OVOC

Product Description

Version 8.0

audiocodes

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

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

Document Revision Record

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94033	Updated Section: Key Interface Elements; Key Elements of the OVOC Suite; Voice Quality Management; Voice Quality Management Key Features; OVOC Server and Client Requirements; OVOC Server and Client Requirements; Analytics API Added Section: QoE for Microsoft Teams; Microsoft Teams Android Based Management; Groups
94034	Updated Sections: Updated screens throughout for the new look and feel OVOC Web interface; OVOC Server; QOE for Microsoft Teams; Key ARM Features; ARM on Azure; Microsoft Teams Enterprise Solutions; Microsoft Teams Hosted Solutions; ARM-Managed Devices
94035	Updated Sections: OVOC Server; Device Manager Pro; Service Provider Cluster Mode Added Sections: EPOS Integration; Android-based Peripheral Device Management; Control Storage of Call Flows Removed Sections: AudioCodes Routing Manager (ARM); SBA ProConnect; Specifications

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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

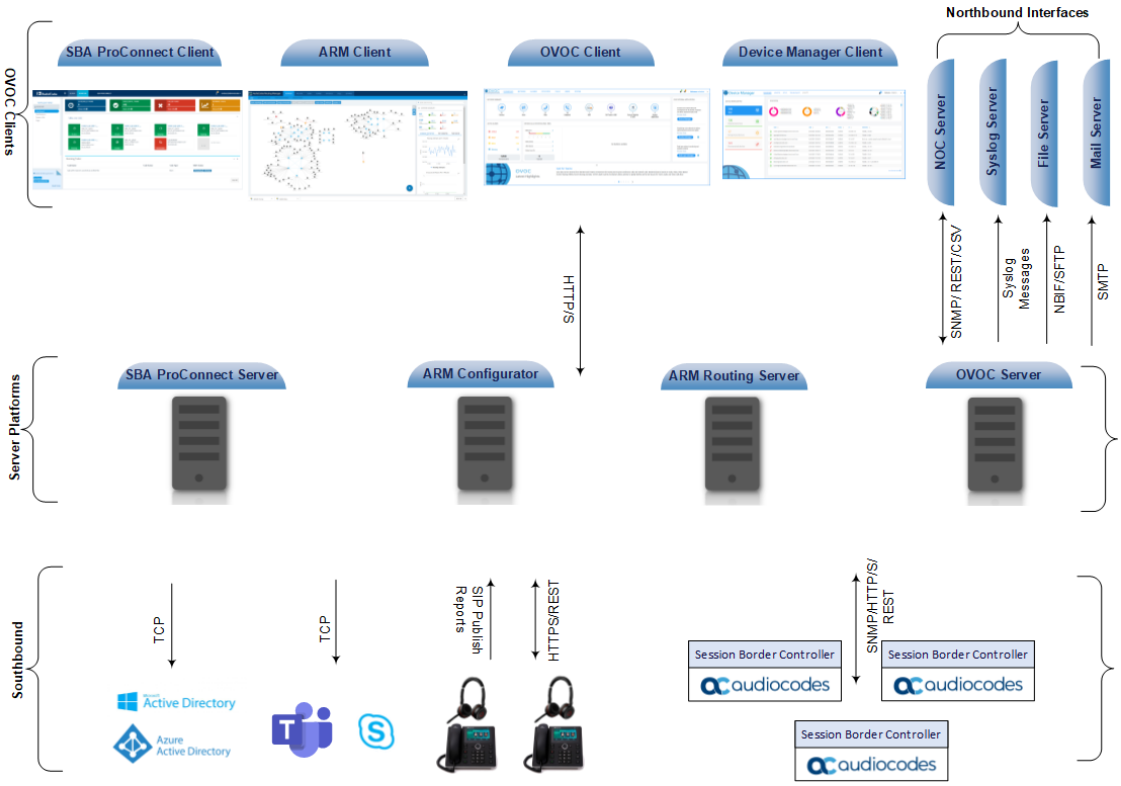
This section describes the key elements of the OVOC suite.

- **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.
  - Integration with Microsoft Teams Subscription Notifications service with Microsoft Graph API for retrieval of Calls data (subscriptions notifications) for users managed by a specific tenant including Teams peer-to-peer or Conference calls and network calls.
  - Integration with Skype for Business server SQL monitoring server to provide end-to-end VoIP quality monitoring of Skype for Business deployments. The OVOC server enables you to synchronize with the Enterprise network Active Directory user databases and monitor call quality for the Active Directory users.
  - 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.

- **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. ARM can also synchronize with the Active Directory for user-based routing.
- **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 Dashboard

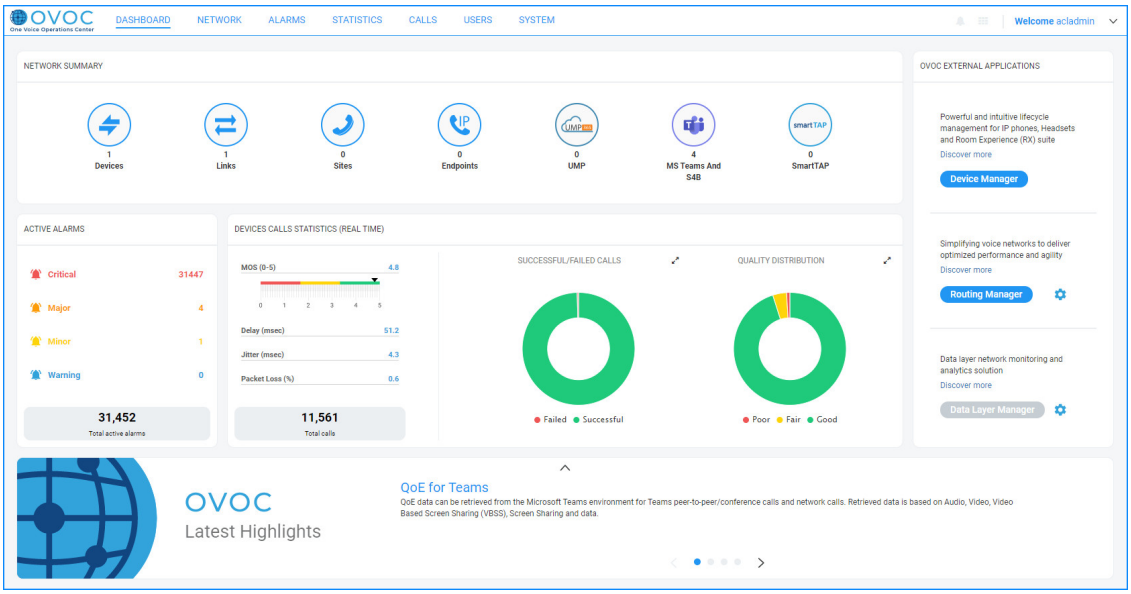
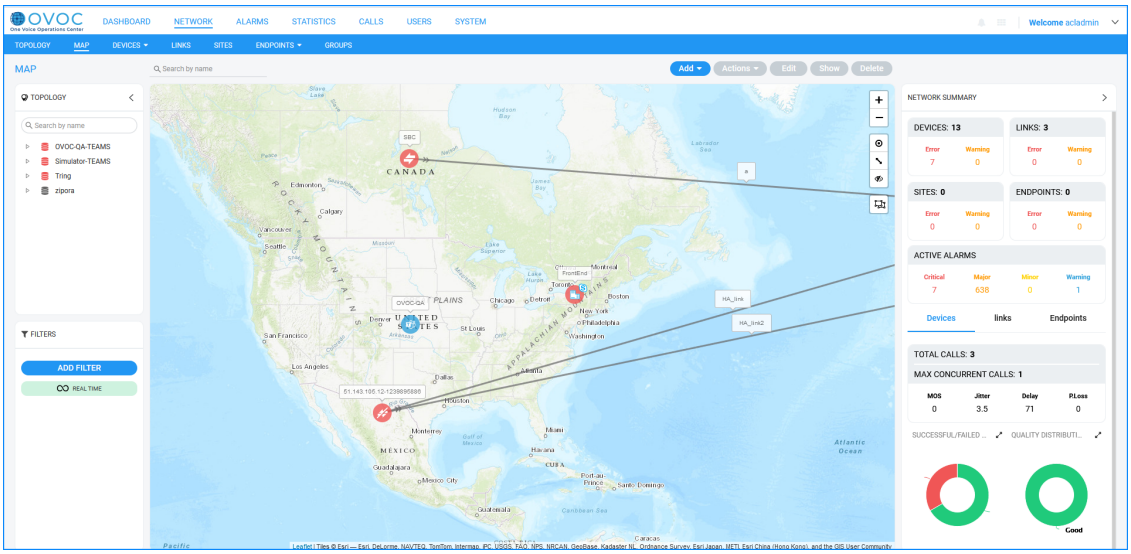


Figure 1-3: OVOC Network Maps



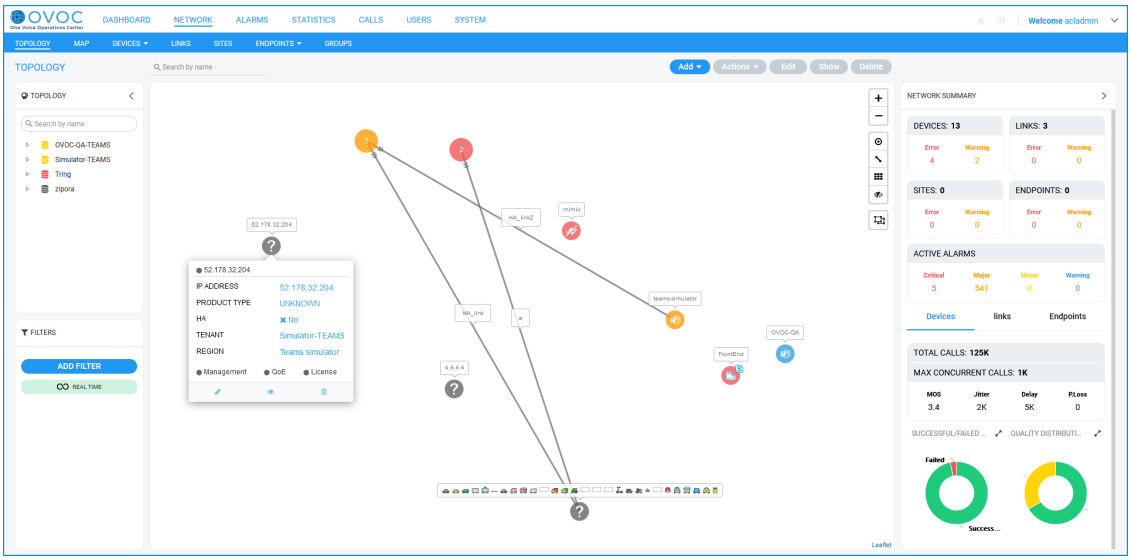
The Geo Map/Topology view consists of the following elements:

- **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.

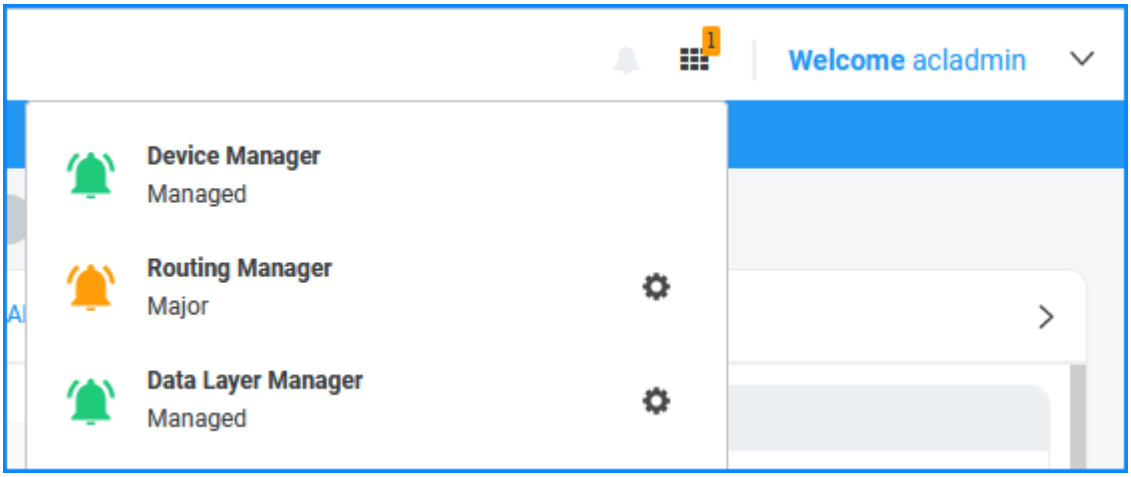
Figure 1-4: Device and Link Aggregation



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



OVOC License Management for Enterprise Devices

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

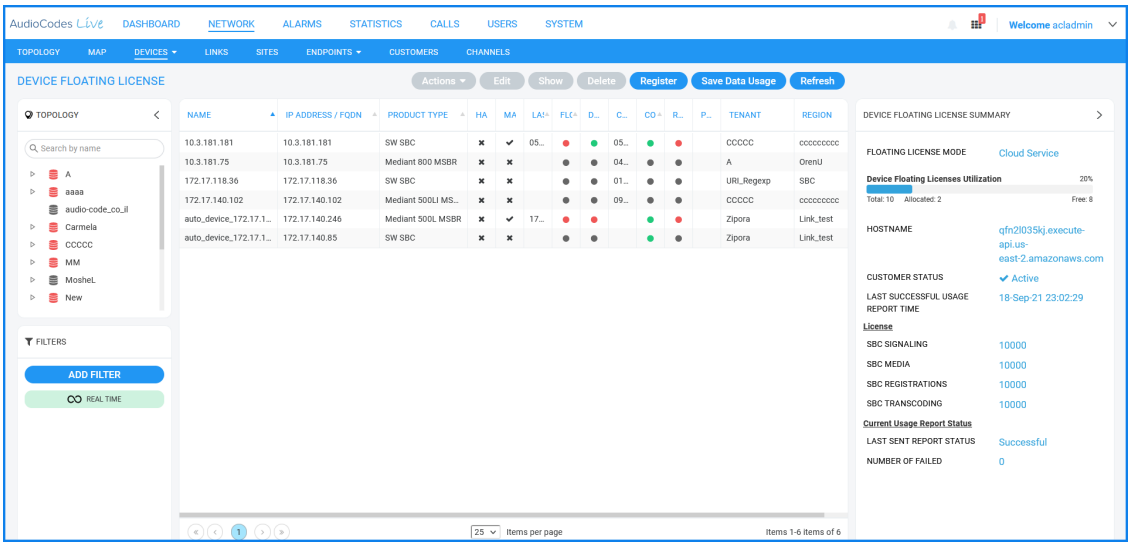
- Local license installed on the device
- Fixed License Pool on page 11
- Floating License below

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:

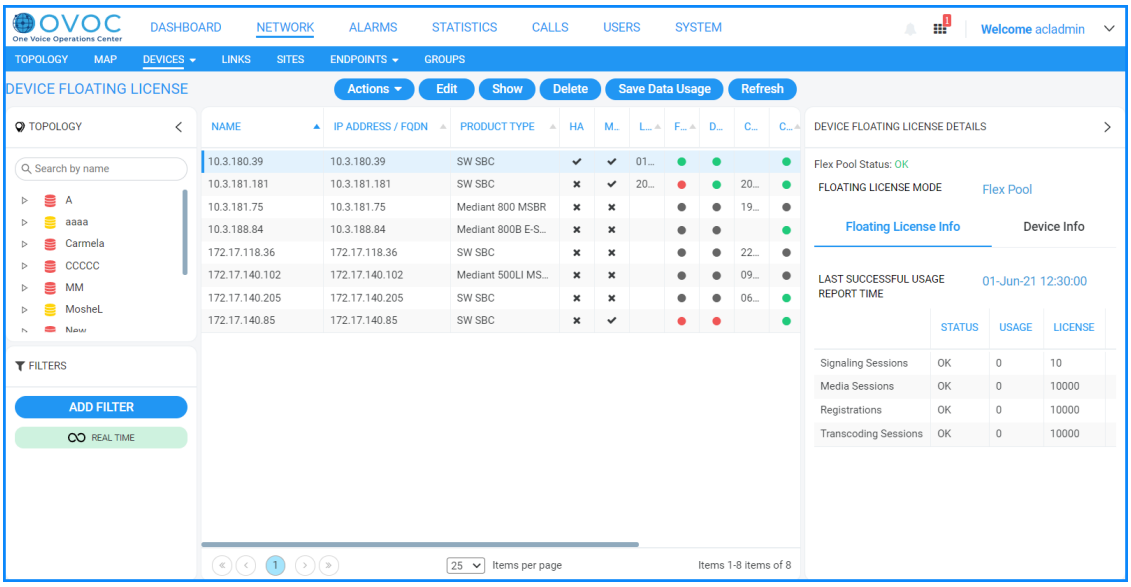
- **Cloud Mode:** This mode manages the license per tenant in the Cloud using the AudioCodes Floating License Service. This model implements 'pay as you grow' model. If the license limits are exceeded, incremental billing is automatically enforced, thereby eliminating the need to manually purchase additional SBC licenses when capacity requirements are increased.

Figure 1-6: Cloud Service



- **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.

Figure 1-7: FlexPool



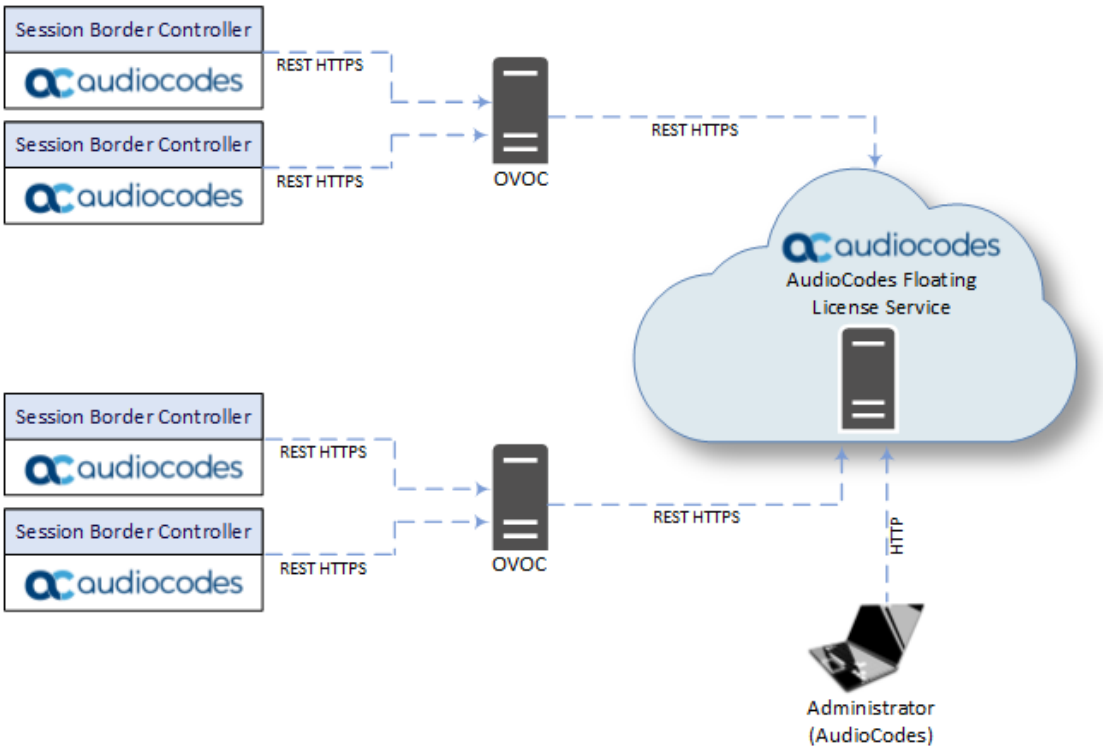
The SBCs deployed in the network are "open" to utilize the maximum hardware capacity of the device based on pre-defined profiles or can be configured by users with customized session capacity profiles. The Floating License includes the following parameters:

- **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 1-8: Floating License Service



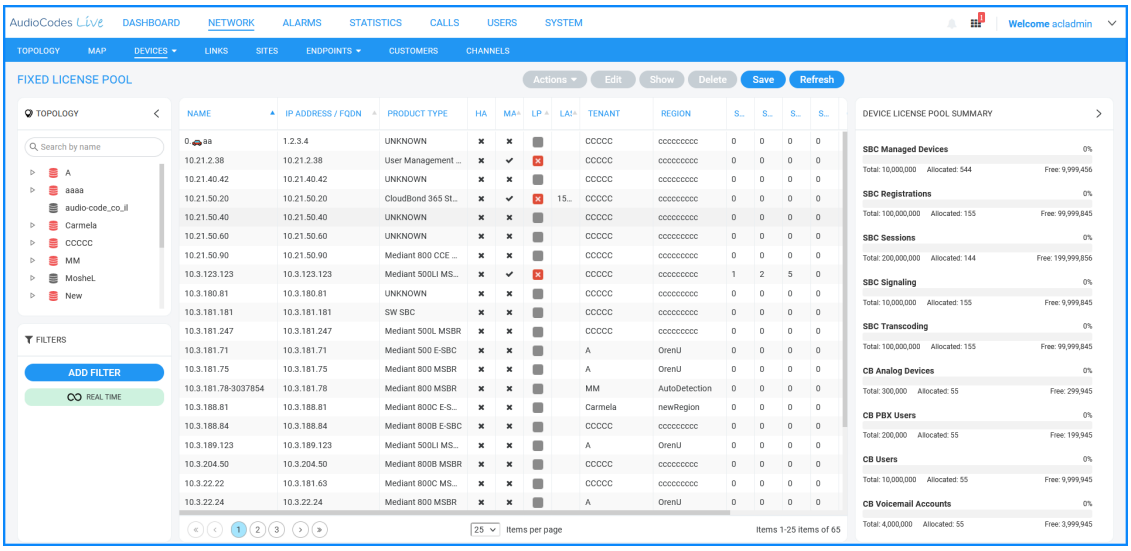
Fixed License Pool

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 1-9: OVOC License Pool Manager



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.

- **Networking:** Support for both IPv4 and IPv6 ethernet interfaces. SBC devices can connect to OVOC from different subnets to the respective interfaces on OVOC. Each IPv4 interface can be configured for NAT and one of the IPv4 interfaces can be configured to work in the Cloud Architecture mode.
- **Storage:** OVOC provides recommended minimum disk sizes for all specifications and in addition supports disk downsizing for economizing disk storage costs.
- **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.

- OVOC supports Security Assertion Markup Language (SAML) based authentication for managing operator authentication between an identity provider (IdP) and a service provider (SP). This authentication method can be applied at system and tenant level for all operator types.
- 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

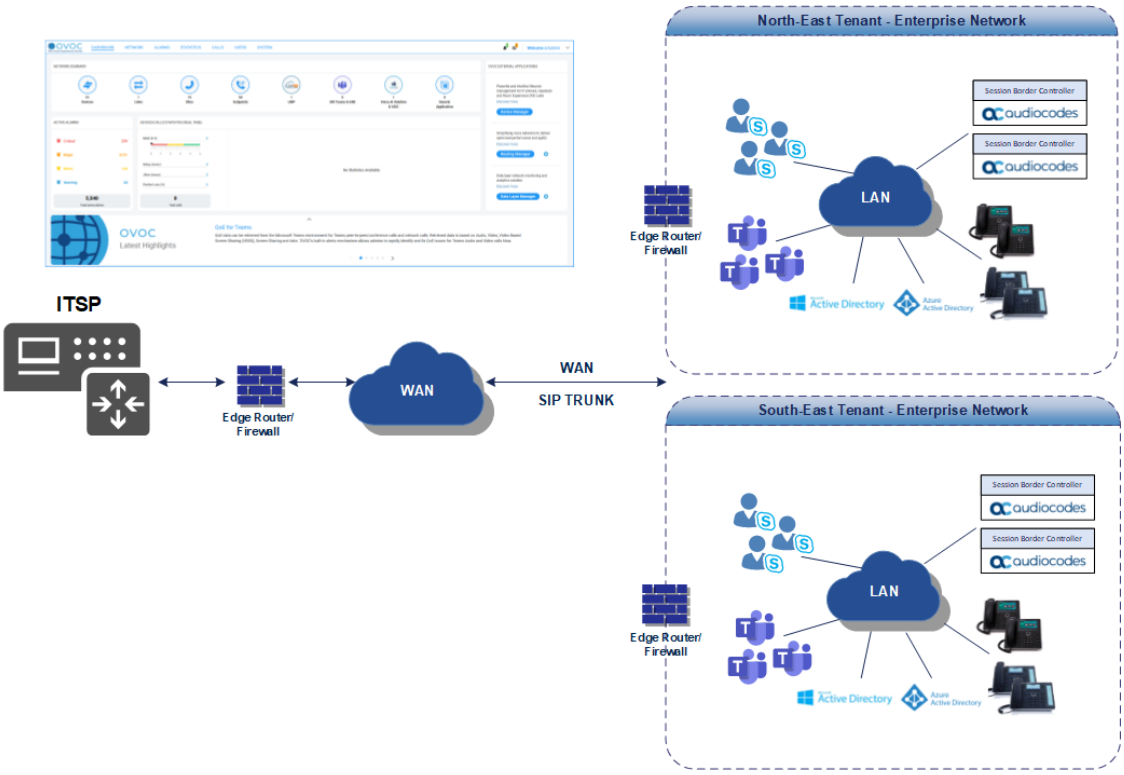
Multi-tenancy architecture enables large enterprises and service providers to install the One Voice Operations Center application in a Data Center and to remotely manage VoIP topology in multiple diverse locations. This may comprise of one of the following topologies:

- **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.

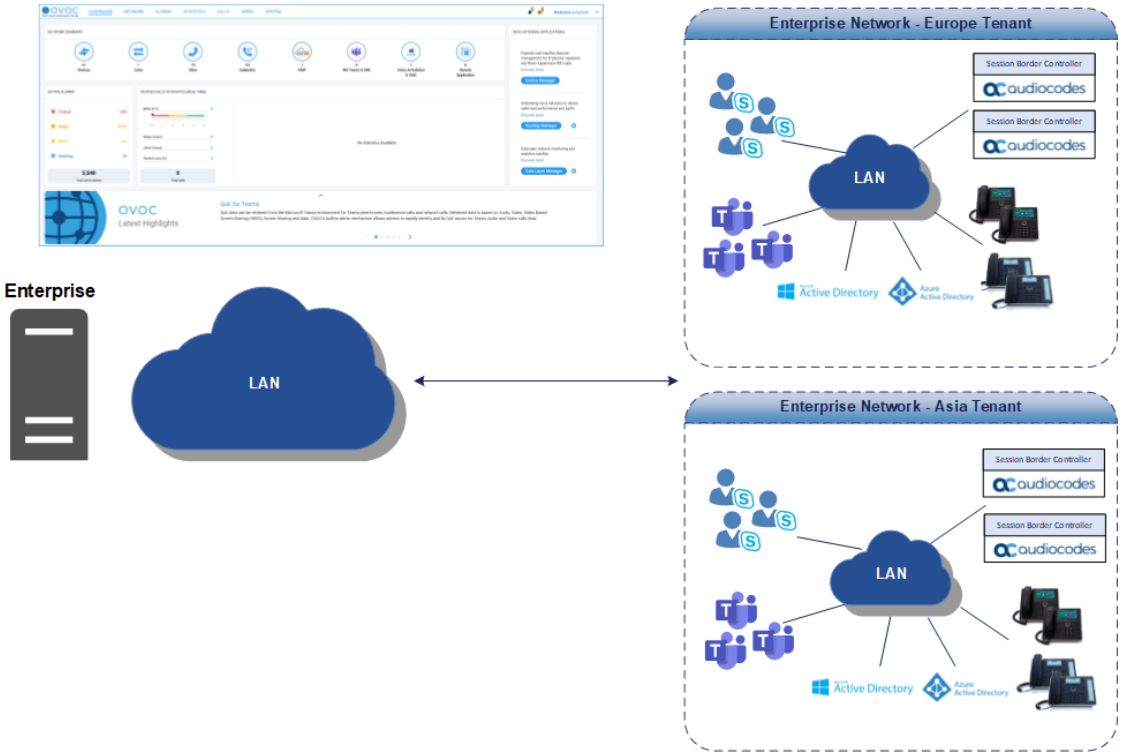
Figure 3-1: ITSP Multi-Tenancy Architecture



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:

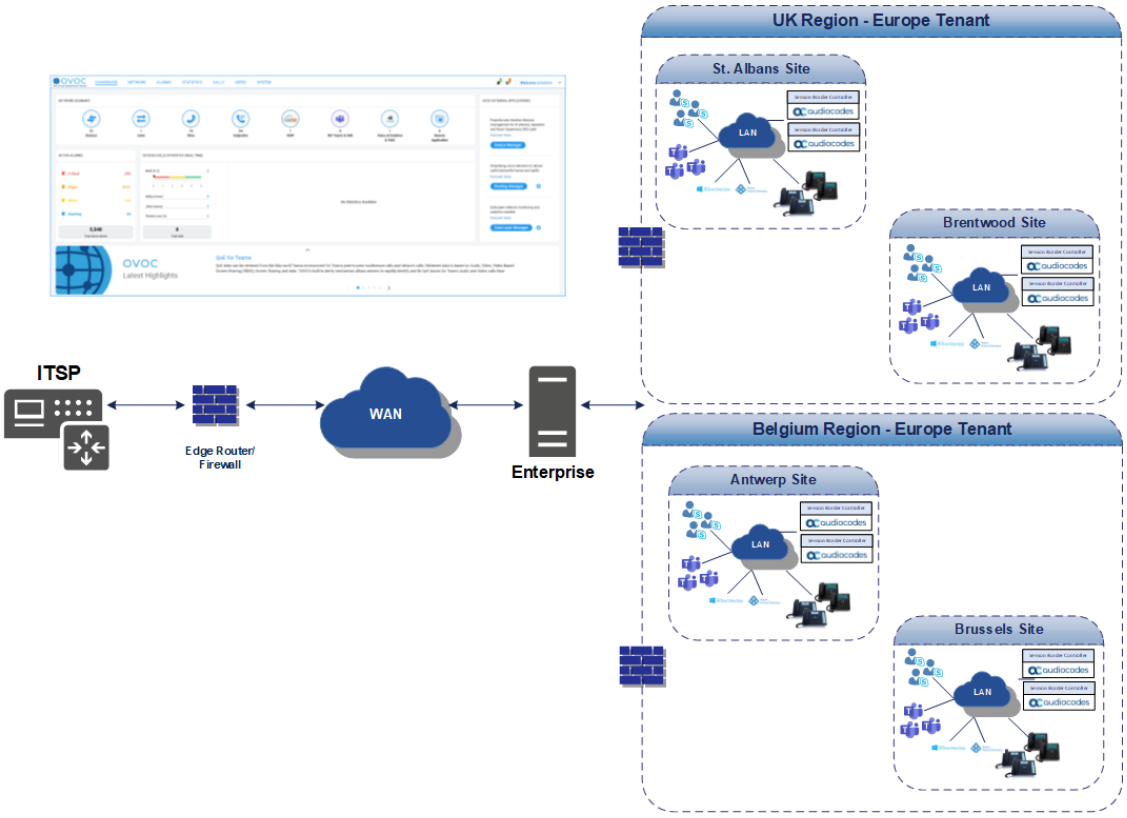
- **Tenant resources:** the portion of the OVOC server License that is allocated to the tenant.
- **Tenant entities:** all entities that are accessible for a specific tenant such as all regions, sites, devices, links, call hierarchies and summaries, journal records and alarms. In addition to statistics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

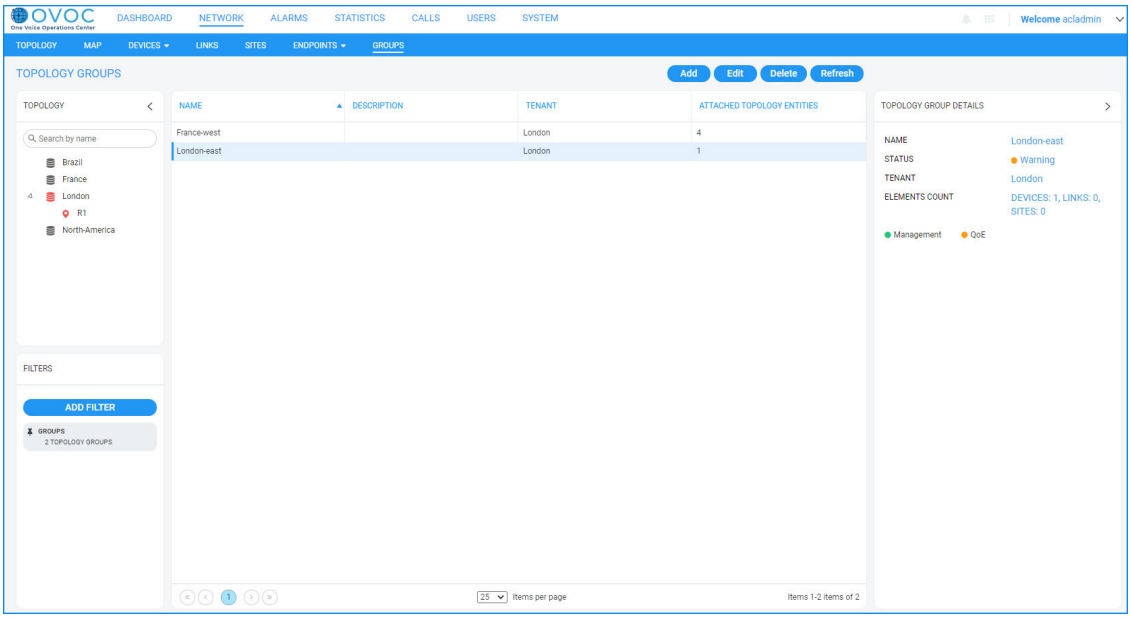
Figure 3-3: Monitoring Links



Groups

The "Group" entity provides a logical entity which contains devices, links and sites with the ability to filter all application topics, topology, calls, statistics and alarms.

Figure 3-4: Groups



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.

- **Device Manager Pro zero touch**: 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.

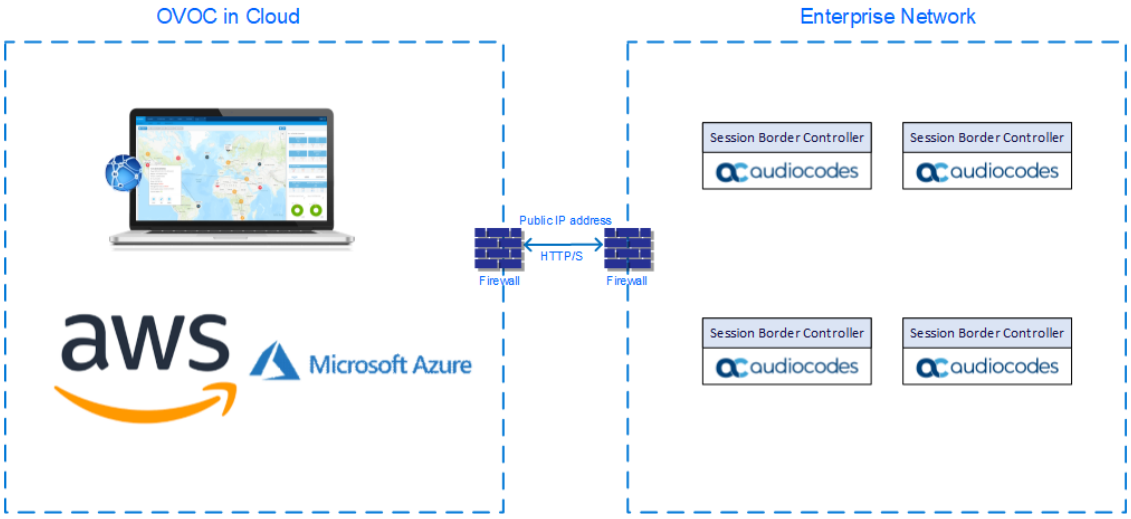
5 OVOC Cloud Architecture Mode

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 and 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 26).
- This mode is supported for both Microsoft Azure and Amazon AWS deployments.

6 Service Provider Cluster

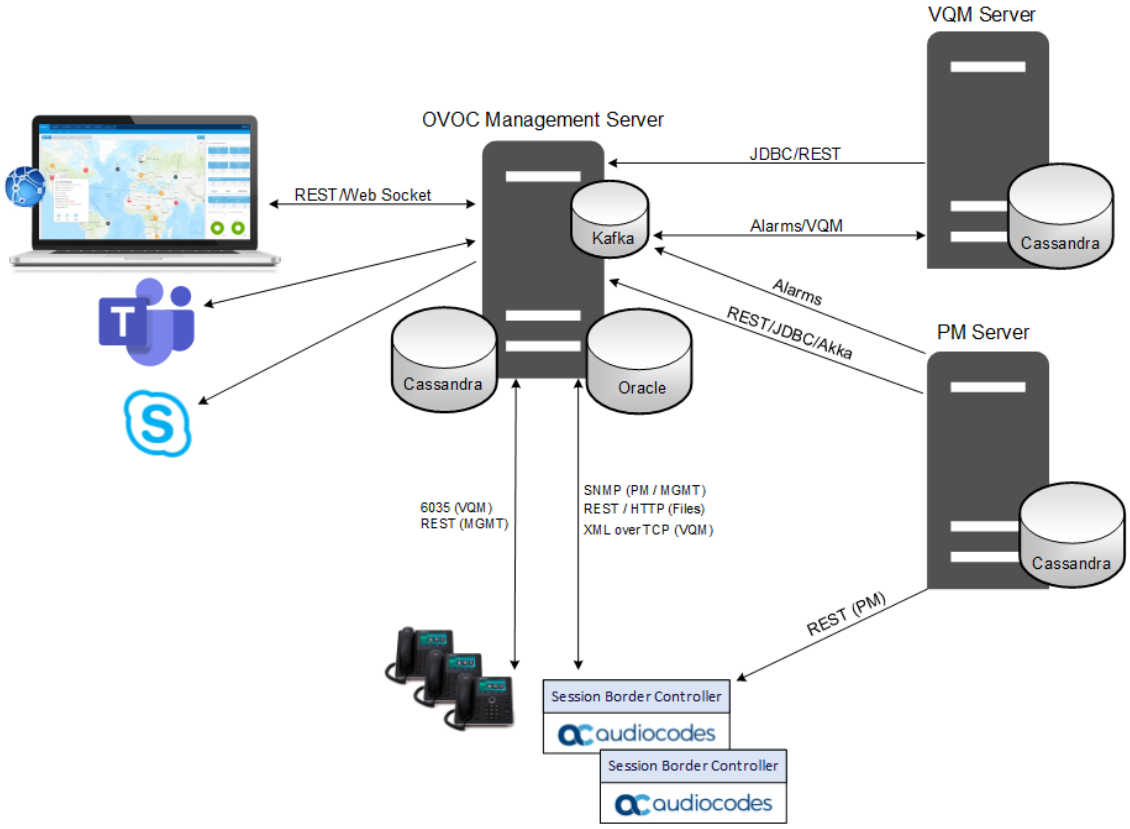
The High Scale Cluster enhances the offerings for large scale deployments through load sharing cluster configuration for the Voice Quality Management (VQM) and Performance Monitoring (PM) processes. This mode shares OVOC load between three Virtual Machines:

- 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.

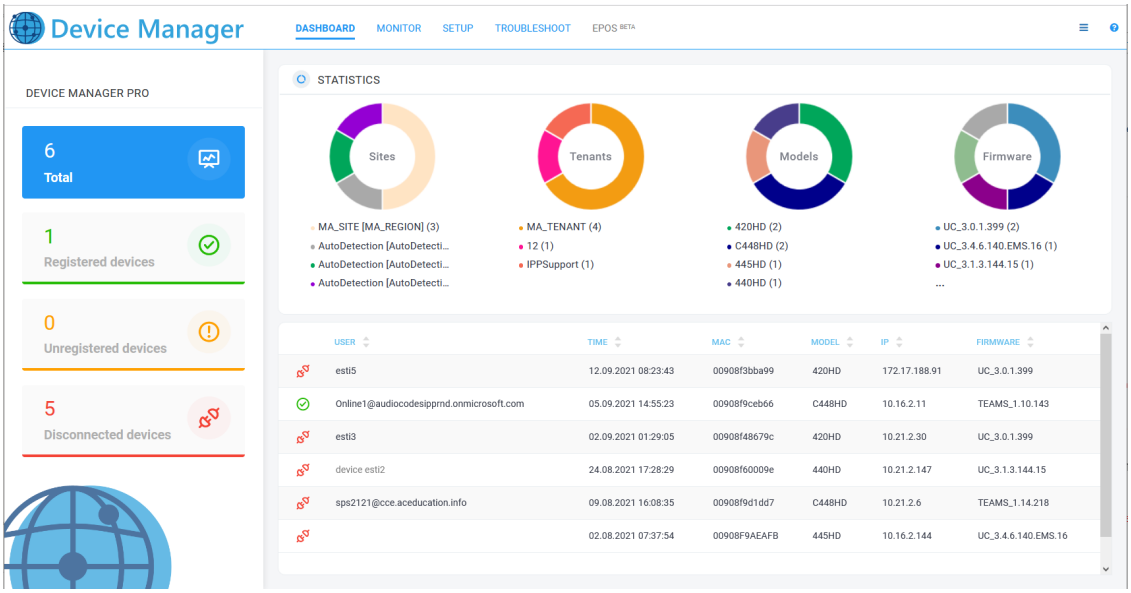
Figure 6-1: Service Provider Cluster



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

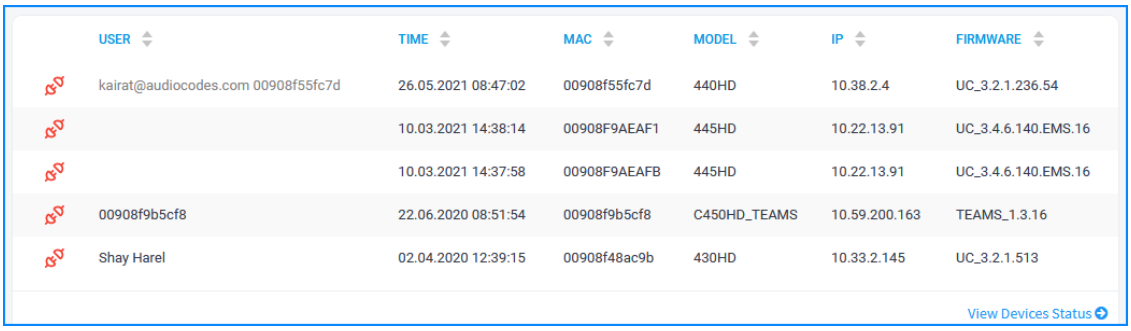


The Dashboard page lets you quickly identify:

- 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.

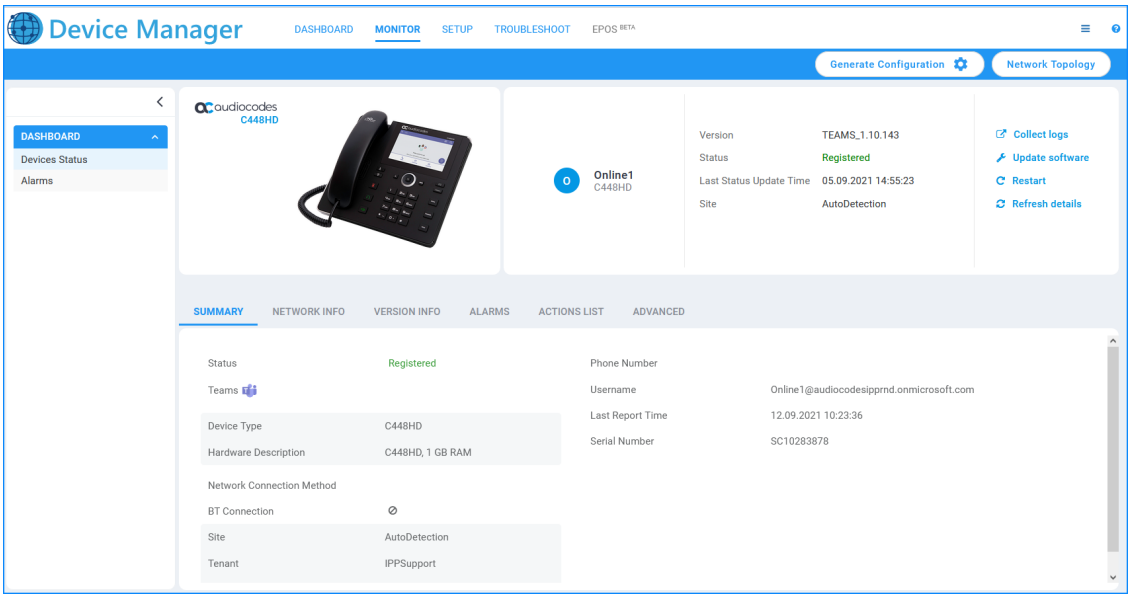
The Recent Reports pane at the bottom of the status screen shows recent operations performed on specific phones. Color icons are used to indicate the status of updates on the phone. For example, the icon below indicates that the device has been registered.

Figure 7-2: Recent Reports



When you click the **Monitor** tab, the Device Status screen opens displaying the details for the category of devices that you selected. For example, 'Registered Devices'.

Figure 7-3: Teams Devices Status

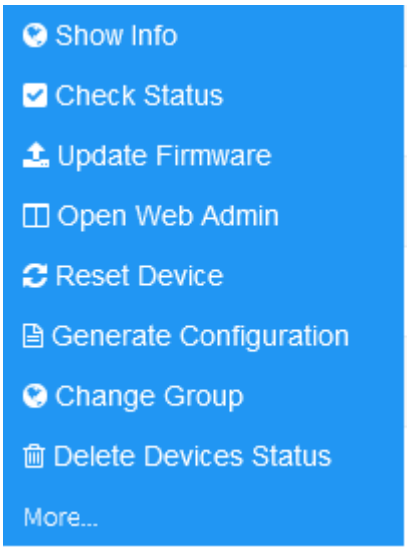


Status information that is displayed for the Teams device includes the following:

- Full version information
- Detailed network status including whether Wi-Fi is enabled.
- Whether the BtoE (Better Together Status) auto pairing is enabled on the device and a list of connected devices
- Filtering capabilities. For example per user, phone #, MAC, IP address, model, version, status
- Whether a device is set as a VIP device

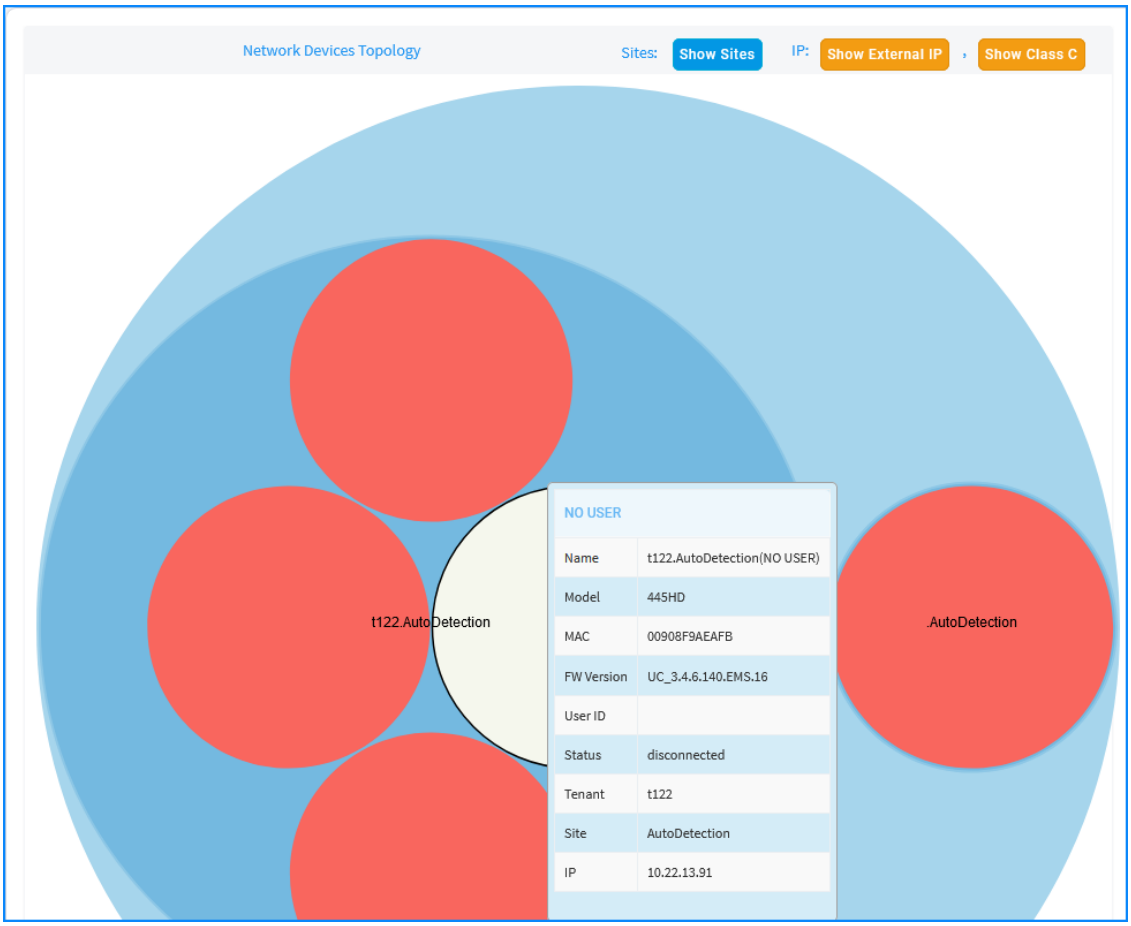
You can perform various right-click operations on each phone record as shown in the figure below.

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.

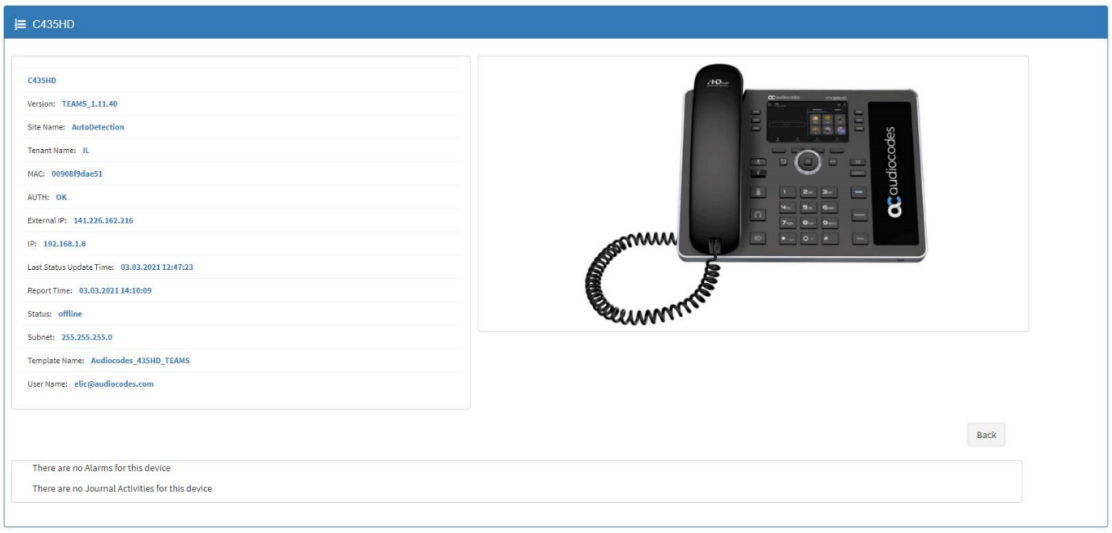
Figure 7-5: Network Device Topology Page



Microsoft Teams Android Based Device Management

Support for Android-based Microsoft Teams devices (Device Manager Pro/Express version 7.8.2000 and later) including the C435HD and C470HD phones and the RXV80 Standalone Video Collaboration Bar The Device Manager manages the Android-based Teams phones in a similar way to Skype for Business/Microsoft Lync and Generic phones. Management actions include the provisioning of configuration and firmware and device reset.

Figure 7-6: C435HD Device

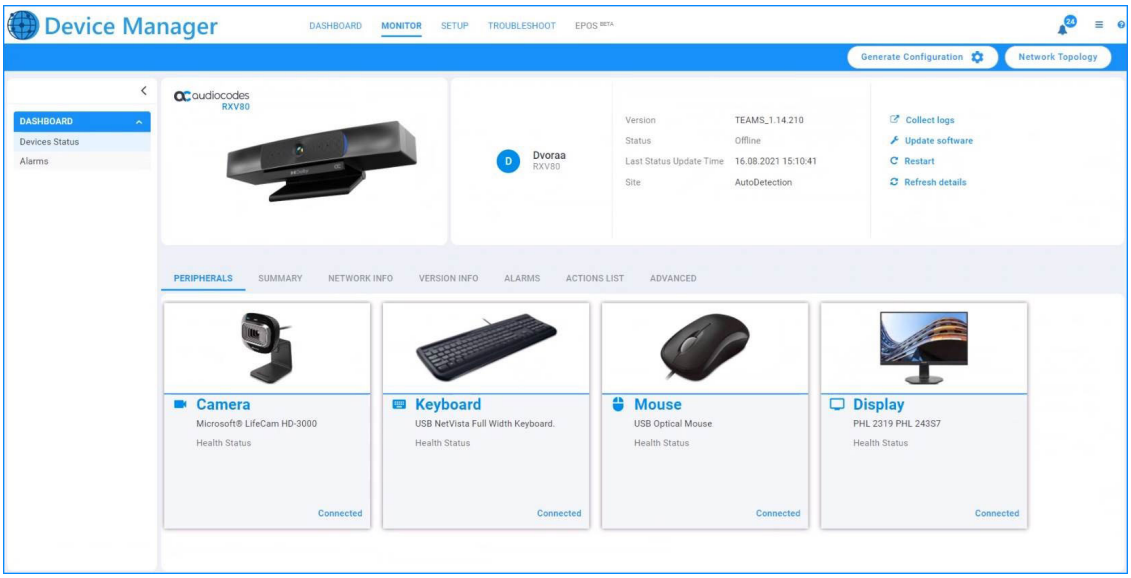


Android-based Peripheral Device Live Monitoring

Peripheral devices that are connected to Android-based devices deployed for Meeting Room solutions can be monitored to determine whether they have an active connection including:

- Camera
- Keyboard
- Mouse
- Display

Figure 7-7: Peripheral Devices



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.

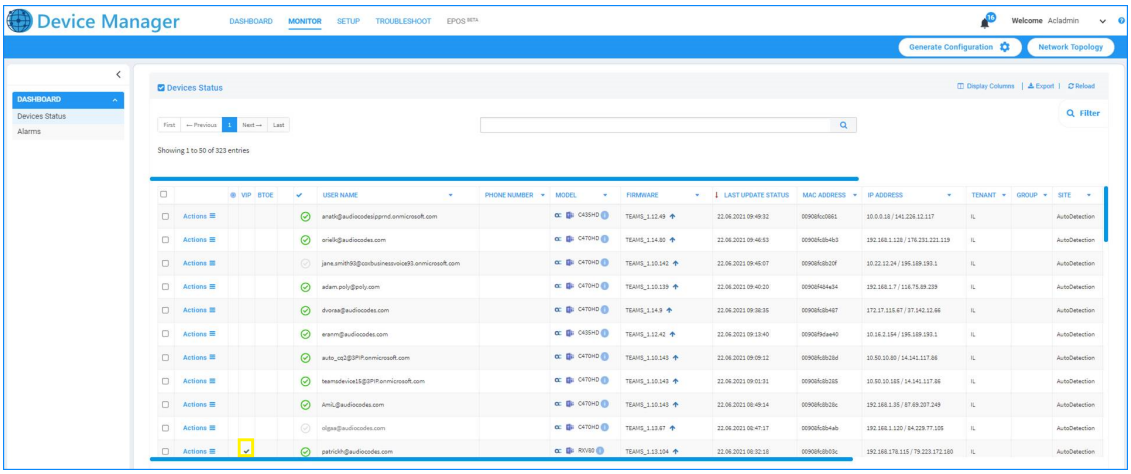
Group Level Management

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 7-8: VIP 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 (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

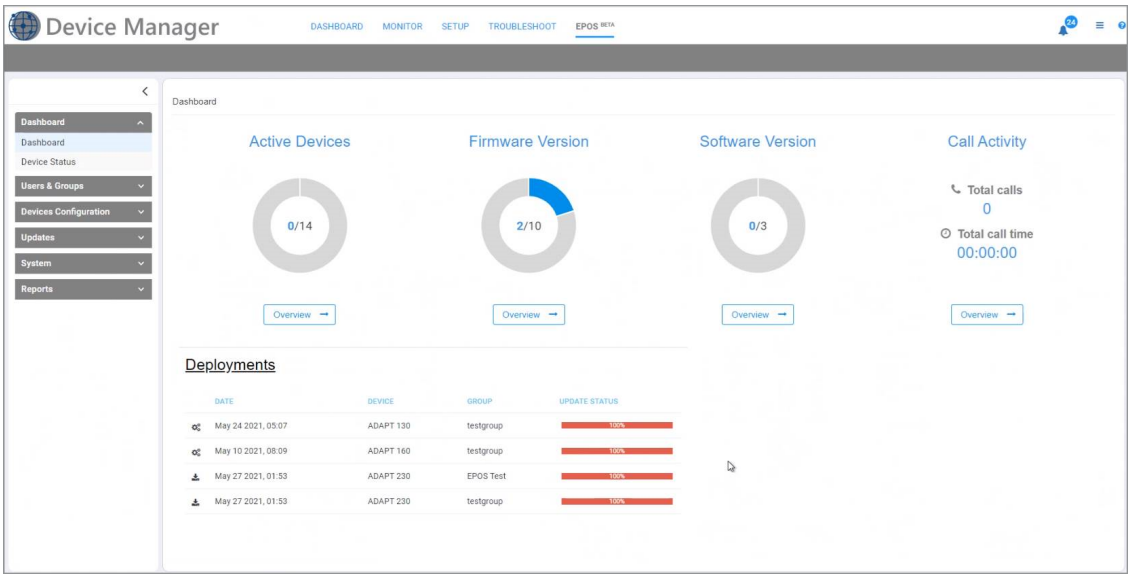
Polycom phones can now be automatically provisioned to be added to specific sites. Previously Polycom phones could only be provisioned by default to the Auto Detection Region.

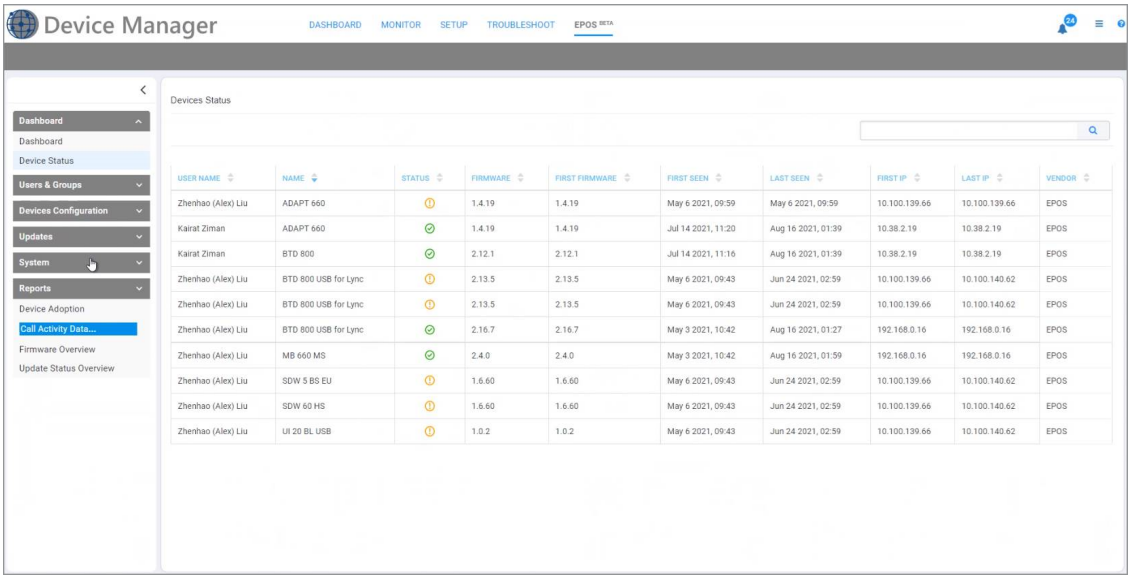
EPOS Integration

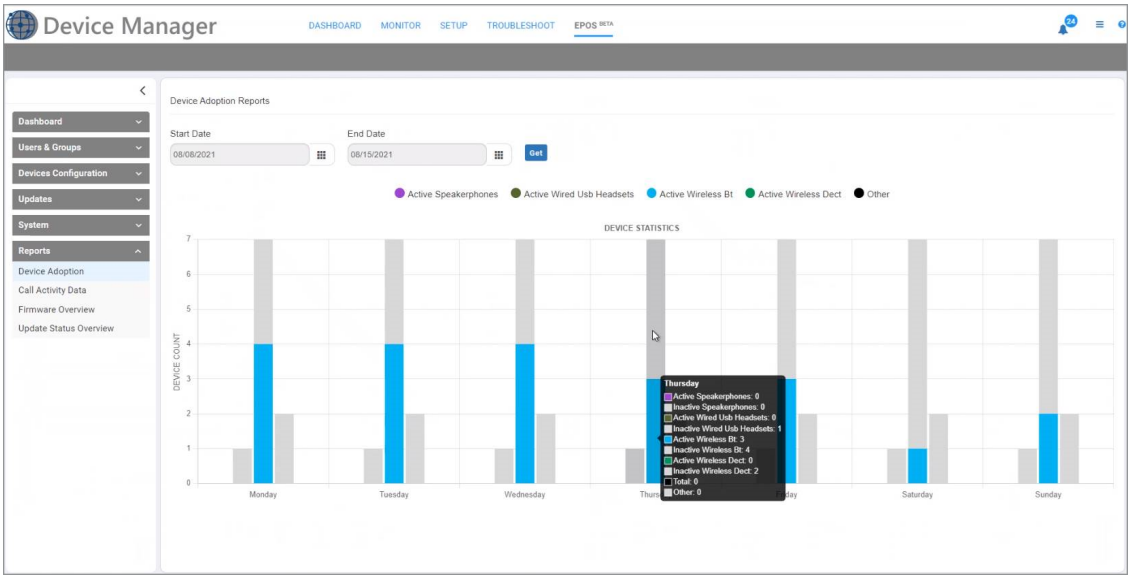
EPOS Manager is a powerful IT management solution that enables IT managers to manage, update and configure settings for EPOS headsets and speakerphones within an organization from any location. EPOS and AudioCodes integration enables IT administrators to manage EPOS devices directly in the AudioCodes One Voice Operations Center (OVOC) solution for a premium and seamless user experience. The full-fledged integration includes the following:

- Remote deployments of firmware and configurations
- Data insights to track EPOS device UC adoption progress through dashboard and reports.
- View active and inactive devices

Figure 7-9: EPOS IT Management




Device Manager
DASHBOARD
MONITOR
SETUP
TROUBLESHOOT
EPOS BETA
Dashboard
Dashboard
Device Status
Users & Groups
Devices Configuration
Updates
System
Reports
Device Adoption
Call Activity Data...
Firmware Overview
Update Status Overview
Devices Status
USER NAME
NAME
STATUS
FIRMWARE
FIRST FIRMWARE
FIRST SEEN
LAST SEEN
FIRST IP
LAST IP
VENDOR
Zhenhao (Alex) Liu ADAPT 660 1.4.19 1.4.19 May 6 2021, 09:59 May 6 2021, 09:59 10.100.139.66 10.100.139.66 EPOS
Kairat Ziman ADAPT 660 1.4.19 1.4.19 Jul 14 2021, 11:20 Aug 16 2021, 01:39 10.38.2.19 10.38.2.19 EPOS
Kairat Ziman BTD 800 2.12.1 2.12.1 Jul 14 2021, 11:16 Aug 16 2021, 01:39 10.38.2.19 10.38.2.19 EPOS
Zhenhao (Alex) Liu BTD 800 USB for Lync 2.13.5 2.13.5 May 6 2021, 09:43 Jun 24 2021, 02:59 10.100.139.66 10.100.140.62 EPOS
Zhenhao (Alex) Liu BTD 800 USB for Lync 2.13.5 2.13.5 May 6 2021, 09:43 Jun 24 2021, 02:59 10.100.139.66 10.100.140.62 EPOS
Zhenhao (Alex) Liu BTD 800 USB for Lync 2.16.7 2.16.7 May 3 2021, 10:42 Aug 16 2021, 01:27 192.168.0.16 192.168.0.16 EPOS
Zhenhao (Alex) Liu MB 660 MS 2.4.0 2.4.0 May 3 2021, 10:42 Aug 16 2021, 01:59 192.168.0.16 192.168.0.16 EPOS
Zhenhao (Alex) Liu SDW 5 BS EU 1.6.60 1.6.60 May 6 2021, 09:43 Jun 24 2021, 02:59 10.100.139.66 10.100.140.62 EPOS
Zhenhao (Alex) Liu SDW 60 HS 1.6.60 1.6.60 May 6 2021, 09:43 Jun 24 2021, 02:59 10.100.139.66 10.100.140.62 EPOS
Zhenhao (Alex) Liu UI 20 BL USB 1.0.2 1.0.2 May 6 2021, 09:43 Jun 24 2021, 02:59 10.100.139.66 10.100.140.62 EPOS

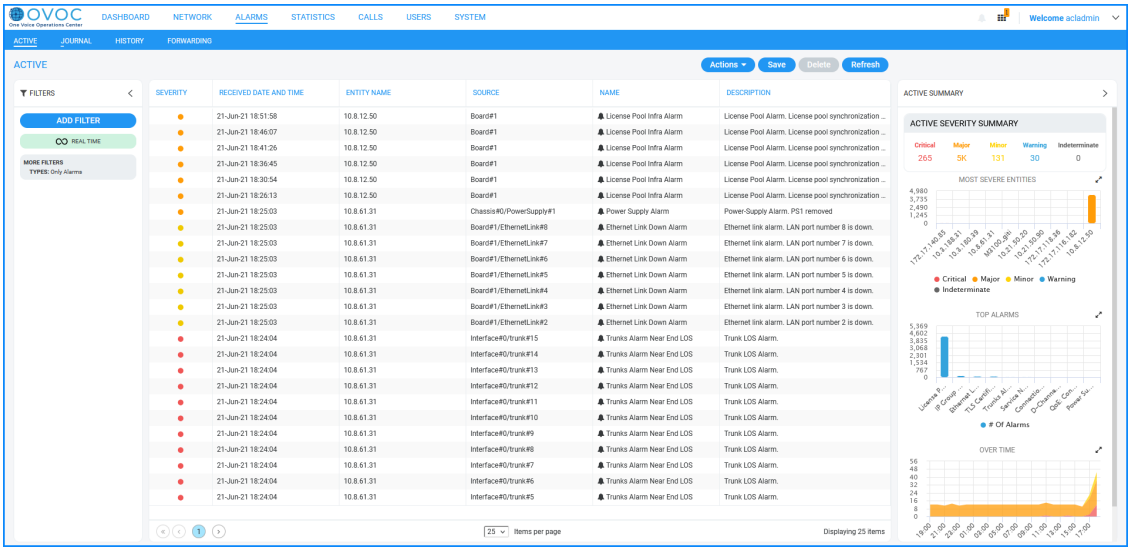

Device Manager
DASHBOARD
MONITOR
SETUP
TROUBLESHOOT
EPOS BETA
Dashboard
Users & Groups
Devices Configuration
Updates
System
Reports
Device Adoption
Call Activity Data
Firmware Overview
Update Status Overview
Device Adoption Reports
Start Date
08/08/2021
End Date
08/15/2021
Get
Active Speakerphones
Active Wired Usb Headsets
Active Wireless Bt
Active Wireless Dect
Other
DEVICE STATISTICS
DEVICE COUNT
Monday
Tuesday
Wednesday
Saturday
Sunday
Thursday
Active Speakerphones: 0
Inactive Speakerphones: 0
Active Wired Usb Headsets: 0
Inactive Wired Usb Headsets: 1
Active Wireless Bt: 3
Inactive Wireless Bt: 4
Active Wireless Dect: 0
Inactive Wireless Dect: 2
Total: 0
Other: 0

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.

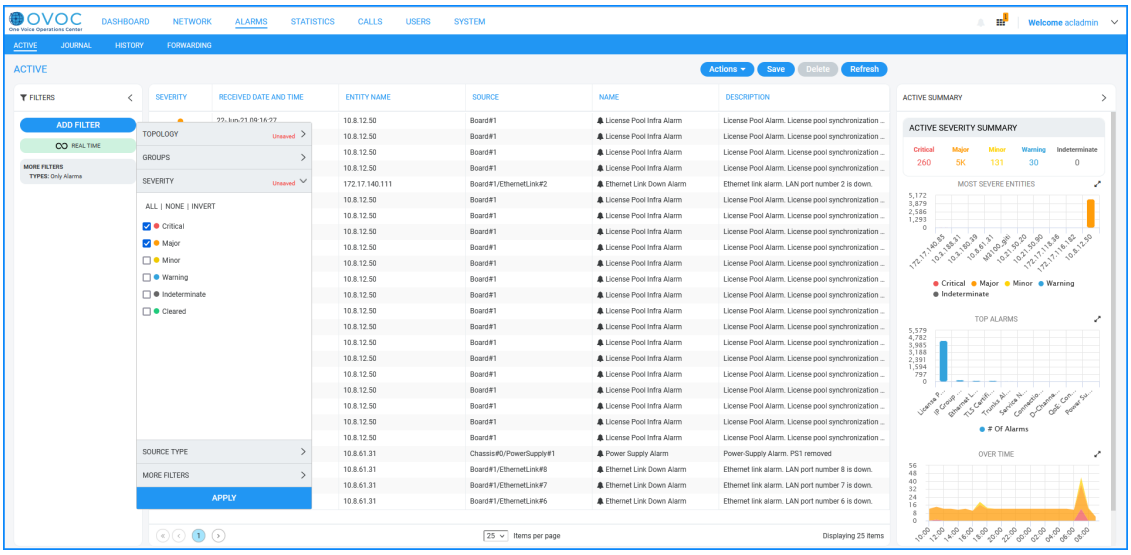
Figure 8-1: OVOC Alarms



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'.

Figure 8-2: Alarm Filtering



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: Aggregated PM Report for Specific Metric

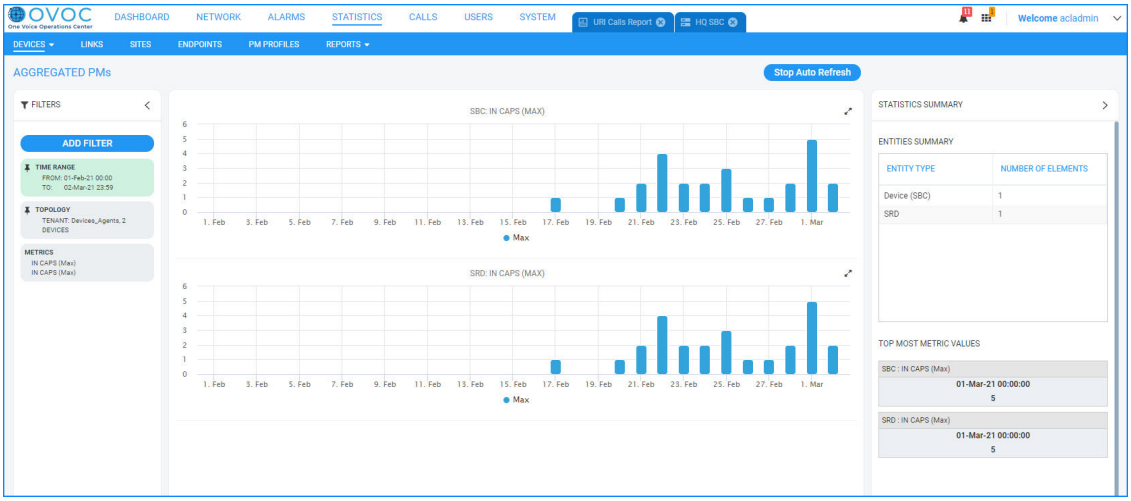
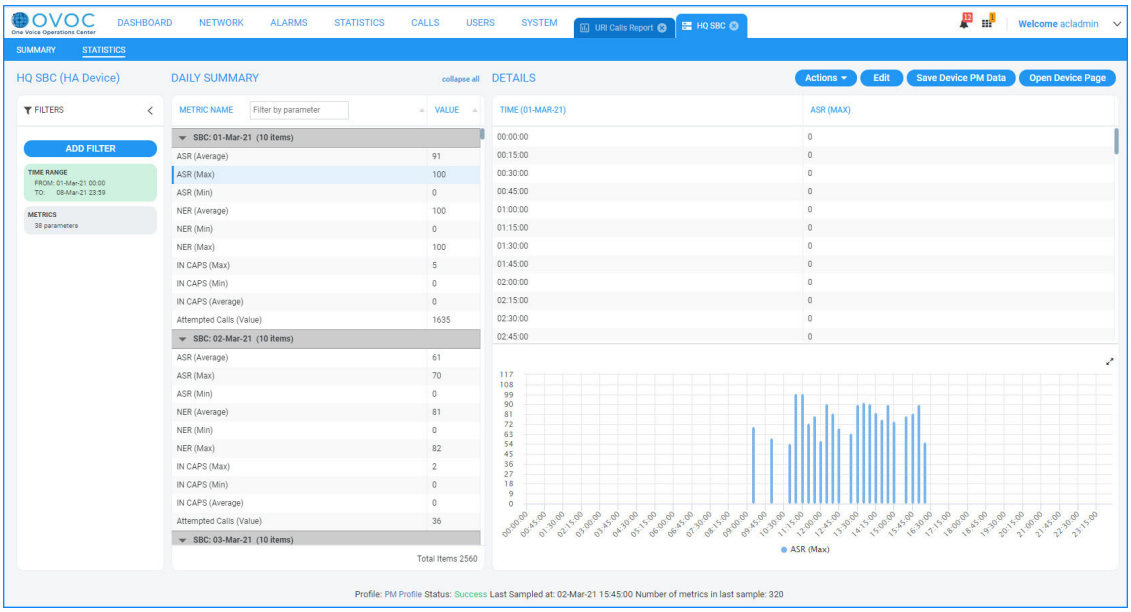


Figure 9-2: Stand Alone PM Report for Multiple Metrics



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

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.
- **QoE for Microsoft Teams:** OVOC can retrieve QoE data (Subscription Notifications service) from the Microsoft Teams environment (Office 365/Microsoft 365/Microsoft Azure). See QoE for Microsoft Teams below
- **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 on the next page)

QoE for Microsoft Teams

OVOC can retrieve QoE data (Subscription Notifications service) from the Microsoft Teams environment (Microsoft Graph API database) on Office 365/Microsoft 365/Microsoft Azure. Permissions for data access is granted for the managed Microsoft Tenant. Calls data (subscriptions notifications) can then be retrieved for users managed by this tenant including Teams peer-to-peer or Conference calls and network calls. Overall call quality and related legs are determined by both voice and video metrics. Threshold-based alarms are affected by both voice and video quality and all the default values in Teams Threshold sets are based on

Microsoft CQD recommended values and can be customized by the operator per Teams device (Teams tenant).

Figure 10-2: Microsoft Teams Calls

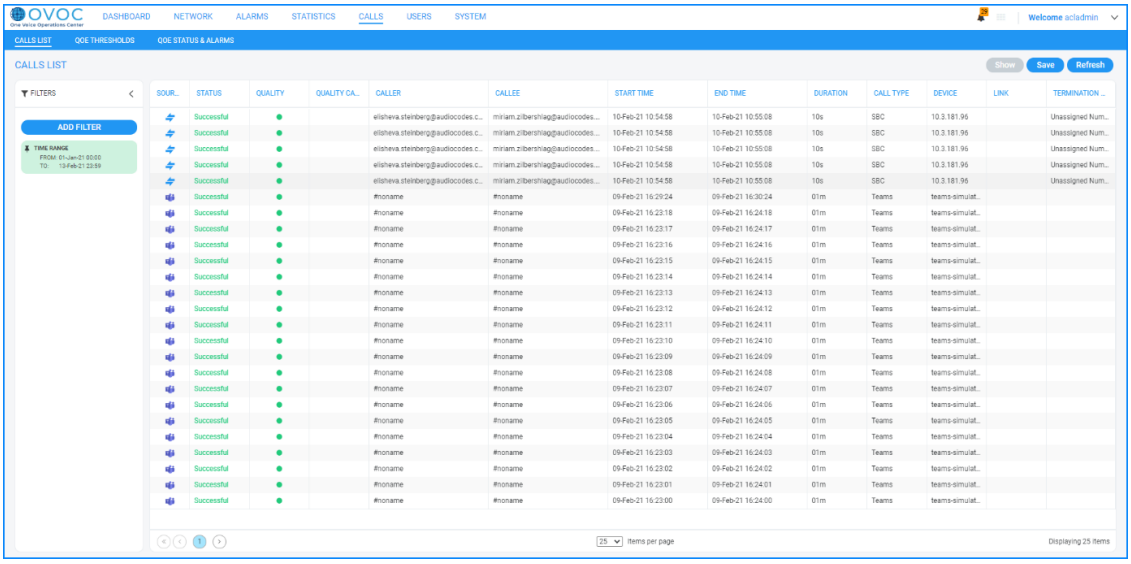
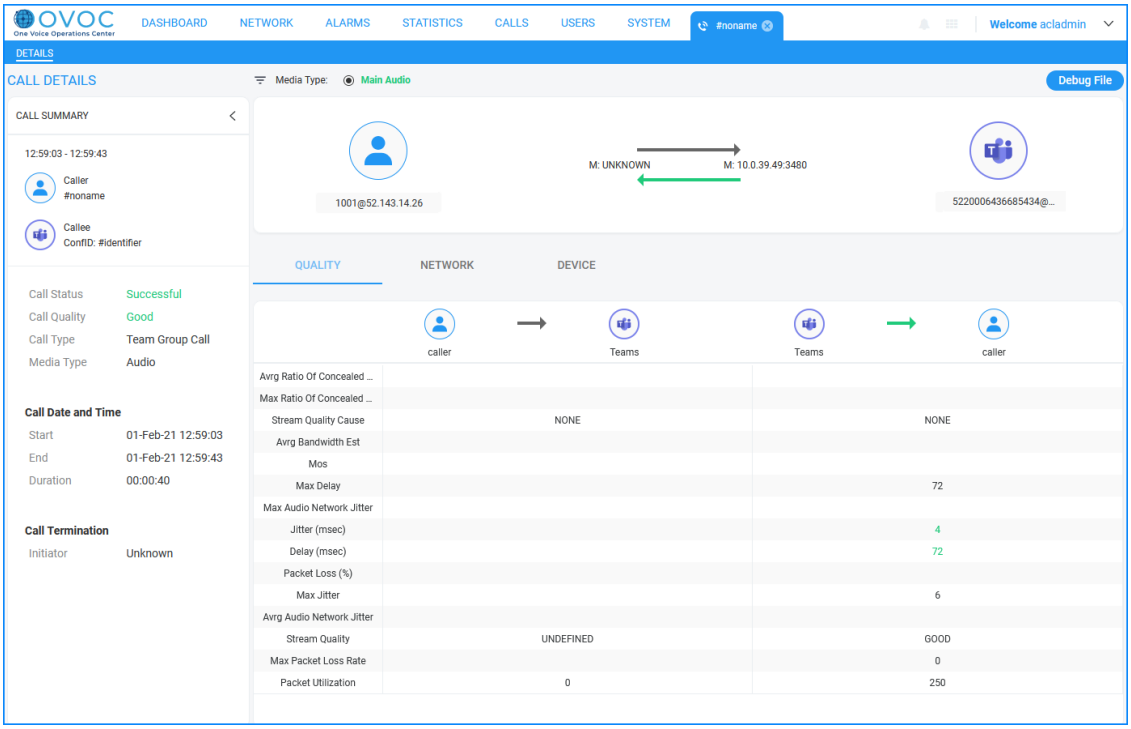


Figure 10-3: Teams Calls Details



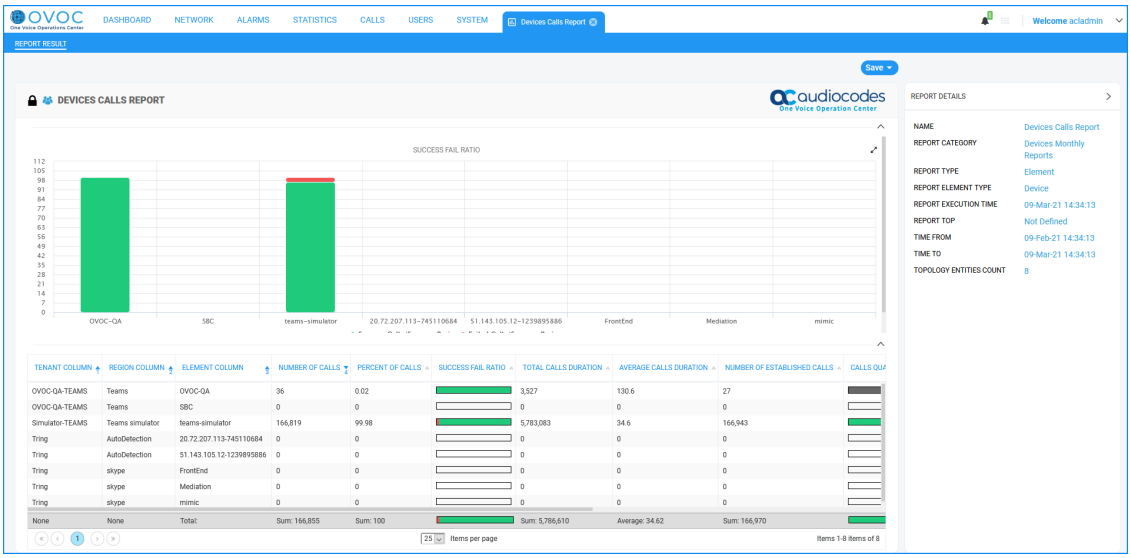
Voice Quality Reports

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 10-4: Voice Quality Reports

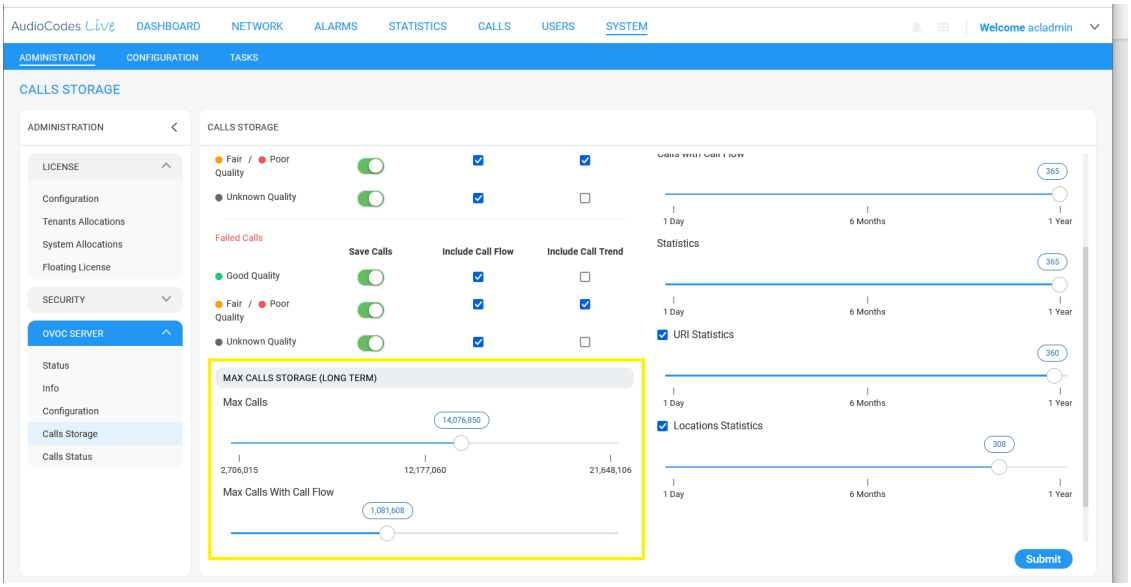


> Customers can generate template reports without purchasing licenses; however, to generate customized reports, customers must purchase licenses as part of the OVOC license ("Reports" Voice Quality feature). These licenses can be allocated to tenant or system operators in the OVOC Web interface.

Control Storage of Call Flows

Customers who are specifically interested in call flow analysis can increase the maximum number of calls with Call Flow that are saved in the OVOC database relative to the Maximum Number of Calls. This action is performed in the Call Storage screen; when the Max Calls with Call Flow parameters is increased, the Max Calls value is decreased and vice-versa.

Control Storage


AudioCodes Live
DASHBOARD
NETWORK
ALARMS
STATISTICS
CALLS
USERS
SYSTEM
Welcome acladmin
ADMINISTRATION
CONFIGURATION
TASKS
CALLS STORAGE
ADMINISTRATION
LICENSE
Configuration
Tenants Allocations
System Allocations
Floating License
SECURITY
OVOC SERVER
Status
Info
Configuration
Calls Storage
Calls Status
CALLS STORAGE
Fair / Poor Quality
Unknown Quality
Failed Calls
Save Calls
Include Call Flow
Include Call Trend
Good Quality
Fair / Poor Quality
Unknown Quality
MAX CALLS STORAGE (LONG TERM)
Max Calls
14,076,850
2,706,015
12,177,060
21,648,106
Max Calls With Call Flow
1,081,608
365
1 Day
6 Months
1 Year
Statistics
365
URI Statistics
360
Locations Statistics
308
Submit

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 Splunk to generate customized dashboards, reports and other representative management data. Customers can combine data from AudioCodes OVOC and enterprise voice or third-party data monitoring tools such as HP OpenView for data such as the following:

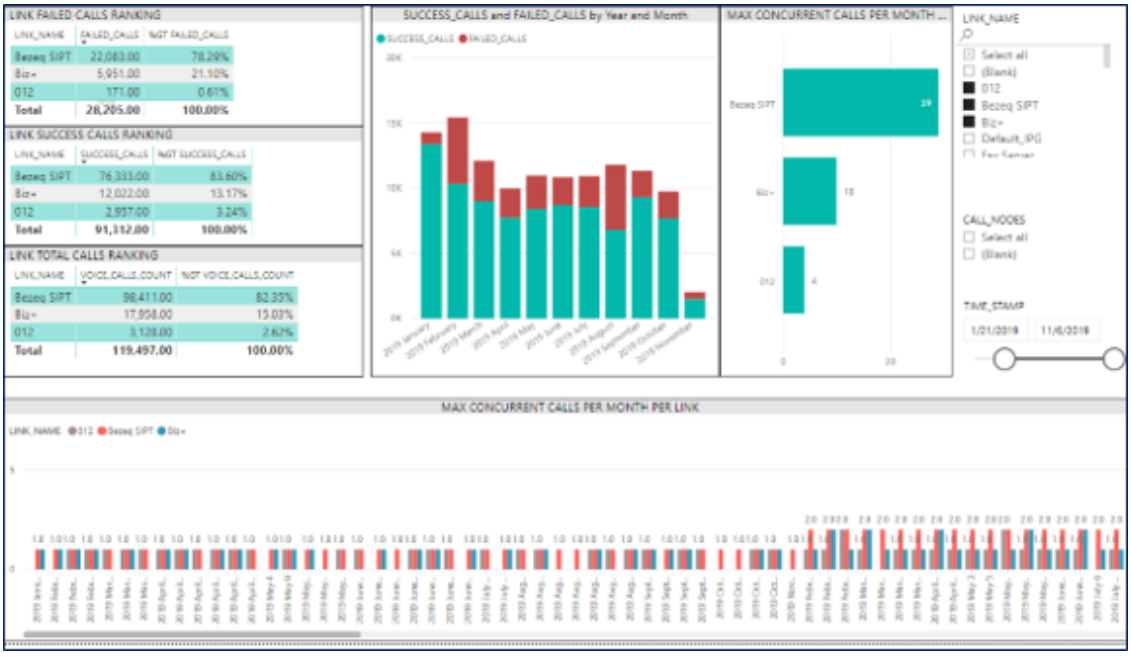
- Receive Alerts from HP OpenView
- Calls tariffs
- Data layer statistics
- User information from corporate directory

The following data is accessible from OVOC:

- 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: PowerBI Reports



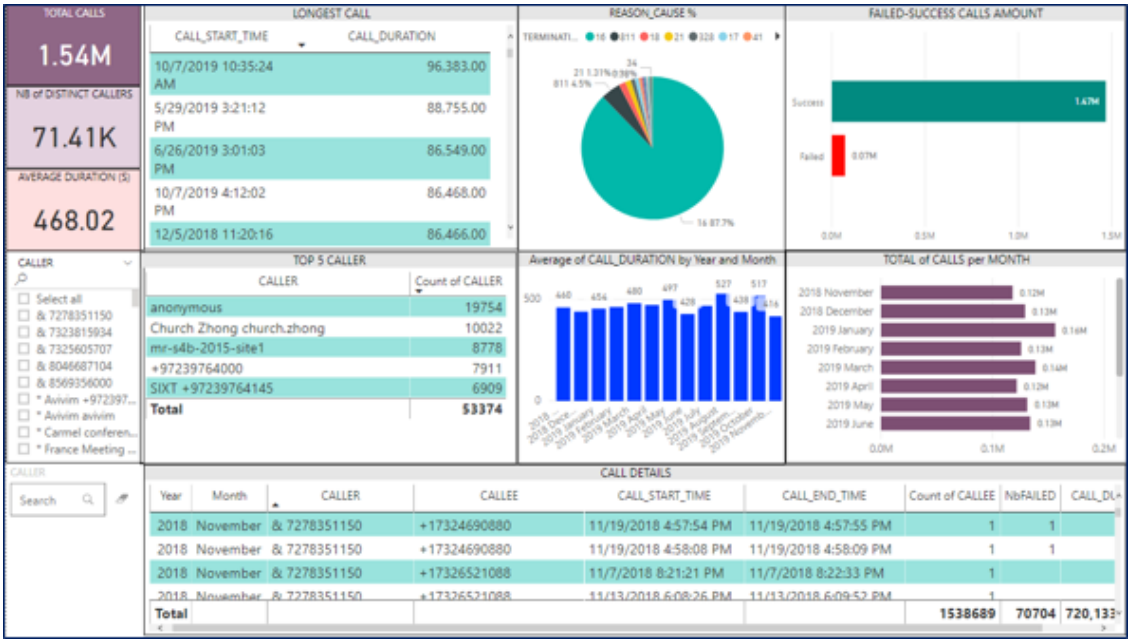


Figure 11-2: Splunk Report

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