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A COOL DATA CENTER

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Michael French, network services manager, corporate information systems, for PerkinElmer



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By Carol Everett Oliver, RCDD, Marketing Analyst,
Berk-Tek, a Nexans Company

A COOL DATA CENTER

When a fire broke out in one of PerkinElmer's reagent labs, located on the fifth floor of a Boston building, water had to be pumped from fire hoses on the streets, as opposed to targeting from the inside, due to the ecological nature of the lab environment. More than 40 percent of the site's production labs were destroyed. The "what-ifs" associated with the fire, however, set off more reactive responses than dealing with the water damage at hand.

To support the company's growth plans, the active reagents labs and a demo lab were moved out of Boston and consolidated with the corporate and administrative staff of the Wellesley, Mass., headquarters into a new, expanded facility in Waltham (20 miles outside of Boston). While the intensive planning and construction of this 110,000-square-foot facility was in the works, the data center was moved to a protected collocation facility without incurring any outage or service disruption.

"When faced with the design of a network for our new facility, I wanted to avoid cabling pitfalls that I've seen throughout my career," states Michael French, network services manager, corporate information systems, for PerkinElmer. "I wanted to ensure that every-

Photography by Carol Everett Oliver, Berk-Tek, a Nexans Company, and Arlene Franchini, Ortronics/Legrand.

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thing—from the design to all the components—in

the data center, the main distribution frame (MDF) and intermediate distribution frames (IDF) created a failsafe network. That includes every detail down to keeping the cable easy to manage and identify."

PerkinElmer is a \$1.6-billion global company with more than 8,500 employees dedicated to developing and producing equipment for furthering optoelectronics and life sciences, including reagent exploration. After the Boston lab fire, the firm wanted to ensure the integrity of all network operations and,

in doing so, installed a Category 6 cabling solution from Berk-Tek and Ortronics/Legrand, tailored to fit PerkinElmer's data center environment and budget. As a result, the company created a somewhat "virtual" and "cool" data center responsible for its expanded IP-based networking system, which controls data, voice, security and power-distribution services.

The design is a small footprint—1,500 square feet—yet large in capabilities, providing for a storage-area network (SAN) and Web hosting, as well as all financial transactions for North America. Because of the size, cost and aesthetics, the design team of RDK Engineers came up with a unique scenario.

"The main concern in the design of most data centers is to maintain low temperatures and proper airflow to ensure reliability of the cabling and associated hardware, which is customarily achieved through a raised-floor environment," says Barry



Randall Rossetti, president of Innovative Cabling Systems, and Michael French, network services manager, corporate information systems, for PerkinElmer, check the cabling connections in the corporate data center.

Poitras of RDK. “However, PerkinElmer wanted to alternatively create airflow from the ceiling down.”

CONSOLIDATED DATA CENTER

“Air conditioning in the under-floor plenum spaces and ramps added costs that we did not want to incur and felt that with a creative design from RDK and product selection, we could achieve our objectives,” adds French. “As a result, the installed hardware—including legacy and new active equipment and a redundant cabling infrastructure—together with a software package that maximizes our server capability, resulted in a highly consolidated, highly used, efficient data center.”

To house the LAN and SAN active equipment and cabling termination within the data center, which also incorporates the main telecom room and one of the IDFs, two rows of 10 cabinets each were set up in a hot/cold aisle scenario, as recom-

mended by TIA-942, a standard for data centers. To further aid in the cooling, all the cabinet doors are perforated and the intercabinet cabling runs above the cabinets in elevated Wiremold “L” series trays. In addition, the intercabinet cable layout includes Ortronics angled Clarity 6 patch panels, as well as standard patch panels mounted vertically along with the cable-management solution.

The fiber and copper cabling runs in two separate pathways within the data center and feeds three other telecom rooms. Berk-Tek’s premise-distribution 62.5-micron indoor tight-buffer 12-strand fiber-optic cable was selected as the backbone and for interconnection between the Ortronics FC Series fiber cabinets in the data center.

“This fiber-optic cable was selected because we were utilizing existing legacy Cisco 6509 switches,” explains Poitras. “Since the distances within the data center did not exceed 50 feet, this cable has the capability to run the existing Fibre Channel protocol within the data center, as well as being able to handle the increased bandwidth required for future 10-Gigabit Ethernet applications. Whereas most new construction sites are selecting the 50-micron fiber, it didn’t make sense here, especially with potential signal loss due to the additional fiber patch cords needed to correspond with the legacy switches.”

“There were approximately 600 fiber connections in the data center alone, which were field terminated with high-density Ortronics LC connectors,” says Randall Rossetti, president of Innovative Cabling Systems, the installation company. All the fiber-optic cable was terminated into the locked fiber cabinets located within the data center cabinets and in racks in the IDFs.

Berk-Tek’s LANmark-1000 enhanced Category 6 cable is installed as the copper interconnection between the primary and secondary switches in the data center, as well as the data/voice horizontal cable within the facility. Within the data center and

main telecom cross-connect, the copper cable is terminated into Ortronics Clarity 6 angled 24-port patch panels for better space efficiency in a dedicated rack. Ortronics’ non-standard patch panels provide termination in open racks in the three other IDFs.

“Because of the redundancy of the copper cabling within the data center and our concern for consistent airflow between the cables and the racks, we designed a vertical mounting system for the standard 24-port patch panels for intercabinet connectivity,” explains Rossetti. “By utilizing the PDU (power-distribution unit) brackets that were already located on the side walls of the cabinets and designing a swing-away wire-management system, we were able to save cabinet space and create better airflow patterns within the cabinets.” Each cabinet contains a vertical PDU for further space and airflow efficiency.

All 650 workstation outlets in the LAN contain redundant ports, as well. Only one LANmark-1000 enhanced Category

6 cable is required at the desktop. Wiremold's Designer Series 2000 raceway was installed to house the data and power cables to support the VoIP phones. Two cables were terminated to the Ortronics Clarity 6 TracJacks inserts in the raceway for redundancy and future proofing. In the labs, Wiremold's DS 4000 was utilized as a way to contain power, communications cable and connectivity.

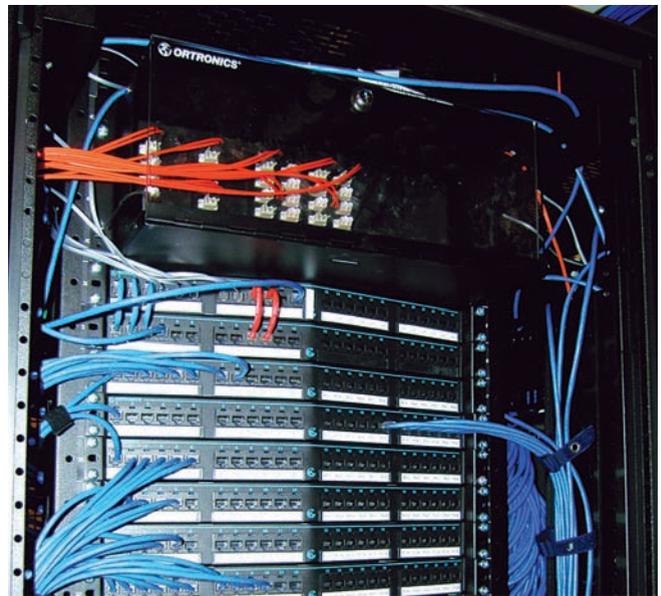
A VIRTUALIZED NETWORK

"Another important aspect to maintaining a smaller footprint in our data center is a software program, called VMware, that allows us to 'virtualize' our server farm," French offers. "With this software, we can consolidate our hardware to emulate multiple servers over one box. So, even though we have approximately 65 to 70 physical servers, they are actually replicating the capacity of 400 servers."

VMware aggregates industry-standard servers and their attached network and storage into unified resource "pools." The operating systems and applications are encapsulated in "virtual" servers that are independent from the hardware to allow central management and monitoring, and simplify application provisioning.

In addition, all IT services, including data and voice infrastructure, building automation controls (such as security) and even PDUs, are IP-enabled. This allows French and the IT team to monitor all components offsite through IP addressing and ensure that the servers or power are not overburdened. If a problem is detected, it can be resolved quickly without a staff member touching the equipment—saving maintenance and staff costs and time.

Two 16-ton Leibert air-conditioning units are located in the ceiling of the data center, and each IDF has its own cool-



The copper cable is terminated into Ortronics Clarity 6 angled 24-port patch panels for better space efficiency in a dedicated rack.

ing unit. In addition, ducting diffusers were placed above the hot/cold aisles in the data center to create a consistent ventilation system.

After the installation was complete, various temperature readings were taken with a Fluke 52 II probe thermometer, part of The Nexan's Data Communications Competence Center efforts in evaluating data centers on the effects of different temperatures in a data center and how they may affect cable and channel performance. As part of that study, and also to make sure that the PerkinsElmer data center layout meets TIA standard temperature readings for efficient airflow and cooling, several ambient readings, as well as specific temperatures inside the server cabinets, were taken in the middle, side and tops of all the racks and in the center of the cable bundles.

Results showed that the ambient entrance temperature was 69.1°F. The average temperature for the many locations in the cold aisle nearest the entrance wall side was 64.1°F. For the middle hot aisle, including several overhead cable bundles and the main and heaviest-populated SAN active-equipment cabinet, the average temperature was 71.2°F. For the far cold aisle, the average temperature equaled 67.4°F.

"The proof is certainly in the efficient design and build-out of the network and its infrastructure," says French. "This was a culmination of utilizing both creative and newer technologies to create an advanced networking standard that will become our corporate standard for future facilities." □

ABOUT ORTRONICS/LEGRAND

Ortronics/Legrand, headquartered in New London, Conn., is a provider of high-performance structured cabling solutions, offering a complete range of Category 5e, 6 and 10-Gig copper, fiber-optic, wireless and residential/MDU connectivity solutions. In addition, Ortronics offers Cablofil wire mesh cable tray and Wiremold pathways. Other programs and services include: engineering and technical support, systems planning, training programs and a 25-year warranty program. Ortronics is ISO9001 registered and an active member of BICSI, TIA/EIA, ISO and other industry standard groups.

Ortronics/Legrand is a subsidiary of Legrand, a specialist in products and systems for electrical installations and information networks in residential, commercial and industrial buildings. Operating in more than 60 countries with sales of \$4.9 billion, Legrand employs approximately 33,000 people, and its catalogs include more than 130,000 products.

Mark Panico was appointed president of Ortronics/Legrand in July 2004 and brings to Ortronics extensive experience in marketing and sales. Prior to Ortronics, Panico held executive positions at the global industrial and institutional services division of *Nalco Co.*, *Honeywell Automation Control & Solutions Services* and *General Electric*. Panico is a graduate of *Fairfield University*, where he obtained his bachelor's degree in chemistry.



Mark Panico

For more information:
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