Avaya Solution & Interoperability Test Lab

Using Cisco Catalyst 3750-24PS to Provide Inline Power to Avaya 4600 Series IP Telephones and Avaya Wireless Access Points - Issue 1.1

Abstract

These Application Notes describe how to configure the Cisco Catalyst 3750-24PS to provide inline power to Avaya 4600 Series IP Telephones and an Avaya Wireless Access Point. 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 traffic. This simplifies network installation and powering design, removing the need for separate power supplies for network devices. IEEE 802.3af defines a standard protocol to be used by power sourcing equipment (PSE) and powered devices (PD). The Catalyst 3750-24PS is IEEE 802.3af compliant and can provide inline power to the Avaya 4600 and 5600 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
- Avaya 4620SW IP Telephone
- Avaya 4621SW IP Telephone
- Avaya 4622SW IP Telephone
- Avaya 4625SW IP Telephone
- Avaya 5602SW IP Telephone
- Avaya 5610SW IP Telephone
- Avaya Gen-2 4606, 4612, and 4624 IP Telephones
- Avaya Wireless AP-4/5/6 802.11a/b/g Access Point

The Avaya 4612 and 4624 IP Telephones can be identified as Gen-2 by inspecting the model number. "2A" in the model number 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.

An example of a model number is 4612D0**2A**-003 (Gen-2).

The Avaya 4620SW Class 2 and Class 3 IP Telephones can be differentiated by the microphone at the bottom right side of the Telephone. If the microphone has one hole, it is Class 2, and if it has two holes, it is Class 3.

The classifications of the phones are dependent on the Institute of Electrical and Electronics Engineers (IEEE) 802.3af classifications for Powered Devices such as Avaya IP Telephones. Each Powered Device is classified by the amount of power that it consumes into one of the

IEEE's five classes. (The IEEE 802.3af PSE and Powered-Device Power Classifications chart can be seen in Table 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.

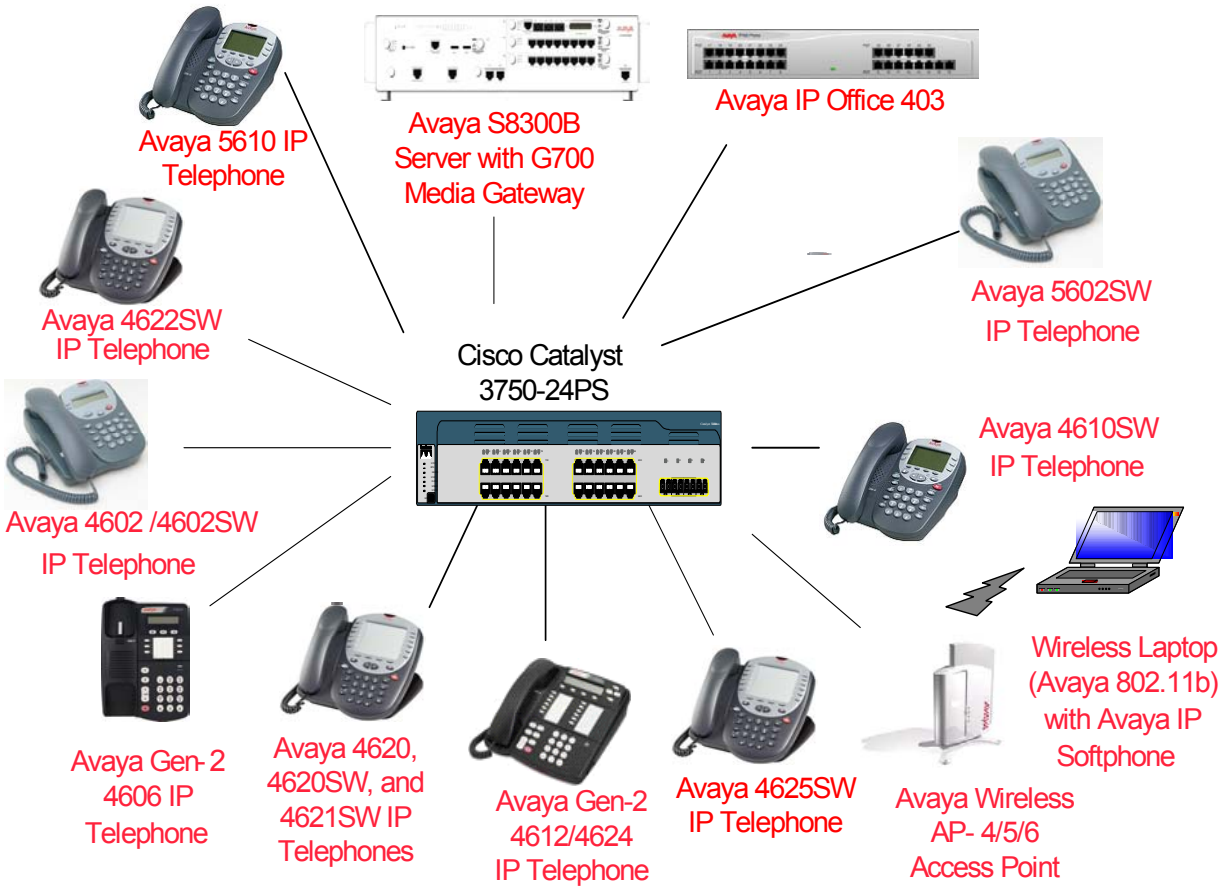

Figure 1: Avaya 4600 Series IP Telephones and a Wireless Access Point with the Cisco Catalyst 3750-24PS

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 Telephone	1.8.2
Avaya 4606 IP Telephone	1.8.3
Avaya 4610SW IP Telephone	2.1
Avaya 4612/4624 Gen-2 IP Telephone	1.8.3
Avaya 4620 IP Telephone	2.1
Avaya 4620SW IP Telephone	2.1
Avaya 4621SW IP Telephone	2.2
Avaya 4622SW IP Telephone	2.2
Avaya 4625SW IP Telephone	2.5
Avaya 5602SW IP Telephone	1.8.6
Avaya 5610SW IP Telephone	2.1
Avaya IP Softphone	5.1.4.6
Avaya AP-4/5/6	2.4.5
Avaya IP Office 403	3.0
Avaya Communication Manager (Avaya S8300 Media Server)	2.2/3.0
Cisco Catalyst 3750-24PS	IOS 12.2(25)SE

Table 1 - Network Component Software Versions

3. IEEE 802.3af PoE implementation on the Avaya PDs and Cisco Catalyst 3750-24PS

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 Catalyst 3750-24PS and Avaya PDs support this optional classification. The Cisco Catalyst 3750-24PS can detect the Avaya PDs with the correct classification and deliver the appropriate power.

The IEEE 802.3af classifications for the PDs 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 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
4620SW (Pre 11/2004)	3	15.4
4620SW (Post 11/2004)	2	7
4621SW	2	7
4622SW	2	7
4625SW	3	15.4
5602SW	1	4
5610SW	2	7
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 Telephones and a Wireless Access Point

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

The Cisco Catalyst 3750-24PS supports 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 3750-24PS interacts with powered devices.

1. PoE-capable ports are, by default, configured to auto mode. This means that powered-device discovery is enabled. If the budget inline power is exceeded, there is no guarantee which device will receive power. The Catalyst 3750-24PS has 370 Watts available to support PDs.

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 or static mode (described in Section 4.1) in order to be powered up by the Cisco Catalyst 3750-24PS. Section 4.1 provide the detailed configurations.

4.1. 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.

```
C3750#show power inline

Module   Available     Used     Remaining
          (Watts)     (Watts)    (Watts)
------   ---------   --------   ---------
1           370.0      107.0       263.0
Interface Admin  Oper       Power   Device              Class Max
                            (Watts)
--------- ------ ---------- ------- ------------------- ----- ----
Fa1/0/1   auto   off        0.0     n/a                 n/a   15.4
Fa1/0/2   static on         15.4    Ieee PD             3     15.4
Fa1/0/3   static on         15.4    Ieee PD             3     15.4
Fa1/0/4   static on         4.0     Ieee PD             1     4.0
Fa1/0/5   static on         4.0     Ieee PD             1     4.0
Fa1/0/6   static on         15.4    Ieee PD             0     15.4
Fa1/0/7   static on         7.0     Ieee PD             2     7.0
Fa1/0/8   auto   off        0.0     n/a                 n/a   15.4
Fa1/0/9   static on         15.4    Ieee PD             0     15.4
Fa1/0/10  auto   off        0.0     n/a                 n/a   15.4
Fa1/0/11  static on         7.0     Ieee PD             2     7.0
Fa1/0/12  static on         15.4    Ieee PD             0     15.4
...
```

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

```
C3750(config-if)#interface fastethernet 1/0/5
C3750(config-if)#power inline ?
  auto    Automatically detect and power inline devices
  never   Never apply inline power
  static  High priority inline power interface
C3750(config-if)#power inline static max ?
  <4000-15400>  milli-watts
```

If the actual power range drawn on a PoE-capable port is known, then the Catalyst 3750-24P switch may be configured, using the **static** option, to allocate power based on the actual maximum rather than the 802.3af power class of the detected PD on the port. It should be noted that for devices where the 802.3af power class is detected by the Cisco Catalyst 3750-24PS, the switch would require that the static setting be equal or greater than what is allocated by the standard for the class. Thus this command is not very useful for the Avaya PDs, and could have an adverse effect. For example, if the static option on a port is configured for 11 Watts, and an Avaya 4620 IP Telephone (Class 3 device) is connected to that port, the Cisco switch will deny power to the IP Telephone.

5. Verification Steps

The following are verification steps for these Applications Notes:

- Connect Avaya IP Telephones to Cisco Catalyst 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 3750-24PS is IEEE 802.3af compliant and can be used to provide inline power to the Avaya IP 4600 and 5600 series IP Telephones and Avaya Wireless Access Points.

Please e-mail any questions or comments pertaining to these Application Notes along with the full title name and filename, located in the lower right corner, directly to the Avaya Solution & Interoperability Test Lab at interoplabnotes@list.avaya.com