



Avaya Solution & Interoperability Test Lab

Application Notes for using Link Layer Discovery Protocol (LLDP) with Brocade FastIron SuperX and GS Switches and Avaya 9600 Series IP Telephone running Avaya one-X Deskphone Edition - Issue 1.0

Abstract

These Application Notes describe the steps for configuring Brocade FastIron SuperX and GS Switches to use the Network Policy Type Length Value (TLV) within the Link Layer Discovery Protocol Media Endpoint Devices (LLDP-MED) to assign VLAN and QoS information to Avaya 9600 Series IP Telephones running Avaya one-X Deskphone Edition.

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

These Application Notes describe a sample configuration for using Link Layer Discovery Protocol (LLDP) to provision VLAN and QoS information to Avaya 9600 Series IP Telephones running Avaya one-X Deskphone Edition.

LLDP or 802.1AB is an IEEE standard designed for the discovery of directly attached adjacent network devices such as Ethernet switches, routers, and other LLDP capable devices such as the Avaya 9600 Series IP Telephones running Avaya one-X Deskphone Edition 3.0. LLDP advertisements are encapsulated in LLDP Data Units (LLDPDU) in the format of Type Length Value or TLV for short. The IEEE 802.1AB specification defines different types of TLVs – Standard and Optional. LLDP capable devices must support the advertisement of Standard TLVs such as Chassis ID, Port ID, and Time to Live TLVs. The same LLDP capable device may also include Network Policy, IEEE 802.3 (MAC/PHY Configuration/Status) and other Vendor specific optional TLVs as part of its LLDP advertisement. Starting with firmware release version 3.0, Avaya 9600 Series IP Telephone supports the use of the Network Policy TLV as a means to accept VLAN and QoS assignment in addition to using vendor specific TLVs. This applies to the H.323 software release for Avaya 9600 Series IP Telephones.

1.1. Interoperability Compliance Testing

The sample network outlined in these Application Notes consists of Brocade FastIron SuperX and GS Switches, serving as the connection point for the Avaya IP Telephones to connect into the network. The Ethernet switch port is configured to support 2 VLANs, one for voice and one for data. The voice VLAN supports Avaya IP Telephone traffic and the data VLAN supports PC traffic. LLDP is enabled on these Ethernet ports and are configured to advertise the voice VLAN ID and QoS information using the Network Policy LLDP TLV.

1.2. Support

Phone Support :

US: 1-877-887-2622

International: 408-207-1600

Email support: support@foundrynet.com

Online support: www.brocade.com/services-support

2. Reference Configuration

Figure 1 illustrates the configuration used in these Application Notes. All Avaya IP Telephones are registered with Avaya Communication Manager connected to the enterprise IP network. All Avaya IP Telephones are assigned to the same IP network region within Avaya Communication Manager. VLAN ID, Layer 2 and Layer 3 QoS information for Avaya 9600 Series IP Telephones running Avaya one-X Deskphone Edition 3.0 (H.323) is obtained through LLDP advertisement configured on the Brocade Networked Switches.

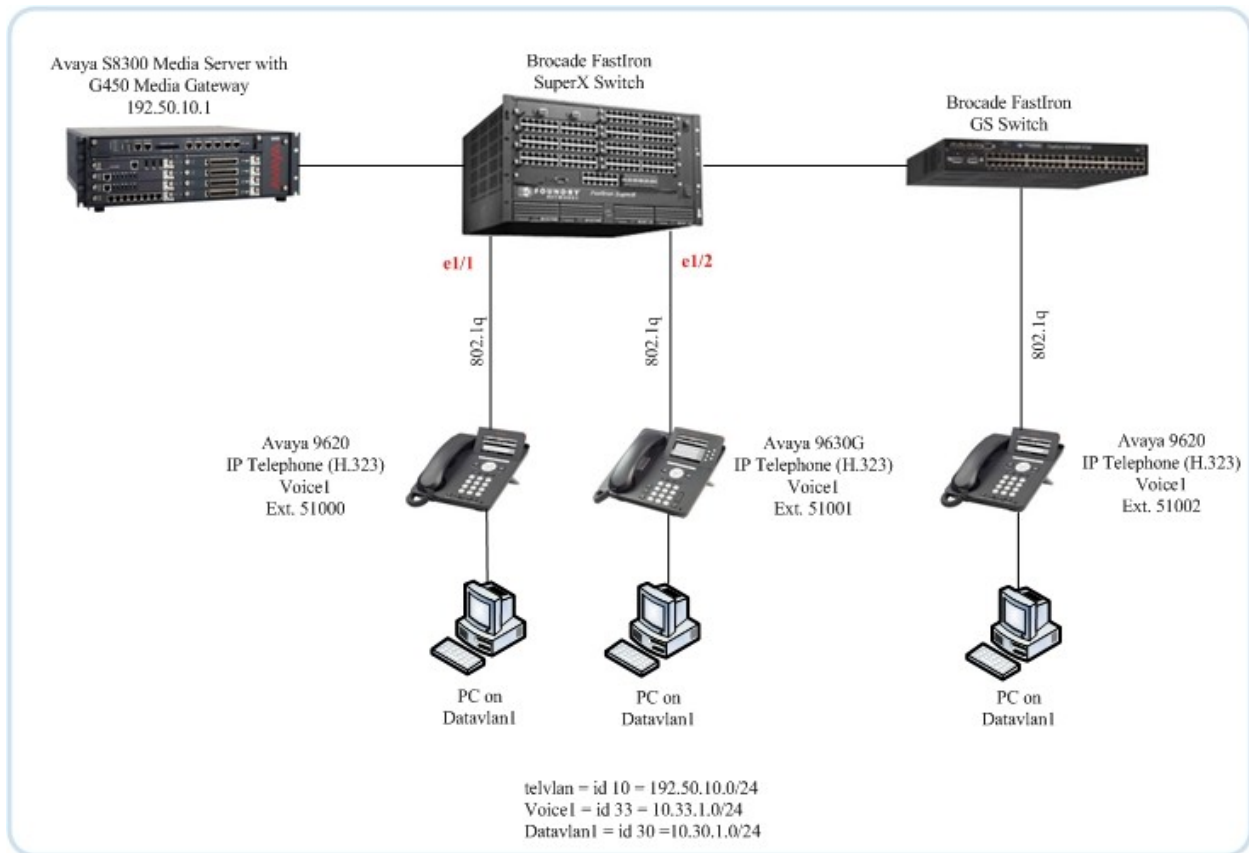


Figure 1: Avaya/Brocade Network Diagram

3. Equipment and Software Validated

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

Equipment	Software/Firmware
Avaya PBX Products	
Avaya S8300 Server running Avaya Communication Manager	Avaya Communication Manager 5.1.2
Avaya G450 Media Gateway MGP MM712 DCP Media Module	28.22.0 HW9
Avaya Telephony Sets	
Avaya 9600 Series IP Telephones	Avaya one-X Deskphone Edition 3.0
Brocade Products	
Brocade FastIron SuperX Switch	05.0.00T3e3
Brocade FastIron GS Switch with routing enabled	04.3.01T7e3
Brocade FastIron GS Switch	04.3.01T7e1

4. Configuration of the Brocade Networks FastIron Switch

This section addresses how to configure the Brocade FastIron Switches as shown in **Figure 1** using the Command Line Interface (CLI). Since the syntax for configuring the Brocade FastIron SuperX Switch, Brocade FastIron GS Switch and Brocade FastIron GS Switch with routing enabled is the same, only the configuration for the SuperX Switch is shown. Basic router configuration is assumed, only information that pertains to the LLDP setup is covered in these Application Notes. Refer to [4] for information on basic setup information.

As shown in **Figure 1**, The PCs in the network are directly connected to the Avaya 9600 Series IP Telephones. The Brocade interfaces that the Avaya IP Telephones are connected to are in dual mode which allows both the data and voice VLANs to be trunked through. For this example, the Datavlan ID is 30 and the Voice ID is 33.

To configure the FastIron SuperX Switch, connect a PC or laptop to the serial port of the FastIron SuperX Switch. Run a terminal emulation program with the following configuration:

- Bits per second: 9600
- Data bits: 8
- Parity: None
- Stop bits: 1
- Flow Control: None

1. Log into Brocade FastIron SuperX Switch.

Connect to the Brocade FastIron SuperX Switch. Log in using the appropriate credentials.

Login:

Password:

FastIron SuperX Switch#

2. Configure Data interfaces.

- Assign interface 1/1 through 1/2 to the data VLAN.
- Place interface 1/1 & 1/2 in dual mode.
- Disable spanning tree.

```
Control_Room # config t
Control_Room(config)# vlan 30
Control_Room(config-vlan-30)# tagged eth 1/1 to 1/2
Control_Room(config)# int eth 1/1
Control_Room(config-if-1/1) dual-mode 30
Control_Room(config-if-1/1) no spanning-tree
Control_Room(config-if-1/1) exit
Control_Room(config)# int eth 1/2
Control_Room(config-if-1/2) dual-mode 30
Control_Room(config-if-1/2) no spanning-tree
Control_Room(config-if-1/2) exit
```

3. Configure Voice interfaces.

- Assign interface 1/1 through 1/2 to the Voice VLAN.

```
Control_Room # config t
Control_Room(config)# vlan 33
Control_Room(config-vlan-33)# tagged eth 1/1 to 1/2
```

4. Configure LLDP values.

- Enable LLDP on the switch ports.
- Start LLDP.
- Assign the voice tagged Vlan, the voice Layer 2 QoS priority value and the voice Layer 3 QoS DSCP values to be advertised.
- Write the running configuration to the startup configuration.

```
Control_Room # config t
Control_Room (config)# lldp enable ports all
Control_Room (config)# lldp run
Control_Room (config)# lldp med network-policy application voice tagged vlan 33
priority 7 dscp 48 ports all
Control_Room (config)# wr mem
```

5. Test Results

The Brocade FastIron SuperX and GS Switches, serving as the connection point for the Avaya IP Telephones, were able to configure the voice VLAN ID and QoS information using the Network Policy LLDP TLV.

6. Verification Steps

The following steps may be used to verify the configuration:

1. Use the **show lldp** command to verify that LLDP is running. If LLDP is not running, refer to **Section 4, Step 4**.

```
Control_Room#show lldp

LLDP transmit interval           : 30 seconds
LLDP transmit hold multiplier    : 4 (transmit TTL: 120 seconds)
LLDP transmit delay              : 2 seconds
LLDP SNMP notification interval  : 5 seconds
LLDP reinitialize delay          : 2 seconds
LLDP-MED fast start repeat count : 3

LLDP maximum neighbors          : 392
LLDP maximum neighbors per port : 4
```

2. Use the **show lldp neighbors** command to verify LLDP neighbors.

```
Control_Room(config)#show lldp neighbors
```

Lcl Port	Chassis ID	Port ID	Port Description	System Nam
1/1	10.33.1.129	0004.0dec.9396		AVAEC9396
1/2	10.33.1.125	0004.0dee.77e6		AVAE77E6

3. Use the **show lldp neighbors detail** command to verify LLDP neighbors detailed information.

```
Control_Room(config)#show lldp neighbors detail ports ethernet 1/1

Local port: 1/1
Neighbor: 0004.0dec.9396, TTL 95 seconds
+ Chassis ID (network address): 10.33.1.129
+ Port ID (MAC address): 0004.0dec.9396
+ Time to live: 120 seconds
+ System name      : "AVAEC9396"
+ System capabilities : bridge, telephone
  Enabled capabilities: bridge, telephone
+ Management address (IPv4): 10.33.1.129
+ 802.3 MAC/PHY      : auto-negotiation enabled
  Advertised capabilities: 10BaseT-HD, 10BaseT-FD, 100BaseTX-HD,
                          100BaseTX-FD, fdxPause, fdxSPause, fdxBPause
  Operational MAU type   : 100BaseTX-FD
+ MED capabilities: capabilities, networkPolicy, inventory
  MED device type : Endpoint Class III
+ MED Network Policy
  Application Type : Voice
  Policy Flags     : Known Policy, Tagged
  VLAN ID       : 33
  L2 Priority   : 7
  DSCP Value    : 48
+ MED Hardware revision : "9630D01A"
+ MED Firmware revision : "hb96xxua3_00.bin"
+ MED Software revision : "ha96xxua3_00.bin"
+ MED Serial number     : "06N534780097"
+ MED Manufacturer     : "Avaya"
+ MED Model name       : "9630"
+ Unknown Organizationally-Specific TLV: OUI 00400D, subtype 1
  Value: (binary) "0000000000000000"
+ Unknown Organizationally-Specific TLV: OUI 00400D, subtype 3
  Value: (binary) "c0320a01"
+ Unknown Organizationally-Specific TLV: OUI 00400D, subtype 4
  Value: (binary) "0a210181ffffff000a2101fe"
+ Unknown Organizationally-Specific TLV: OUI 00400D, subtype 5
  Value: (binary) "00000000"
+ Unknown Organizationally-Specific TLV: OUI 00400D, subtype 6
  Value: (binary) "00000000"
+ Unknown Organizationally-Specific TLV: OUI 00400D, subtype 7
  Value: (binary) "01"AVAEE77E6
```

7. Conclusion

These Application Notes describe the administration steps required to configure the Brocade FastIron SuperX Switch, Brocade FastIron GS Switch and Brocade FastIron GS Switch with routing enabled to use LLDP-MED advertisement to assign VLAN ID, Layer 2 and Layer 3 QoS information to Avaya 9600 Series IP Telephones running Avaya one-X Deskphone Edition 3.0.

8. 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*, Document Number 03-300509.
- [2] *Installing and Administering SIP Enablement Services*, March 2007, Issue 2.1, Document Number 03-600768.
- [3] *Avaya one-X Deskphone Edition for 9600 Series IP Telephones Administrator Guide Release 3.0*, Document Number 16-300698.

The Brocade product documentation can be found at: <http://www.Brocadenet.com/>.

- [4] *Brocade FastIron Configuration Guide* with sections as follows:

- *FastIron X Series Chassis*
 - *FastIron SuperX*
- *FastIron Layer 2 Compact Switches*
 - *FastIron GS*

9. Change History

Issue	Date	Reason
1.0	5/22/2009	Initial issue

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