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CONFLUENT

Pan-European Stock Exchange Relies on Confluent to Power Event Driven Trading Platform

EURONEXT

Headquarters
Amsterdam, Netherlands

Industry
Financial Services

Challenge
Develop a new trading platform for markets across multiple European countries that supports high-volume, high-speed trading and provides clients with access to real-time data.

Solution
Use Confluent Platform to implement a reliable, scalable persistence layer for market orders that supports millisecond latencies and billions of messages per day.

Results
- Reliable 24/5 operations achieved and maintained
- Stringent performance requirements exceeded
- Dedicated, expert support received

As the first pan-European exchange – spanning Belgium, France, Ireland, the Netherlands, Portugal and the UK – Euronext operates regulated securities and derivatives markets in Amsterdam, Brussels, Lisbon and Paris, as well as a regulated securities market in Ireland and the UK. Euronext recently developed a new event-driven trading platform, Optiq®, that provides a tenfold increase in capacity and an average performance latency of as low as 15 micro-seconds for order roundtrip as well as for market data.

Underpinning the Optiq platform is a persistence layer that the Euronext development organization built using Confluent Platform. Confluent Platform provides a reliable, scalable streaming infrastructure for Optiq that supports millisecond latencies with no messages lost. "When we started, Kafka was a new technology to us, and one that we had decided to use for a very critical application in our system," says Philippe Planchon, Architect and Innovative Trading Solutions Director at Euronext. "With Confluent we felt supported in our decision and we knew we had the right level of expertise to get prepared and to help if we encountered any issues. That was a key element in our success."

Challenge

In architecting and building Optiq, the Euronext team placed a heavy emphasis on reliability and scalability. "It was a massive project, and a highly reliable message brokering infrastructure that could scale just by adding more nodes as our business needs changed was key to the entire effort," says Phillipe Pujalte, Infrastructure and Operations Director at Euronext. The performance requirements for this messaging infrastructure were equally stringent. "We needed the streaming platform to be able to ingest up to a million orders per second, with real-time latency in the millisecond range. That's why we began to investigate Kafka," Pujalte adds.

Euronext is at the heart of the European economy. Because entire markets in Europe would depend on the platform, reliability was imperative. "We were building a mission-critical platform to support the market capitalization of six European countries," says Alain Courbebaisse, Chief

Information Officer at Euronext. "As an organization we are also very open source minded, so that was one of our criteria for this project as well. And with all of our open source efforts we want to ensure we have enterprise support." The recognized need for enterprise-level support had at least three dimensions. Pujalte explains, "As our go-live date grew closer, we wanted to make sure that all of our technical implementation decisions were sound, that we did not have any issues with the way we were deploying the infrastructure and that we were going to be able to leverage the highest level of capability from that infrastructure."

Solution

After evaluating several streaming platform alternatives, Euronext selected Confluent Platform with Apache Kafka® for the persistence layer of the Optiq multi-market trading platform.

The Euronext development team started with a proof of concept prototype: a Kafka-based matching engine for an order book with buyers and sellers. Benchmarks of this prototype in which data was pushed to multiple consumers via Kafka showed that it was capable of meeting the platform's overall high-performance requirements.

"With the first benchmark we did with Kafka, we saw that the capacity to ingest messages up to a rate of one million per second was easily achieved," says Pujalte. "Moreover, the integration of Kafka with our C++ world was straightforward to implement via the API and library. From the start of this large project, it was easy to see that Kafka was the right choice for us."

Following the success of the initial proof of concept effort, the team began a multiphase project to build the production platform. The first major milestone in this effort was to replace the market data gateway layer of the existing trading infrastructure with a new version based on Kafka. This gateway handles multiple billions of messages per day, sending market data to vendors, as well as Euronext's trading members that use the information in their trading strategies.

"The new market data gateway pushes a massive amount of data through Kafka," notes Pujalte. "This project further validated that Kafka was the right choice and was our first step in learning to operate Kafka under real production conditions."

Even as the market data gateway went live, the team was already developing other components, including the production matching engine and member gateways. Around this time, the team began working with Confluent engineers to fine-tune aspects of their implementation to ensure consistent performance under extremely heavy load. "Having access Confluent support was a real advantage for us. Confluent helped us understand how to tune our stack to improve performance," says Pujalte.

Continuing to expand the persistence layer, the team developed numerous Kafka consumer applications, including applications that interface with clearinghouses, monitor market latency, provide gateways used by regulators, push data to an SQL database in support of market operations, perform replication of data for disaster recovery, and store records in a data warehouse in compliance with regulatory requirements.

The team also development applications that use the Kafka Streams API library to perform data enrichment in real time. For example, they wrote an application that consumes related trade and order messages and combines information from both to build a more complete trade message containing all the data required by regulators.

Euronext is now running the Optiq trading platform, with its persistence layer built on Confluent Platform, live in production on all its cash markets.

We have been very satisfied with Confluent Platform as the backbone of our persistence engine. The platform has been super reliable. We have stringent requirements for realtime performance and reliability, and we have confirmed – from proof-of-concept to deployment of a cutting-edge production trading platform – that we made the right decision.

Alain Courbebaisse, Chief Information Officer, Euronext

Results

Reliable 24/5 operations achieved and maintained. "High availability and the ability to operate reliably 24/5 is essential for us," says Pujalte. "Since we went live, we have never had a major issue with Confluent Platform, and with our scale, that is very impressive."

Stringent performance requirements exceeded. "With Confluent Platform we met our most stringent benchmarks for throughput and latency," Pujalte says. "Confluent Platform supports real-time operations with millisecond latencies and it can handle multiple millions of messages per second, sustained for hours."

Dedicated, expert support received. "Before we went live, we worked closely with Confluent engineers, who help us with the preparation," says Planchon. "Our mission-critical trading platform running on Confluent Platform successfully went live with no significant issues, which confirmed to us that we had the right expertise and the right support in place."

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