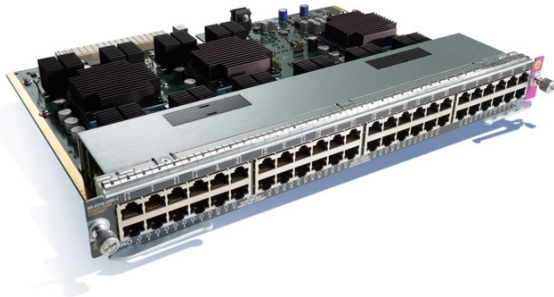


# Cisco Universal Power Over Ethernet:

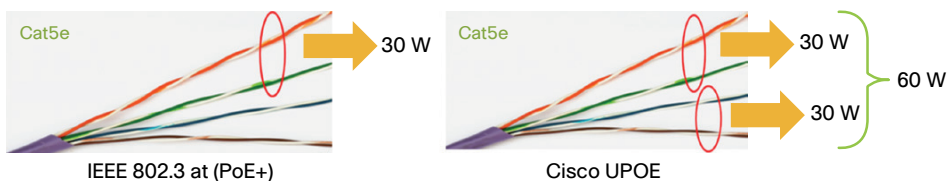
## Unleash the Power of Your Network



### What Is Cisco Universal Power over Ethernet?

The IEEE 802.3 Power over Ethernet (PoE) standard sets the maximum power that can be sourced by data terminal equipment (DTE) at 30W. This power is sourced over two pairs out of the four twisted pairs of conductors in a Class D, or better, cabling as specified in ISO/IEC 11801:1995.

Cisco® Universal Power over Ethernet (UPOE) is a Cisco proprietary technology that extends the IEEE 802.3 PoE standard to provide the capability to source up to 60W of power over standard Ethernet cabling infrastructure (Class D or better).



### Why Should I Care About Cisco UPOE?

Power over Ethernet has long been hailed as the single most critical innovation that has revolutionized and expedited the adoption of IP telephony in the enterprise market segment. The power rating for electronic products is trending down through advances in semiconductor technology, and the cost of power itself is trending up. UPOE extends the benefits offered by PoE technology to a much wider range of devices due to the higher power envelope.

Some of the key primary benefits of UPOE are:

- Cisco UPOE offers **high availability** for power and guarantees uninterrupted services; a requirement for critical applications (e911).
- Cisco UPOE **lowers OpEx** by providing network resiliency at lower cost by consolidating backup power into the wiring closet.
- Cisco UPOE enables **faster deployment** of new campus access networking infrastructures by eliminating the need for a power outlet for every endpoint.
- Cisco UPOE, in combination with Cisco EnergyWise, helps meet **corporate sustainability** mandates while **lowering energy** costs.

### What Applications and End Devices Does Cisco UPOE Enable?

Cisco UPOE simplifies network infrastructures, extends high availability for power (PoE resiliency), and delivers lower total cost of ownership for connected environments such as virtual desktop infrastructure (VDI), financial trading floor, enterprise workspace, conference rooms, hospitality guest suites, and retail. Partnerships with industry leaders and in-house development together have resulted in a variety of end devices that are compatible with Cisco UPOE. A few notable end devices are:

- Samsung integrated display VDI zero clients
- LG Electronic Monitor using UPOE Power Splitter
- BT, IPC and SpeakerBus IP Turrets
- Cisco Catalyst compact switches
- Personal Cisco TelePresence systems
- Building management and physical security device

### What Primary Verticals Does UPOE Address?

UPOE and the associated partner ecosystem (Cisco Developer Network) provide solutions for the following verticals:

- Enterprise workspace
- Financial trading floor
- Hospitality
- Retail
- Enterprise facilities management



### What Is the Effect of Cisco UPOE on Heat Dissipated Within the Cabling Infrastructure?

Cisco UPOE is an efficient mechanism for power delivery since it uses all the four twisted pairs of conductors within the Ethernet cabling to deliver power (as opposed to two twisted pairs used by PoE+). This effectively reduces the channel losses by half for the same power delivered over UPOE vs. PoE+. Moreover, the recommendation published by cabling standards – ISO/IEC and TIA/TR-42 as part of formal liaison communiqué with IEEE 802.3 – indicate that UPOE can be supported over the same standard cabling infrastructures that conform to PoE+ requirements.

### On Which Switching Platform Is Cisco UPOE Being Introduced?

Cisco UPOE is being introduced on the Cisco Catalyst 4500E Series Switches, the most widely deployed modular access switching platform in the industry. The platform has time and again demonstrated leadership in this space, specifically with PoE+, where the Cisco Catalyst 4500 was the first enterprise-class switch to deliver PoE+ compliant switches, two years to the introduction of the IEEE PoE+ standard. UPOE is being introduced on the Cisco Catalyst 4500E platform in the form a new E-Series line card, WS-X4748-UPOE+E, that is compatible with Supervisor Engine 8-E, 7-E, 7L-E and beyond. Cisco UPOE is backward compatible with both PoE (IEEE 802.3af) as well as PoE+ (IEEE 802.3at).

### What Is the UPOE Scalability on a Cisco Catalyst 4500E System?

Each WS-X4748-UPOE+E line card has a total available power budget of 1440W that can be allocated to the 48 front panel ports with a maximum of 60W per port. This provides the capability to power a maximum of 24 ports simultaneously at 60W. With five such line cards on a single system, the maximum number of ports that can simultaneously source 60W is 116. Moreover, each port also supports LLDP-based dynamic power negotiation capability that permits the end device to communicate the exact power requirement to the switch, which in turn enables smart budgeting of power to maximize the total number of UPOE devices that can be powered on a single line card.

### How Is Power Budgeted to Individual Ports?

In addition to extending the power envelope defined by the IEEE 802.3 standard, UPOE also extends the LLDP-PoE dynamic power negotiation protocol defined by IEEE 802.3 to facilitate mutual identification and dynamic budgeting of power to individual ports. Additionally, UPOE also provides the users the capability to statically configure port power budget to enable devices that do not support the LLDP-PoE extensions for UPOE support.

### How Does UPOE Tie in with Cisco's Overall Enterprise Campus Access Strategy?

With the introduction of the Supervisor Engine 8-E, 7-E and 7L-E, the Cisco Catalyst 4500E has become Cisco's leading modular campus access platform. The platform not only offers unprecedented switching bandwidth with line-rate switching to all user access ports and 10G uplinks but also has been the first platform to deliver next-generation services such as subsecond ISSU, Flexible Netflow, Cisco TrustSec® security, Wireshark as a hosted application, and medianet innovations. High availability and lower TCO continue to be the underlying goals for the platform. Cisco UPOE extends high availability for power while minimizing both CapEx and OpEx involved with power delivery.

### For More Information

- Cisco Catalyst 4500 Series Switches White Papers  
[http://www.cisco.com/en/US/products/hw/switches/ps4324/prod\\_white\\_papers\\_list.html](http://www.cisco.com/en/US/products/hw/switches/ps4324/prod_white_papers_list.html)
- Cisco Catalyst 4500 Supervisor 8-E Datasheet  
[http://www.cisco.com/en/US/products/hw/switches/ps4324/products\\_data\\_sheets\\_list.html](http://www.cisco.com/en/US/products/hw/switches/ps4324/products_data_sheets_list.html)
- Cisco Catalyst 4500 Supervisor 7-E Datasheet  
[www.cisco.com/en/US/prod/collateral/switches/ps5718/ps4324/data\\_sheet\\_c78-612364.html](http://www.cisco.com/en/US/prod/collateral/switches/ps5718/ps4324/data_sheet_c78-612364.html)
- Cisco Catalyst 4500 Supervisor 7L-E Datasheet  
[http://www.cisco.com/en/US/prod/collateral/switches/ps5718/ps4324/data\\_sheet\\_c78-686325.html](http://www.cisco.com/en/US/prod/collateral/switches/ps5718/ps4324/data_sheet_c78-686325.html)
- Cisco Catalyst 4500 Line-Card Datasheet  
[www.cisco.com/en/US/prod/collateral/modules/ps2710/ps5494/product\\_data\\_sheet0900aecd802109ea\\_ps4324\\_Products\\_Data\\_Sheet.html](http://www.cisco.com/en/US/prod/collateral/modules/ps2710/ps5494/product_data_sheet0900aecd802109ea_ps4324_Products_Data_Sheet.html)
- Cisco Catalyst 4500 Chassis Datasheet  
[www.cisco.com/en/US/prod/collateral/switches/ps5718/ps4324/product\\_data\\_sheet0900aecd801792b1.html](http://www.cisco.com/en/US/prod/collateral/switches/ps5718/ps4324/product_data_sheet0900aecd801792b1.html)
- Cisco Catalyst 4500 Power Supply Datasheet  
[www.cisco.com/en/US/prod/collateral/switches/ps5718/ps4324/product\\_data\\_sheet09186a00801f3dd9.html](http://www.cisco.com/en/US/prod/collateral/switches/ps5718/ps4324/product_data_sheet09186a00801f3dd9.html)