

# AudioCodes Routing Manager (ARM)

Version 7.0



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## Notice

This *User's Manual* shows how to use the AudioCodes Routing Manager (ARM).

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## Abbreviations and Terminology

Each abbreviation, unless widely used, is spelled out in full when first used.

## Related Documentation

Manual Name
ARM Installation Manual
Mediant 9000 SBC User's Manual
Mediant 4000 SBC User's Manual
Mediant 2600 E-SBC User's Manual
Mediant SE SBC User's Manual
Mediant SE-H SBC User's Manual
Mediant VE SBC User's Manual
Mediant VE-H SBC User's Manual
Mediant 1000B Gateway and E-SBC and Mediant 1000B MSBR User's Manual
Mediant 800B Gateway and E-SBC and Mediant 800B MSBR User's Manual
Mediant 500 E-SBC User's Manual
Mediant 500L MSBR and Mediant 500 MSBR User's Manual
EMS Server IOM Manual
EMS User's Manual

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## Document Revision Record

LTRT	Description
41880	Initial release
41881	New features: Adding ADs, Users and Users Groups, Adding an LDAP Property, Adding a User, Adding a User Property, Adding a User Group, Configuring Settings, Adding Operators, Adding Routing Servers, Configuring a Syslog Server, Adding a Number Manipulation Group, Adding a Prefix Group, Adding an NTP Server, Adding a Software License, Routing
41882	New: Section 8, Migrating Media Gateway Routing

# 1 Overview

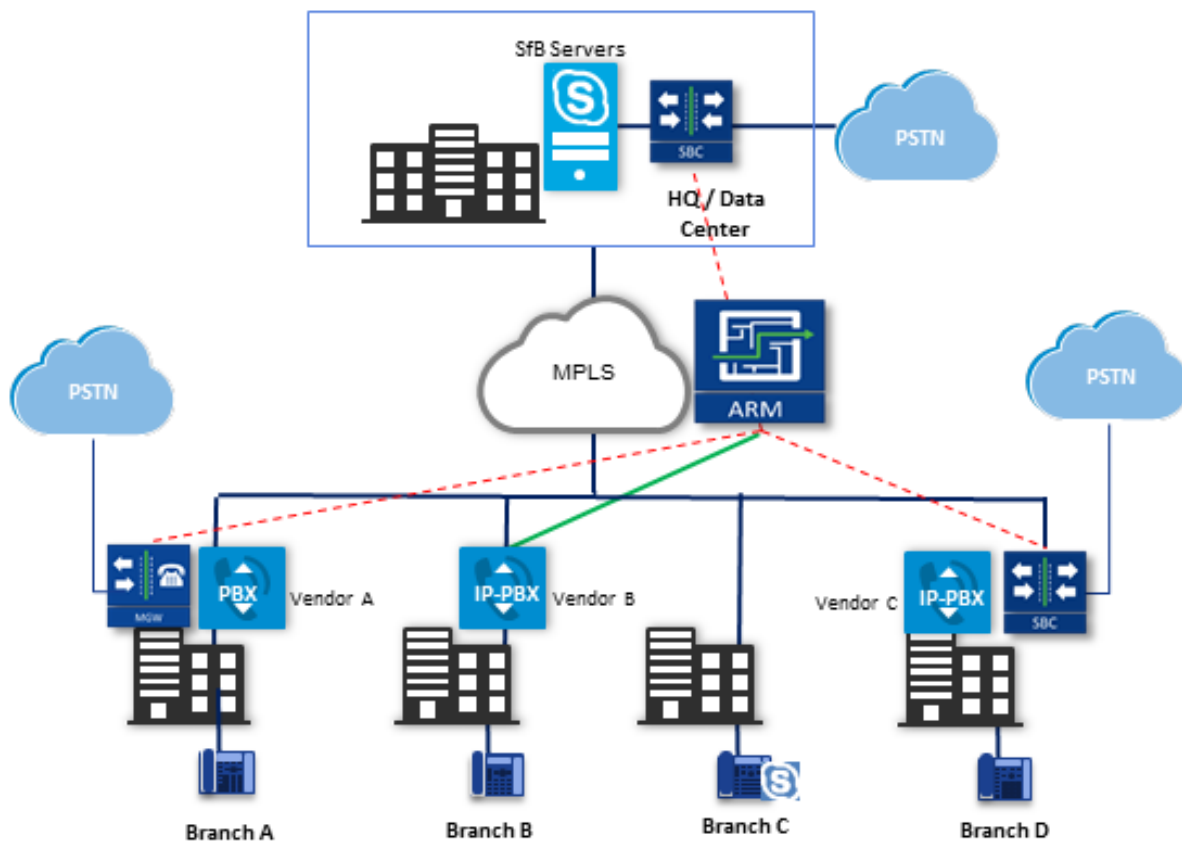
This document shows how to use the AudioCodes Routing Manager (ARM). The ARM is a LINUX-based, software-only, telephony management product which expedites and streamlines IP telephony routing for enterprises with multiple globally distributed branches. The ARM determines the quickest, least expensive, and best call quality routes in packet networks.

Routing data, previously located on the SBC, Unified Communications (UC) application (e.g., Microsoft's Skype for Business), or Media Gateway, is now located on the ARM server. If an enterprise has an SBC in every branch, a single ARM, deployed in HQ, can route all calls in the globally distributed corporate network to PSTN, the local provider, enterprise headquarters, or to the IP network.

Routing rules, configured by the IT manager in the ARM's Routing Table, perform the routing.

If an enterprise has only one or two branches, its IT manager can easily independently implement maintenance changes. In globally distributed enterprises, IT managers until now had to laboriously implement changes, multiple times, per branch. With the ARM, IT managers implement changes only once, saving significant labor and time resources and costs.

The figure below shows a typical, globally-distributed, multi-branch enterprise VoIP network.



VoIP networks like this typically require:

- Distributed routing & policy enforcement
- Distributed PSTN
- Multiple VoIP network elements configurations (i.e., SBC, Media Gateway)
- Multiple dial plans
- SIP Interworking between IP PBXs
- Large number of end users policies
- Efficient ARM routing management

## 1.1 Features

ARM features are as follows:

- Centralized, enterprise-wide session routing management
- Centralized & optimized PSTN routing
- Automatic discovery of VoIP network elements
- Smart dial plan management
  - Centralized dial plan logic; simple, clear, intuitive and easy to maintain
  - Dialing plan dry test by 'Test Route' simulation
  - Incoming number manipulation
  - Outgoing number manipulation
  - User properties manipulation
- Reduces SIP trunk costs
  - Implements Tail-End-Hop-Off Routing
  - Assigns a number of actions to routing rules with different sequence
  - Source and destination number manipulation
- Advanced routing based on user properties
- Automatic topology network generation
- Manual network generation (simply drawing lines between dots)
- On-the-fly routing calculation:
  - Centralized management of Network Routing Rules
  - Routing decision is based on source / destination call parameters, and user properties
  - Predefined weights on connections
  - User information from external Data Bases (e.g., LDAP)
  - Flexible API
- Intuitive graphical representation of the enterprise VoIP network
- Personalized Call Routing Applications
  - Communication-Enabled Business Process
  - Third-party routing applications using ARM northbound interface
  - Software-defined network architecture

- Full on-line management and routing via REST API
- Fallback to SBC routing table if call does not match ARM configuration

## 1.2 Benefits

The ARM benefits users as follows:

- Reduces operational time spent on designing and provisioning network topology
- Reduces OPEX, avoiding routing configuration of VoIP network elements
- Reduces time spent implementing network evolutions such as:
  - Adding new connections to PSTN (e.g., SIP trunks)
  - Adding new branches to the enterprise VoIP network
  - Modifying user voice services privileges

## 1.3 Simplicity

- VoIP network elements registering in the ARM
- Auto-discovery of VoIP peers
- One-click topology network creation, star formation
- One-click topology network creation, mesh formation
- Customized topology network.
  - Configuring a connection is as simple as drawing a line.
  - Modify by adding, deleting and changing connections
- ARM connects to users data base

## 1.4 ARM-Routed Devices

The following devices can be routed by the ARM:

- Mediant 9000 SBC
- Mediant 4000 SBC
- Mediant 2600 E-SBC
- Mediant SE/VE SBC
- Mediant 1000B Gateway and E-SBC and Mediant 1000B MSBR
- Mediant 800B Gateway and E-SBC and Mediant 800B MSBR
- Mediant 500 E-SBC
- Mediant 500L MSBR and Mediant 500 MSBR

## 1.5 Third-Party Open-Source Software

The following third-party open-source software is supported by the ARM:

- CentOS Linux 6.6
- Spring Framework (released under version 2.0)
- MariaDB relational database management system
- ActiveMQ (using the Apache 2.0 license)
- Hibernate (projects licensed under Lesser General Public License (LGPL) v2.1)
- Log4J (Apache License 2.0)
- Guava (Google core libraries - Apache License 2.0)
- jackson-core
- Apache Commons Logging™
- HttpClient - Apache
- XStream (Group: com.thoughtworks.xstream)
- Jersey client
- Joda-Time
- SLF4J (Simple Logging Facade for Java)
- HikariCP Java 6
- Aspectj™ extension to Java
- SNMP4J (Open Source SNMP API for Java)
- Mockito

## 2 Getting Started with the ARM

After installing the ARM and performing initial configuration (see the *ARM Installation Manual*), you can get started with the ARM.

### 2.1 Logging in

This section shows how to log in.

➤ **To log in:**

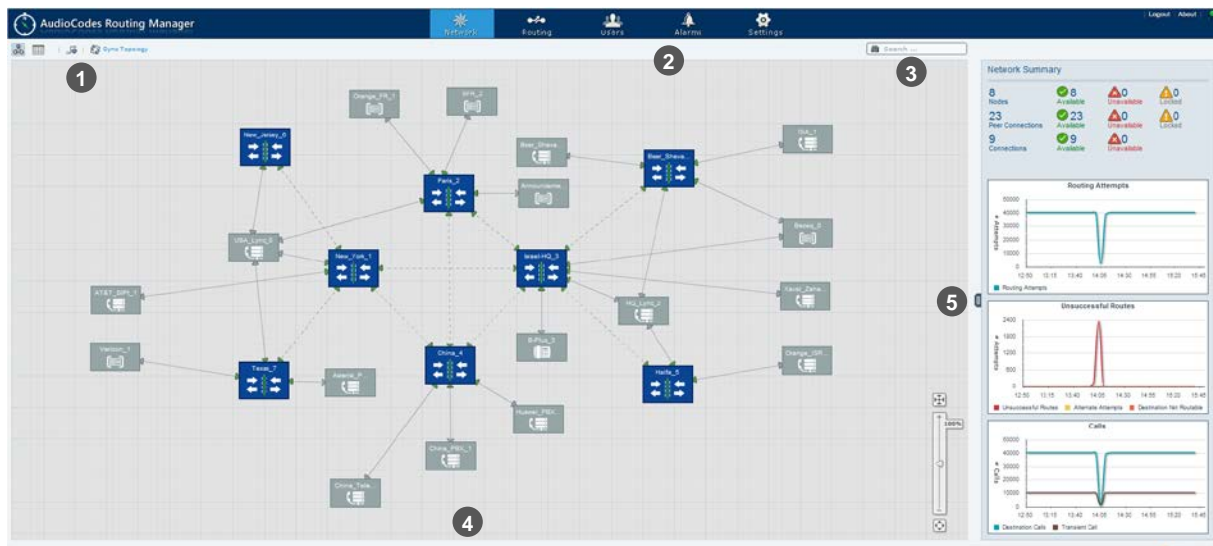
1. Point your web browser to the ARM's IP address and press Enter.
2. In the login screen that opens, log in using the default username and password (**Operator** and **Operator**). It's advisable to change these as soon as possible.

The tool opens in the Network page, Map view (default) in your browser. By default, all VoIP entities managed in the network are displayed.

### 2.2 Getting Acquainted with the ARM GUI






This section familiarizes you with the ARM GUI. The Internet browser based graphic user interface visualizes VoIP network topology and its components, providing centralized, dynamic network management and router rules and logic management. After logging in, the Network page, Map view opens by default, as shown in the figure below.

**Figure 2-1: ARM GUI - Network Page's Map View**



Use [Table 2-1](#) below as a reference to [Figure 2-1](#) shown above.

Table 2-1: ARM GUI

#	GUI Area	Description
1	Actions Bar	<ul style="list-style-type: none"> <li>▪ Map view / Table view</li> <li>▪ Add Connection</li> <li>▪ Sync Topology</li> <li>▪ Build Star Topology</li> </ul>
2	Toolbar	Toolbar icons let you navigate to the following ARM pages: 'Network' (default), 'Routing', 'Users', 'Alarms' and 'Settings'. Logout About (click to display the ARM version)  Connected or  Disconnected (read-only)
3	Search	Lets you locate specific information in the Network page's Map view and Table view, Routing page, Users page, and Settings page.
4	Main Screen	The following menus open in the main screen: <ul style="list-style-type: none"> <li>▪ Map view / Table view</li> <li>▪ Routing</li> <li>▪ Users</li> <li>▪ Settings</li> </ul>  Zoom  = Save devices locations
5	Summary Panes	Network view displays these summary panes: <ul style="list-style-type: none"> <li>• <b>Network Summary</b> <ul style="list-style-type: none"> <li>✓ Nodes (Available, Unavailable, Pre-Deleted, Locked, Unroutable)</li> <li>✓ Peer Connections (Available, Unavailable, Pre-Deleted)</li> <li>✓ Connections (Available, Unavailable)</li> </ul> </li> <li>• <b>Routing Attempts</b></li> <li>• <b>Failed Routing Attempts</b> <ul style="list-style-type: none"> <li>✓ Failed Attempts</li> <li>✓ Alternate Attempts</li> <li>✓ Discard Attempts</li> </ul> </li> <li>• <b>Calls</b></li> </ul> Click  to expand the main screen/hide the summary panes.






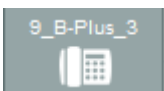
## 2.2.1 Getting Acquainted with the Network Map View

In the Network page, Map view, you can view node information and perform network map actions. Network Map view shows the four main entities that comprise the network topology:

- Nodes
- VoIP Peers
- Pcons
- Connections.

The table below explains each.

**Table 2-2: Network Page's Map View – Network Entities**

Network Entity	Icon	Explanation
Node		Indicates an AudioCodes gateway or SBC communicating with the ARM. It's part of the ARM network network topology.
VoIP Peer		Indicates a non-AudioCodes device or entity that is also part of the ARM network topology: PBXs, SIP trunks, other vendors' SBCs / gateways. These devices participate in processing ARM network calls and are connected to Nodes by 'Peer Connections'. There are four types of VoIP Peers: <ul style="list-style-type: none"> <li>• SIP Trunk</li> <li>• PBX</li> <li>• PSTN</li> <li>• IP Phone</li> </ul>
		Indicates a SIP Trunk (VoIP Peer type).
		Indicates PSTN (VoIP Peer type).
		Indicates an IP PBX (VoIP Peer type).
		Indicates an IP Phone (VoIP Peer type).

Network Entity	Icon	Explanation
Connection		Indicated by a broken line. Joins two Nodes. Calls can be routed between two Nodes only if there is a Connection between them. Defined by adding an IP Group (at Node level). From AudioCodes' gateway/SBC perspective, a 'Connection' is an 'IP Group'.
Peer Connection (Pcon)		Indicated by an unbroken line between a Node and a VoIP Peer. Represents a group of routing destinations/sources (connections to a VoIP Peer), 'last mile' connectivity. From AudioCodes' gateway/SBC perspective, a Pcon is a 'PSTN Trunk Group' or 'IP Group'.

### 2.2.1.1 Node Information and Actions

In the Network page, Map view, you can view node information and perform node actions.

➤ **To view node information:**

1. Click the node whose information you want to view; the node is framed blue and the icon pops up above the top right corner of the device.
2. Click the icon; the Information popup opens:

**Figure 2-2: Node Information**





3. Use the table below as reference.

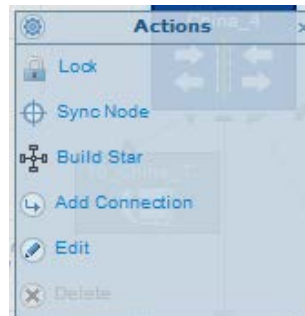
**Table 2-3: Network Page's Map View – Viewing Node Information**

Item	Description
Name	The name of the Node
Type	The type of Node
IP Address	The IP address of the Node
SW Version	The Node's software version
Administrative State	<b>Locked</b> (default) or <b>Unlocked</b> . Can be changed in the Actions popup (see the next section).
Operative State	<b>Available</b> or <b>Unroutable</b> .

➤ **To perform actions on nodes:**

1. Click the node on which you want to perform actions; the node is framed blue and the  icon pops up.
2. Click the  icon; the Actions popup opens:

**Figure 2-3: Node Actions**



3. In the Actions popup you can:
  - a. **Lock/Unlock**
  - b. **Sync Node**
  - c. **Add Connection**
    - ◆ Make sure that the relevant SIP interface in the SBC is configured as 'Used by routing server'
    - ◆ Click **Add Connection** and then click the Node *to which* to make the Connection; a line is defined to indicate that the connection was made.
    - ◆ In the Connection Definition dialog that opens, select the routing interface for Node-1 and then for Node-2, and then click **Apply**.
  - d. **Edit**. In the Node Update dialog that opens, shown in the figure below, update the credentials of the device if necessary (Name, User name and Password).

**Figure 2-4: Node Update**

- e. **Delete**. Only applies to a Node that is **Locked** and with which no routing rules are associated. If there are routing rules associated with the Node and you want to delete it, you must first delete the rules.

### 2.2.1.2 Connection Information and Actions

In the Network page, Map view, you can view connection information and perform connection actions.

➤ **To view connection information:**


1. Click the connection whose information you want to view; the connection is highlighted blue and the 'Information' popup opens.
  - [Figure 2-5](#) shows the 'Information' popup for a Connection between two Nodes (broken line).

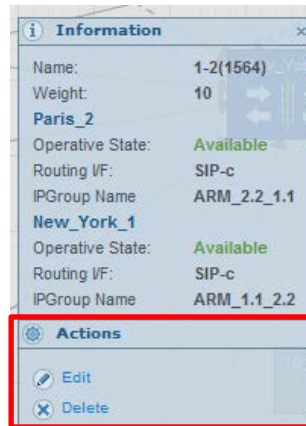
**Figure 2-5: Connection Information**



2. You can view:
  - the Name of the connection
  - its Weight (Range: 0-100. Default: 50)
  - its Operative State
  - Routing I/F
  - IPGroup Name

➤ **To perform an action on a connection:**

1. Click the connection on which you want to perform an action; the connection is highlighted blue and the 'Information' popup opens.
2. Under  Actions, you can select:
  - Edit
  - Delete

**Figure 2-6: Connection Actions**

The figure above shows the available **Actions** for a Connection between two Nodes.

3. Under Actions you can:
  - Edit the connection
  - Delete the connection

### 2.2.1.3 Peer Connection (Pcon) Information and Actions

In the Network page, Map view, you can view peer connection (Pcon) information and perform peer connection actions.

#### ➤ To view peer connection information:

1. Click the peer connection whose information you want to view; the peer connection is highlighted blue and the 'Information' popup opens.
2. View the Pcon's:
  - Name
  - Admin State
  - Operative State
  - IPGroup Name

#### ➤ To perform an action on a peer connection:


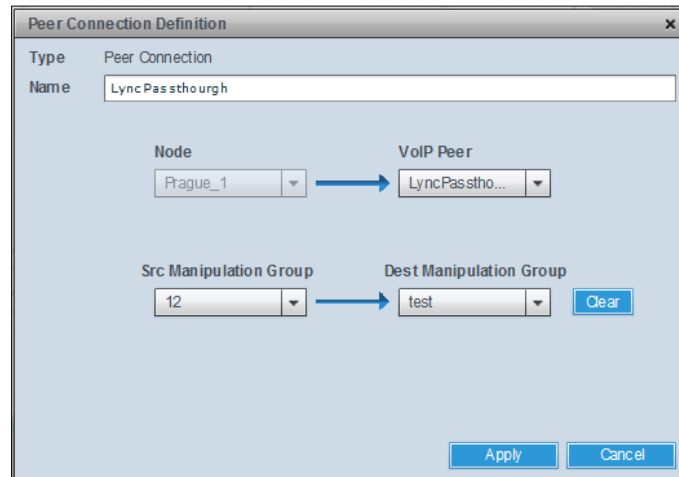
1. Click the peer connection on which you want to perform an action; the peer connection is highlighted blue and the 'Information' popup opens.
2. In the popup, under  Actions, you can select an action.

Figure 2-7: Peer Connection (Pcon) Actions



The figure above shows the available **Actions** for a Peer Connection (Pcon) joining a Node to a VoIP Peer.

3. You can:
  - Lock the Pcon (blue = locked) / Unlock the Pcon (green = unlocked)
  - Edit the Pcon:
    - a. Click the **Edit** option.



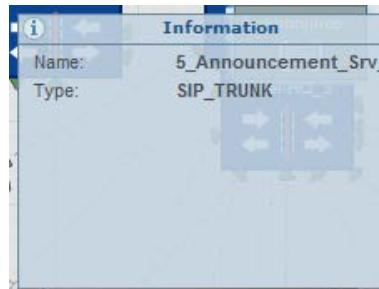
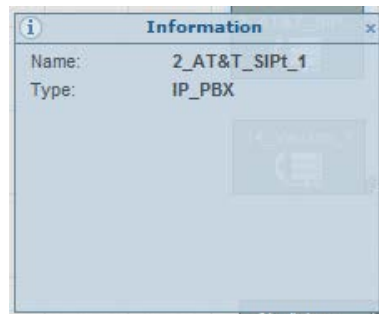
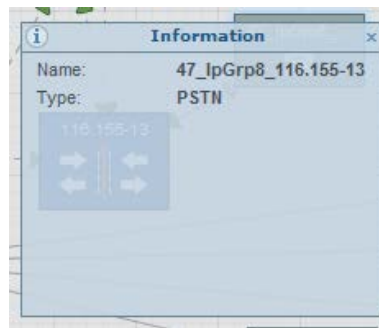
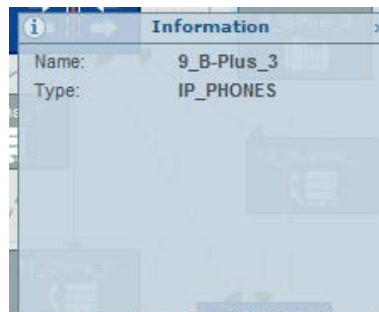
- b. Select the VoIP Peer to route to
  - c. Select the Src Manipulation Group and the Dest Manipulation Group (see Section 5.4)
- Test Route (see Section 6.3)
- Delete the Pcon

### 2.2.1.4 VoIP Peer Information and Actions

In the Network page, Map view, you can view VoIP Peer information and perform connection VoIP Peer actions. There are four types of VoIP Peers:

- SIP Trunk
- PBX
- PSTN
- IP Phone

All four types display **Name** and **Type** in the 'Information' popup.

**Figure 2-8: SIP Trunk Information****Figure 2-9: PBX Information****Figure 2-10: PSTN Information****Figure 2-11: IP Phone Information**

➤ **To perform an action on a VoIP Peer:**


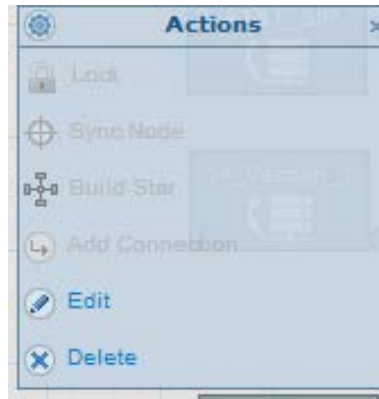
1. In the Network page, Map view, click the VoIP Peer on which you want to perform an action; the VoIP Peer is framed blue.
2. Click the  icon now displayed above the VoIP Peer; the 'Actions' popup opens. All the 'Actions' popup menus for all the VoIP Peers are identical.

Figure 2-12: VoIP Peer Actions



3. In the Actions popup menu you can:

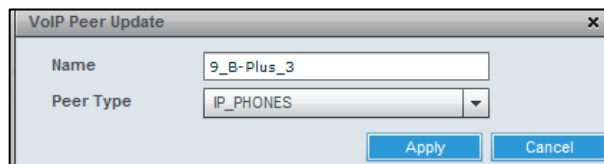
- a. Lock/Unlock
- b. Sync Node
- c. Build Star
- d. Add Connection

Select the option and then click the VoIP Peer to which to make the Connection; a line is defined to indicate that the connection was made.

e. Edit

In the VoIP Peer Update dialog that opens, shown in the figure below, update the credentials of the device if necessary (Name, User name and Password).

Figure 2-13: VoIP Peer Update



- f. Delete. Only applies to a VoIP Peer that is **Locked** and with which no routing rules are associated. If there are routing rules associated with the VoIP Peer and you want to delete it, you must first delete the rules.

## 2.2.2 Getting Acquainted with Network Table View

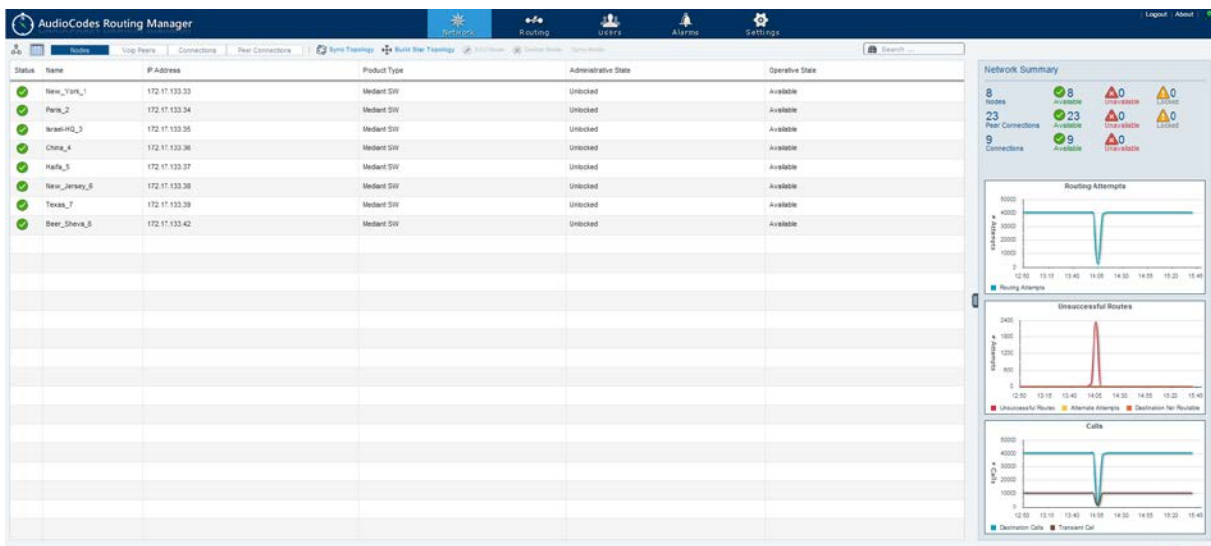
This section describes the Network page's Table view. The view displays four tab options:

- Nodes (default) (see [Figure 2-14](#))
- VoIP peers (see [Figure 2-15](#))
- Connections (see [Figure 2-16](#))
- Peer Connections (see [Figure 2-17](#))

### 2.2.2.1 Viewing Nodes

You can view nodes if they've been defined.

**Figure 2-14: ARM GUI - Network Page's Table View - Nodes**



The table below describes the Network page's Table view - Nodes columns.

**Table 2-4: Network Page's Table View - Nodes**

Column	Description
Name	The name of the node
IP Address	The IP address of the node
Product Type	AudioCodes' Mediant SBC device or Media Gateway device
Administrative State	<b>Locked</b> (default) or <b>Unlocked</b> . Can be changed in the Actions popup.
Operative State	<b>Available</b> or <b>Logout</b> .

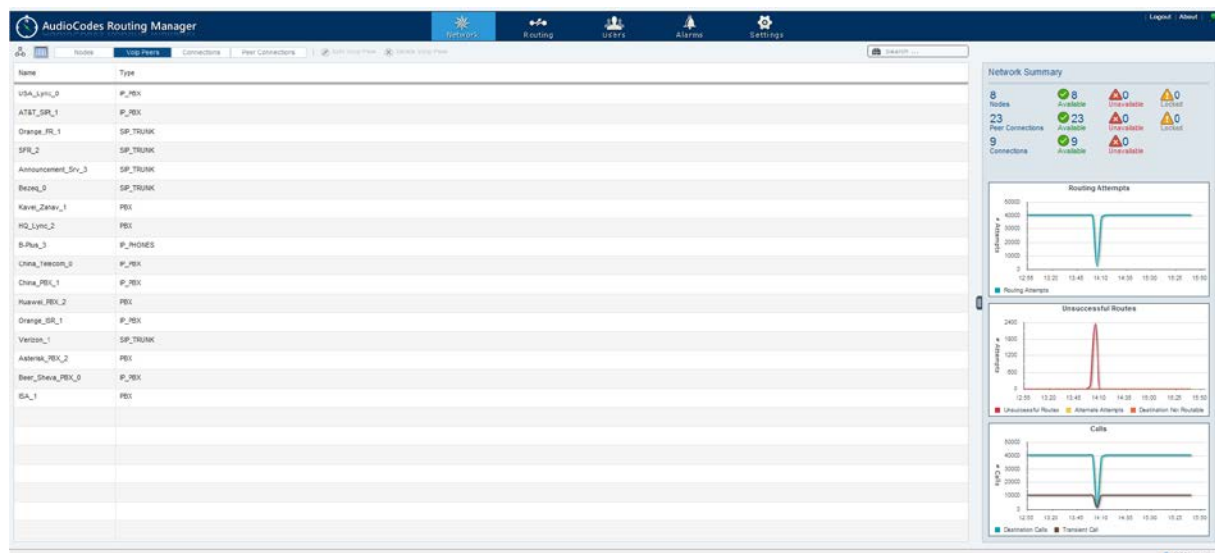
### 2.2.2.2 Viewing VoIP Peers

You can view VoIP Peers.

➤ **To view VoIP Peers:**

1. In the Network page's Table view, click the **VoIP Peers** tab.

**Figure 2-15: ARM GUI - Network Page's Table View – VoIP Peers**



2. Use the table below as reference to the VoIP Peers columns.

**Table 2-5: Network Page's Table View - VoIP Peers**

Column	Description
Name	The name of the VoIP peer
Type	The type of VoIP peer. Example: IP PBX, PBX, SIP Trunk, IP Phones

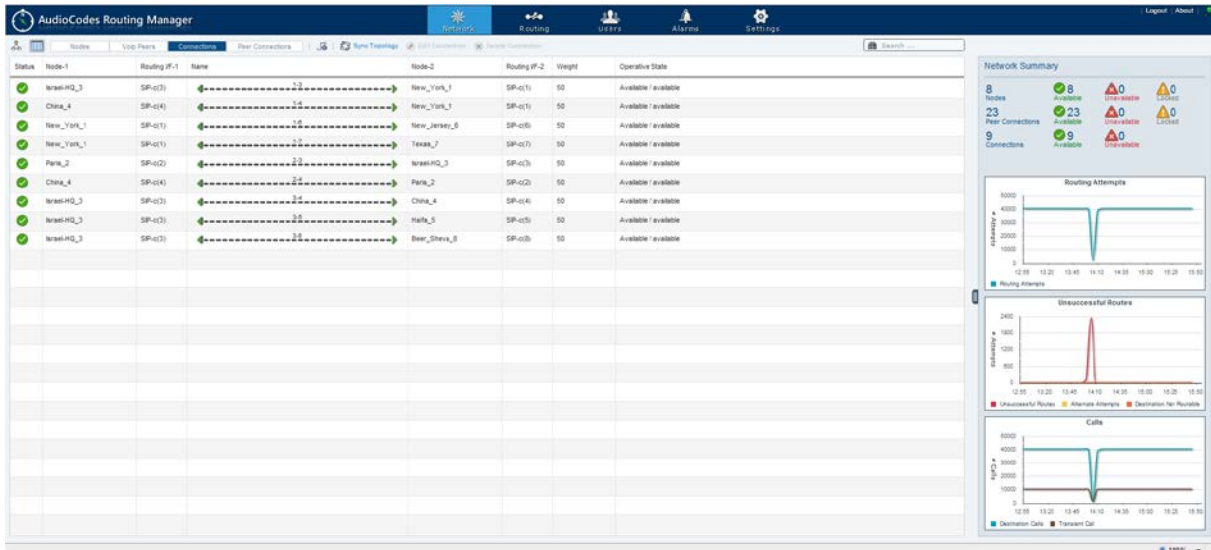
### 2.2.2.3 Viewing Connections

You can view Connections.

➤ **To view Connections:**

1. In the Network page's Table view, click the **Connections** tab.

**Figure 2-16: ARM GUI - Network Page's Table View – Connections**



2. Use the table below as reference to the Connections columns.

**Table 2-6: Network Page's Table View - Connections**

Column	Description
Node-1	The name of the connected device
Routing I/F-1	The IP address of the above connected device
Name	The name of the connection
Node-2	The name of the device to which Node-1 is connected
Routing I/F-2	The IP address of the device to which Node-1 is connected
Weight	The weight of the connection. Range: 0-100. Default: 50
Operative State	The Operative State of each of the connected devices. <b>Available</b> or <b>Unavailable</b> .

To add a connection, see Section 3.1.

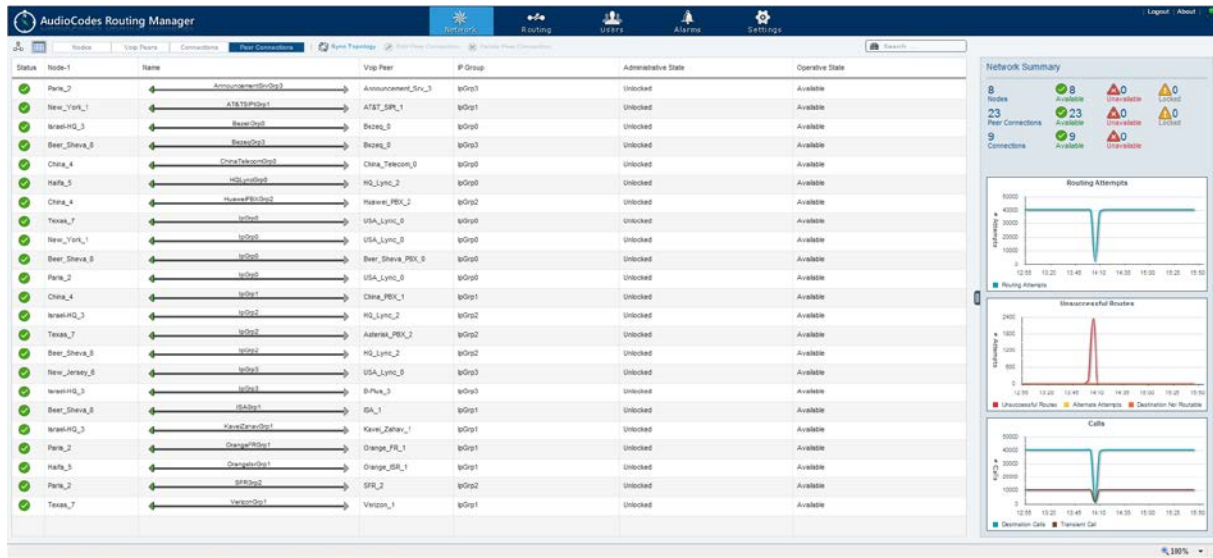
### 2.2.2.4 Viewing Peer Connections

You can view Peer Connections.

➤ **To view Peer Connections:**

1. In the Network page's Table view, click the **Peer Connections** tab.

Figure 2-17: ARM GUI - Network Page's Table View - Peer Connections



2. Use the table below as reference to the Peer Connections columns.

Table 2-7: Network Page's Table View – Peer Connections

Column	Description
Node-1	The name of the connected device
Routing I/F-1	The IP address of the above connected device
Name	The name of the connection
VoIP Peer	The name of the VoIP peer
Administrative State	The Administrative State of the VoIP peer. Locked or Unlocked.
Operative State	The Operative State of each of the connected devices. <b>Available</b> or <b>Unavailable</b> .

## 3 Defining a Network

The ARM features auto-detection capability. It automatically detects and discovers network entities, thereby facilitating defining actions almost immediately.




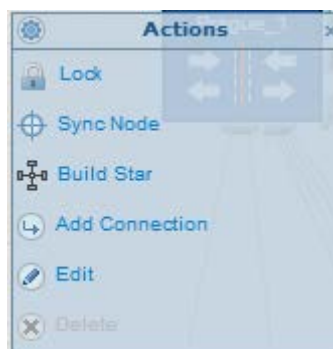
**Note:** Operators should not modify the SBC-level / gateway-level configuration of the connections created by the ARM. It will disrupt routing decisions/performance.


### 3.1 Adding Connections

You can define a connection between two nodes.

➤ **To add a connection:**

1. In the Network page's Map view, select the node from which to define the connection, click the  icon and then from the Actions popup select **Add Connection**

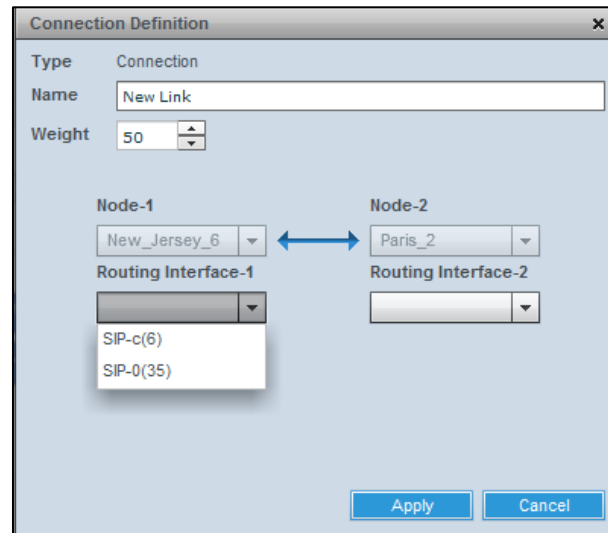


The dialog shown in the figure below opens. Alternatively, in the Network page's Table view, under the **Connections** tab, click the  **Add Connection** icon.

**Figure 3-1: Defining a Connection**

2. Provide an intuitive name for the connection to facilitate user-friendly management in the ARM GUI.
3. Select the weight. Default: 50. Range: 0-100.
4. Select the Node-1 and its routing interface, select Node-2 and its routing interface, and then click **Apply**; the connection is made.

**Figure 3-2: Defining a Connection**



5. Click **Apply** and **Close**.

## 3.2 Synchronizing Topology

The Sync Topology feature allows you to perform *manual* synchronization *per node*.


It's important that node status is fully synchronized with the ARM server *at all times* for the ARM GUI to display the node successfully and for routing to be performed correctly.

For a Mediant SBC / Media Gateway to be displayed in the ARM GUI, you need to point it to the ARM server IP address using the Web interface.

The ARM auto-discovers all network elements such as Nodes, Peer Connection and VoIP Peers, and displays them in the Network page's Map view. The ARM detects activity originating from the node and puts it on the map (peer collection). The ARM recognizes a newly added node and extracts all IP groups (i.e., peer connections). Users must add connections between nodes (see the previous section).

If a node's status is modified, the ARM detects the change when synchronization is performed, and automatically maps it. When synchronizing, the ARM goes to each node and gets all the names and statuses of connections, and compares them to what it already knows. The Sync Topology feature therefore makes sure that the ARM is fully identified with the node's identifiers: IP address, credentials, node type, software version.

### ➤ To sync:

- Click the  **Sync Topology** icon on the actions bar; synchronization is performed.


### 3.3 Building Star Topology

You can build a star topology. In a star topology, every node ('client') is connected to a central node ('server').



All VoIP traffic transitions through the central node. Advantage: It's easy to add more nodes. Disadvantage: there's a single point of failure, namely, the central node.

➤ **To build a star topology:**

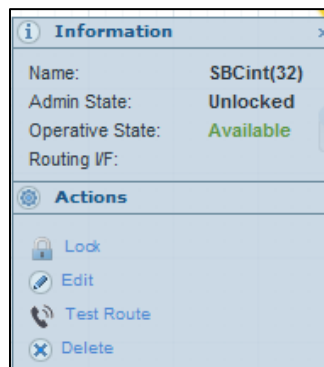
- Click the  **Build Star Topology** icon on the actions bar; the topology is built.


### 3.4 Testing a Route

You can test a route to make sure it performs according to expectations.

➤ **To test a route:**

1. In the Network page, click the **Peer Connections** link in the Network Summary pane.
2. Click the call source; the menu shown below pops up.



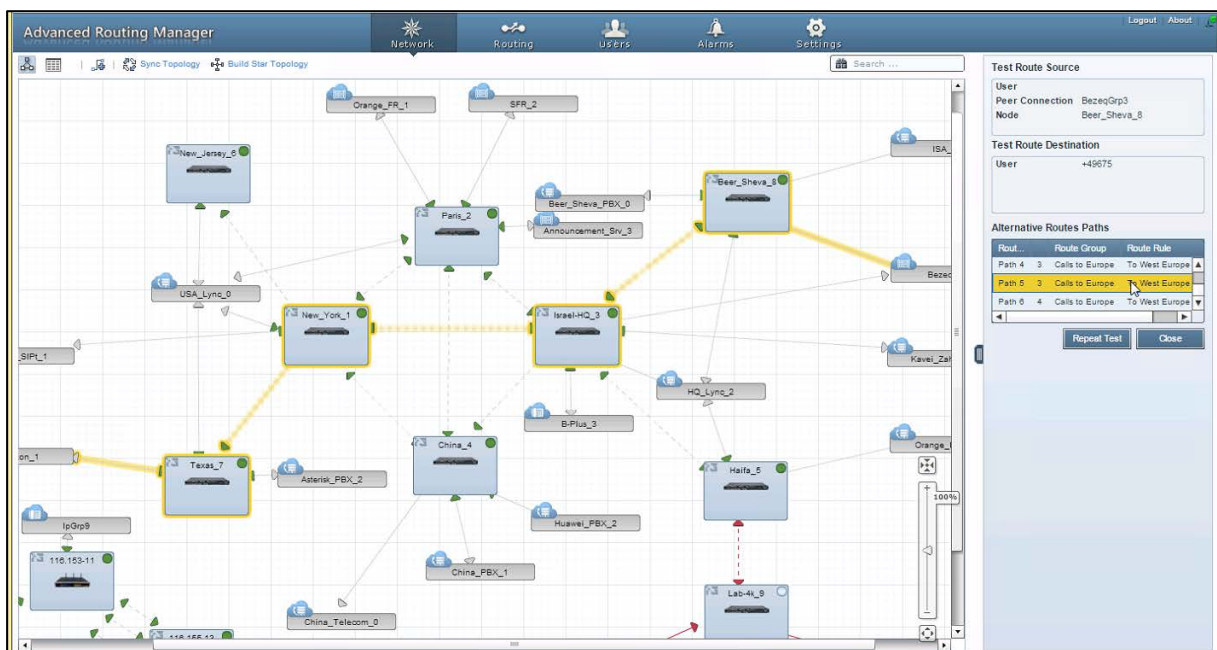
3. Select the  **Test route** option. Test routing is performed precisely as if a real call is occurring, taking the Operative State and Admin State of topology elements (connections, nodes, PCons), and the Admin State of routing rules into account.

The Test Route screen opens.

Figure 3-3: Test Route

4. Enter the Source call parameters.
5. Enter the Destination call parameters, and then click **Find Routes**.

Figure 3-4: Find Routes



All pcons are highlighted yellow.

## 4 Adding ADs, Users and Users Groups

The Users page in the ARM allows the network administrator to add

- Active Directories
- Users
- Users Groups

Enterprises have databases in which employee information is stored. Enterprises generally store information related to employees on Microsoft's Active Directory (AD) server. The ARM supports multiple ADs. LDAP protocol allows network administrators to add the following to the ARM database:

- an AD
- a user
- a new user property
- a new value for a user property
- a users group based on a property and its value, or based on a combination of properties and their values

### 4.1 Adding an AD


Network administrators can add multiple Active Directories to the ARM database.

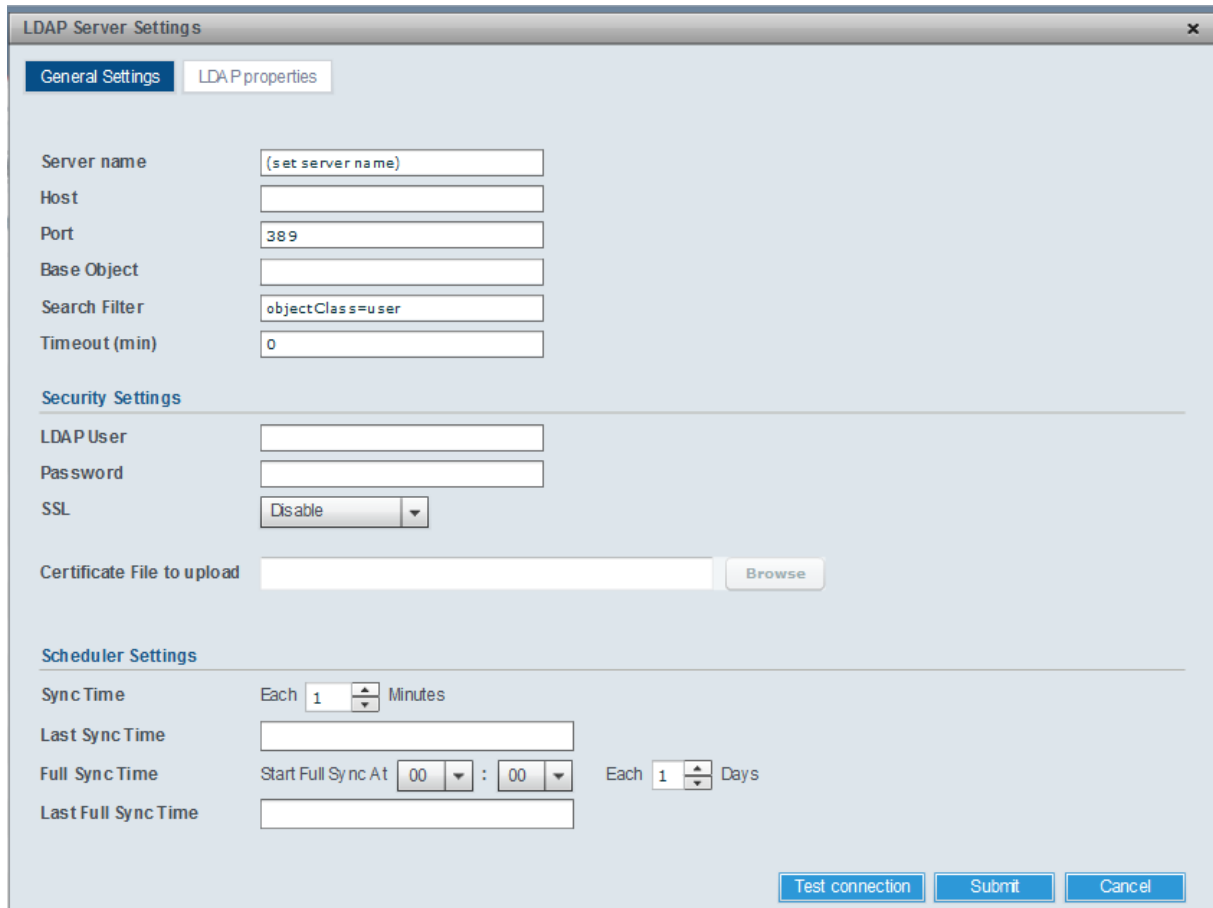
➤ **To add an AD:**

1. Click the Users menu; the Users page opens by default under the **Active Directories** tab.

**Figure 4-1: Users Page – Active Directory tab**

Status	Server name	Host	#Users	Port	SSL	Sync Time (min)	Full Sync (hour)	Full Sync (min)	Full Sync Interval (da)	Last Successful Sync Time	Last Successful Full Sync Time
✓	AUCD	adcs01.camp.audiocodes.com	450	389	Disable	2	4	0	1	14:01:19 Feb 25	22:00:00 Feb 27
✓	DFL_Web	10.8.94.43	15	389	Disable	1	0	0	1	10:07:27 Mar 24	22:00:00 Mar 23

2. Click the icon  Add; the LDAP Server Settings open.

**Figure 4-2: LDAP Server Settings**


3. Configure the settings using the table below as reference.

**Table 4-1: LDAP Server Settings**

Setting	Description
Server name	Enter an intuitive name for the LDAP server.
Host	The IP address or DNS name of the machine on which the AD is located.
Port	The AD port. Default: 389
Base Object	<p>Consult your IT manager responsible for the Active Directory in your enterprise. The setting defines the full path (DN) to the object in the AD tree where the user's information is located. The valid value is a string of up to 256 characters. Example (read from right to left):</p> <p>ou=Users;ou=APC;ou=Israel;ou=AudioCodes;dc=corp;dc=audiocodes;dc=com</p> <p>The DN path is defined by the LDAP names OU (organizational unit) and DC (domain component).</p>

Setting	Description
Search Filter	Lets you search for a base object (distinguished name or DN, e.g., "ou=ABC,dc=corp,dc=abc,dc=com"), which defines the location in the directory from where the LDAP search begins.
Timeout (min)	If the AD server doesn't answer within the period set, the ARM server determines that the AD server is disconnected and a refresh is sent.
<b>Security Settings</b>	
LDAP User	Defines the LDAP user. For example: <a href="mailto:ldap_bind@corp.audiocodes.com">ldap_bind@corp.audiocodes.com</a>
Password	Defines the LDAP password used in order to connect.
SSL	Enables or disables the connection over SSL. Default: Disable. When disabled, communications with the AD server will be open, i.e., unencoded/unencrypted. When left unchanged at the default; the <b>Browse</b> button adjacent to 'Certificate File to Upload' will be unavailable; when enabled, the <b>Browse</b> button becomes available.
Certificate File to Upload	Enables verification that it is the AD server and no other entity that is communicating with the ARM server. Allows you to browse for a root certificate. When the AD server then sends a certificate, the ARM server uses the root certificate to verify that it is the AD server and no other entity on the other side. Following verification, communications are SSL-encoded.
<b>Scheduler Settings</b>	
Sync Time	Lets you schedule synchronization of the ARM and AD databases. Sets the synchronization frequency. Select from the range of 1-48, i.e., every hour (most frequent) to once every two days (most infrequent).
Last Sync Time	Displays the last time the ARM and the Active Directory databases were synchronized.
Full Sync Time	Sets the time (hour and minute) at which to start a full synchronization. Also sets the frequency. You can select from a range of 1-7, i.e., once a day (most frequent) to once a week (most infrequent).
Last Full Sync Time	Displays the last time the ARM and the Active Directory databases were fully synchronized.
Test Connection	Click the button to test ARM server - AD server communications.

4. Click the **Submit** button.

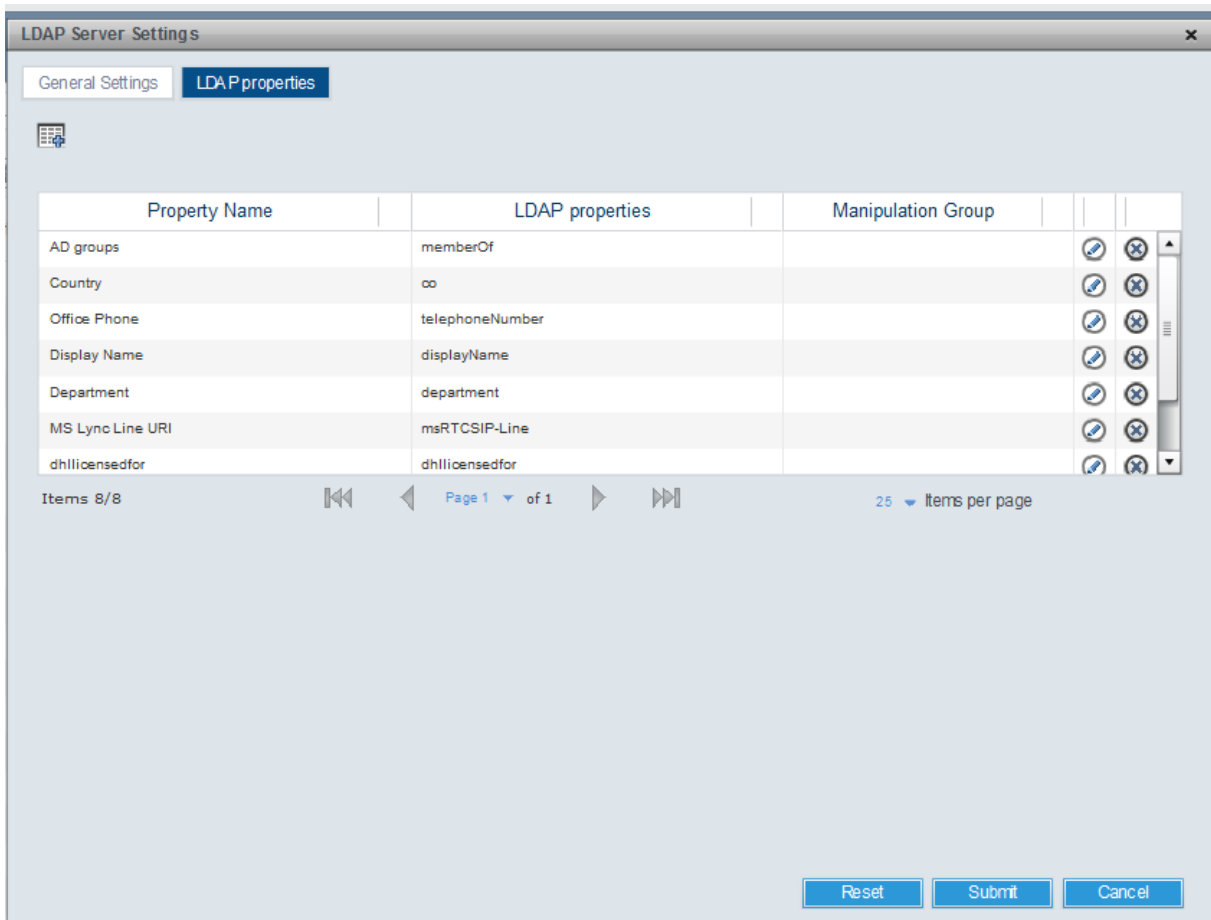
## 4.2 Adding an LDAP Property

Network administrators can add an LDAP property.

➤ **To add an LDAP property:**

1. In the LDAP Server Settings page, click the **LDAP Properties** tab.

**Figure 4-3: LDAP Properties**




2. Click the icon Add.

**Figure 4-4: Add LDAP Property**

3. Add the property using the table below as reference.

**Table 4-2: Add LDAP Property**

Setting	Description
Property Name	From the dropdown, select the AD property name.
LDAP property	From the dropdown, select the LDAP property to be added.
User defined LDAP property	Select the option if the LDAP property is <i>user-defined</i> , in contrast to a <i>default</i> AD property.
Manipulation Group	From the dropdown, select a Manipulation Group, configured as shown in Section 5.4.

4. To edit an LDAP property, access the LDAP Properties screen and click the icon  adjacent to the property to edit. Before editing an LDAP property, make sure number manipulation is defined (see Section 5.4).

**Figure 4-5: Edit LDAP Property**

5. Edit the LDAP property using the table above as reference.

## 4.3 Adding a User

Network administrators can add users to the ARM database.

➤ **To add a user to the ARM database:**

1. In the ARM's Users page, click the **Users** tab; the Users page opens.

**Figure 4-6: Users Page – Users tab**

Name	Origin	Country	Office Phone	Display Name	Department	MS Lync Line URI	@licenseaddr	testattr	test	otherTel
abikim	DH_Jar		38888877	abikim						
abirahang	AUCG	Israel	+97239764095	Abraham Goldblid	Global Services - Customer Supp	+97239764095@972397640	*	*		
AdiD	AUCG	Israel	+97239764184	Adi Goldberg	Operations - Supply Chain	+97239764184@972397641				
AdiR	AUCG	Israel	+97239764147	Adi Rubinatam	Human Resources & Logistics	+97239764147@972397641				
AdinA	AUCG	Israel	+97239764346	Adina Amir	Operations - IT Applications	+97239764346@972397643				
Alan	AUCG	Israel	+97239764263	Alan Roberts	Product - Product Marketing	+97239764263@972397642				
AlbertOC	AUCG	Israel	+97239764282	Alberto Castro	Operations - Supply Chain	+97239764282@972397642				
Alexa	AUCG	Israel	+97239764678	Alex Aganov	R&D - SW	+97239764678@972397641				
AlexE	AUCG	Israel	+97239764165	Alex Leshiv	RC - R&D	+97239764165@972397641				
AlexR	AUCG	Israel	+97239764185	Alex Rodkov	R&D - GA	+97239764185@972397641				[[
AlexS	AUCG	Israel	+97239764542	Alex Stochewy	RC - R&D	+97239764542@972397645				
Alyep	AUCG	Israel	+97239764336	Alysa Pevig	R&D - Solutions	+97239764336@972397643				
AlonM	AUCG	Israel	+97239764168	Alon Moses	RC - R&D	+97239764168@972397641				
Alon	AUCG	Israel	+97239764258	Alon Ripan	Global Services - Customer Supp	+97239764258@972397642				
AlonS	AUCG	Israel	+97239764182	Alon Steiner	Operations - Supply Chain	+97239764182@972397641				
Alony	AUCG	Israel	+97239764731	Alon Yehav	Operations - IT Applications	+97239764731@972397641				
Ami	AUCG	Israel	+97239764603	Ami Leshv	RC - R&D	+97239764603@972397644				
Amir	AUCG	Israel	+97239764636	Amir Klein	R&D - GA	+97239764636@972397643				[[
Amira	AUCG	Israel	+97239764611	Amir Kagan	Operations - IT Infrastructure	+97239764611@972397641				
AmirA	AUCG	Israel	+97239764605	Amir Kuznetz	Operations - Engineering	+97239764605@972397645				
AmirM	AUCG	Israel	+97239764651	Amir Natan	R&D - Hardware	+97239764651@972397643				[[
AmirZ	AUCG	Israel	+97239764603	Amir Zmira	Management	+97239764603@972397645				
AmosB	AUCG	Israel	+97239764604	Amos Buzil	R&D - SW	+97239764604@972397643				
Amotz	AUCG	Israel	+97239764162	Amotz Miller	RC	+97239764162@972397641				
AnatolyC	AUCG	Israel	+97239764347	Anatoly Kapustin	Global Services - Customer Supp	+97239764347@972397643				

2. Click the icon Add; the User Details screen open.

Figure 4-7: User Details

The screenshot shows a 'User Details' dialog box with the following fields and controls:

- Close button (x) in the top right corner.
- User icon in the top left.
- Text input fields for 'User name' and 'Origin'.
- Two tabs: 'Contact' (active) and 'Groups'.
- Text input fields for: 'AD groups', 'Country', 'Office Phone', 'Display Name', 'Department', 'MS Lync Line URI', 'dhlicensedfor', 'testattr', 'test', and 'otherTel'.
- 'Submit' and 'Cancel' buttons at the bottom right.

User Details are taken from the Properties Definition screen. If a property is added in the Properties Definition screen, it appears here. To add a property, see Section 4.4.


3. Click **Submit**; the user is added and displayed in the Users page. To view and/or edit, click the icon  **Show user details** adjacent to the listed user; the screen shown in Figure 4-8 is displayed.

Figure 4-8: Show User Details

The screenshot shows a 'User Details' window with the following fields and values:

- User name:
- Origin:
- Buttons: **Contact** (selected), Groups
- AD groups:
- Country:
- Office Phone:
- Display Name:
- Department:
- MS Lync Line URI:
- dhlicensedfor:
- testattr:
- test:
- otherTel:

Buttons:



**Note:**

- Yellowed fields indicate default AD properties that cannot be edited.
- White fields are AD properties that have been added and can be edited.

## 4.4 Adding a User Property

This section shows how to add an AD user property to the ARM database.

➤ **To add an AD user property:**

1. In the Users page, under the **Users** tab or under the **Active Directories** tab, click the **Properties Definition** tab.

**Figure 4-9: Properties Definitions**

Name	Description	Default LDAP property	Dialable	Display in User:
AD groups		memberOf	false	false
Country		o	false	true
Department		department	false	true
Display Name		displayName	false	true
MS Lync Line URI		msRTCSIP-Line	true	true
Office Phone		telephoneNumber	true	true
dhllicensedfor	Custom Attribute	dhllicensedfor	false	true
otherTel		otherTelephone	true	true
test			true	true

2. Click the icon Add.

**Figure 4-10: User Properties**

User Profile Items

Name

Description

Default LDAP property

Dialable

Display in Users Table

3. Configure the user properties using the table below as reference.

**Table 4-3: User Properties**

Setting	Description
Name	Define an intuitive name for the user property, for intuitive future reference.
Description	Enter a brief description of the user property, for intuitive future reference.
Default LDAP property	Defines the name of the user property in the AD. Leave empty if you want to define the property locally, in the ARM database, using the User Details screen (see <a href="#">Figure 4-7</a> ).
Dialable	Selected by default. Of all the user properties in the AD, the user's telephone number is the most important because the user is identified according to it. The ARM processes user properties to determine dialability, i.e., if it's a telephone number. If it is, the ARM attempts to determine if the number belong to a group, and if it does, to which. The ARM converts the number to a name for source <i>and</i> destination identity.
Display in Users Table	Select the option in order to display the user property in the Users page. The option can be used to reduce clutter on the Users page.

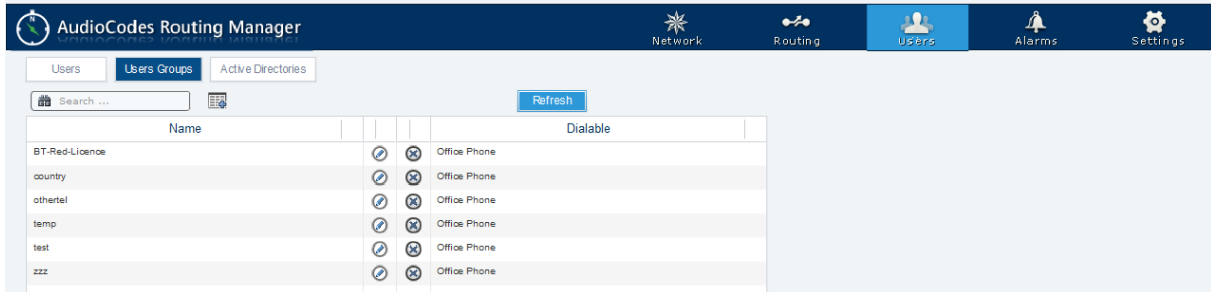
## 4.5 Adding a User Group

This section shows how to add a user group to the ARM database.

➤ **To add a user group:**

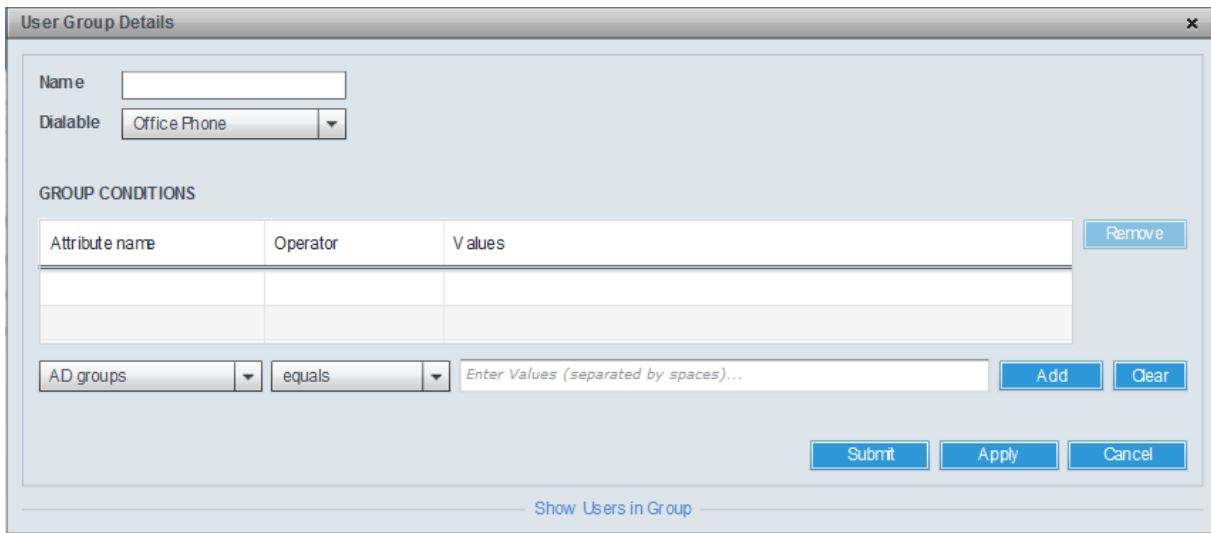
1. In the Users page, click the **Users Groups** tab.

**Figure 4-11: Users Groups**



2. Click the **Add** icon

**Figure 4-12: User Group Details**



3. Configure the details using the table below as reference.

**Table 4-4: User Group Details**

Setting	Description
Name	Enter a name for the group for intuitive future reference.
Dialable	From the dropdown, select the property whose value is dialable, that is, whose value is a phone number. Of all the user information in the AD, the user's telephone number is the most important because the user is identified according to it. The ARM processes user information to determine if it is dialable, i.e., if it is a telephone number. If it is, the ARM attempts to determine if the number belong to a group, and if it does, to which. The ARM converts the number to a name for source and destination identity.
AD groups	From the dropdown, select an AD property according to which the user will be associated with the group. For example: Country. The user can be associated with a group according to one AD property or a combination of AD properties.
equals / not equals contains / not contains	From the dropdown, select the operation to be used to define the criterion.
Value	From the dropdown, select a value for the AD property, according to which the user will be associated with the group. For example: Sweden

4. Click **Apply** and then **Submit**.

## 5 Configuring Settings

The Settings page allows you to perform the actions listed below. The page displays a tab for each action:

- Operators (see the section below)
- Routing Servers (see Section 4)
- Syslog (see Section 4)
- Number Manipulation (see Section 5.4)
- Prefix Groups (see Section 5.5)
- NTP Servers (see Section 5.6)
- Software License (see Section 5.7)
- Routing (see Section 5.8)

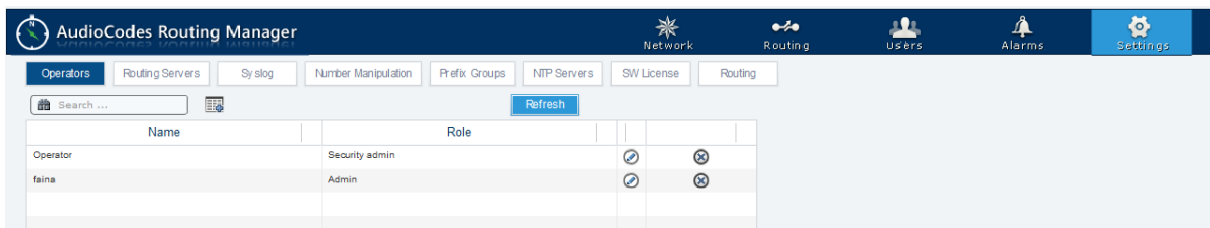
### 5.1 Adding Operators


This section shows how to add an operator (i.e., IT manager or network administrator).

➤ **To add an operator:**

1. In the Settings page, click the **Operators** tab.

**Figure 5-1: Operators**



2. Click the icon Add .

**Figure 5-2: Operator Details**

**Operator Details** ✕

Name

Password

Password confirm

Role  ▼



3. Configure the server details using the table below as reference.

**Table 5-2: Server Details**

Setting	Description
Name	Enter a name for the ARM Router (routing server).
Address	Enter the IP address for the ARM Router (routing server).
Port	Enter the port number for the ARM Router (routing server). Default = 80.
Protocol	From the 'Protocol' dropdown, select: <ul style="list-style-type: none"><li>• HTTP -or-</li><li>• HTTPS</li></ul>

4. Click **Submit**; the routing server is added.

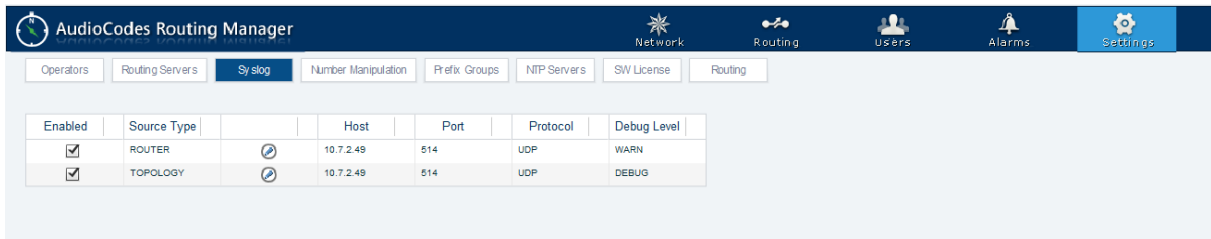
### 5.3 Configuring a Syslog Server


This section shows how to add a Syslog Server.

➤ **To add a Syslog Server:**

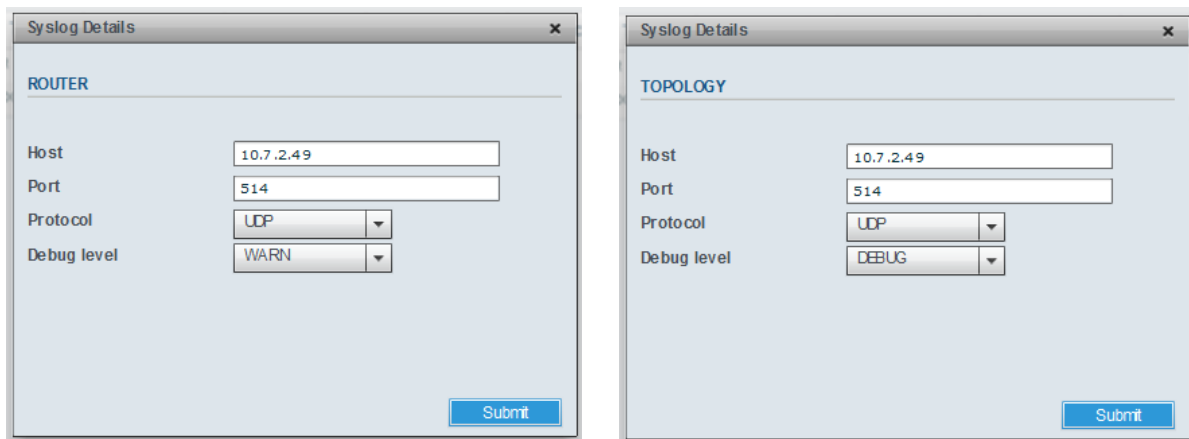
1. In the Settings page, click the **Syslog** tab.

**Figure 5-5: Syslog**



2. Click the icon  Update Syslog adjacent to ROUTER or TOPOLOGY.

**Figure 5-6: Syslog Details: ROUTER and TOPOLOGY**



3. Configure the syslog details using [Table 5-3](#) as reference.

**Table 5-3: Syslog Details**

Setting	Description
Host	IP of the remote syslog server to which messages are sent.
Port	Port of the remote syslog server to which messages are sent.
Protocol	Leave at default (UDP).
Debug Level	From the 'Debug Level' dropdown select either: <ul style="list-style-type: none"><li>• WARN (default level for the ROUTER; only messages whose debug level is WARNING are sent to the syslog server)</li><li>• TRACE</li><li>• DEBUG (default level for TOPOLOGY; only messages whose debug level is DEBUG and higher are sent to the syslog server)</li><li>• INFO</li><li>• ERROR</li></ul>

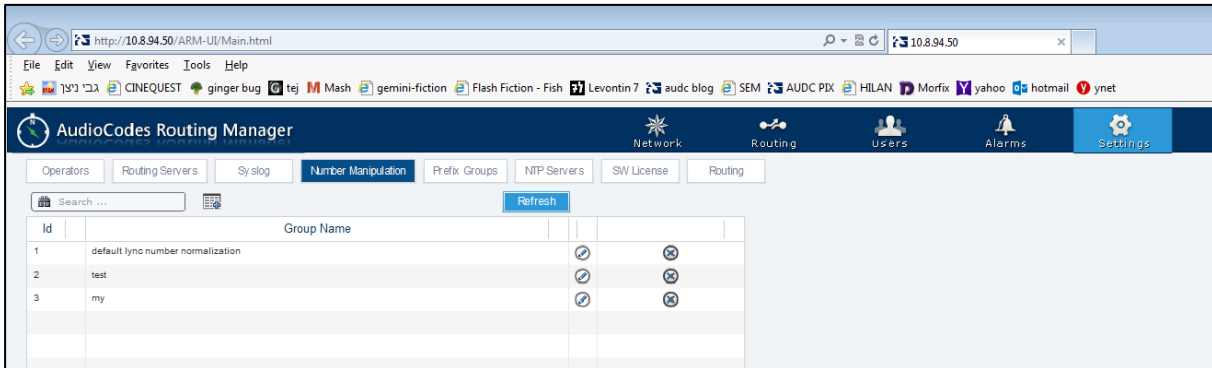
## 5.4 Adding a Number Manipulation Group


This section shows how to add a number manipulation group.

➤ **To add a number manipulation group:**

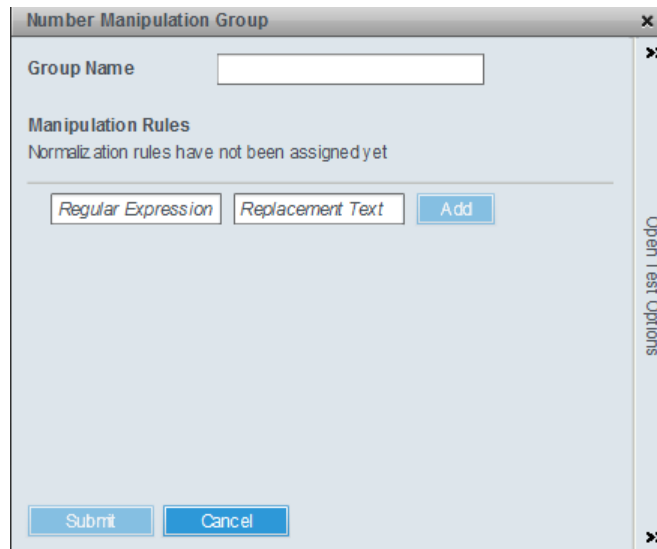
1. In the Settings page, click the **Number Manipulation** tab.

**Figure 5-7: Number Manipulation**



2. Click the icon  Add.

**Figure 5-8: Number Manipulation Group**



3. Configure the Number Manipulation Group (applies to source and destination numbers).
  - a. Enter a Group Name for intuitive future reference.
  - b. In the Regular Expression field, enter a condition, expressed as a string or as part of a string, to search for. See the examples below.
  - c. In the Replacement Text field, enter an action to replace the condition, expressed as a string. See the examples below. The ARM finds a match for the string or for the part of the string, and replaces it with the action.

**Examples**

- Remove any non-number text from the prefix of the number:

Number Manipulation Group

Group Name:

Manipulation Rules

1

*Regular Expression* *Replacement Text*

Close Test Options

- Lync: Remove “tel:” from the prefix and any text from the number's suffix. In the **Test** field, the full number is [tel:+97239762938 \(ext:2938\)](tel:+97239762938).

Number Manipulation Group

Group Name:

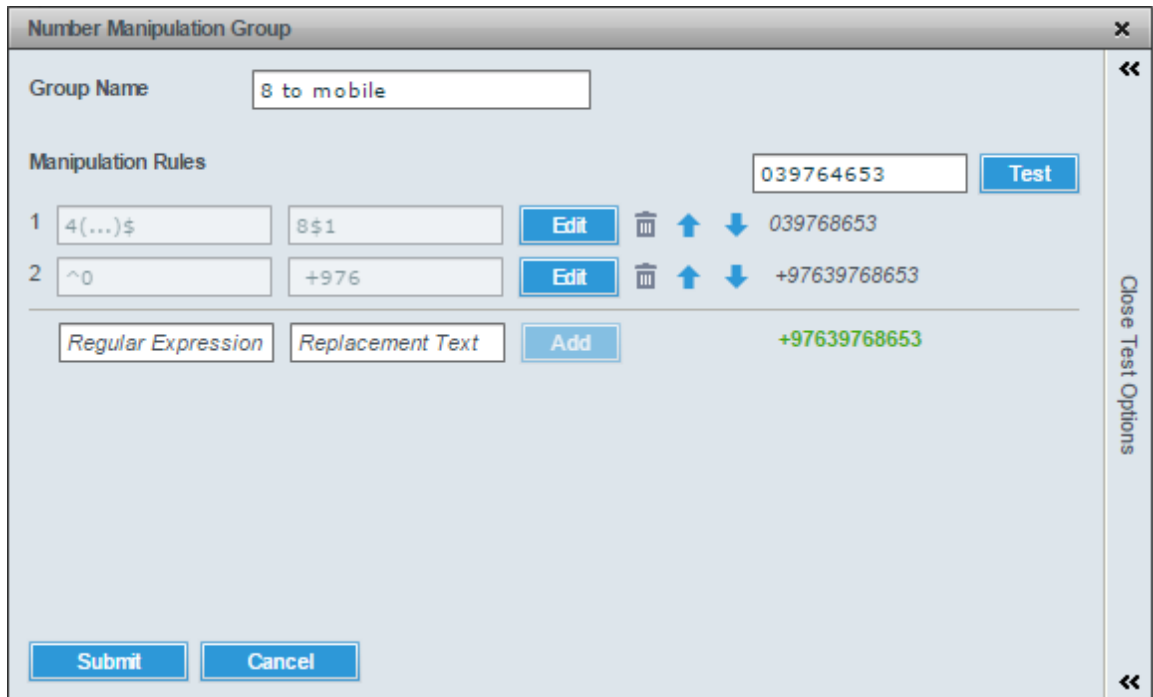
Manipulation Rules

1

*Regular Expression* *Replacement Text*

Close Test Options

- If the fourth digit from the right is **4**, change it to **8**, and if the first digit is **0**, change it to **+972**.



4. Click the **Add** button and then click **Submit**.



**Note:**

- More than one number manipulation rule can be defined in a group.
- After defining a rule, activate it (see Section 6.25.8 for details).
- See also:
  - ✓ Editing a PCON Connection (see under Section 2.2.1.3)
  - ✓ Adding a New Routing Rule (see under Section 6.2)
  - ✓ Adding an LDAP Property (see under Section 4.2)

## 5.5 Adding a Prefix Group

This section shows how to make routing management easier, more efficient and more convenient for operators, using Prefix Groups.

Every routing rule can have scores of prefixes. Grouping prefixes and then associating groups with routing rules reduces visual complexity and allows for more effective management. Prefix Groups save operators from repeatedly having to add prefixes to rules.

Once defined, the Prefix Group comprising multiple prefixes is associated with a routing rule (see Section 6.2 for information on how define a routing rule). If, for example, an enterprise has distributed offices, the following can be defined: If a caller calls from source prefix x, the call is sent from SBC 1; if a caller calls from source prefix 2, the call is sent from SBC 2.



**Note:** To develop a customer-specific Dial Plan into an ARM Prefix Group, the REST API is available. This can significantly expedite ARM provisioning.

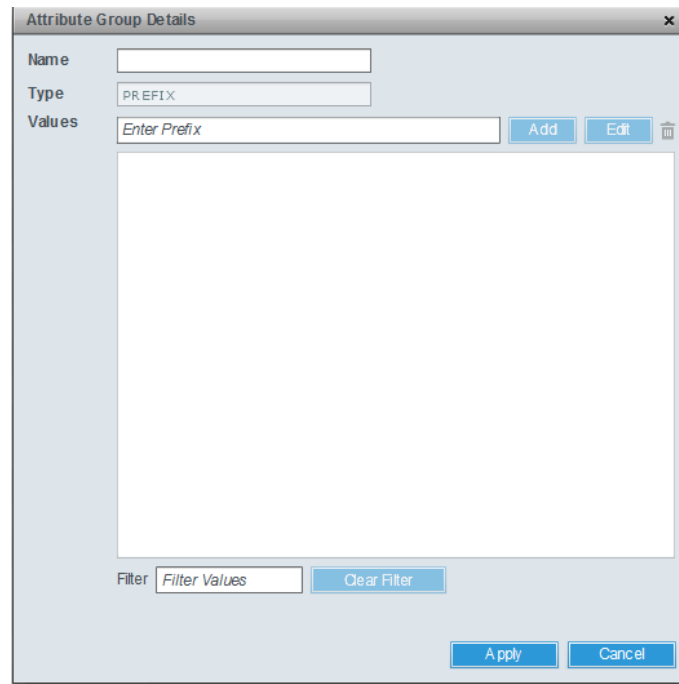
➤ **To add a Prefix Group:**

1. In the Settings page, click the **Prefix Group** tab.

**Figure 5-9: Prefix Group**

Name	Type	Values		
444	PREFIX	yr1,4466,0989,4455,4466,5577		
ghajghj	PREFIX	43534		
ddd	PREFIX	#		
eee	PREFIX	sss		
iii	PREFIX	ggg		
yyy	PREFIX	sss		
ll	PREFIX	ll		
ppp	PREFIX	ppp		
www	PREFIX	www		
ee	PREFIX	ee		
777	PREFIX	fox,nana,omn,bbc,yonet,walla		

2. Click the icon Add.

**Figure 5-10: Prefix Group Details**


3. Configure the Prefix Group using [Table 5-4](#) as reference.

**Table 5-4: Prefix Group Details**

Setting	Description
Name	Enter a name for the prefix group.
Type	Read-only: PREFIX.
Values	Enter a Prefix and then click <b>Add</b> .
Filter	Filter Values

4. Click **Apply**; after creating a group, open the Routing page and associate the group with a rule.

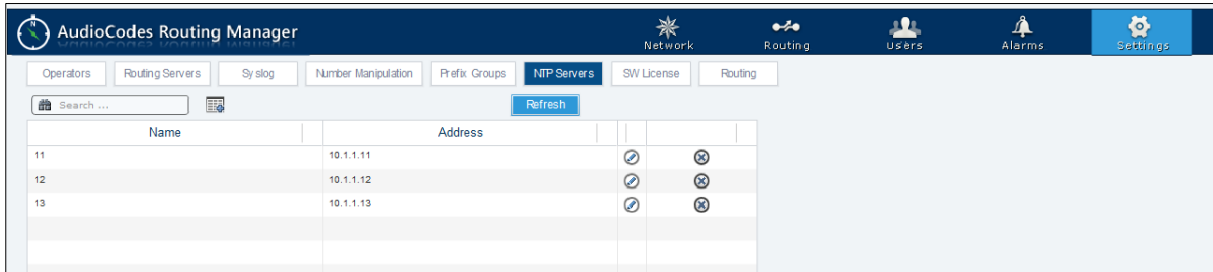
## 5.6 Adding an NTP Server


This section shows how to add an NTP server.

➤ **To add an NTP server:**

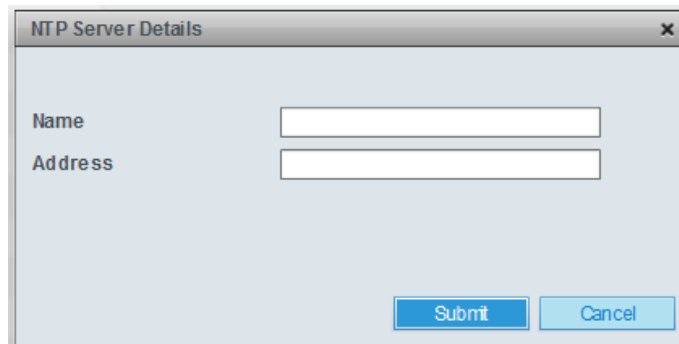
1. In the Settings page, click the **NTP Servers** tab.

**Figure 5-11: NTP Servers**



2. Click the icon  Add.

**Figure 5-12: NTP Server Details**



3. Configure the NTP server details using the table below as reference.

**Table 5-5: NTP Server Details**

Setting	Description
Name	Enter a name for the NTP server.
Address	Enter the IP address of the NTP server.

4. Click **Submit**.

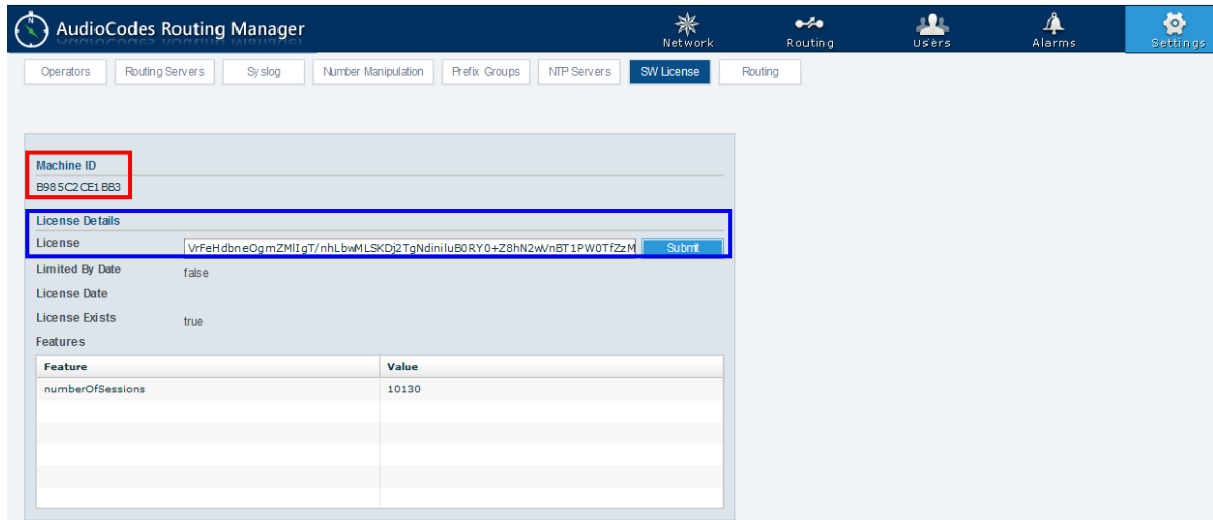
## 5.7 Adding a Software License

The ARM must be licensed with a valid license for the product to become fully operational.

➤ **To activate a license:**

1. In the Settings page, click the **SW License** tab.

**Figure 5-13: Software License Page**



The screenshot shows the 'SW License' tab in the AudioCodes Routing Manager. The 'Machine ID' is 'B985C2CE1B83'. The 'License' field contains the string 'VrFeHdbneOgmZMIgT/nhLbwMLSKDj2TgNdiniluB0RY0+Z8hN2wnBT1PW0TfZzM'. The 'Submit' button is next to the license field. The 'License Details' section shows 'Limited By Date' as false, 'License Date' as empty, and 'License Exists' as true. The 'Features' table has one row: 'numberOfSessions' with a value of '10130'.

Feature	Value
numberOfSessions	10130

2. Select and copy the 'Machine ID' shown in **red** in the figure above.
3. Activate the product through the AudioCodes License Activation tool at [www.audiocodes.com/swactivation](http://www.audiocodes.com/swactivation). You'll need your Product Key and the Server Machine ID for the activation process. An email will subsequently be sent to you with your Product License.
4. Copy and paste the Product License string that AudioCodes sends you into the 'License Details – License' field, indicated in **blue** in the figure above, and then click **Submit**; the number of sessions purchased and the license expiry date are displayed.
5. Make sure the license details (the number of sessions purchased and the license's expiry date) are those that you purchased.

## 5.8 Routing

This section shows how to activate number manipulation groups, described in Section 5.4. The global routing settings only determine *routing decisions*, in this case, *global* routing decisions; packets are unaffected. Non-global routing settings are described in

- Editing a PCON Connection (see under Section 2.2.1.3)
- Adding a New Routing Rule (see under Section 6.2)
- Adding an LDAP Property (see under Section 4.2)

➤ **To configure global routing settings:**

1. In the Settings page, click the **Routing** tab.

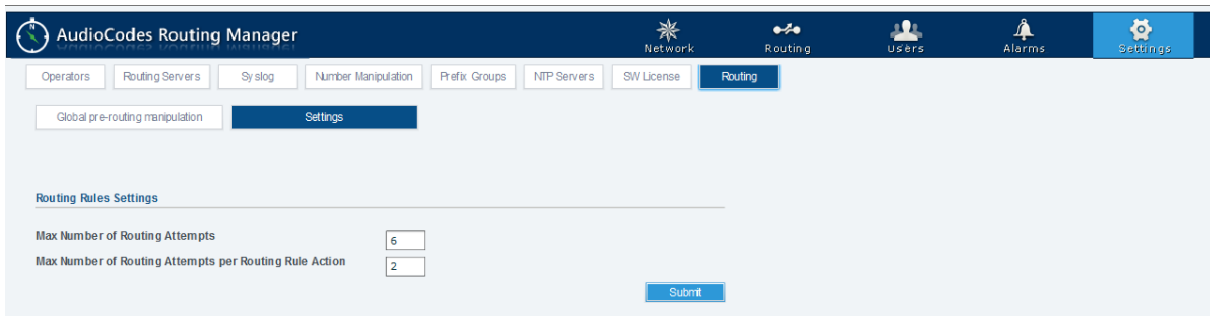
**Figure 5-14: Routing**

2. Under the **Global pre-routing manipulation** tab's page that opens by default, configure the parameters using the table below as reference.

**Table 5-6: Global Pre-routing Manipulation**

Setting	Description
Source Manipulation Group	From the dropdown, select a group of number manipulations from the list (see Section 5.4 for details on how to add a number manipulation group). This globally activates the group on numbers from which calls are made.
Dest Manipulation Group	From the dropdown, select a group of number manipulations from the list (see Section 5.4 for details on how to add a number manipulation group). This globally activates the group on numbers to which calls are made.

3. Click the **Settings** tab.

**Figure 5-15: Routing - Settings**


AudioCodes Routing Manager

Network Routing Users Alarms Settings

Operators Routing Servers Syslog Number Manipulation Prefix Groups NTP Servers SW License Routing

Global pre-routing manipulation Settings

Routing Rules Settings

Max Number of Routing Attempts

Max Number of Routing Attempts per Routing Rule Action

Submit

4. Configure the parameters using [Table 5-7](#) as reference.

**Table 5-7: Settings**

Setting	Description
Max # of Routing Attempts	Define the maximum number of global routing attempts. Default: 6
Max # of Routing Attempts per Routing Rule Action	Define the maximum number of global routing attempts per routing rule action. Default: 2

5. Click **Submit**.

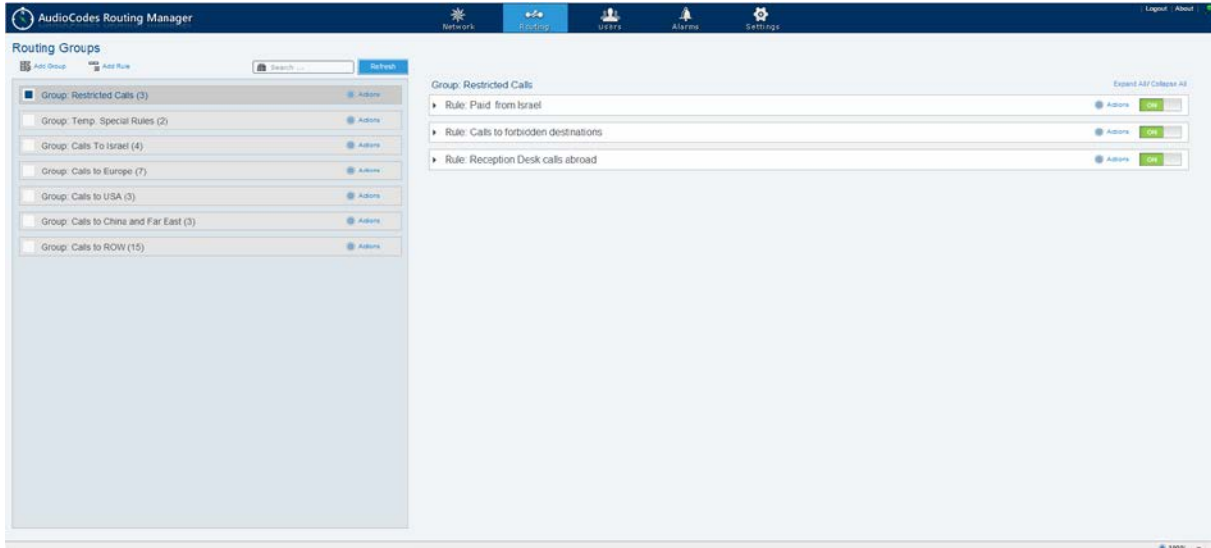
## 6 Defining Calls Routing

The ARM lets IT managers responsible for enterprise VoIP, define calls routing.

➤ **To define calls routing:**

- From any ARM page, click the 'Routing' menu on the actions bar.

**Figure 6-1: Routing**



The figure above shows the defined routing groups. Routing Groups listed higher take precedence over those lower. Routing Groups in the list can be reordered. Routing rules are defined within routing groups. You can view routing rules by clicking a routing group. A rule listed higher than another, even if in the same routing group, takes precedence.

**Note:**

- The ARM routing table supports up to 4000 routing rules and up to 4000 routing groups.
- Each routing rule is included in a routing group.
- Any modification to the routing configuration (adding, deleting or modifying) takes effect within 60 seconds after the modification request is answered by the configurator and does not affect active calls.
- Any modification to routing logic as a result of an operational state change to a node or Pcon takes effect within 60 seconds after the status change is identified by the configurator.
- Any modification to routing logic as a result of a node or Pcon administrative state change takes effect within 60 seconds after the status change is identified by the configurator.
- Changes in users or user groups take effect within 60 seconds after the modification is identified by the configurator.



- **Follow this procedure when performing calls routing:**
1. Add a new Routing Group (see Section 6.1).
  2. Add a new Routing Rule (see Section 6.2)
  3. Perform Group Actions (see under Section 6.4)
  4. Perform Rule Actions (see Section 6.5)
  5. Test the route (see Section 6.3)

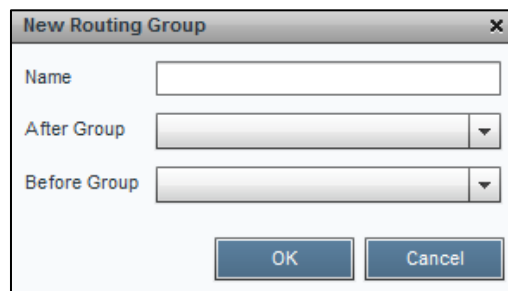
## 6.1 Adding a Routing Group

You should add a routing group before adding a rule. Some example of groups you can add are 'Restricted Calls', 'Calls to Europe', 'Calls to Far East', 'Calls to ROW', etc.

- **To add a routing group:**

1. In the Routing page, click the  **Add Group** icon.

**Figure 6-2: New Routing Group**



2. Define a name for the routing group to be added; define a user-friendly name in order to facilitate intuitive management for IP managers in the ARM GUI.
3. From the 'After Group' dropdown, select after which group to insert the new one. The groups are listed from top to bottom, in order of precedence.
4. From the 'Before Group' dropdown, select before which group to insert the new one. The groups are listed from top to bottom, in order of precedence.



**Note:**

- The routing group's name must be distinct from names of other routing group names, and must be between 1-999 characters.
- Priority is calculated internally, based on Previous and Next groups.

5. Click **OK**; the new routing group is added to the list.

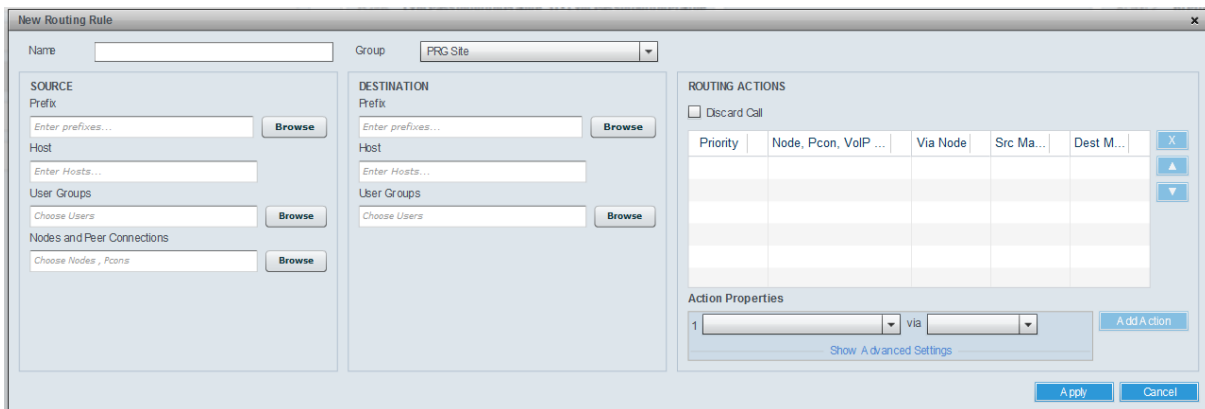
## 6.2 Adding a New Routing Rule


After adding a routing group, add a new routing rule to associate with the group. Each routing rule is given a unique priority within the routing group.

➤ **To add a new routing rule to a group:**

1. In the Routing page, click the  **Add Rule** icon, or, click the  **Actions** icon adjacent to the group and select **Add Rule** from the popup menu.

**Figure 6-3: New Routing Rule**



2. [Left side of the screen is for the condition; right side of the screen for the action] Provide a name that is distinct from the names of the other routing rules in the same group. Define a user-friendly name in order to facilitate intuitive management for other IP managers in the ARM GUI. The name can be between 1-999 characters.
3. From the 'Group' dropdown list, choose the name of the group with which to associate the rule. If you accessed the screen from a group's  **Actions** icon, this field will already be defined (with the name of the group).
4. Use the table below as reference when adding a new routing group.

**Table 6-1: Defining a New Routing Rule**

SOURCE	DESTINATION	ROUTING ACTIONS
Define the rule's source criteria. This is not mandatory. You can leave them undefined if you want. If a call's source matches the criteria you define, it will be routed according to what you define in ROUTING ACTIONS.	Define the rule's destination criteria. This is not mandatory. You can leave them undefined if you want. If a call's destination matches these criteria, it will be routed according to what you define in ROUTING ACTIONS.	Define the rule's ROUTING ACTIONS. This is mandatory, else it's not a routing rule. A ROUTING ACTION can be represented by Node, or by Node and its Pcon, or Volp Peer. An action node must have priority within a rule. Up to two rules may have the same priority. A ROUTING ACTION may contain a single Via Node:

SOURCE	DESTINATION	ROUTING ACTIONS
		routing to this destination traverses through the Via Node.
<p>In the 'Prefix' field, enter the call source's prefix/prefixes; the 'Host' field is disabled. Only calls made from it/them will be routed according to what you define in ROUTING ACTIONS. Up to 5 source prefixes can be defined. You can define specific entries, or a single entry indicating all prefixes/ hosts. If you leave the field undefined, all prefixes and all hosts will apply.</p>	<p>In the 'Prefix' field, enter the call destination's prefix/prefixes; the 'Host' field is disabled. Only calls made to it/them will be routed according to what you define in ROUTING ACTIONS. Up to 5 destination prefixes can be defined. You can define specific entries, or a single entry indicating all prefixes/ hosts. If you leave the field undefined, all prefixes and all hosts will apply.</p>	<p>Select the 'Discard Call' option if you want calls whose SOURCE and DESTINATION criteria match those you defined, to be discarded.</p>
<p>In the 'Host' field, enter the call source's host name; the 'Prefix' field is disabled. Note that the exact name must be entered. If an inexact name is entered, no match will be made. If a match is made, only calls made from that host will be routed according to what you define in ROUTING ACTIONS.</p>	<p>In the 'Host' field, enter the call destination's host name; the 'Prefix' field is disabled. Note that the exact name must be entered. If an inexact name is entered, no match will be made. If a match is made, only calls made to that host will be routed according to what you define in ROUTING ACTIONS.</p>	<ol style="list-style-type: none"> <li>1. From the dropdown, select Priority 1 for Node and Peer Connection.</li> <li>2. Optionally select Via Node, and then click +; Priority 1 is added to the table.</li> <li>3. Click <b>OK</b>.</li> </ol>
<p>In the 'User Groups' field, browse to and select the call source's User Group/s. See Section 6.1. If none is defined, all groups will apply for the rule. Up to 5 can be defined. Only calls made from <i>this/these</i> User Group/s will be routed according to what you define in ROUTING ACTIONS.</p>	<p>From the 'User Groups' dropdown, browse to and select the call destination's User Group. See Section 6.1. If none is defined, all groups will apply for the rule. Up to 5 can be defined. Only calls made to <i>this/these</i> User Group/s will be routed according to what you define in ROUTING ACTIONS.</p>	<ol style="list-style-type: none"> <li>1. From the dropdown, select Priority 2 for Node and Peer Connection.</li> <li>2. Optionally select Via Node, and then click +; Priority 2 is added to the table. This defines through which Node and Pcon the call will go out.</li> <li>3. Click <b>OK</b>.</li> </ol>
<p>In the 'Nodes and Peer Connections' field, browse to the node/s and Pcon/s. Up to five nodes and Pcons can be defined. For a specific node, the Pcon contains either a specific Pcon or all pcons of a node. If the field is left undefined, the rule will apply to all nodes and pcons. Each pcon has a unique</p>		

SOURCE	DESTINATION	ROUTING ACTIONS
<p>ID in the ARM, so specifying a pcon ID implicitly implies the node it is associated with.</p> <p>The REST API - and possibly other APIs in the future - will receive either a node ID, which implies a node with all pcons, or a pcon ID, which means a specific pcon on a specific node.</p>		

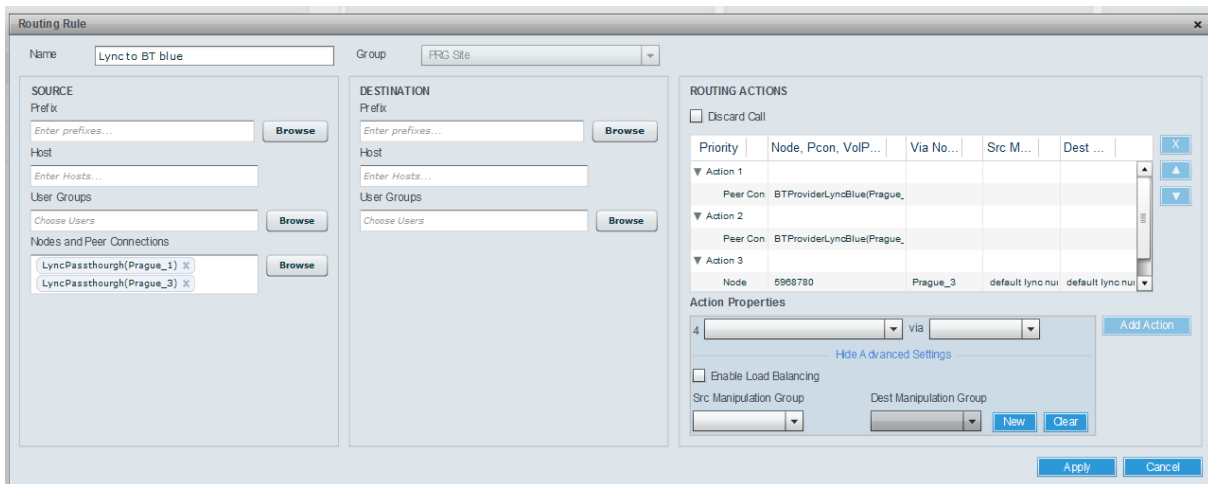
### 6.2.1 Configuring a Src/Dest Number Manipulation Group

You can configure a Source Number Manipulation Group and a Destination Number Manipulation Group for the rule.

➤ **To configure a Src/Dest Number Manipulation Group:**

1. Under Routing Actions in the Routing Rule screen, click the **Extend Advanced Settings** link.

**Figure 6-4: Routing Rule: Extend Advanced Settings**



2. From the Src Manipulation Group dropdown and the Dest Manipulation Group dropdown, select a group. See Section 5.4 for more information on how to configure a Number Manipulation Group.

Figure 6-5: New Routing Rule – Defining Priority 1 for Routing Action

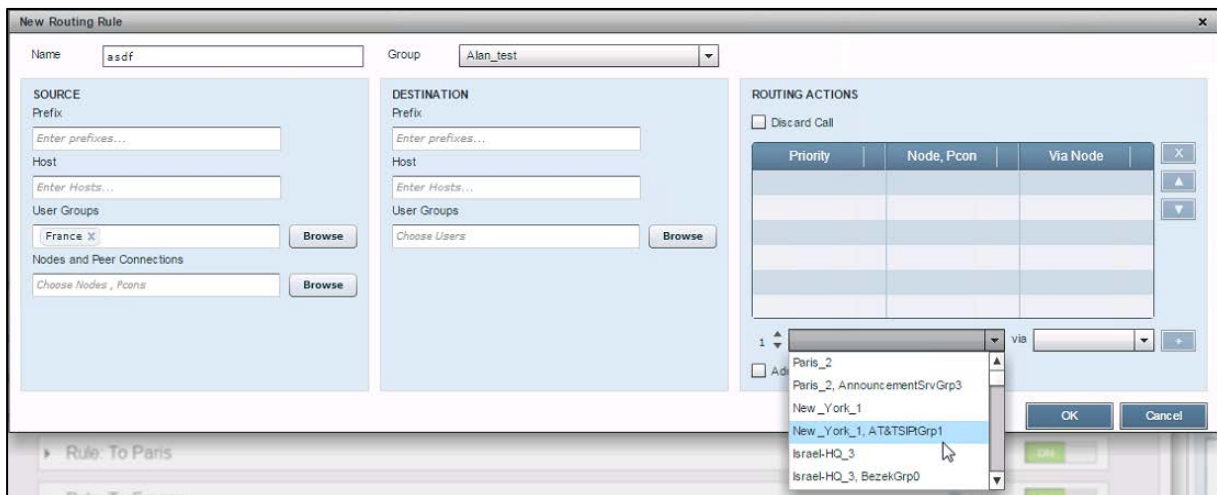


Figure 6-6: New Routing Rule – Defining Priority 2 for Routing Action

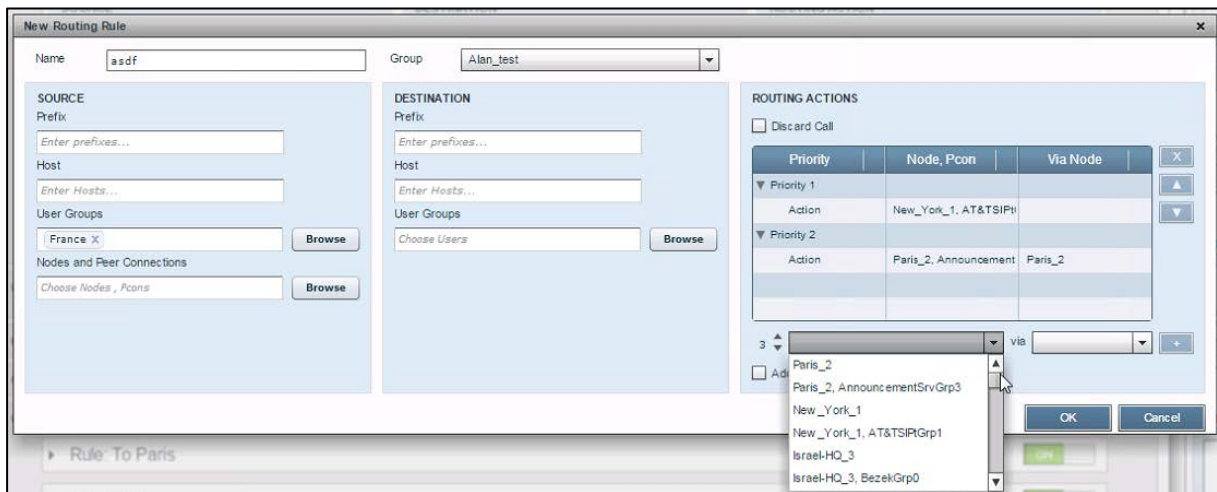
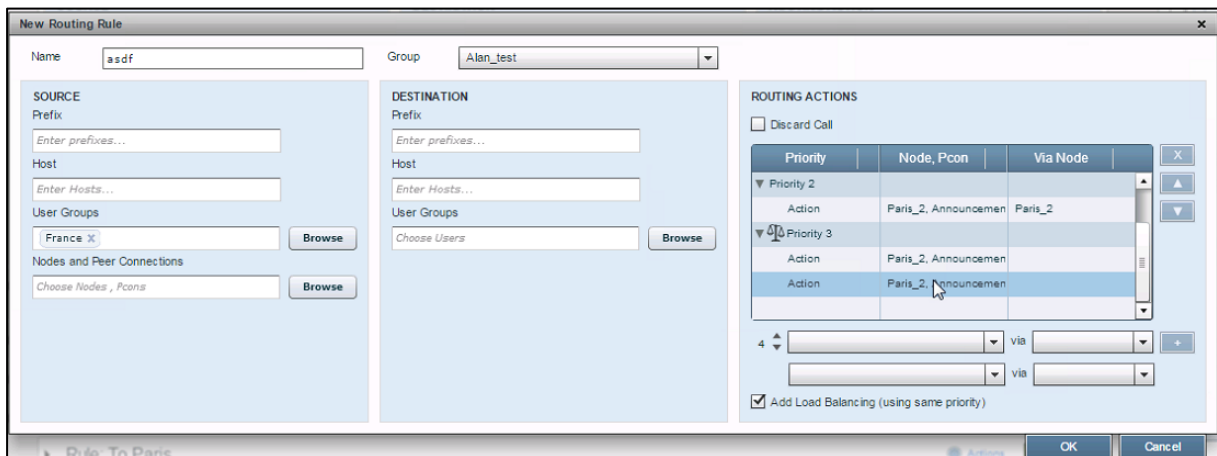


Figure 6-7: New Routing Rule – Defining Priority 3 for Routing Action



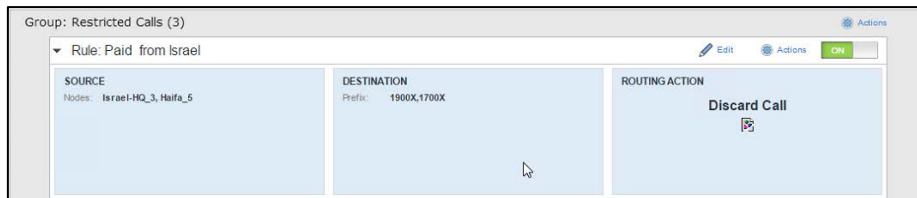


**Note:** Up to five Priorities for Routing Action can be configured. If two actions have the same priority, the ARM will perform load sharing between these destinations represented in the actions.

3. Select the option 'Add Load balancing (using same priority)', as shown in the figure above. Note that Action Destinations in load balance are considered a single action entry. If a Destination is not selected in load balancing, it will not be considered as alternate routing.

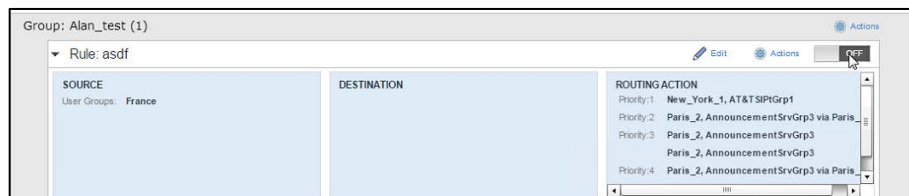
The figure below shows an example of a defined routing rule.

**Figure 6-8: Example 1 of a Defined Routing Rule**



**Implication:** Any call made from nodes 'Israel-HQ' and 'Haifa\_5' and destined for prefixes 1900x and 1700x, will be discarded.

**Figure 6-9: Example 2 of a Defined Routing Rule**



**Implication:** Any call made from France to any destination will be routed via

- [Priority 1] New\_York\_1, AT&TSIPGrp1
  - [Priority 2] Paris\_2, AnnouncementSrvGrp3 via Paris\_
  - [Priority 3] As shown in [Figure 6-9](#).
4. Switch **OFF** > **ON** to activate the routing rule (Default = **OFF**).

## 6.3 Testing a Route

You can test a route to make sure it performs according to expectations.

- **To test a route:**
  - In the Network page, click the **Peer Connections** link in the Network Summary pane. See [Section 3.4](#) for detailed information.

## 6.4 Performing Routing Group Actions

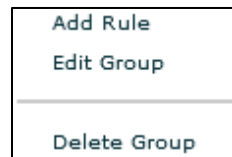
You can perform routing group actions, i.e., you can

- add a rule to a routing group
- edit a routing group
- delete a routing group

➤ **To perform a routing group action:**

1. In the Routing page, click the  **Actions** icon adjacent to a defined group.

**Figure 6-10: Performing Routing Group Actions**



2. Select:
  - **Add Rule** to add a rule to the routing group (see Section 6.2)
  - **Edit Group** to edit the routing group (see below)
  - **Delete Group** to delete the routing group (see below)

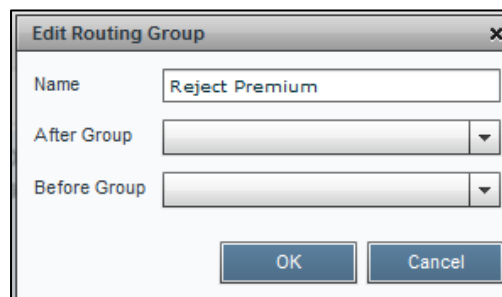
### 6.4.1 Editing a Routing Group

You can edit a routing group.

➤ **To edit a routing group:**

1. Select the **Edit Group** option from the popup menu shown above.

**Figure 6-11: Group Actions - Edit Routing Group**



2. Skip the 'Name' field. It's read-only.
3. Locate the group in the list using the 'After Group' and 'Before Group' dropdown.


### 6.4.2 Deleting a Group

From the Group Actions popup menu choose **Delete Group**; the group is deleted without notification, including rules associated with the group.

## 6.5 Performing Rule Actions

You can perform Rule Actions.

➤ **To perform Rule Actions:**

- Open the group under which the rule is defined, and then adjacent to the rule on which you want to perform actions, click the  **Actions** icon.

**Figure 6-12: Rule Actions**




- To add a rule above, see Section 6.5.1.
- To add a rule below, see Section 6.5.2.
- To move a rule, see Section 6.5.3.
- To delete a rule, see Section 6.5.4.

### 6.5.1 Adding a Rule Above an Already Defined Rule

You can add a rule above an already defined rule.


➤ **To add a rule above an already defined rule:**

1. Open the group under which the rule is defined and adjacent to the defined rule, click the  **Actions** icon; the popup shown above is displayed.
2. Select the **Add Rule Above** option; the Routing Rule screen opens (see Figure 6-2).
3. Add the rule as described under Section 6.2.

### 6.5.2 Adding a Rule Below an Already Defined Rule

You can add a rule below an already defined rule.

➤ **To add a rule below an already defined rule:**


1. Open the group under which the rule is defined and adjacent to the defined rule, click the  **Actions** icon; the popup shown above is displayed.
2. Select **Add Rule Below**; the Routing Rule screen opens (see Figure 6-2).
3. Add the rule as described under Section 6.2.

### 6.5.3 Moving a Rule

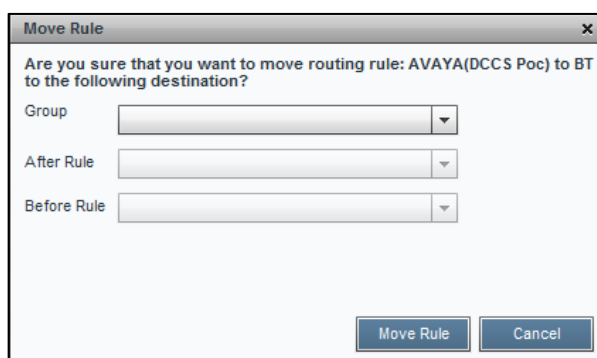
You can move a rule

- within the group under which it is defined
- to another group, above and below already defined rules in that group

➤ **To move a rule:**

1. Open the group under which the rule is defined and then adjacent to the defined rule that you want to move, click the  **Actions** icon; the popup shown in Figure 6-12 is displayed.
2. Select **Move Rule**.

**Figure 6-13: Move Rule**




3. From the 'Group' dropdown, select the group to which you want to move the rule.
4. From the 'After Rule' dropdown, select the rule in that group *after which* you want to move the rule.
5. From the 'Before Rule' dropdown, select the rule in the group *before which* you want to move the rule.
6. Click the **Move Rule** button; the rule is moved to the location you defined.

### 6.5.4 Deleting a Rule

You can delete a rule.

➤ **To delete a rule:**

1. Open the group under which the rule is defined, and then adjacent to the defined rule that you want to delete, click the  **Actions** icon; the popup shown in Figure 6-12 is displayed.
2. Select **Delete Rule** and in the 'Are you sure?' prompt, click **Yes**; the rule is deleted.

# 7 Viewing Alarms

In the Alarms page shown in the figure below, you can view alarms information displayed under two tabs:

- Active Alarms (default)
- History Alarms

Both pages displays the following column headers: Severity, Date, Name, Source, Alarm Type, Probable Cause, Description, Additional Info1, Additional Info2, Acknowledged.

The page shows alarms generated in the enterprise's network topology, e.g., SBC disconnected.

Figure 7-1: Alarms – Active Alarms

Severity	Date	Name	Source	Alarm Type	Probable Cause	Description	Additional Info1	Additional Info2	Acknowledged
Info	13:02:27 Oct 28	Configuration inconsistency	Node#5485:PeerConnection#C0	Processing Error Alarm	Configuration Or Customization Error	Found inconsistency in Peer Connection configuration	ARM database was synchronized to the nodes conf		false
Info	00:55:14 Oct 28	Configuration inconsistency	Node#5485:PeerConnection#C0	Processing Error Alarm	Configuration Or Customization Error	Found inconsistency in Peer Connection configuration	ARM database was synchronized to the nodes conf		false
Info	00:22:00 Oct 28	Configuration inconsistency	Node#5485:PeerConnection#C0	Processing Error Alarm	Configuration Or Customization Error	Found inconsistency in Peer Connection configuration	ARM database was synchronized to the nodes conf		false
Info	13:02:27 Oct 28	Configuration inconsistency	Node#5485:PeerConnection#C0	Processing Error Alarm	Configuration Or Customization Error	Found inconsistency in Peer Connection configuration	ARM database was synchronized to the nodes conf		false
Info	00:55:14 Oct 28	Configuration inconsistency	Node#5485:PeerConnection#C0	Processing Error Alarm	Configuration Or Customization Error	Found inconsistency in Peer Connection configuration	ARM database was synchronized to the nodes conf		false
Info	00:22:00 Oct 28	Configuration inconsistency	Node#5485:RoutingInterface#R0	Processing Error Alarm	Configuration Or Customization Error	Found inconsistency in Routing Interface configuration	ARM database was synchronized to the nodes conf		false
Info	13:02:27 Oct 28	Configuration inconsistency	Node#5485:RoutingInterface#R0	Processing Error Alarm	Configuration Or Customization Error	Found inconsistency in Routing Interface configuration	ARM database was synchronized to the nodes conf		false
Info	00:55:14 Oct 28	Configuration inconsistency	Node#5485:RoutingInterface#R0	Processing Error Alarm	Configuration Or Customization Error	Found inconsistency in Routing Interface configuration	ARM database was synchronized to the nodes conf		false
Major	00:58:38 Oct 28	Operation status changed	Node#5485	Communications Alarm	Communications Subsystem Failure	Node 5485 was marked as Unavailable	The alarm will be cleared once the status will be of	Node was marked as unavailable due to Logout me	false
Major	13:03:40 Oct 28	Operation status changed	Node#5485	Communications Alarm	Communications Subsystem Failure	Node 5485 was marked as Unavailable	The alarm will be cleared once the status will be of	Node was marked as unavailable due to Router an	false

Figure 7-2: Alarms – History Alarms

Severity	Date	Name	Source	Alarm Type	Probable Cause	Description	Additional Info1	Additional Info2	Action
Info	13:02:27 Oct 28	Configuration inconsistency	Node#5485:PeerConnection#C0	Processing Error Alarm	Configuration Or Customization Error	Found inconsistency in Peer Connection configuration	ARM database was synchronized to the nodes configuration		false
Info	00:55:14 Oct 28	Configuration inconsistency	Node#5485:PeerConnection#C0	Processing Error Alarm	Configuration Or Customization Error	Found inconsistency in Peer Connection configuration	ARM database was synchronized to the nodes configuration		false
Info	00:22:00 Oct 28	Configuration inconsistency	Node#5485:PeerConnection#C0	Processing Error Alarm	Configuration Or Customization Error	Found inconsistency in Peer Connection configuration	ARM database was synchronized to the nodes configuration		false
Info	00:55:14 Oct 28	Configuration inconsistency	Node#5485:PeerConnection#C0	Processing Error Alarm	Configuration Or Customization Error	Found inconsistency in Peer Connection configuration	ARM database was synchronized to the nodes configuration		false
Info	13:02:27 Oct 28	Configuration inconsistency	Node#5485:PeerConnection#C0	Processing Error Alarm	Configuration Or Customization Error	Found inconsistency in Peer Connection configuration	ARM database was synchronized to the nodes configuration		false
Info	00:55:14 Oct 28	Configuration inconsistency	Node#5485:RoutingInterface#R0	Processing Error Alarm	Configuration Or Customization Error	Found inconsistency in Routing Interface configuration	ARM database was synchronized to the nodes configuration		false
Info	13:02:27 Oct 28	Configuration inconsistency	Node#5485:RoutingInterface#R0	Processing Error Alarm	Configuration Or Customization Error	Found inconsistency in Routing Interface configuration	ARM database was synchronized to the nodes configuration		false
Info	00:22:00 Oct 28	Configuration inconsistency	Node#5485:RoutingInterface#R0	Processing Error Alarm	Configuration Or Customization Error	Found inconsistency in Routing Interface configuration	ARM database was synchronized to the nodes configuration		false
Clear	13:02:28 Oct 28	Operation status changed	Node#5485	Communications Alarm	Communications Subsystem Failure	Node 5485 was marked as Available	The alarm will be cleared once the status will be changed back to available	Sync passed successfully, node will be marked as available	false
Clear	00:55:15 Oct 28	Operation status changed	Node#5485	Communications Alarm	Communications Subsystem Failure	Node 5485 was marked as Available	The alarm will be cleared once the status will be changed back to available	Sync passed successfully, node will be marked as available	false
Clear	00:22:01 Oct 28	Operation status changed	Node#5485	Communications Alarm	Communications Subsystem Failure	Node 5485 was marked as Available	The alarm will be cleared once the status will be changed back to available	Sync passed successfully, node will be marked as available	false
Clear	13:04:19 Oct 28	Operation status changed	Node#5485	Communications Alarm	Communications Subsystem Failure	Node 5485 was marked as Unavailable	The alarm was deleted		false
Clear	00:49:40 Oct 28	Operation status changed	Node#5485	Communications Alarm	Communications Subsystem Failure	Node 5485 was marked as Unavailable	The alarm was deleted		false
Clear	00:58:53 Oct 28	Operation status changed	Node#5485	Communications Alarm	Communications Subsystem Failure	Node 5485 was marked as Unavailable	The alarm was deleted		false
Major	00:48:50 Oct 28	Operation status changed	Node#5485	Communications Alarm	Communications Subsystem Failure	Node 5485 was marked as Unavailable	The alarm will be cleared once the status will be changed back to available	Node was marked as unavailable due to Logout message from the node	false

- In these pages you can
  - Use the 'Search' field to locate an alarm
  - Refresh the page
  - Sort alarms, according to column header

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## 8 Migrating Device Routing to the ARM

This section shows how to migrate device routing to the ARM.

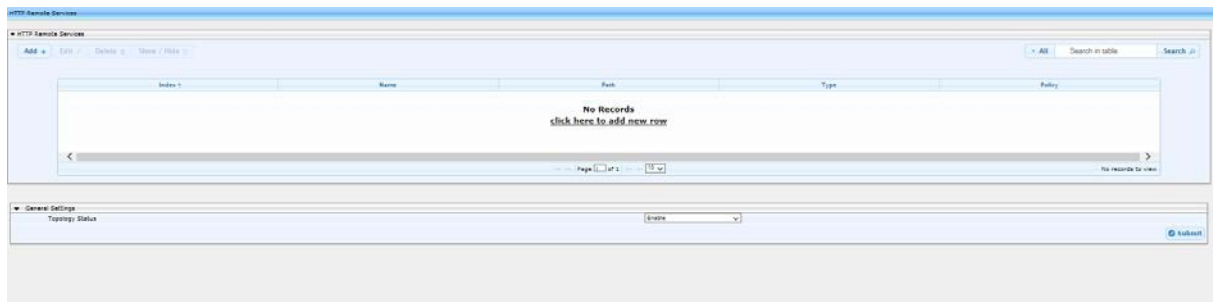
### 8.1 Connecting the Device to the ARM Topology Server

You need to connect the device to the ARM Topology Server.

➤ **To connect the device to the ARM Topology Server:**

1. In your internet browser, enter the device's IP address in the Address bar, and then in the login page that opens, enter the User Name and Password (**Admin**, **Admin** are the defaults).
2. In the device's Web interface that opens, check the **Advanced** option and then navigate to the HTTP Remote Services page (**Configuration > VoIP > HTTP Services > HTTP Remote Services**).

**Figure 8-1: Web Interface - HTTP Remote Services**



3. Click the **Add row**.

**Figure 8-2: Web Interface - HTTP Remote Services – Add Row**

Add Row
✕

Index	<input type="text" value="0"/>
Name	<input type="text" value="TopologyStatus"/>
Path	<input type="text" value="ARM"/>
Type	<input type="text" value="Topology Status"/>
Policy	<input type="text" value="Round Robin"/>
Login Needed	<input type="text" value="Enable"/>
Persistent Connection	<input type="text" value="Enable"/>
Number of Sockets	<input type="text" value="1"/>
Username	<input type="text" value="Admin"/>
Password	<input type="password" value="*****"/>

Figure 8-3: Web Interface - HTTP Remote Services



Figure 8-4: Web Interface - HTTP Remote Services

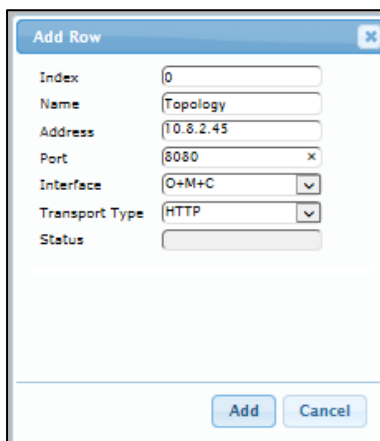
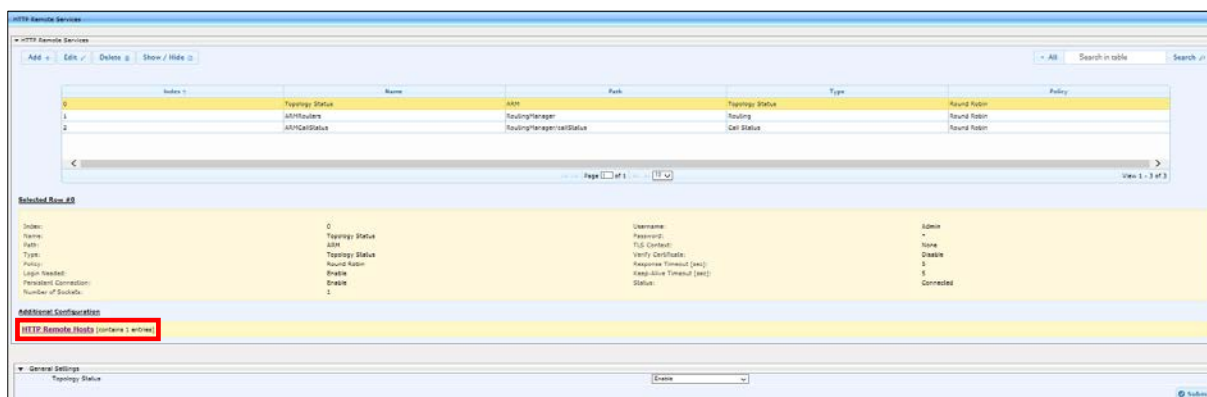
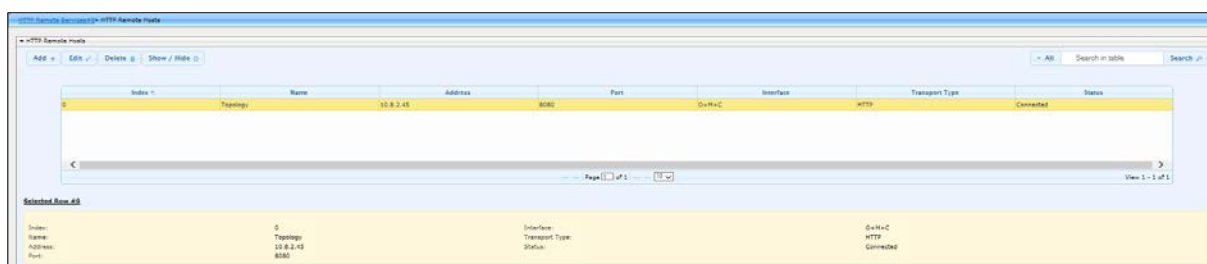


Figure 8-5: Web Interface - HTTP Remote Services – HTTP Remote Hosts



4. Click the **HTTP Remote Hosts** link; the HTTP Remote Hosts page opens.

Figure 8-6: Web Interface - HTTP Remote Services - HTTP Remote Hosts



5. Click the **Edit** tab.

**Figure 8-7: Web Interface - HTTP Remote Services - HTTP Remote Hosts - Edit**

6. Define the IP Address of the ARM Topology Server to which you want to point the device and define the ARM Topology Server settings, and then click **Save**; wait until connected.

**Figure 8-8: Web Interface – Device Connected to ARM Topology Server**

Index	Name	Address	Port	Interface	Transport Type	Status
0	Topology	10.8.2.45	8080	O+M+C	HTTP	Connected

Selected Row #0

Index:	0	Interface:	O+M+C
Name:	Topology	Transport Type:	HTTP
Address:	10.8.2.45	Status:	Connected
Port:	8080		

7. Make sure in the HTTP Remote Services screen that the Status of the host, i.e., of the ARM Topology Server, is **Connected**, as shown in the figure above.
8. Connect to the router/s.

**Figure 8-9: Web Interface – Routers**

Index	Topology Status	Name	Path	Type	Topology Status	Policy
0	ARM	ARM				Round Robin
1	ARM Routers	RoutingManager		Routing		Round Robin
2	ARM Call Status	RoutingManager/CallStatus		Call Status		Round Robin

Selected Row #0

Index:	0	Username:	Admin
Name:	Topology Status	Password:	+
Path:	ARM	TLS Contexts:	None
Type:	Topology Status	Verify Certificate:	Disable
Policy:	Round Robin	Response Timeout [sec]:	5
Login Needed:	Enable	Keep-Alive Timeout [sec]:	0
Persistent Connections:	Enable	Status:	Connected
Number of Sockets:	1		

Additional Configuration

HTTP Remote Hosts (contains 1 entries)

General Settings

Topology Status: [Enable]

9. Make sure that the device is connected to all HTTP ARM services i.e., ARM Topology Server *and* router/s), as shown in the figure above.

## 8.2 Migrating SBC Routing to the ARM

After making sure that the device (in this case, the SBC) is connected to all HTTP ARM services i.e., ARM Topology Server *and* router/s), you can begin to migrate the routing rules from those defined in the Web interface to the ARM. See also



**Note:** 'IP Group' and 'Trunk Group' in the Web are called 'Peer Connection' in the ARM.

➤ **To migrate routing rules to the ARM:**

1. In the Web interface, navigate to the the IP Group Table Page (**Configuration > VoIP > VoIP Network > IP Group Page**).
2. Locate the IP Group to expose the enterprise network to the ARM environment.

**Figure 8-10: Web Interface – IP Group Table**

Index	Name	SRD	Type	SBC Operation Mode	Proxy Set	IP Profile	Media Realm	SIP Group Name	Classify By Proxy Set	Inbound Message Manipulation Set	Outbound Message Manipulation Set
0	LyncGK	SRD (R)	Server	Not Configured	Lync SIPGK RedLine	None	None		Enable	-1	-1
1	LyncPassthrough	SRD (R)	Server	Not Configured	Lync Pass-through	None	None		Enable	-1	-1
2	SIPPBX	SRD (R)	Server	Not Configured	SIP PBX	None	None		Enable	-1	-1
3	H323	SRD (R)	Server	Not Configured	Class R323	None	None		Enable	-1	-1
4	BTPProviderRED	SRD (R)	Server	Not Configured	ServiceProvider Red	None	None		Enable	-1	4
5	BTPProviderLyncBlue	SRD (R)	Server	Not Configured	ServiceProvider Blue	None	None		Enable	-1	-1
6	BTPProviderConf	SRD (R)	Server	Not Configured	ServiceProvider Conf	None	None		Enable	-1	-1
7	IT-SIP-PBX	SRD (R)	Server	Not Configured	IT-SIP-PBX	None	None		Enable	-1	-1
8	DCCS-PNC	SRD (R)	Server	Not Configured	DCCS PNC	None	None		Enable	-1	-1

**Selected Row #0**

Index: 0  
 SRD: SRD

**Common**      **GW**      **SBC**

Name: LyncGK  
 Type: Server  
 Proxy Set: Lync SIPGK RedLine  
 IP Profile: None  
 Media Realm: None  
 SIP Group Name:   
 Contact User:   
 SIP Re-Routing Mode: GW  
 Always Use Route Table: No

**Figure 8-11: Web Interface – IP Group Table - Configuring an IP Group**

**Edit Row**

Index: 0  
 SRD: SRD

**Common**      **GW**      **SBC**

Name: LyncGK  
 Type: Server  
 Proxy Set: Lync SIPGK RedLine  
 IP Profile: None  
 Media Realm: None  
 SIP Group Name:   
 Save      Cancel

3. [Mandatory] Enter a unique name for the IP Group.
4. Set the 'Used By Routing Server' parameter to **Used**.

**Figure 8-12: Web Interface - 'Used By Routing Server' Parameter**

5. Click **Save**.
6. In the ARM GUI, make sure the device is displayed in the Network page, Map view. Verify that the peer connection you configured is displayed. Unlock it (see Section 2.2.1.4); make sure its color is green.



**Note:** After configuring an IP group and then viewing it in the ARM, it is strongly recommended not to change its unique name. Changing its unique name will prevent routing by the ARM of calls to this Pcon (IP group) and receipt by the ARM of calls from this Pcon (IP group).

7. In the Web interface, open the IP-IP Routing Table (**Configuration > VoIP > SBC > IP-to-IP Routing Table**).
8. The screen below shows an example of two routing rules.

**Figure 8-13: Web Interface – IP-to-IP Routing Table**

Index	Name	Routing Policy	Alternative Route Options	Source IP Group	Request Type	Source (Source Name/Prefix)	Destination (Destination Name/Prefix)	Destination Type	Destination IP Group	Destination SIP Interface	Destination Address
1		Default_SBCRoutingPolicy	Route Rule	LocalPeerThrough	All	*	*	IP Group	BTTrunkLynxDue	None	
2		Default_SBCRoutingPolicy	Route Rule	Any	All	*	40258801960-891X	IP Group	SIPBX	None	

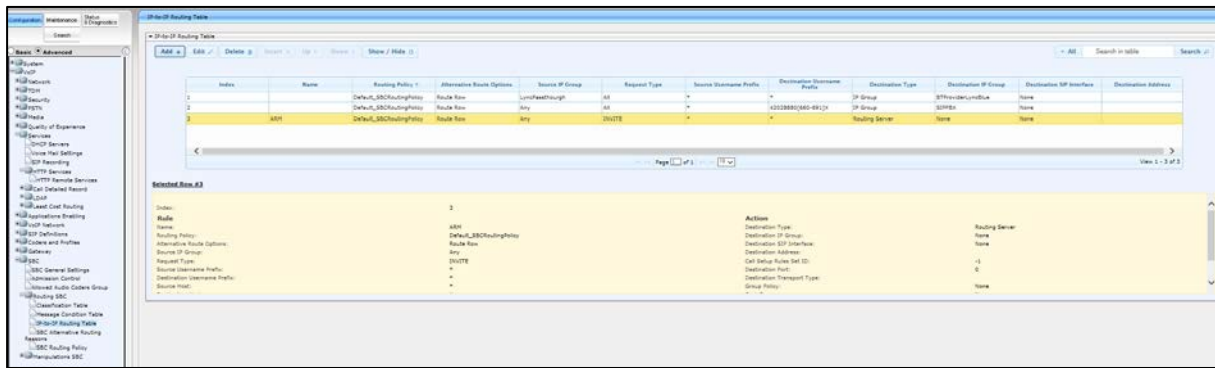
Figure 8-14: Web Interface – IP-to-IP Routing Table – Add Row – Rule tab

9. Under the **Rule** tab, define the routing conditions: Only define a 'Name' and for 'Request Type' define **INVITE**. Leave all other conditions fields undefined (i.e., no conditions, or any).
10. Click **Add**.
11. Click the **ACTION** tab.

Figure 8-15: Web Interface – IP-to-IP Routing Table – Add Row – Action tab

12. From the 'Destination Type' dropdown, select **Routing Server**. This rule will serve to perform routing via the ARM.
13. Leave all other fields undefined, and then click **Add**.

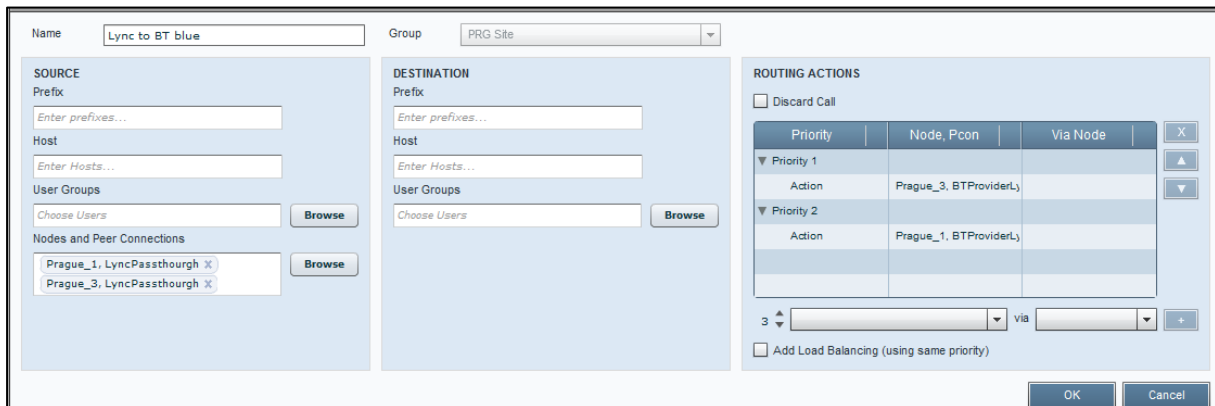
Figure 8-16: Web Interface – IP-to-IP Routing Table



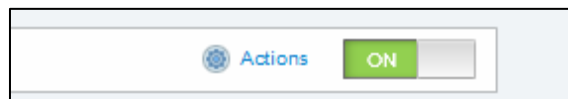
At this point, your routing service will still be operating according to that defined in the IP to IP Routing Table in the SBC Web interface.

- Next, in the ARM GUI's Routing page, configure a rule parallel to one of the rules configured in the Web interface's IP to IP Routing Table.

Figure 8-17: Configuring a Routing Rule in the ARM



- In the ARM GUI, switch **ON** the routing rule; the rule is now activated in the ARM.



- In the Web interface, delete the routing rule. The transition is now complete.
- Perform a Test Route (see Section 6.3 for detailed information).
- Make a call and make sure the call was established by the ARM.

## 8.3 Migrating Media Gateway Routing to the ARM

After making sure that the device (the gateway in this case) is connected to all HTTP ARM services i.e., ARM Topology Server and router/s, you can begin to migrate the routing rules from those defined in the Web interface to the ARM.

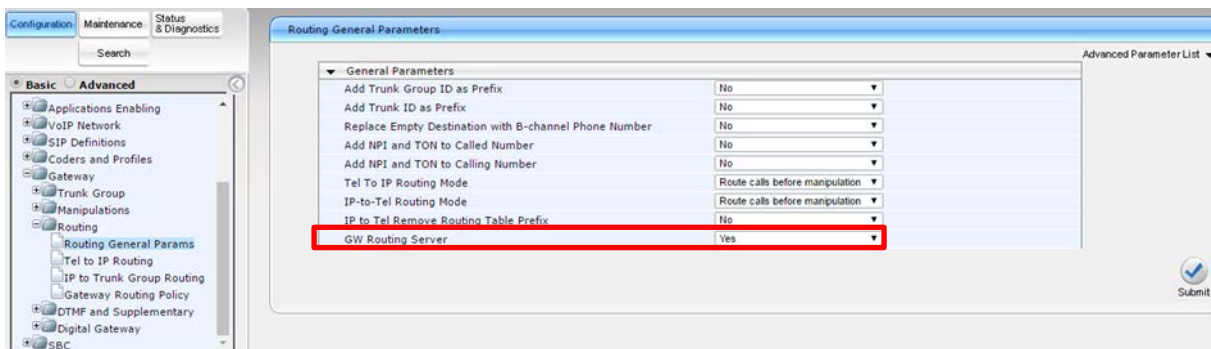


**Note:** 'Trunk Group' and 'IP Group' in the Web are called 'Peer Connection' in the ARM.

➤ **To migrate gateway routing rules to the ARM:**

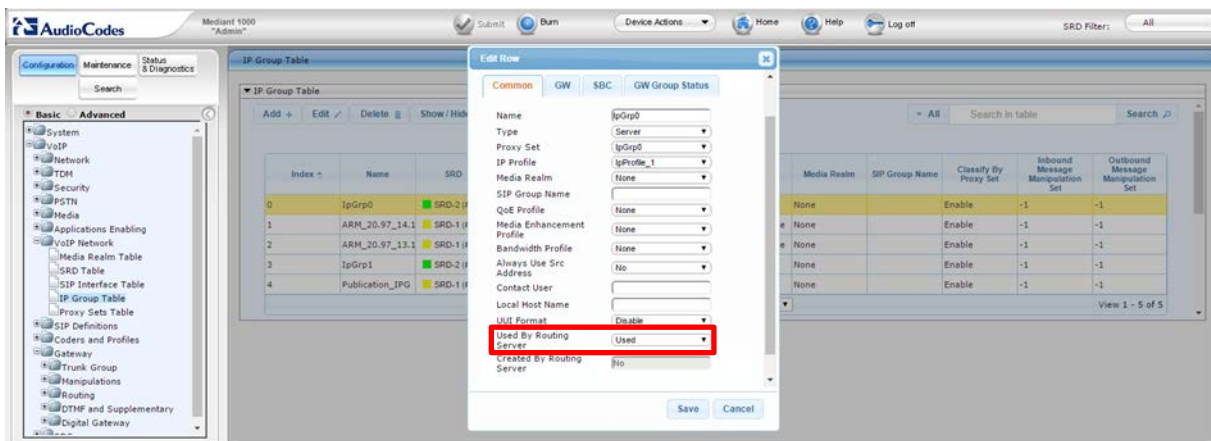
1. In the Web interface, navigate to the Routing General Parameters page, and set the parameter 'GW Routing Server' to **Yes**.

**Figure 8-18: Web Interface - Routing General Parameters Page**



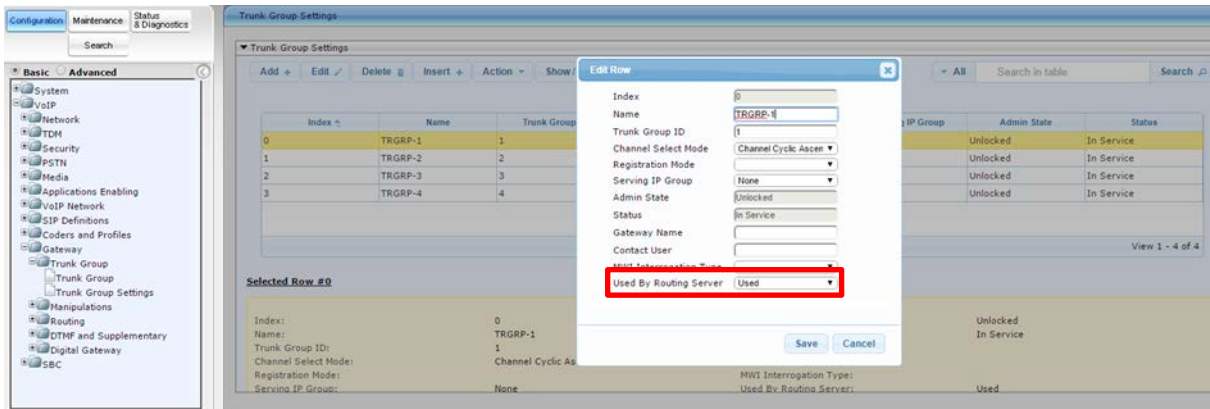
2. Navigate in the Web interface to the IP Group Table page.
3. Locate the IP Group to expose the enterprise network to the ARM environment.
4. [Mandatory] Enter a unique name for the IP Group.
5. Set the 'Used By Routing Server' parameter to **Used**.

**Figure 8-19: Web Interface - IP Group Table Page**



6. Navigate to the Trunk Group Table page.
7. Locate the Trunk Group to expose the enterprise network to the ARM environment.
8. [Mandatory] Enter a unique name for the Trunk Group.
9. Set the 'Used By Routing Server' parameter to **Used**.

Figure 8-20: Web Interface - Trunk Group



10. In the ARM GUI, make sure the device is displayed in the Network page, Map view. Make sure the Peer Connection you configured is displayed. Unlock it and make sure its color is green.



**Note:** After viewing the trunk group or IP Group in the ARM, it is strongly recommended not to change its unique name. Changing its unique name will prevent routing by the ARM of calls to this Peer Connection (trunk / IP group) and receipt by the ARM of calls from this Peer Connection (trunk / IP group).

At this point, your routing service will still be operating according to that defined in the Tel to IP and IP to Tel Routing Tables in the gateway's Web interface.

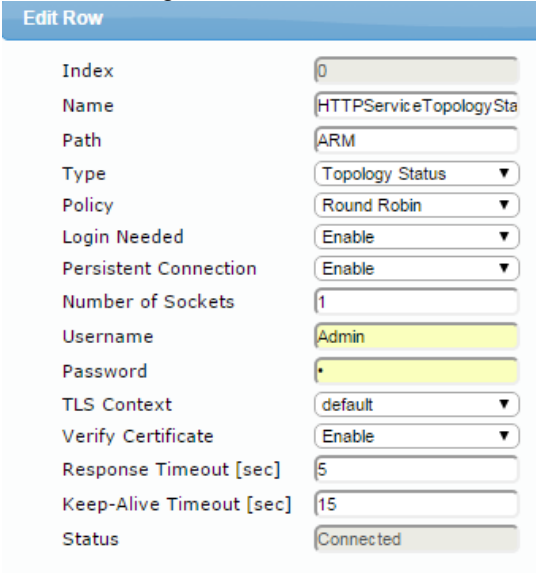
11. In the ARM GUI's Routing page, configure a rule parallel to one of the rules configured in the Web interface's Tel to IP or IP to Tel Routing Table.

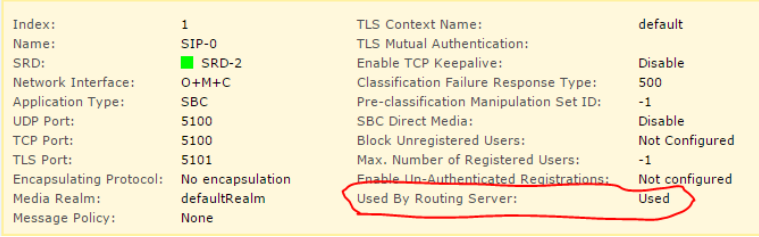
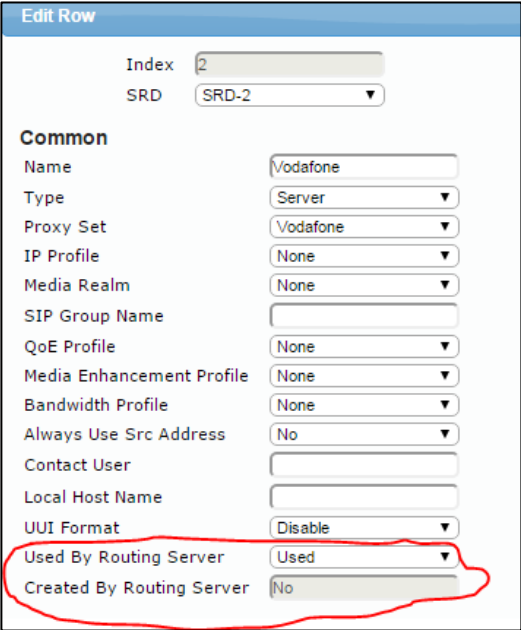
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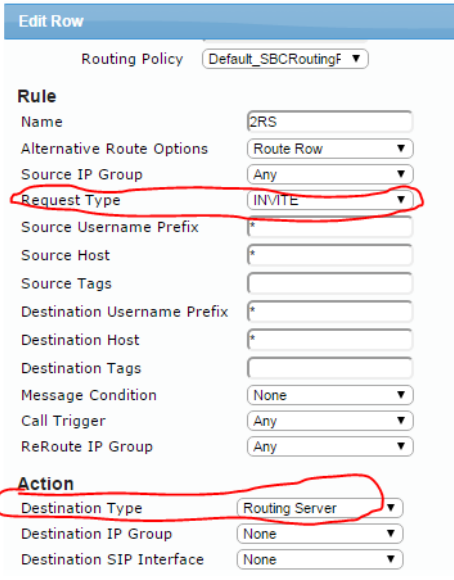
# A Checklist for Migrating SBC Routing to the ARM

This appendix provides administrators with a checklist to use when migrating SBC routing to the ARM. Tick off the items in the list as you proceed.

**Figure A-1: SBC Migration Checklist**

Item	SBC-Level	What should be viewed in the ARM
1	Configure the SBC in the way you used to, including all the IP Groups for connectivity with external SIP trunks and PBXs.	Unrelated to ARM
2	<p>Configure the IP address of the ARM's 'Configurator'</p> <p>Note: Do not configure Routers independently. Only configure 'Configurator' IP address and credentials:</p> <ul style="list-style-type: none"> <li>▪ Currently, it's HTTP only (HTTPs will be supported later)</li> <li>▪ Configure In the SBC's Web interface (Configuration &gt; Advanced &gt; VoIP &gt; Services &gt; HTTP Services &gt; HTTP Remote Services):                             <ul style="list-style-type: none"> <li>- IP address of the Configurator</li> <li>- User name and Password for connecting to the Configurator. Default: Admin/Admin</li> </ul> </li> </ul>  <p>Make sure the status changes to 'Connected'.</p>	<p>View the new Node</p> <p>Make sure it becomes green-coded, indicating that it's available</p>

Item	SBC-Level	What should be viewed in the ARM																																												
3	<p>Choose the SIP interfaces you want to use in the ARM (for ARM Peer connections and ARM Connections) to be 'Used By Routing Server'</p> <p>SBC Web interface (Configuration &gt; Advanced &gt; VoIP &gt; VoIP Network &gt; SIP Interface Table</p>  <table border="1" data-bbox="276 539 1038 775"> <tr><td>Index:</td><td>1</td><td>TLS Context Name:</td><td>default</td></tr> <tr><td>Name:</td><td>SIP-0</td><td>TLS Mutual Authentication:</td><td></td></tr> <tr><td>SRD:</td><td>SRD-2</td><td>Enable TCP Keepalive:</td><td>Disable</td></tr> <tr><td>Network Interface:</td><td>O+M+C</td><td>Classification Failure Response Type:</td><td>500</td></tr> <tr><td>Application Type:</td><td>SBC</td><td>Pre-classification Manipulation Set ID:</td><td>-1</td></tr> <tr><td>UDP Port:</td><td>5100</td><td>SBC Direct Media:</td><td>Disable</td></tr> <tr><td>TCP Port:</td><td>5100</td><td>Block Unregistered Users:</td><td>Not Configured</td></tr> <tr><td>TLS Port:</td><td>5101</td><td>Max. Number of Registered Users:</td><td>-1</td></tr> <tr><td>Encapsulating Protocol:</td><td>No encapsulation</td><td>Enable Un-Authenticated Registrations:</td><td>Not configured</td></tr> <tr><td>Media Realm:</td><td>defaultRealm</td><td>Used By Routing Server:</td><td>Used</td></tr> <tr><td>Message Policy:</td><td>None</td><td></td><td></td></tr> </table>	Index:	1	TLS Context Name:	default	Name:	SIP-0	TLS Mutual Authentication:		SRD:	SRD-2	Enable TCP Keepalive:	Disable	Network Interface:	O+M+C	Classification Failure Response Type:	500	Application Type:	SBC	Pre-classification Manipulation Set ID:	-1	UDP Port:	5100	SBC Direct Media:	Disable	TCP Port:	5100	Block Unregistered Users:	Not Configured	TLS Port:	5101	Max. Number of Registered Users:	-1	Encapsulating Protocol:	No encapsulation	Enable Un-Authenticated Registrations:	Not configured	Media Realm:	defaultRealm	Used By Routing Server:	Used	Message Policy:	None			<p>You're able to select the chosen SIP Interfaces as ARM 'Routing Interfaces' for ARM Connections between the Nodes (SBCs)</p>
Index:	1	TLS Context Name:	default																																											
Name:	SIP-0	TLS Mutual Authentication:																																												
SRD:	SRD-2	Enable TCP Keepalive:	Disable																																											
Network Interface:	O+M+C	Classification Failure Response Type:	500																																											
Application Type:	SBC	Pre-classification Manipulation Set ID:	-1																																											
UDP Port:	5100	SBC Direct Media:	Disable																																											
TCP Port:	5100	Block Unregistered Users:	Not Configured																																											
TLS Port:	5101	Max. Number of Registered Users:	-1																																											
Encapsulating Protocol:	No encapsulation	Enable Un-Authenticated Registrations:	Not configured																																											
Media Realm:	defaultRealm	Used By Routing Server:	Used																																											
Message Policy:	None																																													
4	<p>Select all the IP Groups you want to use in ARM as ARM Peer Connections for routing to be 'Used By Routing Server' (these should be SIP trunks and connections to IP PBXs, for example)</p> <p>SBC WEB page: Configuration &gt; Advanced &gt; VoIP &gt; VoIP Network &gt; IP Group Table</p>  <p>Note: Don't configure anything for ARM Connections at the SBC level. Connections are made at the ARM level and configured by the ARM.</p>	<p>View the selected IP Groups as ARM Peer Connections and attached VoIP Peers.</p> <p>View their availability status (green/red).</p> <p>In the ARM, unlock these Peer connections.</p>																																												

Item	SBC-Level	What should be viewed in the ARM
5	<p>At this stage, the ARM does not route calls, though you can apply a 'test route' at the ARM level. The Node (SBC) does not send a routing request to the ARM after a SIP invite.</p>	<p>In the ARM you can now:</p> <ul style="list-style-type: none"> <li>▪ View and create ARM topology (connections between the Nodes)</li> <li>▪ Add ARM routing groups and Routing rules, manipulation groups, etc.</li> <li>▪ Test yourself using the ARM's 'test route'</li> </ul>
6	<p>Command the SBC to route calls using the ARM:</p> <p>SBC Web interface (Configuration &gt; Advanced &gt; VoIP &gt; SBC &gt; Routing SBC &gt; IP-to-IP Routing Table</p> <p>Add a new rule and configure 'Request Type' = Invite; 'Destination Type' = Routing Server</p> 	<p>Calls are now routed by the ARM:</p> <ul style="list-style-type: none"> <li>▪ SBC gets an INVITE</li> <li>▪ Sends routing Request to ARM</li> <li>▪ Get reply from ARM</li> <li>▪ Sends INVITE further according to the ARM's instructions</li> </ul>
7	<p>Configure manually using the ini file (or in the 'Admin' Web interface page):</p> <p><b>SendAcSessionIDHeader = 1</b></p>	<p>Temporary step. Will be resolved. Causes the SBC to preserve Call ID when a call passes through several SBCs.</p>

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## B Prefixes

The table below describes the prefixes rules.

**Figure B-1: Prefixes**

Notation	Description	Examples
[n-m]	Represents a range of numbers. Note: numbers "n" and "m" should be of the same length.	[5551200-5551300]#: represents all numbers from 5551200 to 5551300. 123[100-200]: represents all numbers from 123100 to 123200.
[n,m,...] or n,m,l, ...	Represents multiple numbers or strings.	[2,3,4,5,6]#: represents a one-digit number starting with 2, 3, 4, 5, or 6. [11,22,33]XXX#: represents a five-digit number that starts with 11, 22, or 33. [111,222]XXX#: represents a six-digit number that starts with 111 or 222. [2X,3X,4X,50,54]XXXXXX#: represents a 8 digit number starting with 2, 3, 4, 50 or 54 aaa,bbb,ce,field : represents names that start with one of the strings: aaa, bbb, ce or field.
[n1-m1,n2-m2, a,b,c,n3-m3]	Represents a mixed notation of multiple ranges and single numbers.	[123-130,455,766,780-790]: represents numbers 123 to 130, 455, 766, and 780 to 790.
X (capital only)	Represents any single digit or character.	BobX: represents names starting with bob1 or bob2@audiocodes.com  AliceX#: represents names of 6 characters length, starting with Alice such as Alice1.
Pound sign (#) at the end of a number	Represents the end of a number.	54324XX#: represents a 7 digit number that starts with 54324.
Empty	Represents any number or string	

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## C Routing Path

This appendix describes the routing path.

- A successful routing response contains 1 primary route and 0-5 alternate routes.
- The maximum number of routes to a specific ROUTING ACTION entry (Node or Node/Pcon) is two.
- The routing path, from source to destination, is selected as follows:
  - All possible paths, from source node to destination node/node+pcon in which all nodes and connections are active and unlocked, are selected.
  - If via is selected, all entries that do not contain the via node are discarded.
  - All routing alternatives are sorted by weighted path, cost and then by number of hops.

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## D Appendix C - Call Routing

This appendix describes call routing.

- A routing request results in an HTTP error response if no available routing is available.
- A routing request from a source node which has an alternate route option returns the next alternate route option. The call route is not recalculated. If the alternate route list is empty, a 404 result is returned.
- A routing request from a node which is not the source node returns the next hop in the routing chain according to the original route selection. The routing logic is not performed again.

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