Moving from Batch to Event Streaming
Modernizing Your Application and Data Infrastructure

Prepared for:
Ventana Research

Confluent
Data Architectures Are Changing

Operations are continuous in most organizations today and so too is the data these operations generate. For example, shopping happens all the time, during the hours a store is open and 24 hours a day at online retail sites. Goods are out for delivery around the clock until they arrive at their destination. Insurance coverage typically is continuous, not just at particular times of the day, week or month. And whether online, over the phone or in person, customer service happens at any hour of the day.

However, data architectures typically are designed around batch processes, an approach that can lead to issues. Only half (49%) of organizations participating in our Internet of Things benchmark research said they can track events and trends well. The data management market has evolved, but much of the focus has been on the volume of data rather than its frequency.

Relational databases are designed for transactional data, not continuous data, which means they cannot provide the latency or throughput that data streams require. Distributed and parallel processing technology has advanced but organizations can still be overwhelmed by the volume and frequency of event data. Organizations need event-based architectures to match their operations. Ventana Research predicts that within two years the collection and analyses of streams of event data will be a standard component of enterprise information architectures. Our research finds that more than three-quarters (78%) of organizations said they expect to be able to perform real-time analytics in IoT processes within two years.

This won’t be possible without expanding information architectures beyond traditional relational database technologies. Organizations will need an event-driven architecture that supports real-time collection and analyses of streaming event data along with historical data.

An Event-Driven Paradigm Creates New Opportunities

Data streams provide organizations with valuable information. For example, location information can enrich an organization’s understanding of both operations and customer behavior. Our research finds that while nearly two in five (38%)
organizations currently capture location-based data, nearly nine in 10 (89%) reported that they expect to capture it eventually. More than 90 percent of organizations said that speeding the flow of information is critical to their ability to respond quickly to opportunities. Organizations are increasingly embracing the powerful opportunities to capitalize on these streams of data that digital transformation provide.

However, the metaphor of streaming or continuous data is a bit misleading, as even streams of data consist of discrete events. Website activity involves clicks and mouse movements and while temperature is continuous, devices capture even that data at discrete intervals. Notwithstanding clumsy terminology, organizations must be able to respond to situations as they occur. More than 80 percent of organizations participating in our research said that it’s vital to their functional area of responsibility to define, detect, monitor and analyze patterns and relationships between events.

These streams of event data provide organizations with measurable benefits. For example, adjusting the heating or cooling in a building where no personnel are present can lead to major savings on utility costs. It’s also possible to use these data streams to predict outcomes and thus respond more proactively to situations. Fortunately, organizations are now able to capture, analyze and retain more of this information due to advances in information architectures.

Embracing an Event-Driven Architecture

An architecture that is event-driven is designed to process a continuous stream of information or events, which can provide several advantages. Event-driven architectures typically incorporate distributed computing, which distributes processing among multiple servers. This approach is both resilient and scalable — the data exists on more than one node so that in the instance of a failure, data can be recovered from another node. Organizations can add more nodes to the system as data volumes increase. Event-driven architectures also simplify the distribution of information. All systems can subscribe to the stream of event data and monitor it rather than messages being routed to specific systems.

This approach requires a robust event streaming platform. “Event processing” has been around for years but was primarily focused on processing individual events or small windows of time. Today’s streaming data uses are different; an event streaming platform should provide publish-and-subscribe capabilities to identify and deliver relevant streams of events. It also should provide the ability to
process or analyze large volumes of events in seconds or milliseconds as they stream through the system and when necessary should store historical event streams for real-time analyses.

Organizations can combine these event-driven architectures with data warehouses and data lakes. Depending on data volumes, an event streaming platform can be the data store for an application or organization. Real-time access to historical data makes it possible to perform, for example, real-time scoring or predictions. In some cases an event-driven architecture supplements a data warehouse or data lake. In those instances, real-time event capture and analysis takes place in the event-processing technology and is then stored as part of the historical database. An organization can use this historical database to develop predictive models offline that can be deployed into the event processing stream for real-time execution. The data warehouse or data lake also can be used for historical reporting and analysis.

It’s likely that many organizations already have in place point-to-point messaging technologies. Organizations that adopt an event-based architecture do not have to replace existing systems wholesale; an event-driven architecture can grow over time. Similar to other technology investments, it’s a good idea to begin with a green-field opportunity or a single system that needs to be updated.

Over time, an event streaming platform can become a centralized event pipeline that connects all your applications and data infrastructure. Organizations that are able to harness the power of event streaming can create a competitive advantage with a new generation of contextual event-driven applications.
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