FIS Successfully Tests CAT Prototype Using Google Cloud Bigtable, with Quarter Hour Ingestion Rates Equivalent to 10 Billion Financial Trade Records per Hour

Neil Palmer, CTO, FIS Advanced Technology
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The Challenge

Among the many initiatives to improve market reliability and transparency following the Emergency Economic Stabilization Act of 2008 is the US Securities and Exchange Commission's (SEC) Rule 613. This rule will require national securities exchanges and associations to create, implement and maintain a Consolidated Audit Trail (CAT) of trading activity in the US. Events such as the so-called May 6, 2010 "flash crash", when about $1 trillion was temporarily wiped out from U.S. stock markets in a matter of minutes, spurred the need for a system to detect and impede market manipulation.

CAT will store data on every market event for every trade in a central repository in order to produce market reconstruction and surveillance reporting in just a few hours. This will require robust technology and data storage to format, validate and establish links between financial entities then deliver the information to regulators. Especially challenging is the end-to-end connectivity between the individual trading desks of numerous financial services institutions, trading counterparties, exchanges and clearing entities.

Adding to the complexity of such an endeavor is financial market volatility. Because the volume of data that needs to be processed can vary dramatically from day to day, the need to scale up and down is imperative in terms of cost control. Some days might see 30 billion trade events, while a tumultuous trading day could trigger as many as 120 billion events. A traditional fixed-hardware IT solution in this scenario could result in millions of dollars of equipment sitting idle on many trading days.

The global financial system is evolving at warp speed, and every second counts. Regulators want to be able to see trading behavior and trace it at every stage and by market participant. Such trade events are part of a jigsaw puzzle that needs to be assembled intelligently in a very short timeframe. CAT must ingest and process as many as 100 billion trade events in just four hours.

Building a Solution

FIS (that finalized its acquisition of SunGard on November 30, 2015) is one of three bidders currently being evaluated to build and operate the CAT Processor. In 2014, FIS began working on a cloud-based CAT processing solution. The company turned to Google Cloud Bigtable for its ability to scale and perform well in extremely high-volume conditions, as well as its flexibility in creating the necessary links between trade events to determine the what, who, why and when of any trade.
Our goal is to remove as much work as possible from both financial institutions and the regulators, and provide elasticity to the platform and thus the process. This requires an architecture that will ensure accuracy, scale, performance, and cost efficiency.

Test Results

Recently, FIS successfully tested a prototype solution that processes trade records into Google Cloud Bigtable, where the data is formatted, validated, linked, and then published to analytical stores to be queried by business intelligence (BI) tools and other applications for analysis and reporting.

Two of the key tests included the following:
- Burst: Ramping up to emulate a spike in market activity, FIS processed 2.5 billion trade records in 15 minutes, equivalent to 10 billion events per hour, or nearly 3 GB/second
- Sustained: FIS processed a staggering six billion trade events in a single one-hour test

Google Cloud Bigtable gives FIS the ability to scale the platform up or down based on trading volume, thus driving cost efficiencies and control at a granular level. The use of a cloud platform, rather than traditional dedicated hardware, allows the system to be dynamically sized based on actual demand, rather than on estimates that may be too high (resulting in unnecessary expenditure on hardware not being used), or too low (causing an inability to meet the required SLAs).

The benefit of this cost efficiency in the industry cannot be underestimated. Stock exchanges will be the majority investors in the CAT initiative, which could mean higher fees to member broker-dealers, and subsequently, higher fees for their customers. With a more cost-effective and scalable solution, exchanges will be able to stave off increased membership fees, which will ultimately help keep the markets more efficient, accessible, and economical to use.

FIS also visualizes great potential to use Bigtable for other uses across the industry. We see this technology applicable to solving many problems, beyond the CAT initiative. With FIS' architecture and Google Cloud Bigtable technology, the possibilities for affecting positive change across the industry are significant.

About FIS

FIS is a global leader in financial services technology, with a focus on retail and institutional banking, payments, asset and wealth management, risk and compliance, consulting and outsourcing solutions. Through the depth and breadth of our solutions portfolio, global capabilities and domain expertise, FIS serves more than 20,000 clients in over 130 countries. Headquartered in Jacksonville, Fla., FIS employs more than 55,000 people worldwide and holds leadership positions in payment processing, financial software and banking solutions. Providing software, services and outsourcing of the technology that empowers the financial world, FIS is a Fortune 500 company and is a member of Standard & Poor's 500® Index. For more information about FIS, visit www.fisglobal.com.

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For more information contact advanced.technology@sungard.com or www.fisglobal.com/advanced-technology