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Avaya Solution & Interoperability Test Lab

Application Notes for the ProCurve 5406zl Switch by HP Supporting Power over Ethernet with Avaya Communication Manager, Avaya one-X™ G11 PSTN Gateway and Avaya IP Telephones – Issue 1.0

Abstract

These Application Notes describe the procedures for configuring the ProCurve 5406zl Switch by HP to provide inline Power over Ethernet (PoE) to Avaya 1600/4600/9600 Series IP Telephones registered to Avaya Communication Manager and the Avaya one-X™ G11 PSTN Gateway. During compliance testing, Avaya IP telephones successfully obtained power and transferred data over standard Ethernet cables from the ProCurve 5406zl Switch.

Information in these Application Notes has been obtained through DevConnect compliance testing and additional technical discussions. Testing was conducted via the DevConnect Program at the Avaya Solution and Interoperability Test Lab.

1. Introduction

Power over Ethernet (PoE) allows both power and data to be simultaneously carried over standard Ethernet cables. PoE-enabled Ethernet switches can supply power directly to Ethernet devices, thereby simplifying installation and removing the need for separate power supplies for those devices. The IEEE 802.3af standard defines the mechanisms for Power Sourcing Equipment (PSE), such as PoE-enabled Ethernet switches, to detect, classify, and supply power to Powered Devices (PDs), such as PoE-enabled IP telephones. In the compliance-tested configuration described in these Application Notes, the ProCurve 5406zl Switch by HP is configured to supply inline PoE to Avaya PDs. No ProCurve 5406zl Switch specific configuration is required on Avaya Communication Manager or Avaya one-X™ G11 PSTN Gateway to support this solution.

As illustrated in **Figure 1**, the Avaya PDs covered in these Application Notes include the following:

- Avaya 9600 Series IP Telephones (Avaya 9630 IP Telephone with and without SBM24 Button Module and Avaya 9620 IP Telephone with and without Gigabit Ethernet [GigE] Adapter).
- Avaya 4600 Series IP Telephones (Avaya 4621SW IP Telephone with and without GigE Adapter).
- Avaya 1600 Series IP Telephones (Avaya 1616 IP Telephone with and without BM32 Button Module).
- Avaya one-X Quick Edition IP Telephones and Avaya one-X G11 PSTN Gateway.
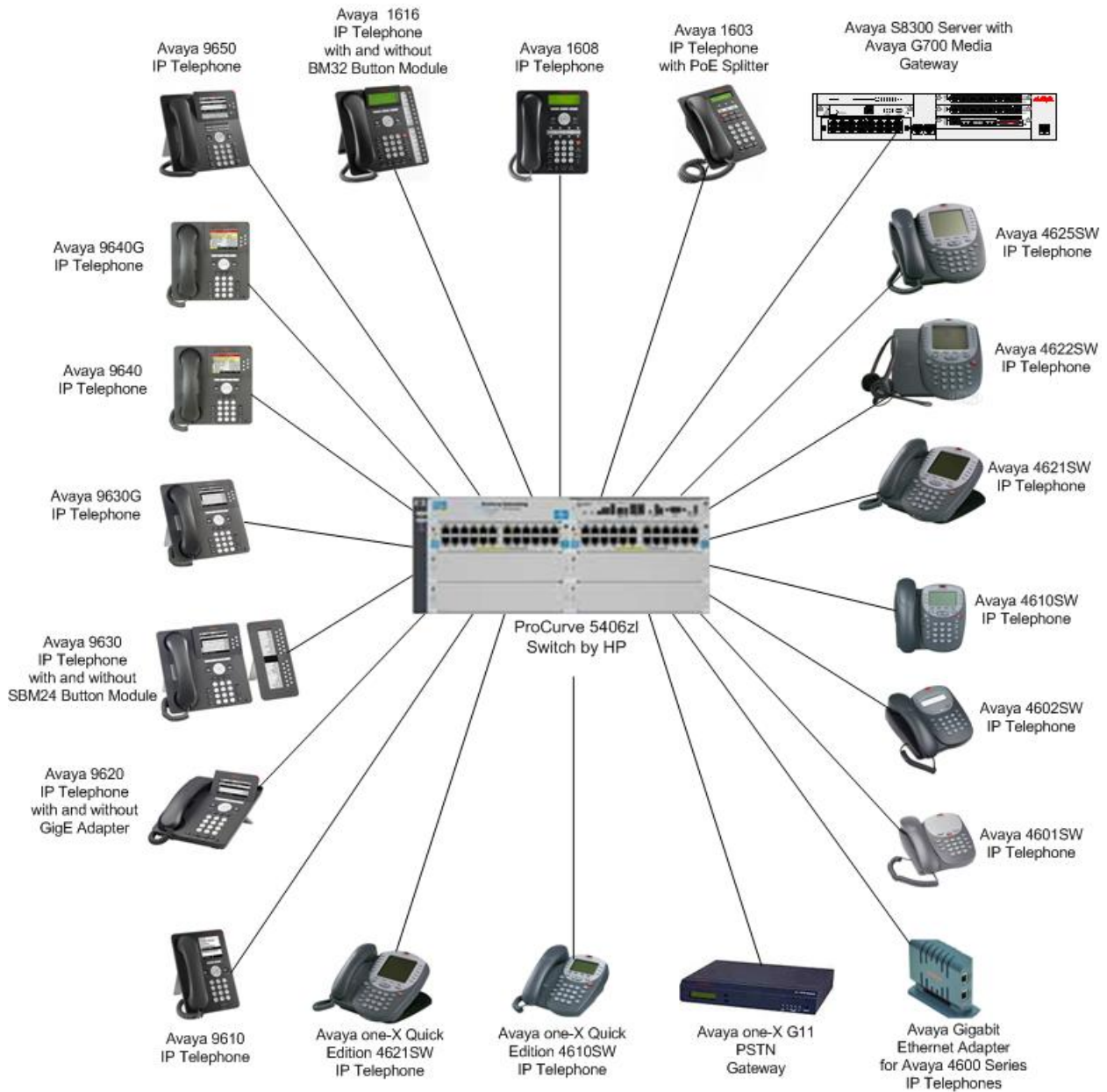
Figure 1: ProCurve 5406zl Switch with Avaya Communication Manager, Avaya IP Telephones and Avaya one-X G11 PSTN Gateway

2. Equipment and Software Validated

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

Equipment	Software/Firmware
Avaya S8300 Server with Avaya G700 Media Gateway	Avaya Communication Manger 4.0 (R014x.00.0.730.5)
Avaya 9650 IP Telephone	Avaya one-X Deskphone Edition 1.5 (H.323)
Avaya 9640G IP Telephone	Avaya one-X Deskphone Edition 1.5 (H.323)
Avaya 9640 IP Telephone	Avaya one-X Deskphone Edition 1.5 (H.323)
Avaya 9630G IP Telephone	Avaya one-X Deskphone Edition 1.5 (H.323)
Avaya 9630 IP Telephone with and without SBM24 Button Module	Avaya one-X Deskphone Edition 1.5 (H.323)
Avaya 9620 IP Telephone with and without GigE Adapter	Avaya one-X Deskphone Edition 1.5 (H.323)
Avaya IP Telephone	Avaya one-X Deskphone Edition 1.5 (H.323)
Avaya 1608 IP Telephone	Avaya one-X Value Edition 1.23 (H.323)
Avaya 1616 IP Telephone with and without BM32 Button Module	Avaya one-X Value Edition 1.23 (H.323)
Avaya 1603 IP Telephone with PoE Splitter	Avaya one-X Value Edition 1.23 (H.323)
Avaya 4625SW IP Telephone	2.8 (H.323)
Avaya 4622SW IP Telephone	2.8 (H.323)
Avaya 4621SW IP Telephone with and without GigE Adapter	2.8 (H.323)
Avaya 4610SW IP Telephone	2.8 (H.323)
Avaya 4602SW IP Telephone	2.8 (H.323)
Avaya 4601SW IP Telephone	2.3 (H.323)
Avaya one-X G11 PSTN Gateway	3.2.1
Avaya one-X Quick Edition 4610SW IP Telephone	3.2.1 (SIP)
Avaya one-X Quick Edition 4621SW IP Telephone	3.2.1 (SIP)
ProCurve 5406zl Switch by HP (model number J8692A) with J8705A module and J8177C transceiver	FW-K.12.22

3. Configure Avaya Communication Manager

- No ProCurve 5406zl Switch specific configuration is required on Avaya Communication Manager or Avaya one-X G11 PSTN Gateway to support this solution.
- Consult the Avaya Communication Manager configuration manual **[1]** for additional configuration details.

4. Configure the ProCurve 5406zl Switch

The configuration covered here is specific to PoE and does not include configuration of other features available in the ProCurve 5406zl Switch. Consult the ProCurve 5406zls Switch configuration manual **[7]** for additional configuration details.

Inline PoE is supported on the ProCurve 5406zl Switch. By default, PoE support is enabled on the system and on all ports.

5. Interoperability Compliance Testing

The interoperability testing focused on verifying PoE interoperability between the ProCurve 5406zl Switch, Avaya IP telephones and the Avaya one-X G11 PSTN Gateway.

The tests included verification of the following after each device was connected to the ProCurve 5406zl Switch:

- Successful boot operation.
- For Avaya IP telephones, successful registration with Avaya Communication Manager.
- Completion of a test call, and raising speakerphone volume to maximum value.
- Connecting a mix of Avaya IP telephones to the switch, power cycling the switch and verifying successful boot operation and registration of the devices.

5.1. General Test Approach

The general test approach was to:

- Connect the Avaya IP Telephones and Avaya one-X G11 PSTN Gateway to ports on the ProCurve 5406zl Switch and verify that the PDs successfully booted.
- Verify completion of a test call.
- Power cycling the ProCurve 5406zl Switch and verifying successful boot operation and registration of the devices.

5.2. Test Results

All Power over Ethernet test cases completed successfully. The ProCurve 5406zl Switch successfully provided inline power to all of the Avaya IP telephones and Avaya one-X G11 PSTN Gateway. **Table 1** lists the IEEE 802.3af class and measured power of the Avaya IP telephones and Avaya one-X G11 PSTN Gateway when connected to the ProCurve 5406zl Switch. The power listed as measured by the ProCurve 5406zl Switch is for PDs under idle conditions. Cable length and impedance affects power usage, so the measurements listed here may vary based on the cable used.

Avaya Powered Device	802.3af Class	Measured Power (W) (Idle)
Avaya 1603 IP Telephone with PoE Splitter	2	4.5
Avaya 1608 IP Telephone	2	4.2
Avaya 1616 IP Telephone	3	5.2
Avaya 1616 IP Telephone with BM32 Button Module	3	6.0
Avaya 4601SW IP Telephone	2	3.2
Avaya 4602SW IP Telephone	2	3.1
Avaya 4610SW IP Telephone	2	3.2
Avaya 4621SW IP Telephone	2	4.9
Avaya 4621SW IP Telephone with GigE Adapter	0	11.0
Avaya 4622SW IP Telephone	2	4.8
Avaya 4625SW IP Telephone	3	7.5
Avaya 9610 IP Telephone	2	4.0
Avaya 9620 IP Telephone	2	4.5
Avaya 9620 IP Telephone with GigE Adapter	3	7.8
Avaya 9630 IP Telephone	2	4.7
Avaya 9630G IP Telephone	2	4.3
Avaya 9630 IP Telephone with SMB24 Button Module	2	5.2
Avaya 9640 IP Telephone	2	3.9
Avaya 9640G IP Telephone	2	4.5
Avaya 9650 IP Telephone	2	4.7
Avaya one-X Quick Edition 4610SW IP Telephone	2	3.2
Avaya one-X Quick Edition 4621SW IP Telephone	2	4.7
Avaya one-X G11 PSTN gateway	0	4.1

Table 1: IEEE 802.3af Class and Measured Power

Table 2 summarizes the power at the PSE for the IEEE 802.3af classes.

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

Table 2: IEEE 802.3af Classes

6. Verification Steps

Inline PoE is supported on the ProCurve 5406zl Switch. By default, PoE support is enabled on the system and on all ports.

The following steps may be used to verify the configuration of PoE related parameters:

- Verify that the PoE **Operational Status** in **ON** at the system level by entering the command **show power-management.**

```
ProCurve Switch 5406zl# show power-management

Status and Counters - System Power Status

 Pre-standard Detect    : On

Status and Counters - System Power Status for slot A

 Maximum Power       : 273 W         Operational Status: On
 Power In Use        :  15 W +/- 6 W  Usage Threshold (%) : 80
```

- Verify that **Power Enable** is **Yes** at the port level by entering the command **show power-management brief**. A detailed explanation of each field is in **Appendix A**.

```
ProCurve Switch 5406zl# show power-management brief

Status and Counters - Port Power Status

      | Power               Configured      Detection    Power
 Port | Enable  Priority    Type            Status       Class
 -----+-------- --------    ----------------  -----------  ------
 A1   | Yes     Low                           Searching    0
 A2   | Yes     Low                           Searching    0
 A3   | Yes     Low                           Searching    0
 A4   | Yes     Low                           Searching    0
 A5   | Yes     Low                           Searching    0
 A6   | Yes     Low                           Searching    0
 A7   | Yes     Low                           Delivering   0
 A8   | Yes     Low                           Searching    0
 A9   | Yes     Low                           Delivering   2
 A10  | Yes     Low                           Delivering   2
 A11  | Yes     Low                           Searching    0
 A12  | Yes     Low                           Delivering   2
 A13  | Yes     Low                           Searching    0
 A14  | Yes     Low                           Searching    0
 A15  | Yes     Low                           Searching    0
 A16  | Yes     Low                           Delivering   2
 A17  | Yes     Low                           Searching    0
 A18  | Yes     Low                           Searching    0
 A19  | Yes     Low                           Searching    0
 A20  | Yes     Low                           Searching    0
```

- Connect the Avaya PD to a PoE enabled port on the ProCurve 5406zl Switch and verify that the PD powers on successfully. If the PD does not power on, enter the command **show power-management <portlist>** where **<portlist>** is the name of the port on the ProCurve 5406zl Switch. A detailed explanation of each field is in **Appendix B**.

```
ProCurve Switch 5406zl# show power-management a9

Status and Counters - Port Power Status for port A9

 Power Enable      : Yes

 Priority          : Low           Configured Type   :
 Detection  Status : Delivering    Power Class       : 2

 Over Current Cnt  : 0             MPS Absent Cnt    : 0
 Power Denied Cnt  : 0             Short Cnt         : 0

 Voltage           : 506 dV        Current           : 90 mA
 Power             : 4558 mw
```

- Verify that Avaya 1600/4600/9600 Series IP Telephones have successfully registered with Avaya Communication Manager. Use the **list registered-ip-stations** command on Avaya Communication Manager.

```
list registered-ip-stations

                       REGISTERED IP STATIONS

Station Ext/   Set    Product   Prod  Station            Net Gatekeeper   TCP
 Orig Port     Type   ID        Rel   IP Address         Rgn IP Address   Skt
50000          9620   IP_Phone  1.500 192.168.200.116 1      10.1.1.1      y
50001          9620   IP_Phone  2.800 192.168.200.115 1      10.1.1.1      y
50004          9630   IP_Phone  1.500 10.33.1.105      1      10.1.1.1      n
51003          4620   IP_Phone  1.500 10.33.1.104      1      10.1.1.1      n




Command successfully completed
Command:
ESC-x=Cancel Esc-e=Submit Esc-p=Prev Pg Esc-n=Next Pg Esc-h=Help Esc-r=Refresh
```

7. Troubleshooting

- If the PD does not power up, check the inline power settings on the ProCurve 5406zl Switch. Enter **show power-management brief** and verify:
    - **Power Enable** is **Yes**
    - **Detection Status** is **Delivering**

- If the PD does not power up, check the inline power configuration on the ProCurve 5406zl Switch. Enter **show power-management 1-24.** Check to see if there is a limit or priority setting on the port. If the output shows that the "Detection Status" is at "Fault" there may be a priority setting or insufficient available power to power the PD. The ProCurve 5406zl Switch provides up to 15.4 W per port. For more information refer to **[7].**

8. Support

For technical support on HP products, consult the support pages at http://www.hp.com/rnd.

9. Conclusion

These Application Notes describe the steps for configuring the ProCurve 5406zl Switch by HP to provide inline PoE to Avaya IP telephones and the Avaya one-X Quick Edition G11 PSTN Gateway. It was verified that PoE was delivered successfully to all Avaya PD's tested.

10. Additional References

The documents referenced below were used for additional support and configuration information.

The following Avaya product documentation can be found at http://support.avaya.com.

[1] Administrator Guide for Avaya Communication Manager, Doc # 03-300509, Issue 3.1, February 2007
[2] Administration for Network Connectivity for Avaya Communication Manager, Doc # 555-233-504, Issue 12, February 2007
[3] Avaya one-X Deskphone Edition for 9600 Series IP Telephones Administrator Guide, Doc # 16-300698
[4] Avaya one-X Deskphone Value Edition 1600 Series IP Telephones Installation and Maintenance Guide Release 1, Doc # 16-601438
[5] 4600 Series IP Telephone Release 2.8 LAN Administrator Guide, Doc # 555-233-507
[6] Avaya one-X Quick Edition Release 3.2.0 Telephone System Administration Guide, Doc # 16-601412

The following HP product documentation can be found at:
http://www.hp.com/rnd/support/manuals

[7] Command Line Interface Reference Guide, ProCurve Switches 3500yl, 6200yl, 5400zl (February 2007)

Appendix A: Description of Fields for "show power-management brief"

- **Port:** Lists all PoE-capable ports on the switch. Power Enable: Shows **Yes** for ports enabled to support PoE (the default) and **No** for ports on which PoE is disabled.
- **Priority:** Lists the power priority (**Low**, **High**, and **Critical**) configured on ports enabled for PoE.
- **Configured Type:** Lists the type of PD connected to each port. For example: Telephone, Webcam, Wireless, Other.
- **Detection Status:**
    - **Searching:** The port is trying to detect a PD connection.
    - **Delivering:** The port is delivering power to a PD.
    - **Disabled:** PoE support is disabled on the port.
    - **Fault:** The switch detects a problem with the connected PD.
- **Power Class:** Shows the 802.3af power class of the PD detected on the indicated port. Classes include:
  0: 0.44W to 12.95W
  1: 0.44W to 3.84W
  2: 3.84W to 6.49W
  3: 6.49W to 12.95W
  4: reserve

Appendix B: Description of Fields for "show power-management <portlist>"

Power Enable: Shows **Yes** for ports enabled to support PoE (the default) and **No** for ports on which PoE is disabled.

Priority: Lists the power priority (**Low**, **High**, and **Critical**) configured on ports enabled for PoE.

Detection Status:
> – **Searching:** The port is available to support a PD connection.
> – **Delivering:** The port is delivering power to a PD.
> – **Disabled:** PoE support is disabled on the port.
> – **Fault:** The switch detects a problem with the connected PD.

Over Current Cnt: Shows the number of times a connected PD has attempted to draw more than 15.4 watts.

Power Denied Cnt: Shows the number of times PDs requesting power on the port have been denied due to insufficient power available. Each occurrence generates an Event Log message.

Voltage: The total voltage, in dV, being delivered to PDs.

Power: The total power, in mW, being delivered to PDs.

Configured Type: Shows the type of PD detected on the port.

Power Class: Shows the power class of the PD detected on the indicated port. Classes include:
> **0**: 0.44W to 12.95W
> **1**: 0.44W to 3.84W
> **2**: 3.84W to 6.49W
> **3**: 6.49W to 12.95W
> **4:** reserved

MPS Absent Cnt: This value shows the number of times a detected PD has no longer requested power from the port. "MPS" refers to the "Maintenance Power Signature".

Short Cnt: Shows the number of times the switch provided insufficient current to a connected PD.

Current: The total current, in mA, being delivered to PDs.