



Interoperability Guide

Configuring SIP Trunking with the NetVanta 7100 and Metaswitch MetaSphere

This document describes the steps required to configure Session Initiation Protocol (SIP) trunking between a Metaswitch MetaSphere Call Feature Server (CFS) solution and the ADTRAN NetVanta 7100 communications system. It provides an overview and instructions for the integration. Also, this guide provides lists of the required equipment and equipment connections for the integration, the features supported by the integration, and the verified functionality of the integration.

This guide consists of the following sections:

- *Metaswitch Integration Overview on page 2*
- *Hardware and Software Requirements and Limitations on page 3*
- *Verified Functionality and Exceptions on page 3*
- *Configuring SIP Trunking on the NetVanta 7100 on page 5*
- *Configuring the Metaswitch MetaSphere CFS on page 11*

Metaswitch Integration Overview

The NetVanta 7100 Communication System provides small and medium-sized businesses with a complete voice and data networking solution. The NetVanta 7100 includes an IP private branch exchange (PBX), voicemail, multilevel auto attendant, full-featured IP router, firewall, Virtual Private Network (VPN), 24-port Power over Ethernet (PoE) (802.3af) Fast Ethernet switch with Gigabit uplinks, 2 foreign exchange service (FXS) ports, 2 foreign exchange office (FXO) ports, music on hold, and two expansion slots for network interface modules (NIMs) and voice interface modules (VIMs).

Metaswitch MetaSphere is a suite of voice applications and products that provide the service provider with next-generation voice services.

The service provider provides the customer with converged voice and data services. A SIP trunk connects the NetVanta 7100 to the service provider MetaSphere CFS through a Session Border Controller (SBC) device. The SBC provides security and SIP access for devices registering to the MetaSphere CFS.

Figure 1 below illustrates a typical deployment of the NetVanta 7100 with the MetaSphere CFS.

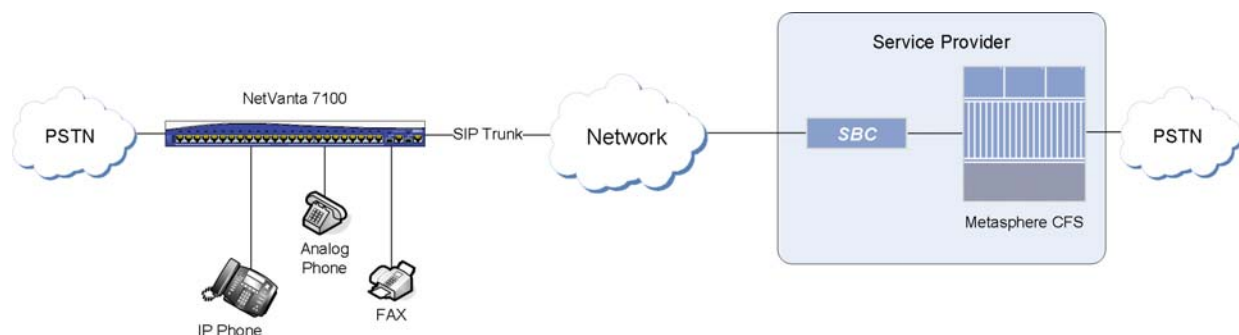
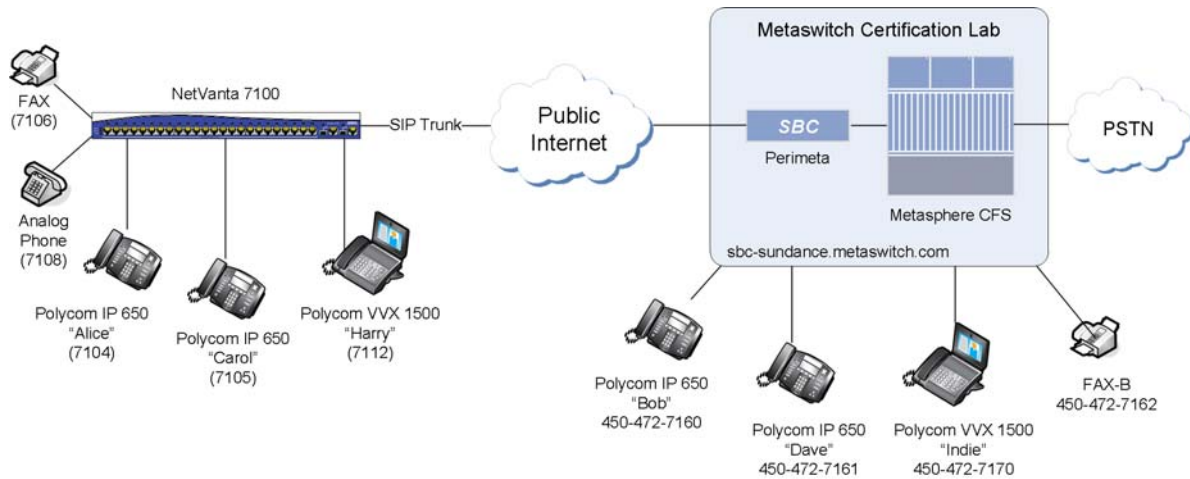


Figure 1. NetVanta 7100 SIP Trunking with Metaswitch

Interoperability Certification

The NetVanta 7100 successfully completed the Metaswitch Interoperability Certification test plan for SIP trunking. Figure 2 below illustrates the test network topology used to perform the testing. In the test network, a simulated small and medium-sized business enterprise site connects to the Metaswitch Certification Lab over the public Internet. The Metaswitch Lab included the MetaSphere CFS and the Perimeta SBC.



Hardware and Software Requirements and Limitations

The following table outlines the equipment and firmware versions used during verification testing.

Table 1. Verification Test Equipment and Firmware Versions

Equipment	Software/Firmware Version
ADTRAN NetVanta 7100	R10.6.0
ADTRAN IP 706	R2.3
ADTRAN IP 712	R2.3
Polycom IP 650 Phone	3.1.3
Metaswitch MetaSphere CFS	7.4
Metaswitch Perimeta SBC	3.3

Verified Functionality and Exceptions

The NetVanta 7100 successfully passed the Metaswitch Interoperability Certification test for SIP trunking with IP PBX devices. The following sections provide information on the supported features and exceptions of the NetVanta 7100 and Metaswitch integration. The features listed in the [Verified Functionality on page 4](#) are the interoperability features you can expect to function with the configuration provided in this guide.

Verified Functionality

The following functions were verified during interoperability testing:

- Basic endpoint functionality - inbound and outbound calling
- Basic endpoint functionality with authentication
- 3-way conference calling
- Attended call transfer
- Blind call transfer
- Calling name and number display
- Quality of Service (QoS) - Differentiated Services Code Point (DSCP) control
- Fault tolerance
- Fax transmission (G.711 direct and indirect media)
- Fax transmission (T.38 direct and indirect media)
- Metaswitch Firebar support
- G.711 CODEC operation
- G.722 CODEC operation
- G.729 CODEC operation
- Hot line - the NetVanta 7100 supports configuring auto-dialing on handset pickup for analog phones connected via FXS ports. SIP endpoints that support this feature should function.
- Music on hold
- Network Time Synchronization Protocol (NTP)
- RFC 2833 (out of band) dual-tone multi-frequency (DTMF) signaling
- Silence suppression
- Video CODEC - the NetVanta 7100 supports media from video capable endpoints.
- Voice quality monitoring (VQM) using RTP Control Protocol (RTCP) - the NetVanta 7100 will pass RTCP packets sent by SIP endpoints to the Metaswitch. The NetVanta 7100 does not generate RTCP packets.
- Auto attendant operations in both the NetVanta 7100 and Metaswitch CFS

Exceptions

The following features or functions are not supported by the integration:

- G.726-32 CODEC for sending and receiving media
- Metaswitch Home Intercom Service
- Multiparty video calls - the NetVanta 7100 does not directly support mixing video media.
- Metaswitch CFS Protection Switch - not available for verification.
- Voice quality monitoring using SIP PUBLISH - the NetVanta 7100 provides VQM support via SIP PUBLISH packets. The NetVanta 7100 VQM is not interoperable with the Metaswitch. The NetVanta 7100 supports VQM operation with the ADTRAN nCommand management system.

Configuring SIP Trunking on the NetVanta 7100

The following steps outline the configuration required on the NetVanta 7100 to create a SIP trunk to the MetaSphere CFS. For more detailed information on configuring SIP trunking on the NetVanta 7100, refer to *Configuring SIP Trunking and Networking for the NetVanta 7000 Series* available from the ADTRAN Support Community (<https://supportforums.adtran.com>).

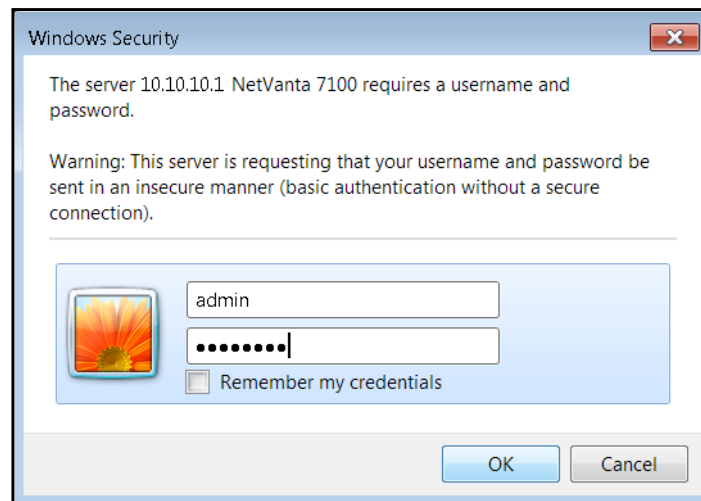
To configure the NetVanta 7100 SIP trunk, follow these steps:

1. *Log in to the NetVanta 7100 GUI as an Administrator on page 5*
2. *Set the Transfer Mode to Local on page 6*
3. *Create a SIP Trunk Account to the MetaSphere CFS on page 6*
4. *Configure a Trunk Group for the MetaSphere CFS on page 9*
5. *Configure 10-digit Dialing on page 10*
6. *Save the NetVanta 7100 Configuration on page 11*

Step 1: Log in to the NetVanta 7100 GUI as an Administrator

To log in to the NetVanta 7100 web-based graphic user interface (GUI) as an administrator, follow these steps:

1. Open a new web page in your Internet browser.
2. Enter your AOS product's IP address in the Internet browser's address field in the form **http://<ip address>/admin**, for example:
http://10.10.10.1/admin
3. At the prompt, enter your user name and password and select **OK**.



*The default user name is **admin** and the default password is **password**.*

Step 2: Set the Transfer Mode to Local

The transfer mode specifies the way in which transfers are handled. Local mode specifies that transfers are handled locally by the unit. To set the NetVanta 7100 transfer mode to local, follow these steps:

1. In the NetVanta 7100 GUI, use the navigation bar on the left side of the page to navigate to **Voice > System Setup > System Parameters**. The **System Parameters** menu will appear.
2. In the **System Parameters** menu, ensure that the **Transfer Mode** is set to **Local**.

The screenshot shows the NetVanta 7100 GUI. On the left is a navigation menu with categories: Wizard, System, Voice, Stations, Trunks, Applications, System Setup, and SIP Server Settings. The 'System Parameters' option under 'System Setup' is selected. The main content area is titled 'System Parameters' and contains a list of configuration items. The 'Transfer Mode' is set to 'Local' and is highlighted with a red rectangle. Other settings include Call Appearance Mode (Multiple), SPRE Handling Mode (Local), Codec Priority Mode (Trunk Priority), Number of Rings (4), Interdigit Timeout (4 seconds), Flashhook Mode (Interpreted), Flashhook Range (300-1000 ms), Hold Reminder Timeout (30 seconds), Park Return (60 seconds), Connected Timeout (12 hours), Alerting Timeout (5 minutes), Country Code (32), International Prefix (00), Prompt Language (English), and Companding Type (A-Law).

System Parameters	
This page contains configuration parameters for system-level items.	
Call Appearance Mode:	Multiple
SPRE Handling Mode:	Local
Transfer Mode:	Local
Codec Priority Mode:	Trunk Priority
Number of Rings:	4 <0 - 9, 0 is unlimited>
Interdigit Timeout:	4 seconds <1 - 16>
Flashhook Mode:	Interpreted
Flashhook Range:	300 1000 ms <300 - 1000>
Hold Reminder Timeout:	30 seconds
Park Return:	60 seconds
Connected Timeout:	12 hours <0 - 1000, 0 is unlimited>
Alerting Timeout:	5 minutes <0 - 60, 0 is unlimited>
Country Code:	32
International Prefix:	00 <input type="checkbox"/> Abbreviated
Prompt Language:	English
Companding Type:	A-Law

Step 3: Create a SIP Trunk Account to the MetaSphere CFS

To create a SIP trunk account to the MetaSphere CFS using the NetVanta 7100 GUI, follow these steps:

1. In the NetVanta 7100 GUI, use the navigation bar on the left side of the page to navigate to **Voice > Trunks > Trunk Accounts**. The **Add/Modify/Delete Trunk Accounts** menu will appear.

2. In the **Trunk Name** field of the **Add/Modify/Delete Trunk Accounts** menu, enter the desired name for the MetaSphere CFS SIP trunk account. Use the **Type** drop-down menu to select **SIP**, then select **Add**. The **Edit SIP Trunk** menu will appear.

ADTRAN NetVanta 7100 Save Logout

+ Wizard
+ System
+ Voice
 Stations
 User Accounts
 IP Phone Configs
 IP Phone Globals
 Ring Groups
 Operator Group
 Paging Groups
 Pickup Groups
 Trunks
 Trunk Accounts
 Trunk Groups
 Shared Line Accounts
 Applications
 Voicemail Settings
 Auto Attendants
 Audio Prompts
 Dial-By-Name Dirs
 Status Groups

Add / Modify / Delete Trunk Accounts

Use this page to add and configure trunk accounts.

Add a New Trunk Account

Trunk Name: ?

Type: ?

Modify/Delete Trunk Account

Click on a name to edit that trunk's settings.

Trunk Name	ID	Type	Role	
Analog Trunk T01	T01	Analog (Loop Start)	User	<input type="button" value="Delete"/>
Analog Trunk T02	T02	Analog (Loop Start)	User	<input type="button" value="Delete"/>
SIP Trunk	T03	SIP	User	<input type="button" value="Delete"/>

3. In the **Edit SIP Trunk** menu, select the **SIP Settings** tab.

4. In the **SIP Settings** tab, select the **Host Name** radio button next to **SIP Server Address**, and enter the fully qualified domain name (FQDN) of the MetaSphere CFS in the adjacent field. In the **SIP Server Port** field, enter **5060**. Use the **Dial String Source** drop-down menu to select **To Header**.

The screenshot shows the 'SIP Settings' configuration page. The 'SIP Settings' tab is selected. The 'SIP Server Address' section has the 'Host' radio button selected, and the 'Host Name' field contains 'fqdn.metaspherecfs.com'. The 'SIP Server Port' field contains '5060'. The 'SIP Proxy Address' section has the 'Not Set' radio button selected. The 'SIP Proxy Port' field is empty. The 'SIP Conferencing URI' field is empty. The 'Force Host Resolve' section has 'Override' and 'Enable' checkboxes, both unchecked. The 'FROM Header User Formatting' section has an 'Override' checkbox unchecked and a dropdown menu set to 'Domestic'. The 'Dial String Source' dropdown menu is set to 'To Header'.



The DNS servers on the NV7100 must be configured to resolve the FQDN of the MetaSphere CFS.

5. In the **SIP Registrar Settings** section, select the **Host Name** radio button next to **SIP Registrar Address**, and enter the FQDN of the MetaSphere CFS in the adjacent field. In the **SIP Registrar Port** field, enter **5060**. Select the **Set** button next to **Default Authentication** to specify a SIP authentication username and password. In the **User** field enter the main business telephone number provided by your service provider. In the **Password** field, enter the account password for the main business telephone number.

The screenshot shows the 'SIP Registrar Settings' window. It contains several sections: 'SIP Registrar Address' with radio buttons for 'Not Set', 'IP Address' (with a dotted IP field), and 'Host Name' (selected, with the text 'fqdn.metaspherecfs.com' in the adjacent field); 'SIP Registrar Port' with a text field containing '5060'; 'Requires Expires' with a checked 'Enable' checkbox; 'Registration Expire Time' with radio buttons for 'Server Default (3600 seconds)' (selected) and 'Request an Expire Time' (with a seconds field); 'Max Concurrent Registrations' with a text field containing '32' and a range '<1-32>'; 'Registrar Threshold' with radio buttons for 'Absolute' (selected, with fields for 0 days, 0 hours, 5 minutes, and 0 seconds) and 'Percentage' (with a percentage field); and 'Default Authentication' with radio buttons for 'Not Set' and 'Set' (selected, with 'User' field containing '4505557100' and a masked 'Password' field).

6. In the **Registration Settings** section, select the **Add Register Entry** button to add a register entry. The **Add Register Entry** menu appears.

The screenshot shows the 'Registration Settings' window. It features a table with three columns: 'Register value', 'End (if range)', and 'Authname'. The table is currently empty, displaying the message 'There are no Register entries for this Trunk.' Below the table is an 'Add Register Entry' button. At the bottom of the window are 'Cancel' and 'Apply' buttons.

7. In the **Start Value** field of the **Add Register Entry** menu, enter the main business telephone number provided by your service provider. Then, select **Add Register Entry**.

Add Register Entry

Start Value: 4505557100 ?

End Value: ?

Authentication: ☒ Not Set ☐ Set ?

User: ?

Password:

Add Register Entry Cancel

8. In the **Edit SIP Trunk** menu, select the **Apply** button to apply and save the settings to the SIP trunk account.

Step 4: Configure a Trunk Group for the MetaSphere CFS

To create a trunk group for the MetaSphere CFS, add the MetaSphere CFS SIP trunk account as a member of the trunk group, and configure the outbound call templates for the trunk group, follow these steps:

1. In the NetVanta 7100 GUI, use the navigation bar on the left side of the page to navigate to **Voice > Trunks > Trunk Groups**. The **Add/Modify/Delete Trunk Groups** menu will appear.
2. In the **Group Name** field of the **Add/Modify/Delete Trunk Groups** menu, enter the desired name for the trunk group. Then, select the **Add** button to add the trunk group. The **Edit Trunk Group** menu will appear.

ADTRAN **NetVanta 7100** [Save](#) [Logout](#)

[+ Wizard](#)
[+ System](#)
[Voice](#)
 [Stations](#)
 User Accounts
 IP Phone Configs
 IP Phone Globals
 Ring Groups
 Operator Group
 Paging Groups
 Pickup Groups
 [Trunks](#)
 Trunk Accounts
 Trunk Groups
 Shared Line Accounts
 [Applications](#)
 Voicemail Settings

Add / Modify / Delete Trunk Groups

Use this page to add and configure trunk groups.

Add a New Trunk Group

Group Name: MetaSphere *Enter a name for this group.*

Add

Modify/Delete Trunk Group

This is a description of this list

Trunk Group	Description
ANALOG FXO TRUNKS	

Delete

3. In the **Trunk Group Member** section of the **Edit Trunk Group** menu, select the **Add Members** button. The **Add Members to Trunk Group** menu will appear.

Edit Trunk Group 'METASPHERE CFS'

Basic configuration for a Trunk Group. Click 'Apply' when done.

Trunk Group Information

Trunk Group Name: METASPHERE

Description:

Resource Selection: ?

Trunk Group Members

Below is a list of [Trunk Accounts](#) that are being used in this Trunk Group.

Trunk Account	ID	Type	Supervision
There are no members configured for this Trunk Group.			

4. In the **Add Members to Trunk Group** menu, select the check box next to the MetaSphere CFS SIP trunk account that you created in *Create a SIP Trunk Account to the MetaSphere CFS on page 6*. Then select **Add Selected Trunks**. The SIP trunk account will be added as a member of the trunk group.
5. In the **Outbound Call Templates** section of the **Edit Trunk Group** menu, use the check boxes to enable the desired outbound call templates for the trunk group. Then select the **Apply** button.

Outbound Call Templates

Check the appropriate boxes below to enable specific outbound call templates. **NOTE:** [Class of service](#) should be used to restrict the types of calls individual users can make (ie: 900 numbers, etc).

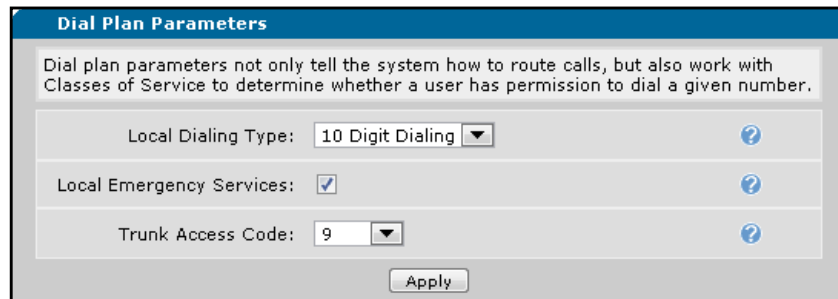
<input checked="" type="checkbox"/> Local Calls (7 Digit)	Low Cost	(NXX-XXXX)
<input checked="" type="checkbox"/> Long Distance Calls	Low Cost	(1-NXX-NXX-XXXX)
<input checked="" type="checkbox"/> Toll-Free Calls	Low Cost	(1-800/855/866/877/888-NXX-XXXX)
<input checked="" type="checkbox"/> International Calls	Low Cost	(011-#)
<input checked="" type="checkbox"/> n11 Calls (411, 611)	Low Cost	(411, 611)
<input checked="" type="checkbox"/> 911 Calls	Low Cost	(911)
<input checked="" type="checkbox"/> Operator-Assisted calls	Low Cost	(0-NXX-NXX-XXXX)
<input checked="" type="checkbox"/> Carrier Specified calls	Low Cost	(10-10-XXX-#)
<input checked="" type="checkbox"/> 900 Calls	Low Cost	(1-900/976-NXX-XXXX 976-XXXX)

Step 5: Configure 10-digit Dialing

To configure 10-digit dialing on the NetVanta 7100, follow these steps:

1. In the NetVanta 7100 GUI, use the navigation bar on the left side of the page to navigate to **Voice > System Setup > Dial Plan**. The **Dial Plan Parameters** menu will appear.

2. In the **Dial Plan Parameters** menu, use the **Local Dialing Type** drop-down menu to select **10 Digit Dialing**. Then select **Apply**.



Step 6: Save the NetVanta 7100 Configuration

To save the configurations made on the NetVanta 7100 so that they will persist after the unit is rebooted, select the **Save** button located at the top-right corner of the GUI.



Configuring the Metaswitch MetaSphere CFS

The following sections describe the MetaSphere CFS configuration required for SIP trunking with the NetVanta 7100.



This section only provides an outline for the configurations required on the MetaSphere CFS. For additional configuration support, contact a Metaswitch customer service representative at <http://www.metaswitch.com/support>.

To configure the MetaSphere CFS for SIP trunking with the NetVanta 7100, follow these steps:

1. *[Import the Remote Media Gateway Model on page 12](#)*
2. *[Configure SIP Binding on the MetaSphere CFS on page 13](#)*
3. *[Configure the Metaswitch Perimeta Session Border Controller on page 13](#)*

Step 1: Import the Remote Media Gateway Model

The Remote Media Gateway Model (RMGM) used on the MetaSphere CFS for interoperability testing with the NetVanta 7100 is shown below. This configuration should be imported into the MetaSphere CFS. For a version of this RMGM to import, contact a Metaswitch customer service representative at <http://www.metaswitch.com/support>.

```
begin MediaGatewayModel // Remote Media Gateway Model "Adtran_7100"
  Category                               SIP
  ModelName                             Adtran_7100
  Description                           Partner Cert 03/2013
  ControlProtocol                       SIP
  DefaultModel                          False
  AlertInfoStringsForDistinctiveRingingHeading  Alert-Info strings for Distinctive Ringing
  AlertInfoForDR2                       info=<Bellcore-dr2>
  AlertInfoForDR3                       info=<Bellcore-dr3>
  AlertInfoForDR4PriorityCallingLDA      info=<Bellcore-dr4>
  SignalingSettingsHeading              Signaling settings
  SupportedHighBandwidthMediaFormats    {G.711 u-law}
  LowBandwidthVoiceCodecsSupportedAsStandard {G.722 (WB),G.722.2 (AMR-WB)}
  AdvancedVoiceCodecsPermitted          Any codecs
  VideoCodecsPermitted                  Any codecs
  PacketizationInterval                 0
  SilenceSuppressionAllowed             True
  MaximumSimultaneousTransactionsOutstanding 100
  DigitOverhangTime                     250
  FixBitsMGCPMeGaCoSIPMSML             {Cannot be hub,Simple contexts,No
loopback between contexts,Cannot play ringback,Cannot control endpoint connectivity,Connections
always receive,Cannot report detection of call-type discrimination tones,T.38 supported}
  DynamicFixBitsMGCPMeGaCoSIPMSML      {Supports RTCP,Trust packet loss
statistics,Trust jitter statistics,Trust round trip time statistics}
  FixBitsSIP                            {Expects unsolicited message waiting
notifications,Supports receiving INVITEs with no SDP}
  FixBitsSIP2                           {}
  SIPResponseCodeForESAFailure          503
  ReferenceCount                         1
  UpToDateCount                          1
  ExportHeading                          Export
  StatusHeading                          Status
  RequestedStatus                        Enabled
end //MediaGatewayModel
```

Step 2: Configure SIP Binding on the MetaSphere CFS

The connection to the NetVanta 7100 is modeled as a configured SIP binding in MetaSphere CFS. The SIP binding must have the following attributes set:

Attribute	Setting
Learns contact details	True
Use caller name provided by SIP device	True
SIP authentication required	True (if required by service provider)
Trusted	True

Step 3: Configure the Metaswitch Perimeta Session Border Controller

The Metaswitch test network was protected by a Metaswitch Perimeta SBC during certification testing. The Perimeta SBC is not required as part of the solution. If a Perimeta SBC is used between the MetaSphere CFS and the NetVanta 7100, please contact a Metaswitch Networks support representative at <http://www.metaswitch.com/support> for configuration details.

If the NetVanta 7100 is configured to access the MetaSphere CFS through a Perimeta SBC, then the Perimeta SBC must be configured so that it will use a different core adjacency (i.e., the adjacency facing the MetaSphere CFS) for calls to and from the NetVanta 7100 from that used for calls to and from other devices. This adjacency must be configured to use shorter, non-reversible Call-ID headers in its SIP messages. This is necessary to support the Metaswitch CFS Protection Switch feature because the Perimeta rewrites the Call-ID header from the NetVanta 7100 resulting in a value longer than the maximum allowed on the MetaSphere CFS. This configuration should only be used on the adjacency used by the NetVanta 7100 because it conflicts with the Metaswitch VQM statistics using SIP PUBLISH.