



Connecting with Power over Ethernet (PoE):

*NETGEAR provides easy-to-deploy
Power over Ethernet solutions*

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Power over Ethernet (PoE) has garnered significant attention as a way to cut IT costs, reduce complexity and enable greater convergence of services over the network. Basically, PoE extends power from a Powered Source Equipment (PSE), such as a switch, to a Powered Device (PD), such as an IP phone, surveillance camera, wireless access point and other appliance. Because it can power a diverse range of devices over an Ethernet LAN cable, PoE provides flexibility, mobility and cost savings and is often a preferred option for small to medium-sized companies.

The IEEE 802.3af Standard

In 2003, the IEEE ratified the PoE standard—802.3af. The standard works by injecting direct current (DC) power over Ethernet cable wires, typically through LAN switches, and delivering three levels of power: 4, 7 or 15.4 Watts. PoE provides 48 volts of DC over two out of four available pairs on a Cat. 3/Cat. 5 cable, producing a maximum current of 400 millamperes for maximum load power of 15.4 Watts. Data can be carried on the same cable as the power, thereby enabling use with 10Base-T, 100Base-T and even Gigabit Ethernet. Power-sourcing equipment (PSE) can detect the presence of a PD and will then inject the applicable current into the data cable.

PoE+ is a new standard being developed by the IEEE 802.3at task force to supply up to 56 Watts of power over a standard Ethernet Cat. 5 cable. PoE+ will allow new self-powered equipment to be operated over PoE, such as WiMAX transmitters, pan-tilt-zoom cameras, videophones and thin clients.

Today, businesses of all sizes are interested in using PoE to reduce the cost and hassle of connecting Power Devices to the corporate network. PoE has stimulated growth in the wireless market and has extensive application in industrial environments. PoE has inspired the creation of PoE capable devices such as video cameras, retail kiosks, point-of-sale devices, card scanners and more. To take advantage of its many uses and benefits, companies should ensure their IT infrastructure supports PoE. This can be accomplished easily by simply installing PoE capable switches.

How it works

How PoE works is simple: Power is transmitted over an RJ45 Ethernet Cable defined by the IEEE 802.3af standard (see Sidebar: The IEEE 802.3af Standard). Because it leverages existing Ethernet connections, PoE eliminates the need for adding power cables and power outlets. This provides greater deployment flexibility. For example, a wireless LAN access point can be mounted in rooms that don't have power outlets or near the ceiling or a window to provide better wireless reception. Since only a single Ethernet cable (Category 3, 4 or 5) is needed, the cost of hiring electricians to install electrical wiring and outlets in multiple locations is eliminated. Deploying an Access Point or IP phone in the middle of a warehouse or a Camera on a tower is as simple as extending an Ethernet cable to that location.

Key benefits of PoE include:

- *Cost-effectiveness:* Reduces high costs of deployment by eliminating the need for additional wiring and outlets.

- *Flexibility*: Offers freedom to install access points where it makes sense or where reception is better.
- *Reliability*: Adding a Universal Power Supply to the Power Source, IE, Switch, automatically puts the end devices on UPS backup as well.
- *Mobility*: Power can be accessed anywhere there is an Ethernet cable. Allowing the business to cost affectively expand the reach of the network.

Powered devices range in power consumption. This will dramatically change the number of PD's a switch will support. For instance, a simple IP Phone is typically either a class 1 or 2 utilizing 7 watts at the most, while a more advanced product such as a Video IP Phone will utilize up to 15.4 watts to support the extra features. This is important when selecting the PSE or switch. Use the charts below to determine what kind of switch best suits your needs. 10/100/1000 ports.

IEEE 802.3af Powered Device Classification

Class	Usage	Minimum Power Levels Output at the PSE	Maximum Power Levels at the Powered Device
0	Default	15.4W	0.44 to 12.95W
1	Optional	4.0W	0.44 to 3.84W
2	Optional	7.0W	3.84 to 6.49W
3	Optional	15.4W	6.49 to 12.95W
4	Reserved for future use	Treat as Class 0	Reserved for Future Use: A class 4 signature cannot be provided by a compliant powered device

Switching intelligence critical for success of PoE

Switching intelligence at the network's edge helps manage the growing number of devices that are connecting to enterprise networks. New switches support full PoE at up to 15.4 Watts per port, enabling more numbers and types of devices to access the network remotely, which, in turn, increases worker productivity

and enhances mobility and flexibility. Other features to look for are 10Gigabit Ethernet support, so that the solution can scale to support continued growth and increasing bandwidth requirements over time, and stackability, which can reduce costs and complexity with simplified management and better security, along with increased network resilience.

PoE Support in a High-Performance NETGEAR ProSafe™ Switches

ProSafe™ 48 and 24 port 10/100 Stackable Smart Switches, Layer 3 Managed Switches, and Unmanaged Switches with PoE support are ideal for deploying devices like wireless access points, VoIP phones, and surveillance cameras, quickly and cost-effectively. NETGEAR also offers a line of ProSave Wireless Access Points that are PoE enabled, to make integration and deployment of wireless applications easy and cost-effective.

Smart Switches with PoE

Designed to support the needs of growing SMB and mid-market companies, the ProSafe FS726TP, FS728TP and FS752TPS deliver performance and scalability through a 4Gbps, dual-ring, resilient stacking architecture that provides the ability to mix and match to stack up to 192 10/100 ports. These switches offer key management features at about the same price as an unmanaged solution, including trunking, port configuration, VLANs and prioritization, and are easily managed via SNMP or through an intuitive, browser-based GUI. Additionally, the new ProSafe Stackable Smart Switches expand on the current ProSafe Smart Switch feature set by adding 801.x security, SNMP v2c and v3 support, Syslog with SNTF, rate limiting and Layer 3 prioritization. ProSafe FS 726TP , FS728TP and FS752TPS each feature four Gigabit Ethernet ports for connection to servers or the network backbone and two hot-swappable Small Form-factor Pluggable (SFP) GBIC slots that provide fiber connectivity for greater distance and security.



Figure 1. GS748TP

Layer 3 Managed Switches with PoE

The FSM7352PS ProSafe 48 Port 10/100 L3 Managed Stackable Switch and the and FSM7326P ProSafe 24 Port 10/100 L3 Managed Switch provides both Layer 2 and Layer 3 managed switching functionality, including routing, switching, and quality of service (QoS) feature sets. Dynamic Layer 3 switching ensures reliable routing between VLANs and network segmentation. The switches enable new IP-based services such as Multiple VLANs, QoS, Bandwidth limiting, access control, subnetting, new security protocols and IP subnetting. The FSM7352PS is also stackable for maximum scalability.



Figure 2. FSM7352PS

Unmanaged ProSafe Switches with POE

The FS108P and FS116P ProSafe Desktop Switches with PoE provide 8 and 16 ports respectively. The FS108P with four PoE ports and the FS116P with eight PoE ports can power IEEE 802.3af-compliant IP-based devices such as wireless access points, Voice-over-IP (VoIP) telephones, surveillance cameras, and card scanners, while maintaining connectivity to standard 10/100 Mbps devices. Easy to install and use, these desktop PoE switches can provide power for up to four ProSafe Access Points, enabling the flexibility to place these access points high on walls or in ceilings where AC power is difficult to access.

Wireless Access Points

The ProSafe family of Wireless Access Points include (WAP) three models that support PoE: the WG102, WG302 and WAG102. These value-packed access points support the demanding networking requirements of growing businesses and are easy to deploy in even the most challenging office environments. The ProSafe WAPs feature SNMP for management, Wi-Fi Protected Access (WPA-Enterprise) and are 802.11i-ready. Fully compatible with IEEE 802.11g, (2.4 GHz), they can also be set for dynamic 108 Mbps 802.11g. Ideal for deploying video, audio and voice applications over the wireless network through support for Wi-Fi Multimedia (WMM), the WAG102 also incorporates Wireless Distribution System (WDS) to support bridging and repeater modes.

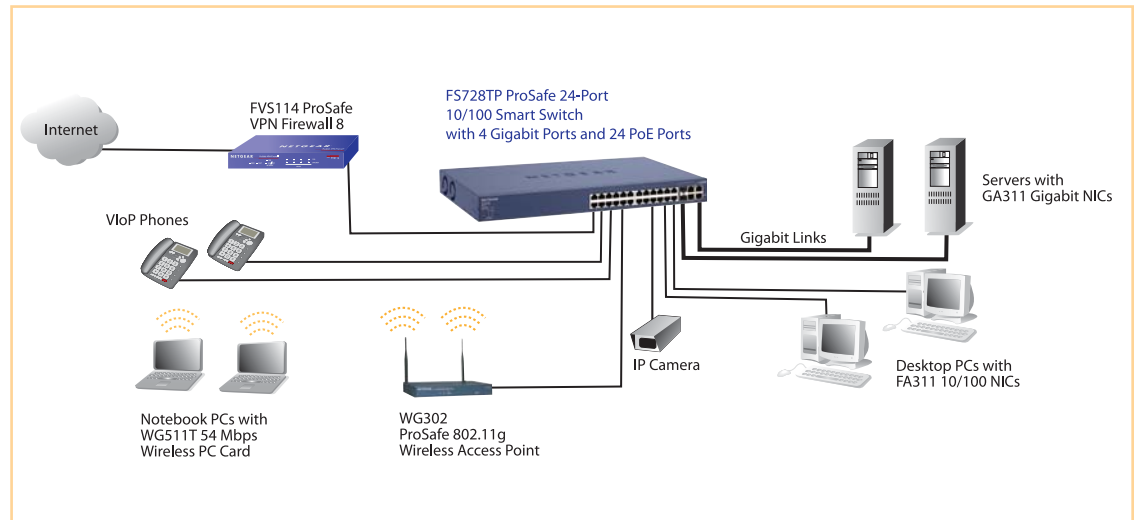
Key Features/Benefits

- Optimized installation and power management of IEEE 802.3af standard-based network devices.
- Comprehensive set of Layer 3 in Layer 3 managed switches enhance data networking and enable new network applications such as voice and video.
- Multiple VLAN support, wire speed routing to offload expensive routers, resiliency, and redundancy.
- Built-in Gigabit Ethernet ports for fast connections to servers over a Gigabit-speed backbone, and combo interfaces for greater flexibility.
- Web-based Smart management features such as performance monitoring, port configuration, VLAN, port trunking, and Class of Service (CoS).

- Optimized for ProSafe Network Management Software (NMS100).
- Robust security features, including 802.1x port-based authentication and access control lists; Secure Sockets Layer (SSLv3) for the Web GUI; and Secured Shell (SSH) for command-line sessions.
- Stackability for easy management and administration.

PoE—A business-enabling technology

Enabling PoE in your network will be an essential business tool moving forward as more and more devices are used to access the network from multiple, increasingly diverse and sometimes remote locations. NETGEAR's ProSafe switches with PoE support offer flexible, scalable, high-performance solutions for delivering maximum throughput and flexible deployment options when and where you need them.



For more information on NETGEAR PoE product offerings, please visit www.netgear.com.