






A Modern Data Layer Accelerates Kroger's Digital Transformation

YugabyteDB delivers cloud native and cloud agnostic database to power modern eCommerce services

 Retail	Company Kroger	Main Use Cases			
	Location Cincinnati, OH	 Database Modernization	 Cloud Native Microservices	 Geo-Distributed Apps	 Edge / IoT
	Website kroger.com				

Executive Summary

As the largest supermarket in the US and a top 5 retailer worldwide, Kroger knows all about the challenges of modern retail. And as a long-time player at the highest levels, they have a huge legacy investment in technology to support their business. The rapid move to cloud computing and the accelerating migration to online retailing has introduced a new set of retail challenges.

To turn those challenges into opportunities, Kroger embarked on a modernization journey where they prioritized a number of key capabilities: cloud-native for agile development while supporting existing on-premises infrastructure; open-source software; and geo-distributed for high-availability, low-latency local experience. Kroger recognized the importance of a modern, cloud native data layer in achieving those goals, so they embraced YugabyteDB as a core solution for critical, customer-facing transactional applications like shopping lists, shopping carts and customer 360 applications.

About

Kroger is the United States' largest supermarket chain by revenue and ranked #17 on the Fortune 500 rankings of the largest United States corporations. In addition, they are the third-largest general retailer behind Walmart and Amazon. Kroger operates supermarkets, specialist retail outlets, regional brands and they integrate down their supply chain, all on a scale rarely rivaled, to deliver a localized experience across a whole continent.

Founded in 1883, Kroger operates over 2,750 supermarkets and multi-departments stores across the US. With a mission to Feed the Human Spirit™, the company's strategy is to ensure customers can find the fresh food they want—no matter how they want to shop. This strategy requires Kroger to maintain a flexible tech stack that can scale with growing demands and the launch of new services and experiences.

Key Results:



9 Million
annual shoppers to support



<10ms
latency for multi-region deployment with sync replication

Challenges

Kroger's existing solution stack was embedded in on-premises computing, legacy databases, and large monolithic applications that are not geared to rapid change and evolution—a familiar situation in any industry with well-established, major players. Being at the top today does not guarantee success tomorrow.

With the rapid change in customer's buying behaviors and expectations, Kroger recognized the need to increase the pace at which they respond by embarking on a significant digital transformation initiative to update key customer-facing services like their shopping cart and coupon applications. Looking up and down their infrastructure stack, they saw opportunities to improve their application, infrastructure and data layers.

With a clear vision to embrace microservices, open source solutions, and a multi-cloud strategy, Kroger quickly realized that legacy databases were not going to meet their requirements. The data layer would play a massive role in enabling the success of that vision so they focused on adopting a modern database as a foundational element to their modernization journey.

In order to deliver modern, omnichannel services, they had to overcome multiple challenges with their existing database:

- **High costs of operating legacy database systems**
- **Slow developer productivity**
- **Locked in to limited deployment models and clouds**

To take full advantage of the hybrid cloud/on-prem, geo-distributed environment necessary for their business, they set out on finding a new database that could overcome challenges and complexities of legacy solutions by delivering the following features:

- **Geo-distributed ACID transactions**
- **Multi-region active-active replication**
- **Multi-API support**

- **Multi-cloud support**
- **Hybrid deployment**
- **Single digit millisecond latency**
- **Elastic scalability**

Solution

Kroger adopted a microservices approach to their applications and IT architecture to simplify and accelerate delivering incremental improvements without risk or disruption to existing systems and processes. The approach was designed to increase productivity—doing more with the same—and to enable the agility that is essential to respond quickly to market opportunities.

By adopting a forward-looking IT strategy based on cloud native technologies, Kroger unlocked access to modern vendors, such as Yugabyte, who are native to the new technological world. Kroger architects had developed a clear vision of what they needed from their next-generation technology, translating their business drivers into a demanding shopping list for potential suppliers to meet.

Kroger chose YugabyteDB after realizing it delivered all of the critical features they demanded:



Cloud Native Agility

The modern architecture built for microservices enabled teams to embrace cloud native benefits



Start Small and Grow

Deploy a small initial footprint with auto-scale-out for cost-effective management of seasonal spikes



Cloud Agnostic

Support for any cloud and platform, Kroger accelerated their multi-cloud initiatives and eliminated lock-in



High Availability

Multi-region active-active deployments provide deployment flexibility and an “always-on” business



Unified Data Fabric

Multi-API support to enable a unified SQL and NoSQL data layer

YugabyteDB clusters were deployed in a multi-region configuration with synchronous replication, achieving single digit millisecond latency across regions with bi-directional asynchronous replication for the shopping list application. With geo-distribution, customers were served from a local cluster to reduce latency and ensure an ideal customer experience.

The agile development of many microservices that YugabyteDB seamlessly supports through its cloud native architecture has allowed Kroger to incrementally address pressing needs, improving services, delivering innovation and replacing legacy, without disrupting customer experience or existing business processes.

YugabyteDB is fully compatible with PostgreSQL as well as with Cassandra's CQL. The availability of familiar interfaces and tools lowered the cost of adoption and the time to full productivity for Kroger's engineers.

To deliver different services with different characteristics Kroger exploited YugabyteDB's capability to support geo-distributed ACID for strict transactional applications and asynchronous synchronization and geo-affinity for others to deliver very low latency to users.

Not all of Kroger's applications required all YugabyteDB's rich set of features. But the breadth and depth of the product, the strong customer support from Yugabyte, and the knowledgeable community beyond, meant that Kroger engineers knew they could rely on YugabyteDB as they deliver a wide spectrum of high-value service capabilities to the business.

“ Kroger took the time to convince ourselves that all the features we needed were available from Yugabyte and that it meets our needs

Mahesh Tyagarajan, VP Engineering

Results & Benefits

With their investment in a modern data layer powered by YugabyteDB, Kroger has established a foundation for an agile, highly-available and scalable digital strategy. With hybrid and multi-cloud support, Kroger can scale rapidly and build application enhancements faster while rolling out and managing these enhancements with ease.

Along with these core benefits, Kroger has realized a number of other results:

- **Single digit millisecond performance for their multi-region and consistent deployment**
- **Database transaction management eliminated application complexity**
- **Full SQL and CQL support simplify and speed migration for new and existing apps**
- **Microservices and agile-friendly features mean decoupled projects can deliver benefits swiftly with no big-bang risk and cost**

Looking ahead, Kroger is excited to start contributing to the overall open source community with some of the tools they have already built. And now that key enterprise applications have been migrated to YugabyteDB, Kroger is eyeing a set of other services that they can migrate to gain those same advantages across additional applications.

