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## Features

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### Cover Story

#### Green LEEDs to Gold

*HSBC's expansive new IP network combines data, voice-over-IP, wireless, facilities-security and videoconferencing capabilities.*

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When HSBC (Hong Kong and Shanghai Banking Co.) consolidated its North American corporate headquarters into a new 560,000-square-foot facility in Mettawa, Ill., a bedroom community of Chicago, management had two top-of-mind issues—long-term network reliability and heightened awareness to the long-term effects of the new facility to the environment. These two separate initiatives became intertwined through the design and construction phases, as the goals of the project were defined.

HSBC had outgrown its former headquarters in Prospects Heights, Ill., which it had occupied since 1979. "Given our history and knowing that we will be in the new building for the long run, we wanted to future proof this facility by ensuring that all voice, data, video and BAS (building automation systems) applications over IP could run through a top-of-the-line unified network infrastructure that would not need to be replaced for at least three generations," says Mike Nicchia, senior manager, new projects network systems.

"Secondly, because HSBC is a 'concerned citizen' with regards to environmental impact, we wanted the design of the facility built in accordance with obtaining the LEED gold certification for new construction from the U.S. Green Building Council."

The expansive IP network for the two wings, six floors and more than 22,500 ports was designed to encompass high-speed data capabilities to each multimedia outlet for data, voice over IP, security cameras, wireless access points, BAS sensors, videoconferencing and multifunctioning devices (MFD).

"Originally, the horizontal cable was going to be an above-the-standards Category 6 cable solution from Berk-Tek and Ortronics/Legrand," says Craig Kennedy, with Terrance Electric and Technology Co. in Elmhurst, Ill. "But when we looked closer at all the IP applications that would be attached to the network and how today's technology is going beyond gigabit, we selected an augmented Category 6 (6a) cabling system to ensure that HSBC could have the speed they required without any threat of latency,



and ample bandwidth with the extra headroom needed as more and more functions are added to the network."

The bank selected the NetClear GTX solution, which combines Berk-Tek's LANmark 10G Category 6a cable with Ortronics' Clarity 10G UTP patch panels, patch cords and TracJack modules. "Even though Category 6a was not standardized at the time of the design, it was on the verge of being ratified, and we were assured that the defined properties and performance to meet or exceed 10GBASE-T were included in the GTX solution from Berk-Tek and Ortronics/Legrand," Kennedy explains.

"The cabling solution that we selected is application-independent, so that in addition to providing data and voice to 3,000 employees, we used the same 10G cable to all the devices, including more than 250 security cameras and 131 MFDs, 14 high-definition conference units and two telepresence units, as well as to almost 900 PC-attached videoconferencing units," Nicchia says.

### **Bandwidth for surveillance**

Due to the distance limitations of copper, Berk-Tek's Adventum two-fiber optic cable was installed to the locations of the outdoor security cameras. Although security cameras today do not require the bandwidth capacity built into a 10-gigabit cable, HSBC's IT team decided to utilize the same cable for consistency and future proofing. Because the cable plant will outlast the edge devices, as most cameras are customarily replaced within five years, the added bandwidth will probably be needed for speed, video clarity and analytics, Nicchia says.

Both the backbone and horizontal cabling were designed through the collaboration of the internal IT department and Environmental System Design (ESD), a Chicago engineering firm. "This total redundant network is designed for a functional failover, and every component in the telecom room is logically laid out and separated by odd and even ports to maximize cable management while minimizing patch cord length," explains Randy Zezulka of Terrance Electric & Technology, who was responsible for the installation schedule and installation team.

The backbone between the 23 telecommunication rooms (TRs) and main distribution room included divergent riser pathways for the Berk-Tek 24-strand, 50-micron fiber, premise-distribution cable. Some singlemode fiber was installed for carrier feeds and video applications.

More than 3.5 million feet of LANmark-10G cable for horizontal distribution was specified for the runs from the TRs to the workstation outlets. "If a jack is visible to an employee, such as in the floor, in the furniture or on the walls, there are three ports and three data runs," says Kennedy. "There are dual runs to the non-data devices, which are called specialty devices and include access points, security cameras, audio and video (A/V), and BAS."

Each TR is essentially identical and equipped with two Mighty Mo 6 four-post racks and two Ortronics two-post racks for all the active and passive components. Two Mighty Mo 6 racks house Ortronics 48-port angled patch panels, separated into odd and even racks with the odd and even ports. One two-post rack houses all the active network equipment, and the other is for specialty network cabling, such as A/V, paging and future applications.

Ortronics/Legrand specially designed and built the 8-foot, two-post racks, because they were only available in a seven-foot height and HSBC wanted height consistency. With all the racks the same height, Cablofil wire mesh cable tray was installed above the racks. Ortronics also customized 22U blank panels to place on the back side of the racks to cover the termination fields.

Since this was one of the first sites to install the first-generation of Berk-Tek's 10G cables, coupled with

a tight total construction schedule of 14 months (from ground breaking to occupancy), some of the installers were faced with conceiving creative and immediate solutions for the pathways and cable installation. All floors except the ground level were built on 14-inch raised floors, for example, and the cable was originally designed to run in conduits in the concrete.

"But, by the time we came on the scene, the subfloor was built during the base build and didn't necessarily coincide with the Category 6a installation methods that came into play," notes Zezulka. "With the diameter and the sheer volume of LANmark-10G cable, we had to make some quick adjustments, including foregoing the conduits and instead utilizing extended sizes of cable tray under the floor for the horizontal cable."

## **Installed and tested**

The majority of work areas consist of cubicles in an open area that are lined up with a center spine that feed no more than 12 cubicles for a total of 36 cables. "There are two entry points to each spine, so a soft drink-sized hole was bored in each floor for each row, and 18 cables were pulled through and then broken off into different directions," explains Nicchia.

The cable installation took 37,000 staff hours, with 12 to 34 installers onsite at any given time. In order to ensure proper installation and receive the 25-year NetClear warranty, one hundred percent of all NetClear GTX channels were tested for internal performance parameters up to a frequency of 500 MHz, according to the recommended requirements of TIA/EIA-568-B.2-10.

Due to the design and inherent headroom of the cabling solution, alien crosstalk testing was not required by Berk-Tek or Ortronics/Legrand to qualify for the warranty. For added assurance, however, HSBC requested that Terrance Electric test 10 percent of the bundles, one victim cable in each bundle, which totaled 15 bundles per TR and MDF.

The alien crosstalk testing took 18 hours per TR to complete the 15 tests. This equated to two-person shifts for almost two months for the 400 cables. Testing for alien crosstalk included connecting a Fluke DTX1800 CableAnalyzer with special AXTalk Communication modules that plug into the back of the tester units. All the possible pair combinations for both alien near-end and far-end crosstalk were measured and evaluated over the frequency range up to 500 MHz. Then the tests were reversed to capture both near-end and far-end results. "There was not one failure, which was a sigh of relief, especially considering our tight deadline," says Zezulka.

Wright Heerema Architects of Chicago designed the building to be a LEED-certified project, but during the design stages HSBC executives requested that they take it even further and go for the gold certification. The LEED (Leadership in Energy and Environmental Design) rating system is a third-party certification program that provides building owners and operators the tools they need to have an immediate and measurable impact on their building's performance. To become LEED Gold Certified, 39-51 points must be obtained from the various categories of performance criteria, which include sustainable site development, water savings, energy efficiency, materials, indoor environmental quality, and innovation and design.

"The first 30 points are fairly uncomplicated to obtain, as they don't incur a lot of additional expense," explains Nicchia. "But going beyond the LEED silver certification level is exponential and needs to be carefully designed into the building's architecture before even breaking ground."

The largest potential contributor to LEED points is the structural design and positioning of the HSBC building. The building is "H" shaped, with an east and west wing, each situated to allow natural light to

enter 70 percent of the building. Forty-five feet of each wing's perimeter on all floors are exposed to natural light, which was costly to construct because of the unique footprint.

Inside, the modular cubicle furniture is designed to line up around the perimeter, and the least-used spaces, such as the electrical closets, TRs and conference rooms, are located in the core of the building. Lights are controlled through sensors, which are connected to the network.

## **Environmental considerations**

Going for the LEED gold certification also affected some of the cable-installation procedures. Installers had to take an orientation class for safety, LEED requirements and qualifications. In addition, there was an onsite LEED accredited professional to make sure materials were moved and disposed of according to the guidelines.

To eliminate waste, Anixter, the selected distributor for the communications and cabling products, assembled the components at its warehouse, removing all the excess packaging before delivery.

When planning the facility, the IT team at HSBC looked at applications that would further utilize the network and centralize equipment. One such implementation is the MFD technology that reduced 800 separate copiers, scanners, faxes and printers to 131 combination units.

HSBC also is looking at emerging technologies, such as power-over-Ethernet switches for both voice over IP and security cameras, to further minimize energy-consuming equipment.

"Not only will the current infrastructure now be increasingly important, as it will be the link to the servers, but communication speeds will also become critical," says Nicchia. Installing the cabling solution to the desktop will allow maximization of IP applications over the same network, while, at the same time, merging devices to become multifunctional, which ultimately reduces energy use.

For more information ([click here](#))

## **About Berk-Tek**

Kevin St. Cyr joined Berk-Tek in 1996 as senior vice president of sales and marketing and was named president in 1999. In 2003, his responsibilities increased to include global product management of high-speed data communications cable solutions. Prior to joining Berk-Tek, he was the vice president of marketing and sales for Champlain Cable Corp. He earned a bachelor's degree in plastics engineering from the University of Massachusetts, and a master's degree from Pennsylvania State University.



**Kevin St. Cyr**

Berk-Tek has been manufacturing wire and cable products for more than 40 years. Flagship products include copper UTP cables, such as Category 5e, 6 and 6a (10 gigabit) and fiber-optic cable products for indoor and outdoor applications. Berk-Tek is a subsidiary of Nexans. Berk-Tek's main focus has been on enterprise networks for voice and data, including backbone cable between the telecom rooms and data centers, and horizontal cable to the workstation outlets.

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