



Avaya Solution & Interoperability Test Lab

Using Cisco Catalyst 3560-24PS and 3750-24PS to Provide Inline Power for Avaya 4600 Series IP Telephones and Avaya Wireless Access Points - Issue 1.0

Abstract

These Application Notes describe how to configure the Cisco Catalyst 3560-24PS and 3750-24PS to provide inline power for Avaya 4600 Series IP Telephones and Avaya Wireless Access Points. The various Avaya powering arrangements are shown and the administration commands for displaying and controlling the powering status of the switch ports are demonstrated.

1. Introduction

Power over Ethernet (PoE) is a feature offered on Ethernet switches. It allows the switch to supply power to a network device within the same cable that carries the Ethernet signaling. This simplifies network installation and powering design, removing the need for a separate power supply for a network device. IEEE 802.3af defines a standard protocol to be used by power sourcing equipment (PSE) and powered devices (PD). The Catalyst 3560-24PS and 3750-24PS are IEEE 802.3af compliant and can provide inline power to the Avaya 4600 Series IP Telephones and Avaya Wireless Access Points, which are IEEE 802.3af compliant PDs.

The Avaya product configurations addressed by these Application Notes are shown in **Figure 1**. The following Avaya products are directly connected to the switch:

- Avaya 4602 and 4602SW IP Telephones
- Avaya 4610SW IP Telephone
- Avaya 4620 IP Telephone with and without EU24
- Avaya 4620SW IP Telephone with and without EU24
- Avaya 4630SW IP Telephone
- Avaya Gen-1 4612 and 4624 IP Telephones with Avaya 30A Switch Bases
- Avaya Gen-2 4606, 4612, and 4624 IP Telephone
- Avaya Wireless AP-4 /5/6 802.11a/b/g Access Point

The Avaya Gen-1 4612 and 4624 IP Telephones require the Avaya 30A Switch Base. **Figure 2** shows the connections for the 30A switch base. The Avaya 4612 and 4624 Telephones can be identified as Gen-1 or Gen-2 by inspecting the model number. “1A” in the model number indicates Gen-1; “2A” indicates Gen-2. The model number can be found by:

- Inspecting the label attached to the bottom of the Telephone.

OR

- Pressing **Mute, V, I, E, W, #** on the keypad and then pressing * until the model number appears. Press # to exit.

Examples of model numbers are “4612D01**A**-003” (Gen-1) and 4612D02**A**-003 (Gen-2).

The powering tests included verification of the following after the product was connected to the switch:

- Successful boot operation
- For Avaya IP Telephones, successful registration with Avaya Communication Manager and completion of a test call
- For Wireless LAN Access Points, successful registration for an Avaya IP Softphone with Avaya Communication Manager and completion of a test call.

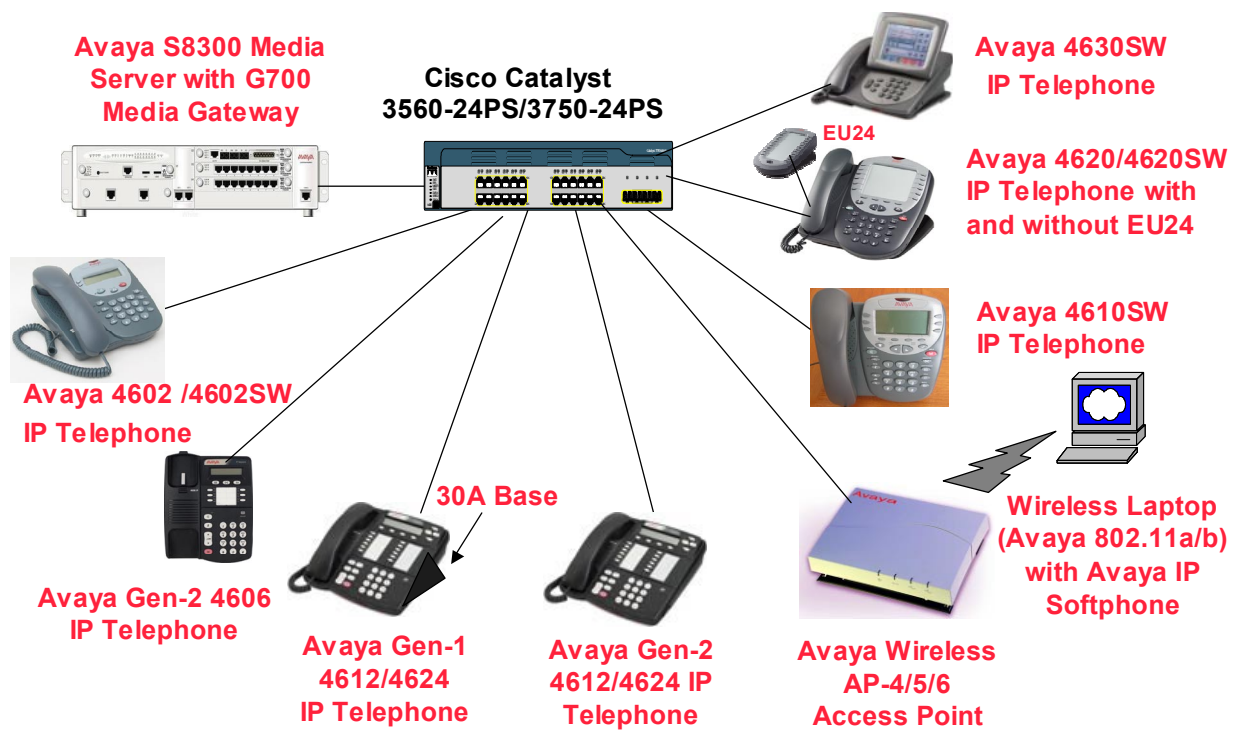


Figure 1: Avaya 4600 Series IP Telephone and Wireless Access Point Configurations with the Cisco Catalyst 3560-24PS and 3750-24PS

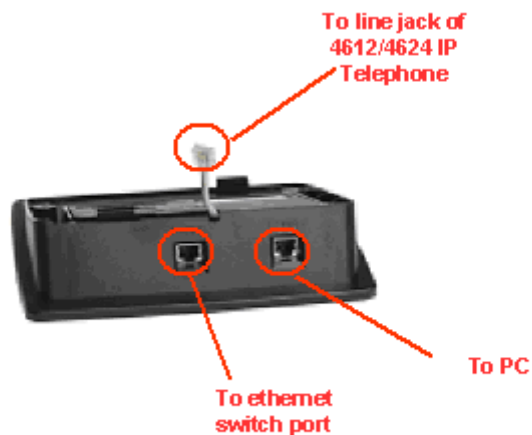


Figure 2: Avaya 30A Switch Base Connections

2. Equipment and Software Validated

The following equipment and software were used for the sample configuration provided:

Network Component	Software Version
Avaya 4602, 4602SW IP Telephones	1.8
Avaya 4610SW IP Telephone	2.0
Avaya 4620 Telephone	2.0
Avaya 4620 IP Telephone with EU24	2.0
Avaya 4620SW IP Telephone	2.0
Avaya 4620SW IP Telephone with EU24	2.0
Avaya 4630SW IP Screenphone	2.0
Avaya 4606 "Gen2" IP Telephone	1.8
Avaya 4612 "Gen1" IP Telephone	1.8
Avaya 4624 "Gen1" IP Telephone	1.8
Avaya 4612 "Gen2" IP Telephone	1.8
Avaya 4624 "Gen2" IP Telephone	1.8
Avaya Wireless AP-4/5/6 Access Point	V2.4.5(758)
Avaya 802.11a/b Wireless Card	2.0.306.0
Avaya Communication Manager (Avaya S8300 Media Server)	CM2.0.1
Cisco Catalyst 3560-24PS BOOTLDR	IOS 12.1(19)EA1b 12.1(19r)EA1b
Cisco Catalyst 3750-24PS BOOTLDR	IOS 12.1(19)EA1c 12.1(19r)EA1b

Table 1 - Network Component Software Versions

3. IEEE 802.3af PoE implementation on the Avaya PDs and Cisco PSE

In June 2003, the IEEE approved a standard for Power over Ethernet. The maximum power is 15.4W per PSE port and the maximum power delivered to a powered device, accounting for cable loss, is 12.95W. Optionally, powered devices may also be classified based on the maximum power the device will draw. Cisco PSEs and Avaya PDs support this optional classification. The Cisco Catalyst 3560-24PS and 3750-24PS can detect the Avaya PDs with the correct classification and deliver the appropriate power.

The IEEE 802.3af classifications for the PSE and PD are given in **Table 2**. Note that Class 0 and Class 3 are identical. The reason for this is that Class 0 covers the case where a powered device is detected but the PSE cannot assign the powered device to Classes 1, 2, or 3.

Class	PSE Output Max. Power
0	15.4W
1	4.0W
2	7.0W
3	15.4W
4	Treat as Class 0

Table 2 - IEEE 802.3af PSE and Powered-Device Power Classifications

Table 3 shows the detected class and power allocated from the Cisco Catalyst 3560-24PS and 3750-24PS to the Avaya IP Telephones and Wireless Access Points.

Avaya IP Telephones	Class	Power Allocated (Watts)
4602	1	4
4602SW	2	7
4610SW	2	7
4620	3	15.4
4620 with EU24	3	15.4
4620SW	3	15.4
4620SW with EU24	3	15.4
4630SW	3	15.4
Gen-1 4612 with 30A	3	15.4
Gen-1 4624 with 30A	3	15.4
Gen-2 4606	0	15.4
Gen-2 4612	0	15.4
Gen-2 4624	0	15.4
Avaya AP-4/5/6	0	15.4

Table 3 – Class and Power Allocation for Avaya IP Telephone and Wireless Access Points

4. Configuring Inline Power on the Cisco Catalyst 3560-24PS and 3750-24PS

The Cisco Catalyst 3560-24PS and 3750-24PS support 370 Watts of inline power, and should support class 3 PDs on all 24 ports. The testing associated with these Application Notes did not cover loading of all ports.

The following describes how the Cisco Catalyst 3560-24PS and 3750-24PS interact with powered devices.

1. PoE-capable ports are by default configured to auto mode. This means that powered-device discovery is enabled. If not enough inline power is available from the power supplies for all the powered devices in auto mode, there is no guarantee which device will receive power.
2. Power over Ethernet ports may be configured to never provide inline power.

The ports connected to the Avaya 4600 IP Telephones and Avaya Wireless Access Points must use the default auto mode in order to be powered up by the Cisco Catalyst 3560-24PS and 3750-24PS.

The same set of commands related to PoE is used on the Cisco Catalyst 3560-24PS and 3750-24PS. Sections 4.1 and 4.2 provide the detailed configurations.

4.1. Configuring and Verifying Inline Power on the Cisco Catalyst 3560-24PS

By default, the power mode of a port is set to auto. Use the command **show power inline** to check the inline power configuration and status. The following display shows that interfaces Fa0/1 to Fa0/8 are configured to auto mode. A Class 2 PD (Avaya 4610SW IP Telephone and Gen-1 4612/4624 with 30A Switch Base) is detected on interface Fa0/1, Class 3 PDs (Avaya 4620/4620SW/4630SW IP Telephones) on interfaces Fa0/2 to Fa0/4 and Class 0 PDs (Avaya Gen-2 4606/4612/4624 IP Telephones and Avaya Wireless AP-4/5/6 Access Points) on interfaces Fa0/5 to Fa0/8.

```
Switch#show power inline
Available:370.0(w)  Used:114.8(w)  Remaining:255.2(w)
```

Interface	Admin	Oper	Power (Watts)	Device	Class
Fa0/1	auto	on	7.0	Ieee PD	Class 2
Fa0/2	auto	on	15.4	Ieee PD	Class 3
Fa0/3	auto	on	15.4	Ieee PD	Class 3
Fa0/4	auto	on	15.4	Ieee PD	Class 3
Fa0/5	auto	on	15.4	Ieee PD	Class 0
Fa0/6	auto	on	15.4	Ieee PD	Class 0
Fa0/7	auto	on	15.4	Ieee PD	Class 0
Fa0/8	auto	on	15.4	Ieee PD	Class 0
...					

The command **power inline <auto|never >** can be used to set the power mode of an interface to auto or never. The default is auto. The following shows the configuration.

```
Switch(config)#interface fastEthernet 0/1
Switch(config-if)#power inline ?
  auto  Automatically detect and power inline devices
  never Never apply inline power

Switch(config-if)#power inline auto
```

4.2. Configuring and Verifying Inline Power on the Cisco 3750-24PS

By default, the power mode of a port is set to auto. Use the command **show power inline** to check the inline power configuration and status.

```
Switch>show power inline

Module      Available      Used      Remaining
(Watts)     (Watts)       (Watts)
-----
1           370.0         114.8     255.2

Interface   Admin    Oper    Power      Device      Class
(Watts)
-----
Fa1/0/1     auto    on       7.0    Ieee PD     Class 2
Fa1/0/2     auto    on      15.4    Ieee PD     Class 3
Fa1/0/3     auto    on      15.4    Ieee PD     Class 3
Fa1/0/4     auto    on      15.4    Ieee PD     Class 3
Fa1/0/5     auto    on      15.4    Ieee PD     Class 0
Fa1/0/6     auto    on      15.4    Ieee PD     Class 0
Fa1/0/7     auto    on      15.4    Ieee PD     Class 0
Fa1/0/8     auto    on      15.4    Ieee PD     Class 0
...
```

The command **power inline <auto|never >** can be used to set a power mode of an interface to auto or never. The default is auto. The following shows the configuration.

```
Switch(config)#interface FastEthernet 1/0/1

Switch(config-if)#power inline ?
  auto    Automatically detect and power inline devices
  never   Never apply inline power

Switch(config-if)#power inline auto
```

5. Verification Steps

The following are verification steps for these Applications Notes:

- Connect Avaya IP Telephones to Cisco Catalyst 3560-24PS or 3750-24PS. Verify that the Avaya IP Telephones can be powered up properly.
- Verify that the Avaya IP Telephones can register with Avaya Communication Manager and calls can be made successfully.
- Use the command **show power inline** on the Cisco switch to check the power status.
- Reset the switch. Verify that all the IP Telephones can be powered up properly.

6. Conclusion

The Cisco Catalyst 3560-24PS and 3750-24PS are IEEE 802.3af compliant and can be used to provide inline power for the Avaya IP 4600 series IP Telephones and Avaya Wireless Access Points.

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