Abstract

These Application Notes describe the steps for configuring the Dynamic Host Configuration Protocol (DHCP) in Avaya Distributed Office to support multiple VLANs in a branch location.
1. Introduction

These Application Notes describe a solution for configuring the Dynamic Host Configuration Protocol (DHCP) in Avaya Distributed Office to administer IP addresses for multiple IP networks in a branch office location.

1.1. Overview

Avaya Distributed Office is a branch office PBX solution that supports a variety of Avaya IP (H.323 & SIP) and Analog Telephones. In addition to the broad range of station support, it also can provide network connectivity for data equipment such as computers through multi-VLAN and 802.1Q support via its Ethernet ports. The sample network used in these Application Notes will describe a solution supporting both Avaya IP Telephones and PCs in a multi-VLAN scenario with Avaya Distributed Office administering all IP addresses.

Two VLANs, one data and one voice, are used in the sample network. Avaya Distributed Office DHCP Server is configured to administer IP addresses for both VLANs. The Juniper Networks SSG5 serves as the router for inter-VLAN routing as well as routing to and from the Core IP Network. The Highlighted network connections in Figure 1 will be discussed in these Application Notes in addition to Avaya Distributed Office DHCP and VLAN setting.

2. Configuration

Figure 1 illustrates the configuration used in these Application Notes.

Figure 1: Sample Network Configuration
3. Equipment and Software Validated
The following equipment and software/firmware were used for the sample configuration:

<table>
<thead>
<tr>
<th>DEVICE DESCRIPTION</th>
<th>VERSION TESTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avaya Distributed Office i120</td>
<td>1.1.1.41.03</td>
</tr>
<tr>
<td>Avaya 4621SW IP Telephone (H.323)</td>
<td>2.8.3</td>
</tr>
<tr>
<td>Juniper Networks SSG5 (Wireless)</td>
<td>ScreenOS 6.0R3</td>
</tr>
</tbody>
</table>

4. Configure Avaya Distributed Office
This section describes the configuration for Avaya Distributed Office in Figure 1. It is assumed that the basic configuration has been performed to support Avaya IP Telephones. For additional information on the installation and configuration of Avaya Distributed Office, please refer to [1].

1. Enter the IP address of Avaya Distributed Office in the form of https://<IP address> into a Web Browser to access the system. Log in using the appropriate Logon name and Password.

2. The following screen for Network Connection shows the network setting for Avaya Distributed Office that was configured as part of the basic configuration. The platform IP address of 77.1.1.19 is also the Avaya Distributed Office DHCP Server’s IP address. By default, the VLAN interface is assigned to 1:V1 which will need to be changed in later step.
3. Create 2 new VLANs by clicking **VLANs** from the left panel menu followed by clicking the **Add New** button. The sample configuration uses VLAN ID 77 for the voice VLAN and VLAN ID 76 for the Data VLAN. Make a note of these VLAN IDs as they are needed when configuring the Juniper Networks SSG 5.

![VLAN Configuration](image)

4. Configure the uplink port 10/3 by clicking on **Ports** from the left panel menu then **10/3**.

![Port Configuration](image)
5. Configure port 10/3 as a trunk port by checking the **Enable Trunk** check box under the **General** tab.

Under the **VLANs** tab, assign all three VLANs to the **Assigned VLANs (Static VLANs)** by clicking on the `>` button. Leave the **Default VLAN (PVID)** as V1(1). Click the **Apply Changes** button to commit changes. By assigning all three VLANs to the **Assigned VLANs (Static VLANs)** allows these VLANs to be transmitted out port 10/3 which is connected to the SSG5.
6. Configure port 6/1 by repeating **Step 4** above and clicking 6/1 from the list. Since port 6/1 is connected to an Avaya IP Telephone, trunking is not enabled (default) and **voice(77)** is assigned as the **Default VLAN (PVID)**. The abbreviated screen below shows the above described settings.
7. Configure port 6/3 by repeating **Step 4** above and clicking 6/3 from the list. Since port 6/3 needs to support both Avaya IP Telephone and a PC and each is assigned to a different VLAN, port 6/3 needs to be configured as a trunk. Check the **Enabled Trunk** check box for port 6/3. Assign both **Data(76)** and **voice(77)** VLANs to the **Assigned VLANs (Static VLANs)** field to allow port 6/3 to support both VLANs. Since the PC’s network traffic should be on the data VLAN, change the **Default VLAN (PVID)** to **Data(76)**. Click **Apply Changes** to commit changes. The abbreviated screen below shows the above described settings.
8. Configure port 6/37 by repeating **Step 4** above and clicking 6/37 from the list. Since port 6/37 is connected only to a PC, trunking is not enabled (default) and **Data(76)** is assigned as the **Default VLAN (PVID)**. Click **Apply Changes** to commit changes. The abbreviated screen capture below shows the above described settings.
9. Click on **Network Connection** on the left panel menu and change the VLAN interface to **77:voice** that was created in **Step 3** from the drop down menu. Click **Apply Changes** to commit changes.
### 4.1. Configure Avaya Distributed Office DHCP

This section describes the step for enabling and configuring the DHCP service in Avaya Distributed Office.

1. Click on **Data Service Status** from the left panel menu and check the **Enable DHCP Service** check box to globally enable DHCP services in Avaya Distributed Office. Click **Apply Changes** to commit changes.

2. Click on **DHCP Service** from the left panel menu to begin configuration. The sample configuration will use 2 out of the 3 total supported IP address pools. Click on **Address Pool 1** to configure IP address pool 1.
3. Enter the **IP Address Range, Subnet Mask, Default Gateway** and **TFTP Server** to be assigned. Check the **Activate Pool** check box to enable this address pool. The abbreviated screen capture below shows the setting used for the **Address pool 1** in the sample network. Click on **Pool 1 – Options** to continue.

Since Address Pool 1 is configured for the voice VLAN, DHCP option 176 and 242 is configured to support the programming of Avaya IP Telephone. Check the **Automatic** check box to allow for the automatic fill in of string for option 176 and 242, alternatively the manual check box can also be checked to discretely administer the string for these two DHCP options. Click **Apply Changes** to commit changes.
4. Click on **Address Pool 2** to configure the 2nd DHCP scope. Enter the **IP Address Range**, **Subnet Mask**, and **Default Gateway** to be assigned. Check the **Activate Pool** check box to enable this address pool. The abbreviated screen capture below shows the setting used for the Address pool 2 in the sample network. Click on **Pool 2 – Options** to continue.

Since Address Pool 2 is configured for the Data VLAN, DHCP option 176 and 242 is configured to notify Avaya IP Telephone which VLAN to use. Check the **Manual** check box and enter the string **L2Q=1, L2QVLAN=77**. This string signals Avaya IP Telephones to enable VLAN tagging and use VLAN tag 77 to send out network traffic. Click **Apply Changes** to commit changes.
5. Click **Save Configuration** to save all changes.

5. **Configure Juniper Networks SSG 5**

This section describes the configuration for the SSG 5 in **Figure 1**. It is assumed that basic configuration has been performed to allow for IP connectivity into the SSG 5. All steps in this section are performed using the command line interface of the SSG 5. The SSG 5 is responsible for all inter-VLAN routing between the voice and data VLAN as well as network connectivity to the Core IP Network. Ethernet port ethernet0/1 is the connection between the SSG 5 and Avaya Distributed Office. This port is configured as an 802.1Q trunk supporting both the data and voice VLAN. It is important to note that the VLAN tag ID used in the SSG 5 must match what is configured in Avaya Distributed Office in **Section 4, Step 3** and are corresponding to the appropriate IP network.

```
#  #---Configure the interfaces
#
set interface ethernet0/1.1 tag 77 zone Trust
set interface ethernet0/1.1 ip 77.1.1.254/24
set interface ethernet0/1.1 route
set interface ethernet0/1.1 ip manageable
set interface ethernet0/1.2 ip 77.1.2.254/24
set interface ethernet0/1.2 route
set interface ethernet0/1.2 tag 76 zone Trust
set interface ethernet0/1.2 ip manageable
#
  #---Configure DHCP Relay
#
  #---The dhcp relay server IP address is the Avaya Distributed Office
  #---Platform IP Address show in Section 4, Step 2.
  #
set interface ethernet0/1.2 dhcp relay server-name 77.1.1.19
set interface ethernet0/1.2 dhcp relay service
save
```
6. Conclusion
These Application Notes have described the administration steps required to configure the Avaya Distributed Office for Dynamic Host Configuration Protocol (DHCP) and Juniper Networks SSG 5 for multi-VLAN support in a branch office location.

7. Verification
1. Connect a PC onto a switch port configured for the data VLAN. Verify the PC can successfully obtain an IP address from the DHCP server.
2. Connect an Avaya IP Telephone into a switch port configured for the voice VLAN. Verify the Avaya IP Telephone can successfully obtain an IP address from the DHCP server.

8. Additional References
Product documentation for Avaya products may be found at http://support.avaya.com

[1] Avaya Distributed Office i120 Installation Quick Start, May 2007 Issue 1, Document Number 03-602289
[2] Sample Configuration for Juniper Networks Secure Services Gateway 5 to support Avaya 3631 Wireless Telephone registering with Avaya Distributed Office, Issue 1.0, Application Notes

Product documentation for Juniper Networks products may be found at http://www.Juniper.net

[3] Concepts & Examples ScreenOS Reference Guide, Volume 1: Overview, Release 6.0.0 Rev. 02, Part Number 530-017767-01, Revision 02