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Cabling

Installation & Maintenance

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Fibre Channel speeds**

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**White boxes in
the enterprise**

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**Going way beyond the
autotest button**

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right move for your data center?

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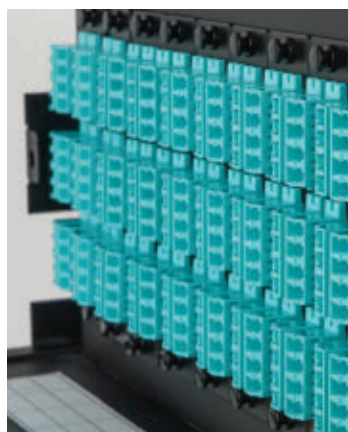
www.cim-subscribe.com; e-mail: CIM@kmpsgroup.com



Cabling Installation & Maintenance® (ISSN 1073-3108), Volume 24, No. 11, Cabling Installation & Maintenance is published 12 times a year, monthly by PennWell® Corporation, 1421 S. Sheridan, Tulsa, OK 74112. Periodicals postage paid at Tulsa, OK 74112 and at additional mailing offices. **SUBSCRIPTION PRICES:** USA \$84 1 yr., \$120 2 yr.; Canada/Mexico \$96 1 yr., \$140 2 yr.; International \$118 1 yr., \$170 2 yr. **POSTMASTER:** Send address corrections to Cabling Installation & Maintenance, P.O. Box 47570, Plymouth, MN 55447. Cabling Installation & Maintenance is a registered trademark. © PennWell Corporation 2017. All rights reserved. Reproduction in whole or in part without permission is prohibited. Permission, however, is granted for employees of corporations licensed under the Annual Authorization Service offered by the Copyright Clearance Center Inc. (CCC), 222 Rosewood Drive, Danvers, Mass. 01923, or by calling CCC's Customer Relations Department at 978-750-8400 prior to copying. We make portions of our subscriber list available to carefully screened companies that offer products and services that may be important for your work. If you do not want to receive those offers and/or information via direct mail, please let us know by contacting us at List Services Cabling Installation & Maintenance, 61 Spit Brook Rd, Suite 401, Nashua, NH 03060. Printed in the USA. GST No. 126813153. Publications Mail Agreement no. 1421727.



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STANDARDS

TIA gives away copy of 942-B data center spec



EDITORIAL

Honor, then horror



PATRICK McLAUGHLIN
patrick@pennwell.com

It was a conference/trade-show week like many others in that the schedule of events was planned and predictable. It was also like many others in that the particular happenings (such as connections made and technologies unveiled) were unique. The 2017 BICSI Fall Conference, held at the Mandalay Bay Resort in Las Vegas, was productive and enjoyable for many. On Monday, September 25 we at *Cabling Installation & Maintenance* honored dozens of people and organizations for the innovations they have brought to the industry. The article that begins on the next page details those honorees and their accomplishments.

On Thursday, September 28, the conference wrapped up with a sizable charitable donation from BICSI Cares to Room for Joy, which provides chronically ill children with fun, positive bedroom environments. As is the case every time BICSI Cares helps a charity, this presentation demonstrated the best of what our industry has to offer, and the best of what humanity has to offer.

That same day, September 28, as nearly everyone who had gathered for the conference checked out of Mandalay Bay, evil checked in to the property. Just a few days later, the world learned of the horror that rained down upon concertgoers from the 32nd floor of that hotel, demonstrating the worst of what humanity has to offer.

As details of the rampage were revealed, it dawned on me that one week to the minute before the shooting began, I had just checked in to that hotel and was walking through the property in search of a meal. Had the conference been scheduled to take place one week later than it did, or had the music festival been planned for one week earlier than it was, thousands of professionals from our industry would have been in and around the property at the time. And plenty likely would have attended the concert.

Some information about the shooting, and little information about the shooter, have been made public. Even if detail about motive is released, we will never really know the answer to the deeper question of why. Why was that group of people subjected to such pain and horror? Whether the view is religious ("There but for the grace of God go I,") or secular (random chance, wrong place/wrong time), we are reminded that we're subject to forces beyond our control. Those forces can manifest in something as savage as a mass shooting or as patently unfair as children with serious chronic illnesses.

Organizations like Room for Joy, and the heroic efforts of concertgoers and first responders, remind us that there is still plenty that is within our control. They also remind us to do what we can, when we can, for whom we can.



2017 Cabling Innovators Awards presented to record number of recipients

Silver, Gold and Platinum level Cabling Innovators Awards honored innovation in product development and use as well as project implementation.

BY PATRICK MCLAUGHLIN

The third annual Cabling Innovators Awards presentation ceremony was held Monday, September 25, 2017 as part of the BICSI Fall Conference and Exhibition. In total 45 awards were distributed. The program was initiated in 2015 to recognize innovative products and systems as well as their uses and applications. The Cabling Innovators Awards program is intended to recognize ingenuity and innovation where it is found in the value chain of cabling-system design, installation and administration.

Participants in the program were invited to self-nominate their products, technologies, systems, programs or projects. A judging panel comprising

industry professionals screened the entries and determined their level of innovation.

Cabling Installation & Maintenance's publisher Alan Bergstein commented, "Our 2017 honorees are an outstanding example of companies who are making an impact in the industry."

Honorees earned a silver award if their entry demonstrated that their innovation represented marked

improvement over previous methods, approaches, or product and system use. Similarly, honorees earning a gold award demonstrated excellent innovation with clear benefits, making substantial improvement over previous methods, approaches, or use. And platinum-level honorees showed a level of innovation that the judging panel characterized as groundbreaking.

Following are brief descriptions of the products, systems, and projects that were honored at each level.



2017 Cabling Installation & Maintenance Silver Innovators Awards

Silver

Honorees recognized at the Silver level demonstrated that their innovation has resulted in marked improvement over previous methods, approaches, or product system and use.

AFL's Wrapping Tube Cable with SpiderWeb Ribbons. The cable is an ultra-high-density outside plant cable designed specifically for fiber-to-the-home or access markets. It's compliant with Telcordia GR-20, the latest issue of the OSP cable standard. With an ultra-high-density and new ribbon technology called SpiderWeb Ribbon, it is available in fiber counts from 144 to 1,728. The cable is available in dielectric or double jacket single armor.

Belden's FiberExpress Enterprise Closet Patch Panel System. Described as elegant, intuitive and flexible, the solution has been designed to maximize installer flexibility compared to other available solutions. FX ECX, as it is called, has been optimized for LAN environments and provides an easy-to-deploy solution for installers.

SnakeBit hollow shaft drill bits from Budco. Manufactured by SnakeBit Drill and available through Budco, these bits are a go-to tool for telecommunications and electrical installers. They eliminate the need to fish wires backwards through walls. Installers snake wires through the hollow shank.

CommScope's High Speed Migration Platform. Provides the agility, speed and density needed while keeping infrastructure efficient and manageable on the path

to higher speeds. Designed with modular building blocks, the platform provides a long-term strategy for supporting higher speeds and emerging applications, without having to rip and replace.

D-Tools' System Integrator 2017. SI 2017 ties estimation, system design, and

long-reaching, slim FIPT-400-MF Automated Multifiber Connector Inspection Tip, nothing stops field crews from following fiber testing best practices and eliminating faulty connector issues that impact a network's performance, EXFO says. The solution allows technicians to quickly inspect multifiber connectors in dual- and single-row set-ups, without missing fibers or having to deal with the hassle of manipulating one or more scanning knobs.

Fluke Networks' DSX-8000 CableAnalyzer. The first field tester independently verified and manufacturer-endorsed to meet all the requirements for the Category 8 field testing standard. It incorporates the first 8P8C modular connector permanent link and channel adapters with full 2-GHz range, allowing field certification of Category 5 through Category 8 and ISO/IEC Class

C through Class F_A and I/II. It offers an 8-second Category 6A certification.

GHMT AG's adapter that tests up to 2.5 GHz. Higher data rates and their corresponding higher transmission frequencies challenge measurement technology, according to the evaluation of these high-frequency systems. Initial standard values for the radio-frequency (RF) and electromagnetic compatibility (EMC) parameters currently being discussed in international standards-development



project management into a single, data-driven, connected process that reduces time, eliminates errors and produces bottom-line results. It adds powerful business intelligence and visual reporting that enable business owners and management to understand and better perform key functions of an integrator's business—estimation, system design, and project management.

EXFO's Automated Multifiber Inspection Solution. With the FIP-435B and the

bodies, define the evaluation up to 2 GHz. This measuring adapter for RF and EMC characteristics reaches 25 percent beyond that limit, to 2.5 GHz.

Major Custom Cable's MTP cables. These MTP cables won't break, Major Custom Cable says, but rather will survive the rigors of any challenging project where they're needed. The patch-cord solution works with traditional hardware with QSFP ports, or can be custom-designed into a channel.

Milliken Infrastructure Solutions' Vis Divide is designed to maximize conduit capacity and result in lower total cost for system owners. It is a segmented HDPE communication conduit that features divider fabric embedded into the conduit walls, which creates dedicated pathways, thereby maximizing available space and simplifying installation.

Panduit's HD Flex 2.0 Fiber Cabling System. The solution is designed for ease of integration with existing fiber infrastructure by accommodating fiber cassettes and fiber adapter panels with different port counts within the same innovative enclosure and panel. 6- or 12-port cassettes and fiber adapter panels can be deployed in virtually any combination to achieve up to 144 fibers (LC) or 864 fibers (MPO) per rack unit. The solution enables seamless port migration from 10G to 25/40/50/100G in the same RU space without replacing existing fibers.

Prysmian Group's FlexTube Cable. This alternative to loose tube cable improves midspan access applications in several ways. It uses flexible fiber modules instead of buffer tubes; the FlexTube



modules can be quickly opened by hand without special tools. Each module is only 1.3 mm in diameter, and won't kink or cause attenuation increases when stored at low temperatures. This makes midspan access quicker and safer, while allowing high fiber counts to be stored in smaller closures.

Siemon's ConvergeIT. This unified intelligent building concept builds a better future by changing the way professionals design and build. Siemon explains it brings together the company's quality, innovation and expertise with advanced cabling and connectivity technology and digital building systems, to create highly efficient, sustainable and cost-effective converged cabling infrastructures for intelligent buildings.

Siemon's V-Built Preconfigured Solutions. Part of the company's WheelHouse Advanced Data Center Solutions, V-Built Custom Preconfigured Solutions are available with VersaPOD, V800, and V600 cabinets, as well as four-post racks and wall-mount cabinets. The preconfigured solutions come preloaded with Siemon components and are identified by one

customer-specific part number and price—making them ideal for a data center or network infrastructure seeking consistency across rows, locations or spaces.

Southwire Tools and Equipment's M300P Professional VDV Cable Mapper. The Mapper quickly tests voice, data and video cabling for common wiring faults including split pairs. The rugged double-molded housing with silicone port covers and easy-to-read backlit LCD screen make the M300P rugged and easy to use.

Tripp Lite's AC Charting Cart for Chromebooks. The CSC36AC 36-device AC charging cart provides efficient charging and secure storage for dozens of Chromebooks and laptops while offering multipurpose features for K-12 environments. Automatic dual-zone charging supports higher wattages without overloads, and key-locking front and rear compartments deter theft.

Viavi Solutions' CERTiFi. This cloud-based solution is for teams who design, build, test, and certify the structured cabling in enterprise networks. Powered by the Viavi Solutions StrataSync platform, CERTiFi empowers every team member with the information needed to complete tasks accurately and on time.

Vision Technologies' integrated technology delivery of a passive optical network. Specializing in design-build technology systems, Vision Technologies Inc. provides the Integrated Technology Delivery (ITD) methodology, which significantly reduces change orders and accelerates projects through effective

collaboration and design—saving end-user organizations time and money.

Wirewerks' NextSTEP Technology.

NextSTEP Technology is a high-density fiber management solution

consisting of two NextSTEP rack-mount patch panels, six NextSTEP common-form-factor fiber modules, and the exclusive NextSTEP CableTree cable management accessory. From

this menu of elements, network managers can custom configure and deploy a feature-rich, cost-effective NextSTEP solution for virtually any passive optical fiber application.

2017 Cabling *Installation & Maintenance* **Gold** **Innovators Awards**

AFC Cable Systems' MC Luminary

Multizone. This cable can replace up to three traditional luminary cables or three power and three control cables. It is designed specifically for use in daylight-harvesting applications and complies with the non-residential indoor lighting requirements of the California Title 24 Energy Efficient Standards.

AFL's ROGUE OTDR with aeRos Workflow

Management. The ROGUE OTDR modules plug into ROGUE modular mainframes and integrate with AFL's aeRos cloud-based Workflow Management system. Significant time and cost savings are achieved when a ROGUE OTDR is used with aeRos. The aeRos browser software allows network project managers to create a project, define fiber groups to be tested, specify common characteristics, identify the number of connections in each fiber, and configure OTDR, OLTS/ORL, and/or connector inspection test setups.

AFL's FOCIS Flex2 Fiber Inspection

System. AFL bills FOCIS Flex 2 as the world's smallest, fastest self-contained fiber connector inspection probe. Its ultrafast auto-focusing system auto-centers, captures and analyzes the optical fiber endface, displaying pass/fail results on the built-in screen with a single button push.

Belden's 4K Ultra-High-Definition Media Cable. Designed specifically for

optimal performance in 4K HDBase-T transmission, the 2183P and 2183R cables from Belden are shielded and deliver 4K content over 100 meters in a unique, small, sleek design.

Clearfield's FieldShield YOURx Platform.

A next-generation hardened optical fiber terminal, test access point, and drop cable options join the FieldShield fiber protection system. The YOURx enclosures are designed to ensure every service provider has the freedom of choice to match drop cable technology with the needs of their environment and first-cost priorities.

Comtran Cable's VITALink CI Free Air Cables. Classified as both CI and CIC,

the cable can be used with or without conduit, making VITALink extremely versatile. The conduit-free solution is particularly beneficial in riser and horizontal installations, and no conduit equals no fill restrictions. All cables in the line are wet-rated and sunlight-resistant, requiring no special tools, termination kits or training.

Corning Optical Communications' ALTOS

binderless FastAccess technology. This technology enables up to 70 percent faster cable access and reduced risk of buffer tube damage compared to traditional methods. The all-dielectric gel-free cable is designed for outdoor and limited indoor use for lashed aerial and duct installations.

Gold

Organizations were honored with Gold level awards by demonstrating an innovation that is considered excellent, and whose benefits are clear, making a substantial improvement over previous methods employed, approaches taken, or products and systems used.





Corning Optical Communications' EDGE8 solutions. EDGE preterminated solutions address density, network uptime, speed, simplicity, and a clear migration path to meet future

requirements. EDGE8 was inspired by the optical technology roadmap, which clearly indicates that transmission speeds ranging from 10 to 400G will be based on either 2- or 8-fiber connectivity

solutions. The Base-8 design ensures 100-percent fiber utilization.

Corning Optical Communications' ALTOS Lite with FastAccess technology. These armored, gel-free cables are designed for outdoor direct-buried installations, enabling up to 60 percent faster cable access and reduced risk of buffer tube damage compared to traditional methods. FastAccess technology, combined with a protective thin film around the cable core, simplifies removal of the cable jacket and buffer tube access.

DINTEK Electronic Ltd.'s TechBench. With TechBench, the installer mounts the bench on the front of the cabinet, thereby requiring less excess cabling. Once the termination is completed, the installer can simply remove the TechBench down to a new location in the cabinet to continue terminations at other panels.

Panduit and Frontera Consulting's Mission CEED project. The Center for Education and Economic Development (CEED) is a dynamic co-working facility in the City of Mission, TX, managed by the Mission Economic Development Corporation. CEED's cabling infrastructure not only enables the technology in the building to serve its occupants, but also to serve as a teaching tool for the program. To support that learning, the cabling infrastructure was left exposed through much of the facility.

Panduit's Angled Termination Solution. The new 45-degree angled wire cap is a simple idea that delivers a significant impact. The angled wire cap helps improve cable routing in confined spaces like modular furniture, raceway, and wall outlets with conduit. The wire caps meet channel and component performance requirements when used with any Panduit UTP TG-style jack body, and are available in Category 5e, 6, and 6A performance levels.

RENT NETWORK TEST EQUIPMENT

Patchbox. The namesake product of Patchbox GmbH revolutionizes patching and cable management in network cabinets. The patented, fully modular system provides the user with the exact cable length needed. Its pulley system is integrated into cassettes, which allows it to automatically pull back unneeded cable length. Patchbox comes ready to install.

Siemon's LightBow Fiber Termination System. The LightBow Termination System features a patent-pending low-cost, lightweight termination tool that is designed to dramatically reduce termination time and increase reliability. LightBow is a direct result of listening to customers, offering a single-step termination, universal LC/SC capability, and protection of the fiber endface.

Specified Technologies' EZ-Path Retrofit Device. Designed to restore the ratings for overfilled cable sleeve penetrations, the EZ-Path Retrofit Device features a built-in fire and smoke sealing system that can attach either to the sleeve or the barrier surface. Its square shape allows cable exit or entry from multiple directions.

Superior Essex and Platformatics' West Baden Springs Hotel project. PowerWise 1G 4PPoE cables were used in this project that re-lit the historic West Baden Springs Hotel. The cables are specifically designed to mitigate temperature buildup, offer exceptional energy efficiency and ensure performance, up to 1 Gigabit Ethernet, over the system's lifetime. It is capable of transmitting 60 Watts of power with 97 percent power efficiency while supporting 1 Gig.

Tripp Lite's 3-Phase Automatic Transfer Switch PDU. This PDU combines the speed of solid-state switching with the efficiency of electromechanical relay switching, to create a 3-phase rack ATS solution up to 17.3 kW. For high-density, clustered environments, this solution delivers high reliability, high efficiency and substantial cost savings while opening the door to new server design possibilities.

Viavi Solutions' SmartClass Fiber MPOLx MPO Optical Loss Test Sets. It's the industry's first dedicated optical loss test set (OLTS) that can perform all the tests for a Tier 1 (Basic) certification using MPO fiber connectivity. The MPOLx provides a source and power meter that integrate essential MPO test capabilities together to ensure a fast and reliable workflow when testing and certifying network links with native MPO connectivity.



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Platinum

The eight honorees receiving Platinum Level Awards demonstrated superb innovation that is characterized by a groundbreaking approach to meeting a need, or a groundbreaking level of performance, efficiency, or ease of use.

CAILabs' AROONA. AROONA is an optical solution that enables network upgrades through legacy fiber. Based on CAILabs' light-shaping technology of Multi-Plane Light Conversion (MPLC), AROONA is installed at the end of a multimode fiber to give that fiber the same capacity as one or more singlemode fibers.

Chatsworth Products Inc.'s Motive Cable Management System. The Motive Cable Management System pioneers a new way of managing cables with an unparalleled, tool-less design. The design and the entire system provide maximum cable support and optimal airflow for Power over Ethernet applications. The system was engineered to mitigate poor cabling practices regarding cable slack, bend radii and organization.

Fluke Networks' FI-500 FiberInspector Micro.

Because your dentist doesn't want you holding a flashlight in your teeth, Fluke Networks developed the FI-500—the first fiber video inspection probe with an integrated flashlight to make it easy for network installers to inspect fibers in today's crowded fiber patch panels. The PortBright feature, autofocus, and large, high-contrast display make the FI-500 an essential scope for fiber technicians working in dense, low-light environments.

Ideal Networks' Test 4 Less program.

The Test 4 Less program offers an opportunity for cabling contractors, installers and technicians to reduce capital expenditure by as much as 57 percent on testing. One aspect of the program is the pay-as-you-test option, under which users purchase

video applications, like security cameras, without the need to add intermediate equipment rooms or spaces that would be required with traditional category cables.

Panduit's OptiCam 2 Fiber Termination Tool.

The introduction of the OptiCam 2 Fiber Termination Tool revolutionized field-installable fiber terminations, Panduit says. The tool goes beyond pass/fail reading to provide an immediate calculated insertion loss for right-the-first-time terminations.

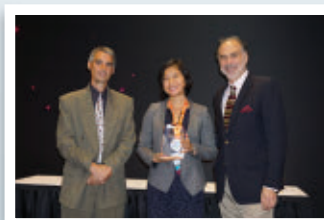
Patton Electronics' CopperLink 1100 Series PoE Extender.

Installers can use CopperLink 1101 kits to position IP-enabled cameras, phones, lighting, digital signs, traffic devices and other network devices in previously unreachable locations. This series of ex-

tender kits are available in weatherproof outdoor enclosures; they can extend 10/100 Ethernet and up to 15 Watts of 802.3af PoE up to 3,300 feet.

Rittal Corporation's Lefdal Mine Data Center project.

Opened May 10, 2017, Phase 1 of the Lefdal Mine Data Center in Norway has a cooling capacity of 45 MW. The mountain hall facility sets a new standard for the data center industry, Rittal says. The large space, combined with modular design, enables a fast time-to-market. The combination of inexpensive and renewable power leads to predictable low costs for customers. ♦



test credits in batches, purchasing those credits only when they are needed. The credits apply to Ideal Networks' LanTEK III cable certifier.

Paige DataCom Solutions' Game Changer Cable.

This cable is capable of transmitting high-definition video and Power over Ethernet up to 850 feet without repeaters, and up to 4,000 feet with PoE repeaters. The cable was designed and engineered to be able to support perimeter and large-space high-def



2017 **Cabling**
Installation & Maintenance
Platinum
Innovators Awards



OptiCam® 2 Fiber Termination Tool

The tool goes beyond a pass-fail reading to provide an immediate calculated insertion loss for right-the-first-time terminations. A simple three-step termination process makes fiber termination fast and easy.

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www.panduit.com

2017 **Cabling**
Installation & Maintenance
Gold
Innovators Awards



Angled Termination Solution

Panduit's new 45° Angled Wire Termination Caps simplify the termination of bulky cable in tight spaces, such as office furniture, raceway and outlet boxes, as well as the rear of patch panels. Available in Category 6A, 6 and 5e, for use with Panduit TG-style RJ45 jacks.

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2017 **Cabling**
Installation & Maintenance
Gold
Innovators Awards



Frontera: Mission CEED

The Center for Education and Economic Development (CEED) is a dynamic co-working facility in the City of Mission, Texas, managed by the Mission Economic Development Corporation (EDC). CEED's goal is to help create an Entrepreneurial, Science, Technology, Engineering, Art, and Math (E-STEAM) ecosystem in the technology-rich building which features a Panduit infrastructure, designed and installed by Frontera Consulting.

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2017 **Cabling**
Installation & Maintenance
Silver
Innovators Awards



HD Flex™ 2.0 Fiber Cabling System

Designed to set data center operators free with no limitations on architecture, deployment and maintenance. HD Flex 2.0 combines an innovative approach with design and implementation, but also addresses upcoming challenges of next generation connectivity demands while providing a simplistic approach for higher speed migration.

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Innovators Awards



Motive™ Cable Management System

Chatsworth Products' (CPI) Motive™ Cable Management System pioneers a new way of managing cables with its unparalleled, tool-less design, which provides maximum cable support and optimal airflow for PoE applications.

www.chatsworth.com/motive

2017 **Cabling**
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Innovators Awards



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Test4Less, a new suite of solutions to help cable installers slash capital expenditure in half

Test4Less from IDEAL Networks can decrease capital expenditure by up to 57% using the right mix of LanTEK III certifiers and SignalTEK testers whilst "Pay As you Test" can improve cash flow.



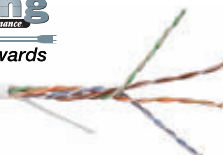
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Belden Wins Innovator Awards for 4K UHD Media Cables and FX Enterprise Closet X (ECX)



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LAN CABLING SYSTEMS



If you're a data cabling installer, you'll know what it's like to squeeze behind a cabinet trying to terminate hundreds of cables and getting a sore back in the process.

At DINTEK we believe there's a better way. We thought, why stand behind the cabinet?

What if you could terminate at the front, and without having to pull out loads of spare cable.

So we created TECHBENCH for installers.



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- ☐ Help You Work Smarter.
- ☐ And Save Your Backs!

- ☐ Sturdy steel construction
- ☐ Compact design
- ☐ Fully self contained
- ☐ Cabinet mountable
- ☐ Mounts direct to cage holes
- ☐ Threaded Adaptor brackets
- ☐ Multiple termination options
- ☐ Accommodates fusion splicers

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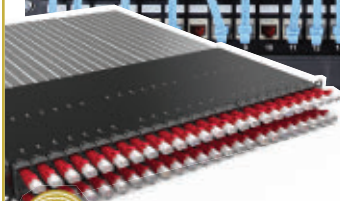
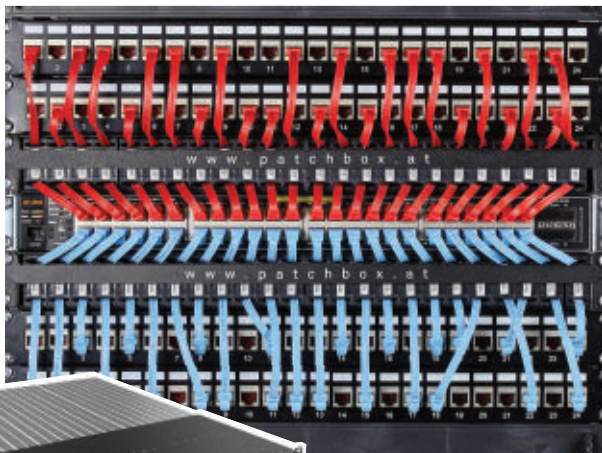


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Fibre Channel's need for speed with OM3 and OM4 optical connectivity

As transmission rates increase, the capabilities of OM3 and OM4 fiber-optic systems help ensure a smooth migration.

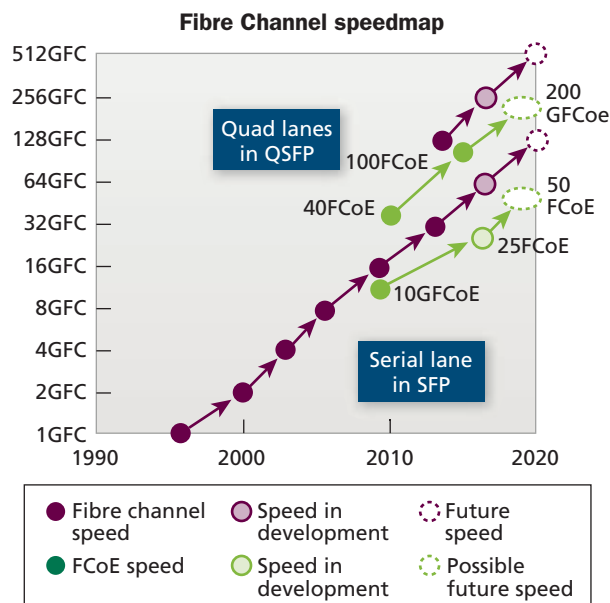
BY DOUG COLEMAN, Corning Incorporated

Fibre Channel transport with laser-optimized 50/125- μ m OM3/OM4 multimode fiber connectivity is the primary method to reliably link servers to external data storage devices in enterprise data centers. The ongoing evolution of high-performance servers and storage technologies drives the need for increased Fibre Channel data rates to reliably link these devices to maximize operating efficiencies and enable low-cost value propositions. This article will discuss server and storage technologies that warrant the higher Fibre Channel data rates in addition to the utilization of OM3/OM4 optical connectivity

Fibre Channel—The need for speed

Fibre Channel's deterministic data delivery, low latency and proven reliability have made it the leading transport

technology for linking servers to external data storage. As servers and storage technologies have progressed over time, Fibre Channel data rates have increased in tandem to support.

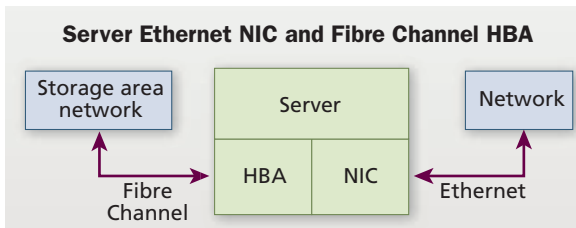


The Fibre Channel Speedmap details the past, present and future of Fibre Channel. It was developed and is updated by the Fibre Channel Industry Association.

Typical enterprise data centers are deploying servers today with integrated multi-core processors that range from 4 to 12 cores. Each core normally has 2 GHz of processing capability that translates into 8-24 GHz of total capability. In addition, servers are now using Peripheral Component Interconnect Express-3 (PCIe3 8G/lane) bus speeds, and PCIe4 16G/lane is fast approaching to complement the increased number of processor cores. The increased server processing necessitates higher Ethernet network data rate input/output (I/O)

as well as increased Fibre Channel data rates (16 Gbit/sec Fibre Channel/32 Gbit/sec Fibre Channel) into the server host bus adapters (HBA) to access and deliver external data for the server applications. The future server trend is for an increased number of processor cores such that Ethernet 50G/100G (NIC) and 64-Gbit Fibre Channel (HBA) interconnects will be required.

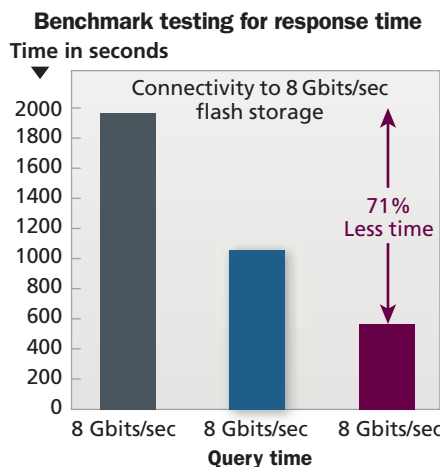
Advances in storage technology are increasing the need for higher Fibre Channel data rates as well. In particular, high-speed all flash arrays (AFAs) are being embraced in the storage industry. AFAs provide substantial improved reliability,



Increased server processing requires higher Ethernet data rate I/O interconnects into the server NIC, as well as increased Fibre Channel data rates into the server HBAs to access and deliver external data for the server applications.

higher data density, durability, plus reduce energy consumption and rack space. Compared to conventional hard disk drives (HDD), AFAs significantly improve the performance to accelerate data transactions per second with sub-millisecond latency to maximize input/output operations per second (IOPS) throughput.

Using 32G Fibre Channel (32G FC), Brocade has demonstrated a 71-percent reduction in response time to access 8G flash storage, compared to using 8G FC. By adopting flash, data centers achieve resource efficiencies that allow them to

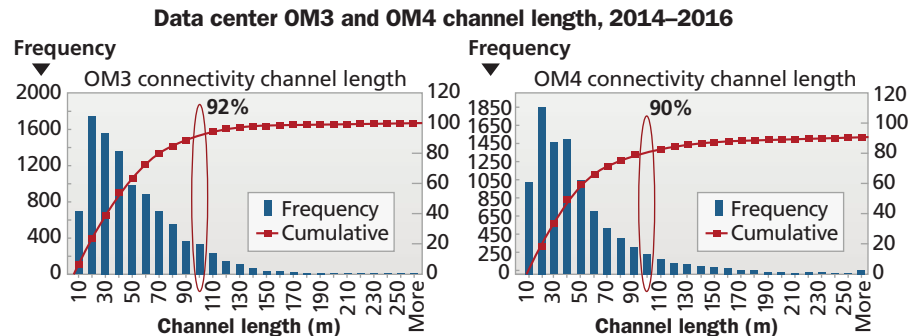


Brocade has demonstrated—as illustrated here—a 71-percent reduction in response time to access 8G flash storage when using 32G Fibre Channel compared to using 8G Fibre Channel. (Source: “Maximize the All-Flash Data Center with Brocade Gen 6 Fibre Channel,” Brocade, 2017)

host more IT services and store more data well into the future. The deployment of flash storage is robust. AFAs are quickly replacing legacy HDD-based systems to become the primary enterprise storage solution.

Fibre Channel—OM3 and OM4 connectivity

Fibre Channel transport is essentially tip-to-tip optical connectivity. OM3/OM4 multimode fiber connectivity continues as the leading optical media used in the data center for short-reach distances up to 100-150 meters. 16 GFC and 32 GFC networks using multimode optical fiber trunks are



Long-term tracking has shown that the 100-meter channel distance represents nearly 95 percent of deployed OM3 and 90 percent of deployed OM4 channel lengths. For the vast majority of users, a 100-meter channel distance is more than sufficient.

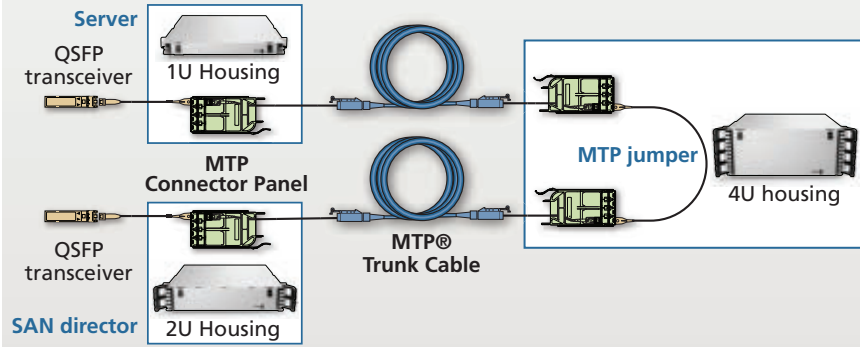
Multimode fiber connectivity distances

Ethernet and Fibre Channel transmission standards develop guidance based on specific criteria that includes technical and commercial feasibility. A primary objective is to deliver economical solutions that meet distance objectives representative of deployed multimode fiber connectivity channel lengths. Corning has tracked and modeled multimode and singlemode fiber connectivity data center channel lengths for an extended period of time. Trends have shown that as Ethernet data rates have increased from 10 to 40 to 100G, and Fibre Channel data rates have increased from 8 to 16 to 32G, the 100-meter channel distance represents approximately 95 percent of deployed OM3 and 90 percent of deployed OM4 channel lengths. In other words, for the vast majority of data center users, a 100-meter channel distance is more than sufficient to meet their needs.

now being deployed. OM3/OM4 multimode fiber enables the utilization of vertical-cavity surface-emitting lasers (VCSELs) to provide synergistic and low-price optical connectivity and electronic solutions.

To date, Fibre Channel has only used small form-factor pluggable (SFP+) transceivers with a duplex LC connector interface with the storage area network (SAN) electronics (server HBA, director switch, and storage). Factory-terminated MTP connectorized trunks are commonly deployed from a central patching area in the main distribution area (MDA) to each area with servers, storage, and SAN directors. In the central patching area, MTP/LC modules are used to breakout the MTP connectors on the trunks into LC duplex ports. LC duplex jumpers are then used to provide the port-to-port connectivity required between any two devices, such as

Structured cabling for storage area network with Base-8 cabling



It is advantageous to pre-cable the SAN director using high-density harness assemblies to reduce the amount of cable bulk and congestion at director cabinets. The harness LC legs can be staggered to match the port spacing of the individual line cards.

the server to SAN director or storage to SAN director.

At the server cabinets and storage devices, MTP/LC modules are used to breakout the MTP connector of the trunk into duplex ports for

interconnection to the server and storage HBAs using LC duplex jumpers. At the SAN directors, however, it is common to use an MTP/LP harness instead of a module to breakout the trunk MTP connector into LC duplex ports. These

high-density harness assemblies reduce the amount of cable bulk and congestion at the director cabinet(s), and the harness LC legs can be staggered to match the port spacing of the individual line cards. This method of pre-cabling of the SAN director optimizes cable management and reduces risk by moving day-to-day move, add, and change work away from the electronic equipment to the passive patching area in the MDA.

The Fibre Channel FC-PI6 Standard includes a 128 GFC data rate that uses a QSFP transceiver with an 8- or 12-fiber MTP interface. The 128 GFC data rate uses parallel optics transmission technology. Parallel optics differs from traditional duplex fiber-optic serial communication in that data is simultaneously transmitted and received over multiple optical fibers. 128 GFC parallel optics require eight OM3 or OM4 fibers

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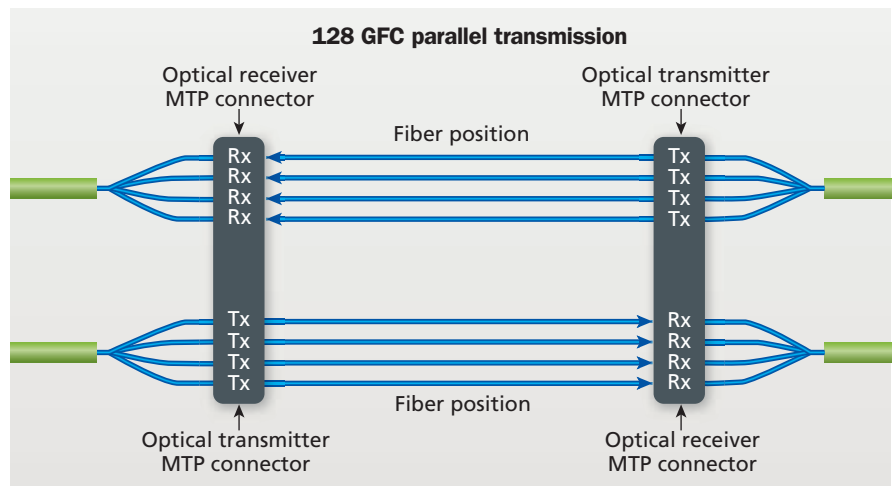


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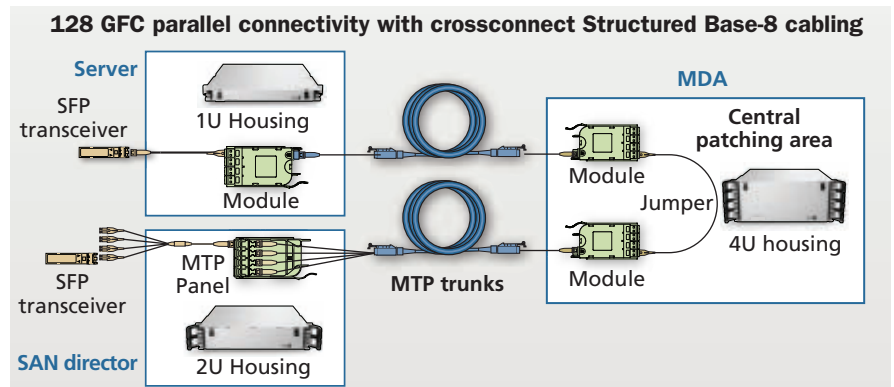
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Fibre Channel's need for speed with OM3 and OM4 optical connectivity *continued*



128-Gbit/sec Fibre Channel parallel optics require eight OM3 or OM4 fibers with 32-Gbit/sec Fibre Channel transmission on each fiber.



A traditional Fibre Channel architecture uses duplex fiber connections at the electronics; the parallel-optic-based 128-Gbit/sec Fibre Channel will use 8-fiber MTP connectors with adapter panels in lieu of MTP/LC modules for interconnections.

with 32 GFC transmission on each fiber: four fibers (4 fibers x 32 GFC/fiber) to transmit (Tx) and four fibers (4 fibers x 32 GFC/fiber) to receive (Rx).

The 128 GFC data rate is the first Fibre Channel defined parallel optics transmission variant. FC-P17 activity is ongoing to include a 256 GFC parallel optic variant in the future.

Initial 128 GFC deployments are expected for inter-switch links (ISL) using MTP connectivity throughout the link. Compared to the traditional Fibre Channel architecture with duplex fiber connections at the electronics, parallel transmission optical connectivity will use 8-fiber MTP connectors with adapter panels in lieu of MTP/LC modules

for interconnections.

Fibre Channel transmission has a need for speed. Higher Fibre Channel data rates (32/64/128 GFC) are emerging in response to advances to server and storage technologies. Fibre Channel deployment distances in enterprise data centers continue to focus on distances up to 100 meters. OM3/OM4 50/125- μ m multimode optical fiber is well-positioned to provide reliable and low-cost connectivity solutions for legacy and future Fibre Channel data rates utilized in storage area networks.

Doug Coleman is manager of technology and standards and a distinguished associate with Corning Incorporated.

The link between software-defined networking and passive optical LANs

The evolution of service providers' networks may foreshadow developments in enterprise LAN environments.

BY PATRICK MCLAUGHLIN

Passive optical local area networks (passive optical LANs) are a prime and current example of a technology developed for fiber-to-the-home/fiber-to-the-X networks making its way into the enterprise. For several years organizations and groups—particularly including the Association for Passive Optical LAN (APOLAN)—have emphasized that passive optical LANs incorporate proven technologies that have served FTTx networks for years.

In a white paper titled “Smarter Networks with Passive Optical LANs,” which is available for download from the APOLAN’s website, experts from IBM begin by stating, “In the 1980s and 1990s, optical communications revolutionized long-haul transmission. Today, the long distance and underwater communications are the backbone of every major provider consisting of optical fiber. The technology has shown to be vastly superior to copper in terms of bandwidth, range, consumed power, longevity and reliability. Recent advances in the manufacturing and commercialization of passive

optical components are now extending these capabilities to the edge and campus networks.

“Buildings that have been traditionally wired with Cat 5/6 copper are facing fantastic opportunity from the emergence of passive optical LAN technology.”

To the extent that passive optical networking technology now has been adopted in enterprises, the technological evolution taking place in service-provider networks today may be a precursor to what will happen in enterprise environments eventually. That possibility came to this author’s mind during a recent conversation with a sales executive at Tellabs, who pointed out that passive optical LANs can help enterprises facilitate software-defined networking (SDN).

This article explores potential links between SDN and passive optical LANs.

VOLTHA, ONF, CORD and more

On October 5, AT&T Labs’ associate vice president for technical design and architecture, Eddy Barker, revealed in a

blog post that AT&T released the Virtual Optical Line Termination Hardware Abstraction (VOLTHA) into the Open Networking Foundation. “This is the first major open-source software release that provides the ‘brain’ for XGS-PON technology,” Barker said. “It also delivers on our commitment to move toward open source software and SDN/NFV [network function virtualization] frameworks.”

Barker further explained that XGS-PON is a passive optical network that promises “broadband connectivity up to 10 Gbits/sec. XGS-PON is a fixed wavelength symmetrical 10-Gbit/sec passive optical network technology. It can co-exist with the current-generation GPON [Gigabit Passive Optical Network] technology and provide 4x faster downstream bandwidth. It’s as cost-effective as GPON.”

The Open Networking Foundation describes itself as “a non-profit operator-led consortium driving transformation of network infrastructure and carrier business models ... The ONF serves as the umbrella for a number of projects building solutions by leveraging network disaggregation, white box economics, open source software and software defined standards to revolutionize the carrier industry.”

One of the ONF’s projects is CORD—Central Office Rearchitected as a Datacenter. “The edge of the operator network (such as the central office for telcos and the headend for cable operators) is

where operators connect to their customers,” the ONF says. “CORD is a project intent on transforming this edge into an agile service delivery platform enabling the operator to deliver the best end-user experience along with innovative next-generation services.

“The CORD platform leverages SDN, NFV and cloud technologies to build agile data centers for the network edge,” ONF continued. “Integrating multiple open source projects, CORD delivers a cloud-native, open, programmable, agile platform for network operators to create innovative services.”

CORD is packaged into three solutions for different market-use cases, ONF explained. M-CORD supports 5G mobile edge services with disaggregated and virtualized radio, and an open source mobile core. R-CORD supports residential subscribers over wireline access technologies like GPON, G.fast, 10GPON and DOCSIS. E-CORD supports enterprise services such as virtual private networks and application optimization (software-defined WAN) over metro and wide area networks.

The VOLTHA 1.0 release is a notable milestone for the CORD project. AT&T’s Barker stated that major software releases like it “are necessary to fulfill our vision of a software-defined network, which employs NFV. We expect to have 55 percent of our networks virtualized by the end of 2017. We aim to have 75 percent of our traffic on our software-defined network by 2020, and we’re pushing hard to beat that goal.

“Open software efforts benefit the industry because we rely on the active participation and feedback from a large community of developers,” he added. “Developers can improve, add, and influence changes to the software that will help us deliver XGS-PON technology to customers quickly. We are currently performing proof-of-concept testing of

VOLTHA in our labs and are planning to deploy XGS-PON field trials before the end of 2017.”

How POL fits

Back to the chat with the Tellabs sales exec who mentioned passive optical LAN and SDN in the same sentence ... it will be a very long time before anything like VOLTHA makes its way into mainstream enterprise networking. But SDN is a timely topic for the LAN. In a document aimed at federal-government users, Tellabs declares that passive optical LAN offers the best architecture for software-defined LANs. It explains that as government network administrators evaluate the merits of SDN functionality in buildings and across campuses, they are doing so “under the assumption that SDN fixes traditional LAN operational efficiencies, security and reliability shortcomings. However, what they don’t realize is that by bolting-on SDN as an overlay to a legacy LAN design, they leave the inherent weakness of traditional LANs.”

Pointing the finger at the traditional LAN architecture, Tellabs further contends, “Adding complexity with SDN can marginally improve LAN operational efficiencies, security and reliability, but by introducing more sophistication, the fixes can negatively contribute to the same attributes they were intended to repair. Furthermore, there are alternative means of addressing the underlying fundamental faults relative to traditional LAN ... that specifically fix root problems.”

Passive optical LAN, Tellabs explains, is one such alternative means. The company points out the following potential pitfalls of implementing SDN as an overlay to a traditional LAN.

- Access, aggregation, distribution, and work-group switches are complex, full-functioning devices, representing potential security weaknesses.
- Complex full-functioning switches

spread across buildings and a campus equals distributed intelligence and management at each port, thereby requiring local provisioning, troubleshooting and management of higher-level IP and Layer 3 functions at each port.

- Adding SDN protocols to existing full-functioning switches inserts security, operation, and reliability complexities.

Conversely, Tellabs argues, an optical LAN “marries the best features of passive optical networking with advanced Ethernet functionality. It does so within the framework that matches cloud, wireless, hosted/managed services, data center and SDN architecture—all of which have the common trait of having centralized intelligence and management.” Plus, a passive optical LAN can define network resources in software, and dynamically allocate them based on real-time demands.

Furthermore, the company stresses, passive optical LAN facilitates SDN implementation in part because “simple unmanaged ONTs [optical network terminals] are better suited for SDN rather than complex full-functioning traditional switches,” and because a passive optical LAN “will allow a mixture of G-PON, XGS-PON, and NG-PON2 [40G] technology choices simultaneously, without the rip-and-replace of today’s infrastructure.”

As IBM’s white paper pointed out, optics changed service-provider networks in the 1980s. It was about 2010 when passive optical LAN technology took hold in enterprise networks. It may be decades before the fruits of the ONF’s efforts are enjoyed by enterprise networks—if they ever are. Nonetheless, proponents of passive optical LANs are pointing to history to make their case for what the future will hold. ♦

Patrick McLaughlin is our chief editor.

White box networking in remote and branch offices

Not just the domain of hyperscale data centers, white box networking can be deployed efficiently in the enterprise.

BY DAN TUCHLER, Pica8

With hundreds or thousands of locations to be connected, managing network services in remote or branch offices can be a significant challenge. Network services support everything from internal and guest WiFi to internet access, internal data networking, Voice over IP phones and video. All of these services have to be delivered and managed in a cost-effective way, but many solutions require rolling an IT truck to each location (which is prohibitively expensive) or adopting expensive proprietary hardware along with onerous support contracts.

There is a different solution—white box switches and networking software that support all the features a branch office needs with remote management, but without the high cost and without vendor lock-in.

Remote and branch office networking challenges

Branch office networks have several common elements. Branches are hundreds or thousands of miles away from the corporate headquarters, and there are typically no trained IT people on site in each branch. Rather, these networks are centrally controlled and

administered from the corporate data center.

Recognizing the need for trouble-free, centrally managed networking infrastructure many years ago, branch office equipment vendors built proprietary, fully integrated systems to handle networking chores. The problem with this approach is that entrenched vendors with proprietary hardware/software architectures demand high costs as they extend their contracts with locked-in enterprise customers. In addition, full-service 24x7 solution support (hardware, software, interoperation and applications) adds to the cost, exacting the steepest possible pricing from enterprise customers.

White box networking: A new approach to branch office networking

Over the past 10 to 15 years, the IT industry underwent a transformation. Rather than buying proprietary servers with proprietary operating systems, enterprise IT departments began buying “white box” servers from suppliers like Quanta and Dell, and running standard operating systems like Linux on them. Today, it’s

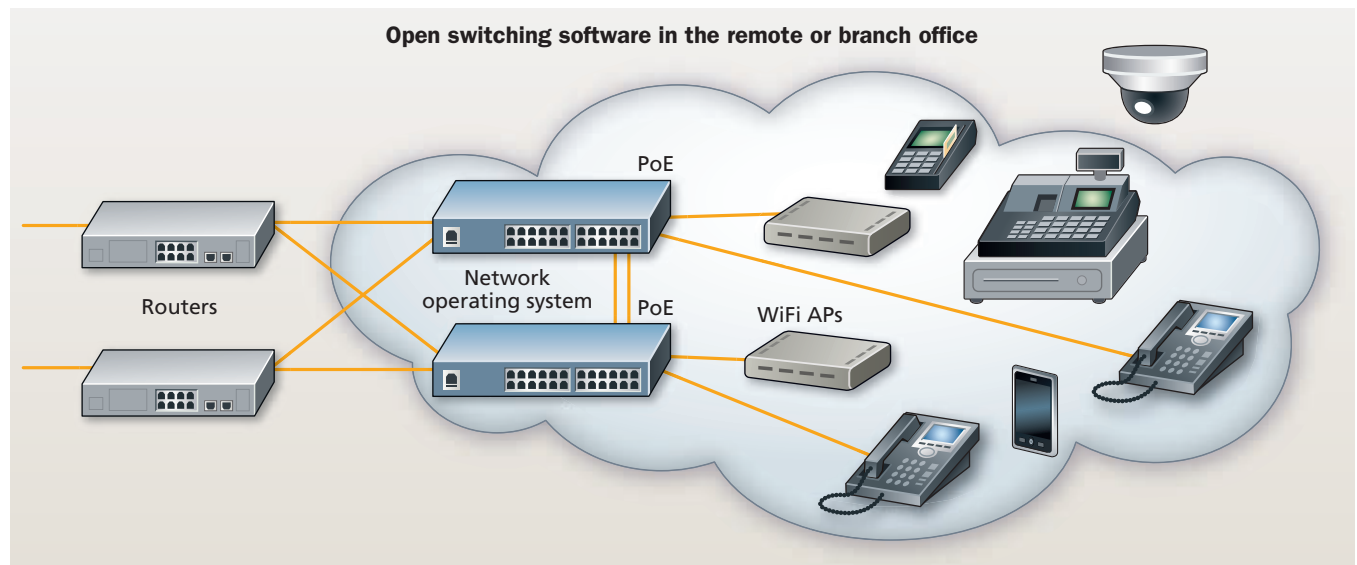
far less common to see customers buying servers with proprietary operating systems pre-installed on them.

A few years ago, mega-scale data centers like Google, Facebook and Amazon wanted to replicate the white box server paradigm with network switches, so they defined standard Ethernet switch architectures that allowed them to buy switch hardware from the best source and put their own switch software on it. Because these companies made very large investments in switching software development teams, they could make this work.

Today enterprises of all sizes are buying white box servers and running Linux or other operating systems, and this trend has now migrated down to networking switches. A number of open networking software companies like Pica8 have emerged, offering enterprises a standards-based, full-featured network operating system (NOS) for use with white box switches.

By using white box switches, enterprises can separate hardware-purchase decisions from software decisions, just as is done with application software and servers. This freedom of choice drives costs down.

The first place these economies were realized was the data center, where the savings are multiplied by the large quantity of top-of-rack switches. Enterprises are recognizing that the same savings are possible anywhere there are numerous, similar switches. Remote



Open switching software in the remote or branch office achieves advantages including company-traffic QoS higher than WiFi guests; remote, centralized provisioning and management; no revenue lost to IT-preventable outages; and economic efficiencies.

and branch offices are a perfect fit—with many identical locations, no on-site IT support, and the need for a flexible approach to fit emerging business requirements while conserving precious budgets.

Open switching software brings a broad range of networking capabilities to white box switches.

Open switching software in the remote and branch office

Besides the cost savings, there are several things needed to satisfy networking in the remote office/branch office environment. Branch offices, particularly today's retail stores, must support a dynamically changing set of demands, including the following.

- **Data**—Transactional support for the business, must always be the highest priority
- **Voice**—IP phones require Power over Ethernet (PoE), plus enough protected bandwidth to ensure call quality
- **Video**—Surveillance cameras, plus advertising and promotional video have specific bandwidth requirements

- **WiFi**—Not only supporting retail employees, but also allowing store customers to browse, check product details, and interact with new retail applications
- **Emerging new immersive technologies**—New ways of selling are evolving quickly
- **Emerging WAN strategies, including SD-WAN**—Replacing traditional dedicated links while offering much higher speeds
- **Whatever's next**—For example, virtual or augmented reality, will continue to advance demands on branch offices

Open switching software includes many features that have been developed to support this challenging environment, including the following.

- Advanced, granular quality of service (QoS)—Giving network architects the tools they need to prioritize and protect classes of traffic
- Device detection and PoE management—The software can recognize approved device types and provide power to them, both simplifying the installation process and preventing unauthorized devices from

getting powered on

- Unapproved devices can be blocked from the network
- A rich set of switching protocols and management interfaces are supported

Hardware-independent switching software in the remote and branch office enables secure network services as well as repeatable, template-based, automated, centrally delivered network element management. Thus, network management efficiency is extended from the data center to branch and remote office networks. This allows enterprises to minimize branch and remote office capex and opex while significantly enhancing application availability and performance.

Open switching software benefits

By using open switching software on white box switches, enterprises can unwind the vendor bundle, thereby introducing significant value via the introduction of hardware price competition, use of the best-designed platform, a full suite of hardware features, and elimination of first-line support costs for tech-savvy enterprises.

With open switching software sources, this strategy is available to anyone. The industry has seen adoption across data centers, telcos, and enterprises. Today network management and switch software give network managers visibility into and dynamic automated control over network bandwidth, route congestion, outages and bandwidth allocation to ensure maximum uptime.

The economics of white box networks

Due to the virtualization of network, compute and storage, enterprises now reap the economics of scale available from centralizing the data center with large complexes containing multiple processors in thousands of servers, just as the mega-scale data center operators like Amazon, Microsoft, Google and Facebook do.

Where there are large numbers of similar branch office installations, the economics of platform-independent switching software executed on white box hardware are compelling, and companies have begun to achieve savings and operational advantages by deploying this approach. Total-cost-of-ownership comparisons of remote office architecture based on Cisco equipment versus the same architecture deployed with a white box switch and open switching software show capital expenditure savings exceeding 50 percent.

Automated provisioning

Remote and branch office switch software delivers key benefits that provide IT operational productivity, accelerate deployment activation, improve network security and raise uptime reliability. Zero-touch provisioning allows employees to just plug in the switch and it configures itself, with no need for on-site IT personnel. Remote administration of all policies, including OpenFlow-powered ACLs and QoS is another

benefit. Additionally, enterprise security, including access control is enhanced. Industry-standard access control protocols admit only authorized users to the network, per a centrally administered access policy. Automation is another benefit. As needs change, the enterprise can update and add features to its branch office solution from a centralized location. Open switching software should include tools that allow changes to be easily rolled out across branches.

Supporting white box switches in the enterprise branch office

White box switches include models made by ALPHA, Delta, EdgecorE, Quanta Cloud Technology, and others. These companies also make switching hardware for most major OEM switch vendors. In addition, brite-box (branded white box) switches are available from HPE and Dell. These white box and brite box switches give customers a broad range of choices, are mature and have very low failure rates.

Some enterprises may still be reluctant to deploy generic original design manufacturer (ODM) hardware without a major network equipment vendor's brand name. However, open switching software vendors offer high-quality software and hardware support to customers in order to alleviate these fears. The open switching software should generate diagnostic messages, allowing remote diagnosis of hardware failures and software issues. In addition, white box switch vendors typically offer full hardware and software support services, including immediate hardware replacement and repair, so that enterprises never have to worry about hardware failures or vendor finger-pointing.

For customers who choose to buy direct from a partner ODM, the first line software and hardware support is delivered by the switching software vendor via phone and/or email. If needed,

tech support uses remote access to the switch to quickly isolate hardware failure and software issues. Then, the normal return merchandise authorization (RMA) process is used for returning the equipment to the hardware vendor.

For customers who buy these solutions from an installation and maintenance vendor, the vendor should collaborate with the switching software vendor and their enterprise customer's IT group to show them the value when they're in the pre-sales stage. Then, during deployment, the open switch software vendor helps the installation and maintenance vendor set up its customer's standard switch configuration parameters (network settings) for the devices the IT group wants connected to the switch. The installation and maintenance companies then activate the switch by downloading the software image, then load the enterprise's standard configuration.

Networking to the enterprise remote or branch office is complex and expensive, and enterprises want alternatives to proprietary hardware/software platforms. White box switching software addresses the expense by running on multiple white box switching platforms from several manufacturers.

White box networking solves the expense of automation and maintenance as well; by automating branch office networking and providing centralized policy control, white box solutions enable fast, comprehensive, and cost-effective networking, eliminating the use of on-site personnel for the bulk of IT management and raising IT staff productivity with built-in automation and remote management. ♦

Dan Tuchler is vice president of product management for Pica8 (www.pica8.com). He has held product management and executive positions at startups including Alteon Websystems, Blade Network Technologies, Force10 Networks, and Mellanox Technologies.

Test-equipment providers turn their tools into project and business management systems

Testing platforms have come a long way from the days of hitting autotest and moving on.

BY PATRICK MCLAUGHLIN

Not too many years ago a cabling tester was just that—a device that tested an installed cabling system to specific performance parameters and reported whether or not the infrastructure met those specifications. What happened with those results, and with the rest of the cabling project, was basically disassociated from the tester's functions. In many cases the most significant convenience throughout the process was that an instrument included an “autotest” button that required just one push to conduct the full suite of prescribed measurements. Test results could be saved to a memory card so those results could be sent to a home office or elsewhere without the tester having to go with them.

Today, for several suppliers the tester is the central instrument in a platform of software- and web-based capabilities that are project- or business-management assets.

StrataSync and CertiFi

One such platform is StrataSync, which was introduced by then-JDSU (now Viavi Solutions) in early 2013. At the time of

its introduction, the company explained that StrataSync “provides network operators with an agile and centralized way to manage and analyze data from thousands of deployed ... test instruments directly from the cloud. StrataSync will help network operators manage and optimize their networks in a more efficient

and cost-effective way, empower their technicians with real-time data, and help to improve customer service.”

The platform's four primary offerings are updates and options (e.g. firmware upgrades, instrument options), asset and configuration management (user-defined configuration templates, monitoring capabilities), test-data management (common repository), and workflow/compliance reporting (job tracking and pass/fail reporting).

Viavi Solutions has built several capabilities using the StrataSync platform, including CertiFi, which the company describes as “a cloud-based solution for



Built upon the StrataSync platform, Viavi Solutions' CertiFi is a cloud-based solution that enables alignment among team members throughout a project—from creating design requirements and assigning tasks to performing tests and analyzing project metrics in real time.

teams who design, build, test, and certify the structured cabling in enterprise networks.” Again, there are four main management capabilities: design, assign, test, analyze. Here’s how Viavi Solutions describes each.

- **Design**—Design and manage multiple projects within a web-based interface; define all test requirements, acceptance criteria, and labeling requirements; use prepopulated vendor specifications or custom specs; add attachments including drawings, maps, photos, scope-of-work documents, or AutoCAD files
- **Assign**—Assign projects to consultants, field technicians, subcontractors or others; download the mobile app; push assignment notifications to crew members’ mobile devices using the app.
- **Test**—Preload test instruments with tasks and required test criteria; add notes, pictures, and/or videos; auto-sync the results to the cloud through the mobile device that deployed the task.
- **Analyze**—Provide site leads with real-time test results and project statuses on mobile devices; view progress dashboards and test results from the CertiFi web interface; provide immediate feedback to field technicians throughout the project.

“Project managers can leverage the web interface to access CertiFi project dashboards,” Viavi Solutions pointed out, “allowing them to view real-time progress of all their projects—whether they are in draft, active or archived—in the field with dashboard summaries, test results, and other details that allow them to analyze project objectives and metrics including project schedules, key dates, project burnout chart, cables and test totals, all team members, progress tables, and test locations.

“This ensures sufficient team

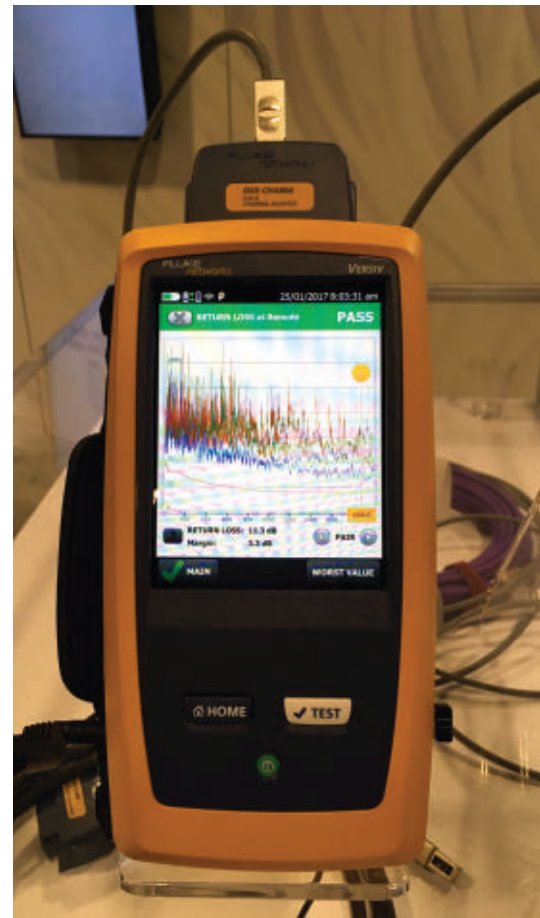
management across multiple projects, flexibility in adapting to changes, accuracy in supporting designs and testing, and the ability to meet or beat deadlines. This reduces downtime, errors, the need for additional or delayed communications with different project teams,” Viavi Solutions added.

LinkWare Live

Since fall 2014, Fluke Networks has offered LinkWare Live to users of its Versiv tester family. Through LinkWare Live, users can upload, manage, and analyze certification test results from cabling projects “anywhere, anytime” the company emphasizes. In early 2017 the company reported that in excess of 5 million test results had been uploaded to the cloud via LinkWare Live. In a blog post commemorating the milestone, Fluke Networks’ marketing manager Mark Mullins stated that more than 300,000 test results were being uploaded monthly. He added that the 5-million-result milestone “is a significant demonstration that more and more of our users are embracing cloud services and connected technologies to transform the way their companies and employees work and do business.”

The upload rate has continued to increase; in October the company said the number of uploaded results had exceeded 8 million.

Since launching LinkWare Live, Fluke Networks has emphasized the platform’s ability to reduce or eliminate time and effort being wasted by cabling installers. A survey of more than 1,000 contractors discovered that 83 percent had one or more test-results-management issues in the previous month, and that on average, contractors spent more than 15 hours per month dealing with test-results issues—including the hours required to get the results back to the office for analysis and reporting.



The DSX-8000 is part of Fluke Networks’ Versiv family of testers. Every product in the Versiv family is equipped with LinkWare Live, which saves cabling contractors from wasted time and effort managing test results. Fluke Networks recently introduced the LinkWare Live Affiliates program and opened its platform to developers.

“Collecting certification test results is a significant challenge because they [traditionally] are stored in testers that frequently move from one job site to another,” Fluke Networks noted in 2014. “These job sites can be hundreds of miles away from one another, as well as from headquarters. Accidentally erased or failed memory cards can negate several days’ worth of work, leading to costly truck rolls, lowered profit margins and delayed payment.

“By uploading test results to

LinkWare Live, project managers can save trips solely to collect results, prevent data loss and continuously track project progress,” the company added. “LinkWare Live automatically organizes test results by job, eliminating the painstaking task of manually compiling results from multiple testers.”

The company has refined and improved the platform since its introduction, including the addition of device tracking and management capabilities in early 2016. The device-management capability enables users to keep track of their testers, and confirm the status of device software and calibration from a single screen.

Affiliates program

In October 2017 Fluke Network announced the LinkWare Live Affiliates program; in doing so it invited companies and developers to create services and products integrated with the LinkWare Live platform. Three producers of label-making tools—Brother, Dymo, and Epson—joined the LinkWare Live Affiliates program and announced applications integrated with LinkWare Live. “The partners’ products make the network and cable labeling process much more efficient by eliminating manual entry and time-wasting tasks by loading the labeler with data generated from LinkWare Live during the network design and installation stages,” Fluke Networks said.

- Brother LabelLink (known as iLink&Label outside the United States) is an app for cable installers using Versiv testers and Brother PT-E550W handheld printers. The app enables a contractor to access the project cable

ID information in the LinkWare Live cloud via smartphone or tablet, then transfers it to the labeler over WiFi. LabelLink eliminates the need for duplicate data entry.

- Dymo ID software is integrated with Fluke Networks LinkWare Live and allows project managers, cable technicians and installers to access projects in LinkWare Live, import cable ID data, and use the built-in label application along with preloaded templates to simplify labeling tasks.
- The Epson Datacom app, when paired with the Epson LabelWorks PX LW-PX400 printer, streamlines network installation labeling with simple-to-navigate menus, TIA-606-B or custom formatting, and brand-name patch-panel templates. The app now works with Fluke Networks’ Versiv System to print wire and cable

ID directly from LinkWare Live.

David Crist, president of Brother Mobile Solutions, pointed out, “Our multi-year journey with Fluke Networks has been an honor and a tremendous learning experience.” Brother and Fluke Networks announced the ability of their systems to work with each other in mid-2016. “When the LinkWare Live and LabelLink combined vision was first conceived by our two companies, we had high hopes for the kind of value this solution would bring to the datacom contractor market. A year later, we both continue to receive validation from the market that the solution is delivering the kind of efficiencies we envisioned.”

Dymo’s director of marketing Adam Delange observed, “Label identification is essential for datacom professionals to keep operations running efficiently, but it can be tedious. Dymo’s new partnership with Fluke Networks makes the labeling process much easier. With Fluke Networks, Dymo users can now easily access LinkWare Live projects, import cable ID data and use built-in label applications and preloaded templates, simplifying previously complex labeling jobs.”

Andrew Kasun, marketing manager for Epson LabelWorks PX, added, “The Epson LabelWorks PX LW-PX400 works wirelessly in the field via Bluetooth and the Epson Datacom app, making it a perfect fit with LinkWare Live. Working together with LinkWare Live, the LW-PX400 makes cable identification easy and seamless.”

As part of its Test4Less program, Ideal Networks makes its LanTEK III certifier available as a free-on-loan device, or for purchase with an initial up-front payment. Ideal offers a pay-as-you-test option, in which LanTEK III users purchase test credits in batches.



Eric Conley, vice president and general manager of Fluke Networks, commented, "The daily work of installers worldwide is changing dramatically as they increasingly use LinkWare Live to design, install and manage cabling projects, uploading nearly half a million test results a month. As more applications are integrated with the LinkWare Live platform, installers will reap the benefits, including increasing time savings and business operations efficiency, which all add up to cost savings and more profits."

Testing: From capex to opex

While Viavi Solutions' StrataSync and Fluke Networks' LinkWare Live use web-based capabilities to broaden the testing process's horizons such that they are project-management tools for contractors, the new program from Ideal Networks changes the economics implications of testing for contractors. Called Test4Less, the program is a combination of products, services, and payment methods that decreases a contractors' capital expenditure on test equipment. In a business sense for the professional contractor, it shifts testing from a capital expense to an operating expense.

The company says its range of Test4Less solutions "has been specifically developed to address the common frustration of data cable installers and systems integrators, and provide cost-effective solutions to help them overcome these challenges."

Ideal Networks' global marketing manager Tim Widdershoven commented, "Companies investing in multiple certifiers face the issue of increased expenditure and reduced ROI," noting that end-of-life for some tester models has brought the issue to the forefront for many contractors.

"Research showed that high capital expenditure for cable certifiers is an

issue for many, as it reduces cash flow and offers a low ROI," the company continued. "We also discovered cable installers required a certifier only 25 percent of their cable installs typically, and on the remainder, a less-expensive cable transmission tester could be utilized to provide proof of performance. These 25 percent of cable installations include building specifications that require a cable certifier, or if cable manufacturer warranties are required. With this simple approach, businesses could reduce capital expenditure on testers by up to 57 percent."

Ideal Networks arrives at this 57-percent figure using costs associated with its own equipment offerings. Its LanTEK III is a certifier; the SignalTEK CT and SignalTEK NT are verifiers. The 57-percent savings calculation is based on the difference between 10 LanTEK III units with permanent link adapters, versus 3 LanTEK III with permanent link adapters and 7 SignalTEK CTs.

Given the high price of certifiers, the company pointed out, many contracting companies buy X number of certifiers and share them among their crews. The "3-certifier/7-verifier" approach enables companies to equip every technician with a verifier.

Ideal Networks offers a "pay-as-you-test" approach, which it says can "transform a certifier fleet from a capital investment into an operating expense." With this approach, users purchase test credits for the LanTEK III in batches from 5,000 to 10,000 tests. Business can opt for either a free-on-loan certifier agreement, or to purchase the certifier with an additional, initial upfront payment.

Ideal Networks' Ideal AnyWARE app enables the transfer of test-results data via a user's mobile device. ◆

Patrick McLaughlin is our chief editor.

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VISUAL FAULT LOCATORS

Siemon's LightBow VFL

Included in Siemon's LightBow fiber termination kit is an essential VFL tool that enables easy verification using the integrated VFL window on the company's LightBow prepolished mechanical splice connectors.



This handheld VFL offers continuous or flashing modes to easily indicate continuity or to identify faults caused by breaks, damaged connectors, defective splices or tight fiber bends on all fiber types up to about 5 km. It has an integrated 2.5-mm adapter for connection to SC, ST and FC connectors and an optional 1.25-mm universal adapter for connection to LC and MU connectors. Siemon's Laser Class 1 pen-style VFL is also constructed with a rubber protective guard and uses a ceramic alignment sleeve to ensure optimum core-to-core alignment.

Siemon, www.siemon.com/lightbow



Greenlee's 180XL VFL

The 180XL visual fault locator allows technicians to quickly and safely visually locate broken and pinched fibers, faulty connectors, and bad splices. The long reach of the 180XL allows technicians to safely confirm fiber continuity up to distances of 7 km. Greenlee asserts that the 180XL allows the technician to quickly locate faults without the use of more-expensive equipment, while its Class 2 designation provides safe light levels for the technician. Other key features include a universal 2.5-mm bulkhead, optional 1.25-mm adapter available, Class 2 certification with 0dBm output power, compatibility with singlemode and multimode fibers, and a 2-Hz modulation mode.

Greenlee Communications.

www.greenleecommunications.com

EXFO Pocket Pal VFL

The EXFO Pocket Pal visual fault locator is billed as a robust, cost-effective OTDR dead-zone tool. This VFL identifies fibers from end to end and locates polished connector endfaces easily. It features a universal connector that accommodates 2.5-mm ferrules for SC, ST, FC connectors. The VFL includes two AAA alkaline batteries, soft pouch and wrist strap with carabiner belt clip, a user guide and a certificate of compliance. EXFO says its Pocket Pals "are the truly affordable way to locate faults in OTDR dead zones. A red laser shines through most yellow-jacketed fibers to help you pinpoint breaks, bends, faulty connectors, splices and other causes of signal loss. These handy locators have up to 5-km distance range and a 635-nm wavelength with excellent visibility and the highest attenuation. Pocket Pals have an attractive short-range visibility/price ratio. They locate faults visually by creating a bright red glow at the exact location of the fault on singlemode or multimode fibers." Due to its small size, light weight, and simple design, the Pocket Pal can accompany technicians even to the most demanding environments, adds EXFO. Each unit has rubber seals, a fully enclosed laser head and a long-lasting on/off switch. The tool's efficiency guarantees prolonged battery operation for 50 hours uninterrupted, according to EXFO. The FLS-241 model features a universal connector that accommodates 2.5-mm ferrules. Each tool is 6.875" x 1" and weighs 4.23 ounces with batteries.

EXFO, www.exfo.com

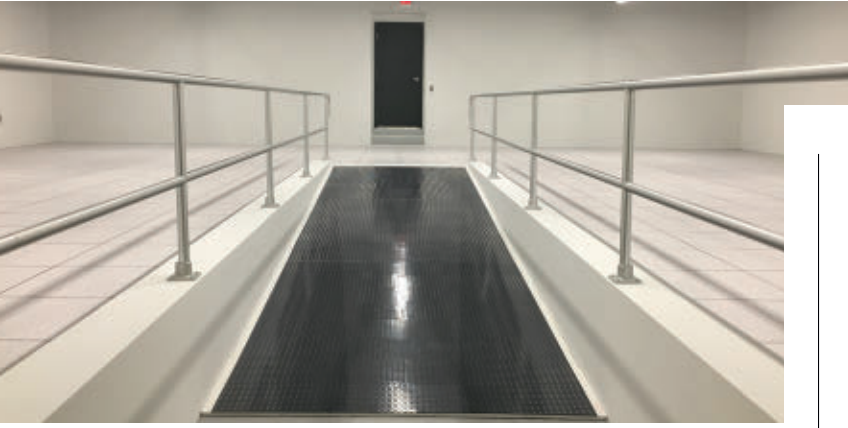


EDITOR'S PICKS

News, products and trends for the communications systems industry

- TELCORDIA CERTIFIES TERMINATION PROCESS
- BUILDING INTELLIGENCE ON DISPLAY
- AV INNOVATIONS

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DATA CENTERS

Carrier-1 adds private suites in colocation building: 'Data center within a data center'

Carrier-1 recently announced the availability of "private, purpose-built, dedicated" suites within its large, fault-tolerant, wholesale colocation building in Dallas, Texas. Within the same 106,866 square foot facility, current and prospective tenants may now lease a private, customized data center suite starting with 1,000 square feet. Per the company, "A private data center suite separated from the general colocation community is ideal for a private cloud deployment or organizations required to comply with regulations and standards related to their business including financial and medical institutions. The Carrier-1 building is an SSAE 16 SOC 1 Type II audited facility and therefore supports compliant requirements including PCI, HIPAA, FedRAMP, FISMA and Sarbanes-Oxley."

One of the company's new private suite clients, Jose Quinones of Tailor Made Servers, asserts, "The private suite gives us the feeling that we work out of our own data center. It's a data center within a data center." Tailor Made Servers rents a custom-built private suite with their own cooling and power distribution. They said they chose Carrier-1's private suites because they needed flexibility to create a specialized environment to allow their technicians to work quickly to support their customers. They use non-standard custom-sized hardware and racks, and require additional space to inventory all parts and equipment. Quinones continued, "Other centers offered a cage, where everything feels somewhat exposed. I love the privacy of the suite, because it gives us a

more individual and independent feeling."

Carrier-1 contends that "the Dallas-Fort Worth area has been one of the top five U.S. markets for data center demand for many reasons. Companies want to establish a data footprint in Dallas, Texas, without the capital expenditures, liability or long lead time that comes with a build. Whether it's a primary site, a secondary location for disaster recovery, or a tertiary point to diversify their footprint, businesses typically want to turn up a data center solution quickly and cost-efficiently. On some occasions, a standard colocation solution is not always the best fit. Carrier-1's private suites are designed to address this type of requirement by allowing customers to be a single tenant with the autonomy, protection and control they need."

"Tenants may design their own infrastructure deployment while benefiting from the shared overhead costs that come with our colocation environment," says Carrier-1's CEO, Peter Pathos. "The core environmental systems, network redundancies, operational efficiencies, local support and security protocols are already in place, allowing us to turn-up dedicated space for a tenant within a few weeks."

Key features of Carrier-1's private data center suites include: customizable size and floorplan layouts; enhanced security for access control; multi-factor authentication options; tailored temperature and humidity controls; high density power options; flexible network connectivity; adjoining private workspace if desired; access to on-site conference rooms, breakrooms and other amenities; 24/7/365 facility monitoring and maintenance; 24/7/365 secure physical access with audited controls; 24/7/365 portal access for bandwidth utilization, ticketing system and billing information; remote hands-and-eyes support plus rack-and-stack service options; shipping/receiving loading dock assistance; account managed by executive management (VP level or higher); competitive wholesale pricing; 100-percent uptime SLA.

Companies may establish, expand or diversify their web infrastructure in Dallas, Texas by leveraging Carrier-1's private data center suites. Suites are available now at wholesale pricing. ◆

Arecont Vision unveils new surveillance dome cameras, plus 4K ultra-high res box camera, at ASIS 2017

IP-based megapixel camera technology provider Arecont Vision recently announced important additions to its MegaDome indoor/outdoor dome surveillance camera series that bring new capabilities and easy installation, as well as the availability of its full-featured MegaVideo 4K/1080p dual-mode day/night indoor box camera series. The company's new MegaDome G3 and G3 RS (remote setup) dome cameras, and its MegaVideo 4K camera series, were showcased at Arecont Vision's booth at the annual ASIS International (Sept. 26-28) security expo in Dallas, TX.

"The MegaDome G3 and G3 RS series include installer-friendly housings with motorized remote focus and zoom for easy installation, while the RS models go even further with revolutionary hands-free setup," says Brad Donaldson, vice president, product development, for Arecont Vision. "Both of the new MegaDome series are packed with advanced capabilities, including bandwidth reduction and day/night technologies for unmatched performance for the widest possible range of customer requirements."

According to the company, the MegaDome G3 offers 1.2, 1080p, 3, 5, and 10MP choices to address any application need. All models offer an IR-corrected motorized P-iris wide angle or telephoto varifocal lens with remote focus/zoom for outstanding image clarity and easy installation. Arecont Vision's H.264 compression and advanced SNAPstream (Smart Noise Adaptation and Processing) technology reduce bandwidth consumption and storage requirements without impacting

image quality in all MegaDome G3 models. Optional STELLAR (Spatio Temporal Low Light Architecture) technology is available in select models for best-in-class light sensitivity to capture full color details in near complete darkness, or with enhanced wide dynamic range (WDR) technology for applications with varied or over-saturated lighting conditions. For enhanced lighting, integrated IR (infrared) illuminators are



available in select models. Per the company, the "MegaDome G3 features an installer-friendly housing that is easier than ever to install, while maintaining both IP66 environmental and IK-10 impact resistant ratings."

The MegaDome G3 RS offers 3 or 5MP resolution choices, SNAPstream, models with optional Enhanced WDR, IP66/IK-10 ratings, and an extensive list of advanced features. "MegaDome G3 RS makes installation and setup faster than ever," says the company. "With remote setup, the installer mounts the camera and installs the PoE (Power over Ethernet) network cable and then dismounts the ladder or lift. The camera's motorized varifocal lens package features remote positioning, focus, pan (359-deg.), tilt (90-deg.), and zoom capabilities for rapid, completely hands-free setup while the

installer is safely on the ground.

Future changes or adjustments to the view and focus can be made without requiring mounting a ladder or lift."

The MegaVideo 4K is the latest member of Arecont Vision's customer-proven box-style camera family. The new dual-mode camera covers a wide range of project requirements with a choice of full 8.3MP (3840x2160 megapixels) for 4K ultra-high resolution image quality at 30 fps (frames per second) or 1080p mode for ultra-fast frame rates of 60 fps. "The new MegaVideo 4K compact box camera affordably delivers many of Arecont Vision's most advanced features and technologies while offering our unique cybersecurity protection and future-proof upgradability," adds Donaldson. "Remote focus and zoom make setup quick and easy for the installer, with a range of lenses and optional enclosures to meet any surveillance requirement for ultra-high definition 4K video."

Per the company, "The MegaVideo 4K features a choice of remote focus/remote zoom motorized P-Iris lens (4.4–10mm, 12-50mm, or 30-120mm). Optional camera housings (11" and 16" models) and mounting accessories ensure the indoor camera can also be used for a wide range of outdoor ultra-high resolution surveillance applications with any of the three lens choices. The proprietary NightView low light color imaging technology, P-Iris control for enhanced depth of field and image clarity, and binning mode (in 1080p resolution) with integrated mechanical IR cut filter



features deliver true day/night functionality. WDR (Wide Dynamic Range) sees clearly in varied and overexposed areas."

The MegaVideo 4K includes the company's SNAPstream (Smart Noise Adaptation and Processing) technology to reduce bandwidth and storage requirements without impacting image quality. Other key features include dual encoders (H.264/MJPEG), casino mode (to maintain a continuous 30fps), privacy mask, real-time 1024-zone motion detection, non-integer scaling, multicasting, multi-streaming (4 non-identical streams), bit rate control, flexible cropping, adjustable shutter speed, picture-in-picture (simultaneous delivery of full field of view and zoomed images), and forensic zooming. The camera also includes a MicroSD (SDHC) card reader for onboard storage requirements. Power can be supplied via a single PoE-compliant network cable with no external power required, or by use of a 12-48V DC/24V AC power supply. The built-in camera webpage allows for an intuitive and fast configuration, while the company's AV IP Utility tool allows quick configuring or updating of one or multiple MegaVideo 4K cameras simultaneously. Network protocols HTTPS, 802.1x, IPv4, SNMP, and DHCP are among those supported for network security, integration, and simplified setup.

All Arecont Vision cameras run the company's in-house developed Massively Parallel Image Processing (MPIP) architecture on a field programmable gate array (FPGA) integrated circuit. All core features and technologies are developed by Arecont Vision, and installed cameras can be upgraded with new capabilities and enhancements via remote firmware updates, thereby extending the useful life of the device. ♦

CONNECTIVITY

Ethernet chip supplier Aquantia files registration statement for proposed IPO

On October 9, Aquantia Corp. announced that it has publicly filed a registration statement with the U.S. Securities and Exchange Commission relating to a proposed initial public offering of shares of its common



stock. The number of shares to be offered and the price range for the proposed offering had not yet been determined at press time. Aquantia has applied to list its common stock on the New York Stock Exchange under the ticker symbol "AQ."

The company is a specialist in the design, development and marketing of advanced, high-speed communications

ICs for Ethernet connectivity in the data center, enterprise infrastructure and access markets. Aquantia says its products are designed to cost-effectively deliver leading-edge data speeds for use in the latest gener-

ation of communications infrastructure to alleviate network bandwidth bottlenecks caused by the growth of global IP traffic.

Morgan Stanley & Co. LLC, Barclays Capital Inc., and Deutsche Bank Securities are acting as book-runners for the proposed offering. Needham & Company and Raymond James are acting as co-managers. ♦

FIBER OPTICS

Clearfield fiber termination process certified by Telcordia for Tier 1 service provider applications

Clearfield, Inc., a specialist in fiber management products for communication service providers, announced that its fiber termination processes, used to manufacture the Clearfield LC/UPC 900 µm 1.6 mm and 2.0 mm jumpers and fiber assemblies, have been tested by an independent test lab compliant to the Telcordia GR-326-Core requirements.

With Telcordia GR-326 certification, Clearfield notes that now can provide maximum assurances for the Tier 1 telecommunications market, which requires the highest standards for manufacturing processes, procedures and quality components. Per a company statement, "As major service providers seek to provide higher density in their networks with a smaller form factor connector, many opt to use LC/UPC jumpers and fiber assemblies in an outside plant (OSP) environment. The Clearfield LC/UPC connectors surpassed rigorous testing to meet a myriad of environmental, handling, use and mechanical functions to survive the stresses in the OSP environment."

"Successfully securing the certifications required to meet the needs of national carriers and cable operators is a sign that our strategy and execution is working," comments Cheri Beranek, Clearfield's president and CEO. "It is yet another sign that we are well-positioned to build the infrastructure needed for Internet of Things device connectivity, 5G and our fiber-driven future." ♦

WIRELESS

Verizon, Ericsson, Qualcomm notch superfast 953-Mbit/sec wireless speed in real-world 4G LTE demo

Claiming a U.S. wireless industry first, Verizon, Ericsson, and Qualcomm Technologies, Inc., a subsidiary of Qualcomm Incorporated, on Aug. 2 announced that the companies jointly reached an astounding 953 Mbits/sec in a joint commercial network deployment in Boca Raton, Florida. While lab tests have shown comparable speeds in recent months, this is the fastest announced speed achieved in a real-world, dynamic network environment leveraging Licensed Assisted Access (LAA) technology, say the companies.

To reach gigabit class speeds, for the demo Verizon used a combination of licensed and unlicensed spectrum for the first time. This four carrier aggregation uses LAA (License Assisted Access) to combine Verizon's spectrum holdings with unlicensed spectrum, which takes advantage of spectrum where home and commercial WiFi technologies exist. In addition to four channel carrier aggregation, other technological advancements include: 4x4 MIMO (multiple in, multiple out) which uses multiple antennae at the cell tower and on consumers' devices to optimize data speeds; 256 QAM which enables customer devices and the network to exchange information in large amounts, delivering more bits of data in each transmission, significantly enhancing data speeds.

According to a press release, "The demonstration used all commercially available Verizon network components including a cell site, hardware, software, and backhaul. Riding on the backbone of Verizon's most reliable network infrastructure, Ericsson provided the most advanced remote radio head in the industry. The micro Radio 2205 for LAA, designed for unlicensed spectrum use, provides small dimensions, flexible mounting and superior performance, and is a component of the Ericsson Radio System, an end-to-end modular radio network portfolio of hardware and software designed to fit all site types and traffic scenarios as networks grow in scale and complexity on the road to 5G. Qualcomm Technologies provided a Qualcomm Snapdragon 835 mobile platform test device, with Gigabit LTE capability

thanks to the integrated Snapdragon X16 LTE modem."

"These technologies produce record speeds for wireless technology and we are proud to be leading the way to commercialization with such strong partnerships," said Joakim Sorelius, head of product area network systems at Ericsson.

"It is exciting to see Gigabit LTE momentum globally and in the U.S., especially as we move closer to a 5G world. With leading operators and infrastructure vendors like Verizon and Ericsson, we will continue to develop and deploy innovative technologies to power future networks and devices," added Mike Finley, president, Qualcomm North America.

Verizon notes that it was the first national wireless provider to introduce 4G LTE speeds in 2010, spurring an ecosystem of video viewing and data sharing at a pace not realized before. Since that time, Verizon and its partners have continued to evolve the 4G LTE network, enabling it to carry more robust applications and solutions for consumers, enterprise customers and government agencies.

"Today's milestone is a great example of our approach to new technology—we deploy the latest capabilities reliably and in real-world environments, not just in a lab," said Nicola Palmer, Chief Wireless Network Officer for Verizon. "By continuing to deploy the latest technologies on our 4G LTE advanced network, we pave the way for better and faster performance for the things our customers do now, and provide the groundwork for our future advancements."

As further noted by Verizon, "a combination of the latest 4G LTE wireless technologies is required to reach these industry-leading speeds. Carrier aggregation, a key technological advancement, bands multiple spectrum channels together to allow data to flow more efficiently resulting in dramatically faster peak speeds. Verizon led the industry last summer when it launched LTE advanced with two channel carrier aggregation nationally and has completed deployment of three channel carrier aggregation using its licensed spectrum." ♦

AROUND THE INDUSTRY

Superior Essex, Legrand team on next-generation building intelligence at 2017 BICSI Fall show

Superior Essex and Legrand, partner providers of cabling and connectivity solutions, teamed at the 2017 BICSI Fall Conference and Exhibition in Las Vegas (Sep. 24-28) to give attendees a glimpse at the roadmap next generation of building intelligence. In their shared exhibition booth, the companies showcased recent advances in Power-over-



Ethernet communications and structured cabling technologies that the companies note "have vastly expanded the scope and value of the Internet of Things (IoT)" by enabling

advanced building controls and analytics and helping to create more efficient and more productive environments.

The BICSI showcase featured the award-winning Superior Essex PowerWise 4-pair Power-over-Ethernet (4PPoE) products, including the debut of the new PowerWise 10G 4PPoE cable designed to support the high power and data demands of next-generation Power-over-Ethernet applications. Superior Essex and Legrand also featured the nCompass Systems, their co-engineered structured cabling solution, which is optimized to support a variety of digital building and IoT applications. Additionally, in the BICSI Fall panel sessions, the two companies brought together leading innovators in digital building technologies to discuss the features, capabilities and strategies for designing and deploying cutting-edge, IoT-ready building solutions.

"The BICSI Fall Conference is a great opportunity for us and our partners to demonstrate first-hand the next generation of communications technologies and the value that these technologies can bring to a variety of enterprises and industries," commented Will Bryan, vice president of technology and market development at Superior Essex. ♦

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AROUND THE INDUSTRY

Leviton showcases latest data center, AV network innovations at 2017 BICSI Fall Conference

Leviton exhibited its latest system solutions for copper, fiber, and IT/AV networks at the 2017 BICSI Fall Conference (Sep. 24-28) in Las Vegas, Nevada. Leviton also delivered two technology-focused presentations during the conference. Attendees heard from Leviton experts on how recent TIA standard updates will impact network management and the latest enterprise wireless deployment trends and technologies.

For his talk entitled, "A Fork in the Road: OM5 vs. Single-Mode in the Data Center" on September 27, Gary Bernstein, Leviton's senior director of global product management, fiber and data center solutions, discussed how the actions of technology leaders and recent market trends can offer insight into whether OM5 will leave networks better prepared for growth than singlemode. Also on Sep. 27, in a talk entitled "Enterprise Wireless: 4 Steps to Successful Deployment" Leviton senior product manager Yuna Shin covered the latest in wireless trends and technologies, including what's coming next, planning the right wireless network based on the environment and applications, and cable and connectivity choices including 2.5/5GBase-T.

On display at Leviton's BICSI show booth in the Mandalay Bay Hotel and Convention Center were systems that enable copper and fiber migration from 10 to 400 Gb/s networks, and solve some of the latest IT/AV network challenges. Leviton's Atlas-X1 system is built on a unified connector form factor and termination method across Cat 5e, Cat 6, Cat 6A and Cat 8 media. The feature-rich system supports mission-critical networks and allows for a seamless migration from 1GBASE-T to 40GBase-T. On the fiber-optic networking side, the Leviton Opt-X Unity System of MTP connectors, trunk cables, harnesses, array cords, adapter plates, and cassettes provides options for installing and reusing a 24-fiber backbone through multiple tech upgrades from 10 to 40,100, 200 and 400 Gb/s. Additionally, the company's HDX TAP Cassettes, part of the popular HDX platform, help provide real-time monitoring for security and performance in the network or storage area network (SAN), with options for LC, MTP, 40 to 10 Gb/s conversion and BiDi transceivers.

Finally, Leviton's IT/AV Systems product line at the BICSI Fall show included its AV control wallplates that connect, switch and extend multiple high-definition AV signals to displays or projectors, with no programming required, to prepare classrooms and conference rooms for the latest technologies such as UHD displays with 4K resolution.



STATEMENT OF OWNERSHIP, MANAGEMENT, AND CIRCULATION

1. Publication title: Cabling Installation & Maintenance.
2. Publication number: 010-968. **3. Filing date:** October 1, 2017.
4. Issue frequency: Monthly. **5. Number of issues published annually:** 12. **6. Annual subscription price:** \$84.00.
7. Complete mailing address of known office of publication: PennWell Corporation 1421 So. Sheridan Road, Tulsa, OK 74112, Tulsa County. **7a. Contact person:** Traci Huntsman.
7b. Telephone: 918-831-9435. **8. Complete mailing address of headquarters or general business office of publisher:** PennWell Corp., 61 Spit Brook Rd., Ste. 401, Nashua, NH 03060.
9. Full names and complete mailing addresses of Publisher, Editor and Managing Editor: Publisher: Alan Bergstein, 61 Spit Brook Rd., Ste. 401, Nashua, NH 03060. Editor: Patrick McLaughlin, 61 Spit Brook Rd., Ste. 401, Nashua, NH 03060. Managing Editor: Matt Vincent, 61 Spit Brook Rd., Ste. 401, Nashua, NH 03060. **10. Owner:** PennWell Corporation, Successors to the Estate of Helen B. Lainger, 1421 So. Sheridan Rd, Tulsa, Tulsa County OK 74112. **11. Known Bondholders, Mortgages, and Other Security Holders Owning or Holding 1 Percent or More of Total Amount of Bonds, Mortgages, or Other Securities:** None. **12. N/A.** **13. Publication Title:** Cabling Installation & Maintenance. **14. Issue Date for Circulation Data:** September, 2017.

15. Extent and Nature of Circulation:

	Average no. copies each issue during preceding 12 months:	No. copies of single issue published nearest to filing date:
a. Total number of copies	15,064	14,637
b. Legitimate paid and/or requested distribution		
1. Outside county paid/requested mail subscriptions stated on PS form 3541	13,507	13,048
2. In-county paid/requested mail subscriptions stated on PS form 3541	0	0
3. Sales through dealers and carriers, street vendors, counter sales, and other paid or requested distribution outside USPS®	166	170
4. Requested copies distributed by other mail classes through the USPS®	0	0
c. Total paid and/or requested circulation	13,673	13,218
d. Non-requested distribution		
1. Outside county nonrequested copies stated on PS form 3541	926	775
2. In-county nonrequested copies stated on PS form 3541	0	0
3. Nonrequested copies distributed through the USPS by other classes of mail	0	0
4. Nonrequested copies distributed outside the mail	216	482
e. Total nonrequested distribution	1,142	1,257
f. Total Distribution	14,815	14,475
g. Copies not Distributed	249	162
h. Total	15,064	14,637
i. Percent paid and/or requested circulation	92.29%	91.32%

16. Electronic Copy Circulation

a. Requested and Paid Electronic Copies	15,104	15,230
b. Total requested and paid print copies + requested/paid electronic copies	28,777	28,448
c. Total requested copy distribution + requested/paid electronic copies	29,919	29,705
d. Percent paid and/or requested circulation	96.18%	95.77%

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17. Publication of Statement of Ownership: Will be printed in the November 2017 issue of this publication.

18. Signature and title of Editor, Publisher, Business Manager, or Owner: Traci Huntsman, Manager Corporate Assets and Postal Compliance. **Date:** 10/01/2017.

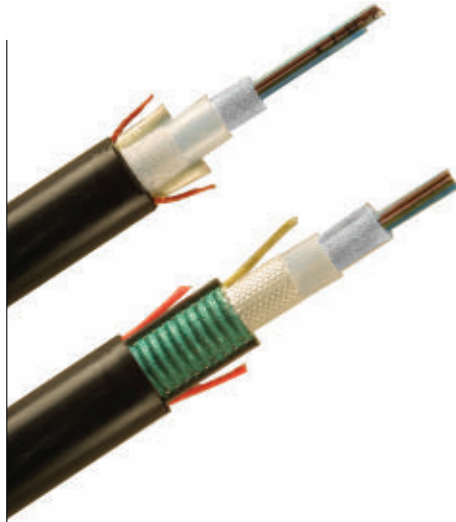
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FIBER OPTICS

OFS expands gel-free AccuRibbon DC fiber-optic ribbon cable family

At ISE Expo (Sep. 12-14), OFS announced the expansion of its AccuRibbon DC Fiber Optic Cable product family to include fiber counts up to 864. The 100-percent gel-free ribbon cables will be available in dielectric and metallic/armored versions. Currently, AccuRibbon DC cables are offered in fiber counts up to 432.

The gel-free cables are designed to significantly reduce both cable preparation times and cable weights, which helps lower deployment costs, reduces splicing expenses and speeds installation/restoration times, according to OFS. Super-absorbent polymer (SAP)



tapes replace the gel in AccuRibbon DC cables to impede water migration in the cable core. Per the company, these cables and water-blocking tapes

have a 15-year, field-proven history in diverse outside plant (OSP) installations and applications.

In addition to meeting Telcordia GR-20 Issue 4 requirements, the AccuRibbon DC cables have successfully met OFS's aggressive coiling simulations where the cables are twisted and coiled under real-world installation conditions. "The installation simulation testing performed is significantly beyond the current minimum testing standards utilized by the industry," adds the company.

The cables are scheduled for commercial availability during fourth quarter 2017.

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Installation & Maintenance

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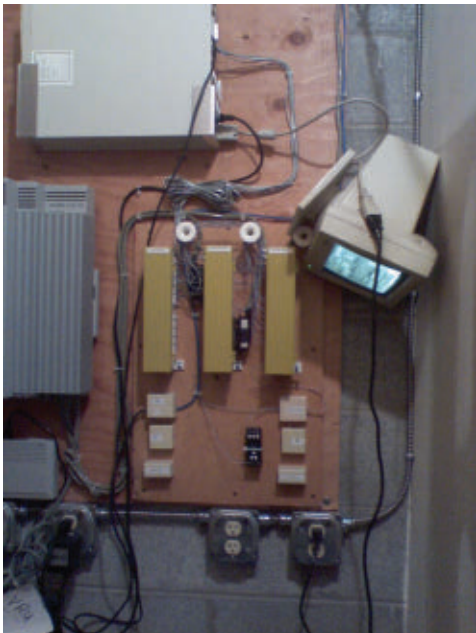
INFRASTRUCTURE INSIGHTS

WTH? Must-see photos

Grant Richards is a certified IT/ telecommunications contractor and course instructor with the Limited Energy Apprenticeship Program at Oregon's Clackamas Community College. He sent us these captioned cabling photos that may make you say, "Hmmmm," writing, "As a low-volt contractor and apprenticeship instructor, I've come across a lot of ugly situations. Here are a few. I took all of these on job sites."

Thanks Grant!

Send your must-see cabling photos to mattv@pennwell.com. ♦



Who needs a shelf when you have a wall and a cabling mushroom to hold up your monitor? This was a monitor for an interactive voice response system at a drug store.

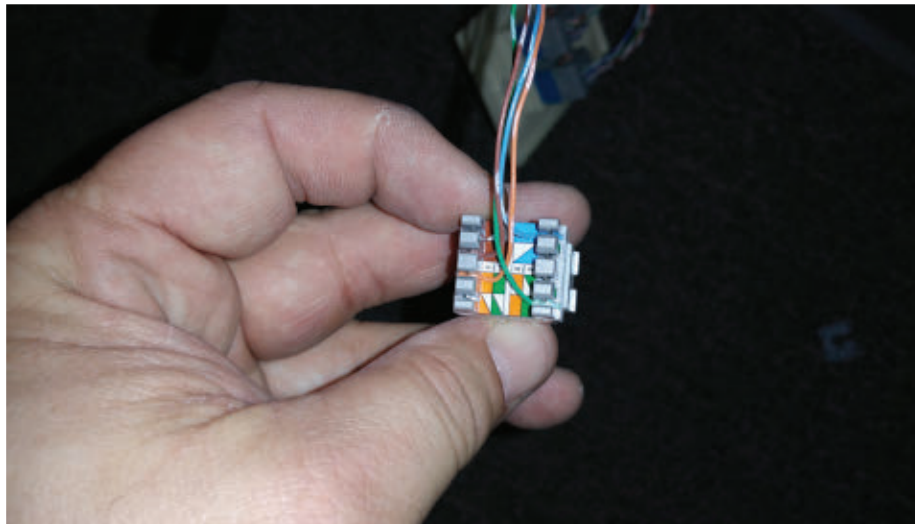
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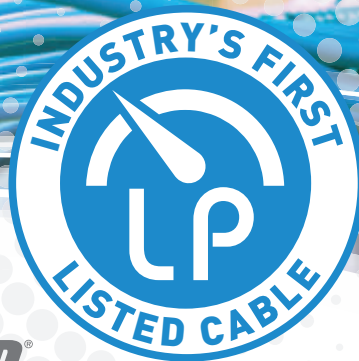
Push pin wire management



Drilled the conduit!



When I teach my code class I'll show the students a picture and ask them to identify the violation. Good fun because there are often multiple issues. WTH?



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