



New Hospital Data Center Leads to Innovative High-Density Fiber Solution

By Jon Lutzen, RCDD

As a modern facility providing a full spectrum of quality patient care services from emergency to cancer treatment, cardiology, maternity, mental health and home healthcare, Licking Memorial Hospital (LMH) in Newark, Ohio is committed to remaining at the forefront of technology. With a need to utilize new data communication technologies, LMH (www.lmhealth.org) recently completed an advanced 2,400-square-foot data center aimed at providing the bandwidth and storage needed for handling increasing volumes of patient information.

A proactive solution to the exponential growth of electronic information in today's healthcare industry, the new LMH data center is one of the most advanced Tier 3 facilities in the area, utilizing the same level of network and storage technologies as major financial institutions and internet providers. The core network technology includes a high-reliability, high-bandwidth infrastructure capable of supporting 10 Gbps (gigabit per second) data transmission over Category 6A unshielded twisted-pair (UTP) cabling and 50µm laser-optimized multimode optical fiber cabling. A Tier 3 data center is highly fault tolerant, with multiple equipment, power, and network redundancies to ensure uninterrupted operation.

With thousands of optical fiber links needed to support high speed data transmission, the new LMH data center required a high-density fiber cabling design. The optimum solution was to utilize pre-terminated "plug-and-play" fiber interconnect systems for rapid deployment and reliable performance through a smaller connection footprint. It was clear that labor-intensive conventional field termination was not feasible. With a set of fundamental requirements, the LMH project team began the design process with Echo 24 (www.echo24.com), a local design/build contractor with whom LMH has had a longstanding relationship. Early involvement of the contractor and connectivity vendor resulted in a unique and innovative optical fiber interconnect solution to support the LMH data center, which later become an industry-leading product.

Up to the Challenge

"We had outgrown our former data center, and saw an opportunity to upgrade the technology," explained Sallie Arnett, vice president of information systems at LMH. With more than 3,000 optical fiber distribution links interconnecting various telecommunications spaces throughout LMH to core network switches, servers and systems, the hospital was

concerned about space utilization in the new data center and initial specifications required the ability to place 96 fiber ports in a 1U rack space. Having worked with LMH for more than a decade, Echo 24 was up to the challenge.

In previous LMH network upgrades and expansions, including a new critical care pavilion, Echo 24 had worked to eliminate a mix of components from various vendors and establish quality and consistency by using network cabling and connectivity components from Hubbell Premise Wiring. With the availability of Hubbell's NEXTSPEED Ascent[®] end-to-end Category 6A UTP cabling and OptiChannel™ 50µm laser-optimized multimode fiber systems, Echo 24 was again ready to propose the Hubbell solution for the new LMH data center. Early in the design phase of the project, Hubbell had been working on a concept for a high-density optical fiber enclosure that would exceed the LMH specification requirements.

"We needed a vendor that offered a high-density fiber solution capable of supporting 96 ports in a 1U space," recalls Tony Gunter, president of Echo 24. "I called Thomas Valentine, my local Hubbell sales manager, to let him know that LMH had established this requirement as a hard specification. Hubbell quickly called me back to let me know they had an innovative fiber solution under development that would support 144 fiber ports in a 1U rack space—an incredible amount of density."

With the concept already under development, Hubbell furnished a pre-production OptiChannel high-density 144-port 1U fiber enclosure to Echo 24 and LMH for evaluation. "In late 2009, the turning point for Hubbell's acceptance into the LMH project was the submittal of our new high-density modular enclosure and compact MPO cassette concept," says Valentine. "Needing to have 64 units available by October 2010, Hubbell was immediately challenged to complete the product design and begin tooling and manufacturing the enclosure."

Valentine meanwhile worked closely with Gary McRoberts and Victor Rudolph at Graybar Columbus, the local distributor for the project, to establish competitive pricing and a delivery schedule. Pricing pressure and labor cost were a major factor in enabling Echo 24 to be competitive in their bid.

The Work Begins

With the challenge of design completion, tooling and manufacturing a new high-density fiber enclosure underway at Hubbell, Echo 24 moved onto an even bigger challenge—designing and deploying redundant pathways to reroute all services into the new data center.

"The new data center was added on to the north side of the hospital, and while it was close to the existing data center, there was concern about damaging existing underground conduit," explains Gunter. "To connect to the existing conduit and services, we ended up carefully building a new manhole around an existing hand hole and deploying new conduit to reroute all services through the Hospital's critical care pavilion. That task was a significant part of the project for us."

To reroute services while ensuring redundancy, some new outside plant fiber cable was added via fusion splicing due to distance. In addition to the redundant pathways, the new LMH data center also features two electrical systems that are activated during the event of a power outage—an uninterruptible power supply (UPS) and generators. The generators are activated automatically if the normal power supply lapses, creating full power within 10 seconds. In the meantime, the UPS is

designed to activate immediately upon a power failure until the generator power begins. The UPS system ensures a continuous flow of electricity, so that there is no discernable loss of power to any of the critical networking equipment needed to support healthcare system throughout the Hospital. The new LMH data center also features a three-foot raised floor with an innovative multi-tier underfloor cable tray system to support optical fiber and copper cabling.

"We spent a considerable amount of time designing in multiple layers of redundancy, for both data and electricity," says Arnett. "If one component should fail, our patients' medical information is always available for their physicians' use."



The new Licking Memorial Hospital Data center

With the new pathways in place, existing services rerouted and the raised floor installed, it was time for Echo 24 to begin building out the new data center and installing optical fiber links from core switches and networking equipment to servers. Under LMH's strict "go-live" date of

December 7, 2010, Hubbell put the development of the high-density fiber enclosure on the fast track. With a long-standing tradition of developing products that incorporate the *Voice of the Customer*, Hubbell conducted multiple field demonstrations to build confidence in the design and assure customer satisfaction. Production of the new OptiChannel 144-port, 1U fiber enclosure began, and the first units off the assembly line were delivered to Graybar Columbus on schedule.

The Final Solution

The new Hubbell OptiChannel High-Density FCR-Series Fiber Enclosure, first designed and developed for the LMH data center, maximizes space utilization without compromising accessibility. The high-density, 144-port 1U fiber enclosure features a three-drawer design that provides a flexible, scalable and reconfigurable fiber interconnect solution. Each drawer accepts four compact ultra-thin fiber cassettes with 12 LC fiber connectors on the front and a rear 12-fiber MPO connector to channel network traffic into a single 3.0mm optical fiber cable to minimize cable congestion and optimize air flow through the rack or cabinet. For the LMH data center interconnects, Hubbell supplied a mix of 24 and 48-strand custom MPO-to-MPO trunk cables that were 100% factory tested for maximum performance.



Fiber Enclosure Installed at the LMH data center



Hubbell's OptiChannel High-Density 144-Port, 1U Enclosure

“The MPO trunk cables provided LMH with a true plug-and-play design without the need for field termination,” says Valentine. “The user-friendly snap-in design makes it easy for LMH to manage their optical network with more efficient moves, adds and changes. And because MPO connectors have been specified for future 40 and 100 gigabit network applications, LMH already has the infrastructure in place to easily upgrade to these speeds when they have the demand.”

Much to the satisfaction of Echo 24 and the LMH team, the fiber data center infrastructure was deployed on schedule, and the custom MPO cords supplied by Hubbell were installed and tested with total success. As a critical installation for Hubbell's new OptiChannel high-density 1U fiber enclosure, Echo 24 was extremely helpful in providing feedback and making on-site cable routing enhancements to be captured into future design refinements. The LMH data center project proved to be a successful installation, enabling Hubbell to solidify an innovative high-density fiber enclosure design, and make a successful product market release in 2011.

“We were pleased to be involved with the design and development of the high-density 1U fiber enclosure, and Hubbell was quick to tweak the design to assist with cable slack management. They have always been the first to listen to their customers and respond to input,” says Gunter. “When you need to terminate thousands of fiber links, there is really no other way to go than a preterminated solution like the Hubbell OptiChannel™ high-density enclosure with pre-terminated MPO cassettes and trunk cables.”

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