High-performance database developer Kx Systems has completed a comprehensive installation at Cantor Fitzgerald, which in turn is providing a rare glimpse into the decisions that are accelerating the race to analyze and trade on market data in milliseconds—and into why a major banking and trading firm chooses one such system over another.

Palo Alto, Calif.-based Kx plans to announce its Cantor deployment as early as today, though the New York securities firm, which has a long-standing reputation as a technology innovator, has been working with the Kx kdb+ database software since November. Many such installations are never publicly announced or elaborated upon because the technology confers a competitive edge and firms do not want to tip off the competition.

But it is an open secret that many big investment banks, asset managers and hedge funds use Kx in sophisticated, high-speed analytics. Founded in 1993 by Arthur Whitney and Janet Lustgarten, respectively the CEO and president, the company specializes in systems that capture and analyze data at speeds and volumes that traditional, relational database management systems and query languages could not match.

Cantor traders are using the kdb+ database, and the proprietary Q programming language that goes with it, to track portfolio risk and trades in real time. That kind of immediacy has become a much-sought-after goal throughout the trade life cycle.

Kx is hardly alone in trying to aid Wall Street’s drive toward low-latency data and trading infrastructures. Its niche is occupied by the likes of Vhayu Technologies, whose Velocity system is geared for tick data processing and algorithmic trading and has been making inroads internationally, and a new wave of ultra-high-volume event and stream processing systems from Aleri Labs, GemStone Systems, StreamBase Systems, Progress Software Corp. and others. The traditional relational database leaders—notably IBM Corp., Oracle Corp. and Sybase—have taken notice and are touting their staying power and research-and-development prowess. Oracle in June 2005 acquired TimesTen, a Kx and Vhayu rival.

Kx chief technology officer Simon Garland said in an interview last week that the crowding of the field is good news for the marketplace, not only because the competition spurs performance advances, but also in bringing credibility and notice to what had been a relative technological backwater. “Five years ago we were a lone voice,” said Garland, who joined Kx in 2002 after working in the search engine business and in Credit Suisse’s risk management area. Kx was a pioneer in envisioning what is now kdb+, with capacity for “many, many terabytes” (trillions of characters), and “we’ve been at this long enough to establish credibility,” said Garland.

The most recent kdb+ release, version 2.3, was announced in March. Its multi-thread capability allows firms to take advantage of the latest generation of parallel processing using multicore, multi-CPU (central processing unit) chips from the leading semiconductor manufacturers.

“Clients are constantly investing in new hardware and applications to keep up with increasing data volumes,” CEO Whitney, a veteran of UBS and Morgan Stanley, said in the 2.3 announcement. “It’s not unusual for a program trader to crunch through gigabytes [billions of characters] of trade and quote data in seconds. Kdb+ 2.3 gives them the capacity to process large amounts of streaming, historical and real-time data simultaneously.”

Kx is now gearing up for another leap in performance with quad-core chips. The next release is likely by year-end, said Garland, adding, “programmers will be excited by more multithreading.”

Tools Are Critical

“If the infrastructure is the engine for market data, the in-memory and time-
series databases are the turbochargers,” Tom Price, a senior analyst at Needham, Mass. research firm TowerGroup, wrote of the Kx-type technology in a May 2006 report on the market data landscape. “Low-latency data receipt and distribution are critical, but they mean nothing without tools for analyzing the data and translating it into actionable market opportunity.”

Price cited Bear Stearns & Co.’s selection of Vhayu early this year as indicative of how major firms are gearing up for millisecond-level response requirements—and of the effectiveness and scalability of Vhayu’s Velocity software. But Bear Stearns was sparing in its public comments about its choice.

Privately held Cantor Fitzgerald, known particularly as a leading institutional government securities brokerage and, technologically, for its spin-off of the publicly listed eSpeed trading systems subsidiary, is openly praising Kx for its platform’s speed, flexibility and efficiency, as well as the support and rapid response time of Kx’s sales and services partner, U.K.-based First Derivatives. Garland said that Cantor is taking advantage of the ability to accommodate tick data, historical queries, multi-asset-class trading and other needs on a single platform, “solving the entire puzzle at once.”

Emphasizing Flexibility

Pressed, in an exchange of e-mails, about why Cantor went with Kx, Loveless replied: “We looked at a handful of vendors and in-house technologies before choosing Kx. We chose Kx for one simple reason—we couldn’t find anything that was faster and more flexible. We are provided access to daily builds of new versions and have direct input into features and performance requirements going forward. That ability to customize a product as our needs change has immense value.”

The focus on low latency and the ability to respond in fractions of a second is less directly about profit-and-loss than about managing “overall market risk,” said Loveless. “Markets gap, and gap quickly. If your mark-to-market is ten seconds old, it’s just not true. As exchanges and ECNs [electronic communications networks] become faster, lower latency will become more and more important. This industry is in a technology arms race with regards to latency.”

He said that as with any new product, there are scalability and disaster-recovery concerns. “Kx’s solution to both was a simple, high-speed integrated messaging system,” he said, adding, “If we did hit any limits, I would expect Kx to rise to the challenge.” He recalled discussing with Kx a complicated analytic that took about 20 minutes to calculate, but the Kx system shortened that to 20 seconds. “It’s hard to hit scalability limits when you can increase performance 3600 times by working with your vendor,” said Loveless.

Integrating a proprietary-language system—Loveless characterized the logic as 95 percent in Q, 5 percent in C—with legacy systems “was no small task,” said Loveless, “but it came easily enough. We found that kdb+ forces one to simplify integration points.”