CloudBolt Cost and Security Management Platform (CSMP)

Documentation as of November 2026

Table of Contents

1. Welcome to CloudBolt Cost and Security Management 9
2. What's New in CloudBolt CSMP 11
2.1. September 2026 12
2.2. August 2026 13
2.3. July 2026 14
2.4. June 2026 15
2.5. May 2026 17
2.6. April 2026 18
2.7. March 2026 20
2.8. February 2026 22
2.9. January 2026 23
2.10. Archived Release Notes 25
2.10.1. 2025 26
2.10.1.1. December 2025 27
2.10.1.2. November 2025 28
2.10.1.3. October 2025 29
2.10.1.4. September 2025 31
2.10.1.5. August 2025 33
2.10.1.6. July 2025 34
2.10.1.7. June 2025 35
2.10.1.8. May 2025 37
2.10.1.9. April 2025 41
2.10.1.10. March 2025 45
2.10.1.11. February 2025 49
2.10.1.12. January 2025 51
2.10.2. 2024 53
2.10.2.1. December 2024 54
2.10.2.2. November 2024 57
2.10.2.3. October 2024 64
2.10.2.4. September 2024 69
2.10.2.5. August 2024 73

2.10.2.6. July 2024 78
2.10.2.7. June 2024 83
2.10.2.8. May 2024 85
2.10.2.9. April 2024 87
2.10.2.10. March 2024 89
2.10.2.11. February 2024 90
2.10.2.12. January 2024 93
2.10.3. 2023 95
2.10.3.1. December 2023 96
2.10.3.2. November 2023 99
2.10.3.3. October 2023 100
2.10.3.4. September 2023 101
2.10.3.5. August 2023 106
2.10.3.6. July 2023 112
2.10.3.7. June 2023 113
2.10.3.8. May 2023 115
2.10.3.9. April 2023 117
2.10.3.10. March 2023 122
2.10.3.11. February 2023 126
2.10.3.12. January 2023 129
3. Getting Started 132
3.1. User Interface 135
3.1.1. Dashboard 136
3.1.2. Header Bar 139
3.1.3. Quick Actions Menu 140
3.1.4. Settings Function 141
3.2. Roles in CloudBolt Cost and Security Management 143
3.3. Creating Local Users 153
3.4. SSO / SAML Authentication 155
3.4.1. Configure SSO in CloudBolt CSMP 156
3.4.2. Configure SAML for AWS 160
3.4.3. Configure SAML for Google 163
3.4.4. Configure SAML for ADFS 3.0 166
3.4.5. Configure SAML for Microsoft Entra ID 170

3.4.5.1. Create Group and Role in Azure for SSO....177
3.4.6. Configure SAML for Okta....184
3.4.7. Configure SAML for Keycloak....188
3.4.8. User Guide for Updating SAML Metadata....197
3.5. Manage Tenants....200
3.6. Collecting an API Access Key....207
4. Adapter Configurations....208
4.1. AWS General Configuration....210
4.1.1. Setting up AWS Credentials....213
4.1.1.1. Using AWS IAM with CloudBolt CSMP....214
4.1.1.2. Use CloudFormation Scripts to Deploy Stacks....216
4.1.1.2.1. Set up Access using Stacks or Stacksets....217
4.1.1.2.2. Configure Access Credentials for Consolidated Billing Account....227
4.1.1.3. Configure Manually from the AWS Management Portal....229
4.1.1.3.1. Creating AWS Policies....230
4.1.1.3.2. Create a Role in AWS....254
4.1.1.3.3. Create AWS Consolidated Billing - Cost and Usage Reports....256
4.1.1.3.4. AWS Organizations Configuration....260
4.1.1.3.5. Role Configuration for Linked (Child) Accounts....263
4.1.1.3.6. Update AWS S3 Bucket Policy and ACL....265
4.1.1.4. Troubleshoot AWS Billing Access in CloudBolt CSMP....268
4.1.2. AWS Adapter....270
4.1.2.1. AWS Normal Adapter....271
4.1.2.2. AWS Consolidated Billing Adapter....273
4.2. Azure Adapter Configuration....280
4.2.1. Set up and Create Adapters for Single Subscription Account....281
4.2.1.1. Register an Application in Azure....282
4.2.1.2. Create a Custom Role for Azure Subscription....284
4.2.1.3. Assign Roles to your Registered App....293
4.2.1.4. Provide Access for Reservations....295
4.2.1.5. Register Resource Providers to Subscription....297
4.2.1.6. Create Azure Export Configuration....300
4.2.1.7. Create a Consolidated Billing Adapter for Azure Single Subscription Account....305
4.2.1.8. Create a Normal Adapter for Azure Single Subscription Account....312

4.2.2. Set up and Create Adapters for Management Group Account..... 314
4.2.2.1. Register an Application in Azure Management Group Account..... 315
4.2.2.2. Create Management Groups in Azure..... 317
4.2.2.3. Create a Custom Role for Azure Management Group..... 321
4.2.2.4. Assign Roles to your Registered App in Azure Management Group Account..... 325
4.2.2.5. Provide Access for Reservations in Azure Management Group Account..... 327
4.2.2.6. Register Resource Providers to Subscription in Azure Management Group Account 328
4.2.2.7. Create Azure Export for Management Group..... 331
4.2.2.8. Create a Consolidated Billing Adapter for Azure Management Group..... 335
4.2.2.9. Create a Normal Adapter for Azure Management Group..... 342
4.2.3. Set up and Create Adapters for Microsoft Customer Agreement (MCA) Account..... 344
4.2.3.1. Register an Application in Microsoft Customer Agreement (MCA) Account..... 345
4.2.3.2. Permissions Set up for Azure Billing Account..... 347
4.2.3.3. Provide Access for Reservations in Microsoft Customer Agreement (MCA) Account 348
4.2.3.4. Create an Azure Export for Microsoft Customer Agreement (MCA) Account..... 350
4.2.3.5. Create a Consolidated Billing Adapter for Microsoft Customer Agreement (MCA) Account..... 355
4.2.3.6. Create a Normal Adapter for Microsoft Customer Agreement (MCA) Account..... 362
4.2.4. Set up and Create Adapters for Enterprise Agreement (EA) Account..... 364
4.2.4.1. Create a Consolidated Billing Adapter for Azure EA Account (Modern Commerce) 365
4.2.4.1.1. Create a Custom Role in Azure EA Account..... 381
4.2.4.1.2. Use PowerShell to Assign Roles to Registered Apps..... 384
4.2.5. Set up and Create Adapters for Cloud Solution Provider (CSP) Partner Account..... 386
4.2.5.1. Set up a Partner (CSP) Account in Azure..... 387
4.2.5.2. Create an Azure Export for a CSP Partner Account..... 393
4.2.5.3. Create a Consolidated Billing Adapter for Cloud Solution Provider (CSP) Partner Account..... 396
4.2.6. User Access restrictions based on Azure Resource groups shared with Tenant..... 401
4.3. GCP Adapter Configuration..... 419
4.3.1. Organization Hierarchy and Projects in GCP..... 421
4.3.2. Enable Cloud Billing Data Export to BigQuery..... 424
4.3.3. Enable APIs for your GCP project..... 431
4.3.4. Create Custom Roles in GCP with Minimum Permission Sets..... 434
4.3.5. Set up GCP Credentials..... 441

4.3.6. Assign Custom Role and Grant Permissions to Service Account 444
4.3.7. Create the GCP Consolidated Billing Adapter 448
4.3.8. Creating a Normal GCP adapter 451
4.3.8.1. Synchronizing the Normal GCP Adapter 454
4.3.8.2. Creating and Managing Google Cloud Service Accounts 459
4.3.9. Download Google Cloud Billing Data from BigQuery 467
4.4. VMware Adapter Configuration 475
4.4.1. VMware Data Collector (VDC2) Configuration 476
4.4.2. VMware Adapter 493
4.4.3. Updating Existing VMware Data Collector Settings 496
5. Resources 498
5.1. Service Manager 499
5.2. Groups 510
5.2.1. Create and Manage AWS Adapter Groups 512
5.2.2. Create and Manage Azure Adapter Groups 520
5.2.3. Create and Manage Azure CSP Adapter Groups 526
5.2.4. Create and Manage GCP Adapter Groups 532
5.2.5. Create and Manage VMware vCenters Groups 538
5.3. Tags 542
6. Custom Dashboard 545
6.1. Select Widgets 575
7. Cost 579
7.1. Cost Report 580
7.1.1. Cost Report for AWS 581
7.1.2. Cost Report for Azure 618
7.1.3. Cost Report for GCP 645
7.1.4. Cost Report for VMware 665
7.1.5. Create a Rolled-up View to Show Total Cost Report for Multiple Azure Accounts 680
7.1.6. Use Wildcard and Operators for Searching 685
7.2. Cost Analysis 689
7.3. Favourite Cost Reports 704
7.4. Cost Allocation Reports 711
7.4.1. AVS Cost Allocation Reports 712
7.4.2. Red Hat OpenShift Service on AWS and Azure Cost Allocation Reports 725

7.5. Cost Service Adviser 740
7.5.1. Service Adviser for AWS 756
7.5.1.1. AWS Unused Services 758
7.5.1.2. AWS Unoptimized Services 781
7.5.1.3. Use Cases for Unused AWS Services 790
7.5.1.4. Use Cases for Unoptimized AWS Services 796
7.5.2. Service Adviser for Azure 800
7.5.2.1. Azure Unused Services 802
7.5.2.2. Azure Unoptimized Services 822
7.5.2.3. Use cases for Azure Service Adviser 827
7.5.3. Service Adviser for GCP 837
7.5.4. Service Adviser for VMWare 840
7.6. AWS Reserved Instance Report 843
7.7. Azure Reserved Instance Report 860
7.8. Savings Plan Report 874
7.9. Right Sizing in CloudBolt CSMP 879
7.10. Budgets 881
8. Security 900
8.1. Security and Compliance Adviser 901
8.2. Security Visualization 907
8.3. Compliance Reports 909
8.4. User Activity 922
8.5. Synchronization History 923
9. Settings 924
9.1. General System 925
9.1.1. Create a New Backup Policy for AWS 926
9.1.2. Configure Service Adviser Telemetry 929
9.1.3. Currency Conversion 934
9.1.3.1. Set User Preferred Currency 937
9.1.4. VMware Rate Card 941
9.1.5. Billing Configuration 944
9.1.6. Report Profiles 986
9.1.7. Billing Configuration - AWS RI/SP 992
9.1.8. Cost Allocation 1000

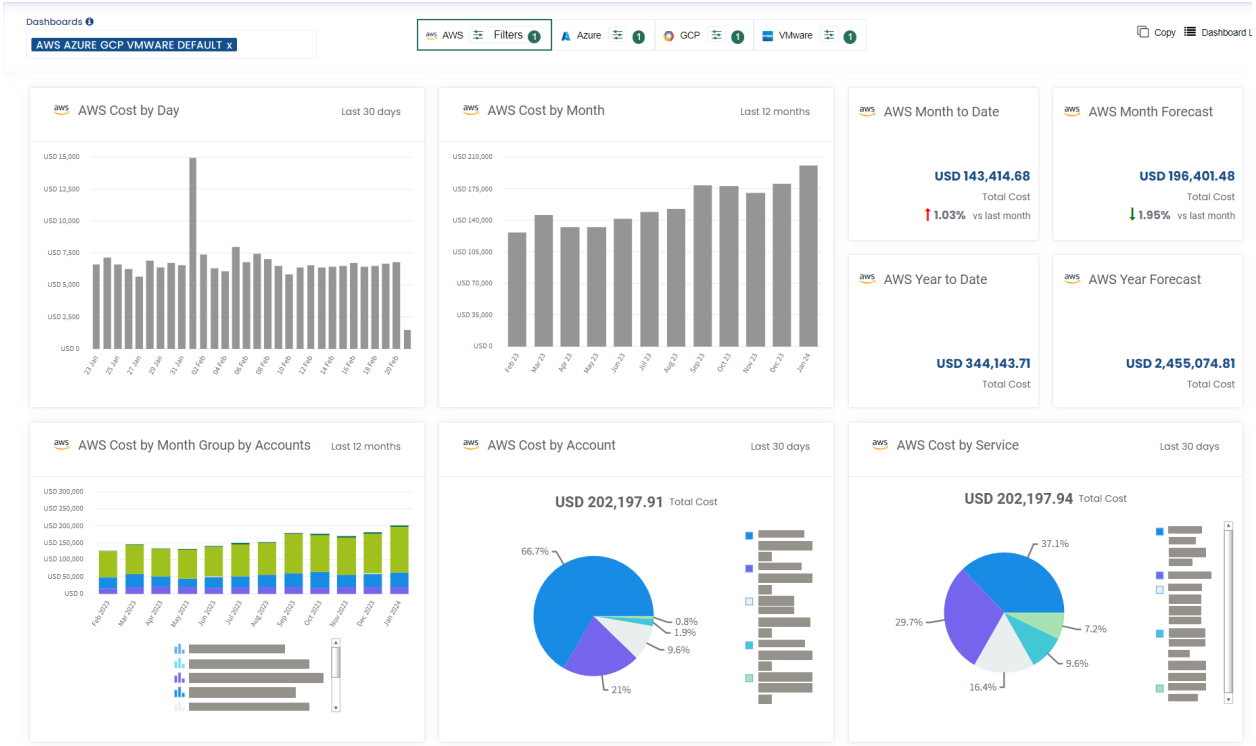
9.1.9. Purchase Order Configuration..... 1014
9.1.9.1. Create and Manage AWS Purchase Order Configuration..... 1016
9.2. Management..... 1032
9.2.1. Default Organization..... 1033
9.2.2. Manage Child Organisation..... 1035
9.2.2.1. Create and Manage Reseller Organisation..... 1038
9.2.2.2. Create and Manage Customer Organisation..... 1048
9.2.2.3. Create and Manage Child Organisation..... 1057
9.2.3. Groups Policy Management..... 1065
9.2.4. Recommendation Policy..... 1069
9.2.5. My Profile..... 1072
9.2.5.1. Set up Multifactor Authentication for CSMP Account..... 1078
10. Standard Operating Environment (SOE)..... 1081
11. Event Scheduler Automation..... 1084
11.1. Schedule a Backup Event..... 1094
11.2. Schedule an EC2 Right Size Event..... 1099
11.3. Schedule a Start and Stop Service Event..... 1104
11.4. Schedule a Start Service Event..... 1109
11.5. Schedule a Stop Service Event..... 1115
11.6. Schedule a Terminate Service Event..... 1121
12. CSMP API..... 1127
12.1. AVS Allocation API..... 1132
13. Create Integrations..... 1136
13.1. Slack Integration..... 1137
13.2. Microsoft Teams Integration..... 1140
13.3. ServiceNow Integration..... 1143
14. Report Data Reprocessing..... 1147
15. OpenShift Utilization Collector..... 1158
16. Data Retention Policy..... 1160

1. Welcome to CloudBolt Cost and Security Management

CloudBolt Cost and Security Management is a Cost and Security Management Platform that provides analytics and actionable insights around cost and security optimization for your cloud services.

Request a Demo

Once product demo is completed, you will receive your CloudBolt CSMP account details.



CloudBolt is an award-winning hybrid Cloud Management Platform that enables you to govern your hybrid cloud while empowering developers with self-service IT. CloudBolt Cost and Security Management, acquired by CloudBolt, is an industry recognized public cloud cost management platform. CloudBolt Cost and Security Management helps you comprehensively monitor your cloud financials, continuously optimize the cloud resources and proactively secure your environment to stay compliant with real-time insights.

Features and Benefits

Cloud Visualization

- Real-time cloud visualization.
- Manage across tenants, accounts, regions, and networks.

Cost Management and Optimization

- Help control cloud services-related spending by monitoring, reporting and automatically optimizing Cloud resources.
- Monitor cloud infrastructure usage, track spending as it relates to resource usage, and use policy-driven workflows to reduce cost without manual intervention.
- Automate and control the processes that manage your Cloud resources and configurations.

Compliance and Security

- Define, continuously monitor, and audit your policies.

Event Scheduling and Workflow Automation

- Workflow automation drives continual Service Optimization to be policy-driven:
    - Right-sizing
    - Instance Class remediation
    - Automated start/stop/terminate
    - Scaling services
    - Backup compliance
    - And more!

2. What's New in CloudBolt CSMP

Monthly product updates.

- September 2026
- August 2026
- July 2026
- June 2026
- May 2026
- April 2026
- March 2026
- February 2026
- January 2026
- Archived Release Notes

2.1. September 2026

Deprecations

- Deprecated the Legacy Instance Sizing (EC2) tab in Service Adviser; AWS instance recommendations are now available through EC2 Right-Sizing. CSMP-31923

Bug Fixes

- Fixed an issue where the Margin/Discount Percentage field broke in the Billing Configuration UI for the On-Demand cost type based on service. CSMP-31934
- Fixed an issue where Swagger/V2 Reporting API responses could show small rounding discrepancies when a report included multiple dimensions and metrics. CSMP-31440
- Fixed regression issues affecting the AWS Export Report, including mismatched cost totals, incorrect account ordering, and inaccurate Savings Plan and Reserved Instance figures. CSMP-31891

2.2. August 2026

Enhancements

- Increased the AWS Adapter sharing limit from 700 to 800. CSMP-31922
- Re-enabled the Tags and Group Tags filters on the AWS Cost Report. CSMP-31331
- Added support for fetching CloudWatch metric data through the Service Manager API. CSMP-31880
- Added Memory Utilization as an available metric for Service Manager and Environments server monitoring. CSMP-31915

Bug Fixes

- Fixed an issue where Payer Accounts failed to load, showing a "Failed to load payer accounts" error. CSMP-31884
- Fixed an issue where the Service Manager CPU/Memory chart displayed blank instead of a "No data available" message. CSMP-31921
- Fixed an issue where the Azure Billing Adapter displayed a generic error message instead of the invalid report configuration error. CSMP-31892
- Fixed an issue where a single CloudWatch metric error caused the entire metric search request to fail instead of skipping that metric. CSMP-31881
- Fixed an issue where the Memory Utilization metric was not visible in Service Adviser's Idle (Running/Stopped) and Right-Sizing views. CSMP-31917

2.3. July 2026

Enhancements

- Added Sub Account IDs to the Fetch Service Groups Swagger API response. CSMP-31790
- Added a list of Payer Account IDs to the AWS Billing Adapter List Swagger API response. CSMP-31835
- Added a radio button to the AWS Cost Report date range filter, allowing users to choose whether results are filtered by Usage Date or Billing Period Date. CSMP-31172
- Added a loading indicator for the CSV download option on Service Advisor (AWS, Azure, GCP, and VMware), matching the behavior of the Cost Report CSV download. CSMP-31829
- Added automatic AWS account group sync for adapters configured with multiple payer accounts, so newly added accounts are included in their corresponding group without manual intervention. CSMP-31724

Bug Fixes

- Fixed an issue where the Azure Cost Report showed $0 values when the Credit metric filter was applied. CSMP-31268
- Fixed an issue where the Dashboard copy count displayed incorrectly for child organizations and invited users. CSMP-16580
- Fixed an issue where the Credit option was disabled on the first metric tab of Azure CSP Cost Analysis when Net Cost was selected. CSMP-31836
- Fixed an issue where Azure adapter export-config errors displayed a generic "Failed to fetch Data from Azure" message instead of the actual Azure error. CSMP-31805

2.4. June 2026

Enhancements

- Added Marketplace - Fee and Marketplace - Usage as distinct AWS charge types to replace the generic Marketplace value, enabling more granular cost analysis. CSMP-31653
- Added support for multiple tag keys (up to 10) on Adapters, Groups, Billing Configuration, and Cost Report for Azure CSP, available for the Distributor default tenant and sub-tenants. CSMP-31282
- Added a Default Organisation View Provider setting in Settings › Management › Default Organisation, allowing admins to configure which cloud provider (AWS, Azure, GCP, or VMware) is shown by default across Cost Report, Cost Analysis, Dashboard, and other modules. Defaults to AWS. CSMP-31610

Bug Fixes

- Fixed an issue where the service dropdown in the AWS Cost Report was disabled when no services were available. CSMP-31727
- Fixed an issue where costs with the Savings Plan Upfront Fee charge type were not appearing in the CloudBolt portal. CSMP-31674
- Fixed an issue where the `get_aws_tag_keys` and `get_azure_tag_keys` API endpoints returned duplicate tag keys. CSMP-31560
- Fixed an issue where the charge type was displayed as Usage instead of Support for the AWS Unified Operations Support service. CSMP-31725
- Fixed an issue where the AWS billing adapter Swagger API sample payloads did not include a key-value example for `service_tag_keys`. CSMP-31556
- Fixed an issue where the `list_service_type_with_count` API endpoint returned HTTP 504 (Gateway Timeout) for `service_type=amis`. CSMP-31586
- Fixed an issue where the Service Advisor returned recommendations across instance classes when Right Size Across Instance Class was disabled. CSMP-31596

- Fixed an issue where Monthly Estimated Savings showed as N/A or 0 for Azure VM Rightsizing recommendations on CSP subscriptions in Cost Service Advisor. CSMP-31537

2.5. May 2026

Enhancements

- AWS Service Manager tabs now include an Export to Excel/CSV option. CSMP-31522
- AWS Cost Report includes the FlatRateSubscription charge type. CSMP-31539

Bug Fixes

- Fixed an issue where the customer ID was not displayed on the Billing Configuration page. CSMP-31555
- Fixed an issue where CSV/PDF download links in scheduled Favorite Report emails were non-functional when the attachment option was disabled. CSMP-31558

2.6. April 2026

Enhancements

- Cost Reports now support new GCP credit types. CSMP-31485
- Favourite Report emails can now include the report PDF and CSV as attachments. CSMP-15567
    - Opt in via the check box when scheduling Favourite Report emails.
    - Scheduled emails continue to include links to the reports in CSMP.
- AWS export reports can now include additional tabs displaying monthly and annual costs by charge type. CSMP-31337
- Azure CSP Cost Report now supports filtering by Group Tags without also having to specify them as a dimension. CSMP-31484
- Billing Adapter now includes a Billing Adapter Name (Account ID/Project ID/Subscription ID) column for normal adapters. CSMP-31495

Bug Fixes

- Fixed an issue affecting downloading CSV reports from the Firefox web browser. CSMP-31471
- Fixed an issue causing the truncation of Azure Advisor recommendation tag values. CSMP-31529
- Fixed an issue causing margins and discounts to reset after disabling recurring billing. CSMP-31468
- Fixed an issue causing an error in the AWS Cost Report when applying the group-tag filter. CSMP-31459
- Fixed an issue causing accounts to not display in AWS child organizations when new adapters were added. CSMP-31457
- Fixed an issue causing the Group Net Cost Amortized dimension to function incorrectly in the AWS Cost Report. CSMP-31441

- Fixed an issue causing an error in the AWS and Azure Cost Reports when tag dimension group-tag keys contained a space character. CSMP-31458
- Fixed an issue causing AWS and Azure Cost Report queries to fail with group-tag and multiple custom-data filters applied simultaneously. CSMP-31461

2.7. March 2026

New Features

- **The Azure Service Adviser API now supports optimization recommendations via new endpoints.** CSMP-31399
    - List Azure right-sized VM recommendations
    - List Azure right-sized SQL DB recommendations
    - List Azure Hybrid Benefit VM recommendations
    - List Azure Hybrid Benefit SQL DB recommendations

Enhancements

- AWS Cost Report Swagger API response now includes the account name alongside the account ID. CSMP-31416

Bug Fixes

- Fixed an issue where Dashboards could be shared with users from other tenants. CSMP-31397
- Fixed an issue where tenant-level Azure Cost Report tag filtering was not enforced. CSMP-31437
- Fixed an issue where AWS Cost Report CostCenter tags failed to display for some accounts. CSMP-31392
- Fixed an issue causing some unbilled data in the Azure CSP Cost Report to display currency as "N/A." CSMP-31417
- Fixed an issue where the Cost Report dimension selection list is hidden upon selecting the search area. CSMP-31434
- Fixed an issue where accounts could be excluded from the Account Group after selecting all for inclusion. CSMP-31435
- Fixed an issue where provider tags were not filtered appropriately per adapter or provider account filtering. CSMP-31430

- Fixed an issue where Unit Price failed to display for Cost Reports with Customer Name Group Tag applied. CSMP-31420
- Fixed an issue where the Charge Type filter failed to work with the Group filter applied for AWS Cost Reports. CSMP-31421
- Fixed an issue causing an incorrect limit on the number of AWS adapters shareable from the parent to the child organization. CSMP-31433
- Fixed an issue where the AWS Support fee was displayed as an Out-of-Cycle Charge in AWS Cost Reports for some customers. CSMP-31367

2.8. February 2026

Enhancements

- **Favorite Reports** now display a "Created By" column, and favorited reports are visible only to users they've been explicitly shared with and within the appropriate tenant. CSMP-31360
- **GCP Cost Reports** now support a new "Charge Type" dimension and multiple "Credit Type" metrics, including "discount_amount," "sustained_usage_discount_amount," and "free_tier_amount." CSMP-31370
- **Azure CSP Cost Analysis, Cost Reports, and Report Profiles** now include a new "Unit Price" metric. CSMP-31372
- **Tenants** can now support selecting up to 500 AWS Adapters (up from 300). CSMP-31398

Bug Fixes

- Resolved an issue where notifications were not properly scoped by tenant, causing users to see notifications from tenants they do not have access to. CSMP-31361
- Fixed an issue where downloading a Cost Report CSV intermittently produced multiple duplicate copies of the same report. CSMP-31366
- Resolved an issue preventing tag values from loading, and implemented API pagination to improve tag list performance and reliability. CSMP-31371
- Fixed an issue in certain modal selector dropdowns where selecting one item triggered "Select All," and clearing the search input closed the dropdown. CSMP-31378
- Resolved an issue preventing Cost Reports and Dashboard filters from loading for subtenants. CSMP-31386

2.9. January 2026

New Features

- **AWS Billing Configuration now supports Percentage of Spend based on Charge Type.** CSMP-31286
- **GCP Cost Report supports new Dimensions Cost Type, Credit Type, and Resource Name.** CSMP-31322

Enhancements

- **AWS Performance**
  - Improvements to queries against AWS account groups. CSMP-31326
  - Improvements to filter API requests. CSMP-31352
- **AWS Billing Adapter** now supports allocating up to 30 Tag Keys (up from 7). CSMP-31297
- **AWS Cost Report** now supports grouping by Charge Types. CSMP-31330
- A preset list of charge types is now used to populate **AWS Charge Types filters**. CSMP-31356
- Non-admin users can now modify their region and time zone. CSMP-31354

Bug Fixes

- **AWS Billing Adapter**
  - Fixed an issue causing Report Configuration updates to fail. CSMP-31329
- **Billing Configuration**
  - Resolved an issue causing the "Apply to future Months" option to disappear from the Percentage of Spend tab. CSMP-31349
- **Export Reports**
  - Fixed an issue causing the Export Reports process to fail. CSMP-31351
- **Groups**

  - Fixed an issue where a search was performed after each character was entered in the search bar, interrupting search term entry. CSMP-31327
  - Resolved an issue where group names exceeding the default column width were truncated, making it difficult to identify groups. CSMP-31332

- **Reports**
  - Resolved an issue causing conflicts and errors when generating custom reports. CSMP-31342
  - Fixed an issue causing report download to fail with "Show Total for Dimensions" checked and the "Group Allocation Cost" metric selected. CSMP-31348

2.10. Archived Release Notes

Archived CSMP release notes.

- 2025
- 2024
- 2023

2.10.1. 2025

Archived CSMP release notes.

- December 2025
- November 2025
- October 2025
- September 2025
- August 2025
- July 2025
- June 2025
- May 2025
- April 2025
- March 2025
- February 2025
- January 2025

2.10.1.1. December 2025

New Features

- **The Azure CSP Cost Report now includes new Dimensions: Billing Currency, Pricing Currency, and Exchange Rate.** CSMP-31315

Enhancements

- AWS Cost Reports and Report Profiles have an improved Charge Types filter. CSMP-31186
- AWS Billing Configuration for Fixed Discount and Margin now supports applying the Dimension Description to the respective Charge Type. CSMP-31294
- AWS Groups calculation for Group Allocation Cost now uses Net Cost rather than Unblended Cost. CSMP-31325
- The Discount and Margin fields in Azure Billing Configuration have been moved from the Basic Details tab to the Percentage of Spend tab. CSMP-31303
- GCP Groups can now support up to 30 Sub Accounts (up from 5) and 199 Projects (up from 99). CSMP-31316
- Improved the GCP Adapter creation process. CSMP-31321

Bug Fixes

- Resolved an issue causing tag values to fail to populate for Tags Filter and Dimension in the Azure CSP Cost Report. CSMP-31309

2.10.1.2. November 2025

New Features

- **Azure CSP Billing Configuration now supports multiple Percentages of Spend tiers.** CSMP-31096
    - This can be configured for one, many, or all services, and applied across multiple ranges of spend.
- **Azure CSP Billing Adapter now supports Base Cost Metrics Billing Pre Tax Total and Pricing Pre Tax Total.** CSMP-31308

Enhancements

- Restructured AWS Cost Report, Cost Analysis, and Billing Configuration charge types to align with AWS Console. CSMP-31250
- AWS Cost Report now supports grouping by multiple custom tags. CSMP-31277
- Azure CSP Cost Report now supports credit tracking. CSMP-31269
- AWS Normal Adapters can now be shared with all organization children. CSMP-31276
- AWS Linked and Normal Adapters now inherit the linked STS region from their billing adapter. CSMP-31281
- Groups now supports retrieving the past two years of AWS tag values. CSMP-31275

Bug Fixes

- Increased Azure Adapter "Name" field character limit from 64 to 128. CSMP-31272
- Resolved a loading issue when filtering by tag value in the Groups page. CSMP-31274
- Fixed an issue with group filter, group tag filter, and group dimension in Cost Report. CSMP-31279
- Resolved an issue causing the Adapter page to fail to load for new tenants. CSMP-31302
- Fixed an issue causing tags filter and dimension values to fail to load in Cost Report. CSMP-31309

2.10.1.3. October 2025

New Features

- **The User Roles API now supports CRUD operations.** CSMP-31138
    - In addition to **GET /user_roles**, the User Roles API now supports:
        - **POST /user_roles**
        - **PUT /user_roles/{id}**
        - **DELETE /user_roles/{id}**
        - **GET /user_roles/{id}**
        - **GET /user_roles{id}/get_access_rights**

Enhancements

- Now supporting Azure CSP Gov adapters. CSMP-31243
- Billing Adapters now support multiple payer account CURs in a single billing adapter. CSMP-31224
- Customer Cost metric is now available in Azure Single Subscription Cost Reports. CSMP-31197
- Publisher Name dimension is now available in Azure Cloud Service Provider (CSP) Cost Reports. CSMP-31229
- AWS Cost Reports now display applicable SPP Discount. CSMP-31249

Bug Fixes

- Improved protection against injection vulnerabilities during sign-up. CSMP-31125
- Resolved an issue causing incorrect values to display in GCP Cost Reports. CSMP-31239
- Resolved an issue preventing the creation of multiple GCP Billing Configurations for different adapter groups. CSMP-31240
- Resolved an issue preventing exclusion of AWS Support Fees from AWS Cost Report. CSMP-31245

- Resolved an issue causing Azure CSP and GCP Billing Configuration group filters to apply incorrectly. CSMP-31252

2.10.1.4. September 2025

Enhancements

- **Cost Report:** The billing center name is available on Cost Report charts. CSMP-31182
- **Cost Report for Azure:**
    - New dimensions and metrics are available for Azure Cloud Service Provider and Single Subscription adapters. CSMP-31157
        - **Dimensions:** Charge Type, Customer Name, Customer Tenant ID, Meter Name, Meter Region, Partner ID, Partner Name, Pricing Model, Publisher Name, Publisher Type, Reseller MPN, Reseller Name, Resource ID, Service Family, SP ID, SP Name.
        - **Metrics:** Partner Earned Credit, PAYG Cost.
    - A **Customer Cost** metric is available for the Azure Single Subscription adapter. CSMP-31197
- **Cost Analysis Report:** Thousands separator introduced and alignment improved for number formatting. CSMP-31212
- **Tenant Management:** Page optimized for improved user experience. CSMP-31185
- **Groups:** Create/edit group includes account ID and enables searching by account ID and name. CSMP-31211
- **Synchronization:** 'Kumolus' reference updated to 'CloudBolt.' CSMP-31177

Bug Fixes

- Resolved an issue that caused scheduled report email links to attempt to visit the Kumolus rather than the CloudBolt domain. CSMP-31178
- Resolved an issue that caused the Fixed Discount in AWS Billing Configuration to fail to display for some users. CSMP-31194
- Resolved an issue that caused an error when generating VMware Cost Reports. CSMP-31188

- Resolved an issue that caused an error when performing Azure right-sizing. CSMP-31201
- Resolved an issue that caused an error when downloading report data. CSMP-31209
- Resolved an issue that caused an error when sending a daily finance report. CSMP-31210

2.10.1.5. August 2025

Enhancements

- Azure Cloud Service Provider **Billing Configuration now supports MPN** in addition to Subscriptions and Customer ID. CSMP-31107
- New metric available in **Cost Report for AWS: Customer Cost - Excluding Tax**. CSMP-31132
- New metric available in **Cost Report for GCP: Customer Cost - Excluding GCP Partner-led Premium Support Variable Fee**. CSMP-31097

Bug Fixes

- Resolved an issue causing a Billing Configuration error message for customers without a service provider adapter configured. CSMP-31155
- Resolved an issue impacting CloudBolt's ability to retrieve Azure CSP billing data. See Assign the PartnerBilling.Read.All Permission. IN-668

2.10.1.6. July 2025

New Features

- **AWS Billing Configuration now supports multiple percentage of spend tiers.** CSMP-31094
    - Configurable for one, many, or all services, and across multiple ranges of spend.

Enhancements

- VMware Rate Card now supports filtering by tag key and value. CSMP-31066
- Azure Reserved Instance Report (Recommendation) can now be sorted by potential benefit (one year and monthly). CSMP-31087

Bug Fixes

- Resolved a time zone validation issue causing Export Reports to fail for some customers. CSMP-31127

2.10.1.7. June 2025

Attention CloudBolt CSMP users!

The current sign-in URL for your CloudBolt CSMP account using "kumolus.net" will be retired on May 08, 2025. To enhance your experience, we are transitioning to a new format to reflect a new domain structure for a more cohesive and branded experience. The updated sign-in URL will use "cloudbolt" as the second-level domain and ".app" as the top-level domain.

You can begin using the new sign-in URL immediately.

For example: If your current sign-in URL is 'example.kumolus.net', the URL now should be updated to 'example.cloudbolt.app'

Steps to Implement this Change Based on Your Sign-in Method

To ensure uninterrupted access to your CloudBolt instance, please follow the outlined steps based on your sign-in method.

1. **If you log in using a username and password:**
    - Going forward, you will need to access your CloudBolt CSMP account through the updated URL with the new domain structure, i.e., **example.cloudbolt.app**.
    - Please make sure to update any bookmarks, saved links, or shortcuts that reference the old URL to the new one.
2. **If you log in via Single Sign-On (SSO):**
    - You will need to update your Identity Provider (IdP) app with the new Service Provider (SP) metadata details.
    - The updated SP metadata can be found by logging into your CloudBolt CSMP account using the old sign-in URL (e.g., example.kumolus.net). It is essential to update your IdP configuration with this new SP metadata to ensure uninterrupted SSO authentication via the new sign-in URL (e.g., example.cloudbolt.app).

- For further guidance on how to update your SP metadata in your IdP, please refer to the User Guide for Updating SAML Metadata available in the documentation.

Additional Actions Required Based on Cloud Providers Adapters in Use

- **No action required** for users with AWS, Azure, or GCP adapters.
- **VMware adapter users**: Please update your VDC settings as outlined in the user guide for Updating Existing VMware Data Collector Settings.

Note: This domain name change applies to all CloudBolt CSMP users. If you encounter any difficulties or need further support, please contact our support team.

Bug Fixes

- Fixed an issue that prevented the tenant search from working correctly when adding inviting a new user. IN-694
- Resolved an issue that prevented billing configurations from functioning correctly. IN-695
- Fixed an issue where OpenShift and AVS cost distribution data was not being generated or displayed as expected. IN-703

2.10.1.8. May 2025

Attention CloudBolt CSMP users!

The current sign-in URL for your CloudBolt CSMP account using "kumolus.net" will be retired on May 08, 2025. To enhance your experience, we are transitioning to a new format to reflect a new domain structure for a more cohesive and branded experience. The updated sign-in URL will use "cloudbolt" as the second-level domain and ".app" as the top-level domain.

You can begin using the new sign-in URL immediately.

For example: If your current sign-in URL is 'example.kumolus.net', the URL now should be updated to 'example.cloudbolt.app'

Steps to Implement this Change Based on Your Sign-in Method

To ensure uninterrupted access to your CloudBolt instance, please follow the outlined steps based on your sign-in method.

1. **If you log in using a username and password:**
    - Going forward, you will need to access your CloudBolt CSMP account through the updated URL with the new domain structure, i.e., **example.cloudbolt.app**.
    - Please make sure to update any bookmarks, saved links, or shortcuts that reference the old URL to the new one.
2. **If you log in via Single Sign-On (SSO):**
    - You will need to update your Identity Provider (IdP) app with the new Service Provider (SP) metadata details.
    - The updated SP metadata can be found by logging into your CloudBolt CSMP account using the old sign-in URL (e.g., example.kumolus.net). It is essential to update your IdP configuration with this new SP metadata to ensure uninterrupted SSO authentication via the new sign-in URL (e.g., example.cloudbolt.app).

- For further guidance on how to update your SP metadata in your IdP, please refer to the User Guide for Updating SAML Metadata available in the documentation.

Additional Actions Required Based on Cloud Providers Adapters in Use

- **No action required** for users with AWS, Azure, or GCP adapters.
- **VMware adapter users**: Please update your VDC settings as outlined in the user guide for Updating Existing VMware Data Collector Settings.

Note: This domain name change applies to all CloudBolt CSMP users. If you encounter any difficulties or need further support, please contact our support team.

New Features

Metric Selection for PO Balance Calculations (AWS Billing Adapter & PO Configurations)

CSMP-30993

A new flexibility in how daily Purchase Order (PO) balances are calculated for AWS billing, with new configuration options across **AWS Billing Adapter**, **PO Configurations**, and **AWS Cost Allocation Rules** has been introduced.

AWS Billing Adapter: Choose Your Metric for PO Calculations

A new configuration option, **Select Metric for PO Calculations**, has been added under the **Other Configuration** tab when creating an AWS billing adapter. This feature allows you to select a metric—either **Net Cost** (default) or **Net Allocated Cost**—to be used for calculating the daily PO balance in future PO configurations.

- This option is available only if the '**awspo_net_allocated_cost_as_source**' feature is enabled for your CSMP account.
- The selected metric is **configurable only during billing adapter creation** and becomes read-only afterward.

- For existing adapters created before this feature was enabled, the system continues to use **Net Cost** by default.

Purchase Order Configurations: View and Use the Selected Metric

A new read-only field, **Metric for PO Calculations**, has been added to the PO configuration page. This field displays the metric used for daily PO balance deductions, based on the selected billing adapter.

How It Works:

- By default, the PO balance is calculated using **Net Cost**.
- To use **Net Allocated Cost**, you must:
    1. Enable the '**awspo_net_allocated_cost_as_source**' feature for your CSMP account.
    2. Create a new billing adapter selecting **Net Allocated Cost** as the metric.
    3. Use that billing adapter in your PO configuration—the chosen metric will auto-populate this field.
- If **Net Allocated Cost** is used, at least one active cost allocation rule must be configured for the billing adapter throughout the entire PO period.

Additionally, when **Net Allocated Cost** is selected, a **Cost Allocation Rule** drop-down becomes visible. It lists all active cost allocation rules valid for the PO's selected date range.

Cost Allocation Rule: New Deletion Restriction

An important restriction has been introduced: AWS cost allocation rules that have been used in any PO configuration can no longer be deleted.

Enhancements

- A new **"Item Description Filter based on"** option has been introduced under the **Item Description** tab of the **Percentage of Spend** section on the AWS billing configuration page. This enhancement allows you to group and configure item description-level **margins** and **discounts** based on either **Service** (default) or **Charge Type**. CSMP-31027

- AWS Service Adviser and Service Manager now support filtering and data visibility for the **Asia Pacific (Malaysia)** region. CSMP-31036
- Enhanced dashboard widgets to dynamically reflect Azure VMware Solution (AVS) context when the 'cost_allocation_reports' feature is enabled, including updated widget labels and AVS-specific data sourcing for accurate cost representation on dashboard widgets. CSMP-31032

Bug Fixes

- Resolved an issue where the Azure **Reserved Instance Report (Existing)** page did not fully update the list of existing Azure Reserved Instances. CSMP-31033
- Resolved an issue where AWS cost report data reprocessing failed after updating the AWS billing adapter to add multiple CUR. CSMP-31045
- Fixed an issue where the **Service Adviser** module failed to load for some users. IN-676
- Removed redundant *Margins* and *Discounts* filter checkboxes from the **Additional Facets** section in the Azure Cost Report filter. IN-664

2.10.1.9. April 2025

Attention CloudBolt CSMP users!

The current sign-in URL for your CloudBolt CSMP account using "kumolus.net" will be retired on May 08, 2025. To enhance your experience, we are transitioning to a new format to reflect a new domain structure for a more cohesive and branded experience. The updated sign-in URL will use "cloudbolt" as the second-level domain and ".app" as the top-level domain.

You can begin using the new sign-in URL immediately.

For example: If your current sign-in URL is 'example.kumolus.net', the URL now should be updated to 'example.cloudbolt.app'

Steps to Implement this Change Based on Your Sign-in Method

To ensure uninterrupted access to your CloudBolt instance, please follow the outlined steps based on your sign-in method.

1. **If you log in using a username and password:**
    - Going forward, you will need to access your CloudBolt CSMP account through the updated URL with the new domain structure, i.e., **example.cloudbolt.app**.
    - Please make sure to update any bookmarks, saved links, or shortcuts that reference the old URL to the new one.
2. **If you log in via Single Sign-On (SSO):**
    - You will need to update your Identity Provider (IdP) app with the new Service Provider (SP) metadata details.
    - The updated SP metadata can be found by logging into your CloudBolt CSMP account using the old sign-in URL (e.g., example.kumolus.net). It is essential to update your IdP configuration with this new SP metadata to ensure uninterrupted SSO authentication via the new sign-in URL (e.g., example.cloudbolt.app).

- For further guidance on how to update your SP metadata in your IdP, please refer to the User Guide for Updating SAML Metadata available in the documentation.

Additional Actions Required Based on Cloud Providers Adapters in Use

- **No action required** for users with AWS, Azure, or GCP adapters.
- **VMware adapter users**: Please update your VDC settings as outlined in the user guide for Updating Existing VMware Data Collector Settings.

Note: This domain name change applies to all CloudBolt CSMP users. If you encounter any difficulties or need further support, please contact our support team.

Enhancements

- The GCP Service Manager now includes a **Details** column displaying the creation timestamp for each VM to improve visibility into their provisioning dates. CSMP-30937
- The **CloudWatch Monitoring** action option within the VMware Service Manager page has been replaced with **Monitor Metrics** for improved clarity. CSMP-15155
- The AWS cost allocation rule now includes a special handling scenario where costs are allocated only to the selected services in the Source tab, even when multiple accounts are selected in the Target tab with proportional allocation. CSMP-30847
- The Cost Allocation Report algorithm for ROSA resources has been updated to use the charge_type column containing the substring 'usage'. CSMP-30962
- The AVS Cost Allocation report now supports customisation using vCenter as a group node setting in the Sankey chart, enabling improved visualisation of cost distribution. Additionally, the report's CSV export includes a new column labelled "vCenter Name" to display the associated vCenter for each VM. CSMP-30942
- The new **Resource Count** metric has been added to AWS Cost Report page, providing you with insights into the number of billable resources. CSMP-30940
- The Red Hat OpenShift Service on AWS (ROSA) Cost Allocation Report can now be configured at the billing entity level for more granular cost tracking. Additionally, the

CSV export of the OpenShift Cost Allocation Report includes a new **billing_entity** column that identifies the invoicing party for each cost item. CSMP-31004

- The PO Configuration list table has been enhanced to deliver a more streamlined and informative user experience. The columns **Billing Entity**, **Seller of Record**, **Accounts**, **Adapter Group**, and **Last Modified** have been removed to eliminate redundancy. In addition, **Purchase Order Amount** has been renamed to **PO Amount** with a standardised currency format ($###,###,###.##), **Start Date** and **End Date** have been merged into a single **Period** column (MM/DD/YYYY - MM/DD/YYYY), and two new columns—**PO Balance** and **Percent Spent**—have been introduced to provide clearer insight into PO utilisation. CSMP-31002
- Enhanced the AWS Cost Report and Cost Analysis pages with support for EKS-specific dimensions and Kubernetes Allocation metrics. All of the following metrics—Reserved Usage, Unused Cost, Split Usage Ratio, Split Usage, Split Cost, Public On Demand Unused Cost, Public On Demand Split Cost, Net Unused Cost, Net Split Cost, and Actual Usage—are now nested under the Kubernetes Allocation metric for more comprehensive cost reporting and analysis. CSMP-30965
- Introduced a new **Partner Cost** metric in the AWS Cost Report to provide clear visibility into charges for third-party services, including AWS Marketplace products. This metric helps you distinguish partner-related expenses by factoring in distributor discounts. CSMP-31015
- The AWS Billing Adapter now supports selecting the '**Partner Cost**' metric as an option for the **Select Metric for Margin and Discount calculations**. CSMP-31024

Bug Fixes

- Resolved an issue where VMware cost data was being inadvertently deleted, which prevented it from appearing in the cost reports. IN-594
- Resolved an issue where Reserved Instance (RI) utilization data and existing historical usage data were not displaying correctly following the adapter migration from Enterprise Agreement (EA) to Microsoft Customer Agreement (MCA). IN-612

- Fixed an issue where the Security Visualization module was intermittently returning a 500 Internal Server Error. This was caused by unhandled exceptions during data processing. The error handling mechanism has been improved, and the underlying logic has been optimised to ensure consistent and reliable performance. CSMP-30996
- Resolved an issue that was preventing the '**Charge Type – Margin**' column in the Billing Configuration tabular view from displaying data. IN-606
- Fixed an issue where AWS **Cost Allocation Rules** were not considering the **Report Profile's metrics** when calculating the **Net Cost** to be allocated. CSMP-31010
- Resolved an issue that prevented retrieving the list of favourite reports for child organizations via the Favourite Reports APIs. IN-623

2.10.1.10. March 2025

Attention CloudBolt CSMP users!

The current sign-in URL for your CloudBolt CSMP account using "kumolus.net" will be retired on May 08, 2025. To enhance your experience, we are transitioning to a new format to reflect a new domain structure for a more cohesive and branded experience. The updated sign-in URL will use "cloudbolt" as the second-level domain and ".app" as the top-level domain.

You can begin using the new sign-in URL immediately.

For example: If your current sign-in URL is 'example.kumolus.net', the URL now should be updated to 'example.cloudbolt.app'

Steps to Implement this Change Based on Your Sign-in Method

To ensure uninterrupted access to your CloudBolt instance, please follow the outlined steps based on your sign-in method.

1. **If you log in using a username and password:**
    - Going forward, you will need to access your CloudBolt CSMP account through the updated URL with the new domain structure, i.e., **example.cloudbolt.app**.
    - Please make sure to update any bookmarks, saved links, or shortcuts that reference the old URL to the new one.
2. **If you log in via Single Sign-On (SSO):**
    - You will need to update your Identity Provider (IdP) app with the new Service Provider (SP) metadata details.
    - The updated SP metadata can be found by logging into your CloudBolt CSMP account using the old sign-in URL (e.g., example.kumolus.net). It is essential to update your IdP configuration with this new SP metadata to ensure uninterrupted SSO authentication via the new sign-in URL (e.g., example.cloudbolt.app).

- For further guidance on how to update your SP metadata in your IdP, please refer to the User Guide for Updating SAML Metadata available in the documentation.

Additional Actions Required Based on Cloud Providers Adapters in Use

- **No action required** for users with AWS, Azure, or GCP adapters.
- **VMware adapter users**: Please update your VDC settings as outlined in the user guide for Updating Existing VMware Data Collector Settings.

Note: This domain name change applies to all CloudBolt CSMP users. If you encounter any difficulties or need further support, please contact our support team.

Enhancements

- We have added "Include" and "Exclude" options to the lists of source and target subscriptions, service types, and locations on the Azure cost allocation creation page. You can now create cost allocation rules for Azure by selecting more than 99 items as sources or targets by utilising the exclude option for more precise control. CSMP-30855
- The "*Select All*" functionality has been introduced to allow you to quickly select all items across different fields when creating a cost allocation rule. CSMP-30796
- The Usage Quantity Multiplier for item descriptions within AWS billing configuration can be now configured using three distinct levels: Service, Usage Type, and Item Description. To use this enhancement, your CloudBolt CSMP account must be enabled for 'awsbc_Usage_Quantity_Multiplier_based_on_usage_type_item_description' feature. CSMP-30885
- The AWS Purchase Order (PO) Configuration page has been enhanced to support PO configurations based on **Billing Entity** or **Seller of Record (Legal Entity Name)** , providing greater flexibility by enabling dynamic filtering of associated accounts, adapter groups, and services. CSMP-30914

- The Cost Allocation Report now includes support for Microsoft Azure Red Hat OpenShift (ARO) service costs, alongside existing support for Red Hat OpenShift Service on AWS (ROSA). CSMP-30876
- The OpenShift Cost Allocation Report CSV export now includes a Date column, and the existing unblended_cost column has been renamed to net_unblended_cost. Additionally, the Total Cost tile within the allocation funnel on the Cost Allocation Report page for OpenShift now displays Azure and AWS costs in their respective billing currencies. CSMP-30928
- The Cost Allocation Report algorithm for OpenShift resources has been updated to use the normalised percentage, replacing utilisation, for more accurate cost allocation calculations. CSMP-30819
- You can now add up to 50 exports can be added for an Azure billing account, management group, or subscription scope billing adapters, an increase from the previous limit of 12. CSMP-30933
- The GCP Billing Adapter has been enhanced to provide more granular reporting options for GCP cost data. The new options allow the cost report to be based on either the **Usage Start Date** or the **Invoice Month**. CSMP-30728
- Two new metrics, **List Cost** and **Negotiated Savings**, have been added to the GCP cost report, providing enhanced visibility into cost breakdowns. CSMP-30728

Bug Fixes

- Resolved an issue where Azure cost report data reprocessing failed after updating the Azure billing configuration. IN-579
- Resolved an issue where the Slack integration was not functioning correctly. IN-565
- Resolved an issue that was preventing users the creation of a normal adapter with a common name across two different cloud providers. Previously, errors occurred when attempting to use the same normal adapter name for different providers. IN-578
- Resolved an issue that was causing favourite reports to disappear from child organisation accounts. IN-544

- Resolved an issue that was causing the Profile, Dashboard, Service Adviser, and Service Manager pages to become unresponsive. CSMP-30957

2.10.1.11. February 2025

- The Billing Entity field has been introduced on the Purchase Order (PO) creation page, enabling users to create POs based for the selected billing entity. CSMP-30790
- The purchase order list can now be filtered based on Billing Entity, Accounts, and Services, allowing for efficient narrowing of the PO search. CSMP-30790
- A new "Select All" option has been added, enabling the efficient selection of all available options within filter categories, including billing entities, accounts, and services, on the PO configuration and list page. CSMP-30791
- The **Purchase Order Name (Description)** dimension has been added to the AWS cost report customisation page to display both the name and description of the purchase orders. CSMP-30789
- The source metric for the AWS cost allocation rule has been updated from "Unblended" to "Net Cost," providing a more accurate reflection of incurred and distributed costs. Similarly, the source metric for the Azure cost allocation rule has been updated from "Cost" to "Net Cost," ensuring consistency and enhancing cost tracking. CSMP-30795
- The *Node Name* field has been removed from the Flow Configuration's Group Settings in the Red Hat OpenShift Service on AWS (ROSA) Cost Allocation Report. CSMP-30726
- The Red Hat OpenShift Service on AWS (ROSA) Cost Allocation Report can be now configured at OpenShift cluster level. CSMP-30721
- You can now exclude irrelevant data points for the selected segmentation points by using the 'Exclude Values from Groups' option within the Flow Configuration settings on the Red Hat OpenShift Service on AWS (ROSA) Cost Allocation Report page. CSMP-30724
- Unnecessary columns have been removed from the Red Hat OpenShift Service on AWS (ROSA) Cost Allocation Report CSV export, and the remaining columns have been reordered for improved readability and usability. CSMP-30794

- The Red Hat OpenShift Service on AWS (ROSA) Cost Allocation Report can be now configured at account tag assigned to an environment key. CSMP-30845
- The Red Hat OpenShift Service on AWS (ROSA) Cost Allocation Report can be now configured at AWS account ID that incurred the usage cost for the reported resource. CSMP-30872
- The Purchase Order (PO) configuration page filter types for billing entity, account, and service have been enhanced to include 'Include' and 'Exclude' options, providing greater flexibility in filtering and applying PO configurations and allowing the explicit definition of which billing entities, accounts, and services should be included or excluded from the PO. CSMP-30792
- Updated the 'SSO Role Keywords' label to 'SSO Tenant Keywords' on the Tenant Management page for improved clarity and better alignment with tenant-related settings. CSMP-30883

Bug Fixes

- Fixed an issue where the "Azure Cost by Month Group By" dashboard widget was not displaying the correct data. CSMP-30745
- Resolved an issue that prevented the complete list of AWS Graviton processors from populating in the "Instance Classes to Exclude from Recommendation" dropdown list within the "Service Adviser Configuration" page for AWS unoptimized EC2. CSMP-28973

2.10.1.12. January 2025

- Introducing the Cost Allocation Report for Red Hat OpenShift Service on AWS (ROSA)

Introducing the Cost Allocation Report for Red Hat OpenShift Service on AWS (ROSA)

CSMP-30078

Managed Service Providers (MSPs) can now allocate costs for Red Hat OpenShift Service on AWS (ROSA) by key OpenShift Kubernetes cluster components, such as Node Name, Pod Name, Namespace, and Pod Labels, using utilisation-based cost allocation. This method calculates the cost distribution based on the highest percentage of four metrics: Actual CPU Usage, CPU Request, Actual Memory Usage, and Memory Request. These metrics are assessed in relation to the total CPU and memory capacity of the respective node.

CloudBolt CSMP cost allocation reports for OpenShift provide a comprehensive breakdown of ROSA costs by these key OpenShift Kubernetes components. The allocated costs are visualised in a Sankey chart, which can be filtered by time period to suit specific reporting needs. The Sankey Chart offers a clear visual representation of how costs are distributed from the OpenShift platform down to individual nodes, pods, pod labels, and namespaces, simplifying the understanding of cost allocation across the environment.

In addition, users can customise the grouping of nodes, with default options including Node Name, Pod Name, Namespace, and Pod Labels. This flexibility allows you to tailor the reports according to your specific needs. For further analysis, the cost allocation data can be viewed in a grid format and exported as a CSV file.

Enhancements

- In addition to the existing management options for Purchase Order (PO) configurations, two new action options—View and Show History—are now available to provide more detailed insights and tracking capabilities. CSMP-30502

- Matching Purchase Orders (POs) are now defined as POs that share at least one common account and service within your CloudBolt CSMP account, provided their start and end dates do not overlap. This enhancement allows for better management of configurations without duplicating usage periods. CSMP-30449
- Enhanced the Azure CSP billing adapter with an improved option to manage the inclusion of Microsoft/Office 365 charges in cost reports. This modification provides:
    - A default setting to include all Microsoft/Office 365 service costs.
    - A configurable drop-down menu for selecting specific services to exclude when opting out of full inclusion. IN-273

Bug Fixes

- Resolved an issue that caused time out error for the AWS Service Adviser Overview page. IN-503

2.10.2. 2024

Archived CSMP release notes.

- December 2024
- November 2024
- October 2024
- September 2024
- August 2024
- July 2024
- June 2024
- May 2024
- April 2024
- March 2024
- February 2024
- January 2024

2.10.2.1. December 2024

- Enhancing AWS RI/SP Benefit Distribution Based on Account Group Purchases and Usage
- Purchase Order (PO) Configuration and Tracking for AWS Accounts and Services

Enhancing AWS RI/SP Benefit Distribution Based on Account Group Purchases and Usage

CSMP-30181

As a Managed Service Provider (MSP), managing the distribution of AWS Reserved Instances (RI) and Savings Plans (SP) benefits purchased in one AWS member account to all other accounts in the group can be challenging, particularly when trying to control and restrict benefit sharing among the group member accounts.

The latest update to CSMP's RI and SP billing configuration for AWS simplifies this process by automating the distribution of cost savings across member accounts within an adapter group. This update streamlines the management of RI and SP benefits and operates as follows:

- **Automatic Identification**: The system automatically identifies the purchasing account and the associated RI and/or SP purchase details.
- **Proportional Benefit Sharing**: After selecting the "Within account group based on Usage" option for the RI and SP benefit sharing preferences, the CSMP's algorithm automatically calculates and allocates the RI and SP benefits to each member account based on its usage proportion.

Purchase Order (PO) Configuration and Tracking for AWS Accounts and Services

CSMP-29819

In many cases, Managed Service Providers (MSPs) or enterprises offering network and IT services to clients face challenges in tracking cloud costs against purchase order (PO) values. This can make it difficult to monitor usage, manage budgets, and notify clients about upcoming PO renewals to ensure continuity of services. To address these

challenges, we have introduced a new **Purchase Order Configuration** feature within the CloudBolt CSMP, designed to simplify and automate this process.

This new feature allows you to configure POs for specific AWS accounts, groups, or individual services. Through the **PO Configuration Page**, you can easily define the PO value for the selected accounts or services, ensuring precise tracking of cloud expenditures for each client. The configuration is integrated with the AWS cost report page within the CloudBolt CSMP, which enables you to monitor the remaining PO balance and usage over time using key metrics like **Purchase Order Balance** and **Purchase Order Value**. These metrics provide a daily and monthly breakdown of the PO status, giving you real-time insights into the remaining PO value and helping you stay on top of renewals.

With this feature, you can now seamlessly track and manage client POs, eliminating the need for manual calculations or reconciliation. The automated PO tracking and renewal notifications offer significant time-saving benefits and ensure that clients are promptly notified when it's time to renew their POs.

Enhancements

- Wildcard search functionality is now supported on the billing configuration creation page, allowing you to search for and select items in the Item Description, Usage Type, and Operation fields using wildcard characters and operators. CSMP-30093
- The default sorting order of the service type list under each accordion type on the Service Adviser page has been updated to descending, based on the total estimated cost or savings amount, ensuring that the service types with the highest values are displayed first when the accordion is expanded. CSMP-30203
- The default sorting behaviour for the Cost Report grid view has been improved. When the "Date" or "Month" dimension is available, data is now automatically sorted in ascending order by these dimensions, regardless of their active status. If these dimensions are not present, the grid defaults to sorting the active metric in descending order. Additionally, custom sorting preferences are now seamlessly integrated: the grid first honours user-defined sorting for specific metrics or dimensions, followed by sorting by "Date" or "Month," then by the active metric,

active dimension, and finally by any remaining applied metrics and dimensions, all in ascending order. CSMP-30202

Bug Fixes

- Resolved an issue where Azure subscriptions with no value in their subscription name field were not being filtered correctly. This occurred when the user selected "All" subscriptions with a value and left the "NA" option unselected in the Azure cost report filter settings for the subscription parameter. CSMP-30321
- Resolved an issue that caused slow loading times for the Service Adviser Overview page. CSMP-30322

2.10.2.2. November 2024

- Enhancing AWS Billing Configuration - Granular Margin and Discount Management by Usage Type, Operation, and Charge Type
- Introducing the Recurring Billing Configuration Feature for AWS
- Enhancing AWS Billing Configuration with Usage Quantity Multipliers for Charge Type, Item Description, Operation, and Usage Type

Enhancing AWS Billing Configuration - Granular Margin and Discount Management by Usage Type, Operation, and Charge Type

CSMP-30132

As a Managed Service Provider (MSP), you may face challenges in managing cloud spend chargebacks for your clients, particularly when it comes to applying agreed-upon margins and discounts based on usage types, operation types, and charge types. While the existing AWS billing configuration feature in CloudBolt CSMP allows you to define margins and discounts based on broad dimensions such as billing entity, service, or item description, this new update enhances your ability to manage billing with more precision.

The latest update introduces new features that allow you to specify margins and discounts in a more granular way — based on specific **usage types**, **operations**, or **charge types**. Depending on features enabled for your CSMP account, you will see options for **Usage Type**, **Operation**, and **Charge Type** under the "Margin/Discount Percentage Based On" setting in the Basic Details tab of the AWS Billing Configuration creation and editing pages.

The selections made for the "Margin/Discount Percentage Based On" setting will generate corresponding sub-tabs within the **Percentage of Spend** tab, enabling you to input detailed margin and discount percentages for each category:

- **Usage Type Sub-tab**: Allows entry of margin and discount percentages based on usage types.
    - Percentage of Spend - Usage Type Margin
    - Percentage of Spend - Usage Type Discount

- **Operation Sub-tab**: Allows entry of margin and discount percentages based on operation types.
    - Percentage of Spend - Operation Margin
    - Percentage of Spend - Operation Discount
- **Charge Type Sub-tab**: Allows entry of margin and discount percentages based on charge types.
    - Percentage of Spend - Charge Type Margin
    - Percentage of Spend - Charge Type Discount

Additionally, new metrics have been added that enable you to customise the **AWS Cost Report** and view the accumulated margin and discount amounts according to the billing configurations based on the selected margin and discount percentage types. These metrics include:

- Percentage of Spend - Usage Type Margin
- Percentage of Spend - Usage Type Discount
- Percentage of Spend - Operation Margin
- Percentage of Spend - Operation Discount
- Percentage of Spend - Charge Type Margin
- Percentage of Spend - Charge Type Discount
- Percentage of Spend - Usage Type Margin (R) (for resellers)
- Percentage of Spend - Usage Type Discount (R) (for resellers)
- Percentage of Spend - Operation Margin (R) (for resellers)
- Percentage of Spend - Operation Discount (R) (for resellers)
- Percentage of Spend - Charge Type Margin (R) (for resellers)
- Percentage of Spend - Charge Type Discount (R) (for resellers)

Introducing the Recurring Billing Configuration Feature for AWS

CSMP-30114

As a Managed Service Provider (MSP), when creating a billing configuration, you may want to set up a configuration that applies on a recurring basis without an end date. To simplify this process, we have introduced the Recurring Billing Configuration feature for AWS. This feature allows you to establish billing configurations that automatically apply to all subsequent months, eliminating the need for manual setup each month. By enabling this feature, you save time and effort while ensuring consistency in your billing process.

The recurring billing configuration offers an efficient and automated way to manage billing settings until you choose to set an expiration date, providing a seamless and consistent billing experience.

To enable this functionality, we have introduced a new feature labelled awsbc_enable_recurring_for_all_subsequent_months. When enabled for a CSMP account, you will see a new checkbox labelled **Enable Reoccurring** on the **Basic Details** tab of both the **Create** and **Edit** pages for AWS Billing Configuration. By selecting this checkbox, you ensure that the billing configuration set for the **Start Month** will automatically apply to all future months. With this option selected, you will only need to enter the **Start Month**, and the **Expires On** field will be hidden, as it is no longer necessary for recurring configurations.

The system will automatically apply the billing configuration from the **Start Month** to all subsequent months, eliminating the need for manual updates each month. Furthermore, you will only need to input billing details for the **Start Month** across various configuration tabs, including **Percentage of Spend**, **Fixed**, **Service Type**, **Usage Hour**, and **Usage Quantity Multiplier**.

Enhancing AWS Billing Configuration with Usage Quantity Multipliers for Charge Type, Item Description, Operation, and Usage Type

CSMP-30133 CSMP-30261

As a Managed Service Provider (MSP), managing cloud spend and applying customised pricing strategies can be challenging, especially when invoicing customers based on the precise usage quantities across different billing dimensions. The existing AWS billing configuration feature in CloudBolt CSMP allows you to define margins and discounts using broad methodologies, such as percentage of spend, fixed margins, and discounts. The new

Usage Quantity Multiplier feature within the CSMP's AWS billing configuration further enhances your billing management capabilities by incorporating usage quantity multipliers.

This latest enhancement allows MSPs to define a **margin factor** (usage quantity multiplier) for key billing dimensions such as **Charge Type**, **Item Description**, **Usage Type**, and **Operation**. The specified margin multiplier is applied to the usage quantity for each selected dimension, calculating the margin amount based on the customer's usage for that dimension.

Depending on the features enabled for your CSMP account, you will see options for Item Description, Usage Type, Operation, and Charge Type in the "Usage Quantity Multiplier Margin Based On" setting, located in the Basic Details tab of the AWS Billing Configuration creation and editing pages.

The selections made in the "Usage Quantity Multiplier Margin Based On" setting will generate corresponding sub-tabs within the Usage Quantity Multiplier tab. These sub-tabs allow you to input margin multiplier values for each dimension, enabling accurate margin calculations based on usage quantities:

- **Item Description Sub-Tab**: Specify the margin multiplier for selected item descriptions.
- **Usage Type Sub-Tab**: Specify the margin multiplier for selected usage types.
- **Operation Sub-Tab**: Specify the margin multiplier for selected operation types.
- **Charge Type Sub-Tab**: Specify the margin multiplier for selected charge types.

In addition to these new features, new metrics have been introduced to customise the AWS Cost Report, allowing you to view accumulated margin amounts based on the billing configurations and usage quantity multiplier settings. These new metrics include:

- Usage Quantity Multiplier - Charge Type Margin
- Usage Quantity Multiplier - Item Description Margin
- Usage Quantity Multiplier - Operation Margin
- Usage Quantity Multiplier - Usage Type Margin
- Usage Quantity Multiplier - Charge Type Margin (R) (for resellers)
- Usage Quantity Multiplier - Item Description Margin (R) (for resellers)

- Usage Quantity Multiplier - Operation Margin (R) (for resellers)
- Usage Quantity Multiplier - Usage Type Margin (R) (for resellers)

The existing Usage Quantity Multiplier metric has been deleted.

Enhancements

- The recommendations list on the "Cost Service Adviser" page is sorted by default to display MES values in descending order. CSMP-30144
- The multi-select drop-down UI has been updated across several pages to improve user experience and consistency. This update applies to the following pages:
    - AWS Reserved Instance (RI) Notifications
    - Azure Reserved Instance (RI) Notifications
    - AWS normal adapter's VPC Access
    - AWS Security and Compliance Advisor Notifications
    - AWS Service Manager
    - SOE OS
    - Tenant Management
    - Event Scheduler CSMP-30267
- A close icon [x] has been added to the filters settings area, enabling you to easily collapse the filter section for a more streamlined and efficient navigation experience. This enhancement is now available on the following pages:
    - Groups
    - Cost Report
    - Cost Analysis
    - RI Utilization
    - Cost Service Adviser
    - Budgets
    - Custom Dashboard
    - Cost Allocation

    - Recommendation Policy CSMP-30143

- An **Export to CSV** icon has been added to the itemised resources cost data page in the AWS, Azure, and GCP cost reports. This enhancement enables you to conveniently download the itemised resource cost data in CSV format. CSMP-30173
- A new dimension, 'Product Code,' has been added to the AWS Cost Report grid view, allowing you to identify and filter costs based on the specific product code associated with each service or resource. CSMP-30096
- A new metric, 'Retail On-Demand Cost,' has been added to the AWS Cost Report grid view to provide a clear view of the On-Demand instance costs based on the highest tier. CSMP-30063
- The 'Account ID' dimension in the AWS Cost Report has been renamed to 'Account Name(ID),' which now displays a concatenation of the AWS account name and its corresponding 12-digit account ID. Additionally, a new dimension, 'Account ID,' has been introduced to display only the 12-digit AWS account ID. CSMP-30121
- A new field, 'Billing Config Types,' has been added to the Basic Details tab of the AWS billing configuration page. By selecting the relevant billing methodology, you'll ensure that only the applicable tabs are displayed, reducing clutter. Certain options will also dynamically appear based on your selection, making the configuration process more intuitive. This enhancement allows you to filter out unnecessary tabs when creating and editing your AWS billing configuration. CSMP-30252
- A new 'Utilization Details' option has been added under the Action column in the existing Azure RI summary table. Using this option, you can view detailed utilisation data for individual Azure Reserved Instances. You can filter reports by date range and period. Additionally, the utilisation report can be downloaded in PDF or CSV format. CSMP-30034

Bug Fixes

- Resolved an issue on the "Create Group" page where selections in the 'Select Accounts' dropdown were being reset after using the search box to find accounts. CSMP-30006

- Resolved an issue where the 'Item Description' drop-down list under the 'Usage Quantity Multiplier' tab was incorrectly populating item description data from a billing account other than the one selected for the AWS billing configuration. CSMP-30119
- Resolved an issue that was preventing the Service Adviser page from loading correctly. CSMP-30153

2.10.2.3. October 2024

- Introducing Functionality to Distribute Fixed Margin and Discount Amounts to a Specific Day of the Month or Across all Days of the Month
- Introducing Daily Margin and Discount Percentages for AWS Billing Configuration
- Enhancing Azure Billing Adapter Functionality to Support Multi-Tenant Azure Accounts
- Enhancing Flexibility in AWS Billing Configurations for Multi-Dimensional Margin and Discount Management

Introducing Functionality to Distribute Fixed Margin and Discount Amounts to a Specific Day of the Month or Across all Days of the Month

CSMP-29780

A new feature, awsbc_specific_day_of_month_fixed_margin_discount has been introduced. When enabled for a CSMP account, you will have the following capabilities on the AWS billing configuration page:

1. **Distribution Method Specification:**
   You can select how to apply the fixed margin and discount amounts defined in the Fixed tab.
2. **Specific Day Distribution:**
   If the distribution method is set to a specific day of month, the margin and discount amounts will be applied on the first day of the month for all accounts linked to the billing configuration. You must provide a unique description for each month's fixed margin and discount values.
3. **All Days Distribution:**
   If the distribution method is set to all days of month, the margin and discount will be proportionally allocated based on the value for the selected **metric for margin and discount calculations**, distributing charges across each day of the month for all applicable accounts.

To enhance the visualisation, two new dimensions are added in the cost report page:

- **Specific Day of Month Fixed Margin Description**
- **Specific Day of Month Fixed Discount Description**

These dimensions will display the descriptions provided in the Fixed tab for easy identification of charges.

- For accounts with the specific day method, descriptions will only show on the first day of the month in the cost report; on other days, the values will display as N/A.
- For accounts with the all days method, the values will display as N/A for every day of the month.

Introducing Daily Margin and Discount Percentages for AWS Billing Configuration

CSMP-29781

A new feature has been introduced that enhances the AWS billing configuration by allowing you to define margin and discount percentages on a daily basis. Previously, margin and discount settings were only configurable on a monthly basis, applying the same percentages to all dates within a specified month.

The new feature has following key features:

- **Daily Margin and Discount Settings:** You can now set varying margin and discount percentages for individual days, providing greater flexibility in managing your AWS costs.
- **Date Range Type Selection:** In the Basic Details tab, a new option allows you to choose the Date Range Type for Percentage of Spend:
    - **Monthly Option:** Enter a single margin and discount percentage that will apply to the entire month.
    - **Daily Option:** Specify a date range for each month. You can select either a specific date or a range of dates, followed by the corresponding margin and discount percentages for those days.

For more information on how to set up and utilize this feature, please refer to the user guide or contact support.

Enhancing Azure Billing Adapter Functionality to Support Multi-Tenant Azure Accounts

CSMP-29141

The Azure Billing Adapter in CloudBolt CSMP allows you to fetch cost data incurred by your Azure subscriptions. It also creates normal adapters for each of your Azure subscriptions using Client ID, Secret Key, and Tenant ID credentials for an Azure account. However, when you have multiple tenants in your Azure Entra ID, the billing adapter requires the Client ID, Secret Key, and Tenant ID credentials for each tenant environment to fetch the subscriptions and create normal adapters for them.

We have introduced a new feature in the Azure Billing Adapter, enables you to add multiple Client IDs, Secret Keys, and Tenant IDs while creating an Azure Billing Adapter in CloudBolt CSMP. This feature allows for the efficient retrieval and creation of normal adapters for all Azure subscriptions across various tenants.

Enhancing Flexibility in AWS Billing Configurations for Multi-Dimensional Margin and Discount Management

CSMP-29909

The AWS billing configuration feature has been enhanced to provide a more flexible and comprehensive solution, introducing several new functionalities and metrics.

New Service Tab Addition

- Default Service Tab: A new default Service tab has been added under the "Percentage of Spend" section.
- Renaming of Existing Tabs: The previous Margin and Discount tabs have been renamed:
    - Percentage of Spend - Service Margin
    - Percentage of Spend - Service Discount

Enhanced Billing Configurations

- Multi-Selection for Margin/Discount Percentage Based On: If your CSMP account has been enabled to create billing configurations using Billing Entity or Item Descriptions, or both, you can now select multiple options in the "Margin/Discount Percentage Based On" section on the Basic Details tab. The sub-tabs under the "Percentage of Spend" tab will dynamically update based on these selections.

Sub-Tab Functionalities

Each selected option for the "Margin/Discount Percentage Based On" section generates corresponding sub-tabs within the "Percentage of Spend" tab:

- Service Sub-Tab: For entering margin and discount percentages for services.
    - Percentage of Spend - Service Margin
    - Percentage of Spend - Service Discount
- Billing Entity Sub-Tab: For entering margin and discount percentages for billing entities.
    - Percentage of Spend - Billing Entity Margin
    - Percentage of Spend - Billing Entity Discount
- Item Description Sub-Tab: For entering margin and discount percentages for item descriptions.
    - Percentage of Spend - Item Description Margin
    - Percentage of Spend - Item Description Discount

Added New Metrics to Customize the Cost Report

The following new metrics have been added to AWS cost reports:

- Percentage of Spend - Billing Entity Margin
- Percentage of Spend - Billing Entity Discount
- Percentage of Spend - Item Description Margin
- Percentage of Spend - Item Description Discount
- Percentage of Spend - Billing Entity Margin (R) (for resellers)
- Percentage of Spend - Billing Entity Discount (R) (for resellers)
- Percentage of Spend - Item Description Margin (R) (for resellers)

- Percentage of Spend - Item Description Discount (R) (for resellers)

Renaming of Existing Metrics

Existing metrics have been renamed for consistency:

- Margin → Percentage of Spend - Service Margin
- Discount → Percentage of Spend - Service Discount
- Margin (R) → Percentage of Spend - Service Margin (R)
- Discount (R) → Percentage of Spend - Service Discount (R)

Enhancements

- On the source tab of the AWS cost allocation page, you can now provide a custom amount that is greater than the "Cost to be Allocated" value. CSMP-29908
- The CSV downloads via the AVS API will now include the following columns: tag_appspace, grouptag_Division, grouptag_BusinessLeader, grouptag_Environment, and cost. CSMP-29930
- You can now select group tags to configure the Sankey chart's node groups. CSMP-29818
- A new tabular view has been added below the Sankey chart on the AVS Allocation Report page. CSMP-29757
- You can now exclude irrelevant data points for the selected node groups by using the 'Exclude Values from Groups' option within the Flow Configuration settings on the AVS Allocation Report page. CSMP-29596
- You can now select a date range option before choosing the predefined period selection on the AVS Allocation Report page. CSMP-30104

Bug Fixes

- Fixed an issue that was preventing the Sankey chart from displaying, even when data was available for the allocation report. CSMP-30148

2.10.2.4. September 2024

- AWS Billing Adapter Creation Using Multiple Reports
- AWS Billing Configuration Creation Using Item Descriptions
- AWS Billing Configuration Creation Using Billing Entity
- Enhancing AWS Billing Configuration for Custom Pricing Contracts

AWS Billing Adapter Creation Using Multiple Reports

CSMP-29868

A new feature, aws_manual_export_report_configuration, has been introduced. This feature significantly enhances the AWS billing adapter creation process. You can now easily add multiple cost reports to a single billing adapter, simplifying the management of billing data. This improvement ensures that all selected reports are stored within the same S3 bucket and utilise a common compression type, streamlining the integration process and making it more efficient.

AWS Billing Configuration Creation Using Item Descriptions

CSMP-23220

A new feature, 'awsbc_percentage_of_spend_based_on_service_or_item_description', has been introduced. Once enabled for a CSMP account, this feature enhances the billing configuration creation and edit page with the following capabilities:

- A new option will appear for setting margin and discount percentages based on AWS service or item descriptions.
- Within the Percentage of Spend tab, you can select specific item descriptions after choosing a service type from the service selection box.
- you can define flat margin and discount percentages for selected item descriptions and apply default rates to unselected descriptions grouped under "Other Item Descriptions."
- The interface allows for adding multiple rows to specify unique margins and discounts for different item descriptions within the same service type.

AWS Billing Configuration Creation Using Billing Entity

CSMP-29774

A new feature, 'awsbc_percentage_of_spend_based_on_billing_entity', has been introduced. Once enabled for a CSMP account, this feature enhances the billing configuration creation and edit page with the following capabilities:

- A new option will appear for setting margin and discount percentages based on AWS service or billing entity.
- Within the Percentage of Spend tab, you can select AWS and AWS Marketplace as billing entity.
- you can define flat or spend greater than margin and discount percentages for selected billing entity.
- The interface allows for adding multiple rows to specify unique margins and discounts for different billing entity types.

Enhancing AWS Billing Configuration for Custom Pricing Contracts

CSMP-29831 CSMP-29876

A new feature, awsbc_usage_quantity_multiplier, has been introduced on the AWS billing configuration page. This feature is designed to assist cloud distributors with existing pricing contracts that define item descriptions with specific rates, rather than discounts, enabling them to calculate their item description specific net costs more effectively using the item usage quantities.

Once enabled for a CSMP account, this feature enhances the AWS billing configuration creation and editing experience with the following capabilities:

- A new tab labeled Usage Quantity Multiplier will be added, which includes a margin tab.
- You can select a service from the Select Service box and then choose an item description from the Select Item Description box, allowing you to specify the agreed rate for that item description in the adjacent usage quantity field.

- You can add multiple item descriptions from a single service type by clicking the plus icon at the end of the selected item description row. To add another service type, simply click the plus icon at the end of the first selected service type row.

To visualise the margin cost associated with the rate specified in the Usage Quantity Multiplier tab of the billing configuration for each item description, a new metric, Usage Quantity Multiplier, has been introduced in the customize cost report section.

Enhancements

- CSV exports from the unused tab in service adviser recommendations now include details of subscription, project, and vCenter IDs, based on the cloud provider. CSMP-28561
- We've introduced "include" and "exclude" option buttons for AWS dashboard filters, giving you greater flexibility to customise your reports. By default, the "include" option is selected, allowing you to easily select all accounts, regions, and services or choose a subset of up to 20 accounts, regions, and services for targeted insights. CSMP-29715
- A search functionality has been added to the tenant selection box in the header bar. CSMP-24337
- We have updated the formula for the Net Allocated Cost metric to enhance accuracy. The new formula is now defined as: Net Cost + Allocated Cost - Drained Cost. CSMP-29863
- You can now specify the time range when configuring the service adviser telemetry details for unoptimized services in AWS and Azure on the service adviser configuration page. CSMP-29760
- You can now specify a full 100% margin or discount in the "Percentage of Spend" tab on the AWS billing configuration page. CSMP-29907
- You can now see the maximum memory utilisation details for AWS windows EC2 resources on the right-sizing recommendation page for AWS. CSMP-29119

Bug Fixes

- Fixed an issue that was preventing the margin and discount percentage settings under the 'Percentage of Spend' tab for a specific month from being applied to all future months using the 'Apply to future Months' checkbox in the AWS billing configuration. IN-344

2.10.2.5. August 2024

- Introducing AWS Support for Cardinality-Based Query: Enhancements in AWS Adapter Group Creation and Reporting Metrics

Introducing AWS Support for Cardinality-Based Query: Enhancements in AWS Adapter Group Creation and Reporting Metrics

CSMP-29407

A new feature, aws_support_for_cardinality_based_query, has been introduced. When enabled for your CSMP account, the following actions and limitations will apply:

1. **Tag Key Selection in AWS Billing Adapter:**
    - You can select up to seven different tag keys in the 'Add Group Service Tag Key ' field, located under the Other Configuration tab.
2. **Tag Key and Value Pair Specifications in AWS Adapter Group:**
    - When creating an AWS adapter group in CSMP, you can specify relationships between tag key-value pairs using the following operators:
        - **Equal (=):** Includes all services/resources from the aforementioned accounts with the specified tag key-value pair in the group.
        - **Not Equal (!=):** Excludes services/resources from the aforementioned accounts with the specified tag key-value pair from the group.
    - The default operator is Equal (=).
    - If multiple tag keys are selected, you can specify a tag query operator to join different tag key-value pairs. The default tag query operator is OR, meaning the AWS group will include services/resources from the aforementioned accounts that have any one of the selected tags. For example, if you select tags A and B with an OR operator, resources with either tag A or tag B will be included in the group. Selecting AND means the AWS group will include only those services/resources from the aforementioned accounts that have all of the selected tags. For example, if you select tags A and B with an AND

operator, only resources that have both tag A and tag B will be included in the group.

- You can select up to 12 different tag key-value pairs for an AWS account group.

3. **Allocation Ratio Field in AWS Adapter Group:**
   - Introduced a new "allocation ratio" field, with values ranging from 0.0 to 1.0. This ratio determines the proportion of the total cost attributed to the group and will be used in calculating the value of newly added metrics.
4. **Cost Report and Cost Analysis Page Adjustments:**
   - The **Applied Tags** and **Applied Group Tags** filter options will not be available on the cost report and cost analysis pages.
   - When selecting a group in the group filter, the applied tags details associated with the selected group will not be displayed. Although specific tag details and their configurations will not be displayed directly on the cost report page, the cost calculations will still account for these tags and their settings. Consequently, the cost values you see will be influenced by the tag key-value pairs and the operators defined for the group.
5. **Customize Report in Cost Report Page:**
   New metrics are now available for customising the AWS cost report:
   - **General Group Allocation:**
     - Calculation: ((Group Allocation Amortized Cost) / (Total AWS Net Amortised Cost for the billing adapter)) * (Advanced Reserved Instances Automation + OCBLateFee Cost).
     - Ensure the Account Group dimension is selected and set as the X-axis label with a Monthly date range filter.
   - **Group Allocation Amortized Cost:**
     - Calculation: (Group's Net Amortised Cost) * (Group's Allocation Ratio).
     - Ensure the Account Group dimension is selected and set as the X-axis label.
   - **Group Allocation Cost:**

- Calculation: (Group's Unblended Cost) * (Group's Allocation Ratio).
- Ensure the Account Group dimension is selected and set as the X-axis label.

- **Group Net Cost:**
  - Calculation: (Group Allocation Cost) + (Support Cost Allocation) + (General Group Allocation).
  - Ensure the Account Group dimension is selected and set as the X-axis label with a Monthly date range filter.
- **Group Net Cost Amortized:**
  - Calculation: (Group Allocation Amortized Cost) + (Support Cost Allocation Amortized) + (General Group Allocation).
  - Ensure the Account Group dimension is selected and set as the X-axis label with a Monthly date range filter.
- **Support Cost Allocation:**
  - Calculation: ((Group Allocation Cost) / (Total AWS Unblended for the billing adapter)) * (AWS Support Enterprise Unblended cost for the billing adapter).
  - Ensure the Account Group dimension is selected and set as the X-axis label with a Monthly date range filter.
- **Support Cost Allocation Amortized:**
  - Calculation: ((Group Allocation Amortized Cost) / (Total AWS Net Amortised Cost for the billing adapter)) * (AWS Support Enterprise Net Amortised Cost for the billing adapter).
  - Ensure the Account Group dimension is selected and set as the X-axis label with a Monthly date range filter.

6. **Billing Configuration:**
   - You can create billing configurations using either the **Accounts** option or the **Adapter Group** option, but not both simultaneously.

- **Margin and Discount Percentages:** The percentages entered in the Percentage of Spend tab apply a flat margin and discount to all services/resources within the selected accounts. If the Adapter Group option is used, the margin and discount apply only to services/resources that meet the tag settings of the group.
- The details entered in the 'Fixed', 'Service Type', and 'Usage Hour' tabs will not be considered for margin and discount calculations.

7. **Default Report Profile Updates:**
   - The Default Report Profile will be updated to include all seven newly added metrics.

To enable the new feature 'aws_support_for_cardinality_based_query' in your CSMP account, you must contact our support team.

Enhancements

- A new column, Subscription Name (ID), has been introduced to the Azure Virtual Machine rightsizing table on the Azure Service Adviser page to display the subscription name and ID associated with each VM. Additionally, Maximum CPU Utilisation and Maximum Memory Utilisation for the past 14 days can now be viewed using the "Show" option within the Azure VM rightsizing table. CSMP-29169
- We have added "Include" and "Exclude" options to the lists of source and target accounts, service types, and regions. Users can now create cost allocation rules for AWS by selecting more than 99 items as sources or targets by utilising the exclude option for more precise control. CSMP-28615
- You can now download AVS cost allocation reports in CSV format. This feature is accessible via the download button located within the Sankey chart section on the Cost Allocation Reports page. CSMP-29595
- The AVS allocation API now includes an enhanced algorithm for calculating physical CPU usage based on CPU tiers. Additionally, CPU used percent calculations will now be performed using physical CPU utilisation rather than CPU cores. CSMP-29669

- We have enhanced role-based access control by updating the role assignment and user invitation processes to strengthen access control. Users with the Administrator role now have the capability to assign any role, whether default or custom, to new users, allowing for comprehensive management of user roles. In contrast, users assigned a non-Administrator default role are now limited to assigning only custom roles and their own default role to new users, effectively preventing unauthorised role escalation. Additionally, users with custom roles are restricted to assigning only their specific role to new users, ensuring strict adherence to role boundaries. These role-based restrictions have been uniformly applied to the tenant management module, aligning it with the updated role assignment policies. CSMP-29638

Bug Fixes

- Fixed an issue that was preventing the CPU utilisation percentage from being displayed according to the selected filter for the "Show Metric" action on the Service Adviser and Service Manager pages, specifically when the filter was set to 2 months or 3 months. CSMP-29463
- Fixed an issue that was preventing the cost report from correctly populating cost data when both group and allocation rule filters were used simultaneously. IN-271

2.10.2.6. July 2024

- Introducing the AVS Cost Allocation Report - Visualizing Financial Data with Sankey Charts
- Support for Integrating Multiple Cost and Usage Reports from Different AWS Billing Accounts into a Single AWS Billing Adapter

Introducing the AVS Cost Allocation Report - Visualizing Financial Data with Sankey Charts

CSMP-29167

Your team may have incurred expenses from purchasing infrastructure through the Azure VMware Solution (AVS). Now, you want to allocate these costs to VMware adapters linked to vCenters, resource pools, and specific tag key types using reference-based cost allocation. The reference-based cost allocation method enables you to calculate the expenses associated with a single virtual machine (VM) based on the ratios of CPU, memory, and storage relative to the overall CPU, memory, and storage of your cloud infrastructure.

Using CloudBolt CSMP **cost allocation reports**, you can monitor and analyse how allocated costs are distributed across VMware adapters, resource pools, and selected tags. The cost allocation reports present the allocated costs in a Sankey chart view, which can be filtered by different time periods.

The Sankey chart visualises data in a node-based format, featuring four distinct node types. Below is a description of the default flow configuration node settings, which you can adjust as needed:

1. **Group 1 Node: Shared Platform**
   This static node represents the AVS platform and displays the total cost to be allocated for the selected period. It can also be understood as the total cost incurred from infrastructure purchases made through AVS.
2. **Group 2 Node: Adapter**
   By default, this node represents VMware adapters. It can also be an adapter, resource pool, or tag node.

3. **Group 3 Node: Resource Pool**
   This node shows VMware resource pool names associated with the Group 2 node. It cannot be the same node type selected for Group 2. By default, it represents resource pools.
4. **Group 4 Node: Tag**
   This node represents tags and cannot be the same node type selected for Groups 2 or 3. By default, it represents tag nodes.

The Sankey Chart visualises the cost allocation process as follows:

1. **From Shared Platform to Group 2 Node (Adapters)**: The total cost is initially allocated to the different VMware adapters associated with these virtual machine expenses.
2. **From Group 2 Node (Adapters) to Group 3 Node (Resource Pools)**: Costs associated with each adapter type are then distributed among various VMware resource pools. If the virtual machine costs associated with each adapter are not linked to any resource pools, such costs will be grouped under an untagged resource pool.
3. **From Group 3 Node (Resource Pools) to Group 4 Node (Tags)**: Costs from each resource pool are further broken down and allocated to the selected tag key's values. If the virtual machines are not associated with the selected tag key, such costs will be grouped under untagged.

To know more about AVS cost allocation report Sankey chart, see Cost Allocation Reports.

Support for Integrating Multiple Cost and Usage Reports from Different AWS Billing Accounts into a Single AWS Billing Adapter

CSMP-29164

A new feature, aws_billing_multiple_report_config_from_different_account, has been introduced. This feature allows you to integrate up to ten additional Cost and Usage Reports (CURs) from ten different AWS billing accounts into a single AWS billing adapter within the CSMP account.

When enabled, this feature streamlines the integration of multiple CURs into a consolidated billing adapter. To ensure proper functionality, you must complete the following setup steps in your AWS billing accounts:

1. **Create Cost and Usage Reports (CUR)**
   Generate CURs for each AWS billing account intended for inclusion in the billing adapter.
2. **Update S3 Bucket Policies**
   Modify the S3 bucket policies to remove Access Control Lists (ACLs) for all S3 buckets containing the CURs.
3. **Modify Billing Policy**
   Include all relevant S3 bucket names in the 'Resource' element of the JSON policy template when setting up the billing policy.

Once an AWS billing adapter is configured with multiple CURs, the cost data displayed across various CSMP modules will aggregate information from all the relevant AWS billing accounts. You can view consolidated cost data by selecting the single billing adapter that incorporates these multiple CURs.

To enable the new feature 'aws_billing_multiple_report_config_from_different_account ' in your CSMP account, you must contact our support team.

Enhancements

- The Provider column has been removed from the groups list for improved clarity and streamlined user experience. CSMP-24737
- The Details column has been renamed to Scope for enhanced clarity and consistency across the interface. CSMP-24737
- The AWS and Azure Groups list has been enhanced to provide a consolidated view of the current month's cost, potential benefits achievable by adopting all Service Adviser recommendations related to adapters within each group, and potential savings from purchasing recommended Reserved Instances (RI) and Savings Plans (SP). CSMP-24737

- The GCP and VMware Groups list has been enhanced to provide a consolidated view of the current month's cost, potential benefits achievable by adopting all Service Adviser recommendations related to adapters within each group. CSMP-24737
- Azure RI Utilization Report now include columns for SKU name and Reservation name in the grid view. CSMP-28254
- Removed the filter parameter "Reservation ID" from the Azure Reserved Instance utilization report. CSMP-28255
- Added a new filter parameter labeled "Reservation Name" to enhance filtering capabilities in the Azure Reserved Instance utilization report. CSMP-28255
- The subscription limit for the Azure billing adapter has been raised to 12. This means that users can now manage up to 12 subscriptions within single billing adapter. CSMP-29210
- When an Azure billing adapter is updated due to changes in scope type, subscription, management group, or billing account details, historical data from past months will remain unchanged. Only the billing data for the current and last months will be updated according to the new scope or account details. CSMP-29207
- The new swagger API endpoints for downloading the shared cost allocation file for the managed AVS platform, containing detailed information about allocated costs, have been introduced. CSMP-29020
- The Swagger API responses have been enhanced to include comprehensive error messages that specifically pinpoint invalid request parameters. CSMP-17991
- Added currency conversion support to the build_custom_reports and build_chart_reports APIs on Swagger V2 for AWS, Azure, and GCP. CSMP-22173
- The Export Report permission is integrated with the finance module permissions, requiring roles to have access to at least Cost Report or Service Adviser to enable report exporting. CSMP-25881
- The Azure CSP cost report can now be customised based on meter name and resource URI dimensions. CSMP-28024

- A new module, named "Cost Allocation Report", has been added under the Cost tab in Access Management roles. Associated action access rights for this module have also been implemented. CSMP-29249

Bug Fixes

- Fixed an issue where the AWS service/resource tags were not fetched and displayed for custom-enabled AWS regions on the service manager page for AWS. CSMP-28934

2.10.2.7. June 2024

- The following additional facets under the AWS cost report filter have been renamed:

  Charges

  - Upfront reservation charges -> Upfront Reservation Fees
  - Support charges -> AWS Support Fees
  - Tax (old filter parameter) -> Tax

  Credits And Refunds

  - General (from old credit section) -> General Credits
  - General (from old refund section) -> General Refunds
  - Tax (from old refund section) -> Tax
  - Enterprise Discount Program (EDP) -> EDP Discounts

  Additionally, the following additional facets have been newly added under the AWS cost report filter section:

  Charges

  - General On Demand Usage
  - Recurring Reservation Fees
  - Covered Reservation Usage
  - Upfront Saving Plan Fees
  - Recurring Savings Plan Fees
  - Covered Savings Plan Usage
  - Out of Cycle Subscription Fees

  Credits And Refunds

  - SPP Discounts
  - Savings Plan Negation

  The Bundled Discount filter option has been removed from the AWS cost report filter section. CSMP-27537

- A new dimension labelled "cost category" has been introduced to the AWS cost report grid view for visualising cost data based on created AWS cost categories. CSMP-28999
- The Azure billing adapter page has been updated to disable the management group selection option whenever the Cost and Usage Report API option is chosen for the Cost Data Source. CSMP-29194

Bug Fixes

- Fixed an issue where the reserved instance drop-down list was not populating under the "reserved instances" field to select the RI has been resolved when creating an expiry notification for an Azure reserved instance. CSMP- 29088

2.10.2.8. May 2024

- Budgets list can now be downloaded in PDF format. CSMP-28519 CSMP-24596
- Azure budgets can now be scoped down to the level of resource groups. CSMP-28012
- Azure SQL DB right-sizing list can now be sorted based on MES. CSMP-28606
- The AWS cost report can now be customised using following dimensions: Cache Engine, Charge Type, Deployment Option, Invoicing Entity, Legal Entity Name, Normalisation Factor, Platform, Purchase Type, Reservation ID, Savings Plan ARN, Savings Plan Type, Tenancy, and Usage Type Group. CSMP-28812
- A new dimension labelled as 'Tax' is added to customise the Azure CSP cost report. CSMP-28338
- Azure has deprecated EA APIs as of May 1, 2024. Due to this, all the existing EA billing adapters that are not updated to either a single subscription, management group, or billing account scope would become invalid and stop fetching the Azure cost data. CSMP-28815
- AWS cost reports and analysis reports can now be refined using 'account tags' as filters. CSMP-28498
- Azure cost reports and analysis reports can now be refined using 'subscription tags' as filters. Additionally, the flexibility to customise the Azure cost report grid view and cost analysis report grid view utilizing the 'subscription tags' dimension has been added. CSMP-28698
- Streamlined access to existing Azure Reserved Instance (RI) details now includes intuitive filters and expanded summary columns. CSMP-28256 CSMP-28483
- The clarity of the error message for Azure billing data export issues has been improved by providing precise instructions to identify the exact problem. CSMP-27131
- An enhancement has been made to the cost report grid view area with the introduction of a new filter option called "Applied Billing Configuration". This addition empowers you to further personalize your cost reports by customising them to specific billing configurations. CSMP-28224

- Multiple resource groups can be selected for filtering the Azure Service Adviser recommendation list based on resource group. CSMP-28560

Bug Fixes

- Fixed an issue where the complete Azure cost report data was not displayed on the CloudBolt CSMP Azure cost report page. CSMP-28542
- Fixed an issue where the change in period for the cost report date filter resets all other filter parameters to their default values. CSMP-20256
- Fixed an issue where the status of 'poweredOff' VMware virtual machine was incorrectly displayed as 'poweredOn' on the service manager page. CSMP-28894
- Fixed an issue where 'poweredOff' VMware virtual machine IDs were not displayed in the Resource Provider IDs filter on the cost report page. CSMP-28933
- Fixed an issue where the data from migrated EA adapters was not fully or accurately displayed. CSMP-28997

2.10.2.9. April 2024

- A new column labelled as MES has been introduced in the Azure SQL DB right sizing list. This column will display the difference in cost between the existing SQL database and the CloudBolt CSMP recommended database.
- Account Tag, a new dimension, has been added to the AWS cost report and cost analysis modules. Cost details for the accounts that contain the chosen account tag key type will be shown by their value types. If an account tag key-value pair has been associated with multiple accounts, the cost of those accounts will be aggregated and displayed in a single line item by their value types for the selected account tag key type.
- AWS users can now filter their cost report using resource names for the selected service types.
- A redundant dimension, tag, has been removed from the dimensions list available for VMware cost report grid view.
- VMware service manager details can be downloaded in CSV format.
- Favourite cost report scheduled emails now include a CSV file format download link.
- Budgets list can now be downloaded in CSV format.
- New dimensions labelled as Cluster Name and Power State are added to customize the VMware cost report.
- The Default tenant users of distributors' and resellers' organizations' accounts can now click the question mark icon found in the net cost and net cost (R) tiles to view the relevant billing configuration details for a cost report.

Bug Fixes

- Bug restricting to fetch and display AWS cost report for a recently created AWS billing adapter has been fixed.
- Bug restricting to fetch and display correct Azure RI charge back cost (amortized) value has been fixed.

- Bug causing the deletion of all the selected adapter groups that are not part of the deleted billing adapter while sharing adapters and adapter groups with the child organization has been fixed.
- A bug restricting the ability to filter VMware services on the services manager page unless a tag filter is set up has been fixed.

2.10.2.10. March 2024

- Group's custom data is now labelled as 'Group Tag (Custom Data)' for better clarity across the UI.
- Group Tags, a new dimension, has been added to the AWS and Azure cost report grid view. Cost details for the groups that contain the chosen group tag (custom data) key type will be shown by their value types. If a group tag (custom data) key-value pair has been associated with multiple groups, the cost of those groups will be aggregated and displayed in a single line item by the value types for the selected group tag (custom data) key type.
- AWS and Azure users can now filter the dashboard, cost report, and cost analysis data using a new filter labelled as 'Applied Group Tags'. Users need to select the group tags (custom data) associated with groups for which they want to filter the cost report. If a group is selected in group filter parameter, the applied group tags filter parameter will not be available.

Bug Fixes

- Fixed an issue with cost report where a group is selected to filter the cost data, but the tags (service tags) associated with the selected group had not been considered.

2.10.2.11. February 2024

- Introducing Support for Migrating from Azure Enterprise Reporting to Microsoft Cost Management APIs

Introducing Support for Migrating from Azure Enterprise Reporting to Microsoft Cost Management APIs

Microsoft is deprecating the existing Azure Enterprise Reporting APIs on 1st May 2024, and recommends to start using Microsoft Cost Management APIs. With effect to this depreciation from Azure, CloudBolt CSMP have updated the Azure EA billing adapter to ingest the Azure cloud cost.

The existing Azure EA billing adapter will no longer supported after 30th April 2024. After this date, you will not be able to update your Azure EA access key in your existing Azure EA billing adapters.

If you are an existing Azure EA user having Azure EA billing adapters created to collect billing data from 'Enterprise Agreement', you must upgrade your existing billing adapters to collect billing data from 'Billing Account/Management Group/Subscription Scope' with scope chosen as Billing Account by 30th April 2024 to ensure a seamless transition.

If you are trying to create a new Azure EA billing adapter to ingest your Azure EA cloud spend in CloudBolt CSMP account, you must create an Azure billing adapter to collect billing data from 'Billing Account/Management Group/Subscription Scope' with scope chosen as Billing Account. For more help and procedures with creating or updating an Azure EA billing adapter, see Create a Consolidated Billing Adapter for Azure EA Account (Modern Commerce).

Enhancements

- An action mode needs to be chosen while creating a recommendation policy. Action mode can be manual-fix or auto-fix. Manual-fix creates and assigns the service adviser recommendation tasks to the assignee, whereas auto-fix mode performs the required action automatically against the services in the cloud account directly.

- After creating a recommendation policy, an event is required to be created for the recommendation policy using the event scheduler module to create and assign the recommendation tasks.
- You can now automate the action required against a recommendation task by creating an event for the recommendation policy.
- The creator of a budget will now receive email notifications about the budget consumption if the 'Notify By Email' option has been selected, but both the roles and custom email have not been added under the event notification tab.
- Tenant users will only see the name and count of the accounts, subscriptions, projects, or vCenters associated with the budget shared with them. Adapter groups name and count will not be displayed to users in the case of a shared budget.
- A shared budget access will be revoked for a tenant when all the relevant shared normal adapter access has been withdrawn by the owner.
- A budget can only be shared with a tenant if the tenant has access to one or more normal adapters from the set of adapters for which the budget was created.
- A budget's start and end month differences can vary by up to 12 months. If expires on month is not selected for a budget, by default such budgets will expire after 12 months from the budget start month.
- VMware users can now create groups of their vCenters.
- The Cost and Usage Report API option is a new alternative to the existing export method for obtaining the cost report for an Azure billing adapter, which collects billing data from: Billing Account/Management Group/Subscription Scope.
- The Scope and Scope Id columns have been added to the Azure billing adapter’s report configuration page to provide the details of the subscription, billing account, or management group linked with the export.
- A new CloudBolt CSMP logo, favicon, tag line, background image, and background overlay colour have been added to change the look and feel of the web page.
- Azure cost data displayed on various dashboard widgets can now be filtered based on resource groups.

- You can now toggle between active and expired savings plans (existing) list on a button click.
- New dimensions labelled as Guest OS Family, Guest OS Full Name, and Guest OS ID are added to customize the VMware cost report. A new metric, No. of Units, is also added.

Bug Fixes

- Bug causing to display incorrect current month cost value on budget's page for child/reseller account has been fixed.
- Bug restricting users to create a new budget has been fixed.
- Bug restricting users to select services while creating a budget has been fixed.

2.10.2.12. January 2024

- CloudBolt CSMP account default tenant users with administrator role will receive an email notification whenever a billing adapter turns in an error state.
- The datastores drop-down list on the disk multipliers tab of the create and edit VMware Rate Card page now includes a search box.
- A new metric labelled as ‘Amortized’ has been introduced in the Azure cost report. Amortized will display the sum of actual cost and the reservation and saving plan purchase cost split over the duration of the reservation and saving plan term.
- Groups can be created using only one tag key type for a billing adapter. However multiple values for the selected key type can be added to create groups. To use a tag key in groups, you must specify your required tag key type in the 'Select Group's Service Tag key' field available under other configuration tab within the create/edit billing adapter page.
- Using account group and subscription group dimensions you can now filter the AWS and Azure services or resources costs that are not associated with any of the groups.
- A new dimension labelled as Group Tag has been introduced to the AWS and Azure cost reports. Cost details for the groups that contain the chosen custom data key will be shown via the Group Tag dimension. If a single custom data key-value pair is utilized by multiple groups, the cost of those groups will be combined by the Group Tag dimension for that group tag key. When the selected custom data key is not associated with a group, the cost of such groups would be displayed against N/A.
- While saving a cost report as favourite report, group name selected in group filter field is now saved and keep displaying when such favourite report is opened. Whenever such groups are deleted, the favourite report will not open the cost report for those groups and a default cost report page would appear.
- Savings plan (existing) report can now be filtered based on date range. It can also be downloaded in CSV and PDF formats.

- The Azure existing RI table now adds an action column with a "Daily usage" option that allows the users to view a comprehensive breakdown of the daily usage for the selected RI.

Bug Fixes

- Bug causing auto-created GCP normal adapters to turn to an error state has been fixed.
- Bug stopping to display the estimated savings amount on service adviser page has been fixed.
- Bug stopping to correctly synchronise VMware tags in CSMP dashboard, cost report, cost analysis, and service manager page has been fixed.
- Bug stopping to fetch the cost report data from an Azure US government cloud account has been fixed.
- Bug restricting to apply tag filter with no tagkey values and create a favourite cost report has been fixed.
- Bug causing to display the AWS savings plans report utilization percent with more than 2 decimal places has been fixed.

2.10.3. 2023

Archived CSMP release notes.

- December 2023
- November 2023
- October 2023
- September 2023
- August 2023
- July 2023
- June 2023
- May 2023
- April 2023
- March 2023
- February 2023
- January 2023

2.10.3.1. December 2023

- Introducing Cost Allocation Strategy in CloudBolt CSMP for AWS and Azure Costs

Introducing Cost Allocation Strategy in CloudBolt CSMP for AWS and Azure Costs

Being a large enterprise administrator, you might want to establish the relationship between central costs from your cloud spend, how those costs were incurred, and which internal departments or business units incurred those costs. Typically, you might want to reallocate your cloud cost of the shared services back out to the internal departments, business units, or teams within your organisation who used those services.

Using CloudBolt CSMP cost allocation, you can reassign or distribute the costs of shared services or any custom amount across different accounts/subscriptions, service types, or regions owned by the consuming internal departments, business units, or teams. Cost allocation allows you to define rules to shift cloud services costs across accounts/subscriptions, service types, or regions. In other words, cost allocation helps making business units or teams accountable and answerable for their own cloud usage. It helps you in creating more granular cost reports for greater visibility into cloud spending.

You can create your cost allocation rule using any one of the following three cost allocation models:

1. **Fixed Percent** – Define a custom percent to distribute the source cost to targets. The sum of all the percents must be 100.
2. **Proportional** – Creates a ratio proportional to the targets based on their cost. For AWS, the target's unblended metric value will be considered; for Azure, the target's cost metric will be taken into account.
3. **Even-Split** – Each of the targets receives an even percentage proportion of the total cost. For AWS, the target's unblended metric value will be considered; for Azure, the target's cost metric will be taken into account.

Cost allocated as per the allocation rules will appear in cost report. The cost assigned to the target accounts/subscriptions, service types, or regions will appear as allocated cost in the cost report grid view. The cost transferred from the source accounts/subscriptions,

service types, or regions will appear as drained cost with a minus sign in the cost report grid view.

It is important to note that cost allocation does not change your cloud billing invoice and billing responsibilities. It only helps you in setting a charge back rules within your organization. To know more about using and seeing the impact of cost allocation, see our documentation for Cost Allocation.

Enhancements

- AWS billing configurations now allow you to specify margin and discount amounts in the customer's currency to whom the billing configuration is applicable.
- A list of available tags within your AWS and Azure cloud account can now be found under Tags.
- To aid in the cost allocation feature, AWS and Azure cost reports now include three additional metrics: allocated cost, drained cost, and net allocated cost
- The VMware cost report now features a new dimension called service tier. The service tier dimension can be used to split the virtual machine's cost into its component elements, such as CPU and memory.
- The AWS idle running and stopped EC2 service adviser export CSV now includes a max memory column. When the memory parameter is enabled, the maximum memory use percentage for an EC2 will be shown in the max memory column. The memory parameter will show N/A if it is not enabled.
- AWS cost reports now include a new metric called Amortized - Including Saving Plan. It will be calculated as Reservation EffectiveCost + SavingsPlanEffectiveCost + Unblended Cost.
- A new option labelled as 'Do you want to include Office 365 charges on cost report?' has been added in the other configuration tab to the Azure CSP billing adapter creation page. When this option is enabled, users can see office 365 costs in their Azure CSP cost reports. By default, this option would be disabled.
- Reporting API endpoints for filter options are updated to produce a list of available tag_keys and tag_values based on filter type parameter selection.

- AWS, Azure CSP, and GCP cloud provider users can now choose the metric type for margin and discount calculations while creating or updating their billing adapters.

Bug Fixes

- Bug stopping to list AWS savings plans utilization and recommendation details for subtenant and child organisation accounts has been fixed.

2.10.3.2. November 2023

- The Service adviser Telemetry Configuration for AWS unoptimized EC2 right sizing now has new checkboxes for eliminating AMD and Graviton processor-based EC2 instances from the AWS service adviser right sizing list.
- To display or conceal the EC2 suggestions based on the CSMP default algorithm, a new option button, "Enable/Show Default Recommendation" has been added to the Service Adviser Telemetry Configuration for AWS EC2 Right Sizing. When the "Enable/Show Default Recommendation" option has been disabled in the Service Adviser Telemetry Configuration page, the MES column in the EC2 right-sizing list will be labelled as Custom MES, and it will display the savings value calculated based on the assumption that custom recommendation size EC2 will be opted for.
- CPU utilization and memory utilization values can now be updated on the Service Adviser Telemetry Configuration page for AWS EC2 Right Sizing by users.

Bug Fixes

- The bug limiting the application of the AWS EC2 right-sizing service adviser configuration exclusion settings has been resolved.

2.10.3.3. October 2023

- CSMP SaaS product is now available on AWS Marketplace.
- The dimension 'Has Partner Earned Credit' has been added for the Azure CSP cost report and cost analysis. The additional dimension would recognise if a partner earned credit is applicable for the resource, resource group, or subscription or not. If the dimension 'has partner earned credit' is marked 'true', it means that the partner earned credit is applicable for the resource, resource group, or subscription. If the dimension 'has partner earned credit' is marked 'false', it indicates that the partner earned credit is not applicable for the resource, resource group, or subscription.
- The AWS Savings Plan report is now accessible for reseller accounts as well.
- A new filter, 'Recommendation Level', has been added for the recommended savings plan.

Bug Fixes

- The bug stopping to synchronise all the AWS services for a billing account to CSMP using CloudTrail has been fixed.
- The bug stopping to record the user activities performed under the service manager module for the AWS database category has been fixed.
- The bug stopping to record the user activities performed to reload the AWS adapter’s VPC list using the adapter’s action option has been fixed.
- The bug that stopped updating the costs displayed on the budget page associated with groups has been fixed.
- The bug that stopped updating service adviser recommendation for Azure government subscriptions AHUB and rightsizing has been fixed.
- The bug stopping to synchronise all the AWS reserved instances for a billing account to CSMP reserved instance report page has been fixed.

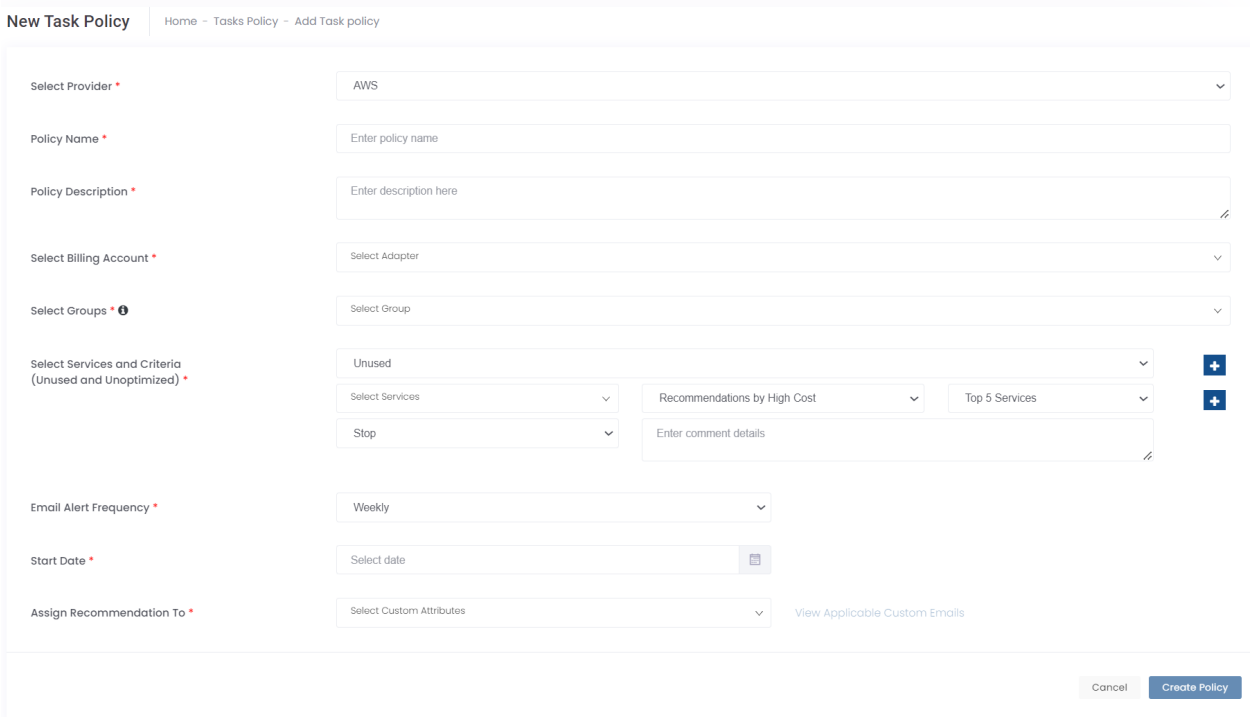
2.10.3.4. September 2023

- Creating Task Policies to Auto Assign the Service Adviser Recommendations for Action
- Introducing Cost Analysis to Analyse Your Cloud Expenses

Creating Task Policies to Auto Assign the Service Adviser Recommendations for Action

Each CloudBolt CSMP service adviser recommendations can be assigned as a task to your team and ask for their action to scale the assigned cloud service using the existing *Assign Task* action option. The existing *Assign Task* action option requires more manual intervention starting from the identifying the correct service recommendation for action to assigning the correct user(s).

Recommendation Task Policy is a new feature that helps you automate service adviser recommendations as task assignments to your CloudBolt CSMP account peers. It uses monthly estimated cost (MEC) to identify the services/resources within the selected service type to decide the task assignments. Typically, you can have one policy for a billing account with multiple adapter groups (groups), service types, and criteria specified. This new feature uses the email ids added as custom data for groups to send task assignment notifications at a set alert frequency.



Users of the default tenant who have all action access enabled for their role in the Task Policy Management module can create task policies to suit their needs. To know more about the creating and managing task policies, see our documentation for Recommendation Task Policy.

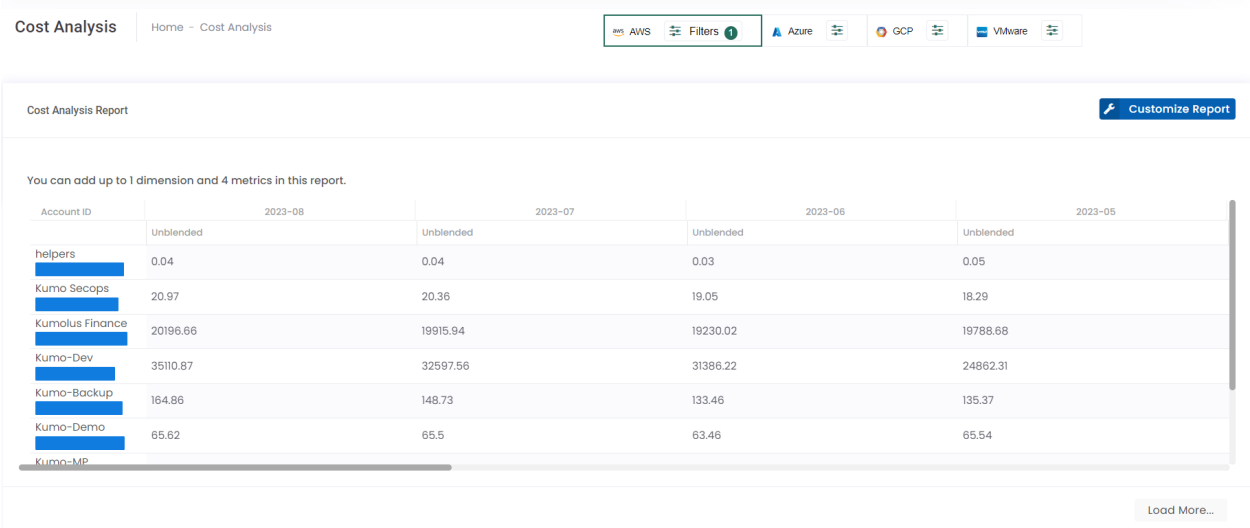
Introducing Cost Analysis to Analyse Your Cloud Expenses

As an administrator or account manager in your organisation, you and your team have been using various cloud services for the last several months. They have created multiple resources that cost money. The need for you is to understand and analyse which cloud resources or team are the primary drivers of your monthly bill.

Cost analysis is a new feature in CloudBolt CSMP that lets you view aggregated costs over the last 12 months period of time. This view helps you understand your team spending habits.

You can view different cost types, such as unblended or customer cost, or net cost, etc., at different dimensions, such as for an account ID or subscription or project or billing entity or resource group or specific tags, etc. Cost analysis report can be visualised by filtering your cost data based on filter options such as billing account, subscriptions, regions, services, tags, etc.

To know more about using cost analysis feature, see our documentation topic for Cost Analysis.



Enhancements

- Task policy management module has been introduced in the access management to control the Recommendation Task Policy features permission.
- Task policy filter option has been introduced in the service adviser page to filter the automatically created tasks based on the selected task policy name(s).
- Show task policy has been added as a new action option for a service adviser task to display the task policy name which automates the selected service adviser task creation. This option is available only for the tasks available under Initiated by Me tab.
- Cost analysis action has been introduced under the financial module of access management to control access to the cost analysis feature.
- The accounts, subscriptions, or projects selection list cannot be updated while editing a group that was formed using the 'Select All' option to pick every account, subscription, or project.
- The billing configuration would not process various margins and discounts for those AWS accounts that are part of a selected AWS group that has been manually created based on an account tag other than a customer tag key. Such groups must

be governed by a group policy for AWS groups in order to properly process the billing configuration data.

- A group will be marked as empty and an info icon with the message "This group is marked as empty as the normal accounts associated with this group are currently not available in this tenant" will appear on the groups list page whenever all of the group's associated normal adapters are deleted or unshared. Additionally, such groups would not be available for selection in any other module such as billing configuration, budget, cost report, etc.
- An AWS group created using account tag selection and the 'Select All' option will keep the adapter count labelled as 'All' even after those account tags have been removed from all of the AWS accounts. In the future, any sub-accounts of the chosen billing account that are assigned the chosen account tags will become part of such a group.
- The APIs responsible for fetching groups data on the dashboard and cost reports have been improved for their response times.
- If you recently added an account tag to your AWS account, you would need to wait up to 24 hours before all the relevant normal adapters are displayed in the Select Accounts drop-down list when creating or updating AWS groups.
- A new drop-down for region selection has been introduced on the CloudBolt CSMP account sign up page.
- Dashboards, cost reports, and cost analysis multiple tag key-value pairs can now be combined with the 'AND' or 'OR' operator.
- Usage quantity metric has been added to display the consumed quantity of VMware services for the VMware cost report.
- CSMP accounts will log out automatically after 4 hours from the account login time.
- The name of the favourite report that is currently displayed on the screen will be shown on the cost and RI report pages.

Bug Fixes

- Bug restricting to download cost report .CSV file has been fixed.

- Bug stopping to download a cost report correctly having special characters has been fixed.
- Bug stopping to sort the grid cost report such that the most recent date or month appears at the top has been fixed.

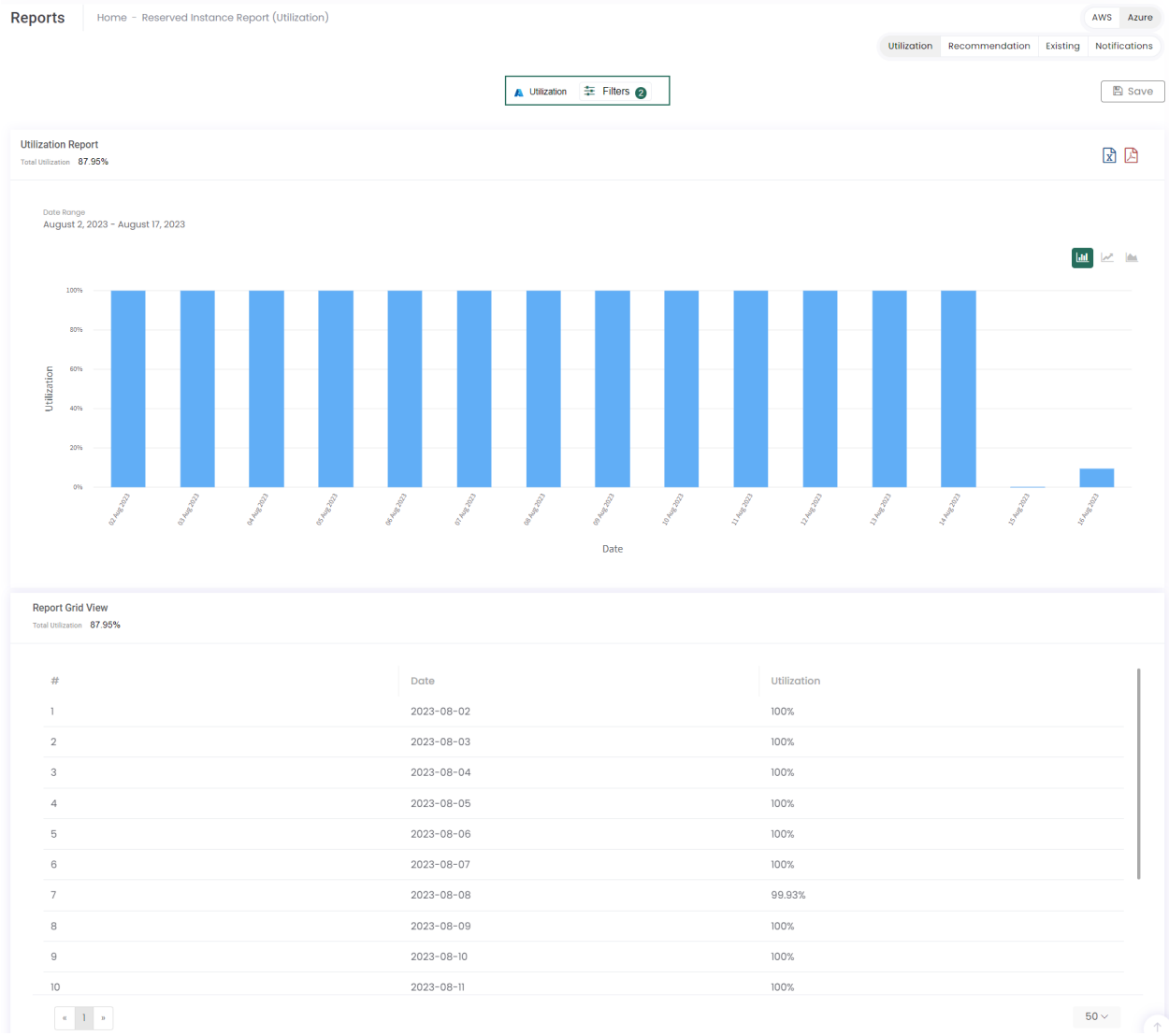
2.10.3.5. August 2023

- Introducing Azure Reserved Instances Utilization Report
- Introducing Invoice Date to Control Past Months Report Data Reprocessing
- Introducing Additional Custom Charges Field in AWS Billing Configuration

Introducing Azure Reserved Instances Utilization Report

Azure Reserved Instances (RI) is a pricing option that allows you to set aside space on a subset of virtual machines for a period of one or three years. By prepaying and committing to the Azure virtual machine and compute component, you might reduce the cost by up to 72%. Reservation discounts for Azure are "use it or lose it" offers. For each hour that you don't have the necessary resources available, you lose a portion of your purchased reservation. CloudBolt CSMP provides Azure Enterprise Agreement (EA) administrators and Microsoft Customer Agreement (MCA) billing administrators with a set of reports on the utilization level of their Azure Reserved Instances (RI).

The utilization report shows how well the designated billing account is using the reservations you've made. The proportion of purchased reservation hours that your instances have used over the allotted period is shown in the utilization report chart and grid view. The 100% usage line at the top of utilization report chart indicates that every one of your reservations is completely utilized.



You can use this report to identify opportunities to increase the utilization of already purchased reservations by modifying the reservations or adjusting workloads to better fit your current bookings. You can filter the utilization report scope using the filters setting on the top of the page.

You may also save your custom-filtered usage report as favourite report for later research or team sharing.

For more information on Azure RI utilization report, see utilization section of our documentation for Azure Reserved Instance Report.

Introducing Invoice Date to Control Past Months Report Data Reprocessing

Being an MSP or CSP administrator invoicing to your resellers/customers is one of the most crucial operations. Committing mistakes or making frequent changes to the invoices can lead to serious ramifications. To help you with invoices for your resellers/customers, CloudBolt CSMP provides you an option to reprocess cost data for individual billing adapters. Now, we are introducing option to set invoice date for each billing adapter. When a billing adapter's invoice date is specified, cost report data for the month prior is processed on that date and cannot be changed afterwards.

By default, invoice date feature will be disabled for each billing adapter. When users enable the invoice date feature, they need to select an invoice date. Default invoice date would be set to 10th day of each month. Invoice date is a date on which users will generate invoices in CloudBolt CSMP account to post them to their customers, resellers, or both. Once the current month's date has passed, the CloudBolt CSMP billing adapter won't be able to access the databases of their cloud provider to get the cloud costs changes for the previous months. However, the billing adapter will continue fetching the current month's cost data.

To know more about report data reprocessing based on invoice date, see Report Data Reprocessing Operation Matrix section of our documentation for Report Data Reprocessing.

Introducing Additional Custom Charges Field in AWS Billing Configuration

Being Managed Service Providers (MSPs) or resellers, you may need to apply chargeback rules or only want to impose a fixed margin or both to your payees. CloudBolt CSMP's billing configuration module already provides options to set margin and discount percent rules for AWS cloud usage billings. Now, we are introducing options in the AWS billing configuration module to charge for AWS accounts as a flat fee, or services as a flat fee, or a charge for each hour that an instance is running, or a combination of any of these.

Below table lists the types of billing configuration charges rules available in CloudBolt CSMP AWS billing configuration module.

Type	Description
Percentage of spend	Applies a percentage-based margin and discount in real-time to all the services/resources in the defined accounts of a billing configuration
Fixed	Applies a set monthly monetary value margin and discount to all the defined accounts of a billing configuration
Service type	Applies a set monthly monetary value margin and discount to all the chosen resources of the selected service type(s)
Usage hour	Applies a set hourly margin and discount value to all the chosen resources of the selected service type(s)

To know more about how to set and use different billing configuration charges rules, see our documentation for Create AWS Billing Configuration.

The AWS cost report will have new metrics Fixed Margin, Fixed Discount, Usage Hour Margin, Usage Hour Discount, Service Type Margin, and Service Type Discount showing the detailed charges in MSPs invoice. The new metrics Fixed Margin (R), Fixed Discount (R), Usage Hour Margin (R), Usage Hour Discount (R), Service Type Margin (R), and Service Type Discount (R) showing the detailed charges in resellers invoice.

To know more about how to use cost report to see specific charge types, see Customize Report section of Cost Report for AWS.

Enhancements

- Service adviser filters are now combined together using 'and' logic, which means that only those recommendations will be listed that meet all selected filter values.
- Selecting a group in service adviser group filter will automatically select all the normal adapters with 'active' and 'error' status in the adapter filter selection box.
- A group that contains at least one 'active' or 'error' status normal adapter will be considered for service adviser data filter.
- 'Account Tag Filters' and 'Custom Data Filters' are now added as SimpleForm view along with other filter settings parameters for groups filters. 'Account Tag Filters' option is available only for AWS groups.

- "This Month", "Next Month", "Next 3 Months", "Tomorrow", "Next 7 Days", "Next 14 Days", "Next 21 Days", "Next 30 Days", and "Next 45 Days" are now available as dynamic future date range selection options for cost report daily period selection.
- "This Month", "Next Month", "Next 3 Months", "Next 6 Months", "Next 9 Months", and "Next 12 Months" are now available as dynamic future date range selection options for cost report monthly period selection.
- Users can now hide spend overview chart.
- 'On demand monthly cost' and 'potential benefit monthly' columns are introduced for recommended Azure reservations purchase list. It helps in identifying the monthly cost and benefits upon the purchase of recommended Azure reservations.
- Reader access to Azure reservations can now be granted using Azure Cloud Shell command.
- SA Recommendation Task Management module has been introduced in the access management to control the service adviser recommendations task assignment features.
- Tasks list within the service adviser module can now be filtered by adapter, group and service Type using the filters setting for the selected cloud provider.
- Comments field within the service adviser's assign task page has been now changed to free text field. Users can now add detailed comments for the task. A task field with drop-down options, stop and rightsize, has been introduced. Selected task field option followed by added comments will appear in the comments column of the service adviser's task list.
- The service adviser's task list now includes a new column called 'Updated At'. Recently updated task would be displayed first.
- Multiple services/resources selection at once to bulk assign task for service adviser's recommendations is now available for Azure and GCP cloud users also.
- Service adviser assign task is now supported for AWS AMI, Azure Hybrid Benefit (VM), Azure Hybrid Benefit (SQL DB), and Azure Hybrid Benefit (Elastic Pool) service adviser recommendations.

- Task status column has been introduced to the service adviser recommendations list to identify if the listed service recommendation has been assigned as task to anyone or not.

Bug Fixes

- A bug causing Azure usage quantity to be displayed as total cost in the Azure cost report's spend overview and grid report view page has been fixed.
- A bug causing AWS usage quantity, saving plan hourly, on demand hours, and reserved hours to be displayed as total cost in the AWS cost report's spend overview and grid report view page has been fixed.
- A bug causing error in calculating the 'customer cost' metric value has been fixed.

2.10.3.6. July 2023

- Default tenant users can now share budgets to sub-tenants available within their CloudBolt CSMP organization account.
- Share access option has been introduced for budget module access management. By default, budget share option will be enabled for the CloudBolt CSMP default administrator role.
- Azure CSP data on CloudBolt CSMP dashboard can now be filtered by cost type(s) along with other filters.
- Pagination option has been introduced to display results per page for GCP customize report data. The default selection is 50 records per page. 'Load more' option button will load next page available for the customize report data result.
- Billing configurations can be created for past month(s). Existing billing configurations' applicability can be extended to past month(s).
- Philippine peso (PHP) currency is now supported for currency conversion. PHP can be set preferred currency. VMware rate card can be created in PHP currency. PHP can now be set as currency for an Azure EA billing adapter.
- You can now ignore, assign as task, and add/see comments for an Idle AKS service adviser recommendations.

Bug Fixes

- Bug causing to send duplicate security and compliance notifications has been resolved.
- Bug restricting to download AMI service adviser recommendations has been fixed.
- Bug restricting to sync Azure resource group with non-English character(s) in their name with CloudBolt CSMP web account has been fixed.

2.10.3.7. June 2023

- Introducing Wildcard and Operators for Searching Cost Report Filters Parameter Values
- Introducing X-Axis Customisation and Cost Group-by Options for Spend Overview Chart

Introducing Wildcard and Operators for Searching Cost Report Filters Parameter Values

When you don't know the full text, you want to search for or when you want to identify the kind of information you are looking for, you may now utilise special characters in your search. Wildcard and operators are the character and collections of characters that can be used to search a filter parameter value. Operators can be used to establish relationship between two or more string of characters with or without wildcard character entered in search field. To know more about how to use wildcard and operators for searching cost report filters parameter records, see Use Wildcard and Operators for Searching.

Introducing X-Axis Customisation and Cost Group-by Options for Spend Overview Chart

Spend overview chart within the cost report allows you to see a graphical representation of your cloud cost based on the applied filters. By default, the X-axis label for spend overview chart has been set to date or month based on your selection for date range option (daily/monthly) within the filters setting.

Now you can change the X-axis label as per your requirement. The existing filter parameter ‘View Multi-stack by’ has been removed from the filters setting area and moved under the spend overview chart area. The dimension of customise report can be set as the X-axis label whereas the metric of customise report can be set as the Y-axis label for spend overview chart. The new spend overview chart with custom X and Y axes label of your choice can be saved as favourite cost report along with other filters setting. For existing favourite cost reports where the filter parameter ‘View Multi-stack by’ was set to an option other than Overview, the date or month would be set as X-axis label based on the set date range option (daily/monthly). To know complete details about how to set X-axis label and

cost group-by option for spend overview chart, refer to our documentation describing the use of cost report tool to view your cloud provider costs.

Enhancements

- The current month's budget amount is now used to compute various budget percentages.
- GCP cost report page now supports CUD Discount as filter and metric options.
- Azure service adviser page now identifies the idle Azure Kubernetes Services (AKS).
- AWS and Azure existing RI details can now be exported as .CSV file.
- Security and compliance adviser notifications name must be unique.
- Idle and unused Azure app service plan details can now be exported as .CSV file using the ‘Export All’ option.
- Core APIs response time has been optimised.
- Two new default report profiles have been added for reseller’s account. Whenever any new reseller account is created, the two default report profiles would be automatically created in those accounts.
- "This Month", "Last Month", and "Last 3 months" are now available as dynamic date range selection options for cost report daily period selection.
- You can now fine tune the AWS RI, AWS SP, and Azure RI recommendations list by your budget value to purchase RI and SP.

Bug Fixes

- The Service Advisers module's bug that prevented it from immediately loading previous page data after removing all of its records from the last page has been resolved.
- Bug restricting to fetch and update AWS billing data has been fixed.

2.10.3.8. May 2023

- Assigning Service Adviser Recommendations to Team for Their Action

Assigning Service Adviser Recommendations to Team for Their Action

CloudBolt CSMP always focuses on optimising and managing the cost of your cloud resources and services by identifying cost-saving opportunities by providing recommendations to downsize or terminate your idle cloud resources and services. It's crucial to confirm that the cloud resources you utilise are the best match for your workloads. Under-provisioning can cause performance concerns while over-provisioning can result in wasteful expenses. CloudBolt CSMP *Cost Service Adviser* module helps you to identify resources that are either over or under-utilized.

Being a cloud account administrator with right permissions, you can then adjust the size of your cloud resources to better match your workloads. In some cases, even if you have the ability to re-provision an existing cloud service, you may require your team or individuals utilising that particular cloud resource or service to decide and act the re-provision or shut down action. Using the *Assign Task* option found in the action column of a particular service, you may now ask your team or individuals to complete the required action.

When you assign a task to someone, the assignee will receive a notification via email. The assigned task with the current status will list under the Tasks tab of service adviser page for specific cloud provider. After performing the required action for cloud resources and services, assignee can update the comment and status of the assigned tasks to them. Once the assigned task has been completed by assignee, assigner will get an update about the task via email. To know more about using *Assign Task* option, see Use of Assign Task Option for a Service Adviser Recommendation.

Enhancements

- 'Load more' option button has been introduced on GCP customize report page to feed more content when clicked and would be active until all contents are loaded. By default, every page will display 2000 records.

- Existing billing configurations can now be edited to update margin and discount percents for past months. A billing configuration that is currently in force and whose expiration month is either the current month or a future month can also have its applicability extended.
- Report data reprocessing history will be available to all the users having administrative permissions and default tenant access.
- Triggering report data reprocessing will now consider billing configurations available in both parent/distributer account and reseller account for the selected billing adapter and month.
- AWS, Azure, and GCP cost data displayed on dashboard widgets can now be filtered by adapter groups in addition to other existing filters.
- Cost Report data for AWS, Azure, and GCP providers can now be filtered based on adapter groups.
- Filters area in a service adviser page and budgets page has been improved by adding the filter combination logics among the available filters.

Bug Fixes

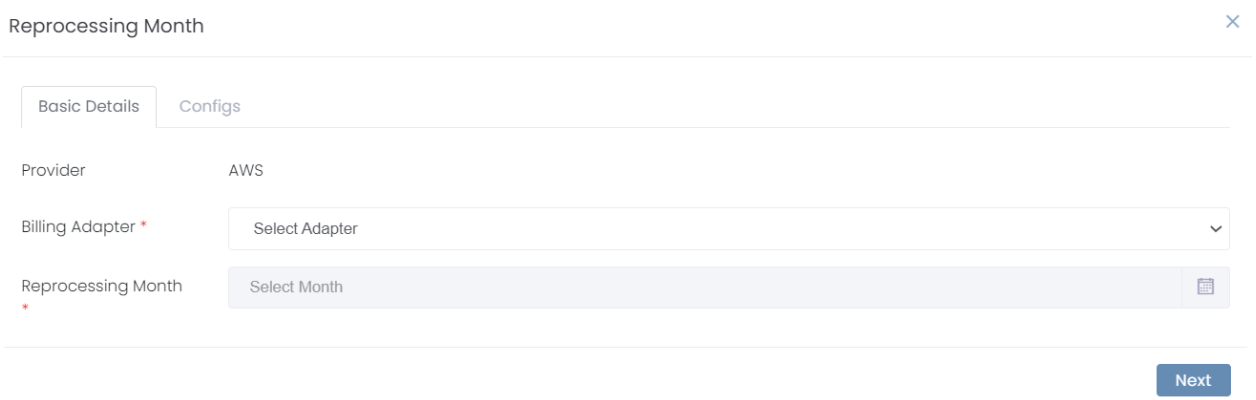
- Bug restricting to view the applicable services details for an existing event under event scheduler has been fixed.

2.10.3.9. April 2023

- Introducing Cost Data Reprocessing Functionality for Past Months
- Introducing Interactive Filter Functionality for Dashboard
- Introducing Interactive and Intuitive Filters for Cost Report
- Introducing Adapter Groups Creation Based on Pre-Defined Groups Policy for AWS, Azure CSP, and GCP Billing Adapters

Introducing Cost Data Reprocessing Functionality for Past Months

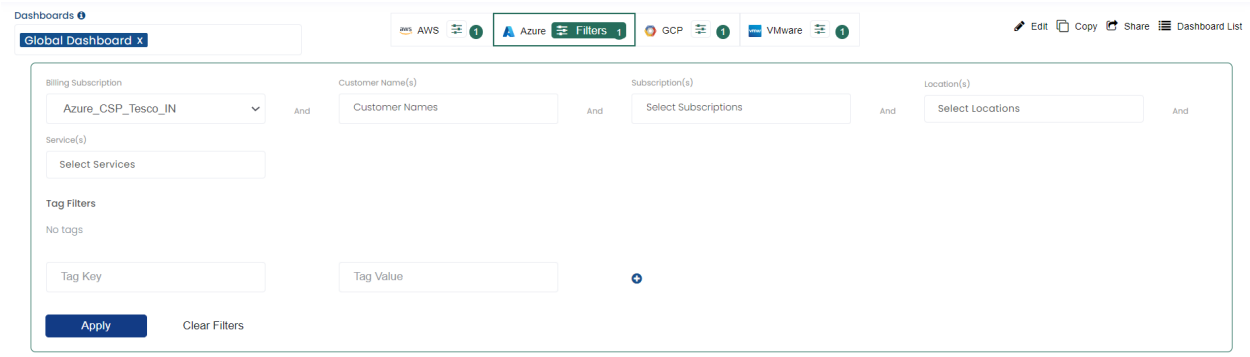
If your customer asks for a discount even after sending the final invoice to them for past months, it becomes challenging for you to recalculate the cost to adjust those discounts. But now you don't need to chase CloudBolt CSMP support team to regenerate the past month cost data with new margin and discount percent.



Till now all the cost data processing were done from backend support. Now we have introduced an URL, using that an admin user of a parent organisation (Distributer) can regenerate the cost data for past months as and when required. An admin user needs to select a billing adapter for which data reprocessing is required along with the month. The cost data will be processing within few minutes depending on the volume of data. To know more about reprocessing functionality, refer Report Data Reprocessing.

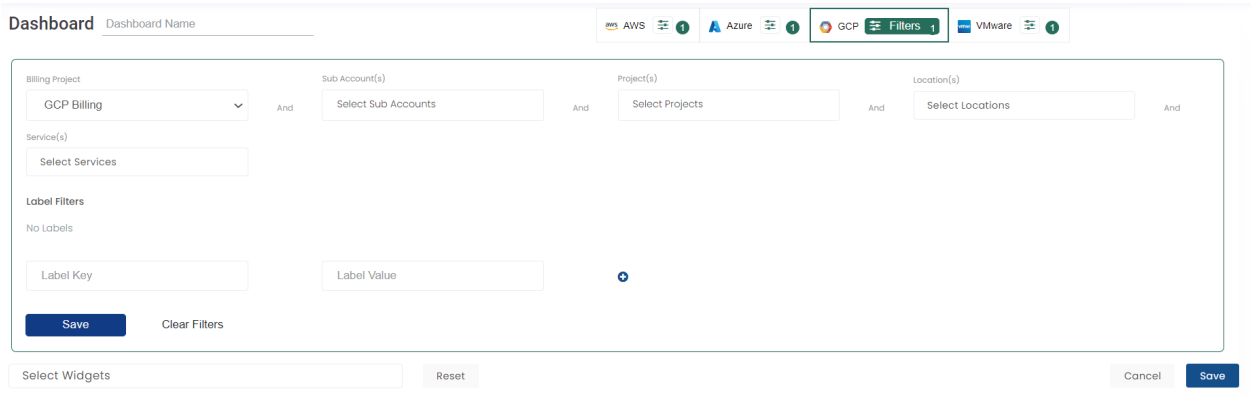
Introducing Interactive Filter Functionality for Dashboard

Users can apply many data perspectives to a single dashboard with the use of dashboard filters. Filters for dashboard has become more intuitive. Now, filters appear as a ribbon at the top of dashboard. You can click the filters button for a specific cloud provider to expand and collapse the filters setting area. Enabled filters count for a specific cloud provider would display in green circle within the cloud providers tab.



After selecting the values for required filters, click Apply button within the filter area for that cloud provider to reflect the dashboard widgets value as the set filters value. It is important to note that all filters for individual cloud provider are combined together using 'and' logic. To know more about dashboard filters, see Filter Dashboard Data.

This interactive filter is not only restricted to an active dashboard data filter, we have now introduce this feature to create a user-generated dashboard. You can apply various filters while creating a dashboard for yourself of team.

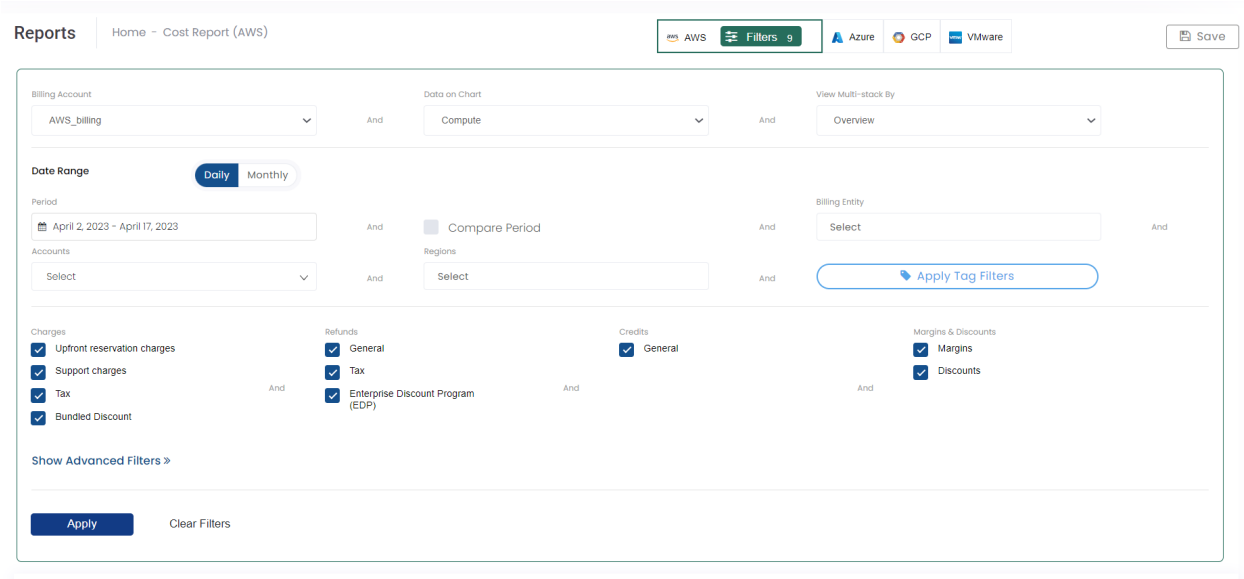


Introducing Interactive and Intuitive Filters for Cost Report

Filters are a key part of any report. Earlier we were using filter fields and multi series tabs to screen the cost report data. Now we are introducing a more interactive and consolidated

filter options to apply a set of values and narrow the results, which help provide more accurate and crisp cost data required by you.

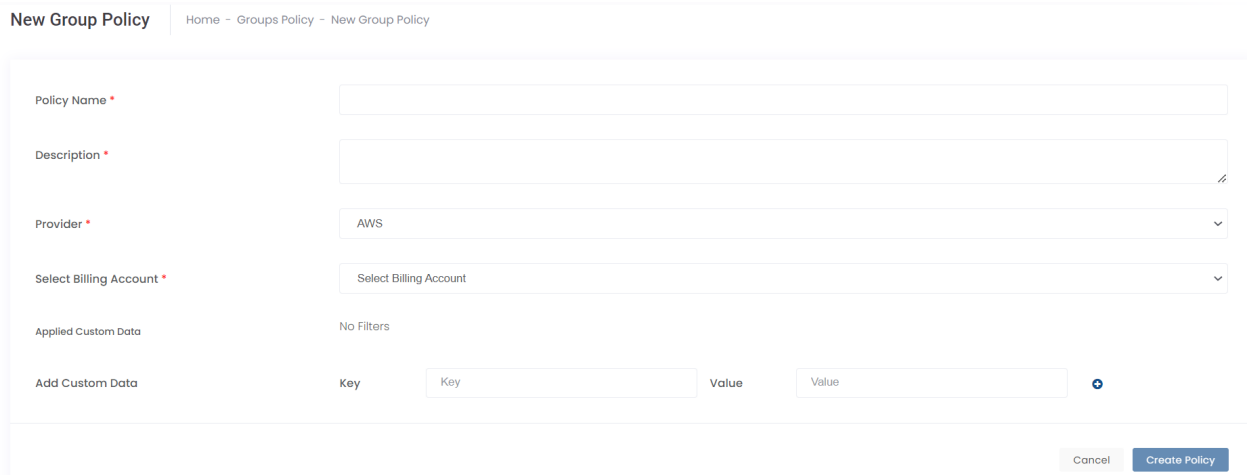
The Filter Result widget is now shown at the top of a cost report as a ribbon. The cloud provider would be chosen using this ribbon, and then the filters button would be used to expand and contract the configuration area for the filters. The number of filters that are activated by default will be indicated in a green circle within the filters button area for that cloud provider. The filters count varies as a filter value is enabled or disabled. When you have configured all necessary criteria, click the Apply button to arrange the cost report value on the Spend Overview widget in accordance with the selected filter values. All filters for individual cloud provider are combined together using 'and' logic. To know more about new filters feature and functionality, refer cost report for specific cloud provider as per your requirement.



Introducing Adapter Groups Creation Based on Pre-Defined Groups Policy for AWS, Azure CSP, and GCP Billing Adapters

When your cloud provider billing account has many secondary accounts linked with various tags, customer IDs, or sub-accounts, it can become difficult to track their costs, aggregate them to share with your CloudBolt tenants and child accounts, report on them, or take bulk actions on them. Grouping such accounts based on tags (for AWS), customer IDs (for Azure CSP), or sub-accounts (for GCP) can make your life easier. But if you have hundreds of tag key-value pairs, customer IDs, or sub-accounts, it becomes difficult to create hundreds of groups manually. *Groups policy management* allows you to define groups

creation policy for a billing adapter. You can then use those groups to help you manage your cloud accounts as per your business needs.



The *Groups policy management* provides you a template where you can select a billing adapter of your cloud provider for which groups need to be created. Once policy is created, the normal adapters groups for the selected billing adapter would be created automatically within the 24 hours based on the policy you defined. To know more about how to use group policy feature, see Groups Policy Management.

Enhancements

- AWS RI utilization filter has been improved to give more intuitive and interactive design.
- AWS cost report grid view can now be filtered based on billing entity. A billing entity identifies whether your invoices or transactions are for AWS Marketplace or for purchases of other AWS direct services.

Bug Fixes

- Bug restricting to schedule a new event under event scheduler has been fixed.
- Bug restricting logging in a reseller's customer account has been fixed.
- Bug restricting the access to Azure security compliance report detailed view has been fixed.

- Bugs restricting to add new AWS Key pairs and S3 bucket using service manager page have been fixed.
- Bug restricting to download unused AWS AMI report from the cost adviser page has been fixed.
- Bugs restricting to acknowledge and display user activities related to AWS and Azure services tags update using service manager page have been fixed.
- Bug restricting to display services list on service manager page as per shared adapters for a child organisation has been fixed.
- Bug causing to display improper adapter counts for a group that is created by selecting all the normal adapters has been fixed.
- Bug restricting child organisation admin users to create groups for their own created normal adapters has been fixed.
- Bug restricting to add a new Azure Route table using service manager page has been fixed.
- Bug causing first time login error for new accounts has been fixed.
- Bug restricting to utilise cost service adviser's ignore functionality for AWS EC2 right sizing recommendation for South America (São Paulo) region has been fixed.

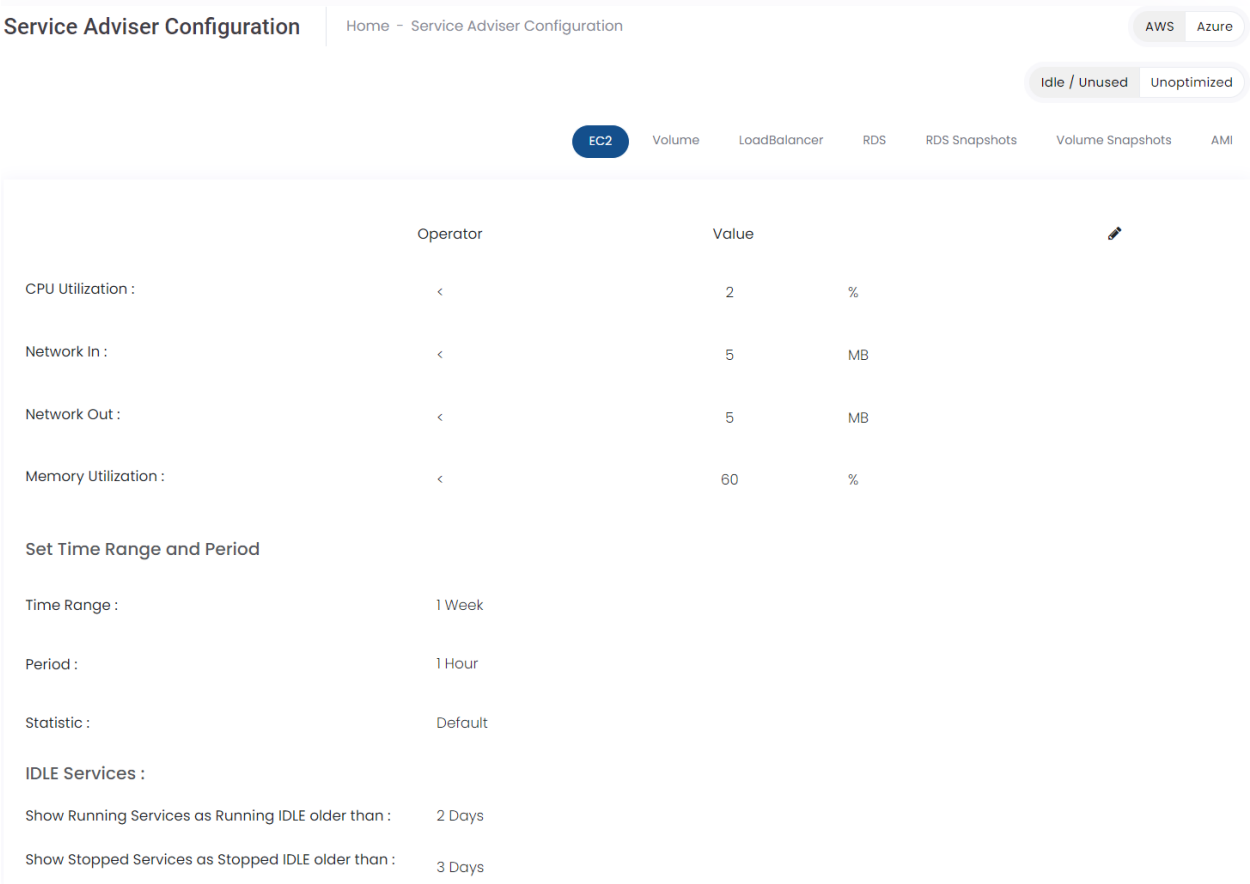
2.10.3.10. March 2023

- Introducing p95 Percentile on AWS EC2 and RDS Service Adviser Telemetry Configuration Page
- Introducing Service Adviser Telemetry Configuration Page for Various Azure Services

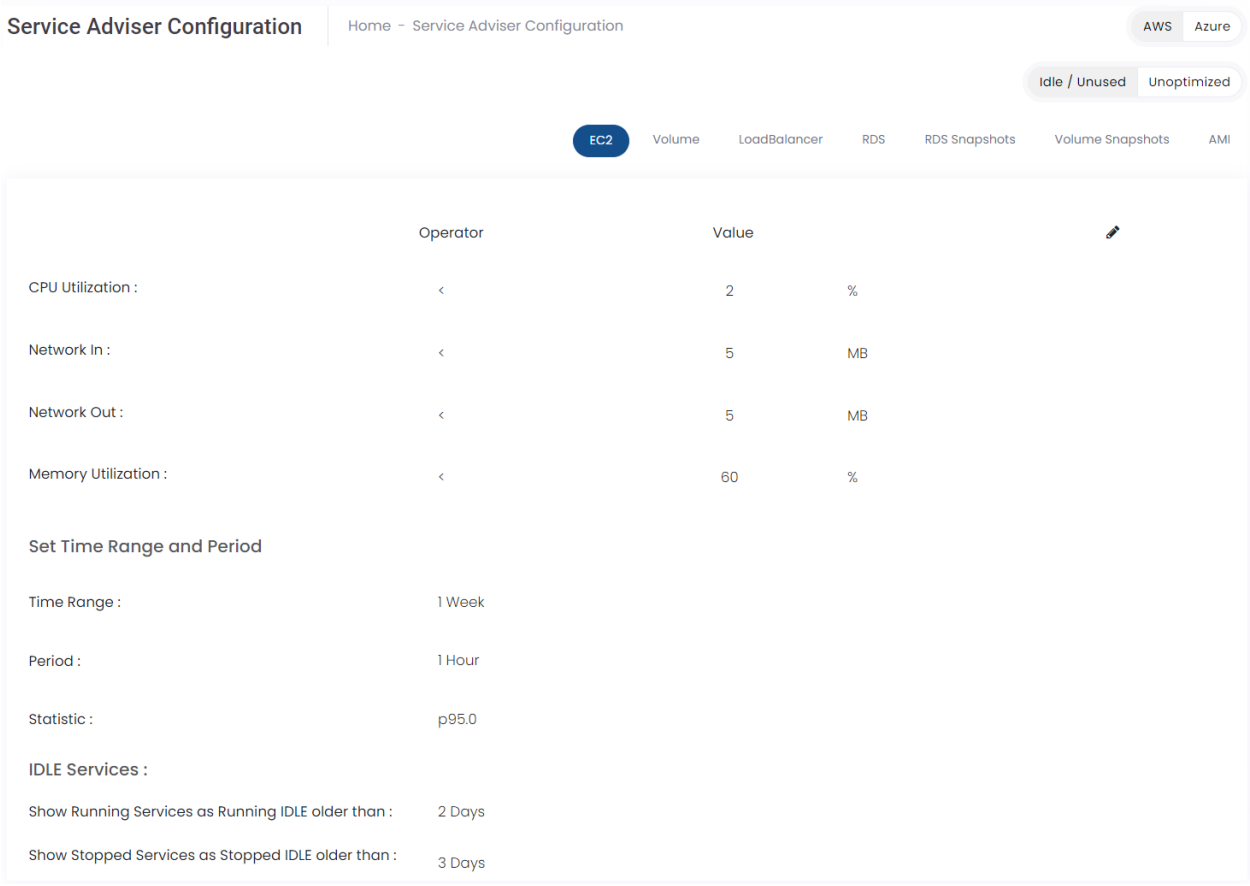
Introducing p95 Percentile on AWS EC2 and RDS Service Adviser Telemetry Configuration Page

If you care about your AWS cloud services cost, you would be interested in identifying the unused and idle AWS services. CloudBolt CSMP application provides you a list of unused and idle AWS services based on average aggregations of usage telemetry within the time period you specify.

Till now we were using averages of metrics within the time period defined by you to consider an AWS EC2 and RDS as idle. Now we are introducing the percentile concept to give you more granular access that will help monitor and measure your EC2 and RDS usage details and consider for service adviser recommendations with more precision. We are using p95, which refers to the 95th percentile data and means that 95 percent of the usage metric data within the period is lower than the value you specify and 5 percent of the data is higher than the value you specify. For example, to consider an EC2 instance as idle you have specified the CPU Utilization must be less than 2%, Network In must be less than 5 MB, Network OUT must be less than 5MB, and Memory Utilization must be less than 60 % for a time of one week with a period set as one hour to aggregate the data and statistic set to default. Now that the statistic is set to default (average), our service adviser module will analyse the usage metric of EC2 instances and only take into account those EC2 instances for idle recommendation whose aggregate metrics average are within the designated limit for each one-hour point over the course of one week.



In another case, to consider an EC2 instance as idle you have specified the CPU Utilization must be less than 2%, Network In must be less than 5 MB, Network OUT must be less than 5MB, and Memory Utilization must be less than 60 % for a time of one week with a period set as one hour to aggregate the data and statistic set to p95.0. The statistic is now set to p95.0, and our service adviser module will analyse the usage metric of EC2 instances and consider those EC2 instances for idle recommendation whose aggregate metrics average are within the designated limit for at least 95% of all one-hour points over the course of one week.



To know about how to set p95.0 statistic for service adviser configuration, see Configure Service Adviser Telemetry.

Introducing Service Adviser Telemetry Configuration Page for Various Azure Services

CloudBolt CSMP service adviser recommends solutions that can help you improve your cloud resources cost effectiveness, performance, and reliability. To recommend a solution for your existing Azure cloud resources, we analyse your resource configuration and usage telemetry for a pre-defined (default) time period.

You can now configure the limits for your Azure resources usage telemetry to receive recommendations based on those specified telemetry. Service adviser configuration page can now be configured to define usage telemetry data for Azure elastic pools, app service plan, blob, snapshot, VM rightsizing, and RDS rightsizing. To know more about how to configure service adviser telemetry for various Azure services, see Configure Service Adviser Telemetry.

Enhancements

- A tenant and child organisation (reseller/customer/child) can now create adapter groups for the normal adapters which are shared with them by parent organisation or owned by their account. For example, if parent organisation has shared 5 normal adapters out of total 7 normal adapter of a billing adapter, then user can create a group for those 5 shared normal adapters only.
- Adapter groups module has been improved to restrict the access of cost data based on the normal adapters shared to a tenant or child organisation account.
- VMware billing configuration margin and discount percent updated for the current billing cycle can be considered immediately for net cost computation.
- Service adviser recommendation for Azure Idle VM will now consider Network In, Network Out and Memory utilization metrics in addition to CPU utilization percent.
- 'Load more' option button has been introduced on Azure customize report page to feed more content when clicked and would be active until all contents are loaded.
- Now whenever Groups page is opened, the default selected cloud provider tab would be the one which have groups created for. The hierarchy of default tab selection based on the availability of groups for the cloud providers would be AWS, Azure, and GCP.
- A temporary locking out a user after 10 incorrect MFA code guessing has been introduced. A warning message will display about the login attempts remaining after the 8th incorrect MFA code entered.
- The MFA reset option link will become invalid after the first use of the MFA reset link provided in the email. Validity for use of the MFA reset link has been set as 3 days, else user needs to request for a new MFA reset email.

Bug Fixes

- Bug stopping to filter AWS AMI cost service adviser list based on tags has been fixed.

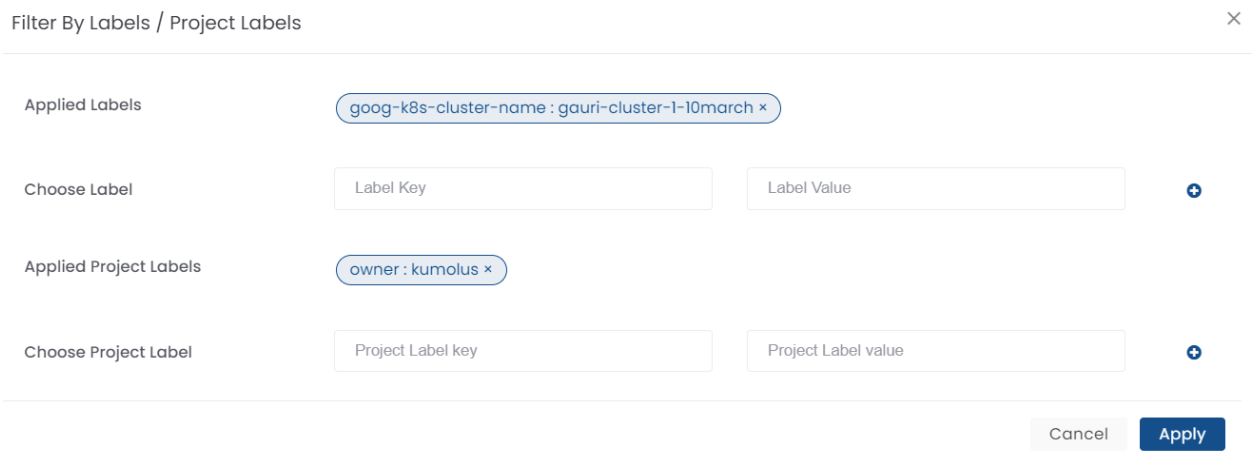
2.10.3.11. February 2023

- Introducing GCP Project Label as Filter and Dimension in Cost Report
- Including Associated Disk Cost in VMware Virtual Machine Cost
- Introducing AWS Bundled Discounts

Introducing GCP Project Label as Filter and Dimension in Cost Report

GCP label is a key-value pair that helps to break down the Google Cloud resources charges by label. Whereas the project label is a key-value pair that helps to break down the Google Cloud resources charges at project level. It is very important for customers to filter the GCP Cloud resources charges at project label.

GCP cost report can now be filtered by labels and project labels. In this release, we have enabled project label filter to filter the GCP cost report based on project label kay-value pairs. In the *Apply Label filters* page an additional option for project labels is added. *Apply Label filters* is renamed as *Apply Label/Project Label Filters*. User can add project label key and value in the appropriate boxes and click + icon to add as filter criteria. In the GCP customized report, labels key, labels value, project labels key, and project labels value dimensions are deleted. New dimensions *labels* and *project labels* are added to group resource labels and project labels available in the selected billing account respectively. To know more how to filter GCP cost report based on labels and project labels, see Cost Report for GCP.



Including Associated Disk Cost in VMware Virtual Machine Cost

A virtual machine in VMware contains a datastore to store files including log files, scripts, configuration files, virtual disks, and so on. A datastore is therefore a necessary component of a virtual machine in the VMware cloud, and as a result, a virtual machine also costs for the datastore. A component that displays the total cost of a VM combined with its datastore is currently missing from customized reports for VMware. The cost of the VM, including the cost of the datastore, must be shown in a dimension.

In this release, a new dimension labelled as 'VM Cost (Including Datastores)' is introduced to show the VM cost including the cost of associated datastore. Itemized cost data will display the breakdown of VM and associated datastore cost. Using 'VM Cost (Including Datastores)' dimension customer can view the cumulative cost for a virtual machine. To know more on how to customize your VMware cost report based on dimensions and metrics, see Cost Report for VMware.

Introducing AWS Bundled Discounts

In this release, we introduced bundled discount for AWS cost. A new metric named 'Bundled Discount' is added in customized report as well as filter option. By default, Bundled Discount filter option would be checked. Using 'Bundled Discount' metric users can view the bundled discount value received in you AWS billing. To know more about how to filter AWS cost for bundled discounts, see Cost Report for AWS.

Enhancements

- Dashboard data can be filtered based on various filters such as accounts, subscription, currency, location, services, tags, etc. A filtered dashboard can be saved as user-generated dashboard as well.
- New endpoints have been added in Swagger API to create and manage billing configurations.
- The Support link URL field for white labelling will accept either a valid email address or a website URL.

- Report profiles settings can be used to control the cost value type displayed on child and tenant account dashboard widgets.

Bug Fixes

- Bug causing the notifications created in Default tenant account accessible in sub-tenant account and vice-versa has been fixed.

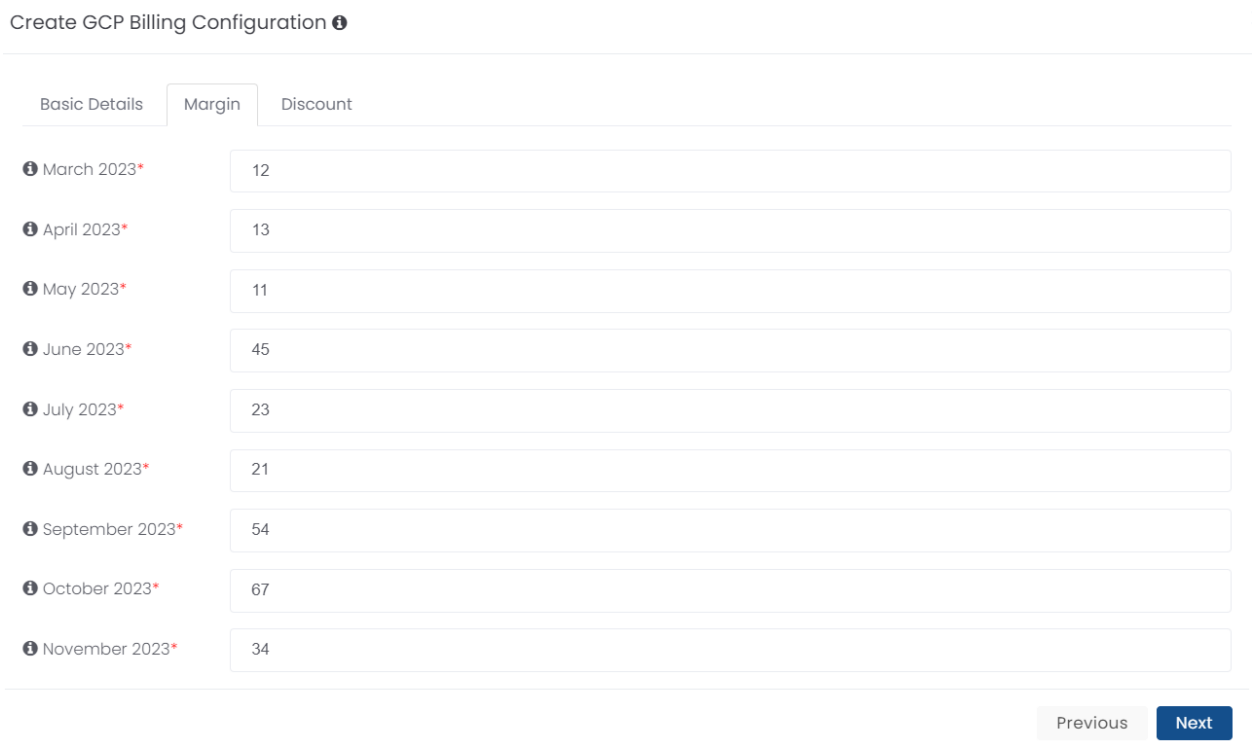
2.10.3.12. January 2023

- Configure Unique Margin and Discount Percent for Each Month in the Billing Configuration
- Filter VMware Cost Report Based on Tags

Configure Unique Margin and Discount Percent for Each Month in the Billing Configuration

An administrator can create a billing configuration for n number of months using a single set of margin and discount percentages. If an administrator wants to set varied margin and discount percentages on a month-to-month basis, administrator must either build separate billing configurations for those months or adjust margin and discount percentage values before each billing cycle.

In this release, user can create single billing configuration for a set of cloud accounts with varying margin and discount percent on a month-to-month basis. The user can enter the margin and discount percent data at the beginning and change it during or before a billing cycle. For more information on how to configure and manage a billing configuration, see Billing Configuration.



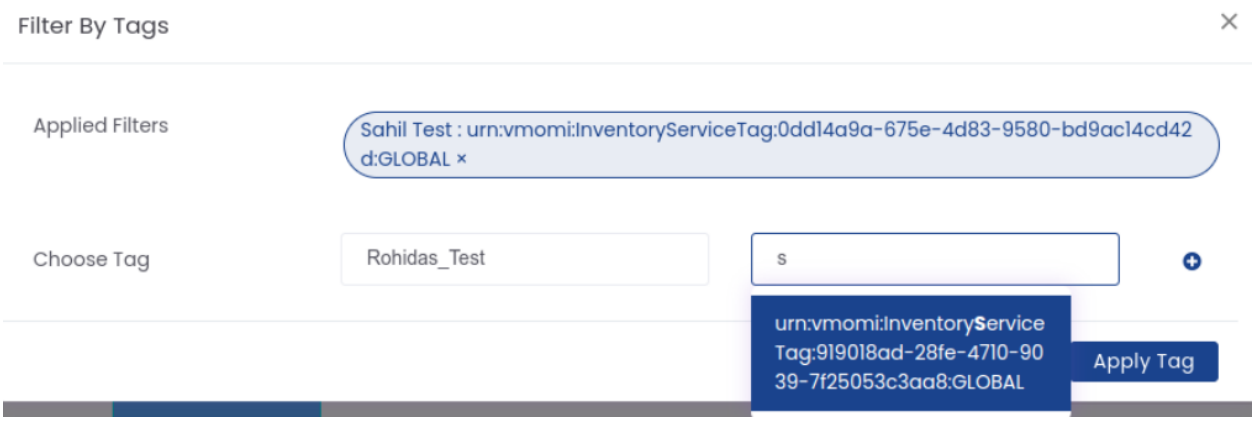
Filter VMware Cost Report Based on Tags

For VMware cost report there was no way to specify dimensions to customize a VMware cost report based on tag key and value.

In this release we added support for below VMware cost report

1. Existing 'Apply Tags/Resource Provider Ids Filters' modal has been changed to 'Apply Tag Filters'. Apply tag filters would be used to filter the cost report based on tag key-value pairs.
2. Resource provider ids and resource name have been added as filter option outside the 'Apply Tag Filters' modal.
3. New dimensions 'Tags Key' and 'Tags Value' have been added under customized report module for VMware.

VMware cost report can be now filtered based on services, resource names, resource provider ids, and tag key-value pairs. Customized cost report can be prepared using resource tag key and tag value. To know more about VMware cost report filter methods, see Cost Report for VMware.



Enhancements

- Billing configuration margin and discount percent updated for the current billing cycle can be considered immediately for net cost computation.
- API response time has been improved to load adapter groups list to be used as filter in various modules.

- Account filter has been added to the AWS savings plans existent and recommended list, as well as to a reserved instances recommendation list.
- ‘Select All’ option button has been introduced to select all the normal adapters of an individual Azure billing adapter while creation an Azure adapters group.
- Info tool tip has been added next to Azure single subscription and CSP billing adapters which are in error status to display the error details.

Bug Fixes

- A bug that caused the displaying of a blank cost report when a group tag is used has been fixed.
- Bug that delays fetching all the subscriptions under multiple Azure CSP customer ids while creating or updating an adapter group has been fixed.
- Bug that causes to cancel few APIs while changing the tenant has been fixed.
- Bug stopping the click operation of header bar menus has been fixed.
- Bug causing to synchronise individual Azure resource multiple times resulting in duplicate DB record creation which in turn displays inappropriate monthly estimated savings for idle databases on CSMP cost service adviser page has been fixed.
- Bug causing to calculate higher actual cost for E8-4as_v4 series VM has been fixed.

3. Getting Started

Learn about the CloudBolt Cost and Security Management concepts, browse the Getting Started guide, or jump right into the documentation.

Introduction

Welcome to CloudBolt Cost and Security Management!

Goal

The goal of the Getting Started series is to introduce you to the terminology and modules you will find in CloudBolt Cost and Security Management. This page will quickly introduce the core components when working with CloudBolt Cost and Security Management.

Getting Started Overview

1. How it all works
2. Adapters

How it all Works?

CloudBolt Cost and Security Management enables self-service and provides analytics and actionable insights around Cost and Security Management for your Cloud Services.

CloudBolt Cost and Security Management connects to your Cloud environments using Cloud Provider APIs (AWS / Azure).

- Discover existing Cloud services and use CloudBolt Cost and Security Management to manage Environments / Services.
- CloudBolt Cost and Security Management collects and reports on all Cost Management / Optimization-related information across your Cloud services.

- Use CloudBolt Cost and Security Management to take action on / automate Cost and Security compliance using Automation and Event Scheduling capabilities.

Adapters

Adapters are the cornerstone of CloudBolt Cost and Security Management.
An Adapter provides access in CloudBolt Cost and Security Management to your Cloud Accounts. These Adapters connect to the Cloud Native Security Services like AWS - IAM and Azure Identity Management (AIM).

CloudBolt Cost and Security Management provides the ability to integrate into Organization Management / Auto Discovery of accounts using features like AWS Organization.

Next Steps

- Welcome to CloudBolt Cost and Security Management
- What's New in CloudBolt CSMP
- Adapter Configurations
- Resources
- Custom Dashboard
- Cost
- Security
- Standard Operating Environment (SOE)
- Event Scheduler Automation
- CSMP API
- Create Integrations
- Report Data Reprocessing
- OpenShift Utilization Collector
- Data Retention Policy
- Roles in CloudBolt Cost and Security Management

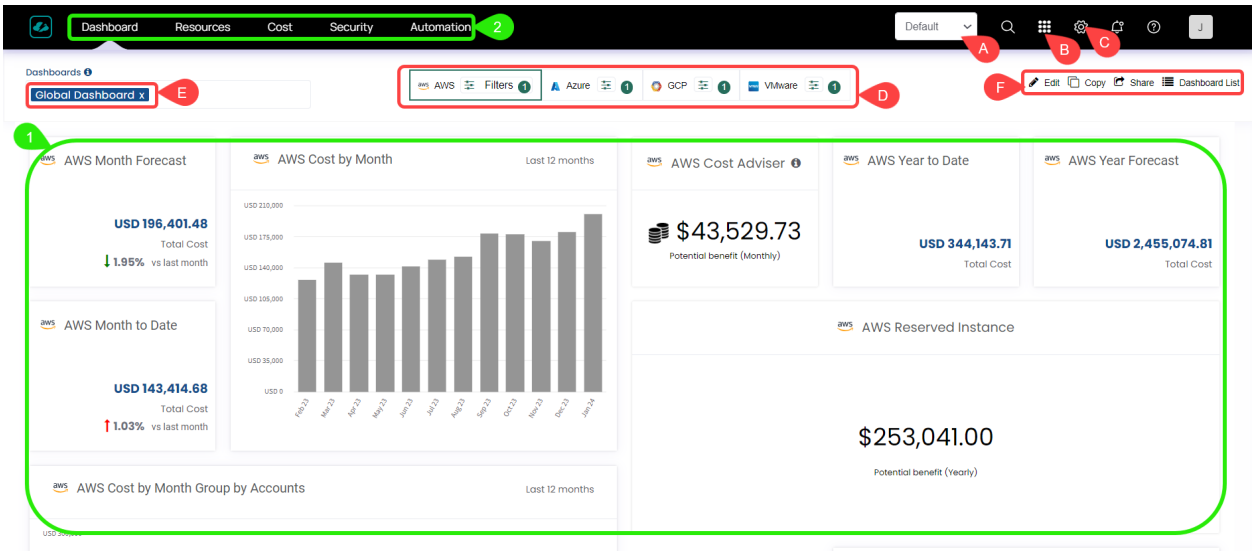
- Creating Local Users
- Manage Tenants
- Collecting an API Access Key

3.1. User Interface

3.1.1. Dashboard

The Dashboard is the first page you see after logging into CloudBolt CSMP.

The Dashboard provides a landing area to quickly view your Cost reports, optimization opportunities, monthly and yearly spend/forecasts, and more. To know more about dashboards, see Custom Dashboard.



Callout	Feature	Description
1	Reports dashboard	Reports at-a-glance live on your Dashboard for quick and easy Cost updates by Day, Year, Service, and Account. Use the filters D to visualize data of your interest. If you are viewing a parent organisation's **Default** tenant user's reports dashboard, the default cost value type displayed on all the widgets are as follows: **Cloud Provider** / **Cost value type displayed on all the dashboard widgets** AWS: Unblended Azure: Cost GCP: Cost VMware: Cost If you are viewing a parent organisation's sub-tenant and child organisation user's reports dashboard, the default cost

<table>
<tr><th>Callout</th><th>Feature</th><th>Description</th></tr>
<tr><td></td><td></td><td>value type displayed on all the widgets are as follows:
<table>
<tr><th>Cloud Provider</th><th>Cost value type displayed on all the dashboard widgets</th></tr>
<tr><td>AWS</td><td>Net Cost</td></tr>
<tr><td>Azure</td><td>Net Cost</td></tr>
<tr><td>GCP</td><td>Net Cost</td></tr>
<tr><td>VMware</td><td>Net Cost</td></tr>
</table>
The default cost value type displayed on each widget while viewing a reseller organisation's child organisation user's reports dashboard is as follows:
<table>
<tr><th>Cloud Provider</th><th>Cost value type displayed on all the dashboard widgets</th></tr>
<tr><td>AWS</td><td>Net Cost (R)</td></tr>
<tr><td>Azure</td><td>Net Cost (R)</td></tr>
<tr><td>GCP</td><td>Net Cost (R)</td></tr>
<tr><td>VMware</td><td>Net Cost (R)</td></tr>
</table>
Parent organisation or reseller organisation administrators can control the cost value type displayed on the dashboard widgets of their tenants and child organisations by setting the Selected Metrics option in report profiles shared with them.</td></tr>
<tr><td>2</td><td>Header Bar</td><td>Use the Header Bar to navigate to different areas of CloudBolt CSMP.</td></tr>
<tr><td>A</td><td>Tenant Drop down</td><td>Click the arrow to quickly change Tenants.</td></tr>
<tr><td>B</td><td>Quick Actions Menu</td><td>Click to expand the Quick Actions menu and make a selection.</td></tr>
<tr><td>C</td><td>Settings</td><td>Expand the Settings menu using the Gear icon.</td></tr>
<tr><td>D</td><td>Filters</td><td>Click on the cloud provider icon to expand the filter setting options for that cloud provider. After specifying the values that you want to filter, click 'Apply' to see dashboard data as per filters. Total number of filter parameters applied for a cloud provider can be depicted in green circle. By default, one filter that is billing account, subscription, project, and vCenter would be selected for each cloud provider. All filters for individual cloud provider are combined together using</td></tr>
</table>

Callout	Feature	Description
		'and' logic, which means that only those records that meet all selected filter parameters are displayed.
E	Dashboard name	Displays the active dashboard's name. Click in the box to get a list of available dashboards. Select the check box for a dashboard to set as active dashboard. To know more about available dashboards, see Custom Dashboard.
F	Dashboard options	Use Edit option to update active dashboard. Copy option can be used to create a copy of active dashboard. To share an active dashboard with user, role, and tenant you can use Share option. Dashboard List can be used to view a list of user-generated dashboard. If you have a system-generated dashboard active, you can only have Copy and Dashboard List options available.

See filter dashboard data to know how to apply different filters on an active dashboard to visualize the data of your interest. Also, see Custom Dashboard to create, customize, and share the dashboard view.

3.1.2. Header Bar

The Header Bar on the **Dashboard** allows you to quickly access modules in CloudBolt CSMP, change Tenants, select Quick Actions, configure Settings, change Users, view Documentation and Support, and more.



Callout	Feature	Description
1	Dashboard	Click the caret to open the Dashboard view.
2	Resources menu	Click the caret to open the Resources menu and select an option.
3	Cost menu	Click the caret to open the Cost menu and select an option.
4	Security menu	Click the caret to open the Security menu and select an option.
5	Automation menu	Click the caret to open the Automation menu and select an option: Event Scheduler or Synchronization.
A	Tenant dropdown	Click the arrow to quickly switch between Tenants.
B	Service search	Click the magnifying glass icon to search Services by Name or ID.
C	Quick Actions menu	Click to expand the Quick Actions menu and make a selection.
D	Settings	Expand the Settings menu using the Gear icon.
E	Notifications	Notifications about successful reports and any adapters that need maintenance show here.
F	User profile	Click the User profile icon to view the email address associated with this account, Logout, view My Profile and navigate to Documentation.

3.1.3. Quick Actions Menu

This menu lets you access frequently used areas of CloudBolt CSMP. Options available under this can also be accessed through other navigation steps.

Introduction

Quick Action menu provides access to the following areas of CloudBolt CSMP.

- Access Management: Manage users and add roles using this page.
- Adapters and Integration: Quickly navigate to your cloud adapters page.
- Event Scheduler: Navigate to the event scheduler module page.
- Security and Compliance Advisor: Navigate to this page to view your organization compliance to various regulations.
- Service Advisor: Navigate to the Service Advisor page to view the potential cost savings advised by CloudBolt CSMP.
- Synchronization: Synchronize your adapters on demand to CloudBolt CSMP and view reports for synchronization and unallocated resources.

3.1.4. Settings Function

Depending upon your role, you can take actions on various setting options available under your CloudBolt CSMP account.

Introduction

A user with administrator role for CloudBolt CSMP account can perform following settings:

General System

Backup Policies: You can create a new backup policy for your AWS services.

Configure Service Adviser: You can customize the cloud telemetry settings that the service adviser module will consider to provide various service recommendations. See configure service adviser telemetry

Currency Conversion: You can create currency conversion rules to convert your source currency to a target currency. See Adding the Target Currency Conversion Rule

Naming Conventions: You can enable naming convention for cloud services.

Payment Info: You can view your AWS marketplace SaaS subscription details.

Tagging: You can create tags and apply to your cloud services.

Configure VMWare Rate Card: You can configure the VMWare rate card to provision your VMWare services.

Billing Configuration: You can create billing configuration for your child organisations (customers or resellers).

Report Profiles: You can create customized report profiles to share with your child organisations and tenants.

Billing Configuration - AWS RI/SP: You can create configuration to share your AWS reserved instances and saving plans cost benefits with your child organisations (customers or resellers).

Management

Default Organization: You can view and update default organization email domain and time zone. You can also enable case insensitive tag filter settings to implement tags filter regardless of tag font case (upper/lower).

Access Management: You can manage your CloudBolt CSMP account users and roles.

SSO Configuration: You can set up your single sign-on configuration for CloudBolt CSMP. See Configure SSO in CloudBolt Cost and Security Management Platform

Tenant Management: You can create and manage tenants in CloudBolt CSMP.

Manage Child Organization: You can create child organisation within your CloudBolt CSMP organization. You must submit a service request to enable this option.

Resource Handlers

Adapters: You can navigate to the cloud adapters page.

Integrations: You can navigate to integrations page.

SOE

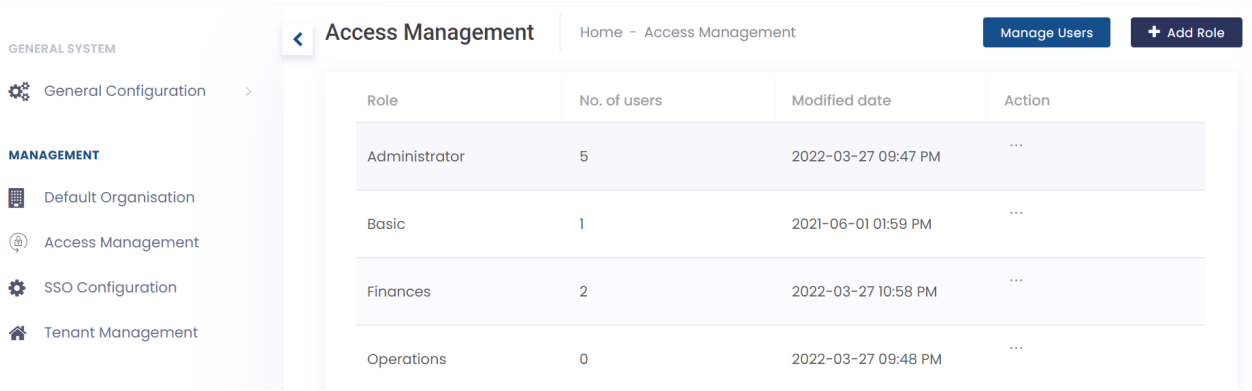
SOE OSs: You can create a standard operating environment for operating systems. See Standard Operating Environment (SOE)

3.2. Roles in CloudBolt Cost and Security Management

Learn how to assign, edit, and create roles in the CloudBolt Cost and Security Management platform.

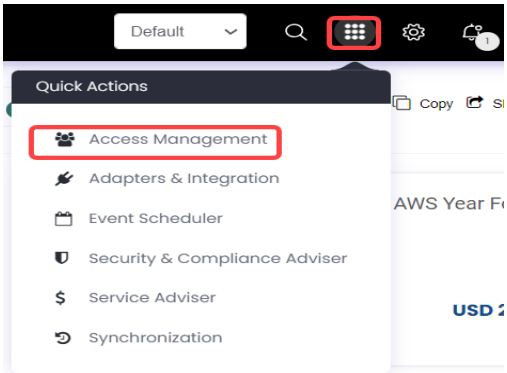
Introduction

CloudBolt Cost and Security Management uses Roles to control access on a per-User basis. Assign the default role(s) to users, or create new roles with specific access rights. Users can be assigned locally, or using Group Mapping from an SSO source.



Access the Roles Interface

1. In CloudBolt Cost and Security Management, click the **Quick Actions menu > Access Management** module.



Default Roles

CloudBolt Cost and Security Management comes out-of-the-box with four default Roles:

- Administrator Role
- Basic Role
- Finances Role
- Operations Role

View the table below for allowed permissions per each Role. If you have specific needs not addressed in the default Role(s), Create a Role in CloudBolt Cost and Security Management.

	Module	Action	Administrator Role	Basic Role	Finances Role	Operations Role
Dashboard	**Custom Dashboard**					
		Custom Dashboard Default				
		Dashboard List				
		Preview				
		Create				
		Modify				
		Delete				
		Share				
		Activate				
		Activate for Organization		**X**	**X**	**X**
	Module	**Action**	**Administrator Role**	**Basic Role**	**Finances Role**	**Operations Role**
Resources	**Service Manager**					
		View Services		**X**	**X**	**X**
		Create/Modify Services		**X**	**X**	**X**
		Delete Services		**X**	**X**	**X**

Module	Action	Administrator Role	Basic Role	Finances Role	Operations Role
Dashboard	**Custom Dashboard**				
	Custom Dashboard Default				
	Dashboard List				
	Preview				
	Create				
	Modify				
	Delete				
	Share				

Module	Action	Administrator Role	Basic Role	Finances Role	Operations Role
Cost	**Financial**				
	Cost Report		X		X
	Reserved Instance Report		X		X
	Savings Plan Report		X		
	Service Adviser		X		X
	Budget				
	View		X		X
	Create		X		X
	Modify		X		X
	Delete		X		X
	Share		X	X	X
	Favourite Reports				
	View		X		
	Create		X		X
	Modify		X		X
	Delete		X		X
	Share		X		X
	Mail		X		X
	Cost Allocation Report				
	View		X	X	X
	Shared		X	X	X

	Module	Action	Administrator Role	Basic Role	Finances Role	Operations Role
Dashboard	Custom Dashboard					
		Custom Dashboard Default				
		Dashboard				

	Module	Action	Administrator Role	Basic Role	Finances Role	Operations Role
Security	Security & Compliance					
		Security Adviser		X		X
		Compliance Reports		X		X
		Security Visualization		X	X	X
		Security Visualization Manage		X	X	X
	Operational					
		User Activity		X		
		Synchronization History		X		X

	Module	Action	Administrator Role	Basic Role	Finances Role	Operations Role
Automation	Synchronization					
		View		X	X	X
		Modify Setting / Save as an Environment		X	X	X
	Event Scheduler					
		View		X	X	X
		Create		X	X	X
		Modify		X	X	X
		Delete		X	X	X

	Module	Action	Administrator Role	Basic Role	Finances Role	Operations Role
Settings	Adapters					

Module	Action	Administrator Role	Basic Role	Finances Role	Operations Role
Dashboard	**Custom Dashboard**				
	Custom Dashboard Default				
	Dashboard List				
	Preview				
	Create				
	Modify				
	Delete				
	Share				
	Activate				
	Activate for Organization		X	X	X
	Add Slack Workspace (Allow Slack Integration)		X	X	X
	Delete Slack Workspace		X	X	X
	Add Slack Channel		X	X	X
	View Slack Channel		X		
	Delete Slack Channel		X	X	X
	Edit / Mute Slack Channel		X	X	X
	Edit Slack Channel Configuration		X	X	X
	Teams Integration				
	View Teams Workspace		X		
	Add Teams Workspace (Allow Teams Integration)		X	X	X
	Delete Teams Workspace		X	X	X
	Show Teams Bot Configuration		X		
	Edit Teams Bot Configuration		X	X	X

Module	Action	Administrator Role	Basic Role	Finances Role	Operations Role
Dashboard	**Custom Dashboard**				
	Custom Dashboard Default				
	Dashboard List				
	Preview				
	Create				
	Modify				
	Delete				
	Share				
	Activate				
	Activate for Organization		X	X	X
	Manage SOE RDS's		X	X	X
	SOE OS'S				
	View AMI's		X	X	X
	Add SOE OS's		X	X	X
	Edit SOE OS's		X	X	X
	Remove SOE OS's		X	X	X
	Manage SOE Scripts		X	X	X
	Access Management				
	View Access Management		X	X	X
	Manage User		X	X	X
	Add Role		X	X	X
	Edit Role		X	X	X
	Delete Role		X	X	X
	Manage Members		X	X	X
	Manage Tenants				
	View Tenants		X	X	X
	Add Tenant		X	X	X
	Edit Tenant		X	X	X
	Delete Tenant		X	X	X
	Manage Tenant Permission		X	X	X

Module	Action	Administrator Role	Basic Role	Finances Role	Operations Role
Dashboard	**Custom Dashboard**				
	Custom Dashboard Default				
	Dashboard List				
	Preview				
	Create				
	Modify				
	Delete				
	Share				
	Activate				
	Activate for Organization		X	X	X
	Edit Customer Organisation		X	X	X
	Activate/Deactivate		X	X	X
	Share/Remove adapters		X	X	X
	Manage Reseller Organisation				
	View Reseller Organisation		X		
	Add Reseller Organisation		X	X	X
	Edit Reseller Organisation		X	X	X
	Activate/Deactivate		X	X	X
	Share/Remove adapters		X	X	X

Module	Action	Administrator Role	Basic Role	Finances Role	Operations Role
Global Settings	**General**				
	View		X	X	X
	Modify		X	X	X
	Backup Policy				
	View		X		
	Create		X	X	X

Module	Action	Administrator Role	Basic Role	Finances Role	Operations Role
Dashboard	**Custom Dashboard**				
	Custom Dashboard Default				
	Dashboard List				
	Preview				
	Create				
	Modify				
	Delete				
	Share				
	Activate				
	Activate for Organization		X	X	X
	Configuration				
	View		X		
	Edit		X	X	X
	Naming Conventions				
	View		X		
	Edit		X	X	X
	Currency Conversion				
	View		X		
	Create		X	X	X
	Modify		X	X	X
	Delete		X	X	X
	Report Profile				
	View		X		
	Create		X	X	X
	Modify		X	X	X
	Delete		X	X	X
	Billing Configuration				
	View		X		
	Create		X	X	X
	Modify		X	X	X
	Delete		X	X	X
	Export Report				

Module	Action	Administrator Role	Basic Role	Finances Role	Operations Role
Dashboard	**Custom Dashboard**				
	Custom Dashboard Default				
	Dashboard List				
	Preview				
	Create				
	Modify				
	Delete				
	Share				
	Activate				
	Activate for Organization		X	X	X
	Delete		X	X	X
	Cost Allocation				
	View		X	X	X
	Create		X	X	X
	Modify		X	X	X
	Delete		X	X	X
	SA Recommendation Task Management				
	View		X		X
	Create		X		X
	Modify		X		X
	History		X		X
	Delete		X		X
	Task Policy Management				
	View		X	X	X
	Create		X	X	X
	Modify		X	X	X
	Delete		X	X	X

Important:

1. The access management settings for Manage Customer Organisation and Manage Reseller Organisation will be available only when your CloudBolt CSMP account is marked as distributer account.
2. The access management settings for Manage Customer Organisation will be available only when your CloudBolt CSMP account is marked as reseller account.
3. The access management settings for Manage Child Organisation will be available only when your CloudBolt CSMP account is enabled to create and manage child organisation.
4. The access management control setting for a child organization will not have access to the Report Profile, Billing Configuration, Saving Plan Report, and Reserved Instance Report permissions since they are only kept for a parent organization administrator.
5. All actions access to the **Favourite** module will be enabled by default for all the roles created earlier than August 2022 that have **Cost Report** action access enabled.
6. All actions access to the **Budget** module will be enabled by default for all the roles created earlier than August 2022 that have Budget's **View** and **Create** actions access enabled.

Create a Role

To create a new Role that is not part of the default suite of Roles:

1. In the **Access Management** dashboard, click **Add Role** within the upper right corner.
2. Fill out the **New Role** form:

The default option for all roles will be **Custom Dashboard Default** access.

Field name	Notes
Name	Enter a name for the new Role. Name can contain only alphabets, numbers, space, and special characters such as - and _.
SSO Role Keywords	Enter a comma-separated list of SSO/SAML roles mapped from your SAML IdP. To enable Role Mapping, configure SSO for your organization.
Manage Access Rights	Select the desired combination of Access Rights for this Role.

3. Click **Create Role.**

3.3. Creating Local Users

Learn how to create and local users and assign them to local Roles in CloudBolt Cost and Security Management.

Create a Local User

To add a local user, navigate to the Access Management / Role Based Access Control module:

1. In CloudBolt Cost and Security Management, click the **Settings icon > Access Management > Manage Users.** The existing list of users is displayed.
2. Click **Invite User.**
3. Fill out the **Invite User** form:

Field name	Notes
User Email	Enter an email address for the user. The invitation request will be sent to the email entered here.
Role	Select a role from the list of available options. The user will inherit the permissions associated with the selected role. The role assignment rules are as follows: ○ If you have the Administrator role (the default CSMP role), you can assign any role—both default and custom—to invited users. ○ If you have a non-Administrator CSMP default role (such as Basic, Finances, or Operations), you can only assign custom roles and the default role you currently hold. ○ If you have a custom role, you can only assign that specific role to invited users.
Tenants	Select a tenant to associate with the user.

4. Click **Invite User.**

The user will receive an invitation request. Once accepted, they will be able to log in.

Manage Local Users

You can see list of active, inactive, and invited users for your CloudBolt CSMP account. You can manage your users using the options available under Action column.

1. In CloudBolt Cost and Security Management, click the **Settings icon > Access Management > Manage Users.** The existing list of users is displayed.
2. You can filter the users list by username, email address, status, and by role.
3. Enter the filter criteria and then click **Submit** to apply the filter(s).
4. Click **Clear** to reset the filter selection.
5. You can enable or disable a user based on their current status using the option available under action column.
6. A SAML user can be updated for tenant and role access.
7. You can delete and copy the invite link for Invited state users using the appropriate option available under the action column.

3.4. SSO / SAML Authentication

3.4.1. Configure SSO in CloudBolt CSMP

Learn how to set up SSO Configuration in the CloudBolt Cost and Security Management platform. Then, select your Identity Provider from the list below to complete SSO setup.

Introduction

This article covers the basics steps for setting up SSO within your CSMP account. In addition, the guide outlines the SSO standards CloudBolt Cost and Security Management supports, the configurations needed to add your SSO login details to an account, and the process of implementing SSO.

What is Single Sign-On?

Single sign-on (SSO) is a solution to enable secure and efficient application access. The purpose of SSO is to help you centralize and simplify your user experience by allowing users to sign in to one application, the Identity Provider, and gain access to other applications such as CloudBolt CSMP.

Glossary of Terms

- **Security Assertion Markup Language (SAML):** An XML-based standard for exchanging authentication and authorization data between security domains.
- **Identity Provider (IdP):** The application that provides a single source of identification for a user. Producer of assertions. Examples of Identity Providers are Microsoft Azure AD, AWS, Okta, Google, and more.
- **Service Provider (SP):** The application that the user wishes to access using the single source of identification provided by the IdP. Consumer of assertions. In this case, CloudBolt Cost and Security Management Platform is the Service Provider.

Setup Overview

1. Set up your Identity Provider (IdP) first. Select a supported technology from the list below.

2. Set up SSO in CloudBolt Cost and Security Management, using values (metadata, attributes) from your IdP application setup.
3. Verify SSO has been set up properly by logging out of CSMP. An **SSO Login** button should display next to the traditional login screen.
    - Configure SAML for AWS
    - Configure SAML for Google
    - Configure SAML for ADFS 3.0
    - Configure SAML for Microsoft Entra ID
    - Configure SAML for Okta
    - Configure SAML for Keycloak
    - User Guide for Updating SAML Metadata

Set up SSO in CloudBolt Cost and Security Management

Enable Single Sign-On from the CloudBolt Cost and Security Management User Interface.

1. Log in to your CloudBolt Cost and Security Management application.
2. Click the **Settings** menu **> General Configuration > SSO Configuration.**
3. If "Disable SSO Login" is checked, **uncheck** it to continue.

SP Metadata Details Tab

This tab displays the Service Provider (SP) Metadata details. Here CloudBolt Cost and Security Management is the Service Provider.

1. Click the copy icon next to an item in order to pass it to your Identity Provider (IdP).
2. After adding IdP Metadata Details, click **Download Metadata** to obtain a file you can then upload to your SSO Provider.

IdP Metadata Details Tab

There are two options to enter Metadata details for your IdP: enter the Metadata XML text or enter the values directly.

Option 1: IdP Metadata

Enter the text of the IdP Metadata file here to provide CloudBolt Cost and Security Management with your IdP information automatically.

Make sure you enter only the text of the file. Metadata URL / file uploading is not currently supported.

1. In your IdP, find the Metadata file for your application and download it.
2. Open the file in a text editor.
3. Copy the text and paste it into the IdP Metadata field in CloudBolt Cost and Security Management.
4. Click **Save.**

Option 2: Enter Values Manually

Enter the ID and URL values manually.

1. From your IdP (Identity Provider) configuration, obtain the following values and enter them in the Option 2 fields:
    - IdP Entity ID
    - IdP Login URL
    - IdP Logout URL
    - IdP Certificate
2. Click **Save.**

Attribute Mapping Tab

Use attribute mappings to pass additional data about your user sign ins to your Identity Provider (IdP).

Regardless of IdP chosen, you can supply a claim attribute called `tenant` and specify the value in the IdP for each selected User. The value in the IdP should map to one of the values in CloudBolt CSMP SSO Keywords within Tenants.

Attributes entered here must exactly match the attribute value entered on your IdP.

CloudBolt Cost and Security Management supports four attributes by default:

Attribute Name	Attribute Format
Name	Name
Email	E-Mail Address

Attribute Name	Attribute Format
Role	Role
Tenant	Tenant

Click **Save** when you are finished.

3.4.2. Configure SAML for AWS

Learn how to configure SAML in your AWS instance to authenticate Users for CloudBolt Cost and Security Management using SSO.

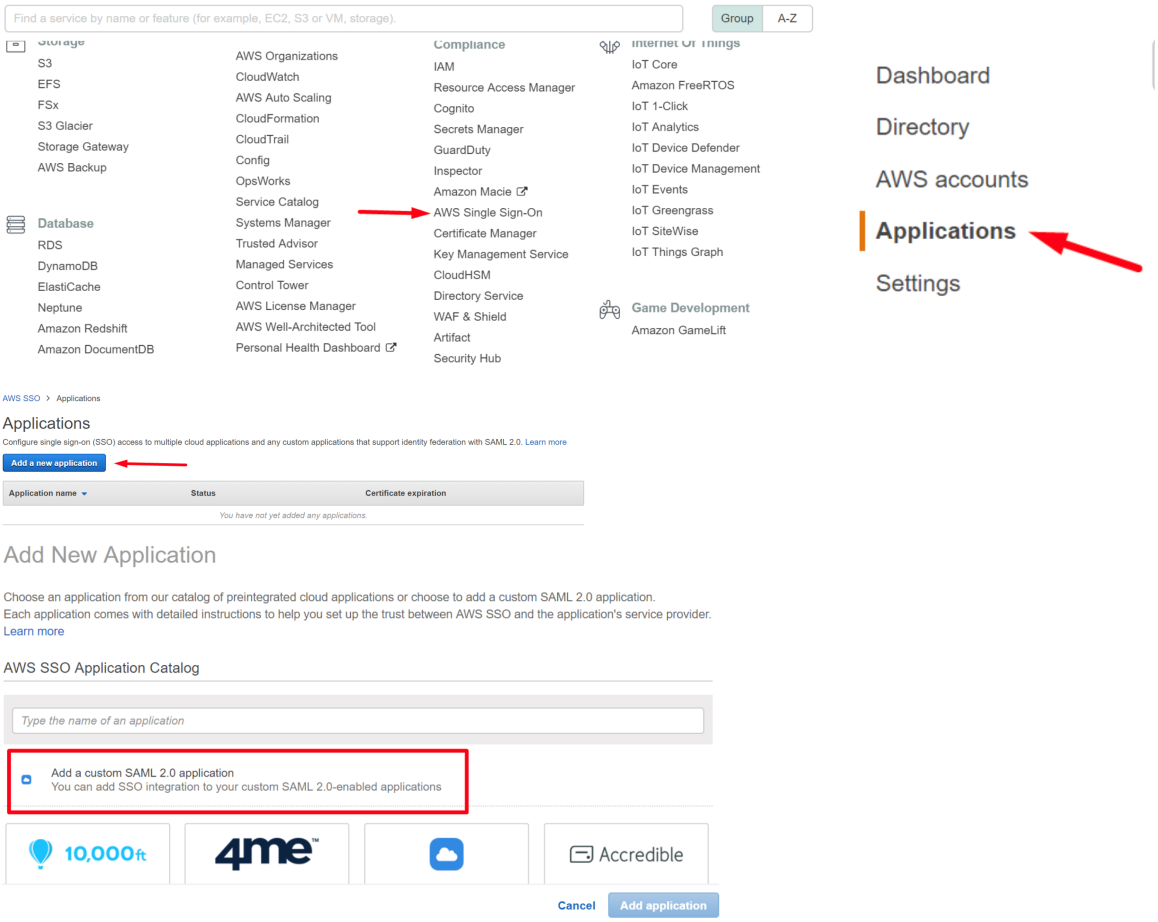
Prerequisites

- An AWS Account with access to the AWS Single Sign-On service.
- Your CloudBolt Cost and Security Management tenant ACS URL and SAML Audience. See CloudBolt Cost and Security Management SSO Configuration.

Configuring SSO for AWS

Add an Application

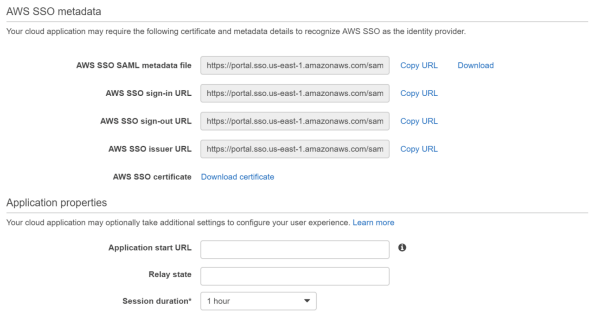
1. Log in to your AWS account using an Admin or IAM User, with permissions to create and modify AWS SSO configurations.
2. In AWS, click **Services > Security, Identity, & Compliance > AWS Single Sign-On** and click to open the dashboard.
3. Click **Applications** from the left-hand menu of the AWS SSO dashboard.
4. Click **Add a new application.**
5. Click **Add a custom SAML 2.0 application.**
6. On the next page, provide the following:
    - **Display Name:** e.g. CloudBolt Cost and Security Management-SSO
    - **Description:** e.g. CloudBolt Cost and Security Management custom SSO configuration.



Collect Metadata

Below the Details section, find the **AWS SSO metadata** section. These URLs will be used in the CloudBolt Cost and Security Management configuration later.

1. Copy or download the **AWS SSO SAML metadata file.**
2. Copy the URLs for sign-in, sign-out, and issuer.
3. Under **Application properties**, select a Session duration after which the user will be logged out.
4. Leave the **Application start URL** and **Relay state** fields blank.



Upload Application Metadata

1. Provide the CloudBolt Cost and Security Management SSO ACS URL downloaded from the AWS Provider.
2. Click **Save Changes.** You will be redirected to the newly created app dashboard.

Configure Attribute Mappings

1. On the **Attribute Mappings** tab, provide the custom attributes for your SAML assertion:

Attribute	AWS SSO Field Mapping
Subject	${user:email}
Given Name	${user:name}
Name	${user:name}
E-Mail Address	${user:email}
Role	${user:AD_GUID}
Tenant	Provided from the SSO Role Keyword field in CSMP. See Set up SSO Role Keywords.

Configure Assigned Users

Assign the CloudBolt Cost and Security Management SSO application to relevant users or groups in your AWS Directory.

1. In your custom SAML application, click the **Assigned users tab > Assign users.**
2. Choose individual users for access, or assign groups to the SSO application.

Next Steps

Proceed to Configure SSO in CloudBolt CSMP.

3.4.3. Configure SAML for Google

Learn how to configure SAML in your Google App instance to authenticate Users for CloudBolt Cost and Security Management using SSO.

Prerequisites

- Google Apps account with Admin permissions

Setup Overview

1. Configure Google Apps
2. Set up the CloudBolt Cost and Security Management Appliance
3. Configure SSO in CloudBolt Cost and Security Management for Google Apps.

Configure Google Apps

1. Log in to the Google Admin Portal for your Google Apps Account.
2. Navigate to **Apps.**
3. In **App Settings,** view a list of Google Apps and Services or existing SAML Applications.
4. Navigate to **SAML Apps**.
5. Click the **+ icon** and select **Set up my own custom app.**

Collect Google Apps Metadata

1. Collect and save the following IdP metadata. This is **required** to configure CloudBolt Cost and Security Management to allow access through Google Apps SAML Authentication.
    - SSO URL
    - Entity ID
    - Certificate

Add Application Details

Add Application details that will be used to identify the custom app for users in your Google Apps directory.

1. Provide a Name, Description, and Logo for the custom application.

Map Attributes

1. Map relevant attributes, i.e. Name, Given Name, Role and Email Address to the SAML Application through Attribute Mapping.
2. For Role Mapping, consider CloudBolt Cost and Security Management Roles and map them to a Custom Field named "Department" in your Google Apps account. **This field is required** to assign appropriate access levels in CloudBolt Cost and Security Management.

Attribute	Google Apps Field Mapping
Name	First Name
Given Name	First Name
Role	Department
E-Mail Address	Primary Email
Tenant	Provided from the SSO Role Keyword field in CSMP. See Set up SSO Role Keywords.

3. Click **Add New Mapping** to create additional mappings as requested by the SAML Application.

Configure SSO in CloudBolt Cost and Security Management for Google Apps

1. In CloudBolt Cost and Security Management, upload IdP Metadata Details and Save. See Configure SSO in CloudBolt CSMP.

Enable the CSMP SAML App

Once the above steps are completed, enable the SAML App for everyone or select Organizations per your requirements. See Set up your own custom SAML application for this step.

3.4.4. Configure SAML for ADFS 3.0

Learn how to configure Single Sign-On for AFDS 3.0.

Setup Overview

1. Setting up ADFS 3.0
2. Configure SSO in CSMP
3. Configuring ADFS Relying Party
4. ADFS Relying Party Claim Rules
5. Verify that SSO is Configured

Setting up ADFS 3.0

The following setup uses ADFS 3.0 and your *domain.cloudbolt.app* as the ADFS website. Replace *domain* with your internal site name.

1. Log in to the ADFS server and open the Management Console.
2. Right click **Service > Edit Federation Service Properties...**
3. Confirm that the General settings match your DNS entries and Certificate names.
4. Browse the Certificates and export the **Token Signing certificate.**
    a. Right-click the certificate and select **View Certificate.**
    b. Select the Details tab.
    c. Click **Copy to File.** The Certificate Export Wizard launches.
    d. Click **Next.**
    e. Ensure **No, do not export the private key** is selected, then click **Next.**
    f. Select **DER** encoded binary X.509 (.cer) then click **Next.**
    g. Choose a save location for the file, then click **Next.**
    h. Click **Finish.**
5. Use the newly created **DER/Binary** certificate and export it to Standard CRT format.

Configuring SSO in CSMP for ADFS 3.0

1. Log in to your CSMP instance.
2. Navigate to **Settings > General Configuration > SSO Configuration.**
3. Click the **IdP Metadata Details tab** and enter the following:

Field name	Notes
Entity ID	http://<your-adfs-domain>/adfs/services/trust
Login URL	https://<your-adfs-domain>/adfs/ls
Logout URL	https://<your-adfs-domain>/adfs/ls/?wa=wsignout1.0
Certificate	.crt (x509)

Configuring ADFS Relying Party

1. Open the **ADFS Management** console and select **Relying Party Trusts**.
2. Select **Add Relying Party Trust…** from the top right corner of the window. The add wizard appears.
3. Click **Start** to begin.
4. Give it a display name and enter any notes you want.
5. Select ADFS 3.0 Profile.
6. Do not select a token encryption certificate. It will use the certificate that is defined on the service that has already been exported.
    - Defining a certificate here will prevent proper communication with CSMP.
    - Do not enable any settings on the Configure URL.
    - Enter the CloudBolt app URL to which you connected as the Relying Party trust identifier. In this case use https://[tenant].cloudbolt.app/sso/metadata and click Add.
    - Permit all users to access this relying party.
7. Click **Next** and clear the **Open the Claims when this finishes** check box.
8. Close this page.
9. The new Relying Party Trust appears in the window.
    a. Right-click on the Relying Party Trust and select **Properties**.

b. Browse to the Advanced tab and set the Secure hash algorithm to SHA-1.

c. Browse to the Endpoints tab and add a SAML Assertion Consumer with a Post binding and a URL of **https://[tenant].cloudbolt.app/sso/acs.**

ADFS Relying Party Claim Rules

Edit the Claim rules to enable proper communication with CSMP (i.e. the Role, Name, and E-Mail Address being provided to CSMP).

1. Right-click on the Relying Party Trust and select **Edit Claim Rules**.
2. On the Issuance Transform Rules tab, select **Add Rules.**

We will create two Roles: Role 1 and Role 2.

Role 1

1. Select **Send LDAP Attribute as Claims** as the claim rule template to use.
2. Give the Claim a name such as **Get Attributes.**
3. Set the Attribute Store to **Active Directory.**
4. Set up the following LDAP Attributes with their Outgoing Claim Type:

LDAP Attribute	Outgoing Claim Type
Display-Name	Name
Token-Group - Unqualified Names	Role
E-Mail-Addresses	E-Mail Address
User-Principal-Name	Tenant

5. Click **OK.**

Role 2

1. Select **Add Rule.**
2. Select **Transform an Incoming Claim** as the claim rule template to use.
3. Give it a name such as an Email to Name ID.
4. Incoming claim type should be E-Mail Address.
    - It must match the Outgoing Claim Type in Rule #1.

- The Outgoing Claim Type is Name ID (this is requested in CSMP Policy **urn:oasis:names:tc:SAML:2.0:nameid-format:transient** and the Outgoing name ID format is **Transient.**
- Pass through all claim values and click **Finish.**

Verify that SSO is Configured Correctly

1. On the CSMP Login page, verify there is an **SSO Login** option; click to initiate SSO login.
2. You will be directed to the ADFS Sign In page. Enter the username and password.
3. After your sign-in credentials are authenticated, you will be logged in and redirected to CSMP Dashboard.

3.4.5. Configure SAML for Microsoft Entra ID

Learn how to set up Microsoft Entra ID SSO with CloudBolt Cost and Security Management to authenticate users.

Introduction

When you integrate CloudBolt Cost and Security Management with Microsoft Entra ID, you can achieve the following:

- Control who has access to CloudBolt Cost and Security Management using Microsoft Entra ID.
- Enable your users to be automatically signed-in to CloudBolt Cost and Security Management with their Microsoft Entra ID accounts.
- Manage your accounts in one central location, the Azure portal.

Prerequisites

These setup instructions require the following:

- An Microsoft Entra ID subscription.
- Ensure you have access to the Microsoft Entra admin center with Cloud Application Administrator privileges or higher.
- A CloudBolt Cost and Security Management subscription with SSO enabled.
  See Configure SSO in CloudBolt CSMP.

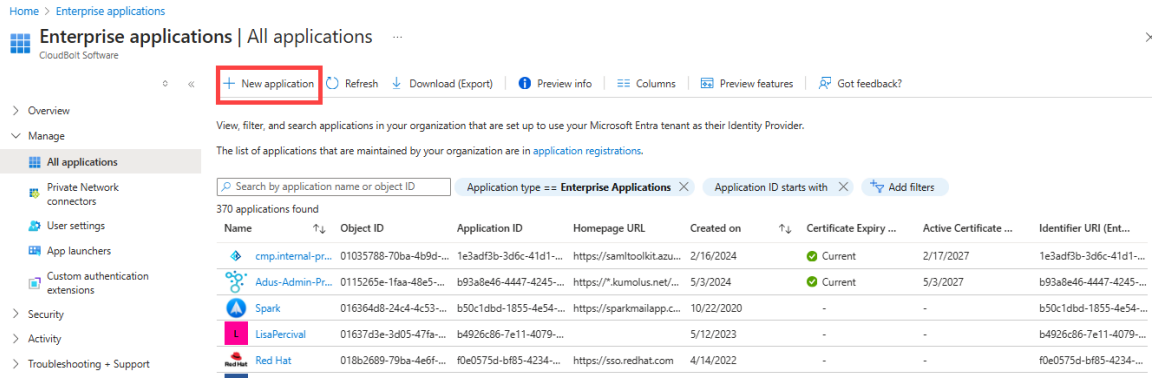
Setup Overview

1. Add Microsoft Entra SAML Toolkit from the Gallery.
2. Configure Microsoft Entra SSO.
3. Test SSO Configuration.

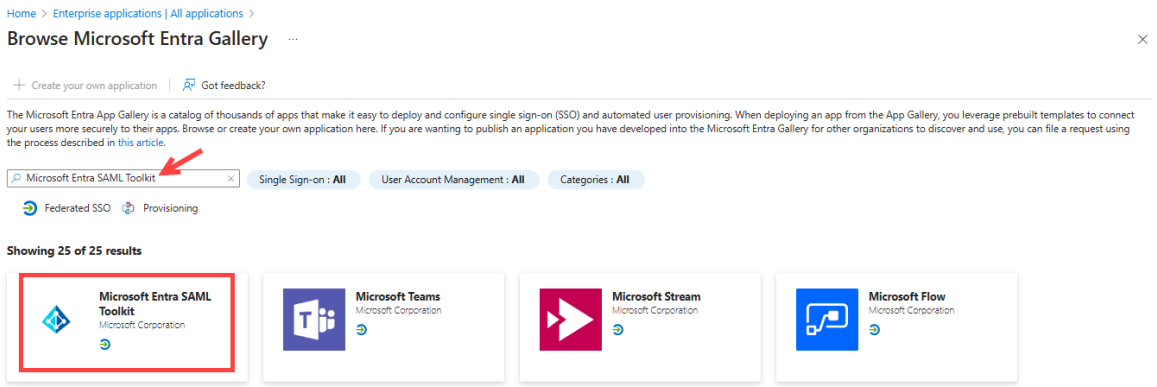
Add Microsoft Entra SAML Toolkit from the Gallery

To configure the integration of CloudBolt Cost and Security Management into Microsoft Entra, first add the **Microsoft Entra SAML Toolkit** application from the **Microsoft Entra Gallery**.

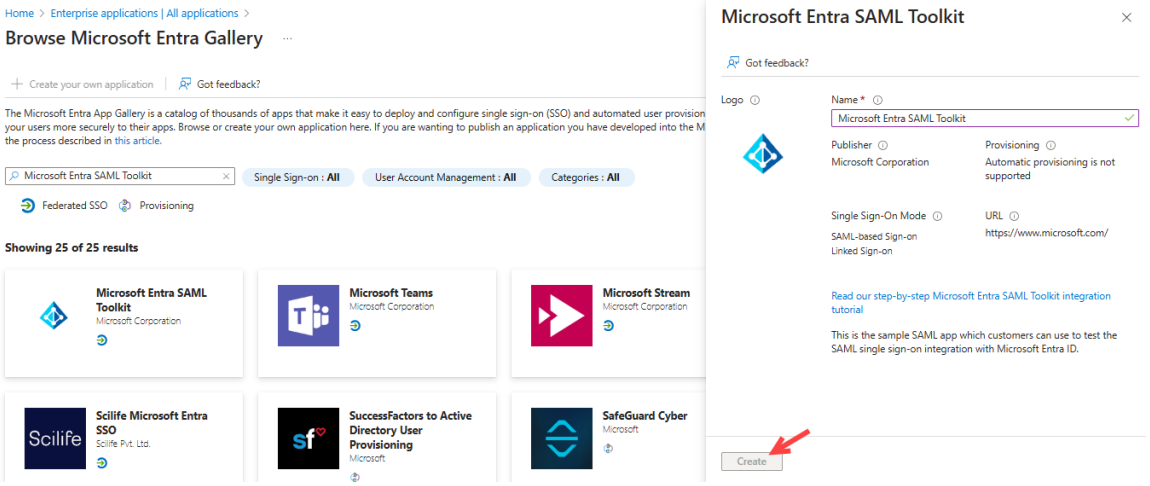
1. Sign in to the Microsoft Entra admin center as at least a Cloud Application Administrator.
2. In the **Azure services** section, select **Enterprise applications**. If it's not visible, use the search box at the top of the page to search for it and select it.
3. Under **Manage**, click **Enterprise applications > All applications**.
4. Click **+ New application**.



5. On the Browse Microsoft Entra Gallery page, type Microsoft Entra SAML Toolkit in the search application box.



6. Select Microsoft Entra SAML Toolkit from the results panel and then click the Create button to add the app. Wait a few seconds while the app is added to your tenant.



Configure Microsoft Entra SSO

After creating the application, you need to configure Single Sign-On (SSO) in the Azure Portal.

1. Sign in to the Microsoft Entra admin center as at least a Cloud Application Administrator.
2. In the Azure services section, select Enterprise applications. If it's not visible, use the search box at the top of the page to search for it and select it.
3. On the Enterprise applications | All applications page search for and select Microsoft Entra SAML Toolkit.
4. On the Microsoft Entra SAML Toolkit application integration page, find the Manage section in the left navigation panel and select Single sign-on.
5. On the Set up Single Sign-On with SAML page, configure each section as follows:

Basic SAML Configuration

If you wish to configure the application in IdP initiated mode, enter the values for the following fields.

Note: These values are example text. Update the values with your Identifier, Reply URL and Sign-on URL generated in CloudBolt Cost and Security Management.

1. **Identifier:** Type in the URL using the following format, or copy / paste from CloudBolt Cost and Security Management SSO **Entity ID** field: `https://{SUBDOMAIN}.cloudbolt.app/sso/metadata`
2. **Reply URL:** Type a URL using the following format, or copy / paste from CloudBolt Cost and Security Management SSO **Assertion Consumer Service (ACS)** field: `https://{SUBDOMAIN}.cloudbolt.app/sso/acs`
3. Click **Set additional URLs** and complete the following step if you wish to configure the application in SP initiated mode:
    - In the **Sign-on URL** text box, type a URL using the following format: `https://{SUBDOMAIN}.cloudbolt.app/`

Add Custom Attribute Mappings

CloudBolt Cost and Security Management Platform expects the SAML assertions in a specific format, which requires you to add custom Attribute Mappings to your SAML token attributes configuration.

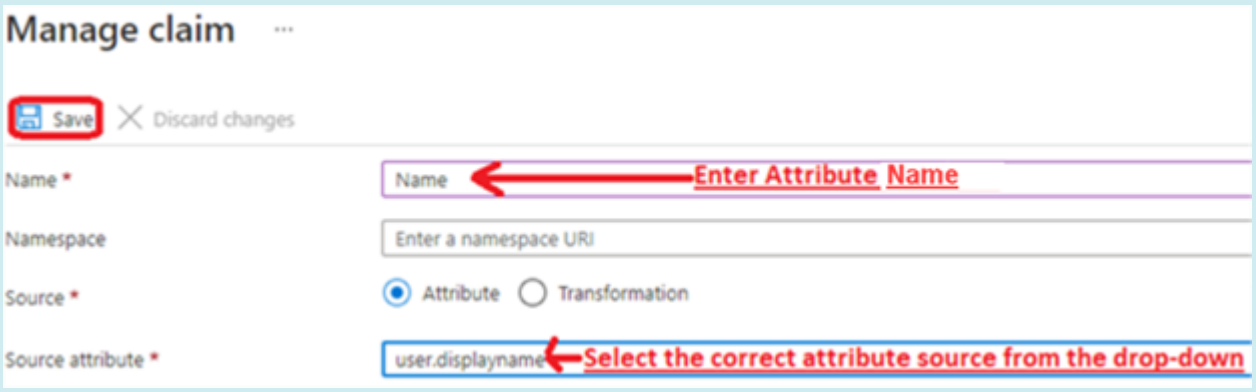
This shows the list of default User Attributes & Claims in Microsoft Entra ID:



In addition to the above, CloudBolt Cost and Security Management expects a few more attributes to be passed back in SAML response. These attributes are also pre-populated, but you may review them as per your requirements.

Name	Source Attribute
E-Mail Address	user.mail
role	user.assignedroles
tenant	Provided from the SSO Role Keyword field in CSMP. See Set up SSO Role Keywords.
name	user.displayname

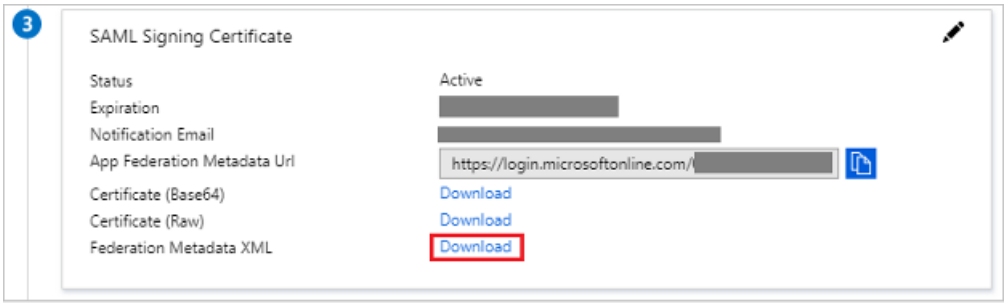
While adding or updating an attribute, ensure that attribute name must be added in the **Name** box **not** in the Namespace URI box.



CloudBolt Cost and Security Management looks for roles for Users assigned to the application. Set up these Roles in Microsoft Entra ID so that Users can be assigned the appropriate Roles. See Create Group and Role in Azure for SSO.

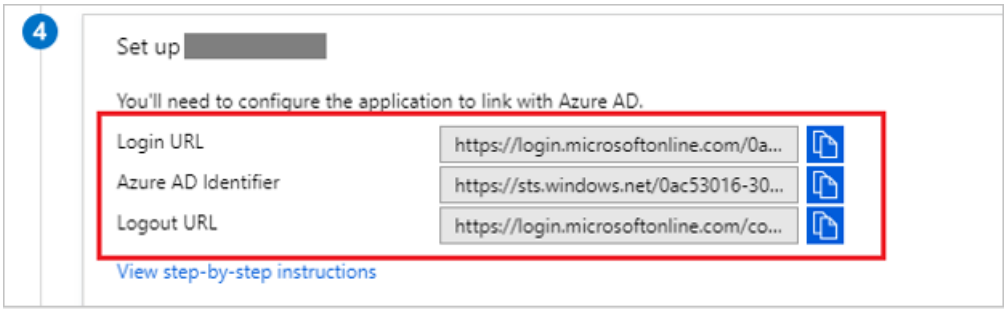
Download the SAML Signing Certificate

1. On the **Set up single sign-on with SAML** page, in section 3: SAML Signing Certificate, find and download the **Federation Metadata XML.**



Set up Microsoft Entra SAML Toolkit

1. In the **Set up Microsoft Entra SAML Toolkit section,** copy the appropriate URL(s) based on your requirement.



Test the SSO Configuration

Create a Microsoft Entra ID Test User

In this section, you will create a test User in the Azure portal called B.Simon.

1. In Azure, from the left-hand menu, click **Microsoft Entra ID > Users > All users.**
2. Select **New user** from the top of the window.
3. In **User properties,** complete the following:
    a. **Name:** B.Simon
    b. **User name:** Format as "username@companyname.extension" (e.g. bsimon@contoso.com)
    c. **Show password:** Check this box to enable, then write down the password shown.
    d. Click **Create.**

Assign the Microsoft Entra ID Test User

In this section, you'll enable B.Simon to use Azure single sign-on by granting access to CloudBolt Cost and Security Management.

1. In Azure, select **Enterprise applications > All applications.**
2. In the applications list, select **Microsoft Entra SAML Toolkit**.
3. In the app's overview page, click **Manage > Users and groups.**
4. Click **Add user,** then **Users and groups** in the Add Assignment dialog.
5. In the **Users and groups** dialog, select **B.Simon from the Users list > click Select.**
6. If you have Roles set up, choose from the **Select a role** dropdown.
7. In the **Add Assignment** dialog, click **Assign.**

Configure SSO in CloudBolt Cost and Security Management

See this article and follow the steps to complete SSO configuration for CloudBolt Cost and Security Management: Configure SSO in Cost Optimization.

Test the Microsoft Entra ID SSO Configuration

In this section, test your Microsoft Entra ID single sign-on configuration with the following options:

Option 1: SP Initiated

- In the Azure portal, click **Test this application.** This redirects to the "Microsoft Entra SAML Toolkit" Sign-On URL where you can initiate the login flow.
- Go to the "Microsoft Entra SAML Toolkit" Sign-On URL directly and initiate the login flow from there.

Option 2: IdP Initiated

- Click on **Test this application** in your Azure portal. You should automatically be signed in to the CloudBolt Cost and Security Management for which you set up SSO.

Option 3: Use Microsoft Access Panel

Use the Microsoft Access Panel to test the application in any mode.

- **SP Mode:** When you click the "Microsoft Entra SAML Toolkit" tile in the Access Panel, you will be redirected to the application sign-on page for initiating the login flow.
- **IdP Mode:** Click "Microsoft Entra SAML Toolkit" in the Access Panel and you will be automatically signed in to the application for which you set up SSO.

Next Steps

Once you configure CloudBolt CSMP, you can enforce session control, which protects exfiltration and infiltration of your organization’s sensitive data in real time. Session control extends from Conditional Access. Learn how to enforce session control with Microsoft Cloud App Security.

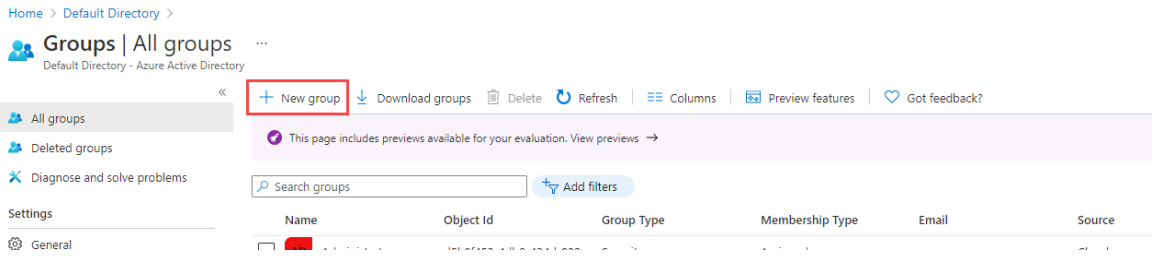
3.4.5.1. Create Group and Role in Azure for SSO

Learn how to create groups and roles in Microsoft Entra ID to be consumed in SAML settings.

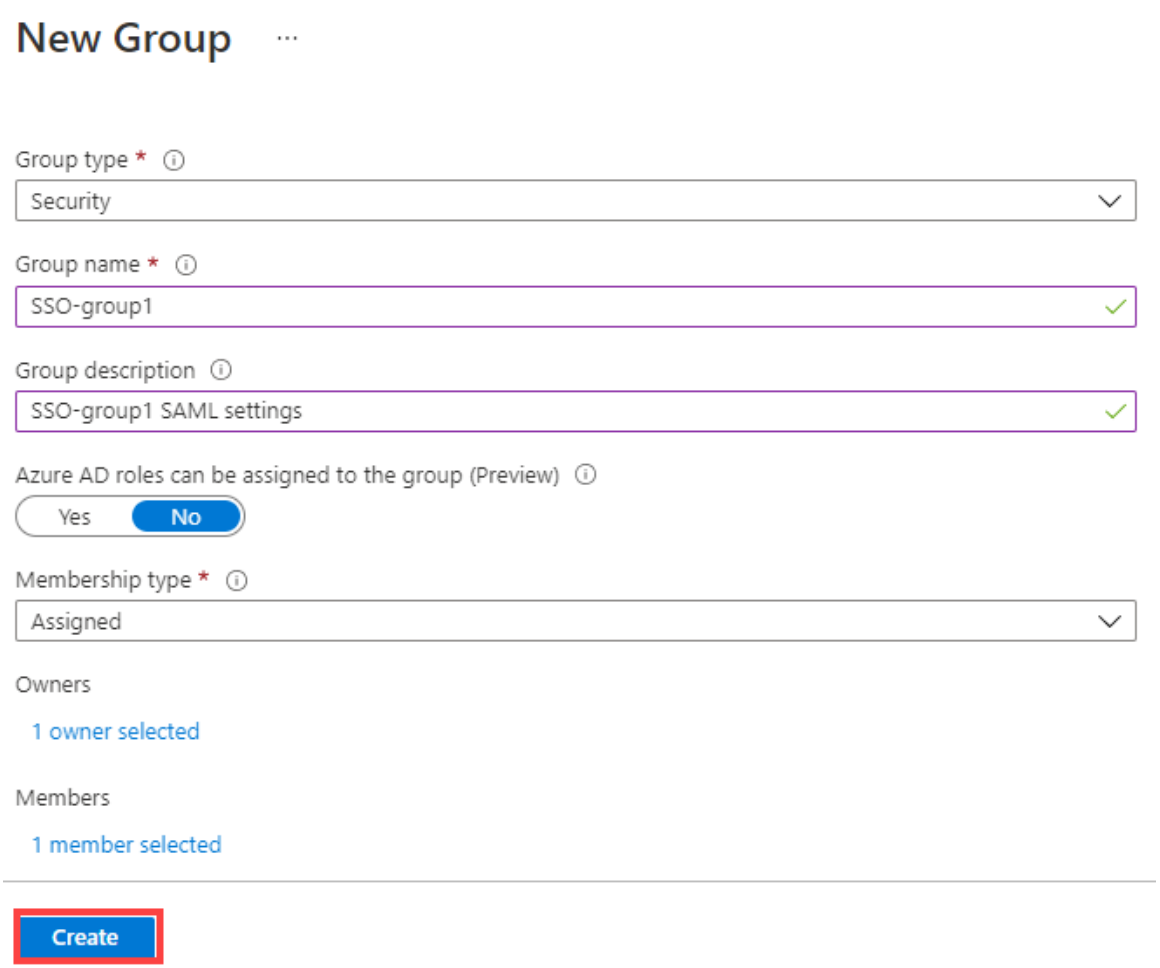
Create a group and add members

You can create a group and add your members to provide access to a particular SSO role and tenant. To create a group and add members use the following procedure:

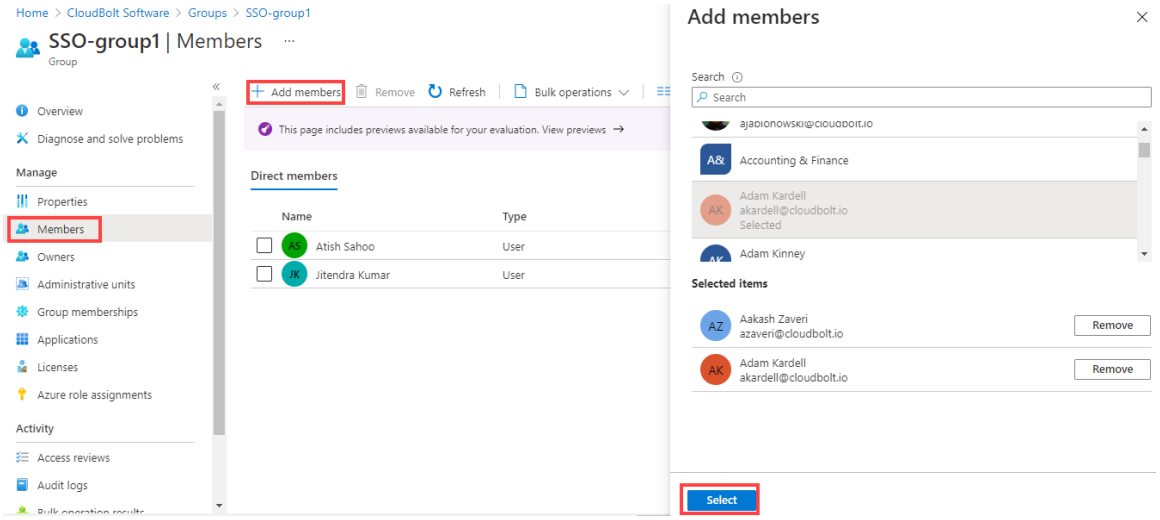
1. Sign in to the Azure portal using a Global administrator account for the directory.
2. Search for and select **Azure Active Directory**.
3. On the **Active Directory** page, select **Groups** and then select **New group**.



4. The **New Group** pane will appear and you must fill out the required information.



5. Select the **Group type** as Security.
6. Enter a **Group name**. Choose a name that you'll remember and that makes sense for the group. A check will be performed to determine if the name is already in use by another group. If the name is already in use, to avoid duplicate naming, you'll be asked to change the name of your group.
7. Select **Membership type** as assigned.
8. Select the **Create** button. Your group is created and ready for you to add members.
9. Select the **Members** area from the **Group** page, Select **Add members**, and then begin searching for the members to add to your group.



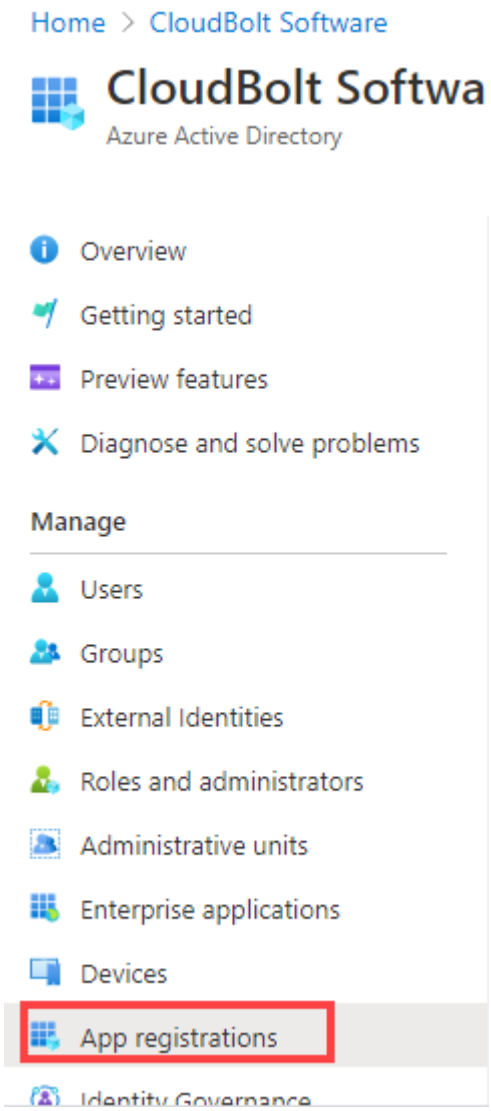
10. When you are done adding members, choose **Select**.

Create a role

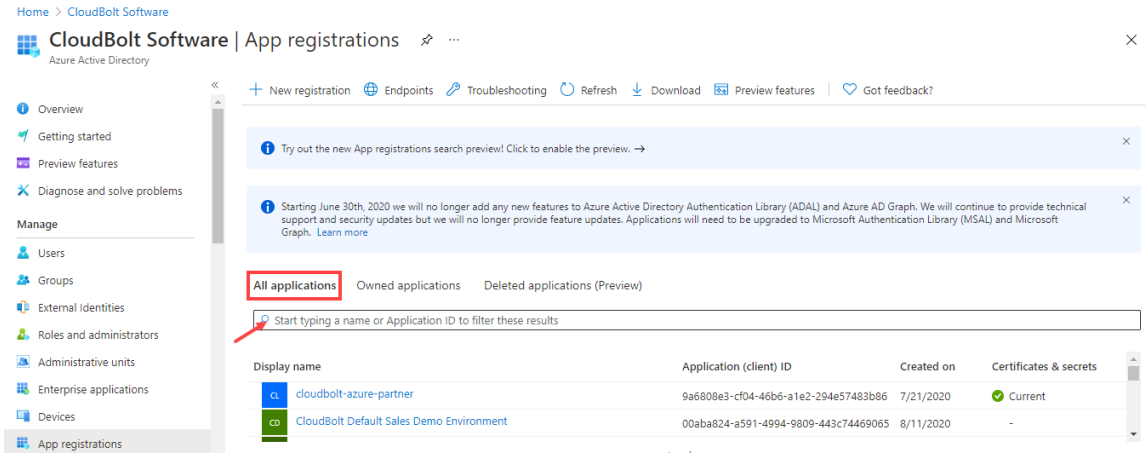
You must create individual roles for each CloudBolt CSMP Role and Tenant you want to use as a part of SSO login.

1. Sign in to the Azure portal using a Global administrator account for the directory.
2. Search and select **Azure Active Directory**.

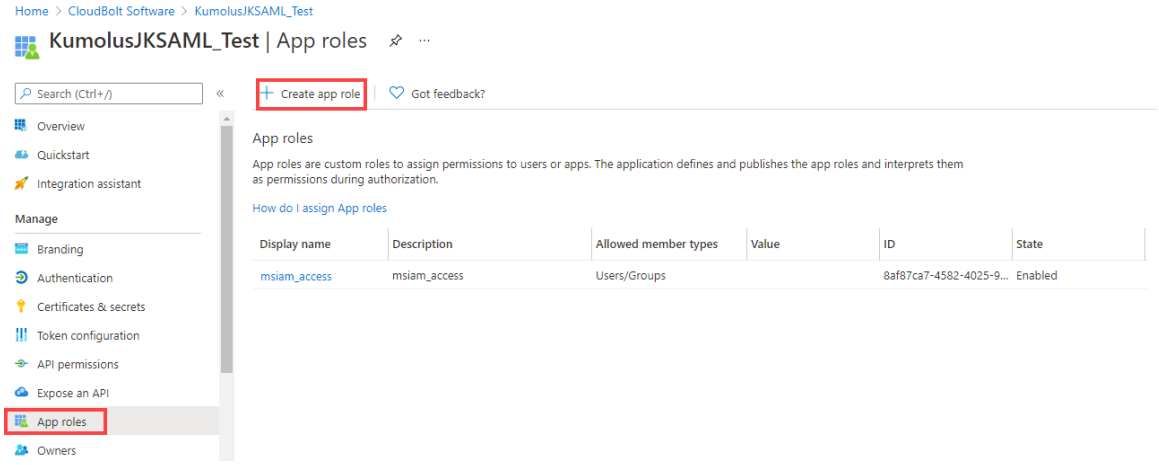
3. Go to **App registrations** under the Manage section on the left navigation panel.



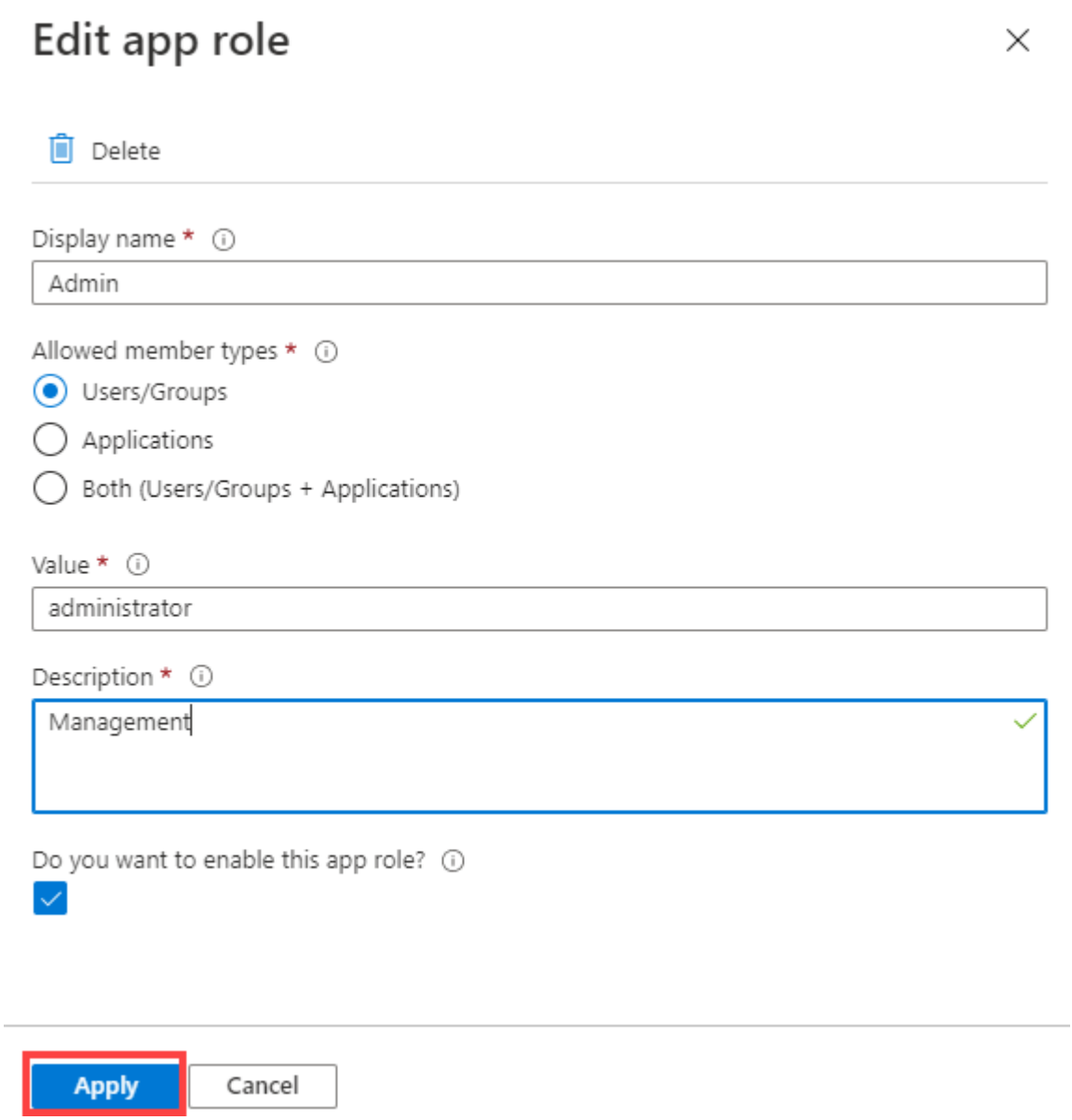
4. Search and select your application created for CloudBolt CSMP SSO login under the **All applications** tab.



5. Select the **App roles** and click **Create app role**.

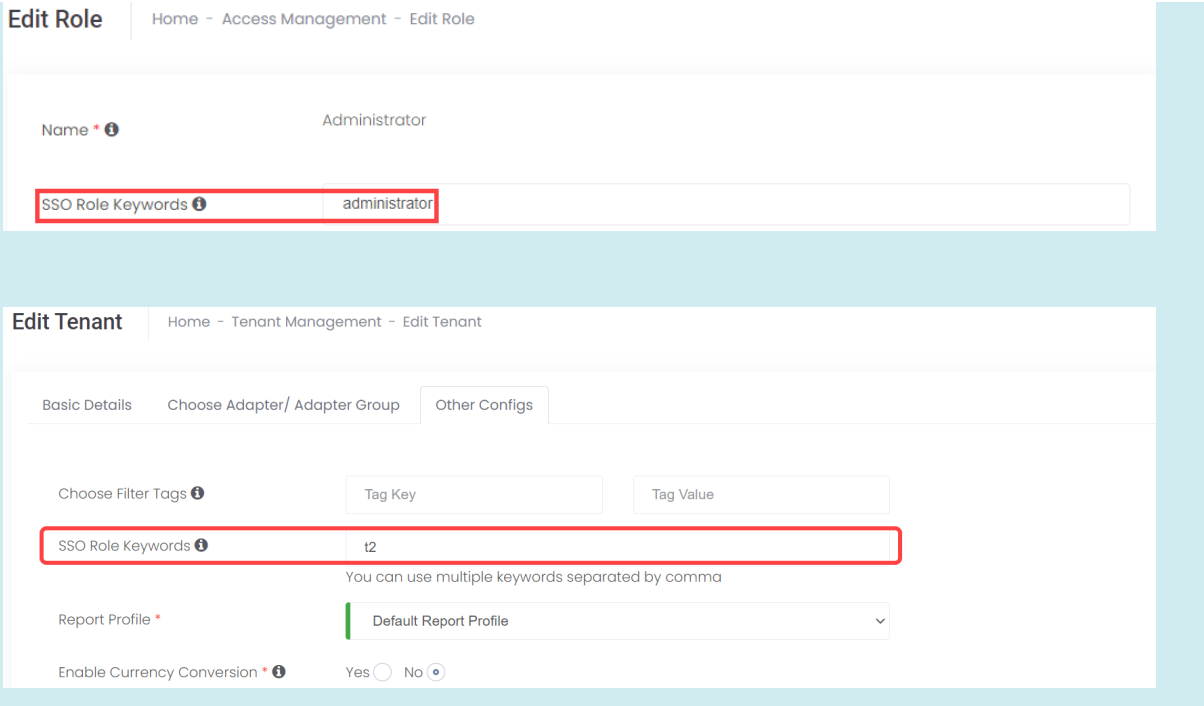


6. The **Create app role** page will appear, you must fill out the required information.



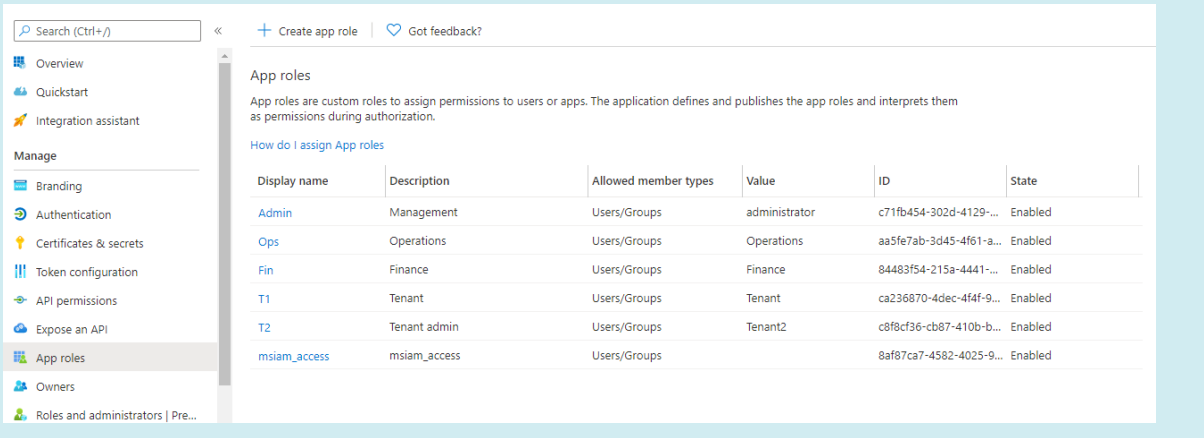
7. Enter a **Display name**.
8. Choose **Users/Groups** for the **Allowed member types**.
9. Enter a **Value** for the role.

Note: Make sure the role value you enter matches your CloudBolt CSMP Role or Tenant **SSO Role Keywords**. The user will not be able to SSO login to their CloudBolt CSMP account if the **value** supplied for an Azure role does not match any of your CloudBolt CSMP role or tenant **SSO Role Keywords**.



10. Enter a valid **Description** for the role.
11. Select the **Apply** button. Your app role is created and ready for assignment.

Note: You must create a role for each CloudBolt CSMP **Role** and **Tenant** you want to use as a part of **CloudBolt CSMP SSO login**.



Outcomes

You have learnt to create groups and roles in Microsoft Entra ID to be used in CloudBolt CSMP SSO settings.

3.4.6. Configure SAML for Okta

Learn about setting up SSO in CloudBolt Cost and Security Management using Okta Identity Provider.

Introduction

If your Organization uses Okta as an Identity Provider, you can set up CloudBolt Cost and Security Management as an Application in Okta's interface. Then, use Okta as a single point of entry for your CloudBolt Cost and Security Management Users to maintain security and governance across your Organization.

Goal

After completing these setup instructions, you will know how to use Okta to securely sign in to CloudBolt Cost and Security Management.

Prerequisites

- An Okta Administrator account exists that can create an application and add Users.
- An Okta Organization exists.

Setup Overview

1. Add an Application in Okta.
2. Configure Okta SSO in CSMP.
3. Test the Okta SSO Configuration.

Add an Application in Okta

1. In Okta, make sure you are in the **Admin** menu (*https://instance-name.okta.com/admin*).
2. From the left-hand menu, click **Applications > Applications.**
3. Click **Create App Integration > SAML 2.0.** Click **Next.**

1. General Settings

1. Enter a **Name** and **Logo (optional)** for your application.
2. Click **Next.**

2. Configure SAML

1. In the SAML Settings section, add the following values:

Configure SAML	
SAML Settings	
Single sign-on URL	Enter the **Single sign on URL** from your CSMP environment. This is the **Assertion Consumer Service (ACS) URL** in CSMP. Example: *https://yourdomain.cloudbolt.app/sso/acs*.
Use this for Recipient URL and Destination URL	Enabled
Allow this app to request other SSO URLs	Disabled
Audience URI (SP Entity ID)	Enter the **Audience URI (SP Entity ID)** from CSMP. Example: *https://yourdomain.cloudbolt.app/sso/metadata*.
Default RelayState	Identifies a specific application resource in an IdP initiated Single Sign-On scenario. In most cases this is blank.
Name ID format	Transient
Application username	Email
Update application username on	Create and Update
Show Advanced Settings	
Click Show Advanced Settings and configure as follows.	
Response	Unsigned
Assertion Signature	Signed
Attribute Statements	
Note: The attribute Name in Okta must exactly match the Name in the column here.	

Attribute in Okta	Value
Name	user.login
E-Mail Address	user.email
Role	administrator Enter a SSO Role Keyword in CSMP that will map to the attribute entered in Okta.
Tenant	Provided from the SSO Role Keyword field in CSMP. See Set up SSO Role Keywords.

2. Click **Preview the SAML Assertion** to verify the info entered.
3. Click **Next** save your app.

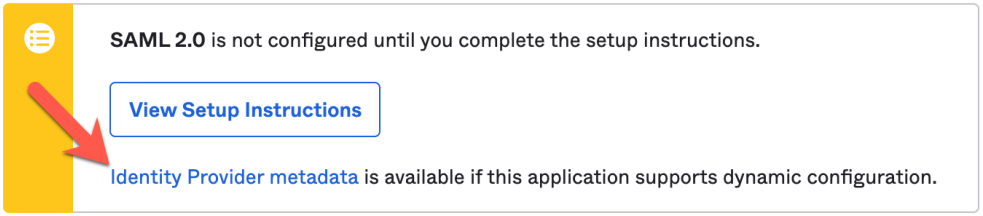
3: Feedback

1. Select "I'm an Okta customer adding an internal app".
2. For App Type, select "This is an internal app that we have created".
3. Click **Finish.**

Download the IdP Metadata File

Note: You may also click **View Setup Instruction** to enter the fields into CSMP SSO manually.

1. In the newly created application in Okta, click the **Sign On** tab.
2. In the Settings area, find the SAML 2.0 tip box.
3. Right click the **Identity Provider metadata link** > **Save Link As** > Save it to your local machine.



Assign User Access to the Application

1. In Okta, click **Directory > People.**
2. Click a Username from the **People & Username** column.
3. Select the **Applications tab > Assign Applications.**
4. Select your CloudBolt Cost and Security Management application. Click **Assign.**
    - Repeat for each user you would like to sign in using Okta.
5. Navigate back to the Application > Assignments tab to see the User's assignment.

Configure Okta in CSMP

1. Navigate to your CloudBolt Cost and Security Management instance.
2. Follow the steps on Configure SSO in CloudBolt CSMP to add the details from your new Okta application.

Test the Okta Configuration

1. In CloudBolt Cost and Security Management, click your Profile Icon > Logout.
2. Click **SSO Login.**
3. You should be automatically logged in to CSMP using Okta.

Outcomes

Your Okta SSO integration is complete.

3.4.7. Configure SAML for Keycloak

Learn how to set up Keycloak SAML to communicate with the CloudBolt CSMP SSO.

Introduction

If your Organization uses Keycloak as an Identity Provider, you can set up CloudBolt CSMP as a client in Keycloak interface. Then, use Keycloak as a single point of entry for your CloudBolt CSMP Users to maintain security and governance across your Organization.

Goal

After completing these setup instructions, you will know how to use Keycloak to securely sign in to CloudBolt CSMP.

Prerequisites

- A Keycloak Administrator account exists that can create a client and add Users.

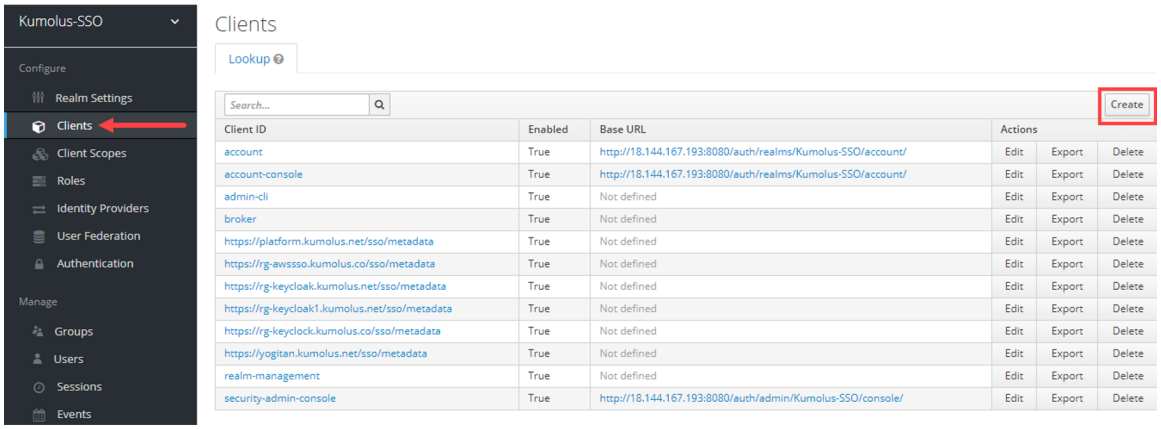
Setup Overview

1. Add a Client Entry in Keycloak
2. Create Users in Keycloak Account
3. Configure Keycloak to CloudBolt CSMP
4. Keycloak Users Role Mapping to CloudBolt CSMP
5. Test the Keycloak Configuration

Add a Client Entry in Keycloak

1. Sign in to your Keycloak administrator console.

2. To create a SAML client, click **Clients** on the left-hand menu bar.



3. Click **Create** on the upper right-hand corner of the Clients page.

1: Add Client

1. Add following values in the **Add Client** page.

Client ID	Enter the **Entity ID** from CloudBolt CSMP. Example: *https://yourdomain.cloudbolt.app/sso/metadata*.
Client Protocol	saml
Client SAML Endpoint	Enter the CloudBolt CSMP account URL.

2. Click **Save**.

2: Clients' Settings

1. Add following values in the clients' **Settings** tab.

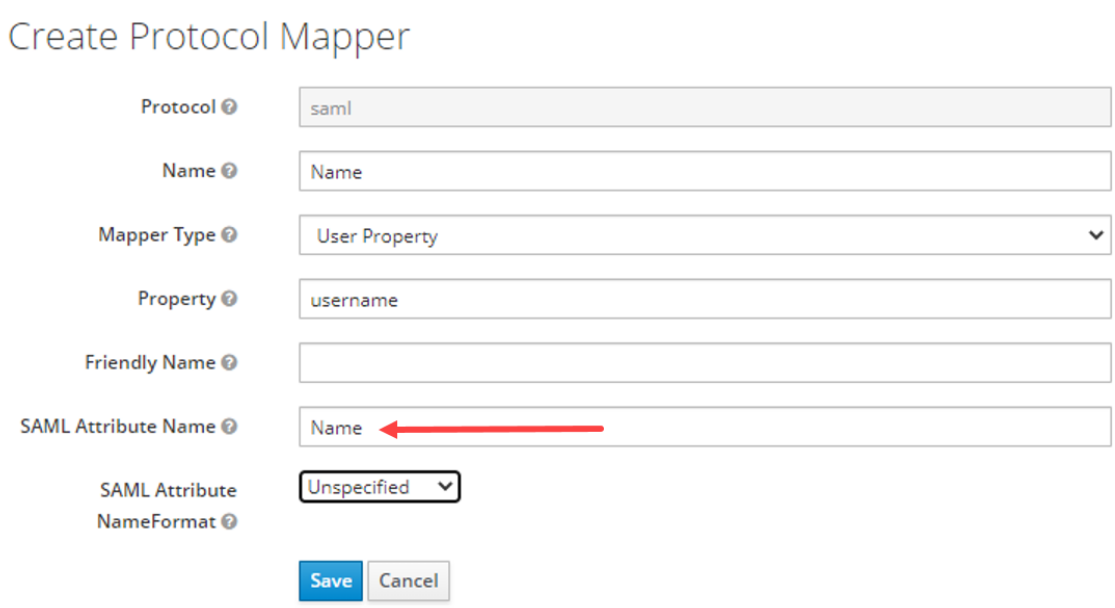
Name	Enter a valid name for your Keycloak user. This name will be displayed in the Keycloak UI.
Description	Enter a valid description for your Keycloak user.
Enabled	ON
Include AuthnStatement	ON
Sign Documents	ON
Client Signature Required	ON
Force POST Binding	ON
Front Channel	ON

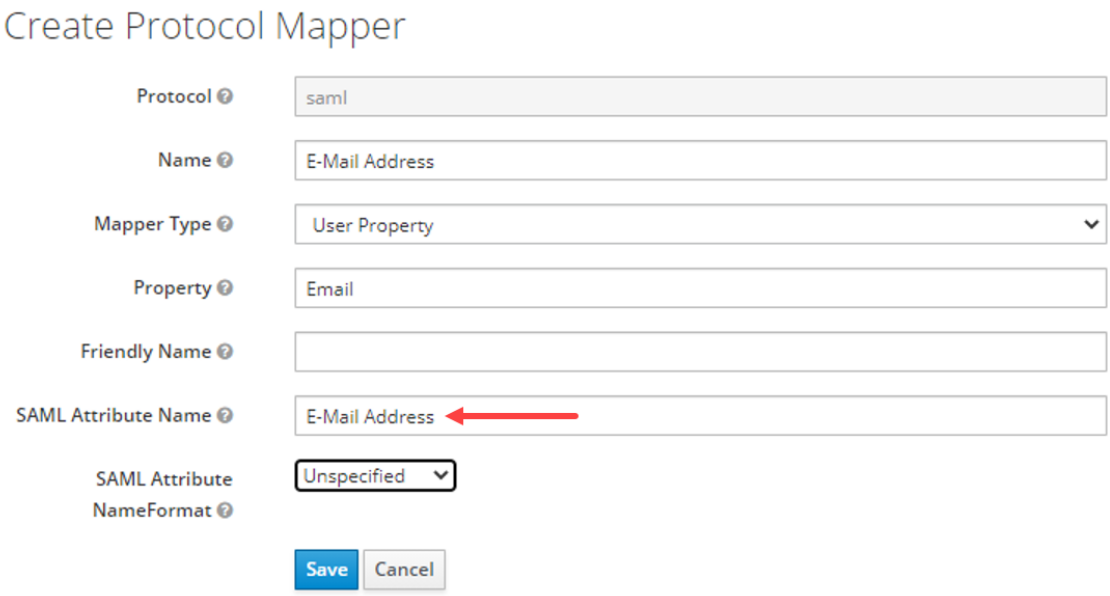
Logout	
Name ID Format	transient
Root URL	Enter the CloudBolt CSMP account URL.
Valid Redirect URIs	Enter the **Single sign on URL** from your CSMP environment. This is the **Assertion Consumer Service (ACS) URL** in CSMP. Example: *https://yourdomain.cloudbolt.app/sso/acs*.
Master SAML Processing URL	Enter the CloudBolt CSMP account URL
Fine Grain SAML Endpoint Configuration	
Assertion Consumer Service POST Binding URL	Enter the **Single sign on URL** from your CSMP environment. This is the **Assertion Consumer Service (ACS) URL** in CSMP. Example: *https://yourdomain.cloudbolt.app/sso/acs*.
Logout Service Redirect Binding URL	Enter the **Logout URL** from your CSMP environment. This is the **Logout URL** in CSMP. Example: *https://yourdomain.cloudbolt.app/sso/logout*.

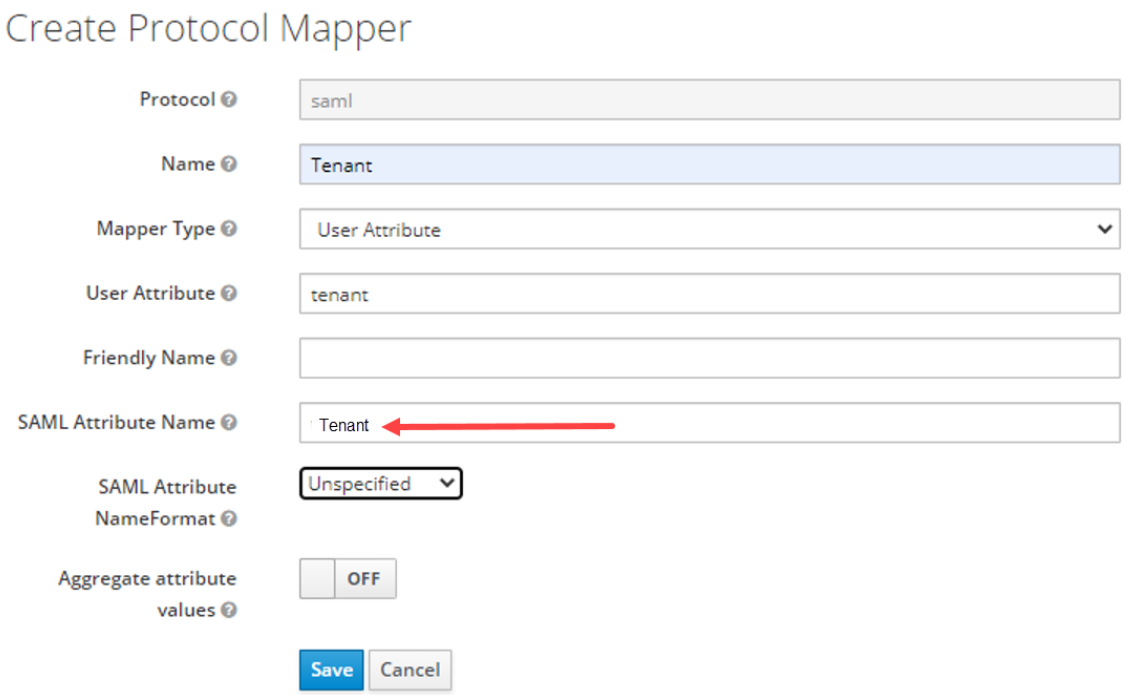
2. Click **Save**.

3: Create Protocol Mappers

1. Go to the **Mappers** tab of your **Keycloak client**.
2. Click **Create**.
3. **Create Protocol Mapper** page appears. Create a mapper for all the three attribute formats (except the Role format) added in the CloudBolt CSMP Attribute Mapping tab, as displayed in the illustrations below. Click the **Save** to save each attribute mapper.

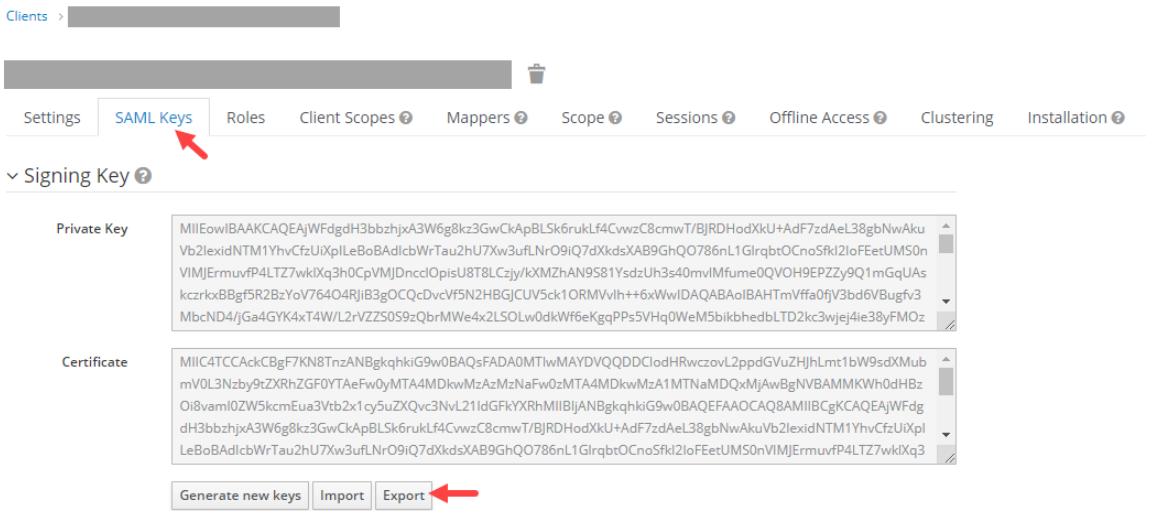

Create Protocol Mapper
Protocol
saml
Name
Name
Mapper Type
User Property
Property
username
Friendly Name
SAML Attribute Name
Name
SAML Attribute NameFormat
Unspecified
Save
Cancel


Create Protocol Mapper
Protocol
saml
Name
E-Mail Address
Mapper Type
User Property
Property
Email
Friendly Name
SAML Attribute Name
E-Mail Address
SAML Attribute NameFormat
Unspecified
Save
Cancel

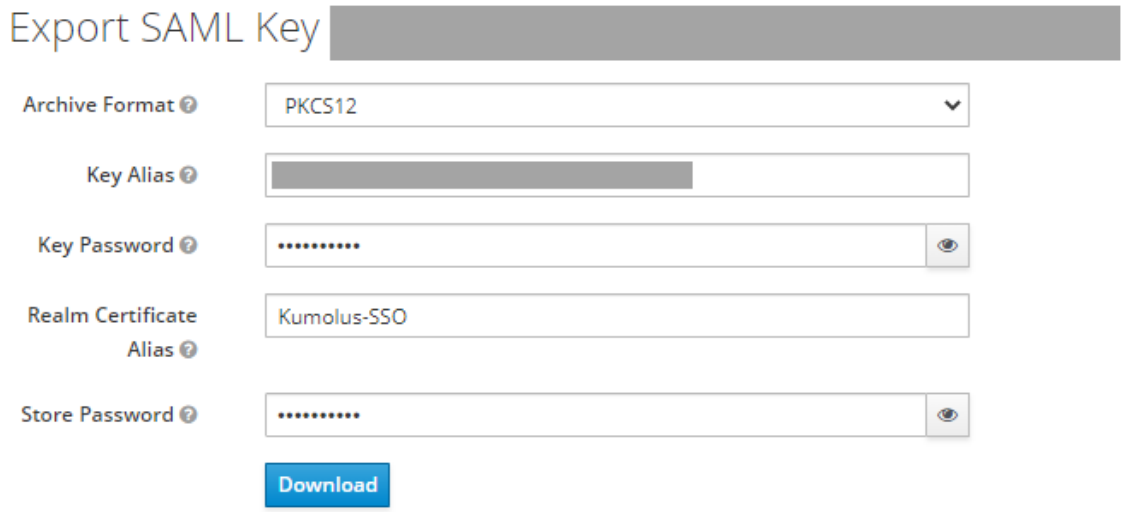


4: Download SAML Keys

1. Go to the **SAML Keys** tab of your Keycloak client page.



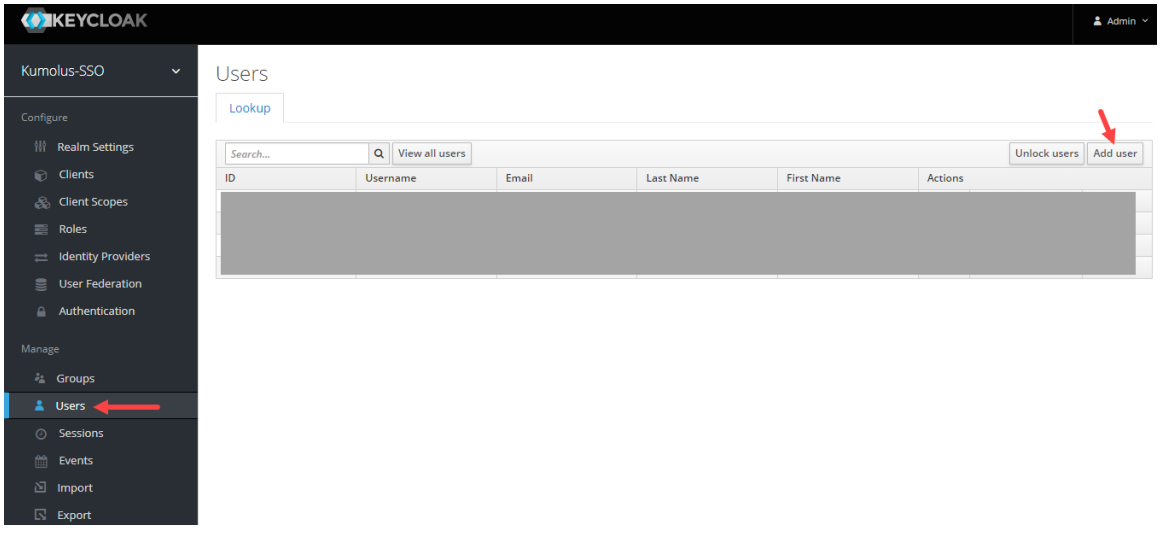
2. Export the Certificate and Private Key in **PKCS12** file format. Add **Key Password** and **Store Password**.



3. Convert the downloaded private key and certificate files in .PEM format using the terminal command `Openssl pkcs12 -in keystore.p12 -nocerts -nodes | openssl rsa -out privkey.pem`, and the password created to download those files.

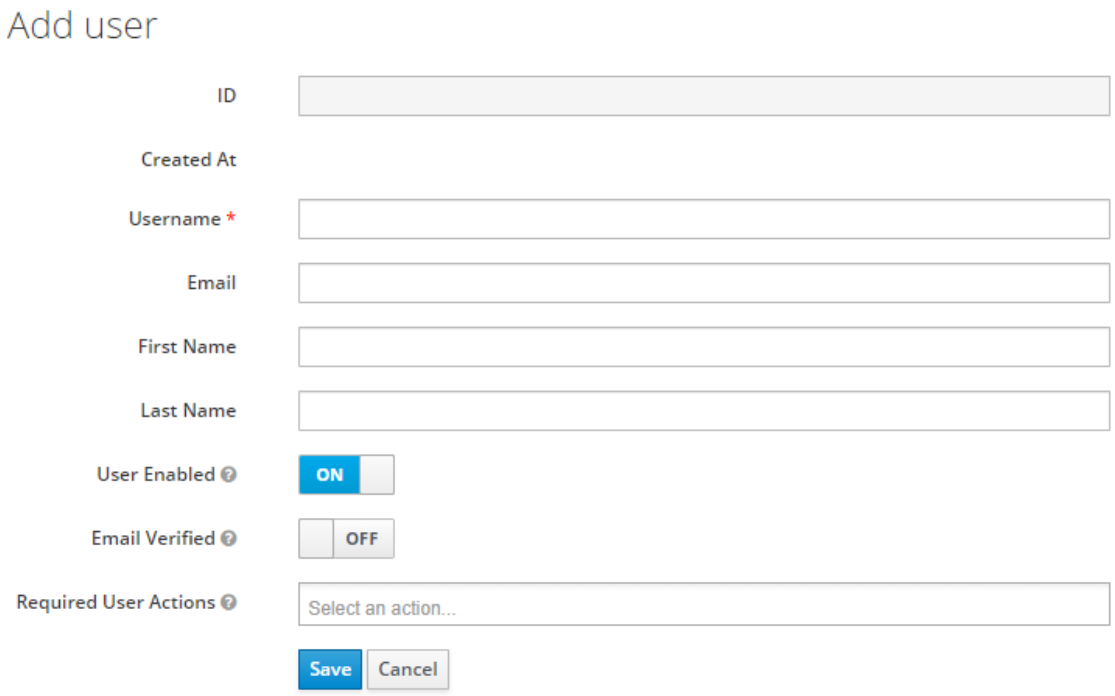
Create Users in Keycloak Account

1. Sign in to your Keycloak administrator console.
2. To create a new user, Click **Users** under the **Manage** section on the left navigation bar.

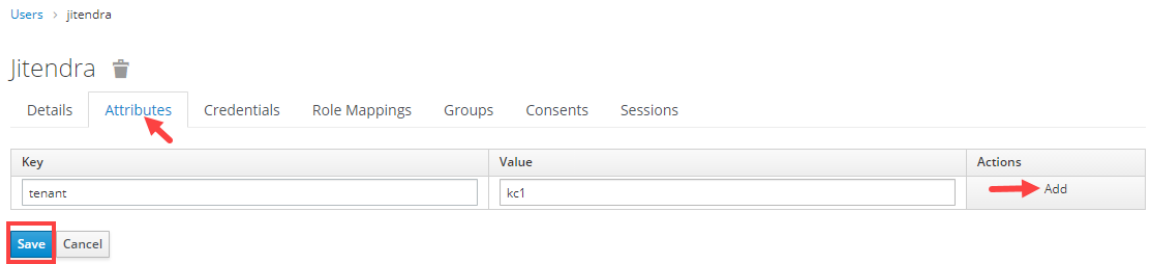


3. Click **Add User**.

4. **Add user** page will appear.

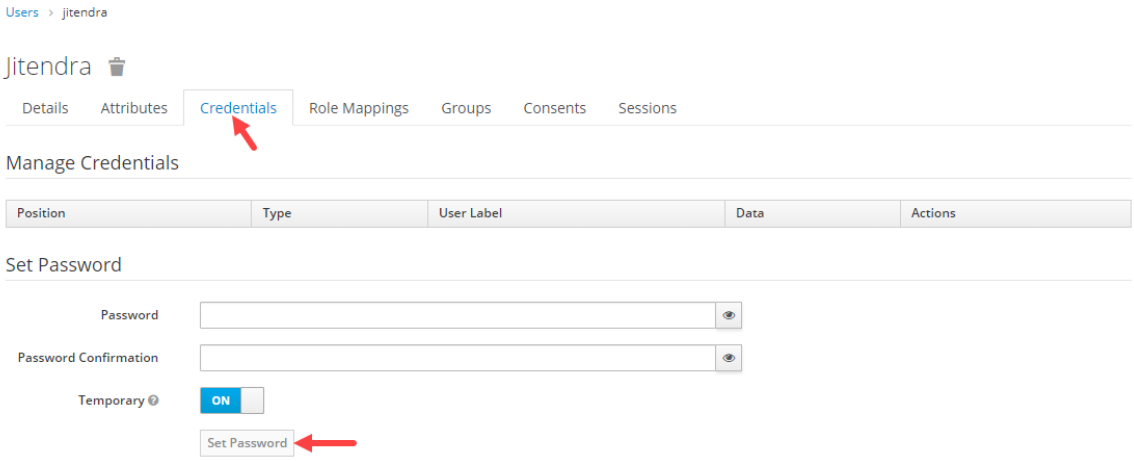


5. Enter the username, email, first name, and last name.
6. User Enabled must be turn on.
7. Click **Save**.
8. The user has been created successfully
9. Go to the **Attributes** tab of the user.



10. In the **Key** box, enter the **User Attribute** data you had added during create Protocol Mappers.
11. In the **Value** box, enter the SSO keywords for each **User Attribute** data of the **Key** box.
12. Click **Add**.
13. After adding all the key: value pairs, click **Save**.

14. Ensure that the **Values** added to the **Tenant** key matches to one of the values in CloudBolt CSMP SSO Keywords within Tenants.
    - Note: If it does not match, the user will be unable to SSO login to their CloudBolt CSMP account.
15. Go to the **Credentials** tab of the user.



16. Set a password for the user.

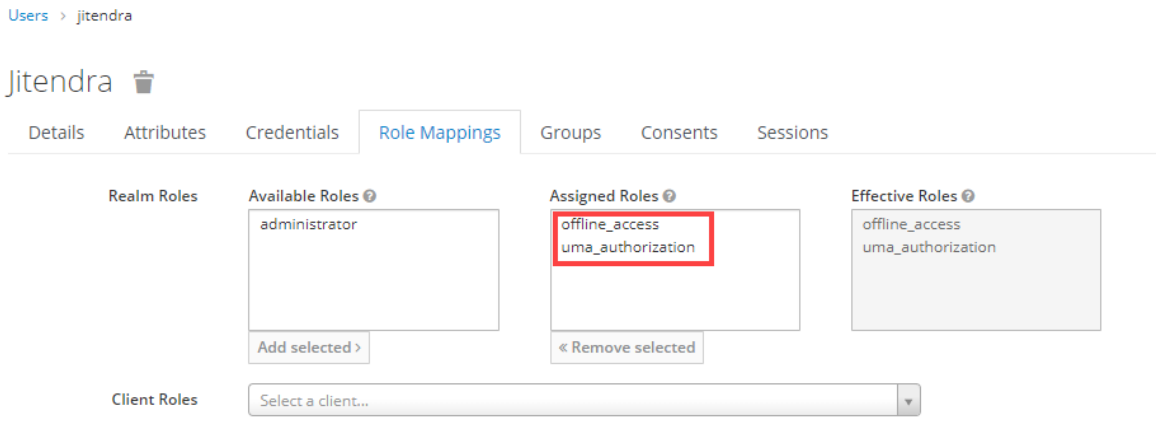
Configure Keycloak to CloudBolt CSMP

1. Navigate to your CloudBolt CSMP instance.
2. Follow the steps on Configure SSO in CloudBolt Cost and Security Management Platform to add the Keycloak IdP (Identity Provider) configuration details manually in the IdP Metadata Details Tab from your new Keycloak client.
3. You must add private key downloaded and converted earlier. See Configure SAML for Keycloak.
    a. Copy the entire content of the private key .PEM file converted in the previous section, and paste in the text box for **Private Key** under the Advance Settings of your CloudBolt CSMP IdP Metadata Details Tab.
    b. Click **Save**.

Keycloak Users Role Mapping to CloudBolt CSMP

1. Go to your **Cloudbolt CSMP > Access Management > Edit Role**.

2. Under the **SSO Role Keywords box of a CloudBolt CSMP** role, you must add the value(s) available under the **Assigned Roles** list available under the **Role Mappings** tab of a Keycloak user.



3. Click **Update Role**.

Test the Keycloak Configuration

1. In CloudBolt CSMP, click your Profile Icon > Logout.
2. Click **Sign in with SSO**.
3. You should be automatically logged in to CSMP using Keycloak.

3.4.8. User Guide for Updating SAML Metadata

Learn how to update your existing SAML application settings for CloudBolt SSO to reflect the domain change of your CSMP account sign-in URL from 'kumolus.net' to 'cloudbolt.app'. This guide will walk you through the process of updating the Service Provider (SP) metadata in your SAML applications.

Introduction

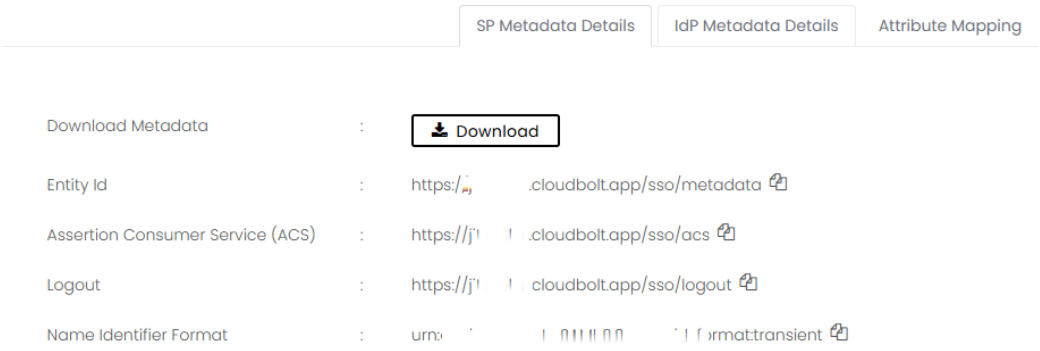
As part of the transition to the new domain **cloudbolt.app**, organisations using Single Sign-On (SSO) for CloudBolt CSMP access will need to update the Service Provider (SP) metadata in their Identity Provider (IdP). This ensures that SSO authentication continues seamlessly with the new CloudBolt CSMP Account Sign-In URL, without any disruptions.

The steps outlined in this guide apply specifically to organisations whose CloudBolt CSMP account was initially signed up using the **kumolus.net** domain URL, and whose sign-in domain URL has now changed to **cloudbolt.app**.

Steps to Update SP Metadata in Your Existing SAML Application

1. **Access CloudBolt CSMP Account Using kumolus.net Domain URL**
    - Log in to your CloudBolt CSMP account via the old sign-in URL: **example.kumolus.net**.
    - Once logged in, click on the **Settings** icon [] and navigate to **SSO Configuration**.
2. **Obtain the New SP Metadata URL**
    - In the **SSO Configuration** page, go to **SP Metadata Details** tab.
    - Copy the provided **new SP metadata URL(s)**. These URL(s) contain the updated domain name, i.e., **cloudbolt.app**.

        - Example URL: https://{subdomain}.**cloudbolt.app**/sso/metadata.
    - Alternatively you can click the **Download** option to download the SP metadata file.



3. **Update the SP Metadata in Your Identity Provider (IdP)**
    - Log in to your IdP (e.g., Okta, ADFS, Azure AD).
    - Navigate to the section where the SP metadata is configured. This is typically in the SAML configuration settings.
    - Replace the old SP metadata URL(s) with the new CloudBolt SP metadata URL(s) you obtained earlier. If you downloaded the metadata file, you can upload it directly to your IdP.
    - Save the changes in your IdP configuration.
4. **Test the Connection**
    - After updating the SP metadata, it is essential to test that the SSO login works correctly with the new sign-in domain URL.
    - Open your browser and enter the updated sign-in domain URL, e.g., **example.cloudbolt.app**.
    - Try logging into CloudBolt CSMP using SSO to confirm that the authentication process is functioning as expected.

Troubleshooting

- If you encounter issues after updating the SP metadata, verify that you've copied the correct URL from CloudBolt CSMP and that the IdP configuration was saved properly.

- Ensure there are no typographical errors in the metadata URL.
- For additional assistance, please contact CloudBolt support.

By completing these steps, your organisation will be able to seamlessly continue using SSO to log in to your CloudBolt CSMP account via the updated domain name, **cloudbolt.app**.

3.5. Manage Tenants

Learn about tenants and how to manage tenants in CloudBolt CSMP.

- Introduction
- Add a Tenant
- View list of Tenants
- Manage Tenants
- Assign CSMP Users to Tenants
- Remove CSMP Users from Tenants
- Edit Permission
- Using Tenants with Single Sign-On
- Set up SSO Tenant Keywords
- Assign SAML Users to Tenants

Introduction

Tenants in CloudBolt Cost and Security Management provide the ability to grant different levels of access to different data views on a User level.

A tenant in the CloudBolt CSMP represents a sub-organisation, which shares billing adapters, normal adapters, and adapter groups with users. A tenant can have one or more users. Tenant allows users access to only their information based on the shared adapters. Within CloudBolt CSMP, each tenant's data is inaccessible to all other tenants, except the default tenant users.

When an organisation is created and a user signs up in the organisation, that user is assigned a default tenant named as **Default**. The Default tenant users have access to all the modules over CloudBolt CSMP. Any other custom tenant created inside the organisation is known as a Sub Tenant. A Sub Tenant does not have access all over CloudBolt CSMP, but has access to the sub tenants and adapters created by it only.

A default tenant can add a new sub tenant, edit a sub tenant details, manage users, assign users, add roles, view edit all roles, view and edit permissions for Sub Tenants user/users and can delete a sub tenant.

For example, if you have five different billing adapters named BA1, BA2, BA3, BA4, and BA5 shared with five different tenants, T1, T2, T3, T4, and T5, respectively. Then, tenant T1 assigned users can only access the data related to adapter BA1, tenant T2 users can only access the data related to adapter BA2, and so on.

Add a Tenant

Add a Tenant in CloudBolt CSMP to get started.

1. Logon to your CloudBolt CSMP instance.
2. Click **Settings > Management > Tenant Management**.
3. Click **Add Tenant**.
4. Fill out the **Basic Details** tab and click **Next**.

Field name	Notes
Tenant Name	Enter a Name for your Tenant.

5. Fill out the **Choose Adapter/Adapter Group** details. To choose the adapters/groups, choose the relevant cloud provider tab that is available on the right side.
    - Applicable to a CloudBolt Parent Organisation account administrator

Field name	Notes
Choose Adapter	Select an Adapter to associate to this Tenant. Select one or multiple Adapters. Use the **Select All** option to select every adapter. Otherwise, you can choose up to 99 normal adapters per cloud provider, including the ones that are a member of adapter groups. **Important:** If you have used **Select All** option to select all the adapters for a tenant, any additional adapters created for that cloud provider within your CloudBolt CSMP account in future will be automatically shared with such tenant.
Choose Adapter	Choose the adapter groups to associate to this tenant. If you have used **Select All** option to select adapters in Choose Adapter field,

Field name	Notes
Group	then **Choose Adapter Group** drop-down will not be available.
Choose Resource Group	If you select any Azure normal adapter and/or adapter group, this field will appear. By default, all the resource groups linked with the previously selected Azure adapters will be selected. You can manually select up to 20 resource groups. CloudBolt CSMP tenant users' access to cost reporting, event scheduler, service manager, and service adviser modules will be restricted based on shared resource groups.

- Applicable to a CloudBolt Child Organisation account administrator

Field name	Notes
Choose Adapter	Select an Adapter to associate to this Tenant. Select one or multiple Adapters. You can choose up to 99 normal adapters per cloud provider, including the ones that are a member of adapter groups.
Choose Adapter Group	Choose the adapter groups to associate to this tenant. If you have selected all the adapters available in Choose Adapter field, then **Choose Adapter Group** drop-down will not be available.
Choose Resource Group	If you select any Azure normal adapter and/or adapter group, this field will appear. By default, all the resource groups linked with the previously selected Azure adapters will be selected. You can manually select up to 20 resource groups. CloudBolt CSMP tenant users' access to cost reporting, event scheduler, service manager, and service adviser modules will be restricted based on shared resource groups.

6. Click **Next** and fill out the **Other Configs** details:

Field name	Notes
Choose Filter Tags	Enter a Filter Tag Key and Tag Value. The Service Adviser will display services for this Tenant with a matching Key:Value pair.
SSO Tenant Keywords	The SSO Tenant Keywords field allows you to define one or more keywords (separated by commas) that will be used to route users to the correct CSMP account tenant during the Single Sign-On (SSO) authentication process. When users log in, the system will match the tenant keywords in their SSO settings to the ones specified here, ensuring they are directed to the appropriate tenant based on the keyword match. This feature helps streamline the user experience by automatically assigning users to the correct CSMP tenant environment without requiring manual intervention. For more information, see Using Tenants with Single Sign-On section.
Report Profile	Select a report profile for this tenant.
Enable Currency	Select **Yes** to allow you to convert Reporting costs in your preferred currency. Select **No** to display Reporting costs in the

Field name	Notes
Conversion	default currency provided by the Cloud provider.
Select Preferred Currency	Choose your preferred currency.

7. Click **Submit.**

View list of Tenants

On the Tenant Management page list of all the tenants will appear. The displayed details include the following:

- Tenant name
- Shared billing and normal adapters. Click View All to see list of adapters.
- Shared groups. Click View All to see details of shared groups.
- Users list with whom the tenant is shared
- Shared resource groups. Click View All to see details of Azure shared resource groups with the tenant.
- Tags
- SSO tenant keywords associated with the tenant
- Report profile name
- An Action Column, where you can
    - Share the tenant with users
    - Edit tenant users' role
    - Update tenant details
    - Delete a tenant.

Manage Tenants

Assign CSMP Users to Tenants

1. In the **Tenant Management** interface, hover over the ellipsis [...] icon in the **Action** column.
2. Click **Share to User.**
3. In the **Find Users** search field, type the Username and select it from the **Users** list.
4. Click **Next.**
5. Select Role(s) as applicable and click **Share.**

Remove CSMP Users from Tenants

1. In the **Tenant Management interface,** in the **Assigned Users** column, click the X icon next to the User's name to remove the user from the Tenant.
2. Click **OK** to confirm.

Edit Permission

The **Edit Permission** feature allows you to update the roles assigned to users within a tenant. Follow the steps below to modify user roles:

1. **Access the Tenant Management Interface**
    - In the Tenant Management interface, locate the ellipsis [...] icon in the Action column.
2. **Select Edit Permission**
    - Hover over the ellipsis [...] icon and click **Edit Permission** from the dropdown menu.
3. **View Assigned Users and Roles**
    - A list of all assigned users for the tenant will appear, showing their current roles.
4. **Update User Roles**
    - To modify the role(s) for a user, select the desired role(s) from the role box next to the user's name. You can choose multiple roles for a user by holding down the **CTRL** key while selecting the roles.

5. **Save Changes**
    - Click **Update** to apply the new roles.

Understanding the role assignment rules is crucial:

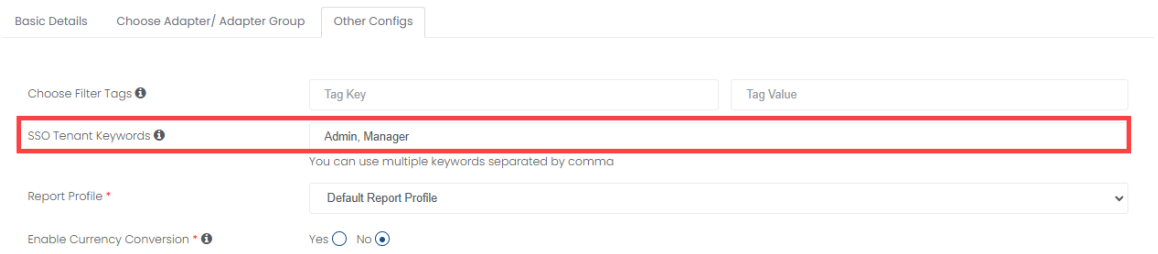
- If you have the Administrator (CSMP default) role, you can assign any role, whether default or custom, to tenant users.
- If you hold a non-Administrator CSMP default role (such as basic, finances, or operations), you are restricted to assigning only custom roles and the default role you currently possess.
- If you have a custom role, you can only assign that specific role to tenant users.

Using Tenants with Single Sign-On

Set up SSO Tenant Keywords

If your organisation uses Single Sign On (SSO) to authenticate users, you can use SSO Tenant Keywords to place the SSO users into the matching Tenant upon login using SSO. The SSO tenant keywords must be assigned when you are adding a Tenant or later by editing the Tenant details.

1. In CloudBolt CSMP, navigate to **Settings > Tenant Management**.
2. Identify the tenant to add SSO tenant keywords and click the ellipsis [...]icon under the Action column. Select **Edit Tenant**
3. In the SSO Tenant Keyword box under the Other Configs tab, add the keywords. You can add multiple keywords separated by comma, if required.



Note: In your IdP (Identity Provider) configuration, you need to add a claim attribute

called "Tenant" with the same value as the SSO Tenant Keyword entered in CloudBolt CSMP.

4. Click **Update.**

Assign SAML Users to Tenants

1. In CloudBolt CSMP, navigate to **Quick Actions > Access Management**.
2. In the **Action** column of a Role, hover over the ellipsis [...] icon and click **Members.**
3. In the **Action** column of the desired Member, hover over the ellipsis [...] icon and click **Edit.**
4. Uncheck "Auto assign tenant" and "Auto assign role" and click **Update.**
5. In the **Tenant Management** interface, for the required Tenant, hover over the ellipsis [...] icon in the Action column.
6. Click **Share to User**.
7. In the **Find Users** search field, type the username (e.g. michael@cloudbolt.com) and select it from the **Users** list.
8. Click **Next.**
9. Select **Role(s)** and click **Share.**

3.6. Collecting an API Access Key

Learn how to create an API Key in CSMP in order to access the API.

Collect the API Key

1. In CloudBolt CSMP, click your **User Profile icon > My Profile.**
2. On the left, click **Access Keys.**
3. Enter a Description, select an Expiration option, and click Save. An access key is generated and displayed in a pop-up.
4. In the popup, click **copy.**

4. Adapter Configurations

Learn all about the CloudBolt CSMP adapters.

The adapter is the main bridge that connects your Cloud service accounts to CloudBolt CSMP. The adapter helps fetch the details for services, notifications, cost, and spend usage from the cloud services accounts to the CloudBolt CSMP dashboard widgets. Currently CloudBolt CSMP supports adapters for AWS, Azure, GCP, and VMware.

There are 3 types of adapters:

- **Normal Adapter**: A normal adapter is created to sync all the services related information such as start, stop, status, notifications, etc. to the widgets in CloudBolt CSMP.
  Note: The Normal adapter does not fetch any financial health information from the service providers.
  After successfully creating a normal adapter, the CloudBolt CSMP worker run will poll the related cloud services data to CloudBolt CSMP at the schedules listed below.
    - For AWS normal adapters: The CloudTrail process fetches data at every 3 hours
    - For Azure normal adapters: Data is fetched everyday at 18:00 UTC
    - For GCP normal adapters: Data is fetched everyday at 19:00 UTC
    - For VMware adapters: Data is fetched through VMware Data Collector at 09:30 and 21:30 UTC.
- **Consolidated Billing Adapter**: This adapter fetches your cloud services cost details from the Service Providers to CloudBolt CSMP. This data helps produce the cost reports such as spend overview, spend details, the total cost for month or year, and recommendations of the cost adviser.
  After successfully creating and configuring a billing adapter, the CloudBolt CSMP worker run will poll billing data from report settings or databases according to the schedules listed below.

  - For AWS billing adapters: 00:00 and 12:00 (all times are in UTC)
  - For Azure billing adapters (except CSP billing adapters): 03:30 and 15:30 (all times are in UTC)
  - For Azure CSP billing adapters: 21:00 UTC
  - For GCP billing adapters: 11:00 UTC

    GCP use the Pacific Standard Time Zone (PST) for its cost reports, which follow daylight saving time shifts. Whereas, CloudBolt CSMP adapters uses the UTC time zone. Due to the time zone difference, there may be some cloud cost variations between the cost reports shown on CloudBolt CSMP and the GCP Cloud cost report.

  - For VMware adapters: Data is fetched through VMware Data Collector at 09:30 and 21:30 UTC.

- **Backup Adapter**: The backup adapter is used for taking backup of your cloud services configuration information through the backup policies and the event scheduler.
- AWS General Configuration
- Azure Adapter Configuration
- GCP Adapter Configuration
- VMware Adapter Configuration

4.1. AWS General Configuration

Learn how to set up AWS before configuring CloudBolt Cost and Security Management.

Goal

Ensures that your AWS account is correctly set up prior to adding the AWS Adapter in CloudBolt Cost and Security Management. Continue to the Setup Overview section below for an overview, and view specific setup sections to configure AWS.

Setup Overview

There are two ways to set up AWS Roles and Credentials prior to configuring your CloudBolt Cost and Security Management Adapter:

Automatically: Use CloudFormation Scripts to Deploy Stacks

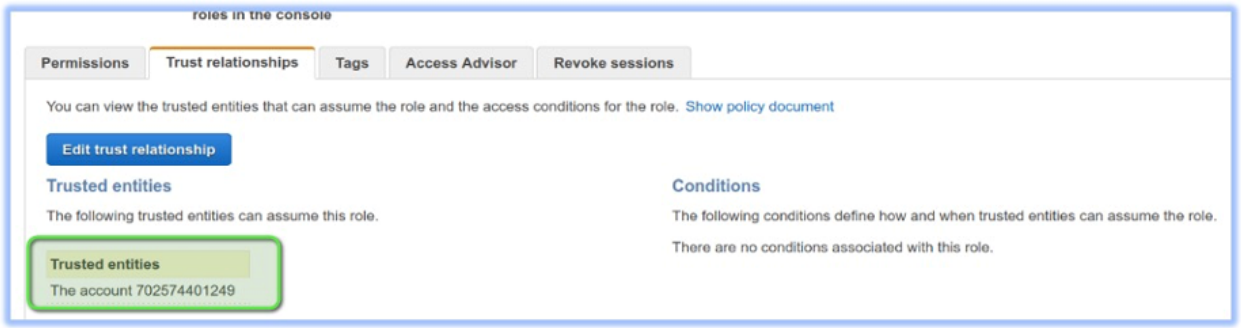
1. Set up Access Using Stacks
2. Set up Access to Multiple Accounts with StackSets

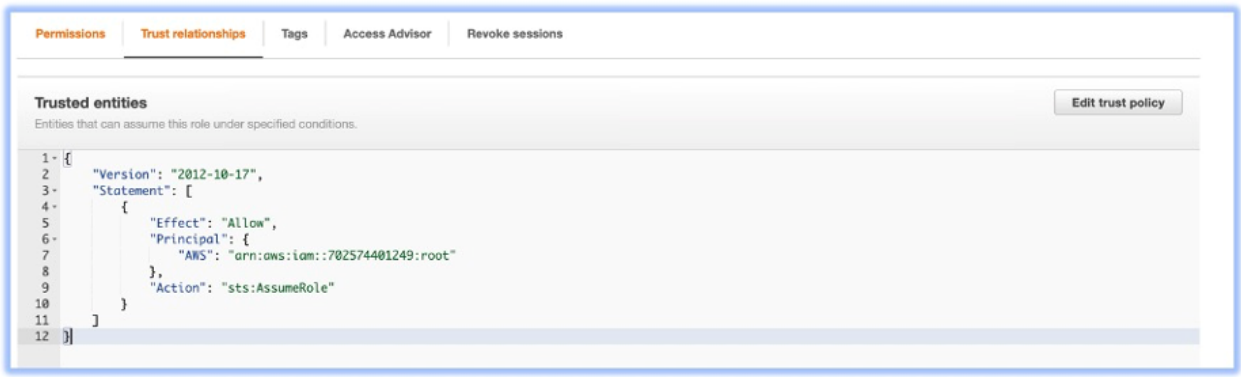
Manually: Configure from the AWS Management Portal

1. Create a Cost and Usage Report in AWS
2. Configure the AWS Organizations
3. Configure AWS Consolidated Billing Account Credentials

General Prerequisite for the AWS Adapter setup

Regardless of the method you choose for setup, ensure that the CloudBolt Cost and Security Management Account ID: 702574401249 is linked to each role ARN trust relationship (for workload and billing). If not present in the trust relationship, Account ID: 702574401249 must be added to the trusted entities as shown below.





Prerequisites for CloudFormation Setup

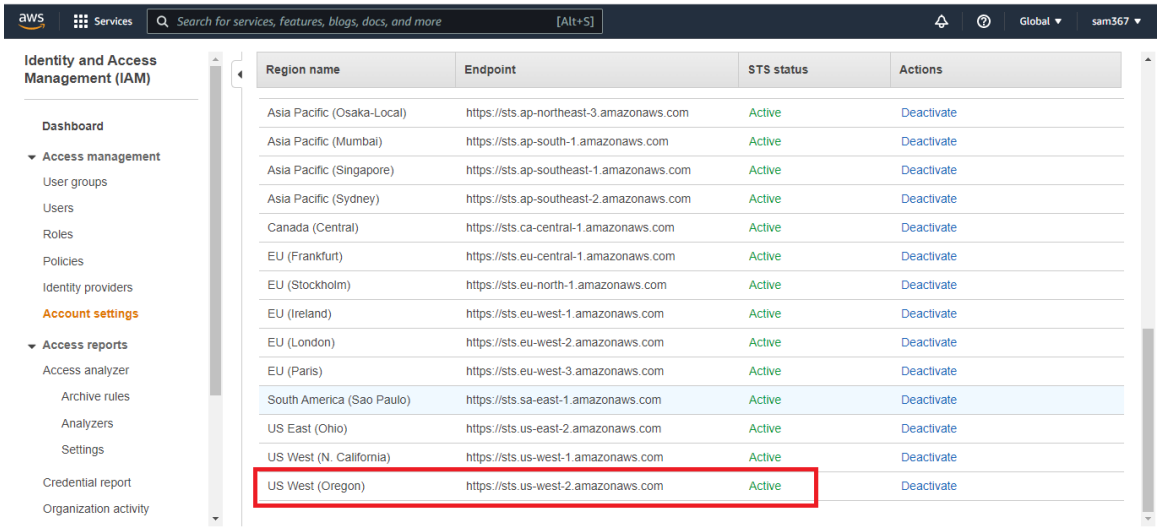
- Have access to all AWS accounts to be configured in CloudBolt Cost and Security Management.
- Your AWS Account *IAM Login* with Administrative permissions to configure relevant IAM Roles, Policies, and trust settings for CloudBolt Cost and Security Management.
- Access to CloudFormation and permissions to create/configure/delete Stacks.

Prerequisites for AWS UI Setup

- Have access to all AWS accounts to be configured in CloudBolt Cost and Security Management.
- You must have an AWS S3 bucket that will house the data for the Cost and Usage report
- Your AWS Account *IAM Login* with Administrative permissions to configure relevant IAM Roles, Policies, and trust settings for CloudBolt Cost and Security Management.
- Verify that your AWS account has Security Token Service (STS) status enabled for the Oregon region as the CloudBolt CSMP is mapped to the Oregon region for API

calls. You can do this from **AWS > IAM > Account Settings.**

Refer this article for more information.



The user account that will be connected to CloudBolt Cost and Security Management must meet the following requirements:

1. Least Privilege Read Only role to AWS Consolidated Billing Account.
2. Least Privilege Read Only role to all AWS workload accounts.
3. An existing AWS Cost and Usage report, with the following configuration:

Field name	Notes
Include resource IDs	Enabled
Time granularity	Hourly
Compression Type	GZIP/ZIP

4.1.1. Setting up AWS Credentials

Learn about the different methods available to set up your credentials in AWS, so you can sync your AWS data to CloudBolt Cost and Security Management via its Adapters.
The following methods are available for your organization to configure its credentials. Depending on the method you choose, not all processes may be required.

Setup Overview

- Using AWS IAM with CloudBolt CSMP
- Use CloudFormation Scripts to Deploy Stacks
    - Set up Access using Stacks
    - Set up Access to Multiple Accounts with StackSets
    - Configure Access Credentials for Consolidated Billing Account
- Configure Manually from the AWS Management Portal
    - Create a Role in AWS

4.1.1.1. Using AWS IAM with CloudBolt CSMP

Learn about the concept of using AWS Identity and Access Management with CloudBolt CSMP.

Introduction

IAM provides a way of securely controlling access to your AWS services and resources. IAM allows you to create users or groups and assign them the required access permissions. Visit AWS' IAM Documentation for more information.

Can I Use IAM with CloudBolt Cost and Security Management?

Yes, but CloudBolt Cost and Security Management maintains or integrates with your SAML-connected directory for its database of users. CloudBolt Cost and Security Management allows you to enforce individual users and permissions within the CloudBolt Cost and Security Management Platform.

To follow AWS Best Practice, CloudBolt Cost and Security Management does not support the use of Root Credentials to connect to the Platform.

Creating Policies

See Creating AWS Policies.

Create three Policies, one for each of the different types of accounts available within CloudBolt Cost and Security Management:

- Normal Account: Where you are running your production, pre-production, or developments environment(s).
- Backup Account: Where you archive your images (AMI) and backup data.

- Consolidated Billing Account: Centralized and controlled by CloudBolt Cost and Security Management.

Create these policies on each account that you have according with your classification. It is possible to have an account with more than one of these policies.

SaaS CloudBolt Cost and Security Management

When using the CloudBolt Cost and Security Management SaaS Application, you will need to first create a role in your AWS account with relevant cross-account permissions, in order for CloudBolt Cost and Security Management to access your AWS Account and its resources.

4.1.1.2. Use CloudFormation Scripts to Deploy Stacks

4.1.1.2.1. Set up Access using Stacks or Stacksets

Deploy AWS access for CloudBolt Cost and Security Management for one or more accounts via stacks and CloudFormation templates.

- Introduction
- Prerequisites
- Template Files
- Set up Access for a single account using Stacks
- IAM Role ARN
- Set up Access for multiple accounts using CloudFormation Templates
- Outcomes

Introduction

Learn about the methods available to set up your credentials in AWS, so you can sync your AWS data to CloudBolt Cost and Security Management via its Adapters.

The following methods are available to your organization for configuring its credentials. Depending on the method you choose, not all processes may be required.

The best way to deploy a CloudFormation template to the Billing Account is to use a CloudFormation Stack.

Prerequisites

- Download a Template File from GitHub or use the Launch Stack button(s) below.
- A Cost and Usage Report set up in AWS and the S3 Bucket where the report is hosted.
- Least Privilege Read-Only Role to AWS Consolidated Billing Account and all AWS workload accounts.

Template Files

There are four types of Template Files: two for Billing Adapter and two for Normal or Backup Adapter. Depending on your use case, download a Template File from GitHub.

Alternatively, click **Launch Stack** in any of the categories below to automatically deploy the Policy Template(s).

Template File Name	Policies Included	Use Case
csmp-billing-credentials-ro.json 	**Read-only access for Cost & Billing**	Existing report configuration.
csmp-billing-credentials-rw.json 	**Read and write access for Cost & Billing**	To configure and manage reports using CloudBolt Cost and Security Management.
csmp-normal-automation-credentials.json 	**Provides read-only and basic write/modify access for normal accounts**	Allows CloudBolt Cost and Security Management to report and remediate issues.
csmp-normal-read-only-credentials.json 	**Provides read-only access for normal accounts**	Allows CloudBolt Cost and Security Management to report.

In this setup example, we are using `csmp-billing-credentials-ro-json.`

Set up Access for a single account using Stacks

1. Log in to the AWS Portal of your Consolidated Billing/AWS Organization account.
2. In the AWS console, go to **Services > Management and Governance > CloudFormation > Stacks > Create stack > With new resources (standard)**.

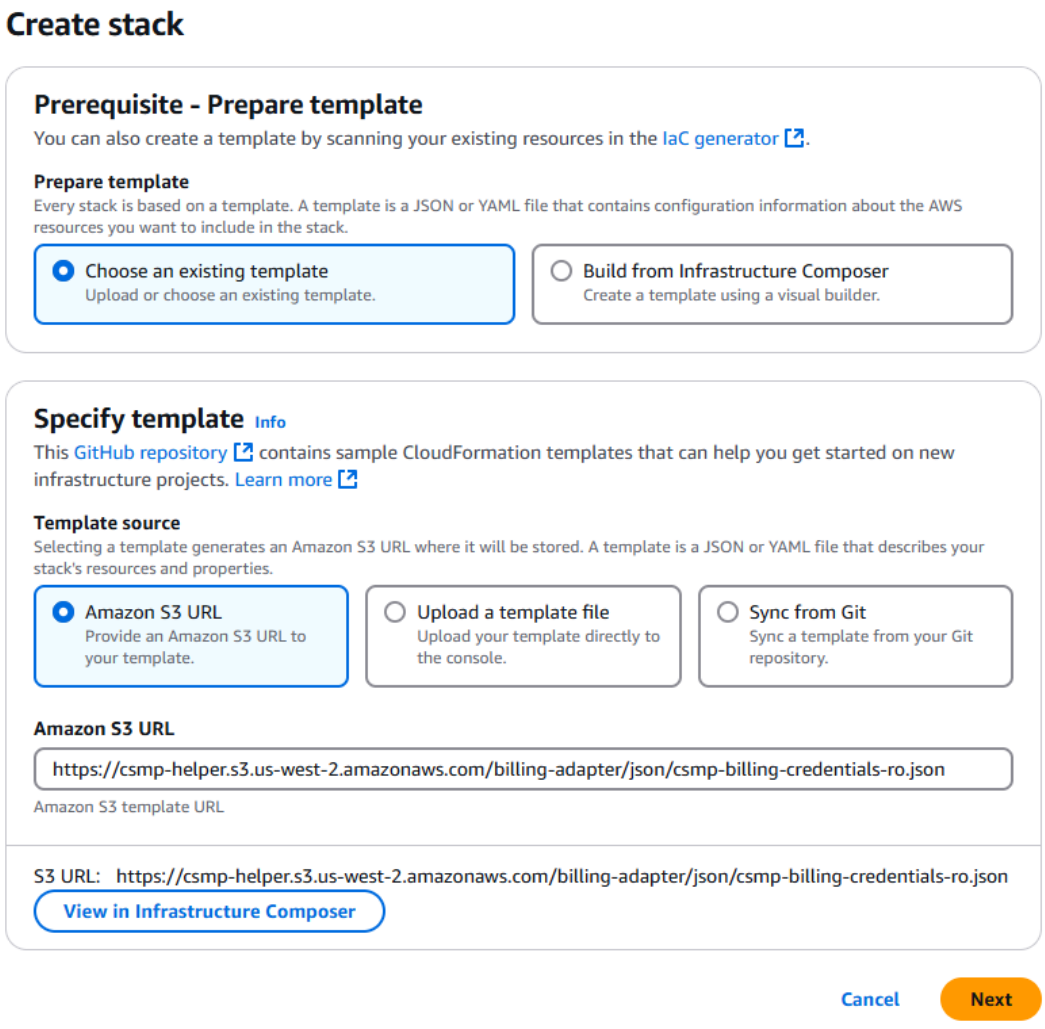
3. Fill out the form using below steps:

a. In the **Prerequisite - Prepare template** section, select **Choose an existing template**.

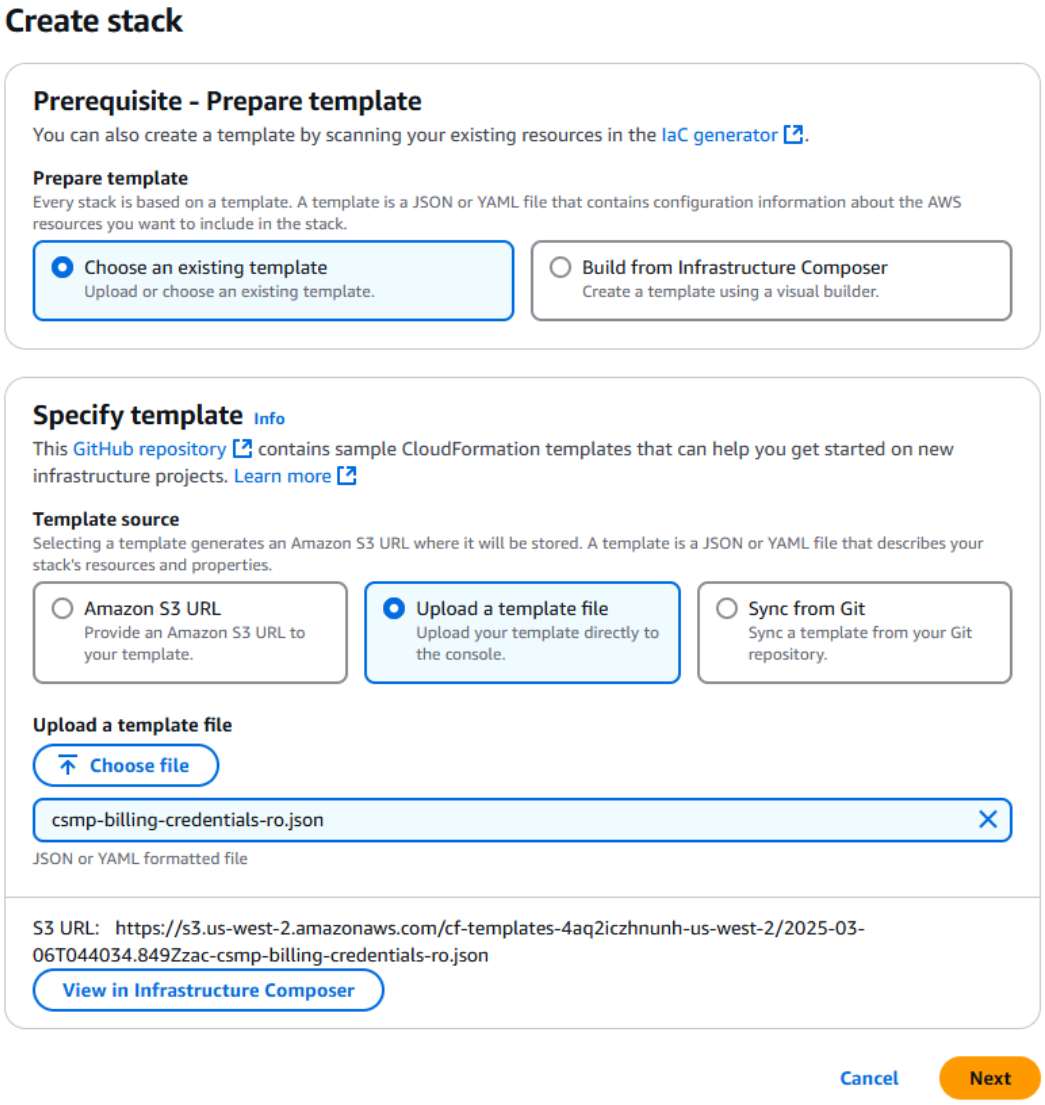
b. In **Specify template** section, use any one of the below options:

OPTION 1: Select **Amazon S3 URL** option, copy and paste the following URL in the **Amazon S3 URL** field:

https://csmp-helper.s3.us-west-2.amazonaws.com/billing-adapter/json/csmp-billing-credentials-ro.json



OPTION 2: Select **Upload a template file** option, select the Template file downloaded from GitHub in the **Choose file** field.



c. Click **Next**.

d. In **Stack name** field, enter **CSMPCBRole** as Stack name.

e. In **Parameters** section, enter **CSMP-CrossAcctRole** as RoleName and the S3 Bucket that is used by the Cost and Usage Reports in **S3Bucket** field.

f. Click **Next**.

g. In **Configure Stack options**, add tags if required, and click **Next**.

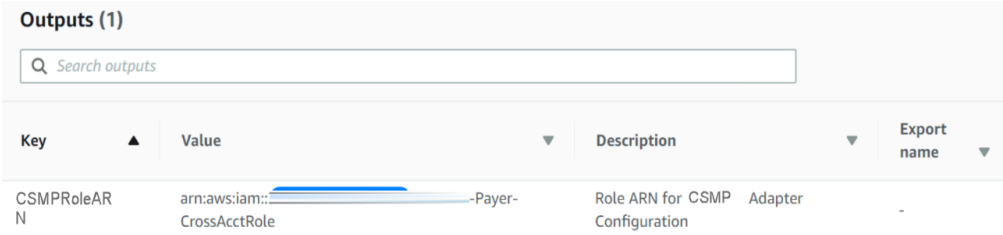
h. In **Review and create** section, scroll all the way down, click on check to acknowledge AWS CloudFormation to create IAM resources, then click **Submit** to complete the process.

Once the Stack is successfully created, you will have an **IAM Role**.

IAM Role ARN

The ARN for this IAM Role will be generated as an output of this CloudFormation script.

Copy the ARN into a text file to be used later during the CloudBolt Cost and Security Management Adapter creation.



If your account is standalone, without Consolidated Billing, follow the steps in Set up AWS from the UI for the same account. This is required to assign relevant permissions for Billing Report, as well as managing your infrastructure. You can modify the Role Name as required for ease of identification.

Set up Access for multiple accounts using CloudFormation Templates

i. Log in to the AWS Portal of your Consolidated Billing/AWS Organization account.

j. In AWS console, click **Services > Management and Governance > CloudFormation > StackSets > Create StackSet**.

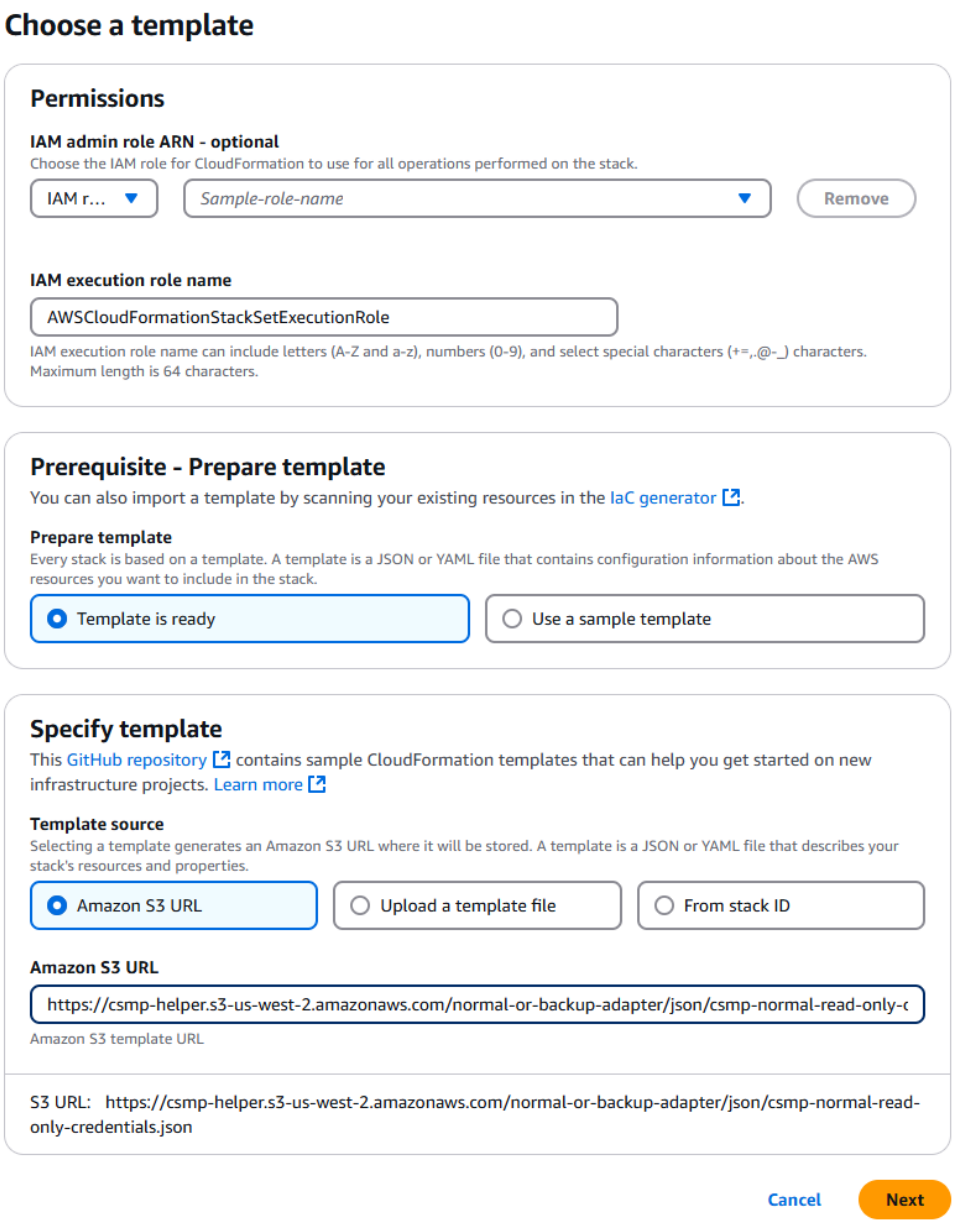
Create StackSet

k. Fill out the form using below steps:

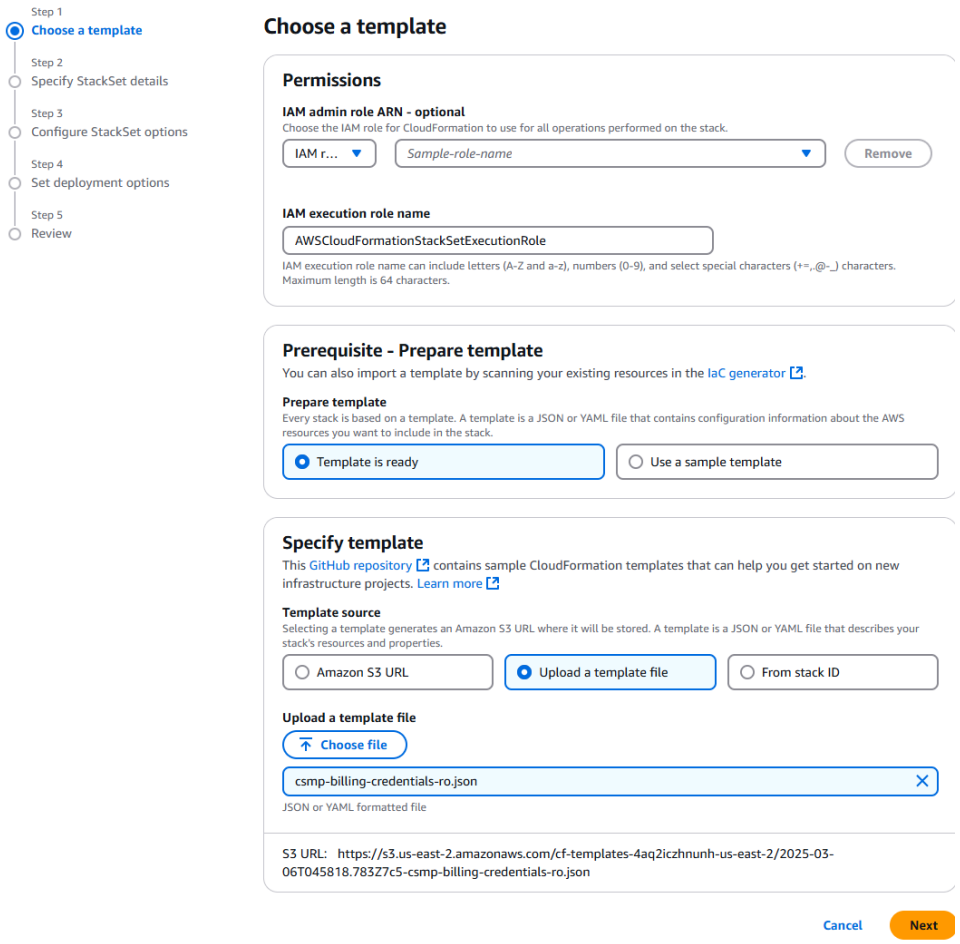
   i. In the **Prerequisite - Prepare template** section, select **Template is ready**.

   ii. In **Specify template** section, use any one of the below options:
   OPTION 1: Select **Amazon S3 URL** option, copy and paste the following URL:
   https://csmp-helper.s3-us-west-2.amazonaws.com/normal-or-backup-

adapter/json/csmp-normal-read-only-credentials.json



OPTION 2: Select **Upload a template file** option, select the Template file downloaded from GitHub in the **Choose file** field.



iii. Click **Next**.

iv. In **StackSet name** field, enter a name for stackset.

v. In **Parameters** section, enter **CSMP-CrossAcctRole** as RoleName.

vi. Click **Next**.

vii. In **Configure StackSet options**, add tags if required, and click **Next**.

viii. In **Set deployment options**, select **Deploy new stacks** in Add stacks to stack set field.

ix. In **Accounts**, select **Deploy stacks in accounts** or **Deploy stacks in organizational units** in Deployment locations field as per your requirement.

1. **Deploy stacks in accounts** can be selected if you are not using an AWS Organization feature account.

   You must have deployed

AWSCloudFormationStackSetAdministrationRole role your account (account using which you are creating the stackset):

YAML

```yaml
AWSTemplateFormatVersion: 2010-09-09
Description: Configure the AWSCloudFormationStackSetAdministrationRole
use of AWS CloudFormation StackSets.

Resources:
  AdministrationRole:
    Type: AWS::IAM::Role
    Properties:
      RoleName: AWSCloudFormationStackSetAdministrationRole
      AssumeRolePolicyDocument:
        Version: 2012-10-17
        Statement:
          - Effect: Allow
            Principal:
              Service: cloudformation.amazonaws.com
            Action:
              - sts:AssumeRole
      Path: /
      Policies:
        - PolicyName: AssumeRole-AWSCloudFormationStackSetExecutionRole
          PolicyDocument:
            Version: 2012-10-17
            Statement:
              - Effect: Allow
                Action:
                  - sts:AssumeRole
                Resource:
                  - "arn:*:iam::*:role/AWSCloudFormationStackSetExecuti
```

In **Account numbers** field enter all the target account separated by commas. You must ensure that AWSCloudFormationStackSetExecutionRole role has been deployed to all the added target accounts:

YAML

```yaml
AWSTemplateFormatVersion: 2010-09-09
Description: Configure the AWSCloudFormationStackSetExecutionRole to en
your account as a target account in AWS CloudFormation StackSets.

Parameters:
  AdministratorAccountId:
    Type: String
    Description: AWS Account Id of the administrator account (the accou
StackSets will be created).
    MaxLength: 12
    MinLength: 12

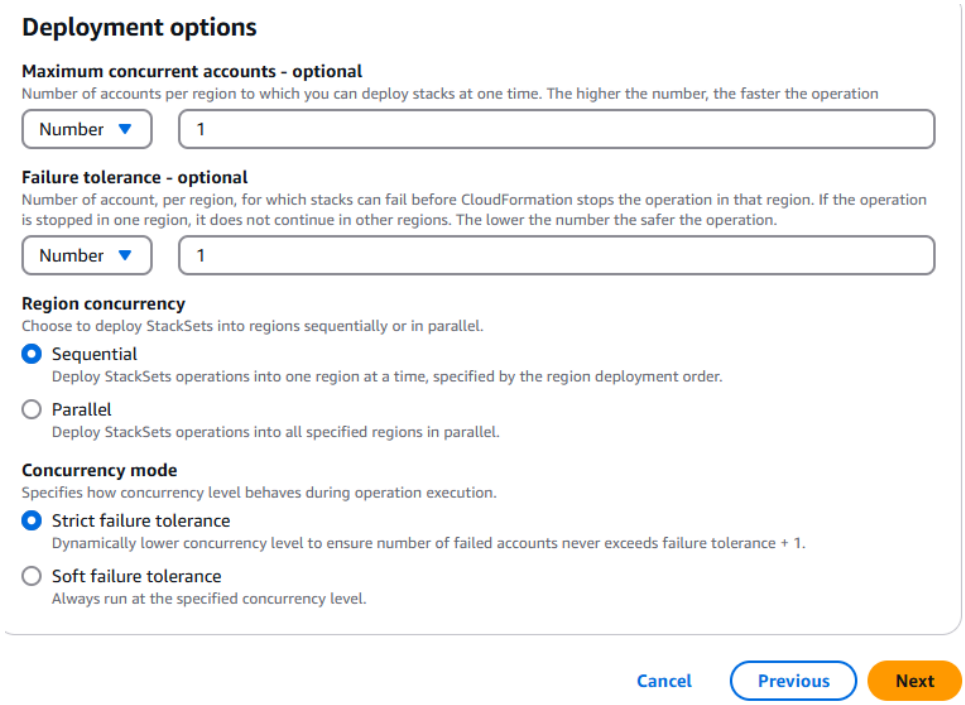
Resources:
  ExecutionRole:
    Type: AWS::IAM::Role
    Properties:
      RoleName: AWSCloudFormationStackSetExecutionRole
      AssumeRolePolicyDocument:
        Version: 2012-10-17
        Statement:
          - Effect: Allow
            Principal:
```

```
            AWS:
              - !Ref AdministratorAccountId
          Action:
            - sts:AssumeRole
    Path: /
    ManagedPolicyArns:
      - !Sub arn:${AWS::Partition}:iam::aws:policy/AdministratorAcces
```

2. **Deploy stacks in organizational units** can be selected if you are using an AWS Organization feature account. Enter your Organization unit number in **Organization numbers** field.

x. In **Specify regions** field, select region for stackset deployment.

xi. In **Deployment options** section, you must choose at least 1 for both Maximum concurrent accounts - optional and Failure tolerance - optional fields.

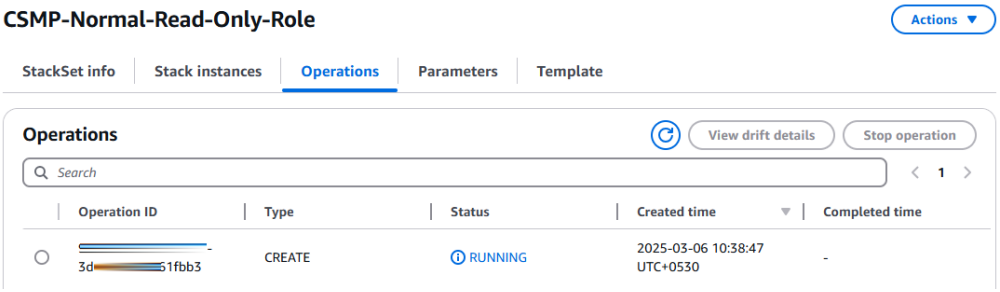


xii. Click **Next**.

xiii. In **Review** section, scroll all the way down, then click **Submit** to complete the process.

Outcomes

You can now monitor the status of the StackSet deployment and will be able to see the successful job and details of the role that has been deployed.



4.1.1.2.2. Configure Access Credentials for Consolidated Billing Account

Choose one of two methods for configuring access to your Consolidated Billing Account for CloudBolt Cost and Security Management.

Introduction

There are two methods to configure access to your Consolidated Billing account:

1. Using CloudFormation Script (recommended)
2. Configure Setting and Access Controls Manually

Using CloudFormation Script

The set of helper scripts (CloudFormation templates) will create the roles and assign relevant permissions for access and synchronization of data from your cloud accounts to CloudBolt Cost and Security Management.

The CloudFormation script will create two policies:

1. One to read the S3 bucket with Cost and Usage Report data.
2. One to perform least privilege cost-related actions (i.e describe RIs).

You will asked enter the Cost and Usage Report S3 bucket name in the CloudFormation template.

View the CloudFormation scripts at our public GitHub repository or launch directly from the CloudFormation stack links below.

Choose a file as per your use case:

Credential File Template	Policies Included	Use Case
csmp-billing-credentials-ro.json	**Read-only access for Cost & Billing**	Existing report configuration.

Credential File Template	Policies Included	Use Case
Launch Stack		
csmp-billing-credentials-rw.json Launch Stack	**Read and write access for Cost & Billing**	To configure and manage reports using CSMP.

Configure Roles, Policies, Trust Relationships, and Settings Manually

Follow the steps on Using AWS IAM with CloudBolt Cost and Security Management to configure.

4.1.1.3. Configure Manually from the AWS Management Portal

4.1.1.3.1. Creating AWS Policies

Learn how to create Policies for a Consolidated Billing Account and Normal Account in AWS.

- Introduction
- Create a Consolidated Billing Policy
- Create a Normal Account Policy
- Create a Backup Account Policy
- Least Privilege AWS IAM Policies
- AWS Organization and Consolidated Billing Accounts
- Normal Service Accounts
- Next Steps

Introduction

Create Policies on each account that you have in AWS. Then, you will be able to assign and use Roles in AWS and CloudBolt Cost and Security Management to access the resources in your AWS account.

Create a Consolidated Billing Policy

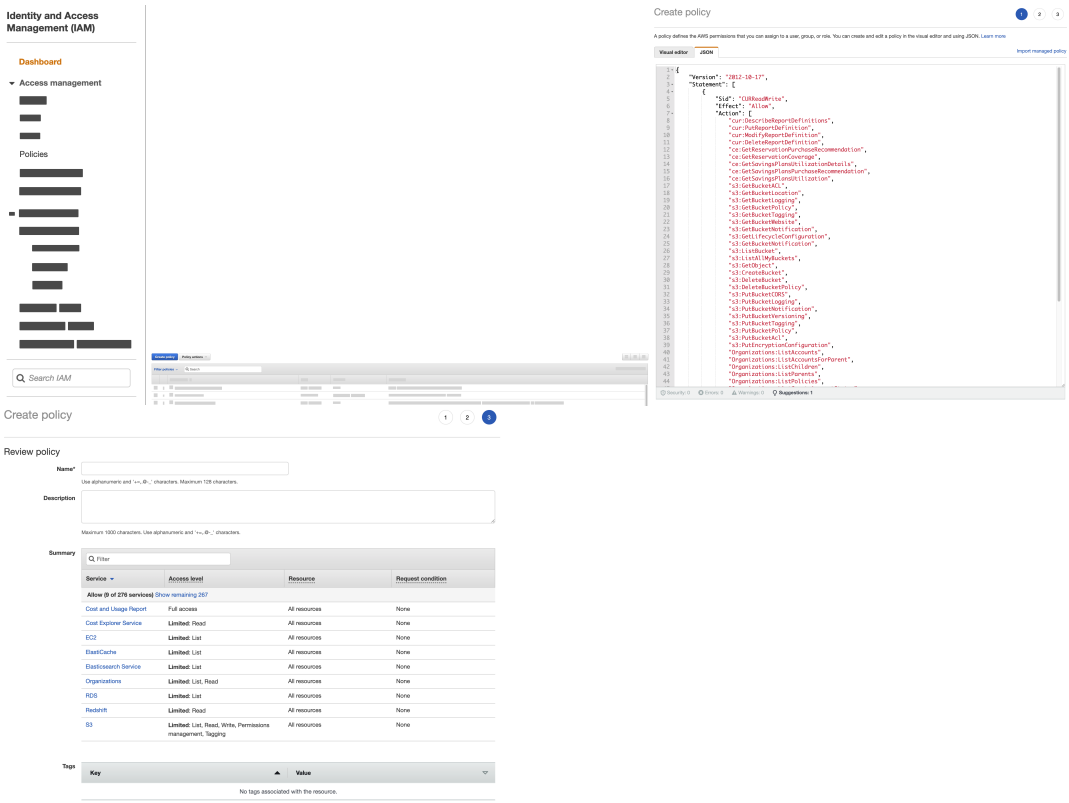
Prerequisite: Choose a billing policy template from the CloudBolt CSMP Public Billing Policy GitHub account.

1. Log in to your AWS Account.
2. Under **Security, Identity, & Compliance,** click **IAM.** Or, use the Search to access IAM.
3. From the left-side menu, click **Policies > Create Policy.**
4. Click **JSON tab** to enter your own policy template.
5. Paste in the contents of the selected policy template. There are two types of billing policy template files. You can choose a policy as per your requirement.

Policy File Name	Policies Included	Use Case
csmp-billing-credentials-ro-policy.json	**Read-only access for Cost & Billing**	Existing report configuration.
csmp-billing-credentials-rw-policy.json	**Read and write access for Cost & Billing**	To configure and manage reports using CloudBolt Cost and Security Management.

If you want to use a single billing adapter to configure multiple AWS cost and usage reports (CUR) from different S3 buckets, you must add all the S3 bucket names under the 'Resource' element of the JSON policy template.

6. Click **Next: Tags > Next: Review.**
7. Give your policy a name such as "CloudBolt Cost and Security Management-ConsolidatedAccount" and a Description.
8. Click **Create Policy.**



Create a Normal Account Policy

Prerequisite: To create a read only normal policy, choose csmp-normal-read-only-credentials-policy folder within the CloudBolt CSMP normal policy GitHub account. If you want to create a read-write normal policy, choose csmp-normal-provision-credentials-policy folder for the policy template files. As the script for normal policies is too big and can't be accommodated in a single template file, we have created two template files named with the suffix policy-1 and policy-2. You would need to create two normal policies regardless of the normal policy type selection.

1. Log in to your AWS Account.
2. Under **Security, Identity, & Compliance,** click **IAM.** Or, use the Search to access IAM.
3. From the left-side menu, click **Policies > Create Policy.**
4. Click **JSON tab** to enter your own Policy template.
5. Paste in the contents of the selected normal policy template. There are two types of normal policy template folder. You can choose a policy folder as per your requirement. Based on your policy folder type selection, you must create two AWS policies using each policy file present in the selected normal policy folder.

Policy Folder Name	Policies Included	Use Case
csmp-normal-read-only-credentials-policy	**Provides read-only access for normal accounts**	Allows CloudBolt Cost and Security Management to report.
csmp-normal-provision-credentials-policy	**Provides read and write/modify access for normal accounts**	Allows CloudBolt Cost and Security Management to report and remediate issues.

6. Click **Next: Tags > Next: Review.**
7. Give your policy a name such as "CloudBolt Cost and Security Management-NormalAccount" and a Description.
8. Validate the Policy.
9. Click **Create Policy.**

10. Follow above steps to create second part of your selected normal policy.

Create a Backup Account Policy

Prerequisites: Copy the backup policy template file from csmp-normal-automation-credentials-policy folder with the CloudBolt CSMP policy GitHub account.

1. Log in to your AWS Account.
2. Under **Security, Identity, & Compliance,** click **IAM.** Or, use the Search to access IAM.
3. From the left-side menu, click **Policies > Create Policy.**
4. Click **JSON tab** to enter your own Policy Template.
5. Paste in the contents of the backup policy template file. As the script for backup policy is too big and can't be accommodated in a single template file, we have created two template files named with the suffix policy-1 and policy-2. You must create two AWS policies using each policy file present in the csmp-normal-automation-credentials-policy folder.
6. Click **Next: Tags > Next: Review.**
7. Give your policy a name such as "CloudBolt Cost and Security Management-BackupAccount" and a Description.
8. Validate the Policy.
9. Click **Create Policy.**
10. Follow above steps to create second part of your selected backup policy.

Least Privilege AWS IAM Policies

CloudBolt Cost and Security Management provides less privilege policies, allowing you to provide access based on your required CloudBolt Cost and Security Management use case.

AWS Organization and Consolidated Billing Accounts

The following script creates two Policies: One to read S3 bucket with cost and usage data, and one to perform basic cost actions (e.g. describe RIs).

You will need to update the S3Bucket name in the Cloud Formation template.

JSON

```
{
    "AWSTemplateFormatVersion": "2010-09-09",
    "Description": "Cloudformation Template to allow your parent/payer AWS Account(s) to
access CloudBolt CSMP",
    "Parameters": {
        "RoleName": {
            "Description": "Name of the Role to be created",
            "Type": "String",
            "Default": "CloudBolt-CrossAcctRole"
        },
        "S3Bucket": {
            "Description": "Name of the report S3 Bucket",
            "Type": "String"
        }
    },
    "Resources": {
        "CostUsageOrgS3ReadPolicy": {
            "Type": "AWS::IAM::ManagedPolicy",
            "Properties": {
                "PolicyDocument": {
                    "Version": "2012-10-17",
                    "Statement": [
                        {
                            "Effect": "Allow",
                            "Action": [
                                "cur:DescribeReportDefinitions",
                                "Organizations:ListAccounts",
                                "Organizations:ListAccountsForParent",
                                "Organizations:ListChildren",
                                "Organizations:ListParents",
                                "Organizations:ListPolicies",
                                "Organizations:ListCreateAccountStatus",
                                "Organizations:DescribeAccount",
                                "Organizations:DescribeOrganization",
                                "Organizations:DescribePolicy",
                                "Organizations:DescribeOrganizationalUnit",
                                "s3:ListBucket",
                                "s3:ListAllMyBuckets",
                                "ec2:DescribeVpcs",
                                "ce:GetReservationPurchaseRecommendation",
                                "ce:GetReservationCoverage",
                                "ce:GetSavingsPlansUtilizationDetails",
                                "ce:GetSavingsPlansPurchaseRecommendation",
                                "ce:GetSavingsPlansUtilization",
                                "ec2:DescribeReservedInstances",
                                "rds:DescribeReservedDBInstances",
                                "redshift:DescribeReservedNodes",
                                "elasticache:DescribeReservedCacheNodes",
                                "es:DescribeReservedElasticsearchInstances"
                            ],
                            "Resource": "*"
                        }
                    ]
                }
            }
        },
        "S3ObjectReadPolicy": {
            "Type": "AWS::IAM::ManagedPolicy",
            "Properties": {
                "PolicyDocument": {
                    "Version": "2012-10-17",
                    "Statement": [
```

```
                        {
                            "Effect": "Allow",
                            "Action": [
                                "s3:GetBucketACL",
                                "s3:GetBucketLocation",
                                "s3:GetBucketLogging",
                                "s3:GetBucketPolicy",
                                "s3:GetBucketTagging",
                                "s3:GetBucketWebsite",
                                "s3:GetBucketNotification",
                                "s3:GetLifecycleConfiguration",
                                "s3:GetObject"
                            ],
                            "Resource": [
                                {
                                    "Fn::Sub": "arn:aws:s3:::${S3Bucket}"
                                },
                                {
                                    "Fn::Sub": "arn:aws:s3:::${S3Bucket}/*"
                                }
                            ]
                        }
                    ]
                }
            }
        },
        "CSMPCrossAcctRole": {
            "Type": "AWS::IAM::Role",
            "Description": "Cross Account Role for CloudBolt Application Access (Payer
Account)",
            "Properties": {
                "RoleName": {
                    "Ref": "RoleName"
                },
                "AssumeRolePolicyDocument": {
                    "Version": "2012-10-17",
                    "Statement": [
                        {
                            "Effect": "Allow",
                            "Principal": {
                                "AWS": {
                                    "Fn::Join": [
                                        "",
                                        [
                                            "arn:aws:iam::702574401249:root"
                                        ]
                                    ]
                                }
                            },
                            "Action": "sts:AssumeRole"
                        }
                    ]
                },
                "Path": "/",
                "ManagedPolicyArns": [
                    {
                        "Ref": "CostUsageOrgS3ReadPolicy"
                    },
                    {
                        "Ref": "S3ObjectReadPolicy"
                    }
                ]
            }
        }
    },
    "Outputs": {
        "CSMPRoleARN": {
```

```
            "Description": "Role ARN for CloudBolt CSMP Adapter Configuration",
            "Value": {
                "Fn::GetAtt": [
                    "CloudBoltCrossAcctRole",
                    "Arn"
                ]
            }
        }
    }
}
```

Normal Service Accounts

Inventory Read/Security and Compliance

Required for all accounts.

The following script provides access to CloudBolt Cost and Security Management to describe/view all services:

JSON

```
{
    "AWSTemplateFormatVersion": "2010-09-09",
    "Description": "Cloudformation Template to allow your AWS Account(s) to access
CloudBolt CSMP",
    "Parameters": {
        "RoleName": {
            "Description": "Name of the Role to be created",
            "Type": "String",
            "Default": "CloudBolt-CrossAcctRole"
        }
    },
    "Resources": {
        "CSMPCrossAcctRole": {
            "Type": "AWS::IAM::Role",
            "Description": "Cross Account Role for CloudBolt CSMP Application Access",
            "Properties": {
                "RoleName": {
                    "Ref": "RoleName"
                },
                "AssumeRolePolicyDocument": {
                    "Version": "2012-10-17",
                    "Statement": [
                        {
                            "Effect": "Allow",
                            "Principal": {
                                "AWS": {
                                    "Fn::Join": [
                                        "",
                                        [
                                            "arn:aws:iam::702574401249:root"
                                        ]
                                    ]
                                }
                            },
                            "Action": "sts:AssumeRole"
                        }
```

```
                ]
            },
            "Path": "/",
            "Policies": [
                {
                    "PolicyName": "CloudBolt-InventoryRead",
                    "PolicyDocument": {
                        "Version": "2012-10-17",
                        "Statement": [
                            {
                                "Sid": "SSMMandatory",
                                "Effect": "Allow",
                                "Action": [
                                    "ssm:ListInstanceAssociations",
                                    "ssm:ListResourceDataSync",
                                    "ssm:ListDocuments",
                                    "ssm:ListInventoryEntries",
                                    "ssm:ListDocumentVersions",
                                    "ssm:ListAssociations"
                                ],
                                "Resource": "*"
                            },
                            {
                                "Sid": "ConfigMandatory",
                                "Effect": "Allow",
                                "Action": [
                                    "config:Describe*",
                                    "config:DescribeConfigRules",
                                    "config:GetComplianceDetailsByConfigRule",
                                    "config:DescribeConfigurationRecorders",
                                    "config:DescribeConfigurationRecorderStatus",
                                    "config:DescribeDeliveryChannels"
                                ],
                                "Resource": "*"
                            },
                            {
                                "Sid": "SNSMandatory",
                                "Effect": "Allow",
                                "Action": [
                                    "sns:ListTopics",
                                    "sns:GetTopicAttributes",
                                    "sns:ListSubscriptionsByTopic",
                                    "sns:GetTopicAttributes",
                                    "sns:GetSubscriptionAttributes"
                                ],
                                "Resource": "*"
                            },
                            {
                                "Sid": "SQSMandatory",
                                "Effect": "Allow",
                                "Action": [
                                    "sqs:ListQueues",
                                    "sqs:GetQueueAttributes"
                                ],
                                "Resource": "*"
                            },
                            {
                                "Sid": "KinesisMandatory",
                                "Effect": "Allow",
                                "Action": [
                                    "kinesis:GetShardIterator",
                                    "kinesis:DescribeStream",
                                    "kinesis:ListStreams"
                                ],
                                "Resource": "*"
                            },
                            {
```

```
            "Sid": "LambdaMandatory",
            "Effect": "Allow",
            "Action": [
                "lambda:ListFunctions",
                "lambda:ListTags"
            ],
            "Resource": "*"
        },
        {
            "Sid": "StoragegatewayMandatory",
            "Effect": "Allow",
            "Action": [
                "storagegateway:List*",
                "storagegateway:Describe*"
            ],
            "Resource": "*"
        },
        {
            "Sid": "SESMandatory",
            "Effect": "Allow",
            "Action": [
                "ses:GetIdentityDkimAttributes",
                "ses:GetIdentityVerificationAttributes",
                "ses:GetSendQuota",
                "ses:ListIdentities",
                "ses:GetSendStatistics"
            ],
            "Resource": "*"
        },
        {
            "Sid": "DynamoDBMandatory",
            "Effect": "Allow",
            "Action": [
                "dynamodb:ListTables",
                "dynamodb:DescribeTable",
                "dynamodb:ListTagsOfResource"
            ],
            "Resource": "*"
        },
        {
            "Sid": "CloudFormationMandatory",
            "Effect": "Allow",
            "Action": [
                "cloudformation:ListStackResources",
                "cloudformation:GetStackPolicy",
                "cloudformation:DescribeStacks",
                "cloudformation:GetTemplate"
            ],
            "Resource": "*"
        },
        {
            "Sid": "CloudFrontMandatory",
            "Effect": "Allow",
            "Action": [
                "cloudfront:GetDistributionConfig",
                "cloudfront:GetStreamingDistributionConfig",
                "cloudfront:List*"
            ],
            "Resource": "*"
        },
        {
            "Sid": "CognitoMandatory",
            "Effect": "Allow",
            "Action": [
                "cognito-idp:ListUsers",
                "cognito-idp:ListGroups",
                "cognito-idp:ListIdentityProviders",
```

```
                "cognito-idp:ListUsersInGroup",
                "cognito-idp:ListUserPools",
                "cognito-identity:ListIdentityPools",
                "cognito-identity:ListIdentities"
            ],
            "Resource": "*"
        },
        {
            "Sid": "CloudHSMMandatory",
            "Effect": "Allow",
            "Action": [
                "cloudhsm:List*",
                "cloudhsm:Describe*"
            ],
            "Resource": "*"
        },
        {
            "Sid": "DataPipelineMandatory",
            "Effect": "Allow",
            "Action": [
                "datapipeline:ListPipelines",
                "datapipeline:DescribePipelines",
                "datapipeline:GetPipelineDefinition"
            ],
            "Resource": "*"
        },
        {
            "Sid": "DirectConnectMandatory",
            "Effect": "Allow",
            "Action": [
                "directconnect:DescribeConnections",
                "directconnect:DescribeVirtualInterfaces",
                "directconnect:DescribeLocations"
            ],
            "Resource": "*"
        },
        {
            "Sid": "ElasticFileSystemMandatory",
            "Effect": "Allow",
            "Action": [
                "elasticfilesystem:DescribeTags",
                "elasticfilesystem:DescribeFileSystems"
            ],
            "Resource": "*"
        },
        {
            "Sid": "Route53Mandatory",
            "Effect": "Allow",
            "Action": [
                "route53:ListHostedZones",
                "route53:ListHealthChecks",
                "route53:ListResourceRecordSets"
            ],
            "Resource": "*"
        },
        {
            "Sid": "WorkspacesMandatory",
            "Effect": "Allow",
            "Action": [
                "workspaces:DescribeWorkspaceDirectories",
                "workspaces:DescribeWorkspaceBundles",
                "workspaces:DescribeWorkspaces"
            ],
            "Resource": "*"
        },
        {
            "Sid": "ACMMandatory",
```

```
            "Effect": "Allow",
            "Action": [
                "acm:DescribeCertificate",
                "acm:ListCertificates",
                "acm:GetCertificate"
            ],
            "Resource": "*"
        },
        {
            "Sid": "GlacierMandatory",
            "Effect": "Allow",
            "Action": [
                "glacier:ListVaults",
                "glacier:DescribeVault",
                "glacier:DescribeJob",
                "glacier:ListTagsForVault",
                "glacier:GetVaultNotifications",
                "glacier:ListJobs",
                "glacier:GetJobOutput"
            ],
            "Resource": "*"
        },
        {
            "Sid": "ElasticMapReduceMandatory",
            "Effect": "Allow",
            "Action": [
                "elasticmapreduce:List*",
                "elasticmapreduce:Describe*"
            ],
            "Resource": "*"
        },
        {
            "Sid": "ESMandatory",
            "Effect": "Allow",
            "Action": [
                "es:ListDomainNames",
                "es:DescribeElasticsearchDomains",
                "es:DescribeReservedElasticsearchInstances"
            ],
            "Resource": "*"
        },
        {
            "Sid": "SDBMandatory",
            "Effect": "Allow",
            "Action": [
                "sdb:ListDomains",
                "sdb:DomainMetadata"
            ],
            "Resource": "*"
        },
        {
            "Sid": "elasticacheMandatory",
            "Effect": "Allow",
            "Action": [
                "elasticache:List*",
                "elasticache:Describe*"
            ],
            "Resource": "*"
        },
        {
            "Sid": "SWFMandatory",
            "Effect": "Allow",
            "Action": [
                "swf:ListWorkflowTypes",
                "swf:ListActivityTypes",
                "swf:ListDomains",
                "swf:ListClosedWorkflowExecutions"
```

```
            ],
            "Resource": "*"
        },
        {
            "Sid": "OtherMandatory",
            "Effect": "Allow",
            "Action": [
                "iot:ListThings",
                "iot:DescribeThing",
                "cloudsearch:Describe*",
                "support:*"
            ],
            "Resource": "*"
        },
        {
            "Sid": "EC2Mandatory",
            "Effect": "Allow",
            "Action": [
                "ec2:DescribeInstances",
                "ec2:DescribeVolumes",
                "ec2:DescribeVolumesModifications",
                "ec2:DescribeSnapshots",
                "ec2:DescribeInternetGateways",
                "ec2:DescribeKeyPairs",
                "ec2:DescribeNetworkAcls",
                "ec2:DescribeRouteTables",
                "ec2:DescribeSnapshotAttribute",
                "ec2:DescribeReservedInstances",
                "ec2:DescribeSubnets",
                "ec2:DescribeAddresses",
                "ec2:DescribeInstanceAttribute",
                "ec2:DescribeVpcs",
                "ec2:DescribeVpcAttribute",
                "ec2:DescribeInstanceStatus",
                "ec2:DescribeIamInstanceProfileAssociations",
                "ec2:DescribeSecurityGroups",
                "ec2:DescribeImages",
                "ec2:DescribeVolumeAttribute",
                "ec2:DescribeNetworkInterfaces",
                "ec2:DescribeAvailabilityZones",
                "ec2:GetConsoleOutput",
                "ec2:DescribeTags",
                "ec2:AssociateRouteTable"
            ],
            "Resource": "*"
        },
        {
            "Sid": "RDSMandatory",
            "Effect": "Allow",
            "Action": [
                "rds:DescribeDBInstances",
                "rds:DescribeDBSubnetGroups",
                "rds:DescribeDBSnapshots",
                "rds:DescribeDBSecurityGroups",
                "rds:ListTagsForResource",
                "rds:DescribeDBParameterGroups",
                "rds:DescribeDBParameters",
                "rds:DescribeReservedDBInstances"
            ],
            "Resource": "*"
        },
        {
            "Sid": "ELBMandatory",
            "Effect": "Allow",
            "Action": [
                "elasticloadbalancing:DescribeLoadBalancers",
```

```
"elasticloadbalancing:DescribeLoadBalancerPolicies",

"elasticloadbalancing:DescribeLoadBalancerAttributes",
                                        "elasticloadbalancing:DescribeInstanceHealth",
                                        "elasticloadbalancing:DescribeTags"
                                    ],
                                    "Resource": "*"
                                },
                                {
                                    "Sid": "AutoScalingMandatory",
                                    "Effect": "Allow",
                                    "Action": [
                                        "autoscaling:DescribeAutoScalingGroups",
                                        "autoscaling:DescribeLoadBalancers",
                                        "autoscaling:DescribeLaunchConfigurations",
                                        "autoscaling:DescribeScalingActivities",
                                        "autoscaling:DescribePolicies",
                                        "autoscaling:DescribeTags",
                                        "autoscaling:DescribeLifecycleHooks",
                                        "autoscaling:DescribeAutoScalingInstances",
                                        "autoscaling:DescribeLoadBalancerTargetGroups",
                                        "autoscaling:DescribeTerminationPolicyTypes"
                                    ],
                                    "Resource": "*"
                                },
                                {
                                    "Sid": "S3Mandatory",
                                    "Effect": "Allow",
                                    "Action": [
                                        "s3:ListBucket",
                                        "s3:ListAllMyBuckets",
                                        "s3:GetBucketLogging",
                                        "s3:GetBucketLocation",
                                        "s3:GetBucketWebsite",
                                        "s3:GetBucketVersioning",
                                        "s3:GetBucketAcl",
                                        "s3:GetEncryptionConfiguration",
                                        "s3:GetBucketPolicy"
                                    ],
                                    "Resource": "*"
                                },
                                {
                                    "Sid": "CloudtrailMandatory",
                                    "Effect": "Allow",
                                    "Action": [
                                        "cloudtrail:ListTrails",
                                        "cloudtrail:DescribeTrails",
                                        "cloudtrail:GetTrail",
                                        "cloudtrail:LookupEvents",
                                        "cloudtrail:GetTrailStatus",
                                        "cloudtrail:GetEventSelectors",
                                        "cloudtrail:GetInsightSelectors"
                                    ],
                                    "Resource": "*"
                                },
                                {
                                    "Sid": "CloudWatchMandatory",
                                    "Effect": "Allow",
                                    "Action": [
                                        "cloudwatch:GetMetricStatistics",
                                        "cloudwatch:DescribeAlarms",
                                        "cloudwatch:DescribeAlarmsForMetric",
                                        "cloudwatch:GetMetricData",
                                        "cloudwatch:GetMetricStatistics",
                                        "cloudwatch:ListMetrics"
                                    ],
                                    "Resource": "*"
```

```
                },
                {
                    "Sid": "KMSMandatory",
                    "Effect": "Allow",
                    "Action": [
                        "kms:ListKeys",
                        "kms:DescribeKey",
                        "kms:ListAliases",
                        "kms:GetKeyRotationStatus",
                        "kms:GetKeyPolicy",
                        "kms:ListKeyPolicies",
                        "kms:ListGrants",
                        "kms:ListResourceTags"
                    ],
                    "Resource": "*"
                },
                {
                    "Sid": "IAMMandatory",
                    "Effect": "Allow",
                    "Action": [
                        "iam:ListUsers",
                        "iam:GetUser",
                        "iam:ListInstanceProfiles",
                        "iam:ListServerCertificates",
                        "iam:GenerateCredentialReport",
                        "iam:GetCredentialReport",
                        "iam:GetRole",
                        "iam:GetRolePolicy",
                        "iam:GetPolicy",
                        "iam:ListUserPolicies",
                        "iam:ListAttachedUserPolicies",
                        "iam:ListAttachedRolePolicies",
                        "iam:ListAttachedGroupPolicies",
                        "iam:ListRolePolicies",
                        "iam:ListRoles",
                        "iam:ListGroupPolicies",
                        "iam:ListGroups",
                        "iam:ListMFADevices",
                        "iam:GetLoginProfile",
                        "iam:ListSSHPublicKeys",
                        "iam:ListAccessKeys",
                        "iam:GetGroup",
                        "iam:GetAccountPasswordPolicy",
                        "organizations:DescribeOrganization"
                    ],
                    "Resource": "*"
                },
                {
                    "Sid": "ECSMandatory",
                    "Effect": "Allow",
                    "Action": [
                        "ecs:ListClusters",
                        "ecs:ListServices",
                        "ecs:ListTasks",
                        "ecs:ListTaskDefinitions",
                        "ecs:ListContainerInstances",
                        "ecs:DescribeTaskDefinition",
                        "ecs:DescribeTasks",
                        "ecs:DescribeClusters",
                        "ecs:DescribeServices",
                        "ecs:DescribeContainerInstances",
                        "ecs:ListTagsForResource"
                    ],
                    "Resource": "*"
                }
            ]
        }
```

```
                    }
                ]
            }
        }
    },
    "Outputs": {
        "CSMPRoleARN": {
            "Description": "Role ARN for CloudBolt CSMP Adapter Configuration",
            "Value": {
                "Fn::GetAtt": [
                    "CloudBoltCrossAcctRole",
                    "Arn"
                ]
            }
        }
    }
```

Automation and Event Scheduling Details

Required for completing Automation from the CloudBolt Cost and Security Management platform. The following script creates a policy that allows CloudBolt Cost and Security Management to describe/view all services and execute automation tasks, such as stopping idle services.

JSON

```
{
    "AWSTemplateFormatVersion": "2010-09-09",
    "Description": "Cloudformation Template to allow your AWS Account(s) to access
CloudBolt CSMP",
    "Parameters": {
        "RoleName": {
            "Description": "Name of the Role to be created",
            "Type": "String",
            "Default": "CloudBolt-CrossAcctRole"
        }
    },
    "Resources": {
        "CSMPCrossAcctRole": {
            "Type": "AWS::IAM::Role",
            "Description": "Cross Account Role for CloudBolt CSMP Application Access",
            "Properties": {
                "RoleName": {
                    "Ref": "RoleName"
                },
                "AssumeRolePolicyDocument": {
                    "Version": "2012-10-17",
                    "Statement": [
                        {
                            "Effect": "Allow",
                            "Principal": {
                                "AWS": {
                                    "Fn::Join": [
                                        "",
                                        [
                                            "arn:aws:iam::702574401249:root"
                                        ]
                                    ]
                                }
                            },
                            "Action": "sts:AssumeRole"
                        }
```

```
            ]
        },
        "Path": "/",
        "Policies": [
            {
                "PolicyName": "CloudBolt-AutomationPolicy",
                "PolicyDocument": {
                    "Version": "2012-10-17",
                    "Statement": [
                        {
                            "Sid": "EC2MandatoryRA",
                            "Effect": "Allow",
                            "Action": [
                                "ec2:CreateImage",
                                "ec2:CopyImage",
                                "ec2:CreateSnapshot",
                                "ec2:CopySnapshot",
                                "ec2:CreateTags",
                                "ec2:DeleteSnapshot",
                                "ec2:DeleteTags",
                                "ec2:DeleteVolume",
                                "ec2:DeregisterImage",
                                "ec2:ModifyImageAttribute",
                                "ec2:ModifySnapshotAttribute",
                                "ec2:StartInstances",
                                "ec2:StopInstances",
                                "ec2:TerminateInstances"
                            ],
                            "Resource": "*"
                        },
                        {
                            "Sid": "RDSMandatoryRA",
                            "Effect": "Allow",
                            "Action": [
                                "rds:AddTagsToResource",
                                "rds:CreateDBSnapshot",
                                "rds:CopyDBSnapshot",
                                "rds:DeleteDBSnapshot",
                                "rds:ModifyDBSnapshot",
                                "rds:ModifyDBSnapshotAttribute",
                                "rds:StopDBInstance",
                                "rds:StartDBInstance",
                                "rds:RemoveTagsFromResource",
                                "rds:StartDBCluster",
                                "rds:StopDBCluster",
                                "rds:ModifyDBClusterSnapshotAttribute",
                                "rds:CopyDBClusterSnapshot",
                                "rds:DeleteDBCluster",
                                "rds:DeleteDBClusterSnapshot",
                                "rds:DeleteDBInstance"
                            ],
                            "Resource": "*"
                        },
                        {
                            "Sid": "ELBMandatoryRA",
                            "Effect": "Allow",
                            "Action": [
                                "elasticloadbalancing:DeleteLoadBalancer"
                            ],
                            "Resource": "*"
                        },
                        {
                            "Sid": "AutoScalingMandatoryRA",
                            "Effect": "Allow",
                            "Action": [
                                "autoscaling:DeleteAutoScalingGroup",
                                "autoscaling:DeleteLaunchConfiguration"
```

```
            ],
            "Resource": "*"
        },
        {
            "Sid": "SSMMandatory",
            "Effect": "Allow",
            "Action": [
                "ssm:ListInstanceAssociations",
                "ssm:ListResourceDataSync",
                "ssm:ListDocuments",
                "ssm:ListInventoryEntries",
                "ssm:ListDocumentVersions",
                "ssm:ListAssociations"
            ],
            "Resource": "*"
        },
        {
            "Sid": "ConfigMandatory",
            "Effect": "Allow",
            "Action": [
                "config:Describe*",
                "config:DescribeConfigRules",
                "config:GetComplianceDetailsByConfigRule",
                "config:DescribeConfigurationRecorders",
                "config:DescribeConfigurationRecorderStatus",
                "config:DescribeDeliveryChannels"
            ],
            "Resource": "*"
        },
        {
            "Sid": "SNSMandatory",
            "Effect": "Allow",
            "Action": [
                "sns:ListTopics",
                "sns:GetTopicAttributes",
                "sns:ListSubscriptionsByTopic",
                "sns:GetTopicAttributes",
                "sns:GetSubscriptionAttributes"
            ],
            "Resource": "*"
        },
        {
            "Sid": "SQSMandatory",
            "Effect": "Allow",
            "Action": [
                "sqs:ListQueues",
                "sqs:GetQueueAttributes"
            ],
            "Resource": "*"
        },
        {
            "Sid": "KinesisMandatory",
            "Effect": "Allow",
            "Action": [
                "kinesis:GetShardIterator",
                "kinesis:DescribeStream",
                "kinesis:ListStreams"
            ],
            "Resource": "*"
        },
        {
            "Sid": "LambdaMandatory",
            "Effect": "Allow",
            "Action": [
                "lambda:ListFunctions",
                "lambda:ListTags"
            ],
```

```
            "Resource": "*"
        },
        {
            "Sid": "StoragegatewayMandatory",
            "Effect": "Allow",
            "Action": [
                "storagegateway:List*",
                "storagegateway:Describe*"
            ],
            "Resource": "*"
        },
        {
            "Sid": "SESMandatory",
            "Effect": "Allow",
            "Action": [
                "ses:GetIdentityDkimAttributes",
                "ses:GetIdentityVerificationAttributes",
                "ses:GetSendQuota",
                "ses:ListIdentities",
                "ses:GetSendStatistics"
            ],
            "Resource": "*"
        },
        {
            "Sid": "DynamoDBMandatory",
            "Effect": "Allow",
            "Action": [
                "dynamodb:ListTables",
                "dynamodb:DescribeTable",
                "dynamodb:ListTagsOfResource"
            ],
            "Resource": "*"
        },
        {
            "Sid": "CloudFormationMandatory",
            "Effect": "Allow",
            "Action": [
                "cloudformation:ListStackResources",
                "cloudformation:GetStackPolicy",
                "cloudformation:DescribeStacks",
                "cloudformation:GetTemplate"
            ],
            "Resource": "*"
        },
        {
            "Sid": "CloudFrontMandatory",
            "Effect": "Allow",
            "Action": [
                "cloudfront:GetDistributionConfig",
                "cloudfront:GetStreamingDistributionConfig",
                "cloudfront:List*"
            ],
            "Resource": "*"
        },
        {
            "Sid": "CognitoMandatory",
            "Effect": "Allow",
            "Action": [
                "cognito-idp:ListUsers",
                "cognito-idp:ListGroups",
                "cognito-idp:ListIdentityProviders",
                "cognito-idp:ListUsersInGroup",
                "cognito-idp:ListUserPools",
                "cognito-identity:ListIdentityPools",
                "cognito-identity:ListIdentities"
            ],
            "Resource": "*"
```

```
                },
                {
                    "Sid": "CloudHSMMandatory",
                    "Effect": "Allow",
                    "Action": [
                        "cloudhsm:List*",
                        "cloudhsm:Describe*"
                    ],
                    "Resource": "*"
                },
                {
                    "Sid": "DataPipelineMandatory",
                    "Effect": "Allow",
                    "Action": [
                        "datapipeline:ListPipelines",
                        "datapipeline:DescribePipelines",
                        "datapipeline:GetPipelineDefinition"
                    ],
                    "Resource": "*"
                },
                {
                    "Sid": "DirectConnectMandatory",
                    "Effect": "Allow",
                    "Action": [
                        "directconnect:DescribeConnections",
                        "directconnect:DescribeVirtualInterfaces",
                        "directconnect:DescribeLocations"
                    ],
                    "Resource": "*"
                },
                {
                    "Sid": "ElasticFileSystemMandatory",
                    "Effect": "Allow",
                    "Action": [
                        "elasticfilesystem:DescribeTags",
                        "elasticfilesystem:DescribeFileSystems"
                    ],
                    "Resource": "*"
                },
                {
                    "Sid": "Route53Mandatory",
                    "Effect": "Allow",
                    "Action": [
                        "route53:ListHostedZones",
                        "route53:ListHealthChecks",
                        "route53:ListResourceRecordSets"
                    ],
                    "Resource": "*"
                },
                {
                    "Sid": "WorkspacesMandatory",
                    "Effect": "Allow",
                    "Action": [
                        "workspaces:DescribeWorkspaceDirectories",
                        "workspaces:DescribeWorkspaceBundles",
                        "workspaces:DescribeWorkspaces"
                    ],
                    "Resource": "*"
                },
                {
                    "Sid": "ACMMandatory",
                    "Effect": "Allow",
                    "Action": [
                        "acm:DescribeCertificate",
                        "acm:ListCertificates",
                        "acm:GetCertificate"
                    ],
```

```
            "Resource": "*"
        },
        {
            "Sid": "GlacierMandatory",
            "Effect": "Allow",
            "Action": [
                "glacier:ListVaults",
                "glacier:DescribeVault",
                "glacier:DescribeJob",
                "glacier:ListTagsForVault",
                "glacier:GetVaultNotifications",
                "glacier:ListJobs",
                "glacier:GetJobOutput"
            ],
            "Resource": "*"
        },
        {
            "Sid": "ElasticMapReduceMandatory",
            "Effect": "Allow",
            "Action": [
                "elasticmapreduce:List*",
                "elasticmapreduce:Describe*"
            ],
            "Resource": "*"
        },
        {
            "Sid": "ESMandatory",
            "Effect": "Allow",
            "Action": [
                "es:ListDomainNames",
                "es:DescribeElasticsearchDomains"
            ],
            "Resource": "*"
        },
        {
            "Sid": "SDBMandatory",
            "Effect": "Allow",
            "Action": [
                "sdb:ListDomains",
                "sdb:DomainMetadata"
            ],
            "Resource": "*"
        },
        {
            "Sid": "elasticacheMandatory",
            "Effect": "Allow",
            "Action": [
                "elasticache:List*",
                "elasticache:Describe*"
            ],
            "Resource": "*"
        },
        {
            "Sid": "SWFMandatory",
            "Effect": "Allow",
            "Action": [
                "swf:ListWorkflowTypes",
                "swf:ListActivityTypes",
                "swf:ListDomains",
                "swf:ListClosedWorkflowExecutions"
            ],
            "Resource": "*"
        },
        {
            "Sid": "OtherMandatory",
            "Effect": "Allow",
            "Action": [
```

```
                                        "iot:ListThings",
                                        "iot:DescribeThing",
                                        "cloudsearch:Describe*",
                                        "support:*"
                                    ],
                                    "Resource": "*"
                                },
                                {
                                    "Sid": "EC2Mandatory",
                                    "Effect": "Allow",
                                    "Action": [
                                        "ec2:DescribeInstances",
                                        "ec2:DescribeVolumes",
                                        "ec2:DescribeVolumesModifications",
                                        "ec2:DescribeSnapshots",
                                        "ec2:DescribeInternetGateways",
                                        "ec2:DescribeKeyPairs",
                                        "ec2:DescribeNetworkAcls",
                                        "ec2:DescribeRouteTables",
                                        "ec2:DescribeSnapshotAttribute",
                                        "ec2:DescribeReservedInstances",
                                        "ec2:DescribeSubnets",
                                        "ec2:DescribeAddresses",
                                        "ec2:DescribeInstanceAttribute",
                                        "ec2:DescribeVpcs",
                                        "ec2:DescribeVpcAttribute",
                                        "ec2:DescribeInstanceStatus",
                                        "ec2:DescribeIamInstanceProfileAssociations",
                                        "ec2:DescribeSecurityGroups",
                                        "ec2:DescribeImages",
                                        "ec2:DescribeVolumeAttribute",
                                        "ec2:DescribeNetworkInterfaces",
                                        "ec2:DescribeAvailabilityZones",
                                        "ec2:GetConsoleOutput",
                                        "ec2:DescribeTags",
                                        "ec2:AssociateRouteTable"
                                    ],
                                    "Resource": "*"
                                },
                                {
                                    "Sid": "RDSMandatory",
                                    "Effect": "Allow",
                                    "Action": [
                                        "rds:DescribeDBInstances",
                                        "rds:DescribeDBSubnetGroups",
                                        "rds:DescribeDBSnapshots",
                                        "rds:DescribeDBSecurityGroups",
                                        "rds:ListTagsForResource",
                                        "rds:DescribeDBParameterGroups",
                                        "rds:DescribeDBParameters"
                                    ],
                                    "Resource": "*"
                                },
                                {
                                    "Sid": "ELBMandatory",
                                    "Effect": "Allow",
                                    "Action": [
                                        "elasticloadbalancing:DescribeLoadBalancers",
"elasticloadbalancing:DescribeLoadBalancerPolicies",
"elasticloadbalancing:DescribeLoadBalancerAttributes",
                                        "elasticloadbalancing:DescribeInstanceHealth",
                                        "elasticloadbalancing:DescribeTags"
                                    ],
                                    "Resource": "*"
                                },
```

```
                                {
                                    "Sid": "AutoScalingMandatory",
                                    "Effect": "Allow",
                                    "Action": [
                                        "autoscaling:DescribeAutoScalingGroups",
                                        "autoscaling:DescribeLoadBalancers",
                                        "autoscaling:DescribeLaunchConfigurations",
                                        "autoscaling:DescribeScalingActivities",
                                        "autoscaling:DescribePolicies",
                                        "autoscaling:DescribeTags",
                                        "autoscaling:DescribeLifecycleHooks",
                                        "autoscaling:DescribeAutoScalingInstances",
                                        "autoscaling:DescribeLoadBalancerTargetGroups",
                                        "autoscaling:DescribeTerminationPolicyTypes"
                                    ],
                                    "Resource": "*"
                                },
                                {
                                    "Sid": "S3Mandatory",
                                    "Effect": "Allow",
                                    "Action": [
                                        "s3:ListBucket",
                                        "s3:ListAllMyBuckets",
                                        "s3:GetBucketLogging",
                                        "s3:GetBucketLocation",
                                        "s3:GetBucketWebsite",
                                        "s3:GetBucketVersioning",
                                        "s3:GetBucketAcl",
                                        "s3:GetEncryptionConfiguration",
                                        "s3:GetBucketPolicy"
                                    ],
                                    "Resource": "*"
                                },
                                {
                                    "Sid": "CloudtrailMandatory",
                                    "Effect": "Allow",
                                    "Action": [
                                        "cloudtrail:ListTrails",
                                        "cloudtrail:DescribeTrails",
                                        "cloudtrail:GetTrail",
                                        "cloudtrail:LookupEvents",
                                        "cloudtrail:GetTrailStatus",
                                        "cloudtrail:GetEventSelectors",
                                        "cloudtrail:GetInsightSelectors"
                                    ],
                                    "Resource": "*"
                                },
                                {
                                    "Sid": "CloudWatchMandatory",
                                    "Effect": "Allow",
                                    "Action": [
                                        "cloudwatch:GetMetricStatistics",
                                        "cloudwatch:DescribeAlarms",
                                        "cloudwatch:ListMetrics",
                                        "cloudwatch:DescribeAlarmsForMetric",
                                        "cloudwatch:GetMetricData",
                                        "cloudwatch:GetMetricStatistics"
                                    ],
                                    "Resource": "*"
                                },
                                {
                                    "Sid": "KMSMandatory",
                                    "Effect": "Allow",
                                    "Action": [
                                        "kms:ListKeys",
                                        "kms:DescribeKey",
                                        "kms:ListAliases",
```

```
                                    "kms:GetKeyRotationStatus",
                                    "kms:GetKeyPolicy",
                                    "kms:ListKeyPolicies",
                                    "kms:ListGrants",
                                    "kms:ListResourceTags",
                                    "kms:CreateGrant"
                                ],
                                "Resource": "*"
                            },
                            {
                                "Sid": "IAMMandatory",
                                "Effect": "Allow",
                                "Action": [
                                    "iam:ListUsers",
                                    "iam:GetUser",
                                    "iam:ListInstanceProfiles",
                                    "iam:ListServerCertificates",
                                    "iam:GenerateCredentialReport",
                                    "iam:GetCredentialReport",
                                    "iam:GetRole",
                                    "iam:GetRolePolicy",
                                    "iam:GetPolicy",
                                    "iam:ListUserPolicies",
                                    "iam:ListAttachedUserPolicies",
                                    "iam:ListAttachedRolePolicies",
                                    "iam:ListAttachedGroupPolicies",
                                    "iam:ListRolePolicies",
                                    "iam:ListRoles",
                                    "iam:ListGroupPolicies",
                                    "iam:ListGroups",
                                    "iam:ListMFADevices",
                                    "iam:GetLoginProfile",
                                    "iam:ListSSHPublicKeys",
                                    "iam:ListAccessKeys",
                                    "iam:GetGroup",
                                    "iam:GetAccountPasswordPolicy",
                                    "organizations:DescribeOrganization"
                                ],
                                "Resource": "*"
                            },
                            {
                                "Sid": "ECSMandatory",
                                "Effect": "Allow",
                                "Action": [
                                    "ecs:ListClusters",
                                    "ecs:ListServices",
                                    "ecs:ListTasks",
                                    "ecs:ListTaskDefinitions",
                                    "ecs:ListContainerInstances",
                                    "ecs:DescribeTaskDefinition",
                                    "ecs:DescribeTasks",
                                    "ecs:DescribeClusters",
                                    "ecs:DescribeServices",
                                    "ecs:DescribeContainerInstances",
                                    "ecs:ListTagsForResource"
                                ],
                                "Resource": "*"
                            }
                        ]
                    }
                }
            ]
        }
    }
},
"Outputs": {
    "CSMPRoleARN": {
```

```
            "Description": "Role ARN for CloudBolt CSMP Adapter Configuration",
            "Value": {
                "Fn::GetAtt": [
                    "CloudBoltCrossAcctRole",
                    "Arn"
                ]
            }
        }
    }
}
```

Next Steps

Create a Role in AWS for CloudBolt Cost and Security Management

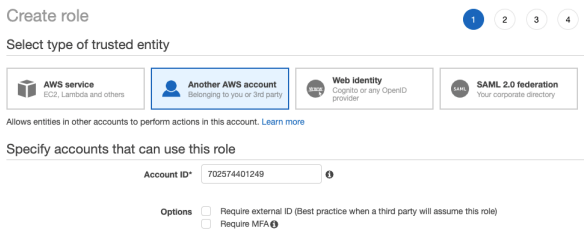
4.1.1.3.2. Create a Role in AWS

Before adding an Adapter in CloudBolt Cost and Security Management for AWS, create a Cross-Account Role in AWS to allow CloudBolt Cost and Security Management to access resources in your account.

Creating the Role and Assigning Policies

Create the Role in AWS

1. Log in to your AWS account.
2. Under **Access management**, click **Roles > Create Role.**
3. In Select type of trusted entity, select **Another AWS account.**
    - Enter the CloudBolt Cost and Security Management Account ID: 702574401249
4. Click **Next:Permissions.**



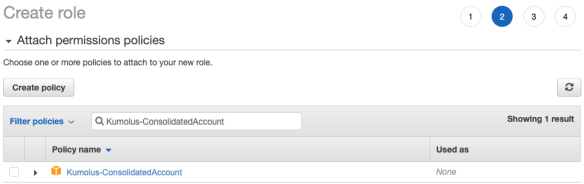
Assign Policies to the Role

1. Search for the Policy or Policies created in Creating AWS Policies, or click **Create a policy** and follow the steps on Creating AWS Policies.
    - Depending on the type of account (Consolidated, Normal, or Backup), relevant Policies can be selected and used with this Role.
2. Click **Next:Tags > Next:Review.**
3. Provide a Role Name and Description, and review the details of Trusted Entities and Attached Policies.
   In the Trusted entities, ensure that you have added CloudBolt Cost and Security

Management Account ID: 702574401249



4. Click **Create Role.**



4.1.1.3.3. Create AWS Consolidated Billing - Cost and Usage Reports

Learn how to setup Cost and Usage Reports in S3 bucket that are required for CloudBolt CSMP.

Introduction

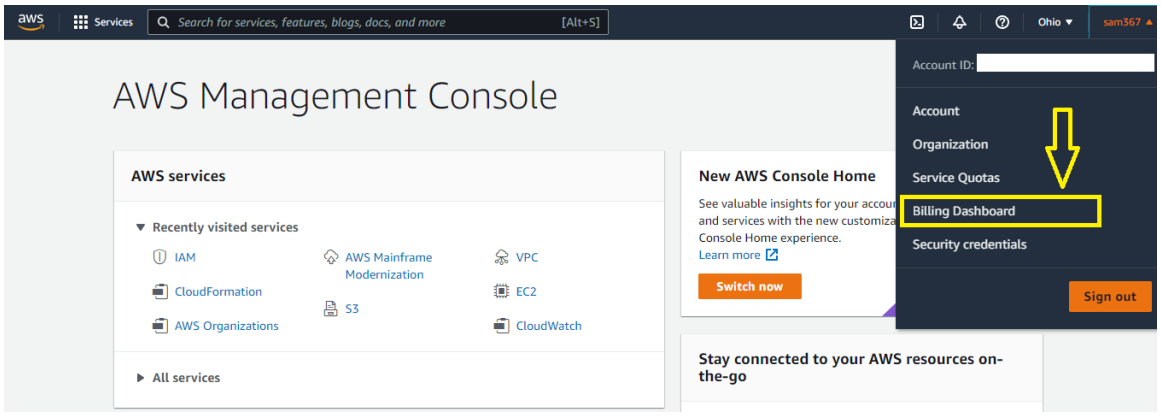
The Cost and Usage Report provides a set of CSV files delivered to an S3 bucket of your choice.

Existing Configuration

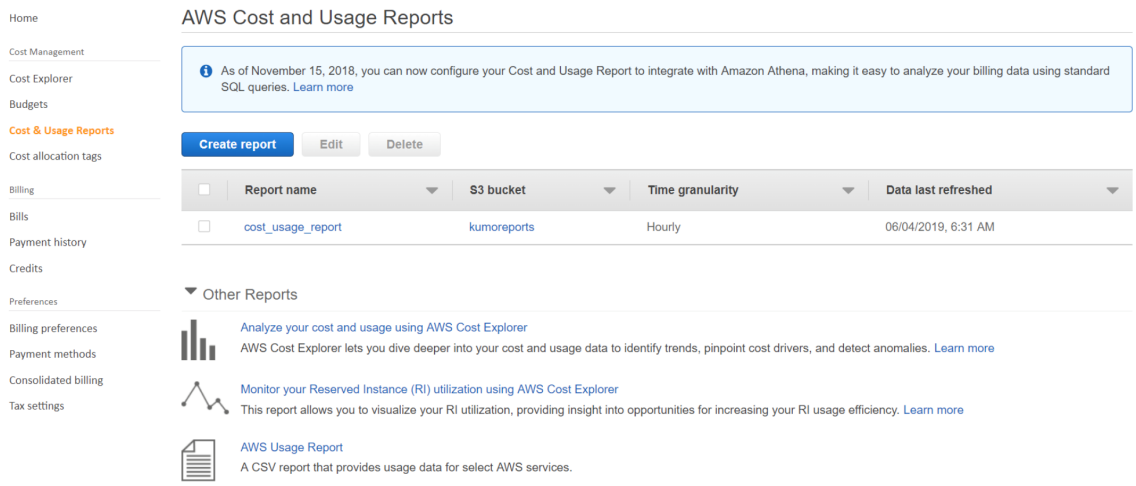
If you already have an existing Cost and Usage Report configured, skip to Create AWS Consolidated Billing Adapter.

Enable Cost and Usage Reports

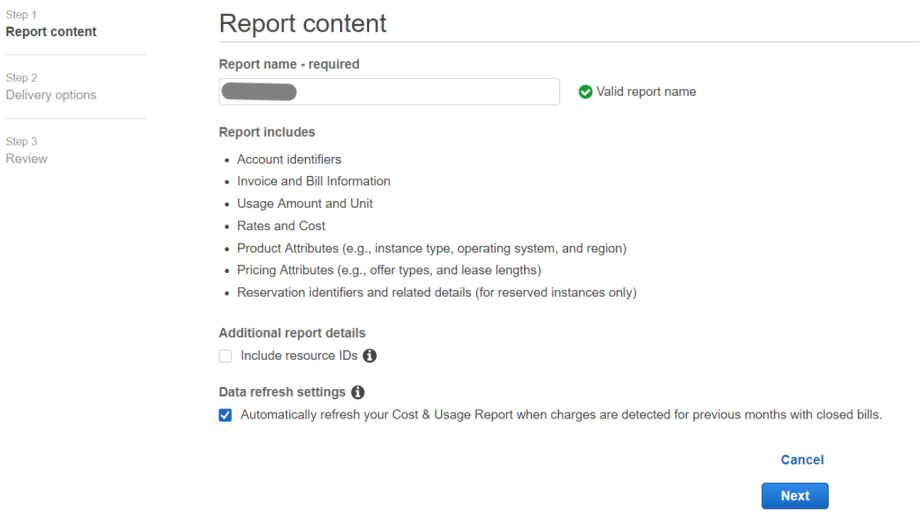
1. Log in to your AWS Consolidated Billing Account.
2. In the AWS Management Console, click the Account name and navigate to **Billing Dashboard.**



3. Under **Cost & Usage Reports**, click **Create report** to set up a report that will be delivered to the S3 bucket you designate. This report will be used for reviewing and managing costs for your account(s).

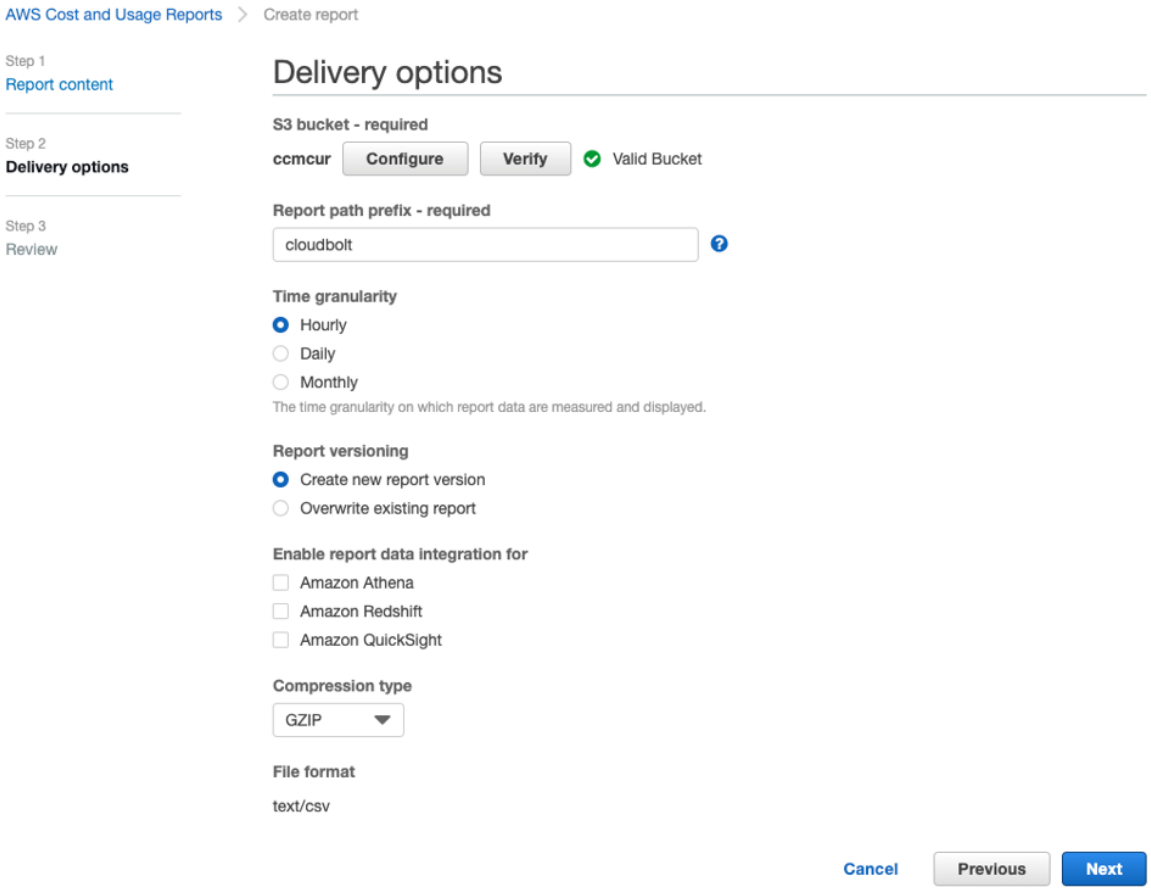


4. Provide a valid name for the report, and select checkboxes based on your reporting requirements.
    - Select the **Include Resource IDs** checkbox if you wish to include Resource IDs in your Report.
    - Select **Data Refresh Settings** to update charges based on paid bills. We recommend always keep this checkbox enabled.



5. Click **Next**.

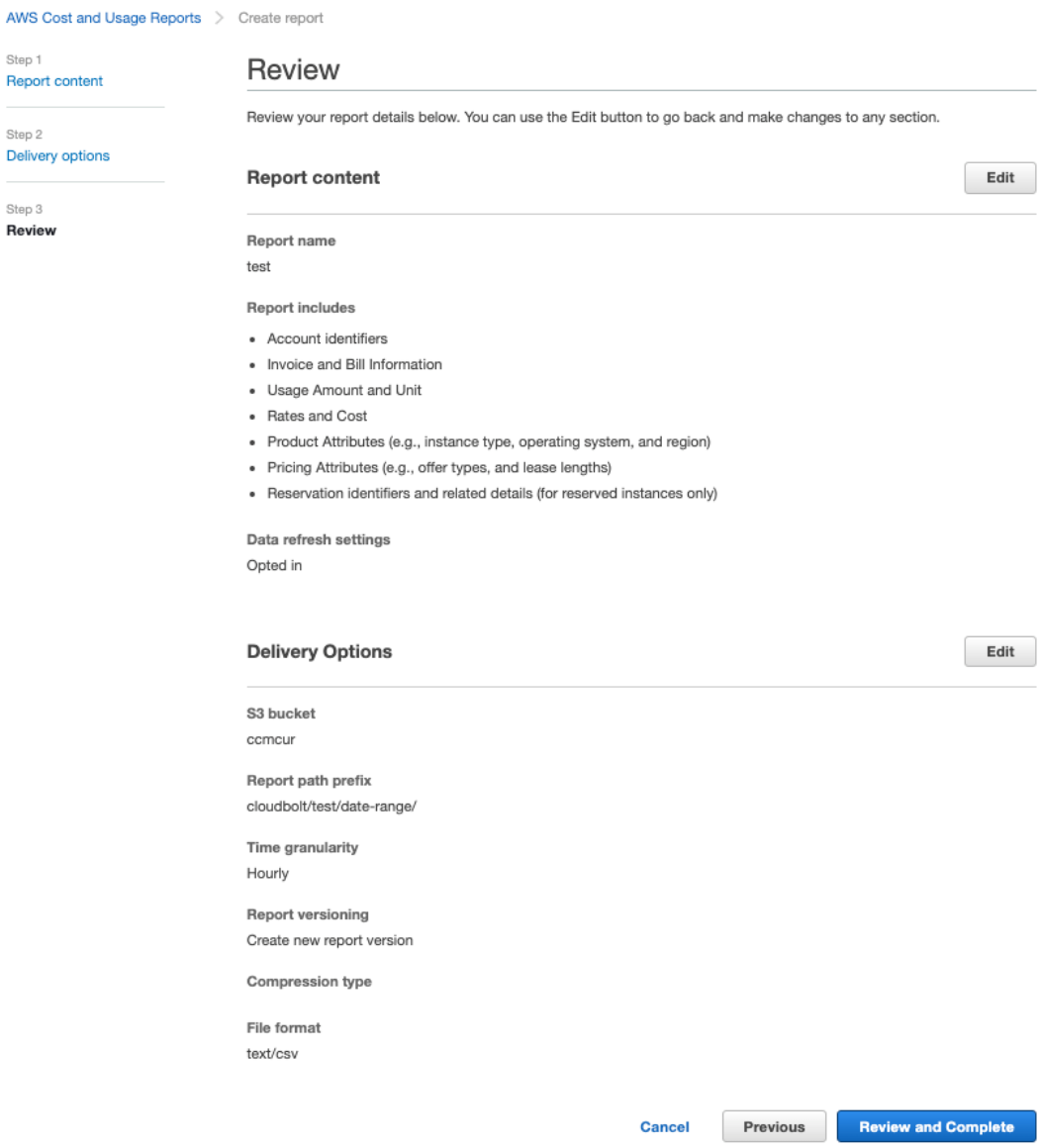
6. In **Delivery options**, provide a Valid Bucket name for the S3 bucket.



7. Follow the on-screen instructions to create the bucket and policies for saving your reports. Set the following metrics to ensure the level of details required in your reports.
    - **Report path prefix:** Provide a custom prefix for your report to be saved in S3 (e.g. *kumo-cur).* This custom prefix will help you easily identify your reports and **is required by CloudBolt Cost and Security Management application for** Adapter **configuration.**
    - **Time Granularity:** We recommend that you set time granularity as **Hourly**. However, you can set **Daily** or **Monthly** options as well if required.
    - **Report Versioning:** Select an option based on your requirements.
    - **Enable report data integration for:** Select an option based on your requirements.

- **Compression type:** We recommend that you set compression type as **GZIP**. However, you can set Parquet or ZIP options as well.

8. Click **Next**. Review your settings and click **Review and Complete.**



Next Steps

Configure AWS Consolidated Billing Account Credentials

4.1.1.3.4. AWS Organizations Configuration

AWS Organizations helps you easily govern your environment in a central pane. It provides the ability to add/remove accounts from a primary (organization) account.

Introduction

Using AWS Organizations, you can automate account creation, create groups of accounts to reflect your business needs, and apply policies for these groups for governance, as well as:

- Simplify billing by setting up a single payment method for all of your accounts.
- Integrate with other AWS services and use Organizations to define central configurations and resource sharing across accounts in your organization.

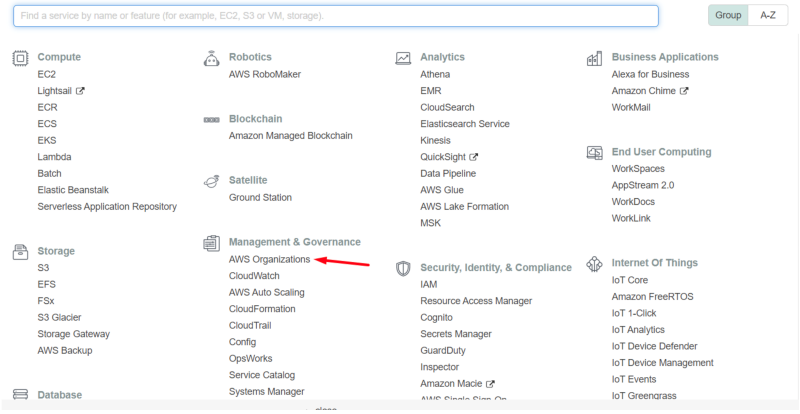
AWS Organizations is available to all AWS customers at no additional charge.

You can also add these accounts to CloudBolt CSMP automatically by configuring relevant roles in your child accounts.

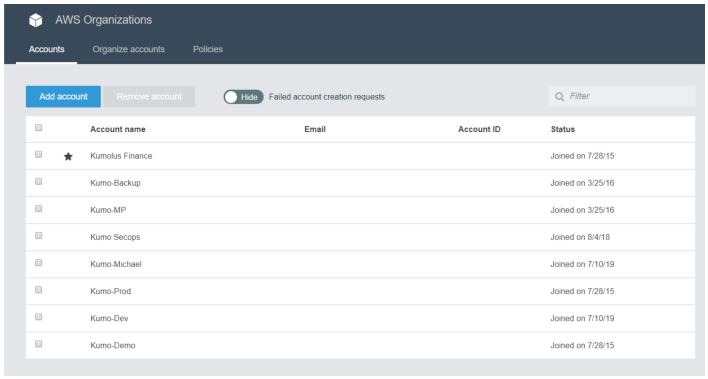
Review AWS Organizations Account List

To review your Account List in the AWS Organizations Dashboard:

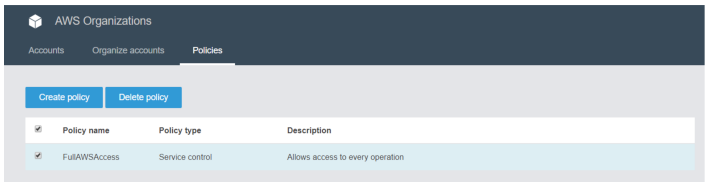
1. Log in to your AWS Master (Payer) Account.
2. Click the **Services** dropdown.
3. Under **Management & Governance,** click **AWS Organizations.**



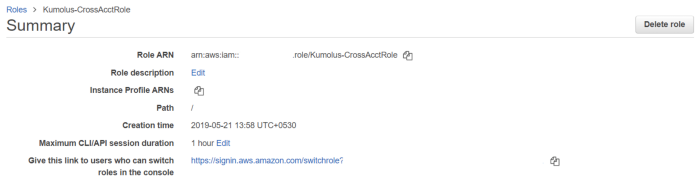
4. View accounts from the Accounts Dashboard. Configure settings as well as Policies from the AWS Organizations dashboard.
    - For security, email and account ID are redacted in the screenshot below. View your unique Account IDs in your AWS Organization Dashboard and use them to run the CloudFormation script for CloudBolt Cost and Security Management configuration.
    - Your Master account will have a star [] icon next to it. Configure settings and Policies from this account.



5. Either assign full AWS access to your child accounts, or limit access based on Policies.



As part of the CloudBolt Cost and Security Management configuration, you will need a consistent IAM Role Name across your accounts to allow for autodiscovery.



4.1.1.3.5. Role Configuration for Linked (Child) Accounts

Configure your AWS linked accounts.

Introduction

Pick and execute a Helper Script from the table below to configure your AWS Linked Accounts for CloudBolt Cost and Security Management.

Configuring Linked Accounts

From the CloudBolt Cost and Security Management Helper Scripts repository, fetch the appropriate script, using the table below as a guide.

There are three versions of the CloudFormation template to accommodate different modules. Execute the script in each of your Child Accounts via Stacks.

CloudBolt Cost and Security Management Helper Scripts Guide

Helper Script Name	Description
csmp-normal-read-only-credentials	Provides read-only access, allowing CloudBolt Cost and Security Management to report.
csmp-normal-provision-credentials	Provides read-only and write/modify access, allowing CloudBolt Cost and Security Management to report/remediate issues.

Discovering Resources in CloudBolt Cost and Security Management

Once your Billing/Payer account is added in CloudBolt Cost and Security Management, it will begin discovering resources in the Consolidated Billing account as well as in Child Accounts for reporting and optimization of your AWS costs.

To auto-add Adapters for your linked accounts, configure an IAM Role in each of your Child Accounts. Ensure that the name of the Role is consistent across your accounts (e.g.

CloudBolt Cost and Security Management-normal-access or *CloudBolt Cost and Security Management-child-autodiscover)*

4.1.1.3.6. Update AWS S3 Bucket Policy and ACL

Learn how to add a new bucket policy for your AWS S3 buckets containing Cost and Usage Reports (CUR) to grant delegate access to the billing adapter role ARN, enabling a single billing adapter in CSMP to retrieve cost data from multiple AWS billing accounts.

Note: If you are setting up an AWS billing adapter in CSMP and you are working with only one AWS billing account, you can skip this step. This step is specifically intended for scenarios where multiple billing accounts need to be added in a single AWS billing adapter, and it might not be relevant to your setup if there's only a single AWS billing account in use.

Add Bucket Policy

If your CSMP account has the 'aws_billing_multiple_report_config_from_different_account' feature enabled, you need to grant permissions to all the S3 buckets containing CURs that you want to use for adapter setup. Update the S3 bucket permissions to provide delegate access to the role ARN used in the billing adapter setup in CSMP, and ensure that Access Control List (ACL) permissions are disabled. Here's a step-by-step guide to do this:

1. **Identify the Role ARN**
   First, ensure you have the Amazon Resource Name (ARN) of the IAM role you want to grant access to. This ARN will be used in the "Role ARN" field under the AWS Account Details tab on the "Add AWS Adapter" page for "consolidated billing" adapter type, with the IAM Role option checked. The ARN typically looks like this:`arn:aws:iam::account-id:role/role-name`
2. **Sign in to the AWS Management Console**
   Go to the AWS Management Console and sign in with your credentials.
3. **Navigate to the S3 Console**
   Open the Amazon S3 console by searching for "S3" in the services menu or directly visiting S3 Management Console.

4. **Select Your Bucket**

   In the S3 console, find and select the bucket which contain the CUR required for your AWS billing adapter.

5. **Go to the Permissions Tab**

   Click on the **Permissions** tab.

6. **Update Bucket Policy**

   Under the Permissions tab, find the **Bucket Policy** section and click **Edit**. The Edit bucket policy page appears.

7. **Modify the Bucket Policy**

   Add following JSON policy statement to grant the IAM role the required permissions.

JSON

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "Stmt1335892150622",
            "Effect": "Allow",
            "Principal": {
                "Service": "billingreports.amazonaws.com"
            },
            "Action": [
                "s3:GetBucketAcl",
                "s3:GetBucketPolicy"
            ],
            "Resource": "arn:aws:s3:::your-bucket-name"
        },
        {
            "Sid": "Stmt1335892526596",
            "Effect": "Allow",
            "Principal": {
                "Service": "billingreports.amazonaws.com"
            },
            "Action": "s3:PutObject",
            "Resource": "arn:aws:s3:::your-bucket-name/*"
        },
        {
            "Sid": "DelegateS3Access",
            "Effect": "Allow",
            "Principal": {
                "AWS": "arn:aws:iam::account-id:role/role-name"
            },
            "Action": [
                "s3:ListBucket",
                "s3:GetBucketLocation",
                "s3:GetObject"
            ],
            "Resource": [
                "arn:aws:s3:::your-bucket-name/*",
                "arn:aws:s3:::your-bucket-name"
            ]
        }
    ]
}
```

Replace 'arn:aws:iam::account-id:role/role-name' with the ARN of your IAM role, and 'your-bucket-name' with the name of your S3 bucket.

8. **Save the Policy**
   After editing the policy, click **Save changes** to apply the updated policy.

Update Bucket Access Control List (ACL)

1. **Access Bucket ACL**
   Go to the **Access Control List** (ACL) tab in the Permissions section.
2. **Modify the ACL**
   - Review the current ACL settings. Ensure that there are no permissions granted to 'Everyone (public access)'.
   - To restrict access, you can remove any permissions granted under the **Public access** and **Access for other AWS accounts** sections. For example:
     - Uncheck 'List objects' and 'Write objects' under **Public access**.
     - Remove any other account permissions that are not required.
3. **Save Changes**
   After making adjustments, click **Save changes** to update the ACL settings.

Important

Update the same permissions on all the S3 buckets you plan to use for setting up the consolidated billing adapter for AWS.

4.1.1.4. Troubleshoot AWS Billing Access in CloudBolt CSMP

Learn to troubleshoot AWS billing display issues on CloudBolt CSMP after successful configuration of a billing adapter.

Introduction

After a successful billing adapter configuration in the CloudBolt CSMP for your AWS account, you must see your billing data synchronized to the CloudBolt CSMP account within 24 hours. If you are still not seeing any cost data, here are a few things you may want to troubleshoot.

1. Recently created a Cost and Usage Report in AWS

We recommend that you wait if you produced the AWS Cost and Usage report less than 24 hours ago. The initial batch of data from AWS to the CloudBolt CSMP environment might take up to 24 hours to collect and sync.

2. S3 bucket name correct

Check the name of the S3 bucket which you have configured at your AWS account and used the same while creating a configuring cost and usage report for AWS using the CloudBolt CSMP report configuration tab for billing adapter creation. It is case-sensitive.

3. AWS Cost and Usage Report modified or deleted

Follow the procedures below if you received a notification that the report configuration for the cost-report adapter was not located on AWS.

1. Make sure that AWS cost and usage report is correctly configured; see Create AWS Consolidated Billing - Cost and Usage Reports.

2. Once the AWS cost and usage report is correctly configured, update the correct Cost and Usage Report for AWS billing adapters in CloudBolt CSMP environment.

4.1.2. AWS Adapter

4.1.2.1. AWS Normal Adapter

Learn how to create a Normal / Backup Adapter for AWS in CloudBolt Cost and Security Management.

Adapter Prerequisites

Complete the following tasks before setting up an AWS Adapter:

- Set up Access using Stacks (recommended)

Create the AWS Normal / Backup Adapter

1. Log in to CloudBolt Cost and Security Management.
2. Click the **Quick Action icon > Adapters & Integration.**
3. Click **Add Cloud Adapter > AWS.**
4. Fill out the Basic Details:
    - **Adapter Type:** Normal or Backup
    - **Name:** Create a Name for your Adapter.
5. Click the **AWS Account Details** tab.

AWS Account Details Tab

1. Enter the required credentials. Depending on the status of the IAM Role checkbox, these credentials will be:
    - **IAM Role Unchecked:** Access Key ID and Secret Access Key
    - **IAM Role Checked:** Account ID, Role ARN, STS Region, and External ID. Role ARN is in the format of *arn:aws:iam::XXXXXXXXXXXX:role/prefix*
    - See Configure Access Credentials for Consolidated Billing Account.
2. Select the **US Gov Cloud** check box if you have US government AWS cloud credentials.
3. Click **Validate**.
4. Click **Submit**.

Manage AWS Normal Adapter

You can perform following actions using the options available under action column of a normal adapter. Click the ellipsis icon [...] under the action column to see options.

- List VPC's : Click to view all the VPCs available in selected AWS sub-account.
- Add VPC: Click to create new VPC in selected AWS sub-account.
- Edit Adapter: Click to update the existing details of the AWS normal adapter.
- Delete Adapter: Click to delete the selected normal adapter.
- Account Tags: Click to view the list of tag key-value pairs available in the selected AWS sub-account.

Outcomes

The Normal Adapter for AWS is ready.

4.1.2.2. AWS Consolidated Billing Adapter

Learn how to create a Consolidated Billing Adapter for AWS in CloudBolt Cost and Security Management.

Adapter Prerequisites

Complete the following tasks before setting up an AWS Adapter:

- Set up Access using Stacks (recommended)
- Configure Access Credentials (for Consolidated Billing account)
- Create an AWS Consolidated Billing - Cost and Usage Report
- Least-privilege Read Only Role for AWS Consolidated Billing account
- Least-privilege Read Only Role to all AWS workload accounts
- Configure Access Credentials for Consolidated Billing Account

Create the AWS Consolidated Billing Adapter

1. Log in to CloudBolt Cost and Security Management.
2. Click the **Quick Action icon > Adapters & Integration.**
3. Click **Add Cloud Adapter > AWS.**
4. Fill the Add AWS Adapter page to create AWS consolidated billing adapter.

Basic Details Tab

1. Fill out the Basic Details and click Next.
    - **Adapter Type:** Consolidated Billing
    - **Name:** Create a Name for your Adapter.

AWS Account Details Tab

1. Enter the required credentials. Depending on the status of the IAM Role checkbox, these credentials will be:
    - **IAM Role Unchecked:** Access Key ID and Secret Access Key

- **IAM Role Checked:** Account ID, Role ARN, and External ID. Role ARN is in the format of *arn:aws:iam::XXXXXXXXXXXX:role/prefix*
  - Click **Validate**.
- See Configure Access Credentials for Consolidated Billing Account.

2. Click **Next.**

AWS Organization Config Tab

1. Select *Yes* or *No* for "Do you want to automatically set up the accounts in CloudBolt using AWS Organizations?"
   - *Yes* creates Normal Adapters for child accounts in AWS.
   - *No* creates 'Not Configured' state Normal Adapters for child accounts in AWS.

   If you have clicked *No* for auto normal adapter creation and later you updated the billing adapter to set the option as *Yes*, the previously *not configured* normal adapters will turn to *active* by default. Whenever a new sub-account is added under your AWS billing account, a Normal Adapter will be created automatically with a status based on your option selection for "Do you want to automatically set up the accounts in CloudBolt using AWS Organizations?" The auto created normal adapters are named as per the AWS sub-account name. If previously provided AWS account details do not have access to fetch the sub-account name, the auto created normal adapters are named using the CloudBolt CSMP sub-domain name and the AWS sub-account id.

2. In this instruction set, we are selecting *Yes*.
3. Enter the AWS ARN Role Name prefix in the **Enter Prefix of Role Name** field. CloudBolt CSMP will use this Role on AWS child account to create a <Normal/Workload> adapter automatically.
   - The Role Name will need to be consistent across all of your child accounts in AWS; e.g. *cloudbolt-autodiscover-role* or *cloudbolt-normal-access*.
4. Select the **STS Region** for your AWS child account. By default, **US West (Oregon) - Default** will be selected.

5. Click **Next.**

Report Configuration Tab

You have two options on the Report Configuration tab:

- **Option 1:** Reuse your existing Cost and Usage Report configuration (recommended, if exists).
- **Option 2:** Create a new Cost and Usage report configuration.

Option 1: Reuse an existing Cost and Usage Report configuration

1. To use an existing Cost and Usage Report configuration, click the **Refresh icon [ ]** next to **Existing reports**.
2. Select an existing report from the **Existing reports** dropdown. The remaining fields will be populated.
3. Click **Submit**.

Tip: create a Cost and Usage Report configuration in AWS, then fetch it by clicking the **Refresh icon [ ]**.

Option 2: Create a new Cost and Usage Report configuration in CloudBolt Cost and Security Management

1. Enter a **Report Name, Report Prefix, Compression Type,** and select a **Cost usage S3 bucket**.
2. Click **Verify**, then **Create**.
3. Click **Next**.

If your CSMP account has the 'aws_billing_multiple_report_config_from_different_account' feature enabled, you will see option to add Cost and Usage Reports (CUR) from different AWS billing accounts.

Prerequisites

1. **Create Cost and Usage Reports (CUR):**
    - Generate cost and usage reports for each AWS billing account you wish to include in the billing adapter.

- Ensure that the compression type of the new CURs matches the compression type of the previously selected CUR. For detailed instructions on creating CUR, refer to Create AWS Consolidated Billing - Cost and Usage Reports.

2. **Update S3 Bucket Policies:**
   - Modify the S3 bucket policies to remove Access Control Lists (ACLs) for all S3 buckets containing the CURs you plan to add.
   - For guidance on updating S3 bucket policies, refer to Update AWS S3 Bucket Policy and ACL.
3. **Modify Billing Policy:**
   - Include all relevant S3 bucket names under the 'Resource' element in the JSON policy template when setting up the billing policy. For details, see Create a Consolidated Billing Policy.

Add Report Configuration from Other Billing Accounts

1. Check the "Add Report Configuration from Other Billing Accounts" checkbox to enable the addition of multiple CURs.
2. Enter the Role ARN of the AWS billing account in the 'Role ARN' field.
3. Click the drop-down icon next to the 'Existing Report' field and select the desired CUR file name. If the desired CUR is not visible, click the refresh icon to update the list.
4. Ensure that the compression type of the selected CUR matches the compression type of the previously selected CUR file.
5. Click **Next**

You can add up to ten additional CURs.

If your CSMP account has the 'aws_manual_export_report_configuration' feature enabled, you will see option to add multiple report name and prefix under the report configuration tab. It is important to note that all the reports which you want in a billing adapter must be stored in a common S3 bucket and use the same compression type.
To add multiple reports, select the checkbox for "Add Other Report Name and Prefix". A new section for the report name and report prefix will appear; you must enter the details

accordingly. To add more reports, click the plus icon (**+**) in the report prefix row. To remove a report from the configuration tab, click the cross icon (**x**).

Other Configuration Tab

In this tab you can set a invoice date, Enterprise Discount Program (EDP) offers, set tag key(s) for group creation, and metric type to calculate margin and discount for this billing adapter.

- **Do you want to enable Invoice Date?**: Invoice date is a date on which you will generate invoices in CloudBolt CSMP account to post them to your customers, resellers, or both. Once the current month's date has passed, the CloudBolt CSMP billing adapter won't be able to access the databases of your cloud provider to get the cloud costs changes for the previous months. However, the billing adapter will continue fetching the current month's cost data. By default, invoice date feature would be disabled. To enable, you must select *Yes* for "Do you want to enable Invoice Date?" Select an invoice date from the drop-down for invoice date. Default invoice date is set to 10.
- **Do you want to configure EDP?**: EDP option allows you to configure EDP offers in cost reports displayed on CloudBolt CSMP account. In this instruction set, we are selecting *Yes*.
    1. Enter Support Discount percent.
    2. If you have other service discounts, select the service type and then enter discount percent. Click plus icon [+] to add multiple service type discounts.
    3. Enter VAT percentage.
- **Select Group's Service Tag key**: Enter a valid tag key in the box. The entered tag key type can only be used while creating groups for this billing adapter. If you are changing an existing tag key with new one and the groups were created using the previous tag key, the tag key-value pairs will be removed from such groups and groups will contain only the sub-accounts.

  This field will not be available if your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled.

- **Group Service Tag key**: It displays all the added tag keys in the "Add Group Service Tag Key" field below.

  This field is available only when your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled.

- **Add Group Service Tag Key**: Enter a valid tag key in the box and then click icon to add it. You can add up to seven different tag keys. Successfully added tag keys will be displayed under the "Group Service Tag key" field. These tag keys can only be used when creating groups for this billing adapter.
  If you delete an existing tag key, any groups that were created using the deleted tag key will have their associated tag key-value pairs removed.

  This field is available only when your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled.

- **Select Metric for Margin/Discount Calculations**: Select a metric type from the drop-down. In future, if you create a billing configuration for this billing adapter, the margin and discount will be calculated against this selected metric. By default, 'customer cost' metric will be selected.
- **Select Metric for PO Calculations**: This option allows you to choose a metric type from a drop-down menu, which will be used to calculate the daily Purchase Order (PO) balance in future PO configurations for the billing adapter. The default selection is 'Net Cost'. The available metric options are: Net Allocated Cost and Net Cost.

  This option is visible only if your CSMP account has the 'awspo_net_allocated_cost_as_source' feature enabled.
  The selected metric can be configured only once—at the time of billing adapter creation. After the adapter is created, the metric becomes view-only and cannot be changed.
  For adapters created before the feature was enabled, the Net Cost metric is applied by default.

Click **Submit** to create the billing adapter.

Outcomes

The Consolidated Billing Adapter for AWS is ready.

4.2. Azure Adapter Configuration

Learn how to set up your Azure accounts, and then create adapters for your Azure account types in CloudBolt CSMP.

Introduction

Ensuring the correct setup of your Azure account before creating an Azure adapter into CloudBolt CSMP is paramount for seamless connectivity and data exchange between CloudBolt CSMP and your Azure accounts.

Begin by identifying the type of Azure account you have: Single Subscription, Management Group, Microsoft Customer Agreement (MCA), Enterprise Agreement (EA), or Cloud Solution Provider (CSP). Once identified, ensure that you are logged in to your Azure account with the least privileged role, typically as an admin.

Setup Overview

Depending on your Azure account type, click the link below to access the comprehensive guide outlining the entire process, from setting up your Azure account to creating adapters in CloudBolt CSMP.

- Set up and Create Adapters for Single Subscription Account
- Set up and Create Adapters for Management Group Account
- Set up and Create Adapters for Microsoft Customer Agreement (MCA) Account
- Set up and Create Adapters for Enterprise Agreement (EA) Account
- Set up and Create Adapters for Cloud Solution Provider (CSP) Partner Account

4.2.1. Set up and Create Adapters for Single Subscription Account

Learn how to set up your Azure single subscription account and then create adapters in CloudBolt CSMP.

Quick Setup

1. Register an Application in Azure
2. Create a Custom Role for Azure Subscription
3. Assign Roles to your Registered App
4. Provide Access for Reservations
5. Register Resource Providers to Subscription
6. Create Azure Export Configuration
7. Create a Consolidated Billing Adapter for Azure Single Subscription Account
8. Create a Normal Adapter for Azure Single Subscription Account

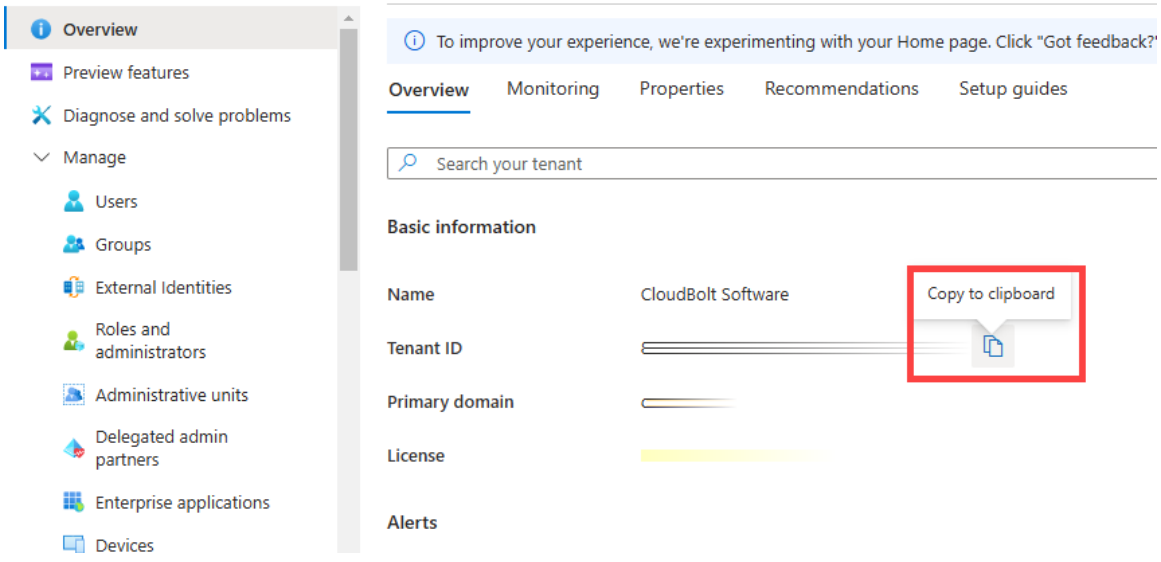
4.2.1.1. Register an Application in Azure

Learn to create an app registration in Microsoft Entra ID to serve as service principal.

Follow these steps to register an application in Azure.

Collect the Tenant ID

1. Log in to the Azure Management Portal using Admin credentials.
    - Azure Portal
    - Azure Portal for the US Government
    - Azure Portal for Germany
    - Azure Portal for China
2. Ensure that you are signed in to the correct tenant from which you want to retrieve the ID.
3. In the Azure services section, select **Microsoft Entra ID**. If it's not visible, use the search box to locate it.
4. On the **Overview** screen, find the **Tenant ID** under the **Basic information** section.
5. Copy the **Tenant ID** by selecting the **Copy to clipboard icon** next to it. You can then paste this value into a text document or another location for later use.



Register a New Application

1. In the Manage section of Microsoft Entra ID, click **App Registrations > New Registration**.
    a. Enter a Name for your application.
    b. Under **Support Account Types**, leave the default settings.
    c. For User **Redirect URI**, leave the default dropdown settings.
    d. Click **Register**.
2. Copy the Application ID after successful registration. This is your **Client ID**.

Manage Certificates and Secrets

1. From the App Registration, locate **Manage > Certificates & secrets**.
2. Under Client Secrets, click **New client secret**.
3. Add a Description for the secret and select an expiration time frame.
4. Click **Add**.

Important: Copy the Client Secret and **save it immediately, you will not be able to view it again**. This is your **Secret Key**.

4.2.1.2. Create a Custom Role for Azure Subscription

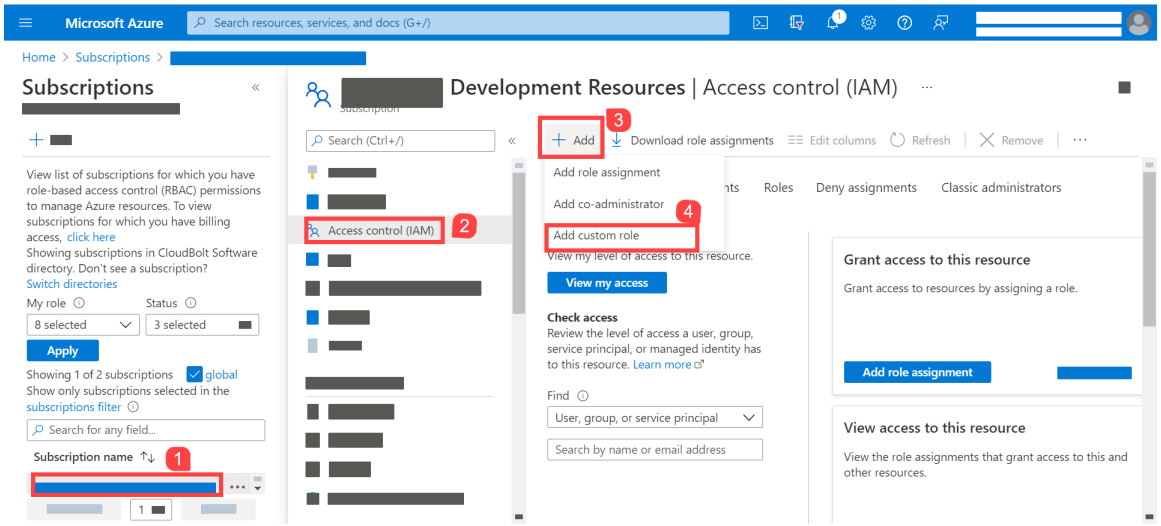
Learn how to create a custom role for your Azure subscription, which will be used when setting up Accounts in Azure.

Prerequisites

You must have Owner or User Access Administrator permissions to create custom roles.

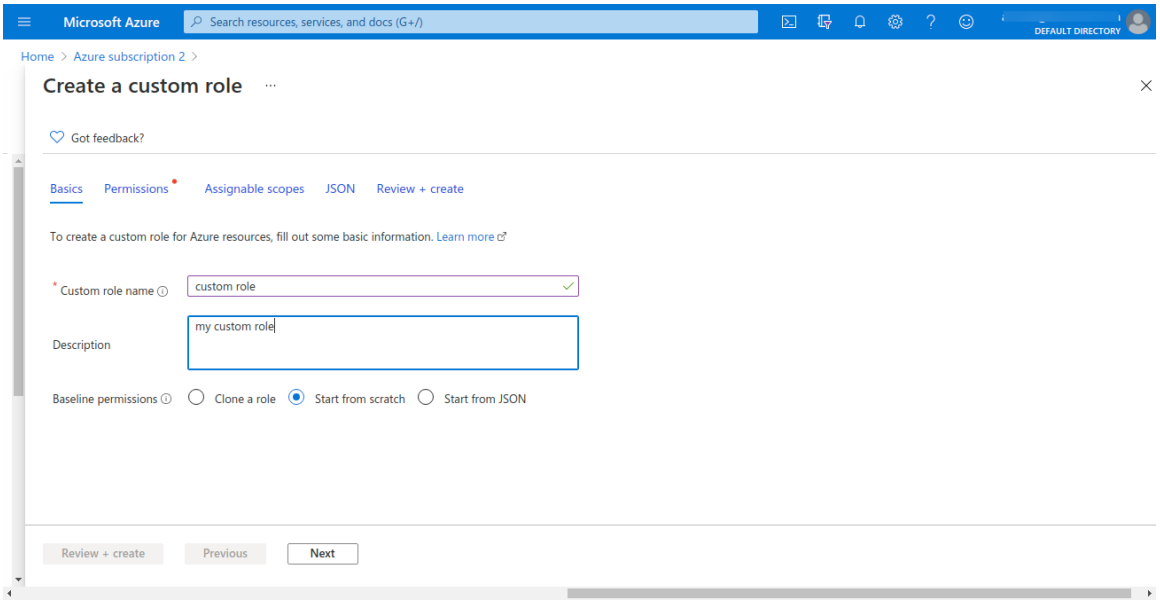
Create a Custom Role for Billing Adapter

1. In the Azure portal, open a subscription where a custom role is to be assigned to.
2. Click **Access control (IAM)** from the navigation panel.
3. On the Access control (IAM) page, click **Add**, and then click **Add custom role**.

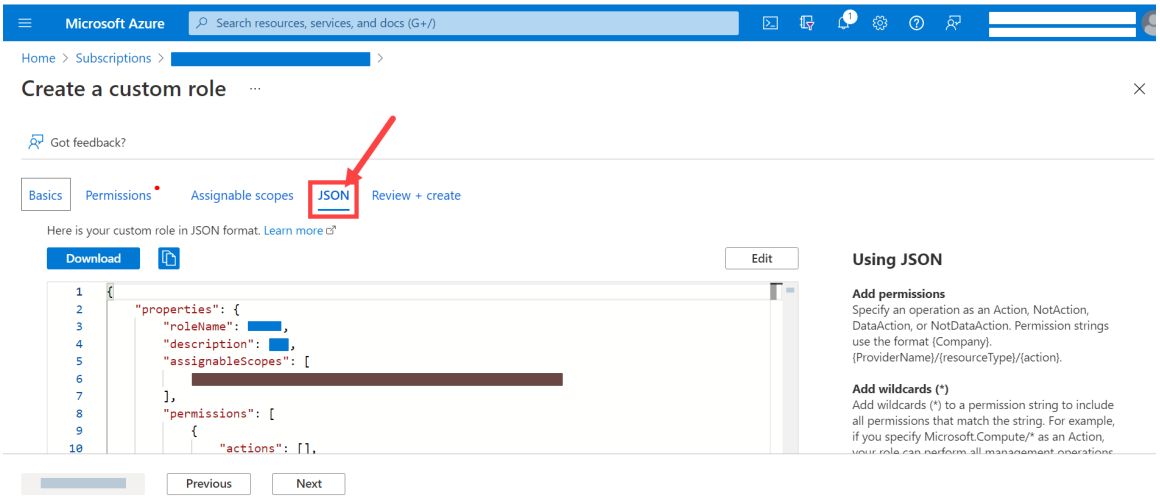


4. **Create a custom role** page appears.
5. On the **Basics** tab, enter a name for the custom role in the **Custom role name** box. In the **Description** box, enter description for the custom role. Leave the **Baseline**

permissions option set as Start from scratch.



6. Leave the **Permissions** and **Assignable scopes** tab data as it is.
7. Open the tab 'JSON'.



8. On the JSON tab, click **Edit**. In the section "**actions**" add the permissions listed below.

ReadOnly Access

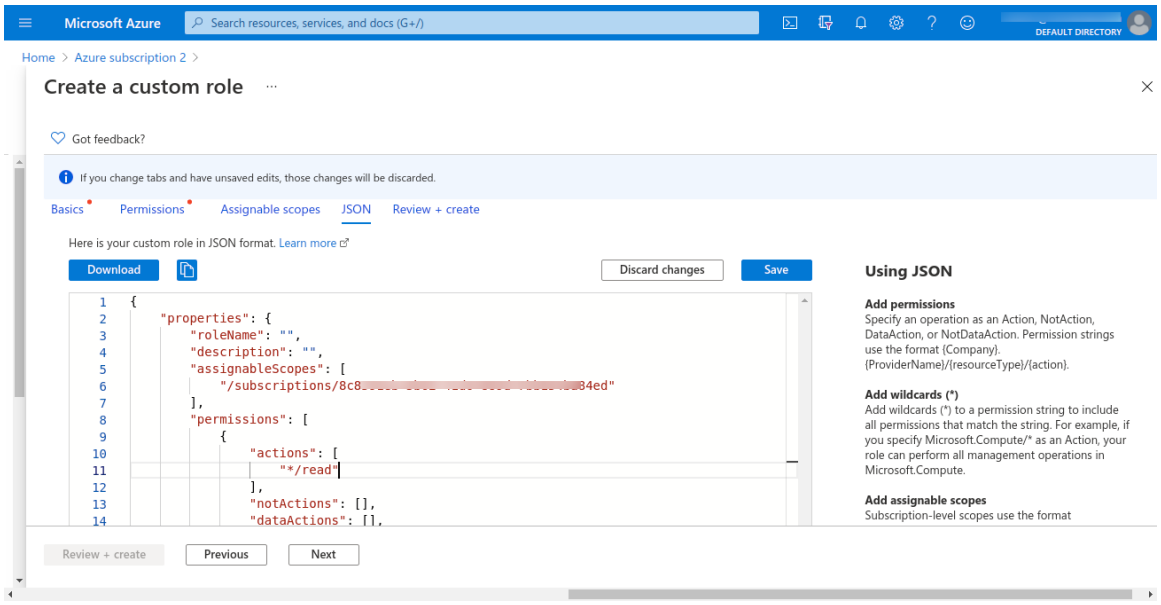
JSON

```
"Microsoft.Storage/storageAccounts/listkeys/action",
"Microsoft.Storage/storageAccounts/read",
"Microsoft.Storage/storageAccounts/blobServices/containers/read",
"Microsoft.CostManagement/exports/read",
"Microsoft.CostManagement/query/action",
"Microsoft.CostManagement/forecast/action",
"Microsoft.Consumption/reservationRecommendations/read",
"Microsoft.Consumption/reservationRecommendationDetails/read",
"Microsoft.CostManagement/reports/action"
```

Read & Write Access

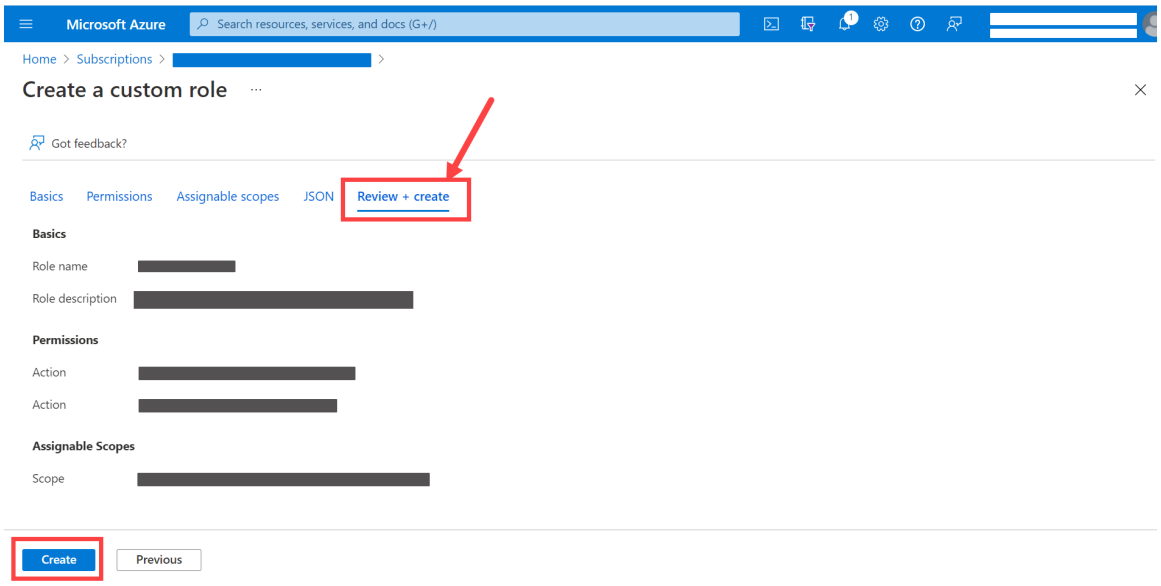
JSON

```
"Microsoft.Storage/storageAccounts/listkeys/action",
"Microsoft.Storage/storageAccounts/read",
"Microsoft.Storage/storageAccounts/blobServices/containers/read",
"Microsoft.CostManagement/exports/*",
"Microsoft.CostManagement/query/action",
"Microsoft.CostManagement/forecast/action",
"Microsoft.Consumption/reservationRecommendations/read",
"Microsoft.Consumption/reservationRecommendationDetails/read",
"Microsoft.CostManagement/reports/action"
```



9. When finished editing JSON body, click **Save**.

10. Open the tab 'Review + Create'. Check the role details and click **Create** to create a custom role.



11. After a few moments, a message box appears indicating your custom role was successfully created.

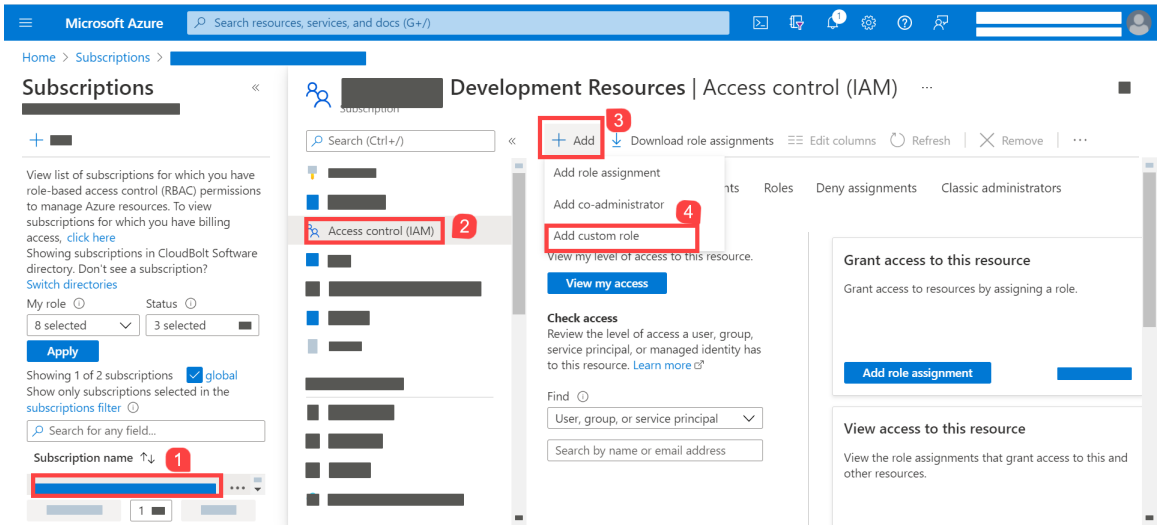
    If any errors are detected, a message will be displayed.

12. View your new custom role in the **Roles** list. If you don't see your custom role, click **Refresh**.

Create a Custom Role for Normal Adapter

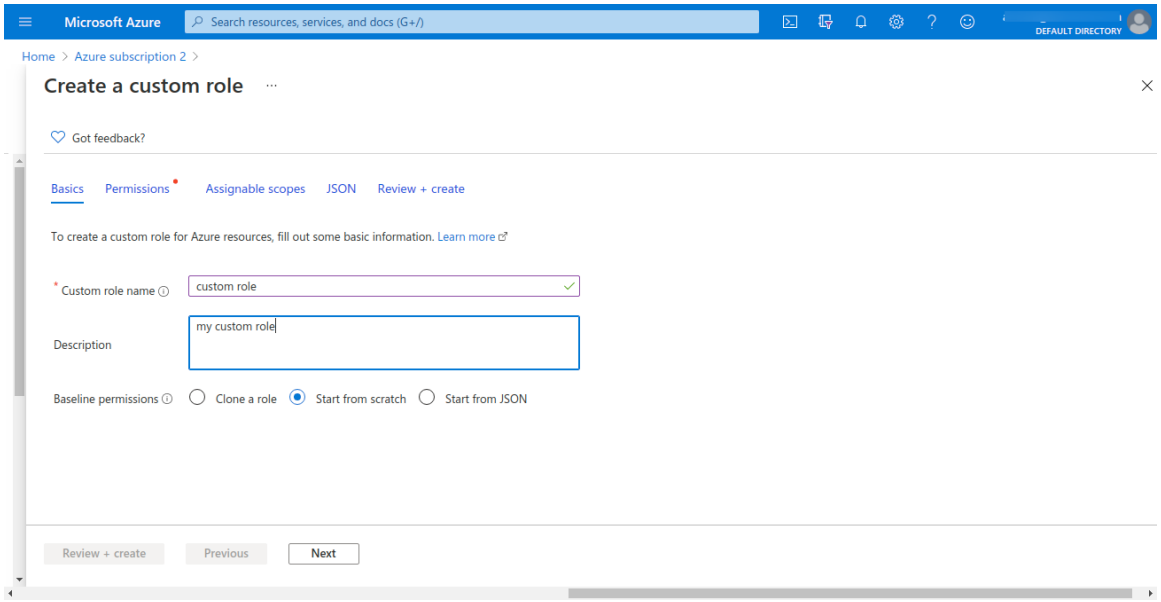
1. In the Azure portal, open a subscription where a custom role is to be assigned to.
2. Click **Access control (IAM)** from the navigation panel.

3. On the Access control (IAM) page, click **Add**, and then click **Add custom role**.



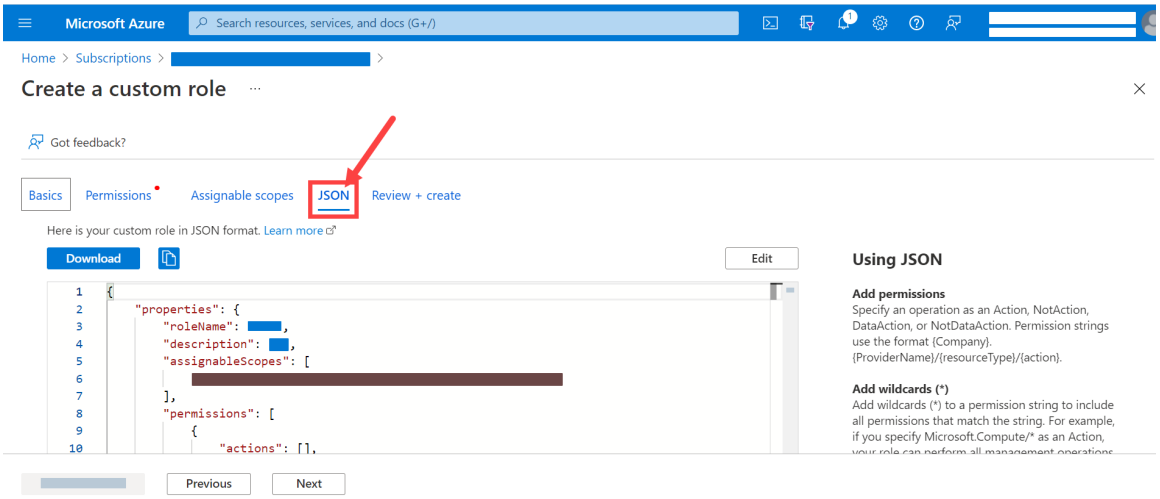
4. **Create a custom role** page appears.

5. On the **Basics** tab, enter a name for the custom role in the **Custom role name** box. In the **Description** box, enter description for the custom role. Leave the **Baseline permissions** option set as Start from scratch.



6. Leave the **Permissions** and **Assignable scopes** tab data as it is.

7. Open the tab 'JSON'.



8. On the JSON tab, click **Edit**. In the section "**actions**" add the permissions listed below.

ReadOnly Access

JSON

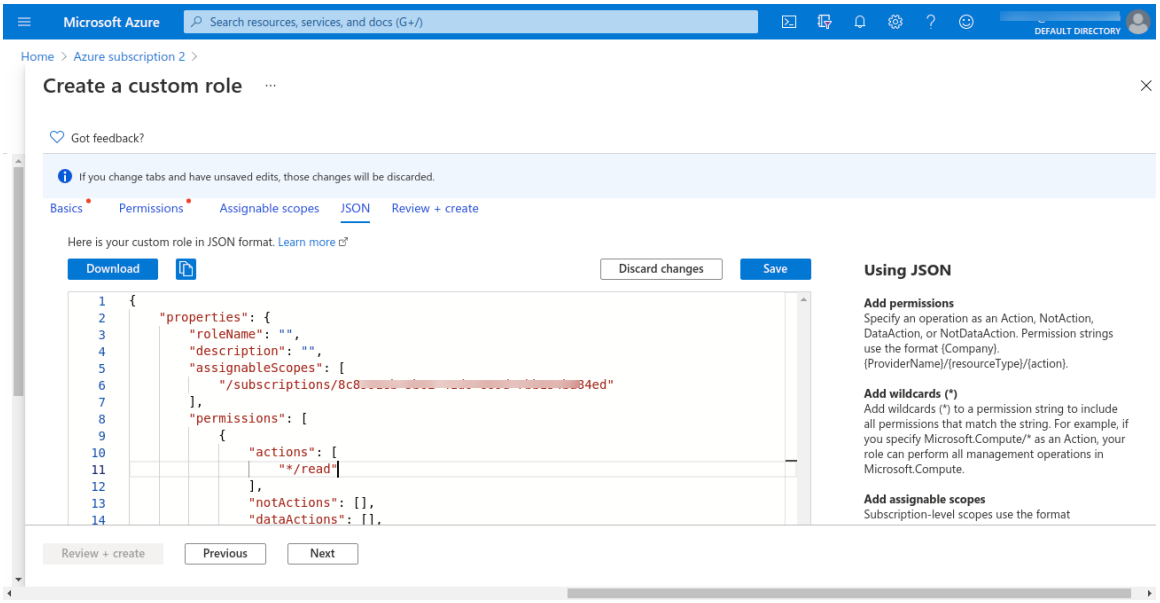
```
"Microsoft.Resources/subscriptions/resourceGroups/read",
"Microsoft.Compute/virtualMachines/read",
"Microsoft.Compute/virtualMachines/instanceView/read",
"Microsoft.Compute/disks/read",
"Microsoft.Compute/availabilitySets/read",
"Microsoft.Compute/snapshots/read",
"Microsoft.Network/virtualNetworks/read",
"Microsoft.Network/loadBalancers/read",
"Microsoft.Network/networkInterfaces/read",
"Microsoft.Network/publicIPAddresses/read",
"Microsoft.Network/routeTables/read",
"Microsoft.Network/networkSecurityGroups/read",
"Microsoft.Network/virtualNetworks/subnets/read",
"Microsoft.DBforMariaDB/servers/read",
"Microsoft.DBforPostgreSQL/servers/read",
"Microsoft.Sql/servers/read",
"Microsoft.Sql/servers/databases/read",
"Microsoft.Sql/servers/elasticPools/read",
"Microsoft.DBforMySQL/servers/read",
"Microsoft.Storage/storageAccounts/read",
"Microsoft.Insights/metrics/read",
"Microsoft.Insights/metricDefinitions/read",
"Microsoft.Commerce/*/read",
"Microsoft.Cache/redis/read",
"Microsoft.DocumentDB/databaseAccounts/services/read",
"Microsoft.Web/staticSites/Read",
"Microsoft.Web/kubeEnvironments/read",
"Microsoft.Kubernetes/connectedClusters/Read",
"Microsoft.Kubernetes/RegisteredSubscriptions/read",
"Microsoft.DataProtection/backupVaults/read",
"Microsoft.DocumentDB/cassandraClusters/read",
"Microsoft.DocumentDB/cassandraClusters/dataCenters/read",
"Microsoft.DocumentDB/databaseAccounts/cassandraKeyspaces/read",
"Microsoft.DesktopVirtualization/applicationgroups/read",
"Microsoft.DesktopVirtualization/hostpools/read",
"Microsoft.DesktopVirtualization/workspaces/read",
"Microsoft.Advisor/recommendations/read",
```

```
"Microsoft.Consumption/reservationRecommendations/read",
"Microsoft.Consumption/reservationRecommendationDetails/read"
"Microsoft.Web/sites/read"
"Microsoft.Web/serverfarms/read"
"Microsoft.ContainerService/managedClusters/read"
```

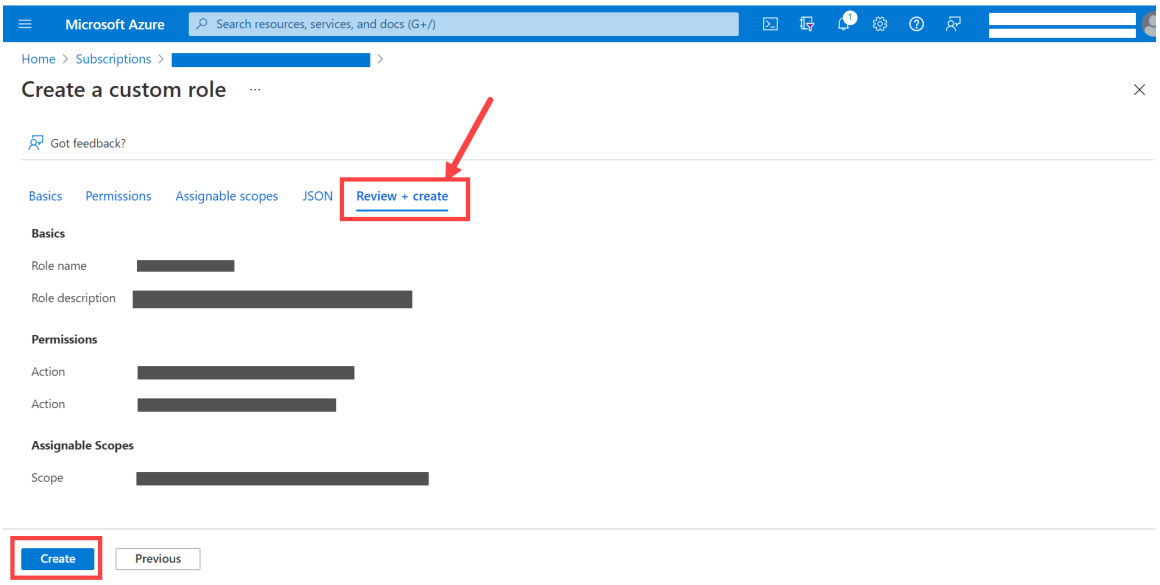
Read & Write Access

JSON

```
"*/read",
"Microsoft.Storage/storageAccounts/write",
"Microsoft.Storage/storageAccounts/delete",
"Microsoft.Compute/virtualMachines/*/action",
"Microsoft.Compute/*/delete",
"Microsoft.Network/*/delete",
"Microsoft.Compute/*/write",
"Microsoft.Network/*/write",
"Microsoft.DBforMariaDB/servers/*/action",
"Microsoft.DBforMariaDB/servers/delete",
"Microsoft.DBforMariaDB/servers/write",
"Microsoft.DBforMySQL/servers/*/action",
"Microsoft.DBforMySQL/servers/delete",
"Microsoft.DBforMySQL/servers/write",
"Microsoft.DBforMySQL/flexibleServers/delete",
"Microsoft.DBforMySQL/flexibleServers/write",
"Microsoft.Sql/servers/delete",
"Microsoft.Sql/servers/write",
"Microsoft.Sql/servers/databases/*/action",
"Microsoft.Sql/servers/databases/delete",
"Microsoft.Sql/servers/databases/write",
"Microsoft.Sql/servers/elasticPools/delete",
"Microsoft.Sql/servers/elasticPools/write",
"Microsoft.DBforPostgreSQL/servers/delete",
"Microsoft.DBforPostgreSQL/servers/write",
"Microsoft.DBforPostgreSQL/servers/*/action",
"Microsoft.Cache/redis/read",
"Microsoft.DocumentDB/databaseAccounts/services/read",
"Microsoft.Web/staticSites/Read",
"Microsoft.Web/kubeEnvironments/read",
"Microsoft.Kubernetes/connectedClusters/Read",
"Microsoft.Kubernetes/RegisteredSubscriptions/read",
"Microsoft.DataProtection/backupVaults/read",
"Microsoft.DataProtection/backupVaults/*/read",
"Microsoft.RecoveryServices/*/read",
"Microsoft.DocumentDB/cassandraClusters/read",
"Microsoft.DocumentDB/cassandraClusters/dataCenters/read",
"Microsoft.DocumentDB/databaseAccounts/cassandraKeyspaces/read",
"Microsoft.DocumentDB/databaseAccounts/cassandraKeyspaces/*/read",
"Microsoft.DesktopVirtualization/applicationgroups/read",
"Microsoft.DesktopVirtualization/applicationgroups/*/read",
"Microsoft.DesktopVirtualization/hostpools/read",
"Microsoft.DesktopVirtualization/hostpools/*/read",
"Microsoft.DesktopVirtualization/workspaces/read",
"Microsoft.DesktopVirtualization/workspaces/*/read",
"Microsoft.Advisor/recommendations/read",
"Microsoft.Consumption/reservationRecommendations/read",
"Microsoft.Consumption/reservationRecommendationDetails/read"
"Microsoft.Web/sites/read"
"Microsoft.Web/serverfarms/read"
"Microsoft.ContainerService/managedClusters/read"
```



9. When finished editing JSON body, click **Save**.
10. Open the tab 'Review + Create'. Check the role details and click **Create** to create a custom role.



11. After a few moments, a message box appears indicating your custom role was successfully created.

    If any errors are detected, a message will be displayed.
12. View your new custom role in the **Roles** list. If you don't see your custom role, click **Refresh**.

Outcomes

You have created a custom role in your Azure subscription.

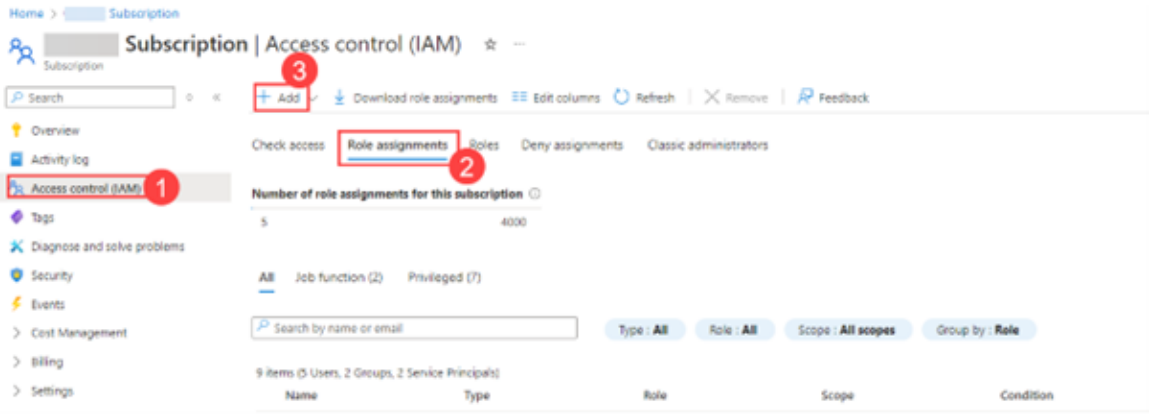
4.2.1.3. Assign Roles to your Registered App

Learn to add custom roles to your app registration.

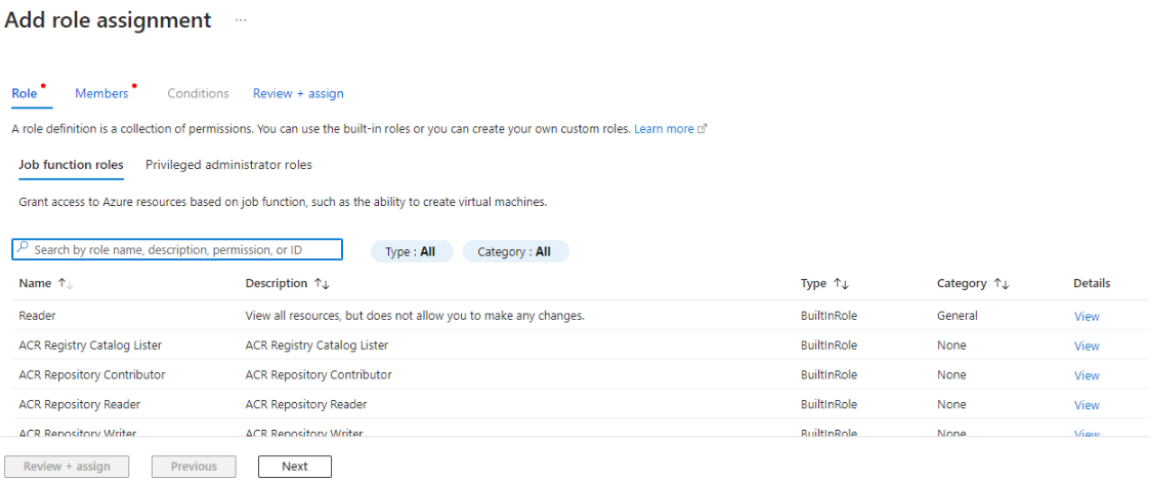
Add a Role Assignment

Before you begin, ensure you must have created roles for billing and normal adapters in your Azure Single subscription account. See Create a Custom Role for Azure Subscription

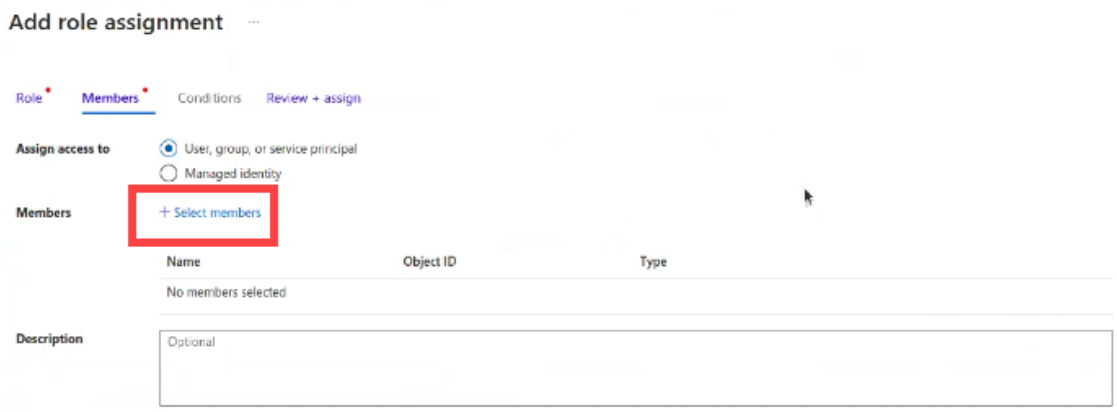
1. In the Azure portal, navigate to **Subscriptions**.
2. Select the subscription where the custom roles were created.
3. In the subscription's menu, go to **Access control (IAM)**.
4. Click **+ Add**, then select **Add role assignment**.



5. In the **Role** tab, search for and select the custom role you created.



6. In the **Members** tab, under the **Assign access to** option, select **User, group, or service principal**.
7. In the **Select members** field, click **+ Select members** to search for and select the previously registered application.



8. Go to **Review + assign** tab and then click **Review + assign** button at the bottom to complete the role assignment.

4.2.1.4. Provide Access for Reservations

Learn to grant access to your Azure reservations.

Using Azure Console

1. Log in to the Azure portal using admin credentials.
2. Go to **Reservations**.
3. Select a reservation and then click on **Reservation order ID**.
4. Select Access Control (IAM) and click **+ Add**.
5. Add **Reservation Reader** role under the role tab of the Add role assignment window.
6. Go to **Members** tab and click **Select members**.
7. Select the registered app name in the **Select members** field and click **Review + assign**.
8. Repeat steps 1 thru 7 for each reservation order ID.

Using Azure Cloud Shell editor

1. Copy the **Application (Client) ID** of the newly registered application.
2. Click the **Cloud Shell** icon in the top navigation of the Azure portal to launch the Cloud Shell terminal.



3. Ensure that you are using a Bash session for the command.
    a. Use the environment selector in the Cloud Shell toolbar to switch between Bash and PowerShell environments. If Cloud Shell is configured to start in PowerShell, the button will be labelled **Switch to Bash**.



    b. If Cloud Shell is configured to start in Bash, the button will be labelled **Switch to PowerShell**.



4. Use the following command to grant Reader access to all reservations available in your Azure account/subscription:

```
Bash (Unix Shell)
az role assignment create --assignee <Application (Client) ID> --role
"Reservations Reader" --scope "/providers/Microsoft.Capacity"
```

Replace '**<Application (Client) ID>**' with the actual Application (Client) ID of the newly registered application.

4.2.1.5. Register Resource Providers to Subscription

Learn registering the resource providers in your Azure subscription.

---

1. Sign in to the Azure portal using admin credentials.
2. On the Azure portal menu, search and select for **Subscriptions**.
3. In the **Azure Subscription List,** click **Settings > Resource providers.**
4. In the "Filter by name..." search field, enter the Resource provider name (e.g. Microsoft.CostManagementExports).
5. Check the status of the Provider:
    - If the status is "Registered", take no action.
    - If the status is "NotRegistered", select a provider from the list and click **Register.**

Ensure the following Resource providers are Registered:

- Microsoft.Storage
- Microsoft.CostManagementExports
- Microsoft.Billing
- Microsoft.Consumption
- Microsoft.CostManagement
- Microsoft.Commerce
- Microsoft.Network
- Microsoft.AlertsManagement
- Microsoft.Compute
- Microsoft.Security
- Microsoft.insights

- Microsoft.PolicyInsights
- Microsoft.DBforMySQL
- Microsoft.ResourceHealth
- Microsoft.DocumentDB
- Microsoft.Sql
- Microsoft.DBforPostgreSQL
- Microsoft.DBforMariaDB
- Microsoft.Authorization
- Microsoft.HDInsight
- Microsoft.KeyVault
- Microsoft.Web
- Microsoft.SqlVirtualMachine
- Microsoft.RecoveryServices
- Microsoft.ManagedIdentity
- Microsoft.Advisor
- Microsoft.ADHybridHealthService
- Microsoft.ClassicSubscription
- Microsoft.Features
- Microsoft.MarketplaceOrdering
- Microsoft.Portal
- Microsoft.SerialConsole
- Microsoft.support
- Microsoft.WorkloadMonitor
- Microsoft.VirtualMachineImages
- Microsoft.SecurityInsights
- Microsoft.OperationalInsights
- Microsoft.OperationsManagement

- Microsoft.ApiManagement

4.2.1.6. Create Azure Export Configuration

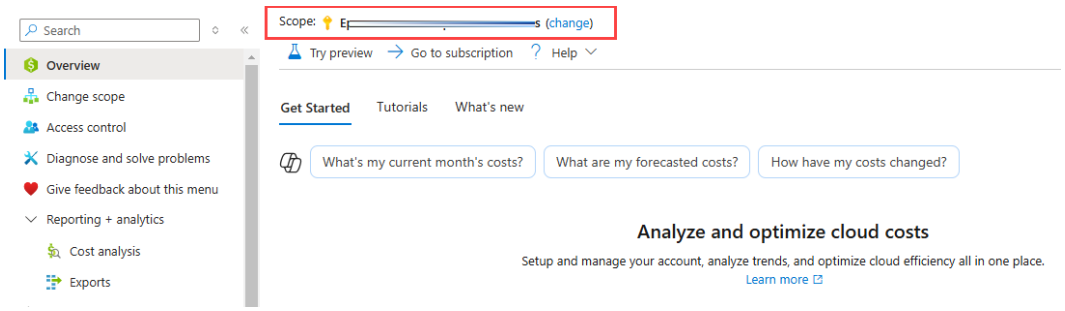
Learn how to create an Azure Export Configuration in Cost Management and Billing.

Introduction

CloudBolt Cost and Security Management requires an Export Configuration in order to accurately report billing information. An Azure Export Configuration allows you to schedule daily exports to publish your billing data to a storage account.

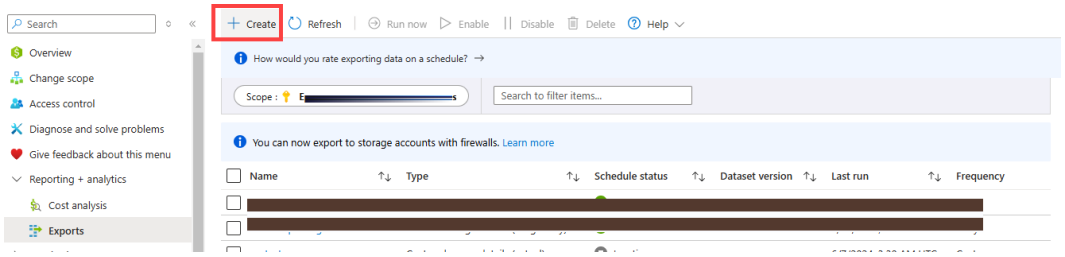
Create an Azure Export Configuration

1. **Log in to the Azure Portal**
    - Visit Azure Portal and sign in with your Azure credentials.
2. **Access Cost Management**
    - In the **Azure services** section, select **Cost Management**. If it's not visible, use the search box at the top of the page to search for it and select it.
3. **Select Your Billing Scope**
    - Choose the subscription under which you want to create the export. This will be the billing scope for your export.

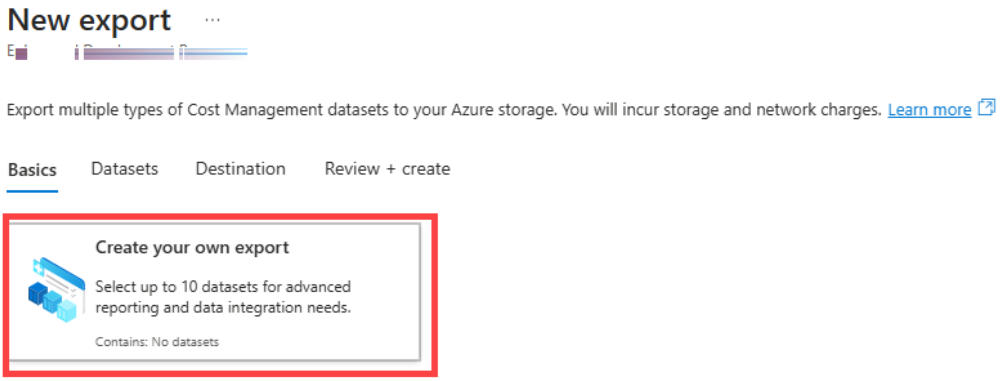


4. **Navigate to Exports**
    - In the left-hand navigation menu, select **Exports** to open the page where you can manage and configure your cost exports.
5. **Create a New Export**

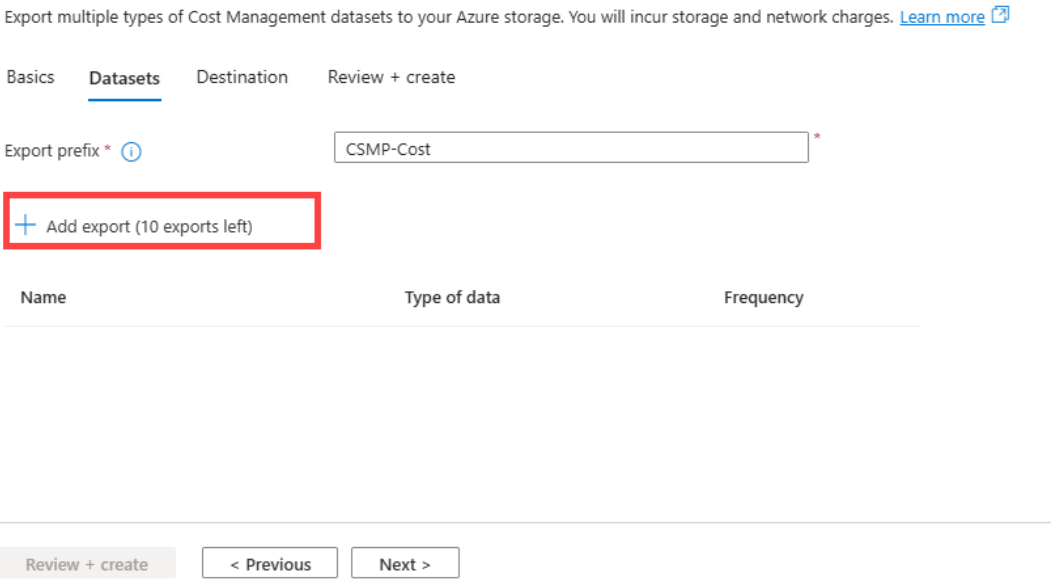
- On the **Exports** page, click on the **+ Create** button at the top of the page to begin the export creation process.



6. **Choose Export Type**
   - In the **Basics** tab, select **Create your own export**.



7. **Customise Export Name**
   - On the **Datasets** tab, enter a common export prefix in the **Export prefix** field. This will help you identify the export later. Once done, click **+ Add export**.

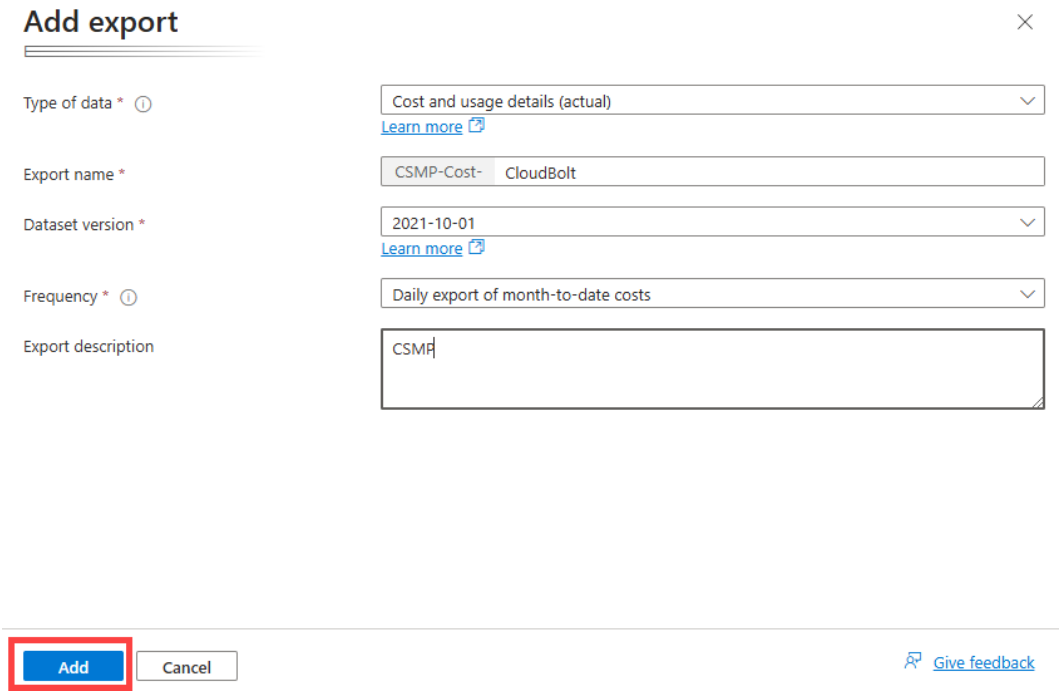


8. **Configure Export Details**

- In the **Add export** panel, fill in the following fields:

Field Name	Description
Type of data	Select **Cost and usage details (actual)**
Export name	Enter a name for your export
Dataset version	Select **2021-10-01**
Frequency	Select **Daily export of month-to-date costs**
Export description	Optionally, provide a description of the export

- After completing the fields, click **Add** to add the export to the Datasets tab.

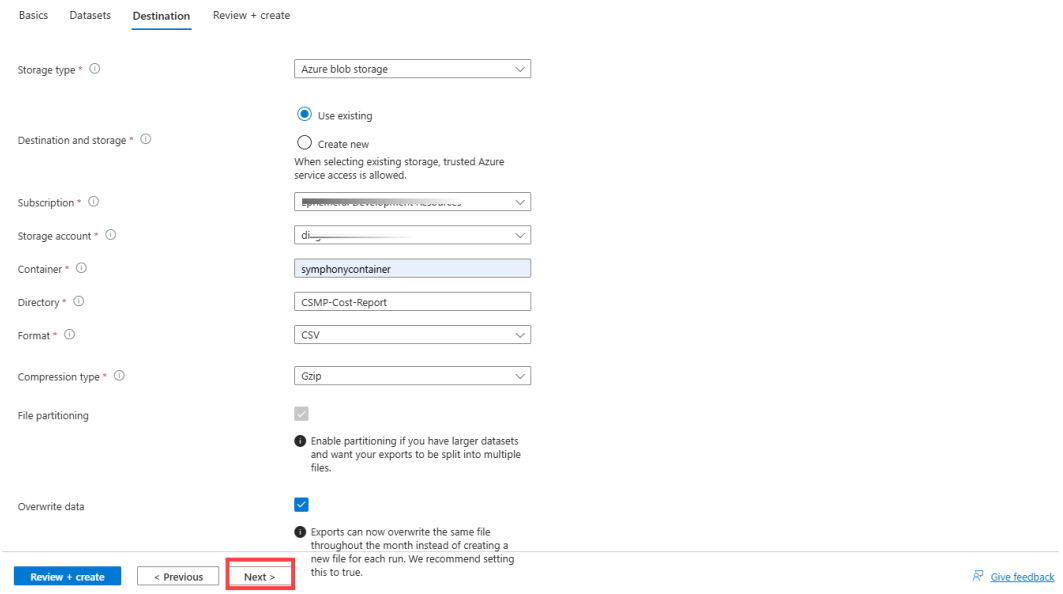


9. **Add More Exports (Optional)**
   - If you need to create additional exports, click **+ Add export**. You can create up to 10 exports.
10. **Configure the Destination**
    - Click **Next** to proceed to the **Destination** tab. Complete the following fields to configure where the export data will be stored:

Field Name	Description
Storage type	Select **Azure Blob Storage**
Destination and storage	Choose **Use existing** to use an existing storage account
Subscription	Select the subscription of your storage account
Storage account	Choose the storage account where the data will be exported

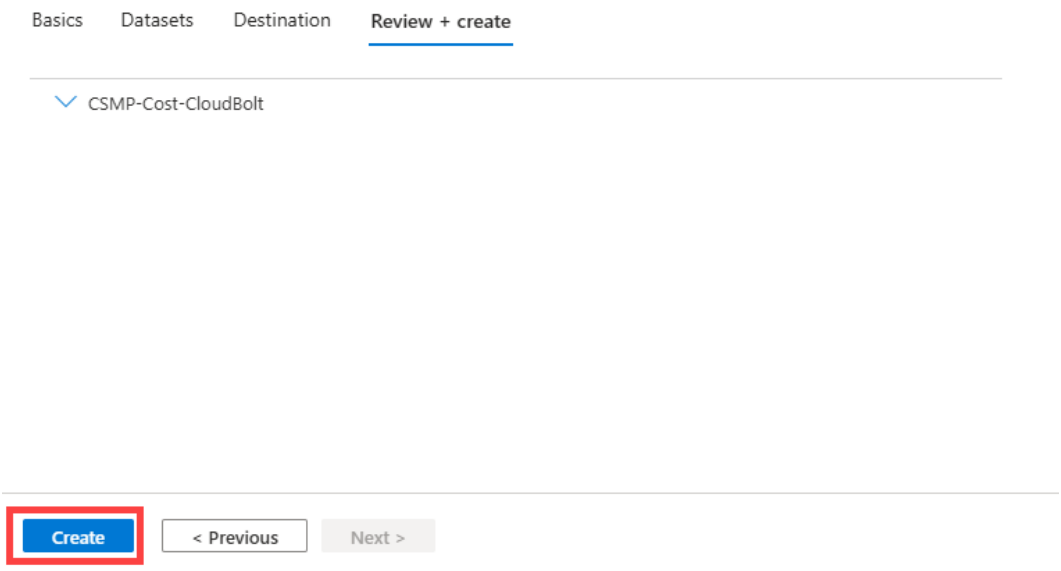
Field Name	Description
Container	Enter the container name where the report should be stored
Directory	Specify the directory path where the export should be saved
Format	Choose **CSV** or **Parquet** for the export file format
Compression type	Choose None, Gzip for CSV file format, or Snappy for the parquet file format.
File partitioning	Enabled by default (splits large files into smaller ones)
Overwrite data	Enabled by default (overwrites the previous day's file)

- After completing the fields, Click **Next** to move to the **Review + create** tab.



11. **Review Your Configuration**
    - On the **Review + Create** tab, review all the details you've configured. Ensure everything is correct and make any necessary adjustments.
12. **Create the Export**

- When you're satisfied with your settings, click **Create** to complete the process. Your Azure cost export will now be created and ready for use.



4.2.1.7. Create a Consolidated Billing Adapter for Azure Single Subscription Account

Learn how to create a consolidated billing adapter for Azure single subscription in CloudBolt CSMP.

Prerequisites

Complete the following tasks before creating a billing adapter for your Azure subscription:

1. Register an Application in Azure
2. Create a Custom Role for Azure Subscription
3. Assign Roles to your Registered App
4. Provide Access for Reservations
5. Register Resource Providers to Subscription
6. Create Azure Export Configuration

Create the Consolidated Billing Adapter

1. Log in to CloudBolt Cost and Security Management.
2. Click the **Quick Action icon > Adapters & Integration.**
3. Click **Add Cloud Adapter > Azure.**
4. Fill out the Basic Details:
    - **Adapter Type:** Consolidated Billing
    - **Collect Billing Data From:** Billing Account/Management Group/Subscription Scope
    - **Azure Cloud:** Select the correct Azure cloud region for your account
    - **Name:** Create a Name for your Adapter.
5. Click the **Azure Account Details** tab and fill out the details:

- Client ID
- Secret Key
- Tenant ID

6. Click **Validate.**
7. After the credentials are validated, Click **Next**.
8. Fill out the **Azure AD** details as required. The Azure AD tab provides the option to create Normal Adapters for all your subscriptions under the Azure Account.
    - *Yes* creates Normal Adapters for all the subscriptions within the Azure billing accounts.
    - *No* creates 'Not Configured' state Normal Adapters for all the subscriptions within the Azure billing accounts.

    If you have clicked *No* for auto normal adapter creation and later you updated the billing adapter to set the option as *Yes*, the previously *not configured* normal adapters will turn to *active* by default. Whenever a new subscription is created under your Azure billing account, a normal adapter will be created automatically with a status based on your option selection for "Do you want to automatically setup the adapters in CloudBolt using subscriptions available in your tenant?" The auto created normal adapters are named as per the subscription name.

    If your Azure account includes multiple tenants and you want to create normal adapters for all subscriptions across these tenants, you need to follow a specific process. First, when prompted with the question, "Do you have more tenants in your Azure Account?", make sure to select **Yes**. This indicates that you will be providing additional tenant information.

    Next, you will need to enter the credentials for each additional tenant. Specifically, you will input the **Client ID**, **Secret Key**, and **Tenant ID** for each tenant that is different from the credentials already entered in the Azure Account Details tab. Once you have filled in these fields, click on **Verify & Add** to proceed.

    It is important to note that this option will only be visible if your CSMP account is enabled for the **azuress_support_additional_azure_tenants_for_normal_adapter**

feature. Therefore, ensure that your account has the necessary permissions before attempting to add more tenants.

Additionally, before entering the credentials, make sure you have completed all prerequisite steps for each tenant you wish to add.

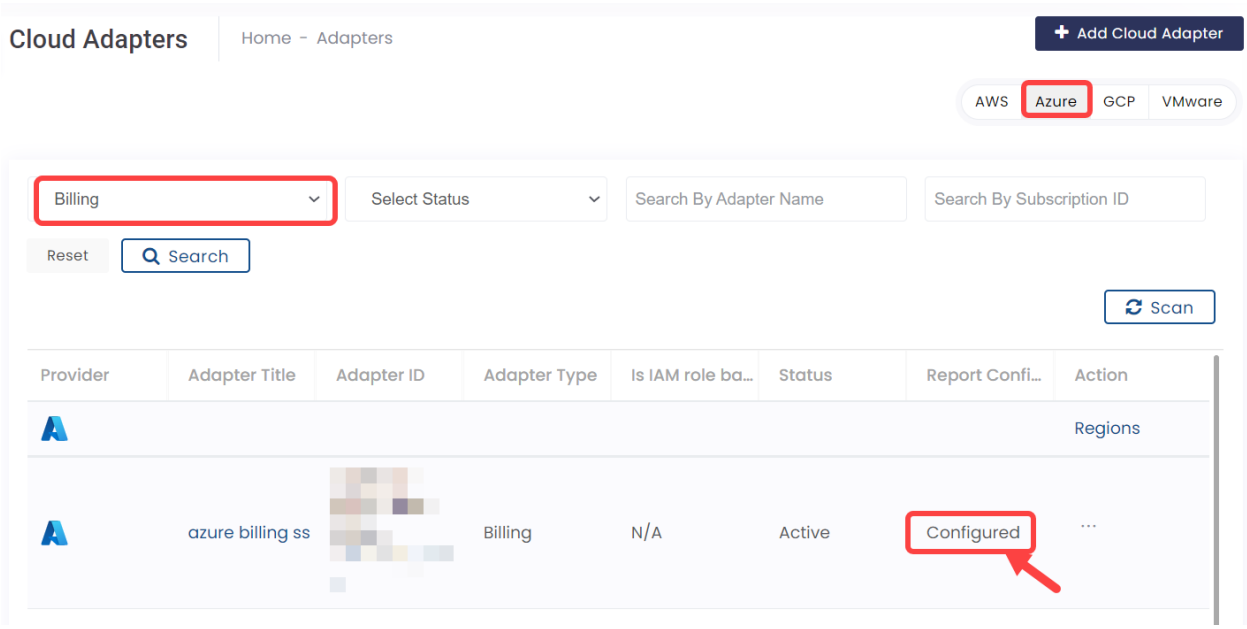
9. Click **Next**.
10. Fill out the **Export Configuration** details using any one option for the **Cost Data Source**.

Export	○ **Scope:** Select Subscription ○ **Subscription:** Select the correct subscription for which you want to create this adapter ○ **Existing Exports:** Select an existing export or create a new export for billing configuration. Click **Refresh [ ]** icon to view list of your existing exports ○ Select **Create new** to create a new billing export configuration using the CSMP platform. Fill the details for new export creation: ▪ **Name:** Enter a name for the export ▪ **Container:** Enter the container name for the export ▪ **Directory:** Enter the Azure directory name for the export ▪ **Storage Account:** Select a storage account from the drop-down list. ▪ Click **Create Export**. You can add up to 50 exports for the same or different subscription types. To add another export, click adjacent to the Subscription drop-down box, and fill the data as required. To remove an export, click adjacent to the Subscription drop-down box.
Cost and Usage report API	○ **Scope:** Select Subscription ○ **Subscription:** Select a subscription whose cost data you want to fetch using the API. You must add all the subscriptions whose billing data you wish to be displayed in your CloudBolt CSMP account. To add another subscription, click adjacent to the Subscription drop-down box, and select the subscription. To remove a subscription, click adjacent to the **Subscription** drop-down box. You can add up to 50 subscriptions.

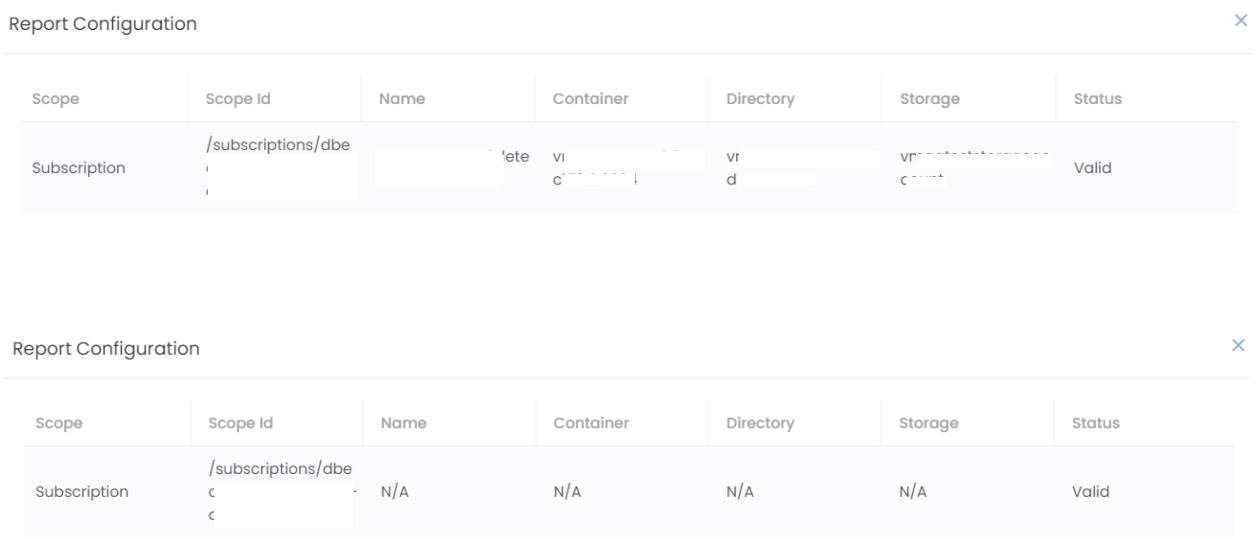
11. Click **Next**.

12. Fill out the **Other Configuration** details.
    - **Do you want to enable Invoice Date?**: Here you can set an invoice date for this billing adapter. Invoice date is a date on which you will generate invoices in CloudBolt CSMP account to post them to your customers, resellers, or both. Once the current month's date has passed, the CloudBolt CSMP billing adapter will not access your cloud provider databases to get the cloud costs changes for the previous months. However, the billing adapter will continue fetching the current month's cost data.
      By default, invoice date feature would be disabled. To enable, you must select Yes for "Do you want to enable Invoice Date?" Select an invoice date from the drop-down for invoice date. Default invoice date is set to 10.
    - **Select Group's Service Tag key**: Enter a valid tag key in the box. The entered tag key type can only be used while creating groups for this billing adapter. If you are changing an existing tag key with new one and the groups were created using the previous tag key, the tag key-value pairs will be removed from such groups and groups will contain only the sub-accounts.
13. Click **Submit** to create a billing adapter.

To see the created billing adapter, go to Azure adapter page and filter by adapter type as billing. A list of billing adapters will be displayed. To see the exports linked with a billing adapter, click **Configured** under the Report Configuration column.



Report configuration page will display all the linked exports with their details such as export name, container, directory, storage, and current status. If you had chosen Cost and Usage report API option as Cost Data Source under the export configuration tab while creating the billing adapter, then the export name, container, directory, and storage will be marked as N/A in the report configuration page.



Limitations

- When updating an existing Subscription scope adapter to modify an export without altering the subscription, there will be no impact on your cost data for both previous and current months.
- When updating an existing Subscription scope adapter to modify an export due to changes in the subscription, please note the following: Any changes in cost data will only affect the last and current month. Cost data from past months will remain unchanged. However, if the set invoice date for the last month has passed in the current month, the data for the last month will not be updated to reflect the new subscription details.
- When updating an existing Subscription scope adapter with the 'cost and usage report API' without modifying the subscription, no changes will be reflected in your cost data for both past and current months.

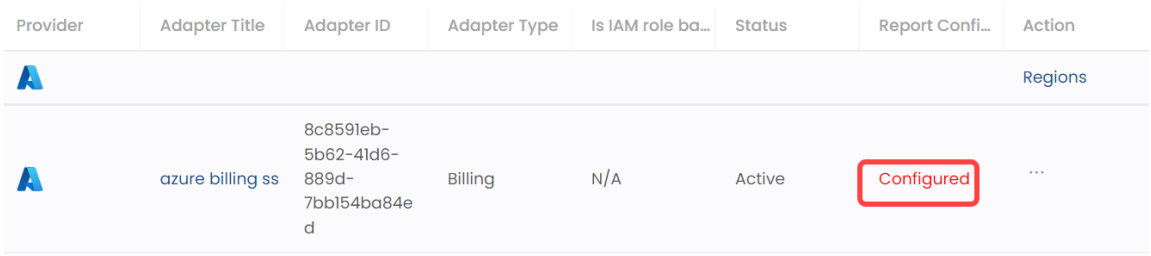
- When updating an existing Subscription scope adapter using the 'cost and usage report API' with a change in the subscription, please note the following: Any changes in cost data will only affect the last and current month. Cost data from past months will remain unchanged. However, if the set invoice date for the last month has passed in the current month, the data for the last month will not be updated to reflect the new subscription details.
- When updating an existing Subscription scope adapter to switch the Cost Data Source between 'export' and 'cost and usage report API' without changing the subscription, please note that there will be no impact on your cost data for both past and current months.
- When updating an existing Subscription scope adapter to switch the Cost Data Source between 'export' and 'cost and usage report API' due to a change in the subscription, please note the following: Any changes in cost data will only affect the last and current month. Cost data from past months will remain unchanged. However, if the set invoice date for the last month has passed in the current month, the data for the last month will not be updated to reflect the new subscription details.
- When converting an existing EA (Legacy) adapter to a Subscription scope adapter with the Cost Data Source set to 'cost and usage report API' without adding the necessary role/permissions to the registered app will result in no changes to historical data or current month cost data. Also, future month data will not be processed.
- When changing an existing EA (Legacy) adapter to a Subscription scope adapter with Cost Data Source set to 'export' or 'cost and usage report API' and assigning the required role/permissions to the registered app, please note that there will be a change in your cost data for the current month only; past month's cost data will remain unchanged.
- When changing the scope from 'Billing Account' to 'Subscription', please note the following: Any changes in cost data will only affect the last and current month. Cost data from past months will remain unchanged. However, if the set invoice date for

the last month has passed in the current month, the data for the last month will not be updated to reflect the new subscription details.

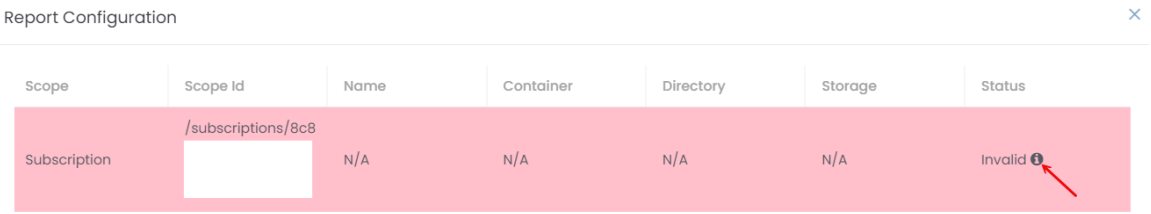
It may take up to 24 hours for the updated cost data to reflect in your CSMP account. You can manually reprocess your cost data from the past month using the report data reprocessing URL. See, Report Data Reprocessing.

Troubleshooting

1. After creating a billing adapter, if you see report configuration status as 'Configured' in red font, it denotes that some of or all the exports are having some issue and need your attention. Click Configured to see the status of exports.



Export with red highlight indicates an export in error. Hover over the info icon to see the detail.



2. Data from the recently added export is not fetched completely. Ensure that you have added new export after the data from existing exports have been fetched completely. You must delete the recently added export from the adapter and try to add after one hour.

Outcomes

The billing and normal Adapters for Azure single subscription account are ready.

4.2.1.8. Create a Normal Adapter for Azure Single Subscription Account

Learn how to create and set up a Normal Adapter for Azure single subscription in CloudBolt CSMP.

Introduction

A Normal Adapter is a must to manage the resources related to your Azure accounts. Normal Adapter produce service advice to identify the unused services, and displays potential savings. Security and Compliance Adviser and Event Scheduler also use Normal Adapters.

Prerequisites

Complete the following tasks before setting up an Azure Normal Adapter to get the Client ID, Secret Key and Tenant ID for your subscriptions.

1. Register an Application in Azure
2. Create a Custom Role for Azure Subscription
3. Assign Roles to your Registered App
4. Provide Access for Reservations
5. Register Resource Providers to Subscription

Create an Azure Normal Adapter

There are two ways to set up an Azure Normal Adapter:

Option 1: A Normal Adapter can be created along with the Consolidated Billing Adapter. See, Create a Consolidated Billing Adapter for Azure Single Subscription Account.

Option 2: Create a Normal Adapter on its own. These instructions will cover Option 2.

You will need the Client ID, Secret Key, and Tenant ID from your subscription for which you want to create a normal adapter.

Create the Azure Normal Adapter

1. Log in to CloudBolt Cost and Security Management.
2. Click the **Quick Action icon > Adapters & Integration**.
3. Click **Add Cloud** Adapter **> Azure**.
4. Fill out the Basic Details:
    - **Adapter Type:** Normal
    - **Azure Cloud:** Select the correct Azure cloud region for your account
    - **Name:** Create a Name for your Adapter.
5. Click the **Azure Account Details** tab.
6. Enter the **Client ID, Secret Key, and Tenant ID** collected from Register an Application and click **Validate.**
7. After the credentials are validated, click **Submit.**

Outcomes

Your Azure Normal Adapter is ready.

4.2.2. Set up and Create Adapters for Management Group Account

Learn how to set up your Azure management group account and then create adapters in CloudBolt CSMP.

Quick Setup

1. Register an Application in Azure Management Group Account
2. Create Management Groups in Azure
3. Create a Custom Role for Azure Management Group
4. Assign Roles to your Registered App in Azure Management Group Account
5. Provide Access for Reservations in Azure Management Group Account
6. Register Resource Providers to Subscription in Azure Management Group Account
7. Create Azure Export for Management Group
8. Create a Consolidated Billing Adapter for Azure Management Group
9. Create a Normal Adapter for Azure Management Group

4.2.2.1. Register an Application in Azure Management Group Account

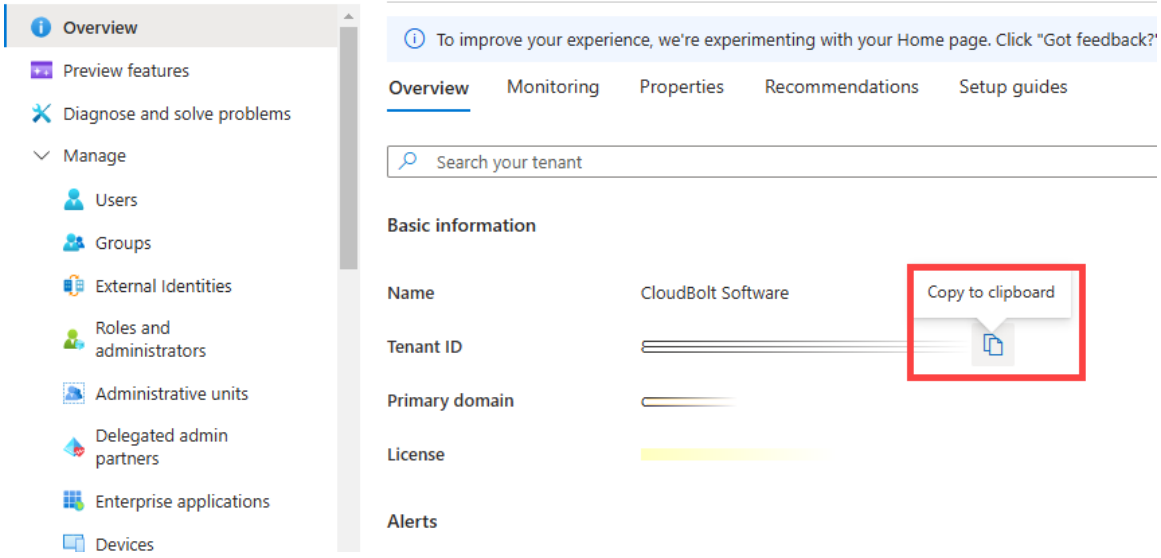
Learn to create an app registration in Microsoft Entra ID to serve as service principal.

Follow these steps to register an application in Azure.

Collect the Tenant ID

1. Log in to the Azure Management Portal using Admin credentials.
    - Azure Portal
    - Azure Portal for the US Government
    - Azure Portal for Germany
    - Azure Portal for China
2. Ensure that you are signed in to the correct tenant from which you want to retrieve the ID.
3. In the Azure services section, select **Microsoft Entra ID**. If it's not visible, use the search box to locate it.
4. On the **Overview** screen, find the **Tenant ID** under the **Basic information** section.

5. Copy the **Tenant ID** by selecting the **Copy to clipboard icon** next to it. You can then paste this value into a text document or another location for later use.



Register a New Application

1. In the Manage section of Microsoft Entra ID, click **App Registrations > New Registration**.
    a. Enter a Name for your application.
    b. Under **Support Account Types**, leave the default settings.
    c. For User **Redirect URI**, leave the default dropdown settings.
    d. Click **Register**.
2. Copy the Application ID after successful registration. This is your **Client ID**.

Manage Certificates and Secrets

1. From the App Registration, locate **Manage > Certificates & secrets**.
2. Under Client Secrets, click **New client secret**.
3. Add a Description for the secret and select an expiration time frame.
4. Click **Add**.

Important: Copy the Client Secret and **save it immediately, you will not be able to view it again**. This is your **Secret Key**.

4.2.2.2. Create Management Groups in Azure

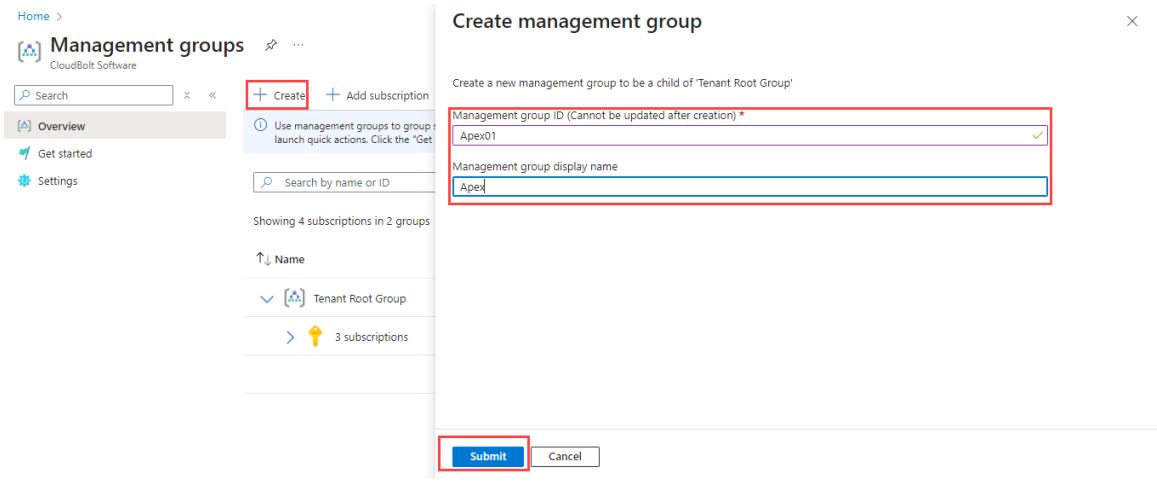
Learn how to create management groups and then add subscriptions to management groups in Azure to organize your resources and subscriptions.

Introduction

Azure's management groups, a hierarchical organizational structure, allow for the possible centralization of management of numerous Azure subscriptions. With management groups, all of your subscriptions that are a part of the group can have their resource consumption, costs, and subscription compliance tracked with a single billing adapter.

Create Management Groups

1. Sign in to the Azure portal.
2. In the Search bar, search for and select **Management Groups**.
3. To create a management group, click **Create**.



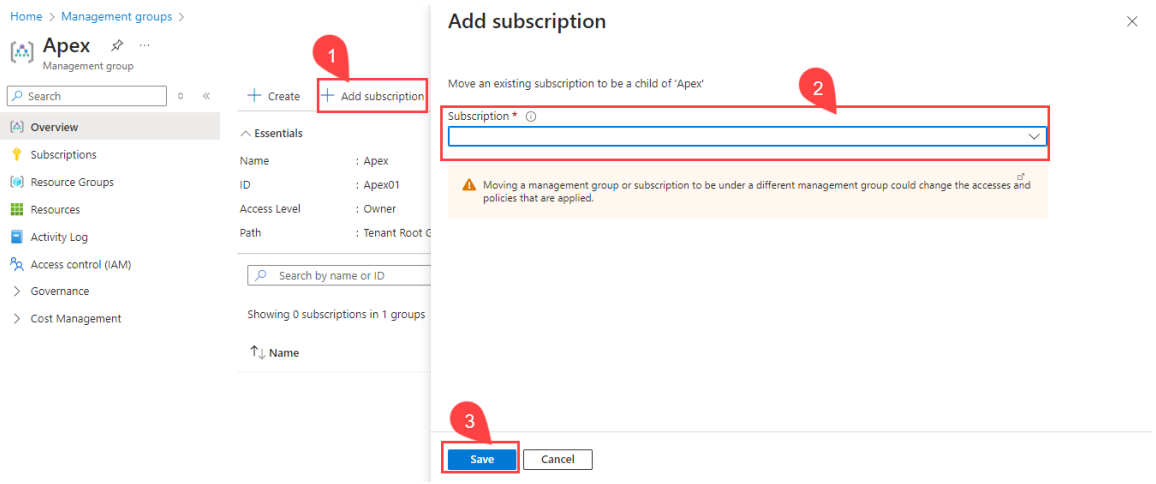
4. **Create management group** pane appears in the right side.
5. Enter a unique identifier in the **Management group ID** field for your management group. Make sure that you do not give space between letters in the ID.

6. Enter a suitable name in the **Management group display name** field.
7. Click **Submit**.
8. After few seconds your management groups page refreshes and the management group is created.

Add Subscriptions to a Management Group

Use this procedure to add subscriptions to the management group that you created.

1. Sign in to the Azure portal.
2. In the Search bar, search for and select **Management Groups**.
3. Management groups page appears with list of all the management groups available.
4. Select the management group to which you want to add your Azure subscriptions.
5. When the group's page opens, click **Add Subscription**.

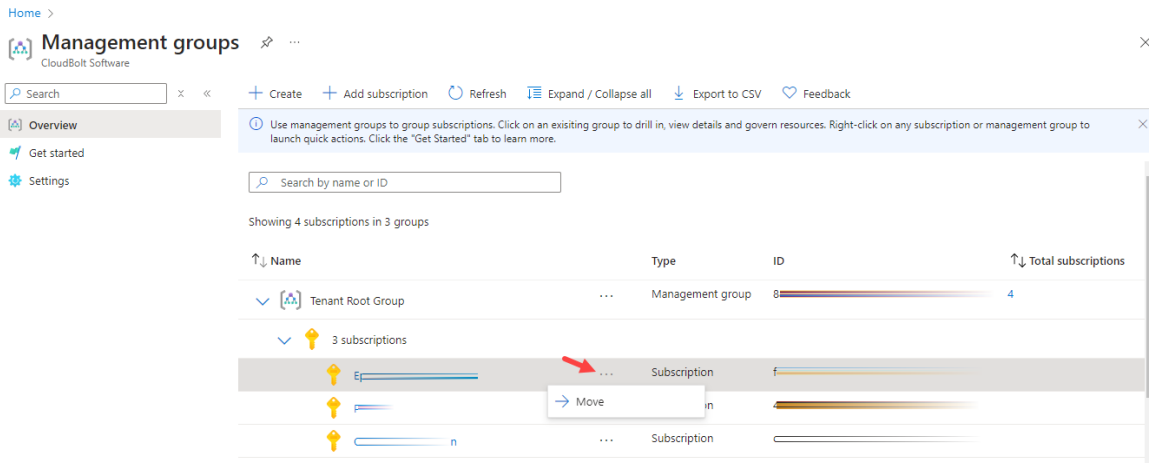


6. **Add subscription** pane appears in the right side.
7. Select a subscription from the **Subscription** drop-down list, that you want to add in the selected management group and click **Save**. Repeat until you've added all the required subscriptions in the management group.

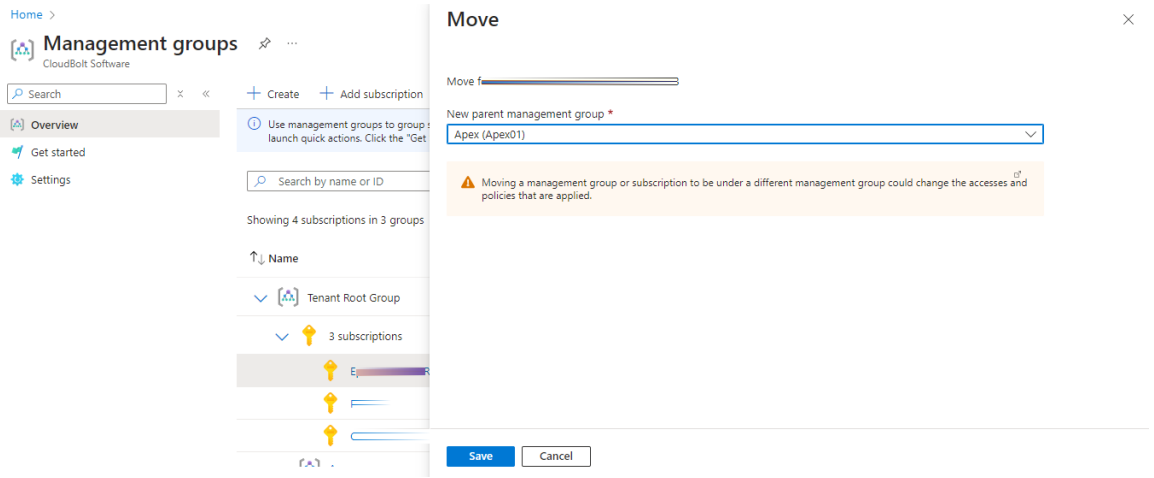
Move an Azure Subscription to Another Management Group

If you have more than one management group, you can move an Azure Subscription from one management group to a different management group.

1. Sign in to the Azure portal.
2. In the Search bar, search for and select **Management Groups**.
3. Go to the individual management group whose subscriptions you want to move under another management group.
4. Identify the subscription you want to move and click the ellipsis […] icon adjacent to the subscription name, and then click **Move**.



5. Move pane appears in the right side, select the destination management group, and click **Save**.



6. After the "Updating subscription" event successfully completes, you can see the selected subscription as part of the management group you had selected.

4.2.2.3. Create a Custom Role for Azure Management Group

Learn how to create a custom role for your Azure management group, which will be used when setting up Management Groups in Azure.

Prerequisites

You must have Owner or User Access Administrator permissions to create custom roles.

Create a Custom Role for Billing Adapter

1. In the Azure portal, open a management group where a custom role is to be assigned to.
2. Click **Access control (IAM)** from the navigation panel.
3. On the Access control (IAM) page, click **Add**, and then click **Add custom role**.
4. **Create a custom role** page appears.
5. On the **Basics** tab, enter a name for the custom role in the **Custom role name** box. In the **Description** box, enter description for the custom role. Leave the **Baseline permissions** option set as Start from scratch.
6. Leave the **Permissions** and **Assignable scopes** tab data as it is.
7. Open the tab 'JSON'.
8. On the JSON tab, click **Edit**. In the section "**actions**" add the permissions listed below.

   ReadOnly Access

```
JSON
"Microsoft.Storage/storageAccounts/listkeys/action",
"Microsoft.Storage/storageAccounts/read",
"Microsoft.Storage/storageAccounts/blobServices/containers/read",
"Microsoft.CostManagement/exports/read",
"Microsoft.CostManagement/query/action",
"Microsoft.CostManagement/forecast/action",
"Microsoft.Consumption/reservationRecommendations/read",
```

```
"Microsoft.Consumption/reservationRecommendationDetails/read",
"Microsoft.CostManagement/reports/action"
```

Read & Write Access

JSON

```
"Microsoft.Storage/storageAccounts/listkeys/action",
"Microsoft.Storage/storageAccounts/read",
"Microsoft.Storage/storageAccounts/blobServices/containers/read",
"Microsoft.CostManagement/exports/*",
"Microsoft.CostManagement/query/action",
"Microsoft.CostManagement/forecast/action",
"Microsoft.Consumption/reservationRecommendations/read",
"Microsoft.Consumption/reservationRecommendationDetails/read",
"Microsoft.CostManagement/reports/action"
```

9. When finished editing JSON body, click **Save**.
10. Open the tab 'Review + Create'. Check the role details and click **Create** to create a custom role.
11. After a few moments, a message box appears indicating your custom role was successfully created.
    If any errors are detected, a message will be displayed.
12. View your new custom role in the **Roles** list. If you don't see your custom role, click **Refresh**.

Create a Custom Role for Normal Adapter

1. In the Azure portal, open a management group where a custom role is to be assigned to.
2. Click **Access control (IAM)** from the navigation panel.
3. On the Access control (IAM) page, click **Add**, and then click **Add custom role**.
4. **Create a custom role** page appears.
5. On the **Basics** tab, enter a name for the custom role in the **Custom role name** box. In the **Description** box, enter description for the custom role. Leave the **Baseline permissions** option set as Start from scratch.
6. Leave the **Permissions** and **Assignable scopes** tab data as it is.
7. Open the tab 'JSON'.

8. On the JSON tab, click **Edit**. In the section "**actions**" add the permissions listed below.

ReadOnly Access

JSON

```
"Microsoft.Resources/subscriptions/resourceGroups/read",
"Microsoft.Compute/virtualMachines/read",
"Microsoft.Compute/virtualMachines/instanceView/read",
"Microsoft.Compute/disks/read",
"Microsoft.Compute/availabilitySets/read",
"Microsoft.Compute/snapshots/read",
"Microsoft.Network/virtualNetworks/read",
"Microsoft.Network/loadBalancers/read",
"Microsoft.Network/networkInterfaces/read",
"Microsoft.Network/publicIPAddresses/read",
"Microsoft.Network/routeTables/read",
"Microsoft.Network/networkSecurityGroups/read",
"Microsoft.Network/virtualNetworks/subnets/read",
"Microsoft.DBforMariaDB/servers/read",
"Microsoft.DBforPostgreSQL/servers/read",
"Microsoft.Sql/servers/read",
"Microsoft.Sql/servers/databases/read",
"Microsoft.Sql/servers/elasticPools/read",
"Microsoft.DBforMySQL/servers/read",
"Microsoft.Storage/storageAccounts/read",
"Microsoft.Insights/metrics/read",
"Microsoft.Insights/metricDefinitions/read",
"Microsoft.Commerce/*/read",
"Microsoft.Cache/redis/read",
"Microsoft.DocumentDB/databaseAccounts/services/read",
"Microsoft.Web/staticSites/Read",
"Microsoft.Web/kubeEnvironments/read",
"Microsoft.Kubernetes/connectedClusters/Read",
"Microsoft.Kubernetes/RegisteredSubscriptions/read",
"Microsoft.DataProtection/backupVaults/read",
"Microsoft.DocumentDB/cassandraClusters/read",
"Microsoft.DocumentDB/cassandraClusters/dataCenters/read",
"Microsoft.DocumentDB/databaseAccounts/cassandraKeyspaces/read",
"Microsoft.DesktopVirtualization/applicationgroups/read",
"Microsoft.DesktopVirtualization/hostpools/read",
"Microsoft.DesktopVirtualization/workspaces/read",
"Microsoft.Advisor/recommendations/read",
"Microsoft.Consumption/reservationRecommendations/read",
"Microsoft.Consumption/reservationRecommendationDetails/read",
"Microsoft.Web/sites/read",
"Microsoft.Web/serverfarms/read",
"Microsoft.ContainerService/managedClusters/read"
```

Read & Write Access

JSON

```
"*/read",
"Microsoft.Storage/storageAccounts/write",
"Microsoft.Storage/storageAccounts/delete",
"Microsoft.Compute/virtualMachines/*/action",
"Microsoft.Compute/*/delete",
"Microsoft.Network/*/delete",
"Microsoft.Compute/*/write",
"Microsoft.Network/*/write",
"Microsoft.DBforMariaDB/servers/*/action",
"Microsoft.DBforMariaDB/servers/delete",
```

```
"Microsoft.DBforMariaDB/servers/write",
"Microsoft.DBforMySQL/servers/*/action",
"Microsoft.DBforMySQL/servers/delete",
"Microsoft.DBforMySQL/servers/write",
"Microsoft.DBforMySQL/flexibleServers/delete",
"Microsoft.DBforMySQL/flexibleServers/write",
"Microsoft.Sql/servers/delete",
"Microsoft.Sql/servers/write",
"Microsoft.Sql/servers/databases/*/action",
"Microsoft.Sql/servers/databases/delete",
"Microsoft.Sql/servers/databases/write",
"Microsoft.Sql/servers/elasticPools/delete",
"Microsoft.Sql/servers/elasticPools/write",
"Microsoft.DBforPostgreSQL/servers/delete",
"Microsoft.DBforPostgreSQL/servers/write",
"Microsoft.DBforPostgreSQL/servers/*/action",
"Microsoft.Cache/redis/read",
"Microsoft.DocumentDB/databaseAccounts/services/read",
"Microsoft.Web/staticSites/Read",
"Microsoft.Web/kubeEnvironments/read",
"Microsoft.Kubernetes/connectedClusters/Read",
"Microsoft.Kubernetes/RegisteredSubscriptions/read",
"Microsoft.DataProtection/backupVaults/read",
"Microsoft.DataProtection/backupVaults/*/read",
"Microsoft.RecoveryServices/*/read",
"Microsoft.DocumentDB/cassandraClusters/read",
"Microsoft.DocumentDB/cassandraClusters/dataCenters/read",
"Microsoft.DocumentDB/databaseAccounts/cassandraKeyspaces/read",
"Microsoft.DocumentDB/databaseAccounts/cassandraKeyspaces/*/read",
"Microsoft.DesktopVirtualization/applicationgroups/read",
"Microsoft.DesktopVirtualization/applicationgroups/*/read",
"Microsoft.DesktopVirtualization/hostpools/read",
"Microsoft.DesktopVirtualization/hostpools/*/read",
"Microsoft.DesktopVirtualization/workspaces/read",
"Microsoft.DesktopVirtualization/workspaces/*/read",
"Microsoft.Advisor/recommendations/read",
"Microsoft.Consumption/reservationRecommendations/read",
"Microsoft.Consumption/reservationRecommendationDetails/read",
"Microsoft.Web/sites/read",
"Microsoft.Web/serverfarms/read",
"Microsoft.ContainerService/managedClusters/read"
```

9. When finished editing JSON body, click **Save**.
10. Open the tab 'Review + Create'. Check the role details and click **Create** to create a custom role.
11. After a few moments, a message box appears indicating your custom role was successfully created.

    If any errors are detected, a message will be displayed.
12. View your new custom role in the **Roles** list. If you don't see your custom role, click **Refresh**.

Outcomes

You have created a custom role in your Azure management group.

4.2.2.4. Assign Roles to your Registered App in Azure Management Group Account

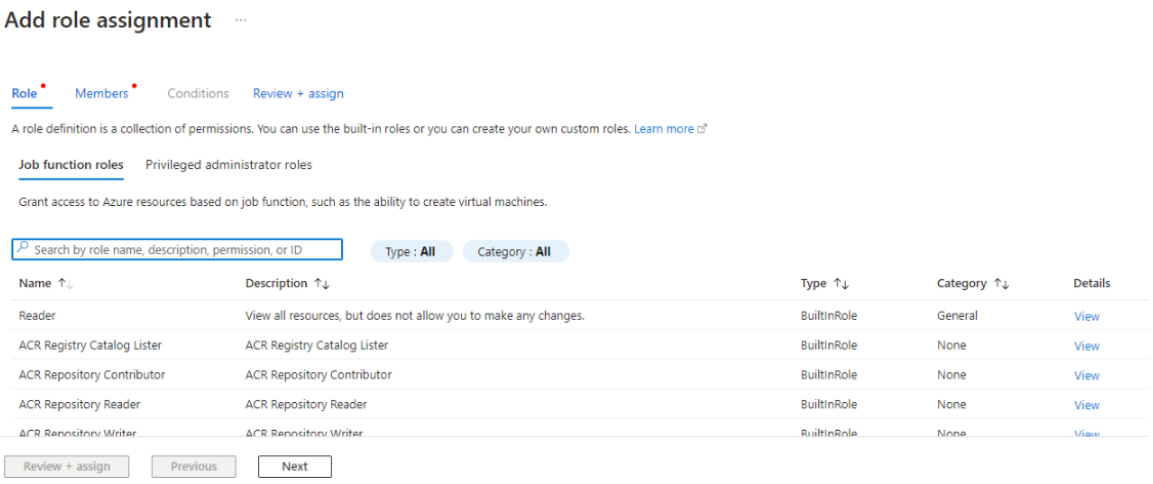
Learn to add custom roles to your app registration.

Before you begin, ensure you must have:

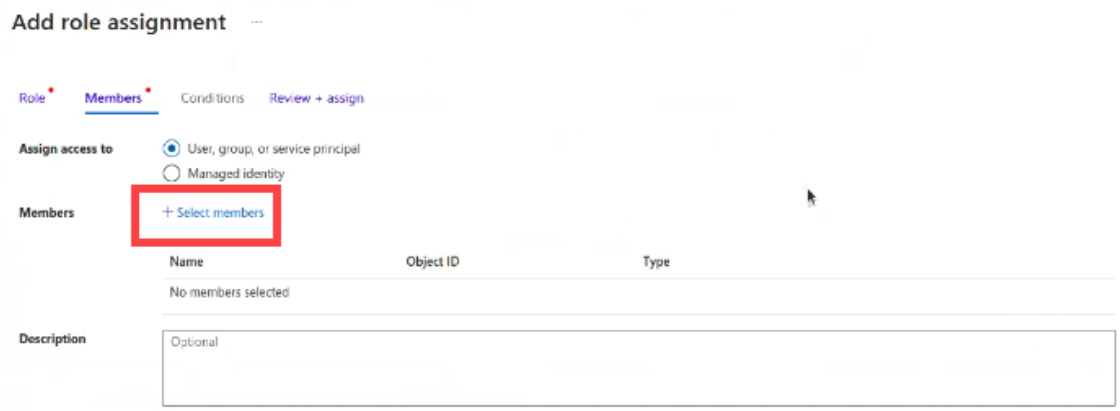
1. A management group created with all the required subscriptions added to it for which you want to create billing adapter. To know about creating a management group, see Create Management Groups in Azure.
2. Created roles for billing and normal adapters in your Azure Management Group scope. For more details, see Create a Custom Role for Azure Management Group.

Add a Role Assignment

1. In Azure, navigate to the Management Group and select the Management Group for which a billing adapter is required.
    a. Select **Access control (IAM)**.
    b. Click **Add > Add Role Assignment**.
2. In the **Role** tab, search for and select the custom role you created.



3. In the **Members** tab, click **+ Select members** to search for and select the previously registered app.



4. Go to **Review + assign** tab and then click **Review + assign** button at the bottom to complete the role assignment.

4.2.2.5. Provide Access for Reservations in Azure Management Group Account

Learn to grant access to your Azure reservations.

1. Log in to the Azure portal using admin credentials.
2. Go to **Reservations**.
3. Select a reservation and then click on **Reservation order ID**.
4. Select Access Control (IAM) and click **+ Add**.
5. Add **Reservation Reader** role under the role tab of the Add role assignment window.
6. Go to **Members** tab and click **Select members**.
7. Select the registered app name in the **Select members** field and click **Review + assign**.
8. Repeat steps 1 thru 7 for each reservation order ID.

4.2.2.6. Register Resource Providers to Subscription in Azure Management Group Account

Learn registering the resource providers in your Azure subscription.

---

1. Sign in to the Azure portal using admin credentials.
2. On the Azure portal menu, search and select for **Subscriptions**.
3. In the **Azure Subscription List,** click **Settings > Resource providers.**
4. In the "Filter by name..." search field, enter the Resource provider name (e.g. Microsoft.CostManagementExports).
5. Check the status of the Provider:
    - If the status is "Registered", take no action.
    - If the status is "NotRegistered", select a provider from the list and click **Register.**

Ensure the following Resource providers are Registered:

- Microsoft.Storage
- Microsoft.CostManagementExports
- Microsoft.Billing
- Microsoft.Consumption
- Microsoft.CostManagement
- Microsoft.Commerce
- Microsoft.Network
- Microsoft.AlertsManagement
- Microsoft.Compute
- Microsoft.Security
- Microsoft.insights

- Microsoft.PolicyInsights
- Microsoft.DBforMySQL
- Microsoft.ResourceHealth
- Microsoft.DocumentDB
- Microsoft.Sql
- Microsoft.DBforPostgreSQL
- Microsoft.DBforMariaDB
- Microsoft.Authorization
- Microsoft.HDInsight
- Microsoft.KeyVault
- Microsoft.Web
- Microsoft.SqlVirtualMachine
- Microsoft.RecoveryServices
- Microsoft.ManagedIdentity
- Microsoft.Advisor
- Microsoft.ADHybridHealthService
- Microsoft.ClassicSubscription
- Microsoft.Features
- Microsoft.MarketplaceOrdering
- Microsoft.Portal
- Microsoft.SerialConsole
- Microsoft.support
- Microsoft.WorkloadMonitor
- Microsoft.VirtualMachineImages
- Microsoft.SecurityInsights
- Microsoft.OperationalInsights
- Microsoft.OperationsManagement

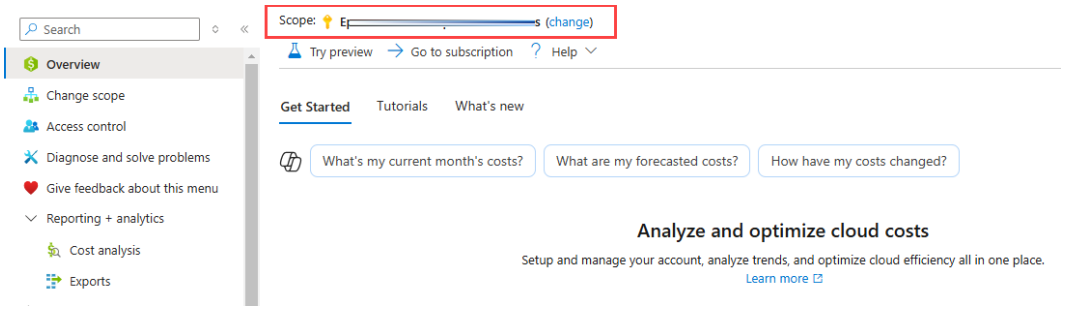
- Microsoft.ApiManagement

4.2.2.7. Create Azure Export for Management Group

Learn how to create an Azure Export for Management Group Accounts.

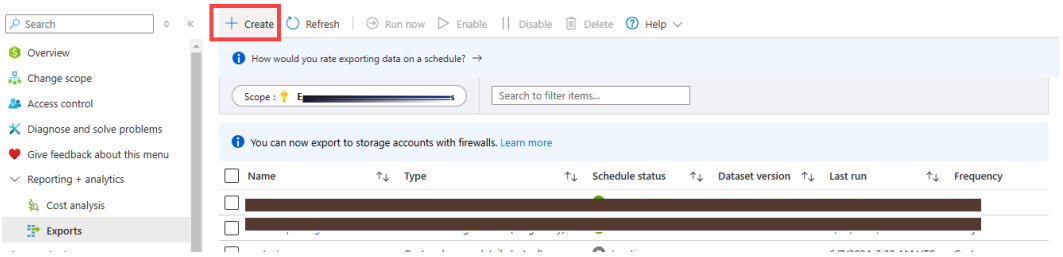
Create an Export in Azure

1. **Log in to the Azure Portal**
    - Visit Azure Portal and sign in with your Azure credentials.
2. **Access Cost Management**
    - In the **Azure services** section, select **Cost Management**. If it's not visible, use the search box at the top of the page to search for it and select it.
3. **Select Your Billing Scope**
    - Choose the management group under which you want to create the export. This will be the billing scope for your export.

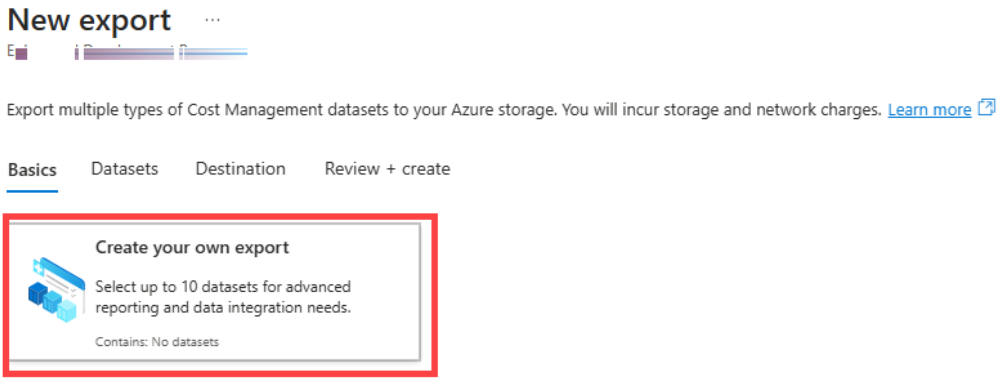


4. **Navigate to Exports**
    - In the left-hand navigation menu, select **Exports** to open the page where you can manage and configure your cost exports.
5. **Create a New Export**

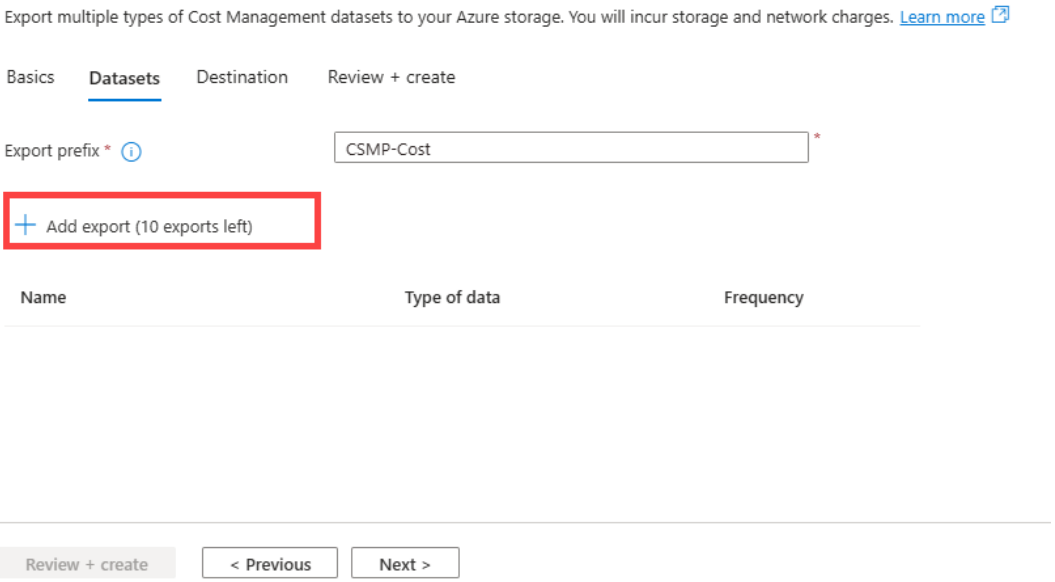
- On the **Exports** page, click on the **+ Create** button at the top of the page to begin the export creation process.



6. **Choose Export Type**
   - In the **Basics** tab, select **Create your own export**.



7. **Customise Export Name**
   - On the **Datasets** tab, enter a common export prefix in the **Export prefix** field. This will help you identify the export later. Once done, click **+ Add export**.

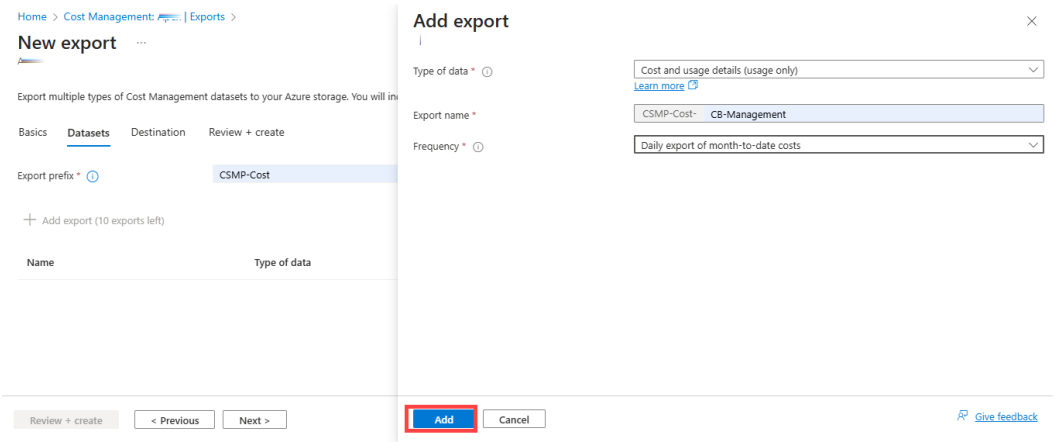


8. **Configure Export Details**

- In the **Add export** panel, fill in the following fields:

Field Name	Description
Type of data	Select **Cost and usage details (usage only)**
Export name	Enter a name for your export
Frequency	Select **Daily export of month-to-date costs**

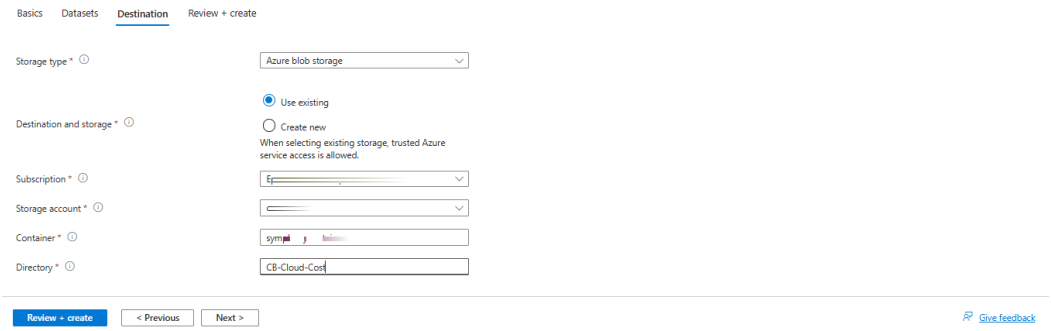
- After completing the fields, click **Add** to add the export to the Datasets tab.



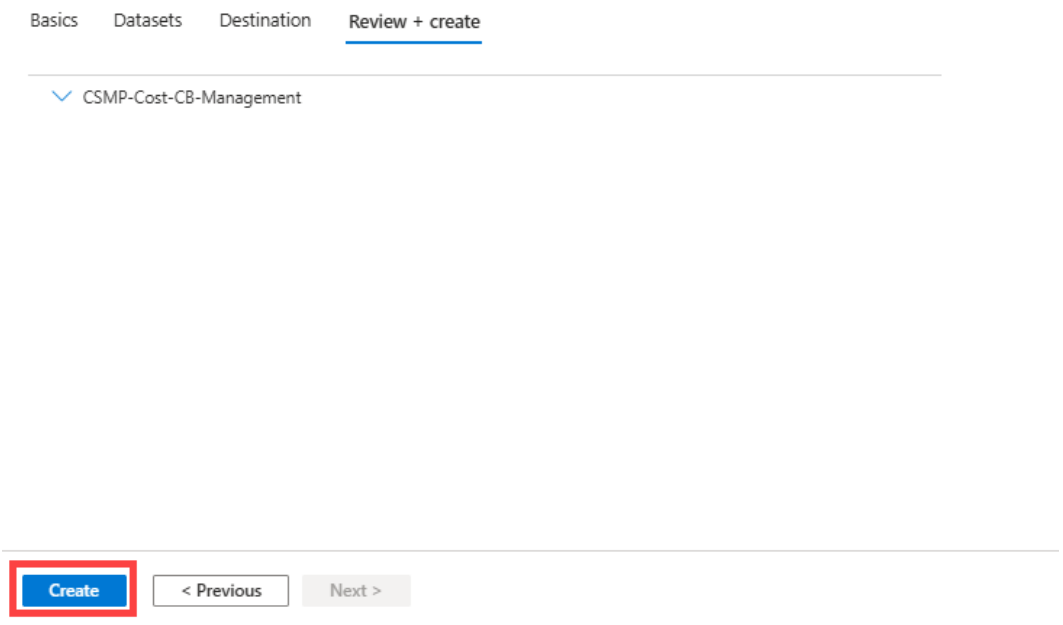
9. **Add More Exports (Optional)**
   - If you need to create additional exports, click **+ Add export**. You can create up to 10 exports.
10. **Configure the Destination**
    - Click **Next** to proceed to the **Destination** tab. Complete the following fields to configure where the export data will be stored:

Field Name	Description
Storage type	Select **Azure Blob Storage**
Destination and storage	Choose **Use existing** to use an existing storage account
Subscription	Select the subscription of your storage account
Storage account	Choose the storage account where the data will be exported
Container	Enter the container name where the report should be stored
Directory	Specify the directory path where the export should be saved

- After completing the fields, Click **Next** to move to the **Review + create** tab.



11. **Review Your Configuration**
    - On the **Review + Create** tab, review all the details you've configured. Ensure everything is correct and make any necessary adjustments.
12. **Create the Export**
    - When you're satisfied with your settings, click **Create** to complete the process. Your Azure cost export will now be created and ready for use.



4.2.2.8. Create a Consolidated Billing Adapter for Azure Management Group

Learn how to create a Consolidated Billing Adapter for Azure Management Group in CloudBolt Cost and Security Management.

Prerequisites

Complete the following tasks before setting up an Azure Billing Adapter:

1. Register an Application in Azure Management Group Account
2. Create Management Groups in Azure
3. Create a Custom Role for Azure Management Group
4. Assign Roles to your Registered App in Azure Management Group Account
5. Provide Access for Reservations in Azure Management Group Account
6. Register Resource Providers to Subscription in Azure Management Group Account
7. Create Azure Export for Management Group

Create the Consolidated Billing Adapter

1. Log in to CloudBolt Cost and Security Management.
2. Click the **Quick Action icon > Adapters & Integration.**
3. Click **Add Cloud Adapter > Azure.**
4. Fill out the Basic Details:
    - **Adapter Type:** Consolidated Billing
    - **Collect Billing Data From:** Billing Account/Management Group/Subscription Scope
    - **Azure Cloud:** Select the correct Azure cloud region for your account
    - **Name:** Create a Name for your Adapter.
5. Click the **Azure Account Details** tab and fill out the details:
    - Client ID

- Secret Key
- Tenant ID

6. Click **Validate.**
7. After the credentials are validated, Click **Next**.
8. Fill out the Azure AD details as required. The Azure AD tab provides the option to create Normal Adapters for all your subscriptions under the Management Group.
    - *Yes* creates Normal Adapters for all the subscriptions within the Azure management group.
    - *No* creates 'Not Configured' state Normal Adapters for all the subscriptions within the Azure management group.

    If you have clicked *No* for auto normal adapter creation and later you updated the billing adapter to set the option as *Yes*, the previously *not configured* normal adapters will turn to *active* by default. Whenever a new subscription is created under the Azure management group, a Normal Adapter will be created automatically with a status based on your option selection for "Do you want to automatically setup the adapters in CloudBolt using subscriptions available in your tenants?" The auto created normal adapters are named as per the subscription name.

If your Azure account includes multiple tenants and you want to create normal adapters for all subscriptions across these tenants, you need to follow a specific process. First, when prompted with the question, "Do you have more tenants in your Azure Account?", make sure to select **Yes**. This indicates that you will be providing additional tenant information.

Next, you will need to enter the credentials for each additional tenant. Specifically, you will input the **Client ID**, **Secret Key**, and **Tenant ID** for each tenant that is different from the credentials already entered in the Azure Account Details tab. Once you have filled in these fields, click on **Verify & Add** to proceed.

It is important to note that this option will only be visible if your CSMP account is enabled for the **azuress_support_additional_azure_tenants_for_normal_adapter**

feature. Therefore, ensure that your account has the necessary permissions before attempting to add more tenants.

Additionally, before entering the credentials, make sure you have completed all prerequisite steps for each tenant you wish to add.

9. Click **Next**.
10. Fill out the **Export Configuration** details using 'Export' option for the **Cost Data Source**.

Export	○ **Scope:** Select Management Group ○ **Management Group:** Select the correct management group for which you want to create this adapter ○ **Existing Exports:** Select an existing export. Click **Refresh [ ]** icon to view list of your existing exports You can add up to 50 exports for the same or different management groups. To add another export, click adjacent to the Management Group drop-down box, and fill the data as required. To remove an export, click adjacent to the Management Group drop-down box.
Cost and Usage report API	○ Not Available when scope is set as Management Group. If you had created the adapter using the 'Cost and Usage Report API' before June 13, 2024, the export would become invalid, accompanied by an error message similar to: '*Cost and Usage report API' is not supported for management group scope*'.

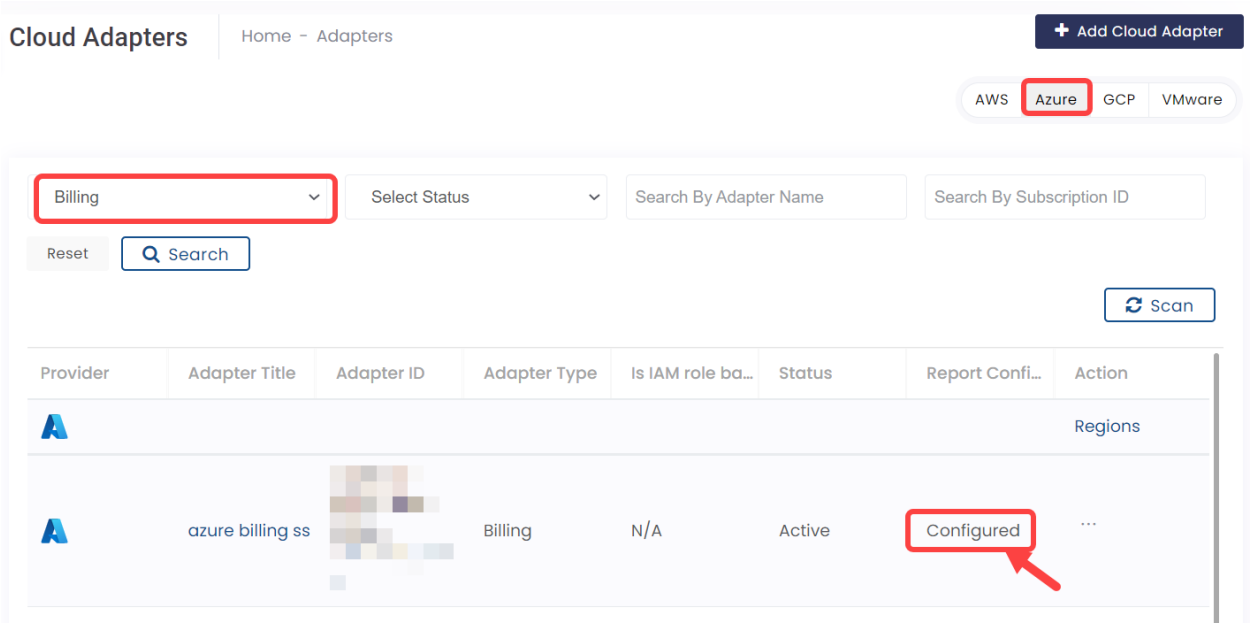
11. Click **Next**.
12. Fill out the **Other Configuration** details.
    - **Do you want to enable Invoice Date?**: Here you can set an invoice date for this billing adapter. Invoice date is a date on which you will generate invoices in CloudBolt CSMP account to post them to your customers, resellers, or both. Once the current month's date has passed, the CloudBolt CSMP billing adapter will not access your cloud provider databases to get the cloud costs changes for the previous months. However, the billing adapter will continue fetching the current month's cost data.
      By default, invoice date feature would be disabled. To enable, you must select

Yes for "Do you want to enable Invoice Date?" Select an invoice date from the drop-down for invoice date. Default invoice date is set to 10.

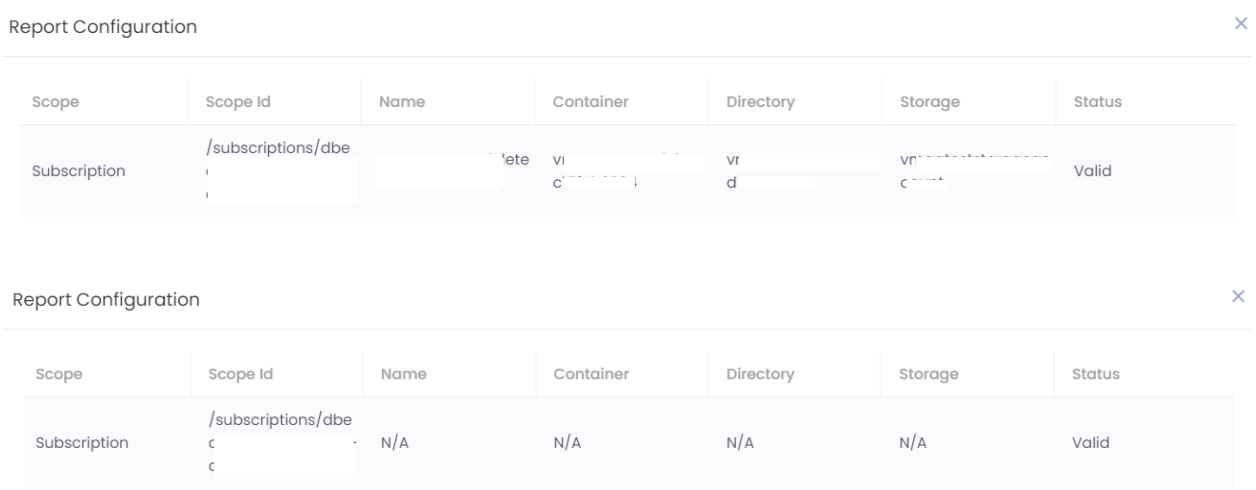
- **Select Group's Service Tag key**: Enter a valid tag key in the box. The entered tag key type can only be used while creating groups for this billing adapter. If you are changing an existing tag key with new one and the groups were created using the previous tag key, the tag key-value pairs will be removed from such groups and groups will contain only the sub-accounts.

13. Click **Submit** to create a billing adapter.

To see the created billing adapter, go to Azure adapter page and filter by adapter type as billing. A list of billing adapters will be displayed. To see the exports linked with a billing adapter, click **Configured** under the Report Configuration column.



Report configuration page will display all the linked exports with their details such as export name, container, directory, storage, and current status. If you had chosen Cost and Usage report API option as Cost Data Source under the export configuration tab while creating the billing adapter, then the export name, container, directory, and storage will be marked as N/A in the report configuration page.



Limitations

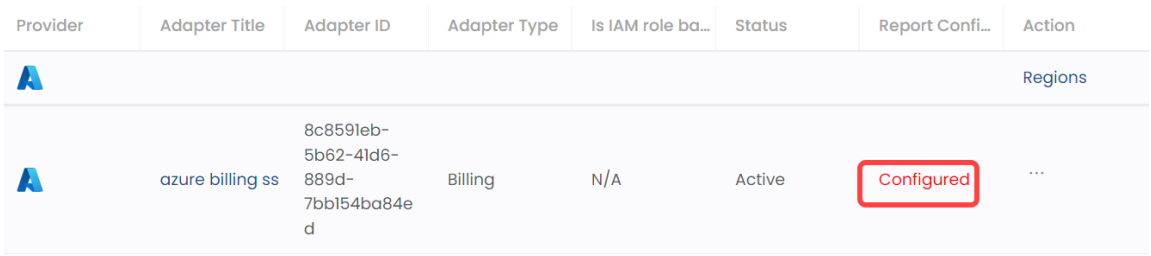
- When updating an existing Management Group scope adapter to modify an export without altering the management group, there will be no impact on your cost data for both previous and current months.
- When updating an existing Management Group scope adapter for modifying an export due to changes in management group, please note the following: Any changes in cost data will only affect the last and current month. Cost data from past months will remain unchanged. However, if the set invoice date for the last month has passed in the current month, the data for the last month will not be updated to reflect the new management group details.
- When converting an existing EA (Legacy) adapter to a Management Group scope adapter without adding the necessary role/permissions to the registered app will result in no changes to historical data or current month cost data. Also, future month data will not be processed.
- When changing an existing EA (Legacy) adapter to a Management Group scope adapter and assigning the required roles/permissions to the registered app, please note that there will be a change in your cost data for the current month only; past month's cost data will remain unchanged.
- When changing the scope from 'Billing Account' to 'Management Group', please note the following: Any changes in cost data will only affect the last and current month.

Cost data from past months will remain unchanged. However, if the set invoice date for the last month has passed in the current month, the data for the last month will not be updated to reflect the new management group details.

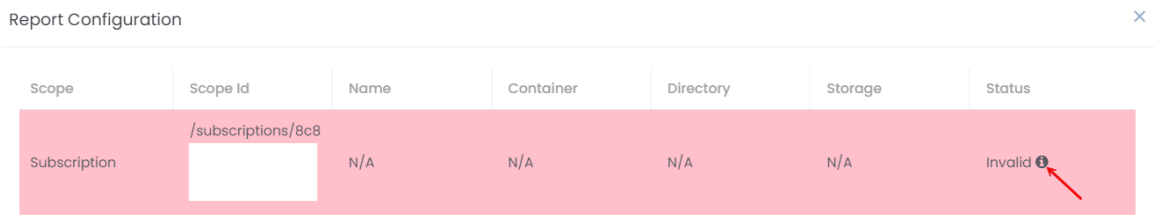
It may take up to 24 hours for the updated cost data to reflect in your CSMP account. You can manually reprocess your cost data from the past month using the report data reprocessing URL. See, Report Data Reprocessing.

Troubleshooting

1. After creating a billing adapter, if you see report configuration status as 'Configured' in red font, it denotes that some of or all the exports are having some issue and need your attention. Click Configured to see the status of exports.



Export with red highlight indicates an export in error. Hover over the info icon to see the detail.



2. Data from the recently added export is not fetched completely. Ensure that you have added new export after the data from existing exports have been fetched completely. You must delete the recently added export from the adapter and try to add after one hour.

Outcomes

The Consolidated Billing and Normal Adapters for Azure Management Group is ready.

4.2.2.9. Create a Normal Adapter for Azure Management Group

Learn how to create and set up a Normal Adapter for Azure management group account in CloudBolt CSMP.

Introduction

A Normal Adapter is a must to manage the resources related to your Azure accounts. Normal Adapter produce service advice to identify the unused services, and displays potential savings. Security and Compliance Adviser and Event Scheduler also use Normal Adapters.

Prerequisites

Complete the following tasks before setting up an Azure Normal Adapter to get the Client ID, Secret Key and Tenant ID for your subscriptions.

1. Register an Application in Azure Management Group Account
2. Create Management Groups in Azure
3. Create a Custom Role for Azure Management Group
4. Assign Roles to your Registered App in Azure Management Group Account
5. Provide Access for Reservations in Azure Management Group Account
6. Register Resource Providers to Subscription in Azure Management Group Account

Create an Azure Normal Adapter

There are two ways to set up an Azure Normal Adapter:

Option 1: A Normal Adapter can be created along with the Consolidated Billing Adapter. See, Create a Consolidated Billing Adapter for Azure Management Group.

Option 2: Create a Normal Adapter on its own. These instructions will cover Option 2.

You will need the Client ID, Secret Key, and Tenant ID from your subscription for which you want to create a normal adapter.

Create the Azure Normal Adapter

1. Log in to CloudBolt Cost and Security Management.
2. Click the **Quick Action icon > Adapters & Integration**.
3. Click **Add Cloud** Adapter **> Azure**.
4. Fill out the Basic Details:
    - **Adapter Type:** Normal
    - **Azure Cloud:** Select the correct Azure cloud region for your account
    - **Name:** Create a Name for your Adapter.
5. Click the **Azure Account Details** tab.
6. Enter the **Client ID, Secret Key, and Tenant ID** collected from Register an Application and click **Validate.**
7. After the credentials are validated, click **Submit.**

Outcomes

Your Azure Normal Adapter is ready.

4.2.3. Set up and Create Adapters for Microsoft Customer Agreement (MCA) Account

Learn how to set up your Microsoft Customer Agreement (MCA) account and then create adapters in CloudBolt CSMP.

Quick Setup

1. Register an Application in Microsoft Customer Agreement (MCA) Account
2. Permissions Set up for Azure Billing Account
3. Provide Access for Reservations in Microsoft Customer Agreement (MCA) Account
4. Create an Azure Export for Microsoft Customer Agreement (MCA) Account
5. Create a Consolidated Billing Adapter for Microsoft Customer Agreement (MCA) Account
6. Create a Normal Adapter for Microsoft Customer Agreement (MCA) Account

4.2.3.1. Register an Application in Microsoft Customer Agreement (MCA) Account

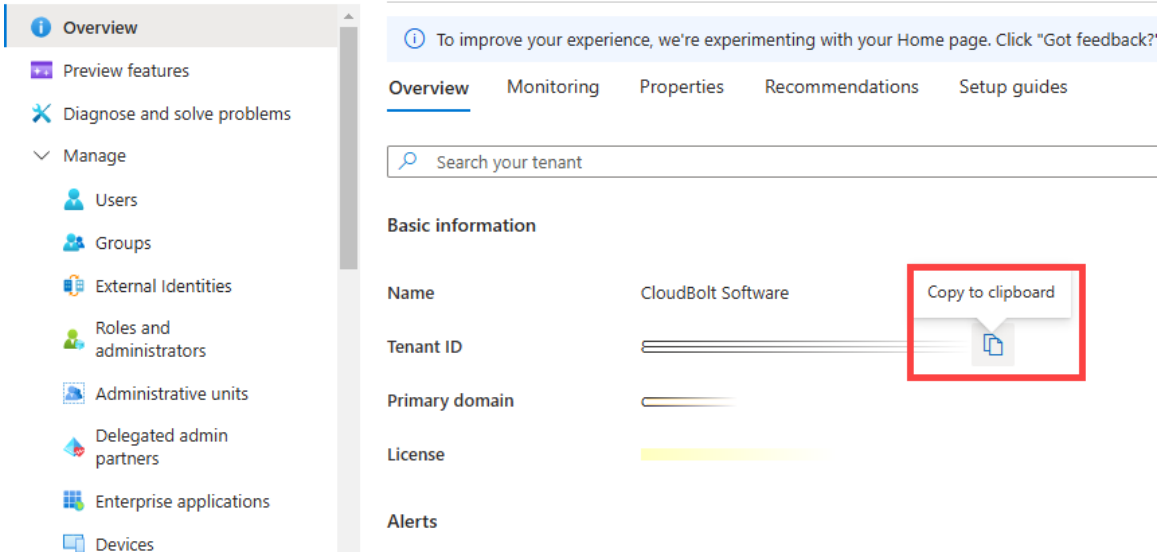
Learn to create an app registration in Microsoft Entra ID to serve as service principal.

Follow these steps to register an application in Azure.

Collect the Tenant ID

1. Log in to the Azure Management Portal using Admin credentials.
    - Azure Portal
    - Azure Portal for the US Government
    - Azure Portal for Germany
    - Azure Portal for China
2. Ensure that you are signed in to the correct tenant from which you want to retrieve the ID.
3. In the Azure services section, select **Microsoft Entra ID**. If it's not visible, use the search box to locate it.
4. On the **Overview** screen, find the **Tenant ID** under the **Basic information** section.

5. Copy the **Tenant ID** by selecting the **Copy to clipboard icon** next to it. You can then paste this value into a text document or another location for later use.



Register a New Application

1. In the Manage section of Microsoft Entra ID, click **App Registrations > New Registration**.
    a. Enter a Name for your application.
    b. Under **Support Account Types**, leave the default settings.
    c. For User **Redirect URI**, leave the default dropdown settings.
    d. Click **Register**.
2. Copy the Application ID after successful registration. This is your **Client ID**.

Manage Certificates and Secrets

1. From the App Registration, locate **Manage > Certificates & secrets**.
2. Under Client Secrets, click **New client secret**.
3. Add a Description for the secret and select an expiration time frame.
4. Click **Add**.

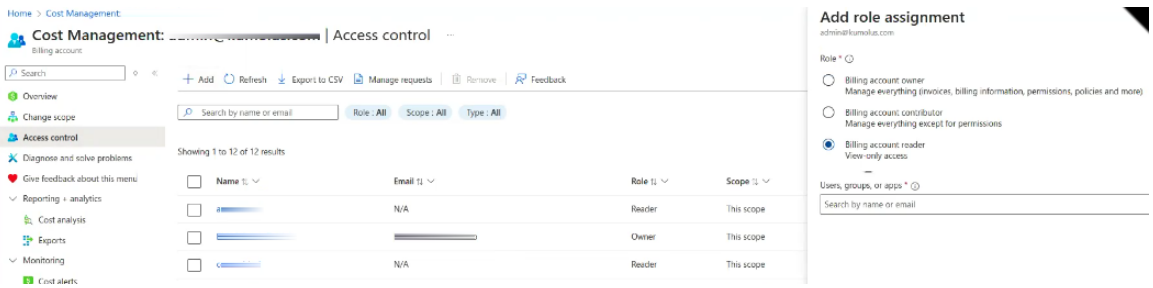
Important: Copy the Client Secret and **save it immediately, you will not be able to view it again**. This is your **Secret Key**.

4.2.3.2. Permissions Set up for Azure Billing Account

Learn how to set up permissions for your Azure Billing Account.

Add an IAM Role

1. In your Azure account, navigate to **Cost Management**.
2. Click **Change scope** from the left-hand menu.Select the Billing Account for which you will add the Role.
3. In the left-hand menu, click **Access Control**.
4. Click **Add** at the top of the table. A form will open on the right side.
5. Select a Role (Billing account reader / Billing account contributor) in the **Role field.**
6. In the **Users, groups, or apps** dropdown, find the application you registered during Register an Application in Microsoft Customer Agreement (MCA) Account.



7. Select the app and click **Add**.

Next Steps

Configure an Azure Export for MCA Account.

4.2.3.3. Provide Access for Reservations in Microsoft Customer Agreement (MCA) Account

Learn to grant access to your Azure reservations.

Using Azure console

1. Log in to the Azure portal using admin credentials.
2. Go to **Reservations**.
3. Select a reservation and then click on **Reservation order ID**.
4. Select Access Control (IAM) and click **+ Add**.
5. Add **Reservation Reader** role under the role tab of the Add role assignment window.
6. Go to **Members** tab and click **Select members**.
7. Select the registered app name in the **Select members** field and click **Review + assign**.
8. Repeat steps 1 thru 7 for each reservation order ID.

Using Azure Cloud Shell editor

1. Copy the **Application (Client) ID** of the newly registered application.
2. Click the **Cloud Shell** icon in the top navigation of the Azure portal to launch the Cloud Shell terminal.



3. Ensure that you are using a Bash session for the command.
    a. Use the environment selector in the Cloud Shell toolbar to switch between Bash and PowerShell environments. If Cloud Shell is configured to start in PowerShell, the button will be labelled **Switch to Bash**.



b. If Cloud Shell is configured to start in Bash, the button will be labelled **Switch to PowerShell**.



4. Use the following command to grant Reader access to all reservations available in your Azure account/subscription:

Bash (Unix Shell)

```
az role assignment create --assignee <Application (Client) ID> --role "Reservations Reader" --scope "/providers/Microsoft.Capacity"
```

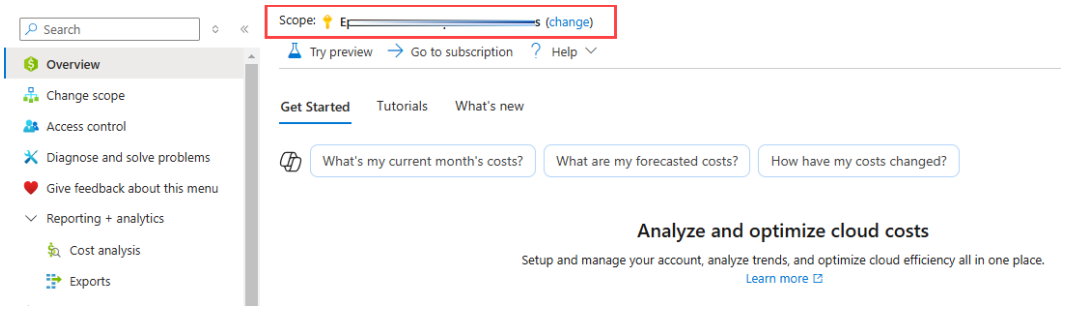
Replace '**<Application (Client) ID>**' with the actual Application (Client) ID of the newly registered application.

4.2.3.4. Create an Azure Export for Microsoft Customer Agreement (MCA) Account

Learn how to create an Azure Export for Microsoft Customer Agreement Billing Accounts.

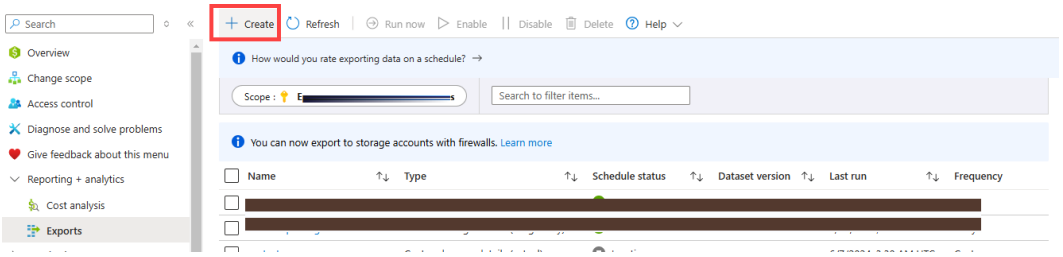
Create an Export in Azure

1. **Log in to the Azure Portal**
    - Visit Azure Portal and sign in with your Azure credentials.
2. **Access Cost Management**
    - In the **Azure services** section, select **Cost Management**. If it's not visible, use the search box at the top of the page to search for it and select it.
3. **Select Your Billing Scope**
    - Choose the billing account under which you want to create the export. This will be the billing scope for your export.

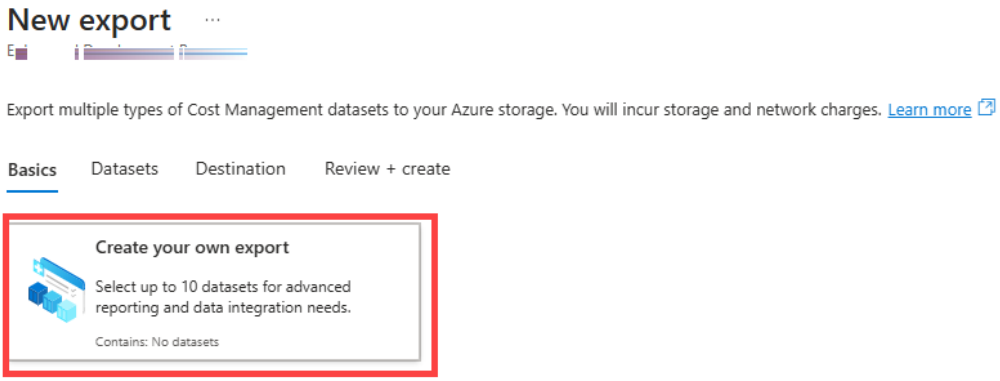


4. **Navigate to Exports**
    - In the left-hand navigation menu, select **Exports** to open the page where you can manage and configure your cost exports.
5. **Create a New Export**

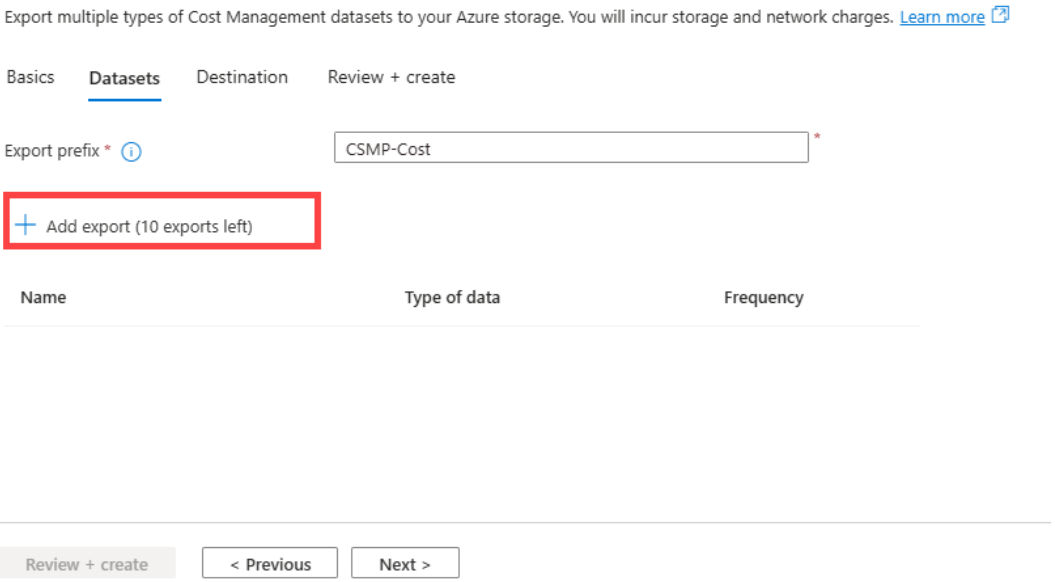
- On the **Exports** page, click on the **+ Create** button at the top of the page to begin the export creation process.



6. **Choose Export Type**
   - In the **Basics** tab, select **Create your own export**.



7. **Customise Export Name**
   - On the **Datasets** tab, enter a common export prefix in the **Export prefix** field. This will help you identify the export later. Once done, click **+ Add export**.

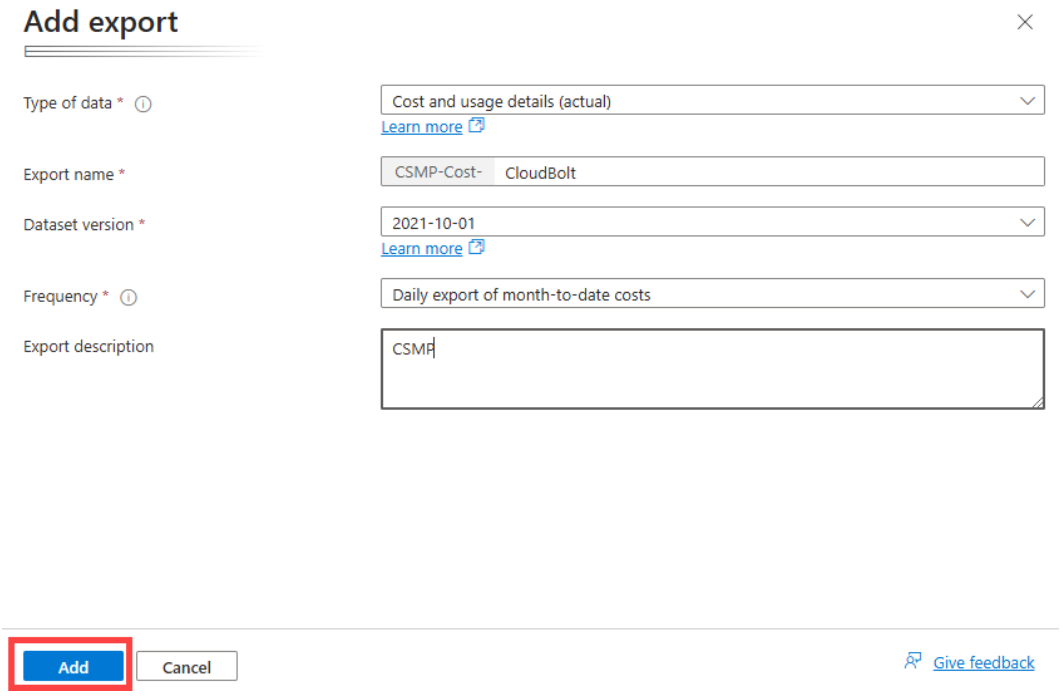


8. **Configure Export Details**

- In the **Add export** panel, fill in the following fields:

Field Name	Description
Type of data	Select **Cost and usage details (actual)**
Export name	Enter a name for your export
Dataset version	Select **2021-10-01**
Frequency	Select **Daily export of month-to-date costs**
Export description	Optionally, provide a description of the export

- After completing the fields, click **Add** to add the export to the Datasets tab.

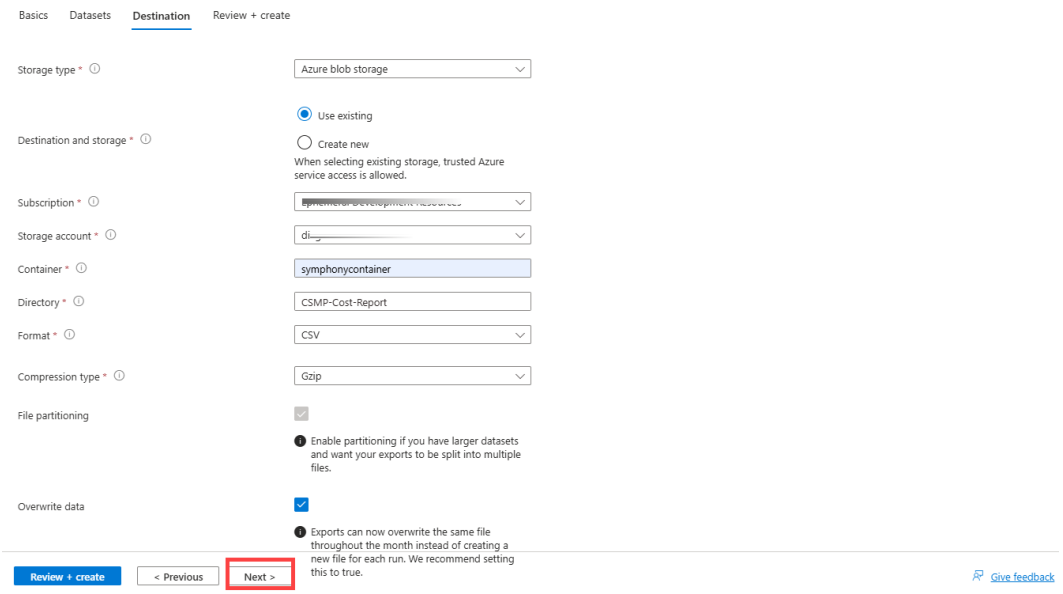


9. **Add More Exports (Optional)**
   - If you need to create additional exports, click **+ Add export**. You can create up to 10 exports.
10. **Configure the Destination**
    - Click **Next** to proceed to the **Destination** tab. Complete the following fields to configure where the export data will be stored:

Field Name	Description
Storage type	Select **Azure Blob Storage**
Destination and storage	Choose **Use existing** to use an existing storage account
Subscription	Select the subscription of your storage account
Storage account	Choose the storage account where the data will be exported

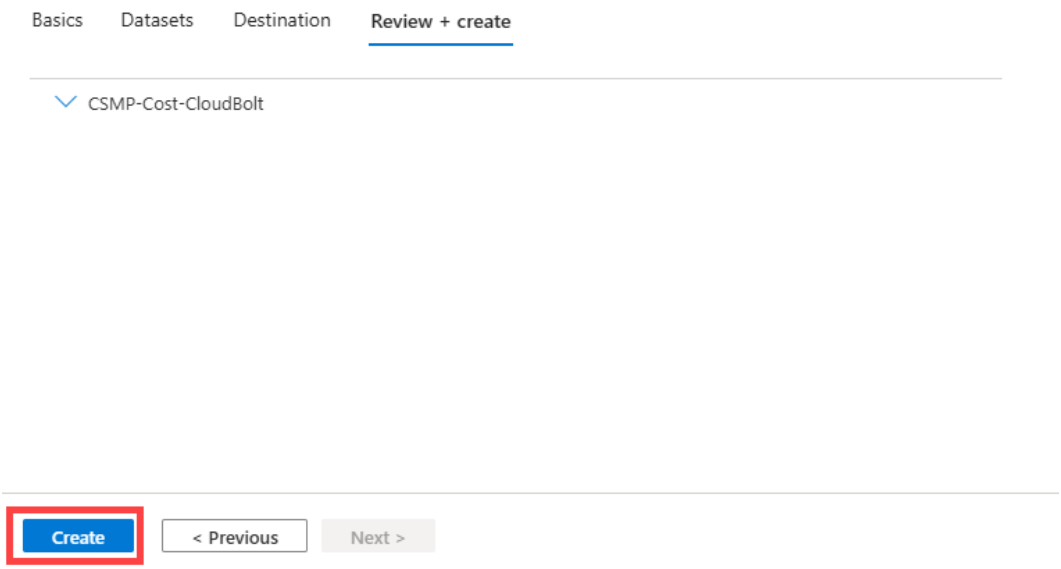
Field Name	Description
Container	Enter the container name where the report should be stored
Directory	Specify the directory path where the export should be saved
Format	Choose **CSV** or **Parquet** for the export file format
Compression type	Choose None, Gzip for CSV file format, or Snappy for the parquet file format.
File partitioning	Enabled by default (splits large files into smaller ones)
Overwrite data	Enabled by default (overwrites the previous day's file)

- After completing the fields, Click **Next** to move to the **Review + create** tab.



11. **Review Your Configuration**
    - On the **Review + Create** tab, review all the details you've configured. Ensure everything is correct and make any necessary adjustments.
12. **Create the Export**

- When you're satisfied with your settings, click **Create** to complete the process. Your Azure cost export will now be created and ready for use.



Next Steps

Configure an Azure Consolidated Billing Adapter for MCA Account.

4.2.3.5. Create a Consolidated Billing Adapter for Microsoft Customer Agreement (MCA) Account

Learn how to create a Consolidated Billing Adapter for MCA.

Prerequisites

Complete the following tasks before setting up this Azure Adapter:

1. Register an Application in Microsoft Customer Agreement (MCA) Account
2. Permissions Set up for Azure Billing Account
3. Provide Access for Reservations in Microsoft Customer Agreement (MCA) Account
4. Create an Azure Export for Microsoft Customer Agreement (MCA) Account

Create the Azure MCA Consolidated Billing Adapter

1. Log in to CloudBolt Cost and Security Management.
2. Click the **Quick Action icon >** Adapters **& Integration**.
3. Click **Add Cloud Adapter > Azure**.
4. Fill out the Basic Details:
    - Adapter **Type:** Consolidated Billing
    - **Collect Billing Data From:** Billing Account/Management Group/Subscription Scope
    - **Azure Cloud:** Select the correct Azure cloud region for your account.
    - **Name:** Create a Name for your Adapter.
5. Click the **Azure Account Details** tab.
    a. Enter the Client ID, Secret Key, and Tenant ID collected from Register an Application in Microsoft Customer Agreement (MCA) Account.
    b. Click **Validate.**
6. After the credentials are validated, click **Next.**

(Optional) Create Normal Adapters for all Subscriptions under the MCA Account

The **Azure AD** tab provides the option to create Normal Adapters for all your subscriptions under the Azure MCA account. Select *Yes* or *No* for "Do you want to automatically setup the adapters in CloudBolt using subscriptions available in your tenants?"

- *Yes* creates Normal Adapters for all the subscriptions within the Azure MCA account.
- *No* creates 'Not Configured' state Normal Adapters for all the subscriptions within the Azure MCA account.

If you have clicked *No* for auto normal adapter creation and later you updated the billing adapter to set the option as *Yes*, the previously *not configured* normal adapters will turn to *active* by default. Whenever a new subscription is created under the Azure MCA account, a Normal Adapter will be created automatically with a status based on your option selection for "Do you want to automatically setup the adapters in CloudBolt using subscriptions available in your tenants?" The auto created normal adapters are named as per the subscription name.

If your Azure account includes multiple tenants and you want to create normal adapters for all subscriptions across these tenants, you need to follow a specific process. First, when prompted with the question, "Do you have more tenants in your Azure Account?", make sure to select **Yes**. This indicates that you will be providing additional tenant information.

Next, you will need to enter the credentials for each additional tenant. Specifically, you will input the **Client ID**, **Secret Key**, and **Tenant ID** for each tenant that is different from the credentials already entered in the Azure Account Details tab. Once you have filled in these fields, click on **Verify & Add** to proceed.

It is important to note that this option will only be visible if your CSMP account is enabled for the **azuress_support_additional_azure_tenants_for_normal_adapter** feature. Therefore, ensure that your account has the necessary permissions before attempting to add more tenants.

Additionally, before entering the credentials, make sure you have completed all prerequisite steps for each tenant you wish to add.

Export Configuration

Fill out the **Export Configuration** details using any one option for the **Cost Data Source**.

Export	• **Scope:** Choose **Billing Account.** • **Billing Account:** Select your account from the dropdown. • Click **Next**. You can add up to 50 exports for the same or different billing accounts. To add another export, click adjacent to the Billing Account drop-down list, and fill the data as required. To remove an export, click adjacent to the Billing Account drop-down list.
Cost and Usage report API	• **Scope:** Select Billing Account • **Billing Account:** Select a billing account whose cost data you want to fetch using the API. You must add all the billing account whose billing data you wish to be displayed in your CloudBolt CSMP account. To add another billing account, click adjacent to the Billing Account drop-down box, and select the billing account. To remove a billing account, click adjacent to the **Billing Account** drop-down box. You can add up to 50 billing accounts.

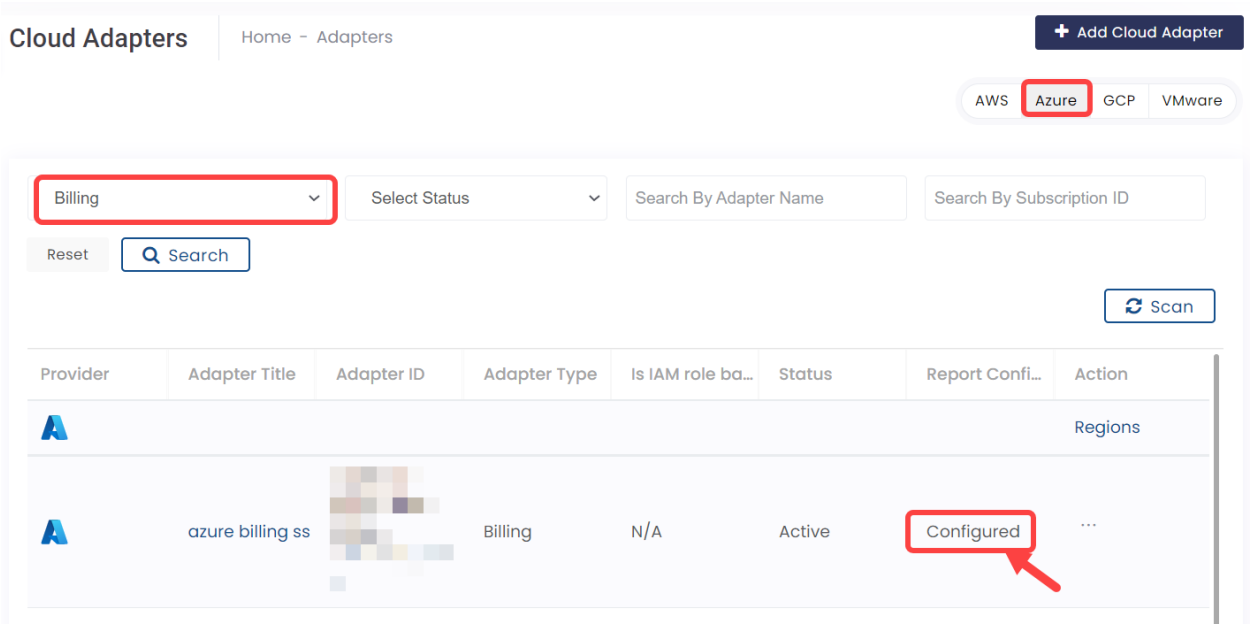
Other Configuration

- **Do you want to enable Invoice Date?**: Here you can set an invoice date for this billing adapter. Invoice date is a date on which you will generate invoices in CloudBolt CSMP account to post them to your customers, resellers, or both. Once the current month's date has passed, the CloudBolt CSMP billing adapter will not access your cloud provider databases to get the cloud costs changes for the previous months. However, the billing adapter will continue fetching the current month's cost data. By default, invoice date feature would be disabled. To enable, you must select Yes for "Do you want to enable Invoice Date?" Select an invoice date from the drop-down for invoice date. Default invoice date is set to 10.
- **Select Group's Service Tag key**: Enter a valid tag key in the box. The entered tag key type can only be used while creating groups for this billing adapter. If you are

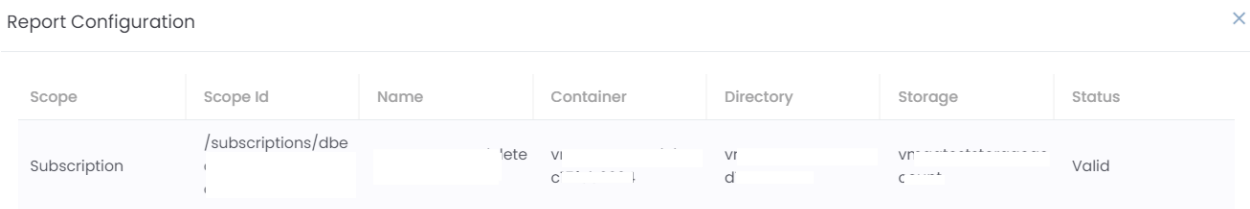
changing an existing tag key with new one and the groups were created using the previous tag key, the tag key-value pairs will be removed from such groups and groups will contain only the sub-accounts.

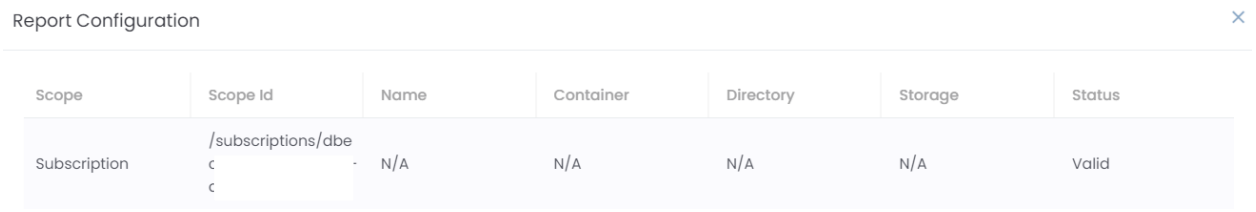
Click **Submit** to create the billing adapter.

To see the created billing adapter, go to Azure adapter page and filter by adapter type as billing. A list of billing adapters will be displayed. To see the exports linked with a billing adapter, click **Configured** under the Report Configuration column.



Report configuration page will display all the linked exports with their details such as export name, container, directory, storage, and current status. If you had chosen Cost and Usage report API option as Cost Data Source under the export configuration tab while creating the billing adapter, then the export name, container, directory, and storage will be marked as N/A in the report configuration page.




Report Configuration

Scope	Scope Id	Name	Container	Directory	Storage	Status
Subscription	/subscriptions/dbe c c	N/A	N/A	N/A	N/A	Valid

Limitations

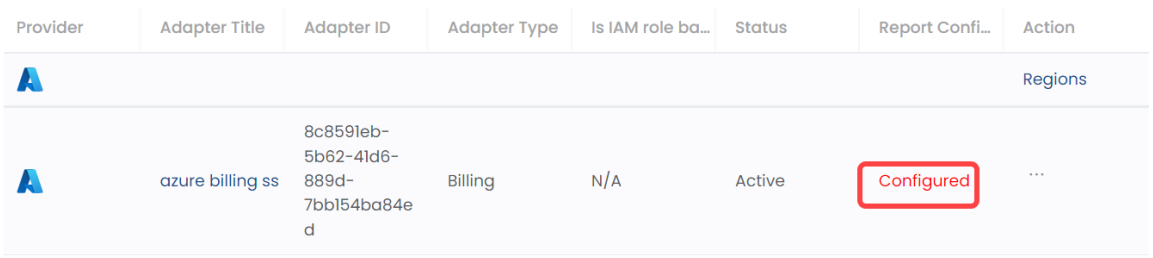
- When updating an existing Billing scope adapter to modify an export without altering the billing account, there will be no impact on your cost data for both previous and current months.
- When updating an existing Billing scope adapter for modifying an export due to changes in billing account, please note the following: Any changes in cost data will only affect the last and current month. Cost data from past months will remain unchanged. However, if the set invoice date for the last month has passed in the current month, the data for the last month will not be updated to reflect the new billing account details.
- When updating an existing Billing scope adapter with the 'cost and usage report API' without modifying the billing account, no changes will be reflected in your cost data for both past and current months.
- When updating an existing Billing scope adapter using the 'cost and usage report API' with a change in the billing account, please note the following: Any changes in cost data will only affect the last and current month. Cost data from past months will remain unchanged. However, if the set invoice date for the last month has passed in the current month, the data for the last month will not be updated to reflect the new billing account details.
- When updating an existing Billing scope adapter to switch the Cost Data Source between 'export' and 'cost and usage report API' without changing the billing account, please note that there will be no impact on your cost data for both past and current months.

- When updating an existing Billing scope adapter to switch the Cost Data Source between 'export' and 'cost and usage report API' due to a change in the billing account, please note the following: Any changes in cost data will only affect the last and current month. Cost data from past months will remain unchanged. However, if the set invoice date for the last month has passed in the current month, the data for the last month will not be updated to reflect the new billing account details.
- When converting an existing EA (Legacy) adapter to a Billing scope adapter with the Cost Data Source set to 'cost and usage report API' without adding the necessary role/permissions to the registered app will result in no changes to historical data or current month cost data. Also, future month data will not be processed.
- When changing an existing EA (Legacy) adapter to a Billing scope adapter with Cost Data Source set to 'export' or 'cost and usage report API' and assigning the required role/permissions to the registered app, please note that there will be a change in your cost data for the current month only; past month's cost data will remain unchanged.
- When changing the scope from 'Subscription' to 'Billing Account', please note the following: Any changes in cost data will only affect the last and current month. Cost data from past months will remain unchanged. However, if the set invoice date for the last month has passed in the current month, the data for the last month will not be updated to reflect the new billing account details.

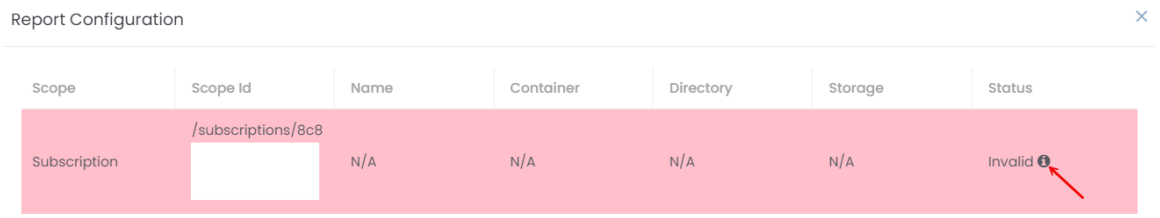
It may take up to 24 hours for the updated cost data to reflect in your CSMP account. You can manually reprocess your cost data from the past month using the report data reprocessing URL. See, Report Data Reprocessing.

Troubleshooting

1. After creating a billing adapter, if you see report configuration status as 'Configured' in red font, it denotes that some of or all the exports are having some issue and need your attention. Click Configured to see the status of exports.



Export with red highlight indicates an export in error. Hover over the info icon to see the detail.



2. Data from the recently added export is not fetched completely. Ensure that you have added new export after the data from existing exports have been fetched completely. You must delete the recently added export from the adapter and try to add after one hour.

Outcomes

The Consolidated Billing and Normal Adapters for Azure MCA Account are ready.

4.2.3.6. Create a Normal Adapter for Microsoft Customer Agreement (MCA) Account

Learn how to create and set up a Normal Adapter for Azure management group account in CloudBolt CSMP.

Introduction

A Normal Adapter is a must to manage the resources related to your Azure accounts. Normal Adapter produce service advice to identify the unused services, and displays potential savings. Security and Compliance Adviser and Event Scheduler also use Normal Adapters.

Prerequisites

Complete the following tasks before setting up an Azure Normal Adapter to get the Client ID, Secret Key and Tenant ID for your subscriptions.

1. Register an Application in Microsoft Customer Agreement (MCA) Account
2. Permissions Set up for Azure Billing Account
3. Provide Access for Reservations in Microsoft Customer Agreement (MCA) Account

Create an Azure Normal Adapter

There are two ways to set up an Azure Normal Adapter:

Option 1: A Normal Adapter can be created along with the Consolidated Billing Adapter. See, Create a Consolidated Billing Adapter for Microsoft Customer Agreement (MCA) Account.

Option 2: Create a Normal Adapter on its own. These instructions will cover Option 2.

You will need the Client ID, Secret Key, and Tenant ID from your subscription for which you want to create a normal adapter.

Create the Azure Normal Adapter

1. Log in to CloudBolt Cost and Security Management.
2. Click the **Quick Action icon > Adapters & Integration**.
3. Click **Add Cloud** Adapter **> Azure**.
4. Fill out the Basic Details:
    - **Adapter Type:** Normal
    - **Azure Cloud:** Select the correct Azure cloud region for your account
    - **Name:** Create a Name for your Adapter.
5. Click the **Azure Account Details** tab.
6. Enter the **Client ID, Secret Key, and Tenant ID** collected from Register an Application and click **Validate.**
7. After the credentials are validated, click **Submit.**

Outcomes

Your Azure Normal Adapter is ready.

4.2.4. Set up and Create Adapters for Enterprise Agreement (EA) Account

Learn how to set up your Enterprise Agreement (EA) account and then create adapters in CloudBolt CSMP.

Quick Setup

1. Create a Consolidated Billing Adapter for Azure EA Account (Modern Commerce)

4.2.4.1. Create a Consolidated Billing Adapter for Azure EA Account (Modern Commerce)

Learn how to set up an Enterprise Agreement (EA) Account (modern commerce) in Azure Enterprise and then create a Consolidated Billing adapter needed to connect Azure Enterprise Agreement (Modern Commerce) billing data to the CloudBolt CSMP.

Important:

Azure will deprecate EA APIs starting May 1, 2024. Therefore, all new CSMP users must follow this article to create new billing adapters for their Azure EA accounts. Existing CSMP users will also need to follow this article to upgrade their current EA billing adapters.

- Introduction
- Create App Registration in Microsoft Entra ID
- Add Billing Access Permission to Your Registered App
- Provide Access for Reservations
- Using Azure console
- Using Azure Cloud Shell editor
- Assign a Role to the Registered App
- Create an Azure Export for the Billing Scope
- Create Azure EA (Modern Commerce) Billing Adapter in CloudBolt CSMP
- Basic Details
- Azure Account Details
- Export Configuration
- Other Configuration
- Limitations
- Outcomes

Introduction

Exports are used by CloudBolt CSMP to provide you a precise picture of your cloud expenses for all of your services and subscriptions. The CloudBolt CSMP billing adapters use this export data, which is also made accessible for pre-built and ad-hoc analytics. Certain configuration procedures need to be carried out with particular data and credentials exchanged with CloudBolt CSMP in order to obtain the cost information.

This article describes the configuration, input information needed, and procedures to create Azure Enterprise Agreement (Modern Commerce) billing adapter in CloudBolt CSMP.

The following steps must be completed to connect your Azure Enterprise Agreement (Modern Commerce) billing data to CloudBolt CSMP via a billing adapter:

1. Create App Registration in Microsoft Entra ID
2. Add Billing Access Permission to Your Registered App
3. Provide Access for Reservations
4. Add Subscriptions Access Permission to Your Registered App
5. Create an Azure Export for the Billing Scope
6. Create Azure EA Account (Modern Commerce) Billing Adapter in CloudBolt CSMP

Create App Registration in Microsoft Entra ID

Use this procedure to create an app registration in Microsoft Entra ID to serve as service principal for the billing adapter to transfer cost information into CloudBolt CSMP.

1. Sign in to the Azure portal with your Azure EA account.
2. From the left-hand menu, select **Microsoft Entra ID**.
3. Select Properties from the list.
    a. Copy and save the **Tenant ID**.
4. In the **Manage** section of the left-hand menu, click **App registrations**.
    a. Click **New Registration**.
    b. Enter a **Name** for your application.

c. Under **Supported account types**, leave the default settings.

d. Under **Redirect URI**, leave the default settings.

e. Click **Register**.

5. After successful registration, copy the **Application ID**. This is your **Client ID**.
6. Copy the **Object ID**. This is your **service principal ID for adding billing access permission**.
7. In the **Manage** section, click **Certificates & secrets**.
    a. Under **Client secrets**, click **New client secret**.
    b. Enter a Name for the client secret and select an expiration.
    c. Click **Add**.

    Important:

    Copy the client secret and save it immediately, as you will not be able to view it again. This is your Secret Key.

Add Billing Access Permission to Your Registered App

Use this procedure to add EnrollmentReader role to your app registration created in previous section. It is necessary to has access to read cost information.

1. Go to Role Assignments - Put REST API article. Select **Try it** to get started by using the service principal.
2. Sign in with your Azure EA account credentials.
3. Provide the following parameters as part of the API request:
    a. billingAccountName: This parameter is the **Billing account ID**.
    b. billingRoleAssignmentName: This parameter is a unique GUID that you need to provide. You can generate a GUID using the New-Guid PowerShell command. You can also use the Online GUID / UUID Generator website to generate a unique GUID.
    c. api-version: Use the **2019-10-01-preview** version.
    The request body has JSON code with three parameters that you need to use.

Parameter	Where can you f
properties.principalId	It is the value of **Object ID**.
properties.principalTenantId	It is the value of **Tenant ID**.
properties.roleDefinitionId	/providers/Microsoft.Billing/billingAccounts/{BillingAcc -1668-4659-b5e2-40bb5f3a7d7e

The billing account name is the same parameter that you used in the API parameters, i.e., the **Billing account ID**. 24f8edb6-1668-4659-b5e2-40bb5f3a7d7e is a billing role definition ID for an EnrollmentReader role.

JSON

```
PUT
https://management.azure.com/providers/Microsoft.Billing/billingAccounts/{billingAccountName}/billingRoleAssignments/{billingRoleAssignmentName}?api-version=2019-10-01-preview

{
  "properties": {
    "principalId": "{object-id}",
    "principalTenantId": "{tenant-id}",
    "roleDefinitionId":
"/providers/Microsoft.Billing/billingAccounts/{BillingAccountName}/billingRoleDefinitions/24f8edb6-1668-4659-b5e2-40bb5f3a7d7e"
  }
}
```

4. Select **Run** to start the command.

   A 200 OK response shows that the service principal was successfully added.

Now you can use the service principal to automatically access EA APIs. The service principal has the EnrollmentReader role.

Provide Access for Reservations

Using Azure console

1. Log in to the Azure portal using admin credentials.
2. Go to **Reservations**.
3. Select a reservation and then click on **Reservation order ID**.
4. Select Access Control (IAM) and click **+ Add**.
5. Add **Reservation Reader** role under the role tab of the Add role assignment window.
6. Go to **Members** tab and click **Select members**.

7. Select the registered app name in the **Select members** field and click **Review + assign**.
8. Repeat steps 1 thru 7 for each reservation order ID.

Using Azure Cloud Shell editor

1. Copy the **Application (Client) ID** of the newly registered application.
2. Click the **Cloud Shell** icon in the top navigation of the Azure portal to launch the Cloud Shell terminal.



3. Ensure that you are using a Bash session for the command.
    a. Use the environment selector in the Cloud Shell toolbar to switch between Bash and PowerShell environments. If Cloud Shell is configured to start in PowerShell, the button will be labelled **Switch to Bash**.



    b. If Cloud Shell is configured to start in Bash, the button will be labelled **Switch to PowerShell**.



4. Use the following command to grant Reader access to all reservations available in your Azure account/subscription:

Bash (Unix Shell)

```
az role assignment create --assignee <Application (Client) ID> --role
"Reservations Reader" --scope "/providers/Microsoft.Capacity"
```

Replace '**<Application (Client) ID>**' with the actual Application (Client) ID of the newly registered application.

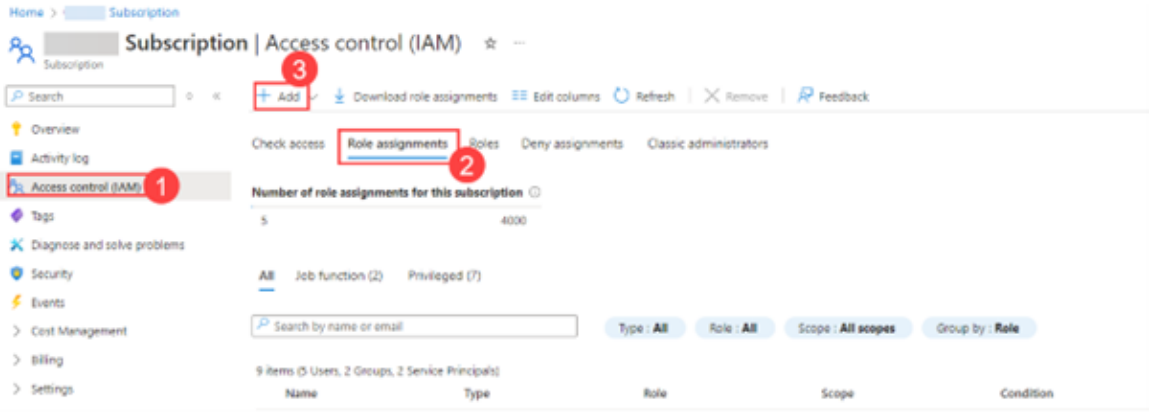
Assign a Role to the Registered App

Note: If you want to use programmatic Role assignment to registered app for all subscriptions instead of a specific subscription, then please follow Programmatic Role assignment to registered app for all Subscriptions instead of the below steps.

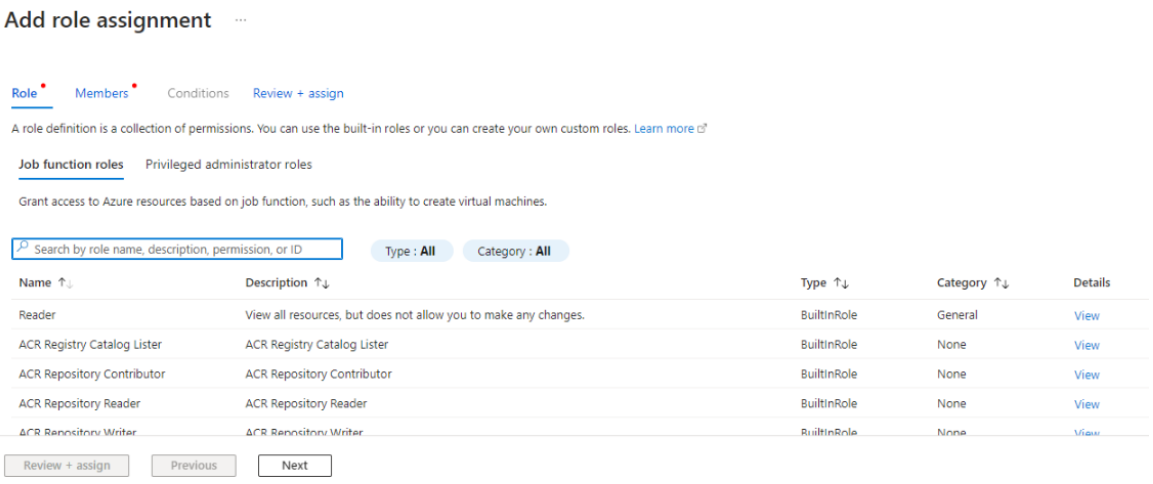
Prerequisite: Follow the steps to Create a Custom Role in Azure EA Account.

1. In the Azure portal, navigate to **Subscriptions**.

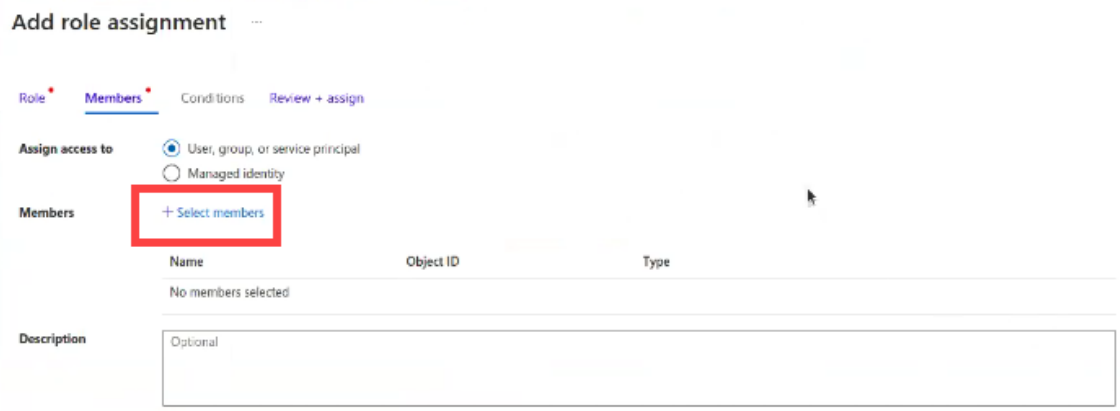
2. Select the subscription where the custom roles were created.
3. In the subscription's menu, go to **Access control (IAM)**.
4. Click **+ Add**, then select **Add role assignment**.



5. In the **Role** tab, search for and select the custom role you created.



6. In the **Members** tab, under the **Assign access to** option, select **User, group, or service principal**.
7. In the **Select members** field, click **+ Select members** to search for and select the previously registered application.



8. Go to **Review + assign** tab and then click **Review + assign** button at the bottom to complete the role assignment.

Follow the steps above for all subscriptions.

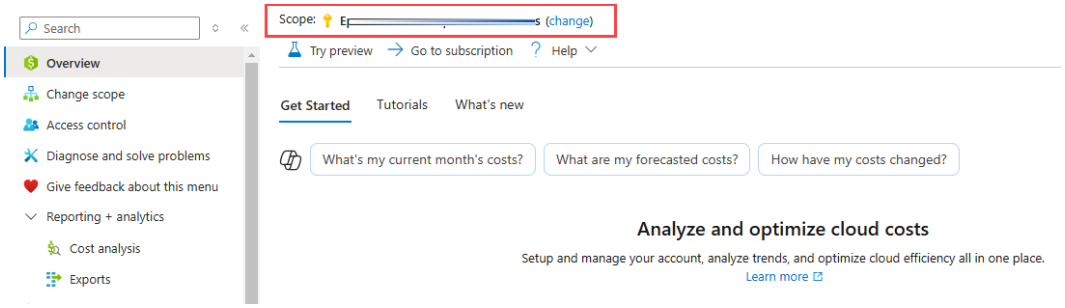
Create an Azure Export for the Billing Scope

If you do not wish to create an export, alternatively you can use cost and usage report API to ingest the cost data in CloudBolt CSMP.

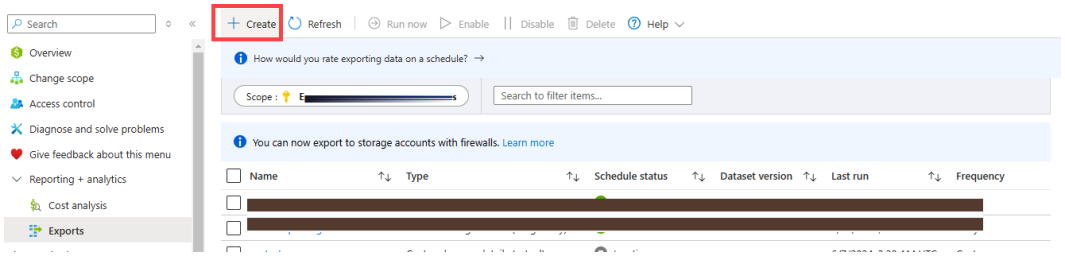
Use this procedure to create automatic exports of all your cost management data to Azure storage which will be further ingested by billing adapters to show you a custom cost data in CloudBolt CSMP.

1. **Log in to the Azure Portal**
    - Visit Azure Portal and sign in with your Azure credentials.
2. **Access Cost Management**
    - In the **Azure services** section, select **Cost Management**. If it's not visible, use the search box at the top of the page to search for it and select it.
3. **Select Your Billing Scope**

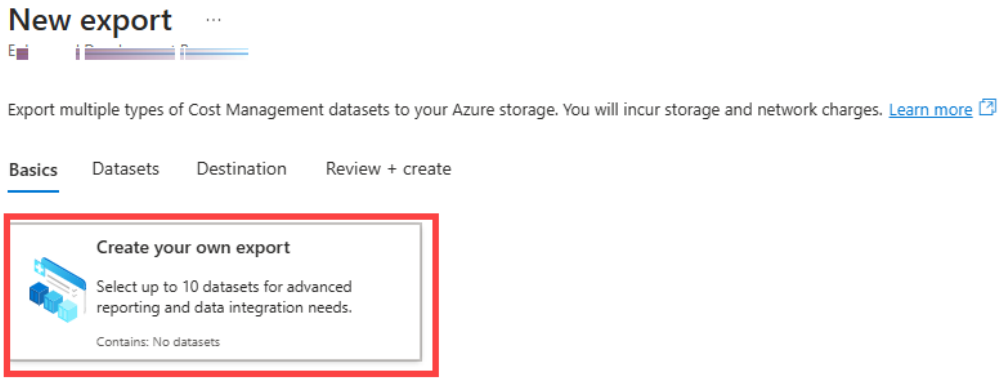
- Choose the billing account under which you want to create the export. This will be the billing scope for your export.



4. **Navigate to Exports**
   - In the left-hand navigation menu, select **Exports** to open the page where you can manage and configure your cost exports.
5. **Create a New Export**
   - On the **Exports** page, click on the **+ Create** button at the top of the page to begin the export creation process.

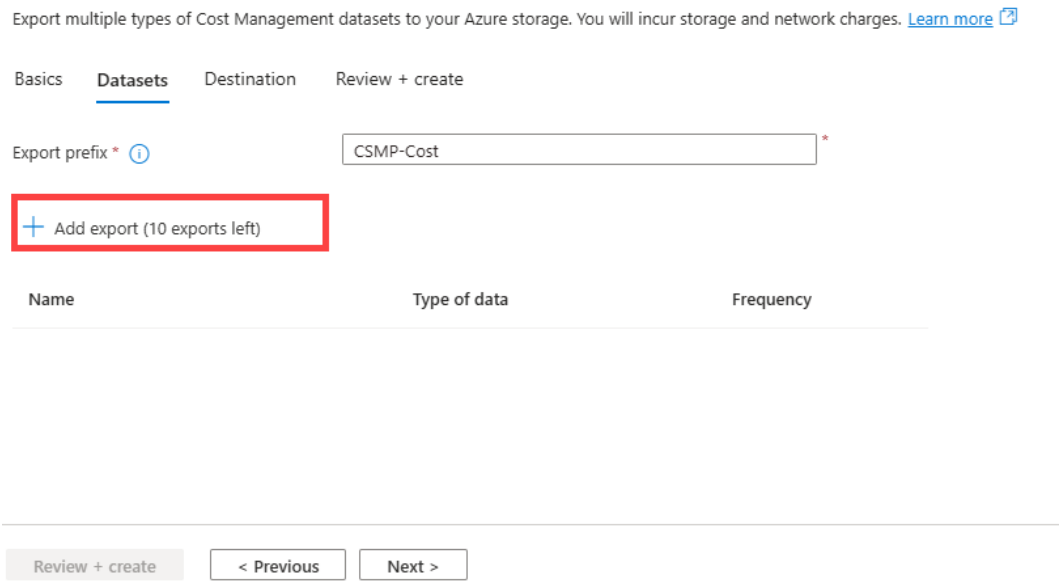


6. **Choose Export Type**
   - In the **Basics** tab, select **Create your own export**.



7. **Customise Export Name**

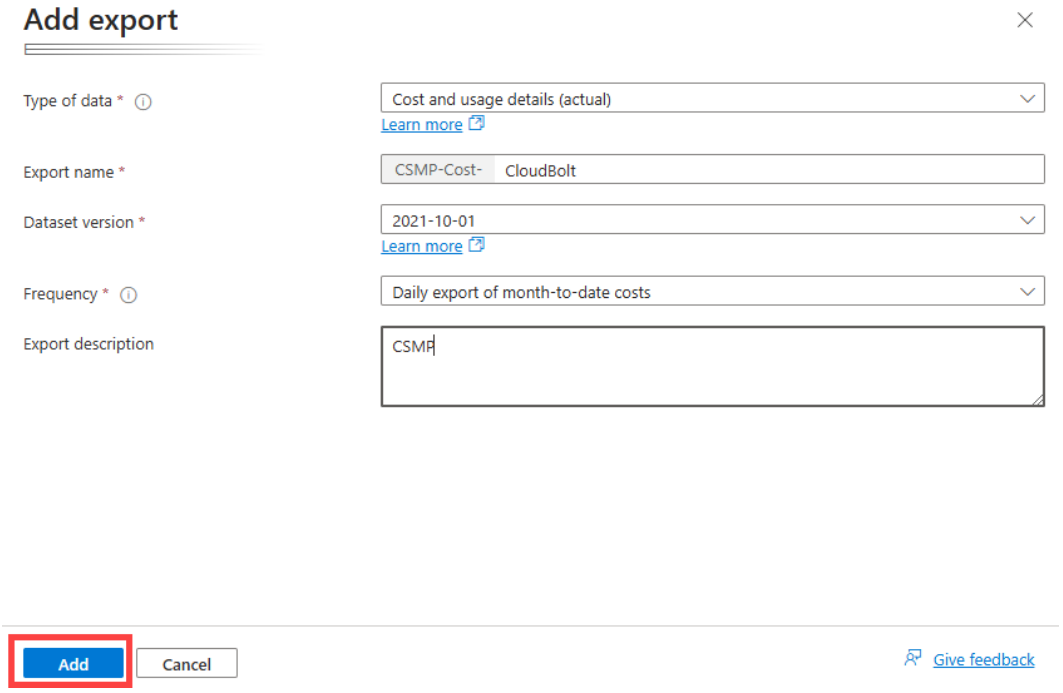
- On the **Datasets** tab, enter a common export prefix in the **Export prefix** field. This will help you identify the export later. Once done, click **+ Add export**.



8. **Configure Export Details**
   - In the **Add export** panel, fill in the following fields:

Field Name	Description
Type of data	Select **Cost and usage details (actual)**
Export name	Enter a name for your export
Dataset version	Select **2021-10-01**
Frequency	Select **Daily export of month-to-date costs**
Export description	Optionally, provide a description of the export

- After completing the fields, click **Add** to add the export to the Datasets tab.

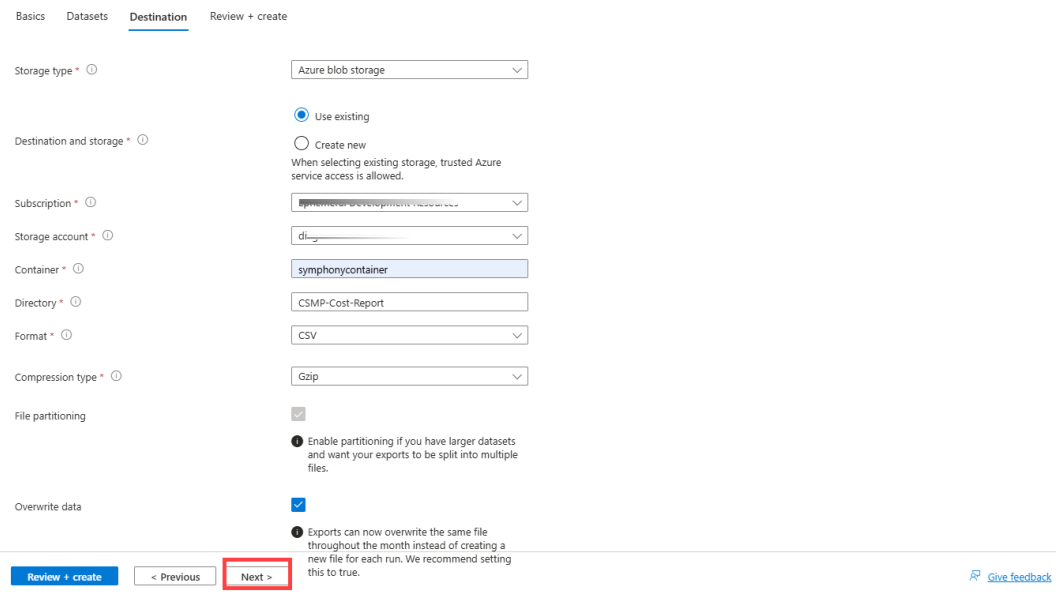


9. **Add More Exports (Optional)**
   - If you need to create additional exports, click **+ Add export**. You can create up to 10 exports.
10. **Configure the Destination**
    - Click **Next** to proceed to the **Destination** tab. Complete the following fields to configure where the export data will be stored:

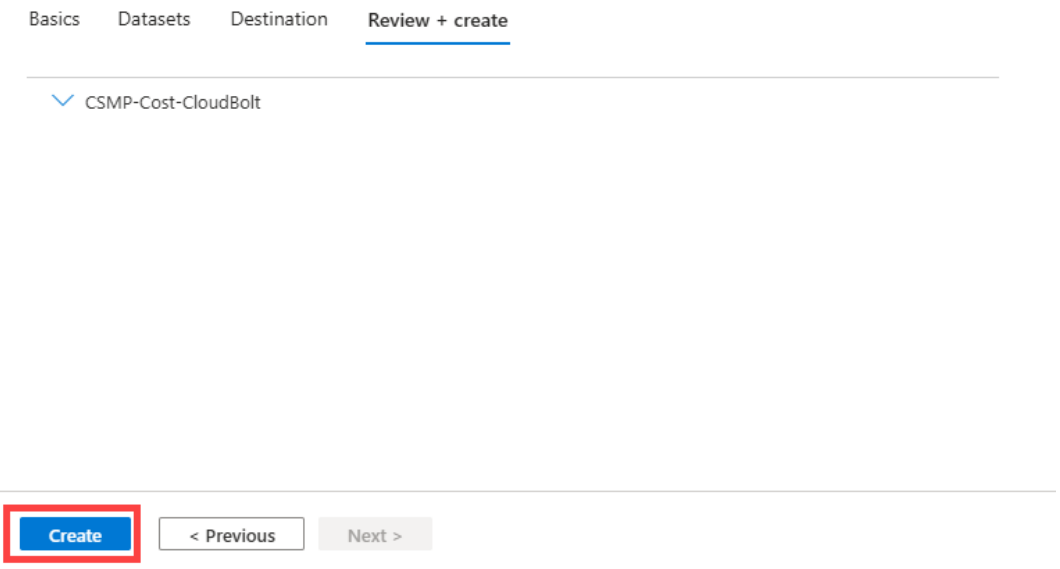
Field Name	Description
Storage type	Select **Azure Blob Storage**
Destination and storage	Choose **Use existing** to use an existing storage account
Subscription	Select the subscription of your storage account
Storage account	Choose the storage account where the data will be exported
Container	Enter the container name where the report should be stored
Directory	Specify the directory path where the export should be saved
Format	Choose **CSV** or **Parquet** for the export file format
Compression type	Choose None, Gzip for CSV file format, or Snappy for the parquet file format.
File partitioning	Enabled by default (splits large files into smaller ones)

Field Name	Description
Overwrite data	Enabled by default (overwrites the previous day's file)

- After completing the fields, Click **Next** to move to the **Review + create** tab.



11. **Review Your Configuration**
    - On the **Review + Create** tab, review all the details you've configured. Ensure everything is correct and make any necessary adjustments.
12. **Create the Export**
    - When you're satisfied with your settings, click **Create** to complete the process. Your Azure cost export will now be created and ready for use.



Create Azure EA (Modern Commerce) Billing Adapter in CloudBolt CSMP

Use this procedure to create a new billing adapter for Azure EA account. This procedure can also be used to update an existing Azure EA (Legacy) account billing adapters to migrate to the new Azure Cost Management APIs to maintain your Azure EA cost reporting in CloudBolt CSMP and maintain a seamless transition.

1. Log in to CloudBolt CSMP account as an administrator.
2. Click the **Settings [] > Adapters**.
3. If you are trying to upgrade an existing Azure EA (Legacy) billing adapter, then select Azure tab, identify the billing adapter you want to update, and then click ellipsis […] icon under action column to select **Edit Adapter** option.
4. If you want to create a new billing adapter for you Azure EA account, then click **Add Cloud Adapter > Azure**.
5. Fill out the details as follows:

Basic Details

a. Adapter Type: Consolidated Billing

b. Collect Billing Data From: Billing Account/Management Group/Subscription Scope

c. Azure Cloud: Select the correct Azure cloud region for your account.

d. Name: Create a Name for your Adapter.

Azure Account Details

e. Enter the **Client ID**, **Secret Key**, and **Tenant ID** collected from Create App Registration in Microsoft Entra ID.

f. Click **Validate**.

g. After the credentials are validated, click **Next**.

Create Normal Adapters for all Subscriptions under the EA Account

The **Azure AD** tab provides the option to create Normal Adapters for all your subscriptions under the Azure EA account. Select *Yes* or *No* for "**Do you want to**

automatically setup the adapters in CloudBolt using subscriptions available in your tenants?"

- **Yes** creates Normal Adapters for all the subscriptions within the Azure EA account.
- **No** creates 'Not Configured' state Normal Adapters for all the subscriptions within the Azure EA account.

If you have clicked No for auto normal adapter creation and later you updated the billing adapter to set the option as Yes, the previously not configured normal adapters will turn to active by default. Whenever a new subscription is created under the Azure EA account, a Normal Adapter will be created automatically with a status based on your option selection for "Do you want to automatically setup the adapters in CloudBolt using subscriptions available in your tenants?" The auto created normal adapters are named as per the subscription name.

Export Configuration

Fill out the Export Configuration details using any one option for the Cost Data Source.

Export	- **Scope:** Choose **Billing Account.** - **Billing Account:** Select your account from the dropdown. - Click **Next**. You can add up to 50 exports for the same or different billing accounts. To add another export, click adjacent to the Billing Account drop-down list, and fill the data as required. To remove an export, click adjacent to the Billing Account drop-down list.
Cost and Usage report API	- **Scope:** Select Billing Account - **Billing Account:** Select a billing account whose cost data you want to fetch using the API. You must add all the billing account whose billing data you wish to be displayed in your CloudBolt CSMP account. To add another billing account, click adjacent to the Billing Account drop-down box, and select the billing account. To remove a billing account, click adjacent to the **Billing Account** drop-down box. You can add up to 50 billing

accounts.

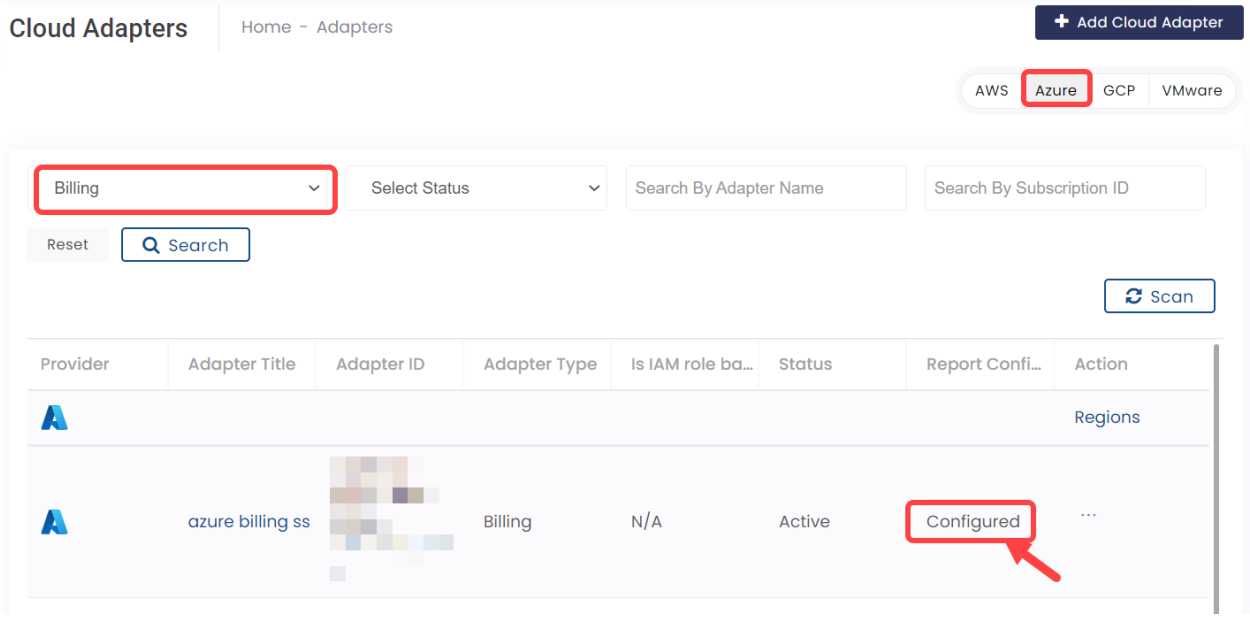
Other Configuration

- **Do you want to enable Invoice Date?**: Here you can set an invoice date for this billing adapter. Invoice date is a date on which you will generate invoices in CloudBolt CSMP account to post them to your customers, resellers, or both. Once the current month's date has passed, the CloudBolt CSMP billing adapter will not access your cloud provider databases to get the cloud costs changes for the previous months. However, the billing adapter will continue fetching the current month's cost data.
  By default, invoice date feature would be disabled. To enable, you must select Yes for "Do you want to enable Invoice Date?" Select an invoice date from the drop-down for invoice date. Default invoice date is set to 10.
- **Select Group's Service Tag key**: Enter a valid tag key in the box. The entered tag key type can only be used while creating groups for this billing adapter. If you are changing an existing tag key with new one and the groups were created using the previous tag key, the tag key-value pairs will be removed from such groups and groups will contain only the sub-accounts.

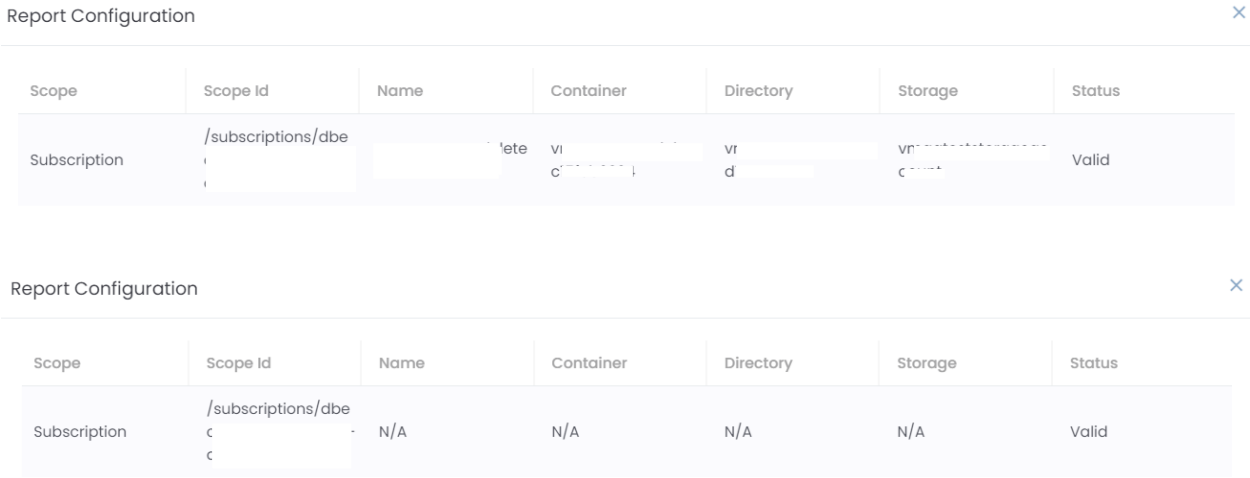
6. Click **Submit** to create the billing adapter.

To see the created billing adapter, go to Azure adapter page and filter by adapter type as billing. A list of billing adapters will be displayed. To see the exports linked with a billing

adapter, click Configured under the Report Configuration column.



Report configuration page will display all the linked exports with their details such as export name, container, directory, storage, and current status. If you had chosen Cost and Usage report API option as Cost Data Source under the export configuration tab while creating the billing adapter, then the export name, container, directory, and storage will be marked as N/A in the report configuration page.



Limitations

- When converting an existing EA (Legacy) adapter to a Billing scope adapter with the Cost Data Source set to 'cost and usage report API' without adding the necessary

role/permissions to the registered app will result in no changes to historical data or current month cost data. Also, future month data will not be processed.

- When changing an existing EA (Legacy) adapter to a Billing scope adapter with Cost Data Source set to 'export' or 'cost and usage report API' and assigning the required role/permissions to the registered app, please note that there will be a change in your cost data for the current month only; past month's cost data will remain unchanged.

It may take up to 24 hours for the updated cost data to reflect in your CSMP account. You can manually reprocess your cost data from the past month using the report data reprocessing URL. See, Report Data Reprocessing.

Outcomes

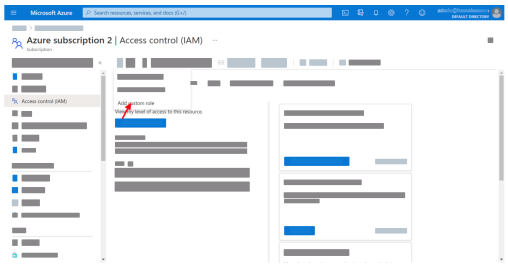
You have learnt how to configure a billing adapter for Azure EA account.

4.2.4.1.1. Create a Custom Role in Azure EA Account

Learn how to create a Custom Role in Azure EA account, which will be used when setting up Azure EA accounts for CloudBolt CSMP.

Create a Custom Role

1. In your Azure account, select the Subscription for which you will create the custom role.
2. From the left side menu, click **Access Control (IAM).**
3. Click **Add custom role.**



4. Under the **Basics** section, add a Custom role name and description.
5. Select **Start from scratch** under Baseline permissions.
6. Do not change the **Permissions** or **Assignable scopes** tab selections.
7. On the **JSON Tab**, click **Edit.** Under **Actions,** enter the following Permissions List code:

ReadOnly Access

JSON

```
"Microsoft.Resources/subscriptions/resourceGroups/read",
"Microsoft.Compute/virtualMachines/read",
"Microsoft.Compute/virtualMachines/instanceView/read",
"Microsoft.Compute/disks/read",
"Microsoft.Compute/availabilitySets/read",
"Microsoft.Compute/snapshots/read",
"Microsoft.Network/virtualNetworks/read",
"Microsoft.Network/loadBalancers/read",
"Microsoft.Network/networkInterfaces/read",
"Microsoft.Network/publicIPAddresses/read",
"Microsoft.Network/routeTables/read",
"Microsoft.Network/networkSecurityGroups/read",
```

```
"Microsoft.Network/virtualNetworks/subnets/read",
"Microsoft.DBforMariaDB/servers/read",
"Microsoft.DBforPostgreSQL/servers/read",
"Microsoft.Sql/servers/read",
"Microsoft.Sql/servers/databases/read",
"Microsoft.Sql/servers/elasticPools/read",
"Microsoft.DBforMySQL/servers/read",
"Microsoft.Storage/storageAccounts/read",
"Microsoft.Insights/metrics/read",
"Microsoft.Insights/metricDefinitions/read",
"Microsoft.Commerce/*/read",
"Microsoft.Cache/redis/read",
"Microsoft.DocumentDB/databaseAccounts/services/read",
"Microsoft.Web/staticSites/Read",
"Microsoft.Web/kubeEnvironments/read",
"Microsoft.Kubernetes/connectedClusters/Read",
"Microsoft.Kubernetes/RegisteredSubscriptions/read",
"Microsoft.DataProtection/backupVaults/read",
"Microsoft.DocumentDB/cassandraClusters/read",
"Microsoft.DocumentDB/cassandraClusters/dataCenters/read",
"Microsoft.DocumentDB/databaseAccounts/cassandraKeyspaces/read",
"Microsoft.DesktopVirtualization/applicationgroups/read",
"Microsoft.DesktopVirtualization/hostpools/read",
"Microsoft.DesktopVirtualization/workspaces/read",
"Microsoft.Advisor/recommendations/read",
"Microsoft.Consumption/reservationRecommendations/read",
"Microsoft.Consumption/reservationRecommendationDetails/read"
"Microsoft.Web/sites/read"
"Microsoft.Web/serverfarms/read"
"Microsoft.ContainerService/managedClusters/read"
```

Read & Write Access

JSON

```
"*/read",
"Microsoft.Storage/storageAccounts/write",
"Microsoft.Storage/storageAccounts/delete",
"Microsoft.Compute/virtualMachines/*/action",
"Microsoft.Compute/*/delete",
"Microsoft.Network/*/delete",
"Microsoft.Compute/*/write",
"Microsoft.Network/*/write",
"Microsoft.DBforMariaDB/servers/*/action",
"Microsoft.DBforMariaDB/servers/delete",
"Microsoft.DBforMariaDB/servers/write",
"Microsoft.DBforMySQL/servers/*/action",
"Microsoft.DBforMySQL/servers/delete",
"Microsoft.DBforMySQL/servers/write",
"Microsoft.DBforMySQL/flexibleServers/delete",
"Microsoft.DBforMySQL/flexibleServers/write",
"Microsoft.Sql/servers/delete",
"Microsoft.Sql/servers/write",
"Microsoft.Sql/servers/databases/*/action",
"Microsoft.Sql/servers/databases/delete",
"Microsoft.Sql/servers/databases/write",
"Microsoft.Sql/servers/elasticPools/delete",
"Microsoft.Sql/servers/elasticPools/write",
"Microsoft.DBforPostgreSQL/servers/delete",
"Microsoft.DBforPostgreSQL/servers/write",
"Microsoft.DBforPostgreSQL/servers/*/action",
"Microsoft.Cache/redis/read",
"Microsoft.DocumentDB/databaseAccounts/services/read",
"Microsoft.Web/staticSites/Read",
"Microsoft.Web/kubeEnvironments/read",
"Microsoft.Kubernetes/connectedClusters/Read",
"Microsoft.Kubernetes/RegisteredSubscriptions/read",
```

```
"Microsoft.DataProtection/backupVaults/read",
"Microsoft.DataProtection/backupVaults/*/read",
"Microsoft.RecoveryServices/*/read",
"Microsoft.DocumentDB/cassandraClusters/read",
"Microsoft.DocumentDB/cassandraClusters/dataCenters/read",
"Microsoft.DocumentDB/databaseAccounts/cassandraKeyspaces/read",
"Microsoft.DocumentDB/databaseAccounts/cassandraKeyspaces/*/read",
"Microsoft.DesktopVirtualization/applicationgroups/read",
"Microsoft.DesktopVirtualization/applicationgroups/*/read",
"Microsoft.DesktopVirtualization/hostpools/read",
"Microsoft.DesktopVirtualization/hostpools/*/read",
"Microsoft.DesktopVirtualization/workspaces/read",
"Microsoft.DesktopVirtualization/workspaces/*/read",
"Microsoft.Advisor/recommendations/read",
"Microsoft.Consumption/reservationRecommendations/read",
"Microsoft.Consumption/reservationRecommendationDetails/read"
"Microsoft.Web/sites/read"
"Microsoft.Web/serverfarms/read"
"Microsoft.ContainerService/managedClusters/read"
```

8. Click **Save**. On the **Review + create tab**, click **Update**.

4.2.4.1.2. Use PowerShell to Assign Roles to Registered Apps

Learn how to use PowerShell in Azure's Cloud Portal to assign Roles to registered applications for all Subscriptions in Azure.

Prerequisites

- An Admin account in Azure with access to the PowerShell portal.
- An existing CSMP Application in Azure.
- At least one active Azure subscription.

Add the Script in Azure PowerShell

1. Log in to your Azure portal. In the top navigation bar, click **Cloud Shell.**
2. In the Cloud Shell window, select **PowerShell.**
3. Run the following script in the PowerShell terminal:

Code

```
$location = Read-Host -Prompt "Enter a location (i.e. centralus)"
 $roleName = Read-Host -Prompt "Enter custom role Name"
 $templateUriType = Read-Host -Prompt "For read only access Enter readOnly and For Read &
Write access Enter readWrite"
 $templateUri = "https://raw.githubusercontent.com/CloudBoltSoftware/csmp-
helpers/main/azure-role-assignment-scripts/readOnly.json"
 $scopes = foreach($item in Get-AzSubscription){ "/subscriptions/$item" }
 New-AzDeployment -Location $location -TemplateUri $templateUri -scopes $scopes -roleName
$roleName
```

4. You will see a prompt for **location**. Choose a location from the table below and enter it in the terminal.
    -

centralus	japaneast	koreacentral
eastasia	japanwest	koreasouth
southeastasia	brazilsouth	francecentral
eastus	australiasoutheast	southafricanorth

eastus2	australiaeast	uaenorth
westus	westindia	australiacentral
westus2	southindia	switzerlandnorth
northcentralus	centralindia	germanywestcentral
southcentralus	canadacentral	norwayeast
westcentralus	canadaeast	jioindiawest
northeurope	uksouth	westus3
westeurope	ukwest	australiacentral2

5. Enter a **Role** name when prompted.
6. Enter one of the following **Permission types** when prompted:
    - readOnly
    - readWrite
7. Next, run the following command. Replace `<applicationName>` with the name of the application you created during Application setup:

Code

```
$servicePrincipalId = (Get-AzADServicePrincipal -DisplayName <applicationName>).id
```

8. Lastly, run the following command:

Code

```
foreach($item in Get-AzSubscription)
{
   New-AzRoleAssignment -ObjectId $servicePrincipalId -RoleDefinitionName $roleName -
Scope "/subscriptions/$item"
}
```

4.2.5. Set up and Create Adapters for Cloud Solution Provider (CSP) Partner Account

Learn how to set up your Cloud Solution Provider (CSP) Partner account and then create adapters in CloudBolt CSMP.

Quick Setup

1. Set up a CSP Partner Account in Azure
2. Create an Azure Export for a CSP Partner Account
3. Create a Consolidated Billing Adapter for a CSP Partner Account

4.2.5.1. Set up a Partner (CSP) Account in Azure

Learn how to set up a CSP account to get the Client ID, Secret Key, and Tenant ID details required to create a Consolidated Billing Adapter in CloudBolt CSMP. Also learn to add destination URIs to redirect after successful user authentication consent addition.

- Introduction
- Prerequisites
- Add a new Web App
- Get Azure CSP Web App Details
- Redirect URIs List
- Add Redirect URI to Azure CSP Web App
- Assign the PartnerBilling.Read.All Permission
- Provide Access for Reservations

Introduction

In this article, you will learn how to add a new web app on your Microsoft Partner portal and get the Client ID, Secret Key, and Tenant ID for your partner center. The Client ID, Secret Key, and Tenant ID will be used to synchronize CSP billing data from Azure to CloudBolt CSMP using the billing adapter.

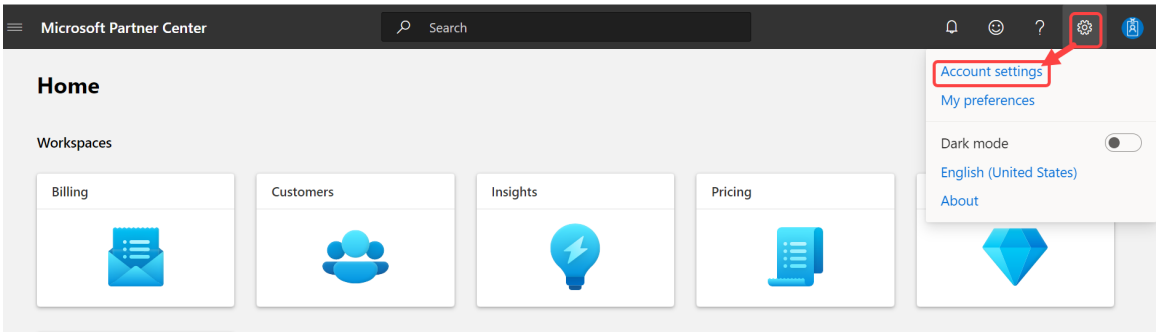
Prerequisites

- User must have a global admin account.
- User account must have MFA configured.

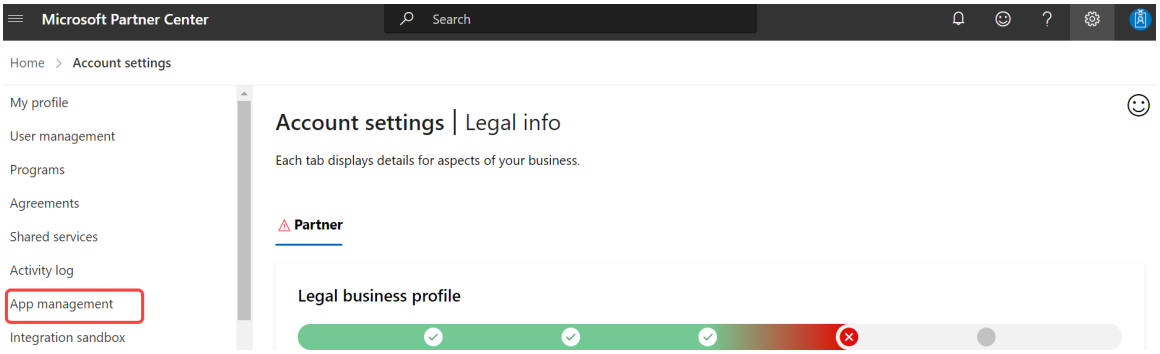
Add a new Web App

Follow the steps given below to add a new web app to your Microsoft partner center account.

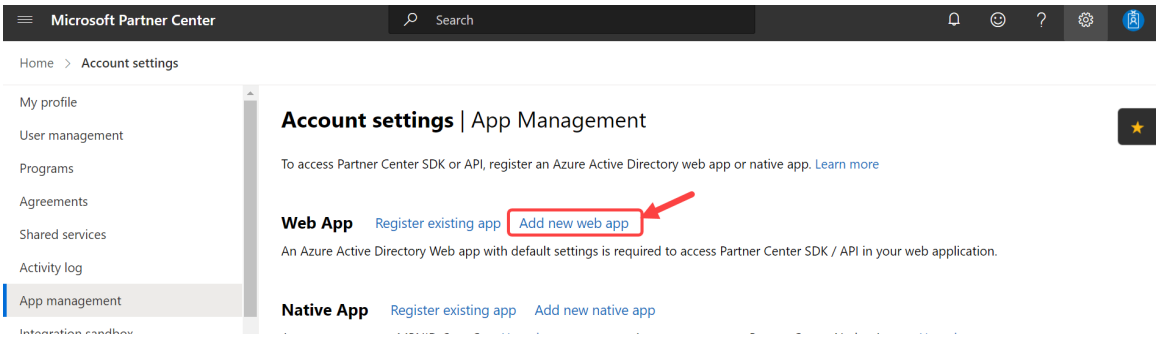
1. Sign into the Partner Dashboard using a global admin account.
2. From the **Settings []** menu, select **Account settings**.



3. On the **Account settings** page, select **App management** from the left navigation panel.

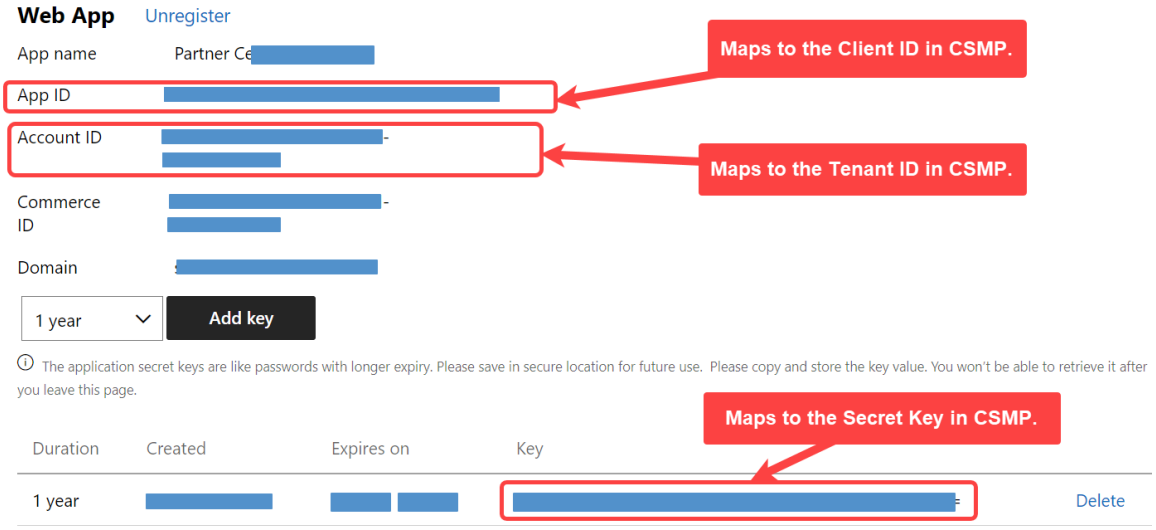


4. Click **Add new web app**. If you already have a web app registered, you can skip the following steps and go to Get Azure CSP Web App Details.



5. Copy the app registration information (Client ID, Tenant ID, and Secret Key). The Web App App ID maps to the Client ID for CloudBolt CSMP. CloudBolt CSMP uses the Account ID in the partner portal as the tenant ID. Your web app **Key** in the partner

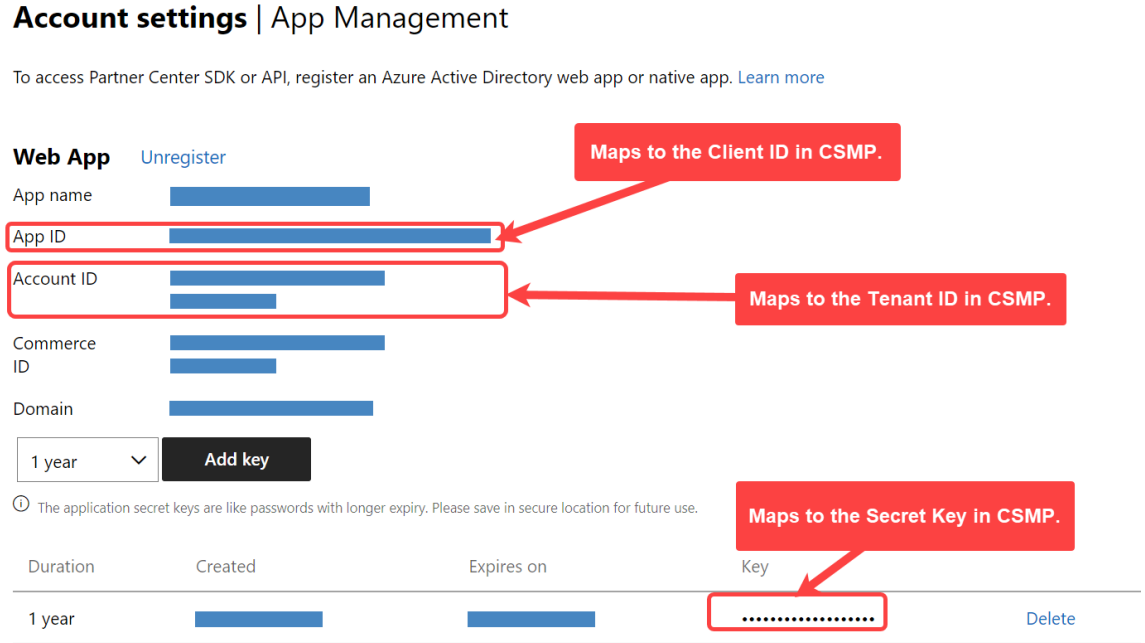
portal will work as a secret key for CloudBolt CSMP. Store the key in a safe place, as the key will not be available afterwards.



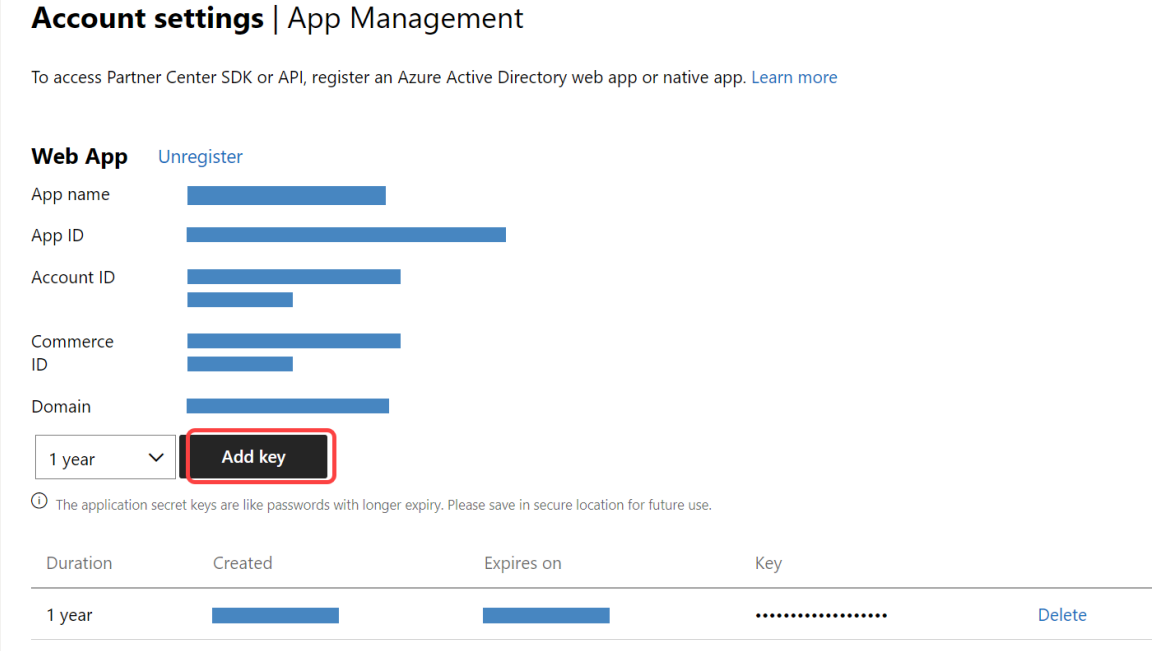
Get Azure CSP Web App Details

If you have an existing web app in your partner center, copy the app registration details (Client ID, Tenant ID, and Secret Key) that will be used during the creation of the Azure Consolidated billing adapter for CSP.

1. Copy the Web App ID. The Web App ID maps to the Client ID in CSMP. Similarly, the Account ID in the Web App maps to the Tenant ID in CSMP, and the Web App secret key maps to the secret key for CloudBolt CSMP.



2. Copy the Web App Account ID. The Web App Account ID maps to the Tenant ID for CloudBolt CSMP.
3. Click **Add key** to generate a new key. If you already configured a key for your app, you can use that key also. This secret key maps to the Secret Key while creating an Azure consolidated billing adapter for CSP.



Redirect URIs List

A redirect URI, or callback URL, is the location where the authorization server sends the user once the app has been successfully authorized and granted an authorization code or access token.

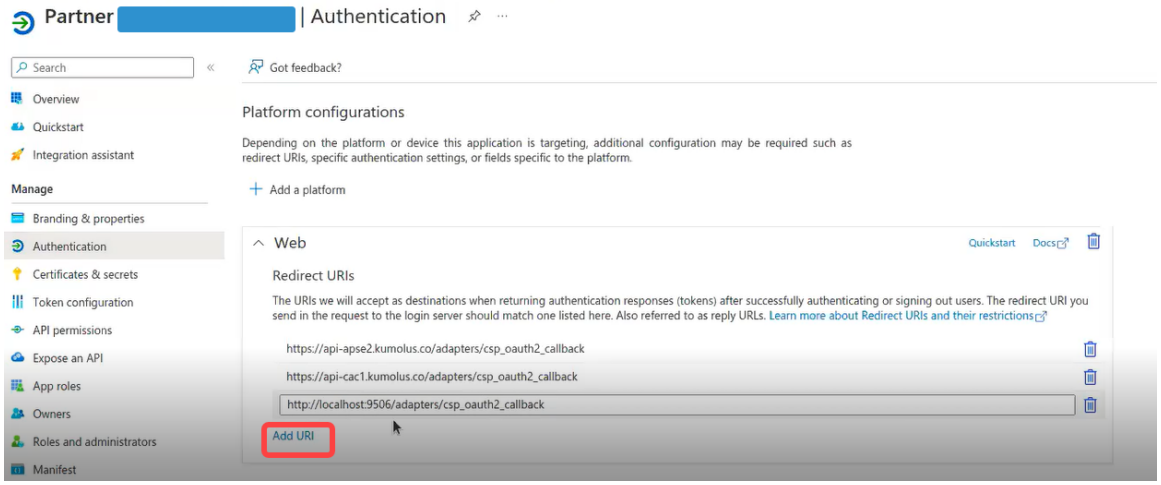
For each CloudBolt CSMP environment, a redirect URI is provided below. You must add a redirect URI from below list in your web app depending on your CloudBolt CSMP hosted zone.

- Oregon: `https://api.cloudbolt.app/adapters/csp_oauth2_callback`
- Singapore: `https://api-apse1.cloudbolt.app/adapters/csp_oauth2_callback`
- Sydney: `https://api-apse2.cloudbolt.app/adapters/csp_oauth2_callback`
- Canada: `https://api-cac1.cloudbolt.app/adapters/csp_oauth2_callback`
- Frankfurt: `https://api-ff.cloudbolt.app/adapters/csp_oauth2_callback`

- London: `https://api-euw2.cloudbolt.app/adapters/csp_oauth2_callback`

Add Redirect URI to Azure CSP Web App

1. Sign into the Partner Dashboard using a global admin account.
2. From the portal menu, select **Azure Active Directory**, then go to the **App registrations** tab.
3. Search and select your app using the App ID.
4. Select **Authentication**.
5. Click **Add URI** under the Web section.



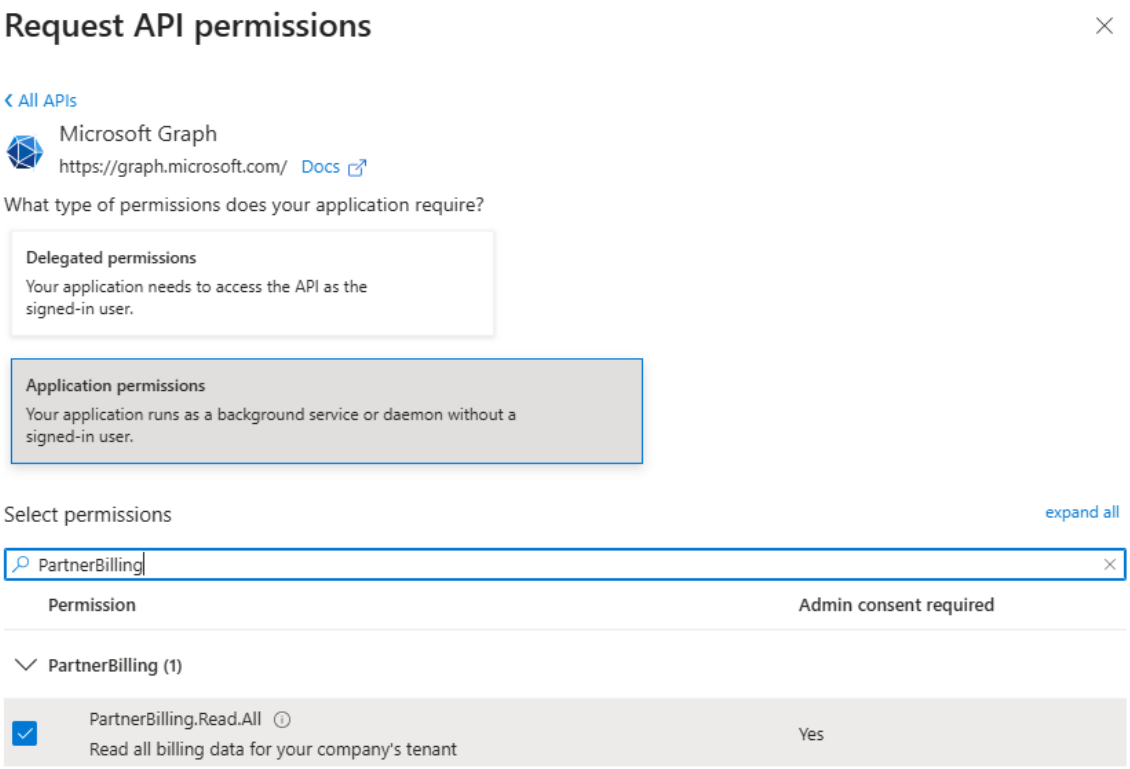
6. Add a redirect URI from the redirect URIs list depending on your CloudBolt CSMP environment.

Assign the PartnerBilling.Read.All Permission

The **PartnerBilling.Read.All** permission grants CloudBolt read-only access to your billing data.

1. Navigate to your **web app**.
2. Under API Permissions, select **Add a permission**.

3. Search and assign **MicrosoftGraph** > **PartnerBilling.Read.All**.



Refer to the **Microsoft Azure documentation** for more information on assigning this permission.

Provide Access for Reservations

1. In the Azure portal, go to **Reservations**.
2. Select a reservation and then click on **Reservation order ID**.
3. Select Access Control (IAM) and click **+ Add**.
4. Add **Reservation Reader** role under the role tab of the Add role assignment window.
5. Go to **Members** tab and click **Select members**.
6. Select the newly created web app name in the **Select members** field and click **Review + assign**.
7. Repeat steps 1 thru 6 for each reservation order ID.

4.2.5.2. Create an Azure Export for a CSP Partner Account

Configure an Azure Cost Management export to send FOCUS cost data to blob storage, where CloudBolt CSMP can ingest it through the CSP Consolidated Billing Adapter.

- Overview
- Prerequisites
- Create the Export
- Grant Storage Access to the CloudBolt App Registration
- Next Steps

Overview

CloudBolt CSMP uses Azure Cost Management exports to collect billing data from CSP partner accounts. This page walks you through creating a FOCUS-format export in the Azure Portal, then granting read access to the CloudBolt app registration so CSMP can retrieve the data.

Prerequisites

Before you begin, ensure you have:

- **Cost Management Contributor** (or higher) permissions on the target subscription
- An Azure Blob Storage Account where the export data will be saved
- **Storage Account Contributor** (or equivalent) permissions on that storage account

---

Create the Export

1. In the Azure Portal, search for and select **Cost Management + Billing**.
2. In the left menu, select **Billing scopes**, then choose your subscription.
3. In the left menu under **Cost Management**, select **Exports**.

4. Select **+ Create**.
5. On the **Basics** tab, configure the following:
    a. For **Export Type**, select **Cost & usage (FOCUS)**.
    b. For **Export Name**, provide a descriptive name (for example, `MySubscriptionFocus`).
    c. Select the edit option next to the export name and verify that **Version** is set to **1.0** and **Frequency** is set to **Daily export of month-to-date costs**.
6. On the **Destination** tab, configure the following:
    a. For **Storage Type**, select **Azure blob storage**.
    b. For **Subscription**, select the subscription where the target storage account resides.
    c. For **Resource Group**, select the resource group that contains the target storage account.
    d. For **Account Name**, select the target storage account.
    e. For **Container**, create or select a container for the export data.
    f. For **Directory**, specify a folder path (for example, `billing`).
    g. For **Format**, select **CSV**.
    h. For **Compression Type**, select **Gzip**.
    i. Verify that **Overwrite data** is *not* selected.
7. Select **Review + create**, then select **Create**.

Grant Storage Access to the CloudBolt App Registration

1. In the Azure Portal, navigate to the storage account you configured as the export destination.
2. In the left menu, select **Access control (IAM)**.
3. Add a role assignment that grants the **Storage Blob Data Reader** role to the existing CloudBolt app registration.

Next Steps

After the role assignment is in place, CloudBolt CSMP can read the exported cost data. To complete the integration, create a CSP Consolidated Billing Adapter in CloudBolt CSMP. For instructions, see Create a Consolidated Billing Adapter.

4.2.5.3. Create a Consolidated Billing Adapter for Cloud Solution Provider (CSP) Partner Account

Learn how to create a Consolidated Billing Adapter for CSP account.

Adapter Prerequisites

Complete the following tasks before setting up this Azure Adapter:

- Set up a Partner (CSP) Account in Azure.

Create the Azure CSP Consolidated Billing Adapter

1. Log in to your CloudBolt CSMP account.
2. Click the **Quick Action icon > Adapters & Integration**.
3. Click **Add Cloud Adapter > Azure**.
4. Fill out the Basic Details:
    - **Adapter Type**: Consolidated Billing
    - **Collect Billing Data From**: Partner Center/CSP
    - **Azure Cloud**: Select the correct Azure cloud region for your account.
    - **Name**: Enter a name for your Adapter.
5. Click the **Azure Account Details** tab.
    a. Enter the Client ID, Secret Key, and Tenant ID collected from Set up a Partner (CSP) Account in Azure.
    b. Click **Validate**.
6. After the credentials are validated, click **Next**.
7. Select a Partner Earn Credit (PEC) calculation method under the PEC Configuration tab.

a. By default, PEC calculation method **Total Sell - Total Cost** will be selected.

b. If you change the PEC calculation method in the mid of a billing cycle, the PEC calculation will be updated from the current billing cycle. However, there would be no change in PEC calculated values for the previous billing cycles.

8. Click **Next**.
9. Fill out the **Other Configuration** details.
   - **Do you want to enable Invoice Date?**: Here you can set an invoice date for this billing adapter. Invoice date is a date on which you will generate invoices in CloudBolt CSMP account to post them to your customers, resellers, or both. Once the current month's date has passed, the CloudBolt CSMP billing adapter won't be able to access the databases of your cloud provider to get the cloud costs changes for the previous months. However, the billing adapter will continue fetching the current month's cost data.
     By default, invoice date feature would be disabled. To enable, you must select *Yes* for "Do you want to enable Invoice Date?" Select an invoice date from the drop-down for invoice date. Default invoice date is set to 10.
   - **Select Group's Service Tag key**: Enter a valid tag key in the box. The entered tag key type can only be used while creating groups for this billing adapter. If you are changing an existing tag key with new one and the groups were created using the previous tag key, the tag key-value pairs will be removed from such groups and groups will contain only the sub-accounts.
   - **Select Metric for Margin/Discount Calculations**: Select a metric type from the drop-down. In future, if you create a billing configuration for this billing adapter, the margin and discount will be calculated against this selected metric. By default, 'customer cost' metric will be selected.
   - **Do You Want to Include Microsoft/Office 365 Charges in the Cost Report?**: This option allows you to determine whether the costs for Microsoft and Office 365 services are included in your Azure CSP cost reports within CloudBolt CSMP.
     By default, the option is set to **Yes**, enabling the inclusion of all Microsoft/Office 365 service costs in the Azure CSP cost report. This means

that charges for services such as Office 365, Office LTSC, Microsoft 365, Access LTSC, Teams, and other related services will appear in the report.
If you select **No**, the inclusion of selected Microsoft/Office 365 services in the cost report will be disabled. When this option is selected, a drop-down menu labelled **Select Microsoft/Office 365 Services** will appear. From this menu, you can choose specific services to exclude from the report. For example, if you choose Microsoft 365, the costs for services such as Microsoft 365 F1, Microsoft 365 F3, Microsoft 365 F5, Microsoft 365 E3, Microsoft Copilot for Microsoft 365, etc. will be excluded from the cost report.

Behaviour for Existing Billing Adapters Created or Last Updated Before January 15, 2025:

- If the billing adapter was configured with the **Yes** option, the Azure CSP cost report will continue to include all Microsoft/Office 365 service costs.
- If the **No** option was selected, the **Select Microsoft/Office 365 Services** setting will default to **Select All**, meaning that costs for all Microsoft/Office 365 services will be excluded from the cost report.

Important

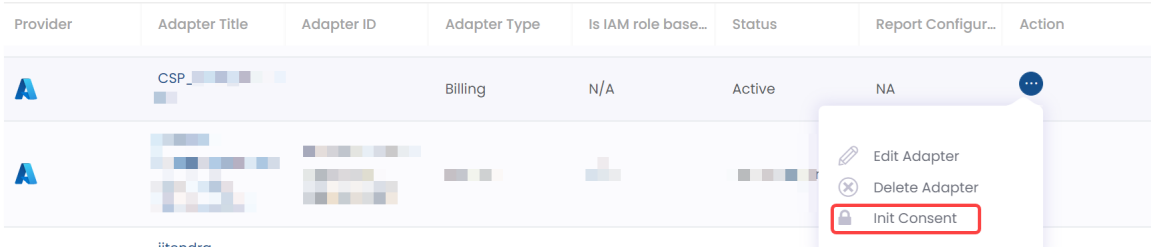
Any updates to this option will immediately impact the cost report page within CSMP, reflecting the updated service costs. However, reflecting the updated cost data on the Budget page, based on the changes made to this option, may take up to 12 hours.

10. Click **Submit**.

Complete CSP User Authentication

After creating an Azure CSP partner billing adapter, you must complete the user authentication. User authentication can be completed with a global admin user account with MFA configured from which you will make Partner Center API calls. Before, proceeding to user authentication, make sure that redirect URIs are added, see Add Redirect URI to Azure CSP Web App.

1. Go to Azure adapter list.
2. Identify the Azure CSP partner billing adapter for which user authentication is required.
3. Click the ellipsis icon under the Action column and select *Init Consent* option



4. When prompted, log in with global admin user account with MFA configured.
5. After successful authentication, you will see message similar to: *Authentication details received. You may close this window at any time*.

```
Authentication details received. You may close this window at any time
```

6. On the adapter list page, you can see *Consent Successful* option under the Action column.

Limitations

- When updating an existing CSP adapter with a new set of Azure CSP account details, please note that any changes in cost data will only affect the current month. Past months' cost data will remain unchanged.
- When updating an existing CSP adapter without change in Azure account details, there will be no impact on your cost data for both previous and current months.

It may take up to 24 hours for the updated cost data to reflect in your CSMP account. You can manually reprocess your cost data from the past month using the report data reprocessing URL. See, Report Data Reprocessing.

Outcomes

The Consolidated Billing adapter for Azure CSP Account is ready.

4.2.6. User Access restrictions based on Azure Resource groups shared with Tenant

This user guide helps you understand the Tenant users' access to various CloudBolt CSMP modules based on different scenarios related to shared Azure adapters and resource groups.

Introduction

Whenever an Azure normal adapter or adapter group is shared with a tenant, it is mandatory to select the resource group(s) for an Azure normal adapter with active status. By default, all the resource groups will be marked to be shared, whereas you have also the option to explicitly select the resource groups. You can select up to 20 resource groups manually for all the shared active Azure normal adapters.

Abbreviations/Glossary

Ad: Adapter(s)

Adapter group: It is a group of Normal adapters under a common Billing adapter. For this document, it must be considered as a Normal adapter(s).

Normal Active: A Normal adapter with **Active** status only.

Normal Adapter: A Normal adapter with status as Active, or Not Configured depending on the scenario.

NotConfig: A Normal adapter with **Not configured** status only.

RG: Resource Group. Resource groups are available for selection only when you share an Azure normal active adapter or adapter group with a Tenant

Access to Cost Reporting Module

Under this section, you will get to know about the cost reporting module access restrictions imposed on Tenant Users based on various scenarios. The cost reporting module consists of data displayed on the CloudBolt CSMP dashboard, budget, cost report, and overview sections.

The scenarios column will list the possible combinations of billing adapter, normal adapter, adapter group and RGs shared with a Tenant.

The dashboard, budget, cost overview, and cost report columns will list the permissible access for each scenario.

Scenarios	Dashboard	Budget	Cost Overview	Cost Custom Report
Billing Ad + Normal Active with all RGs + Normal NotConfig	By default, the dashboard chart will display cost data for all the subscriptions of the shared billing adapter. Select subscription dropdown will allow the user to select the subscription(s) for the dashboard charts. Suppose the billing adapter for a shared normal active adapter and NotConfig adapter is not shared with the	Display cost to date of current month cost for all the subscriptions under the shared billing adapter. Suppose the billing adapter for a shared normal active adapter and NotConfig adapter is not shared with the Tenant. In that case, the budget cost to date will be displayed only for the subscriptions whose normal adapters are	By default, the cost data of all the subscriptions under the shared billing adapter will be displayed. Select Subscription dropdown box will allow the user to choose subscriptions to view the cost for a specific subscription. Suppose the billing adapter for a shared normal active adapter and NotConfig	Custom Cost report will display cost data for all the subscriptions under the shared billing adapter. For the filters section, Subscription dropdown - All the subscriptions of shared billing adapter will be listed for selection. Resource Groups dropdown - All the RGs available for the selected time

	Tenant. In that case, the dashboard charts will be updated only for the subscriptions whose normal adapters are shared. The backend API will fetch the billing adapter name for the shared normal adapters whose billing adapter is not shared with the Tenant.	shared. The backend API will fetch the billing adapter name for the shared normal adapters whose billing adapter is not shared with the Tenant.	adapter is not shared with the Tenant. In that case, the Overview charts will be updated only for the subscriptions whose normal adapters are shared. The backend API will fetch the billing adapter name for the shared normal adapters whose billing adapter is not shared with the Tenant.	interval will be listed for the selected subscription Suppose the billing adapter for a shared normal active adapter and NotConfig adapter is not shared with the Tenant. In that case, the custom cost report charts will be updated only for the subscriptions whose normal adapters are shared. The backend API will fetch the billing adapter name for the shared normal adapters whose billing adapter is not shared with the Tenant. For the filters section, Subscription dropdown - The subscription dropdown will list the only subscriptions linked with the shared normal adapters. Resource Groups

				dropdown - All the RGs available for the selected time interval will be listed for the selected subscription.
Billing Ad + Normal Active with restricted RGs + Normal NotConfig	By default, the dashboard chart will display cost data for all the subscriptions of the shared billing adapter. Select subscription dropdown will allow the user to select the subscription(s) for the dashboard charts. Suppose the billing adapter for a shared normal active adapter and NotConfig adapter is not shared with the Tenant. In that case, the dashboard charts will be updated only for the shared RGs of subscriptions whose normal adapters are shared. The backend API will fetch the billing adapter name for the shared	Display cost to date of current month cost for all the subscriptions under the shared billing adapter. Suppose the billing adapter for a shared normal active adapter and NotConfig adapter is not shared with the Tenant. In that case, the budget cost to date will be displayed only for the shared RGs of the subscriptions. The backend API will fetch the billing adapter name for the shared normal adapters whose billing adapter is not shared with the Tenant.	By default, the cost data of all the subscriptions under the shared billing adapter will be displayed. Select Subscription dropdown box will allow the user to choose subscriptions to view the cost for a specific subscription. Suppose the billing adapter for a shared normal active adapter and NotConfig adapter is not shared with the Tenant. In that case, the Overview charts will be updated only for the shared RGs of subscriptions whose normal adapters are shared. The backend API	Custom Cost report will display cost data for all the subscriptions under the shared billing adapter. For the filters section, Subscription dropdown - All the subscriptions of shared billing adapter will be listed for selection. Resource Groups dropdown – All the RGs available for the selected time interval will be listed for the selected subscription(s). Suppose the billing adapter for a shared normal adapter and NotConfig adapter is not shared with the Tenant. In that case, the custom cost

	normal adapters whose billing adapter is not shared with the Tenant.		will fetch the billing adapter name for the shared normal adapters whose billing adapter is not shared with the Tenant.	report charts will be updated only for the shared RGs of the subscriptions. The backend API will fetch the billing adapter name for the shared normal adapters whose billing adapter is not shared with the Tenant. For the filters section, Subscription dropdown - The subscription dropdown will list the only subscriptions linked with the shared normal adapters. Resource Groups dropdown – Only the shared RGs will be listed for the selected subscription(s).
Billing Ad + Normal Active with restricted RGs	By default, the dashboard chart will display cost data for all the subscriptions of the shared billing adapter. Select subscription dropdown will allow the user to select the	Display cost to date of current month cost for all the subscriptions under the shared billing adapter. Suppose the billing adapter for a shared	By default, the cost data of all the subscriptions under the shared billing adapter will be displayed. Select Subscription dropdown box will allow the	Custom Cost report will display cost data for all the subscriptions under the shared billing adapter. For the filters section, Subscription dropdown - All

	subscription(s) for the dashboard charts. Suppose the respective billing adapter for a shared normal active adapter is not shared with the Tenant. In that case, the dashboard charts will be updated only for shared RGs of the subscriptions whose normal adapters are shared. The backend API will fetch the billing adapter name for the shared normal adapters whose billing adapter is not shared with the Tenant.	normal active adapter is not shared with the Tenant. In that case, the budget cost to date will be displayed only for the shared RGs of the subscriptions. The backend API will fetch the billing adapter name for the shared normal adapters whose billing adapter is not shared with the Tenant.	user to choose subscriptions to view the cost for a specific subscription. Suppose the respective billing adapter for a shared normal active adapter is not shared with the Tenant. In that case, the Overview charts will be updated only for the shared RGs of subscriptions whose normal adapters are shared. The backend API will fetch the billing adapter name for the shared normal adapters whose billing adapter is not shared with the Tenant.	the subscriptions of shared billing adapter will be listed for selection. Resource Groups dropdown – All the RGs available for the selected time interval will be listed for the selected subscription(s). Suppose the respective billing adapter for a shared normal adapter is not shared with the Tenant. In that case, the custom cost report charts will be updated only for the shared RGs of the subscriptions. The backend API will fetch the billing adapter name for the shared normal adapters whose billing adapter is not shared with the Tenant. For the filters section, Subscription dropdown - The subscription

				dropdown will list the only subscriptions linked with the shared normal adapters. Resource Groups dropdown - Only the shared RGs will be listed for the selected subscription(s).
Billing Ad + Normal NotConfig	By default, the dashboard chart will display cost data for all the subscriptions of the shared billing adapter. Select subscription dropdown will allow the user to select the subscription(s) for the dashboard charts. Suppose the respective billing adapter for a shared normal NotCofig adapter is not shared with the Tenant. In that case, the dashboard charts will be updated only for the subscriptions whose normal adapters are shared. The	Display cost to date of current month cost for all the subscriptions under the shared billing adapter. Suppose the billing adapter for a shared normal NotConfig adapter is not shared with the Tenant. In that case, the budget cost to date will be displayed only for the subscriptions whose normal NotCofig adapters are shared. The backend API will fetch the billing adapter name for the shared normal adapters whose billing adapter is not shared with the	By default, the cost data of all the subscriptions under the shared billing adapter will be displayed. Select Subscription dropdown box will allow the user to choose subscriptions to view the cost for a specific subscription. Suppose the respective billing adapter for a shared normal NotConfig adapter is not shared with the Tenant. In that case, the Overview charts will be updated only for the subscriptions	Custom Cost report will display cost data for all the subscriptions under the shared billing adapter. For the filters section, Subscription dropdown - All the subscriptions of shared billing adapter will be listed for selection. Resource Groups dropdown – All the RGs available for the selected time interval will be listed for the selected subscription(s). Suppose the respective billing adapter for a shared normal NotConfig

	backend API will fetch the billing adapter name for the shared normal adapters whose billing adapter is not shared with the Tenant.	Tenant.	whose normal NotCofig adapters are shared. The backend API will fetch the billing adapter name for the shared normal adapters whose billing adapter is not shared with the Tenant.	adapter is not shared with the Tenant. In that case, the custom cost report charts will be updated only for the subscriptions whose normal NotCofig adapters are shared. The backend API will fetch the billing adapter name for the shared normal NotCofig adapters whose billing adapter is not shared with the Tenant. For the filters section, Subscription dropdown - The subscription dropdown will list the only subscriptions linked with the shared normal NotConfig adapters. Resource Groups dropdown – All the RGs available for the selected time interval will be listed for the selected subscription.

Normal Active with all RGs + Normal_NotConfig	Select subscription dropdown will allow the user to select the subscription(s) for dashboard charts. By default, the dashboard chart displays data for all the subscriptions linked with the shared normal active and NotConfig adapters. The backend API will fetch the billing adapter name for the shared normal adapters.	Display cost to date of current month cost for all the subscriptions under the shared normal adapters.	By default, the cost data of all shared normal adapter's subscriptions will be displayed. Select Subscription dropdown box will allow the user to choose subscriptions to view the cost for a specific subscription.	Custom Cost report will display data for all the subscriptions linked with the shared normal active and NotConfig adapters. For filters, Subscription dropdown - All shared subscriptions will be listed for selection. Resource Groups dropdown - All RGs related to the shared normal active and NotConfig adapters available for the selected time interval will be listed for selection.
Normal Active with restricted RGs + Normal NotConfig	Dashboard charts will display the cost details of the shared resource groups related to the normal active adapter's subscription only. However, all the subscriptions linked with the shared normal adapters will display under	Display cost to date of the current month cost subscription only for the resource groups that are shared and linked with the shared normal active adapters. Normal NotConfig adapters will not be	All shared resource groups' cost data under the shared normal active adapter's subscriptions will be displayed by default. Select Subscription dropdown box will allow the user to choose subscriptions	Custom cost data will be displayed only for the subscriptions linked with the shared normal active adapters. For filters menu, Subscription dropdown - All subscriptions linked with the shared normal adapters will be

	the subscription dropdown box. Still, the normal NotConfig adapters will not be considered for the dashboard charts data.	considered for the budget data.	to view the cost for a specific subscription.	listed for selection. Resource Groups dropdown – Only shared RGs related to the shared normal active adapters will be listed for selection.
Normal Active with all RGs	The dashboard charts will display cost details for all the subscriptions linked with the shared normal active adapters. The subscription dropdown box will provide an option to select the subscription for cost data.	Display cost to date of the current month cost subscription only for the resource groups that are shared and linked with the shared normal active adapters.	The cost overview page will display the cost for all the subscriptions linked with the shared normal active adapters. Select Subscription dropdown box will allow the user to choose subscriptions to view the cost for a specific subscription.	By default, the custom cost data will be populated for all the subscriptions linked with the shared normal active adapters. For filters menu, Subscription dropdown - All subscriptions linked with the shared normal adapters will be listed for selection. Resource Groups dropdown – All RGs based on subscriptions' selection will be listed.
Normal Active with restricted RGs	The dashboard charts will display the cost details of all the shared resource groups with the linked subscriptions	The monthly cost to date value for shared RGs will be displayed for all the subscriptions linked with the	The cost overview page will display the cost data for the shared resource groups only. The	By default, the custom cost data will be populated for the shared RGs under the subscriptions linked with all

	for the shared normal active adapters. Under the subscription dropdown box, all the subscriptions linked with all the shared normal active adapters will display.	shared normal active adapters.	subscription dropdown will list all the subscriptions linked with the shared normal active adapters.	the shared normal active adapters. For filters menu, Subscription dropdown - All subscriptions linked with the shared normal adapters will be listed for selection. Resource Groups dropdown – All shared RGs linked with the selected subscription will be listed for selection.
Normal Active with restricted RGs + Normal Active with No RGs	By default, the dashboard chart will show subscription cost data only for the shared resource groups. No cost data will be displayed for the subscription whose none of the resource groups are shared. The subscription dropdown menu will list all the subscriptions linked with all the shared normal active adapters but no cost data for those whose	The budget will be displayed only for the subscriptions whose resource groups are shared. The monthly cost to date value for shared RGs will be displayed for the subscriptions linked with the shared normal active adapters.	The cost overview will populate the cost charts for the subscriptions only of the shared resource groups. The cost overview chart will not include the cost data for the subscriptions whose none of the resource groups are shared.	Custom cost reports will populate the data for those subscriptions only, whose resource groups are shared. For filters menu, Subscription dropdown - All subscriptions linked with the shared normal adapters will be listed for selection. Resource Groups dropdown – All shared RGs related to the

	resource groups are not shared.			selected subscription will be listed for selection. Suppose no resource groups are shared for a normal active adapter; the custom report will show no cost data for such subscriptions.
No adapters	A message will display, with text similar to: Create your first Consolidated Azure Billing Adapter.	A message will display, with text similar to: Billing Adapter or Adapter with Billing Reports enabled not found.	A message will display, with text similar to: Billing Adapter or Adapter with Billing Reports enabled not found.	A message will display, with text similar to: Billing Adapter or Adapter with Billing Reports enabled not found.
Billing Ad only	The dashboard charts will show cost data for all the subscriptions under the shared billing adapter. The Subscription dropdown menu will list all the subscriptions available under the shared billing adapter.	Cost to date data will be available for all the subscriptions under the shared billing adapter.	The cost overview will display all the cost data applicable for the shared billing adapter.	Custom cost data will display cost data for all the subscriptions under the shared billing adapters. For filters menu, Subscription dropdown - All subscriptions linked with the shared billing adapters will be listed for selection. Resource Groups dropdown – All the selected subscription(s) resource groups

				will be listed for selection.
Normal Active with explicitly selected all RGs + Normal NotConfig	This scenario will be treated as a scenario: Normal Active with restricted RGs + Normal NotConfig	This scenario will be treated as a scenario: Normal Active with restricted RGs + Normal NotConfig	This scenario will be treated as a scenario: Normal Active with restricted RGs + Normal NotConfig	This scenario will be treated as a scenario: Normal Active with restricted RGs + Normal NotConfig

Access to Event Scheduler Module

Under this section of the user guide, you will know about the access restrictions on the Event Scheduler module based on various scenarios.

The scenarios column will list the possible combinations of billing adapter, normal adapter, adapter group and RGs shared with a Tenant.

Scenario	Access to Schedule Event Page
Billing Ad + Normal Active with all RGs + Normal NotConfig	On the Event Details tab of the Schedule Event page, the user will select only the shared normal active state adapter(s) from the dropdown. Users can apply the event to all the RGs or any specific number of RGs. By default, all the shared normal active state adapters and RGs will be selected. The billing adapter and normal not configured state adapters will not be available for selection.
Billing Ad + Normal Active with restricted RGs + Normal NotConfig	On the Event Details tab of the Schedule Event page, the user will select only the shared normal active state adapter(s) from the dropdown. The event can be applied only to the shared RGs with the Tenant. By default, all the shared normal active state adapters and RGs will be selected. The billing adapter and normal not configured state adapters will not be available for selection.
Billing Ad + Normal Active with restricted RGs	On the Event Details tab of the Schedule Event page, the user will select only the shared normal active state adapter(s) from the dropdown. The event can be applied only to the shared RGs with the Tenant. By default, all the shared normal active state adapters and RGs will be selected. The billing adapter will not be available for selection.
Billing Ad + Normal	Users cannot create an event as no normal active adapter is

NotConfig	shared.
Normal Active with all RGs + Normal_NotConfig	On the Event Details tab of the Schedule Event page, the user will select only the shared normal active state adapter(s) from the dropdown. The event can be applied to all the RGs of the normal active state adapter(s). By default, all the shared normal active state adapters and RGs will be selected. The normal not configured state adapter will not be available for selection.
Normal Active with restricted RGs + Normal NotConfig	On the Event Details tab of the Schedule Event page, the user will select only the shared normal active state adapter(s) from the dropdown. The event can be applied only to the shared RGs with the Tenant. By default, all the shared normal active state adapters and RGs will be selected. The normal not configured state adapter will not be available for selection.
Normal Active with all RGs	On the Event Details tab of the Schedule Event page, the user will select the shared normal active state adapter(s) from the dropdown. The event can be applied to all the RGs of the normal active state adapter(s). By default, all the shared normal active state adapters and RGs will be selected.
Normal Active with restricted RGs	On the Event Details tab of the Schedule Event page, the user can select only the shared normal active state adapter(s) from the dropdown. The event can be applied only to the shared RGs with the Tenant. By default, all the shared normal active state adapters and RGs will be selected.
Normal Active with restricted RGs + Normal Active with No RGs	On the Event Details tab of the Schedule Event page, the user must select the shared normal active state adapter(s) whose RGs are shared with the Tenant from the dropdown to create an event. The event can be applied only to the shared RGs with the Tenant. By default, all the shared normal active state adapters and RGs will be selected. You cannot create an event if you only select the normal active adapter(s) whose RGs are not shared.
No adapters	Users cannot create an event as no normal active adapter is shared.
Billing Ad only	Users cannot create an event as no normal active adapter is shared.
Normal Active with explicitly selected all RGs + Normal NotConfig	On the Event Details tab of the Schedule Event page, the user will select the shared normal active state adapter(s) from the dropdown. The event can be applied to all the shared RGs of the normal active state adapter(s). By default, all the shared normal active state adapters and RGs will be selected. The normal not configured state adapter will not be available for

selection.

Access to Service Manager Module

Under this section of the user guide, you will know about the access restrictions for the Service Manager feature based on various scenarios.

The scenarios column will list the possible combinations of billing adapter, normal adapter, adapter group and RGs shared with a Tenant.

Scenarios	Access to Service manager page
Billing Ad + Normal Active with all RGs + Normal NotConfig	The user can only select the shared normal active adapters from the Adapters dropdown, and their shared RGs from the Resource Groups dropdown to view, and manage their associated services on the service manager page. Shared billing adapter and normal NotConfig adapters will not be available for selection.
Billing Ad + Normal Active with restricted RGs + Normal NotConfig	The user can only select the shared normal active adapters from the Adapters dropdown, and their shared RGs from the Resource Groups dropdown to view, and manage their associated services on the service manager page. Shared billing adapter and normal NotConfig adapters will not be available for selection.
Billing Ad + Normal Active with restricted RGs	The user can only select the shared normal active adapters from the Adapters dropdown, and their shared RGs from the Resource Groups dropdown to view, and manage their associated services on the service manager page. A shared billing adapter will not be available for selection.
Billing Ad + Normal NotConfig	No data will be displayed on the service manager page.
Normal Active with all RGs + Normal_NotConfig	The user can only select the shared normal active adapters from the Adapters dropdown, and their shared RGs from the Resource Groups dropdown to view, and manage their associated services on the service manager page. A shared normal NotConfig adapter will not be available for selection.
Normal Active with restricted RGs + Normal NotConfig	The user can only select the shared normal active adapters from the Adapters dropdown, and their shared RGs from the Resource Groups dropdown to view, and manage their associated services on the service manager page. A shared normal NotConfig adapter will not be available for selection.
Normal Active with all RGs	The user can only select the shared normal active adapters from the Adapters dropdown, and their shared RGs from the Resource Groups dropdown to view, and manage their associated services on the service manager page.

Normal Active with restricted RGs	The user can only select the shared normal active adapters from the Adapters dropdown, and their shared RGs from the Resource Groups dropdown to view, and manage their associated services on the service manager page.
Normal Active with restricted RGs + Normal Active with No RGs	The user can only select the shared normal active adapters from the Adapters dropdown, and their shared RGs from the Resource Groups dropdown to view, and manage their associated services on the service manager page. The normal active adapters whose none of the RGs are shared will not be available in the Adapters dropdown, and none of their services will appear on the service manager page.
No adapters	No data will be displayed on the service manager page.
Billing Ad only	No data will be displayed on the service manager page.
Normal Active with explicitly selected all RGs + Normal NotConfig	The user can only select the shared normal active adapters from the Adapters dropdown, and their shared RGs from the Resource Groups dropdown to view, and manage their associated services on the service manager page. A shared normal NotConfig adapter will not be available for selection.

Access to Cost Service Adviser Module

Under this section of the user guide, you will know about the access restrictions for the Cost-Service Adviser feature based on various scenarios.

The scenarios column will list the possible combinations of billing adapter, normal adapter, adapter group and RGs shared with a Tenant.

Scenarios	**Access to Cost Adviser**
Billing Ad + Normal Active with all RGs + Normal NotConfig	By default, the Azure Service Adviser page displays the potential cost-benefit for all the shared normal active adapter and shared resource groups. Alternatively, the user can select a shared normal active adapter from the Accounts dropdown, and select an RG from the Resource Group dropdown to view the potential cost benefits for a specific RG. The shared billing adapter and normal NotConfig adapters details will not be available for selection.
Billing Ad + Normal Active with restricted RGs + Normal NotConfig	By default, the Azure Service Adviser page displays the potential cost-benefit for all the shared normal active adapter and shared resource groups. Alternatively, the user can select a shared normal active adapter from the Accounts dropdown, and select an RG from the Resource Group dropdown to view the potential cost benefits for a specific RG. The shared billing adapter and normal NotConfig adapters details will not be available for selection.
Billing Ad +	By default, the Azure Service Adviser page displays the potential cost-

Normal Active with restricted RGs	benefit for all the shared normal active adapter and shared resource groups. Alternatively, the user can select a shared normal active adapter from the Accounts dropdown, and select an RG from the Resource Group dropdown to view the potential cost benefits for a specific RG. The shared billing adapter will not be available for selection.
Billing Ad + Normal NotConfig	An error message will display, similar to text: No adapter found or no adapter matched from adapter group.
Normal Active with all RGs + Normal_NotConfig	By default, the Azure Service Adviser page displays the potential cost-benefit for all the shared normal active adapter and shared resource groups. Alternatively, the user can select a shared normal active adapter from the Accounts dropdown, and select an RG from the Resource Group dropdown to view the potential cost benefits for a specific RG. The shared normal NotConfig adapter will not be available for selection.
Normal Active with restricted RGs + Normal NotConfig	By default, the Azure Service Adviser page displays the potential cost-benefit for all the shared normal active adapter and shared resource groups. Alternatively, the user can select a shared normal active adapter from the Accounts dropdown, and select an RG from the Resource Group dropdown to view the potential cost benefits for a specific RG. The shared normal NotConfig adapter will not be available for selection.
Normal Active with all RGs	By default, the Azure Service Adviser page displays the potential cost-benefit for all the shared normal active adapter and shared resource groups. Alternatively, the user can select a shared normal active adapter from the Accounts dropdown, and select an RG from the Resource Group dropdown to view the potential cost benefits for a specific RG.
Normal Active with restricted RGs	By default, the Azure Service Adviser page displays the potential cost-benefit for all the shared normal active adapter and shared resource groups. Alternatively, the user can select a shared normal active adapter from the Accounts dropdown, and select an RG from the Resource Group dropdown to view the potential cost benefits for a specific RG.
Normal Active with restricted RGs + Normal Active with No RGs	By default, the Azure Service Adviser page displays the potential cost-benefit for all the shared normal active adapter whose resource group(s) are shared with the tenant. Alternatively, the user can select a shared normal active adapter from the Accounts dropdown, and select an RG from the Resource Group dropdown to view the potential cost benefits for a specific RG. Suppose the user selects a normal active adapter whose none of the RGs are shared with the tenant, No data available message will appear in the Resource Group dropdown.
No adapters	An error message will display, similar to text: No adapter found or no adapter matched from adapter group.
Billing Ad only	An error message will display, similar to text: No adapter found or no

	adapter matched from adapter group.
Normal Active with explicitly selected all RGs + Normal NotConfig	By default, the Azure Service Adviser page displays the potential cost-benefit for all the shared normal active adapter and shared resource groups. Alternatively, the user can select a shared normal active adapter from the Accounts dropdown, and select an RG from the Resource Group dropdown to view the potential cost benefits for a specific RG. The shared normal NotConfig adapter will not be available for selection.

Limitations

Limitations:

If an Azure cost favourite report created by a default tenant user, shared with a tenant with restricted access, would only run the report based on their permissions.
If a tenant user has created an event, the Default tenant user(s) can only view the event details. Default tenant users can not perform any activity on such events.

4.3. GCP Adapter Configuration

Learn how to set up your GCP account and then create a GCP billing Adapter in CloudBolt CSMP.

Introduction

You need to create a consolidated billing Adapter in your CloudBolt CSMP account to fetch your cost and spend details of your GCP account to the CloudBolt CSMP account. Ensures that your GCP account is correctly set up prior to adding the GCP billing Adapter in CloudBolt CSMP in order to view GCP billing and cost data in CloudBolt CSMP. Continue to the Setup Overview section below for an overview and view specific setup sections to be configured in GCP and CloudBolt CSMP.

Prerequisites

Your GCP account must have following roles and permissions to successfully complete the GCP account setup.

Authorization scope level	Required roles/permissions	Remarks
Organization	Folder Admin or Folder Creator	To create and manage folders
Organization	iam.roles.create, roles/iam.roleAdmin, and roles/iam.organizationRoleAdmin	To create a custom role
Organization	Billing account administrator	To enable and configure Google Cloud billing data export to a BigQuery dataset
Project	BigQuery User	To enable and configure Google Cloud billing data export to a BigQuery dataset
Organization	Project Creator role with following permissions: • resourcemanager.organizations.get • resourcemanager.projects.create	To create and manage new projects
Organization	Service Account Admin role with following	To assign custom roles to

Authorization scope level	Required roles/permissions	Remarks
	permission: • roles/iam.serviceAccountAdmin	principals (service accounts)

The CloudBolt CSMP role associated with your CloudBolt CSMP account must have all the actions permissions for adapters module.

Setup Overview

1. Create folders in GCP and arrange the projects in folders in a hierarchical manner. See, Organization Hierarchy and Projects in GCP.
2. Enable cloud billing data export to Big Query in Google Cloud console to obtain Billing Table Name of BigQuery Dataset ID, to be used in CloudBolt Adapter configuration. See, Enable Cloud Billing Data Export to BigQuery.
3. Enable APIs for all the GCP projects. See, Enable APIs for your GCP Project.
4. Create custom roles in GCP for your organization and assign required permissions to the roles. See, Create Custom Roles in GCP with Minimum Permission Sets.
5. Setup Google Cloud credentials to obtain Service Account Key, to be used in Adapter setup in CloudBolt CSMP. See, Set up GCP Credentials.
6. Grant Permissions/Assign custom roles to the service account. See, Assign Custom Role and Grant Permissions to Service Account.
7. Configure the GCP Billing Adapter in CloudBolt with the required details collected. See, Create the GCP Consolidated Billing Adapter.

4.3.1. Organization Hierarchy and Projects in GCP

Here we will learn how project folders in GCP at org level and below can be utilized to assign permissions for CloudBolt CSMP access.

Introduction

A folder in GCP can contain projects, other folders, or a combination of both. You can use folders to group projects under the organization which requires to be assigned with a common custom roles.

You can assign permissions in GCP to the service account at both the org level as well as the project level. This can be achieved by creating appropriate roles at org level or project level and then assigning the role to the principal (service account) in GCP.

A service account can be assigned a role that has permissions at the **org level**. Then that service account will have permissions to all the project in the organization. However, if the service account is assigned a **project level role**, that service account will not have access to the other projects in your organization.

Granting permissions in GCP can be achieved by arranging the project folders in an hierarchical manner starting with the org at domain level and then creating or moving the project folders under that level as required.
The permissions assigned thereafter at the domain level and folder level follow the inheritance path, i.e. a folder at top most level will inherit the access permissions for all the subfolders within that folder. However a sub-folder would not have access permissions over the parent folder.

See Assign Custom Role and Grant Permissions to Service Account

See also Create Custom Roles in GCP with Minimum Permission Sets

Prerequisites

To create folders, you must have the Folder Admin or Folder Creator role at the parent level. For example, to create folders at the Organization level, you must have one of these roles at the Organization level.

As part of creating a folder, you must assign it a name. Folder names must meet the following requirements:

- The name may contain letters, digits, spaces, hyphens and underscores.
- The folder's display name must start and end with a letter or digit.
- The name must be between 3 and 30 characters.
- The name must be distinct from all other folders that share its parent.

Creating a Folder in GCP

1. Logon to the GCP cloud console, and go to the Manage resources page in the Cloud Console.

   Go to **Manage resources**

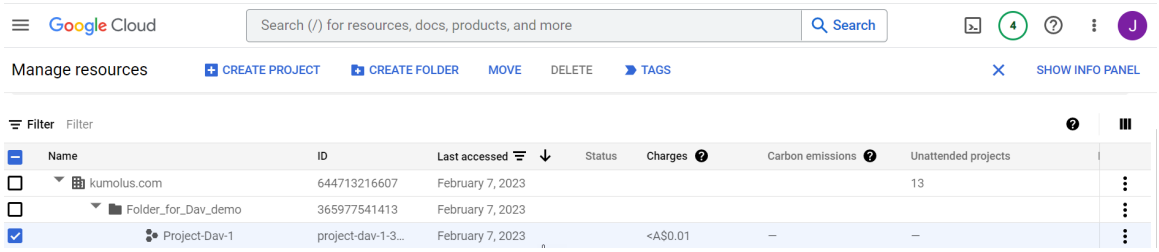
2. Click **Create folder.**
3. In the Folder name text box, enter your new folder's name.
4. In the Organization drop-down, select your organization name.
5. Under Location, click **Browse,** then select the organization node under which you want to create your new folder.
6. Click **Create**.

Moving a Project into a Folder

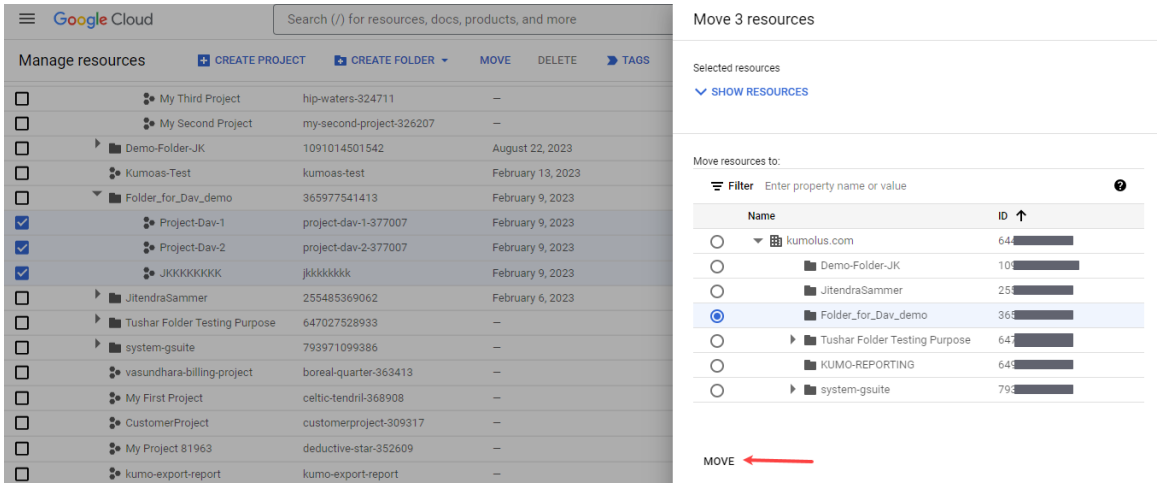
1. In the Google Cloud Console, go to the Manage resources page.

   Go to **Manage resources**

2. Click the check box on your project's row to select your projects from the list of resources which you want to move to previously created folder. Note that you must not click on the name of the project, which takes you to the project's IAM page.
3. Click **Move** button at the top of the page.



4. Select the previously created folder to move the projects on the right hand pane.



5. Click **Move** button on the right hand pane.

Outcomes

Create and move folders in GCP as required for organizational hierarchy and permissions.

4.3.2. Enable Cloud Billing Data Export to BigQuery

The first step to integrate your GCP instance with CloudBolt CSMP is to enable Cloud Billing data export to BigQuery.

- Required Permissions
- Enable Cloud Billing Data to BigQuery
- Create a BigQuery Dataset
- Enable Cloud Billing Data Export to BigQuery
- Billing Data Tables
- Frequency of Data Loads
- Run a Query in the BigQuery page

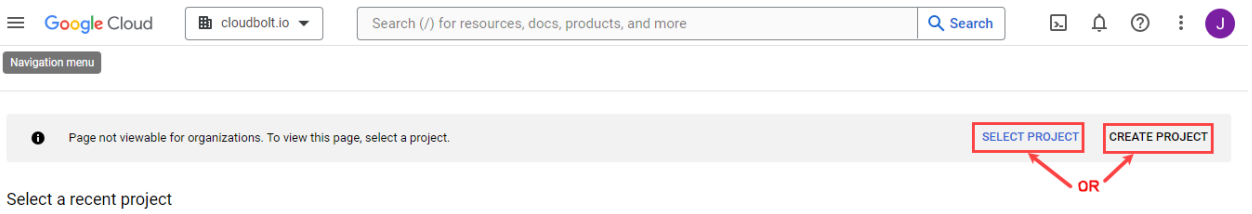
Required Permissions

You must have the following permissions to enable and configure Google Cloud billing data export to a BigQuery dataset:

- Billing account administrator role for the target Cloud billing account.
- BigQuery User role for the Cloud project that contains the BigQuery dataset that will be used to store the Cloud Billing data.
- Project Creator role on the organization or folder. To create a new project, you must have the following permissions:
  - `resourcemanager.organizations.get`
  - `resourcemanager.projects.create`

Enable Cloud Billing Data to BigQuery

Select or create a project that will contain your dataset.



1. In the Google Cloud console, select or create a Google Cloud project on the project selector page to contain your BigQuery dataset.
    - The project you create or select must have Billing enabled, and must be linked to the same Cloud Billing account that contains the data you plan to export to the BigQuery dataset.
2. In the **Select a project** dropdown at the top of the Google Cloud Console, select your project.
3. Open the **Navigation menu [] > Billing.**

Projects with No Linked Billing Account

If Billing is not enabled on the project, a popup window opens with text like: "This project is not linked to a billing account".

1. Enable Billing on the project by either selecting **Link a billing account** or **Manage billing accounts** options.
2. Continue to **Create a BigQuery Dataset.**

Projects with Linked Billing Account(s)

- If Billing is enabled on the project and you have only one Cloud Billing account, the **Billing Overview** page will display.
- If Billing is enabled on the project and you have more than one Cloud Billing account, a popup window will display with text like:: "Billing account <Your Billing Account> is linked to this project."

Continue to Create a BigQuery Dataset.

Create a BigQuery Dataset

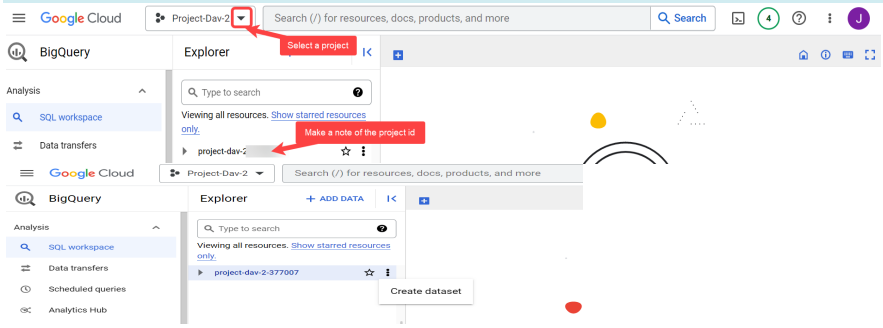
1. Sign in to the **Google Cloud Console > Navigation menu [] > BigQuery.**

2. In the **Project** dropdown in the main Navigation bar, select the project you set up to contain your dataset.
    - Make a note of the **Project ID,** as you will need it in the next step.
3. In the **Explorer panel,** click the overflow menu [] next to your project ID and click **Create Dataset**.
4. In **Create dataset** panel fill in the fields:

Field name	Notes
Dataset ID	Enter an ID (name) for this dataset. Letters, numbers, and underscores are allowed in this field.
Location type	Select a data location. **After you create your dataset, the location cannot be changed.** The data location specifies the region where your data is stored. All tables within this dataset will share this location. When creating a dataset, the Default location is the US multi-region.
Default table expiration	Set this option to **never**. Keep **Enable table expiration** check box clear.
Encryption	Set to **Google-managed key.** Customer Managed Encryption Keys (CMEK) are not supported when exporting billing data to BigQuery.

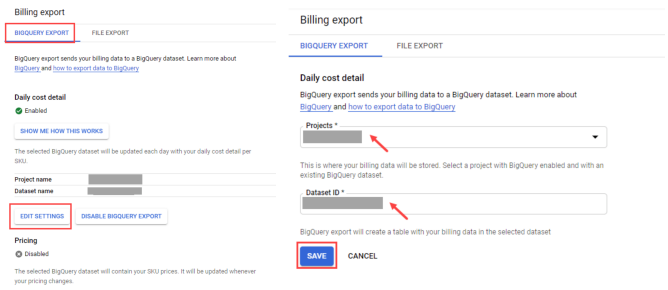
5. Click **Create dataset.**

Note: Your BigQuery dataset only reflects Google Cloud billing data incurred from the date you set up Cloud Billing export, and onward. The billing data for all the projects linked to the above selected project's billing account will be pulled into this dataset.



Enable Cloud Billing Data Export to BigQuery

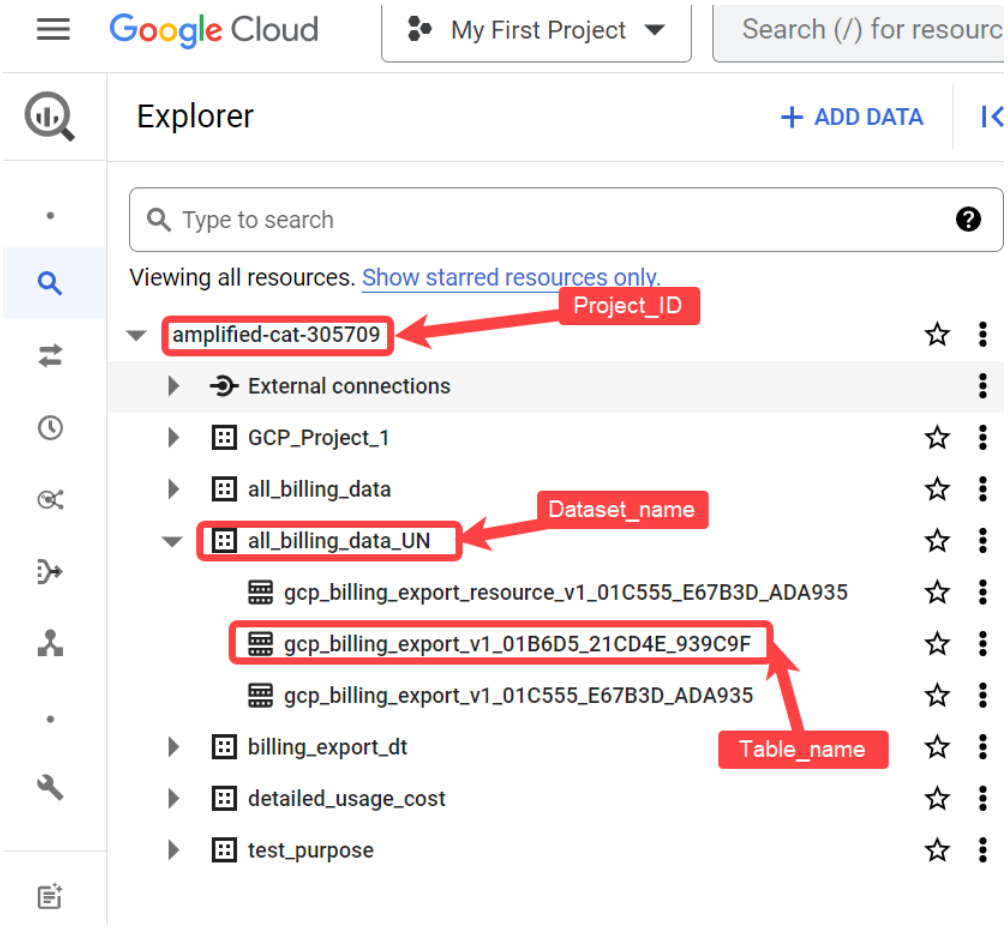
1. Sign in to the Google Cloud Console.
2. Open the console **Navigation menu [] > Billing.**
3. Choose the Cloud Billing account at the top right pane of the billing menu. Ensure that the billing account is the same as the billing account linked to the project where the BigQuery dataset is created.
4. From the **Billing menu**, select **Billing export.**
5. Select the **BigQuery export** tab. From here, choose the type(s) of data to export. This guide covers **Daily cost detail** type only.
    a. Daily cost detail
    b. Pricing
6. From the **BigQuery export** tab, click **Edit Settings** for Standard usage cost**.**
7. In the **Projects** dropdown, choose the Project under which the BigQuery dataset has been created previously.
8. In the **Dataset** dropdown, choose the dataset that you set up to contain your exported Cloud Billing data.
    - **Note:** You must enable **BigQuery API** for the project you set up in order to export data to BigQuery.
9. Click **Save.**



Billing Data Tables

Once you enable Cloud Billing export to BigQuery, billing data tables are automatically created in the BigQuery dataset. Make note of the **billing data table** name. You will need

this information during Billing Adapter creation. It can take up to one hour to get the billing data table created after creating a dataset.



Frequency of Data Loads

When you first enable the **daily cost detail** export to BigQuery, it may take a few hours to start seeing your Google Cloud cost data.

Run a Query in the BigQuery page

You can use queries to check whether the costs shown on the CloudBolt CSMP report page match the costs shown in the BigQuery for the chosen time frame.

Query to get Project IDs

Run this query to get the project ids associated to the selected database.

PL/SQL

```
SELECT DISTINCT project.id FROM '<enter your project_ID>.<enter dataset_name>.<enter
table_name>' WHERE CAST(usage_start_time AS DATE) >= CAST('YYYY-MM-DD' AS DATE) AND
CAST(usage_end_time AS DATE) <= CAST('YYYY-MM-DD' AS DATE) ;
```

Query to get cost data for single project, single service, time stamp (from and to)

PL/SQL

```
SELECT * FROM '<enter your project_ID>.<enter dataset_name>.<enter table_name>' WHERE
CAST(usage_start_time AS DATE) >= CAST('YYYY-MM-DD' AS DATE)  AND CAST(usage_end_time AS
DATE) <= CAST('YYYY-MM-DD' AS DATE)  AND project.id IN ('<enter project_id>')  AND
service.description IN ('<enter service_name>')
```

Query to get cost data for single project , multiple service , time stamp (from and to)

PL/SQL

```
SELECT * FROM '<enter your project_ID>.<enter dataset_name>.<enter table_name>' WHERE
CAST(usage_start_time AS DATE) >= CAST('YYYY-MM-DD' AS DATE)  AND CAST(usage_end_time AS
DATE) <= CAST('YYYY-MM-DD' AS DATE)  AND project.id IN ('<enter project_id>')  AND
service.description IN ('<enter service_name_1>','<enter service_name_2>','<enter
service_name_3>' and so on)
```

Query to get cost data for single project , All service , time stamp (from and to)

PL/SQL

```
SELECT * FROM '<enter your project_ID>.<enter dataset_name>.<enter table_name>' WHERE
CAST(usage_start_time AS DATE) >= CAST('YYYY-MM-DD' AS DATE)  AND CAST(usage_end_time AS
DATE) <= CAST('YYYY-MM-DD' AS DATE)  AND project.id IN ('<enter project_id>')
```

Query to get cost data for multiple project, single service, time stamp (from and to)

PL/SQL

```
SELECT * FROM '<enter your project_ID>.<enter dataset_name>.<enter table_name>' WHERE
CAST(usage_start_time AS DATE) >= CAST('YYYY-MM-DD' AS DATE)  AND CAST(usage_end_time AS
DATE) <= CAST('YYYY-MM-DD' AS DATE)  AND project.id IN ('<enter project_id1>', '<enter
project_id2>','<enter project_id3>' and so on)  AND service.description IN ('<enter
service_name_1>')
```

Query to get cost data for multiple project, multiple service, time stamp (from and to)

PL/SQL

```
SELECT * FROM '<enter your project_ID>.<enter dataset_name>.<enter table_name>' WHERE
CAST(usage_start_time AS DATE) >= CAST('YYYY-MM-DD' AS DATE)  AND CAST(usage_end_time AS
DATE) <= CAST('YYYY-MM-DD' AS DATE)  AND project.id IN ('<enter project_id1>', '<enter
project_id2>','<enter project_id3>' and so on)  AND service.description IN ('<enter
service_name_1>','<enter service_name_2>','<enter service_name_3>' and so on)
```

Query to get cost data for multiple project, All service, time stamp (from and to)

PL/SQL

```
SELECT * FROM '<enter your project_ID>.<enter dataset_name>.<enter table_name>' WHERE
CAST(usage_start_time AS DATE) >= CAST('YYYY-MM-DD' AS DATE)  AND CAST(usage_end_time AS
DATE) <= CAST('YYYY-MM-DD' AS DATE)  AND project.id IN ('<enter project_id1>', '<enter
project_id2>','<enter project_id3>' and so on)
```

Query to get cost data for all projects, all services, time stamp (from and to)

PL/SQL

```
SELECT * FROM '<enter your project_ID>.<enter dataset_name>.<enter table_name>' WHERE
CAST(usage_start_time AS DATE) >= CAST('YYYY-MM-DD' AS DATE)  AND CAST(usage_end_time AS
DATE) <= CAST('YYYY-MM-DD' AS DATE)
```

Query to get cost data for all project, multiple service, time stamp (from and to)

PL/SQL

```
SELECT * FROM '<enter your project_ID>.<enter dataset_name>.<enter table_name>' WHERE
CAST(usage_start_time AS DATE) >= CAST('YYYY-MM-DD' AS DATE)  AND CAST(usage_end_time AS
DATE) <= CAST('YYYY-MM-DD' AS DATE) AND service.description IN ('<enter
service_name_1>','<enter service_name_2>','<enter service_name_3>' and so on)
```

Query to get cost data for all projects, single service, time stamp (from and to)

PL/SQL

```
SELECT * FROM '<enter your project_ID>.<enter dataset_name>.<enter table_name>' WHERE
CAST(usage_start_time AS DATE) >= CAST('YYYY-MM-DD' AS DATE)  AND CAST(usage_end_time AS
DATE) <= CAST('YYYY-MM-DD' AS DATE) AND service.description IN ('<enter service_name>')
```

4.3.3. Enable APIs for your GCP project

You will need to logon to your Google Cloud Platform account and enable the Cloud Resource manager and Stackdriver Monitoring APIs for all of your GCP projects.

Metadata for Google Cloud Platform resource containers are updated via the Cloud Resource Manager and Stackdriver Monitoring APIs. If you wish to build active GCP normal adapters for all your projects tied to a GCP billing account along with billing adapter creation, you must activate both Cloud Resource Manager and Stackdriver Monitoring APIs .

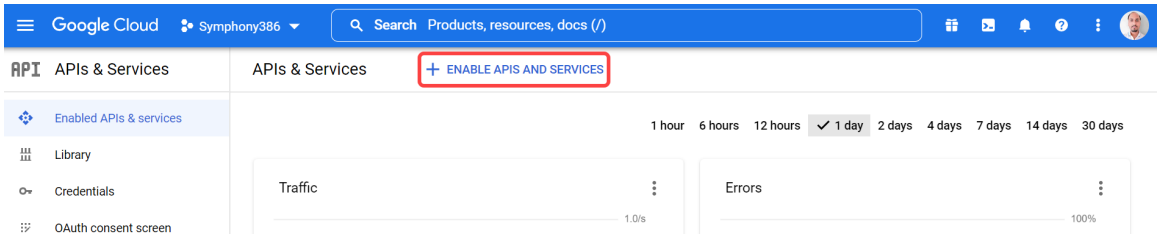
Enable APIs using Google Cloud console

You must follow below steps for each project to enable APIs.

1. Logon to your Google Cloud Platform (GCP) account.
2. In the Google Cloud console, select the Cloud project for which you want to enable the API, and then go to the APIs & Services page:

   Go to **APIs & Services**

3. Click the **ENABLE APIS AND SERVICES** button.



4. Search for "resource manager"
5. In the search results, click through to "Cloud Resource Manager API"
6. If "API enabled" is displayed, then the API is already enabled. If not, then click **Enable**.

7. Go to the APIs & Services page.

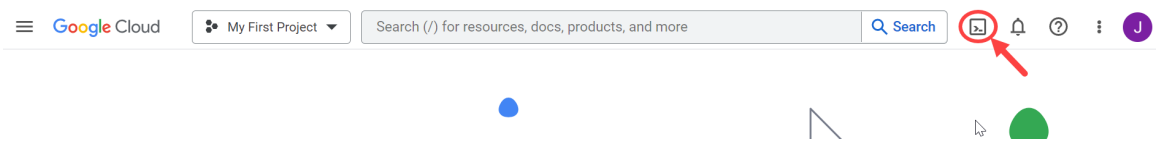
   Go to **APIs & Services**

8. Click the Enable APIs and Service button.
9. Search for "Monitoring".
10. In the search results, click through to "Stackdriver Monitoring API".
11. If "API enabled" is displayed, then the API is already enabled. If not, then click **Enable**.

Enable APIs using Google Cloud CLI

You can enable the Cloud Resource Management and Stackdriver Monitoring APIs for all of the projects in your Google Cloud account at once by using the steps below.

1. Open the Google Cloud Shell by clicking the **Activate Cloud Shell** icon in the top right corner.



2. If prompted to Enable the CLI Service, click Enable.
3. In the Cloud Shell terminal, copy and paste the below command, and then press Enter.

Code

```
for project in  $(gcloud projects list --format="value(projectId)")
do
    echo "ProjectId:  $project"
    gcloud services enable monitoring.googleapis.com --project=$project
    gcloud services enable cloudresourcemanager.googleapis.com --project=$project
done
```

4. If prompted to Authorize Cloud Shell, click Authorize.
5. You will see a operation successful line for each API when enabled on each project. If the API is already enabled for a project in the list, you will not see any success response line.

6. Following completion, you can check to see if the API was successfully enabled by heading to any project's API and Services Menu and looking for the API that was enabled.

Outcomes

Your project is granted the Cloud Resource Manager and Stackdriver Monitoring APIs access.

4.3.4. Create Custom Roles in GCP with Minimum Permission Sets

Learn to create different roles as required with requisite permissions in GCP. Later these roles would be assigned to principals.

Custom Roles

Creation of roles is dependent on the requirement. You can either create custom roles for various responsibilities such as monitoring, synchronizing, and then assign the required permissions to these roles. Or you can create a single custom role and assign all the permissions to that role. Later you can assign that role to the account whose service keys you have used to integrate with CloudBolt CSMP.

CloudBolt CSMP uses billing data tables available within the BigQuery dataset to display the various cost reports. Hence the permissions as listed in the following tables are required for the roles to perform the required tasks. A different set of permissions may be require for the Service Manager role.

The following table lists some **suggestive** roles and permissions. If required, you can create a role and add a combination of permissions from the roles listed below as required and assign the corresponding permissions to that role.

Role	Permission required	Functionality
CloudBolt Billing Administrator This role would fetch all your GCP billing account cost data to CloudBolt CSMP.	bigquery.jobs.create	This permission is required to validate the attached key while creating billing adapter and run jobs (including queries) within the project.
	bigquery.tables.getData	The permission is required for fetching data from GCP BigQuery database to CloudBolt CSMP database.
	bigquery.tables.list	This permission provides access to GCP BigQuery tables list and metadata at client end.
	bigquery.readsessions.create	This permission is required to

Role	Permission required	Functionality
		create a new read session via the BigQuery Storage Read API.
	bigquery.readsessions.getData	This permission is required to read data from a read session via the Storage Read API.
	bigquery.tables.get	This permission is required to get metadata about tables.
Service Manager This role would synchronize all the services of a GCP project to CloudBolt CSMP.	resourcemanager.projects.get	This permission is required while creating a new normal adapter, we authenticate service account keys with the project id described in the Keys. This permission ensures that keys have access to the respective project.
	compute.instances.list	This permission is required for fetching all instances of the project.
	compute.machineTypes.get	In CloudBolt CSMP Service Manager module we show the MEC (Montly Estimate Cost) for this, we need Instance configuration like RAM and CPU to calculate the price.
	compute.disks.list	This permission is required to fetch listing of all disks of the project.
	compute.snapshots.list	This permission is required to fetch listing of all snapshots of the project.
	compute.images.list	This permission is required to fetch listing of all images of the project.
Service Advisor This role helps monitor your GCP services using CloudBolt CSMP.	monitoring.timeSeries.list	In CloudBolt CSMP Service Advisor module we show Idle (Instance and Disk) tab for the instance, so for that purpose we need monitoring tool to fetch the instance data.

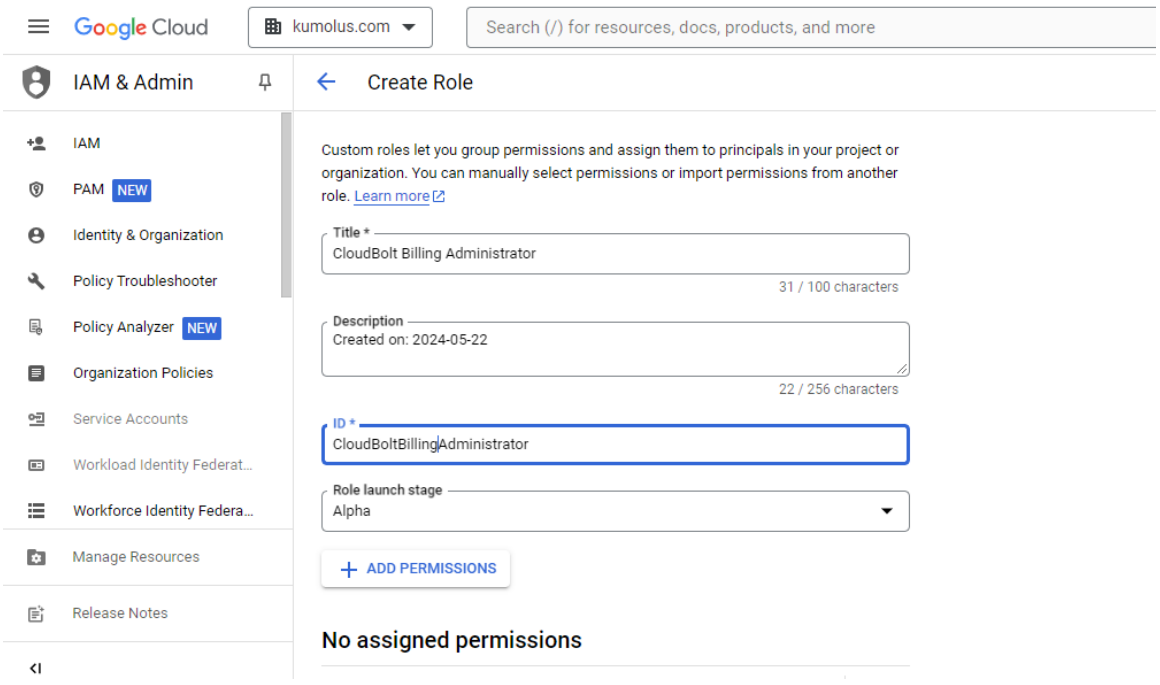
Important: To create a custom role at organization level, you must have the *iam.roles.create*, *roles/iam.roleAdmin*, and *roles/iam.organizationRoleAdmin* permissions. By default, the owner of a project or an organization has these permissions and can create

and manage custom roles. Users who are not owners, including organization admins, must be assigned either the Organization Role Administrator role, or the IAM Role Administrator role.

Creation of Custom Roles in GCP

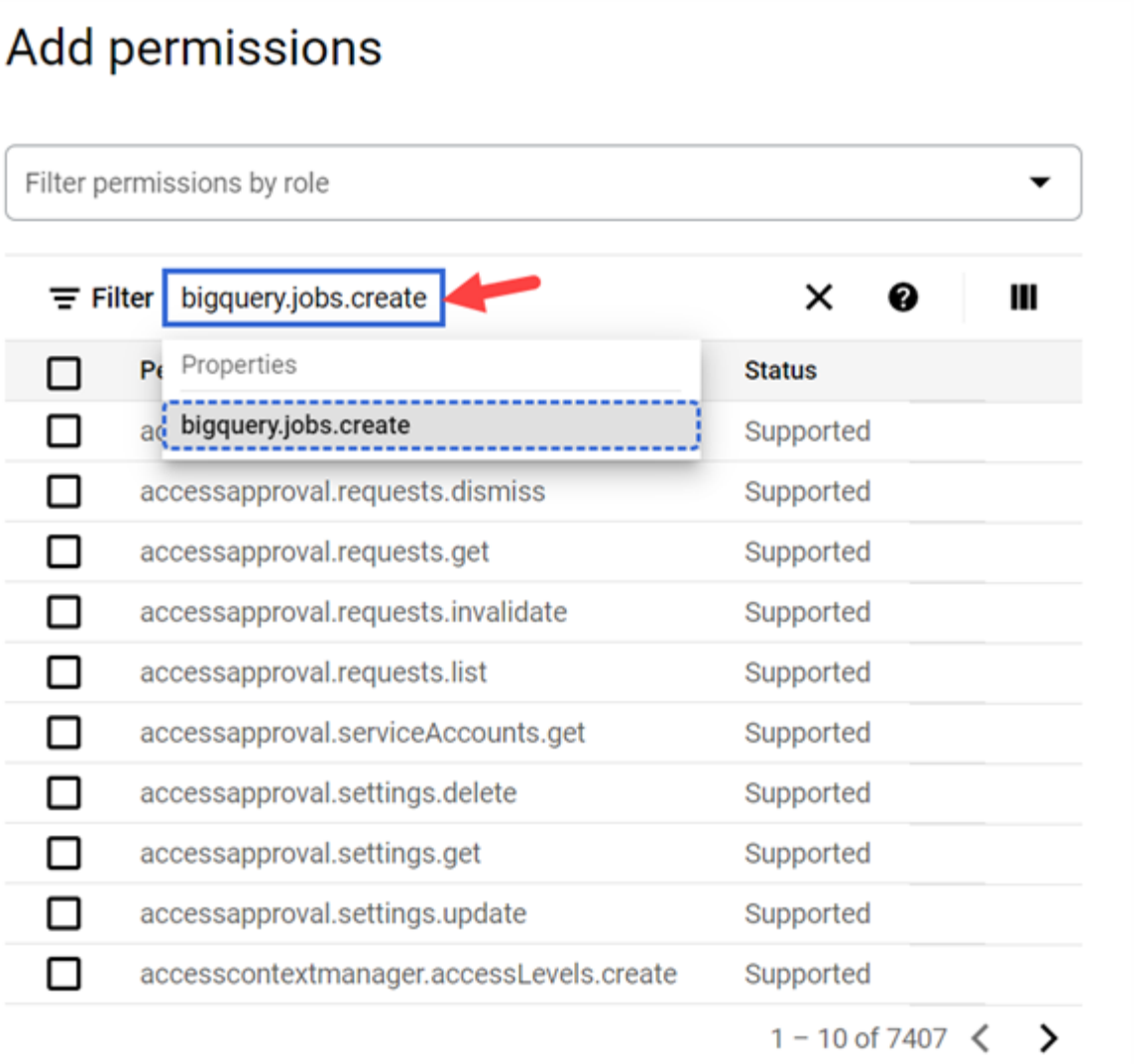
In the following example, we will create a custom role called **CloudBolt Billing Administrator**.

1. Logon to your GCP platform.
2. Select the organization from the drop-down list at the top of the page for your integration with CloudBolt CSMP.
3. Navigate to IAM & Admin page.
4. In the search bar, enter Roles and click the search icon. Click **Roles IAM & Admin** from the search results.
5. Click **+ Create Role**. The Create Role page is displayed.
6. Enter the title, for example, **CloudBolt Billing Administrator**.

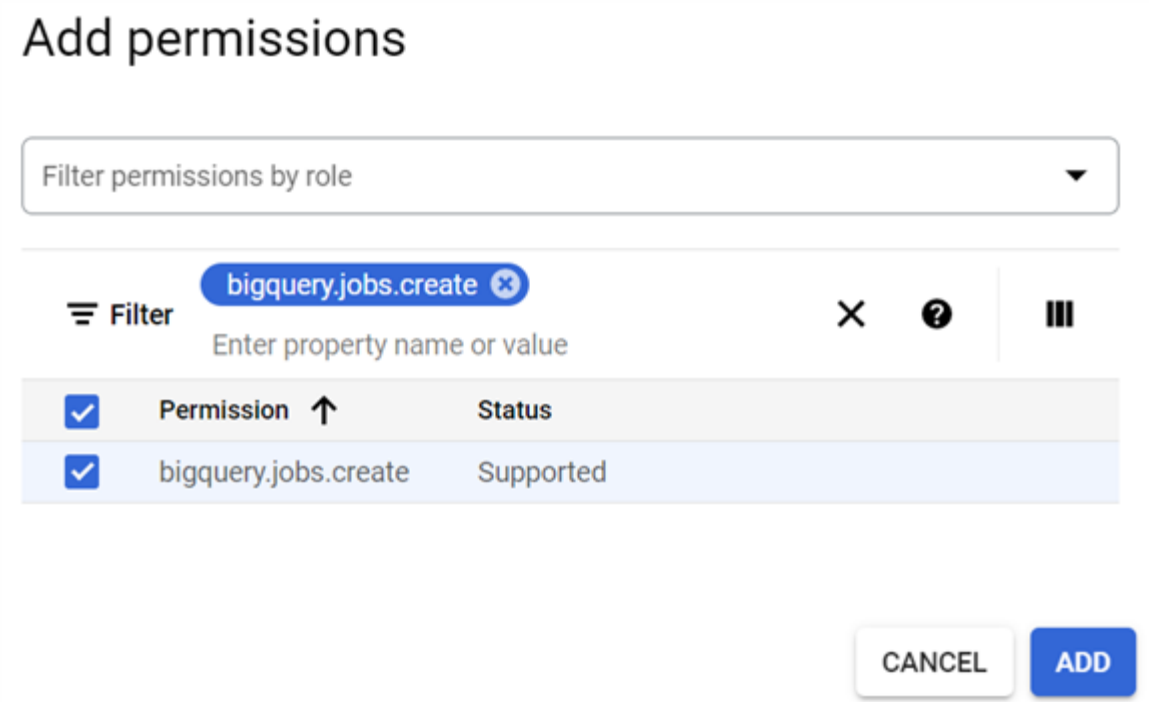


7. The ID field is created by GCP, you can rename the default ID if required.

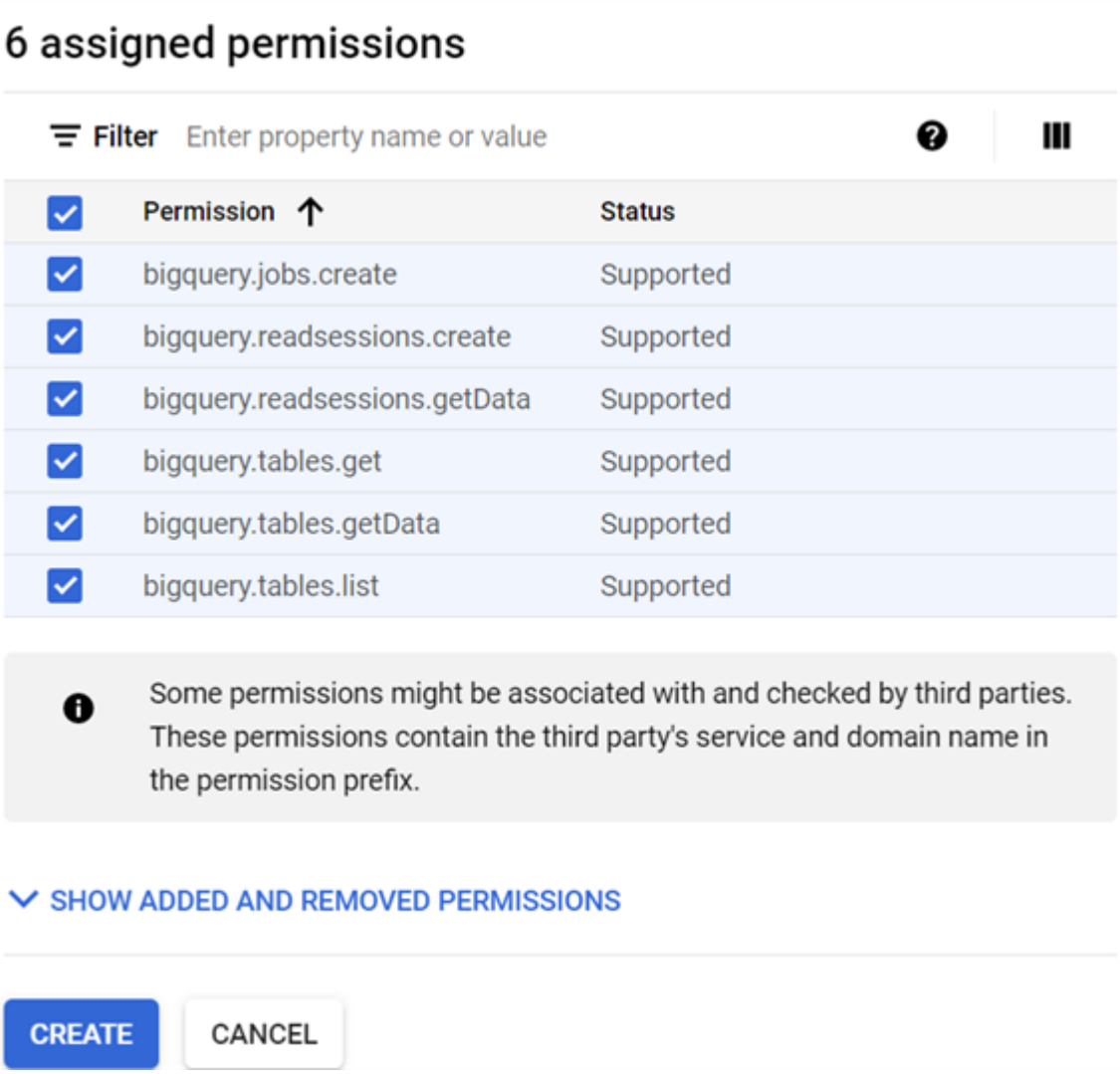
8. For the Role Launch stage, let it remain Alpha which is selected by default.
9. Click **+ADD PERMISSIONS.**
10. In the **Add permissions** dialog, in the **Filter** textbox, enter *bigquery.jobs.create*.



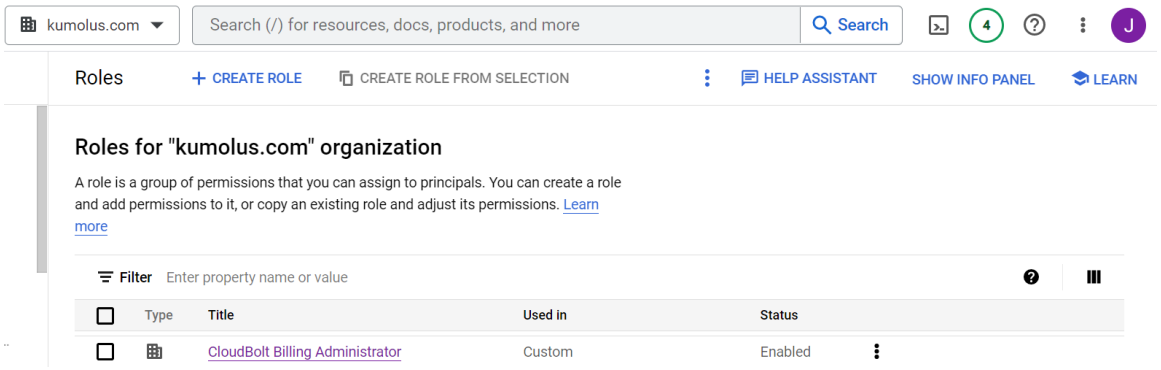
11. Select **bigquery.jobs.create**.



12. Click **Add**.
13. Similarly filter and add **bigquery.tables.getData**, **bigquery.tables.list**, **bigquery.readsessions.create**, **bigquery.readsessions.getData**, and **bigquery.tables.get** permissions to the role.



14. Click **Create**. The custom role **CloudBolt Billing Administrator** is created with assigned permissions and added to the roles list.



Note:

The permissions must be added at the associated organization or folder level.

For the Service Manager role, you must grant Service Manager access role and Service Adviser access role to the service account's principal under all the projects linked with a billing account.

Outcomes

The required roles are created with minimum permissions in GCP.

4.3.5. Set up GCP Credentials

Learn how to establish the identity of your Google Service Account in order to use it with CSMP.

Introduction

To use a Service Account from CSMP, you must first establish the identity of the Service Account. Public/private key pairs provide a secure way of accomplishing this goal. When you create a Service Account key, the public portion is stored on Google Cloud, while the private portion is only available to you.

Prerequisites

- A Google Cloud Platform account exists with Administrative permissions.
- An existing Google Cloud Billing Account with a Project; see Enable Cloud Billing Data Export to BigQuery.

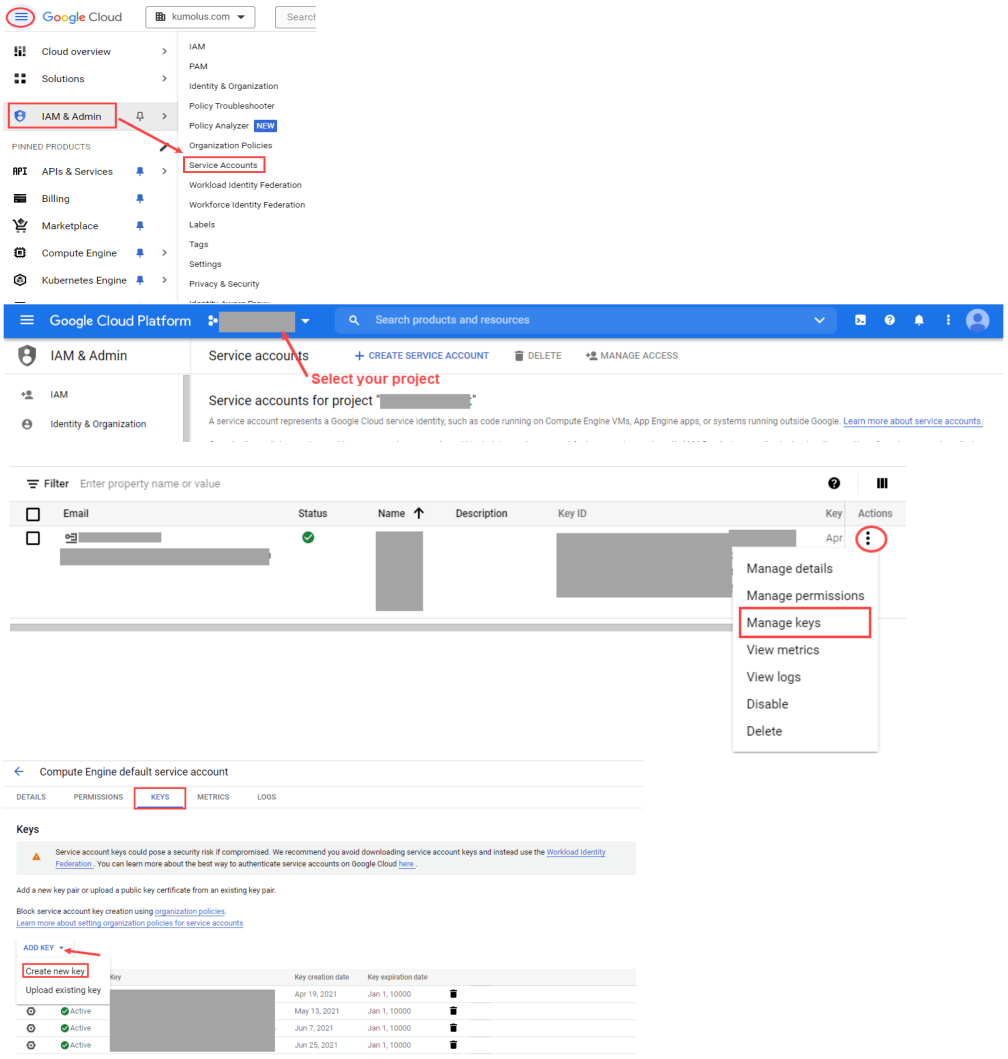
Create a Service Account Key

You will need this key to create a GCP Adapter; make sure you store the created key in a secure location.

Create a Service Account key using the Google Cloud Console. A Service Account can have up to 10 keys.

1. In the Cloud Console, navigate to **IAM & Admin > Service Accounts.**
2. From the dropdown, select the project you set up in Enable Cloud Billing Data Export to BigQuery.
3. In the Actions column of your selected project, click the vertical ellipses > Manage keys.
4. Click the **ADD KEY dropdown>Create new key.**
5. Select **JSON** as the key type and click **Create.**

Important: Ensure to store the key file securely; after you download the key file, you cannot download it again.



Service Account Key File

- Clicking **Create** downloads a service account key file.
- **Ensure to store the key file securely; after you download the key file, you cannot download it again.**
- This key file is required while creating a billing adapter in CloudBolt CSMP to display your GCP cost detail.
- After you create a key, you might need to wait for 60 seconds or more before using the key. If you try to use a key immediately after you create it, and you receive an error, wait at least 60 seconds and try again.

The downloaded key has the following format, where `private-key` is the private portion of the public/private key pair:

JSON

```
{
  "type": "service_account",
  "project_id": "project-id",
  "private_key_id": "key-id",
  "private_key": "-----BEGIN PRIVATE KEY-----
private-key
-----END PRIVATE KEY-----
",
  "client_email": "service-account-email",
  "client_id": "client-id",
  "auth_uri": "https://accounts.google.com/o/oauth2/auth",
  "token_uri": "https://accounts.google.com/o/oauth2/token",
  "auth_provider_x509_cert_url": "https://www.googleapis.com/oauth2/v1/certs",
  "client_x509_cert_url": "https://www.googleapis.com/robot/v1/metadata/x509/service-
account-email"
}
```

Outcomes

You have learnt to generate and export Google Service Account Key.

4.3.6. Assign Custom Role and Grant Permissions to Service Account

In GCP, BigQuery uses a service account (also known as principal) to manage dataset permissions. As soon as you enable Cloud Billing export to BigQuery, GCP automatically adds a service account as an owner to the dataset that you specify in GCP.
The service account has the following format: *gcp-role-test@amplified-cat-305709-iam.gserviceaccount.com.* By assigning roles to the principal, you grant the permissions associated with that role to the service account. Based on these permissions, the service account can fetch the required data from GCP organization or project(s) or folder to CloudBolt CSMP.

Based on your requirement, you can follow any one of the procedures: Assign Roles to the Service Account at Organization Level or Assign Roles to the Service Account at Folder Level.

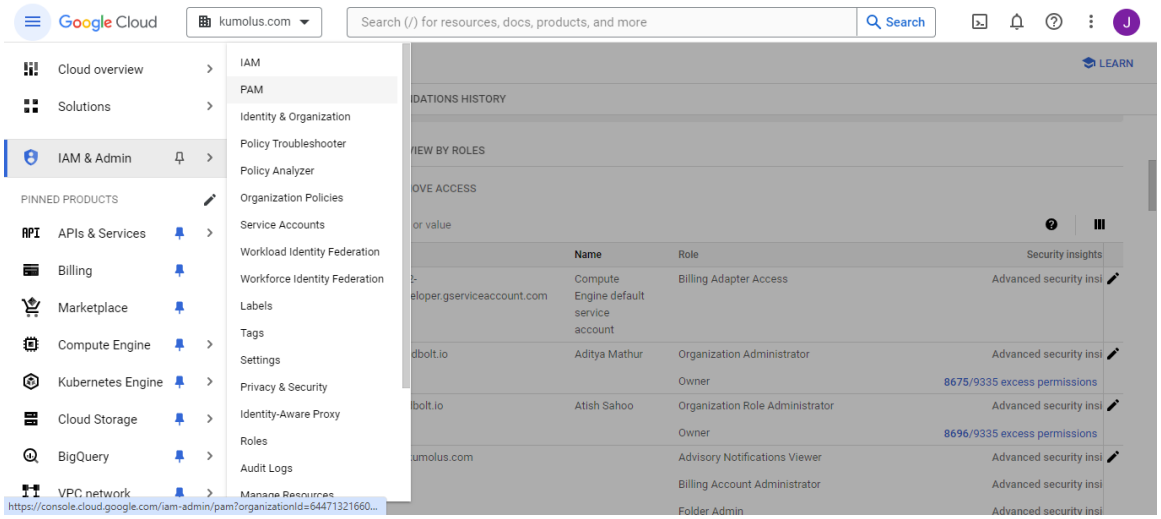
Prerequisites

1. You must enable the IAM API.
   Enable the API
2. The service account or the project that owns the service account must have the Service Account Admin (roles/iam.serviceAccountAdmin) IAM role granted.

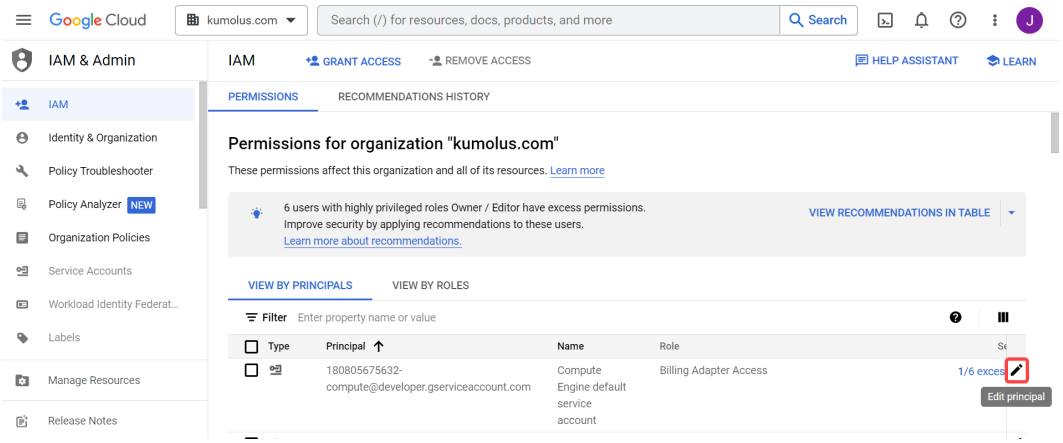
Assign Roles to the Service Account at Organization Level

A service account can be assigned a role that has permissions at the **org level**. Then that service account will have permissions to all the project in the organization. In this example, we shall see how to assign a role created with minimum permissions to the service account(principal) at organization level. We shall use the role "CloudBolt Billing Administrator" created earlier.
See Create Custom Roles in GCP with minimum permission sets.

1. In the cloud console, go to **IAM & Admin > IAM**.



2. Select the organization.
3. Select a principal of your service account:
    a. To grant a role to a principal who already has other roles on the service account, find the row containing the principal's email address, then click **Edit principal** in that row, then click add **+Add another role**.

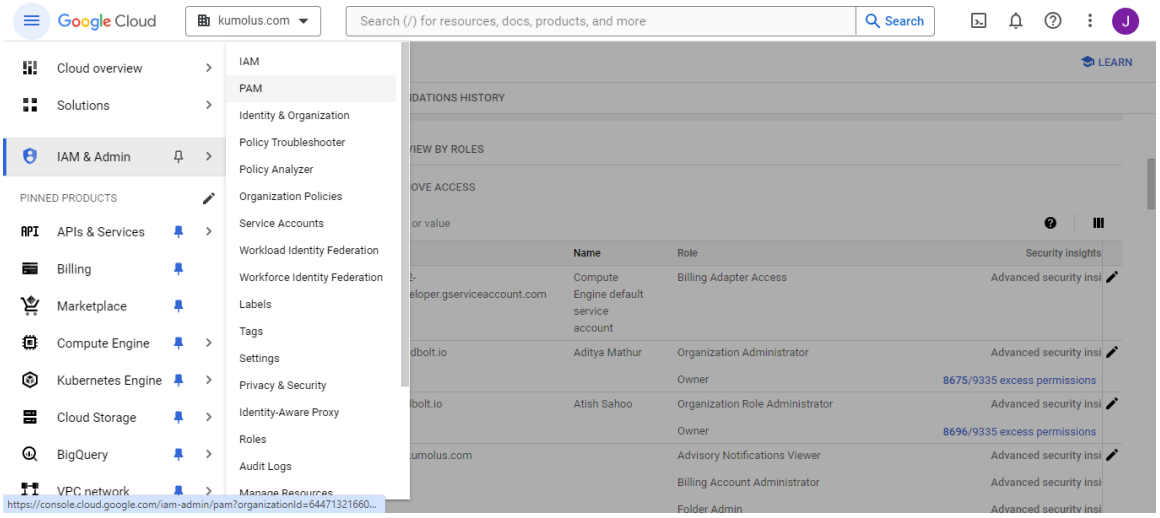


    b. To grant a principal who does not already have other roles on the service account, click **GRANT ACCESS** from the top, then enter the principal's email address.
4. In the Select a role drop-down, browse to Custom, and select the recently created role **CloudBolt Billing Administrator** , **Service Manager**, and **Service Advisor** which we created earlier. See Create Custom Roles in GCP with Minimum Permission Sets.
5. Click **Save**.

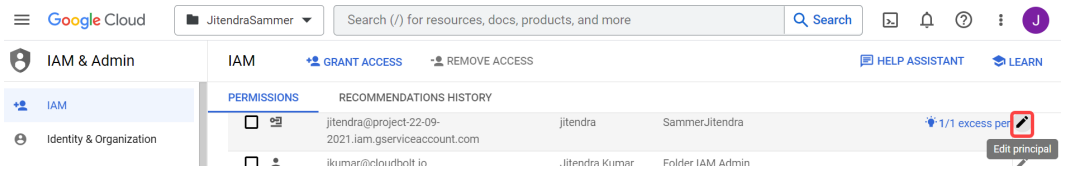
Assign Roles to the Service Account at Folder Level

Use below procedure to grant custom role(s) to the service account's principal at folder level. See Organization Hierarchy and Projects in GCP

1. In the cloud console, go to **IAM & Admin > IAM**.



2. Select the folder.
3. Select a principal of your service account:
    a. To grant a role to a principal who already has other roles on the service account, find the row containing the principal's email address, then click **Edit principal** icon in that row, then click add **+Add another role.**



    b. To grant a principal who does not already have other roles on the service account, click **GRANT ACCESS** from the top, then enter the principal's email address.
4. In the Select a role drop-down, browse to Custom, and select the recently created role **CloudBolt Billing Administrator** , **Service Manager**, and **Service Advisor** which we created earlier. See Create Custom Roles in GCP with Minimum Permission Sets.
5. Click **Save**. The principal is granted the roles on the service account.

Outcomes

The principal (service account) is granted the custom roles permissions.

4.3.7. Create the GCP Consolidated Billing Adapter

Learn how to set up the GCP Consolidated Billing Adapter in CloudBolt Cost and Security Management Platform.

Introduction

The GCP Consolidated Billing Adapter interacts with consolidated billing features in GCP to produce the cost reports such as spend overview, spend details, the total cost for month or year, and cost adviser.

GCP use the Pacific Standard Time Zone (PST) for its cost reports, which follow daylight saving time shifts. Whereas, CloudBolt CSMP adapters uses the UTC time zone. Due to the time zone difference, there may be some cloud cost variations between the cost reports shown on CloudBolt CSMP and the GCP Cloud cost report.

Prerequisites

Before creating a GCP Consolidated Billing Adapter, complete the following steps:

1. Create folders in GCP and arrange the projects in folders in a hierarchical manner. See, Organization Hierarchy and Projects in GCP.
2. Enable cloud billing data export to Big Query in Google Cloud console to obtain Billing Table Name of BigQuery Dataset ID, to be used in CloudBolt Adapter configuration. See, Enable Cloud Billing Data Export to BigQuery.
3. Enable APIs for all the GCP projects. See, Enable APIs for your GCP Project.
4. Create custom roles in GCP for your organization and assign required permissions to the roles. See, Create Custom Roles in GCP with Minimum Permission Sets.
5. Setup Google Cloud credentials to obtain Service Account Key, to be used in Adapter setup in CloudBolt CSMP. See, Set up GCP Credentials.

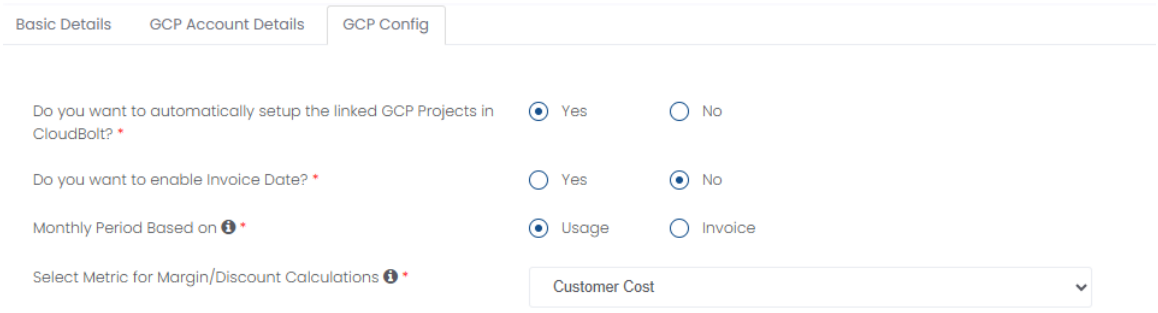
6. Grant Permissions/Assign custom roles to the service account. See, Assign Custom Role and Grant Permissions to Service Account.

Create the GCP Consolidated Billing Adapter

1. Log in to CloudBolt Cost and Security Management.
2. Click the **Quick Action icon >** Adapters **& Integration**.
3. Click **Add Cloud** Adapter **> GCP**.
4. Fill out the Basic Details, then click **Next**.
    - **Adapter Type:** Consolidated Billing
    - **Name:** Create a Name for your Adapter.
5. Click the **GCP Account Details** tab and fill in the fields:

Field name	Notes
GCP Details	Enter the downloaded Service Account Key collected during Create a Service Account Key.
Dataset Name	Enter the dataset name collected during Create a BigQuery Dataset configuration.
Table Name	Enter the Table Name of your BigQuery dataset.

6. Click **Verify.** If the account details are correct, you will see a message that looks like this: Credentials are valid.
7. Click **Next.** The GCP Config tab appears.



8. Click **Yes** if you want to create normal adapters for all the projects linked with the GCP billing account associated with the project under which your BigQuery dataset is available. If you click No, 'Not Configured' state Normal Adapters will be created.

If you have clicked *No* for auto normal adapter creation and later you updated the billing adapter to set the option as *Yes*, the previously *not configured* normal adapters will turn to *active* by default. Whenever a new project is created under the GCP billing account, a normal adapter will be created automatically with a status based on your option selection for "Do you want to automatically setup the linked GCP Projects in CloudBolt?" The auto created normal adapters are named as per the project name.

9. By default, invoice date feature would be disabled. To enable, you must select *Yes* for "Do you want to enable Invoice Date?" Select an invoice date from the drop-down for invoice date. Default invoice date is set to 10.
10. The 'Monthly Period Based on' field allows you to select how cost report data is organized. By default, it is set to 'Usage', which enables you to view the data using both daily and monthly filters. Alternatively, selecting the 'Invoice' option will organise the cost report data around the GCP invoice date, allowing you to view it based solely on the monthly filter.
11. Select a metric type from the drop-down for 'Select Metric for Margin/Discount Calculations' field. In future, if you create a billing configuration for this billing adapter, the margin and discount will be calculated against this selected metric. By default, 'customer cost' metric will be selected.
12. Click **Submit** to create the GCP Billing Adapter.

Outcomes

View the created GCP Adapter in the CloudBolt Cloud Adapters dashboard.

4.3.8. Creating a Normal GCP adapter

Learn how to create a Normal Google Cloud Platform (GCP) adapter in CloudBolt CSMP

Introduction

To manage the resources available in your GCP projects using the CloudBolt CSMP, you will need to create a Normal GCP adapter in CloudBolt CSMP.

CloudBolt CSMP uses a Normal GCP adapter to generate service advice, which identifies unused and unoptimized services to save on your Google cloud cost. Normal GCP adapters are also used by the security and compliance adviser and the event scheduler.

Prerequisites

Before creating a Normal adapter for the GCP project, ensure to

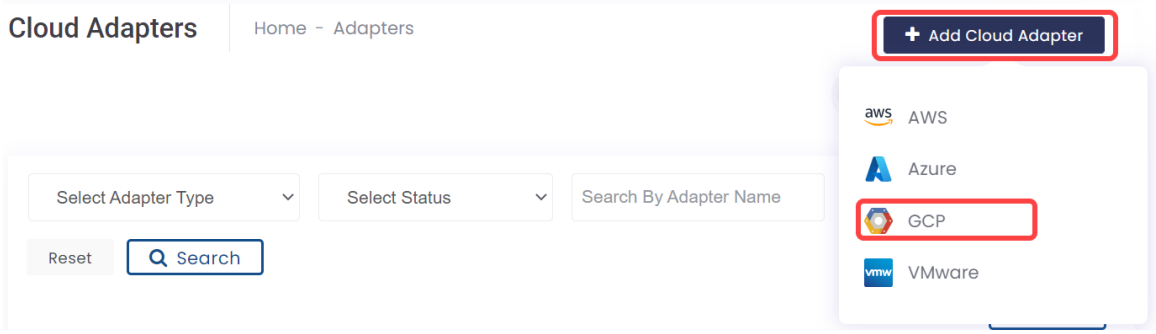
- Create a folder containing all your GCP projects which you want to synchronize in the CloudBolt CSMP. See Organization Hierarchy and Projects in GCP
- Create a Google Cloud Service account, generate service keys, and assign roles (**Service Manager** and **Service Advisor**) to the service account. See Creating and Managing Google Cloud Service Accounts
- Enable APIs for your GCP Project

Creating a Normal GCP adapter

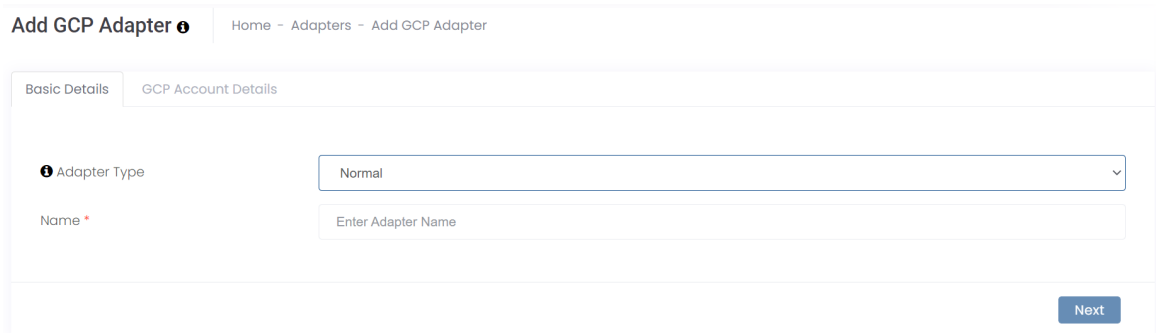
Carry out the following steps to create a Normal adapter for a GCP project.

1. Login to the CloudBolt CSMP account using your credentials.
2. In the header bar, click the **Quick Actions icon []** and then click **Adapters & Integration** option.

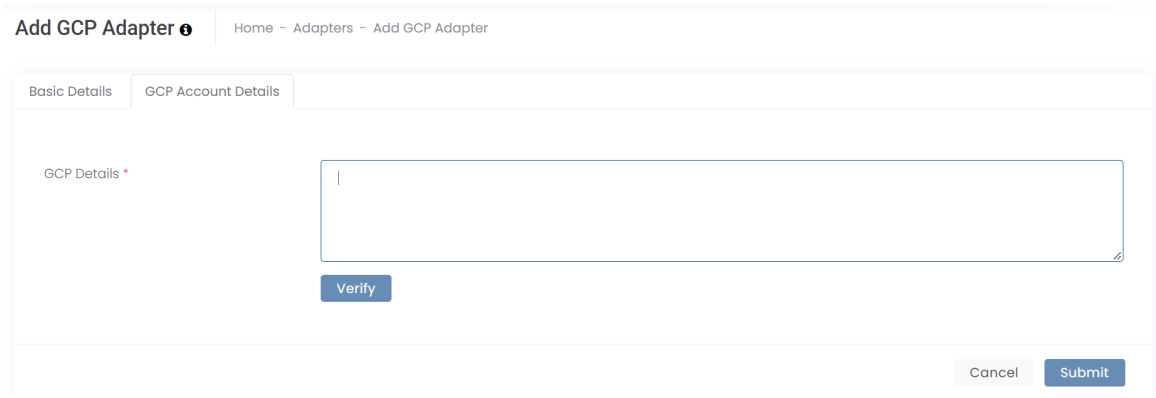
3. Click **Add Cloud Adapter > GCP.**



4. Under the **Basic Details** tab, in the Adapter type list, click the drop-down and select Normal.



5. In the **Name** text box, enter a valid name for your normal adapter.
6. Click **Next**. The GCP Account Details tab is displayed.



7. In the **GCP Details** text box, enter the previously downloaded Google service account key for your project.
8. Click **Verify** button. If your Google service account key is valid, you will see a message similar to: Credentials are valid.

9. Click the **Submit** button to complete the Normal GCP adapter creation.

Note:
You can create one adapter per project ID. If your Google service account key's project ID has been used with another Normal adapter, you will get an error message similar to: '**<Project_name>' project id is already in use with adapter '<Normal_adapter_name>**'.

Outcome

Your Normal GCP adapter is successfully created in CloudBolt CSMP for your Google standard billing account.

4.3.8.1. Synchronizing the Normal GCP Adapter

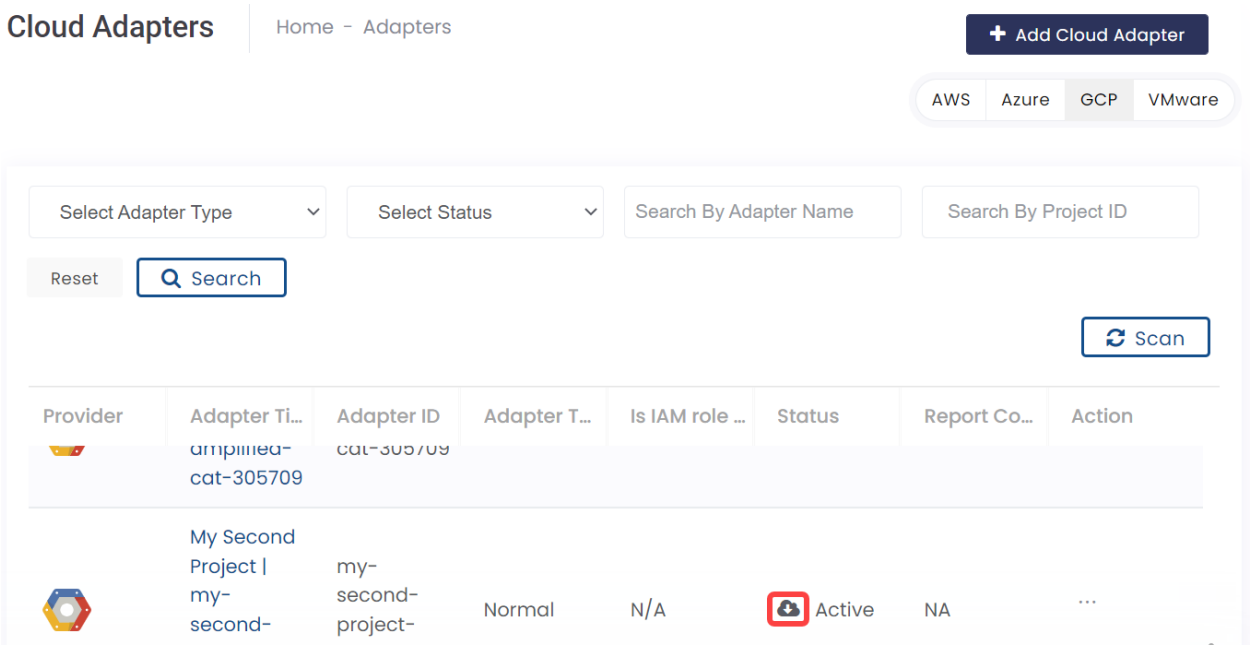
Learn how to synchronize a Normal GCP adapter

Normal GCP adapters will be listed on the CloudBolt CSMP's Adapters page once they have been successfully created. When you create or update a Normal adapter, it synchronizes your Google cloud services with CloudBolt CSMP modules.

When synchronization starts you will get a notification similar to:

"Synchronization process has been started for adapter <adapter_name>".

A synchronization icon will also appear under the Status column of the adapter while synchronization is in progress.



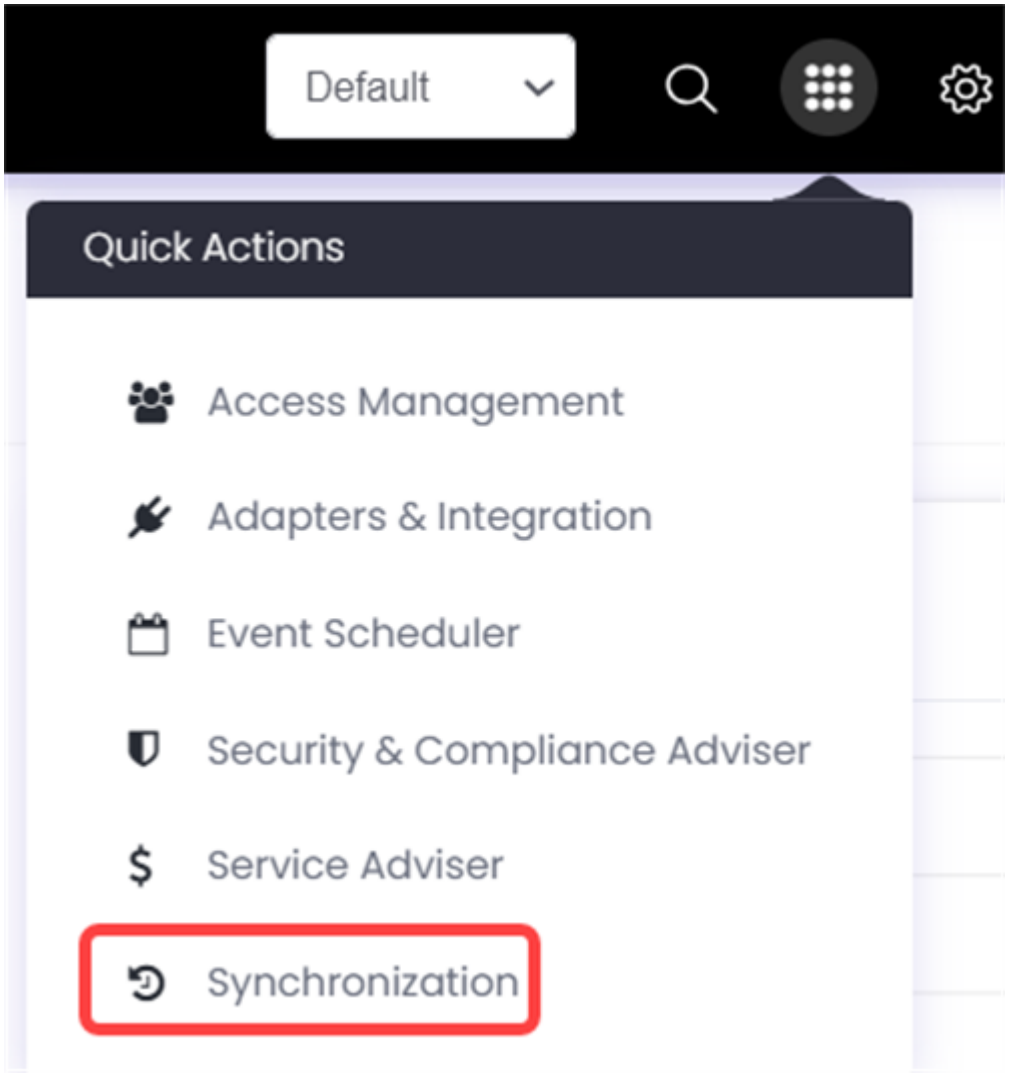
When synchronization finishes you will get a notification similar to: "Synchronization process has been completed for adapter <adapter_name>".

You need to synchronize the newly added Normal GCP adapter to get the information from Google Cloud accounts.

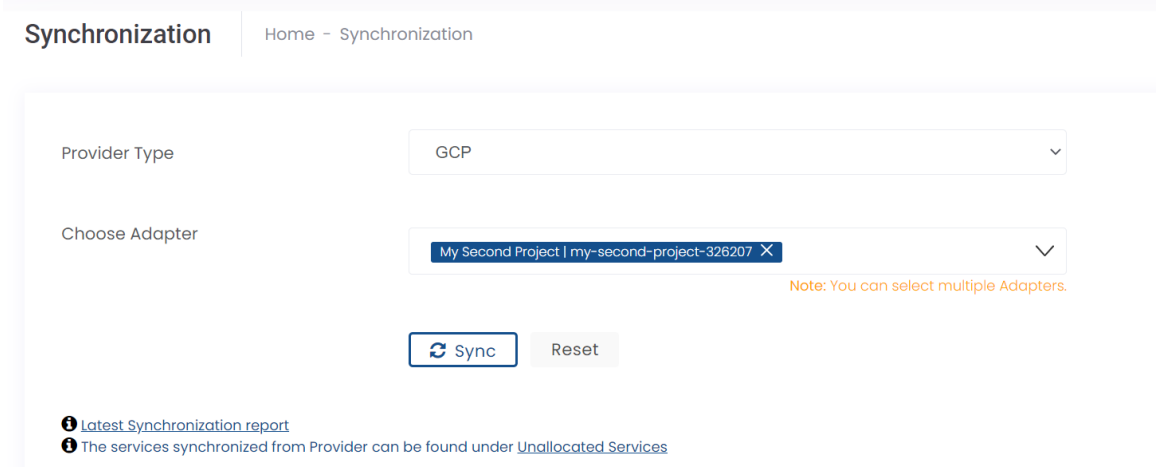
Synchronizing the Normal GCP adapter manually

Where synchronization process does not happen automatically, you must follow below procedure to synchronize the normal adapters with your GCP projects.

1. Click the **Quick Actions** icon on the header.



2. Click **Synchronization** option. The Synchronization page appears.



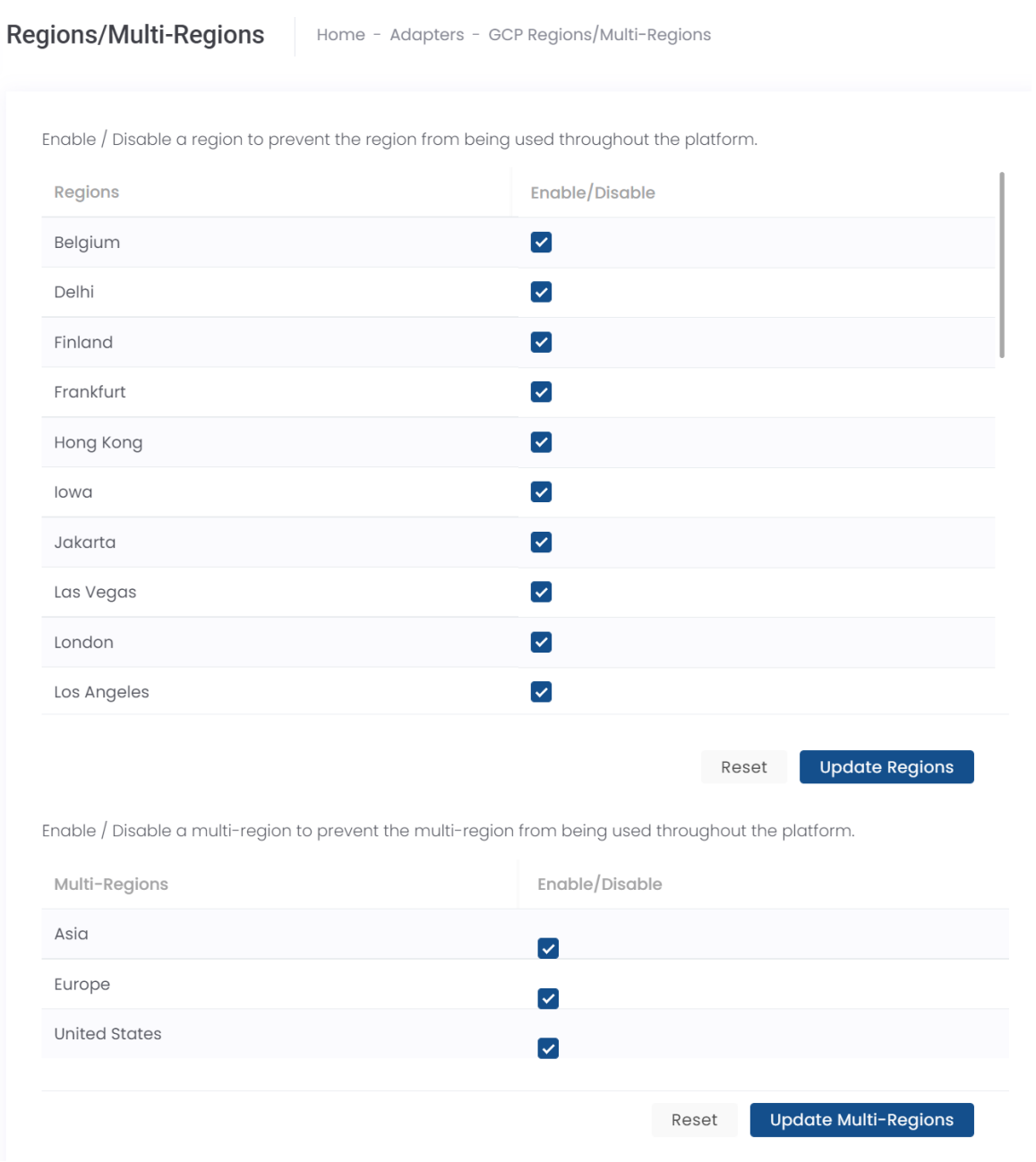
3. In the Provider Type list, select your cloud provider name, in this case, it is GCP.
4. In the Choose Adapter list, select the appropriate Normal adapter name whose Services you want to synchronize.
5. Click **Sync now**.

GCP Regions

GCP regions selection allows you to enable or disable your GCP location to synchronize your GCP services. By default, all the available regions will be enabled. When a region is enabled, all services available in that location will be synchronized to the CloudBolt CSMP.

To update your region preference, follow the steps given below.

1. Go to **Adapters** page on CloudBolt CSMP.
2. Navigate to GCP adapters list page. Under the Actions column, click **Regions/Multi-region** for the GCP adapters. The Regions/Multi-Regions page is displayed.



3. By default, all the regions/multi-regions will be selected and therefore enabled.
4. To disable a region/multi-regions, clear the respective region/multi-regions check box.
5. To enable a disabled region/multi-regions, select the check box.
6. Click **Update Regions** and **Update Multi-Regions** at the end of the list to save the changes.

Limitations

Currently, the Normal adapters for GCP can only synchronize VM instances and Disks.

4.3.8.2. Creating and Managing Google Cloud Service Accounts

Learn to create a Google Cloud Service account, generate service keys, and assign roles to the service account.

- Introduction
- Create Custom Roles
- Create a Service Account
- Assign Roles to the Service Account
- Assign Roles to the Service Account at Organization Level
- Assign Roles to the Service Account at Folder Level
- Generate Service Account Keys
- Outcome

Introduction

This publication will explain how to create service accounts using the Google Cloud Console. You will also get to know about managing the required permissions and keys to synchronize the services with the CloudBolt CSMP. A service account can be created inside a project.

By default, each project can have up to 100 service accounts that control access to your resources using CloudBolt CSMP.

Create Custom Roles

You must create **Service Manager** and **Service Advisor** roles at your GCP organization level. See Create Custom Roles in GCP with Minimum Permission Sets

Create a Service Account

To create a service account, at minimum the user must be granted the Service Account Admin role or the Editor basic role.

1. In the Google cloud Console, go to the **Service accounts** page.
2. Select the organization.
3. Click **Create service account**.
4. Enter a service account name to display in the Google cloud console.

   Note: The Google cloud console generates a service account ID based on this name. Edit the ID if necessary. You cannot change the ID later.

5. Optional: Enter a description of the service account.
6. Click **CREATE AND CONTINUE** and continue to **Grant this service account access to project** step.
7. Click **CONTINUE.** A policy updated prompt is displayed.
8. In the Service account users role field, add members that can impersonate the service account.(Optional)
9. In the Service account admins role field, add members that can manage the service account. (Optional)
10. Click **DONE** to finish creating the service account.

Assign Roles to the Service Account

You must assign custom roles created previously to the service account at organization level or folder level. To create a folder, see Organization Hierarchy and Projects in GCP.

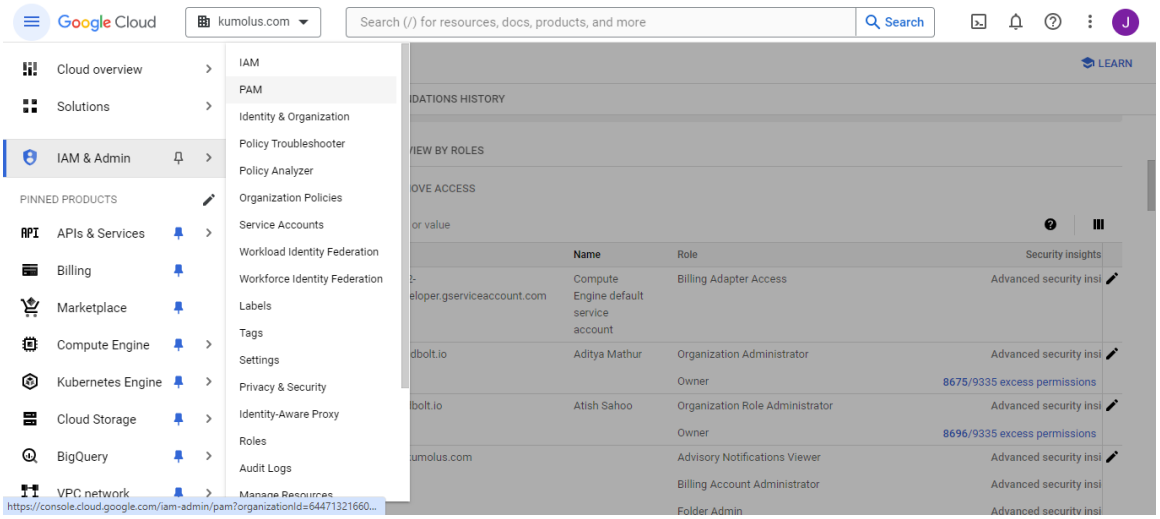
You must enable the IAM API.
Enable the API

The service account or the project that owns the service account must have the Service Account Admin (roles/iam.serviceAccountAdmin) IAM role granted.

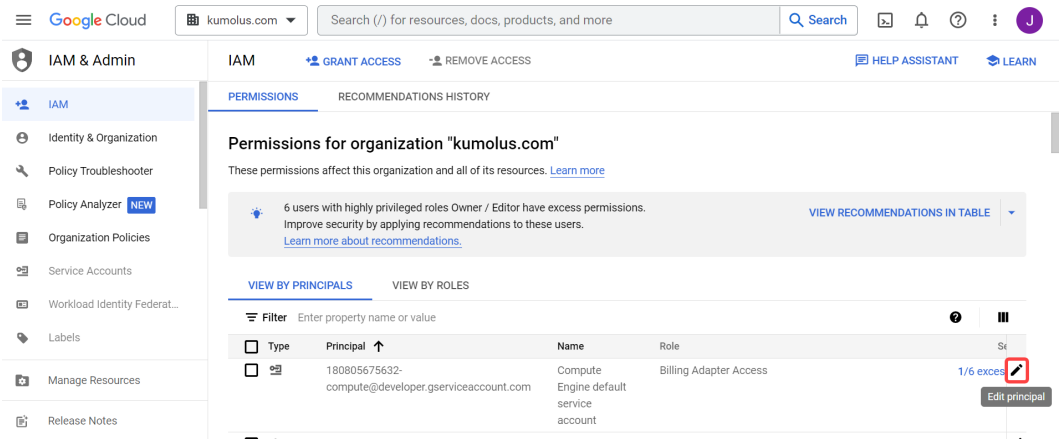
Assign Roles to the Service Account at Organization Level

Use below procedure to grant custom roles to the service account's principal at organization level.

1. In the cloud console, go to **IAM & Admin > IAM**.



2. Select the organization.
3. Select the principal of your service account:
    a. To grant a role to a principal who already has other roles on the service account, find the row containing the principal's email address, then click **Edit principal** in that row, then click add **+Add another role**.



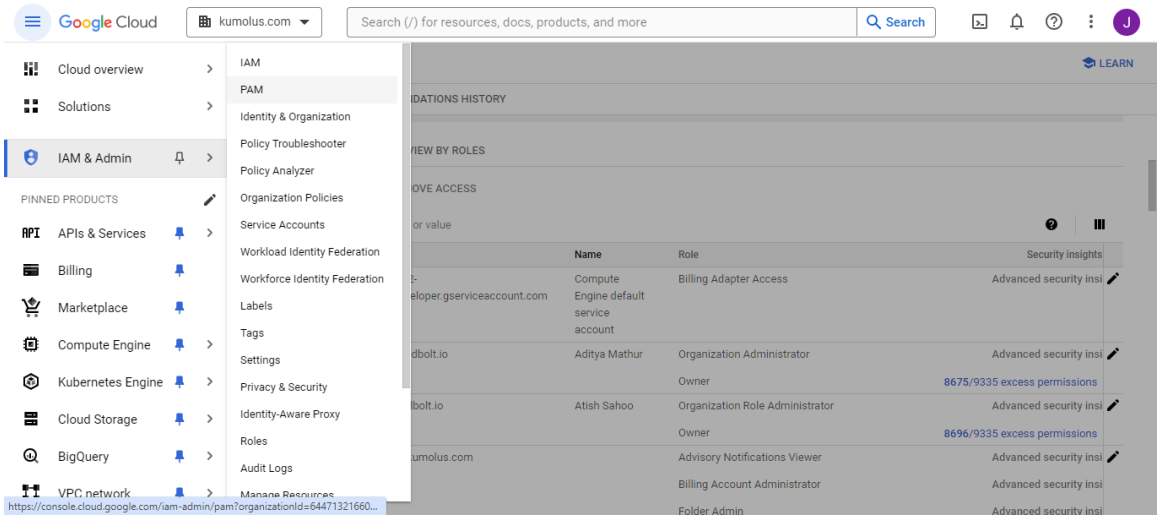
    b. To grant a principal who does not already have other roles on the service account, click **GRANT ACCESS** from the top, then enter the principal's email address.

4. In the **Select a role** drop-down, browse to **Custom**, and select the recently created role **Service Manager** and **Service Advisor** which we created earlier. See Create Custom Roles in GCP with Minimum Permission Sets
5. Click **Save**. The principal is granted the roles on the service account.

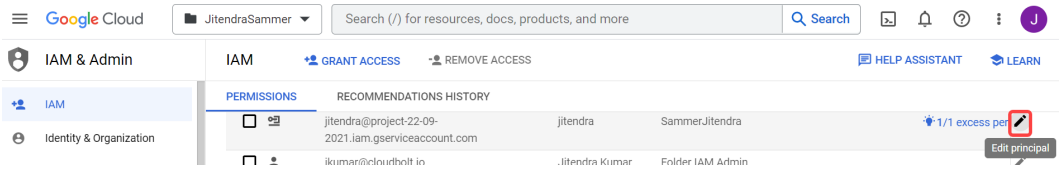
Assign Roles to the Service Account at Folder Level

Use below procedure to grant custom roles to the service account's principal at folder level.

1. In the cloud console, go to **IAM & Admin > IAM**.



2. Select the folder.
3. Select the principal of your service account:
    a. To grant a role to a principal who already has other roles on the service account, find the row containing the principal's email address, then click **Edit principal** icon in that row, then click add **+Add another role.**



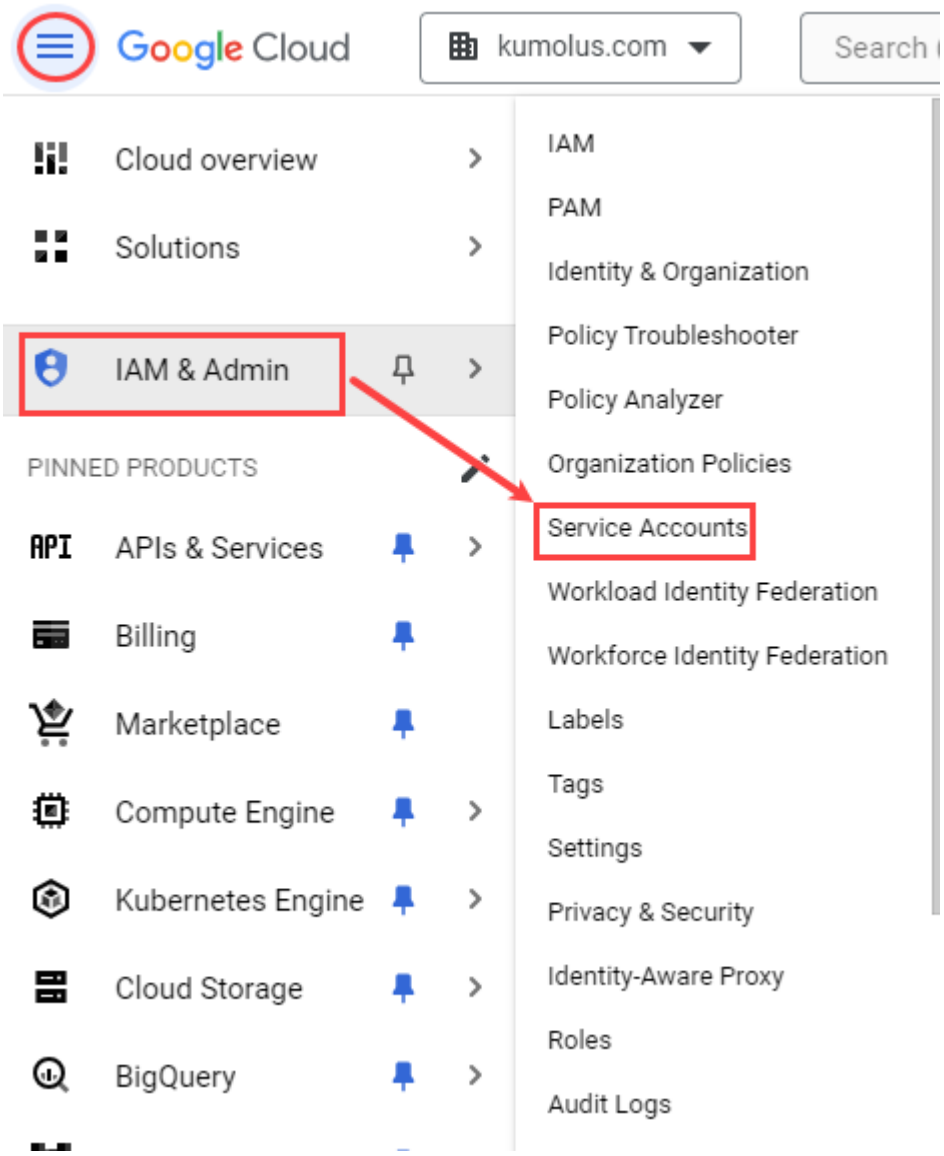
    b. To grant a principal who does not already have other roles on the service account, click **GRANT ACCESS** from the top, then enter the principal's email address.
4. In the **Select a role** drop-down, browse to **Custom**, and select the recently created role **Service Manager** and **Service Advisor** which we created earlier. See Create Custom Roles in GCP with Minimum Permission Sets

5. Click Save. The principal is granted the roles on the service account.

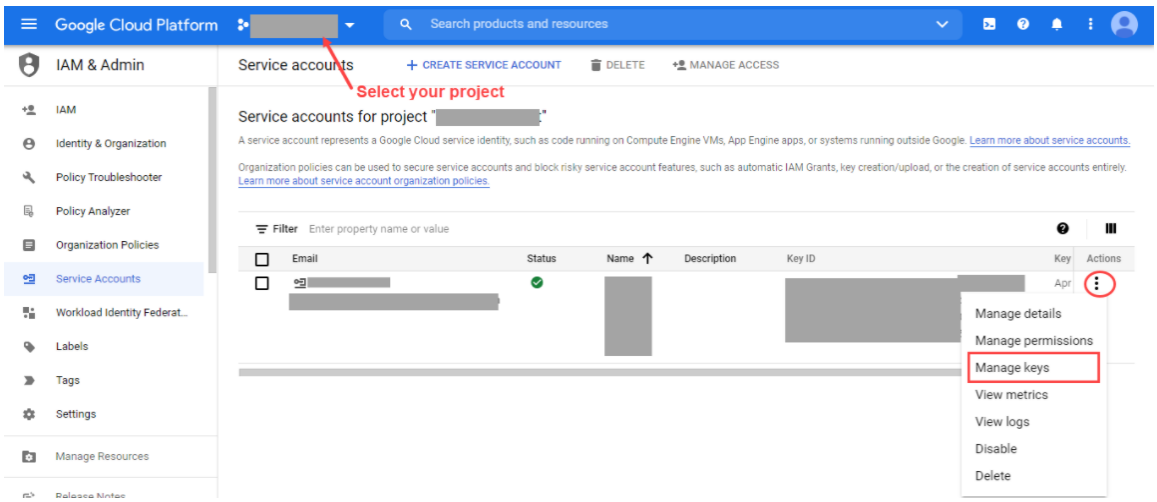
Generate Service Account Keys

Use the following procedure to create service account keys which you must enter in the GCP Details text box while creating a Normal adapter in CloudBolt CSMP.

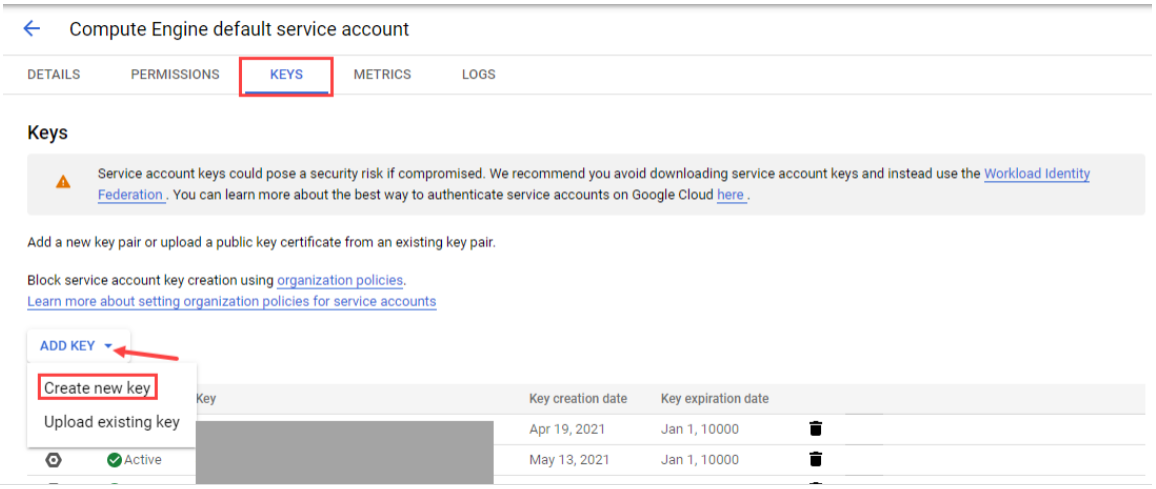
1. In the Cloud Console, go to the Service Accounts page.



2. Select the project you want to synchronize in CloudBolt CSMP.
3. Click the vertical ellipsis [⋮] icon under the **Actions** column of the email address of the service account that you want to create a key for.

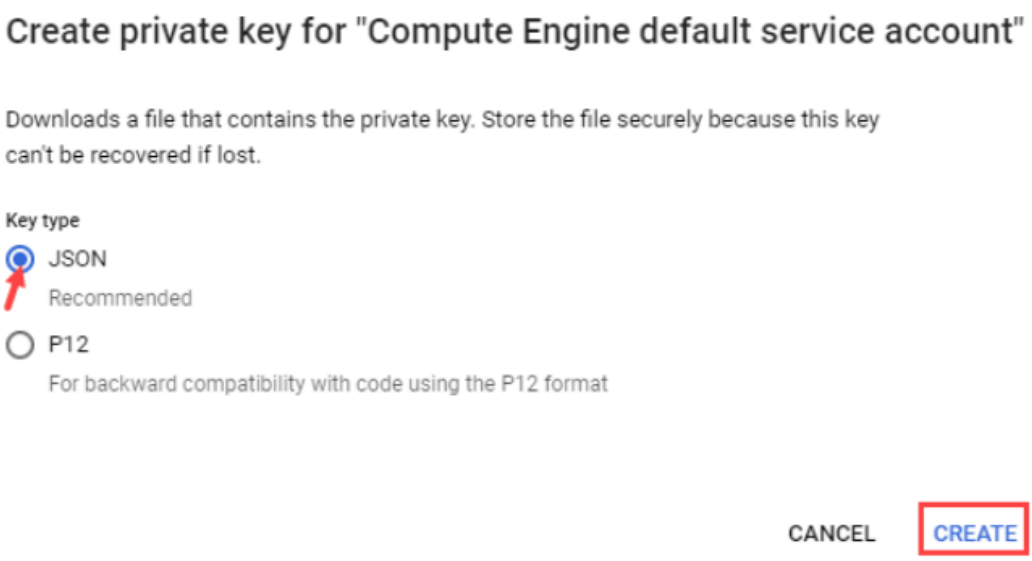


4. Select **Manage keys**.

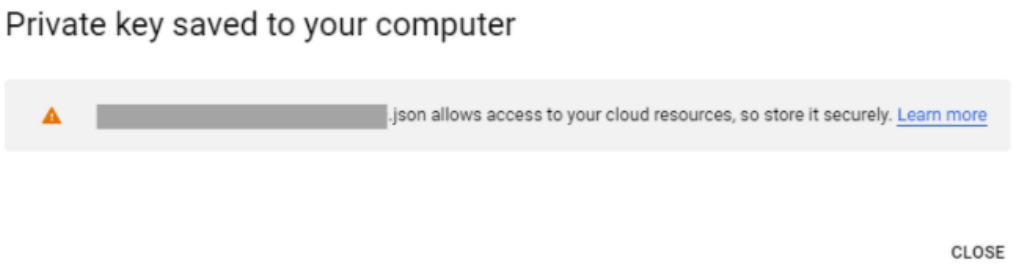


5. Click the **ADD KEY** drop-down menu, then click **Create new key**.

6. Select JSON as the Key type and click **Create**.



a. Clicking **Create** downloads a service account key file to your computer.



Ensure to store the key file securely; after you download the key file, you cannot download it again. This key file is required while creating a Normal adapter in CloudBolt CSMP to synchronize your GCP services with CloudBolt CSMP.

Note: After you create a key, you might need to wait for 60 seconds or more before using the key. If you try to use a key immediately after you create it, and you receive an error, wait at least 60 seconds and try again.

Outcome

You have created a Google Cloud Service Account, generated service keys and granted access permission to the service accounts in GCP.

4.3.9. Download Google Cloud Billing Data from BigQuery

This guide provides you with all the required setup steps to enable Cloud Billing data export to BigQuery and share with the CloudBolt team to get insights of your GCP cloud costs.

Introduction

If you are hesitant to create a billing adapter and add required permissions in your GCP project to be used by CloudBolt CSMP, use following procedure to download Google cloud billing data from BigQuery. CloudBolt CSMP team will use this BigQuery data to produce a cost and savings opportunities for your Google cloud costs.

- Introduction
- Required Permissions
- Enable Cloud Billing Data to BigQuery
- Projects with No Linked Billing Account
- Projects with Linked Billing Account(s)
- Create a BigQuery Dataset
- Enable Cloud Billing Data Export to BigQuery
- Billing Data Tables
- Frequency of Data Loads
- Download Cost Detail Exports from BigQuery
- Outcomes

Required Permissions

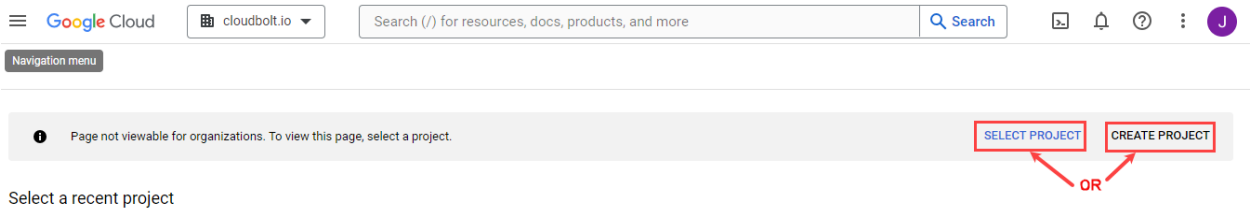
You must have the following permissions to enable and configure Google Cloud billing data export to a BigQuery dataset:

- Billing account administrator role for the target Cloud billing account.

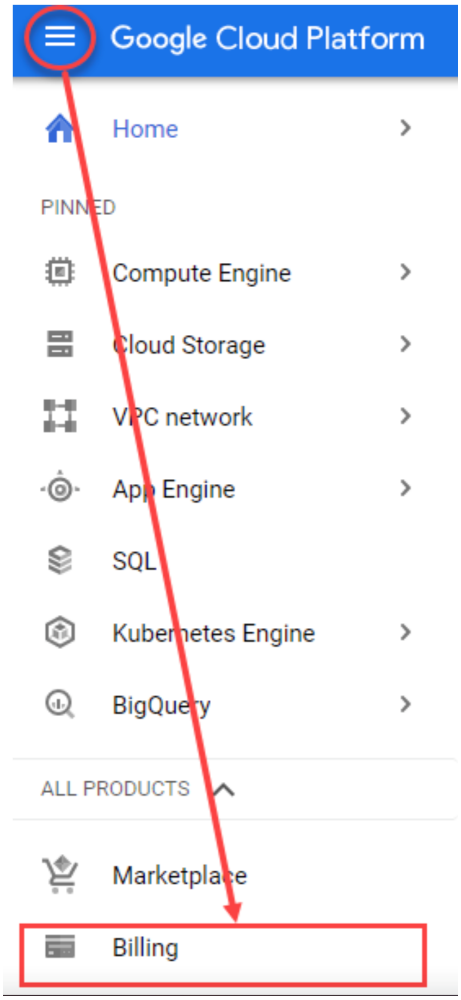
- BigQuery User role for the Cloud project that contains the BigQuery dataset that will be used to store the Cloud Billing data.
- Project Creator role on the organization or folder. To create a new project, you must have the following permissions:
    - `resourcemanager.organizations.get`
    - `resourcemanager.projects.create`

Enable Cloud Billing Data to BigQuery

Select or create a project that will contain your dataset.



1. In the Google Cloud console, select or create a Google Cloud project on the project selector page to contain your BigQuery dataset.
    - The project you create or select must have Billing enabled, and must be linked to the same Cloud Billing account that contains the data you plan to export to the BigQuery dataset.
2. In the **Select a project** dropdown at the top of the Google Cloud Console, select your project.
3. Open the **Navigation menu [] > Billing.**



Projects with No Linked Billing Account

If Billing is not enabled on the project, a popup window opens with text like: "This project is not linked to a billing account".

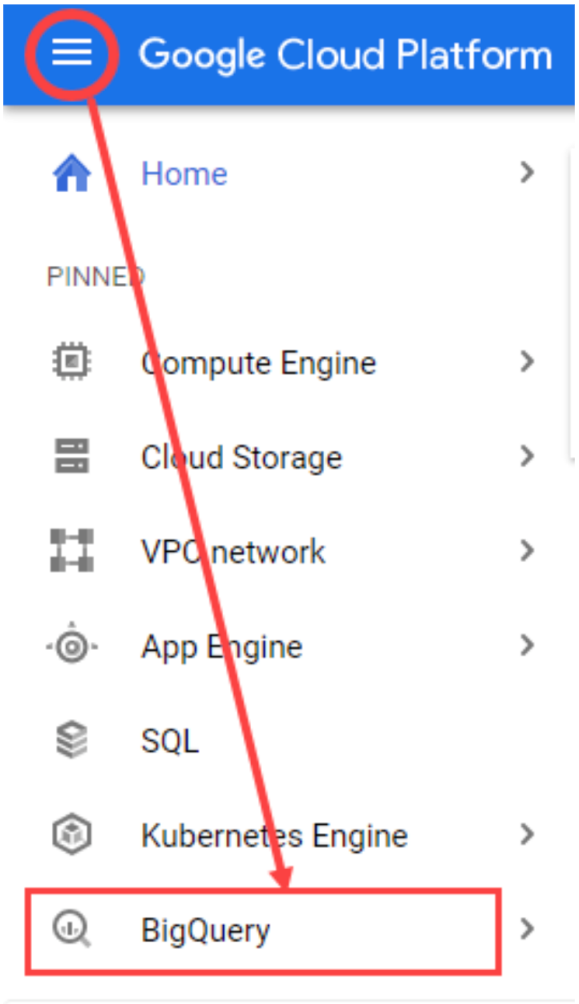
1. Enable Billing on the project by either selecting **Link a billing account** or **Manage billing accounts** options.
2. Continue to **Create a BigQuery Dataset.**

Projects with Linked Billing Account(s)

- If Billing is enabled on the project and you have only one Cloud Billing account, the **Billing Overview** page will display.
- If Billing is enabled on the project and you have more than one Cloud Billing account, a popup window will display with text like:: "Billing account <Your Billing Account> is linked to this project."

Continue to Create a BigQuery Dataset.

Create a BigQuery Dataset



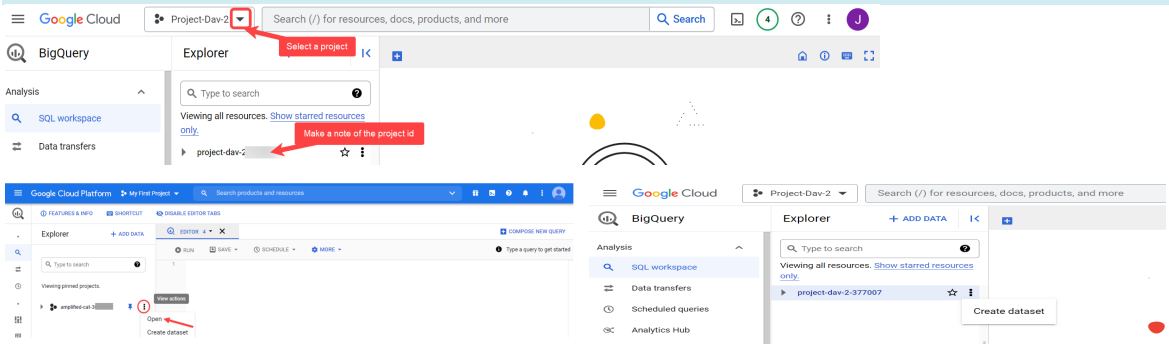
1. Sign in to the **Google Cloud Console > Navigation menu [] > BigQuery.**
2. In the **Project** dropdown in the main Navigation bar, select the project you set up to contain your dataset.
    - Make a note of the **Project ID,** as you will need it in the next step.
3. In the **Explorer panel > pinned projects,** click the overflow menu [] next to your project ID and select **Open.**
4. Click **Create Dataset** and fill in the fields:

Field name	Notes
Dataset ID	Enter an ID for this dataset.

Field name	Notes
Data location	Select a data location. **After you create your dataset, the location cannot be changed.** The data location specifies the region where your data is stored. All tables within this dataset will share this location. When creating a dataset, the Default location is the US multi-region.
Default table expiration	Set this option to **never.**
Encryption	Set to **Google-managed key.** Customer Managed Encryption Keys (CMEK) are not supported when exporting billing data to BigQuery.

5. Click **Create dataset.**

Note: Your BigQuery dataset only reflects Google Cloud billing data incurred from the date you set up Cloud Billing export, and onward. The billing data for all the projects linked to the above selected project's billing account will be pulled into this dataset.

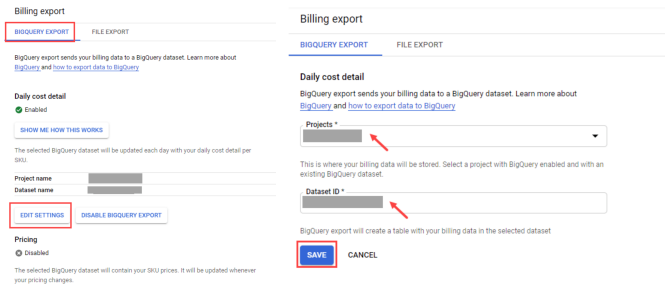


Enable Cloud Billing Data Export to BigQuery

1. Sign in to the Google Cloud Console.
2. Open the console **Navigation menu [] > Billing.**
3. From the **Billing menu**, select **Billing export.**
4. Select the **BigQuery export** tab. From here, choose the type(s) of data to export. This guide covers **Daily cost detail** type only.

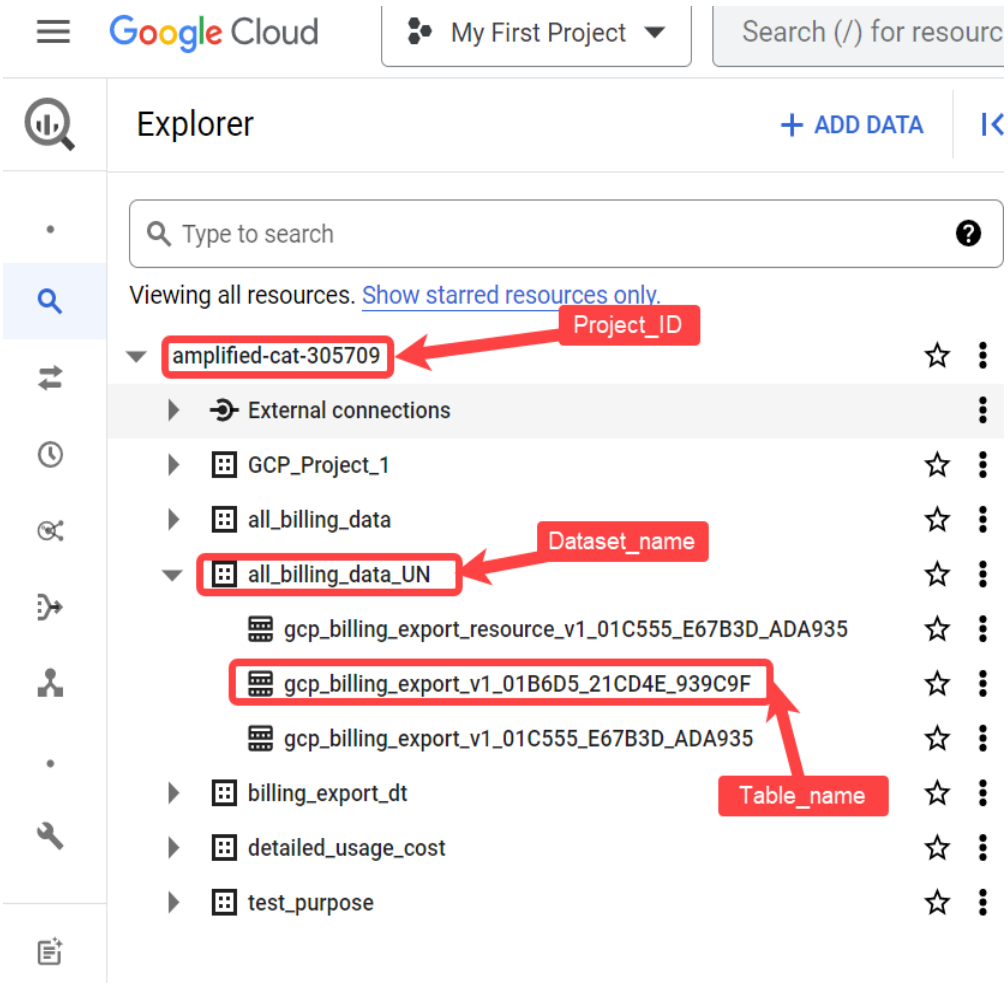
a. Daily cost detail
b. Pricing

5. From the **BigQuery export** tab, click **Edit Settings.**
6. In the **Projects** dropdown, choose the Project that you want to contain your BigQuery dataset.
7. From the **Billing export dataset** list, select the dataset that you set up to contain your exported Cloud Billing data.
    - **Note:** You must enable **BigQuery API** for the project you set up in order to export data to BigQuery.
8. Click **Save.**



Billing Data Tables

Once you enable Cloud Billing export to BigQuery, billing data tables are automatically created in the BigQuery dataset. Make a note of the billing data table name. You will need the table name to download your data.



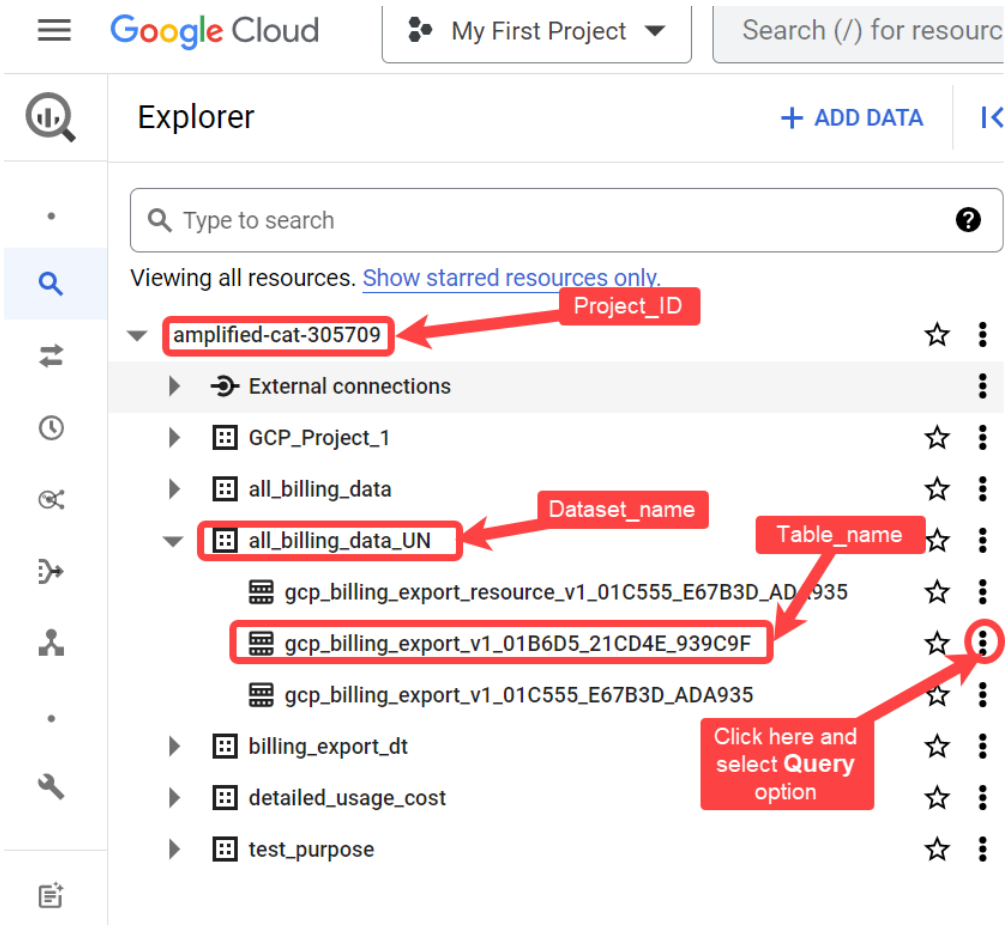
Frequency of Data Loads

When you first enable the **daily cost detail** export to BigQuery, it might take a few hours to start seeing your Google Cloud cost data.

Download Cost Detail Exports from BigQuery

1. Go to the billing data table which you want to download and share with the CloudBolt CSMP team.

2. Click on the *overflow menu* [⋮] next to the table name, and then click **Query**.



3. Run a SQL query to fetch the data.

PL/SQL

```
SELECT * FROM '<enter your project_ID>.<enter dataset_name>.<enter table_name>'
WHERE CAST(usage_start_time as date) > CAST('YYYY-MM-DD' as date) AND
CAST(usage_end_time as date) <= CAST('YYYY-MM-DD' as date)
```

4. On the **Query results** panel, click **SAVE RESULTS** to save the files in JSON format.
5. Share the saved JSON files with the CloudBolt CSMP team to see your cloud cost insights in the CloudBolt CSMP.

Outcomes

You have learnt how to download Google cloud usage data from the BigQuery dataset tables.

4.4. VMware Adapter Configuration

Learn how to set up and configure the VMware Adapter in order to view VMware billing and cost data in CloudBolt CSMP.

- VMware Data Collector (VDC2) Configuration
- VMware Adapter
- Updating Existing VMware Data Collector Settings

4.4.1. VMware Data Collector (VDC2) Configuration

- Overview
- Installation & Configuration Guide
- VMware Data Collector Configuration
- Management Command
- General Usage of management command/other usage, including proxy server

Overview

The VMware data collector is a component of the Cloud Management Platform appliance that collects inventory of assets for your on-premises infrastructure and pushes them to the CloudBolt CSMP. The collector is deployed with the Cloud Management Platform appliance and does not require a CSMP license to run.

The collector can be configured in one of two ways:

1. If you are a CMP-licensed customer, then configuration can be done using the standard Cloud Management Platform Administration UI.
2. If you only have a CSMP license, you need to deploy the Cloud Management Platform appliance in Collector mode and use management commands.

Installation & Configuration Guide

Installation

To install the VMware Data Collector, deploy the Cloud Management Platform appliance to your vCenter environment or use the CloudBolt installer script to install it on a server running one of the supported operating systems.

After installation, launch the appliance and complete the appliance configuration.

To configure the network information

1. Set the Fully Qualified Domain Name (FQDN).
2. Press the ENTER key to set the FQDN.
3. Press the ENTER key to accept.
4. Set the IP Address.
5. Use the arrow keys to navigate to Set IP address, then press ENTER.
6. Confirm the IP Address.
7. Press the ENTER key to accept.
8. Repeat for Gateway, Primary DNS, Secondary DNS, and SELinux Mode (default is permissive).

After configuration, add the NTP settings for the Linux client, similar to Red Hat's steps to configure chrony as an NTP client or server.

If you are a CSMP-only customer and do not have a Cloud Management Platform license, you will need to set the appliance mode to "CSMP Collector."

To set the appliance to CSMP Collector mode and the time zone

1. Add the following to the /var/opt/cloudbolt/proserv/customer_settings.py file.

```
Code
CSMP_DATA_COLLECTOR_ENABLED=True
TIME_ZONE = 'America/New_York'
```

2. Execute the following command to create the required base objects.

```
Code
/opt/cloudbolt/initialize/create_objects.py
/opt/cloudbolt/initialize/cb_minimal.py
```

3. Restart Job Engine.

```
Code
supervisorctl restart jobengine:*
```

VMware Data Collector Configuration

To set up the data collector

1. In the CSMP tenant, configure one VMware adaptor, and configure the VMware rate card.
2. Configure one connection info named "VMware Data Collector" configured with your CSMP Domain URL and CSMP API Key.
3. Configure one or more Resource Handlers in Cloud Management Platform for the CSMP adaptors to collect data from.
4. Confirm the Recurring Job named "CSMP VMware Data Collector" is scheduled to run the data collector every 30 minutes.

This collector supports a **proxy server**. The Resource Handler's service account must have the **built-in Read-Only** role and **Storage Profile permissions** to collect data successfully.

Management Command

If you are a CSMP-only customer, you can configure the above steps using the collector_config management command.

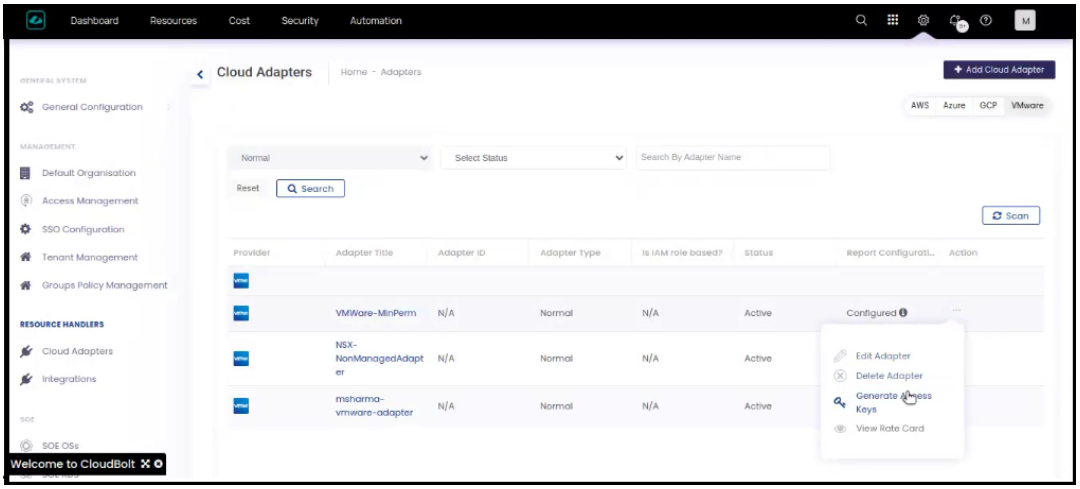
1. To configure the connection info named "VMware Data Collector" configured with your CSMP Domain URL and CSMP API Key, run this command:

```
Code
/opt/cloudbolt/manage.py collector_config csmp create --domain-url
https://mycsmp.cloudbolt.app --api-key yourapikey
```

   Fetch the VMware adapter key from the CSMP portal as follows:

   i. Log in to the CSMP portal, for example: "https://abcxys.cloudbolt.app/" and go to VMware Adapters.

   ii. Generate the Access key for the specific VMware Adapter as shown in the following screenshot:



iii. Use the option **Generate access key** to generate the required API key.

2. To configure one or more Resource Handlers in Cloud Management Platform, run this command:

```
Code
/opt/cloudbolt/manage.py collector_config vmware create --host
myvcenter.cloudbolt.com --username yourvcenteruser --password yourvcenterpassword
```

Command Line Arguments

Argument	Description	Required
--host	vCenter Hostname or IP address..	Y
--port	vCenter Port, defaults to 443.	N
--username	vCenter Username.	Y
--skip-ssl	Include to skip SSL certificate verification when making vCenter API calls, defaults to False when not included on the command call.	N
--password	vCenter Password: if not specified, the user will be prompted to enter it.	N
--skip-verify	Include to skip VMware connection verification.	N

To confirm the Recurring Job named "CSMP VMware Data Collector" is scheduled, run this command:

```
Code
/opt/cloudbolt/manage.py collector_config recurring-job list
```

Sample Output

```
Code
+--------------+-------------------------------------------------------------------------+----
```

```
-----+----------------------+
|      ID      |                                  Name                                  |
Enabled |       Last Run       |
+--------------+--------------------------------------------------------------------------+----
-----+----------------------+
| RJB-374fv8ip | CSMP VMware Data Collector - vcenter2-csmp.cblabqa.net-RH-ly17mzoa |
True  | 01-Apr-2024 18:30:00 |
+--------------+--------------------------------------------------------------------------+----
-----+----------------------+
```

General Usage of management command/other usage, including proxy server

The section below describes how to use the collector_config management command.

The collector_config management command is used to configure the VMware Data Collector when the Cloud Management Platform appliance is running in collector mode.

You can use this command only when the appliance is running in collector mode.

Command Line Arguments

Argument	Description	Required
sub command	Available Sub Commands: • csmp • vmware • recurring-job	Y
operation	Sub-command operation: specific to each sub-command, described in the sections below.	Y

Sub-commands

The collector_config command contains the following sub-commands.

csmp

The csmp command is used to manage the CSMP VMware Data Collector configuration.

create

Create a VMware Data Collector configuration.

- Command Line Arguments

Argument	Description	Required
--domain-url	CSMP domain URL	Y
--api-key	CSMP API Key: if not specified, the user will be prompted for it.	N
--skip-verify	Include this to skip CSMP connection verification.	N

- Sample Usage

```
/opt/cloudbolt/manage.py collector_config csmp create --domain-url
https://mycsmp.cloudbolt.app --api-key yourapikey
```

list

List VMware Data Collector configurations; requires no command-line arguments.

- Sample Usage

```
/opt/cloudbolt/manage.py collector_config csmp list
```

- Sample Output

```
+--------------+------------------------------+
|      ID      |        CSMP Domain URL       |
+--------------+------------------------------+
| CON-xfxnxbat | https://mycsmp.cloudbolt.app |
+--------------+------------------------------+
```

update-apikey

Update a CSMP API Key.

- Command Line Arguments

Argument	Description	Required
--config-id	The ID of the config you want to change the API Key for. This can be obtained by using the list operation for this command.	Y
--api-key	CSMP API Key: if not specified, the user will be prompted for it.	N

- Sample Usage

```
/opt/cloudbolt/manage.py collector_config csmp update-apikey --config-id CON-
xfxnxbat --api-key yournewapikey
```

remove

Remove a VMware Data Collector configuration.

- Command Line Arguments

Argument	Description	Required
--config-id	The ID of the config you want to remove, this can be obtained by using the list operation for this command.	Y

- Sample Usage

Code

```
/opt/cloudbolt/manage.py collector_config csmp remove --config-id CON-xfxnxbat
```

recurring-job

The recurring-job command is used to get information about “CSMP VMware Data Collector” jobs

list

List all VMware Data Collector recurring jobs.

- Sample Usage

Code

```
/opt/cloudbolt/manage.py collector_config recurring-job list
```

- Sample Output

Code

```
+--------------+-------------------------------------------------------------------
---+---------+----------------------+
|      ID      |                                  Name
| Enabled |       Last Run       |
+--------------+-------------------------------------------------------------------
---+---------+----------------------+
| RJB-374fv8ip | CSMP VMware Data Collector - vcenter2-csmp.cblabqa.net-RH-
ly17mzoa |   True  | 01-Apr-2024 18:30:00 |
+--------------+-------------------------------------------------------------------
---+---------+----------------------+
```

create

Create a VMware Data Collector recurring job for a VMware configuration.

- Command Line Arguments

Argument	Description	Required
--config-id	The ID of the VMware config you want to create a recurring job for. This can be obtained by using the list operation of the VMware sub-command.	Y

- Sample Usage

```
Code
/opt/cloudbolt/manage.py collector_config recurring-job create --config-id RH-ly17mzoa
```

update

Update information about recurring jobs, such as dry_run, interval_time, schedule, and max_retries.

- Command Line Arguments

Argument	Description	Required
--config-id	The ID of the Recurring Job config that the job run belongs to. This can be obtained by using the list operation for this command.	Y
--max-retries	Specify the maximum number of retries for the recurring job	Y
--interval-time	Specify the retry interval (in seconds).	Y
--schedule	Specify the schedule for the recurring job (e.g., "0 1 * * *")	Y
--dry-run	Run the recurring job in dry run mode without executing any actions.	Y

- Sample Usage

```
Code
/opt/cloudbolt/manage.py collector_config recurring-job update --config-id RJB-702701o7 --max-retries 2 --interval-time 180
```

- Sample Output

```
Code
Recurring Job 'max_retries' successfully updated
Recurring Job 'interval_time' successfully updated
```

enable

Enable a VMware Data Collector Recurring Job.

- Command Line Arguments

Argument	Description	Required

Argument	Description	Required
--config-id	The ID of the Recurring Job config you want to enable. This can be obtained by using the list operation for this command.	Y

- Sample Usage

```
Code
/opt/cloudbolt/manage.py collector_config recurring-job enable --config-id RJB-702701o7
```

disable

Disable a VMware Data Collector Recurring Job.

- Command Line Arguments

Argument	Description	Required
--config-id	The ID of the Recurring Job config you want to disable. This can be obtained by using the list operation for this command.	Y

- Sample Usage

```
Code
/opt/cloudbolt/manage.py collector_config recurring-job disable --config-id RJB-702701o7
```

remove

Remove a VMware Data Collector Recurring Job.

- Command Line Arguments

Argument	Description	Required
--config-id	The ID of the Recurring Job config you want to disable. This can be obtained by using the list operation for this command.	Y

- Sample Usage

```
Code
/opt/cloudbolt/manage.py collector_config recurring-job remove --config-id RJB-702701o7
```

run-now

Manually initiate a VMware Data Collector Job

- Command Line Arguments

Argument	Description	Required

Argument	Description	Required
--config-id	The ID of the Recurring Job config you want to initiate a job run for. This can be obtained by using the list operation for this command.	Y

- Sample Usage

```
Code
/opt/cloudbolt/manage.py collector_config recurring-job run-now  --config-id RJB-702701o7
```

list-jobs

List the summary of the last 25 jobs for a CSMP VMware Data Collector, including start and end dates, and status.

- Command Line Arguments

Argument	Description	Required
--config-id	The ID of the Recurring Job config you want to list jobs for. This can be obtained by using the list operation for this command.	Y
--job-status	Optional: list jobs by job status.	N
--start-date	Optional: list jobs by start date in the format DD-Mon-YYYY.	N
--end-date	Optional: list jobs by end date in the format DD-Mon-YYYY.	N
--display-limit	Optional: specify the number of jobs to list, defaults to the most recent 50.	N

- Sample Usage

```
Code
/opt/cloudbolt/manage.py collector_config recurring-job list-jobs --config-id RJB-702701o7
```

- Sample Output

```
Code
| JOB-xb855j0c | 26-Mar-2024 18:43:07 | 26-Mar-2024 18:55:28 | SUCCESS |
/var/log/cloudbolt/jobs/3.log |
| JOB-judyl6e4 | 26-Mar-2024 18:40:09 | 26-Mar-2024 18:40:11 | FAILURE |
/var/log/cloudbolt/jobs/4.log |
| JOB-mqk7p29f | 25-Mar-2024 21:01:25 | 25-Mar-2024 21:03:01 | SUCCESS |
/var/log/cloudbolt/jobs/5.log |
+--------------+----------------------+----------------------+---------+---------
----------------------+
```

get-job

Get information about job runs, including start and end dates, and status.

- Command Line Arguments

Argument	Description	Required
--config-id	The ID of the Recurring Job config you want to list jobs for. This can be obtained by using the list operation for this command.	Y
--job-id	The ID of the job you want to view. This can be obtained by using the list operation.	Y

- Sample Usage

Code

```
/opt/cloudbolt/manage.py collector_config recurring-job get-job --config-id RJB-702701o7 --job-id JOB-21nnojnu
```

- Sample Output

Code

```
+--------------+----------------------+----------------------+---------+
|      ID      |      Staors |
+--------+
|         |
+--------+
```

vmware

The VMware command is used to manage one or more VMware Resource configurations.

create

Create VMware configurations.

- Command Line arguments

Argument	Description	Required
--host	vCenter Hostname or IP address..	Y
--port	vCenter Port, defaults to 443.	N
--username	vCenter Username.	Y
--skip-ssl	Include this to skip SSL certificate verification when making vCenter API calls; defaults to False when not included on the command call.	N
--password	vCenter Password: if not specified, the user will be prompted for it.	N
--skip-verify	Include this to skip VMware connection verification.	N

- Sample Output

Code

```
/opt/cloudbolt/manage.py collector_config vmware create --host
```

```
myvcenter.cloudbolt.com --username yourvcenteruser --password yourvcenterpassword
```

list

List VMware resource configurations; requires no command-line arguments

- Sample Usage

Code

```
/opt/cloudbolt/manage.py collector_config vmware list
```

- Sample Output

Code

```
+-------------+---------------------------+--------------+-----------------------
------+-----------+---------+
|      ID     |        vCenter Host       | vCenter Port |       vCenter Username
| Scheduled | Enabled |
+-------------+---------------------------+--------------+-----------------------
------+-----------+---------+
| RH-ly17mzoa | vcenter2-csmp.cblabqa.net |     443      |
administrator@vsphere.local |    Yes    |   Yes   |
+-------------+---------------------------+--------------+-----------------------
------+-----------+---------+
```

update-password

Update your vCenter password

- Command Line Arguments

	Argument	Description	Required
	config-id	The ID of the config you want to change the password for. This can be obtained by	Y

	Argument	Description	Required
		using the list operation for this command.	
	password	vCenter Password, if not specified, the user will be prompted for it.	N

- Sample Usage

```
/opt/cloudbolt/manage.py collector_config vmware update-password --config-id RH-mzk1bw32 --password yournewvcenterpassword
```

remove

Remove VMware Resource configuration.

- Command Line Argument

Argument	Description	Required
--config-id	The ID of the config you want to remove. This can be obtained by using the list operation for this command.	Y

- Sample Usage

```
/opt/cloudbolt/manage.py collector_config vmware remove --config-id RH-mzk1bw32
```

proxy

Manage proxy server settings.

create

Configure a proxy server.

- Command Line Arguments

Argument	Description	Required
--host	The proxy server IP or hostname	Y
--protocol	The proxy server protocol: if not specified, a proxy is set up for HTTP and HTTPS	N
--port	The proxy server protocol port	N
--username	The proxy server username	N
--password	The proxy server password	N
--bypass-proxy-domains	A comma-separated list of the domains for which CloudBolt should not attempt to use a proxy server to route the connections. These domain names are regular expressions and could also be represented as IPv4 IP addresses. Ex. '.*\.internal\.loc,192\.168\..*,my\.domain\.com'.	N

- Sample Usage

Code

```
/opt/cloudbolt/manage.py collector_config proxy create --host
myproxy.mydomain.net --port 3128 --protocol http --bypass-proxy-domains
".\.mydomain\.net,.\.mydomain2\.net
```

list

List proxy servers

- Sample Usage

Code

```
/opt/cloudbolt/manage.py collector_config proxy list
```

- Sample Output

Code

```
+----------------------+----------+------------+----------------+----------------
----------------------+
|       Host/IP        | Protocol | Proxy Port | Proxy Username |
Bypass Domains           |
+----------------------+----------+------------+----------------+----------------
----------------------+
| myproxy.mydomain.net |          |    3128    |                |
.*\.mydomain\.net,.*\.mydomain2\.net |
```

```
+---------------------+---------+-----------+---------------+---------------
----------------------+
```

update-proxy-bypass

Update proxy bypass rules.

- Command Line Arguments

Argument	Description	Required
--bypass-proxy-domains	A comma-separated list of the domains for which CloudBolt should not attempt to use a proxy server to route the connections. These domain names are regular expressions and could also be represented as IPv4 IP addresses. Ex. '.*\.internal\.loc,192\.168\..*,my\.domain\.com'. If not specified, all bypass rules are removed.	N

- Sample Usage

Code

```
/opt/cloudbolt/manage.py collector_config proxy update-proxy-bypass --bypass-
proxy-domains ".*\.mydomain\.net,.*\.mydomain2\.net"
```

remove

Remove proxy server configuration.

- Sample Usage

Code

```
/opt/cloudbolt/manage.py collector_config proxy remove
```

verify-domain

Verify a request domain that will be routed through the proxy or bypass the proxy.

- Command Line Arguments

Argument	Description	Required
--request-domain	The request domain to verify if requests for this domain will be routed through the proxy.	Y

- Sample Usage

Code

```
/opt/cloudbolt/manage.py collector_config proxy verify-domain --request-domain
google.com
```

- Sample Output

```
Requests for domain google.com will be routed through proxies: {'http':
'http://myproxy.mydomain.net:3128', 'https': 'https://myproxy.mydomain.net:3128'}
```

Recurring Job: Agent - Resent Processed Queue files

We have an automated recurring job that resends processed ZIP files to the CSMP endpoint if the CSMP host is unreachable. Additionally, the management commands listed below can be used to run the Agent - Resend Processed Queue Files job manually.

run-now

Manually initiate an Agent and resend processed queue files run.

- Command Line Arguments

Argument	Description	Required
--config-id	The ID of the Recurring Job config you want to initiate a job run for. This can be obtained by using the list operation for this command.	Y

- Sample Usage

```
/opt/cloudbolt/manage.py collector_config recurring-job run-now --config-id RJB-
702701o7
```

- Output

```
Successfully initiated Agent - Resend Processed Queue Files job, Job ID: JOB-
12wb0q4o
```

enable

Enable an Agent-Resent Processed Queue files Recurring Job.

- Command Line Arguments

Argument	Description	Required
--config-id	The ID of the Recurring Job config you want to enable. This can be obtained by using the list operation for this command.	Y

- Sample Usage

```
/opt/cloudbolt/manage.py collector_config recurring-job enable --config-id RJB-
702701o7
```

disable

Disable an Agent-Resent Processed Queue files Recurring Job.

- Command Line Arguments

Argument	Description	Required
--config-id	The ID of the Recurring Job config you want to disable. This can be obtained by using the list operation for this command.	Y

- Sample Usage

Code

```
/opt/cloudbolt/manage.py collector_config recurring-job disable --config-id RJB-702701o7
```

remove

Remove an Agent-Resent Processed Queue files Recurring Job.

- Command Line Arguments

Argument	Description	Required
--config-id	The ID of the Recurring Job config you want to disable. This can be obtained by using the list operation for this command.	Y

- Sample Usage

Code

```
opt/cloudbolt/manage.py collector_config recurring-job remove --config-id RJB-702701o7
```

If the "Agent-Resent Processed Queue" file job is not found after running the command.

Code

```
/opt/cloudbolt/manage.py collector_config recurring-job list
```

Then, use the command

Code

```
/opt/cloudbolt/manage.py collector_config setup initialize
```

4.4.2. VMware Adapter

Set up the VMware Adapter and connect it to your VMware Data Collector.

Introduction

The VMware Data Collector is deployed on-premises and sends data to the CloudBolt Cost and Security Management platform.

Prerequisites

- Install and configure the VMware Data Collector.

Create VMware Adapter

After registering the CloudBolt Cost and Security Management application with VMware, open CloudBolt Cost and Security Management platform and create a VMware Adapter.

1. In CloudBolt Cost and Security Management, click the **Quick Actions** menu **> Adapters & Integration.**
2. Hover **Add Cloud Adapter > VMware.**
3. Enter a **Name** for the Adapter and click **Submit.**
4. Find the newly added Adapter and hover the **[...] ellipsis menu > Create Rate Card** to create a VMware rate card for the selected Adapter.
5. Find the newly added Adapter and hover the **[...] ellipsis menu > Generate Access Keys**.
6. Copy the generated **Access Key**.

Configure the VMware Cloud Service

1. In the VMware Data Collector, click the **Cloud Services** tab. Provide the following information:

- CloudBolt Cost and Security Management URL (yourcompany.cloudbolt.app)
- Access key previously generated for your VMware adapter.
- Proxy details (if the user has set up a proxy for connecting to CloudBolt Cost and Security Management).
  - Proxy Username
  - Proxy Password

Register vCenter to VMware Data Collector

1. In CloudBolt Cost and Security Management, click the **vCenters** tab and provide the following information to register vCenter:
   - Hostname / IP Address of your vCenter instance
   - Username and Password of your vCenter instance
   - Port Number
2. Click **Register.**

Create vCenter Jobs

1. In CloudBolt Cost and Security Management, click the **Schedule Jobs** tab and fill in the following information:
   - Name for the Job
   - Select any registered vCenter from the dropdown.
   - Select date & time to start the job for the first time.
   - Select sampling frequency to collect data for a specific time frame, i.e:
     - Real-time
     - 30 minutes
     - 2 hours
   - Select the interval time (30 minutes by default)

Run Scheduled Jobs Now

After completing the above steps, you can choose to run scheduled Jobs immediately to reflect changes in the CloudBolt Cost and Security Management platform on demand.

1. In the **Schedule Jobs** tab, click the [...] icon next to the Job's name.
2. Click **Run Now.**

4.4.3. Updating Existing VMware Data Collector Settings

Update your VMware Data Collector (VDC) settings to ensure seamless integration with the new CloudBolt CSMP account URL.

Introduction

CloudBolt is transitioning its CSMP (Cloud Service Management Platform) account sign-in URL from **kumolus.net** to **cloudbolt.app**. As part of this transition, organizations that use the **VMware adapter** to manage cloud cost data through their CloudBolt CSMP account must update their corresponding **VDC** settings to continue syncing data without disruption.

Prerequisites

- Ensure you have administrative access to the CloudBolt environment.
- Familiarity with CLI tools.
- Access to the VMware Data Collector environment.

Updating VMware Data Collector Configuration

Step 1: Clean up Existing Configuration

1. **Get the List of CSMP Accounts**

   The first step is to list all VMware Data Collector configurations that are linked to the CSMP account.

   - Sample Usage

     Code
     ```
     /opt/cloudbolt/manage.py collector_config csmp list
     ```

   - Sample Output

     Code
     ```
     +----------------------+-------------------------------------------------------+
     |       ID             |        CSMP Domain URL                                |
     ```

```
+---------------------+-------------------------------------------------------+
| CON-xfxnxbat | https://mycsmp.kumolus.net       |
+---------------------+-------------------------------------------------------+
```

2. **Delete the CSMP Account linked with the VDC**

   Once you have the list of linked CSMP accounts, remove the existing configuration that points to the old **kumolus.net** domain.

   - Sample Usage

```
Code
/opt/cloudbolt/manage.py collector_config csmp remove --config-id CON-xfxnxbat
```

Step 2: Update VMware Data Collector with New CSMP Account URL

1. Command Line Arguments

Argument	Description	Required
--domain-url	The new CSMP domain URL ending with '.cloudbolt.app'	Y
--api-key	Access key generated for the VMware adapter.	Y

2. Sample Usage

```
Code
/opt/cloudbolt/manage.py collector_config csmp create --domain-url
https://mycsmp.cloudbolt.app --api-key yourapikey
```

5. Resources

Introduction

Resources in CloudBolt CSMP covers all the services that can be your provisioned from the Cloud Service providers. These can include server instances, VPCs, databases, Storage devices, Security and Identity providers, containers, certificate managers, load balancers, network interfaces, Elastic IPs, volumes, Key pairs, tags, and others.

Resources can be clubbed in groups, tagged, and classified for ease of use. These groups and tags can be used for a variety of purposes including filtering, reports and efficient managing of resources.,,

5.1. Service Manager

CloudBolt CSMP features a service manager for each cloud service provider. The service manager lists all your provisioned services at one place.

Introduction

CloudBolt CSMP Service Manager provides you a unified user interface so that you can track the status, lifecycle, types, cost for your cloud services and resources. With Service Manager, you can view the detailed metrics, operational data, view and add tags, delete, and perform various settings for cloud services. It provides you a centralized point for all the existing cloud resources.

- Introduction
- Service Manager for AWS
- Service Manager for Azure
- Service Manager for GCP
- Prerequisites
- Navigate to GCP Service Manager
- Service Manager for VMware
- Prerequisites
- Navigate to VMware Service Manager
- Outcomes

Service Manager for AWS

Use the service manager to see all the details related to the various services you have provisioned from the AWS. CloudBolt CSMP Service Manager provides you a unified user interface so that you can track the status, lifecycle, types, cost for your cloud services and resources. With Service Manager, you can view the detailed metrics, operational data, view

and add tags, delete, and perform various settings for cloud services. It provides you a centralized point for all the existing cloud resources.

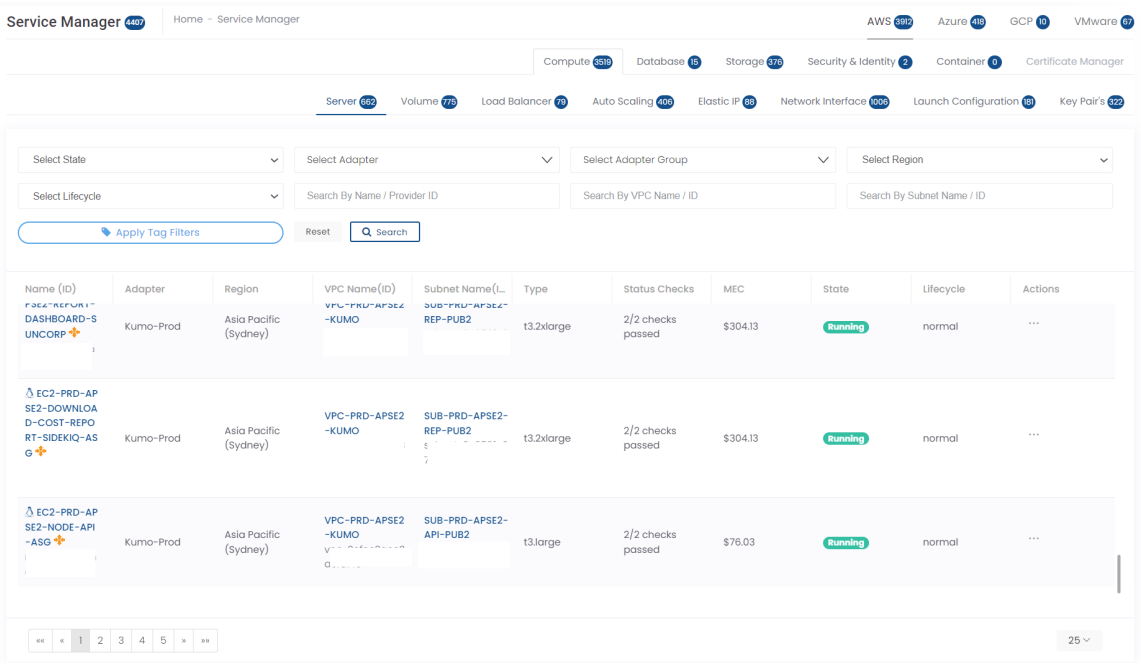
Services are listed under the following categories:

- Compute for all your computing instance requirements
    - These are further listed under categories as server, volume, Load Balancer, Auto Scaling, Elastic IPs, Network Interface, Launch Configuration, Key Pairs
- Database for all your database engine requirements
    - Further categorized as RDS and Cluster
- Storage for all your data storage S3 requirements or otherwise
- Security and Identity services
- Container for Elastic Kubernetes Service (EKS)
- Certificate Manager

You can further filter the Compute services using the following parameters:

- State: Whether error, running, or stopped
- Adapter, adapter groups, by region, or tags
- Lifecycle, whether normal or spot

1. Select the parameters from the listed options to view the services under that category.
2. Click Search. The results are listed based on your search parameters. The following screenshot displays a sample list of services under Compute section.



3. Click the ellipsis [...]icon under Action column of each resource for more options. Options can vary based on service category and type.
    - View More: Use this option to view more details about specific resource.
    - Instance Setting: Use this option to view system log details of the individual resource.
    - CloudWatch Monitoring: Use this option to view different metrics of the individual resource.
    - View Tags: Use this option to see all the tags associated with individual resource. You can also add and delete tags to the resource using this option. To add tags, you need to enter a key and value in the respective fields, click '**+Add**', and then click '**Update**'. To delete tags, you need to click the delete (**X**) icon adjacent to a tag detail and then click '**Update**'. To edit a tag detail, you must click the pencil icon, then update the key and value as required and click '**Update**'.
    - Delete: Use this option to delete a resource from the list.
    - Snapshots: Use this option to see list of snapshots associated with the individual resource.
    - Instance State: Use this option to stop and reboot a resource.

Service Manager for Azure

CloudBolt CSMP Service Manager for Azure provides you a unified user interface so that you can track the status, lifecycle, types, cost for your Azure services and resources. With Service Manager, you can view the detailed metrics, operational data, view and add tags, delete, and perform various settings to your Azure services. It provides you a centralized point for all the provisioned Azure cloud resources.

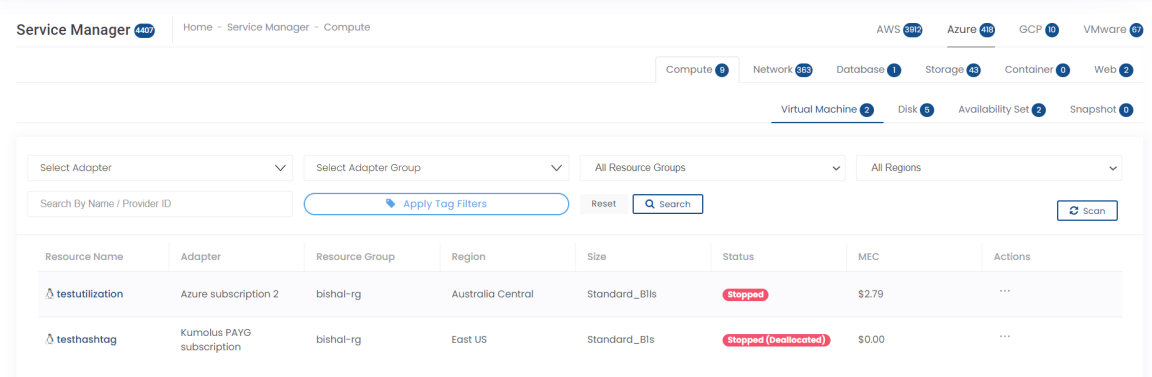
Services are listed under the following categories:

- Compute for all your computing instance requirements
    - These are further listed under categories as Virtual Machine, Disk, Availability Set, Snapshot
- Network for all your networking instance requirements
    - These are further categorized as Virtual Network, Load Balancer, Network Interface, Public IP Address, Route Table, Security Group, Subnet.
- Database for all your database engine requirements
    - Further categorized as Maria DB, PostgreSQL, SQL Server, SQL Databases, MySQL, Elastic Pool.
- Storage for all your data storage account and blob services
- Container for Azure Kubernetes Service (AKS)
- Web for Azure web app services
    - Further classified as App Service and App Service Plan

You can further filter the services using the following parameters:

- Adapter
- Adapter Groups
- Resource Group
- Region
- Tag
- Name

1. Select the parameters from the listed options to view the services under that category.
2. Click Search. The results are listed based on your search parameters. The following screenshot displays a sample list of services under Compute section.



3. Click the ellipsis [...] icon under Action column of each resource for more options. Options can vary based on service category and type.
    - Monitor Metrics: Use this option to view different metrics of the individual resource.
    - View Tags: Use this option to see all the tags associated with individual resource. You can also add and delete tags to the resource using this option. To add tags, you need to enter a key and value in the respective fields, click '**+Add**', and then click '**Update**'. To delete tags, you need to click the delete (**X**) icon adjacent to a tag detail and then click '**Update**'. To edit a tag detail, you must click the pencil icon, then update the key and value as required and click '**Update**'.
    - Stop/Stop: Use this option to stop or stop a running VM resource.
    - Reload: Use this option to reload the resource.
    - Delete: Use this option to delete a resource from the list.

Service Manager for GCP

CloudBolt CSMP Service Manager allows you to get a list of all your GCP services in one place.

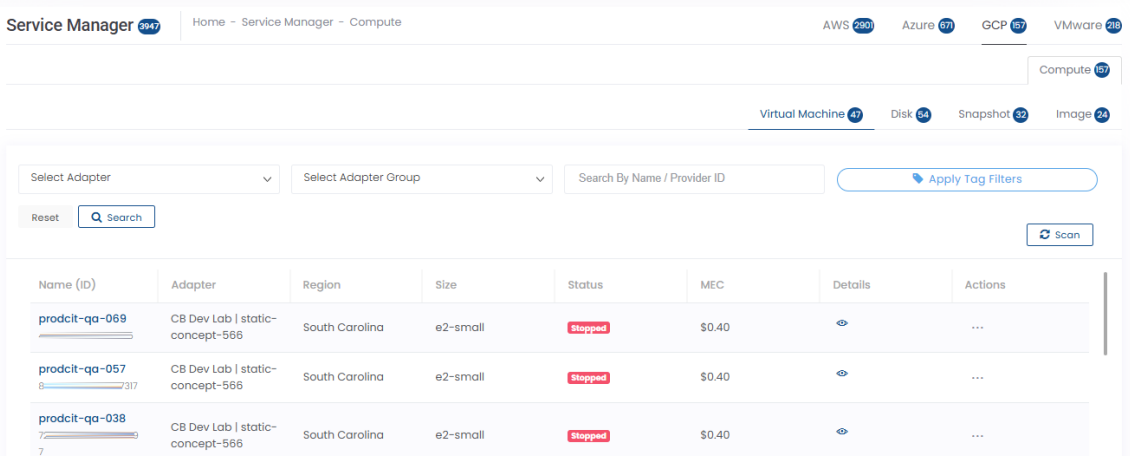
Prerequisites

You must have created and synchronized Normal adapters for each of your GCP projects whose services you want to manage using the Service Manager. See, Creating a Normal GCP adapter.

Navigate to GCP Service Manager

Use this procedure to use CloudBolt CSMP Service Manager to view all the services available in your GCP projects.

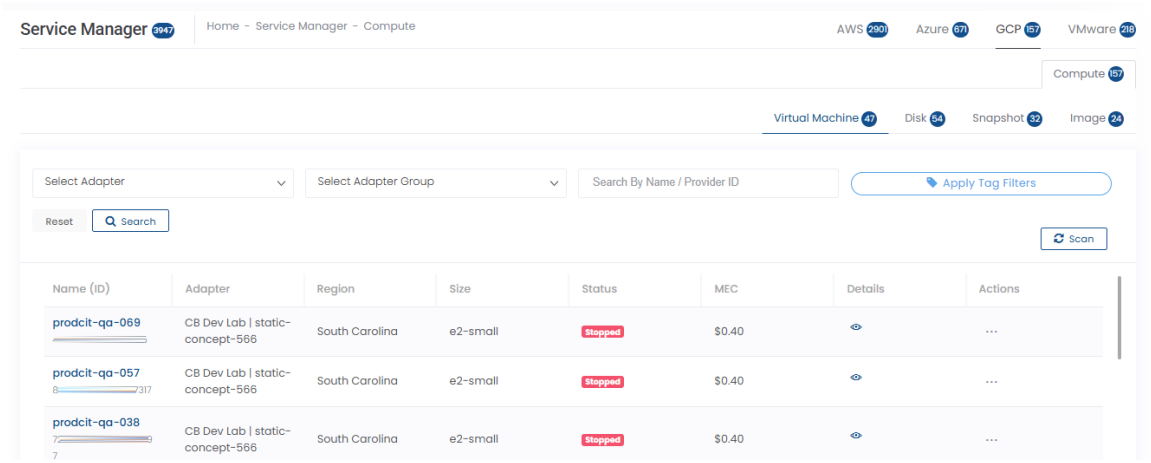
1. Log in to your CloudBolt CSMP account.
2. Navigate to **Resources > Service Manager**.
3. **Service Manager** page appears.
4. If you have multiple cloud service provider synchronized with the CloudBolt CSMP, select GCP as your cloud provider.



View list of GCP Virtual Machine

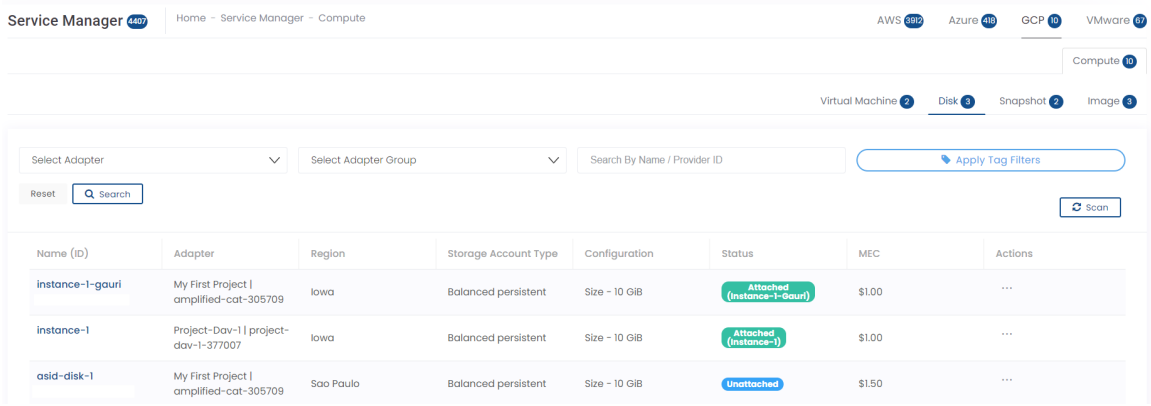
1. By default, all the **Virtual Machines** list will appear.
2. You can filter your GCP Virtual Machine list using adapter, region, name, and tag value.
3. The details displayed include the following:
    - Name (ID): The name of GCP Virtual Machine and their ID.
    - Adapter: The GCP normal adapter name under which the VM exists.
    - Region: The location where the VM is hosted.

- Size: Family and series name of the VM.
- Status: VM instance lifecycle state.
- MEC: The monthly estimated cost for the VM.
- Details: Click the eye icon to see the VM creation date and time.
- Actions: Click the ellipsis icon [...] to view the tags associated with the VM.



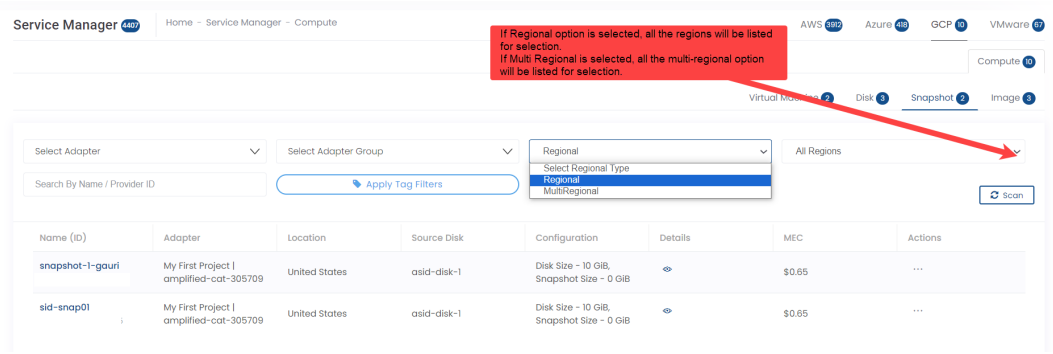
View list of GCP Disk

1. To see the list of disks, click **Disk** tab under the Compute.
2. You can filter your GCP Disk list using adapter, region, name, and tag value.
3. The details displayed for GCP disk include the following:
   - Name: The name of GCP Disk and their ID.
   - Adapter: The GCP normal adapter name under which the disk exists.
   - Region: The location where the disk is hosted.
   - Storage Account Type: The disk type or storage option name.
   - Configuration: The disk size
   - Status: The disk and VM relation. If a disk is attached to VM, it will be attached, else unattached.
   - MEC: The monthly estimated cost.
   - Actions: Click the ellipsis icon [...] to view the tags associated with the disk.

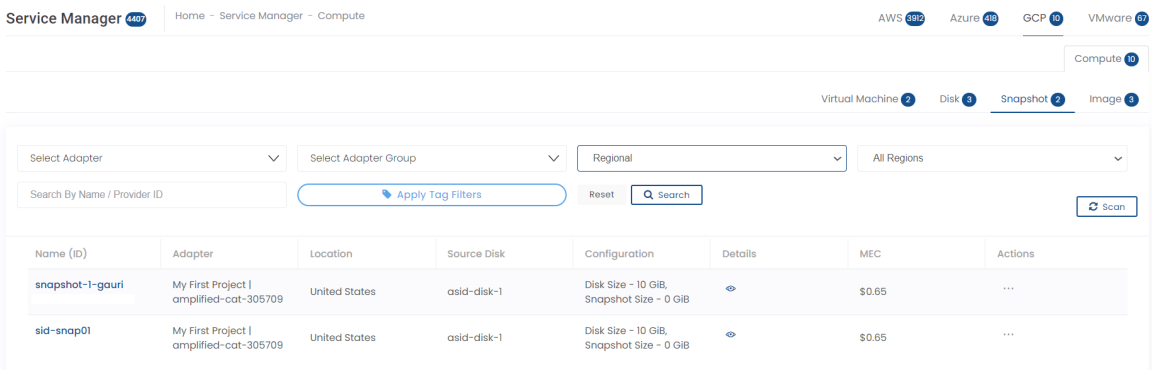


View list of GCP Snapshot

1. To view list of snapshots, click **Snapshot** tab under the Compute.
2. You can filter your GCP snapshot list using adapter, multi-regional or regional location, name, and tag value.
    a. Based on multi-regional or regional selection the region selection option will change.

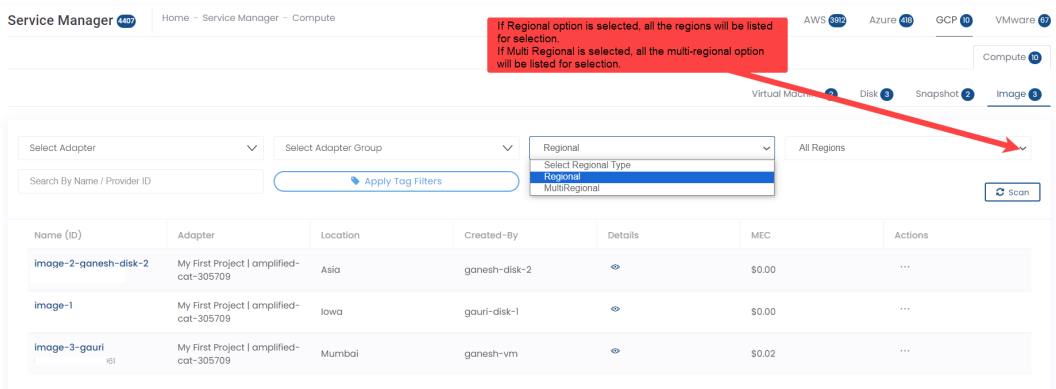


3. The details displayed for GCP snapshot include following:
    - Name (ID): Snapshot name and ID.
    - Adapter: The GCP normal adapter name under which the snapshot exists.
    - Location: The location where the snapshot is hosted.
    - Source Disk: The disk name whose current state is captured as snapshot.
    - Configuration: The parent disk and its snapshot size in GiB.
    - Details: The snapshot creation type and date.
    - MEC: The monthly estimated cost for the snapshot based on the disk size.
    - Actions: Click the ellipsis icon [...] to view the tags associated with the snapshot.

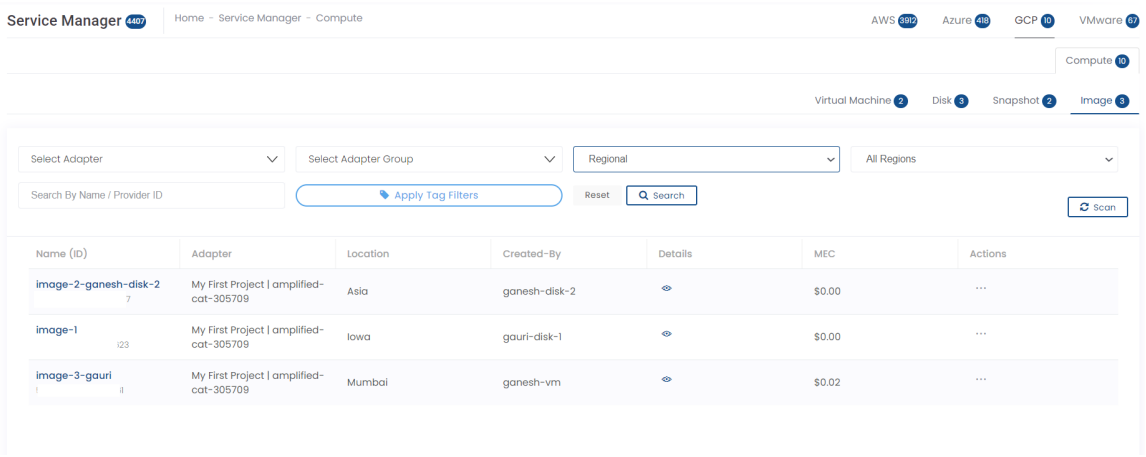


View list of GCP Image

1. To view list of images, click **Image** tab under the Compute.
2. You can filter your GCP image list using adapter, multi-regional or regional location, name, and tag value.
    a. Based on multi-regional or regional selection the region selection option will change.



3. The details displayed for GCP image include following:
    - Name (ID): Image name and ID.
    - Adapter: The GCP normal adapter name under which the image exists.
    - Location: The location where the image is hosted.
    - Created-By: Image creator details.
    - Details: More information about the image.
    - MEC: The monthly estimated cost value based on archive size.
    - Actions: Click the ellipsis icon [...] to view the tags associated with the image.



Service Manager for VMware

CloudBolt Service Manager for VMware provides you a unified user interface so that you can track the status, lifecycle, types, cost for your cloud services and resources. With Service Manager, you can view the detailed metrics, operational data, view and add tags, delete, and perform various settings for cloud services. It provides you a centralized point for all the existing cloud resources. You can download the report in CSV format. Click the 'Export to CSV' icon to obtain the service manager report.

Prerequisites

- Complete Deploying the VMware Collector. See VMware Data Collector Configuration.
- Set up the VMware Adapter in the CloudBolt CSMP. See VMware Data Collector Configuration
- Configure a VMWare rate card. See VMware Rate Card.

Navigate to VMware Service Manager

1. In CloudBolt CSMP, navigate to **Resources > Service Manager.**
2. Click VMWare on the upper right corner to select the VMWare service Provider**.**
3. On the VMware Service Manager page, you can view a list of all the VMware services grouped by virtual machine and disk. You can filter the services based on VMware adapter, vCenters groups, service name, and tags.

4. Click the ellipsis [...] icon under Action column of each resource for more options. Options can vary based on service category and type.
    - View Tags: Use this option to see all the tags associated with individual resource.
    - Delete: Use this option to delete a resource from the list.
    - View More: Use this option to view more details about specific resource.
    - Monitor Metrics: Use this option to view different metrics of the individual resource.

Outcomes

You have learnt to use the service manager to view details for the various cloud services that you have provisioned.

5.2. Groups

Learn how to create and manage CloudBolt CSMP Adapter groups.

Introduction

As a CloudBolt account administrator, you can create adapter groups to manage the various cost and services insights access of your cloud accounts to your CloudBolt account users and child organizations.

In CloudBolt CSMP, groups are collection of Normal adapter(s) of an individual Billing adapter along with the selected tags (your cloud services tags) and assigned group tags (custom data) key-value pairs.

Using groups, you can:

- Designate a set of your cloud sub-accounts with specific tags to a CloudBolt Tenant for tenant level data restriction
- Designate a set of your cloud sub-accounts with specific tags to your CloudBolt Customer, Reseller, and Child Organizations for organisation level data restriction
- Filter services based on the group settings using the *select adapter group* filter option available in CloudBolt Service Manager, Service Adviser, and Security Compliance Adviser modules
- Filter cost report based on groups using the *group* filter parameter.
- Select accounts, subscriptions, customer ID, sub-accounts, projects and tags with one click by selecting the appropriate adapter groups in the *group* filter option while creating a user-generated dashboard.
- Customize cost reports based on account group (for AWS), subscription group (for Azure and Azure CSP), and project group (for GCP).
- Create an event for a recommendation policy.

Important:

The billing adapter will, however, never be shared as part of a shared group; rather, it will be used to drive the group.

- Create and Manage AWS Adapter Groups
- Create and Manage Azure Adapter Groups
- Create and Manage Azure CSP Adapter Groups
- Create and Manage GCP Adapter Groups
- Create and Manage VMware vCenters Groups

5.2.1. Create and Manage AWS Adapter Groups

Learn how to create and manage AWS adapters groups in CloudBolt CSMP.

- Create AWS Adapters Groups
- View List of AWS Adapters Groups
- Edit the AWS Adapter Group
- Delete AWS Adapter Groups
- Outcomes

Create AWS Adapters Groups

Use this procedure to create new AWS adapters groups manually. Alternatively, you can set a policy to create groups automatically.

1. Navigate to **Resources > Groups**.
2. Click **Add Group > AWS**.
3. Enter the details as follows:

Field name	Notes
Provider	Select provider as AWS.
Group Name	Enter a valid name for group.
Description	Enter a description for group.
Select Billing Account	Select a billing adapter. **Important:** Sharing a group will never share the billing adapter.
Group based on Account Tag	By default, *No* will be selected. Select *Yes* to create group based on an account tag key-value pair.
Account Tag	Select a value from the account tag key drop-down list and then from the account tag value drop-down list. Based on the selected value, the account option list for Select Accounts will

Field name	Notes
	change. **Important:** If you recently added account tags to your AWS accounts, you would need to wait up to 24 hours before all the relevant normal adapters are displayed in the Select Accounts drop-down list.
Select Accounts	Select normal adapters which you want to include in this group. **Important:** ○ If you want to create this group for a billing adapter which is recently created, it may take up to 30 minutes to get all the normal adapters populated in *Select Accounts* drop down list. ○ You can select maximum of 99 normal adapters. Alternatively, you can use *Select All* option to select all the normal adapters available in the list. If you have used Select All option to select normal adapters for this group, any additional normal adapters created as part of the previously selected billing adapter will be added automatically to this group. If you are a sub-tenant user of parent organisation or a child organisation user with a subset of accounts shared with you, *Select All* option will only select all the accounts shared with your tenant/child organisation.
Select Tags [Optional]	Enter **Tag Key** and **Tag Value** in the appropriate boxes. The tag key must be same as specified in the selected billing adapter's '**Select Group's Service Tag key**' field available under other configuration tab. If invalid or no tag key has been specified in the billing adapter page, you need to first update your billing adapter with a valid tag key in the '**Select Group's Service Tag key**' field available under other configuration tab. You can add up to ten values for the selected tag key. Click to add the entered tag key-value pair as tag filter for this group. When your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled, the following specifications apply to the "Select Tag" field: ○ Enter Tag Key and Tag Value in the appropriate boxes. Click to add the entered tag key-value pair as tag filter for this group. The tag key must match the tag key specified in the selected billing adapter's "Group Service Tag Key" field, which is available under the "Other Configuration" tab. If an invalid or no tag key is specified in the billing

Field name	Notes
	adapter page, you must first update your billing adapter with a valid tag key in the "Add Group Service Tag Key" field under the "Other Configuration" tab. ○ **Tag Key-Value Pair Operators:** ▪ **Equal (=):** Includes all services/resources from the specified accounts with the given tag key-value pair in the group. ▪ **Not Equal (!=):** Excludes services/resources from the specified accounts with the given tag key-value pair from the group. ▪ The default operator is **Equal (=)**. ○ **Tag Query Operator:** ▪ If multiple tag keys are selected, you can use a tag query operator to combine different tag key-value pairs: • **OR:** The AWS group will include services/resources from the specified accounts that have any one of the selected tags. For example, selecting tags A and B with an OR operator will include resources with either tag A or tag B. • **AND:** The AWS group will include only those services/resources from the specified accounts that have all of the selected tags. For example, selecting tags A and B with an AND operator will include only resources that have both tag A and tag B. ▪ The default tag query operator is **OR**. ○ **Limitations:** You can specify up to 12 different tag key-value pairs for a group.
Add Group Tags (Custom Data) [Optional]	You can define your own custom label consisting of key and value to filter groups. You can add an account admin email address to use when you create an event for a recommendation policy. For example, you can put several accounts/sub accounts with multiple tags in a group named as Department_1 and then add group tags (custom data) like: Cost Center = 1234 VP = John Doe

Field name	Notes
	Account Owner = example1@email.com Later you will be able to filter the group using these group tags (custom data) key and value pair(s). To add group tags (custom data) to a group, enter **Key** and **Value** in the appropriate boxes. Click to add the entered key and value pair as group tags (custom data) for the group. You can add up to ten key and value pairs to a group. These group tags (custom data) keys and values will be applicable to the selected group only. It will not impact your cloud resources existing tag key-value pair(s).
Allocation Ratio	Enter the allocation ratio ranging between 0.0 to 1.0. This ratio determines the proportion of the total cost that has been accumulated by this group. This option is available only if your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled.

4. Click **Create Group**.

View List of AWS Adapters Groups

1. Navigate to **Resources > Groups**.
2. By default, AWS cloud provider tab will be selected provided that an AWS adapter group has been created or shared with you. If not, select AWS cloud provider tab from the top.
3. A list of user created, auto created groups based on group policy, and shared groups is displayed.
4. A group marked as 'N/A' under the policy name column indicates that the group was created manually by the user.
5. A group for which group policy name is available under the policy name column signifies that group is automatically created based on specified group policy. Name for such groups would be in the format of [AWS]-[Billing_Account_Name]-[Tag_Key]-[Tag_Value].

If you had previously manually created a group that now mirrors the group policy scenario, the group name would remain the same, but the group policy name will be displayed under the policy name column.

6. You can filter the group list by group name, billing adapter, account tag, and group tags (custom data). To view the account tag filters field, you must select a billing adapter from the drop-down in the billing account selection box. After setting the required filter parameters, you must click **Apply** button to see the groups list as per set filters. **Clear Filters** button removes all the filter settings.
7. You can see the following details for each group:
    - Group Name: Name of the group
    - Billing Adapter: Billing adapter for the group
    - Policy Name: Group policy name if group is created automatically based on a group policy.
    - Scope: Lists normal adapter's count and service tags count included in the group. Click on the count values to see details of normal adapters and tags respectively. If *Select All* option was used to select all the accounts while creating or updating a group, adapters details would show as *All*, provided that you have all the normal adapters for the selected billing adapter listed in your adapters page.

      If you had used 'Select All' check box to select all the accounts in the list while creating the group. But, if adapter count is displayed instead of *All*, it indicates that all the normal adapters of the selected billing adapter are not owned or shared with you.

      The adapters count will be marked as N/A and an info icon with the message "This group is marked as empty as the normal accounts associated with this group are currently not available in this tenant" will appear on the groups list page whenever all of the group's associated normal adapters are deleted or unshared. Additionally, such groups would not be available for selection in any other module such as billing configuration, budget, cost report, etc.

An AWS group created based on account tag selection and the 'Select All' option will keep the adapter count labelled as 'All' even after those account tags have been removed from all of the AWS accounts. In the future, any sub-accounts of the chosen billing account that are assigned the chosen account tags will become part of such a group.

- Group Tags: Lists the applied group tags (custom data) count. Click on the count value to see applied group tags (custom data) details.
- Current Month Spend: This column displays the cost metric value for the current month, excluding today's date, based on the metric type selected in the "Selected Metric" field of the report profile set for your tenant or child organization type. The cost value represented in this column is the aggregate of all normal adapters' costs without applying any tags associated with the group. If the currency conversion feature is enabled for your tenant, the cost value will be converted to your preferred currency. A prefix of 'A' before the '$' sign indicates that the currency type is AUD (Australian Dollars). Click on the cost amount hyperlink to navigate to the cost report page, where the group filter is set to the selected group without any tags.
- Potential Benefit (Unused and Unoptimized): This column shows the potential savings amount that could be achieved by transitioning the services linked to the normal adapters associated with the group to the recommendations provided in the Service Adviser module. The calculation of the potential benefit amount does not take into account any tags associated with the group. If the currency conversion feature is enabled for your tenant, the savings will be converted to your preferred currency. A prefix of 'A' before the '$' sign indicates that the currency type is AUD (Australian Dollars). Click on the amount hyperlink to navigate to the service adviser page, where the group filter is set to the selected group without any tags.
- Potential RI Savings (3 year): This column shows the amount that can be saved by purchasing three-year term Reserved Instances for all recommended service types associated with the accounts in the group. Click

on the amount to go to the Reserved Instance Report (Recommendation) page.

- Potential Savings Plan Savings (3 year): This column shows the amount that can be saved by purchasing three-years term Savings Plans for payer recommendation level and all savings plan types associated with the accounts in the group. Click on the amount to go to the Savings Plans (Recommendation) page.
- Action: Allows to view, edit, and delete a group. If a group is shared with you, edit and delete group actions will not be available for that group.

Edit the AWS Adapter Group

You can modify a group that has been created by you.

1. Navigate to **Resources > Groups**.
2. By default, AWS cloud provider tab will be selected provided that an AWS adapter group has been created or shared with you. If not, select AWS cloud provider tab from the upper right corner.
3. Click the ellipsis […] icon against the group that you want to modify.
4. Click **Edit Group**.
5. Enter or select the modification in the attribute field (for example, modify the name in the Group Name field or select a different account in the **Select Accounts** drop-down).

   The accounts selection list cannot be updated while editing a group that was formed using the 'Select All' option to pick all the accounts.

6. Click **Update Group**.

If you have updated the group to add or remove a normal adapter, it may take up to 24 hours to update the value in the "current month cost" column. However, data in the other columns will be updated instantly.

Delete AWS Adapter Groups

You can remove unused groups from the Groups list.

1. Navigate to **Resources > Groups**.
2. By default, AWS cloud provider tab will be selected provided that an AWS adapter group has been created or shared with you. If not, select AWS cloud provider tab from the upper right corner.
3. Click the ellipsis […] icon against the group that you want to delete.
4. Click **Delete Group**.
5. Click **OK** to delete a group.

Outcomes

You have learnt how to create an AWS adapters group in the CloudBolt CSMP.

5.2.2. Create and Manage Azure Adapter Groups

Learn how to create and manage Azure adapters groups in CloudBolt CSMP.

- Create Azure Adapters Groups
- View List of Azure Adapters Groups
- Edit the Azure Adapter Group
- Delete Azure Adapter Groups
- Outcomes

Create Azure Adapters Groups

Use this procedure to create new Azure adapters groups.

1. Navigate to **Resources > Groups**.
2. Click **Add Group > Azure**.
3. Enter the details as follows:

Field name	Notes
Provider	Select provider as Azure.
Group Name	Enter a valid name for group.
Description	Enter description for group.
Select Billing Subscriptions	Select a billing adapter. **Important:** Sharing a group will never share the billing adapter.
Select Subscriptions	Select normal adapters which you want to include in this group. **Important:** ○ If you want to create this group for a billing adapter which is recently created, it may take up to 30 minutes to get all the normal adapters populated in *Select Subscriptions* drop down list.

Field name	Notes
	○ You can select maximum of 99 normal adapters. Alternatively, you can use Select All option to select all the normal adapters available in the list. If you have used Select All option to select normal adapters for this group, any additional normal adapters created as part of the previously selected billing adapter will be added automatically to this group. If you are a sub-tenant user of parent organisation or a child organisation user with a subset of subscriptions shared with you, *Select All* option will only select all the subscriptions shared with your tenant/child organisation.
Select Tags [Optional]	Enter **Tag Key** and **Tag Value** in the appropriate boxes. The tag key must be same as specified in the selected billing adapter's '**Select Group's Service Tag key**' field available under other configuration tab. If invalid or no tag key has been specified in the billing adapter page, you need to first update your billing adapter with a tag key in the '**Select Group's Service Tag key**' field available under other configuration tab. You can add up to ten values for the selected tag key. Click to add the entered tag key-value pair as tag filter for this group.
Add Group Tags (Custom Data) [Optional]	You can define your own custom label consisting of key and value to filter groups. You can add an account admin email address to use when you create an event for a recommendation policy. For example, you can put several subscriptions with multiple tags in a group named as Department_1 and then add group tags (custom data) like: Cost Center = 1234 VP = John Doe Account Owner = example1@email.com Later you will be able to filter the group using these group tags (custom data) key and value pair(s). To add group tags (custom data) to a group, enter **Key** and **Value** in the appropriate boxes. Click to add the entered key and value pair as group tags (custom data) for the group. You can add up to ten key and value pairs to a group. These group tags () keys and values will be applicable to the selected group only. It will not impact your cloud resources existing tag key-value pair(s).

4. Click **Create Group**.

View List of Azure Adapters Groups

1. Navigate to **Resources > Groups**.

2. By default, Azure cloud provider tab will be selected provided that only Azure adapter groups have been created or shared with you. If not, select Azure cloud provider tab from top.
3. A list of all the user created and shared with the user Groups will display.
4. You can filter the group list by group name, billing adapter, and group tags (custom data). After setting the required filter parameters, you must click **Apply** button to see the groups list as per set filters. **Clear Filters** button removes all the filter settings.
5. You can see the following details for each group:
    - Group Name: Name of the group
    - Billing Adapter: Billing adapter for the group
    - Scope: Lists normal adapter's count and service tags count included in the group. Click on the count values to see details of normal adapters and tags respectively. If *Select All* option was used to select all the subscriptions while creating or updating a group, adapters details would show as *All*, provided that you have all the normal adapters for the selected billing adapter listed in your adapters page.

      If you had used 'Select All' check box to select all the subscriptions in the list while creating the group. But, if adapter count is displayed instead of *All*, it indicates that all the normal adapters of the selected billing adapter are not owned or shared with you.

      The adapters count will be marked as N/A and an info icon with the message "This group is marked as empty as the normal accounts associated with this group are currently not available in this tenant" will appear on the groups list page whenever all of the group's associated normal adapters are deleted or unshared. Additionally, such groups would not be available for selection in any other module such as billing configuration, budget, cost report, etc.

    - Group Tags: Lists the applied group tags (custom data) count. Click on the count value to see applied group tags (custom data) details.

- Current Month Spend: This column displays the cost metric value for the current month, excluding today's date, based on the metric type selected in the "Selected Metric" field of the report profile set for your tenant or child organization type. The cost value represented in this column is the aggregate of all normal adapters' costs without applying any tags associated with the group. If the currency conversion feature is enabled for your tenant, the cost value will be converted to your preferred currency. A prefix of 'A' before the '$' sign indicates that the currency type is AUD (Australian Dollars). Click on the cost amount hyperlink to navigate to the cost report page, where the group filter is set to the selected group without any tags.
- Potential Benefit (Unused and Unoptimized): This column shows the potential savings amount that could be achieved by transitioning the services linked to the normal adapters associated with the group to the recommendations provided in the Service Adviser module. The calculation of the potential benefit amount does not take into account any tags associated with the group. If the currency conversion feature is enabled for your tenant, the savings will be converted to your preferred currency. A prefix of 'A' before the '$' sign indicates that the currency type is AUD (Australian Dollars). Click on the amount hyperlink to navigate to the service adviser page, where the group filter is set to the selected group without any tags.
- Potential RI Savings (3 year): This column shows the amount that can be saved by purchasing three-year term Reserved Instances for all recommended service types associated with the accounts in the group. Click on the amount to go to the Reserved Instance Report (Recommendation) page.
- Action: Allows to view, edit, and delete a group. If a group is shared with you, edit and delete group actions will not be available for that group.

Edit the Azure Adapter Group

You can modify a group that has been created by you.

1. Navigate to **Resources > Groups**.
2. By default, Azure cloud provider tab will be selected provided that only Azure adapter groups have been created or shared with you. If not, select Azure cloud provider tab from the upper right corner.
3. Click the ellipsis […] icon against the group that you want to modify.
4. Click **Edit Group**.
5. Enter or select the modification in the attribute field (for example, modify the name in the Group Name field or select a different account in the **Select Subscriptions** drop-down).

   The subscriptions selection list cannot be updated while editing a group that was formed using the 'Select All' option to pick all the subscriptions.

6. Click **Update Group**.

If you have updated the group to add or remove a normal adapter, it may take up to 24 hours to update the value in the "current month cost" column. However, data in the other columns will be updated instantly.

Delete Azure Adapter Groups

You can remove unused groups from the Groups list.

1. Navigate to **Resources > Groups**.
2. By default, Azure cloud provider tab will be selected provided that only Azure adapter groups have been created or shared with you. If not, select Azure cloud provider tab from the upper right corner.
3. Click the ellipsis […] icon against the group that you want to delete.
4. Click **Delete Group**.
5. Click **OK** to delete a group.

Outcomes

You have learnt how to create an Azure adapters group in the CloudBolt CSMP.

5.2.3. Create and Manage Azure CSP Adapter Groups

Learn how to create and manage Azure CSP adapters groups in CloudBolt CSMP.

- Create Azure CSP Adapters Groups
- View List of Azure CSP Adapters Groups
- Edit the Azure CSP Adapter Group
- Delete Azure CSP Adapter Groups
- Outcomes

Create Azure CSP Adapters Groups

Use this procedure to create new Azure CSP adapters groups manually. Alternatively, you can set a policy to create groups automatically.

1. Navigate to **Resources > Groups**.
2. Click **Add Group > Azure**.
3. Enter the details as follows:

Field name	Notes
Provider	Select provider as Azure.
Group Name	Enter a valid name for group.
Description	Enter a description for group.
Select Billing Subscriptions	Select a billing adapter. Based on the billing adapter selection, the customer id and accounts selection lists will display. **Important:** Sharing a group will never share the billing adapter.
Select Customer Id	Select a customer id which you want to include in this group.

Field name	Notes
Select Subscriptions	Select normal adapters which you want to include in this group. **Important:** ○ If you want to create this group for a billing adapter which is recently created, it may take up to 30 minutes to get all the normal adapters populated in *Select Subscriptions* drop down list. ○ You can select maximum of 99 normal adapters. Alternatively, you can use **Select All** option to select all the normal adapters available in the list. If you have used **Select All** option to select normal adapters for this group, any additional normal adapters created as part of the previously selected billing adapter will be added automatically to this group. If you are a sub-tenant user of parent organisation or a child organisation user with a subset of subscriptions shared with you, *Select All* option will only select all the subscriptions shared with your tenant/child organisation.
Select Tags [Optional]	Enter **Tag Key** and **Tag Value** in the appropriate boxes. The tag key must be same as specified in the selected billing adapter's '**Select Group's Service Tag key**' field available under other configuration tab. If invalid or no tag key has been specified in the billing adapter page, you need to first update your billing adapter with a tag key in the '**Select Group's Service Tag key**' field available under other configuration tab. You can add multiple values for the selected tag key. Click to add the entered tag key-value pair as tag filter for this group. Maximum ten tags can be added to a group.
Add Group Tags (Custom Data) [Optional]	You can define your own custom label consisting of key and value to filter groups. You can add an account admin email address to use when you create an event for a recommendation policy. For example, you can put several subscriptions with multiple tags in a group named as Department_1 and then add group tags (custom data) like: Cost Center = 1234 VP = John Doe Account Owner = example1@email.com Later you will be able to filter the group using these group tags (custom data) key and value pair(s). To add group tags (custom data) to a group, enter **Key** and **Value** in the appropriate boxes. Click to add the entered key and value pair as group tags (custom data) for the group. You can add up to ten key and value pairs to a group. These group tags (custom data) keys and values will be applicable to the selected group only. It will not impact your cloud

Field name	Notes
	resources existing tag key-value pair(s).

4. Click **Create Group**.

View List of Azure CSP Adapters Groups

1. Navigate to **Resources > Groups**.
2. By default, Azure cloud provider tab will be selected provided that only Azure adapter groups have been created or shared with you. If not, select Azure cloud provider tab from top.
3. A list of user created, auto created groups based on group policy, and shared groups is displayed.
4. A group marked as 'N/A' under the policy name column indicates that the group was created manually by the user.
5. A group for which a group policy name is available under the policy name column signifies that group is automatically created based on specified group policy. Name for such groups would be in the format of [Azure CSP]-[Billing_Account_Name]-[CustomerName(ID)].

   If you had previously manually created a group that now mirrors the group policy scenario, the group name would remain the same, but the group policy name will be displayed under the policy name column.

6. You can filter the group list by group name, billing adapter, customer id, and group tags (custom data). After setting the required filter parameters, you must click **Apply** button to see the groups list as per set filters. **Clear Filters** button removes all the filter settings.
7. You can see the following details for each group:
   - Group Name: Name of the group
   - Billing Adapter: Billing adapter for the group
   - Policy Name: Group policy name if group is created automatically based on a group policy.

- Scope: Displays customer id linked with the group. Lists normal adapter's count and service tags count included in the group. Click on the count values to see details of normal adapters and tags respectively. If *Select All* option was used to select all the subscriptions while creating or updating a group, adapters details would show as *All*, provided that you have all the normal adapters for the selected billing adapter listed in your adapters page.

  If you had used 'Select All' check box to select all the subscriptions in the list while creating the group. But, if adapter count is displayed instead of *All*, it indicates that all the normal adapters of the selected billing adapter are not owned or shared with you.

  The adapters count will be marked as N/A and an info icon with the message "This group is marked as empty as the normal accounts associated with this group are currently not available in this tenant" will appear on the groups list page whenever all of the group's associated normal adapters are deleted or unshared. Additionally, such groups would not be available for selection in any other module such as billing configuration, budget, cost report, etc.

- Group Tags: Lists the applied group tags (custom data) count. Click on the count value to see applied group tags (custom data) details.
- Current Month Spend: This column displays the cost metric value for the current month, excluding today's date, based on the metric type selected in the "Selected Metric" field of the report profile set for your tenant or child organization type. The cost value represented in this column is the aggregate of all normal adapters' costs without applying any tags associated with the group. If the currency conversion feature is enabled for your tenant, the cost value will be converted to your preferred currency. A prefix of 'A' before the '$' sign indicates that the currency type is AUD (Australian Dollars). Click on the cost amount hyperlink to navigate to the cost report page, where the group filter is set to the selected group without any tags.
- Potential Benefit (Unused and Unoptimized): This column shows the potential savings amount that could be achieved by transitioning the services linked to

the normal adapters associated with the group to the recommendations provided in the Service Adviser module. The calculation of the potential benefit amount does not take into account any tags associated with the group. If the currency conversion feature is enabled for your tenant, the savings will be converted to your preferred currency. A prefix of 'A' before the '$' sign indicates that the currency type is AUD (Australian Dollars). Click on the amount hyperlink to navigate to the service adviser page, where the group filter is set to the selected group without any tags.

- Action: Allows to view, edit, and delete a group. If a group is shared with you, edit and delete group actions will not be available for that group.

Edit the Azure CSP Adapter Group

You can modify a group that has been created by you.

1. Navigate to **Resources > Groups**.
2. By default, Azure cloud provider tab will be selected provided that only Azure adapter groups have been created or shared with you. If not, select Azure cloud provider tab from the upper right corner.
3. Click the ellipsis […] icon against the group that you want to modify.
4. Click **Edit Group**.
5. Enter or select the modification in the attribute field (for example, modify the name in the Group Name field or select a different account in the **Select Subscriptions** drop-down).

   The subscriptions selection list cannot be updated while editing a group that was formed using the 'Select All' option to pick all the subscriptions.

6. Click **Update Group**.

If you have updated the group to add or remove a normal adapter, it may take up to 24 hours to update the value in the "current month cost" column. However, data in the other columns will be updated instantly.

Delete Azure CSP Adapter Groups

You can remove unused groups from the Groups list.

1. Navigate to **Resources > Groups**.
2. By default, Azure cloud provider tab will be selected provided that only Azure adapter groups have been created or shared with you. If not, select Azure cloud provider tab from the upper right corner.
3. Click the ellipsis […] icon against the group that you want to delete.
4. Click **Delete Group**.
5. Click **OK** to delete a group.

Outcomes

You have learnt how to create an Azure CSP adapters group in the CloudBolt CSMP.

5.2.4. Create and Manage GCP Adapter Groups

Learn how to create and manage GCP adapters groups in CloudBolt CSMP.

- Create GCP Adapters Groups
- View List of GCP Adapters Groups
- Edit the GCP Adapter Group
- Delete GCP Adapter Groups
- Outcomes

Create GCP Adapters Groups

Use this procedure to create new GCP adapters groups manually. Alternatively, you can set a policy to create groups automatically.

1. Navigate to **Resources > Groups**.
2. Click **Add Group > GCP**.
3. Enter the details as follows:

Field name	Notes
Provider	Select provider as GCP.
Group Name	Enter a valid name for group.
Description	Enter description for group.
Select Billing Projects	Select a billing adapter. **Important:** Sharing a group will never share the billing adapter.
Select Sub Accounts	Select a GCP sub-account for the group.
Select Projects	Select normal adapters which you want to include in this group. **Important:** ○ If you want to create this group for a billing adapter which is recently created, it may take up to 30 minutes to get all the

Field name	Notes
	normal adapters populated in *Select Projects* drop down list. ○ You can select maximum of 99 normal adapters. Alternatively, you can use **Select All** option to select all the normal adapters available in the list. If you have used **Select All** option to select normal adapters for this group, any additional normal adapters created as part of the previously selected billing adapter will be added automatically to this group. If you are a sub-tenant user of parent organisation or a child organisation user with a subset of projects shared with you, *Select All* option will only select all the projects shared with your tenant/child organisation.
Select Tags [Optional]	Enter the service label key in the **Tag Key** and label value in the **Tag Value** boxes. You must enter correct tag key and value. Click to add the entered tag key-value pair as tag filter for this group. You can add multiple tag key-value pairs for the group.
Add Group Tags (Custom Data) [Optional]	You can define your own custom label consisting of key and value to filter groups. For example, you can put several accounts/sub accounts with multiple tags in a group named as Department_1 and then add group tags (custom data) like: Cost Center = 1234 VP = John Doe Account Owner = example1@email.com Later you will be able to filter the group using these group tags (custom data) key and value pair(s). To add group tags (custom data) to a group, enter **Key** and **Value** in the appropriate boxes. Click to add the entered key and value pair as group (custom data) for the group. You can add up to ten key and value pairs to a group. These group tags (custom data) keys and values will be applicable to the selected group only. It will not impact your cloud resources existing tag key-value pair(s).

- Click **Create Group**.

View List of GCP Adapters Groups

1. Navigate to **Resources > Groups**.
2. By default, GCP cloud provider tab will be selected provided that only GCP adapter groups have been created or shared with you. If not, select GCP cloud provider tab from top.

3. A list of user created, auto created groups based on group policy, and shared groups is displayed.
4. A group marked as 'N/A' under the policy name column indicates that the group was created manually by the user.
5. A group for which group policy name is available under the policy name column signifies that group is automatically created based on specified group policy. Name for such groups would be in the format of [GCP]-[Billing_Account_Name]-[SubAccountID].

   If you had previously manually created a group that now mirrors the group policy scenario, the group name would remain the same, but the group policy name will be displayed under the policy name column.

6. You can filter the group list by group name, billing adapter, and group tags (custom data). After setting the required filter parameters, you must click **Apply** button to see the groups list as per set filters. **Clear Filters** button removes all the filter settings.
7. You can see the following details for each group:
   - Group Name: Name of the group
   - Policy Name: Group policy name if group is created automatically based on a group policy.
   - Scope: Displays sub-account name linked with the group. Lists normal adapter's count and service tags count included in the group. Click on the count values to see details of normal adapters and tags respectively. If *Select All* option was used to select all the projects while creating or updating a group, adapters details would show as *All*, provided that you have all the normal adapters for the selected billing adapter listed in your adapters page.

     If you had used 'Select All' check box to select all the projects in the list while creating the group. But, if adapter count is displayed instead of *All*, it indicates that all the normal adapters of the selected billing adapter are not owned or shared with you.

     The adapters count will be marked as N/A and an info icon with the message "This group is marked as empty as the normal accounts associated with this

group are currently not available in this tenant" will appear on the groups list page whenever all of the group's associated normal adapters are deleted or unshared. Additionally, such groups would not be available for selection in any other module such as billing configuration, budget, cost report, etc.

- Group Tags: Displays the applied group tags (custom data) count. Click on the count value to see applied group tags (custom data) details.
- Current Month Spend: This column displays the cost metric value for the current month, excluding today's date, based on the metric type selected in the "Selected Metric" field of the report profile set for your tenant or child organization type. The cost value represented in this column is the aggregate of all normal adapters' costs without applying any tags associated with the group. If the currency conversion feature is enabled for your tenant, the cost value will be converted to your preferred currency. A prefix of 'A' before the '$' sign indicates that the currency type is AUD (Australian Dollars). Click on the cost amount hyperlink to navigate to the cost report page, where the group filter is set to the selected group without any tags.
- Potential Benefit (Unused and Unoptimized): This column shows the potential savings amount that could be achieved by transitioning the services linked to the normal adapters associated with the group to the recommendations provided in the Service Adviser module. The calculation of the potential benefit amount does not take into account any tags associated with the group. If the currency conversion feature is enabled for your tenant, the savings will be converted to your preferred currency. A prefix of 'A' before the '$' sign indicates that the currency type is AUD (Australian Dollars). Click on the amount hyperlink to navigate to the service adviser page, where the group filter is set to the selected group without any tags.
- Action: Allows to view, edit, and delete a group. If a group is shared with you, edit and delete group actions will not be available for that group.

Edit the GCP Adapter Group

You can modify a group that has been created by you.

1. Navigate to **Resources > Groups**.
2. By default, GCP cloud provider tab will be selected provided that only GCP adapter groups have been created or shared with you. If not, select GCP cloud provider tab from the upper right corner.
3. Click the ellipsis […] icon against the group that you want to modify.
4. Click **Edit Group**.
5. Enter or select the modification in the attribute field (for example, modify the name in the Group Name field or select a different project in the **Select Projects** drop-down).

   The projects selection list cannot be updated while editing a group that was formed using the 'Select All' option to pick all the projects.

6. Click **Update Group**.

If you have updated the group to add or remove a normal adapter, it may take up to 24 hours to update the value in the "current month cost" column. However, data in the other columns will be updated instantly.

Delete GCP Adapter Groups

You can remove unused groups from the Groups list.

1. Navigate to **Resources > Groups**.
2. By default, GCP cloud provider tab will be selected provided that only GCP adapter groups have been created or shared with you. If not, select GCP cloud provider tab from the upper right corner.
3. Click the ellipsis […] icon against the group that you want to delete.
4. Click **Delete Group**.
5. Click **OK** to delete a group.

Outcomes

You have learnt how to create GCP adapters group in the CloudBolt CSMP.

5.2.5. Create and Manage VMware vCenters Groups

Learn how to create and manage VMware vCenters groups in CloudBolt CSMP.

- Create new VMware vCenters Groups
- View List of VMware vCenters Groups
- Edit the VMware vCenters Group
- Delete VMware vCenters Groups
- Outcomes

Create new VMware vCenters Groups

Use this procedure to create new VMware vCenters groups manually.

1. Navigate to **Resources > Groups**.
2. Click **Add Group > VMware**.
3. Enter the details as follows:

Field name	Notes
Provider	Select provider as VMware.
Group Name	Enter a valid name for the group.
Description	Enter description for the group.
Select Billing vCenters	Select a VMware adapter for which rate card has been configured and succesfully sychronised from VDC.
Select vCenters	Select vCenters which you want to group together.
Select Tags [Optional]	Enter the service label key in the **Tag Key** and label value in the **Tag Value** boxes. You must enter correct tag key and value. Click to add the entered tag key-value pair as tag filter for this group. You can add multiple tag key-value pairs for the group.
Add Group Tags (Custom Data) [Optional]	You can define your own custom label consisting of key and value to filter groups. For example, you can put several vCenters with multiple tags in a group named as Department_1 and then add group tags (custom data) like: Cost Center = 1234

Field name	Notes
	VP = John Doe Account Owner = example1@email.com Later you will be able to filter the group using these group tag key and value pair(s). To add group tag (custom data) to a group, enter **Key** and **Value** in the appropriate boxes. Click to add the entered key and value pair as group tag (custom data) for the group. You can add up to ten key-value pairs to a group. These group tag (custom data) keys and values will be applicable to the selected group only. It will not impact your cloud resources existing tag key-value pair(s).

4. Click **Create Group**.

View List of VMware vCenters Groups

1. Navigate to **Resources > Groups**.
2. By default, VMware cloud provider tab will be selected provided that only VMware adapter groups have been created or shared with you. If not, select VMware cloud provider tab.
3. A list of VMware Vcenters groups is displayed. The list contains groups that are created by you and groups that are shared to your tenant.
4. You can filter the group list by group name, billing vCenter (adapter name), and group tags (custom data). After setting the required filter parameters, you must click **Apply** button to see the groups list as per the set filters. **Clear Filters** button removes all the filter settings.
5. You can see the following details for each group:
    - Group Name: Name of the group
    - Billing vCenters: VMware adapter name for the group
    - Details: Lists vCenters and service tags count included in the group. Click on the count values to see details of vCenters and tags respectively. If *Select All* option was used to select all the vCenters while creating, vCenters details would show as *All*.

- Group Tags: Displays the applied group tags (custom data) count. Click on the count value to see applied group tags (custom data) details.
- Current Month Spend: This column displays the cost metric value for the current month, excluding today's date, based on the metric type selected in the "Selected Metric" field of the report profile set for your tenant or child organization type. The cost value represented in this column is the aggregate of all vCenters' costs without applying any tags associated with the group. Click on the cost amount hyperlink to navigate to the cost report page, where the group filter is set to the selected group without any tags.
- Potential Benefit (Unused and Unoptimized): This column shows the potential savings amount that could be achieved by transitioning the services linked to the vCenters associated with the group to the recommendations provided in the Service Adviser module. The calculation of the potential benefit amount does not take into account any tags associated with the group. Click on the amount hyperlink to navigate to the service adviser page, where the group filter is set to the selected group without any tags.
- Action: Allows to view, edit, and delete a group. If a group is shared with you, edit and delete group actions will not be available for that group.

Edit the VMware vCenters Group

You can only modify a group that has been created by you.

1. Navigate to **Resources > Groups**.
2. By default, VMware cloud provider tab will be selected provided that only VMware adapter groups have been created or shared with you. If not, select VMware cloud provider tab.
3. Click the ellipsis […] icon against the group that you want to modify.
4. Click **Edit Group**.
5. Enter or select the modification in the attribute field.

The billing vCenters and vCenters selection list cannot be updated while editing a group that was formed using the 'Select All' option to pick all the Vcenters.

6. Click **Update Group**.

If you have updated the group to add or remove a vCenter, it may take up to 24 hours to update the value in the "current month cost" column. However, data in the other columns will be updated instantly.

Delete VMware vCenters Groups

You can remove unused groups from the Groups list.

1. Navigate to **Resources > Groups**.
2. By default, VMware cloud provider tab will be selected provided that only VMware adapter groups have been created or shared with you. If not, select VMware cloud provider tab.
3. Click the ellipsis […] icon against the group that you want to delete.
4. Click **Delete Group**.
5. Click **OK** to delete a group.

Outcomes

You have learnt how to create VMware vCenters group in the CloudBolt CSMP.

5.3. Tags

Learn to see a list of available tags within your AWS and Azure cloud accounts.

Introduction

Tags are a simple method to assign metadata to your cloud resources at any time, which you cannot include in the resource name. Each tag is a label with a **key** and **value**. Each tag key must be unique and each tag key can have one or multiple values. Tags can assist you with resource management, identification, organization, search, reporting, and filtering. You may use tags to organize resources according to their purpose, owner, environment, or other factors.

Each tag has two parts:

1. A tag ***key*** (for example, Environment, Project, or Owner). Tag keys might be case sensitive or insensitive, depending on your cloud resource provider.
2. A tag ***value*** (for example, Production or 1276667). Like tag keys, tag values might be case sensitive or insensitive, depending on your cloud resource provider.

You can connect costs with standard financial reporting dimensions inside your company by using business tags like cost centre, business unit, or project. It enables clients to quickly link expenses to technical or security aspects like specific applications, environments, or compliance programs. CloudBolt CSMP **Cost Report** module provides you with an option to generate cost reports based on tags.

When it comes to infrastructure automation, resource or service-specific tags are frequently employed to filter resources. Tags can be used to opt into or out of automatic operations and identify specific resource versions to archive, update, or delete. You may automate your cloud services events with particular tags using **Event Scheduler** module.

Tags can be used to incorporate cloud resource assistance into daily operations, such as IT Service Management (ITSM) procedures like Incident Management. Many customers also use tags to assist operations like backup/restore and operating system patching. Using the

CloudBolt CSMP **Event Scheduler** module, you can automate your cloud backup events for the services with specific tags.

Tag-based conditions are supported by many cloud services and policies, allowing consumers to limit access based on specific tags and their values. Tags can be applied to resources that require more stringent security risk management procedures. CloudBolt **Security and Compliance Adviser** module helps you to identify the security threats using tags.

View AWS Tags

1. Log in to your CloudBolt CSMP account.
2. Navigate to **Resources** > **Tags**.
3. Select Provider tab. By default, **Provider** tab would be selected.
4. Select **AWS** tab.
5. You can see a list of AWS-generated and user-defined tags. The list contains following information:
    a. **Tag Key**: It displays the tag key part.
    b. **Tag Values**: It displays the tag key value. Click 'View' to see all the values associated with the respective tag key. Value associated with tag key can be single or multiple.
    c. **Tag Type**: It displays the tag type. Native tag type indicates AWS-generated tag and User tag type indicates user-generated tag.
    d. **Usage Type**: It displays tag utilization type. Provider indicates that the tag has been utilized in the AWS portal only.
6. You can filter the tags list based on AWS billing account, member accounts, service type, region, tag type, and tag key. Enter the appropriate filter parameters in the boxes and click **Search**. Click **Reset** to clear the filters and set to default filter setting.

View Azure Tags

1. Log in to your CloudBolt CSMP account.
2. Navigate to **Resources** > **Tags**.
3. Select Provider tab. By default, **Provider** tab would be selected.
4. Select **Azure** tab.
5. You can see a list of Azure tags used in selected Azure billing account. The list contains following information:
    a. **Tag Key**: It is the tag key part.
    b. **Tag Values**: It is the tag key value. Value associated with tag key can be single or multiple.
    c. **Tag Type**: It is the tag type. Native tag type indicates Azure-generated tag and User tag type indicates user-generated tag.
    d. **Usage Type**: It displays tag utilization type. Provider indicates that the tag has been utilized in the Azure portal only.
6. You can filter the tags list based on Azure billing account, member subscription, service type, region, tag type, and tag key. Enter the appropriate filter parameters in the boxes and click **Search**. Click **Reset** to clear the filters and set to default filter setting.

Outcomes

You have learnt how to see a consolidated list of tags used in your AWS and Azure cloud accounts.

6. Custom Dashboard

Learn how to create, customize, and share the dashboard view for your CloudBolt CSMP.

- Introduction
- Prerequisites
- Default Static Dashboard
- System-Generated Dashboard
- GUI Message
- User-Generated Dashboard
- Create a Dashboard
- View and Activate a Dashboard
- Filter Dashboard Data
- Limitations
- Outcomes

Introduction

Every new account in the CloudBolt CSMP comes with a "Default Static Dashboard". By default, a **system-generated dashboard** will be displayed for an existing CloudBolt CSMP account. While the default dashboard may be adequate, the true value of dashboards resides in your ability to create and personalize them to your preference.

You can add various cost data and charts reported by the CloudBolt CSMP. You can also use custom dashboards to present the selected metrics to a user who only needs a relatively focused view of their cloud cost. In this article, you will learn how to create, customize, and manage a system or user-generated dashboard.

Prerequisites

- You must have a role with all the access permissions applicable for **Custom Dashboard** module. For more information, see Roles in CloudBolt Cost and Security Management.
- You must have at least an **Active** billing adapter with a report configuration status as **Configured**.

Default Static Dashboard

The **Default Static Dashboard** is for the CloudBolt CSMP accounts that do not have a billing adapter. A default static dashboard is a dashboard view that displays all widgets with static data that has no link to your actual cloud cost data. The CloudBolt CSMP account can have a billing adapter created or shared.

A CloudBolt CSMP child account and a tenant without a billing adapter created or shared are likewise subject to the **Default Static Dashboard**.

System-Generated Dashboard

Each CloudBolt CSMP account creates dashboard views from a variety of cloud providers. For example, if your CSMP account contains billing adapters for four separate cloud providers, such as AWS, Azure, GCP, and VMware, you'll get 15 system-generated dashboard views as follows:

1. AWS DEFAULT
2. AZURE DEFAULT
3. GCP DEFAULT
4. VMWARE DEFAULT
5. AWS AZURE DEFAULT
6. AWS GCP DEFAULT
7. AWS VMWARE DEFAULT
8. AZURE GCP DEFAULT

9. AZURE VMWARE DEFAULT
10. GCP VMWARE DEFAULT
11. AWS AZURE GCP DEFAULT
12. AWS AZURE VMWARE DEFAULT
13. AWS GCP VMWARE DEFAULT
14. AZURE GCP VMWARE DEFAULT
15. AWS AZURE GCP VMWARE DEFAULT

By default, a system-generated dashboard that has maximum combination of cloud provider will apply to the CloudBolt CSMP account. In this case, system-generated dashboard named as AWS AZURE GCP VMWARE DEFAULT will apply to the CloudBolt CSMP account.

Important:

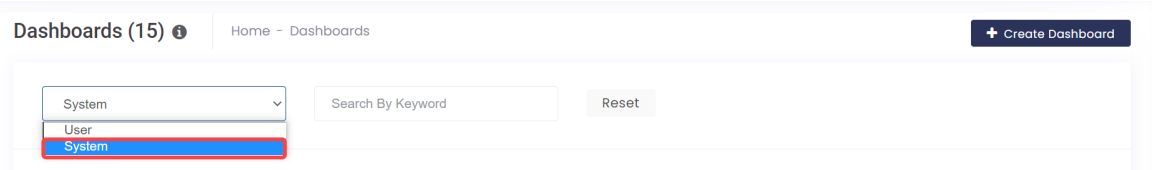
The system-generated dashboard will be re-generated based on the new active cloud provider combination if all billing adapters for a cloud provider are deleted or added to your CloudBolt CSMP account. If you have a system-generated dashboard activated for your CloudBolt CSMP account, it will be replaced with a new system-generated dashboard that includes all the cloud providers.

If you have activated a user-generated dashboard for your CloudBolt account, the new system-generated dashboard will not be activated by default.

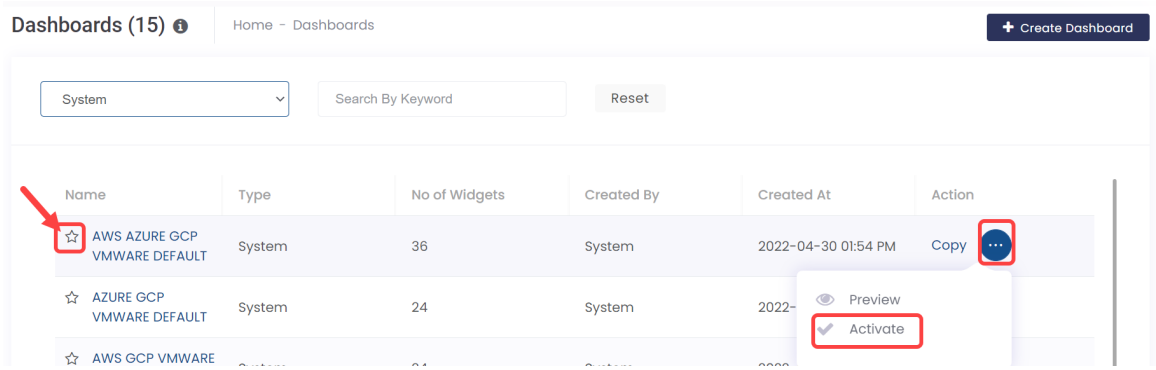
You can only copy, preview, and activate a system-generated dashboard.

You can activate a dashboard view of your choice by following below steps:

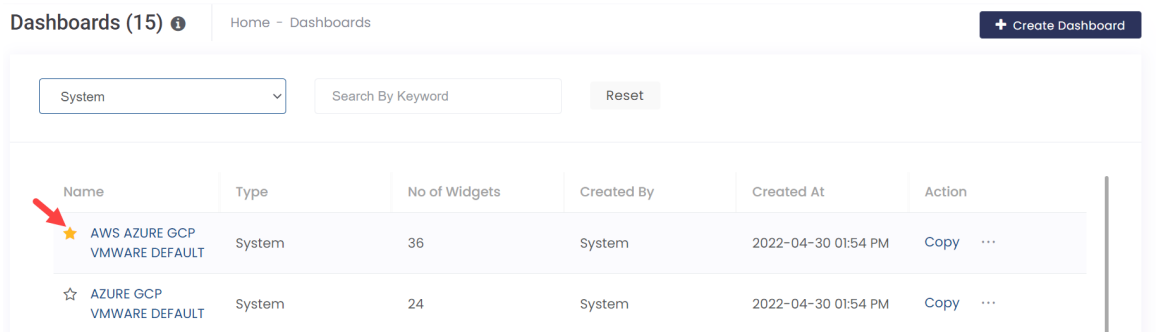
1. Click **Dashboard List** link on the upper left corner of the CloudBolt CSMP dashboard to go to the dashboard list.
2. On the Dashboards page, filter the list by **System** to select and apply a system-generated dashboard. Alternatively, you can also select a user-generated dashboard.



3. Identify the dashboard name, click the ellipsis [...] icon at the end of the row, and then click **Activate**. Alternatively, clicking the star icon next to a dashboard activates that dashboard.



4. The active dashboard will appear with a star mark.



GUI Message

When a system-generated dashboard is activated, there are instances when you might see a message with text similar to: "*Your system dashboard has changed. To know more, see Custom Dashboard*." Below are the instances when the dashboard change message appears on the GUI.

1. A tenant in the tenant drop-down box may have been chosen that hasn't created or shared any billing adapters for a specific cloud provider, whereas the prior tenant had billing adapters for that cloud provider.
2. All the billing adapters for a specific cloud provider might have been deleted.
3. In the case of shared billing adapter, admin user might either deleted or unshared the billing adapters for a specific cloud provider.

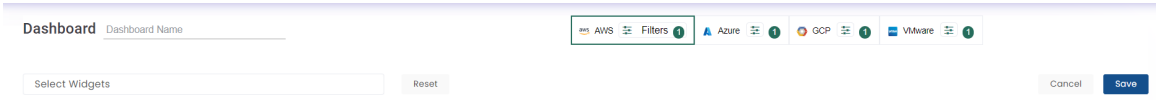
User-Generated Dashboard

CloudBolt CSMP allows an account administrator to create a personalized dashboard known as user-generated dashboard.

Create a Dashboard

Use below procedure to create a customized dashboard view:

1. Login to your CloudBolt CSMP account.
2. Click **Dashboard List** link on the upper left corner of the CloudBolt CSMP dashboard.
3. The **Dashboards** page appears.
4. Click **+ Create Dashboard** button.
5. In the **Dashboard Name** field, enter a name for your dashboard.
6. In the **Filters** area, click the cloud provider icon to expand and collapse the filters field for the specific cloud provider. Filters field can be used to specify the values such as group, account, subscription, project, vCenter, adapter group, customer name, currency, region, service, and tag. By default, one filter that is billing account, subscription, project, and vCenter would be selected for each cloud provider. All filters for individual cloud provider are combined together using 'and' logic, which means that only those records that meet all selected filter values are displayed.



   a. Set AWS filters as follows:

      - **Billing Account** allows you to select an AWS billing adapter (management account). Selected dashboard widgets would display cost data for the selected management account that is responsible for paying the charges of all the member accounts. By default, a billing account will be selected. If you have multiple billing account, you can change the selection.
      - **Group** field would list all the adapter groups created for the chosen billing account. You can select a group. As you select a group, the

account(s) and **tag filters** fields would populate the normal adapters (accounts) and tags associated with the selected adapter group. Group field is to leverage the selection of multiple accounts specially more than 20 and tags at once. While saving the filters, group field would not be saved. However, associated accounts and tags data would be saved. It is important to note that updating the groups to add or delete linked accounts, in future, would not affect the saved dashboard filters.

- **Account(s)** field allows you to select the AWS member account for which you want to view costs on the dashboard widgets. If you select a group, all accounts within the selected adapter group will be automatically chosen. You can also select additional accounts as needed from the drop-down list. To select all accounts, use the **Select All** checkbox, or choose a subset of up to 20 accounts by clicking on them in the list. To remove an account from your selection, simply uncheck the box next to that account.
  You can use the **Include** or **Exclude** options to determine which accounts will be considered for displaying cost data on the dashboard widgets. If you select either option but do not choose any accounts from the list, costs for all accounts will be displayed on the dashboard widgets.
- **Region(s)** drop-down list allows you to specify the geographic locations for which you want to view costs on the dashboard widgets. You can select all AWS regions using the **Select All** checkbox or choose a subset of up to 20 regions by clicking on them in the list. Additionally, you can use the **Include** or **Exclude** options to determine which regions will be considered for displaying cost data on the dashboard widgets. If you select either option but do not choose any regions from the list, costs for all regions will be displayed on the dashboard widgets.

- **Service(s)** filter allows you to filter costs based on selected AWS services. You can choose all services using the **Select All** checkbox or select a subset of up to 20 services by clicking on them in the list. Additionally, you can use the **Include** or **Exclude** options to specify which services will be considered for displaying cost data on the dashboard widgets. If you select either option but do not choose any services from the list, costs for all services will be displayed on the dashboard widgets.
- To apply a **tag filter**, enter tag key in the Tag Key box. The tag value would be populated based on the tag key, you must select a tag value from the list, and then click . You can use the following values:
    - **Exclude No Tagkey: (selected tag key)** - Filter cost for all cloud resources/services with the specified tag key, but there must be no tag value.
    - **No Tagkey: (selected tag key)** - Filter cost all cloud resources/services that do not have the specified tag key.
    - The displayed tag value - Filter cost all cloud resources/services with the specified tag key and the specified tag value.

  You can add up to ten tags. Whenever you add two or more different tag key types, you must choose an operator to join those tag filters. By default, OR operator will be selected.
  If you had selected a group, the associated tag key-value pair(s) would automatically appear in tag filters. If the selected group has multiple tag filters applied, by default, the AND operator would be selected to join tag filters.
- **Applied Group Tags** allows you to filter the cost report for multiple groups using their group tags (custom data). To filter cost report by group tags:

i. Enter the group tag key in **Group Tag Key** box. Select the group tag value from the drop-down list.You can use the following values:

- **Exclude No Group Tagkey: (selected tag key)** - Filter cost for all the groups with the specified group tag key, but there must be no group tag value.
- **No Group Tagkey: (selected tag key)** - Filter cost all the groups that do not have the specified group tag key.
- The displayed tag value - Filter cost all the groups with the specified group tag key and the specified group tag value.

ii. Click to apply the specified group tag key-value pair(s) as applied group tags filter. You can add up to ten group tags as filter.

iii. Whenever you add two or more different group tag key types, you must choose an operator from the group tag operator selection box to combine those group tag pairs. By default, OR operator will be selected, which means that cost report would be generated for all groups that contains any of the specified group tag pairs. Selecting AND operator means that cost report would be generated only for such groups that have all the specified group tag pairs.

Applied Group Tags filter option will not be available if you had selected a group from the group filter drop-down list.

- Click **Save** within filter field area to save the specified filter values.
- **Clear Filters** would delete all filter fields settings and set the billing account selection to default.

b. Set Azure filters as follows:

- **Billing Subscription** allows you to select an Azure billing adapter. Selected dashboard widgets would display cost data for the selected

billing subscription that is responsible for paying the charges of all the member subscriptions. By default, a billing subscription will be selected. If you have multiple billing subscriptions, you can change the selection. *Total* billing subscription option can be used to see the cost of all the billing subscriptions linked in your CloudBolt CSMP account.

- **Group** field would list all the adapter groups created for the chosen billing subscription. You can select a group. As you select a group, the subscription(s) and tag filters fields would populate the normal adapters (subscriptions) and tags associated with the selected adapter group. Group field leverages the selection of multiple subscriptions specially more than 20 and tags at once. While saving the filters, group field would not be saved. However, associated subscriptions and tags data would be saved. Group filter option would not be available if you select total as billing subscription. It is important to note that updating the groups to add or delete linked subscriptions, in future, would not affect the saved dashboard filters.
- **Subscription(s)** field allows you to select your Azure member subscription whose cost you want to view on dashboard widgets. If you had selected a group, subscriptions those are part of selected adapter group would be selected automatically. You can select additional subscription(s) as per your requirement from the drop-down list. You can select all the subscriptions using the **Select All** check box or select a subset of maximum 20 subscriptions by clicking them in the list. To remove a subscription from the selection, you can clear the check box for individual subscription.
- **Resource Group** allows you to select resource groups whose cost you want to view on dashboard widgets. You can select all the resource groups using the **Select All** check box or select a subset of maximum 20 resource groups by clicking them in the list. To remove a resource group from the selection, you can clear the check box for individual resource group.

- **Location(s)** drop-down list allows you to specify the geographic locations whose cost you want to view on dashboard widgets. You can select all Azure locations using the Select All check box or select a subset of maximum 20 locations by clicking them in the list.
- **Service(s)** allows you to filter cost based on the selected Azure services. You can select all the services using the Select All check box or a subset of maximum 20 services by clicking them in the list.
- To apply a **tag filters**, enter tag key in the Tag Key box. The tag value would be populated based on the tag key, you must select a tag value from the list, and then click . You can use the following values:
    - **Exclude No Tagkey: (selected tag key)** - Filter cost for all cloud resources/services with the specified tag key, but there must be no tag value.
    - **No Tagkey: (selected tag key)** - Filter cost all cloud resources/services that do not have the specified tag key.
    - The displayed tag value - Filter cost all cloud resources/services with the specified tag key and the specified tag value.

  You can add up to ten tags. Whenever you add two or more different tag key types, you must choose an operator to join those tag filters. By default, OR operator will be selected.
  If you had selected a group, the associated tag key-value pair(s) would automatically appear in tag filters. If the selected group has multiple tag filters applied, by default, the AND operator would be selected to join tag filters.
- **Applied Group Tags** allows you to filter the cost report for multiple groups using their group tags (custom data). To filter cost report by group tags:
    i. Enter the group tag key in **Group Tag Key** box. Select the group tag value from the drop-down list.You can use the following values:

- **Exclude No Group Tagkey: (selected tag key)** - Filter cost for all the groups with the specified group tag key, but there must be no group tag value.
- **No Group Tagkey: (selected tag key)** - Filter cost all the groups that do not have the specified group tag key.
- The displayed tag value - Filter cost all the groups with the specified group tag key and the specified group tag value.

ii. Click to apply the specified group tag key-value pair(s) as applied group tags filter. You can add up to ten group tags as filter.

iii. Whenever you add two or more different group tag key types, you must choose an operator from the group tag operator selection box to combine those group tag pairs. By default, OR operator will be selected, which means that cost report would be generated for all groups that contains any of the specified group tag pairs. Selecting AND operator means that cost report would be generated only for such groups that have all the specified group tag pairs.

Applied Group Tags filter option will not be available if you had selected a group from the group filter drop-down list.

- **Currency** allows you to select the currency in which you want to see the cost on dashboard widgets. This filter is applicable only when an Azure CSP billing subscription has been selected.
- **Cost Type(s)** allows you to select all the cost type or a subset of cost type by clicking them in the list. This filter is applicable only when an Azure CSP billing subscription has been selected. If you select Total as billing subscription, Cost Type(s) filter would not be available.
- **Customer name** allows you to select customer name whose billing data you would like to see on dashboard widgets. This filter is

applicable only when an Azure CSP billing subscription has been selected.

- Click **Save** within filter field area to save the specified filter values.
- **Clear Filters** would delete all filter fields settings and set the billing subscription selection to default.

c. Set GCP filters as follows:

- **Billing Project** allows you to select a GCP billing adapter. Selected dashboard widgets would display cost data for the selected billing project where you set up the bigquery dataset. By default, a billing project will be selected. If you have multiple billing projects, you can change the selection.
- **Group** field would list all the adapter groups created for the chosen billing project. You can select a group. As you select a group, the sub account(s), project(s), and label filters fields would populate data as per the selected adapter group. Group field leverages the selection of multiple projects specially more than 20 and labels at once. While saving the filters, group field would not be saved. However, associated sub accounts, projects, and labels data would be saved. It is important to note that updating the groups to add or delete linked projects, in future, would not affect the saved dashboard filters.
- **Sub Account(s)** allows you to select a sub-account of GCP organization. If you had selected a group, sub account would be selected based on the group selected. You can change it as per your requirement. You can select all the sub accounts using the **Select All** check box or select a subset of maximum 20 sub accounts by clicking them in the list.
- **Project(s)** field allows you to select your GCP projects whose cost you want to view on dashboard widgets. If you had selected a group, projects those are part of selected adapter group would be selected automatically. You can select additional projects(s) as per your requirement from the drop-down list. You can select all the projects

using the **Select All** check box or select a subset of maximum 20 projects by clicking them in the list. To remove a project from the selection, you can clear the check box for individual project.

- **Location(s)** drop-down list allows you to specify the geographic locations whose cost you want to view on dashboard widgets. You can select all GCP locations using the Select All check box or select a subset of maximum 20 locations by clicking them in the list.
- **Service(s)** allows you to filter cost based on the selected GCP services. You can select all the services using the Select All check box or a subset of maximum 20 services by clicking them in the list.
- To apply a **label filters**, enter label key in the Label Key box. The label value would be populated based on the label key, you must select a label value from the list, and then click **+**. You can add multiple label filters. Whenever you add two or more label filters, you must choose an operator to join those label filters. By default, OR operator will be selected.

  If you had selected a group, the associated label key-value pair would automatically appear in label filters. If the selected group has multiple label filters applied, by default, the AND operator would be selected to join label filters.
- Click **Save** within filter field area to save the specified filter values.
- **Clear Filters** would delete all filter fields settings and set the billing project selection to default.

d. Set VMware filters as follows:

If your CSMP account has been enabled for the 'cost_allocation_reports' feature to view Azure VMware Solution (AVS) cost data, the filter will be labelled as **AVS** instead of **VMware**.

- **Billing vCenter** allows you to select a VMware adapter. By default, a billing vCenter will be selected. If you have multiple billing vCenters, you can change the selection.

- **Group** field would list all the vCenters groups created for the chosen VMware adapter under billing vCenter field. You can select a group. As you select a group, the vCenter(s) filter field would populate vCenters selected as per the selected vCenters group. Group field leverages the selection of multiple vCenters along with multiple tags. While saving the filters, group field would not be saved. However, associated vCenters and tags data would be saved. It is important to note that updating the groups to add or delete linked vCenters, tags, and custom data, in future, would not affect the saved dashboard filters.

  This filter will not be available when the 'cost_allocation_reports' feature is enabled for your CSMP account.

- **vCenters(s)** field allows you to select your vCenters whose cost you want to view on dashboard widgets. You can select all VCenters using the Select All check box or select a subset of maximum 20 vCenters by clicking them in the list. To remove a vcenter from the selection, you can clear the check box for individual vCenter.
- **Service(s)** allows you to filter cost based on the selected VMware services. You can select all the services using the Select All check box or a subset of maximum 20 services by clicking them in the list.
- To apply a **tag filters**, enter tag key in the Tag Key box. The tag value would be populated based on the tag key, you must select a tag value from the list, and then click **+**. You can add multiple tag filters. Whenever you add two or more tag filters, you must choose an operator to join those tag filters. By default, OR operator will be selected.

  This filter will not be available when the 'cost_allocation_reports' feature is enabled for your CSMP account.

- Click **Save** within filter field area to save the specified filter values.
- **Clear Filters** would delete all filter fields settings and set the billing vCenter selection to default.

When the 'cost_allocation_reports' feature is enabled for your CSMP account, AVS-specific cost data is derived from dedicated cost allocation workflows. As a result, legacy VMware filters (including Group and Tags) are suppressed in the dashboard UI. AVS cost insights are instead available through pre-aggregated and account-scoped datasets tailored for Azure VMware Solution billing structures. All cost data displayed on the dashboard under this configuration is derived exclusively from AVS cost allocation workflows.

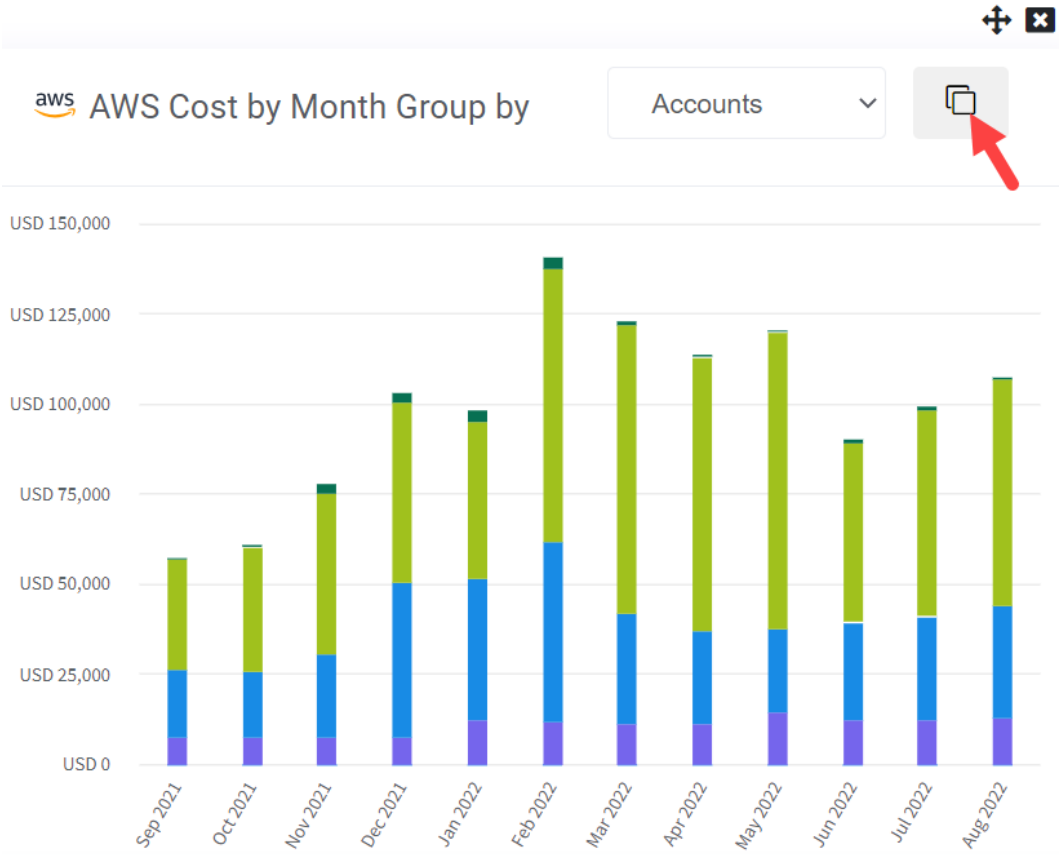
7. In the **Select Widgets** box, select the widgets you want to add in your dashboard. Selected widgets will display data based on the values specified in the filter fields of the cloud providers.

   Quick Start, Cost Adviser, Global, Favourite Report, Budget, and Subscription Details widgets are unfilterable. Data available in these widgets are not affected by filter values for dashboard.

   a. If you select **cost by month group by** widget type for a cloud provider, you can group the cost by choosing an option such as Accounts, Services, Regions, Tags, and so on based on the cloud provider.

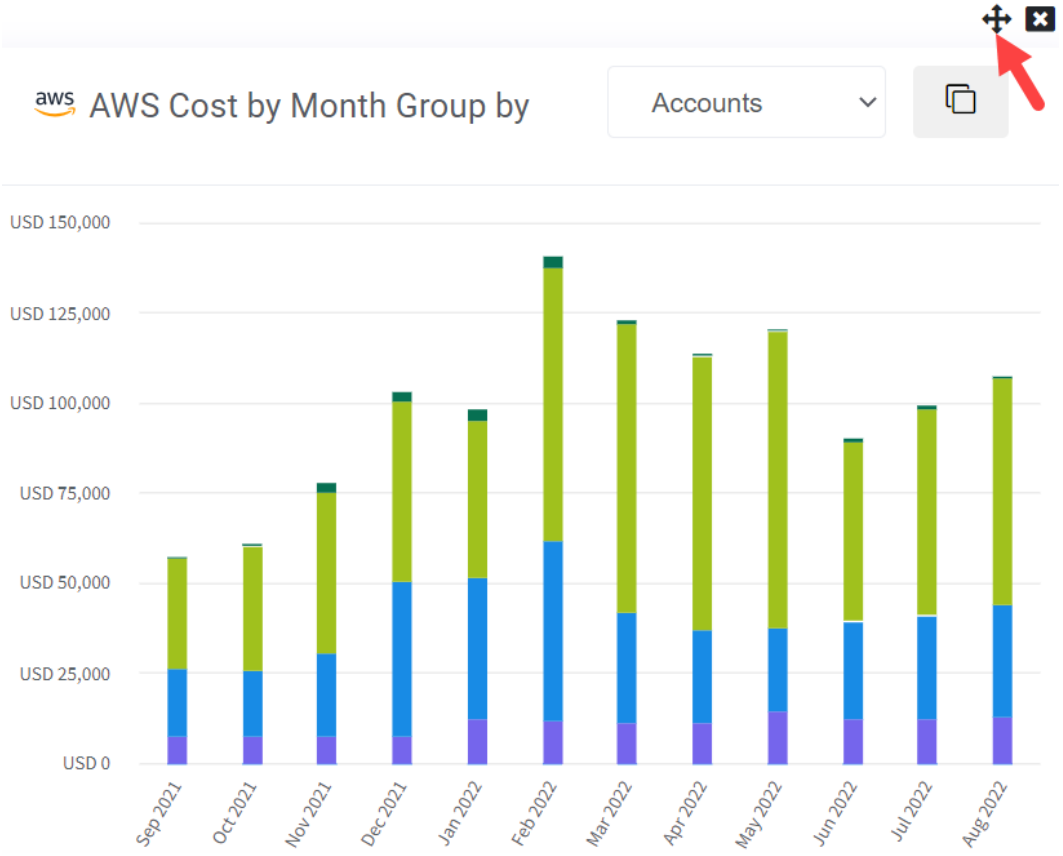
   b. You can add multiple **cost by month group by** widget type for a cloud provider by clicking the clone icon available on the **cost by month group by** widget and then choose the group by option from the drop-down. Using the clone option will create a new **cost by month group by** widget for the next group by option based on your cloud provider selection. After creating widget for all the **cost**

by month group by options, the clone icon becomes unavailable.



c. You can resize the chart area by hovering over the chart area and then using the resizer icon available at the bottom left and right corner of the charts.

d. You can reposition a chart by clicking the move icon of the widget and then drag to a new position.



e. You can remove a chart by clicking the close button.

f. You can use **Reset** button to clear all your widget selection.

8. Click **Save** to create your user-generated dashboard.

Important:

After creating a dashboard, if all the billing adapters of a specific cloud provider have been deleted or there are no data available for the specified filter values, all the widgets of that cloud provider displays text similar to: "*No data to display*."

View and Activate a Dashboard

Use this procedure to view and apply a user or system-generated dashboard as your Cloudbolt CSMP dashboard.

1. Login to your CloudBolt CSMP account.

2. Click **Dashboard List** link on the upper left corner of the CloudBolt CSMP dashboard.
3. By default, the **Dashboards** page appears with a list of all the user-generated dashboards.
4. You can apply filters to sort the dashboards list.
    - User: List all the user-generated dashboards created by current user.
    - System: List all the system-generated dashboards.
    - Created By Me: This filter is applied by default when the **User** filter is applied. It shows all of the user-generated dashboards that the current user has created. You can edit, copy, share, preview, apply, apply for organization, and delete a dashboard created by current user.
    - Shared With Me: This filter is only available when the **User** filter is applied. It lists all the user-generated dashboards that are created and shared by other user of the same CloudBolt CSMP account to which the current user belongs. You can only copy and apply such dashboards.
    - Search By Keyword: Enter a dashboard name to get a list of dashboards having that term in their name.
5. Click **Edit** under the Action column of the user-generated dashboards list to update an existing dashboard.
6. Click **Copy** under the Action column of the dashboards list to create a copy of an existing system or user-generated dashboard.
7. Click **Share** under the Action column of the user-generated dashboards list to share the dashboard with users, roles, and tenants of your CloudBolt CSMP account.

    Note: A user must be in enabled state to share a dashboard with them.

8. Hover over the ellipsis icon [...] under the Action column against the dashboard name and click **Preview** to visualize the selected dashboard without applying it as your CloudBolt CSMP dashboard. Alternatively, click on the dashboard name to see a preview of that dashboard.
9. Hover over the ellipsis icon [...] under the Action column against the dashboard name, which you want to apply as your CloudBolt CSMP dashboard, and then click

Activate. Alternatively, clicking the star icon next to a dashboard activates that dashboard.

10. Hover over the ellipsis icon [...] under the Action column against the dashboard name and click **Activate for Organization** to apply the selected user-generated dashboard to all the accounts of the your CloudBolt CSMP organization.

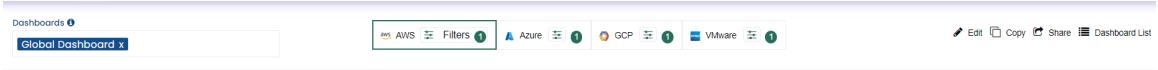
> **Important:**
>
> The Activate for Organization option is available only for the owner of the CloudBolt CSMP organization who has logged in with the Default tenant. A user-generated dashboard that the owner has created can have Activate for Organization option.

11. Hover over the ellipsis icon [...] under the Action column and click **Delete** to delete a user-generated dashboard the current user has created.

Filter Dashboard Data

Although you can apply various filters while creating a custom dashboard. The CloudBolt CSMP dashboard itself gives you the choice of applying several data filters to an active dashboard. The dashboard widgets would show the data according to your interests when filters were defined and applied.

1. Login to your CloudBolt CSMP account.
2. In the **Filters** area, click the cloud provider icon to expand and collapse the filters setting field for the specific cloud provider. By default, one filter that is billing account, subscription, project, and vCenter would be selected for each cloud provider. All filters for individual cloud provider are combined together using 'and' logic, which means that only those records that meet all selected filter parameters are displayed.



   a. Set AWS filters as follows:

      - **Billing Account** allows you to select an AWS billing adapter (management account). Selected dashboard widgets would display

cost data for the selected management account that is responsible for paying the charges of all the member accounts. By default, a billing account will be selected. If you have multiple billing account, you can change the selection.

- **Group** field would list all the adapter groups created for the chosen billing account. You can select a group. As you select a group, the **account(s)** and **tag filters** fields would populate the normal adapters (accounts) and tags associated with the selected adapter group. Group field is to leverage the selection of multiple accounts specially more that 20 accounts and tags at once.
- **Account(s)** field allows you to select the AWS member account for which you want to view costs on the dashboard widgets. If you select a group, all accounts within the selected adapter group will be automatically chosen. You can also select additional accounts as needed from the drop-down list. To select all accounts, use the **Select All** checkbox, or choose a subset of up to 20 accounts by clicking on them in the list. To remove an account from your selection, simply uncheck the box next to that account.

  You can use the **Include** or **Exclude** options to determine which accounts will be considered for displaying cost data on the dashboard widgets. If you select either option but do not choose any accounts from the list, costs for all accounts will be displayed on the dashboard widgets.
- **Region(s)** drop-down list allows you to specify the geographic locations for which you want to view costs on the dashboard widgets. You can select all AWS regions using the **Select All** checkbox or choose a subset of up to 20 regions by clicking on them in the list. Additionally, you can use the **Include** or **Exclude** options to determine which regions will be considered for displaying cost data on the dashboard widgets. If you select either option but do not choose any

regions from the list, costs for all regions will be displayed on the dashboard widgets.

- **Service(s)** filter allows you to filter costs based on selected AWS services. You can choose all services using the **Select All** checkbox or select a subset of up to 20 services by clicking on them in the list. Additionally, you can use the **Include** or **Exclude** options to specify which services will be considered for displaying cost data on the dashboard widgets. If you select either option but do not choose any services from the list, costs for all services will be displayed on the dashboard widgets.
- To apply a **tag filter**, enter tag key in the Tag Key box. The tag value would be populated based on the tag key, you must select a tag value from the list, and then click . You can use the following values:
    - **Exclude No Tagkey: (selected tag key)** - Filter cost for all cloud resources/services with the specified tag key, but there must be no tag value.
    - **No Tagkey: (selected tag key)** - Filter cost all cloud resources/services that do not have the specified tag key.
    - The displayed tag value - Filter cost all cloud resources/services with the specified tag key and the specified tag value.

  You can add up to ten tags. Whenever you add two or more different tag key types, you must choose an operator to join those tag filters. By default, OR operator will be selected.
  If you had selected a group, the associated tag key-value pair would automatically appear in tag filters. If the selected group has multiple tag filters applied, by default, the AND operator would be selected to join tag filters.
- **Applied Group Tags** allows you to filter the cost report for multiple groups using their group tags (custom data). To filter cost report by group tags:

i. Enter the group tag key in **Group Tag Key** box. Select the group tag value from the drop-down list.You can use the following values:

- **Exclude No Group Tagkey: (selected tag key)** - Filter cost for all the groups with the specified group tag key, but there must be no group tag value.
- **No Group Tagkey: (selected tag key)** - Filter cost all the groups that do not have the specified group tag key.
- The displayed tag value - Filter cost all the groups with the specified group tag key and the specified group tag value.

ii. Click to apply the specified group tag key-value pair(s) as applied group tags filter. You can add up to ten group tags as filter.

iii. Whenever you add two or more different group tag key types, you must choose an operator from the group tag operator selection box to combine those group tag pairs. By default, OR operator will be selected, which means that cost report would be generated for all groups that contains any of the specified group tag pairs. Selecting AND operator means that cost report would be generated only for such groups that have all the specified group tag pairs.

Applied Group Tags filter option will not be available if you had selected a group from the group filter drop-down list.

- Click **Apply** within filters setting area to save the specified filter values.
- **Clear Filters** would delete all filter fields settings and set the billing account selection to default.

b. Set Azure filters as follows:

- **Billing Subscription** allows you to select an Azure billing adapter. Selected dashboard widgets would display cost data for the selected

billing subscription that is responsible for paying the charges of all the member subscriptions. By default, a billing subscription will be selected. If you have multiple billing subscriptions, you can change the selection. *Total* billing subscription option can be used to see the cost of all the billing subscriptions linked in your CloudBolt CSMP account.

- **Group** field would list all the adapter groups created for the chosen billing subscription. You can select a group. As you select a group, the subscription(s) and tag filters fields would populate the normal adapters (subscriptions) and tags associated with the selected adapter group. Group field leverages the selection of multiple subscriptions specially more than 20 and tags at once. Group filter option would not be available if you select *total* as billing subscription.
- **Subscription(s)** field allows you to select your Azure member subscription whose cost you want to view on dashboard widgets. If you had selected a group, subscriptions those are part of selected adapter group would be selected automatically. You can select additional subscription(s) as per your requirement from the drop-down list. You can select all the subscriptions using the **Select All** check box or select a subset of maximum 20 subscriptions by clicking them in the list. To remove a subscription from the selection, you can clear the check box for individual subscription.
- **Resource Group** allows you to select resource groups whose cost you want to view on dashboard widgets. You can select all the resource groups using the Select All check box or select a subset of maximum 20 resource groups by clicking them in the list. To remove a resource group from the selection, you can clear the check box for individual resource group.
- **Location(s)** drop-down list allows you to specify the geographic locations whose cost you want to view on dashboard widgets. You can select all Azure locations using the Select All check box or select a subset of maximum 20 locations by clicking them in the list.

- **Service(s)** allows you to filter cost based on the selected Azure services. You can select all the services using the Select All check box or a subset of maximum 20 services by clicking them in the list.
- To apply a **tag filters**, enter tag key in the Tag Key box. The tag value would be populated based on the tag key, you must select a tag value from the list, and then click . You can use the following values:
    - **Exclude No Tagkey: (selected tag key)** - Filter cost for all cloud resources/services with the specified tag key, but there must be no tag value.
    - **No Tagkey: (selected tag key)** - Filter cost all cloud resources/services that do not have the specified tag key.
    - The displayed tag value - Filter cost all cloud resources/services with the specified tag key and the specified tag value.

  You can add up to ten tags. Whenever you add two or more different tag key types, you must choose an operator to join those tag filters. By default, OR operator will be selected.
  If you had selected a group, the associated tag key-value pair(s) would automatically appear in tag filters. If the selected group has multiple tag filters applied, by default, the AND operator would be selected to join tag filters.
- **Applied Group Tags** allows you to filter the cost report for multiple groups using their group tags (custom data). To filter cost report by group tags:
    i. Enter the group tag key in **Group Tag Key** box. Select the group tag value from the drop-down list.You can use the following values:
        - **Exclude No Group Tagkey: (selected tag key)** - Filter cost for all the groups with the specified group tag key, but there must be no group tag value.

- **No Group Tagkey: (selected tag key)** - Filter cost all the groups that do not have the specified group tag key.
- The displayed tag value - Filter cost all the groups with the specified group tag key and the specified group tag value.

ii. Click to apply the specified group tag key-value pair(s) as applied group tags filter. You can add up to ten group tags as filter.

iii. Whenever you add two or more different group tag key types, you must choose an operator from the group tag operator selection box to combine those group tag pairs. By default, OR operator will be selected, which means that cost report would be generated for all groups that contains any of the specified group tag pairs. Selecting AND operator means that cost report would be generated only for such groups that have all the specified group tag pairs.

Applied Group Tags filter option will not be available if you had selected a group from the group filter drop-down list.

- **Currency** allows you to select the currency in which you want to see the cost on dashboard widgets. This filter is applicable only when an Azure CSP billing subscription has been selected.
- **Cost Type(s)** allows you to select all the cost type or a subset of cost type by clicking them in the list. This filter is applicable only when an Azure CSP billing subscription has been selected. If you select Total as billing subscription, Cost Type(s) filter would not be available.
- **Customer name** allows you to select customer name whose billing data you would like to see on dashboard widgets. This filter is applicable only when an Azure CSP billing subscription has been selected.
- Click **Apply** within filter field area to save the specified filter values.

- **Clear Filters** would delete all filter fields settings and set the billing subscription selection to default.

c. Set GCP filters as follows:

- **Billing Project** allows you to select a GCP billing adapter. Selected dashboard widgets would display cost data for the selected billing project where you set up the bigquery dataset. By default, a billing project will be selected. If you have multiple billing projects, you can change the selection.
- **Group** field would list all the adapter groups created for the chosen billing project. You can select a group. As you select a group, the sub account(s), project(s), and label filters fields would populate data as per the selected adapter group. Group field leverages the selection of multiple projects specially more than 20 and labels at once.
- **Sub Account(s)** allows you to select a sub-account of GCP organization. If you had selected a group, sub account would be selected based on the group selected. You can change it as per your requirement. You can select all the sub accounts using the **Select All** check box or select a subset of maximum 20 sub accounts by clicking them in the list.
- **Project(s)** field allows you to select your GCP projects whose cost you want to view on dashboard widgets. If you had selected a group, projects those are part of selected adapter group would be selected automatically. You can select additional projects(s) as per your requirement from the drop-down list. You can select all the projects using the **Select All** check box or select a subset of maximum 20 projects by clicking them in the list. To remove a project from the selection, you can clear the check box for individual project.
- **Location(s)** drop-down list allows you to specify the geographic locations whose cost you want to view on dashboard widgets. You can select all GCP locations using the Select All check box or select a subset of maximum 20 locations by clicking them in the list.

- **Service(s)** allows you to filter cost based on the selected GCP services. You can select all the services using the Select All check box or a subset of maximum 20 services by clicking them in the list.
- To apply a **label filters**, enter label key in the Label Key box. The label value would be populated based on the label key, you must select a label value from the list, and then click **+**. You can add multiple label filters. Whenever you add two or more label filters, you must choose an operator to join those label filters. By default, OR operator will be selected.

  If you had selected a group, the associated label key-value pair(s) would automatically appear in label filters. If the selected group has multiple label filters applied, by default, the AND operator would be selected to join label filters.
- Click **Apply** within filter field area to save the specified filter values.
- **Clear Filters** would delete all filter fields settings and set the billing project selection to default.

d. Set VMware filters as follows:

If your CSMP account has been enabled for the 'cost_allocation_reports' feature to view Azure VMware Solution (AVS) cost data, the filter will be labelled as **AVS** instead of **VMware**.

- **Billing vCenter** allows you to select a VMware adapter. By default, a billing vCenter will be selected. If you have multiple billing vCenters, you can change the selection.
- **Group** field would list all the vCenters groups created for the chosen VMware adapter under billing vCenter field. You can select a group. As you select a group, the vCenter(s) filter field would populate vCenters selected as per the selected vCenters group. Group field leverages the selection of multiple vCenters along with multiple tags. While saving the filters, group field would not be saved. However, associated vCenters and tags data would be saved. It is important to note that

updating the groups to add or delete linked vCenters, tags, and custom data, in future, would not affect the saved dashboard filters.

This filter will not be available when the 'cost_allocation_reports' feature is enabled for your CSMP account.

- **vCenters(s)** field allows you to select your vCenters whose cost you want to view on dashboard widgets. You can select all VCenters using the Select All check box or select a subset of maximum 20 vCenters by clicking them in the list. To remove a vcenter from the selection, you can clear the check box for individual vCenter.
- **Service(s)** allows you to filter cost based on the selected VMware services. You can select all the services using the Select All check box or a subset of maximum 20 services by clicking them in the list.
- To apply a **tag filters**, enter tag key in the Tag Key box. The tag value would be populated based on the tag key, you must select a tag value from the list, and then click **+**. You can add multiple tag filters. Whenever you add two or more tag filters, you must choose an operator to join those tag filters. By default, OR operator will be selected.

  This filter will not be available when the 'cost_allocation_reports' feature is enabled for your CSMP account.

- Click **Apply** within filter field area to save the specified filter values.
- **Clear Filters** would delete all filter fields settings and set the billing vCenter selection to default.

When the 'cost_allocation_reports' feature is enabled for your CSMP account, AVS-specific cost data is derived from dedicated cost allocation workflows. As a result, legacy VMware filters (including Group and Tags) are suppressed in the dashboard UI. AVS cost insights are instead available through pre-aggregated and account-scoped datasets tailored for Azure VMware Solution billing structures.

All cost data displayed on the dashboard under this configuration is derived exclusively from AVS cost allocation workflows.

3. Now data displayed on dashboard widgets are filtered as per the values specified in filters.
4. If you navigate to cost report by clicking the dashboard widget, the cost report would display cost values based on the filters specified on the dashboard. It is important to note that all the filters setting on the cost report page would replicate the dashboard filters except for the group name. Group name would not appear on cost report filters, however the accounts, subscriptions, and projects linked with the selected group would be correctly selected in the appropriate filter parameters. When you access the AWS cost report by clicking the dashboard widget, the cost values displayed will reflect the filters set on the dashboard, which exclude certain accounts, regions, and services, treating these exclusions as inclusions.

If the 'cost_allocation_reports' feature is enabled for your CSMP account, the hyperlink to the cost report page is disabled for AVS-related dashboard widgets. As a result, clicking these widgets will not redirect you to a detailed cost report view. This behavior is by design, as AVS cost data is sourced from specialized allocation workflows that are not directly linked to standard cost report pages.

Data displayed by widgets such as Quick Start, Cost Adviser, Global, and Subscription are unfilterable. Data available in these widgets are not affected by filter values.

Limitations

Limitations:

- Deleting an activated user-generated dashboard will change your CloudBolt CSMP dashboard to a system-generated dashboard that has maximum combination of cloud providers.
- If you use a dashboard that was shared with you by another user and the owner of that dashboard now deletes it, your CloudBolt CSMP account dashboard will change a system-generated dashboard that has maximum combination of cloud providers.

Outcomes

You can customize your CloudBolt CSMP account dashboard.

6.1. Select Widgets

Learn about the different widgets available for selection while creating a user-generated dashboard and data displayed by that widget.

Select Widgets will display the widgets list available for your selection while creating a user-generated dashboard. The widgets list will change based on the billing adapters availability for a cloud provider. For example, if your cloudBolt CSMP account has only billing adapter for AWS, then you can have widgets related to AWS only. However, there are widgets like Global, Quick Start, and Subscription Details available irrespective of cloud providers' billing adapter.

Below is the list of widgets available for the selection by a CloudBolt CSMP account have billing adapters for all the four cloud providers, i.e. AWS, Azure, GCP, and VMware.

Widget Name	Description
AWS Cost Adviser	It displays the potential savings from AWS Cloud costs that you can do with the help of the CloudBolt CSMP recommendations.
AWS Cost by Account	It displays the cost of each AWS account for last 30 days.
AWS Cost by Day	It displays the AWS services daily cost for the last 30 days. The current date is not exhibited.
AWS Cost by Month	It displays the monthly AWS services cost for the last 12 months.
AWS Cost by Month Group by	It displays the cumulative monthly AWS cost data grouped by AWS accounts, services, regions, and tags for the last 12 months.
AWS Cost by Service	It displays the cost of each AWS service for last 30 days.
AWS Cost Efficiency	It displays the AWS resources efficiency.
AWS Hourly Instance Usage	It displays the AWS hourly on-demand and reserved instance usage details.
AWS Month Forecast	It displays the AWS services forecast cost value for the current month.
AWS Month to Date	It displays the total AWS services cost for a period starting at the beginning of the current month to the previous date.
AWS Reserved Instances	It displays the potential savings from AWS RI.
AWS Year Forecast	It displays the AWS services forecast cost value for the current year.

Widget Name	Description
AWS Year to Date	It displays the total AWS services cost for a period starting at the beginning of the current year to the previous date.
Azure Cost Adviser	It displays the potential savings from Azure Cloud costs that you can do with the help of the CloudBolt CSMP recommendations.
Azure Cost by Day	It displays the Azure services daily cost for the last 30 days.
Azure Cost by Month	It displays the monthly Azure services cost for the last 12 months.
Azure Cost by Month Group by	It displays the cumulative monthly Azure cost data grouped by Azure subscriptions, services, locations, and tags for the last 12 months.
Azure Cost by Resource	It displays the cost of each Azure resources for last 30 days.
Azure Cost by Subscription	It displays the cost of each Azure subscription for last 30 days.
Azure Month Forecast	It displays the Azure services forecast cost value for the current month.
Azure Month to Date	It displays the total Azure services cost for a period starting at the beginning of the current month to the previous date.
Azure Reserved Instances	It displays the potential savings from Azure RI.
Azure Year Forecast	It displays the Azure services forecast cost value for the current year.
Azure Year to Date	It displays the total Azure services cost for a period starting at the beginning of the current year to the previous date.
Budget	It displays the selected budget's data such as budget period, amount, and Cost to date value. You must choose at least one budget from the list. Use Clone icon to add multiple budget widgets.
Favourite Report	It displays the list of favourite reports. You must choose at least one favourite report from the list of your favourite reports to be displayed on the dashboard widget. A maximum of five favourite reports can be displayed on the dashboard widget.
GCP Cost Adviser	It displays the potential savings from GCP Cloud costs that you can do with the help of the CloudBolt CSMP recommendations.
GCP Cost by Day	It displays the GCP services daily cost for the last 30 days.
GCP Cost by Month	It displays the monthly GCP services cost for the last 12 months.
GCP Cost by Month Group by	It displays the cumulative monthly GCP cost data grouped by GCP projects, services, locations, and labels for the last 12 months.

Widget Name	Description
GCP Cost by Project	It displays the cost of each GCP project for last 30 days.
GCP Cost by Service	It displays the cost of each GCP service for last 30 days.
GCP Month Forecast	It displays the GCP services forecast cost value for the current month.
GCP Month to Date	It displays the total GCP services cost for a period starting at the beginning of the current month to the previous date.
GCP Year Forecast	It displays the GCP services forecast cost value for the current year.
GCP Year to Date	It displays the total GCP services cost for a period starting at the beginning of the current year to the previous date.
Global	It displays global information about your CloudBolt CSMP instance.
Quick Start	Click a link to jump to a quick action.
Subscription Details	It displays your CloudBolt CSMP account subscription details.
VMware Cost Adviser	It displays the potential savings from VMware Cloud costs that you can do with the help of the CloudBolt CSMP recommendations.
VMware Cost by Day ***(Labelled as AVS Cost by Day when 'cost_allocation_reports' is enabled)***	It displays the VMware services daily cost for the last 30 days. **Note:** If the 'cost_allocation_reports' feature is enabled, this widget displays daily Azure VMware Solution (AVS) costs, sourced from AVS-specific cost allocation workflows.
VMware Cost by Month ***(Labelled as AVS Cost by Month when 'cost_allocation_reports' is enabled)***	It displays the monthly VMware services cost for the last 12 months. **Note:** When 'cost_allocation_reports' is enabled, this widget reflects monthly AVS costs derived from account-scoped allocation datasets.
VMware Cost by Service ***(Labelled as AVS Cost by Service when 'cost_allocation_reports' is enabled)***	It displays the cost of each VMware service for last 30 days. **Note:** With 'cost_allocation_reports' enabled, this widget shows costs by AVS service, based on allocation workflows tailored to Azure VMware Solution.
VMware Cost by vCenter ***(Labelled as AVS Cost by vCenter when 'cost_allocation_reports' is enabled)***	It displays the cost of each vCenter for the last 30 days. **Note:** With the 'cost_allocation_reports' feature enabled, shows AVS-specific cost attribution by vCenter, derived from allocation workflows.
VMware Month Forecast ***(Labelled as AVS Month Forecast when 'cost_allocation_reports' is***	It displays the VMware services forecast cost value for the current month. **Note:** If 'cost_allocation_reports' is enabled, the forecast reflects projected AVS costs using historical allocation data.

Widget Name	Description
enabled)	
VMware Month to Date ***(Labelled as AVS Month to Date when 'cost_allocation_reports' is enabled)***	It displays the total VMware services cost for a period starting at the beginning of the current month to the previous date. **Note:** When 'cost_allocation_reports' is enabled, reflects month-to-date AVS costs based on allocation datasets.
VMware Year Forecast ***(Labelled as AVS Year Forecast when 'cost_allocation_reports' is enabled)***	It displays the VMware services forecast cost value for the current year. **Note:** Under the 'cost_allocation_reports' feature, this widget forecasts AVS service costs based on historical allocation trends.
VMware Year to Date ***(Labelled as AVS Year to Date when 'cost_allocation_reports' is enabled)***	It displays the total VMware services cost for a period starting at the beginning of the current year to the previous date. **Note:** If the 'cost_allocation_reports' feature is active, this value is derived exclusively from AVS cost allocation workflows.

The various cost data displayed by the above widgets are based on the billing adapter and their sub-account (account, subscription, project, or vCenter) selection in the dashboard.

7. Cost

Cloud resources help you save money on resources. However costs may quickly overrun your budgets and cut into your profits. Hence it is important that you keep a tab on your spending. CloudBolt CSMP help your manage your costs and reduce the spending, which in turn helps increase your profits.

7.1. Cost Report

CloudBolt CSMP helps you to monitor your cloud cost. Additionally, it may assist you in lowering the expenses and overhead needed to comprehend and handle numerous cloud bills.

Cost Report is a tool in CloudBolt CSMP that allows you to view aggregated costs over a period for your cloud provider. It can help you understand your spending trends.

You can see expenses for various services, such as compute or databases, using Cost Report. You may also examine charges at several scopes, such a particular account, regions, tags, etc.

Cost Report provides built-in charts. You can customize your cost report using filter options. The cost report is also available for download in CSV and PDF formats.

- Cost Report for AWS
- Cost Report for Azure
- Cost Report for GCP
- Cost Report for VMware
- Create a Rolled-up View to Show Total Cost Report for Multiple Azure Accounts
- Use Wildcard and Operators for Searching

7.1.1. Cost Report for AWS

Learn how to use CloudBolt CSMP Cost Report tool to view your AWS cloud costs.

- Introduction
- Filters Setting
- Spend Overview
- Customize Report
- Outcomes

Introduction

Cloud computing helps your organization save costs on buying infrastructure and software. However, if not monitored, costs can quickly turn your profits into losses. It is very important that you have total and granular visibility on the costs incurred for the services availed. Historical data on spending combined with actual spending and forecasts can help you plan your budgets. The Cost Report tool in CloudBolt CSMP help you with these difficult aspects of cost optimization by displaying the current and historical cost amount, proposed recommendations, and dynamic calculations of estimated savings.

Filters Setting

AWS cost report in CloudBolt CSMP can be customized by using appropriate filters. Options available for filters setting depend on the Report Profile shared with your tenant or organisation (child/reseller/customer). By default, when you first access the cost report for AWS, the filters are configured to all values, except the billing account. As you set your filters and click **Apply**, the total cost displayed in spend overview adjust to represent the aggregated costs based on the filters selected. All filters are combined together using 'and' logic, which means that only those records that meet all selected filter values are displayed.

To access filters setting, log in to your CloudBolt CSMP account. Navigate to Cost > Cost Report. Select AWS cloud provider tab and then click Filters.

1. **Billing Account**: Select the billing account for which you want to see the cost data.
2. **Group**: For the chosen billing account, pick a adapter group for which you want to see the cost data. Selecting an adapter group would populate the accounts and applied tag filters with all the accounts and tags associated with the selected group.

   If your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled, selecting a group in the group filter, the applied tags details associated with the selected group will not be displayed. Although specific tag details and their configurations will not be displayed directly on the cost report page, the cost calculations will still account for these tags and their settings. Consequently, the cost values you see will be influenced by the tag key-value pairs and the operators defined for the group.

3. **Cost Allocations**: This filter parameter will be available only when you have a cost allocation rule for AWS. Choose cost allocation rule to see the allocated cost, drained cost, and net allocated cost for the targets set in the chosen allocation rule. Whenever cost allocation filter is applied, the dimension applied in the report grid view will be set to the target's native provider value, and the default metric would be set to allocated cost.
4. **Data on Chart**: Select the appropriate option to view the cost accumulated by service type. By default, All Costs would be selected. Options available are:
   - All Costs: Displays aggregated cost for all the AWS services available in the selected billing account.
   - Compute: Displays aggregated cost for all the AWS Compute services available in the selected billing account.
   - Database: Displays aggregated cost for all the AWS Database services available in the selected billing account.
   - Storage: Displays aggregated cost for all the AWS Storage services available in the selected billing account.
   - Data Transfer: Displays aggregated cost for all the AWS data transfer activities done to and from the selected billing account.

5. **Date Range**: Set the range of time for the cost report you want to analyse. You can select between Daily or Monthly. By default, when you first access the cost report, the Date Range is set to Daily, with the last 16 days selected including today. You can filter the cost report on a monthly basis by selecting the monthly tile. Your choice of a daily or monthly tile limits the customize report dimension options for date or month. If you choose daily, you could select date in the customize report section's dimension selection box; but, if you choose monthly, you can choose month as one of the dimensions.

   A "day" is defined as midnight to midnight in the cost report's selected time zone. A "month" is defined as first to last date of a calendar month in the report's selected time zone. The current day's (that is, Today's) cost data is not included in the report except for default date range selection and "This Month" option selection as dynamic future date range. Preset dynamic past date ranges are listed on left side of the period selection list. Preset dynamic future date ranges are listed on the right side of the period selection list.

   - **Daily** returns your AWS costs incurred during the last 16 days period selected including today on a daily basis. When you select Daily, you can choose a dynamic past or future date range, such as "This Month" or "Last Month" or "Yesterday", or "Next Month" or a custom date range from the **Period** selection box to view your cost reports. Dynamic past and future date ranges display cost data over a rolling time, such as "Last Month" or "Last 7 days" or "Next Month". Dynamic past date ranges are: "This Month", "Last Month", "Last 3 Months", "Yesterday", "Last 7 Days", "Last 14 Days", "Last 21 Days", "Last 30 Days", and "Last 45 Days". Dynamic future date ranges are: "This Month", "Next Month", "Next 3 months", "Tomorrow", "Next 7 Days", "Next 14 Days", "Next 21 Days", "Next 30 Days", and "Next 45 Days". Dynamic date ranges are best for your favourite cost reports. Custom ranges let you focus on specific start and end dates. Your start and end date duration can be up to 100 days. After selecting a date range, you must click **Apply** button available within the period selection area.

- **Monthly** returns your AWS costs grouped on a monthly basis. When you select Monthly, you can choose a dynamic past or future date range, such as "This Month" or "Last Month" or "Next Month", or a custom date range from the **Period** selection box to view your cost reports. Dynamic past and future date ranges display cost data over a rolling time, such as "Last Month" or "Last 6 Months" or "Next Month". Dynamic past date ranges are: "This Month", "Last Month", "Last 3 Months", "Last 6 Months", "Last 9 Months", and "Last 12 Months". Dynamic future date ranges are: "This Month", "Next Month", "Next 3 Months", "Next 6 Months", "Next 9 Months", and "Next 12 Months". Dynamic date ranges are best for your favourite cost reports. Custom ranges let you focus on specific start and end dates. After selecting a date range, you must click **Apply** button available within the period selection area.

6. **Compare Period**: Select the **Compare Period** check box to set a start date to compare your AWS cost against the previously selected date range under Period selection box. Cost comparison will display as the total cost for two time ranges in the spend overview section. For example, you have selected February 23, 2022 to March 09, 2022 date range in the Period, duration of 15 days. In the **Compare Period Start** box you select February 07, 2022 as start date. After clicking the Apply button for filter result, the spend overview graph and total cost will display the cost for February 23, 2022 to March 09, 2022 compared to February 07, 2022 to February 21, 2022. You can see that the compare period end date has been adjusted based on the period you choose. Alternatively, if you chose a dynamic date range in the Period, then selected a date in the **Compare Period Start** box, your compared to days will likewise be *n* days based on date range in the Period beginning from the Compare Period Start date. When a compare period is saved as a favourite cost report, the date selected in the **Compare Period Start** box will be dynamically updated based on the start date in the Period to show a compare start date when you open the favourite report.
7. **Billing Entity**: It is the entity that issues invoices to you. It helps you identify whether your invoices or transactions are for AWS Marketplace or for purchases of other AWS services. You can use wildcard and operators for searching the billing entity. Possible values include:

AWS – Identifies a transaction for AWS services other than in AWS Marketplace
AWS Marketplace – Identifies a purchase in AWS Marketplace.

8. **Accounts**: If you have selected a group previously, all the accounts available in the selected group would be selected by default. You can select all AWS member accounts or management accounts available under the selected billing adapter or select a subset of them by clicking them in the list. You can use this field to track costs or usage by account. You can use wildcard and operators for searching the accounts.
9. **Regions**: The geographical area that hosts your AWS services. You can select all AWS regions available under the selected billing adapter or select a subset of regions by clicking them in the list. You can use wildcard and operators for searching the regions.
10. **Services**: The full name of the AWS services available in selected billing adapter. Use this field to filter AWS usage by AWS service. You can select all services available under the selected AWS billing adapter or select a subset of services by clicking them in the list. You can use wildcard and operators for searching the services.
11. **Usage type**: Select the usage type for the selected services. You can select all usage types under the selected services or select a subset of it by clicking them in the list. You can use wildcard and operators for searching the usage type.
12. **Resource Name**: Select the resource name for the selected services. You can use wildcard and operators for searching the resource name.
13. **Operation**: Select the operation type for the selected usage type. You can select all operation types under the selected usage type or select a subset of it by clicking them in the list. You can use wildcard and operators for searching the operation.
14. **Applied Tags**: Tags are key-value pairs attached to your AWS services/resources. To filter cost report by tags:
    a. Enter the tag key type in the **Tag Key** box. You must specify correct tag key. Select the tag value from the drop-down list. You can use the following values:

- **Exclude No Tagkey: (selected tag key)** - Filter cost for all cloud resources/services with the specified tag key, but there must be no tag value.
- **No Tagkey: (selected tag key)** - Filter cost for all cloud resources/services that do not have the specified tag key.
- The displayed tag value - Filter cost for all cloud resources/services with the specified tag key and the specified tag value.

b. Click to apply the entered tag key-value pair as tag filter. You can add up to ten tag key-value pairs to filter your cost report.

c. Whenever you add two or more different tag key types, you must choose an operator from the tag operator selection box to join those tag filters. By default, OR operator will be selected, which means that cost report would be generated for all the selected tags. Selecting AND operator means that cost report would be generated when all the selected tags are available to a service, account, resource, etc.

d. If you had selected a group, the associated tag key-value pair(s) would automatically appear in tag filters, and you could not add or delete any other tag. If the selected group has multiple tag filters applied, by default, the AND operator would be selected to join tag filters.

There are instances when some of your user-defined cost allocation tags from the AWS account do not appear correctly in the applied tags filter. To view the complete list of available tags on the CSMP cost reporting page, you need to activate them in the AWS Management Console. Follow these steps to activate cost allocation tags in your AWS account:

e. Sign in to the AWS Management Console and open the AWS Billing and Cost Management console at https://console.aws.amazon.com/billing/.

f. In the navigation pane, select "Cost Allocation Tags."

g. Choose the tag keys that you want to activate.

h. Click "Activate."

i. After creating and applying user-defined tags to your resources, it may take up to 24 hours for the tag keys to appear on your cost allocation tags page for activation. Once they appear, it can take up to another 24 hours for the tag keys to be fully activated.

This filter option will not be available if your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled.

15. **Applied Group Tags**: Group tags are the custom labels applied to the groups. It is a key-value pair attached with groups. This filter option allows you to filter the cost report for multiple groups using their group tags (custom data). To filter cost report by group tags:
    a. Enter the group tag key in **Group Tag Key** box. Select the group tag value from the drop-down list. You can use the following values:
        - **Exclude No Group Tagkey: (selected tag key)** - Filter cost for all the groups with the specified group tag key, but there must be no group tag value.
        - **No Group Tagkey: (selected tag key)** - Filter cost for all the groups that do not have the specified group tag key.
        - The displayed tag value - Filter cost for all the groups with the specified group tag key and the specified group tag value.
    b. Click to apply the specified group tag key-value pair(s) as applied group tags filter. You can add up to ten group tags as filter.
    c. Whenever you add two or more different group tag key types, you must choose an operator from the group tag operator selection box to combine those group tag pairs. By default, OR operator will be selected, which means that cost report would be generated for all groups that contains any of the specified group tag pairs. Selecting AND operator means that cost report would be generated only for such groups that have all the specified group tag pairs.

Applied Group Tags filter option will not be available if you had selected a group from the group filter drop-down list.

This filter option will not be available if your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled.

16. **Applied Account Tags**: Account tags are key-value pairs attached to your AWS accounts. To filter cost report by account tags:
    a. Enter the account tag key type in the **AccountTag Key** box. You must specify correct account tag key. Select the account tag value from the drop-down list. You can use the following values:
        - **Exclude No Account Tagkey: (selected account tag key)** - Filter cost for all AWS accounts with the specified account tag key, but there must be no account tag value.
        - **No Account Tagkey: (selected account tag key)** - Filter cost for all AWS accounts that do not have the specified account tag key.
        - The displayed account tag value - Filter cost for all AWS accounts with the specified account tag key and the specified account tag value.
    b. Click to apply the entered account tag key-value pair as account tag filter. You can add up to ten account tag key-value pairs to filter your cost report.
    c. Whenever you add two or more different account tag key types, you must choose an operator from the account tag operator selection box to join those account tag filters. By default, OR operator will be selected, which means that cost report would be generated for all the selected account tags. Selecting AND operator means that cost report would be generated when all the selected account tags are available to an AWS account.

    If you recently added account tags to your AWS accounts, you would need to wait up to 24 hours to use them to filter the cost report.

17. **Charges**
    - General On Demand Usage: Include or exclude usage that AWS didn't apply reservation discounts to. By default, general on demand usage are included in the cost report.

- Upfront Reservation Fees: Include or exclude upfront payment values from your cost report. By default, the upfront reservation charges are included in the cost report.
- Recurring Reservation Fees: Include or exclude any recurring charges to your account. When you buy a Partial Upfront or No Upfront Reserved Instance from AWS, you pay a recurring fee for a discounted instance rate. By default, any recurring reservation fees are included in your cost report.
- Covered Reservation Usage: Include or exclude the usage of AWS resources that is eligible for reservation benefits. By default, covered reservation usage is included in your AWS cost report.
- Upfront Saving Plan Fees: Include or exclude one-time upfront fee associated with your purchase of an All Upfront or Partial Upfront Savings Plan. By default, upfront saving plan fees are included in your cost report.
- Recurring Savings Plan Fees: Include or exclude any recurring hourly charges that correspond with your No Upfront or Partial Upfront Savings Plan. By default, recurring savings plan fees are included in your cost report.
- Covered Savings Plan Usage: Include or exclude the usage of AWS resources that is eligible for savings plan benefits. By default, covered savings plan usage is included in your AWS cost report.
- Out of Cycle Subscription Fees: Include or exclude charges incurred for AWS services or subscriptions that are billed outside of the regular billing cycle. By default, all out of cycle subscription fees are included in your cost report.
- AWS Support Fees: Include or exclude charges levied by AWS for the supports provided to each member account. By default, the support charges are included in the cost report.
- Tax: Include or exclude any taxes that AWS applied to your cost report. It is a non-negative value. By default, the taxes are included.

18. **Credits And Refunds**
    - General Credits: Any credits that AWS applied to your bill. By default, all credits are applied to your cost report.

- General Refunds: The negative charges that AWS refunded money for. By default, general refunds are included in your cost report.
- Tax: Any tax refund that AWS applied to your cost report. It is a negative value. By default, all tax refunds are included in your cost report.
- EDP Discounts: Discounts received from AWS for enterprise cloud users who have a demonstrated history of high commitment. By default, EDP discounts are included in your cost report.
- SPP Discounts: This refers to the discounts applied to your AWS usage when you purchase Savings Plans (SPs). By default, SPP discounts are included in your cost report.
- Savings Plan Negation: Refers to adjustments or corrections made to Savings Plans purchases or usage that result in reducing or negating the associated discounts or credits initially applied. This could happen due to various reasons such as changes in usage patterns, adjustments in Savings Plans coverage, or corrections in billing calculations. By default, any savings plan negation is included in your cost report.

To see the selected filters' effect on spend overview, you must click **Apply**. You can even save the applied filters as your favourite cost report by clicking **Save** button available at the upper right corner.

Click **Clear Filters** to remove all the filter settings and return to default filters setting.

Spend Overview

Spend Overview widget gives you visibility of your AWS cloud costs as per the filters setting.

1. Logon to your CloudBolt CSMP instance.
2. Navigate to **Cost > Cost Report**.
3. Select the cloud provider as AWS.

4. By default, the Spend Overview widget will show the total cost for the default chosen billing account over the last 16 days including today on a daily basis. The current day's (that is, Today's) cost will consists of historic and forecast cost for the day.
5. Do the filters setting as per your requirements to view the data on chart. If you set future dates for the date filter, the cost for such dates would be marked as forecast cost.
6. The chart section would show the values of the set filters parameter. A filter parameter that has not been set will not appear in the chart area, indicating that the parameter's default setting has been applied. To know more about the details of displayed filter parameters in the chart area, see use wildcard and operators for searching.
7. You can hide or show spend overview chart. By default, spend overview chart will be shown. Use *Hide Chart* to hide the spend overview chart.
8. All the chart legend labels would be displayed on the right side of the chart.
9. Data displayed on the spend overview chart can be further bifurcated by using ***group by*** option selection. By default, *Group by Overview* would be selected. Options vary according on the service type chosen in the 'Data on Chart' filter. Available options for group by could be:
    - **Group by Overview**: Displays the aggregated cost for the selected AWS service type. The Spend Overview graph displays the forecast value for the future period (if filter applied for the future date) based on your historical cost value.
    - **Group by Accounts**: Displays a multi series graph for the service cost split by accounts. Hover over the graph to view the cost specific to an account.
    - **Group by Services**: Displays a multi series graph for the service cost split by services. Hover over the graph to view the cost specific to a service.
    - **Group by Regions**: Displays a multi series graph for the service cost split by regions. Hover over the graph to view the cost specific to a region.
    - **Group by Tags**: Displays a multi series graph for the service cost split by tags. Hover over the graph to view the cost specific to a tag.

- **Group by API Operations**: Displays a multi series graph for the service cost split by API operations. Hover over the graph to view the cost specific to an API operation.
- **Group by Purchase Option**: Displays a multi series graph for the service cost split by purchase type (reserved/on demand). Hover over the graph to view the cost specific to a purchase option type.
- **Group by Usage type**: Displays a multi series graph for the service cost split by usage type. Hover over the graph to view the cost specific to an usage type.
- **Group by Instances Sizes**: Displays a multi series graph for the service cost split by instance sizes. Hover over the graph to view the cost specific to an instance size.
- **Group by DB Engines**: Displays a multi series graph for the service cost split by DB Engines. Hover over the graph to view the cost specific to a DB engine.
- **Group by Sub Services**: Displays a multi series graph for the service cost split by sub services. Hover over the graph to view the cost specific to a sub service.
- **Group by Buckets**: Displays a multi series graph for the service cost split by S3 buckets. Hover over the graph to view the cost specific to S3 buckets.
- **Group by Resources**: Displays a multi series graph for the service cost split by resources. Hover over the graph to view the cost specific to a resource.
- **Group by Sources**: Displays a multi series graph for the service cost split by sources. Hover over the graph to view the cost specific to a source.

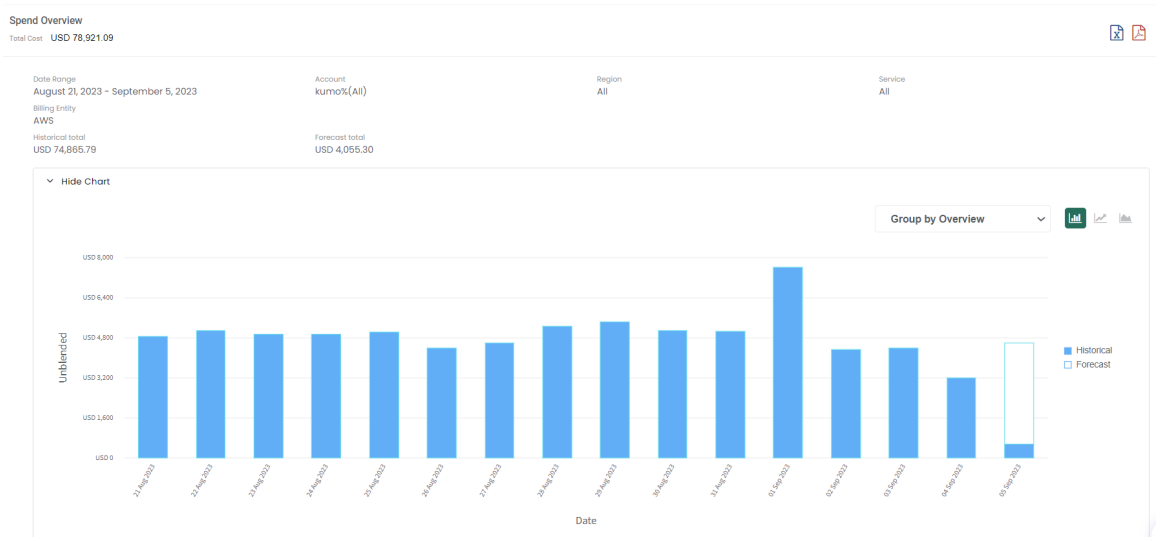
10. By default, chart X-axis label would be set to date or month based on your filter setting for data range (daily/monthly). However, if you had applied cost allocation filter, the chart X-axis label would be set to the chosen allocation rule's target native provider value. You can change the X-axis label to any one of dimensions selected in customize report.

    If you set the X-axis label other than 'date' or 'month', the data on the graph would be set to 'group by overview'. Alternatively, if you choose a group by option other than

'group by overview', the X-axis dimension would switch to 'date' or 'month' depending on your date range filter selection.

When you set the X-axis label other than 'date' or 'month', you can decide to show top 10, 20, or 30 attributes of the selected labels on the graph and remaining attributes combined as other.

11. Similarly, the chart Y-axis label could be changed to any of the selected metrics in the customize report.
12. Click the designated graph icon to view the result in Bar, Line, or Area graph. By default, cost data will be displayed in bar graph.
13. Click the appropriate download icons to export the results in CSV or PDF format. The graph can be exported to PDF format only.



Customize Report

Cost Report is highly customizable in CloudBolt CSMP. You can add up to 7 dimensions and 7 metrics based on the report profile shared with your tenant or organization and narrow down the cost analysis to individual units in your Cloud Infrastructure. You can see exactly in which Unit, or Resource group, or by which instance is costing you how much money. You can also use ‘Show Total for Dimensions’ option to get total costs for the added dimensions.

The following list shows some of the dimensions you can use to break down the projected cost amount:

- Account Group: It allows you to view various metric values according to the adapter group settings for the selected billing account. The metrics value for the accounts or services that are not associated with any groups will be aggregated against ‘N/A’ group name.
- Account ID
- Account Name(ID)
- Account Tags: It allows you to see various metrics value based on the account tag key and their value types. You need to select an account tag key type from the list. The metrics value for the accounts that are not associated with the selected account tag key will be aggregated against 'N/A' line item. However, if the selected account tag key type is added to an account with a blank tag value field, the metrics value associated with such accounts will be aggregated against 'No Value' line item. If you have recently added a tag key-value pair to you AWS account, you may need to wait up to 24 hours to use such account tags to customize your cost report in CloudBolt CSMP.
- Availability Zone
- Billing Entity
- Cache Engine
- Charge Type
- Cost Category
- Date
- DB Engine
- Deployment Option
- Group Tag: It allows you to see various metrics value based on the group tag (custom data) key and their value types. You need to select a group tag (custom data) key type from the list. The metrics value for the groups, accounts, and services that are not associated with the selected group tag (custom data) key will be

aggregated against 'N/A' line item. However, if the selected group tag (custom data) key type is added to a group with a blank value field, the cost associated with such groups will be aggregated against 'No Value' line item.

- Instance Architecture
- Instance Category
- Instance Size
- Invoicing Entity
- Item Description
- Lease Type
- Legal Entity Name
- Month
- Normalisation Factor
- Operating System
- Operation
- Parent Resource Id
- Payer Account ID
- Platform
- Product Code
- Purchase Order Name(Description): This dimension displays the name and description of the purchase order. It will only be available when either Date or Month is selected as another dimension. This dimension is available only if your CSMP account has the 'aws_azure_po_config' feature enabled.
- Purchase Type
- Region
- Reservation ID
- Resource Name (Currently, it can be used to see cost data for Amazon Elastic Compute Cloud service resources.)
- Savings Plan ARN

- Savings Plan Type
- Service
- Specific Day of Month Fixed Margin Description: This dimension is available only when your CSMP account has 'awsbc_specific_day_of_month_fixed_margin_discount' feature enabled. It displays the dimension description entered in the billing configuration page.
- Specific Day of Month Fixed Discount Description: This dimension is available only when your CSMP account has 'awsbc_specific_day_of_month_fixed_margin_discount' feature enabled. It displays the dimension description entered in the billing configuration page.
- Tags
- Tenancy
- Total vCPU
- Usage Type
- Usage Type Group

The following list shows metrics you can use to see the cost details (list may vary upon the report profile shared with you):

- Allocated Cost: It is the cost that has been allocated to a target account, service type, or region.
- Amortized: It is calculated as *Reservation Effective Cost + Unblended cost*.
- Amortized - Including Saving Plan: It is calculated as *Reservation Effective Cost + Savings Plan Effective Cost + Unblended cost*.
- Blended: It is the *BlendedRate* multiplied by the *UsageAmount*.
- Bundled Discount: A usage-based discount that provides free or discounted usage of a service or feature based on the usage of another service or feature.
- Credit: Any credits that AWS applied to your bill.
- Customer Cost: It is calculated as *Unblended Cost* minus *SPP Discount*.
- Drained Cost: It is the cost that has been assigned from the source account, service type, or region. It is denoted with a minus sign.

- Exclude RI Benefit: It is the value that could have been subtracted from your unblended cost if RI benefit sharing had been turned on for the selected account(s).
- Exclude SP Benefit: It is the value that could have been subtracted from your unblended cost if SP benefit sharing had been turned on for the selected account(s).
- Fixed Discount: It is the discount amount specified in the *fixed* tab of AWS billing configuration for the selected AWS account.
- Fixed Margin: It is the margin amount specified in the *fixed* tab of AWS billing configuration for the selected AWS account.
- General Group Allocation: The metric is calculated as ((Group Allocation Amortized Cost) / (Total AWS Net Amortised Cost for the billing adapter)) * (Advanced Reserved Instances Automation + OCBLateFee Cost). To use this metric, ensure that you have selected the Account Group dimension and set it as the X-axis label for the spend overview chart. Additionally, make sure the date range filter is set to Monthly. This metric is available only if your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled.
- Group Allocation Amortized Cost: The metric is calculated as (Group’s Net Amortised Cost) * (Group's Allocation Ratio). To use this metric, ensure that you have selected the Account Group dimension and set it as the X-axis label for the spend overview chart. This metric is available only if your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled.
- Group Allocation Cost: The metric is calculated as (Group's Unblended Cost) * (Group's Allocation Ratio). To use this metric, ensure that you have selected the Account Group dimension and set it as the X-axis label for the spend overview chart. This metric is available only if your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled.
- Group Net Cost: The metric is calculated as (Group Allocation Cost) + (Support Cost Allocation) + (General Group Allocation). To use this metric, ensure that you have selected the Account Group dimension and set it as the X-axis label for the spend overview chart. Additionally, make sure the date range filter is set to Monthly. This metric is available only if your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled.

- Group Net Cost Amortized: The metric is calculated as (Group Allocation Amortized Cost) + (Support Cost Allocation Amortized) + (General Group Allocation). To use this metric, ensure that you have selected the Account Group dimension and set it as the X-axis label for the spend overview chart. Additionally, make sure the date range filter is set to Monthly. This metric is available only if your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled.
- Kubernetes Allocation: This is a non-selectable, organisational category that groups together all metrics related to cost and usage attribution for Kubernetes workloads within AWS.
    - Reserved Usage: It is the portion of Reserved Instance (RI) capacity that was actually consumed by Kubernetes workloads. This metric helps evaluate how much of the purchased reserved capacity was used by compute resources managed by Kubernetes.
    - Unused Cost: It is the portion of reserved instance cost that was not utilised by Kubernetes workloads. This value indicates over-provisioning of RI capacity and is calculated by subtracting the cost of Reserved Usage from the total reserved cost allocated to Kubernetes.
    - Split Usage Ratio: It is the ratio of Kubernetes workload usage to the total usage on a shared AWS resource. This metric is used to proportionally allocate costs between Kubernetes and non-Kubernetes consumers of the same infrastructure.
    - Split Usage: It is the actual amount of usage attributed to Kubernetes workloads on a shared AWS resource. This is determined by applying the Split Usage Ratio to the total usage of that resource.
    - Split Cost: It is the portion of the total cost of a shared resource that is allocated to Kubernetes workloads. This metric is calculated by multiplying the Split Usage Ratio by the total cost of the shared AWS resource.
    - Public On Demand Unused Cost: It is the cost of public on-demand AWS resources allocated to Kubernetes that were not used. This metric highlights inefficiencies in scaling and resource provisioning.

  - Public On Demand Split Cost: It is the portion of public on-demand resource cost attributed to Kubernetes workloads based on actual usage. This is calculated by applying the Split Usage Ratio to the total public on-demand cost.
  - Net Unused Cost: It is the total unused cost by Kubernetes workloads after accounting for both reserved and public on-demand unused capacities. This metric is the sum of Unused Cost and Public On Demand Unused Cost.
  - Net Split Cost: It is the final effective cost attributed to Kubernetes workloads after subtracting unused costs. This is calculated by summing Split Cost and Public On Demand Split Cost, then subtracting the Net Unused Cost.
  - Actual Usage: It is the raw resource usage—such as CPU, memory, or storage—by Kubernetes workloads. This usage is measured before applying any cost allocation and forms the foundation for usage-based billing metrics.
- Percentage of Spend - Billing Entity Discount: This metric is calculated by multiplying the selected metric for margin/discount calculations specified in the billing adapter by the discount percentage defined in the "Percentage of Spend - Billing Entity Discount" tab of the billing configuration.
- Percentage of Spend - Billing Entity Margin: This metric is calculated by multiplying the selected metric for margin/discount calculations specified in the billing adapter by the margin percentage defined in the "Percentage of Spend - Billing Entity Margin" tab of the billing configuration.
- Percentage of Spend - Charge Type Discount: This metric is calculated by multiplying the selected metric for margin/discount calculations specified in the billing adapter by the discount percentage defined in the "Percentage of Spend - Charge Type Discount" tab of the billing configuration.
- Percentage of Spend - Charge Type Margin: This metric is calculated by multiplying the selected metric for margin/discount calculations specified in the billing adapter by the margin percentage defined in the "Percentage of Spend - Charge Type Margin" tab of the billing configuration.

- Percentage of Spend - Item Description Discount: This metric is calculated by multiplying the selected metric for margin/discount calculations specified in the billing adapter by the discount percentage defined in the "Percentage of Spend - Item Description Discount" tab of the billing configuration.
- Percentage of Spend - Item Description Margin: This metric is calculated by multiplying the selected metric for margin/discount calculations specified in the billing adapter by the margin percentage defined in the "Percentage of Spend - Item Description Margin" tab of the billing configuration.
- Percentage of Spend - Operation Discount: This metric is calculated by multiplying the selected metric for margin/discount calculations specified in the billing adapter by the discount percentage defined in the "Percentage of Spend - Operation Discount" tab of the billing configuration.
- Percentage of Spend - Operation Margin: This metric is calculated by multiplying the selected metric for margin/discount calculations specified in the billing adapter by the margin percentage defined in the "Percentage of Spend - Operation Margin" tab of the billing configuration.
- Percentage of Spend - Service Discount: It is the metric displaying the Percentage of Spend - Service Discount value calculation specified in the *Percentage of Spend - Service Discount tab of the billing configuration*.
- Percentage of Spend - Service Margin: It is the metric displaying the Percentage of Spend - Service Margin value calculation specified in the *Percentage of Spend - Service Margin tab of the billing configuration*.
- Percentage of Spend - Usage Type Discount: This metric is calculated by multiplying the selected metric for margin/discount calculations specified in the billing adapter by the discount percentage defined in the "Percentage of Spend - Usage Type Discount" tab of the billing configuration.
- Percentage of Spend - Usage Type Margin: This metric is calculated by multiplying the selected metric for margin/discount calculations specified in the billing adapter by the margin percentage defined in the "Percentage of Spend - Usage Type Margin" tab of the billing configuration.

- Purchase Order Balance: It is the remaining balance of a purchase order (PO) after deducting the net costs associated with the selected accounts and services. As costs are incurred, the PO balance decreases, providing a real-time view of the remaining funds available under the PO. Once the net costs exceed the PO value, the balance will reach zero and no further charges can be applied to the PO. This metric will only be available when you have selected either Date or Month as the dimensions. Other dimensions should not be selected for customising the report.
- Purchase Order Value: It is the total amount allocated to a purchase order at the time of its creation. This is the full budget or limit that can be consumed over a specified period. The PO balance at the end of each day will become the PO value for the following day. This metric will only be available when you have selected either Date or Month as the dimensions. Other dimensions should not be selected for customising the report.
- Net Allocated Cost: It is calculated as Net Cost + Allocated Cost - Drained Cost.
- Net Amortised Cost: It is calculated as Amortized + All Taxes - All Discounts
- Net cost: It is the calculated as Customer Cost + (Percentage of Spend - Service Margin + Percentage of Spend - Billing Entity Margin + Percentage of Spend - Item Description Margin + Percentage of Spend - Usage Type Margin + Percentage of Spend - Operation Margin + Percentage of Spend - Charge Type Margin + Fixed Margin + Service Type Margin + Usage Hour Margin + Usage Quantity Multiplier - Charge Type Margin + Usage Quantity Multiplier - Item Description Margin + Usage Quantity Multiplier - Operation Margin + Usage Quantity Multiplier - Usage Type Margin) – (Percentage of Spend - Service Discount + Percentage of Spend - Billing Entity Discount + Percentage of Spend - Item Description Discount + Percentage of Spend - Usage Type Discount + Percentage of Spend - Operation Discount + Percentage of Spend - Charge Type Discount + Fixed Discount + Service Type Discount + Usage Hour Discount).
- Net Unblended Cost: It is sum of all values under column net_unblended_cost if value is not present then pick value from unblended_cost_column.
- On Demand Hours: It is sum of usage quantity having term 'OnDemand', product_instance_type should not be null, line_item_operation should be

RunInstances or CreateDBInstance and line_item_line_item_type should be 'Usage','DiscountedUsage'.

- Partner Cost: It represents the charges for third-party services (e.g., AWS Marketplace) and is calculated as the Unblended Cost minus Distributor Discount. *Note: Distributor Discount is typically negative.*
- Refund: It is the negative charges that AWS refunded money for.
- Reservation Charge: It is sum of unblended cost having line item type 'RIFee'.
- Reserved Hours: It is sum of usage quantity having term 'reserved', product_instance_type should not be null, line_item_operation should be RunInstances or CreateDBInstance and line_item_line_item_type should be 'Usage','DiscountedUsage'.
- Resource Count: It is the total number of distinct billable resources associated during the reporting period. This metric is only available when either 'Date' or 'Month' is selected as a dimension.
- Retail On-Demand Cost: It is the cost value displayed in your AWS CUR (Cost and Usage Report) under the column pricing/publicOnDemandCost.
- Saving Plan Hourly Usage: It is the sum of usage amount having line item type 'SavingsPlanCoveredUsage'.
- Saving Plan Usage: It is the *savings_plan_savings_plan_effective_cost* plus *savings_plan_recurring_commitment_for_billing_period*.
- Service Type Discount: It is the discount amount for the AWS resource specified in the *service type* tab of AWS billing configuration for the selected AWS account.
- Service Type Margin: It is the margin amount for the AWS resource specified in the *service type* tab of AWS billing configuration for the selected AWS account.
- SPP Discount: It is the AWS Solution Provider Program (SPP) discount value.
- Support Cost Allocation: The metric is calculated as ((Group Allocation Cost) / (Total AWS Unblended for the billing adapter)) * (AWS Support Enterprise Unblended cost for the billing adapter). To use this metric, ensure that you have selected the Account Group dimension and set it as the X-axis label for the spend overview chart. Additionally, make sure the date range filter is set to Monthly. This metric is available

only if your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled.

- Support Cost Allocation Amortized: The metric is calculated as ((Group Allocation Amortized Cost) / (Total AWS Net Amortised Cost for the billing adapter)) * (AWS Support Enterprise Net Amortised Cost for the billing adapter). To use this metric, ensure that you have selected the Account Group dimension and set it as the X-axis label for the spend overview chart. Additionally, make sure the date range filter is set to Monthly. This metric is available only if your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled.
- Tax: Any taxes that AWS applied to your bill.
- Unblended: It is the *UnblendedRate* multiplied by the *UsageAmount*.
- Usage Hour Discount: It is calculated as *On Demand Hours* multiplied by *hourly discount* amount specified for the specific resource name specified in the usage hour tab of AWS billing configuration for the selected AWS account.
- Usage Hour Margin: It is calculated as *On Demand Hours* multiplied by *hourly margin* amount specified for the specific resource name specified in the usage hour tab of AWS billing configuration for the selected AWS account.
- Usage Quantity: It is the sum of usage quantity cost column for applied filters.
- Usage Quantity Multiplier - Charge Type Margin: It is calculated as Usage quantity of the charge type multiplied by the margin multiplier specified in the billing configuration's Usage Quantity Multiplier - Charge Type Margin tab. This metric will be available only when your CSMP account has been enabled for 'awsbc_usage_quantity_multiplier_based_on_charge_type' feature.
- Usage Quantity Multiplier - Item Description Margin: It is calculated as Usage quantity of an item description multiplied by the margin multiplier specified in the billing configuration's Usage Quantity Multiplier - Item Description Margin tab. This metric will be available only when your CSMP account has been enabled for 'awsbc_usage_quantity_multiplier_based_on_item_description' feature.
- Usage Quantity Multiplier - Operation Margin: It is calculated as Usage quantity of the operation type multiplied by the margin multiplier specified in the billing

configuration's Usage Quantity Multiplier - Operation Margin tab. This metric will be available only when your CSMP account has been enabled for 'awsbc_usage_quantity_multiplier_based_on_operation' feature.

- Usage Quantity Multiplier - Usage Type Margin: It is calculated as Usage quantity of the usage type multiplied by the margin multiplier specified in the billing configuration's Usage Quantity Multiplier - Usage Type Margin tab. This metric will be available only when your CSMP account has been enabled for 'awsbc_usage_quantity_multiplier_based_on_usage_type' feature.
- Fixed Discount (R): It is applicable only for reseller organization. It is the discount amount specified in the *fixed* tab of AWS billing configuration for the selected AWS account.
- Fixed Margin (R): It is applicable only for reseller organization. It is the margin amount specified in the *fixed* tab of AWS billing configuration for the selected AWS account.
- Percentage of Spend - Billing Entity Discount (R): This metric is applicable only to reseller organizations. It is calculated by multiplying the selected metric for margin/discount calculations specified in the billing adapter by the discount percentage defined in the "Percentage of Spend - Billing Entity Discount" tab of the billing configuration created in the reseller CSMP account.
- Percentage of Spend - Billing Entity Margin (R): This metric is applicable only to reseller organizations. It is calculated by multiplying the selected metric for margin/discount calculations specified in the billing adapter by the margin percentage defined in the "Percentage of Spend - Billing Entity Margin" tab of the billing configuration created in the reseller CSMP account.
- Percentage of Spend - Charge Type Discount(R): This metric is applicable only to reseller organizations. This metric is calculated by multiplying the selected metric for margin/discount calculations specified in the billing adapter by the discount percentage defined in the "Percentage of Spend - Charge Type Discount" tab of the billing configuration created in the reseller CSMP account.
- Percentage of Spend - Charge Type Margin(R): This metric is applicable only to reseller organizations. This metric is calculated by multiplying the selected metric

for margin/discount calculations specified in the billing adapter by the margin percentage defined in the "Percentage of Spend - Charge Type Margin" tab of the billing configuration created in the reseller CSMP account.

- Percentage of Spend - Item Description Discount (R): This metric is applicable only to reseller organizations. It is calculated by multiplying the selected metric for margin/discount calculations specified in the billing adapter by the discount percentage defined in the "Percentage of Spend - Item Description Discount" tab of the billing configuration created in the reseller CSMP account.
- Percentage of Spend - Item Description Margin (R): This metric is applicable only to reseller organizations. It is calculated by multiplying the selected metric for margin/discount calculations specified in the billing adapter by the margin percentage defined in the "Percentage of Spend - Item Description Margin" tab of the billing configuration created in the reseller CSMP account.
- Percentage of Spend - Operation Discount(R): This metric is applicable only to reseller organizations. This metric is calculated by multiplying the selected metric for margin/discount calculations specified in the billing adapter by the discount percentage defined in the "Percentage of Spend - Operation Discount" tab of the billing configuration created in the reseller CSMP account.
- Percentage of Spend - Operation Margin(R): This metric is applicable only to reseller organizations. This metric is calculated by multiplying the selected metric for margin/discount calculations specified in the billing adapter by the margin percentage defined in the "Percentage of Spend - Operation Margin" tab of the billing configuration created in the reseller CSMP account.
- Percentage of Spend - Service Discount (R): It is applicable only for reseller organization. It is the metric displaying the Percentage of Spend - Service Discount value calculation specified in the "Percentage of Spend - Service Discount" tab of the billing configuration.
- Percentage of Spend - Service Margin (R): It is applicable only for reseller organization. It is the metric displaying the Percentage of Spend - Service Margin value calculation specified in the "Percentage of Spend - Service Margin" tab of the billing configuration.

- Percentage of Spend - Usage Type Discount(R): This metric is applicable only to reseller organizations. This metric is calculated by multiplying the selected metric for margin/discount calculations specified in the billing adapter by the discount percentage defined in the "Percentage of Spend - Usage Type Discount" tab of the billing configuration created in the reseller CSMP account.
- Percentage of Spend - Usage Type Margin(R): This metric is applicable only to reseller organizations. This metric is calculated by multiplying the selected metric for margin/discount calculations specified in the billing adapter by the margin percentage defined in the "Percentage of Spend - Usage Type Margin" tab of the billing configuration created in the reseller CSMP account.
- Net cost (R): It is the calculated as Customer Cost (R) + (Percentage of Spend - Service Margin (R) + Percentage of Spend - Billing Entity Margin (R) + Percentage of Spend - Item Description Margin (R) + Percentage of Spend - Usage Type Margin (R) + Percentage of Spend - Operation Margin (R) + Percentage of Spend - Charge Type Margin (R) + Fixed Margin (R) + Service Type Margin (R) + Usage Hour Margin (R) + Usage Quantity Multiplier - Charge Type Margin (R) + Usage Quantity Multiplier - Item Description Margin (R) + Usage Quantity Multiplier - Operation Margin (R) + Usage Quantity Multiplier - Usage Type Margin (R)) – (Percentage of Spend - Service Discount (R) + Percentage of Spend - Billing Entity Discount (R) + Percentage of Spend - Item Description Discount (R) + Percentage of Spend - Usage Type Discount (R) + Percentage of Spend - Operation Discount (R) + Percentage of Spend - Charge Type Discount (R) + Fixed Discount (R) + Service Type Discount (R) + Usage Hour Discount (R)).
- Service Type Discount (R): It is applicable only for reseller organisation. It is the discount amount for the AWS resource specified in the *service type* tab of AWS billing configuration for the selected AWS account.
- Service Type Margin (R): It is applicable only for reseller organisation. It is the margin amount for the AWS resource specified in the *service type* tab of AWS billing configuration for the selected AWS account.
- Usage Hour Discount (R): It is applicable only for reseller organisation. It is calculated as *On Demand Hours* multiplied by *hourly discount* amount specified for

the specific resource name specified in the *usage hour* tab of AWS billing configuration for the selected AWS account.

- Usage Hour Margin (R): It is applicable only for reseller organisation. It is calculated as *On Demand Hours* multiplied by *hourly margin* amount specified for the specific resource name specified in the *usage hour* tab of AWS billing configuration for the selected AWS account.
- Usage Quantity Multiplier - Charge Type Margin (R): It is applicable only for reseller organisation. It is calculated as Usage quantity of the charge type multiplied by the margin multiplier specified in the billing configuration's Usage Quantity Multiplier - Charge Type Margin tab. This metric will be available only when your CSMP account has been enabled for 'awsbc_usage_quantity_multiplier_based_on_charge_type' feature.
- Usage Quantity Multiplier - Item Description Margin (R): It is applicable only for reseller organisation. It is calculated as Usage quantity of an item description multiplied by the margin multiplier specified in the billing configuration's Usage Quantity Multiplier - Item Description Margin tab. This metric will be available only when your CSMP account has been enabled for 'awsbc_usage_quantity_multiplier_based_on_item_description' feature.
- Usage Quantity Multiplier - Operation Margin (R): It is applicable only for reseller organisation. It is calculated as Usage quantity of the operation type multiplied by the margin multiplier specified in the billing configuration's Usage Quantity Multiplier - Operation Margin tab. This metric will be available only when your CSMP account has been enabled for 'awsbc_usage_quantity_multiplier_based_on_operation' feature.
- Usage Quantity Multiplier - Usage Type Margin (R): It is applicable only for reseller organisation. It is calculated as Usage quantity of the usage type multiplied by the margin multiplier specified in the billing configuration's Usage Quantity Multiplier - Usage Type Margin tab. This metric will be available only when your CSMP account has been enabled for 'awsbc_usage_quantity_multiplier_based_on_usage_type' feature.

Only resellers and their customer organization users will have access to reseller-specific metrics, provided the reseller has created a billing configuration.

Using Dimensions and Metrics to Refine Report Statistics

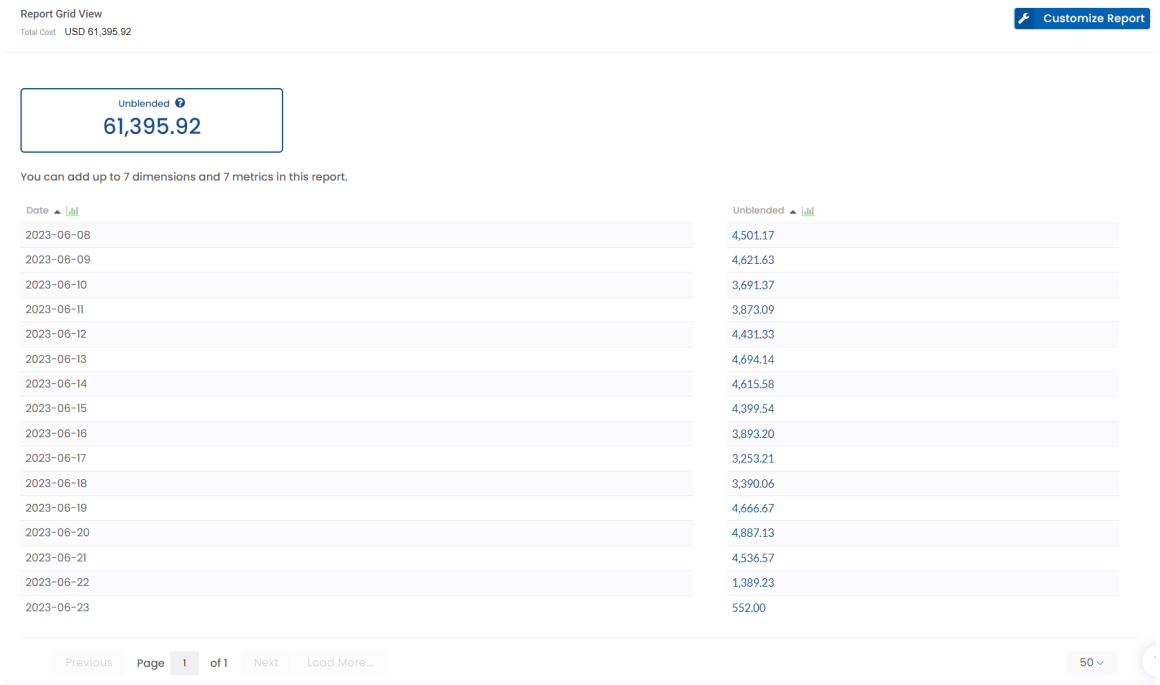
You can see the breakup for the spend by dimensions and metrics for the set parameters in the Filters Setting. Dimensions are attributes of your cloud resources. For example, the dimension Date indicates the date. Whereas, Metrics contain numeric values that tie to a dimension. For example, the metric Unblended represents the usage cost value for the selected dimension(s). Using the Customize Report button, you can add up to 7 dimensions and 7 metrics to view the corresponding spend for the selected dimensions and or metrics.

Date is the default dimension selected when date range in the filters setting is set to daily. Default metric changes based on report profile shared with user's account tenant or organisation.

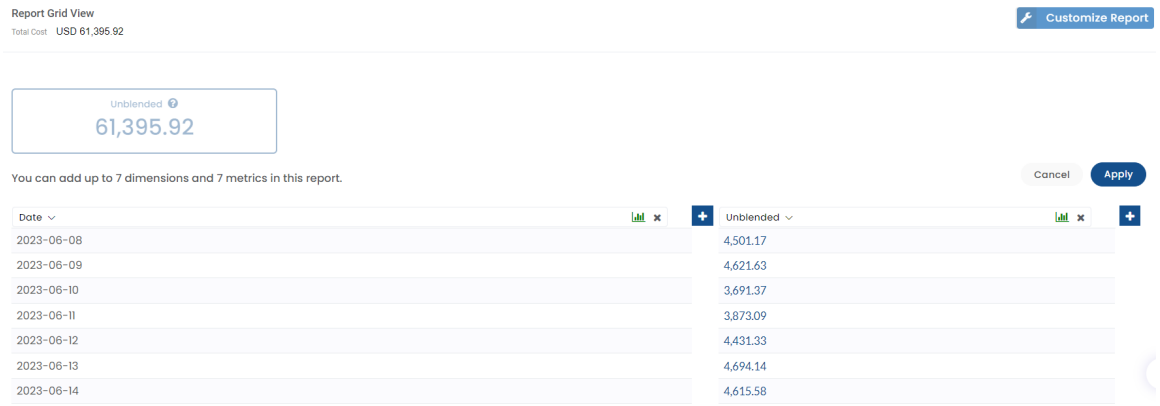
1. Logon to your CloudBolt CSMP account.
2. Navigate to **Cost > Cost Report**.
3. Select the service provider as AWS.

   Note: AWS is selected by default. If any other service provider is selected you can switch to AWS by clicking the AWS button at the top of cost report page.

4. Set the filters setting as required.
5. Scroll down to the Report Grid View, the Total Cost for the selected date range can be seen.



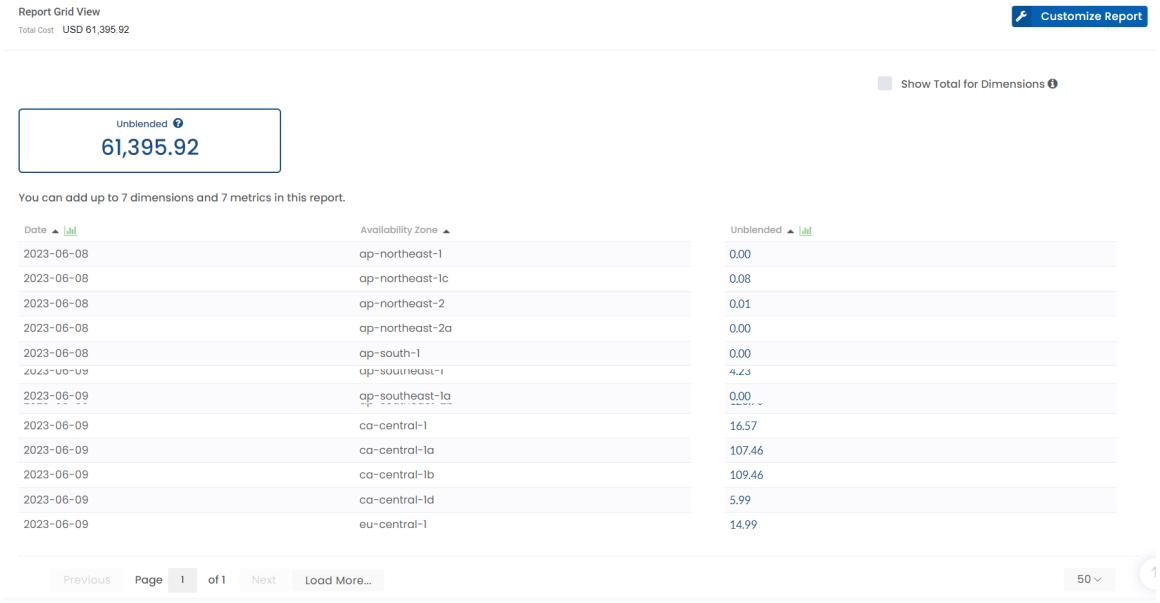
6. Click **Customize Report**. The **+** option to add dimensions and metrics is displayed.



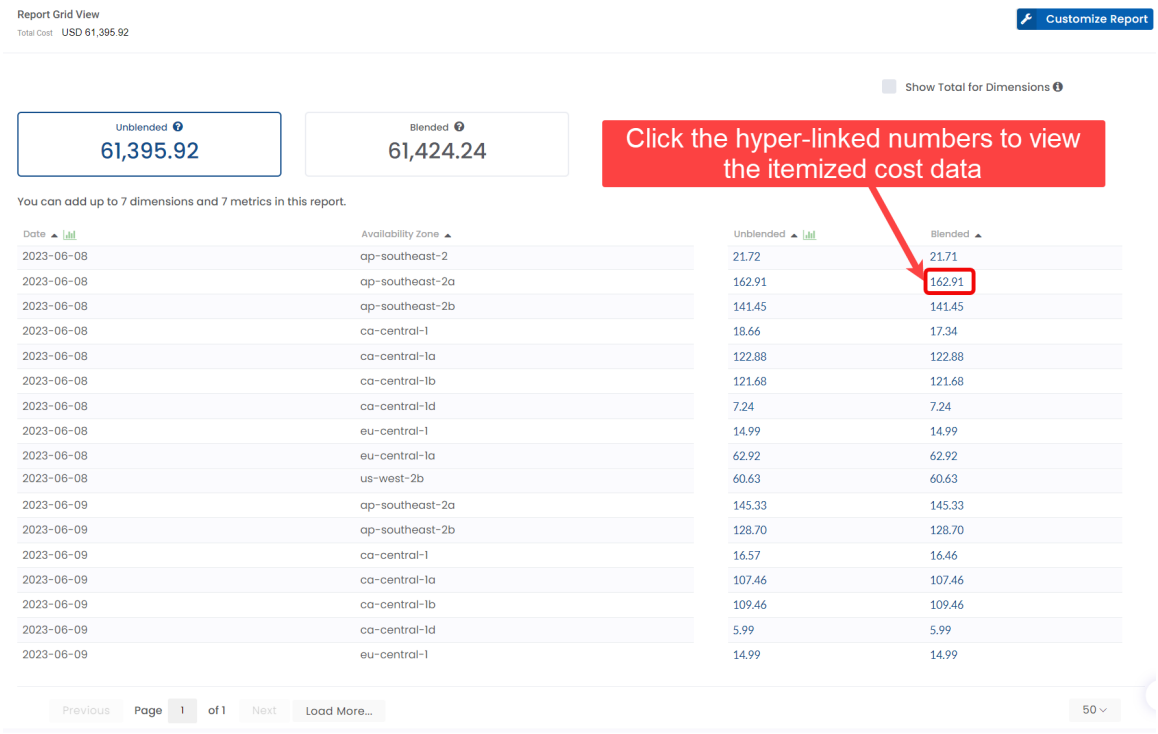
7. Click + to add the dimensions as required. For example, we will see the cost breakup by **Availability Zones**. Click + and add **Availability Zones** from the drop-down list.



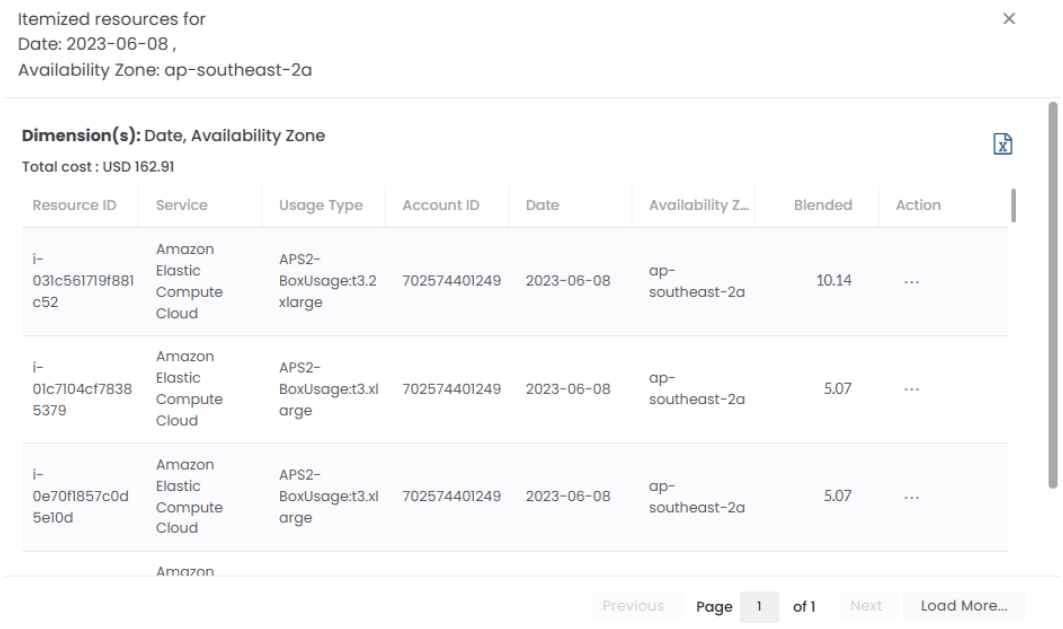
8. To set a dimension as X-axis label for spend overview chart, select the vertical poll icon for that dimension. A green colour filled vertical poll icon for a dimension indicates that the dimension is set as X-axis label for the spend overview chart.
9. Click **Apply**. The cost data will be displayed **Date** and **Availability Zones** wise.



10. Similarly, you can view the cost by multiple metrics, for example, by blended. Click **Customize Report**, click **+**, select **Blended** from Metrics drop-down, and then click **Apply**. The cost for the previously selected dimensions would be displayed by unblended and blended.

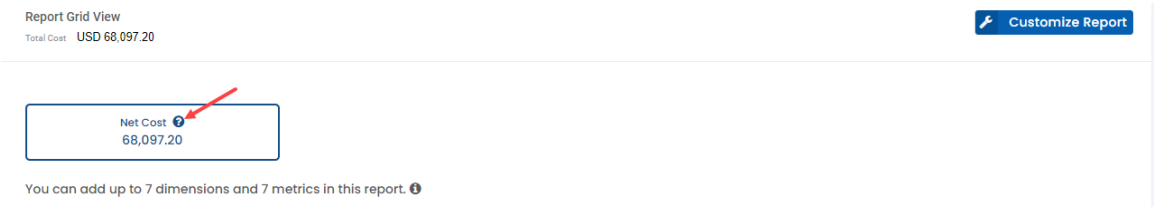


- You can click on the metrics value to view more detailed, itemized cost data for the selected dimensions. This feature is available only when currency conversion is disabled for your CSMP account tenant. The itemized cost is not available for metrics "Purchase Order Balance", "Purchase Order Value", and "Resource Count".



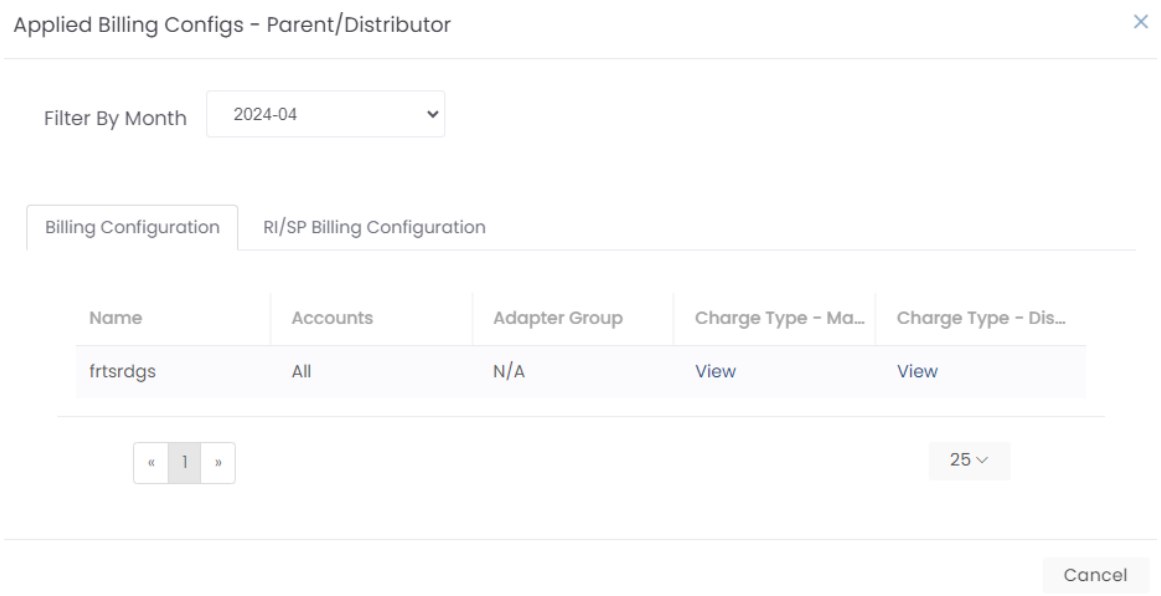
- You can download the itemized cost data. Click 'Export to CSV' icon [] to download the report.
- Click ellipsis [...] icon under the Action column to view and select from the available action options.

11. To set a metric as Y-axis label for spend overview chart, select the vertical poll icon for that metric. A green colour filled vertical poll icon indicates the active metric for Y-axis label for the spend overview chart.
12. If you are a default tenant user and your CloudBolt CSMP account is marked as a distributor or reseller account, you can see the applied billing configuration details directly from the Report Grid View section. To see the billing configuration details you must need to customize the cost report for at least one of the metrics as Net Cost (for distributor account) or Net Cost (R) (for reseller account). Click the question mark icon available in the Net Cost or Net Cost (R) tile.



A pop-up window will open with billing configuration and RI/SP billing configuration tabs. If your cost report grid view contains data for multiple months, you need to select the month from Filter By Month drop-down list to see the applicable billing configuration details. If no billing configuration has been set for a particular month, you will see a message similar to: *No data found!* Click **Cancel** to close the billing

configuration pop-up window.



Using Show Total for Dimensions Option

You can see a total cost grouped for multiple dimensions. In order to turn on show total for dimensions, you must have at least two dimensions selected in the Customize Report. If you have two dimensions selected, you will see the total metric value for one dimension only, i.e. the first dimension listed on the report grid view from the left side. Similarly, if you have three dimensions selected, you will see the total metric value for two dimension only, i.e. the first two dimensions listed on the report grid view from the left side. And so on.

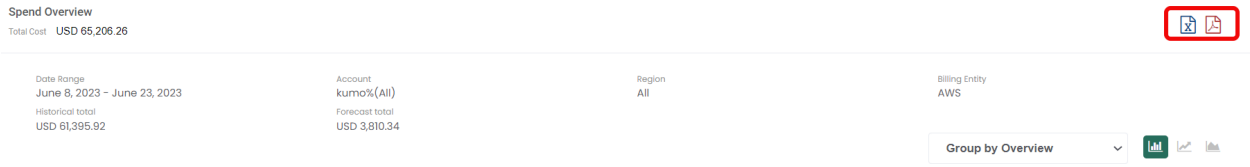
When two or more metrics are selected for customize report, you must choose a metric to see the total for dimensions.

With descending order sort, total for dimensions will appear automatically on the right side of the report grid view.

To enable show total for dimensions, you must click the **Customize Report** and then select the **Show Total for Dimensions** check box.



You can even download the cost report with Show Total for Dimensions turned on using the options such as export to CSV and export to PDF, available under Spend Overview section.



You can also save this cost report format as favourite cost report by clicking the Save button available the upper right side of the cost report page.

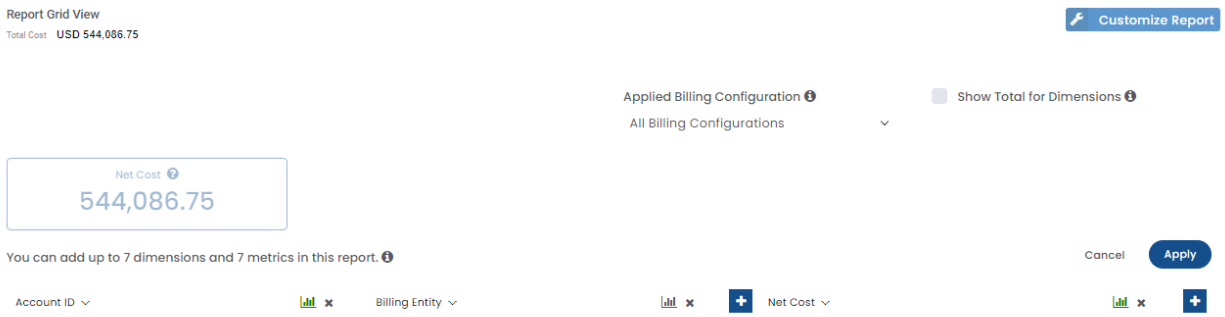
Using Applied Billing Configuration Option

You can customize your cost report grid view based on billing configurations. To customize your cost report based on billing configuration, you need to select at least one metric whose value is defined by billing configuration. Below is a list of metrics whose value is defined by billing configuration:

- Discount
- Fixed Discount

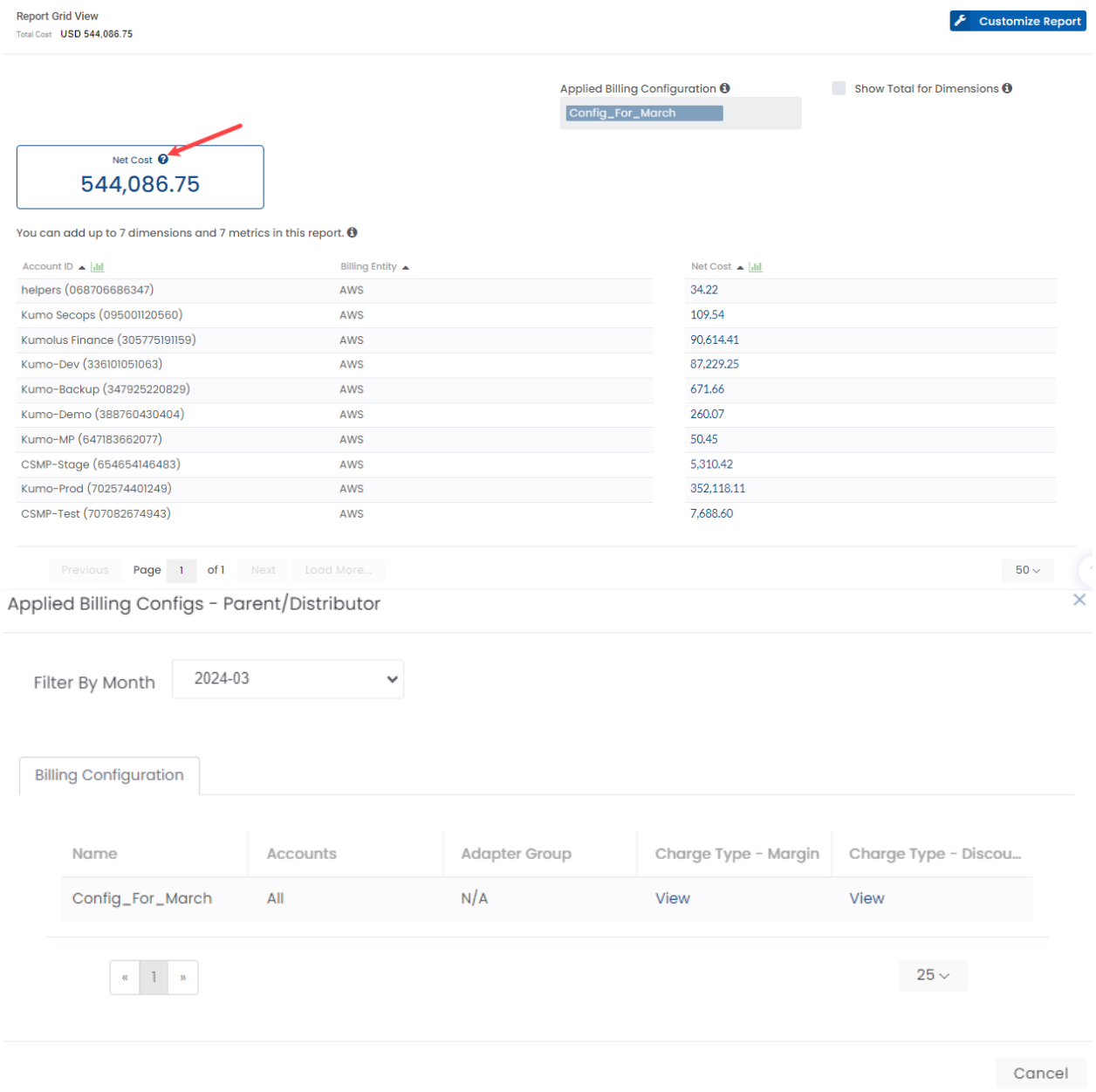
- Fixed Margin
- Margin
- Net cost
- Service Type Discount
- Service Type Margin
- Usage Hour Discount
- Usage Hour Margin
- Discount (R)
- Fixed Discount (R)
- Fixed Margin (R)
- Margin (R)
- Net cost (R)
- Service Type Discount (R)
- Service Type Margin (R)
- Usage Hour Discount (R)
- Usage Hour Margin (R)

Upon adding any metric from the above list to customize the report, a drop-down selection box option labeled "Applied Billing Configuration" will appear. By default, the system will automatically select the "All Billing Configuration" option. This default setting implies that the cost displayed in the cost report grid view will aggregate data from all billing configurations associated with the selected billing adapter and the specified period in the filter settings area.



If you opt for a specific billing configuration that is applicable to any months within the set period defined in the period filter and then click **Apply**, the data presented in the cost report grid view will exclusively feature the sub-accounts associated with the chosen billing configuration. Conversely, selecting a billing configuration that isn't applicable to any months within the set period defined in the period filter will result in the display of all sub-accounts linked to the chosen billing account, unless there are restrictions imposed by filter settings.

You can access the applicable billing and RI/SP configuration details by clicking the icon within the net cost or net cost (R) metric tile. If you wish to view billing configuration details for a specific month, you can choose the desired month from the 'Filter By Month' selection drop-down. Additionally, by clicking the respective 'View' link, you can explore various margin and discount details associated with the selected billing configuration.



Outcomes

Learnt how to analyze the costs incurred on provisioning cloud services in granular detail.

7.1.2. Cost Report for Azure

Learn how to use CloudBolt CSMP Cost Report tool to view your Azure cloud costs.

- Introduction
- Filters Setting
- Spend Overview
- Customize Report
- Using Dimensions and Metrics to Refine Report Statistics
- Using Show Total for Dimensions Option
- Using Applied Billing Configuration Option
- Outcomes

Introduction

Cloud computing helps your organization save costs on buying infrastructure and software. However, if not monitored, costs can quickly turn your profits into losses. It is very important that you have total and granular visibility on the costs incurred for the services availed. Historical data on spending combined with actual spending and forecasts can help you plan your budgets. The Cost Report tool in CloudBolt CSMP help you with these difficult aspects of cost optimization by displaying the current and historical cost amount, proposed recommendations, and dynamic calculations of estimated savings.

Filters Setting

Azure cost report in CloudBolt CSMP can be customized by using appropriate filter parameters. Options available for filters setting depend on the Report Profile shared with your tenant or organisation (child/reseller/customer). By default, when you first access the cost report for Azure, the filters are configured to all values, except the billing subscription. As you set your filters and click **Apply**, the total cost displayed in spend overview adjust to represent the aggregated costs based on the filter parameters selected. All filters are

combined together using 'and' logic, which means that only those records that meet all selected filter values are displayed.

To access filters setting, log in to your CloudBolt CSMP account. Navigate to Cost > Cost Report. Select Azure cloud provider tab and then click Filters with the selected tab.

1. **Billing Subscription**: Select the billing subscription whose cost details you want to view.
2. **Group**: For the chosen billing subscription, pick an adapter group for which you want to see the cost data. Selecting a group would populate the subscriptions and applied tag filters with all the accounts and tags associated with the selected adapter group. To know more about groups, see Create and Manage Azure Adapter Groups and Create and Manage Azure CSP Adapter Groups.
3. **Cost Allocations**: This filter parameter will be available only when you have a cost allocation rule for Azure. Choose cost allocation rule to see the allocated cost, drained cost, and net allocated cost for the targets set in the chosen allocation rule. Whenever cost allocation filter is applied, the dimension applied in the report grid view will be set to the target's native provider value, and the default metric would be set to allocated cost.
4. **Select Currency [applicable for Azure CSP only]**: If you select an Azure CSP billing subscription that has multiple billing currencies, you must select a currency. The Spend Overview widgets will display services cost for the subscriptions whose billing currency matches the currency selected in the currency drop-down box. If individual rules have been defined under Currency Conversion to convert all the currencies available in the selected CSP billing subscription to USD or BRL, you can utilize the 'Total Cost in USD' and 'Total Cost in BRL' options to view the total expenses for the selected CSP billing subscription in USD and BRL, respectively.
5. **Data on Chart**: Select the appropriate service type to view the cost accumulated by that specific service type. By default, All Costs will be selected. options available are:
    - All Costs: Displays aggregated cost for all the Azure services available in the selected billing subscription.

- Compute: Displays aggregated cost for all the Azure Compute services available in the selected billing subscription.
- Database: Displays aggregated cost for all the Azure Database services available in the selected billing subscription.
- Storage: Displays aggregated cost for all the Azure Storage services available in the selected billing subscription.

6. **Date Range**: Set the range of time for the cost report you want to analyse. You can select between Daily or Monthly. By default, when you first access the cost report, the Date Range is set to Daily, with the last 16 days selected including today. By default, daily is enabled. You can filter the cost report on a monthly basis by selecting the monthly tile. Your choice of a daily or monthly tile limits the customize report dimension options for date or month. If you choose daily, you could select date in the customize report section's dimension selection box; but, if you choose monthly, you can choose month as one of the dimensions.
   - **Daily** returns your Azure costs incurred during the last 16 days period selected including today on a daily basis. When you select Daily, you can choose a dynamic past or future date range, such as "This Month" or "Last Month" or "Yesterday", or "Next Month" or a custom date range from the **Period** selection box to view your cost reports. Dynamic past and future date ranges display cost data over a rolling time, such as "Last Month" or "Last 7 days" or "Next Month". Dynamic past date ranges are: "This Month", "Last Month", "Last 3 Months", "Yesterday", "Last 7 Days", "Last 14 Days", "Last 21 Days", "Last 30 Days", and "Last 45 Days". Dynamic future date ranges are: "This Month", "Next Month", "Next 3 months", "Tomorrow", "Next 7 Days", "Next 14 Days", "Next 21 Days", "Next 30 Days", and "Next 45 Days". Dynamic date ranges are best for your favourite cost reports. Custom ranges let you focus on specific start and end dates. Your start and end date duration can be up to 100 days. After selecting a date range, you must click **Apply** button available within the period selection area.
   - **Monthly** returns your Azure costs grouped on a monthly basis. When you select Monthly, you can choose a dynamic past or future date range, such as

"This Month" or "Last Month" or "Next Month", or a custom date range from the **Period** selection box to view your cost reports. Dynamic past and future date ranges display cost data over a rolling time, such as "Last Month" or "Last 6 Months" or "Next Month". Dynamic past date ranges are: "This Month", "Last Month", "Last 3 Months", "Last 6 Months", "Last 9 Months", and "Last 12 Months". Dynamic future date ranges are: "This Month", "Next Month", "Next 3 Months", "Next 6 Months", "Next 9 Months", and "Next 12 Months". Dynamic date ranges are best for your favourite cost reports. Custom ranges let you focus on specific start and end dates. After selecting a date range, you must click **Apply** button available within the period selection area.

A "day" is defined as midnight to midnight in the cost report's selected time zone. A "month" is defined as first to last date of a calendar month in the report's selected time zone. The current day's (that is, Today's) cost data is not included in the report except for default date range selection and "This Month" option selection as dynamic future date range. Preset dynamic past date ranges are listed on left side of the period selection list. Preset dynamic future date ranges are listed on the right side of the period selection list.

7. **Compare Period**: Select the **Compare Period** check box to set a start date to compare your Azure cost against the previously selected date range under Period selection box. Cost comparison will display as the total cost for two time ranges in the spend overview section. For example, you have selected February 23, 2022 to March 09, 2022 date range in the Period, duration of 15 days. In the **Compare Period Start** box you select February 07, 2022 as start date. After clicking the Apply button for filter result, the spend overview graph and total cost will display the cost for February 23, 2022 to March 09, 2022 compared to February 07, 2022 to February 21, 2022. You can see that the compare period end date has been adjusted based on the period you choose. Alternatively, if you chose a dynamic date range in the Period, then selected a date in the **Compare Period Start** box, your compared to days will likewise be *n* days based on date range in the Period beginning from the Compare Period Start date. When a compare period is saved as a favourite cost report, the date selected in the **Compare Period Start** box will be dynamically updated based on

the start date in the Period to show a compare start date when you open the favourite report.

8. **Subscription**: If you have selected an adapter group in the group filter, all the accounts available in the selected group would be selected by default. You can select all subscriptions available under the selected billing adapter or select a subset of them by clicking them in the list. You can use this field to track costs by subscription. You can use wildcard and operators for searching the subscription.
9. **Resource Group**: You can select all resource group available under the selected subscription or select a subset of them by clicking them in the list. You can use this field to track costs by resource group. You can use wildcard and operators for searching the resource group.
10. **Location**: The geographical area that hosts your Azure services. You can select all Azure regions available under the selected billing adapter or select a subset of regions by clicking them in the list. You can use wildcard and operators for searching the location.
11. **Service Name**: You can select all services available under the selected adapter or select a subset of service by clicking them in the list. You can use wildcard and operators for searching the service name.
12. **Resource Name**: Select the resource name for the selected services. You can use wildcard and operators for searching the resource name.
13. **Service Tier**: Select the service tier. You can use wildcard and operators for searching the service tier.
14. **Cost Type [applicable for Azure CSP only]**: Select all the cost type or a subset of cost type by clicking them in the list. If you select Total as billing subscription, Cost Type filter would not be available.
15. **Invoice Number [applicable for Azure CSP only]**: Select all the invoice number or a subset of invoice number by clicking them in the list.
16. **Reseller MPN ID [applicable for Azure CSP only]**: Select all the ID for the reseller associated with the subscription or a subset of reseller MPN ID by clicking them in the list.

17. **Customer Name [applicable for Azure CSP only]**: Select all the customers or a subset of customer name by clicking them in the list.
18. **Applied Tags**: Tags are key-value pairs attached to your Azure services/resources. To filter cost report by tags:
    a. Enter the tag key type in the **Tag Key** box. You must specify correct tag key. Select the tag value from the drop-down list. You can use the following values:
        - **Exclude No Tagkey: (selected tag key)** - Filter cost for all cloud resources/services with the specified tag key, but there must be no tag value.
        - **No Tagkey: (selected tag key)** - Filter cost for all cloud resources/services that do not have the specified tag key.
        - The displayed tag value - Filter cost for all cloud resources/services with the specified tag key and the specified tag value.
    b. Click to apply the entered tag key-value pair as tag filter. You can add up to ten tag filters to filter your cost report.
    c. Whenever you add two or more different tag key types, you must choose an operator from the tag operator selection box to join those tag filters. By default, OR operator will be selected, which means that cost report would be generated for all the selected tags. Selecting AND operator means that cost report would be generated when all the selected tags are available to a service, subscription, resource, etc.
    d. If you had selected a group, the associated tag key-value pair(s) would automatically appear in tag filters, and you could not add or delete any other tag. If the selected group has multiple tag filters applied, by default, the AND operator would be selected to join tag filters.
19. **Applied Group Tags**: Group tags are the custom labels applied to the groups. It is a key-value pair attached with groups. This filter option allows you to filter the cost report for multiple groups using their group tags (custom data). To filter cost report by group tags:

a. Enter the group tag key in **Group Tag Key** box. Select the group tag value from the drop-down list. You can use the following values:
    - **Exclude No Group Tagkey: (selected tag key)** - Filter cost for all the groups with the specified group tag key, but there must be no group tag value.
    - **No Group Tagkey: (selected tag key)** - Filter cost for all the groups that do not have the specified group tag key.
    - The displayed tag value - Filter cost for all the groups with the specified group tag key and the specified group tag value.

b. Click to apply the specified group tag key-value pair(s) as applied group tags filter. You can add up to ten group tags as filter.

c. Whenever you add two or more different group tag key types, you must choose an operator from the group tag operator selection box to combine those group tag pairs. By default, OR operator will be selected, which means that cost report would be generated for all groups that contains any of the specified group tag pairs. Selecting AND operator means that cost report would be generated only for such groups that have all the specified group tag pairs.

Applied Group Tags filter option will not be available if you had selected a group from the group filter drop-down list.

20. **Applied Subscription Tags**: Subscription tags are key-value pairs attached to your Azure subscriptions. To filter cost report by subscription tags:

    a. Enter the subscription tag key (name) type in the **Subscription Tag Key** box. You must specify correct subscription tag key. Select the subscription tag value from the provided drop-down list. You can use the following values:
        - **Exclude No Subscription Tagkey: (selected subscription tag key)** - Filter cost for all Azure subscriptions with the specified subscription tag key, but there must be no subscription tag value.

- **No Subscription Tagkey: (selected subscription tag key)** - Filter cost for all Azure subscriptions that do not have the specified subscription tag key.
- The displayed subscription tag value - Filter cost for all Azure subscriptions with the specified subscription tag key and the specified subscription tag value.

b. Click to apply the entered subscription tag key-value pair as subscription tag filter. You can add up to ten subscription tags to filter your cost report.

c. Whenever you add two or more different subscription tag key types, you must choose an operator from the subscription tag operator selection box to join those subscription tags. By default, OR operator will be selected, which means that cost report would be generated for all the selected subscription tags. Selecting AND operator means that cost report would be generated when all the selected subscription tags are associated with a subscription.

Important:

i. If your billing adapter collects billing data from Billing Account/Management Group/Subscription Scope and was created before May 2024, you need to reprocess your Azure cost data for past months in order to filter and view the cost report based on subscription tags. To know about reprocessing cost data for past months, see Report Data Reprocessing.

ii. If you're an Azure CSP user, it's mandatory to have an active and configured state normal adapters for all your Azure CSP subscriptions. If your Azure CSP normal adapters were created before May 2024, you'll need to reprocess your Azure CSP cost data for past months in order to filter and view the cost report based on subscription tags. To know about reprocessing cost data for past months, see Report Data Reprocessing.

To see the selected filters' effect on spend overview, you must click **Apply**. You can even save the applied filters as your favourite cost report by clicking **Save** button available at the upper right corner.

Click **Clear Filters** to remove all the filters setting and return to default filters setting.

Spend Overview

Spend Overview widget gives you visibility of your Azure cloud costs as per the filters setting.

1. Logon to your CloudBolt CSMP instance.
2. Navigate to **Cost > Cost Report**.
3. Select the cloud provider as Azure.
4. By default, the Spend Overview widget will show the total cost for the chosen billing subscription over the last 16 days including today on a daily basis. The current day's (that is, Today's) cost will consists of historic and forecast cost for the day.
5. Do the filters setting as per your requirements to view the data on chart. If you set future dates for the date filter, the cost for such dates would be marked as forecast cost.
6. The chart section would show the values of the set filters parameter. A filter parameter that has not been set will not appear in the chart area, indicating that the parameter's default setting has been applied. To know more about the details of displayed filter parameters in the chart area, see use wildcard and operators for searching.
7. You can hide or show spend overview chart. By default, spend overview chart will be shown. Use *Hide Chart* to hide the spend overview chart.
8. All the chart legend labels would be displayed on the right side of the chart.
9. Data displayed on the spend overview chart can be further bifurcated by using ***group by*** option selection. By default, *Group by Overview* would be selected. Options vary according on the service type chosen in the 'Data on Chart' filter. Available options for group by could be:
    - **Group by Overview**: Displays the aggregated cost for the selected Azure service type. The Spend Overview graph displays the forecast value for the

future period (if filter applied for the future date) based on your historical cost value.

- **Group by Resource Groups**: Displays a multi series graph for the service cost split by resource groups. Hover over the graph to view the cost specific to a resource group.
- **Group by Services**: Displays a multi series graph for the service cost split by services. Hover over the graph to view the cost specific to a service.
- **Group by Locations**: Displays a multi series graph for the service cost split by geographic location. Hover over the graph to view the cost specific to a location.
- **Group by Subscription**: Displays a multi series graph for the service cost split by subscriptions. Hover over the graph to view the cost specific to a subscription.
- **Group by Service Tiers**: Displays a multi series graph for the service cost split by service tiers. Hover over the graph to view the cost specific to a service tier.

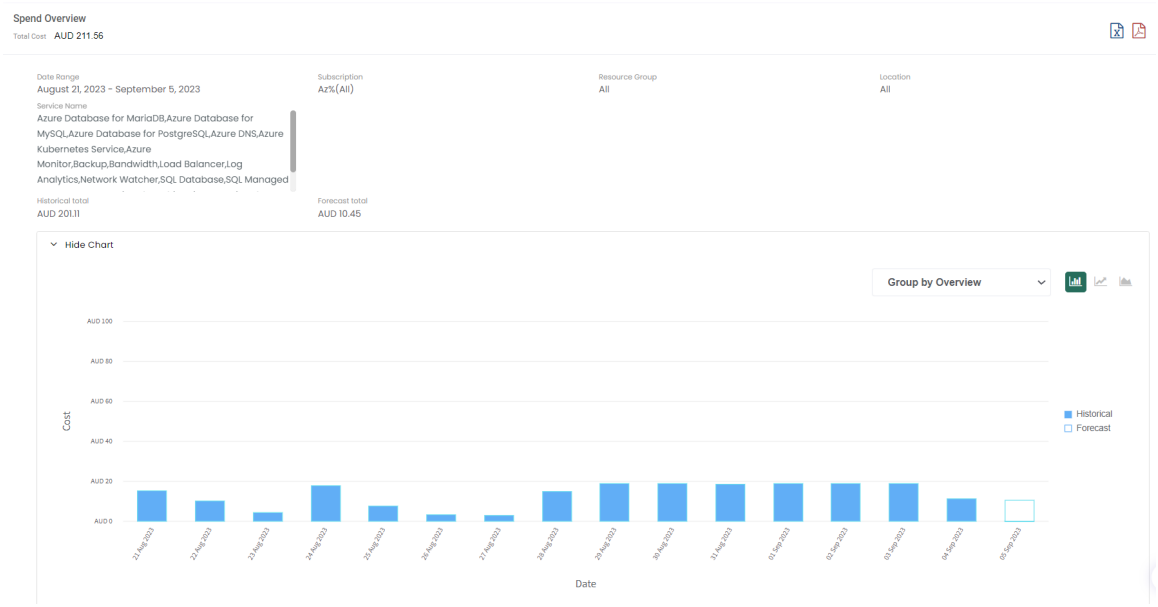
10. By default, chart X-axis label would be set to date or month based on your filter setting for data range (daily/monthly). However, if you had applied cost allocation filter, the chart X-axis label would be set to the chosen allocation rule's target native provider value. You can change the X-axis label to any one of dimensions selected in customize report.

    If you set the X-axis label other than 'date' or 'month', the data on the graph would be set to 'group by overview'. Alternatively, if you choose a group by option other than 'group by overview', the X-axis dimension would switch to 'date' or 'month' depending on your date range filter selection.

    When you set the X-axis label other than 'date' or 'month', you can decide to show top 10, 20, or 30 attributes of the selected labels on the graph and remaining attributes combined as other.

11. Similarly, the chart Y-axis label could be changed to any of the selected metrics in the customize report.

12. Click the designated graph icon to view the result in Bar, Line, or Area graph. By default, cost data will be displayed in bar graph.
13. Click the appropriate download icons to export the results in CSV or PDF format. The graph can be exported to PDF format only.



Customize Report

Cost Report is highly customizable in CloudBolt CSMP. You can add up to 7 dimensions and 7 metrics based on the report profile shared with your tenant or organization and narrow down the cost analysis to individual units in your Cloud Infrastructure. You can see exactly in which Unit, or Resource group, or by which instance is costing you how much money. You can also use 'Show Total for Dimensions' option to get total costs for the added dimensions.

The following list shows some of the dimensions you can use to break down the projected cost amount for Azure account (except Azure CSP):

- Currency
- Date
- Group Tag: It allows you to see various metrics values based on the group tag (custom data) key types. You need to select a group tag (custom data) key type from the list. The metrics values for the groups, subscriptions, services, and

resources that are not associated with the selected group tag (custom data) key will be aggregated against 'N/A' line item. However, if the selected group tag (custom data) key type is added to a group with a blank value field, the cost associated with such groups will be aggregated against 'No Value' line item.

- Location
- Meter Category
- Meter SubCategory
- Month
- Product Name
- Resource Group
- Resource Name
- Resource Rate
- Service Name
- Service Tier
- Subscription
- Subscription Group: It allows you to see various metrics values based on groups available for the selected billing subscription. The metrics values for the subscriptions, or services, or resources that are not associated with any groups will be aggregated against ‘N/A’ group name.
- Subscription Guid
- Subscription Tags: This dimension showcases the selected metric values for subscriptions containing the chosen subscription tag key, organized by the tag values. In cases where a subscription tag key-value pair is linked to multiple subscriptions, the aggregated metrics value of these subscriptions will be presented in a single line item categorized by the tag values for the selected subscription tag key. If the selected subscription tag key is not associated with any subscriptions, the metrics value of such subscriptions will be displayed under an 'N/A' line item within the selected subscription tag key. Additionally, if a subscription tag key is added to any subscriptions but with an empty tag value field, the cost of these subscriptions

will be displayed under a 'No Value' line item for the selected subscription tag key dimension. Please note that the subscription tag dimension will be displayed in the dimension list only if any of the subscriptions linked with the selected billing adapter contain at least one subscription tag.

- Tags
- Unit

The following list shows metrics you can use to see the Azure (except Azure CSP) cost details (list may vary upon the report profile shared with you):

- Allocated Cost: It is the cost that has been allocated to a target subscription, service type, or location.
- Amortized: It is the sum of cost and the reservation and saving plan purchase cost split over the duration of the reservation and saving plan term. Amortized metric is available only for a billing account created with scope level set as Billing Account/Management Group/Subscription scope.
- Cost: It is the total cost incurred for using Azure services (like VMs, Disks, etc.) and purchasing reservations & marketplace services.
- Discount: It is the *Cost* multiplied by the *discount percent* defined in billing configuration.
- Drained Cost: It is the cost that has been assigned from the source subscription, service type, or location. It is denoted with a minus sign.
- Margin: It is the *Cost* multiplied by the *margin percent* defined in billing configuration.
- Net Allocated Cost: It is calculated as Net Cost + Allocated Cost - Drained Cost.
- Net Cost: It is the *Cost* plus *Margin* minus *Discount*.
- Usage Quantity: It is the consumed quantity of Azure Services like VMs, Disks, etc.
- Margin (R): It is applicable only for reseller organisation. It is the *Net Cost* multiplied by the *Margin percent* described in the billing configuration created by reseller organisation.

- Discount (R): It is applicable only for reseller organisation. It is the *Net Cost* multiplied by the *Discount percent* described in the billing configuration created by reseller organisation.
- Net Cost (R): It is applicable only for reseller organisation. It is the *Net Cost* plus *Margin (R)* minus *Discount (R)*.

Only resellers and their customer organisations will have access to the metrics Margin (R), Discount (R), and Net Cost (R) if the reseller has set up a billing configuration.

Following are the list of dimensions you can use to break down the projected cost amount for Azure CSP account:

- Cost Type
- Currency
- Customer Domain Name
- Customer ID
- Customer Name
- Date
- Group Tag: It allows you to see various metrics values based on the groups' custom data key values. You need to select a custom data key type from the list. The metrics values for the subscriptions, or services, or resources that are not associated with the selected custom data key will be aggregated against 'N/A' group tag.
- Has Partner Earned Credit
- Invoice Number
- Location
- Meter Category
- Meter Name
- Meter SubCategory
- Month
- Product Name
- Reseller MPN ID

- Resource Group
- Resource Name
- Resource Rate
- Resource URI
- Service Name
- Service Tier
- Sku Name
- Subscription
- Subscription Group: It allows you to see various metrics values based on groups available for the selected billing subscription. The metrics values for the subscriptions, or services, or resources that are not associated with any groups will be aggregated against ‘N/A’ group name.
- Subscription Guid
- Subscription Tags: This dimension showcases the selected metric values for subscriptions containing the chosen subscription tag key, organized by the tag values. In cases where a subscription tag key-value pair is linked to multiple subscriptions, the aggregated metrics value of these subscriptions will be presented in a single line item categorized by the tag values for the selected subscription tag key. If the selected subscription tag key is not associated with any subscriptions, the metrics value of such subscriptions will be displayed under an 'N/A' line item within the selected subscription tag key. Additionally, if a subscription tag key is added to any subscriptions but with an empty tag value field, the cost of these subscriptions will be displayed under a 'No Value' line item for the selected subscription tag key dimension. Please note that the subscription tag dimension will be displayed in the dimension list only if any of the subscriptions linked with the selected billing adapter contain at least one subscription tag.
- Tags
- Tax
- Unit

The following list shows metrics you can use to see the Azure CSP cost details (list may vary upon the report profile shared with you):

- Allocated Cost: It is the cost that has been allocated to a target subscription, service type, or location.
- Cost: It is the total cost incurred for using Azure services (like VMs, Disks, etc.) and purchasing reservations & marketplace services.
- Credit
- Customer Cost: It is the sum of *Cost* and *Partner Earned Credit*.
- Drained Cost: It is the cost that has been assigned from the source subscription, service type, or location. It is denoted with a minus sign.
- Marketplace Discount: It is the metric selected for margin/discount calculations specified in billing adapter multiplied by the *Marketplace Discount percent* defined in billing configuration.
- Marketplace Margin: It is the metric selected for margin/discount calculations specified in billing adapter multiplied by the *Marketplace Margin percent* defined in billing configuration.
- Net Allocated Cost: It is calculated as Net Cost + Allocated Cost - Drained Cost.
- Net Cost: It is calculated as *Customer cost + (Marketplace Margin + Office Based purchases margin + On Demand margin + Reservations margin) - (Marketplace discount + Office Based purchases discount + On Demand discount + Reservations discount)*.
- Office Based Purchases Discount: It is the metric selected for margin/discount calculations specified in billing adapter multiplied by the *Office Based Purchases Discount percent* defined in billing configuration.
- Office Based Purchases Margin: It is the metric selected for margin/discount calculations specified in billing adapter multiplied by the *Office Based Purchases Margin percent* defined in billing configuration.

- On Demand Discount: It is the metric selected for margin/discount calculations specified in billing adapter multiplied by the *On Demand Discount percent* defined in billing configuration.
- On Demand Margin: It is the metric selected for margin/discount calculations specified in billing adapter multiplied by the *On Demand Margin percent* defined in billing configuration.
- Partner Earned Credit: It is the Azure discount earned by billing partners who provide 24 X 7 cloud-operations management activity support. It is applicable at resource, resource group, or subscription level.
- Refund:
- Reservations Discount: It is the metric selected for margin/discount calculations specified in billing adapter multiplied by the *Reservations Discount percent* defined in billing configuration.
- Reservations Margin: It is the metric selected for margin/discount calculations specified in billing adapter multiplied by the *Reservations Margin percent* defined in billing configuration.
- Usage Quantity: It is the consumed Quantity of Azure Services (like VMs, Disks, etc.) and purchased units of reservations, marketplace services, software subscriptions & office based purchases.
- Marketplace Discount (R): It is applicable only for reseller organisation. It is the *Net Cost* multiplied by the *Marketplace Discount percent* defined in billing configuration created by reseller.
- Marketplace Margin (R): It is applicable only for reseller organisation. It is the *Net Cost* multiplied by the *Marketplace Margin percent* defined in billing configuration created by reseller.
- Office Based Purchases Discount (R): It is applicable only for reseller organisation. It is the *Net Cost* multiplied by the *Office Based Purchases Discount percent* defined in billing configuration created by reseller created by reseller.

- Office Based Purchases Margin (R): It is applicable only for reseller organisation. It is the *Net Cost* multiplied by the *Office Based Purchases Margin percent* defined in billing configuration created by reseller.
- On Demand Discount (R): It is applicable only for reseller organisation. It is the *Net Cost* multiplied by the *On Demand Discount percent* defined in billing configuration created by reseller created by reseller.
- On Demand Margin (R): It is applicable only for reseller organisation. It is the *Net Cost* multiplied by the *On Demand Margin percent* defined in billing configuration created by reseller.
- Reservations Discount (R): It is applicable only for reseller organisation. It is the *Net Cost* multiplied by the *Reservations Discount percent* defined in billing configuration created by reseller created by reseller.
- Reservations Margin (R): It is applicable only for reseller organisation. It is the *Net Cost* multiplied by the *Reservations Margin percent* defined in billing configuration created by reseller.
- Net Cost (R): It is applicable only for reseller organisation. It is the *Net cost + (Marketplace Margin (R) + Office Based purchases margin (R) + On Demand margin (R) + Reservations margin (R)) - (Marketplace discount (R) + Office Based purchases discount (R) + On Demand discount (R) + Reservations discount (R))*

Only resellers and their customer organisations will have access to the metrics Marketplace Discount (R), Marketplace Margin (R), Office Based Purchases Discount (R), Office Based Purchases Margin (R), On Demand Discount (R), On Demand Margin (R), Reservations Discount (R), and Reservations Margin (R) if the reseller has set up a billing configuration.

Using Dimensions and Metrics to Refine Report Statistics

You can see the breakup for the spend by dimensions and metrics for the set parameters in the Filters Setting. Dimensions are attributes of your cloud resources. For example, the dimension Date indicates the date. Whereas, Metrics contain numeric values that tie to a dimension. For example, the metric Cost represents the usage cost value for the selected

dimension(s). Using the Customize Report button, you can add up to 7 dimensions and 7 metrics to view the corresponding spend for the selected dimensions and or metrics.

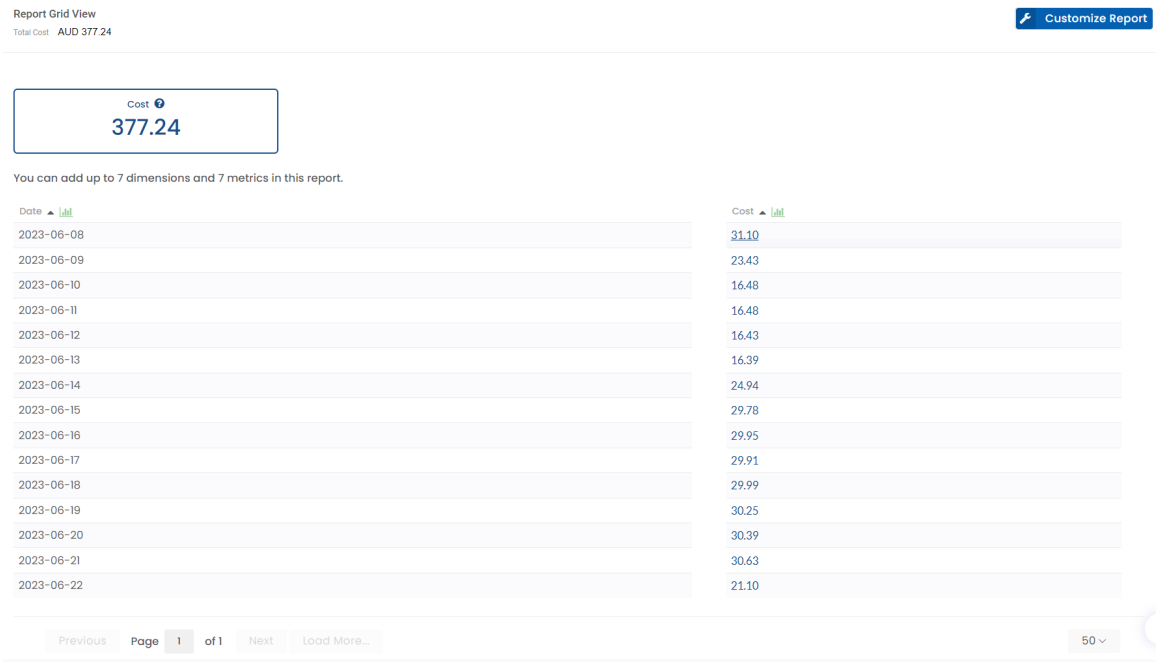
Date is the default dimension selected when date range in the filters is set to daily. Default metric changes based on report profile shared with user's account tenant or organisation.

1. Logon to your CloudBolt CSMP instance.
2. Navigate to **Cost > Cost Report**.
3. Select the cloud provider as Azure.
4. Select the billing subscription as required.

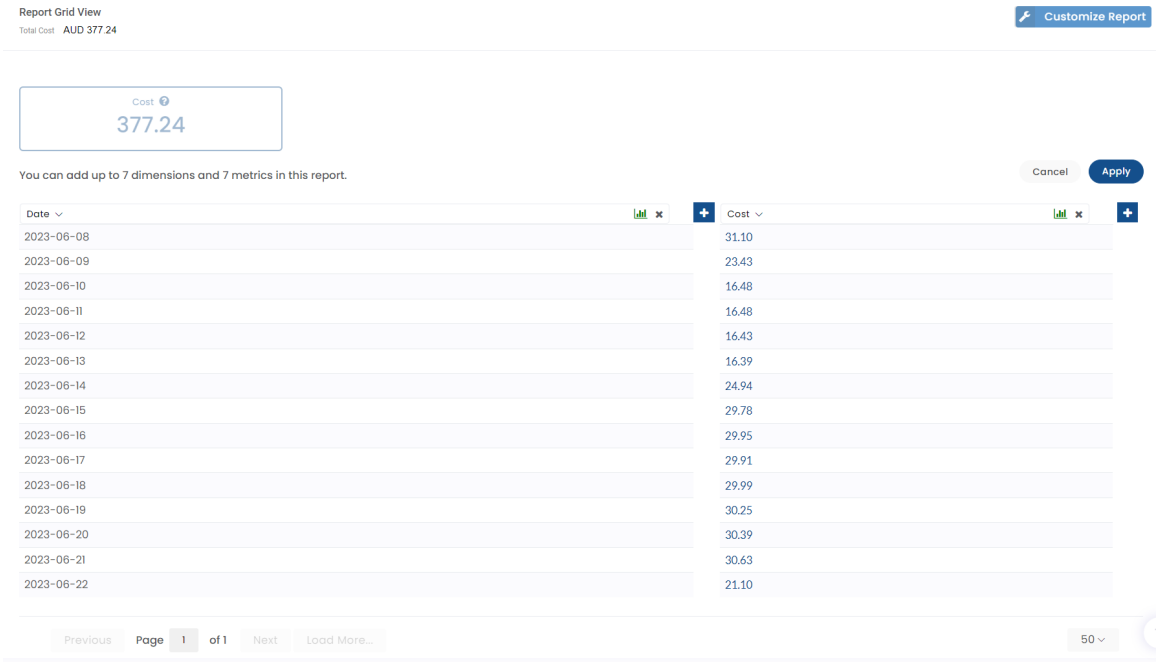
   Note: If you select an Azure CSP billing subscription that has multiple billing currencies, you must select a currency. If individual rules have been defined under Currency Conversion to convert all the currencies available in the selected CSP billing subscription to USD or BRL, you can utilize the 'Total Cost in USD' and 'Total Cost in BRL' options to view the total expenses for the selected CSP billing subscription in USD and BRL, respectively.

5. Set the filters setting as required.
6. Scroll down to the Report Grid View, the total cost for the selected filters can be seen.

   Note: If you select an Azure CSP billing subscription that has multiple billing currencies, the total cost will display the services cost whose billing currency matches the currency selected in the currency drop-down box.



7. Click **Customize Report**. The **+** option to add dimensions and metrics is displayed.

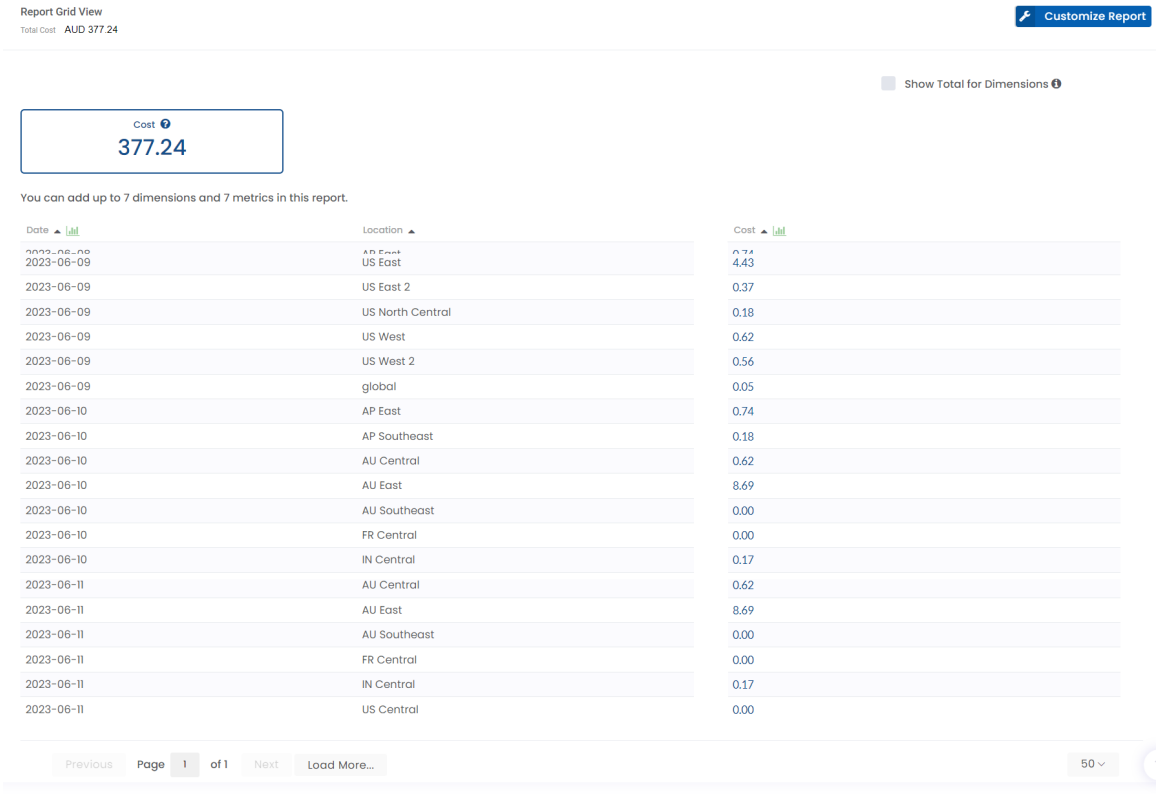


8. Click **+** to add the dimensions as required. For example, we will see the cost breakup by **Location**. Click **+** and add **Location** from the drop-down list.

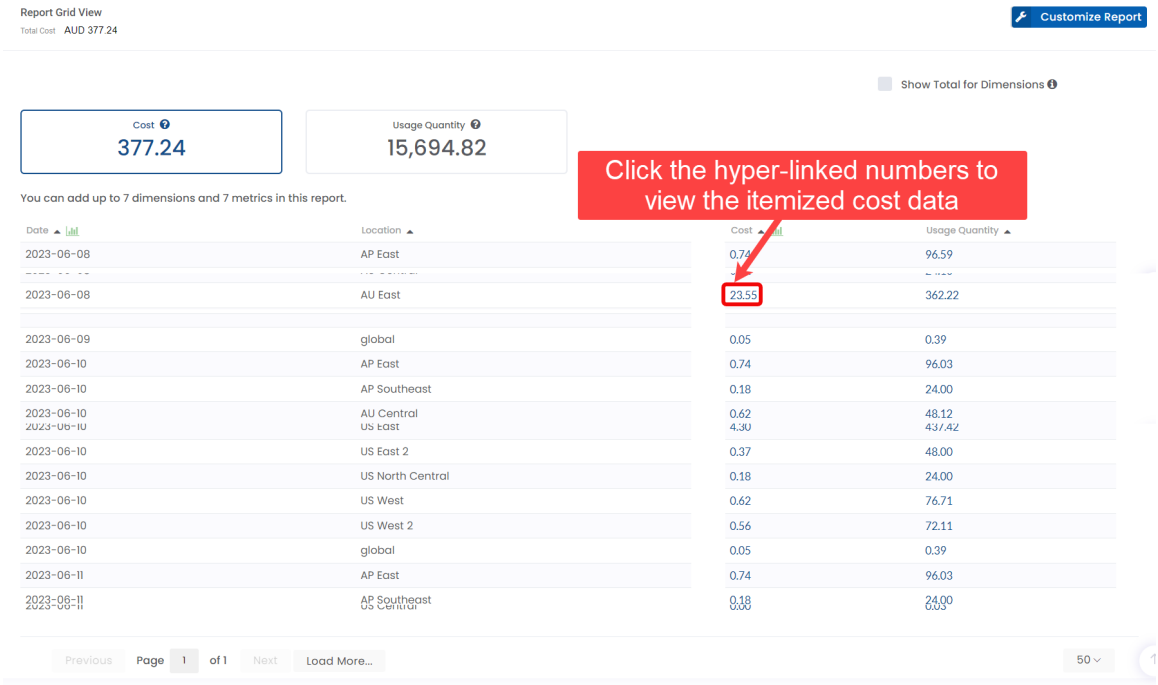
If you have selected *Total* as billing subscription, you must have date or month dimension selected as a minimum requirement to see cost details.



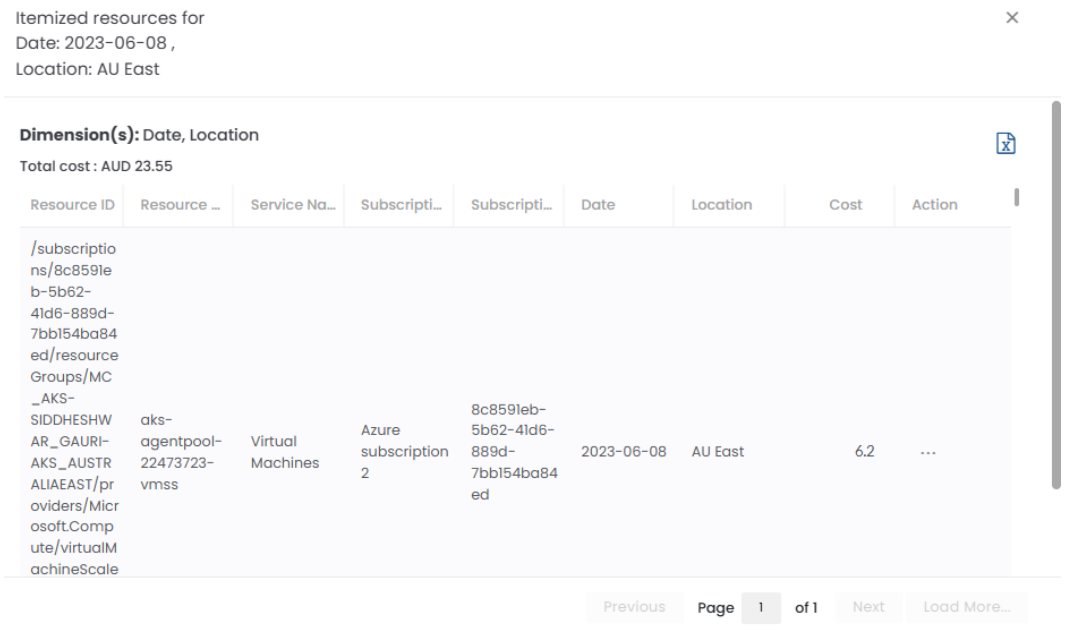
9. To set a dimension as X-axis label for spend overview chart, select the vertical poll icon for that dimension. A green colour filled vertical poll icon indicates the active X-axis dimension for the spend overview chart.
10. Click **Apply**. The cost data will be displayed **Date** and **Locations** wise.



11. Similarly, you can view the cost by multiple metrics, for example, by usage quantity. Click **Customize Report**, click +, select **Usage Quantity** from metrics drop-down, and then click **Apply**. The cost for the previously selected dimensions would be displayed by cost and usage quantity.



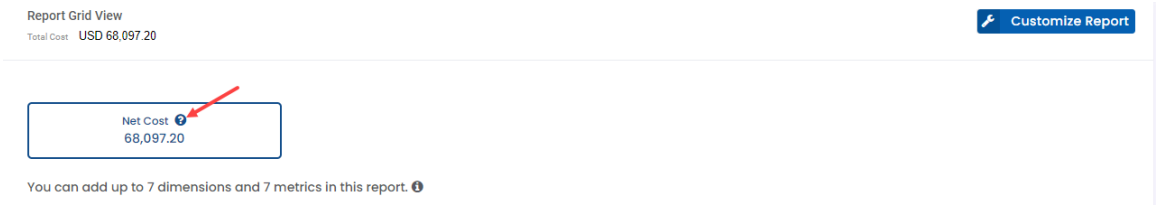
a. You can click on the metrics value to view more detailed, itemized cost data for the selected dimensions. This feature is available only when currency conversion is disabled for your CSMP account tenant.



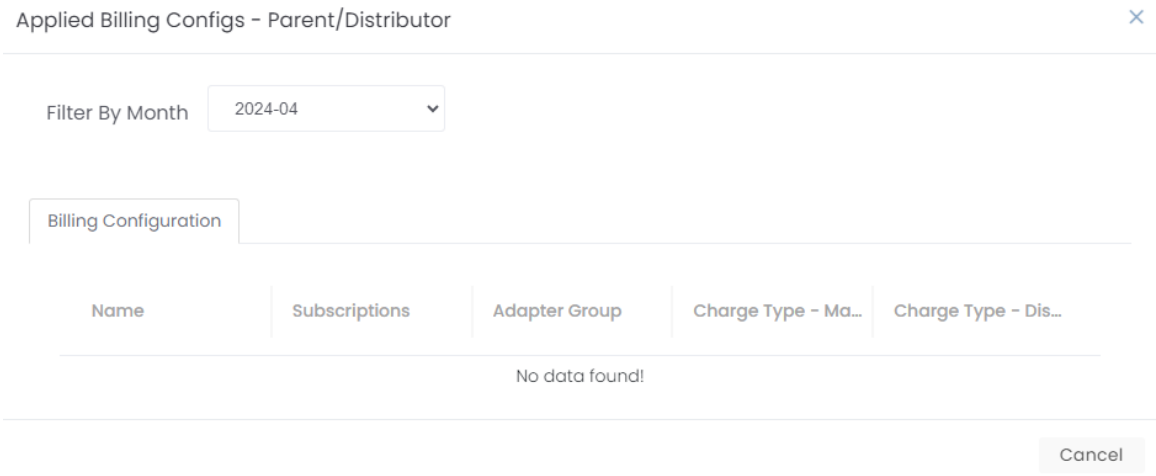
b. You can download this itemized cost data. Click 'Export to CSV' icon [] to download the report.

c. Click ellipsis [...] icon under the Action column to view and select from the available action options.

12. To set a metric as Y-axis label for spend overview chart, select the vertical poll icon for that metric. A green colour filled vertical poll icon indicates the active metric for Y-axis label for the spend overview chart.
13. If you are a default tenant user and your CloudBolt CSMP account is marked as a distributor or reseller account, you can see the applied billing configuration details directly from the Report Grid View section. To see the billing configuration details you must need to customize the cost report for at least one of the metrics as Net Cost (for distributor account) or Net Cost (R) (for reseller account). Click the question mark icon available in the Net Cost or Net Cost (R) tile.



A pop-up window will open to display applied billing configuration. If your cost report grid view contains data for multiple months, you need to select the month from Filter By Month drop-down list to see the applicable billing configuration details. If no billing configuration has been set for a particular month, you will see a message similar to: *No data found!* Click **Cancel** to close the billing configuration pop-up window.



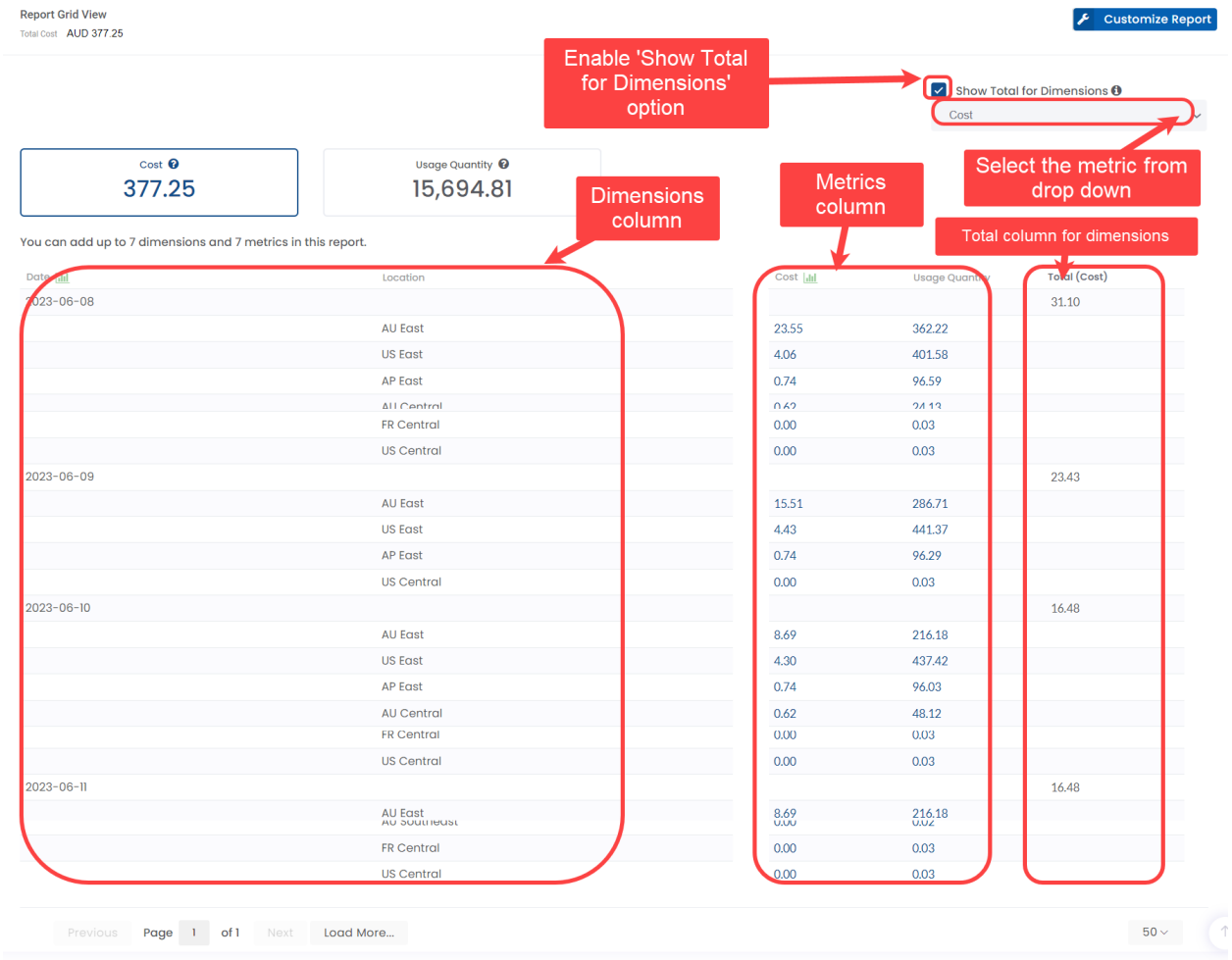
Using Show Total for Dimensions Option

You can see a total cost grouped for multiple dimensions. In order to turn on show total for dimensions, you must have at least two dimensions selected in the Customize Report. If you have two dimensions selected, you will see the total metric value for one dimension only, i.e. the first dimension listed on the report grid view from the left side. Similarly, if you have three dimensions selected, you will see the total metric value for two dimension only, i.e. the first two dimensions listed on the report grid view from the left side. And so on.

When two or more metrics are selected for customize report, you must choose a metric to see the total for dimensions.

With descending order sort, total for dimensions will appear automatically on the right side of the report grid view.

To enable show total for dimensions, you must click the **Customize Report** and then select the **Show Total for Dimensions** check box.



You can download the cost report with Show Total for Dimensions turned on using the options such as export to CSV and export to PDF, available under Spend Overview section.

You can also save this cost report format as favourite cost report by clicking the Save button available the upper right side of the cost report page.

Using Applied Billing Configuration Option

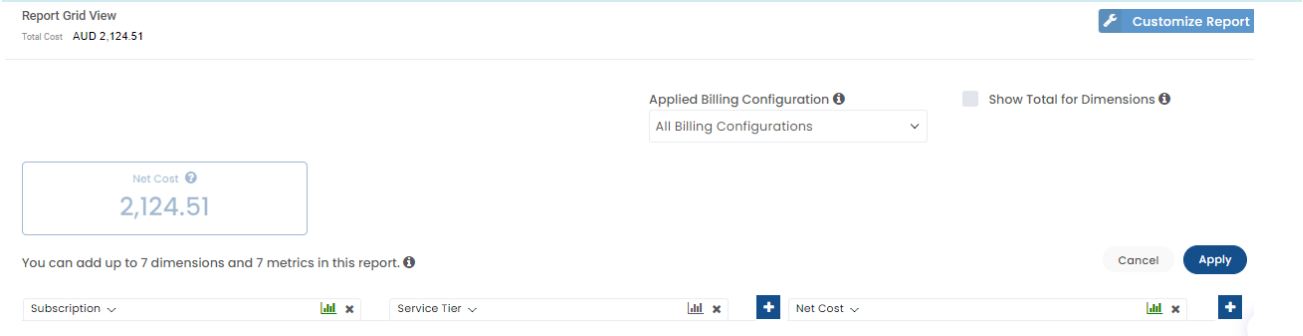
You can customize your cost report grid view based on billing configurations. To customize your cost report based on billing configuration, you need to select at least one metric whose value is defined by billing configuration. Below is a list of metrics whose value is defined by billing configuration:

- Discount
- Margin
- Marketplace Discount
- Marketplace Margin
- Net Cost
- Office Based Purchases Discount
- Office Based Purchases Margin
- On Demand Discount
- On Demand Margin
- Reservations Discount
- Reservations Margin
- Discount (R)
- Margin (R)
- Marketplace Discount (R)
- Marketplace Margin (R)
- Net Cost (R)
- Office Based Purchases Discount (R)
- Office Based Purchases Margin (R)

- On Demand Discount (R)
- On Demand Margin (R)
- Reservations Discount (R)
- Reservations Margin (R)

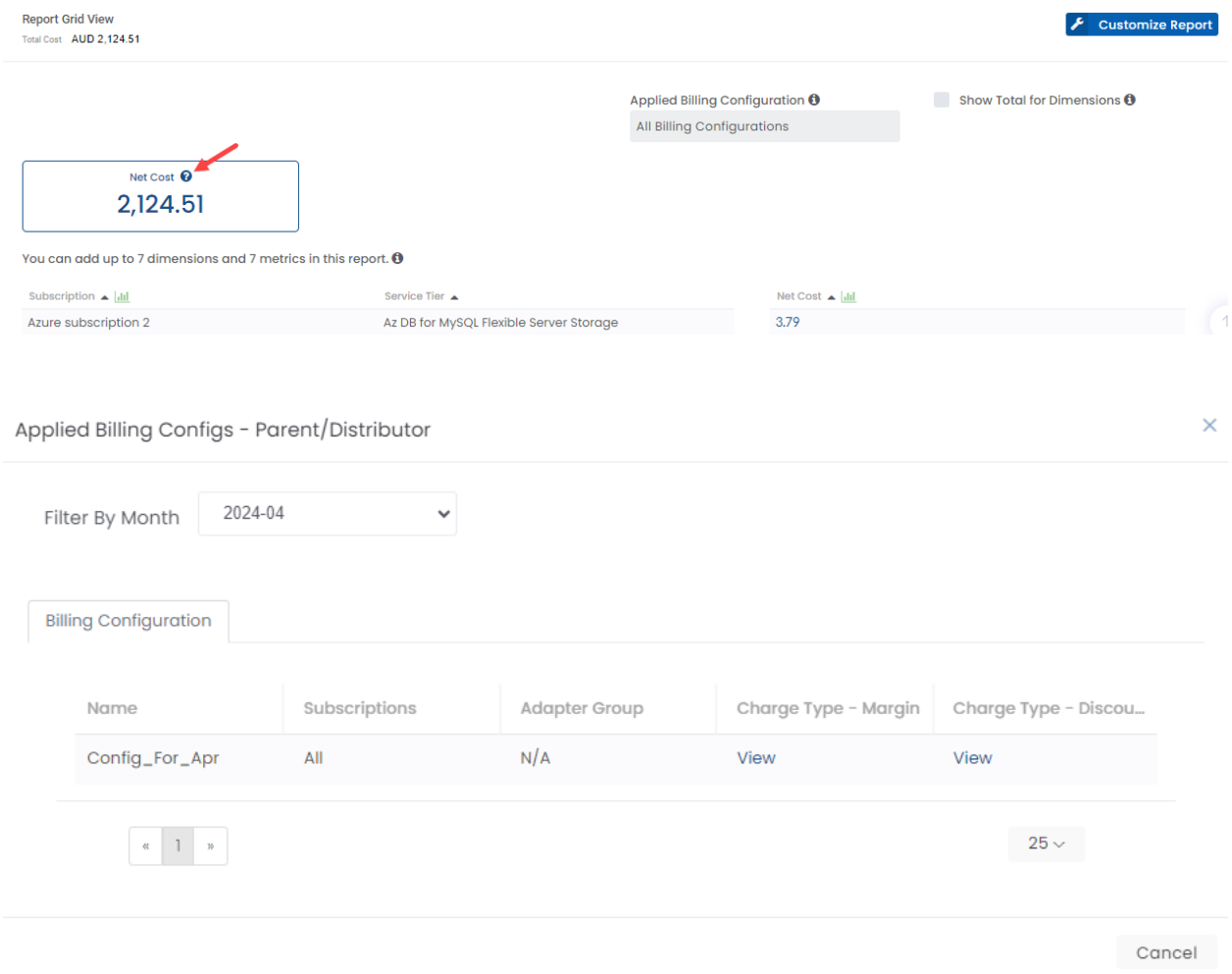
Upon adding any metric from the above list to customize the report, a drop-down selection box option labeled "Applied Billing Configuration" will appear. By default, the system will automatically select the "All Billing Configuration" option. This default setting implies that the cost displayed in the cost report grid view will aggregate data from all billing configurations associated with the selected billing adapter and the specified period in the filter settings area.

When you choose the "Total" option from the Billing Subscription filter dropdown, you won't be able to access the Applied Billing configuration option to customize your cost report.



If you opt for a specific billing configuration that is applicable to any months within the set period defined in the period filter and then click **Apply**, the data presented in the cost report grid view will exclusively feature the subscriptions associated with the chosen billing configuration. Conversely, selecting a billing configuration that isn't applicable to any months within the set period defined in the period filter will result in the display of all subscriptions linked to the chosen billing subscription, unless there are restrictions imposed by filter settings.

You can access the applicable billing configuration details by clicking the icon within the Net Cost or Net Cost (R) metric tile. If you wish to view billing configuration details for a specific month, you can choose the desired month from the 'Filter By Month' selection drop-down. Additionally, by clicking the respective 'View' link, you can explore various margin and discount details associated with the selected billing configuration.



Outcomes

You have learnt how to analyze the costs incurred on provisioning cloud services in granular detail.

7.1.3. Cost Report for GCP

Learn how to use CloudBolt CSMP Cost Report tool to view your GCP cloud costs.

- Introduction
- Filters Setting
- Spend Overview
- Customize Report
- Using Dimensions and Metrics to Refine Report Statistics
- Using Show Total for Dimensions Option
- Using Applied Billing Configuration Option
- Outcomes

Introduction

Cloud computing helps your organization save costs on buying infrastructure and software. However, if not monitored, costs can quickly turn your profits into losses. It is very important that you have total and granular visibility on the costs incurred for the services availed. Historical data on spending combined with actual spending and forecasts can help you plan your budgets. The Cost Report tool in CloudBolt CSMP help you with these difficult aspects of cost optimization by displaying the current and historical cost amount, proposed recommendations, and dynamic calculations of estimated savings.

Filters Setting

GCP cost report in CloudBolt CSMP can be customized by using appropriate filters. Options available for the filters setting depend on the Report Profile shared with your tenant or organisation (child/reseller/customer). By default, when you first access the cost report for GCP, the filters are configured to all values, except the billing project. As you set your filters and click **Apply**, the total cost displayed in spend overview adjust to represent the aggregated costs based on the filters selected. All filters are combined together using 'and'

logic, which means that only those records that meet all selected filter values are displayed.

To access filters setting, log in to your CloudBolt CSMP account. Navigate to Cost > Cost Report. Select GCP cloud provider tab and then click Filters within the selected cloud provider tab.

1. **Billing Project**: Select the billing adapter for which you want to see the cost data.
2. **Group**: For selected billing project, pick an adapter group for which you want to see the cost data. Selecting an adapter group would populate the sub account and project filters by selecting all the sub account and projects associated with the selected adapter group.
3. **Data on Chart**: Select the appropriate service type to view the cost accumulated by a specific service type. By default, All Costs would be selected. options available are:
    - All Costs: Displays aggregated cost for all the GCP services available in the selected billing project.
    - Compute: Displays aggregated cost for all the GCP Compute services available in the selected billing project.
    - Database: Displays aggregated cost for all the GCP Database services available in the selected billing project.
4. **Date Range**: Set the range of time for the cost report you want to analyse. You can select between Daily or Monthly. By default, when you first access the cost report, the Date Range is set to Daily, with the last 16 days selected including today. By default, daily is enabled. You can filter the cost report on a monthly basis by selecting the monthly tile. Your choice of a daily or monthly tile limits the customize report dimension options for date or month. If you choose daily, you could select date in the customize report section's dimension selection box; but, if you choose monthly, you can choose month as one of the dimensions.
    - **Daily** returns your GCP costs incurred during the last 16 days period selected including today on a daily basis. When you select Daily, you can choose a dynamic past or future date range, such as "This Month" or "Last Month" or "Yesterday", or "Next Month" or a custom date range from the **Period**

selection box to view your cost reports. Dynamic past and future date ranges display cost data over a rolling time, such as "Last Month" or "Last 7 days" or "Next Month". Dynamic past date ranges are: "This Month", "Last Month", "Last 3 Months", "Yesterday", "Last 7 Days", "Last 14 Days", "Last 21 Days", "Last 30 Days", and "Last 45 Days". Dynamic future date ranges are: "This Month", "Next Month", "Next 3 months", "Tomorrow", "Next 7 Days", "Next 14 Days", "Next 21 Days", "Next 30 Days", and "Next 45 Days". Dynamic date ranges are best for your favourite cost reports. Custom ranges let you focus on specific start and end dates. Your start and end date duration can be up to 100 days. After selecting a date range, you must click **Apply** button available within the period selection area.

If the **Monthly Period Based on** field for the GCP billing adapter is set to **Invoice**, the **Daily** option will be unavailable in the date range filter.

- **Monthly** returns your GCP costs grouped on a monthly basis. When you select Monthly, you can choose a dynamic past or future date range, such as "This Month" or "Last Month" or "Next Month", or a custom date range from the **Period** selection box to view your cost reports. Dynamic past and future date ranges display cost data over a rolling time, such as "Last Month" or "Last 6 Months" or "Next Month". Dynamic past date ranges are: "This Month", "Last Month", "Last 3 Months", "Last 6 Months", "Last 9 Months", and "Last 12 Months". Dynamic future date ranges are: "This Month", "Next Month", "Next 3 Months", "Next 6 Months", "Next 9 Months", and "Next 12 Months". Dynamic date ranges are best for your favourite cost reports. Custom ranges let you focus on specific start and end dates. After selecting a date range, you must click **Apply** button available within the period selection area.

  If the **Monthly Period Based on** field for the GCP billing adapter is set to **Invoice**, the dynamic future date range options will not be available in the period filter.

A "day" is defined as midnight to midnight in the cost report's selected time zone. A "month" is defined as first to last date of a calendar month in the report's selected

time zone. The current day's (that is, Today's) cost data is not included in the report except for default date range selection and "This Month" option selection as dynamic future date range. Preset dynamic past date ranges are listed on left side of the period selection list. Preset dynamic future date ranges are listed on the right side of the period selection list.

5. **Compare Period**: Select the **Compare Period** check box to set a start date to compare your GCP cost against the previously selected date range under Period selection box. Cost comparison will display as the total cost for two time ranges in the spend overview section. For example, you have selected February 23, 2022 to March 09, 2022 date range in the Period, duration of 15 days. In the **Compare Period Start** box you select February 07, 2022 as start date. After clicking the Apply button for filter result, the spend overview graph and total cost will display the cost for February 23, 2022 to March 09, 2022 compared to February 07, 2022 to February 21, 2022. You can see that the compare period end date has been adjusted based on the period you choose. Alternatively, if you chose a dynamic date range in the Period, then selected a date in the **Compare Period Start** box, your compared to days will likewise be *n* days based on date range in the Period beginning from the Compare Period Start date. When a compare period is saved as a favourite cost report, the date selected in the **Compare Period Start** box will be dynamically updated based on the start date in the Period to show a compare start date when you open the favourite report.
6. **Sub Account**: If you have selected an adapter group in the group filter, all the sub accounts available in the selected group would be selected by default. You can select all sub accounts available under the selected adapter or select a subset of sub account by clicking them in the list. You can use wildcard and operators for searching the sub account.

   Note: You must choose sub account to filter the cost report based on project. Sub Account list can change to display the active sub accounts for the selected period.
7. **Project**: If you have selected an adapter group in the group filter, all the projects available in the selected group would be selected by default. You can select all

projects available under the previously selected sub account(s) or select a subset of projects by clicking them in the list. You can use wildcard and operators for searching the project.

8. **Location**: You can select all locations available under the selected adapter or select a subset of location by clicking them in the list. You can use wildcard and operators for searching the location.
9. **Service**: You can select all services available under the selected adapter or select a subset of service by clicking them in the list. You can use wildcard and operators for searching the service.
10. **SKU**: You can select all SKU available under the selected adapter or select a subset of SKU by clicking them in the list. You can use wildcard and operators for searching the SKU.
11. **Applied Label/Project Label Filters**: A Label is a key-value pair attached to your Google Cloud resources. A Project Label is a key-value pair attached to your Google Cloud projects. You can filter your cost report based on label(s) or project label(s) or both. To filter cost report by different labels:
    a. Enter **Label Key**/**Project Label Key** and **Label Value**/**Project Label Value** in the appropriate boxes. You can use the following values:
        - **Exclude No LabelKey/ProjectLabelKey: (selected LabelKey/ProjectLabelKey)** - Filter cost for all GCP projects with the specified LabelKey/ProjectLabelKey, but there must be no Label Key/Project Label value.
        - **No LabelKey/ProjectLabelKey: (selected LabelKey/ProjectLabelKey)** - Filter cost for all GCP projects that do not have the specified LabelKey/ProjectLabelKey.
        - The displayed label value/project label value - Filter cost for all GCP projects with the specified label key/project label key and the specified label value/project label value.
    b. Click (add) to apply the entered label/project label key-value pair as filter. You can add multiple label/project label key-value pairs to filter your cost report.

c. Whenever you add two or more label filters, you must choose an operator from the respective label operator selection box to join those label filters. By default, OR operator will be selected, which means that cost report would be generated for all the selected labels. Selecting AND operator means that cost report would be generated when all the selected labels are available to a service, project, resource, etc.

d. If you had selected a group, the associated label key-value pair(s) would automatically appear in label filters. If the selected group has multiple label filters applied, by default, the AND operator would be selected to join label filters.

Applied labels and project labels are combined together using AND logic.

12. **Invoice**: If you select a period for which invoice has been generated, you can select **Invoice** check box to see the invoiced cost for the selected period. By default, invoice check box will be selected.
13. **Charges**
    - **Tax**: Include or exclude tax. By default, tax is included in cost report.
14. **Margins & Discounts**
    - **Reseller Margins**: Include or exclude Reseller Program Discount credit earned on eligible items. By default, reseller margin is included in cost report. To exclude the reseller margin from cost value, clear the reseller margin check box.
    - **Partner Discounts**: Include or exclude any other GCP discount credits as part of your final GCP billed charges by GCP. Partner discounts can be Discount, Sustained_Usage_Discount, Free_Tier, Promotion, and Subscription_Benefit. By default, partner discount are included in the cost. To exclude the partner discount from cost value, clear the partner discount check box.
    - **CUD Discount**: Include or exclude Committed_Usage_Discount and Committed_Usage_Discount_Dollar_Base discounts in the cost report. By default, CUD discount is included in the cost. To exclude the CUD discount from cost value, clear the CUD discount check box.

To see the selected filters' effect on spend overview, you must click **Apply**. You can even save the applied filters as your favourite cost report by clicking **Save** button available at the upper right corner. If an adapter group has been selected in the group filter, the group name would not be saved, whereas, the associated sub account, projects, and tags would be saved as part of favourite cost report. It means that in future, if the selected adapter group is updated to add or remove any project, it would not update the already saved favourite cost report.

Click **Clear Filters** to remove all the filter settings and return to default filters setting.

Spend Overview

Spend Overview widget gives you visibility of your GCP cloud costs as per the filters setting.

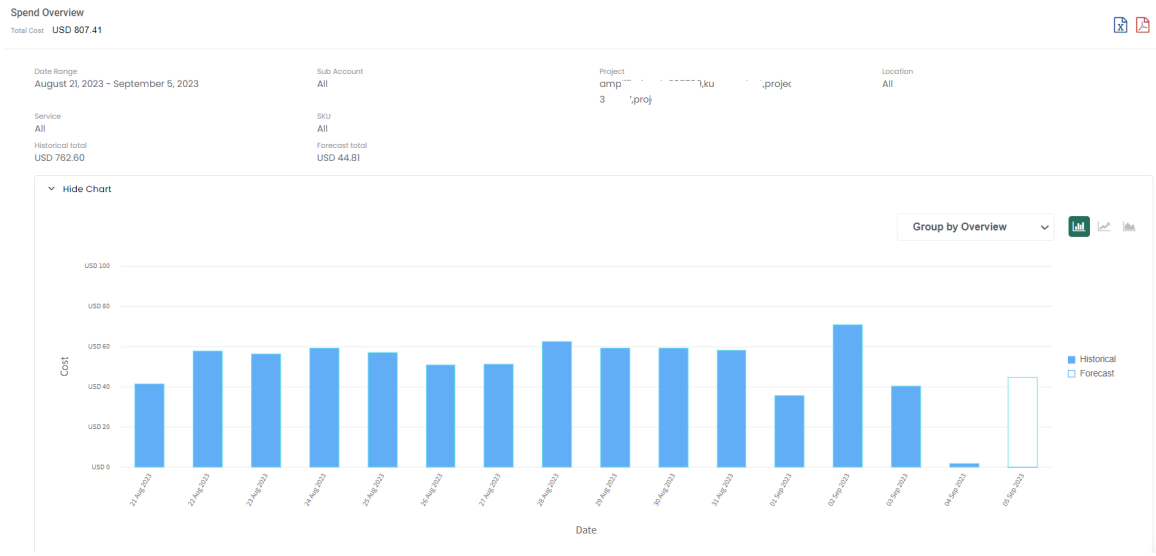
1. Logon to your CloudBolt CSMP instance.
2. Navigate to **Cost > Cost Report**.
3. Select the cloud provider as GCP.
4. By default, the Spend Overview widget will show the total cost for the default chosen billing project over the last 16 days including today on a daily basis. The current day's (that is, Today's) cost will consists of historic and forecast cost for the day.
5. Do the filters setting as per your requirements to view the data on chart. If you set future dates for the date filter, the cost for such dates would be marked as forecast cost.
6. The chart section would show the values of the set filters parameter. A filter parameter that has not been set will not appear in the chart area, indicating that the parameter's default setting has been applied. To know more about the details of displayed filter parameters in the chart area, see use wildcard and operators for searching.
7. You can hide or show spend overview chart. By default, spend overview chart will be shown. Use *Hide Chart* to hide the spend overview chart.
8. All the chart legend labels would be displayed on the right side of the chart.

9. Data displayed on the spend overview chart can be further bifurcated by using *group by* option selection. By default, ***Group by Overview*** would be selected. Options vary according on the service type chosen in the 'Data on Chart' filter. Available options for group by could be:
    - **Group by Overview**: Displays the aggregated cost for the selected GCP service type. The Spend Overview graph displays the forecast value for the future period (if filter applied for the future date) based on your historical cost value.
    - **Group by Sub Account**: Displays a multi series graph for the service cost split by sub accounts. Hover over the graph to view the cost specific to a sub account.
    - **Group by Projects**: Displays a multi series graph for the service cost split by projects. Hover over the graph to view the cost specific to a project.
    - **Group by Services**: Displays a multi series graph for the service cost split by service types. Hover over the graph to view the cost specific to a service type.
    - **Group by Locations**: Displays a multi series graph for the service cost split by geographic locations. Hover over the graph to view the cost specific to a location.
10. By default, chart X-axis label would be set to date or month based on your filter setting for data range (daily/monthly).

    If you set the X-axis label other than 'date' or 'month', the data on the graph would be set to 'group by overview'. Alternatively, if you choose a group by option other than 'group by overview', the X-axis dimension would switch to 'date' or 'month' depending on your date range filter selection.

    When you set the X-axis label other than 'date' or 'month', you can decide to show top 10, 20, or 30 attributes of the selected labels on the graph and remaining attributes combined as other.
11. Similarly, the chart Y-axis label could be changed to any of the selected metrics in the customize report.

12. Click the designated graph icon to view the result in Bar, Line, or Area graph. By default, cost data will be displayed in bar graph.
13. Click the appropriate download icons to export the results in CSV or PDF format. The graph can be exported to PDF format only.



Customize Report

Cost Report is highly customizable in CloudBolt CSMP. You can add up to 7 dimensions and 7 metrics based on the report profile shared with your tenant or organization and narrow down the cost analysis to individual units in your Cloud Infrastructure. You can see exactly in which Unit, or Resource group, or by which instance is costing you how much money. You can also use 'Show Total for Dimensions' option to get total costs for the added dimensions.

The following list shows some of the dimensions you can use to break down the projected cost amount. The metrics value against N/A line item for the selected dimension denotes the cumulative metric value of those services/resources to which the selected dimension is not applied. Whereas the metric value against the No Value line item for the selected dimension denotes the cumulative metric value of such services/resources which has the selected dimension applied but the value field for selected dimension is blank.

- Country
- Date

- Labels
- Month
- Project Group
- Project Id
- Project Labels
- Project Name
- Project Number
- Region
- Service
- Service Description
- Service Id
- SKU Description
- SKU Id
- Sub Account

The following list shows metrics you can use to see the cost details (list may vary upon the report profile shared with you):

- Cost: The cost amount displayed varies based on your filters setting for *partner discounts* and *CUD discount*. It is your cloud resources usage cost including/excluding all the credits applicable to your cost calculations. Credits can be Partner Discounts and CUD discount. When *partner discounts* and *CUD discount* filters check boxes are selected, the resultant **cost** value would be the credits subtracted from the actual usage cost. Where as if *partner discounts* and *CUD discount* filters check boxes are not selected, then the resultant **cost** value would be the actual usage cost without any credits applied.
- CUD Discount: It is sum of credit types: Committed_Usage_Discount and Committed_Usage_Discount_Dollar_Base.
- Customer Cost: It is your cloud resources usage cost excluding all the credits (partner discounts, reseller margins, and CUD discount).

- Discount: It is the metric selected for margin/discount calculations specified in billing adapter multiplied by the *discount percent defined in billing configuration*.
- List Cost: List cost represents the standard, undiscounted price of a specific Google Cloud service or resource (e.g., a virtual machine instance, storage bucket, or network bandwidth).
- Margin: It is the metric selected for margin/discount calculations specified in billing adapter multiplied by the *margin percent defined in billing configuration*.
- Negotiated Savings: It is the *List Cost* minus *Actual Usage Cost (without considering any credits/discounts)*.
- Net Cost: It is the *Customer Cost* plus *Margin* minus *Discount*.
- Partner Discount: It is sum of credit types: Discount, Sustained_Usage_Discount, Free_Tier, Promotion, and Subscription_Benefit.
- Reseller Margin: It is the *Reseller Program Discount* credit earned.
- Margin(R): It is applicable only for reseller organisation. It is the *Net Cost* multiplied by the *Margin percent described in the billing configuration created by reseller organisation*.
- Net Cost(R): It is applicable only for reseller organisation. It is the *Net Cost* plus *Margin (R)* minus *Discount (R)*.
- Discount(R): It is applicable only for reseller organisation. It is the *Net Cost* multiplied by the *Discount percent described in the billing configuration created by reseller organisation*.

Only resellers and their customer organisations will have access to the metrics Margin (R), Net Cost (R), and Discount (R) if the reseller has set up a billing configuration.

Using Dimensions and Metrics to Refine Report Statistics

You can see the breakup for the spend by dimensions and metrics for the set parameters in the Filters Setting. Dimensions are attributes of your cloud resources. For example, the dimension Date indicates the date. Whereas, Metrics contain numeric values that tie to a dimension. For example, the metric Cost represents the usage cost value for the selected

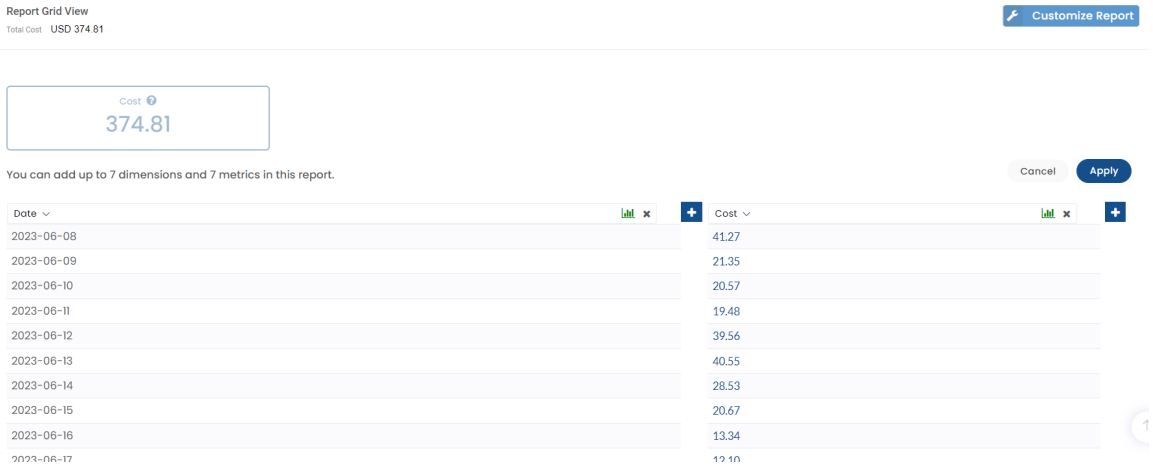
dimension(s). Using the Customize Report button, you can add up to 7 dimensions and 7 metrics to view the corresponding spend for the selected dimensions and or metrics.

Date is the default dimension selected when date range in the filters is set to daily. Default metric changes based on report profile shared with user's account tenant or organisation.

1. Logon to your CloudBolt CSMP account.
2. Navigate to **Cost > Cost Report**.
3. Select the Service Provider as GCP.
4. Set the filters setting as required.
5. Scroll down to the Report Grid View, the Total Cost for the selected filters can be seen.



6. Click **Customize Report**. The **+** option to add dimensions and metrics is displayed.

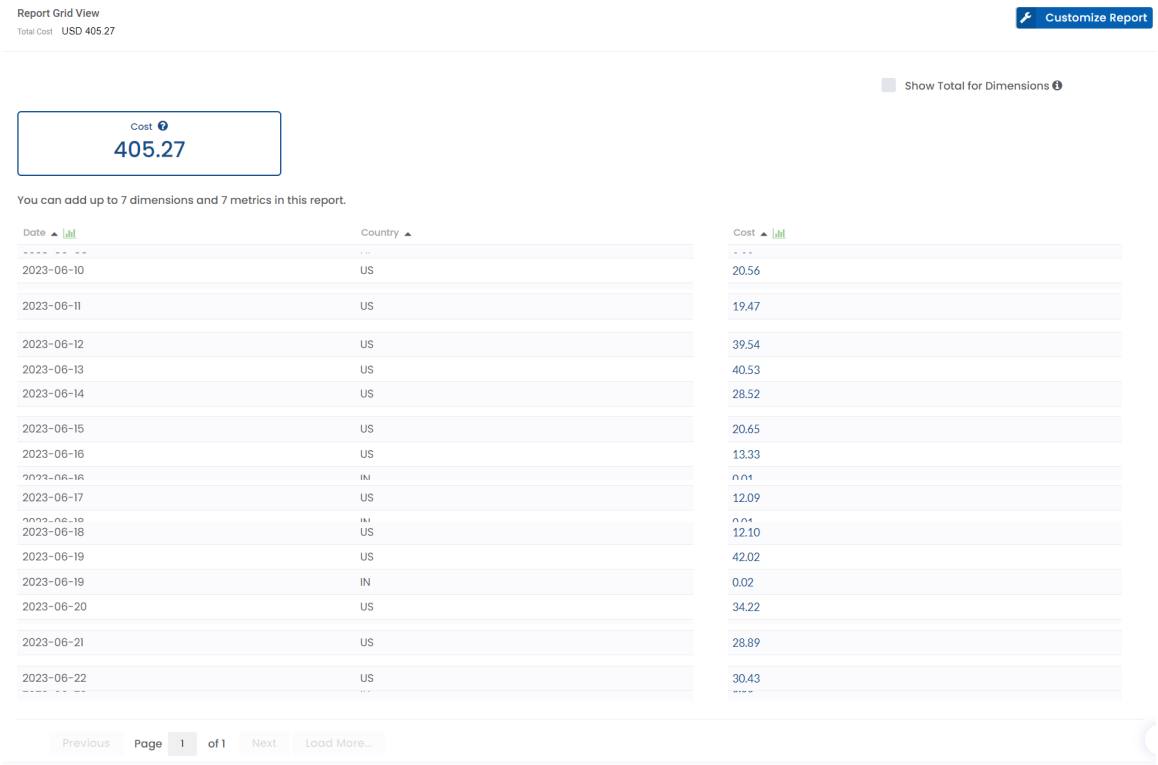


7. Click + to add the dimensions as required. For example, we will see the cost breakup by **Country**. Click + and add **Country** from the drop-down list.

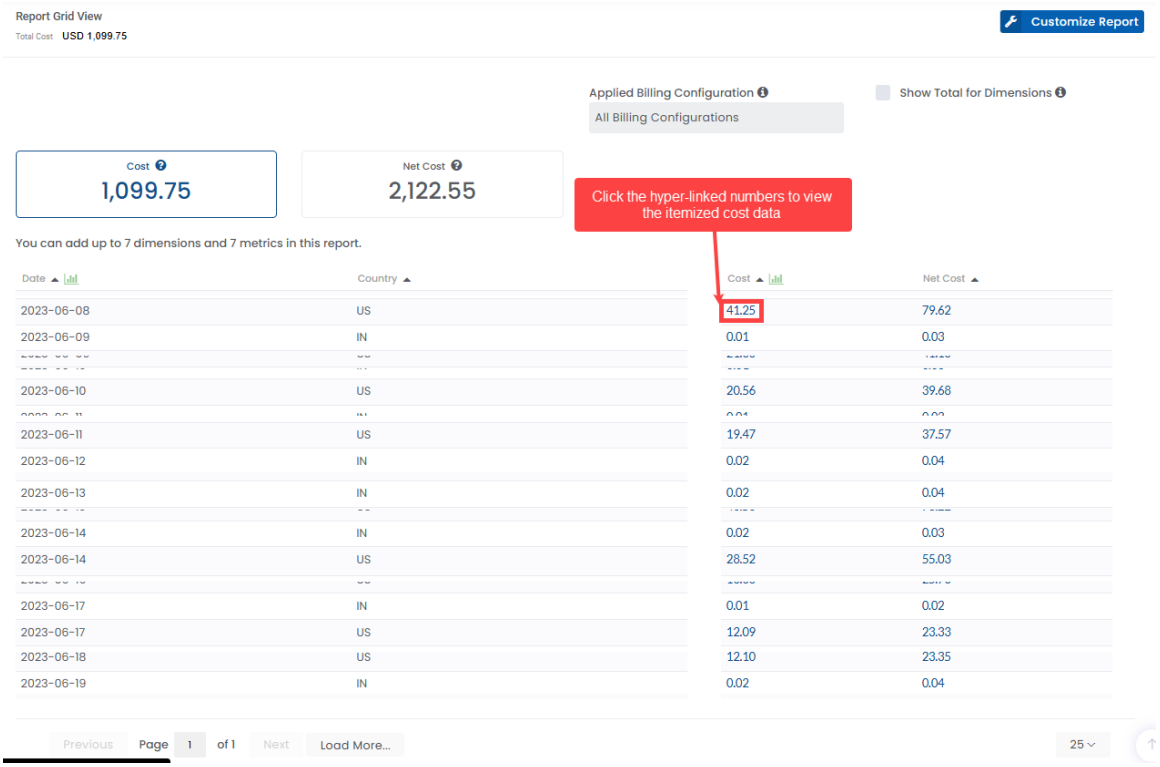


8. To set a dimension as X-axis label for spend overview chart, select the vertical poll icon for that dimension. A green colour filled vertical poll icon for a dimension indicates that the dimension is set as X-axis label for the spend overview chart.

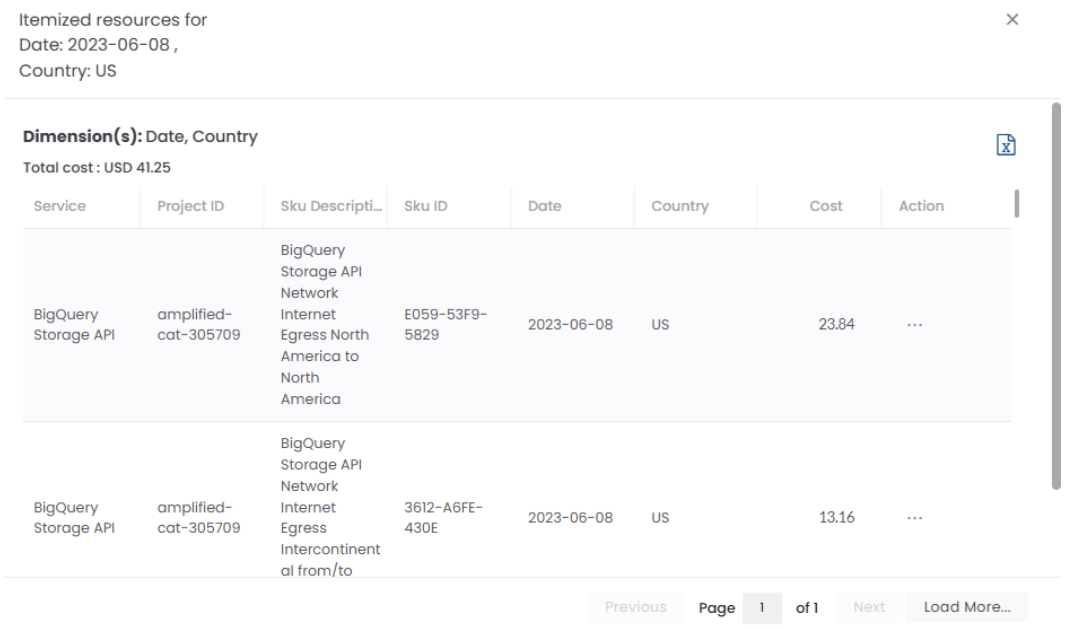
9. Click **Apply**. The cost data will be displayed **Date** and **Country** wise.



10. Similarly, you can view the cost by multiple metrics, for example, by Net Cost. Click **Customize Report**, click **+**, select **Net Cost** from metrics drop-down list, and then click **Apply**. The net cost for the previously selected dimensions is displayed.



a. You can click on the metrics value to view more detailed, itemized cost data for the selected dimensions. This feature is available only when currency conversion is disabled for your CSMP account tenant.

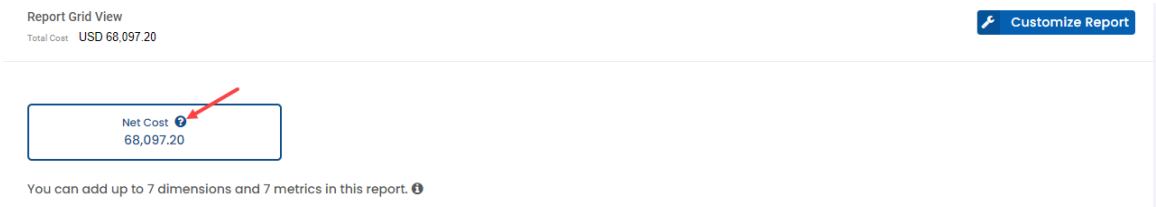


b. You can download the itemized cost data. Click 'Export to CSV' icon [] to download the report.

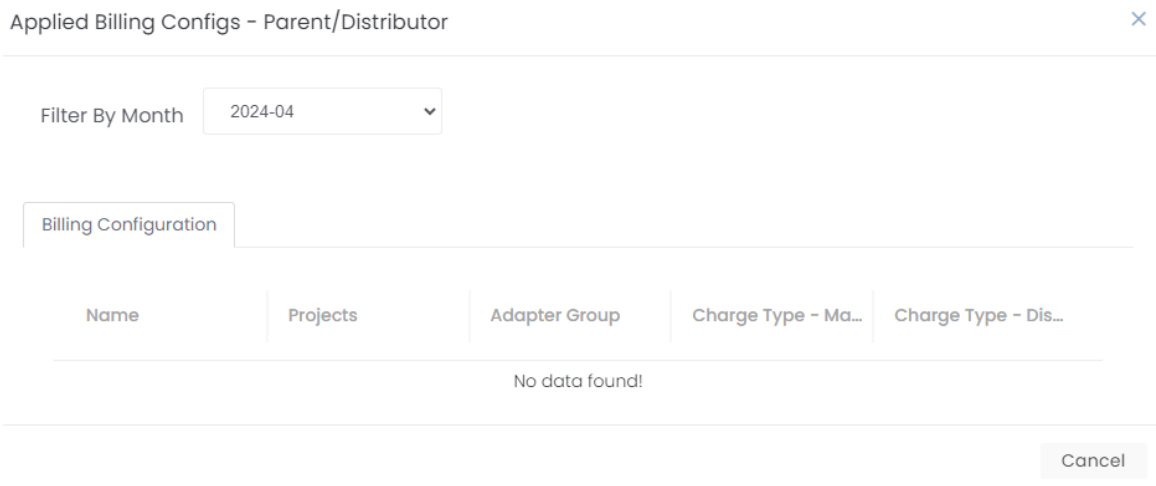
c. Click ellipsis [...] icon under the Action column to view the cost trend.

11. To set a metric as Y-axis label for spend overview chart, select the vertical poll icon for that metric. A green colour filled vertical poll icon indicates the active metric for Y-axis label for the spend overview chart.

12. If you are a default tenant user and your CloudBolt CSMP account is marked as a distributor or reseller account, you can see the applied billing configuration details directly from the Report Grid View section. To see the billing configuration details you must need to customize the cost report for at least one of the metrics as Net Cost (for distributor account) or Net Cost (R) (for reseller account). Click the question mark icon available in the Net Cost or Net Cost (R) tile.



A pop-up window will open to display applied billing configuration. If your cost report grid view contains data for multiple months, you need to select the month from Filter By Month drop-down list to see the applicable billing configuration details. If no billing configuration has been set for a particular month, you will see a message similar to: *No data found!* Click **Cancel** to close the billing configuration pop-up window.



Using Show Total for Dimensions Option

You can see a total cost grouped for multiple dimensions. In order to turn on show total for dimensions, you must have at least two dimensions selected in the Customize Report. If you have two dimensions selected, you will see the total metric value for one dimension only, i.e. the first dimension listed on the report grid view from the left side. Similarly, if you have three dimensions selected, you will see the total metric value for two dimension only, i.e. the first two dimensions listed on the report grid view from the left side. And so on.

When two or more metrics are selected for customize report, you must choose a metric to see the total for dimensions.

With descending order sort, total for dimensions will appear automatically on the right side of the report grid view.

To enable show total for dimensions, you must click the **Customize Report** and then select the **Show Total for Dimensions** check box.



You can download the cost report with Show Total for Dimensions turned on using the options such as export to CSV and export to PDF, available under Spend Overview section.

You can also save this cost report format as favourite cost report by clicking the Save button available the upper right side of the cost report page.

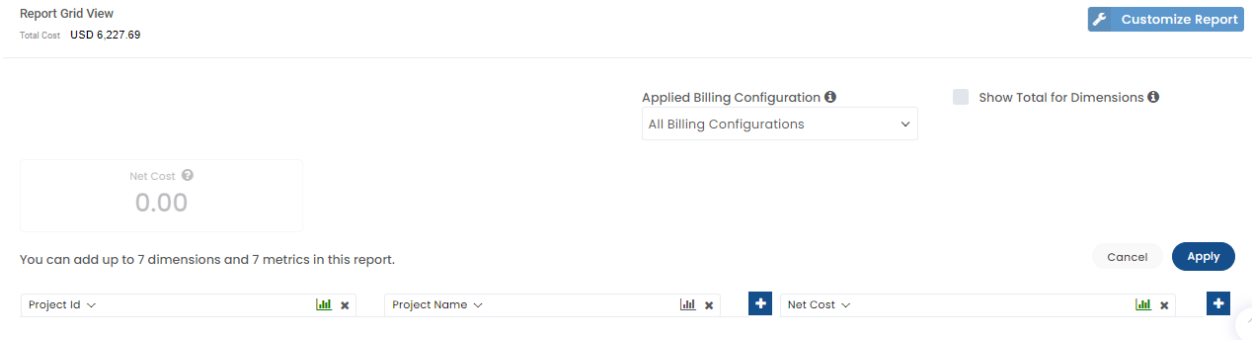
Using Applied Billing Configuration Option

You can customize your cost report grid view based on billing configurations. To customize your cost report based on billing configuration, you need to select at least one metric whose value is defined by billing configuration. Below is a list of metrics whose value is defined by billing configuration:

- Discount
- Margin
- Net Cost

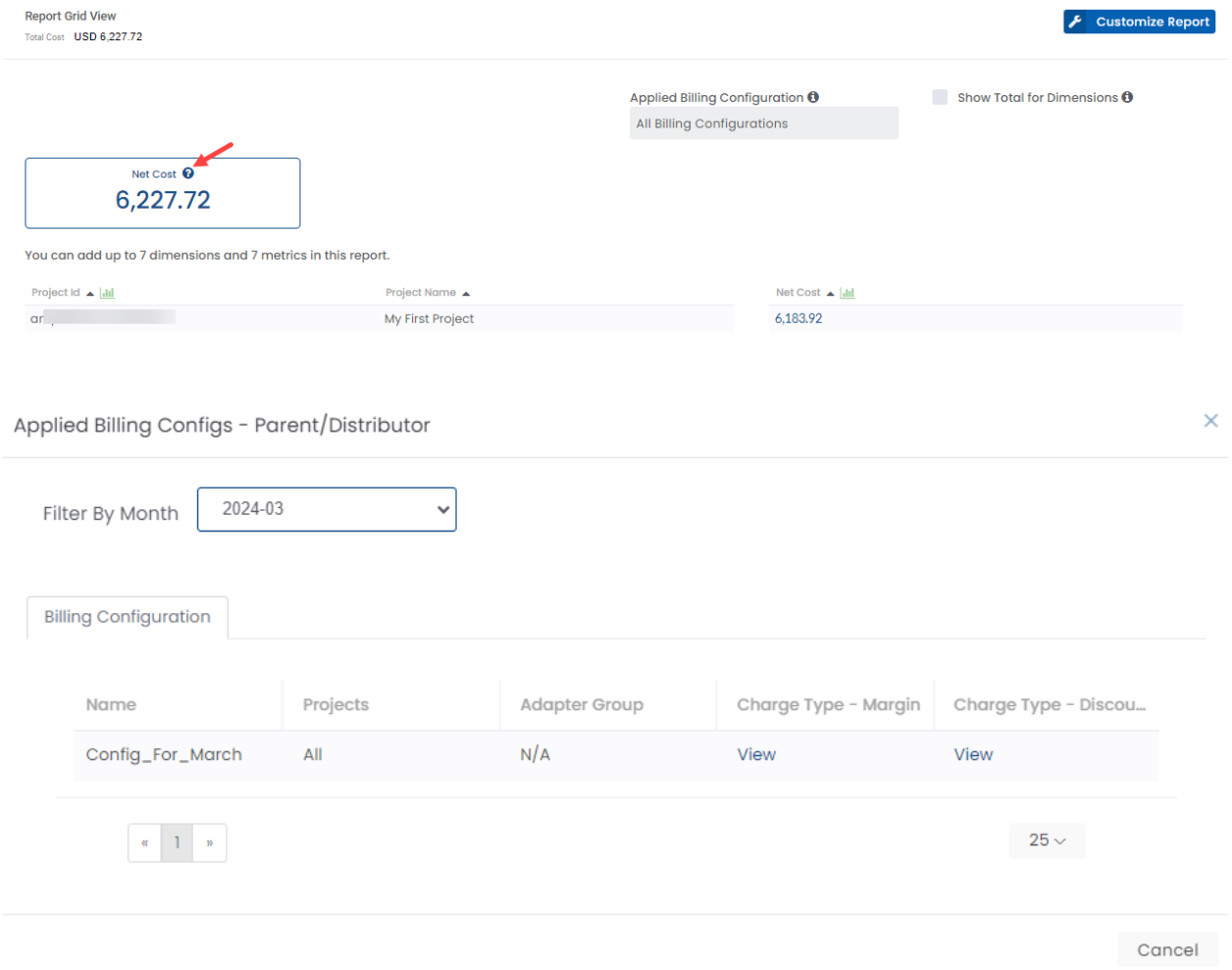
- Discount (R)
- Margin (R)
- Net Cost (R)

Upon adding any metric from the above list to customize the report, a drop-down selection box option labeled "Applied Billing Configuration" will appear. By default, the system will automatically select the "All Billing Configuration" option. This default setting implies that the cost displayed in the cost report grid view will aggregate data from all billing configurations associated with the selected billing adapter and the specified period in the filter settings area.



If you opt for a specific billing configuration that is applicable to any months within the set period defined in the period filter and then click **Apply**, the data presented in the cost report grid view will exclusively feature the projects associated with the chosen billing configuration. Conversely, selecting a billing configuration that isn't applicable to any months within the set period defined in the period filter will result in the display of all projects linked to the chosen billing project, unless there are restrictions imposed by filter settings.

You can access the applicable billing configuration details by clicking the icon within the Net Cost or Net Cost (R) metric tile. If you wish to view billing configuration details for a specific month, you can choose the desired month from the 'Filter By Month' selection drop-down. Additionally, by clicking the respective 'View' link, you can explore various margin and discount details associated with the selected billing configuration.



Outcomes

You have learnt how to analyze the costs incurred on provisioning cloud services in granular detail.

7.1.4. Cost Report for VMware

Learn how to use CloudBolt CSMP Cost Report tool to view your VMware cloud costs.

- Introduction
- Filters Setting
- Spend Overview
- Customize Report
- Using Dimensions and Metrics to Refine Report Statistics
- Using Show Total for Dimensions Option
- Using Applied Billing Configuration Option
- Outcomes

Introduction

Cloud computing helps your organisation save costs on buying infrastructure and software. However, if not monitored, costs can quickly turn your profits into losses. It is very important that you have total and granular visibility on the costs incurred for the services availed. Historical data on spending combined with actual spending and forecasts can help you plan your budgets. The Cost Report tool in CloudBolt CSMP help you with these difficult aspects of cost optimisation by displaying the current and historical cost amount, proposed recommendations, and dynamic calculations of estimated savings.

Filters Setting

VMware cost report in CloudBolt CSMP can be customised by using appropriate filters. Options available for filters setting depend on the Report Profile shared with your tenant or organisation (child/reseller/customer). By default, when you first access the cost report for VMware, the filters are configured to all values, except the billing vCenter. As you set your filters and click **Apply**, the total cost displayed in spend overview adjust to represent the aggregated costs based on the filters selected. All filters are combined together using 'and'

logic, which means that only those records that meet all selected filter values are displayed.

To access filters setting, log in to your CloudBolt CSMP account. Navigate to Cost > Cost Report. Select VMware cloud provider tab and then click Filters within the selected cloud provider.

1. **Billing vCenter**: Select the billing vCenter for which you want to see the cost data.
2. **Group**: For the chosen billing vCenter, pick a VMware vCenters group for which you want to see the cost data. Selecting a vCenters group would populate the vCenters and applied tag filters with all the vCenters and tags associated with the selected group.
3. **Data on Chart**: Default value is All Costs.
4. **Date Range**: Set the range of time for the cost report you want to analyse. You can select between **Daily** or **Monthly**. By default, when you first access the cost report, the **Date Range** is set to **Daily**, with the last 16 days selected including today. By default, daily is enabled. You can filter the cost report on a monthly basis by selecting the monthly tile. Your choice of a daily or monthly tile limits the customize report dimension options for date or month. If you choose daily, you could select date in the customize report section's dimension selection box; but, if you choose monthly, you can choose month as one of the dimensions.
    - **Daily** returns your VMware costs incurred during the last 16 days period selected including today on a daily basis. When you select Daily, you can choose a dynamic past or future date range, such as "This Month" or "Last Month" or "Yesterday", or "Next Month" or a custom date range from the **Period** selection box to view your cost reports. Dynamic past and future date ranges display cost data over a rolling time, such as "Last Month" or "Last 7 days" or "Next Month". Dynamic past date ranges are: "This Month", "Last Month", "Last 3 Months", "Yesterday", "Last 7 Days", "Last 14 Days", "Last 21 Days", "Last 30 Days", and "Last 45 Days". Dynamic future date ranges are: "This Month", "Next Month", "Next 3 months", "Tomorrow", "Next 7 Days", "Next 14 Days", "Next 21 Days", "Next 30 Days", and "Next 45 Days". Dynamic date ranges are best for your favourite cost reports. Custom ranges let you focus

on specific start and end dates. Your start and end date duration can be up to 100 days. After selecting a date range, you must click **Apply** button available within the period selection area.

- **Monthly** returns your VMware costs grouped on a monthly basis. When you select Monthly, you can choose a dynamic past or future date range, such as "This Month" or "Last Month" or "Next Month", or a custom date range from the **Period** selection box to view your cost reports. Dynamic past and future date ranges display cost data over a rolling time, such as "Last Month" or "Last 6 Months" or "Next Month". Dynamic past date ranges are: "This Month", "Last Month", "Last 3 Months", "Last 6 Months", "Last 9 Months", and "Last 12 Months". Dynamic future date ranges are: "This Month", "Next Month", "Next 3 Months", "Next 6 Months", "Next 9 Months", and "Next 12 Months". Dynamic date ranges are best for your favourite cost reports. Custom ranges let you focus on specific start and end dates. After selecting a date range, you must click **Apply** button available within the period selection area.

A "day" is defined as midnight to midnight in the cost report's selected time zone. A "month" is defined as first to last date of a calendar month in the report's selected time zone. The current day's (that is, Today's) cost data is not included in the report except for default date range selection and "This Month" option selection as dynamic future date range. Preset dynamic past date ranges are listed on left side of the period selection list. Preset dynamic future date ranges are listed on the right side of the period selection list.

5. **Compare Period**: Select the **Compare Period** check box to set a start date to compare your VMware cost against the previously selected date range under Period selection box. Cost comparison will display as the total cost for two time ranges in the spend overview section. For example, you have selected February 23, 2022 to March 09, 2022 date range in the Period, duration of 15 days. In the **Compare Period Start** box you select February 07, 2022 as start date. After clicking the Apply button for filter result, the spend overview graph and total cost will display the cost for February 23, 2022 to March 09, 2022 compared to February 07, 2022 to February 21, 2022. You can see that the compare period end date has been adjusted based on

the period you choose. Alternatively, if you chose a dynamic date range in the Period, then selected a date in the **Compare Period Start** box, your compared to days will likewise be *n* days based on date range in the Period beginning from the Compare Period Start date. When a compare period is saved as a favourite cost report, the date selected in the **Compare Period Start** box will be dynamically updated based on the start date in the Period to show a compare start date when you open the favourite report.

6. **vCenters**: You can select all vCenters available under the selected adapter or select a subset of vCenters by clicking them in the list. You can use wildcard and operators for searching the vCenters.
7. **Resource Name**: You can select all resource names available under the selected adapter or select a subset of resource name by clicking them in the list. You can use wildcard and operators for searching the resource name.
8. **Resource Provider Ids**: You can select all resource provider ids available under the selected adapter or select a subset of resource provider ids by clicking them in the list. You can use wildcard and operators for searching the resource provider ids.
9. **Services**: You can select all services available under the selected adapter or select a subset of services by clicking them in the list. You can use wildcard and operators for searching the services.
10. **Resource**: You can select all resources available under the selected services or select a subset of resources by clicking them in the list. You can use wildcard and operators for searching the resource.
11. **Applied Tag Filters**: Tags are key-value pairs attached to your VMware resources. To filter cost report by tags:
    a. Enter **Tag Key** and **Tag Value** in the appropriate boxes. You must enter correct tag key and value. You can use the following values:
        - **Exclude No Tagkey: (selected tag key)** - Filter cost for all cloud resources/services with the specified tag key, but there must be no tag value.
        - **No Tagkey: (selected tag key)** - Filter cost for all cloud resources/services that do not have the specified tag key.

- The displayed tag value - Filter cost for all cloud resources/services with the specified tag key and the specified tag value.

b. Click to apply the entered tag key-value pair as tag filter. You can add multiple tag filters to filter your cost report.

c. Whenever you add two or more tag filters, you must choose an operator from the tag operator selection box to join those tag filters. By default, OR operator will be selected, which means that cost report would be generated for all the selected tags. Selecting AND operator means that cost report would be generated when all the selected tags are available to a service, vCenter, resource, etc.

To see the selected filters' effect on spend overview, you must click **Apply**. You can even save the applied filters as your favourite cost report by clicking **Save** button available at the upper right corner.

Click **Clear Filters** to remove all the filter settings and return to default filters setting.

Spend Overview

Spend Overview widget gives you visibility of your AWS cloud costs as per the filters setting.

1. Logon to your CloudBolt CSMP instance.
2. Navigate to **Cost > Cost Report**.
3. Select the cloud provider as VMware.
4. By default, the Spend Overview widget will show the total cost for the default chosen billing account over the last 16 days including today on a daily basis. The current day's (that is, Today's) cost will consists of historic and forecast cost for the day.
5. Do the filters setting as per your requirements to view the data on chart. If you set future dates for the date filter, the cost for such dates would be marked as forecast cost.
6. The chart section would show the values of the set filters parameter. A filter parameter that has not been set will not appear in the chart area, indicating that the

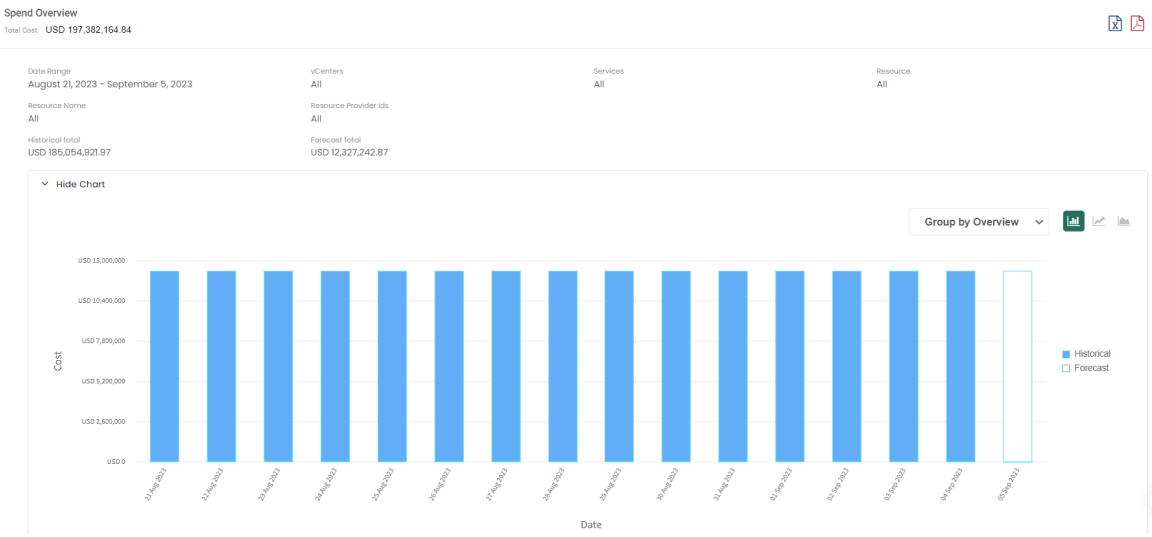
parameter's default setting has been applied. To know more about the details of displayed filter parameters in the chart area, see use wildcard and operators for searching.

7. You can hide or show spend overview chart. By default, spend overview chart will be shown. Use *Hide Chart* to hide the spend overview chart.
8. All the chart legend labels would be displayed on the right side of the chart.
9. Data displayed on the spend overview chart can be further bifurcated by using *group by* option selection. By default, ***Group by Overview*** would be selected. Options vary according on the service type chosen in the 'Data on Chart' filter. Available options for group by could be:
    - **Group by Overview:** Displays the aggregated cost for the selected VMware billing vCenter. The Spend Overview graph displays the forecast value for the future period (if filter applied for the future date) based on your historical cost value.
    - **Group by vCenters:** Displays a multi series graph for the selected VMware vCenter cost grouped by vCenters. Hover over the graph to view the cost specific to a vCenter.
    - **Group by Services:** Displays a multi series graph for the selected VMware vCenter cost grouped by service types availed. Hover over the graph to view the cost specific to a service type.
10. By default, chart X-axis label would be set to date or month based on your filter setting for data range (daily/monthly). You can change the X-axis label to any one of dimensions selected in customize report.

    If you set the X-axis label other than 'date' or 'month', the data on the graph would be set to 'group by overview'. Alternatively, if you choose a group by option other than 'group by overview', the X-axis dimension would switch to 'date' or 'month' depending on your date range filter selection.

    When you set the X-axis label other than 'date' or 'month', you can decide to show top 10, 20, or 30 attributes of the selected labels on the graph and remaining attributes combined as other.

11. Similarly, the chart Y-axis label could be changed to any of the selected metrics in the customize report.
12. Click the designated graph icon to view the result in Bar, Line, or Area graph. By default, cost data will be displayed in bar graph.
13. Click the appropriate download icons to export the results in CSV or PDF format. The graph can be exported to PDF format only.



Customize Report

Cost Report is highly customizable in CloudBolt CSMP. You can add up to 7 dimensions and 7 metrics based on the report profile shared with your tenant or organisation and narrow down the cost analysis to individual units in your Cloud Infrastructure. You can see exactly in which Unit, or Resource group, or by which instance is costing you how much money. You can also use 'Show Total for Dimensions' option to get total costs for the added dimensions.

The following list shows some of the dimensions you can use to break down the projected cost amount. The metrics value against N/A line item for the selected dimension denotes the cumulative metric value of those services/resources to which the selected dimension is not applied. Whereas the metric value against the No Value line item for the selected dimension denotes the cumulative metric value of such services/resources which has the selected dimension applied but the value field for selected dimension is blank.

- Cluster Name
- Date
- Guest OS Family
- Guest OS Full Name
- Guest OS ID
- Month
- Power State
- Resource Name
- Resource Provider Id
- Service
- Service Tier
- vCenters
- vCenter group
- VM Cost (Including Datastores)

The following list shows metrics you can use to see the cost details (list may vary upon the report profile shared with you):

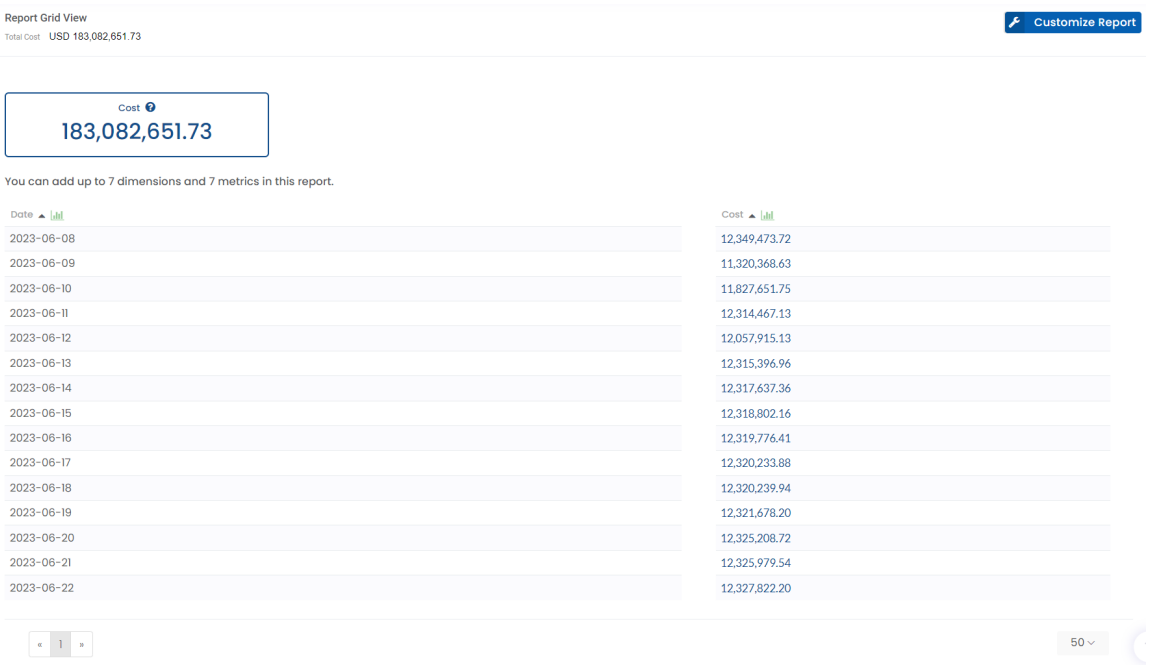
- Cost: It is the total billed amount for your VMware services based on applied filters.
- Discount: It is the *Cost* multiplied by the *discount percent* defined in billing configuration for the selected period.
- Margin: It is the *Cost* multiplied by the *margin percent* defined in billing configuration for the selected period.
- Net Cost: It is the *Cost* plus *Margin* minus *Discount*.
- No. of Units: It is number of cores for a CPU service tier and GB for memory and storage service tiers.
- Usage Quantity: It is the consumed Quantity of VMware Services.

Using Dimensions and Metrics to Refine Report Statistics

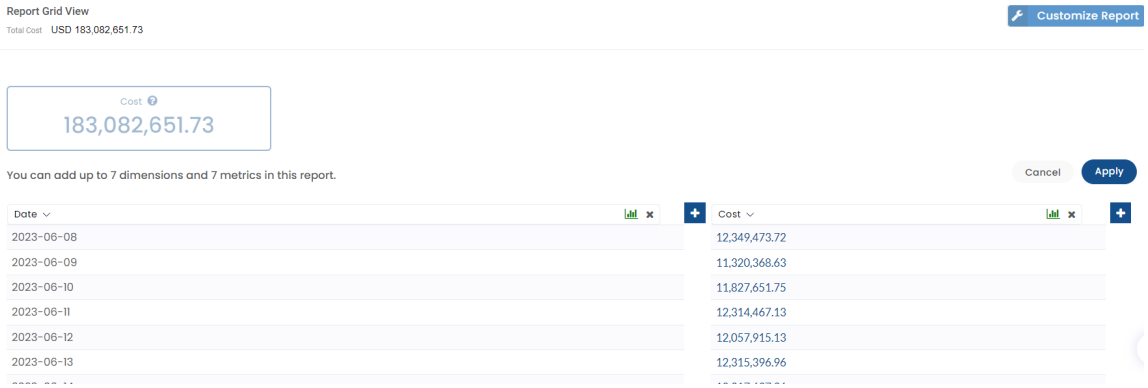
You can see the breakup for the spend by dimensions and metrics for the set parameters in the Filters setting. Dimensions are attributes of your cloud resources. For example, the dimension Date indicates the date. Whereas, Metrics contain numeric values that tie to a dimension. For example, the metric Cost represents the usage cost value for the selected dimension(s). Using the Customize Report button, you can add up to 7 dimensions and 7 metrics to view the corresponding spend for the selected dimensions and or metrics.

Date is the default dimension selected when date range in the filters is set to daily. Default metric changes based on report profile shared with user's account tenant or organisation.

1. Logon to your CloudBolt CSMP account.
2. Navigate to **Cost > Cost Report**.
3. Select the Service Provider as VMware.
4. Set the filters setting as required.
5. Scroll down to the Report Grid View, the Total Cost for the selected filters can be seen.



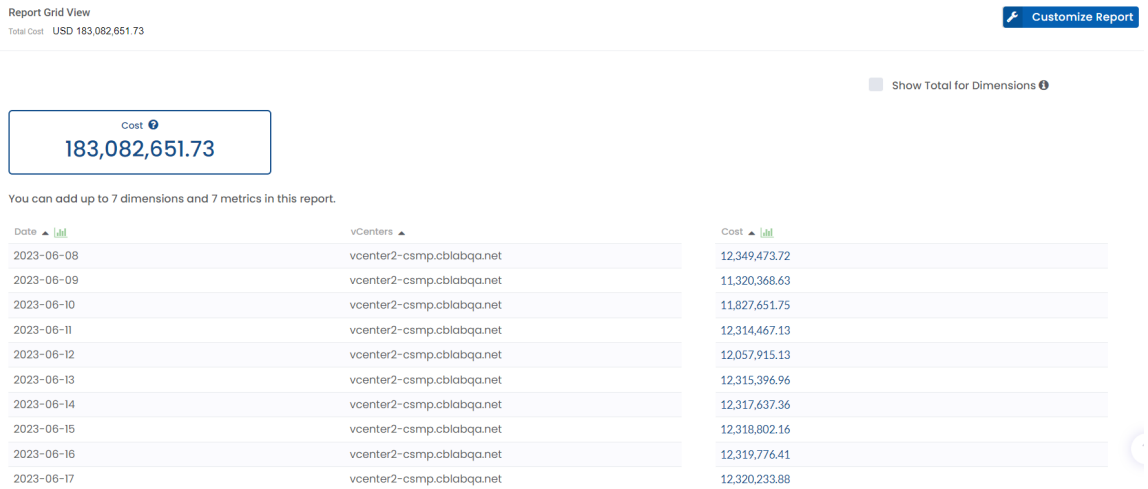
6. Click **Customize Report**. The **+** option to add dimensions and metrics is displayed.



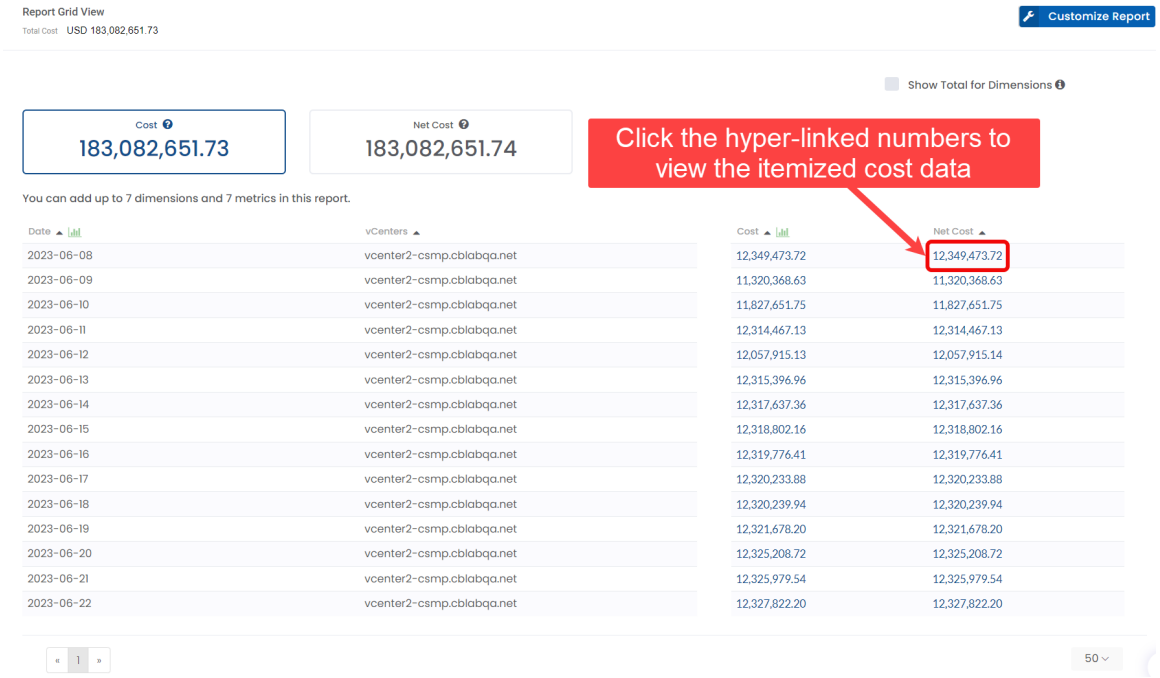
7. Click + to add the dimensions as required. For example, we will see the cost breakup by **vCenters**. Click + and add **vCenters** from the drop-down list.



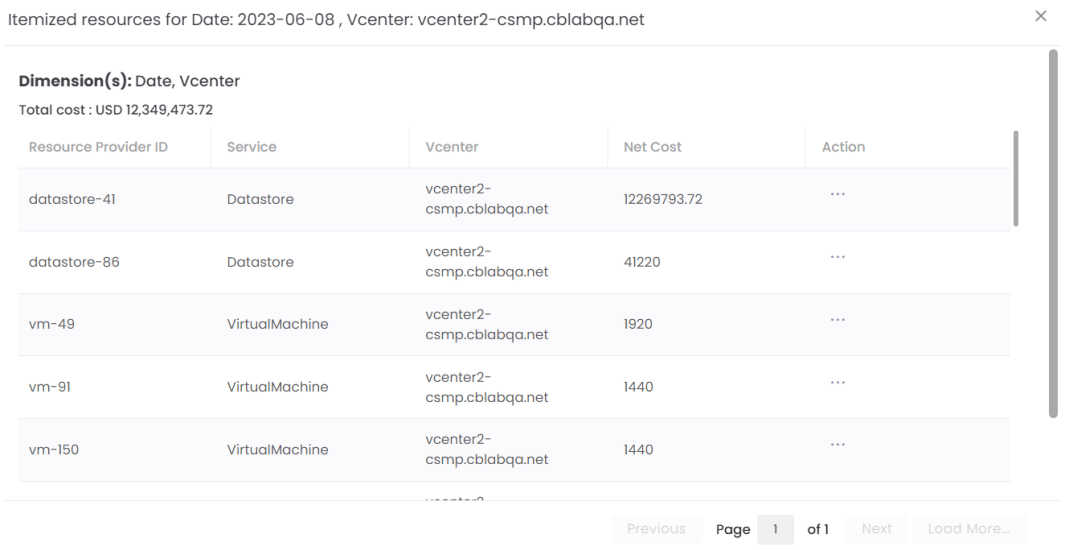
8. To set a dimension as X-axis label for spend overview chart, select the vertical poll icon for that dimension. A green colour filled vertical poll icon indicates the active X-axis dimension for the spend overview chart.
9. Click **Apply**. The cost data will be displayed **Date** and **vCenters** wise.



10. Similarly, you can view the cost by multiple metrics, for example, by Net Cost. Click **Customize Report**, click **+**, select **Net Cost** from Metrics drop-down list, and then click **Apply**. The Net Cost for the previously selected dimensions would be displayed.

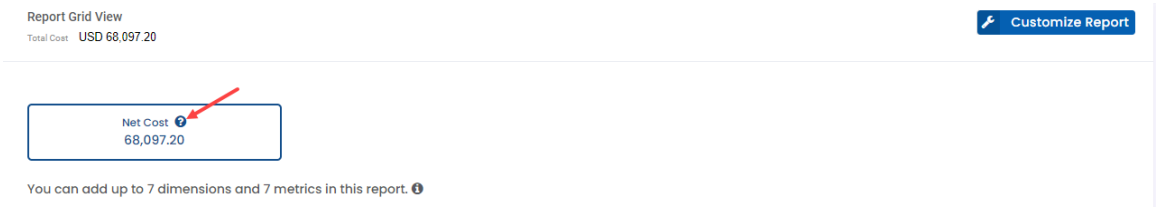


a. You can click on the metrics value to view more detailed, itemized cost data for the selected dimensions. This feature is available only when currency conversion is disabled for your CSMP account tenant.

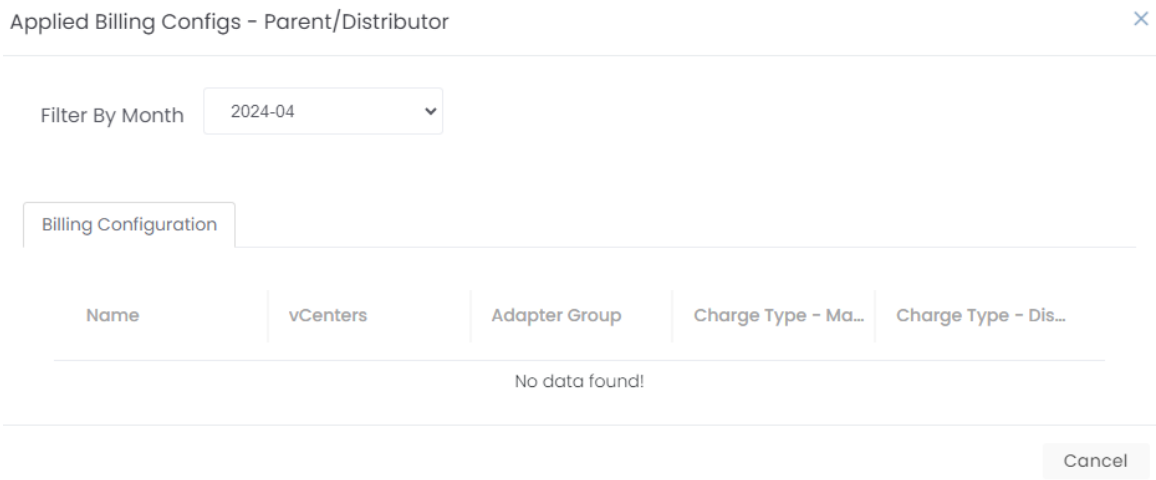


b. Click ellipsis […] icon under the Action column to view the cost trend.

11. To set a metric as Y-axis label for spend overview chart, select the vertical poll icon for that metric. A green colour filled vertical poll icon indicates the active metric for Y-axis label for the spend overview chart.
12. If you are a default tenant user and your CloudBolt CSMP account is marked as a distributor or reseller account, you can see the applied billing configuration details directly from the Report Grid View section. To see the billing configuration details you must need to customize the cost report for at least one of the metrics as Net Cost (for distributor account) or Net Cost (R) (for reseller account). Click the question mark icon available in the Net Cost or Net Cost (R) tile.



A pop-up window will open to display applied billing configuration. If your cost report grid view contains data for multiple months, you need to select the month from Filter By Month drop-down list to see the applicable billing configuration details. If no billing configuration has been set for a particular month, you will see a message similar to: *No data found!* Click **Cancel** to close the billing configuration pop-up window.



Using Show Total for Dimensions Option

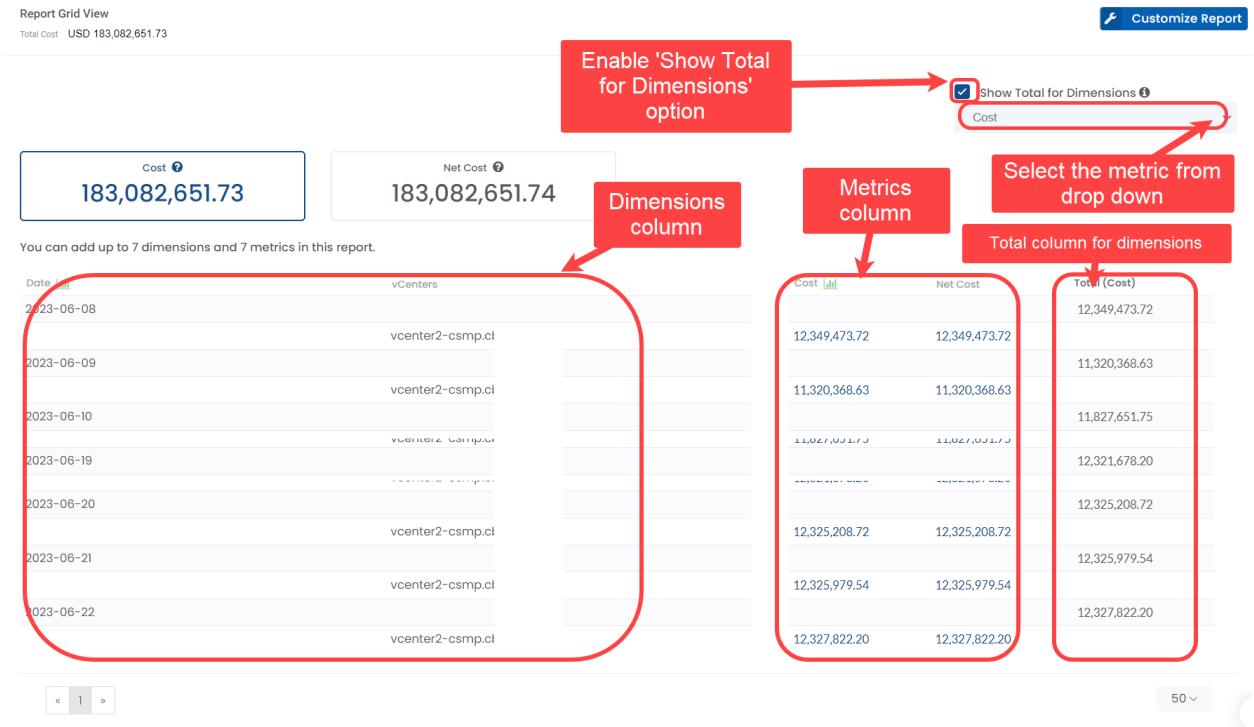
You can see a total cost grouped for multiple dimensions. In order to turn on show total for dimensions, you must have at least two dimensions selected in the Customize Report. If you have two dimensions selected, you will see the total metric value for one dimension

only, i.e. the first dimension listed on the report grid view from the left side. Similarly, if you have three dimensions selected, you will see the total metric value for two dimension only, i.e. the first two dimensions listed on the report grid view from the left side. And so on.

When two or more metrics are selected for customize report, you must choose a metric to see the total for dimensions.

With descending order sort, total for dimensions will appear automatically on the right side of the report grid view.

To enable show total for dimensions, you must click the **Customize Report** and then select the **Show Total for Dimensions** check box.



You can download the cost report with Show Total for Dimensions turned on using the options such as export to CSV and export to PDF, available under Spend Overview section.

You can also save this cost report format as favourite cost report by clicking the Save button available the upper right side of the cost report page.

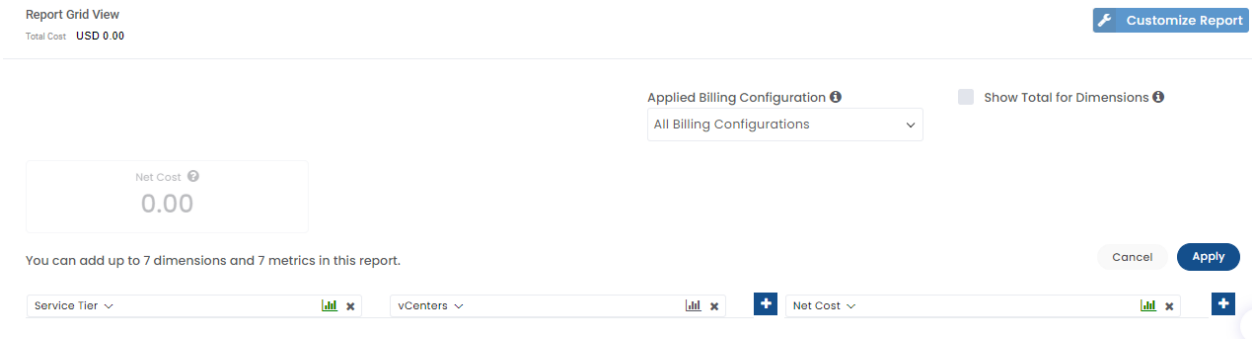
Using Applied Billing Configuration Option

You can customize your cost report grid view based on billing configurations. To customize your cost report based on billing configuration, you need to select at least one metric

whose value is defined by billing configuration. Below is a list of metrics whose value is defined by billing configuration:

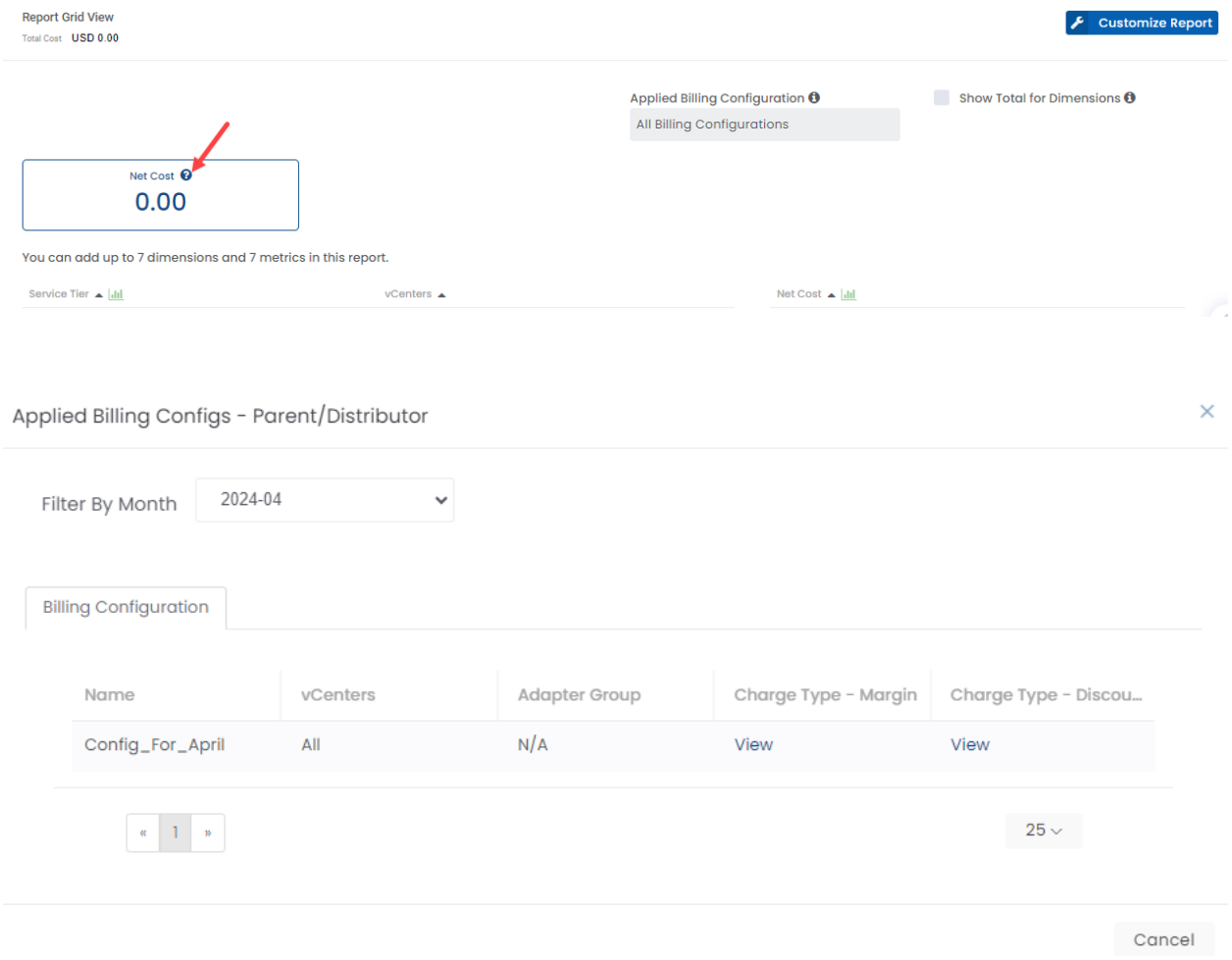
- Discount
- Margin
- Net Cost

Upon adding any metric from the above list to customize the report, a drop-down selection box option labeled "Applied Billing Configuration" will appear. By default, the system will automatically select the "All Billing Configuration" option. This default setting implies that the cost displayed in the cost report grid view will aggregate data from all billing configurations associated with the selected billing adapter and the specified period in the filter settings area.



If you opt for a specific billing configuration that is applicable to any months within the set period defined in the period filter and then click **Apply**, the data presented in the cost report grid view will exclusively feature the vCenters associated with the chosen billing configuration. Conversely, selecting a billing configuration that isn't applicable to any months within the set period defined in the period filter will result in the display of all vCenters linked to the chosen billing vCenter, unless there are restrictions imposed by filter settings.

You can access the applicable billing configuration details by clicking the icon within the Net Cost or Net Cost (R) metric tile. If you wish to view billing configuration details for a specific month, you can choose the desired month from the 'Filter By Month' selection drop-down. Additionally, by clicking the respective 'View' link, you can explore various margin and discount details associated with the selected billing configuration.



Outcomes

You have learnt how to analyse the costs incurred on provisioning cloud services in granular detail.

7.1.5. Create a Rolled-up View to Show Total Cost Report for Multiple Azure Accounts

Learn how to create a rolled-up view for the total cost of multiple Azure subscriptions.

Introduction

You might have been operating in a multi-national organization with many billing subscriptions in various currencies or even in a single currency. You might even have multiple Azure subscriptions per departments. Regardless of how you have ended with multiple Azure billing subscriptions, you can view your rolled-up costs in a single report that too in a single currency for all your Azure billing subscriptions using CloudBolt CSMP.

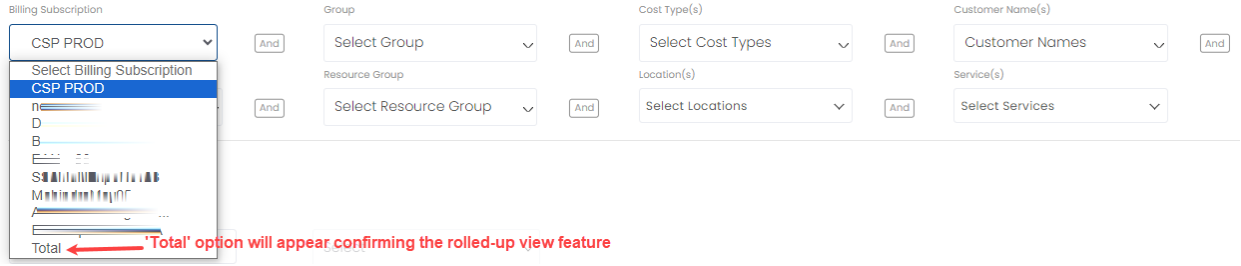
Each CSMP account user may control the rolled-up view functionality in the CloudBolt CSMP. When a user has multiple Azure billing adapters allocated to them, the rolled-up functionality can be enabled if all of the pre-requisites are met.

Note: Assume you have access to multiple Azure billing adapters, such as eight, each actively configured to report in its respective native currency type. To view consolidated costs across all your Azure billing subscriptions in CloudBolt, it is crucial to enable the currency conversion feature for your tenant. Additionally, ensure there is a currency conversion rule established for each of the eight different currencies, converting them into a single unified currency. If currency conversion is enabled but rules are not configured for all currencies to a single currency, the rolled-up cost functionality will remain disabled.

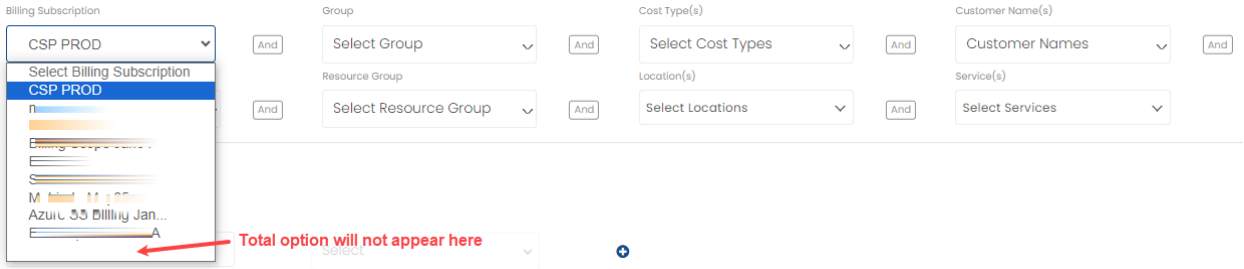
If you have multiple Azure billing subscriptions with a single native currency for all the subscriptions, you can readily create a rolled-up view for all your Azure billing subscriptions.

When the rolled-up view is enabled, the Billing Subscription filter drop-down list in the dashboard and cost report for Azure will include 'Total' as an option, in addition to the

names of all other Azure billing adapters.



If you have multiple Azure billing adapters with different native currencies for their Azure billing subscriptions, the 'Total' option under the 'Billing Subscription' list will not appear unless the currency conversion feature for the tenant is enabled by admin. Also, the currency conversion rule must exist for each of the native currency to a single target currency.



When the tenant's currency conversion option is enabled, but users wish to see a rolled-up cost for their Azure subscriptions in their preferred currency, then they must set user preferred currency under their CloudBolt CSMP account profile.

This document will show you how to use the CloudBolt CSMP to generate a rolled-up (Total) Azure cost report.

Prerequisites

If you have multiple Azure billing subscriptions with a single native currency, you can skip to create a rolled-up cost report.

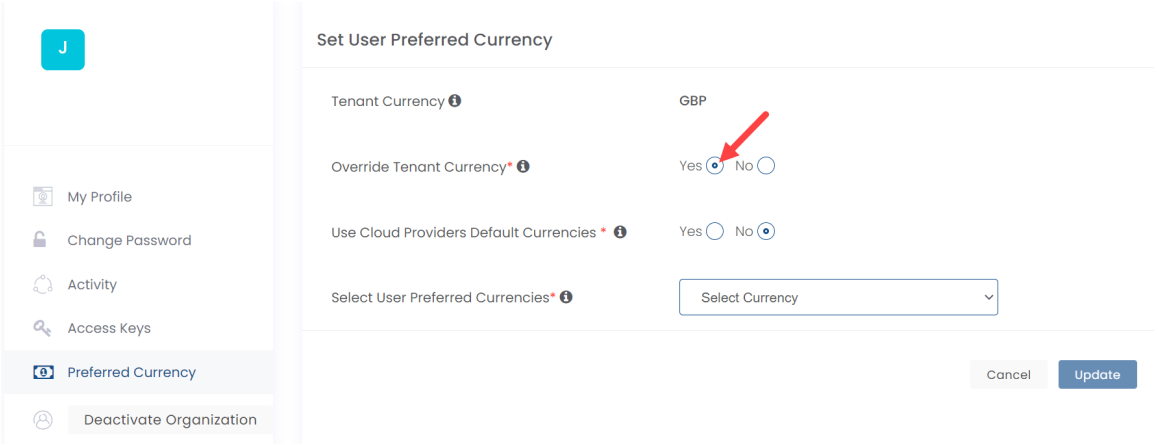
Where you have multiple Azure billing subscriptions with different native currencies, to view a rolled-up (Total) cost report, you must have:

- Enabled currency conversion feature for the tenant to a single target currency in your CloudBolt CSMP.

Note: Assume you have access to multiple Azure billing adapters, such as eight, each actively configured to report in its respective native currency type. To view consolidated costs across all your Azure billing subscriptions in CloudBolt, it is crucial to enable the currency conversion feature for your tenant. Additionally, ensure there is a currency conversion rule established for each of the eight different currencies, converting them into a single unified currency. If currency conversion is enabled but rules are not configured for all currencies to a single currency, the rolled-up cost functionality will remain disabled.

Or

- If you have set user preferred currency for your CloudBolt CSMP profile, you must set the 'Use Cloud Providers Default Currencies' option as 'No', and there must exist currency conversion rules for all your Azure native currencies to the preferred (target) currency.

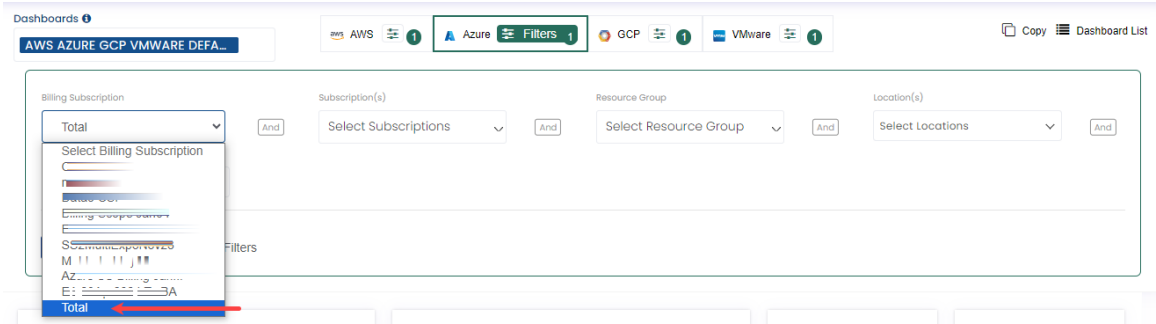


Create a Rolled-up Cost Report on Dashboard

1. Navigate to the CloudBolt CSMP dashboard and choose Azure as your cloud provider. Then, expand the filter settings area to configure your preferences.
2. Within the Billing Subscription list, select 'Total' to view the aggregated cost across all your Azure billing subscriptions.

Note: If your CloudBolt CSMP profile includes active Azure billing adapters (for example, eight), selecting the 'Total' option in the Billing Subscription list will

aggregate the cost values displayed across various charts, representing the total expenses of all eight billing subscriptions.



3. Customize the dashboard reports by applying filters such as subscriptions, resource group, location, and services. Select your desired filters and click **Apply** to refine the data displayed.
4. The dashboard widget charts will then illustrate the combined costs of all your Azure subscriptions.

Create a Rolled-up Cost Report on Azure Cost Report Page

1. Navigate to the CloudBolt CSMP dashboard header and go to **Cost > Cost Report**.
2. Select Azure as your cloud provider and expand the filter settings area by clicking on the filters icon.
3. From the Billing Subscription list, choose 'Total' to view the aggregated cost across all your Azure billing subscriptions.

   Note: If you have active Azure billing adapters (for example, eight) in your CloudBolt CSMP profile and you select 'Total' from the Billing Subscription list, the displayed cost value on the spend overview chart will represent the total expenses of all eight billing subscriptions.

4. You can apply various filters to customize your aggregated cost reports, such as data on the chart, date range, subscription, resource group, location, reservation name, service name, resource name, and service tier. Select your desired filters and

click **Apply** to refine the data displayed in both the spend overview and report grid view areas.

Limitations

Whenever 'Total' is selected as a billing subscription on the cost report page, the following features would not be available.

1. In the rolled-up view, only active state billing adapters are considered; error state billing adapters' costs are not included.
2. Favourite Report: You cannot create a favourite report for your filters when the billing subscription is set to Total.
3. The Itemized Report link for the itemized cost report cannot be accessed in the Customize Report section.
4. The Tags, Group Tag, and Subscription Tags dimensions will not be available for customizing the cost report grid view.
5. Only cost, discount, margin, and net cost metrics, all in the target currency, will be available for customizing the cost report grid view.

Outcomes

You have learned how to create a rolled-up view for your multiple Azure subscriptions.

7.1.6. Use Wildcard and Operators for Searching

Learn how to use wildcard and operators to sort the cost report filter parameter records.

Wildcard

In CloudBolt CSMP, you can use the percent sign (%) as wildcard syntax in your cost report filters parameter search box. The wildcard character (%) can be used to look for a partial value in the search field when you are unsure about the full value. You put in the wildcard where the unknown letters occur.

The wildcard character (%) may be used to specify any number of characters. It is used as substitute for string of characters. It can be used at the *end of a string of characters (root word)* or *start of a string of characters (root word)* or both using appropriate operators. When you want to search for variable endings of a root word, you use the wildcard character (%) at the end of the root word. Whereas if you want to search for variable starting of a root word, you use the wildcard character (%) at the start of the root word. For example, to find words such as accept, acceptable, access, according to, and academic year, type **ac%** in the search field and press *Enter*. In another example, to find words such as prices, spaces, fences, chances, AWS services, and Azure services, type **%ces** in the search field and press *Enter*. Wildcard character (%) cannot be used at the start and end of a single *string of characters*.

If you type a string of characters without wildcard character in the search field and press *Enter*, you will get all the records that contain the typed string of characters regardless of their position in the record.

Operators

An operator can be used to specify the type of data that you are searching using the string of characters with or without wildcard. In CloudBolt CSMP, we support && and || as operators.

Operator	Description
&&	Look for records that include at least one instance of each of your search strings. For example, the search field **ac% && %es** returns records that start with **ac** and conclude with **es**, such as aces, acme aces, academic races, and account vertices.
||	Look for records that include at least one instance of any of your search strings. For example, the search field **ac% || %es** returns records that start with **ac**, end with **es**, or start with **ac** and end with **es**, such as ace, acute, zees, classes, aces, acme aces, academic races, and account vertices.

You cannot use combination of different operators in a single search. However, you can use combination of a single operator for multiple string of characters with and without wildcard.

Special Characters

CloudBolt CSMP allows you to use the search *string of characters* with special characters. The following special characters are supported as part of a string of characters: **/ [ ] . - _ ( )**. For example, to search records such as (acme) and (account) vertices, type **(ac%** in the search field and press *Enter*.

Searching Constraints

To search records as per the typed string of characters with or without wildcard and operators, you must press *Enter*.

You can select all the records returned based on the search strings using **Select All** option check box. Alternatively, you can select maximum of 99 records by clicking them in the list. If you have used **Select All** option to select the records, any records matching the search strings would be added automatically in future when filters are saved as favourite.

Search results for a filter parameter can be appended or overwritten with another search strings results based on the resulted records selection method.

Scenarios	Earliest search records selection method	Latest search records selection method	Final records retained for the filter parameter
Scenario 1	Partially selected by	Partially selected by	Append all the

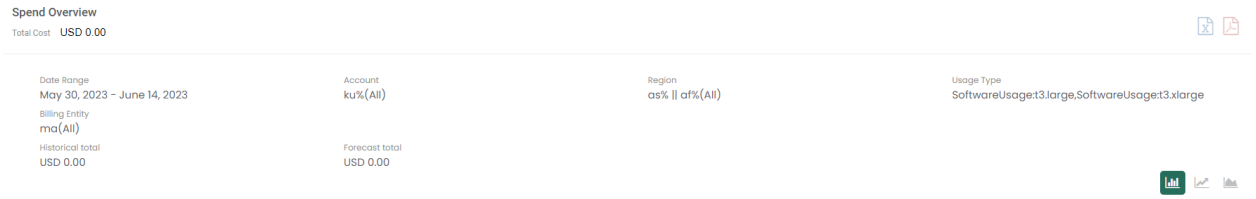
Scenarios	Earliest search records selection method	Latest search records selection method	Final records retained for the filter parameter
	clicking them in the list	clicking them in the list	selected records from earliest and latest search records.
Scenario 2	Selected all the records using **Select All** option check box	Selected all the records using **Select All** option check box	Only latest search records (select all) are retained.
Scenario 3	Partially selected by clicking them in the list	Selected all the records using **Select All** option check box	Only latest search records (select all) are retained.
Scenario 4	Selected all the records using **Select All** option check box	Partially selected by clicking them in the list	Only latest search records (partial selections) are retained.

Additional Information

When you use string of characters with or without wildcard and operator to search records for a filter parameter, the spend overview would list those string of characters for respective filter parameters. The filter parameters detail on spend overview would vary based on the way you chose the searched records for that parameter.

Search field scenario description	Option used to select the searched records	Detail format displayed on Spend Overview graph area
Entered string of characters without wildcard character	Partial selection from the resulted records	List all the individual records those are selected.
Entered string of characters without wildcard character	Used **Select All** option to select the resulted records	String of characters and the suffix (All).
Entered string of characters with wildcard character	Partial selection from the resulted records	List all the individual records those are selected.
Entered string of characters with wildcard character	Used **Select All** option to select the resulted records	String of characters containing the wildcard character and the suffix (All).
Entered string of characters with wildcard character and operator(s)	Partial selection from the resulted records	List all the individual records those are selected.
Entered string of characters with wildcard character and operator(s)	Used **Select All** option to select the resulted records	String of characters containing the wildcard character, operator(s), and

Search field scenario description	Option used to select the searched records	Detail format displayed on Spend Overview graph area
		the suffix (All).
No search strings used	Partial selection from the drop-down list	List all the individual records those are selected.
No search strings used	Used **Select All** option to select all the records	All



7.2. Cost Analysis

Understand and analyse which cloud resources or team are the primary drivers of your monthly bill.

- Introduction
- Prerequisites
- Cost Analysis Report for AWS
- Cost Analysis Report for Azure
- Cost Analysis Report for GCP
- Cost Analysis Report for VMware
- Outcomes

Introduction

Cloud computing has become a game-changer in the ever-evolving world of technology. It is crucial to perform a cost analysis to maintain your budget as cloud computing expands. Cost analysis need to be performed in order to understand cloud resource use and spending across your cloud accounts, environment, team, etc. The CloudBolt CSMP Cost Analysis tool gives you insight into your cloud spending trends over the previous 12 months. You can discover the price of each service and how it contributes to your overall cloud expenditure.

Cost analysis may help you identify patterns in cloud spending, view aggregated costs, and discover where expenses are incurred. You may also keep track of total spending over time and use this information to forecast quarterly, monthly, or yearly expense patterns in relation to a certain budget.

Prerequisites

Your CloudBolt CSMP role must have access to use Cost Analysis action under the financial module. You must have a billing adapter created for your cloud provider account.

Cost Analysis Report for AWS

Use this procedure to generate cost analysis report for your AWS billing account.

Accessing Cost Analysis

1. Login to your CloudBolt CSMP account.
2. Navigate to **Cost > Cost Analysis**.
3. Select the cloud provider as AWS by clicking the AWS box at the top of the page.

Filters Setting

Set the filters to view the cost analysis report based on billing account, group, accounts, regions, tags, etc. Filter settings are optional. If you do not select any value for a specific filter, all the available values will be considered selected for such filters. By default, a billing account would be selected for the billing account filter. All filters are combined together using 'and' logic, which means that only those records that meet all the selected filter values are displayed.

1. To access filters, click **Filters** within the AWS cloud provider box. Following options are available to filter the cost analysis report:
    - **Billing Account** allows you to select an AWS billing adapter (management account).
    - **Group** field would list all the adapter groups created for the chosen billing account. You can select a group. As you select a group, the accounts and tags filters fields will populate the normal adapters (accounts) and tags associated with the selected adapter group. The group field is to leverage the selection of multiple accounts and tags at once.

      If your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled, selecting a group in the group filter, the applied tags details associated with the selected group will not be displayed. Although specific tag details and their configurations will not be displayed directly on the cost report page, the cost calculations will still account for these tags and their

settings. Consequently, the cost values you see will be influenced by the tag key-value pairs and the operators defined for the group.

- **Accounts** field allows you to select your AWS member account whose cost analysis report you want to view. If you had selected a group, accounts that are part of selected group would be selected automatically. You can select other account(s) as per your requirement from the drop-down list. You can select all the accounts using the **Select All** check box or select a subset of accounts by clicking them in the list. To remove an account from the selection, you can clear the check box for individual accounts.
- **Regions** drop-down list allows you to specify the geographic locations whose cost analysis report you want to view. You can select all AWS regions using the **Select All** check box or select a subset of regions by clicking them in the list.
- **Services** allows you to filter the cost analysis report based on the selected AWS services. You can select all the services using the **Select All** check box or a subset of services by clicking them in the list.
- **Applied Tags** allows you to filter the cost analysis report based on tag key-value pairs attached to your AWS services/resources. Enter a tag key in the Tag Key box. The tag value would be populated based on the tag key; you must select a tag value from the list and then click . You can add up to ten tag key-value pairs to filter your cost report. Whenever you add two or more different tag key types, you must choose an operator from the tag operator selection box to join those tag filters. By default, OR operator will be selected, which means that cost analysis report would be generated for all the selected tags. Selecting AND operator means that cost analysis report would be generated when all the selected tags are available to a service, account, resource, etc.

  If you had selected a group, the associated tag key-value pair(s) would automatically appear in **applied tag** filters. If the selected group has multiple tag filters applied, by default, the AND operator would be selected to join tag filters.

There are instances when some of your user-defined cost allocation tags from the AWS account do not appear correctly in the applied tags filter. To view the complete list of available tags on the CSMP cost reporting page, you need to activate them in the AWS Management Console. Follow these steps to activate cost allocation tags in your AWS account:

a. Sign in to the AWS Management Console and open the AWS Billing and Cost Management console at https://console.aws.amazon.com/billing/.
b. In the navigation pane, select "Cost Allocation Tags."
c. Choose the tag keys that you want to activate.
d. Click "Activate."
e. After creating and applying user-defined tags to your resources, it may take up to 24 hours for the tag keys to appear on your cost allocation tags page for activation. Once they appear, it can take up to another 24 hours for the tag keys to be fully activated.

This filter option will not be available if your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled.

- **Applied Group Tags** allows you to filter the cost analysis report based on the custom labels applied to the groups. Enter the group tag key in Group Tag Key box. Select the group tag value from the drop-down list. Click to apply the specified group tag key-value pair(s) as applied group tags filter. You can add up to ten group tags as filter. Whenever you add two or more different group tag key types, you must choose an operator from the group tag operator selection box to combine those group tag pairs. By default, OR operator will be selected, which means that cost report would be generated for all groups that contains any of the specified group tag pairs. Selecting AND operator means that cost report would be generated only for such groups that have all the specified group tag pairs.
  Applied Group Tags filter option will not be available if you had selected a group from the group filter drop-down list.

This filter option will not be available if your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled.

- **Applied Account Tags** allows you to filter the cost analysis report based on account tag key-value pairs attached to your AWS accounts. Enter an account tag key in the **Account Tag Key** box. The account tag value would be populated based on the account tag key; you must select an account tag value from the list and then click . You can add up to ten account tag key-value pairs to filter your cost report. Whenever you add two or more different account tag key types, you must choose an operator from the account tag operator selection box to join those account tag filters. By default, OR operator will be selected, which means that cost analysis report would be generated for all the selected account tags. Selecting AND operator means that cost analysis report would be generated when all the selected account tags are available to an account.

  If you recently added account tags to your AWS accounts, you would need to wait up to 24 hours to use them to filter the cost analysis report.

2. Click **Apply** within the filters setting area to create the cost analysis report based on the selected filters.
3. **Clear Filters** would delete all filter field settings and set the billing account selection to default.
4. To collapse the filter settings area, click **Filters** within the AWS cloud provider box.

Customize Cost Analysis Report

By default, cost analysis report displays the **Unblended** value for all the **Account IDs** available for the selected billing account. The cost analysis report generates data for previous 12 months. You can easily customize the cost analysis report using the dimensions and metrics. To know more about dimensions and metrics, see customize report section of cost report for AWS. The dimensions and metrics available to customize your cost analysis report depends on the report profile shared with your CloudBolt CSMP tenant and organisation (child/reseller/customer). Use following procedure to customize the cost analysis report as per your requirements:

1. Click **Customize Report** button available at the upper right corner of the Cost Analysis Report.
2. Select a dimension other than Account ID as per your requirement from the drop-down menu available at the left side of the report. Currently only one dimension selection is allowed.
3. Select a metric other than Unblended from the drop-down menu available on the right side of the report. You can add up to four metrics to a cost analysis report. To add more metrics, click the icon and select a metric from the drop-down menu. After adding all the required metrics, click **Apply**. To reset the dimension and metrics, click **Cancel**.
4. The cost analysis report would display the data as per the set dimension and metrics.
5. Click the '**Load More...**' button at the end of the report to load more data into the cost analysis report. Once all the data is displayed, the '**Load More...**' button will become inactive.

Cost Analysis Report for Azure

Use this procedure to generate cost analysis report for an Azure billing subscription.

Accessing Cost Analysis

1. Login to your CloudBolt CSMP account.
2. Navigate to **Cost > Cost Analysis**.
3. Select the cloud provider as Azure by clicking the Azure box at the top of the page.

Filters Setting

Set the filters to view the cost analysis report based on billing subscription, group, subscriptions, regions, services, tags, etc. Filter settings are optional. If you do not select any value for a specific filter, all the available values will be considered selected for such filters. By default, a billing subscription would be selected for the billing subscription filter. All filters are combined together using 'and' logic, which means that only those records that meet all the selected filter values are displayed.

1. To access filters, click **Filters** within the Azure cloud provider box. Following options are available to filter the cost analysis report:
    - **Billing Subscription** allows you to select an Azure billing adapter.
    - The **Group** field would list all the adapter groups created for the chosen billing subscription. You can select a group. As you select a group, the customer name (when a CSP billing adapter is selected), subscriptions, and tags filter fields will populate the customer name, normal adapters (subscriptions), and tags associated with the selected adapter group. The group field is to leverage the selection of multiple subscriptions and tags at once.
    - **Subscription** field allows you to select your Azure member subscription whose cost analysis report you want to view. If you had selected a group, subscriptions that are part of the selected adapter group would be selected automatically. You can select additional subscriptions as per your requirements from the drop-down list. You can select all the subscriptions using the **Select All** check box or select a subset of subscriptions by clicking them in the list. To remove a subscription from the selection, you can clear the check box for individual subscriptions.
    - The **Location** drop-down list allows you to specify the geographic locations whose cost analysis you want to view. You can select all Azure locations using the **Select All** check box or select a subset of locations by clicking them in the list.
    - **Services Name** allows you to filter the cost analysis report based on the selected Azure services. You can select all the services using the **Select All** check box or a subset of services by clicking them in the list.
    - **Currency** allows you to select the currency in which you want to see the cost analysis report. This filter is applicable only when an Azure CSP multi-currency billing subscription has been selected.
    - **Cost Type** allows you to select all the cost types or a subset of cost types by clicking them in the list. This filter is applicable only when an Azure CSP billing subscription has been selected.

- **Customer name** allows you to select customer names whose cost analysis report you would like to see. If you had selected a group, customer names that are part of the selected adapter group would be selected automatically. You can select additional customer names as per your requirements from the drop-down list. You can select all the customer names using the **Select All** check box or select a subset of customer name by clicking them in the list. To remove a customer names from the selection, you can clear the check box for individual customer names. This filter is applicable only when an Azure CSP billing subscription has been selected.
- **Applied Tags** allows you to filter the cost analysis report based on key-value pairs attached to your Azure services/resources. Enter a tag key in the Tag Key box. The tag value would be populated based on the tag key; you must select a tag value from the list and then click . You can add up to ten tag key-value pairs to filter your cost report. Whenever you add two or more different tag key types, you must choose an operator from the tag operator selection box to join those tag filters. By default, OR operator will be selected, which means that cost analysis report would be generated for all the selected tags. Selecting AND operator means that cost analysis report would be generated when all the selected tags are available to a service, account, resource, etc. If you had selected a group, the associated tag key-value pair(s) would automatically appear in **applied tag** filters. If the selected group has multiple tag filters applied, by default, the AND operator would be selected to join tag filters.
- **Applied Group Tags** allows you to filter the cost analysis report based on the custom labels applied to the groups.Enter the group tag key in Group Tag Key box. Select the group tag value from the drop-down list. Click to apply the specified group tag key-value pair(s) as applied group tags filter. You can add up to ten group tags as filter. Whenever you add two or more different group tag key types, you must choose an operator from the group tag operator selection box to combine those group tag pairs. By default, OR operator will be selected, which means that cost report would be generated for all groups

that contains any of the specified group tag pairs. Selecting AND operator means that cost report would be generated only for such groups that have all the specified group tag pairs.
Applied Group Tags filter option will not be available if you had selected a group from the group filter drop-down list.

- **Applied Subscription Tags** allows you to filter the cost analysis report based on key-value pairs attached to your Azure subscriptions. Enter a subscription tag key in the Subscription Tag Key box. The subscription tag value would be populated based on the entered subscription tag key; you must select a subscription tag value from the list and then click . You can add up to ten subscription tag key-value pairs to filter your cost report. Whenever you add two or more different subscription tag key types, you must choose an operator from the subscription tag operator selection box to join those subscription tags as a filter. By default, OR operator will be selected, which means that cost analysis report would be generated for all the selected subscription tags. Selecting AND operator means that cost analysis report would be generated when all the selected subscription tags are available to a subscription.

2. Click **Apply** within the filters setting area to create the cost analysis report based on the selected filters.
3. **Clear Filters** would delete all filter field settings and set the billing subscription selection to default.
4. To collapse the filter settings area, click **Filters** within the Azure cloud provider box.

Customize Cost Analysis Report

By default, cost analysis report displays the **Cost** value for all the **Subscriptions** available for the selected billing subscription. The cost analysis report generates data for previous 12 months. You can easily customize the cost analysis report using the dimensions and metrics. To know more about dimensions and metrics, see customize report section of cost report for Azure. The dimensions and metrics available to customize your cost analysis report depends on the report profile shared with your CloudBolt CSMP tenant and

organisation (child/reseller/customer). Use following procedure to customize the cost analysis report as per your requirements:

1. Click **Customize Report** button available at the upper right corner of the Cost Analysis Report.
2. Select a dimension other than Subscription as per your requirement from the drop-down menu available at the left side of the report. Currently only one dimension selection is allowed.
3. Select a metric other than Cost from the drop-down menu available on the right side of the report. You can add up to four metrics to a cost analysis report. To add more metrics, click the icon and select a metric from the drop-down menu. After adding all the required metrics, click **Apply**. To reset the dimension and metrics, click **Cancel**.
4. The cost analysis report would display the data as per the set dimension and metrics.
5. Click the '**Load More...**' button at the end of the report to load more data into the cost analysis report. Once all the data is displayed, the '**Load More...**' button will become inactive.

Cost Analysis Report for GCP

Use this procedure to generate cost analysis report for a GCP billing project.

Accessing Cost Analysis

1. Login to your CloudBolt CSMP account.
2. Navigate to **Cost > Cost Analysis**.
3. Select the cloud provider as GCP by clicking the GCP box at the top of the page.

Filters Setting

Set the filters to view the cost analysis report based on billing project, group, sub accounts, projects, labels, etc. Filter settings are optional. If you do not select any value for a specific filter, all the available values will be considered selected for such filters. By default, a billing project would be selected for the billing project filter. All filters are combined together using

'and' logic, which means that only those records that meet all the selected filter values are displayed.

1. To access filters, click **Filters** within the GCP cloud provider box. Following options are available to filter the cost analysis report:
    - **Billing Project** allows you to select a GCP billing project.
    - The **Group** field would list all the adapter groups created for the chosen billing project. You can select a group. As you select a group, the sub account, project, and labels filter fields will populate the sub accounts, projects, and labels associated with the selected adapter group.
    - **Sub Account** allows you to select sub-accounts of the GCP organization. If you had selected a group, sub-accounts would be selected based on the group selected. You can change it as per your requirements. You can select all the sub accounts using the **Select All** check box or select a subset of sub accounts by clicking them in the list. To remove a sub-account from the selection, you can clear the check box for individual sub-accounts.
    - **Project** field allows you to select your GCP projects whose cost analysis report you want to view. If you had selected a group, projects that are part of the selected adapter group would be selected automatically. You can select additional projects as per your requirements from the drop-down list. You can select all the projects using the **Select All** check box or select a subset of projects by clicking them in the list. To remove a project from the selection, you can clear the check box for individual projects.
    - The **Location** drop-down list allows you to specify the geographic locations whose cost analysis you want to view. You can select all GCP locations using the **Select All** check box or select a subset of locations by clicking them in the list.
    - **Services** allows you to filter the cost analysis report based on the selected GCP services. You can select all the services using the **Select All** check box or a subset of services by clicking them in the list.

- **Applied Labels** allows you to filter the cost analysis report based on the label key-value pairs attached to your GCP services. Enter a label key in the Label Key box. The label value would be populated based on the label key; you must select a label value from the list and then click . You can add multiple label filters. Whenever you add two or more label filters, you must choose an operator to join those label filters. By default, OR operator will be selected. If you had selected a group, the associated label key-value pair(s) would automatically appear in label filters. If the selected group has multiple label filters applied, by default, the AND operator would be selected to join label filters.

2. Click **Apply** within the filters setting area to create the cost analysis report based on the selected filters.
3. **Clear Filters** would delete all filter field settings and set the billing project selection to default.
4. To collapse the filter settings area, click **Filters** within the GCP cloud provider box.

Customize Cost Analysis Report

By default, cost analysis report displays the **Cost** value for all the **Project IDs** available for the selected billing project. The cost analysis report generates data for previous 12 months. You can easily customize the cost analysis report using the dimensions and metrics. To know more about dimensions and metrics, see customize report section of cost report for GCP. The dimensions and metrics available to customize your cost analysis report depends on the report profile shared with your CloudBolt CSMP tenant and organisation (child/reseller/customer). Use following procedure to customize the cost analysis report as per your requirements:

1. Click **Customize Report** button available at the upper right corner of the Cost Analysis Report.
2. Select a dimension other than Project ID as per your requirement from the drop-down menu available at the left side of the report. Currently only one dimension selection is allowed.
3. Select a metric other than Cost from the drop-down menu available on the right side of the report. You can add up to four metrics to a cost analysis report. To add more

metrics, click the icon and select a metric from the drop-down menu. After adding all the required metrics, click **Apply**. To reset the dimension and metrics, click **Cancel**.

4. The cost analysis report would display the data as per the set dimension and metrics.
5. Click the '**Load More...**' button at the end of the report to load more data into the cost analysis report. Once all the data is displayed, the '**Load More...**' button will become inactive.

Cost Analysis Report for VMware

Use this procedure to generate cost analysis report for a VMware billing vCenter.

Accessing Cost Analysis

1. Login to your CloudBolt CSMP account.
2. Navigate to **Cost > Cost Analysis**.
3. Select the cloud provider as VMware by clicking the VMware box at the top of the page.

Filters Setting

Set the filters to view the cost analysis report based on billing vCenter, vCenters, services, and tags. Filter settings are optional. If you do not select any value for a specific filter, all the available values will be considered selected for such filters. By default, a billing vCenter would be selected for the billing vCenter filter. All filters are combined together using 'and' logic, which means that only those records that meet all the selected filter values are displayed.

1. To access filters, click **Filters** within the VMware cloud provider box. Following options are available to filter the cost analysis report:
    - **Billing vCenter** allows you to select a VMware billing vCenter.
    - **Group** allows you to filter the cost analysis report based on the vCenters group. For the chosen billing vCenter, pick a VMware vCenters group for which you want to see the cost data. Selecting a vCenters group would

populate the vCenters and applied tag filters with all the vCenters and tags associated with the selected group.

- **vCenter** drop-down list allows you to select your VMware vCenters whose cost analysis report you want to view. You can select all the vCenters using the **Select All** check box or select a subset of vCenters by clicking them in the list. To remove a vCenter from the selection, you can clear the check box for individual vCenters.
- **Services** allows you to filter the cost analysis report based on the selected VMware services. You can select all the services using the **Select All** check box or a subset of services by clicking them in the list.
- **Applied Filters** allows you to filter the cost analysis report based on tag key-value pairs attached to your VMware services/resources. To apply a tag filter, enter a tag key in the Tag Key box. The tag value would be populated based on the tag key; you must select a tag value from the list and then click . You can add multiple tag filters. Whenever you add two or more tag filters, you must choose an operator to join those tag filters. By default, OR operator will be selected.

2. Click **Apply** within the filters setting area to create the cost analysis report based on the selected filters.
3. **Clear Filters** would delete all filter field settings and set the billing vCenter selection to default.
4. To collapse the filter settings area, click **Filters** within the VMware cloud provider box.

Customize Cost Analysis Report

By default, cost analysis report displays the **Cost** value for all the **vCenters** available for the selected billing vCenter. The cost analysis report generates data for previous 12 months. You can easily customize the cost analysis report using the dimensions and metrics. To know more about dimensions and metrics, see customize report section of cost report for VMware. The dimensions and metrics available to customize your cost analysis report depends on the report profile shared with your CloudBolt CSMP tenant and organisation

(child/reseller/customer). Use following procedure to customize the cost analysis report as per your requirements:

1. Click **Customize Report** button available at the upper right corner of the Cost Analysis Report.
2. Select a dimension other than vCenters as per your requirement from the drop-down menu available at the left side of the report. Currently only one dimension selection is allowed.
3. Select a metric other than Cost from the drop-down menu available on the right side of the report. You can add up to four metrics to a cost analysis report. To add more metrics, click the icon and select a metric from the drop-down menu. After adding all the required metrics, click **Apply**. To reset the dimension and metrics, click **Cancel**.
4. The cost analysis report would display the data as per the set dimension and metrics.
5. Click the '**Load More…**' button at the end of the report to load more data into the cost analysis report. Once all the data is displayed, the '**Load More…**' button will become inactive.

Outcomes

You have learnt how to generate a cost analysis report for your cloud computing needs. Based on the analysis report, you can now create budgets for your cloud usage.

7.3. Favourite Cost Reports

You can customize reports according to your requirement and add these reports to Favourite. Later you can view the reports as required.

Customizing reports

Reports in CloudBolt are customizable. You can do the following with the reports:

- For each Service Providers, you can view/save by Group, Accounts, Services, Regions, Tags, API operations and Purchase options.
- View by category such as Compute, Database, Storage, and Data Transfer.
- Remove or add the upfront charges, tax, support charges, refunds under general, tax or Enterprise refund programs, or credits if any.
- Filter by Billing Entity, Accounts, regions, services or apply tags.
- Share the reports with users and Tenants also.
- Download in Excel sheet or PDF format.
- View in bar, line or area graph format.

Follow these steps to create a favourite report.

1. Logon to CloudBolt CSMP. Navigate to **Cost > Favourite Reports**.
2. Click **+ Add Favourite** and select the cloud provider.
3. You would be redirected to cost report page of selected cloud provider.
4. Update the filters setting by referring to below links as per the selected cloud provider.
    - AWS Cost Report Filters Setting
    - AWS RI Utilization Report Filters Setting
    - Azure Cost Report Filters Setting
    - Azure RI Utilization Report Filters Setting
    - GCP Cost Report Filters Setting

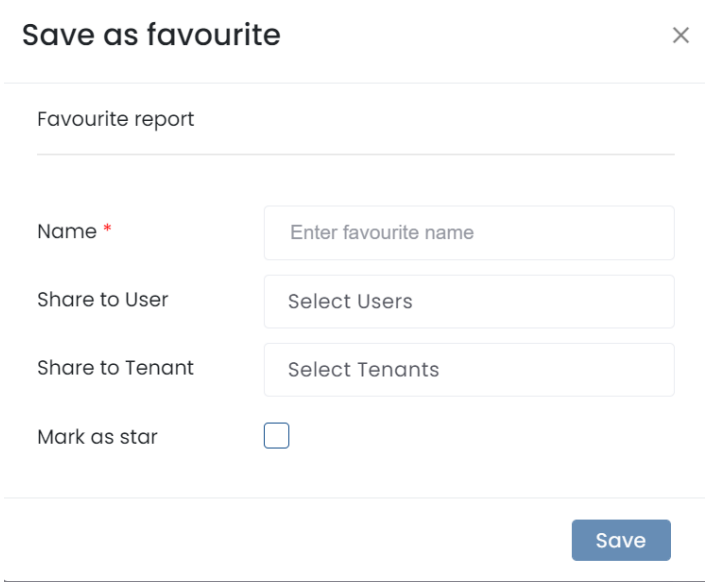
- VMware Cost Report Filters Setting

5. After applying the filters setting for a cloud provider, click **Save** button available at the upper right corner. For this instance, we are creating AWS cost favourite report.

Spend overview graph and customize report settings would also be retained as part of a favourite report.
Favourite reports that have multiple tags applied as a filter and were created before October 2023 will have those tags joined together using AND logic.



6. Save as favourite page appears.



7. Enter a name for this favourite report.
8. Enter the name of users whom you want to share the report with. You can select users of your colleague tenant only.
9. Select the Tenants to share the report with. You can select the tenants whose access you have.
10. Select Mark as star check box to mark the report with star mark.
11. Click **Save**.

Important Considerations

When working with favourite reports, please be aware of the following scenarios that may result in error messages:

Default Database Error

If you encounter the error message: **"Unable to create the favourite report as DB set as default"** .

This indicates that the database has been set as the default, preventing the creation of a new favourite report. Please contact our support team for assistance.

Error Messages for Missing Adapters or Metrics

If you attempt to open an Azure CSP favourite report that has a billing adapter, normal adapter, or metric associated with it that has since been removed or unshared from your account, you will be redirected to the default cost report page with an error message, such as: **"Favourite Report cannot be viewed because it does not have the required billing and normal adapter"**.

Group Deletion

If you have selected a group in the filter settings and that group has since been deleted, you will not be able to access such favourite report. You will be redirected to the default cost report page with an error message, such as: **"The group associated with the selected favourite report does not exist in your current tenant. The selected favourite report cannot be opened currently"**.

Deleted Metrics

If access to a metric is deleted from a report profile shared with your organisation or tenant, any favourite reports created using those metrics will show an error like: **"Failed to apply the selected favourite report because required metrics/filters are restricted from Report Profile"**.

In such cases, you must contact your administrator.

Cost Allocation Rules Deletion

If you have saved a favourite report with a cost allocation filter applied, and that allocation rule is now deleted, the report will display an error message in the spend overview chart, such as: **"No data to display"** .

Deleted Billing Configuration

If a favourite report was saved with a specific billing configuration under the "Applied Billing

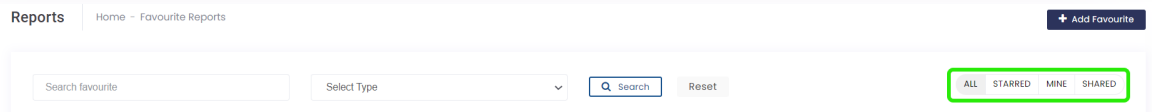
Configuration" option, and that configuration has since been deleted, you will encounter an error like: **"The billing configuration associated with the selected favourite report does not exist in your current tenant. The selected favourite report cannot be opened currently"**.

Error Message for Changes in 'Monthly Period Based On' Setting
If you attempt to open a GCP favourite report whose associated billing adapter has been updated for the 'Monthly Period Based On' option, changing it from Usage to Invoice, you will see an error message, such as: **"Failed to apply the favourite report due to a change in the billing adapter's 'Monthly Period Based On' option from Usage to Invoice"**.

Managing Favourite Reports

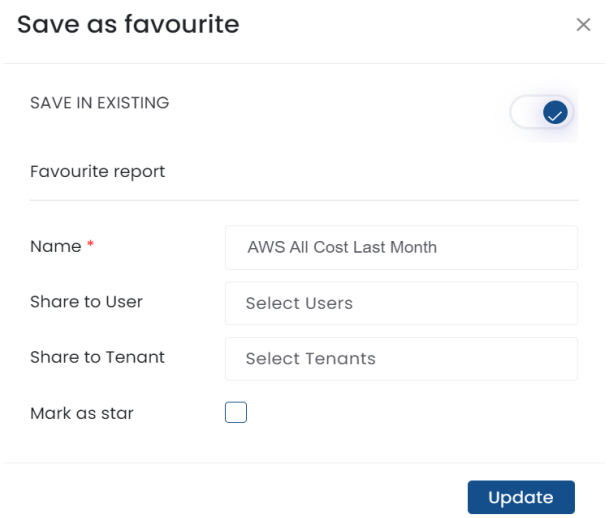
Use this procedure to manage your favourite reports created earlier. You can view, edit, copy, delete, share a favourite report.

1. Logon to CloudBolt CSMP. Navigate to **Cost > Favourite Reports**.
2. A list of all the existing favourite report will appear.
3. You can filter the favourite report list based on their name and favourite report type. Enter the favourite report name string in the **Search favourite** box and click **Search**. Click Reset to clear the filters.
4. You can also use toggle buttons on right side to filter the favourite reports.



   - ALL: Displays all the favourite reports.
   - STARRED: Displays star marked favourite reports.
   - MINE: Displays favourite reports created by you.
   - SHARED: Displays favourite reports which you have shared with different users and tenants.
5. Click **Edit** option under the Action column of a favourite report to edit the favourite report.

- After updating the required changes, click **Apply**, and then **Save Report**.



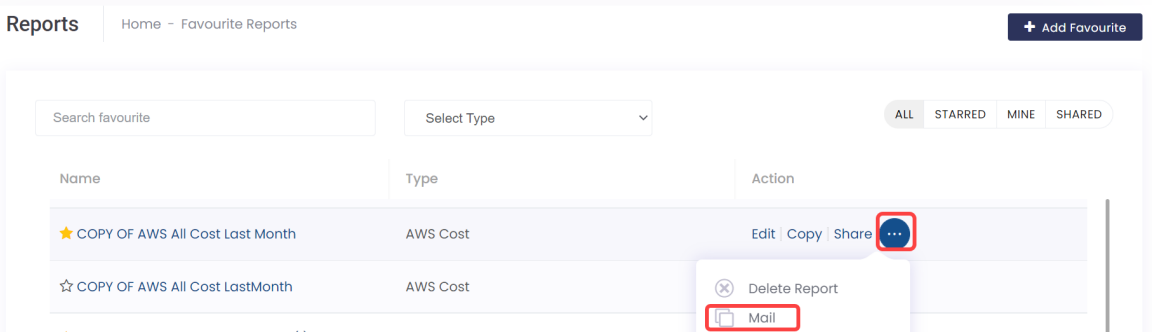
- Select the options as required and click **Update** or **Save** depending on your selection for SAVE IN EXISTING option.

6. Click **Copy** option under the Action column of a favourite report to create a copy of the selected favourite report. A new favourite report will be created with same name having prefix as COPY OF. If you are copying of a favourite report whose copy already exists, the new copied favourite report will be renamed with a number suffix along with the usual prefix.
7. Click **Share** option under the Action column of a favourite report to share the selected favourite report with users and tenants.
   - In the **Users** box, select username with whom you want to share this favourite report.
   - In the **Tenants** box, select the tenants with whom you want to share this favourite report.
8. Click **Delete** Report option under ellipsis icon of the Action column to delete selected favourite report.
   - You will see a message similar to: You want to delete this favourite?
   - Click **OK** to delete the favourite report.

Scheduling Email Notification for a Favourite Report

You can share a favourite report via email at set interval.

1. Logon to CloudBolt CSMP. Navigate to **Cost > Favourite Reports**.
2. Identify the favourite report for which you want to set the email schedule.
3. Click the ellipsis icon under the Action column and select **Mail**.



4. On the **Schedules** page, click **+ Create Schedule**.
5. On the **Schedule** page, fill the details as follows.

Field Name	Notes
Name	Enter a name for this schedule.
Schedule For	Select an email frequency for the selected favourite report. If you select **Weekly**, you must select a day on which email should be sent.
Starts On	Select start date and time for the schedule.
Send To	Select among Roles and Users. When Roles is selected, you must choose the roles whose users you want to sent this favourite report notifications. When Users is opted, you

Field Name	Notes
	must select the users whom you want to receive this notification.
Custom Emails	Enter an email to receive this notification. Click **+** icon to add the email id.

6. Click **+ Create** to create the mail schedule.
7. A list of all the schedules for selected favourite report will be displayed on **Schedules** page of that favourite report.
8. You can view, edit, and delete a schedule by selecting the appropriate option under the ellipsis icon of the Action column.

Outcome

You can customize your reports, save them as Favourite, and share them with others for viewing anytime later.

7.4. Cost Allocation Reports

Learn how to navigate the Cost Allocation Reports UI in CSMP to view the cost distributions for your shared platform usage.

- AVS Cost Allocation Reports
- Red Hat OpenShift Service on AWS and Azure Cost Allocation Reports

7.4.1. AVS Cost Allocation Reports

Learn to see the AVS cost allocation report in Sankey chart view.

Introduction

As your team incurs expenses from procuring infrastructure through the Azure VMware Solution (AVS), it becomes crucial to allocate these costs effectively. To achieve this, you want to allocate costs to VMware adapters associated with vCenters, resource pools, and specific tag key types using reference-based cost allocation. The reference-based cost allocation method allows you to compute the expenses for an individual virtual machine (VM) by proportionally distributing costs based on the ratios of CPU, memory, and storage in relation to the overall CPU, memory, and storage within your cloud infrastructure.

The **cost allocation reports** feature is essential for monitoring and analysing how these costs are distributed across VMware adapters, resource pools, and selected tags. These reports utilise a Sankey chart to visually represent the allocation of costs, using node methodology to distribute expenses.

In this article, you will learn about the default flow configuration settings, how to customise these settings to meet your requirements, and how to interpret the Sankey chart visualisation with an example scenario.

Use Cases

1. When you want to analyse the distribution of AVS infrastructure costs on a monthly basis across vCenters, resource pools, specific service tags, and group tags.
2. When you want to evaluate and allocate AVS infrastructure costs for the past quarters across vCenters, resource pools, service tags, and group tags.
3. When you want to understand and allocate AVS infrastructure costs over the past six months for vCenters, resource pools, service tags, and group tags.

4. When you want to provide a comprehensive view of AVS infrastructure cost distribution over the past year for vCenters, resource pools, service tags, and group tags.
5. When you want to analyse how AVS costs are distributed across various vCenters, resource pools, service tags, and group tags.
6. When you want to identify and manage untagged AVS costs that are not properly categorised.
7. When you want to download the AVS cost allocation details in CSV format.

Prerequisites

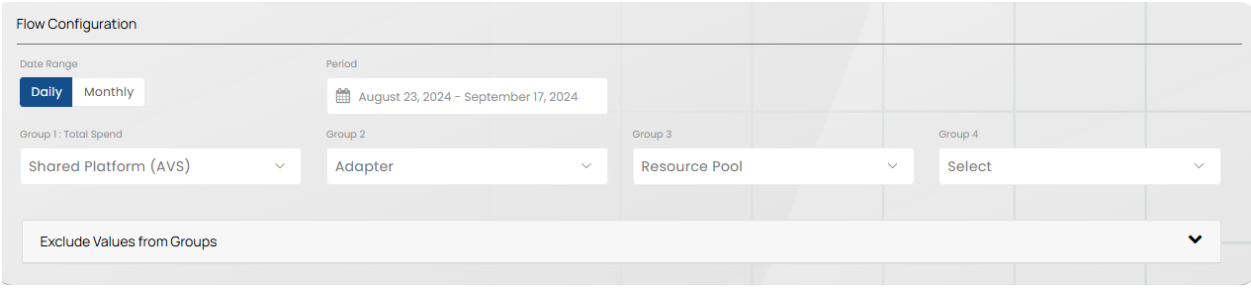
Before you can enable the cost allocation reports feature for your CSMP account, ensure the following prerequisites are met:

1. **Contact Support**: Reach out to our support team to initiate the process of enabling the cost allocation reports feature for your account.
2. **User Role Permissions**: Verify that the role associated with your user account has view permissions for the Cost Allocation Report module and access to the Shared Platform (AVS) on the Access Management page.
3. **Account Configuration**:
    - **Azure Billing Adapter**: Ensure that your CSMP account includes at least one Azure Billing Adapter with a 'Specialized Compute' Amortized Cost greater than 0 for the selected period.
    - **VMware Adapter**: Confirm that at least one VMware Adapter has inventories set and available for the selected period.

Navigate to Cost Allocation Reports

1. Log in to your CloudBolt CSMP account.
2. Navigate to **Cost > Cost Allocation Reports**.

Flow Configuration



In the flow configuration for the Sankey chart, you can apply period filters and configure groups (segmentation points) to customise your cost allocation view. Below are the details for setting up the period filter and groupings:

Period Filter Section

The Period Filter section allows you to select a date range for your cost allocation report, enabling a more tailored analysis based on your specific needs. This filter offers two options: **Date Range** and **Period**.

Select Date Range

First, choose a date range from the options available—**Daily** or **Monthly**. Based on your selection, the available period options will vary:

For Daily:

- Options include:
    - "This Month"
    - "Last Month"
    - "Yesterday"
    - "Last 7 Days"
    - "Last 14 Days"
    - "Last 21 Days"
    - "Last 30 Days"
    - "Last 45 Days"
    - Custom date range

For Monthly:

- Options include:
    - "This Month"
    - "Last Month"
    - "Last 3 Months"
    - "Last 6 Months"
    - "Last 9 Months"
    - "Last 12 Months"
    - Custom date range

Node Groups

In the Sankey chart, you can use different node groups to distribute costs. The available nodes and their options are as follows:

1. **Group 1: Shared Platform**
   This static node represents the shared platform, i.e., AVS and displays the total cost to be allocated for the selected period. Ensure that you have selected Shared Platform (AVS) for this node group. It reflects the total cost incurred from infrastructure purchases made through AVS.
   Costs flow from this node to the other nodes, providing a baseline for all subsequent cost distributions.
2. **Group 2: Adapter**
   By default, this node represents VMware adapters. It can also be configured to represent resource pool, service tag key, vCenter, or group tag key.
   Costs flow from the Shared Platform node to the node Group 2 (Adapters). This node represents how the total costs are allocated to different adapters.
3. **Group 3: Resource Pool**
   This node displays VMware resource pool names associated with the Group 2 node. By default, Resource Pool is the setting for Group 3. You can change it to adapter, a service tag (tags), vCenter, or a group tag. However, it cannot be the same node type as that selected for Group 2.
   Costs flow from the node Group 2 (Adapters) to the node Group 3 (Resource Pool).

This node shows how the costs associated with adapters are distributed among different resource pools.

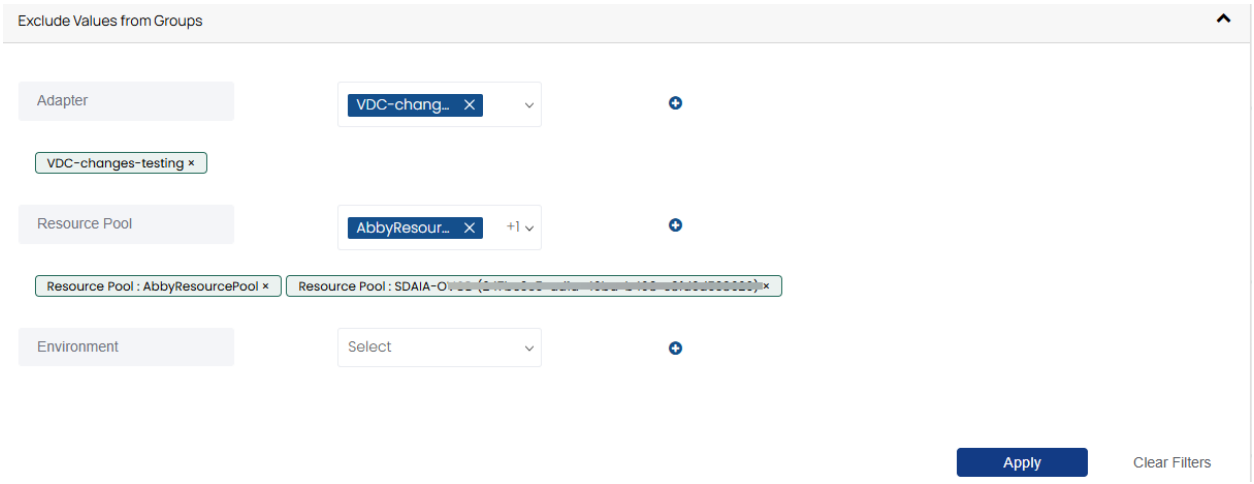
4. **Group 4: Tags**

   By default, this node represents tags. To select a service tag key, click the drop-down icon in the Group 4 box, hover over the tags, and choose the desired service tag key. You can also select a group tag key, adapter, vCenter, or resource pool, as long as it has not been selected for previous nodes.

   Costs flow from the node Group 3 (Resource Pools) to the node Group 4 (Tags). This node provides the most granular view, showing how costs from resource pools are further linked to different selected tag key's values.

To view the allocation report Sankey chart, you must select a value for each node group. To reset the values for node groups 2, 3, and 4, use the "Clear Selection" option available under the allocation funnel.

Exclude Values from Groups



This section allows you to exclude specific cost values for selected node group values from the total distributed cost in your cost allocation reports. Follow the steps below to configure exclusions effectively.

1. **Expand the Exclude Values Section**

   Click the expand icon for the **Exclude Values from Groups** section to reveal the available options for excluding costs.

2. **Select Node Groups**

   You can choose the values to exclude from node groups 2, 3, and 4:

- **Node Group 2:** In this article, the excluded values are VMware adapters.
- **Node Group 3:** In this article, the excluded values are resource pools.
- **Node Group 4:** In this article, the excluded values are those associated with the environment tag.

3. **Choose Values to Exclude**
   For each node group, click the select drop-down menu to display the available values. From this list, select the value(s) you want to exclude from the cost distribution.
4. **Add to Exclusion List**
   After selecting the desired value(s), click the plus icon available next to that row to add the selected value to the exclusion list. The excluded values for each node group will be displayed below the corresponding node group in the **Exclude Values from Groups** section.
5. **Apply Changes**
   Once you have added all the required values for each node group, click the **Apply** button within the **Exclude Values from Groups** section to implement your exclusions. This will update the cost distribution to reflect the exclusions.
6. **Clear Exclusion Filters**
   If you need to remove the exclusion filters, click the **Clear Filters** button. After clearing, ensure you click **Apply** again to update the distribution and remove the excluded values from the report.

Allocation Funnel

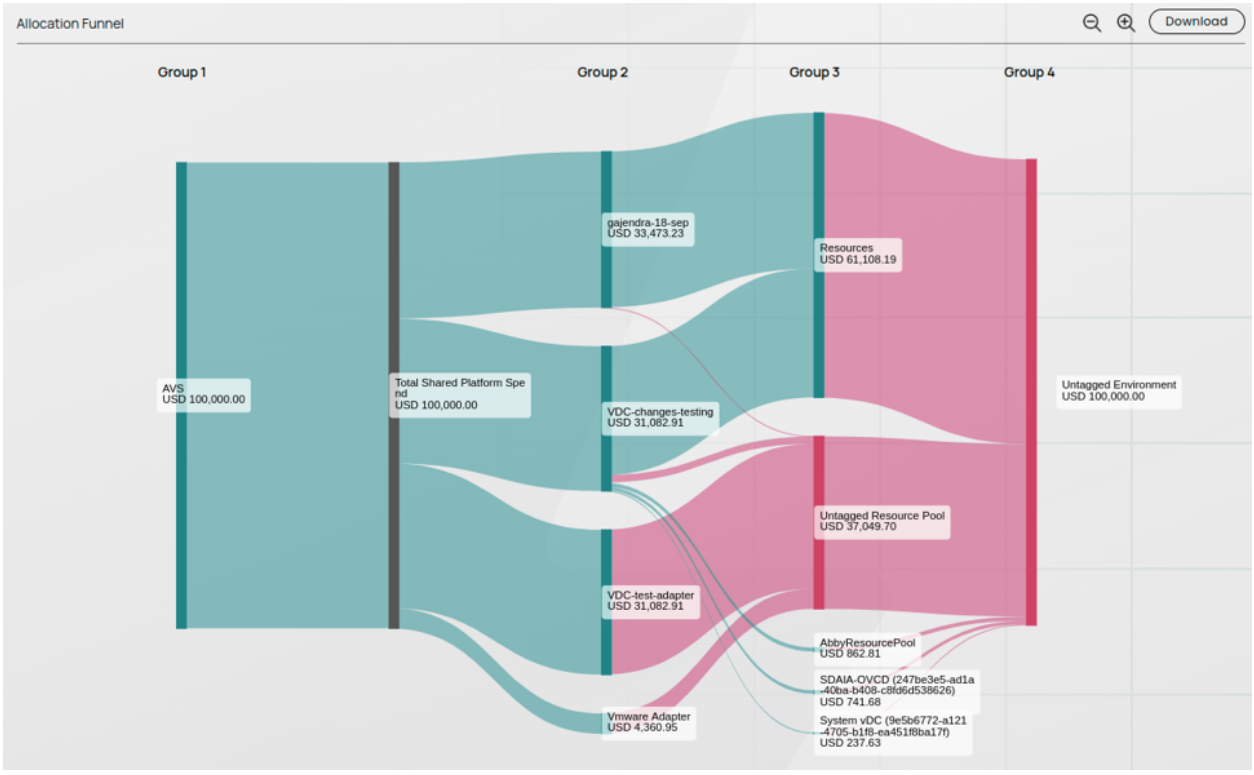


The allocation funnel provides the distribution percentage of allocated costs, excluding untagged costs, relative to the total spend. Any cost value not associated with the selected group type is classified as untagged cost. This helps in understanding how much of the total spend is allocated to the selected group type versus untagged costs.

The allocation funnel includes options to reset group selections for Groups 2, 3, and 4. The behavior of these reset options is as follows:

- **Clear Selection in Group 2**: Clicking 'Clear Selection' in Group 2 will reset the flow configuration dropdowns for Groups 2, 3, and 4. It also resets the distribution percentages for all three groups.
- **Clear Selection in Group 3**: Clicking 'Clear Selection' in Group 3 will reset the flow configuration dropdowns for Groups 3 and 4. It will also reset the distribution percentages for Groups 3 and 4.
- **Clear Selection in Group 4**: Clicking 'Clear Selection' in Group 4 will reset the flow configuration dropdowns for Group 4 only and reset the distribution percentage for Group 4.

Sankey Chart Visualisation and Flow



This section outlines the default flow configuration settings for the Sankey chart. Note that adjusting the flow configuration settings will alter the cost distribution accordingly.

1. **Starting Point**
   The Sankey chart initiates with the node group 1 (Total Spend), which displays the total cost for shared platform (AVS) for the selected period.
2. **Cost Distribution**
   - **From Shared Platform (AVS) to Node Group 2 (Adapters)**: The total cost is initially allocated to various VMware adapters within Node Group 2.
   - **From Node Group 2 (Adapters) to Node Group 3 (Resource Pool)**: Costs associated with each adapter are then distributed among different resource pools within Node Group 3. Costs not linked to any resource pool are categorised under "Untagged."
   - **From Node Group 3 (Resource Pools) to Node Group 4 (Tags)**: Costs from each resource pool are further allocated to various tag values of the selected tag key in Node Group 4. Costs that do not associate with any tag value of the selected tag key are grouped under "Untagged."
3. **Flow Widths**
   The width of the arrows or lines connecting the nodes represents the magnitude of cost allocation. Wider lines signify higher costs, offering a clear visual representation of cost distribution.
4. **Flow Colours**
   - **Blue Arrows**: Indicate costs associated with the subsequent node group.
   - **Red Arrows**: Represent untagged costs related to the subsequent node group.

Example Scenario

Consider the following flow configuration settings for your analysis:

- **Period**: This Month
- **Group 2**: VMware Adapters
- **Group 3**: Resource Pools
- **Group 4**: Tags (e.g., Environment)

In the Sankey chart, the flow of costs will be as follows:

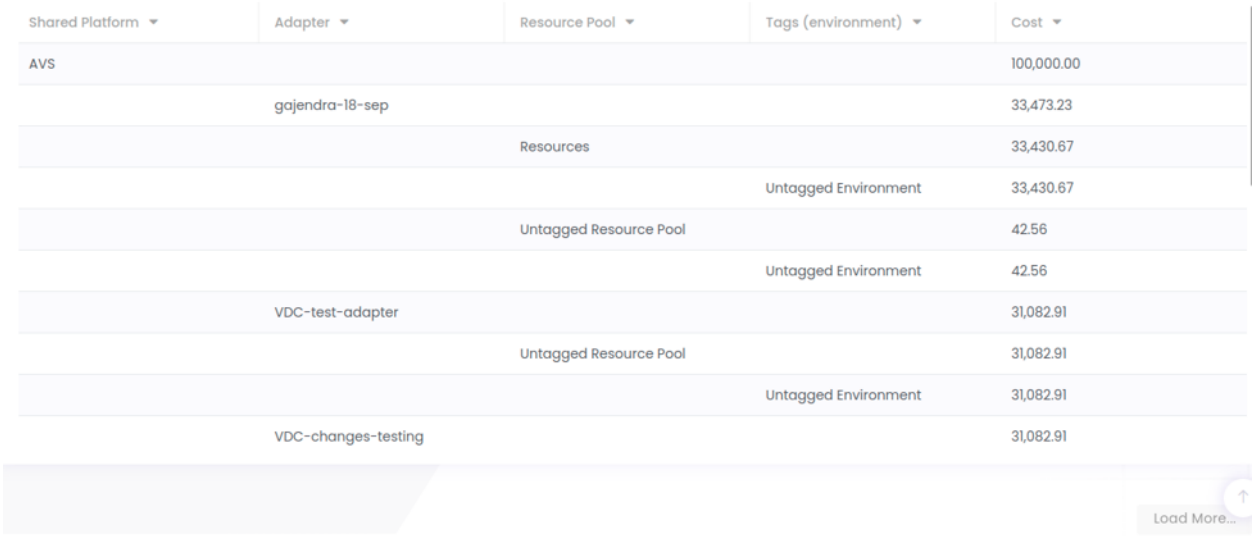
1. **Starting Point**: The group 1 (Total Spend) node displays the **Shared Platform (AVS)** total cost for the current month, excluding today's expenses.
2. **Distribution to VMware Adapters**: Costs are allocated from the Shared Platform node to various VMware Adapters within Group 2.
3. **Allocation to Resource Pools**: Costs associated with each VMware Adapter are further distributed to different Resource Pools within Group 3.
4. **Tag Distribution**: Finally, costs from each Resource Pool are allocated to specific tags under the selected tag key (e.g., Environment) in Group 4. This step illustrates how each tag value is affected by the cost distribution.

Sankey Chart Tabular View

Below the Sankey chart, the tabular view presents the chart data in an organised format. This tabular view complements the visual representation of the Sankey chart by providing a clear and detailed breakdown of cost distributions. The columns in the table correspond to the node groups defined in the flow configuration. Here’s how the data is structured based on our example scenario:

Table Columns

- **Shared Platform (AVS):** Represents the name of the shared platform i.e. AVS.
- **Adapter:** Lists the VMware Adapters from Group 2, with individual rows for each adapter.
- **Resource Pool:** Denotes the Resource Pools from Group 3, featuring rows for each resource pool name.
- **Tag (environment):** Displays the tag values under the Environment key in Group 4.
- **Cost:** Shows the cost associated with the row values.



Shared Platform	Adapter	Resource Pool	Tags (environment)	Cost
AVS				100,000.00
	gajendra-18-sep			33,473.23
		Resources		33,430.67
			Untagged Environment	33,430.67
		Untagged Resource Pool		42.56
			Untagged Environment	42.56
	VDC-test-adapter			31,082.91
		Untagged Resource Pool		31,082.91
			Untagged Environment	31,082.91
	VDC-changes-testing			31,082.91

Data Breakdown

Shared Platform Column

- This column indicates the total cost incurred for the AVS platform during the selected period.

Adapter Column

- Each row under this column corresponds to a specific VMware Adapter. The cost values displayed for each adapter contribute to the overall total for the AVS platform. The sum of all adapter costs should equal the total cost listed in the Shared Platform column.

Resource Pool Column

- Rows in this section represent various resource pools associated with each adapter. If an adapter incurs costs that are not linked to any specific resource pool, those costs will be categorised under "Untagged Resource Pool."
- The total cost for each adapter must match the sum of all associated resource pool costs, including those attributed to the untagged resource pool.

Tag (environment) Column

- This column details the costs associated with each resource pool, grouped by the values of the Environment tag key. If any costs lack a corresponding environment tag, they will be aggregated under the "Untagged Environment" row.

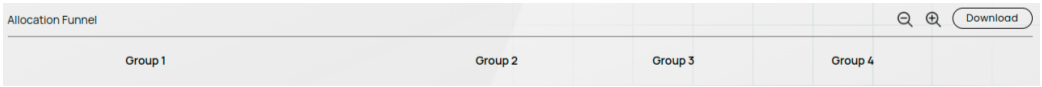
Sorting the Table Contents

You can sort each column by clicking the sort icon associated with it.

Download the Cost Allocation Report

You can download the AVS cost allocation report using the download button available within Sankey chart section. To obtain the AVS cost allocation report, follow these steps:

1. **Access the Download Option**
    - Go to the Sankey chart section.
    - Locate and click the **Download** button.



2. **Select the Date Range**
    - In the **Period** selection box, choose from the following predefined date ranges:
        - This Month
        - Last Month
        - Last 3 Months
        - Last 7 Days
        - Last 14 Days
        - Last 30 Days
    - For a custom date range, select **Custom Range** and specify your desired dates.
    - Click **Apply** to set the date range.
3. **Download the Report**

- After applying the date range, click **Download** to initiate the report download.

4. **View the Downloaded File**
   - The downloaded file will be in CSV format and will include the following columns:
     - Date: Displays the date corresponding to the available data.
     - Name: Name of the virtual machine.
     - VCenterId: Unique ID of the vCenter associated with the VM.
     - Vcenter_Name: Name of the vCenter associated with the VM.
     - CPU_Tier: CPU tier class.
     - CPUs: Total CPU cores utilised by the individual VM for the selected period.
     - Physical_CPU: Equivalent physical CPU numbers based on CPU tier and CPU cores utilised by the VM.
     - MemGB: Total memory utilised by the individual virtual machine for the selected period.
     - StorageGB: Total disk utilised by the individual virtual machine for the selected period.
     - vSAN_ConsumedGB: It is for the virtual machines which are part of vSAN cluster. It is the used storage size calculated based on the multiplier associated with the storage policy name.
     - CPU_Used_Percent: It represents the percentage of physical CPUs in use compared to the total physical CPUs utilised during the selected period.
     - Mem_Used_Percent: It represents the percentage of memory in use compared to the total memory utilised during the selected period.
     - Storage_Used_Percent: It represents the percentage of storage in use compared to the total storage utilised during the selected period.
     - Total_Percent: It is sum of CPU_Used_Percent, Mem_Used_Percent, and Storage_Used_Percent.

- Total_Adjusted_Percent: It is 'Total_Percent' divided by three.
- Tags: All the tag key-value pairs associated with the VM.
- tag_appspace: It represents the values for the appsapce tag key associated with the VM.
- grouptag_Division: It represents the values of the division group tag key associated with the Azure group containing the appspace tag key.
- grouptag_BusinessLeader: It represents the values of the businessleader group tag key associated with the Azure group containing the appspace tag key.
- grouptag_Environment: It represents the values of the environment group tag key associated with the Azure group containing the appspace tag key.
- Cost: It equals the product of 'Total_Adjusted_Percent' and the 'Total Host Cost', divided by 100.
- Amortized_Cost: It equals the product of 'Total_Adjusted_Percent' and the ‘Total Host Amortized Cost’, divided by 100.

Outcomes

You have learnt how to interpret the AVS cost allocation Sankey chart.

7.4.2. Red Hat OpenShift Service on AWS and Azure Cost Allocation Reports

Learn to see the Red Hat OpenShift Service on AWS (ROSA) and Azure Red Hat OpenShift Service (ARO) cost allocation report in Sankey chart view.

Introduction

Red Hat OpenShift Service on AWS (ROSA) and Azure (ARO) provides a powerful, scalable, and secure platform for managing containerized applications. As organisations adopt cloud-native solutions, effectively managing and tracking the costs associated with these resources becomes a critical task. Understanding where and how resources are being utilised can be complex, especially in large environments with multiple clusters and applications.

The **Cost Allocation Reports** feature in CloudBolt CSMP for Red Hat OpenShift simplifies the process of tracking cloud expenditures by providing a detailed breakdown of costs associated with OpenShift clusters on both AWS and Azure. This feature enables you to view and analyse costs based on different segmentation points, such as pod name, namespace, cluster, and pod labels. By gaining insights into the distribution of costs, organisations can make more informed decisions and optimise their cloud infrastructure spending.

In this guide, we will walk you through how to interpret the cost allocation report, customise it to meet your specific needs, and use the available tools to analyse your cloud resource expenditures effectively. By the end of this guide, you will have the knowledge to use cost allocation report tool to view your OpenShift environments cost data using different segmentation points, ensuring efficient resource use and better control over your cloud costs.

This feature is available upon request through the 'openshift_allocation_reports' feature flag.

Use Cases

1. When you want to understand how costs are distributed across the OpenShift Kubernetes cluster, from platform to different segmentation points.
2. When you want to Pinpoint high-cost areas and optimise resource allocation.
3. Allocate costs accurately among various teams and departments based on resource utilisation.

Prerequisites

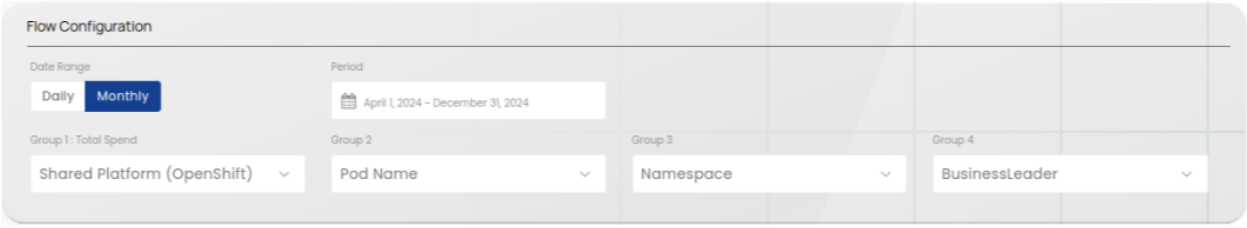
Before you can enable the OpenShift cost allocation reports feature for your CSMP account, ensure the following prerequisites are met:

1. **Contact Support**: Reach out to our support team to enable the 'openshift_allocation_reports' feature.
2. **User Role Permissions**: Ensure you have view permissions for the Cost Allocation Report module and access to the Shared Platform (OpenShift) on the Access Management page.

Navigate to Cost Allocation Reports

1. Log in to your CloudBolt CSMP account.
2. Navigate to **Cost > Cost Allocation Reports**.

Flow Configuration



In the flow configuration for the Sankey chart, you can apply period filters and configure groups (segmentation points) to customise your cost allocation view. Below are the details for setting up the period filter and groupings:

Period Filter Section

The Period Filter section allows you to select a date range for your cost allocation report, enabling a more tailored analysis based on your specific needs. This filter offers two options: **Date Range** and **Period**.

Select Date Range

First, choose a date range from the options available—**Daily** or **Monthly**. Based on your selection, the available period options will vary:

For Daily:

- Options include:
    - "This Month"
    - "Last Month"
    - "Yesterday"
    - "Last 7 Days"
    - "Last 14 Days"
    - "Last 21 Days"
    - "Last 30 Days"
    - "Last 45 Days"
    - Custom date range

For Monthly:

- Options include:
    - "This Month"
    - "Last Month"
    - "Last 3 Months"
    - "Last 6 Months"
    - "Last 9 Months"

- "Last 12 Months"
- Custom date range

Customise Groups (Segmentation Points) for Sankey Chart

In the Sankey chart, various dimensions can be utilised as segmentation points to allocate and visualise costs. By leveraging different groups as segmentation points, you can gain a clear view of cost transitions and insightful breakdowns for your OpenShift cost distributions. The available segmentation points and their respective options are outlined as follows:

1. **Group 1 - Shared Platform:** For OpenShift costs, you must set it to **Shared Platform (OpenShift)**. This group represents the overall cost of the OpenShift platform for the specified time period, offering a high-level overview of platform-wide expenses. Costs flow from this group to the other points, establishing a baseline for all subsequent cost distributions.
2. **Group 2 - Pod Name:** By default, this group displays the cost distribution across each pod within the OpenShift Kubernetes cluster node, providing a granular view of resource utilisation across your infrastructure. You can configure this group point to any of the dimension available.
3. **Group 3 - Namespace:** By default, this group distribute the costs to specific namespaces associated with each pod. This group point can be set to any other available dimension, but cannot be the same as the one selected for Group 2.
4. **Group 4 - BusinessLeader:** By default, this group further distributes cost data based on the AWS groups' custom tag values for business leaders associated with the AWS and Azure accounts where the OpenShift clusters are running. The group point can be assigned to any other available dimension; however, it must be distinct from the selections made for Group 2 and Group 3.
   If the AWS and Azure groups created in your CSMP account do not contain any values for the business leader group (custom) tag, Group 4 will be assigned to a group tag that holds a valid value. The hierarchy for default selecting the appropriate group tag follows this order:
   Status → CostCenter → IsCritical → ServiceNowApplicationName → ServiceDeliveryManager → OperationalBusinessOwner → Division →

OwnerPrimaryContact → ServiceNowApplicationID → LineOfBusiness → ProviderAccountID.

If none of the group tag keys contain a value, Group 4 will default to the first available pod label key.

These groups are fully customisable to suit your reporting requirements, providing you with the flexibility to tailor the visual representation and gain deeper insights into cost allocation.

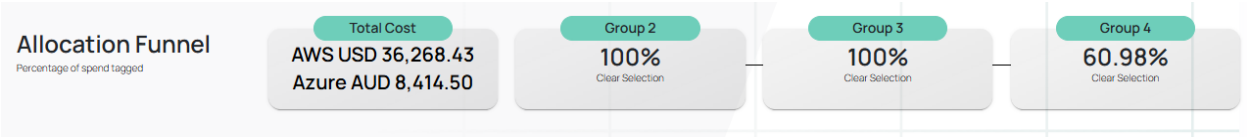
Exclude Values from Groups (Segmentation Points)

This section allows you to exclude cost values related to specific values for selected groups (segmentation points) values from the total distributed cost in your cost allocation reports. Follow the steps below to configure exclusions effectively.

1. **Expand the Exclude Values Section**
   Click the expand icon for the **Exclude Values from Groups** section to reveal the available options for excluding costs.
2. **Select Values to Exclude from the Set Groups (Segmentation Points)**
   For each segmentation point, click the select drop-down menu to display the available values. From this list, select the value(s) you want to exclude from the cost distribution.
3. **Add to Exclusion List**
   After selecting the desired value(s), click the plus icon available next to that row to add the selected value to the exclusion list. The excluded values for each segmentation point will be displayed below the corresponding segmentation point name in the **Exclude Values from Groups** section.
4. **Apply Changes**
   Once you have added all the required values for each segmentation point, click the **Apply** button within the **Exclude Values from Groups** section to implement your exclusions. This will update the cost distribution to reflect the exclusions.
5. **Clear Exclusion Filters**
   If you need to remove the exclusion filters, click the **Clear Filters** button. After

clearing, ensure you click **Apply** again to update the distribution and remove the excluded values from the report.

Allocation Funnel



The **Allocation Funnel** visually represents the proportion of allocated costs relative to the total spend, excluding any untagged costs. It provides insights into how much of the overall expenditure is associated with selected segmentation point values, making it easier to identify untagged costs. The **Total Cost** tile reflects the accumulated costs exclusively derived from AWS and Azure, representing the overall spend for OpenShift resource usage. In the image shown above, the AWS cost amounts to USD 36,268.43 and the Azure cost amounts to AUD 8,414.50, giving a clear overview of the combined expenditure. All cost values are the amortized cost value displayed in the page.

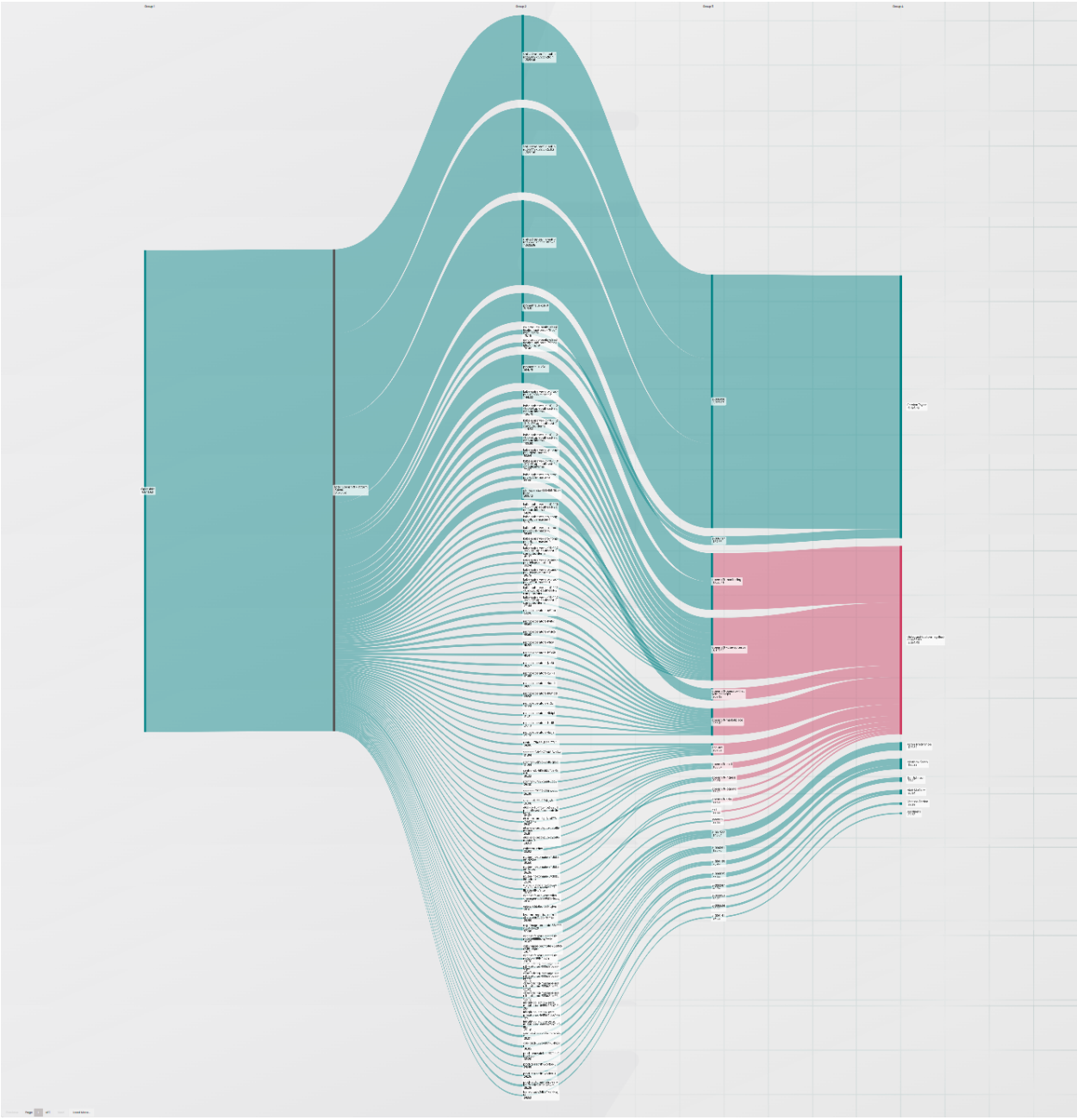
Each group within the funnel, such as **Group 2**, **Group 3**, and **Group 4**, displays the percentage of the total cost linked to the selected segmentation point value. For instance, the **100%** shown in **Group 2** indicates that all the costs are associated with the segmentation point value for that group, which in this case is the **pod name**. This means that no costs remain untagged at this level. Moving to **Group 4**, the percentage drops to **60.98%**, indicating that only this portion of the total cost is associated with the **business leader custom tag**. The remaining **39.02%** of the cost-generating resources are untagged, meaning they are not linked to any of the **business leader custom tag key-value pairs**.

The allocation funnel includes options to reset group selections for Groups 2, 3, and 4. The behavior of these reset options is as follows:

- **Clear Selection in Group 2**: Clicking 'Clear Selection' in Group 2 will reset the flow configuration dropdowns for Groups 2, 3, and 4. It also resets the distribution percentages for all three groups.
- **Clear Selection in Group 3**: Clicking 'Clear Selection' in Group 3 will reset the flow configuration dropdowns for Groups 3 and 4. It will also reset the distribution percentages for Groups 3 and 4.

- **Clear Selection in Group 4**: Clicking 'Clear Selection' in Group 4 will reset the flow configuration dropdowns for Group 4 only and reset the distribution percentage for Group 4.

Sankey Chart Visualisation and Flow



This section outlines the default flow configuration settings for the Sankey chart. Please note that adjusting the flow configuration settings will alter the cost distribution accordingly.

1. **Starting Point**
   The Sankey chart begins with the Shared Platform (OpenShift) as Group 1, displaying the total amortized cost of OpenShift resources utilisation for the selected period.
2. **Cost Distribution**
   - **From Shared Platform (OpenShift) to Group 2 (Pod Name)**: The total amortized cost for the OpenShift platform is initially allocated to various Kubernetes Cluster pods.
   - **From Group 2 (Pod Name) to Group 3 (Namespace)**: Amortized costs from each pod are further allocated to the various namespaces associated with the pod.
   - **From Group 3 (Namespace) to Group 4 (BusinessLeader)**: The amortized costs associated with each namespace are distributed among the various business leaders linked to the AWS and Azure account groups. This group corresponds to the AWS and Azure accounts responsible for running the ROSA and ARO services and is created within your CSMP account.
3. **Flow Widths**
   The width of the arrows or lines connecting the group junctions represents the magnitude of amortized cost allocation. Wider lines signify higher amortized costs, providing a clear visual representation of cost distribution.

Example Scenario

Consider the following flow configuration settings for your analysis:

- **Period**: This Month
- **Group 2**: Cluster
- **Group 3**: Pod Name
- **Group 4**: Namespace

In the Sankey chart, the flow of costs will be as follows:

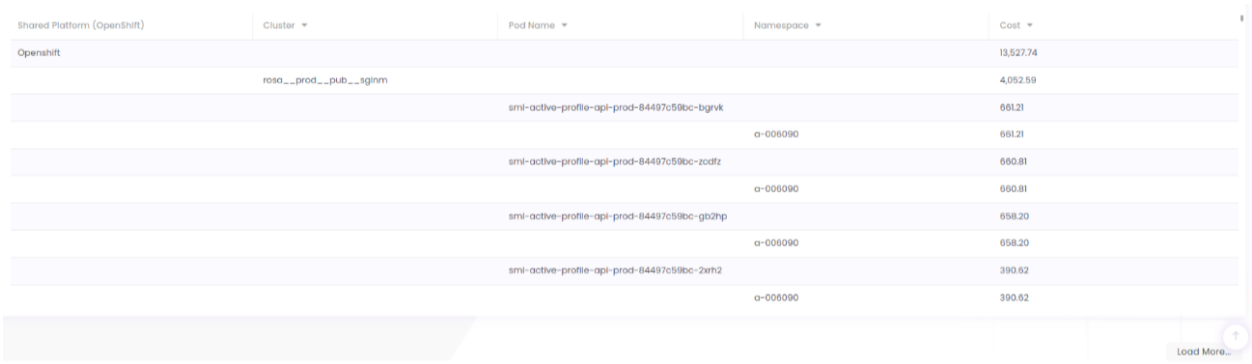
1. **Starting Point**: The total incurred amortized cost for the Shared Platform (OpenShift) for the current month is displayed, excluding today's expenses.
2. **Distribution to Cluster**: The total amortized cost for the Shared Platform (OpenShift) is allocated to the various clusters of the OpenShift.
3. **Allocation to Pod Name**: Amortized costs associated with each OpenShift cluster are further distributed to their respective pod names.
4. **Allocation to Namespace**: Finally, amortized costs from each pod are allocated to the specific namespaces associated with each pod.

Sankey Chart Tabular View

Below the Sankey chart, the tabular view presents the chart data in an organised format. This view complements the visual representation of the Sankey chart by providing a clear and detailed breakdown of cost distributions. The columns in the table correspond to the group dimensions defined in the flow configuration. Here's how the data is structured based on our example scenario:

Table Columns

- **Shared Platform (OpenShift)**: Represents the name of the shared platform, i.e., OpenShift.
- **Cluster**: Lists the cluster names, with individual rows for each cluster name.
- **Pod Name**: Denotes the pod names, with rows for each pod name.
- **Namespace**: Displays the namespaces under each pod name.
- **Cost**: Shows the amortized cost associated with the row values.



Data Breakdown

Shared Platform Column

- This column indicates the name of the shared platform, i.e., OpenShift.

Cluster Column

- Each row under this column corresponds to a specific cluster within the OpenShift Kubernetes environment. The cost values displayed for each cluster contribute to the overall total for the OpenShift platform. The sum of all cluster costs should equal the total cost listed in the cost column for the OpenShift row.

Pod Name Column

- Rows in this section represent the various pods associated with each cluster. If a cluster incurs costs that are not linked to any specific pod, those costs will be categorised under "Untagged Pod Name."
- The total cost for each cluster must match the sum of all associated pods, including those attributed to the untagged pod name.

Namespace Column

- This column details the amortized costs associated with each namespace linked to the pods. If a pod is not associated with a namespace, the costs will be aggregated under the "Untagged Namespace" row.

Sorting the Table Contents

You can sort each column by clicking the sort icon associated with it.

Download the Cost Allocation Report

You can download the OpenShift cost allocation report using the download button available within Sankey chart section. To obtain the OpenShift cost allocation report in CSV file format, follow these steps:

1. **Access the Download Option**
    - Go to the Sankey chart section.

- Locate and click the **Download** button.



2. **Select the Date Range**
   - In the **Period** selection box, choose from the following predefined date ranges:
     - This Month
     - Last Month
     - Last 3 Months
     - Last 7 Days
     - Last 14 Days
     - Last 30 Days
   - For a custom date range, select **Custom Range** and specify your desired dates.
   - Click **Apply** to set the date range.
3. **Download the Report**
   - After applying the date range, click **Download** to initiate the report download.
4. **View the Downloaded File**
   - The downloaded file will be in CSV format and will include the following columns:
     - date: The date for which the cost data were recorded.
     - node_name: The name of the node hosting the pod.
     - pod_name: The name of the pod consuming cluster resources.
     - provider_id: Unique identifier of the instance provided by the cloud provider.
     - namespace: The Kubernetes namespace where the pod is deployed.
     - pod_status: The current operational state of the pod (e.g., Running)

- node_external_id: External ID assigned to the node by the cloud provider.
- provider_type: The cloud provider type hosting the cluster (AWS or Azure).
- billing_entity: The entity type issuing the invoices for the cost (AWS or AWS Marketplace).
- environment_tag: Tag identifying the environment where the workload runs (e.g., prod, nonprod).
- account_subscription_id: The account or subscription ID from the cloud provider.
- resource_id_name: The ID of the underlying resource used by the pod.
- cluster_id: Unique identifier for the OpenShift cluster.
- pod_usage_cpu: The amount of CPU consumed by the pod.
- pod_usage_cpu_unit: The unit of measurement for CPU usage (cores).
- pod_usage_memory: The amount of memory consumed by the pod.
- pod_usage_memory_unit: The unit of measurement for memory usage (MiB).
- pod_request_cpu: The amount of CPU requested by the pod.
- pod_request_cpu_unit: The unit of measurement for requested CPU.
- pod_request_memory: The amount of memory requested by the pod.
- pod_request_memory_unit: The unit of measurement for requested memory.
- cpu_usage_percentage: The percentage of allocated CPU consumed by the pod.
- memory_usage_percentage: The percentage of allocated memory consumed by the pod.
- cpu_request_percentage: The percentage of requested CPU used by the pod.

- memory_request_percentage: The percentage of requested memory used by the pod.
- normalised_percentage: It is the (greatest_percentage × 100) / total_greatest_percentage.
- net_unblended_cost: For AWS: (normalised_percentage * total_unblended_cost) / 100. For Azure: (normalised_percentage * total_cost) / 100.
- net_amortized_cost: For AWS: (normalised_percentage * total_net_amortized_cost) / 100. For Azure: (normalised_percentage * total_amortized_cost) / 100.
- grouptag_Division: The values associated with the division group tag key, linked to the group created within your CSMP account for the AWS and Azure accounts to which the OpenShift resource belongs.
- grouptag_BusinessLeader: The values associated with the business leader group tag key, linked to the group created within your CSMP account for the AWS and Azure accounts to which the OpenShift resource belongs.

Algorithm for Cost Allocation Calculation

The algorithm behind the Cost Allocation Report is designed to provide an accurate allocation of costs. All the costs displayed on the Cost Allocation Report UI is Amortized cost.

Step 1: Fetch OpenShift Resources Cost from AWS and Azure

- **AWS:** Retrieve accumulated costs from AWS cost reports by filtering resources based on the "charge_type" column, which contains the substring `usage`.
- **Azure:** Fetch accumulated costs from Azure cost reports by applying a filter on subscription names containing the phrase `aro` and where the `appspace` tag is blank.

Step 2: Map OpenShift Inventories with AWS and Azure Data

- **AWS Mapping:** Use `line_item_usage_account_id` from AWS and match it with `provider_id` from OpenShift.
- **Azure Mapping:** Use `subscription_guid` from Azure and match it with `provider_id` from OpenShift.

Step 3: Calculate Total Pod Capacity for Selected Date Range

For the selected date range, calculate the total capacity at the pod level by aggregating the following metrics based on `environment_tag` (i.e., `prod` or `non_prod`):

- `total(pod_usage_cpu)` → `total_pod_usage_cpu`
- `total(pod_usage_memory)` → `total_pod_usage_memory`
- `total(pod_request_cpu)` → `total_pod_request_cpu`
- `total(pod_request_memory)` → `total_pod_request_memory`

Step 4: Calculate Pod-Level Usage and Request Percentages

For each pod, compute the usage and request percentages for CPU and Memory using the formulas below:

- **CPU Usage Percentage:** `cpu_usage_percentage = (pod_usage_cpu / total_pod_usage_cpu) × 100`
- **Memory Usage Percentage:** `memory_usage_percentage = (pod_usage_memory / total_pod_usage_memory) × 100`
- **CPU Request Percentage:** `cpu_request_percentage = (pod_request_cpu / total_pod_request_cpu) × 100`
- **Memory Request Percentage:** `memory_request_percentage = (pod_request_memory / total_pod_request_memory) × 100`

Step 5: Determine the Greatest Percentage and Sum of Occurrences

- Identify the highest percentage value from the four calculated percentages.
- Compute the total sum of occurrences of the highest percentage.

Step 6: Calculate Normalised Percentage

To normalise the greatest percentage for each pod, apply the formula:

- `normalised_percentage = (greatest_percentage × 100) / total_greatest_percentage`

Step 7: Allocate Costs to OpenShift Inventories

- **AWS Cost Allocation:** Allocate AWS costs to OpenShift inventories based on the `normalised_percentage`.
    - `Net Unblended Cost = (normalised_percentage * total_unblended_cost) / 100`
    - `Net Amortised cost = (normalised_percentage * total_net_amortized_cost) / 100`
- **Azure Cost Allocation:** Allocate Azure costs to OpenShift inventories based on the `normalised_percentage`.
    - `Net Unblended Cost = (normalised_percentage * total_cost) / 100`
    - `Net Amortised cost = (normalised_percentage * total_amortized_cost) / 100`

Cost allocation is performed based on the `environment_tag` (`prod` or `non_prod`).

7.5. Cost Service Adviser

Learn about how the Service Adviser in CloudBolt CSMP can help you reduce your cloud costs. You will also learn about the different parameters checked by CloudBolt CSMP before concluding your cloud services as unused or optimized.

- Introduction
- Prerequisites
- Accessing the Service Adviser
- Use of Ignore/Unignore Service option for a Service Adviser Recommendation
- Use of Show Comments Option
- Add a new comment
- Limitations
- Use of Assign Task Option for a Service Adviser Recommendation
- Outcomes

Introduction

CloudBolt CSMP analyses your Cloud project services and their usage. Based on the analysis, it will provide you with personalized, actionable recommendations to help you reduce your cloud costs.

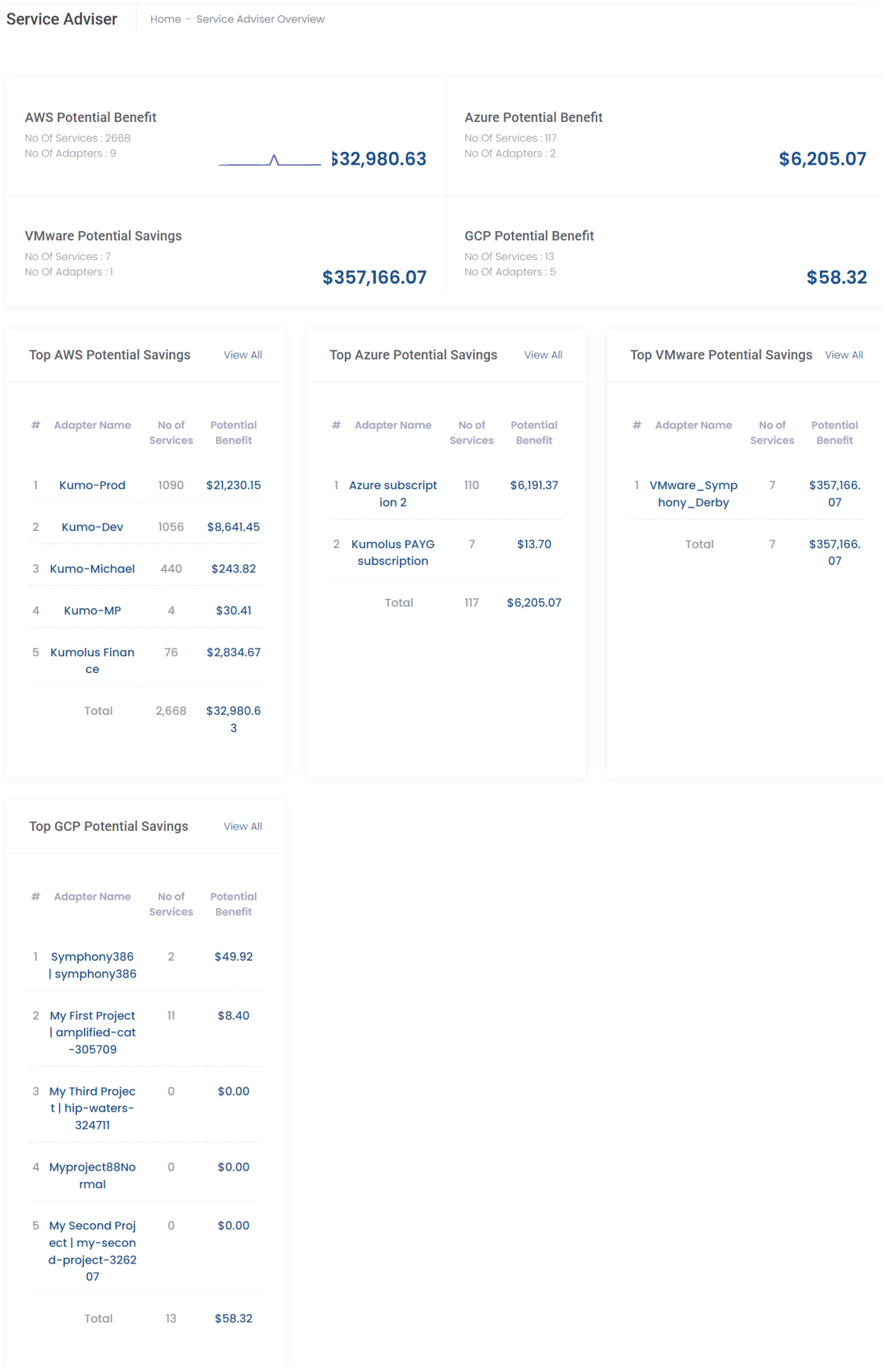
Prerequisites

For each of your projects (Cloud services accounts) you must have created normal adapters in CloudBolt CSMP and synchronized them.

Accessing the Service Adviser

1. Log in to your CloudBolt CSMP instance.

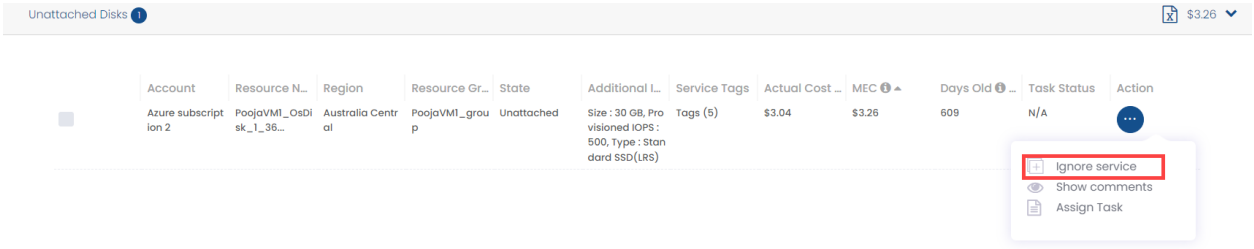
2. Navigate to **Settings > Quick Actions > Service Adviser.** The Service Adviser Overview is displayed with widgets for Potential savings that can be made, and the number of services availed and the related adapters. Further the Service Adviser page displays widgets for all your Cloud Service Providers and the potential savings that can be made.


Service Adviser
Home - Service Adviser Overview
AWS Potential Benefit
No Of Services : 2668
No Of Adapters : 9
$32,980.63
Azure Potential Benefit
No Of Services : 117
No Of Adapters : 2
$6,205.07
VMware Potential Savings
No Of Services : 7
No Of Adapters : 1
$357,166.07
GCP Potential Benefit
No Of Services : 13
No Of Adapters : 5
$58.32
Top AWS Potential Savings
View All
Adapter Name No of Services Potential Benefit
1 Kumo-Prod 1090 $21,230.15
2 Kumo-Dev 1056 $8,641.45
3 Kumo-Michael 440 $243.82
4 Kumo-MP 4 $30.41
5 Kumolus Finance 76 $2,834.67
Total 2,668 $32,980.63
Top Azure Potential Savings
View All
Adapter Name No of Services Potential Benefit
1 Azure subscription 2 110 $6,191.37
2 Kumolus PAYG subscription 7 $13.70
Total 117 $6,205.07
Top VMware Potential Savings
View All
Adapter Name No of Services Potential Benefit
1 VMware_Symphony_Derby 7 $357,166.07
Total 7 $357,166.07
Top GCP Potential Savings
View All
Adapter Name No of Services Potential Benefit
1 Symphony386 | symphony386 2 $49.92
2 My First Project | amplified-cat-305709 11 $8.40
3 My Third Project | hip-waters-324711 0 $0.00
4 Myproject88Normal 0 $0.00
5 My Second Project | my-second-project-326207 0 $0.00
Total 13 $58.32

3. Click **View All** in upper right corner of the Cloud Service Provider that you want to view. The corresponding details are displayed.
4. On a typical service adviser page, you can see services categorized in following tabs:
    a. Unused: Displays the services that are lying idle or unutilized.
    b. Unoptimized: Displays the services that are under utilized.
    c. Suppressed: List the services that you have ignored to be considered unused and unoptimized.
    d. Tasks: List the CloudBolt CSMP service adviser recommendations as task for action. These tasks can be manually created used the Assign Task action option or based on a recommendation policy. Tasks created by you will be listed under 'Initiated by Me' tab and tasks assigned to you for your action will be listed under 'Assigned to Me' tab.

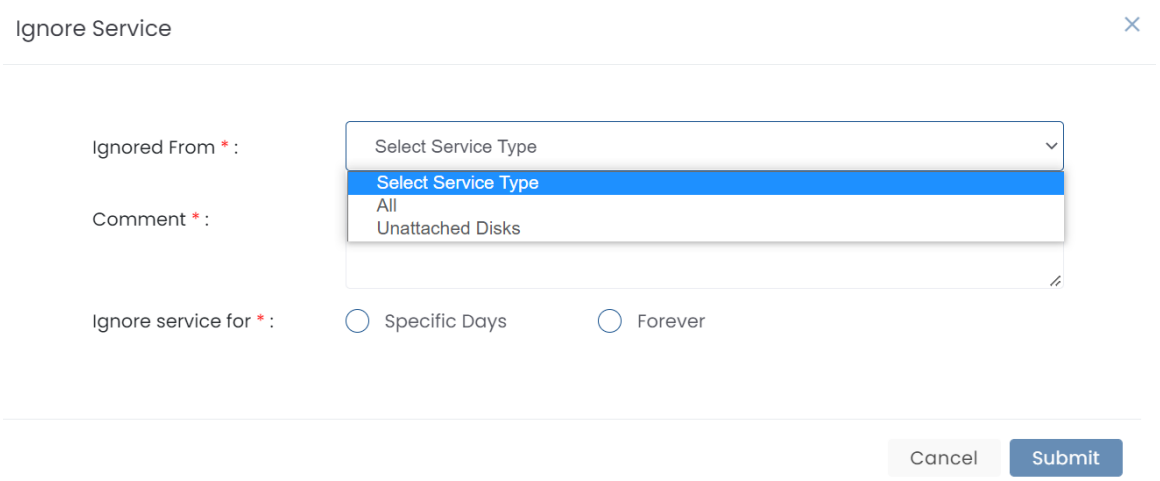
Use of Ignore/Unignore Service option for a Service Adviser Recommendation

There are many instances where a user has opted for new services but left unused (idle) for a specific duration. These services might be required soon. As the services are idle for the time being, the CloudBolt CSMP Service adviser identifies them as unused and list them as a recommendation to stop. To avoid this unintentional shut down of services, you must use the Ignore service option available under the **Action** column.



1. To remove a service from the unused service adviser list, click the ellipsis […] icon under the **Action** column of the service.
2. Click **Ignore service**.

3. **Ignore Service** page appears.



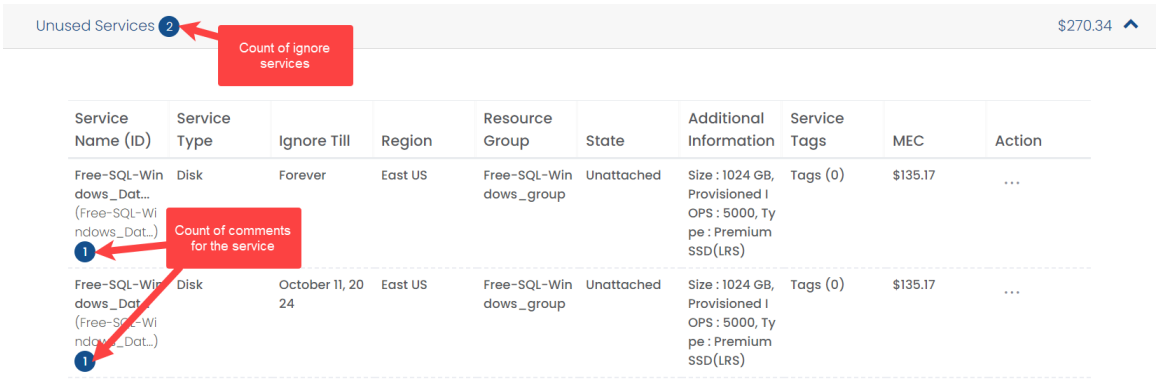
4. In the **Ignored From** drop-down, select the service type from which group you want to ignore the service. You must select **All** from the drop-down to ignore a service from all the occurrences of that particular service within your cloud service provider's account. To ignore a service from a specific service type, select the specific service type from the drop-down.
5. In the **Comment** box, you must add a comment for ignore
6. Select an option for **Ignore service for**.
    a. To ignore a service for specific days, select **Specific Days**, and enter the number of days in the box for **Days**. The maximum number of days you can enter is 730. Once the specified days are completed, the service will automatically list in the respective service type under the **Unused** tab.



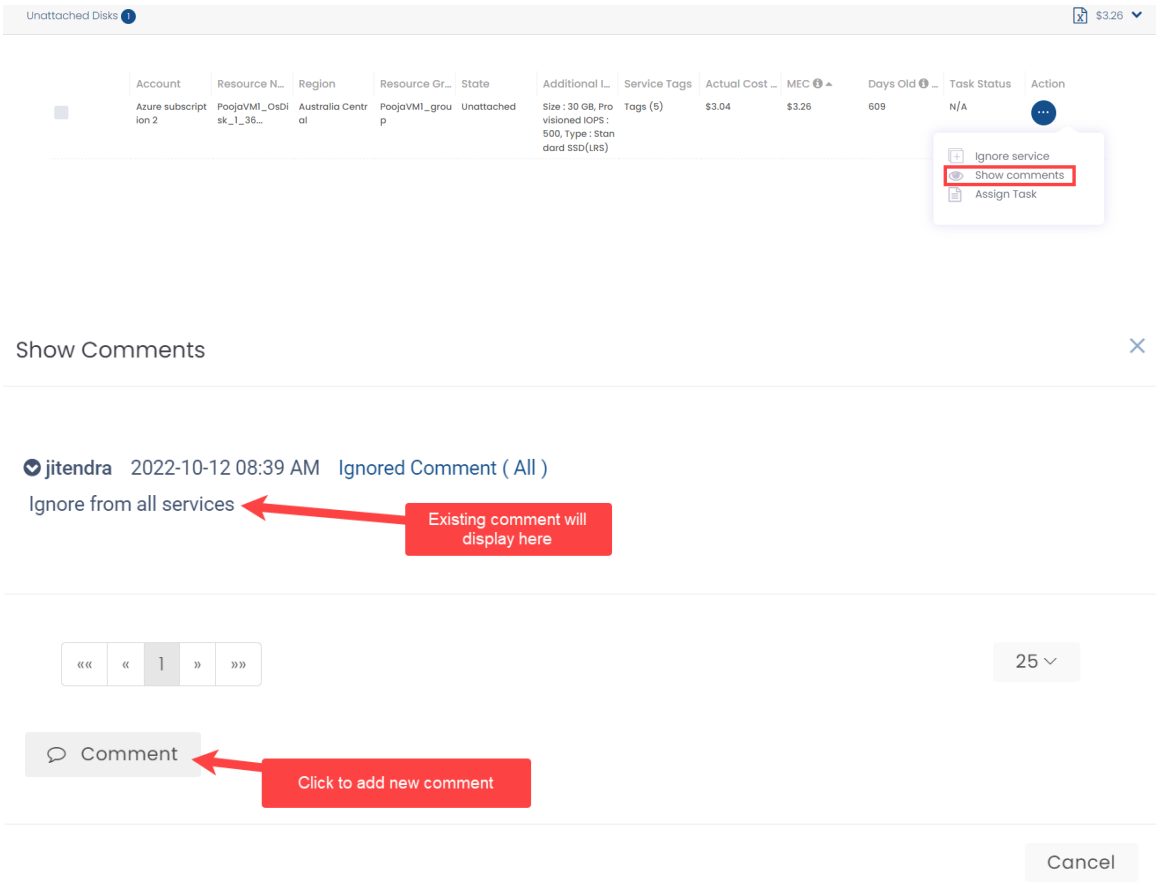
    b. To ignore a service for more than 730 days, you must select **Forever**.



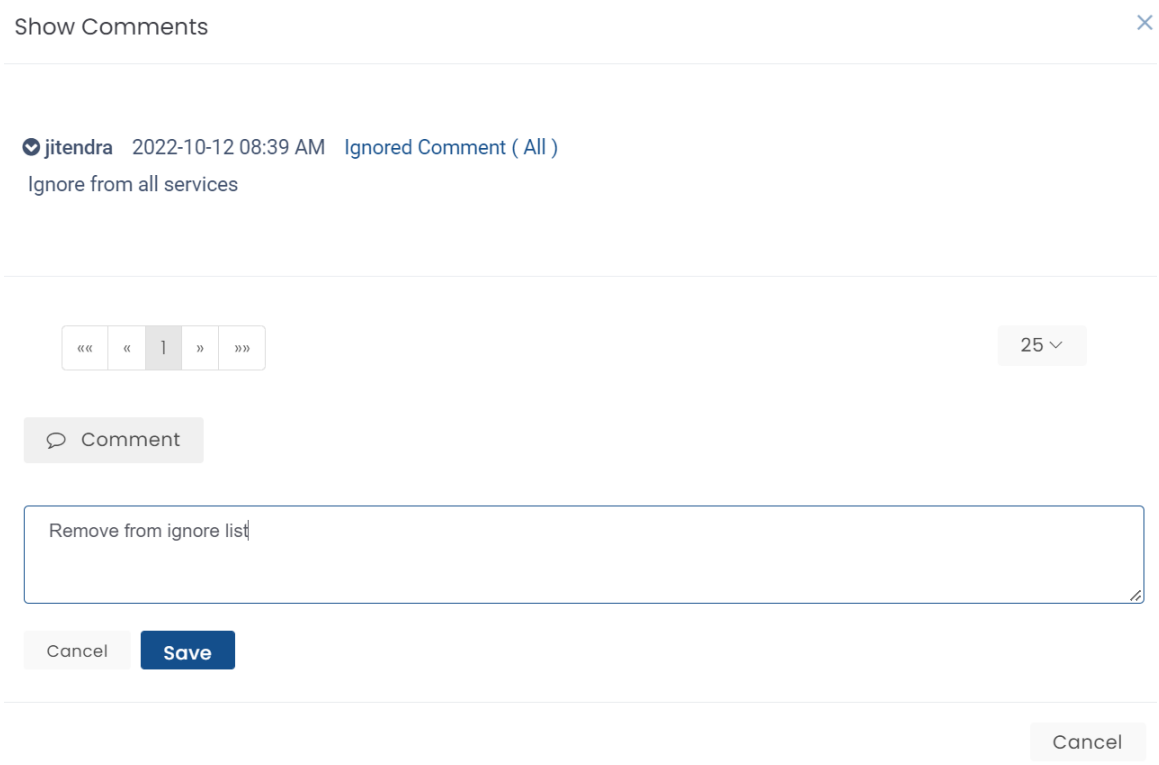
7. Click **Submit**.
8. Ignored services will list under the **Suppressed** tab grouped by unused and unoptimized services.



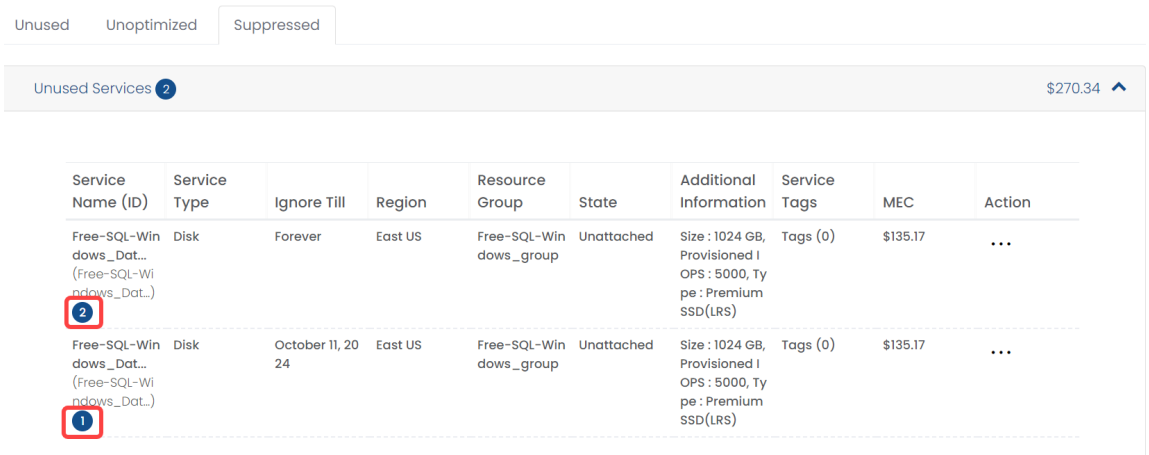
9. When a service is Ignored, the Potential benefit value will reduce by the ignored services MEC value.
10. Click the ellipsis […] icon under the **Action** column and click **Show comments** to see the comments against an ignored service.

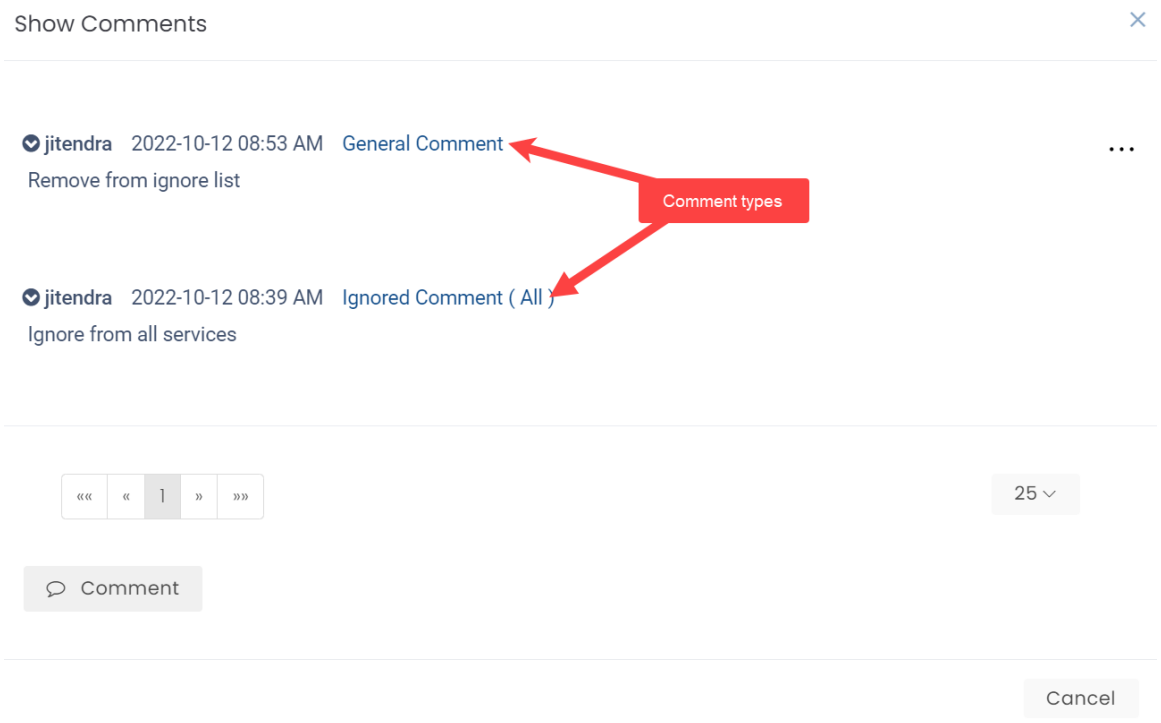


11. Click **Comment** button on the **Show Comments** panel to add new comments. Add a comment and click **Save.**

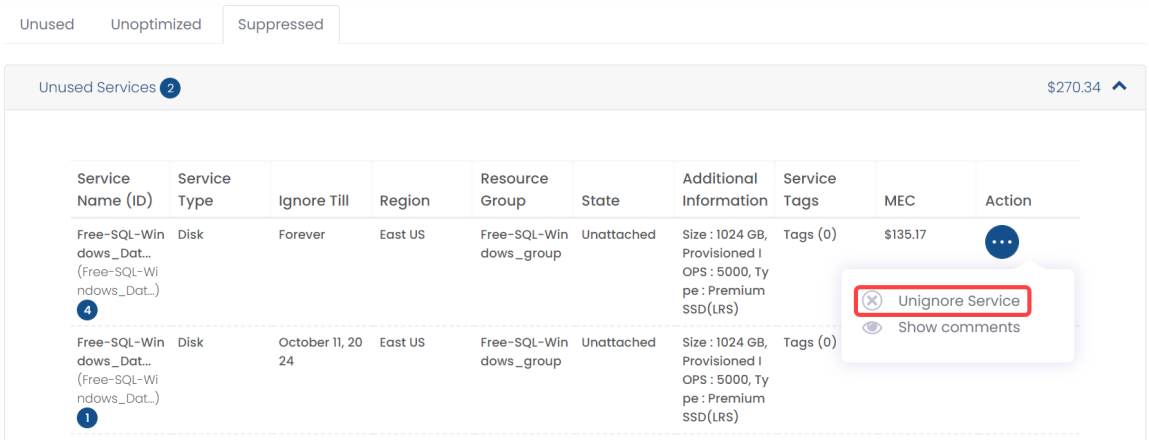


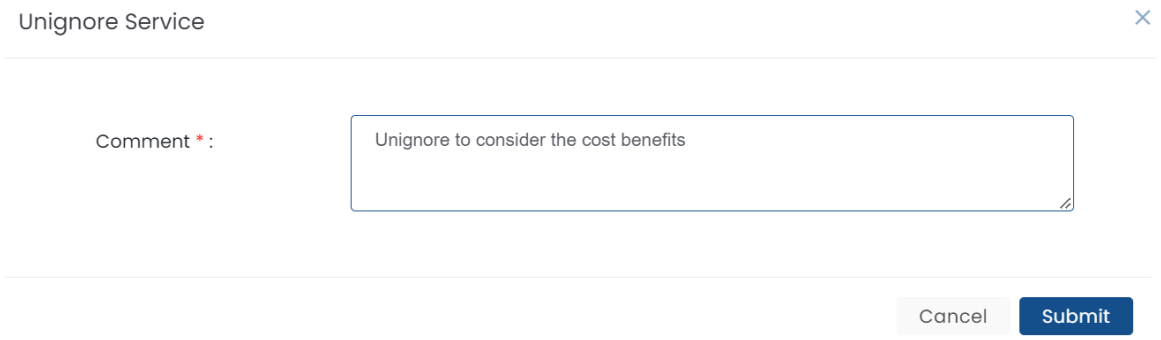
12. Click the badge icon with a number against the Service name to view all the comments against that service.





13. To remove a service from the ignore services list instantly, go to the **Ignore services** list, identify the service to remove from the list, click the ellipsis […] icon under the **Action** column, and then click **Unignore Service** option.





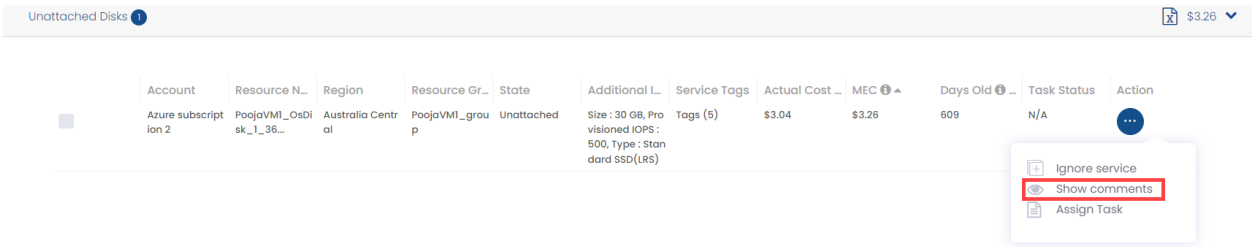
14. Add the comments and click **Submit**.
15. The unignored service will display under the respective service type of the **Unused** tab now.
16. When a service is Unignored, its MEC value will add up in the Potential benefit value.

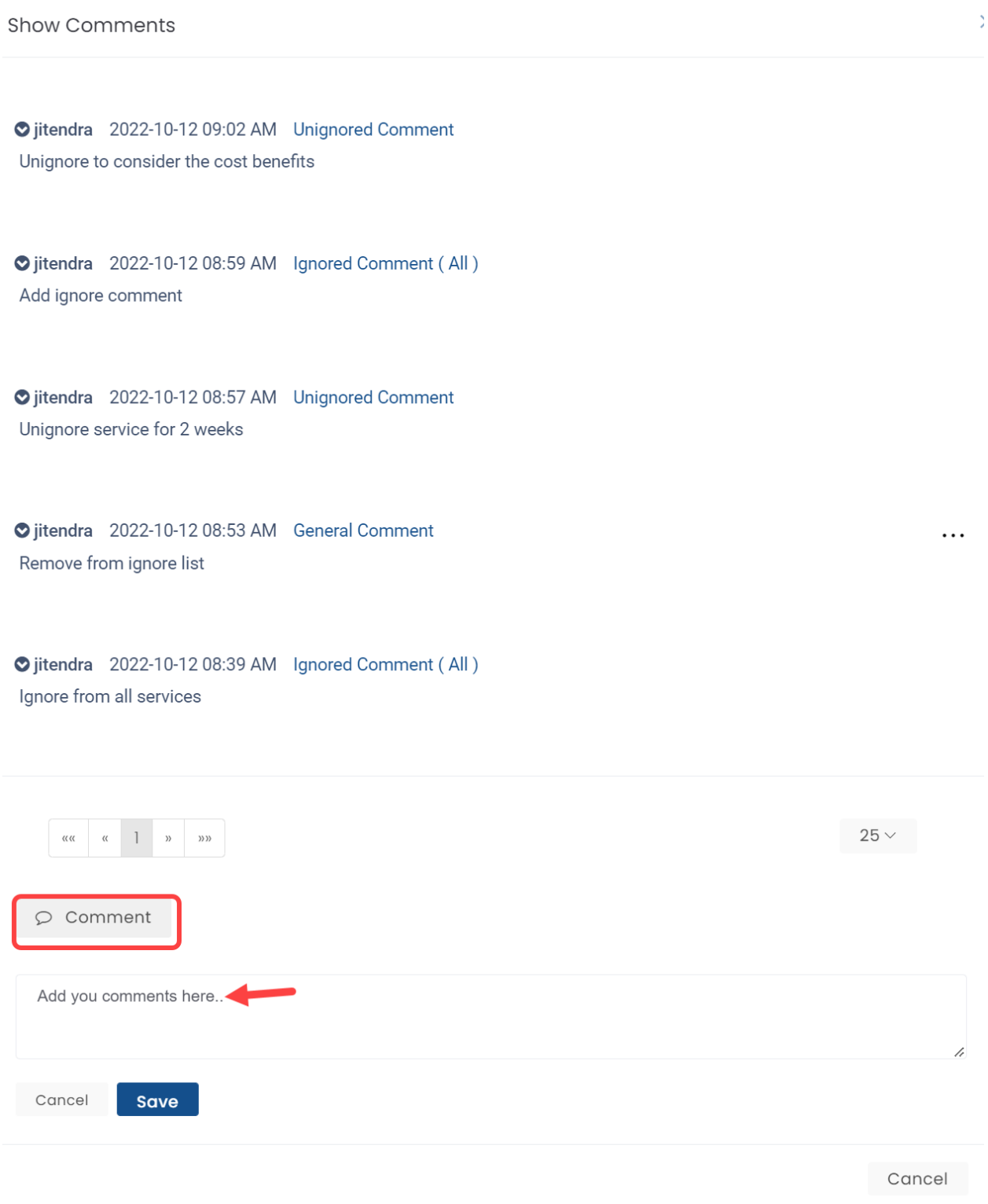
Use of Show Comments Option

Show comments option against services allows you to add, edit, and view all records made for the services. If you add a comment to ignore a service, it will be identified as **Ignored Comment**. Comment added during unignore process is called **Unignored Comment**. All other comments are known as **General comments**.

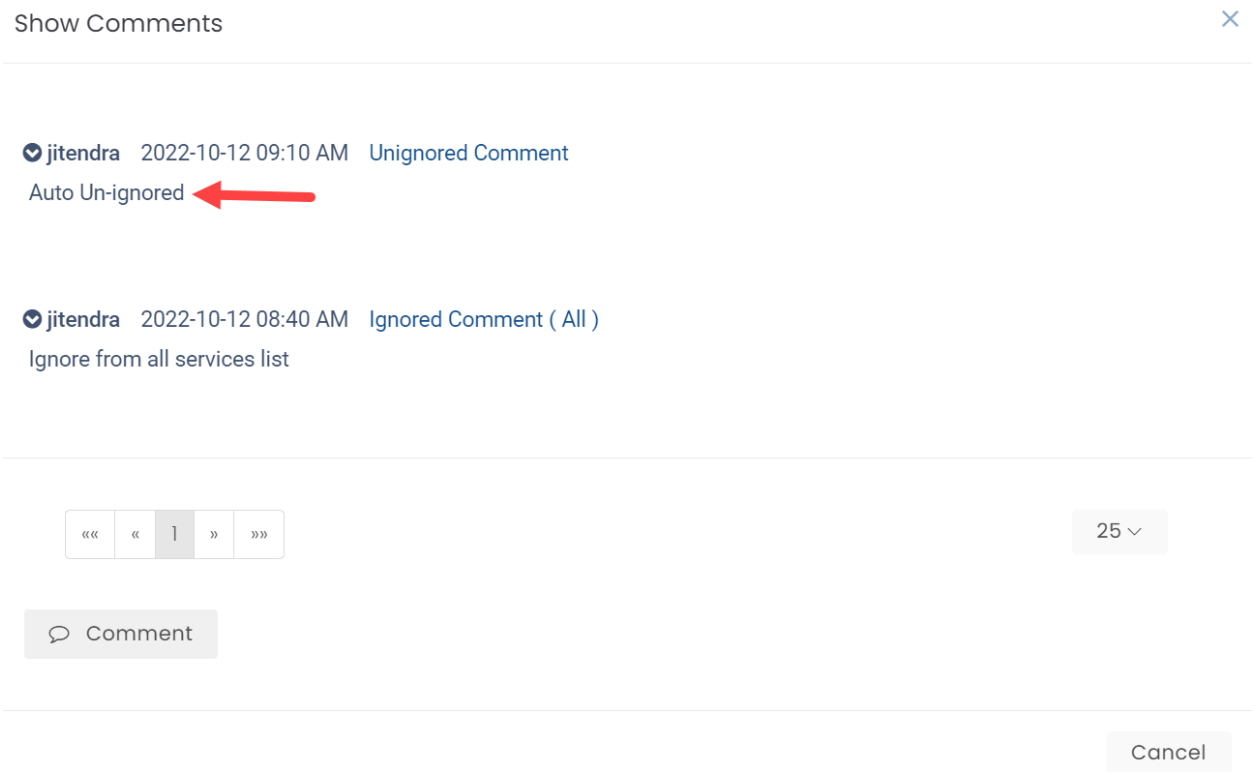
Add a new comment

Hover over the ellipsis […] icon, click the **Show comments** option under the **Action**, and then click **Comment** button to add a new general comment for the selected service.





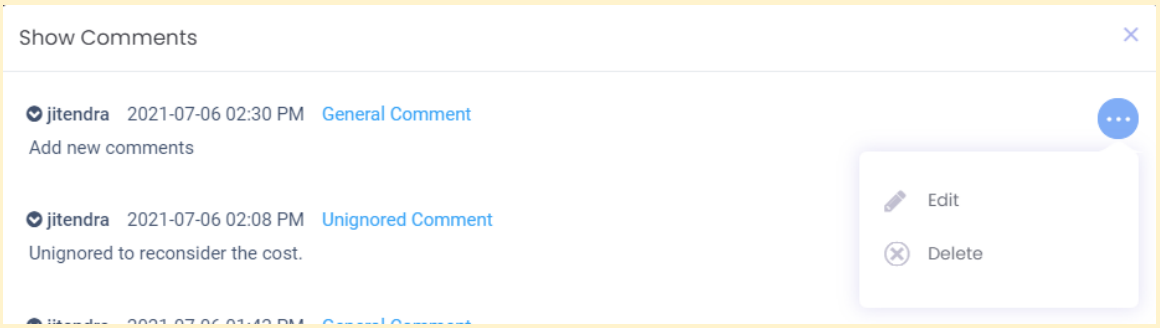
When a service is ignored for a certain day, after completing the set ignore period, services will automatically be unignored, and a comment stating '**auto un-ignored**' will be posted. The comments will be posted against the user who had set the ignore period for the service.



Click the badge icon with a number against the Service name to view all the comments against that service. The latest comment will display at the top.

Limitations

- You cannot delete and edit **Ignore** and **Unignore** comments.
- General comment owners can edit and delete their comments. Users must click the ellipsis against their comment to edit or delete the comment.



Use of Assign Task Option for a Service Adviser Recommendation

Using assign task option, you can assign the service adviser recommendations as task to your team and ask for their action to scale the assigned cloud service as per the CloudBolt CSMP recommendation. Alternatively, you can use recommendation policy settings option to automate the task creation action. You can track the task to completion or rejection. All tasks that you have created or been assigned to you for a specific cloud provider would be listed under the *Tasks* tab, grouped by category (unused and unoptimized). When task status column is marked as 'Assigned' against a service/resource name under unused and unoptimized tabs indicates that a task has been created and assigned to user(s) for that service.

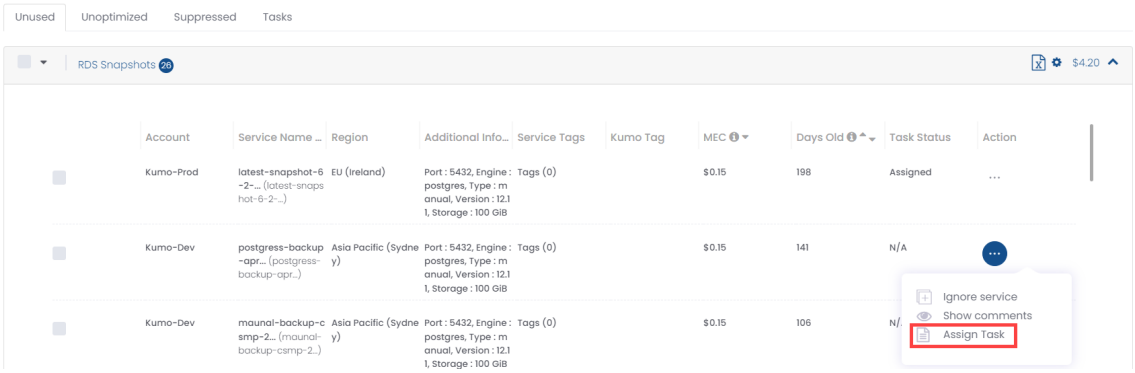
Whenever a new task is assigned, the assignee would receive an email notification from CloudBolt Support with a subject line [Action Required] [CloudBolt CSMP Cost Service Adviser Recommendation]. Once assignee completes a task, assigner would receive an email notification from CloudBolt Support.

Use following steps to assign a new task to your team and individuals.

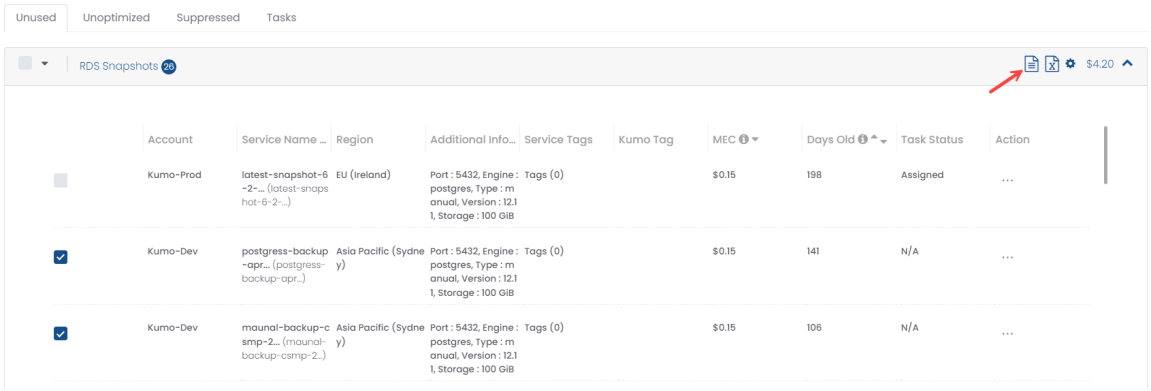
Prerequisites

To use assign task feature, your CloudBolt CSMP role must have view, create, modify, history, and delete access enabled for the SA Recommendation Task Management module.

1. Log in to your CloudBolt CSMP service adviser page for the cloud provider (for example, AWS).
2. Identify the individual service which you want to assign as task. Click the ellipsis [...] icon under the action column of a specific service/resource and choose **Assign Task** option to assign that individual service/resource as task.



Alternatively, select the boxes available at the left side of the services to assign multiple services/resources as task at once. Click the task icon available at the upper right corner of the service type bar.



Assign Task action option is not available for unoptimized Azure right sizing SQL DB.

3. Assign Task pane appears.
4. In the **Assign to** field, select an assignee type from the drop-down list.
    a. **User**: Select ‘user’ if you want to assign the task to individual user(s). In the **Select Users** field, choose user(s) from the drop-down list. Only your tenant colleague active state users would be available for selection.
    b. **Roles**: Select ‘roles’ when you want to assign the task to all the members of specific role(s). In the **Select Roles** field, choose role(s) from the drop-down list. The task would be assigned to all the users of selected roles who have Default tenant access. Roles option would not be available if your tenant setting is other than Default.

c. **Custom Email**: Select 'custom email' when you want to assign the task to a member outside of your CloudBolt CSMP organisation account. In the **Add Custom Email Id** field, enter an email id and click the plus icon. You can add multiple email id. After successful addition of emails, you can see such email ids in **Selected Custom Emails** field.

5. In the **Task** field, select an action recommendation from the drop-down for the task(s). **Stop** can be selected to stop the selected service/resource in the assigned task. **Rightsizing** indicates to reprovision the selected service/resource as per the CloudBolt CSMP service adviser recommendation.
6. In the **Comments** field, enter description about the action required from the assigner.
7. Click **Assign** to create the task.

If you have selected a service for which a task has been created previously, you would see an error message similar to: *Provider Service already assigned as task*. When you choose many services at once to create tasks, the tasks will be created only for the services for which a task has not yet been created. If a cloud service recommendation is available in both unused and unoptimized category, you can create task under any one category only.

Use following steps to view and manage your service adviser tasks.

Prerequisites

To view and manage tasks, your CloudBolt CSMP role must have view, create, modify, history, and delete access enabled for the SA Recommendation Task Management module.

1. Log in to your CloudBolt CSMP service adviser page for the cloud provider (for example, AWS).
2. Navigate to *Tasks* tab. A list of existing tasks grouped by unused and unoptimized service categories is displayed.
3. To view the tasks, click the expand icon available at the right end of the unused and unoptimized service types header.
4. By default, the 'Initiated by Me' tab will be chosen and will show all the tasks that you have manually created using the Assign Task action option or that are automatically

produced by a Recommendation Policy that you have set. Click the 'Assigned to Me' tab to view the tasks that have been given to you for action. You can filter the task list using the filter settings for the cloud provider.

5. Action column allows you to perform various activities on a task.
    a. The following actions are allowed on the tasks available under the 'Initiated by Me' tab:
        - **View Task**: Displays the details of task such as current status, Service Type, Service Name, Assigner comment, Assignee comment, and Assignee details.
        - **Edit Task**: This option allows you to edit an assigned, in-progress, and rejected state task. Edit task option would not be available for a completed state task. Using this option, you can reassign task to other users and update the comments. After updating the task details, you must click Update.
        - **Delete Task:** Using this option you can delete any task from the tasks list.
        - **Show History**: It displays the comments and status history of the task.
    b. The following actions can be performed on the tasks available under the 'Assigned to Me' tab:
        - **View Task**: It allows you to see task details such as current state, service type, service name, Assigner comment, and Assignee comment.
        - **Edit Task**: This option allows you to edit an assigned and in-progress state task. Edit task option would not be available for a completed state task. Once you have completed the scaling action for your cloud service/resource as per assigner comment, you can update the task as **Completed**. You can update the status as **In Progress** if your cloud service/resource scaling action is ongoing. If you are unable to perform the cloud service/resource scaling action, you can update the status as **Rejected**. After updating the status, you must select appropriate comment from the **Comments** drop-down list for the

selected status. After updating the task details, you must click **Update**. While updating a task, if you get an error message similar to: *You are not authorized to update this task*; indicates that the adapter associated with the task is no longer available with your tenant.

- **Show History**: It displays the comments and status history of the task.

Outcomes

You have learnt how to identify the unused and unoptimized services and reduce the costs associated with these services. You have also learnt about ignore/unignore a service from the service adviser recommendation list. You can add general comments also to the service adviser recommendations. You can assign service recommendations to your team members as task for their action and see list of tasks assigned to you as well.

7.5.1. Service Adviser for AWS

Here you will learn about the potential savings from AWS Cloud costs that you can do with the help of the CloudBolt CSMP recommendations.

AWS Unused Services

AWS Unoptimized Services

AWS Services List applicable for CloudBolt CSMP Cost Service Adviser Recommendations

CloudBolt CSMP offers cost optimization recommendations for AWS services. Basically the optimization types are categorized into Idle/Unused services, and Unoptimized and Rightsizing recommendations.

Below is the list of services for which CloudBolt CSMP provides recommendations. To determine Idle strategies mostly the metrics parameters like CPU usage, disk usage, Memory utilization, I/O and network I/O along with few other parameters are checked for the past period. Any instance(s) resulting these values matching to the predefined values for a certain period, it is safe to assume that these instances has been inactive/idle and need to seek appropriate action. You can configure service adviser telemetry as per your requirements. To know more about CloudBolt CSMP default parameters considered for Service adviser recommendations, see Use cases for Unused and Unoptimized AWS Services.

Service Name	Category	Service Adviser Group
Amazon Machine Image (AMI)	Unused	Unused
Volumes	Unused or Idle Running	Unused
AWS EC2 and RDS	Idle Running or Stopped	Unused
AWS Load Balancers	Idle Running or Unhealthy	Unused
RDS Snapshots	Unused	Unused
Elastic IPs	Unassociated	Unused
AWS EKS	Unused or Unhealthy	Unused

Service Name	Category	Service Adviser Group
Launch Configurations	Unused	Unused
Volume Snapshots	Unused	Unused
Legacy Instance Sizing (EC2 and RDS)	Instance sizing	Unoptimized
AWS EC2, RDS, and S3	Right Sizing	Unoptimized
Unused Provisioned IOPS (RDS and Volume)	Unused	Unoptimized

Outcomes

By identifying the services that are lying unused or underutilized with the help of CloudBolt CSMP Service adviser and implementing the recommendations, you can save on your cloud costs.

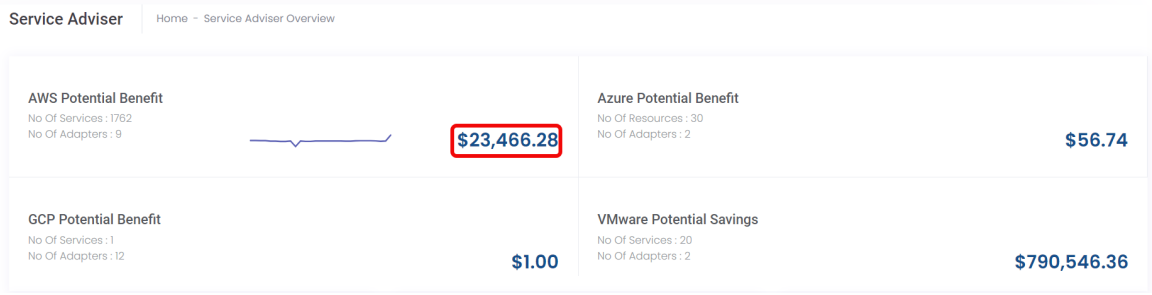
7.5.1.1. AWS Unused Services

Learn how to get a list of AWS unused services using the CloudBolt CSMP Cost Service Adviser.

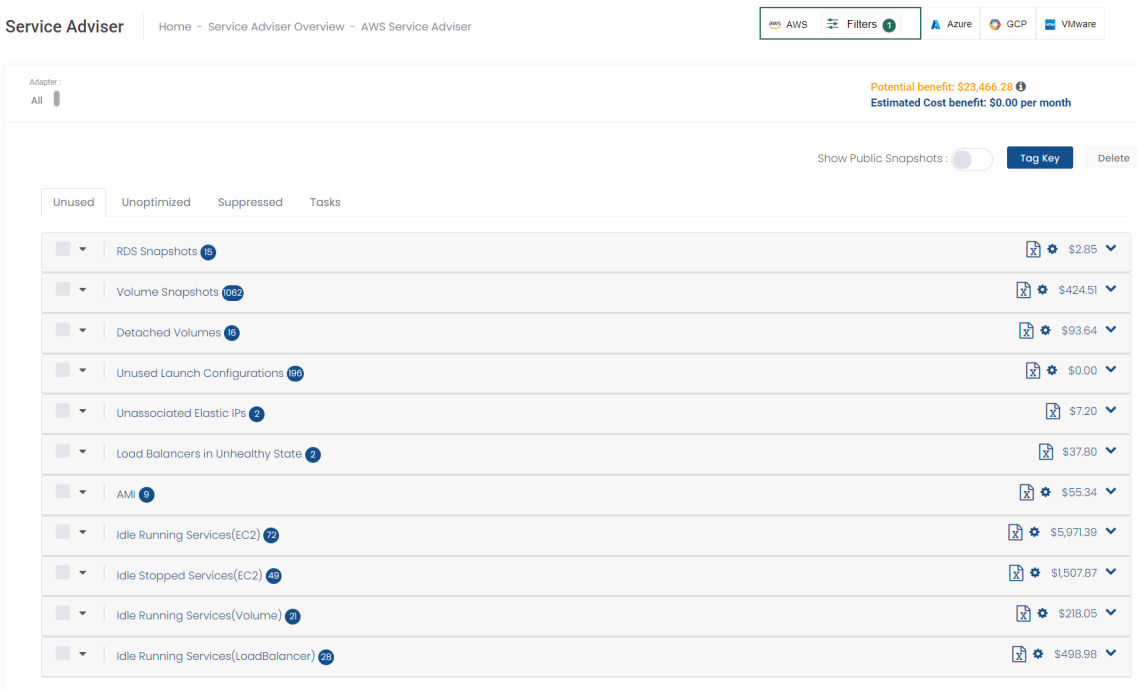
- Introduction
- Viewing the Unused services
- Amazon Machine Images (AMI)
- Detached Volumes
- Idle Running Services (EC2)
- Idle Running Services (LoadBalancers)
- Idle Running Services (RDS)
- Idle Running Services (Volume)
- Idle Stopped Services (EC2)
- Idle Stopped Services (RDS)
- Load Balancers in unhealthy state
- RDS Snapshot
- Unassociated Elastic IPs
- Unused and unhealthy AWS EKS
- Unused Launch Configurations
- Volume Snapshot
- Outcomes

Introduction

1. Logon to your CloudBolt CSMP instance. Select the Tenant for which you want the details from the Tenant drop-down.
2. Navigate to **Quick Actions > Service Adviser**. The Service Adviser Overview page displays the Potential Benefit for each of the service providers.



3. Click the savings amount displayed for the AWS potential benefit to further view the detailed recommendations for AWS cloud service provider. The Unused, Unoptimized and Suppressed tabs display the corresponding services. The Unused services tab is displayed by default.



4. You can filter the displayed data as required using the following filters. By default, all the normal adapters, region, service type, lifecycles, and tags would be considered to display service adviser recommendations. To access the filters setting, click the filter button within the selected cloud provider box. All filters are combined together using 'and' logic, which means that only those records that meet all selected filter values are displayed. After selecting the required filters, you must click **Apply** to view the service adviser recommendations list for the set filters. Click **Clear Filters** to remove all the filter selections.

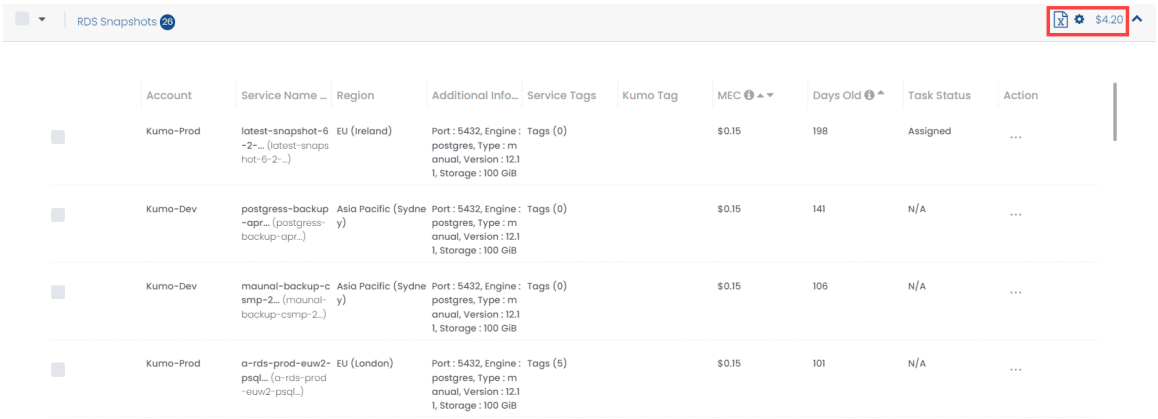
- Provider: Select the cloud provider. By default AWS would be selected.
- Group: Select an adapter group whose service recommendations you want to see. Only ‘active’ and ‘error’ status normal adapters from the selected group would be considered to display the service adviser data.
- Adapter: Select normal adapters whose service recommendations you want to see. If you selected a group previously, the normal adapters with ‘active’ and ‘error’ status from the selected group would be marked selected automatically. However, you can manage the selection of normal adapters from the drop-down list.
- Region: Select AWS region whose service recommendations you want to see.
- Service Type: Select a service type from the drop-down list to see recommendation related to individual service.
- Lifecycle: Select the lifecycle state of the services.
- Task Policy: Select task policies to filter the task lists that are created based on the selected policies.
- Applied Filters: To filter service recommendation list based on tag filters, enter tag key and tag value in the appropriate boxes. You can stablish the relation between tag key and tag value by selecting the tag operator symbol box located between the tag key and tag value boxes. Tag operator '=' would filter the services which have the selected tag key and value linked. Tag operator '!=' would filter the services which have entered tag key linked, but for all other tag values as entered in the tag value field. To apply a tag, click the **+** icon. You can add multiple tags. When two or more tags are applied, you must select the tag query operator. Tag query operator '&&(AND)' means all the tags are combined with 'and' logic, which means that only those records that meet all applied tags are displayed. Tag query operator '|| (OR)' means all the tags are combined with 'OR' logic, which means service adviser recommendations matching to either of the tags would be displayed.

Viewing the Unused services

The unused tab details the services, that you have provisioned for but these services are lying idle or unutilized. These following list includes the services that may be displayed under the unused tab with the corresponding savings that can be effected:

- AMI
- Detached Volumes
- Idle Running services (EC2)
- Idle Running services (LoadBalancer)
- Idle Running services (RDS)
- Idle Running services (Volume)
- Idle Stopped Services (EC2)
- Idle Stopped Services (RDS)
- Load Balancers in Unhealthy State
- RDS Snapshots
- Unassociated Elastic IPs
- Unhealthy EKS
- Unused EKS
- Unused Launch Configurations
- Volume Snapshots

1. Click on any service type to view the details for that service. For e.g. the details for the RDS Snapshots are displayed.



2. Click on the service type again to close the details window.
3. Click the Page icon to download the CloudBolt recommendations detail for that service type. Click the settings icon to open event scheduler page, where you can schedule termination, start/stop, and right sizing process for the services.

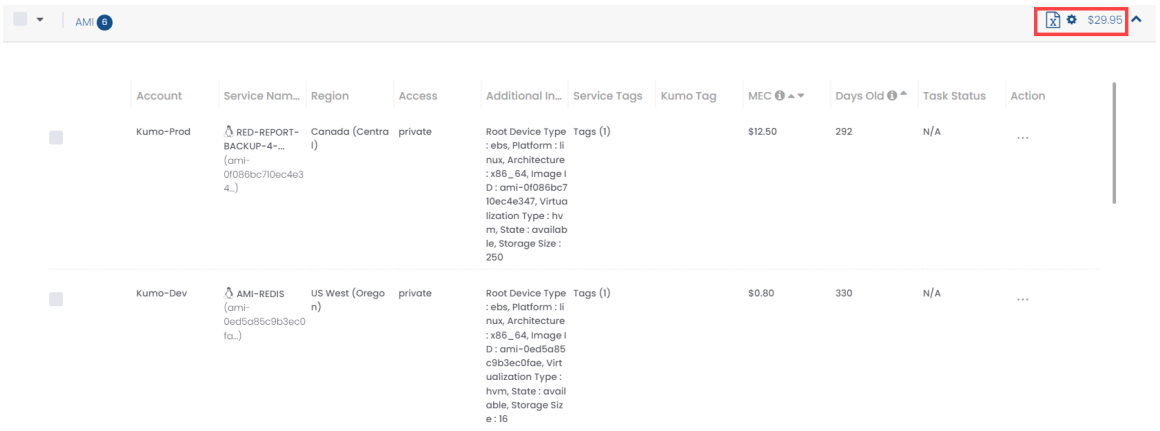
Amazon Machine Images (AMI)

An Amazon Machine Image (AMI) includes the information required to launch an EC2instance and may include one or more Amazon EBS, snapshots, or instance-store-backed AMIs, a template for the root volume of the instance, launch permissions, and the volumes. Unutilized AMIs may cost you a significant amount. You can delete the unused AMI and save money.

The details displayed include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- Billing Account
- Service name
- Region deployed
- Access type for the service
- Additional information about the architecture, platform, storage size
- Tags associated with the service
- The monthly estimated cost (MEC)

- Age in days
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action column, where you can
    - Choose to ignore the details for this service
    - Comment about the service or view previous comments
    - Assign recommended action as a task.
- The upper right corner (highlighted red box) includes the following
    - Option to export the information to a CSV file, click the Page icon to download the file to your desktop.
    - Option to create a automated event for that service, click this gear icon to navigate to the Scheduler page
    - Cost of the service which you can potentially save if you take the necessary steps by deleting the snapshots.
- Sort the MEC column by cost and Days old column by number of days



Detached Volumes

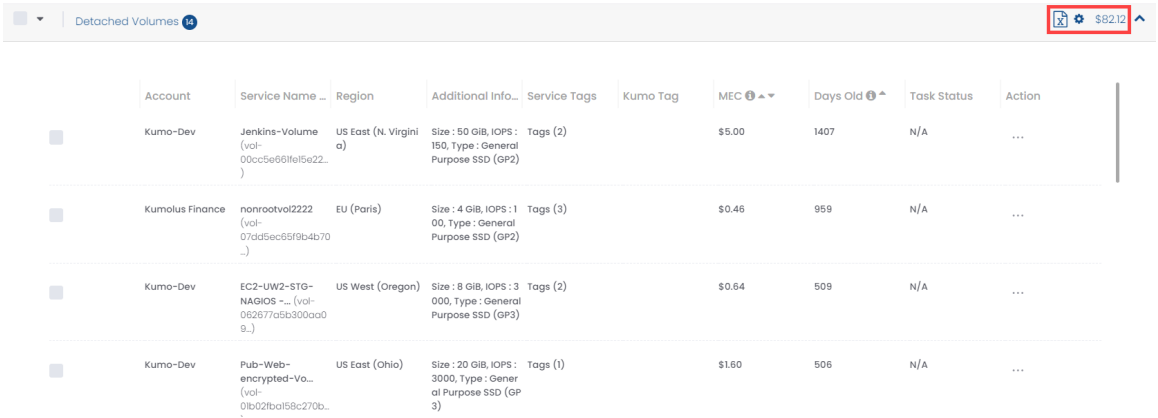
Over the course of time, after you may have detached volumes from your instances, and you are no longer using these volumes with any other instances. You may still be charged for your detached volumes if the storage amount exceeds the limit of the AWS Free Tier.

detached volumes that are no longer in use can be deleted as they consume valuable storage space.

The details displayed include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- Billing Account
- Service name
- Region deployed
- Additional information about the type, size of database, service tags, local CSMP tags, if any
- The monthly estimated cost (MEC)
- Age of the volume
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action Column, where you can
    - Choose to ignore the details for this service
    - Comment about the service or view previous comments
    - Assign recommended action as a task.
- The upper right corner (highlighted red box) includes the following
    - Option to export the information to a CSV file, click the Page icon to download the file to your desktop.
    - Option to create a automated event for that service, click this gear icon to navigate to the Scheduler page
    - Cost of the service which you can potentially save if you take the necessary steps by deleting the snapshots.

- Sort the MEC column by cost and Days old column by number of days



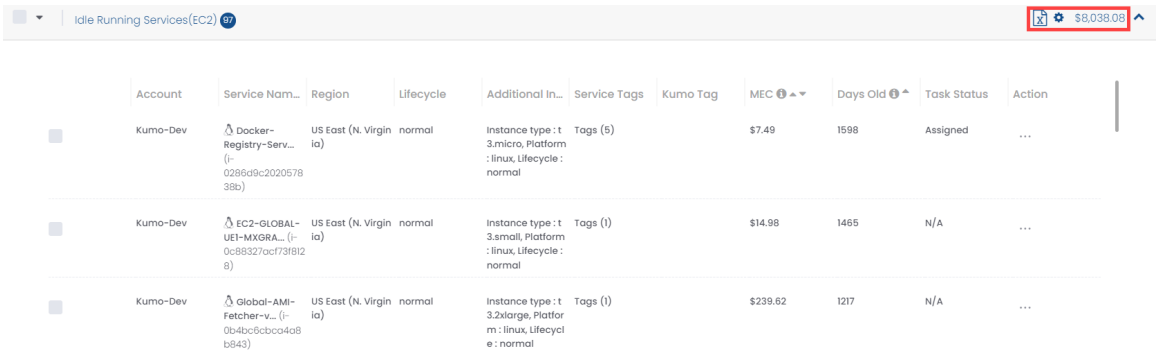
Idle Running Services (EC2)

An Amazon Elastic Compute Cloud (Amazon EC2) provides easily scalable computing capacity in the cloud and eliminates your need to invest in hardware costs. However, over time, a number of EC2 instances that you have provisioned for use may end up being unused, but still running. These instances can cost you a significant amount, if detected, you can terminate such instances in time and save money.

The details displayed include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- Billing Account
- Service name
- Region deployed
- Additional information about the instance type, OS, platform, Lifecycle, service tags, local CSMP tags, if any
- The monthly estimated cost (MEC)
- Age in days
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action column, where you can

    - Choose to ignore the details for this service
    - Comment about the service or view previous comments
    - Assign recommended action as a task.
- The upper right corner (highlighted red box) includes the following
    - Option to export the information to a CSV file, click the Page icon to download the file to your desktop.
    - Option to create a automated event for that service, click this gear icon to navigate to the Scheduler page
    - Cost of the service which you can potentially save if you take the necessary steps by deleting the snapshots.
- Sort the MEC column by cost and Days old column by number of days



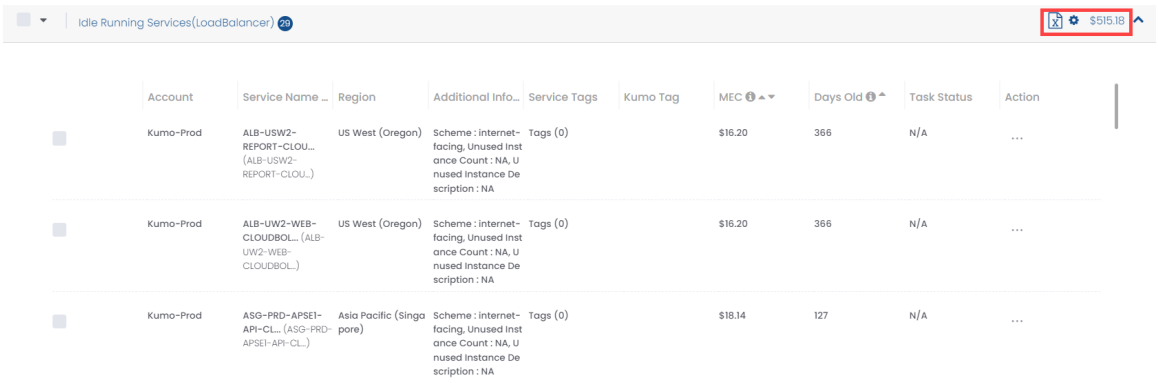
Idle Running Services (LoadBalancers)

You may have provisioned Elastic Load Balancers to distribute the incoming traffic across your multiple EC2 instances, containers, and IP addresses. However, after some time, these Load Balancers may have become unused and are still running. These may incur significant charges over time.

The details displayed include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- Billing Account
- Service name
- Region deployed

- Additional information about the scheme, usage details, service tags, local CSMP tags, if any.
- The monthly estimated cost (MEC)
- Age in days
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action column, where you can
    - Choose to ignore the details for this service
    - Comment about the service or view previous comments
    - Assign recommended action as a task.
- The upper right corner (highlighted red box) includes the following
    - Option to export the information to a CSV file, click the Page icon to download the file to your desktop.
    - Option to create a automated event for that service, click this gear icon to navigate to the Scheduler page
    - Cost of the service which you can potentially save if you take the necessary steps by deleting the snapshots.
- Sort the MEC column by cost and Days old column by number of days



Idle Running Services (RDS)

Amazon Relational Database Service (RDS) is easy to set up and operate, and provides cost-efficient and resizable database capacity in the cloud. However, if you have provisioned these RDS services and they are lying unused could cost you a significant amount of money. If detected in time, you can terminate such instances in time and save money.

The details displayed include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- Billing Account
- Service name
- Region deployed
- Additional information about the instance type, service tags, local CSMP tags, if any.
- The monthly estimated cost (MEC)
- Age in days
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action column, where you can
    - Choose to ignore the details for this service
    - Comment about the service or view previous comments
    - Assign recommended action as a task.
- The upper right corner (highlighted red box) includes the following
    - Option to export the information to a CSV file, click the Page icon to download the file to your desktop.
    - Option to create a automated event for that service, click this gear icon to navigate to the Scheduler page

    - Cost of the service which you can potentially save if you take the necessary steps by deleting the snapshots.
- Sort the MEC column by cost and Days old column by number of days

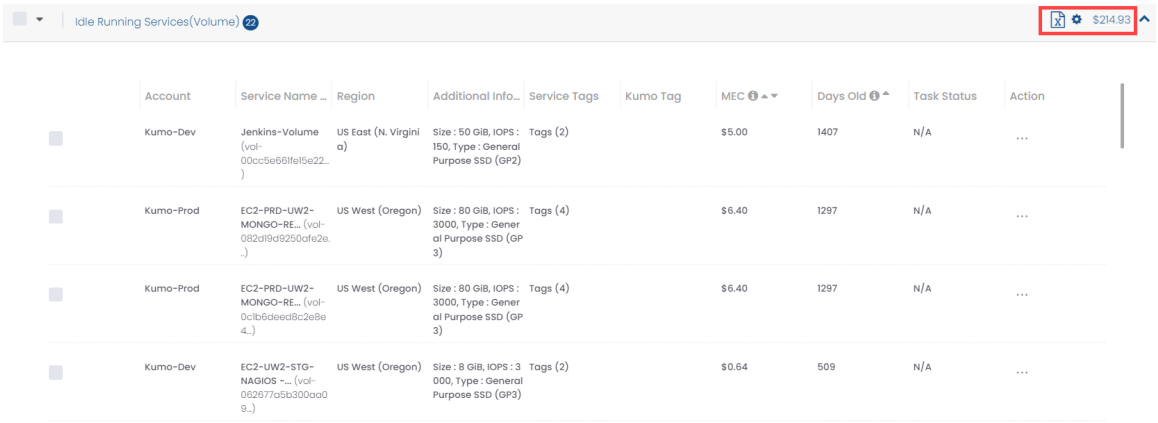
Idle Running Services (Volume)

You may have provisioned a number of volumes for your EC2 instances that you were using at a point in tine, however, have stopped using these volumes. These idle volumes can cost you a significant amount, if detected, you can terminate such instances in time and save money.

The details displayed include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- Billing Account
- Service name
- Region deployed
- Additional information about the type, size, purpose, service tags, and local CSMP tags, if any.
- The monthly estimated cost (MEC)
- Age in days
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action column, where you can
    - Choose to ignore the details for this service
    - Comment about the service or view previous comments
    - Assign recommended action as a task.
- The upper right corner (highlighted red box) includes the following
    - Option to export the information to a CSV file, click the Page icon to download the file to your desktop.

    - Option to create a automated event for that service, click this gear icon to navigate to the Scheduler page
    - Cost of the service which you can potentially save if you take the necessary steps by deleting the snapshots.
- Sort the MEC column by cost and Days old column by number of days



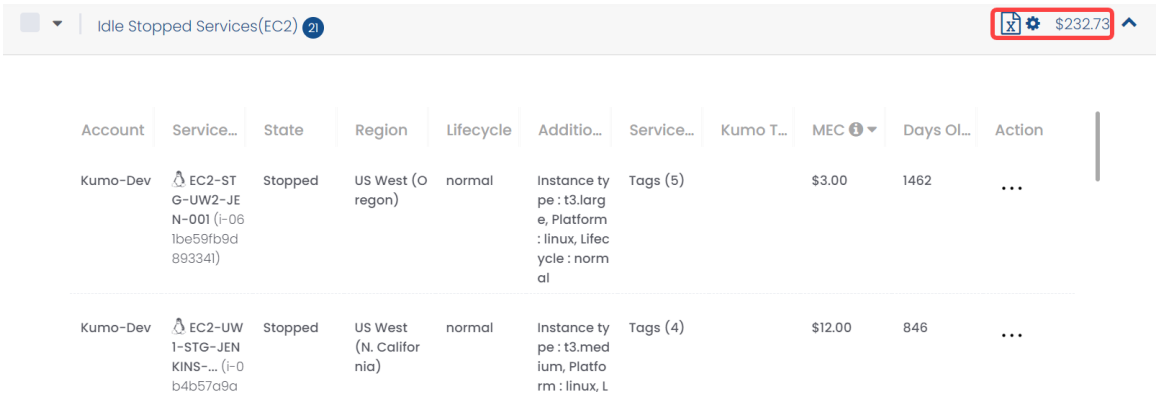
Idle Stopped Services (EC2)

You may have provisioned a number of EC2 instances that you were using at a point in time, however, have stopped these instances. These instances can cost you a significant amount, if detected, you can terminate such instances in time and save money.

The details displayed include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- Billing Account
- Service name
- Region deployed
- Additional information about the instance type, OS, platform, Lifecycle, service tags, local CSMP tags, if any.
- The monthly estimated cost (MEC)
- Age in days

- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action column, where you can
    - Choose to ignore the details for this service
    - Comment about the service or view previous comments
    - Assign recommended action as a task.
- The upper right corner (highlighted red box) includes the following
    - Option to export the information to a CSV file, click the Page icon to download the file to your desktop.
    - Option to create a automated event for that service, click this gear icon to navigate to the Scheduler page
    - Cost of the service which you can potentially save if you take the necessary steps by deleting the snapshots.
- Sort the MEC column by cost and Days old column by number of days



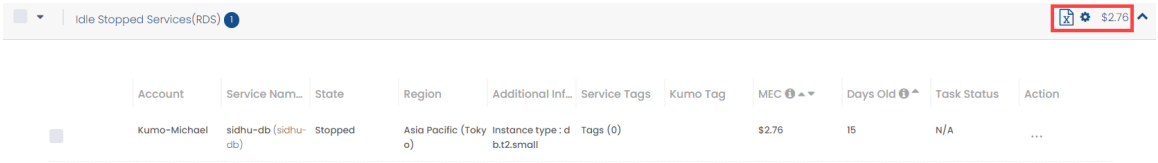
Idle Stopped Services (RDS)

Amazon Relational Database Service (RDS) is easy to set up and operate, and provides cost-efficient and resizable database capacity in the cloud. However, if you have provisioned these RDS services and they are lying unused could cost you a significant amount of money. If detected in time, you can terminate such instances in time and save money.

The details displayed include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- Billing Account
- Service name
- Current status of the RDS
- Region deployed
- Additional information about the instance type, service tags, local CSMP tags, if any.
- The monthly estimated cost (MEC)
- Age in days
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action column, where you can
    - Choose to ignore the details for this service
    - Comment about the service or view previous comments
    - Assign recommended action as a task.
- The upper right corner (highlighted red box) includes the following
    - Option to export the information to a CSV file, click the Page icon to download the file to your desktop.
    - Option to create a automated event for that service, click this gear icon to navigate to the Scheduler page
    - Cost of the service which you can potentially save if you take the necessary steps by deleting the snapshots.

- Sort the MEC column by cost and Days old column by number of days



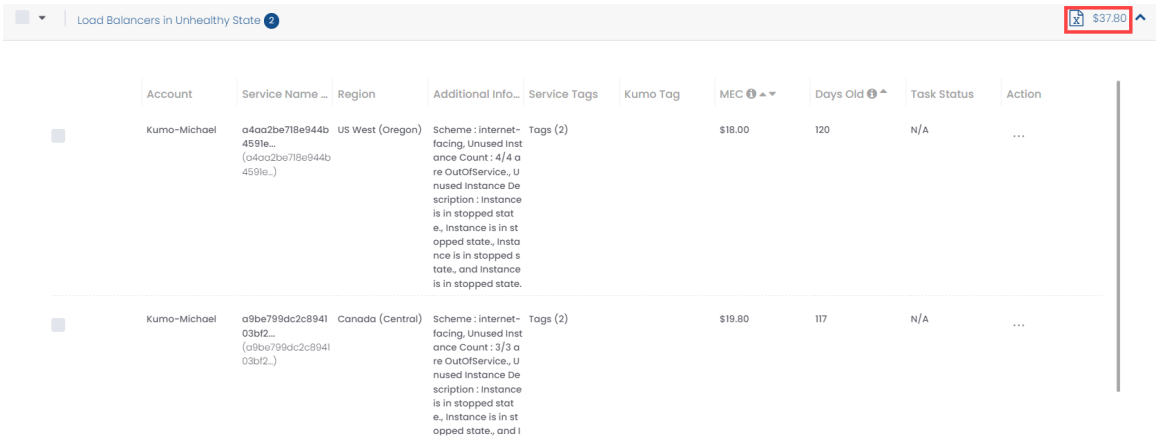
Load Balancers in unhealthy state

Elastic Load Balancers automatically distribute the incoming traffic across multiple EC2 instances, containers, and IP addresses, in one or more Availability Zones. If the load balancer fails to connect with the target EC2 instance at the specified port within the configured response timeout period, the instance is considered unhealthy. Apart from deteriorating performance, these load balancers in an unhealthy state still can cost you. This charge may be minimal, but over time it can quickly scale up costs.

The details displayed include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- Billing Account
- Service name
- Region deployed
- Additional information
- Service tags and local CSMP tags, if any
- The monthly estimated cost (MEC)
- Age in days
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action column, where you can
    - Choose to ignore the details for this service
    - Comment about the service or view previous comments
    - Assign recommended action as a task.

- The upper right corner (highlighted red box) includes the following
    - Option to export the information to a CSV file, click the Page icon to download the file to your desktop.
    - Option to create a automated event for that service, click this gear icon to navigate to the Scheduler page
    - Cost of the service which you can potentially save if you take the necessary steps by deleting the snapshots.
- Sort the MEC column by cost and Days old column by number of days



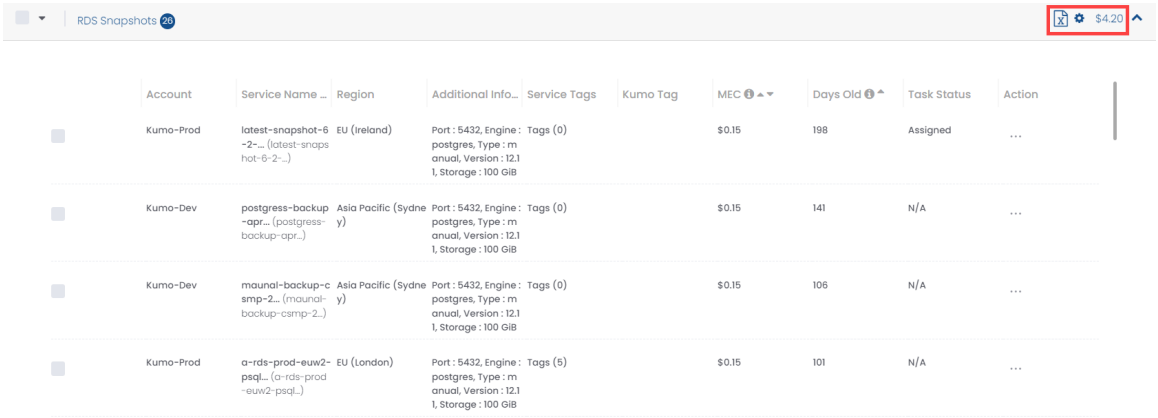
RDS Snapshot

In the AWS RDS Snapshot, the schema, data, functions and triggers for your database are all included which are stored in the S3 bucket. A snapshot is a temporary measure till proper backups are taken after which the snapshot is deleted. In certain scenarios, snapshots may still exist long after they are useful and consume valuable storage space.

The details displayed include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- Billing Account
- Service name
- Region deployed
- Additional information about the type, size of database, service tags if any

- The monthly estimated cost (MEC)
- Age of the snapshot
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action Column, where you can
    - Choose to ignore the details for this service
    - Comment about the service or view previous comments
    - Assign recommended action as a task.
- The upper right side (highlighted red box) includes the following
    - Option to export the information to a CSV file, click the Page icon to download the file to your desktop.
    - Option to create a automated event for that service, click this gear icon to navigate to the Scheduler page
    - Cost of the service which you can potentially save if you take the necessary steps by deleting the snapshots.
- Sort the MEC column by cost and Days old column by number of days



Unassociated Elastic IPs

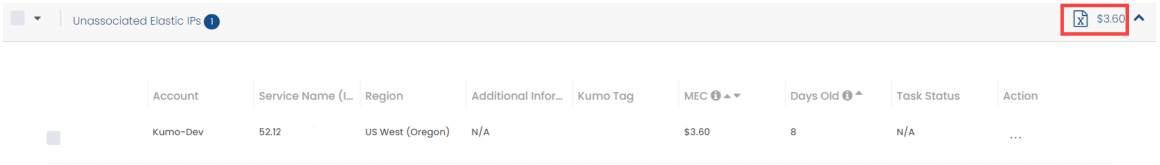
You may have provisioned Elastic IP addresses which are allocated to your AWS account, and is retained by you until you release it. Over time, a number of unassociated Elastic IP addresses might have been provisioned and are no longer being utilized. These Elastic IP

addresses can cost you a small hourly charge if an Elastic IP address is not associated with a running instance, or if it is associated with a stopped instance or an unattached network interface. This charge may be minimal, but over time it can quickly scale up costs.

The details displayed include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- Billing Account
- Service name
- Region deployed
- Additional information about the type, size of database, service tags, local CSMP tags, if any
- The monthly estimated cost (MEC)
- Age in days
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action column, where you can
    - Choose to ignore the details for this service
    - Comment about the service or view previous comments
    - Assign recommended action as a task.
- The upper right corner (highlighted red box) includes the following
    - Option to export the information to a CSV file, click the Page icon to download the file to your desktop.
    - Cost of the service which you can potentially save if you take the necessary steps by deleting the snapshots.

- Sort the MEC column by cost and Days old column by number of days



Unused and unhealthy AWS EKS

You may have provisioned Amazon Elastic Kubernetes Service (Amazon EKS) to run Kubernetes on AWS without needing to install, operate, and maintain your own Kubernetes control plane or nodes. However, over time, a number of AWS EKS clusters that you have provisioned for use may end up begin unused due to unavailability of an Amazon EC2 nodes, or undeployed AWS Fargate, or an unhealthy EC2 node group. These instances can still cost for your AWS EKS cluster, if detected, you can terminate such AWS EKS clusters and save money.
The details displayed include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- Billing Account
- Service Name
- Current status of the service (running/stopped)
- Region deployed
- Additional information about the EKS cluster version, status, and public access
- Service tags count to the EKS
- The monthly estimated cost (MEC)
- Age in days
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An action column, where you can
    - Choose to ignore the details for this service

    - Comment about the service or view previous comments
    - Assign recommended action as a task.
- The upper right corner (highlighted red box), click the Page icon to download the information to a CSV file to your desktop
- Sort the MEC column by cost and Days old column by number of days

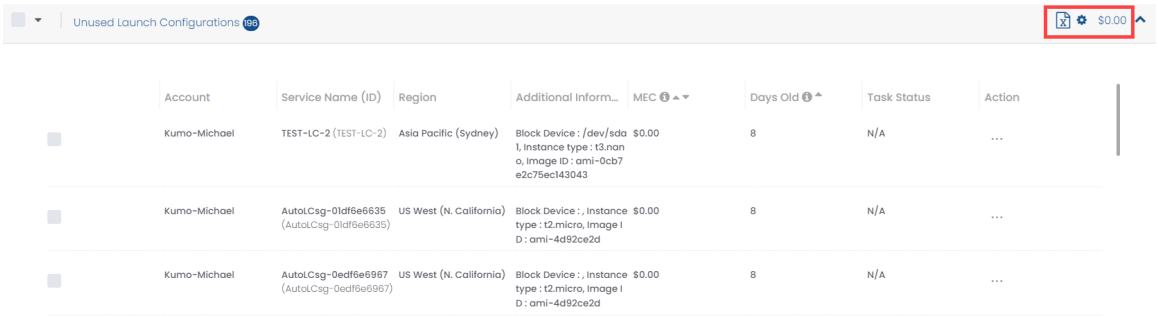
Unused Launch Configurations

A Launch configuration stores information about instances and can be used as a template to launch other instances. Over the course of time, after you may have a number of launch configurations that are no longer in use. Launch configurations use less space, however if there are a large number of unused launch configurations, you may still be charged for storage space if the storage amount exceeds the limit of the AWS Free Tier. Launch configurations that are no longer in use can be deleted as they consume valuable storage space.

The details displayed include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- Billing Account
- Service name
- Region deployed
- Additional information about the type, size of database
- The monthly estimated cost (MEC)
- Age of the launch configuration
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action Column, where you can
    - Choose to ignore the details for this service
    - Comment about the service or view previous comments

    - Assign recommended action as a task.
- The upper right corner (highlighted red box) includes the following
    - Option to export the information to a CSV file, click the Page icon to download the file to your desktop.
    - Option to create a automated event for that service, click this gear icon to navigate to the Scheduler page
    - Cost of the service which you can potentially save if you take the necessary steps by deleting the snapshots.
- Sort the MEC column by cost and Days old column by number of days



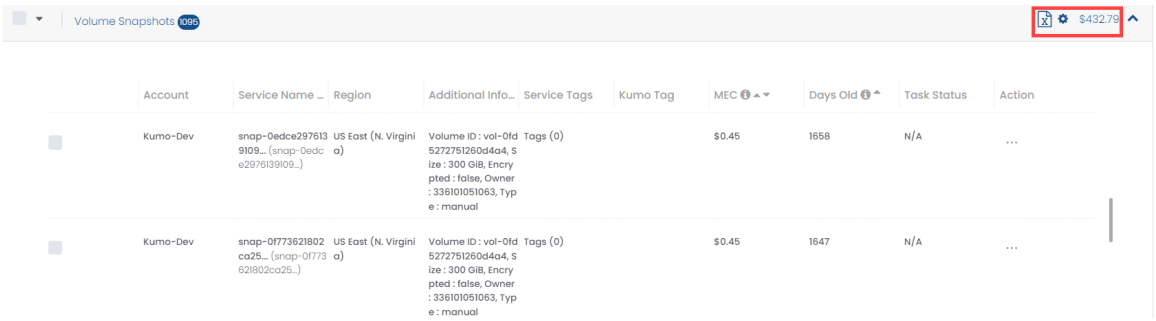
Volume Snapshot

In the AWS EBS volume snapshot, the data on your EBS volumes are backed up to an S3 bucket. A volume snapshot are incremental and may not be required after a point in time. In certain scenarios, snapshots may still exist long after they are useful and consume valuable storage space.

The details displayed include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- Billing Account
- Service name
- Region deployed
- Additional information about the type, size of database, service tags if any
- The monthly estimated cost (MEC)

- Age of the snapshot
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action column, where you can
    - Choose to ignore the details for this service
    - Comment about the service or view previous comments
    - Assign recommended action as a task.
- The upper right side (highlighted red box) includes the following
    - Option to export the information to a CSV file, click the Page icon to download the file to your desktop.
    - Option to create a automated event for that service, click this gear icon to navigate to the Scheduler page
    - Cost of the service which you can potentially save if you take the necessary steps by deleting the snapshots.
- Sort the MEC column by cost and Days old column by number of days



Outcomes

By identifying the services that are lying unused with the help of CloudBolt CSMP Service adviser and implementing the recommendations, you can save on your cloud costs.

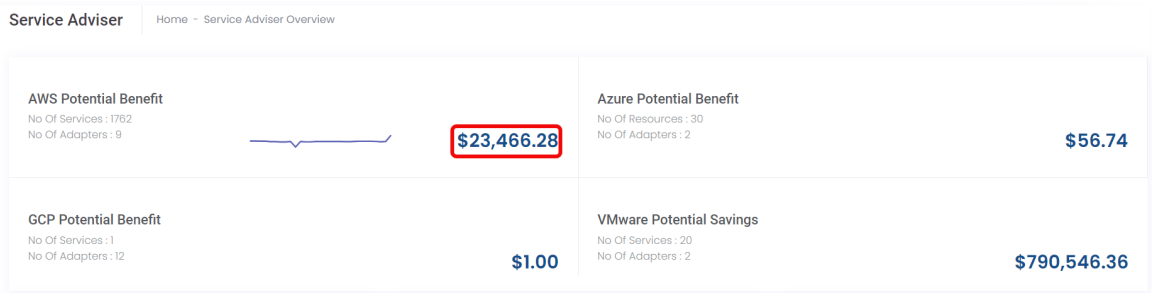
7.5.1.2. AWS Unoptimized Services

Learn how to get a list of AWS unoptimized services using the CloudBolt CSMP Cost Service Adviser.

- Introduction
- Viewing the Unoptimized services
- Outcomes

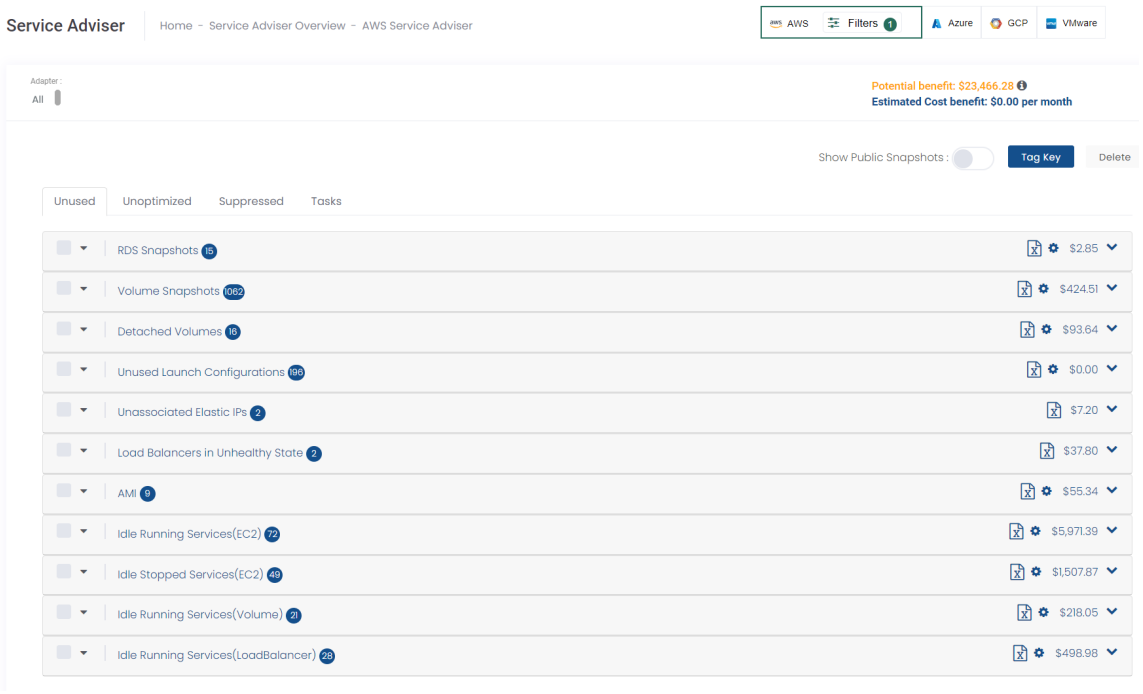
Introduction

1. Logon to your CloudBolt CSMP instance. Select the Tenant for which you want the details from the Tenant drop-down.
2. Navigate to **Quick Actions > Service Adviser**. The Service Adviser Overview page displays the Potential Benefit for each of the service providers.



3. Click the savings amount displayed on the AWS widget to further view the detailed recommendations for AWS cloud service provider. The Unused, Unoptimized and Suppressed tabs display the corresponding services. The Unused services tab is

displayed by default.



4. You can filter the displayed data as required using the following filters. By default, all the normal adapters, region, service type, lifecycles, and tags would be considered to display service adviser recommendations. To access the filters setting, click the filter button within the selected cloud provider box. All filters are combined together using 'and' logic, which means that only those records that meet all selected filter values are displayed. After selecting the required filters, you must click **Apply** to view the service adviser recommendations list for the set filters. Click **Clear Filters** to remove all the filter selections.
    - Provider: Select the cloud provider. By default AWS would be selected.
    - Group: Select an adapter group whose service recommendations you want to see. Only 'active' and 'error' status normal adapters from the selected group would be considered to display the service adviser data.
    - Adapter: Select normal adapters whose service recommendations you want to see. If you selected a group previously, the normal adapters with 'active' and 'error' status from the selected group would be marked selected automatically. However, you can manage the selection of normal adapters from the drop-down list.
    - Region: Select AWS region whose service recommendations you want to see.

- Service Type: Select a service type from the drop-down list to see recommendation related to individual service.
- Lifecycle: Select the lifecycle state of the services.
- Task Policy: Select task policies to filter the task lists that are created based on the selected policies.
- Applied Filters: To filter service recommendation list based on tag filters, enter tag key and tag value in the appropriate boxes. You can stablish the relation between tag key and tag value by selecting the tag operator symbol box located between the tag key and tag value boxes. Tag operator '=' would filter the services which have the selected tag key and value linked. Tag operator '!=' would filter the services which have entered tag key linked, but for all other tag values as entered in the tag value field. To apply a tag, click the **+** icon. You can add multiple tags. When two or more tags are applied, you must select the tag query operator. Tag query operator '&&(AND)' means all the tags are combined with 'and' logic, which means that only those records that meet all applied tags are displayed. Tag query operator '|| (OR)' means all the tags are combined with 'OR' logic, which means service adviser recommendations matching to either of the tags would be displayed.

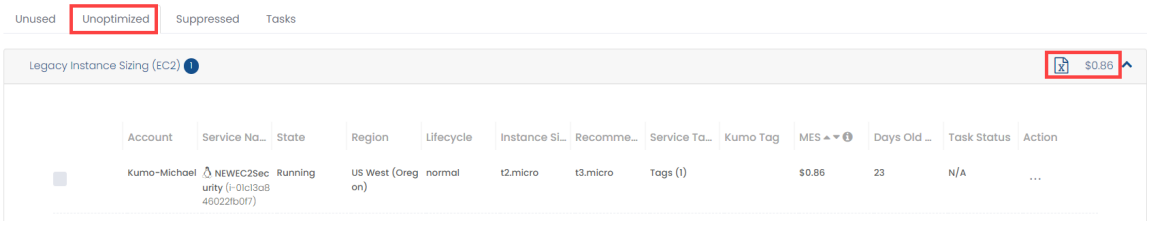
Viewing the Unoptimized services

This tab details the services, that you have provisioned for but these services are under utilized. These following list includes the services that may be displayed under unoptimized tab with the corresponding savings that can be made after following the recommendation provided.

- Legacy Instance Sizing (EC2)
- Legacy Instance Sizing (RDS)
- Right Sizing (EC2)
- Right Sizing (RDS)
- Right Sizing (S3)

- Unused Provisioned IOPS (RDS)
- Unused Provisioned IOPS (Volume)

1. Click on the Unoptimized tab to view the list of the AWS unoptimized services.



2. Click on any service type to view list of unoptimized services.
3. Click on the service type again to close the details window.
4. Click the Page icon to download the CloudBolt recommendations detail for that service type.

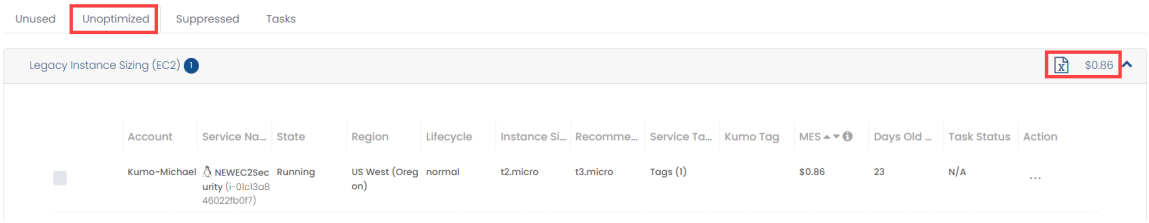
Legacy Instance Sizing (EC2)

If you are using a Previous Generation Instances for your workloads, it is necessary that you choose the right instances. The Legacy Instance Sizing for EC2 provides you a recommendation for new EC2 instance type based on your usage.

The details displayed include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- Billing Account
- Service Name
- State
- Region deployed
- Lifecycle status
- Current Instance size
- Recommended Instance Size
- Service tags and local CSMP tags, if any
- Monthly Estimated Savings (MES)
- Age of the EC2 instance

- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action Column, where you can
    - Choose to ignore the details for this service
    - Comment about the service or view previous comments
    - Assign recommended action as a task
- The upper right side (highlighted red box) includes the following
    - Option to export the information to a CSV file, click the Page icon to download the file to your desktop.
    - Cost of the service which you can potentially save if you take the necessary steps by opting the recommendations
- Sort the MES column by cost and Days old column by number of days



Right Sizing (EC2)

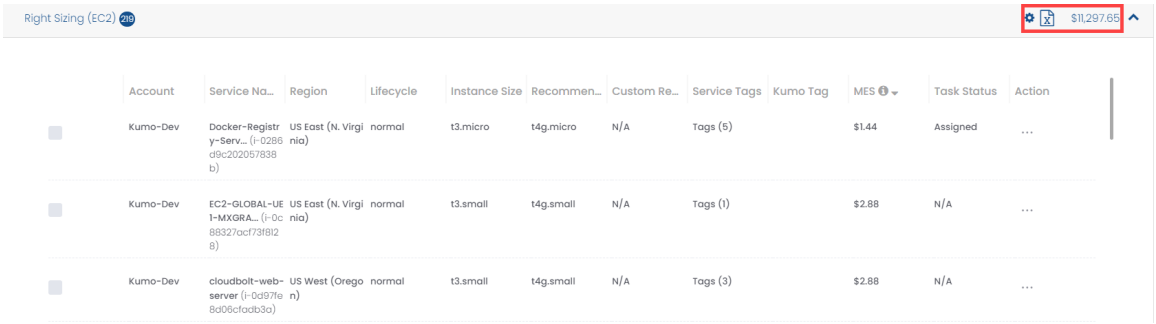
Instance types and sizes are matched to your workload's performance and capacity needs at the lowest feasible cost. This process is known as right-sizing. Additionally, it is the process of analyzing deployed instances to find areas where there are chances to reduce or delete them without sacrificing capacity or other needs, which lowers costs. Right sizing EC2 recommends you instance types optimized to fit your workload.

The details displayed include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- Billing Account
- Service Name

- Region deployed
- Lifecycle status
- Current Instance size
- Recommended Size is the recommended EC2 instance type based on pre-defined CloudBolt CSMP algorithms for EC2 right sizing. Recommended size column will not display if you have turned off the "Enable/Show Default Recommendation" option setting in service adviser telemetry configuration for EC2 right sizing.
- Custom Recommended Size displays the EC2 instance type recommendation based on your service adviser telemetry configuration for EC2 right sizing.
- Service tags count
- MES/Custom MES is the monthly estimated savings when you switch to the recommended size/custom recommended size.
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action Column, where you can
    - Show the metrics graph
    - Choose to ignore the details for this service
    - Comment about the service or view previous comments
    - Assign recommended action as a task
- The upper right side (highlighted red box) includes the following
    - Option to export the information to a CSV file, click the Page icon to download the file to your desktop
    - Option to create a automated event for that service, click this gear icon to navigate to the Scheduler page
    - Cost of the service which you can potentially save if you take the necessary steps by opting the recommendations

- Sort the MES column by cost



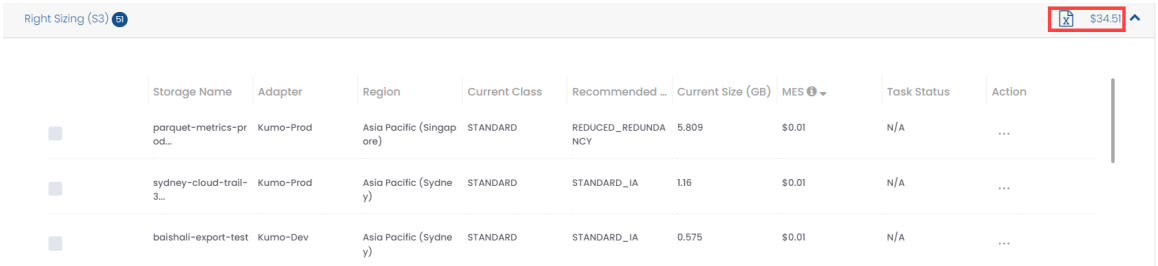
Right Sizing (S3)

A variety of storage classes tailored for various use cases are available with Amazon S3. You must choose correct S3 class for your workload.

The details displayed include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- The current storage name
- Billing adapter name
- Region deployed
- Lifecycle status
- Current storage class
- Recommended storage class
- Current storage class size in GB
- Monthly Estimated Savings (MES)
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action Column, where you can
    - Show the metrics graph
    - Choose to ignore the details for this service

    - Comment about the service or view previous comments
    - Assign recommended action as a task
- The upper right side (highlighted red box) includes the following
    - Option to export the information to a CSV file, click the Page icon to download the file to your desktop.
    - Cost of the service which you can potentially save if you take the necessary steps by opting the recommendations
- Sort the MES column by cost



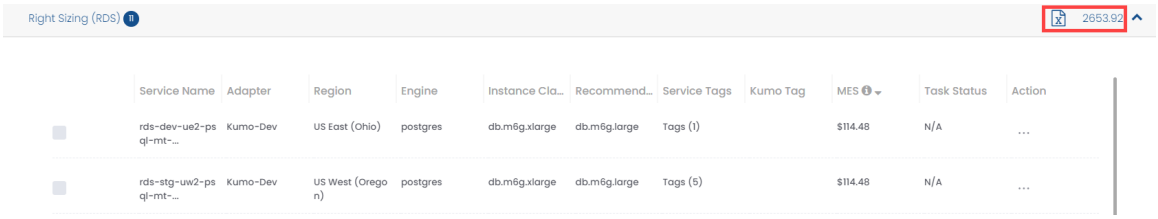
Right Sizing (RDS)

A variety of instance types designed for various relational database use cases are available through Amazon RDS. You have the freedom to select the ideal combination of resources for your database thanks to the flexibility provided by instance types, which include different combinations of CPU, memory, storage, and networking capabilities. You may adjust the size of your database to meet the needs of your intended workload since each instance type offers a range of instance sizes. CloudBolt right sizing provides you a recommendation to choose cost efficient RDS instance class.

The details displayed include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- The current RDS service name
- Billing adapter name
- Region deployed
- DB Engine

- Current Instance class
- Recommended Instance class
- Service tags count
- Monthly Estimated Savings (MES)
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action Column, where you can
    - Show the metrics graph
    - Choose to ignore the details for this service
    - Comment about the service or view previous comments
    - Assign recommended action as a task
- The upper right side (highlighted red box) includes the following
    - Option to export the information to a CSV file, click the Page icon to download the file to your desktop.
    - Cost of the service which you can potentially save if you take the necessary steps by opting the recommendations
- Sort the MES column by cost



Outcomes

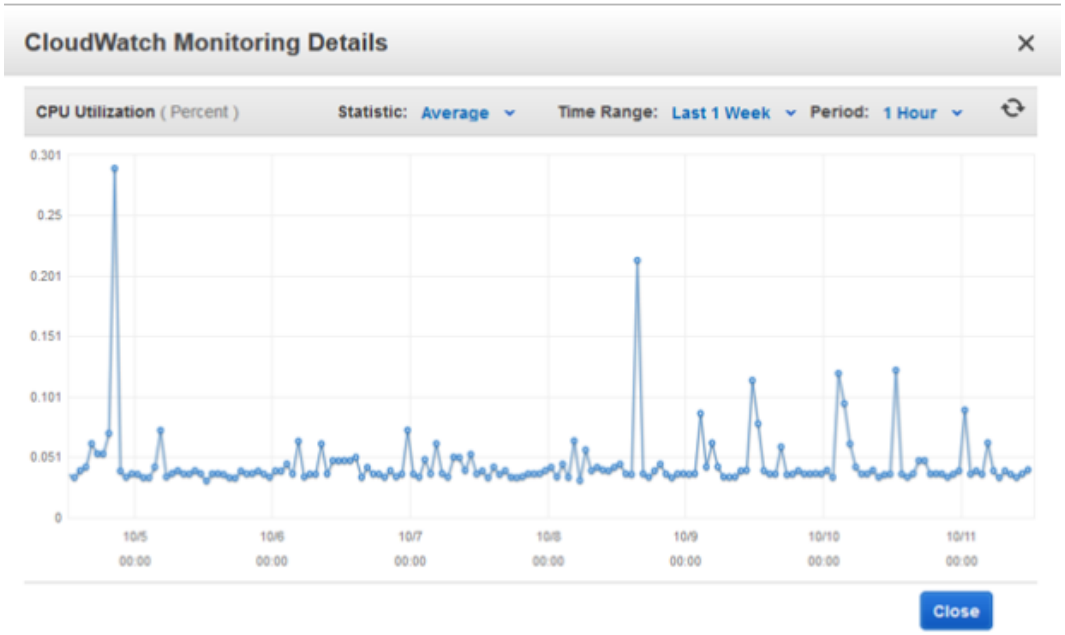
By identifying the services that are lying unoptimized with the help of CloudBolt CSMP Service adviser and implementing the recommendations, you can save on your cloud costs.

7.5.1.3. Use Cases for Unused AWS Services

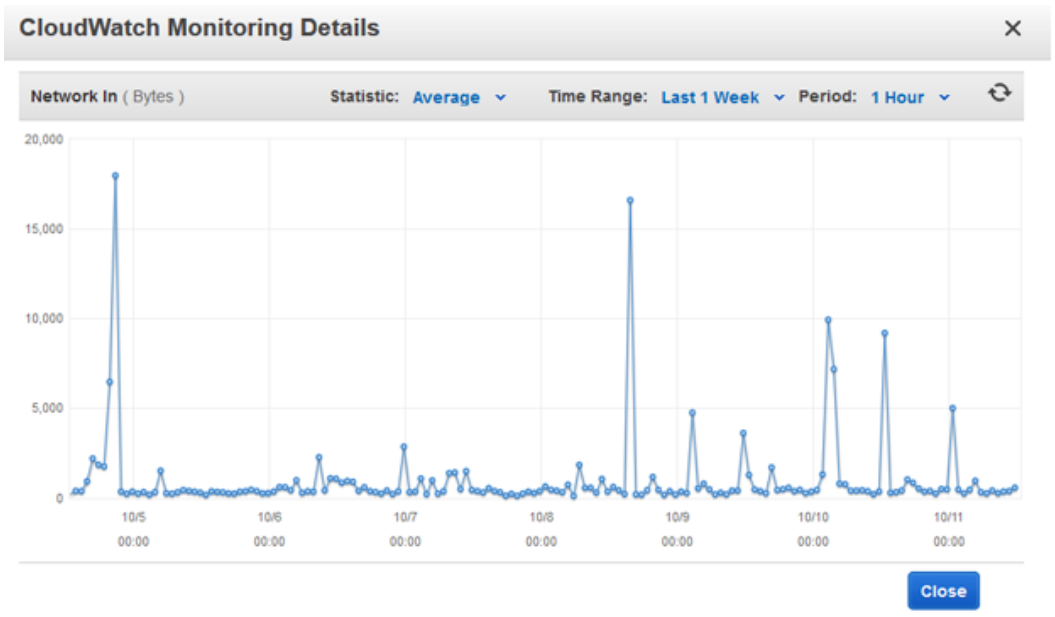
Learn about the CloudBolt CSMP default parameters value that are considered for identifying the Unused AWS services as part of service adviser. If you want to modify the parameters value, use Configure Service Adviser Telemetry.

- **RDS Snapshots**: When an RDS snapshot is not referenced with any Amazon RDS for the number of days specified in their CloudBolt CSMP service adviser configuration settings, the RDS snapshot will be listed under the Unused tab.
- **Volume Snapshots:** When a Volume snapshot is not referenced with any Amazon volumes for the number of days specified in their CloudBolt CSMP service adviser configuration settings, the volume snapshot will be listed under the Unused tab.
- **Detached Volumes:** If an Amazon volume is not linked with any Amazon servers, the volume will be categorized as detached volume under the Unused tab.
- **Unused Launch Configuration**: When a launch configuration is not used to launch an AWS EC2 instance, it will be classified as an unused launch configuration.
- **Unassociated Elastic IPs**: When an Elastic IP address is not associated with your AWS EC2 instance, and the hourly cost for such Elastic IPs must not be nil, it will classify as an unassociated Elastic IP.
- **AMI:** If an AMI is not specified to launch any AWS instances, such AMIs are considered unused AMI and display under service adviser recommendations.
- **Idle EC2 Running/Stopped conditions**

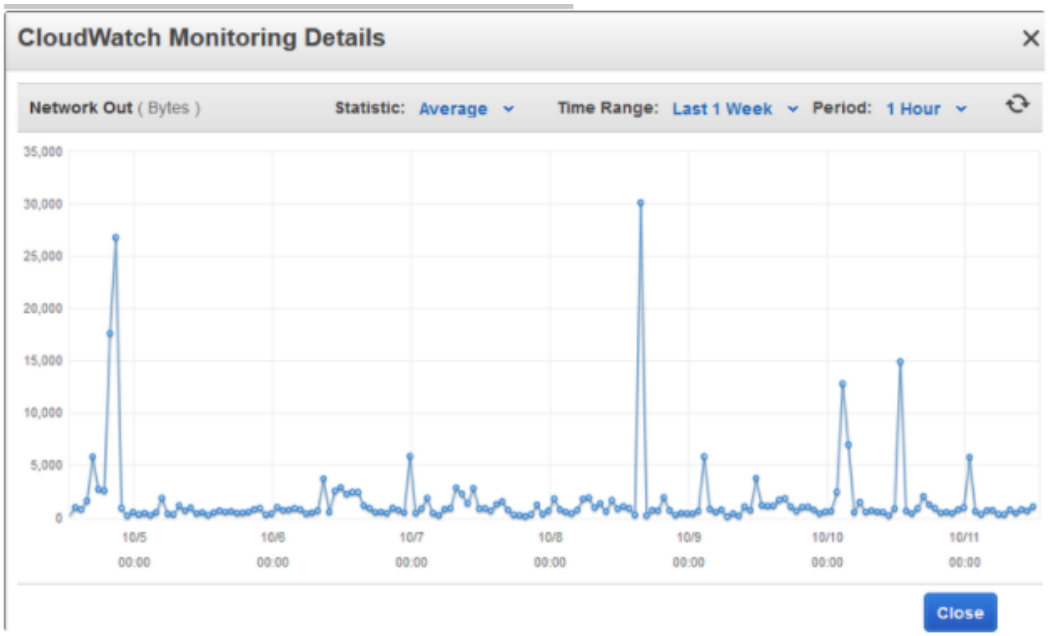
- **CPU Utilization**: The average CPU utilization for an EC2 service must be less than 2% for the last one week with time granularity set as 1 hour.



- **NetworkIn**: The average NetworkIn for an EC2 service must be less than 5 MB for the last one week with time granularity set as 1 hour.



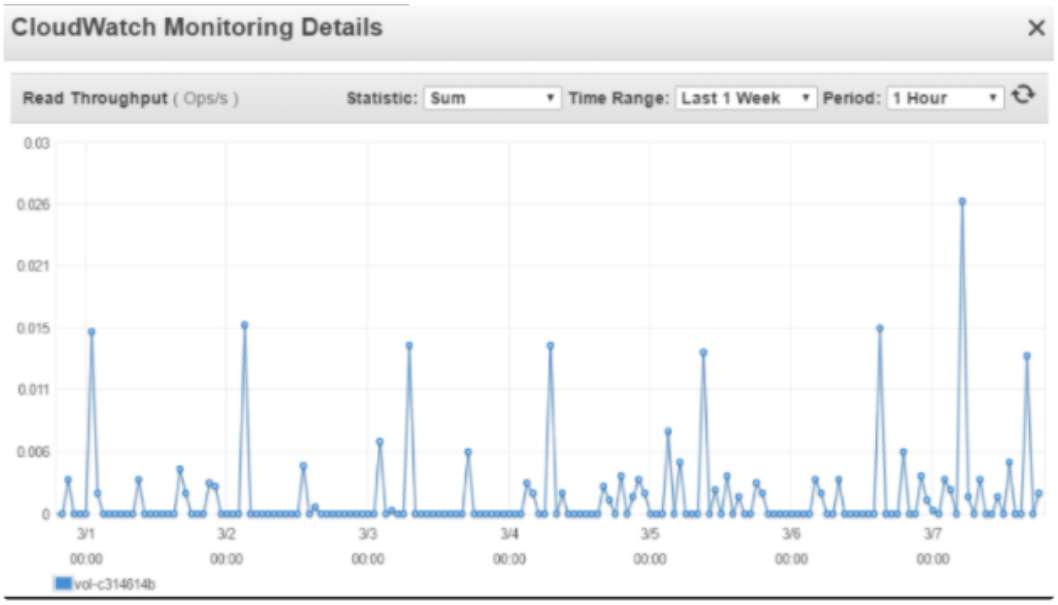
- **NetworkOut**: The average NetworkOut for an EC2 service must be less than 5MB for the last one week with time granularity set as 1 hour.



- **Memory Utilization**: The average memory utilization for an EC2 service must be less than 60% for the last one week with time granularity set as 1 hour.
    - Note: If a user has not configured Memory Utilization metric for their EC2 then it will be excluded from Idle consideration use case. In that case other three use cases must consider for Idle EC2 Running/Stopped.

If all the above use case conditions are true for an EC2, then that EC2 will consider as Idle.

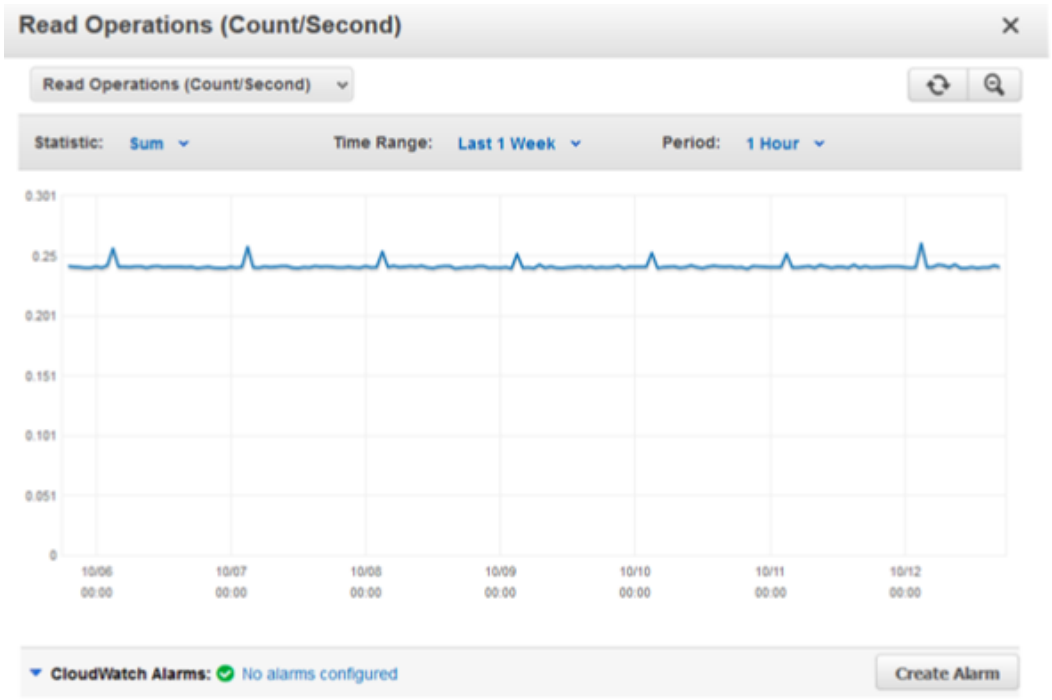
- **Idle Running EBS Volume conditions**
    - **VolumeReadOps**: The VolumeReadOps sum must be less than 1 for the last one week with time granularity set as 1 hour.



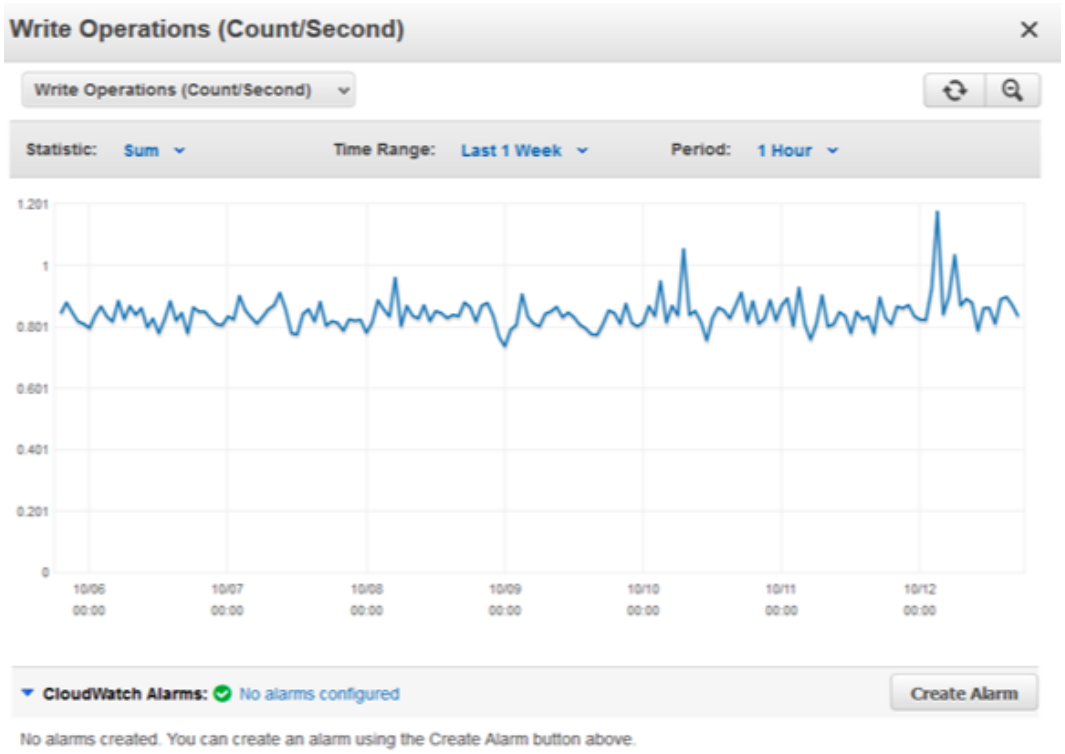
- **VolumeWriteOps**: The VolumeWriteOps sum must be less than 1 for the last one week with time granularity set as 1 hour.

An EBS volume must be considered idle if both the use case conditions are true.

- **Idle Running/Stopped RDS**
  - **DatabaseConnections**: The average DatabaseConnections counts for an RDS must be Zero for the last one week with time granularity set as 1 hour.
  - **ReadIOPS**: The ReadIOPS Sum Count per Second for an RDS must be less than 20 for the last one week with time granularity set as 1 hour.



- **WriteIOPS**: The WriteIOPS Sum Count per Second for an RDS must be less than 20 for the last one week with time granularity set as 1 hour.



A RDS must be considered idle if all the above three use case conditions are true.

- **Idle Running Classic and Application LoadBalancer**: If the RequestCount Sum for a load balancer is less than 100 for the last one week with time granularity set as 1 hour, it will classify as idle.
- **Idle Running Network LoadBalancer**: If the sum of NewFlowCount counts for a NLB is less than 100 for the last one week with time granularity set as 1 hour, it will classify as idle network loadbalancer.
- **Unused EKS**: When an AWS EKS cluster lacks both worker node and fargate, it will be categorized as unused.
- **Unhealthy EKS**: When an AWS EKS cluster's node group has a health issue, it will be categorized as unhealthy.

Outcomes

You have learnt about the default parameters and their values considered to identify unused cloud resources in AWS.

7.5.1.4. Use Cases for Unoptimized AWS Services

Learn about the CloudBolt CSMP default parameters value and algorithms that are considered for identifying the Unoptimized AWS services recommendation as part of service adviser. If you want to modify the parameters value, use Configure Service Adviser Telemetry.

AWS S3 Bucket Right Sizing

Right sizing for S3 bucket objects provides recommendations for optimal storage class and estimated cost savings.

To provide the best right sizing for S3 buckets, CloudBolt CSMP considers the users' accessibility behaviors (how frequent the objects are accessed), storage size and counts of the API requests (PUT, COPY, POST, LIST, GET, SELECT, among others) for last 30 days.

If a bucket contains objects with different storage classes, we will consider the storage class as having the maximum number of objects for optimization recommendation calculation.

Calculating the Recommended Storage Class

1. Get a count of the following parameters for the last 30 days:
    - PUT, COPY, POST, and LIST requests
    - GET, SELECT, and all other requests
    - Lifecycle Transition requests count
    - Data Retrieval requests count
    - Data retrievals size
2. Based on the above request counts, CloudBolt CSMP API will recommend a frequent or infrequent S3 storage category.
3. Using the S3 pricing chart, CloudBolt CSMP API will calculate the cost for existing and other storage classes among the frequent or infrequent S3 storage categories.

4. A final price comparison API will check for the storage class with less cost than the existing one, and recommended that storage class as part of the service adviser.

AWS RDS Right Sizing

The peak of average daily vCPU (CPU) utilization percent must be less than 40% continuously for the last 14 days of an RDS to qualify for the right sizing consideration. If an RDS has been created within the last 14 days and does not have their usage data for the last 14 days, our right sizing API will consider the existing daily average vCPU utilization percent.

Amazon RDS's right sizing recommendation will always be within the same region, instance class, and DB engine.

Getting the RDS Rightsized

Case 1: The average vCPU and memory utilization are less than 40%.

When the vCPU and memory utilization are less than 40%, the right sizing worker-run will suggest the new RDS with a vCPU and memory of more than 50% but less than the existing RDS instance's CPU and memory.

Based on the above filters, the new RDS instances will be compared for their pricing, and the instance with the least price will be displayed as RDS right sizing recommendation.

For example, if you have an RDS of R5 instance model db.m6g.16xlarge (vCPU: 64 & Memory: 256 GiB), the peak average vCPU utilization for the last 14 days is 20%, with average memory utilization of 30%. Now the right sizing worker-run will do the following checks before recommending the new RDS instance model:

1. Check the peak average daily vCPU utilization for the last 14 days: As the peak vCPU utilization is only 20%, it qualifies for the right sizing consideration.
2. The new RDS model must have vCPU in the range of 32 (inclusive) to 64. RDS models db.m6g.8xlarge, and db.m6g.12xlarge matches the required vCPU criteria.
3. The next check will be memory utilization. As the average memory utilization is 30%, the new RDS model must have memory between 128 (inclusive) to 256 GiB.

4. The RDS models db.m6g.8xlarge, and db.m6g.12xlarge fulfils the vCPU and memory requirements.
5. A final comparison will be done for pricing. The price for db.m6g.8xlarge is $4.864 per hour, whereas db.m6g.12xlarge costs $7.296 per hour.
6. The right sizing worker-run will recommend db.m6g.8xlarge as it saves $2.432 more than db.m6g.12xlarge model.

Case 2: The average vCPU (CPU) utilization is less than 40%, but the average memory utilization is more than 40%

The right sizing worker-run will search for a new RDS instance with a vCPU of more than 50% but less than the existing vCPU value with no change in the memory value.

Based on the above filters, the new RDS instances will be compared for their pricing, and the instance with the least price will be displayed as RDS right sizing recommendation.

For example, if you have an RDS of R5 instance model **db.r5.12xlarge.tpc2.mem2x** (vCPU: 48 & Memory: 768 GiB), the peak average vCPU utilization for the last 14 days is 20%, with average memory utilization of 60%. Now the right sizing worker-run will do the following checks before recommending the new RDS instance model.

1. Check the peak average vCPU utilization for the last 14 days: As the peak vCPU utilization is only 20%, it qualifies for the right sizing consideration.
2. The new RDS model must have vCPU in the range of 24 (inclusive) to 48. RDS models db.r5.8xlarge, db.r5.6xlarge.tpc2.mem4x, and db.r5.8xlarge.tpc2.mem3x matches the required vCPU criteria.
3. The next check will be memory utilization. As the average memory utilization is 60%, the new RDS model must have a memory same as the existing model, i.e. 768 GiB. The right sizing worker-run will sort the RDS models resulted in the previous step for the memory same as the existing model, i.e. db.r5.12xlarge.tpc2.mem2x (vCPU: 48 & Memory: 768 GiB).
4. The list of RDS shrinks to db.r5.6xlarge.tpc2.mem4x, and db.r5.8xlarge.tpc2.mem3x.
5. A final comparison will be done for pricing. The price for db.r5.6xlarge is $1.92 per hour, whereas for db.r5.8xlarge is $3.84 per hour.

6. The right sizing worker-run will recommend **db.r5.6xlarge.tpc2.mem4x** as it saves $1.92 more compared to db.r5.8xlarge.tpc2.mem3x model.

AWS EC2 Right Sizing

The maximum CPU and memory utilization percent must be less than 50% continuously for the last 14 days with time granularity set as 1 hour of an EC2 instance to qualify for the right sizing consideration.

Algorithm to Calculate EC2 Recommended Size

1. CPU and memory size must be same or more than the current instance's maximum CPU and memory utilization.
2. IOPS must be same or better.
3. Network throughput must be same or higher.
4. Using the EC2 instance pricing chart, a price for the new instance class meeting the above three conditions would be calculated.
5. A final price comparison API will check for the instance class with less cost than the existing one and recommended that instance class as part of the service adviser recommendation.

Outcomes

You have learnt about the default parameters and their values considered to identify unoptimized cloud resources in AWS.

7.5.2. Service Adviser for Azure

Here you will learn about the potential savings from Azure Cloud costs that you can do with the help of the CloudBolt CSMP recommendations.

Azure Unused Services

Azure Unoptimized Services

Azure Services List applicable for CloudBolt CSMP Cost Service Adviser Recommendations

CloudBolt CSMP offers cost optimization recommendations for Azure services. The optimization types are categorized into idle/unused services, unoptimized, hybrid benefit, and rightsizing recommendations.

Below is the list of services for which CloudBolt CSMP provides recommendations. To determine idle/unused strategies mostly the metrics parameters like CPU usage, disk usage, Memory utilization, I/O and network I/O along with few other parameters are checked for the past period. Any instance(s) resulting these values matching to the predefined values for a certain period, it is safe to assume that these instances has been inactive/idle and need to seek appropriate action. You can configure service adviser telemetry as per your requirements. To know more about CloudBolt CSMP default parameters considered for Service adviser recommendations, see Use cases for Azure Service Adviser.

Service Name	Category	Service Adviser Group
Virtual Machines (VM)	Idle Running or Stopped	Unused
Databases	Idle	Unused
Disks	Unused or Idle	Unused
Load Balancers	Unused or Idle	Unused
Public IPs	Unused	Unused
Snapshots	Unused	Unused
Elastic Pools	Idle	Unused
Blob Services	Idle	Unused

Service Name	Category	Service Adviser Group
App Services Plans	Unused or Idle	Unused
Elastic Pools	Hybrid Benefit	Unoptimized
SQL DB	Hybrid Benefit or Right Sizing	Unoptimized
Virtual Machines (VM)	Hybrid Benefit or Right Sizing	Unoptimized

Outcomes

By identifying the services that are lying unused or unoptimized services with the help of CloudBolt CSMP Service adviser and implementing the recommendations, you can save on your Azure cloud costs.

7.5.2.1. Azure Unused Services

Learn how to get a list of Azure unused services using the CloudBolt CSMP Cost Service Adviser.

- Introduction
- Viewing the Unused services
- Idle VM (Running)
- Idle VM (Stopped)
- Idle Databases
- Idle Disks
- Unassociated or Idle Load Balancers services
- Unassociated Public IPs
- Unattached Disks
- Unused Snapshots
- Idle Elastic Pools
- Idle Blob Services
- Idle App Service Plans
- Unused App Service Plans
- Idle AKS
- Outcomes

Introduction

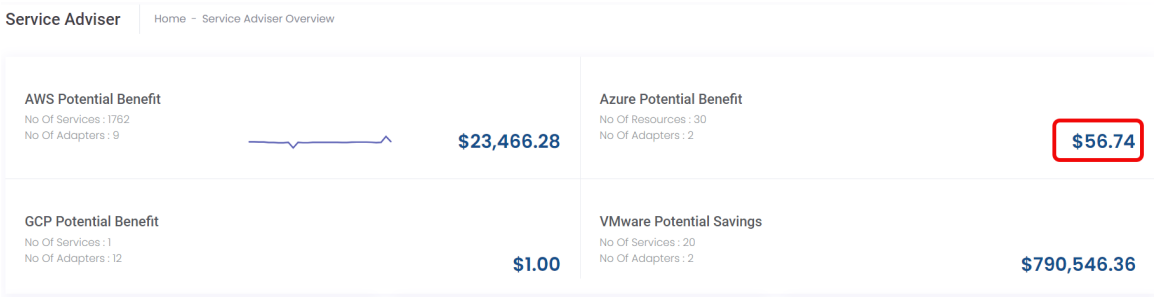
CloudBolt CSMP analyses your Azure account's subscribed services and their usage. Based on the CloudBolt CSMP provides you with personalized, actionable recommendations to help you reduce your Azure cost.

The Service Adviser provides you with an insight into potential cost benefits for your cloud service provider. Based on unused or unoptimized services for each normal adapter, it calculates potential savings. The service adviser module provides a list of unused services,

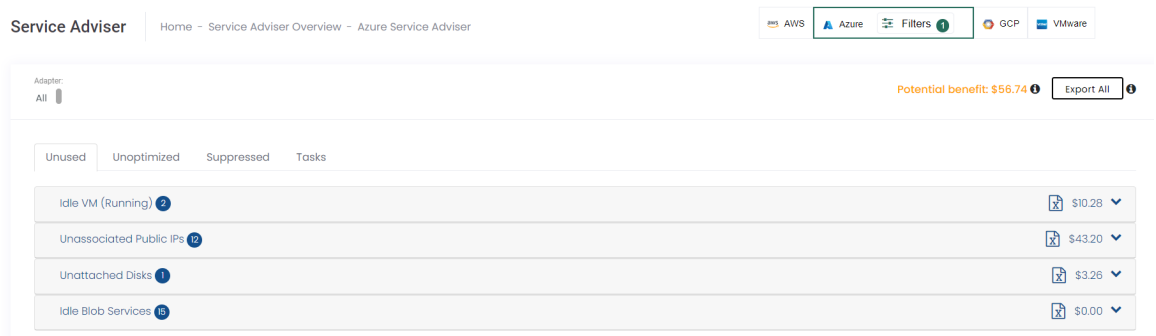
which you can turn off to reduce your cloud costs. Our unoptimized service adviser helps to right-size your services and gain cost benefits.

CSMP service adviser also runs post all the adapter synchronizations to identify the unused, unoptimized and suppressed services.

1. Logon to your CloudBolt CSMP instance. Select the Tenant for which you want the details from the Tenant drop-down.
2. Navigate to **Quick Actions > Service Adviser**. The Service Adviser Overview page displays the Potential Benefit for each of the service providers.



3. Click the savings amount displayed (highlighted in red rectangle) on the Azure widget to further view the detailed recommendations for Azure cloud service provider. The **Unused, Unoptimized, and Suppressed** tabs display the corresponding services. The **Unused** services tab is displayed by default.



4. You can filter the displayed data as required using the following filters. By default, all the normal adapters, region, resource group, service type, and tags would be considered to display service adviser recommendations. To access the filters setting, click the filter button within the selected cloud provider box. All filters are combined together using 'and' logic, which means that only those records that meet

all selected filter values are displayed. After selecting the required filters, you must click **Apply** to view the service adviser recommendations list for the set filters. Click **Clear Filters** to remove all the filter selections.

- Provider: Select the cloud provider. By default Azure would be selected.
- Group: Select adapter group whose service recommendations you want to see. Only 'active' and 'error' status normal adapters from the selected group would be considered to display the service adviser data.
- Adapter: Select normal adapters whose service recommendations you want to see. If you selected a group previously, the normal adapters with 'active' and 'error' status from the selected group would be marked selected automatically. However, you can manage the selection of normal adapters from the drop-down list.
- Region: Select Azure region whose service recommendations you want to see.
- Resource Group: Select a resource group or a subset of resource groups by clicking them in the list.
- Service Type: Select a service type from the drop-down list to see recommendation related to individual service.
- Task Policy: Select task policies to filter the task lists that are created based on the selected policies.
- Applied Filters: To filter service recommendation list based on tag filters, enter tag key and tag value in the appropriate boxes. You can stablish the relation between tag key and tag value by selecting the tag operator symbol box located between the tag key and tag value boxes. Tag operator '=' would filter the services which have the selected tag key and value linked. Tag operator '!=' would filter the services which have entered tag key linked, but for all other tag values as entered in the tag value field. To apply a tag, click the **+** icon. You can add multiple tags. When two or more tags are applied, you must select the tag query operator. Tag query operator '&&(AND)' means all the tags are combined with 'and' logic, which means that only those records

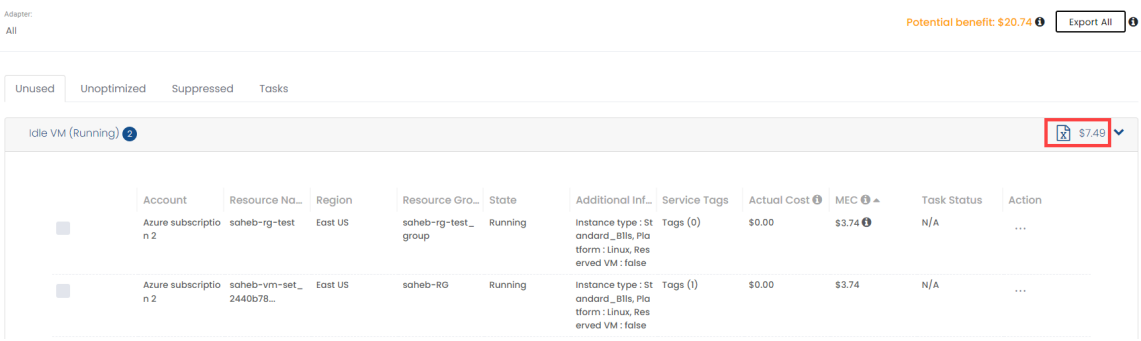
that meet all applied tags are displayed. Tag query operator '|| (OR)' means all the tags are combined with 'OR' logic, which means service adviser recommendations matching to either of the tags would be displayed.

Viewing the Unused services

This tab details the services, that you have provisioned for but these services are lying idle or unused. These following list includes the services that may be displayed along with the potential savings that can be effected.

- Idle VM (Running)
- Idle VM (Stopped)
- Idle Databases
- Idle Disks
- Unassociated Load Balancers
- Idle Load Balancers
- Unassociated Public IPs
- Unattached Disks
- Unused Snapshots
- Idle Elastic Pools
- Idle Blob Services
- Idle App Services Plans
- Unused App Services Plans

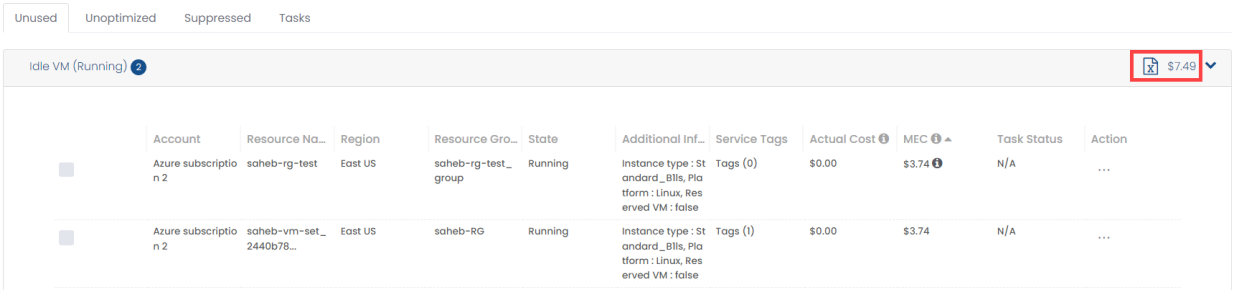
1. Click on any service type to view the details for that service. For e.g. the details for the Idle VM (Running) are displayed.



2. Click on the service type again to close the details window.
3. Click the Page icon to download the CloudBolt recommendations detail for that service.
4. You may send yourself a.CSV file containing all of the Azure Service Adviser's suggestions by clicking **Export All**.

Idle VM (Running)

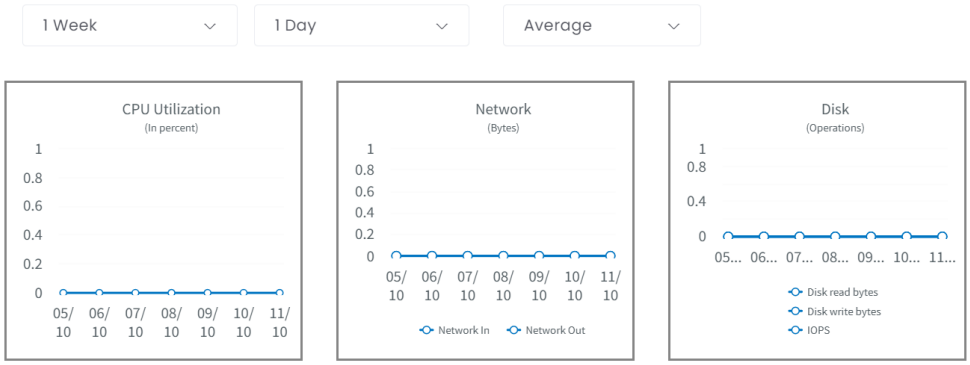
In the Azure cloud, Idle VMs are virtual machines that keep running even though not in use. For e.g. the VMs could have been used in a project POC but the VMs were never decommissioned. These Idle VMs add to cloud costs as they consume CPU, memory, and storage resources.



The displayed details include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- Azure Normal adapter name
- Service name
- Region deployed

- Resource Group
- State, whether running or shut down
- Additional information about the type, platform, service tags if any
- The pre-tax actual cost for the last 30 days
- The monthly estimated cost (MEC)
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action Column, where you can
    - Show/hide further details for this service. Click **Show** to view the following details for that VM



    - Ignore service. If you select to ignore, you can specify when to ignore on specific days or forever.
    - Comment about the service or view previous comments
    - Assign recommended action as a task

The upper right side (highlighted red box) includes the following

- Option to export the information to a CSV file, click the Page icon to download the file to your desktop.
- Total cost of the idle VMs which you can potentially save if you take the necessary steps for the listed VMs.

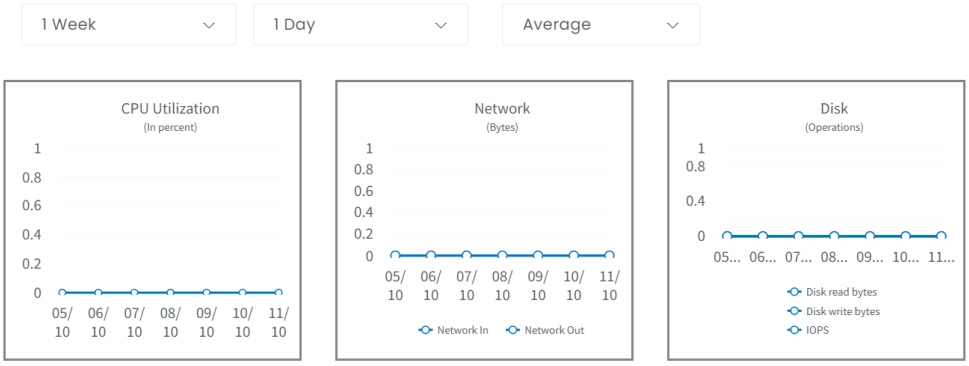
Idle VM (Stopped)

In the Azure cloud, Stopped VMs are idle virtual machines that keep charging you by the hour for this instance even though not in use. For e.g. The server may be shut off using a command while you are signed in to the Azure VM's operating system. You'll be booted out of the OS and all programs will halt, but the hardware allotted will remain active (including the IP addresses currently assigned). These Idle VMs add to cloud costs as they consume resources.



The displayed details include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- Azure Normal adapter name
- Service name
- Region deployed
- Resource Group
- State, whether running or stopped
- Additional information about the type, platform, service tags if any
- Service tags count
- The pre-tax actual cost for the last 30 days
- The monthly estimated cost (MEC)
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action Column, where you can
    - Show/hide further details for this service. Click **Show** to view the following details for that VM



- Ignore service. If you select to ignore, you can specify when to ignore on specific days or forever.
- Comment about the service or view previous comments
- Assign recommended action as a task

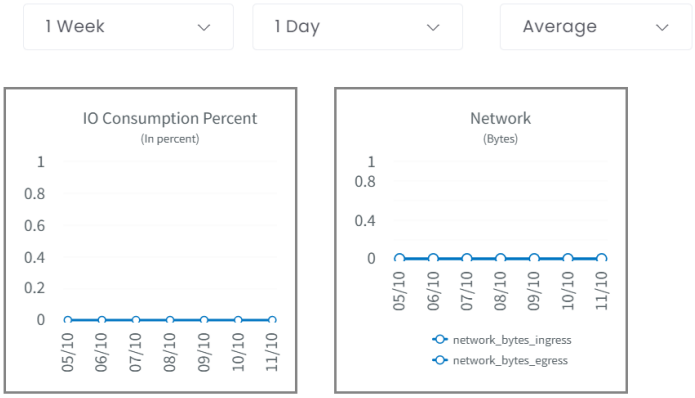
Idle Databases

In the Azure cloud, Idle Databases are databases that you might have provisioned at some time but are paused, idle or running even though not in use. For e.g. the databases could have been used in a project POC but were never decommissioned.
These Idle databases add to cloud costs as they consume storage resources.

The displayed details include the following:

- he total number of services in this category depicted in a blue circle on upper left corner
- The upper right side (highlighted red box) includes the following
  - Option to export the information to a CSV file, click the Page icon to download the file to your desktop
  - Cost of the service which you can potentially save if you take the necessary steps by deleting the snapshots
- Azure Normal adapter name
- Type of database
- Region deployed
- Resource Group

- State, whether ready, or shut down
- Additional information about the type, platform, service tags if any
- The pre-tax actual cost for the last 30 day
- The monthly estimated cost (MEC). You can sort the MEC column by cost
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action Column, where you can
    - Show/hide further details for this service. Click **Show** to view the IO consumption and network details for that database and **Hide** to collapse



    - Ignore service. If you select to ignore, you can specify when to ignore on specific days or forever
    - Comment about the service or view previous comments
    - Assign recommended action as a task

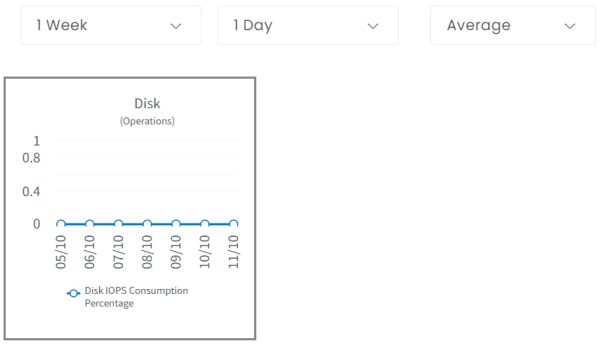
Idle Disks

In the Azure cloud, Idle Disks are storage devices that you might have provisioned at some time but are not in use.
These Idle disks add to cloud costs as they consume storage resources.

The displayed details include the following:

- The total number of services in this category depicted in a blue circle on upper left corner

- The upper right side (highlighted red box) includes the following
    - Option to export the information to a CSV file, click the Page icon to download the file to your desktop
    - Cost of the service which you can potentially save if you take the necessary steps by deleting the snapshots
- Azure Normal adapter name
- Service Name
- Region deployed
- Resource Group
- State, whether attached or detached
- Additional information about the size and type, service tags if any
- The pre-tax actual cost for last 30 days
- The monthly estimated cost (MEC). You can sort the MEC column by cost. If you stop the services, you can save that much of the amount. The sum of these costs constitutes the potential benefit value
- Days old - Age or when commissioned. You can sort the details on this field
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action Column, where you can
    - Show/hide further details for this service. Click **Show** to view the disk consumption over days and **Hide** to collapse



    - Ignore service. If you select to ignore, you can specify when to ignore on specific days or forever
    - Comment about the service or view previous comments
    - Assign recommended action as a task

Unassociated or Idle Load Balancers services

You may have provisioned Load Balancers to distribute the incoming traffic across your multiple VM instances and IP addresses. However, after some time, these Load Balancers may have become unused and are no longer associated with any VM or are just idle. These may incur significant charges over time.

The details displayed include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- The upper right corner (highlighted red box) includes the following
    - Option to export the information to a CSV file, click the Page icon to download the file to your desktop.
    - Cost of the service which you can potentially save if you take the necessary steps by deleting the snapshots.
- Azure Normal adapter name
- Service name
- Region deployed
- Resource group to which belongs
- State
- Additional information about the SKU type, Service tags if any.
- The pre-tax actual cost for last 30 days
- The monthly estimated cost (MEC). You can sort the details on the cost.
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.

- An Action column, where you can
    - Choose to ignore the details for this service
    - Show previous comments about the service or enter comments
    - Assign recommended action as a task

Unassociated Public IPs

You may have provisioned Public IP addresses which are allocated to your Azure projects, and is retained by you until you release it. Over time, a number of unassociated Public IP addresses might have been provisioned and are no longer being utilized. These IP addresses can cost you a small hourly charge. This charge may be minimal, but over time it can quickly scale up costs.

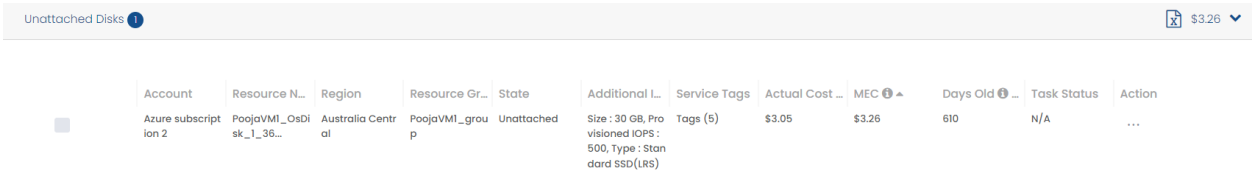


- The total number of services in this category depicted in a blue circle on upper left corner
- The upper right corner (highlighted red box) includes the following
    - Option to export the information to a CSV file, click the Page icon to download the file to your desktop.
    - Cost of the service which you can potentially save if you take the necessary steps by deleting the snapshots.
- Azure Normal adapter name
- Service name
- Region deployed
- Resource group to which belongs
- Additional information about the type, and allocation, Service tags if any.
- The pre-tax actual cost for the last 30 days
- The monthly estimated cost (MEC). You can sort the details on the cost.

- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action column, where you can
    - Choose to ignore the details for this service.
    - Show previous comments about the service or enter comments
    - Assign recommended action as a task

Unattached Disks

Over the course of time, after you may have provisioned disks for your VM instances, and you are no longer using these volumes with any other instances. You may still be charged for your unattached disks. Unattached disks that are no longer in use can be terminated and costs saved.



The details displayed include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- The upper right corner (highlighted red box) includes the following
    - Option to export the information to a CSV file, click the Page icon to download the file to your desktop.
    - Cost of the service which you can potentially save if you take the necessary steps.
- Azure Normal adapter name
- Service name
- Region deployed
- Resource group to which belongs
- State

- Additional information about the type, and size, Service tags if any.
- The pre-tax actual cost for the last 30 days
- The monthly estimated cost (MEC). You can sort the details on the cost.
- Age: Days since provisioned. You can sort the details on days.
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action column, where you can
    - Choose to ignore the details for this service.
    - Show previous comments about the service or enter comments
    - Assign recommended action as a task

Unused Snapshots

In the Azure cloud an Azure Snapshot is a read-only copy of the existing disk. A snapshot is a temporary measure till proper backups are taken after which the snapshot is deleted. In certain scenarios, snapshots may still exist long after they are useful and consume valuable storage space. Hence it is good practice to delete snapshots after the proper backups are taken which can reduce your Azure Cloud costs.

The details displayed include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- The upper right corner (highlighted red box) includes the following
    - Option to export the information to a CSV file, click the Page icon to download the file to your desktop.
    - Cost of the service which you can potentially save if you take the necessary steps
- Azure Normal adapter name
- Service name
- Region deployed

- Resource group to which belongs
- State
- Additional information about the type, and size, Service tags if any.
- The pre-tax actual cost for the last 30 days
- The monthly estimated cost (MEC). You can sort the details on the cost.
- Age: Days old or since when provisioned. You can sort the details on days.
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action column, where you can
    - Choose to ignore the details for this service.
    - Show previous comments about the service or enter comments
    - Assign recommended action as a task

Idle Elastic Pools

Multiple databases with different performance levels may be managed using Azure Elastic pools. Performance may be improved when several databases in an elastic pool share DTUs and vCores as and when necessary. Idle Elastic Pools are the services that you might have provisioned at some time but now there are no databases linked to it or not in use.

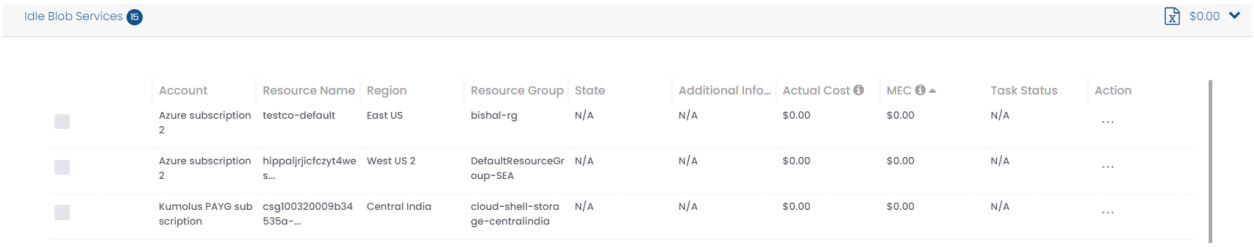
The displayed details include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- The upper right side (highlighted red box), click the Page icon to download the information to a CSV file to your desktop
- Azure Normal adapter name
- Service Name
- Region deployed
- Resource group to which belongs
- State

- Additional information about the tier, family, capacity
- Service tags count
- The pre-tax actual cost for last 30 days
- The monthly estimated cost (MEC). You can sort the details on the cost
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action column, where you can
    - Show/hide further details for this service. Click Show to view the following details for that Elastic Pool
    - Choose to ignore the details for this service
    - Show previous comments about the service or enter comments
    - Assign recommended action as a task

Idle Blob Services

Azure Blob is a storage solution provided by Microsoft Azure. Idle Blobs are the services that you might have provisioned at some time but now are not in use.



The displayed details include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- The upper right side (highlighted red box), click the Page icon to download the information to a CSV file to your desktop
- Azure Normal adapter name
- Service Name

- Region deployed
- Resource group to which belongs
- The pre-tax actual cost for last 30 days
- The monthly estimated cost (MEC). You can sort the details on the cost
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action column, where you can
    - Choose to ignore the details for this service
    - Show previous comments about the service or enter comments
    - Assign recommended action as a task

Idle App Service Plans

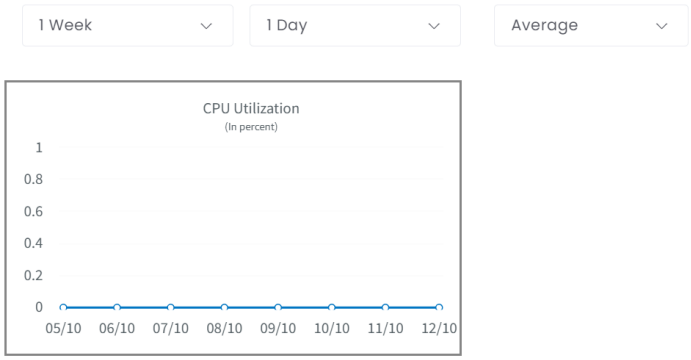
An App Service plan defines a set of compute resources for an app to run. There are chances when adequate apps are not linked as per the operating system of the app service plan or apps linked with the app service plan are idle resulting in unnecessary cost for idle app service plans.

Note: The free and shared App Service Plan will never be part of Idle App Service Plans recommendation.

The displayed details include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- The upper right side (highlighted red box), click the Page icon to download the information to a CSV file to your desktop
- Azure Normal adapter name
- Service Name
- Region deployed
- Resource group to which belongs
- State

- Additional information about the size, capacity, tier, platform, number of apps
- Service tags count
- The pre-tax actual cost for last 30 days
- The monthly estimated cost (MEC). You can sort the details on the cost
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action column, where you can
    - Show/hide further details for this service. Click Show to view the following details for that Elastic Pool



    - Choose to ignore the details for this service
    - Show previous comments about the service or enter comments
    - Assign recommended action as a task

Unused App Service Plans

An App Service plan defines a set of compute resources for an app to run. There are chances when no apps are not linked to the app service plan.

Note: The free and shared App Service Plan will never be part of Unused App Service Plans recommendation.

The displayed details include the following:

- The total number of services in this category depicted in a blue circle on upper left corner

- The upper right side (highlighted red box), click the Page icon to download the information to a CSV file to your desktop
- Azure Normal adapter name
- Service Name
- Region deployed
- Resource group to which belongs
- State
- Additional information about the size, capacity, tier, platform, number of apps
- Service tags count
- The pre-tax actual cost for last 30 days
- The monthly estimated cost (MEC). You can sort the details on the cost
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action column, where you can
    - Choose to ignore the details for this service
    - Show previous comments about the service or enter comments
    - Assign recommended action as a task

Idle AKS

There are times where your AKS cluster might not be running for a long time. You might need to identify such clusters and turn off, or stop to save your cloud cost.

The displayed details include the following:

- The total number of services in this category depicted in a blue circle on upper left corner
- The upper right side (highlighted red box), click the Page icon to download the information to a CSV file to your desktop
- Azure Normal adapter name

- Resource Name
- Region deployed
- Resource group to which belongs
- State
- Additional information about the number of nodes, OS type, OS disk capacity
- Service tags count
- The pre-tax actual cost for last 30 days
- The monthly estimated cost (MEC). You can sort the details on the cost
- Task status of the service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- An Action column, where you can
    - Choose to ignore the details for this service
    - Show previous comments about the service or enter comments
    - Assign recommended action as a task

Outcomes

By identifying the services that are lying unused with the help of CloudBolt CSMP Service adviser and implementing the recommendations, you can save on your cloud costs.

7.5.2.2. Azure Unoptimized Services

Learn how to get a list of Azure unoptimized services using the CloudBolt CSMP Cost Service Adviser.

- Introduction
- Viewing the Unoptimized services
- Outcomes

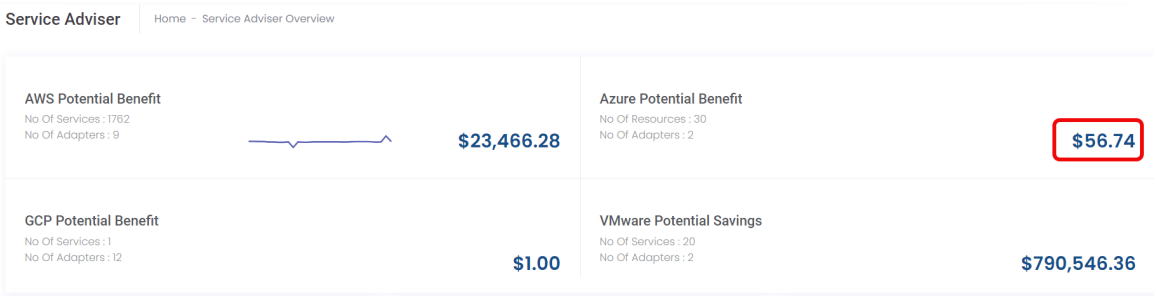
Introduction

CloudBolt CSMP analyses your Azure account's subscribed services and their usage. Based on the CloudBolt CSMP provides you with personalized, actionable recommendations to help you reduce your Azure cost.

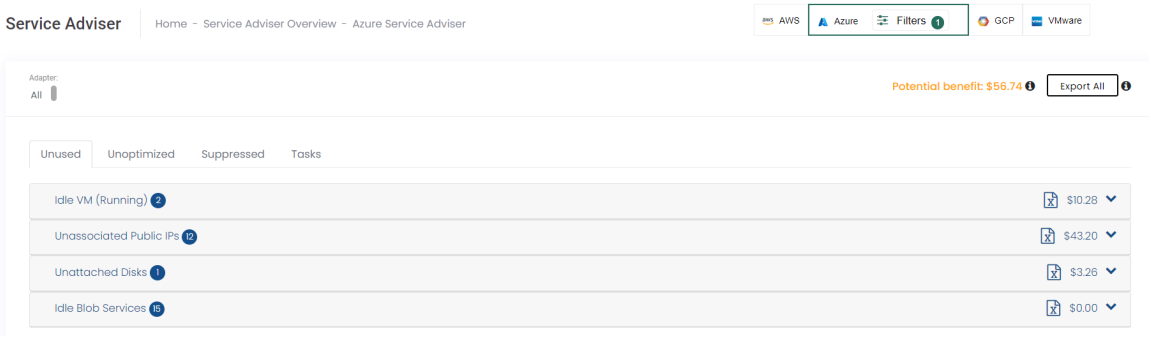
The Service Adviser provides you with an insight into potential cost benefits for your cloud service provider. Based on unused or unoptimized services for each normal adapter, it calculates potential savings. The service adviser module provides a list of unused services, which you can turn off to reduce your cloud costs. Our unoptimized service adviser helps to right-size your services and gain cost benefits.

CSMP service adviser also runs post all the adapter synchronizations to identify the unused, unoptimized and suppressed services.

1. Logon to your CloudBolt CSMP instance. Select the Tenant for which you want the details from the Tenant drop-down.
2. Navigate to **Quick Actions > Service Adviser**. The Service Adviser Overview page displays the Potential Benefit for each of the service providers.



3. Click the savings amount displayed (highlighted in red rectangle) on the Azure widget to further view the detailed recommendations for Azure cloud service provider. The **Unused, Unoptimized, and Suppressed** tabs display the corresponding services. The **Unused** services tab is displayed by default.



4. You can filter the displayed data as required using the following filters. By default, all the normal adapters, region, resource group, service type, and tags would be considered to display service adviser recommendations. To access the filters setting, click the filter button within the selected cloud provider box. All filters are combined together using 'and' logic, which means that only those records that meet all selected filter values are displayed. After selecting the required filters, you must click **Apply** to view the service adviser recommendations list for the set filters. Click **Clear Filters** to remove all the filter selections.
    - Provider: Select the cloud provider. By default Azure would be selected.
    - Group: Select adapter group whose service recommendations you want to see. Only ‘active’ and ‘error’ status normal adapters from the selected group would be considered to display the service adviser data.
    - Adapter: Select normal adapters whose service recommendations you want to see. If you selected a group previously, the normal adapters with ‘active’ and ‘error’ status from the selected group would be marked selected automatically. However, you can manage the selection of normal adapters from the drop-down list.
    - Region: Select Azure region whose service recommendations you want to see.
    - Resource Group: Select a resource group or a subset of resource groups by clicking them in the list.

- Service Type: Select a service type from the drop-down list to see recommendation related to individual service.
- Task Policy: Select task policies to filter the task lists that are created based on the selected policies.
- Applied Filters: To filter service recommendation list based on tag filters, enter tag key and tag value in the appropriate boxes. You can stablish the relation between tag key and tag value by selecting the tag operator symbol box located between the tag key and tag value boxes. Tag operator '=' would filter the services which have the selected tag key and value linked. Tag operator '!=' would filter the services which have entered tag key linked, but for all other tag values as entered in the tag value field. To apply a tag, click the **+** icon. You can add multiple tags. When two or more tags are applied, you must select the tag query operator. Tag query operator '&&(AND)' means all the tags are combined with 'and' logic, which means that only those records that meet all applied tags are displayed. Tag query operator '|| (OR)' means all the tags are combined with 'OR' logic, which means service adviser recommendations matching to either of the tags would be displayed.

Viewing the Unoptimized services

The Unoptimized tab provides the list of right sizing VMs and SQL DBs. It also provides the list of services applicable for Azure Hybrid Benefit. The Unoptimized tab can list following services:

- Hybrid Benefit (Elastic Pool)
- Hybrid Benefit (SQL DB)
- Hybrid Benefit (VM)
- Right Sizing (SQL DB)
- Right Sizing (VM)

The VM and SQL DB right sizing list contains following details:

- Subscription Name (ID): It displays the subscription name and ID associated with each VM.
- Account: Name of Azure Normal adapter
- Resource name (ID): Name of the Azure VM
- Region: Geographical region of the VM
- VM size / SQL DB size: It is the current VM or SQL DB size
- Recommended size: It is the recommended size for your existing VM or SQL DB based on the current usage history. The VM recommendation will always be within the same series of the existing VM. In case of SQL DB, recommendation for new SQL DB will be within the existing model of the SQL DB.
- Service tags: Azure applied tags count
- MES: It is the monthly estimated savings value when you opt for the CSMP recommended VM or SQL DB. You can sort the list based on MES. If a VM belong to an Azure CSP account, the MES will be displayed as N/A.
- Task Status: It indicates the assign task status for the service recommendation. It is available only for VM right sizing list. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
- Action: You can view the usage metrics, ignore or unignore the services, and view comments.

Based on these recommendations, Azure admin can use the shutdown option to stop services manually.

The Unoptimized tab also provides the list of Azure Hybrid Benefit services. The Azure Hybrid Benefit services are categorized as Hybrid Benefit (VM), Hybrid Benefit (SQL DB), and Hybrid Benefit (Elastic Pool).

The Azure Hybrid Benefit list contains following details:

- Account: Name of Azure Normal adapter
- Service Name (ID): VM, SQL DB, or Elastic Pool name
- Region: Azure service deployment region

- VM / SQLDB / Elastic Pool Size: VM or SQL DB class and size
- Image Type: Image type used for VM
- Service Tags: Azure applied tags count
- MEC: Monthly estimated cost of the Azure service without hybrid benefit
- AHUB MEC: Monthly estimated cost of the Azure service after opting for hybrid benefit
- MES: Monthly estimated cost savings value after opting for hybrid benefit
- Task Status: It indicates the assign task status for the service recommendation. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.

Note

Currently, CloudBolt CSMP Azure service manager module for Hybrid Benefit (VM) can check Windows, SQL, Red Hat Enterprise Linux (RHEL), and SUSE Linux Enterprise Server (SLES) virtual machines only.

Outcomes

By identifying the services that are lying unoptimized with the help of CloudBolt CSMP Service adviser and implementing the recommendations, you can save on your cloud costs.

7.5.2.3. Use cases for Azure Service Adviser

Learn about the CloudBolt CSMP default parameters value that are considered for identifying the Unused or Unoptimized Azure services as part of service adviser. If you want to modify the parameters value, use Configure Service Adviser Telemetry.

Service Adviser API run schedule

To identify unused services, CSMP service adviser API runs every day at 1800 hrs. UTC for all the accounts.

To identify unoptimized VMs, CSMP service adviser API runs every day at 1700 hrs. UTC for all the accounts. Whereas to identify unoptimized SQL DBs, CSMP service adviser API runs every day at 1900 hrs. UTC for all the accounts.

Use Cases for Unused Services

- **Idle VM (Running)**
    - CPU utilization: The average CPU utilization for a running VM must be less than 10% for the last seven days with time granularity set as 1 hour.
    - Network In Total: The average NetworkIn for a running VM must be less than 5 MB for the last seven days with time granularity set as 1 hour.
    - Network Out Total: The average NetworkOut for a running VM must be less than 5 MB for the last seven days with time granularity set as 1 hour.
    - Memory Utilization: The average memory utilization for a running VM must be less than 60% for the last seven days with time granularity set as 1 hour.

  If all the above conditions comply with a running VM, it would be categorized as unused idle VM (running).
- **Idle VM (Stopped)**
    - CPU utilization: The average CPU utilization for a stopped VM must be less than 10% for the last seven days with time granularity set as 1 hour.

  - Network In Total: The average NetworkIn for a stopped VM must be less than 5 MB for the last seven days with time granularity set as 1 hour.
  - Network Out Total: The average NetworkOut for a stopped VM must be less than 5 MB for the last seven days with time granularity set as 1 hour.
  - Memory Utilization: The average memory utilization for a stopped VM must be less than 60% for the last seven days with time granularity set as 1 hour.

  If all the above conditions comply with a stopped VM, it would be categorized as unused idle VM (stopped).

- **Idle Databases for PostgreSQL, MariaDB, MySQL**
  - Network_bytes_ingress: The average Network In must be less than 5 MBytes for the last seven days with time granularity set as 1 hour.
  - Network_bytes_egress: The average Network Out must be less than 5 MBytes for the last seven days with time granularity set as 1 hour.
  - IO_consumption_percent: The average IO percent must be less than 5% for the last seven days with time granularity set as 1 hour.

  If all the above three conditions comply with PostgreSQL, MariaDB, and MySQL type databases, it would be categorized as an **idle** database.

- **Idle Databases for SQL with DTU-based Model**

  DTU_consumption_percent: The DTU percentage must be less than 5% for the last seven days with time granularity set as 1 hour. When a SQL database service with the DTU model meets the above condition, it will be categorized as **idle.**

- **Idle Databases for SQL with vCore-based Model**
  - CPU_percent: The CPU percentage must be less than 5% for the last seven days with time granularity set as 1 hour.
  - Physical_data_read_percent: The Data IO percentage must be less than 5% for the last seven days with time granularity set as 1 hour.

  If both of the above two conditions comply with the vCore model SQL database service, it would be categorized as an **idle** database.

- **Idle Elastic Pool with the DTU-based Model**
  DTU_consumption_percent: The DTU percent must be less than 5% for the last 30 days with time granularity set as 1 hour. When a DTU based elastic pool meets the above condition, it will be categorized as **idle.**
- **Idle Elastic Pool with the vCore-based Model:**
  CPU_usage_percent: The CPU usage percent must be less than 5% for the last 30 days with time granularity set as 1 hour. When a vCore based elastic pool meets the above condition, it will be categorized as **idle.**
- **Idle Disks (Operating System Disk)**: OS Disk IOPS Consumed Percentage: The average OS Disk IOPS Consumed Percentage must be less than 1% for the last seven days with time granularity set as 1 hour.
  An OS disk with the above condition will be categorized as an **idle disk**.
- **Idle Disks (Data Disk)**
  Data Disk IOPS Consumed Percentage: The average Data Disk IOPS Consumed Percentage must be less than 1% for the last seven days with time granularity set as 1 hour.
  A data disk with the above condition will be categorized as an **idle disk.**
- **Idle Load Balancers**: ByteCount: The average Byte Count must be less than 10 MBytes for the last seven days with time granularity set as 1 hour.
  A load balancer with the above condition will be categorized as an **idle load balancer.**
- **Idle Blob Services**
  - Availability: The average availability must be 100% for the last 30 days with time granularity set as 1 hour.
  - Ingress: The maximum ingress for a Blob service must be less than 5 MBytes for the last 30 days with time granularity set as 1 hour.
  - Egress: The maximum Egress for a Blob service must be less than 5 MBytes for the last 30 days with time granularity set as 1 hour.
    If a Blob service complies all the above requirements, it will be categorized as an **idle Blob service.**

- **Unassociated Load Balancers**

  A load balancer must be associated with a minimum of one back end address pool. If a load balancer is not associated with any back end pool, it will be categorized as an **unassociated load balancer.**

- **Unassociated Public IPs**

  A public IP must be attached with a load balancer, VM, and NAT gateway to have a valid network configuration.

  If a public IP does not have a valid network configuration, public IP will be categorized as an **unassociated public IP.**

- **Unattached Disks**

  When you delete a virtual machine (VM) in Azure, by default, any disks that are attached to the VM are not deleted. You must delete any unattached disks after creating a backup, if required, and reduce unnecessary costs.

  If a disk is not attached with a VM for the last 30 days, the disk will be categorized as **unattached disks**.

- **Unused Snapshots**

  A snapshot of the OS or data disk must be used to create a VM.

  If a snapshot is not used within the last 30 days, it will be categorized as an **unused snapshot.**

- **Idle App Service Plans**

  An App Service plan defines a set of compute resources for an app to run.

  If CpuPercentage is less than 15% for the last seven days with time granularity set as 1 hour, it will be categorized as an **idle app service plan.**

- **Unused App Service Plans**

  An App Service plan defines a set of compute resources for an app to run.

  If there is no apps linked with a app service plan, it will be categorized as an **unused app service plan.**

- **Idle AKS**

  - CPU Usage Percentage: The average CPU Usage Percentage for a running AKS must be less than 10% for the last seven days with time granularity set as 1 hour.

- Memory RSS Percentage: The Memory RSS Percentage for a running AKS must be less than 30% for the last seven days with time granularity set as 1 hour.

If all the above conditions comply with a running AKS, it would be categorized as idle AKS.

Use Cases for Unoptimized VMs

Below are the use cases that CloudBolt CSMP API considers to decide a VM as unoptimized and provides rightsizing recommendations:

General Purpose and Compute Optimized VMs

General purpose and compute optimized VMs that have average maximum CPU utilization percent less than 50% for all the instances within the last 14 days, with time granularity set as 1 hour are viable candidates for rightsizing in CloudBolt CSMP.

The algorithm utilised by CloudBolt's default settings for general purpose and compute optimized VMs rightsizing recommendations are as follows:

1. Check the actual CPU usage percentage to get the vCPU value.
2. If the actual CPU usage value is in decimal, it will be scaled to the following whole number (for example, if actual CPU usage is 1.2, then the actual CPU will be rounded as 2 vCore).
3. The new CPU value would be the sum of the rounded CPU value and one.
4. Calculate the actual cached IOPS percent. IOPS is the input/output operations per second, which in general is either a read or write operation. It is the percentage calculated by the total IOPS consumed over the max cached virtual machine IOPS limit.
5. The new cached IOPS percent would be the sum of the actual cached IOPS percent and one.
6. If the diagnostic settings agent is installed in the VM, then the memory condition will be applied. It is entirely optional for the general purpose and compute-optimized VMs.

7. If the memory usage data is available, add a grace value of 1 to the actual memory usage value. The new VM Memory must be the actual memory usage plus one.
8. Get a list of all the VMs that satisfy the new vCPU, cached IOPS, and memory (if considered) requirements within the parent series of the VM.
9. Compare the hourly cost of the shortlisted VMs against the existing VM using the VmPricelist table and choose the VM with minimum price as a recommendation.

Memory Optimized VMs

You must install the Azure Diagnostic Setting agent and Azure Sink from the Diagnostic setting to get the memory percent data to run our rightsizing API codes for your memory-optimized VMs. Memory percent data metric name are different for Windows and Linux VM.

1. Memory % Committed Bytes In Use (for Window VM)
2. mem/used_percent (for Linux VM)

Memory optimized VMs that have average maximum CPU utilization percent less than 50% and memory utilisation percent less than 60% for all the instances within the last 14 days, with time granularity set as 1 hour are viable candidates for rightsizing in CloudBolt CSMP.

The algorithm utilised by CloudBolt's default settings for memory optimized VMs rightsizing recommendations are as follows:

1. Check the actual CPU usage percentage to get the vCPU value.
2. If the actual CPU usage value is in decimal, it will be scaled to the following whole number (for example, the actual CPU usage is 1.2, then the actual CPU will be rounded as 2 vCore).
3. The new CPU value would be the sum of the rounded CPU value and one.
4. Get the actual cached IOPS percent. IOPS is the input/output operations per second, which in general is either a read or write operation. It is the percentage calculated by the total IOPS consumed over the max cached virtual machine IOPS limit.
5. The new cached IOPS percent would be the sum of the actual cached IOPS percent and one.

6. Check the actual memory usage data, add a grace value of 1 to the actual memory usage value. The new VM Memory must have at least the actual memory usage plus one.
7. Get a list of all the VMs that satisfy the new vCPU, cached IOPS, and memory requirements within the same series of the VM.
8. Compare the hourly cost of the shortlisted VMs against the existing VM using the VmPricelist table and choose the VM with minimum price as a recommendation.

Storage Optimized VMs

Storage optimized VMs that have average maximum CPU utilization percent less than 50% for all the instances within the last 14 days, with time granularity set as 1 hour are viable candidates for rightsizing in CloudBolt CSMP.

The algorithm utilised by CloudBolt's default settings for storage optimized VMs rightsizing recommendations are as follows:

1. Check the actual CPU usage percentage to get the vCPU value.
2. If the actual CPU usage value is in decimal, it will be scaled to the following whole number (for example, if the actual CPU usage is 1.2, then the actual CPU will be rounded as 2 vCore).
3. The new CPU value would be the sum of the rounded CPU value and one.
4. Calculate the actual uncached IOPS percent. IOPS is the input/output operations per second, which in general is either a read or write operation. It is the percentage calculated by the total IOPS consumed over the max cached virtual machine IOPS limit.
5. The new uncached IOPS percent would be the sum of the actual uncached IOPS percent and one.
6. If the diagnostic settings agent is installed in the VM, then the memory condition will be applied. It is entirely optional for the general purpose and compute-optimized VMs.
7. If the memory usage data is available, add a grace value of 1 to the actual memory usage value. The new VM Memory must be the actual memory usage plus one.

8. Get a list of all the VMs that satisfy the new vCPU, uncached IOPS, and memory (if considered) requirements within the parent series of the VM.
9. Compare the hourly cost of the shortlisted VMs against the existing VM using the VmPricelist table and choose the VM with minimum price as a recommendation.

Use Cases for Unoptimized SQL Databases

Below are the use cases that CloudBolt API considers to decide a SQL database as unoptimized and provides rightsizing recommendations:

- **DTU-based SQL Database**
  The average of maximum DTU consumption percent must be less that 40% for all the instances within the last 14 days with time granularity set as 1 hour.
- **vCore-based SQL Database**
  The average of maximum CPU utilization percent must be less that 40% for all the instances within the last 14 days with time granularity set as 1 hour.

Use Cases for Azure Hybrid Benefit (VM)

Azure Hybrid Benefit for Windows Server VMs

To qualify an Azure VM for Azure Hybrid Benefit for Windows Server VM, you must have on-premises core licenses for Windows Server with publisher as *MicrosoftWindowsServer* and license type as *Windows_Server*.

You must have a minimum of 16-core licenses, either Windows Server Datacenter or Windows Server Standard edition, which allows you to use up to 16 virtual cores across two or fewer virtual machines. You can use up to 8 virtual cores on a single virtual machine with each additional set of 8-core licenses.

Using the existing billing data for the VM, we will identify the total cost and licensing cost for the selected VM. The licensing cost will be the monthly estimated cost savings value after opting for hybrid benefit.

Windows Server Standard edition licences must be used either on-premises or in Azure; they cannot be used simultaneously. The sole exception is once, for up to 180 days, to

enable you to move the same workloads to Azure.
Windows Server Datacenter edition licenses allow simultaneous usage on-premises and in Azure.
Windows Server Standard or Datacenter edition licenses must be protected by software assurance, a subscription through a CSP, or another subscription scheme.

Azure Hybrid Benefit for Windows SQLServer VMs

To qualify an Azure VM for Azure Hybrid Benefit for Windows SQLServer VM, you must have on-premises core licenses for Windows SQLServer with publisher as *MicrosoftSQLServer* and license type as *Windows_Server*.

You must have a minimum of 1-core licenses, either Standard or Enterprise edition. 1-core Enterprise edition license allows you to use up to 4 vCPU for General Purpose and Hyper Scale or 1vCPU Business Critical SQL VM. Whereas 1-core Standard edition license allows you to use up to 1 vCPU for General Purpose and Hyper Scale SQL VM. You will need 4-core Standard edition license to create 1 vCPU Business Critical SQL VM.

Using the existing billing data for the SQL VM, we will identify the total cost and licensing cost for the selected SQL VM. The licensing cost will be the monthly estimated cost savings value after opting for hybrid benefit.

Standard and Enterprise edition licenses must be used either on-premises or in Azure; they cannot be used simultaneously. The sole exception is once, for up to 180 days, to enable you to move the same workloads to Azure.
Windows SQL Server Standard or Enterprise edition licenses must be protected by software assurance, a subscription through a CSP, or another subscription scheme.

Azure Hybrid Benefit for Red Hat Enterprise Linux (RHEL) VMs

To qualify an Azure RHEL VM for Azure Hybrid Benefit, you must have on-premises active or unused RHEL subscriptions with publisher as *RedHat* and license type as *RHEL_BYOS*.

Using the existing billing data for the RHEL VM, we will identify the total cost and licensing cost for the selected RHEL VM. The licensing cost will be the monthly estimated cost savings value after opting for hybrid benefit.

Azure Hybrid Benefit for SUSE Linux Enterprise Server (SLES) VMs

To qualify an Azure SLES VM for Azure Hybrid Benefit, you must have on-premises unused SUSE subscriptions with publisher as *SUSE* and license type as *SLES_BYOS*.

Using the existing billing data for the SLES VM, we will identify the total cost and licensing cost for the selected SLES VM. The licensing cost will be the monthly estimated cost savings value after opting for hybrid benefit.

Use Cases for Azure Hybrid Benefit (SQL Database)

Azure Hybrid Benefit for SQL database is only available when using the provisioned compute tier of the vCore-based purchasing model. Azure Hybrid Benefit doesn't apply to DTU-based purchasing models or the serverless compute tier.

To qualify an Azure vCore based SQL Database for Azure Hybrid Benefit, you must have an underlying infrastructure with license type as *LicenseIncluded*.

Using the billing data and meter id level we split the compute cost and licensing cost.

Use Cases for Azure Hybrid Benefit (Elastic Pool)

Azure Hybrid Benefit for Elastic Pool is only available for the vCore-based purchasing model.

To qualify an Azure vCore based Elastic Pool for Azure Hybrid Benefit, you must have an underlying infrastructure with license type as *LicenseIncluded*.

Using the billing data and meter id level we split the compute cost and licensing cost.

Outcomes

You have learnt about the default parameters and their values considered to identify unused and unoptimized cloud resources in Azure.

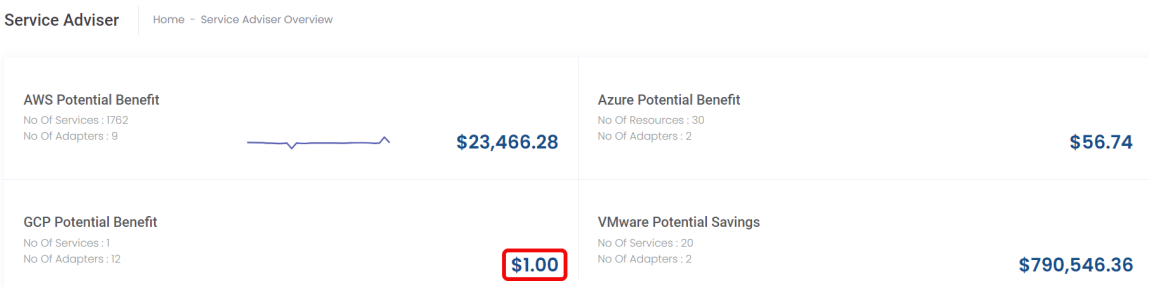
7.5.3. Service Adviser for GCP

Here you will learn about the potential savings from GCP Cloud costs that you can do with the help of the CloudBolt CSMP recommendations.

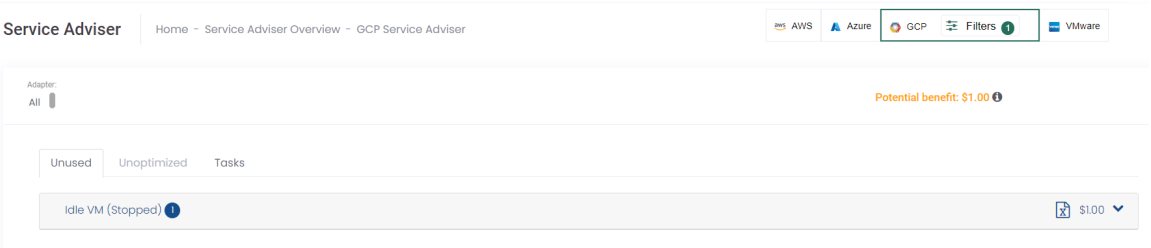
Introduction

CloudBolt CSMP analyses your GCP project services and their usage. Based on the analysis, CloudBolt CSMP provides you with personalized, actionable recommendations to help you reduce your GCP cost.

1. Logon to your CloudBolt CSMP instance.
2. Navigate to **Cost > Cost Service Adviser** or **Quick Actions > Service Adviser.** The Service Adviser Overview page displays the Potential Benefit for each of the service providers.



3. Click the figure displayed for the GCP Potential Benefits. The details are displayed.



4. You can filter the displayed data as required using the following filters. By default, all the normal adapters, region, and service type would be considered to display service adviser recommendations. To access the filters setting, click the filter button within the selected cloud provider box. All filters are combined together using 'and' logic,

which means that only those records that meet all selected filter values are displayed. After selecting the required filters, you must click **Apply** to view the service adviser recommendations list for the set filters. Click **Clear Filters** to remove all the filter selections.

- Provider: Select the cloud provider. By default GCP would be selected.
- Group: Select an adapter group whose service recommendations you want to see. Only 'active' and 'error' status normal adapters from the selected group would be considered to display the service adviser data.
- Adapter: Select normal adapters whose service recommendations you want to see. If you selected a group previously, the normal adapters with 'active' and 'error' status from the selected group would be marked selected automatically. However, you can manage the selection of normal adapters from the drop-down list.
- Region: Select GCP region whose service recommendations you want to see.
- Service Type: Select a service type from the drop-down list to see recommendation related to individual service.
- Task Policy: Select task policies to filter the task lists that are created based on the selected policies.

Google Cloud Platform Services List applicable for CloudBolt CSMP Cost Service Adviser Recommendations

CloudBolt CSMP offers cost optimization recommendations for GCP services. The optimization types are categorized into idle services recommendations.

Below is the list of services for which CloudBolt CSMP provides recommendations. To determine idle strategies mostly the metrics parameters like CPU usage, disk usage, Memory utilization, I/O and network I/O along with few other parameters are checked for the past period.

Service Name	Category	Service Adviser Group
Virtual Machines (VM)	Idle Running or Stopped	Unused
Disks	Idle	Unused

Viewing the Unused services

This tab details the services, that you have provisioned for but these services are lying idle or unused. These following list includes the services that may be displayed along with the potential savings that can be effected.

- Idle Disks
- Idle VM (Running)
- Idle VM (Stopped)

1. Click on any service type to view the details for that service. For e.g. the details for the Idle VM (Running) are displayed.
2. Click on the service type again to close the details window.
3. Click the 'Export to CSV'to download the CloudBolt recommendations detail for that service.
4. The displayed details include the following:
    - Account displays the normal adapter name.
    - Service Name displays the name of the service.
    - State displays the current status of the service.
    - Region displays the deployed geometric location for the service.
    - Additional Information displays details about the service.
    - MEC is the monthly estimated cost for the service.
    - Task Status displays the status of task created for that service. Assigned indicates a task has been assigned to someone for the selected individual service recommendation. N/A indicates no task has been assigned.
    - Action allows you to create and assign a recommended action as a task for the service.

7.5.4. Service Adviser for VMWare

Here you will learn about the potential savings from VMWare Cloud costs that you can do with the help of the CloudBolt CSMP recommendations.

Introduction

CloudBolt CSMP analyses your VMware project services and their usage. Based on the analysis, CloudBolt CSMP provides you with personalized, actionable recommendations to help you reduce your VMware costs.

1. Logon to your CloudBolt CSMP instance. Select the Tenant for which you want the details from the Tenant drop-down.
2. Navigate to **Settings > Quick Actions > Service Adviser.** The Service Adviser Overview page displays the Potential Benefit for each of the service providers.
3. Click the figure displayed for the VMware Potential Benefits. The details are displayed.
4. You can filter the displayed data as required using the following filters. To access the filters setting, click the filter button within the selected cloud provider box. All filters are combined together using 'and' logic, which means that only those records that meet all selected filter values are displayed. After selecting the required filters, you must click **Apply** to view the service adviser recommendations list for the set filters. Click **Clear Filters** to remove all the filter selections.
    - Provider: Select the cloud provider. By default VMware would be selected.
    - Group: Select a VMware vCenters group whose service recommendations you want to see.
    - Adapter: Select an adapter whose service recommendations you want to see.
    - vCenters: Select vCenters whose service recommendations you want to see.
    - Service Type: Select a service type from the drop-down list to see recommendation related to individual service.

VMWare - Recommendations

Below are some recommendations that are considered to take action on the instance. To determine Idle strategies mostly the metrics parameters like CPU usage, disk usage, Memory utilization, I/O and network I/O are checked for the past period. Any instance(s) resulting these values close to zero (0) for a certain period, is it safe to assume that these instances has been inactive/idle and need to seek appropriate action.

Item	Resource	Type	Description
Cost	Virtual Machine (VM)	Idle	Based on available metrics like CPU, Memory utilization, Network In & Out for last 7 days with 1 hour frequency, a VM is classified as Idle. • CPU Utilization < 2% @ 1 Hour interval • NetworkIn < 5 MB @ 1 Hour interval • NetworkOut < 5 MB @ 1 Hour interval • Memory Utilization < 80% @ 1 Hour interval
Cost	Virtual Machine(VM)	Right Sizing/Unoptimized	Based on the available metrics, a virtual machine (VM) will be considered stable if its average CPU and memory usage remains between 50% and 75% continuously over the last 30 days. If the usage is consistently below 50% during this period, the VM will be classified as oversized; if it exceeds 75%, it will be categorized as undersized.

7.6. AWS Reserved Instance Report

This page gives you a visibility on the usage of your reserved instances, their utilization in percentage, and a comparison of the costs related to reserved instances and On-demand instances based over your past usage over a selected period.

- Introduction
- Prerequisites
- Overview
- RI Coverage
- RI Utilization
- RI Calculator
- Utilization
- Report Grid View
- Recommendation
- Existing
- Underutilized
- Notifications
- Add Notification
- Reserved Instance Report access matrix for Child Organisation's Default tenant users
- Reserved Instance Report access matrix for Child Organisation’s sub-tenant users
- Outcomes

Introduction

Reserved instances are usually provisioned if you have a clear idea of your instance usage over time. Reserved instances come at a discounted price, however if they are underutilized, they may end up increasing your overall costs for cloud services. CloudBolt

CSMP gives you an idea of utilization of reserved instances in percentage, over a period of time, an RI calculator that helps you calculate your potential savings and some top recommendations to help you cut down costs.

Prerequisites

User's CloudBolt CSMP role must have access for Reserved Instance Report.

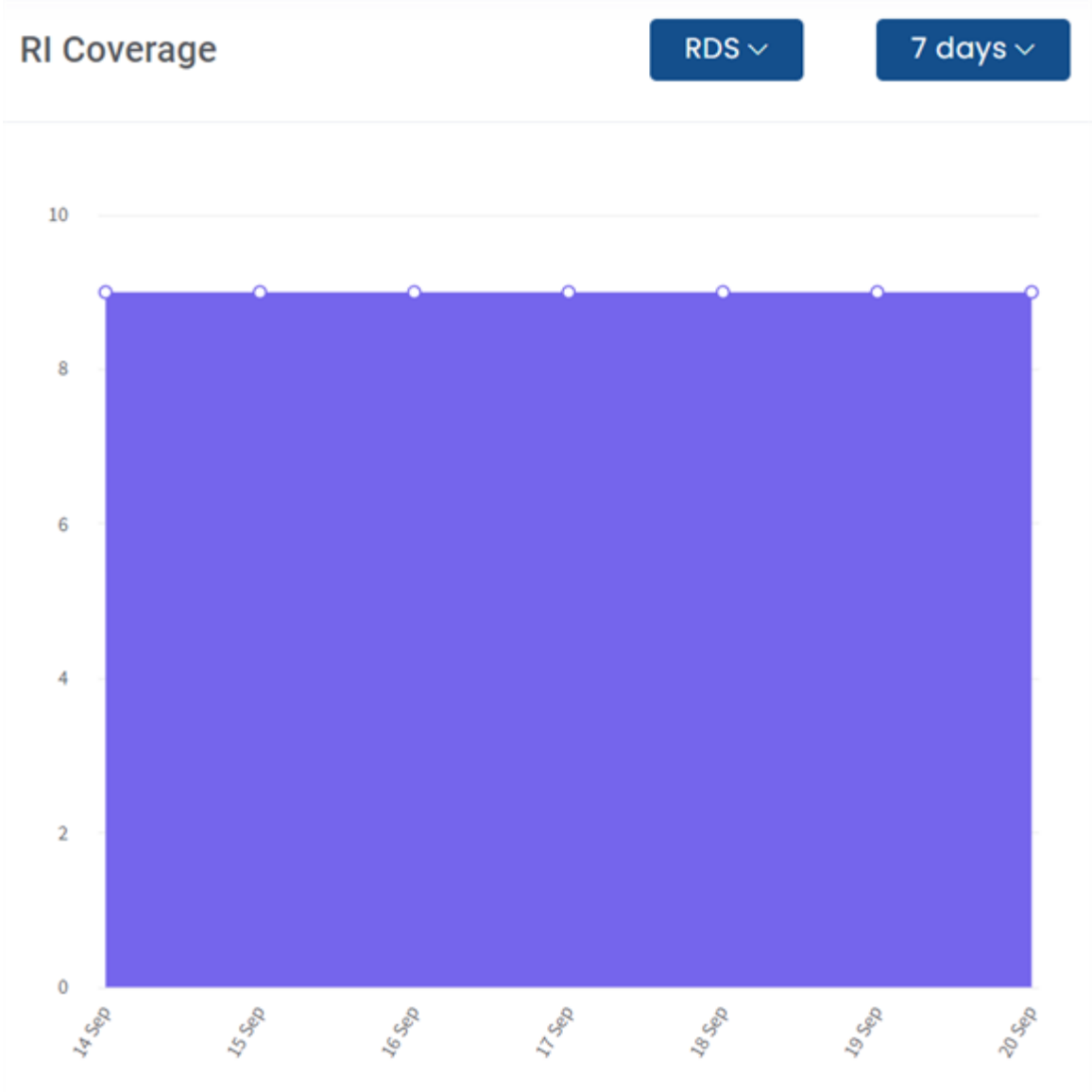
Overview

1. Logon to the CloudBolt CSMP portal and navigate to **Cost > Reserved Instance Report**.
2. By default, AWS will be selected as cloud provider. If not, select AWS as cloud provider from the upper right corner.
3. Select Overview tab. Select the AWS billing account whose RI you want to see. There are 3 main widgets displayed here, RI Coverage, RI Utilization, RI Calculator.

RI Coverage

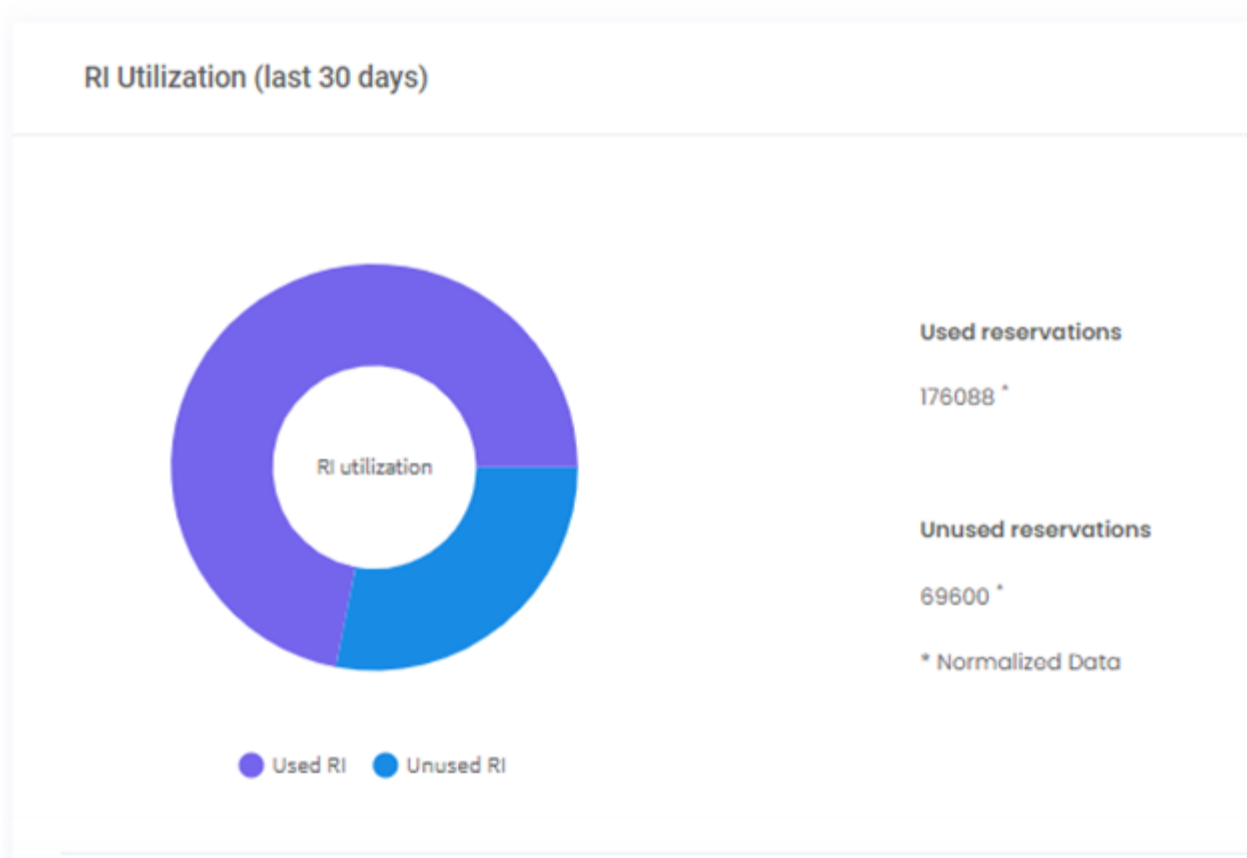
This widget lets you select your reserved instances and see the percentage of utilization of the instances over a selected period of time.

1. Select the instance type from the drop-down and corresponding period of 7, 30, or 60 days. It should be noted that in addition to EC2, CloudBolt CSMP now offers RI inventories for ElastiCache, ElasticSearch, RDS, and Redshift.



RI Utilization

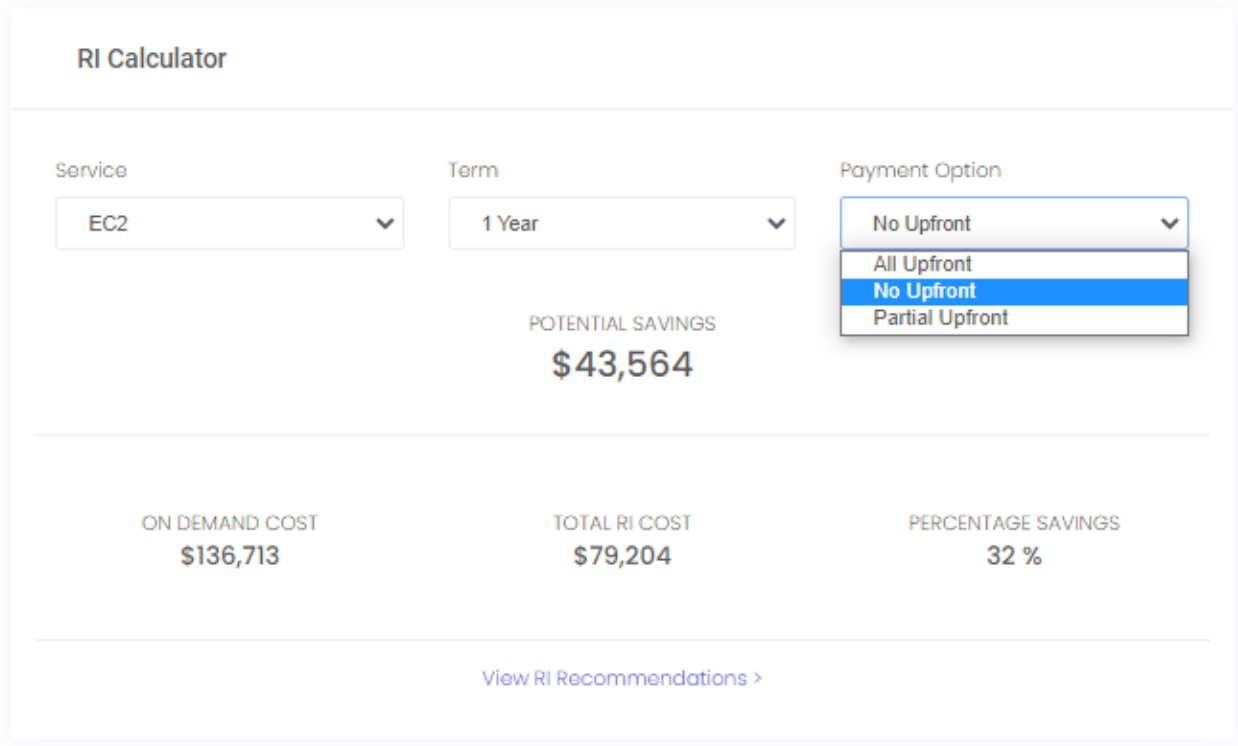
This RI Utilization (last 30 days) widget displays a comparison of your reserved instances with the unused instances for the last 30 days



RI Calculator

The RI calculator helps you calculate your potential savings for a particular service requirements over a fixed period of time if you pay upfront or do not pay up-front or pay up partially.

In the RI calculator widget, select the type of service, then the period required, and the payment type.



The potential savings is calculated and displayed as compared with costs for an On demand instance of the same service type.

Utilization

This tab gives you a visibility over the overall utilization of your reserved AWS instances based on the filters setting. You can view the utilization report in Bar, Line, or area graph. Click the appropriate download icons to export the results in CSV or PDF format. To do filters setting, click Filters within the utilization tab. All filters are combined together using 'and' logic, which means that only those records that meet all selected filters value are displayed.

- **Billing Account**: Select a billing account for which you want to see RI utilization report.
- **Group**: For the chosen billing account, pick an adapter group for which you want to see the RI utilization report data. Selecting an adapter group would populate the accounts filter by selecting all the accounts associated with the selected adapter group

- **Date Range**: Set the range of time for the AWS RI utilization report you want to view. You can select between Daily or Monthly. By default, when you first access the utilization report, the Date Range is set to Daily, with the last 16 days selected including today. You can filter the cost report on a monthly basis by selecting the monthly tile. Your choice of a daily or monthly tile set the report grid view time scale to date or month.
    - **Daily** returns your AWS RI utilization report incurred during the last 16 days period selected including today on a daily basis. When you select Daily, you can choose a dynamic date range, such as "This Month" or "Last Month" or "Yesterday", or a custom date range from the **Period** selection box to view your utilization reports. Dynamic date ranges display utilization data over a rolling time, such as "Last Month" or "Last 7 days" or "Last 14 days". Dynamic date ranges are: "This Month", "Last Month", "Last 3 Months", "Yesterday", "Last 7 Days", "Last 14 Days", "Last 21 Days", "Last 30 Days", and "Last 45 Days". Dynamic date ranges are best for your favourite reports. Custom ranges let you focus on specific start and end dates. Your start and end date duration can be up to 100 days. After selecting a date range, you must click **Apply** button available within the period selection area.
    - **Monthly** returns your AWS RI utilization report grouped on a monthly basis. When you select Monthly, you can choose a dynamic date range, such as "This Month" or "Last Month" or "Last 3 Months", or a custom date range from the **Period** selection box to view your utilization reports. Dynamic date ranges display utilization data over a rolling time, such as "Last Month" or "Last 6 Months" or "Last 3 Months". Dynamic date ranges are: "This Month", "Last Month", "Last 3 Months", "Last 6 Months", "Last 9 Months", and "Last 12 Months". Dynamic date ranges are best for your favourite reports. Custom ranges let you focus on specific start and end dates. After selecting a date range, you must click **Apply** button available within the period selection area.

A "day" is defined as midnight to midnight in the cost report’s selected time zone. A "month" is defined as first to last date of a calendar month in the report's selected time zone.

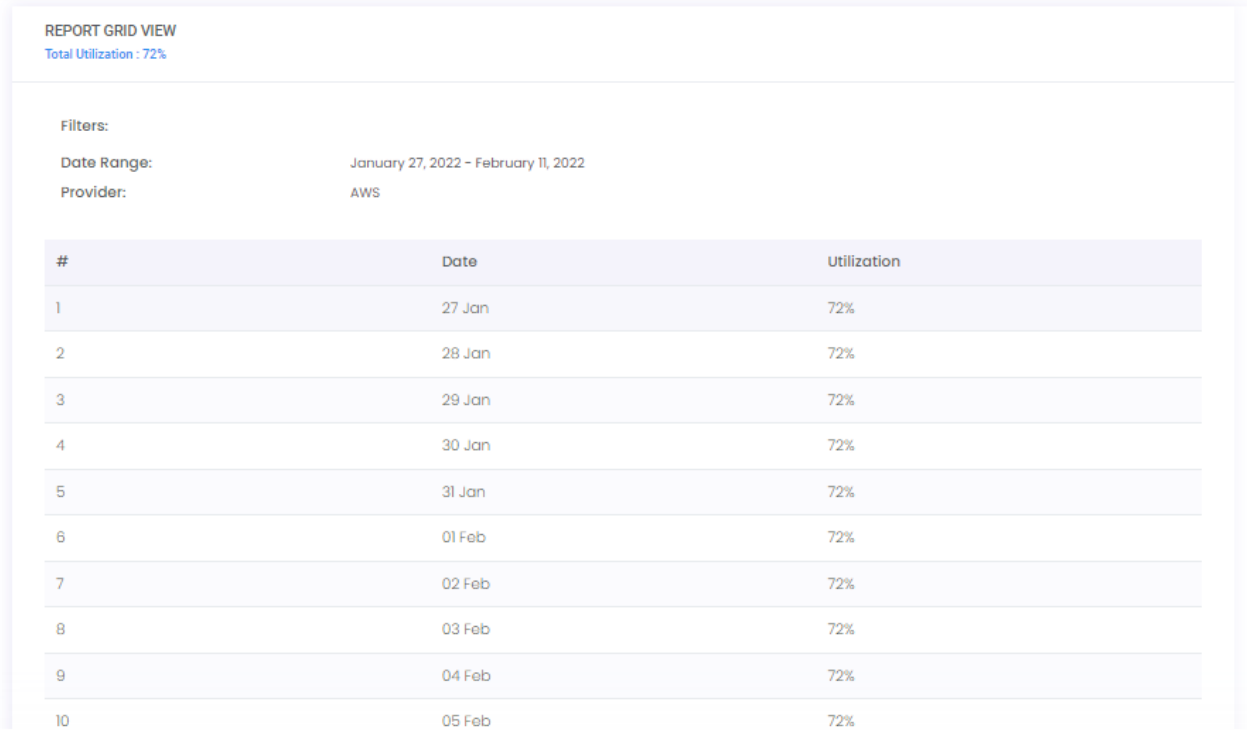
- **Accounts**: If you have selected a group previously, all the accounts available in the selected group would be selected by default. You can select all AWS member accounts or management accounts available under the selected billing adapter or select a subset of them by clicking them in the list. You can use this field to track utilization by accounts.
- **Regions**: The geographical areas that hosts your AWS RI. You can select all AWS regions available under the selected billing adapter or select a subset of regions by clicking them in the list.
- **Services**: The full name of the AWS services available in selected billing adapter. Use this field to filter AWS usage by AWS service. You can select all services available under the selected AWS billing adapter or select a subset of services by clicking them in the list.
- **Instance type**: Select the instance type for the selected services. You can select all instance types under the selected services or select a subset of it by clicking them in the list.
- **Platform**: Select the platform type for the selected instance type. You can select all platform types under the selected instance type or select a subset of it by clicking them in the list.

To view the utilization report as per the set filters value you must click **Apply**. To save the set filters as Favourite, click the **Save** button available at the upper right corner. It is important to note that while saving the applied filters as favourite, the group name would not be saved, whereas, the associated accounts would be saved as part of favourite report. It means that in future, if the selected adapter group is updated to add or remove any account, it would not update the already saved favourite cost report.

Click **Clear Filters** to remove all the filter settings and return to default filters setting.

Report Grid View

You can also view the information for the above selected parameters in a Report Grid View as follows:



REPORT GRID VIEW

Total Utilization : 72%

Filters:

Date Range: January 27, 2022 - February 11, 2022

Provider: AWS

#	Date	Utilization
1	27 Jan	72%
2	28 Jan	72%
3	29 Jan	72%
4	30 Jan	72%
5	31 Jan	72%
6	01 Feb	72%
7	02 Feb	72%
8	03 Feb	72%
9	04 Feb	72%
10	05 Feb	72%

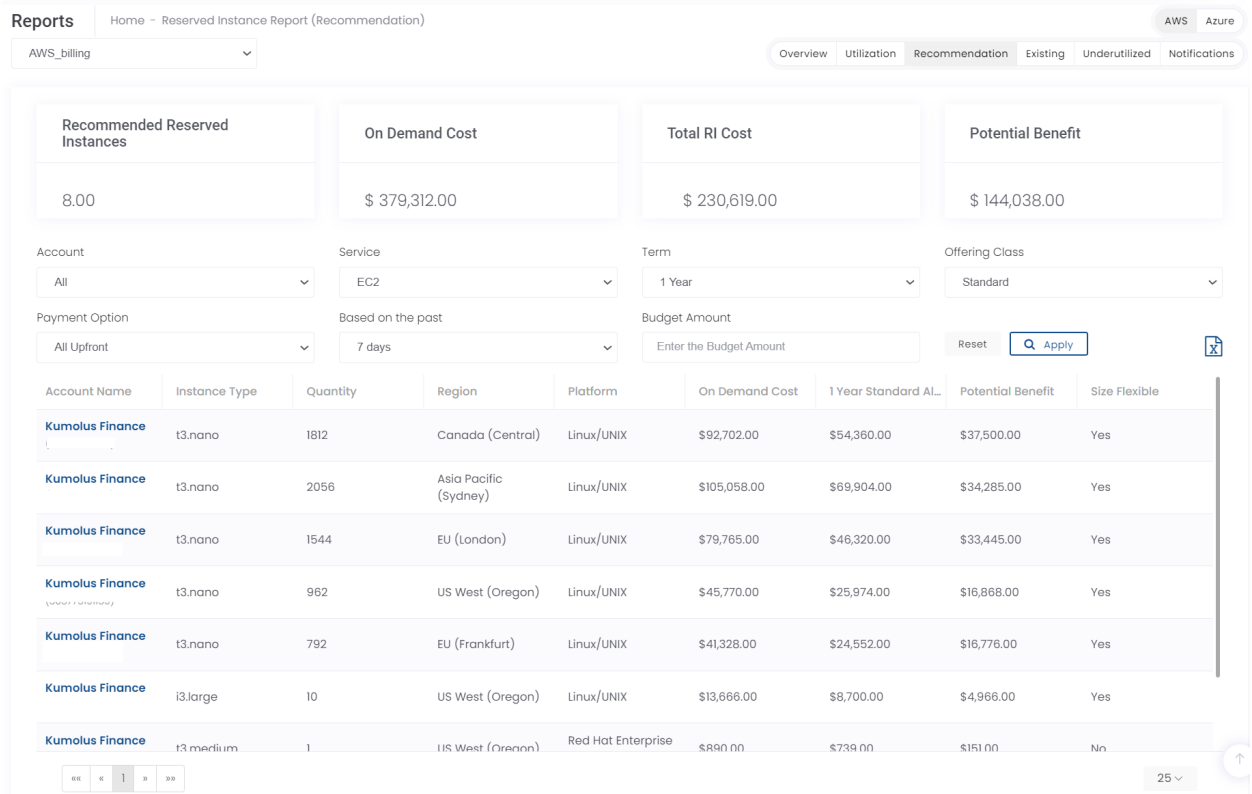
Recommendation

CloudBolt CSMP gives you recommendations for Reserved Instances, based on which you can potentially save on your spending related to reserved instances.

A comparison between the costs related to provisioning an On-Demand instance compared to a reserved instance is displayed. Based on your past usage of services, the potential benefits that can be realised are displayed.

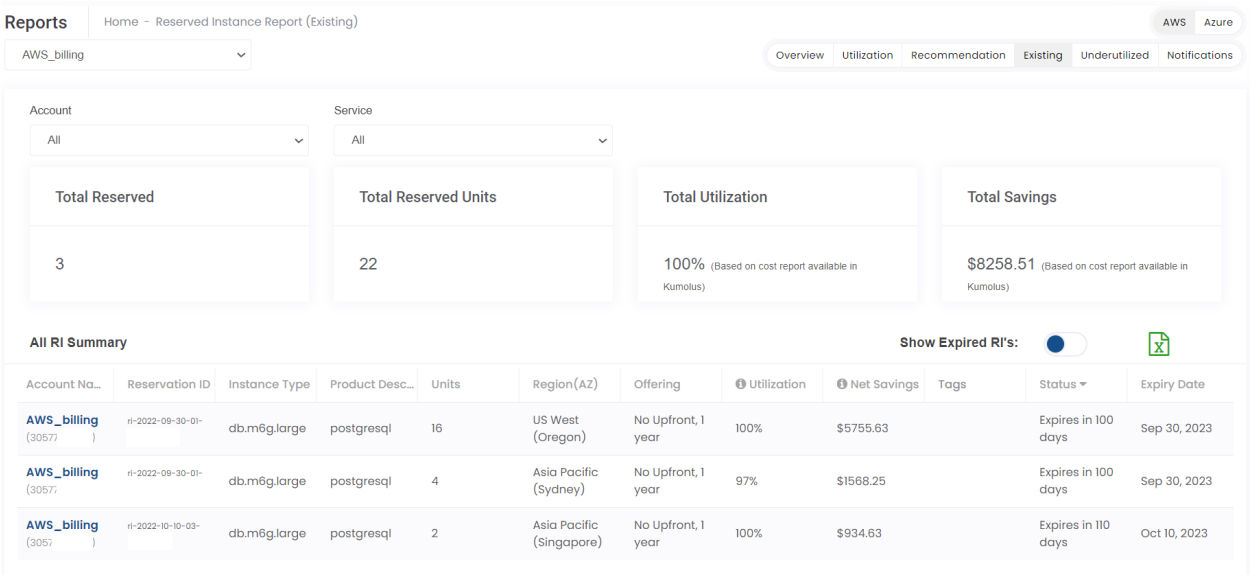
You can fine tune the potential savings calculations by selecting the AWS sub-account, service, term of duration required, the offering class, and the type of payment made, whether up-front or partial payment. You can based the calculations on your past usage of 7, 30, or 60 days as required. You can also narrow down the recommended list using the budget amount. Enter your budget amount value in the budget's field to see the list of RIs whose standard cost suits your budget. You must click **Apply** to get the updated list as per selected filters.

You can download the Reserved Instances recommended list for the AWS services by clicking the CSV icon.



Existing

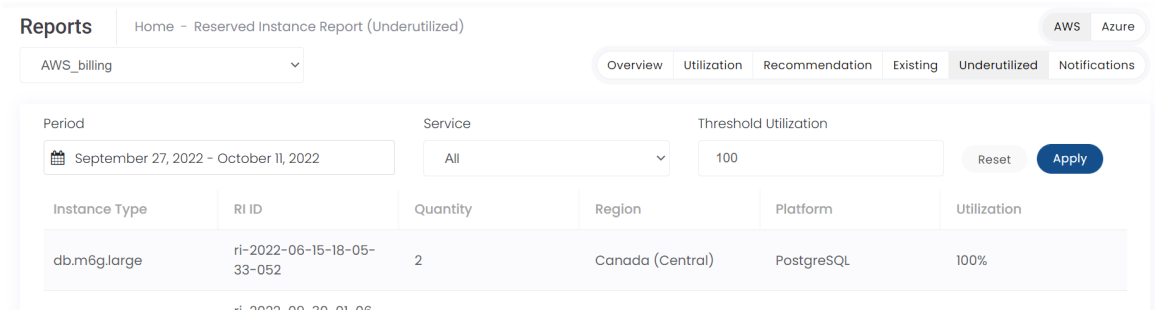
This tab shows you the reserved instances that you have provisioned for selected AWS billing account. You can filter the RIs list by AWS service and account. By default, all active RIs will be listed. To see expired RIs, click **Show Expired RI's** toggle switch. Click the page icon next to Show Expired RI's toggle switch to download the existing RI details in .CSV file.



Underutilized

This tab shows you the reserved instances that are underutilized.

1. Select a period for which you want to se underutilization report.
2. Select a service type.
3. Enter the threshold utilization value. It can be between 1 to 100.
4. Click **Apply**.

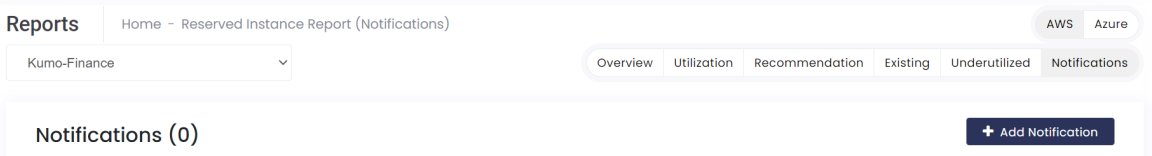


Notifications

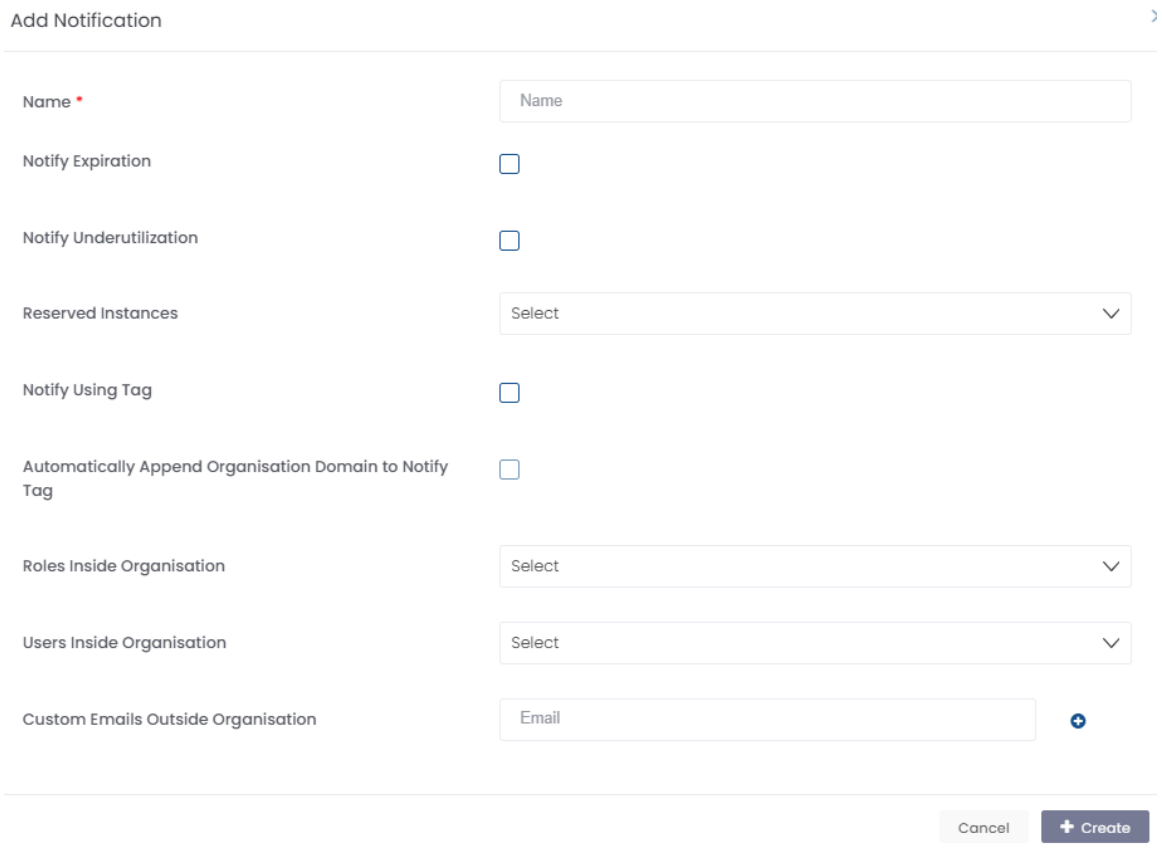
You can add notifications for your AWS reserved instances that will alert you if an AWS reserved instance is expiring or underutilized in preconfigured number of days. You can share the notification with users in the organization as well as outside the organization through email.

Add Notification

1. Logon to the CloudBolt CSMP portal and navigate to **Cost > Reserved Instances Report**.
2. Select AWS tab, on the upper right corner.
3. Click the **Notifications** tab.



4. Click **Add Notification**. The Add Notification page is displayed.



5. Enter a name in the **Name** field for the notification.
6. Select option for notification type.
    a. When **Notify Expiration** selected, you must enter the value for Expiry before days in Expiry before (in days) field. You will be notified in advance with number of days you specify here before your reserved instances are due for expiry.
    b. When **Notify Underutilization** selected, you must enter the number of days and threshold utilization percent value.
7. Select the reserved instance types from the **Reserved instances** drop-down menu.
8. Set the **Notify using tags** option if required and option to automatically append Organisation domain to Notify tag.
9. Select the Roles who will be notified.
10. Select the users inside organization who will be notified.

11. Enter any emails that you need to notify, these can be outside the organization. Click **+** to add such email addresses.
12. Click **+Create**. The notification is saved and added to the list of notifications. You will receive alerts as configured above.
13. You can view, edit, and delete notifications created.

Reserved Instance Report access matrix for Child Organisation's Default tenant users

Adapter types and ownership detail	Overview	Utilization	Recommendation	Existing	Underutilized	Notifications
Parent organisation shared billing adapter only	No data	No data	No data	No data	No data	No data
Parent organisation shared both billing and normal adapters	No data	RI utilization data of the shared normal adapter	No data	Existing RI details of the shared normal adapter	RI utilization data of the shared normal adapter	Create notifications for the RI available in shared normal adapter
Parent organisation shared normal adapter only	No data	RI utilization data of the shared normal adapter	No data	Existing RI details of the shared normal adapter	RI utilization data of the shared normal adapter	Create notifications for the RI available in shared normal adapter
Parent organisation shared billing adapter only + child organisation'	No data	RI utilization data of the shared normal adapter	No data	Existing RI details of the shared normal adapte	RI utilization data of the shared normal adapter	Create notifications for the RI available in shared normal adapter

Adapter types and ownership detail	Overview	Utilization	Recommendation	Existing	Underutilized	Notifications
s default tenant user created own normal adapter				r		
Child organisation's default tenant user created own billing adapter only	RI overview for the billing adapter	RI utilization data of the billing adapter	RI recommendations for the billing adapter	Existing RI details of the billing adapter	RI utilization data of the billing adapter	Create notifications for the RI available in billing adapter
Child organisation's default tenant user created own billing and normal adapters	RI overview for the billing adapter	RI utilization data of the billing adapter	RI recommendations for the billing adapter	Existing RI details of the billing adapter	RI utilization data of the billing adapter	Create notifications for the RI available in billing adapter
Child organisation's default tenant user created own normal adapter only	No data	RI utilization data of the normal adapter	No data	Existing RI details of the normal adapter	RI utilization data of the normal adapter	Create notifications for the RI available in normal adapter
Child organisation's default tenant user created own billing adapter + parent organisation shared normal adapter	RI overview for the billing adapter	RI utilization data of the billing adapter	RI recommendations for the billing adapter	Existing RI details of the billing adapter	RI utilization data of the billing adapter	Create notifications for the RI available in billing adapter

Reserved Instance Report access matrix for Child Organisation's sub-tenant users

Adapter types and ownership detail	Overview	Utilization	Recommendation	Existing	Underutilized	Notifications
Parent organisation shared billing adapter only	No data	No data	No data	No data	No data	No data
Parent organisation shared both billing and normal adapters	No data	RI utilization data of the shared normal adapter	No data	Existing RI details of the shared normal adapter	RI underutilization data of the shared normal adapter	Create notifications for the RI available in shared normal adapter
Parent organisation shared normal adapter only	No data	RI utilization data of the shared normal adapter	No data	Existing RI details of the shared normal adapter	RI underutilization data of the shared normal adapter	Create notifications for the RI available in shared normal adapter
Parent organisation shared billing adapter + child organisation default tenant user shared own normal adapter	No data	RI utilization data of the shared normal adapter	No data	Existing RI details of the shared normal adapter	RI underutilization data of the shared normal adapter	Create notifications for the RI available in shared normal adapter

Adapter types and ownership detail	Overview	Utilization	Recommendation	Existing	Underutilized	Notifications
Parent organisation shared billing adapter + child organisation default tenant user shared own billing adapter	RI overview for the child organisation default tenant user shared billing adapter	RI utilization data for the child organisation default tenant user shared billing adapter	RI recommendations for the child organisation default tenant user shared billing adapter	Existing RI details of the child organisation default tenant user shared billing adapter	RI underutilization data of the child organisation default tenant user shared billing adapter	Create notifications for the RI available in child organisation default tenant user shared billing adapter
Child organization's default tenant user shared own billing adapter only	RI overview for the child organisation default tenant user shared billing adapter	RI utilization data for the child organisation default tenant user shared billing adapter	RI recommendations for the child organisation default tenant user shared billing adapter	Existing RI details of the child organisation default tenant user shared billing adapter	RI underutilization data of the child organisation default tenant user shared billing adapter	Create notifications for the RI available in child organisation default tenant user shared billing adapter
Child organization's default tenant user shared own billing and normal adapters	RI overview for the child organisation default tenant user shared billing adapter	RI utilization data for the child organisation default tenant user shared billing adapter	RI recommendations for the child organisation default tenant user shared billing adapter	Existing RI details of the child organisation default tenant user shared billing adapter	RI underutilization data of the child organisation default tenant user shared billing adapter	Create notifications for the RI available in child organisation default tenant user shared billing adapter
Child organisation's default	RI overview for the	RI utilization data for	RI recommendations for the	Existing RI details of the	RI underutilization data of	Create notifications for the

Adapter types and ownership detail	Overview	Utilization	Recommendation	Existing	Underutilized	Notifications
tenant user shared own billing adapter + parent organisation shared normal adapter	child organisation default tenant user shared billing adapter	the child organisation default tenant user shared billing adapter	child organisation default tenant user shared billing adapter	child organisation default tenant user shared billing adapter	the child organisation default tenant user shared billing adapter	RI available in child organisation default tenant user shared billing adapter
Child organization's default tenant user shared own normal adapter only	No data	RI utilization data of the shared normal adapter	No data	Existing RI details of the shared normal adapter	RI underutilization data of the shared normal adapter	Create notifications for the RI available in shared normal adapter
Child organization's sub-tenant user created own billing adapter only	RI overview for the billing adapter	RI utilization data of the billing adapter	RI recommendations for the billing adapter	Existing RI details of the billing adapter	RI utilization data of the billing adapter	Create notifications for the RI available in billing adapter
Child organization's sub-tenant user created own billing and normal adapters	RI overview for the billing adapter	RI utilization data of the billing adapter	RI recommendations for the billing adapter	Existing RI details of the billing adapter	RI utilization data of the billing adapter	Create notifications for the RI available in billing adapter
Child organization's sub-tenant user created own normal adapter	No data	RI utilization data of the normal adapter	No data	Existing RI details of the normal adapter	RI utilization data of the normal adapter	Create notifications for the RI available in normal adapter

Adapter types and ownership detail	Overview	Utilization	Recommendation	Existing	Underutilized	Notifications
only						

Outcomes

You have learnt how CloudBolt CSMP can help you save on services costs by going through the recommendations.

7.7. Azure Reserved Instance Report

This page gives you a visibility of your purchased Azure Reserved Instances (RI), their utilization report, and a comparison of the costs related to reserved instanced and On-demand instances based over your past usage over a selected period.

- Introduction
- Prerequisites
- Utilization
- Recommendation
- Existing
- Notifications
- Add Notification
- Reserved Instance Report access matrix for Child Organisation's Default tenant users
- Reserved Instance Report access matrix for Child Organisation's sub-tenant users
- Outcomes

Introduction

Reserved instances are usually provisioned if you have a clear idea of your instance usage over time. Reserved instances come at a discounted price, however if they are underutilized, they may end up increasing your overall costs for cloud services. CloudBolt CSMP gives you an idea of utilization of reserved instances in percentage and some top recommendations to help you cut down costs.

1. Logon to the CloudBolt CSMP portal and navigate to **Cost > Reserved Instance Report**.
2. Select Azure as cloud provider from the upper right corner.

Prerequisites

- User's CloudBolt CSMP role must have access for Reserved Instance Report.
- You must own or share a billing adapter.

Utilization

This tab produces reports on the utilization level of your Azure Reserved Instances (RI). This report will show you how effectively your paid reservations are being used.

Important

Access to the Azure Reservations Utilization Report is currently restricted to billing adapters associated with a Microsoft Customer Agreement (MCA) account.

You can view the utilization report in Bar, Line, or area graph. The 100% usage line at the top of utilization report graph indicates that every one of your reservations is completely utilized. The report grid view allows you to view the utilization data for the selected period in tabular form.

You can download the utilization report by clicking the appropriate download icons to export the results in CSV or PDF format. Utilization report graph can be downloaded in PDF format only.

You can filter the utilization report data using the filters setting on the top side of the page. To do filters setting, click Filters within the utilization tab. All filters are combined together using 'and' logic, which means that only those records that meet all selected filters value are displayed.

- **Billing Account**: Select a billing account for which you want to see RI utilization report.
- **Date Range**: Set the range of time for the Azure RI utilization report you want to view. You can select between Daily or Monthly. By default, when you first access the utilization report, the Date Range is set to Daily, with the last 16 days selected including today. You can filter the cost report on a monthly basis by selecting the

monthly tile. Your choice of a daily or monthly tile set the report grid view time scale to date or month.

- **Daily** returns your Azure RI utilization report incurred during the last 16 days period selected including today on a daily basis. When you select Daily, you can choose a dynamic date range, such as "This Month" or "Last Month" or "Yesterday", or a custom date range from the **Period** selection box to view your utilization reports. Dynamic date ranges display utilization data over a rolling time, such as "Last Month" or "Last 7 days" or "Last 14 days". Dynamic date ranges are: "This Month", "Last Month", "Last 3 Months", "Yesterday", "Last 7 Days", "Last 14 Days", "Last 21 Days", "Last 30 Days", and "Last 45 Days". Dynamic date ranges are best for your favourite reports. Custom ranges let you focus on specific start and end dates. Your start and end date duration can be up to 100 days. After selecting a date range, you must click **Apply** button available within the period selection area.
- **Monthly** returns your Azure RI utilization report grouped on a monthly basis. When you select Monthly, you can choose a dynamic date range, such as "This Month" or "Last Month" or "Last 3 Months", or a custom date range from the **Period** selection box to view your utilization reports. Dynamic date ranges display utilization data over a rolling time, such as "Last Month" or "Last 6 Months" or "Last 3 Months". Dynamic date ranges are: "This Month", "Last Month", "Last 3 Months", "Last 6 Months", "Last 9 Months", and "Last 12 Months". Dynamic date ranges are best for your favourite reports. Custom ranges let you focus on specific start and end dates. After selecting a date range, you must click **Apply** button available within the period selection area.

A "day" is defined as midnight to midnight in the cost report's selected time zone. A "month" is defined as first to last date of a calendar month in the report's selected time zone.

- **Reservation Order ID**: Select the reservation order ID for the selected billing account. You can select all reservation order ID under the selected billing account or select a subset of it by clicking them in the list.

- **Reservation Name**: Select the reservation name associated with the chosen billing account. The reservation name list will display each reservation name and its ID in parentheses. You can either select all reservation names under the chosen billing account using the 'Select All' option or choose specific ones by clicking on them in the list.
- **SKU Name**: Select the Stock-keeping-Unit (SKU) name for the selected billing account. You can select all SKU name under the selected billing account or select a subset of it by clicking them in the list.

To view the utilization report as per the set filters value you must click **Apply**. To save the set filters as Favourite, click the **Save** button available at the upper right corner.

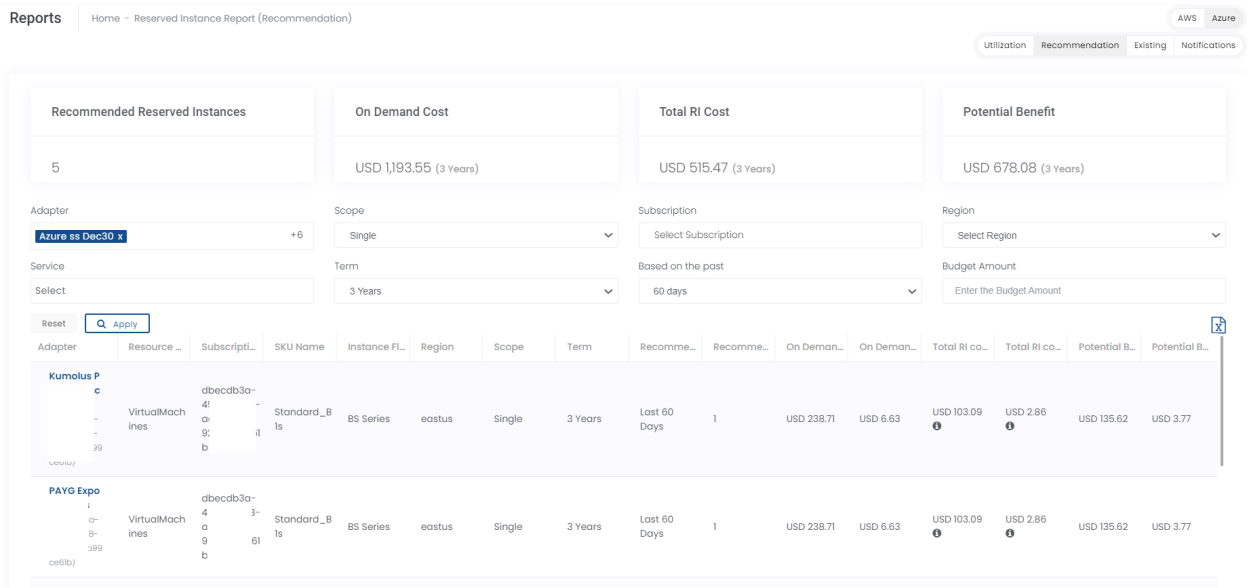
Click **Clear Filters** to remove all the filter settings and return to default filters setting.

Recommendation

The section shows you the recommendations for RI purchase for the potential cost savings that can be made if you go by the given recommendations.

A comparison is displayed for the cost of Reserved instances v/s the On-Demand and the Potential benefit possible. You can filter the recommendations breakup for your Azure adapters by adapter, subscription, region, service, term reserved for, scope and the data on which the recommendations are based, i.e. the past 7, 30, or 60 days data. You can also narrow down the recommended list using the budget amount. Enter your budget amount value in the budget's field to see the list of RIs whose total RI cost suits your budget. You must click **Apply** to get the updated list as per selected filters.

You can download the Reserved Instances recommended list for the Azure services by clicking the CSV icon.



Existing

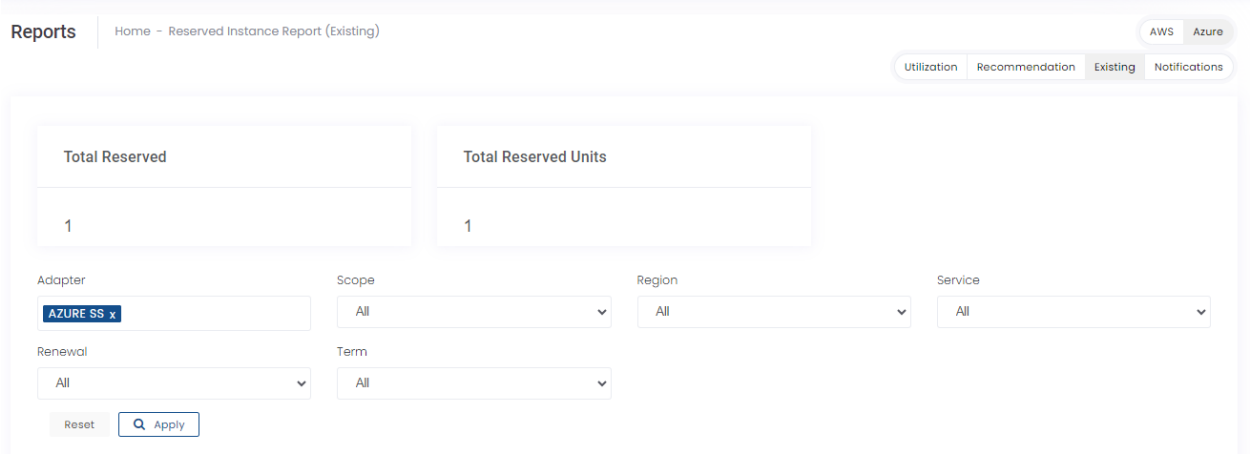
The "Existing" tab provides a summary of your existing Reserved Instances (RIs) within the selected Azure subscription, management group, or billing account scope adapter. This tab offers an overview of the RIs that have already been purchased or provisioned in your Azure environment. It serves as a tool for tracking your current Reserved Instances and understanding the resources that have already been committed.

If you are an Azure Cloud Solution Provider (CSP) account holder, please be aware that the "Existing" tab will not display your existing Reserved Instances. At this time, the existing RIs list is not supported for Azure CSP accounts. Therefore, you will not be able to view a summary of your existing RIs under this tab.

To retrieve existing RI details, your CSMP accounts must have either a billing adapter or a normal adapter for the respective Azure subscriptions containing the RIs. If your CSMP account is marked as a child, reseller, or customer organization, you must either own or have been shared access to a billing adapter or normal adapter for the respective Azure subscriptions containing the RIs.

The "Total Reserved" and "Total Reserved Units" tiles on this page signify the aggregate number of Reserved Instances (RIs) and reserved units across all subscriptions or management groups within the Azure environment, respectively.

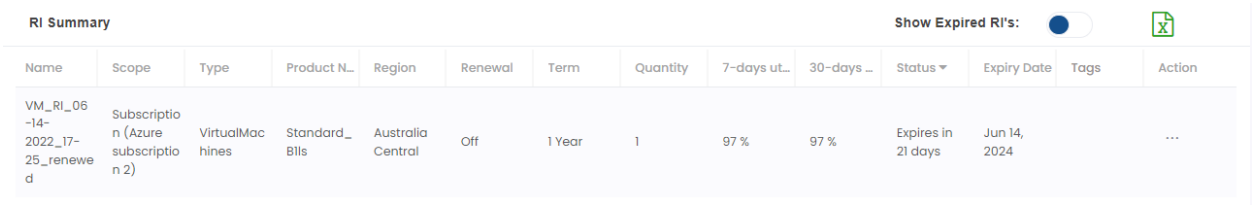
1. Total Reserved: This tile displays the total number of Reserved Instances (RIs) that have been purchased or provisioned across all subscriptions or management groups. It provides a high-level overview of the total quantity of RIs currently in use within the Azure environment.
2. Total Reserved Units: This tile represents the total number of reserved units associated with Reserved Instances across all subscriptions or management groups. In Azure, reserved units are often used to measure the quantity of resources covered by Reserved Instances, such as virtual machines or databases.



Set the filters as required and click Apply to populate the RI summary table as per the applied filters. You can filter the RI summary table using the following filters:

- Adapter: This filter enables you to specify billing adapters to view the available RIs associated with your subscriptions.
- Scope: Allows you to filter RIs based on their scope, such as shared, management group, subscription, or single resource group. The shared scope applies Reserved Instance discounts across multiple subscriptions, while the single resource group scope applies discounts to specific resources within a single resource group in an Azure subscription.
- Region: Enables you to filter RIs by geographical region. This is useful when you want to focus on RIs deployed in specific regions or data centers.
- Service: Helps you filter RIs based on the Azure service they are associated with, such as virtual machines, databases, or storage.

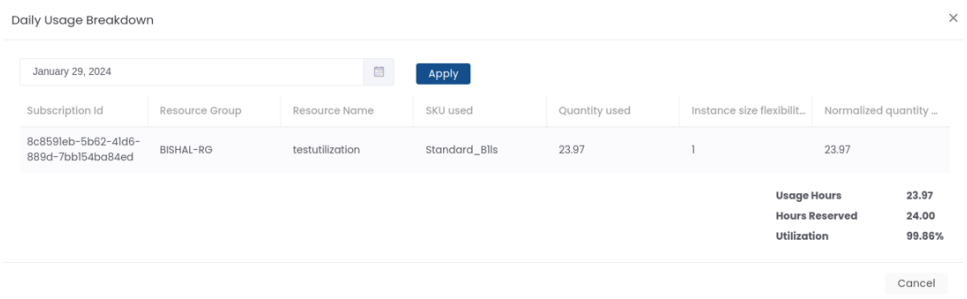
- Renewal: Allows you to filter RIs based on their renewal status, such as whether they are set to auto-renew or require manual renewal. This helps you manage your RI renewals more effectively and ensures you are aware of RIs that need attention.
- Term: Enables you to filter RIs based on their term length, such as one year, three years, or five years.



By default, the RI summary table presents all active Reserved Instances (RIs). If you desire to see expired RIs, you can easily do so by toggling the "Show Expired RIs" switch. Moreover, you can download the RI summary table in CSV file format by clicking on the Export to CSV page icon located next to the "Show Expired RIs" toggle switch. The RI Summary offers comprehensive information and functionality, empowering you to efficiently manage your existing RIs within the Azure environment. It includes the following columns:

- Name: Displays the name or identifier of the Reserved Instance, allowing you to easily identify and reference specific RIs.
- Scope: Indicates the scope of the RI, such as subscription, management group, or shared, providing context for where the RI is applied within the Azure environment.
- Type: Specifies the service type of the Reserved Instance, whether it's virtual machines, databases, storage, or another type, giving you insight into the RI's characteristics and flexibility.
- Product Name: Displays the name of the Azure product or service associated with the RI, helping you understand which resources the RI covers.
- Region: Indicates the geographical region where the RI is deployed, allowing you to identify RIs deployed in specific regions or data centers.
- Renewal: Indicates the auto-renewal status of the RI, such as on or off, helping you manage RI renewals effectively.
- Term: Specifies the length of the RI term, whether it's one year, three years, or another duration, assisting you in understanding the commitment period of the RI.

- Quantity: Displays the quantity of instances covered by the RI, providing information on the scale of coverage provided by the RI.
- 7-days Utilization: Shows the utilisation of the RI over the past seven days, helping you track and optimize RI usage and cost-effectiveness.
- 30-days Utilization: Displays the utilisation of the RI over the past 30 days, providing you with a longer-term perspective on RI usage trends.
- Status: Indicates the number of days left until your RI expires.
- Expiry Date: Specifies the date when the RI will expire, allowing you to plan and manage RI renewals effectively.
- Tags: Displays any tags associated with the RI, providing additional metadata or organisational information for tracking and management purposes.
- Action: you have access to two key actions that provide detailed insights into your RI usage and utilization: **Daily Usage** and **Utilization Details**.
    - **Daily Usage**: The **Daily Usage** option allows you to view a breakdown of the daily usage for the selected RI.
        - Click the ellipsis [...] icon in the **Action** column of the RI summary table and select **Daily Usage** from the dropdown menu.
        - On the **Daily Usage Breakdown** page, choose a specific past date to view usage details for that day, and then click **Apply**.
        - Only RIs provisioned within an Azure account that has a billing adapter created as part of the '**Billing Account/Management Group/ Subscription scope**' will have access to the daily usage breakdown.



    - **Utilization Details**: The **Utilization Details** option provides in-depth metrics on the utilisation of the selected RI for a specified time range and period.

- Click the ellipsis [...] icon in the **Action** column of the RI summary table and select **Utilization Details**.
- On the **Utilization** page, you can apply filters such as **Date Range** and **Period** to customise the report according to your needs.
- Data like **Reservation Order ID**, **Reservation Name**, and **SKU Name** will automatically populate based on your selected RI from the summary table. These fields are read-only and cannot be modified.
- After selecting the appropriate filters, click **Apply** to generate the utilisation report. The report will be displayed both as a graph and in a grid view format.
- You can view the report in different graph types (Bar, Line, or Area) by clicking the respective icon. By default, the cost data is shown in a Bar Graph.
- You can download the report in PDF or CSV format by clicking the Export to PDF or Export to CSV icons.

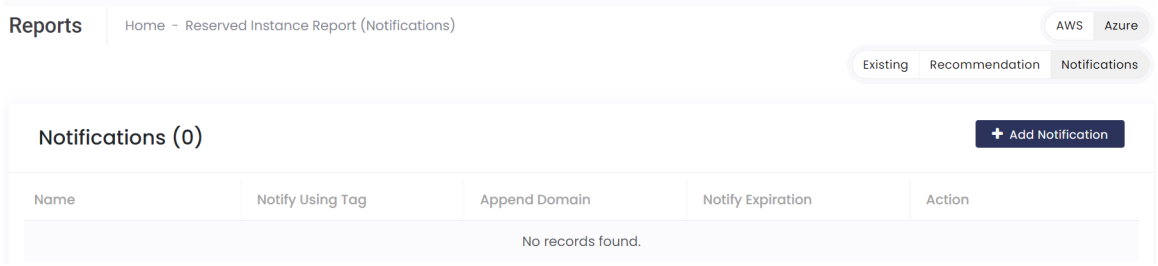


Notifications

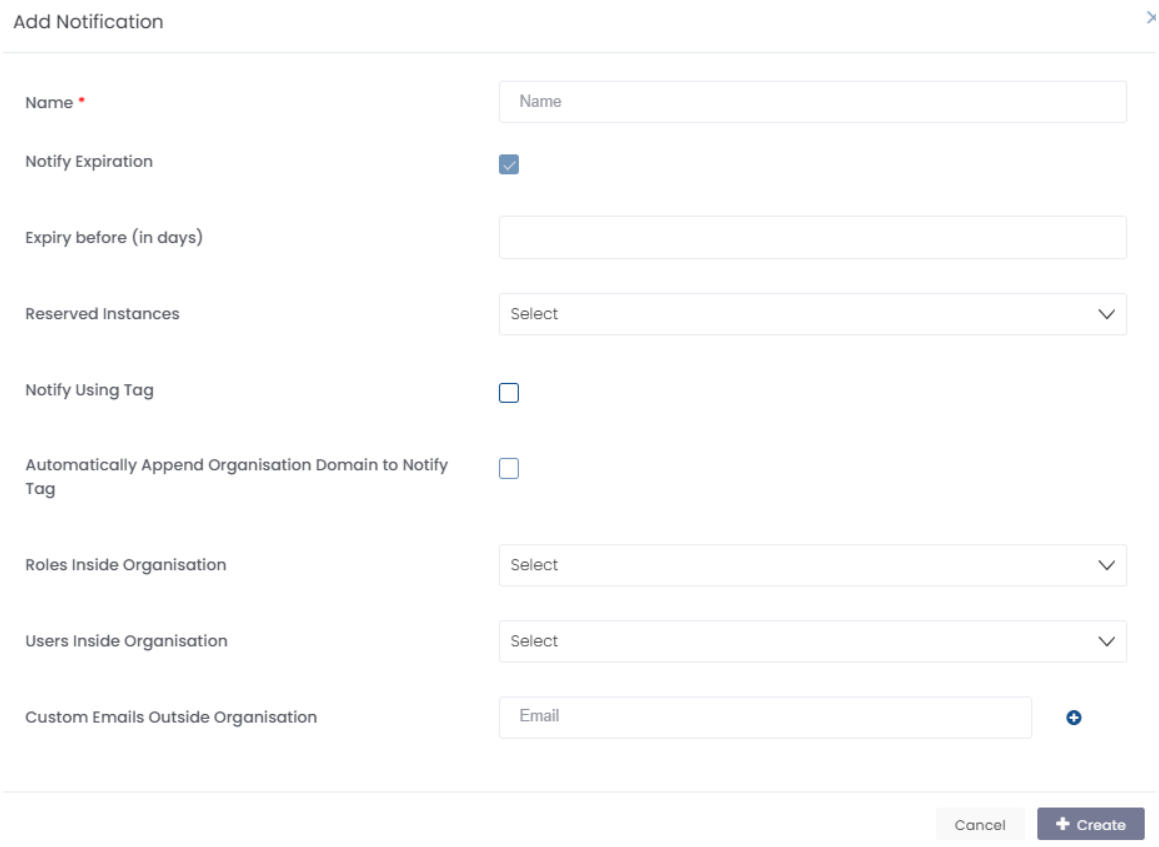
You can add notifications for your Azure reserved instances that will alert you if an Azure reserved instance is expiring in preconfigured number of days. You can share the notification with users in the organization as well as outside the organization through email. You can view, edit, and delete existing notifications if any.

Add Notification

1. Logon to the CloudBolt CSMP portal and navigate to **Cost > Reserved Instance Report**.
2. Select Azure tab, on the upper right corner.
3. Click the **Notifications** tab.



4. Click **Add Notification**. The Add Notification page is displayed.



5. Enter the Name for the notification.

6. Enter the value for Expiry before days. You will be notified in advance with number of days you specify here before your reserved instances are due for expiry.
   Note: The option for Notify Expirations is enabled by default.
7. Select the reserved instance types.
8. Set the Notify using tags option if required and option to append Organization domain to Notify tag.
9. Select the Roles who will be notified.
10. Select the users inside organization who will be notified.
11. Enter any emails that you need to notify, these can be outside the organization. Click + to add such email adresses.
12. Click **Create**. The notification is created, listed and activated.

Reserved Instance Report access matrix for Child Organisation's Default tenant users

Assumptions: All the billing adapters are in active and configured state. All the normal adapters are in active state.

Adapter types and ownership detail	Existing	Recommendation	Notifications
Parent organisation shared billing adapter only	No data	No data	No data
Parent organisation shared both billing and normal adapters	Existing RI details of the shared normal adapter	RI recommendations for the billing and normal adapters	Create notifications for the RI available in shared normal adapter
Parent organisation shared billing adapter only + child organisation's default tenant user created own normal adapter	Existing RI details of the shared normal adapter	RI recommendations for the billing and normal adapters	Create notifications for the RI available in shared normal adapter
Child organisation's default tenant user created own billing adapter only	Existing RI details of the billing adapter	RI recommendations for the billing adapter	Create notifications for the RI available in billing adapter
Child organisation's default	Existing RI	RI recommendations	Create notifications

Adapter types and ownership detail	Existing	Recommendation	Notifications
tenant user created own billing and normal adapters	details of the billing adapter	for the billing and normal adapters	for the RI available in billing adapter
Child organisation's default tenant user created own normal adapter only	Existing RI details of the normal adapter	RI recommendations for the normal adapter	Create notifications for the RI available in normal adapter
Child organisation's default tenant user created own billing adapter + parent organisation shared normal adapter	Existing RI details of the billing adapter	RI recommendations for the billing adapter	Create notifications for the RI available in billing adapter

Reserved Instance Report access matrix for Child Organisation's sub-tenant users

Assumptions: All the billing adapters are in active and configured state. All the normal adapters are in active state. Parent organisation has shared billing and normal adapters to the child organisation. Now, it is the child organisation administrator who shares adapters with following combinations to their sub-tenant.

Adapter types and ownership detail	Existing	Recommendation	Notifications
Parent organisation shared billing adapter only	No data	No data	No data
Parent organisation shared billing and normal adapters	Existing RI details of the shared normal adapter	RI recommendations for the parent organisation shared billing and normal adapters	Create notifications for the RI available in shared normal adapter
Parent organisation shared normal adapter only	Existing RI details of the shared normal adapter	RI recommendations for the parent organisation shared normal adapters	Create notifications for the RI available in shared normal adapter
Parent organisation shared billing adapter + child organisation default tenant user shared own normal adapter	Existing RI details of the shared normal adapter	RI recommendation for billing and normal adapters	Create notifications for the RI available in shared normal adapter

Adapter types and ownership detail	Existing	Recommendation	Notifications
Parent organisation shared billing adapter + child organisation default tenant user shared own billing adapter	Existing RI details of the child organisation default tenant user shared billing adapter	RI recommendations for the child organisation default tenant user shared billing adapter	Create notifications for the RI available in child organisation default tenant user shared billing adapter
Child organization's default tenant user shared own billing adapter only	Existing RI details of the child organisation default tenant user shared billing adapter	RI recommendations for the child organisation default tenant user shared billing adapter	Create notifications for the RI available in child organisation default tenant user shared billing adapter
Child organization's default tenant user shared own billing and normal adapters	Existing RI details of the child organisation default tenant user shared billing adapter	RI recommendations for the child organisation default tenant user shared billing and normal adapters	Create notifications for the RI available in child organisation default tenant user shared billing adapter
Child organisation’s default tenant user shared own billing adapter + parent organisation shared normal adapter	Existing RI details of the child organisation default tenant user shared billing adapter	RI recommendations for the child organisation default tenant user shared billing and parent organisation's normal adapters	Create notifications for the RI available in child organisation default tenant user shared billing adapter
Child organization's default tenant user shared own normal adapter only	Existing RI details of the shared normal adapter	RI recommendations for the normal adapter	Create notifications for the RI available in shared normal adapter
Child organization's sub-tenant user created own billing adapter only	Existing RI details of the billing adapter	RI recommendations for the billing adapter	Create notifications for the RI available in billing adapter
Child organization's sub-tenant user created own billing and normal adapters	Existing RI details of the billing adapter	RI recommendations for the billing and normal adapters	Create notifications for the RI available in billing adapter
Child organization's sub-tenant user created own normal	Existing RI details of the normal adapter	RI recommendations for the normal adapter	Create notifications for the RI available in normal adapter

Adapter types and ownership detail	Existing	Recommendation	Notifications
adapter only			

Outcomes

You have learnt how CloudBolt CSMP can help you save on services costs by going through the recommendations.

7.8. Savings Plan Report

Learn how savings plans recommended by CloudBolt CSMP can help you save AWS cloud service costs over a long term.

Introduction

In exchange for a commitment to consume a certain amount of computing power (measured in $/hour) over a one- or three-year period, Savings Plans provide considerable savings over On-Demand Instances. CloudBolt CSMP develops certain savings strategies based on your historical usage and costs paid to assist you in determining the kind of reserved services your organisation needs. Savings Plans are available for one or three-year terms, and by utilising recommendations, you may manage your plans with ease.

To see your AWS savings plans report, you must follow:

1. Logon to your CloudBolt CSMP instance.
2. Navigate to **Cost > Savings Plan Report**.
3. Select the billing adapter whose savings plan details you want to view. CloudBolt CSMP provides list of your existing and recommended savings plans based on your past usage. You can switch between *existing* and *recommendation* tabs to see desired report.

Prerequisites

Role associated with your CloudBolt CSMP user must have access for Savings Plan Report. You must own or share AWS billing adapters that have been created within your CloudBolt CSMP account organisation level.

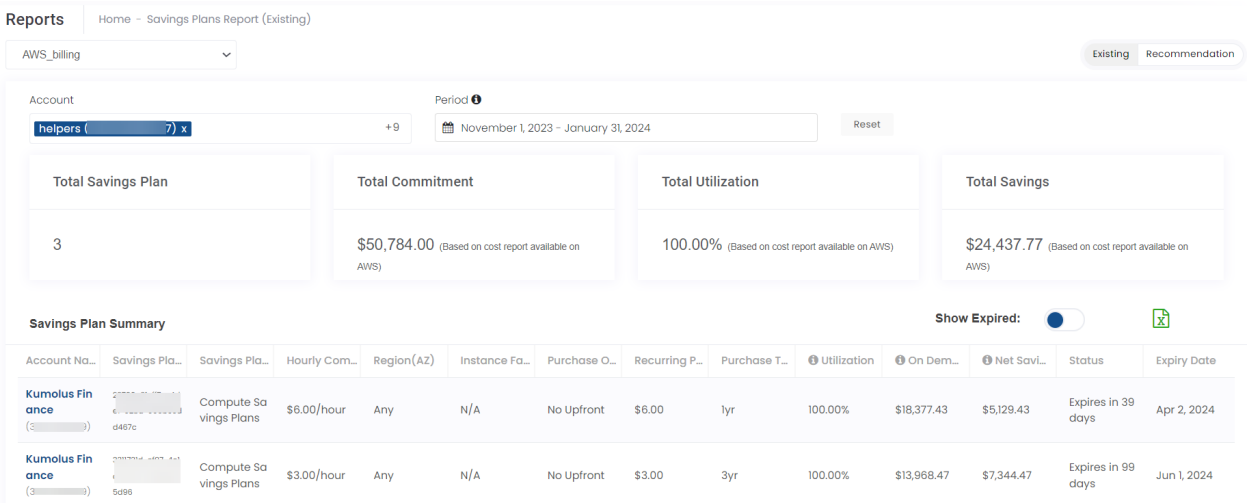
Existing Savings Plans

This tab shows you the savings plans that you have provisioned for selected AWS billing account.

Total savings plan widget displays the total number of savings plans available for the selected sub-accounts and period.
Total commitment widget displays the total cost for the purchased commitment for the selected sub-accounts and period.
Total utilization widget displays the available savings plan usage over the selected sub-accounts and period.
Total savings widget displays the total cost savings upon using the savings plan for the selected sub-accounts and period.

You can filter the savings plans list by AWS sub-accounts and date range. By default, all the sub-accounts are selected. Default date range is last 3 months. Click **Reset** to set the filters to default values.

You can download the savings plan report in CSV format. Click the icon beside 'Show Expired' toggle button to obtain savings plan report.



In the above example 3 active savings plan are displayed which includes the following details:

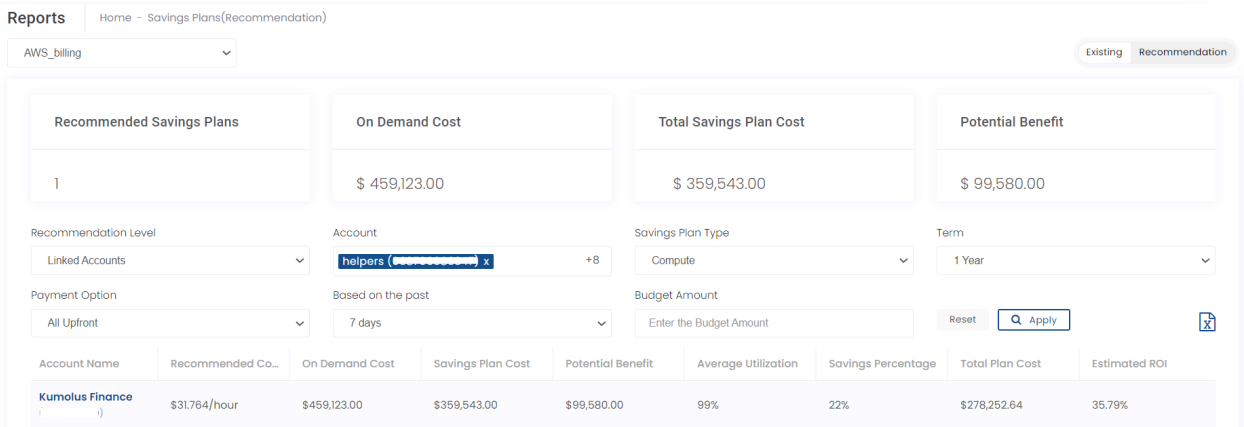
- AWS sub-account for which the savings plan exists. An info icon against a sub-account denotes that the saving plan mentioned in the next column has expired during the selected period.
- Savings plan ID
- Savings plan type
- Hourly commitment

- Instance region
- Instance family type
- Type of payment you preferred
- Recurring cost incurred
- Period for what duration you purchased the savings plan
- Utilization percentage
- Corresponding costs if you go for an On-demand service
- Net savings you made
- Status and expiry dates for the existing plans.

You can see list of expired savings plan also. Click **Show Expired** toggle switch to get a list of expired savings plan for the set date range.

Recommended Savings Plans

CloudBolt CSMP gives you recommendations for Savings Plans, based on which you can potentially save on your spending related to AWS cloud services.



Recommended Savings Plans tile displays the total SPs recommendation available.

On Demand Cost tile displays the current total on demand spend of the applicable usage types based on the past days selected.

Total Savings Plan Cost tile displays the total cost for the SPs.

Potential Benefit tile displays the estimated cost saving upon purchase of the SPs.

You can filter the recommendations list by *Recommendation Level*. The *Recommendation Level* filter allows you to filter the savings plan recommendation list available for payer account and sub-accounts linked with the selected billing adapter. If you are a parent organisation user owning or sharing an AWS billing adapter in your CloudBolt CSMP account, the *Payer* option will be selected by default. If you are a parent organisation user not owning or sharing with any AWS billing adapter and have only normal and billing adapters shared with you in your CloudBolt CSMP account, the *Linked Accounts* option would be selected by default for the *Recommendation Level* filter.
If you are a user of a child organisation (customer or child) account and have created AWS billing adapters within your CloudBolt CSMP account at the organisation level (i.e., customer or child), the *Payer* option will be selected by default for the *Recommendation Level* filter. In all other cases, the *Linked Accounts* option will be selected by default for the *Recommendation Level* filter. If a child organisation (reseller, customer, or child) has not created any AWS billing adapters, the *Payer* option will not be available for selection.

When *Recommendation Level* is set to *Payer*, the savings plan will be recommended at the master (paying) account label. Whereas if *Recommendation Level* is set to *Linked Accounts*, the recommended savings plan can be further filtered by member account(s) using the *Account* filter option.

You can further filter the SPs recommendation list by selecting the savings plan type (EC2 or Compute), term of duration required, type of payment made, whether up-front or partial payment, and the calculations on your past usage of 7, 30, or 60 days as required. You can also narrow down the recommended list using the budget amount. Enter your budget amount value in the budget's field to see the list of SPs whose cost suits your budget. You must click **Apply** to get the updated list as per selected filters.

You can download the SPs recommended list by clicking the CSV icon.

The recommended savings plans table displays following details:

- Account Name: AWS account name for which SP is recommended
- Region: AWS account region (applicable only for EC2 SPs)
- Instance Family: EC2 instance family type
- Recommended Commitment: Hourly cost for recommended SP

- On Demand Cost: On demand spend of the applicable usage types over the selected period/term
- Savings Plan Cost: The estimated savings plan cost of the usage after purchasing the recommended Savings Plans. This is a sum of the total cost of Savings Plans during this term, and the remaining On-Demand usage.
- Potential Benefit: The estimated cost saving upon purchase of the SPs. This is calculated as *On Demand Cost – Savings Plan Cost*.
- Estimated ROI: The estimated return on investment that's based on the recommended Savings Plans that you purchased. This is calculated as *(Potential Benefit / Total Cost) *100*.
- Average Utilization: Utilization commitment
- Savings Percentage: The estimated savings percentage relative to the total cost of applicable On-Demand usage for the selected period/term. This is calculated as *(Potential Benefit / On Demand Cost) *100*.
- Total Cost: The total Savings Plans cost on a daily (24 hourly) basis for the selected period/term. This is calculated as *Recommended Commitment *24 *number of days for the selected term*.

Outcomes

Use the CloudBolt CSMP recommended savings plans to save on your AWS cloud costs.

7.9. Right Sizing in CloudBolt CSMP

Learn about the concept of Right Sizing and how it can be achieved using CloudBolt Cost Service Advisor

Introduction

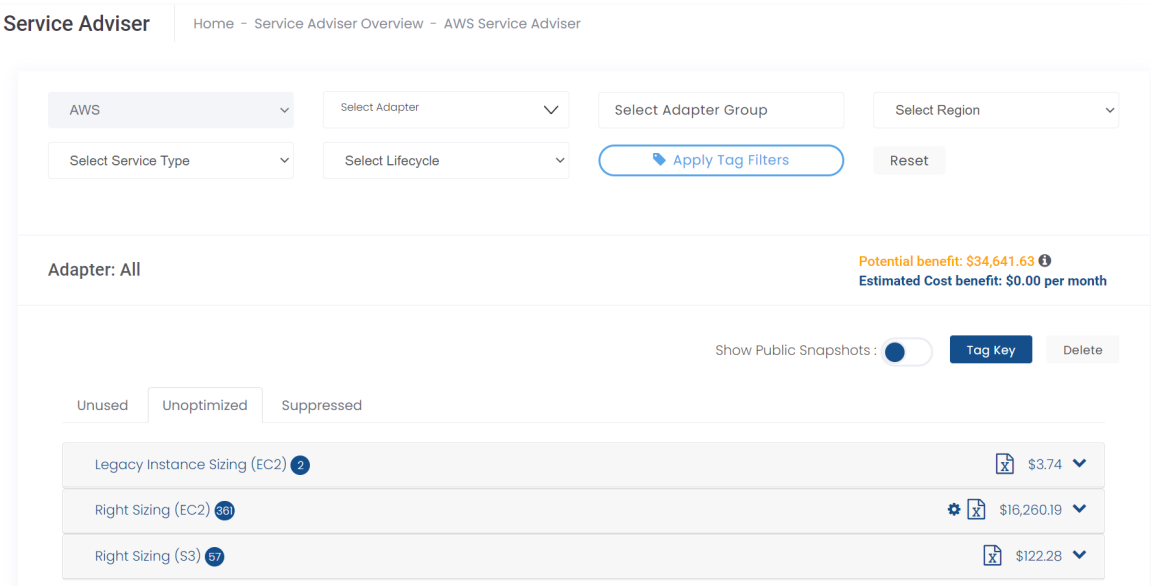
Right sizing is the process of matching Cloud instance types and sizes according to your workload performance and capacity requirements at the lowest possible cost. Rightsizing also involves identifying opportunities in your deployed instances to eliminate or downsize without affecting capacity or functionality to reduce costs.

Right sizing in CloudBolt CSMP involves analyzing instance performance and usage needs and patterns continuously and then turning off idle instanced or rightsizing the oversized or undersized to match the workload and performance. CloudBolt CSMP Cost Advisor examines your un-optimzed Legacy EC2 instances, RDS instances and your storage buckets S3 to give you an opportunity to right size resources to match your requirements.

Identifying rightsizing opportunities

1. Navigate to **Cost > Service Advisor.**
2. **Click Unoptimized tab.** The following 3 categories are displayed:
    - Legacy Instance Sizing (EC2) - Displays the EC2 instances that can be rightsized
    - Legacy Instance sizing (RDS) - Displays the RDS instanced that can be rightsized
    - Right Sizing S3 - Displays the S3 storage buckets that can be rightsized
    - Right Sizing EC2 - Displays the EC2 instances that can be rightsized
    - Right Sizing RDS - Displays the RDS instances that can be rightsized.

3. Click the category that you want to explore for right sizing opportunities. For example, EC2. the following details are displayed.



4. The details displayed include the Current instance size and the recommended size, the MES or the Monthly estimated savings if implements. It also displays how many days old the instance is which gives you an idea of the cost that could have been saved.
5. Similarly the other tabs for Legacy Instance sizing (RDS) and Right Sizing S3 also display similar opportunities when expanded to view the corresponding details.
6. You can also set up the event scheduler to do the right sizing automatically. See Schedule an EC2 Right Size Event.

7.10. Budgets

Learn how budgeting in CloudBolt CSMP helps you track your expenses, control your spending, and save money.

- Introduction
- Prerequisites
- Create a new AWS Budget
- Create a new Azure Budget
- Create a new GCP Budget
- Create a new VMware Budget
- Get a list of Budgets
- View details of an Existing Budget
- Update an Existing Budget
- Delete an Existing Budget
- View Change Log of a Budget
- Share a Budget
- Outcomes

Introduction

A budget is an estimation of your revenue and planned expenses over a specified future period of time.

You can setup monthly, quarterly, or annual budgets in CloudBolt for Service Providers, Tenants, adapters, groups, services and accounts. CloudBolt CSMP alerts you through notifications when your budgets are exhausted, or reaching exhausting levels depending on the percentage amount you specify when creating the budgets. You can also setup notifications via email and any of the CloudBolt supported integrations. See Create Integrations for detailed information on how to configure your integrations' notification settings.

The performance of your cloud resources is unaffected by budget settings.

Prerequisites

1. You must have normal adapters configured or shared for accounts, subscriptions, projects, and vCenters.
2. CloudBolt CSMP role associated with user must have view, create, modify, and delete access enabled for the Budget module.

Create a new AWS Budget

You can create a budget for a monthly, quarterly, or annual period. Use the following procedure to create a new AWS cost budget.

1. Log in to your CloudBolt CSMP portal**.**
2. Navigate to **Cost > Budgets.**
3. On the budgets page, select the AWS cloud provider box and then click **+ Add Budget > AWS** within the upper right corner.
4. **Add New Budget** page appears.

Budget

1. Fill out the **Budget** details as follows, then click **Next**.

Field Name	Notes
Name	Enter an unique budget name. The budget Name must have a minimum of three characters.
Description	Enter the budget description.
Set Period	Choose how often you want the budget value to reset. It is also referred to as the budget period in this article. Monthly, Quarterly, or Annually are the options for each month, quarter, or year.
Start Month	Click the calendar icon to choose the start month to begin evaluating against your budget value. If you choose a past month, you can still track your expenses against the budget amount, but you will not receive any threshold or over budget notifications for past months.
Expires on	Choose an end month for the budget by clicking the calendar icon . The start and end month differences can vary by up to 12 months.

Field Name	Notes
	Click the **Reset** icon next to the select month box to clear the expires on data.
Monthly, Quarterly, or Annually Budget	In the **Monthly, Quarterly, or Annually Budget** (depending on the set period selection, the name changes) box, enter the total **budget value** you want to spend for each budget period. Click pencil icon next to the Budget box to customize your budget value monthly. o If your budget period is **Monthly**, each month amount starting from the budget's **Start Month** will be the same as the budget value specified in the **Monthly Budget** box on the **Customize Monthly Budget** page. The **budget value** in the **Monthly Budget** box will be updated to the maximum value of the month if you change the budget amount for a month on the **Customize Monthly Budget** page. By selecting the box next to "**Apply changes to future Months**," the budget value for the selected month will be automatically updated for all upcoming months. The **budget amount** available for a month on the **Customize Monthly Budget** page will be used to evaluate all the budget alerts for that month. Using the description field next to each month's budget amount, you can add unique descriptions for each line item. o If your budget period is **Quarterly**, the **budget value** entered in the **Quarterly Budget** box will be equally divided into three months, starting from the budget **Start Month** on the **Customize Quarterly Budget** page. The **budget value** in the **Quarterly Budget** box will be updated to the maximum value of the quarter if you change the budget amount for a month on the **Customize Quarterly Budget** page. By selecting the box next to "**Apply changes to future Months**," the budget value for the selected month will be automatically updated for all upcoming months. The **budget amount** available for a month on the **Customize Quarterly Budget** page will be used to evaluate all the budget alerts for that month. Using the description field next to each month's budget amount, you can add unique descriptions for each line item. o If your budget period is **Annually**, the **budget value** entered in the Budget box will be equally divided into 12 months, starting from the budget **Start Month** on the **Customize Annually Budget** page. The **budget value** in the Annually Budget box will be updated to the sum of all the amounts if you change the budget amount for a month on the **Customize Annually Budget** page. By selecting the box next to "**Apply changes to future Months**," the budget value for the selected month will be automatically updated for all upcoming months. The **budget amount** available for a month on the **Customize Annually Budget** page will be used to

Field Name	Notes
	evaluate all the budget alerts for that month. Using the description field next to each month's budget amount, you can add unique descriptions for each line item.

Accounts

1. Fill out the **Accounts** details as follows, then click **Next**.

Field Name	Notes
Accounts	Choose the AWS accounts (normal adapters) for which you want to apply this budget. By default, a budget will be applied to all the AWS accounts (normal adapters) configured/shared in your CloudBolt CSMP account.
Adapter Group	You can choose an adapter group to apply the budget. Note: This option is available only when you select partial or none of the accounts in the Accounts selection box.
Service Type	Choose the AWS services for which this budget may apply. By default, a budget will be applied to all the AWS services available within your AWS account.

Tags

1. Fill out the **Tags** details as follows, then click **Next**.

Field Name	Notes
Choose Tags	Add tag key and value pair for which you want to apply this budget. To apply a tag, click icon. You can add multiple tags.

Event-Notification

1. Fill out the **Event-Notification** details to configure budget alerts for the actual cost, then click **Create budget** to create your budget. You can also receive your budget notifications over various other integrated platforms.

Field Name	Notes
Warning Notification	Enter threshold (% of budget value) to get notifications about your actual cost vs the set budget, and click icon. You can optionally include up to three thresholds.

Field Name	Notes
Notify By Email	Select the checkbox to send email notifications for the threshold consumption and over budget alerts. The budget creator will receive email notifications when both the 'Roles Inside Organisation' and 'Custom Emails Outside Organisation' fields are left blank. In all other cases, email notifications would be sent to users as per the options selected or entered in the below fields.
Roles Inside Organisation	Select the roles whose users you want to send this budget notifications.
Custom Emails Outside Organisation	Add an email id to receive the budget notifications. Click icon to add email(s) to the recipient list. You can add multiple emails.

Create a new Azure Budget

You can create a budget for a monthly, quarterly, or annual period. Use the following procedure to create a new Azure cost budget.

1. Log in to your CloudBolt CSMP portal**.**
2. Navigate to **Cost > Budgets.**
3. On the budgets page, select the Azure cloud provider box and then click **+Add Budget > Azure** within the upper right corner.
4. **Add New Budget** page appears.

Budget

1. Fill out the **Budget** details as follows, then click **Next**.

Field Name	Notes
Name	Enter an unique budget name. The budget Name must have a minimum of three characters.
Description	Enter the budget description.
Set Period	Choose how often you want the budget value to reset. It is also referred to as the budget period in this article. Monthly, Quarterly, or Annually are the options for each month, quarter, or year.
Start Month	Click the calendar icon to choose the start month to begin evaluating against your budget value. If you choose a past month, you can still track your expenses against the budget amount, but you will not receive any threshold or over budget notifications for past months.
Expires on	Choose an end month for the budget by clicking the calendar icon .

Field Name	Notes
	The start and end month differences can vary by up to 12 months. Click the **Reset** icon next to the select month box to clear the expires on data.
Monthly, Quarterly, or Annually Budget	In the **Monthly, Quarterly, or Annually Budget** (depending on the set period selection, the name changes) box, enter the total **budget value** you want to spend for each budget period. Click pencil icon next to the Budget box to customize your budget value monthly. o If your budget period is **Monthly**, each month amount starting from the budget's **Start Month** will be the same as the budget value specified in the **Monthly Budget** box on the **Customize Monthly Budget** page. The **budget value** in the **Monthly Budget** box will be updated to the maximum value of the month if you change the budget amount for a month on the **Customize Monthly Budget** page. By selecting the box next to "**Apply changes to future Months**," the budget value for the selected month will be automatically updated for all upcoming months. The **budget amount** available for a month on the **Customize Monthly Budget** page will be used to evaluate all the budget alerts for that month. Using the description field next to each month's budget amount, you can add unique descriptions for each line item. o If your budget period is **Quarterly**, the **budget value** entered in the **Quarterly Budget** box will be equally divided into three months, starting from the budget **Start Month** on the **Customize Quarterly Budget** page. The **budget value** in the **Quarterly Budget** box will be updated to the maximum value of the quarter if you change the budget amount for a month on the **Customize Quarterly Budget** page. By selecting the box next to "**Apply changes to future Months**," the budget value for the selected month will be automatically updated for all upcoming months. The **budget amount** available for a month on the **Customize Quarterly Budget** page will be used to evaluate all the budget alerts for that month. Using the description field next to each month's budget amount, you can add unique descriptions for each line item. o If your budget period is **Annually**, the **budget value** entered in the Budget box will be equally divided into 12 months, starting from the budget **Start Month** on the **Customize Annually Budget** page. The **budget value** in the Annually Budget box will be updated to the sum of all the amounts if you change the budget amount for a month on the **Customize Annually Budget** page. By selecting the box next to "**Apply changes to future Months**," the budget value for the selected month will be automatically updated for all upcoming months. The **budget amount** available for a month

Field Name	Notes
	on the **Customize Annually Budget** page will be used to evaluate all the budget alerts for that month. Using the description field next to each month's budget amount, you can add unique descriptions for each line item.

Accounts

1. Fill out the **Accounts** details as follows, then click **Next**.

Field Name	Notes
Subscription	Choose the Azure subscriptions (normal adapters) for which you want to apply this budget. By default, a budget will be applied to all the Azure subscriptions (single subscriptions' normal adapters) configured/shared in your CloudBolt CSMP account.
Adapter Group	You can choose an adapter group to apply the budget. Note: This option is available only when you select partial or none of the subscriptions in the Subscription selection box.
Resource Group	Select the required resource groups from the drop-down list which you want to scope for this budget. The budget amount will be applicable to the selected resource groups if resource groups are selected. If no resource groups are selected the budget will be applicable to all the resource groups available in the selected subscriptions, or adapter group, or both. You can select all the resource groups using **Select All** option or select a subset of resource groups up to 99 resource groups by clicking them in the list.
Service Type	Choose the Azure services for which this budget may apply. By default, a budget will be applied to all the Azure services available within your Azure account.

Tags

1. Fill out the **Tags** details as follows, then click **Next**.

Field Name	Notes
Choose Tags	Add tag key and value pair for which you want to apply this budget. To apply a tag, click icon. You can add multiple tags.

Event-Notification

1. Fill out the **Event-Notification** details to configure budget alerts for the actual cost, then click **Create budget** to create your budget. You can also receive your budget notifications over various other integrated platforms.

Field Name	Notes
Warning Notification	Enter threshold (% of budget value) to get notifications about your actual cost vs the set budget, and click icon. You can optionally include up to three thresholds.
Notify By Email	Select the checkbox to send email notifications for the threshold consumption and over budget alerts. The budget creator will receive email notifications when both the 'Roles Inside Organisation' and 'Custom Emails Outside Organisation' fields are left blank. In all other cases, email notifications would be sent to users as per the options selected or entered in the below fields.
Roles Inside Organisation	Select the roles whose users you want to send this budget notifications.
Custom Emails Outside Organisation	Add an email id to receive the budget notifications. Click icon to add email(s) to the recipient list. You can add multiple emails.

Create a new GCP Budget

You can create a budget for a monthly, quarterly, or annual period. Use the following procedure to create a new GCP cost budget.

1. Log in to your CloudBolt CSMP portal**.**
2. Navigate to **Cost > Budgets.**
3. On the budgets page, select the GCP cloud provider box and then click **+ Add Budget > GCP** within the upper right corner.

4. **Add New Budget** page appears.

Budget

1. Fill out the **Budget** details as follows, then click **Next**.

Field Name	Notes
Name	Enter an unique budget name. The budget Name must have a minimum of three characters.
Description	Enter the budget description.
Set Period	Choose how often you want the budget value to reset. It is also referred to as the budget period in this article. Monthly, Quarterly, or Annually are the options for each month, quarter, or year.
Start Month	Click the calendar icon to choose the start month to begin evaluating against your budget value. If you choose a past month, you can still track your expenses against the budget amount, but you will not receive any threshold or over budget notifications for past months.
Expires on	Choose an end month for the budget by clicking the calendar icon . The start and end month differences can vary by up to 12 months. Click the **Reset** icon next to the select month box to clear the expires on data.
Monthly, Quarterly, or Annually Budget	In the **Monthly, Quarterly, or Annually Budget** (depending on the set period selection, the name changes) box, enter the total **budget value** you want to spend for each budget period. Click pencil icon next to the Budget box to customize your budget value monthly. o If your budget period is **Monthly**, each month amount starting from the budget's **Start Month** will be the same as the budget value specified in the **Monthly Budget** box on the **Customize Monthly Budget** page. The **budget value** in the **Monthly Budget** box will be updated to the maximum value of the month if you change the budget amount for a month on the **Customize Monthly Budget** page. The **budget amount** available for a month on the **Customize Monthly Budget** page will be used to evaluate all the budget alerts for that month. Using the description field next to each month's budget amount, you can add unique descriptions for each line item. o If your budget period is **Quarterly**, the **budget value** entered in the **Quarterly Budget** box will be equally divided into three months, starting from the budget **Start Month** on the **Customize Quarterly Budget** page. The **budget value** in the **Quarterly Budget** box will be updated to the maximum value of the quarter if you change the budget amount for a month on the **Customize Quarterly Budget** page. The **budget**

Field Name	Notes
	amount available for a month on the **Customize Quarterly Budget** page will be used to evaluate all the budget alerts for that month. Using the description field next to each month's budget amount, you can add unique descriptions for each line item. ○ If your budget period is **Annually**, the **budget value** entered in the Budget box will be equally divided into 12 months, starting from the budget **Start Month** on the **Customize Annually Budget** page. The **budget value** in the Annually Budget box will be updated to the sum of all the amounts if you change the budget amount for a month on the **Customize Annually Budget** page. The **budget amount** available for a month on the **Customize Annually Budget** page will be used to evaluate all the budget alerts for that month. Using the description field next to each month's budget amount, you can add unique descriptions for each line item.

Projects

1. Fill out the **Projects** details as follows, then click **Next**.

Field Name	Notes
Projects	Choose the GCP projects (normal adapters) for which you want to apply this budget. By default, a budget will be applied to all the GCP projects configured/shared in your CloudBolt CSMP account.
Service Type	Choose the GCP services for which this budget may apply. By default, a budget will be applied to all the GCP services available within your GCP project.

Event-Notification

1. Fill out the **Event-Notification** details to configure budget alerts for the actual cost, then click **Create budget** to create your budget. You can also receive your budget notifications over various other integrated platforms.

Field Name	Notes
Warning Notification	Enter threshold (% of budget value) to get notifications about your actual cost vs the set budget, and click icon. You can optionally include up to three thresholds.

Field Name	Notes
Notify By Email	Select the checkbox to send email notifications for the threshold consumption and over budget alerts. The budget creator will receive email notifications when both the 'Roles Inside Organisation' and 'Custom Emails Outside Organisation' fields are left blank. In all other cases, email notifications would be sent to users as per the options selected or entered in the below fields.
Roles Inside Organisation	Select the roles whose users you want to send this budget notifications.
Custom Emails Outside Organisation	Add an email id to receive the budget notifications. Click icon to add email(s) to the recipient list. You can add multiple emails.

Create a new VMware Budget

You can create a budget for a monthly, quarterly, or annual period. Use the following procedure to create a new VMware cost budget.

1. Log in to your CloudBolt CSMP portal**.**
2. Navigate to **Cost > Budgets.**
3. On the budgets page, select VMware cloud provider box and then click **+ Add Budget > VMware** within the upper right corner.
4. **Add New Budget** page appears.

Budget

1. Fill out the **Budget** details as follows, then click **Next**.

Field Name	Notes
Name	Enter an unique budget name. The budget Name must have a minimum of three characters.
Description	Enter the budget description.
Set Period	Choose how often you want the budget value to reset. It is also referred to as the budget period in this article. Monthly, Quarterly, or Annually are the options for each month, quarter, or year.
Start Month	Click the calendar icon to choose the start month to begin evaluating against your budget value. If you choose a past month, you can still track your expenses against the budget amount, but you will not receive any threshold or over budget notifications for past months.
Expires on	Choose an end month for the budget by clicking the calendar icon .

Field Name	Notes
	The start and end month differences can vary by up to 12 months. Click the **Reset** icon next to the select month box to clear the expires on data.
Monthly, Quarterly, or Annually Budget	In the **Monthly, Quarterly, or Annually Budget** (depending on the set period selection, the name changes) box, enter the total **budget value** you want to spend for each budget period. Click pencil icon next to the Budget box to customize your budget value monthly. ○ If your budget period is **Monthly**, each month amount starting from the budget's **Start Month** will be the same as the budget value specified in the **Monthly Budget** box on the **Customize Monthly Budget** page. The **budget value** in the **Monthly Budget** box will be updated to the maximum value of the month if you change the budget amount for a month on the **Customize Monthly Budget** page. The **budget amount** available for a month on the **Customize Monthly Budget** page will be used to evaluate all the budget alerts for that month. Using the description field next to each month's budget amount, you can add unique descriptions for each line item. ○ If your budget period is **Quarterly**, the **budget value** entered in the **Quarterly Budget** box will be equally divided into three months, starting from the budget **Start Month** on the **Customize Quarterly Budget** page. The **budget value** in the **Quarterly Budget** box will be updated to the maximum value of the quarter if you change the budget amount for a month on the **Customize Quarterly Budget** page. The **budget amount** available for a month on the **Customize Quarterly Budget** page will be used to evaluate all the budget alerts for that month. Using the description field next to each month's budget amount, you can add unique descriptions for each line item. ○ If your budget period is **Annually**, the **budget value** entered in the Budget box will be equally divided into 12 months, starting from the budget **Start Month** on the **Customize Annually Budget** page. The **budget value** in the Annually Budget box will be updated to the sum of all the amounts if you change the budget amount for a month on the **Customize Annually Budget** page. The **budget amount** available for a month on the **Customize Annually Budget** page will be used to evaluate all the budget alerts for that month. Using the description field next to each month's budget amount, you can add unique descriptions for each line item.

vCenters

1. Fill out the **vCenters** details as follows, then click **Next**.

Field Name	Notes
vCenters	Choose the VMware vCenters for which you want to apply this budget. By default, a budget will be applied to all the vCenters in your VMware profile.
Adapter Group	You can choose a Vmware vCenters group to apply the budget. Note: This option is available only when you select partial or none of the vCenters in the vCenters selection box.
Service Type	Choose the VMware services for which this budget may apply. By default, a budget will be applied to all the VMware services available within your VMware profile.

Event-Notification

1. Fill out the **Event-Notification** details to configure budget alerts for the actual cost, then click **Create budget** to create your budget. You can also receive your budget notifications over various other integrated platforms.

Field Name	Notes
Warning Notification	Enter threshold (% of budget value) to get notifications about your actual cost vs the set budget, and click icon. You can optionally include up to three thresholds.
Notify By Email	Select the checkbox to send email notifications for the threshold consumption and over budget alerts. The budget creator will receive email notifications when both the 'Roles Inside Organisation' and 'Custom Emails Outside Organisation' fields are left blank. In all other cases, email notifications would be sent to users as per the options selected or entered in the below fields.
Roles Inside Organisation	Select the roles whose users you want to send this budget notifications.
Custom Emails Outside Organisation	Add an email id to receive the budget notifications. Click icon to add email(s) to the recipient list. You can add multiple emails.

Get a list of Budgets

Use the following procedure to see all the own created or shared with your tenant budgets.

1. Log in to your CloudBolt CSMP portal.
2. Navigate to **Cost > Budgets.**
3. On the budgets page, select the cloud provider box whose budgets you want to see.
4. You can filter the budget list based on billing account, name, and period. All the filters are combined together using 'and' logic, which means that only those budgets that meet all selected filter values are displayed.
5. You can download the filtered budgets list in PDF and CSV formats. Click 'Export to CSV' and/or 'Export to PDF' adjacent to the current month to obtain the budget report for the selected cloud provider.
6. If you have existing budgets for the selected cloud provider, it will appear in a simple table view with their details. If you are a sub-tenant (other than Default tenant) user, you can switch the list of budgets among your own created or shared by selecting the appropriate tab available at the upper right side of the budget list. By default, all the budgets available for you will be listed. **Scan** button would allow you to update the budgets list with latest data; this option is available only for sub-tenant budgets page.
    - **Name**: Budget name
    - **Period**: Budget period
    - **Start Month**: Budget start month
    - **Budget Amount**: Budget value for the selected budget period
    - **Cost vs Budget (Monthly)**: It displays the current month cost to date value for the accounts/subscriptions/projects/vCenters and groups to which this budget apply. It shows the actual cost only. No forecast cost value included. It displays the percentage of the monthly budget that has been spent to date. It is calculated as (current_month_cost_to_date / current month_budget_amount) * 100. The current_month_cost_to_date is the Unblended metric value for AWS budgets and Cost metric value for Azure, GCP, and VMware budgets for a parent organisation's Default tenant users. For all other users (sub-tenant users of a parent organisation, all users of child organisation, reseller organisation, and customer organisation), the

current_month_cost_to_date value would be the metric value set in selected metrics box of the report profile shared with them.

- **Cost vs Previous Month**: It displays the previous month cost. It also displays the percentage of current month cost to date against the previous month cost value. It is calculated as (current_month_cost_to_date / previous_month_cost) * 100. The cost values used in this formula are the Unblended metric value for AWS budgets and Cost metric value for Azure, GCP, and VMware budgets for a parent organisation's Default tenant users. For all other users (sub-tenant users of a parent organisation, all users of child organisation, reseller organisation, and customer organisation), the current_month_cost_to_date value would be the metric value set in selected metrics box of the report profile shared with them.
- **Forecast vs Budget**: It displays the forecasted expense value for the current month. It indicates the percentage of forecasted value against the current month budget amount. It is calculated as (current_month_forecast_value / current_month_budget_amount) * 100.
- **Total Balance**: It is calculated as forecasted expense value subtracted from the current month budget amount. A negative sign indicates the overspent monthly budget. Whereas a positive sign indicates underspent monthly budget.
- **Details**: Displays applied accounts/subscriptions/projects/vCenters, adapter group, tags, service types counts along with budget description. If you have configured/shared with all the accounts/subscriptions/projects/vCenters (normal adapters) in your CloudBolt CSMP account and the budget applies to all the accounts/subscriptions/projects/vCenters, then accounts/subscriptions/projects/vCenters count would show as *All*. For all other cases, the accounts/subscriptions/projects/vCenters count would display the actual count of the accounts/subscriptions/projects/vCenters to which the budget applies.

  If you are a sub tenant user and created a budget with shared adapters or groups, any change in your tenant shared adapter list or groups associated

with this budget would automatically affect the accounts/subscriptions/projects/vCenters (normal adapters) count. The same can be tracked in the user activity module.
If you have a shared budget in your budget list, you can see the accounts, subscriptions, projects, and vCenters counts based on the normal adapters' availability within your CloudBolt CSMP account. The adapter group details will not be available for a shared budget.

- **Action**: Provides options to view, update, delete, see change history log, and share the selected budget. Sharing option is available only for Default tenant users account.

7. If you have set a threshold limit for your budget, an info icon would be displayed when a budget threshold is met. To see the message available in the info icon, hover over the info icon.
8. If your actual expenses for a budget has exceeded, you could see an info icon present to the left side of the budget name. To see the message available in the info icon, hover over the info icon.

View details of an Existing Budget

You can see details of an exiting budget using View More option. Use the following procedure to see the details of an existing budget.

1. Go to the budget whose details you want to see.
2. Click the ellipsis […] icon under the **Action** column of the budget.
3. Click **View More**.
4. In the **Budget** tab, you can see each month budget value and actual expense value from the start month of the selected budget.
5. In the **Notification** tab, you can see the threshold settings for the budget, custom email ids and roles inside the organisation for threshold notifications, and the budget start and end month.
6. In the **Current Month Estimate** tab, you can see a cumulative graphical representation of actual (historical) and forecasted expenses for the current month.

7. In the **Annual or Quarterly Estimate** tab, you can see a cumulative graphical representation of actual (historical) and forecasted monthly (for Annual Estimate) or quarterly (for Quarterly Estimate) expenses for a year from the budget start month.

Update an Existing Budget

If you have created a budget for your cloud accounts, you can edit the existing details of own created budget anytime. Use this procedure to update existing budget details.

1. Go to the budget which you want to update.
2. Click the ellipsis […] icon under the **Action** column of the budget.
3. Click **Edit Budget**.
4. **Edit Budget** page appears.
5. Update the details you want to update.

   Note: If you are adding a new account/subscription/project (normal adapter) to an existing budget, it may take up to 24 hours to reflect the updated cost value.

6. Go to the **Event-Notification** tab of the Edit Budget page.
7. Click **Update budget** to complete updating the budget.

Delete an Existing Budget

Use this procedure to delete your own created budget.

1. Go to the budget which you want to delete.
2. Click the ellipsis […] icon under the **Action** column of the budget.
3. Click **Delete Budget**.
4. You will see a message similar to: Are you Sure?
5. Click **Ok** to delete the budget.

View Change Log of a Budget

Use this procedure to view the update history of your own created budget.

1. Go to the budget whose update history you want to see.
2. Click the ellipsis […] icon under the **Action** column of the budget.
3. Click **View Change Log**.
4. User Activity page for the selected Budget will open. List will contain following details:
    a. Activity date
    b. Username of the account who performed the update
    c. IP address
    d. Budget name
    e. Description of the changes made in the budget. To view the budget log with the old and new values for the key name whose value has been altered, click **View**. If you have created a new budget, the old value will be populated as NA for all the key names. Budget Log details are available for the budget updates made from July 2022 onwards.
    f. Module name
    g. Tenant name

Share a Budget

Prerequisites

To share a budget, you must be a **Default** tenant user with a CloudBolt CSMP role that have view, create, and share access enabled for the Budget module. The target tenant must have been shared with at least one normal adapter out of the adapters for which the budget applies.

Use this procedure to share a budget with your sub-tenants (other than Default tenant) within your CloudBolt CSMP organisation account.

1. Identify the budget which you want to share with tenants.
2. Click the ellipsis […] icon under the **Action** column of the budget.
3. Click **Share**.

4. **Share Budget** page appears.
5. Select tenants from the tenant drop-down list. A list of tenants who have been shared with at least one of the accounts, subscriptions, projects, or vCentres for whom the chosen budget is applicable will appear in the tenant drop-down list.
6. Click **Share** button available within the share budget page.

Important

It is important to note that when a budget is shared with a sub-tenant, the budget amount would be applicable to their cloud costs (net cost/net cost (R)) accumulated by the shared adapters and resource groups with the specific sub-tenant. However, budget amount will remain unchanged. For example, you have created a budget for 7 adapters including accounts which are part of shared groups, then shared the budget to a sub-tenant which shares only 5 adapters out of these 7 adapters. The Cost vs Budget (Monthly) and Cost vs Previous Month columns for the shared budget on the sub-tenant's budget page will only show the net cost for the 5 shared adapters. Similarly, if an Azure budget has been created with a scope of resource groups and then shared same budget to a sub-tenant whose access is restricted based on resource groups. The cost displayed on such sub-tenant's budget page will be based on their resource groups access. Also, this net cost will be used for all the percentage calculations.

Outcomes

You have learnt how to setup budgets for the cloud services, adapters, groups and accounts.

If all the normal adapters linked to the shared budget are unshared in the future, the shared budget will be immediately removed from the sub-tenant.

In the future, if shared normal adapters list is updated to add or delete, the associated shared budget’s accounts, subscriptions, projects, or vCenters count will also be updated for the sub-tenant.

8. Security

Learn about security services provided by CloudBolt CSMP.

The Security section of the CloudBolt CSMP covers the following topics. Jump to a topic to view information and setup steps for that function.

- Security and Compliance Adviser
- Security Visualization
- Compliance Reports
- User Activity
- Synchronization History

8.1. Security and Compliance Adviser

Learn how security and compliance to regulations are critical for your cloud services and resources.

- Introduction
- Prerequisite
- View security posture by service
- View security posture by Rule
- Notifications
- Outcomes

Introduction

Companies increasingly are moving towards cloud computing to optimize costs, scale up, and modernize. However, this step exposes the companies to new risks. Some of the common risks are data loss, insecure APIs, vulnerabilities, Denial of Service (DoS) attacks, and many more. Hence it is important that steps are taken to mitigate these potential conditions that might be detrimental to the progress of the companies. CloudBolt CSMP helps you with the risk assessment of these threats and compliance to security norms and alerts you to potentially serious situations.

Incidents are flagged with 4 conditions, high, low, medium, and very high risk.

You can do the following on the Security page of CSMP:

- View security alerts by service, rule, resources, and Service Provider
- View security statistics for services scanned, total threats, warnings issued, and critical incidents
- Scan your infrastructure for vulnerabilities
- Add and view notifications
- Download report in .xls format

  Note: Reports may vary according to the Service provider selected.

Prerequisite

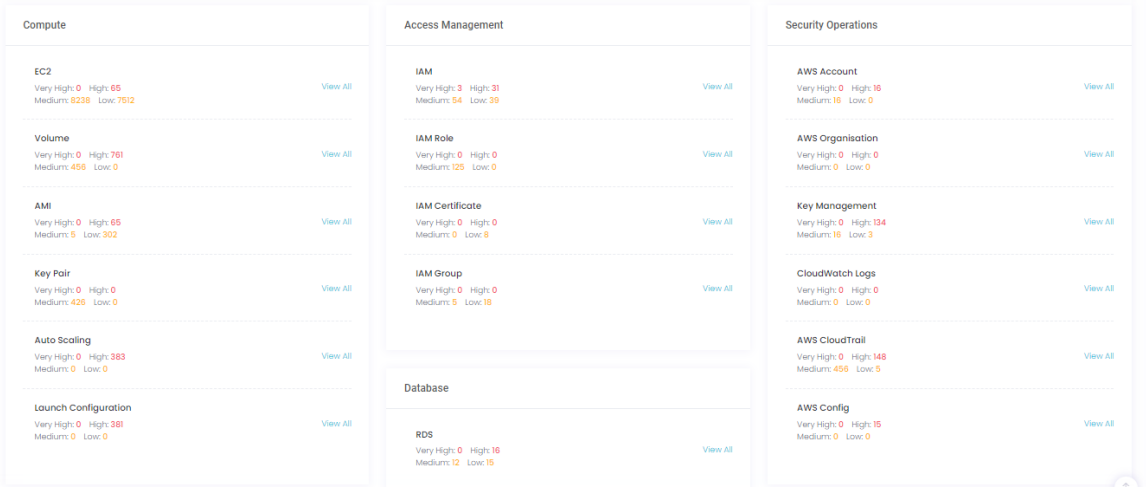
To view security alerts for your cloud accounts, you must first create a normal adapter with an active status for each cloud account for which you wish to view security alerts.

View security posture by service

1. Navigate to **Security > Security and Compliance adviser**. By default the posture displays the details for services. If not, click By Service to view the service related details. The details are displayed.



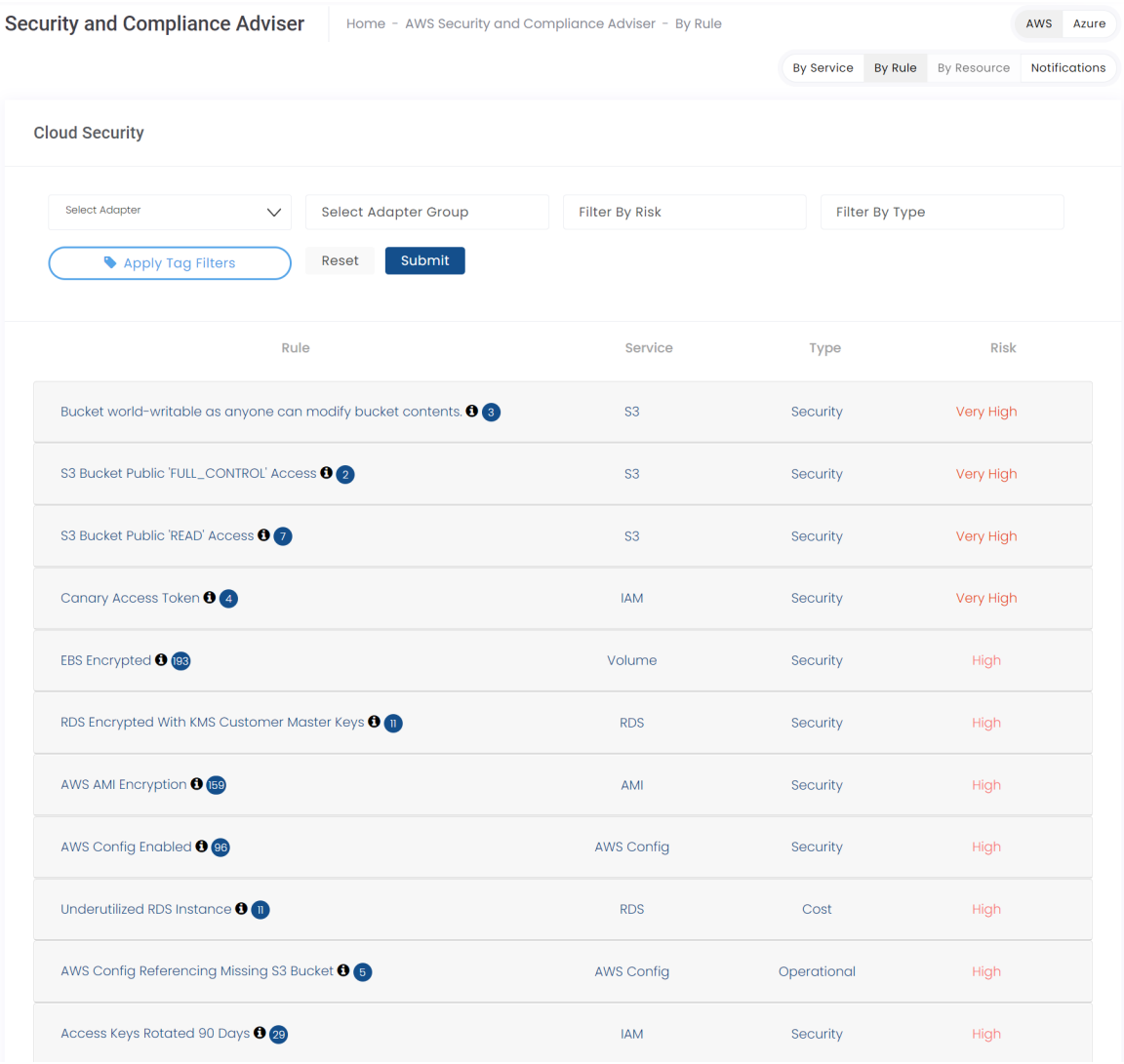
2. You can also view the security posture By Rule and By Resources. Click the designated tab as required.
3. The lower part of the dashboard displays the granular details for modules such as Compute, Access Management, Security Operations, database, network and storage. Click **View All** on upper right of each module to view details.



View security posture by Rule

You can filter the incidents by risk, whether high medium or low, type whether related to Cost Operational, Performance, Reliability, or Security, and apply tags also.

1. Navigate to **Security > Security and Compliance Adviser**. By default the posture displays the details for services.
2. Click **By Rule** to view the rule related details. Select your cloud provider tab as required. By default, a comprehensive report is displayed.



3. To view details for a particular incident, select the adapter, adapter group as required, or use the key words in the Filters for risk and type.
4. To apply tag filters, click **Apply tag** filters and enter the tag keys and corresponding values in the Filter by Tags dialog.
5. Click **Apply Tag** and click **Submit**. The results are updated as per the entered criteria.

Notifications

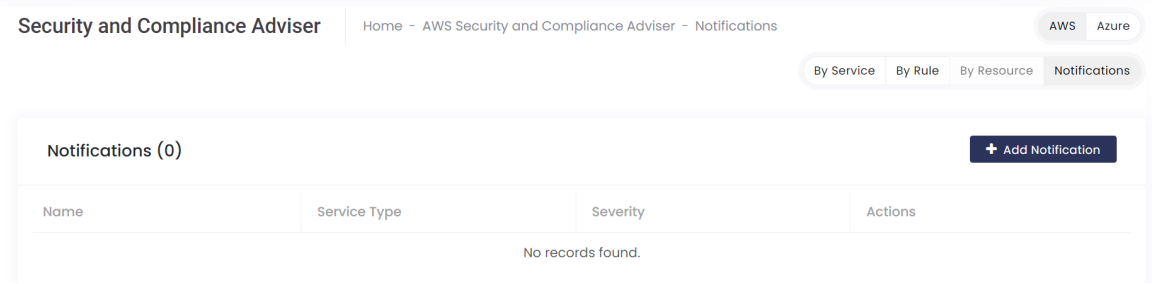
You can create and configure notifications to alert you of impending security incidents based on Service type or severity. Notifications can be appended tags, and you can add

roles and users in the organization to receive the notifications. You can also send the notifications to custom emails outside the organization.

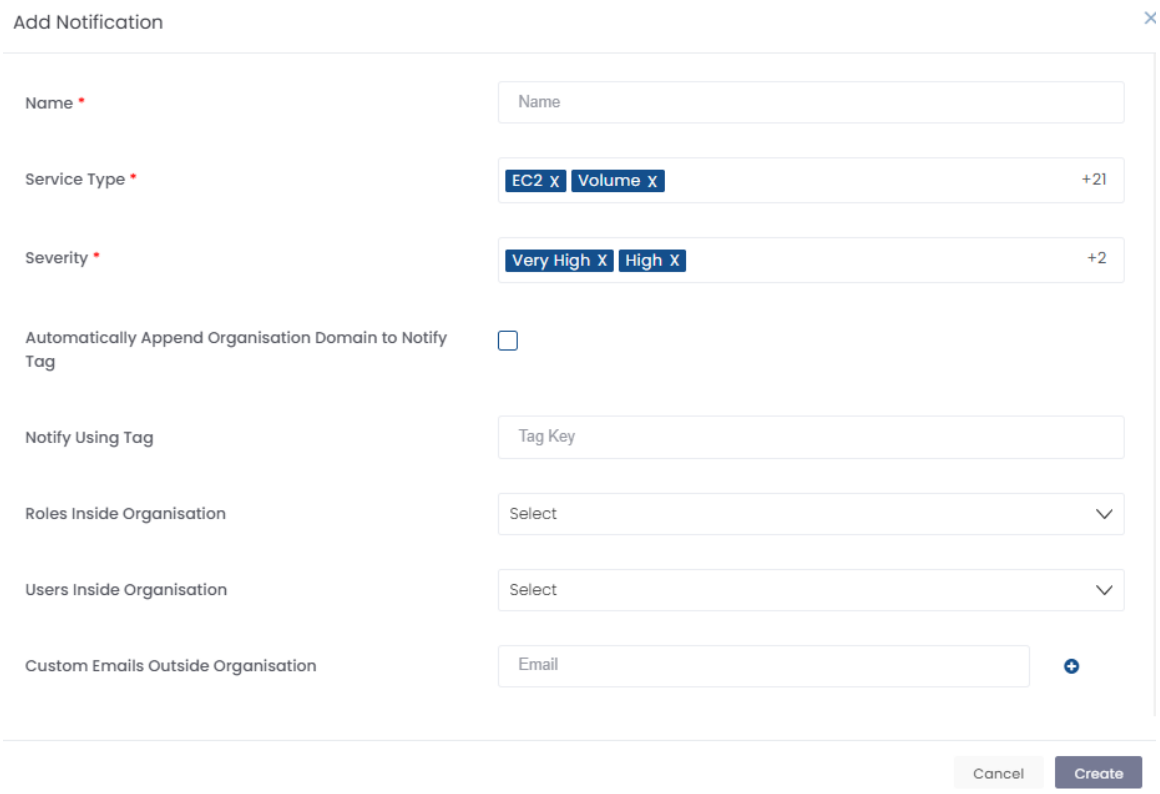
Important

To create and update a notification, you must have at least an active billing or normal adapter in your CloudBolt CSMP account.

1. Navigate to **Security > Security and Compliance Adviser**.
2. Click the Notifications tab on the upper right corner. Existing notifications if any will be listed.



3. Click **+ Add Notification**. The Add notifications dialog appears.



4. Enter an unique name for the notification.
5. Configure the Service type, and severity for the incidents that you want the notification to be triggered.
6. Append organization domain tag if required.
7. Add any tags if required to the notification.
8. Select the roles in the organization, which must receive the notifications.
9. Select the users in the organization that should receive the notifications.
10. If required, you can send the notification outside the organization domain, click + to add any external emails.
11. Click **Create** if you have completed entering the remaining details. The notification is created and will be triggered when the conditions are met.

Outcomes

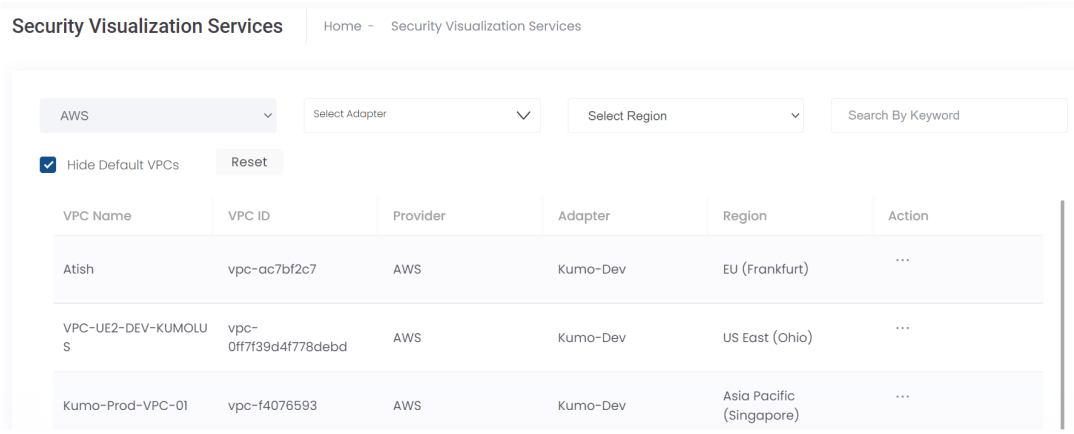
You have learnt how to avoid security lapses and how you organization can comply with regulations using CloudBolt CSMP.

8.2. Security Visualization

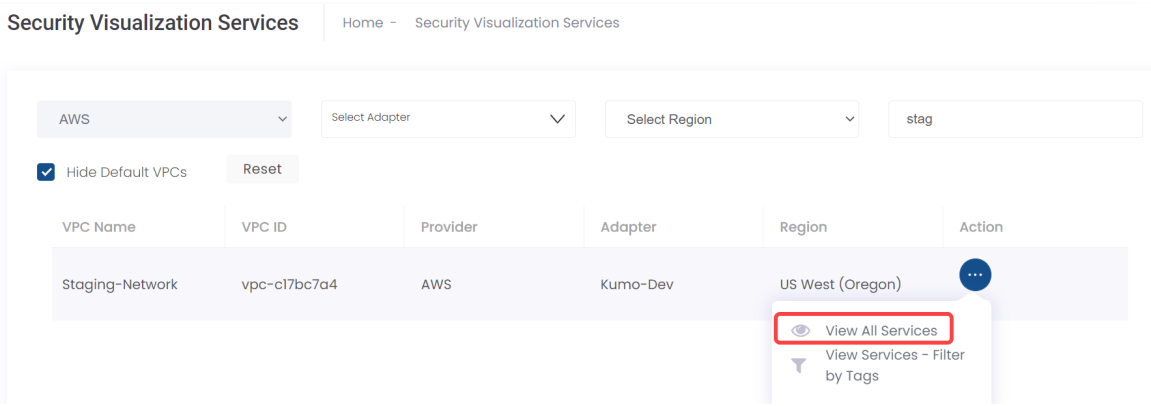
Introduction

Here you can view all the VPCs (Virtual Private Circuits) that your organization has provisioned for by Provider, adapter, by region, and by keywords.

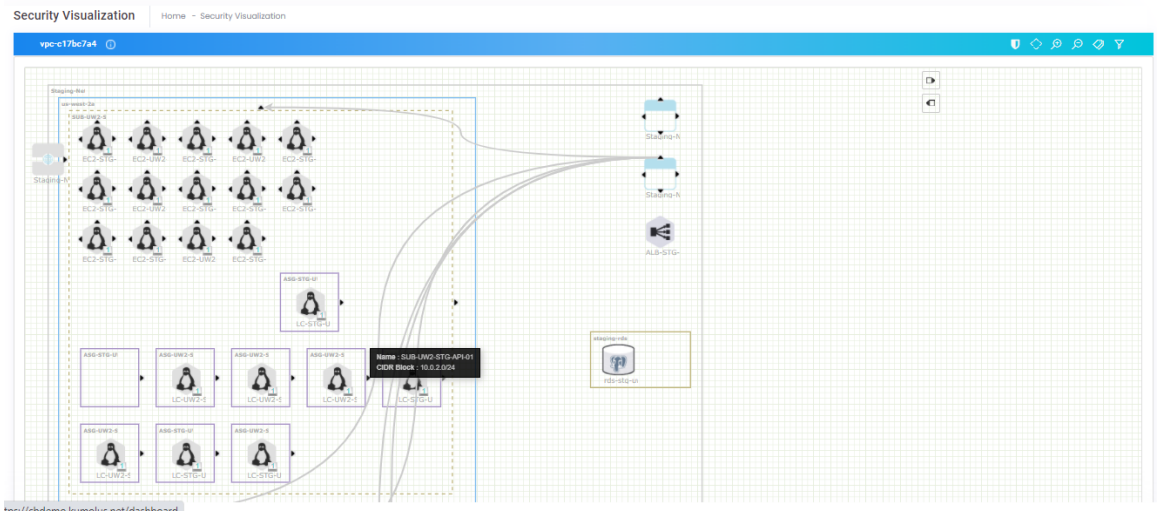
1. Logon to your instance of CloudBolt CSMP.
2. Navigate to **Security > Security Visualization**. The list of your VPCs is displayed.
3. Select the provider, adapter and region as required. You can also narrow down your search by entering a keyword in the designated textbox. The list is updated as per the selected parameters.



4. Enter the keyword "stag", for example to view the security visualization for staging networks. The details for staging networks are displayed.



5. Click the 3 dots (ellipses) and from the displayed options, select View All Services. The visualization for the staging networks is rendered on your screen as follows:



6. Click the icons on upper right corner (highlighted in red rectangle) to do the following:



- View an Overlay for the associated security threats
- Move up
- Zoom out
- Zoom in
- Assign tags
- Apply tag filters as required.
- Click on the displayed resources to view more details.

Outcomes

A visual posture of all your VPCs can help you know exactly by which adapter, service provider, and by which region your VPCs are operating.

8.3. Compliance Reports

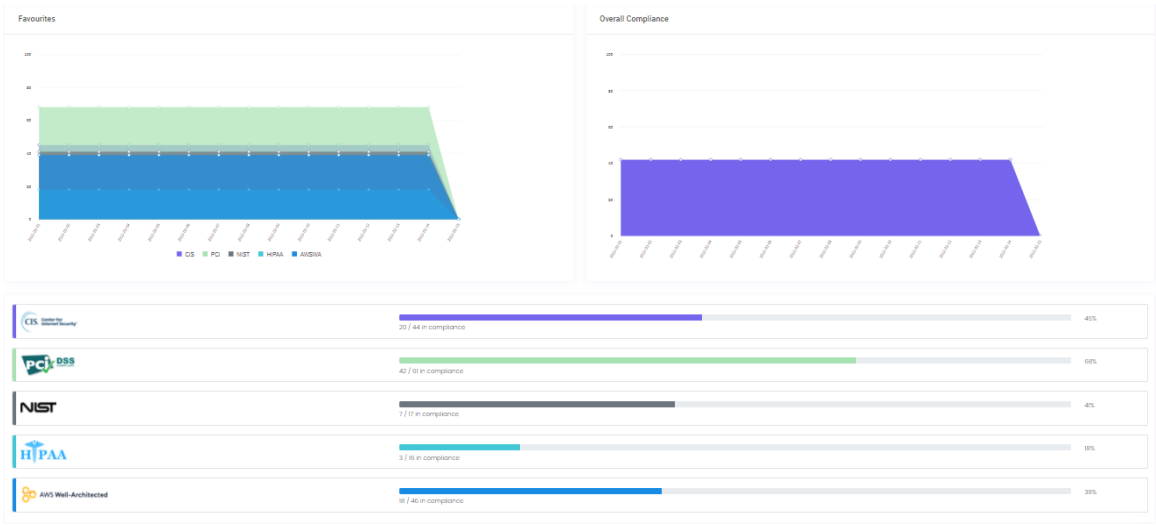
Data privacy is being taken seriously across the world and many countries have enacted laws and regulations to safeguard data privacy of its citizens. It is mandatory today for organizations to comply with certain regulations such as CIS, PCI, NIST, HIPAA, AWSWA and others. Any organization that does not comply with these regulations runs the risk of being fined heavily.

Introduction

CloudBolt CSMP helps you keep a watch on the compliance for the various regulations. The reports show you how many adaptors, instances, are complying with the legal requirements.

1. Navigate to **Security > Compliance Reports.** You can view the overview for all type of compliance regulations or select a particular type. The overview is displayed by default. Click on any other type as required.

2. Select the Service Provider.
3. Select the Adapter or Adapter Group for which you want to see the compliance reports.
4. Select whether daily or monthly report, or enter the custom period using the calendar provided. The compliance reports for the selected parameters are displayed.



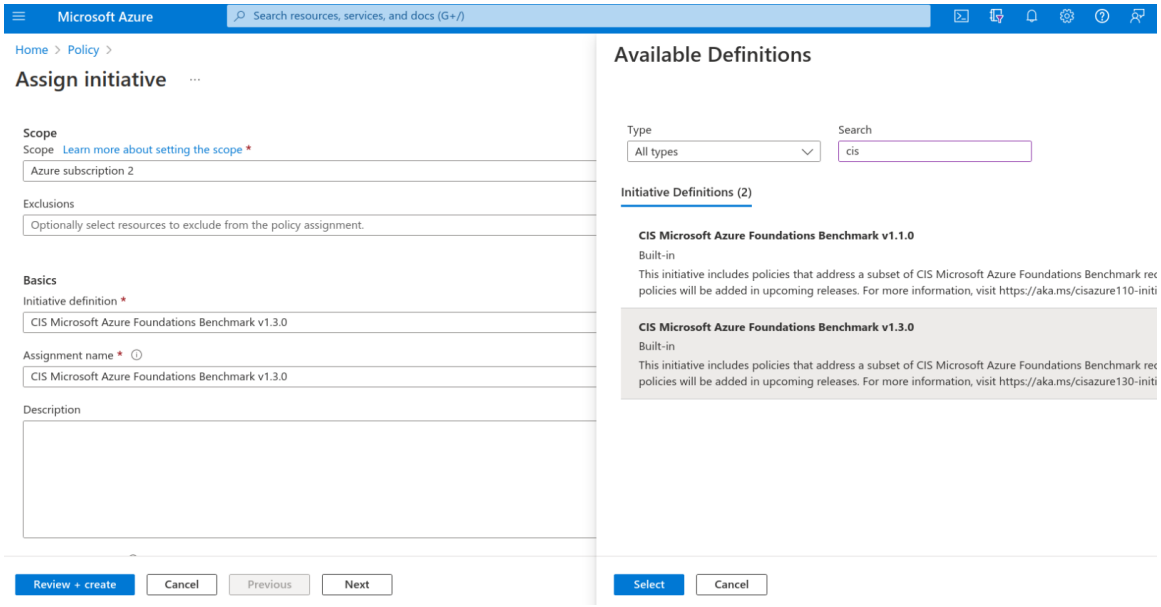
Azure Compliance report for CIS

CIS benchmarks are set by the Center for Internet Security (CIS) for a range of IT systems and products. You can use CloudBolt CSMP compliance reports for CIS to ensure compliance with industry-agreed cybersecurity standards.

Prerequisites

To see the CIS benchmark compliance for your Azure account, you must assign the *CIS Microsoft Azure Foundations Benchmark v1.3.0* policy compliance initiative definition.

1. Launch the Azure Policy service in the Azure portal by selecting All services, then searching for and selecting Policy.
2. Select **Compliance** on the left side of the Azure Policy page.
3. Select **Assign initiative** from the top of the **Policy - Compliance** page.
4. On the **Assign initiative** page, set the Scope by selecting the ellipsis and then selecting a subscription. Optionally, select a resource group. A scope determines what resources or grouping of resources the policy initiative gets enforced on. Then use the Select button at the bottom of the Scope page.
5. Select the **Initiative definition** ellipsis to open the list of available definitions.
6. Search the initiative definitions list to find the **CIS Microsoft Azure Foundations Benchmark v1.3.0** definition. Select that initiative and then use the **Select** button.



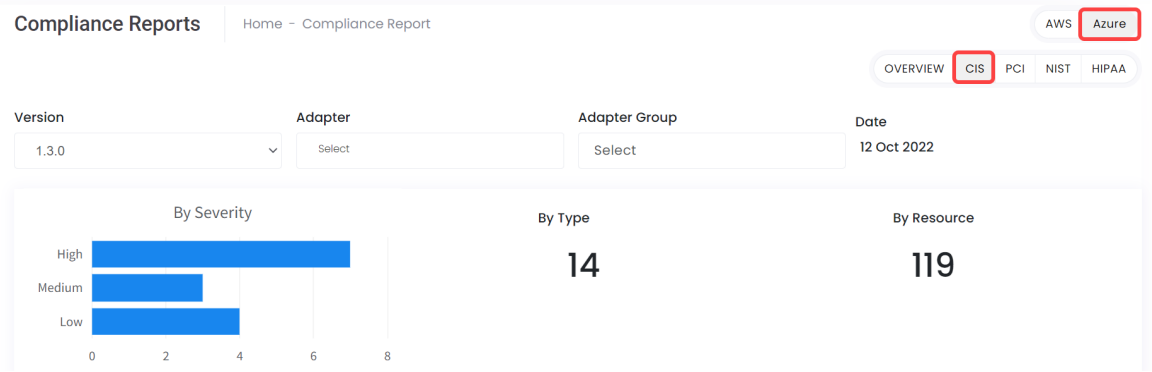
7. The Assignment name is automatically populated with the initiative name, but you can change it. You can also add an optional Description. The description provides details about this initiative assignment. Assigned by will automatically fill based on who is logged in. This field is optional, so custom values can be entered.
8. Leave policy enforcement *Enabled*.
9. Select **Review + Create** at the bottom of the page.
10. Review the selected options, then select **Create** at the bottom of the page.

Now you must go to your CloudBolt CSMP account and synchronize the adapter related to your Azure subscription to view the CIS compliance reports on the CloudBolt CSMP.

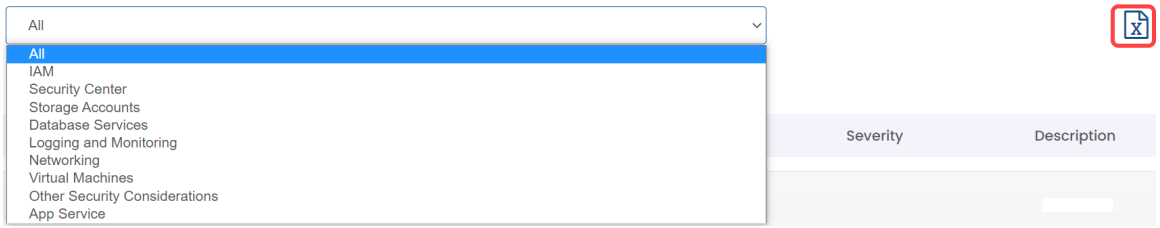
View Azure CIS Report

1. Navigate to **Security > Compliance Reports.**
2. Click on **Azure**.

3. Select the version and the required adapters. The report for CIS will be displayed.



4. You can drill down further for compliance on module types using the drop down selection if required. Click the page icon to download the report in excel format if required.



5. The details in the report are as follows:
    - Count by severity
    - Count by type
    - Count by resource
6. Further, the recommendations for individual rules, the status, severity and description are also available. Click the corresponding entry in the table to view further details on the status, severity and the description of the rule requirements.

Azure Compliance report for PCI

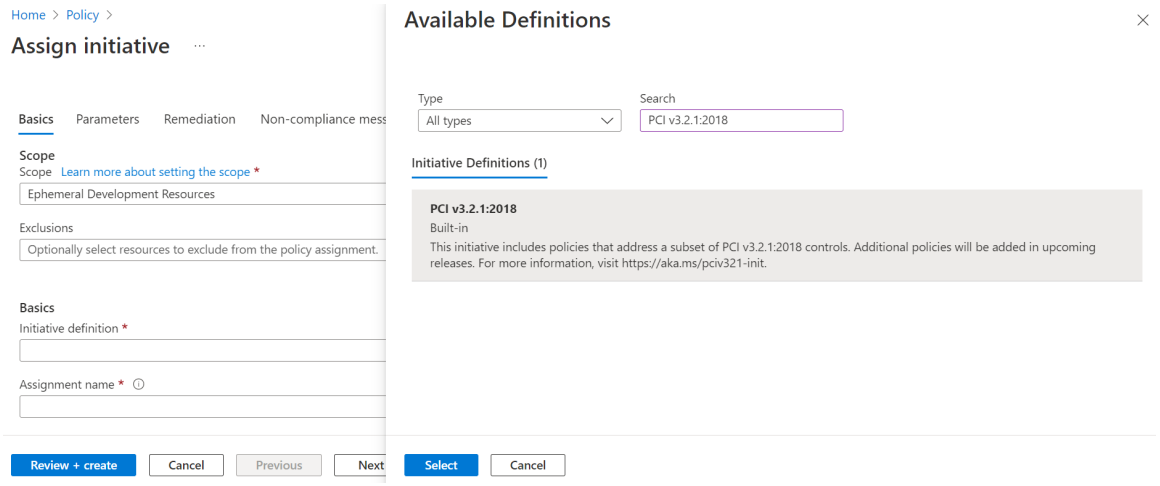
Payment card industry compliance is the term used to describe the technical and operational guidelines that organizations use to safeguard and protect the credit card information that cardholders submit and transmit during card processing transactions. The PCI Security Standards Council creates and oversees PCI standards for compliance. You

can use CloudBolt CSMP compliance reports for PCI to ensure compliance with industry-agreed cybersecurity standards.

Prerequisites

To see the PCI benchmark compliance for your Azure account, you must assign the *PCI v3.2.1:2018* policy compliance initiative definition.

1. Launch the Azure Policy service in the Azure portal by selecting All services, then searching for and selecting Policy.
2. Select **Compliance** on the left side of the Azure Policy page.
3. Select **Assign initiative** from the top of the **Policy - Compliance** page.
4. On the **Assign initiative** page, set the Scope by selecting the ellipsis and then selecting a subscription. Optionally, select a resource group. A scope determines what resources or grouping of resources the policy initiative gets enforced on. Then use the Select button at the bottom of the Scope page.
5. Select the **Initiative definition** ellipsis to open the list of available definitions.
6. Search the initiative definitions list to find the **PCI v3.2.1:2018** definition. Select that initiative and then use the **Select** button.



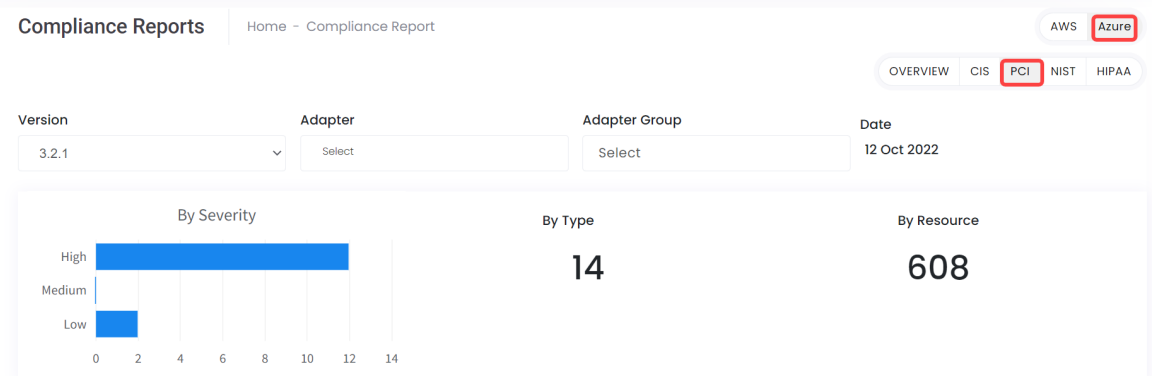
7. The Assignment name is automatically populated with the initiative name, but you can change it. You can also add an optional Description. The description provides details about this initiative assignment. Assigned by will automatically fill based on who is logged in. This field is optional, so custom values can be entered.

8. Leave policy enforcement *Enabled*.
9. Select **Review + Create** at the bottom of the page.
10. Review the selected options, then select **Create** at the bottom of the page.

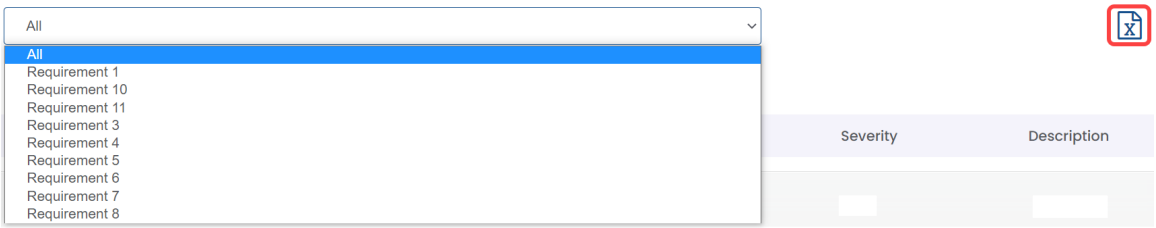
Now you must go to your CloudBolt CSMP account and synchronize the adapter related to your Azure subscription to view the PCI compliance reports on the CloudBolt CSMP.

View Azure PCI Report

1. Navigate to **Security > Compliance Reports.**
2. Click on **Azure > PCI**.
3. Select the version and the required adapters. The report for PCI will be displayed.



4. You can drill down further for compliance on module types using the drop down selection if required. Click the page icon to download the report in an excel format if required.



5. The details in the report are as follows:
   - Count by severity
   - Count by type
   - Count by resource

6. Further, the recommendations for individual rules, the status, severity and description are also available. Click the corresponding entry in the table to view further details on the status, severity and the description of the rule requirements.

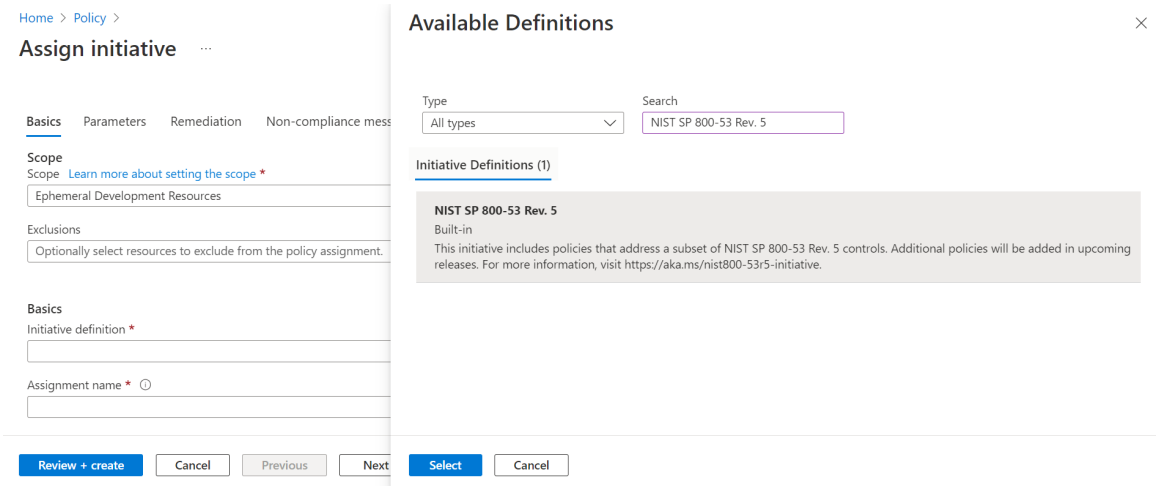
Azure Compliance report for NIST

The National Institute of Standards and Technology (NIST) influence and guide cybersecurity frameworks in the U.S. federal government. You can use CloudBolt CSMP compliance reports for NIST to ensure compliance with industry-agreed cybersecurity standards.

Prerequisites

To see the NIST CSF compliance for your Azure account, you must assign the *NIST SP 800-53 Rev. 5* policy compliance initiative definition.

1. Launch the Azure Policy service in the Azure portal by selecting All services, then searching for and selecting Policy.
2. Select **Compliance** on the left side of the Azure Policy page.
3. Select **Assign initiative** from the top of the **Policy - Compliance** page.
4. On the **Assign initiative** page, set the Scope by selecting the ellipsis and then selecting a subscription. Optionally, select a resource group. A scope determines what resources or grouping of resources the policy initiative gets enforced on. Then use the Select button at the bottom of the Scope page.
5. Select the **Initiative definition** ellipsis to open the list of available definitions.
6. Search the initiative definitions list to find the **NIST SP 800-53 Rev. 5** definition. Select that initiative and then use the **Select** button.

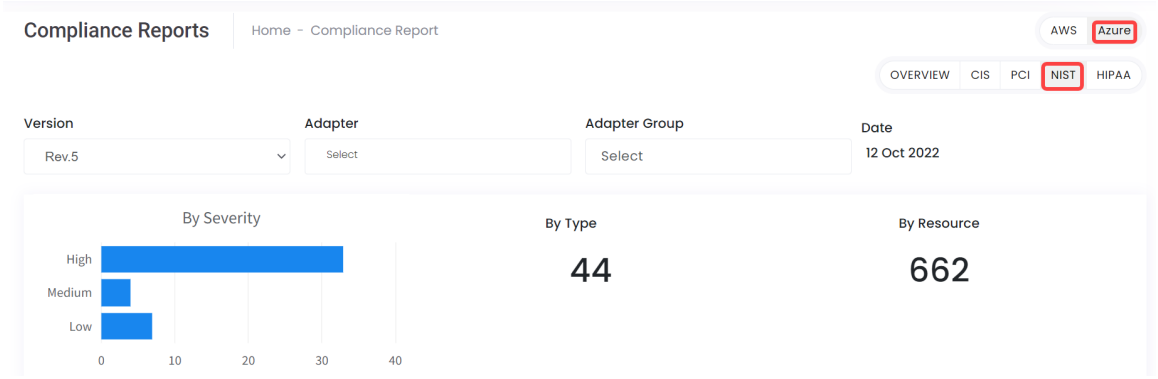


7. The Assignment name is automatically populated with the initiative name, but you can change it. You can also add an optional Description. The description provides details about this initiative assignment. Assigned by will automatically fill based on who is logged in. This field is optional, so custom values can be entered.
8. Leave policy enforcement *Enabled*.
9. Select **Review + Create** at the bottom of the page.
10. Review the selected options, then select **Create** at the bottom of the page.

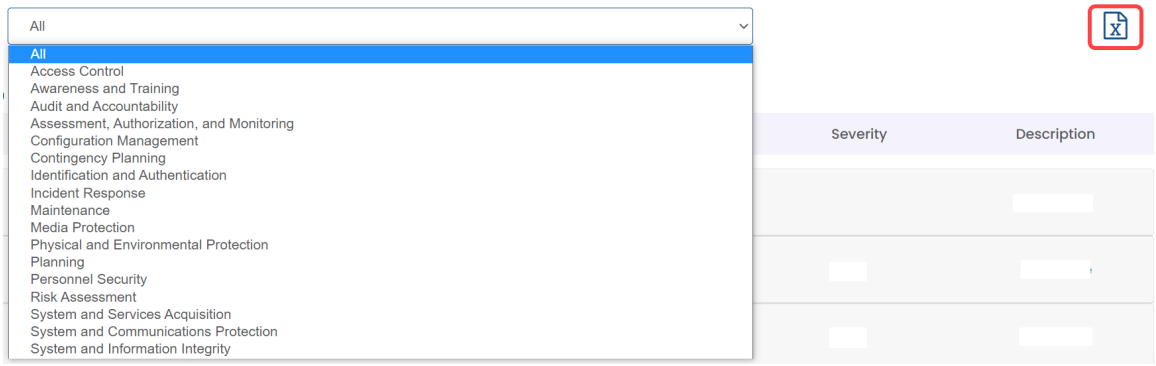
Now you must go to your CloudBolt CSMP account and synchronize the adapter related to your Azure subscription to view the NIST compliance reports on the CloudBolt CSMP.

View Azure NIST Report

1. Navigate to **Security > Compliance Reports.**
2. Click on **Azure > NIST**.
3. Select the version and the required adapters. The report for NIST will be displayed.



4. You can drill down further for compliance on module types using the drop down selection if required. Click the page icon to download the report in excel format if required.



5. The details in the report are as follows:
    - Count by severity
    - Count by type
    - Count by resource
6. Further, the recommendations for individual rules, the status, severity and description are also available. Click the corresponding entry in the table to view further details on the status, severity and the description of the rule requirements.

Azure Compliance report for HIPAA

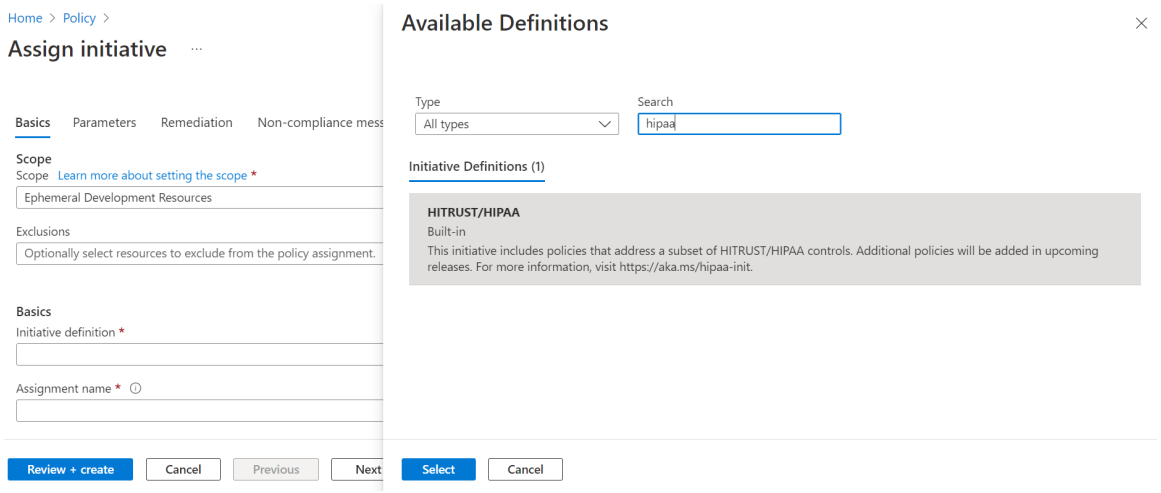
Health care organizations must instill a HIPAA-compliant culture throughout their operations in order to safeguard the confidentiality, security, and integrity of protected health information. You can use CloudBolt CSMP compliance reports for HIPAA to ensure compliance with industry-agreed compliant standards.

Prerequisites

To see the HIPAA compliance for your Azure account, you must assign the *HITRUST/HIPAA* policy compliance initiative definition.

1. Launch the Azure Policy service in the Azure portal by selecting All services, then searching for and selecting Policy.
2. Select **Compliance** on the left side of the Azure Policy page.

3. Select **Assign initiative** from the top of the **Policy - Compliance** page.
4. On the **Assign initiative** page, set the Scope by selecting the ellipsis and then selecting a subscription. Optionally, select a resource group. A scope determines what resources or grouping of resources the policy initiative gets enforced on. Then use the Select button at the bottom of the Scope page.
5. Select the **Initiative definition** ellipsis to open the list of available definitions.
6. Search the initiative definitions list to find the **HITRUST/HIPAA** definition. Select that initiative and then use the **Select** button.



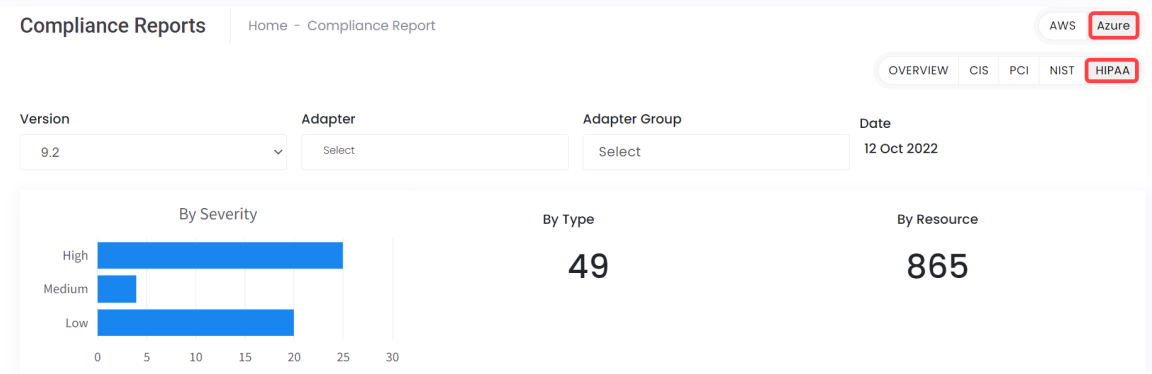
7. The Assignment name is automatically populated with the initiative name, but you can change it. You can also add an optional Description. The description provides details about this initiative assignment. Assigned by will automatically fill based on who is logged in. This field is optional, so custom values can be entered.
8. Leave policy enforcement *Enabled*.
9. Select **Review + Create** at the bottom of the page.
10. Review the selected options, then select **Create** at the bottom of the page.

Now you must go to your CloudBolt CSMP account and synchronize the adapter related to your Azure subscription to view the HIPAA compliance reports on the CloudBolt CSMP.

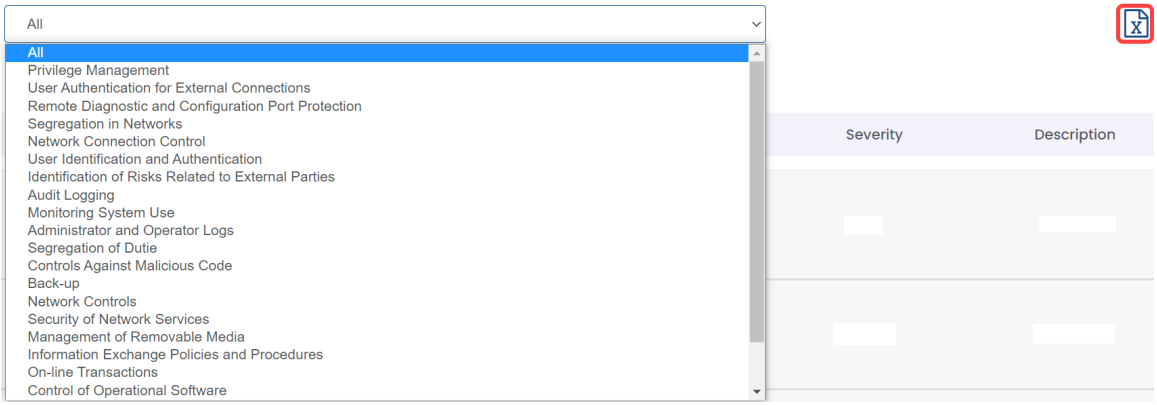
View Azure HIPAA Report

1. Navigate to **Security > Compliance Reports.**
2. Click on **Azure > HIPAA**.

3. Select the version and the required adapters. The report for HIPAA will be displayed.



4. You can drill down further for compliance on module types using the drop down selection if required. Click the page icon to download the report in excel format if required.

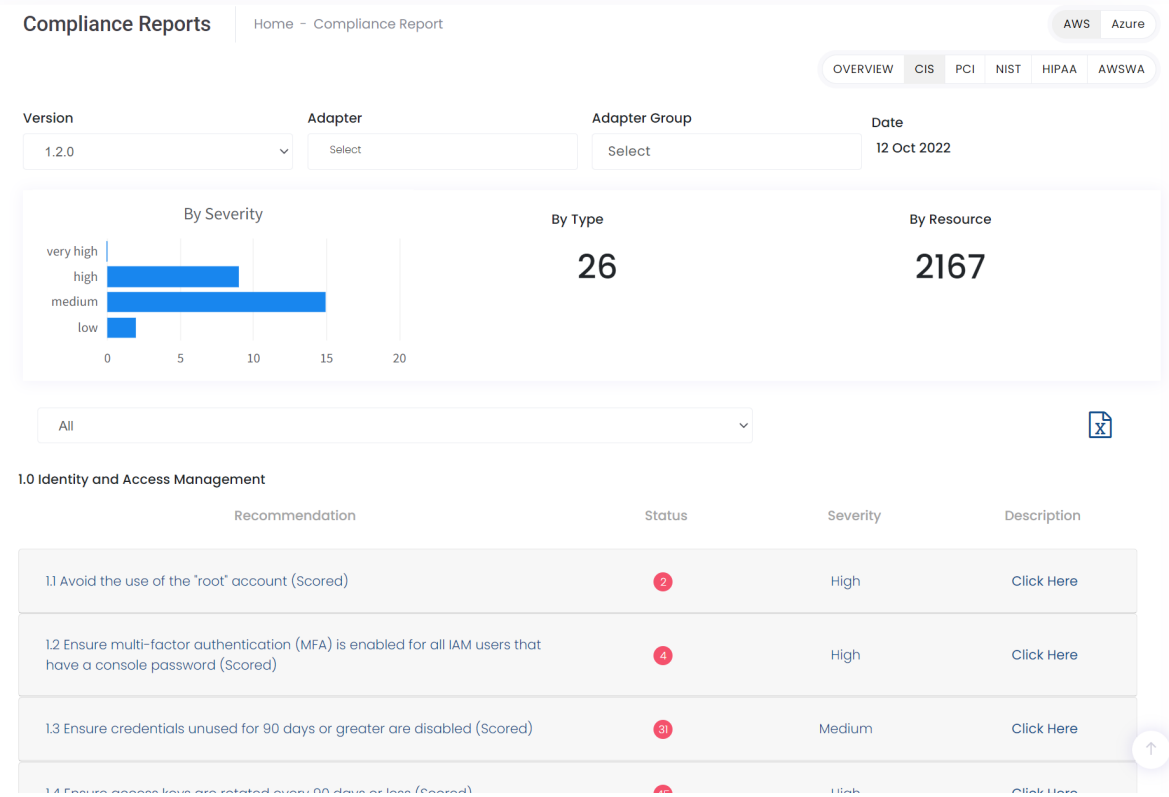


5. The details in the report are as follows:
    - Count by severity
    - Count by type
    - Count by resource
6. Further, the recommendations for individual rules, the status, severity and description are also available. Click the corresponding entry in the table to view further details on the status, severity and the description of the rule requirements.

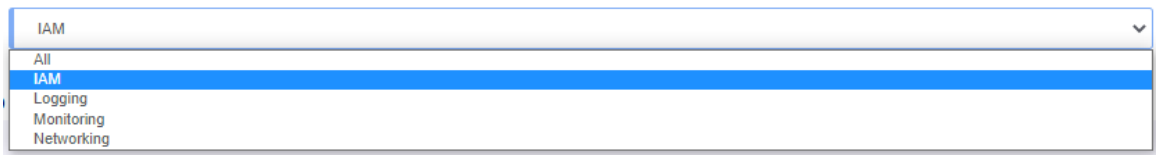
AWS Compliance report for CIS

CIS benchmarks are set by the Center for Internet Security (CIS) for a range of IT systems and products. You can use CloudBolt CSMP compliance reports for CIS to to ensure compliance with industry-agreed cybersecurity standards.

1. Navigate to **Security > Compliance Reports.**
2. Click on **CIS**.
3. Select the version and the required adapters. The report for CIS will be displayed.



4. You can drill down further for compliance on module types using the drop down selection if required.



5. The details in the report are as follows:
    - Count by severity
    - Count by type

- Count by resource

6. Further, the recommendations for individual rules, the status, severity and description are also available. Click the corresponding entry in the table to view further details on the status, severity and the description of the rule requirements.
7. Download the report in an excel format if required.

Similarly, you can click the tabs for **PCI, NIST, HIPAA, and AWSWA** as required to obtain the corresponding compliance reports.

Outcomes

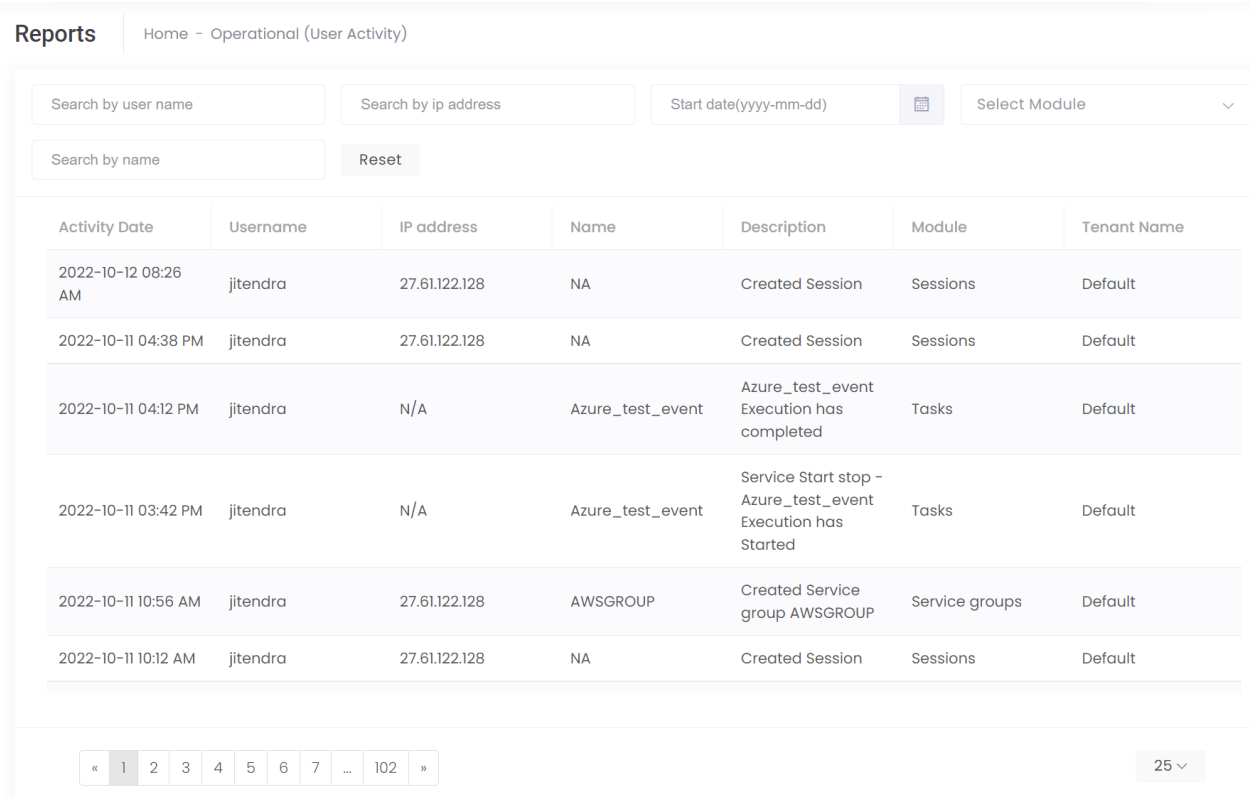
Use compliance reports by CloudBolt CSMP to track compliance of your organization to the required regulations.

8.4. User Activity

View all your user activity on one page.

Introduction

Here you can view all the actions that have been carried out by you in your CloudBolt CSMP account. If you are a **Default** tenant user, you can view actions performed by other sub-tenant users. **Tenant Name** column provides the tenant detail for specific activity. You can filter by username, IP address, start of activity date, module, and name.



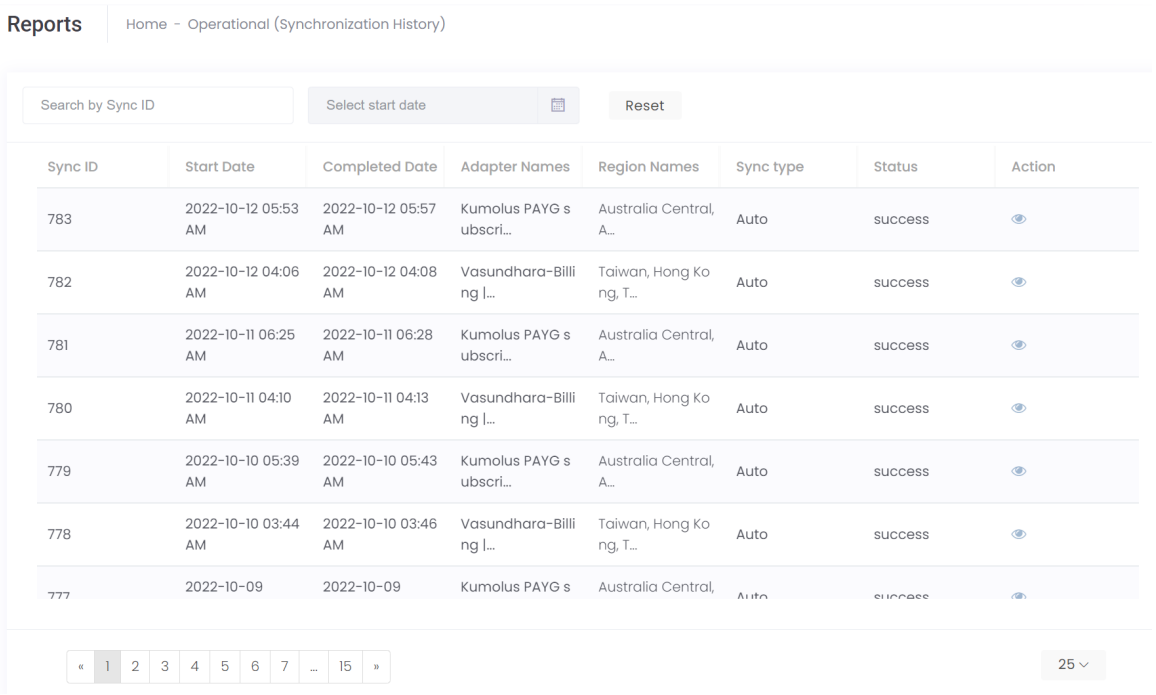
8.5. Synchronization History

View the synchronization activity for the adapters in your organization.

Introduction

You can synchronize the adapter groups to view the latest information from the instances connected to the adapters. This page displays all the details for the synchronization activities carried out by users to the various adaptors.

1. Navigate to **Security > Synchronization Activity**.
2. Enter the required details in the designated search box for Sync ID and select the date/period as required. The results are displayed.



9. Settings

9.1. General System

Learn about the General System section of CloudBolt Cost and Security Management.

Introduction

The General System section of CloudBolt Cost and Security Management covers the following topics. Jump to a topic to view information and setup steps for that function.

- Create a New Backup Policy for AWS
- Configure Service Adviser Telemetry
- Currency Conversion
- VMware Rate Card
- Billing Configuration
- Report Profiles
- Billing Configuration - AWS RI/SP
- Cost Allocation
- Purchase Order Configuration

Configure SAML for Single Sign-On

- Configure SAML for AWS
- Configure SAML for Azure AD
- Configure SAML for Google
- Configure SAML for Okta

9.1.1. Create a New Backup Policy for AWS

Learn how to create a Backup Policy in order to create a Backup Event in CSMP.

Introduction

A Backup Policy is required to create a Backup event for your AWS services such as server, database, root volume, EBS volume, volume snapshot, and RDS snapshot. The backup policy will allow you to store backups locally, or use the bunker facility to store it into another AWS account.

Access the Backup Policy Interface

Access the Backup Policy dashboard using one of the following methods:

Option 1: Click **Settings > General Configuration > Backup Policies.**

Option 2: From the **Schedule Event** page, click **Event Details tab > Backup Policies > Add Policy.**

Create a Backup Policy from the Backup Policies Dashboard

Use Option 1 from Access the Backup Policy Interface above to open the Backup Policies Dashboard.

1. In the **Backup Policies** dashboard, click **Add Policy.**
2. Fill out the **Add Backup Policy** form, then click **Save**.

Field name	Notes
Policy Name	Enter a name for the new Backup Policy. No spaces are allowed.
Choose	Select the AWS Services for which to create a backup as part of

Field name	Notes
services	this Backup Policy.
Backup Retention	Check the checkbox to set the retention period for your Backup, for a maximum of 365 days. If the checkbox is not checked, backup will be available in the account until you manually delete them.
Copy Tags	When checked, all relevant tags of the services will copy to their respective backups.
Additional Tags	When checked, you can add additional tags to the backups.
Bunker Option	With the bunker option enabled, you can avoid storing the backup copy in the source AWS account. Store your backup services in different AWS accounts depending on your Backup Adapter settings. You must have a Backup Adapter created within your CSMP instance.
Remove Source Copy	With **Remove Source Copy** enabled, the backup will store in the destination AWS account only.
Destination Adapter	Select a Backup Adapter when the Bunker Option is enabled. The AWS account linked with the Backup Adapter will store the Backup services.

Manage Backup Policies

Scheduling a Backup

1. On the **Backup Policies** dashboard, hover over the ellipsis [...] icon in the **Action** column.
2. Click **Schedule Backup.**
3. Follow the Schedule a Backup Event topic for steps.

Edit a Backup Policy

1. On the **Backup Policies** dashboard, hover over the ellipsis [...] icon in the **Action** column.
2. Click **Edit Policy.**
3. Edit the desired fields.
4. Click **Update** to save the changes.

Delete a Backup Policy

1. On the **Backup Policies** dashboard, hover over the ellipsis [...] icon in the **Action** column.
2. Click **Delete Policy.**
3. Click **OK** to delete the backup policy.

9.1.2. Configure Service Adviser Telemetry

Learn how to configure various service telemetry to be considered by CloudBolt CSMP service adviser module for service recommendations.

Introduction

CloudBolt CSMP Service Adviser is a cloud consultant that analyzes your cloud resource usage telemetry categorizes the resources as unused, idle, unassociated, unattached, and unoptimized. Using this service advice, you can improve the cost effectiveness of your cloud. The **Configure Service Adviser** option allows you to customize the cloud telemetry settings that the service adviser will consume. The CloudBolt CSMP service adviser will use the new telemetry configuration to identify the services as unused or unoptimized.

Update Service Adviser configuration for Idle/Unused resources

Use this procedure to update the telemetry settings for your cloud resource to consider unused or unoptimized services.

1. Log in to your CloudBolt CSMP portal.
2. From the CloudBolt CSMP header, go to **Settings > Configure Service Adviser**.
3. **Service Adviser Configuration** page appears.
4. Select your cloud provider in the upper right-hand corner.
5. Select **Idle/Unused** to update the telemetry for underutilized resources.
6. Select the cloud **resource** type for which you want to update the telemetry values.
7. Click to start updating the telemtery values.
8. Update the operator symbol and values for each telemetry as per your requirement.

9. In the **Time Range** drop-down list, select the duration to consider the telemetry values for the service adviser.

   The time range selection option is restricted to few services or service types only.

10. In the **Period** drop-down list, select the time granularity to analyze the telemetry values for the set time range.

    The period selection option is restricted to few services or service types only.

    Evaluating Algorithm

    To evaluate the services based on previously updated telemetry values (metric data), we use the time range and period specified earlier. The period value is employed to measure the average of the set telemetry. The time range value is applied to look at the stability of the average telemetry value at a set period. Once the average of the set telemetry value for a cloud resource at a defined period is maintained continuously for the specified time range, the resource will be evaluated for service recommendation.

    For example, you have set following telemetry value for Idle VM:
    Percentage CPU < 2%
    Network In Total < 5 MB
    Network Out Total < 5 MB
    Time Range: 2 Months
    Period: 6 Hours
    The evaluating algorithm will check the average percentage CPU utilization, average of total network in, and average of total network out at the granularity level of six hours for the last two months. When the average of all three telemetry values at each six-hours duration is maintained as specified continuously for the last two months, the resource will be categorized for recommendation.

11. In the **Statistic** list, select the telemetry values (metric data) aggregations method over the specified time range and period.
    a. **Default (Average)** identifies an AWS EC2 or RDS as underutilized when all the defined metrics parameters matches with actual usage metric data for the entire time range specified.

b. **p95.0** identifies an AWS EC2 or RDS as underutilized when all the defined metrics parameters matches with actual usage metric data for at least 95 percent of the time range specified and 5 percent of the time range actual usage metric data is higher than the defined metrics.

The statistic selection option is available only for AWS idle EC2 and RDS service telemetry set up page.

12. In the **IDLE Services** section, select the number of days to consider service as IDLE.

Idle services days selection is applicable only for EC2 instances. As compared to other services used by an organization, idle status for an EC2 is a bit more dynamic and different. It is normal for EC2 instances to have one or two days of under utilization by design as workloads change. Accordingly, the value set for the "IDLE Service Days" reflects for how many days your organization considers your EC2 fleet truly "IDLE" and would only show the EC2 instances that meet that threshold in service advisor.

13. Click **Save**.
14. To set the CloudBolt CSMP default telemetry as service adviser configuration, click **Reset**.

Update Service Adviser configuration for Unoptimized resources

1. Log in to your CloudBolt CSMP portal.
2. From the dashboard header, go to **Settings > Configure Service Adviser**.
3. **Service Adviser Configuration** page appears.
4. Select your cloud provider in the upper right-hand corner.
5. Select **Unoptimized** to update the telemetry for right-sizing considerations.
6. Select the cloud **resource** type for which you want to update the telemetry values.
7. Click to start updating the values.
8. Select an operator and enter value for the required metrics.

9. In the **Time Range** field, enter a value and select a unit from the dropdown menu. This duration will be used to assess the entered telemetry values.
10. In the **Period** field, enter a period value and select a unit from the dropdown menu. This will determine the average telemetry values assessed over the specified time range.
11. Update the options as required.
    a. For AWS EC2 right sizing, using the option button for Instance Class, you can decide whether to accept or reject right-sizing suggestions across each instance class in Amazon EC2. Choose the desired instance class from the "Exclude Instance Classes from Recommendation" list if you want to exclude a certain EC2 instance type from the list of recommended instances. You can use 'All AMD' and 'All Graviton' checkboxes to select all the AMD and Graviton processor-based EC2 instance classes in the "Exclude Instance Classes from Recommendation" list. Use the "Shift" key to select multiple classes at once. You can turn on or off using the "Enable/Show Default Recommendation" option to see or conceal the EC2 rightsizing recommendations based on the pre-defined CloudBolt CSMP algorithms for EC2 right sizing. Additionally, you may choose to have EC2 right sizing recommendations for idle running/stopped instances.
    b. For Azure VM and RDS right sizing, configure the usage metric as required. The right sizing recommendations would be within the same type as current VM and RDS type.
12. Click **Save**.
13. To set the CloudBolt CSMP default settings as service adviser configuration, click **Reset**.

Synchronize Normal adapter

Once the Service Adviser Configuration has been updated, you must synchronize the relevant Normal adapter to apply the new telemetry to the service adviser APIs. If you fail to synchronize the relevant normal adapter(s), the CloudBolt CSMP Service Adviser will keep

populating the Idle/Unused and Unoptimized service recommendations as per the previously synchronized telemetry.

Use this procedure to synchronize the normal adapters with new telemetry.

1. Click **Quick Actions** icon in the header.
2. Click **Synchronization** option.
3. **Synchronization** page appears.
4. In the **Provider Type** list, select your cloud provider name.
5. In the **Choose Adapter** list, select the appropriate Normal adapter whose Service Adviser Configuration you want to update.
6. Click **Sync now**.

After the synchronization is completed, the Service Adviser recommendations would be updated according to the new Service Adviser Configuration telemetry settings within 24 hours.

Outcomes

The advice from the CloudBolt CSMP service adviser will be based on your modified telemetry settings.

9.1.3. Currency Conversion

Learn how to use the Currency Conversion feature in CloudBolt Cost and Security Management Platform.

Introduction

The Currency Conversion feature is a way to enable your preferred currency on the Cost and Reporting areas of CSMP. **Currency Conversion is enabled on a per-Tenant basis.** When Currency Conversion feature is enabled for a tenant, the tenant users' can set user preferred currency enabling their own preferred currency on the Cost and Reporting areas of CSMP.

When Currency Conversion is enabled for a Tenant, all the Cost details for that Tenant's accounts (linked with Shared Billing or Normal Adapters) will convert to the selected currency.

Note: This feature is currently available for AWS, Microsoft Azure, and GCP cloud service providers only. It is applicable for all CSMP modules except the Budget module. You can also download your Cloud cost reports details in your preferred currency.

Important:

If a user has set user preferred currency, the cost reports will be displayed in their preferred currency, assuming that a currency conversion rule exists for the selected preferred currency. If a user has not set user preferred currency for their profile, the cost reports will follow the tenant level currency conversion settings, assuming that a valid currency conversion rule exists for each cloud provider.

Glossary of Terms

- **Source Currency:** The currency set on Cloud Billing account.
- **Target / Preferred Currency:** The currency you would like your Cloud Billing Costs to appear in on CSMP.

Adding the Target Currency Conversion Rule

1. In CloudBolt CSMP, click **Settings [] > General System > Currency Conversion.**
2. On the **Currency Conversion** interface, click the cloud provider tab for which you want to add currency conversion rule and click **Add New.**

   Note: If you want to view your cloud expenses in preferred currency, you'll need to create a conversion rule for each cloud provider. If you add a currency conversion rule on the Azure tab only, for example, the cost reports for AWS will still be in source currency.

3. On the **Currency Selection** tab, select a **Source Currency** and a **Target Currency. Choose two different values here.**
4. Click **Next.**
5. Enter the exchange ratio of your Source Currency to the Target Currency for all of the months available on the Currency Conversion tab.
   - A maximum of six digits are allowed before and after the decimal. Ensure that the exchange ratio is more than zero.

Use the Action column to Edit, View, or Delete a Currency Conversion.

Enabling Currency Conversion for a Tenant

Enable the Currency Conversion for each Tenant in order to see cost details related to its Billing and Normal Adapters in their preferred currency. If multiple Tenants share the same Adapters or Adapter Groups, all the Tenants must have Currency Conversion enabled to get the cost details in their preferred currency.

1. Click **Settings [] > Manage Tenants.**
2. If adding a new Tenant, select **Yes** for **Enable Currency Conversion** and select a Preferred Currency.
3. For existing Tenants, click the ellipsis [...] icon under **Action,** then **Edit Tenant**.
4. Select **Yes** for **Enable Currency Conversion** and select a Preferred Currency.
5. Click **Update.**

Outcomes

To see the effect of the Currency Conversion feature for your Tenant, go to your Dashboard. Select the Tenant for which the Currency Conversion is enabled.

All your dashboard charts will show the cost values in the currency selected for conversion while creating or updating the Tenant. For example, with Euro (EUR) selected as the Conversion Currency, the dashboard cost widgets will display values in Euro.

9.1.3.1. Set User Preferred Currency

Learn how to set the User Preferred Currency in CloudBolt Cost Management.

Introduction

User Preferred Currency is the currency that is applied for all the Cloud Cost Reports accessed by the User in CSMP, including favorite and forecast reports.

By default, all your Cloud Costs are displayed in your Cloud provider's currency settings.

Using the Preferred Currency option in CSMP, each tenant user can convert the Cloud costs as per their Preferred Currency type. Users can also switch to their Preferred currency to compare those cost values.

Prerequisites

- The Currency Conversion feature must be enabled for your Tenant.
- You must have added a Currency Conversion rule to convert your Source currency to your Preferred Currency. See Adding the Target Currency Conversion Rule

Glossary of Terms

- **Source Currency:** The currency set on your Cloud billing account.
- **Target / Preferred Currency:** The currency you would like to use on the CSMP to calculate your Cloud billing costs.

Limitations:

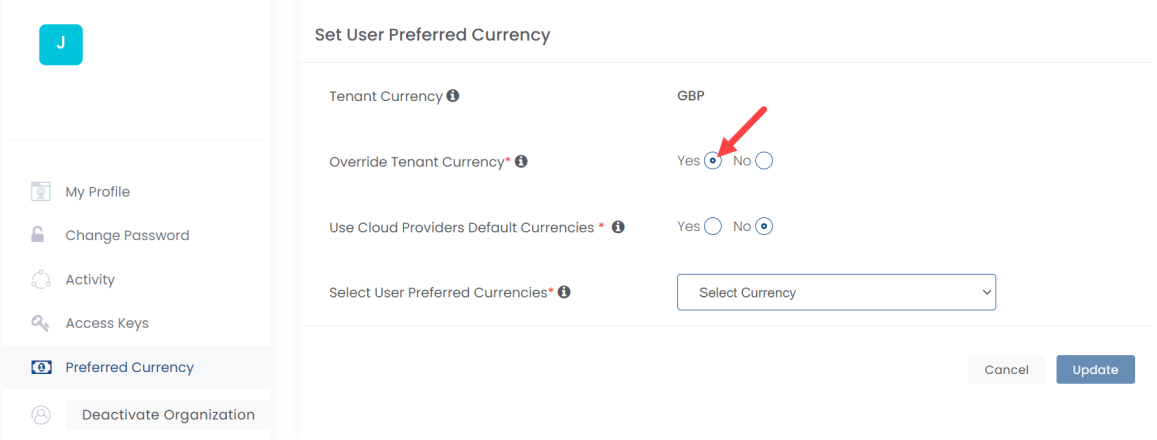
1. The Currency Conversion feature is currently available for AWS and Microsoft Azure services only.
2. The Currency Conversion feature will convert cost values for the following features:
    - Dashboard
    - Overview
    - Cost Report

- Export .CSV and .PDF
- Favorite Report
- Favorite Report Email
- Forecast Report

Enable User Preferred Currency

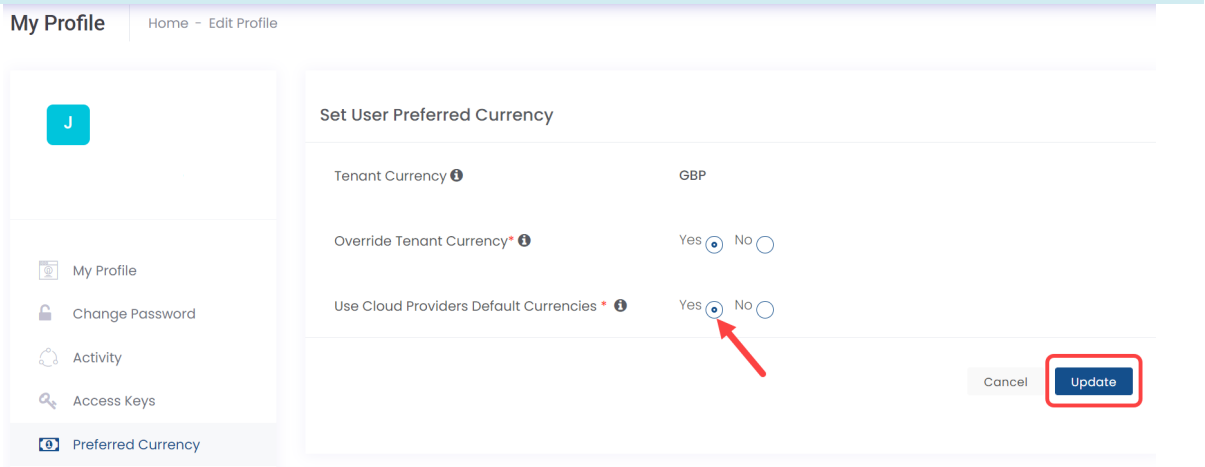
1. In CloudBolt CSMP, click on your username icon at the top right of the homepage and then click **Profile**.
2. From the left navigation panel on the **My Profile** page, click **Preferred Currency**.

   Note: If your administrator has disabled the currency conversion option for your tenant, you see an error message on your Preferred Currency page similar to: "You cannot set an user preferred currency because currency configuration is disabled for your Tenant. Please request your administrator to enable currency conversion for your tenant and then try again."
3. By default, the **Override Tenant Currency** option will be selected as **No**. When the **Override Tenant Currency** option is turned off, the cost report will be displayed in the tenant's preferred currency, provided your tenant has been successfully enabled for currency conversion. The user will still see cost reports in the Source Currency if tenant currency conversion is not enabled.
4. on the **Set User Preferred Currency** pane, select **Yes** against the **Override Tenant Currency** option to see cost reports in your preferred currency.

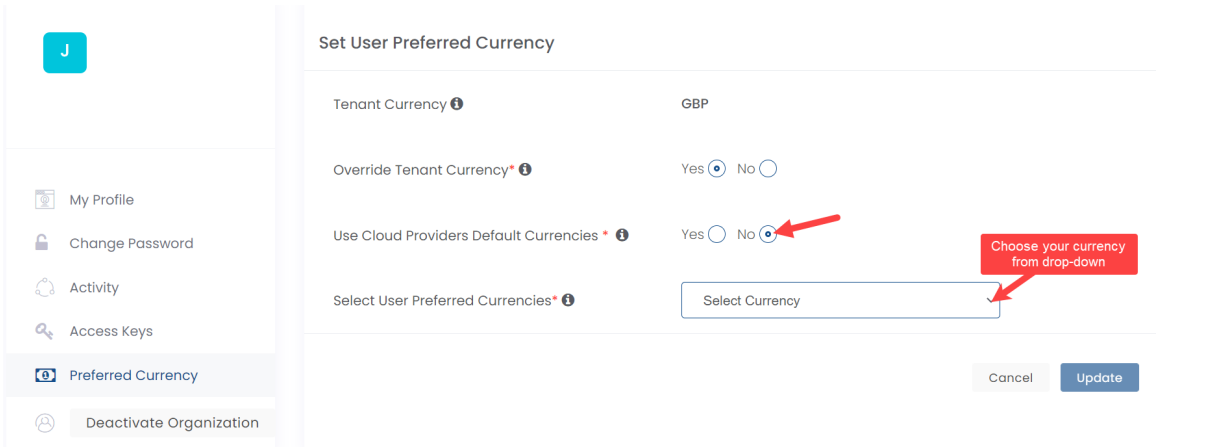


5. Select **Yes** against the **Use Cloud Providers Default Currencies** option if you want to see all your cloud cost reports in your cloud provider's **Source Currency** settings on the CloudBolt CSMP. Click **Update**. You can skip this step if you wish to see your cloud expenses in a different currency of your wish.

Note: To see the cloud costs in your source currency, you must enable the **Use Cloud Providers Default Currencies** option. By default, the Use Cloud Providers Default Currencies option will be disabled on the **Set User Preferred Currency** panel.



6. You must choose **No** against the **Use Cloud Providers Default Currencies** option to establish your own preferred currency. Choose your desired currency from the **Select User Preferred Currencies** list. Make sure that your CloudBolt CSMP's basic configuration settings include a Currency Conversion rule for your desired currency. If your selected currency misses a currency conversion rule, it will not appear in the list of **Select User Preferred Currencies**.



7. Click the **Update** button to view your cloud cost values in your preferred currency.

Troubleshooting

If you see an error message similar to this while activating your preferred currency on the **Select User Preferred Currency** panel: “You cannot set an user preferred currency because currency configuration is disabled for your Tenant. Please request your administrator to enable currency conversion for your tenant and then try again.“, you must check with your administrator to activate the currency conversion feature for your tenant.

Outcomes

All your dashboard widgets will show the cost values in your preferred currency.

9.1.4. VMware Rate Card

Learn how to configure the rate card for provisioning VMWare services cost.

Introduction

CloudBolt CSMP allows you to create rate cards on the pricing strategy determined by VMware Operations Cloud administrator to calculate the cost associated with your VMware virtual infrastructure. You can assign rate cards to VMware adapters. With the aid of the rate cards, you can determine the cost of any resource that is supported by CloudBolt and is present in your VMware virtual environment.

Prerequisites

- VMWare Data Collector must have been setup successfully. See VMware Data Collector Configuration.
- VMWare must have been setup in CloudBolt CSMP
- User must have admin privileges to setup the rate card.

Create VMware Rate Card

After successful creation of a VMware adapter with CloudBolt CSMP, use below procedure to set up your VMware rate card in the CloudBolt CSMP.

1. In the CloudBolt CSMP, navigate to **Settings [] > General System > Configure VMWare Rate Card**.
2. Click **Create** to setup a new rate card.
3. Fill out the **Basic Details** and click **Next**.
    - **Adapter:** Choose an adapter to which this rate card will apply
    - **CPU cost (per core):** Enter the agreed CPU per core cost for the VMware virtual machine

- **Memory cost (per GB):** Enter the agreed Memory per GB cost for the VMware virtual machine
- **Disk cost (per GB):** Enter the agreed Disk per GB cost for VMware disks. Enter the highest common factor across all the different disk rates if your disk rates vary. For varying disk rates, you must use Disk Multipliers tab to update the rates

4. Fill out **Disk Multipliers** details and click **Next**.
    a. When varying disk rates are applied to you, select the disk name in the left side box and enter the multiplier value in the right side box. Use plus [+] icon to add more lines for disk multipliers.
    For example, you have four disks D1, D2, D3, and D4 with rates as $5, $10, $15, and $10 per GB respectively. The highest common factor for the above rates is five. You must enter five in the Disk cost (per GB) field. Now in the Disk Multipliers tab you must add two lines, one for disk D2 and D4 with multiplier value as 2, and another line for disk D3 with multiplier value as 3.
5. Fill out **Rate Time** and **Currency Unit** details.
    - **Rate time unit:** Select a rate time unit
    - **Rate currency unit:** Set the rate currency unit correctly. You cannot change it later.
6. Click **Save**.

Important:

You can create only one rate card for a specific adapter. If you try to create a rate card using an adapter that is already associated with another rate card, an error message will display similar to: Adapter id is already taken.

Manage Existing VMware Rate Cards

1. In the CloudBolt CSMP, navigate to **Settings [] > General System > Configure VMWare Rate Card**.
2. A list of all the existing VMware rate cards will display.

3. You can filter the rate card by adapter name.
4. You can click ‘View’ link available under the Disk Multiplier column to see multipliers detail.
5. Click the ellipsis [...] icon under the Action column to edit and see update history of a rate card.

Outcomes

You have learnt how to create and manage a rate card for VMware adapters.

9.1.5. Billing Configuration

Learn how to create and manage a billing configuration to add margins and discounts to your cloud cost.

- Introduction
- Glossary of Terms
- Required Permissions
- Create AWS Billing Configuration
- Create Azure Billing Configuration
- Create Azure CSP Billing Configuration
- Create GCP Billing Configuration
- Create VMware Billing Configuration
- View Billing Configurations
- Billing Configuration Usage
- Troubleshooting
- Outcomes

Introduction

Maintaining the cloud spend for dozens of your clients as a Managed Service Provider (MSP) or Cloud Solution Provider (CSP) or resellers, or Enterprise distributors might result in unexpected costs at the end of the month. The CloudBolt CSMP provides a billing solution including a number of features focused on cloud billing administration for MSPs and resellers or distributors. The CloudBolt CSMP billing configuration feature will support you to enforce various chargeback rules by adding margins and discounts percent or charges as a flat fee or charges for each hour an instance is running in cloud environment, or a combination of any of these to the overall cloud cost from the provider.

Glossary of Terms

Billing Cycle: A new billing cycle starts from the first day of each month.

Child Organisation: It represents the CloudBolt CSMP accounts of resellers or customers within the MSP or CSP model where a distributor or reseller (tier1 or tier2) manages a group of their customers using CloudBolt CSMP platform.

Cloud Solution Provider (CSP): It is an Azure term and is similar to MSP but will manage only Azure cloud resources.

Customer/Customer Organisation: It represents the CloudBolt CSMP accounts of a distributor's or reseller's customer.

Discount: It is the percent of the actual cloud cost, which will subtract from the actual cloud cost to get the net cost.

Flat: When flat option is selected, the margin and discount will apply on the entire value of your cloud expense for the service type.

Managed Service Provider (MSP): It manages a huge number of client cloud resources, provides support, and charges the customer for additional services. MSPs may manage resources from a variety of sources, including AWS, Azure, Google Cloud Platform, VMware, and private clouds, among others.

Margin: It is the percent of the actual cloud cost, which will add to the actual cloud cost to get the net cost.

Net cost: It is the sum of actual cloud cost, margin value minus the discount value.

Parent Organisation: These are the CloudBolt CSMP accounts of large or small customers who are using CloudBolt CSMP to manage their cloud platform spends using cost optimization and actionable insights. In this publication, a parent organisation can be a MSP or CSP or a reseller or distributor who has signed up using the cloudbolt.app signup URL. Parent organisation can have multiple reseller or customer as child organisation.

Reseller Organisation: These are the CloudBolt CSMP accounts created by a distributor parent organisation.

Spend Greater Than: It is the amount specified in your cloud billing currency. When calculating margin and discount, any expenditures above this amount will be taken into account.

Required Permissions

You must have following permissions to create a billing configuration:

- A parent or reseller organisation account user with administrator role having permissions to view, create, modify, and delete Billing Configuration module.
- Billing adapter for the cloud provider's account for which a billing configuration is required.

Create AWS Billing Configuration

Use this procedure to create a billing configuration for AWS.

1. Log in to your CloudBolt CSMP account.
2. Click the **Settings icon [] > Billing Configuration**.
3. On the billing configuration page, select the AWS tab as cloud provider and then click **+ Create**.
4. Create AWS Billing Configuration page appears.
5. Fill the **Basic Details** tab and then click **Next**.

Field name	Notes
Name	Enter a name for your billing configuration. Name must be between three and 50 characters. It can contain any letters from a to z and any numbers from 0 through 9.
Description	Enter a valid description for the billing configuration.
Billing Adapter	Select the billing adapter for which billing configuration is required.
Metric for Margin/Discount Calculations	It is the metric which will be used to calculate margin and discount. To change the metric type here, you need to update your choice in the 'Select Metric for Margin/Discount Calculations' field available in the other configuration tab by editing the above selected billing adapter. In this article, we are considering customer cost as the metric for margin/discount calculations.

Field name	Notes
Do you want to enter margin and discount amounts in your customer currency?	Select 'Yes' to enter margin and discount amounts in your customer currency in 'Fixed', 'Service Type', and 'Usage Hour' tabs. Note: This option would be available only when you have a currency conversion rule available for your customer currency to the selected billing adapter currency. For example, you want to enter margin and discount amounts in your customer currency i.e. AUD. Your billing adapter currency is USD. Then you must have a currency conversion rule available for AUD to USD to see this option available in your billing configuration page.
Select Customer Currency	Select the currency in which you want to enter margin and discount amounts in 'Fixed', 'Service Type', and 'Usage Hour' tabs.
Accounts	Select the associated accounts of the previously selected billing adapter for which billing configuration required. By default, all the accounts will be selected. If you select partial accounts, you can select a maximum of 99 accounts. If your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled, you can create billing configuration using either the **Accounts** option or the **Adapter Group option**, but not both simultaneously.
Adapter Group	Select the adapter group for which billing configuration is required. This option is available only when you select partial or none of the accounts linked with the previously selected billing adapter. The billing configuration would not process various margins and discounts for those AWS accounts that are part of a selected AWS adapter group that has been manually created based on an account tag other than a customer tag key, and the 'Select All' option has been used to select all the accounts of the selected tag type. Such groups must be governed by a group policy for AWS groups in order to properly process the billing configuration data. If your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled, you can create billing configuration using either the **Accounts** option or the **Adapter Group option**, but not both simultaneously.
Enable Reoccurring (i.e. Start	The **Enable Reoccurring** checkbox allows you to apply the billing configuration set for the **Start Month** automatically to all subsequent months. By selecting this checkbox, you only need to

Field name	Notes
month's config will be applied for all subsequent months)	input the **Start Month**. The **Expires On** field will be hidden, as it is not required for recurring billing configurations. Once enabled, the term "**reoccurring**" will be appended to the **Start Month** across various configuration tabs, including **Percentage of Spend**, **Fixed**, **Service Type**, **Usage Hour**, and **Usage Quantity Multiplier**, indicating that the billing configuration applies to all future months. The Enable Reoccurring checkbox is accessible only if your CSMP account has the '**awsbc_enable_reoccurring_for_all_subsequent_months**', feature enabled. If both the **awsbc_based_on_daily_daterange** and **awsbc_enable_reoccurring_for_all_subsequent_months** features are enabled on your CSMP account, the **Date Range Type for Percentage of Spend** option will be disabled when creating a new configuration. This allows you to create recurring billing configurations without using daily date ranges. Additionally, if you attempt to edit an existing configuration created with a daily date range, the **Enable Reoccurring** checkbox will not be available.
Start Month	Select a start month for the billing configuration. Start month can be a past, current, or future month.
Expires On	Select a terminating month for the billing configuration. It can be a past month, but cannot be less than start month.
Billing Config Types	Select a methodology for this billing configuration. Based on your selection, only the relevant tabs associated with the chosen methodology will be displayed, simplifying the configuration process. By default, the "Percentage of Spend" option is pre-selected.
Margin / Discount Percentage based on	This option allows you to select the dimensions on which you wish to calculate margin and discount values. The default selection is Service. The available dimension options for this setting depend on the features enabled in your CSMP account. You can choose multiple dimensions to calculate margins and discounts based on your specific needs: ○ **Service**: Select this option to calculate margin and discount values at the AWS service level. This means the calculations will be based on overall service usage. ○ **Billing Entity**: Select this option to calculate margin and discount values at the AWS billing entity level. The margin and discount calculations, as specified in the Billing Entity sub-tab of the Percentage of Spend tab, will be based on different billing entity types.

Field name	Notes
	○ **Item Description**: Choose this option if you prefer to calculate margin and discount values based on specific item descriptions for a given service type. ○ **Usage Type**: Choose this option if you prefer to calculate margin and discount values based on specific usage types for a given service type. ○ **Operation**: Choose this option if you prefer to calculate margin and discount values based on specific operation types for a given service. ○ **Charge Type**: Choose this option if you prefer to calculate margin and discount values based on specific charge types. This option is available only if you have selected the 'Percentage of Spend' option in the **Billing Config Types** field and your CSMP account has one or more of the following features enabled: 'awsbc_percentage_of_spend_based_on_service_or_item_description', 'awsbc_percentage_of_spend_based_on_billing_entity', 'awsbc_percentage_of_spend_based_on_usage_type', 'awsbc_percentage_of_spend_based_on_operation', or 'awsbc_percentage_of_spend_based_on_charge_type'.
Date Range Type for Percentage of Spend	Select a method to define the margin and discount percentages entered in the Percentage of Spend tab on either a monthly or daily basis. If the **monthly** option is selected, you will need to enter a single margin and discount percentage that applies to the entire month. In contrast, the **daily** option allows you to specify individual dates or a range of dates, along with the corresponding margin and discount percentages for those days. This option is available only if you have selected the 'Percentage of Spend' option in the **Billing Config Types** field and your CSMP account has the 'awsbc_based_on_daily_daterange', feature enabled. This option is available only when you select "Service," "Billing Entity," and/or "Item Description" for the '**Margin/Discount Percentage based on**' settings above. If both the **awsbc_based_on_daily_daterange** and **awsbc_enable_reoccurring_for_all_subsequent_months** features are enabled on your CSMP account, the **Date Range Type for Percentage of Spend** option will be disabled when creating a new configuration. Additionally, if you attempt to edit an existing configuration created with a daily date range, the **Enable Reoccurring** checkbox will not be available. However, you will still be able to edit the configuration with the **Date Range Type for**

Field name	Notes
	Percentage of Spend option enabled.
Usage Quantity Multiplier Margin based on	This option allows you to select the dimensions for which you wish to apply margin multipliers. The available dimension options for this setting depend on the features enabled in your CSMP account. You may select multiple dimensions to calculate margins using the margin multipliers: ○ **Item Description**: Choose this option if you wish to enter a margin multiplier for specific item descriptions of a service type. ○ **Usage Type**: Choose this option if you wish to enter a margin multiplier for usage types. ○ **Operation**: Choose this option if you wish to enter a margin multiplier for operation types of a service type. ○ **Charge Type**: Choose this option if you wish to enter a margin multiplier for charge types. This option is available only if you have selected the 'Usage Quantity Multiplier' option in the **Billing Config Types** field and your CSMP account has one or more of the following features enabled: 'awsbc_usage_quantity_multiplier_based_on_item_description', 'awsbc_Usage_Quantity_Multiplier_based_on_usage_type_item_description', 'awsbc_usage_quantity_multiplier_based_on_usage_type', 'awsbc_usage_quantity_multiplier_based_on_charge_type', or 'awsbc_usage_quantity_multiplier_based_on_operation'.
Distribute Fixed Margin/Discount to	Choose a method for distributing the margin and discount values that you will enter under the Fixed tab. If you choose the **specific day of month** option, the margin and discount amounts will be applied on the first day of the month for all accounts linked to this billing configuration. In contrast, the **all days of month** option will distribute the margin and discount amounts proportionally across each day of the month, based on the value for the selected **metric for margin and discount calculations** for that day. This option is available only if you have selected the 'Fixed' option in the **Billing Config Types** field and your CSMP account has the 'awsbc_specific_day_of_month_fixed_margin_discount', feature enabled.

6. Fill the **Percentage of Spend** tab. This tab is visible only when the 'Percentage of Spend' option is selected in the **Billing Config Types** field on the Basic Details tab. The margin and discount percentages entered in this tab will apply in real-time as percentage-based adjustments. These percentages are applicable to the metric specified for margin and discount calculations on the Basic Details tab; in this case,

that metric is the Customer Cost.

Features of Percentage of Spend:Steps to Enter Margins and Discounts Percentages:

Note:

- Ensure all values entered for the Spend greater than option are in your AWS billing currency.
- If your account has the 'aws_support_for_cardinality_based_query' feature enabled, only the flat margin and discount percentages will apply to all services/resources within the selected accounts. If the Adapter Group option is used, the margin and discount apply only to services/resources that meet the tag settings of the group.

Example Scenario:

If you select all available options for "Margin/Discount Percentage Based On" (i.e., service, billing entity, item description, usage type, operation, and charge type), the "Percentage of Spend" tab will display sub-tabs for each.

For instance, you have:

Based on this configuration:

Algorithm to calculate monthly/daily margin and discount amount to display in cost report

Using Flat percent concept

Monthly/Daily Margin = Customer cost * Flat Margin %

Monthly/Daily Discount = Customer cost * Flat Discount %

Using Spend greater than concept

c. For daily margin/discount calculation:

Step 1: Calculate spend percentage for the day using below formula

Spend percentage = Amount entered in the box adjacent to spend greater than / specified month's total cost

Step 2: Calculate daily margin/discount

Margin = (Daily customer cost - (Daily customer cost * Spend percentage)) * Margin %

Discount = (Daily customer cost - (Daily customer cost * Spend percentage)) * Discount%

d. For monthly margin/discount calculation:

Step 1: Calculate spend percentage for the month using below formula

Spend greater amount = Specified month's total cost - amount entered in the box adjacent to spend greater than

Step 2: Calculate monthly margin/discount

Margin = Spend greater amount * Margin %

Discount = Spend greater amount * Discount %

e. **Service-Specific Configurations**
   - The tab includes options for specifying margins and discounts at the service level through dedicated sub-tabs:
     - Percentage of Spend - Service Margin
     - Percentage of Spend - Service Discount
   - This is the default option available.

f. **Thresholds for Margin and Discount Application**
   - You can set margins and discounts to apply only when costs exceed a specified threshold using the "Spend greater than" option. This ensures that only costs above a certain level are considered in calculations.

g. **Apply Percentage Settings for a Particular Month to All Future Months**

- You can apply margin and discount settings for a particular month to future months by selecting the "Apply to future Months" checkbox.

h. **Billing Entity-Specific Configurations**

- If your CSMP account has the 'awsbc_percentage_of_spend_based_on_billing_entity' feature enabled, you can configure margins and discounts at the billing entity level. This includes:
  - Percentage of Spend - Billing Entity Margin
  - Percentage of Spend - Billing Entity Discount

i. **Item Description-Specific Configurations**

- If your CSMP account has the 'awsbc_percentage_of_spend_based_on_service_or_item_description' feature enabled, you can configure margins and discounts at the item description level, allowing for granular control over pricing strategies. This includes:
  - Percentage of Spend - Item Description Margin
  - Percentage of Spend - Item Description Discount

j. **Usage Type-Specific Configurations**

- If your CSMP account has the 'awsbc_percentage_of_spend_based_on_usage_type' feature enabled, you can configure margins and discounts at the usage type level for a service type. This includes:
  - Percentage of Spend - Usage Type Margin
  - Percentage of Spend - Usage Type Discount

k. **Operation-Specific Configurations**

- If your CSMP account has the 'awsbc_percentage_of_spend_based_on_operation' feature enabled, you can configure margins and discounts at the operation level for a service type. This includes:

- Percentage of Spend - Operation Margin
- Percentage of Spend - Operation Discount

l. **Charge Type-Specific Configurations**

- If your CSMP account has the 'awsbc_percentage_of_spend_based_on_charge_type' feature enabled, you can configure margins and discounts at the charge type level. This includes:
  - Percentage of Spend - Charge Type Margin
  - Percentage of Spend - Charge Type Discount

m. **Daily Date Range Option**

- If your CSMP account has the 'awsbc_based_on_daily_daterange' feature enabled, you can set margin and discount percentages on a daily basis, but only at the service, item description, and billing entity levels. However, if you select "Usage Type," "Operation," or "Charge Type" for the 'Margin/Discount Percentage based on' settings in the Basic Details tab, you will only be able to set margin and discount percentages on a monthly basis for all the selected dimensions.
- Select a tab based on the features enabled for your account to specify the margin and discount percentages.
- Set start and end dates, then enter the margin and discount percentages. By default, the start and end dates for a month will be set to the first and last dates of that month.
- If you have selected a partial date range for the month, you can add another date range by clicking the plus icon (**+**) next to the start and end date selection row. The start and end dates can be the same, allowing you to specify the margin percentage on a daily basis.
- Repeat this step for each month to which the billing configuration applies.

n. **Service Level Margin**

- Navigate to the Service tab, then select Percentage of Spend - Service Margin.
- Choose the margin calculation method between the flat and Spend greater than options. The default setting is flat.
- Enter the desired margin percentage for each applicable month. If you select the Spend greater than option, enter the cost amount in the adjacent box.
- Use the Plus (**+**) icon to add specific service types or to apply the margin to other service types.
- The "Other Service Type" row indicates that the margin applies to services not listed in separate rows.
- To apply the margin percentage settings for a particular month to all future months, select the "Apply to future Months" checkbox, which appears when you hover over the Other Service Type label.

o. **Service Level Discount**

- For discounts, select Percentage of Spend - Service Discount within the Service tab.
- Follow similar steps to the Service Level Margin to enter the discount percentages for service types.

p. **Billing Entity Level Margin**

- If your account has the 'awsbc_percentage_of_spend_based_on_billing_entity' feature enabled and you have chosen to calculate Margin/Discount Percentage based on Billing Entity, you will see the Billing Entity tab. If you have chosen to calculate Margin/Discount Percentage based on both Service and Billing Entity, you will see separate tabs for each.
- Navigate to the Billing Entity tab, then select Percentage of Spend - Billing Entity Margin.
- Click the Plus (**+**) icon next to the Other Billing Entity option and select a billing entity type from the drop-down menu.

- Choose between the flat and Spend greater than options.
- Enter the margin percentage in the designated box. If you select the Spend greater than option, enter the cost amount in the box adjacent to Spend greater than, indicating the threshold above which the specified margin percentage will be applied.
- To add another row for a different billing entity type, click the Plus (**+**) icon next to the first row of the billing entity type. Follow the steps above to specify the margin percentage for the selected billing entity.
- The "Other Billing Entity" row indicates that the margin applies to services from entities not listed in separate rows. To apply the margin percentage settings for a particular month to all future months, select the "Apply to future Months" checkbox, which appears when you hover over the Other Billing Entity label.

q. **Billing Entity Level Discount**

- For discounts, select Percentage of Spend - Billing Entity Discount within the Billing Entity tab.
- Follow similar steps to the Billing Entity Level Margin to enter the discount percentages for billing entity types.

r. **Item Description Level Margin**

- If your account has the 'awsbc_percentage_of_spend_based_on_service_or_item_description' feature enabled and you have chosen to calculate Margin/Discount Percentage based on Item Descriptions only, you will see the Item Descriptions tab. If you have chosen to calculate Margin/Discount Percentage based on both Service and Item Descriptions, you will see separate tabs for each.
- Navigate to the Item Description tab.
- Select how item descriptions should be grouped using the "Item Description Filter based on" option at the top:

- Service (default): Item Descriptions will be grouped under services like Amazon Athena, allowing you to configure margin or discount percentages by service.
- Charge Type: Item Descriptions will be grouped based on AWS charge types such as usage, fees, or tax.

The selected option here will be used in both the Percentage of Spend - Item Description Margin and Percentage of Spend - Item Description Discount sections.

- Select Percentage of Spend - Item Description Margin.
- Click the Plus (**+**) icon next to the Other Service Type or Other Charge Type label (depending on the filter selection), and choose the relevant service or charge type from the drop-down list.
- Once a service or charge type is selected, a new drop-down for item description selection will appear. Choose the applicable item descriptions and enter the flat margin percentage in the designated box.
- To define separate margin percentages for additional item descriptions under the same service or charge type, click the Plus (**+**) icon next to the margin percentage box of the first item description row for that service or charge type. Add more item descriptions and assign their respective margin percentages.
- The "Other Item Descriptions" row groups any remaining item descriptions that do not have their own dedicated row. Similarly:
  - If Service is selected: the row label will be Other Service Type
  - If Charge Type is selected: the row label will be Other Charge Type

  The flat margin entered here will apply to all unlisted item descriptions under unlisted service or charge types.
- To configure margins based on a spend threshold, use the "Spend greater than" option under the Other Service/Charge Type row. This

applies the defined margin percent only if the cost exceeds the specified amount.

- To add new rows for additional service or charge types, click the Plus (**+**) icon next to the first row of the service or charge type.
- Use the cross (**×**) icon to remove any row for a service/charge type or item description.
- To apply the margin percentage settings for a particular month to all future months, select the "Apply to future Months" checkbox, which appears when you hover over the Other Service Type label.

s. **Item Description Level Discount**

- For discounts, select Percentage of Spend - Item Description Discount within the Item Description tab.
- Follow similar steps as described in the Margin section above to configure discount percentages for item descriptions, based on the selected grouping (Service or Charge Type).

t. **Usage Type Level Margin**

- If your account has the 'awsbc_percentage_of_spend_based_on_usage_type' feature enabled and you have chosen to calculate Margin/Discount Percentage based on Usage Type only, you will see the Usage Type tab. If you have chosen to calculate Margin/Discount Percentage based on both Service and Usage Type, you will see separate tabs for each.
- Navigate to the Usage Type tab, then select Percentage of Spend - Usage Type Margin.
- Click the Plus (**+**) icon next to the Other Service Type option and select the service type from the drop-down menu.
- Once the service type is selected, a new drop-down menu for usage type selection will appear. Choose the usage types and enter the margin percentage to apply. Only the flat margin calculation method is available; enter the margin percentage in the designated box.

- To set a different margin percentage for a different usage type within the same service type, click the Plus (**+**) icon next to the margin percentage box of the first usage type row for that service type. Select the specific usage type and enter the margin percentage for each.
- The "Other Usage Types" row will group all remaining usage types that do not have a separate row for the selected service type. Similarly, the "Other Service Type" row indicates that the margin will apply to those services for which a separate row has not been added.
- For the "Other Service Type" row, when using the Spend greater than option, enter the cost amount in the box adjacent to Spend greater than, which indicates the threshold above which the specified margin percentage should be applied.
- To add a new row for a service type, click the Plus (**+**) icon next to the first row of the service type.
- To remove a service type or usage type row, click the cross icon associated with that row.
- To apply the margin percentage settings for a particular month to all future months, select the "Apply to future Months" checkbox, which appears when you hover over the Other Service Type label.

u. **Usage Type Level Discount**

- For discounts, select Percentage of Spend – Usage Type Discount within the Usage Type tab.
- Follow similar steps to the Usage Type Level Margin to enter the discount percentages for usage types.

v. **Operation Level Margin**

- If your account has the 'awsbc_percentage_of_spend_based_on_operation' feature enabled and you have chosen to calculate Margin/Discount Percentage based on Operation only, you will see the Operation tab. If you have chosen to

calculate Margin/Discount Percentage based on both Service and Operation, you will see separate tabs for each.

- Navigate to the Operation tab, then select Percentage of Spend - Operation Margin.
- Click the Plus (**+**) icon next to the Other Service Type option and select the service type from the drop-down menu.
- Once the service type is selected, a new drop-down menu for operation selection will appear. Choose the operation and enter the margin percentage to apply. Only the flat margin calculation method is available; enter the margin percentage in the designated box.
- To set a different margin percentage for a different operation within the same service type, click the Plus (**+**) icon next to the margin percentage box of the first operation row for that service type. Select the specific operation and enter the margin percentage for each.
- The "Other operations" row will group all remaining operations that do not have a separate row for the selected service type. Similarly, the "Other Service Type" row indicates that the margin will apply to those services for which a separate row has not been added.
- For the "Other Service Type" row, when using the Spend greater than option, enter the cost amount in the box adjacent to Spend greater than, which indicates the threshold above which the specified margin percentage should be applied.
- To add a new row for a service type, click the Plus (**+**) icon next to the first row of the service type.
- To remove a service type or operation row, click the cross icon associated with that row.
- To apply the margin percentage settings for a particular month to all future months, select the "Apply to future Months" checkbox, which appears when you hover over the Other Service Type label.

w. **Operation Level Discount**

- For discounts, select Percentage of Spend - Operation Discount within the Operation tab.
- Follow similar steps to the Operation Level Margin to enter the discount percentages for operation types.

x. **Charge Type Level Margin**

- If your account has the 'awsbc_percentage_of_spend_based_on_charge_type' feature enabled and you have chosen to calculate Margin/Discount Percentage based on Charge Type only, you will see the Charge Type tab. If you have chosen to calculate Margin/Discount Percentage based on both Service and Charge Type, you will see separate tabs for each.
- Navigate to the Charge Type tab, then select Percentage of Spend - Charge Type Margin.
- Click the Plus (**+**) icon next to the Other Charge Type option and select the charge type from the drop-down menu.
- Enter the margin percentage in the designated box. Only the flat margin calculation method is available.
- To add another row for a different charge type, click the Plus (**+**) icon next to the first row of the charge type. Follow the steps above to specify the margin percentage for the selected charge type.
- The "Other Charge Type" row indicates that the margin applies to all the charge types for which separate rows has not been added.
- To remove a charge type row, click the cross icon associated with that row.
- To apply the margin percentage settings for a particular month to all future months, select the "Apply to future Months" checkbox, which appears when you hover over the Other Charge Type label.

y. **Charge Type Level Discount**

- For discounts, select Percentage of Spend - Charge Type Discount within the Charge Type tab.

- Follow similar steps to the Charge Type Level Margin to enter the discount percentages for charge types.

z. Set a 7% margin for the **Amazon API Gateway** service in the **"Percentage of Spend - Service Margin"** tab. This service is associated with the AWS billing entity.

aa. Specified a 10% margin for the **AWS** billing entity in the **"Percentage of Spend - Billing Entity Margin"** tab.

bb. Defined a 5% margin for an **item description** (e.g., "$3.50/million requests - first 333 million requests/month") under the **"Percentage of Spend - Item Description Margin"** tab, which falls under the Amazon API Gateway service.

cc. Set a 6% margin for the usage type **CAN1-ApiGatewayRequest** in the **"Percentage of Spend - Usage Type Margin"** tab, which is part of the item description ($3.50/million requests - first 333 million requests/month).

dd. Defined an 8% margin for the operation **ApiGatewayRequest** in the **"Percentage of Spend - Operation Margin"** tab, which is associated with the usage type **CAN1-ApiGatewayRequest**.

ee. Set a 9% margin for the charge type **Usage** under the **"Percentage of Spend - Charge Type Margin"** tab, which applies to the operation ApiGatewayRequest.

ff. The **item description** "$3.50/million requests - first 333 million requests/month" will have a total margin of **22%** (7% for the service + 10% for the billing entity + 5% for the item description).

gg. All other item descriptions under the **Amazon API Gateway** service will have a margin of **17%** (7% for the service + 10% for the billing entity), unless specific margins are defined in the **"Percentage of Spend - Item Description Margin"** tab.

hh. For other services within the **AWS** billing entity, the margin will be **10%**, unless different margins are set in the **"Percentage of Spend - Service Margin"** tab.

ii. The usage type **CAN1-ApiGatewayRequest** will have a total margin of **28%** (7% for the service + 10% for the billing entity + 5% for the item description + 6% for the usage type).

jj. All other usage types under the **Amazon API Gateway** service will have a margin of **17%** (7% for the service + 10% for the billing entity), unless specific margins are set in the **"Percentage of Spend - Usage Type Margin"** tab.

kk. The operation type **ApiGatewayRequest** (associated with the usage type **CAN1-ApiGatewayRequest**) will incur a total margin of **36%** (7% for the service + 10% for the billing entity + 5% for the item description + 6% for the usage type + 8% for the operation).

ll. All other operation types within the **Amazon API Gateway** service will have a margin of **17%** (7% for the service + 10% for the billing entity), unless specific margins are set in the **"Percentage of Spend - Operation Margin"** tab.

mm. The charge type **Usage** associated with the **ApiGatewayRequest** operation will have a total margin of **45%** (7% for the service + 10% for the billing entity + 5% for the item description + 6% for the usage type + 8% for the operation + 9% for the charge type).

nn. All other charge types within the **Amazon API Gateway** service will incur a margin of **17%** (7% for the service + 10% for the billing entity), unless specific margins are set in the **"Percentage of Spend - Charge Type Margin"** tab.

7. Fill the **Fixed** tab. This tab is visible only when the 'Fixed' option is selected in the **Billing Config Types** field on the Basic Details tab. This tab allows you to enter a fixed monthly monetary value as margin or discount, or both. The margin and discount amount entered in this tab apply in real-time, to each individual account for which this billing configuration applies.

If your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled, the details entered in the 'Fixed' tab will not be considered for margin and discount calculations.

Algorithm to calculate monthly/daily fixed margin and discount amount for each account to display in cost report

Monthly fixed margin/discount for an account

Fixed Margin = Fixed margin amount entered in the margin tab

Fixed Discount = Fixed discount amount entered in the discount tab

Daily fixed margin/discount for an account

Step 1: Calculate daily spend percentage for the day using below formula

Daily Spend Percentage = (Daily Spend) / (Total Month Spend) * 100

Step 2: Calculate daily margin/discount

Fixed Margin = (Daily Spend Percentage) * (Fixed margin amount entered in the margin tab) / 100

Fixed Discount = (Daily Spend Percentage) * (Fixed discount amount entered in the discount tab) / 100

a. On the **Margin** tab, enter a fixed monthly margin amount for each month for which billing configuration is applicable. If you have opted to enter the margin and discount value in customer currency, you will see the converted value for the margin amount in your AWS invoice currency based on the exchange rate set in the currency conversion rule. If the margin amount does not change, it means that the currency conversion rule is not available for that month or the exchange ratio is set to one for that month. Select the check box "Apply to future Months", to copy the margin amount to all the future months.

If your CSMP account has the 'awsbc_specific_day_of_month_fixed_margin_discount' feature enabled, the options available on the fixed margin will depend on your selection for the "Distribute Fixed Margin/Discount To" option in the Basic Details tab:

i. **When the distribution method is set to "specific day of month":** When this method is selected, the Fixed Margin page will display the first date of each month alongside the month name. You will need to:

- Enter the margin amount in the amount box for each month.

- Provide a description in the **Dimension Description** box for each month.

This description will assist in easily identifying the margin value in your cost reports by utilising the **Specific Day of Month Fixed Margin Description** dimension. The description will appear against the first date of each month for the **Specific Day of Month Fixed Margin Description** dimension, facilitating clear identification of charge type details.

ii. **When the distribution method is set to "all days of month":**
If you select this distribution method, you will enter the margin amount in the amount box for each month.

b. On the **Discount** tab, enter a fixed monthly discount amount for each month for which billing configuration is applicable. If you have opted to enter the margin and discount value in customer currency, you will see the converted value for the discount amount in your AWS invoice currency based on the exchange rate set in the currency conversion rule. If the discount amount does not change, it means that the currency conversion rule is not available for that month or the exchange ratio is set to one for that month. Select the check box "Apply to future Months", to copy the discount amount to all the future months.

If your CSMP account has the 'awsbc_specific_day_of_month_fixed_margin_discount' feature enabled, the options available on the fixed discount will depend on your selection for the "Distribute Fixed Margin/Discount To" option in the Basic Details tab:

i. **When the distribution method is set to "specific day of month":**
When this method is selected, the Fixed Discount page will display the first date of each month alongside the month name. You will need to:

- Enter the discount amount in the amount box for each month.
- Provide a description in the **Dimension Description** box for each month.

This description will assist in easily identifying the discount value in your cost reports by utilising the **Specific Day of Month Fixed Discount Description** dimension. The description will appear against the first date of each month for the **Specific Day of Month Fixed Discount Description** dimension, facilitating clear identification of charge type details.

ii. **When the distribution method is set to "all days of month":**
If you select this distribution method, you will enter the discount amount in the amount box for each month.

8. Fill **Service Type** tab. This tab is visible only when the 'Service Type' option is selected in the **Billing Config Types** field on the Basic Details tab. It allows you to enter a fixed monthly monetary value as margin or discount, or both for all the selected AWS services and resource names. The margin and discount amount entered in this tab apply in real-time to all the resources of the selected service(s) if no resource name is selected from the resource name drop-down or to each individual resource you select from the resource name drop-down. When you select service(s) from the services drop-down and do not select any resource name from the resource name drop-down, the margin or discount would apply to all the resources available in the selected service(s). Whereas, if you select service(s) from the services drop-down and then select resource(s) from the resource name drop-down, the margin or discount would apply to the selected resources only.

If your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled, the details entered in the 'Service Type' tab will not be considered for margin and discount calculations.

Algorithm to calculate monthly/daily service type margin and discount amount for each resources to display in cost report

Monthly service type margin/discount for a resource

Service Type Margin = Margin amount entered in the margin tab

Service Type Discount = Discount amount entered in the discount tab

Daily service type margin/discount for a resource

Step 1: Calculate daily spend percentage for the day using below formula

Daily Spend Percentage = (Daily spend of the resource) / (Monthly spend of the resource) * 100

Step 2: Calculate daily margin/discount

Service Type Margin = (Daily Spend Percentage) * (Margin amount entered in the margin tab) / 100

Service Type Discount = (Daily Spend Percentage) * (Discount amount entered in the discount tab) / 100

a. On the **Margin** tab, select the services and resources as per your requirement and then enter a fixed monthly margin amount for each month for which billing configuration is applicable. If you have opted to enter the margin and discount value in customer currency, you will see the converted value for the margin amount in your AWS invoice currency based on the exchange rate set in the currency conversion rule. If the margin amount does not change, it means that the currency conversion rule is not available for that month or the exchange ratio is set to one for that month. Select the check box "Apply to future Months", to copy the selected service(s), resource names, and margin amount to all the future months.

b. On the **Discount** tab, select the services and resources as per your requirement and then enter a fixed monthly discount amount for each month for which billing configuration is applicable. If you have opted to enter the margin and discount value in customer currency, you will see the converted value for the discount amount in your AWS invoice currency based on the exchange rate set in the currency conversion rule. If the discount amount does not change, it means that the currency conversion rule is not available for that month or the exchange ratio is set to one for that month. Select the

check box "Apply to future Months", to copy the selected service(s), resource names, and discount amount to all the future months.

9. Fill **Usage Hour** tab. This tab is visible only when the 'Usage Hour' option is selected in the **Billing Config Types** field on the Basic Details tab. It allows you to apply a set monetary value as hourly margin or discount, or both for each hour that an instance is running. The hourly margin and discount amount entered in this tab apply to on-demand hours of resource/instance to each individual resource you select from resource name drop-down. When you select service(s) from the services drop-down and do not select any resource name from the resource name drop-down, the hourly margin or discount would apply to all the resources available in the selected service(s). Whereas, if you select service(s) from the services drop-down and then select resource(s) from the resource name drop-down, the hourly margin or discount would apply to the selected resources only.

If your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled, the details entered in the 'Usage Hour' tab will not be considered for margin and discount calculations.

Algorithm to calculate monthly/daily usage hour margin and discount amount for on-demand resources/instances to display in cost report

Monthly usage hour margin/discount for a resource

Usage Hour Margin = Monthly On-Demand Hours of Resource * Hourly Margin for that resource

Usage Hour Discount = Monthly On-Demand Hours of Resource * Hourly Discount for that resource

Daily usage hour margin/discount for a resource

Usage Hour Margin = Daily On-Demand Hours of Resource * Hourly Margin for that resource

Usage Hour Discount = Daily On-Demand Hours of Resource * Hourly Discount for that resource

a. On the **Margin** tab, select the services and resources as per your requirement and then enter a fixed hourly margin amount for each month for which billing configuration is applicable. If you have opted to enter the margin and discount value in customer currency, you will see the converted value for the margin amount in your AWS invoice currency based on the exchange rate set in the currency conversion rule. If the margin amount does not change, it means that the currency conversion rule is not available for that month or the exchange ratio is set to one for that month. Select the check box "Apply to future Months", to copy the selected service(s), resource names, and margin amount to all the future months.

b. On the **Discount** tab, select the services and resources as per your requirement and then enter a fixed hourly discount amount for each month for which billing configuration is applicable. If you have opted to enter the margin and discount value in customer currency, you will see the converted value for the discount amount in your AWS invoice currency based on the exchange rate set in the currency conversion rule. If the discount amount does not change, it means that the currency conversion rule is not available for that month or the exchange ratio is set to one for that month. Select the check box "Apply to future Months", to copy the selected service(s), resource names, and discount amount to all the future months.

10. Fill **Usage Quantity Multiplier** tab. This tab is visible only when the 'Usage Quantity Multiplier' option is selected in the **Billing Config Types** field on the Basic Details tab. It allows you to enter the margin multiplier values for the dimensions selected in the "Usage Quantity Multiplier Margin based on" option within the Basic Details tab. The multiplier value you enter for a specific dimension will be multiplied by the usage quantity of that dimension, resulting in the margin amount for that dimension items. **Steps to Enter Margin Multipliers:**

Algorithm to calculate the monthly/daily usage quantity multiplier margin amount for a dimension to display in cost report

Monthly usage quantity multiplier margin amount for a dimension

Usage Quantity Multiplier = Monthly usage quantity of the dimension * margin multiplier specified for the dimension under the Usage Quantity Multiplier tab

Daily usage quantity multiplier amount for a dimension

Usage Quantity Multiplier = Daily usage quantity of the dimension * margin multiplier specified for the dimension under the Usage Quantity Multiplier tab

a. **Item Description**

- If your CloudBolt CSMP account has the 'awsbc_usage_quantity_multiplier_based_on_item_description' or 'awsbc_Usage_Quantity_Multiplier_based_on_usage_type_item_description' feature enabled, and you've selected to calculate the "Usage Quantity Multiplier Margin based on" **Item Descriptions**, the **Item Descriptions** tab will be visible.
- **To set the margin multiplier**:

  This feature allows you to set the item description margin multiplier at the service type level.

  i. Select the **Item Description** tab, then choose **Usage Quantity Multiplier - Item Description Margin**.

  ii. From the drop-down menu, select a **service type**.

  iii. Once the service type is selected, a new drop-down menu for selecting item description(s) will appear. **Choose the relevant item description(s)** and enter the desired margin multiplier value in the multiplier box. By default, the multiplier value is set to zero.

  iv. To apply a different margin multiplier to another item description within the same service type:

  - Click the **Plus icon (+)** next to the multiplier box for the first item description row.

- Select the specific item description(s) and enter the corresponding multiplier value.

v. To add an item description from a different service type:
   - Click the **Plus icon (+)** at the end of the first selected service type row.
   - Choose the item description and enter the multiplier value.

vi. To delete an item description and service type, **click the cross icon (X)** next to the item description and service type.

vii. **Repeat these steps** for each month to which the billing configuration applies.

This feature allows you to set the item description margin multiplier at the usage type level for a service type.

viii. **Select the Item Description tab**, then choose **Usage Quantity Multiplier - Item Description Margin**.

ix. From the drop-down menu, **select a service type**.

x. After selecting the service type, a new drop-down menu for selecting a **usage type** for the selected service type will appear. **Choose a usage type**.

xi. Once the usage type is selected, a new drop-down menu for selecting item description(s) will appear. **Choose the relevant item description(s)** and enter the desired margin multiplier value in the multiplier box. By default, the multiplier value is set to zero.

xii. To apply a different margin multiplier to another item description within the same service type and usage type:
   - Click the **Plus icon (+)** next to the multiplier box for the first item description row.
   - Select the specific item description(s) and enter the corresponding multiplier value.

xiii. To add a different usage type for a previously selected service type:
    - Click the **Plus icon (+)** at the end of the first selected usage type row within that service type.

xiv. To add a different service type:
    - Click the **Plus icon (+)** at the end of the first selected service type row.

xv. To delete an item description, usage type, and service type rows, **click the cross icon (X)** next to the item description, usage type, and service type rows.

xvi. **Repeat these steps** for each month to which the billing configuration applies.

You can set the item description margin multiplier at the usage type level.

xvii. **Select the Item Description tab**, then choose **Usage Quantity Multiplier - Item Description Margin**.

xviii. From the drop-down menu, **select a service type**.

xix. After selecting the service type, a new drop-down menu for selecting a **usage type** for the selected service type will appear. **Choose a usage type**.

xx. Once the usage type is selected, a new drop-down menu for selecting item description(s) will appear. **Choose the relevant item description(s)** and enter the desired margin multiplier value in the multiplier box. By default, the multiplier value is set to zero.

xxi. To apply a different margin multiplier to another item description within the same service type and usage type:
    - Click the **Plus icon (+)** next to the multiplier box for the first item description row.

- Select the specific item description(s) and enter the corresponding multiplier value.

xxii. To add a different usage type for a previously selected service type:

- Click the **Plus icon (+)** at the end of the first selected usage type row within that service type.

xxiii. To add a different service type:

- Click the **Plus icon (+)** at the end of the first selected service type row.

xxiv. To delete an item description, usage type, and service type rows, **click the cross icon (X)** next to the item description, usage type, and service type rows.

xxv. **Repeat these steps** for each month to which the billing configuration applies.

b. **Usage Type**

- If your account has the 'awsbc_usage_quantity_multiplier_based_on_usage_type' feature enabled, and you've chosen to calculate the "Usage Quantity Multiplier Margin based on" **Usage Type**, the **Usage Type** tab will appear.
- **To set the margin multiplier**:

i. Select the **Usage Type** tab, then choose **Usage Quantity Multiplier - Usage Type Margin**.

ii. Select an option for **usage type filter based on:** region or service.
Note: If your billing configuration spans multiple months, the selected option to populate the usage type list will be applied to each month.

iii. Select the desired **service type** or **region** from the drop-down menu, depending on the option chosen for **usage type filter based on**.

iv. Once the service type or region is selected, a new drop-down menu for **usage type(s)** will appear. Choose the usage type(s) and enter the margin multiplier value in the multiplier box (default is zero).

v. To set a different margin multiplier for another usage type within the same service type or region, click the **Plus (+)** icon next to the multiplier box and select the usage type(s), then enter the margin multiplier.

vi. To add a usage type from a different service type or region, click the **Plus (+)** icon at the end of the first selected service type or region row. Then select the desired usage type and enter the multiplier value.

vii. To delete a usage type and service type/region, click the **cross icon (X)** next to the usage type and service type/region.

c. **Operation**

- If your account has the 'awsbc_usage_quantity_multiplier_based_on_operation' feature enabled, and you've chosen to calculate the "Usage Quantity Multiplier Margin based on" **operation**, the **Operation** tab will be available.
- **To set the margin multiplier**:

i. Select the **Operation** tab, then choose **Usage Quantity Multiplier - Operation Margin**.

ii. From the drop-down menu, select a **service type**.

iii. Once the service type is selected, a new drop-down menu for **operation(s)** selection will appear. Choose the operation(s) and enter the margin multiplier value in the multiplier box (default is zero).

iv. To apply a different margin multiplier to a different operation within the same service type, click the **Plus (+)** icon next to the

multiplier box and select the specific operation(s), then enter the multiplier.

v. To add an operation from a different service type, click the **Plus (+)** icon at the end of the service type row. Select the desired operation(s) and enter the margin multiplier value.

vi. To delete an operation and service type, click the **cross icon (X)** next to the operation and service type.

d. **Charge Type**

- If your account has the 'awsbc_usage_quantity_multiplier_based_on_charge_type' feature enabled, and you've chosen to calculate the "Usage Quantity Multiplier Margin based on" **charge type**, the **Charge Type** tab will appear.
- **To set the margin multiplier**:

i. Select the **Charge Type** tab, then choose **Usage Quantity Multiplier - Charge Type Margin**.

ii. From the drop-down menu, select the **charge type**.

iii. Enter the margin multiplier value in the multiplier box (default is zero).

iv. To add a different charge type, click the **Plus (+)** icon at the end of the charge type row, select the desired charge type, and enter the margin multiplier value.

v. To delete a charge type and its corresponding multiplier, click the **cross icon (X)** next to the charge type.

11. Click **+ Create**.

Limitations:

For a particular account and billing period, you can create only one billing configuration.

If your CSMP account has the 'aws_support_for_cardinality_based_query' feature enabled, you can create multiple billing configurations for a specific period using

adapter groups containing same accounts but with different tags settings for each group.

Create Azure Billing Configuration

Use this procedure to create a billing configuration for Azure.

1. Log in to your CloudBolt CSMP account.
2. Click the **Settings icon [] > Billing Configuration**.
3. On the billing configuration page, select Azure tab as cloud provider and then click **+ Create**.
4. Create Azure Billing Configuration page appears.
5. Fill the **Basic Details** tab and then click **Next**.

Field name	Notes
Name	Enter a name for your billing configuration. Name must be between three and 50 characters. It can contain any letters from a to z and any numbers from 0 through 9.
Description	Enter a valid description for the billing configuration.
Billing Adapter	Select the billing adapter for which billing configuration is required.
Metric for Margin/Discount Calculations	It is the metric which will be used to calculate margin and discount.
Subscriptions	Select the associated subscriptions of the previously selected billing adapter. By default, all the subscriptions will be selected. If you select partial subscriptions, you can select a maximum of 99 subscriptions.
Adapter Group	Select the adapter group for which billing configuration is required. This option is available only when you select partial or none of the subscriptions linked with the previously selected billing adapter.

Field name	Notes
Start Month	Select a start month for the billing configuration. Start month can be a past, current, or future month.
Expires On	Select a terminating month for the billing configuration. Expires on can be a past month, but not earlier than the set start month.

6. On the **Margin** tab, enter the margin percent for each month for which billing configuration is applicable. You can update margin percent for current and future months, the new margin will be considered for billing with immediate effect. Select the check box "Apply to future Months", to copy the margin percent to all the future months.
7. Click **Next**.
8. On the **Discount** tab, enter the discount percent for each month for which billing configuration is applicable. You can update discount for current and future months, the new discount will be considered for billing with immediate effect. Select the check box "Apply to future Months", to copy the discount percent to all the future months.
9. Click **+ Create**.

Limitations:

For a particular subscription and billing period, you can create only one billing configuration.

Create Azure CSP Billing Configuration

Use this procedure to create a billing configuration for Azure CSP account.

1. Log in to your CloudBolt CSMP account.
2. Click the **Settings icon [] > Billing Configuration**.

3. On the billing configuration page, select the Azure CSP tab as cloud provider and then click **+ Create**.
4. Create Azure CSP Billing Configuration page appears.
5. Fill the **Basic Details** tab and then click **Next**.

Field name	Notes
Name	Enter a name for your billing configuration. Name must be between three and 50 characters. It can contain any letters from a to z and any numbers from 0 through 9.
Description	Enter a valid description for the billing configuration.
Billing Adapter	Select the billing adapter for which billing configuration is required.
Metric for Margin/Discount Calculations	It is the metric which will be used to calculate margin and discount. To change the metric type here, you need to update your choice in the 'Select Metric for Margin/Discount Calculations' field available in the other configuration tab by editing the above selected billing adapter.
Exclude	You can opt not to include the subscriptions or a customer Id or both of the selected billing adapter in this billing configuration by using the exclude option. By default, exclude option will be off. To enable the exclude functionality, switch to exclude.
Subscriptions	*When exclude option is off:* Select the associated subscriptions of the previously selected billing adapter. By default, all the subscriptions will be selected. If you select partial subscriptions, you can select a maximum of 99 subscriptions. *When exclude option is on:* Select the subscriptions which you want to opt out from this billing configuration. You can select maximum of 99 subscriptions to opt out from a billing configuration.

Field name	Notes
Adapter Group	Select the adapter group for which billing configuration is required. This option is available only when you select partial or none of the subscriptions linked with the previously selected billing adapter and exclude option is turned off.
Customer Id	Select a customer Id which you do not want to include in this billing configuration. This option is available only when exclude option is enabled.
Start Month	Select a start month for the billing configuration. Start month can be a past, current, or future month.
Expires On	Select a terminating month for the billing configuration. Expires on can be a past month, but not earlier than the set start month.

6. On the **Margin** tab, enter different margin types percent for each month for which billing configuration is applicable. You can update margin percent for current and future months, the new margin will be considered for billing with immediate effect. Select the check box "Apply to future Months", to copy the margin percent to all the future months.
7. Click **Next**.
8. On the **Discount** tab, enter different discount types percent for each month for which billing configuration is applicable. You can update discount for current and future months, the new discount will be considered for billing with immediate effect. Select the check box "Apply to future Months", to copy the discount percent to all the future months.
9. Click **+ Create**.

Limitations:

For a particular subscription and billing period, you can create one billing configuration with exclude 'yes' and in another billing configuration you can select same subscription with exclude 'off' option. For example, if you created a billing configuration for December 2022 with exclude 'yes' option for subscription 'S1' and customer id 'CI1' then, you can create another billing configuration for December 2022 with exclude 'off' option for subscription 'S1' and customer id 'CI1'. Whereas if you want to create another billing configuration for December 2022 to January 2023 with exclude 'yes' option for subscription 'S1' and customer id 'CI1' is not allowed. It is because you have a billing configuration for December 2022 with similar settings. However a billing configuration for January 2023 with exclude 'yes' option for subscription 'S1' and customer id 'CI1' is allowed.

Create GCP Billing Configuration

Use this procedure to create a billing configuration for GCP.

1. Log in to your CloudBolt CSMP account.
2. Click the **Settings icon [] > Billing Configuration**.
3. On the billing configuration page, select GCP tab as cloud provider and then click **+ Create**.
4. Create GCP Billing Configuration page appears.
5. Fill the **Basic Details** tab and then click **+ Create**.

Field name	Notes
Name	Enter a name for your billing configuration. Name must be between three and 50 characters. It can contain any letters from a to z and any numbers from 0 through 9.
Description	Enter a valid description for the billing configuration.
Billing Adapter	Select the billing adapter for which billing configuration is required.
Metric for Margin/Discount Calculations	It is the metric which will be used to calculate margin and discount. To change the metric type here, you need to update your choice in the 'Select Metric for Margin/Discount Calculations' field available in the GCP config tab by editing

Field name	Notes
	the above selected billing adapter.
Projects	Select the associated projects of the previously selected billing adapter for which billing configuration is required. By default, all the projects will be selected. If you select partial projects, you can select a maximum of 99 projects.
Adapter Group	Select the adapter group for which billing configuration is required. This option is available only when you select partial or none of the projects linked with the previously selected billing adapter.
Start Month	Select a start month for the billing configuration. Start month can be a past, current, or future month.
Expires On	Select a terminating month for the billing configuration. Expires on can be a past month, but not earlier than the start month.

6. On the **Margin** tab, enter the margin percent for each month for which billing configuration is applicable. You can update margin percent for current and future months, the new margin will be considered for billing with immediate effect. Select the check box "Apply to future Months", to copy the margin percent to all the future months.
7. Click **Next**.
8. On the **Discount** tab, enter the discount percent for each month for which billing configuration is applicable. You can update discount for current and future months, the new discount will be considered for billing with immediate effect. Select the check box "Apply to future Months", to copy the discount percent to all the future months.
9. Click **+ Create**.

Limitations:

For a particular project and billing period, you can create only one billing configuration.

Create VMware Billing Configuration

Use this procedure to create a billing configuration for VMware.

1. Log in to your CloudBolt CSMP account.
2. Click the **Settings icon [] > Billing Configuration**.
3. On the billing configuration page, select VMware tab as the cloud provider and then click **+ Create**.
4. Create VMware Billing Configuration page appears.
5. Fill the **Basic Details** tab and then click **Next**.

Field name	Notes
Name	Enter a name for your billing configuration. Name must be between three and 50 characters. It can contain any letters from a to z and any numbers from 0 through 9.
Description	Enter a valid description for the billing configuration.
Billing Adapter	Select the billing adapter for which billing configuration is required.
Metric for Margin/Discount Calculations	It is the metric which will be used to calculate margin and discount.
vCenters	Select the associated vCenters of the previously selected billing adapter for which billing configuration is required. By default, all the vCenters will be selected. If you select partial vCenters, you can select a maximum of 99 vCenters.
Adapter Group	Select the VMware vCenters groups for which billing configuration is required. This option is available only when you select partial or none of the vCenters linked with the

Field name	Notes
	previously selected billing adapter.
Start Month	Select a start month for the billing configuration. Start month can be a past, current, or future month.
Expires On	Select a terminating month for the billing configuration. Expires on can be a past month, but not earlier than the start month.

6. On the **Margin** tab, enter the margin percent for each month for which billing configuration is applicable. You can update margin percent for current and future months, the new margin will be considered for billing with immediate effect. Select the check box "Apply to future Months", to copy the margin percent to all the future months.
7. Click **Next**.
8. On the **Discount** tab, enter the discount percent for each month for which billing configuration is applicable. You can update discount for current and future months, the new discount will be considered for billing with immediate effect. Select the check box "Apply to future Months", to copy the discount percent to all the future months.
9. Click **+ Create**.

Limitations:

For a particular vCenter and billing period, you can create only one billing configuration.

View Billing Configurations

You can view all the billing configurations that were previously created.

1. Log in to your CloudBolt CSMP account.
2. Click the **Settings icon [] > Billing Configuration**.

3. On the **Billing Configuration** page, select the cloud provider tab whose billing configuration you want to see.
4. You can search a billing configuration for selected cloud provider by name. You can also filter the billing configuration list based on billing adapter.
5. Hover over the ellipsis icon [...] under the **Action** column of the billing configuration list. You can edit, delete or see update history for the selected billing configuration.
    a. **Edit**: Use this option to edit the existing details for a billing configuration. You can change the start month to a past, current, or future month. Similarly, expires on month can be modified to set a past, current, or future month.

    Whenever you update the start month or end month or both, you must update margin and discount percent values for all the newly added month(s).
    If you update margin and discount for past month(s), you must reprocess cost data for such month(s) to get the various cost data updated as per the new margin and discount percent.

    b. **Delete**: Use this option to delete a billing configuration permanently. If you delete a billing configuration in the mid of a billing cycle, the associated margin and discount percent for the specific account will discontinue from the current billing cycle. However, there would be no change to the current and previous billing cycles net cost values.
    c. **Show History**: Use this option to see the update history for a billing configuration.

Billing Configuration Usage

You may utilize the billing configuration option as a parent organisation (MSP, CSP, reseller, or distributor) to figure out your cloud cost to the supplier and net cost to your resellers, customers, and child organisations. Billing configuration allows you to include margins and discounts in your cloud costs and display your customers the net cost value. When a billing configuration for a cloud account is created, the actual cloud cost will be presented in all cost charts on the parent organisation's CloudBolt CSMP account. When you share an

adapter with a child organisation, that child organisation's users can view the net cost of their cloud use in their CloudBolt CSMP account.

Troubleshooting

1. **Error: "The chosen Billing Adapter is currently in error state. The customer ids for your Billing Adapter could not be fetched"**

   This error typically occurs during the creation or update of your Azure CSP billing configuration. It indicates that the selected **Azure CSP billing adapter** is in an error state and cannot fetch the required customer IDs.

   Solution: To resolve this issue, you need to update your **Azure account details** in the CSP billing adapter. Follow these steps:

   a. **Verify Azure Account Credentials:** Ensure that the Azure account details provided are correct and up-to-date. This includes checking the secret keys, client IDs, and other relevant account settings.

   b. **Update Billing Adapter Settings:** Access the billing adapter settings and update the required details to restore connectivity. Ensure the adapter is configured correctly to fetch customer IDs.

   c. **Retry Configuration Creation/Update:** Once the billing adapter is updated, try creating or updating your billing configuration again.

2. **Error: "Unable to create the Billing configuration as DB set as default"**

   If you encounter the error "**Unable to create the Billing configuration as DB set as default**", it indicates that the database has been set as the default, which prevents the creation of a new billing configuration.

   Solution: To resolve this issue, please contact our support team.

Outcomes

You have learnt how to create billing configuration and their usage.

9.1.6. Report Profiles

Learn how to create and manage a report profile that you can share with your CloudBolt CSMP child organisations and tenants.

- Introduction
- Glossary of Terms
- Required Permissions
- Default Report Profiles
- Create a Report Profile
- Manage Report Profiles
- Usage of Report Profiles
- Troubleshooting
- Outcomes

Introduction

Cost report's filter widget and customized report allow users to enable various parameters while viewing and generating their cloud cost report. You may not want to reveal many of the business sensitive parameters data to your child organisation or tenant users as a parent organisation administrator. Report profiles let you build a set of metrics and other parameters that you can share with a child organisation or tenant to limit the filtration possibilities for customized reports and custom report filter widgets.

Glossary of Terms

Child organisation: It represents the CloudBolt CSMP accounts of resellers or customers within the MSP or CSP model where a distributer or reseller (tier1 or tier2) manages a group of their customers using CloudBolt CSMP platform.

Cloud Solution Provider (CSP): It is an Azure term and is similar to MSP but will manage only Azure cloud resources.

Managed Service Provider (MSP): It manages a huge number of client cloud resources, provides support, and charges the customer for additional services. MSPs may manage resources from a variety of sources, including AWS, Azure, Google Cloud Platform, VMware, and private clouds, among others.

Parent organisation: These are the CloudBolt CSMP accounts of large or small customers who are using CloudBolt CSMP to manage their cloud platform spends using cost optimization and actionable insights. In this publication, a parent organisation can be a MSP or CSP or a reseller who has signed up using the cloudbolt.app URL. Parent organisation can have multiple reseller or customer as child organisation.

Required Permissions

You must have following permissions to create a report profile:

- A parent organisation account with administrator role.
- You must have an active Billing adapter for the cloud provider for which you want to create a report profile.

Default Report Profiles

CloudBolt CSMP creates default report profiles for each parent organisation account which you can assign to tenants, resellers, customers, and child organisations. These report profiles could not be modified or deleted.

1. **Default Report Profile** will be created for each parent organisation account. By default, the **Default Report Profile** would be assigned to such tenants for whom the Exclude Refund check box was not checked previously (prior to March 2022).
2. **Default Child Report Profile** would be created to such parent organisation which has been enabled for Manage Child Organisation option. Ideally, this report profile can be assigned to a child organisation.
3. **Default Report Profile Excluding EDP** would apply to such tenants for which Exclude Refund option was enable earlier (prior to March 2022). Enable Exclude Refund feature allow tenant users to view AWS cost reports without Refund charges. The

AWS EDP refund parameter for cost report's filters setting would be inaccessible for the users who are assigned with default report profile excluding EDP.

Whenever a parent organisation creates a reseller organisation, following default report profiles would be created within the newly created reseller's organisation account.

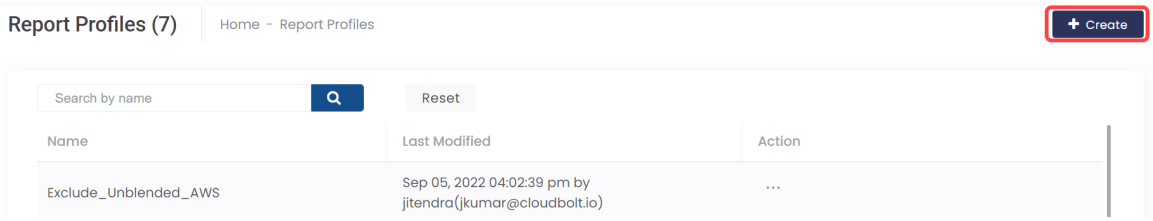
1. **Reseller Admin Report Profile** consists all the metrics and filters setting options shared with the individual reseller organisation by their parent organisation using the report profile shared. It also consists of reseller specific metrics such as margin (R), discount (R), etc. Being a reseller organisation admin, this report profile can be assigned to a tenant whom you want to assign with admin privileges.
2. **Reseller's End Customer Report Profile** consists only one metric i.e. net cost (R). It can be assigned to reseller's customer organisations.

If you want to create an exclusive report profile to assign to your child, customer, reseller organisation, or tenant, continue to Create a Report Profile.

Create a Report Profile

Use this procedure to create a new report profile.

1. Log in to your CloudBolt CSMP account.
2. Click the **Settings icon [] > Report Profiles**.
3. Click **+ Create** from the upper right corner.



4. On the **Create Report Profiles** form, enter a name for your report profile.
5. Click the cloud provider tab for which you want to create a new report profile.

   Note: You can only select the cloud tab for which you have an active billing adapter.

6. Select the check box adjacent to the parameters you wish to make accessible to your tenant and child organisation cost report filter result widget.

7. In the **Metrics** box, select the metrics you wish to make accessible to your tenant and child organisation in the customized report. By default, all the metrics would be selected.
8. In the **Selected Metrics** box, you must select a metric. The metric chosen in this box will be the cost value type that is shown on all dashboard widgets for the tenant and child organisation that use this report profile.

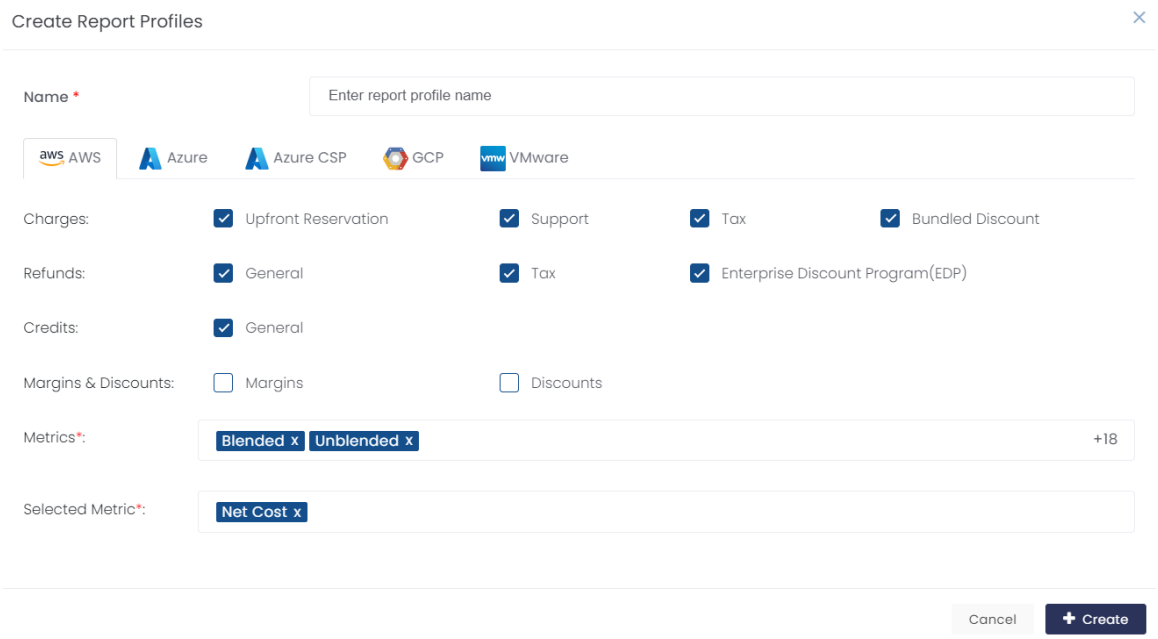
Important:

You must have that metric chosen in the *Metrics* box in order to pick it in the *Selected Metrics* box. The metrics listed below are those that may be set for the *Selected Metrics* by a parent organisation administrator.

- For AWS: Unblended, Customer Cost, or Net Cost
- For Azure: Cost or Net Cost
- For Azure CSP: Cost, Customer Cost, or Net Cost
- For GCP: Cost, Customer Cost, or Net Cost
- For VMware: Cost or Net Cost

The metrics listed below are those that may be set for the *Selected Metrics* by a reseller organisation administrator.

- For AWS: Net Cost (R)
- For Azure: Net Cost (R)
- For Azure CSP: Net Cost (R)
- For GCP: Net Cost (R)
- For VMware: Net Cost (R)



9. Click **+ Create**.

Manage Report Profiles

Use this procedure to manage your previously created report profiles.

1. Log in to your CloudBolt CSMP account.
2. Click the **Settings icon []> Report Profiles**.
3. On the **Report Profiles** page, a list of all the report profiles will appear including CloudBolt CSMP created default report profiles.
4. You can only view a CloudBolt CSMP created default report profiles. Click the ellipsis icon […] under the action column and click **View**.
5. To edit user created report profiles, click the ellipsis icon […] under the action column and then click **Edit**.
6. User created report profiles can be deleted as long as they are not shared with any of the child organisations or tenants. To delete a report profile, click the ellipsis icon […] under the action column and then click **Delete**.

Usage of Report Profiles

Report profile is required to manage child organisation and manage tenants in CloudBolt CSMP.

Troubleshooting

1. **Error: "Unable to create the Report Profile as DB set as default"**

   If you encounter the error "**Unable to create the Report Profile as DB set as default**", it indicates that the database has been set as the default, which prevents the creation of a new report profile.

   Solution: To resolve this issue, please contact our support team.

Outcomes

You have learnt how to create a report profile and their usage.

9.1.7. Billing Configuration - AWS RI/SP

Learn how to create and manage a billing configuration to turn on and off AWS Savings Plans and Reserved Instances being an AWS Managed Service Providers.

Introduction

As a Managed Service Providers (MSPs), you might have purchased services and instances at a significant discounted rate using the Savings Plans (SPs) and Reserved Instances (RIs). As MSPs, you would like to resell that capacity to your customers at on-demand rates to lift your profits. It is challenging for Enterprise customers and MSPs to develop a successful chargeback strategy since the default AWS logic applies SPs and RIs discounts across the consolidated billing family rather than to the buying account. Using CloudBolt CSMP **Billing Configuration - AWS RI/SP** feature, you can reverse discounts so that accounts who unintentionally profited from SPs and RIs are charged at the on-demand rate. CloudBolt analyses your customers' account usage and allocate the discounts based on their usage percent with a real-time updates as the month progresses. CloudBolt CSMP **Billing Configuration - AWS RI/SP** feature allows you to customize the discount benefits to a group of accounts.

Required Permissions

You must have following permissions to create a billing configuration - AWS RI/SP:

- A parent organization account user with administrator role having permissions to view, create, modify, and delete Billing Configuration - AWS RI/SP module.
- AWS Billing adapter for which a billing configuration – AWS RI/SP is required.
- User having permissions to view, create, edit, and delete adapter groups.

Create AWS RI/SP Billing Configuration

1. Log in to your CloudBolt CSMP account.
2. Click the **Settings icon [] > Billing Configuration - AWS RI/SP**.

3. Click **Create** in the upper right corner of the Billing Configuration - AWS RI/SP page.
4. Fill out the **Basic Details** as follows:

Field Name	Description
Name	Enter a valid name for this configuration.
Description	Enter description for the configuration.
Billing Adapter	Choose a billing adapter for which this billing configuration will apply.
Start Month	Select a start month for this billing configuration. Start month cannot be the current month.
Expires On	Select a terminating month for this billing configuration.

5. Click **Next**.
6. Fill out the **Savings Plan** tab as follows to reverse out all SPs benefits that accounts should not receive.

Field Name	Description
SP Sharing off	Check the **SP Sharing off** check box to remove all SPs discounts from all the accounts or selected adapter groups.
Select All Account	Check the **Select All Account** check box to turn off the SP sharing benefits for all the individual member accounts.
Adapter Group	Select group of adapters from the drop-down list that must not be honoured by any SPs profits. **Adapter group** option will appear only if **Select All Account** check box is clear.

For a particular Savings Plans and time range, you can only create one AWS RI/SP billing configuration.

7. Fill out the **Savings Plan** tab as follows to provide selected SPs benefits to accounts.

Field Name	Description
SP Sharing off	Clear the **SP Sharing off** check box. By default, it will be unchecked.
Saving Plan	Select the savings plans whose benefits you want to share with all the individual accounts or selected groups of accounts.
Sharing Based On	Select SPs benefits sharing preferences. **Usage:** When you select sharing based on usage, the SPs discounts will be shared to all the individual accounts or selected groups of accounts based on their usage percentage. For example, account A has purchased the saving plans, account A will be the first to use the plans. Then, if there is any unused hourly commitment remains, the Savings Plans are then applied based on consumption with the largest calculated savings to all other accounts for which sharing have switched on. Suppose account B, C,

Field Name	Description
	and D are selected for SPs benefit sharing. Consumption percent for those accounts are 32, 46, and 22 respectively. In that event, the unused hourly commitment of the selected SPs will first go to account C, then account B, and then if any remaining hourly commitment will go to account D. **Custom Percentage:** When you select sharing based on custom percentage, the SPs discount will be shared to selected groups of accounts based on the percent you assigned for each group. For example, you want to share the SPs benefit among group GR-B, GR-C, and GR-D with 20, 35, 25 percent. Savings plans first apply to usage in the purchasing account. Then, if there is any unused hourly commitment left, the selected accounts groups will be benefited as per the percent decided in this configuration. The benefited hours for a group will be distributed to their accounts based on consumption. In the given example, the benefit percent sums to 80 only, therefore, the remaining 20% of benefit will again go back to the purchasing account. **Within account group based on Usage:** The "Within account group based on Usage" option is available only when the 'awsrispbc_within_account_group_based_on_usage' feature is enabled for your CSMP account. When selected, this option removes the need for manually selecting a Savings Plan option, as it automatically identifies the Savings Plan purchasing account and the relevant Savings Plan details within the chosen adapter group. The Savings Plan discount is then distributed among all member accounts in the group based on their individual usage proportions. For example, if you select Adapter Group AD1, which consists of member accounts A, B, C, and D, and Account A is the Savings Plan purchaser, the system prioritises Account A to receive the full benefits of the Savings Plan. Any unused hourly commitment is then shared with the other accounts (B, C, and D) based on their consumption. If Account B uses 32% of the total consumption, Account C uses 46%, and Account D uses 22%, the unused hourly commitment will be first allocated to Account C, followed by Account B, and any remaining amount will be given to Account D. It is important to note that when the "Within account group based on Usage" option is selected for SP benefit sharing, the same preference will automatically apply to RI benefit sharing as well, and this cannot be changed.
Select All Account	Check the **Select All Account** check box to turn on the SP sharing benefits for all the individual member accounts. This option is available only when sharing based on usage is enabled.
Adapter Group	Select groups of adapters from the drop-down list that must be honoured by selected SPs profits. When sharing based on custom percentage is enabled, you must specify the percent value for each selected adapter group. The sum of share percent must not exceed 100.

For a particular Savings Plans and time range, you can only create one AWS RI/SP billing configuration.

8. Click **Next**.
9. Fill out the **Reserved Instance** tab as follows to reverse out all RIs benefits that accounts should not receive.

Field Name	Description
RI Sharing off	Check the **RI Sharing off** check box to remove all RIs discounts from all the accounts or selected adapter groups.
Select All Account	Check the **Select All Account** check box to turn off the RIs sharing benefits for all the individual member accounts.
Adapter Group	Select group of adapters from the drop-down list that must not be honoured by any RIs profits. **Adapter group** option will appear only if **Select All Account** check box is clear.

For a particular Reserved Instances and time range, you can only create one AWS RI/SP billing configuration.

10. Fill out the **Reserved Instance** tab as follows to provide selected RIs benefits to accounts.

Field Name	Description
RI Sharing Off	Clear the **RI Sharing off** check box. By default, it will be unchecked.
Reserved Instance	Select the RIs whose benefits you want to share with all the individual accounts or selected groups of accounts.
Sharing Based On	Select RIs benefits sharing preference. **Usage:** When you select sharing based on usage, the RIs discounts will be shared to all the individual accounts or selected groups of accounts based on their usage percentage. For example, account A has purchased the reserved instances, account A will be the first to receive the discounts. Then, if there are any unused instances remaining, the Reserved Instances are then applied based on consumption with the largest usage to all other accounts for which sharing have switched on. Suppose account B, C, and D are selected for RIs benefit sharing. Consumption percent for those accounts are 32, 46, and 22 respectively. In that event, the unused instances of the selected RIs will first go to account C, then account B, and then if any remaining instances, will go to account D. **Custom Percentage:** When you select sharing based on custom percentage, the RIs discount will be shared to selected groups of accounts based on the percent you assigned for each group. For example, you want to share the RIs benefit among group GR-B, GR-C, and GR-D with 20, 35, 25 percent. Reserved Instances first apply to usage in the purchasing account. Then, if there are any unused instances left, the selected accounts groups will be benefited as per the percent decided in this configuration. The benefited instances for a group will be distributed to their accounts based on consumption. In the given example, the benefit

Field Name	Description
	percent sums to 80 only, therefore, the remaining 20% of benefit will again go back to the RIs purchasing account. **Within account group based on Usage:** The "Within account group based on Usage" option is available only when the 'awsrispbc_within_account_group_based_on_usage' feature is enabled for your CSMP account. When selected, this option removes the need for manually selecting a Reserved Instance option, as it automatically identifies the Reserved Instance purchasing account and the relevant Reserved Instance details within the chosen adapter group. The Reserved Instance discount is then distributed among all member accounts in the group based on their individual usage proportions. For example, if you select Adapter Group AD1, which consists of member accounts A, B, C, and D, and Account A is the Reserved Instance purchaser, the system prioritises Account A to receive the full benefits of the Reserved Instance. Any unused instances remaining is then shared with the other accounts (B, C, and D) based on their consumption. If Account B uses 32% of the total consumption, Account C uses 46%, and Account D uses 22%, the unused hourly commitment will be first allocated to Account C, followed by Account B, and any remaining amount will be given to Account D. It is important to note that when the "Within account group based on Usage" option is selected for SP benefit sharing, the same preference will automatically apply to RI benefit sharing as well, and this cannot be changed. If you wish to set a different option for RI benefit sharing, you must first change the SP benefit sharing method to something other than the "Within account group based on Usage" option.
Select All Account	Check the Select All Account check box to turn on the RIs sharing benefits for all the individual member accounts. This option is available only when sharing based on usage is enabled.
Adapter Group	Select groups of adapters from the drop-down list that must be honoured by selected RIs profits. When sharing based on custom percentage is enabled, you must specify the percent value for each selected adapter group. The sum of share percent must not exceed 100.

For a particular Reserved Instances and time range, you can only create one AWS RI/SP billing configuration.

11. Click **Create**.

View AWS RI/SP Billing Configuration

1. Log in to your CloudBolt CSMP account.
2. Click the **Settings icon [] > Billing Configuration - AWS RI/SP**.

3. By default, list of all the AWS RI/SP Billing Configuration will display with following details.
    a. Name of the configuration.
    b. Description of the configuration.
    c. Applicable billing adapter for the configuration.
    d. Start and end month for the configuration.
    e. Saving plans details. Click View to see the complete details.
    f. Reserved instance details. Click View to see the complete details.
    g. Action option to perform following actions:
        i. Edit: Use this option to edit the existing details of an AWS RI/SP billing configuration.

        If you update the details related to SP, RI, and accounts for an AWS RI/SP billing configuration in the mid of a billing cycle, it will come into effect from the next billing cycle only. A new billing cycle starts from the first day of each month.

        ii. Delete: Use this option to delete a configuration permanently. If you delete a configuration in the mid of a billing cycle, the associated benefits for the accounts will discontinue from the next billing cycle.
        iii. Show History: Use this option to see the update history for a configuration.
4. You can filter the configurations by their name.

Troubleshooting

1. During billing configuration creation if you see an error message `Some reserved instance/saving plan/Accounts are already covered in one of the Ri Sp Billing Configurations for similar/partial time range. Please remove such reserved instance/saving plan/Accounts and try to create Ri Sp Billing Configuration again`. It denotes that some reserved instances, saving plans, and accounts have already been covered for a similar or

partial time period by one of the RI/SP Billing Configurations. Please delete any such reserved instances, saving plans, or accounts before attempting to create this RI/SP Billing Configuration.

2. During billing configuration creation where multiple adapter groups are selected, if you see an error message `Some Account IDs are present in more than one adapter-groups, please remove such account`. It denotes that some of the accounts are available in multiple adapter groups, you need to update adapter groups by removing such accounts.
3. When sharing based on custom percentage is enabled and you get error message `The total saving plan benefit share percentage for all the adapter groups should be equal to or less than 100 percent`. You must ensure that the sum of SPs benefit share percent among different adapter groups must be less than or equal to 100.
4. When sharing based on custom percentage is enabled and you get error message `The total reserved instance benefit share percentage for all the adapter groups should be equal to or less than 100 percent`. You must ensure that the sum of RIs benefit share percent among different adapter groups must be less than or equal to 100.

Outcomes

You have learnt how to create and manage a billing configuration to turn on and off AWS Savings Plans and Reserved Instances to different AWS accounts.

Being a parent organisation administrator, you can see the impact of **Billing Configuration - AWS RI/SP** in your cloud cost report.

1. Go to Customize Report section under the Cost Report for AWS.
2. On the Filter Result, select date range as Monthly.
3. Add Month and Account ID as dimensions.
4. Add Unblended, Exclude RI Benefit, Exclude SP Benefit, and Customer Cost as metrics.
5. Click **Apply** to see the cost report for the account ids.
   If **Billing Configuration - AWS RI/SP** has been enabled to share the RIs and SPs

benefits to the account(s) for that month, the unblended values will include the RI and SP discounts values. The metrics Exclude RI Benefit and Exclude SP Benefit values will be zero for the account ids which are turned on for benefits sharing. The unblended and customer cost will be same for the accounts which are enabled for RIs & SPs benefits sharing.

If your billing account has purchased RIs and SPs, but RIs and SPs benefits sharing is turned off for accounts. Then, metrics Exclude RI Benefit and Exclude SP Benefit will indicate values which would have been reduced from customer cost.

6. This customer cost will be used to compute the MSP's margins and discounts according to the billing configuration for the accounts, which will then become the customer's net cost.

Being a child organisation user, you can view the different metrics value as per the report profile shared with your organisation.

9.1.8. Cost Allocation

Learn how to create cost allocation rules to distribute one cost across multiple accounts/subscriptions, service types, or regions.

Introduction

CloudBolt CSMP allocation feature allows you to create cost distribution rules for the net cost from source accounts/subscriptions, service type, or regions to target accounts/subscriptions, service type, or regions within your organisation. Using these allocation rules, you can make business units or teams accountable and answerable for their own cloud usage.

Allocated cost will appear in cost report after applying the cost allocation filter parameter. The net cost assigned to the target accounts/subscriptions, service types, or regions will appear as allocated cost in the cost report grid view. The net cost transferred from the source accounts/subscriptions, service types, or regions will appear as drained cost with a minus sign in the cost report grid view.

In this article, you will learn to set up and manage cost allocation rules.

Prerequisites

To use cost allocation feature, your CloudBolt CSMP account must tagged as parent organisation's Default tenant user. Your CloudBolt CSMP role must have all the access permissions applicable for **Cost Allocation** module. You must have an active and configured state billing adapter within your CloudBolt CSMP account.

Create Cost Allocation Rule for AWS

Use this procedure to create a new cost allocation rule for your AWS billing account.

1. Log in to your CloudBolt CSMP account.
2. Navigate to **Settings []** > **Cost Allocation**.

3. Allocation rules page appears with a list of the already created cost allocation rules for AWS.
4. By default, AWS cloud provider is selected. If not, select the cloud provider as AWS by clicking the AWS box at the top-center of the page.
5. Click **Add Allocation Rule** and then select AWS.
6. **Add New Rule** page appears. Fill the **Basic Details** tab as follows and click **Next**.

Field Name	Notes
Name	Enter a valid name for the cost allocation rule.
Adapter	Select a billing adapter from the drop-down list.
Start Month	Select a start month. Start month can be a past, current, or future month. When you select a past month, you must reprocess report data for past month(s) to reflect the cost allocation data in cost report.
Expires On	Select an end month for this rule. If you do not select end month the allocation rule will remain in effect until you delete or set the termination month.

7. Fill the **Source** tab as follows and click **Next**. Source tab allows you to select either accounts, service types, or regions to choose net costs to distribute.
    a. Select an option for source **Native Provider** as required.

Native Provider Option	Description
Account	Allows you to select accounts to choose net costs to distribute to target accounts, service types, or regions.
Service Type	Allows you to select service types to choose net costs to distribute to target accounts, service types, or regions.
Region	Allows you to select regions to choose net costs to distribute to target accounts, service types, or regions.

    b. Select an option for **'Do you want to allocate costs on only Account/Service Type/Region basis?'** The option label changes based on native provider option selection. By default, 'Yes' option will be selected, and you can choose source net costs at accounts, service types, or region level. When 'No' option is selected, you can choose source net costs at resource level.
    c. Select **Accounts/Service Type/Region**

- Choose the specific accounts, service types, or regions whose net costs you want to distribute. The labels will change based on the selected native provider option.
- You can use the **Include** or **Exclude** options to determine which items' net costs are considered for distribution:
    - **Include**: Net costs from the selected items in the Accounts/Service Type/Region filter list will be included for distribution. You can select a maximum of 99 items individually when using the "Include" option. Alternatively, use the "Select All" option to include all available items in the drop-down list.
    - **Exclude**: Net costs from the selected items in the Accounts/Service Type/Region filter list will be excluded from distribution. If you need to include net costs from more than 99 distinct accounts, services, or regions, use the "Exclude" option. This allows you to target items beyond the 99-item limit. Note that you can select a maximum of 99 items at a time to exclude. Using the "Select All" option will automatically switch to the "Include" option, including all available items.

d. **Allocation Basis**

- If you have opted to **allocate costs on only Account/Service Type/Region basis**, you will see **$** icon next to the Account/Service Type/Region selection box.
- If you have opted **not** to **allocate costs on only Account/Service Type/Region basis**, you will see tab icon next to the Account/Service Type/Region selection box. Click tab icon to choose resources from the **Select Resources to Allocate cost** drop-down box. After selecting resources, the **$** icon will appear.

e. **Set Distribution Amount**

- Click the **$** icon to set the amount to distribute to the target account/service type/region.

- You will see a section for each month starting from the set start month. **Cost to be Allocated** represents the total net cost for the selected accounts/service types/regions/resources available for distribution to the target.

  The amount shown here will match the net cost displayed on the Cost Report page for the corresponding month.

f. **Choose Allocation Method**

- Select between **Full Fetched Amount** and **Custom Amount**:
  - **Full Fetched Amount**: The entire amount displayed for "Cost to be Allocated" will be drained from the source and distributed to the target.
  - **Custom Amount**: Specify the exact amount to be distributed to the target from the selected source.
- Values entered for cost allocation in the source tab will be marked as drained costs against the selected accounts/service types/regions/resources on the cost report grid view.

8. Fill the **Target** tab as follows. Target tab allows you to select either accounts, service types, or regions to receive the allocated costs.

a. Select an option for target **Native Provider** as required.

Native Provider Option	Description
Account	Allows you to select accounts to receive the allocated net costs from source accounts, service types, or regions. The drained cost from the source will be distributed to all the selected accounts based on allocation percentage setting.
Service Type	Allows you to select service types to receive the allocated net costs from source accounts, service types, or regions. The drained cost from the source will be distributed to all the selected services based on allocation percentage setting.
Region	Allows you to select regions to receive the allocated net costs from source accounts, service types, or regions. The drained cost from the source will be distributed to all the selected regions based on allocation percentage setting.

b. Select **Accounts/Service Name/Region**

- Choose the appropriate values from the drop-down menus for Accounts, Service Names, or Regions. The option label will change based on the selected native provider option in the target tab.
- Ensure that the selected accounts, service names, or regions have incurred costs. Items without incurred costs during the specified period will not be included in the target and no net costs will be assigned to them.
- You can use the **Include** or **Exclude** options to determine which items are considered for the target:
    - **Include**: Select this option to assign net costs to the items specified in the Accounts/Service Name/Region filter list. Only the items you choose will be included in the target. You can select a maximum of 99 items individually when using the "Include" option. Alternatively, use the "Select All" option to include all available items in the drop-down list.
    - **Exclude**: Select this option to assign net costs to all items except those selected in the Accounts/Service Name/Region filter list. If you need to assign net costs to more than 99 distinct accounts, services, or regions, use the "Exclude" option. This allows you to target items beyond the 99-item limit. Note that you can select a maximum of 99 items at a time to exclude. Using the "Select All" option will automatically switch to the "Include" option, including all available items.

c. Choose an option for **Allocation Percentage**.

- **Fixed** – Define a custom percentage to distribute the allocated net costs to selected target accounts/service names/regions. The sum of all the custom percentages must equal to 100.
- **Proportional** – Creates a ratio proportional to the selected target accounts/service names/regions based on their net cost value.
- **Even-Split** – Each of the selected target accounts/service names/regions receives an even percentage proportion of their

unblended value. For example, you have selected three different regions labeled as A, B, and C to distribute the net cost evenly, but the region A and B have not incurred any cost for the specific month then 100% of the allocated net cost will be allocated to region C.

d. Based on your selected allocation percentages, you can view the net cost allocation details for each month, starting from the defined start month. The costs are split according to your allocation settings, and a detailed monthly breakdown is provided.

   For each month, the total of the split costs will match the corresponding **Cost to be Allocated** amount shown on the **Source** tab.

e. In the **Comment** box, enter comments.

9. Click **Create Rule** to create the cost allocation rule.

AWS Cost Allocation Rule Exception: Special Case for Service Type and Account Allocation

In some scenarios, the AWS cost allocation rule settings might not behave in the conventional way as described in the previous sections. This section outlines an exception to the typical cost allocation process when specific settings are used for Native Provider selection in the Source and Target tabs.

Special Case: Service Type as Native Provider in Source and Account as Native Provider in Target

How It Works

When a cost allocation rule is created with **Service Type** as the Native Provider in the **Source tab** and **Account** as the Native Provider in the **Target tab**, with the **Allocation Percentage** set to **Proportional**, the allocation process behaves differently than expected. Instead of distributing the cost to **all services** within the selected accounts in the Target tab, the allocation is restricted to the **services** specified in the Source tab.

Example Scenario:

1. **Source Tab Settings**
   - Services selected: **Amazon Athena** and **Amazon API Gateway**

- Total cost to be allocated for the month: **$100**
- The cost distribution for these services is as follows:
  - **Amazon Athena:** $80 (80% of the total cost)
  - **Amazon API Gateway:** $20 (20% of the total cost)

2. **Target Tab Settings**
   - Accounts selected: **Production** and **Development**
   - Allocation percentage set to **Proportional**
   - The proportional distribution of costs between the two accounts based on their total net cost:
     - **Production Account:** 40%
     - **Development Account:** 60%
3. **Cost Allocation Calculation**
   - First, the total cost to be allocated ($100) is distributed between the two accounts (Production and Development) according to their proportionality:
     - **Production:** $40 (40% of $100)
     - **Development:** $60 (60% of $100)
4. **Service Cost Allocation Within Each Account**
   - Now, within each of the accounts, the allocated cost will be distributed between the services (Amazon Athena and Amazon API Gateway) based on their respective ratio in the source tab.

In the Production Account:

- **Amazon Athena:** Allocated 40% of $40 = **$16**
- **Amazon API Gateway:** Allocated 60% of $40 = **$24**

In the Development Account:

- **Amazon Athena:** Allocated 40% of $60 = **$24**
- **Amazon API Gateway:** Allocated 60% of $60 = **$36**

Summary of the Cost Allocation Displayed on the Cost Report Page:

Account	Service	Allocated Cost
Production	Amazon Athena	$16
Production	Amazon API Gateway	$24
Development	Amazon Athena	$24
Development	Amazon API Gateway	$36

- In this special case, the cost to be allocated is distributed **only to the services selected in the Source tab**. In our example, **Amazon Athena** and **Amazon API Gateway** are the only services considered, even though both **Production** and **Development** accounts are involved.
- The **Proportional Allocation Percentage** is first applied to the total cost per account and then to each service based on their proportion of the total cost.

Create Cost Allocation Rule for Azure

Use this procedure to create a new cost allocation rule for your Azure billing account.

1. Log in to your CloudBolt CSMP account.
2. Navigate to **Settings []** > **Cost Allocation**.
3. Allocation rules page appears with a list of the already created cost allocation rules for AWS.
4. Select the cloud provider as Azure by clicking the Azure box at the top-center of the page
5. Click **Add Allocation Rule** and then select Azure.
6. **Add New Rule** page appears. Fill the **Basic Details** tab as follows and click **Next**.

Field Name	Notes
Name	Enter a valid name for the cost allocation rule.
Adapter	Select a billing adapter from the drop-down list.
Start Month	Select a start month. Start month can be a past, current, or future month. When you select a past month, you must reprocess report data for past month(s) to reflect the cost allocation data in cost report.
Expires On	Select an end month for this rule. If you do not select end month the allocation rule will remain in effect until you delete or set the

Field Name	Notes
	termination month.

7. Fill the **Source** tab as follows and click **Next**. Source tab allows you to select either accounts, service types, or regions to choose net costs to distribute.
    a. Select an option for source **Native Provider** as required.

Native Provider Option	Description
Subscription	Allows you to select subscriptions to choose net costs to distribute to target subscriptions, service types, or locations.
Service Type	Allows you to select service types to choose net costs to distribute to target subscriptions, service types, or locations.
Location	Allows you to select locations to choose net costs to distribute to target subscriptions, service types, or locations.

    b. Select an option for **'Do you want to allocate costs on only Subscription/Service Type/Location basis?'** The option label changes based on native provider option selection. By default, 'Yes' option will be selected, and you can choose source net costs at subscription, service types, or location level. When 'No' option is selected, you can choose source net costs at resource level.
    c. Select **Subscription/Service Type/Location**
        - Choose the specific subscriptions, service types, or locations whose net costs you want to distribute. The labels will change based on the selected native provider option.
        - You can use the **Include** or **Exclude** options to determine which items' net costs are considered for distribution:
            - **Include**: Net costs from the selected items in the Subscription/Service Type/Location filter list will be included for distribution. You can select a maximum of 99 items individually when using the "Include" option. Alternatively, use the "Select All" option to include all available items in the drop-down list.
            - **Exclude**: Net costs from the selected items in the Subscription/Service Type/Location filter list will be excluded

from distribution. If you need to include net costs from more than 99 distinct subscriptions, services, or locations, use the "Exclude" option. This allows you to target items beyond the 99-item limit. Note that you can select a maximum of 99 items at a time to exclude. Using the "Select All" option will automatically switch to the "Include" option, including all available items.

d. **Allocation Basis**

- If you have opted to **allocate costs on only Subscription/Service Type/Location basis**, you will see **$** icon next to the Subscription/Service Type/Location selection box.
- If you have opted **not** to **allocate costs on only Subscription/Service Type/Location basis**, you will see tab icon next to the Subscription/Service Type/Location selection box. Click tab icon to choose the resources in the **Select Resources to Allocate cost** drop-down box whose net costs you want to distribute. After selecting the resources, you will see **$** icon.

e. **Set Distribution Amount**

- Click **$** icon to set the amount to distribute to target subscription/service type/region. You will see section for each month from the set start month. **Cost to be allocated** denotes the total net cost for the selected subscriptions/service types/locations/resources that can be distributed to targets.

f. **Choose Allocation Method**

- Select an option between **Full Fetched Amount** and **Custom Amount** to allocate net cost amounts to targets.
  - **Full Fetched Amount**: When **Full Fetched Amount** option is selected, the entire amount displayed for Cost to be allocated will be drained from source and distributed to the target.
  - **Custom Amount**: When selecting **Custom Amount** option, you need to decide the net cost amount to be distributed to the targets from the selected sources.

- Values entered for the cost allocation in the source tab will be marked as drained cost against the selected subscriptions/service types/locations/resources on the cost report grid view.

8. Fill the **Target** tab as follows. Target tab allows you to select either subscriptions, service types, or locations to receive the allocated costs.
    a. Select an option for target **Native Provider** as required.

Native Provider Option	Description
Subscription	Allows you to select subscriptions to receive the allocated net costs from source subscriptions, service types, or locations. The drained cost from the source will be distributed to all the selected subscriptions based on allocation percentage setting.
Service Type	Allows you to select service types to receive the allocated net costs from source subscriptions, service types, or locations. The drained cost from the source will be distributed to all the selected services based on allocation percentage setting.
Location	Allows you to select locations to receive the allocated net costs from source subscriptions, service types, or locations. The drained cost from the source will be distributed to all the selected locations based on allocation percentage setting.

    b. Select **Subscription/Service Name/Location**
        - Choose appropriate values from the drop-down for **Subscription/Service Name/Location**. The option label changes based on native provider option selection in the target tab.
        - Ensure that the selected subscriptions, service names, or locations have incurred some net cost. Items without incurred net cost during the specified period will not be included in the target and no net costs will be assigned to them.
        - You can use the Include or Exclude options to determine which items are considered for the target:
            - **Include**: Select this option to assign net costs to the items specified in the Subscription/Service Name/Location filter list.

Only the items you choose will be included in the target. You can select a maximum of 99 items individually when using the "Include" option. Alternatively, use the "Select All" option to include all available items in the drop-down list.

- **Exclude**: Select this option to assign net costs to all items except those selected in the Subscription/Service Name/Location filter list. If you need to assign net costs to more than 99 distinct subscriptions, services, or locations, use the "Exclude" option. This allows you to target items beyond the 99-item limit. Note that you can select a maximum of 99 items at a time to exclude. Using the "Select All" option will automatically switch to the "Include" option, including all available items.

c. Choose an option for **Allocation Percentage**.

- **Fixed** – Define a custom percentage to distribute the allocated net costs to selected target subscriptions/service names/locations. The sum of all the custom percentages must equal to 100.
- **Proportional** – Creates a ratio proportional to the selected target subscriptions/service names/locations based on their net cost value.
- **Even-Split** – Each of the selected target subscriptions/service names/locations receives an even percentage proportion of their net cost value. For example, you have selected three different regions labeled as A, B, and C to distribute the net cost evenly, but the region A and B have not incurred any cost for the specific month then 100% of the allocated net cost will be allocated to region C.

d. Based on your allocation percentage selection, you can see cost allocation details for each month from the set start month.

e. In the **Comment** box, enter comments.

9. Click **Create Rule** to create the cost allocation rule.

View and Edit Existing Cost Allocation Rules

1. Log in to your CloudBolt CSMP account.
2. Navigate to **Settings []** > **Cost Allocation**.
3. Allocation rules page appears.
4. Select the cloud provider at the top-center of the page whose cost allocation rule you want to see.
5. A list of the already created cost allocation rules for the selected cloud provider will appear.
6. You can filter the allocation rule list based on billing account and rule name. In the filter area select the billing account name and enter the rule name, then click **Apply** to filter the rule list. Click **Clear Filters** to reset the filter parameters.
7. Allocation rule list will contain following columns:
    a. Name: It displays the allocation rule name.
    b. Source: It displays the costs source details.
    c. Target: It displays the allocation target details.
    d. Mode: It displays the cost allocation model.
    e. Allocation%: It displays the allocation values. Click 'View' to see the detailed allocation values.
    f. Action: Click the ellipsis icon ([…]) next to the allocation rule to view available options.
        - **To edit a rule**: Select **Edit Rule**. You can modify the rule's name, source, and target details.

          If you edit a rule for a past month, you must reprocess report data to reflect the changes in the cost report.

        - **To delete a rule**: Select **Delete Rule**, then confirm the action by clicking **OK** on the confirmation page.

          You cannot delete an AWS cost allocation rule that has been used to create an AWS Purchase Order configuration.

Limitations

Currently, cost allocation is supported in cost report only. Source and target accounts/subscriptions/service type/regions/resources must be different. It may take up to 24 hours for a newly created cost allocation rule to see the effect the cost report for the current month. To see the effect of a cost allocation rule in past month cost report, you must perform report data reprocessing.

Outcomes

You have learnt to create and manage cost allocation rules for AWS and Azure cloud providers. To see the effect of cost allocation in your cost report, you must apply cost allocation filter in cost report page.

9.1.9. Purchase Order Configuration

Streamline cloud cost tracking and management with Purchase Order Configuration.

Introduction

The Purchase Order (PO) Configuration feature in CloudBolt CSMP streamlines and automates the tracking and management of cloud net costs against purchase orders. Managed Service Providers (MSPs) and enterprises that offer network and IT services to clients often face challenges in managing and tracking cloud costs against POs. These challenges can lead to difficulties in budget management, usage monitoring, and ensuring timely PO renewals.

The Purchase Order Configuration feature addresses these issues by providing a centralized, easy-to-use interface to configure and track POs linked to your clients' cloud accounts, account groups, or specific services. By defining the PO value for each account or service, you can ensure precise tracking of cloud expenditures. Integrated with CloudBolt CSMP's cost reports, this feature provides real-time tracking, allowing you to monitor PO balances, net costs, remaining PO values, and receive timely renewal notifications based on your set threshold PO balance limit. Automated notifications ensure that you and your clients are alerted about upcoming renewals, helping maintain service continuity and avoid disruptions.

Use Cases for Purchase Order Configuration

1. **Tracking Cloud Costs for Specific AWS Accounts**
   As an MSP managing cloud services for multiple clients, you can configure a specific PO for each AWS account under your management. This enables you to track the net cost for each account against its corresponding PO value, ensuring accurate tracking and easy reconciliation of cloud net costs.
2. **Managing Budgets for Account Groups**
   If your clients have multiple AWS accounts grouped under specific categories in CSMP, you can configure a single PO for the entire group. This allows you to monitor

the group's aggregated cloud net costs, enabling higher-level budget management without tracking individual accounts separately.

3. **Service-Level PO Configuration**
   For clients using specific AWS services (e.g., EC2 instances, S3 storage) with distinct cost structures, you can configure POs at the service level. This allows you to track cloud net costs specifically for each service, making it easier to manage costs and ensure that usage does not exceed budgeted amounts for individual services.
4. **Automating PO Renewal Notifications**
   When the PO balance approaches the threshold you set, the system will automatically send notifications to the designated team members. This ensures timely renewals and prevents service interruptions caused by expired POs, in line with your client agreements.
5. **Monthly and Daily PO Usage Insights**
   The PO Configuration feature integrates with the cost report page in CloudBolt CSMP, providing key metrics, including daily and monthly usage breakdowns. These insights allow you to monitor PO balances and usage in real time, helping you make informed decisions and manage client expectations effectively.
6. **Reducing Manual Work and Administrative Overhead**
   Rather than manually calculating or reconciling PO balances, the PO Configuration feature, together with the cost report, automates this process. This reduces administrative workload, increases accuracy, and ensures that the system reflects the latest usage and balance data.

- Create and Manage AWS Purchase Order Configuration

9.1.9.1. Create and Manage AWS Purchase Order Configuration

Learn to create and manage Purchase Order Configurations for AWS Accounts, Account Groups, and Services.

- Introduction
- Prerequisites
- Create a new AWS Purchase Order Configuration
- Matching and Duplicate Purchase Order Configurations
- Matching Purchase Order Configurations
- Duplicate Purchase Order Configurations
- View and Manage Existing Purchase Order Configurations
- Understand Purchase Order Integration with Cost Report Data
- Metric Consumption Behaviour Comparison
- PO Consumption Using the 'Net Cost' Metric
- PO Consumption Using the 'Net Allocated Cost' Metric
- Special Scenarios and Exceptional Cases (Net Allocated Cost Only)
- Limitations
- Outcomes

Introduction

This guide will walk you through the process of creating and managing AWS Purchase Order (PO) configurations within your CloudBolt CSMP account. By following these steps, you can securely manage AWS Purchase Order configurations associated with your AWS accounts, account groups, and services.

Prerequisites

Before proceeding, ensure that your CloudBolt CSMP account is enabled for the 'aws_azure_po_config' feature. If this feature is not enabled, please contact CloudBolt Support team.

Create a new AWS Purchase Order Configuration

1. Log in to your CloudBolt CSMP account.
2. Navigate to **Settings > General System > Purchase Order Configuration**.
3. The **Purchase Order Configuration** page will load, displaying a list of all previously created POs.
4. At the upper-right corner of the page, select the **AWS** cloud provider tab.
5. Click the **Create**button to initiate the creation of a new AWS Purchase Order configuration.
6. The **Create AWS Purchase Order Configuration** page will appear. Fill in the details for your new PO as follows:

Field Name	Description
Name	Enter a unique name for the purchase order.
Description	Enter a description for your purchase order.
Billing Adapter	Select an AWS billing adapter whose member accounts this PO will apply to.
Metric for PO Calculations	Displays the metric used to calculate the daily PO balance by deducting the corresponding amount from the PO value. This field is read-only and shown for reference only. By default, PO balance calculations are based on the **Net Cost** metric. To use an alternative metric such as **Net Allocated Cost**, you must first get the 'awspo_net_allocated_cost_as_source' feature enabled for your CSMP account. Then, create a billing adapter with the desired metric selected under the **Select Metric for PO Calculations** option in the *Other Configuration* tab. When you select that billing adapter in this PO configuration, the corresponding metric will be displayed automatically in this field. If **Net Allocated Cost** is set as the metric for PO calculations, you must have at least one active cost allocation rule configured for the billing adapter for the entire period covered by the PO.

Field Name	Description
Filter based on	This field allows you to configure the PO for either a **Billing Entity** or **Seller of Record (Legal Entity Name)**.
Billing Entity	Select the billing entity types associated with the selected billing account. You can choose one or more billing entities from the dropdown menu. **Include/Exclude Options:** ○ **Include**: The selected billing entities will be considered for the PO configuration. ○ **Exclude**: The selected billing entities will be excluded from the PO configuration. The PO will apply to all other billing entities except those excluded. **Select All Option**: To include all available billing entities at once, use the "Select All" option. **Dynamic Update**: Available options for accounts, adapter groups, and services will be updated based on your selection of billing entities.
Seller of Record (Legal Entity Name)	This field lists the Seller of Record (Legal Entity Name) types associated with the selected billing account. You can choose one or more seller of record (legal entity name). **Include/Exclude Options:** ○ **Include**: The selected seller of record (legal entity name) will be considered for the PO configuration. ○ **Exclude**: The selected seller of record (legal entity name) will be excluded from the PO configuration. The PO will apply to all other sellers of record except those excluded. **Select All Option**: To include all available seller of record (legal entity name) at once, use the "Select All" option. **Dynamic Update**: Available options for accounts, adapter groups, and services will be updated based on your selection of seller of record (legal entity name).
Accounts	Based on the selection for Seller of Record (Legal Entity Name) or Billing Entity, the available accounts will be dynamically filtered and displayed. **Include/Exclude Options:** ○ **Include**: Only the specific member accounts you choose will be included in the PO's scope and will be subject to the PO configuration settings. ○ **Exclude**: The selected accounts will be excluded from the PO configuration. The PO will apply to all other accounts except the ones you've excluded. **Select All Option**: To include all available accounts at once, use the "Select All" option.
Adapter	If you have created a group of AWS accounts in CSMP, select the

Field Name	Description
Groups	groups from the drop-down menu. This option is available when no or partial accounts are selected in the **Accounts** field above.
Services	Select specific AWS services to apply this PO to particular services. You can use the **Include** or **Exclude** options to specify which services should be included in the PO configuration. **Include**: Only the selected services will be considered for the PO configuration. **Exclude**: The selected services will be excluded from the PO configuration. The PO will apply to all others. **No Services Selected**: If no services are selected, the PO algorithm will treat all services as included, regardless of the specified **Include** or **Exclude** options. **Select All Option**: To include all available services at once, use the "Select All" option.
Start Date	Select a start date. The start date can be any date within the current month.
End Date	Set an end date for the PO. If no end date is selected, the PO will remain valid indefinitely until an end date is set.
Cost Allocation Rule	Select a cost allocation rule from the drop-down list. This field displays all active cost allocation rules associated with the selected billing adapter that are valid for the PO's selected start and end dates. This field is visible only when the **Metric for PO Calculations** is set to **Net Allocated Cost**.
Purchase Order Amount	Enter the total amount for the PO.
Warning Notification	Enter a percentage value. When the PO balance reaches the specified threshold percentage, the creator of the PO will receive an email notification.
Notify by Email	Check the box if you want to notify your team members about the PO balance depletion.
Role Inside Organisation	Select the roles of CSMP account users you wish to notify when the PO balance reaches the specified threshold.
Custom Emails Outside Organisation	Enter email addresses for team members outside your organisation (not using CloudBolt CSMP) to notify them about PO balance depletion.

7. After filling in the required information, click **Create** to save the new PO configuration.
8. The newly created PO will appear at the top of the PO list on the **Purchase Order Configuration** page.

Important

To maintain clarity and avoid conflicts, CloudBolt CSMP does not allow the creation of duplicate Purchase Orders (POs) for the same accounts or services within an overlapping time period. If you attempt to create a PO that shares accounts or services with an existing PO for an overlapping date range, you will receive an error notification. Be sure to carefully review your account and service selections, as well as the time frame, to ensure that each PO is unique and accurately reflects the intended accounts and services. This helps to keep your PO management streamlined and error-free.

For more information on duplicate purchase orders, refer to Duplicate Purchase Order Configurations section in this guide.

Matching and Duplicate Purchase Order Configurations

Matching Purchase Order Configurations

A matching purchase order (PO) occurs when there is at least one common account and service among the POs in your CloudBolt CSMP account. However, the start date and end date of these POs must not overlap. Matching POs enable you to manage configurations without duplicating the usage periods.

Example:

1. **PO_01**: Covers accounts ACC_001, ACC_002, ACC_003, and ACC_004 with service types Amazon API Gateway and Amazon Athena for the date range October 01, 2024, to November 03, 2024.
2. **PO_02**: Covers accounts ACC_001 and ACC_006 with the service type Amazon API Gateway only for the date range November 06, 2024, to November 20, 2024.

These POs are considered matching POs because they share a common account (ACC_001) and service type (Amazon API Gateway), but their date ranges do not overlap.

Duplicate Purchase Order Configurations

A duplicate purchase order (PO) is a PO where there are overlapping start and end dates for POs with matching accounts and service types. The system does not allow the creation of duplicate POs to ensure clarity and prevent configuration conflicts.

Example:

1. **PO_02**: Covers accounts ACC_001 and ACC_006 with the service type Amazon API Gateway only for the date range November 06, 2024, to November 20, 2024.
2. **PO_03**: Hypothetically covers accounts ACC_006 and ACC_007 for all services for the date range November 18, 2024, to November 30, 2024.

In this case, **PO_02** and **PO_03** are considered duplicate POs because they overlap in the date range (November 18, 2024, to November 20, 2024) and have matching accounts (ACC_006) and services (Amazon API Gateway). However, the system would prevent the creation of **PO_03**, avoiding duplicate POs.

View and Manage Existing Purchase Order Configurations

1. Log in to your CloudBolt CSMP account.
2. Navigate to **Settings > General System > Purchase Order Configuration**.
3. The **Purchase Order Configuration** page will load, displaying a list of all previously created POs.
4. You can efficiently locate specific POs using the filtering options available on the page.
    - **Filter by Provider**: Select the appropriate cloud provider tab at the top of the page.
    - **Filter by Billing Account**: Select the billing adapter from the drop-down menu under **Select Billing Account** to filter the PO list by the selected billing adapter.
    - **Filter by Billing Entity**: Select the billing entity from the drop-down menu under **Select Billing Entity** to filter the PO list by the selected billing entity. You can choose one or more billing entities from the dropdown menu. To

select all available billing entities at once, you can use the "Select All" option.

- **Filter by Accounts**: Select the account from the drop-down menu under **Select Account** to filter the PO list by the selected accounts. You can choose one or more accounts from the dropdown menu. To select all available accounts at once, you can use the "Select All" option.
- **Filter by Services**: Select the service from the drop-down menu under **Select Service** to filter the PO list by the selected services. You can choose one or more services from the dropdown menu. To select all available services at once, you can use the "Select All" option.
- **Filter by Name**: Enter the name string in the **Search by name** field.

After selecting the required filters, click the **Apply** button to populate the PO list based on the set filters. It is important to note that all the filters work together using an **'AND'** logic, meaning only those records that meet all selected filter values will be displayed.

5. The PO configuration list contains following columns:
   - **Name**: The name of the PO.
   - **Description**: The description of the PO.
   - **Billing Adapter**: The AWS billing adapter that is linked to this PO.
   - **PO Amount**: The total value of the PO.
   - **PO Balance**: The remaining value of a PO after deducting the net cost of services, as specified in the PO, that have been rendered within the defined PO period. It is calculated using the formula: **PO Amount - Net Cost**.
   - **Percent Spent**: The percentage of the PO amount that has been utilised within the specified PO period. It is calculated using the formula: **(1 - (PO Balance / PO Amount)) × 100**.
   - **End Date**: The duration for which the PO is valid, combining the start and end dates into a single range. The dates are displayed in the format: **MM/DD/YYYY – MM/DD/YYYY**.

- **Action**: This column contains action buttons for managing each PO. Click the ellipsis icon [...] to see the options. The available actions are:
  - **View**: Click the **View** option to access and review the detailed configuration of the selected PO. This will display a read-only version of the PO, including all related information such as its name, description, billing adapter, associated AWS accounts, PO amount, dates, and notification settings. Use this option to quickly check the configuration without making any edits.
  - **Edit**: Click the **Edit** option to modify the PO details, such as name, description, end date, and notification settings. The **End Date** field can only be changed to the current date or a future date if the Start Date of the selected PO falls within the current month or a future month. The end date cannot be earlier than start date.
  - **Delete**: Click the **Delete** option to remove the PO. You will be prompted to confirm the deletion before the PO is permanently removed from the list.
  - **Show History**: Click the **Show History** option to view the change history of the selected PO. This feature provides a detailed log of all modifications made to the PO, including edits to its configuration, updates to the associated accounts, or changes to the end date. The history is shown in a timeline format, allowing you to track when changes occurred and who made them.

Understand Purchase Order Integration with Cost Report Data

When you create a PO configuration, it is linked with your AWS cost data, allowing you to monitor how the PO balance is utilised over time. Note that it may take up to 24 hours for the first cost report data reflecting the PO balance and value to appear.

Once a PO is active, associated costs are deducted based on the selected **metric for PO calculations**. Two cost metrics are currently supported:

- **Net Cost:** *Calculated as the Customer Cost adjusted by a comprehensive set of margins and discounts across various spend categories and usage dimensions.*
- **Net Allocated Cost:** *Calculated as Net Cost plus Allocated Cost, minus Drained Cost—capturing post-distribution values derived through active Cost Allocation Rules (CARs).*

The cost metric applied for PO calculations is determined by the "**Select Metric for PO Calculations**" field configured within your **billing adapter's Other Configuration tab**. This setting controls whether the PO consumption is based on raw cost metrics or CAR-governed allocations.

The selected metric directly impacts how and when the PO balance is consumed and determines compatibility with Cost Allocation Rules and multi-month accounting behaviour.

Metric Consumption Behaviour Comparison

Attribute	Net Cost	Net Allocated Cost
Calculation Basis	*Customer Cost adjusted by margins and discounts across multiple spend and usage dimensions.*	*Net Cost + Allocated Cost – Drained Cost, reflecting CAR-based cost distribution.*
CAR Dependency	No	Yes – mandatory
PO Balance Carry Forward	Supported	Not supported outside CAR validity
Multi-Month PO Support	Fully supported	Requires CAR extension across months
Frozen Balance Handling	Not applicable	Balance outside CAR validity is frozen and unusable
Cost Processing Scope	Entire PO date range	Limited to CAR's active month

PO Consumption Using the 'Net Cost' Metric

Example PO Configuration:

Let's say you created a PO configuration named **PO_012** with the following details:

- **Start Date**: September 16, 2024
- **End Date**: October 01, 2024
- **PO Value**: 50,000

- **Accounts**: ACC_01 and ACC_02

How to Track PO Consumption Using Cost Report:

To view the consumption details of **PO_012**:

1. Navigate to the **AWS Cost Report** page.
2. Filter the report by the accounts **ACC_01** and **ACC_02**, and set the start date to **September 16, 2024**.
3. Customise the report with the **Date** dimension and apply the following metrics:
    - **Net Cost**
    - **Purchase Order Balance**
    - **Purchase Order Value**

Note that the **Purchase Order Balance** and **Purchase Order Value** metrics will only be available when you have selected either **Date** or **Month** as the dimensions.

PO Balance Depletion:

- The daily net cost for the selected accounts will reduce the PO balance.
- The **Purchase Order Balance** metric shows the remaining balance after deducting the daily net cost. This balance becomes the **Purchase Order value** for the next day.
- If the net cost exceeds the PO value, the balance will display as zero (it will not show a negative value).

Example Report:

Date Wise Cost Report			
Date	Net Cost	Purchase Order Balance	Purchase Order Value
16 September 2024	5000	45000	50000
17 September 2024	4500	40500	45000
18 September 2024	2700	37800	40500
19 September 2024	6000	31800	37800
20 September 2024	3400	28400	31800
21 September 2024	2200	26200	28400
22 September 2024	2700	23500	26200
23 September 2024	1000	22500	23500
24 September 2024	1200	21300	22500
25 September 2024	1500	19800	21300
26 September 2024	1700	18100	19800
27 September 2024	5000	13100	18100
28 September 2024	7000	6100	13100
29 September 2024	3800	2300	6100
30 September 2024	5000	0	2300
01 October 2024	5000	0	0

As shown in the example above, the **Purchase Order Balance** reduces based on the **Net Cost** incurred each day. Once the PO value is fully depleted (i.e., the balance reaches zero), **PO_012** will no longer be valid for further consumption, even if the end date is not yet reached.

The PO value reduces daily based on the net costs incurred. Once the entire PO value is depleted (i.e., the balance reaches zero), the PO becomes invalid for further use, even if its specified end date has not yet passed.

To illustrate:

- Suppose you have a PO (PO_012) with an end date of **October 01, 2024**.
- If the balance is not fully depleted by October 01, 2024, the PO will remain valid and continue to be used.
- The balance will continue depleting daily based on incurred net cost until it is completely depleted.
- For example, if the PO_012 balance is fully depleted on **October 05, 2024**, the PO will become invalid on that date, regardless of the originally specified end date.

- Cost reports will reflect the PO balance and usage until it is fully depleted, which in this case is **October 05, 2024**.

In summary, the validity of the PO is determined by when its balance is depleted, not solely by its end date.

Matching POs and Cost Report Integration:

For matching POs in your CloudBolt CSMP account, consumption follows the PO period sequence in the cost report.

Example:

1. **PO_01**: Covers accounts ACC_001, ACC_002, ACC_003, and ACC_004 for the date range October 01, 2024, to November 03, 2024, with a PO amount of 15,000.
2. **PO_02**: Covers accounts ACC_001 and ACC_06 for the date range November 06, 2024, to November 20, 2024, with a PO amount of 8,000.

In the cost report:

- **PO_01** is consumed first.
- If **PO_01** is fully depleted by October 31, 2024, there will be no PO utilisation from November 01, 2024, to November 05, 2024, because **PO_02** starts on November 06, 2024.
- If **PO_01** has a remaining balance on November 03, 2024, it will continue to be utilised until the balance reaches zero. For example, if **PO_01** is fully depleted on November 07, 2024, then **PO_02** will start depleting from November 08, 2024, onward.

This sequential consumption ensures accurate tracking and utilisation of matching POs.

PO Consumption Using the 'Net Allocated Cost' Metric

When the **Net Allocated Cost** metric is selected, the PO only consumes cost that has been explicitly allocated to the PO's accounts through a valid **Cost Allocation Rule (CAR)**. The behaviour differs significantly from the Net Cost flow and includes restrictions that affect cross-month processing and PO lifecycle.

Example PO Configuration:

- **PO Name:** PO_021
- **Date Range:** March 15 – March 28, 2025
- **PO Value:** 30,000
- **Accounts:** ACC_07
- **Linked CAR:** March 2025

How to Track PO Consumption Using Cost Report:

1. Navigate to the AWS Cost Report page.
2. **Apply filters** as follows:
    - Select the **billing adapter** for which the PO is configured.
    - Apply the **Cost Allocation Rule** (CAR) filter that is associated with the PO.
    - Filter by the relevant **accounts** (e.g., ACC_07).
    - Set the **date range** to match the PO's validity window—for example, March 15 to March 28, 2025.
3. Customise the report with the **Date** dimension (alternatively, use **Month** if needed) and apply the following metrics:
    - **Net Allocated Cost**
    - **Purchase Order Balance**
    - **Purchase Order Value**

Note that the **Purchase Order Balance**, **Purchase Order Value** metrics, and the **Purchase Order Name (Description)** dimension will only be available for selection in the report when the **Date** or **Month** dimension is selected, and the **correct Cost Allocation Rule (CAR)** is applied in the cost allocation filter. Without these conditions, the relevant PO-related data will not appear in the report grid view.

PO Balance Depletion Rules:

- The daily net allocated cost for the selected accounts will reduce the PO balance. For more information refer to the Special Scenarios and Exceptional Cases (Net Allocated Cost Only) section below.

- The **Purchase Order Balance** metric shows the remaining balance after deducting the daily net allocated cost. This balance becomes the **Purchase Order value** for the next day.
- If the **net allocated cost exceeds the PO value**, the **balance will display as zero** (it will not show a negative value).
- PO consumption is restricted to the **month in which the linked CAR is valid**.
- Any cost falling **outside the CAR's active month** is ignored.
- Remaining PO balances are not carried forward unless the **CAR is explicitly extended**.
- The PO is effectively **frozen** when outside its CAR's validity.

Special Scenarios and Exceptional Cases (Net Allocated Cost Only)

When using the **Net Allocated Cost** metric for PO calculation, specific edge cases may impact how POs are consumed. The following scenarios outline these exceptions and the necessary user actions to ensure accurate PO processing.

1. **PO Consumption Start Date and End Date Behaviour**
    - **Scenario:** A PO is configured with a date range from **March 15 to March 28**, while the associated **CAR** is valid only for the month of **March**.
    - **Impact:** PO consumption begins on **March 15** and **continues daily until either the Net Allocated Cost exceeds the remaining PO balance** or until **March 31**, whichever comes first. Any **unused PO balance remain frozen from April 1** and becomes unusable beyond that date.
2. **Remaining PO Balance Carry Forward**
    - **Scenario:** A PO is created for the month of **March**, and the linked CAR is also valid only for March.
    - **Impact:** Any unutilised balance remaining at the end of March will become **frozen** starting **April 1** and will not carry forward automatically.
    - **Resolution:** To allow continued consumption into April, extend the **CAR's validity period** to include April.
3. **Multiple POs Using the Same CAR**

- **Scenario:** Two POs reference a **single CAR** that is valid only for **January**:
  - **PO1:** Active from **January 5 to January 20**
  - **PO2:** Active from **January 21 to January 30**
- **Impact:** PO1 begins consumption from January 5. If it is **fully depleted before January 20**, there will be **no PO usage** until PO2 becomes active on January 21. However, if **PO1 still has a balance** on January 20, it will continue to be consumed until it is exhausted—even past its configured end date. Only after PO1's balance reaches zero will **PO2 begin consumption**. Any **remaining balance** from either PO that persists into **February** will be **frozen** due to the CAR's limited validity.
- **Resolution:** Either **extend the January CAR into February** or **create a new PO** that is linked to a **February CAR**.

4. **Cross-Month PO Linked to a Single-Month CAR**
   - **Scenario:** A PO is configured for the date range **April 15 to May 15**, but the CAR selected is valid for **April only**.
   - **Impact:** The PO will be consumed only for the period **April 15 to April 30**. No consumption will occur in May, and the remaining balance will be **ignored** starting May 1.
   - **Resolution:** Extend the CAR's validity into **May** to enable full PO consumption across the intended date range.
5. **PO Spanning Multiple Months with Mid-Month CAR Selection**
   - **Scenario:** A PO is configured for the period **March 15 to July 31**, but the selected CAR is valid only for **June**.
   - **Impact:** The PO will only begin consumption on **June 1**, and will be active **only for the month of June**. PO usage in **March**, **April**, **May**, and **July** will be **skipped entirely**.
   - **Resolution:** To enable usage across the entire PO date range, either:
     - **Extend the CAR validity** to cover all months from March through July, or

- **Create separate POs** for each month, each mapped to its corresponding month's CAR.

Best Practices

- Always align the PO date range with the CAR's validity period.
- For cross-month POs, either:
  - Extend the CAR across all applicable months, or
  - Split POs monthly and link each to the correct CAR.

Limitations

1. On the cost report page, the metrics "Purchase Order Balance" and "Purchase Order Value" are only available for selection when the date/month dimension is selected. These metrics will not appear if other dimensions are selected.
2. On the cost report page, itemised cost data is not available for the metrics "Purchase Order Balance" and "Purchase Order Value". These metrics provide aggregated data only.
3. On the cost report page, if any records exist for a date/month with negative net costs, the metrics "Purchase Order Balance" and "Purchase Order Value" may not apply the correct algorithm for their calculations, resulting in inaccurate values being displayed for these two metrics.

Outcomes

You have learned the process of creating and managing AWS Purchase Order configurations in CloudBolt CSMP.

9.2. Management

Learn about the Management section of CloudBolt CSMP.

Introduction

The Management section of the CloudBolt CSMP covers the following topics. Jump to a topic to view information and setup steps for that function.

- Default Organization
- Manage Child Organisation
- Groups Policy Management
- Recommendation Policy
- My Profile

9.2.1. Default Organization

You will learn how to set default email domain and time zone.

Setting Default Email Domain

A **Default Organization Email Domain** can be used to generate email ID in combination with tag value. An admin user of the CloudBolt CSMP default organization can update their default organization email domain. Use this procedure to set your default organization email domain.

1. Log in to your CloudBolt CSMP account.
2. Click the **Settings icon > Default Organization**.
3. In the **Organization Email Domain** box, enter your domain name.
4. Click **Update**.

Setting Default Time Zone

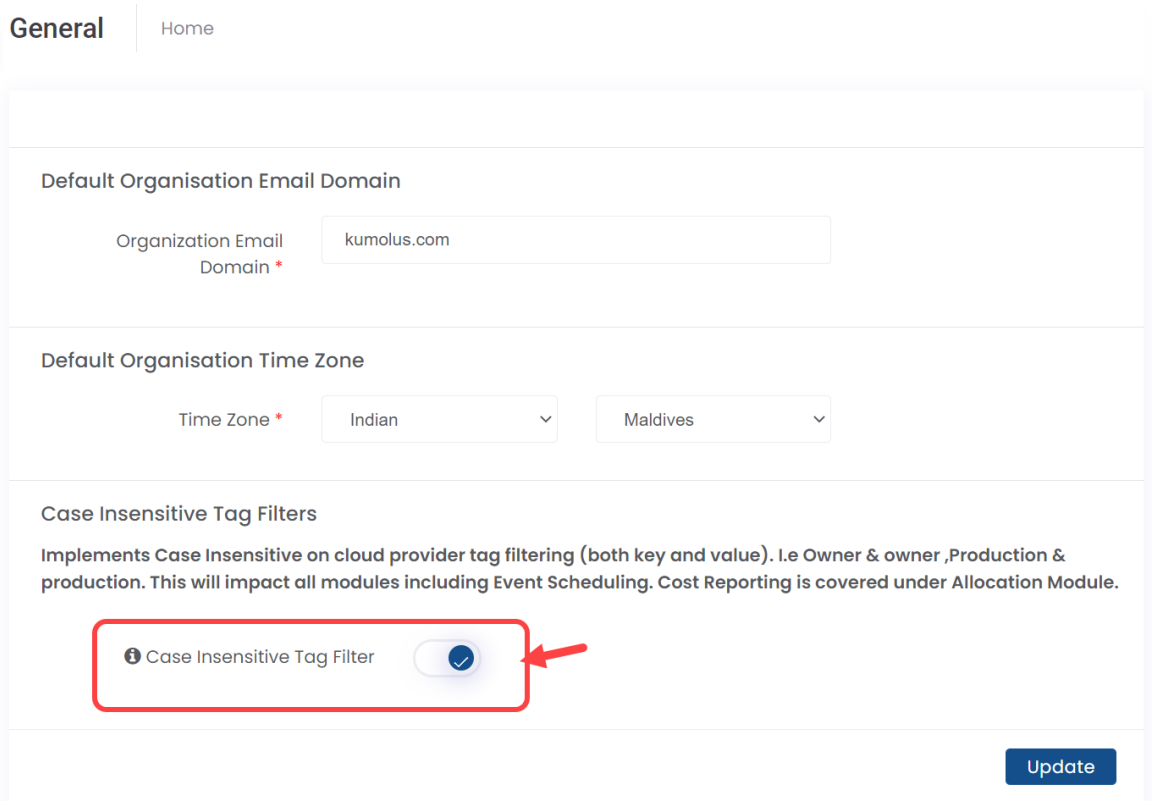
By default, the default organization time zone will be set to Australian Eastern Standard Time (UTC+10). An admin user of the CloudBolt CSMP default organization can update their default organization time zone. The time zone for all associated CloudBolt CSMP users account will be updated as per the default organization time zone. Each user can update profile data to set their time zone as per their local time. Use this procedure to update default organization time zone.

1. Log in to your CloudBolt CSMP account.
2. Click the **Settings icon > Default Organization**.
3. In the **Time Zone** drop-down, select your time zone.
4. Click **Update**.

Setting Case Insensitive Tag Filters

Tags are simple method to assign and identify metadata to your cloud resources at any time. CludBolt CSMP allows you to retrieve cloud resources based on their tags without having to worry about the font case of the tags. For this, you must enable case insensitive tag filters option. Use this procedure to enable case insensitive tag filters.

1. Log in to your CloudBolt CSMP account.
2. Click the **Settings icon > Default Organization.**
3. Enable **Case Insensitive Tag Filter**.



4. Click **Update**.

Outcomes

You have learnt about the CloudBolt CSMP default organization. You also know how to set default email domain and time zone for your CloudBolt CSMP account. You can now activate case insensitive tag filter feature.

9.2.2. Manage Child Organisation

Learn how to create a reseller, customer, and child organisation account from a parent organisation account.

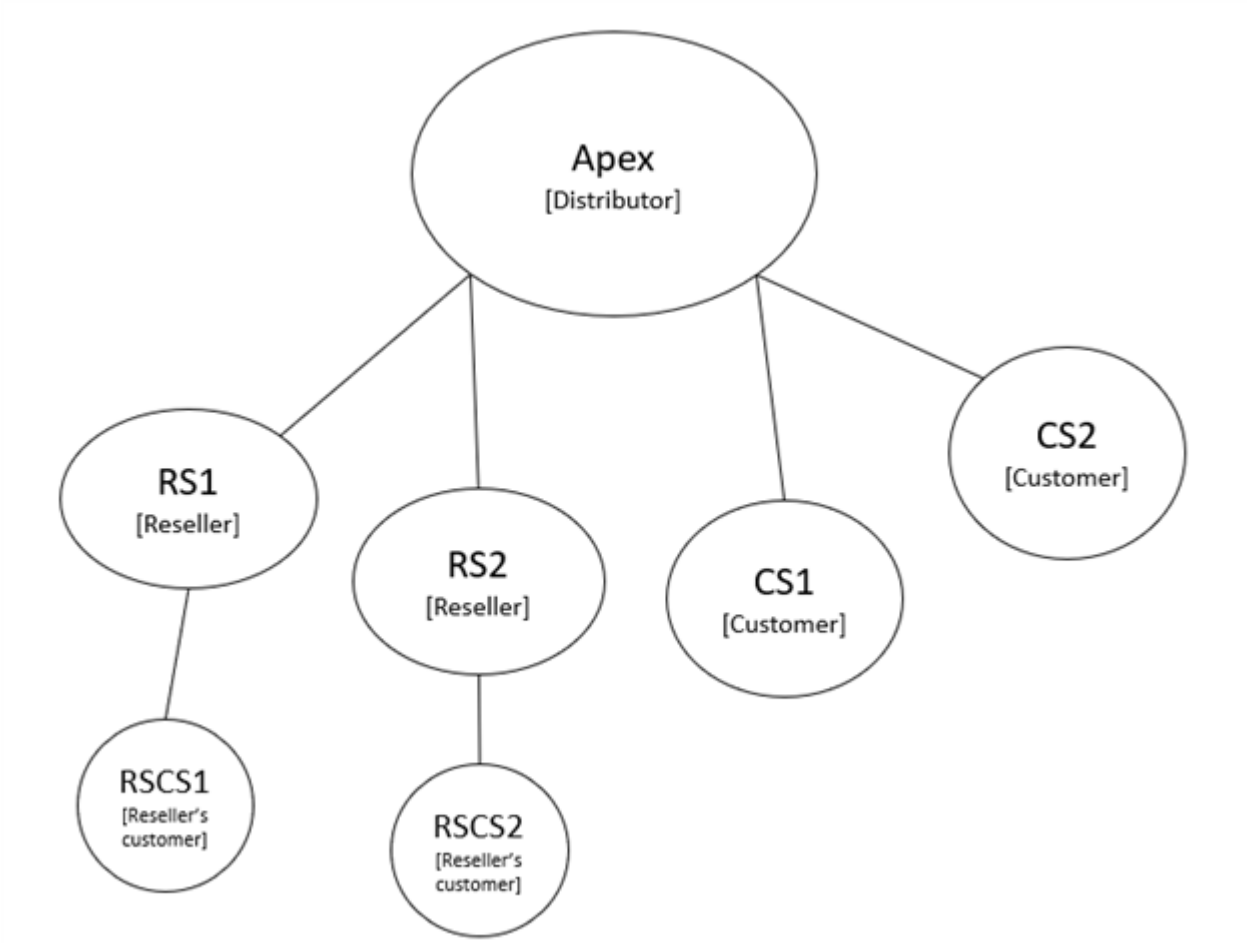
Overview

As a cloud business distributor, your clients may be direct customers, resellers, or both. Manage Child Organisation allows you to create separate CloudBolt CSMP subdomain for your client based on their business type. They can have separate SSO settings than yours. It allows your clients to manage their cloud services using CloudBolt CSMP analytics and pricing information. They can also customise their service adviser configuration to suite their cost-savings requirements.

A distributor mode can be used by a parent organisation who sells cloud services to resellers and/or direct customers. When Manage Child Organisation as **distributor mode** is enabled for a parent organisation, parent organisation admin can create separate CloudBolt subdomains for their resellers and customers. These subdomains will be known as reseller organisations and customer organisations based on the business types.

A service provider mode can be used by a parent organisation who sells cloud services to direct customers. Manage Child Organisation as **service provider** allows parent organisation admin to create separate CloudBolt subdomains for their customers. These subdomains will be known as child organisations.

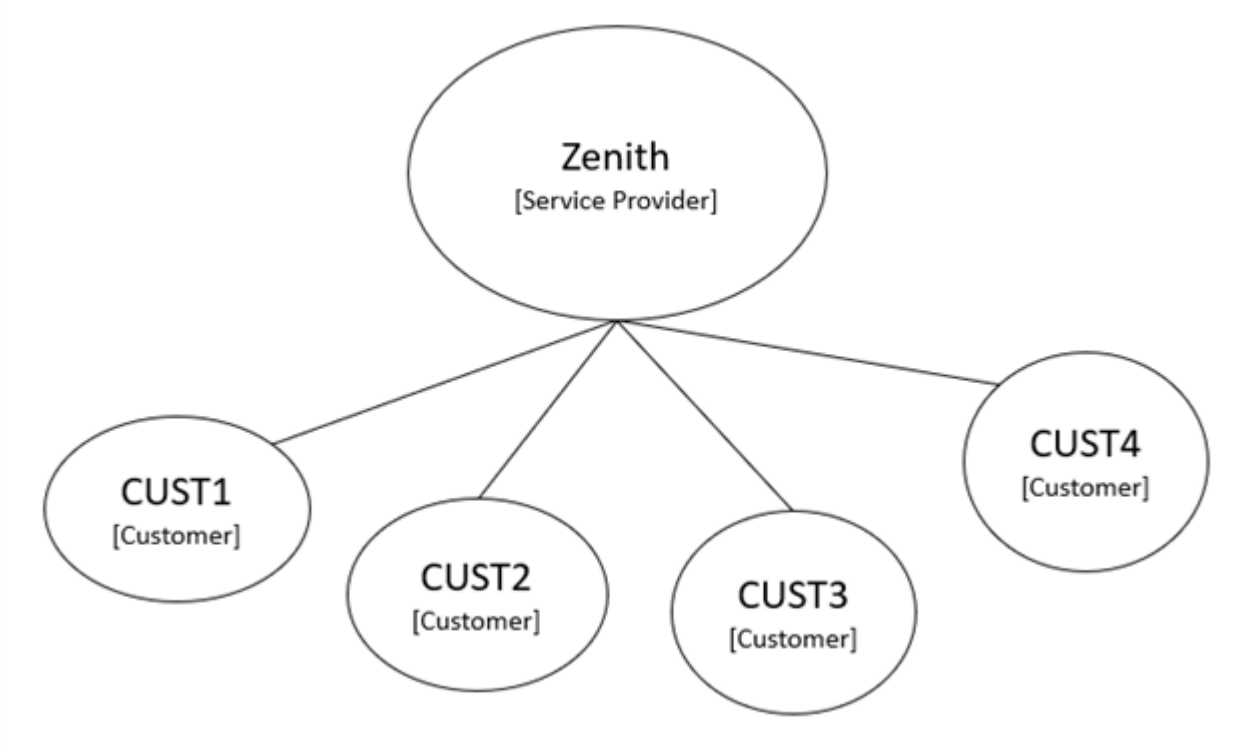
Let us say you serve ‘Apex’, a cloud distributor company. You have clients with business type reseller and customer. You have two resellers named RS1 and RS2, who sell their capacity to clients named RSCS1 and RSCS2, respectively. You do market your products directly to customers like CS1 and CS2. You might be charging your resellers and direct customers as per agreed contract. It might be challenging to invoice them correctly at the month end. With Manage Child Organisation, you can invoice them as per their consumptions with real-time updates as the month progresses.



For example, Apex is the distributor within CloudBolt CSMP account hierarchy. Being a parent organisation, Apex account administrator can create reseller and customer organisation's CloudBolt CSMP account using Manage Reseller Organisations and Customer Organisation options within the Manage Child Organisation. The Manage Reseller Organisations option can be used to create reseller organisation account for resellers RS1 and RS2. The reseller organisations (RS1 and RS2) administrators can further create child accounts for their customers (RSCS1 and RSCS2) using the Manage Customer Organisations option. Whereas customers (CS1 and CS2) will not have privilege to create their child organisations account. To create CloudBolt CSMP account for direct customers (CS1 and CS2), Apex account administrator can use Manage Customer Organisations option.

You must need to submit a request using CloudBolt CSMP support to get the distributor mode within the **Manage Child Organisation** access enabled for your CloudBolt CSMP account.

In another case, let us say you serve 'Zenith', a cloud service provider company having hundreds of customers. Using the service provider mode of **Manage Child Organisation** you can create separate CloudBolt subdomains for each customer.



In the above illustration, Zenith is the service provider, who uses CloudBolt CSMP to manage their customers' cloud cost invoices. Being a parent organisation, Zenith account administrator can create their customers (CUST1, CUST2, CUST3, and CUST4) CloudBolt CSMP account using the **Manage Child Organisation** option. Customers (CUST1, CUST2, CUST3, and CUST4) will not have privilege to create their child organisations account. You must need to submit a request using CloudBolt CSMP support to get the service provider mode within the **Manage Child Organisation** access enabled for your CloudBolt CSMP account.

- Create and Manage Reseller Organisation
- Create and Manage Customer Organisation
- Create and Manage Child Organisation

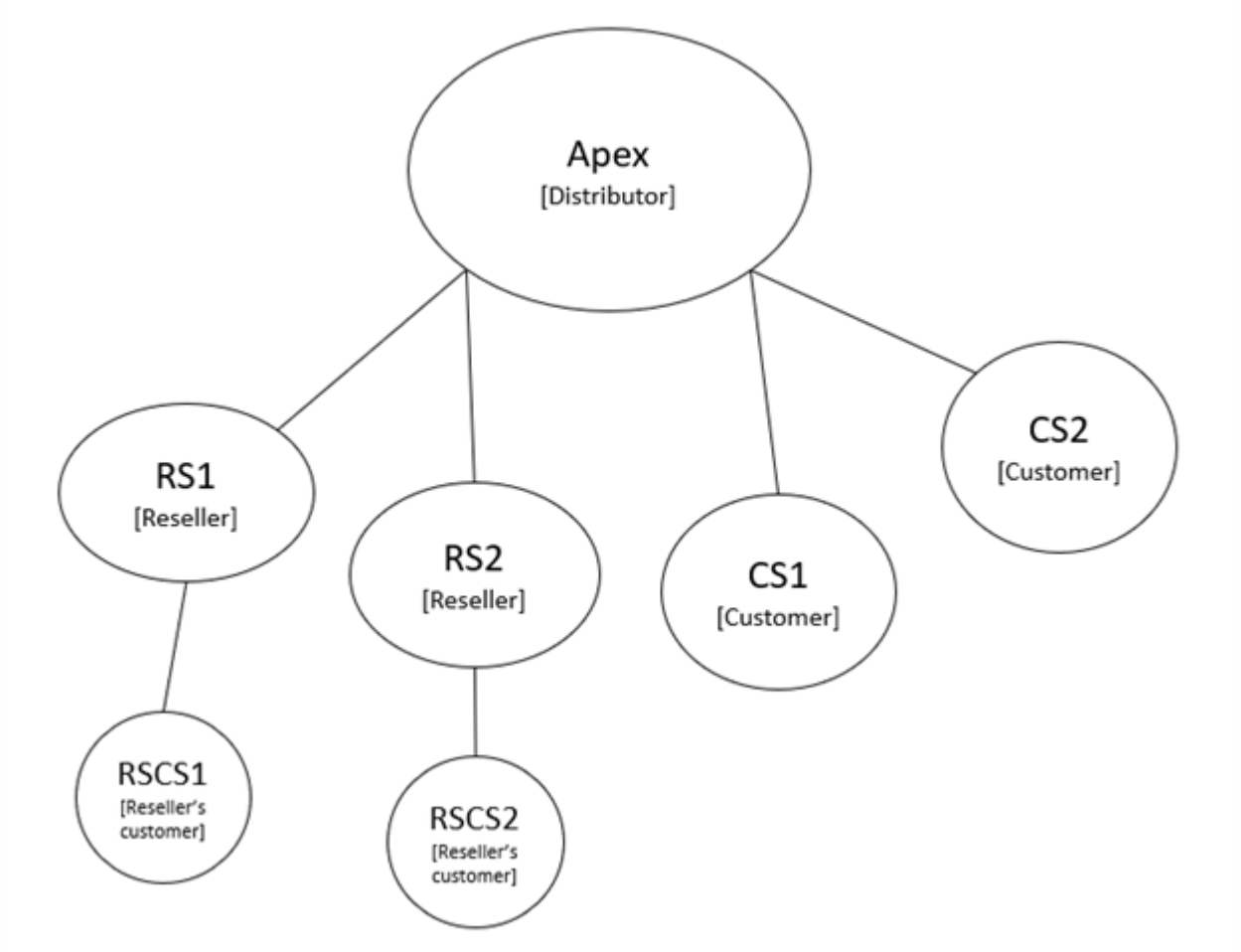
9.2.2.1. Create and Manage Reseller Organisation

Learn how to create a new reseller organisation within your CloudBolt CSMP account.

Introduction

Being a cloud services distributor, you might have clients who resells your services. Using CloudBolt CSMP account you can create a reseller account to monitor the cloud cost and optimization methods.

Let us say you serve ‘Apex’, a cloud distributor company. You have clients with business type reseller and customer. You have two resellers named RS1 and RS2, who sell their capacity to clients named RSCS1 and RSCS2, respectively. You do market your products directly to customers like CS1 and CS2. You might be charging your resellers and direct customers as per agreed contract. It might be challenging to invoice them correctly at the month end. With Manage Child Organisation, you can invoice them as per their consumptions with a real-time update as the month progresses.



To create CloudBolt CSMP resellers' account for your resellers RS1 and RS2, you can use Manage Reseller Organisations option within Manage Child Organisation option. To create CloudBolt CSMP customers' account for your direct customers, you can use Customer Organisation option within Manage Child Organisation option.

In this publication, we will learn about creating and managing a reseller organisation account for a parent CloudBolt CSMP account.

Prerequisites

To create and manage reseller organisations account user must have following privileges:

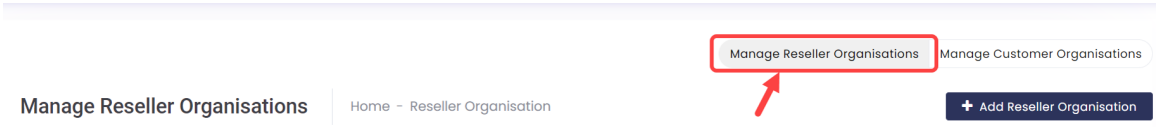
- A parent organisation's Default tenant user with administrator role having permissions to view, add, edit, activate/deactivate reseller 0rganisation, and share/remove adapters.

- To create a reseller organisation, parent organisation admin user need to submit a request using CloudBolt CSMP support to get the manage child organisation access with distributor mode enabled for their account from the CloudBolt CSMP support team.

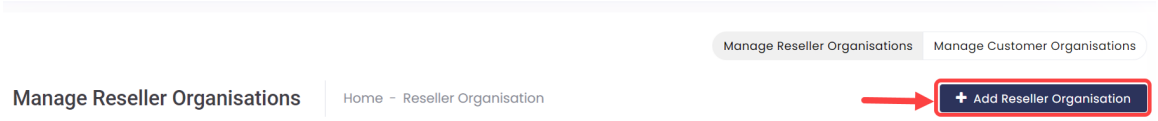
Creating a Reseller Organisation

Use this procedure to create a new reseller organisation.

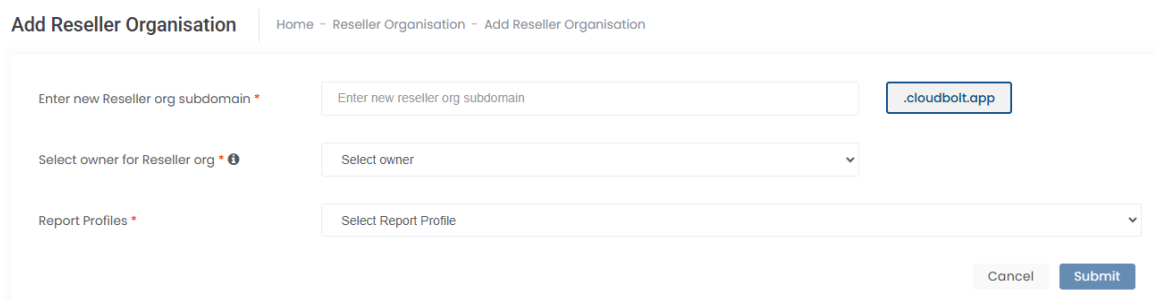
1. Login to your CloudBolt CSMP account.
2. Go to **Settings []** from the header bar and then click **Manage Child Organisation** under management.
3. By default, **Manage Reseller Organisations** page appears. If not, click Manage Reseller Organisations tab available at the upper right.



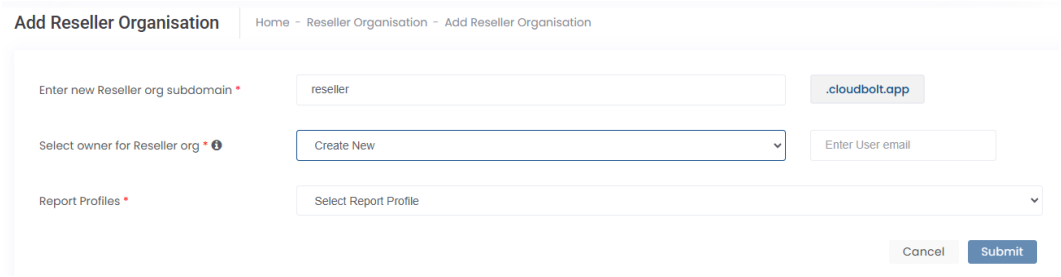
4. Click **+ Add Reseller Organisation**.



5. **Add Reseller Organisation** page appears.

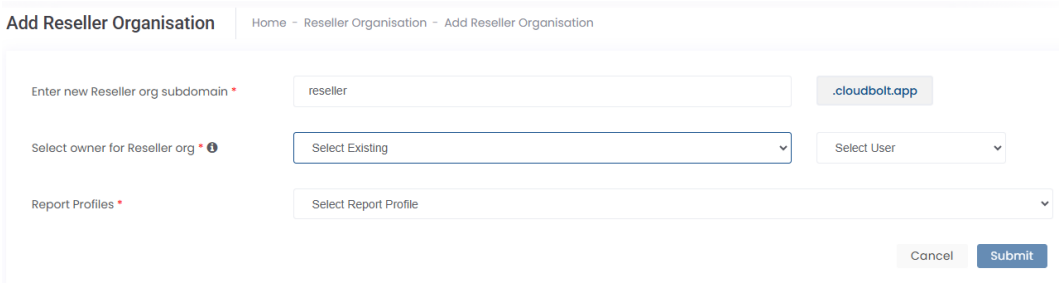


6. In the **Enter new reseller org subdomain** textbox, enter a domain name for the reseller organisation. If you have added *reseller* as subdomain name, then the URL for your reseller organisation would be *https://reseller.cloudbolt.app/*.
7. In the **Select owner for reseller org** drop-down select an owner for your reseller organisation:
    a. If you click **Create New** option, enter the email address of the user whom you want to assign as owner of the new reseller organisation account.

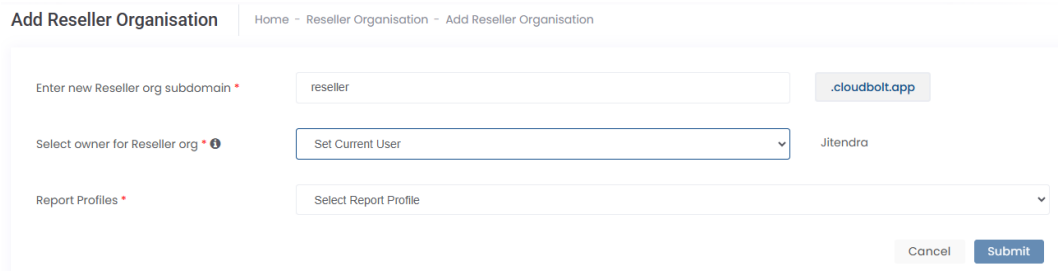


    b. If you click **Select Existing** option, you can select a user within your existing users as an owner.

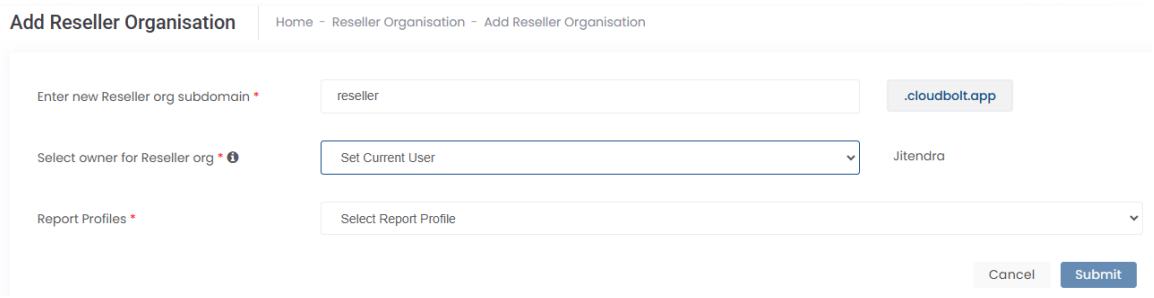
> Only KUMO Usertype users can be chosen to be the owner of a reseller organisation.



    c. If you click **Set Current User** option, you will be assigned as an owner for the reseller organisation.



8. In the **Report Profiles** drop-down, select a Report Profile for this reseller organisation.



9. Click **Submit**.
10. After few moments, you will see a message indicating your reseller organisation added successfully. You can see list of all your reseller organisations on the Manage Reseller Organisations page.
    a. Domain column displays your reseller organisation's URL.
    b. Shared Adapters/Accounts column lists all the billing and normal adapters shared with your reseller organisation.
    c. Shared Adapters Groups column lists all the adapter groups shared with your reseller organisation.
    d. State column displays the status of your reseller organisation.
    e. Report profile column displays the report profile shared with the reseller organisation.
    f. Action column provides option to deactivate, share adapters and adapter groups, and view users associated with the selected reseller organisation.

Activating a Reseller Organisation Owner Account

Whenever a user has been assigned as owner of a reseller organisation, user will receive an invitation email from the CloudBolt Support. To activate the owner profile for the reseller organisation, user must sign up using the URL provided in the email. Upon successful sign up, owner profile becomes active.

Owner of a reseller organisation can perform all the activities on the CSMP account except for creating any adapters and automation module. Reseller organisation owner can create and manage customer account for their cloud services buyers.

Sharing Adapters and Adapter Groups to the Reseller Organisation

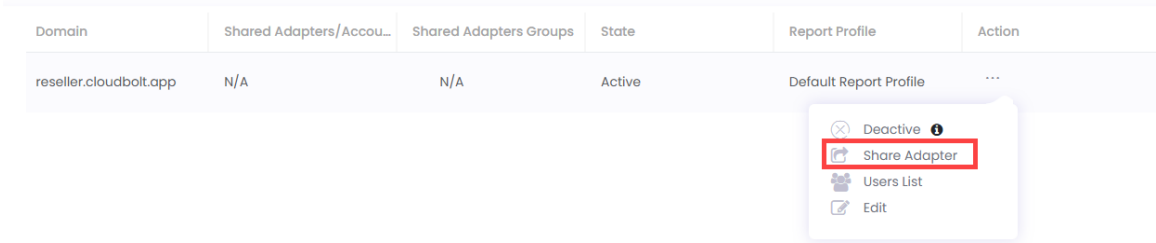
Parent organisation admin can share their billing adapter, normal adapter, and adapter groups with reseller organisations.

Important

An individual normal adapter and adapter groups can be shared with only one reseller or customer organisation. Let us say, you have normal adapters AD1, AD2, AD3, AD4, and AD5. You have also an adapter group ADG1 consists of adapters AD4 and AD5. You have resellers RS1 and RS2 and direct customer CS1 in your CloudBolt CSMP organisation. For example, if normal adapters AD1 and AD4 have been shared with reseller RS1, then those adapters cannot be shared with another organisation's account. Also, it must be noted that adapter group ADG1 consists of adapters AD4 and AD5; so, ADG1 cannot be shared with another organisation's account.

Use this procedure to share adapter and adapter groups with a reseller organisation.

1. Go to Manage Reseller Organisations page.
2. Identify the reseller organisation domain with whom you want to share the adapters or adapter groups.
3. Click the ellipsis icon [...] under the **Action** column of the associated reseller organisation and then click **Share Adapter**.



4. On the **Shared Adapter** page, select the cloud provider tab from the right side whose adapters you want to share. You must select at least one billing adapter from the **Choose Billing Adapters** drop-down.
5. Based on your billing adapter(s) selection, Choose Adapters Group and Choose Normal Adapter drop-downs will enable the associated list for selection.
6. Select the adapter group(s) under the Choose Adapters Group drop-down.

   Note

   a. After choosing the adapter groups, if any of the chosen billing adapters are removed from the Choose Billing Adapter list, the selection of all the adapter groups will be lost, and you will need to choose them again.
   b. Deselecting a billing adapter will, however, simply deselect the relevant adapter group, if any, provided the shared adapters were previously saved. The associated adapter group will automatically be selected when the previously shared billing adapter is reselected.

7. Select the normal adapters under the **Choose Normal Adapter** drop-down and then click **Save**. A maximum of 99 normal adapters including the ones that are a member of adapter groups can be shared for each cloud provider.

   Note
   After choosing the normal adapters, if any of the chosen billing adapters are removed from the Choose Billing Adapter list, the selection of all the normal adapters will be lost, and you will need to choose them again.

8. A message dialog box will appear asking to confirm share of adapters with reseller organisation. Click **OK** to confirm the adapter sharing, else click **Cancel** to re-select the adapters.

Viewing Users List of a Reseller Organisation

A parent organisation admin can view a list of all the users available in their reseller organisation. Use this procedure to view list of users available in a reseller organisation.

1. Go to Manage Reseller Organisations page.
2. Identify the reseller organisation domain whose users list you want to view.
3. Click the ellipsis icon [...] under the **Action** column of the associated reseller organisation and then click **Users List**.
4. A list of all the users available in that reseller organisation will appear.
5. User state can be Invited, Active, or Disabled.
    a. User state can be *Invited* when a new user has been added to the organisation, but user has not completed their sign up process.
    b. User state can be *Active* when a user has completed their sign up process using the URL provided in the welcome email.
    c. User state can be *Disabled* when reseller organisation owner has disabled a user.

Deactivating a Reseller Organisation

Reseller organisation owner can only deactivate their CloudBolt CSMP account. To deactivate a reseller organisation using parent organisation, you must be owner for the reseller organisation that you want to deactivate.

Use this procedure to deactivate a reseller organisation.

1. Go to Manage Reseller Organisations page.
2. Identify the reseller organisation domain that you want to deactivate.
3. Click the ellipsis icon [...] under the **Action** column of the associated reseller organisation and then click **Deactive**. Deactive option will be available only when you are owner for that reseller organisation.
4. A message dialog box will appear, click **Ok**.

5. Reseller organisation is deactivated.
6. You can activate your reseller organisation account by clicking **Active** option.

Editing a Reseller Organisation

Edit option for a reseller organisation allows you to update the report profile shared with the reseller organisation.

1. Go to the Manage Reseller Organisations page.
2. Identify the reseller organisation domain whose report profile you want to change.
3. Click the ellipsis icon [...] under the **Action** column of the associated reseller organisation and then click **Edit**.
4. Select a new report profile and click **Update**.

Viewing Member List

A parent organization administrator can use the member list URL to get a list of reseller organisations that have a user with the specified username and password combination in their CloudBolt CSMP organisation. The member list URL will be in the format `https://<parent organisation domain>.cloudbolt.app/member/login`, where the `<parent organisation domain>` is the site name of the parent organisation.

On the **Member Log In** page, enter the username, password, and then click **Log In**. A list of reseller organisations containing a user with the previously entered username and password combination will display. Clicking on the organisation name will log you into the selected organisation. If the entered username and password combination does not match with any of the reseller organisation's user credentials, an error message similar to: 'Incorrect username or password' will display.

When a reseller organisation is not active, clicking on the organisation name will show an error message similar to: 'Your Organisation has been deactivated. Please contact our Support team.' When a reseller organisation user has not confirmed the email id, clicking on the organisation name will show an error message similar to: 'Email Id not confirmed yet. Please confirm your email ID first.'

Filter the reseller organisation list by subdomain name. Click **Back to Login** to go back to member log in page.

Outcomes

You have learnt how to create and manage a reseller organisation within your CloudBolt CSMP account. The following actions are prohibited on a reseller account:

- Creating and synchronising adapters
- Creating and managing automated cloud events to manage cloud services
- Creating and managing new reseller organisations within their CloudBolt CSMP organisation.

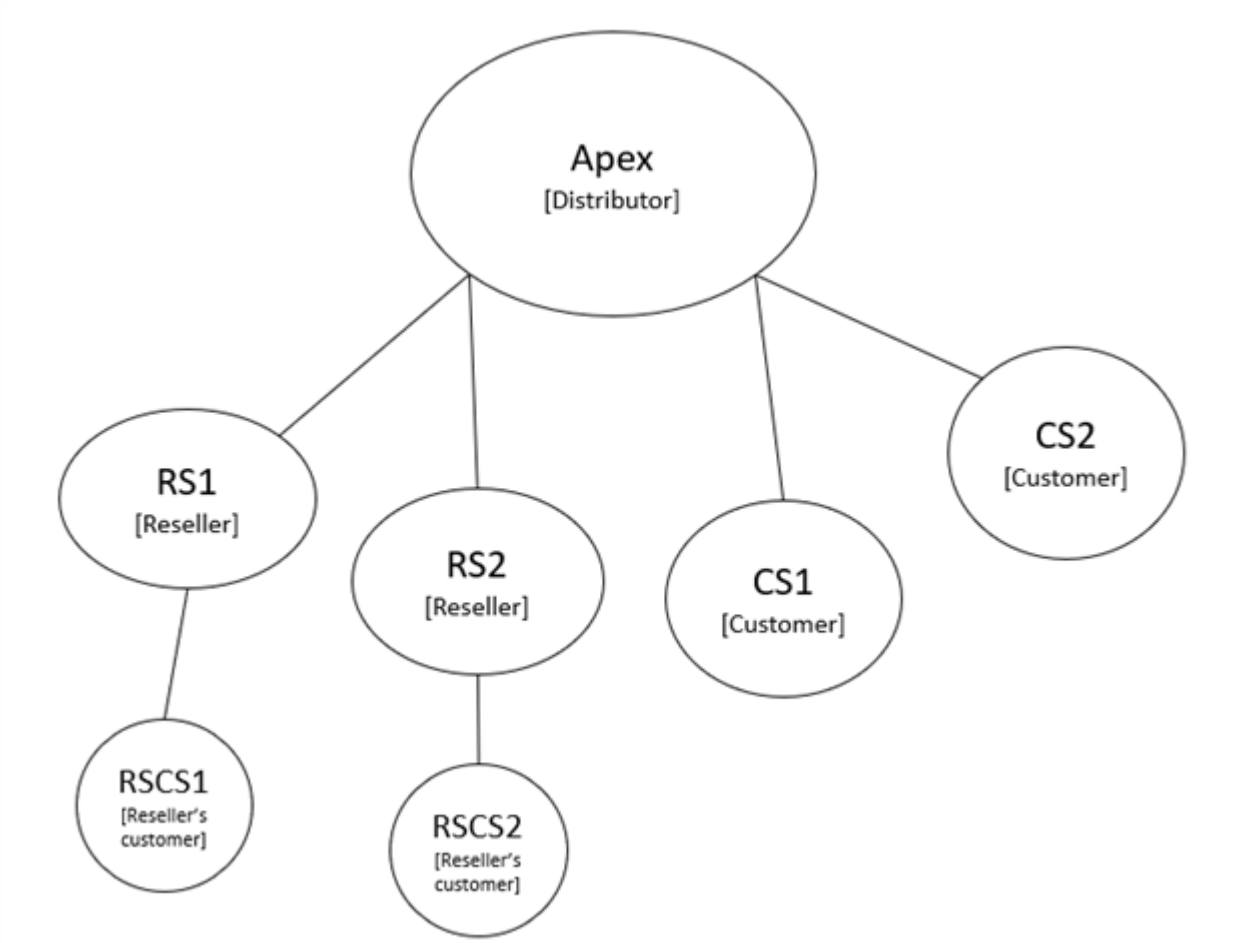
9.2.2.2. Create and Manage Customer Organisation

Learn how to create a new customer organisation within your CloudBolt CSMP account.

Introduction

Being a cloud services distributor, you might have direct customers who use your services. Using CloudBolt CSMP account you can create a customer account to monitor the cloud cost and optimization methods. If you are a cloud reseller and your distributor had created a reseller account in CloudBolt CSMP for your organisation, then you can create customer accounts for your customers using the Manage Child Organisation option.

Let us say you serve ‘Apex’, a cloud distributor company. You have clients with business type reseller and customer. You have two resellers named RS1 and RS2, who sell their capacity to clients named RSCS1 and RSCS2, respectively. You do market your products directly to customers like CS1 and CS2. You might be charging your resellers and direct customers as per agreed contract. It might be challenging to invoice them correctly at the month end. With Manage Child Organisation, you can invoice them as per their consumptions with a real-time update as the month progresses.



To create CloudBolt CSMP customers' account for your direct customers CS1 and CS2, you can use Manage Customer Organisations option within Manage Child Organisation option. To create a reseller's customer account for your resellers, reseller admin must use the Customer Organisation option within the Manage Child Organisation option.

In this publication, we will learn about creating and managing a customer organisation account for a parent and reseller CloudBolt CSMP account.

Prerequisites

To create and manage customer organisations account user must have following privileges:

- A parent organisation's Default tenant user with an administrator role has permissions to view, add, edit, activate/deactivate customer organisation, and share/remove adapters.

- To create a customer organisation, parent organisation admin user needs to submit a request using CloudBolt CSMP support to get manage child organisation access with distributor mode enabled for their account from the CloudBolt CSMP support team.

If you are a reseller, a user with administrator role permissions can create customer organisation.

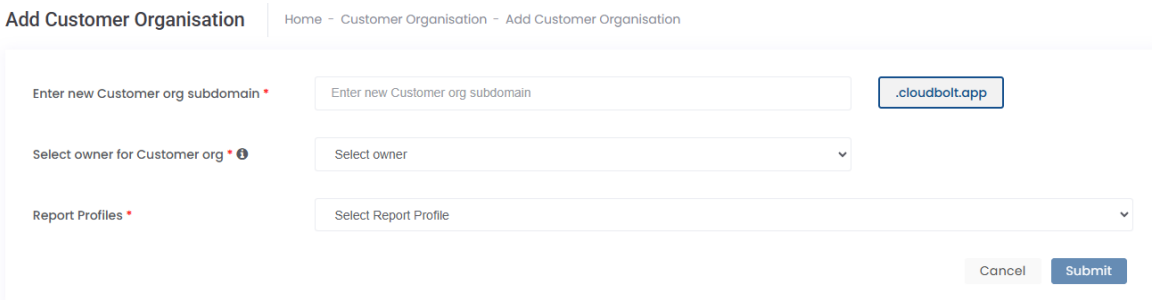
Creating a Customer Organisation

Use this procedure to create a new customer organisation.

1. Login to your CloudBolt CSMP account.
2. Go to **Settings []** from the header bar and then click **Manage Child Organisation** under management.
3. If you are a parent organisation user, click **Manage Customer Organisations** tab available at the upper right.



4. If you are a reseller organisation user, Customer Organisation page will appear.
5. Click **+ Add Customer Organisation** button.
6. Add Customer Organisation page appears.

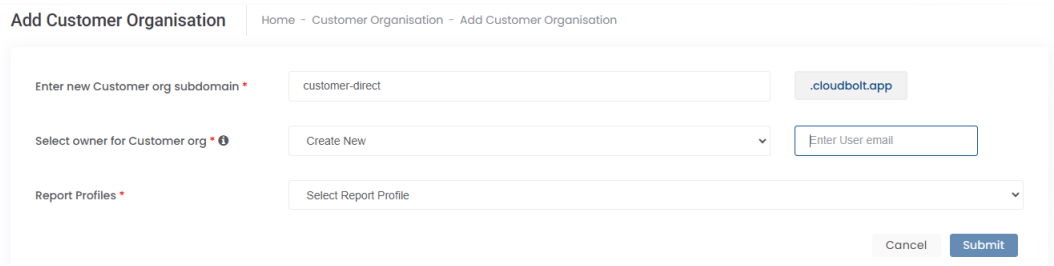


7. In the **Enter new customer org subdomain** textbox, enter a domain name for the customer organisation. If you have added *customer-direct* as subdomain name, then

the URL for your customer organisation would be *https://customer-direct.cloudbolt.app/*.

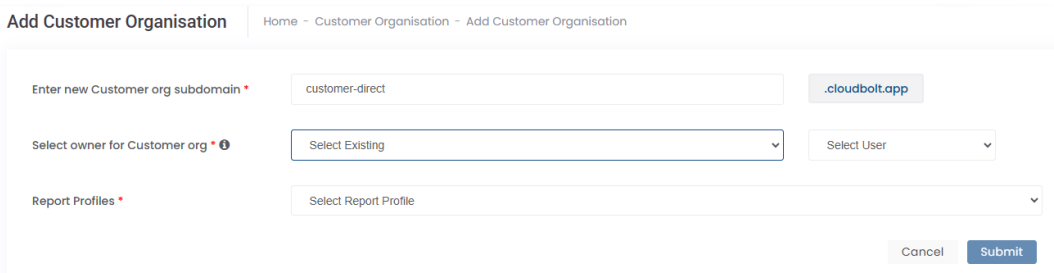
8. In the **Select owner for customer org** drop-down select an owner for your customer organisation:

    a. If you click **Create New** option, enter the email address of the user whom you want to assign as owner of the new customer organisation account.

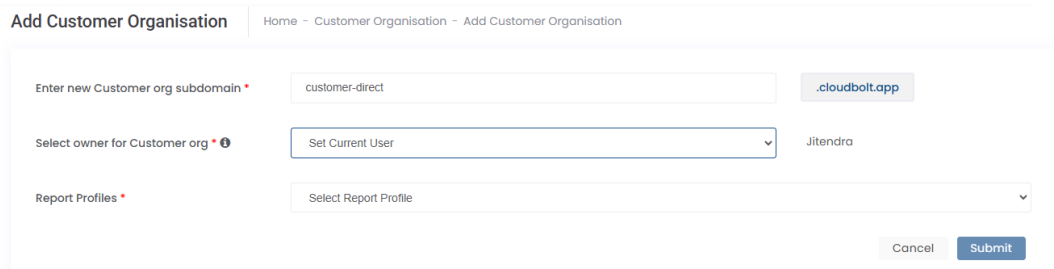


    b. If you click **Select Existing** option, you can select a user within your existing users as an owner.

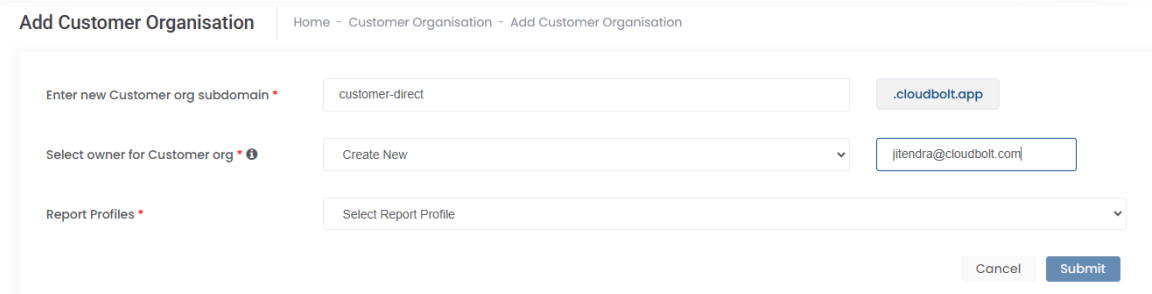
> Only KUMO Usertype users can be chosen to be the owner of a customer organisation.



    c. If you click **Set Current User** option, you will be assigned as an owner for the customer organisation.



9. In the **Report Profiles** drop-down, select a report profile for this customer organisation.



10. Click **Submit**.
11. After few moments, you will see a message indicating your customer organisation added successfully. You can see list of all your customer organisations on the Customer Organisation page.
    a. Domain column displays your customer organisation's URL.
    b. Shared Adapters/Accounts column lists all the billing and normal adapters that you have shared with your customer organisation.
    c. Shared Adapters Groups column lists all the adapter groups that you have shared with your customer organisation.
    d. State column displays the status of your customer organisation.
    e. Report profile column displays the report profile shared with the customer organisation.
    f. Action column provides option to deactivate, share adapters and adapter groups, and view users associated with the selected customer organisation.

Activating a Customer Organisation Owner Account

Whenever a user has been assigned as owner of a customer organisation, user will receive an invitation email from the CloudBolt Support. To activate the owner profile for the customer organisation, user must sign up using the URL provided in the email. Upon successful sign up, owner profile becomes active.

Sharing Adapters and Adapter Groups to the Customer Organisation

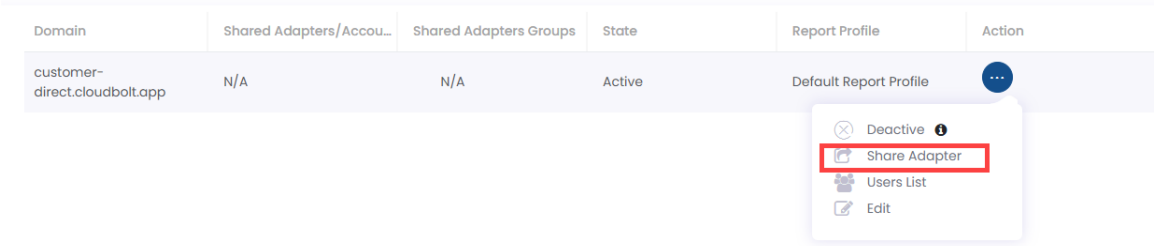
Parent or reseller organisation admin can share their billing adapter, normal adapter, and adapter groups with customer organisations.

Important

An individual normal adapter and adapter groups can be shared with only one reseller or customer organisation. Let us say, you have normal adapters AD1, AD2, AD3, AD4, and AD5. You have also an adapter group ADG1 consists of normal adapters AD4 and AD5. You have customers CS1 and CS2 in your CloudBolt CSMP organisation. For example, if adapters AD1 and AD4 have been shared with customer CS1, then those adapters cannot be shared with another customer's account. Also, it must be noted that adapter group ADG1 consists of adapters AD4 and AD5; so, ADG1 cannot be shared with another customer's account.

Use this procedure to share adapter and adapter groups with a customer organisation.

1. Go to Customer Organisation page.
2. Identify the customer organisation domain with whom you want to share the adapters or adapter groups.
3. Click the ellipsis icon [...] under the **Action** column of the associated customer organisation and then click **Share Adapter**.



4. On the **Shared Adapter** page, select the cloud provider tab from the right side whose adapters you want to share. You must select at least one billing adapter from the **Choose Billing Adapters** drop-down.
5. Based on your billing adapter(s) selection, Choose Adapters Group and Choose Normal Adapter drop-downs will enable the associated list for selection.

6. Select the adapter group(s) under the **Choose Adapters Group** drop-down.

   Note

   a. After choosing the adapter groups, if any of the chosen billing adapters are removed from the Choose Billing Adapter list, the selection of all the adapter groups will be lost, and you will need to choose them again.
   b. Deselecting a billing adapter will, however, simply deselect the relevant adapter group, if any, provided the shared adapters were previously saved. The associated adapter group will automatically be selected when the previously shared billing adapter is reselected.

7. Select the normal adapters under the **Choose Normal Adapter** drop-down and then click **Save**. A maximum of 99 normal adapters including the ones that are a member of adapter groups can be shared for each cloud provider.

   Note
   After choosing the normal adapters, if any of the chosen billing adapters are removed from the Choose Billing Adapter list, the selection of all the normal adapters will be lost, and you will need to choose them again.

8. A message dialog box will appear asking to confirm share of adapters with customer organisation. Click **OK** to confirm the adapter sharing, else click **Cancel** to re-select the adapters.

Viewing Users List of a Customer Organisation

A parent or reseller organisation admin can view a list of all the users available in their customer organisation. Use this procedure to view list of users available in a customer organisation.

1. Go to Customer Organisation page.
2. Identify the customer organisation domain whose users list you want to view.
3. Click the ellipsis icon [...] under the **Action** column of the associated customer organisation and then click **Users List**.
4. A list of all the users available in that customer organisation will appear.

5. User state can be Invited, Active, or Disabled.
    a. User state can be *Invited* when a new user has been added to the organisation, but user has not completed their sign up process.
    b. User state can be *Active* when a user has completed their sign up process using the URL provided in the welcome email.
    c. User state can be *Disabled* when reseller organisation owner has disabled a user.

Deactivating a Customer Organisation

Customer organisation owner can only deactivate their CloudBolt CSMP account. To deactivate a customer organisation using parent or reseller organisation, you must be owner for the customer organisation that you want to deactivate.

Use this procedure to deactivate a customer organisation.

1. Go to Customer Organisation page.
2. Identify the customer organisation domain that you want to deactivate.
3. Click the ellipsis icon [...] under the **Action** column of the associated customer organisation and then click **Deactive**. Deactive option will be available only when you are owner for that customer organisation.
4. A message dialog box will appear, click **Ok**.
5. Customer organisation is deactivated.
6. You can activate your customer organisation account by clicking **Active** option.

Editing a Customer Organisation

Edit option for a customer organisation allows you to update the report profile shared with the customer organisation.

1. Go to the Customer Organisation page.
2. Identify the customer organisation domain whose report profile you want to change.

3. Click the ellipsis icon [...] under the Action column of the associated customer organisation and then click Edit.
4. Select a new report profile and click Update.

Outcomes

You have learnt how to create and manage a customer organisation within your CloudBolt CSMP account. A customer organisation can create adapters to view and manage their cloud services cost insights. See Adapter Configurations to create and manage cloud adapters.

9.2.2.3. Create and Manage Child Organisation

Learn how to create a new child organisation within your CloudBolt CSMP account.

Introduction

The CloudBolt CSMP child organisation concept is developed to allow several users from various departments within an existing CloudBolt CSMP organisation to use the same application at the same time. Each user has their own user interface of the CloudBolt CSMP, which they use, administrate, and configure as a separate instance of the platform, with no knowledge of other users who are using the same application.

Child organisation concept ensures that users do not have access to data that is not for their own department. It uses billing adapter, normal adapter, and adapter groups to restrict the data. A child organisation is typically an organisation with all the access same as a parent organisation account except for creation of other child account within a child organisation.

- Introduction
- Prerequisites
- Creating a Child Organisation
- Activating a Child Organization Owner Account
- Sharing Adapters and Adapter Groups to the Child Organization
- Viewing Users List of a Child Organization
- Deactivating a Child Organization
- Editing a Child Organization
- Viewing Member List
- Outcomes

Prerequisites

A parent organisation user being a member of Default tenant can only create and manage child organisation within their CloudBolt CSMP. To create a child organisation, parent organisation admin user need to submit a request using CloudBolt CSMP support to get the *manage child organization* access enabled for their profile from the CloudBolt CSMP support team.

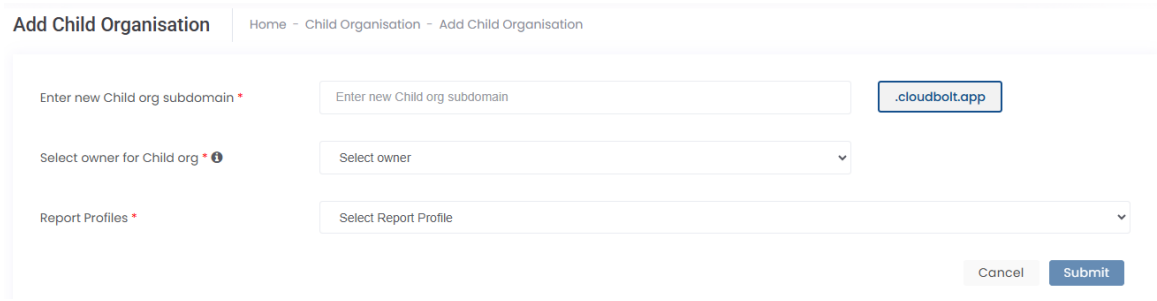
Creating a Child Organisation

Use this procedure to create a new child organisation.

1. Login to your CloudBolt CSMP account.
2. Go to **Settings** from the header bar and then click Manage Child Organization under management.
3. Child Organization page appears.
4. To add a new child organization, click + Add Child Organization button.

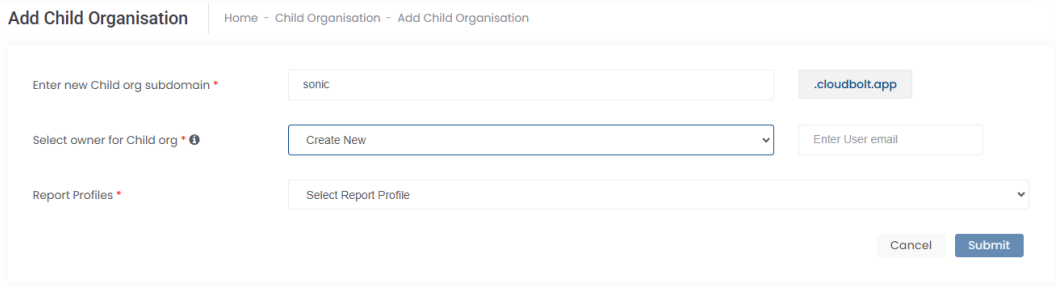


5. Add Child Organization page appears.



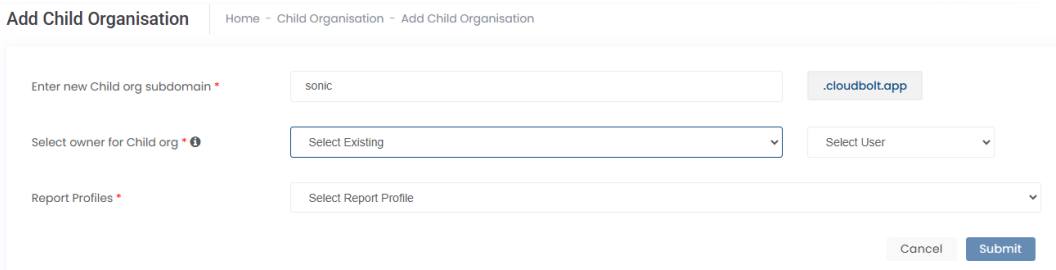
6. In the **Enter new child org subdomain** textbox, enter a domain name for the child organization. If you have added *sonic* as subdomain name, then the URL for your child organization would be https://*sonic*.cloudbolt.app/.
7. In the **Select owner for child org** drop-down select an owner for your child organization:

a. If you click **Create New** option, enter the email address of the user whom you want to assign as owner of the new child organization account.



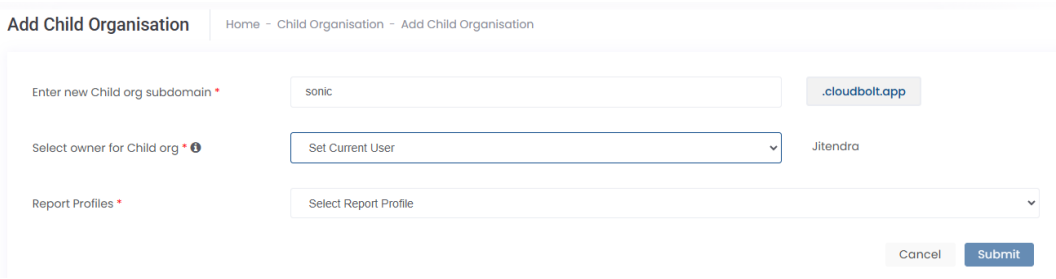
b. If you click **Select Existing** option, you can select a user within your existing users as an owner.

> Note
> Only KUMO Usertype users can be chosen to be the owner of a child organisation.

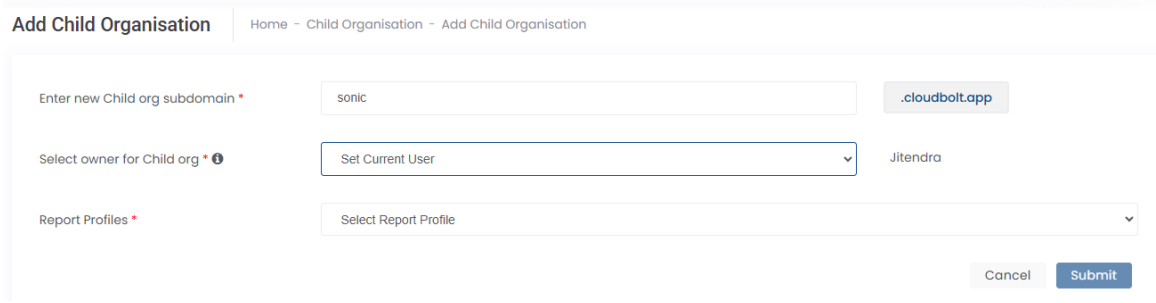


c. If you click **Set Current User** option, you will be assigned as an owner for the child organization.

> Note
> You won't see this option if you have logged in as a SAML user type.



8. Select a Report Profile for this child organization.



9. Click **Submit**.
10. After few moments, you will see a message indicating your child organization added successfully. You can see list of all your child organizations on the Child Organization page.
    a. Domain column displays your child organization's URL.
    b. Shared Adapters/Accounts column lists all the billing and normal adapters shared with your child organization.
    c. Shared Adapters Groups column lists all the adapter groups shared with your child organization.
    d. State column displays the status of your child organization.
    e. Action column provides option to deactivate, share adapters and adapter groups, and view users associated with the child organization.

Activating a Child Organization Owner Account

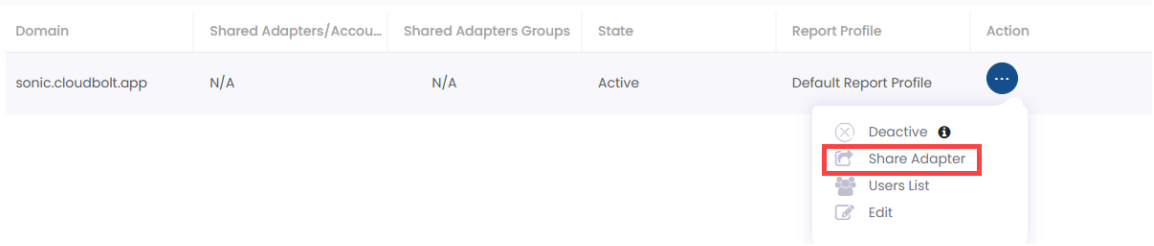
Whenever a user has been assigned as owner of a child organization, user will receive a invitation email from the CloudBolt CSMP. To activate the owner profile for the child organization, user must sign up using the URL provided in the email. Upon successful sign up, owner profile will be active.

Owner of a child organization can perform all the activities on the CSMP account except creation of another child organization.

Sharing Adapters and Adapter Groups to the Child Organization

Default organization admin can share their billing adapter, normal adapter, and adapter groups with a child organization. Use this procedure to share adapter and adapter groups with a child organization.

1. Go to Child Organization page.
2. Identify the child organization domain with whom you want to share the adapters or adapter groups.
3. Click the ellipsis icon [...] under the **Action** column of the associated child organization and then click **Share Adapter**.



4. On the **Shared Adapter** page, select the cloud provider tab from the right side whose billing adapter you want to share. You must select at least one billing adapter from the **Choose Billing Adapters** drop-down.
5. Based on your billing adapter(s) selection, Choose Adapters Group and Choose Normal Adapter drop-downs will enable the associated list for selection.
6. Select the adapter group(s) under the **Choose Adapters Group** drop-down.

Note

a. After choosing the adapter groups, if any of the chosen billing adapters are removed from the Choose Billing Adapter list, the selection of all the adapter groups will be lost, and you will need to choose them again.
b. Deselecting a billing adapter will, however, simply deselect the relevant adapter group, if any, provided the shared adapters were previously saved. The associated adapter group will automatically be selected when the previously shared billing adapter is reselected.

7. Select the normal adapters under the **Choose Normal Adapter** drop-down and then click **Save**. A maximum of 99 normal adapters including the ones that are a member of adapter groups can be shared for one cloud provider.

   Note
   After choosing the normal adapters, if any of the chosen billing adapters are removed from the Choose Billing Adapter list, the selection of all the normal adapters will be lost, and you will need to choose them again.

8. A message dialog box will appear asking to confirm share of adapters, click **OK**.

Viewing Users List of a Child Organization

A default organization admin can view a list of all the users available in their child organization. Use this procedure to view list of uses available in the child organization.

1. Go to Child organization page.
2. Identify the child organization domain whose users list you want to view.
3. Click the ellipsis icon [...] under the **Action** column of the associated child organization and then click **Users List**.
4. A list of all the users available in the child organization will appear.
5. User state can be Invited, Active, or Disabled.
   a. User state can be *Invited* when a new user has been added to the organization but user has not completed their sign up process.
   b. User state can be *Active* when a user has completed their sign up process using the URL provided in the welcome email.
   c. User state can be *Disabled* when child organization owner has disabled a user.

Deactivating a Child Organization

Child organization owner can only deactivate their child organization account. To delete a child organization using default organization, you must be owner for the child organization that you want to delete.

Use this procedure to deactivate a child organization.

1. Go to Child Organization page.
2. Identify the child organizationdomain that you want to deactivate.
3. Click the ellipsis icon [...] under the **Action** column of the associated child organization and then click **Deactive**. Deactive option will be available only when you are owner for the child organization.
4. A message dialog box will appear, click **Ok**.
5. Child organization is deactivated.
6. You can activate your child organization account by clicking **Active** option.

Editing a Child Organization

Edit option for a child organization allows you to update the report profile shared with the child organization.

1. Go to the child organization page.
2. Identify the child organization domain whose report profile you want to change.
3. Click the ellipsis icon [...] under the **Action** column of the associated child organization and then click **Edit**.
4. Select a new report profile and click **Update**.

Viewing Member List

A parent organisation administrator can use the member list URL to get a list of child organisations that have a user with the specified username and password combination in their CloudBolt CSMP organisation. The member list URL will be in the format

`https://<parent organisation domain>.cloudbolt.app/member/login`, where the `<parent organisation domain>` is the site name of the parent organisation.

On the **Member Log In** page, enter the username, password, and then click **Log In**. A list of child organisations containing a user with the previously entered username and password combination will display. Clicking on the organisation name will log you into the selected organisation. If the entered username and password combination does not match with any of the child organisation's user credentials, an error message similar to: 'Incorrect username or password' will display.

When a child organisation is not active, clicking on the organisation name will show an error message similar to: 'Your organisation has been deactivated. Please contact our Support team. ' When a child organisation user has not confirmed the email id, clicking on the organisation name will show an error message similar to: 'Email Id not confirmed yet. Please confirm your email ID first. '

Filter the child organisation list by subdomain name. Click **Back to Login** to go back to member log in page.

Outcomes

You have learnt how to create and manage a child organization within your CloudBolt CSMP account.

9.2.3. Groups Policy Management

Learn about how to create and manage group policies for automatic creation of adapter groups.

Introduction

Groups policy helps you in defining auto creation of adapters group. When you have hundreds of cloud accounts, it can become difficult to track their costs or aggregate them to share with your CloudBolt tenants and child accounts. Grouping can be an easier way to manage such accounts. But creating groups manually can be challenging. *Groups policy management* allows you to define groups creation policy for a billing adapter. You can then use those groups to help you manage your cloud accounts as per your business needs.

Prerequisites

1. You must have created a billing adapter in CloudBolt CSMP account for your cloud account.

   You will not be able to create groups policy for a billing adapter which is shared with you.

2. Your CloudBolt CSMP account role must have permissions to view, create, modify, and delete *Groups Policy Management* module.
3. Your CloudBolt CSMP account must be a parent, distributor, customer, or child organisation type.

Create a new Group Policy

1. Open the settings [] menu and click Groups Policy Management. A list of the already created group policies for AWS is displayed.
2. Click **Add Group Policy** and then select the cloud provider for which you want to create policy within the cloud providers list.
3. Enter the following:

- **Policy Name**: Enter a unique name for the policy. It must be minimum of 5 characters length.
- **Description**: Enter a friendly description for the policy. You can change it later if you want.
- **Provider**: Choose correct cloud provider for which you want to apply this policy.
- **Select Billing Account**: Select a billing adapter whose normal adapters' group you want to create.

  For AWS, groups will be created based on selected tag key. For Azure CSP, groups will be created for each customer ID. And, for GCP, groups will be created for each sub-account.

- **Tag** [applicable only for AWS cloud provider's group policy]: Select a tag key. Groups would be created for each value of the selected tag key. For example, assume you have selected 'customer' as tag key which has values like Apex, NSE, and Jio. Individual account groups would be created for each tag value i.e., Apex, NSE, and Jio.
- **Add Custom Data** [Optional]: Enter Key and Value in the appropriate boxes. Click to add the entered key and value pair as group tags (custom data) for the groups created based on this policy.

4. Click **Create Policy**.
5. Groups would be created as per defined policy within 24 hours.
6. All accounts that fulfil the policy requirements are taken into consideration by automatically generated groups. Consider the scenario where 10 AWS sub-accounts are connected to the chosen billing adapter. The tag key-value pair "Customer = Apex" is present in the ten AWS accounts. Customer was the tag key you had selected while creating group policy. Therefore, all 10 accounts will now be included in one group when it is created. Similar rules apply to Azure CSP and GCP, where each subscription and project associated with a specific customer ID and sub-account respectively would be a member of a single group.

For AWS, it is also important to note that if your group policy is active and in future you have created new sub-account(s) that matches to the tag key defined in the active group policy would be automatically added to such groups. For Azure CSP and GCP, any new subscription(s) and project(s) created in selected billing account for which an active group policy exists would be added to respective groups based on customer ID and sub-account respectively.

7. To know how to identify list of auto created adapters groups, refer below links as per your cloud provider.

Cloud Provider Name	Topic Link
AWS	View List of AWS Adapters Groups
Azure CSP	View List of Azure CSP Adapters Groups
GCP	View List of GCP Adapters Groups

8. If you have already created a group which exactly matches the created group policy, then a new group will not be created. However, the name of the *group policy* will be added to such group's detail column and displayed in the groups list page. Also, the custom data (if any) available in the group policy will append to such groups.

Manage Existing Group Policy

You can view, update, delete, disable, and enable an existing group policy.

1. Open the settings [] menu and click **Groups Policy Management**.
2. Select the correct cloud provider tab whose group policy you want to manage.
3. Identify the group policy and then click the ellipsis […] icon under the action column.
4. Click **Show Group Policy** option to view the details of selected group policy.
5. Click **Edit Group Policy** option to update the selected group policy. You can update policy name, description, and custom data details. Custom data which is added and deleted after the automatic creation of groups based on selected group policy would not append to such groups. However, any automatic created groups based on such policy would consider the updated group policy custom data.

6. Click **Delete Group Policy** option to delete selected group policy. Deleting a group policy would not delete the groups created based on that policy. You can still use such groups.
7. Click **Disable Group Policy** option to disable an enabled group policy. If you want to create a new group policy for the billing adapter for which a group policy already exists, you must disable the existing group policy before creating another group policy for same billing adapter.
8. Click **Enable Group Policy** option to activate the selected group policy. Only one group policy for an individual billing adapter can be set to active status at a time.

Outcomes

You have learnt how to create and manage a groups policy.

9.2.4. Recommendation Policy

Learn how to define a service action with action mode to perform service adviser recommendations in association with event scheduler.

Introduction

Recommendation policy help you in defining the service action to be performed on the CloudBolt CSMP service adviser recommendations based on a set criterion. The policy action can be performed automatically based on the selected action mode using the create an Event for Recommendation Policy in event scheduler page.

Prerequisites

Recommendation policy settings option is available to Default tenant users of CloudBolt CSMP account. The CloudBolt CSMP role associated with the user must have view, create, modify, and delete access enabled for the Task Policy Management module.

Add a new Recommendation Policy

Use this procedure to create a new recommendation policy.

1. Log in to your CloudBolt CSMP account.
2. Open the **settings []** menu and click **Recommendation Policy**. A list of the already created task policies displays.
3. Click **Add Policy** and then select the cloud provider for which you want to create policy within the cloud providers list.
4. New Recommendation Policy page appears. Enter the following details:
    - **Select Provider**: Select a cloud provider from the drop-down list for which this policy applies.
    - **Name**: Enter a unique name for the policy.

- **Description**: Enter a friendly description for the policy.
- **Recommendation Type**: Currently, it is restricted to unused only. It indicates that the filters set for this policy will apply to services listed in unused tab of the services adviser page.
- **Service Action**: In the select comment drop-down, select a recommended action type to be performed on the filtered services. By default, terminate option will be selected. Terminate action will permanently shutdown your cloud instances and services. Stop action will move the services to stopped state. Select service type in the next drop-down. You can select multiple service types.
- **Filters**: Select a filter criterion among 'Recommendations by High Cost' or 'Resource MEC Greater than'. When 'Recommendations by High Cost' selected, the services of the selected service type that are most expensive (high MEC value) would be considered in this policy. You can specify top 5, 10, or 20 most expensive services to be considered. When 'Resource MEC Greater than' is selected, enter monthly estimated cost value in the Enter Amount field. The services of the selected service type that cost more than the entered amount would be considered in this policy.
- **Comment**: Add additional information about this policy which need to be conveyed to assignee after executing the event for this policy.
- **Action Mode**: It can be manual-fix or auto-fix. When manual-fix is selected, and an event is scheduled for execution. The event execution will create and assign tasks to assignee defined in the event for each service that meet the previously defined filter criteria. With auto-fix, the event will directly perform the previously set action on the services meeting the defined filter criteria.

5. Click **Create Policy** to create the policy with specified filter criteria.

Manage Existing Recommendation Policy

Use this procedure to view and delete an existing recommendation policy.

1. Open the **settings []** menu and click Recommendation Policy. A list of the already created task policies will display.
2. Select the cloud provider boxes available on the top to view the recommendation policy for respective cloud provider.
3. You can filter the recommendation policy list by policy name.
4. Recommendation policy table contains following columns:
    - **Policy Name**: Specifies the policy name. Click the info icon adjacent to a policy name to view the policy description details.
    - **Service Action**: Specifies the service action selected for the policy.
    - **Services**: Specifies service types selected for the policy.
    - **Action Mode**: Specifies selected the action mode for the policy.
    - **Created Date**: Specifies the creation date for the policy.
    - **Action**: Provides a list of action options. Click **Show** option to view the details of the policy. **Delete** option deletes the selected policy.

Limitations

Currently, recommendation policy feature is available only for AWS and Azure cloud services.

Next Step

Create an Event for Recommendation Policy.

9.2.5. My Profile

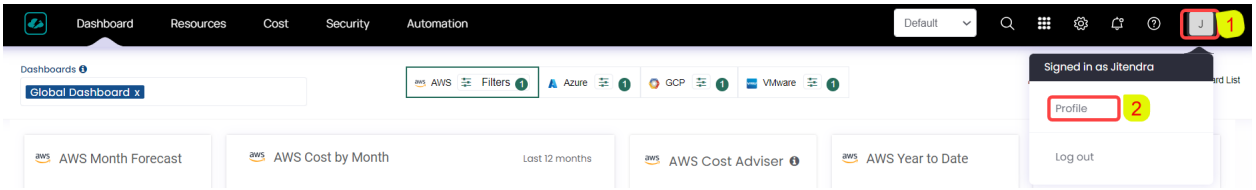
Learn how to update your CloudBolt CSMP profile data, change password, view your activities over the CloudBolt CSMP account, generate API access key, and more.

- Introduction
- Update Profile Data
- Change Password
- MFA Configuration
- View Account Activity
- Generate Access Keys
- Set User Preferred Currency
- Deactivate Organization
- Outcomes

Introduction

The **My Profile** page in your CloudBolt CSMP account allows you to modify your own profiles (for example, update organization name, profile name, MFA settings, and so on). It allows you to change your CloudBolt CSMP account password. You can also view all the actions performed by you in your account, generate API access keys, and set your preferred currency to view your cloud resources cost in your preferred currency. You can also deactivate your CloudBolt CSMP account.

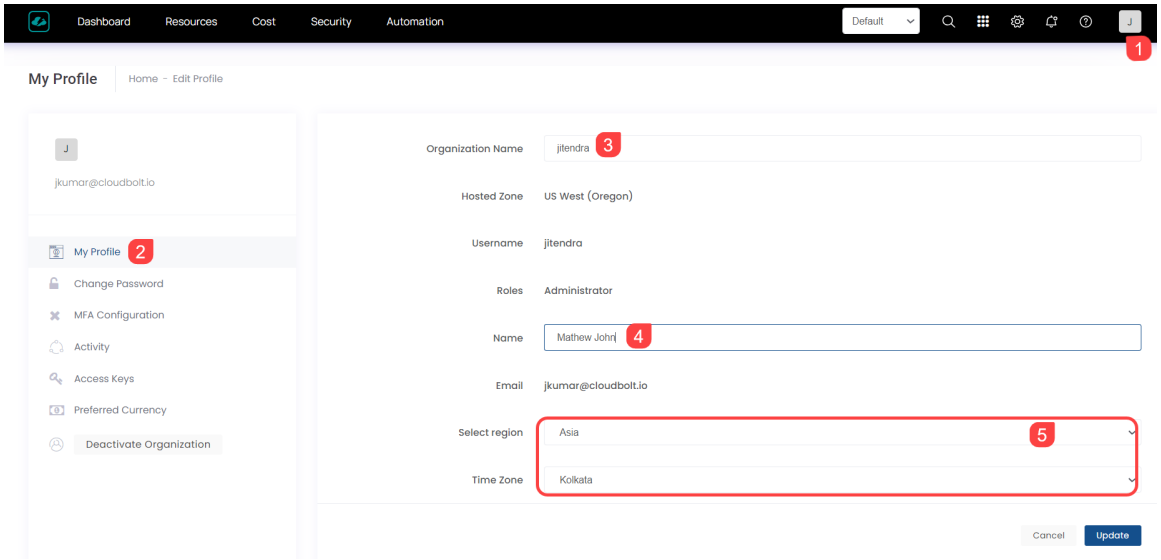
To get to your profile data page, you must click your profile image in the upper right corner of the CloudBolt CSMP dashboard, and then click **Profile**.



Update Profile Data

Use this procedure to update organization name, user display name, and time zone.

1. Go to the profile page from the dashboard.
2. Click **My Profile** in the left navigation panel.



3. In the **Organization Name** box, update your organization name.
    - Note: A user with administrator role can only update the organization name.
4. In the **Name** box, enter a name for the user. First letter of the name updated in the Name box will display as profile image. If there is no name in the box, first letter of the username will display as profile image. Name can be same for multiple accounts of your CloudBolt CSMP organization; do not get confused with the username. Once name is updated for a profile, the sign in information will display with name. In the absence of name, the sign in information will display with username.



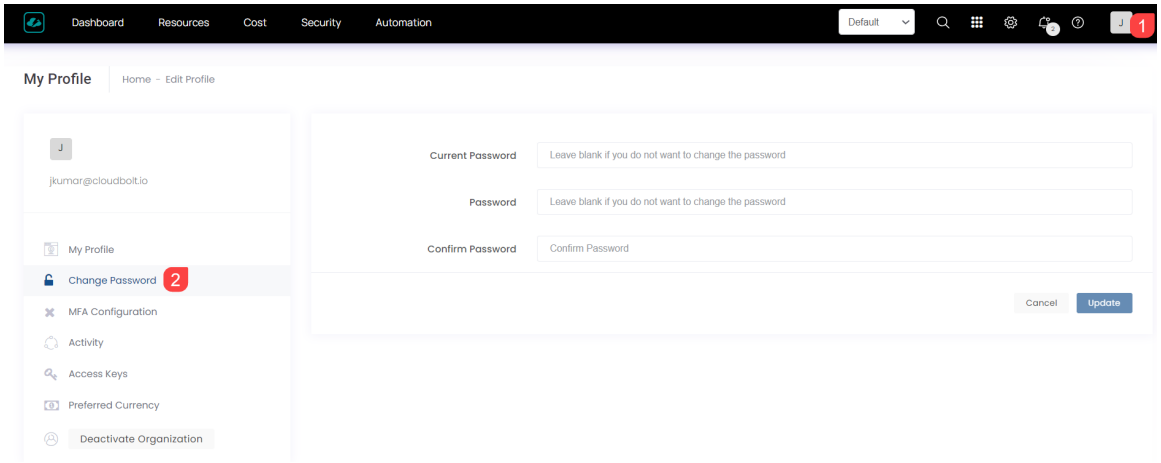
5. In the **Select region** drop down list, select region for your time zone and then select a time zone from the Time Zone drop down list. By default, your time zone will be same as your default organization time zone settings.
    - Note: All the events performed on your CloudBolt CSMP account will use the time zone updated in your profile data.

6. Click **Update** to save the changes.
7. Hosted zone displays the route traffic for your CloudBolt CSMP account. You can not alter it.
8. Username is the unique login name for your CloudBolt CSMP account. You can not alter it.
9. Roles display the assigned roles to your profile. To know more about roles, see Roles in CloudBolt Cost and Security Management.
10. Email displays the email id linked with the specific CloudBolt CSMP account.

Change Password

Use this procedure to update your CloudBolt CSMP account password.

1. Go to the profile page from the dashboard.
2. Click **Change Password** in the left navigation panel.



3. In the **Current Password** box, enter the existing CloudBolt CSMP account password.
4. In the **Password** box, enter a new password. Password must contain one uppercase, one lowercase, and one special character. Password can be no longer than 40 characters, no shorter than eight.
5. In the **Confirm Password** box, re-enter your new password.
6. Click **Update** to change your password.

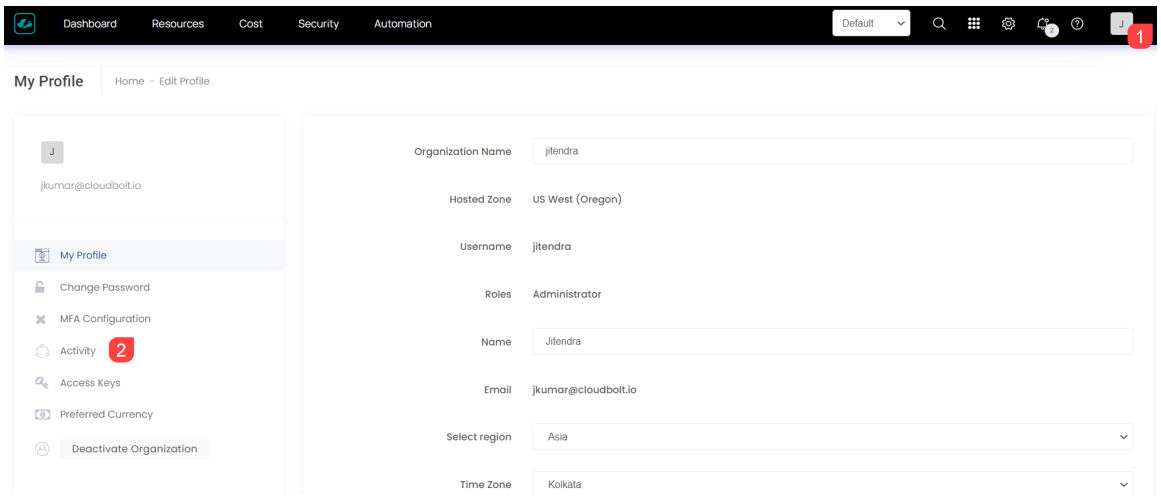
MFA Configuration

MFA Configuration allows you to set up two factor authentication for your account. For more information, see set up multifactor authentication for CSMP account.

View Account Activity

You can see all the actions performed in your CloudBolt CSMP account. You can filter by IP address, start and end of activity date, and by modules. Use this procedure to see your account activity logs.

1. Go to the profile page from the dashboard.
2. Click **Activity** in the left navigation panel.



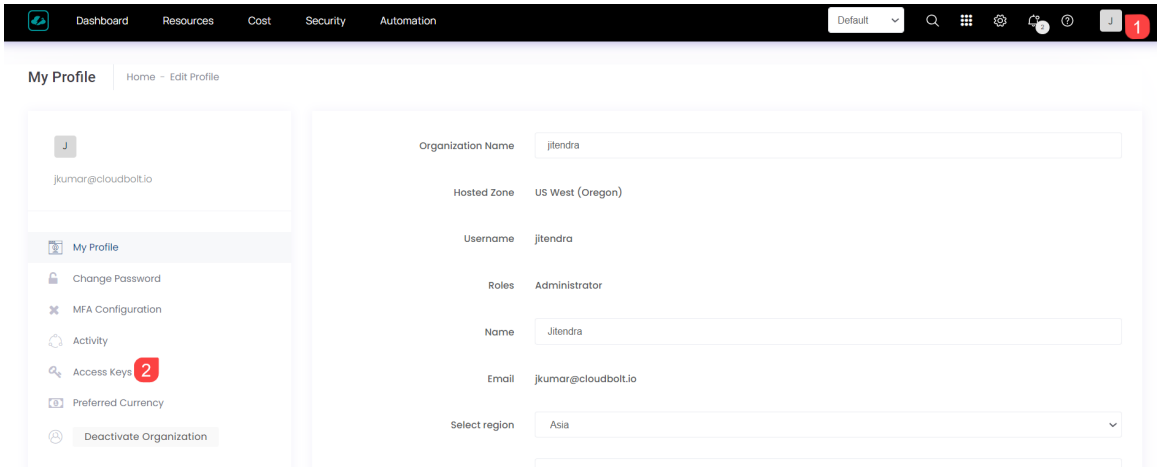
3. **My Activity** page appears. For more information, see User Activity.

Generate Access Keys

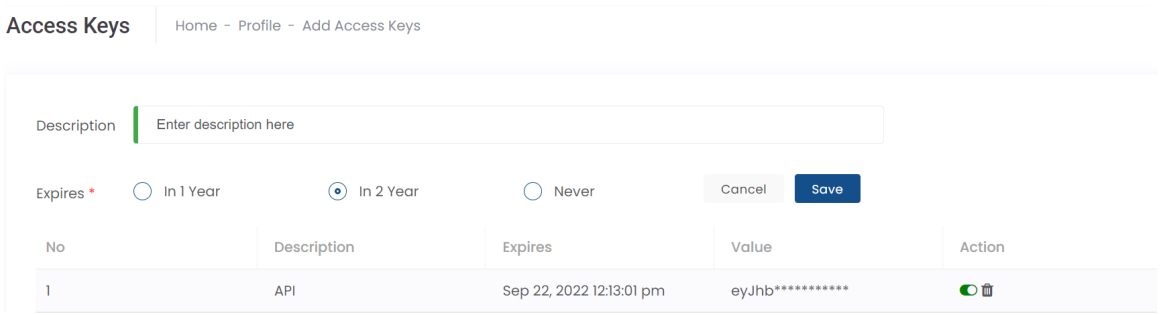
You can create API access keys to access CloudBolt CSMP services using API calls. Use this procedure to create a new access key.

1. Go to the profile page from the dashboard.

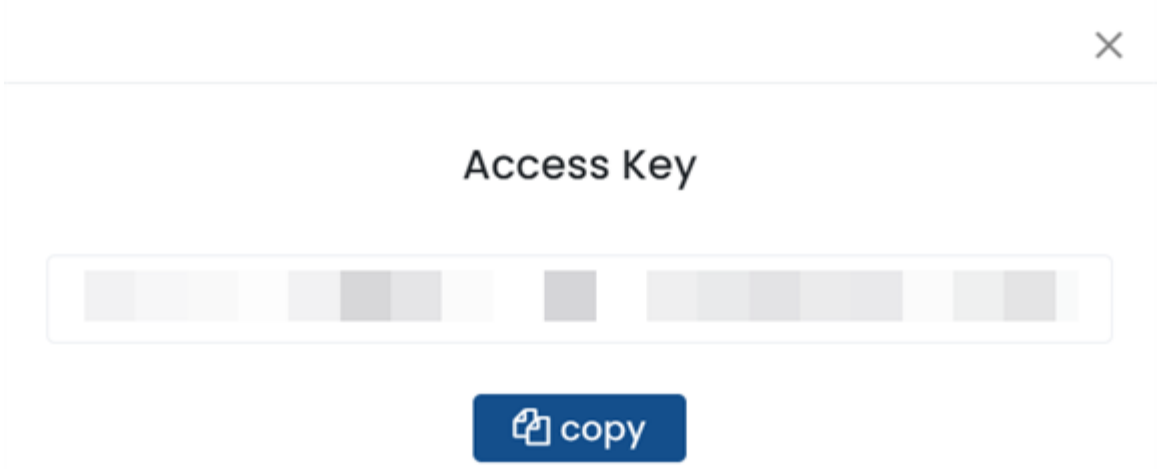
2. Click **Access Keys** in the left navigation panel.



3. In the **Description** box, enter a description for your access key.



4. From the **Expires** options, select when you want to expire your access key.
5. Click **Save** to generate an access key.
6. You must copy the access key by clicking the **Copy** button. If you fail to copy and save, you will need to generate a new access key.



Set User Preferred Currency

You can set a currency of your choice to view all your cloud resources billing costs synchronised with your CloudBolt CSMP account.

See Set the User Preferred Currency

Deactivate Organization

A user with administrator role can deactivate their CloudBolt CSMP account.

1. Go to the profile page from the dashboard.
2. Click **Deactivate Organization** in the left navigation panel.
3. Click **Ok** to deactivate your CloudBolt CSMP account.
4. After a few moments, you will receive a organization deactivation confirmation email. You can reactivate your account within six months from the date of deactivation. To reactivate your account, you must contact CloudBolt CSMP support team.

Outcomes

You have updated your CloudBolt CSMP account profile data.

9.2.5.1. Set up Multifactor Authentication for CSMP Account

Learn how to set up multifactor authentication for your CloudBolt CSMP account.

Introduction

Multifactor authentication (MFA) means you must provide more than one way to log in to your CloudBolt CSMP account to add more security to your account. By setting up MFA, you add an extra layer of security to your CloudBolt CSMP account. When MFA is enabled, you first enter your username and password, and when prompted, you need to type a time-based one-time password (TOTP) displayed in your authenticator app.

Prerequisites

You must have a smartphone with an authenticator app installed on it. Install the latest version of the authenticator app, based on your smartphone operation system.

You can download and install apps for your smartphone from the app store that is specific to your type of smartphone. For examples, refer to the table below.

Android	Twilio Authy Authenticator, Duo Mobile, LastPass Authenticator, Microsoft Authenticator, Google Authenticator, Symantec VIP, andOTP, FreeOTP
iOS	Twilio Authy Authenticator, Duo Mobile, LastPass Authenticator, Microsoft Authenticator, Google Authenticator, Symantec VIP, OTP auth, FreeOTP, iOS built-in authenticator (starting with iOS 15)

Activate MFA

1. Log in to your CloudBolt CSMP with your username and password.
2. Click your profile image in the upper right corner of the CloudBolt CSMP dashboard and then, click **Profile**.
3. Click **MFA Configuration** in the left navigation panel.

4. Use the authenticator app installed in your smartphone to scan the QR code displayed. For example, open your authenticator app and click the plus icon or click the camera icon or click an option similar to Scan code, and then use the device's camera to scan the code. Once scan completed, you can see CloudBolt token added on the authenticator page. The CloudBolt token will display your email id and organization name available in your CloudBolt CSMP profile along with your domain URL.
5. In the MFA Configuration page, enter the one-time password that currently appears in your authenticator app.
6. Click **Activate MFA.**
7. You will see a message similar to: *Are you sure? To activate MFA, click Logout*.
8. Click **Logout** to activate the MFA.
9. The next time you log in to your CloudBolt CSMP account, after entering your username and password, you'll be prompted to type the MFA code provided by your authenticator app.

Deactivate MFA

If you have trouble logging in using a multi-factor authentication, you can deactivate MFA settings at any time using any one of following options.

Option 1

1. Go to login page of your CloudBolt CSMP account.
2. Enter your username and password then, click Log In.
3. You will be redirected to multi-factor authentication page.
4. Click **MFA Issues - Disable MFA** button.
5. Enter the email id and click **Submit**.
6. You will receive an email from CloudBolt Support with a link to deactivate the multi-factor authentication.
7. Click the link to disable the MFA associated with your email id.

   The email link will be valid for one hour.

8. You will see a message similar to: *MFA authentication disabled successfully*.

Option 2

1. Log in to your CloudBolt CSMP.
2. Click your profile image in the upper right corner of the CloudBolt CSMP dashboard and then, click **Profile**.
3. Click **MFA Configuration** in the left navigation panel.
4. Click **Deactivate MFA**.
5. You will see a message similar to: *MFA authentication disabled successfully*.

Limitations

1. MFA considers email id, which means if a single email id has been used (invited) for multiple CloudBolt CSMP accounts/organisations, there MFA setting will remain same for each account.
2. MFA is applicable only for KUMO user types. MFA won't apply to the accounts utilising SSO.

Outcomes

You have learnt how to activate and deactivate multifactor authentication for your CloudBolt CSMP account.

10. Standard Operating Environment (SOE)

Use CSMP Standard Operating Environment (SOE) to automate configuration tasks.

Introduction

CloudBolt CSMP provides a Standard Operating Environment (SOE), where you can define standard commands and user data for automated configuration tasks. When you launch a new EC2 instance as part of right sizing, run your pre-defined script to ensure that all the required software packages are updated and necessary web server packages are installed.

Glossary

- **Command**: Instruction to perform a specific task.
- **OSs**: Operating Systems.
- **SOE**: Standard Operating Environment.
- **User data**: A set of commands/data you can provide to an instance at launch time.

Create a New Script

Use this procedure to create a script using CSMP SOE.

1. Log in to your CSMP account.
2. From the dashboard menu, click **Settings > SOE OSs**.
3. On the right side of the **SOE OSs** page, click **Scripts**.
4. Click **Add New** to create a new script.
5. Fill out the Add Script form:

Field name	Notes

Field name	Notes
Select Group	To select an existing group to store your script, click the drop-down and choose from the list. If you would like to create a new group, enter a name in the **Enter New Group Name** text box.
Script Name	Enter a name for your script.
Supported OS	Select the OS for your script. If the OS for an existing group is changed, the OS for all other scripts in that group will be updated as well. If you wish to develop a script for an existing group with a different OS, you must first create a new group.
Type	Select the script type.
Script	Enter your script.

6. Click **Submit** to create your script.

Create New Scripts using Remote Script

Use this procedure to import your script from a remote location such as S3.

1. Log in to your CSMP account.
2. From the dashboard menu, click **Settings > SOE > SOE OSs**.
3. On the right side of the **SOE OSs** page, click **Scripts**.
4. Click **Remote Sources** to import a script.
5. On the **Remote Scripts** page, click **Add New.**
6. On the **Manage Scripts** page, in the **Name** field, enter the name for your remote script.
7. In the **URL** field, enter the address of the script location.
8. Click **Submit.**
9. Click **Sync All** to synchronize your script.

Manage Existing Scripts

Use this procedure to see your existing scripts and perform edit, copy, and delete actions.

1. Log in to your CSMP account.
2. From the dashboard menu, click **Settings > SOE > SOE OSs**.

3. On the right side of the **SOE OSs** page, click **Scripts**.
4. A list of scripts, organized by group name, will appear.
    a. Individual script names will show organized under the group it belongs to.
    b. Dashed lines separate script names.
5. To edit, copy, and delete a group or script, click its ellipsis [...] icon and select the desired option.
6. To view a list of your remote scripts, click **Remote Sources.**
7. To edit, copy, and delete a remote script, click its ellipsis [...] icon and select the desired option.

11. Event Scheduler Automation

Learn how to automate IT actions for your cloud services and resources by scheduling an event type for services or recommendation policy.

- Introduction
- Prerequisites
- Topic Terms
- Navigate to the Event Scheduler Module
- Event Scheduler Dashboard
- Create a Direct Event
- Create an Event for Recommendation Policy
- Outcomes

Introduction

The Event Scheduler module allows you to schedule two types of events for automating the actions to perform in your cloud account: scheduling a direct event for your cloud services/resources and scheduling an action based on a recommendation policy. The event scheduler module helps automate events you need to execute once, twice, or many times on a recurring basis. This solution lowers your cloud operating costs by shutting down unused services and resources.

Using a direct event, you can automate the backups, rightsizing, start, stop, and terminate actions for your cloud services/resources.

Using an event for a recommendation policy, you can schedule task assignment to team members or perform direct actions on your cloud services based on the filter criteria and action mode defined in the selected recommendation policy.

Prerequisites

The following requirements must be met before setting up a direct event in the event scheduler:

1. The CloudBolt CSMP role associated with the user must have view, create, modify, and delete access enabled for the event scheduler module.
2. You must have normal adapters created in CSMP for each of your Cloud Server Provider accounts for which events will be scheduled.
3. Normal adapters must be in "Active" status.
4. All of the services must be synchronized to CSMP using the respective normal adapters.

Following conditions must be met in addition to the above requirements before setting up an event for a recommendation policy:

1. You must have created a recommendation policy under settings.
2. You must ensure that a valid email id is added in the group tag (custom data) value field for the selected groups to which the event applies.

   A valid email id is the email id of an invited user of your colleague within your CloudBolt CSMP account with enabled state.

Topic Terms

- **Backup Event:** Use this event to create a backup of your services. A backup event can be created for AWS services such as server, database, root volume, EBS volume, volume snapshot, and RDS snapshot.
- **Direct Event:** It is an **event for service**. It is used to create automated backups, rightsizing, start, stop, and terminate actions for your cloud services/resources directly. To create a direct event, you need to opt for service option under the **Select Event For** field.
- **EC2 Right Size Event:** Use this event to change the instance type of your AWS EC2 instance based on the rightsizing recommendations under the Service Adviser.

- **Event for Recommendation Policy:** It is scheduling an automation action for a recommendation policy. When the action mode is set to manual-fix inside the selected recommendation policy, these scheduled events generate tasks and assign them to users for their actions. Whereas if the action mode is set to auto-fix inside the selected recommendation policy, the scheduled event will automatically perform the set service action against the selected cloud services. However, if you schedule an event for a recommendation policy whose action mode is set to auto-fix and MIRA has been enabled for your AWS account, the tasks will be posted to the MIRA dashboard rather than performing the action against the cloud services. To create an event for recommendation policy, you need to opt for recommendation service option under the **Select Event For** field.
- **Start & Stop Service Event:** Use this event to schedule your Cloud services to start and stop events combined at a pre-determined schedule without manual intervention.
- **Start Service Event:** Use this event to schedule a stopped Cloud service to start at a pre-determined schedule without manual intervention.
- **Stop Service Event:** Use this event to schedule a Cloud service to stop at a pre-determined schedule without manual intervention.
- **Terminate Service Event:** Use this event type to permanently shutdown a Cloud service instance at a scheduled time.

Navigate to the Event Scheduler Module

Use one of the two options below to navigate to the Event Schedule Module:

1. In the Header Bar, click **Automation > Event Scheduler**
2. Click the **Quick Actions icon** on the right hand side of the Header Bar > **Event Scheduler**.

Event Scheduler Dashboard

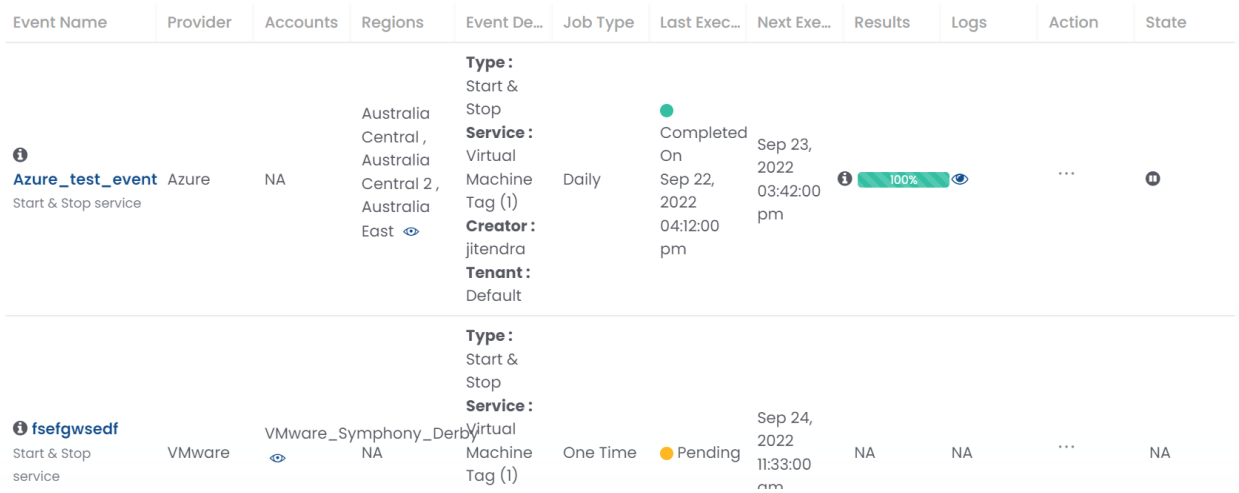
The Event Scheduler dashboard provides a list of all the events. You can apply various filters to the events list.

Field name	Description
Select Provider	Click the dropdown to select a Cloud Provider. It can be AWS, Azure, or VMware.
Select Adapter	Choose the Adapter for which events you would like to see. This is only applicable for AWS and Azure Providers.
Select Regions	Choose the Regions. This is only applicable for AWS and Azure Providers.
Select Event Schedule Type	Choose an event schedule. Options are daily, hourly, minutely, monthly, one time, weekdays, weekly, and yearly.
Select Event Status	Choose the event completion status. Options are completed 100%, completed less than 100%, failed, and pending.
Select Event Type	Choose an event type. Options can vary based on your Cloud Provider selection.
Show / Hide all Events	Select to either Show all Events, Hide All Past Events, or Hide Past Events with an execution older than 7 days.

Event Scheduler Results

After selecting filters, click Apply to populate the event scheduler results list. Enter an event name in the Search By Event Name field to find a specific event. Click **Scan** button to refresh the event scheduler results list.

The events list table provides consolidated information about the events.



Field name	Description
Event Name	Displays the name of the event in this row. Hover over the info [] icon to see whether this event is created as a direct event or based on a recommendation policy.
Provider	The Cloud Service provider for this event (AWS, Azure, VMware).
Accounts	List of your Cloud Service account(s) for which the event is created. Hover over the view [] icon to see all accounts.
Regions	Lists the applicable Region(s) for the event, when the provider is AWS or Azure.
Event details	Lists the event type, services included, tags, creator and tenant details.
Job type	How often the Job runs based on its type.
Last execution status and time	For repeat events, this provides information on the last event run. For one time or future events, it displays **Pending**.
Next execution time	The upcoming execution schedule for the event.
Results	The status of event execution. If successfully completed, this area will show 100%. For the currently running event, it displays the percent completion. For future events, Result will show N/A.
Logs	The event execution logs. Click view [] icon to see the log details.
Action	Hover over the ellipsis [...] icon to view options: • **Edit:** Edit the event, including all Parameters of the event except Cloud Service provider name, event type, and time schedule. • **Delete:** Delete an existing event. • **View:** Select the View option to see the event details. View basic information of the selected event, schedule, any additional applicable filters, and the event log notification settings detail. • **Run Now:** Run the selected event immediately, irrespective of its execution schedule. • **Dry Run:** Only available with **Stop** and **Terminate** event types. This allows you to execute the event in Test mode. Dry Run for services will not affect any of your Cloud environments or services.
State	Using the State icon, pause, or resume a repeat event.

Create a Direct Event

Use this procedure to schedule a new direct event to automate your desired actions against cloud services. To view the complete process for each event, click on the corresponding link.

- Schedule a Backup Event
- Schedule an EC2 Right Size Event
- Schedule a Start and Stop Service Event
- Schedule a Start Service Event
- Schedule a Stop Service Event
- Schedule a Terminate Service Event

Create an Event for Recommendation Policy

Use this procedure to automate an action on the recommendation policy. You must create a recommendation policy before you can use it with event scheduler. This type of events performs actions based on the action mode setting within the selected recommendation policy. Users will be assigned jobs under tasks tab on their cost service adviser page when the action mode in a recommendation policy is set to manual-fix. When action mode in a recommendation policy is set as auto-fix, upon event execution, the action will be performed directly on the services based on the service action option setting in the respective recommendation policy.

1. Navigate to event scheduler module.
2. On the event scheduler dashboard, click **Add Event** available at the upper right corner.
3. On the **Add Event** page, in the **Basic Details** tab, enter details as follows:

Field name	Notes
Name	Enter a valid and descriptive name for the event.
Select Provider	Choose your Cloud Service Provider from the dropdown. Options are AWS or Azure.
Select Event For	Select **Recommendation Service** option.
Select Policy	Choose a recommendation policy name for which you want to create an event from the drop-down.

4. Click **Next**, in the **Event Details** tab, enter details as follows:

Field name	Notes
Adapters	Select source adapters for the event, or check "Select All". You can select adapters or adapter groups.

Field name	Notes
Adapter Groups	Select adapter groups for the event, or check "Select All". You can select adapters or adapter groups. This field is available only for AWS and Azure cloud events.
Resource Group	Select resource groups for this event. By default, all the resource groups are selected. This field is available only for Azure cloud events.

5. Click **Next**, in the **Assign To** tab, enter details as follows:

Assign To tab will be available only when you are creating an event for such recommendation policy whose action mode is set as manual-fix.

Field name	Notes
Assign to Users	Select a user from the list whom you want to assign the created task. To select multiple users, press the **Ctrl** key and select them one by one. This option is available only when adapters are chosen in Event Details tab.
Custom Emails	If you are unable to identify users by their usernames from the above list, use this field to assign the users using their email ids. Enter a **valid email id** and click icon to add. You can add multiple email id. A valid email id is the email id of an invited user of your tenant colleague within your CloudBolt CSMP account with enabled state. This option is available only when adapters are chosen in Event Details tab.
Assign By Group Tag	The **Select Custom Attributes** drop-down list displays all the group tag (custom data) keys available in the previously selected groups for this event. You must select group tag (custom data) key(s) whose value has a valid email address. If you fail to select a group tag (custom data) key whose value has a valid email address, the task would be created when the event executes, but would not be assigned to anyone as it requires a valid email address for task assignment. You can click the **View Applicable Emails** link to see selected group tag (custom data) details. This option is available only when adapter groups are chosen in Event Details tab.

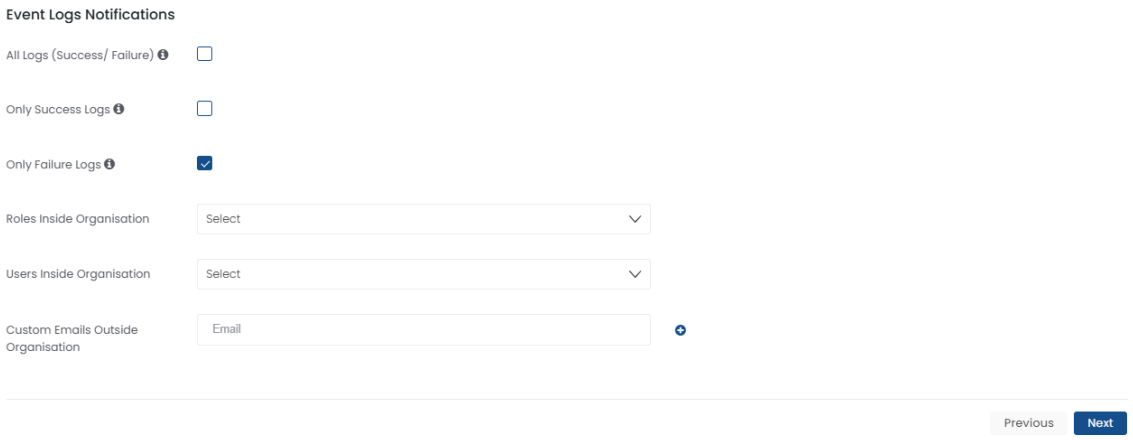
6. Click **Next**, in the **Filters** tab, enter details as follows:

Field name	Notes

Field name	Notes
Select Region	Choose one or many Regions for your start event. Check the "All" box to choose all Regions.
Applied Tags	Enter a tag key in the Service Tag box. Enter a tag value in the Tag Value box. Select a relation between the entered tag key and value. By default, `=` is selected. `=` denotes equal to operator. `!=` denotes not equal to operator. Click to add the entered tag key-value pair as a filter method to filter services for this event. You can add multiple tag key-value pairs as filter. When multiple tags are added, you must select tag query operator to establish relation between multiple tag key-value pairs. By default, `|| OR` tag query operator is selected. `|| OR` denotes that services having any one of the applied tags will be considered for this event. `&& AND` denotes that only those services that have all the applied tags available will be considered for this event. To view the applicable services considered based on applied tags and operators, click Applicable services link.

7. Click **Next**, in the **Notification** tab, enter details as follows:

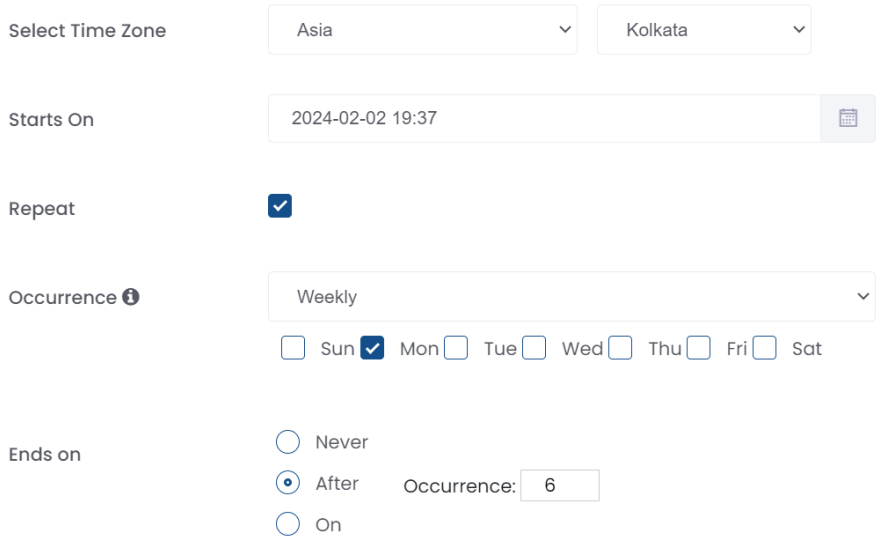
   Set up a notification for this event. By default, the creator of this event will receive all types of notifications related to the events. It is important to note that the settings done on notification tab is related to the event execution logs rather than tasks created as part of this event execution.



Field name	Notes
All Logs (Success / Failure)	When enabled, Users will receive both the successful and failed event run logs.
Only Success Logs	When enabled, Users will receive logs only for the successfully completed events.

Field name	Notes
Only Failure Logs	When enabled, Users will receive logs only for the failed events. This field is enabled by default.
Roles Inside Organization	All the members of the selected roles will receive all of the enabled notifications.
Users Inside Organization	Select the Users within your organization who will receive notifications.
Custom Emails Outside Organization	Add custom email addresses that will also receive notifications. Click icon to add a custom email.

8. Click **Next**, in the **Time Schedule** tab, enter the details as follows:



Field name	Notes
Select Time Zone	Select the time zone that determines the event schedule start and end.
Starts On	Select the first event execution date and time. The first event execution time must be at least 30 minutes after the event creation time.
Repeat	Check "Repeat" to make this a repeating event. Continue to Occurrence and Ends On if checked.
Occurrence	For repeat events, select the occurrence from the dropdown.
Ends On	For repeat events, select an end time: ○ **Never:** Event does not have an end date and will continue to execute as per the occurrence schedule. ○ **After:** The event will end after the number of specified execution occurrences, with 5 occurrences as the default. ○ **On:** Select a specific date and time to end the execution of the event.

9. Click **Create** to complete scheduling this event.

Events, Recommendation Policy, and Tasks Correlation

Whenever multiple events are created using a single recommendation policy with action mode set as manual-fix, the resulted tasks will be grouped together with a single task count. The assignee will be updated in the same task and notifications would be sent accordingly.

When a recommendation policy with action mode set as auto-fix is used to create an event for AWS cloud services and you have a MIRA enabled AWS organization account, the event execution will send tasks to MIRA dashboards rather than performing the action directly on the services.

Limitations

Currently, you can create recommendation policy event for AWS and Azure cloud providers only.

Outcomes

You have learnt how to schedule different types of events to automate actions on your cloud services.

11.1. Schedule a Backup Event

Learn how to schedule a backup for your AWS account.

Use this procedure to create and schedule a backup event for AWS.

1. Navigate to event scheduler module.
2. On the event scheduler dashboard, click **Add Event** available at the upper right corner.
3. On the **Add Event** page, in the **Basic Details** tab, enter details as follows:

Field name	Notes
Name	Enter a valid and descriptive name for the event.
Select Provider	Choose AWS as your Cloud Service Provider from the dropdown.
Select Event For	select **Service** option.
Select Event	Choose *Backup*. After selecting backup, the **Select Event For** field disappears.

4. Click **Next**, in the **Event Details** tab, enter details as follows:

Field name	Notes
Source Adapters	Select source adapters for the backup, or check "Select All". You can select adapters or adapter groups.
Source Adapter Groups	Select adapter groups for the backup, or check "Select All". You can select adapters or adapter groups.
Backup Policies	If a backup policy exists, select it from the dropdown. If not, Create a New Backup Policy for your backup event.

5. Click **Next**, in the **Filters** tab, enter details as follows:

Field name	Notes
Select Region	Choose one or many Regions for your backup. Check the "All" box to choose all Regions.
Applied Tags	Enter a tag key in the Service Tag box. Enter a tag value in the Tag Value box. Select a relation between the entered tag key and value. By default, `=` is selected. `=` denotes equal to operator. `!=` denotes not equal to operator. Click to add the entered tag key-value pair as a filter method to filter services for this event. You can add multiple tag key-value pairs as filter. When multiple tags are added, you must select tag query operator

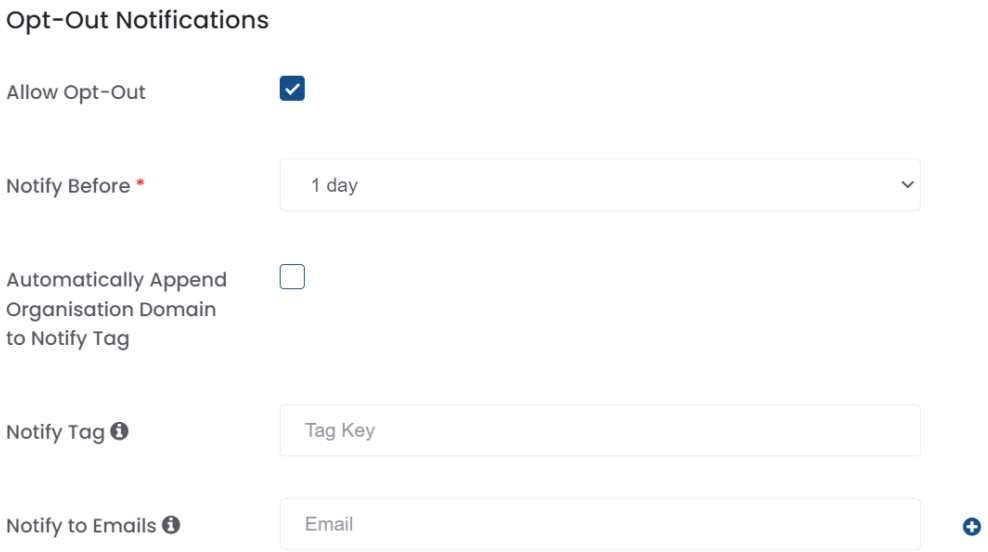
Field name	Notes
	to establish relation between multiple tag key-value pairs. By default, `|| OR` tag query operator is selected. `|| OR` denotes that services having any one of the applied tags will be considered for this event. `&& AND` denotes that only those services that have all the applied tags available will be considered for this event. To view the applicable services considered based on applied tags and operators, click Applicable services link.

6. Click **Next**, in the **Notification** tab, enter details as follows:

Set up a notification for this event. By default, the creator of this event will receive all types of notifications related to the events.

- **Opt-Out Notifications**

  This notification feature sends you an email at a pre-set time before the actual event execution. The email notification provides you with a link that redirects you to CloudBolt CSMP event scheduler dashboard and a list of your scheduled services displays. You can opt-out of the specific event schedule. Fill out the Opt-Out Notifications form as your workflow requires, then continue to the Event Logs Notifications.



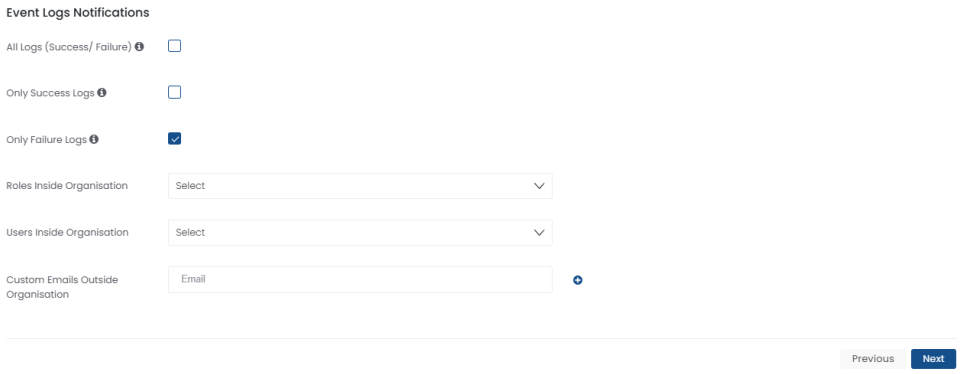
Field name	Notes
Allow Opt-Out	Check the "Allow Opt-Out" checkbox to enable Opt-Out

Field name	Notes
	notifications. This notification is available for backup, start, stop, EC2 rightsizing, and terminate event types. The link provided in the email for opt-out will expire 30 minutes before the actual event execution schedule.
Notify Before	Select the number of days before which you want to receive the opt-out email notification. By default, 1 day will be selected. For repeat events with occurrence type as minutely and hourly, you will receive immediate notification for the next event.
Automatically Append Organization Domain to Notify Tag	When enabled, it uses the Default Organization Email Domain available under the Default Organisation settings to create an email ID from the tag value for the specified tag key type in the Notify Tag field. An email notification will be sent to all of the email IDs.
Notify Tag	Enter the tag key type whose value you want to be utilized to generate emails in combination with the Default Organization Email Domain. If the combination of entered tag key's value and default organisation email domain creates a valid email ID, an email notification would be sent to such email ID. Emails will be sent only for the services that have a matching tag Key.
Notify to Emails	Add custom email IDs to receive an opt-out email notification. Click icon to add an email ID.

- **Event Logs Notifications**

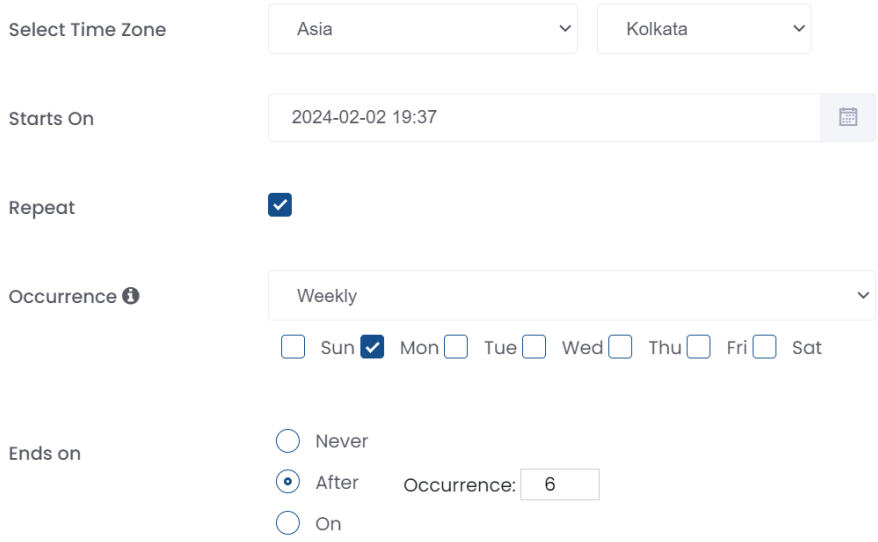
  This notification feature sends you an email notification after the event execution.

  Fill out the Event Logs Notifications as fits your workflow, then click **Next**.



Field name	Notes
All Logs (Success / Failure)	When enabled, Users will receive both the successful and failed event run logs.
Only Success Logs	When enabled, Users will receive logs only for the successfully completed events.
Only Failure Logs	When enabled, Users will receive logs only for the failed events. This field is enabled by default.
Roles Inside Organization	All the members of the selected roles will receive all of the enabled notifications.
Users Inside Organization	Select the Users within your organization who will receive notifications.
Custom Emails Outside Organization	Add custom email addresses that will also receive notifications. Click icon to add a custom email.

7. Click **Next**, in the **Time Schedule** tab, enter the details as follows:



Field name	Notes
Select Time Zone	Select the time zone that determines the event schedule start and end.
Starts On	Select the first event execution date and time. The first event execution time must be at least 30 minutes after the event creation time.
Repeat	Check "Repeat" to make this a repeating event. Continue to Occurrence and Ends On if checked.
Occurrence	For repeat events, select the occurrence from the dropdown.

Field name	Notes
Ends On	For repeat events, select an end time: ○ **Never:** Event does not have an end date and will continue to execute as per the occurrence schedule. ○ **After:** The event will end after the number of specified execution occurrences, with 5 occurrences as the default. ○ **On:** Select a specific date and time to end the execution of the event.

8. Click **Create**to complete scheduling this backup event.

11.2. Schedule an EC2 Right Size Event

Learn how to schedule an AWS EC2 Right Size event using the CSMP Event Scheduler module.

Use this procedure to create and schedule an EC2 Right Size event for your AWS Virtual Machines at pre-defined intervals.

1. Navigate to event scheduler module.
2. On the event scheduler dashboard, click **Add Event** available at the upper right corner.
3. On the **Add Event** page, in the **Basic Details** tab, enter details as follows:

Field name	Notes
Name	Enter a valid and descriptive name for the event.
Select Provider	Choose AWS as your Cloud Service Provider from the dropdown.
Select Event For	select **Service** option.
Select Event	Choose *EC2 Right Size*.

4. Click **Next**, in the **Event Details** tab, enter details as follows:

Field name	Notes
Adapters	Select source adapters for the event, or check "Select All". You can select adapters or adapter groups.
Adapter Groups	Select adapter groups for the event, or check "Select All". You can select adapters or adapter groups.
Service Type	Choose the Service Type based on the adapters or adapter groups selection for the event.

5. Click **Next**, in the **Filters** tab, enter details as follows:

Field name	Notes
Select Region	Choose one or many Regions for your backup. Check the "All" box to choose all Regions.
Perform Backup	Check this box to create a backup of old servers before changing their instances.
Run	Choose a command to be executed on the new server instance.

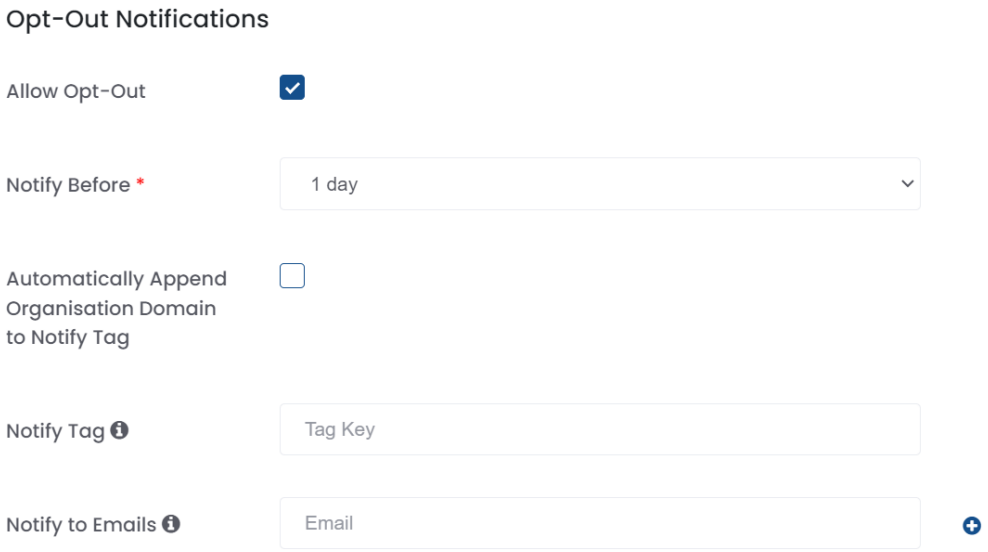
Field name	Notes
Command	
Applied Tags	Enter a tag key in the Service Tag box. Enter a tag value in the Tag Value box. Select a relation between the entered tag key and value. By default, `=` is selected. `=` denotes equal to operator. `!=` denotes not equal to operator. Click to add the entered tag key-value pair as a filter method to filter services for this event. You can add multiple tag key-value pairs as filter. When multiple tags are added, you must select tag query operator to establish relation between multiple tag key-value pairs. By default, `|| OR` tag query operator is selected. `|| OR` denotes that services having any one of the applied tags will be considered for this event. `&& AND` denotes that only those services that have all the applied tags available will be considered for this event. To view the applicable services considered based on applied tags and operators, click Applicable services link.

6. Click **Next**, in the **Notification** tab, enter details as follows:

   Set up a notification for this event. By default, the creator of this event will receive all types of notifications related to the events.

   - **Opt-Out Notifications**

     This notification feature sends you an email at a pre-set time before the actual event execution. The email notification provides you with a link that redirects you to CloudBolt CSMP event scheduler dashboard and a list of your scheduled services displays. You can opt-out of the specific event schedule. Fill out the Opt-Out Notifications form as your workflow requires, then continue to the Event Logs Notifications.



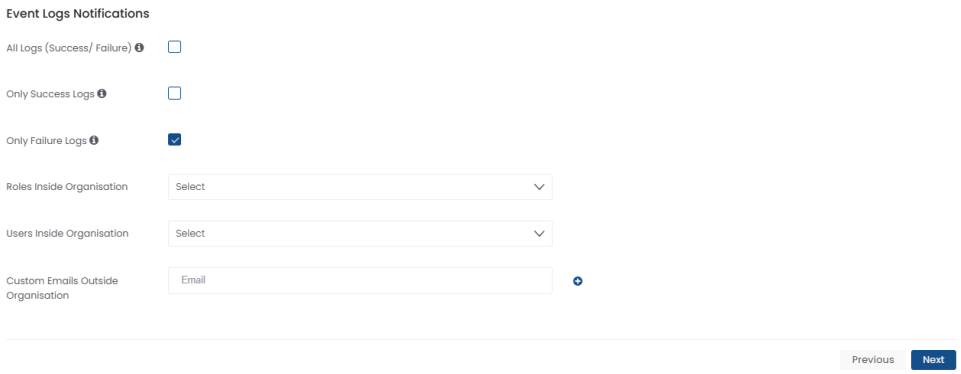
Field name	Notes
Allow Opt-Out	Check the "Allow Opt-Out" checkbox to enable Opt-Out notifications. This notification is available for backup, start, stop, EC2 rightsizing, and terminate event types. The link provided in the email for opt-out will expire 30 minutes before the actual event execution schedule.
Notify Before	Select the number of days before which you want to receive the opt-out email notification. By default, 1 day will be selected. For repeat events with occurrence type as minutely and hourly, you will receive immediate notification for the next event.
Automatically Append Organization Domain to Notify Tag	When enabled, it uses the Default Organization Email Domain available under the Default Organisation settings to create an email ID from the tag value for the specified tag key type in the Notify Tag field. An email notification will be sent to all of the email IDs.
Notify Tag	Enter the tag key type whose value you want to be utilized to generate emails in combination with the Default Organization Email Domain. If the combination of entered tag key's value and default organisation email domain creates a valid email ID, an email notification would be sent to such email ID. Emails will be sent only for the services that have a matching tag Key.

Field name	Notes
Notify to Emails	Add custom email IDs to receive an opt-out email notification. Click icon to add an email ID.

- **Event Logs Notifications**

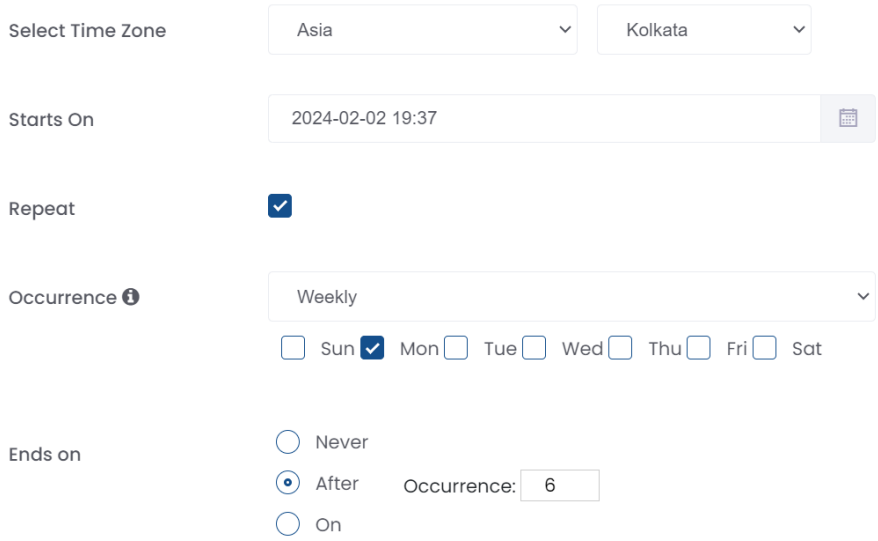
This notification feature sends you an email notification after the event execution.

Fill out the Event Logs Notifications as fits your workflow, then click **Next**.



Field name	Notes
All Logs (Success / Failure)	When enabled, Users will receive both the successful and failed event run logs.
Only Success Logs	When enabled, Users will receive logs only for the successfully completed events.
Only Failure Logs	When enabled, Users will receive logs only for the failed events. This field is enabled by default.
Roles Inside Organization	All the members of the selected roles will receive all of the enabled notifications.
Users Inside Organization	Select the Users within your organization who will receive notifications.
Custom Emails Outside Organization	Add custom email addresses that will also receive notifications. Click icon to add a custom email.

7. Click **Next**, in the **Time Schedule** tab, enter the details as follows:



Field name	Notes
Select Time Zone	Select the time zone that determines the event schedule start and end.
Starts On	Select the first event execution date and time. The first event execution time must be at least 30 minutes after the event creation time.
Repeat	Check "Repeat" to make this a repeating event. Continue to Occurrence and Ends On if checked.
Occurrence	For repeat events, select the occurrence from the dropdown.
Ends On	For repeat events, select an end time: ○ **Never:** Event does not have an end date and will continue to execute as per the occurrence schedule. ○ **After:** The event will end after the number of specified execution occurrences, with 5 occurrences as the default. ○ **On:** Select a specific date and time to end the execution of the event.

8. Click **Create**to complete scheduling this right sizing event.

11.3. Schedule a Start and Stop Service Event

Learn how to schedule a start and stop action for your cloud services using the CloudBolt CSMP event scheduler.

Use this procedure to automate a start and stop event to your Virtual Machines.

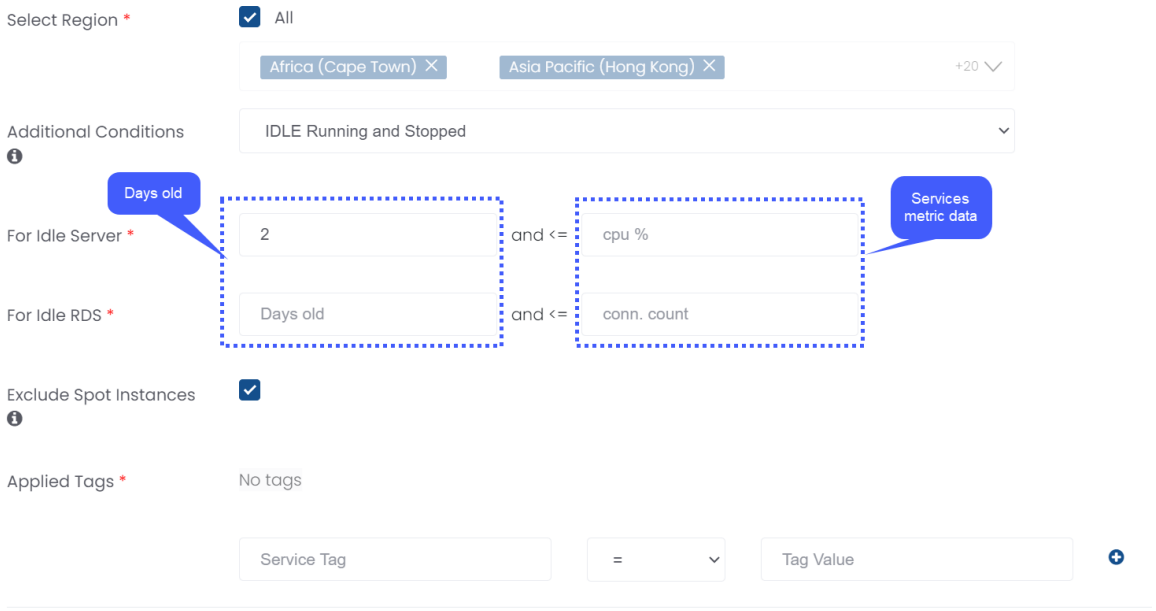
1. Navigate to event scheduler module.
2. On the event scheduler dashboard, click **Add Event** available at the upper right corner.
3. On the **Add Event** page, in the **Basic Details** tab, enter details as follows:

Field name	Notes
Name	Enter a valid and descriptive name for the event.
Select Provider	Choose your Cloud Service Provider from the dropdown. Options are AWS, Azure, and VMware.
Select Event For	select **Service** option.
Select Event	Choose *Start & Stop Service*.

4. Click **Next**, in the **Event Details** tab, enter details as follows:

Field name	Notes
Adapters	Select source adapters for the event, or check "Select All". You can select adapters or adapter groups.
Adapter Groups	Select adapter groups for the event, or check "Select All". You can select adapters or adapter groups. This field is available only for AWS and Azure cloud events.
Resource Group	Select resource groups for this event. By default, all the resource groups are selected. This field is available only for Azure cloud events.
Service Type	Choose the Service Type based on the adapters or adapter groups selection for the event.

5. Click **Next**, in the **Filters** tab, enter details as follows:

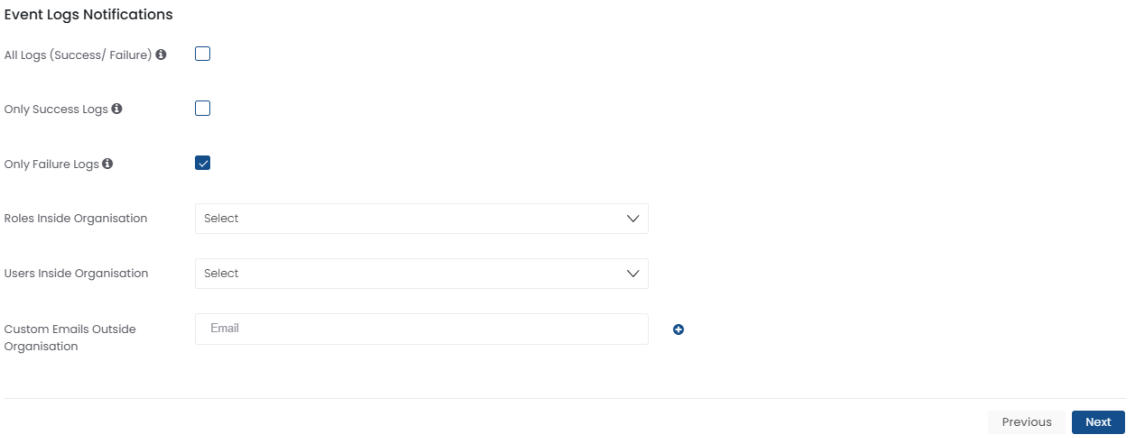


Field name	Notes
Select Region	Choose one or many Regions for your backup. Check the "All" box to choose all Regions.
Additional Conditions (Optional)	It is to sort the services for the selected event type. Drop-down options can vary. Choose any one of the three conditions based on your requirement: ○ **IDLE Running and Stopped**: This condition will filter both the services which are either in "running" state or "stopped" state based on the parameters entered. Those services which comply with this condition will be considered for this event run. ○ **IDLE Running**: This condition will filter for the running services based on the parameters entered. Those services which comply with this condition will be considered for this event run. ○ **IDLE Stopped**: This condition will filter for the stopped services based on the parameters entered. Those services which comply with this condition will be considered for this event run.
For Idle Server/RDS/etc. (service type)	**Days old:** Enter the number of days for idle services under the **Days old** text box. By default, 2 days is selected. **Services metric data:** Enter the services metric data to consider the idle condition. The idle consideration metric varies for each service:

Field name	Notes
	○ **Idle Server:** We consider **Days old** and the average of **CPUUtilization** metric. ○ **Idle RDS:** We consider **Days old** and the average of **DatabaseConnections** metric. ○ **Idle Volume:** We consider **Days old** and the sum of **VolumeReadOps** and **VolumeWriteOps** metrics. ○ **Idle Load Balancer:** We consider **Days old** and the sum of the **RequestCount** metric. ○ **Idle AMI, Idle Volume Snapshot, and Idle RDS Snapshot:** We consider only **Days old** of Idle services.
Exclude Spot Instances	By default, this checkbox is enabled to exclude all spot instances from event execution.
Applied Tags	Enter a tag key in the Service Tag box. Enter a tag value in the Tag Value box. Select a relation between the entered tag key and value. By default, `=` is selected. `=` denotes equal to operator. `!=` denotes not equal to operator. Click to add the entered tag key-value pair as a filter method to filter services for this event. You can add multiple tag key-value pairs as filter. When multiple tags are added, you must select tag query operator to establish relation between multiple tag key-value pairs. By default, `|| OR` tag query operator is selected. `|| OR` denotes that services having any one of the applied tags will be considered for this event. `&& AND` denotes that only those services that have all the applied tags available will be considered for this event. To view the applicable services considered based on applied tags and operators, click Applicable services link.

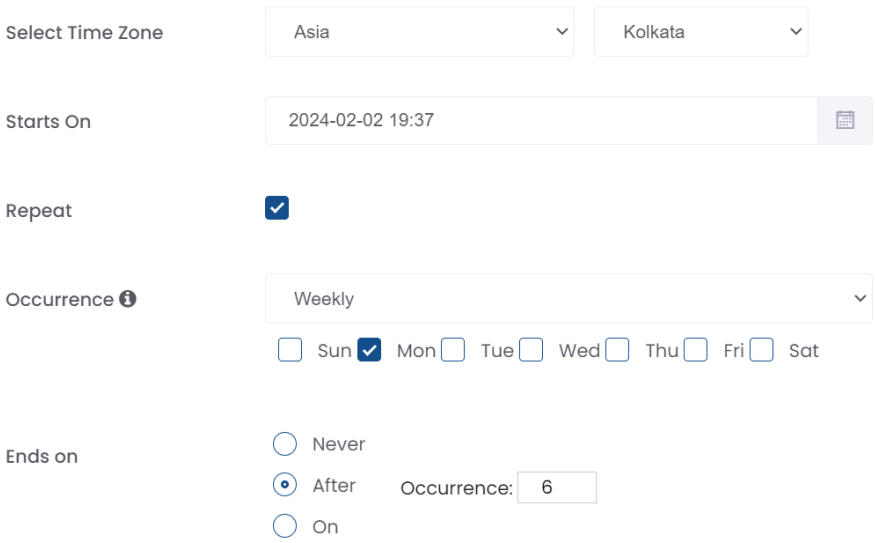
6. Click **Next**, in the **Notification** tab, enter details as follows:

   Set up a notification for this event. By default, the creator of this event will receive all types of notifications related to the events. It is important to note that the settings done on notification tab is related to the event execution logs rather than tasks created as part of this event execution.



Field name	Notes
All Logs (Success / Failure)	When enabled, Users will receive both the successful and failed event run logs.
Only Success Logs	When enabled, Users will receive logs only for the successfully completed events.
Only Failure Logs	When enabled, Users will receive logs only for the failed events. This field is enabled by default.
Roles Inside Organization	All the members of the selected roles will receive all of the enabled notifications.
Users Inside Organization	Select the Users within your organization who will receive notifications.
Custom Emails Outside Organization	Add custom email addresses that will also receive notifications. Click icon to add a custom email.

7. Click **Next**, in the **Time Schedule** tab, enter the details as follows:



Field name	Notes
Select Time Zone	Select the time zone that determines the event schedule start and end.
Starts On	Select the first event execution date and time. The first event execution time must be at least 30 minutes after the event creation time.
Repeat	Check "Repeat" to make this a repeating event. Continue to Occurrence and Ends On if checked.
Occurrence	For repeat events, select the occurrence from the dropdown.
Ends On	For repeat events, select an end time: ○ **Never:** Event does not have an end date and will continue to execute as per the occurrence schedule. ○ **After:** The event will end after the number of specified execution occurrences, with 5 occurrences as the default. ○ **On:** Select a specific date and time to end the execution of the event.

8. Click **Create** to complete scheduling this event.

11.4. Schedule a Start Service Event

Learn how to schedule a start service event for your cloud services using the CloudBolt CSMP event scheduler.

Use this procedure to automate a start action event for your cloud services.

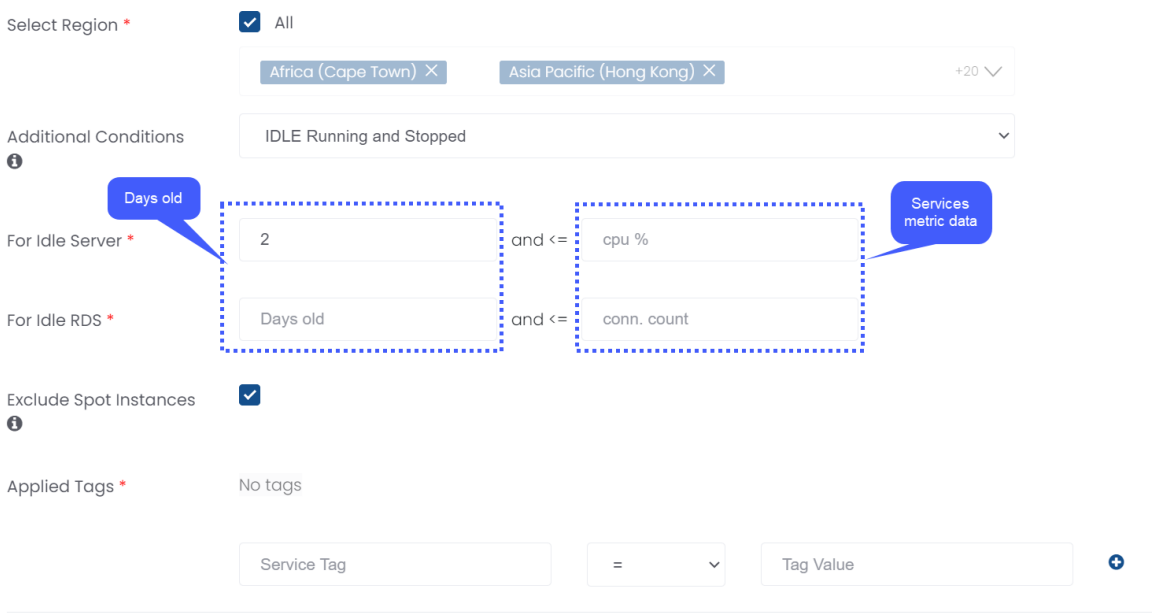
1. Navigate to event scheduler module.
2. On the event scheduler dashboard, click **Add Event** available at the upper right corner.
3. On the **Add Event** page, in the **Basic Details** tab, enter details as follows:

Field name	Notes
Name	Enter a valid and descriptive name for the event.
Select Provider	Choose your Cloud Service Provider from the dropdown. Options are AWS, Azure, and VMware.
Select Event For	select **Service** option.
Select Event	Choose *Start Service*.

4. Click **Next**, in the **Event Details** tab, enter details as follows:

Field name	Notes
Adapters	Select source adapters for the event, or check "Select All". You can select adapters or adapter groups.
Adapter Groups	Select adapter groups for the event, or check "Select All". You can select adapters or adapter groups. This field is available only for AWS and Azure cloud events.
Resource Group	Select resource groups for this event. By default, all the resource groups are selected. This field is available only for Azure cloud events.
Service Type	Choose the Service Type based on the adapters or adapter groups selection for the event.

5. Click **Next**, in the **Filters** tab, enter details as follows:



Field name	Notes
Select Region	Choose one or many Regions for your start event. Check the "All" box to choose all Regions.
Additional Conditions (Optional)	It is to sort the services for the selected event type. Choose any one of the three conditions based on your requirement: ○ **IDLE Running and Stopped**: This condition will filter both the services which are either in "running" state or "stopped" state based on the parameters entered. Those services which comply with this condition will be considered for this event run. ○ **IDLE Running**: This condition will filter for the running services based on the parameters entered. Those services which comply with this condition will be considered for this event run. ○ **IDLE Stopped**: This condition will filter for the stopped services based on the parameters entered. Those services which comply with this condition will be considered for this event run.
For Idle Server/RDS/etc. (service type)	**Days old:** Enter the number of days for idle services under the **Days old** text box. By default, 2 days is selected. **Services metric data:** Enter the services metric data to consider the idle condition. The idle consideration metric varies for each service: ○ **Idle Server:** We consider **Days old** and the average of

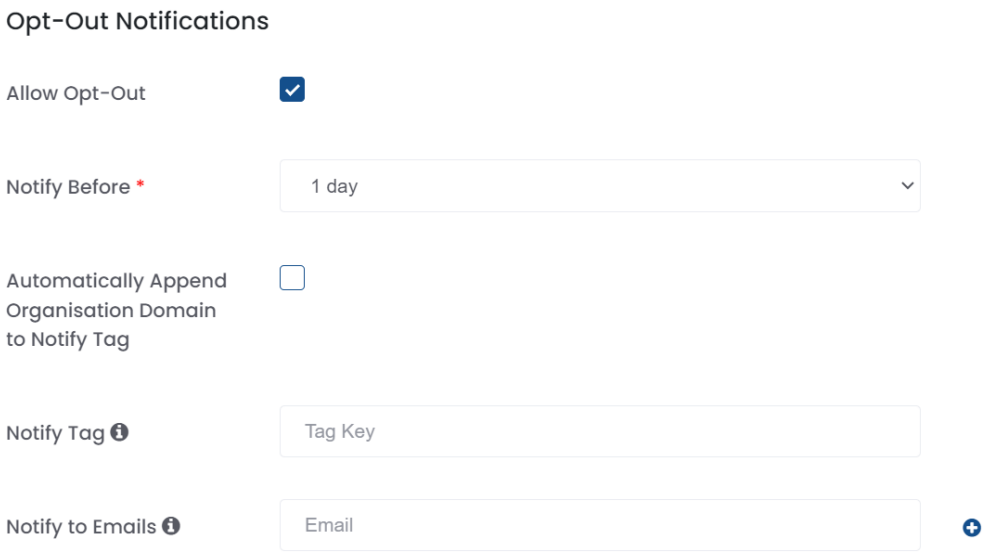
Field name	Notes
	CPUUtilization metric. ○ **Idle RDS:** We consider **Days old** and the average of **DatabaseConnections** metric. ○ **Idle Volume:** We consider **Days old** and the sum of **VolumeReadOps** and **VolumeWriteOps** metrics. ○ **Idle Load Balancer:** We consider **Days old** and the sum of the **RequestCount** metric. ○ **Idle AMI, Idle Volume Snapshot, and Idle RDS Snapshot:** We consider only **Days old** of Idle services.
Exclude Spot Instances	By default, this checkbox is enabled to exclude all spot instances from event execution.
Applied Tags	Enter a tag key in the Service Tag box. Enter a tag value in the Tag Value box. Select a relation between the entered tag key and value. By default, `=` is selected. `=` denotes equal to operator. `!=` denotes not equal to operator. Click to add the entered tag key-value pair as a filter method to filter services for this event. You can add multiple tag key-value pairs as filter. When multiple tags are added, you must select tag query operator to establish relation between multiple tag key-value pairs. By default, `|| OR` tag query operator is selected. `|| OR` denotes that services having any one of the applied tags will be considered for this event. `&& AND` denotes that only those services that have all the applied tags available will be considered for this event. To view the applicable services considered based on applied tags and operators, click Applicable services link.

6. Click **Next**, in the **Notification** tab, enter details as follows:

   Set up a notification for this event. By default, the creator of this event will receive all types of notifications related to the events.

   - **Opt-Out Notifications**

     This notification feature sends you an email at a pre-set time before the actual event execution. The email notification provides you with a link that redirects you to CloudBolt CSMP event scheduler dashboard and a list of your scheduled services displays. You can opt-out of the specific event schedule. Fill out the Opt-Out Notifications form as your workflow requires, then continue to the Event Logs Notifications.



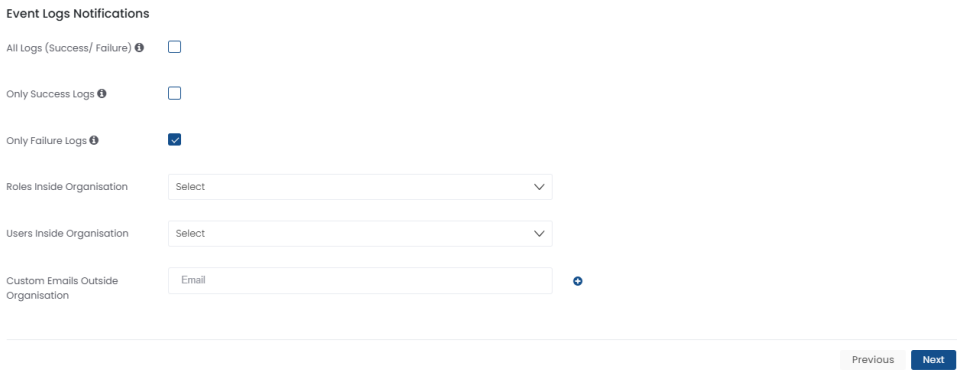
Field name	Notes
Allow Opt-Out	Check the "Allow Opt-Out" checkbox to enable Opt-Out notifications. This notification is available for backup, start, stop, EC2 rightsizing, and terminate event types. The link provided in the email for opt-out will expire 30 minutes before the actual event execution schedule.
Notify Before	Select the number of days before which you want to receive the opt-out email notification. By default, 1 day will be selected. For repeat events with occurrence type as minutely and hourly, you will receive immediate notification for the next event.
Automatically Append Organization Domain to Notify Tag	When enabled, it uses the Default Organization Email Domain available under the Default Organisation settings to create an email ID from the tag value for the specified tag key type in the Notify Tag field. An email notification will be sent to all of the email IDs.
Notify Tag	Enter the tag key type whose value you want to be utilized to generate emails in combination with the Default Organization Email Domain. If the combination of entered tag key's value and default organisation email domain creates a valid email ID, an email notification would be sent to such email ID. Emails will be sent only for the services that have a matching tag Key.

Field name	Notes
Notify to Emails	Add custom email IDs to receive an opt-out email notification. Click icon to add an email ID.

- **Event Logs Notifications**

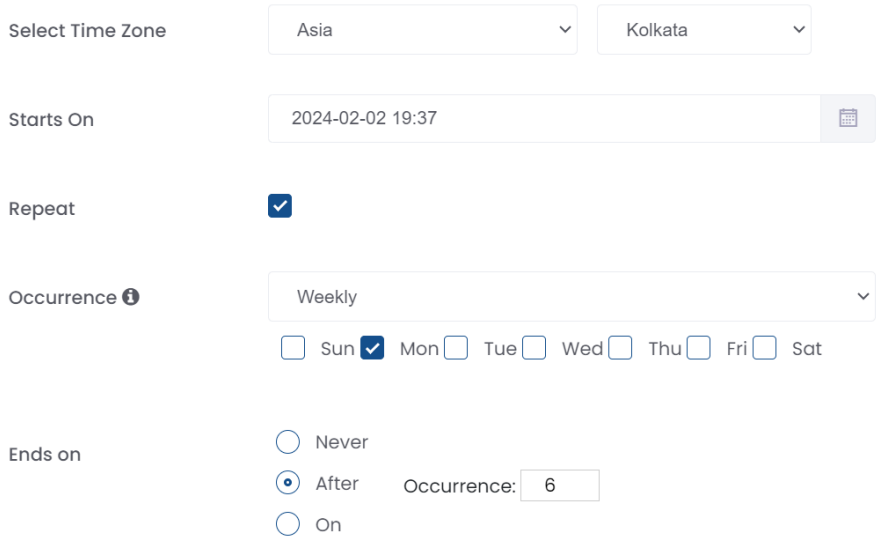
This notification feature sends you an email notification after the event execution.

Fill out the Event Logs Notifications as fits your workflow, then click **Next**.



Field name	Notes
All Logs (Success / Failure)	When enabled, Users will receive both the successful and failed event run logs.
Only Success Logs	When enabled, Users will receive logs only for the successfully completed events.
Only Failure Logs	When enabled, Users will receive logs only for the failed events. This field is enabled by default.
Roles Inside Organization	All the members of the selected roles will receive all of the enabled notifications.
Users Inside Organization	Select the Users within your organization who will receive notifications.
Custom Emails Outside Organization	Add custom email addresses that will also receive notifications. Click icon to add a custom email.

7. Click **Next**, in the **Time Schedule** tab, enter the details as follows:



Field name	Notes
Select Time Zone	Select the time zone that determines the event schedule start and end.
Starts On	Select the first event execution date and time. The first event execution time must be at least 30 minutes after the event creation time.
Repeat	Check "Repeat" to make this a repeating event. Continue to Occurrence and Ends On if checked.
Occurrence	For repeat events, select the occurrence from the dropdown.
Ends On	For repeat events, select an end time: ○ **Never:** Event does not have an end date and will continue to execute as per the occurrence schedule. ○ **After:** The event will end after the number of specified execution occurrences, with 5 occurrences as the default. ○ **On:** Select a specific date and time to end the execution of the event.

8. Click **Create** to complete scheduling this event.

11.5. Schedule a Stop Service Event

Learn how to schedule a stop service event for your cloud services using the CloudBolt CSMP event scheduler.

Use this procedure to automate a stop action event for your cloud services.

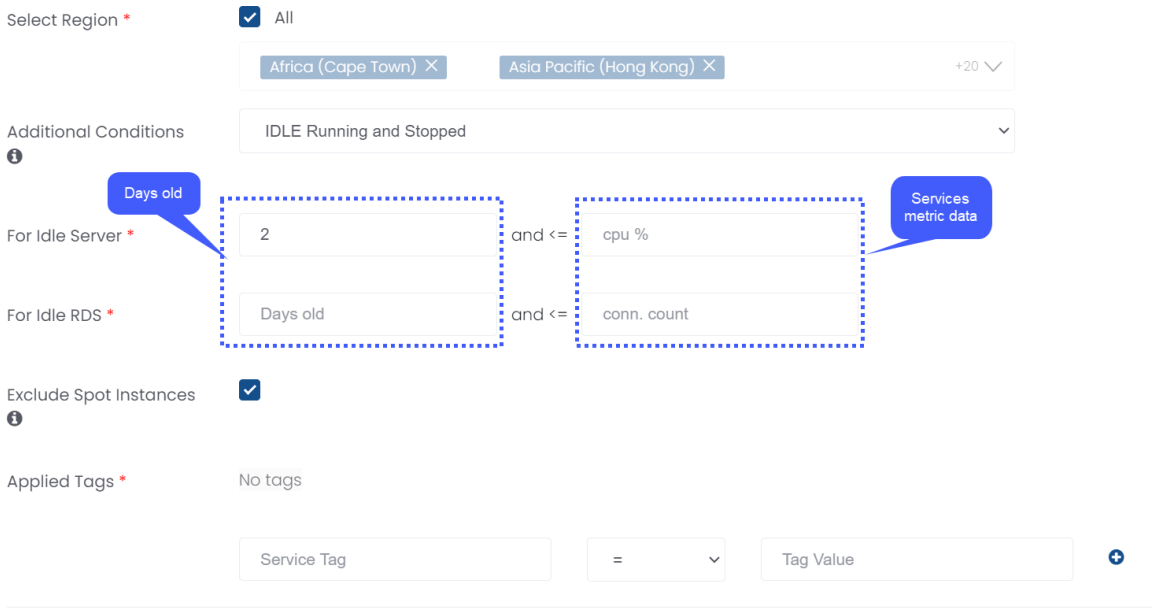
1. Navigate to event scheduler module.
2. On the event scheduler dashboard, click **Add Event** available at the upper right corner.
3. On the **Add Event** page, in the **Basic Details** tab, enter details as follows:

Field name	Notes
Name	Enter a valid and descriptive name for the event.
Select Provider	Choose your Cloud Service Provider from the dropdown. Options are AWS, Azure, and VMware.
Select Event For	select **Service** option.
Select Event	Choose *Stop Service*.
Dry run	Check *Dry run* to run this event in test mode. *Dry run* will not affect any of your cloud services; you will get event logs stating that it is a dry run log.

4. Click **Next**, in the **Event Details** tab, enter details as follows:

Field name	Notes
Adapters	Select source adapters for the event, or check "Select All". You can select adapters or adapter groups.
Adapter Groups	Select adapter groups for the event, or check "Select All". You can select adapters or adapter groups. This field is available only for AWS and Azure cloud events.
Resource Group	Select resource groups for this event. By default, all the resource groups are selected. This field is available only for Azure cloud events.
Service Type	Choose the Service Type based on the adapters or adapter groups selection for the event.

5. Click **Next**, in the **Filters** tab, enter details as follows:



Field name	Notes
Select Region	Choose one or many Regions for your start event. Check the "All" box to choose all Regions.
Additional Conditions (Optional)	It is to sort the services for the selected event type. Drop-down options can vary. Choose any one of the three conditions based on your requirement: ○ **IDLE Running and Stopped**: This condition will filter both the services which are either in "running" state or "stopped" state based on the parameters entered. Those services which comply with this condition will be considered for this event run. ○ **IDLE Running**: This condition will filter for the running services based on the parameters entered. Those services which comply with this condition will be considered for this event run. ○ **IDLE Stopped**: This condition will filter for the stopped services based on the parameters entered. Those services which comply with this condition will be considered for this event run.
For Idle Server/RDS/etc. (service type)	**Days old:** Enter the number of days for idle services under the **Days old** text box. By default, 2 days is selected. **Services metric data:** Enter the services metric data to consider the idle condition. The idle consideration metric varies for each service:

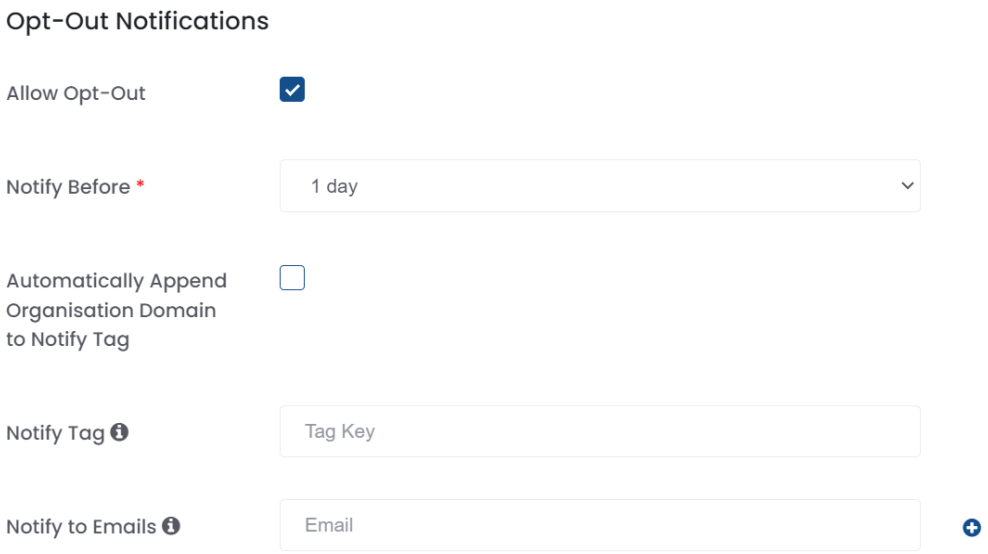
Field name	Notes
	○ **Idle Server:** We consider **Days old** and the average of **CPUUtilization** metric. ○ **Idle RDS:** We consider **Days old** and the average of **DatabaseConnections** metric. ○ **Idle Volume:** We consider **Days old** and the sum of **VolumeReadOps** and **VolumeWriteOps** metrics. ○ **Idle Load Balancer:** We consider **Days old** and the sum of the **RequestCount** metric. ○ **Idle AMI, Idle Volume Snapshot, and Idle RDS Snapshot:** We consider only **Days old** of Idle services.
Exclude Spot Instances	By default, this checkbox is enabled to exclude all spot instances from event execution.
Applied Tags	Enter a tag key in the Service Tag box. Enter a tag value in the Tag Value box. Select a relation between the entered tag key and value. By default, `=` is selected. `=` denotes equal to operator. `!=` denotes not equal to operator. Click to add the entered tag key-value pair as a filter method to filter services for this event. You can add multiple tag key-value pairs as filter. When multiple tags are added, you must select tag query operator to establish relation between multiple tag key-value pairs. By default, `|| OR` tag query operator is selected. `|| OR` denotes that services having any one of the applied tags will be considered for this event. `&& AND` denotes that only those services that have all the applied tags available will be considered for this event. To view the applicable services considered based on applied tags and operators, click Applicable services link.

6. Click **Next**, in the **Notification** tab, enter details as follows:

   Set up a notification for this event. By default, the creator of this event will receive all types of notifications related to the events.

   - **Opt-Out Notifications**

     This notification feature sends you an email at a pre-set time before the actual event execution. The email notification provides you with a link that redirects you to CloudBolt CSMP event scheduler dashboard and a list of your scheduled services displays. You can opt-out of the specific event schedule. Fill out the Opt-Out Notifications form as your workflow requires, then continue to the Event Logs Notifications.



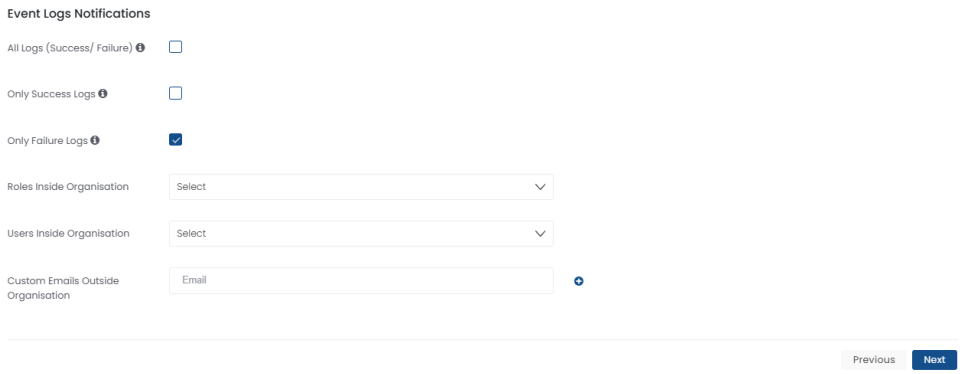
Field name	Notes
Allow Opt-Out	Check the "Allow Opt-Out" checkbox to enable Opt-Out notifications. This notification is available for backup, start, stop, EC2 rightsizing, and terminate event types. The link provided in the email for opt-out will expire 30 minutes before the actual event execution schedule.
Notify Before	Select the number of days before which you want to receive the opt-out email notification. By default, 1 day will be selected. For repeat events with occurrence type as minutely and hourly, you will receive immediate notification for the next event.
Automatically Append Organization Domain to Notify Tag	When enabled, it uses the Default Organization Email Domain available under the Default Organisation settings to create an email ID from the tag value for the specified tag key type in the Notify Tag field. An email notification will be sent to all of the email IDs.
Notify Tag	Enter the tag key type whose value you want to be utilized to generate emails in combination with the Default Organization Email Domain. If the combination of entered tag key's value and default organisation email domain creates a valid email ID, an email notification would be sent to such email ID. Emails will be sent only for the services that have a matching tag Key.

Field name	Notes
Notify to Emails	Add custom email IDs to receive an opt-out email notification. Click icon to add an email ID.

- **Event Logs Notifications**

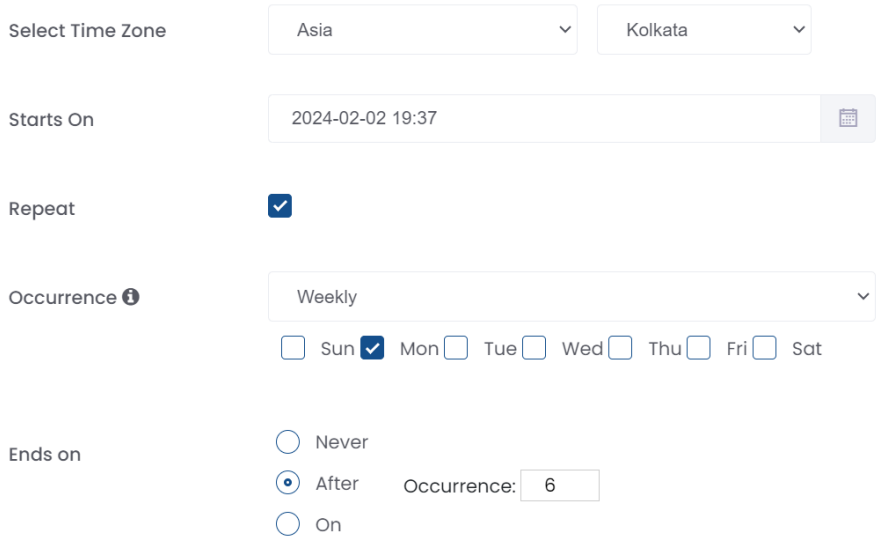
This notification feature sends you an email notification after the event execution.

Fill out the Event Logs Notifications as fits your workflow, then click **Next**.



Field name	Notes
All Logs (Success / Failure)	When enabled, Users will receive both the successful and failed event run logs.
Only Success Logs	When enabled, Users will receive logs only for the successfully completed events.
Only Failure Logs	When enabled, Users will receive logs only for the failed events. This field is enabled by default.
Roles Inside Organization	All the members of the selected roles will receive all of the enabled notifications.
Users Inside Organization	Select the Users within your organization who will receive notifications.
Custom Emails Outside Organization	Add custom email addresses that will also receive notifications. Click icon to add a custom email.

7. Click **Next**, in the **Time Schedule** tab, enter the details as follows:



Field name	Notes
Select Time Zone	Select the time zone that determines the event schedule start and end.
Starts On	Select the first event execution date and time. The first event execution time must be at least 30 minutes after the event creation time.
Repeat	Check "Repeat" to make this a repeating event. Continue to Occurrence and Ends On if checked.
Occurrence	For repeat events, select the occurrence from the dropdown.
Ends On	For repeat events, select an end time: ○ **Never:** Event does not have an end date and will continue to execute as per the occurrence schedule. ○ **After:** The event will end after the number of specified execution occurrences, with 5 occurrences as the default. ○ **On:** Select a specific date and time to end the execution of the event.

8. Click **Create** to complete scheduling this event.

11.6. Schedule a Terminate Service Event

Learn how to schedule a shutdown event for your cloud instances and services using CloudBolt CSMP event scheduler.

Use this procedure to permanently shutdown event for your cloud services.

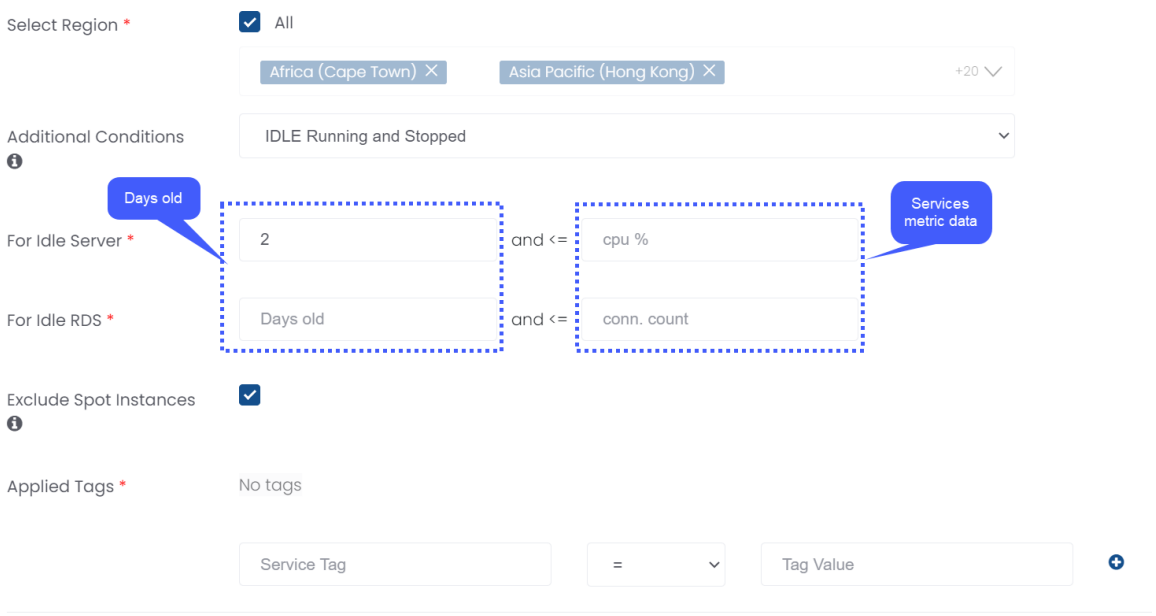
1. Navigate to event scheduler module.
2. On the event scheduler dashboard, click **Add Event**available at the upper right corner.
3. On the **Add Event** page, in the **Basic Details** tab, enter details as follows:

Field name	Notes
Name	Enter a valid and descriptive name for the event.
Select Provider	Choose your Cloud Service Provider from the dropdown. Options are AWS, Azure, and VMware.
Select Event For	select **Service** option.
Select Event	Choose *Terminate Service*.
Dry run	Check *Dry run* to run this event in test mode. *Dry run* will not affect any of your cloud services; you will get event logs stating that it is a dry run log.

4. Click **Next**, in the **Event Details** tab, enter details as follows:

Field name	Notes
Adapters	Select source adapters for the event, or check "Select All". You can select adapters or adapter groups.
Adapter Groups	Select adapter groups for the event, or check "Select All". You can select adapters or adapter groups. This field is available only for AWS and Azure cloud events.
Resource Group	Select resource groups for this event. By default, all the resource groups are selected. This field is available only for Azure cloud events.
Service Type	Choose the service type based on the adapters or adapter groups selection for the event.

5. Click **Next**, in the **Filters** tab, enter details as follows:



Field name	Notes
Select Region	Choose one or many Regions for your start event. Check the "All" box to choose all Regions.
Additional Conditions (Optional)	It is to sort the services for the selected event type. Drop-down options can vary. Choose any one of the three conditions based on your requirement: ○ **IDLE Running and Stopped**: This condition will filter both the services which are either in "running" state or "stopped" state based on the parameters entered. Those services which comply with this condition will be considered for this event run. ○ **IDLE Running**: This condition will filter for the running services based on the parameters entered. Those services which comply with this condition will be considered for this event run. ○ **IDLE Stopped**: This condition will filter for the stopped services based on the parameters entered. Those services which comply with this condition will be considered for this event run.
For Idle Server/RDS	**Days old:** Enter the number of days for idle services under the **Days old** text box. By default, 2 days is selected. **Services metric data:** Enter the services metric data to consider the idle condition. The idle consideration metric varies for each service:

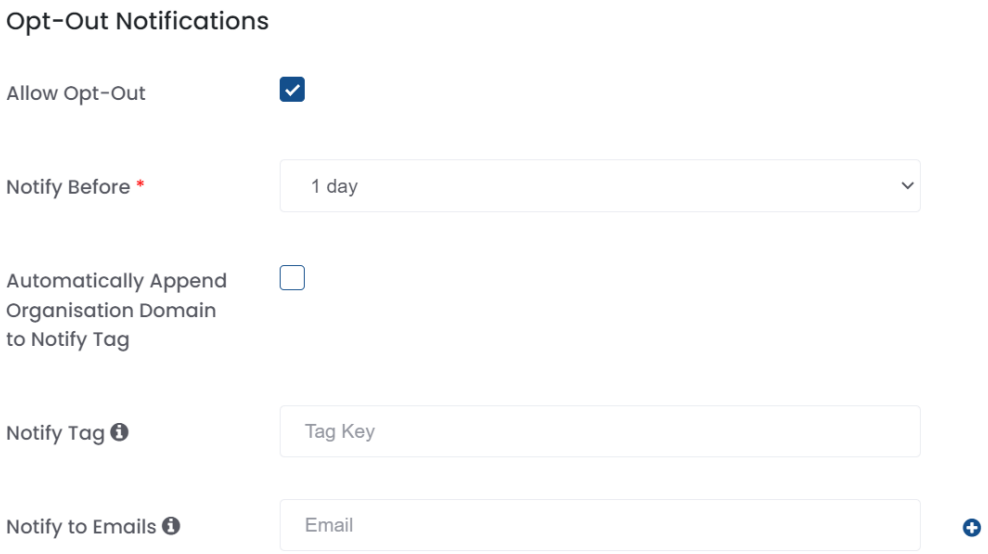
Field name	Notes
	○ **Idle Server:** We consider **Days old** and the average of **CPUUtilization** metric. ○ **Idle RDS:** We consider **Days old** and the average of **DatabaseConnections** metric. ○ **Idle Volume:** We consider **Days old** and the sum of **VolumeReadOps** and **VolumeWriteOps** metrics. ○ **Idle Load Balancer:** We consider **Days old** and the sum of the **RequestCount** metric. ○ **Idle AMI, Idle Volume Snapshot, and Idle RDS Snapshot:** We consider only **Days old** of Idle services.
Exclude Spot Instances	By default, this checkbox is enabled to exclude all spot instances from event execution.
Applied Tags	Enter a tag key in the Service Tag box. Enter a tag value in the Tag Value box. Select a relation between the entered tag key and value. By default, `=` is selected. `=` denotes equal to operator. `!=` denotes not equal to operator. Click to add the entered tag key-value pair as a filter method to filter services for this event. You can add multiple tag key-value pairs as filter. When multiple tags are added, you must select tag query operator to establish relation between multiple tag key-value pairs. By default, `|| OR` tag query operator is selected. `|| OR` denotes that services having any one of the applied tags will be considered for this event. `&& AND` denotes that only those services that have all the applied tags available will be considered for this event. To view the applicable services considered based on applied tags and operators, click Applicable services link.

6. Click **Next**, in the **Notification** tab, enter details as follows:

   Set up a notification for this event. By default, the creator of this event will receive all types of notifications related to the events.

   - **Opt-Out Notifications**

     This notification feature sends you an email at a pre-set time before the actual event execution. The email notification provides you with a link that redirects you to CloudBolt CSMP event scheduler dashboard and a list of your scheduled services displays. You can opt-out of the specific event schedule. Fill out the Opt-Out Notifications form as your workflow requires, then continue to the Event Logs Notifications.



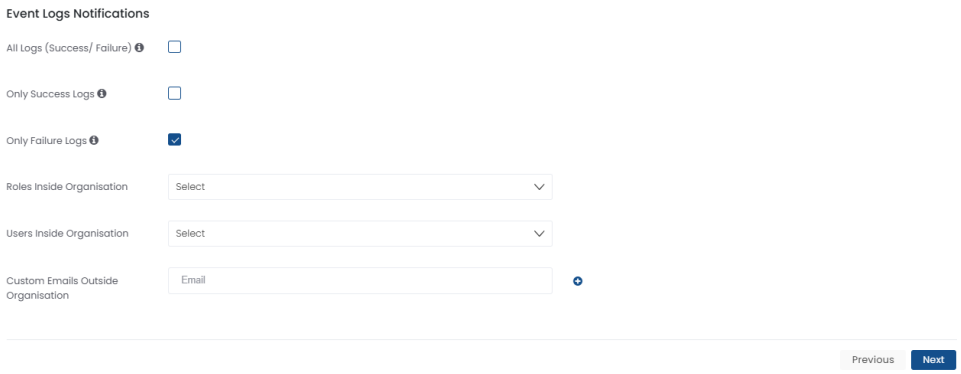
Field name	Notes
Allow Opt-Out	Check the "Allow Opt-Out" checkbox to enable Opt-Out notifications. This notification is available for backup, start, stop, EC2 rightsizing, and terminate event types. The link provided in the email for opt-out will expire 30 minutes before the actual event execution schedule.
Notify Before	Select the number of days before which you want to receive the opt-out email notification. By default, 1 day will be selected. For repeat events with occurrence type as minutely and hourly, you will receive immediate notification for the next event.
Automatically Append Organization Domain to Notify Tag	When enabled, it uses the Default Organization Email Domain available under the Default Organisation settings to create an email ID from the tag value for the specified tag key type in the Notify Tag field. An email notification will be sent to all of the email IDs.
Notify Tag	Enter the tag key type whose value you want to be utilized to generate emails in combination with the Default Organization Email Domain. If the combination of entered tag key's value and default organisation email domain creates a valid email ID, an email notification would be sent to such email ID. Emails will be sent only for the services that have a matching tag Key.

Field name	Notes
Notify to Emails	Add custom email IDs to receive an opt-out email notification. Click icon to add an email ID.

- **Event Logs Notifications**

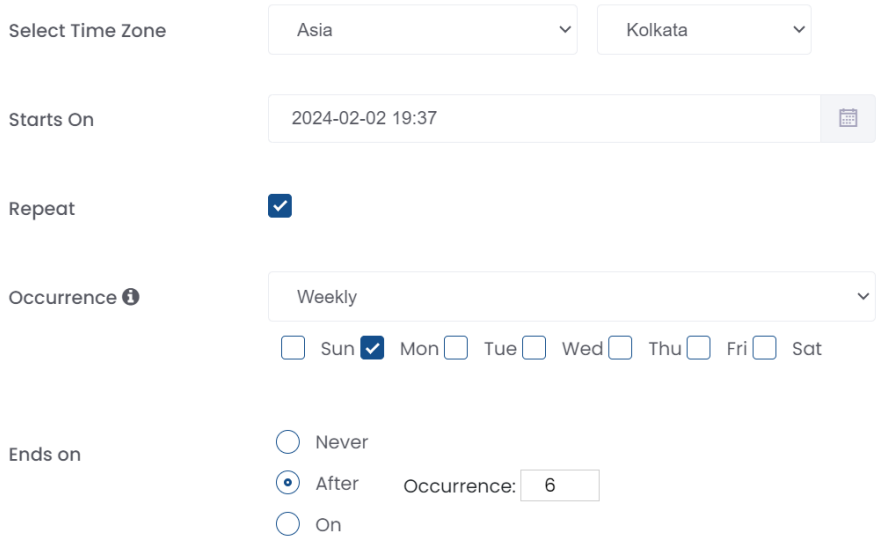
This notification feature sends you an email notification after the event execution.

Fill out the Event Logs Notifications as fits your workflow, then click **Next**.



Field name	Notes
All Logs (Success / Failure)	When enabled, Users will receive both the successful and failed event run logs.
Only Success Logs	When enabled, Users will receive logs only for the successfully completed events.
Only Failure Logs	When enabled, Users will receive logs only for the failed events. This field is enabled by default.
Roles Inside Organization	All the members of the selected roles will receive all of the enabled notifications.
Users Inside Organization	Select the Users within your organization who will receive notifications.
Custom Emails Outside Organization	Add custom email addresses that will also receive notifications. Click icon to add a custom email.

7. Click **Next**, in the **Time Schedule** tab, enter the details as follows:



Field name	Notes
Select Time Zone	Select the time zone that determines the event schedule start and end.
Starts On	Select the first event execution date and time. The first event execution time must be at least 30 minutes after the event creation time.
Repeat	Check "Repeat" to make this a repeating event. Continue to Occurrence and Ends On if checked.
Occurrence	For repeat events, select the occurrence from the dropdown.
Ends On	For repeat events, select an end time: ○ **Never:** Event does not have an end date and will continue to execute as per the occurrence schedule. ○ **After:** The event will end after the number of specified execution occurrences, with 5 occurrences as the default. ○ **On:** Select a specific date and time to end the execution of the event.

8. Click **Create** to complete scheduling this event.

12. CSMP API

Example API endpoints supported by CloudBolt CSMP.

To see the full CloudBolt API documentation in Swagger, see the API documentation and then choose between Core APIs and Reporting APIs.

Filtration Menu

Retrieves all the filter values for a billing adapter.

Endpoint URL: <Base URL> /aws/reports/get_filteration_menu?adapter_id={{adapter_id}}

Method: GET

Description: This API returns all available filter values for a specific billing adapter. The user can use these values to apply a filter in the custom report API.

Request header:

Authorization	API access key

Request body: N/A

Response body:

JSON

```
{
    "filteration_menu": {
        "cost_report": {
            "AWS": {
                "Services": {},
                "Regions": {},
                "Tags": {},
                "Accounts": []
            }
        },
        "reserved_instance_report": {}
    },
    "favourite_report_count": {
        "total": 11,
        "cost_report": 9,
        "reserved_instance_report": 2,
        "azure_cost_report": 0
    }
}
```

AWS Billing Adapter List

Lists all the AWS adapters.

Endpoint URL: /aws/reports/get_billing_adapters

Description: Retrieves all the AWS adapters within a CloudBolt CSMP account with their name, id, and type. Only users with admin-level permissions will be able to use this API.

Request header:

Authorization	API access key

Request body: N/A

Response body:

JSON

```
{
    "adapters/aws": [
        {
            "id": "<adapter_id here>",
            "name": "<adapter name here>",
            "state": "active",
            "is_configured": <true/false>
        }
      ]
  }
```

Custom Report

Lists cost data as per the metrics provided by the user.

Endpoint URL: <Base URL>/aws/reports/build_custom_reports

Method: POST

Description: Create cost reports based on the user's specified date range, filters, dimensions, and metrics. It responds based on the dimensions and metrics entered.

Request header:

Authorization	API access key

Request body:

JSON

```
{
   "adapter_id": <adapter_id>,
   "date_range": {
    "start_date": "01-04-2021",
    "end_date": "18-04-2021",
    },
  "tags": {},
  "account": [],
  "service": [],
  "region": [],
  "usage_type": [],
  "operation": [],
  "dimensions": [
    "date"
  ],
  "metrics": [
    "unblended"
  ],
 }
```

Response body:

JSON

```
{
    "response": [
        {
            "dimensions": {
                "date": "2020-04-20"
            },
            "metrics": {
                "unblended": 183.81
            }
        },
        {
            "dimensions": {
                "date": "2020-04-21"
            },
            "metrics": {
                "unblended": 180.4
            }
        }
     ]
 }
```

URI Parameters:

1. **Adapter ID (Required)**:
    a. Type: String
    b. Valid value: See AWS Billing Adapter List to get adapter ID.
2. **Date Range (Required)**:
    a. Type: String
    b. Valid value: "01-04-2021"

    "date_range" { "start_date": "01-04-2021", "end_date": "18-04-2021" }

3. **Dimensions (Required)**:

a. Type: Array

b. Max count: 4 dimensions are allowed in one request

c. Valid values: 'account_id' | 'region' | 'availability_zone' | 'date' | 'month' | 'db_engine' | 'instance_size' | 'Operation' | 'service' | 'usage_type' | 'volume_type' | 'Item_description' | 'term' | 'payer_account_id'

dimensions	["date", "account_id"]

4. **Metrics (Required)**:

a. Type: Array

b. Max count: 2 metrices are allowed in one request

c. Valid values: 'unblended' | 'blended' | 'amortised' | 'credit' | 'reservation_charge' | 'tax' | 'saving_plan_savings' | 'saving_plan_hourly' | 'usage_quantity' | 'on_demand_hours' | 'reserved_hours

metrics	["unblended"]

5. **Account / Service / Region (Optional)**:

a. Type: Array

b. Valid values: For valid values see Filtration Menu response

6. **Product Family (Optional)**:

a. Type: Array

b. Valid values: "Data transfer "

c.

Example	"product_family": ["Data Transfer"]

7. **Tags (Optional)**:

a. Type: JSON

b. Valid values: For valid values see Filtration Menu response

c.

Example	"tags": {
	"Service:Owner": [
	"Developers"
	]
	}

8. **Usage type (Optional)**:

a. Type: String

b. This parameter is service-specific. If the user set a Service filter then only Usage type will appear.

c. Valid values: For valid values see Filtration Menu response

Example	"service": ["AWS Cost Explorer"], "usage_type": [“USE1-APIRequest” “USE1-CostDataStorage”]

9. **Operation (Optional)**:

a. Type: Array

b. Operation depends on Usage type & Service filter

c. Valid values: For valid values see Filtration Menu response.

- AVS Allocation API

12.1. AVS Allocation API

Learn to download the AVS allocation file.

Introduction

This article highlights the endpoints for downloading the shared cost allocation file for the managed AVS platform, containing detailed information about allocated costs.

API overview

This Reporting API enables you to retrieve reports and export data in JSON and CSV format for further analysis and processing. It allows you to gain insights into cost allocation patterns and generate custom reports as needed. This API facilitates the allocation of amortized costs for Azure VMware solutions by assigning them according to the subscription environment tag. Subsequently, these costs are distributed among VMware virtual machine services, taking into account their average percentage usage over the specified period.

Prerequisites

- You must have Azure services named as 'Specialized Compute'.
- You must configure AVS VMware adapters with all configuration settings and VDC setup.

Authentication

Access to the Reporting API requires authentication using API keys. To generate an access key, follow this path: **My Profile > Access Keys**. For more information on generating the access key, see Generate Access Keys.

Once the access key is generated, you need to add this access key as Bearer token in your CloudBolt Reporting APIs page.

Using the API

Documentation is available in the CSMP API Swagger Docs, in the "VMWare Cost Report" section.

A general flow for accessing data is:

1. Generate an authentication token
2. Query for the IDs of relevant AWS and Azure adapters using the `/adapters` endpoint
3. Executing a GET request to the `/vm_ware/avs_allocations/download` using the arguments described in the documentation.

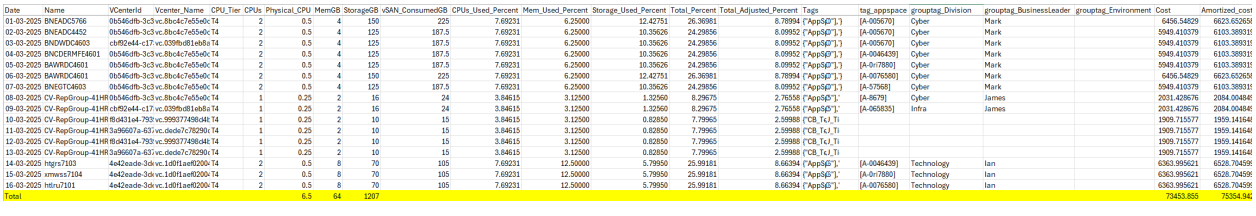
Algorithm

Here is the general algorithmic approach utilised by the AVS cost allocation report API:

1. Identify the total host amortized cost: The amortized cost value for all services named as 'Specialized Compute' is calculated based on the Azure adapter ID and the AVS environment type at the subscription tag level.
2. Determine target: Based on VMware adapter ID, the target virtual machines are identified.
3. Calculate physical CPU: Depending on the CPU tier, the formula for calculating the physical CPU differs. For CPU tier T1, the physical CPU will be the same as the number of CPU cores (CPUs). For CPU tier T2, the physical CPU will be the CPUs divided by 2. For all other CPU tiers, the physical CPU will be calculated by dividing the CPUs by 4.
4. Calculate CPU used percentage: Calculate the percentage of physical CPU in use for the individual virtual machine compared to the total physical CPUs utilised across all the target virtual machines during the selected period.
5. Calculate memory used percentage: Calculate the percentage of memory in use for the individual virtual machine compared to the total memory utilised across all the target virtual machines during the selected period.

6. Calculate storage used percentage: Calculate the percentage of storage in use for the individual virtual machine compared to the total storage utilised across all the target virtual machines during the selected period.
   If the target virtual machine is part of a vSAN cluster, indicated by a datastore_type value of 'vSAN,' the storage percentage is calculated using a PowerShell script. The steps for calculating the vSAN consumed GB and storage used percentage are as follows:
   a. Calculate vSAN consumed GB: For each virtual machine, identify disks with a datastore_type of 'vSAN.' Iterate through these disks and apply a multiplier based on the policy name to compute the vSAN consumed GB. Aggregate the vSAN consumed GB for each VM that is part of the vSAN cluster to get the total vSAN consumed GB.
   b. Calculate storage used percentage: Using the PowerShell script, compute the storage percentage for each virtual machine with the formula: (vSAN consumed GB / Total vSAN consumed GB) * 100.
7. Total percentage: Aggregate the percentages of each resource (CPU, memory, and storage) for every virtual machine.
8. Normalised percentage: It is the 'total percentage' to the total number of resources for a virtual machine.
9. Allocate amortized costs: Multiply the total host amortized cost to be allocated by the 'normalised percentage' for each virtual machine.

Below is a sample CSV file screenshot. The total row at the bottom is included solely for illustrative purposes. Calculation details for each column can be found below.



Date	Name	VCenterId	Vcenter_Name	CPU_Tier	CPUs	Physical_CPU	MemGB	StorageGB	vSAN_ConsumedGB	CPUs_Used_Percent	Mem_Used_Percent	Storage_Used_Percent	Total_Percent	Total_Adjusted_Percent	Tags	tag_appspace	grouptag_Division	grouptag_BusinessLeader	grouptag_Environment	Cost	Amortized_cost
01-03-2025	BNEADC5766	0b546dfb-3c3	vc.8bc4c7e55e0c	T4	2	0.5	4	150	225	7.69231	6.25000	12.42751	26.36981	8.78994	{"AppSβ":,}	[A-005670]	Cyber	Mark		6456.54829	6623.652654
02-03-2025	BNEADC4432	0b546dfb-3c3	vc.8bc4c7e55e0c	T4	2	0.5	4	125	187.5	7.69231	6.25000	10.35626	24.29856	8.09952	{"AppSβ":,}	[A-005670]	Cyber	Mark		5949.410379	6103.389315
03-03-2025	BNDWDC4603	cbf92e44-c17	vc.039fbd81eb8a	T4	2	0.5	4	125	187.5	7.69231	6.25000	10.35626	24.29856	8.09952	{"AppSβ":,}	[A-005670]	Cyber	Mark		5949.410379	6103.389315
04-03-2025	BNCDERMFE4601	0b546dfb-3c3	vc.8bc4c7e55e0c	T4	2	0.5	4	125	187.5	7.69231	6.25000	10.35626	24.29856	8.09952	{"AppSβ":,}	[A-0046439]	Cyber	Mark		5949.410379	6103.389315
05-03-2025	BAWRDC4601	0b546dfb-3c3	vc.8bc4c7e55e0c	T4	2	0.5	4	125	187.5	7.69231	6.25000	10.35626	24.29856	8.09952	{"AppSβ":,}	[A-0r7880]	Cyber	Mark		5949.410379	6103.389315
06-03-2025	BAWRDC4601	0b546dfb-3c3	vc.8bc4c7e55e0c	T4	2	0.5	4	150	225	7.69231	6.25000	12.42751	26.36981	8.78994	{"AppSβ":,}	[A-0075580]	Cyber	Mark		6456.54829	6623.652654
07-03-2025	BNEGTC4603	0b546dfb-3c3	vc.8bc4c7e55e0c	T4	2	0.5	4	125	187.5	7.69231	6.25000	10.35626	24.29856	8.09952	{"AppSβ":,}	[A-57668]	Cyber	Mark		5949.410379	6103.389315
08-03-2025	CV-RepGroup-41HR	0b546dfb-3c3	vc.8bc4c7e55e0c	T4	1	0.25	2	16	24	3.84615	3.12500	1.32560	8.29675	2.76558	{"AppSβ":,}	[A-8679]	Cyber	James		2031.428676	2084.004849
09-03-2025	CV-RepGroup-41HR	cbf92e44-c17	vc.039fbd81eb8a	T4	1	0.25	2	16	24	3.84615	3.12500	1.32560	8.29675	2.76558	{"AppSβ":,}	[A-065835]	Infra	James		2031.428676	2084.004849
10-03-2025	CV-RepGroup-41HR	f8d431e4-793	vc.999377498c4t	T4	1	0.25	2	10	15	3.84615	3.12500	0.82850	7.79965	2.59988	{"CB_Tc_Ti_					1909.715577	1959.141648
11-03-2025	CV-RepGroup-41HR	3a96607a-637	vc.dede7c78290	T4	1	0.25	2	10	15	3.84615	3.12500	0.82850	7.79965	2.59988	{"CB_Tc_Ti_					1909.715577	1959.141648
12-03-2025	CV-RepGroup-41HR	f8d431e4-793	vc.999377498c4t	T4	1	0.25	2	10	15	3.84615	3.12500	0.82850	7.79965	2.59988	{"CB_Tc_Ti_					1909.715577	1959.141648
13-03-2025	CV-RepGroup-41HR	3a96607a-637	vc.dede7c78290	T4	1	0.25	2	10	15	3.84615	3.12500	0.82850	7.79965	2.59988	{"CB_Tc_Ti_					1909.715577	1959.141648
14-03-2025	htgrs7103	4e42eade-3dc	vc.1d0f1aef0200	T4	2	0.5	8	70	105	7.69231	12.50000	5.79950	25.99181	8.66394	{"AppSβ":,}	[A-0046439]	Technology	Ian		6363.995621	6528.704599
15-03-2025	xrmers7104	4e42eade-3dc	vc.1d0f1aef0200	T4	2	0.5	8	70	105	7.69231	12.50000	5.79950	25.99181	8.66394	{"AppSβ":,}	[A-0r7880]	Technology	Ian		6363.995621	6528.704599
16-03-2025	htiru7101	4e42eade-3dc	vc.1d0f1aef0200	T4	2	0.5	8	70	105	7.69231	12.50000	5.79950	25.99181	8.66394	{"AppSβ":,}	[A-0076580]	Technology	Ian		6363.995621	6528.704599
Total						6.5	64	1207												73453.855	75354.942

- Date: Displays the date corresponding to the available data.
- Name: Name of the virtual machine.
- VCenterId: Unique ID of the vCenter associated with the VM.

- Vcenter_Name: Name of the vCenter associated with the VM.
- CPU_Tier: CPU tier class.
- CPUs: Total CPU cores utilised by the individual VM for the selected period.
- Physical_CPU: Equivalent physical CPU numbers based on CPU tier and CPU cores utilised by the VM.
- MemGB: Total memory utilised by the individual virtual machine for the selected period.
- StorageGB: Total disk utilised by the individual virtual machine for the selected period.
- vSAN_ConsumedGB: It is for the virtual machines which are part of vSAN cluster. It is the used storage size calculated based on the multiplier associated with the storage policy name.
- CPU_Used_Percent: It represents the percentage of physical CPUs in use compared to the total physical CPUs utilised during the selected period.
- Mem_Used_Percent: It represents the percentage of memory in use compared to the total memory utilised during the selected period.
- Storage_Used_Percent: It represents the percentage of storage in use compared to the total storage utilised during the selected period.
- Total_Percent: It is sum of CPU_Used_Percent, Mem_Used_Percent, and Storage_Used_Percent.
- Total_Adjusted_Percent: It is 'Total_Percent' divided by three.
- Tags: All the tag key-value pairs associated with the VM.
- tag_appspace: It represents the values for the appsapce tag key associated with the VM.
- grouptag_Division: It represents the values of the division group tag key associated with the Azure group containing the appspace tag key.
- grouptag_BusinessLeader: It represents the values of the businessleader group tag key associated with the Azure group containing the appspace tag key.
- grouptag_Environment: It represents the values of the environment group tag key associated with the Azure group containing the appspace tag key.
- Cost: It equals the product of 'Total_Adjusted_Percent' and the 'Total Host Cost', divided by 100.
- Amortized_Cost: It equals the product of 'Total_Adjusted_Percent' and the ‘Total Host Amortized Cost’, divided by 100.

13. Create Integrations

Learn how to create connection between CloudBolt CSMP module and other platforms

Introduction

Integrations allows creating a connection between the CloudBolt CSMP account and other communication or computing platforms to receive instant notifications. Jump to a topic to view information and setup steps for that function.

- Slack Integration
- Microsoft Teams Integration
- ServiceNow Integration

13.1. Slack Integration

Learn how to integrate your Slack account with CloudBolt CSMP.

Introduction

This guide describes how to integrate Slack with your CloudBolt CSMP account. Set up this integration to receive alerts from CloudBolt CSMP to your Slack chat service.

Prerequisites

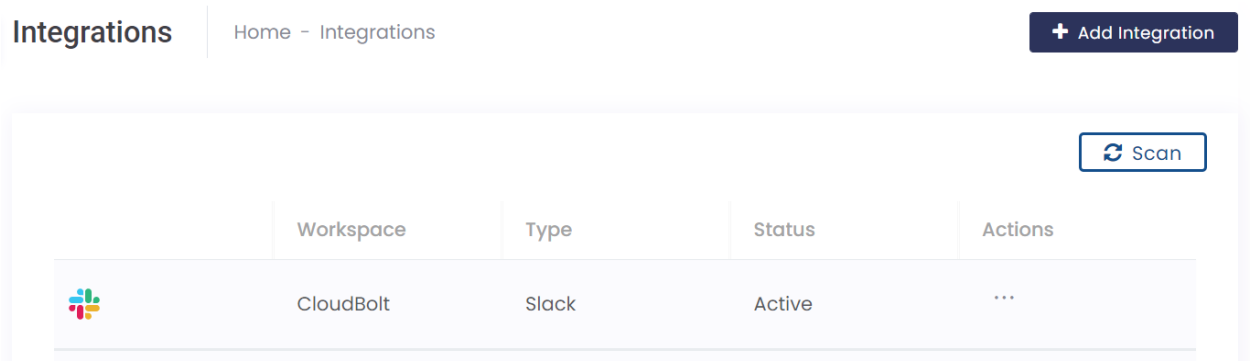
Before integrating Slack to your CloudBolt CSMP account, the following prerequisites are required:

- An active Slack account and workspace.
- Your account Role must have access rights for Slack integration.
    - The Admin Role has all permissions by default, or you can Create a Role and designate the required permissions.

Setup Overview

1. Add the Slack integration in your CloudBolt CSMP instance.
2. Add Slack Channel(s) and Workspace(s) and configure them.

Add the Slack Integration in CloudBolt CSMP

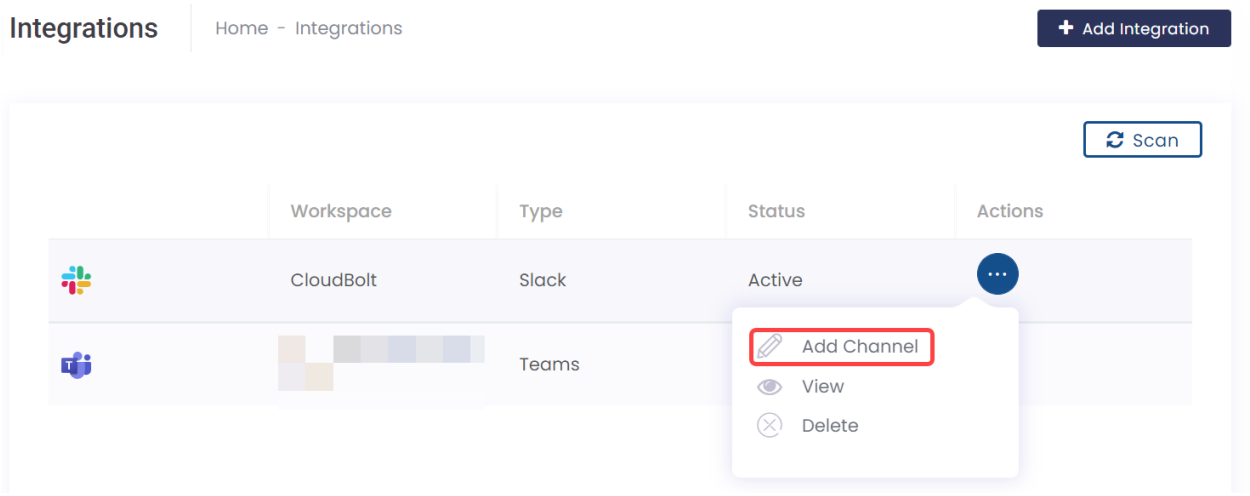


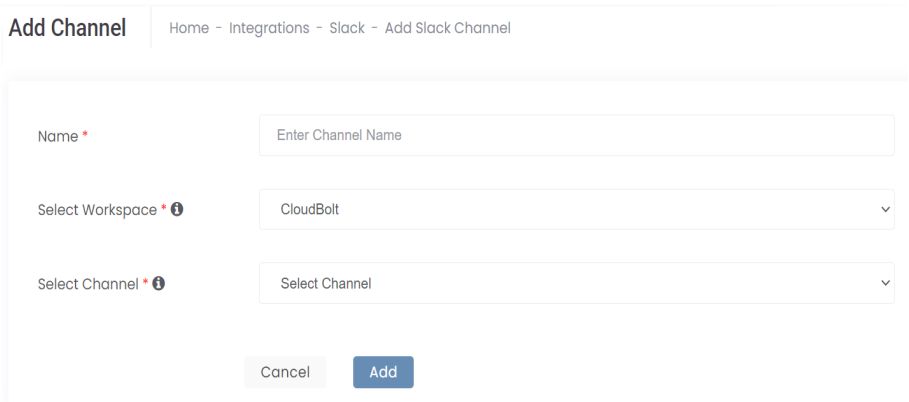
1. Log in to your CloudBolt CSMP instance.

2. Click **Settings > Integration.**
3. On the Integrations page, hover over **Add Integration > Slack**.
    - If you have not already signed in to your Slack workspace, you will be redirected to the Slack sign in page.
    - After successfully signing in to the Slack workspace, your Slack workspace name will appear on the CloudBolt CSMP Integrations page.

Add Channels in CloudBolt CSMP

1. On the Integrations page, hover over the ellipsis [...] icon in the **Actions** column and select **Add Channel.**
2. Enter the **Channel Name**, select the **Workspace**, and **Channel**.
3. Click **Add.**

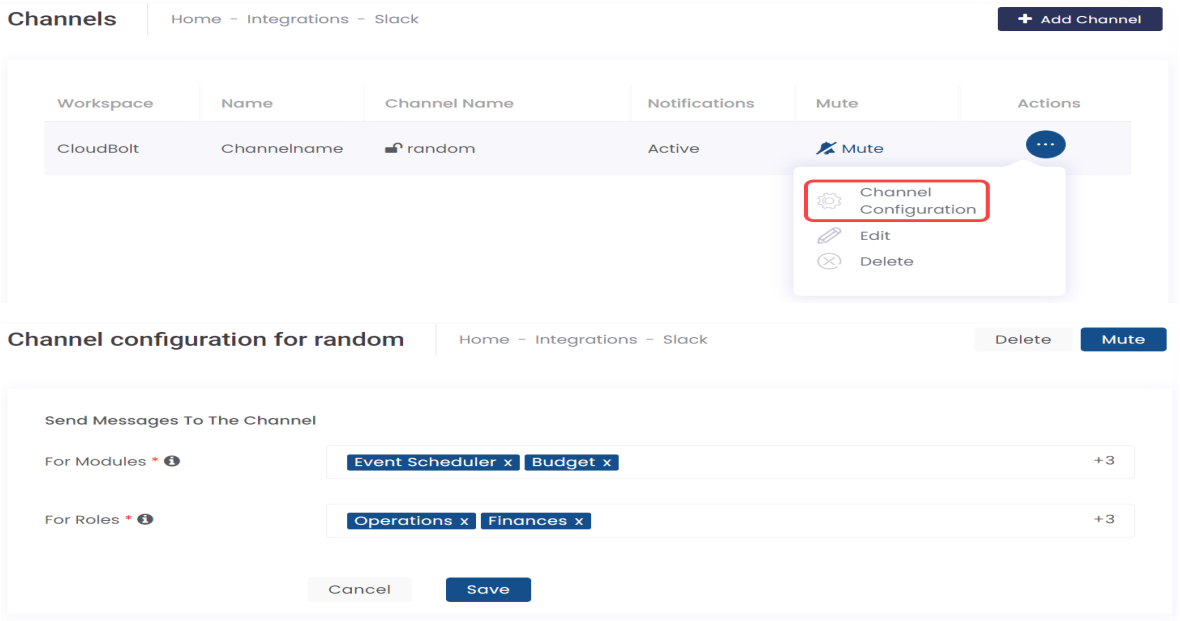




Next, Configure Channels.

Configure Channels in CloudBolt CSMP

1. On the Integrations page, hover over the ellipsis [...] icon in the **Actions** column and select **Channel Configuration.**
2. On the **Channel Configuration** page, select the **Modules** and **Roles** for which you would like to receive notifications.
3. Click **Save.**



Outcomes

Your Slack workspace is now integrated with CloudBolt CSMP and you will receive notifications from CloudBolt CSMP in Slack.

13.2. Microsoft Teams Integration

Learn how to integrate your Microsoft Teams account with CloudBolt CSMP.

Introduction

This guide describes how to integrate Microsoft Teams with your CloudBolt CSMP account. Set up this integration to receive alerts from CSMP to your Microsoft Teams chat service.

Prerequisites

Before integrating MS Teams to your CloudBolt CSMP account, the following prerequisites are required:

- An active MS Teams account.
- Your account Role must have access rights for Teams integration.
    - The Admin Role has all permissions by default, or you can Create a Role and designate the required permissions.

Setup Overview

1. Add the MS Teams integration in your CloudBolt CSMP instance.
2. Set up MS Teams Bot configuration in CloudBolt CSMP.

Add the MS Teams Integration in CSMP

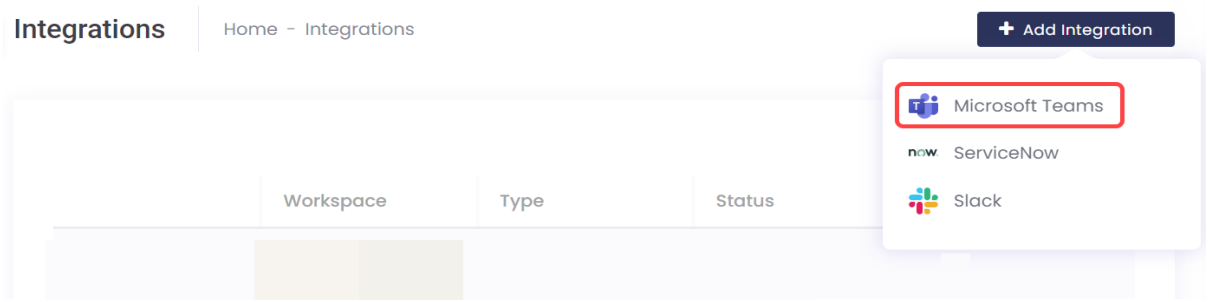
1. Log in to your CSMP instance.
2. Click **Settings > Integration.**
3. On the Integrations page, hover over **Add Integration > Microsoft Teams**.
    - If you have not already signed in to your MS Teams account, you will be redirected to the Microsoft Teams sign in page.

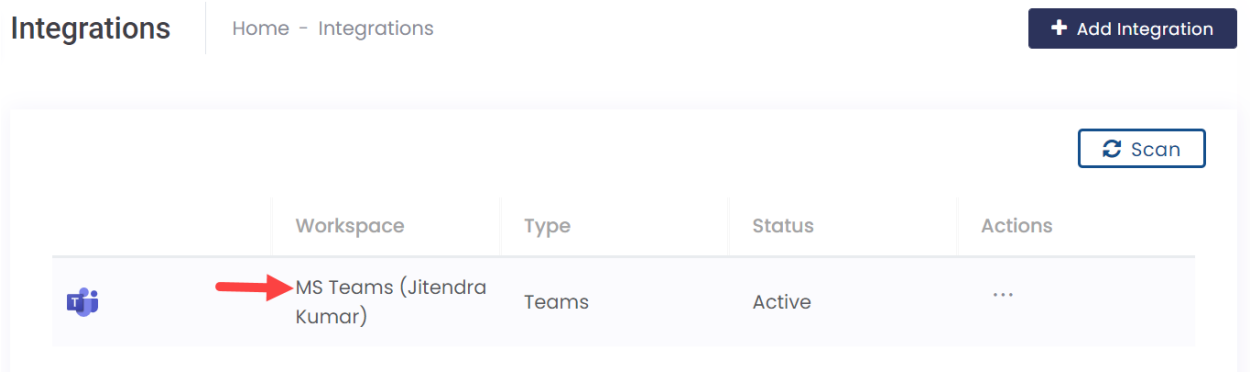
- After successfully signing in to the Microsoft Teams account, your Microsoft Teams account name will appear on the CloudBolt CSMP Integrations page.

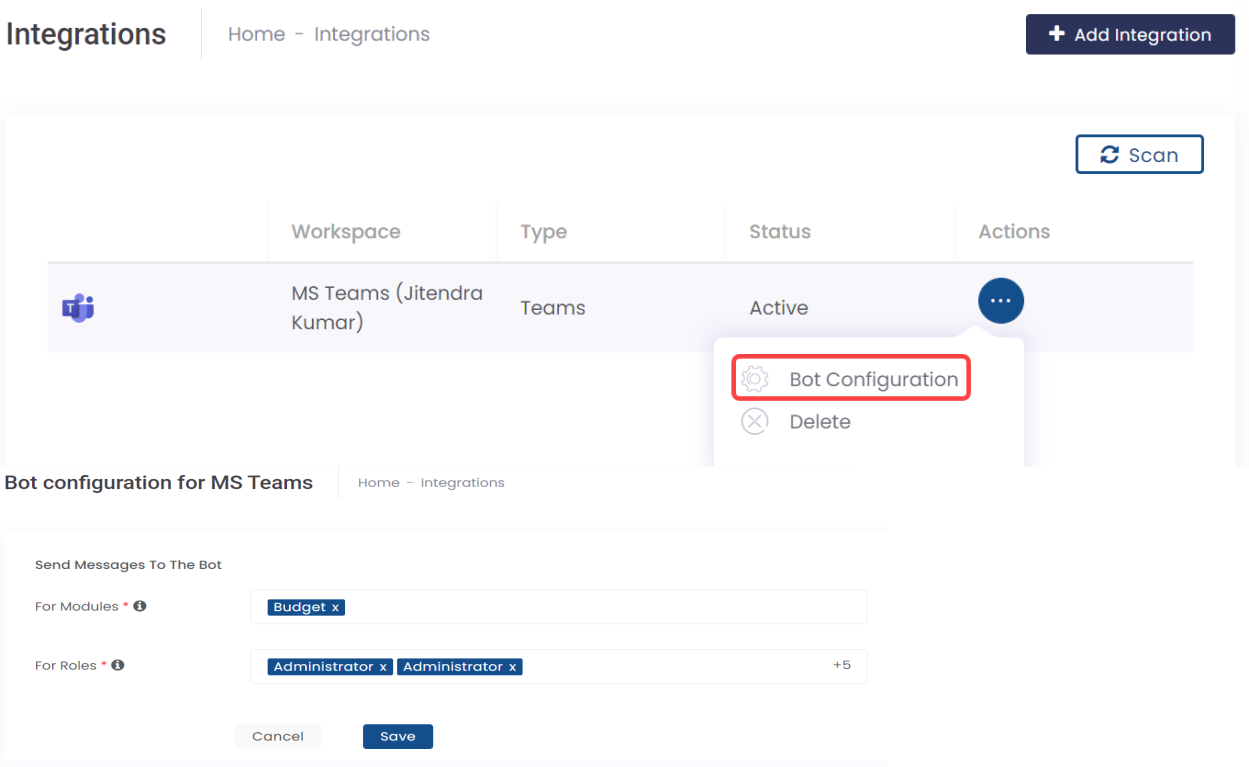
4. You will receive a welcome chat notification from CloudBolt CSMP app in your Microsoft Teams chat section when the integration succeeds. This may appear as "CloudBolt".

Configure MS Teams Bot in CSMP

1. On the Integrations page, hover over the ellipsis [...] icon in the **Actions** column and select **Bot Configuration.**
2. On the **Bot Configuration** page, select the **Modules** and **Roles** for which you would like to receive notifications.
3. Click **Save.**







Outcomes

Your Microsoft Teams account is now integrated with CloudBolt CSMP and you will receive notifications from CloudBolt CSMP in Microsoft Teams.

13.3. ServiceNow Integration

Learn about the ServiceNow integration with CloudBolt CSMP and how to set it up.

Introduction

This page describes how to integrate CloudBolt CSMP with your ServiceNow account. After the successful integration, CloudBolt CSMP notifications for the selected modules in CloudBolt CSMP will directly be displayed as incidents in your ticketing tool or incident response tools in ServiceNow.

Prerequisites

- A ServiceNow user account and an associated developer instance
- User account in ServiceNow designated with role as ITIL. Incidents will be created using this username in CloudBolt CSMP and will reflect in ServiceNow Ticketing tool.
- An Application Registry entry in ServiceNow – and the corresponding Client ID and Client Secret in ServiceNow
- Domain name of ServiceNow account: For e.g. devXXXXX where XXXXX is a number

Creating a user with required role (ITIL)

You will need to create a user account in ServiceNow with an assigned role of ITIL so that the user has the requisite permissions. The User ID and the password will be required when you configure the connection from CloudBolt CSMP to ServiceNow.

1. Logon to your ServiceNow developer instance account using your credentials.
2. Navigate to **Organization > Users**.
3. Click **New** to create a new user.
4. Enter a User ID for the user to logon, and the other corresponding information.

5. Note down the User ID and password. You will need it later for the integration of ServiceNow with CloudBolt CSMP.
6. Click **Submit**. The user is created and name updated in the Users list.
7. Locate the user using the search filter and select the user by placing a checkmark against the name.
8. Click on the User Name. The User details are displayed.
9. Browse down to the **Related Links** section.
10. On the Roles tab, click **Edit**. The Edit members page is displayed.
11. In the collection textbox, type **itil**. From the roles listed in the collection, select **itil** and move it to the right under Roles List using the forward caret.
12. Click **Save**. The user is updated with the **itil** role.
13. Click **Update**. The records are updated with the role change.

Creating an application registry in ServiceNow

You will need to create an application registry entry for the CloudBolt CSMP in ServiceNow. You will need the generated authentication details for CloudBolt CSMP APIs to connect to the ServiceNow application.

1. Logon to your ServiceNow developer instance account using your credentials.
2. Navigate to **System OAuth > Application Registry**. Click **New** on the **Application Registry** page.
3. Enter the required details for the application and click **Submit**.
4. Click on **Create an OAuth API endpoint for external clients**.
5. Enter a name for the application registry for CloudBolt CSMP.
6. Enter a **Client Secret**. Alternatively you can leave it blank so that it is generated automatically.
7. Enter the information for the other fields as required.
8. Click **Submit**. The application registry is created and listed.
9. Browse and locate the application registry entry and copy the Client ID.

10. If you have opted for the Client secret to be generated automatically, you need to double-click and open the Application registry entry. The Client secret is locked and not visible. Click the **Lock** icon to display the Client secret. Copy the **Client secret** along with the Client ID that you copied earlier.
    You will need the Client ID and Client secret to connect your application registry to the CloudBolt CSMP.

Integrating ServiceNow with CloudBolt CSMP

Next, you will need to configure the connection to ServiceNow from CloudBolt CSMP. You will need the Client ID and Secret Key that was generated in the earlier step of creating an application registry in ServiceNow.

1. Navigate to **Quick Actions > Adapters & Integration**.
2. Click on **Add Integrations**. Select **ServiceNow**.
3. Enter the Username and Password for the user that you had created with ITIL role in your ServiceNow account.
4. Enter the **Client ID** and **Secret Key** that you had saved earlier after configuring your ServiceNow application registry.
5. Enter your ServiceNow domain name.
   Note: If your domain name is for e.g. https://devXXXXX.service-now.com, enter only devXXXXX in the domain name textbox.
6. Click **Verify**. The credentials will be verified by making a connection to the specified domain name and a success prompt displayed.
7. Click **Save**. Your ServiceNow integration is complete.

Configuring modules and roles

After you have integrated ServiceNow with CSMP successfully, you need to configure the modules in CSMP that will send notifications to ServiceNow. You also need to configure the user roles that will be sending the messages to ServiceNow.

1. In CloudBolt CSMP, navigate to **Quick Actions > Adapter & Integrations**.
2. Click Integrations, the apps that are integrated with CloudBolt CSMP are displayed.
3. Under Actions, click the eliipses **...** (3 dots) for the ServiceNow application and click **Configuration**. The Configuration dialog is displayed.
4. By default, the Budget module and the Administrator roles in CloudBolt CSMP are selected to send messages to ServiceNow. Click the corresponding textbox for modules to add more modules and the box for roles if you want to add more roles. Add or remove roles and modules as required.
5. Click **Save**.

Outcome

You have configured a connection from the CloudBolt CSMP notification module to the ServiceNow application. The notifications from the selected modules in CloudBolt CSMP will now be reflected as incidents in ServiceNow ticket response and incident management tools as configured.

14. Report Data Reprocessing

Learn how to reprocess your past month cost data.

Introduction

There are instances when your customers ask for a discount after generating the final invoices for them. After updating the discount and margin percent in billing configurations, you need to reprocess the cost data as per new discount and margin percent. Report data reprocessing module is a self-service function that helps you to regenerate the cost data for past month.

Prerequisites

You must be a parent organisation's Default tenant user with the administrative permissions.

Reprocess Cost Data

1. Log in your CloudBolt CSMP account.
2. Use URL `https://<organization_domain>.cloudbolt.app/reprocessing_reporting_data` to open Report Data Reprocessing page, where the `<organization_domain>` is the 'site' name of the parent organisation.
3. Select the cloud provider tab from the upper right corner.
4. Click **Trigger Reprocessing**.
5. Reprocessing Month page appears.
6. On **Basic Details** tab, select billing adapter whose billing data needs to be reprocessed, and then select the month.

   Month selection depends on your billing adapter's invoice date settings. Refer Report Data Reprocessing Operation Matrix for AWS, Azure SS, Azure EA, Azure CSP, and GCP section to know more about month selection options.

7. Click **Next**.
8. On **Configs** tab, you can see the applied billing configuration(s) for the selected billing adapter and month. Click parent/distributor link to see applied billing configuration for parent organisation. Click reseller link to see applied billing configuration for reseller organisation.

   For AWS provider, Applied RI/SP Configs would be listed in addition to billing configuration.

9. Click **Start Reprocessing** to initiate the reprocessing.
10. You will see your report reprocessing list with In-Progress status.
11. Once the report reprocessing is completed, the status will change to completed or failed with an info icon. Hover over the info icon to see the details of data reprocesses status.
12. Use **Scan** button to refresh the status.

View History of Data Reprocessing

A list of all the completed, failed and in-progress status data processes cloud provider wise would appear on Report Data Reprocessing home page. You can filter the list by billing adapter, month for which data was reprocessed, start time when the reprocessing was triggered, status of the data reprocessing, and user who started the reprocess.

Report Data Reprocessing Operation Matrix for AWS, Azure SS, Azure EA, Azure CSP, and GCP

Legends:

- AZ SS = Azure Single Subscription billing adapters
- AZ EA = Azure Enterprise Agreement billing adapters
- AZ CSP = Azure CSP billing adapters
- AZ China = Azure China billing adapters
- Current month = Present calendar month

- Last month = Month before the current month
- Past month = All months before the last month
- No = Reprocessing not allowed for the selected month
- Yes = Reprocessing allowed for the selected month

Manifest Data Updated/Provider Data Updated/Billed Data Generated	Billing Configuration	Sr. No.	Reprocessing Month	Invoice date		
				opted	Opted	
No	Not Updated	1	Current Month	AWS - No GCP - No AZ SS2 - No AZ EA - Yes AZ CSP - Yes AZ China - No	Before Invoice Date	AWS - No GCP - No AZ SS2 - No AZ EA - Yes AZ CSP - Yes AZ China - No
					After Invoice Date	AWS - No GCP - No AZ SS2 - No AZ EA - Yes AZ CSP - Yes AZ China - No
		2	Last Month	AWS - No GCP - No	Before Invoice Date	AWS - No GCP - No

Manifest Data Updated/Provider Data Updated/Billed Data Generated	Billing Configuration	Sr. No.	Reprocessing Month	Invoice date		
				opted	Opted	
				AZ SS2 - No AZ EA - Yes AZ CSP - Yes AZ China - No		AZ SS2 - No AZ EA - Yes AZ CSP - Yes AZ China - No
					After Invoice Date	AWS - No GCP - No AZ SS2 - No AZ EA - Yes AZ CSP - Yes AZ China - No
		3	Past Month	AWS - No GCP - No AZ SS2 - No AZ EA - Yes AZ CSP - No AZ China - No	Before Invoice Date	AWS - No GCP - No AZ SS2 - No AZ EA - No AZ CSP - No AZ China - No
					After Invoice Date	AWS - No

Manifest Data Updated/Provider Data Updated/Billed Data Generated	Billing Configuration	Sr. No.	Reprocessing Month	Invoice date		
				opted	Opted	
						GCP - No AZ SS2 - No AZ EA - No AZ CSP - No AZ China - No
	Updated	4	Current Month	AWS - Yes GCP - Yes AZ SS2 - Yes AZ EA - Yes AZ CSP - Yes AZ China - Yes	Before Invoice Date	AWS - Yes GCP - Yes AZ SS2 - Yes AZ EA - Yes AZ CSP - Yes AZ China - Yes
					After Invoice Date	AWS - Yes GCP - Yes AZ SS2 - Yes AZ EA - Yes AZ CSP - Yes AZ China - Yes

Manifest Data Updated/Provider Data Updated/Billed Data Generated	Billing Configuration	Sr. No.	Reprocessing Month	Invoice date		
				opted	Opted	
		5	Last Month	AWS - Yes GCP - Yes AZ SS2 - Yes AZ EA - Yes AZ CSP - Yes AZ China - Yes	Before Invoice Date	AWS - Yes GCP - Yes AZ SS2 - Yes AZ EA - Yes AZ CSP - Yes AZ China - Yes
					After Invoice Date	AWS - No GCP - No AZ SS2 - No AZ EA - No AZ CSP - No
		6	Past Month	AWS - Yes GCP - Yes AZ SS2 - Yes AZ EA - Yes AZ CSP - Yes	Before Invoice Date	AWS - No GCP - No AZ SS2 - No AZ EA - No AZ CSP - No

Manifest Data Updated/Provider Data Updated/Billed Data Generated	Billing Configuration	Sr. No.	Reprocessing Month	Invoice date		
				opted	Opted	
				AZ China - Yes		AZ China - No
					After Invoice Date	AWS - No GCP - No AZ SS2 - No AZ EA - No AZ CSP - No AZ China - No
Yes	Not Updated	7	Current Month	AWS - Yes GCP - Yes AZ SS2 - Yes AZ EA - Yes AZ CSP - Yes AZ China - Yes	Before Invoice Date	AWS - Yes GCP - Yes AZ SS2 - Yes AZ EA - Yes AZ CSP - Yes AZ China - Yes
					After Invoice Date	AWS - Yes GCP - Yes AZ SS2 - Yes AZ EA - Yes

Manifest Data Updated/Provider Data Updated/Billed Data Generated	Billing Configuration	Sr. No.	Reprocessing Month	Invoice date opted	Opted	
						AZ CSP - Yes AZ China - Yes
		8	Last Month	AWS - Yes GCP - Yes AZ SS2 - Yes AZ EA - Yes AZ CSP - Yes AZ China - Yes	Before Invoice Date	AWS - Yes GCP - Yes AZ SS2 - Yes AZ EA - Yes AZ CSP - Yes AZ China - Yes
					After Invoice Date	AWS - No GCP - No AZ SS2 - No AZ EA - No AZ CSP - No AZ China - No
		9	Past Month	AWS - Yes GCP - Yes AZ SS2 - Yes	Before Invoice Date	AWS - No GCP - No AZ SS2 - No

Manifest Data Updated/Provider Data Updated/Billed Data Generated	Billing Configuration	Sr. No.	Reprocessing Month	Invoice date		
				opted	Opted	
				AZ EA - Yes AZ CSP - No AZ China - Yes		AZ EA - No AZ CSP - No AZ China - No
					After Invoice Date	AWS - No GCP - No AZ SS2 - No AZ EA - No AZ CSP - No AZ China - No
	Updated	10	Current Month	AWS - Yes GCP - Yes AZ SS2 - Yes AZ EA - Yes AZ CSP - Yes AZ China - Yes	Before Invoice Date	AWS - Yes GCP - Yes AZ SS2 - Yes AZ EA - Yes AZ CSP - Yes AZ China - Yes
					After Invoice Date	AWS - Yes GCP - Yes

Manifest Data Updated/Provider Data Updated/Billed Data Generated	Billing Configuration	Sr. No.	Reprocessing Month	Invoice date		
				opted		Opted
						AZ SS2 - Yes AZ EA - Yes AZ CSP - Yes AZ China - Yes
		11	Last Month	AWS - Yes GCP - Yes AZ SS2 - Yes AZ EA - Yes AZ CSP - Yes AZ China - Yes	Before Invoice Date	AWS - Yes GCP - Yes AZ SS2 - Yes AZ EA - Yes AZ CSP - Yes AZ China - Yes
					After Invoice Date	AWS - No GCP - No AZ SS2 - No AZ EA - No AZ CSP - No AZ China - No
		12	Past Month	AWS - Yes	Before Invoice Date	AWS - No

Manifest Data Updated/Provider Data Updated/Billed Data Generated	Billing Configuration	Sr. No.	Reprocessing Month	Invoice date		
				opted	Opted	
				GCP - Yes AZ SS2 - Yes AZ EA - Yes AZ CSP - Yes AZ China - Yes		GCP - No AZ SS2 - No AZ EA - No AZ CSP - No AZ China - No
					After Invoice Date	AWS - No GCP - No AZ SS2 - No AZ EA - No AZ CSP - No AZ China - No

Outcomes

You have your updated cost data available on Cost Report page.

15. OpenShift Utilization Collector

Follow the instructions below to configure and run an automated script to collect per-namespace utilization statistics from the CSMP API.

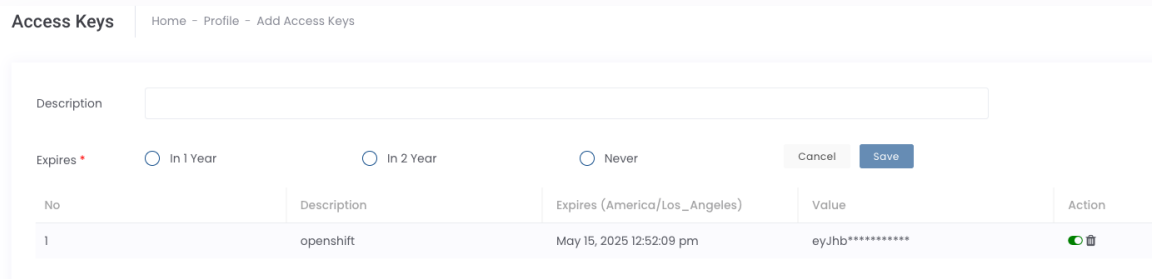
Preparation

1. Download the utilization script here: openshift_telemetry_percentage_script.py
2. A valid python3 environment is needed. An example of how to create an environment is posted below:

Bash (Unix Shell)

```
python3 -m venv corp_name
source corp_name/bin/activate
pip3 install requests
```

3. Create a bearer token for use with the script. This can be created from the CSMP UI by navigating to `Profile -> Access Keys`.



4. The script contains constants that require modification prior to use, documented in the box below.

Code

```
CLOUDBOLT_BEARER_TOKEN = '<insert_token_here>'
START_DATE = '2024-05-01'
END_DATE = '2024-05-01'
```

Execute

Data will be collected by running the script in the virtual environment you enabled above:

Bash (Unix Shell)

```
python openshift-utilization-v1.py
```

A JSON string will be output to the screen, where utilization percentage for each namespace is displayed, under each node.It has the following format:

JSON

```
{
    "request_payload": {
        (...)
    },
    "response": [
        {
            "node_id": "1ed3e303-5d28-4baf-915a-ff1556b85cdc",
            "node_name": "ip-10-11-2-13.ap-southeast-2.compute.internal",
            "utilization_detail": [
                {
                    "namespace": "cloudbolt-collector",
                    "utilization": 0.5586,
                    "utilization_unit": "percent",
                    "details": {
                        "cpu_usage_percentage": 0.1012,
                        "memory_usage_percentage": 0.5586,
                        "cpu_request_percentage": 0.0,
                        "memory_request_percentage": 0.0
                    }
                },
                (... more namespaces in that node)
            ]
        },
        (... more nodes)
    ]
}
```

16. Data Retention Policy

Learn about the CloudBolt data retention policy for CSMP.

Overview

This Data Retention Policy document outlines the guidelines for the retention, management, and deletion of data collected by CloudBolt Cost & Security Management Platform (CSMP). This policy ensures that all data is managed in compliance with relevant legal and regulatory requirements, while also providing transparency to customers regarding how their data is handled throughout the lifecycle of the service.

Data Retention Period

Ingested Data Retention

During the initial term and any subsequent renewal terms of the order for CSMP (hereafter referred to as the "Term"), data ingested through CSMP's data ingestion capabilities, including APIs and native cloud credentials provided to the platform, will be retained for a period of **15 months** from the first ingestion timestamp such data is ingested into the platform.

This data, which excludes performance telemetry data, will be available for reporting at both daily and monthly granularity. However, the immediate date range available for reporting may vary based on the specific data set configuration and the volume of data being analysed.

Data Deletion Requests

Notwithstanding the above, the retention period for the ingested data will cease if:

- The data is deleted by the Customer, or
- A request is made by the Customer to delete the data.

Additionally, all data will be deleted no later than **30 days** after the termination or expiration of the Term.

Post-Term Data Deletion

After 30 days from the end of the Term, all ingested data will be **permanently deleted** from CloudBolt systems, unless:

- Legal obligations or compliance requirements necessitate a longer retention period, or
- Specific agreements dictate otherwise.

Exceptions to Data Retention

Legal and Compliance Requirements

In some instances, data may need to be retained beyond the standard retention period due to legal or regulatory obligations. These requirements will take precedence, and the retention period will be adjusted accordingly to meet such obligations.