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RTI's Infrastructure for High Performance Trading offers buy- and sell-side users better real-time data distribution and stronger complex event processing.

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RTI Provides Low-Latency, High-Throughput Messaging

NEW YORK — As if complex instruments and staggering asset shifts were not enough, today's fast-moving, volatile markets and an increasingly global universe of securities and data are highlighting a growing technological challenge: latency.

The good news may be that several technology companies are on hand with answers, among them Sunnyvale, Calif.-based **Real-Time Innovations Inc.** RTI, whose latency solutions have been aimed at the defense industry, is also finding favor among financial services players seeking to develop the framework and support to both lower latency and increase throughput in their trading operations.

Latency and throughput are important issues, according to David Barnett, Vice President of Product Marketing, RTI. Because traditional approaches are server-centric, throughput requirements can create stress. Typical volumes of a few thousand messages per second can be easily handled, but message traffic often spikes at the beginning or end of the day or when news or events affect the market. Message volume can increase to hundreds of thousands or even a million messages per second and infrastructure for the traditional system cannot keep up, causing dropped or delayed data, Barnett notes. This makes automated trading suspect because traders don't get full visibility of what's being traded electronically.

Traders and their firms look for new infrastructure to sustain messaging

throughput when volumes of messages spike in that manner. RTI's Infrastructure for High Performance Trading offers both buy- and sell-side users better real-time data distribution and support for development of real-time applications, as well as messaging software that addresses data distribution and complex event processing.

One of the world's leading fixed-income management companies, **PIMCO**, has adopted RTI's low-latency messaging for its fixed-income operations. "We use it in our pre-trade compliance system," says Yanay Halevy, Senior Vice President of Technology at PIMCO. "Our pre-trade compliance system used to be single executable, in the sense that it was on a server that was all encompassing. All the code that had to do with pre-trade compliance was in one program. We decided to break it apart and use multiple executables that could run on multiple machines. We wanted all these things to talk to each other in such a way that we will not lose information."

PIMCO turned to RTI when it entered new European and Asian markets. "We had to service requirements that were far beyond what we were doing before in complexity," says Halevy. "Our business growth has been explosive and impacted our systems generally. There is so much more data to crunch than we ever anticipated." To support all these service requirements, PIMCO had to break the server into several pieces and implement RTI along with it to support business requirements that were not there before.

FOCUS ON LATENCY

PIMCO deals a lot in futures and other derivatives markets which tend to move very quickly. “Every second matters. Every half-second matters. Every tenth of a second matters.”

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Halevy describes a potential scenario in which a trader could lose a request to evaluate a specific bond trade for a particular client account because of a communication error. “The trader presumes everything is O.K., goes ahead and buys the bond for the client, and the bond should not have been bought for the client,” he says. “The client is not going to be happy. It is obviously difficult to unwind.” That is one problem. “Another is that we use pre-trade compliance,” adds Halevy. “By definition, the trader waits for a result before he or she hits the market. They cannot lose time.” PIMCO deals a lot in futures and other derivatives markets and these markets tend to move very quickly, he notes.

“Every second matters. Every half-second matters,” says Halevy. “People in my trade will tell you that every tenth of a second matters. The calculations and the juxtapositions that we need to do are very complicated. PIMCO operates on all five continents. We are in every market you can imagine. We have clients around the world. The guidelines we receive are sometimes very complex and have to be done in real-time.”

Using RTI, PIMCO can program internally and get two programs to communicate. RTI protects PIMCO from losing any messages between programs, according to Halevy, in addition to checking pre-trade compliance with low latency. “When we decided to break the server, multiple pieces had to talk to each other,” says Halevy. “That is when 100 percent efficiency is needed in not losing information and doing it as fast as technology can offer us nowadays.”

PIMCO found RTI had an unexpected strength compared to other providers it considered, precisely because of its work for the defense industry, recalls Halevy. “What made us chuckle in the beginning and when we thought about it, was that the kind of communication RTI does requires them to make sure they don’t lose information,” he says. “They pass the communication as fast as possible or someone gets hit. When we thought

about it, we felt this was a good metaphor for what can happen to our accounts.”

Before PIMCO began to use RTI messaging and its persistent messaging component, it handled messaging functions manually. RTI provides speed and sets a time constraint. “Some of this comes from our military heritage, where timing is critical,” says Barnett. “It is not enough to just get the data fast. Data often has a limited lifetime in the applications we offer. It is important to know that the data you are getting is not stale.”

Limiting latency when message volume spikes helps users make smart decisions. “We give applications that visibility so that they can tune their behavior to what is actually happening at that moment,” says Barnett.

RTI’s solution is software-based and has a peer-to-peer architecture, along with “multi-cast” modern switches that tag messages on publication with “multi-cast script identification,” explains Barnett. “The subscriber tells the switch that it wants data associated with that multicast group or address by symbol or by depth of book,” he says. “The switch does all the work, automatically routing or copying data to applications that need it quickly.”

Low-latency solutions and peer-to-peer architecture (also known as “clouds,” and meaning how underlying communication occurs) are interrelated. The “cloud” is a reference to the application-level view. “You might have the same symbol being traded on multiple exchanges,” says Barnett. “The application says this customer wants IBM data at this depth of book or this type of messages related to the company and they specify that they want it in the cloud, which would be RTI. Underneath that cloud we are using a peer-to-peer architecture to route any of the data point-to-point. It is possible to implement the cloud model without the peer-to-peer architecture, but it is not efficient.” □