OVOC Product Suite

OVOC

Product Description

Version 7.8

audiocodes

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Related Documentation

Document Name
Mediant 500 MSBR User's Manual
Mediant 500L MSBR User's Manual
Mediant 500L Gateway and E-SBC User's Manual

Document Name
Mediant 800B Gateway and E-SBC User’s Manual
Mediant 800B 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
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
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

Document Revision Record

LTRT	Description
94030	Updates to Sections: OVOC Server Platform; Voice Quality Reports-Key Features; Device Manager Pro; Floating License; Key Elements of the OVOC Suite ;Device Manager Pro; Polycom Device Management; One Voice Operations Center Minimum Platform Requirements New Sections: Voice Quality Reports; Device Manager Agent; VIP Device Management; ARM on Azure Marketplace; Key ARM Features; SBA ProConnect
94031	Added Sections: AudioCodes Live Teams Cloud; Analytics API; Group Level Management; OVOC Cloud Architecture Mode Updated Sections: OVOC Server; OVOC Server and Client Requirements; Device Manager Pro Specifications; Device Manager Agent
94032	Added Sections: Service Provider Cluster Mode; Service Provider Cluster Mode Requirements; Enhanced ARM Capacity Updated Sections: Mass Operations; Performance Monitoring; AudioCodes Routing Manager (ARM); Key ARM Features; Managing User Routing Data; ARM Requirements Removed Section: AudioCodes Live Teams Cloud

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1 One Voice Operations Center - Overview

AudioCodes One Voice Operations Center (OVOC) is a voice network management solution that combines management of voice network devices and quality of experience monitoring into a single, intuitive web-based application. OVOC enables administrators to adopt a holistic approach to network lifecycle management by simplifying everyday tasks and assisting in troubleshooting all the way from detection to correction.

In light of OVOC's clear GUI design, system administrators can manage the full life-cycle of VoIP devices and elements from a single centralized location, saving time and costs. Tasks which would normally be complex and time-consuming, such as performing root cause analysis, adding new devices to the VoIP network and initiating bulk software updates, can now be performed with speed and simplicity.

OVOC uses standards-compliant distributed SNMP-based management software that is optimized to support day-to-day Network Operation Center (NOC) activities with a feature-rich management framework. It supports fault management, voice quality management and security for devices, endpoints, links and sites. The OVOC simultaneously manages AudioCodes' full line of SBCs, VoIP Media Gateways, Customer Premises Equipment (CPE), Multi-Service Business Routers (MSBR), Microsoft SBAs, CloudBond 365s, CCEs and devices.

The OVOC suite is perfectly tailored for medium to large enterprises as well as for Service Providers with its high security features, high availability and multi-tenancy.

OVOC features sophisticated Web architecture, enabling customer access from multiple, remotely located work centers and workstations over HTTPS.

OVOC can run on a dedicated HP server provided by AudioCodes, either VMware or HyperV platforms. OVOC server runs on Linux CentOS 64-bit platform. All management data is stored on the server using Oracle relational database software. OVOC server High Availability is supported on Virtualization platforms.

OVOC includes a tenant and region/site hierarchy in which devices can be defined. The combination of OVOC tenants and regions/sites and user configuration can be used to define multi tenancy where each user can be defined to operate or monitor in specific tenants or regions/sites.

OVOC can simultaneously manage multiple AudioCodes devices and endpoints. For a full listing of supported managed products and versions, refer to the OVOC Release Notes.

OVOC has an integration point with the AudioCodes Routing Manager (ARM). Managing the dial plan and call routing rules for multi-site, multi-vendor enterprise VoIP networks can be an extremely complicated activity. AudioCodes Routing Manager (ARM) delivers a powerful, innovative solution to this problem by enabling centralized control of all session routing decisions.

Key Elements of the OVOC Suite

This section describes the key elements of the OVOC suite.

- **Remote Management of Entities:** Remote standards-based management of AudioCodes products within VoIP 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.

- **Voice Quality Management:** Real-time Voice Quality statistics analysis enables the rapid identification of the metrics responsible for degradation in the quality of any VoIP call made over the network nodes including managed endpoints. 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 Skype for Business server monitoring server to provide end-to-end VoIP quality monitoring on Skype for Business deployments. OVOC also integrates and monitors with endpoints reporting RFC 6035 SIP PUBLISH packets.

- **Device Management:** AudioCodes' Device Manager Pro interface enables enterprise network administrators to effortlessly and effectively set up, configure and update up to 30000 400HD Series IP phones in globally distributed corporations. Remote management and configuration can be performed with no additional installation in case the devices are located on a remote site where an AudioCodes device may be installed on the remote site and used as an HTTP Proxy to traverse NAT and firewalls. AudioCodes' Device Manager Pro run using standard web browser supporting HTML5 such as Internet Explorer, Chrome or Firefox. REST (Representational State Transfer) based architecture enables statuses, commands and alarms to be communicated between the devices and the OVOC server. The device send their status to the server according to configured interval (e.g. one hour) for display. Management of devices through Cloud Services (SaaS) as a centralized hosting business or through Internet Telephony Service Providers (ITSPs). When devices are deployed behind a firewall or NAT, communication is facilitated through an agent application "Device Management Agent". This agent enables the OVOC server to initiate actions toward devices such as uploading firmware and configuration files.

- **Performance Monitoring:** Performance Monitoring analysis enables OVOC operators with network planning and administration in the OVOC topology through the collection of high-level historic data polled from the managed entities.

- **Skype for Business Integration:** The OVOC server enables you to synchronize with the Enterprise network Active Directory user databases and monitor call quality for the Active Directory users. In addition, the ARM can also synchronize with the Active Directory for user-based routing. The OVOC server also enables Skype for Business call quality monitoring using the Skype for Business Monitoring SQL server.

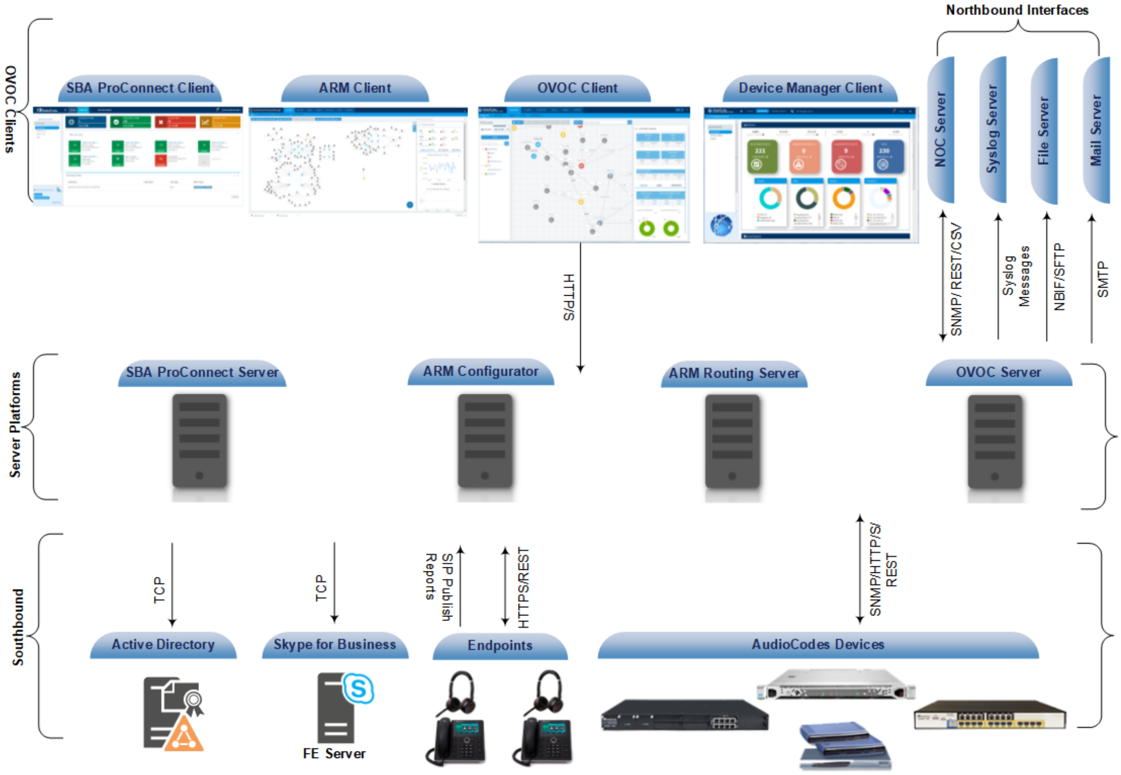
- **Simplified Routing:** Call routing configuration, previously handled by multiple SBC/Media Gateway devices, each requiring separate routing configurations, can now be handled centrally by the ARM server. If an enterprise has an SBC in every branch, a single ARM, deployed in HQ, can route all calls in the globally distributed corporate network to PSTN, the local provider, enterprise headquarters, or to the IP network (Skype for Business/ Lync). Consequently, this saves considerable IT resources, by significantly reducing the configuration time.

- **SBA ProConnect:** The SBA Pro Connect is a Web Management tool designed for servicing the installation base for large SBA deployments. This tool enables you to perform the following actions:
  - Upgrade from Microsoft Lync 2010/13 to Skype for Business.
  - Mass Microsoft Cumulative Updates (CU)
  - Upgrade process monitoring and notifications
  - Task scheduling
  - Segmentation of SBAs into groups for selective upgrade

- **Tool for AudioCodes Professional Services:** Prior to the deployment of AudioCodes products, AudioCodes professional services team are often contracted to conduct a readiness analysis of the customer's VoIP network. This analysis includes the voice quality analysis of existing network, network capacity limits assessment for voice traffic (e.g. peak hours) and voice quality analysis across LAN and WAN (multiple sites and remote users). Once the analysis is complete, recommendations are made on the best-fit deployment of AudioCodes products.

The figure below illustrates the OVOC products' suite architecture:

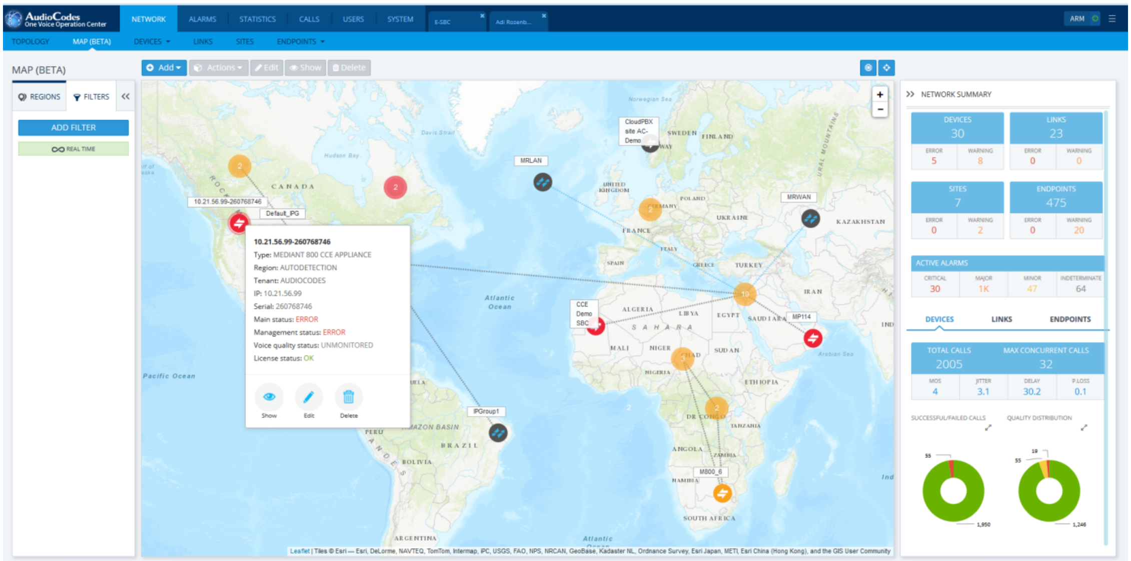
Figure 1-1: OVOC Architecture



Key Interface Elements

The figures below display examples of the OVOC Map view which represents the OVOC topology transposed over a map indicating the location of managed entities. Clicking a specific tenant or region node opens a magnified view of the site installations for the selected tenant or region.

Figure 1-2: OVOC Network Maps



10.21.56.99-260768746
Type: MEDIANT 800 CCE APPLIANCE
Region: AUTODETECTION
Tenant: AUDIOCODES
IP: 10.21.56.99
Serial: 260768746
Main status: ERROR
Management status: ERROR
Voice quality status: UNMONITORED
License status: OK

NETWORK SUMMARY

DEVICES 30		LINKS 23	
ERROR	WARNING	ERROR	WARNING
5	8	0	0

SITES 7		ENDPOINTS 475	
ERROR	WARNING	ERROR	WARNING
0	2	0	20

ACTIVE ALARMS			
CRITICAL	MAJOR	MINOR	INDETERMINATE
30	1K	47	64

DEVICES LINKS ENDPOINTS

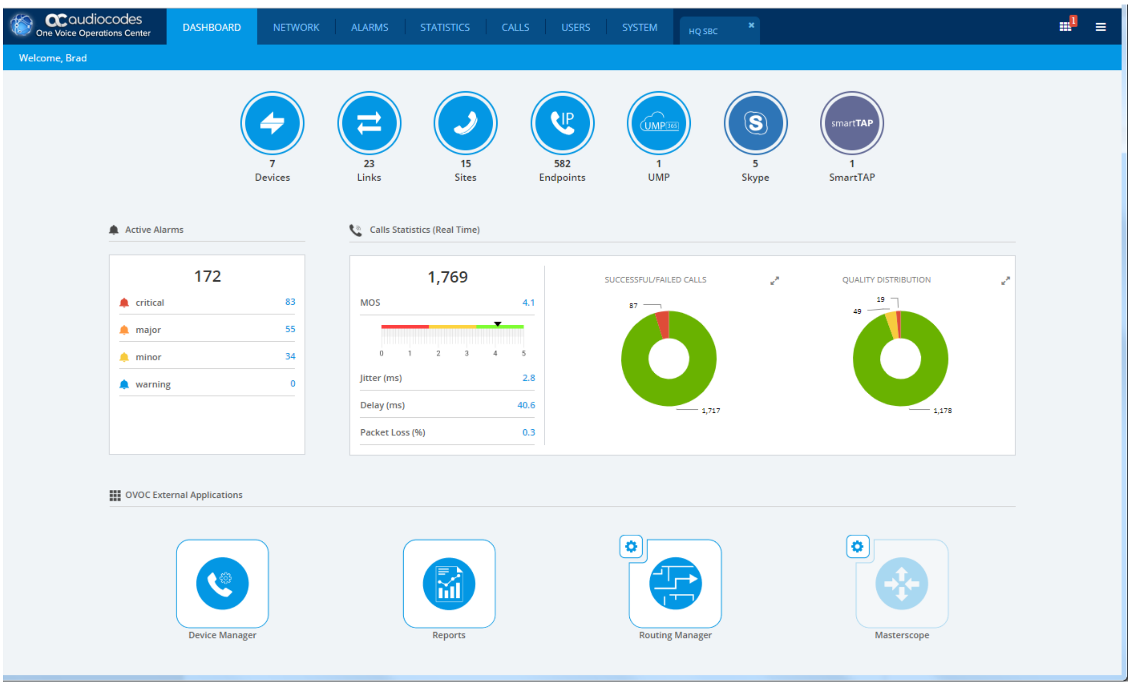
TOTAL CALLS 2005		MAX CONCURRENT CALLS 32	
MOS	JITTER	DELAY	P.LOSS
4	3.1	30.2	0.1

SUCCESSFUL/FAILED CALLS: 55, 1,950

QUALITY DISTRIBUTION: 19, 55, 1,246

Leaflet | Tiles © Esri — Esri, DeLorme, NAVTEQ, TomTom, Intermap, iPC, USGS, FAO, NPS, NRCAN, GeoBase, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

Figure 1-3: OVOC Dashboard



7 Devices | 23 Links | 15 Sites | 582 Endpoints | 1 UMP | 5 Skype | 1 SmartTAP

Active Alarms: 172

critical	83
major	55
minor	34
warning	0

Calls Statistics (Real Time): 1,769

MOS	4.1
Jitter (ms)	2.8
Delay (ms)	40.6
Packet Loss (%)	0.3

SUCCESSFUL/FAILED CALLS: 87, 1,717

QUALITY DISTRIBUTION: 19, 49, 1,178

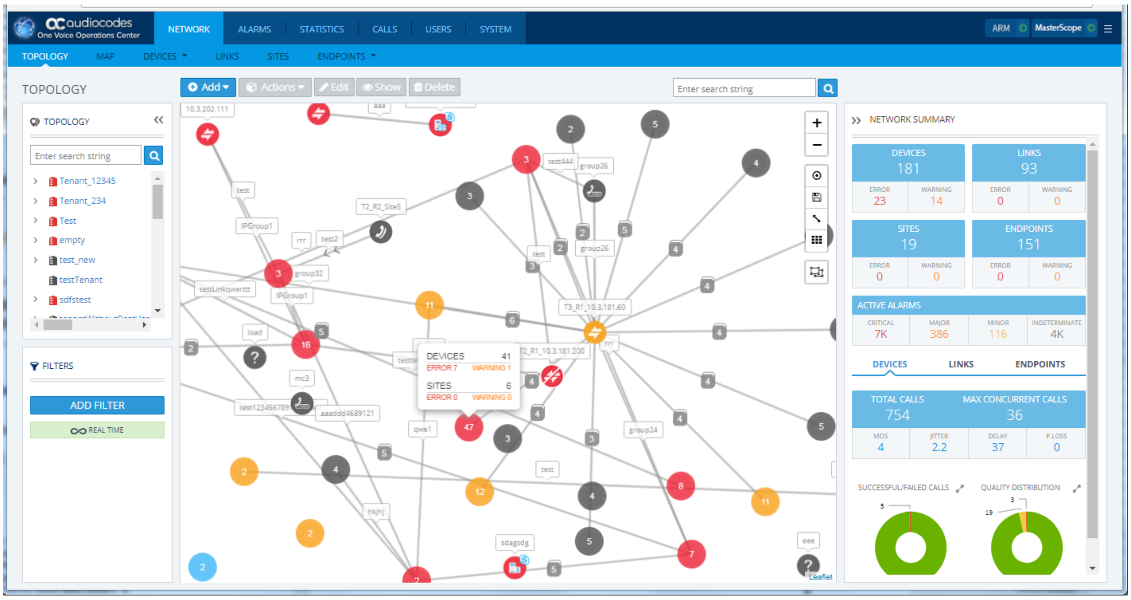
The Geo Map/Topology view consists of the following elements:

- **OVOC Dashboard:** The OVOC dashboard provides a snapshot view of the state of the OVOC network for all managed entities and external applications including the following:

- Aggregation of the number of managed entities for each managed device type. For example, 29 Devices indicates that OVOC currently manages a total of 29 SBC / MSBR / gateway devices.
- Links to the corresponding entity status page. For example, clicking the Devices icon opens the Devices page for all managed AudioCodes devices.
- Aggregation of the active alarms for all managed entities and link to the Active Alarms page.
- Aggregation of call statistics and link to the Device Statistics page
- Links to the login page for each of the supported external application management interfaces

- **Regions pane:** This pane allows you to manage and check the health of the Topology tree which consists of of Tenants, Regions and Sites.
- **Topology/Map:** This is the main view which shows all of the managed devices and links.
- **Network Summary pane:** This pane shows the following:
  - A summary of all devices, links, sites and endpoints, listing the number of errors and warnings for each of these entities.
  - A list of active alarms including a division for critical, major and minor alarms.
  - QoE statistics for all devices, links and endpoints.
- **Real-Time Color-Coded operative statuses for all nodes associated with the tenant:** Color-Coded indications of the operative states of all tenants and their associated nodes. The indications include operative and health state of all nodes under this tenant.
- **Filters:** Filtering is a powerful feature of the interface that allows you to display only information that is relevant to the current monitoring activity or analysis. For example, you can filter based on a time range, or based on the Topology i.e. you can display information that is only associated to a specific tenant.
- **Context-Sensitive Entity Actions:** Context-sensitive action button options differ according to the configured entity and relevant view. For example, on the device's page, you can perform Upload and Download of files or Reset. On the License Manager page, available actions include Apply License or Refresh License.
- **Smart Devices and Links Aggregation in Network Map View:** Support for viewing aggregating of device statuses (Network Topology view). Devices and links are aggregated into clusters where the number of devices and links in each cluster are indicated. Clicking the parent cluster node, opens the sub-nodes or sub-clusters according to the next aggregation level. In addition, you can select shift and click (make area selection) and drag to select specific devices. For links, an indication is also provided whether the link is configured to show only incoming or outgoing calls with an arrow showing the link direction. You can zoom in and out to display different aggregated clusters of devices and links i.e. when you zoom out to the maximum, you see the total aggregated devices and links for the installation.

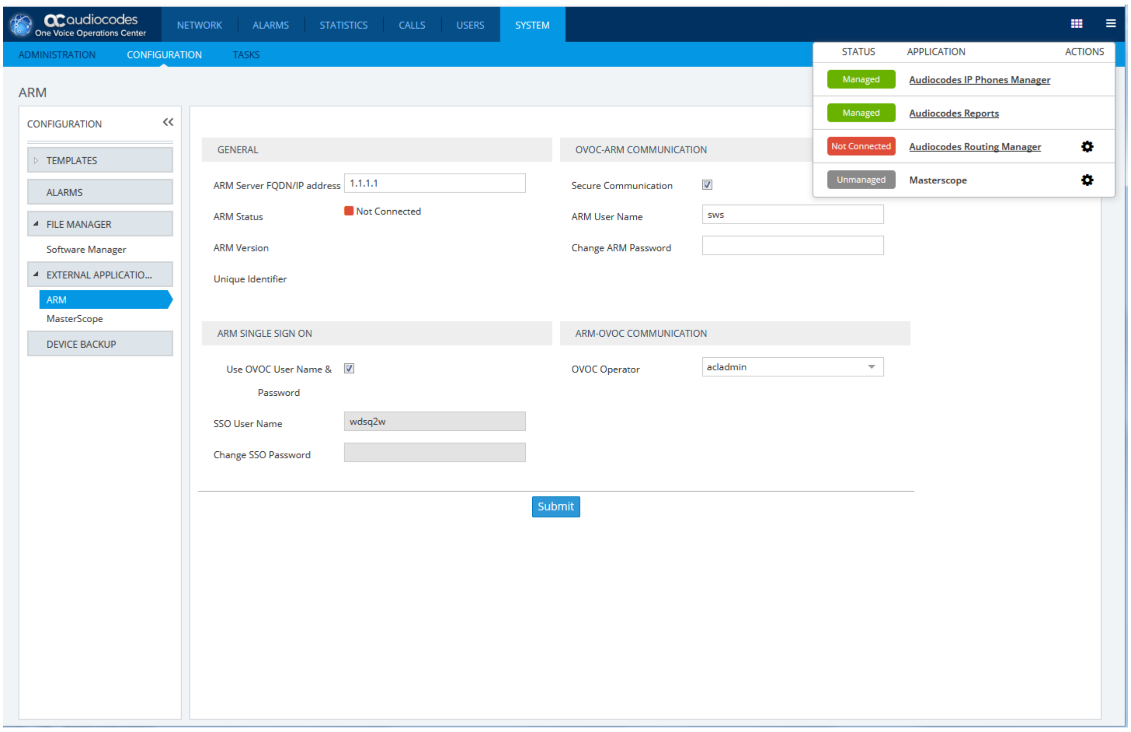
Figure 1-4: Device and Link Aggregation



External Application Integration

The OVOC platform enables you to connect to external applications. The status window keeps track of these applications and enables you to access them from the Status screen.

Figure 1-5: External Application Integration



STATUS	APPLICATION	ACTIONS
Managed	Audiocodes IP Phones Manager	
Managed	Audiocodes Reports	
Not Connected	Audiocodes Routing Manager	⚙
Unmanaged	Masterscope	⚙

ARM Server FQDN/IP address: 1.1.1.1

ARM Status: 🟥 Not Connected

ARM Version

Unique Identifier

Secure Communication ☑

ARM User Name: sws

Change ARM Password

Use OVOC User Name & Password ☑

SSO User Name: wdsq2w

Change SSO Password

OVOC Operator: acladmin

OVOC License Management for Enterprise Devices

Licenses for AudioCodes Gateway and SBC devices can be managed using the following methods:

- Local license installed on the device
- Fixed Pool License
- Floating License

Floating License

The Floating License service, managed as an AudioCodes Cloud service provides a network-wide license intended for customer deployments with multiple SBCs sharing a dynamic pool of SBC resources. The Floating License simplifies network capacity planning, and provides cost benefits related to aggregated calls statistics, follow-the-sun scenarios and on disaster recovery setups which involve two or more data centers. The Floating license operates in the following modes:

- **Cloud Mode:** This mode manages the license per tenant in the Cloud using the AudioCodes Floating License Service. This model implements 'pay as you grow' model. If the license limits are exceeded, incremental billing is automatically enforced, thereby eliminating the need to manually purchase additional SBC licenses when capacity requirements are increased.
- **FlexPool Mode:** This mode supports a Floating License across a network without the need to connect to a public cloud. If the license limits are exceeded, service is disrupted for a percentage of managed devices and for the remainder of devices allowed to continue uninterrupted for a grace period . Once the grace period has expired, services are disrupted for all managed devices. Priorities can be assigned in the Devices page per device ("Low", "Normal" and "High") to determine the order of devices to which service is disrupted. The license limit mechanism is managed per parameter feature e.g. SBC Sessions.

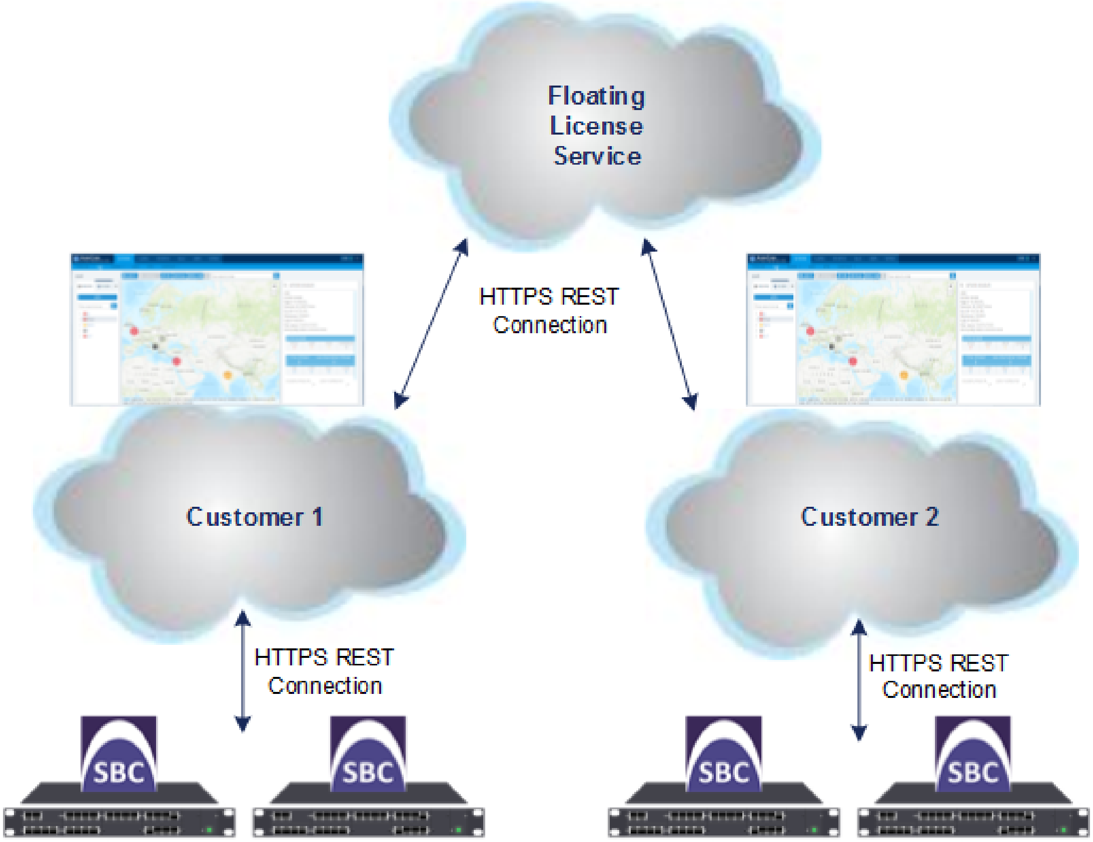
The SBCs deployed in the network are "open" to utilize the maximum hardware capacity of the device based on pre-defined profiles or can be configured by users with customized session capacity profiles. The Floating License includes the following parameters:

- **SBC Sessions:** the number of concurrent SBC call sessions (media and signaling)
- **SBC Signaling Sessions**: the number of concurrent SIP messages (signaling only)
- **Registrations:** The number of SIP endpoints that can register on the SBC devices.
- **Transcoding Sessions:** The number of concurrent codec types
- **SBC Sessions:** The number of SBC devices that can be managed (FlexPool mode only)

The managed SBC devices report their capacity consumption to OVOC every five minutes. For the Cloud mode, OVOC sends this information to the AudioCodes Floating License cloud service.

If the SBC device does not receive acknowledgment from the OVOC server that Usage reports have been received (by default within 90 days) , then service is shutdown for this SBC device. The SBC must then reestablish connection with the OVOC server. The figure below illustrates an example topology with two OVOC managed customer sites connected to AudioCodes Cloud License Manager Web service.

Figure 1-6: Floating License Service



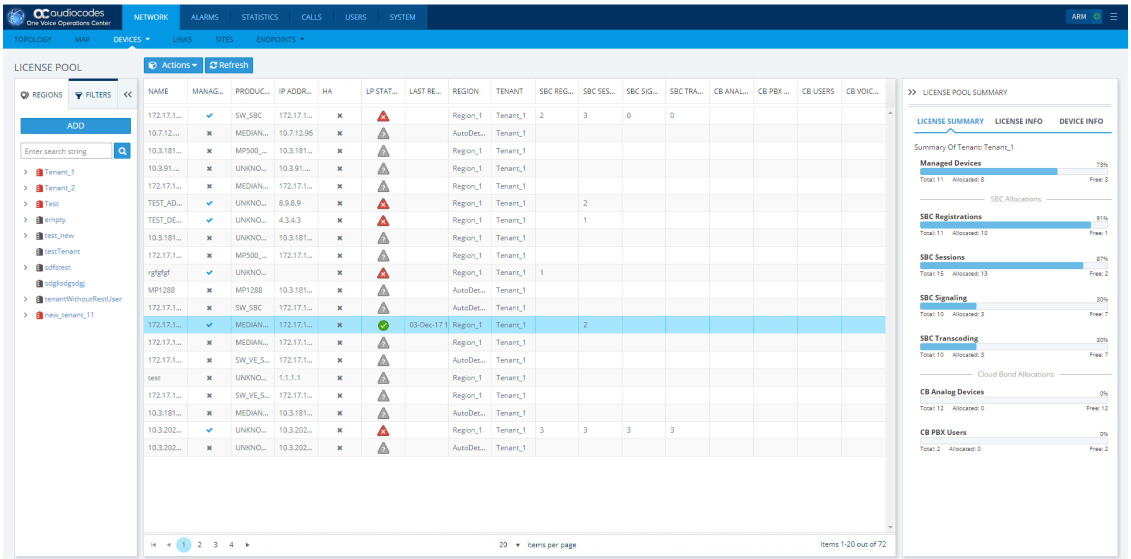
Fixed License Pool

The OVOC License Pool Manager enables operators to centrally manage and distribute session licenses for multiple devices using a flexible license pool. The operator can allocate and de-allocate the licenses for the devices in the pool according to their capacity requirements. This tool enables the following:

- License management between devices without changing the devices' local license key.
- Adding and removing licenses for devices according to site requirements without the need to contact AudioCodes. The License Pool feature does not require a new License key file per device from AudioCodes each time the user wishes to apply different settings to each device.
- Enables service providers to manage licenses for multiple customers by using the license pool to allocate licenses between them.

The operator can manage the various license parameters such as SBC session or SBC registrations using the License Pool Manager.

Figure 1-7: OVOC License Pool Manager



NAME	MANAG...	PRODUC...	IP ADDR...	HA	LP STAT...	LAST RE...	REGION	TENANT	SBC REG...	SBC SES...	SBC SIG...	SBC TRA...	CB ANAL...	CB PBX ...	CB USERS	CB VOIC...
172.17.1...	✓	SW_SBC	172.17.1...	✖	⚠		Region_1	Tenant_1	2	3	0	0				
10.7.12....	✖	MEDIAN...	10.7.12.96	✖	⚠		AutoDet...	Tenant_1								
10.3.181...	✖	MP500_...	10.3.181...	✖	⚠		Region_1	Tenant_1								
10.3.91....	✖	UNKNO...	10.3.91....	✖	⚠		Region_1	Tenant_1								
172.17.1...	✖	MEDIAN...	172.17.1...	✖	⚠		Region_1	Tenant_1								
TEST_AD...	✓	UNKNO...	8.9.8.9	✖	⚠		Region_1	Tenant_1		2						
TEST_DE...	✓	UNKNO...	4.3.4.3	✖	⚠		Region_1	Tenant_1		1						
10.3.181...	✖	UNKNO...	10.3.181...	✖	⚠		Region_1	Tenant_1								
172.17.1...	✖	MP500_...	172.17.1...	✖	⚠		Region_1	Tenant_1								
rgfgfgf	✓	UNKNO...		✖	⚠		Region_1	Tenant_1	1							
MP1288	✖	MP1288	10.3.181...	✖	⚠		AutoDet...	Tenant_1								
172.17.1...	✖	SW_SBC	172.17.1...	✖	⚠		AutoDet...	Tenant_1								
172.17.1...	✓	MEDIAN...	172.17.1...	✖	✓	03-Dec-17 1	Region_1	Tenant_1		2						
172.17.1...	✖	MEDIAN...	172.17.1...	✖	⚠		Region_1	Tenant_1								
172.17.1...	✖	SW_VE_S...	172.17.1...	✖	⚠		AutoDet...	Tenant_1								
test	✖	UNKNO...	1.1.1.1	✖	⚠		Region_1	Tenant_1								
172.17.1...	✖	SW_VE_S...	172.17.1...	✖	⚠		Region_1	Tenant_1								
10.3.181...	✖	MEDIAN...	10.3.181...	✖	⚠		AutoDet...	Tenant_1								
10.3.202...	✓	UNKNO...	10.3.202...	✖	⚠		Region_1	Tenant_1	3	3	3	3				
10.3.202...	✖	UNKNO...	10.3.202...	✖	⚠		AutoDet...	Tenant_1								

20 items per page Items 1-20 out of 72

LICENSE POOL SUMMARY

LICENSE SUMMARY LICENSE INFO DEVICE INFO

Summary Of Tenant: Tenant_1

Managed Devices 73%
Total: 11 Allocated: 8 Free: 3

SBC Allocations

SBC Registrations 91%
Total: 11 Allocated: 10 Free: 1

SBC Sessions 87%
Total: 15 Allocated: 13 Free: 2

SBC Signaling 30%
Total: 10 Allocated: 3 Free: 7

SBC Transcoding 30%
Total: 10 Allocated: 3 Free: 7

Cloud Bond Allocations

CB Analog Devices 0%
Total: 12 Allocated: 0 Free: 12

CB PBX Users 0%
Total: 2 Allocated: 0 Free: 2

2 OVOC Server

This chapter describes the key features of the OVOC server platform.

- **Installation platform:**
    - On dedicated hardware
    - On a virtual machine: VMware or HyperV
    - On the cloud: Amazon AWS or Microsoft Azure
- **High Availability:** OVOC supports HA on the VMware or HyperV platforms by using the existing virtualization high availability features (e.g. VMware vSphere).

> ⚠ High Availability is not supported for OVOC servers on a Bare Metal platform.

- **Backup and Restore:**

  OVOC can automatically periodically back up device configurations (ini or MSBR CLI script) files according to OVOC server application time.

  Device ini and CLI script files are saved on the OVOC server machine in the /data/NBIF/mgBackup/ folder. These files can be accessed and transferred using SSH, and SFTP.

  Backup files are managed by the MG Backup Manager tool. This tool displays a summary for all files that have been backed up to OVOC for each device and a full listing of all backup files that have been saved to the MG Backup Manager for all devices.

  The user may rollback to former backup configuration in case of a disaster recovery handling in a single click.

  A lightweight mode enables partial backup of the OVOC database including OVOC topology and OVOC Web configuration. This prevents excessive downtime and reduces system utilization in the restore operation.

- **Security Management:**
    - Initial access to the OVOC application is secured via the Login screen, where access control consists of authentication and authorization with a user name and password. An OVOC operator is authenticated and authorized using either the local OVOC user management tools or a centralized RADIUS, LDAP server or Microsoft Azure. These credentials can also be used to login to the AudioCodes devices via a Single Sign-on mechanism. By default, OVOC manages its users in the local OVOC server database.
    - The OVOC server supports the implementation of X.509 user-defined certificates on OVOC server components and on AudioCodes devices for customer deployments requiring mutual SSL authentication using their own SSL certificate implementation.
    - "Privacy” mode can been enabled to to prevent specific operators from viewing sensitive data for their managed elements (regions, sites, devices and links). This includes the masking of gateway and SBC phone numbers, and hiding of calls data.

- **For devices:**
    - OVOC server and device communication is secured over SNMPv3 for maintenance actions and fault management.
    - HTTPS is used for upgrading software and loading regional files and REST communication.
- **For endpoints:**
    - Used for downloading firmware and configuration files
    - Used for sending REST updates

All user names and passwords used by the OVOC application to access devices (including SNMP, HTTP and SSH) are stored encrypted in the OVOC database. All actions performed in OVOC are recorded in an Actions Journal.

3 Multi-Tenancy

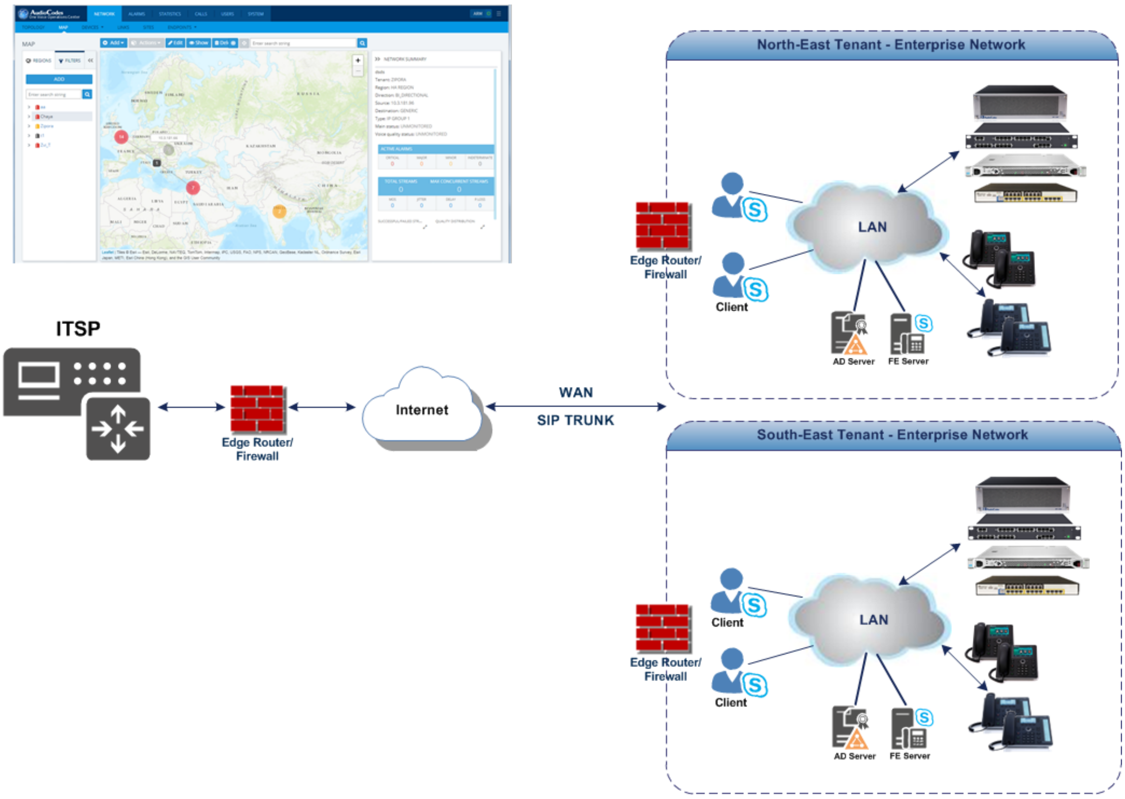
Multi-tenancy architecture enables large enterprises and service providers to install the One Voice Operations Center application in a Data Center and to remotely manage VoIP topology in multiple diverse locations. This may comprise of one of the following topologies:

- ITSP Multi-Tenancy: an ITSP can purchase a single instance of the OVOC application with a license to manage multiple tenants, where each tenant may represent an Enterprise customer.
- Enterprise Multi-Tenancy: an Enterprise can purchase a single instance of the OVOC application with a license to manage multiple tenants, where each tenant may represent a separate Enterprise entity.
- You can configure regions and sites under each tenant. For example, under the Europe tenant, you can configure the region Holland with sites Amsterdam and Rotterdam and the region Belgium with sites for Brussels and Antwerp.

ITSP Multi-Tenancy Architecture

ITSP multi- tenancy architecture allows an Internet Telephony Service Provider (ITSP) administrator to deploy a single instance of the OVOC application to provide a telephony network management service to multiple enterprise customers (tenants). Remote SNMP Management of devices over a WAN connection through a firewall is enabled through the Auto-detection mechanism.

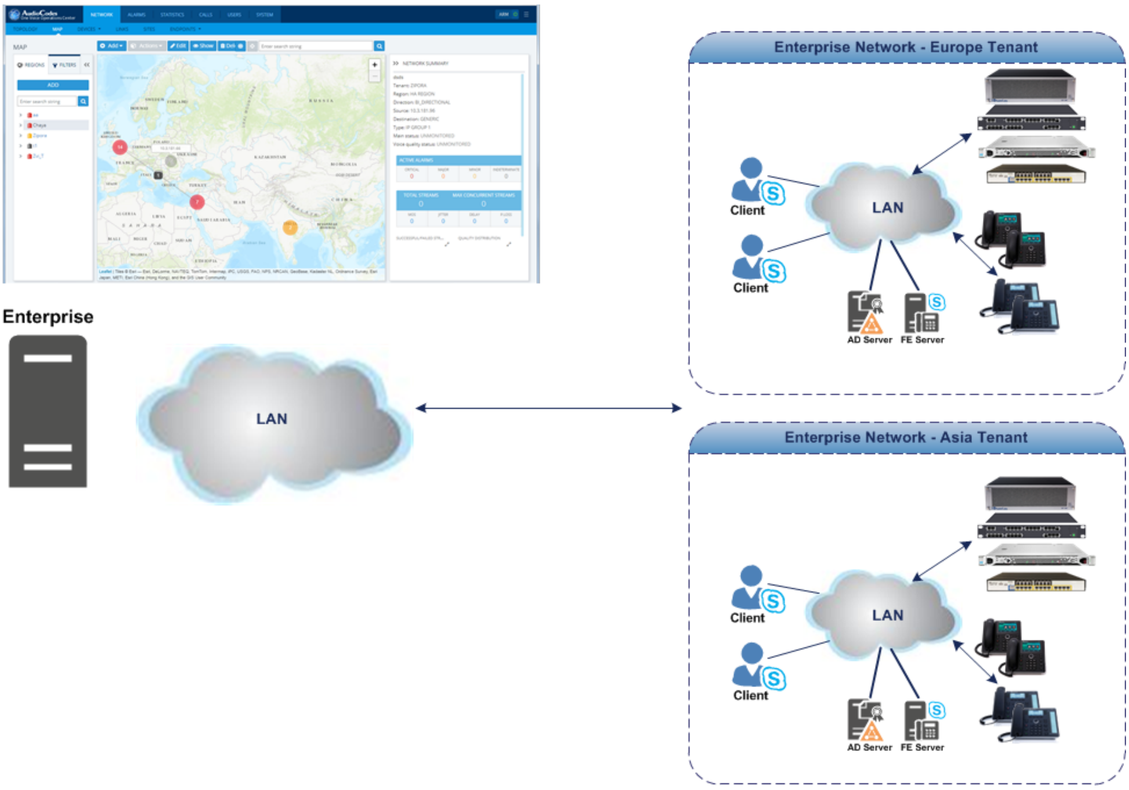
Figure 3-1: ITSP Multi-Tenancy Architecture


North-East Tenant - Enterprise Network
South-East Tenant - Enterprise Network
ITSP
Edge Router/ Firewall
Internet
WAN
SIP TRUNK
LAN
Client
AD Server
FE Server

Enterprise Multi-Tenancy Architecture

Enterprise multi-tenancy architecture allows an enterprise to deploy a single instance of the OVOC application in order to provide a telephony network management service to multiple tenants.

Figure 3-2: Enterprise Multi-Tenancy Architecture



What is Managed Globally by OVOC?

The following elements are managed globally by OVOC:

- **Global resources:** OVOC server-related management including the OVOC server License, File Storage, Operating System, Server Backup and Restore and HA configuration.
- **Global entities:** security policy for operators, CA certificate assignment, storage policy, global alarm settings and device backup policy settings.
- **System entities:** system alarms, forwarding rules for system alarms and statistics reports.

What is Managed by the Tenant in the OVOC ?

The following elements are managed specifically by each tenant:

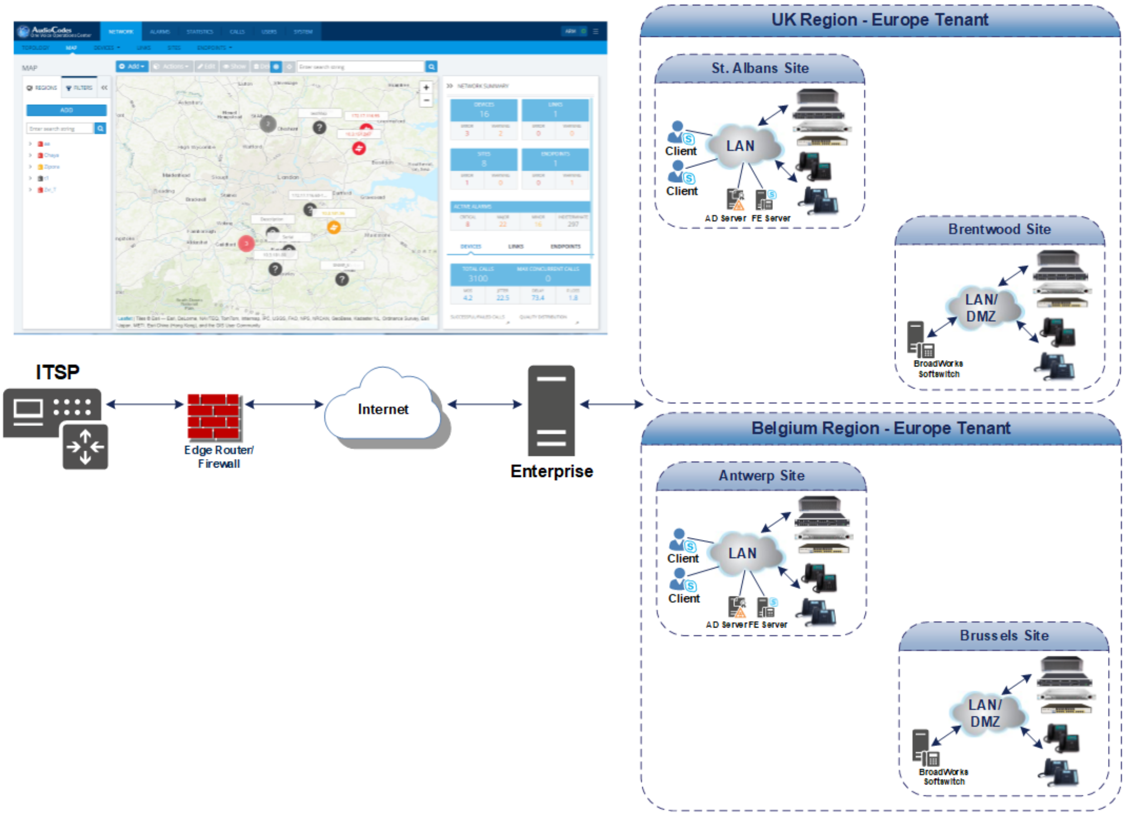
- **Tenant resources:** the portion of the OVOC server License that is allocated to the tenant.
- **Tenant entities:** all entities that are accessible for a specific tenant such as all regions, sites, devices, links, call hierarchies and summaries, journal records and alarms. In addition to statistics reports, alarm forwarding rules and threshold and alert rules.

For details of which actions can be performed according to Operator Security level, refer to the documentation of each specific feature in the OVOC User’s Manual.

Monitoring Links

The Monitoring Links security profile allows multiple operators assigned to the same tenant to monitor a sub-set of links. For example, separate dedicated operators may be defined to manage links for Broadworks and Microsoft deployments;. Microsoft deployment between the Microsoft Edge Server IP Group and the Skype for Business Front End IP Group and for the Broadworks deployment between defined trunk groups and the BroadWorks Softswitch.The monitoring capabilities include viewing all call data for the managed link entities such as alarms and events and call statistics. This feature complements OVOC’s existing ITSP multi-tenancy architecture that allows Service providers to deploy a single instance of the OVOC application to provide a telephony network management service to multiple enterprise tenants. The Monitoring Links operator’s tenant is assigned to an LDAP Authentication Group, which is defined globally for all Monitoring Links operators for the OVOC server instance.

Figure 3-3: Monitoring Links



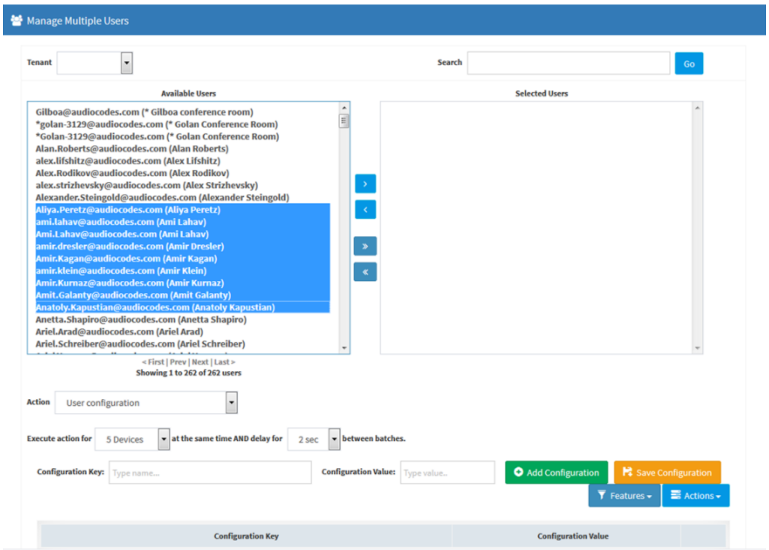
4 Provisioning and Commissioning

- **Automatic Device Detection:** Automatic detection enables devices to be added to OVOC automatically (without adding them manually in the OVOC). As soon as a device is configured with the OVOC server IP address and to send keep-alive messages, OVOC connects to the device or endpoint and automatically determines its firmware version and its subnet. The devices are then added to the appropriate tenant/region/site according to the best match to its subnet address. Devices that cannot be successfully matched are added to the Auto-Detection region under the default tenant. This feature is used also for NAT traversal, and allows SNMP communication with the devices when they are located behind NAT and are managed over a remote WAN connection.

- **Interoperability Automatic Provisioning for Devices:** The Interoperability Automatic Provisioning feature enables the mass deployment of multiple devices in your network. This is achieved by providing an automated mechanism for loading template configuration files and firmware files to new devices. This feature enables a quick-and-easy initial deployment of multiple devices in the customer network, with only minimal pre-configuration. Once the new device and OVOC connection is configured, the template configuration and firmware files can automatically be loaded to the device upon power up.

- The Device Manager Pro zero touch feature enables the automatic download of configuration and firmware to the devices when they are initially connected to the network. A Configuration Profile Wizard enables the quick setup for connecting and initial provisioning of the Skype for Business devices to the OVOC server. The wizard lets you define initial settings, associate templates and configure the DHCP server. The configuration file templates lets network administrators customize configuration files per phone model, tenant, site, device and user. You can also apply template configurations for specific features, for example, Daylight Savings Time. Once the phones have been loaded with their initial configuration, you can provision specific phones with updates for groups of users or for individual users as shown in the example figure below. Phones can be provisioned with their template file either by defining a tenant in the URL in DHCP Option 160 or according to their subnet. If the network administrator does not define a tenant in the URL in DHCP Option 160, the phone is allocated a tenant/site according to best match i.e. according to either a tenant Subnet Mask or site Subnet Mask that is configured in Site/Tenant details in the OVOC Web. You can import (.csv files) and export (.zip files) containing configuration and phone firmware files. You can also import and export lists of users and devices. Both Skype for Business and non-Skype for Business users can be associated with devices upon user login (with user and password authentication) to the phone and therefore only users need to be imported to the IP Phone Manager in the pre-staging deployment stage.

Figure 4-1: Manage Multiple Users-Configuration Update



Manage Multiple Users

Tenant:

Search:

Available Users

Gilboa@audiocodes.com (* Gilboa conference room)
golan-3129@audiocodes.com (Golan Conference Room)
Golan-3129@audiocodes.com (Golan Conference Room)
Alan.Roberts@audiocodes.com (Alan Roberts)
alex.lifshitz@audiocodes.com (Alex Lifshitz)
Alex.Rodikov@audiocodes.com (Alex Rodikov)
alex.strizhevsky@audiocodes.com (Alex Strizhevsky)
Alexander.Steingold@audiocodes.com (Alexander Steingold)
Aliya.Peretz@audiocodes.com (Aliya Peretz)
ami.lahav@audiocodes.com (Ami Lahav)
Ami.Lahav@audiocodes.com (Ami Lahav)
amir.dresler@audiocodes.com (Amir Dresler)
Amir.Kagan@audiocodes.com (Amir Kagan)
amir.klein@audiocodes.com (Amir Klein)
Amir.Kurnaz@audiocodes.com (Amir Kurnaz)
Amit.Galanty@audiocodes.com (Amit Galanty)
Anatoly.Kapustian@audiocodes.com (Anatoly Kapustian)
Anetta.Shapiro@audiocodes.com (Anetta Shapiro)
Ariel.Arad@audiocodes.com (Ariel Arad)
Ariel.Schreiber@audiocodes.com (Ariel Schreiber)

Selected Users

Showing 1 to 262 of 262 users

Action: User configuration

Execute action for 5 Devices at the same time AND delay for 2 sec between batches.

Configuration Key: Type name...

Configuration Value: Type value..

Configuration Key	Configuration Value	

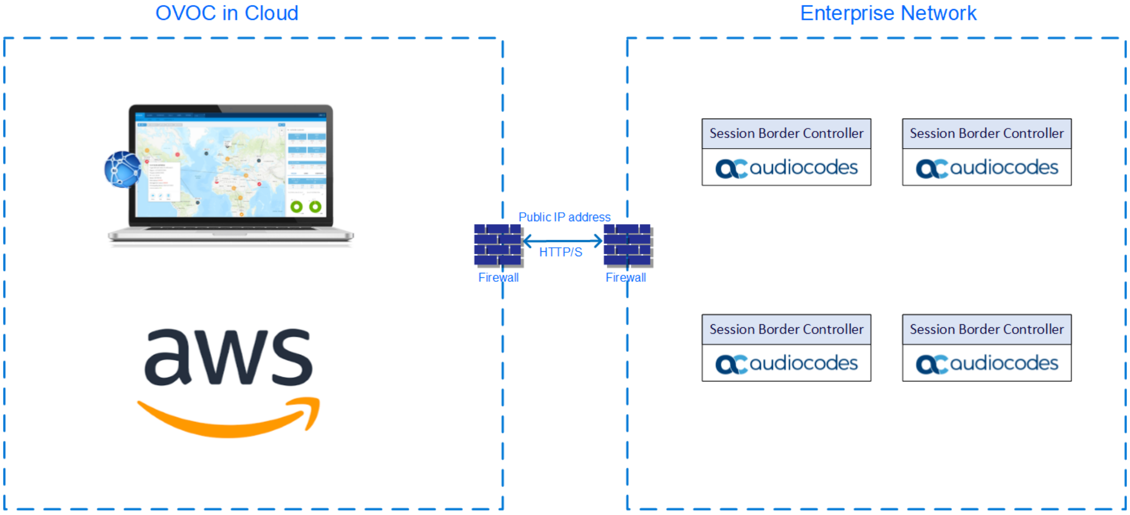
5 OVOC Cloud Architecture Mode

When OVOC is deployed in the AWS Cloud, an automatic mechanism can be enabled to secure OVOC server and Device communication including SNMP, HTTP, syslog and debug recording through binding to a single dedicated HTTP/S tunnel through a generic WebSocket server connection. This mechanism provides the following benefits:

- Enables Single Sign-on to managed devices that are deployed behind a NAT
- Eliminates the need for administrators to manually manage firewall rules
- Eliminates the need to lease third-party VPN services

This deployment is illustrated in the figure below:

Figure 5-1: OVOC Cloud Deployment



For devices managed by the Device Manager (phones ands headsets), the Device Manager Agent is used for secure communication with the OVOC server, when these devices are located behind a NAT (see Device Manager Agent on page 25).

6 Service Provider Cluster

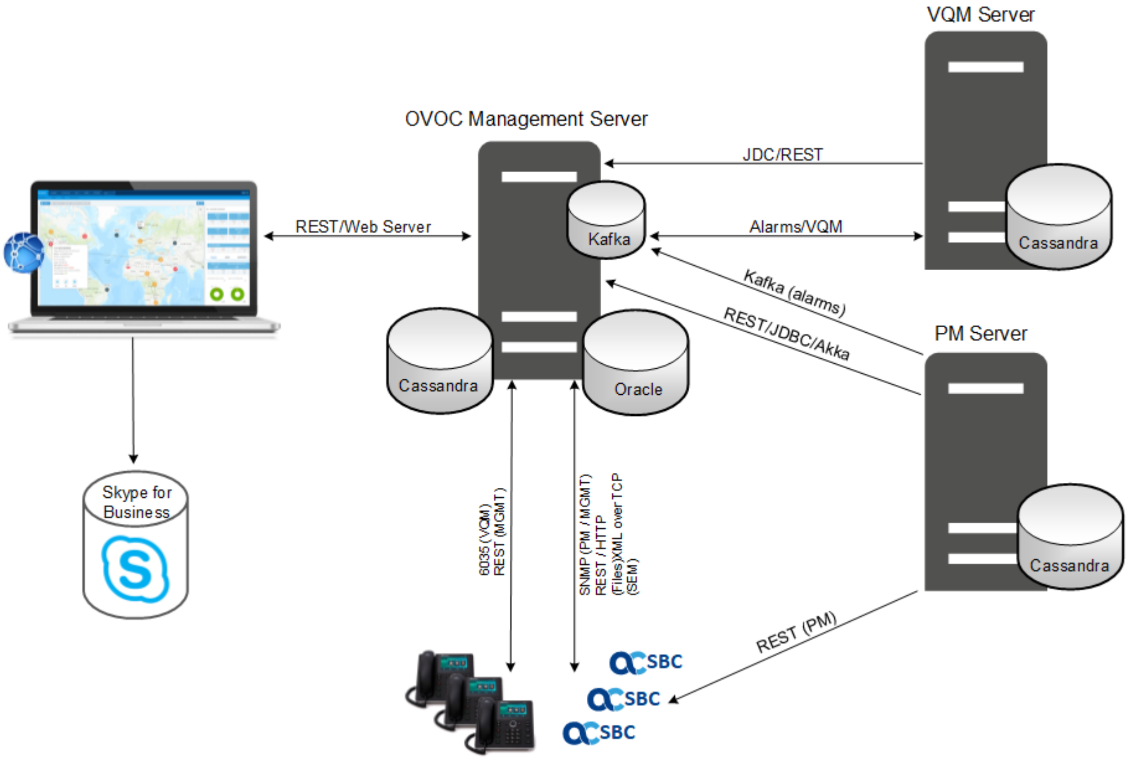
The High Scale Cluster enhances the offerings for large scale deployments through load sharing cluster configuration for the Voice Quality Management (VQM) and Performance Monitoring (PM) processes. This mode shares OVOC load between three Virtual Machines:

- Management
- Voice Quality Management (VQM)
- Performance Monitoring (PM)

> ⚠ Service Provider Cluster setup is released in this version as a Controlled Introduction feature. When customers are ready to deploy this feature, contact the AudioCodes OVOC Product Manager to coordinate an initial interview session.

The topology is illustrated in the figure below.

Figure 6-1: Service Provider Cluster

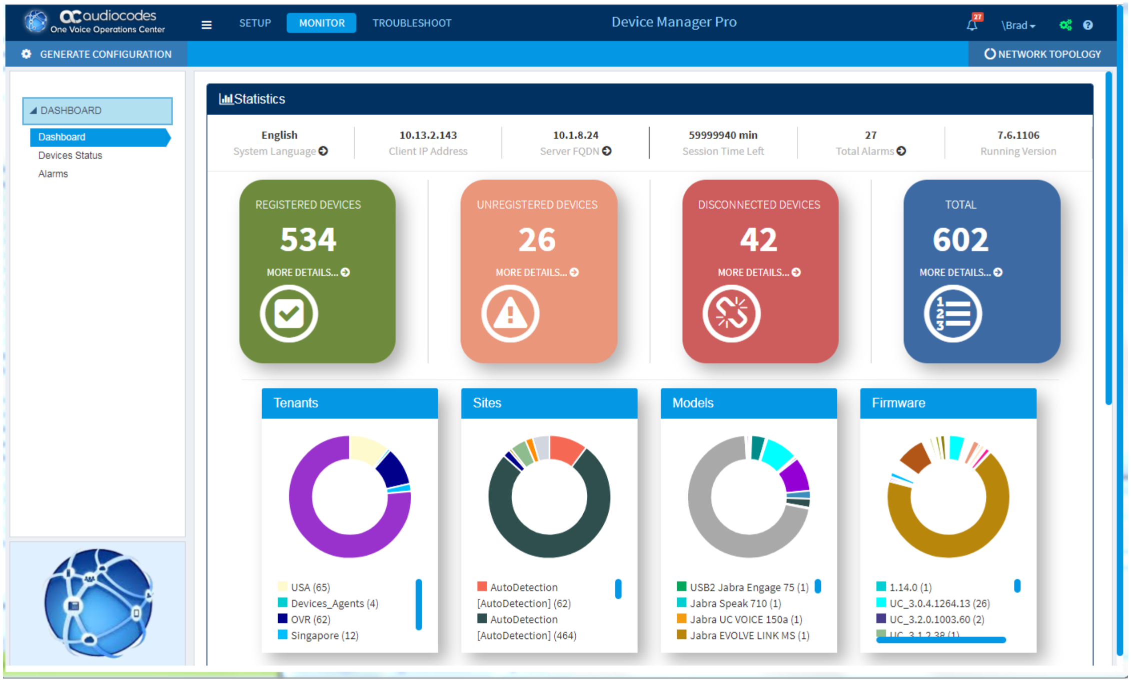


For technical specifications, see OVOC Service Provider Cluster Requirements on page 46

7 Device Manager Pro

The IP Phone Manager Pro provides a very comprehensive zero touch provisioning and firmware updates per different templates which can be configured for tenants, regions, sites, device model and users. Administrators can perform actions on multiple phones including: uploading a CSV file with a devices' MAC addresses and SIP credentials; approving devices at the click of a button; sending messages to phones' LCDs, resetting devices, and moving devices between regions. The figure below displays the Device Manager Pro dashboard.

Figure 7-1: Device Manager Pro



Statistics

English – System Language
10.13.2.143 – Client IP Address
10.1.8.24 – Server FQDN
59999940 min – Session Time Left
27 – Total Alarms
7.6.1106 – Running Version

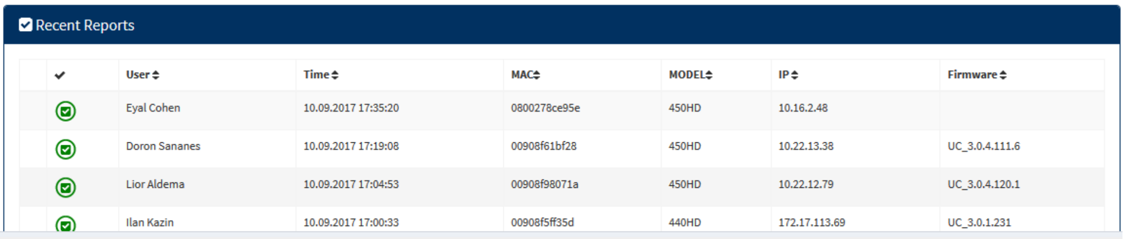
REGISTERED DEVICES 534 MORE DETAILS...
UNREGISTERED DEVICES 26 MORE DETAILS...
DISCONNECTED DEVICES 42 MORE DETAILS...
TOTAL 602 MORE DETAILS...

The Dashboard page lets you quickly identify:

- A breakdown of the number of registered, unregistered and disconnected devices in the network.
- A breakdown of the key data for Tenants, Sites, Phone models and firmware.
- System data including the Web language, the IP address, session time left and the running OVOC server version.

The Recent Reports pane at the bottom of the status screen shows recent operations performed on specific phones. Color icons are used to indicate the status of updates on the phone. For example, the icon below indicates that the device has been registered.

Figure 7-2: Recent Reports

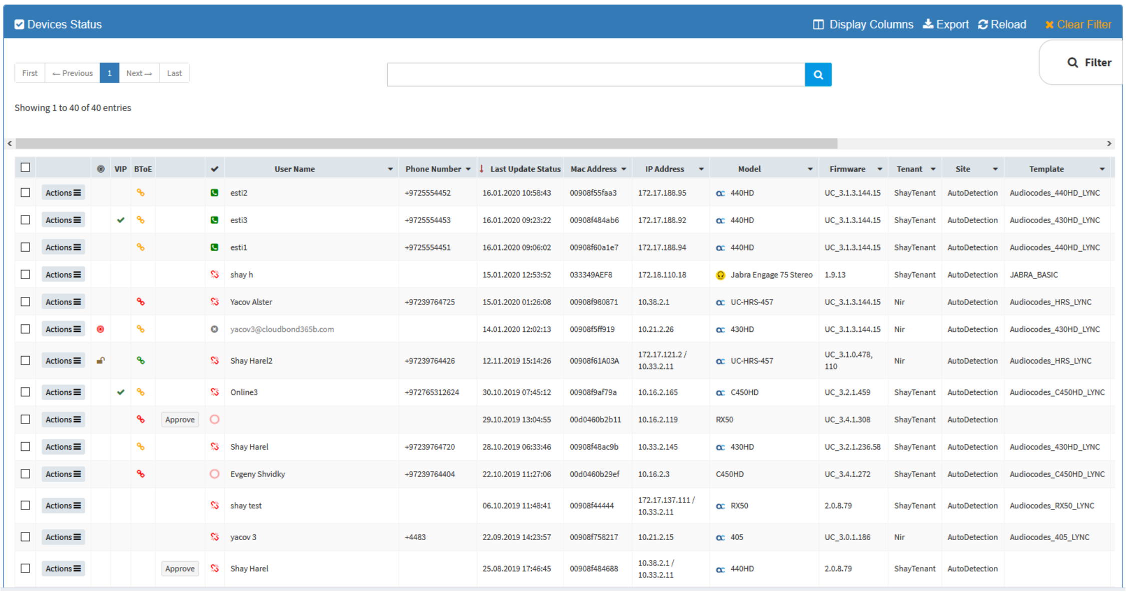


☑ Recent Reports

✓	User	Time	MAC	MODEL	IP	Firmware
☑	Eyal Cohen	10.09.2017 17:35:20	0800278ce95e	450HD	10.16.2.48	
☑	Doron Sananes	10.09.2017 17:19:08	00908f61bf28	450HD	10.22.13.38	UC_3.0.4.111.6
☑	Lior Aldema	10.09.2017 17:04:53	00908f98071a	450HD	10.22.12.79	UC_3.0.4.120.1
☑	Ilan Kazin	10.09.2017 17:00:33	00908f5ff35d	440HD	172.17.113.69	UC_3.0.1.231

When you click **More Details** link for one of the status icons, the Device Status screen opens displaying the details for the category of devices that you selected. For example, ‘Registered Devices’.

Figure 7-3: Devices Status

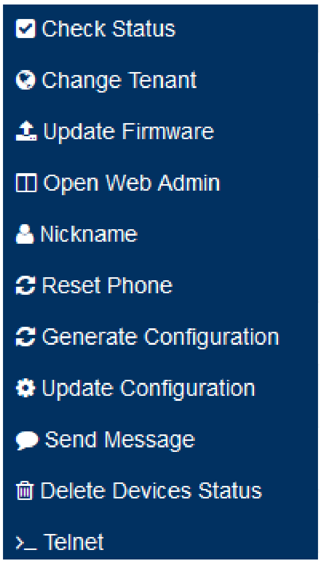


Showing 1 to 40 of 40 entries

□		◉	VIP	BToE		✓	User Name	Phone Number	Last Update Status	Mac Address	IP Address	Model	Firmware	Tenant	Site	Template
□	Actions ☰						esti2	+9725554452	16.01.2020 10:58:43	00908f55faa3	172.17.188.95	440HD	UC_3.1.3.144.15	ShayTenant	AutoDetection	Audiocodes_440HD_LYNC
□	Actions ☰		✓				esti3	+9725554453	16.01.2020 09:23:22	00908f484ab6	172.17.188.92	440HD	UC_3.1.3.144.15	ShayTenant	AutoDetection	Audiocodes_430HD_LYNC
□	Actions ☰						esti1	+9725554451	16.01.2020 09:06:02	00908f60a1e7	172.17.188.94	440HD	UC_3.1.3.144.15	ShayTenant	AutoDetection	Audiocodes_440HD_LYNC
□	Actions ☰						shay h		15.01.2020 12:53:52	033349AEF8	172.18.110.18	Jabra Engage 75 Stereo	1.9.13	ShayTenant	AutoDetection	JABRA_BASIC
□	Actions ☰						Yacov Alster	+97239764725	15.01.2020 01:26:08	00908f980871	10.38.2.1	UC-HRS-457	UC_3.1.3.144.15	Nir	AutoDetection	Audiocodes_HRS_LYNC
□	Actions ☰	●					yacov3@cloudbond365b.com		14.01.2020 12:02:13	00908f5ff919	10.21.2.26	430HD	UC_3.1.3.144.15	Nir	AutoDetection	Audiocodes_430HD_LYNC
□	Actions ☰						Shay Harel2	+97239764426	12.11.2019 15:14:26	00908f61A03A	172.17.121.2 / 10.33.2.11	UC-HRS-457	UC_3.1.0.478, 110	Nir	AutoDetection	Audiocodes_HRS_LYNC
□	Actions ☰		✓				Online3	+972765312624	30.10.2019 07:45:12	00908f9af79a	10.16.2.165	C450HD	UC_3.2.1.459	ShayTenant	AutoDetection	Audiocodes_C450HD_LYNC
□	Actions ☰				Approve	○			29.10.2019 13:04:55	00d0460b2b11	10.16.2.119	RX50	UC_3.4.1.308	ShayTenant	AutoDetection	
□	Actions ☰						Shay Harel	+97239764720	28.10.2019 06:33:46	00908f48ac9b	10.33.2.145	430HD	UC_3.2.1.236.58	ShayTenant	AutoDetection	Audiocodes_430HD_LYNC
□	Actions ☰					○	Evgeny Shvidky	+97239764404	22.10.2019 11:27:06	00d0460b29ef	10.16.2.3	C450HD	UC_3.4.1.272	ShayTenant	AutoDetection	Audiocodes_C450HD_LYNC
□	Actions ☰						shay test		06.10.2019 11:48:41	00908f44444	172.17.137.111 / 10.33.2.11	RX50	2.0.8.79	ShayTenant	AutoDetection	Audiocodes_RX50_LYNC
□	Actions ☰						yacov 3	+4483	22.09.2019 14:23:57	00908f758217	10.21.2.15	405	UC_3.0.1.186	Nir	AutoDetection	Audiocodes_405_LYNC
□	Actions ☰				Approve		Shay Harel		25.08.2019 17:46:45	00908f484688	10.38.2.1 / 10.33.2.11	440HD	2.0.8.79	ShayTenant	AutoDetection	

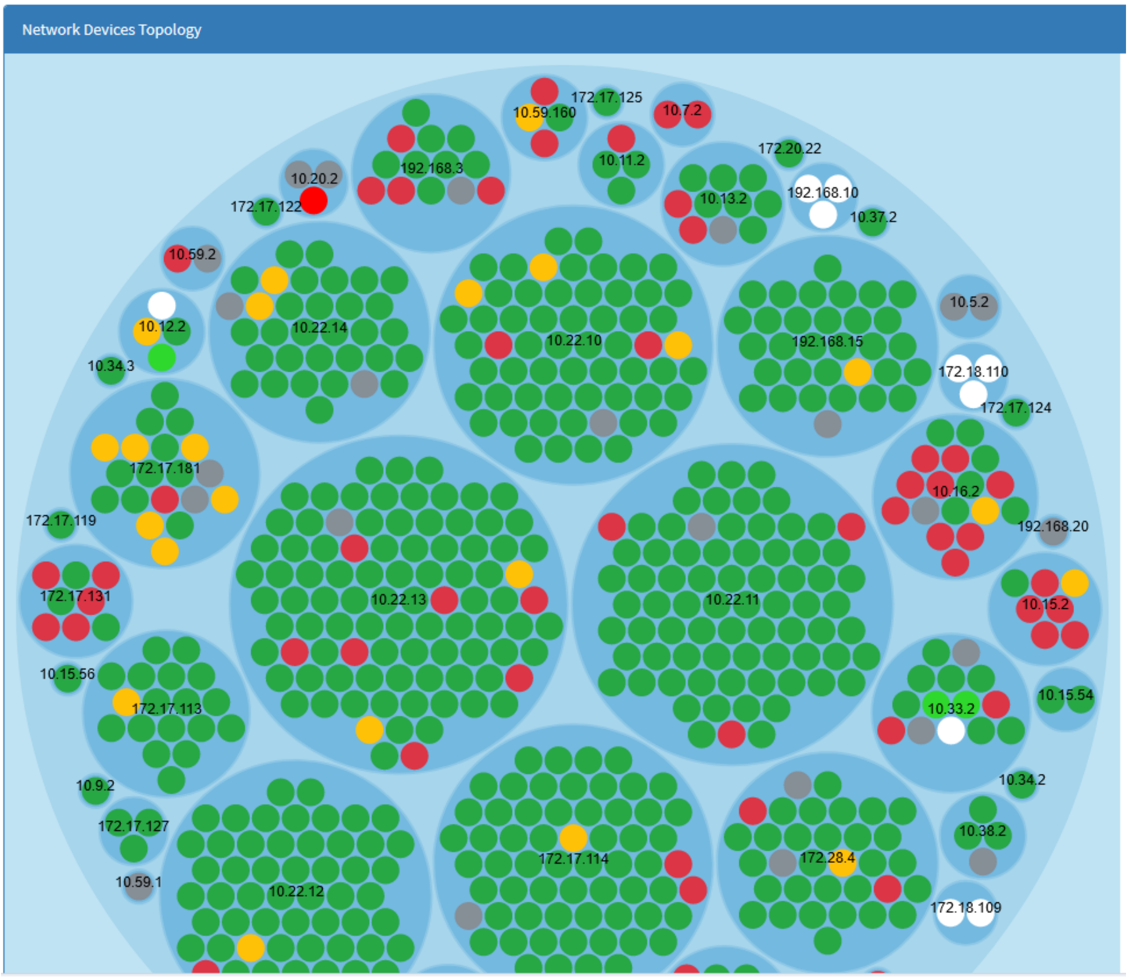
Example indications include when an alarm is currently active on the device, when the BtoE (Better Together Status) auto pairing is enabled on the device or when a device is set as a VIP device. You can perform various right-click operations on each phone record as shown in the figure below.

Figure 7-4: Phone Actions



You can use filters to display device status according to specified criteria. The IP Phones active alarms are displayed in a Dashboard, including information such as alarm description. After an alarm is cleared, it disappears from the Alarms screen. The Network Topology map view allows administrators to view a snapshot of the network's tenants and subnets; its possible to toggle to display either IP addresses, classes or site labels. The page allows administrators, for example, to determine at a glance which subnets are causing traffic overload.

Figure 7-5: Network Device Topology Page



Mass Operations

You can perform mass operations on multiple users such as reset passwords, restart devices, generate and update device configuration files and send messages to multiple devices. You can also perform mass operations on multiple devices such as change device type, change languages, restart multiple devices and generate and update device configuration files and send messages to multiple devices. When devices are deployed behind a NAT, OVOC cannot establish a direct connection with the phones, therefore the following mechanisms are used:

- For Microsoft Lync/Skype for Business phones, Polycom Trio devices, Polycom VVX devices and Spectralink 8440 devices, OVOC performs actions on these devices via the Device Manager Agent
- For Microsoft Teams deployments, a special mechanism is deployed to reach the Teams phones by embedding commands from the OVOC server in the Keep-alive messages that are sent from these phones

Device Manager Agent

An increasing number of customer sites use Cloud Services to manage equipment remotely through Cloud Services (SaaS) or through service providers. For such deployments, devices are managed behind a firewall or NAT. For this purpose, the Device Manager Agent is installed on a Microsoft Windows server in the local enterprise network. The Agent allows OVOC to manage multiple heterogeneous device configurations. The Agent listens to OVOC at predefined intervals and checks if there are actions required to run on the devices in the network. Actions are aggregated per tenant and run on each device in the network. The actions include checking statuses, updating firmware, resetting the device, configuration updates and sending SIP messages. The connection between the Device Manager Agent and OVOC is secured over HTTPS with encryption.

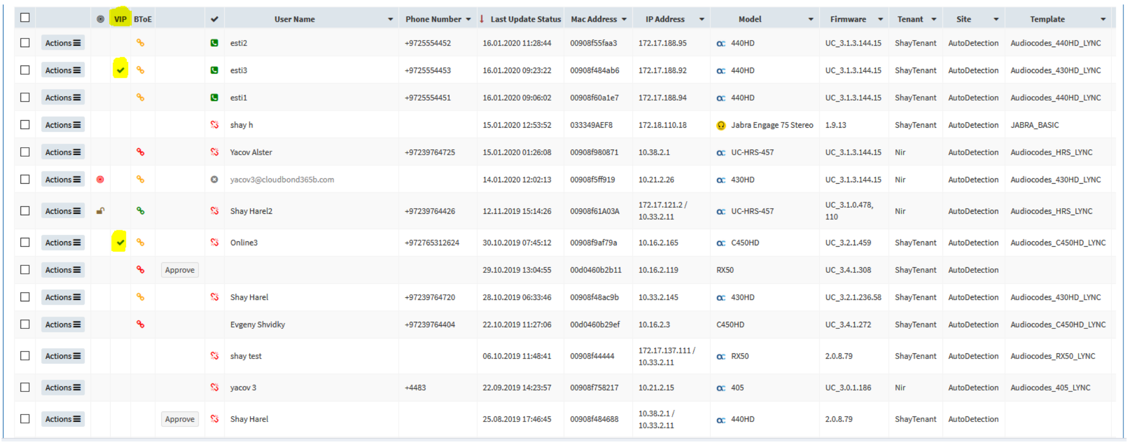
Group Level Management

Tenant Operator can define Endpoint Groups in OVOC to manage groups of phones with similar configuration. For example, you may wish to define separate groups for “Marketing” and “Logistics”. This enables greater control in the automatic provisioning (“Zero-touch”) process by preventing the misconfiguration of large number of phones system-wide. These groups are created in OVOC by the System Administrator and can then be configured in the Device Manager in a similar manner to Tenants, Sites and Users in the Manage Multiple Devices screen and using Configuration keys.

VIP Device Management

Devices can be set as VIP devices in the Device Status screen. This enables the prioritization for the monitoring of devices of key management personnel. In addition, in the Device System Settings, you can customize the global Keep-alive timeout to ensure that any disconnection for such devices are rapidly detected. Custom alarms are generated when the device connection is lost and when the device connection is unregistered.

Figure 7-6: VIP Devices



□		◉	VIP	BToE		✓	User Name	Phone Number	Last Update Status	Mac Address	IP Address	Model	Firmware	Tenant	Site	Template
□	Actions ☰			🔗		☎	esti2	+9725554452	16.01.2020 11:28:44	00908f55faa3	172.17.188.95	440HD	UC_3.1.3.144.15	ShayTenant	AutoDetection	Audiocodes_440HD_LYNC
□	Actions ☰		✓	🔗		☎	esti3	+9725554453	16.01.2020 09:23:22	00908f484ab6	172.17.188.92	440HD	UC_3.1.3.144.15	ShayTenant	AutoDetection	Audiocodes_430HD_LYNC
□	Actions ☰			🔗		☎	esti1	+9725554451	16.01.2020 09:06:02	00908f60a1e7	172.17.188.94	440HD	UC_3.1.3.144.15	ShayTenant	AutoDetection	Audiocodes_440HD_LYNC
□	Actions ☰					☎	shay h		15.01.2020 12:53:52	033349AEF8	172.18.110.18	Jabra Engage 75 Stereo	1.9.13	ShayTenant	AutoDetection	JABRA_BASIC
□	Actions ☰			🔗		☎	Yacov Alster	+97239764725	15.01.2020 01:26:08	00908f980871	10.38.2.1	UC-HRS-457	UC_3.1.3.144.15	Nir	AutoDetection	Audiocodes_HRS_LYNC
□	Actions ☰	◉		🔗		⊗	yacov3@cloudbond365b.com		14.01.2020 12:02:13	00908f5ff919	10.21.2.26	430HD	UC_3.1.3.144.15	Nir	AutoDetection	Audiocodes_430HD_LYNC
□	Actions ☰	🔓		🔗		☎	Shay Harel2	+97239764426	12.11.2019 15:14:26	00908f61A03A	172.17.121.2 / 10.33.2.11	UC-HRS-457	UC_3.1.0.478, 110	Nir	AutoDetection	Audiocodes_HRS_LYNC
□	Actions ☰		✓	🔗		☎	Online3	+972765312624	30.10.2019 07:45:12	00908f9af79a	10.16.2.165	C450HD	UC_3.2.1.459	ShayTenant	AutoDetection	Audiocodes_C450HD_LYNC
□	Actions ☰			🔗	Approve				29.10.2019 13:04:55	00d0460b2b11	10.16.2.119	RX50	UC_3.4.1.308	ShayTenant	AutoDetection	
□	Actions ☰			🔗		☎	Shay Harel	+97239764720	28.10.2019 06:33:46	00908f48ac9b	10.33.2.145	430HD	UC_3.2.1.236.58	ShayTenant	AutoDetection	Audiocodes_430HD_LYNC
□	Actions ☰			🔗			Evgeny Shvidky	+97239764404	22.10.2019 11:27:06	00d0460b29ef	10.16.2.3	C450HD	UC_3.4.1.272	ShayTenant	AutoDetection	Audiocodes_C450HD_LYNC
□	Actions ☰					☎	shay test		06.10.2019 11:48:41	00908f44444	172.17.137.111 / 10.33.2.11	RX50	2.0.8.79	ShayTenant	AutoDetection	Audiocodes_RX50_LYNC
□	Actions ☰					☎	yacov 3	+4483	22.09.2019 14:23:57	00908f758217	10.21.2.15	405	UC_3.0.1.186	Nir	AutoDetection	Audiocodes_405_LYNC
□	Actions ☰				Approve	☎	Shay Harel		25.08.2019 17:46:45	00908f484688	10.38.2.1 / 10.33.2.11	440HD	2.0.8.79	ShayTenant	AutoDetection	

Jabra Device Management

Jabra devices can be managed by OVOC including for status and health monitoring, alarms, configuration and software upgrade of the Jabra devices. A Jabra Integration Service is installed on the workstation PCs that are connected to Jabra devices. This service sends alarms and statuses to the Device Manager either directly or through the Device Manager Agent and receives the provisioning requests (see Device Manager Agent on the previous page).

Polycom Device Management

Polycom Trio 8800 and VVX devices can be managed by the Device Manager Pro over REST API interface:

- Automatic provisioning with different templates per model from AudioCodes' provisioning server and added to specific sites according to the phones subnet mask.
- Synchronize with the AudioCodes' firmware Cloud repository to retrieve the latest Polycom device firmware files.
- Monitor the status of the Polycom devices including displaying presence, registration status and hardware information and viewing the assigned template.
- Access the Polycom device's Web Configuration Utility
- Reset the Polycom device

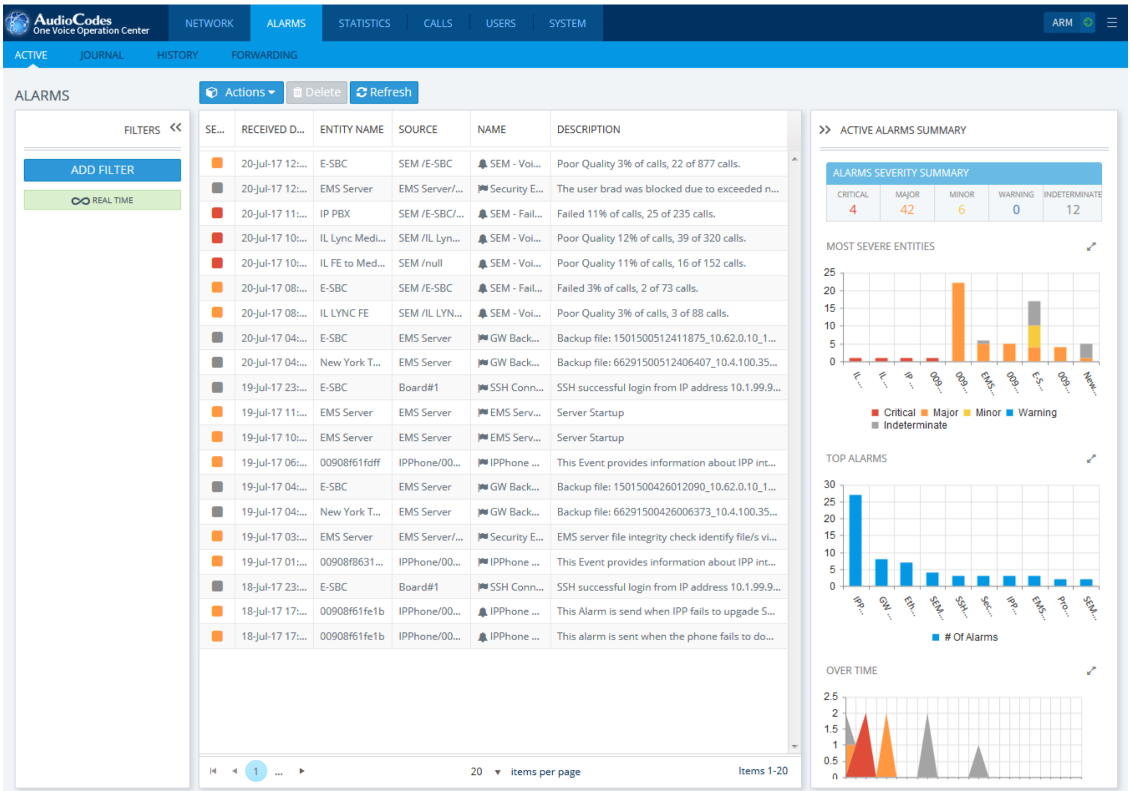
Polycom phones can now be automatically provisioned to be added to specific sites. Previously Polycom phones could only be provisioned by default to the Auto Detection Region.

8 Fault Management

The OVOC's high-level fault management functionality manages all alarms and events from managed elements (received via SNMP traps) and displays them in an Alarm view. Separate views are displayed for active and history alarms. OVOC can typically process 20 SNMP traps per second continuously. When an alarm is received, it is parsed, stored in the database and immediately displayed. The alarms are summarized in graphical reports according to key indicators such as distribution of alarm severities and alarm types. Operators can quickly isolate a problem's precise location i.e. Region, site or device and view all Journal records and Alarms History related to these contexts. You can also filter alarms according to specific criteria, such as time interval or device IP address. All traps received by the OVOC from managed entities and the ones that are issued by the OVOC itself can be forwarded to the NMS over SNMPv2c or SNMPv3. Active alarms can be synchronized to overcome network impairments. Device alarms and events can also be forwarded as Mail notifications or Syslog messages.

An aggregated list of alarm notifications can be forwarded from OVOC in a batch to a mail server in a single email according to the alarm filter settings in the Forwarding rule.

Figure 8-1: OVOC Alarms



SE...	RECEIVED D...	ENTITY NAME	SOURCE	NAME	DESCRIPTION
🟧	20-Jul-17 12:...	E-SBC	SEM /E-SBC	SEM - Voi...	Poor Quality 3% of calls, 22 of 877 calls.
⬛	20-Jul-17 12:...	EMS Server	EMS Server/...	Security E...	The user brad was blocked due to exceeded n...
🟥	20-Jul-17 11:...	IP PBX	SEM /E-SBC/...	SEM - Fail...	Failed 11% of calls, 25 of 235 calls.
🟥	20-Jul-17 10:...	IL Lync Medi...	SEM /IL Lyn...	SEM - Voi...	Poor Quality 12% of calls, 39 of 320 calls.
🟥	20-Jul-17 10:...	IL FE to Med...	SEM /null	SEM - Voi...	Poor Quality 11% of calls, 16 of 152 calls.
🟧	20-Jul-17 08:...	E-SBC	SEM /E-SBC	SEM - Fail...	Failed 3% of calls, 2 of 73 calls.
🟧	20-Jul-17 08:...	IL LYNC FE	SEM /IL LYN...	SEM - Voi...	Poor Quality 3% of calls, 3 of 88 calls.
⬛	20-Jul-17 04:...	E-SBC	EMS Server	GW Back...	Backup file: 1501500512411875_10.62.0.10_1...
⬛	20-Jul-17 04:...	New York T...	EMS Server	GW Back...	Backup file: 66291500512406407_10.4.100.35...
⬛	19-Jul-17 23:...	E-SBC	Board#1	SSH Conn...	SSH successful login from IP address 10.1.99.9...
🟧	19-Jul-17 11:...	EMS Server	EMS Server	EMS Serv...	Server Startup
🟧	19-Jul-17 10:...	EMS Server	EMS Server	EMS Serv...	Server Startup
🟧	19-Jul-17 06:...	00908f61fdff	IPPhone/00...	IPPhone ...	This Event provides information about IPP int...
⬛	19-Jul-17 04:...	E-SBC	EMS Server	GW Back...	Backup file: 1501500426012090_10.62.0.10_1...
⬛	19-Jul-17 04:...	New York T...	EMS Server	GW Back...	Backup file: 66291500426006373_10.4.100.35...
🟧	19-Jul-17 03:...	EMS Server	EMS Server/...	Security E...	EMS server file integrity check identify file/s vi...
🟧	19-Jul-17 01:...	00908f8631...	IPPhone/00...	IPPhone ...	This Event provides information about IPP int...
⬛	18-Jul-17 23:...	E-SBC	Board#1	SSH Conn...	SSH successful login from IP address 10.1.99.9...
🟧	18-Jul-17 17:...	00908f61fe1b	IPPhone/00...	IPPhone ...	This Alarm is send when IPP fails to upgade S...
🟧	18-Jul-17 17:...	00908f61fe1b	IPPhone/00...	IPPhone ...	This alarm is sent when the phone fails to do...

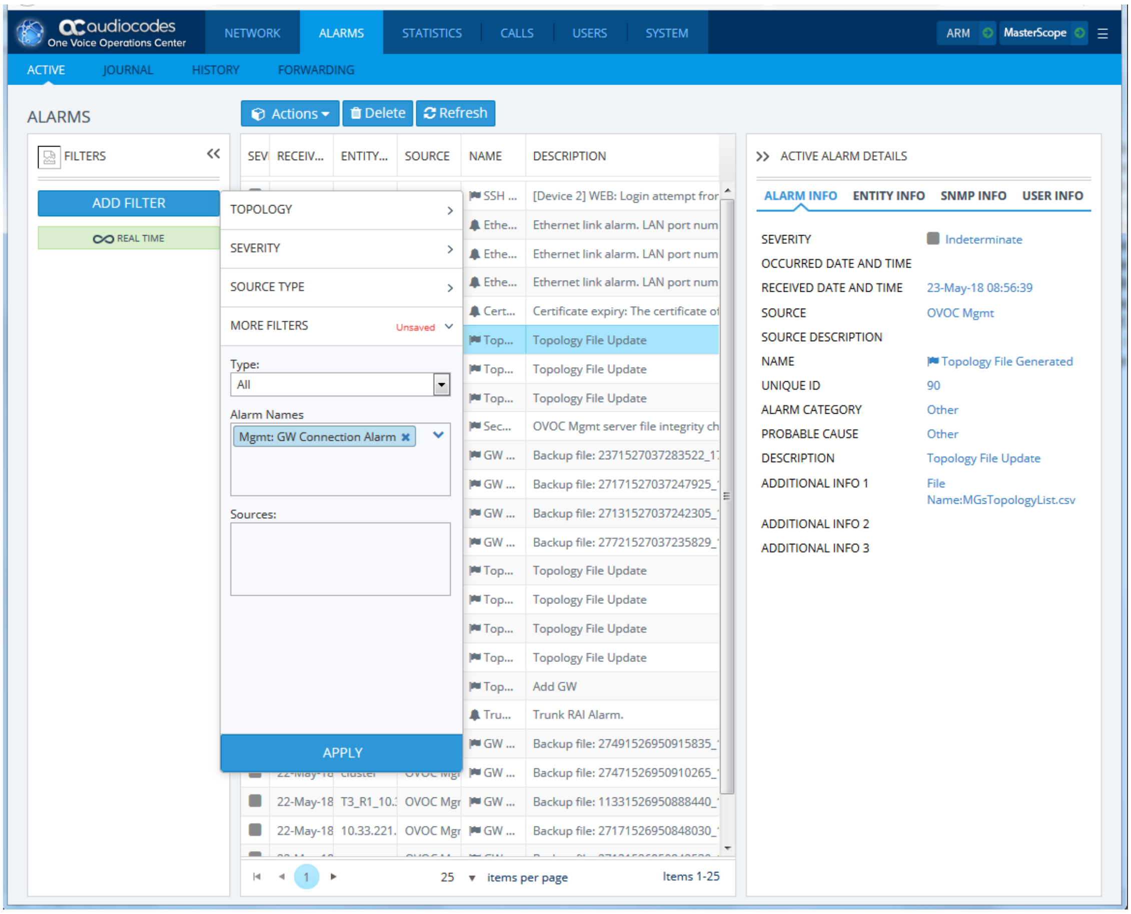
1 ... 20 items per page Items 1-20

ALARMS SEVERITY SUMMARY

CRITICAL	MAJOR	MINOR	WARNING	INDETERMINATE
4	42	6	0	12

Alarm Filtering

You can customize filters for alarms according to specific criteria, such as time interval,device IP address, severity or alarm name or type.The example below shows alarm filter criteria for a specific alarm 'GW Connection Alarm'.



Type: All

Alarm Names: Mgmt: GW Connection Alarm

Sources:

SEV	RECEIV...	ENTITY...	SOURCE	NAME	DESCRIPTION
				SSH ...	[Device 2] WEB: Login attempt fror
				Ethe...	Ethernet link alarm. LAN port num
				Ethe...	Ethernet link alarm. LAN port num
				Ethe...	Ethernet link alarm. LAN port num
				Cert...	Certificate expiry: The certificate of
				Top...	Topology File Update
				Top...	Topology File Update
				Top...	Topology File Update
				Sec...	OVOC Mgmt server file integrity ch
				GW ...	Backup file: 2371527037283522_1
				GW ...	Backup file: 2717152703724792 5_
				GW ...	Backup file: 2713152703724230 5_
				GW ...	Backup file: 2772152703723582 9_
				Top...	Topology File Update
				Top...	Topology File Update
				Top...	Topology File Update
				Top...	Topology File Update
				Top...	Add GW
				Tru...	Trunk RAI Alarm.
				GW ...	Backup file: 27491526950915835_
	22-May-18	cluster	OVOC Mgr	GW ...	Backup file: 27471526950910265_
	22-May-18	T3_R1_10.	OVOC Mgr	GW ...	Backup file: 1133152695088844 0_
	22-May-18	10.33.221.	OVOC Mgr	GW ...	Backup file: 27171526950848030_

1 | 25 items per page | Items 1-25

ACTIVE ALARM DETAILS

ALARM INFO | ENTITY INFO | SNMP INFO | USER INFO

SEVERITY	Indeterminate
OCCURRED DATE AND TIME	
RECEIVED DATE AND TIME	23-May-18 08:56:39
SOURCE	OVOC Mgmt
SOURCE DESCRIPTION	
NAME	Topology File Generated
UNIQUE ID	90
ALARM CATEGORY	Other
PROBABLE CAUSE	Other
DESCRIPTION	Topology File Update
ADDITIONAL INFO 1	File Name:MGsTopologyList.csv
ADDITIONAL INFO 2	
ADDITIONAL INFO 3	

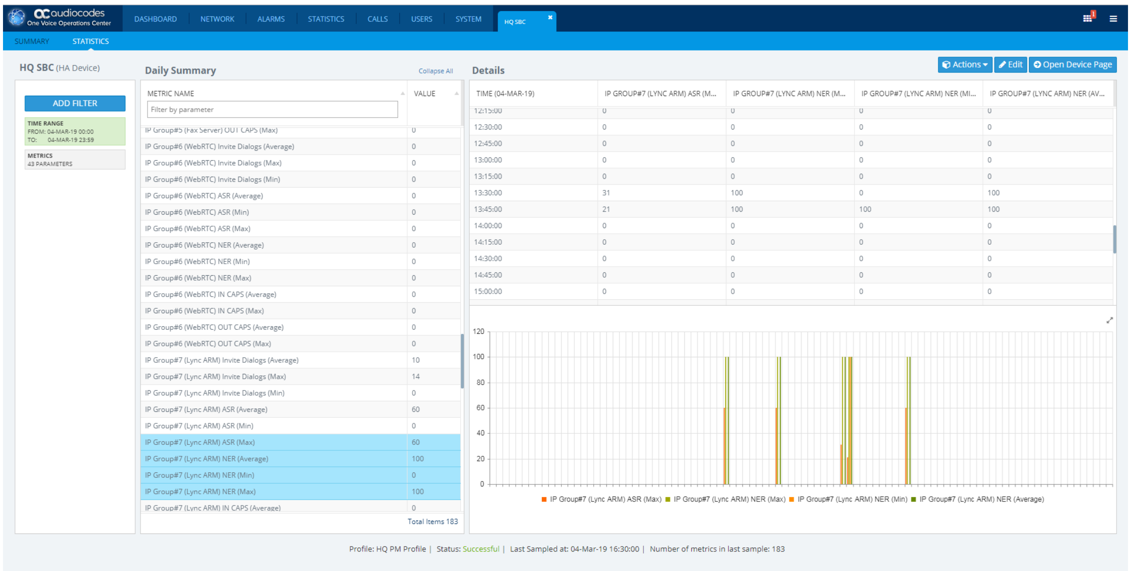
9 Performance Monitoring

Performance Monitoring analysis is one of the tools that can be used by OVOC operators for network planning and administration in the OVOC topology. This monitoring involves the collection of high-level historic data polled from the managed entities. Examples of uses include:

- Set different subscriber plans according to traffic peaks based on PMs such as the number of attempted and established calls by comparing polling results for different time intervals during a 24-hour period.
- Determine transcoding requirements based on data such as the maximum number of G711 and G729 Active Calls for the filtered time period.
- Track the effective level of license utilization based on the number of media legs, transcoding sessions for the filtered time period.
- Performance Monitoring parameters can be managed using both SNMP and REST API

The data topology is based on a default tenant-level profile which is automatically allocated to a new tenant. Tenant Operators can later customize PM templates and easily assign them to all types of managed devices. Polling can be started and stopped for one or more devices. Threshold monitors raise alarms when a threshold is exceeded and clear them when the PMs value falls below the defined low threshold value. Polled Performance Monitoring data can be automatically saved to a data file according to PM template for each polling interval (saved to the NBIF folder). In addition, you can save the output of a PM filter query to a CSV file. For example, you can save output for several polling intervals.

Figure 9-1: Performance Monitoring Filtered Output


audiocodes
One Voice Operations Center
DASHBOARD
NETWORK
ALARMS
STATISTICS
CALLS
USERS
SYSTEM
HQ SBC
SUMMARY
STATISTICS
Collapse All
Actions
Edit
Open Device Page
ADD FILTER
120
100
80
60
40
20
0
■ IP Group#7 (Lync ARM) ASR (Max) ■ IP Group#7 (Lync ARM) NER (Max) ■ IP Group#7 (Lync ARM) NER (Min) ■ IP Group#7 (Lync ARM) NER (Average)

HQ SBC (HA Device)

TIME RANGE
FROM: 04-MAR-19 00:00
TO: 04-MAR-19 23:59

METRICS
43 PARAMETERS

Daily Summary

Filter by parameter

METRIC NAME	VALUE
IP Group#5 (Fax Server) OUT CAPS (Max)	0
IP Group#6 (WebRTC) Invite Dialogs (Average)	0
IP Group#6 (WebRTC) Invite Dialogs (Max)	0
IP Group#6 (WebRTC) Invite Dialogs (Min)	0
IP Group#6 (WebRTC) ASR (Average)	0
IP Group#6 (WebRTC) ASR (Min)	0
IP Group#6 (WebRTC) ASR (Max)	0
IP Group#6 (WebRTC) NER (Average)	0
IP Group#6 (WebRTC) NER (Min)	0
IP Group#6 (WebRTC) NER (Max)	0
IP Group#6 (WebRTC) IN CAPS (Average)	0
IP Group#6 (WebRTC) IN CAPS (Max)	0
IP Group#6 (WebRTC) OUT CAPS (Average)	0
IP Group#6 (WebRTC) OUT CAPS (Max)	0
IP Group#7 (Lync ARM) Invite Dialogs (Average)	10
IP Group#7 (Lync ARM) Invite Dialogs (Max)	14
IP Group#7 (Lync ARM) Invite Dialogs (Min)	0
IP Group#7 (Lync ARM) ASR (Average)	60
IP Group#7 (Lync ARM) ASR (Min)	0
IP Group#7 (Lync ARM) ASR (Max)	60
IP Group#7 (Lync ARM) NER (Average)	100
IP Group#7 (Lync ARM) NER (Min)	0
IP Group#7 (Lync ARM) NER (Max)	100
IP Group#7 (Lync ARM) IN CAPS (Average)	0

Total Items 183

Details

TIME (04-MAR-19)	IP GROUP#7 (LYNC ARM) ASR (M...	IP GROUP#7 (LYNC ARM) NER (M...	IP GROUP#7 (LYNC ARM) NER (MI...	IP GROUP#7 (LYNC ARM) NER (AV...
12:15:00	0	0	0	0
12:30:00	0	0	0	0
12:45:00	0	0	0	0
13:00:00	0	0	0	0
13:15:00	0	0	0	0
13:30:00	31	100	0	100
13:45:00	21	100	100	100
14:00:00	0	0	0	0
14:15:00	0	0	0	0
14:30:00	0	0	0	0
14:45:00	0	0	0	0
15:00:00	0	0	0	0

Profile: HQ PM Profile | Status: Successful | Last Sampled at: 04-Mar-19 16:30:00 | Number of metrics in last sample: 183

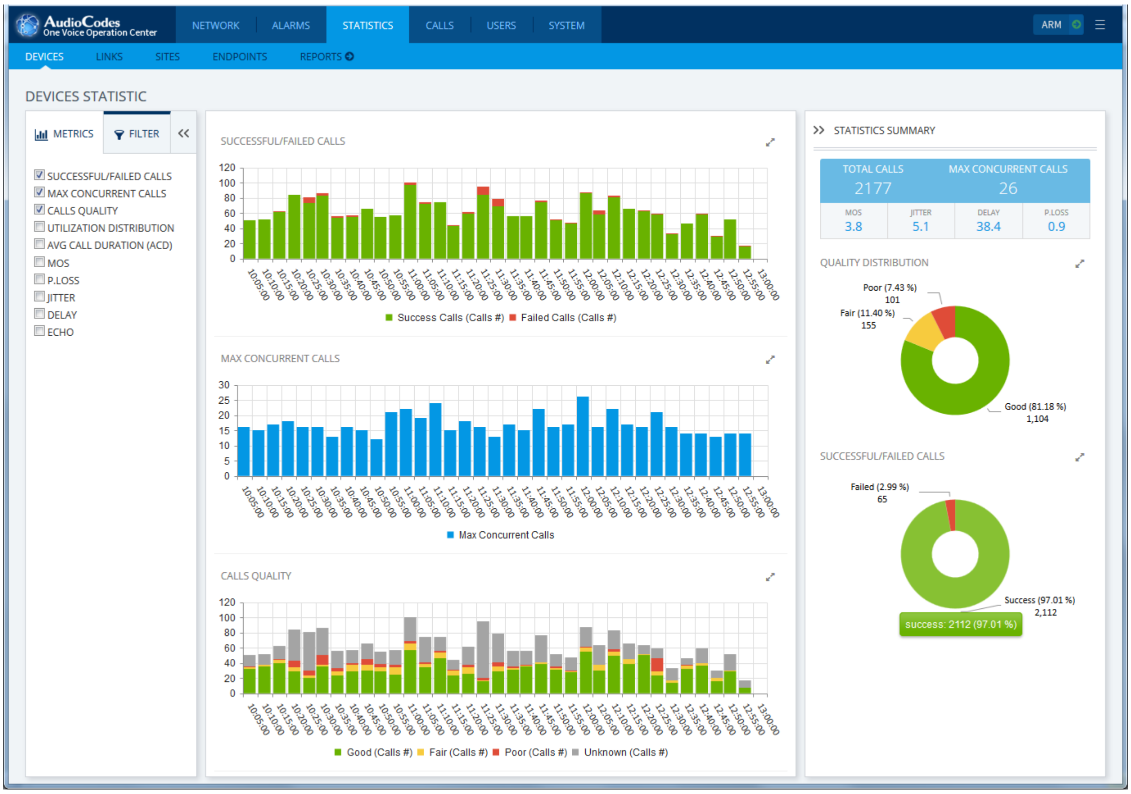
For a comprehensive list of PM parameters supported on each device, refer to the OVOC Performance Monitoring Guide.

10 Voice Quality Management

AudioCodes' Voice Quality Management delivers important technical and business statistics based on AudioCodes methodologies developed over many years of VoIP implementation and design . It provides real-time health and diagnostics monitoring of VoIP voice traffic network quality data that is generated by AudioCodes devices, endpoints and links. It includes modular views for analyzing network nodes, aggregated voice quality statistics, user data and alarms. In addition, sophisticated report modules enable the generation of tailored reports according to specific users and called telephone numbers. Managed entities are graphically represented in map, table and region, featuring popup summaries of critical metrics. VoIP network traffic health monitoring includes both history and real-time modules. The key focus of the Voice quality data processing is based on the call quality rating metrics (MOS, jitter, packet loss, delay/latency and echo).

AudioCodes' Voice Quality Management includes the monitoring of links which can be automatically created for calls between AudioCodes devices and Microsoft Skype for Business server components and third-party SIP trunks. You can also manage Active Directory users and their respective call statistics. Call trend statistics are collected based on key metrics, traffic load, and average call duration and call success. Alerts can be generated based on call success rate and quality thresholds defined by the network administrator.

Figure 10-1: Statistics



DEVICES STATISTIC

☑ SUCCESSFUL/FAILED CALLS
☑ MAX CONCURRENT CALLS
☑ CALLS QUALITY
□ UTILIZATION DISTRIBUTION
□ AVG CALL DURATION (ACD)
□ MOS
□ P.LOSS
□ JITTER
□ DELAY
□ ECHO

TOTAL CALLS	MAX CONCURRENT CALLS
2177	26

MOS	JITTER	DELAY	P.LOSS
3.8	5.1	38.4	0.9

Voice Quality Management-Key Features

- **Network Readiness Testing:** OVOC may be used by AudioCodes Professional services in order to test VoIP network quality readiness prior to actual deployment of the UC systems. This is done by setting active probes in the network which simulate calls in the VoIP network. This data is then collected and analyzed by AudioCodes Professional services teams using the OVOC quality monitoring capabilities.
- **Triggering Quality Alerts:** Quality alerts optimize session experience management by providing VoIP network administrators with the ability to trigger alerts according to pre-defined quality of service alert rules. This help to avoid false alarms when defining the appropriate minimal number of calls and criteria thresholds.
- **Skype for Business Server Components Monitoring**: OVOC can synchronize with the Skype for Business server and retrieve call quality measures for all the major components (Front End, Edge, SBA and Mediation servers) and their connecting links.
- **Active Directory Users Management:** OVOC can synchronize with Active Directory organization user databases and retrieve all registered users. You can then manage the telephony experience from the retrieved list of the enterprise's Active Directory listed employees.
- **Endpoint Device Monitoring:** OVOC supports endpoint devices reporting call quality using SIP Publish messages according to compliance with RFC 6035. Endpoints are added to the OVOC application automatically after the first time that SIP Publish messages are sent to the OVOC server. This feature is supported for the following phone models:
    - Polycom Trio conference phones
    - Polycom VVX phones

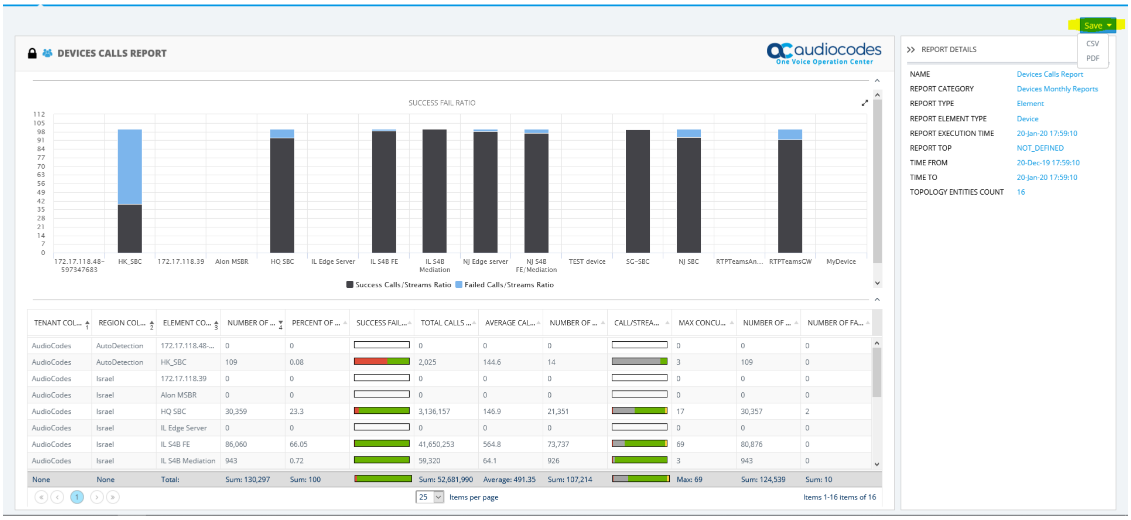
  For more information, refer to the Device Manager for Third-Party Phones Administrator's Manual
- **OVOC-Defined QoE Threshold Profiles:**QoE Threshold profiles can be applied for voice quality metrics (MOS, Delay, Packet Loss, Echo and Jitter). The QoE Threshold profile consists of threshold values set for each of these metrics for the following different call quality categories: 'Poor', 'Fair' and 'Good'. This feature includes pre-defined profiles. In addition, the user can define their own custom profile with threshold definitions for specific metrics.
- **Voice Quality Reports:** Both template and custom reports can be generated for devices, links and URIs for managed entities (Tenants, Regions and Elements) (see Voice Quality Reports below)

Voice Quality Reports

Both template and custom Voice Quality reports can be generated for devices, links and URIs for Tenants, Regions and Elements.

- Reports can be customized to different report types including Element Statistics, Aggregated Statistics Trends and Trends Statistics Comparison and for Top URI Monthly elements.
- Reports can be filtered for specific topology and tailored with a personal "look and feel" including the table columns and graph types and to include a tenant's corporate logo.
- Reports can be scheduled to run hourly, daily, weekly or monthly.
- Report definitions can be exported to a JSON file and opened using Adobe Acrobat. Likewise, report definitions can be imported and replicated.
- Results of the Report output (see figure below) can be exported to a CSV file

Figure 10-2: Voice Quality Reports



TENANT COL...	REGION COL...	ELEMENT CO...	NUMBER OF ...	PERCENT OF ...	SUCCESS FAIL...	TOTAL CALLS ...	AVERAGE CAL...	NUMBER OF ...	CALL/STREA...	MAX CONCU...	NUMBER OF ...	NUMBER OF FA...
AudioCodes	AutoDetection	172.17.118.48-...	0	0	▭	0	0	0	▭	0	0	0
AudioCodes	AutoDetection	HK_SBC	109	0.08	🟥🟩	2,025	144.6	14	▭🟩	3	109	0
AudioCodes	Israel	172.17.118.39	0	0	▭	0	0	0	▭	0	0	0
AudioCodes	Israel	Alon MSBR	0	0	▭	0	0	0	▭	0	0	0
AudioCodes	Israel	HQ SBC	30,359	23.3	🟥🟩	3,136,157	146.9	21,351	▭🟩	17	30,357	2
AudioCodes	Israel	IL Edge Server	0	0	▭	0	0	0	▭	0	0	0
AudioCodes	Israel	IL S4B FE	86,060	66.05	🟩	41,650,253	564.8	73,737	▭🟩	69	80,876	0
AudioCodes	Israel	IL S4B Mediation	943	0.72	🟩	59,320	64.1	926	🟩	3	943	0
None	None	Total:	Sum: 130,297	Sum: 100	🟩	Sum: 52,681,990	Average: 491.35	Sum: 107,214	▭🟩	Max: 69	Sum: 124,539	Sum: 10

25 Items per page

Items 1-16 items of 16

REPORT DETAILS

NAME	Devices Calls Report
REPORT CATEGORY	Devices Monthly Reports
REPORT TYPE	Element
REPORT ELEMENT TYPE	Device
REPORT EXECUTION TIME	20-Jan-20 17:59:10
REPORT TOP	NOT_DEFINED
TIME FROM	20-Dec-19 17:59:10
TIME TO	20-Jan-20 17:59:10
TOPOLOGY ENTITIES COUNT	16

Customers can generate template reports without purchasing licenses; however, to generate customized reports, customers must purchase licenses as part of the OVOC license ("Reports" Voice Quality feature). These licenses can be allocated to tenant or system operators in the OVOC Web interface.

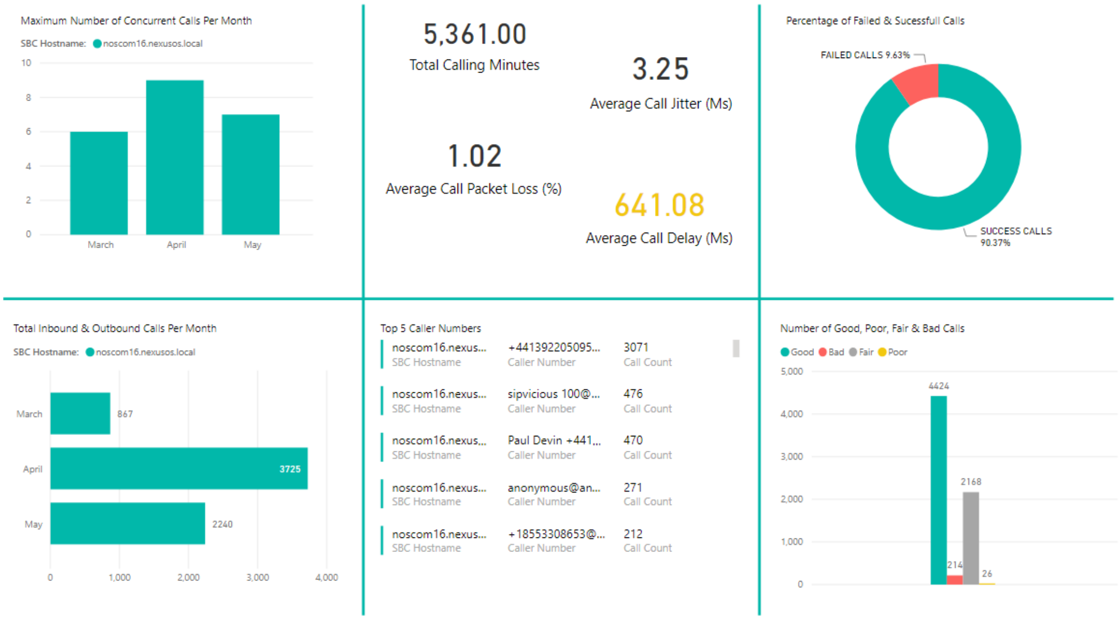
11 Analytics API

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 other Analytic tools to generate customized dashboards, reports and other representative management data. This may be particularly useful during management reporting periods. The following data is accessible:

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

⚠ Analytics data can be viewed for up to the last 24 hours.

Figure 11-1: Data Analytics Example


Maximum Number of Concurrent Calls Per Month
SBC Hostname: ● noscom16.nexusos.local
10
8
6
4
2
0
March
April
May
5,361.00
Total Calling Minutes
3.25
Average Call Jitter (Ms)
1.02
Average Call Packet Loss (%)
641.08
Average Call Delay (Ms)
Percentage of Failed & Sucessfull Calls
FAILED CALLS 9.63%
SUCCESS CALLS 90.37%
Total Inbound & Outbound Calls Per Month
SBC Hostname: ● noscom16.nexusos.local
March
April
May
867
3725
2240
0
1,000
2,000
3,000
4,000
Number of Good, Poor, Fair & Bad Calls
● Good ● Bad ● Fair ● Poor
5,000
4,000
3,000
2,000
1,000
0
4424
214
2168
26

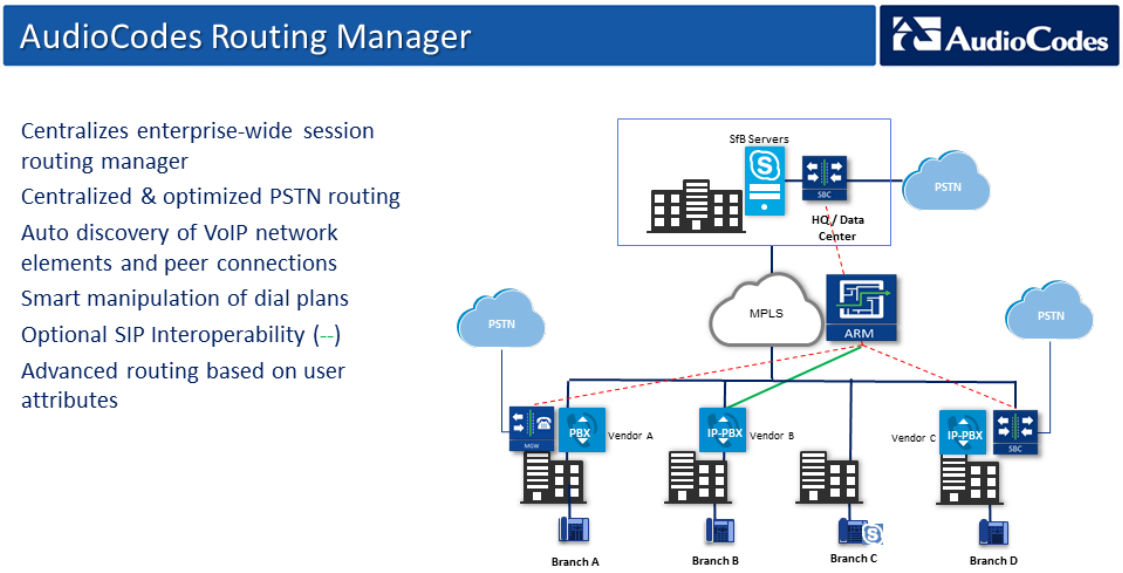
Top 5 Caller Numbers

SBC Hostname	Caller Number	Call Count
noscom16.nexus...	+441392205095...	3071
noscom16.nexus...	sipvicious 100@...	476
noscom16.nexus...	Paul Devin +441...	470
noscom16.nexus...	anonymous@an...	271
noscom16.nexus...	+18553308653@...	212

12 AudioCodes Routing Manager (ARM)

The ARM (AudioCodes Routing Manager) is a holistic dynamic routing manager that has been developed to deal with the increasingly complex task of managing heterogeneous VoIP networks. This complexity is a result of organization consolidation, relocation, upgrades and integration of IP-PBXs, SBCs and gateways and Unified Communications. As a consequence these networks may deploy multiple devices with unique configurations. For example, each device in the network may be connected to a different IP-PBX and consequently require different dial plans, manipulations, routing rules and user policies. The ARM addresses these challenges by automating and simplifying the process for creating and managing such elements for the entire network. It serves as a dynamic routing controller which determines the optimal end-to-end routing path of a call. In addition, ARM can also be used for determining the optimal path for SIP endpoints (phones) in the network for registering with a soft switch or registrar.

Figure 12-1: Enterprise VoIP Network with ARM



AudioCodes Routing Manager

- Centralizes enterprise-wide session routing manager
- Centralized & optimized PSTN routing
- Auto discovery of VoIP network elements and peer connections
- Smart manipulation of dial plans
- Optional SIP Interoperability (--)
- Advanced routing based on user attributes

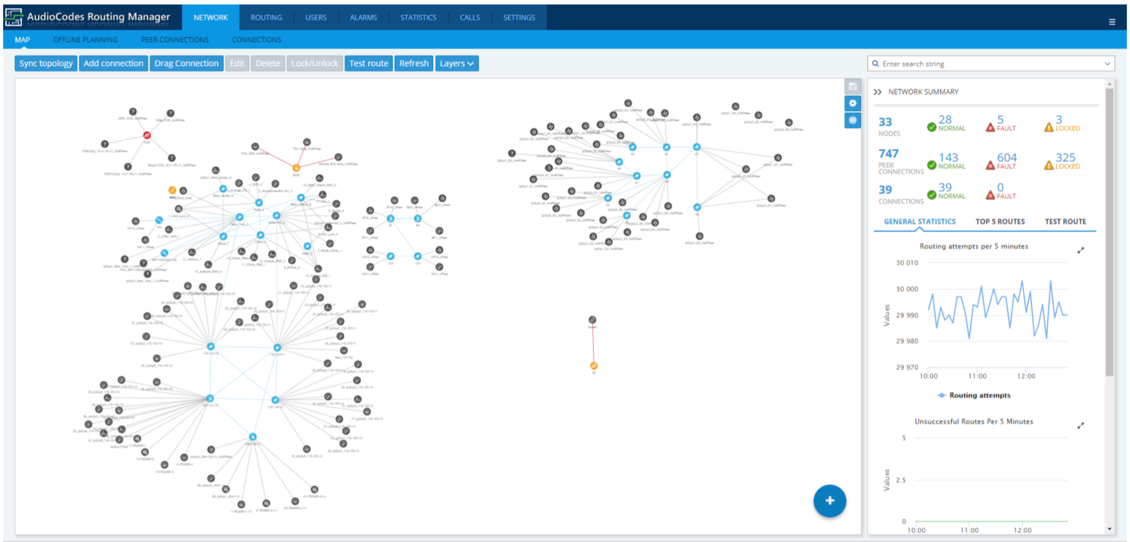
Key ARM Features

- **Network design:** ARM can be used to assist with the VoIP network design and creation where the organization's connections between SIP network elements can be setup automatically by inheriting classification rules, profiles and routing rules that are associated with the IP Groups and Trunk Groups of these nodes. This eradicates the need to replicate the configuration for each SBC and gateway in the network. Connections can be made by simply clicking and dragging a line between the connection nodes.
- **Updates on-the-fly:** Once the system is up and running, all SIP network elements register to the ARM automatically upon boot-up and update the ARM on-the-fly with all the peer connections.

- **Entity Specific Call Routing:** The call itself can be routed according to users, user groups and phone numbers. For example, the ARM manages imports and aggregates users' information and huge dial plans from different sources (i.e. LDAP Active Directory server and csv files) and groups user groups and dial groups that are used for user-based routing.
- **Routing logic:** The calculation of the actual routing path is determined by multiple factors such as priority, time based, least cost, quality and connectivity. ARM calculates the entire route end-to-end and sends it to each SBC or gateway node in the routing chain via the REST API.
- **Test Route Call Simulation:** A Test Route mode allows operators to configure Routing Rules or Dial Plans offline without impacting or disrupting live calls traffic. Test Routing rules can also take into account call quality and avoid passing through 'bad' or 'fair' Connections/Peer Connections. This mode can also simulate a call with a specific SIP header's values.
- **Offline Planning Mode:** Operators can design a VoIP network from scratch, for example, by importing entire or partial topology or by adding branches and testing them before implementation. This assists in the discovery of problems in the network design and maintenance phases and thereby prevents future downtime in the production system. Operators can change Administrative or Operative States of each virtual ARM element and Quality and Weights and test how these changes impact call traffic.
- **Call preemption:** An advanced condition can be set to prioritize emergency calls over regular calls; ARM supports emergency call preemption for SBC and gateway calls.
- **Dedicated Interface on SBC:** Operators can configure an IP interface on the AudioCodes SBC device that is dedicated to ARM traffic, which separates ARM traffic from other device management traffic such as Web, SNMP and NTP.
- **Routing rule scheduling and profiles:** Operators can activate routing rules at specified scheduled times. Time conditions can be configured as profiles and therefore reused multiple times. The condition can be applied to both routing rules and routing groups.
- **Load balancing:** Operators can implement load balancing between calls for multiple destinations of the same action. Users can configure the percentage distribution of calls between peer destinations in the network.
- **Northbound interface:** Personalized Call Routing applications can be implemented such as Communication-Enabled Business Process, and Third-party routing applications using ARM's northbound interface.
- **Integration with Third-party vendor SBCs (SIP Module):** this feature enables support for integrating third-party SBC vendors in the routing chain.
- **Flexible Cloud-compatible architecture:** ARM is highly adaptable to the cloud environment. For example, its stateless architecture facilitates call routing to work with multiple instances of the routing server according to configured routing policies such as Round Robin and Stickiness.

- **Call-Detail Records (CDRs):** stores calls information and call-detail records (CDRs). Call information is collected by the ARM Configurator from ARM Routers and then correlated to display a single call record for each ARM end-to-end call.
- **Routing Servers Groups with Internal and External Priorities:** customers can configure an ARM Routing Servers Group with internal policies within a group and with external policies between groups.
- **Calls Forking:** When a call matches an ARM routing rule condition with forking, the ARM instructs the SBC to perform forking per the actions configured in ARM Routing rule.
- **Call Routing based on SIP Header Info:** route calls based on information that is passed in the SIP Header. For example, a TGRP value or specific SDP information.
- **Support for Distributed Registered Users at the Network Level:** ARM can route calls based on SBC user registrations where SBC-level IP groups of type ‘User’ are treated as regular ARM ‘Peer Connections’.
- **Resource Groups:** allows network administrators to add and view a group of ARM topology resources. The group of resources can contain topology elements of the same type, like Nodes, Peer Connections or VoIP Peers
- **Security-based Routing:** supports Security-based routing through integration with SecureLogix’s Orchestra One™ CAS (Call Authentication Service). This service enables routing decisions to be applied on calls based on a calls security score. For example, for bad calls, the routing action may be to 'Drop call' or for average-scoring calls (suspicious calls), the network administrator can apply number manipulation and display the number with a ‘?’ or with the word ‘Suspicious’.
- **Tag-based routing:** Tags can be assigned to the messages routed by the ARM and the Tag values can be used as routing criteria. The feature can be applied for the routing of both Call and Registration messages. Multiple Tags can be assigned to a single message (up to three) and all these Tags’ values can be used for routing matching.
- **ARM on Azure Marketplace:** see ARM on Azure Marketplace on the next page
- **Managing User Routing Data:** see Managing User Routing Data on the next page
- **Managing Registration Requests from SIP Endpoints (phones):** see Managing Registration Requests from SIP Endpoints (Phones) on the next page
- **Policy Studio:** see Policy Studio on page 38
- **ARM Analytics API:** ARM Analytics API on page 39

Figure 12-2: AudioCodes Routing Manager (ARM)



ARM on Azure Marketplace

ARM supports Microsoft's Azure Marketplace solution which includes ARM Configurator and two ARM Routers. The solution (Configurator and Routers) is deployed automatically in one Azure region, selected by the customer. AudioCodes also provides a GUI for creating a solution that includes multiple Virtual Machines.Both ARM Routers are created in the same Azure Availability Set; Azure will not instantiate them on the same rack.

Managing User Routing Data

User-based routing can be implemented according to users call routing related information. ARM can import LDAP Active Directory user data to the ARM database and then periodically synchronize with the Active Directory. You can also configure LDAP server attributes such as Normalization Groups and Property dictionaries. Alternatively, operators can import user data from other sources using the ARM Northbound REST API.

Managing Registration Requests from SIP Endpoints (Phones)

ARM routing can be extended to manage registration requests that are sent from phones to an IP PBX or SIP Registrar. Enterprises with large phone deployments across multiple sites require high availability mechanisms for ensuring phones register seamlessly to the IP PBX or SIP Registrar and therefore minimize the time that phones are "offline". Phones sometimes may be temporarily offline following network configuration updates and then need to manually or automatically re-register, a process which may take time depending on network connection and server availability. Consequently ARM implements the following features to address this issue:

- **Routing of Registration Messages:** ARM can route SIP Register requests from phones towards the required destination, such as an IP PBX or registrar. Dedicated sets of Routing Rules for Registration messages routing can be defined. A License Key is required for enabling the required number of users (phones) allowed for Registrations routing.

- **Authentication server for SIP Users (phones):** SBC Authentication server functionality for managing SIP messages requests from phones is enhanced by ARM where SBC devices can be configured to forward the phones SIP Register authentication requests via REST API to ARM to provide credentials for specific SIP users (phones). In other words, instead of authenticating phone register requests separately on the database on each SBC device in the network, user/phone credentials can be stored and authenticated centrally from the ARM database.
- **Policy Studio Rule Sets:** Policy Studio rules can be configured for matching the phones credentials. See Section Policy Studio below
- **Test Registration messages**: Registration messages can be tested in the same manner as call routing messages, however including specific parameters such as User@host.
- **Message Routing Statistics:** ARM generates and displays relevant Statistics for Registration messages routing such as Registrations routed and Registrations blocked.

Policy Studio

The Policy Studio allows users to configure rules for performing on-the-fly manipulations to route requests from the users table. This method provides an efficient alternative to running complex queries to the LDAP server. The Policy Studio allows the definition of rules sets including a match condition and an action. ARM searches in the users table for a user that matches the rule sets. If a user is not found, the ARM proceeds to the next rule. If a user is found, the ARM stops parsing the rules and performs the action in this rule. The action is to replace all the listed fields with the properties of the user, as configured. The Policy Studio includes the following types of rules:

- Policy Studio rules designated for Call Setup (Calls and Registrations pre-routing smart manipulation)
- Policy Studio rules designated for Credentials with matching criteria for Policy Studio of type Credentials User_URI/HOST_URI. These rules sets are specifically designed for managing authentication for phones registration requests.

Example-Routing

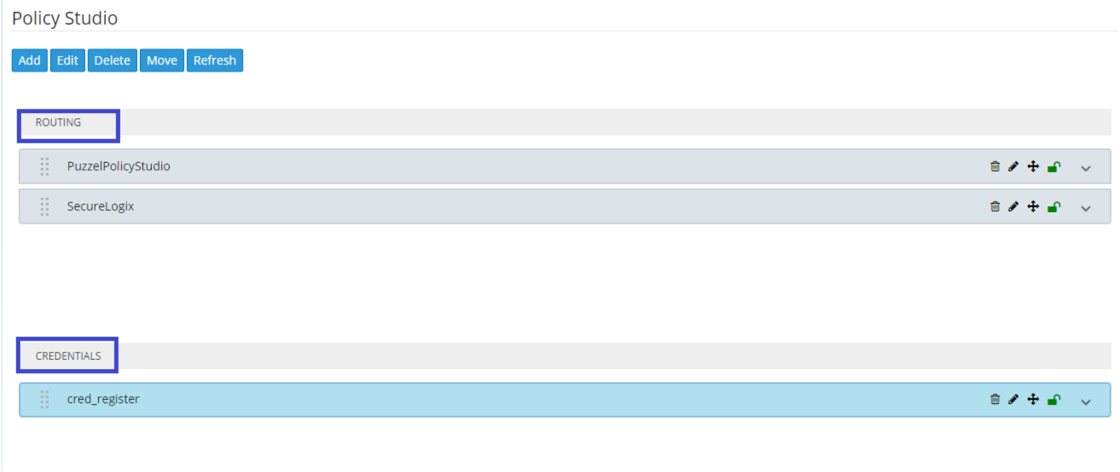
- Each user has an internal 4-digit extension and an unrelated external phone number. When a user makes a call outside the enterprise, the source number, i.e., the user's extension, must be replaced with their external number. For an incoming call from outside the enterprise, the external number must be replaced with the user’s extension.
- More than one user with the same extension, however with a different hostname. The ARM can locate the user based on a combination of the extension and hostname attributes.

Example-Credentials

- A match rule can be set to allow phones to register only when the user request is from a specific IP Group/Peer Connection or Group of Peer Connections or Nodes, etc.) i.e. the credentials are OK; however the rule discards the credentials when the request comes from a node that does not meet the rule conditions.

- Alternatively a rule set can be defined to discard credentials when a request is received from a node that does not match the user group. For example, a request is received from ‘China’ for users who are part of the ‘United States’ users group.

Figure 12-3: Policy Studio



Policy Studio

ARM Analytics API

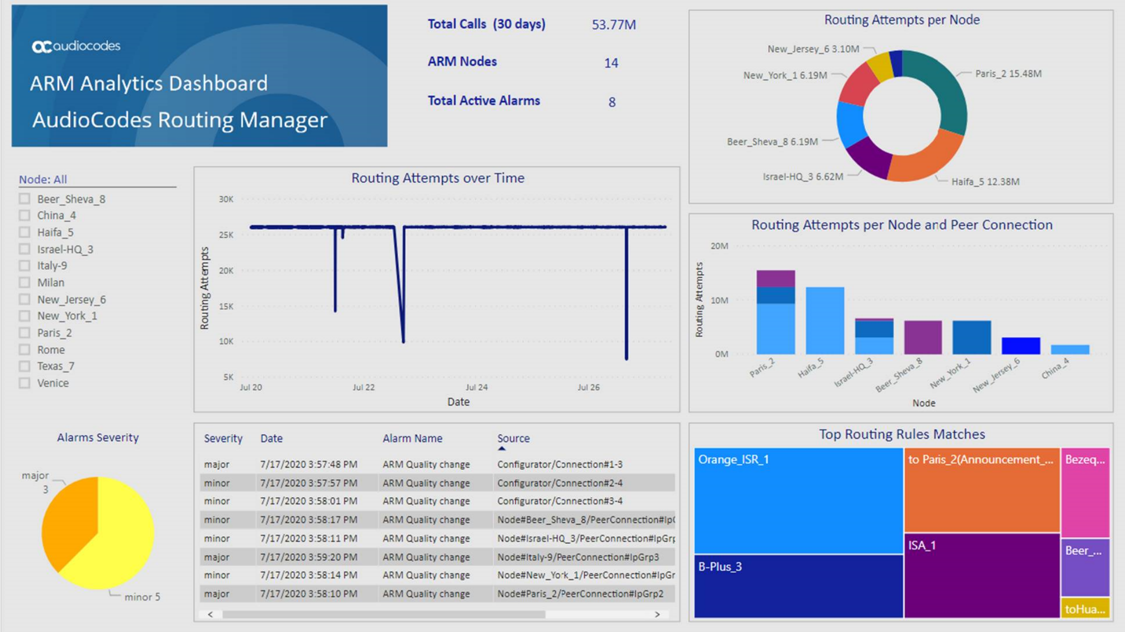
ARM enables customers to use their preferred analytics and third-party Business Intelligence (BI) tool such as Microsoft’s Power BI using ARM data. Customers are able to create their own dashboards and reports based on ARM data or combined data from ARM and other tools (such as OVOC). ARM allows access to specific database tables (described below) using the views capability of MariaDB. To access the ARM Analytics API, customers must purchase the relevant license. As in OVOC data, the Analytics API is accessed by the ‘analytics’ operator. The following views and statistics are provided as part of the Analytics API:

- **Nodes view:** APM nodes table with nodes related essential information (such as ID, Serial Number, Name, Admin and Operative State, Software version, etc.)
- **Peer connection view:** Peer Connection table with information such as ID, Peer Connection Name, Admin state, related Node ID, etc.
- **Connection view:** Connection table with information such as Connection ID, Source and Destination Nodes ID and Operative State, etc.
- **VoIP Peer view:** VoIP Peers table with information such as ID, name and type.
- **Routing rules view:** Routing Rules table (ID, Name, Admin state and Routing Group reference).
- **Routing groups view:** Routing Group table (ID and Name of Routing Group)

- **Node Statistics:** Node Statistics table (such as Routing Attempts, alternative routing attempts, failed routing attempts, discard routing attempts, destination calls, transient calls, etc.). Only the last week's statistics are displayed.
- **Connection Statistics:** Connection Statistics table (transient calls). Only the last week's statistics are displayed.
- **Peer Connection Statistics:** Predefined view reflecting data from the Peer Connections Statistics table (such as Routing Attempts, alternative routing attempts, failed routing attempts, discard routing attempts, destination calls, etc.). Only the last week's statistics are displayed.
- **Routing Statistics:** Routing Statistics table (such as Routing Rule first match, routing rule second match, routing rule try, routing rule fail, etc.). Only the last week's statistics are displayed.
- **Alarms View:** Alarms table which includes all ARM alarms field columns (such as Name, Source, Severity, Date, Description, etc.).

In the example below, Microsoft's Power BI data visualization tool was connected to the ARM database. The tool provided these interactive visualizations and business intelligence capabilities. The Dashboard below shows the total # of calls handled over 30 days, the # of ARM nodes and the total # of active alarms. The left side of the screen shows the filter and a pie chart showing Alarms Severity. The middle of the screen shows routing attempts over time and a breakdown of the active alarms. The panes on the right side of the screen show (top to bottom) a pie chart indicating routing attempts per node, a bar chart indicating routing attempts per node and peer connection, and top Routing Rule matches.

Figure 12-4: ARM Analytics Dashboard



audiocodes

ARM Analytics Dashboard

AudioCodes Routing Manager

Total Calls (30 days) 53.77M

ARM Nodes 14

Total Active Alarms 8

Node: All

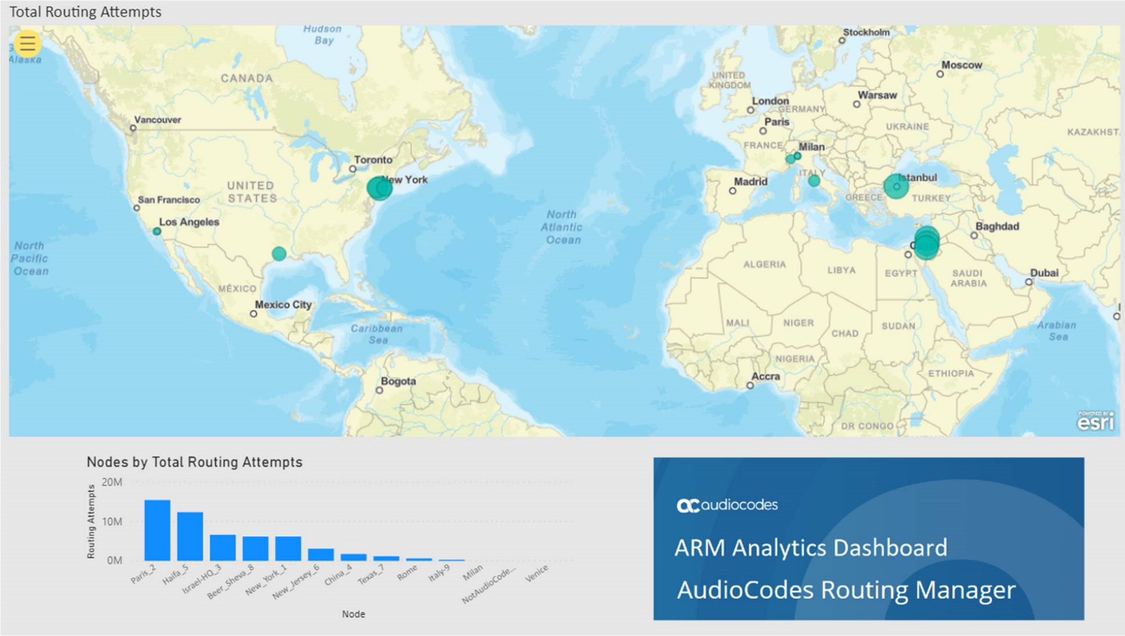
- ☐ Beer_Sheva_8
- ☐ China_4
- ☐ Haifa_5
- ☐ Israel-HQ_3
- ☐ Italy-9
- ☐ Milan
- ☐ New_Jersey_6
- ☐ New_York_1
- ☐ Paris_2
- ☐ Rome
- ☐ Texas_7
- ☐ Venice

Severity	Date	Alarm Name	Source
major	7/17/2020 3:57:48 PM	ARM Quality change	Configurator/Connection#1-3
minor	7/17/2020 3:57:57 PM	ARM Quality change	Configurator/Connection#2-4
minor	7/17/2020 3:58:01 PM	ARM Quality change	Configurator/Connection#3-4
minor	7/17/2020 3:58:17 PM	ARM Quality change	Node#Beer_Sheva_8/PeerConnection#Ip(
minor	7/17/2020 3:58:11 PM	ARM Quality change	Node#Israel-HQ_3/PeerConnection#IpGr;
major	7/17/2020 3:59:20 PM	ARM Quality change	Node#Italy-9/PeerConnection#IpGrp3
minor	7/17/2020 3:58:14 PM	ARM Quality change	Node#New_York_1/PeerConnection#IpGr
major	7/17/2020 3:58:10 PM	ARM Quality change	Node#Paris_2/PeerConnection#IpGrp2

The dashboard below shows how the total # of routing attempts was distributed across the nodes in the network:

- Smaller green balloons = smaller # routing attempts
- Larger green balloons = higher # of routing attempts

Figure 12-5: Total Routing Attempts



13 SBA ProConnect

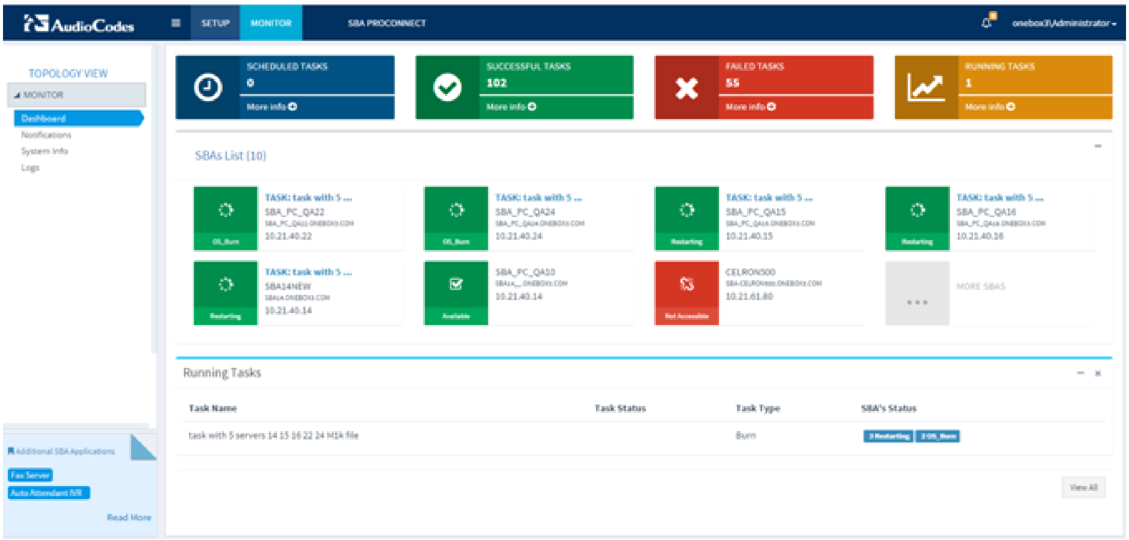
The SBA ProConnect provides a remote and intuitive method for mass upgrade of the AudioCodes SBA branch appliances in a Skype for Business environment from a central platform. This is useful for customers with large SBA deployments where upgrading each device manually may be cumbersome and time consuming. The ProConnect can update the following:

- Microsoft Cumulative Updates (CU) – patches for Microsoft Skype for Business Server for various Skype for Business Server functionality.

  When Microsoft releases a CU, AudioCodes as the SBA vendor, issues a Product Notices (after testing the CU in-house) to advise customers to install CU components on their AudioCodes SBA devices. When these components are installed, the SBA image files on the respective SBA devices are updated accordingly.

- Microsoft Skype for Business Server or Microsoft Lync Server Upgrade– an upgrade from Microsoft Lync Server 2010 to Lync Server 2013 or from Microsoft Lync Server 2010 or Microsoft Lync Server 2013 to Skype for Business Server).

Figure 13-1: SBA ProConnect



Task Name	Task Status	Task Type	SBA's Status
task with 5 servers 14 15 16 22 24 M1k file		Burn	3 Restarting 2 OS_Burn

- The required installation files can be copied to the SBA ProConnect server by RDP access or via a USB.

- The SBA List allows you to manage any SBA server that is defined in the Active Directory domain of the logged in user. The SBA servers list can be synchronized with the Skype for Business Topology Builder and SBA devices can also be individually synchronized from the SBA servers list. You can also manually update this list or import a pre-configured list using a CSV file.

- The SBA servers are upgraded by scheduling tasks to run the upgrades automatically at a specific scheduled time for a selected list of SBA servers. You can segment SBAs into groups and then assign upgrade tasks to these groups. After the installation files have been downloaded to the SBA server, you can either start the upgrade process automatically or manually at a desired time. The latter option allows you to best manage system resources by separately controlling the execution of the download and upgrade task.

- All actions performed in the SBA ProConnect are recorded in Activity and Service logs. A daily activity log is saved in the csv format. You can download these files to your PC.

14 Specifications

- Software Version Number: 7.8
- Package and Upgrade Distribution: via AudioCodes Web site at https://www.audiocodes.com/library/firmware

OVOC Standard Platform Requirements

Table 14-1: OVOC Server Dedicated Platform Requirements

Resource	Specification
Hardware	HP DL360p Gen10
Operating System	Linux CentOS Version 7.7 64-bit Rev.19
Memory	64 GB RAM
Disk space	Disk: 2x 1.92 TB SSD configured in RAID 0
Processor	CPU: Intel (R) Xeon(R) Gold 6126 (12 cores 2.60 GHz each)

Table 14-2: OVOC Server Virtual and Cloud Platform Minimum Requirements

Resource	Specification		
Platform Type	AWS	Azure	Virtual OVOC
Operating System	Linux CentOS Version 7.7 64-bit		
Platform Details	AWS EC2 Instance Type: c4.4xlarge	■ High Profile: VM Size: F16s ■ Low Profile: VM Size D4s_v3	■ VMware: ESXi 6.7; VMware HA cluster: VMware ESXi 6.5 ■ Microsoft Hyper-V Server 2016; Microsoft Hyper-V Server 2016 HA cluster
Memory	30GiB (c4.4xlarge)	■ High Profile: 32 GB RAM (F16s) ■ Low Profile: 16 GB RAM (D4s_v3)	■ High Profile: 32 GB RAM ■ Low Profile: 16 GB RAM
Disk Space	AWS EBS:	■ High Profile: 2 TB	■ High Profile: 1.2 TB

Resource	Specification		
	General Purpose SSD (GP2) 2TB	SSD Low Profile: 500 GB SSD	Low Profile: 500 GB
Processor	16 vCPUs (c4.4xlarge)	High Profile:16 vCPUs (F16s) Low Profile: 4 vCPUs (D4s_v3)	High Profile: 6 cores with at least 2 GHz Low Profile: 1 core with at least 2.5 GHz Low Profile: 2 core each with at least 2.0 GHz

- The OVOC server works with the Java Development Kit (JDK) version 1.8 (JDK 1.8 for Linux™).
- The Oracle database used is version 12.1.0.2.

> - The JDK and Oracle database component versions mentioned above are provided as part of the OVOC installation image.
> - The installation and upgrade scripts validate the minimum requirements for the Virtual CPU, Memory and Disk components as shown in the table above. Failure to meet these requirements will lead to the aborting of the scripts.

The table below lists the minimum requirements for running an OVOC web client.

Table 14-3: OVOC Client Minimum Requirements

Resource	OVOC Client
Hardware	Screen resolution: 1280 x 1024
Operating System	Windows 7 or later
Memory	8 GB RAM
Disk Space	-
Processor	-
Web Browsers	Mozilla Firefox version 39 and higher Google Chrome version 79 and higher Microsoft Edge Browser version 80 and higher
Scripts	PHP Version 7.4 Angular 7.0

OVOC Service Provider Cluster Requirements

The table below describes the specifications for the Service Provide Cluster including three servers: Management Server, VQM server and PM server. It is based on 50,000 devices with 3000 CAPs . For other parameters, refer to the tables below.

Table 14-4: Service Provide Cluster Mode Server Configuration

Item	Machine Specification
Server	VMware: ESXi 6.7; VMware HA cluster: VMware ESXi 6.5
Memory	256 GB
CPU	24 cores at 2.60 GHz
Disk	SSD 20TB
Ethernet	■ 1x10GB + 4x1 GB ports (through and through) Note the following recommendations: ■ Use jumbo frames ■ Create a dedicated vswitch with dedicated uplinks ■ For software ISCSI, use 1 vmkernel nic per 1 physical nic ■ In case of multiple vmkernel nics and physical nics, use port binding

Table 14-5: Service Provide Cluster Mode Capacities

Item	Capacity
Topology-Management	
OVOC managed devices	50,000
Tenants	5000
Devices per region	500
Links	10,000
Operators	25
Managed devices per tenant	5,000
Alarms– Management	
Steady state	100 alarms per second

Item	Capacity
Total alarms	100,000,000
Performance Monitoring– Management	
PMs per OVOC instance (per polling interval)	■ 5,000,000 for Version 7.4 devices (REST interface) ■ 500,000 for Version 7.2 devices (SNMP interface)
PMs per device	500,000
Storage time	One year
Voice Quality– applicable for QoE license only	
CAPS per device	1000
OVOC QoE managed devices	30000
CAPS per OVOC instance (SBC and Skype for Business and RFC SIP Publish 6035)	3000
Call Details Storage - detailed information per call	800,000,000 or one year
Calls Statistics Storage - Statistic information storage (per five minute interval).[1]	1,500,000 or one year
QoE Call Flow (for SBC calls only)– applicable for QoE license only	
CAPS per OVOC instance	1,000
CAPS per device	300
Maximum number of calls	10,000,000
Lync and AD Servers– applicable for QoE license only	
MS Lync servers	Up to 2
AD Servers for Users sync	Up to 2
Users sync	Up to 150,000

[1] For each managed entity: Device, Link, Site, Endpoint, User and URI. In addition to the relevant number of statistics in corresponding hourly and daily summary tables per entity.

Item	Capacity
Devices Management (Device Manager Pro)	
Number of managed devices	- 30,000 - 4,000 Team devices
Disk space allocated for firmware files	20GB

FCAPS

AudioCodes' OVOC supports FCAPS functionality:

- Fault management
- Configuration management
- Accounting (managed by a higher – level management system such as an NMS)
- Performance management
- Security management

Alarms

Alarm Priorities: are according to industry-standard management and communication protocols (ITU-T Recommendation X.733, 3GPP Recommendation 3G TS 32.111-1), with color-coding. The alarm capacities are described in the table below.

Table 14-6: Alarms

Active Alarms	History Alarms
- 40 and 100 alarms for analog devices - 300 alarms for gateway & SBC devices - 1000 alarms for Mediant 9000 SBC and Software SBC products.	- 100 alarms for analog media gateways - 1000 alarms for gateway & SBC products - 2000 alarms for software SBC and Mediant 9000 SBC. The Alarms History screen provides a history of at least one year and up to 10 million alarms, depending on disk space available:

Device Manager Pro Specifications

- Web-based interface to manage up to 30,000 4XXHD IP Phones
- Tenant and Site support
- Integral part of the One Voice Operations Center application and installation
- Mass 4XXHD configuration and firmware files download

- Auto-provisioning
- Comprehensive configuration templates based on phone model, tenant, site, device and user
- Import and export of configuration, users and devices.
- Users management
- Real time device status and dashboards including:
    - Registration
    - User based information (phone number, IP address, status)
    - Device based information (health, MAC address, location)
    - Alarms (including links from the device status screen to Alarms screen)
- Support for the following third-party vendor phones:
    - Spectralink 8440
    - Polycom Trio 8800
    - Polycom VVX
- Jabra Headset Support: refer to document *Device Manager for Third-Party Vendor Products Administrator's Manual*.

ARM Requirements

ARM Minimum Platform Requirements	
Supported platforms	■ VMware vSphere Hypervisor (ESXi) version 6.5 and 6.7 ■ Hyper-V: ✔ Windows Server 2016 ✔ Hyper-V Manager Microsoft Corporation Version: 10.0.14393.0 Amazon Web Services (AWS) Microsoft Azure
GUI	Firefox, Chrome, Microsoft Edge
RAM	■ ARM Router: 8 GB (16 GB for managing more than 1 million users) ■ ARM Configurator: 16 GB
CPU	■ 2 cores (64 bit) per Router VM ■ 4 cores (64 bit) per Configurator VM
Number of required	A minimum of three VMs, i.e., One Configurator and at least two routers.

ARM Minimum Platform Requirements	
VMs	
High Availability	■ At least two host machines for high availability (HA); the minimum hardware requirement is at least a 64-bit CPU register size. ■ Redundant host, on a redundant network connection, and power supply.
Storage	■ ARM Router: 40 GB per VM ■ ARM Configurator: 80 GB per VM

Enhanced ARM Capacity

- ARM supports up to 4 million users from one of the following sources:
  - File Repositories (typically the most common source for a high number of users – more than 1 million)
  - Multiple Active Directories (LDAPs) – up to 1 million users per LDAP server host where each LDAP hosts up to 1 million users
  - Local users

⚠ Management of more than one million users requires ARM Routers with extended memory of 16 GB (instead of the standard 8 GB) for the purpose of real-time user-based routing. The ARM Routers memory extension should be applied at a VM level prior to applying a Feature Key with an extended number of users.

ARM-Managed Devices

The following devices can be routed by the ARM:

- Mediant 9000 SBC Version 7.2.158 and later
- Mediant 4000 SBC Version 7.2.158 and later
- Mediant 2600 SBC Version 7.2.158 and later
- Mediant SE/VE SBC Version 7.2.158 and later
- Mediant 1000B Gateway and E-SBC Version 7.2.158 and later
- Mediant 800B Gateway and E-SBC Version 7.2.158 and later
- Mediant 800C Version 7.2.158 and later
- Mediant 500 E-SBC Version 7.2.158 and later
- Mediant 500L SBC Version 7.2.158 and later
- Mediant SBC CE (Cloud Edition) Version 7.2.250 and later

- Mediant 3000 Gateway only Version 7.00A.129.004 and later

SBA ProConnect

- The SBA ProConnect can be installed on the following platforms:
    - Microsoft Windows Server 2012 R2
    - MIcrosoft Windows Server 2016
- The following components must be installed prior to SBA ProConnect:
    - PowerShell 3.0 (Microsoft Windows Server 2012 R2) and PowerShell 5.1 (Microsoft Windows Server 2016)
    - IIS 8 (Microsoft Windows Server 2012 R2) and IIS 10 (MIcrosoft Windows Server 2016)
    - .Net 3.5 - Install the Microsoft ASP.NET Framework 3.5 features using Add roles and features.
- Hardware requirements:
    - CPU: 2 Core
    - Memory: 2 GB
    - Disk: 100 GB
- Security: Mass upgrades can be performed over an HTTP/S connection between the SBA ProConnect server and the SBA servers.
- Mass upgrade of Microsoft Lync: Upgrades from Lync 2010 to Lync 2013 and from Lync 2010 to Skype for Business and Lync 2013 to Skype for Business.
- Mass Microsoft Cumulative Updates (CU)

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International Headquarters

1 Hayarden Street,

Airport City

Lod 7019900, Israel

Tel: +972-3-976-4000

Fax: +972-3-976-4040

AudioCodes Inc.

200 Cottontail Lane

Suite A101E

Somerset NJ 08873

Tel: +1-732-469-0880

Fax: +1-732-469-2298

Contact us: https://www.audiocodes.com/corporate/offices-worldwide

Website: https://www.audiocodes.com/

Documentation Feedback: https://online.audiocodes.com/documentation-feedback

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