SIEMON™

IT Infrastructure Solutions

Automated Trading Desk

Category 6/Class E Infrastructure Carries Expert Systems

The historic buildings and live oaks draped with Spanish moss along the Promenade in Charleston, SC evoke the rich heritage of a world-class port city, a sophisticated cultural center of the colonial American South. What was once a center of world trade in cotton and tobacco is again a world trading power. Not because of its proximity to the ocean, river or natural resources, however, but because of stock market trading technology.

Charleston is home to Automated Trading Desk, LLC, a pioneer in the development and creation of systems and software for automated limit-order trading. ATD's proprietary, expert systems capture and analyze vast amounts of market data in real time and predict very short-term price movements in individual stocks. Through its subsidiary, ATD Brokerage Services, ATD places limit orders on its own behalf, as well as for institutional clients.



Automated Trading Desk, LLC A pioneer in the development and creation of systems and software for automated limit-order trading.

Approximately 95 percent of ATD's trades are executed on a fully automated basis by its own expert system, while human traders handle the remaining 5 percent. Each trading day begins without a portfolio and ends similarly, as all transactions are closed out by the end of the trading day.

ATD's state-of-the-art data center transacts over 4 percent of the NASDAQ's total volume, comprising over 200,000 executions and 65 million shares on an average day. The company first spiked over 100 million in April 2002.

While hundreds of thousand of shares may be exchanged in a matter of seconds, all transactions are initiated and concluded within the same trading day. The 4:30 p.m. bell leaves nothing outstanding.

In an environment where "round trips" are measured in seconds, and literally millions of shares are in play at a given moment, reliability is critical. ATD's network infrastructure, provided by The Siemon Company, delivers the industry maximum in reliability.

Designing A Hurricane Resistant Facility

Jorge Riano, ATD's Director of Data Center & Operations, devoted the better part of two years to comparing, compiling and combining the industry's best practices in data center construction. Riano talked extensively to operators of the biggest data centers on the eastern seaboard, asking each what they might have wanted to do over in hindsight. "Cost was not a chief factor for us," said Riano. As a result of these interviews, plus a number of original insights, ATD's operation is among the most resilient, reliable operations anywhere.



ATD's new facility is located on a 22-acre site a few blocks from the ocean in Mount Pleasant, which at 23.5 feet above sea level is one of the highest elevations in Charleston. Since Hurricane Hugo in 1989 and Andrew in 1992, companies in the Charleston area have paid close attention to the most effective ways of preventing storm damage. The ATD facility may be one of the nation's most hurricane-resistant sites, exceeding even the strictest standards defined by the Miami-Dade County hurricane building codes and the International Building Code (IBC) standard. "We intend to conduct business as usual even under extreme duress, such as hurricane conditions," said Riano.

The building houses a trading wing, an office wing and an unwired "shell" wing for future expansion. Thirty-three miles of Category 6/Class E cable span the inside of the data center, with another 26 miles outside the facility, interconnecting over 1500 Siemon Category 6/Class E MAX outlets, data jacks, racks and fiber patch panels.

Consistent with its critical path mission, ATD's facility is supported by power feeds with dual loop entry points from South Carolina Gas & Electric (SCG&E), further backed up by three load-sharing 750KVa Caterpillar generators with two, 5,000-gallon diesel tanks, capable of sustaining critical operations for up to two weeks without a refill.

Cabling lies beneath a higher-than-usual raised floor, recessed so as not to require a ramp. Beneath the slab is a waterproof membrane that ensures protection from moisture. Surrounding the 5,000-square-foot data center is a 6-foot curb to further protect against water leakage from inside or outside the building.

Fiber, copper and power are each elevated in separate trays. "Nothing sits on the slab," said Riano. Wiring closets are climate controlled, and although humidity is generally a not a factor, "Siemon's molded components are less prone to corrosion," he added. "The connectors are molded so there is no exposed copper."

Connecting ATD to the outside world, BellSouth's dual feed fibers enter opposite ends of the Data Center. Routed independently for maximum redundancy, each is configured to accommodate external telecom traffic in the event of interruption. Now operating over 70 T-1's, BellSouth's modular OC3+ Smartring technology gives ATD the capability to grow the number of circuits without bringing in additional fiber. BellSouth's equipment bays inside the data center are equivalent to a complete central office configuration.

Network Security

ATD uses the latest KVM (keyboard-video-mouse) technology from Raritan, Inc., by employing their Ethernet-based Paragon product. IT personnel can access the network from anywhere, log into and literally become any machine on the network. They can connect to machines from KVM switches with Siemon Cat 6 IC6 cables. "One console can be set up to operate from anywhere - giving the ability to get to any machine or multiple machines from the same desk."

All external traffic to ATD or internal traffic passes through several firewalls. Network security is supplemented by extensive climate controls, fire suppression, security systems and video surveillance, with high-tech cameras throughout the facility. The network operations center (NOC) is where all the controls and monitoring take place.

Installation Contractor: Encompass Electrical Technologies

The ATD installation was performed by Encompass Technology of Charleston, part of a national group whose South Carolina Vice President, Jim Hearn, was "hands-on involved" in all design processes from the earliest stages.

Hearn had first become familiar with Siemon in early 2001 while wiring the 4000-square-foot home of one of ATD's owners with 250 Cat 6 drops using Siemon residential cabling systems. Hearn introduced Siemon to the

company during an upgrade of generator and UPS systems at ATD's older facility. "We were confident in Siemon's components and its certification a year ahead of delivery," said Riano.

Riano and Hearn traveled to Siemon Corporate Headquarters in Watertown, Connecticut, where they attended Siemon's intensive week-long ISO 9001 and BICSI-certified training program resulting in certification as Siemon-authorized designers/installers. Siemon also conducted a two-day training for the ATD IT team.

"Siemon local Sales Manager Matt Knowles and Siemon network engineers were extremely receptive to and helpful in working with our unusual design," said Riano. "They gave us excellent feedback and worked closely with us, making sure our designs met Siemon specs."

The Data Center

Every cabinet in the data center was pre-wired with cable prior to installation. Hearn's group ran cable to the panels, Cisco systems, KVM, security systems and surveillance cameras, among others. A combination of two Cisco 6513 and seven Cisco 6509 switches support the main distribution frame (MDF), backbone and core machines, while trading machines used rack-mount servers. Remote wiring closets support intermediate data facilities (IDF) located in each of the two wings, one of which is reserved for future expansion. Each has its own mechanical room and electrical room. Underground conduits and raceways were installed to support the future wing.



"We use technology to do our work while building the power to expand," said Riano.

Throughout the 18 months of facility design, and six months of data center design, ATD elegantly integrated Siemon's user-friendly color-coding for efficient troubleshooting. Siemon's color-coded cables, patch panel racks and cross-connects "enabled the IT team to focus on troubleshooting and spend less time running wires," said Riano. "One glance at a rack is all it takes" to identify and correlate cable routing with specific functions. Router cables are black; cables supporting trading applications are blue. ATD's labeling and cable ID convention ensures that each end of every cable is identified with its associated source and destination. "Our techs can look at any connector or outlet jack and know exactly what it's connected to, whether in the data center or elsewhere," added Riano.

Office Configurations

Siemon equipment in ATD's facility supports 1300 Cat 6/Class E drops in its 56,000-square-foot building of 60 identical offices, meeting or exceeding BICSI standards for future technology contingencies. "We designed them for universal use and any type of duty, regardless of who's in it," said Riano. With less than 60 on the payroll, ATD is conservative in taking on new employees. Each office holds a single trader using two or three computers, plus a VoIP telephone from Cisco. With eight cables per office supporting two four-drop outlets each and two spare outlets, the design allows double the number of occupants per office, each with full redundancy and the ability to add new technology-- should the need arise.

Going Live and Looking Beyond

The new data cabling was completed in about two months, with seven technicians, for a total of six months to install, configure and activate the data network. By late summer, 2002, Riano was running ATD on tandem networks in both the old and new locations preparing for the cut-over. During Labor Day weekend, 2002, ATD's $32 million, three-wing facility and 95 percent of its traders were cut over onto the Siemon Cat 6/Class E cabling

infrastructure without a single error. The rigorous measures taken by Siemon in the manufacturing and testing of its components and connectors resulted in exceptional reliability and performance ATD personnel, uniquely qualified and experienced in both trading and programming, occupied their new offices by the end of September 2002.

"Though growing in processing capability," Riano explained, "our 5000-square-foot data center is only operating at about 50 percent of capacity." ATD is currently conducting trials to expand after-hours trading until 6:30 p.m. "We use technology to do our work while building the power to expand," said Riano. "We have the communications infrastructure to process 4 billion shares per day - enough to support 24-hour trading if we decide to go that way."

(Cabling For The Future, 2003, US)

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