



**Certified Wireless Network Administrator (CWNA)
PW0-106**



Chapter 17
Power over Ethernet (PoE)



Chapter 17 Overview

- History of PoE
- PoE Devices
- Planning and Deploying PoE



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History of PoE

- PoE provides power to devices over Ethernet cables
 - Commonly used for VoIP desk phones
 - Used for APs and other network devices
 - The PSTN uses power over phone lines to power analog traditional phones

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PoE Types

- Nonstandard
- 802.3af
- 802.3-2005, clause 33
- 802.3at-2009
- 802.3-2012, Clause 33

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SYBEX **WILEY**

PoE Devices

- Powered Device (PD)
 - Draws or consumes power
- Power-Sourcing Equipment (PSE)
 - Provides power
 - Endpoint PSE
 - Midspan PSE

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SYBEX **WILEY**

Values used to identify the various classification signatures.

Parameter	Conditions	Minimum	Maximum	Unit
Class 0	14.5 V to 20.5 V	0	4	milliampere (mA)
Class 1	14.5 V to 20.5 V	9	12	mA
Class 2	14.5 V to 20.5 V	17	20	mA
Class 3	14.5 V to 20.5 V	26	30	mA
Class 4	14.5 V to 20.5 V	36	44	mA

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Class	Usage	Range of maximum power used	Class description
0	Default	0.44 W to 12.95 W	Class unimplemented
1	Optional	0.44 W to 3.84 W	Very low power
2	Optional	3.84 W to 6.49 W	Low power
3	Optional	6.49 W to 12.95 W	Mid power
4	Type 2 devices	12.95 W to 25.5 W	High power

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Class	Minimum power from the PSE
0	15.4 W
1	4.0 W
2	7.0 W
3	15.4 W
4	30.0 W

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PoE Devices (Endpoint PSE)



The image shows two Cisco PoE switches. The top switch is a 24-port PoE switch with a console port. The bottom switch is a 24-port PoE switch with a console port and a power jack.

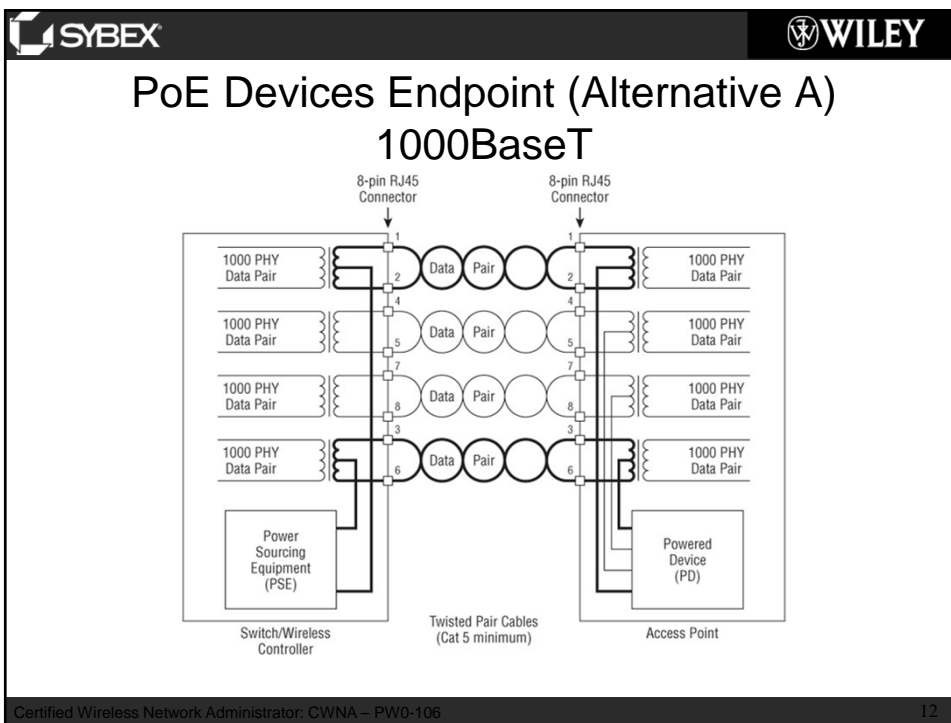
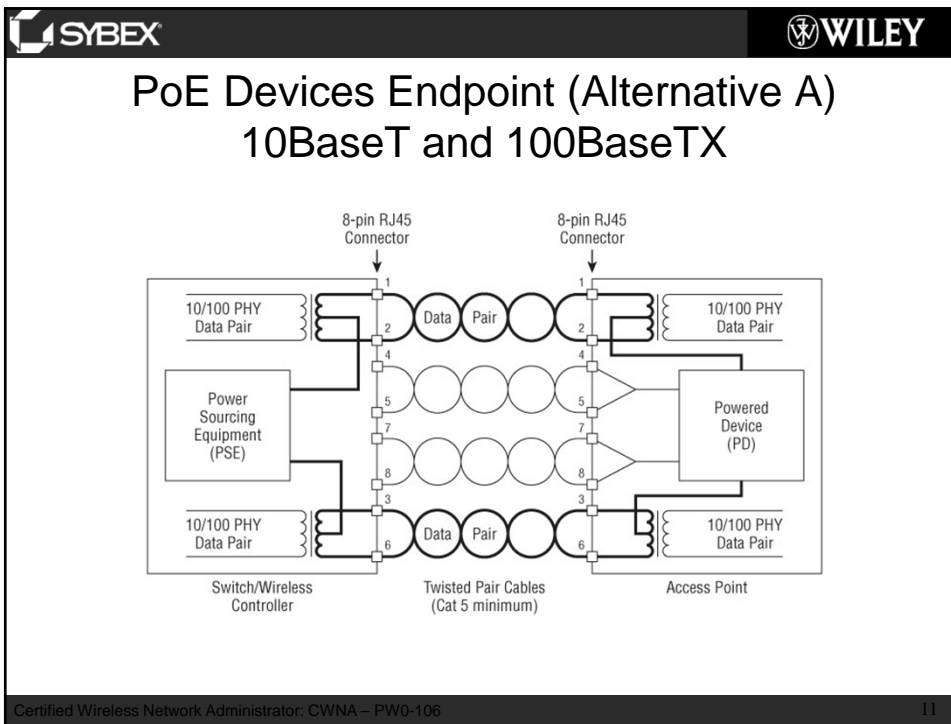
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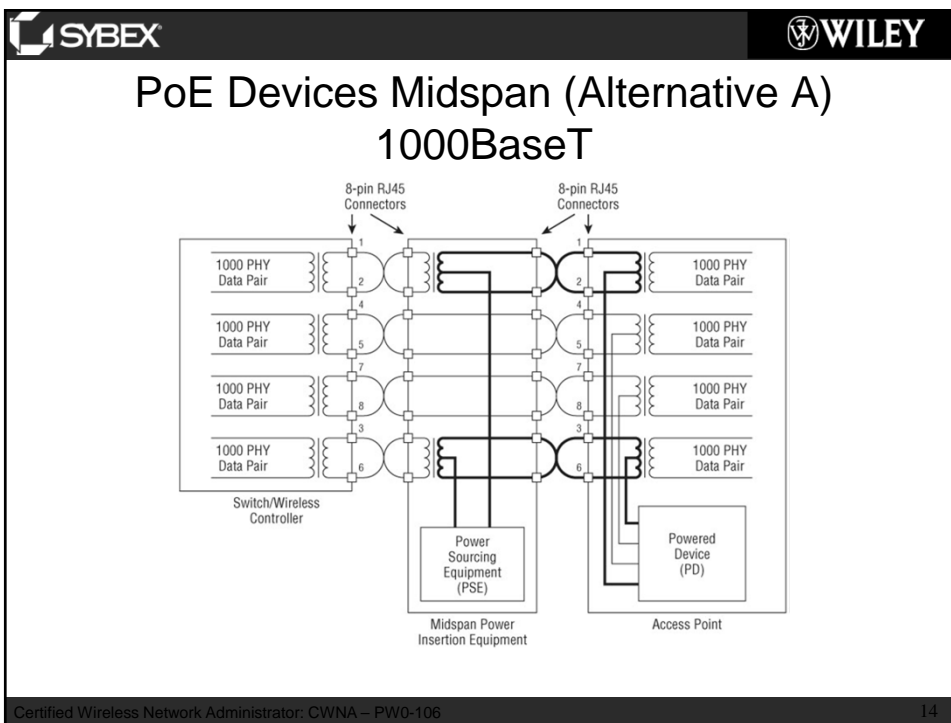
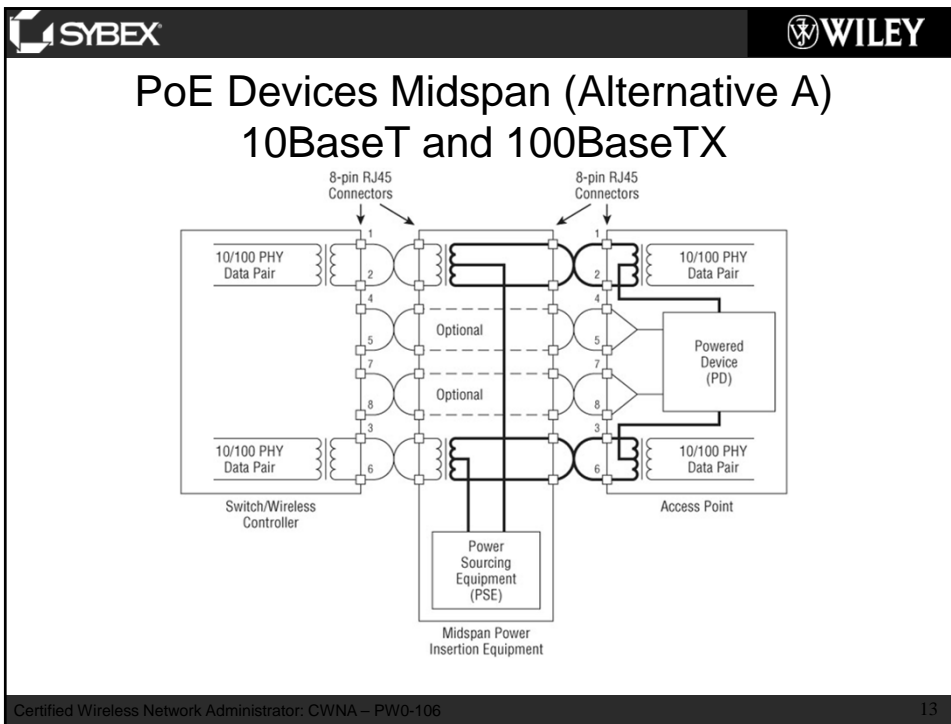
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PoE Devices Endpoint

- Alternative A - the PSE places power on the data pair
- Alternative B - provides power on the spare unused pair of wires in a 10BaseT/100BaseTX cable

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SYBEX **WILEY**

Power-Sourcing Equipment Pin Assignments

1000BaseT
midspan PSE,
Alternative A

Switch/Wireless Controller Midspan Power Insertion Equipment Access Point

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SYBEX **WILEY**

Power-Sourcing Equipment Pin Assignments

10BaseT/100B
aseTX
midspan PSE,
Alternative B

Switch/Wireless Controller Midspan Power Insertion Equipment Access Point

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SYBEX **WILEY**

Power-Sourcing Equipment Pin Assignments

1000BaseT midspan PSE, Alternative B

The diagram illustrates the pin assignments for a 1000BaseT midspan Power Sourcing Equipment (PSE) in Alternative B configuration. It shows a Switch/Wireless Controller on the left and an Access Point on the right, both connected to a central Midspan Power Insertion Equipment (MPE) unit. Each side has four 1000 PHY Data Pairs connected to 8-pin RJ45 connectors. The MPE unit is connected to the 1, 2, 3, and 6 pins of the RJ45 connectors on both sides. The PSE is connected to the 4, 5, 7, and 8 pins of the RJ45 connectors on both sides. The PD (Powered Device) is connected to the 1, 2, 3, and 6 pins of the RJ45 connectors on the Access Point side.

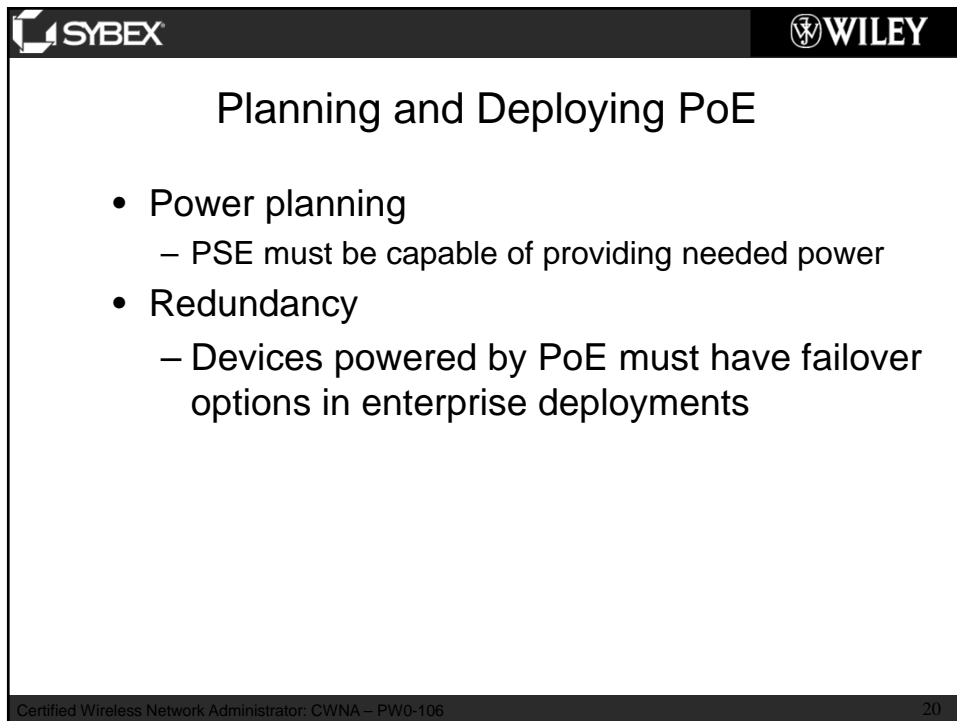
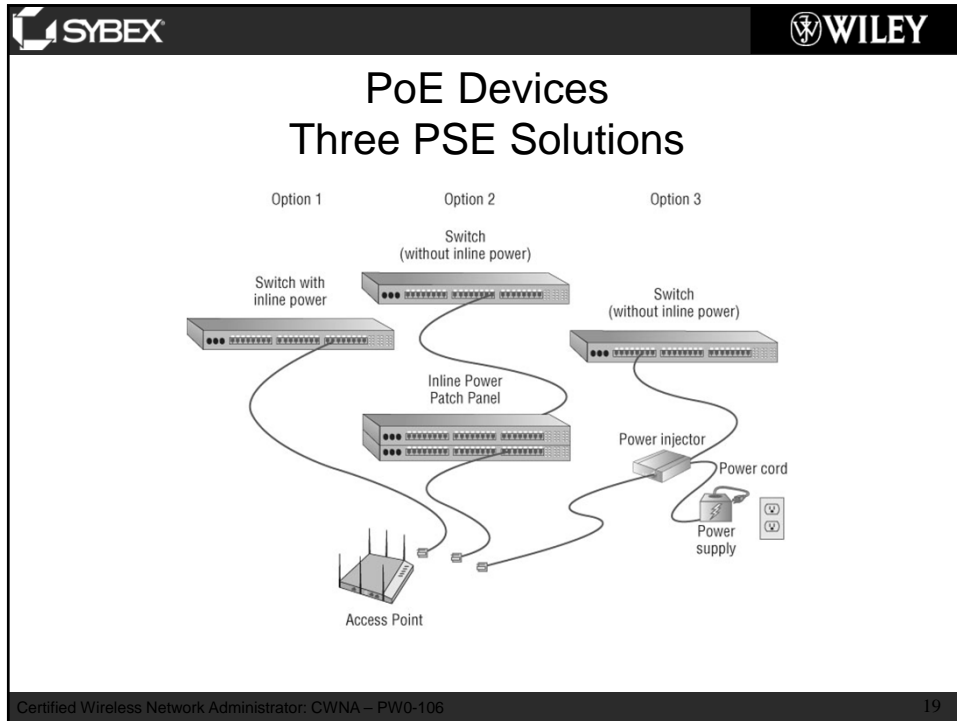
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SYBEX **WILEY**

PowerDsine power injector and PoE hubs

The photograph shows two pieces of PowerDsine equipment. On the left is a power injector, a small black device with two RJ45 ports on the front. On the right is a PoE hub, a larger black device with multiple RJ45 ports and a power input on the front.

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Port level PoE budgeting

PSE Profile >

Name: Trunk-Ports

Description: PoE for the access points

Power Mode: 802.3af

Power Limit: 15400 (100-15400 mW)

Priority: low

PSE Profile >

Name: Trunk-Ports

Description: PoE for the access points

Power Mode: 802.3af

Power Limit: 32000 (100-32000 mW)

Priority: critical

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SYBEX **WILEY**

Power budget monitoring

Systems at a Glance

PS2 Details

Port	Status	Power	Powered Device Type	Powered Device Class
eth1/1	Delivering	5.5 Watts	802.3af	Class 0
eth1/2	Searching	0.3 Watts	None	Class not defined
eth1/3	Searching	0.3 Watts	None	Class not defined
eth1/4	Searching	0.3 Watts	None	Class not defined

Total Power for PoE Devices: 104.3 Watts
 Total Power Used: 5.5 Watts
 Remaining Power: 108.8 Watts

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802.11n or 802.11ac and PoE

- Almost all of the current generation of 3x3:3 dual-frequency 802.11n APs are capable of running with full transmitter capabilities using 802.3af PoE
- The next generation of 802.11ac hardware will use a new chipset that enables beamforming capabilities, which will require more processing resources and therefore more power

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SYBEX **WILEY**

Fluke NetTool Series II inline network tester



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