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Leviton Poll

Which type of wireless access point do you expect to install in the next two years?

802.11 ax 41%
802.11 ac 53%
802.11n 4%

Leviton has released a print and digital 2019 North America product catalog that includes the latest copper and fiber cabling systems for data center and enterprise networks. New additions to the catalog include:

- Easy-to-use bulk packaging for Leviton’s most popular jacks
- Innovative cable management for patch panels
- 24-fiber MTP® single-mode cable assemblies and cassettes
- More lengths for High-Flex Cat 6 Patch Cords

For more catalog information, please visit leviton.com/catalogs.


The Power over Ethernet Revolution Rolls On

This is a big year for Power over Ethernet (PoE). This system for delivering power and data over twisted pair cabling is about to get a big boost from the late 2018 release of the IEEE 802.3bt standard, defining PoE over four pairs instead of two. This change means PoE will be able to support more devices that require higher power. For this reason — along with the rise of the Internet of Things — more than 700 million PoE-enabled Ethernet switch ports and 280 million PoE devices are expected to ship in the next five years, according to market research firm Dell’Oro.

PoE now encompasses a tremendous range of devices and applications, and the drive for more connected “intelligent” buildings is increasingly feasible thanks to PoE. One of the biggest pushes is for more smart lighting, and Gartner research predicts that 70% of new commercial building lighting installations will implement smart lighting by 2020.

Devices with higher power requirements will need the right cabling and network design in place. Twisted-pair cabling transmitting upwards of 100 watts can encounter potential overheating issues that may affect transmission performance. Industry standards groups like TIA recommend Category 6A cable for new PoE installations in order to meet high-wattage PoE requirements and support future network upgrades.

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PLANNING FOR NEXT-GENERATION ENTERPRISE WIRELESS

Enterprise Wi-Fi will continue to evolve to bring many benefits over 5G. IEEE 802.11ax — also known as Wi-Fi 6 — is due for release this year, and will allow for wireless data rates up to 10 Gb/s and wider coverage than 802.11ac. In 2019 we will see 802.11ax show up in all kinds of devices, including phones, computers, tablets, and more.

At the same time 802.11ac (Wi-Fi 5) will continue to grow in the enterprise, with the capability to deliver up to 6.93 Gb/s. Some enterprise networks will use their existing Cat 5e or Cat 6 cabling infrastructure and upgrade to NBASE-T switches to deliver multigigabit wireless (2.5 or 5 Gb/s) over 802.11ac. But to get the most out of 802.11ac and 802.11ax, the Telecom Industry Association (TIA) recommends using Cat 6A cables in new installations, which will give you higher data rates and increased power. The organization also suggests a minimum of two drops for every wireless WAP, so future upgrades take less time.

AV AND IT SYSTEMS CONVERGE

Businesses, universities, and other enterprise environments are increasingly integrating their AV systems into the larger network. With videoconferencing, presentation through BYOD devices, collaborative technology, and large 4K displays, IT and AV are more intertwined than ever. And that means that AV will increasingly fall under the realm of IT managers, as opposed to facility managers in the past.

We will continue to see a move to HDBaseT technology throughout these enterprise environments, especially in classrooms and conference rooms. HDBaseT allows for the long-distance delivery of ultra-high-definition audio and video, Ethernet, controls, USB 2.0 and power — all over twisted pair category cable. Power over HDBaseT (PoH) powers the HDBaseT link over the same category cable, allowing for integrated transmitters, in devices like matrix switches, to power remote receivers.

DATA CENTERS MOVE TO 100 GB/S AND BEYOND

Data centers everywhere are updating their networks to address bandwidth demands. 100 Gb/s Ethernet made big moves in the market in 2018 and 100 Gb/s switch shipments are now surpassing 40 Gb/s shipments.

In the future, we can expect data centers to migrate to 200 and 400 Gb/s uplinks and 50 and 100 Gb/s at the server. 400 Gb/s Ethernet switches began shipping in 2018, and we will begin to see adoption among some large and hyperscale data centers in 2019. Crehan Research predicts that these switches will drive the majority of data center switch bandwidth by 2022.

As the market moves toward 200 and 400 Gb/s, single-mode fiber cabling will see greater adoption. In fact, recent adoption by hyperscale data centers has reduced the cost of single-mode optics to the point where the cost for 100 Gb/s single-mode transceivers dropped tenfold over the past two years, bringing it in line with multimode fiber. Even as data centers move to higher speeds, there are areas where their existing cabling fiber infrastructure — such as OM3 or OM4 — will satisfy many of the applications moving forward.

MORE INFRASTRUCTURE FOR SMARTER BUILDINGS, SMARTER CITIES

Many Leviton customers in IT construction planning and design are being asked to design new and productive work spaces with building technology intelligence in mind. Facilities are rapidly embracing Ethernet and PoE for building protocol controls in lieu and in conjunction with their native protocols (as touched on in the enterprise network trends above). This will increase the need for better cabling pathways and planning to support Intelligent Building Systems (IBS).

Also, in addition to supporting smart buildings and the internet of things (IoT) by installing higher category cabling, PoE, and HDBaseT as mentioned earlier, many networks will take advantage of new single-pair Ethernet cabling options for low-bandwidth applications in the near future. This new option will connect sensors for HVAC, access controls, and other machine-to-machine connections in industrial environments. The single-pair cables and small form-factor connectors — still being defined by TIA and ISO — will support the IEEE 10BASE-T1 standard, which is expected to be approved in mid 2019.
THE MARKET HAS SPOKEN: OM4 and SINGLE-MODE Leave No Place for Unproven OM5

By Gary Bernstein, Senior Director of Product Management, Fiber and Data Center Solutions, Leviton Network Solutions

Typically, industry standards and associations set the stage for the next-generation of cabling and infrastructure that support network communications. But there are instances when the market decides to take a different route. This is currently the case with the recently standardized OM5 fiber. Even though TIA developed a standard for OM5 (TIA-492AAE), this new fiber type very likely won’t see wide industry adoption because there is no current or planned application that requires it.

Due to new transceiver launches, coupled with customer perception of their needs and network requirements, the market is ignoring the new, unproven OM5 cable and sticking with proven solutions like OM4 and single-mode fiber.

For example, Cisco’s recently launched 40/100G BiDi transceiver creates a clean line and transition path for OM4 in 40 and 100 Gb/s ports. This new dual-rate transceiver — QSFP-40/100-SR8D — uses a duplex LC interface. Cisco does not really want their customers to install new cabling; they want them to be able to use their existing OM3 or OM4 cabling and upgrade with new transceivers or new switches. And when data centers managers plan for speeds and distances beyond 40 or 100 Gb/s, they will move to single-mode fiber.

Transceiver manufacturers are taking a stand and promoting the benefits of reusing existing cabling backbone to speed network upgrades to avoid network disruptions and unnecessary additional costs. There is nowhere in this path for another multimode fiber like OM5.

The current 100 Gb/s transceivers with the highest sales volumes — and the expected high runners for 200 and 400 Gb/s — all work with OM4 or OS2. OM5 offers no real benefit.

The chart below shows the some of the top-selling 100 Gb/s transceivers:

<table>
<thead>
<tr>
<th>Transceiver (100G)</th>
<th>Switch Vendor</th>
<th>Form Factor</th>
<th>IEEE Compliant</th>
<th>Fiber Type</th>
<th>Distance (Meters)</th>
<th># of Fibers</th>
<th>Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR4</td>
<td>All</td>
<td>QSFP28</td>
<td>Yes</td>
<td>OM3, OM4</td>
<td>70 / 100</td>
<td>8</td>
<td>12F MTP</td>
</tr>
<tr>
<td>CWD4</td>
<td></td>
<td></td>
<td>No</td>
<td>OS2</td>
<td>2,000</td>
<td>2</td>
<td>LC</td>
</tr>
<tr>
<td>PSM4</td>
<td>Cisco, Arista</td>
<td></td>
<td></td>
<td>OS2</td>
<td>500</td>
<td>8</td>
<td>12F MTP</td>
</tr>
<tr>
<td>SMSR/LRL4</td>
<td>Cisco, (40/100), Arista</td>
<td></td>
<td></td>
<td>OM3, OM4</td>
<td>70 / 100</td>
<td>2</td>
<td>LC</td>
</tr>
</tbody>
</table>

Below are the expected high-volume 200 and 400 Gb/s transceivers:

<table>
<thead>
<tr>
<th>Transceiver (200G)</th>
<th>IEEE Standard</th>
<th>Fiber Type</th>
<th>Distance (Meters)</th>
<th># of Fibers</th>
<th>Connector</th>
<th>IEEE Standard Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR4</td>
<td>802.3bs</td>
<td>OS2</td>
<td>500</td>
<td>8</td>
<td>12F MTP</td>
<td>12-2017</td>
</tr>
<tr>
<td>FR4</td>
<td></td>
<td></td>
<td>2,000</td>
<td>2</td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>SR4</td>
<td>802.3cd</td>
<td>OM3, OM4, OM5</td>
<td>70/100/100</td>
<td>8</td>
<td>12F MTP</td>
<td>12-2018</td>
</tr>
<tr>
<td>DR4</td>
<td>802.3bs</td>
<td>OS2</td>
<td>500</td>
<td>2</td>
<td>LC</td>
<td>12-2017</td>
</tr>
<tr>
<td>FR8</td>
<td></td>
<td></td>
<td>2,000</td>
<td>2</td>
<td>LC</td>
<td></td>
</tr>
</tbody>
</table>

When it comes to network infrastructure, users are reluctant to replace their entire cable backbone. And even with a greenfield installation, they are unlikely to install something different from their existing facilities unless the added capabilities (bandwidth and reach) are extraordinary. Customer and market perception is crystallizing on OM4 for multimode, and when a jump in fiber type is necessary and OM4 will no longer suffice, single-mode is by far the recognized next step.

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The Market Has Spoken: OM4 and Single-Mode Leave No Place for Unproven OM5

This trend is supported by a recent Leviton poll that found a significant jump in OS2 single-mode, compared to surveys from previous years.

Some of the follow-up comments from the Leviton survey included responses about OM5:

“I do not believe that OM5 offers a real advantage, it’s mainly a marketing ploy by manufacturers.” — IT manager at a global financial company

“OM5 isn’t needed. There is no real place for it between OM4 and OS2.” — communications consultant

With the continued advancement in higher speed technologies, network engineers and IT infrastructure managers are faced with an overwhelming amount of choices for their network designs. For example, there are 13 different 100 Gb/s transceiver options available today! IT managers want a cabling manufacturer that can help them understand what all these options mean, and help them build a more flexible infrastructure that can handle future network upgrades.

You can learn more about fiber cabling trends in our recent white paper "Navigating Cabling Options for Enterprise and Cloud Data Centers."

TECH TIPS

AddressingPermanent Link Length Limits

TIA standards set the maximum cabling length permitted in a permanent link at 90 meters (295 feet). When a Permanent Link runs beyond this limit, it will fail field testing and will not be warrantable. If the pathway cannot be modified to reduce the horizontal length, your options would be as follows:

1. Add an additional Telecommunications Room (TR) to the floor or add a Telecommunications Enclosure (TE) such that the distant Work Areas may be cabled with a Permanent Link of 90 meters or less. Install copper or fiber backbone cabling between the main TR and the added TR or TE.

2. For a single work area solution, install a low strand count fiber backbone (4-6 strands recommended) to the work area outlet and use a media converter. If the fiber is left with a decent service coil at the user end, it can be converted to a traditional backbone for TR or TE connection, if additional capacity is required later.

ASK THE EXPERTS

Q: What connectivity do you offer that has a plenum rating?

Leviton offers a complete plenum-rated in-ceiling system which includes patch cords, cable, Atlas-X1™ Jacks, QuickPort® Surface Mount Boxes, and mounting brackets. These solutions have been tested and approved to meet requirements for flammability and smoke density in air-handling spaces.

You can check out Leviton’s plenum-rated solutions at Leviton.com/plenum.