

Mojix Builds Real-time Retail and Supply Chain IoT Platforms with Confluent Cloud



Headquarters

Los Angeles, CA, USA

Industry

Retail

Challenge

Provide retailers with a solution to improve inventory accuracy, enable operational intelligence and support omnichannel sales

Solution

Use Confluent Cloud and Kafka to build a scalable, highly available platform for real-time data streaming and complex event processing both on-premises and in the cloud.

Results

- Inventory accuracy increased from 65% to 99%.
- Expert training and support received
- Fault-tolerant, scalable architecture
- Focus on development sharpened



For many large retailers, there is a significant gap between the actual inventory in stores and warehouses and the digital records used to represent that inventory. Diminished inventory accuracy, which is often as low as 65%, makes it particularly difficult for retailers with a brick-and-mortar presence to pursue omnichannel strategies designed to improve the customer experience by enabling, for example, shoppers to order a product online and pick it up in the store. Inventory accuracy is not only critical for the customer experience, it also opens opportunities for a sales lift within stores, post-sales activities, increased efficiency in logistics and other business-enhancing improvements.

With its ViZix® item chain management platform, Mojix is helping major retailers store, analyze and act on inventory data collected from IoT sensor streams in real time. Built using Confluent Cloud and Apache Kafka®, the ViZix platform supports real-time operational intelligence with complex event processing for a hybrid cloud across the edge – at retail stores and distribution centers – and the cloud.

“To have a true omnichannel environment, retailers need to achieve close to 100% inventory accuracy, and that’s been the driving force behind the advanced technologies coming into retail,” says Dan Doles, CEO at Mojix. “Just as important, however, is the ability to access and act upon inventory data and other information in real time. The platform we built with Confluent Cloud and Kafka enables realtime operational intelligence. This makes it possible for retailers to acquire relevant insights from data that they’re getting right now, instead of relying solely on business intelligence tools that look back at data from last month or last quarter.”

Challenge

It is not uncommon for a single Mojix customer to generate 10 terabytes of data and a billion events per day across hundreds of stores from a wide

variety of sources, including RFID readers, camera sensors, beacons, mobile devices and routers. To enable retailers to extract value from this data and make informed, timely business decisions, Mojix needed to perform real-time stream processing at individual stores and distribution centers.

In addition to performing low-latency, secure filtering and complex event processing at the edge, Mojix wanted a scalable cloud component to support centralized monitoring, management and configuration. The Mojix team's extensive past experience with stream processing and cloud operations informed their decision-making on the core technology for the ViZix platform. "We have a talented group of software engineers with a lot of experience in streaming frameworks, including Storm, Spark and Flink. We could see that for the design patterns we wanted to implement that those really would not work well for us," says Gustavo Rivera, Senior Vice President, Software Development at Mojix. "At the same time, our DevOps team understands very well how to scale services up and down. But after you reach a certain level of sophistication at that, you appreciate the value of having another company provide that service for you, especially when you are growing rapidly."

Solution

Mojix used Confluent Cloud with Apache Kafka to build its ViZix item chain platform.

The ViZix edge component, which Mojix delivers as a set of Docker containers or as a standalone appliance, includes a Kafka broker as well as Kafka Streams applications

and connectors. Operating on customer premises, this component ingests item-level data from a variety of sources and performs sensor fusion, event filtering, data transformations and complex event processing to produce a stream of higher-level events.

In the cloud, the ViZix platform is built on Confluent Cloud, enabling Mojix to take advantage of a fully managed streaming data service and stream higher-level events from hundreds of on-premises Kafka brokers to a centrally managed cloud infrastructure.

Edge-originated events, along with health and status information, are streamed to Confluent Cloud, which uses the same Kafka technology to perform further transformations and apply additional event processing and business. Configuration commands flow in the opposite direction – from the cloud to the edge – enabling edge components to be easily updated and managed.

"We use the same kinds of Kafka Streams applications, complex event processing, transformations and connectors in the cloud as we have on the edge," says Rivera. "We've extended everything elegantly right to the edge, so we can deploy to containers at thousands of retail locations and maintain a secure connection up to the cloud. We can decide which rules we want to have on the edge and which in the cloud, and every time we improve our Kafka architecture or our Streams apps, all of the new capabilities are immediately available across the entire platform."

During the development of the ViZix platform's stream processing architecture, Mojix worked with Confluent engineers on refining design and implementation details.

"The level of credibility that Confluent has built in terms of modern, scalable and flexible stream processing does much of our blocking and tackling for us."

— Gustavo Rivera, Senior Vice President, Software Development, Mojix

"We never want to reinvent the wheel, so we always want to be careful in what we develop," says Rivera. "Working with the people who developed Kafka made a big difference for us, from that perspective."

Mojix is expanding the capabilities of the ViZix platform, extending cloud integration to business intelligence systems, partners in their customers' supply chain and a blockchain layer for immutable record-keeping. "Real-time inventory accuracy is just the foundation for much more than just inventory management; it enables retailers to improve post sales and supply chain processes as well as customer engagement and the customer experience," says Doles. "And beyond retail, the real-time asset tracking and supply chain management solutions we've built with Kafka and Confluent Cloud are opening opportunities across a wide range of industries including manufacturing, energy and healthcare."

Results

- **Inventory accuracy increased from 65% to 99%.**

"Retailers that have 65% inventory accuracy are really hampered in omnichannel operations," says Rivera. "We have deployed our solution – with Kafka on the edge and Confluent Cloud – to retailers in that situation, and within a matter of days after they started collecting data they achieved 99% inventory accuracy

or better, opening the door to all sorts of new business capabilities."

- **Expert training and support received.** "With Confluent, we are working with a company that not only helps us with infrastructure management, but also supports us in terms of training and certification as well as answering tough questions from a development perspective," Rivera says. "The close relationship we have with the Confluent team is important to our Ops teams and on the Dev side as well as we continue to build our products on Confluent Cloud."
- **Fault-tolerant, scalable architecture.** "We've learned a lot from Confluent engineers on how to instrument our containers and Kafka Streams applications to expose the proper health and status information to support high availability and fail-over," says Rivera. "As a result, we were able to build a highly fault-tolerant and scalable architecture with Kafka and Confluent Cloud that has been everything we expected from a reliability perspective."
- **Focus on development sharpened.** "Now instead of building all the infrastructure ourselves, our DevOps team can rely on Confluent Cloud for high availability streaming data services across multiple regions," says Rivera. "Leveraging those capabilities and Confluent expertise enables us to focus more of our efforts on the development of our own products."

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