

Get Smart With PoE

Ten Reasons Smart Power-Over-Ethernet Switches are the Wise Choice for Upgrading IP Surveillance Networks

An ever-increasing number of today's businesses, school districts and healthcare facilities are delving into Smart Ethernet switches with Power-over-Ethernet (PoE) technology—and reaping big benefits for their IP Surveillance networks.

PoE Switches: The Basics

With PoE technology, IP cameras are powered using the same LAN cable (typically a UTP Cat5e or better) that also carries the IP video data. Normally, at the center of the network is a PoE switch—a traditional Ethernet switch that has the additional capability of “injecting” PoE power (48VDC) on the LAN cable. A PoE switch will commonly have 4, 8, 16, 24 or 48 ports, although other variants are also available. This switch provides power and data to the IP camera on each port—using a single LAN cable—up to 330 ft. (100 m.) away.

PoE switches fall into three basic categories: unmanaged, smart and managed.

- Unmanaged switches provide basic connectivity between networked devices at a low cost. However, they aren't capable of changing settings or functions. They tend to be easy to use and good for simple connectivity only.
- Smart switches have a Graphical User Interface (GUI) with easy-to-understand controls, and are managed via a web browser. They provide intuitive guidance to users and are ideal for those who have no advanced network training.
- Fully Managed switches have a GUI, and also a more technical Command Line Interface (CLI), which allows network administrators to create scripts to program and manage multiple switches. Fully managed switches have a full suite of capabilities that are often beyond the needs of a basic IP surveillance network.

Why PoE Smart Switches Over Unmanaged Switches?

When designing an IP Surveillance network, here are ten reasons it makes smart sense to “step up” from an unmanaged PoE switch to a Smart PoE switch.

Reason #1: More Bang for the Buck.

When working with budget-conscious customers, many system integrators and network designers normally specify unmanaged PoE switches, due to their simplicity and low cost. However, upgrading to a Smart PoE switch can net big value. The cost increase is minimal, and yet the added capabilities, tools and benefits for the surveillance network (and administrators) can be compelling.

Reason #2: Easier Administration.

Smart PoE switches feature an easy-to-use, browser-based user interface and straightforward communication. An administrator simply browses to the IP address of the switch. The administrator can then use an intuitive graphical user interface (GUI) that becomes a simple vehicle for configuring and monitoring important elements and features in the network.

Reason #3: Remote Reboots and Power Control.

With smart switches, an administrator can remotely turn on and off the PoE power to each camera via the graphical user interface. This comes in especially handy when a camera needs to be rebooted. This action can be manually controlled at any time from anywhere on the network, including over the Internet.

Using PoE cameras and switches is a win-win strategy because it offers:

- Flexibility: End devices can be installed where it's hard to get power, and they can easily be moved to wherever there's a LAN cable.
- Simplicity: Only a LAN cable is needed to the end device, which minimizes cable clutter.
- Safety: No AC power is needed for outdoor applications.
- Cost Savings: There's no need to install power outlets, which saves on electrician and permitting costs.

While the task of manually provisioning VLANs can sound daunting and complicated, D-Link Smart PoE switches support a feature called Auto Surveillance VLAN, which enables the Smart PoE switch to automatically detect any D-Link (or other manufacturer's) IP camera on the network.

The administrator need not be at the camera's location, nor be in the same room as the PoE switch, which avoids truck rolls, saves time and money. PoE ports can be powered up/down one at a time, many ports at a time or all ports together.

Some Smart PoE switches, such as business-class solutions from D-Link, even support Time Based PoE—an option that allows administrators to set a time window that determines when each camera is powered on and off. This can be useful for networks that need to be shut down during certain times of the day, or for automatically scheduling IP camera reboots on a periodic (daily) basis with no manual intervention.

Reason #4: Real-Time Power Statistics and Power-Saving Features.

Under certain conditions, network administrators need to know the real-time power consumption for each switch port, including the overall PoE budget utilization. Capturing this data simply isn't possible with an unmanaged switch. A Smart PoE switch, however, can provide the following power consumption statistics in real time:

- PoE power utilization per port, including Power (W), Current draw (mA) and Voltage levels (VDC)
- Overall system power, including the total system PoE power budget, amount of PoE power currently being used and the remaining PoE power still available

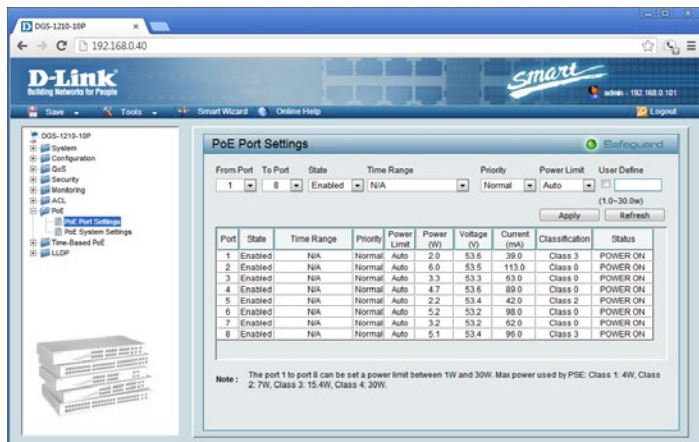


Figure 1. Sample Smart switch graphical user interface (GUI) showing real-time PoE port settings and status.

Also, Smart PoE switches may often support power-saving features that are not found in unmanaged PoE switches. For example, when a Smart PoE switch senses that an RJ-45 port is link down, or the connected device (camera) is idle, has been disconnected or turned

off, the signal power to that port will be reduced. By reducing signal power consumption, less heat is produced, resulting in extended product life and lower operating costs.

Reason #5: Auto Surveillance VLAN.

A Virtual Local Area Network (VLAN) uses an Ethernet Switch to partition a physical network, thereby creating distinct broadcast domains. VLANs are especially useful when an IP Surveillance network shares the same network infrastructure with other functions or applications, such as a corporate data network. By assigning the IP Surveillance traffic to a separate, distinct, high-priority VLAN, the traffic is assured to pass through the network swiftly and securely.

While the task of manually provisioning VLANs can sound daunting and complicated, D-Link Smart PoE switches support a feature called Auto Surveillance VLAN, which enables the Smart PoE switch to automatically detect any D-Link (or other manufacturer's) IP camera on the network. With no manual intervention, traffic from each camera is automatically assigned to a high-priority VLAN, which guarantees the quality and security of the surveillance information, even during periods of high network congestion.

Reason #6: Smarter Management of the PoE Power Budget.

Smart PoE switches also have a distinct advantage when it comes to managing the PoE power budget. As the network grows and additional cameras are added, a PoE switch will be asked to supply more power. When an unmanaged switch reaches its power budget maximum, it will prohibit turn up of any additional ports. On the other hand, a Smart PoE switch allows an administrator to manage increased power demands in a much more controlled manner, through user-defined port-priority assignments and policies.

Reason #7: Ability to Set PoE Power Threshold Limits Per Port.

Under some conditions, a network administrator may need to set a limit to the amount of power applied to any particular switch port for an IP camera. This is especially useful for IP cameras that don't "self-report" their power classification to the switch automatically.

Setting power limits cannot be done with unmanaged PoE switches, but it's quite easy to do with a Smart PoE switch. Most Smart PoE switches allow administrators to configure a power threshold per port based on pre-defined IEEE 802.3at Classifications (i.e., 4.0W, 7.0W, 15.4W or 30.0W). Others even allow administrators to define a custom power limit (from 1-30W) for any designated port.

Reason #8: Better Cable Diagnostics.

Smart PoE switches enable administrators to easily examine the quality of the copper cables connected to each switch port. Tests can be initiated from anywhere on the network and run on each port during installation or troubleshooting to determine any potential cable errors.

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This is a distinct advantage over unmanaged switches, which don't have this functionality. Diagnostics data includes:

- Cable connection: OK / Short Circuit / Open Circuit.
- Cable Fault Distance: If a cable fault is found, the test results will show the distance of the fault from the switch port.
- Cable Length: If test results show OK, they will also show the total length of the cable.

Reason #9: Automatic Loop Detection.

Smart PoE switches may also feature a loop detection function, which can locate unintentional loops in a network. If a loop is detected, the switch automatically shuts down the port and alerts the administrator. Loop detection can be enabled on a single port, a range of ports or all ports simultaneously. Without such protection, undetected loops can wreak major havoc and cause serious traffic flow disruptions.

Reason #10: PoE Traps and Alerts for Administrators.

Unmanaged PoE switches have no ability to alert the network administrator after a change or disruption to the network. Smart

switches, however, can send "traps" or alerts to a network management system (typically SNMP-based) when such challenges arise. For example, a Smart PoE switch can send a trap/alert to administrators when:

- An Ethernet link goes up or down (e.g. an IP camera establishes or loses a link)
- PoE power turns on/off for any port
- A short circuit occurs on any port
- A "Power Deny" action occurs on any port

In Summary

Unmanaged PoE switches are considered a mainstay of IP surveillance networks because they are low-cost, easy-to-use and good for simple connectivity. However, more and more security professionals are beginning to realize the tremendous benefits of upgrading to Smart (managed) PoE switches. Not only do they represent minimal cost increases, they provide network administrators with a simple, easy-to-use interface through which the IP surveillance network can be configured and monitored from anywhere, anytime. They also offer additional tools that enable administrators to enjoy faster network installation, easier network maintenance and upgrades, and better visibility into network health. It all adds up to time- and cost-savings that are attractive selling features for today's budget-conscious organizations.