5 Reasons **Power over Ethernet** is Right for Enterprise

By Kirk Krahn, Senior Product Manager, Leviton Network Solutions

Over the past decade, Power over Ethernet (PoE) has steadily increased its footprint in enterprise applications. This powerful technology is being deployed more and more often today thanks to the range of devices and applications that are compatible with PoE, as well as its convenience, ease of installation, and efficiency.

While PoE has already made inroads in the health care, retail, finance, commercial, office, security, and industrial sectors, high-power PoE is becoming increasingly popular across all enterprise markets. There are five key reasons for this growth.

1 › COST REDUCTION
PoE offers faster deployment and a significant cost reduction compared with traditional cabling installations. This cost reduction isn't limited to cabling, but includes wiring installation supplies and components, as well as labour and maintenance. And with a single power and data cabling system to be maintained, rather than two separate systems, the total system operating cost also drops. In addition, PoE reduces power consumption — up to 50% of energy typically wasted by an organisation can be eliminated by a properly designed PoE system and other smart building initiatives, according to Cisco Systems.

CONNECTING
the Smart Factory
Manufacturing enters a new industrial revolution

When asked to describe a typical factory floor, most people conjure images of assembly equipment and highly automated technology — something like robotic arms on a car production line. This type of computer driven operation is an example of the third industrial revolution, introduced in the latter half of the 20th century. It followed the second revolution in the 19th century, which introduced electricity and mass production, and the steam-powered first revolution of the 18th century.

Experts agree we are now entering the fourth industrial revolution — often called "Industry 4.0". This new revolution is ushering in the digitisation of the factory, with "smart" technologies and sensors that can transmit data, allowing operations to be more efficient, flexible, and competitive. This transformation means that networks — and the infrastructure behind them — take on an even more critical function across a wide range of industrial operations.

IN THIS **ISSUE**

LEVITON **POLL**

Leviton recently surveyed customers about which fibre type they would install today to plan for future growth.

The poll revealed a drop in OM5 and a gain in OS2 from the previous survey in 2017. These changes may partially be a result of recent standards committee activities.

	2017	2018
OM3		
OM4		
OM5		
OS2		

5 Reasons Power over Ethernet is Right for Enterprise
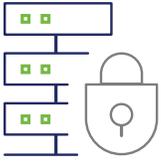
2 › IMPROVED NETWORK CONTROL

Network system downtime is a big financial risk for businesses. The centralised control and simplified management capabilities of a PoE system can help reduce human error and network downtime during unplanned maintenance or disasters. PoE allows network administrators to continuously back up data from all devices on the network to a remote storage facility. And power sourcing equipment can be connected to an uninterruptable power supply (UPS) to prevent lighting, security, monitoring, and mission critical systems from losing power during a localised power outage.

3 › OPERATIONAL EFFICIENCY

PoE-connected devices, such as LED lights and sensors, are capable of collecting data on a number of environmental factors, including temperature, humidity level, ambient light, and room occupancy. PoE can also support advanced applications that use data gathered from employees' mobile devices or workspaces. This information can be used to make strategic business decisions for better space usage, improved staff management, and greater energy efficiency throughout a building.

4 › TECHNOLOGY EXPANSION

PoE is designed to support network growth and the integration of next-generation applications. PoE relies on a standardised RJ-45 jack interface across all networked devices. This allows data and power connections to easily be made anywhere in the enterprise with category-rated cable. This simplicity of device integration and low technology upgrade costs enable a business to add WAPs, advanced metrics-collecting devices, PoE lighting, and other upgrades to support new technology, such as the Internet of Things (IoT).

5 › FUTURE-PROOFED NETWORKS

PoE makes it less costly for an enterprise network to upgrade and expand over time. As an Ethernet-based protocol, PoE is inherently scalable. It can be expanded to meet the needs of a business as it grows. PoE systems can be designed to meet current and emerging standards in concert with a business' future network demands. Such a system will be able to handle the demands of next-generation applications, making the network reliably future-proofed.

POE SOLUTIONS

High-quality connectivity is essential for current and future PoE network operations. Leviton's end-to-end PoE systems of cable, jacks, patch cords, and patch panels are component rated, and third-party tested and verified to exceed industry standard performance, including higher bandwidth and power levels.

Leviton Atlas-X1 jacks have a PoE optimised tine geometry that prevents damage from electrical arcing at the critical contact mating zone between the plug and jack. They also use patented Retention Force Technology to maintain contact force between the plug and jack, preventing intermittent disconnects that may cause arcing. Finally, Atlas-X1 unshielded jacks have a solid metal body, which dissipates 53% more heat than plastic alternatives, reducing temperature build-up and the potential for heat-related performance issues.

Learn more about Power over Ethernet solutions at **Leviton.com/PoE**.

IEEE Votes Down
A NEXT-GEN **200 GB/S STANDARD** THAT WOULD HAVE BENEFITTED OM5

By Gary Bernstein, Senior Director of Product Management, Fibre and Data Centre, Leviton Network Solutions

At the March 7, 2018 IEEE 802.3 meeting, the Next-Gen Multimode 200 and 400 Gb/s study group voted down physical layer specification that supports 200 Gb/s operation over one pair of multimode fibre. This was the second time the proposal was voted down. The specification would have included duplex OM3, OM4, and the potential for OM5, which supports shortwave wavelength division multiplexing (SWDM). The failed motion raises

further questions about the viability or benefit of OM5 for current or future applications.

One major roadblock facing OM5: SWDM technology cannot be easily broken out at the servers, limiting it to switch-to-switch topology. Yet most installed multimode fibre links in data centres — almost 50% according to Leviton data — use breakout cables at switch to server. This severely limits the broad market potential for 200 Gb/s over duplex multimode.

Here is a summary of current and planned 200 Gb/s options:

IEEE Application	Standard	Fibre	Number of Fibres	Reach
200GBASE-DR4	802.3bs	OS2	8	500 m
200GBASE-FR8	802.3bs	OS2	2	2 km
200GBASE-LR4	802.3bs	OS2	2	10 km
200GBASE-SR4	802.3cd	OM4/OM5	8	100 m

As OM5 appears to offer almost no benefit over OM4, and with the growing feasibility of single-mode options, OM5 is likely to become the "Cat 4" of the fibre generations: skipped over and forgotten.

Learn more about cabling options for 200 Gb/s, 400 Gb/s and beyond in the white paper **Navigating Cabling Options for Enterprise and Cloud Data Centres**.

Connecting the Smart Factory

Industry 4.0 was originally coined by the German government to describe next steps in developing the factory of the future. The European Union defines Industry 4.0 as "the organisation of production processes based on technology and devices autonomously communicating with each other along the value chain: a model of the 'smart' factory of the future where computer-driven systems monitor physical processes, create a virtual copy of the physical world and make decentralised decisions based on self-organisation mechanisms."

There's a lot to unpack in that definition, but in a nutshell, Industry 4.0 includes some fundamental changes that help companies become more efficient and competitive. These include:

- Capturing real-time information from the factory floor and along the supply chain, using sensors, energy metres, and the Industrial Internet of Things (IIoT)
- Big data, analytics, and added intelligence like machine learning and AI
- 3D printing and fast conversion from digital to physical
- Augmented Reality and other new methods of human-machine interaction

For most businesses, this type of digital transformation will be incremental. Many experts predict as much as 40 to 50 percent of machines will need to be replaced or upgraded to include sensors or connectivity, so most plants have started to selectively implement these initiatives. A 2016 survey of 750 production managers by Boston Consulting Group found that 74% have implemented or plan to implement within the next five years elements of the "factory of the future".

IT INFRASTRUCTURE REQUIREMENTS

When adopting Industry 4.0 initiatives, one of the big challenges is building the right IT infrastructure to support so many connected devices across the plant. Networks must be fast and reliable to handle near real-time data, and connectivity infrastructure must be able to adapt and scale to handle greater bandwidth demands through medium- to long-term changes.

Many industrial operations are more likely to use on-premises private cloud for data storage, partly for security reasons, but also to better support Industrial Internet of Things (IIoT) applications. According to F5 Networks, areas using IIoT apps are one of the top candidates for using on-premises private cloud footprints, as the large volume of data that industrial devices transmit requires closer proximity to where the data will be processed.

Wireless LAN networks will play a larger role in transmitting production data. These networks will require high-performance cabling systems like Category 6A to prepare for future expansion and support for high-power PoE applications. Industry standards recommend Category 6A for new wireless installations, as it is ideal for 802.11ac and future 802.11ax wireless technology.

RELY ON LEVITON TO HELP WITH INDUSTRIAL NETWORKS

Our experienced network experts can work closely with customers to understand their plant-wide network requirements and ensure their performance expectations are met. Contact us at +44 (0) 1592 772124.

Industrial Revolutions

18th Century

First revolution: water and steam power for industrial applications

19th Century

Second revolution: electricity and mass production

20th Century

Third revolution: computers for automation of production

21st Century

Fourth revolution: digitisation, smart factories

NEWS YOU CAN USE

INDUSTRY

ENTERPRISE WIRELESS LAN market sales saw double-digit growth rates in 2017, the highest since 2013, according to the *Wireless LAN Quarterly Report* from the Dell'Oro Group. Much of the growth is attributed to higher adoption from developing regions such as the Middle East, Africa, Asia, and Latin America.

---

400 GIGABIT ETHERNET SWITCHES will begin to ship this year, and Crehan Research predicts that these switches will drive the majority of data centre switch bandwidth by 2022. According to the company's *Data Centre Switch Long-Range Forecast Report*, 400 Gb/s will surpass a million ports shipped in less time than it took 100 Gb/s to reach that threshold. The report also predicts that 100 Gb/s shipments will surpass 40 Gb/s shipments in 2018.

> "400 Gb/s will surpass a million ports"

WEBINAR

CLOUD CITY: Navigating Cloud Data Centre and Enterprise Network Cabling Options

French — Friday 15th June 2018
REGISTER TODAY

Italian — Wednesday 27th June 2018
REGISTER TODAY

YESTERDAY'S NEWS

1998 — 20 years ago, 1000BASE-T was approved for delivering 1 Gigabit Ethernet over Category 5, replacing the "Fast Ethernet" 100BASE-T technology.

TECH TIPS

Preventing Insertion Loss when Using Fan Out Kits

FAN OUT KITS are a necessary component in termination of loose tube fibre optic cables. The kits help to protect the transition point exiting the outer cable jacket and 250 µm fibres from crushing or bending. While the termination process is easy with minimal tools and consumables, there are a few considerations during the process.

Two factors must be observed that can affect performance while installing a fan out kit in relation to the housing:

- Avoid over-crimping of the crimp points. Crimp only enough to properly secure the outer jacket or tubing from slippage with minor pull force. A slight manipulation of the jacket or tubing will be visible. Over-crimping can potentially damage fibres inside the tubing.

- Allow sufficient length between the exit point of the cable and the fan out tubing entry point. Position the exit point just past the second crimp pins (as shown above on the right). Positioning the exit point too close to the entrance point of the furcation tubing block can cause macro-bending of fibres, potentially resulting in damaged fibres or high insertion loss.

1-2 mm from crimp point

Macro bends
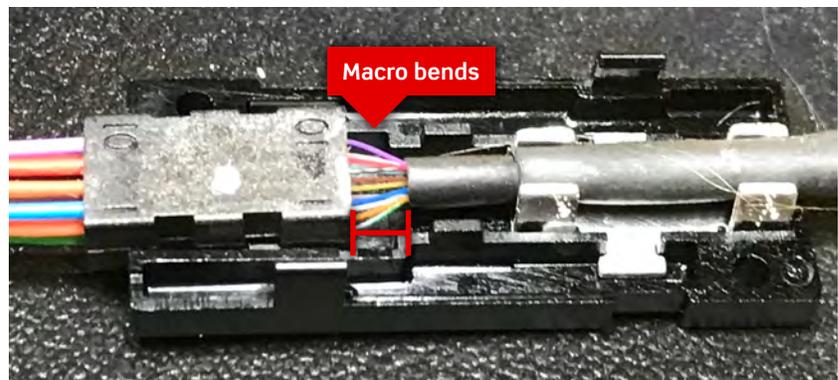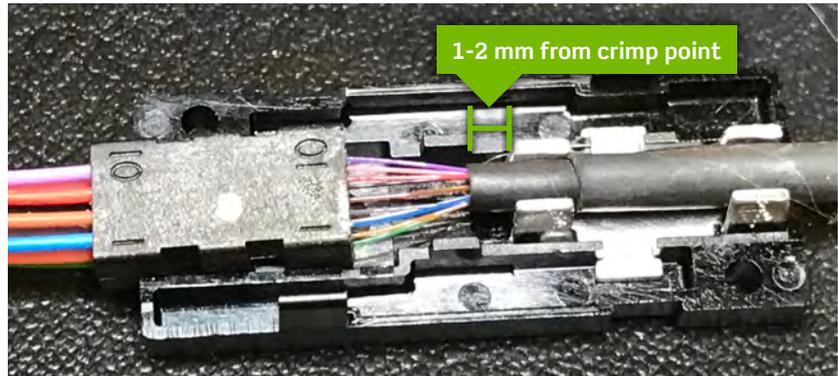
ASK THE **EXPERTS**

Q: For short reach fibre, how does the cost of multimode SWDM transceivers compare to single-mode transceivers?

A: **SHORTWAVE WAVELENGTH DIVISION MULTIPLEXING** (SWDM) is a new technology, so SWDM4 transceivers will be more expensive than single-mode SR4 transceivers. Cisco offers a bidirectional (BiDi) solution that brings the price point closer to single-mode QSFP-SR4 optics, but single-mode is currently more cost effective, especially when combining the entire link — including cabling and transceiver costs.

For example, 100G-PSM4 single-mode technology, created in 2014 by a multi-source agreement group, is currently the same price as 100G-SR4 multimode transceivers. PSM4 transceivers were specifically designed as a low-cost option for 500 metres or less, using an 8-fibre MPO/MTP connection. Also, the price for long-reach single-mode solutions such as 100G-LR4 has dropped and will continue to drop over the next several years.

QUESTIONS?
COMMENTS?
IDEAS?

We want to hear from you!
Email: **crosstalk@leviton.com**