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Fairview Health Services

Leading Health Care Provider Deploys New Cable Technology and Proves Performance for Ensuring Enhanced Patient Care

quality innovative technology service



The health care industry is at the very forefront of the technological evolution with massive change being driven by advances in diagnostics and monitoring, electronic medical records, patient information systems and digital imaging technologies. While these advancements will enhance patient care, they require real-time access to information and reliable transmission of large files like patient x-rays or digital scans. Hospitals and clinics around the nation are faced with the need to upgrade their network infrastructures to support these growing trends and ultimately reduce health care costs. Fairview Health Services, one of the Midwest's top integrated health care networks, is doing just that.

Building from the Ground Up

Founded in 1906, Fairview Health Services is ranked among the nation's top 50 health care systems with seven hospitals, 36 primary care clinics, 55 specialty clinics, six urgent care facilities and a variety of hospice, rehabilitation, counseling, home care and retail pharmacy services. All told, Fairview Health Services houses more than 2,500 beds and employs over 20,000 health care workers to provide comprehensive medical and surgical services to Minnesota's Twin Cities and the surrounding communities. With advanced health care technology requiring reliable high-speed transmission and storage of massive amounts of information, Fairview Health Services found themselves in need of a new data center.

"Today's equipment requires more power to accommodate the increased number and speed of processors and a greater amount of cooling to suppress the heat generated by the increased power," says Mike Elton, IT program champion for the new data center. "Our existing data center was at capacity for electrical services, cooling and raised floor space, and we were very close to exceeding the structural capacity."

With Fairview running out of power and space in the existing data center and risking reduced reliability and uptime, they decided to construct a new 25,000-square-foot data center from the ground up. The new facility was designed with a raised floor and the latest network systems and infrastructure to support growing health care technology needs. Under the guidance of Dunham and Associates, the consulting engineering firm responsible for designing the

data center, Fairview decided to implement a network cabling infrastructure capable of providing 10 Gigabit Ethernet transmission performance. Jones, Lang LaSalle, a global real estate firm, implemented this project and provided project management services.

"When planning to support existing and future applications, we decided to go with a 10 Gig solution to protect our investment," says Dick Neubauer, technology consultant for Fairview. "While we may not need 10 Gig speeds immediately, more and more applications will eventually require this bandwidth."

Choosing the Very Latest

A PanGen® structured cabling solution, featuring cable from General Cable and enhanced network connectivity from Panduit, was selected for Fairview's new data center, including end-to-end Category 6A unshielded twisted-pair (UTP) copper and laser-optimized multimode optical fiber systems designed to support superior 10 Gig performance. Minneapolis-based Parallel Technologies, a leading provider of networking services and solutions, was selected to deploy the PanGen network infrastructure. Shortly before installation was to begin, General Cable and Panduit developed an advanced 10 Gig copper UTP cable – the revolutionary GenSPEED® 10 MTP™ (Mosaic Twisted Pair™).

To provide superior 10 Gig electrical performance and more headroom, GenSPEED 10 MTP uses the patent-pending Mosaic Crossblock™ technology to shield cable from noise coming from external cable sources. This external noise, referred to as alien crosstalk (PSANEXT and PSAACRF), is the primary





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transmission parameter impacting performance at the higher frequencies required for 10 Gigabit Ethernet. The Mosaic Crossblock is designed with individual overlapping metallic blocks separated by an insulating layer of polyester film. Because the insulating layer prevents metal-to-metal contact, there is no path for current to flow longitudinally along the cable, which minimizes EMI (electro-magnetic interference) and eliminates the need for grounding the cable during termination.

Unlike other 10 Gig UTP solutions, the noise immunity provided by the Mosaic Crossblock technology means that the cable can be mixed with other copper cabling media in pathways, allowing customers to slowly upgrade to 10 Gbps without having to replace or separate other cable types. GenSPEED 10 MTP also features the Flex-Separator™ inside the cable to stabilize and separate each pair for optimized internal pair geometry and crosstalk performance while providing an overall smaller, easy-to-install round cable profile ideal for data center applications.

When Parallel Technologies learned of the new GenSPEED 10 MTP cable, they demonstrated the product and explained the technology and increased headroom that it could provide for Fairview's new data center. Fairview made a last-minute decision to deploy the new cable, becoming the first major installation of this advanced technology, with nearly 60 miles of the new cable supporting more than 5,000 data center links.

“We were all set to go with the standard 10 Gig copper cable, but the design of the Mosaic Twisted Pair and the way the cable was built provided more reliability and flexibility,” says Neubauer. “You only get one chance to build a data center, and we wanted to get it right the first time. By switching to the Mosaic technology, it will keep us from having to swap out cable as the application requirements continue to grow.”

Using the new GenSPEED 10 MTP cable and advanced connector compensation techniques from Panduit, Fairview's PanGen Category 6A cabling solution exceeds the ANSI/EIA/TIA 568 B.2-10 and IEC 61156-5 component standards. It provides certified channel performance in a 4-connector configuration up to 100 meters and exceeds the requirements of ANSI/EIA/TIA 568 B.2-10 Category 6A and ISO 11801 Class EA standards for supporting 10GBASE-T transmission over twisted-pair cabling systems.

Proving the Performance

With its UTP design that performs as well as a shielded cable, the new GenSPEED 10 MTP has quickly gained attention in the industry. When Fluke Networks, a leading provider of innovative certification and testing solutions for copper, fiber and wireless networks, found out about the major installation of GenSPEED 10 MTP at Fairview's new data center, they offered to assist in testing the alien crosstalk performance of the system following installation and the permanent link testing completed by Parallel Technologies.

The shorter links found in the Fairview data center range from 8 to 29 meters, which can add significant noise contribution from pairs transmitting at the same end of a link. This noise contribution, known as near-end crosstalk (NEXT), requires precise workmanship when terminating connectors on a short link to avoid performance issues.

“When two connectors are in close proximity to one another, they can contribute significantly to near-end crosstalk and return loss in that link. Fortunately, many connector manufacturers have improved their designs, but these shorter links still require quality connector terminations every time,” says Adrian Young, senior customer support engineer for Fluke Networks' Technical Assistance Center. “I was expecting to see several issues due to the shorter length links in the Fairview data center, but that wasn't the case. All of the links passed, and more than 99% showed significant margin. It was really quite an achievement.”

Following the permanent link testing, Fluke Networks used the successful results to prepare for alien crosstalk testing, the most critical performance parameter for 10 Gig. Using their AxTalk Analyzer software, Fluke Networks tested links in bundles using the sampling method recommended by ISO/IEC standards.

“Alien crosstalk between bundles is not an issue, so we typically look at testing one victim cable in a bundle of 12, or 2 victim cables in a bundle of 24, and then moving on to another bundle,” explains Young. “In Fairview's data center, 36 of the 48 ports on the patch panels were terminated with one bundle of 12 and one bundle of 24. To test the worst-case scenario, we focused on the bundles of 24 and identified short, middle and long links for testing as recommended by the standards.”

As demonstrated by the testing results, the Category 6A links tested in Fairview's new data center showed no alien crosstalk issues at all and provided a significant margin, averaging 4 dB for PSANEXT and 26 to 30 dB for PSAACRF alien crosstalk parameters, which, according to Young, is worth celebrating.

“We know that alien crosstalk is related more to component and cable choice versus installation, and we also know that shorter links can be a problem. When I walked into that data center, the first bundle we tested was the shortest one we could find. Because it passed with plenty of margin, we can make the bold statement that this data center will likely have no alien crosstalk performance concerns,” says Young. “On shorter links, any margin over 0 dB is a good margin to have. My gut reaction is that the GenSPEED 10 MTP cable and Panduit TX6A components did their job and gave us the extra margin we needed for these short links.”

Thriving from the Success

With a successfully designed, deployed and tested PanGen structured cabling solution in place, Fairview Health Services is ready to take on the very latest medical technologies and redefine the delivery of health care in Minnesota's Twin Cities and the surrounding communities. The new data center and bandwidth provided by the GenSPEED 10 MTP cable and Panduit connectivity will allow Fairview to implement server virtualization and consolidation for cutting operational costs while supporting current and future applications, which will ultimately improve patient care. Fairview will continue to maintain its position as a nationally recognized leader in clinical excellence and innovation.

“We're extremely pleased with the results and the work performed by Parallel Technologies. We had successfully used products from General Cable and Panduit in the past—we wanted state-of-the-art, and the GenSPEED 10 MTP cable proved to be the superior choice,” says Fairview's Neubauer. “It was the obvious system, especially given that health care is a 24/7 operation, and applications are spreading throughout this environment to the point where there is not a single device or process that doesn't touch the network.”



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