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Power over Ethernet and Fiber Optic Networks

Is PoE Anti-Fiber?

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Fiber Optics LAN Section (FOLS)

- Founded in 1993 as a Section of the TIA's Fiber Optics Division.
- Mission: to educate system designers, architects, consultants, engineers, contractors, end users and the media about the technical advantages that optical transmission brings to customer-owned networks.
- FOLS also stimulates the development of new fiber standards and the promotion of optical-based applications in customer-owned networks.





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FOLS Members

- 3M
- ADC
- Berk-Tek, a Nexans Company
- Corning
- Corning Cable Systems
- Draka Comteq
- Leviton Voice & Data
- OFS
- Ortronics/Legrand
- Panduit
- Sumitomo Electric Lightwave
- Tyco Electronics





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Agenda

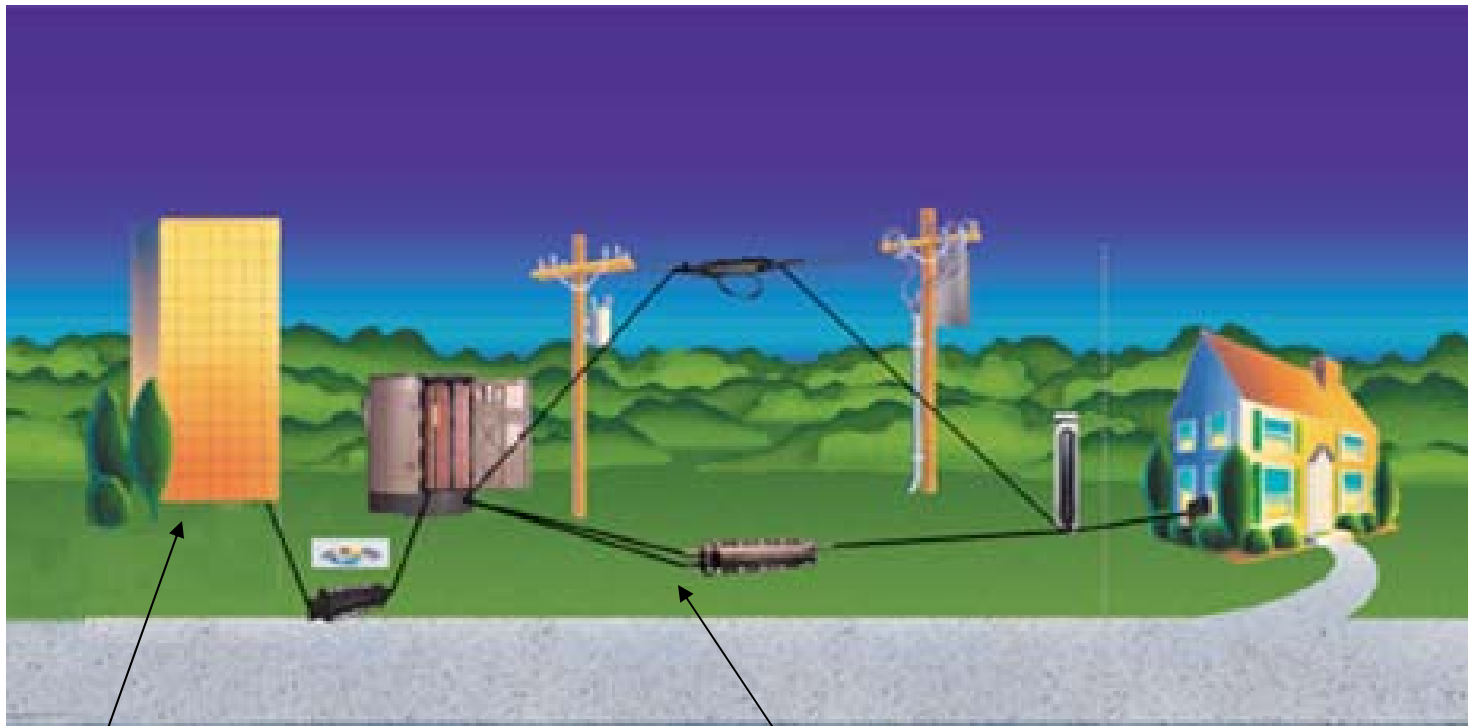
- History of uninterrupted telephone service
- Relationship of PoE to Voice over IP (VoIP)
- Comparing VoIP to traditional telephony
- Power over Ethernet and fiber networks
- Fiber to the Telecom Enclosure (FTTE)
- Alternate methods of providing 911 service
- Is PoE Anti-Fiber?





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Traditional Telephony



Central Office:

- Telephone Switch
- -48Vdc Power
- Emergency power backup

2 wire "Local Loop" to every house





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VoIP and PoE

- Voice over IP is a network-based telephone service. Since VoIP doesn't derive its power from the telephone company central office, other means of backup power are needed.
- Power Over Ethernet was originally intended to provide VoIP with a source of backup power. It simulates the traditional telephone's availability during power outages and provide 911 service at all times.
- PoE-IEEE 802.3af provides 48Vdc power over 2 of 4 available pairs on Category UTP cable. After line loss, about 13W of power are available





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VoIP and Fiber

- VoIP and PoE are complimentary but they are not codependent.
- VoIP is media independent and works over copper, fiber and wireless.
- It can work on a PC, a dedicated handset or even a PDA.
- VoIP is used extensively by telephone service providers offering fiber to the home or by cable companies offering digital voice over coax.





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VoIP

vs.

PSTN

Circuit Independent

Voltage Independent

Packet-based digital format

Portable

Media Independent

Difficult to bill

Works with various Codecs

Dedicated Circuit

Voltage Dependent (-48v)

Fixed Analog and digital format

Media Dependent

Easy to bill





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Does PoE work with Fiber?

- Generally PoE doesn't work directly over fiber.
- PoE can work in a complimentary way with fiber.
- TIA/FOLS modeling has shown that the FTTE architecture has many advantages and can incorporate PoE as well.

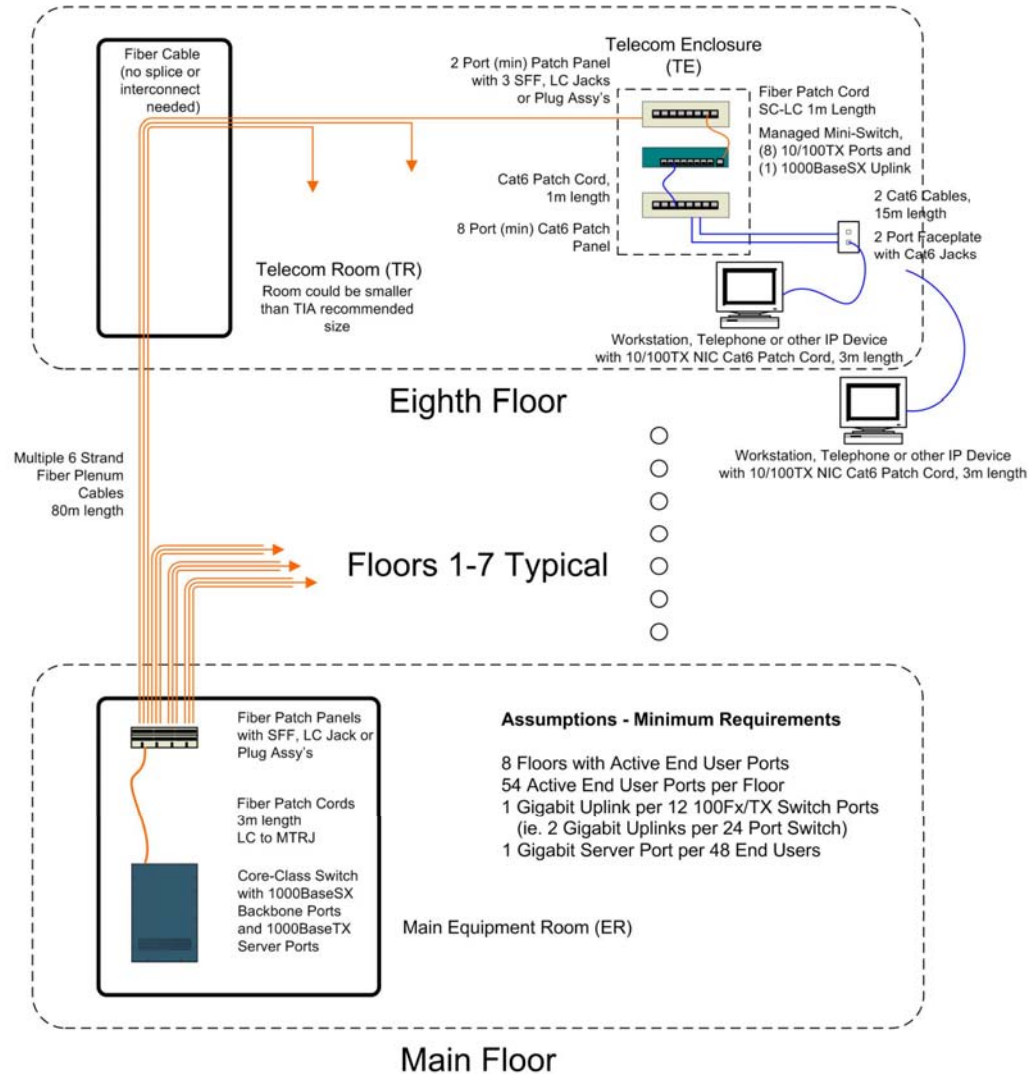




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FTTE

Fiber to the Telecom Enclosure





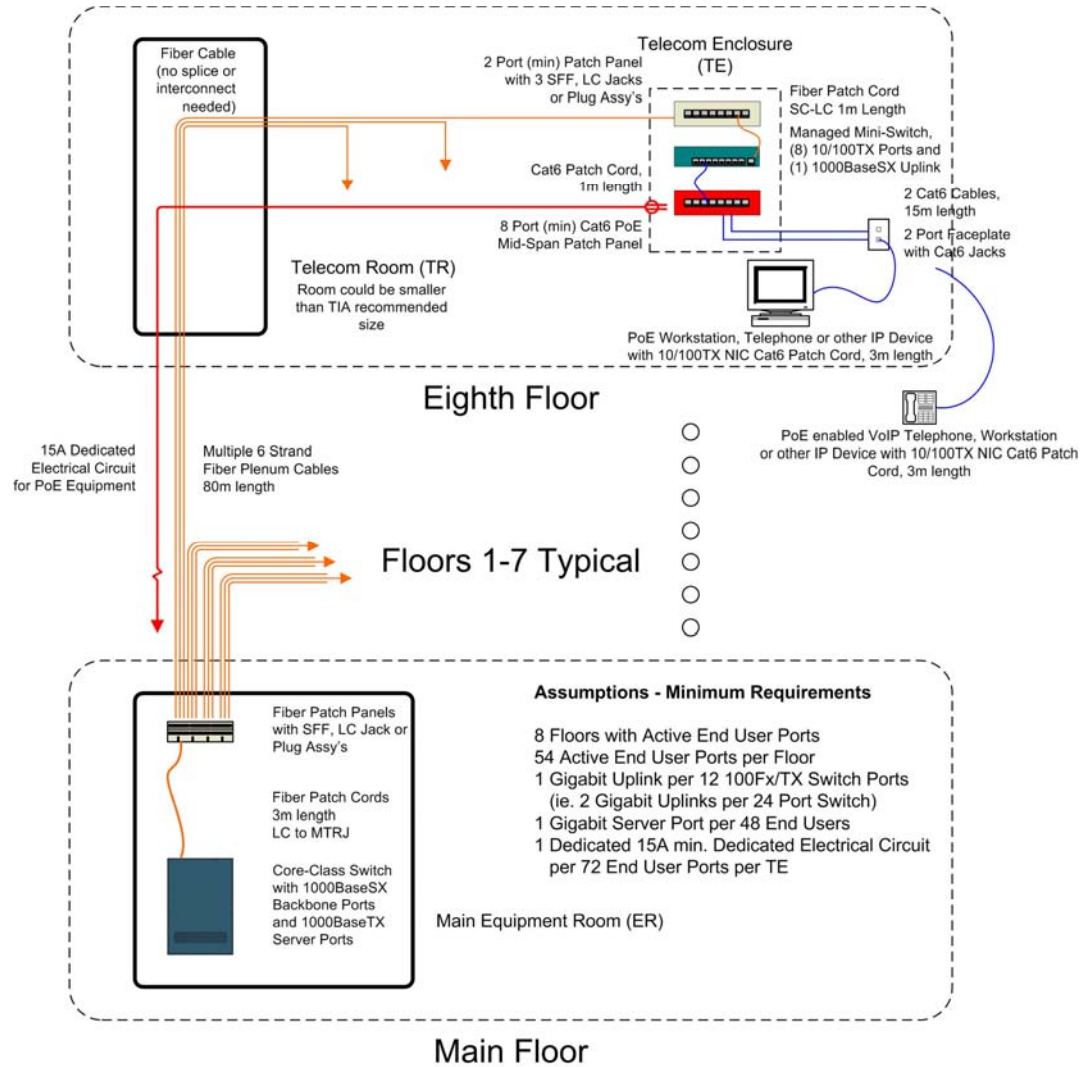
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FTTE

Fiber to the Telecom Enclosure

+

Power over Ethernet





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Alternatives to PoE

- Dedicated electrical outlets.
- Battery power.
- Dual copper and fiber networks
- Power over fiber





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Dedicated Electrical Outlets

Dedicated electrical outlets have been used for many years to provide clean or emergency power for various types of equipment. They do require more complex planning and construction of the electrical plant, but the critical function is to provide a certain percentage of telephones with power from dedicated circuits in an emergency. In fact, for enterprises such as hospitals, the entire building has emergency power, thus eliminating the need to use PoE as a source of emergency power.





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Battery Power

We have become very dependent on batteries for the sake of our mobility. Cell phones, iPods, laptops, and cordless telephones are commonplace. Networks and many desktop computers are backed up with battery power. FTTH relies on batteries for 911 emergency powered telephones. The beauty of battery technology is that it preserves our portability, especially when it resides on the device itself. And battery technology has not been pushed to its limits; devices such as hydrogen power cells are lurking on the horizon. In addition, core electronics get smaller and consume less power to accomplish the same job over time.





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Dual Copper / Fiber Networks

It is possible to install FTTD alongside a traditional copper network using PoE that supports only the VoIP telephones. At first, this approach seems time-consuming and expensive, but in reality it is very similar to deploying a data network and a voice network (except that the voice network is VoIP). The two networks can perform computer-telephone integration through the main ER, and the VoIP network can rival a traditional PBX network in cost and function. VoIP also consumes low bandwidth, allowing the VoIP network to be designed to its own standards and neither competes with nor affects the bandwidth of the FTTD network.





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Power over Fiber

If VoIP phones were able to consume or recharge on a few watts, there is a budding technology that someday could provide emergency power directly over fiber. JDS Uniphase last year acquired Photonic Power Systems, developer of a laser-photovoltaic power converter system that produces electrical power over fiber. This system can currently deliver up to 1 W of power over 500 m of multimode fiber and promises more power in the future.





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Has PoE lost its Scope?

- PoE is becoming a generic low-voltage power system.
- PoE-IEEE 802.3at is meant to increase power to 30W.
- The move to more power for PoE goes against technology trend of lower power requirements.
- Role of electrical engineer and building official is being crossed by IT professional.
- PoE is useless without adequate power backup systems.





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Conclusion

Implementing VoIP and providing 911 emergency response during power outages can be a challenge. PoE can help in meeting the goal. While doing so may require some trade-offs, the sacrifice that we shouldn't be willing to make is the one that includes fiber optics. Fiber represents the long term, long haul, long stride of progression in providing significantly more bandwidth to more people in a more efficient way.

We should look at PoE as one of several solutions to a specific VoIP-based problem and not get sidetracked.

