

COVER STORY

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After the storm

New cabling infrastructure returns Louisiana Superdome to state-of-the-art status.

by Betsy Ziobron

Hurricane Katrina will go down in U.S. history as the costliest landfalling hurricane ever recorded. When 80,000 people flocked to the Louisiana Superdome



for shelter, no one thought that the world's largest steel-constructed room designed to withstand winds up to 200 miles per hour would fail. A leaking roof, combined with flooding and vandalism, called for a complete restoration of the facility, including the entire network-cabling infrastructure.

Amidst the grave circumstances, Dave Stewart, regional manager of technology for SMG, the private management company for the facility, saw an opportunity to return the Superdome to state-of-the-art status with today's cabling infrastructure technology. Headquartered in Philadelphia, SMG manages 22 arenas, eight stadiums, 58 convention centers, 43 performing arts centers and 14 other recreational facilities.

The Louisiana Stadium and Exposition District (LSED) owns the Superdome and leases it back to the state. SMG took over private management of the Superdome from the state in 1977, just two years after its opening.

"Prior to Hurricane Katrina, the Superdome relied primarily on an outdated copper infrastructure that included over 40,000 pairs of Category 3 and 10,000 pairs of Category 5 cable," explains Stewart. "Within the last five years, we had implemented a small multimode fiber backbone between the Superdome and New Orleans Arena. But with so many different types of events, we continually had to add network drops in remote locations, which required multiple patching. In some instances, a simple analog line needed to be cross connected in six separate closets, which often left us with an unorganized cabling

mess.”

In the last days of August 2005, the Superdome served as a shelter for those who could not evacuate New Orleans ahead of Hurricane Katrina's arrival. Not only was the facility inadequately equipped to house the evacuees, but about 70% of the roof failed in the high winds. The broken levees separating Lake Pontchartrain and Lake Borgne from New Orleans flooded nearly 80% of the city, including the first level of the Superdome. Additional interior damage was caused by vandalism from the thousands of stranded people.

In the days that followed Hurricane Katrina, Doug Thorton, regional VP for SMG, organized a team to assess the damage. “Our team caravanned through half a dozen military blockades back to the Dome, where we needed complete biohazard protection, including hazard suits, double layers of protective gloves and special respirators,” recalls Stewart. “Once inside, the sights and smells were beyond belief. After the initial shock wore off, we each set out to assess our departments.”

NETWORK EQUIPMENT DAMAGED

The original main data center was located on the first level where flooding occurred, and Stewart's first goal was to recover any salvageable servers and network equipment. “It only took a few hours to realize that most, if not all, equipment had failed. Some failures were due to water intrusion, while others were a result of multiple power spikes and overheating,” says Stewart. “No matter what their condition, I knew I would take the domain controller, e-mail server and AS400.” Following the assessment, Stewart spent the next 60 days repairing and operating the critical equipment from his home in Belle Chasse, La.



The Louisiana Superdome was considered a lost cause after the devastation and flooding wrought by Hurricane Katrina last year. The original main data center was located on the first level where flooding occurred; it was relocated to the mezzanine level with the intent of being above future floodwaters (below). According to Dave Stewart, regional manager of technology for SMG, “It only took a few hours to realize that most, if not all, equipment had failed,” in the original data center.

Donning a full biohazard suit with only a small flashlight to guide him, it took weeks for Stewart to inspect nearly two million square feet and assess the damage to the existing cabling infrastructure. All of this work was done with no working elevators, 90-degree temperatures and extremely high humidity in the Superdome.



“Beyond the physical damage caused by wind, flying debris and vandalism, the building was dripping with rain and floodwater,” says Stewart. “In just days, the lack of power and air conditioning, along with high humidity, caused 66 and 110 punch-down

blocks to show signs of mineral deposits and corrosion. Anyone who’s ever punched down wire could see that most of the cabling infrastructure needed replacing.”

The mandate from the Federal Emergency Management Agency (FEMA) was to repair the damaged Superdome to its previous condition by paying 90% of the renovation costs. The other 10% was covered by the state. In order to receive FEMA funding, each and every damaged item had to be thoroughly documented, including servers, PCs, switches, routers, cabling and connections.

“Accounting for every item was no small task, and I would recommend that every IT manager keep up with their documentation, because you never know when you’ll need it,” says Stewart.

Stewart worked with Nortel and Anixter to review the latest network technologies and decided on a mix of singlemode and multimode fiber for the backbone infrastructure, and Category 6 for the horizontal cabling. He was then faced with the task of convincing FEMA to pay for technology that was far better than what had previously existed at the Superdome.

“It turned out that the new infrastructure would cost less than repairing the old Category 3 and Category 5 system,” he explains. “The size of the Superdome would have called for a ton of copper, and fiber is much cheaper if you plan correctly. When it came to the horizontal solution, Anixter was able to price Category 6 cabling only pennies higher than Category 5.”

DETAILS ARE IMPORTANT

Once the components were selected and FEMA approvals acquired, Stewart and his team worked with local engineers to draft scopes of work for an open bidding process. The network infrastructure installation was granted to two local subcontractors. “When it came to accuracy and attention to detail, these two had the most comprehensive proposals. Usually, more detail up front means more attention to detail during the installation.”

To select a specific Category 6 cabling solution, an in-house, real-life installation was set up to test performance of the two vendors' solutions. "They tested the cables right out of the box, simulating the bends, twists and kinks that might happen during installation. And then they tested again to determine which solution was the most resilient," says Stewart. The performance testing resulted in selection of the Belden IBDN System 2400-gigabit cabling solution from Belden CDT.

Based on the Belden Series 2400 UTP cables and GigaFlex PS6 connectivity products, System 2400 exceeds published Category 6 requirements, delivering 250 MHz of user bandwidth and supporting data rates up to 2.4 Gbps. The GigaFlex PS6 connectivity features a termination bar (T-bar) that acts as a tiny cable manager for individual copper pairs to provide stable, high-performance terminations for Category 6 solutions and beyond. Use of the T-bar limits the amount of unjacketed cable, controls the amount of untwisting on critical pair combinations and optimizes the spatial position of the twisted pairs. The T-bar also contributes to stabilizing the performance of the terminated ports when a connector needs to be rotated for cable servicing.

The Superdome is an elliptical-shaped building consisting of 11 levels, including ground and mezzanine levels. The main data center was relocated from the ground floor to the mezzanine level with the intent of being above future floodwaters. The new data center is fed from the Bell South demarcation point on the ground level via 48 strands of singlemode fiber, 48 strands of laser-optimized 50-micron multimode fiber and 500-pair copper.

From the data center, 12 strands of singlemode fiber, 12 strands of laser-optimized 50-micron multimode fiber and 50-pair Category 3 copper voice cable feed most intermediate distribution frames (IDFs). Another IDF for CCTV and two future pressrooms are fed with 24 strands of singlemode fiber, 24 strands of laser-optimized 50-micron multimode fiber and 300-pair Category 3 voice cable.

On the ground level, 24 custom-made floor boxes are each fed with six strands of singlemode, six strands of laser-optimized 50-micron multimode and four Category 6 cables. An additional 12 strands of singlemode and 12 strands of laser-optimized 50-micron multimode fiber were installed from the Superdome main distribution frame (MDF) to the New Orleans Arena located across the street. All fiber-optic cable was manufactured by Corning Cable Systems.

The cabling infrastructure is divided into four quadrants, and most floors include two IDFs in each quadrant for a total of more than 70 IDFs throughout the facility. Belden 2400 Category 6 cable provides nearly 2,000 connections located in press boxes, suites, offices and the concession area. The Category 6 cable also provides connectivity for more than 300 wireless access points located throughout the Superdome.

"In the past, selling service was time consuming due to the multiple

Donning a full biohazard

patching needed to hand off a stable link. With the new IDF locations, and the fact that they are all home run back to the MDF, the time required to provide service to clients will be cut in half," says Stewart. The infrastructure also enables day-to-day employee functions, such as e-mail, Internet access and accounting systems.

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While some IDFs are located in existing closets, most are housed in Middle Atlantic SR Series pivoting cabinets. These freestanding, secure cabinets feature a lockable swing-out body that allows access to the back of the mounted equipment and patch panels. Due to the overall magnitude of the Superdome, each quadrant required both a large cabinet (40 RU) and a smaller cabinet (24 RU) to maintain the 100-meter distance limitation for horizontal copper cabling as specified by TIA 568-B standards.

RENOVATION FAST-TRACKED

Each quadrant is approximately 720 feet of linear space, and running the horizontal cabling from one central IDF would have exceeded the distance limitations, explains Stewart. As a result, an additional smaller cabinet in each quadrant had to be installed to pick up the balance. For the ground level of the Superdome, Middle Atlantic provided custom enclosures by redesigning the base to include an additional 11 inches of height, putting equipment above the 18-inch flood level.

In early January, the \$168-million renovation of the Superdome was fast-tracked to ready the facility for reopening in September. The goal was to accommodate a capacity crowd for the first Saints NFL game on Monday, Sept. 25. The aggressive schedule gave crews just 90 days to implement miles of conduit, voice and data fiber-optic backbone cabling, and more than 375,000 feet of horizontal Category 6 cabling.

A time-saving cabling-installation system (CIS) was implemented that ultimately provided the Superdome with an efficiently and properly installed infrastructure. CIS is a new concept driven by the need for more careful handling and organization of high-speed UTP cables to ensure long-term performance, life expectancy and future flexibility. The Beast Cabling Installation System was selected for the Superdome because it offered several components working together to address efficiency, material savings, cable organization and performance.

Consistency was provided by maintaining separation and organization of cables in the pathway, while reducing cable stress, kinks and jacket burn that can happen during installation, and eventually lead to degraded network performance. Because a natural separation of cables in the pathway was maintained, crosstalk performance is enhanced, and cables are easier to access and identify for future moves, adds and changes.

"Without a proper cable installation, we might as well throw half the money away," says Stewart. "Imagine renting the facility to a major

technology company for their annual stockholders meeting. Imagine they need to use a vital communication link to support their keynote speaker. Now imagine the consequences of that infrastructure having performance issues due to an inadequate installation process. IT managers need to remember that proper installation starts with the design and doesn't end until every pair of fiber and copper passes every single test.

"In today's world, communications are a vital part of a successful business," he continues. "Stadiums, convention centers and arenas are no exception. During the NCAA quarterfinals, our building supplied thousands of phone lines, hundreds of DSLs, and dozens of ISDNs and T-1s. Super Bowl XXXVI doubled those NCAA numbers, and future Super Bowl events will undoubtedly triple those numbers. Without a state-of-the-art, extensive network infrastructure, major events would move to other sites, and companies like Microsoft, Cisco, Peoplesoft and Nationwide would re-think holding major events in our city. The New Orleans economy, like all major cities, needs to stay ahead of the technology curve in order to stay competitive.

"It's interesting how initially we were full of despair seeing our building and network in such disarray, but we soon realized that this could be a new beginning that could establish the Superdome as a technology leader among stadiums throughout the country," Stewart adds. "It's safe to say that in some small way, the rebirth of New Orleans hinges upon the Superdome coming back to life."

Betsy Ziobron is a freelance writer covering the network and telecommunications industry.

For more information from **Belden CDT**:
www.rsleads.com/611cn-253

About Belden CDT

Belden CDT was formed in July 2004 through the merger of Belden and Cable Design Technologies Corp. Belden CDT is one of the largest U.S.-based manufacturers of high-speed electronic cables and focuses on products for the specialty electronics and data networking markets. Belden offers thousands of wire and cable products, and a complete selection of data network connectivity products and structured cabling systems and services, enclosures and racks, surface raceway systems, cable-management accessories, and power-over-Ethernet systems.



John Stroup

John Stroup, who joined Belden CDT in October 2005, is the company's president, CEO and director. Prior to joining Belden CDT, Stroup served as group executive for Danaher Corp.

All Belden IBDN networking system components are engineered to exacting specifications and manufactured under stringent quality controls. The components used in Belden IBDN Systems—including backbone cables, cross-connect hardware, cross-connect patch wires and cords, and horizontal cables—have been designed to work together as an integrated system. All Belden IBDN systems are also fully certified—designed and installed by a factory-trained certified system vendor.