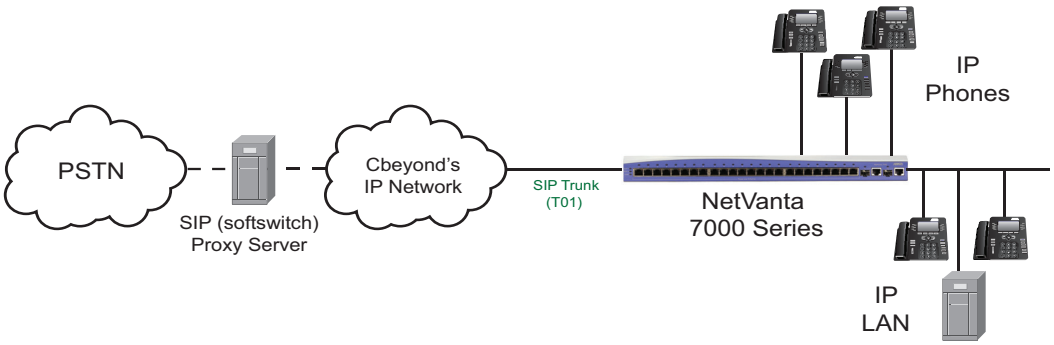
Connecting to a

Cbeyond SIP Trunk

Using the NetVanta 7100 Series

Quick Configuration Guide **61200268L1-42.4B** **September 2010**

Session Initiation Protocol (SIP) trunking is a packet-based voice service that routes calls over an IP network to an IP-compatible private branch exchange (PBX) or voice switch using SIP signaling to place and receive calls. ADTRAN's NetVanta 7100 IP PBX supports SIP trunks delivered from your Cbeyond service provider. The following sections explain the implementation of SIP trunking using the ADTRAN NetVanta 7100 IP PBX with Cbeyond's integrated access.



The following ADTRAN documents are prerequisites to configuring a new Cbeyond SIP trunk on your system and are available online at http://kb.adtran.com:

- *NetVanta 7000 Series Quick Start Guide, article number 2511*
- *NetVanta 7100 Administrator's Guide, article number 2292*
- *NetVanta 7000 Series SIP Trunking, article number 2508*

The following ADTRAN documentation is also available relating to SIP trunks and SIP networks:

- *Source and ANI Based Routing, article number 2510*
- *Switchboard and Dial Plan, article number 2130*
- *Configuring SIP Proxy in AOS, article number 2183*
- *Voice Quality Monitoring, article number 2262*
- *User Accounts (available in the NetVanta 7000 Series Administrator's Guide, article number 2292)*
- *Voicemail Quick Configuration Guide, article number 2198*
- *Introduction to the Firewall Menu in the Web GUI Technical Note, article number 1968*
- *NetVanta 7000 Series Security Guide, article number 3399*
- *Enhanced ANI/DNIS Substitution in AOS, article number 2509*

Configuration guides are located on the *AOS Documentation* CD shipped with your NetVanta 7100 product or online at http://kb.adtran.com.

Hardware and Software Requirements and Limitations

The ADTRAN Operating System (AOS) firmware version A2.05.00 or later is required on your NetVanta 7100 product in order to support Cbeyond's SIP trunking. You should confirm that you are using hardware part number 1200796E1 for this configuration. Hardware part number 1200796L1 does not support transcoding between G.729 and G.711 RTP streams, which is needed to access voicemail and AA over Cbeyond's SIP trunk service. The hardware part number can be seen on the label at the bottom of the unit and also through the CLI with the **show version** command; check the DSP number (7119 for E1 and 7116 for L1).

The NetVanta 7100 product provides native SIP trunking capabilities and does not require an external SIP application level gateway (ALG). However, when using the NetVanta 7060 for SIP trunking, an external SIP-aware router or firewall is required in front of the NetVanta 7060 for network address translation (NAT) to function properly. If a SIP-aware router or firewall is not used in conjunction with the NetVanta 7060, then the SIP trunking service may not function correctly. Because of this constraint, the NetVanta 7060 is not approved for use with SIP trunking applications on the Cbeyond network.

Configuration Methods

There are two methods for configuring NetVanta 7100 products: the Web-based graphical user interface (GUI) or the command line interface (CLI). Both methods are covered in this guide. Not all the features can be enabled through both methods and will be noted when this limitation occurs.

Follow the steps below to configure the incoming Cbeyond SIP trunk:

- Create a SIP trunk account.
  - Set the SIP server address.
  - Set the SIP proxy address.
- Create trunk group(s).

Create a SIP Trunk Account Using the GUI

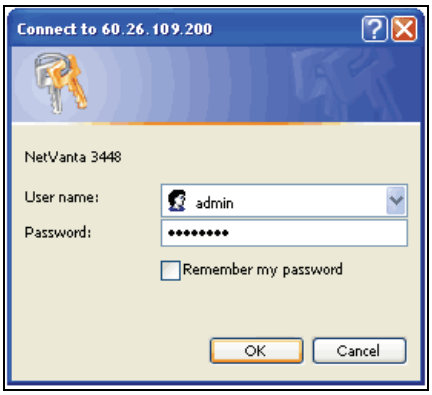
1. Open a new page in your Web browser.

2. Type your unit's IP address in the browser's address field in the following form:

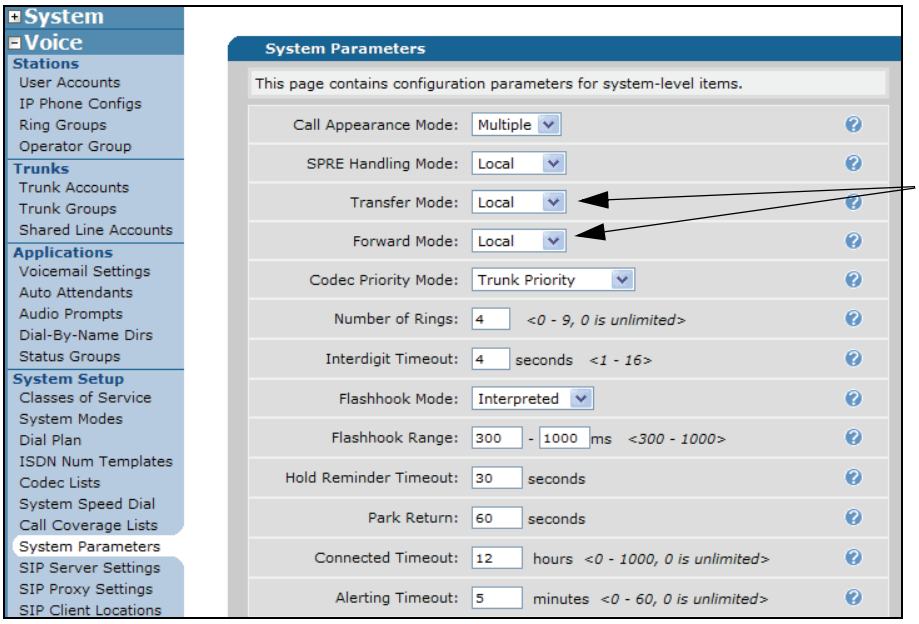
   http://<*ip address*>**/admin**

> *The IP address may also be entered in **https://** if your unit has **ip http secure-server** enabled.*

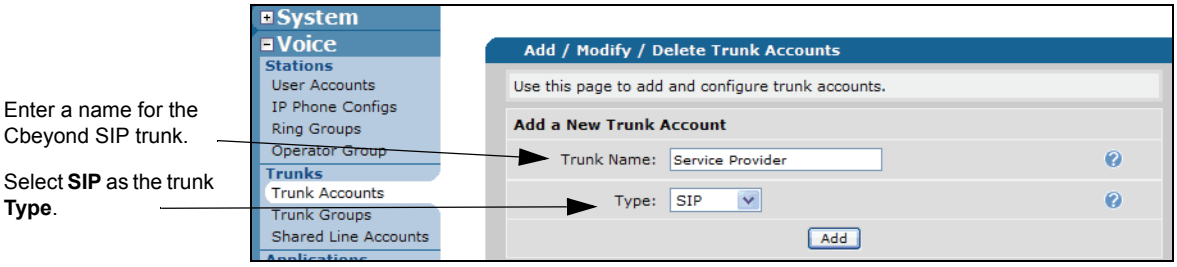
3. At the prompt, enter your user name and password and select **OK**. By default, the user name is **admin** and the password is **password**.



4. From the initial GUI menu, navigate to the **Voice > System Setup > System Parameters** menu. Verify that the **Transfer Mode** and **Forward Mode** are set to the default setting, **Local** (decisions are made internally by the NetVanta unit).



5. Navigate to the **Voice > Trunks > Trunk Accounts** menu. Enter the desired name for the SIP trunk in the **Trunk Name** field and select **SIP** as the trunk **Type**. Select **Add** to create the new trunk account and go to the **Edit SIP Trunk** menu.



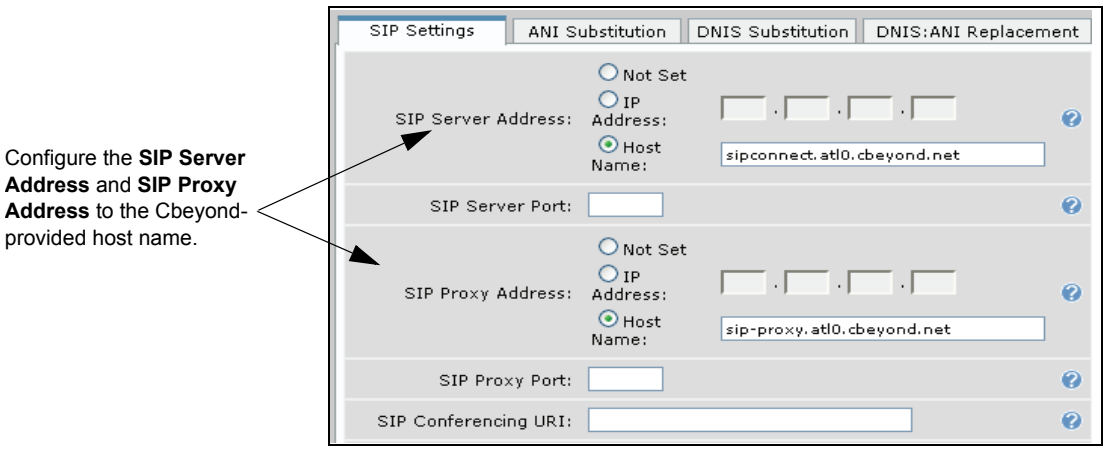
6. Continue the SIP trunk configuration on the **SIP Settings** tab.

   Enter the **SIP Server Address** using either the specific host name with the fully qualified domain name (FQDN) or the IP address on which the trunks will terminate. The **SIP Server Address** is defined as the **SIPconnect Domain** on the Cbeyond **Install Profile** (provided by Cbeyond at http://CbeyondOnline.net).

   Enter the **SIP Proxy Address** using the specific IP address or FQDN on which the trunks will terminate. The **SIP Proxy Address** is defined as the **Outbound Proxy** on the Cbeyond **Install Profile** (provided by Cbeyond at http://CbeyondOnline.net).

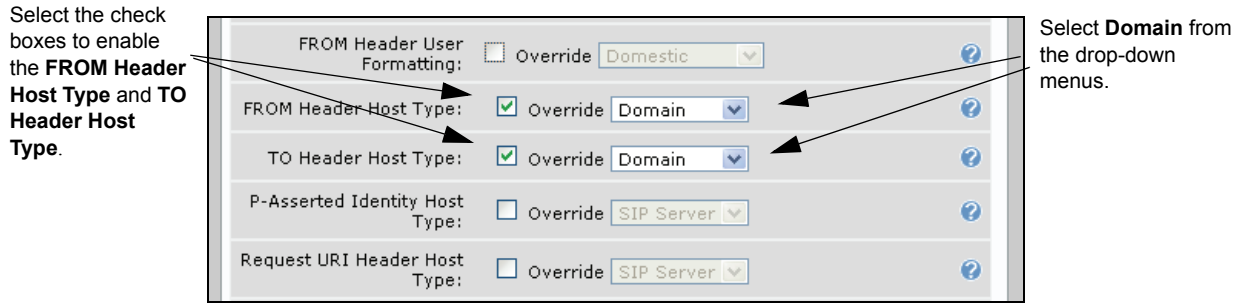
   The following illustration displays the **SIPconnect Domain** and **Outbound Proxy** addresses listed on the Cbeyond **Install Profile** (in the **Phone Vendor Info** menu).

   In the following example, **sipconnect.atl0.cbeyond.net** is used for the SIP server address, and **sip-proxy.atl0.cbeyond.net** is used for the SIP proxy address.



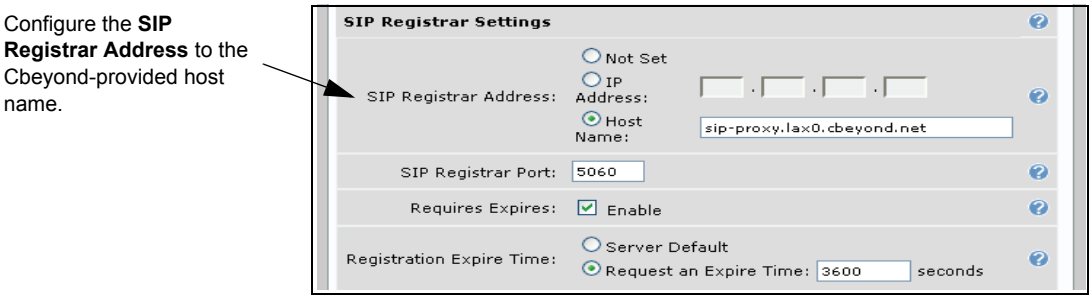
7. Enable the **FROM Header Host Type** and **TO Header Host Type** using the check boxes.

   Select **Domain** from both drop-down menus.

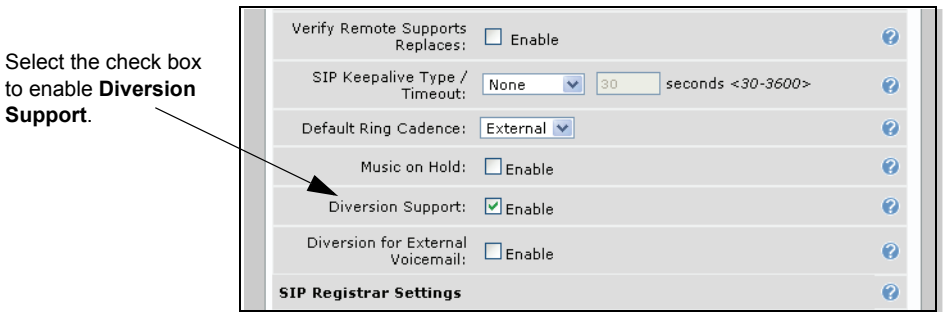


8. Enter the **SIP Registrar Address** using either the specific host name with the FQDN or IP address. The **SIP Registrar Address** is defined as the **Outbound Proxy** address provided in the Cbeyond **Install Profile** (provided by Cbeyond at http://CbeyondOnline.net). By default, the **SIP Registrar Port** is set to **5060**.

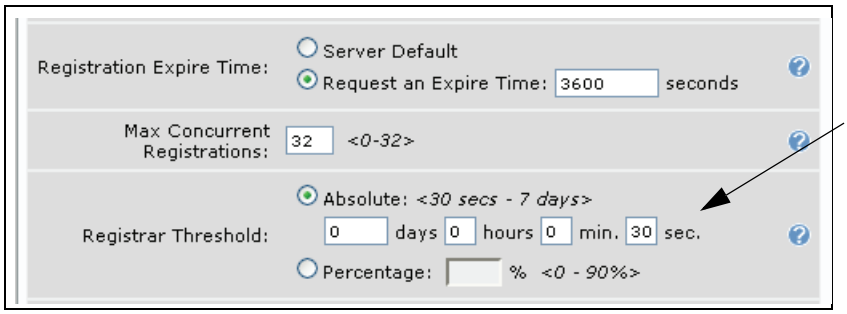
   In the following example, **sip-proxy.lax0.cbeyond.net** is used for the **SIP Registrar Address**.



9. Enable **Diversion Support** using the check box.

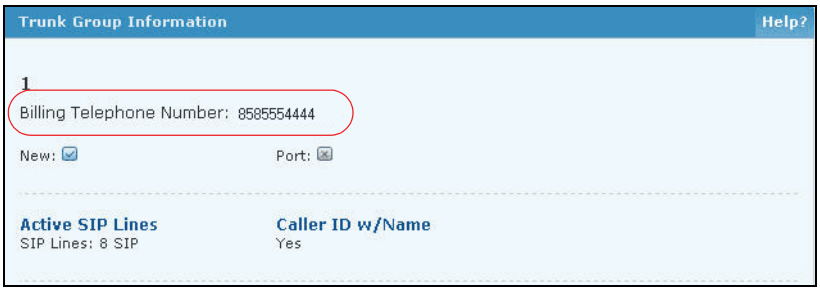


10. Change the **Registrar Threshold** setting to 30 seconds.

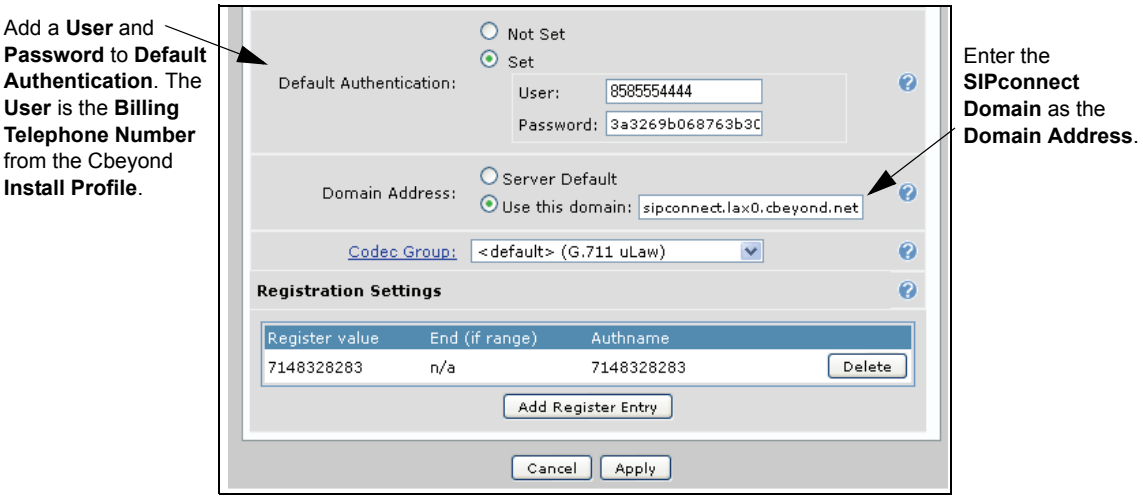


11. Add a **User** and **Password** to **Default Authentication**. The **User** is the **Billing Telephone Number** listed in the Cbeyond **Install Profile**. In addition, under **Registration Settings** in the NetVanta unit, specify that the **Domain Address** used by the NetVanta 7100 is set to **Use this domain**, and enter the **SIPconnect Domain** from the Cbeyond **Install Profile** (provided by Cbeyond at http://CbeyondOnline.net).

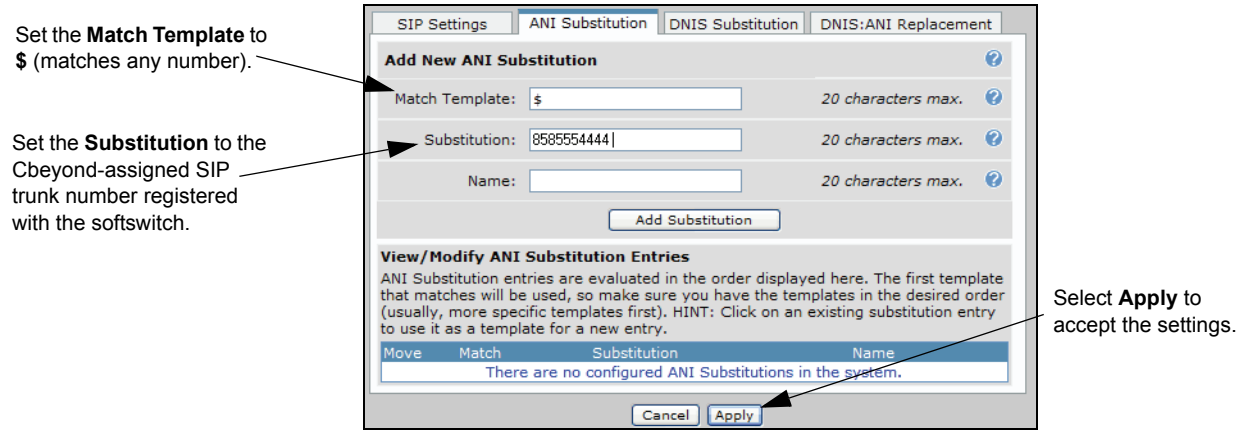
    The following illustration displays the **Billing Telephone Number** listed on the Cbeyond **Install Profile** (in the **Trunk Group Information** menu). The **SIPconnect Domain** address is located in the **Phone Vendor Info** menu of the **Install Profile**.The **Install Profile** is available online at http://CbeyondOnline.net.



    In the following example, the **User** is specified as the Cbeyond **Billing Telephone Number** (**8585554444**), the password is specified, **Default Authentication** is enabled, and the **Domain Address** is specified as the Cbeyond **SIPconnect Domain** address (**sipconnect.lax0.cbeyond.net**).



12. Select the **ANI Substitution** tab (still on the **Edit SIP Trunk** menu) to configure outgoing caller ID to match the main Cbeyond assigned number on the SIP trunk. Set the **Match Template** to **$** (matches any number). Set the **Substitution** to the Cbeyond-assigned SIP trunk number registered with the softswitch. Other Cbeyond numbers can be added here as well. For more information, refer to the configuration guide *Enhanced ANI/DNIS Substitution in AOS* (article number 2509) available online at http://kb.adtran.com. Select **Apply** to accept the SIP trunk settings.

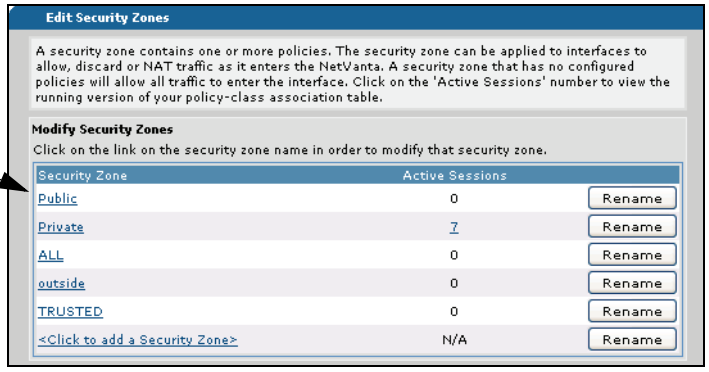


> NOTE *For more information on securing the NetVanta 7100 IP PBX, refer to the **NetVanta 7000 Series Security Guide** (article number 3399) available online at http://kb.adtran.com.*

13. Configure the necessary firewall settings by navigating to the **Data > Firewall > Security Zones** menu.

In the **Edit Security Zones** menu, select the **Public** security zone from the list.

Select **Public** from the **Edit Security Zones** menu.



Select **Add Policy to Zone 'Public'**.

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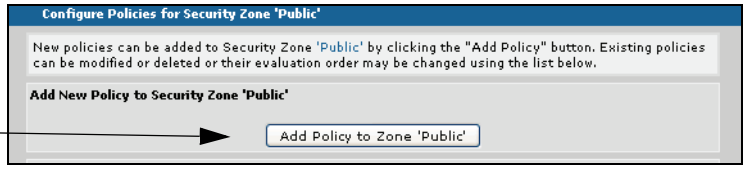

Select **Allow** from the **Policy Type** drop-down menu and select **Continue**.

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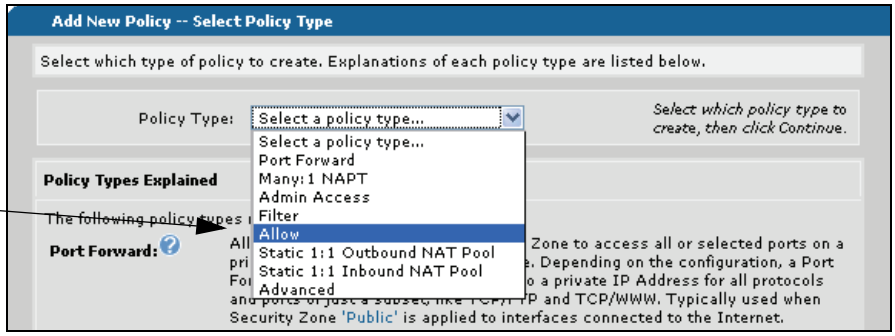


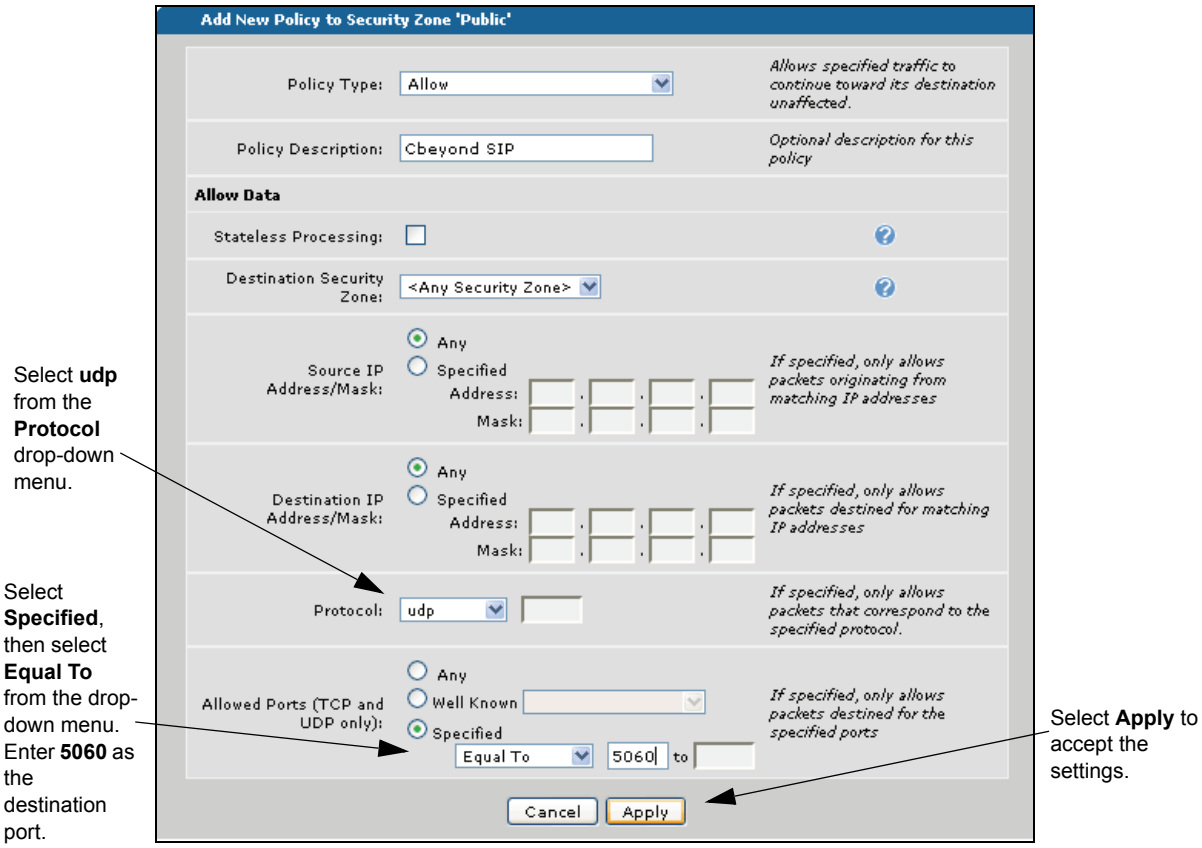
14. Configure the custom policy entry for the Public security zone.

    Select **udp** from the **Protocol** drop-down menu.

    Under **Allowed Ports**, select **Specified**. Select **Equal To** from the drop-down menu and enter **5060** as the destination port.

> NOTE
>
> *For security purposes, ADTRAN recommends restricting the firewall connection to allow public SIP traffic only from Cbeyond's network. In the previous example, the allowed port is the default SIP port. For added security, only allow the SIP server defined in* ***Step 6*** *on page 4. For specific configuration instructions, refer to Restricting Your Firewall Access on page 11.*

    Select **Apply** to accept the settings.



15. If you need further assistance configuring the firewall or virtual local area network (VLAN) settings, refer to the technical note *Introduction to the Firewall Menu in the Web GUI* (article number 1968), the *NetVanta 7060/7000 Configuration Checklist* (article number 2284), or the technical note *Changing the Default VLAN Subnets* (article number 2281). These guides are located online at http://kb.adtran.com.

Create a SIP Trunk Account Using the CLI

1. Boot up the unit.

2. Telnet to the unit (**telnet** <*ip address*>). For example:

   telnet 208.61.209.1

> NOTE *If during the unit's setup process you have changed the default IP address (**10.10.10.1**), use the configured IP address.*

3. Enter your user name and password at the prompt.

> *The AOS default user name is **admin** and the default password is **password**. If your product no longer has the default user name and password, contact your system administrator for the appropriate user name and password.*

4. Enter the Enable mode by entering **enable** at the prompt as follows:

   >enable

5. Enter your Enable mode password at the prompt.

6. Set the **Transfer Mode** and **Forward Mode** to the default setting, **Local** (decisions are made internally by the NetVanta unit).

   #configure terminal

   (config)**#voice transfer-mode local**

   (config)**#voice forward-mode local**

7. Create the new trunk account, provide a name, and set **SIP** as the trunk type using the **voice trunk** command:

   (config)**#voice trunk t01 type sip**

> *If other trunks are installed (such as analog trunks), you may need to use a different trunk number. For example, **t03**.*

8. Set the SIP server and SIP proxy addresses to the specific host name provided by Cbeyond. In this example, **sipconnect.atl0.cbeyond.net** is used for the SIP server address and **sip-proxy.atl0.cbeyond.net** is used for the SIP proxy address.

   (config-t01)**#sip-server primary sipconnect.atl0.cbeyond.net**

   (config-t01)**#outbound-proxy primary sip-proxy.atl0.cbeyond.net**

> *The SIP server and SIP proxy addresses are provided by Cbeyond in the **Install Profile** available online at http://CbeyondOnline.net. The SIP server address corresponds to Cbeyond's **SIPconnect Domain** address, and the SIP proxy address corresponds to Cbeyond's **Outbound Proxy** address.*

9. Enable the **FROM Header Host Type** and **TO Header Host Type**.

   (config-t01)**#grammar from host domain**

   (config-t01)**#grammar to host domain**

10. Set the **SIP Registrar Address** to the specific host name provided by Cbeyond. In this example, **sip-proxy.lax0.cbeyond.net** is used for the SIP registrar address.

    (config-t01)**#registrar primary sip-proxy.lax0.cbeyond.net**

> *The SIP registrar address is provided by Cbeyond in the **Install Profile** available online at http://CbeyondOnline.net. The SIP registrar address corresponds to the **Outbound Proxy** address.*

11. Set the registrar threshold to 30 seconds.

    (config-t01)**#registrar threshold absolute 30**

12. Configure the SIP trunk to support diversion headers.

    (config-t01)**#diversion-supported**

13. Add a **Username** and **Password** to **Default Authentication**. In this example, **8585554444** is used for the user name and **3a3269b068763b30** is used for the password.

    (config-t01)**#authentication username 8585554444 password 3a3269b068763b30**

14. Configure **ANI substitution** by setting the outgoing caller ID to match the main Cbeyond-assigned number on the SIP trunk.

    (config-t01)**#match ani $ substitute 8585554444**

15. Add a new access control list (ACL).

    (config-t01)**#ip access-list extended CBeyond**

16. Configure the custom policy entry.

    (config-ext-nacl)**#permit udp any any eq 5060**

17. Apply the custom policy entry to the **Public** security zone.

    (config)**#ip policy-class Public**

    (config-policy-class)**#allow list CBeyond**

> NOTE
>
> *For security purposes, ADTRAN recommends restricting the firewall connection to allow public SIP traffic only from Cbeyond's network. For added security, only allow the SIP server defined in **Step 8** on page 10. For specific configuration instructions, refer to Restricting Your Firewall Access on page 11.*

Restricting Your Firewall Access

For security purposes, ADTRAN recommends restricting the firewall connection to allow public SIP traffic only from Cbeyond's network. In the previous configuration examples, the custom policy entry for the security zone **Public** allows all traffic through the default SIP port (**udp 5060**). For added security, only allow the SIP server defined in ***Step 6*** *on page 4*, or ***Step 8*** *on page 10*, which is the SIP server with the address defined as the **SIPconnect Domain** on the Cbeyond **Install Profile** (provided by Cbeyond at http://CbeyondOnline.net).

You can change the firewall connection using either the GUI or the CLI. These changes are made to allow SIP traffic only from the trusted Cbeyond SIP server and to remove any default statements in the configuration where traffic is allowed from any source through the default SIP port.

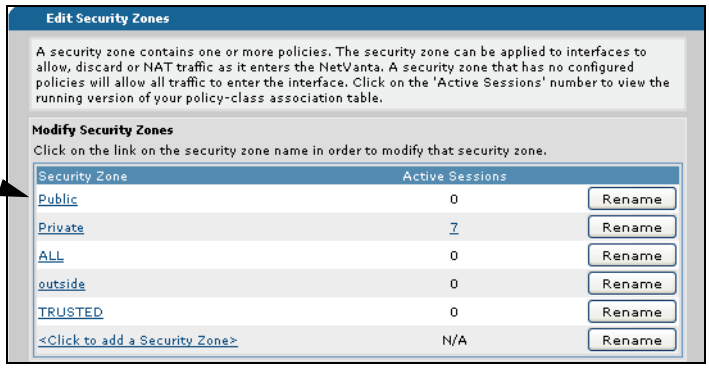
Restricting Your Firewall Access Using the GUI

To change the source of allowed SIP traffic from the default to the Cbeyond SIP server, follow these steps:

1. From the GUI main menu, navigate to **Data** > **Firewall** > **Security Zones**.

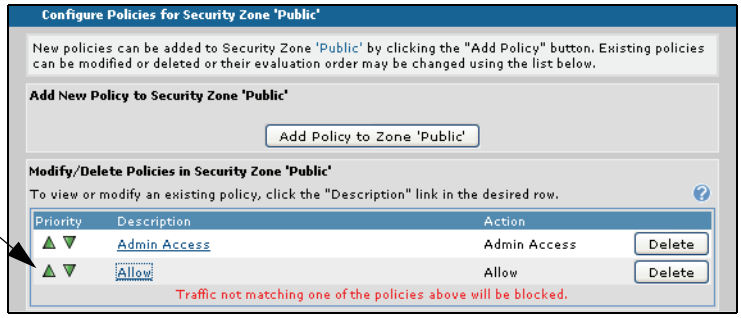
2. From the **Edit Security Zones** menu, select **Public**.

Select **Public** from the **Edit Security Zones** menu.



3. Select the default traffic policy that allows traffic from UDP port 5060. In the example below, the default policy is **Allow**.

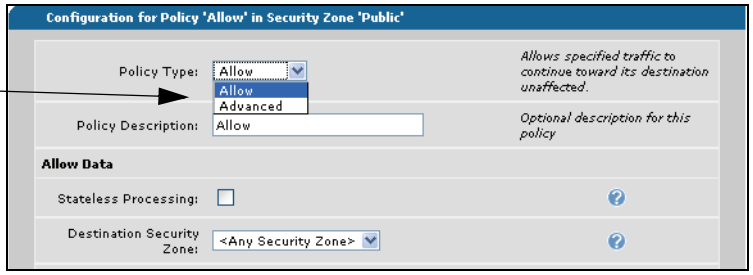
Select the default traffic policy that allows traffic from UDP port 5060. Here the default policy is **Allow**.



> NOTE *If a default allow policy does not exist, create a new advanced policy type and enter the information given in the following steps.*

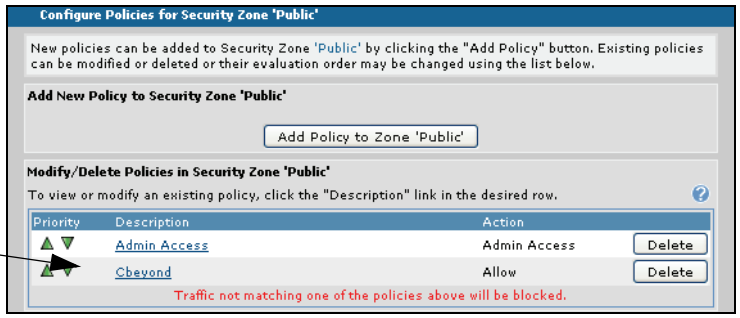
4. In the **Configuration for Policy 'Allow' in Security Zone 'Public'** menu, change the **Policy Type** to **Advanced** by selecting the option from the drop-down menu.

Select **Advanced** from the **Policy Type** drop-down menu.



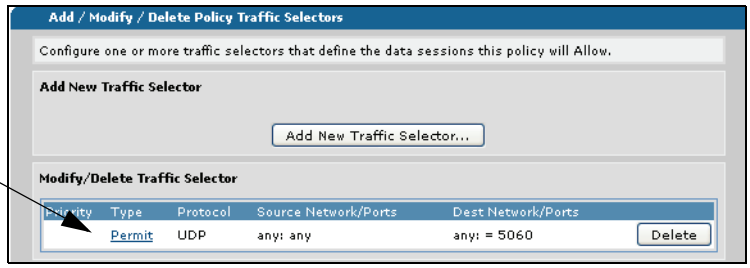
5. Optionally, you can change the **Policy Description** so that you know this policy works with the Cbeyond network. For example, change the description to **Cbeyond**. Once you have changed the **Policy Type** and **Policy Description**, select **Apply** at the bottom of the **Configuration for Policy** menu.
6. Selecting **Apply** returns you to the **Public Security Zone** menu. Select the newly updated policy from the policy list (returning you to the **Configuration for Policy** menu). In this example, the updated policy is the **Cbeyond** policy.

Select the newly updated policy from the list. Here the updated policy is the **Cbeyond** policy.



7. Scroll down to the **Add/Modify/Delete Policy Traffic Selectors** menu. Select the **Permit** traffic selector for editing.

Select the **Permit** traffic selector.



NOTE

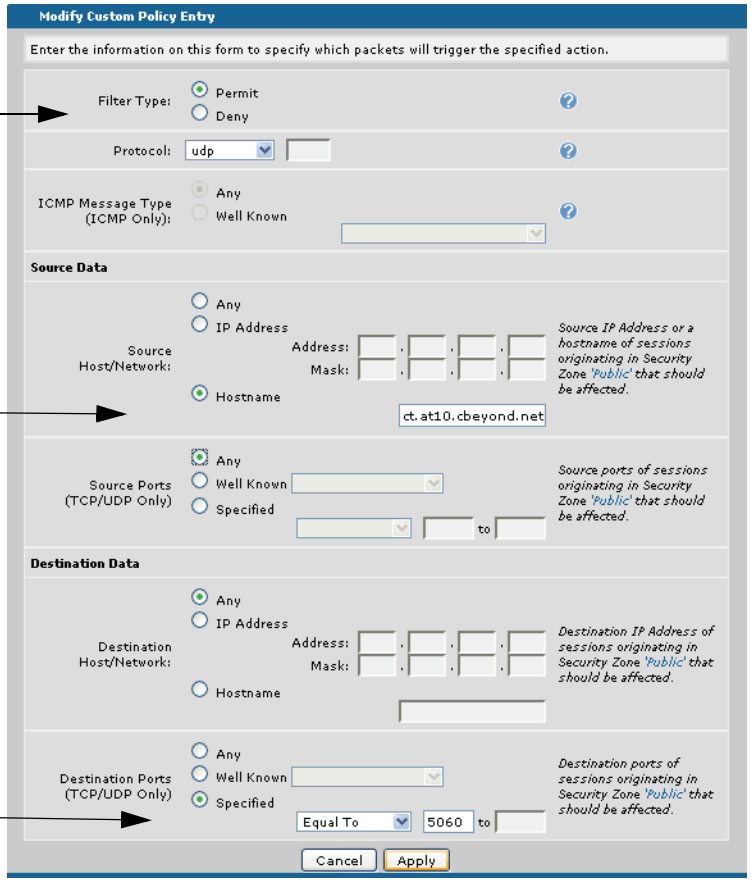
*The **Add/Modify/Delete Policy Traffic Selectors** menu will not appear if the policy type is not set to **Advanced**.*

8. After selecting **Permit**, you can modify the policy from the **Modify Custom Policy Entry** menu. Specify that the policy is set to **Permit**, that the protocol is **udp**, and specify the **Source Host/Network** by selecting **Hostname** and entering the host name of the Cbeyond **SIPconnect Domain** from the Cbeyond **Install Profile** (provided by Cbeyond at http://CbeyondOnline.net). The host name entered in this policy should be the host name of the Cbeyond server specified in ***Step 6*** *on page 4*. For example, the illustration below uses the **SIPconnect Domain** (the **SIP Server Address**) **sipconnect.at10.cbeyond.net**. In this menu, you should also specify the **Destination Ports** as **Equal To** port **5060**. Once you have entered these settings, select **Apply**.

Verify that the **Filter Type** is set to **Permit** and that the **Protocol** is set to **udp**.

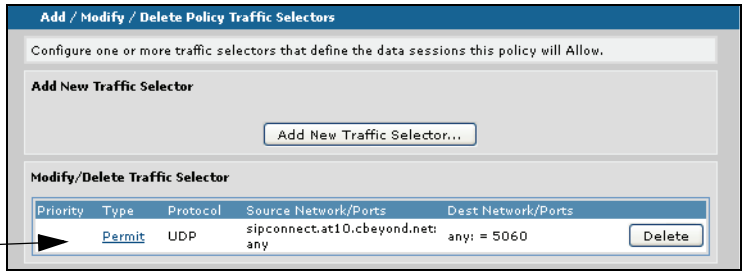
Specify the **Source Host/Network** by **Hostname**, and enter the **SIPconnect Domain** host name from the Cbeyond **Install Profile**.

Specify the **Destination Ports** as **Equal To** port **5060** and select **Apply**.



9. The updated **Permit** policy traffic selector appears in the **Add/Modify/Delete Policy Traffic Selectors** menu and confirms that the default policy has been changed.

The updated **Permit** policy is now listed in the **Add/Modify/Delete Policy Traffic Selectors** menu.



10. Save this setting by selecting **Save** from the upper right corner of the GUI. The firewall is now restricted to only allow SIP traffic from Cbeyond's network.

> NOTE *You should also remove any other default statements in your configuration that allow SIP traffic (UDP port 5060) from **any** source since you now have a specific entry for Cbeyond.*

Restricting Your Firewall Access Using the CLI

To change the allowed source of SIP traffic from the default to the Cbeyond SIP server, follow these steps:

1. Create an extended ACL with a different description than the default ACL (defined in ***Step 15*** *on page 11*). For example:

   (config-t01)**#ip access-list extended cbeyond-sip-connect**

2. Configure the ACL to only permit traffic from the Cbeyond SIP server and SIP proxy server. The server addresses are provided by Cbeyond (refer to ***Step 8*** *on page 10*). In the example below, **x.x.x.x** is your public IP or subnet and **y.y.y.y** is your subnet mask. For example:

   (config-ext-nacl)**#permit ip hostname sipconnect.at10.cbeyond.net x.x.x.x y.y.y.y**
   (config-ext-nacl)**#permit ip hostname sip-proxy.at10.cbeyond.net x.x.x.x y.y.y.y**

3. Apply the new ACL to the **Public** security zone.

   (config)**#ip policy-class Public**
   (config-policy-class)**#allow list cbeyond-sip-connect**

4. Save the new configuration.

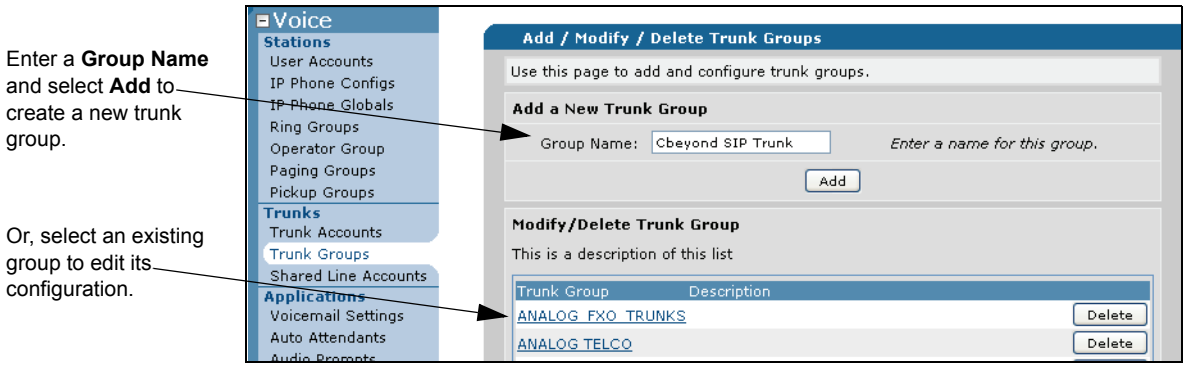
> NOTE *You should also remove any other default statements in your configuration that allow SIP traffic (UDP port 5060) from **any** source since you now have a specific entry for Cbeyond.*

Create Trunk Groups

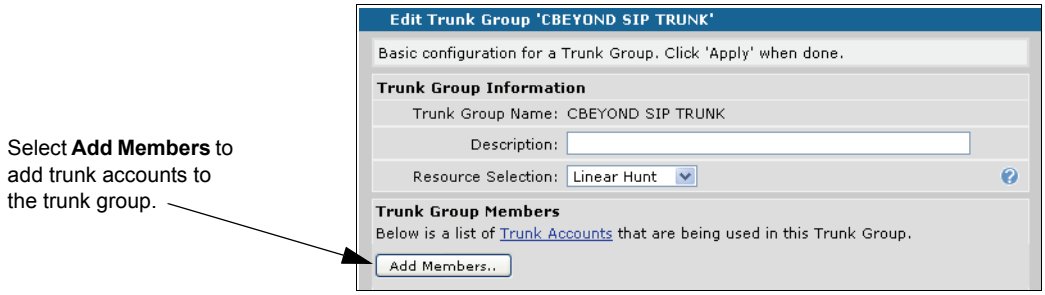
Trunk groups combine one or more trunk accounts and assign outbound call characteristics. The trunk group is assigned outbound call capabilities (local calls, long distance calls, etc.). Additionally, a cost is assigned to each attribute in the outbound call template. Use this section to create a trunk group, add the trunk account members to the group, and define the outbound call templates and costs.

Create Trunk Groups Using the GUI

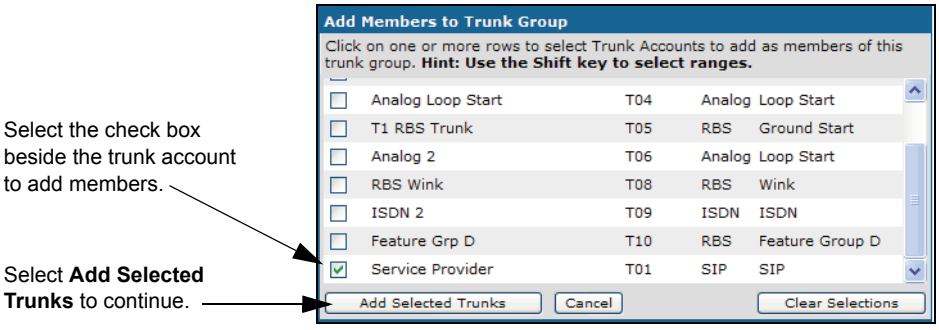
1. Navigate to the **Voice > Trunks > Trunk Groups** menu. To add a new trunk group, and go to the **Edit Trunk Group** menu, enter a new **Group Name** and select **Add**. To edit an existing trunk, select the link for the desired trunk from the list under **Modify/Delete Trunk Group**.



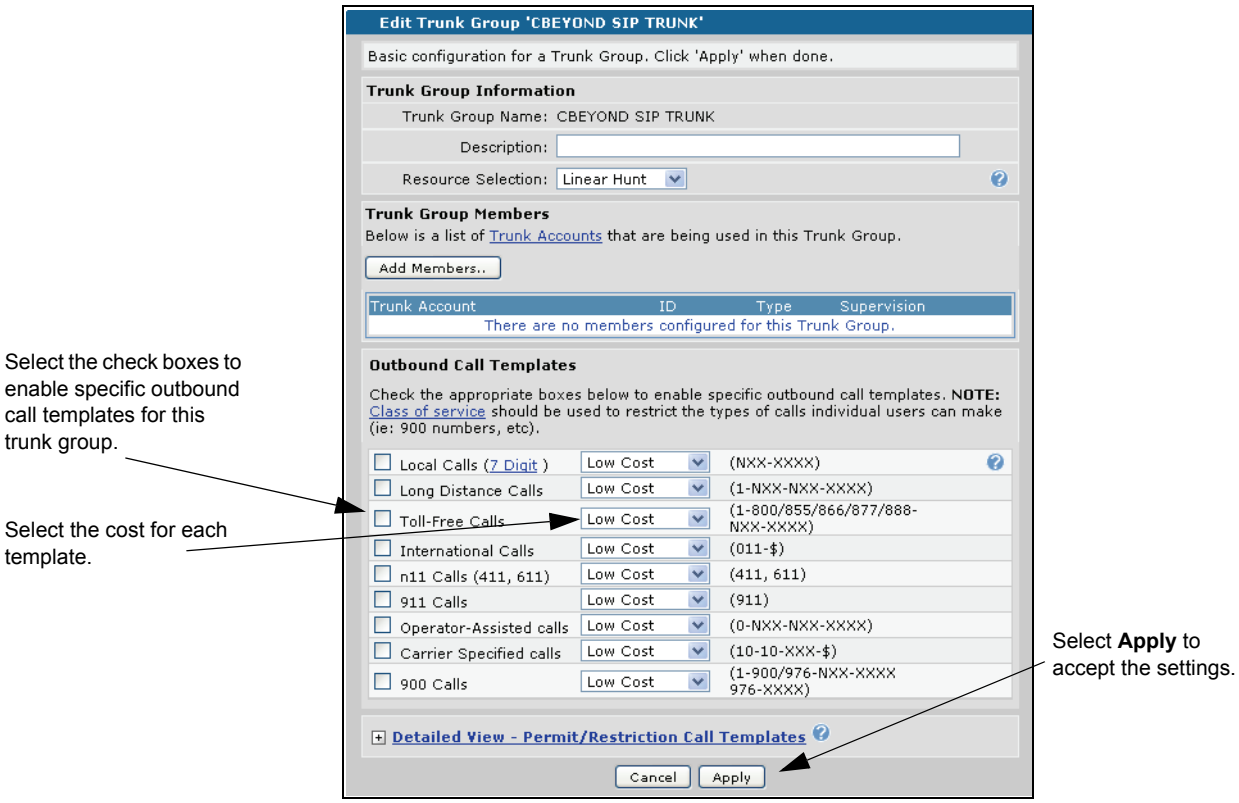
2. To add members to the trunk group, select the **Add Members** button. The **Add Members to Trunk Group** menu will appear.



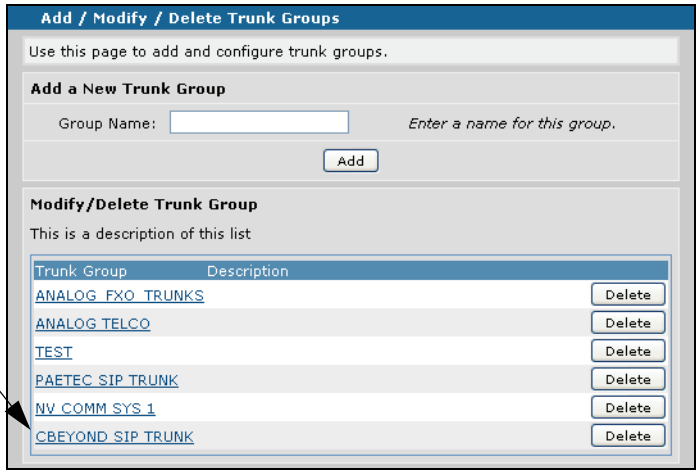
3. Add members by selecting the check box beside the name you entered for the Cbeyond SIP trunk. Select **Add Selected Trunks** to append the new member selection(s) and return to the **Edit Trunk Group** menu.



4. Scroll down in the **Edit Trunk Group** menu. Select the appropriate check boxes under **Outbound Call Templates** to enable specific templates. Outbound call templates are the types of calls to allow from this trunk. Select a cost for each template. Select **Apply** at the bottom of the menu to accept the new settings and return to the **Add/Modify/Delete Trunk Groups** menu.



5. Verify the addition of the new Cbeyond trunk group.



Create Trunk Groups Using the CLI

1. Create a new trunk group or enter the configuration command set for an existing trunk group using the **voice grouped-trunk** command.

   >enable
   #configure terminal
   (config)**#voice grouped-trunk Cbeyond SIP Trunk**

2. Add members to the trunk group:

   (config-SIP_Trunk)**#trunk T01**

3. Enable specific outbound call templates and specify a cost for each template. Outbound call templates are the types of calls to allow from this trunk.

   (config-SIP_Trunk)**#accept NXX-XXXX cost 0**