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Many companies are at a crossroads between outsourcing or upgrading their data centers. At the same time, they are tasked with lowering capital expenditures and operating expenses. As more businesses look to public cloud services to host their data and applications, they are consolidating their on-premises data centers.

In many cases, this consolidation is not a simple elimination of facilities. Companies and government agencies often require at least some new space to support larger, highly utilized and efficient data center operations. They also need a more centralized infrastructure, and many will purchase new hardware to maximize efficiency gains and equipment lifespan.

A two-tier or leaf-spine architecture addresses these challenges and has become the standard for greenfield data centers. All access switches are connected to every interconnection switch, providing a redundant path. Traffic runs east-west, reducing latency between access switches. This is a very scalable fabric. The leaf-spine architecture has led to an increase in top-of-rack and centralized switching topologies. Both of these topologies result in more fiber in the Main Distribution Area (MDA).

Along with centralized switching, a centralized patching field is installed in the MDA, serving as the main cross-connect patching location for all fiber channels in the data center. It can support cabling from network servers, core switches, the SAN, mainframe, and disk or tape storage.

This approach keeps things centralized to make network management easier. In larger facilities, the centralized patching field keeps moves, adds, and changes much more manageable. And as a data center infrastructure grows, the management area doesn’t. Workers aren’t required to go to remote areas of a facility to do connection work: they’re able to handle it from the patching field.

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New Interactive Health Care Web Page Shows How Leviton Connects Every Area of a Hospital

Now you can go inside different areas of a typical hospital to see how Leviton solutions can be used throughout a health care facility. From the data center to the nurse station, labs, and operating rooms, we provide specific product recommendations and show how Leviton keeps caregivers, researchers, and patients connected.

Take a tour at Leviton.com/ns/healthcare

HDBaseT: We recently asked 100+ end users and specifiers:

What type of cable do you typically use for HDBaseT extension installations?

• Cat 5e FTP (shielded) 3%
• Cat 6 UTP 48%
• Cat 6 FTP (shielded) 14%
• Cat 6A UTP 19%
• Cat 6A FTP (shielded) 16%

Get advice for installing HDBaseT in the white paper AV Cable Recommendations for HDBaseT.
There are other distinct benefits to using a centralized patching field:

- A centralized patching field should replicate the switches or respective equipment devices, port for port. This greatly simplifies maintenance and MACs. Also, there is little need to access the cabinets that house high-dollar assets like switches and routers. This makes these assets more secure and minimizes the risk of damage or downtime.

- A centralized patching field does not have to be centrally located: since it does not require power or cooling, it can be located away from the active equipment in its own floor space, or isolated in a separate room. This frees up premium floor space in the data center for additional revenue-generating cabinets housing switches and servers.

- Traffic can easily be redirected at the patching field while equipment gets serviced or changed out, saving time and lowering operating expenditures associated with tech refreshes.

Typically, centralized patching fields come in the forms of traditional cabinets or an open frame with no active equipment inside. Traditional 19-inch cabinets maintain a consistent look with other cabinets in a data center.

The image to the right represents a centralized patching field in a Traditional Cabinet, using 4RU enclosures. The top three enclosures replicate core switches, while the middle and bottom enclosures replicate edge switches.

Typically, one 4RU enclosure can accommodate up to 288 fibers using LC connections, the entire cabinet can house up to 2,592 fibers. There are ultra-high-density enclosures available today that can double the density, raising that number to more than 5,000 fibers per cabinet. However, managing cords and trunks in such a high-density application with traditional rack enclosures becomes challenging. There is little room for adequate slack management, and fiber bend radius become a concern, especially for trunks entering the cabinet.

Distribution Frame solutions are most often used by carriers in central offices, where tens of thousands of fibers are being managed. However, in recent years, data centers have begun adopting the frames. They are capable of patching thousands of fibers, and designed with cable management to alleviate the challenges of higher densities.

For example, the Leviton HDX Fiber Distribution Frame has the ability to patch 3,168 LC fibers or 15,552 MTP fibers on only one 2’ x 2’ data center floor tile, and includes vertical and horizontal cable managers integrated into the frame. It includes slack spools and cable clamps for properly routing cords and trunks, and unique patch decks with trays that handle horizontal cord management.

In contrast, vertical and horizontal cable management solutions for traditional cabinets are sold separately and installed at the job site. Some cabinet manufacturers kit the cable management with the cabinet, but cable management will need to be moved or adjusted horizontally and vertically based on the layout.

Also, a distribution frame leaves a much smaller footprint than a traditional cabinet. The HDX Distribution Frame occupies only one 2x2-foot data center floor tile, while a traditional cabinet occupies four data-center floor tiles. Even though it takes up a much smaller footprint, the HDX Frame is capable of patching more than 3,000 fibers using LC connections. This is the highest density per square foot for an open frame system. Reducing the footprint while adding density opens up space for additional cabinets dedicated to network switches and servers — the revenue-generating cabinets in a data center.

As with traditional cabinets used for cross-connect patching, a distribution frame replicates core switches in the top half and edge switches in the bottom half. When patching within one frame, the HDX Frame requires only one length of patch cord, at three meters. This means data center managers don't need to stock multiple-length patch cords.

Cabinet or Frame? Calculate Your Savings

Leviton offers an online calculator to help determine how much money and space you can save by using a distribution frame compared to traditional cabinets. The HDX Frame ROii™ Calculator will help you generate a business case for using a frame, showing the return on infrastructure investment over a five-year span. It takes the average cost of data-center floor space — which can range from 35 to 150 dollars per square foot — and factors in the number of cabinets, devices, and channels per cabinet in each zone to help generate your cost savings.

To learn more, go to Leviton.com/HDX.
As soon as the new Racino entertainment complex opened, residents from Dayton, Ohio and surrounding towns flocked to try their hand at Lady Luck on the new video gaming equipment. Slot machines are no longer one-armed bandits. They have been replaced by new digital Video Lottery Terminals (VLTs) and winning is based on random algorithms.

Racino, which is part of the Hollywood Casino franchise owned by Penn National Gaming, sits on 170 acres. This newly constructed multi-building complex features a gaming facility with 1,000 VLTs, a sports bar and food court, retail shops, an outdoor horse track, a horse paddock (stalls) and outbuildings. Bets were made as to whether the facility would be completed on time in 10 months due to many challenges, including one of the worst winters on record.

The winning team of Chapel Electric of Dayton, Ohio, and their sister company, Chapel Romanoff Technologies (CRT) collaborated to provide Racino with an efficient and reliable infrastructure. The CRT team included Dennis Severance, RCDD, Vice President of Operations, Jeff Carr, Project Manager, and Lee Olinger, General Foreman. CRT specified the indoor and outdoor cable plant, and Chapel Electric designed the pathway system. For CRT, installing so many different cable types created challenges because the workstations were very diverse. The network infrastructure had to support multiple applications and devices including voice (VoIP) and data in the offices, VLTs on the casino floor, outdoor digital signage, a clocking system around the track, and data to the horse stalls. Additionally, throughout the complex, the network infrastructure connects security cameras, retail point-of-purchase devices, and A/V systems. All of these IP devices had to be integrated into a converged IP network.

Racino Hits the Jackpot with Fast, Efficient Network

The CRT led team also included Michael Raiser Associates (MRA), a nationally known technology consultant specializing in the hospitality market segment, as well as Turner Construction, who served as the general contractor. Together, the project team was faced with adhering to extremely tight deadlines, harsh winter conditions and a multifaceted network layout. The team had to plan and install three different networks, including separate backbone and horizontal cabling, and tie them together in redundant main distribution frames (MDFs). The three segmented networks included the IT data system, AV, and Electronic Safety and Security (ESS).

“Because we were pulling the data cable alongside of the electrical cable, MRA selected shielded Category 6A cable,” notes Severance. “Performance-wise, in regards to bandwidth, we might have been fine with Category 6, but when installing in a casino environment, we wanted to make sure that the cable would handle the video needed for these sophisticated VLTs. And BICSI and TIA standards now recommend Category 6A cables as the horizontal cable for all new installations,” he adds.

There are a total of seven telecom rooms (TRs) or intermediate distribution frames (IDFs), and two equipment rooms which house the MDFs — one as a core and the other as a back-up. The MDFs for the IT data and AV were physically separated to protect the core IT system from outside vendor operated systems. The surveillance system has its own MDF. The redundant cabling between the equipment and telecom rooms included different single-mode and multimode fiber optic cable constructions.

The majority of the backbone fiber optic cable and connectivity comes from Berk-Tek Leviton Technologies. The installed ArmorTek® cable by Berk-Tek consists of a flexible armor around the cable jacketing for added protection. “The armor protection is preferred because of weather and environmental threats in outdoor trenches and for protection in indoor cable tray, as well,” explains Carr. There were two fiber optic cable types within the armoring. One type was Berk-Tek’s Adventum™ loose-tube plenum (LTP), which was selected mainly for outdoor applications. The second was Berk-Tek’s premise distribution plenum (PDP) tight-buffer cable used for indoor applications. “We installed a variety of 6 and 12 strand single-mode fiber, totaling almost a mile. Between closets, our multimode runs included 12,000 feet of 6-strand, 8,500 feet of 12-strand and 600 feet of 48-strand, depending on the requirements and applications that each TR served,” he notes. “The most time-consuming installation procedure for the fiber backbone was fusion splicing all of the LC connections in the TRs,” states Carr. All of the fiber optic cable used Berk-Tek’s GIGAlite™−10 OM3 glass for high-bandwidth applications, with connections patched in Leviton Opt-X® 1000i Rack-Mount Enclosures.

The project team (L to R); Jeff Carr (CRT), Brad Wagner (Penn National Gaming), Lee Olinger (CRT), Kevin Moussa (Penn National Gaming), and Dennis Severance (CRT).

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“CRT’s ‘go-to’ manufacturer is Berk-Tek Leviton Technologies because of their warranty and customer service.”

Where There’s Gaming, There’s Security

Security in a casino environment is a top priority and it has to comply with the state gaming regulations. At Racino, the third separate network is the security system which is segmented from the other network applications. VLTs are regulated by the state and all are under careful surveillance by IP video cameras. There are 500 cameras within the gaming area and all connected to the TRs through 145,000 feet of black LANmark-1000 Category 6 cable. Unlike the Category 6A F/UTP cables, the Category 6 UTP cable did not require shielded connectivity or additional grounding and bonding. The LANmark-1000 cable was terminated to Leviton eXtreme® Category 6 110-style patch panels. These panels include a patented retention force technology that protects against connector tine damage and adds to the longevity of the system.

The gaming area at Racino has high ceilings which created another cabling pathway challenge. All the indoor PTZ cameras, projector mounts and several TVs are exposed and needed to be camouflaged. In addition, the cable from the tray and J-hooks needed to be covered and protected coming down to the devices. The CRT team devised a creative solution by designing and constructing custom conduit pathways for the cable which would also provide physical support for the cameras. Using 1.5-inch rigid conduits, CRT cut these to specific lengths, attached flanges to secure the cable to the cameras and painted everything black to blend in with the black ceiling. “Because the job was moving so quickly, we could do this behind-the-scenes in our warehouse tandem with the construction schedule. Once on-site, our installers could easily bring the cable from the tray down through the prefabricated conduit assembly and attach to the cameras,” adds Carr.

A Winning Combination

“We had 10 months from start to finish to install the entire IP network, which is a very short timeframe for the amount of work,” states Carr. “My biggest challenge was to get enough people and materials on-site so we could get it all done.”

After all the cable was pulled and terminated, each run was fully tested to comply with the Berk-Tek Leviton Technologies system warranties. In this project, the four system warranties included: CX6100 Category 6 Enhanced UTP System for up to 1 GbE; CS6600 Category 6A+ F/UTP System for up to 10 GbE; Premium OM3 Multimode Fiber backbone with Berk-Tek Adventum cables and OS2 single-mode fiber for the campus and equipment room building backbone.

“Because Berk-Tek and Leviton have supported CRT in many installations for so long, we knew they would support our customer well,” states Severance. “To assure long-term reliability, we pulled in additional cabling for future use and are well-prepared to expand the facility or add more networked devices, as IP convergence is growing, especially in the casino environment,” he concludes.
As of July 1, 2016, the Official Journal of the European Union (OJEU) will include requirements for a CE marking on cables for Safety in the Event of Fire. This will impact all cables that are being used in a construction product as part of the Construction Products Regulation (CPR).

The inclusion of the recently published EN50575, “Power, control and communication cables - Cables for general applications in construction works subject to reaction to fire requirements” in the OJEU provides the standard that all cabling must meet to achieve a CE mark for a certain fire-performance category.

There is a one-year transition period, and on July 1, 2017, cabling manufacturers having a mandatory requirement to apply the CE marking to their products manufactured to a European technical specification.

Cabling manufacturer Brand-Rex, a Leviton Company, is making extensive preparations for this event and will be on hand to support and provide advice to specifiers, installers and the supply chain through the one-year transition phase.

You can learn more at Brand-Rex.com/technology/cpr.

**NEW EU Cable Fire Safety Regulations**

**INDUSTRY**

The TIA has issued a call for interest for updating the ANSI/TIA-568-C.2 twisted pair copper cabling and component standard. The **new version** will be known as ANSI/TIA-568.2-D, and will supersede the “C.2” standards, including new Category 8 specifications.

**COMPANY**

**Ian Wilkie** has been appointed managing director of Brand-Rex, a Leviton Company. Brand-Rex is part of Leviton’s Network Solutions group and serves customers in Europe, the Middle East, and Asia Pacific markets. Wilkie has been with Brand-Rex for more than 15 years, including his most recent role as commercial director.

Leviton Manufacturing of Canada has appointed **Shari English**, its Network Solutions’ national director. English brings over 20 years of experience in the data field and, until recently, held the position of national sales manager of DataComm at Wesco.

**PRODUCT**

Leviton has introduced two new IT/AV Control solutions: the **Autoswitching HDBaseT Extender Wallplate** and **8-Button Control Panel Wallplate**. The Autoswitching wallplate can connect to a single display via one VGA and two HDMI® connections. This allows users to easily add/ control inputs from up to three different sources. The 8-Button wallplate can control the HDMI and VGA sources, and syncs with the display’s IR remote to control the display power and volume.

Go to Leviton.com/ITAV for solution briefs that show how these new solutions work within an IT/AV system in classrooms and conference rooms.

**TECH TIPS**

**Using the Right Cable Supports**

Cable support structures include the hardware associated with backbone and horizontal pathways. Telecommunications pathways must have the proper support to make the installation function properly and comply with applicable codes.

When designing cable pathways, you should always include independent support hardware for cables. Pathways and cables should not rest on or be supported by structural beams, ceiling panels and wires, or any other suspended ceiling components (HVAC, fire sprinklers, etc.).

By using proper cable support, you ensure a number of important things happen:

- Optimize system performance
- Add protection from potential electromagnetic interference
- Accommodate future moves, adds, and changes
- Ensure that local building electrical code requirements are met

**YESTERDAY’S NEWS**

**1916:** Claude Elwood Shannon was born 100 years ago. Shannon coined the term “bit” for the unit of both data and computation. He is considered the father of information theory.
Understanding Wideband Multimode Fiber

Berk-Tek and Leviton data center experts answer common questions about new wideband multimode fiber (WBMMF) technology

What is WBMMF?

WBMMF is a new fiber designed to carry multiple short wavelength signals that can be aggregated for high-bandwidth applications — a technology known as wave division multiplexing (WDM). The fiber geometry will stay the same as existing OM3/OM4 fibers, with a 50 µm core and 125 µm cladding. Therefore, WBMMF will be physically compatible with existing multimode fiber connectivity.

The plan is to be able to transmit up to four wavelengths near the traditional 850 nm operating wavelength (also known as the “short” wavelength). This will at least quadruple the current information carrying capacity of multimode fiber. The image below shows the plan to transmit 4x25 Gbps resulting in a 100 Gbps link across a single pair of multimode fibers terminated with LC connectors.

Is it a standards-based product?

The TIA TR42.12 working group aims to standardize the optical fiber. Both Leviton and Berk-Tek are active members of this committee. The TIA-492AAAE standard has been under development since early 2015 and is expected to be completed by mid 2016. This has been (and may continue to be) a contentious project due to the active interest of many parties. When the TIA project is completed, IEC will take up the project for the international standards. At this point, IEEE does not recognize multi-wavelength transmission around 850 nm, but multiple transceiver vendors are producing products that comply with existing MSAs (multi source agreements).

Will it be successful?

Ultimately, the market will decide whether or not WBMMF will be successful. But the technology definitely shows promise. The early success of the 40G BiDi transceiver from Cisco is an example of a non-standards based option that can utilize this technology. Avago and Finisar have both released transceivers that operate at multiple wavelengths between 850 nm and 950 nm. Several companies have banded together to form the Short Wavelength Division Multiplexing (SWDM) Alliance to promote applications based on this technology. The SWDM Alliance is focused first on 40 Gbps (using four 10 Gbps wavelengths) and then on 100 Gbps (using four 25 Gbps wavelengths).

What is Leviton’s position on WBMMF?

As mentioned, the standardization effort has been contentious. In our opinion, there are several significant issues that should be resolved before we can confidently recommend installing this product. Among these issues are:

- Backwards compatibility with optical performances specified for OM4
- Installed testing parameters for the new operating wavelengths
- Assured interoperability between multiple vendors

The TEK Center at Berk-Tek is working with WBMMF products from multiple vendors so we can assure our customers that solutions will work as expected. Leviton and Berk-Tek are active members of the standardization process and are ready to deliver products to the market once we are satisfied that the solution is reliable.

Will it be called OM5?

The short answer is “possibly.” Even though TIA is working on the performance standard, it is IEC that owns the “OM” nomenclature. At this point, IEC does not have a project open to look at this particular product, but it is anticipated that IEC will harmonize with the TIA performance. Once that is complete, it seems likely that the product will be identified as OM5, but that is not certain.