

OVOC

Product Description

Version 7.6



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Date Published: March-31-2019

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Related Documentation

Document Name
Mediant 500 MSBR User's Manual
Mediant 500L MSBR User's Manual
Mediant 500 E-SBC User's Manual
Mediant 500L E-SBC User's Manual
Mediant 800B Gateway and E-SBC User's Manual
Mediant 800B MSBR User's Manual

Document Name
Mediant 1000B Gateway and E-SBC User's Manual
Mediant 1000B MSBR User's Manual
Mediant 2600 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
One Voice Operations Center Server Installation, Operation and Maintenance Manual
One Voice Operations Center Integration with Northbound Interfaces
One Voice Operations Center User's Manual
Device Manager Pro Administrator's Manual
Device Phone Manager Express Administrator's Manual
One Voice Operations Center Alarms Guide
One Voice Operations Center Security Guidelines
Device Manager Agent Installation and Configuration Guide
Device Manager for Third-Party Vendor Products Administrator's Manual
ARM User's Manual

Document Revision Record

LTRT	Description
94020	Initial document release for Version 7.4
94021	Updated OVOC platform requirements and added SBC Call Flow feature description.
94022	Updates for the new OVOC managed SBC floating license service; a new OVOC installation platform for Amazon AWS; a new IP Phones Configuration Profile Wizard; Smart Devices and Links Aggregation in Network Map View and Alarm filtering enhancements; individually synchronize of SBA devices from the SBA servers list.
94023	Update to the OVOCsystem requirements table for the AWS platform.
94024	Added support for the HP DL360p Gen10 dedicated hardware platform (OVOC Minimum Platform Requirements)
94026	Added Sections: External Application Integration; Provisioning and Commissioning; Fault Monitoring; Minimum Platform Requirements.

LTRT	Description
94027	Updates to Sections: Key Elements of the OVOC suite; Key Interface Elements; OVOC Architecture; Voice Quality Management; Device Manager Pro Specifications; One Voice Operations Center Minimum Platform Requirements; OVOC Server Platform; AudioCodes Routing Manager (ARM); ARM Minimum Platform Requirements; SBA ProConnect Added Chapters: Performance Monitoring; Jabra Device Management

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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.

Thanks to 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 also supported.

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 SBC/Media Gateway 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 version 11 and later, 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 in the IP Phone Manager Pro user interface.

Management of devices through Cloud Services (SaaS) as a centralized hosting business or through Internet Telephony Service Providers (ITSPs) deployed behind a firewall or NAT 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

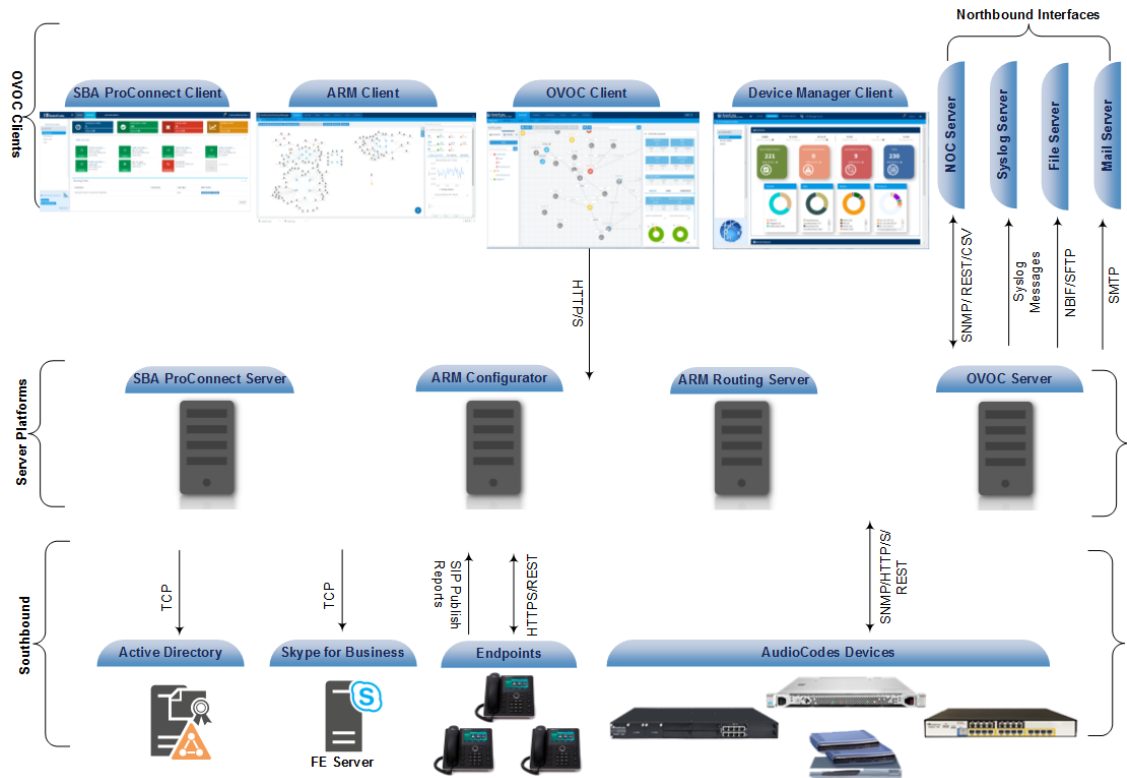


Figure 1-2:

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 1-3: OVOC Network Maps

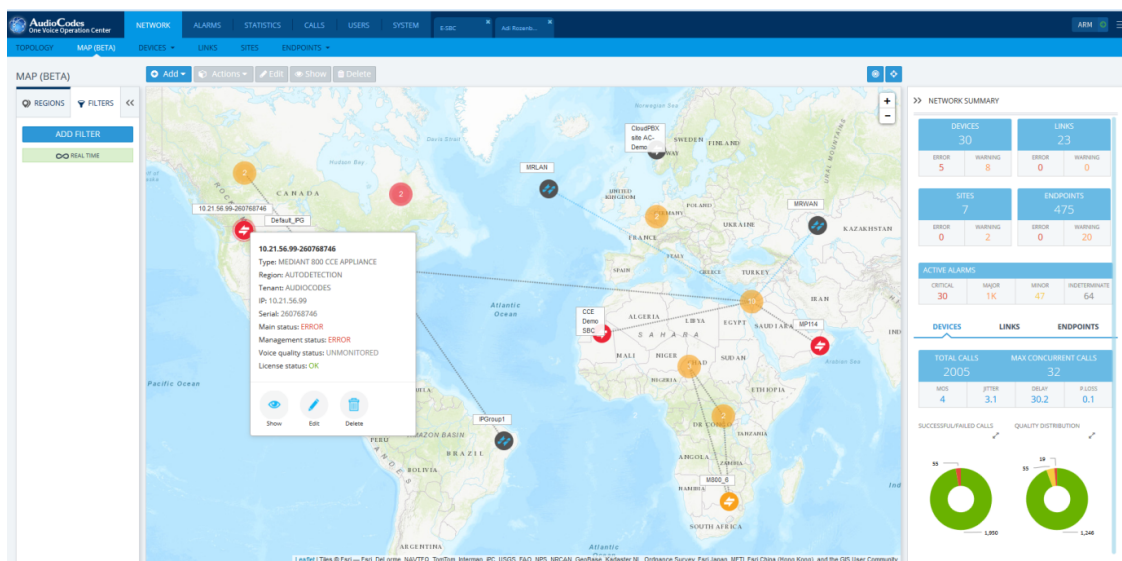
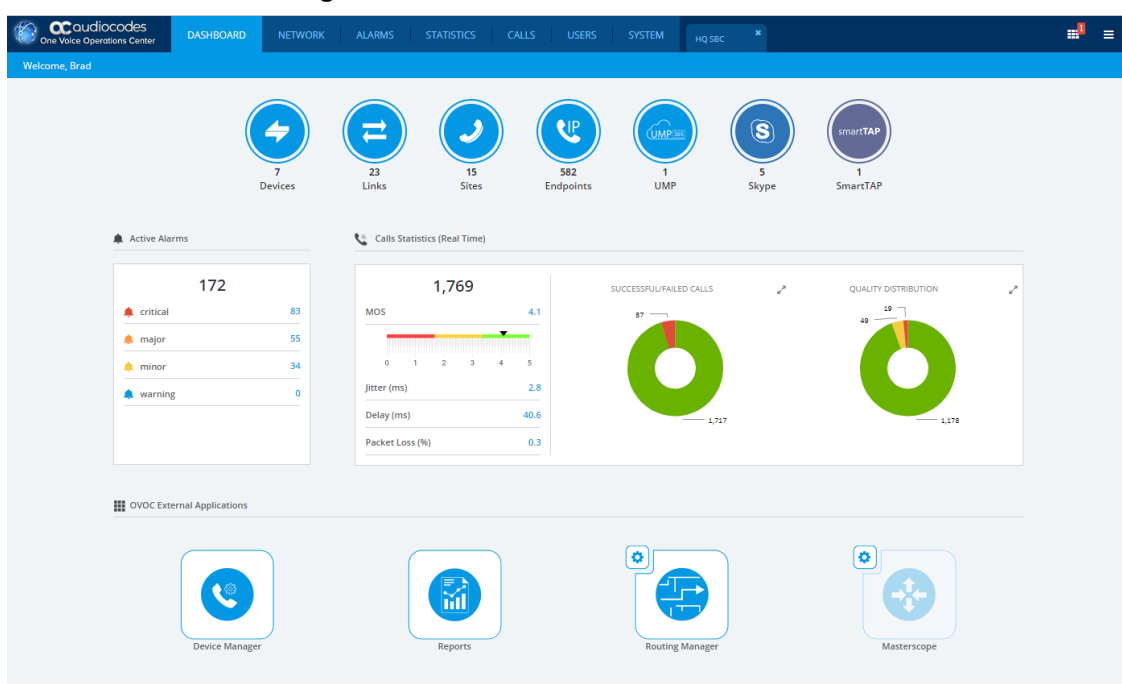


Figure 1-4: OVOC Dashboard

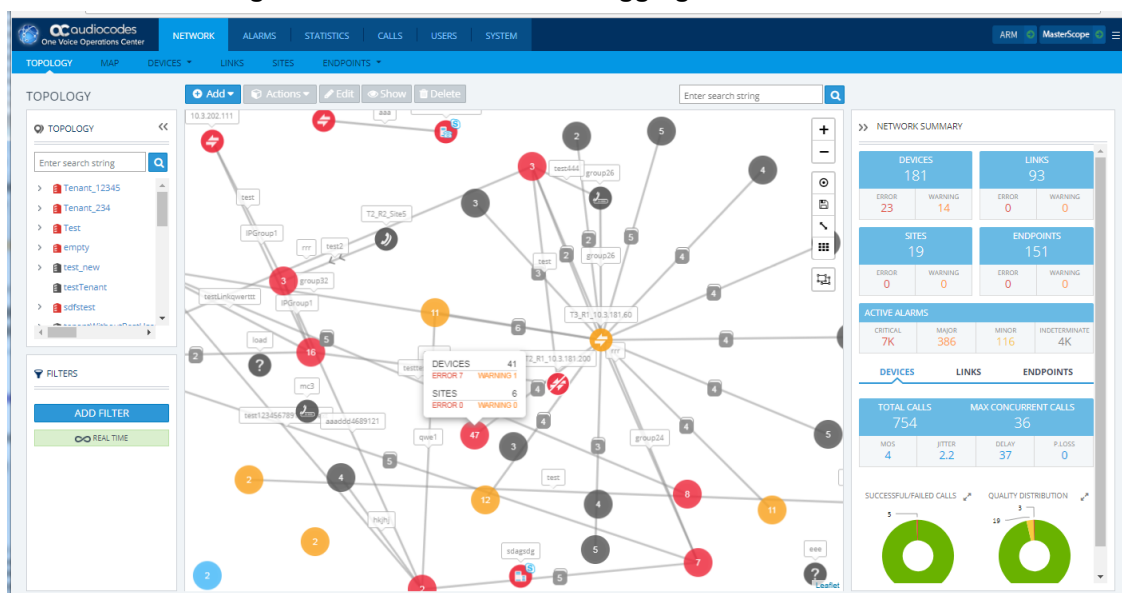


The Geo Map/Topology view consists of the following elements:

- 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 / GW 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 1-5: 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 1-6: External Application Integration

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 AudioCodes' 'Floating License' licensing feature effectively allows customers to 'pay as they grow' by eliminating the need to manually purchase additional SBC licenses when their capacity requirements are increased. Customers initially purchase license capacity based on their estimated requirements. Later, they may experience business growth and therefore require enhanced session capacity. In this case, customers are billed for the additional sessions.

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

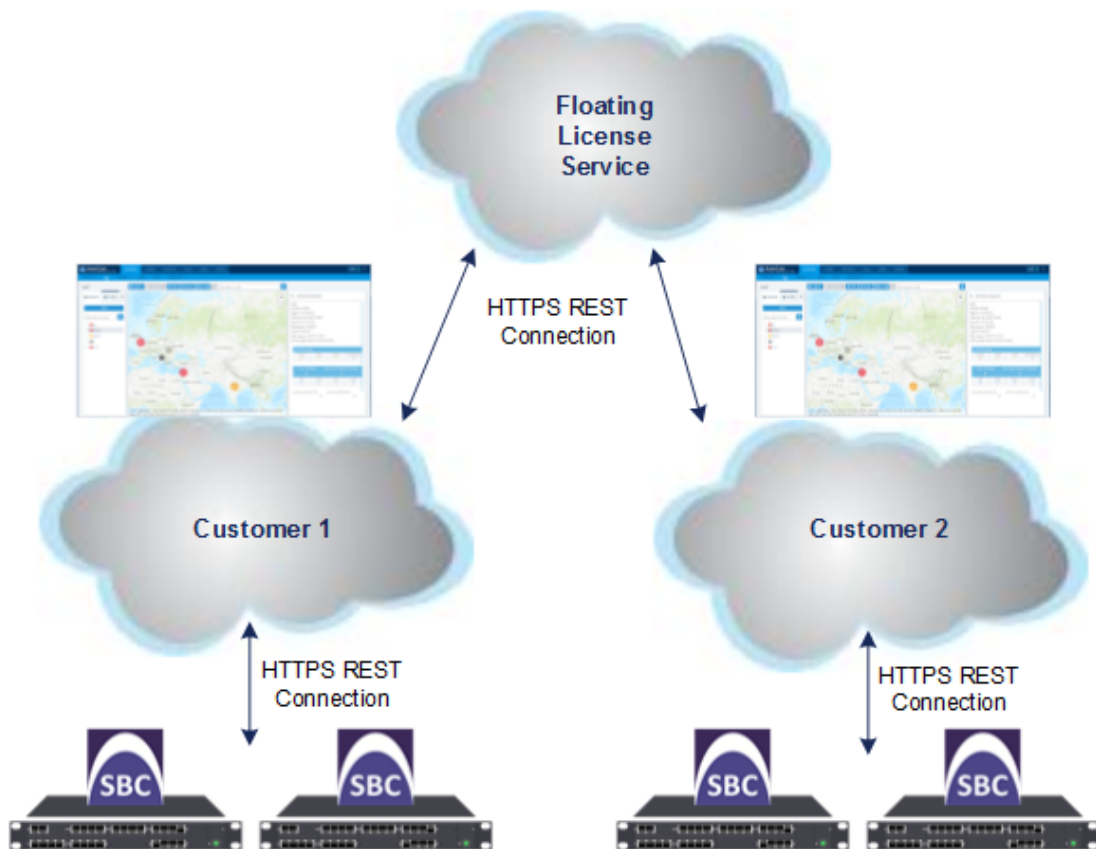
- SBC Sessions (# of concurrent SBC call sessions-media and signaling)
- SBC Signaling Sessions (# of concurrent SIP messages- only signaling)
- Far End Users (FEU) (# of concurrent users that can be registered on the device)
- Transcoding Sessions (# of concurrent codec types)

When an SBC is configured to operate with Floating License, and an SNMP connection is successfully established with OVOC, the device is connected to OVOC's Floating License application mode. The managed SBC devices report their capacity consumption to OVOC for the above-mentioned SBC call functionalities every five minutes. OVOC then sends this information in interim usage reports (current daily; however, configurable in the Floating License service) to AudioCodes Floating License cloud service for all SBCs managed by OVOC for this feature. Based on this information, the Floating License service monitors whether customers have exceeded their purchased license limit (as described above). In addition, if a customer hasn't met the terms of payment, their license may be revoked and this action is reported to OVOC, which blocks the calling service for all managed SBC devices.

If a disconnection of the service between the SBC and the OVOC occurs or between the OVOC and the Floating License service, a one-month grace period is given without affecting SBC call service.

The figure below illustrates an example topology with two OVOC managed customer sites connected to AudioCodes Cloud License Manager Web service.

Figure 1-7: Floating License Service



Fixed License Pool

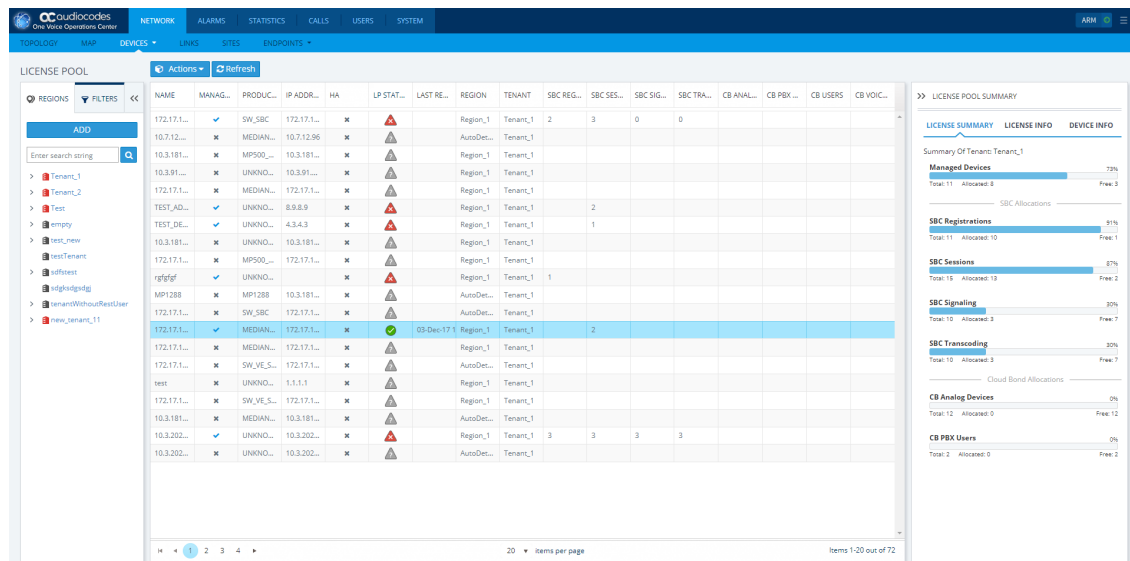
The OVOC License Pool Manager enables operators to centrally manage and distribute session licenses for multiple devices using a flexible license pool. The operator can allocate and de-allocate the licenses for the devices in the pool according to their capacity requirements. This tool enables the following:

- 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 1-8: OVOC License Pool Manager



2 OVOC Server Platform

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

- **Dedicated hardware or virtual platform:** OVOC can be installed on dedicated hardware or on a virtual machine including VMware, HyperV, Amazon AWS and Microsoft Azure.

- **High Availability (HA):**

OVOC servers High Availability (HA) is supported for OVOC applications running on a dedicated hardware server. When the OVOC application is active, all data stored in the OVOC server machine and Database is replicated from the primary machine to the secondary machine. Upon primary machine failure recognition (either on the OVOC application or on the network), activity is automatically transferred from the primary server machine to the secondary server machine. Both servers are located in the same subnet and a single OVOC server IP address - Global (Virtual) IP address is used for all the network components (OVOC clients and managed gateways).

OVOC servers High Availability (HA) is supported for OVOC applications running on a dedicated hardware server. When the OVOC application is active, all data stored in the OVOC server machine and Database is replicated from the primary machine to the secondary machine. Upon primary machine failure recognition (either on the OVOC application or on the network), activity is automatically transferred from the primary server machine to the secondary server machine. Two models of high availability are supported:

- Regular: both servers are located in the same subnet. A single OVOC server IP address - Global (Virtual) IP address is used for all the network components (OVOC clients and managed gateways).
- Geographic: each server is located in a different network subnet and has its own IP address. The user provisions both these IP addresses in the client login dialog. The OVOC client application constantly searches for the currently active OVOC server machine.

In case OVOC runs on VMware or HyperV, the supported HA scheme is by using the exiting virtualization platform high availability features (e.g. VMware HA).

- **Backup and Restore:**

The 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.

- **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 or LDAP server. These credentials can also be used to login to the AudioCodes devices via a Single Sign-on mechanism. By default, the OVOC application 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.

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

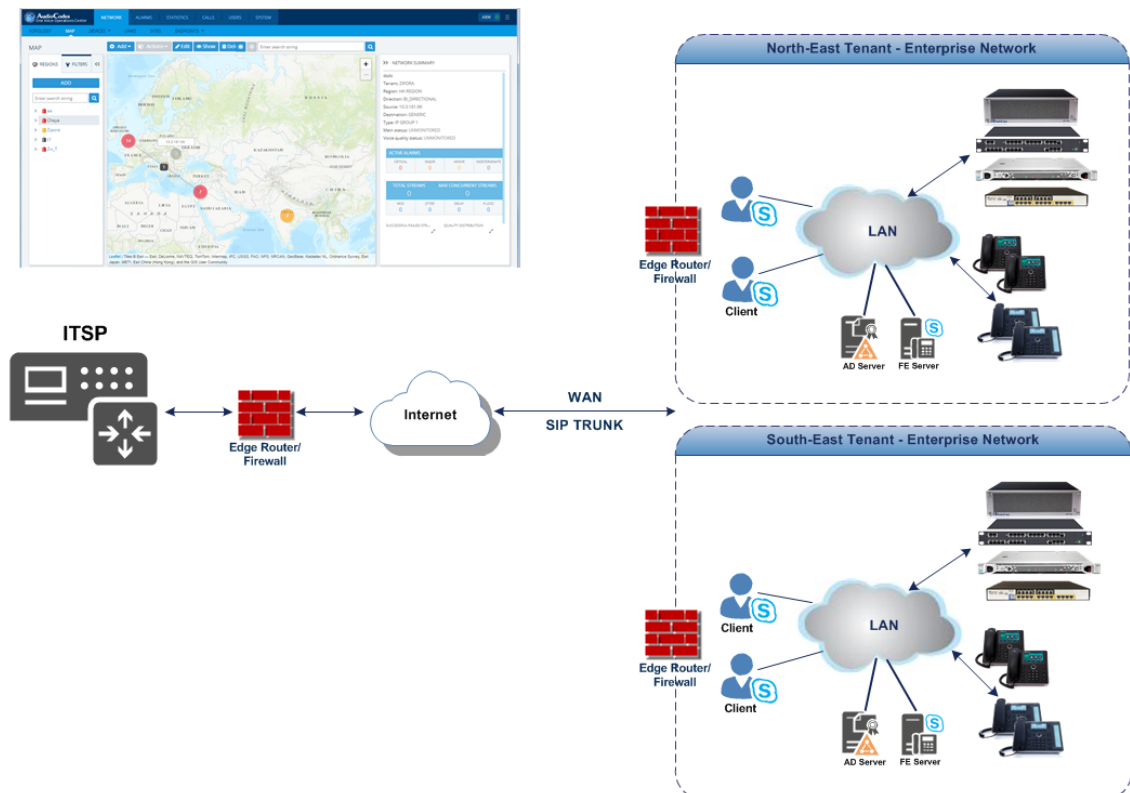
Multi-tenancy architecture enables large enterprises and service providers to install the One Voice Operations Center application in a Data Center and to remotely manage VoIP topology in multiple diverse locations. This may comprise of one of the following topologies:

- 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

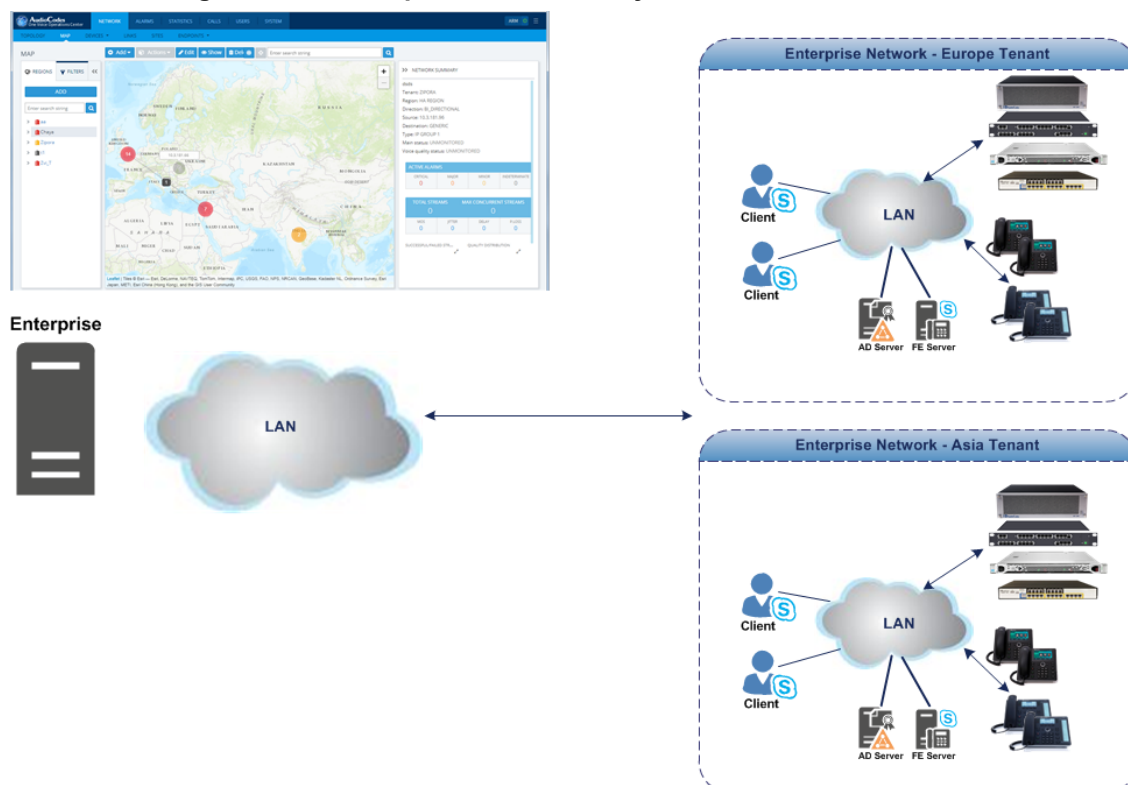
ITSP multi-tenancy architecture allows an Internet Telephony Service Provider (ITSP) administrator to deploy a single instance of the OVOC application to provide a telephony network management service to multiple enterprise customers (tenants). Remote SNMP Management of devices over a WAN connection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

Figure 3-1: ITSP Multi-Tenancy Architecture



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.

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

The screenshot displays the 'Manage Multiple Users' interface. At the top, there is a 'Tenant' dropdown menu and a 'Search' field with a 'Go' button. Below this, the interface is divided into two main sections: 'Available Users' and 'Selected Users'.

The 'Available Users' section contains a list of users with their email addresses and names in parentheses. The list includes:

- 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.ilshitz@audiocodes.com (Alex Lifshitz)
- Alex.Rodikov@audiocodes.com (Alex Rodikov)
- alex.strizhevsky@audiocodes.com (Alex Strizhevsky)
- Alexander.Steingold@audiocodes.com (Alexander Steingold)
- Allya.Perez@audiocodes.com (Allya Perez)
- amir.lahav@audiocodes.com (Amir Lahav)
- Amir.Lahav@audiocodes.com (Amir Lahav)
- amir.dresler@audiocodes.com (Amir Dresler)
- Amir.Kagan@audiocodes.com (Amir Kagan)
- amir.klein@audiocodes.com (Amir Klein)
- Amir.Kornaz@audiocodes.com (Amir Kornaz)
- Amir.Galanty@audiocodes.com (Amir Galanty)
- Amir.Kurzman@audiocodes.com (Amir Kurzman)
- Anetta.Shapiro@audiocodes.com (Anetta Shapiro)
- Ariel.Arad@audiocodes.com (Ariel Arad)
- Ariel.Schreiber@audiocodes.com (Ariel Schreiber)

Below the list, there are navigation controls: '< First | Prev | Next | Last >' and 'Showing 1 to 262 of 262 users'. To the right of the list are four numbered buttons (1, 2, 3, 4).

The 'Selected Users' section is currently empty.

Below the user lists, there is an 'Action' dropdown menu set to 'User configuration'. Below this, there is a section for 'Execute action for' with a dropdown set to '5 Devices', followed by 'at the same time AND delay for' with a dropdown set to '2 sec', and 'between batches'.

Below this, there are two input fields: 'Configuration Key: Type name...' and 'Configuration Value: Type value...'. To the right of these fields are two buttons: 'Add Configuration' (green) and 'Save Configuration' (orange). Below these buttons are two more buttons: 'Features' (blue) and 'Actions' (blue).

At the bottom of the interface, there is a table with two columns: 'Configuration Key' and 'Configuration Value'.

4 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 main screen.

Figure 4-2: Device Manager Pro



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 4-3: 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	00908f61b28	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 on the 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 4-4: Devices Status

Devices Status

Display Columns Export Reload

Filter

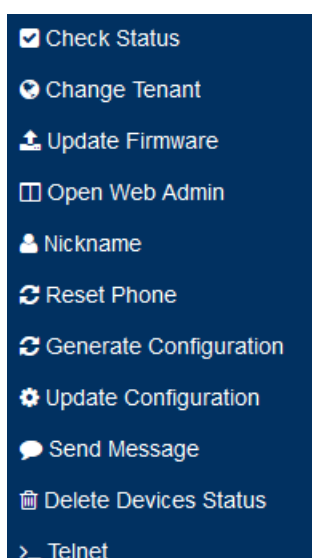
status:registered

Showing 1 to 50 of 454 entries

		BtoE		User Name	Phone Number	Last Update Status	Mac Address	IP Address	IP
			Actions	Golan Buznak	+97239764121	10.09.2017 18:21:20	00908f55f9a7	10.22.12.74	440H
			Actions	Haim Hazan	+97239764262	10.09.2017 18:15:18	00908f55fd35	10.22.13.8	440H
			Actions	Eyal Cohen		10.09.2017 17:35:20	0800278ce95e	10.16.2.48	450H
			Actions	Ilan Kazin	+97239764324	10.09.2017 17:00:33	00908f5ff35d	172.17.113.69	440H
			Actions	user03	+97239966603	10.09.2017 16:57:59	00908f4837ff	172.17.127.117	420H
			Actions	Omar Abu Rabia	+97239764566	10.09.2017 16:57:52	00908f60022b	172.17.127.23	440H
			Actions	Ofir05	+17323751008	10.09.2017 16:53:12	00908f86477b	10.22.13.39	440H
			Actions	Eliezer Davila	+97239764510	10.09.2017 16:51:09	00908f4844f7	172.17.124.14	440H
			Actions	Orgad Shaneh		10.09.2017 16:48:00	00908f55f803	10.22.13.33	440H
			Actions	Ofir05	+17323751008	10.09.2017 16:39:58	00908f484733	10.22.13.36	440H
			Actions	Marina Lubinski	+97239764178	10.09.2017 16:38:58	00908f55f9c0	10.22.10.103	440H
			Actions	Ariel Arad	+97239764161	10.09.2017 16:14:55	00908f55fa33	10.22.13.50	440H
			Actions	Nimrod Borovsky	+97239764402	10.09.2017 16:09:23	00908f98089c	10.12.2.159	450H
			Actions	Oriel Krispin	+97239764249	10.09.2017 16:07:32	00908f60000f	10.4.2.176	440H

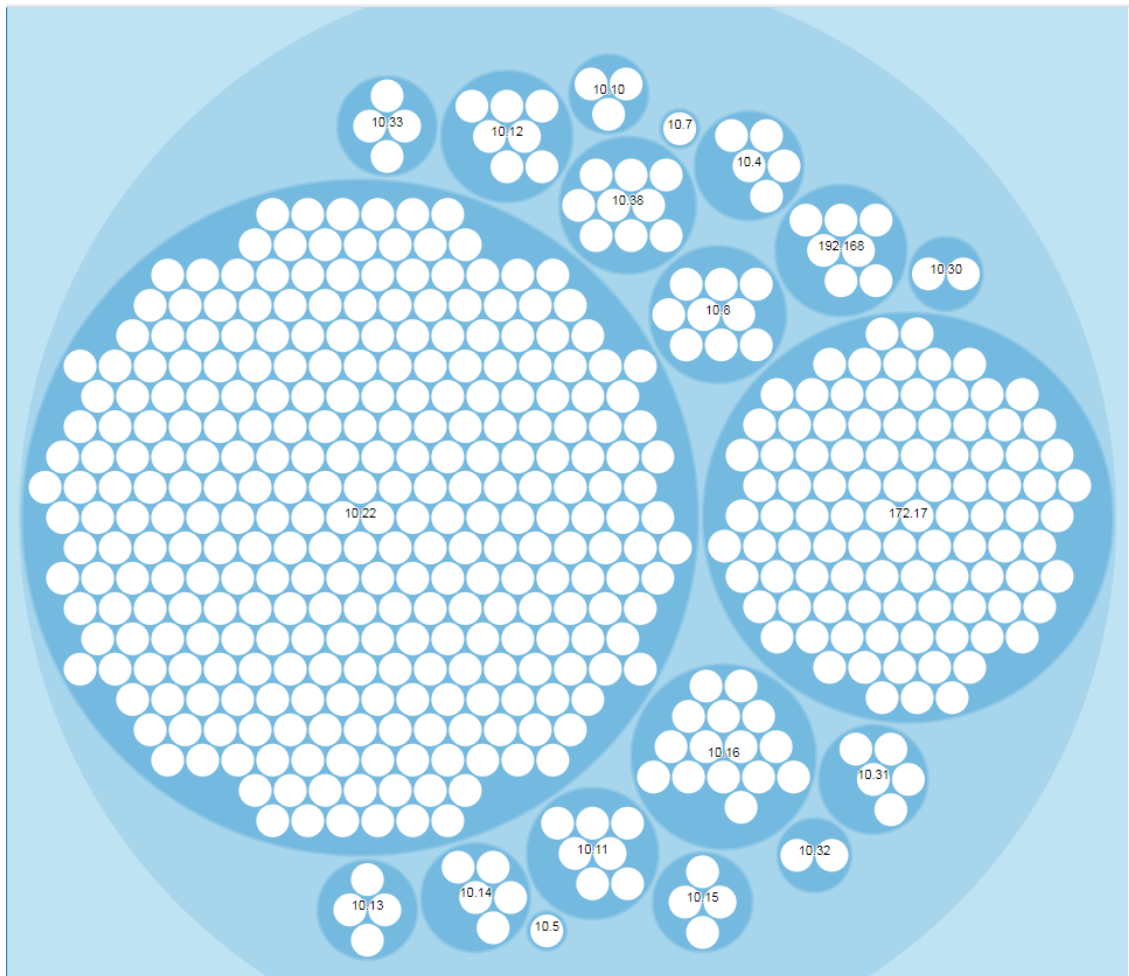
Indications are shown, for example when an alarm is currently active on the device and when the BtoE (Better Together Status) auto pairing is enabled on the device. You can perform various right-click operations on each phone record as shown in the figure below.

Figure 4-5: 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 link allows administrators to view a snapshot of the network's tenants and subnets. Devices are divided according to subnets. The page allows administrators to determine at a glance which subnets are causing traffic overload (for example).

Figure 4-6: 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.

Jabra Device Management

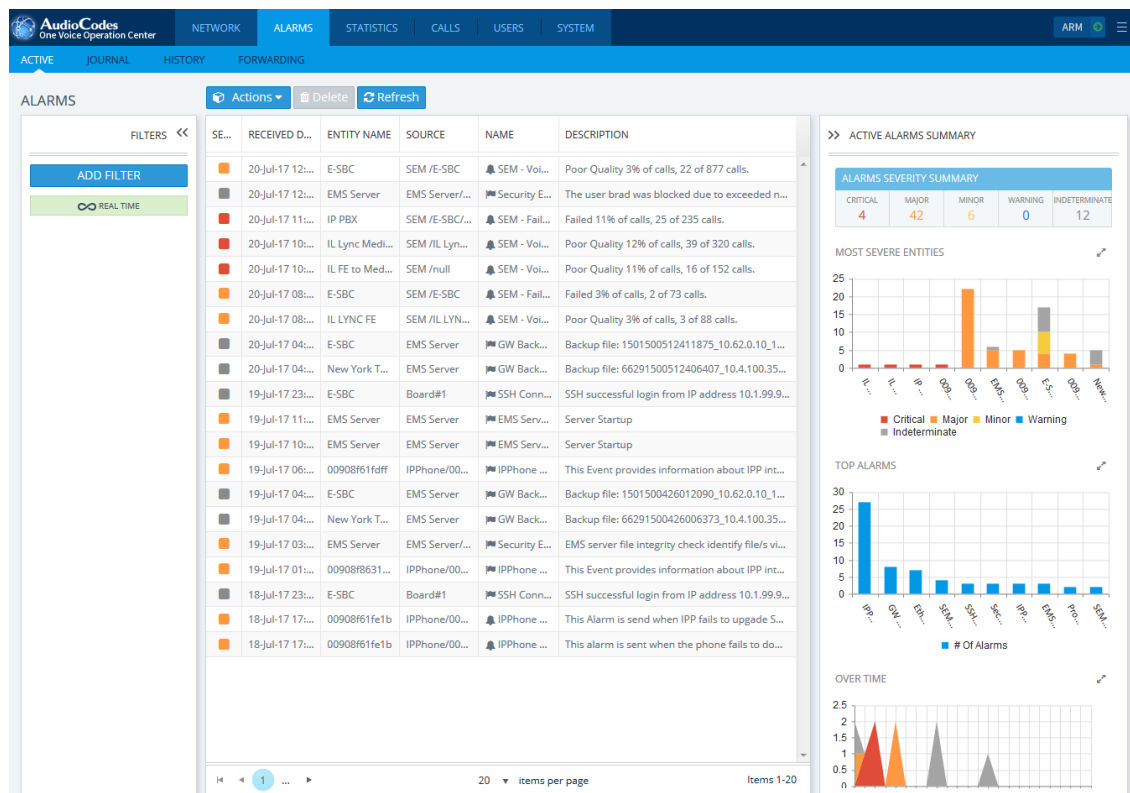
Jabra devices can be managed by OVOC including for status and health monitoring, alarms, configuration and software upgrade of the Jabra devices. A Jabra Integration Service is installed on the workstation PCs that are connected to Jabra devices. This service sends alarms and statuses to the Device Manager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

5 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 5-1: OVOC Alarms



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'.

ALARMS

Actions Delete Refresh

FILTERS << >>

ADD FILTER

REAL TIME

TOPOLOGY >

SEVERITY >

SOURCE TYPE >

MORE FILTERS Unsaved

Type: All

Alarm Names

Mgmt: GW Connection Alarm

Sources:

APPLY

SEV	RECEIV...	ENTITY...	SOURCE	NAME	DESCRIPTION
				SSH ...	[Device 2] WEB: Login attempt from
				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: 27171527037247925_
				GW ...	Backup file: 27131527037242305_
				GW ...	Backup file: 27721527037235829_
				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_
				GW ...	Backup file: 27471526950910265_
				GW ...	Backup file: 11331526950888440_
				GW ...	Backup file: 27171526950848030_

22-May-18 T3_R1_10. OVOC Mgr

22-May-18 10.33.221. OVOC Mgr

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

6 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 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 6-1: Statistics



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.

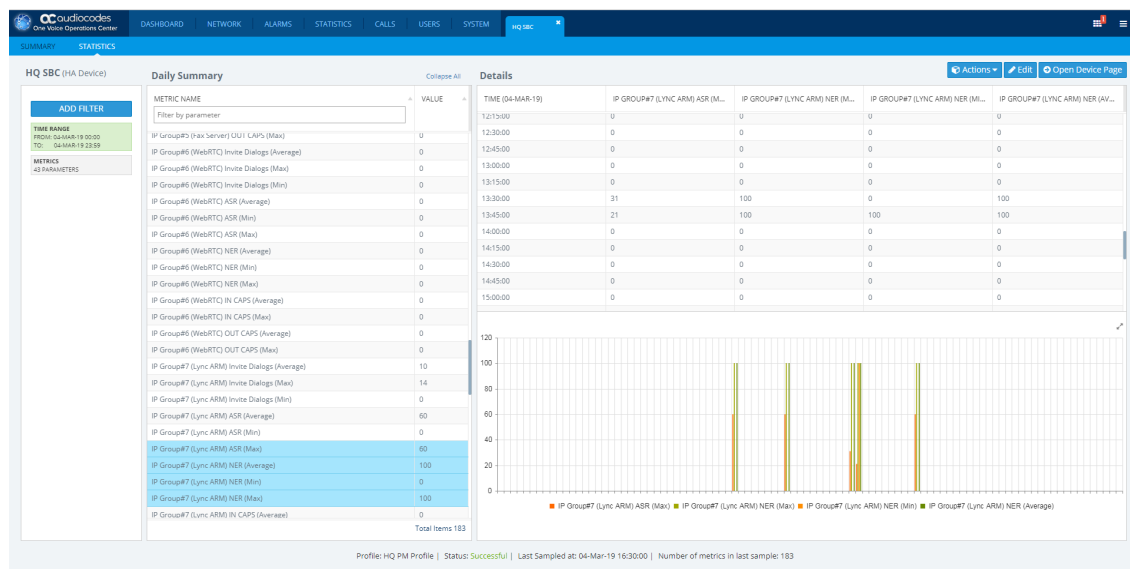
7 Performance Monitoring

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.

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.

Figure 7-1: Performance Monitoring Filtered Output

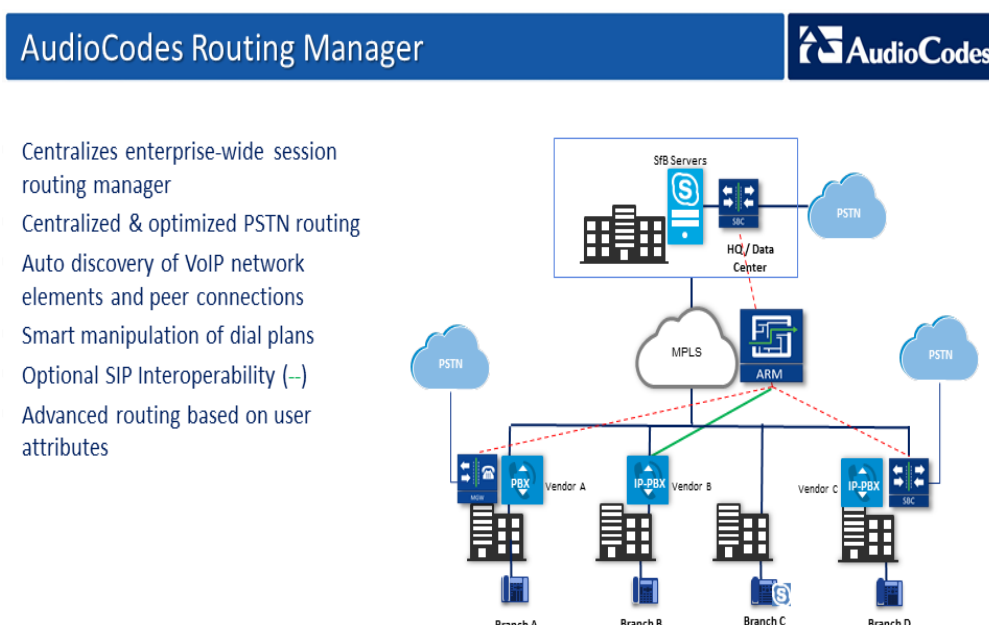


For a comprehensive list of PM parameters supported on each device, refer to the OVOC Performance Monitoring Guide.

8 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 calculates the optimal end-to-end routing path of a call.

Figure 8-1: Enterprise VoIP Network with ARM

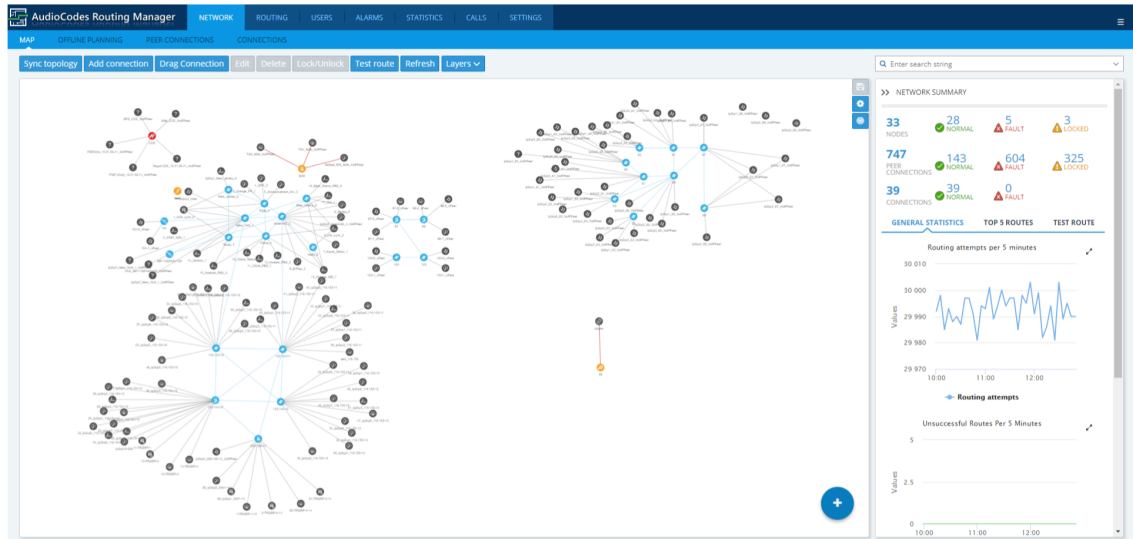


Centralizes enterprise-wide session routing manager
 Centralized & optimized PSTN routing
 Auto discovery of VoIP network elements and peer connections
 Smart manipulation of dial plans
 Optional SIP Interoperability (–)
 Advanced routing based on user attributes

Key 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 mode:** A Test 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.
- **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.
- **Active Directory users:** User-based routing can be implemented according to Active Directory users.
- **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). Information on a call 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.

Figure 8-2: AudioCodes Routing Manager (ARM)

9 SBA ProConnect

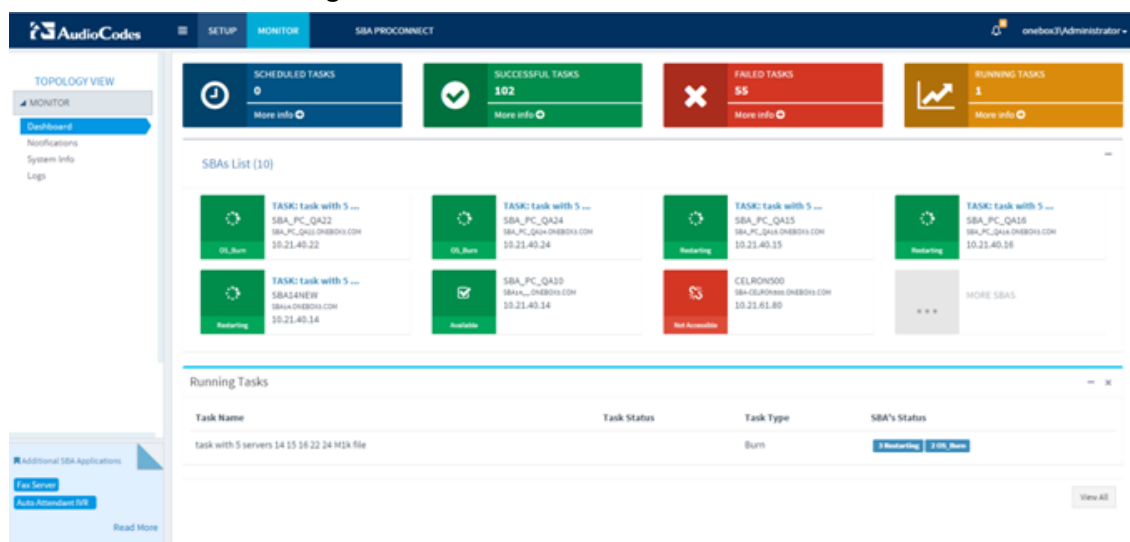
The SBA ProConnect provides a remote and intuitive method for mass upgrade of the AudioCodes SBA branch appliances in a Skype for Business environment from a central platform. This is useful for customers with large SBA deployments where upgrading each device manually may be cumbersome and time consuming. 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 9-1: SBA ProConnect



- 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.

10 Specifications

- Software Version Number: 7.6
- Package and Upgrade Distribution: via AudioCodes Web site at <https://www.audiocodes.com/library/firmware>

One Voice Operations Center Minimum Platform Requirements

Table 10-1: OVOC - Minimal Platform Requirements

Resource	Dedicated OVOC Server-Linux OS	AWS	Azure	Virtual OVOC-High Profile	Virtual OVOC-Low Profile
Hardware	■ G10: HP DL360p	–	–	–	–
Operating System	■ G10: Linux CentOS Version 7.3-1611 64-bit, Rev.19	Linux CentOS Version 7.3-1611 64-bit, Rev.19	–	Linux CentOS Version 7.3-1611 64-bit, Rev.19	Linux CentOS Version 7.3-1611 64-bit, Rev.19
Virtualization platform	–	AWS EC2 Instance Type: c4.4xlarge	Azure VM Size: F16s	<ul style="list-style-type: none"> ■ VMware: ESXi 6.5 ■ VMware HA cluster: VMware ESXi 6.5 ■ Microsoft Hyper-V Windows server 2012R2 ■ Microsoft Hyper-V Windows server HA cluster: 2012R2 	–
Memory	■ G10: 64 GB RAM	30GiB (c4.4xlarge)	32GB (F16s)	32 GB RAM	16 GB RAM
Disk space	■ G10: Disk: 2x 1.92 TB SSD configured in RAID 0	AWS EBS: General Purpose SSD (GP2)	2 TB SSD	1.2 TB	500 GB

Resource	Dedicated OVOC Server-Linux OS	AWS	Azure	Virtual OVOC-High Profile	Virtual OVOC-Low Profile
Processor	■ G10: CPU: Intel (R) Xeon (R) Gold 6126 (12 cores 2.60 GHz each)	16 vCPUs (c4.4xlarge)	16 vCPUs (F16s)	6 cores not less than 2 GHz	1 core not less than 2.5 GHz
DVD-ROM	Local (G8 only)	—	—	—	—

- The working space requirements on the OVOC server are as follows:
 - Linux: Executable bash
- 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.
- Supported browsers for Web client applications are as follows:
 - Internet Explorer version 11 and higher
 - Mozilla Firefox version 39 and higher
 - Google Chrome version 70 and higher
- Flash Version 11 is required for generating Statistics Reports



The JDK and Oracle database component versions mentioned above are provided as part of the OVOC installation image.

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 10-2: Alarms

Active Alarms	History Alarms
■ 40 and 100 alarms for analog devices	■ 100 alarms for analog media gateways ■ 1000 alarms for gateway & SBC products

Active Alarms	History Alarms
<ul style="list-style-type: none"> ■ 300 alarms for gateway & SBC devices ■ 1000 alarms for Mediant 9000 SBC and Software SBC products. 	<ul style="list-style-type: none"> ■ 2000 alarms for software SBC and Mediant 9000 SBC. <p>The Alarms History screen provides a history of at least one year and up to 10 million alarms, depending on disk space available:</p>

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 410

ARM Minimum Platform Requirements

ARM Minimum Platform Requirements	
Supported platforms	<ul style="list-style-type: none"> ■ VMware vSphere Hypervisor (ESXi) version 5.5 and later ■ VMware vCenter Server version 5.5 and later ■ HyperV Windows Server 2016 ■ Amazon Web Services (AWS)
GUI	Firefox, Chrome, Internet Explorer (Version 11)
RAM	<ul style="list-style-type: none"> ■ ARM Configurator: 16 GB ■ ARM Router: 8 GB
CPU	<ul style="list-style-type: none"> ■ 2 cores (64 bit) per Router VM ■ 4 cores (64 bit) per Configurator VM
Number of required VMs	A minimum of three VMs, i.e., One Configurator and at least two routers.

ARM Minimum Platform Requirements	
High Availability	<ul style="list-style-type: none"> ■ 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	40 GB per VM

ARM-Managed Devices

The following devices can be routed by the ARM:

- Mediant 9000 SBC 7.2.158 and later
- Mediant 4000 SBC 7.2.158 and later
- Mediant 2600 SBC 7.2.158 and later
- Mediant SE/VE SBC 7.2.158 and later
- Mediant 1000B Gateway and E-SBC 7.2.158 and later
- Mediant 800B Gateway and E-SBC 7.2.158 and later
- Mediant 800C 7.2.158 and later
- Mediant 500 E-SBC 7.2.158 and later
- Mediant 500 L - SBC 7.2.158 and later
- Mediant SBC CE (Cloud Edition) 7.2.250 and later
- Mediant 3000 Gateway only 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
 - IIS 8
 - .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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Document #: LTRT-94027

