

Mediant Cloud Edition (CE)

Deployment in OpenStack, VMware and Private
Cloud Environments

Version 7.4

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Abbreviations and Terminology

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

Related Documentation

| Manual Name |
|---|
| Release Notes |
| Stack Manager for Mediant VE-CE SBC User's Manual |
| Mediant Software SBC User's Manual |

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1 Introduction

Mediant Cloud Edition (CE) Session Border Controller (SBC), hereafter referred to as *Mediant CE*, is a software-based product that can be deployed in one of the following operational environments:

- Amazon Web Services (AWS)
- Microsoft Azure
- Google Cloud
- OpenStack
- Private cloud environments (e.g., VMware)

This document describes deployment of Mediant CE in OpenStack and private cloud environments (e.g., VMware).

For detailed instructions on Mediant CE installation in other operational environments (for example, Microsoft Azure), refer to the dedicated installation manual.

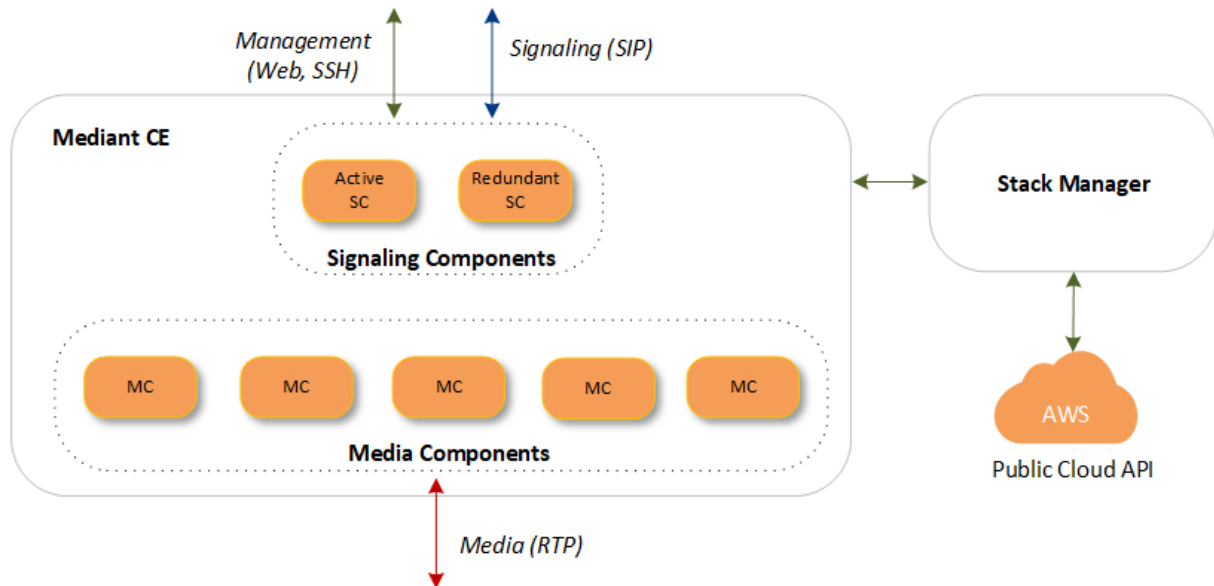


Note:

- **Mediant CE deployment in OpenStack and private cloud environments is currently available for evaluation purposes only.**
- Deployments in **VMware and private cloud environments** are done manually, without the Stack Manager tool, and lack certain lifecycle management features (e.g., automatic scaling).
- For configuring Mediant CE SBC, refer to the *Mediant Software SBC User's Manual*.

1.1 Architecture Overview

Figure 1-1: Mediant CE Architecture



Mediant CE cluster is comprised of multiple components (virtual machines) that perform distinct functions:

- **Signaling Components:** Handle signaling (SIP) and management (Web, SSH, etc) traffic. It also determines which Media Component (see below) handles the specific media traffic, which is based on load balancing between the Media Components.
- **Media Components:** Handle media (RTP, RTCP) traffic, including transcoding functionality. Up to 21 Media Components can be used in the deployed Mediant CE.

Incoming calls are initially processed (at signaling level) by Signaling Components, which choose the Media Component based on current cluster utilization and pass the media streams to it.

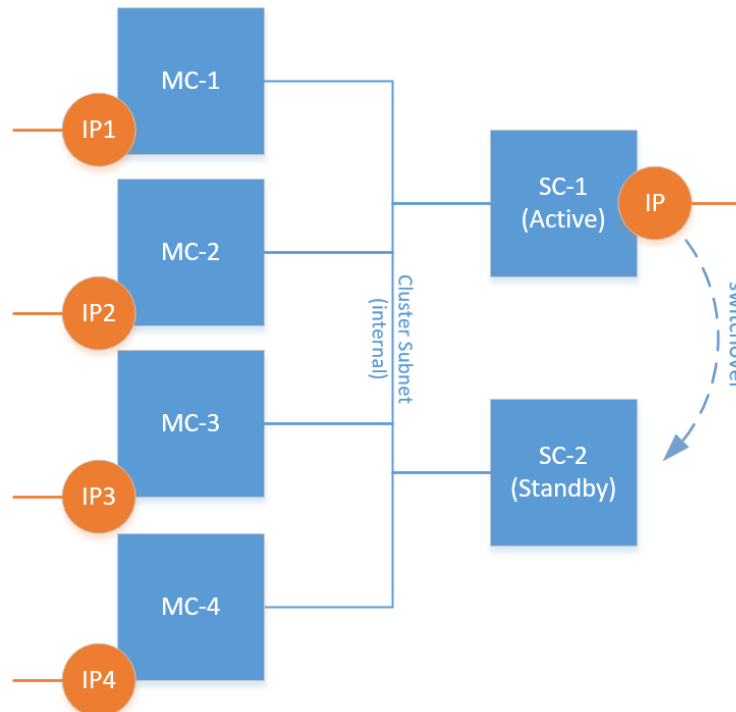
Signaling components also serve as a “single point of contact” for all management tasks. They provide Web and CLI interfaces through which customers have complete control over all cluster components.

1.2 Deployment Topology

In a typical Mediant CE deployment, two Signaling Components are created and operate in 1+1 Active / Standby mode. In case of a failure in the active signaling component, all IP addresses are seamlessly moved to the remaining (newly active) signaling component and all established calls are preserved.

The Mediant CE cluster may contain up to 21 Media Components that operate in N+1 Load Sharing mode. In case of a specific Media Component failure, calls handled by it are re-distributed across the other Media Components, with no visible effect on established calls.

Figure 1-2: Signaling Components Switchover



You can adjust cluster size by scaling Media Components “in” or “out” based on cluster utilization and/or explicit customer request. “Scaled down” media components are kept in “stopped” state, which ensures that they can be quickly started during “scale out” operation.

You may also deploy Mediant CE in private cloud environments (e.g., VMware) via manual installation and configuration instructions, provided below. Such deployments don't support the Stack Manager component and certain cluster management features. For example, they don't support automatic scaling.



Note:

- Mediant VE and CE products share the same software image. Therefore, in some places in this document, the Mediant VE product name is referenced even though the document concerns Mediant CE.
- The scope of this document does not fully cover security aspects for deploying the product in the intended environment. Security measures should be done in accordance with specific security policies and recommendations of the intended environment.
- For configuring Mediant CE, refer to the *Mediant Software SBC User's Manual*.

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2 Deployment in OpenStack

2.1 Prerequisites

Prior to deploying Mediant CE in the OpenStack environment, make sure that you meet the following prerequisites:

- You have uploaded the AudioCodes Mediant VE/CE image to the image repository. For more information, see Section AudioCodes Mediant VE/CE Image.
- You have created all subnets needed for Mediant CE deployment. For more information, see Section Network Prerequisites.

2.1.1 AudioCodes Mediant VE/CE Image

To deploy Mediant CE on OpenStack, you must use the *Mediant VE/CE QCOW2 Image for KVM/OpenStack*. For more information, go to <https://www.audiocodes.com/library/firmware>.

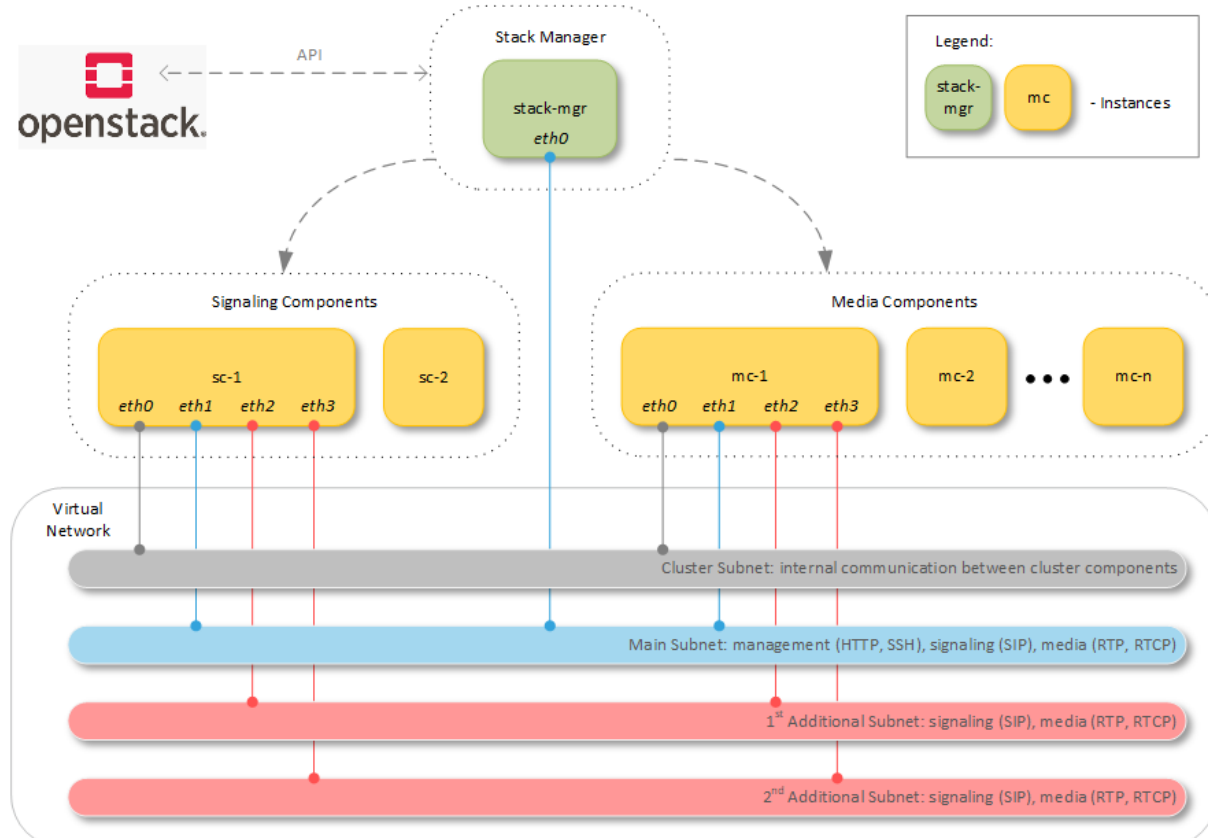
Upload the image to the OpenStack image repository, using the following command:

```
# openstack image create --disk-format qcow2 \
  --container-format bare --public \
  --file ./sbc-F7.20A.202.204.qcow2 sbc-F7.20A.202.204
```

2.1.2 Network Prerequisites

Mediant CE on OpenStack uses the following network architecture:

Figure 2-1: Mediant CE Network Architecture – OpenStack



Up to four subnets may be used:

- **Cluster Subnet:** For internal communication between Mediant CE components. It's connected to both Signaling Component and Media Component instances as the first network interface (eth0).
- **Main Subnet:** Carries management (HTTP, SSH, etc.), signaling (SIP) and media (RTP, RTCP) traffic. It's connected to both Signaling Component and Media Component instances as the second network interface (eth1) and to the Stack Manager instance.
- **1st and 2nd Additional Subnets:** Carry signaling (SIP) and media (RTP, RTCP) traffic. They are connected to Media Component instances as the third and fourth network interfaces (eth2 and eth3), respectively. These subnets are optional, as the Main Subnet may carry all types of traffic.

All needed subnets must be created prior to Mediant CE deployment.

2.1.3 Instance Flavors

It's recommended to use the following instance flavors for Mediant CE components:

- Signaling Component instances: 4 vCPU (hyperthreading enabled), 16GB RAM
- Forwarding Media Component instances: 2 vCPU (Hyper-threading enabled), 4GB RAM
- Transcoding Media Component instances: 8 vCPU (Hyper-threading enabled), 8GB RAM

2.2 Deployment via Stack Manager

The recommended method for deploying Mediant CE in an OpenStack environment is via the Stack Manager tool. Alternatively, you may perform manual installation and configuration as described in Section Deployment via Manual Installation and Configuration.

Stack Manager is a management tool developed by AudioCodes that enables simple and intuitive deployment and complete lifecycle management of Mediant CE products on on public and private clouds. The tool provides the following features for Mediant CE:

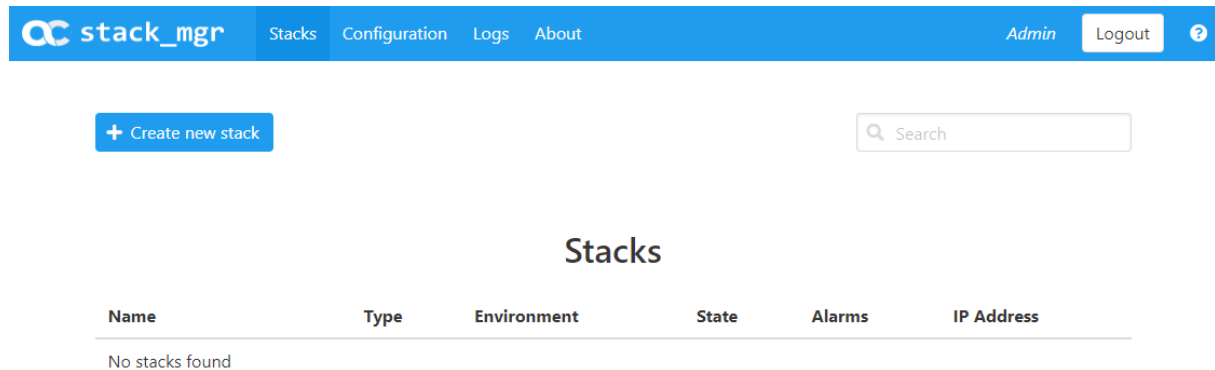
- Initial product deployment.
- Update of deployed stack's network topology
- Automatic and on-demand scaling of media components, to adjust stack footprint and minimize infrastructure costs.
- Monitoring of deployed OpenStack resources and recovery in case of their corruption / accidental removal
- Upgrade of software on all Mediant CE components
- Removal of all deployed resources in case of stack deletion

Stack Manager uses dynamically generated Heat templates for stack deployment on the OpenStack platform and is not involved in call processing or any other services provided by Mediant CE.

➤ **To deploy Mediant CE:**

1. Install the Stack Manager tool, as described in the [Stack Manager User's Manual](#).
2. Log into the Stack Manager tool after deployment; the following screen appears:

Figure 2-2: Stack Manager Main Screen



3. Click **Create** to create a new stack; the following dialog box appears:

Figure 2-3: Create Stack Dialog – Step 1

4. In the 'Name' field, enter a name for the stack (e.g., "mediant-ce").
5. From the 'Stack type' drop-down list, select **Mediant CE**.

6. From the 'Image' drop-down list, select the AudioCodes Mediant VE/CE image, prepared as described in Section AudioCodes Mediant VE/CE Image.
7. From the 'Key pair' drop-down list, select the key pair that you will use to access the deployed stack's CLI interface (via SSH protocol). Alternatively, you may use username / password (defined in the same dialog box later) to access both Web and CLI interfaces.
8. Select the subnets that Mediant CE will be connected to.

Figure 2-4: Create Stack Dialog – Step 2

Create new stack

Signaling Components

VM type -- select -- ☒ Customize

Media Components

Profile forwarding ☒ Customize

VM type -- select -- ☒ Customize

Min number 2

Max number 3

Admin User

Username

Password

Advanced

Advanced config

Create **Cancel**

9. From the 'VM type' drop-down list, select the type of virtual machine for the signaling and media components.
10. From the 'Profile' drop-down list, select whether you need media components to perform simple media stream **forwarding** (includes RTP-to-SRTP translation and vice versa) or need **transcoding** capabilities (for coder conversion or DTMF detection).
11. In the 'Min number' and 'Max number' fields, select the minimum and maximum number of media components in the stack. Stack Manager creates the selected maximum number of media components, but initially starts only creating the selected minimum number of them. You may later adjust the number of running media components via **scale out** and **scale in** actions.

12. In the 'Username' and 'Password' fields, enter the admin user credentials that will be configured on the deployed stack. You use these credentials when connecting to the stack via Web or CLI management interfaces. Note that Stack Manager uses different credentials to communicate with the stack – **StackMgr** user and randomly generated password. Therefore, even if you later change admin user credentials (e.g., via Mediant CE's Web or CLI interface) communication between Stack Manager and deployed Mediant CE stack is not be affected.
13. In the 'Advanced config' text box, enter advanced configuration parameters, if needed. See the next sections for a partial list of supported advanced configuration parameters. Refer to *Stack Manager User's Manual* for a complete list.
14. Click **Create** to start stack creation.
15. Wait until stack is created.

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3 Deployment in Private Cloud Environments (e.g., VMware)

3.1 Prerequisites

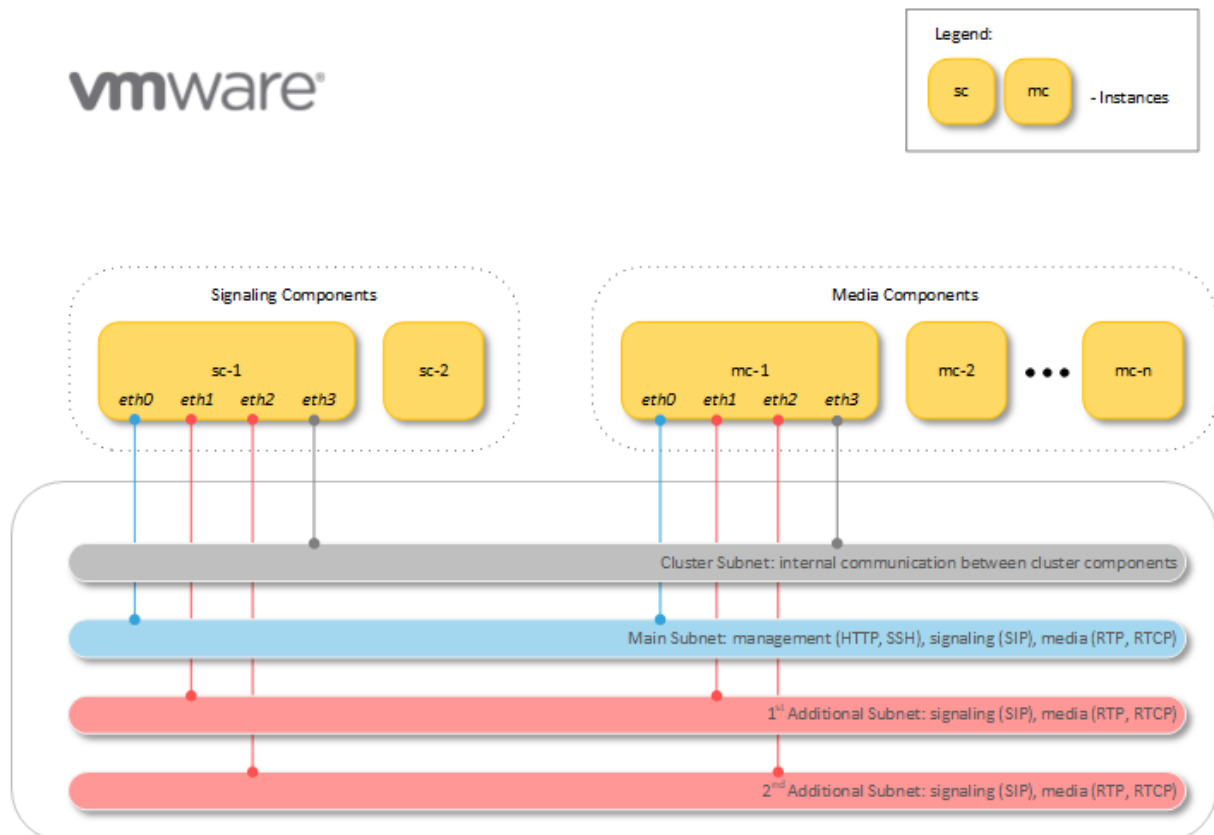
Prior to deploying Mediant CE in a private cloud environment (e.g., VMware), make sure that you meet the following prerequisites:

- You have AudioCodes Mediant VE/CE image for your environment (e.g., OVF image for VMware). Images can be downloaded from AudioCodes website at <https://www.audiocodes.com/library/firmware>.
- All subnets needed for Mediant CE deployment are available, including the Cluster subnet. For more information, see the following section.

3.1.1 Network Prerequisites

Mediant CE in private cloud environments (e.g., VMware) uses the following network architecture:

Figure 3-1: Mediant CE Network Architecture – Private Cloud Environments (e.g., VMware)



Up to four subnets may be used:

- **Cluster Subnet**: For internal communication between Mediant CE components.
- **Main Subnet**: Carries management (HTTP, SSH, etc.), signaling (SIP), and media (RTP, RTCP) traffic.

- **1st and 2nd Additional Subnets:** Carries signaling (SIP) and media (RTP, RTCP) traffic. These subnets are optional because the Main Subnet may carry all types of traffic. The 1st network interface (eth0) is typically connected to the Main subnet. The last network interface is typically connected to the Cluster subnet.

3.1.2 Virtual Machine Types

The recommended virtual machine types for Mediant CE components depend on the host's CPU type:

- **Prior to Intel® Xeon® Scalable Processors:**
 - Signaling Component instances:
 - ◆ 4 vCPU (non-hyperthreaded, 4 physical cores)
 - ◆ 16GB RAM, 50GB Storage
 - Forwarding-only Media Component instances:
 - ◆ 1 vCPU (non-hyperthreaded, 1 physical core)
 - ◆ 4GB RAM, 10GB Storage
 - Transcoding Media Component instances:
 - ◆ 8 vCPU (non-hyperthreaded, 8 physical cores)
 - ◆ 8GB RAM, 10GB Storage
- **Intel® Xeon® Scalable Processors or later:** it's recommended to utilize Hyper-Threading capability, which provides improved performance while using lower CPU resources.
 - Signaling Component instances:
 - ◆ 4 vCPU (hyperthreaded, 2 physical cores)
 - ◆ 16GB RAM, 50GB Storage
 - Forwarding-only Media Component instances:
 - ◆ 2 vCPU (hyperthreaded, 1 physical core)
 - ◆ 4GB RAM, 10GB Storage
 - Transcoding Media Component instances:
 - ◆ 8 vCPU (hyperthreaded, 4 physical cores)
 - ◆ 8GB RAM, 10GB Storage

3.2 Redundancy Deployment Options

3.2.1 Protection from Software Failure

Software protection of the Signaling Component is achieved using 1+1 instances of Signaling Component's (1+1 VM's).

Software Protection of the Media Components is achieved using N+1 instances of Media Component's (N+1 VM's).

3.2.2 Protection from Hardware Failure

Hardware failure is more restrictive than software failure because a failure of a single server may pose simultaneous failures of multiple virtual machines (either Signaling Component or Media Component) residing on that server.

When protection from a hardware failure is required on the Signaling Component, two host servers should be deployed and occupy a single Signaling Component on each. These servers can deploy Media Component virtual machines as well.

When protection from a hardware failure is required for the Media Components, calculation of the minimum number of servers required for allocation of Media Components should take into account the following factors:

- Maximum active media sessions allowed on a single server. For figures, refer to the [Release Notes](#) (Section 'Mediant CE SBC for VMware'), which is currently 4,000 sessions.
- Transcoding capacity required and transcoding capacity per Media Component (refer to the [Release Notes](#) for the specific transcoding type/s required).
- Session capacity required, and session capacity per Media Component (refer to the [Release Notes](#)).

It's recommended to consult with AudioCodes to reach the minimum number of servers.

3.2.3 Redundancy Deployments Summary

The following table describes redundancy options for deployment:

| Component Module (VM Type) | Redundancy Protection | | Number of Components (VMs) Required | Servers (Hosts) Deployment |
|----------------------------|-----------------------|-------------------------------------|-------------------------------------|---|
| | Software Failure Only | Software and Server (Host) Failures | | |
| Signaling Components | - | - | 1 | Single Signaling Component on a single server |
| | + | - | 1+1 | Both Signaling Components can reside on the same server, or different servers |
| | + | + | 1+1 | Each Signaling Component on a different server |
| Media Components | - | - | N ¹ | Each server can occupy as many Media Components as possible |
| | + | - | At least N+1 | Each server can occupy as many Media Components as possible |
| | + | + | At least $\frac{N*S}{S-1}$ | Each server should occupy at least $\frac{N}{S-1}$ Media Components |

3.2.4 Protection from Hardware and Software Failure

When protection from both hardware and software failure is required on the Signaling Component, two host servers should occupy a single Signaling Component on each.

When protection from both hardware and software failure is required on the Media Component, the minimum number of servers required for allocation of Media Components can be calculated as follows:

$$S \geq \frac{N + Ns}{Ns}$$

Where:

- **S** is the number of servers required (minimum 2).
- **N** is the number of Media Components required to reach the required media capacity (forwarding and transcoding).
- **Ns** is the maximum number of Media Components that can be installed on a single server.

¹ N is the number of MCs required to achieve the required media capacity (forwarding and transcoding) without redundancy. S is the number of servers in the deployment.

3.3 Creating Virtual Machines

Create virtual machines for signaling and media components as follows:

1. For each server (host) in the deployment, configure BIOS settings according to Section 3.1 "Configuring the Server's BIOS" in the *Mediant Virtual Edition SBC Installation Manual*.
2. Create a virtual machine for the first signaling component, according to Section 3 in the *Mediant Virtual Edition SBC Installation Manual*. For example, for VMware vSphere ESXi, follow detailed instructions in:
 - Section 3.2 "Installing Mediant VE SBC on VMware vSphere ESXi"
 - Section 3.7 "Configuring Console Access Method".
 - Section 3.8 "Reconfiguring Default IP Address to Match Network Settings"



Note: Section 3.9 "Adding Transcoding Capabilities" is not applicable to Mediant CE.

3. Repeat Step 2 to create a virtual machine for the second signaling component. This signaling component should reside on the same server (host) or on a different server according to Section Redundancy Deployment Options.
4. Configure two signaling components as a high-availability (HA) pair, as described in Section 3.13 in the *Mediant Virtual Edition SBC Installation Manual*.
5. Repeat Step 2 to create virtual machines for media components. The number of media components is determined according to Section Redundancy Deployment Options.
6. Follow the instructions in Section Deployment via Manual Installation and Configuration.

3.4 Deployment via Manual Installation and Configuration

This deployment method enables Mediant CE deployment in private cloud environments (e.g., VMware). All needed resources (e.g., subnets and virtual machines) must be manually created and properly configured by the operator, as described below.

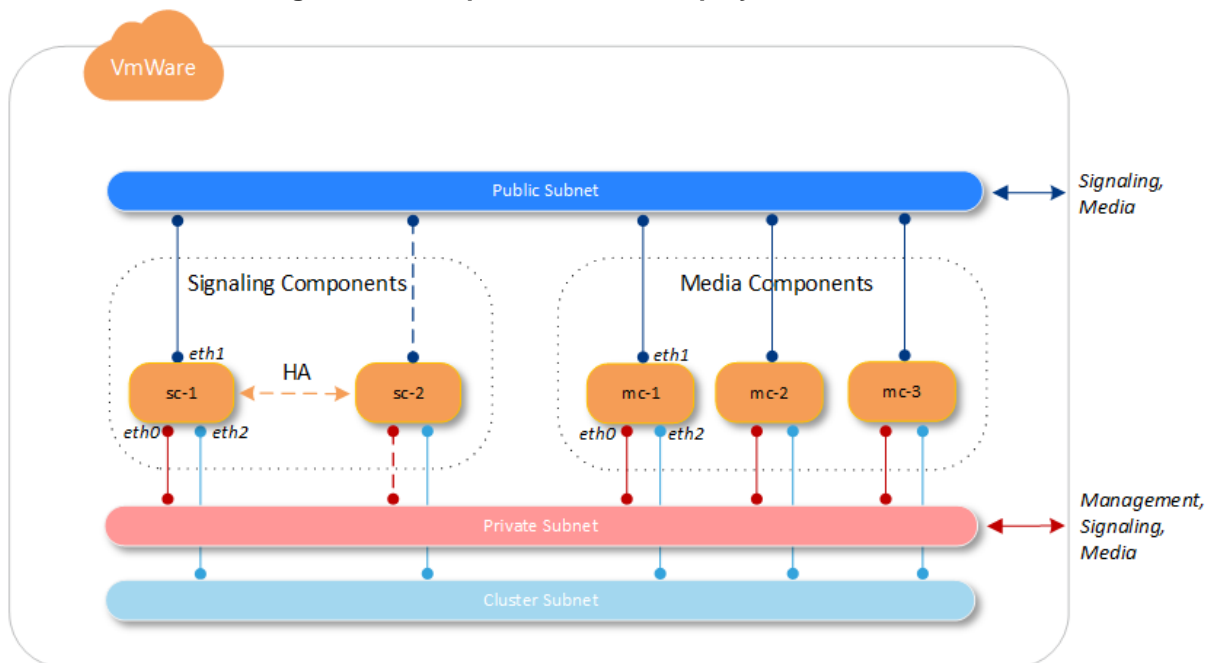
As this deployment method doesn't include a "management component", automatic scaling is not supported. Manual scaling may be done by creating and configuring additional resources, but it's considerably more complicated than when using Stack Manager.



Note: For cloud environments, you should deploy Mediant CE using the Stack Manager tool, as described previously.

The following instructions describe the following Mediant CE deployment example:

Figure 3-2: Sample Mediant CE Deployment In VMware



The deployment consists of:

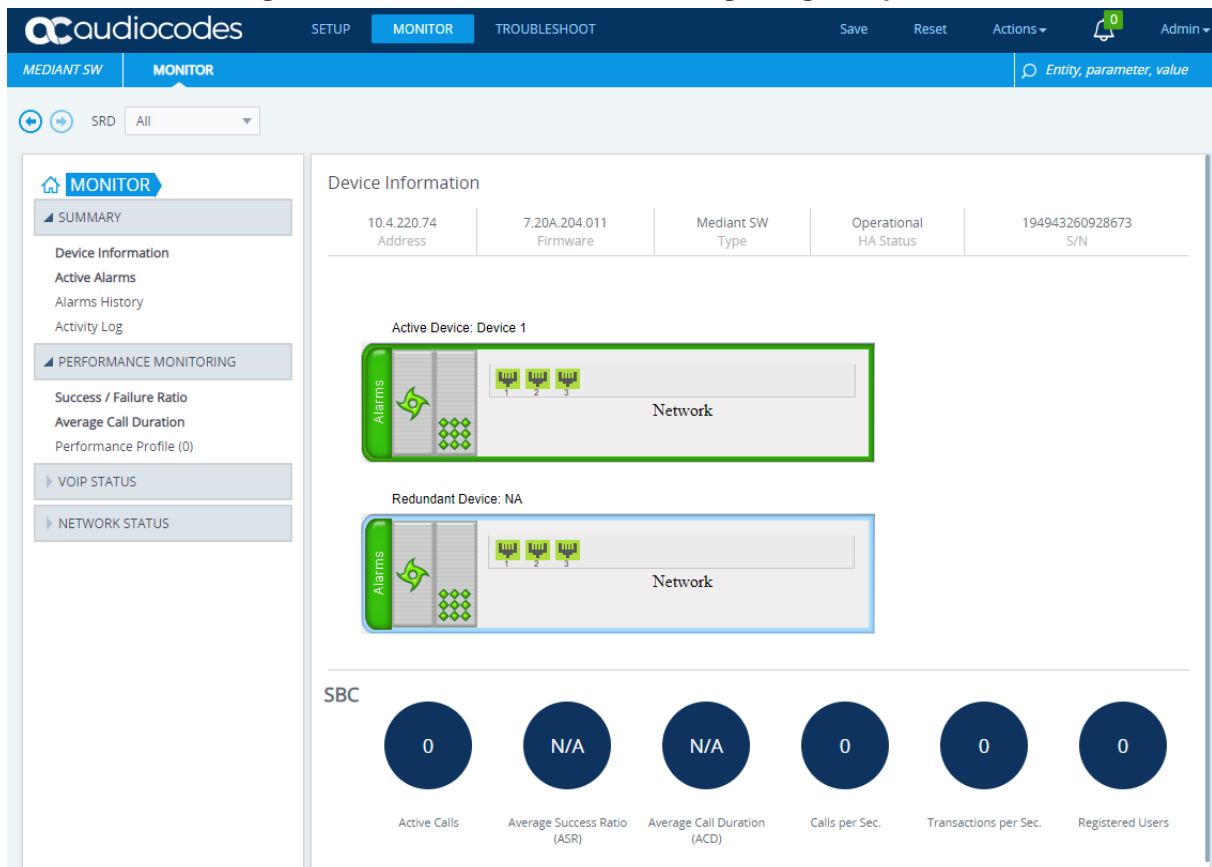
- Two signaling components: sc-1 and sc-2
- Three media components: mc-1, mc-2, and mc-3
- Private subnet, which is used for management (e.g., SSH and HTTP), signaling (SIP), and media (RTP) traffic
- Public subnet, which is used for signaling (SIP) and media (RTP) traffic
- Cluster subnet, which is used for internal communication between Mediant CE components

➤ **To deploy Mediant CE:**

1. Create virtual machines for all Mediant CE components.
2. Connect all virtual machines to the subnets:
 - eth0 (1st network port) – private subnet
 - eth1 (2nd network port) – public subnet
 - eth2 (3rd network port) – cluster subnet
3. Configure IP addresses on the 1st Signaling Component (sc-1):
 - eth0 – Application Type is **O+C+M**
 - eth1 – Application Type is **C+M**
 - eth2 – Application Type is **Maintenance (HA)**
4. Configure IP addresses on the 2nd Signaling Component (sc-2):
 - eth0 – Application Type is **O+C+M**
 - eth2 – Application Type is **Maintenance (HA)**
5. Configure IP addresses on the Media Component (mc-1, mc-2, and mc-3):
 - eth0 – Application Type is **O+C+M**
 - eth1 – Application Type is **C+M**
 - eth2 – Application Type is **Cluster**
6. Configure HA connection between Signaling Components:
 - a. On the 1st Signaling Component (sc-1):
 - a. Open the HA Settings page (**Setup** menu > **IP Network** tab > **Core Entities** folder > **HA Settings**).
 - b. Configure the 'HA Remote Address' parameter to the Maintenance IP address (eth2) of the 2nd Signaling Component (sc-2).
 - c. Save configuration.
 - b. On the 2nd Signaling Component (sc-2):
 - a. Open HA Settings page (**Setup** menu > **IP Network** tab > **Core Entities** folder > **HA Settings**).
 - b. Configure the 'HA Remote Address' parameter to the Maintenance IP address (eth2) of the 1st Signaling Component (sc-1).
 - c. Save configuration.
 - c. Restart the 1st Signaling Component and wait until it boots up.
 - d. Restart the 2nd Signaling Component. When the restart completes, the 2nd Signaling Component establishes HA connection with the 1st Signaling Component and loses all its networking configuration, except for the Maintenance IP address. Therefore, you are unable to access its Web interface. Instead, you should check its status on the **Monitor** page on the Web interface of the 1st Signaling Component.

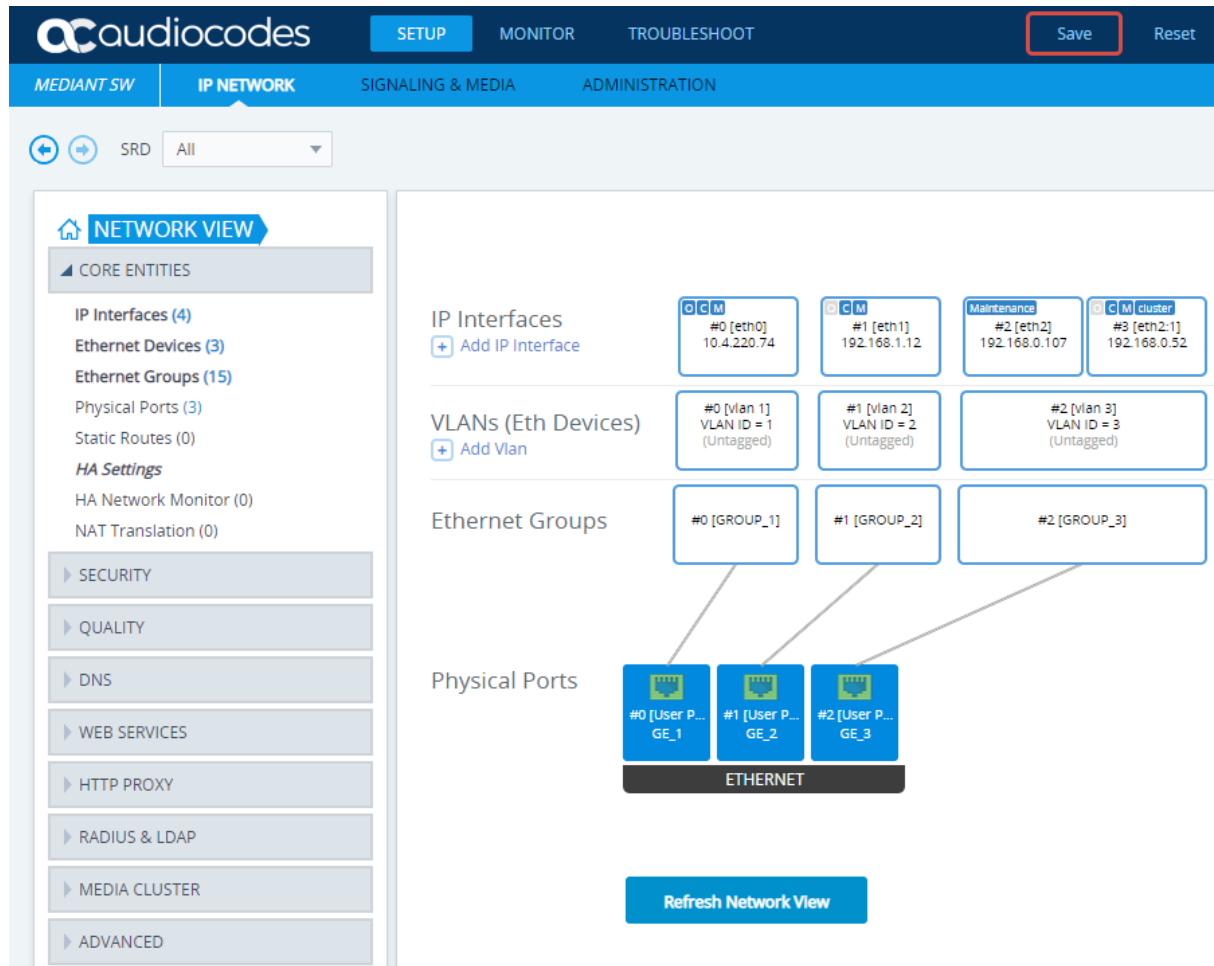
- e. Wait until the HA connection between Signaling Components is fully established and the **Monitor** page displays the 'HA Status' as "Operational" and both Active and Redundant devices are visible.

Figure 3-3: HA Connection Between Signaling Components



7. Add the cluster IP address to the Signaling Components:
 - a. On the 1st Signaling Component (sc-1), open the IP Interfaces table (**Setup** menu > **IP Network** tab > **Core Entities** folder > **IP Interfaces**).
 - b. Add an additional (secondary) IP address to the VLAN that is attached to the 3rd network interface (eth3).
 - c. Configure the 'Application Type' parameter to **Cluster** for this additional IP address.

Figure 3-4: Network Configuration on Signaling Components



8. Configure Signaling Components to operate in Media Cluster mode:
 - a. On the 1st Signaling Component (sc-1), open the Cluster Manager Settings page (**Setup** menu > **IP Network** tab > **Media Cluster** folder > **Cluster Manager Settings**).
 - ◆ Configure the 'Cluster Mode' parameter to **Media Cluster**.
 - ◆ Configure the 'Device Role' parameter to **Signaling Component**.
 - b. Save configuration.
 - c. Restart the device to activate the new operation mode.
9. Configure Media Components (mc-1, mc-2, mc-3) to operate in Media Cluster mode:
 - a. On each Media Component (mc-1, mc-2, mc-3), open the Cluster Manager Settings page (**Setup** menu > **IP Network** tab > **Media Cluster** folder > **Cluster Manager Settings**).
 - ◆ Configure the 'Cluster Mode' parameter to **Media Cluster**.
 - ◆ Configure the 'Device Role' parameter to **Media Component**.

- b. Refresh the navigation menu, by clicking the browser's Reload button or using the Ctrl+R shortcut key.
 - c. Open the MC Settings page (**Setup** menu > **IP Network** tab > **Media Cluster** folder > **MC Settings**).
 - ◆ Configure the 'Cluster Manager IP Address' parameter to the Cluster IP address of the Signaling Component (added in Step 7).
 - ◆ Configure the 'Media Component Profile' parameter to match the intended operational mode of the Media Components.
 - d. Save configuration.
 - e. Restart the device to activate the new configuration.
10. Configure Signaling Components to operate with Media Components:
- a. On the 1st Signaling Component (sc-1), open the Media Components page (**Setup** menu > **IP Network** tab > **Media Cluster** folder > **Media Components**).
 - b. Click **New** to add a new Media Component entry.
 - c. Configure the Media Component name and corresponding OAM IP address (assigned to eth0 interface).
 - d. Repeat the above steps for all Media Components.
 - e. Save configuration.
 - f. Wait until the 'Status' field of all Media Components displays "Connected".

Figure 3-5: Media Components Configuration and Status Table

The screenshot shows the Audiocodes Mediant CE SBC configuration interface. The top navigation bar includes 'Setup', 'Monitor', and 'Troubleshoot' tabs. The 'Setup' tab is active, and the 'IP Network' sub-tab is selected. The left sidebar shows a tree view of configuration categories, with 'Media Cluster' expanded and 'Media Components (3)' selected.

The main content area displays the 'Media Components (3)' configuration page. It includes a table with the following data:

| INDEX | NAME | OAMP IP ADDRESS | ADMIN STATE | VERSION | STATUS | MEDIA UTILIZATION (LEGS) | DSP UTILIZATION (LEGS) | ALARM SEVERITY |
|-------|------|-----------------|-------------|---------------|-----------|--------------------------|------------------------|----------------|
| 0 | mc-1 | 10.4.220.69 | Unlocked | 7.20A.204.011 | Connected | 0% (0) | 0% (0) | None |
| 1 | mc-2 | 10.4.220.72 | Unlocked | 7.20A.204.011 | Connected | 0% (0) | 0% (0) | None |
| 2 | mc-3 | 10.4.220.75 | Unlocked | 7.20A.204.011 | Connected | 0% (0) | 0% (0) | None |

Below the table, a detailed view for the selected component '#0[mc-1]' is shown. It includes sections for 'DEVICE SETTINGS', 'DEVICE INFORMATION', and 'DSP INFORMATION'.

DEVICE SETTINGS:

- Name: mc-1
- OAMP IP Address: 10.4.220.69
- Cluster Manager IP Address: 192.168.0.52
- Admin State: Unlocked
- Media Utilization (Legs): 0% (0)

DEVICE INFORMATION:

- Media Component Type: vMC
- Version: 7.20A.204.011
- Serial Number: 149070522145563

DSP INFORMATION:

- DSP SW Name: SOFTDSP
- DSP Count: 0
- DSP SW Version: 00.00
- DSP Utilization (Legs): 0% (0)

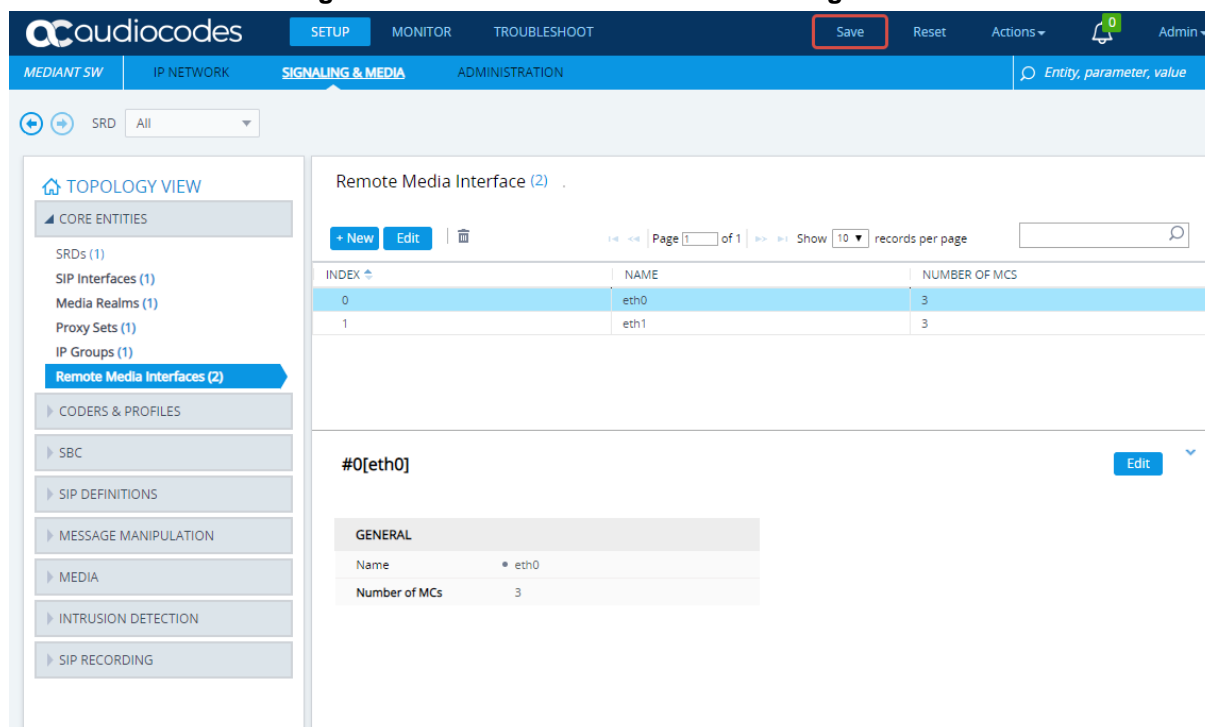
DEVICE STATUS:

- Status: Connected
- Device Up Time: 00:00H:21M:06S
- Alarm Severity: None

11. Configure Remote Media Interfaces on Signaling Components:
 - a. On the 1st Signaling Component (sc-1), open the Remote Media Interfaces page (**Setup** menu > **Signaling & Media** tab > **Core Entities** folder > **Remote Media Interfaces**).
 - b. Click **New** to add a new Remote Media Interface.
 - c. Enter the name of the network interface on Media Components that is capable of handling media traffic (e.g., "eth0" or "eth1" in our example).

- d. Repeat the above steps for all network interfaces on the Media Components that are capable of handling media traffic.
- e. Verify that the 'Number of MCs' for each configured interface matches the actual number of Media Components (three in our example).

Figure 3-6: Remote Media Interfaces Configuration



12. Update Media Realms configuration on Signaling Components:
 - a. On the 1st Signaling Component (sc-1), open the Media Realms page (**Setup** menu > **Signaling & Media** tab > **Core Entities** folder > **Media Realms**).
 - b. Click **Edit** to edit the default Media Realm.
 - c. Configure 'Remote IPv4 Interface Name' to reference one of the Media Component's network interfaces, configured as Remote Media Interfaces in Step 12.

All traffic associated with this Media Realm is sent/received via the corresponding network interface on one of the Media Components. If you need to define additional Media Realms, configure them in a similar manner. In other words, configure 'Remote IPv4 Interface Name' or 'Remote IPv6 Interface Name' to associate the Media Realm with the corresponding network interface on one of the Media Components. Mediant CE automatically distributes calls across available Media Components, choosing the proper network interface and port range as configured for the Media Realm.

Figure 3-7: Media Realms Configuration

The screenshot displays the Audiocodes Mediant CE SBC configuration interface. The top navigation bar includes tabs for SETUP, MONITOR, and TROUBLESHOOT. The left sidebar shows a TOPOLOGY VIEW with various entities like SRDs, SIP Interfaces, Proxy Sets, IP Groups, and Remote Media Interfaces. The main content area is titled 'Media Realms (1)' and contains a table with one entry: 'DefaultRealm'. Below the table, the configuration details for '#0[DefaultRealm]' are shown, including a GENERAL section with fields like Name, Topology Location, Remote IPv4 Interface, Remote IPv6 Interface, Port Range Start, Number Of Media, Port Range End, and Default Media Realm. A QUALITY OF EXPERIENCE section is also visible with fields for QoE Profile and Bandwidth Profile.

| INDEX | NAME | PORT RANGE START | NUMBER OF MEDIA SESSION LEGS | PORT RANGE END | DEFAULT MEDIA REALM |
|-------|--------------|------------------|------------------------------|----------------|---------------------|
| 0 | DefaultRealm | 6000 | 11907 | 65534 | Yes |

#0[DefaultRealm]

| GENERAL | | QUALITY OF EXPERIENCE | |
|-----------------------|---------------|-----------------------|------------|
| Name | DefaultRealm | QoE Profile | # [-] View |
| Topology Location | Down | Bandwidth Profile | # [-] View |
| Remote IPv4 Interf... | # [eth0] View | | |
| Remote IPv6 Interf... | # [-] View | | |
| Port Range Start | 6000 | | |
| Number Of Media ... | 11907 | | |
| Port Range End | 65534 | | |
| Default Media Realm | Yes | | |

13. If one of your subnets resides behind the NAT device, configure NAT translation as follows:

For each Media Component (mc-1, mc-2, and mc-3):

- a. Open the NAT Translation page (**Setup** menu > **IP Network** tab > **Core Entities** folder > **NAT Translation**).
- b. Click **New** to create a new NAT Translation rule, and then configure it as follows:
 - ◆ Configure the 'Source Interface' parameter to reference the corresponding network interface (e.g. eth1).
 - ◆ Configure the 'Source Start Port' parameter to 1.
 - ◆ Configure the 'Source End Port' parameter to **65535**.
 - ◆ Configure the 'Target IP Address' parameter to match the public IP address of the NAT device (e.g., 10.6.2.101).
 - ◆ Configure the 'Target Start Port' parameter to 1.
 - ◆ Configure the 'Target End Port' parameter to **65535**.
- c. Restart the Media Component to activate the new configuration.
- d. Repeat the above steps for all Media Components.

On the 1st Signaling Component (sc-1):

- a. Open the Media Components page (**Setup** menu > **IP Network** tab > **Media Cluster** folder > **Media Components**).
- b. For each entry that corresponds to the specific Media Component, click the **Network Interfaces** link at the bottom of the page, and then verify that the Public IP Address is properly detected for relevant interfaces.

Figure 3-8: Verifying Public IP Address of the Media Component

The screenshot shows the Audiocodes Mediant SW interface. The left sidebar contains a navigation menu with categories like SECURITY, QUALITY, DNS, WEB SERVICES, HTTP PROXY, RADIUS & LDAP, and MEDIA CLUSTER. The 'MEDIA CLUSTER' section is expanded, showing 'Media Components (3)' as the selected item. The main content area displays the 'Media Components [2] > Network Interfaces (2)' page. It features a table with the following data:

| INDEX | INTERFACE NAME | PRIVATE IP ADDRESS | PUBLIC IP ADDRESS | NETWORK GROUP | APPLICATION TYPE | VLAN ID |
|-------|----------------|--------------------|-------------------|---------------|------------------|-----------------|
| 0 | eth0 | 10.4.220.75 | | GROUP_1 | O+M+C | 1 (Native Vlan) |
| 1 | eth1 | 192.168.1.6 | 10.6.2.101 | GROUP_2 | MEDIA+CONTROL | 2 (Native Vlan) |

Below the table, the details for entry #1 are shown under the 'GENERAL' tab:

| | |
|--------------------|-----------------|
| Interface Name | eth1 |
| Private IP Address | 192.168.1.6 |
| Public IP Address | 10.6.2.101 |
| Network Group | GROUP_2 |
| Application Type | MEDIA+CONTROL |
| Vlan ID | 2 (Native Vlan) |

14. Open the NAT Translation page (**Setup** menu > **IP Network** tab > **Core Entities** folder > **NAT Translation**).
15. Click **New** to create a new NAT Translation rule, and then configure it as follows:
 - Leave the 'Source Interface' parameter empty.
 - Configure the 'Remote Interface Name' parameter to reference the corresponding Media Component's network interface (e.g., eth1).
 - Configure the 'Source Start Port' parameter to **1**.
 - Configure the 'Source End Port' parameter to **65535**.
 - Configure the 'Target IP Mode' parameter to **Automatic**.
 - Configure the 'Target Start Port' parameter to **1**.
 - Configure the 'Target End Port' parameter to **65535**.

Mediant CE automatically performs NAT Translation, using the Public IP address of the Media Component that handles the specific call.

16. Your basic Mediant CE configuration is complete. You should now configure the SIP application, as described in the *Mediant VE/CE User's Manual* and perform some basic calls to verify correct system operation.

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4 Managing Mediant CE

Mediant CE management is performed through the Web, CLI, and REST management interfaces provided by the active Signaling Component. These management interfaces are accessible via:

- **OpenStack:** via "eth1" private or public IP addresses assigned to the active signaling component
- **Private cloud environments (e.g., VMware):** via "eth0" private or public IP addresses assigned to the active signaling component

All Mediant CE management operations are performed through the above described management interface. There is no need to access management interfaces on other components (e.g., on media components).

5 Default Security Rules

Stack Manager creates security groups during Mediant CE deployment that enable only relevant traffic for each component and subnet. These security rules are assigned to network interfaces on both signaling components and media components.

The following table lists inbound rules for default security rules. You may change signaling and media rules by updating the 'Signaling ports' and 'Media ports' fields described previously.

Table 5-1: Inbound Rules for Default Security Groups

| Component | Traffic | Subnet | Protocol | Port |
|---------------------|------------------|--|----------|---------------------|
| Signaling Component | SSH | Main | TCP | 22 |
| | HTTP | Main | TCP | 80 |
| | HTTPS | Main | TCP | 443 |
| | SIP over UDP | <ul style="list-style-type: none"> ■ Main ■ Additional1 ■ Additional2 | UDP | 5060 |
| | SIP over TCP/TLS | <ul style="list-style-type: none"> ■ Main ■ Additional1 ■ Additional2 | TCP | 5060, 5061 |
| Media Component | RTP, RTCP | <ul style="list-style-type: none"> ■ Main ■ Additional1 ■ Additional2 | UDP | 6000-65535 |
| All | Internal | Cluster | UDP | 669, 680, 925, 3900 |
| | | Cluster | TCP | 80, 2442, 224 |

Inbound security rules in the Main and Additional subnets are configured by default to accept all traffic, including management traffic, from all sources, which constitutes a significant security risk. It's highly recommended to modify them after Mediant CE creation to allow inbound traffic only from specific IP addresses / subnets, especially for management traffic.

Inbound security rules in the Cluster subnet are configured by default to accept traffic from the virtual machines that belong to the same security group / virtual network only. Therefore, there is no need to further adjust them.

Outbound security rules in all subnets are configured by default to allow all traffic. You may adjust them as per your needs.

If you performed Mediant CE deployment via manual installation and configuration, consider creating similar or equivalent security rules in virtual environment specific network configuration.

6 Upgrading Software Version



IMPORTANT NOTICE

For upgrading Mediant CE SBC to a version using a digitally signed .cmp file, you **must** follow the upgrade prerequisites and instructions in the document [Mediant SW-90xx SBC Signed-CMP Upgrade Procedure Configuration Note](#).

You may upgrade the software version of the deployed Mediant CE using the Software Version file (.cmp) through one of the following means:

- Using Mediant CE Web interface:
 - Upgrade Signaling Components using the Software Upgrade Wizard (**Action > Software Upgrade**).
 - Upgrade "active" (currently running) Media Components using the Cluster Management page (**SETUP > IP NETWORK > MEDIA CLUSTER > Cluster Management**).
 - Upgrade "idle" (currently stopped) Media Components using Stack Manager (**Update Idle MCs**).
- Using Stack Manager's Web interface:
 - Upgrade all components at once using the **Upgrade** operation

Figure 6-1: Upgrading Mediant CE via Stack Manager



Note: Make sure that the Signaling Components have the same or later version than the Media Components.

Upgrade using the Software Version file (.cmp) may be performed only within the same OS version stream.

The following streams are available:

- 7.20A stream – based on OS Version 6
- 7.20CO stream – based on OS Version 8
- 7.40A stream – based on OS Version 8

For example, if your Mediant CE is currently running software version 7.20A.256.396 (i.e., 7.20A stream, based on OS Version 6), you may use 7.20A.258.010 .cmp file to upgrade it to a newer version (also based on OS Version 6). However, you may not use 7.40A.005.509 .cmp file to perform a similar upgrade to a version from the 7.40A stream (based on OS Version 8).

If you want to upgrade Mediant CE deployed with a version from 7.20A stream (based on OS Version 6) to a version from 7.20CO or 7.40A streams (based on OS Version 8), use one of the following methods:

- **Method 1:** Deploy a new Mediant CE instance using OS Version 8 software image, configure it, and then switch live traffic to the new instance. See Section 6.1 for detailed instructions.
- **Method 2:** Rebuild the existing Mediant CE instance from the new OS Version 8 image. See Section 6.2 for detailed instructions.

Advantages and disadvantages of each method are listed in the table below:

| Method | Advantages | Disadvantages |
|-----------------|--|--|
| Method 1 | <ul style="list-style-type: none"> ■ In case of any problems with the new software version (based on OS Version 8), live traffic may be switched back to the old instance, running the old software version. ■ Traffic may be gradually moved to a new instance (assuming VoIP equipment that sent traffic towards the Mediant CE supports such functionality), thereby providing better control over the upgrade process and minimizing service downtime. | <ul style="list-style-type: none"> ■ Requires the use of additional resources for the duration of the upgrade. ■ Implies a change of IP addresses (both public and private) and therefore, requires re-configuration of VoIP equipment that communicates with the Mediant CE. ■ Requires a new License Key for the new Mediant CE instance. |
| Method 2 | <ul style="list-style-type: none"> ■ Doesn't require additional resources. ■ Preserves public and private IP addresses of the deployed CE instance. | <ul style="list-style-type: none"> ■ Requires a new License Key after the upgrade (because Signaling Component's serial number changes). ■ Service is unavailable while instances are rebuilt (typically for 10-15 minutes). |

6.1 Method 1 – Side-By-Side Deployment of New Version

This section describes the upgrade of the Mediant CE instance running software version from the 7.20A stream (based on OS Version 6) to a version from the 7.20CO or 7.40A streams (based on OS Version 8) via side-by-side installation of a new Mediant CE instance and gradual migration of live traffic from the old to the new instance.

➤ **To perform upgrade via "side-by-side deployment" method:**

1. Deploy a new Mediant CE instance using Stack Manager. Choose **OS Version = 8** during the deployment. Connect the new Mediant CE instance to the same Virtual Network and Subnets as the existing Mediant CE instance.
2. Download the configuration (INI) file from the existing Mediant CE instance: **Actions > Configuration File > Save INI File**.
3. Remove all networking configuration from the downloaded file, by doing one of the following:
 - Using the ini_cleanup.py script from the *Mediant VE Installation Kit* available on www.audiocodes.com portal:

```
# python ini_cleanup.py old.ini new.ini
```
 - Manually: Open the file in a text editor (e.g. Notepad++), and then delete the following elements:
 - ◆ Configuration tables: PhysicalPortsTable, EtherGroupTable, DeviceTable, InterfaceTable, MtcEntities
 - ◆ Configuration parameters: HARemoteAddress, HAUnitIdName, HARemoteUnitIdName, HAPriority, HARemotePriority, HALocalMAC, HARemoteMAC
4. Load the "cleaned up" configuration file to the new Mediant CE instance as an incremental INI file: **SETUP > ADMINISTRATION > MAINTENANCE > Auxiliary Files > INI file (incremental)**.
5. Obtain, activate and apply the license to the new Mediant CE instance, as described in Section 7.
6. Switch live traffic from the old Mediant CE instance to the new one. This typically requires a change in the SBC IP address in the VoIP equipment that communicates with the Mediant CE. Consider performing gradual traffic migration if your VoIP equipment supports it. For example, first switch 10% of your live traffic to the new Mediant CE instance, verify that it's processed as expected, and only after that switch the rest of the traffic.
7. After all live traffic is switched to the new Mediant CE instance and service operates normally, delete the old Mediant CE instance.

6.2 Method 2 – Rebuild Existing Mediant CE Instance from New Image

This section describes the upgrade procedure of Mediant CE instance running software version from the 7.20A stream (based on OS Version 6) to a version from the 7.20CO or 7.40A streams (based on OS Version 8) via a rebuild of existing Mediant CE instance from a new image.

The described procedure preserves all IP addresses (private and public) assigned to the Mediant CE instance, as well as most of the SBC configuration. However, the following configuration elements will be lost and must be manually restored after the procedure:

- TLS Contexts configuration (certificates and private keys)
- Auxiliary files (e.g., Pre-recorded Tone files)
- License keys (as the serial number of rebuilt instances changes)

➤ To perform upgrade via "rebuild from a new image" method:

1. Connect to the Stack Manager Web interface.
2. Click the corresponding stack name.
3. Click **Modify**, and then change the **OS Version** to **8**.
4. Click **Update** to rebuild the stack.
5. Wait for the **Update** operation to complete. The operation typically takes 10-15 minutes, during which all VM instances are rebuilt and service is unavailable. Mediant CE configuration, including private and public IP addresses is preserved.
6. Restore parts of the SBC configuration that have been lost during the rebuild (i.e., TLS certificates, private keys and auxiliary files).
7. Obtain, activate and apply the license to the Signaling Components, as described in Section 7.

Your Mediant CE is now running the new software version based on OS Version 8 and is fully operational.

Figure 6-2: Upgrading Mediant CE to New Image Based on OS Version 8

The screenshot shows the Stack Manager Web interface. At the top, there is a navigation bar with 'stack_mgr' and links for 'Stacks', 'Configuration', 'Logs', and 'About'. A 'Logout' button is in the top right. Below the navigation bar is a row of action buttons: 'Start', 'Stop', 'Heal', 'Scale Out', 'Scale In', 'Scale To', 'Modify', 'Update', 'More', and 'Delete'. The 'Update' button is highlighted. Below the buttons is a green notification box with the following text:

```

Modifying stack
Modifying stack configuration... done

Stack configuration was modified.
Use 'update' command to apply the changes.

Update of 'os_type' performs rebuild of VMs during which:
- local license of signaling components will be lost
- TLS contexts configuration and auxiliary files will be lost
Done
  
```

Below the notification box, the stack name 'alex-ce-3' is displayed. Underneath, there are two tabs: 'General' and 'Active Alarms'. The 'General' tab is active, showing the 'Name' as 'alex-ce-3'.

7 Downgrading Software Version

The procedure for downgrading Mediant CE software version is similar to the upgrading procedure, as described in the previous section, but in the reverse order:

- You first need to downgrade the Media Components.
- Afterwards, you need to downgrade the Signaling Components

This sequence ensures that the Signaling Components always have the same or later version than the Media Components.

When downgrading from version 7.40A.100.* or later to version 7.40A.005.*, the following additional configuration steps must be performed prior to the downgrade:

1. Connect to the Mediant CE's CLI interface (provided by Signaling Components) through an SSH client or a serial console.
2. Log in as an administrative user.
3. Run the following commands:

```
enable
    <password> (e.g. "Admin")
configure system
    voice-config
        TpncpEncryptionEnable = 0
    exit
exit
```

4. Reboot the Signaling Components using the `reload now` CLI command or the Web interface's **Reset** button.
5. Wait until the Media Components are connected. Verify that their displayed status is "Connected" and not "Connected (TLS)".



Note: The above procedure is required because the communication protocol between the Signaling Components and Media Components was changed in version 7.40A.100.*. Failure to perform this procedure will prevent the Media Components from connecting to the Signaling Components after the latter are downgraded to the 7.40A.005.* version.

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8 Licensing Mediant CE

Once you have successfully installed Mediant CE, you need to obtain, activate and then install the License Key.



Note: Licensing is applicable only to Signaling Components; Media Components do not require licensing.

8.1 Obtaining and Activating a Purchased License Key

For Mediant CE to provide you with all the required capacity and features, you need to obtain and activate a License Key which enables these capabilities.



Note:

- License activation is intended **only** for first-time software activation upon product purchase (or if your License Key is "lost", due to whatever reason). For subsequent software feature upgrades, the License Key file is e-mailed to you after your Purchase Order has been processed.
- For Mediant CE with two Signaling Component instances, each Signaling Component instance has its own Serial Number, Product Key and License Key. Therefore, the instructions in this section must be done per Signaling Component instance.

➤ **To obtain and activate the License Key:**

1. Open AudioCodes Web-based Software License Activation tool at <https://www.audiocodes.com/swactivation>:

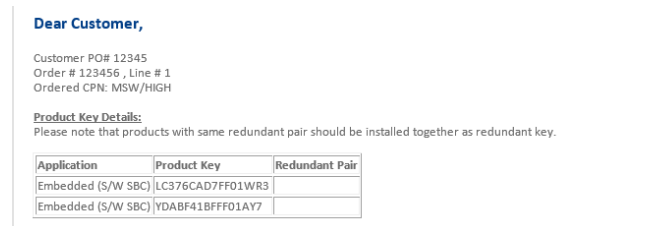
Figure 8-1: Software License Activation Tool

The screenshot shows the 'Software License Activation' web form. At the top, there is a breadcrumb 'Home > Software License Activation' and a title 'Software License Activation' with a accessibility icon. Below the title, instructions state: 'Please enter your Product Key received from AudioCodes and the fingerprint (e.g. Serial Number or Server Machine ID) that was generated as a result of your installation. For technical assistance, please contact AudioCodes support at support@audiocodes.com. *Supports CloudBlend 365 version 7.2 and above.' The form contains three input fields: 'Product Key *', 'Fingerprint *', and 'Email *'. Below the 'Fingerprint *' field, there is a note: 'For instructions on how to locate your product's fingerprint, please read the documentation relevant to your product'. At the bottom of the form, there is a checkbox labeled 'I'm not a robot' next to a reCAPTCHA logo, and a large teal 'SUBMIT' button.

2. Enter the following information:

- **Product Key:** The Product Key identifies your specific Mediant CE purchase for the purpose of subsequent communication with AudioCodes (for example, for support and software upgrades). The Product Key is provided in the Order Confirmation e-mail sent to you by AudioCodes upon your purchase, as shown in the example below:

Figure 8-2: Product Key in Order Confirmation E-mail



Note: For Mediant CE orders with two Signaling Component instances, you are provided with two Product Keys, one for each Signaling Component instance. In such cases, you need to perform license activation twice to obtain License Keys for both Signaling Component instances.

- **Fingerprint:** The fingerprint is the Mediant CE's Serial Number. The Serial Number uniquely identifies the software installation. The Serial Number is displayed in the 'Serial Number' field on the Device Information page (**Monitor** menu > **Monitor** menu > **Summary** tab > **Device Information**).
 - **Email:** Provide one or more e-mail addresses to where you want the License Key to be sent.
3. Click **Submit** to send your license activation request.
 4. Once AudioCodes processes and completes your license activation, you will receive an e-mail notification with the License Key file attached. Open the file with any text-based program (such as Notepad) and make sure that the serial number ("**S/N**") in the License Key is correct and reflects the Serial Number of your Signaling Component instance.



Warning: Do not modify the contents of the License Key file.

8.2 Installing the License Key

For installing the License Key on Mediant CE, refer to the *Mediant Software SBC User's Manual*.



Note: The License Key file for Mediant CE with two Signaling Component instances must contain two License Keys - one for the active Signaling Component instance and one for the redundant Signaling Component instance. Each License Key has a different serial number ("**S/N**"), which reflects the serial number of each Signaling Component instance.

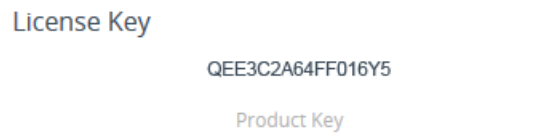
8.3 Product Key

The Product Key identifies a specific purchase of your Mediant CE deployment for the purpose of subsequent communication with AudioCodes (e.g., for support and software upgrades). The Product Key is provided in the order-confirmation email sent to you upon your product purchase and is used for activating your license through AudioCodes Software License Activation tool.

The Product Key is included in the License Key. Once the License Key is installed, you can view the Product Key in the following Web pages:

- License Key page (**Setup** menu > **Administration** tab > **Maintenance** folder > **License Key**). The Product Key is displayed in the read-only 'Product Key' field, as shown in the example below:

Figure 8-3: Viewing Product Key

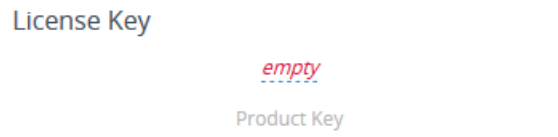


- Device Information page.

If your License Key was purchased in an earlier version (for example, 7.0), the 'Product Key' field may appear empty. In such a scenario, request the Product Key from your AudioCodes sales representative. Once received, do the following:

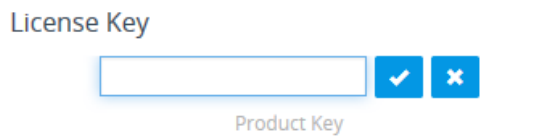
1. Open the License Key page.
2. Locate the Product Key group:



Figure 8-4: Empty Product Key Field



3. Click "empty"; the following appears:

Figure 8-5: Entering Product Key



4. In the field, enter the Product Key, and then click **Submit**  (or **Cancel**  to discard your entry).

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