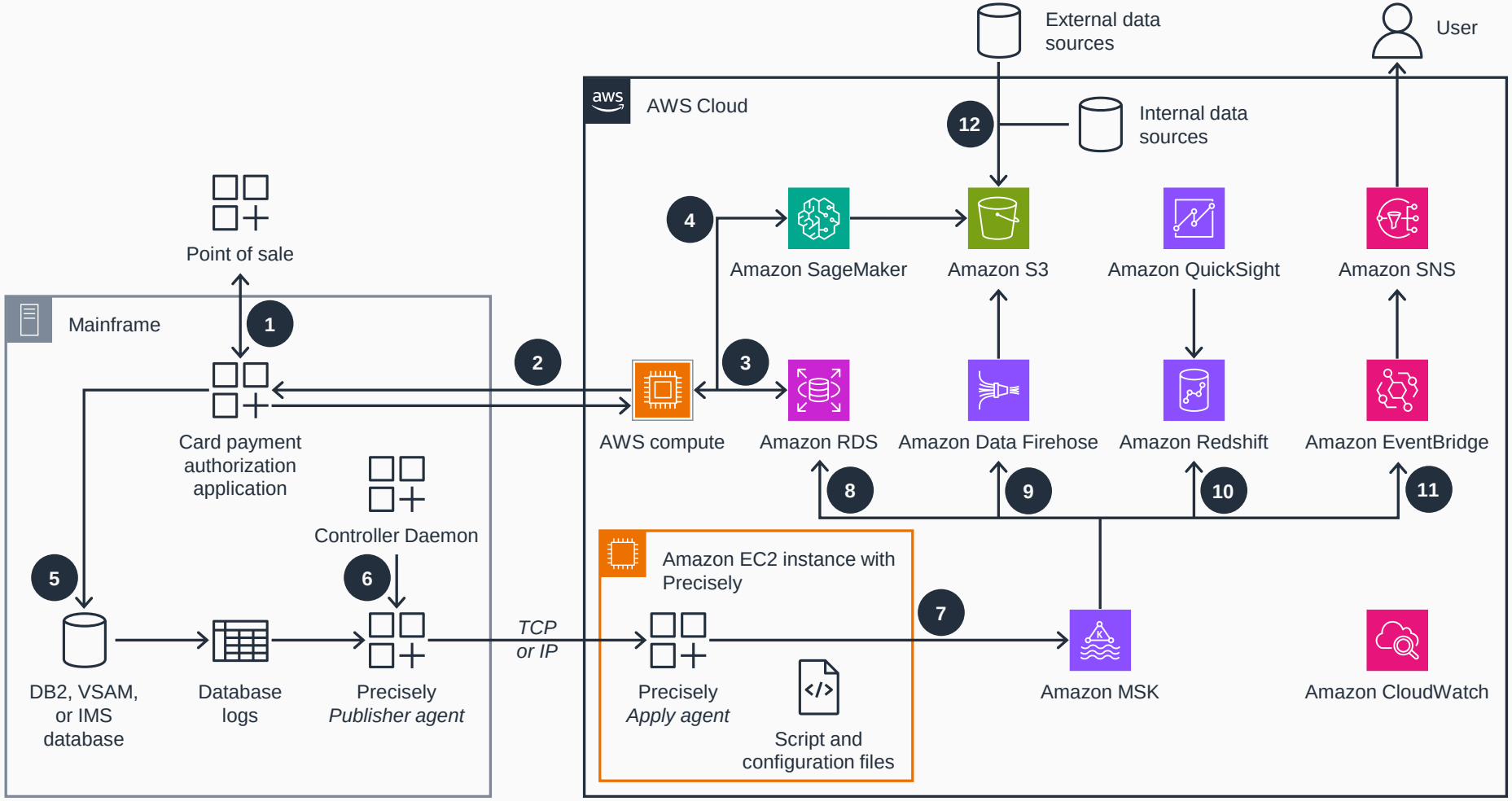
Guidance for Credit Card Fraud Detection Using Mainframe Data Replication on AWS

This architecture diagram shows how to replicate card payment data from a zero downtime operating system (z/OS) to the cloud in near real-time. It uses change-data-capture software from Precisely to enable fraud insights and analytics on AWS.



1. Your bank receives the card payment authorization requests on your mainframe.
2. The authorization process makes a real-time call to AWS to get the fraud score using AWS compute.
3. The integration application on AWS enriches the request with customer and merchant historical data stored on **Amazon Relational Database Service (Amazon RDS)**.
4. Artificial intelligence and machine learning (AI/ML) models running on **Amazon SageMaker** generate the fraud score and return it to the mainframe so that it can approve or decline the transaction.
5. The authorization history message is inserted into an IBM Db2, virtual storage access method (VSAM), or IBM information management system (IMS) database.
6. The Precisely publisher agent captures the database change records and publishes them to the apply agent running on an **Amazon Elastic Compute Cloud (Amazon EC2)** instance.
7. The Precisely apply agent publishes the change records to **Amazon Managed Streaming for Apache Kafka (Amazon MSK)**.
8. An **Amazon MSK** connector process reads the messages from **Amazon MSK** and inserts them into the **Amazon RDS** history database. The same data is read during scoring.
9. **Amazon Data Firehose** (successor to Amazon Kinesis Data Firehose) streams the data from **Amazon MSK** to **Amazon Simple Storage Service (Amazon S3)**.
10. **Amazon Redshift** consumes data from **Amazon MSK**. Business dashboards are created using **Amazon QuickSight**, which also provides the capability to query data using natural language.
11. **Amazon Simple Notification Service (Amazon SNS)** and **Amazon EventBridge** send alerts and notifications.
12. **SageMaker** trains the AI/ML model offline using the transaction data stored in **Amazon S3** along with other internal and external data.

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AWS Reference Architecture