Security Trends – What's New For Electrical ?

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Much is being made of "Security Convergence" describing the inevitable integration of IT and Security technologies and their relevant business processes. Forrester Research predicted that convergence project spending in North America and Europe will balloon from $500M in 2004 to exceed $11B by 2008. This doubling of expenditure each year means 2006 spending will be $2.7B.

Successful implementation of Security Convergence requires effective "*convergence engineering"* - developing ways and methods to integrate disparate systems together.

Recent developments with *electrical supply technology* are impacting the speed of change and integration by allowing managed low voltage DC to be pushed from a central location – in some cases completely replacing a mains supply that was required to network devices such as cameras, access control readers and IP phones. This means that the eight wire cabling systems that connect devices together may now also be used to carry power as well as data - enter PoE – Power over Ethernet.

In 1999, the IEEE standards body began specification development and the goal was:

"To provide power for a new class of devices with 802.3 interfaces enabled by progress in silicon technology. These devices are characterized by low power requirements and LAN connectivity."

The objective is to lower the total cost of ownership of a network. This enables numerous new classes of "network appliances" to emerge because of more convenient and inexpensive power distribution. Two standards have emerged; 802.3af and 802.3at which allow 13 Watts and 56 Watts of power respectively. The latter presently utilizes the entire cable.

What is the saving when you can utilize *existing* cabling without the risk of frying the device at the end of the network? Typical commercial 110v "mains" power costs $250 - $500 per outlet – depending on whether it is a new or existing installation. In contrast, Power over Ethernet is $60-$200 per port - or more if an active splitter is required to assist non-conforming equipment. Custom active splitters are affordable for device manufacturers to engineer into their non-conforming products, costing around $4-10 per unit in volume.

Clearly, this can be more cost effective than placing a new electrical cable through difficult terrain.

Issues :

Cheap V Good. What trade-off will an owner accept for a much reduced cost of network (cabling infrastructure) versus a reduced security standard with wires strung over the ceiling and through walls instead of placed in secure ducting ?

Future possibilities. In the case of a new installations it may be possible to *engineer* a specification that serves the needs of all stakeholders – secure, tamperproof, code compliant layouts that serve fire alarm, building utilities, IT and security.

Result: More expensive to manufacture, but integration means a better quality, more cost effective route to a secure implementation.

Challenges: How to reticulate the last few feet – the need for better options than a plug in the wall security device.

PSE Types :

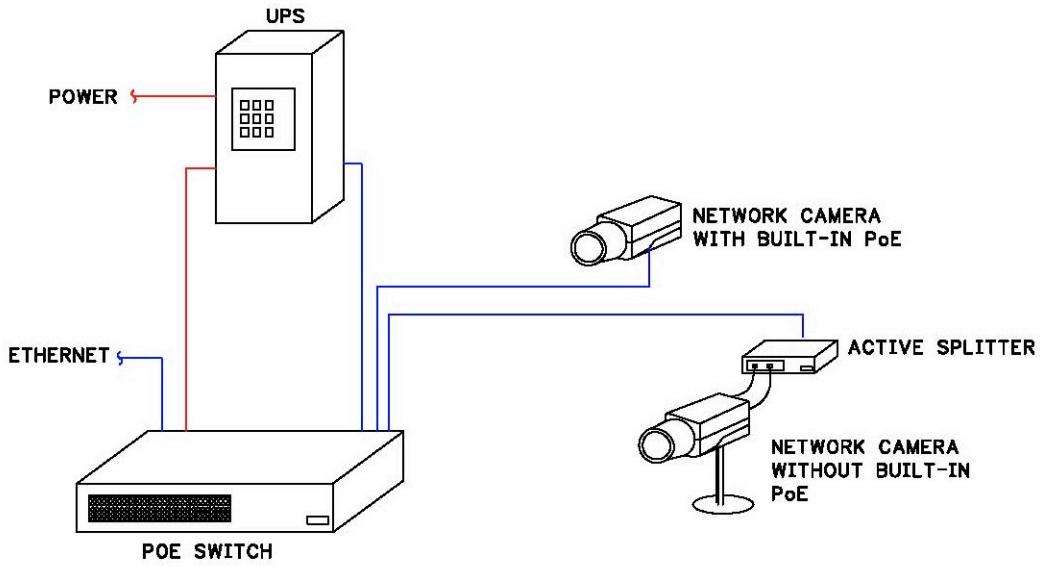

Figure 1. Endspan – PoE enabled switch – power directly from data ports. Many endspan devices are bundled in with a standard Ethernet switch.

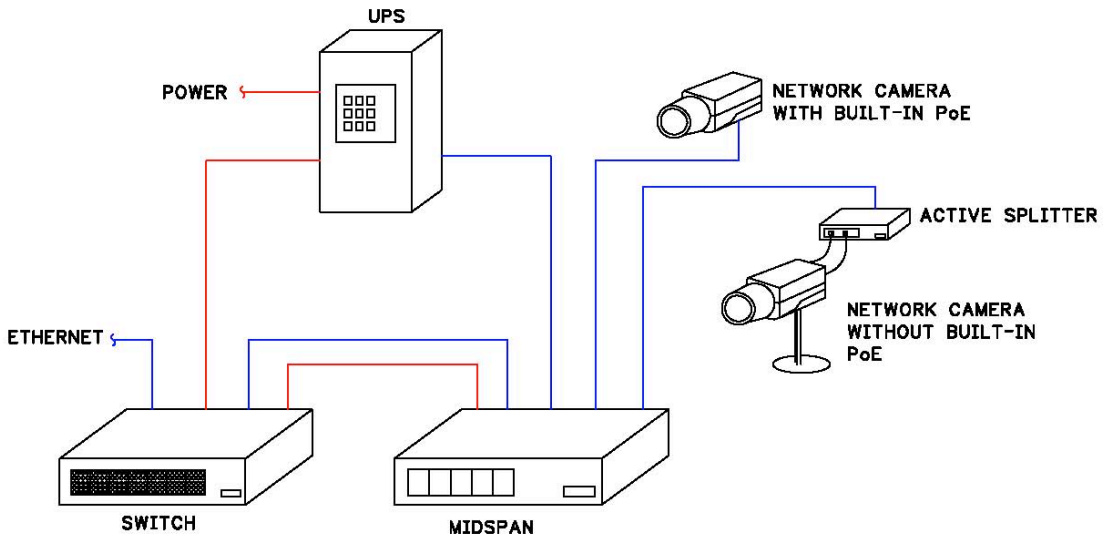

Figure 2. Midspan – Patch panel like, resides between switch and terminals. Power added to spare wires, data uninterrupted

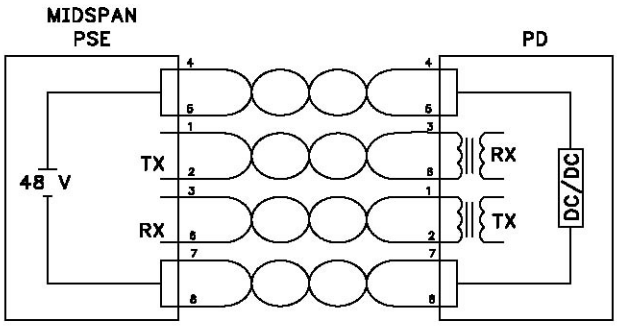

Figure 3. Wiring Cable Wiring

Specifications

- Minimum 40VDC, 300mA
- Range 44-57VDC

- Maximum continuous current no more than 350mA
- "Resisitor" discovery technique
- The standard emphasizes reliability over efficiency

Components

"PSE" – power sourcing equipment – supplies power

"PD" – IEEE compliant powered device

The PSE typically monitors the current drawn and if the draw drops below a certain minimum level (for examples if the power is unplugged), power supply is ended and the discovery process begins again.

Design Considerations :

Distance from data switch (generally 330 feet)

Leave room for expansion

Manufacturers different sizes – e.g. – 6,12 and 24 port

Role of the "Active Splitter" – reduces 48V PoE to 12V to power devices (e.g. – IP Camera)

Examples of Power Consumption

Passive Infrared Detectors: 9-15V 15mA

Piezo Siren: 9-15V 15mA/120mA

Biometric Readers: 12-24V under 5W

Benefits of Power over Ethernet

- Installation Time lessened with readily available cable infrastructure
- Cost savings with existing cabling in place
- Automatic Activation of power – no damage with wrong device plugged in
- Status of power consumption - network managed device

- Device may be power reset or shutdown remotely by software
- Reliability factor over mains ("Vacuum cleaner syndrome" from cleaners)
- No new AC installation for equipment placement changes
- Centralized UPS may power network wide devices
- Integrates with computer equipment racks – 42" rack mount common
- Cooled, monitored, protected

110V Mains Disadvantages

- Expensive to install
- Tradesman must be licensed
- Changes must be in building plans for safety approvals
- Failure of one electrical branch creates "holes" in network for multiple devices

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Bibliography - References and Useful Links

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