



Avaya Solution & Interoperability Test Lab

**Configuring the Cisco 2811 Integrated Services Router
Supporting Power over Ethernet with Avaya
Communication Manager and Avaya IP Telephones – Issue
1.0**

Abstract

These Application Notes describe the configuration of the Cisco 2811 Integrated Services Router and Avaya 1600/4600/9600 Series IP Telephones registered to Avaya Communication Manager including Avaya Quick Edition IP Telephones with an Avaya G10 PSTN Gateway.

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. The Cisco 2811 Integrated Service Router, when installed with the EtherSwitch Service Modules with IEEE 802.3af Support, provides 16 ports with PoE.

The Avaya product configurations addressed by these Application Notes are shown in **Figure 1**. The following Avaya powered devices were covered:

- Avaya one-X DeskPhone Edition IP Telephones : 9610, 9620, 9630, 9630G, 9640 (with SBM24), 9650
- Avaya 46xx Series IP Telephones: 4601, 4602, 4610, 4621, 4622, 4625
- Avaya one-X Deskphone Value Edition IP Telephones: 1603 with PoE Splitter, 1608, 1616 (with and without BM32 Button Module)
- Avaya Quick Edition: 4610SW, 4621SW, and G10 PSTN Gateway

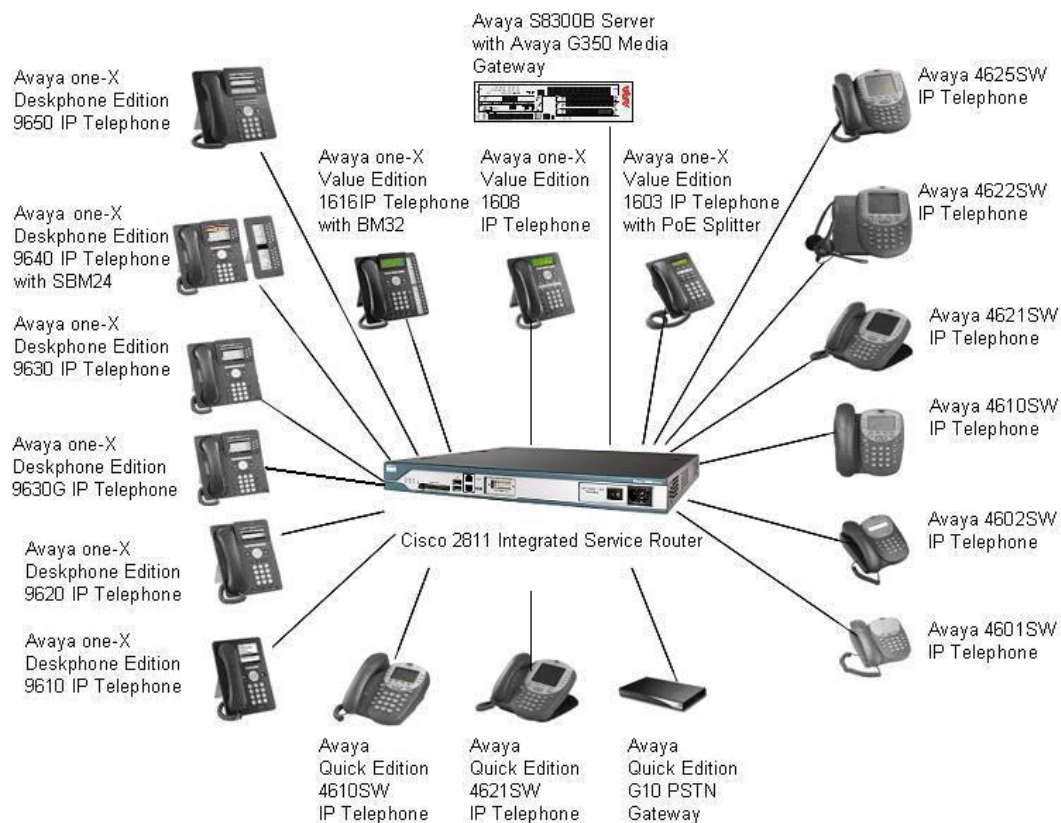


Figure 1: Network Configuration

2. Equipment and Software Validated

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

Equipment	Version
Avaya G350 Media Gateway with Avaya S8300B Server	Avaya Communication Manger 4.0.1 (R014x.00.1.731.2)
Avaya one-X Deskphone Edition 9610 IP Telephone	1.5
Avaya one-X Deskphone Edition 9620 IP Telephone	1.5
Avaya one-X Deskphone Edition 9630 IP Telephone	1.5
Avaya one-X Deskphone Edition 9630G IP Telephone	1.5
Avaya one-X Deskphone Edition 9640 IP Telephone with SBM24 Button Module	1.5
Avaya one-X Deskphone Edition 9650 IP Telephone	1.5
Avaya 4601SW IP Telephone	2.3
Avaya 4602+ IP Telephone	2.8
Avaya 4610SW IP Telephone	2.8
Avaya 4621SW IP Telephone	2.8
Avaya 4622SW IP Telephone	2.8
Avaya 4625SW IP Telephone	2.8
Avaya one-X Value Edition 1603 IP Telephone with PoE Splitter	1.0
Avaya one-X Value Edition 1608 IP Telephone	1.0
Avaya one-X Value Edition 1616 IP Telephone with BM32	1.0
Avaya one-X Quick Edition 4610 IP Telephone	7.2.1958
Avaya one-X Quick Edition 4621 IP Telephone	7.2.1958
Avaya one-X Quick Edition G10 PSTN Gateway	7.2.1958
Cisco 2811 Integrated Services Router - EtherSwitch Service Module with IEEE 802.3af Support (NME-16ES-1G-P) - Cisco 2811 AC inline power supply (PWR-2811-AC-IP)	Revision 253.50 SW 12.4(3f) 12.2(25)SEC -

3. Configuration of the Avaya endpoints

There is no configuration requirement on the Avaya endpoints to use PoE. For details on configuring Avaya Servers, Gateways, or Endpoints, consult the Administrator's guide [1].

4. IEEE 802.3af PoE Implementation on the Avaya PDs and Cisco 2811 Integrated Services Router

In June 2003, the IEEE approved a standard for Power over Ethernet that allows a maximum of 15.4 W per PSE port. The maximum power delivered to the device, after cable loss, can be no more than 12.95W. Optionally, the powered devices can be classified according to the maximum power the device uses. This optional classification is supported on the Cisco 2811 Integrated Services Router and Avaya PDs and the appropriate power is allocated to the PD.

The IEEE 802.3af classifications for the PDs are given in **Table 1**. 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	15.4 W
1	4.0 W
2	7.0 W
3	15.4 W
4	Treat as Class 0

Table 1 – IEEE 802.3af PSE and PD Power Classifications

Table 2 shows the detected class and power allocated from the Cisco 2811 Integrated Services Router to the Avaya IP Telephones.

Avaya Product	Class	Power Allocated (Watts)
4601	2	7.0 Watts
4602+	2	7.0 Watts
4610SW	2	7.0 Watts
4621SW	2	7.0 Watts
4622SW	2	7.0 Watts
4625SW	3	15.4 Watts
9610	2	7.0 Watts
9620	2	7.0 Watts
9630	2	7.0 Watts
9630G	2	7.0 Watts
9640 with SBM24	2	7.0 Watts
9650	2	7.0 Watts
1603 with POE Adapter	2	7.0 Watts
1608	2	7.0 Watts
1616	3	15.4 Watts

1616 with BM32	3	15.4 Watts
Quick Edition 4610	2	7.0 Watts
Quick Edition 4621	2	7.0 Watts
Quick Edition G10	0	15.4 Watts

Table 2 – Class and Power Allocation for Avaya IP Telephones

5. Configuring Inline Power on the Cisco 2811 Integrated Services Router

The Cisco 2811 Integrated Services Router installed with a NME-16ES-1G-P EtherSwitch Service Module and Cisco 2811 AC inline power supply (PWR-2811-AC-IP) supports 160 Watts of inline power, which is enough to support Class 2 and some Class 3 PDs on all 16 ports. The testing associated with these Application Notes did not cover loading of all ports on the PSE.

The ports connecting to the Avaya IP Telephones must be set to the default **auto** mode in order to receive power from the router.

To access the router, connect the console cable to the PC's serial port with the other end connected to the router's console port located at the front of the router. Use HyperTerminal to access the console.

Assign an IP address to the interface associated with the EtherSwitch Service Module and then open a session to it.

```

routername#config t
routername#interface gigabitEthernet 1/0
routername#ip address 10.1.20.15 255.255.255.0
routername#no shut
routername#service-module gigabitethernet 1/0 session

```

The power inline of each port is set to **auto** by default. The command **show power inline** will display the inline power configuration and status.

```
Switch>show power inline
```

Module	Available (Watts)	Used (Watts)	Remaining (Watts)				
-----	-----	-----	-----				
1	160.0	137.2	22.8				
Interface	Admin	Oper	Power (Watts)	Device	Class	Max	
-----	-----	-----	-----	-----	-----	-----	-----
Fal/0/1	auto	on	7.0	Ieee PD	2	7.0	
Fal/0/2	auto	on	7.0	Ieee PD	2	7.0	
Fal/0/3	auto	on	15.4	Ieee PD	3	15.4	
Fal/0/4	auto	on	7.0	Ieee PD	2	7.0	
Fal/0/5	auto	on	15.4	Ieee PD	0	15.4	
Fal/0/6	auto	on	15.4	Ieee PD	3	15.4	
Fal/0/7	auto	on	7.0	Ieee PD	2	7.0	
Fal/0/8	auto	on	7.0	Ieee PD	2	7.0	
Fal/0/9	auto	on	7.0	Ieee PD	2	7.0	
Fal/0/10	auto	on	7.0	Ieee PD	2	7.0	
Fal/0/11	auto	on	7.0	Ieee PD	2	7.0	
Fal/0/12	auto	on	7.0	Ieee PD	2	7.0	
Fal/0/13	auto	on	7.0	Ieee PD	2	7.0	
Fal/0/14	auto	on	7.0	Ieee PD	2	7.0	
Fal/0/15	auto	on	7.0	Ieee PD	2	7.0	
Fal/0/16	auto	on	7.0	Ieee PD	2	7.0	

```
Switch>
```

To change the power mode, access the port interface and then use the command **power inline <auto|never|static>**. The mode should be set to **auto** for Avaya IP Telephones to work.

```
Switch#config t
Switch(config)#interface fastethernet 1/0/5
Switch(config-if)#power inline ?
  auto    Automatically detect and power inline devices
  never   Never apply inline power
  static  High priority inline power interface
Switch(config-if)#
```

6. Verification Steps

The following commands can be used verify the proper operation of the Cisco 2811 Integrated Services Router.

- Connect the Avaya IP Telephones, Avaya Quick Edition IP Telephones and the Avaya G10 PSTN Gateway to Cisco 2811 Integrated Services Router. Verify the Avaya IP Telephones can be powered 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** to check the power status of the EtherSwitch Service Module ports. Verify the power mode is set to **auto**.
- Reset the router and verify the Avaya IP telephones can be powered up properly.

7. Conclusion

These Application Notes described configuration of the Cisco 2811 Integrated Services Router to provide power over Ethernet to the Avaya IP Telephones, and the Avaya Quick Edition G10 PSTN Gateway. The Cisco 2811 was able to power all devices tested.

8. Additional References

The Avaya product documentation is available at <http://support.avaya.com>.

[1] *Administrator Guide for Avaya Communication Manager*, Release 4.0, Issue 3, February 2007, Document Number 03-300509.

Cisco documentation is available from the Cisco website.

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