Avaya Solution & Interoperability Test Lab

Application Note for Configuring Extreme Networks Summit X250e-24t and Summit X250e-48t Switches with Avaya IP Office – Issue 1.1

Abstract

These Application Notes detail the configuration process needed to provide interoperability of Avaya IP Office with Extreme Networks Summit X250e-24t and Summit X250e-48t Switches. Information in these Application Notes has been obtained through Developer*Connection* compliance testing. Testing was conducted via the Developer*Connection* Program at the Avaya Solution and Interoperability Test Lab.

1. Introduction

As new products are delivered to the market, product readiness becomes an important issue for customers who may choose to implement these new products. These Application Notes demonstrate the configuration process used to create a Layer 3 prioritized VoIP-enabled network using the Extreme Networks Summit X250e-24t or Summit X250e-48t switch with Avaya IP Office.

1.1. Network Diagram

The network diagram shown in **Figure 1** illustrates the testing environment used for compliance testing. The network consists of an Avaya IP Office, two different models of IP telephones, one digital telephone, one Extreme Networks Summit X250e-24t (or Summit X250e-48t) switch and two computers providing network services such as DHCP, TFTP. One of the computers runs the Avaya IP Office Manager along with the Avaya IP Office Voicemail Lite software applications. The wired telephones include an Avaya 4621SW and an Avaya 5620SW IP Telephone and an Avaya 2420 Digital Telephone.

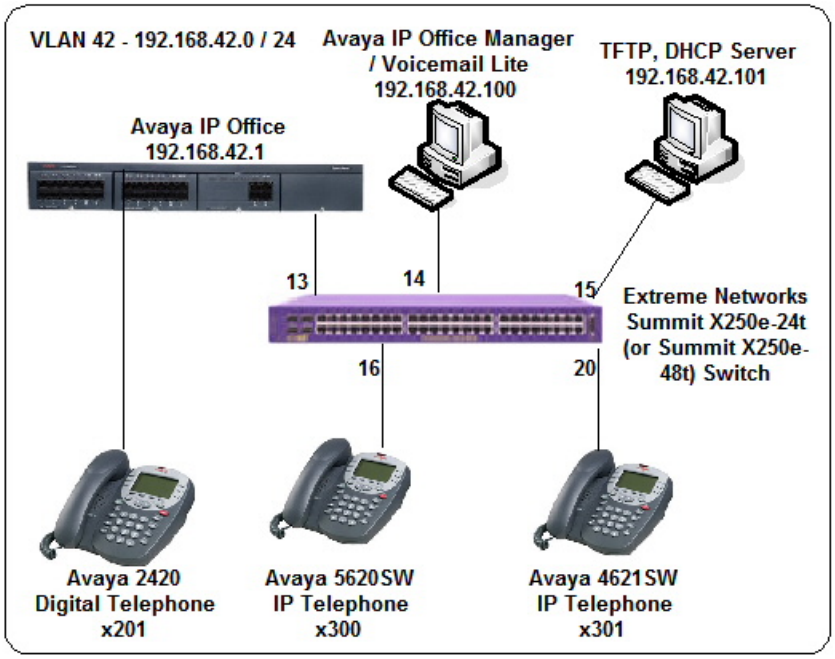


Figure 1: Sample Network Diagram

2. Equipment and Software Validated

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

Equipment	Software
Avaya IP Office IP500	4.0.5
Avaya IP Office Manager	6.0.5.0
Avaya IP Office Voicemail Lite	2.1
Avaya 2420 Digital Telephone	N/A
Avaya 4621SW IP Telephone	2.6
Avaya 5620SW IP Telephone	2.3
Extreme Networks X250e-24t Switch	12.0.1.11
Extreme Networks X250e-48t Switch	12.0.1.11

3. Configure Avaya IP Office

All of the telephones configured in the sample network in **Figure 1** were added as VoIP extensions in Avaya IP Office except for the digital telephone which was administered as a digital extension. For complete references on how to administer these types of stations refer to **Section 9, References** [**1**] and [**2**].

4. Extreme Networks Summit X250e-24t (or Summit X250e-48t) Switch Configuration

Step	Description
1.	Connect to the Summit X250e-24t (or Summit X250e-48t) switch and log in using the appropriate credentials. See **Section 9, Reference** [**3**]. A connection to the switch can be either through the console port, which requires a serial cable connection, a terminal application such as Hyperterm, or through a telnet connection if the switch has an IP address assignment. Regardless of the connection the CLI (Command Line Interface) configuration is the same. Should the switch have an existing configuration the command below will factory default the switch. `X250e-24t # unconfigure switch all`

2.	Configure the VLAN that will be used for the Avaya IP Office. Assign an 802.1Q Tag value for the VLAN, provision the IP address of the VLAN, enable routing on the VLAN and configure the switch ports that will belong to the VLAN. When using LLDP to provision the Avaya 4600 Series IP Telephones the VLAN name must be pre-pended with the keyword "voice". In the sample configuration the name of the VLAN was "voice-vlan42".
	
	`X250e-24t # conf default delete ports all`
	`X250e-24t # create vlan voice-vlan42`
	`X250e-24t # conf voice-vlan42 tag 42`
	`X250e-24t # conf voice-vlan42 ipadd 192.168.42.254/24`
	`X250e-24t # enable ipforwarding voice-vlan42`
	`X250e-24t # conf voice-vlan42 add port 12 – 24 untagged`

3.	Create the QoS (Quality of Service) profile, assign the Layer 3 priority bits (Type of Service/Differentiated Services Code Point) to that QoS profile and enable Layer 3 priority examination on the switch ports. Note that these values must match the DSCP value administered on Avaya IP Office. See Appendix A for details.
	
	`X250e-24t # create qosprofile QP7`
	`X250e-24t # conf diffserv examination code-point 46 qp7`
	`X250e-24t # enable diffserv examination ports all`

Step	Description

4.	Configure the Avaya specific LLDP (Link Layer Discovery Protocol) parameters to advertise the voice VLAN and call server information. After the LLDP port parameters have been configured, enable the LLDP feature. This feature is enabled per port, therefore LLDP will need to be enabled on each port an Avaya 4600 Series IP Telephone is connected. **Note:** The Avaya 5600 Series IP Telephone does not support LLDP, therefore, the feature should not be enabled on ports where an Avaya 5600 Series IP Telephone is connected.
	
	`X250e-24t # configure lldp port 20 advertise vendor-specific dot1 port-vlan-id`
	
	`X250e-24t # configure lldp port 20 advertise vendor-specific dot1 vlan-name vlan voice-vlan42`
	
	`X250e-24t # configure lldp port 20 advertise vendor-specific avaya-extreme call-server 192.168.42.1`
	
	`X250e-24t # configure lldp port 20 advertise vendor-specific avaya-extreme dot1q-framing untagged`
	
	`X250e-24t # enable lldp ports 20`

5. Interoperability Compliance Testing

The interoperability compliance testing focused on assessing the ability of the Extreme Networks Summit X250e-24t (or Summit X250e-48t) switch in supporting Avaya IP Office and Avaya IP telephones in a Layer 3 prioritized VoIP-enabled network.

5.1. General Test Approach

The general test approach was to register the Avaya IP Telephones with the Avaya IP Office through the Extreme Networks Summit X250e-24t (or Summit X250e-48t) switch and place calls between the telephones in the network. Once the telephones were registered, calls were made between telephones within the network and calling features were exercised.

5.2. Test Results

The Extreme Networks Summit X250e-24t (or Summit X250e-48t) switch passed all test cases in the compliance testing. Low priority background traffic was injected into the network and the Extreme Networks Summit X250e-24t (or Summit X250e-48t) switch was verified to implement prioritization of voice traffic over lower priority background traffic. The Extreme Networks Summit X250e-24t (or Summit X250e-48t) switch was verified to be capable of provisioning Avaya 4600 Series IP Telephones with VLAN and call server information using LLDP. The Extreme Networks Summit X250e-24t (or Summit X250e-48t) switch was verified to support call flows between Avaya IP Telephones when the media-path for voice traffic was direct between telephones or centralized through the Avaya IP Office.

6. Verification Steps

The following steps may be used to verify the configuration:

- Use the "show port <port #> qosmonitor" command to verify that voice traffic is being transmitted by the correct priority queue.

```
X250e-24t # show port 20 qosmonitor
Qos Monitor Req Summary                    Thu May 31 11:59:15 2007
Port   QP1    QP2    QP3    QP4    QP5    QP6    QP7      QP8
       Pkt    Pkt    Pkt    Pkt    Pkt    Pkt    Pkt    Pkt
       Xmts   Xmts   Xmts   Xmts   Xmts   Xmts   Xmts   Xmts
============================================================
20     191      0      0      0      0      0   3192     0
```

- Use the "show lldp neighbors detail" command and verify that the switch reports the correct LLDP information.

```
X250e-24t # show lldp neighbors detail
LLDP Port 20 detected 1 neighbor
  Neighbor: (5.1)192.168.42.101/00:04:0D:EF:C4:98, age 6 seconds
    - Chassis ID type: Network address (5); Address type: IPv4 (1)
      Chassis ID     : 192.168.42.101
    - Port ID type: MAC address (3)
      Port ID     : 00:04:0D:EF:C4:98
    - Time To Live: 120 seconds
    - System Name: "AVAEFC498"
    - System Capabilities : "Bridge, Telephone"
      Enabled Capabilities: "Bridge, Telephone"
    - Management Address Subtype: IPv4 (1)
      Management Address        : 192.168.42.101
      Interface Number Subtype  : System Port Number (3)
      Interface Number          : 1
      Object ID String          : "1.3.6.1.4.1.6889.1.69.1.11"
    - IEEE802.3 MAC/PHY Configuration/Status
      Auto-negotiation       : Supported, Enabled (0x03)
      Operational MAU Type   : 100BaseTXFD (16)
    - MED Capabilities: "MED Capabilities, Network Policy, Invento
      MED Device Type : Endpoint Class III (3)
    - MED Network Policy
      Application Type  : Voice (1)
      Policy Flags      : Known Policy, Untagged (0x0)
      VLAN ID           : 42
      L2 Priority       : 6
      DSCP Value        : 46
    - MED Hardware Revision: "4621D01A"
    - MED Firmware Revision: "b20d01b2_6.bin"
    - MED Software Revision: "a20d01b2_6.bin"
    - MED Serial Number: "061628001965"
    - MED Manufacturer Name: "Avaya"
    - MED Model Name: "4621"
    - Avaya/Extreme Conservation Level Support
      Current Conservation Level: 0
```

```
      Typical Power Value       : 4.9 Watts
      Maximum Power Value       : 6.4 Watts
      Conservation Power Level  : 1=4.4W
    - Avaya/Extreme Call Server(s): 192.168.42.1
    - Avaya/Extreme IP Phone Address: 192.168.42.101 255.255.255.0
      Default Gateway Address       : 192.168.42.254
    - Avaya/Extreme CNA Server: 0.0.0.0
    - Avaya/Extreme File Server(s): 0.0.0.0
    - Avaya/Extreme IEEE 802.1q Framing: Untagged
```

7. Support

For technical support on the Extreme Networks products visit http://www.extremenetworks.com or use the information listed below.

- **Phone:** 1-800-998-2408
- **Email:** support@extremenetworks.com

8. Conclusion

These Application Notes demonstrate how to build a sample VOIP enable network using Layer 3 prioritization with the Avaya IP Office and Avaya IP Telephones with Extreme Networks Summit X250e-24t (or Summit X250e-48t) switch. These Application Notes also demonstrate the configuration process that enables LLDP provisioning for the Avaya 4600 Series IP Telephones.

9. Additional References

The documents referenced below were used for additional support and configuration information. The Avaya documentation was obtained from http://support.avaya.com. The Extreme Networks documentation was obtained from http://www.extremenetworks.com (access to Extreme Networks documentation may require a support account).

[1] *Avaya IP Office 4.0 Installation Manual*, January 2007, Issue 15e, Document Number 15- 601042

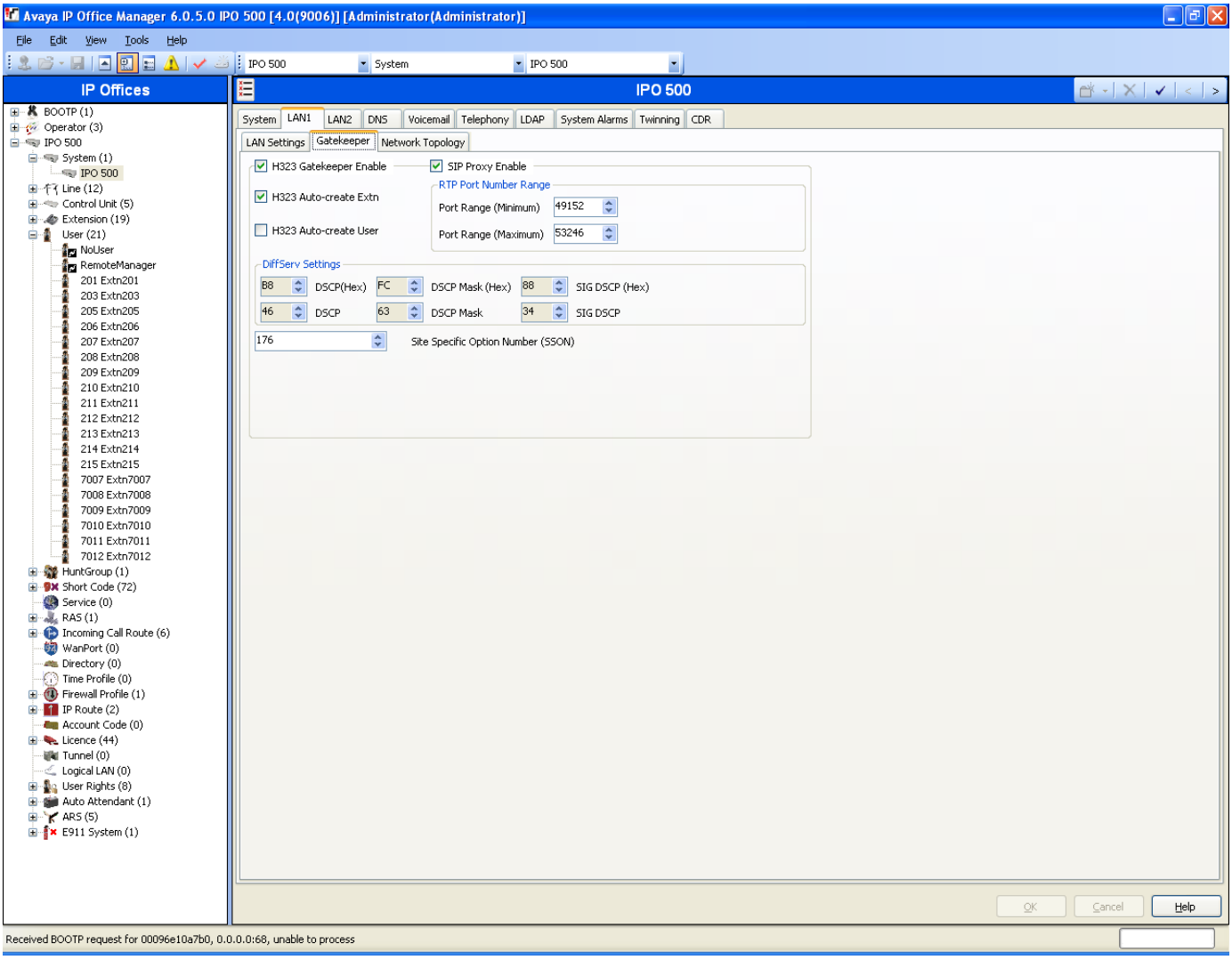
[2] *Avaya IP Office 4.0 Manager:02. Configuration Settings*, January 2007, Issue 19k

[3] *ExtremeXOS Concepts Guide, Software Version 12.0*, Part number 100262-00 Rev. 01, 2007

[4] *ExtremeXOS Command Reference Guide, Software Version 12.0*, Part number 100261-00 Rev. 01, 2007

APPENDIX A

The QoS setting (DSCP) used by the Extreme switch is on the Gatekeeper Tab of the LAN1 form. For complete references on how to administer this field, refer to **Section 9, References** [**1**] and [**2**].



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 Developer*Connection* Program at devconnect@avaya.com.