Avaya Solution & Interoperability Test Lab

Application Notes for Configuring a SonicWALL VPN with an Avaya IP Telephony Infrastructure - Issue 1.0

Abstract

These Application Notes describe the steps for configuring SonicWALL's VPN to support an Avaya IP Telephony infrastructure consisting of a Main site with Avaya Communication Manager, and two branch sites. During compliance testing, H.323 telephone calls traversing the VPN tunnel were successfully established and maintained while competing non-VoIP traffic queued according to bandwidth reservation defined in the SonicWALL devices. In addition, non-VoIP network traffic using Network Address Translation (NAT) outside of the VPN tunnel was successfully demonstrated. Information in these Application Notes has been obtained through Developer*Connection* compliance testing and additional technical discussions. Testing was conducted via the Developer*Connection* Program at the Avaya Solution and Interoperability Test Lab.

1. Introduction

These Application Notes describe a compliance-tested solution comprised of Avaya Communication Manager, Avaya IP Telephones, and SonicWALL Unified Threat Management (UTM) devices. The SonicWALL UTM devices tested were the SonicWALL PRO 4060 and TZ 170.

The sample configuration simulates an enterprise with a Main Site, Branch Site A, and Branch Site B. The Main Site and Branch Site A are connected via a 768Kbps PPP WAN link. An Avaya S8300 Media Server at the Main Site is responsible for supporting Avaya IP telephones at the Main Site and Branch Site A. A SonicWALL UTM device is installed at these two sites between the WAN router and the local IP networks. Although the SonicWALL UTM device is capable of functioning as a firewall, that was not the focus of the compliance testing. A single VPN tunnel was established between the SonicWALL PRO 4060 at the Main Site and the TZ 170 at the Branch Site A. The SonicWALL UTM devices were configured to automatically recognize RTP traffic flow negotiated by the H.323 protocol and provide guaranteed bandwidth for the call. Guaranteed bandwidth for two simultaneous Avaya VoIP telephone calls was configured in the SonicWALL UTM devices.

Branch Site B simulated a PC only user site with no Avaya VoIP requirement. This site was used to demonstrate and verify that SonicWALL Network Address Translation does not interfere with Avaya VoIP traffic traversing the VPN tunnel between the Main Site and Branch Site A.

1.1. Configuration

Figure 1 illustrates the configuration used in these Application Notes. All Avaya IP telephones are registered with Avaya Communication Manager in the Main Site. A 768K PPP link simulating a WAN link connects the Main Site and Branch Site A while the SonicWALL UTM establishes the VPN tunnel over this link. A separate 10Mbps link simulating a WAN link connects the Main Site and Branch Site B. All data traffic destined to Branch Site B is NAT to the SonicWALL PRO 4060 WAN interface IP address.

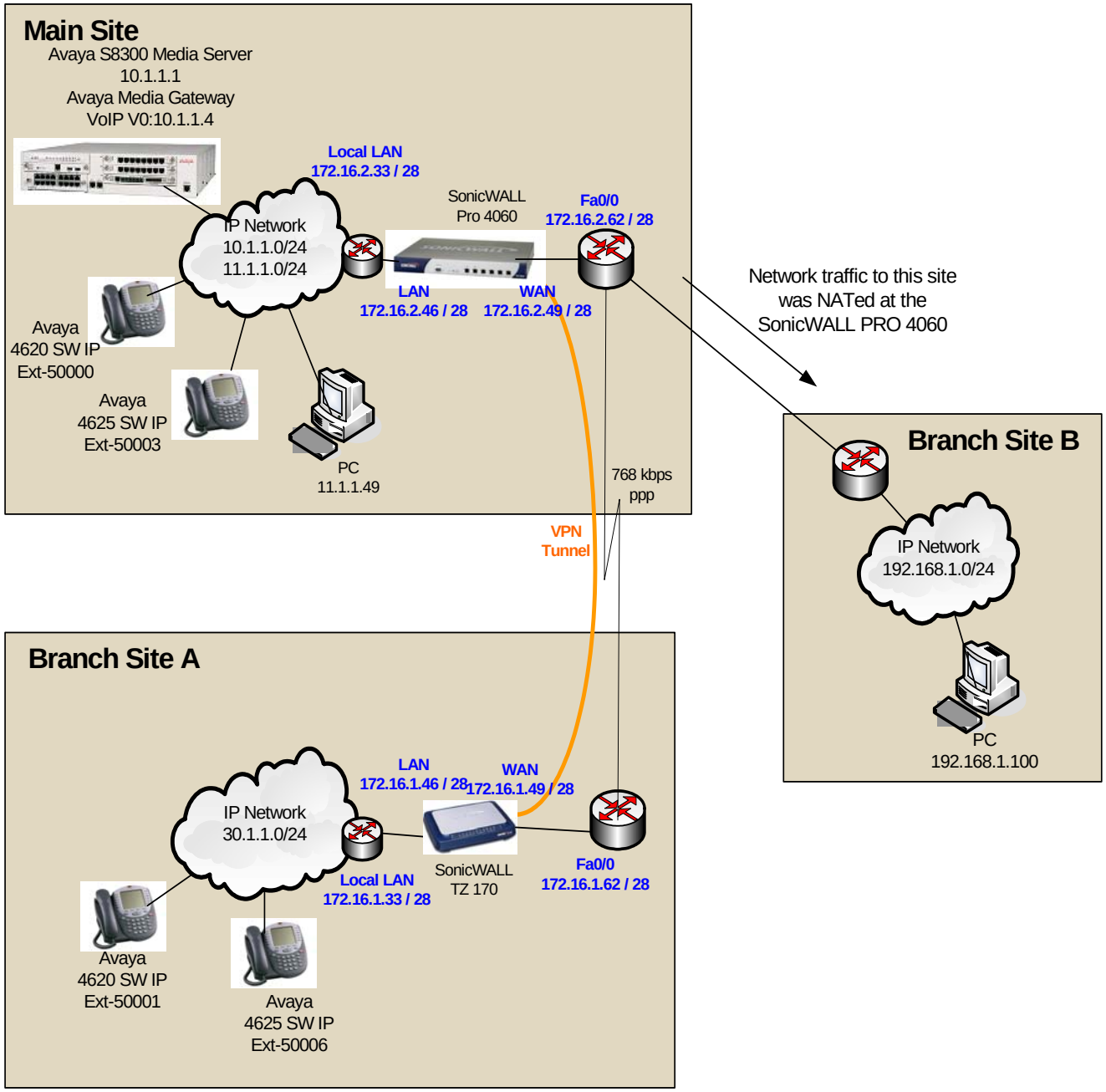


Figure 1: Sample Network Configuration

2. Equipment and Software Validated

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

Equipment	Software/Firmware
Avaya S8300 Media Server with G700 Media Gateway	Avaya Communication Manager 3.0.1 (R0.13x.00.0.346.0)
Avaya 4620SW IP Telephones (H.323)	2.2.3
Avaya 4625SW IP Telephones (H.323)	2.5
SonicWALL Pro4060	SonicOS Enhanced 3.2.0.0-20e
SonicWALL TZ170	SonicOS Enhanced 3.2.0.0-20e

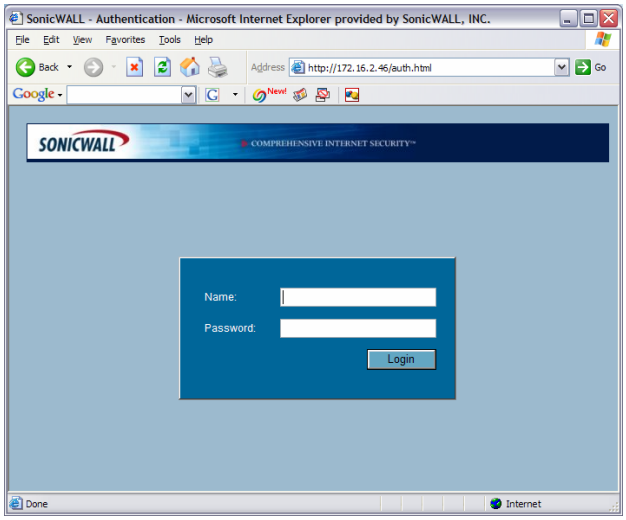
3. SonicWALL Unified Threat Management

The SonicWALL Unified Threat Management (UTM) devices SonicWALL PRO 4060 and TZ 170, were used to establish a VPN tunnel between the Main Site and Branch site A and provide Network Address Translation between the Main Site and Branch Site B. The following steps outline the configuration for SonicWALL Unified Threat Management devices and the VPN tunnel.

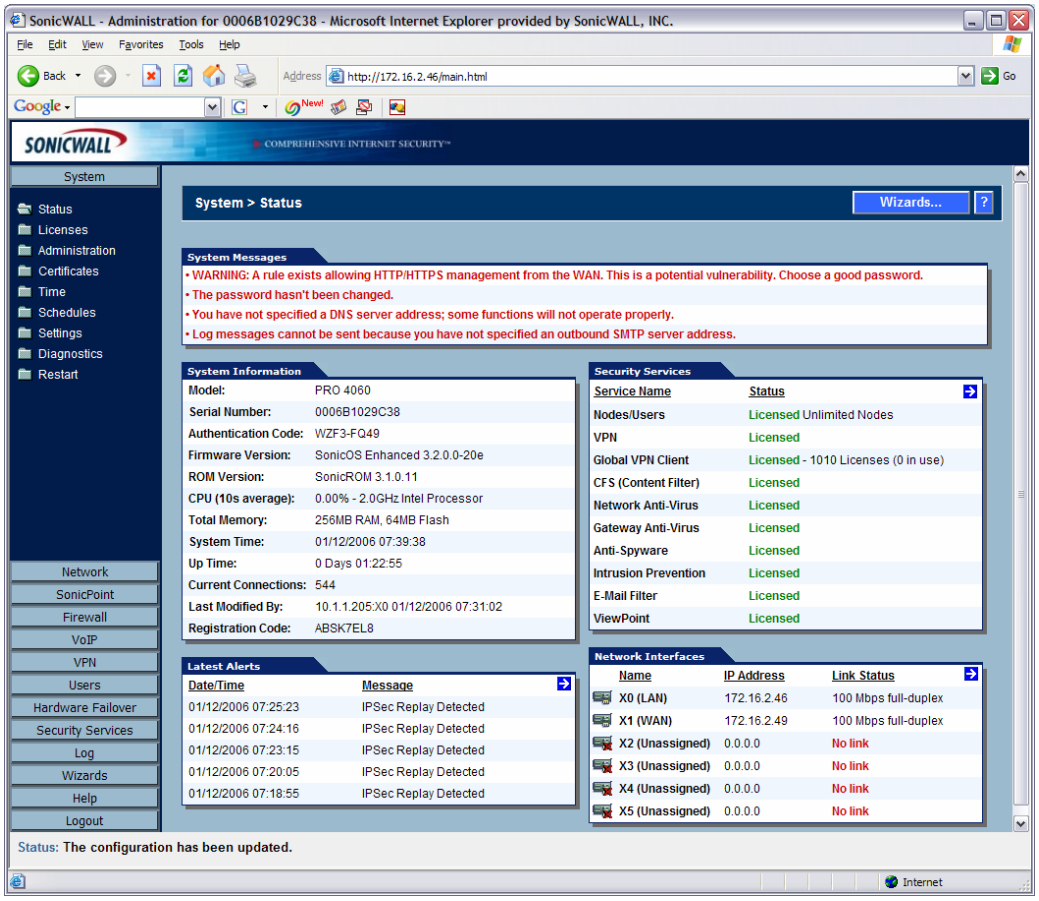
The steps in this section depict the screen displays for the SonicWALL PRO 4060 at the Main Site. Repeat these steps for the SonicWALL TZ 170 at Branch Site A with the appropriate IP address information.

3.1. General SonicWALL UTM Configuration

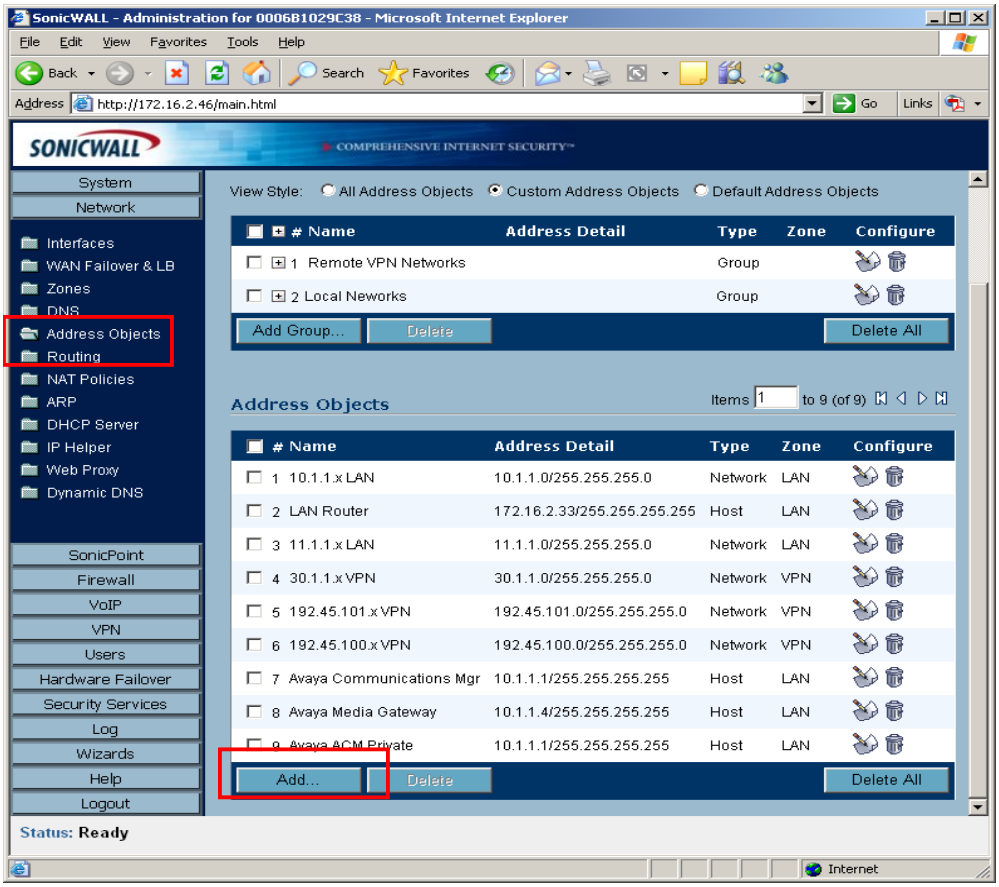
This section presents the SonicWALL VPN tunnel configuration.

Step	Description
1.	Enter the IP address of the SonicWALL PRO 4060 into the Web Browser. Enter the appropriate **Name** and **Password** to log into the system. 

Step	Description
2.	The **System>Status** screen is displayed after successfully logging on. Click on the **Network** tab on the left to expand it.



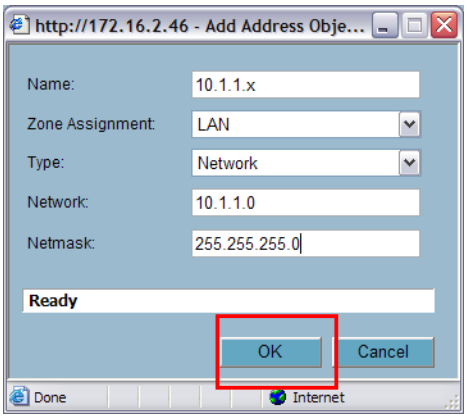
Step	Description
3.	Under the expanded **Network** tab on the left, select **Address Objects**. Click the **Add** button in the **Address Objects** panel to display the **Add Address Objects** pop-up window.

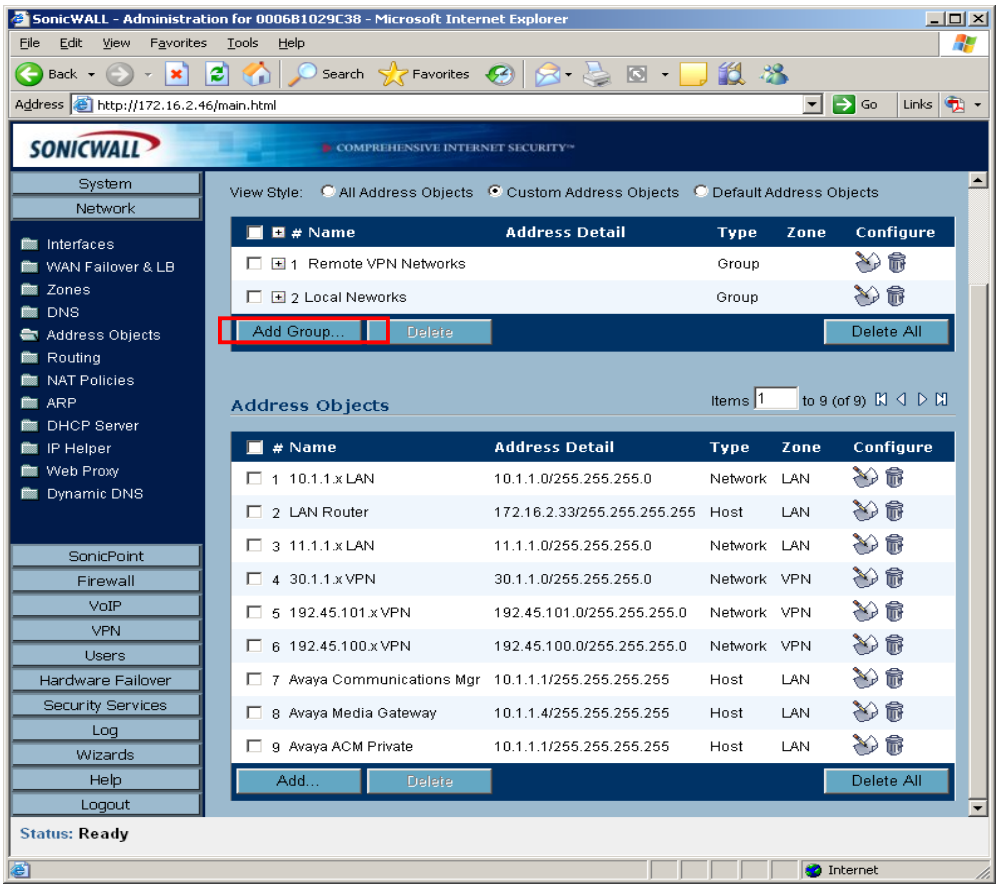


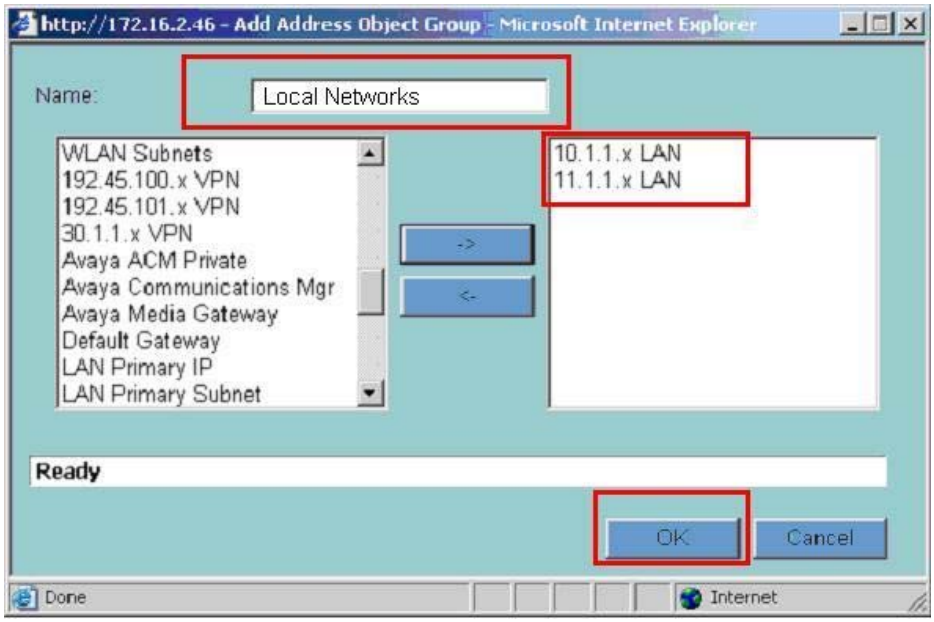
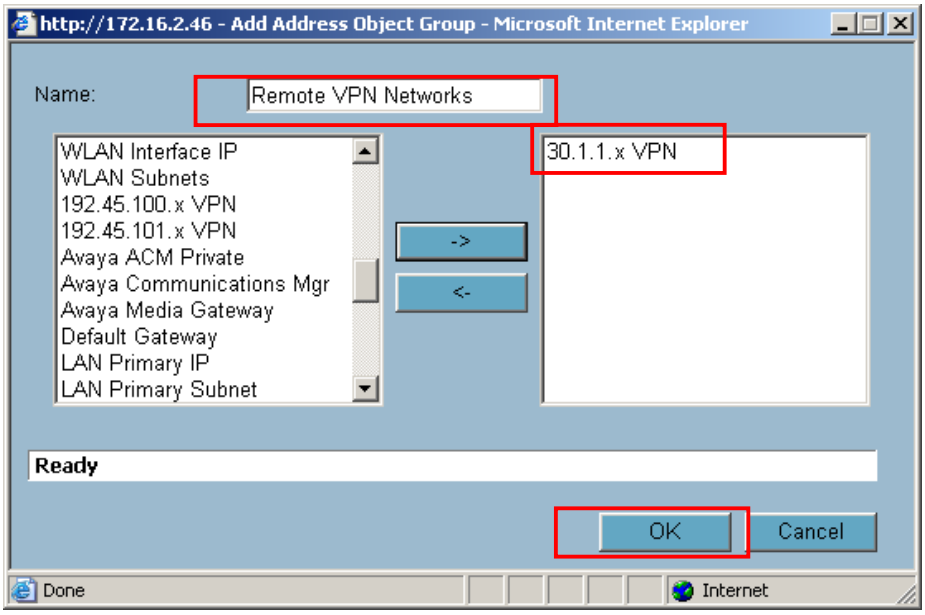
Step	Description
4.	Define all the IP networks that will be traversing the VPN tunnel. Click **OK** to save after entering the information. There are three IP networks and two hosts in the sample configuration that need to be defined. The IP Networks and host information are as follows:

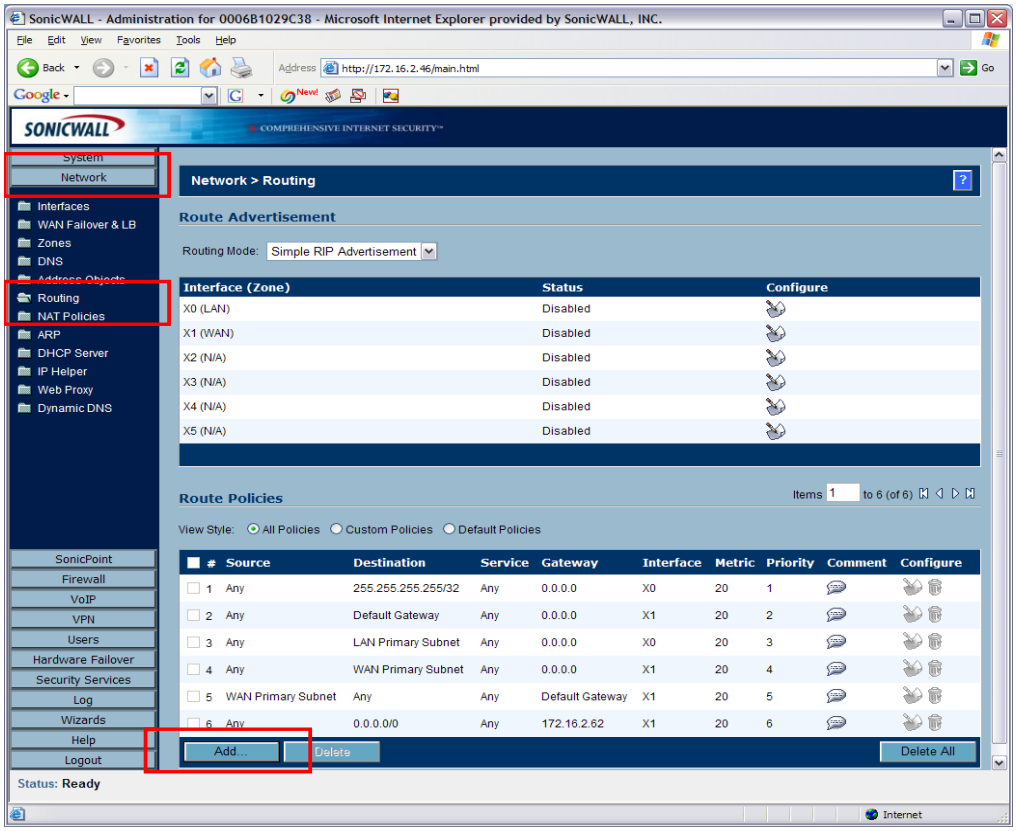
Name:	Zone Assignment	Type	Network	Netmask
10.1.1.x	LAN	Network	10.1.1.0	255.255.255.0
11.1.1.x	LAN	Network	11.1.1.0	255.255.255.0
30.1.1.x	VPN	Network	30.1.1.0	255.255.255.0
LAN Router	LAN	Host	172.16.2.33	N/A
Avaya Media Gateway	LAN	Host	10.1.1.4	N/A

Repeat step 3 and 4 until all the IP networks and hosts above are defined.



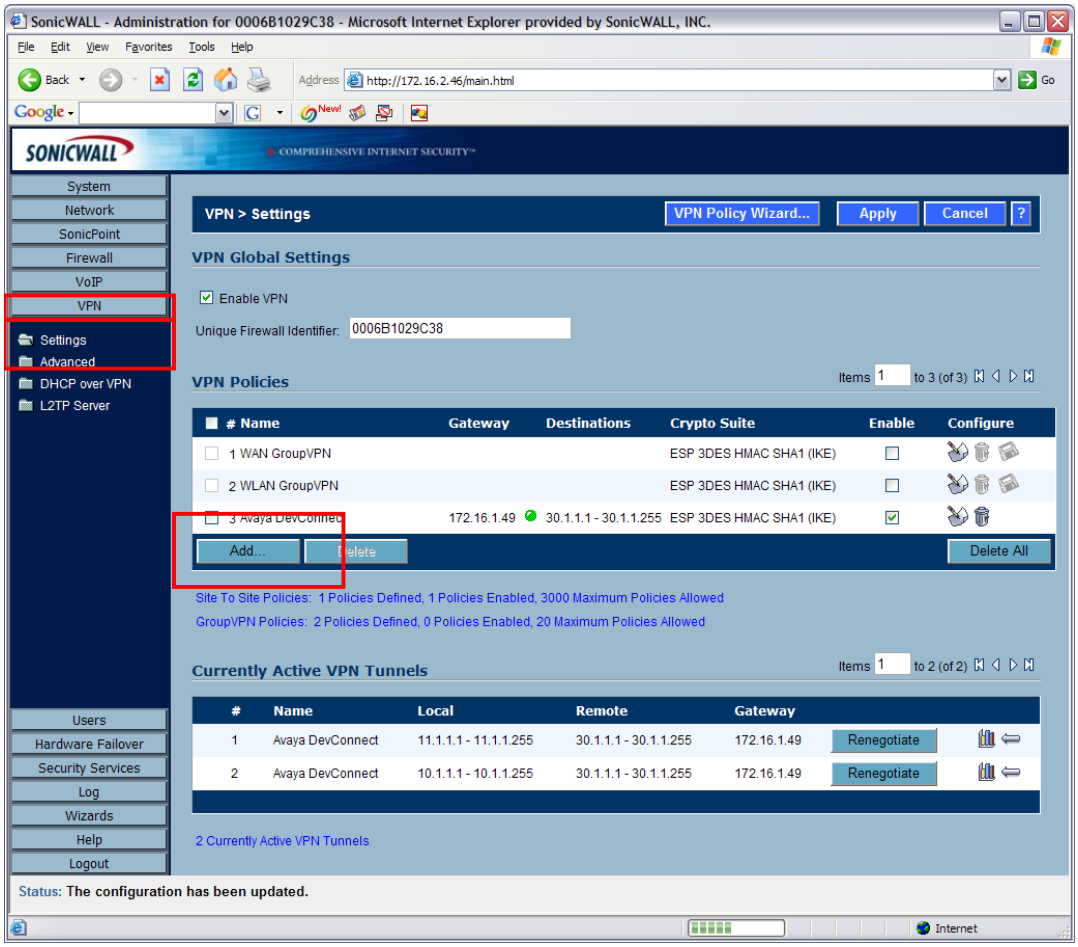
Step	Description
5.	Define the group where the **Address Objects** belong. In the sample configuration, there were two groups. The **Local Networks** was composed of all the locally connected IP networks, and the **Remote VPN Networks** was composed of all the IP networks on the other end of the VPN tunnel. Click **Add Group** to display the **Add Address Object Group** pop-up windows. 

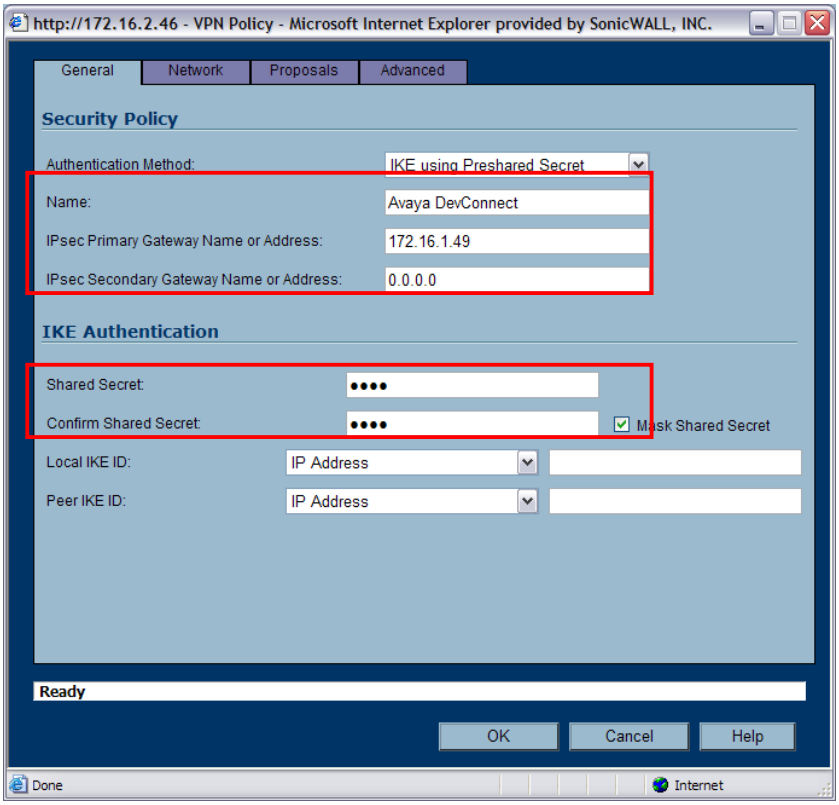
Step	Description
6.	At the **Add Address Object Group** window, enter the name for the network group. The sample configuration used the name **Local Networks**. Highlight the desired networks to be included in this group on the left, then click -> to move the highlighted objects to the right. Click **OK** to complete. 
7.	Repeat Step 5 for the **Remote VPN Networks**. Click **OK** to complete. 

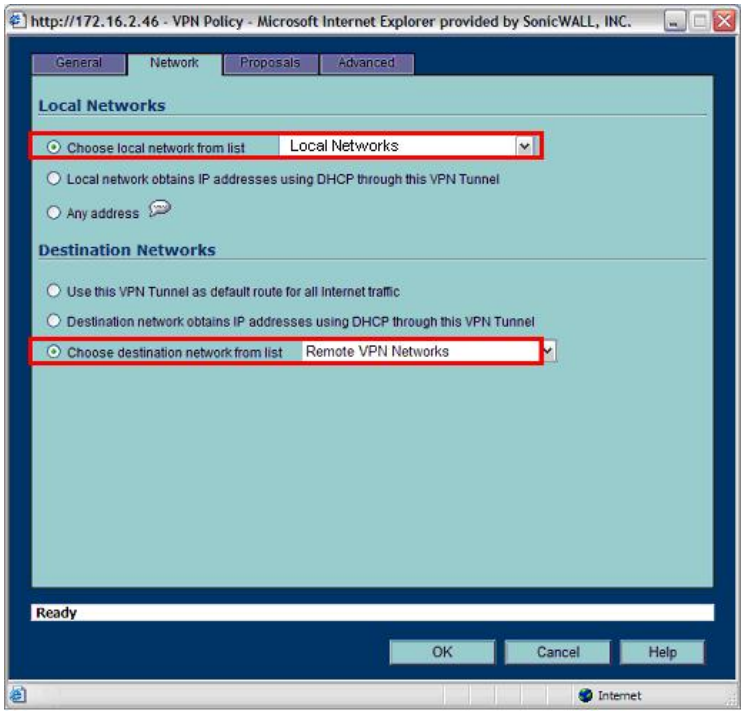
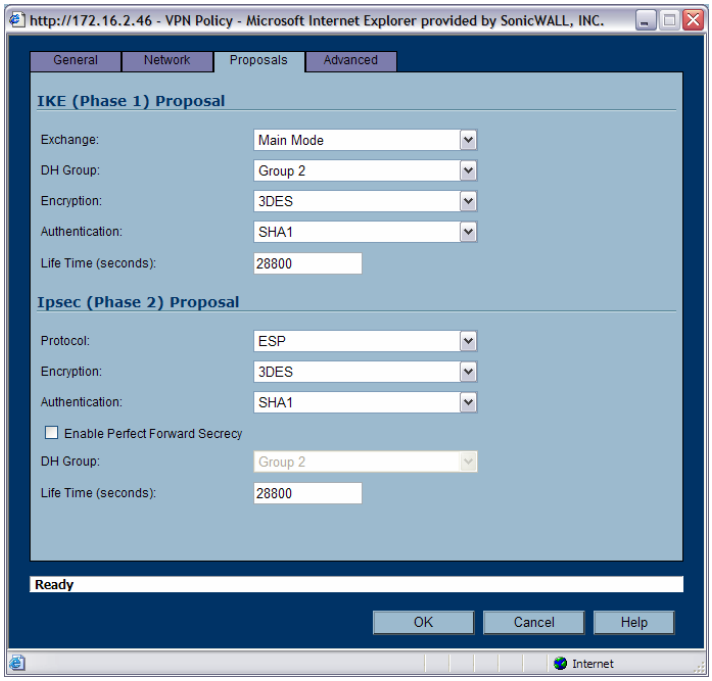
Step	Description
8.	Define the routing configuration of the SonicWALL PRO 4060 by clicking on **Routing** under the **Network** tab on the left. Click **Add** under the **Route Policies** panel to display the **Add Route Policy** pop-up windows. 
9.	Define a route policy as shown: Traffic from ***Any*** source destined to the ***Local Networks*** for ***Any*** service use ***LAN Router*** gateway reachable from interface X0 with a metric of ***1***. ***Local Networks*** and ***LAN Router*** were defined in step 6 and 4 above respectively. 

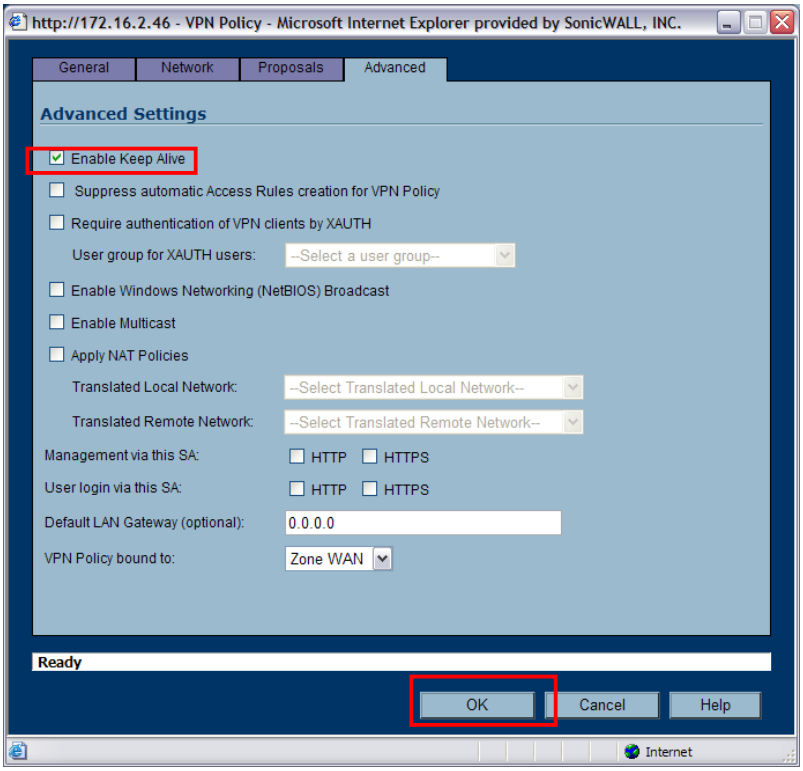
3.2. Configure the VPN tunnel for the SonicWALL UTM devices

Step	Description
1.	Begin configuration of the VPN tunnel by clicking on **Settings** under the **VPN** tab on the left. Click **Add** under the VPN policies panel to display the **Security Policy** pop-up window.



Step	Description
2.	In the General tab of the **Security Policy** pop-up window, enter the following information for the VPN tunnel. **Name**: ***Avaya DevConnect*** (a descriptive name for the VPN tunnel) **IPsec Primary Gateway Name or Address:** ***172.16.1.49*** (the IP address of the remote SonicWALL's WAN interface) **IPsec Secondary Gateway Name or Address:** ***0.0.0.0*** **Shared Secret:** ***1234*** (a secret string that will be entered into both SonicWALL devices) Click on the **Network** tab after entering the above information. 

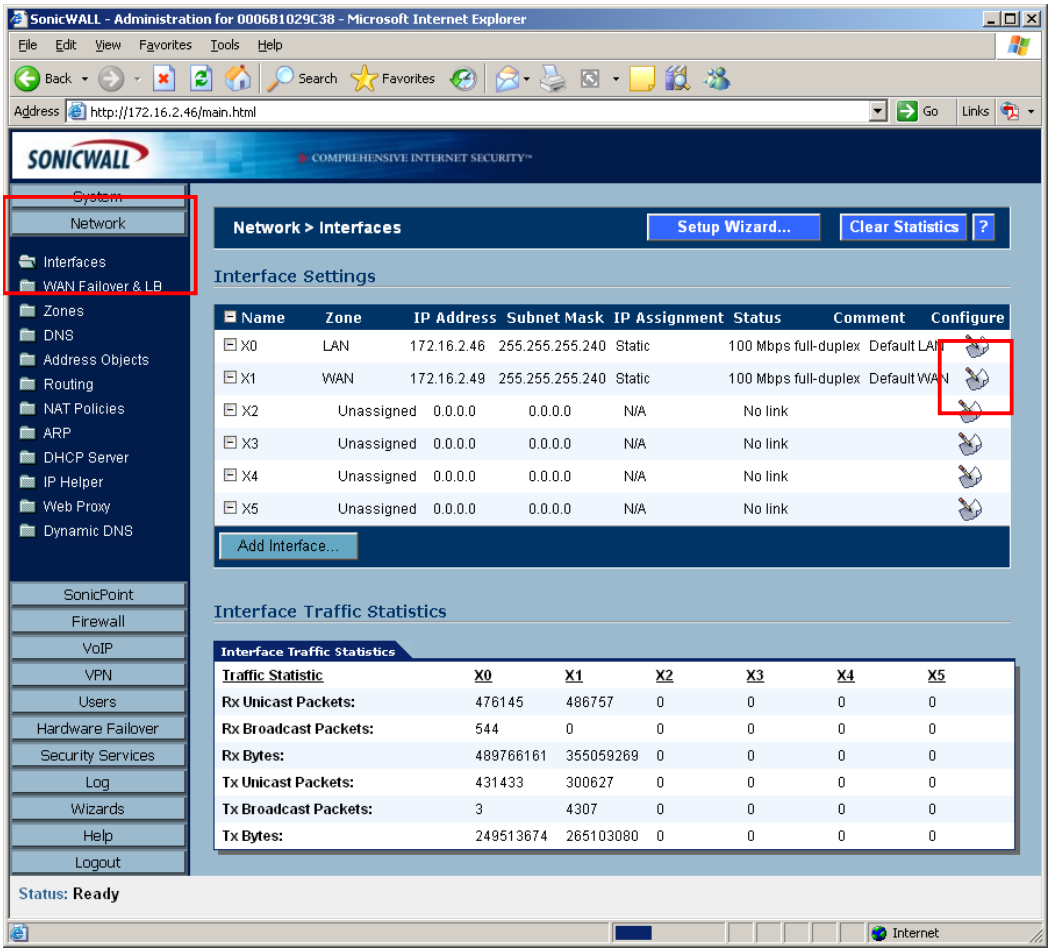
Step	Description
3.	Under the Network tab, select **Local Networks** and **Remote VPN Networks** as defined in Section 3.1 step 6 and 7 respectively. Click on the **Proposals** tab. 
4.	All the fields in the **Proposal** tab were left at the default value in the sample configuration. Click on the **Advanced** tab to continue. 

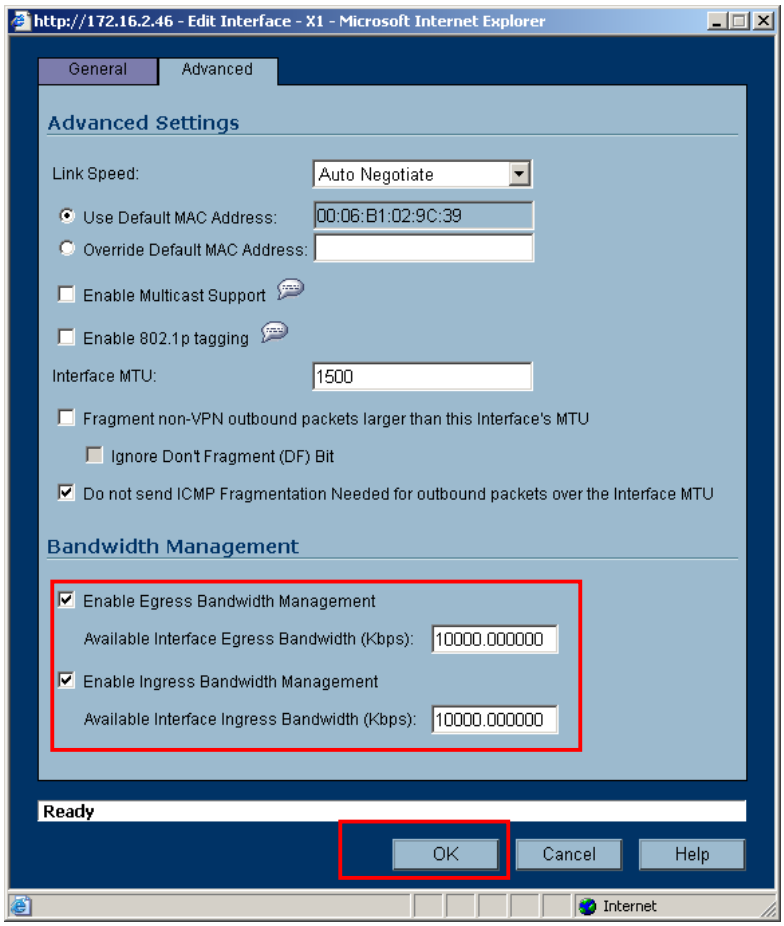
Step	Description
5.	Under the **Advanced** tab, **Enable Keep Alive** by clicking the check box on the left. Click **OK** to complete. 

3.3. Configure the Firewall Access Rules and Bandwidth Reservation for the SonicWALL VPN Tunnel.

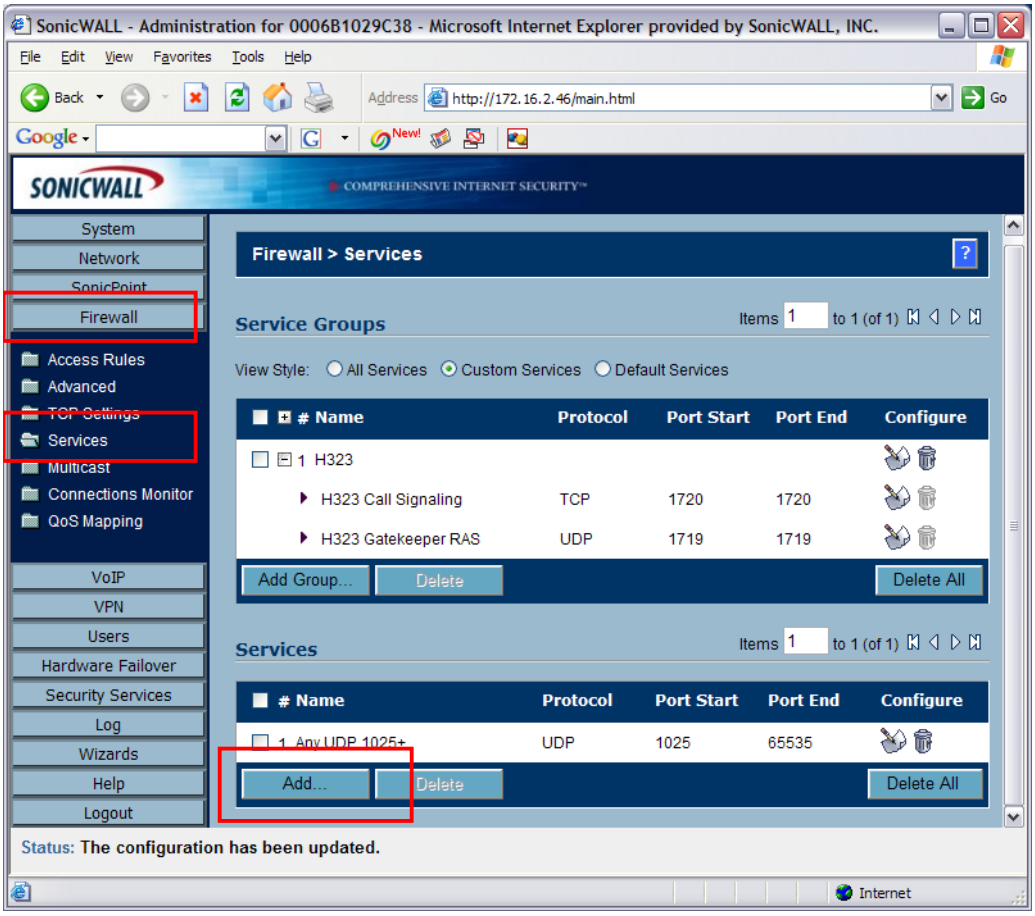
This section defines the necessary Firewall Access Rules and Bandwidth Reservation for VoIP traffic for the VPN Tunnel.

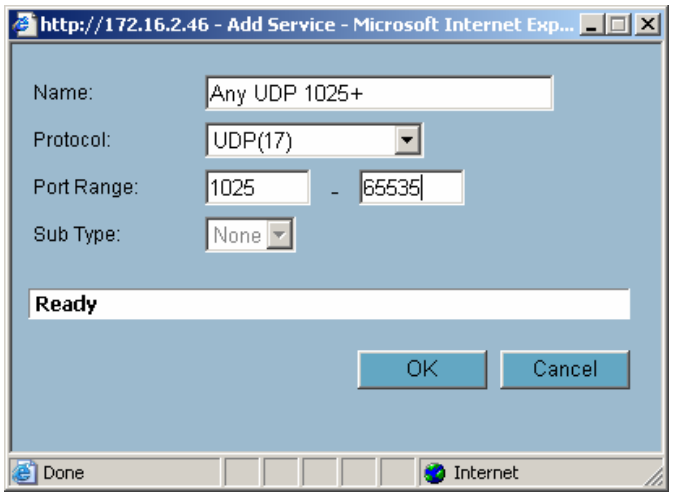
Step	Description
1.	Begin by defining the Bandwidth for the WAN interface by selecting **Interfaces** under the **Network** tab on the left. Click on the  icon on the right for the WAN Zone under the Interface Settings panel.

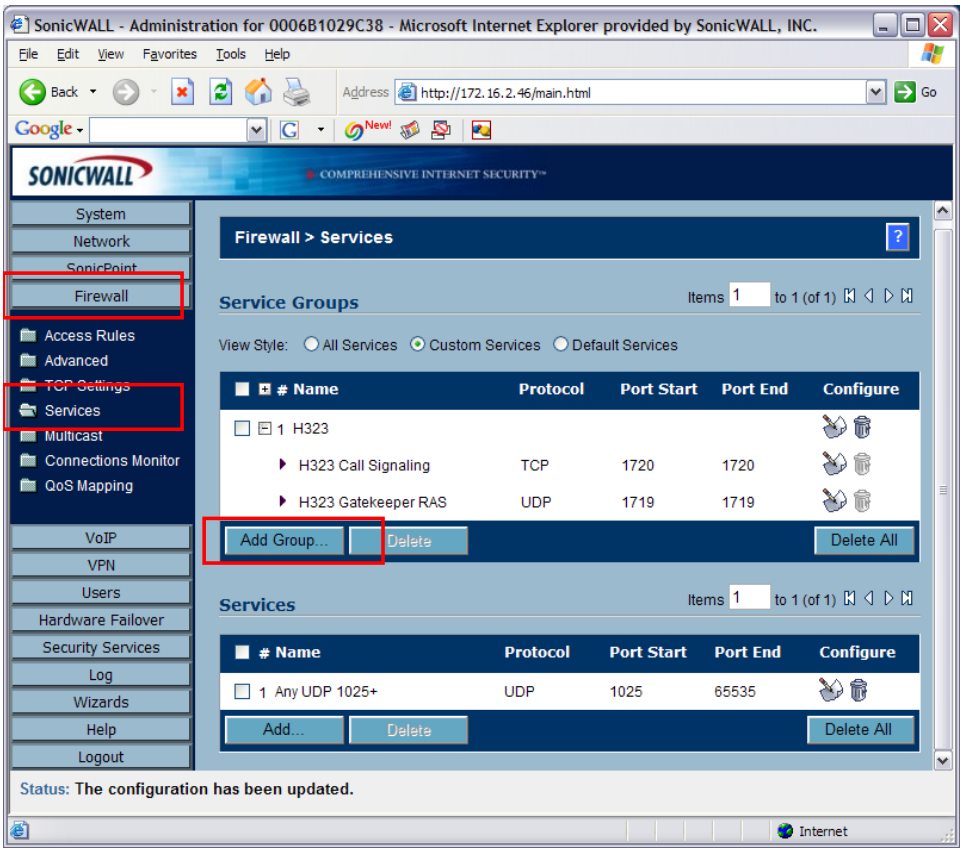
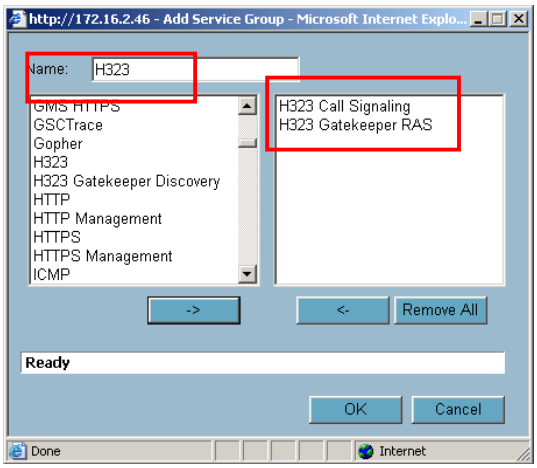


Step	Description
2.	From the **Edit Interface** pop-up window, select the **Advanced** tab. Enable bandwidth management by checking the **Enable Egress Bandwidth Management** and **Enable Ingress Bandwidth Management** check box. Enter the appropriate Egress and Ingress Bandwidth in kbps. The sample configuration was configured with 10,000 kbps as shown below. This number will be used as the basis for calculating Bandwidth Reservation. Click **OK** to complete. 

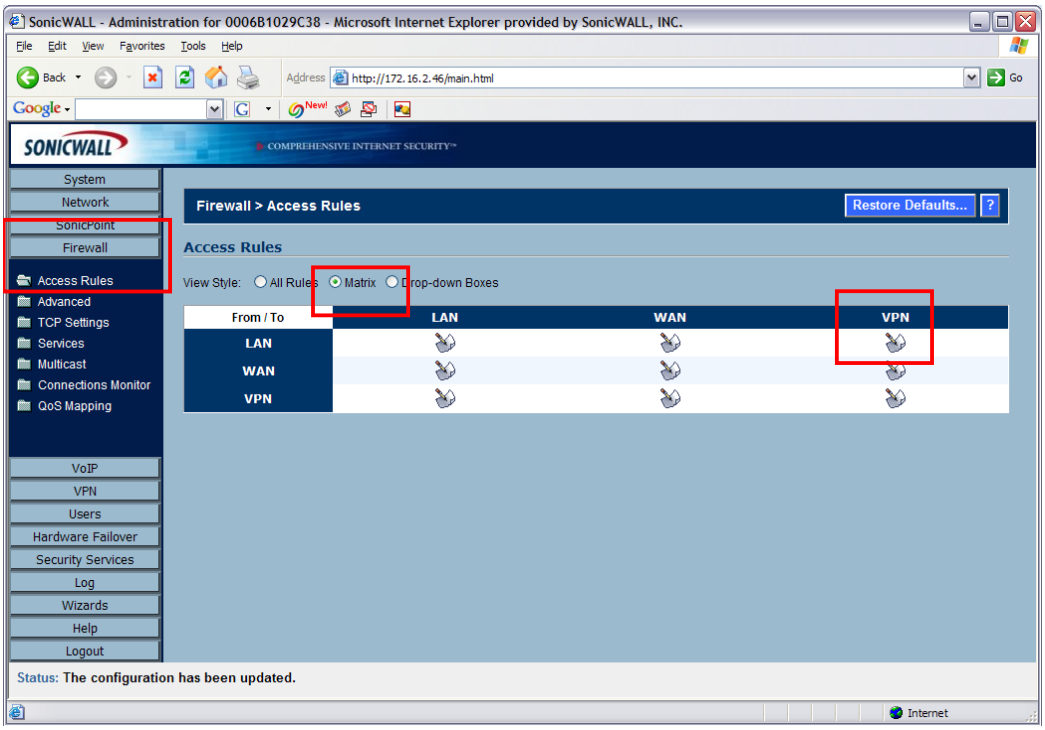
Step	Description
3.	Now define the Firewall services by selecting **Services** under the **Firewall** tab on the left. Click on **Add** under **Services** panel to display the **Add Service** pop-up window.



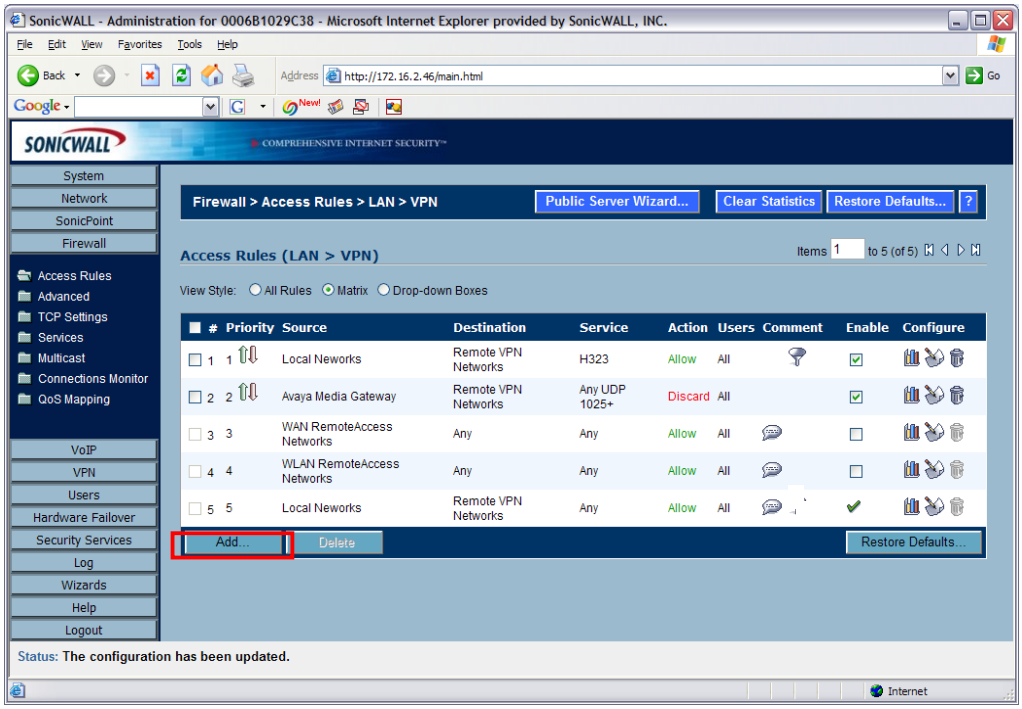
Step	Description
4.	Enter the following information for the new Firewall service. **Name:** Any UDP 1025+ (a descriptive name for the Firewall service) **Protocol:** UDP(17) **Port Range:** 1025 - 65535 This rule is designed to filter out all UDP traffic that has not been negotiated using the H.323. Click **OK** after entering all the information. 

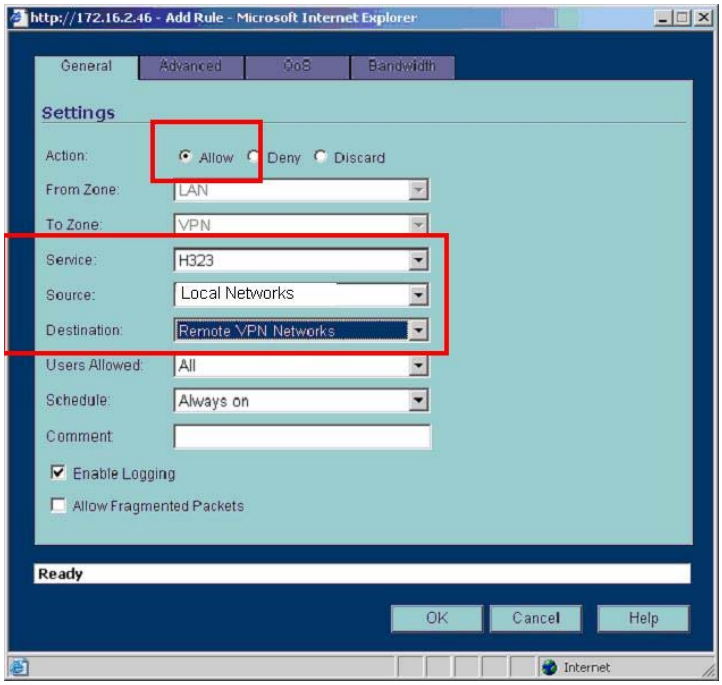
Step	Description
5.	From the Firewall's Services display, click **Add Group** under the **Service Groups** panel to add a new Service Group. 
6.	At the **Add Service Group** pop-up window, enter a name for the new Service Group. The sample network used the name ***H323***. Highlight **H323 Call Signaling** and **H323 Gatekeeper RAS** from the left, and then click **->** to move the selected Services to the right panel. Click **OK** to complete. 

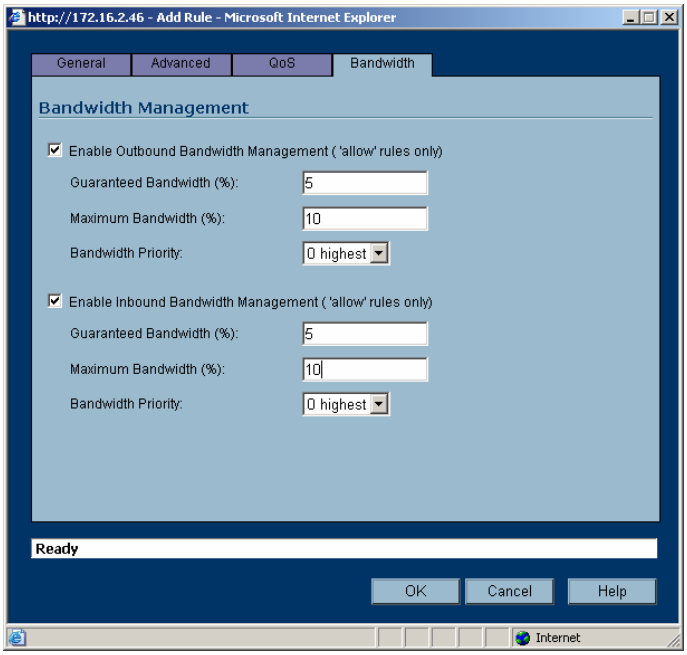
Step	Description
7.	Select **Access Rules** under the **Firewall** tab on the left to configure the Firewall's rules. Select **Matrix** to better display all the selections. There are two sides of the firewall that need to be configured. One is LAN to VPN and the other is VPN to LAN. Select the  icon in the first row and third column to configure the LAN to VPN Access rule.

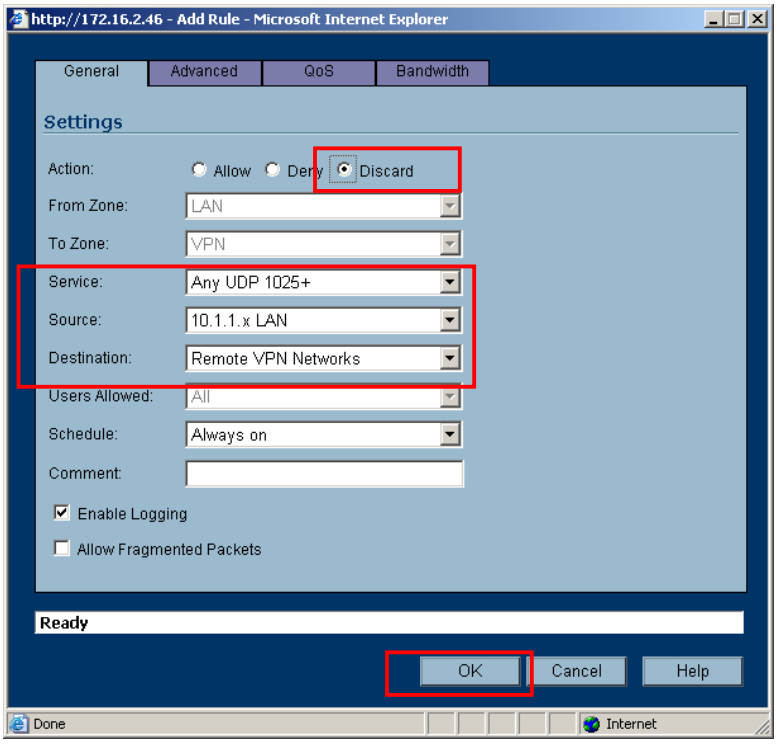


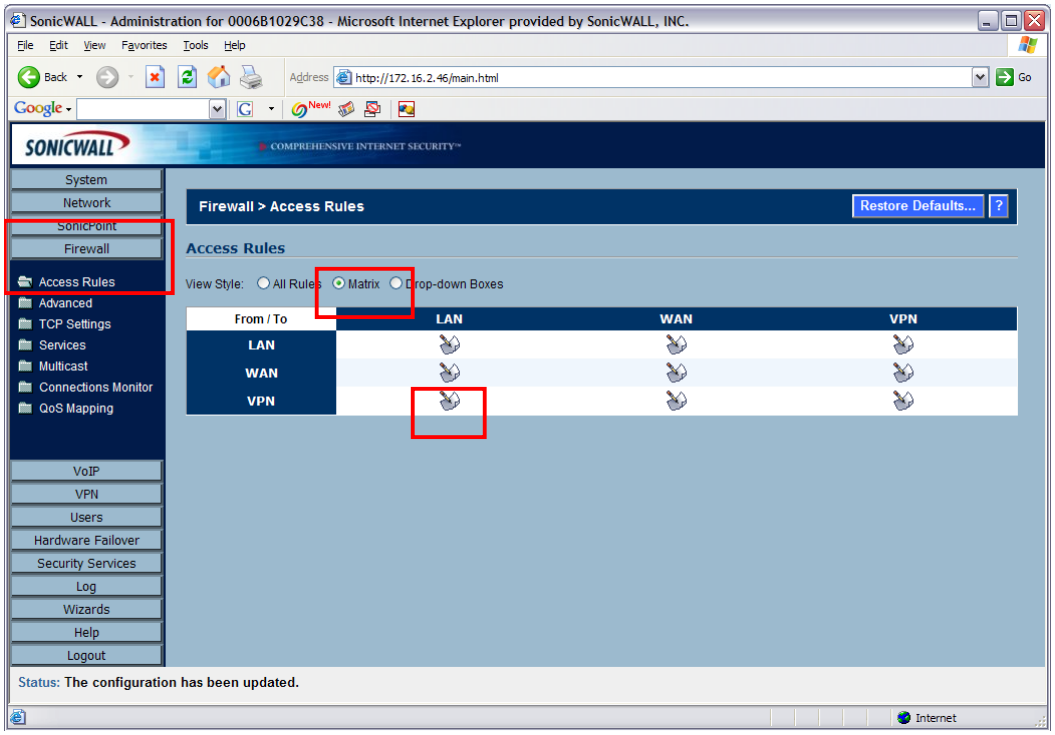
Step	Description
8.	Click on **Add** under the **Firewall > Access Rules > LAN > VPN** panel to add a new Access Rule.

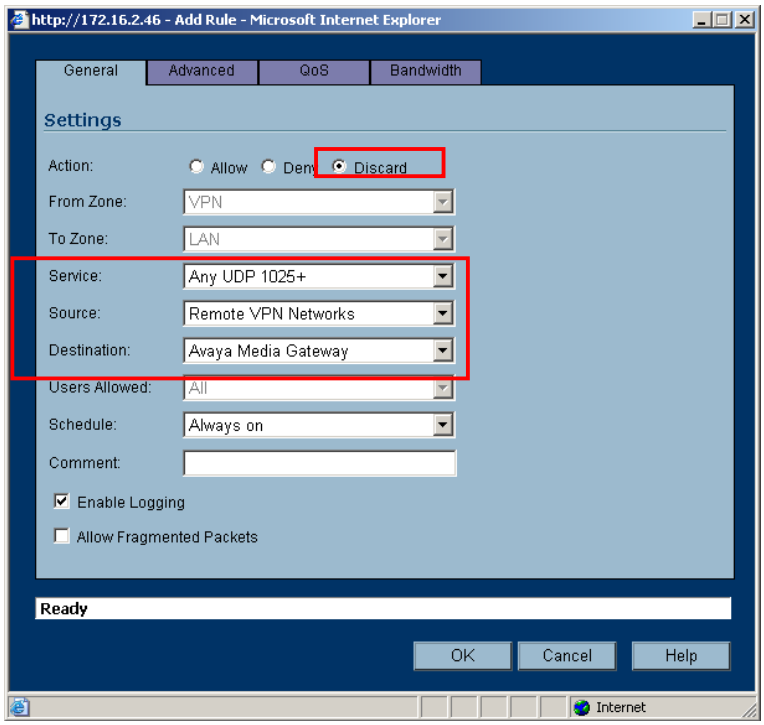


Step	Description
9.	Under the **General** tab of the **Add Rules** pop-up window, enter the following information: **Action:** ***Allow*** radio button selected **Service:** ***H323*** (defined in section 3.3 step 6) **Source:** ***Local Networks*** (defined in section 3.1 step 6) **Destination:** ***Remote VPN Networks*** (defined in section 3.1 step 7) Click on the **Bandwidth** tab to continue. 

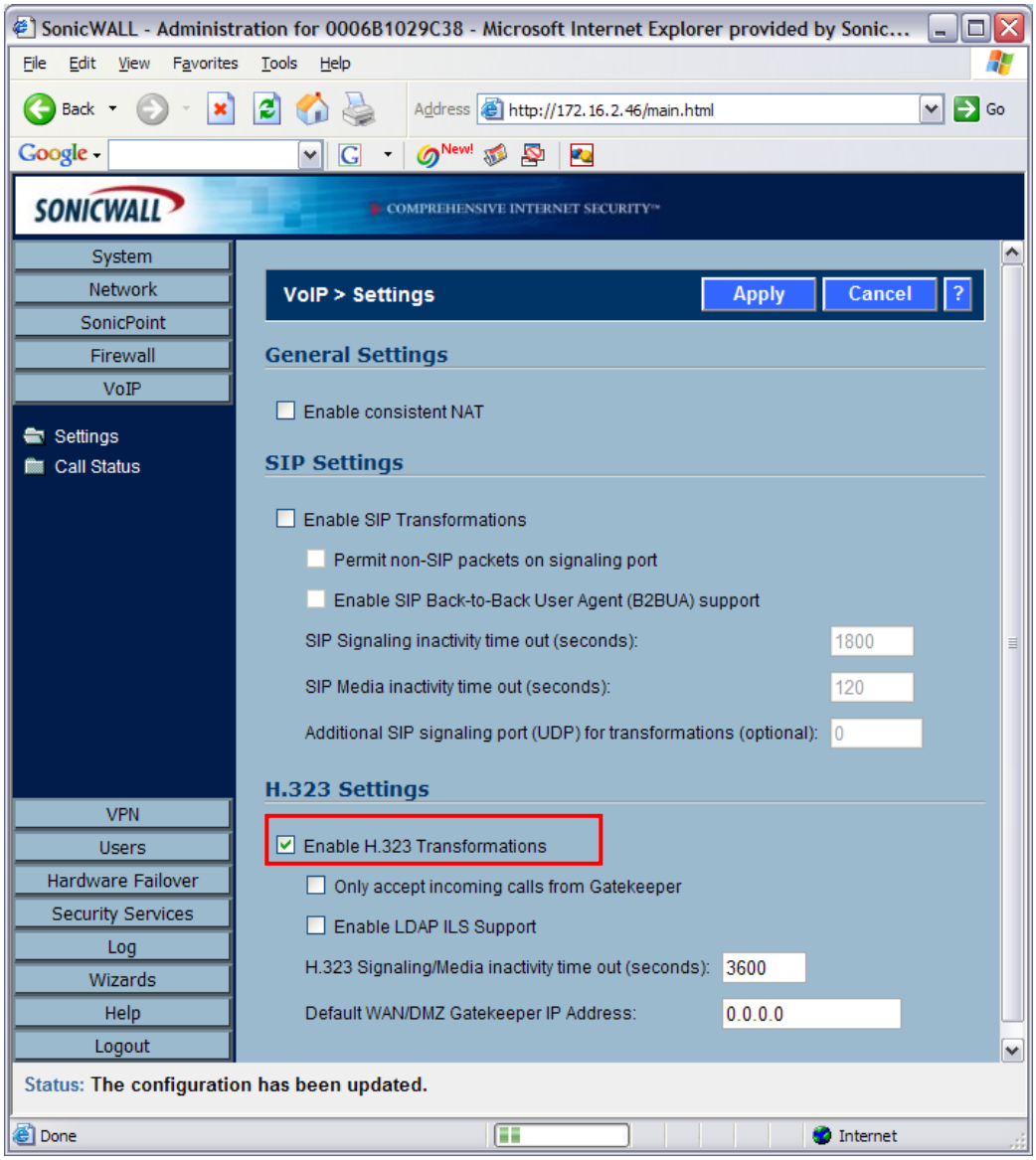
Step	Description
10.	Under the **Bandwidth** tab, the bandwidth and priority are defined for the Outbound and Inbound traffic. The **H323** Access Rule in the sample network has defined the following: **Outbound Bandwidth Management** **Guaranteed Bandwidth (%):** ***5*** **Maximum Bandwidth (%):** ***10*** **Bandwidth Priority:** ***0 highest*** **Inbound Bandwidth Management** **Guaranteed Bandwidth (%):** ***5*** **Maximum Bandwidth (%):** ***10*** **Bandwidth Priority:** ***0 highest*** After entering all the information, click **OK** to complete. Note: The percentage is based on the WAN interface bandwidth defined in Section 3.3 Step 2, not the bandwidth of the VPN tunnel. 

Step	Description
11.	Click **Add** again from the **Firewall > Access Rule > LAN > VPN** menu in Section 3.3 Step 6 to add another access rule. Under the General tab of the Access Rules pop-up window, enter the following information: **Action:** ***Discard*** radio button selected **Service:** ***Any UDP 1025 +*** (defined in section 3.3 step 2) **Source:** ***10.1.1.x LAN*** (defined in section 3.1 step 4) **Destination:** ***Remote VPN Networks*** (defined in section 3.1 step 7) This rule discards RTP traffic that has not been negotiated using H.323. Click on the **OK** tab to complete. 
12.	After entering the “H323” and “Any UDP 1025 +” access rules, make sure the rules order is as displayed in Step 8 of this section. The “H323” must be before the “Any UDP 1025 +” Access Rule. If necessary, use the icon to move the selected rule up or down to obtain the appropriate order.

Step	Description
13.	Now configure the VPN to LAN access Rule by selecting **Access Rules** under the **Firewall** tab on the left. Select **Matrix** to better display the selections. Select the  icon in the third row and first column to configure the VPN to LAN access rule. 

Step	Description
14.	Repeat Steps 8-13 in this Section to configure the same Access Rules for the VPN to LAN direction. Note: Make sure in Step 9 the **Source** is ***Remote VPN Networks*** and the **Destination** is ***Avaya Media Gateway*** as shown below. 

Step	Description
15.	Select **Settings** under the **VoIP** tab on the left. ***Check*** the **Enable H.323 Transformations** field. Click **Apply** to complete.



4. Interoperability Compliance Testing

The interoperability compliance testing focused on assessing the ability of the SonicWALL PRO 4060 and TZ170 to establish a VPN tunnel that would support an infrastructure consisting of Avaya Communication Manager, and Avaya 46xx IP telephones while providing guaranteed bandwidth management for Avaya VoIP traffic.

4.1. General Test Approach

The general test approach was to verify that the Avaya IP telephones could successfully place and receive calls through the network as shown in **Figure 1** while competing with simulated non-VoIP low priority traffic. In addition, network traffic to Branch Site B was Network Address Translated to that of the IP address of the SonicWALL PRO 4060 WAN interface.

The main objectives were to verify:

- SonicWALL UTM devices can automatically allow RTP traffic streams based on H.323 signaling.
- Calls between telephones at the different locations were successfully completed and maintained with good voice quality.
- Multiple telephone calls between sites could be completed as per the desired bandwidth configured in the SonicWALL UTM devices.
- Non-VoIP traffic did not encroach upon the bandwidth reserved for the voice application.
- The solution supports G.711 and G.729 codecs.
- The solution supports DTMF.
- Preservation of Layer-3 DiffServ information.
- Network Address Translation (NAT) was implemented between the Main Site and Branch Site B.

4.2. Test Results

The objectives were successfully verified during compliance testing. Multiple telephone calls were successfully placed and received as per the bandwidth policy defined by the SonicWall UTM devices during varying levels of simulated competing traffic. Voice quality was good throughout testing regardless of traffic flow. DTMF was verified via access to the Meet-me Conference configured the Avaya Communication Manager.

5. Verification Steps

The following steps may be used to verify the configuration:

- Make sure all the SonicWALL UTM devices interfaces are reachable.
- Place and receive call from the Avaya telephones.
- From the SonicWALL UTM devices, verify the status of the VPN Link.
- From the SonicWALL UTM devices, verify the Access Rules are configured correctly by placing the mouse pointer over the bar chart icon in Step 8 Section 3.3. A pop-up window will display the packet count and byte processed by the Access Rule.

6. Support

For technical support on the SonicWALL UTM, contact SonicWALL, Inc. at
http://www.sonicwall.com/support/contact.html

North America 1-888-777-1476

7. Conclusion

These Application Notes have described the administration steps required to configure the SonicWALL UTM devices to interoperate with and prioritize WAN bandwidth for Avaya IP H.323 phone traffic. During compliance testing, H.323 phone calls traversing the WAN link were successfully established and maintained while sharing the link with non-VoIP traffic.

8. Additional References

[1] *Administrator Guide for Avaya Communication Manager, Doc # 03-300509*, Issue 1, June 2005
[2] *Avaya Communication Manager Advanced Administration Quick Reference*, Doc # 03-300364, Issue 2, June 2005 Release 3.0
[3] *SonicOS Enhanced 3.0 Administrator's Guide*

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

Product documentation for SonicWALL products may be found at
http://www.sonicwall.com

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.