



Avaya Solution & Interoperability Test Lab

Application Notes for Configuring a Small to Medium Size Business VoIP and Data Network Solution Consisting of HP ProCurve Networking Switches and an Avaya Telephony Infrastructure using Avaya IP Office - Issue 1.0

Abstract

These Application Notes describe the configuration of a Voice over IP (VoIP) and data network solution using HP ProCurve Networking 2610 and 2520 Series Switches with an Avaya Telephony Infrastructure using Avaya IP Office. Emphasis was placed on verifying the prioritization of VoIP traffic and voice quality in a Multi-Site converged VoIP and Data network scenario.

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 the configuration of a Voice over IP (VoIP) and data network small to medium size business (SMB) solution using HP ProCurve 2610 and 2520 Series Switches connected to Avaya IP Office. Compliance testing emphasis was placed on verifying voice quality in a converged VoIP and Data network scenario. Depending on the test scenario, Quality of Service (QoS) based on 802.1p (Layer 2 Priority) and Layer 3 Differentiated Services (DiffServ) was implemented across the network to prioritize voice over the LAN. The Avaya IP Telephones get QoS priority settings from Avaya IP Office and are enforced in the network by the ProCurve Switches.

The VoIP traffic was given priority over the best effort data traffic. Tests were performed by over subscribing the LAN interfaces with low priority data traffic and verifying that good voice quality was achieved when routed through the over subscribed LAN interfaces. Compliance testing included QoS, throughput, and G.711 & G.729 codecs.

1.1. Interoperability Compliance Testing

Interoperability compliance testing covered feature functionality, serviceability, and performance testing.

QoS testing verified that when the ProCurve Switch interfaces are over subscribed with low priority data traffic, the higher priority VoIP media and signaling traffic still got through the over subscribed LAN interfaces. Prioritization of voice traffic was achieved by implementing Layer 3 DiffServ-based QoS and Layer 2 priority (801.p). Voice and data traffic were segmented in the enterprise network using VLANs. At the end of the performance test, it was verified that the network devices continued to operate successfully.

The telephony features verified to operate correctly included attended/unattended transfer, conference call participation, conference call add/drop, multiple call appearances, caller ID operation, call forwarding unconditional, call forwarding on busy, call park, call pick-up, bridged call appearances, voicemail using VoiceMail Pro, Message Waiting Indicator (MWI), and hold and return from hold.

Serviceability testing was conducted to verify the ability of the Avaya/ProCurve VoIP solution to recover from adverse conditions, such as power cycling network devices and disconnecting cables between the LAN interfaces. In all cases, the ability to recover after the network normalized was verified.

1.2. Support

For technical support on ProCurve products, consult the support pages at: <http://www.procurve.com/customer care/support>

2. Reference Configuration

The configuration in **Figure 1** shows a converged VoIP and data network.

For compliance testing, the DHCP server function on Avaya IP Office was disabled and a centralized corporate DHCP server was used. To better manage the different traffic types, the voice and data traffic were separated onto different VLANs.

2.1. Control Room

The control room consisted of a ProCurve 2610-24-PWR Switch, Avaya IP Office, one Avaya 1616 IP Telephone running Avaya one-X Deskphone Value Edition on VLAN Voice1, one Avaya 5610SW IP Telephone on VLAN Voice1, Avaya IP Office Manager running on a Server and one Corporate DHCP/File server. The corporate site provided a DHCP/File server for assigning IP network parameters and to download settings to the Avaya IP telephones. The ProCurve 2610-24-PWR Switch supplied Power over Ethernet (PoE) power for the Avaya IP telephones and was configured to support rapid spanning tree, VLANs and enforce QoS policies.

2.2. Lab

Lab consisted of a ProCurve 2520-24-PoE Switch, one Avaya 1616 IP Telephone running Avaya one-X Deskphone Value Edition on VLAN Voice1, one Avaya 5610SW IP Telephone on VLAN Voice1 and two PCs on Datavlan1. The ProCurve 2520-24-PoE Switch supplied PoE power for the Avaya IP telephones and was configured to support rapid spanning tree, VLANs and enforce QoS policies.

2.3. Offices

The Offices consisted of a ProCurve 2520G-24-PoE Switch, one Avaya 1616 IP Telephone running Avaya one-X Deskphone Value Edition on VLAN Voice1, one Avaya 5610SW IP Telephone on VLAN Voice1 and two PCs on VLAN Datavlan1. The ProCurve 2520G-24-PoE Switch supplied PoE power for the Avaya IP telephones and was configured to support rapid spanning tree, VLANs and enforce QoS policies

2.4. Conference Room

The Conference Room consisted of a ProCurve 2520-8-PoE Switch, one Avaya 1616 IP Telephone running Avaya one-X Deskphone Value Edition on VLAN Voice1, and two Laptops on VLAN Datavlan1. The ProCurve 2520-8-PoE Switch supplied PoE power for the Avaya IP telephones and was configured to support rapid spanning tree, VLANs and enforce QoS policies.

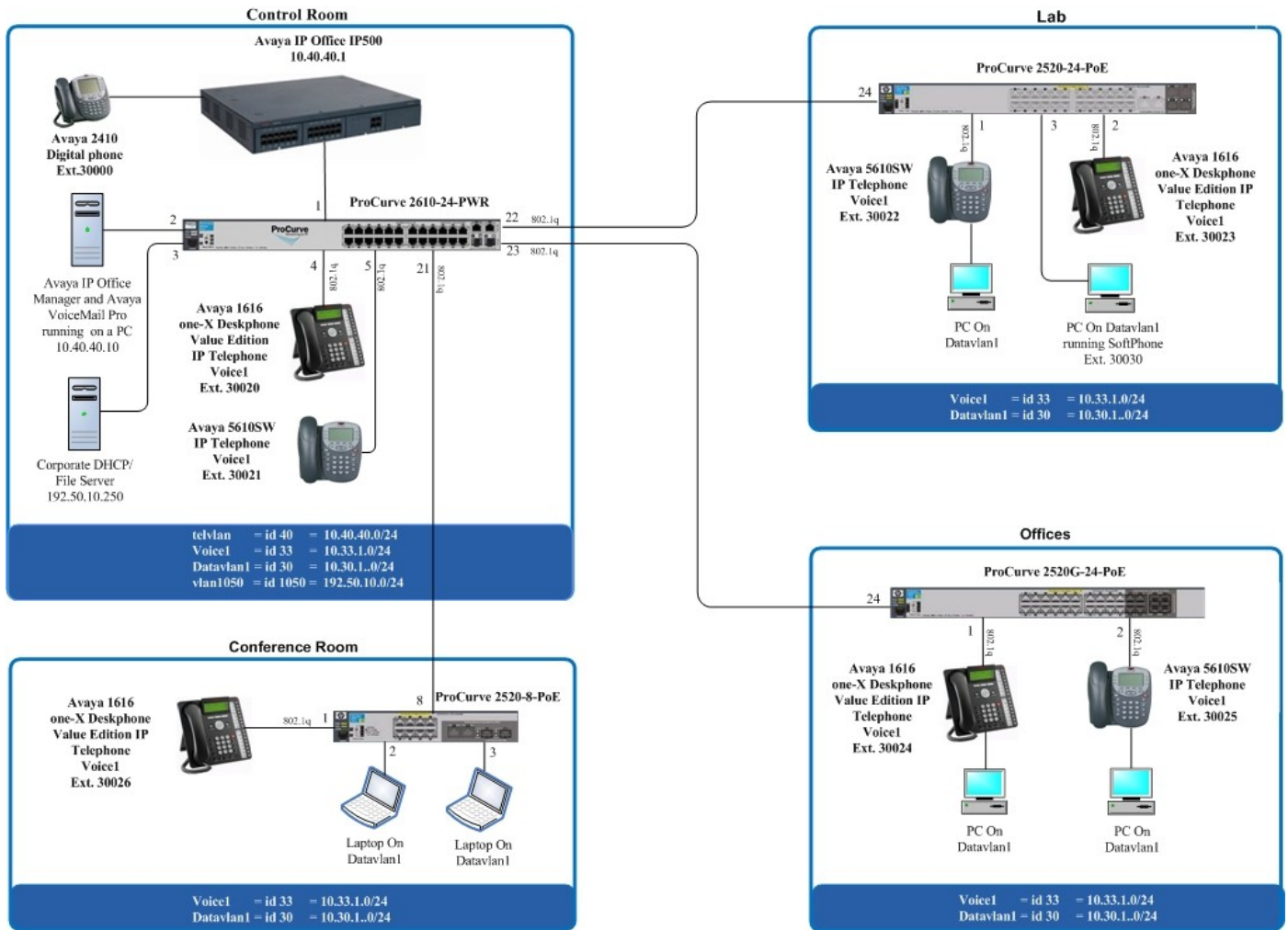


Figure 1: Network Configuration

3. Equipment and Software Validated

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

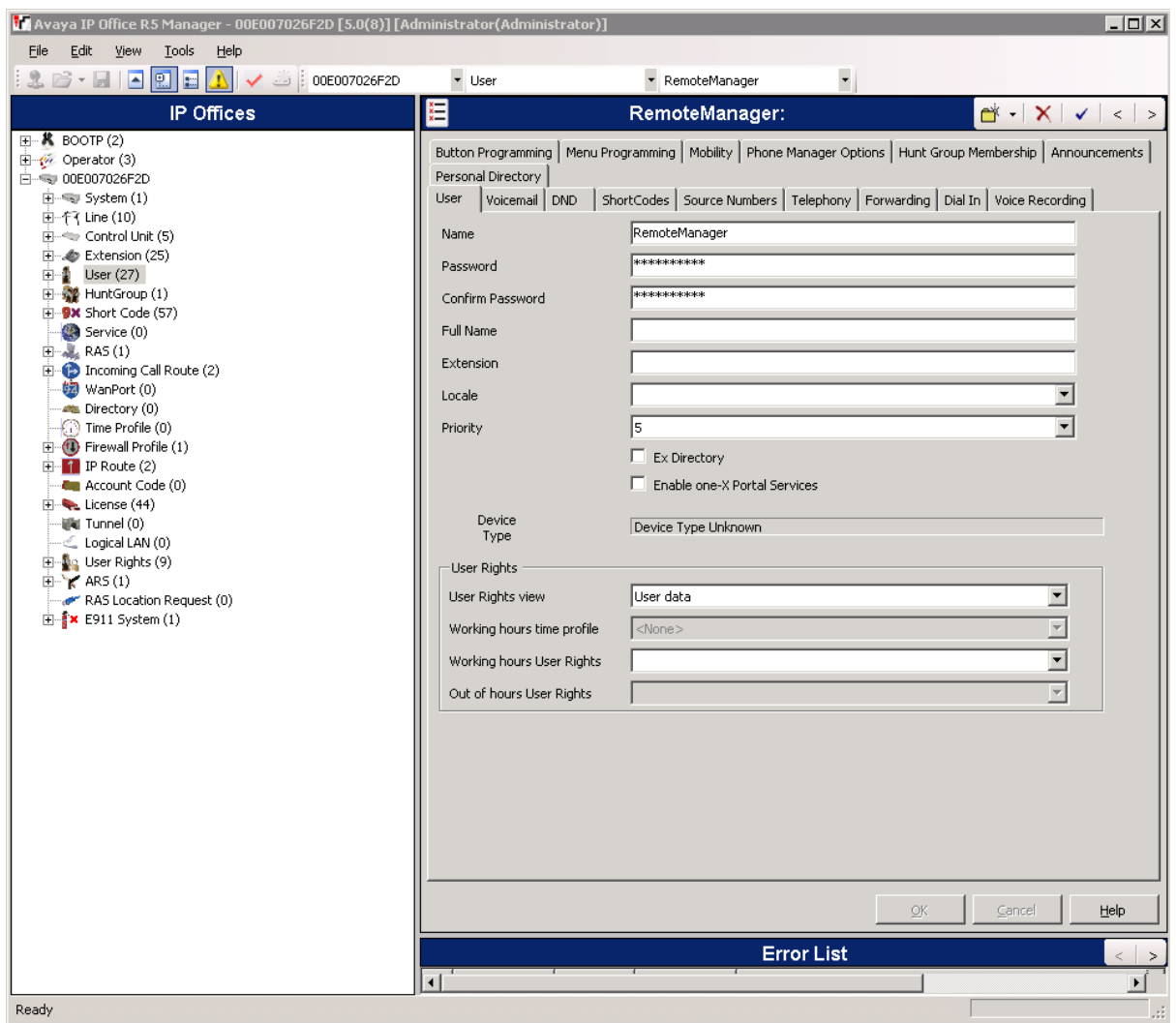
Equipment	Software/Firmware
Avaya PBX Products	
Avaya IP Office (IP500)	5.0 (8)
Avaya IP Office Manager	7.0 (8)
Avaya Messaging (Voice Mail) Products	
Avaya VoiceMail Pro	5.0 (21)
Avaya Telephony Sets	
Avaya 1600 Series IP Telephones	Avaya one-X Deskphone Value Edition 1.020
Avaya 5600 Series IP Telephones	8.016
Avaya 2410 Digital Telephone	5.0
HP ProCurve Products	
HP ProCurve 2610-24-PWR Switch	R.11.30
HP ProCurve 2520G-24-PoE Switch	J.14.01
HP ProCurve 2520-24-PoE Switch	S.14.03
HP ProCurve 2520-8-PoE Switch	S.14.03
MS Products	
PC	Microsoft Windows 2003 Server (File/DHCP Service)

4. Verify Avaya IP Office Settings

This section was included to verify that Avaya IP Office was configured correctly. Except where stated, the parameters in all steps are the default settings and are supplied for reference. For all other provisioning information such as provisioning of the trunks, call coverage, extensions, and voice mail, please refer to the Avaya IP Office product documentation in **Section 10**.

Step	Description
1.	Avaya IP Office is configured via the Avaya IP Office Manager program. Log into the Avaya IP Office Manager PC and select Start → Programs → IP Office → Manager to launch the Avaya IP Office Manager application. Select File → Open to search for IP Offices in the network. Click on appropriate Avaya IP Office. Click OK to continue Log into the Avaya IP Office Manager application using the appropriate credentials.

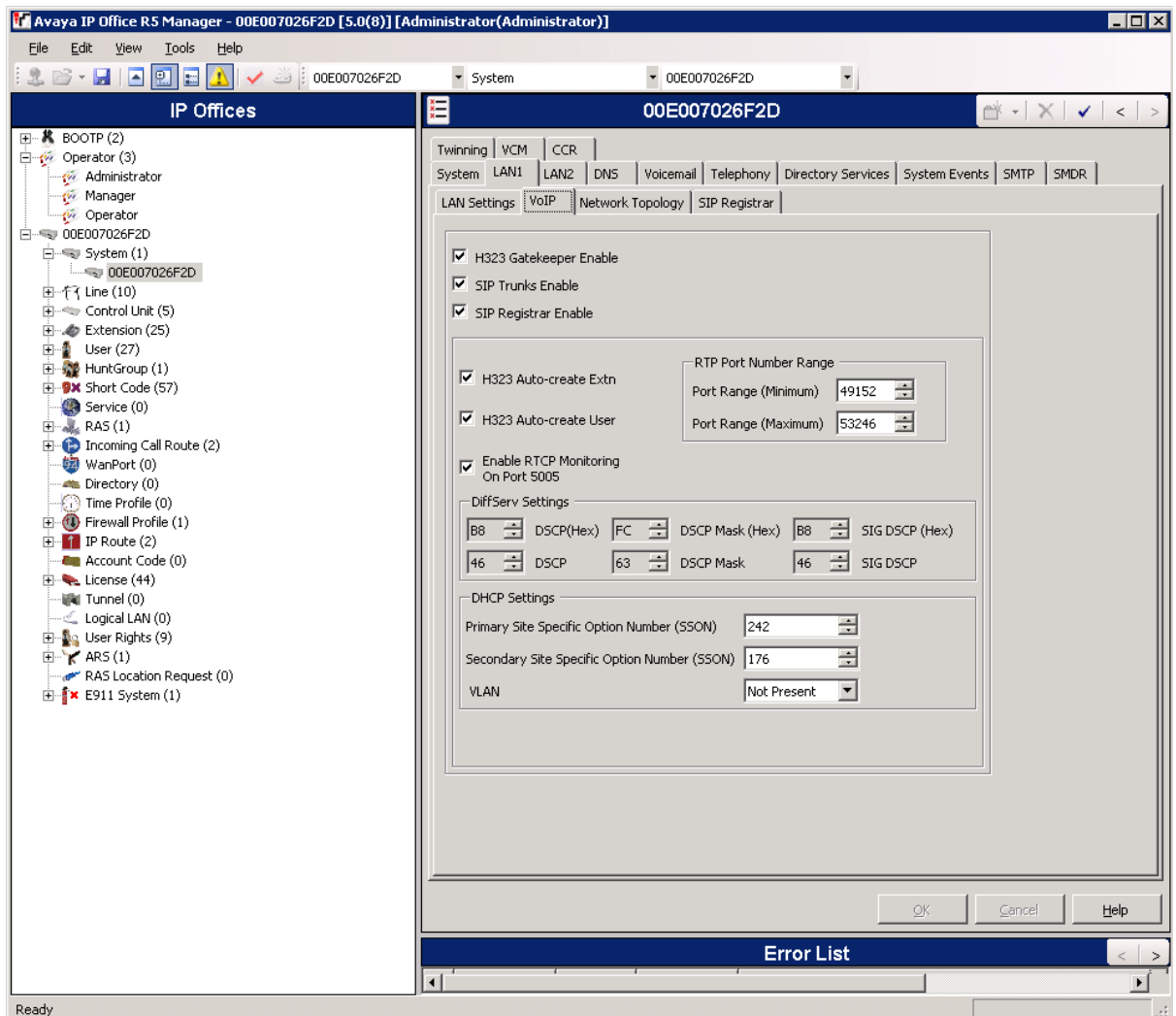
Step	Description
2.	The main IP Office Manager window appears. The following steps refer to the Configuration Tree which is in the left pane of the window and under the heading IP Offices .



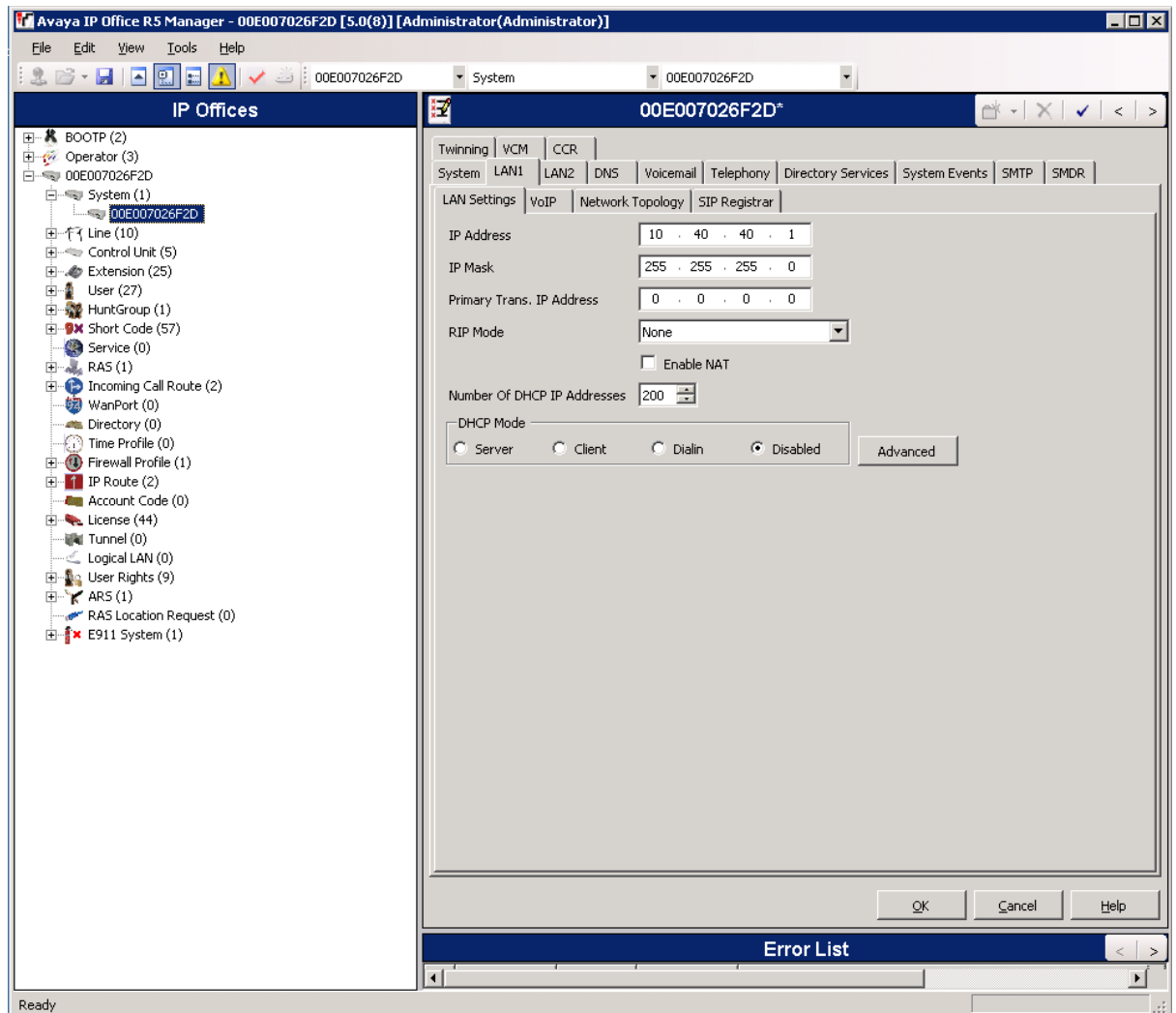
3. Verify H323 Gatekeeper information.


The Avaya IP Telephones will get Differentiated Services information from the Avaya IP Office. In the Manager window, from the Configuration Tree, click **System** → **LAN1** → **VoIP**. Verify that the **DiffServ Settings** for **DSCP** and **SIG DSCP** are set to **46** and **46**, respectively.

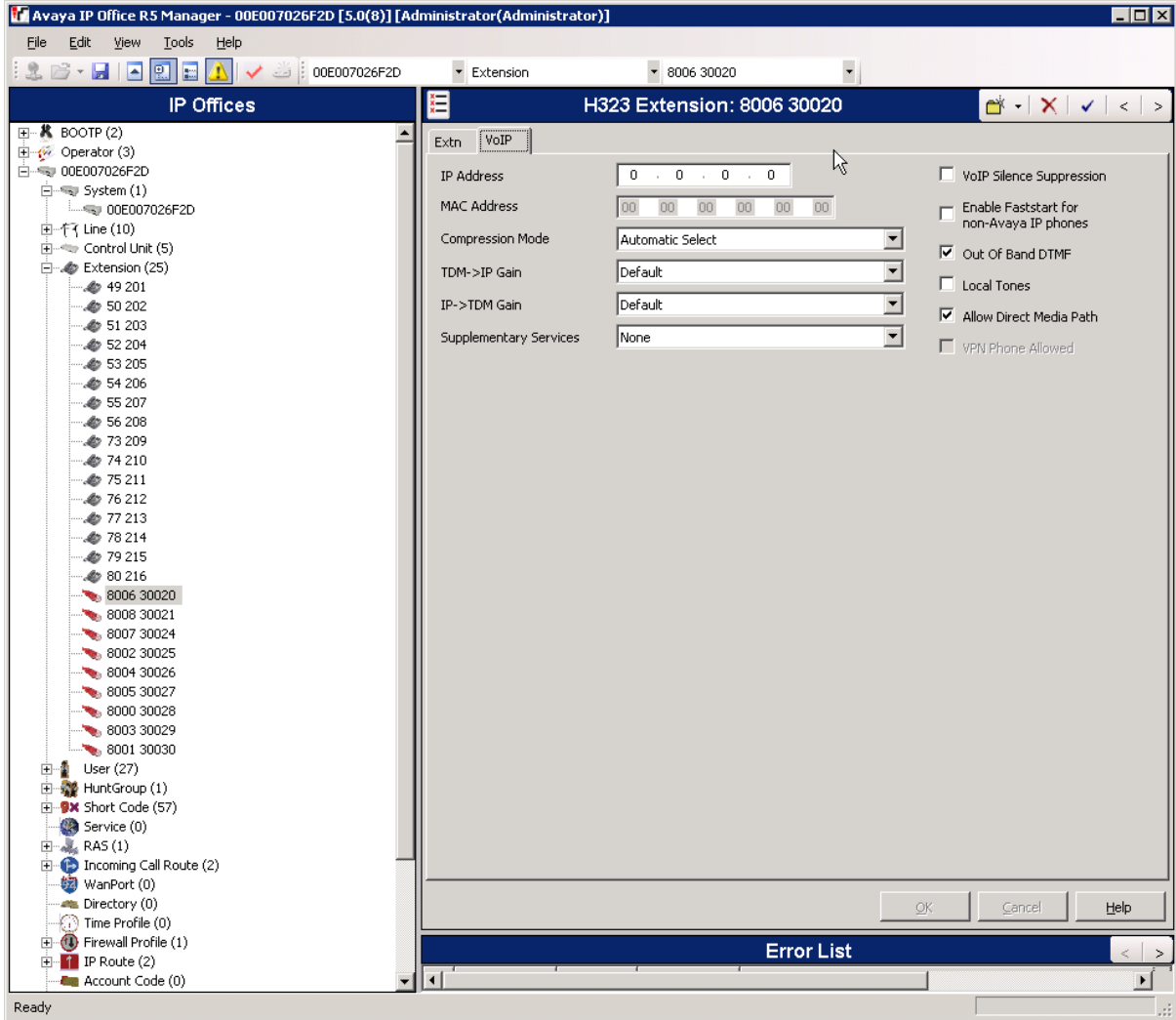
Note: 00E007026F2D is the MAC address of this specific IP Office and will be different for all IP Offices.



4. Disable DHCP server on Avaya IP Office.
From the Configuration Tree, click **System** → **LAN1** → **LAN Settings**. Set the **DHCP Mode** to **Disabled**. Click **OK** to continue.



Step	Description
5.	<p>Verify Direct Media Path.</p> <p>From the Configuration Tree, select Extension. Click on the IP telephone extension and select the VoIP tab. Verify that Allow Direct Media Path is checked. Click OK to continue. The changes must be saved before they will take effect, click to the  icon to save the configuration.</p>



The screenshot shows the Avaya IP Office R5 Manager interface. The title bar reads "Avaya IP Office R5 Manager - 00E007026F2D [5.0(8)] [Administrator/Administrator]". The main window is divided into two panes. The left pane, titled "IP Offices", shows a configuration tree with "Extension (25)" expanded, and "8006 30020" selected. The right pane, titled "H323 Extension: 8006 30020", has the "VoIP" tab selected. The "VoIP" configuration includes fields for IP Address (0 . 0 . 0 . 0), MAC Address (00 00 00 00 00 00), Compression Mode (Automatic Select), TDM->IP Gain (Default), IP->TDM Gain (Default), and Supplementary Services (None). On the right side of the VoIP configuration, several checkboxes are visible: "VoIP Silence Suppression" (unchecked), "Enable Faststart for non-Avaya IP phones" (unchecked), "Out Of Band DTMF" (checked), "Local Tones" (unchecked), "Allow Direct Media Path" (checked), and "VPN Phone Allowed" (unchecked). At the bottom of the right pane are "OK", "Cancel", and "Help" buttons. Below the main configuration area is an "Error List" pane, which is currently empty. The status bar at the bottom left shows "Ready".

5. Configure the HP ProCurve Switches

Three QoS types were validated during compliance testing, VLAN based QoS (HP ProCurve recommended), Dynamic Layer 2 QoS and Dynamic Layer 3 QoS. Only the VLAN based QoS configuration will be shown in this document. See **Observations [7] and Section 10** for more information on how to configure Dynamic Layer 2 and Layer 3 QoS.

5.1. Configure the ProCurve 2610-24-PWR Switch

This section addresses how to configure the ProCurve 2610-24-PWR Switch. The ProCurve 2610-24-PWR Switch is used as the core Layer 2/Layer 3 router, enforces QoS policies and supports spanning tree.

To configure the ProCurve 2610-24-PWR Switch, connect a PC or laptop to the serial port of the ProCurve 2610-24-PWR 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 the ProCurve 2610-24-PWR Switch using the appropriate Login ID and Password.

```
ProCurve Switch 2610-24-PWR#  
Login:  
Password:  
ProCurve Switch 2610-24-PWR#
```

2. Enable the following features on the ProCurve 2610-24-PWR Switch.
 - Enable routing.
 - Enable spanning tree.
 - Make the ProCurve 2610-24-PWR Switch the root bridge.
 - Assign priority 6 to DSCP CodePoint 101110.
 - Assign a QoS value for IP Office and Avaya IP Office Manager.
 - Save the running configuration to the startup configuration.

```
ProCurve Switch 2610-24-PWR# configure  
ProCurve Switch 2610-24-PWR(config)# ip routing  
ProCurve Switch 2610-24-PWR(config)# spanning-tree  
ProCurve Switch 2610-24-PWR(config)# spanning-tree priority 1  
ProCurve Switch 2610-24-PWR(config)# qos dscp-map 101110 priority 6  
ProCurve Switch 2610-24-PWR(config)# qos device-priority 10.40.40.1 priority 6  
ProCurve Switch 2610-24-PWR(config)# qos device-priority 10.40.40.10 priority 6  
ProCurve Switch 2610-24-PWR(config)# write memory
```

3. Create and configure the telephony VLAN where all of the Avaya telephony equipment will run.
 - Assign a VLAN ID for the telephony VLAN.
 - Assign a name for the telephony VLAN.
 - Assign an IP address for the telephony VLAN.
 - Assign ports to the telephony VLAN.

```
ProCurve Switch 2610-24-PWR# configure
ProCurve Switch 2610-24-PWR(config)# vlan 40
ProCurve Switch 2610-24-PWR(vlan-40)# vlan 40 name telvlan
ProCurve Switch 2610-24-PWR(vlan-40)# ip address 10.40.40.254/24
ProCurve Switch 2610-24-PWR(vlan-40)# untagged 1-2
ProCurve Switch 2610-24-PWR(vlan-40)# exit
```

4. Create and configure the voice VLAN.
 - Assign a VLAN ID for the voice VLAN.
 - Assign a name for the voice VLAN.
 - Assign an IP address for the voice VLAN.
 - Set an IP helper address for DHCP.
 - Assign ports to the voice VLAN.

```
ProCurve Switch 2610-24-PWR# configure
ProCurve Switch 2610-24-PWR(config)# vlan 33
ProCurve Switch 2610-24-PWR(vlan-33)# vlan 33 name Voice1
ProCurve Switch 2610-24-PWR(vlan-33)# ip address 10.33.1.254/24
ProCurve Switch 2610-24-PWR(vlan-33)# ip helper-address 10.20.20.250
ProCurve Switch 2610-24-PWR(vlan-33)# tagged 4-5,21-23
ProCurve Switch 2610-24-PWR(vlan-33)# qos priority 6
ProCurve Switch 2610-24-PWR(config)# exit
```

5. Create and configure the data VLAN.
 - Assign a VLAN ID for the data VLAN.
 - Assign a name for the data VLAN.
 - Assign an IP address for the data VLAN.
 - Set an IP helper address for DHCP.
 - Assign ports to the data VLAN.

```
ProCurve Switch 2610-24-PWR# configure
ProCurve Switch 2610-24-PWR(config)# vlan 30
ProCurve Switch 2610-24-PWR(vlan-30)# vlan 30 name Datavlan1
ProCurve Switch 2610-24-PWR(vlan-30)# ip address 10.30.1.254/24
ProCurve Switch 2610-24-PWR(vlan-30)# ip helper-address 10.20.20.250
ProCurve Switch 2610-24-PWR(vlan-30)# tagged 21-23
ProCurve Switch 2610-24-PWR(vlan-30)# untagged 4-5
ProCurve Switch 2610-24-PWR(vlan-30)# exit
```

6. Create and configure the VLAN that where the DHCP/File server runs.
 - Assign a VLAN ID for the DHCP/File VLAN.
 - Assign a name for the DHCP/File VLAN.
 - Assign an IP address for the DHCP/File VLAN.
 - Assign ports to the DHCP/File VLAN.

```
ProCurve Switch 2610-24-PWR# configure
ProCurve Switch 2610-24-PWR(config)# vlan 1050
ProCurve Switch 2610-24-PWR(vlan-1050)#vlan 1050 name vlan1050
ProCurve Switch 2610-24-PWR(vlan-1050)#ip address 192.50.10.254/24
ProCurve Switch 2610-24-PWR(vlan-1050)# untagged 3
ProCurve Switch 2610-24-PWR(vlan-2)# exit
```

7. Save the running configuration to the startup configuration.

```
ProCurve Switch 2610-24-PWR# configure
ProCurve Switch 2610-24-PWR(config)# write memory
```

5.2. Configure Lab ProCurve 2520-24-PoE Switch

This section addresses configuring the ProCurve 2520-24-PoE Switch. The ProCurve 2520-24-PoE Switch will support VLANs, enforce QoS policies and supply PoE power to the Avaya IP telephones.

To configure the ProCurve 2520-24-PoE Switch, connect a PC or laptop to the serial port of the 2520-24-PoE. 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 ProCurve 2520-24-PoE Switch using the appropriate Login ID and Password.

```
ProCurve Switch 2520-24-PoE#  
Login:  
Password:  
ProCurve Switch 2520-24-PoE#
```

2. Enable the following features on the ProCurve 2520-24-PoE Switch.

- Enable spanning tree.
- Assign priority 6 to DSCP CodePoint 101110.

```
ProCurve Switch 2520-24-PoE# configure  
ProCurve Switch 2520-24-PoE(config)# spanning-tree  
ProCurve Switch 2520-24-PoE(config)# qos dscp-map 101110 priority 6
```

3. Create and configure the voice VLAN.

- Assign a VLAN ID for the voice VLAN.
- Assign a name for the voice VLAN.
- Assign ports to the voice VLAN.

```
ProCurve Switch 2520-24-PoE# configure  
ProCurve Switch 2520-24-PoE(config)# vlan 33  
ProCurve Switch 2520-24-PoE(vlan-33)# vlan 33 name Voice1  
ProCurve Switch 2520-24-PoE(vlan-33)# tagged 1-2,24  
ProCurve Switch 2520-24-PoE(vlan-33)# exit
```

4. Create and configure the data VLAN.

- Assign a VLAN ID for the data VLAN.
- Assign a name for the data VLAN.
- Assign ports to the data VLAN.

```
ProCurve Switch 2520-24-PoE# configure  
ProCurve Switch 2520-24-PoE(config)# vlan 30  
ProCurve Switch 2520-24-PoE(vlan-30)# vlan 30 name Datavlan1  
ProCurve Switch 2520-24-PoE(vlan-30)# vlan untagged 1-3  
ProCurve Switch 2520-24-PoE(vlan-30)# vlan tagged 24  
ProCurve Switch 2520-24-PoE(vlan-30)# vlan exit
```

5. Save the running configuration to the startup configuration.

```
ProCurve Switch 2520-24-PoE# configure  
ProCurve Switch 2520-24-PoE(config)# write memory
```

5.3. Configure Offices ProCurve 2520G-24-PoE Switch

This section addresses configuring the ProCurve 2520G-24-PoE Switch. The ProCurve 2520G-24-PoE Switch will support VLANs, enforce QoS policies and supply PoE power to the Avaya IP telephones.

To configure the ProCurve 2520G-24-PoE Switch, connect a PC or laptop to the serial port of the 2520G-24-PoE. Run a terminal emulation program with the following configuration:

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

6. Log into ProCurve 2520G-24-PoE Switch using the appropriate Login ID and Password.

```
ProCurve Switch 2520G-24-PoE#  
Login:  
Password:  
ProCurve Switch 2520G-24-PoE#
```

7. Enable the following features on the ProCurve 2520G-24-PoE Switch.

- Enable spanning tree.
- Assign priority 6 to DSCP CodePoint 101110.

```
ProCurve Switch 2520G-24-PoE# configure  
ProCurve Switch 2520G-24-PoE(config)# spanning-tree  
ProCurve Switch 2520G-24-PoE(config)# qos dscp-map 101110 priority 6
```

8. Create and configure the voice VLAN.

- Assign a VLAN ID for the voice VLAN.
- Assign a name for the voice VLAN.
- Assign ports to the voice VLAN.

```
ProCurve Switch 2520G-24-PoE# configure  
ProCurve Switch 2520G-24-PoE(config)# vlan 33  
ProCurve Switch 2520G-24-PoE(vlan-33)# vlan 33 name Voice1  
ProCurve Switch 2520G-24-PoE(vlan-33)# tagged 1-2,24  
ProCurve Switch 2520G-24-PoE(vlan-33)# exit
```

9. Create and configure the data VLAN.
 - Assign a VLAN ID for the data VLAN.
 - Assign a name for the data VLAN.
 - Assign ports to the data VLAN.

```
ProCurve Switch 2520G-24-PoE# configure
ProCurve Switch 2520G-24-PoE(config)# vlan 30
ProCurve Switch 2520G-24-PoE(vlan-30)# vlan 30 name Datavlan1
ProCurve Switch 2520G-24-PoE(vlan-30)# vlan untagged 1-2
ProCurve Switch 2520G-24-PoE(vlan-30)# vlan tagged 24
ProCurve Switch 2520G-24-PoE(vlan-30)# vlan exit
```

10. Save the running configuration to the startup configuration.

```
ProCurve Switch 2520G-24-PoE# configure
ProCurve Switch 2520G-24-PoE(config)# write memory
```

5.4. Configure Conference Room ProCurve 2520-8-PoE Switch

This section addresses configuring the ProCurve 2520-8-PoE Switch. The ProCurve 2520-8-PoE Switch will support VLANs, enforce QoS policies and supply PoE power to the Avaya IP telephones.

To configure the ProCurve 2520-8-PoE Switch, connect a PC or laptop to the serial port of the 2520-8-PoE. Run a terminal emulation program with the following configuration:

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

11. Log into ProCurve 2520-8-PoE Switch using the appropriate Login ID and Password.

```
Login:
Password:
ProCurve Switch 2520-8-PoE#
```


12. Enable the following features on the ProCurve 2520-8-PoE Switch.

- Enable spanning tree.
- Assign priority 6 to DSCP CodePoint 101110.

```
ProCurve Switch 2520-8-PoE# configure  
ProCurve Switch 2520-8-PoE(config)# spanning-tree  
ProCurve Switch 2520-8-PoE(config)# qos dscp-map 101110 priority 6
```

13. Create and configure the voice VLAN.

- Assign a VLAN ID for the voice VLAN.
- Assign a name for the voice VLAN.
- Assign ports to the voice VLAN.

```
ProCurve Switch 2520-8-PoE# configure  
ProCurve Switch 2520-8-PoE(config)# vlan 33  
ProCurve Switch 2520-8-PoE(vlan-33)# vlan 33 name Voice1  
ProCurve Switch 2520-8-PoE(vlan-33)# tagged 1-2,8  
ProCurve Switch 2520-8-PoE(vlan-33)# exit
```

14. Create and configure the data VLAN.

- Assign a VLAN ID for the data VLAN.
- Assign a name for the data VLAN.
- Assign ports to the data VLAN.

```
ProCurve Switch 2520-8-PoE# configure  
ProCurve Switch 2520-8-PoE(config)# vlan 30  
ProCurve Switch 2520-8-PoE(vlan-30)# vlan 30 name Datavlan1  
ProCurve Switch 2520-8-PoE(vlan-30)# vlan untagged 1-2  
ProCurve Switch 2520-8-PoE(vlan-30)# vlan tagged 8  
ProCurve Switch 2520-8-PoE(vlan-30)# vlan exit
```

15. Save the running configuration to the startup configuration.

```
ProCurve Switch 2520-8-PoE# configure  
ProCurve Switch 2520-8-PoE(config)# write memory
```

6. General Test Approach and Test Results

6.1. Test Approach

All feature functionality test cases were performed manually. The general test approach entailed verifying the following:

- LAN connectivity between the Avaya and ProCurve products
- Registration of Avaya IP Telephones with Avaya IP Office
- Verification of the DHCP relay configuration
- VoIP calls over local area networks
- Inter & Intra office calls using G.711 mu-law & G.729 codecs, conferencing, and sending low priority data traffic over the LAN
- Verify QoS Types and that the ProCurve switches directed the voice signaling and media to the higher priority queues based on the packets' QoS value.

The QoS tests were performed by oversubscribing the lines with low priority data traffic and verifying that good voice quality was achieved when calls are routed over all of the LAN interfaces.

- VLAN Based QoS (HP ProCurve Recommended): Two VLANS were used, one Voice and one Data. The QoS priority value of 6 was assigned directly to the Voice VLAN and was tested letting the ProCurve switches direct the voice signaling and media packets based on the Layer 2 Priority value to the correct QoS queue.
- Dynamic Layer 2 QoS is the default value. Two VLANS were used and was tested by letting the ProCurve switches direct the voice signaling and media packets based on the Layer 2 Priority value to the correct QoS queue.
- Dynamic Layer 3 QoS was verified by enabling Layer 3 QoS, one VLAN was used and was tested by connecting the Avaya IP Telephones untagged to the Data VLAN and verify that the ProCurve switches direct the voice signaling and media packets based on the Layer 3 Priority value to the correct QoS queue.

6.2. Test Results

All feature functionality, serviceability, and performance test cases passed. The ProCurve small to medium size business implementation yielded good voice quality and no calls were lost. The stability of the Avaya/ProCurve solution was successfully verified through performance and serviceability testing.

7. Observations

Under heavy traffic load (140% over subscribed in both directions), some calls experienced problems with Dynamic Layer 2 and Dynamic Layer 3 QoS due to the fact that the ARP traffic has a priority value of 0 and is not directed to the high priority queue.

8. Verification Steps

This section provides the steps for verifying end-to-end network connectivity and QoS. In general, the verification steps include:

- Verify the DHCP relay is functioning by confirming that the all IP telephones from all locations receive their IP addresses from the DHCP server connected to the ProCurve 2610-24-PWR Switch.
- Place calls between all Labs, Conference Rooms and Offices for each Avaya IP Telephone.

9. Conclusion

These Application Notes describe the configuration steps required for integrating HP ProCurve Networking small to medium size business Switch solution with an Avaya Telephony Infrastructure using Avaya IP Office in a Converged VoIP and Data Network. For the configuration described in these Application Notes, the ProCurve switches were responsible for enforcing QoS. The Avaya IP Office delivered the voice traffic to the routers for transmission over the LAN together with low priority data traffic. Prioritization of VoIP traffic and good voice quality was successfully achieved in the Avaya/ProCurve configuration described herein.

10. Additional References

This section references the Avaya documentation relevant to these Application Notes. The following Avaya product documentation is available at <http://support.avaya.com>

- [1] *IP Office Installation*, Document Number 15-601042
- [2] *Voicemail Pro Installation and Administration*, Document Number, 15-601063
- [3] *IP Office 5.0 Manager*, Document Number 15-601011
- [4] *Phone Manager Installation Manual*
- [5] *H323 IP Telephone Installation*, Document # 15-601046

The HP product documentation can be found at:

<http://www.procurve.com/customercare/support/manuals/index.htm>

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