Vigitron IP Infrastructure Design Educational Series

Are Network Switches Really Designed for IP Video Security?

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The simple answers is no. As video security migrated to IP, the major concern of video security personal was the future of their involvements in regards to the system specification and the control. After all, networks are under the control of IT directors. However, as the transition occurred and the demands of IP video security grew, it became apparent that database networks do not directly translate into IP video applications. One example of this is the Power over Ethernet aspect of network switches. Too often, random shut downs will result in technical calls to a camera manufacturer. If the response is the power source (namely, the switches PoE port), the typical answer is to read the power specifications which is either 802.3af (15.4 watts) or 802.3at (30 watts) to assure adequate power is available.

The misinterpretation of the actual port power is the first problem. Just because a switch port is capable of handling a certain power level does not mean that power is actually available. To further confuse matters, most switch specifications only provide an overall power figure. In operations, some power must be allocated to the switch functions with the remaining power divided between the ports. Next is how the switch allocates this power. In general, it can one of three ways - activate PoE per port, available power is divided equally across all ports, or full PoE Class 3 power is available to all ports. In the first method, it is unlikely that full PoE class power can be achieved at any of the ports. In the second method, the required power levels can only be achieved until the PoE budget or available PoE is exhausted, leaving some ports without any power. The third method is often reserved for the most expensive switches and provides at least full 802.3af power to all ports with the ability to allocate up to 30 watts to some ports. In network PoE switches, the most expensive components are those providing PoE power.

Simply put, there are no standards for the allocation of PoE power. However, there are other considerations. In most data applications, the surge power required to turn on the PoE devices or the applications in working PoE devices is limited. Day/night, LED, autoback focus, and PTZ start-up all require large power surges which can exceed available port power. In the case of PTZ, when power is applied, the dome goes to a reference zero position drawing excessive amounts of power. If a system uses a several PoE domes, this can actual result in damaging a switch's power supply.

Reading network switch specifications can be confusing. The following is taken from an actual switch specification. Note how easy it is to misread the specifications and to think that all ports provide 15.4 watts at the same time.

Power over Ethernet	
PoE Standard	IEEE 802.3af Power over Ethernet/PSE
PoE Power Supply Type	End-Span
PoE Power Output	Per Port 48V DC, 350mA. Max 15.4 watts
Power Pin Assignment	1/2(+), 3/6(-)
PoE Power Budget	380 Watts
Max. number of Class 2 PD	24
Max number of Class 2 PD	24

The following is a specification for a typical Layer 2 network switch. Upon the first reading, you might believe that this switch has the ability to provide a full 15.4W (802.3af) to all 24 ports. But, look carefully. Here is the complete switch specification with regards to power.

PoE Power Output	Per Port 48V DC, 350mA. Max 15.4 watts

The wording indicates that all ports are capable of handling 15.4W, but does not state that all ports provide 15.4W at the same time.

PoE Power Budget	380 Watts

The PoE budget is stated as 15.4W, but there is no indication of the power required for overheads.

Max. number of Class 2 PD	24
Max number of Class 2 PD	24

This is the most interesting specification. Class 2 is 6.49W and the specification clearly states that the maximum number of Class 2 PDs (cameras that can be powered are 24, but according to the specification only at Class 2).

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In general, the network switches offer no protection other than main power fusing which will render the switch inoperative. Further, as network PoE switches conform to the safety aspects of 802.3 features, large surges will shut down PoE to a camera without the ability to restart. In these cases, the switch can be damaged beyond repair or the individual camera taken offline. Both of these result in lost of recording and costly service calls. As IP cameras power requirements continue to increase, the ability to provide required PoE of network PoE meeting the needs of IP video systems will continue to diminish. Too often, a misreading of network switch specifications leads to the selection of switches that will only assure camera shutdowns or misleading returns of properly working cameras to their respective manufacturers. System users learn only too late that their selected switches, despite their "brand names" or reliable operation in data networks, must be replaced or augmented with separate PoE midspans.

Vigitron's network switches are uniquely designed for IP cameras featuring the ability to transmit the largest Jumbo Frames at 100Mbps and are certified with IP megapixel cameras up to 29MP. They are designed with the highest available PoE budgets, providing the greatest number of ports with available 802.3at (30 watts) and assuring every port can provide full Class 3, 802.3af (15.4 watts) power. Up to 26 ports versions are available with built-in PoE protection allow for port polling and delayed PoE application to prevent damage. Vigitron network switches have the ability to sense connection losses and automatically reconnect avoiding service calls while providing the industry's longest warranty.

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