

PoE Powers Wireless

Wireless permeates many of today's communication applications. From point-to-point communications to wireless networks, communication via electronic emissions without a contiguous connection of copper or fiber is ubiquitous. PoE has become a major option to power these applications.



What Is PoE?

Power over Ethernet (PoE) is the ability to provide both power and data over an ethernet cable. Introduced in 1997 by what is today the Microchip PoE business unit, the technology enabled manufacturers to power connected devices through an Integrated Circuit (IC) that put power onto an Ethernet cable and a second IC that took the power off the cable and provided it to the device.

Originally, there were no PoE network switches that could provide power. The Microchip PoE business unit developed the first PoE midspan, also known as a PoE injector. This is a system that takes input through an Ethernet cable from a network switch that contains data and adds or "injects" power onto the line and provides an output Ethernet cable that contains both power and data.

When a PoE Switch Is Not Enough

There are switches available in the market today that not only deliver data but also power over the Ethernet cable. However, only about 20% of the switches deployed today provide power. Thus, if installing a wireless network powered by PoE over an existing infrastructure with a non-PoE switch, power must be injected onto the Ethernet cable. The most cost-effective and convenient way to do this is by installing a PoE midspan.

Even if a PoE switch is deployed, there are limitations. Every switch comes with a total power budget. A portion of that budget will be used to power the switch itself. The remaining power can be used to provide PoE power through the port. However, switches rarely have enough power budget to provide full power on every port. In this case, PoE midspans can be used to provide supplemental power to those ports.

Microchip has the largest portfolio of PoE midspans to meet every customer's needs. See our post on the benefits of PoE midspans to understand when to use a midspan versus a PoE switch.

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PoE for Wireless

Many wireless devices today are powered by PoE. The most common include Wireless Access Points (WAPs) for Wi-Fi® networks. When deploying a wireless network in an organization or throughout a venue, utilizing PoE as the power source simplifies and reduces the cost of the installation. There is no need to ensure that there is an AC plug everywhere a WAP is deployed. This gives the installer the flexibility to place the device in the optimum location for maximum coverage.

Many other wireless devices are powered by PoE today. Point-to-point wireless radio connections are becoming extremely popular in smart city applications. The ability to communicate with remote cameras or RFID readers through point-to-point communications enables advanced applications.

When point-to-point deployments are not robust enough to support an application, hierarchical telecommunications networks are built. At the edge are subnets with the end devices, and connecting those subnets to the main network through an intermediate structure is the backhaul network. This infrastructure can be built using fiber; however, for the most flexibility, wireless radios powered by PoE are commonly used.

When One Gig Is Not Enough

Today's wireless applications have placed new demands on networks, especially data speeds. In the past, one Gigabit per second (Gbps) was fast enough to support most common applications. Today's wireless infrastructure requires much more. With the introduction of Wi-Fi® 6e, networks can now have more connections and handle more data throughput. To enable this expanded capability, these networks demand higher data rates of up to 10 Gbps.

The need for faster networks is growing exponentially. One of the biggest drivers of this growth are the 5G networks being deployed by mobile carriers around the world. 5G networks can handle significantly more data than 4G networks due to the shorter wavelength. Shorter wavelengths also mean shorter transmission ranges; thus, 5G networks require substantially more cellular end points. PoE enables carriers and providers to easily place endpoints where they are needed without any dependency on the AC infrastructure.

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Microchip has the most extensive selection of multigig PoE midspans in the marketplace including single-port versions that support 1, 2.5, 5 and 10 Gbps. In addition, today Microchip is the only source of multi-port PoE midspans of up to 24 ports and 10-Gbps data rate.

When Indoor Is Not Enough

The deployment of public Wi-Fi, 5G and smart buildings/cities is no longer limited to indoor environments. Many organizations such as college campuses and sports arenas have mixed environments that require both indoor and outdoor coverage. 5G networks are predominantly deployed in an outdoor environment.

Many try to address this requirement by placing a switch or midspan designed for indoor or industrial use and placing it in an outdoor enclosure such as a NEMA box. The challenge with these deployments is that the units installed were never built for the outdoor environment. Extreme hot and cold temperatures pose significant risks to such enclosures. They are also subject to damage from electrical surges.

We take a unique approach by providing a totally sealed unit that has an Ingress Protection (IP) rating of 66/67. This means the unit can not only resist heavy seas or powerful jets of water, it is also protected against immersion in water for up to 30 minutes at depths up to 1000 mm.

In addition to designing the units to be fully waterproof, all of our outdoor devices are protected from electrical surges. All units meet GR-1089-Core Issue 4 ITU-T K.21 enhanced surge protection up to 6 KV on data and AC Lines.

We provide a full line of single-port outdoor PoE midspans at 30, 60 and 90W, which also supports data rates up to 10 Gbps on most units. Microchip was also the first to introduce a four-port PoE switch with one SFP uplink port for the outdoor environment. Since then, some have come out with their own offerings; however, none have a sealed unit, four PoE ports and one SFP port.

Microchip is introducing the next-generation outdoor PoE switch. This switch supports IEEE® 802.3bt type 4 with up to 90W of power on a port. It has four PoE ports and two SFP ports that provide redundancy to enhance the reliability of the switch providing failover support should one fiber link fail. In addition, it comes with full security and network capabilities. The switch is an excellent solution for deploying fixed outdoor wireless topologies.

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Why Microchip

There are many vendors of PoE to choose from in the marketplace. Yet when it comes to PoE, Microchip stands out above the crowd. The Microchip PoE business unit first introduced PoE in the 1990s. Microchip led the drive to create an industry standard for PoE with IEEE providing over 70% of the documentation for the first standard. We have been a driving force in all subsequent standards.

In addition, Microchip is known for the quality of the devices built. Many customers have provided feedback on the success they have experienced deploying Microchip as opposed to competition. This can be seen in the very high Mean Time Between Failure (MTBF) and the low number of failures experienced.

Microchip continues to be the thought leader and innovator of PoE in the marketplace. Microchip is the only vendor to produce ICs, PoE switches and midspans. All the experience we have from producing the ICs goes into the superior design of our PoE systems. The experience with our PoE systems gets fed back to the IC engineers so they can design better semiconductors. This leads to Microchip producing the first PoE midspan and outdoor PoE switch and extending the benefits of PoE to the USB-C® marketplace.