Power over Ethernet

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What is Power over Ethernet (PoE)

• Method of supplying Power over standard Ethernet cables as defined by the IEEE standard
IEEE 802.3af divides PoE technology into two distinct parts
- The Power Sourcing Equipment (PSE) that supplies power to the cables
- The Powered Devices (PD’s) that accepts the power
History of PoE

• PoE was first applied by Cisco in 2000 to provide solutions VoIP Phones
• Gained increased support during 2001-2002
• 802.3af defines voltage and current ratings for transmission - 2003
PoE Features

• A Method to transfer power and data over the same cable
• No extension needed for existing architecture
• Low power loss over single cable transmission
PoE Specifications

- Can send up to 15.4W on cable
- Maximum transmission of 100m before signal decay
- Support for 10Mb or 100Mb Ethernet connections for End devices
Why PoE?

• Saves Time and Money but how?
  • IP Cameras installed far away from an existing electrical outlet
    1. Move the camera
    2. Pay money to electrician
    3. Use PoE technology
Advantages

• Only one set of wires to bring to your appliance
• Saves Money for expensive installations
• Easy Movement of Equipments
Advantages

• Can use SNMP network management infrastructure to monitor and control the appliances
• Appliances can be shut down or reset remotely
Advantages

• LAN systems simplifies the RF survey task
• Safe and secure to use
• Extend your network with Power over Ethernet (PoE)
Disadvantages

• Not Widely used in the industry
• Implementation will take time
• Not ideal for High power applications
Power over Ethernet : How?

- Pin 1: Transmit +
- Pin 2: Transmit -
- Pin 3: Receive +
- Pin 4: Reserved
- Pin 5: Reserved
- Pin 6: Receive -
- Pin 7: Reserved
- Pin 8: Reserved
Power Sourcing Equipment (PSE)

- Injects +48V to spare data pairs
- Provides $\approx 13W$ of power to cable
- Endspan vs. Midspan
Three main functions:

- Detection of the PoE PD
- Receive Maintain Power Signature (MPS) from PD
- 2.7-10.1V applied to Power Interface with incremental resistance signals
Power over Ethernet: PSE

- Classification of the PoE PD Class
  - Classes 0-4, varying power and current
- Operation
  - Provide voltage to PD
Power over Ethernet: PD

- Powered Device
  - Power receiving system
  - Steps down +48V using DC-DC converters
  - Sends MPS to PSE letting it know it’s present
Communicate with PSE to find maximum power requirements
Applications
(What’s In it for Me?!?)
Voice Over IP with PoE

• Solves the issues with VoIP
  • Reliability and Flexibility
• No Need for AC Power Source
• Centrally Backed-up in Case of Failure
Voice Over IP with PoE

- Simple to Install
- Moving Over to PoE is Easy
- All Phones on One Power Source
IP Security Cameras

• Reduce Cost/ No Need to Run Power!
• Functions When Needed Most
  • In Case of Power Outage
• Being Used Everywhere- Industry, Home, Fields, Border Security...
Other Applications

- Mac Wireless PoE
- Analog/Digital Clocks with PoE
Other Applications

• High Precision Devices - Medical Instruments

• Electric Shavers
Other Applications

• Message Boards with PoE

• Access Points
Future of PoE

• Proposal to Revise the Standard to 30w
• The Next Standard to be called PoE-Plus
• Support 1000 Base-T Cable
• Backward Compatibility for current PoE Products
Questions?
Thank you!