Integration Guide

AudioCodes One Voice Operation Center (OVOC)

OVOC

Integration with Northbound Interfaces

Version 8.0

audiocodes

Notice

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Document Name
OVOC Documents
Migration from EMS and SEM Ver. 7.2 to One Voice Operations Center
One Voice Operations Center IOM Manual
One Voice Operations Center Product Description

Document Name
One Voice Operations Center User's Manual
Device Manager Pro Administrator's Manual
One Voice Operations Center Alarms Monitoring Guide
One Voice Operations Center Performance Monitoring Guide
One Voice Operations Center Security Guidelines
One Voice Operations Center Integration with Northbound Interfaces
Device Manager for Third-Party Vendor Products Administrator's Manual
Device Manager Agent Installation and Configuration Guide
ARM User's Manual
Documents for Managed Devices
Mediant 500 MSBR User's Manual
Mediant 500L MSBR User's Manual
Mediant 500Li MSBR User's Manual
Mediant 500L Gateway and E-SBC User's Manual
Mediant 800B Gateway and E-SBC User's Manual
Mediant 800 MSBR User's Manual
Mediant 1000B Gateway and E-SBC User's Manual
Mediant 1000B MSBR User's Manual
Mediant 2600 E-SBC User's Manual
Mediant 3000 User's Manual
Mediant 4000 SBC User's Manual
Mediant 9000 SBC User's Manual
Mediant Software SBC User's Manual
Microsoft Teams Direct Routing SBA Installation and Maintenance Manual

Document Name
Mediant 800B/1000B/2600B SBA for Skype for Business Installation and Maintenance Manual
Fax Server and Auto Attendant IVR Administrator's Guide
Voca Administrator's Guide
VoiceAI Connect Installation and Configuration Manual

Document Revision Record

LTRT	Description
19226	Update to Sections: MGs Topology List; Alarm Forwarding Data Formats; OVOC Server Backup and Restore; Data Analytics API.
19227	Removed Section "Configuring AudioCodes Azure Active Directory' with reference to the IOM (note this section was not removed from LTRT-19226 as previously stated).
19228	Updates to Section: "NBIF" folder; Authentication and Authorization using Microsoft Azure; Configuring Radius Server (replaced screen); Authentication and Authorization using an LDAP Server (replaced screen).
19229	Update to Section Data Analytics API.

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1 Overview

AudioCodes One Voice Operations Center OVOC delivers a comprehensive management tools suite comprising of base platform and add-on modular applications for the management, monitoring and operation of converged VoIP and data networks implemented in large-scale cloud or premise-based unified communications deployments using AudioCodes devices. The products that are managed by the OC include the Session Border Controllers (SBC), Media Gateways, Microsoft Survivable Branch Appliances (SBA), Multi Service Business Router (MSBR), residential gateways and devices .OVOC also integrates with the Microsoft Skype for Business environment platforms.

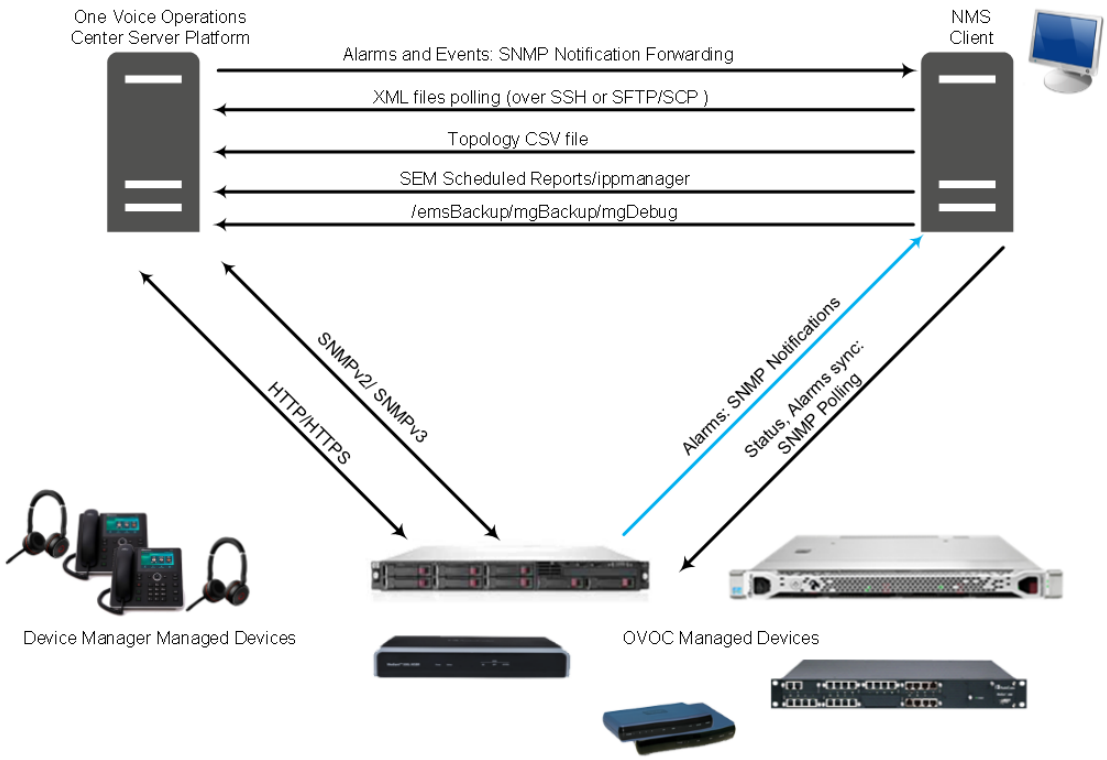
The Network Operations Center's core product, the Operations Center OC manages these products in a centralized device inventory via a Web client, enabling integrative network operations. The following describes the key products in the OC suite:

- **The One Voice Operations Center:** The OVOC is an advanced solution for remote standards-based management of AudioCodes products within VoP networks, covering all areas vital for their efficient operation, administration, management and security. A single user interface provides real time information including network and device component status, activity logs and alarms. Complete End-to-End network control includes data on all devices, all locations, all sizes, all network functions and services and full control over the network, including services, updates, upgrades, and operations. The OVOC is in AudioCodes' assessment, the best tool to manage AudioCodes devices. However, it does not replace the NMS and OSS management systems, which displays to operators a comprehensive view of the network, including other vendors' equipment. After defining and initially provisioning a device via the device's embedded Web server tool, operators will usually work with an NMS / OSS for day-to-day maintenance. Only in the event of problems with a device or when significant maintenance tasks must be performed, will operators open the OVOC and work directly with it. Consequently, the OVOC provides APIs for faults monitoring (alarms) and security integration with a higher level management system.
- **Voice Quality Management:** Voice Quality Management involves the analyze of real-time Voice Quality statistics, which enables the rapid identification of the metrics responsible for degradation in the quality of any VoIP call made over the network nodes including AudioCodes devices and links. It provides an accurate diagnostic and troubleshooting tool for analyzing quality problems in response to VoIP user criticism. It proactively prevents VoIP quality degradation and optimizes quality of experience for VoIP users. In addition, it integrates with Microsoft Skype for Business monitoring server to provide end-to-end VoIP quality monitoring on Microsoft Skype for Business deployments. In addition, Voice Quality integrates and monitors with endpoints reporting RFC 6035 SIP PUBLISH packets.
- **The Device Manager Pro:** Enables enterprise network administrators to effortlessly and effectively set up, configure and update up to 30000 400HD Series IP phones in globally distributed corporations. These phones can upload configuration files from the OVOC server and send status updates over the REST protocol.

2 OVOC Integration

This document describes how to integrate the network elements of AudioCodes One Voice Operation Center (OVOC) with northbound interfaces. This includes the integration of alarms and events that are generated by the managed elements, the XML files polling and the Topology file. The figure below illustrates this integration.

Figure 2-1: OVOC Integration Overview



OVOC Integration Elements

This section describes the integration elements.

OVOC Topology File

The OVOC Topology file includes a snapshot of all the devices that are defined in the OVOC application. This file is located on the OVOC server and is available for the higher level management system (see Topology Files).

Alarms

Alarms are forwarded to the NMS as SNMP notifications (traps). These alarms can be forwarded using one of the following methods:

- Forwarded by the OVOC application to the NMS server (for all the network elements and the OVOC itself).

- Sent directly by each one of the network elements directly to the NMS server. In this case, there is the possibility to enable OVOC alarms. For example, when a connection between the OVOC server and device is established or lost, traps are forwarded to the NMS server.

For detailed information, see Fault Management.

Gateway Status

The status of a device can be determined based on the set of supported IETF Management Information Base (MIB-II) tables (described in the SNMP Reference Guide).

Security

Security integration covers two main areas: Users Management and Network Communication protocols.

- OVOC Users Management (Authentication and Authorization) locally in the OVOC database or via a centralized RADIUS server or LDAP server.
- Network Communication Protocols:
  - HTTP/HTTPS:
    - NBIF Client- OVOC server connection is secured by default over HTTPS port 443 using AudioCodes default certificates or custom certificates
    - File transfer
  - SNMPv2 and SNMPv3: For Maintenance actions and Faults
  - SSH/SFTP/SCP: used for File transfer

For detailed information, see OVOC Server Backup and Restore

Configuration and Maintenance

A REST API will be available in a future release for performing configuration and maintenance actions from the NMS and running automation scripts using REST API URLs. For more information, contact your AudioCodes representative.

MIB Folder

AudioCodes MIB files are located under the following folder:

/opt/ACEMS/server_<server.version>/externals/mibs/

NBIF Folder

All OVOC and device information available for the NMS and other Northbound interfaces including Topology and Backup data is located in the OVOC server machine under the folder /NBIF. This folder can be accessed using HTTPS browsing by entering the URL https://<OVOC server IP>/NBIF in your Web browser.

- The customer's Web browser must have installed the appropriate X.509 certificates signed by the same Certificate Authority (CA) as the OVOC server web browser certificates. Choose the appropriate certificate, and then click OK.
- For more information on the implementation of X.509 certificates, refer to the *OVOC Security Guidelines*.
- HTTP/S access to the NBIF folder requires a user name and password. This is required for multi-tenancy support where only authorized tenants should be able to access the NBIF folder. The Default user name is "nbif" and the default password "pass_1234". This password can be changed using the OVOC server Manager, for more information, refer to Section Change HTTP/S Authentication Password for NBIF Directory in the *OVOC Server IOM*.

The 'NBIF' folder content opens; double-click each one of the folders to list its contents. Double-click each file to open its contents.

Figure 2-2: NBIF Parent Directory

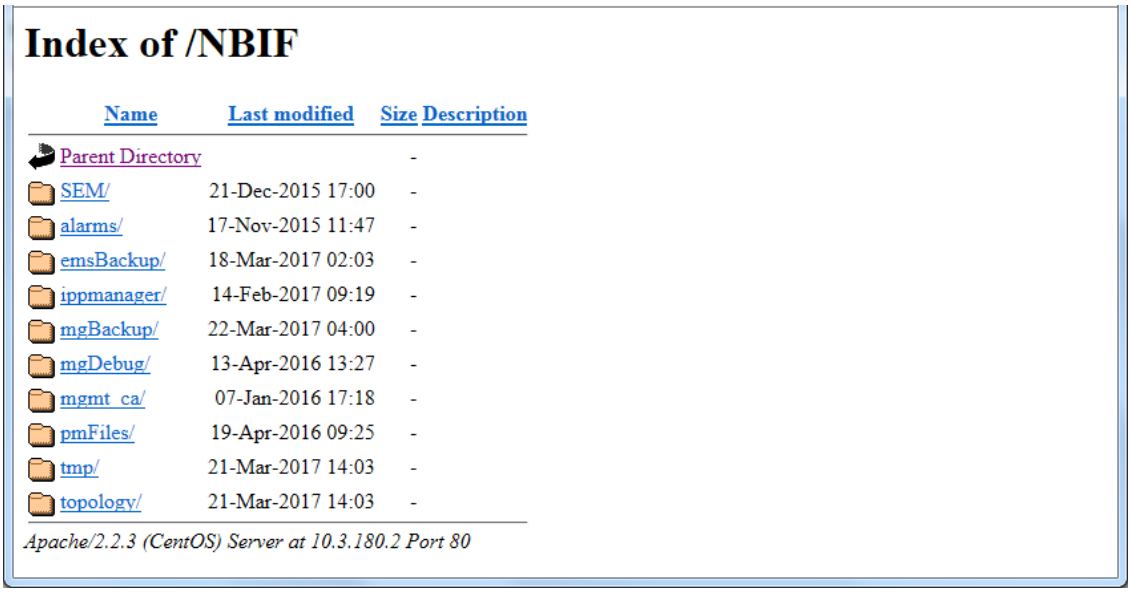


Figure 2-3: NBIF Topology Directory

The 'NBIF' folder contains the following sub-folders:

- **SEM:** this folder contains Scheduled Reports. For more information, see Voice Quality Reports
- **alarms:** this folder contains a file saved by the OVOC user (Actions > Save Alarms To File' which is available in the Active Alarms/History Alarms and Journal pages) where the action result displays no less than 1500 records. This file is created for local user requests and must not be collected by higher level Management or Backup systems.
- **emsBackup:** this folder contains the daily and weekly backup of the OVOC server. For more information, see OVOC Server Backup and Restore.
- **ippmanager (Device Manager)**: this folder contains the following folders:
  - generate: contains the device firmware files
  - regioncache: contains the device global cfg files
  - sess: contains system folder for sessions management
  - templates: contains the device cfg template files
  - tmp: contains system folder for temporary files
- **mgBackup:** This folder contains the backed up device configuration files. Up to five backup files can be stored for each managed device (for all formats) as follows:
  - AudioCodes SBC / Gateway Version 7.4.200 and later: .Zip Configuration Package.
  - MSBR: CLI script file
  - MP-202 or MP-204: Conf file
  - VoiceAI Connect: Zip file
  - Stack Manager: Json file
  - For all other AudioCodes devices (except CloudBond, UMP and SmartTAP): ini files
- **mgDebug:** This folder contains Syslog and Packets debug information.
- **Mgmt_ca:** This folder contains the default certificate files for the OVOC Managed devices and the OVOC Root CA file.
- **pmFiles:** This folder contains the output XML file for Performance Monitoring data that is collected per polling interval according to the PM Profile and output to XML file according to the filter settings.
- **topology:** A Summary file of all the devices and their basic properties defined in the OVOC application. The summary file is located under the 'topology' folder and is always named MGsTopologyList.csv. For more information, see Topology Files.

3 Topology Files

Topology files are created and maintained by the OVOC application. These file includes updated information on the OVOC topology. The following files are generated by the OVOC server:

- MGsTopologyList.csv (see below)
- Topology.xml file (see Topology.xml File)

Both the 'MGsTopologyList.csv' and the Topology.xml file can be retrieved using one of the following methods:

- Using the 'Collect Logs' option in the EMS Server Manager
- By FTP or SFTP protocol
- Via Telnet or SSH using 'nbif' user with user nbif, pass_1234

The Topology.xml must be generated manually using the Topology Export procedure (described below in Topology.xml File).

MGs Topology List

The MGsTopologyList.csv file is used by the NMS system to synchronize the list of devices that are currently managed by the OVOC for the purposes of Alarms Forwarding integration. For example, if a specific device has not been receiving alarms, you can verify in the topology file, whether the relevant device is displayed in the list of connected gateways.

The Topology file is automatically updated upon the addition /removal of a device or upon updates to the device's properties, such as name, IP address or region modification. The OVOC sends 'acEMSTopologyUpdateEvent' (Topology Update) for changes in the definition or update of a device and sends 'acEMSTopologyFileEvent (Topology File Generated) for a topology file update. These events are displayed in the OVOC Alarm Browser and in the NMS Alarm Browser when the 'OVOC Events Forwarding' check box is selected in the Trap Configuration 'Destination Rule Configuration' dialog.

When multiple devices are added, the Topology file is updated approximately once per minute as the entire operation may take more than a few minutes. For detailed information on the exact event fields, refer to the *OVOC Alarms Guide*.

The file header is composed of two lines commencing with ";" file format version, and column names. Each row in the file represents a device in the OVOC tree and includes the following information:

- Device Serial Number (displays either 32-bit and 64-bit serial numbers for SBC devices) according to the device firmware version and configuration settings in the externals/configurationProperties/generalConfig file for the include_serial_string.
- IP Address
- FQDN
- Node Name

- Region Name
- Description
- Product Type
- Software Version
- Connection Status – Connected / Not Connected – represent the ability of OVOC application to communicate with the device
- Administrative State – Locked / Unlocked / Shutting Down
- Operational State – Enabled / Disabled
- Mismatch State – No Mismatch / Software Version Unsupported / Software Mismatch / Hardware Mismatch.
- Last Change Time
- Protocol Type –SIP
- Reset Needed
- SBA FQDN Name
- SBA IP Address
- SNMP Version – options are SNMPv2/SNMPv3
- SNMP Read – encrypted SNMP read community
- SNMP Write – encrypted SNMP write community
- SNMP User Profile - SNMP v3 user credentials in format: (EnginID;SecurityName;SecurityLevel;AuthProtocol;PrivacyKey)
- Gateway User – user name for MG web access
- Gateway Password– user password for device web access
- HTTPS Enabled – 0-disabled/1-enabled HTTPS access to the device
- Tenant Name

See an example Excel file view in the figure below.

Figure 3-1: Topology File-Excel View

;Serial Nu	IP Address	Node Nan	RegionNa	Product Ty	Software	Connectic	Administr	Operative	Mismatch	Last Chan	Preformat	Performat	Protocol T	Master Pr	Reset Nee	Descriptic	SBA FQDI	SBA IP A	SNMP Ve	SNMP Re	SNMP Write	SNMP User	Gateway	Gateway	HTTPS Enabled
3583846	192.168.1(	SSO-Proxy	Eran	UNKNOW	unknown	Not Connected			No Misma	2014-12-1(	Not Polling								SNMPv2	8kXtnrBul	f/OB4MNtinsMV6rykI4hF	Admin	fseUajPSa		1
3846546	10.3.101.1	M4K	Eran	MEDIANT	7.00A.003.	Connecte	Unlocked		No Misma	2015-02-1(	Not Polling								SNMPv2	8kXtnrBul	f/OB4MNtinsMV6rykI4hF	Admin	fseUajPSa		1
1242278	10.3.151.2	SSBC	Eran	SW SBC	7.00A.005.	Connecte	Unlocked		No Misma	2015-02-1(	Not Polling								SNMPv2	8kXtnrBul	f/OB4MNtinsMV6rykI4hF	Admin	fseUajPSa		0
123456	1.1.1.1		Eran	UNKNOW	unknown	Not Connected			No Misma	2014-12-0(	Not Polling					1.1.1.1			SNMPv2	8kXtnrBul	f/OB4MNtinsMV6rykI4hF	Admin	fseUajPSa		1
273196	10.4.100.3	10.4.100.3	Vladi	MEDIANT	6.80A.255.	Connecte	Unlocked		No Misma	2015-02-1(	Not Polling								SNMPv2	8kXtnrBul	f/OB4MNtinsMV6rykI4hF	Admin	fseUajPSa		1
4773083	10.3.181.9	10.4.100.1	AutoDete	MEDIANT	7.00A.004.	Not Conne	Unlocked		No Misma	2015-02-0(	Not Polling								SNMPv2	8kXtnrBul	f/OB4MNtinsMV6rykI4hF	Admin	fseUajPSa		1
760978	10.3.80.16	10.3.80.16	AutoDete	MP124	6.60A.290.	Not Conne	Unlocked		No Misma	2015-02-0(	Not Polling	SIP		Reset Not	Needed				SNMPv2	8kXtnrBul	f/OB4MNtinsMV6rykI4hF	Admin	fseUajPSa		1
3480922	10.15.4.6	10.15.4.6-	AutoDete	Mediant 8	6.80A.261.	Connecte	Unlocked		No Misma	2015-02-1(	Not Polling								SNMPv2	8kXtnrBul	f/OB4MNtinsMV6rykI4hF	Admin	fseUajPSa		1
5200544	10.3.181.7	10.3.181.7	AutoDete	Mediant 5	6.90A.048	Not Conne	Unlocked	Enabled	No Misma	2014-12-1(	Not Polling								SNMPv2	8kXtnrBul	f/OB4MNtinsMV6rykI4hF	Admin	fseUajPSa		0
893335	10.3.181.2	10.3.181.2	AutoDete	MEDIANT	6.80A.219	Not Conne	Unlocked	Enabled	No Misma	2015-01-0(	Not Polling								SNMPv2	8kXtnrBul	f/OB4MNtinsMV6rykI4hF				1
3037728	10.3.181.6	10.3.181.6	AutoDete	Mediant 5	6.80.244.0	Connecte	Unlocked		Hardware	2015-02-1(	Not Polling								SNMPv2	8kXtnrBul	f/OB4MNtinsMV6rykI4hF	Admin	fseUajPSa		1
5264110	10.3.181.1	10.3.181.1	AutoDete	UNKNOW	unknown	Not Connected			No Misma	2014-12-1(	Not Polling								SNMPv2	8kXtnrBul	f/OB4MNtinsMV6rykI4hF	Admin	fseUajPSa		1
4979399	10.3.3.214	10.3.3.214	AutoDete	Mediant 8	7.00A.001	Not Conne	Unlocked		No Misma	2015-01-0(	Not Polling								SNMPv2	8kXtnrBul	f/OB4MNtinsMV6rykI4hF				1

Topology.xml File

The Topology.xml file backs up the following data:

- Tenants/Regions/Sites

- AudioCodes devices
- Skype for Business devices
- Generic devices
- Links
- SBAs/CloudBond/CCE Appliances
- License Pool configuration for each managed device

➢ **To export the OVOC topology xml file:**

1. Log in to the OVOC server platform as 'root' user with password root (default password is root):

```
su - root
```

2. Change directory to /ACEMS/server_7.4.xxx:

```
cd /ACEMS/server_7.4.xxx
```

3. Execute topologyExport.pl script:

```
./topologyExport.pl
```

4 Managing PM Files

Performance Monitoring data can be retrieved as follows:

- Data files can be generated for polled data according to PM profile for each polling interval (see Creating PM Data File)
- Filter queries can be saved to an XML file which you can save to an external location (see Saving PM Filter Queries)

> Performance Monitoring parameters can be managed using SNMP and REST API.

Saving PM Filter Queries

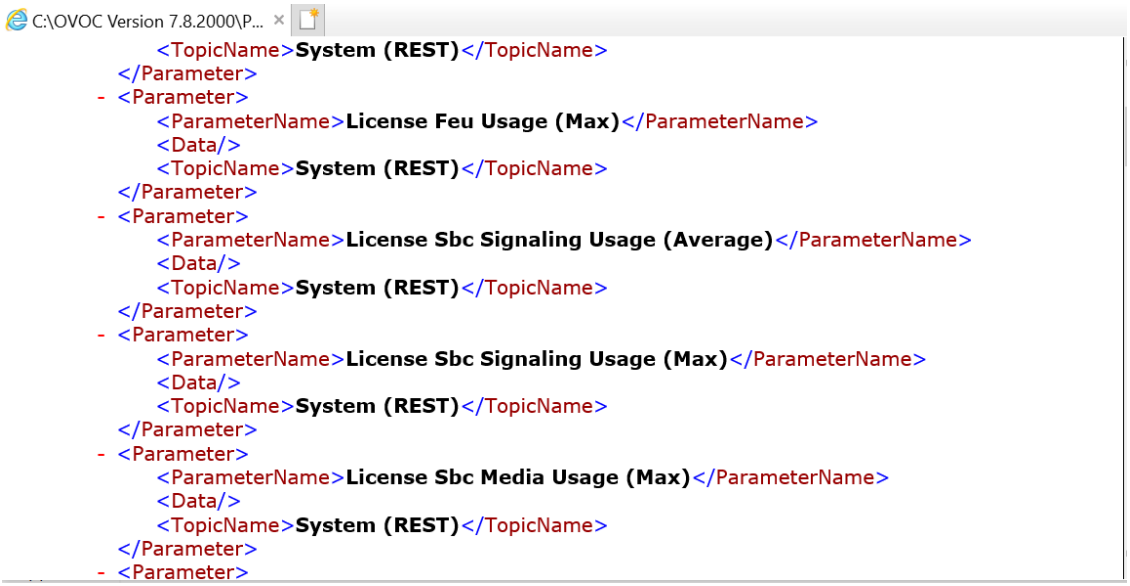
You can save PM filter queries to a CSV file by selecting the option **Save Device PM Data.**

➢ **To save PM filter queries:**

1. In the OVOC Web, open the Network Devices page (**Network** tab > **Devices** menu).
2. Select the device whose data you wish to extract and click **Show**.
3. Verify that the device is currently being polled.
4. Click the **Statistics** tab and add a new filter.
5. Click **Save Device PM Data**.

   Filter output is saved to a CSV file; save the file to the desired external location. See example file below.

Figure 4-1: PM Data File



Creating PM Data File

A PM data file can be automatically generated when the option "Create Data File" is selected in the PM Profile in the OVOC Web. The data file is generated for polled data for each polling interval for all parameters that are defined in the profile. These files can be retrieved from the NBIF directory (see NBIF Folder).

➢ To create a PM data file:

1. In the OVOC Web, open the Add PM Profile screen (**Statistics** > **PM Profiles** > **Add**).
2. Select the 'Create Data File' check box.

See example XML format in XML editor below.

Figure 4-2: Performance Monitoring XML Output

```
−<root>
  −<data>
    −<topics>
      −<topic>
          <topicName>SBC</topicName>
        −<parameters>
          −<parameter>
            −<parameterData>
                <value>0.0</value>
              </parameterData>
              <paramName>acPMSBCAsrMax</paramName>
            </parameter>
          −<parameter>
            −<parameterData>
                <value>0.0</value>
              </parameterData>
              <paramName>acPMSBCAsrMin</paramName>
            </parameter>
          −<parameter>
            −<parameterData>
                <value>0.0</value>
              </parameterData>
              <paramName>acPMSBCAsrAverage</paramName>
            </parameter>
          −<parameter>
            −<parameterData>
```

5 Fault Management

AudioCodes devices report their faults (alarms and events) and state changes (Administrative/Operative state) via SNMP notification traps. Both standard and proprietary traps are supported. AudioCodes proprietary traps have the same variable bindings set. Each alarm includes information required by the ITU-T X.733 standard. Operative and Administrative states are managed according to the ITU-T X.731 standard. See the OVOC Alarms Guide for the exact list of standard, MG proprietary and OVOC proprietary traps that are supported for each device. For each trap description, it's indicated whether the trap is defined as an alarm or an event.

Alarms and Events Forwarding to the NMS

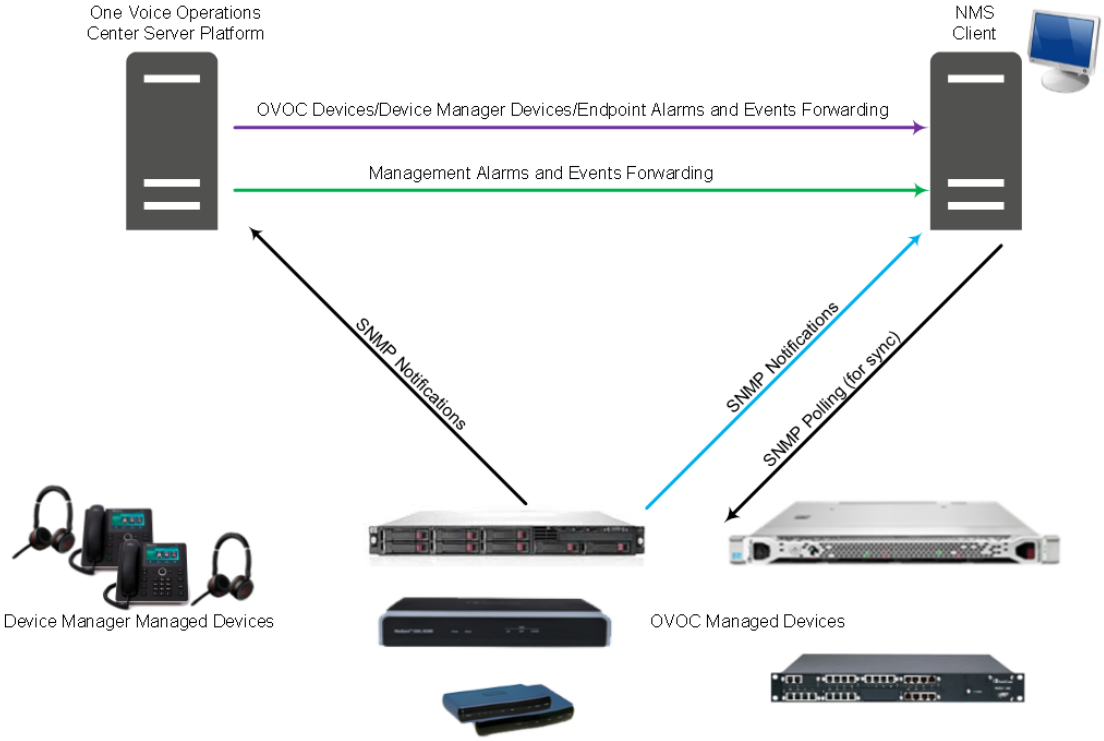
Alarms can be forwarded to the NMS using one of the following methods:

- Alarms and events are forwarded by the OVOC application to the NMS for all network elements (devices, IP Phones and endpoints (purple-colored path in the figure below) or only Management alarms and events are forwarded (green-colored path in the figure below).
- Each one of the network elements (devices and devices) sends its own alarms directly to the NMS (blue-colored path in the figure below). The device can send alarms to several destinations (the exact number of destinations depends on the device type). For example, the device can send alarms to the OVOC and NMS. You can configure each destination with a different trap port.

Traps are forwarded to the NMS as SNMPv2 or SNMPv3 Notifications. The SNMPv3 protocol provides more sophisticated security mechanisms than SNMPv2c. It implements a user-based security model (USM), allowing both authentication and encryption of the requests sent between the OVOC Manager and their agents, as well as user-based access control. SNMP can be configured in the OVOC at the global level using an SNMP Connectivity template, at the tenant level (Tenant SNMP Profile). You must configure identical SNMP settings on all managed devices.

Although the OVOC can forward alarms and events in several formats (SNMP Notifications, Mail and Syslog), alarms and events are always sent to an NMS as SNMP notifications for purposes of NMS integration.

Figure 5-1: Alarm and Event Forwarding



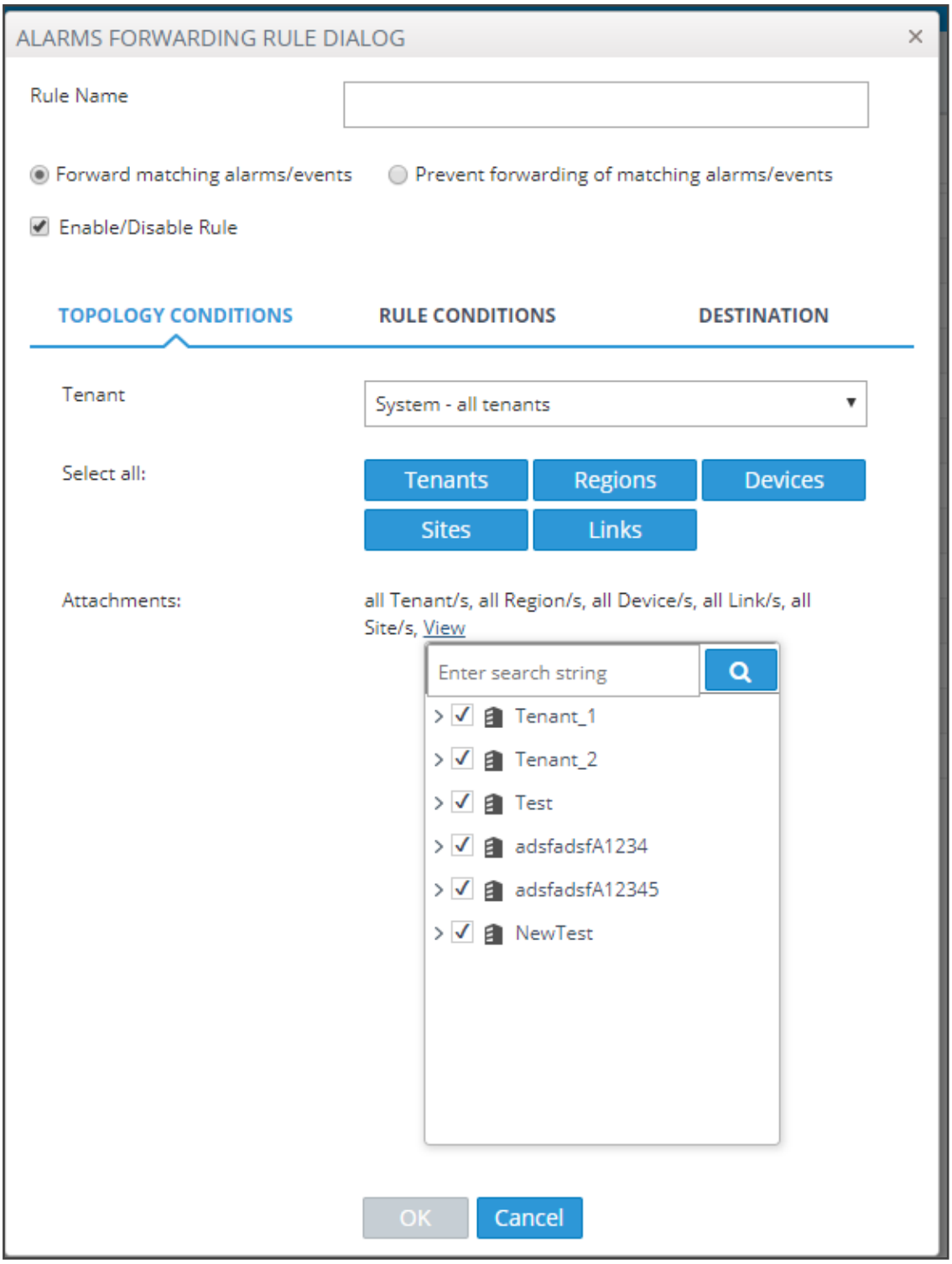
Forwarding Alarms from OVOC Server to the NMS

This section describes how to configure alarms forwarding from the OVOC server to the NMS.

➢ **To forward alarms from the OVOC to the NMS:**

1. Open the Alarms Forwarding page (**Alarms** > **Forwarding**).

Figure 5-2: Alarms – Forwarding – Topology Conditions

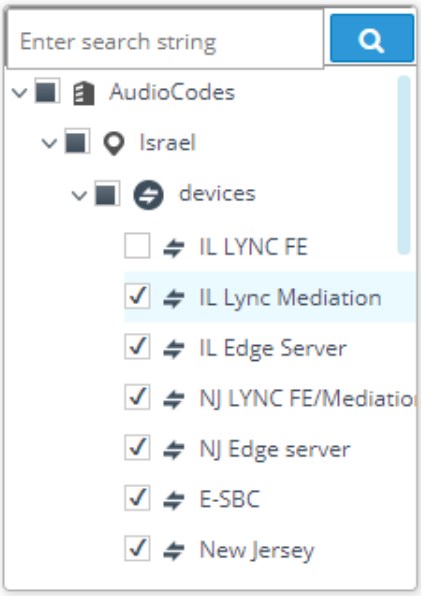


2. Configure using the table below as a reference:

Table 5-1: Forwarding Alarms – Topology Conditions - Parameter Descriptions

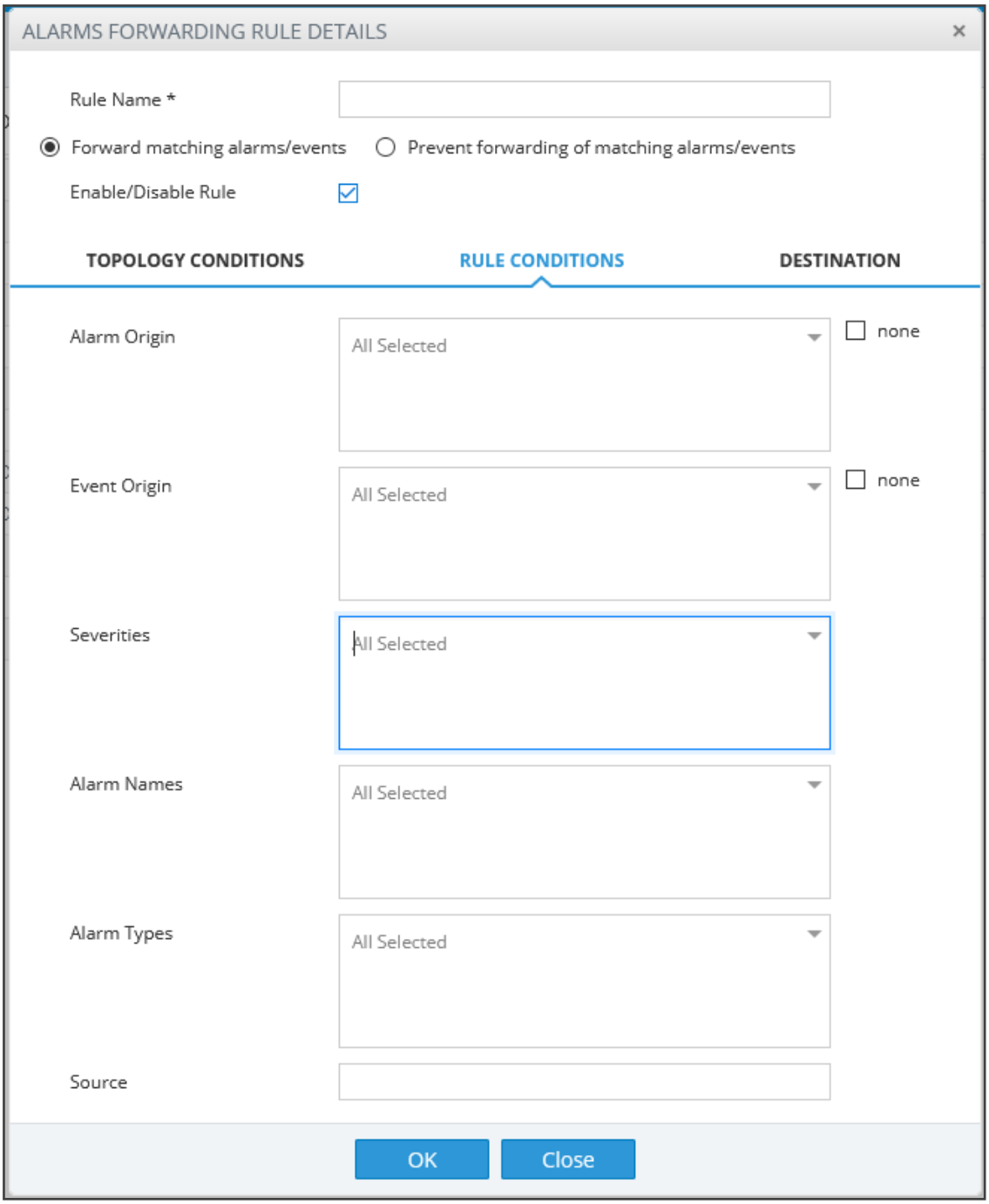
Parameter	Description
Rule Name	Define an intuitive name, to be displayed in the alarm summary

Parameter	Description
	screen.
Forward matching alarms/events -or- Prevent forwarding matching alarms/events	Allows or prevents forwarding alarms as Emails or Syslog depending on the option you select from the 'Destination Type' dropdown under the Destination tab. If for example you select Prevent forwarding matching alarms/events and then select Minor Alarms from the 'Severities' dropdown under the Rule Conditions tab, then minor alarms are not forwarded.
Enable/Disable Rule	Enables or disables the rule if the parameters and conditions configured under this tab as well as under Rule Conditions and Destinations are met.
Tenant	From the dropdown, select System – all tenants; the rule will then apply to all tenants and to all regions/links/devices/sites under all tenants. Next to 'Attachments', you'll then view: all Tenant/s, all Region/s, all Device/s, all Link/s, all Site/s Click View to view all tenants in a collapsed tree; expand the branches to view and select specific regions/links/devices/sites to apply the rule to. Alternatively: Select from the dropdown a specific tenant; the rule will be applied only to regions/links/devices/sites under that specified tenant. Click View to view only that specified tenant displayed in the tree. You can expand the tenant to view and select specific regions/links/devices/sites under it.
Tenants|Regions Devices|Sites|Links	Click a button to apply the rule to that entity and the entities under it. The buttons filter the System – all tenants option described above. For example, if you want the rule to be applied to all tenants but only to devices under all tenants, click the Devices button. Next to 'Attachments' you'll then view: 0 Tenant/s, 0 Region/s, all Device/s, 0 Link/s, 0 Site/s If you click the View link, you'll view all tenants and all devices under them displayed in a collapsed tree. After expanding the tree and selecting specific entities, 'All Devices' will change to n devices as follows:

Parameter	Description
	0 Tenant/s, 0 Region/s, 17 Device/s, 0 Link/s, 0 Site/s, View 

3. Click **OK** or optionally click the **Rule Conditions** tab.

Figure 5-3: Alarms – Forwarding – Rule Conditions



4. Configure using the table below as a reference:

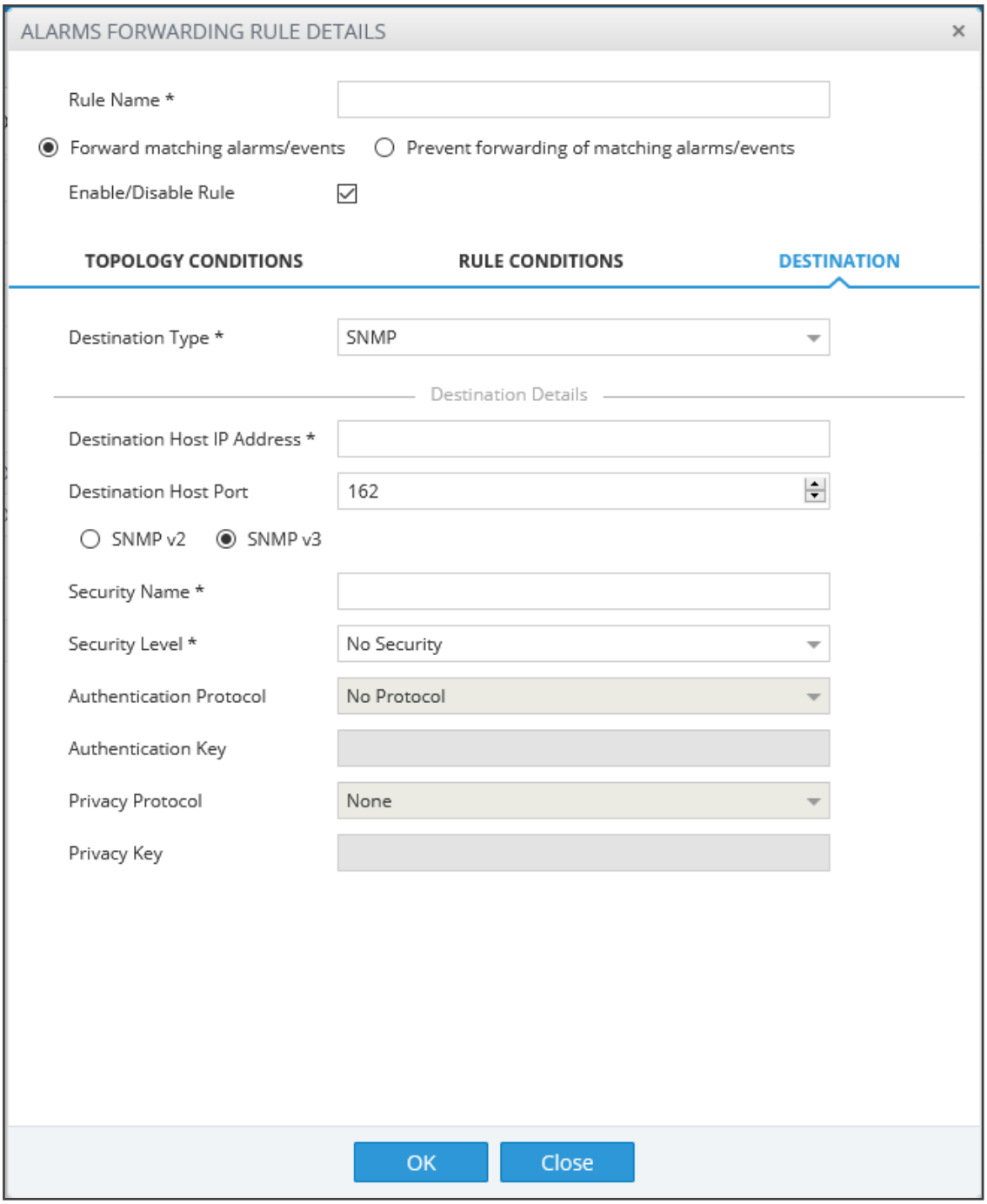
Table 5-2: Forwarding Alarms – Rule Conditions - Parameter Descriptions

Parameter	Description
Alarm Origin	Select the origin from which alarms will be forwarded: ■ Management ■ QoE

Parameter	Description
	■ Devices ■ Endpoints ■ ARM ■ VIP Endpoint Users
Event Origin	Select the origin from which events will be forwarded: ■ Management ■ QoE ■ Devices ■ Endpoints ■ ARM ■ VIP Endpoint Users
Severities	From the 'Severities' dropdown, select the severity level of the alarms you want to receive: ■ Warning ■ Minor ■ Major ■ Critical ■ Indeterminate Default: All Selected.
Alarm Names	Allows forwarding alarms according to specific alarm names. For example, if you select Power Supply Failure then only this alarm will be forwarded. Default: All Selected.
Alarm Types	Allows forwarding alarms according to specific alarm types. For example, if you select communicationsAlarm then only this alarm type will be forwarded. Default: All Selected.

5. Click **OK** or - optionally - click the **Destination** tab.

Figure 5-4: Alarms – Forwarding – Destination SNMPv3



6. Configure using the tables below as reference:

Table 5-3: Forwarding Alarms – Destination

Parameter	Description
Destination Type	Determines the format in which the alarm or event will be forwarded. From the dropdown, select ■ SNMP

Parameter	Description
	■ MAIL ■ SYSLOG

7. Select SNMP. Configure the parameters that are displayed using the table below as a reference.

Table 5-4: Forwarding Alarms - Destination - SNMP

Parameter	Description
Destination Host IP Address	Enter the **destination NMS host IP address to which to** forward alarms. Make sure you receive the alarms and events in the specified IP address on the port specified below.
Destination Host Port	Enter the **destination host port to which to** forward alarms. Make sure you receive the alarms and events on the specified port in the IP address specified above. In the 'Destination Host port' field, enter the port number of the destination host (the default SNMP port for trap reception is 162).
SNMP v2/SNMP v3	Select either SNMP v2 or SNMP v3. Default: SNMP v3. Forwards only those alarms that are in the format of the SNMP version you select. Note: ensure that you configure identical SNMPv2 or SNMPv3 account details on the NMS.
Trap Community	[Only available if SNMP v2 is selected above]. Note: OVOC by default sends SNMPv2c traps with the field 'SNMPv2c Trap Community' set to public.
Security Name	Enter the name of the operator.
Security Level	From the dropdown select either: ■ No security ■ Authentication ■ Authentication & Privacy See the table below for OVOC-Syslog mapping.
Authentication Protocol	Only available if you select Authentication or Authentication & Privacy from the list above. Select either: ■ No Protocol ■ MD5 ■ SHA

Parameter	Description
Authentication Key	Only available if you select MD5 or SHA from the list above.
Privacy Protocol	From the drop-down list, select the SNMP v3 operator's privacy protocol. ■ None ■ DES ■ AES-128
Privacy Key	Enter the privacy key. Keys can be entered in the form of a text password or long hex string. Keys are always persisted as long hex strings and keys are localized.

Forwarding Alarms Directly from Devices to NMS

Alarms are forwarded directly from the network element to the NMS over SNMPv2 or SNMPv3. On the managed devices, configure the NMS Trap Destination and identical SNMPv2 or SNMPv3 account settings. On the NMS, also configure identical SNMPv2 or SNMPv3 account settings. If you wish to forward alarms directly from devices to the NMS; however, forward alarms from the other network elements via the OVOC server, then you can configure the alarm forwarding rules accordingly as described in Alarms and Events Forwarding to the NMS.

Alarm Aggregation

An aggregated list of alarm notifications can be forwarded from OVOC in a batch in a single email with the alarm filter settings according to the Forwarding rule. "Max number of alarms to aggregate in single Email" sets the maximum number of alarms to aggregate into a single mail and "Email alarms aggregation time interval (seconds)" sets the time interval between sending the batch of alarms. For example, if the number of alarms to aggregate is set to 10, the time interval is set to 60 seconds and then after 60 seconds there are only 5 alarms raised according to the forwarding rule, then 5 alarms are forwarded.

Examples of Aggregated Alarms

The following shows examples of alarm alerts that are sent from OVOC to an NMS.


Alarms are separated by ***** Info****

Subject: OVOC received 10 new alarms

***** Event Info *****

Alarm Name: OVOC server Started

Date & Time: 1:12:54 PM Aug 8, 2018

Source: OVOC Mgmt

Source Description:

Severity: major

Unique ID: 0

Alarm Type: communicationsAlarm

Alarm Probable Cause : other

Description: Server Startup

Additional Info 1:

Additional Info 2:

Additional Info 3:

***** System Info *****

System Name: OVOC Mgmt

System IP Address: 172.17.118.148

****

***** Alarm Info *****

Alarm Name: License Pool Infra Alarm

Date & Time: 12:13:03 PM Aug 6, 2018

Source: Board#1

Source Description:

Severity: clear

Unique ID: 12

Alarm Type: communicationsAlarm

Alarm Probable Cause : keyExpired

Description: Alarm cleared: License Pool Alarm. Device was unable to access the License Server.

Additional Info 1:

Additional Info 2:

Additional Info 3:

***** Device Info *****

Device Name: 172.17.118.51

Device Tenant: Eran

Device Region: Tel Aviv

Device IP Address: 172.17.118.51

Device Type: Mediant 500 MSBR

Device Serial: 5856696

Device Description:

Alarm Forwarding Data Formats

The table below describes the data format for the MIB fields that are forwarded to Northbound destinations.

Table 5-5: Data Fields for Alarm Forwarding

MIB Name	Description
Name (1)	■ Integer 0..1000 ■ The Alarm/event number as listed by product (usually matches the last digit in the trap OID)
TextualDescription(2)	■ OCTET STRING 0..200 ■ Summary of the reported issue that is sent in acEMSTrapGlobalsTextualDescription varbind
Source (3)	■ OCTET STRING 0..255 ■ (Devices + OVOC: currently defined as 0..100) ■ The entity source of the problem, usually in the following format: ✓ Trunk#1 ✓ SEM/Link#2 ✓ Entity1#x/Entity2#y/Entity3#z
Severity (4)	■ cleared(0) ■ indeterminate(1) ■ warning(2) ■ minor(3) ■ major(4) ■ critical(5)
UniqID (5)	■ Integer 0..32000 ■ The running number of alarms since the installation of the OVOC instance. ■ The value of this number should be managed by the system

MIB Name	Description
	separately for alarms and events. ■ The OVOC application uses this number to recognize if alarms were missed and to retrieve them using the Carrier-grade system. ■ The forwarded information includes OVOC alarms sequencing for NMS carrier-grade alarms: where the running number events: always -1
Type (6)	■ other(0) ■ communicationsAlarm(1) ■ qualityOfServiceAlarm(2) ■ processingErrorAlarm(3) ■ equipmentAlarm(4) ■ environmentalAlarm(5) ■ integrityViolation(6) ■ operationalViolation(7) ■ physicalViolation(8) ■ securityServiceOrMechanismViolation(9) ■ timeDomainViolation(10)
ProbableCause (7)	■ other(0) ■ adapterError(1) ■ applicationSubsystemFailure(2) ■ bandwidthReduced(3) ■ callEstablishmentError(4) ■ communicationsProtocolError(5) ■ communicationsSubsystemFailure(6) ■ configurationOrCustomizationError(7) ■ congestion(8) ■ corruptData(9) ■ cpuCyclesLimitExceeded(10) ■ dataSetOrModemError(11)

MIB Name	Description
	■ degradedSignal(12) ■ dteDceInterfaceError(13) ■ enclosureDoorOpen(14) ■ equipmentMalfunction(15) ■ excessiveVibration(16) ■ fileError(17) ■ fireDetected(18) ■ floodDetected(19) ■ framingError(20) ■ heatingVentCoolingSystemProblem(21) ■ humidityUnacceptable(22) ■ inputOutputDeviceError(23) ■ inputDeviceError(24) ■ lanError(25) ■ leakDetected(26) ■ localNodeTransmissionError(27) ■ lossOfFrame(28) ■ lossOfSignal(29) ■ materialSupplyExhausted(30) ■ multiplexerProblem(31) ■ outOfMemory(32) ■ ouputDeviceError(33) ■ performanceDegraded(34) ■ powerProblem(35) ■ pressureUnacceptable(36) ■ processorProblem(37) ■ pumpFailure(38) ■ queueSizeExceeded(39) ■ receiveFailure(40) ■ receiverFailure(41)

MIB Name	Description
	■ remoteNodeTransmissionError(42) ■ resourceAtOrNearingCapacity(43) ■ responseTimeExecessive(44) ■ retransmissionRateExcessive(45) ■ softwareError(46) ■ softwareProgramAbnormallyTerminated(47) ■ softwareProgramError(48) ■ storageCapacityProblem(49) ■ temperatureUnacceptable(50) ■ thresholdCrossed(51) ■ timingProblem(52) ■ toxicLeakDetected(53) ■ transmitFailure(54) ■ transmitterFailure(55) ■ underlyingResourceUnavailable(56) ■ versionMismatch(57) ■ authenticationFailure(58) ■ breachOfConfidentiality(59) ■ cableTamper(60) ■ delayedInformation(61) ■ denialOfService(62) ■ duplicateInformation(63) ■ informationMissing(64) ■ informationModificationDetected(65) ■ informationOutOfSequence(66) ■ intrusionDetection(67) ■ keyExpired(68) ■ nonRepudiationFailure(69) ■ outOfHoursActivity(70) ■ outOfService(71)

MIB Name	Description
	■ proceduralError(72) ■ unauthorizedAccessAttempt(73) ■ unexpectedInformation(74)
AdditionalInfo1 (8)	■ OCTET STRING 0..255 ■ (Devices + OVOC: currently defined as 0..100) This field is used by the system to provide additional information regarding the reported alarm/event.
AdditionalInfo2 (9)	■ OCTET STRING 0..255 ■ (Devices + OVOC: currently defined as 0..100) This field is used by the system to provide additional information regarding the reported alarm/event.
AdditionalInfo3 (10)	■ OCTET STRING 0..255 ■ This field is used be the system to provide additional information regarding the reported alarm/event ■ The forwarded information is filled in the following format: GW_IP: <Device IP>, GW_TRAP_ID: <device's alarm unique ID>
DateAndTime (11)	DateAndTime SNMP Object
SystemSeverity (12)	■ cleared(0) ■ indeterminate(1) ■ warning(2) ■ minor(3) ■ major(4) ■ critical(5) Each value represents the entire system severity when a specific alarm/event is issued. ⚠ This varbind is not sent for system alarms (alarms that were generated by OVOC such as OVOC Disk Space alarm).
DeviceName(13)	■ OCTET STRING 0..255

MIB Name	Description
	■ (Devices+ OVOC: currently defined as 0..250) ■ This field should not be filled by any of the products, as its reserved for OVOC when an alarm/event is forwarded. The information is filled in the following format: ■ Until **Version 7.4:** MG Region:<EMS Region Name>, MG Name:<EMS MG Name> ■ Until **Version 7.6:** <Entity Type> Name:<Entity Name>, Tenant:<Tenant Name>, Region:<Region Name> Where entity type can be one of the following: ■ Tenant, Region, Site, Device, Link, System etc. ■ Tenant: <Tenant Name> - exists only when the entity has tenant ■ Region: <Region Name> - exists only when the entity has region
DeviceInfo(14)	■ OCTET STRING 0..255 ■ (Devices + OVOC: currently defined as 0..100) ■ This field should not be filled by any of the products, as its reserved for OVOC when the alarm/event is forwarded. The information is filled in the following format: ■ Until **Version 7.4:** MG Type: <Device Type>, MG Serial: <primary device serial number>, <secondary device serial number> <secondary device serial number> is applicable for HA devices only ■ Until **Version 7.6:** Device Type: <Device Type> Empty if entity not a device
DeviceDescription(15)	■ OCTET STRING 0..255 ■ This field should not be filled by any of the products, as its reserved for OVOC when the alarm/event is forwarded. The information is filled in the following format:

MIB Name	Description
	<Device Description> OR <SBA Description> <SBA Description> is provisioned in the device details under SBA definition rubric. A free text description field can also be globally configured in the OVOC Server Configuration page (System > Administration > OVOC Server > Configuration) for all OVOC System alarms. This text is then sent to trap destinations in alarm forwarding in the varbind acEMSTrapGlobalsDeviceDescription field for all system alarms. For example, OVOC Disk Space alarm. The hard-coded text description of the alarm that is sent in the TextualDescription (2) acEMSTrapGlobalsTextualDescription varbind (see above) is a separate description field that is different for each alarm OID.
SystemSerialNumber (16)	From **Version 7.6:** OCTET STRING 0..255 The information is filled in the following format: ■ For Stand-alone systems: <Device serial number> ■ For HA Systems: format <device serial #1>_<device serial #2>) Device Serial Number (displays either 32-bit and 64-bit serial numbers for SBC devices) according to the device's firmware version and configuration settings in the externals/configurationProperties/generalConfig file for the include_serial_string.

OVOC Server Alarm Settings

This section describes the global alarm settings on the OVOC server.

Alarms Automatic Clearing (on Startup)

The Active Alarms page is cleared of all the current alarms for a specific device upon system GW startup (cold start event). Critical, Major, Minor, Warning or Info alarms are automatically cleared from the Active Alarms Page (and transferred to the Alarms History page) when a Clear alarm is generated by the same entity (source) and the same device. This feature prevents older alarms from congesting the Active Alarms page. This feature is configured in the Alarms page (System tab > Configuration > Alarms).

Alarms Automatic Clearing Period (Days)

The operator can also configure the automatic clearing of Active alarms (disabled by default) according to a time period. When the Automatic Clearing feature is enabled, alarms are cleared by default every 30 days.

When the OVOC application performs automatic clearing, it moves the cleared Alarms to the Alarms History page with the text indication 'Automatic Cleared'. This feature is configured in the Alarms page (System tab > Configuration > Alarms).

Events Clearing Mechanism

Events are informative messages for OVOC and device actions (usually with low severity). Device events (originating from the device) are automatically cleared from the Active Alarms page upon GW startup (cold start event); however, device events originating in the OVOC (e.g. adding a gateway) are not cleared upon device reset. The OVOC consequently employs a mechanism to automatically clear these events from the Alarms page (by default this feature is enabled and events are cleared every three days). This feature prevents old events from congesting the Active Alarms page. When automatic clearing is performed, the cleared Events are moved to the Alarm History page with the text indication 'Automatic Cleared'. This feature is configured in the Alarms page (System tab > Configuration > Alarms).

Alarm Suppression Mechanism

This option enables the generating of the 'Alarm Suppression' alarm when the OVOC server identifies that the number of alarms of the same type and from the same source, generated in a time period, is greater than the number defined in the threshold. At this point, these alarms are not added to the database and are not forwarded to configured destinations. This feature is configured in the Alarms page (System tab > Configuration > Alarms).

Alarms Sequence Numbering

1. When receiving alarms directly from the devices and endpoints:
   - These alarms and events have a different scala of sequence numbers. These sequence numbers are placed at 'TrapGlobalsUniqID' varbindings (respectively 'tgTrapGlobalsUniqID', 'acBoardTrapGlobalsUniqID').
   - OVOC alarms have a sequence number scala. Events are always sent with 'acEMSTrapGlobalsUniqID -1'.
2. When the OVOC server forwards device and OVOC alarms:
   - Cold Start Trap is the only standard event that is forwarded by the OVOC application. All other standard events are not forwarded.
   - Each one of the alarms and events are forwarded with the original Notification OID and variable bindings OIDs.

- The original content of 'TrapGlobalsUniqID' varbinding (respectively 'tgTrapGlobalsUniqID', 'acBoardTrapGlobalsUniqID' and 'acEMSTrapGlobalsUniqID') is updated as follows:
  - For all the forwarded events, the 'TrapGlobalsUniqID' is set to -1.
  - For all the forwarded alarms, the original 'TrapGlobalsUniqID' is replaced with the OVOC sequence number, allowing the NMS to follow the forwarded alarms sequencing. The original device 'TrapGlobalsUniqID' is applied to 'TrapGlobalsAdditionalInfo3' varbinding.
  - For all the forwarded alarms and events, 'TrapGlobalsAdditionalInfo3' varbinding (respectively 'tgTrapGlobals AdditionalInfo3', 'acBoardTrapGlobals AdditionalInfo3' and 'acEMSTrapGlobals' 'AdditionalInfo3') is updated as follows: original device IP address and device 'TrapGlobalsUniqID' in the following format:

```
GATEWAY_IP:x ,GATEWAY_TRAP_ID:y
```

A carrier-grade alarm system is characterized by the following:

- Active Alarms

  The device can determine which alarms are currently active by maintaining an Active Alarms table. When an alarm is raised, it is added to the active alarms list. Upon alarm clearing, it is removed from the active alarms list.

  The maximal size of the active alarms for each of the product is shown in the table below:

Table 5-6: Maximum Active Alarms according to Device

Product	Maximum Size of Active Alarms Table
MP-1xx	40
MP-124	100
MP-1288	200
Mediant 500 MSBR, Mediant 500 SBC, Mediant 500L MSBR, Mediant 500L SBC, Mediant 800 MSBR, Mediant 800 SBC and Mediant 1000 SBC	300
Mediant 3000	500
Mediant 2600 E-SBC and Mediant 4000 SBC	600
Mediant 9000 SBC and Mediant Software SBC	1000

  When the active alarms list exceeds its maximum size, an enterprise Active Alarms Overflow alarm is sent to the Management system.

- The device sends a cold start trap to indicate that it is starting up. This allows the management system to synchronize its view of the device's active alarms.
- Two views of active alarms table are supported by devices:
  - Standard MIB: alarmActiveTable and alarmActiveVariableTable in the IETF ALARM MIB for all the devices.
  - Enterprise MIB:
    - acActiveAlarmTable in the AC-ALARM-MIB mib for devices products.
    - AudioCodes.acProducts.acEMS.acEMSConfiguration.acFaults (see SNMP Alarms Synchronization below).

■ History Alarms

The device allows the recovery of lost alarm raise and clear notifications by maintaining a log history alarms table. Each time an alarm-type trap (raise or clear) is sent, the Carrier-Grade Alarm System adds it to the alarms history list. The trap contains a unique Sequence Number. Each time a trap is sent, this number is incremented. The device allows detection of lost alarms and clear notifications by managing an alarm sequence number and displaying the current number.

The maximal size of the history alarms table is defined as follows:

Table 5-7: Maximum Active Alarms according to Device

Product	Maximum Size of History Alarms Table
MP-1xx	100
MP-1288	1000
Mediant 500 MSBR, Mediant 500 SBC, Mediant 500L MSBR, Mediant 500L SBC, Mediant 800 MSBR, Mediant 800 SBC and Mediant 1000 SBC	1000
Mediant 3000	500
Mediant 2600 E-SBC and Mediant 4000 SBC	1000
Mediant 9000 SBC and Software SBC	2000

When the history alarm list exceeds its maximum size, it starts overriding the oldest alarms in the list in cyclic order.

- The following views of log history alarms table are supported by the devices:
  - Standard MIB: 'nlmLogTable' and 'nlmLogVariableTable' in the NOTIFICATION-LOG-MIB for all the devices.
  - Enterprise MIB:

- acAlarmHistoryTable in the 'AC-ALARM-MIB mib' for CPE and MP products.

SNMP Alarms Synchronization

A carrier-grade alarm system provides a reliable alarm reporting mechanism that takes into account Operations Center system or network layer outages, and transport layer outages, such as SNMP over UDP. During such outages, alarms may be raised, however not forwarded. This mechanism is implemented at SNMP agent level, and serves OVOC, NMS, or higher level management system synchronization. During the OVOC server synchronization process, the OVOC server can recover such missed alarms from its database (events are not synchronized) and then forward them to the NMS according to the following:

- History alarms: By default, synchronization is performed with the Alarms History table. When only a partial Alarms History table is retrieved from the OVOC server database, the OVOC server notifies the user with one of the following events: 'Synchronizing Alarms Event' and 'Synchronizing Active Alarms Event'. For more information, see the OVOC Alarms Guide.
- Active alarms: By default, synchronization is not performed with the Active Alarms table; however, a mechanism can be implemented to perform random synchronization of this table (see below).

Resynchronization (Resync) Mechanism

The Resync mechanism enables you to perform random requests to retrieve the Active alarms table when there are network problems (as described above) or a discontinuation of the alarm sequence is detected.

This feature implements an SNMP agent on the OVOC server with the MIB AudioCodes.acProducts.acEMS.acEMSConfiguration.acFaults with the following fields:

Table 5-8: Faults MIBs

Name	Type	OID
acFaultsFwdHostIp	IpAddress	1.3.6.1.4.1.5003.9.20.1.1.1
acFaultsFwdHostPort	Integer	1.3.6.1.4.1.5003.9.20.1.1.2
acFaultsFwdUpdate	Integer (0-1)	1.3.6.1.4.1.5003.9.20.1.1.3

Each SNMP message should be processed in the order shown in the table above

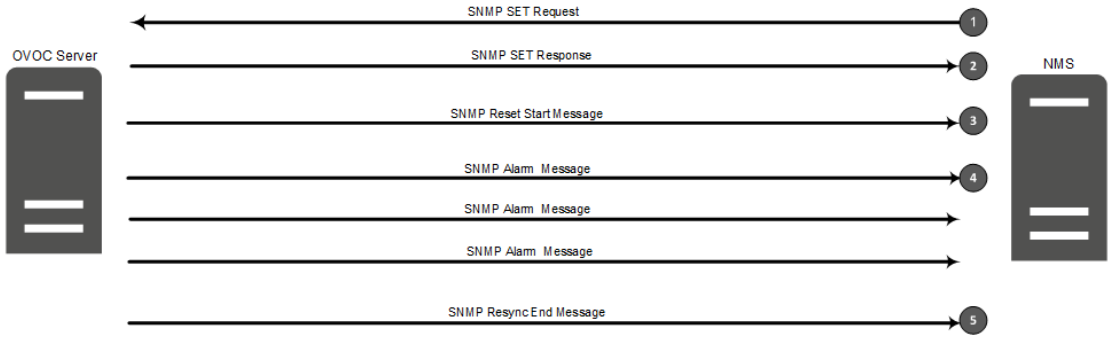
When the acFaultsFwdUpdate field is set to 1, the SNMP agent reads the acFaultsFwdHostIp & acFaultsFwdHostPort fields and searches for all active SNMP Alarm Forwarding rules according to the configured 'Destination Host IP Address' and 'Destination Host Port'. It then resends all the current Active alarms according to SNMPv2/SNMPv3 account credentials and the other

criteria defined in the rule. If a specific rule is not active (Enable/Disable check box is clear), then alarms are not sent to this destination.

- The acFaultsFwdHostIp & acFaultsFwdHostPort parameters should be re-set each time after the Resync action is performed (they are set to default after each Resync action).
- The OVOC SNMP agent supports only SNMPv2 get/set commands. However, alarms can still be forwarded when configured with either SNMPv2 or SNMPv3 credentials in the alarm forwarding rule definition.
- The SNMP port used for this SNMP agent may be configured using the EMS Server Manager (Network Configuration > SNMP Agent > SNMP Agent Listener Port), instead of using the standard SNMP port number (161).
- When the SNMP agent is restarted, the acFaultsFwdHostIp & acFaultsFwdHostPort parameters need to be reset.
- The Resync feature is applicable only for alarms and is not relevant for events.

The figure below illustrates the Resync flow process:

Figure 5-5: Resync Flow



The following steps describe the flow illustrated in the figure above:

1. The NMS executes SNMP SET to acFaultsFwdHostIp & acFaultsFwdHostPort
2. The NMS executes SNMP SET to acFaultsFwdUpdate to 1 (acFaultsFwdHostIp & acFaultsFwdHostPort & acFaultsFwdUpdate are & set back to 0 automatically).
3. The OVOC server responds confirming successful SNMP SET.
4. The OVOC server finds all relevant Alarm Forwarding rules by acFaultsFwdHostIp & acFaultsFwdHostPort.
5. The OVOC server sends an event regarding the start of re-sending of all active alarms (acOvocReSyncEvent 1.3.6.1.4.1.5003.9.20.3.2.0.58) with Severity Indeterminate and 'TrapGlobalsUniqID' set to -1.
6. The OVOC server resends all active alarms according to the configured forwarding rules.
7. The OVOC server sends an event informing the end of resynchronization with Severity clear and 'TrapGlobalsUniqID' set to -1.

- Alarms are not cleared from the Active alarms table when the OVOC server is reset.
- When a device is deleted or removed from the OVOC Web client, its active alarms are also removed from the Active Active alarms table.
- Alarms are forwarded in the sequence order that they were received on the OVOC server.
- SNMP traps are sent from source port 1164-1174 on the OVOC server.
- The Resync operation can be performed on up to three simultaneously active SNMP forwarding rules.
- The Resync operation can send up to 5000 of the last received alarms.
- New alarms raised during the Resync operation are also forwarded.
- There can be up to two concurrent Resync processes. If more than two processes are simultaneously active i.e. more than two users are concurrently attempting to perform this operation, then all the additional attempts (greater than two) fail and an error is sent to the log file (see below).
- Resync operation log failures are written to the log 'alarmsReSync.csv' (/var/log/ems).

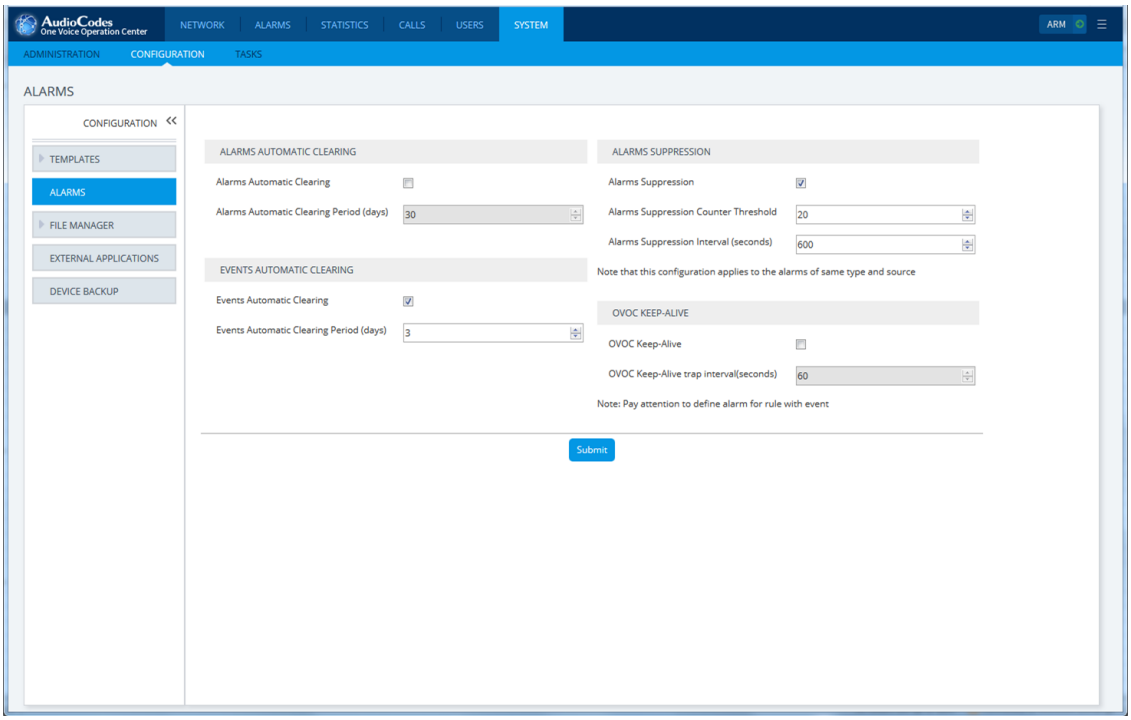
OVOC Keep-alive

You can configure the OVOC to generate SNMP Keep-alive traps toward the SNMP destination. When the "OVOC Keep-Alive" check box is checked, this trap is sent from the OVOC to a configured destination according to a configured interval (default 60 seconds). You can send the Keep-alive trap to the desired SNMP destination, according to an existing configured forwarding destination rule.

➢ **To configure OVOC Keep-alive:**

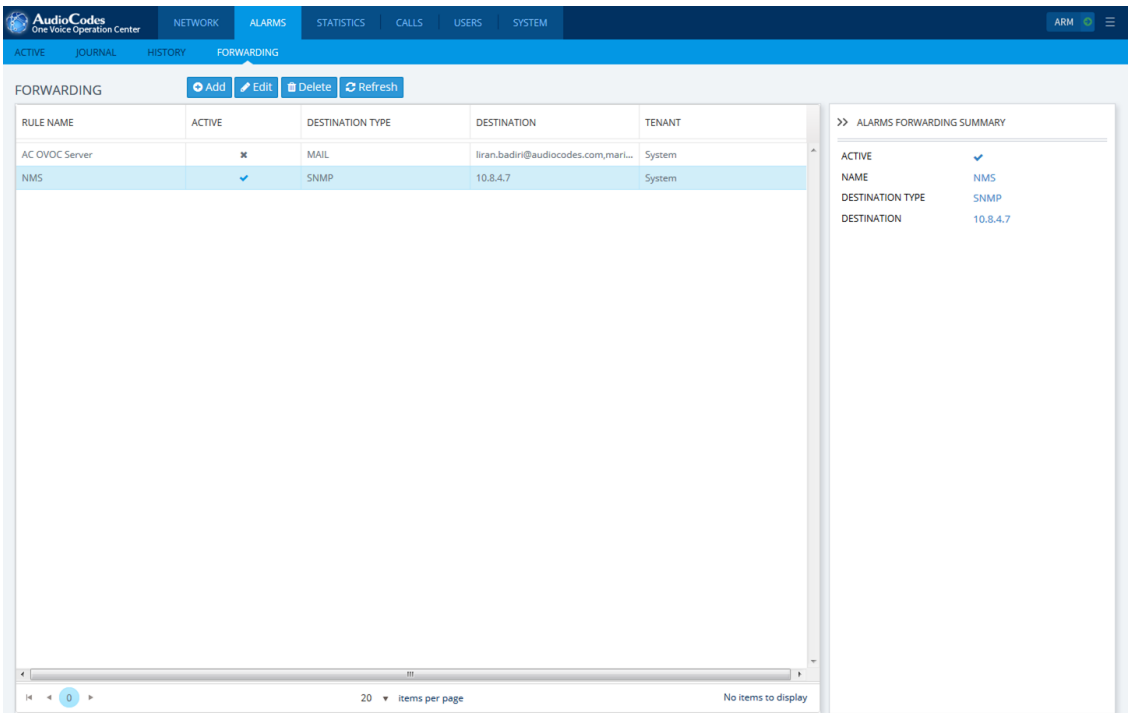
1. In the OVOC Web menu, open the Alarms page (System > Configuration > Alarms).

Figure 5-6: OVOC Keep-alive



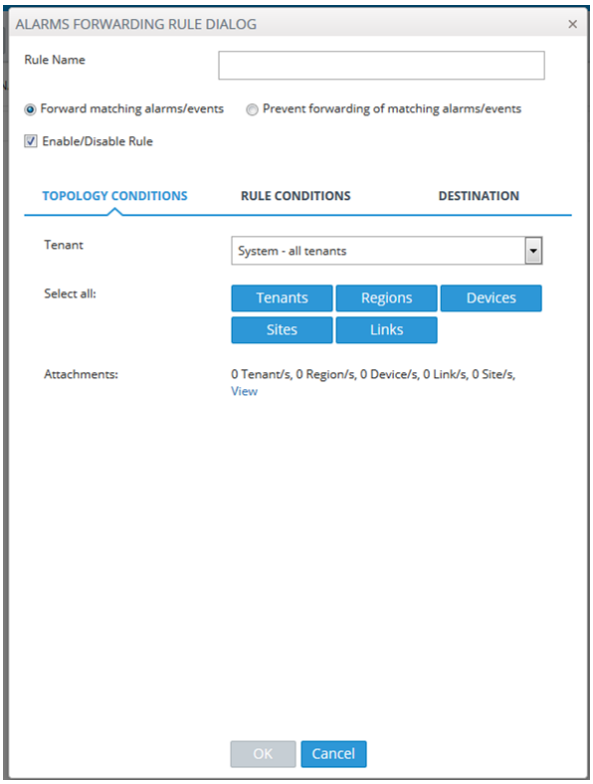
2. Select the OVOC Keep-Alive check box.
3. Open the Alarm Forwarding Rule page (Alarms > Forwarding); the Alarm Forwarding Rules Configuration window is displayed:

Figure 5-7: Alarm Forwarding Configuration



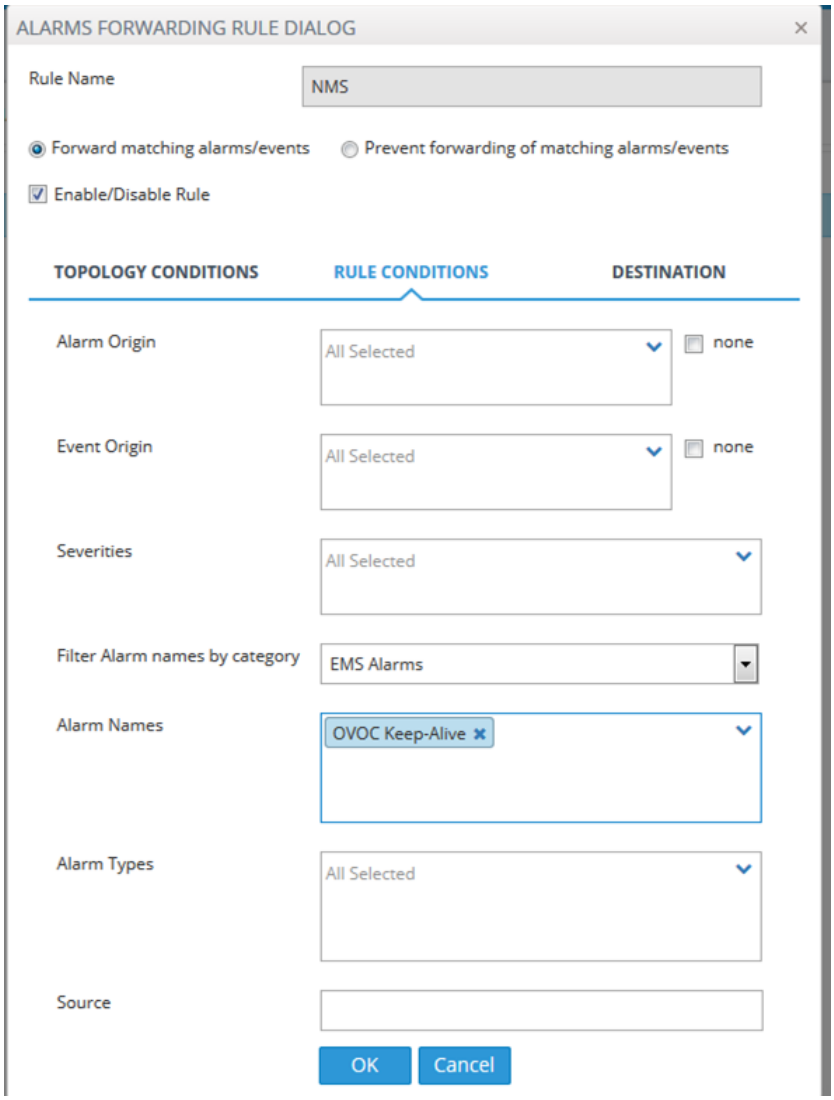
4. Select the SNMP forwarding rule and then click Edit.

Figure 5-8: Alarms Forwarding Rule Dialog



5. Ensure that the 'Enable/Disable Rule' check box is selected for each destination that you wish to forward the OVOC Keep-alive trap.
6. In the Alarm Names pane, click the Alarms Filter and ensure that the "OVOC Keep-Alive" alarm is selected.

Figure 5-9: Destination Rule Configuration



Status / State Management via Devices SNMP Interface

For details regarding supported SNMP MIBs, refer to the *SNMP Reference Guide for Gateways-SBCs-MSBRs*.

6 Voice Quality Reports

Both template and custom Voice Quality reports can be generated for devices, links and URIs for Tenants, Regions and Elements. You can export the report's definitions to JSON format from the Reports screen in the OVOC Web interface. The figure below shows an example of an exported JSON file.

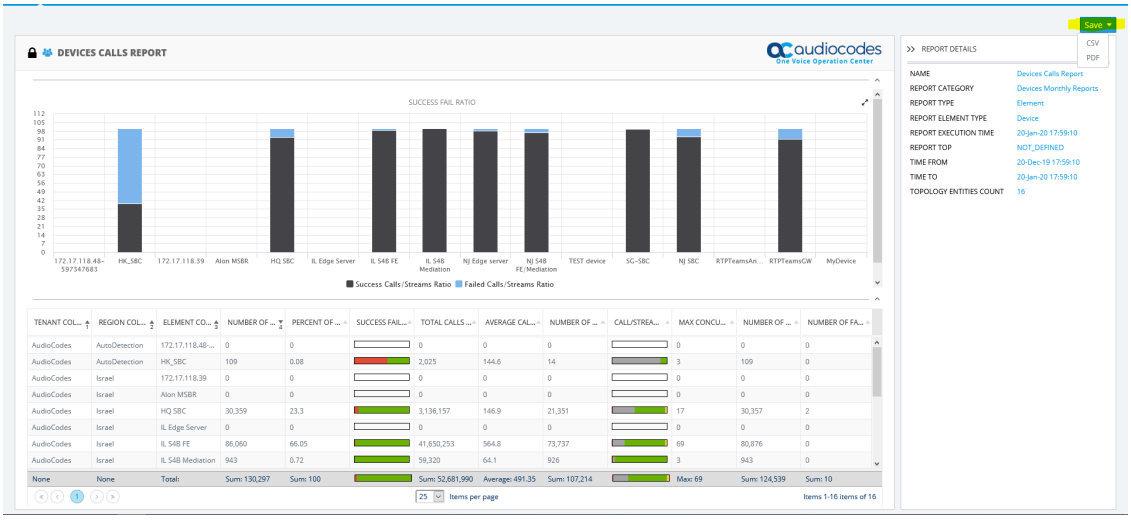
The generation of customized Voice Quality Reports requires a license. For more information, contact your AudioCodes representative.

Figure 6-1: Voice Quality Reports

JSON
devices
0
familyType : "UMP"
lastSyncTime : "1970-01-01T01:00:00.000+0100"
swVersion : "8.0.100.0"
definedAt : "2020-01-02T11:50:32.000+0000"
lastChanged : "2020-01-19T08:36:12.000+0000"
ipAddress : "10.21.50.61"
description : null
applicationsStatus
snmpInfo
networkState : "REGULAR_NETWORK"
url : "/ovoc/v1/topology/devices/107"
regionId : 2
name : "10.21.50.61"
tenantId : 1
location
id : 107
productType : "USER_MANAGEMENT_PACK_MULTI_TENANT"
sbcInfo
status : "ERROR"
1
familyType : "ACL"
lastSyncTime : "1970-01-01T01:00:00.000+0100"
swVersion : "7.20A.254.557"
definedAt : "2019-11-27T09:25:37.000+0000"
lastChanged : "2020-01-20T09:43:45.000+0000"
ipAddress : "10.3.181.73"
description : null
applicationsStatus
snmpInfo
networkState : "REGULAR_NETWORK"
url : "/ovoc/v1/topology/devices/3"
regionId : 2
name : "10.3.181.73"
tenantId : 1
location
id : 3
productType : "MP500_MSBG"
sbcInfo
status : "ERROR"
2
familyType : "ACL"
lastSyncTime : "1970-01-01T01:00:00.000+0100"
swVersion : "7.20A.203.479"
definedAt : "2019-12-09T13:46:59.000+0000"
lastChanged : "2020-01-20T04:01:12.000+0000"
ipAddress : "10.3.50.53"

You can also save the output of the run reports to a CSV or PDF file.

Figure 6-2: Run Report



7 OVOC Server Backup and Restore

There are four main backup processes that run on the OVOC server:

- **Weekly backup:** runs once a week at a pre-configured date & time (default is Saturday 02:00). In this process, the whole database is backed up into several "RMAN" files that are located in /data/NBIF/emsBackup/RmanBackup directory. In addition, several other configuration and software files are backed up to the archive file emsServerBackup_<version>_<time&date>.tar in the /data/NBIF/emsBackup directory. In general, this TAR file contains the entire /data/NBIF directory's content, with the exception of the 'emsBackup' directory, OVOC Software Manager content and server_xxx directory content.

  To change the weekly backup's time and date, refer to Section "Change Schedule Backup Time" in the OVOC IOM.

- **Daily backup:** runs daily except on the day scheduled for the weekly backup (see above). The daily backup process backs up the last 24 hours. There are no changes in the TAR file in this process.

- **Cassandra backup:** runs daily (runs prior to the above) and backs up the last 24 hours to the archive file cassandraBackup_<version>_<date>_<snapshotId>_<Role>_numberOfNodes.tar.gz. When working in **Service Provider Cluster**, backup of the cluster node servers (VQM and PM) is performed on the Management server. Cassandra backup files are generated separately for both the VQM and PM server and must be copied separately to the respective server node machine (see below

- **Configuration backup:** runs daily and backs up to the archive file ovocConfigBackup_<version>_<time&date>.tar.gz

Daily and weekly backups run one hour after the Cassandra backup. For example, if the backup time is 2:00, the Cassandra backup runs at 2:00 and the Weekly/Daily and Configuration backups runs at 3:00.

- The Backup process does not backup configurations performed using EMS Server Manager, such as networking and security.
- RmanBackup files are deleted during the OVOC server upgrade.
- It is highly recommended to maintain all backup files on an external machine. These files can be transferred outside the server directly from their default location by SCP or SFTP client using 'acems' user.

Backup OVOC Server

➢ **to backup the OVOC server:**

1. Copy the following backup files to an external machine:
   - /data/NBIF/emsBackup/emsServerBackup_<version>_<time&date>.tar
   - /data/NBIF/ovocConfigBackup_<version>_<time&date>.tar.gz

- /data/NBIF/emsBackup/cassandraBackup_<version>_<date>_<snapshotId>_<MGMT>_numberOfNodes.tar.gz
- /data/NBIF/emsBackup/daily_dbems_<time&date>
- /data/NBIF/emsBackup/weekly_dbems_<time&date>
- /data/NBIF/emsBackup/control.ctl
- /data/NBIF/emsBackup/init.ora

where:

- <time&date> is an example; replace this path with your filename.
- <version> is the version number of the OVOC server release

2. In addition, when operating in **Service Provider Cluster**, copy Cassandra backup files to the /data/NBIF directory on the Cluster node of the respective server:
   - /data/NBIF/emsBackup/cassandraBackup__<version>_<date>_<snapshotId>_<VQM>_numberOfNodes.tar.gz
   - /data/NBIF/emsBackup/cassandraBackup__<version>_<date>_<snapshotId>_<PM>_numberOfNodes.tar.gz

Restore the OVOC Server

➢ **To restore the OVOC server:**

1. In the EMS Server Manager, choose the **Restore** option.
2. Install (or upgrade) OVOC to the same version from which the backup files were created. The Linux version must also be identical between the source and target machines.
3. Use the EMS Server Manager to perform all the required configurations, such as Networking and Security, as was previously configured on the source machine.
4. Make sure all server processes are up in EMS Server Manager / Status menu and the server functions properly.
5. Copy all the files you backed up to /data/NBIF directory by SCP or SFTP client using the 'acems' user. Overwrite existing files if required.
6. Choose one of the following options:
   - **Configuration Restore:** Restores OVOC topology and OVOC Web configuration
   - **Full Restore:** Restores OVOC topology, OVOC Web configuration and data that is retrieved from managed devices.

   For more information, refer to Section "OVOC Server Restore" in the *OVOC IOM* manual.

When operating in Service Provider Cluster:

- The restore cluster should be with identical system specifications as the backed up server i.e. the same number of VQM/PM servers.

- Following restore, restart slaves and then wait up to 24 hours for Cassandra DB data(call details and PM details) to synchronize on all servers.

8 Data Analytics API

The Analytic API Voice Quality license enables access to specially designed views with selected data from the OVOC database for the purpose of integration with Northbound third-party interfaces. Customers can connect to the OVOC database using third-party DB access clients and retrieve topology and statistics. This data can then be used in management interfaces such as Power BI and Splunk to generate customized dashboards, reports and other representative management data. Customers can combine data from AudioCodes OVOC and enterprise voice or third-party data monitoring tools such as HP OpenView for data such as the following:

- Receive Alerts from HP OpenView
- Calls tariffs
- Data layer statistics
- User information from corporate directory

The following data is accessible from OVOC (details of retrieved DB tables are shown below):

- Network Topology including Tenants, Regions, Devices, Non-ACL Devices, Links
- QoE Statistics including Calls, Nodes and Links Summaries
- Active and History Alarms

A dedicated DB operator("ANALYTICS") is used for securing connection to the OVOC server over port 1521. This port must be open on the customer firewall once this feature is enabled (for more details, refer to the *OVOC IOM*).

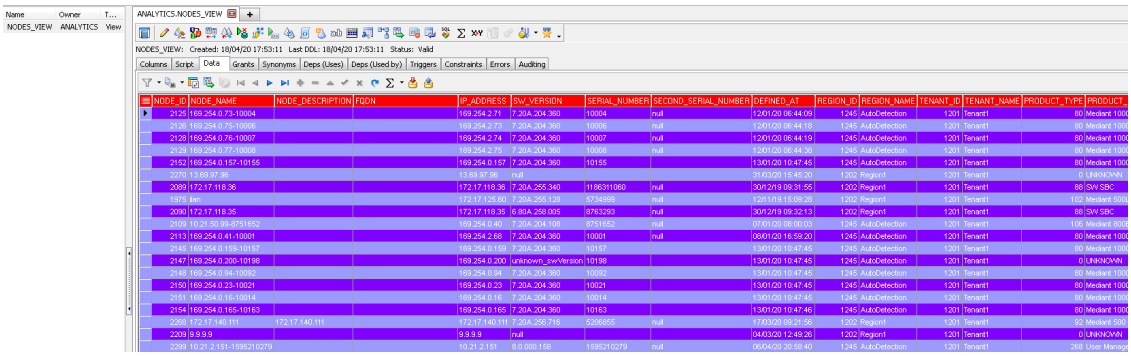
- Multi-Tenancy is not supported for this feature.
- All data is read-only.
- Data is retrieved for the last 24 hours; it's recommended to synchronize daily with the OVOC database, save this data to an external server and then run the Analytics tool on this server.
- Backup and restore is not applicable for this feature.

➢ **To connect to the OVOC server:**

1. Open your DB access client.
2. Configure the following parameters:
   - OVOC server IP address
   - OVOC server port: **1521**
   - Username: **ANALYTICS**
   - Service Name: **DBEMS**

An example database schema retrieved from an access client is displayed below:

Figure 8-1: Example Database schema



The following OVOC database tables are retrieved (for details, see Data Analytics API Database Tables):

- **Main Table Views:**
  - View Name: NODES_VIEW
  - View Name: LINKS_VIEW
  - View Name: CALLS_VIEW
  - View Name: ALARMS_VIEW
  - View Name: NODES_SUMMARY_VIEW
  - View Name: LINKS_SUMMARY_VIEW
- **Type Views:**
  - Type Name: DisableEnableType
  - Type Name: MGType
  - Type Name: ItuPerceivedSeverity
  - Type Name: ConnectionType
  - Type Name: MismatchType
  - Type Name: SemConnectionState
  - Type Name: StatusType
  - Type Name: VQThresholdStatus
  - Type Name: SipMessageStatusType
  - Type Name: NoYesType
  - Type Name: NetworkState
  - Type Name: ManagedType
  - Type Name: FailSuccessType
  - Type Name: BackupStatusType
  - Type Name: ItuEntityAdministrativeState

- Type Name: AlarmStatusType
- Type Name: AlarmNameType
- Type Name: QualityLevelType
- Type Name: CallCauseType
- Type Name: CallOriginatorType
- Type Name: TerminationReasonType
- Type Name: TerminationReasonDetailsType
- Type Name: MediaType
- Type Name: EndpointType
- Type Name: CallSourceType
- Type Name: PstnTermReasonType
- Type Name: LinkType
- Type Name: LinkDirection

9 Security

The following aspects are relevant for the NMS application when integrating the OVOC and the managed device:

- Network Communication Protocols (see below)
- OVOC Users Management (Authentication and Authorization) (see OVOC User Identity Management)
- HTTPS Connection (see HTTPS Connection)

For detailed information, refer to the *OVOC Security Guidelines* document.

Network Communication Protocols

The following describes the different OVOC network communication protocols:

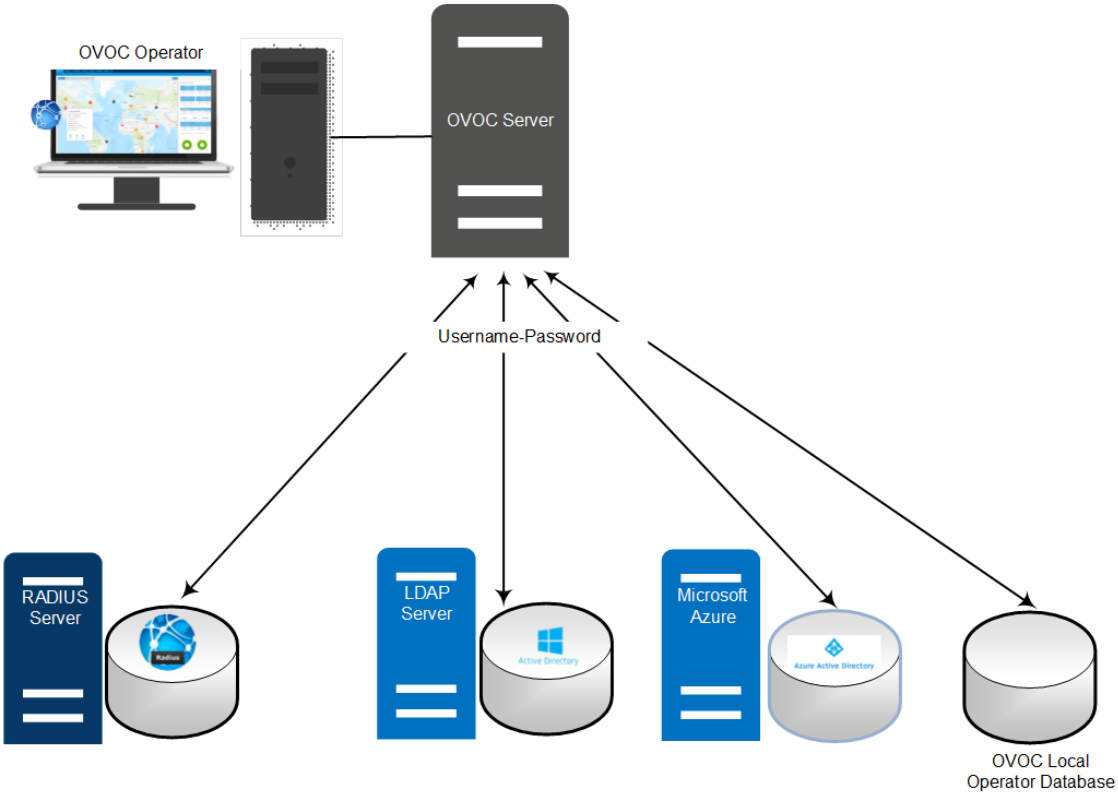
- OVOC client - server communication is secured using an HTTPS tunnel with a single HTTPS port.
- OVOC server – managed devices communication can be secured as follows:
  - Devices:
    - SNMPv3 for Maintenance Actions and Faults Management
    - HTTPS for file transfer and for Single Sign-to the managed device
- OVOC server secure access:
  - Secure access to the OVOC server machine is possible via SSH and SFTP protocols for performing maintenance actions and accessing files.
  - SNMPv3 traps can be forwarded from the OVOC server machine to another SNMP Trap Manager.
  - OVOC User Authentication and Authorization is performed either via the OVOC Application local database, or via a centralized user database on RADIUS, LDAP or Microsoft Azure (see OVOC User Identity Management) according to the Security profile configured by the OVOC Administrator.

- Syslog messages and emails sent from the OVOC server to a northbound interface are not secured.
- Single sign-on is not supported for devices located behind a NAT, unless the Cloud Architecture feature is enabled, in which case, SBC device connections can be secured over an HTTP/S Tunnel Overlay network (refer to the IOM manual and the Security Guidelines for more information).
- An SSH connection from the OVOC server to the device is not supported.

OVOC User Identity Management

By default, OVOC users are managed in the OVOC server's local database. Users can also be managed via a centralized RADIUS or LDAP server or using Microsoft Azure. The figure below illustrates these options.

Figure 9-1: OVOC User Management



- For information on the local OVOC users database, refer to the *OVOC User's Manual*
- For OVOC user authentication with RADIUS server, see Authentication and Authorization using a Radius Server
- For OVOC user authentication with LDAP server, see Authentication and Authorization using an LDAP Server
- For OVOC user authentication with Microsoft Azure, see Authentication and Authorization using Microsoft Azure

Authentication and Authorization using a Radius Server

Customers may enhance the security and capabilities of logging into the OVOC application by using a Remote Authentication Dial-In User Service (RADIUS) to store numerous usernames, passwords and access level attributes. This feature allows multiple user management on a centralized platform. RADIUS (RFC 2865) is a standard authentication protocol that defines a method for contacting a pre-defined server and verifying a given name and password pair against a remote database in a secure manner.

When accessing the OVOC application, users must provide a valid username and password of up to 128 Unicode characters. OVOC doesn't store the username and password; however, forwards them to the pre-configured RADIUS server for authentication (acceptance or rejection). If the login attempt to the RADIUS server fails, OVOC attempts to connect with the same credentials to the local database. An additional fallback mechanism 'Combined Authentication Mode' can also be implemented (for information, refer to the *OVOC User's Manual*)

OVOC supports the provisioning of up to three Radius servers for redundancy purposes. When the first server does not respond, the OVOC proceeds to the second server, and then to the third server. OVOC will always start working with the previously responded server that is indicated as the Current Active Radius servers.

Configuring Radius Server Client

This section describes an example of a RADIUS server configuration. You must configure the OVOC server as a RADIUS client to perform authentication and authorization of OVOC users using the RADIUS server from the OVOC application.

The example configuration is based on FreeRADIUS, which can be downloaded from the following location: www.freeradius.org. Follow the directions on this site for information on installing and configuring the server.

If you use a RADIUS server from a different vendor, refer to the appropriate vendor documentation.

➢ **To set up OVOC RADIUS client using FreeRADIUS:**

1. Define the OVOC server as an authorized client of the RADIUS server with a predefined 'shared secret' (a password used to secure communication) and a 'vendor ID'. The figure below displays an example of the file 'clients.conf' (FreeRADIUS client configuration).

Example of the File clients.conf (FreeRADIUS Client Configuration)

```
#
# clients.conf - client configuration directives
#
client 10.31.4.47 {
      secret        = FutureRADIUS
      shortname     = OVOC
}
```

2. If access levels are required, set up a VSA dictionary for the RADIUS server and select an attribute ID that represents each user's access level. The following example shows a dictionary file for FreeRADIUS that defines the attribute 'ACL-Auth-Level' with ID=35.

Example of a Dictionary File for FreeRADIUS (FreeRADIUS Client Configuration)

```
#
# AudioCodes VSA dictionary
#
```

```
VENDOR AudioCodes 5003
ATTRIBUTE ACL-Auth-Level 35 integer AudioCodes
VALUE ACL-Auth-Level ACL-Auth-Monitor 50
VALUE ACL-Auth-Level ACL-Auth-Operator 100
VALUE ACL-Auth-Level ACL-Auth-Admin 200
```

3. In the RADIUS server, define the list of users who are authorized to use the device, using one of the password authentication methods supported by the OVOC server implementation. The following example shows a user configuration file for FreeRADIUS using a plain-text password.

   Example of a User Configuration File for FreeRADIUS Using a Plain-Text Password

```
# users - local user configuration database
john    Auth-Type := Local, User-Password == "qwerty"
        Service-Type = Login-User,
        ACL-Auth-Level = ACL-Auth-Monitor
larry   Auth-Type := Local, User-Password == "123456"
        Service-Type = Login-User,
        ACL-Auth-Level = ACL-Auth-Admin
```

4. Record and retain the IP address, port number, 'shared secret', vendor ID and VSA access level identifier (if access levels are used) used by the RADIUS server.
5. Provision the relevant OVOC parameters according to the section below.

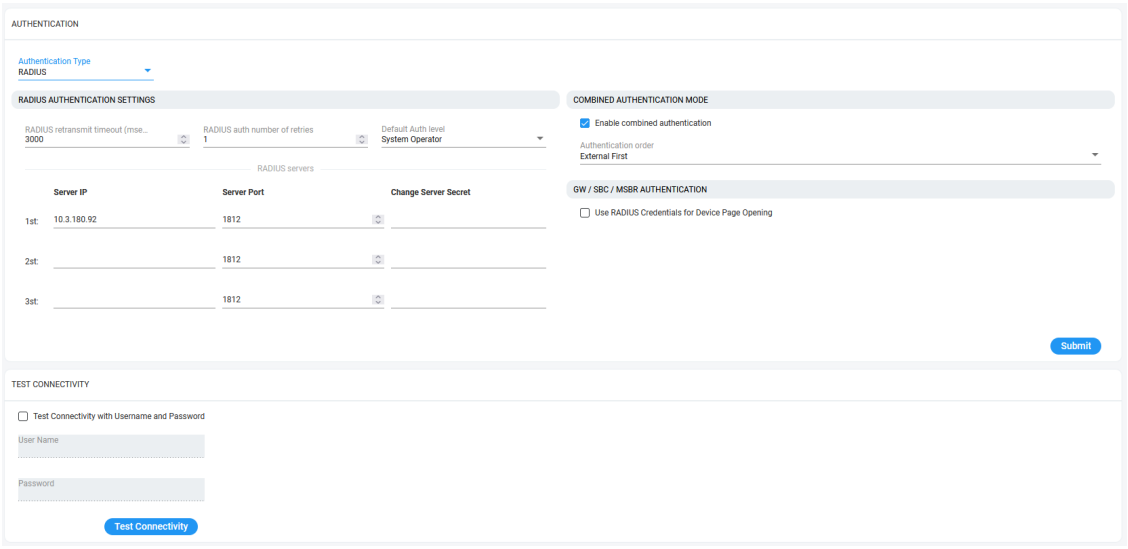
Configuring RADIUS Server

You can centrally configure authentication of OVOC operators using a RADIUS (Remote Authentication Dial-In User Service) server. If you already have centralized user authentication via a RADIUS server, it's recommended to implement it for OVOC operators as well. When the RADIUS-authenticated operator logs into OVOC, they're assigned one of the OVOC security levels, for example - 'Operator'. If it's not defined on the RADIUS server, OVOC by default allows access for the RADIUS-authenticated operator, with 'Operator' permission.

➢ **To configure using a RADIUS server.**

1. In the OVOC Web, open the RADIUS Authentication Settings page (System tab > Security > Authentication), and then from the Authentication Type drop-down list, select **RADIUS**.

Figure 9-2: RADIUS Authentication and Authorization



2. For each one of the three RADIUS servers, define the IP address, port and Secret. Note, that at least one RADIUS server must be provisioned.
3. Define the following parameters:
   - RADIUS Auth Retransmit Timeout' (default-3000 milliseconds)
   - RADIUS Auth Number of Retries (default-1)

These parameters will be used for each of the Radius Servers.

4. Configure other parameters as required according to your RADIUS server configuration. For more information, refer to the *OVOC User's Manual*.

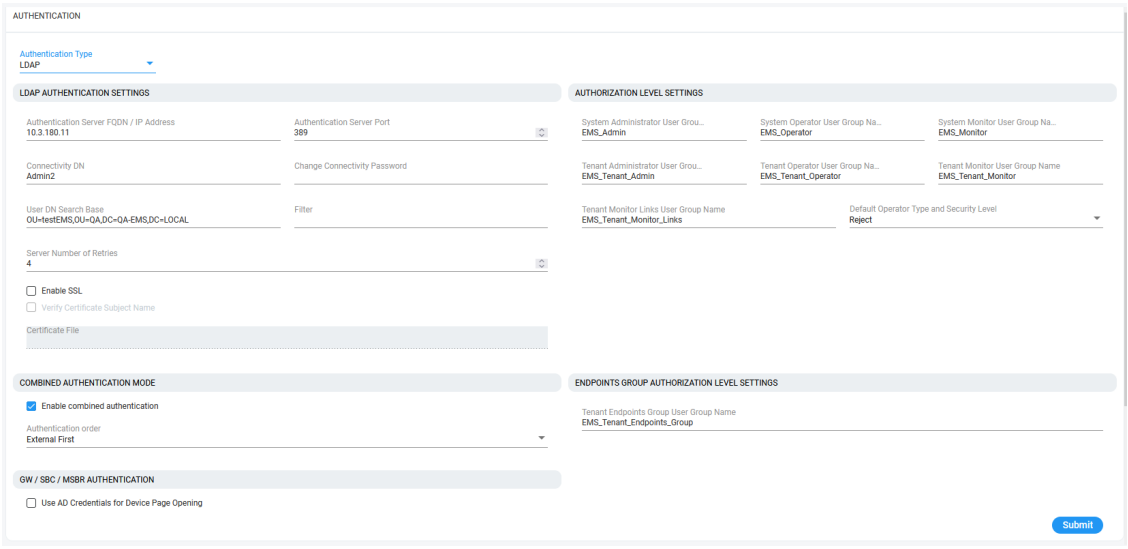
Authentication and Authorization using an LDAP Server

Authentication of OVOC operators can be centrally configured using a Lightweight Directory Access Protocol (LDAP) server. If you already have centralized user authentication via an LDAP server, it's recommended to implement it for OVOC operators as well. When an LDAPauthenticated operator logs into OVOC, they're assigned one of OVOC's security levels, e.g., 'Operator'. The equivalent names for these security levels on the LDAP server are displayed in the screen below. When one of these security levels is not defined on the LDAP server, OVOC by default allows access to the LDAP-authenticated operator with 'Operator' permissions.

➢ To configure using an LDAP server.

1. In the OVOC Web, open the LDAP Authentication Settings page (System tab > Security > Authentication), and then from the Authentication Type drop-down list, select **LDAP**.

Figure 9-3: LDAP Authentication and Authorization



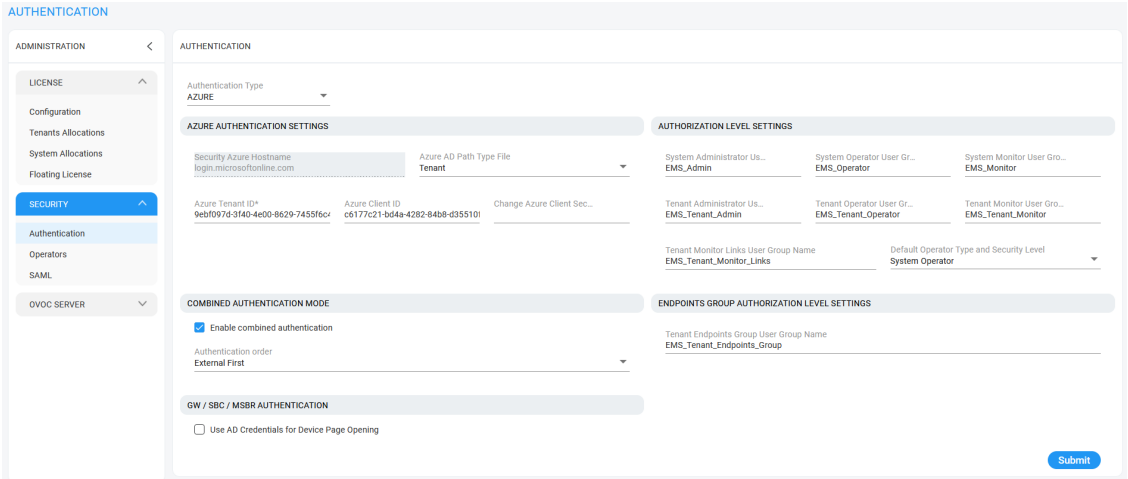
2. Configure parameters as required (refer to the *OVOC User's Manual*).

Authentication and Authorization using Microsoft Azure

Authentication of OVOC operators can be centrally configured using the Microsoft Azure Active Directory (AD). If you already have centralized user authentication via Azure AD, it's recommended to implement it for OVOC operators as well. When an Azure-authenticated operator logs into the OVOC, they're assigned one of OVOC's security levels, e.g., 'Operator'. The equivalent names for these security levels in the Azure AD are displayed in the screen below. When no security level is configured in the Azure AD, the parameter 'Default Operator Type and Security Level' in OVOC's Authentication page (when 'Authentication Type' is **AZURE**) is applied.

For configuration on Microsoft Azure, see Configuring OVOC Web Azure Settings

Figure 9-4: Azure Authentication



HTTPS Connection

The connection between the NBIF client and the OVOC server is by default secured over HTTPS (port 443). This security is managed by the EMS Server Manager option 'IP Phone Manager Pro and NBIF Web pages Secured Communication'. You can secure this connection either using AudioCodes default self-signed certificates or by applying custom certificates signed by an external CA. For more information, refer to the *OVOC Security Guidelines* document.

10 Data Analytics API Database Tables

This chapter describes the database tables that are accessible using the Data Analytics API:

- Main Table Views
- Type Views

Main Table Views

This section describes the Main Table Views that are accessible in the OVOC database.

Table 10-1: View Name: NODES_VIEW

Name	Null?	Supported Enumerator
NODE_ID	x	NUMBER(28)
NODE_NAME	x	NVARCHAR2(100)
NODE_DESCRIPTION	x	NVARCHAR2(255)
FQDN	x	NVARCHAR2(255)
IP_ADDRESS	x	VARCHAR2(20)
SW_VERSION	x	VARCHAR2(100)
SERIAL_NUMBER	x	VARCHAR2(255)
SECOND_SERIAL_NUMBER	x	VARCHAR2(255)
DEFINED_AT	x	DATE
REGION_ID	x	NUMBER(28)
REGION_NAME	x	NVARCHAR2(100)
TENANT_ID	x	NUMBER(28)
TENANT_NAME	x	VARCHAR2(100)
PRODUCT_TYPE	x	NUMBER(3)
PRODUCT_TYPE_NAME	x	VARCHAR2(100)
ADMIN_STATE	x	VARCHAR2(20)
ADMIN_STATE_VALUE	x	VARCHAR2(100)

Name	Null?	Supported Enumerator
MGMT_STATUS	x	NUMBER(3)
MGMT_STATUS_VALUE	x	VARCHAR2(100)
SEVERITY_STATE	x	VARCHAR2(20)
SEVERITY	x	VARCHAR2(100)
CONNECTION_STATE	x	NUMBER(3)
CONNECTION_STATE_VALUE	x	VARCHAR2(100)
CONNECTION_LOST_TIME	x	DATE
MISMATCH_STATE	x	NUMBER
MISMATCH_STATE_VALUE	x	VARCHAR2(100)
RESET_NEEDED	x	NUMBER
RESET_NEEDED_VALUE	x	VARCHAR2(100)
BURN_NEEDED	x	NUMBER
BURN_NEEDED_VALUE	x	VARCHAR2(100)
NETWORK_STATE	x	NUMBER
NETWORK_STATE_VALUE	x	VARCHAR2(100)
SBA_CONNECTION_STATE	x	NUMBER
SBA_CONNECTION_STATE_VALUE	x	VARCHAR2(100)
VQM_CONNECTION_STATE	x	NUMBER
VQM_CONNECTION_STATE_VALUE	x	VARCHAR2(100)
VQ_STATUS	x	NUMBER(3)
VQ_STATUS_VALUE	x	VARCHAR2(100)
VQ_CONTROL_STATUS	x	NUMBER(3)
VQ_CONTROL_STATUS_VALUE	x	VARCHAR2(100)
VQ_MEDIA_STATUS	x	NUMBER(3)

Name	Null?	Supported Enumerator
VQ_MEDIA_STATUS_VALUE	x	VARCHAR2(100)
SIP_MESSAGE_STATUS	x	NUMBER
SIP_MESSAGE_STATUS_VALUE	x	VARCHAR2(100)
CALLS_COUNT	x	NUMBER(10)
MANAGED_STATE	x	NUMBER
MANAGED_STATE_VALUE	x	VARCHAR2(100)
MANAGED_STATE_SEM	x	NUMBER
MANAGED_STATE_SEM_VALUE	x	VARCHAR2(100)
LICENSE_STATUS	x	NUMBER(3)
LICENSE_STATUS_VALUE	x	VARCHAR2(100)
LICENSE_POOL_STATUS	x	NUMBER
CLM_STATUS	x	NUMBER
SNMP_PORT	x	NUMBER
SNMP_VERSION	x	NUMBER
HTTPS_PROXY_ENABLED	x	NUMBER
HTTPS_ENABLED_VALUE	x	VARCHAR2(100)
LAST_BACKUP_STATUS	x	NUMBER
LAST_BACKUP_STATUS_VALUE	x	VARCHAR2(100)
LAST_PERFORMED_BACKUP_TIME	x	DATE
POLLING_ENABLED	x	NUMBER
POLLING_ENABLED_VALUE	x	VARCHAR2(100)
LAST_POLLING_STATUS	x	NUMBER
LAST_POLLING_STATUS_VALUE	x	VARCHAR2(100)
LAST_POLLING_FAIL_REASON	x	NUMBER

Name	Null?	Supported Enumerator
LAST_SUCCESFUL_POLLING	x	DATE
LAST_UNSUCCESFUL_POLLING	x	DATE
LAST_NUM_POLLING	x	NUMBER
NETWORK_X_LOCATION	x	FLOAT(126)
NETWORK_Y_LOCATION	x	FLOAT(126)
NETWORK_LATITUDE	x	VARCHAR2(25)
NETWORK_LONGITUDE	x	VARCHAR2(25)
REPORTED_NODE_ID	x	NUMBER
SQL_SERVRE_IP	x	NVARCHAR2(50)
SQL_SERVER_PORT	x	NUMBER
SQL_SERVER_INSTANCE_NAME	x	VARCHAR2(50)

Table 10-2: View Name: LINKS_VIEW

Name	Null?	Supported Enumerator
LINK_ID	NOT NULL	NUMBER(10)
LINK_NAME	x	VARCHAR2(50)
TENANT_ID	NOT NULL	NUMBER(28)
SRC_TENANT_NAME	x	VARCHAR2(100)
SECOND_TENANT_ID	NOT NULL	NUMBER(28)
DEST_TENANT_NAME	x	VARCHAR2(100)
REGION_ID	NOT NULL	NUMBER(28)
REGION_NAME	x	NVARCHAR2(100)
SRC_NODE_ID	NOT NULL	NUMBER(28)
SRC_NODE_NAME	x	NVARCHAR2(100)
SRC_N_NODE_NAME	x	NVARCHAR2(100)

Name	Null?	Supported Enumerator
DEST_NODE_ID	NOT NULL	NUMBER(28)
DEST_NODE_NAME	x	NVARCHAR2(100)
DEST_N_NODE_NAME	x	NVARCHAR2(100)
LINK_TYPE	x	NUMBER(3)
LINK_TYPE_VALUE	x	VARCHAR2(100)
TYPE_IP_GROUP	x	NUMBER(10)
TYPE_TRUNK_GROUP	x	NUMBER(10)
TYPE_IP_PREFIX	x	VARCHAR2(250)
TYPE_PHONE_PREFIX	x	VARCHAR2(250)
TYPE_MEDIA_REALM	x	NUMBER(10)
TYPE_MEDIA_IP_PREFIX	x	VARCHAR2(250)
TYPE_SRC_FQDN	x	NVARCHAR2(100)
TYPE_DEST_FQDN	x	NVARCHAR2(100)
SRC_PRODUCT_TYPE	x	NUMBER(3)
SRC_PRODUCT_TYPE_NAME	x	VARCHAR2(100)
DEST_PRODUCT_TYPE	x	NUMBER(3)
DEST_PRODUCT_TYPE_NAME	x	VARCHAR2(100)
LINK_DIRECTION	x	NUMBER(3)
LINK_DIRECTION_VALUE	x	VARCHAR2(100)
DEFINED_AT	x	NOT NULL
VQ_STATUS	x	NOT NULL
VQ_STATUS_VALUE	x	VARCHAR2(100)
VQ_CONTROL_STATUS	x	NUMBER(3)
VQ_CONTROL_STATUS_VALUE	x	VARCHAR2(100)

Name	Null?	Supported Enumerator
VQ_MEDIA_STATUS	x	NUMBER(3)
VQ_MEDIA_STATUS_VALUE	x	VARCHAR2(100)
VQ_CALL_DURATION_STATUS	x	NUMBER(3)
VQ_CALL_DURATION_STATUS_VALUE	x	VARCHAR2(100)
VQ_MAX_CONCURRENT_CALLS_STATUS	x	NUMBER(3)
VQ_MAX_CONC_CALLS_STATUS_V	x	VARCHAR2(100)
VQ_BANDWIDTH_STATUS	x	NUMBER(3)
VQ_BANDWIDTH_STATUS_VALUE	x	VARCHAR2(100)
CALLS_COUNT	x	NUMBER(10)

Table 10-3: View Name: CALLS_VIEW

Name	Null?	Supported Enumerator
CALL_INDEX	NOT NULL	NUMBER(28)
EMS_CALL_IDENTIFIER	NOT NULL	NUMBER(28)
NODE_ID	NOT NULL	NUMBER(28)
NODE_NAME	x	NVARCHAR2(100)
SESSION_ID	NOT NULL	NUMBER(28)
CALL_START_TIME	NOT NULL	DATE
CALL_END_TIME	NOT NULL	DATE
CALL_DURATION	x	NUMBER(10)
CALL_STATUS	x	NUMBER(3)
CALL_STATUS_VALUE	x	VARCHAR2(100)
VQ_COLOR	x	NUMBER(3)
VQ_COLOR_VALUE	x	VARCHAR2(100)
QUALITY_CAUSE	x	NUMBER(3)

Name	Null?	Supported Enumerator
QUALITY_CAUSE_VALUE	x	VARCHAR2(100)
RED_COLOR_PERCENT	x	NUMBER(10,2)
YELLOW_COLOR_PERCENT	x	NUMBER(10,2)
GREEN_COLOR_PERCENT	x	NUMBER(10,2)
TERMINATION_INITIATOR	x	NUMBER(3)
TERMINATION_INITIATOR_VALUE	x	VARCHAR2(100)
TERMINATION_REASON_CATEGORY	x	NUMBER(3)
TERM_REASON_CATEGORY_VALUE	x	VARCHAR2(100)
TERMINATION_REASON_DETAILS	x	VARCHAR2(100)
TERM_REASON_DETAILS_VALUE	x	VARCHAR2(100)
SIP_TERMINATION_REASON	x	VARCHAR2(50)
SIP_TERMINATION_DESC	x	VARCHAR2(100)
PSTN_TERMINATION_REASON	x	NUMBER(4)
PSTN_TERM_REASON_VALUE	x	VARCHAR2(100)
MEDIA_TYPE	x	NUMBER(3)
MEDIA_TYPE_VALUE	x	VARCHAR2(100)
ENDPOINT_TYPE	x	NUMBER(10)
ENDPOINT_TYPE_VALUE	x	VARCHAR2(100)
CALLER_URI	x	VARCHAR2(160)
CALLEE_URI	x	VARCHAR2(160)
NO_EVENT_FLAG	x	NUMBER(3)
CALL_NODES	x	VARCHAR2(300)
CALL_LINKS	x	VARCHAR2(300)
CALL_SOURCE_TYPE	x	NOT NULL

Name	Null?	Supported Enumerator
CALL_SOURCE_TYPE_VALUE	x	VARCHAR2(100)
MOS	x	NUMBER(10,2)
JITTER	x	NUMBER(10,2)
PLOSS	x	NUMBER(10,2)
DELAY	x	NUMBER(10,2)
RERL	x	NUMBER(10,2)

Table 10-4: View Name: ALARMS_VIEW

Name	Null?	Supported Enumerator
ALARM_ID	x	NUMBER(28)
IS_EVENT	x	NUMBER(8)
ALARM_REMOTE_HOST	x	NVARCHAR2(100)
ALARM_UNIQUE_ID	x	NVARCHAR2(100)
ALARM_NAME	x	VARCHAR2(100)
ALARM_DESCRIPTION	x	NVARCHAR2(255)
ALARM_SEVERITY	x	NUMBER(3)
ALARM_SEVERITY_VALU	x	VARCHAR2(100)
ALARM_SOURCE	x	NVARCHAR2(255)
ALARM_ADDITIONAL_INFO1	x	NVARCHAR2(255)
ALARM_ADDITIONAL_INFO2	x	NVARCHAR2(255)
ALARM_ADDITIONAL_INFO3	x	NVARCHAR2(255)
ALARM_REMOTE_PORT	x	NUMBER(8)
ALARM_SYSTEM_UP_TIME	x	NVARCHAR2(100)
ALARM_SNMP_VERSION	x	NUMBER(3)
ALARM_OID	x	VARCHAR2(100)

Name	Null?	Supported Enumerator
ALARM_STATUS	x	NUMBER(3)
ALARM_STATUS_VALUE	x	VARCHAR2(100)
LAST_ACTION_TIME	x	DATE
LAST_ACTION_OPERATOR	x	NVARCHAR2(100)
ALARM_RECIEVED_TIME	x	DATE
ALARM_UNIT_NAME	x	NVARCHAR2(100)
ALARM_REGION_ID	x	NUMBER(28)
ALARM_REGION_NAME	x	NVARCHAR2(100)
ALARM_UNIT_ID	x	NUMBER(28)
TENANT_ID	x	NUMBER(28)
TENANT_NAME	x	VARCHAR2(100)
ALARM_SOURCE_NAME	x	NVARCHAR2(255)
ALARM_DATE_TIME	x	NVARCHAR2(255)

Table 10-5: View Name: NODES_SUMMARY_VIEW

Name	Null?	Supported Enumerator
DEVICE_NAME	x	NVARCHAR2(100)
NODE_ID	NOT NULL	NUMBER(28)
TIME_STAMP	NOT NULL	DATE
NODE_NAME	x	VARCHAR2(100)
REGION_ID	x	NUMBER(28)
CALLS_COUNT	x	NUMBER(10)
CALLS_DURATION_TOTAL	x	NUMBER(10)
CALLS_DURATION_COUNT	x	NUMBER(10)
SUCCESS_CALLS	x	NUMBER(10)

Name	Null?	Supported Enumerator
FAILED_CALLS	x	NUMBER(10)
RED_CALLS	x	NUMBER(10)
YELLOW_CALLS	x	NUMBER(10)
GREEN_CALLS	x	NUMBER(10)
GRAY_CALLS	x	NUMBER(10)
MOS_CAUSE	x	NUMBER(10)
JITTER_CAUSE	x	NUMBER(10)
PLOSS_CAUSE	x	NUMBER(10)
DELAY_CAUSE	x	NUMBER(10)
RERL_CAUSE	x	NUMBER(10)
MOS_MIN	x	NUMBER(10,2)
JITTER_MIN	x	NUMBER(10)
PLOSS_MIN	x	NUMBER(10)
DELAY_MIN	x	NUMBER(10)
RERL_MIN	x	NUMBER(10)
MOS_MAX	x	NUMBER(10,2)
JITTER_MAX	x	NUMBER(10)
PLOSS_MAX	x	NUMBER(10)
DELAY_MAX	x	NUMBER(10)
RERL_MAX	x	NUMBER(10)
MOS_TOTAL	x	NUMBER(10,2)
JITTER_TOTAL	x	NUMBER(10,2)
PLOSS_TOTAL	x	NUMBER(10,2)
DELAY_TOTAL	x	NUMBER(10,2)

Name	Null?	Supported Enumerator
RERL_TOTAL	x	NUMBER(10,2)
MOS_COUNT	x	NUMBER(10)
JITTER_COUNT	x	NUMBER(10)
PLOSS_COUNT	x	NUMBER(10)
DELAY_COUNT	x	NUMBER(10)
RERL_COUNT	x	NUMBER(10)
SNR_MIN	x	NUMBER(10)
SNR_MAX	x	NUMBER(10)
SNR_TOTAL	x	NUMBER(10,2)
SNR_COUNT	x	NUMBER(10)
RX_KB_TOTAL	x	NUMBER(28)
TX_KB_TOTAL	x	NUMBER(28)
VOICE_CALLS_COUNT	x	NUMBER(10)
FAX_CALLS_COUNT	x	NUMBER(10)
MOS_RED_CALLS	x	NUMBER(10)
MOS_YELLOW_CALLS	x	NUMBER(10)
MOS_GREEN_CALLS	x	NUMBER(10)
MOS_GRAY_CALLS	x	NUMBER(10)
JITTER_RED_CALLS	x	NUMBER(10)
JITTER_YELLOW_CALLS	x	NUMBER(10)
JITTER_GREEN_CALLS	x	NUMBER(10)
JITTER_GRAY_CALLS	x	NUMBER(10)
PLOSS_RED_CALLS	x	NUMBER(10)
PLOSS_YELLOW_CALLS	x	NUMBER(10)

Name	Null?	Supported Enumerator
PLOSS_GREEN_CALLS	x	NUMBER(10)
PLOSS_GRAY_CALLS	x	NUMBER(10)
DELAY_RED_CALLS	x	NUMBER(10)
DELAY_YELLOW_CALLS	x	NUMBER(10)
DELAY_GREEN_CALLS	x	NUMBER(10)
DELAY_GRAY_CALLS	x	NUMBER(10)
RERL_RED_CALLS	x	NUMBER(10)
RERL_YELLOW_CALLS	x	NUMBER(10)
RERL_GREEN_CALLS	x	NUMBER(10)
RERL_GRAY_CALLS	x	NUMBER(10)
MAX_CONCURRENT_CALLS	x	NUMBER(10)
INCOMING_CALLS	x	NUMBER(10)
OUTGOING_CALLS	x	NUMBER(10)

Table 10-6: View Name: LINKS_SUMMARY_VIEW

Name	Null?	Supported Enumerator
REAL_LINK_NAME	x	VARCHAR2(50)
LINK_ID	NOT NULL	NUMBER(28)
TIME_STAMP	NOT NULL	DATE
LINK_NAME	x	VARCHAR2(50)
REGION_ID	x	NUMBER(28)
CALLS_COUNT	x	NUMBER(10)
CALLS_DURATION_TOTAL	x	NUMBER(10)
CALLS_DURATION_COUNT	x	NUMBER(10)
SUCCESS_CALLS	x	NUMBER(10)

Name	Null?	Supported Enumerator
FAILED_CALLS	x	NUMBER(10)
RED_CALLS	x	NUMBER(10)
YELLOW_CALLS	x	NUMBER(10)
GREEN_CALLS	x	NUMBER(10)
GRAY_CALLS	x	NUMBER(10)
MOS_CAUSE	x	NUMBER(10)
JITTER_CAUSE	x	NUMBER(10)
PLOSS_CAUSE	x	NUMBER(10)
DELAY_CAUSE	x	NUMBER(10)
RERL_CAUSE	x	NUMBER(10)
MOS_MIN	x	NUMBER(10,2)
JITTER_MIN	x	NUMBER(10)
PLOSS_MIN	x	NUMBER(10)
DELAY_MIN	x	NUMBER(10)
RERL_MIN	x	NUMBER(10)
MOS_MAX	x	NUMBER(10,2)
JITTER_MAX	x	NUMBER(10)
PLOSS_MAX	x	NUMBER(10)
DELAY_MAX	x	NUMBER(10)
RERL_MAX	x	NUMBER(10)
MOS_TOTAL	x	NUMBER(10,2)
JITTER_TOTAL	x	NUMBER(10,2)
PLOSS_TOTAL	x	NUMBER(10,2)
DELAY_TOTAL	x	NUMBER(10,2)

Name	Null?	Supported Enumerator
RERL_TOTAL	x	NUMBER(10,2)
MOS_COUNT	x	NUMBER(10)
JITTER_COUNT	x	NUMBER(10)
PLOSS_COUNT	x	NUMBER(10)
DELAY_COUNT	x	NUMBER(10)
RERL_COUNT	x	NUMBER(10)
SNR_MIN	x	NUMBER(10)
SNR_MAX	x	NUMBER(10)
SNR_TOTAL	x	NUMBER(10,2)
SNR_COUNT	x	NUMBER(10)
RX_KB_TOTAL	x	NUMBER(28)
TX_KB_TOTAL	x	NUMBER(28)
VOICE_CALLS_COUNT	x	NUMBER(10)
FAX_CALLS_COUNT	x	NUMBER(10)
MOS_RED_CALLS	x	NUMBER(10)
MOS_YELLOW_CALLS	x	NUMBER(10)
MOS_GREEN_CALLS	x	NUMBER(10)
MOS_GRAY_CALLS	x	NUMBER(10)
JITTER_RED_CALLS	x	NUMBER(10)
JITTER_YELLOW_CALLS	x	NUMBER(10)
JITTER_GREEN_CALLS	x	NUMBER(10)
JITTER_GRAY_CALLS	x	NUMBER(10)
PLOSS_RED_CALLS	x	NUMBER(10)
PLOSS_YELLOW_CALLS	x	NUMBER(10)

Name	Null?	Supported Enumerator
PLOSS_GREEN_CALLS	x	NUMBER(10)
PLOSS_GRAY_CALLS	x	NUMBER(10)
DELAY_RED_CALLS	x	NUMBER(10)
DELAY_YELLOW_CALLS	x	NUMBER(10)
DELAY_GREEN_CALLS	x	NUMBER(10)
DELAY_GRAY_CALLS	x	NUMBER(10)
RERL_RED_CALLS	x	NUMBER(10)
RERL_YELLOW_CALLS	x	NUMBER(10)
RERL_GREEN_CALLS	x	NUMBER(10)
RERL_GRAY_CALLS	x	NUMBER(10)
MAX_CONCURRENT_CALLS	x	NUMBER(10)
INCOMING_CALLS	x	NUMBER(10)
OUTGOING_CALLS	x	NUMBER(10)

Type Views

This appendix describes the Type Views that are accessible in the OVOC database.

Table 10-7: Type Name: DisableEnableType

Type Values
(0) Disable
(1) Enable

The table below is divided into two columns for readability. In the database, there is a single column for “MGType” e.g. (0) UNKNOWN.

Table 10-8: Type Name: MGType

Type Values	MGType
(0)	UNKNOWN
(1)	Mediant 8000
(2)	STRETTO 8000
(3)	Mediant 5000
(4)	STRETTO 5000
(5)	Mediant 2000
(6)	STRETTO 2000
(7)	MP102
(8)	MP104 FXS
(9)	MP104 FXO
(10)	MP108 FXS
(11)	MP108 FXO
(12)	MP124
(13)	IPAT 8000
(14)	IPAT 5000
(15)	IPAT 2000
(16)	CA IPAT 8000
(17)	CA IPAT 5000
(18)	CA IPAT 2000
(20)	UNKNOWN MP102
(21)	UNKNOWN MP104 FXS
(22)	UNKNOWN MP104 FXO
(23)	UNKNOWN MP108 FXS

Type Values	MGType
(24)	UNKNOWN MP108 FXO
(25)	UNKNOWN MP124
(26)	UNKNOWN Mediant 2000
(27)	UNKNOWN STRETTO 2000
(28)	UNKNOWN Mediant 8000
(29)	UNKNOWN STRETTO 8000
(30)	UNKNOWN Mediant 5000
(31)	UNKNOWN STRETTO 5000
(32)	UNKNOWN IPAT 8000
(33)	UNKNOWN IPAT 5000
(34)	UNKNOWN IPAT 2000
(35)	UNKNOWN CA IPAT 8000
(36)	UNKNOWN CA IPAT 5000
(37)	UNKNOWN CA IPAT 2000
(38)	IPMedia 2000
(39)	UNKNOWN IPMEDIA 2000
(40)	IPMedia 5000
(41)	UNKNOWN IPMEDIA 5000
(42)	IPMedia 8000
(43)	UNKNOWN IPMEDIA 8000
(44)	Mediant 1000
(45)	UNKNOWN Mediant 1000
(46)	Mediant 3000
(47)	UNKNOWN Mediant 3000

Type Values	MGType
(9)	UNKNOWN MP118FXS
(50)	MP114 FXS
(51)	UNKNOWN MP114FXS
(52)	MP112
(53)	UNKNOWN MP112
(54)	MP118 FXO
(55)	UNKNOWN MP118FXO
(56)	MP114 FXO
(57)	UNKNOWN MP114FXO
(58)	IPMedia 3000
(59)	UNKNOWN IPMEDIA 3000
(60)	MP118 FXSFXO
(61)	UNKNOWN MP118 FXS/FXO
(62)	MP114 FXSFXO
(63)	UNKNOWN MP114 FXS/FXO
(64)	Mediant 260
(65)	UNKNOWN Mediant 260
(66)	IPMedia 260
(67)	UNKNOWN IPMEDIA 260
(68)	Mediant 3000 8410
(69)	UNKNOWN Mediant 3000 8410
(70)	IPMedia 3000 8410
(71)	UNKNOWN IPMedia 3000 8410 8410
(72)	Mediant 3000 8410 V5.2

Type Values	MGType
(73)	UNKNOWN Mediant 3000 8410 V5.2
(74)	IPMedia 3000 8410 VIDEO
(75)	UNKNOWN IPMedia 3000 8410 8410 VIDEO
(76)	Mediant 600
(77)	UNKNOWN Mediant 600
(78)	Mediant 800 MSBR
(79)	UNKNOWN Mediant 800 MSBR
(80)	Mediant 1000 MSBR
(81)	UNKNOWN Mediant 1000 MSBR
(82)	Mediant 800 E-SBC
(83)	UNKNOWN Mediant 800 E-SBC
(84)	Mediant 1000 E-SBC
(85)	UNKNOWN Mediant 1000 E-SBC
(86)	Mediant 4000 E-SBC
(87)	UNKNOWN Mediant 4000 E-SBC
(88)	SW SBC
(89)	UNKNOWN S
(90)	Mediant 500 MSBR
(91)	UNKNOWN Mediant 500 MSBR
(92)	Mediant 500 E-SBC
(93)	UNKNOWN Mediant 500 E-SBC
(94)	Mediant 850 MSBR
(95)	UNKNOWN Mediant 850 MSBR
(96)	Mediant 850 E-SBC

Type Values	MGType
(97)	UNKNOWN Mediant 850 E-SBC
(98)	Mediant 2600 E-SBC
(99)	UNKNOWN Mediant 2600 E-SBC
(100)	Mediant 500L MSBR
(101)	UNKNOWN Mediant 500L MSBR
(102)	Mediant 500L E-SBC
(103)	UNKNOWN Mediant 500L E-SBC
(104)	Mediant 800B MSBR
(105)	UNKNOWN Mediant 800B MSBR
(106)	Mediant 800B E-SBC
(107)	UNKNOWN Mediant 800B E-SBC
(108)	SW SE SBC
(109)	UNKNOWN SW SE SBC
(110)	SW SE-H SBC
(111)	UNKNOWN SW SE-H SBC
(112)	SW VE SBC
(113)	UNKNOWN SW VE SBC
(114)	SW VE-H SBC
(115)	UNKNOWN SW VE-H SBC
(116)	Mediant 9000 SBC
(117)	UNKNOWN Mediant 9000 SBC
(118)	SW SBC CM
(119)	UNKNOWN SW SBC CM
(120)	Mediant 4000B E-SBC

Type Values	MGType
(121)	UNKNOWN Mediant 4000B E-SBC
(122)	Mediant 9000 SBC CM
(123)	UNKNOWN Mediant 9000 SBC CM
(124)	SW VE SBC CM
(125)	UNKNOWN SW VE SBC CM
(126)	MP1288
(127)	UNKNOWN MP1288
(128)	SW SE SBC CM
(129)	UNKNOWN SW SE SBC CM
(19)	MP124-E
(130)	UNKNOWN MP124E
(131)	Mediant 2600B E-SBC
(132)	UNKNOWN Mediant 2600B E-SBC
(133)	Mediant 500LI MSBR
(134)	UNKNOWN Mediant 500LI MSBR
(200)	Generic Device
(250)	CloudBond 365 Standard Edition
(251)	UNKNOWN CloudBond 365 Standard Edition
(252)	CloudBond 365 Standard Plus Edition
(253)	UNKNOWN CloudBond 365 Standard Plus Edition
(254)	CloudBond 365 Pro Edition
(255)	UNKNOWN CloudBond 365 Pro Edition
(256)	CloudBond 365 Enterprise Edition
(257)	UNKNOWN CloudBond 365 Enterprise Edition

Type Values	MGType
(258)	CloudBond 365 Virtualized Edition
(259)	UNKNOWN CloudBond 365 Virtualized Edition
(260)	User Management Pack
(261)	UNKNOWN User Management Pack
(262)	Mediant 800 CCE Appliance
(263)	UNKNOWN Mediant 800 CCE Appliance
(264)	Mediant Server CCE Appliance
(265)	UNKNOWN Mediant Server CCE Appliance
(266)	SmartTap
(267)	null
(268)	User Management Pack Multi-Tenant
(269)	UNKNOWN User Management Pack Multi-Tenant
(299)	SBA
(300)	Skype Front End Server
(301)	Skype Mediation Server
(302)	Skype Edge Server
(303)	Skype SBA
(304)	MP202 B
(305)	UNKNOWN MP202 B
(306)	MP204 B
(307)	UNKNOWN MP204 B
(308)	MP202
(309)	UNKNOWN MP202
(310)	MP204

Type Values	MGType
(311)	UNKNOWN MP204
(326)	MP202 R
(327)	UNKNOWN MP202 R
(328)	MP204 R
(329)	UNKNOWN MP204 R
(312)	SW SE SBC SC
(313)	UNKNOWN SW SE SBC SC
(314)	SW SE-H SBC SC
(315)	UNKNOWN SW SE-H SBC SC
(316)	SW VE SBC SC
(317)	UNKNOWN SW VE SBC SC
(318)	SW VE-H SBC SC
(319)	UNKNOWN SW VE-H SBC SC
(320)	SW ESBC SC
(321)	UNKNOWN SW ESBC SC
(322)	Mediant 800C MSBR
(323)	UNKNOWN Mediant 800C MSBR
(324)	Mediant 800C E-SBC
(325)	UNKNOWN Mediant 800C E-SBC

Table 10-9: Type Name: ItuPerceivedSeverity

Values
(0) cleared
(1) indeterminate
(2) warning

Values
(3) minor
(4) major
(5) critical

Table 10-10:Type Name: ConnectionType

Type Values
(0) Not Connected
(1) Connected

Table 10-11:Type Name: MismatchType

Type Values
(0) No Mismatch
(1) Hardware Mismatch
(2) Sw Version Unsupported
(3) Configuration Mismatch
(4) Predefine Mismatch
(5) Predefine Mismatch with upload configuration
(6) Predefine Mismatch with Download configuration

Table 10-12:Type Name: SemConnectionState

Type Values
(0) Not defined
(1) Not defined not connected
(2) Not connected
(3) connected
(4) Not connected no resources

Table 10-13:Type Name: StatusType

Type Values
(0) ERROR
(1) WARNING
(2) OK
(3) UNMONITORED

Table 10-14:Type Name: VQThresholdStatus

Type Values
(0) CRITICAL
(1) MAJOR
(2) CLEAR
(3) UNMONITORED

Table 10-15:Type Name: SipMessageStatusType

Type Values
(0) UNDEFINED
(1) SBC_IND_START_SENDING_SIPM
(2) SBC_IND_STOP_SENDING_SIPM

Table 10-16:Type Name: NoYesType

Type Values
(0) No
(1) Yes

Table 10-17:Type Name: NetworkState

Type Values
(0) Regular
(1) NAT

Table 10-18:Type Name: ManagedType

Type Values
(0) Not Defined
(1) Managed
(2) Unmanaged

Table 10-19:Type Name: FailSuccessType

Type Values
(0) Fail
(1) Success

Table 10-20:Type Name: BackupStatusType

Type Values
(0) No backup info
(1) File uploaded
(2) File not changed
(3) MG not connected
(4) Upload error
(5) Not enough disk space
(6) Backup error

Table 10-21:Type Name: ItuEntityAdministrativeState

Type Values
(0) Locked
(1) ShuttingDown
(2) Unlocked

Table 10-22:Type Name: AlarmStatusType

Type Values
(0) New
(1) Acknowledged
(2) Cleared
(3) Automatically Cleared
(4) Coldstart Cleared

The table below is divided into two columns for readability. In the database, there is a single column for "Type Values" e.g. (.1.3.6.1.4.1.5003.9.10.1.21.2.0.41) acSonetLineRDIAlarm.

Table 10-23:Type Name: AlarmNameType

OID	Type Values
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.41)	acSonetLineRDIAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.40)	acSonetLineAISAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.43)	acHwFailureAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.42)	acSonetIfHwFailureAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.70)	IPPhoneRequiresReset
(.1.3.6.1.4.1.5003.9.30.2.2.0.5)	acSbaCertificateExpiredAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.72)	acAlarmsFwOverflow
(.1.3.6.1.4.1.5003.9.30.2.2.0.4)	acSBADiskSpaceAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.71)	acAlarmsOverflow
(.1.3.6.1.4.1.5003.9.20.3.2.0.74)	acPmTimeOutEvent
(.1.3.6.1.4.1.5003.9.20.3.2.0.73)	acEMSFQDNResolveEvent
(.1.3.6.1.4.1.5003.9.20.3.2.0.76)	acDevicePmPollingEvent
(.1.3.6.1.4.1.5003.9.20.3.2.0.75)	acTokenPoolIsEmpty

OID	Type Values
(.1.3.6.1.4.1.5003.9.20.3.2.0.78)	acPmHasNoSnmpConnection
(.1.3.6.1.4.1.5003.9.20.3.2.0.77)	acPmBatchOverFlowAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.79)	JabraFirmwareUpgradeFailed
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.49)	acTrunksAlarmNearEndLOS
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.48)	acHitlessUpdateStatus
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.45)	acDialPlanFileReplaced
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.44)	acH248LostConnectionWithCA
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.47)	acAnalogPortHighTemperature
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.46)	acAnalogPortSPIOutOfService
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.52)	acTrunksAlarmFarEndLOF
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.51)	acTrunksAlarmRcvAIS
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.54)	acAMSProcedureResult
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.53)	acIPv6ErrorAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.50)	acTrunksAlarmNearEndLOF
(.1.3.6.1.4.1.5003.9.20.3.2.0.61)	floatingLicenseExtended
(.1.3.6.1.4.1.5003.9.20.3.2.0.60)	acSEMSipMessageStatusAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.63)	acClmRegisterSuccessfulEvent
(.1.3.6.1.4.1.5003.9.20.3.2.0.62)	acClmDeviceReportAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.65)	acClmFailToSendUsageReportAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.64)	acClmRegisterFailureAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.67)	acClmServiceShutdownAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.66)	acClmFailToSendUsageReportExtendedAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.69)	acClmMaxDeviceCapacityAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.68)	acClmMaxDeviceMismatchEvent

OID	Type Values
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.59)	acGWSASEmergencyModeAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.56)	acTMInconsistentRemoteAndLocalPLLStatus
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.55)	acWeakRedundancy
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.58)	acTMReferenceChange
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.57)	acTMReferenceStatus
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.21)	acSS7LinkBlockStateChangeAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.20)	acSS7LinkInhibitStateChangeAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.50)	acSEMLicenseKeyAlarmDevice
(.1.3.6.1.4.1.5003.9.20.3.2.0.52)	acEMSNotEnoughOracleSpaceAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.51)	acEMSDiskSpaceAlarmCheck
(.1.3.6.1.4.1.5003.9.20.3.2.0.54)	IPPhoneSpeakerFirmDownloadFailure
(.1.3.6.1.4.1.5003.9.20.3.2.0.53)	acLicenseAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.55)	IPPhoneSpeakerFirmUpgradeFailure
(.1.3.6.1.4.1.5003.9.20.3.2.0.56)	IPPhoneConferSpeakerConnectFailure
(.1.3.6.1.4.1.5003.9.20.3.2.0.58)	acOvocReSyncEvent
(.1.3.6.1.4.1.5003.9.20.3.2.0.57)	IPPhoneGeneralLocalEvent
(.1.3.6.1.4.1.5003.9.20.3.2.0.59)	IPPhoneWebSuccessiveLoginFailure
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.27)	acPerformanceMonitoringThresholdCrossing
(.1.3.6.1.2.1.10.18.15.0.1)	ds1LineStatus
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.26)	acSS7RedundancyAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.29)	acFanTrayAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.28)	acHTTPDownloadResult
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.23)	acSS7LinkSetStateChangeAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.22)	acSS7LinkCongestionStateChangeAlarm

OID	Type Values
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.25)	acSS7SNSetStateChangeAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.24)	acSS7RouteSetStateChangeAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.30)	acPowerSupplyAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.32)	acSAMissingAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.31)	acPEMAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.41)	IPPhoneLyncLoginFailure
(.1.3.6.1.4.1.5003.9.20.3.2.0.40)	IPPhoneSurvivableModeStart
(.1.3.6.1.4.1.5003.9.30.2.2.0.1)	acSBAServicesStatusAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.43)	acSEMRuleBandwidthAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.42)	acEMSAlarmSuppression
(.1.3.6.1.4.1.5003.9.30.2.2.0.3)	acSBAMemoryStatusAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.45)	acEMSKeepAliveAlarm
(.1.3.6.1.4.1.5003.9.30.2.2.0.2)	acSBACpuStatusAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.44)	acSEMRuleMaxConcurrentCallsAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.47)	acEndpointPublishAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.46)	acEMSPreProvisioningAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.49)	acEndpointServerOverloadAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.48)	acEndpointLicenseAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.38)	acSonetSectionLOFAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.37)	acDChannelStatus
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.39)	acSonetSectionLOSAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.34)	acHASystemConfigMismatchAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.33)	acHASystemFaultAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.36)	acUserInputAlarm

OID	Type Values
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.35)	acHASystemSwitchOverAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.3)	acEMSNodeConnectionLostAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.9)	acEMSNoMismatchNodeAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.7)	acEMSConfigurationMismatchNodeAlarm
(.1.3.6.1.4.1.5003.9.70.1.2.2.0.12)	acARMTopologyReloaded
(.1.3.6.1.4.1.5003.9.70.1.2.2.0.13)	acARMRoutingRuleMatch
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.10)	acBoardEthernetLinkAlarm
(.1.3.6.1.4.1.5003.9.70.1.2.2.0.10)	acARMLicenseMissing
(.1.3.6.1.4.1.5003.9.70.1.2.2.0.11)	acARMQualityChanged
(.1.3.6.1.2.1.47.2.0.1)	entConfigChange
(.1.3.6.1.4.1.5003.9.70.1.2.2.0.16)	acARMRegistrationStatusResyncThreshold
(.1.3.6.1.4.1.5003.9.70.1.2.2.0.17)	acARMExternalWebService
(.1.3.6.1.4.1.5003.9.10.1.5.2)	resettingBoard
(.1.3.6.1.4.1.5003.9.70.1.2.2.0.14)	acARMRouterReloaded
(.1.3.6.1.4.1.5003.9.70.1.2.2.0.15)	acARMNoAvailableRouter
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.19)	acSS7LinkStateChangeAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.1)	acEMSSnmpCannotBindError
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.16)	acKeepAlive
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.15)	acOperationalStateChange
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.18)	acEnhancedBITStatus
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.17)	acNATTraversalAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.12)	acActiveAlarmTableOverflow
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.11)	acBoardOverloadAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.14)	acAudioProvisioningAlarm

OID	Type Values
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.13)	acAtmPortAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.141)	acAnalogLineLeftOffhookAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.142)	acCDRServerAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.140)	acInstallationFailureAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.138)	acFloatingLicenseAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.139)	acAWSSecurityRoleAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.136)	acHANetworkMonitorAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.137)	acHAEthernetGroupAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.134)	acMediaClusterRemoteInterfaceAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.135)	acHANetworkMismatchAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.132)	acCloudLicenseManagerAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.133)	acMediaClusterAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.81)	endpointVipDisconnected
(.1.3.6.1.2.1.255.3.1)	rtcpXrVoipThresholdViolation
(.1.3.6.1.4.1.5003.9.20.3.2.0.80)	endpointVipUnregistered
(.1.3.6.1.4.1.5003.9.20.3.2.0.83)	acReportSchedulersLoadAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.82)	acReportSchedulersTimeEvent
(.1.3.6.1.4.1.5003.9.20.3.2.0.85)	acFlexPoolLicenseUsage
(.1.3.6.1.4.1.5003.9.20.3.2.0.84)	acReportSchedulersExecutionEvent
(.1.3.6.1.4.1.5003.9.20.3.2.0.86)	acUMPUsersSchedulerAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.145)	acRemoteMonitoringAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.143)	acDSPFarmsMismatchAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.144)	acFlexLicenseManagerAlarm
(.1.3.6.1.6.3.1.1.5.1)	coldStart

OID	Type Values
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.120)	acMtcePsuFailureAlarm
(.1.3.6.1.6.3.1.1.5.2)	warmStart
(.1.3.6.1.6.3.1.1.5.3)	linkDown
(.1.3.6.1.6.3.1.1.5.4)	linkUp
(.1.3.6.1.6.3.1.1.5.5)	authenticationFailure
(.1.3.6.1.4.1.5003.9.80.3.2.0.50)	acUmpEndUserAuthFailEvent
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.116)	acMtceNetworkFailureAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.117)	acMtceSwUpgradeFailureAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.114)	acIpGroupNoRouteAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.115)	acMtcmClusterHaAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.112)	acACDThresholdAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.113)	acNERThresholdAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.110)	acResetNeededAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.111)	acASRThresholdAlarm
(.1.3.6.1.4.1.5003.9.40.3.2.0.13)	acVaCallRecordingErrorEvent
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.118)	acMtceHwTemperatureFailureAlarm
(.1.3.6.1.4.1.5003.9.40.3.2.0.11)	acVaResourceThresholdAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.119)	acMtceHwFanTrayFailureAlarm
(.1.3.6.1.4.1.5003.9.40.3.2.0.12)	acVaConnectionFailureAlarm
(.1.3.6.1.4.1.5003.9.80.3.2.0.49)	acUmpUserSettingsFailEvent
(.1.3.6.1.4.1.5003.9.80.3.2.0.48)	acUmpO365CommandExEvent
(.1.3.6.1.4.1.5003.9.80.3.2.0.45)	acUmpAzureADSyncAlarm
(.1.3.6.1.4.1.5003.9.80.3.2.0.44)	acUmpEndUserLicThresholdAlarm
(.1.3.6.1.4.1.5003.9.80.3.2.0.47)	acUmpSBCFailureAlarm

OID	Type Values
(.1.3.6.1.4.1.5003.9.80.3.2.0.46)	acUmpO365FailureAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.130)	acNGINXConfigurationIsInvalidAlarm
(.1.3.6.1.4.1.5003.9.80.3.2.0.41)	acUmpTenantLicThresholdAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.131)	acNGINXPprocessIsNotRunningAlarm
(.1.3.6.1.4.1.5003.9.80.3.2.0.43)	acUmpSuAdminAuthFailEvent
(.1.3.6.1.4.1.5003.9.80.3.2.0.42)	acUmpUserLicThresholdAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.127)	acLicensePoolExpirationAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.128)	acCertificateExpiryAlarm
(.1.3.6.1.4.1.5003.9.70.1.2.1.0.2)	acARMAdminStateChanged
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.125)	acLicensePoolOverAllocationAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.126)	acClusterBandwidthAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.123)	acModuleOperationAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.124)	acPortServiceAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.121)	acTrackIdStateChangeAlarm
(.1.3.6.1.4.1.5003.9.70.1.2.1.0.1)	acARMConfigurationInconsistency
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.122)	acModuleServiceAlarm
(.1.3.6.1.4.1.5003.9.70.1.2.1.0.0)	acARMDefaultTrap
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.129)	acLicenseKeyHitlessUpgradeAlarm
(.1.3.6.1.4.1.5003.9.10.1.5.1)	boardStarted
(.1.3.6.1.4.1.5003.9.70.1.2.2.0.8)	acARMNTPSyncStatus
(.1.3.6.1.4.1.5003.9.70.1.2.2.0.7)	acARMRouterUsingOtherConfigurator
(.1.3.6.1.4.1.5003.9.70.1.2.2.0.6)	acARMLicenseHasExpired
(.1.3.6.1.4.1.5003.9.70.1.2.2.0.5)	acARMLicenseAboutToExpire
(.1.3.6.1.4.1.5003.9.70.1.2.2.0.9)	acARMLicenseSessionNumber

OID	Type Values
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.105)	acActivityLog
(.1.3.6.1.4.1.5003.9.40.3.2.0.28)	acVaDiskSpaceAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.106)	acLicensePoolInfraAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.103)	acBoardSignalingCpuUsageThresholdAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.9)	acBoardControllerFailureAlarm
(.1.3.6.1.4.1.5003.9.40.3.2.0.26)	acVaCompEventViewerDropped
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.8)	acBoardCallResourcesAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.104)	acWirelessCellularModemStatusChanged
(.1.3.6.1.4.1.5003.9.40.3.2.0.27)	acVaCompCertificateExpiredAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.101)	acIDSBlacklistNotification
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.102)	acProxyConnectivity
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.100)	acIDSThresholdCrossNotification
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.3)	acBoardTemperatureAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.2)	acBoardConfigurationError
(.1.3.6.1.4.1.5003.9.40.3.2.0.21)	acVACompPcGenAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.1)	acBoardFatalError
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.7)	acgwAdminStateChange
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.109)	acHTTPEMSService
(.1.3.6.1.4.1.5003.9.40.3.2.0.24)	acVaCompEventViewer
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.6)	acFeatureKeyError
(.1.3.6.1.4.1.5003.9.40.3.2.0.25)	acVaCompEventLogAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.5)	acBoardEvResettingBoard
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.107)	acLicensePoolApplicationAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.108)	acHttpProxyService

OID	Type Values
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.4)	acBoardEvBoardStarted
(.1.3.6.1.4.1.5003.9.40.3.2.0.23)	acVaCompSrvAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.85)	acBChannelAlarm
(.1.3.6.1.4.1.5003.9.80.3.2.0.16)	acCbCompEventViewerDropped
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.84)	acNFASGroupAlarm
(.1.3.6.1.4.1.5003.9.80.3.2.0.15)	acCbCompEventLogAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.87)	acMediaRealmBWThresholdAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.86)	acEthernetGroupAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.81)	acMediaProcessOverloadAlarm
(.1.3.6.1.4.1.5003.9.80.3.2.0.12)	acCbCompPcServAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.80)	acPowerOverEthernetStatus
(.1.3.6.1.4.1.5003.9.80.3.2.0.11)	acCbCompPcGenAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.83)	acDataInterfaceStatus
(.1.3.6.1.4.1.5003.9.80.3.2.0.14)	acCbCompEventViewer
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.82)	acWirelessCellularModemAlarm
(.1.3.6.1.4.1.5003.9.80.3.2.0.13)	acCbCompSrvAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.30)	acSEMRuleFailedCallsAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.32)	acSEMRuleAvrgCallDurationAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.31)	acSEMRulePoorQualityCallsAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.34)	acSEMCallDroppedAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.33)	acSEMLicenseKeyAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.36)	acSEMConnectionStatusAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.35)	acSEMClientLoadFlagAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.38)	acSEMMSLyncADServerAlarm

OID	Type Values
(.1.3.6.1.4.1.5003.9.20.3.2.0.37)	acMSLyncConnectionAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.39)	IPPhoneRegisterFailure
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.89)	acNqmRttAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.88)	acNqmConnectivityAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.96)	acNqmLqMosAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.95)	acNqmCqMosAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.98)	acHANetworkWatchdogStatusAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.97)	acRedundantBoardAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.92)	acCertificateExpiryNotifiaction
(.1.3.6.1.4.1.5003.9.70.1.2.2.0.4)	acARMDiskSize
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.91)	acNqmPacketLossAlarm
(.1.3.6.1.4.1.5003.9.70.1.2.2.0.3)	acARMDiskSpaceUsage
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.94)	acProxyConnectionLost
(.1.3.6.1.4.1.5003.9.70.1.2.2.0.2)	acARMLimitReached
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.93)	acWEBUserAccessDisabled
(.1.3.6.1.4.1.5003.9.70.1.2.2.0.1)	acARMOperationStatusChanged
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.90)	acNqmJitterAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.21)	acEMSMGBackupEvent
(.1.3.6.1.4.1.5003.9.20.3.2.0.20)	acEMSNodeColdStartMissedEvent
(.1.3.6.1.4.1.5003.9.20.3.2.0.23)	acEMSSecurityAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.22)	acEMSMGEmsIpMismatchEvent
(.1.3.6.1.4.1.5003.9.20.3.2.0.25)	acEMSTopologyUpdateEvent
(.1.3.6.1.4.1.5003.9.20.3.2.0.24)	acEMSSecurityEvent
(.1.3.6.1.4.1.5003.9.20.3.2.0.27)	acEMSSyncAlarmEvent

OID	Type Values
(.1.3.6.1.4.1.5003.9.20.3.2.0.26)	acEMSTopologyFileEvent
(.1.3.6.1.4.1.5003.9.80.3.2.0.3)	acCbManEnvRestartEvent
(.1.3.6.1.4.1.5003.9.20.3.2.0.29)	acEMSLicenseKeyAlarm
(.1.3.6.1.4.1.5003.9.80.3.2.0.2)	acCbManEnvUnreachableAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.28)	acEMSSyncActiveAlarmEvent
(.1.3.6.1.4.1.5003.9.40.3.2.0.43)	acVaManLicViolationEvent
(.1.3.6.1.4.1.5003.9.80.3.2.0.1)	acCbManLicenseCommitAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.99)	acIDSPolicyAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.63)	acSonetPathSTSRDIAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.62)	acSonetPathSTSAISAlarm
(.1.3.6.1.4.1.5003.9.80.3.2.0.37)	acCceWindowsLicenseAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.65)	acSonetPathSignalLabelMismatchAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.64)	acSonetPathUnequippedAlarm
(.1.3.6.1.4.1.5003.9.80.3.2.0.34)	acCceWrongSettingsAlarm
(.1.3.6.1.4.1.5003.9.80.3.2.0.33)	acCceWrongOperatingAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.61)	acSonetPathSTSLOPAlarm
(.1.3.6.1.4.1.5003.9.80.3.2.0.36)	acCceDiskSpaceAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.60)	acV52InterfaceAlarm
(.1.3.6.1.4.1.5003.9.80.3.2.0.35)	acCceLoginFailedAlarm
(.1.3.6.1.4.1.5003.9.80.3.2.0.32)	acCceAdminCertificateExpiredAlarm
(.1.3.6.1.4.1.5003.9.80.3.2.0.31)	acCceAdminSystemCloudStatusAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.12)	acEMSNotEnoughDiskSpaceAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.11)	acEMSServerStartup
(.1.3.6.1.2.1.10.30.15.0.1)	dsx3LineStatus

OID	Type Values
(.1.3.6.1.4.1.5003.9.20.3.2.0.14)	acEMSSoftwareReplaceAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.13)	acEMSMGSoftwareUpgradeAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.15)	acEMSHardwareReplaceAlarm
(.1.3.6.1.4.1.5003.9.20.3.2.0.18)	acEMSPmFileGenerate
(.1.3.6.1.4.1.5003.9.40.3.2.0.9)	acVaCompResFailedEvent
(.1.3.6.1.4.1.5003.9.20.3.2.0.19)	acEMSPmHistoryAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.67)	acDS3AISAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.66)	acDS3RAIAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.69)	acDS3LOSAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.68)	acDS3LOFAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.74)	acSS7UalGroupStateChangeAlarm
(.1.3.6.1.4.1.5003.9.40.3.2.0.1)	acVAManEnvUnreachableAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.73)	acSS7AliasPcStateChangeAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.76)	acAnalogPortGroundFaultOutOfService
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.75)	acLDAPLostConnection
(.1.3.6.1.4.1.5003.9.40.3.2.0.2)	acVAManEnvRestartEvent
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.70)	acSWUpgradeAlarm
(.1.3.6.1.4.1.5003.9.80.3.2.0.23)	acCbAdminOpsUsrFailedEvent
(.1.3.6.1.4.1.5003.9.80.3.2.0.22)	acCbAdminLicViolationEvent
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.72)	acThreeWayConferenceOutOfResources
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.71)	acNTPServerStatusAlarm
(.1.3.6.1.4.1.5003.9.80.3.2.0.24)	acCbAdminOpsBackupEvent
(.1.3.6.1.4.1.5003.9.80.3.2.0.21)	acCbAdminLicInvalidAlarm
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.78)	acOCSPServerStatusAlarm

OID	Type Values
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.77)	acSSHConnectionStatus
(.1.3.6.1.4.1.5003.9.10.1.21.2.0.79)	acBoardWanLinkAlarm

Table 10-24:Type Name: QualityLevelType

Type Values
(0) Poor
(1) Fair
(2) Good
(3) Undefined

Table 10-25:Type Name: CallCauseType

Type Values
(0) NONE
(1) MOS
(2) MOS LQ
(3) JITTER
(4) DELAY
(5) PACKET LOSS
(6) RERL

Table 10-26:Type Name: CallOriginatorType

Type Values
(0) Unknown
(1) Caller
(2) Callee
(3) Device
(10) Conference server

Type Values
(11) Conference user

Table 10-27:Type Name: TerminationReasonType

Type Values
(0) Unknown
(1) Normal Call Clear
(2) No Answer
(3) Busy
(4) No Resources
(5) No Match
(6) Forwarded
(7) General Failed
(8) Abnormally Terminated

Table 10-28:Type Name: TerminationReasonDetailsType

Type Values
(0) Reason Not Relevant
(1) Unassigned Number
(2) No Route To Transit Net
(3) No Route To Destination
(4) Send Special Information Tone
(5) Misdialed Trunk Prefix
(6) Channel Unacceptable
(7) Call Awarded And
(8) Preemption
(9) Preemption Circuit Reserved For Reuse

Type Values
(16) Normal Call Clear
(17) User Busy
(18) No User Responding
(19) No Answer From User Alerted
(20) MFCR2 Accept Call
(21) Call Rejected
(22) Number Changed
(23) Redirection
(25) Exchange Routing Error
(26) Non Selected User Clearing
(27) Release Because Trunk Disconnected
(28) Invalid Number Format
(29) Facility Reject
(30) Response To Status Enquiry
(31) Normal Unspecified
(32) Circuit Congestion
(33) User Congestion
(34) No Circuit Available
(38) Network Out Of Order
(41) Network Temporary Failure
(42) Network Congestion
(43) Access Information Discarded
(44) Requested Circuit Not Available
(47) Resource Unavailable Unspecified

Type Values
(39) Perm Fr Mode Conn Out Of S
(40) Perm Fr Mode Conn Operational
(46) Precedence Call Blocked
(49) Quality Of Service Unavailable
(50) Requested Fac Not Subscribed
(57) Bc Not Authorized
(58) Bc Not Presently Available
(63) Service Not Available
(53) Cug Out Calls Barred
(55) Cug Inc Calls Barred
(62) Access Info Subs Class Incons
(65) Bc Not Implemented
(66) Channel Type Not Implemented
(69) Requested Fac Not Implemented
(70) Only Restricted Info Bearer
(79) Service Not Implemented Unspecified
(81) Invalid Call Ref
(82) Identified Channel Not Exist
(83) Suspended Call But Call Id Not Exist
(84) Call Id In Use
(85) No Call Suspended
(86) Call Having Call Id Cleared
(88) Incompatible Destination
(91) Invalid Transit Network Selection

Type Values
(95) Invalid Message Unspecified
(87) Not Cug Member
(90) Cug Non Existent
(96) Mandatory Ie Missing
(97) Message Type Non Existent
(98) Message State Inconsistency
(99) Non Existent Ie
(100) Invalid Ie Content
(101) Message Not Compatible
(102) Recovery On Timer Expiry
(103) Parameter Non Existent
(110) Message With Unrecognized Param
(111) Protocol Error Unspecified
(112) Unknown Error
(127) Interworking Unspecified
(128) Q931 Last Reason
(304) Release Because Unknown Reason
(306) Release Because Remote Cancel Call
(307) Release Because Unmatched Capabilities
(308) Release Because Unmatched Credentials
(309) Release Because Unable To Handle Remote Request
(310) Release Because No Conference Resources Left
(311) Release Because Conference Full
(312) Release Because Voice Prompt Play Ended

Type Values
(313) Release Because Voice Prompt Not Found
(315) Release Because Manual Disc
(316) Release Because Silence Disc
(317) Release Because Nortel Xfer Success
(318) Release Because Rtp Conn Broken
(319) Release Because Disconnect Code
(320) Release Because Gw Locked
(321) Release Because Fail
(322) Release Because Forward
(323) Release Because Anonymous Source
(324) Release Because Preemption Analog Circuit Reserved For Reuse
(325) Release Because Precedence Call Blocked
(326) Release Because Held Timeout
(327) Release Because Media Mismatch
(328) Release Because Max Duration Timer Expired
(329) Release Because Transcoding Full
(330) Release Because No Transcoding Resources Left
(331) Release Postpone Possible
(332) Release Because Preemption Due To High Priority
(333) Release Because Preemption Failed
(805) Release Because Ip Profile Call Limit
(806) Release Because Media Limits Exceeded
(807) Release Because Call Transfered
(808) Release Because Classification Failed

Type Values
(809) Release Because Authentication Failed
(810) Release Because Ipgroup Registration Mode
(811) Release Because Arm Drop
(812) Release Because Media Dest Unreachable
(813) Release Because Start Arm Routing
(814) Release Because Forward Supplementary
(815) Release Because Fax ReRouting
(816) Release Because Ldap Failure
(817) Release Because Callsetuprules Failure
(818) Release Because No User Found
(819) Release Because In Admission Failed
(820) Release Because out Admission Failed
(821) Release Because In Media Limits Exceeded
(822) Release Because User Blocked
(823) Release Because Bad Info Package
(824) Release Because Src Ip Is Not Dedicated Registrar
(850) Release Because ACD Threshold Crossed
(851) Release Because ASR Threshold Crossed
(852) Release Because NER Threshold Crossed
(853) Release Because Ipgroup Registration Mode
(854) Release Because Featurekey Changed
(855) Release Because Internal Route
(856) Release Because CID CMD Failure
(857) Release Because Other Forked Call Answered

Type Values
(858) Release Because Media Sync Failed
(859) Release Because Reg Max Threshold Crossed

Table 10-29:Type Name: MediaType

Type Values
(0) Voice
(1) Video
(2) Audio Video
(3) Image
(4) Data
(5) Audio V150
(6) Text
(7) Unknown
(8) MSRP
(27) Application Sharing
(28) Chat

Table 10-30:Type Name: EndpointType

Type Values
(0) FXO
(1) FXS
(2) EANDM
(3) ISDN
(4) CAS
(5) DAA
(6) IPMedia(7) NETANN

Type Values
(8) Streaming
(9) Transparent
(10) MSCML
(11) VXML
(12) SBC
(13) IP2IP
(14) Test
(18) Test SBC
(19) HTTP
(100) Skype
(101) Skype Conference
(200) IP Phone

Table 10-31:Type Name: CallSourceType

Type Values
(0) AudioCodes
(1) MSLync
(2) IPPhone
(10) Site
(11) Link

Table 10-32:Type Name: PstnTermReasonType

Type Values
(1) UNALLOCATED_NUMBER
(2) NO_ROUTE_TO_SPECIFIED_TRANSIT_NETWORK
(3) NO_ROUTE_TO_DESTINATION

Type Values
(4) SEND_SPECIAL_INFORMATION_TONE
(5) MISDIALED_TRUNK_PREFIX
(6) CHANNEL_UNACCEPTABLE
(7) CALL_AWARDED_BEING_DELIVERED
(8) PREEMPTION
(9) PREEMPTION_CIRCUIT_RESERVED_FOR_REUSE
(10) NORMAL_CALL_CLEARING
(17) USER_BUSY
(18) NO_USER_RESPONDING
(19) NO_ANSWER_FROM_USER
(20) SUBSCRIBER_ABSENT
(21) CALL_REJECTED
(22) NUMBER_CHANGED
(26) NONSELECTED_USER_CLEARING
(27) DESTINATION_OUT_OF_ORDER
(28) INVALID_NUMBER_FORMAT
(29) FACILITIES_REJECTED
(30) RESPONSE_TO_STATUS_INQUIRY
(31) NORMAL_UNSPECIFIED
(34) NO_CIRCUIT_CHANNEL_AVAILABLE
(35) CALL_QUEUED
(38) NETWORK_OUT_OF_ORDER
(39) PERMANENT_FRAME_MODE_CONNECTION_OUTOFSERVICE
(40) PERMANENT_FRAME_MODE_CONNECTION_OPERATIONAL

Type Values
(41) TEMPORARY_FAILURE
(42) SWITCHING_EQUIPMENT_CONGESTION
(43) ACCESS_INFORMATION_DISCARDED
(44) REQUESTED_CIRCUIT_CHANNEL_NOT_AVAILABLE
(46) PRECEDENCE_CALL_BLOCKED
(47) RESOURCE_UNAVAILABLE_UNSPECIFIED
(49) QUALITY_OF_SERVICE_NOT_AVAILABLE
(50) REQUESTED_FACILITY_NOT_SUBSCRIBED
(52) OUTGOING_CALLS_BARRED
(53) OUTGOING_CALLS_BARRED_WITHIN_CUG
(54) INCOMING_CALLS_BARRED
(55) INCOMING_CALLS_BARRED_WITHIN_CUG
(57) BEARER_CAPABILITY_NOT_AUTHORIZED
(58) BEARER_CAPABILITY_NOT_PRESENTLY_AVAILABLE
(62) INCONSISTENCY_IN_OUTGOING_INFORMATION_ELEMENT
(63) SERVICE_OR_OPTION_NOT_AVAILABLE
(65) BEARER_CAPABILITY_NOT_IMPLEMENTED
(66) CHANNEL_TYPE_NOT_IMPLEMENTED
(69) REQUESTED_FACILITY_NOT_IMPLEMENTED
(79) ONLY_RESTRICTED_DIGITAL_INFORMATION_AVAILABLE
(81) INVALID_CALL_REFERENCE_VALUE
(82) IDENTIFIED_CHANNEL_DOES_NOT_EXIST
(83) A_SUSPENDED_CALL_EXISTS_BUT
(84) CALL_IDENTITY_IN_USE

Type Values
(85) NO_CALL_SUSPENDED
(86) CALL_HAVING_THE_REQUESTED_BEEN_CLEARED
(87) USER_NOT_A_MEMBER_OF_CUG
(88) INCOMPATIBLE_DESTINATION
(90) NONEXISTENT_CUG
(91) INVALID_TRANSIT_NETWORK_SELECTION
(95) INVALID_MESSAGE_UNSPECIFIED
(96) MANDATORY_INFORMATION_ELEMENT_IS_MISSING
(97) MESSAGE_TYPE_NONEXISTENT_OR_NOT_IMPLEMENTED
(98) MESSAGE_NOT_COMPATIBLE_NONEXISTENT
(99) INFORMATION_ELEMENT_PARAMETER_NONEXISTENT
(100) INVALID_INFORMATION_ELEMENT_CONTENTS
(101) MESSAGE_NOT_COMPATIBLE_WITH_CALL_STATE
(102) RECOVERY_ON_TIMER_EXPIRY
(103) PARAMETER_NONEXISTENT_OR_NOT_IMPLEMENTED
(110) MESSAGE_WITH_UNRECOGNIZED_PARAMETER_DISCARDED
(111) PROTOCOL_ERROR_UNSPECIFIED
(127) INTERWORKING_UNSPECIFIED

Table 10-33:Type Name: LinkType

Type Values
(1) IP Group
(2) Trunk Group
(4) Phone Prefix
(8) Control IP

Type Values
(16) Media IP
(32) Media Realm
(64) Remote Media Subnet
(128) FQDN
(256) Media Server

Table 10-34:Type Name: LinkDirection

Type Values
(1) BI DIRECTIONAL
(2) INGRESS
(3) EGRESS

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