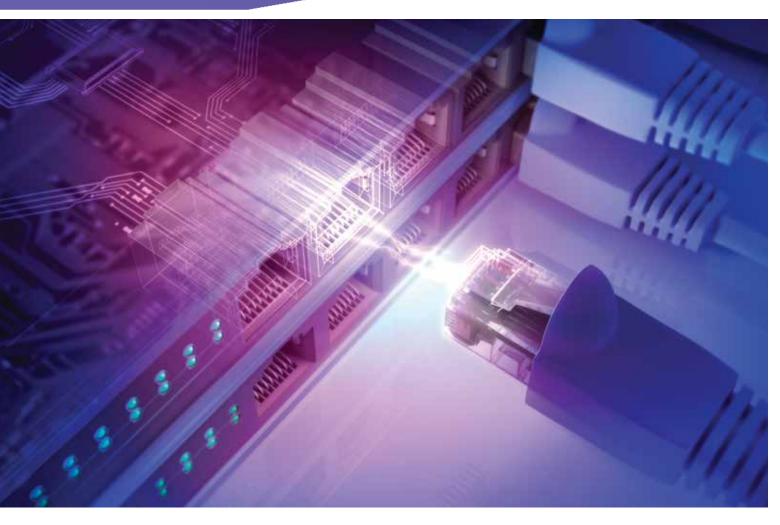# GET SMART WITH POE

10 reasons smart switches are the wise upgrade for IP surveillance networks

By Steven Olen

When developing IP surveillance installations, many security system integrators and IP-Surveillance network designers have turned to PoE technology, and for good reason. Using PoE cameras and switches eliminates the need for separate power and data cables, thus simplifying installation, increasing flexibility for camera locations and saving money. This strategy enables integrators to use more cameras, helping ensure a more comprehensive solution for customers and extending the overall profit margin for integrators.

PoE Switches: The Basics

With PoE technology, IP cameras can be powered using the same LAN cable—typically a UTP Cat-5e or better—that also carries the IP video data. A PoE switch is a traditional Ethernet switch with the additional capability of "injecting" PoE power (48VDC) on the LAN cable. A PoE switch commonly has 4, 8, 16, 24 or 48 ports, although other variants also are available. This switch provides power and data to the IP camera on each port—using a single LAN cable—up to 330 feet 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, but only for simple connectivity.

Smart, managed switches have graphical user interface (GUI) with easy-to-understand controls and are managed via Web browser. They provide intuitive guidance to users, which is ideal for those who have no advanced network training.

Fully managed switches have a GUI and 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 Choose PoE Smart Switches over Unmanaged Switches? When designing an IP surveillance network, here are 10 reasons it makes sense to "step up" from a basic (unmanaged) PoE switch to a smart PoE switch.

More Bang for the Buck

When working with budget-conscious customers, many system integrators and network designers normally specify unmanaged PoE switches, due to simplicity and low cost. However, taking a step up 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 its administrators—can be compelling.

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, and can then use an intuitive GUI that becomes a simple vehicle for configuring and monitoring important elements and features in the network.

Remote Reboots and Power Control

With smart switches, an administrator can remotely turn on and off the PoE to each camera via the GUI. This comes in handy when a camera needs to be rebooted. This action can be manually controlled from anywhere, at any time on the network, including over the Internet. The administrator does not need to be at the camera's location, nor be in the same room as the PoE switch, which helps avoid truck rolls, saving time and money. PoE ports can be powered up/down one by one, several at a time or all ports together.

Some smart PoE switches, such as business-class solutions, 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.

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 use. Capturing this data isn't possible with an unmanaged switch. A smart PoE switch, however, can provide the following power consumption statistics in real time:

- Power use per port, including power (Watts), current draw (mA) and voltage levels (VDC)
- Overall system power, including the total system power budget, amount of power currently being used and the remaining power available

Also, smart PoE switches will often support power-saving features that are not found in unmanaged PoE switches. For example, when a smart 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.

Auto Surveillance VLAN

A VLAN uses an Ethernet switch to partition a physical network, thereby creating distinct broadcast domains. VLANs are especially useful when a network shares the same 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, even during times of high network traffic.

While the task of manually provisioning VLANs can sound daunting and complicated, some smart PoE switches support a feature called auto surveillance VLAN, which enables the smart PoE switch to automatically detect any 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, including at periods of high network congestion.

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.

Ability to Set PoE Power Thresholds 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 simple 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 802.3 at Classifications (4.0W, 7.0W, 15.4W or 30.0W). Other switches allow administrators to define a custom power limit (from 1 to 30 watts)

for any designated port.

Better Cable Diagnostics
Smart PoE switches enable administrators to 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. 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 also will show the total length of the cable.

Automatic Loop Detection
Smart PoE switches 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.

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 has occurred, such as an IP camera becoming compromised in the field. Smart switches 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
- PoE power turns on/off for any port
- A short circuit occurs on any port
- A "Power Deny" action occurs on any port

The Bottom Line
Unmanaged PoE switches are regarded as low-cost, easy-to-use and good for simple connectivity, which is why they're a mainstay of IP surveillance networks. Yet today's system integrators and network designers are quickly realizing the benefits gained by upgrading to smart or managed PoE switches.

Not only do they represent minimal cost increases, but they also provide network administrators with a simple, easy-to-use interface through which the IP surveillance network can be configured and monitored from anywhere, anytime. Additional tools enable administrators to enjoy faster network installation, easier network maintenance, upgrades and better visibility into network health—all of which helps save time and money. It's all about getting smart, and working smarter. ◉

Steven Olen is the director of product marketing, business networking solutions, at D-Link.