User's Manual

AudioCodes Mediant™ Family of Session Border Controllers

Stack Manager

Mediant Cloud Edition (CE) SBC
Mediant Virtual Edition (VE) SBC

Version 7.2

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Notice

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Abbreviations and Terminology

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

Document Revision Record

LTRT	Description
28905	Initial document release for Version 7.2.
28906	Microsoft Azure added.
28907	OpenStack added.
28908	Parameters removed: [--mc-profile {forwarding,transcoding}] and [--mc-max-pps-limit MC_MAX_PPS_LIMIT]

LTRT	Description
28909	Typos; Managed Service Identity section update; Upgrading Stack Manager section added.
28911	Google Cloud deployment added
28912	Code typo in Section Post-Installation Configuration on Microsoft Azure.
28913	OpenStack supported; majority of document update.
28914	Azure zones creation update; new parameters sc_num_of_interfaces. mc_num_of_interfaces, and storage_account_type.
28922	New subsections under Enabling Access to Azure APIs via Managed Service Identity; 'resource_group' parameter added
28923	Format update
28924	iam:CreateServiceLinkedRole added to IAM Role for Stack Manager
28925	Ubuntu Linux versions (updated); Mediant VE added; IAM Role for Stack Manager (updated); Subnet and Elastic/Public/External IP Addresses (updated); creating Median CE/VE (AWS/Azure/Google/OpenStack); parameters updated - sc_public_ips, mc_public_ips, sc_additional_ips, mc_additional_ips, sc_tags (Azure), mc_tags (Azure), availability_zones (new); Advanced Configuration for Mediant VE (new); Rebuilding / Upgrading Stack (updated); Adjusting Security Groups (updated); Using Pre-Defined Public/Private IP Addresses (updated)
28926	Ubuntu versions; accessing web interface updated; OpenStack "flavor" profile; spot_instances (new); use_proximity (new); placement_group (new); use_placement_group (new); mc_max_pps_limit (new); manage_via_https (new); public_ips (udated); additional_ips(updated); Active Alarms (new section); Scale Out / In Operation (updated); Modifying Stack Configuration (updated); Modifiable Parameters for Mediant CE (updated); Service Interruption During Stack Update (removed); Global Configuration (updated); Creating New Stack (updated); Checking Stack State (updated)
28927	CentOS 8 for Azure; Google Cloud updates
28928	Upgrading Stack Manager updated; oam_ip parameter added; note removed from modifying stack configuration; modifiable parameters added for Mediant VE; rebuilding and upgrading stack updated with Mediant VE
28929	Updates - creating Mediant CE in AWS; new alarm (sc-ha-alarm); automatic scaling updated; automatic healing updated; usage information updated; list command updated; operational logs updated
28930	custom IAM roles; restricting custom IAM roles; new parameters (cluster_nsg_id, oam_nsg_id, signaling_nsg_id, media_nsg_id, auto_start_time, auto_stop_time, oam_subnet_cidr, ,main_subnet_cidr, additional1_subnet_cidr, additional2_subnet_cidr); miscellaneous
28934	Typos

1 Introduction

Stack Manager is used for managing 'software stacks' deployed in virtual environments. It implements the complete stack lifecycle, including:

- Stack deployment
- Stack termination
- Manual stack size adjustment – using user-initiated scale-in / scale-out
- Automatic stack size adjustment – using automatic scaling
- Stack configuration update

Current implementation supports Mediant CE (Cloud Edition) and Mediant VE (Virtual Edition) SBC in the following environments:

- Amazon Web Services (AWS)
- Microsoft Azure
- Google Cloud
- OpenStack

Stack Manager implements VNFM (Virtual Network Function Manager) functionality as defined in the NFV Management and Organization (MANO) architectural framework.

The following management interfaces are provided:

- Web interface
- Command line interface (CLI)
- REST API

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2 Deployment

2.1 Operational Environment

Stack Manager is mostly written in Python and may be installed on one of the following operating systems:

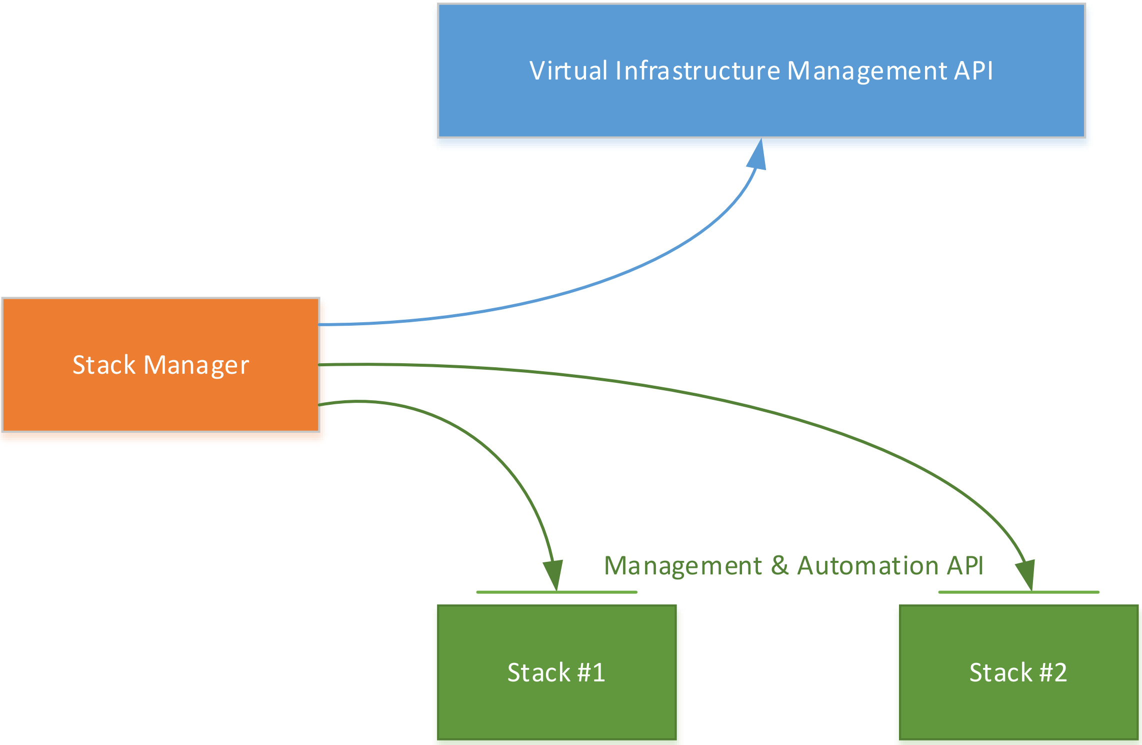
- Ubuntu Linux versions 16.04, 18.04, or 20.04
- Amazon Linux versions 1 and 2
- Red Hat Linux versions 7 and 8
- CentOS Linux versions 7 and 8
- Debian Linux Version 9

2.2 Network Topology

Stack Manager needs to have access to the following APIs for correct operation:

- Virtual Infrastructure Management API (e.g., AWS API) for deploying stack components and managing their lifecycle.
- Management API of the deployed stack (e.g., REST API of Mediant CE) for assessing operational status of deployed stack instances and managing their configuration and state.

Figure 2-1: Stack Manager Deployment Topology


Virtual Infrastructure Management API
Stack Manager
Management & Automation API
Stack #1
Stack #2

2.3 Installation Prerequisites

2.3.1 Installation Prerequisites for Amazon Web Services (AWS) Environment

Prior to installing Stack Manager in the Amazon Web Services (AWS) environment, make sure that you meet the following prerequisites:

- You have an AWS account. If you don't have one, you can sign up for one on Amazon's website at http://aws.amazon.com/.
- You have created IAM Role that enables Stack Manager to access all needed AWS APIs. For more information, see Section 2.3.1.1.
- Security groups of the "Main Subnet", where Stack Manager will be deployed, allow Stack Manager to communicate with both the AWS APIs and the deployed Mediant VE/CE stack instances, using the HTTPS protocol (Port 443).

2.3.1.1 IAM Role for Stack Manager

The following IAM role ensures that Stack Manager can access all needed AWS APIs for successful stack deployment and management. This role must be attached to the Stack Manager’s virtual instances, as described in Section 2.4.

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Action": [
                "ec2:*",
                "cloudformation:*",
                "cloudwatch:DeleteAlarms",
                "cloudwatch:PutMetricAlarm",
                "iam:PassRole",
                "iam:ListInstanceProfiles",
                "iam:CreateServiceLinkedRole"
            ],
            "Effect": "Allow",
            "Resource": "*"
        }
    ]
}
```

➢ To create an IAM Role

1. Open the AWS IAM console (https://console.aws.amazon.com/iam).
2. Navigate to the **Policies** screen:
    a. Click **Create**.
    b. Select the **JSON** tab, copy-and-paste the IAM policy rules listed above, and then click **Review policy**.
    c. Enter the IAM policy name (e.g., "STACK_MGR"), and then click **Create policy**.
3. Navigate to the **Roles** screen:
    a. Click **Create role**.
    b. Choose **EC2** use case, and then click **Next: permissions**.

c. Search for the IAM policy created in the previous step, select it, and then click **Next: tags**.

d. Click **Next: review**.

e. Enter the IAM role name (e.g., "STACK_MGR"), and then click **Create role**.

The IAM role specified above grants access to all EC2 and CloudFormation APIs. Stack Manager currently uses the following specific services from these APIs:

```
    "ec2:AllocateAddress",
    "ec2:AssociateAddress",
    "ec2:AssignPrivateIpAddresses",
    "ec2:AttachNetworkInterface",
    "ec2:AuthorizeSecurityGroupEgress",
    "ec2:AuthorizeSecurityGroupIngress",
    "ec2:CreateNetworkInterface",
    "ec2:CreatePlacementGroup",
    "ec2:CreateSecurityGroup",
    "ec2:CreateTags",
    "ec2:DeleteNetworkInterface",
    "ec2:DeletePlacementGroup",
    "ec2:DeleteSecurityGroup",
    "ec2:DeleteTags",
    "ec2:DescribeAddresses",
    "ec2:DescribeImages",
    "ec2:DescribeInstances",
    "ec2:DescribeInstanceStatus",
    "ec2:DescribeKeyPairs",
    "ec2:DescribeNetworkInterfaces",
    "ec2:DescribePlacementGroups",
    "ec2:DescribeRegions",
    "ec2:DescribeSecurityGroups",
    "ec2:DescribeSubnets",
    "ec2:DescribeVpcs",
    "ec2:DetachNetworkInterface",
    "ec2:DisassociateAddress",
    "ec2:ModifyNetworkInterfaceAttribute",
    "ec2:ReleaseAddress",
    "ec2:RevokeSecurityGroupEgress",
    "ec2:RevokeSecurityGroupIngress",
    "ec2:RunInstances",
    "ec2:StartInstances",
    "ec2:StopInstances",
    "ec2:TerminateInstances",
    "ec2:UnassignPrivateIpAddresses",
    "cloudformation:CreateStack",
    "cloudformation:DeleteStack",
    "cloudformation:DescribeStackEvents",
    "cloudformation:DescribeStackResources",
    "cloudformation:DescribeStacks",
    "cloudformation:GetTemplate",
    "cloudformation:ListStacks",
    "cloudformation:UpdateStack"
```

Note: The above list may change as Stack Manager implementation is updated and new functionality is added.

2.3.1.2 Subnet and Elastic IP Addresses

Stack Manager uses the following IP addresses when communicating with Mediant VE/CE stack instances that it deploys:

- If the stack instance has a public IP address (Elastic IP) assigned to its management interface, Stack Manager uses this public IP address to access the stack instance's management REST API.
- Otherwise, Stack Manager uses the private IP address of the stack instance's management interface.

To enable Stack Manager's access to the deployed Mediant VE/CE stack's management APIs, it is recommended to deploy Stack Manager to the same "Main Subnet" that is used for carrying management traffic of the deployed Mediant VE/CE stack(s).

Stack Manager also needs to communicate with AWS APIs, which are accessible via public IP addresses. Therefore, it should either be assigned with an Elastic IP address or placed behind a NAT Gateway.

2.3.2 Installation Prerequisites for Microsoft Azure Environment

Prior to installing Stack Manager in the Microsoft Azure environment, make sure that you meet the following prerequisites:

- You have an Azure account. If you don't have one, you can sign up for one on Microsoft's website at http://azure.microsoft.com.
- Security groups of the "Main Subnet", where Stack Manager will be deployed, allow Stack Manager to communicate with both the Azure API and the deployed Mediant VE/CE stack instances, using the HTTPS protocol (Port 443).

2.3.2.1 Subnet and Public IP Addresses

Stack Manager uses the following IP addresses when communicating with Mediant VE/CE stack instances that it deploys:

- If the stack instance has a public IP address assigned to its management interface, Stack Manager uses this public IP address to access the stack instance's management REST API.
- Otherwise, Stack Manager uses the private IP address of the stack instance's management interface.

To enable Stack Manager's access to the deployed Mediant VE/CE stack's management APIs, it is recommended to deploy Stack Manager to the same "Main Subnet" that is used for carrying management traffic of the deployed Mediant VE/CE stack(s).

Stack Manager also needs to communicate with Azure APIs, which are accessible via public IP addresses. Therefore, it should either be assigned with a public IP address or placed behind a NAT Gateway.

2.3.3 Installation Prerequisites for Google Cloud Environment

Prior to installing Stack Manager in the Google Cloud environment, make sure that you meet the following prerequisites:

- You have a Google Cloud account. If you don't have one, you can sign up for one on Google’s website at http://cloud.google.com.
- Firewall Rules of the "Main Subnet", where Stack Manager will be deployed, allow Stack Manager to communicate with both the Google Cloud API and the deployed Mediant VE/CE stack instances, using the HTTPS protocol (Port 443).

2.3.3.1 Subnet and External IP Addresses

Stack Manager uses External IP addresses when communicating with Mediant VE/CE stack instances that it deploys. Therefore, it may be deployed in any subnet as long as it’s assigned with an External IP and is allowed to communicate with Mediant VE/CE instances.

Nevertheless, to simplify network topology, it is recommended to deploy Stack Manager to the same "Main Subnet" that is used for carrying management traffic of the deployed Mediant VE/CE stack(s).

Stack Manager also needs to communicate with Google Cloud APIs, which are accessible via public IP addresses. Therefore, it should either be assigned with an External IP address or placed behind a NAT Gateway.

2.3.4 Installation Prerequisites for OpenStack Environment

Prior to installing Stack Manager in the OpenStack environment, make sure that you meet the following prerequisites:

- The OpenStack environment contains the following components:
    - Nova
    - Neutron
    - Cinder
    - Glance
    - Heat
- Security groups of the "Main Subnet", where Stack Manager will be deployed, allow Stack Manager to communicate with both the OpenStack API and the deployed Mediant CE stack instances, using the HTTPS protocol (Port 443).

2.3.4.1 Provider Versus Self-Service Networks

Stack Manager supports deployment both in provider (flat) and self-service networks.

2.3.4.2 Subnet and Floating IP Addresses

Stack Manager uses the following IP addresses when communicating with Mediant VE/CE stack instances that it deploys:

- If the stack instance has a Floating IP address assigned to its management interface, Stack Manager uses this Floating IP address to access the stack instance’s management REST API.
- Otherwise, Stack Manager uses the private IP address of the stack instance’s management interface.

To enable Stack Manager’s access to the deployed Mediant VE/CE stack’s management APIs, it is recommended to deploy Stack Manager to the same "Main Subnet" that is used for carrying management traffic of the deployed Mediant VE/CE stack(s).

Stack Manager also needs to communicate with OpenStack automation APIs. Make sure that your network topology enables such communication.

2.4 Installation

2.4.1 Overview

For Microsoft Azure, Stack Manager is available in the Azure Marketplace. Therefore, its deployment consists of a single step, as described in Section 2.4.3, Deploying Stack Manager on Microsoft Azure.

For other cloud environments, Stack Manager installation consists of two steps:

1. Creating the Instance / Virtual Machine: This step differs, depending on the virtual environment. For detailed instructions, see the following sections:
   - Section 2.4.2, Creating Amazon Web Services (AWS) Instance
   - Section 2.4.4, Creating Google Cloud Virtual Machine
   - Section 2.4.5, Creating OpenStack Instance
2. Installing the Stack Manager application: For detailed instructions, see Section 2.4.6, Installing Stack Manager Application

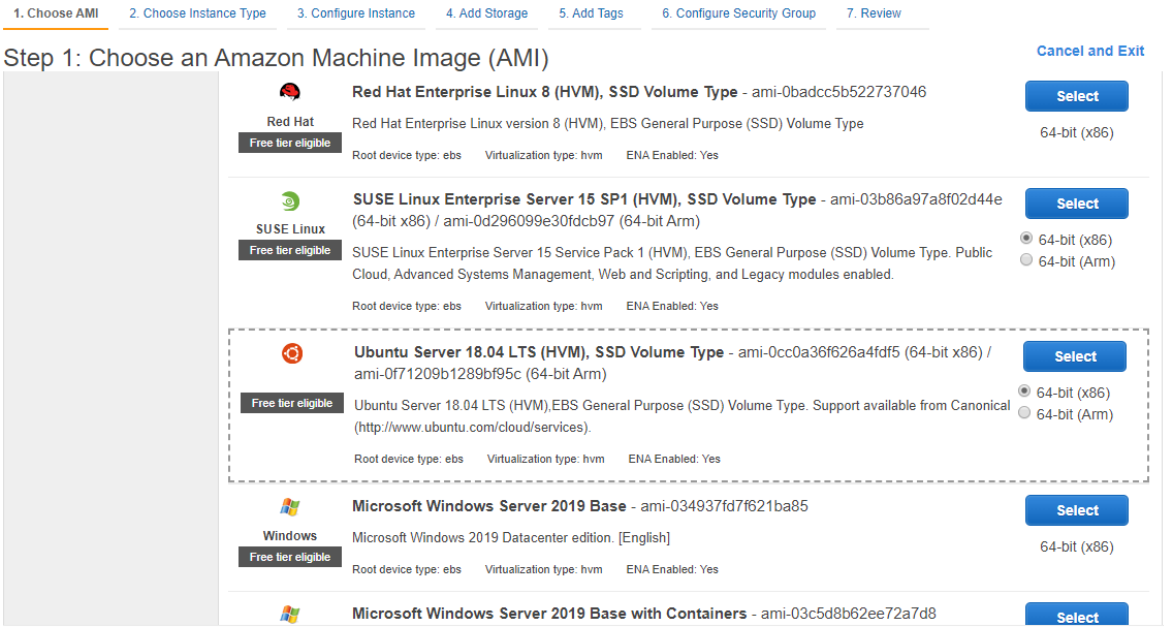
2.4.2 Creating Amazon Web Services (AWS) Instance

The following procedure describes how to create a new AWS instance for running the Stack Manager application.

➢ To create a new AWS instance for running Stack Manager application:

1. Open the AWS EC2 Console at http://console.aws.amazon.com/ec2.
2. In the Instances screen, click **Launch Instance**.
3. Choose one of the supported operating systems (e.g., "Ubuntu Server 18.04 LTS (HVM), SSD Volume Type"), and then click **Select**.

Figure 2-2: Choose an Amazon Machine Image (AMI) – Step 1



Step 1: Choose an Amazon Machine Image (AMI)

Red Hat Enterprise Linux 8 (HVM), SSD Volume Type - ami-0badcc5b522737046

Red Hat Enterprise Linux version 8 (HVM), EBS General Purpose (SSD) Volume Type

Root device type: ebs Virtualization type: hvm ENA Enabled: Yes

64-bit (x86)

SUSE Linux Enterprise Server 15 SP1 (HVM), SSD Volume Type - ami-03b86a97a8f02d44e (64-bit x86) / ami-0d296099e30fdcb97 (64-bit Arm)

SUSE Linux Enterprise Server 15 Service Pack 1 (HVM), EBS General Purpose (SSD) Volume Type. Public Cloud, Advanced Systems Management, Web and Scripting, and Legacy modules enabled.

Root device type: ebs Virtualization type: hvm ENA Enabled: Yes

● 64-bit (x86)
○ 64-bit (Arm)

Ubuntu Server 18.04 LTS (HVM), SSD Volume Type - ami-0cc0a36f626a4fdf5 (64-bit x86) / ami-0f71209b1289bf95c (64-bit Arm)

Ubuntu Server 18.04 LTS (HVM),EBS General Purpose (SSD) Volume Type. Support available from Canonical (http://www.ubuntu.com/cloud/services).

Root device type: ebs Virtualization type: hvm ENA Enabled: Yes

● 64-bit (x86)
○ 64-bit (Arm)

Microsoft Windows Server 2019 Base - ami-034937fd7f621ba85

Microsoft Windows 2019 Datacenter edition. [English]

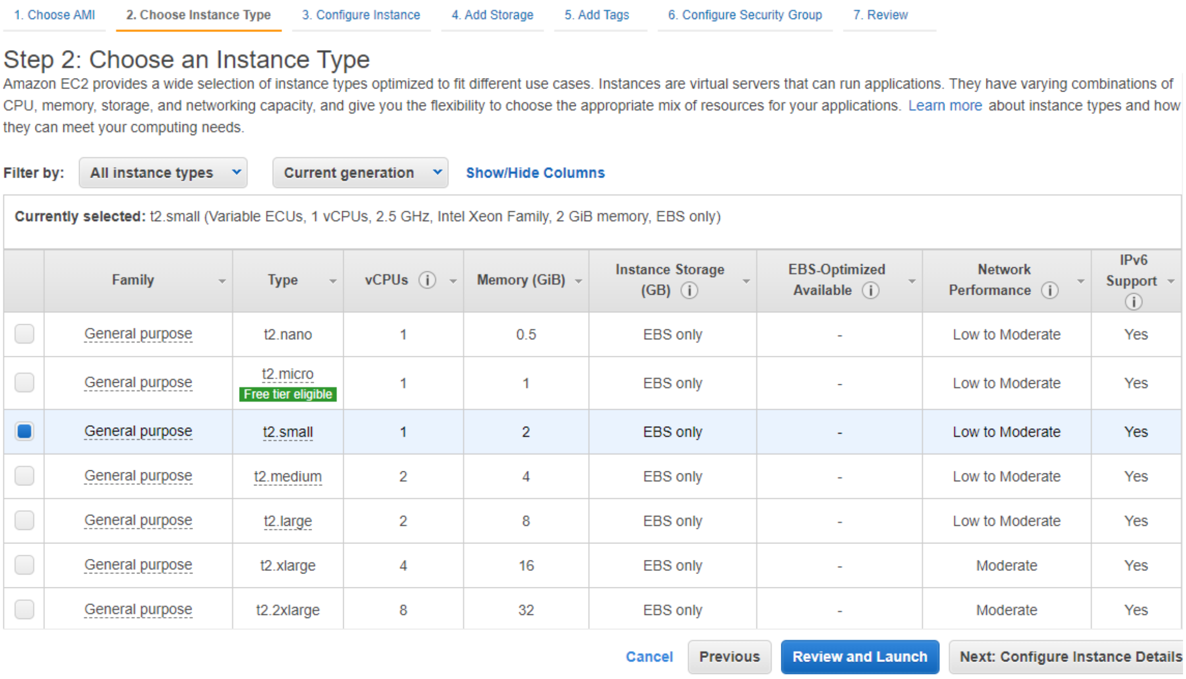
Root device type: ebs Virtualization type: hvm ENA Enabled: Yes

64-bit (x86)

Microsoft Windows Server 2019 Base with Containers - ami-03c5d8b62ee72a7d8

4. In the Choose an Instance Type screen, choose the "t2.small" instance type, and then click **Next**; the Configure Instance Details screen appears.

Figure 2-3: Choose an Instance Type – Step 2



Step 2: Choose an Instance Type

Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are virtual servers that can run applications. They have varying combinations of CPU, memory, storage, and networking capacity, and give you the flexibility to choose the appropriate mix of resources for your applications. Learn more about instance types and how they can meet your computing needs.

Filter by: All instance types | Current generation | Show/Hide Columns

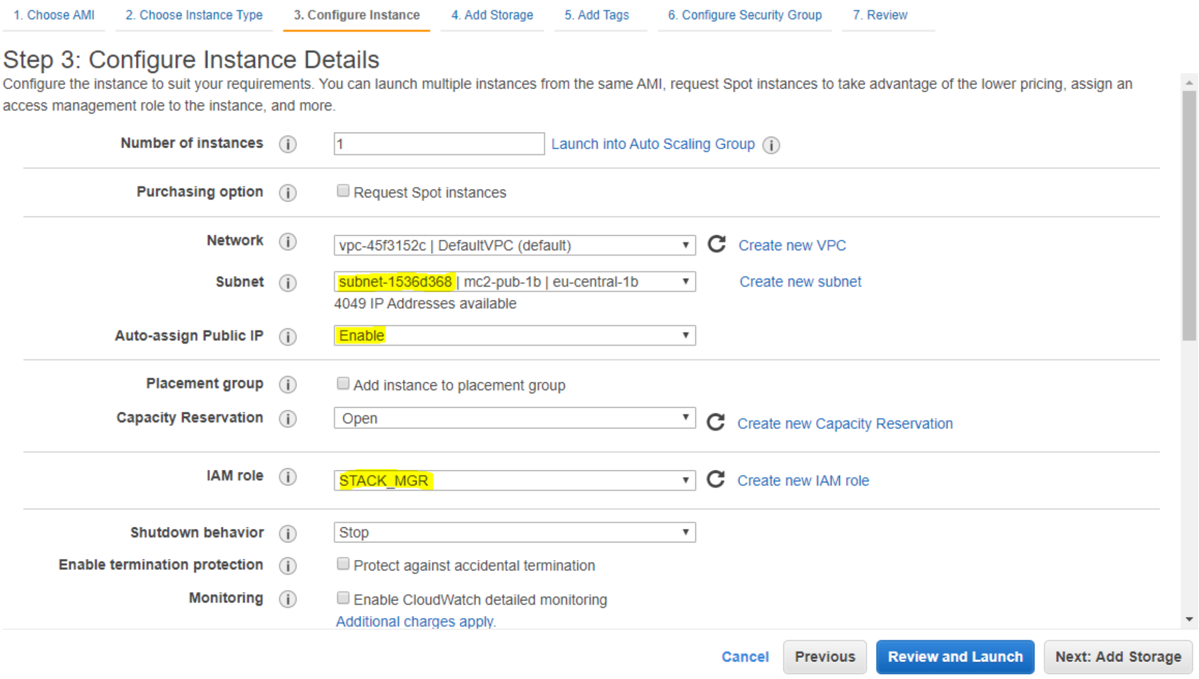
Currently selected: t2.small (Variable ECUs, 1 vCPUs, 2.5 GHz, Intel Xeon Family, 2 GiB memory, EBS only)

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance	IPv6 Support
□	General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
□	General purpose	t2.micro Free tier eligible	1	1	EBS only	-	Low to Moderate	Yes
■	General purpose	t2.small	1	2	EBS only	-	Low to Moderate	Yes
□	General purpose	t2.medium	2	4	EBS only	-	Low to Moderate	Yes
□	General purpose	t2.large	2	8	EBS only	-	Low to Moderate	Yes
□	General purpose	t2.xlarge	4	16	EBS only	-	Moderate	Yes
□	General purpose	t2.2xlarge	8	32	EBS only	-	Moderate	Yes

5. In the Configure Instance Details screen, configure the following:

- 'Subnet': Choose the "Main Subnet" that is used for connecting to the management interface of the deployed Mediant VE/CE stack(s).
- 'Auto-assign Public IP': Choose **Enable**.
- 'IAM Role': Choose the IAM role that you created for Stack Manager in Section 2.3.1.1, IAM Role for Stack Manager.

Figure 2-4: Configure Instance Details – Step 3



Step 3: Configure Instance Details

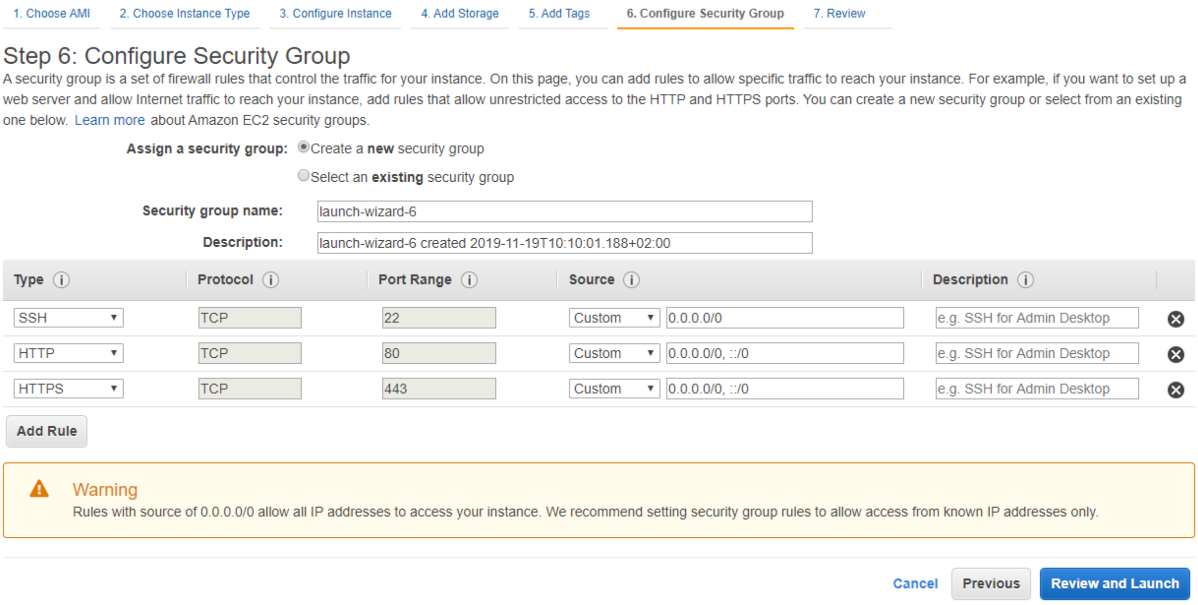
Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.

Number of instances	1	Launch into Auto Scaling Group
Purchasing option	□ Request Spot instances	
Network	vpc-45f3152c | DefaultVPC (default)	Create new VPC
Subnet	subnet-1536d368 | mc2-pub-1b | eu-central-1b 4049 IP Addresses available	Create new subnet
Auto-assign Public IP	Enable	
Placement group	□ Add instance to placement group	
Capacity Reservation	Open	Create new Capacity Reservation
IAM role	STACK_MGR	Create new IAM role
Shutdown behavior	Stop	
Enable termination protection	□ Protect against accidental termination	
Monitoring	□ Enable CloudWatch detailed monitoring Additional charges apply.	

6. Click **Next**; the Add Storage screen appears.
7. Click **Next**; the Add Tags screen appears.
8. Add a Name tag to the instance, and then click **Next**; the Configure Security Group page appears.
9. Create a new or choose an existing security group that enables the following ports and protocols to communicate with the Stack Manager instance:

Port	Protocol	Purpose
22	TCP	SSH connection to Stack Manager’s CLI interface.
80	TCP	HTTP connection to Stack Manager’s Web interface.
443	TCP	HTTPS connection to Stack Manager’s Web interface.

Figure 2-5: Configure Security Group Step



Step 6: Configure Security Group

A security group is a set of firewall rules that control the traffic for your instance. On this page, you can add rules to allow specific traffic to reach your instance. For example, if you want to set up a web server and allow Internet traffic to reach your instance, add rules that allow unrestricted access to the HTTP and HTTPS ports. You can create a new security group or select from an existing one below. Learn more about Amazon EC2 security groups.

Assign a security group: ● Create a **new** security group
○ Select an **existing** security group

Security group name: launch-wizard-6

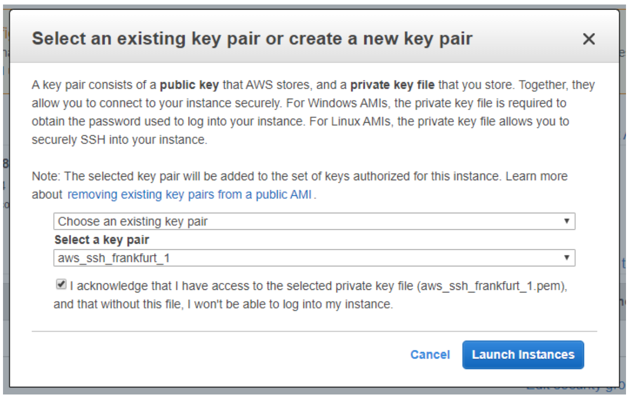
Description: launch-wizard-6 created 2019-11-19T10:10:01.188+02:00

Type	Protocol	Port Range	Source		Description
SSH	TCP	22	Custom	0.0.0.0/0	e.g. SSH for Admin Desktop
HTTP	TCP	80	Custom	0.0.0.0/0, ::/0	e.g. SSH for Admin Desktop
HTTPS	TCP	443	Custom	0.0.0.0/0, ::/0	e.g. SSH for Admin Desktop

Warning
Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

10. Click **Review and Launch**; the Review Instance Launch screen appears.
11. Click **Launch**; the Select an existing key pair … screen appears.
12. Choose an existing key pair or create a new one. Make sure that you have private key that matches the selected pair because you will need it to connect the deployed instance through the SSH protocol.

Figure 2-6: Select a Key Pair



Select an existing key pair or create a new key pair

A key pair consists of a **public key** that AWS stores, and a **private key file** that you store. Together, they allow you to connect to your instance securely. For Windows AMIs, the private key file is required to obtain the password used to log into your instance. For Linux AMIs, the private key file allows you to securely SSH into your instance.

Note: The selected key pair will be added to the set of keys authorized for this instance. Learn more about removing existing key pairs from a public AMI .

Choose an existing key pair

Select a key pair: aws_ssh_frankfurt_1

☑ I acknowledge that I have access to the selected private key file (aws_ssh_frankfurt_1.pem), and that without this file, I won't be able to log into my instance.

13. Click **Launch Instances**.

14. Wait until the instance is successfully launched.

15. Connect to the instance through SSH using the default username and configured SSH key. The default username depends on the image:

Image	Default username
Ubuntu 16.04, 18.04 and 20.04	**ubuntu**
Amazon Linux, Amazon Linux 2, RHEL 7 and 8	**ec2-user**
CentOS 7 and 8	**centos**

16. By default, new AWS instances are assigned with a Public IP address that changes when the instance is stopped or started. If you want Stack Manager's Public IP address to remain unchanged, create an Elastic IP and attach it to the instance.

17. Continue with Stack Manager installation, as described in Section 2.4.6, Installing Stack Manager Application.

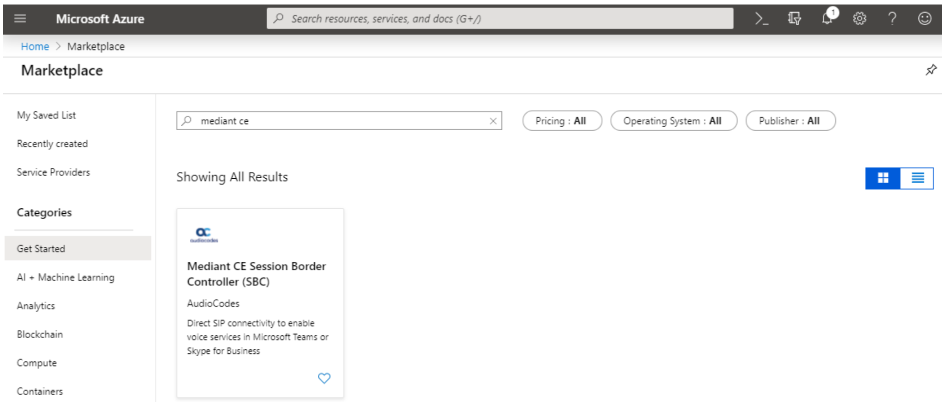
2.4.3 Deploying Stack Manager on Microsoft Azure

Stack Manager is available in Microsoft Azure Marketplace. Therefore, it is recommended that you deploy it from there, instead of manually creating a Virtual Machine and installing Stack Manager application on it.

➢ **To deploy Stack Manager on Microsoft Azure:**

1. Open the Azure portal at https://portal.azure.com/.
2. Navigate to Azure Marketplace (**All services** > **Marketplace**).
3. Search for the product "Mediant CE Session Border Controller (SBC)" published by AudioCodes.

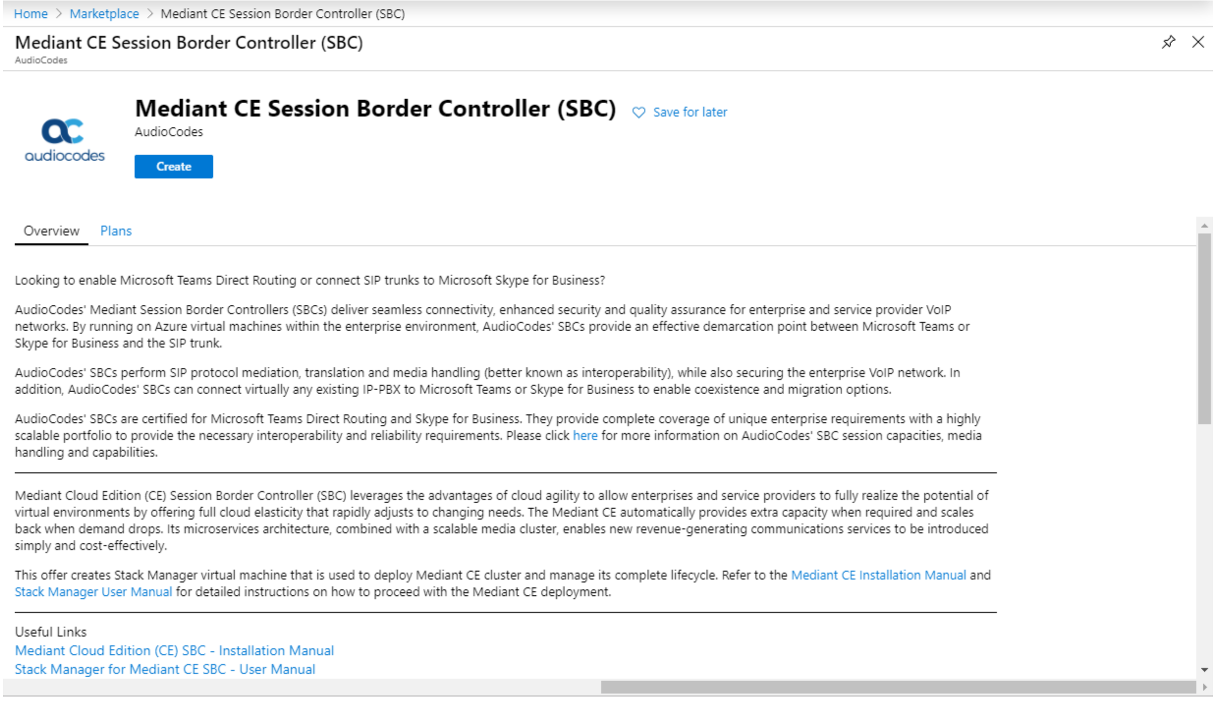
Figure 2-7: Azure Marketplace



Direct SIP connectivity to enable voice services in Microsoft Teams or Skype for Business

4. Click the "Mediant CE Session Border Controller (SBC)" product; the Mediant CE Product overview screen appears.

Figure 2-8: Mediant CE SBC Product Offer


Home > Marketplace > Mediant CE Session Border Controller (SBC)
Mediant CE Session Border Controller (SBC)
AudioCodes
audiocodes
Mediant CE Session Border Controller (SBC)
Save for later
AudioCodes
Create
Overview
Plans

Looking to enable Microsoft Teams Direct Routing or connect SIP trunks to Microsoft Skype for Business?

AudioCodes' Mediant Session Border Controllers (SBCs) deliver seamless connectivity, enhanced security and quality assurance for enterprise and service provider VoIP networks. By running on Azure virtual machines within the enterprise environment, AudioCodes' SBCs provide an effective demarcation point between Microsoft Teams or Skype for Business and the SIP trunk.

AudioCodes' SBCs perform SIP protocol mediation, translation and media handling (better known as interoperability), while also securing the enterprise VoIP network. In addition, AudioCodes' SBCs can connect virtually any existing IP-PBX to Microsoft Teams or Skype for Business to enable coexistence and migration options.

AudioCodes' SBCs are certified for Microsoft Teams Direct Routing and Skype for Business. They provide complete coverage of unique enterprise requirements with a highly scalable portfolio to provide the necessary interoperability and reliability requirements. Please click here for more information on AudioCodes' SBC session capacities, media handling and capabilities.

Mediant Cloud Edition (CE) Session Border Controller (SBC) leverages the advantages of cloud agility to allow enterprises and service providers to fully realize the potential of virtual environments by offering full cloud elasticity that rapidly adjusts to changing needs. The Mediant CE automatically provides extra capacity when required and scales back when demand drops. Its microservices architecture, combined with a scalable media cluster, enables new revenue-generating communications services to be introduced simply and cost-effectively.

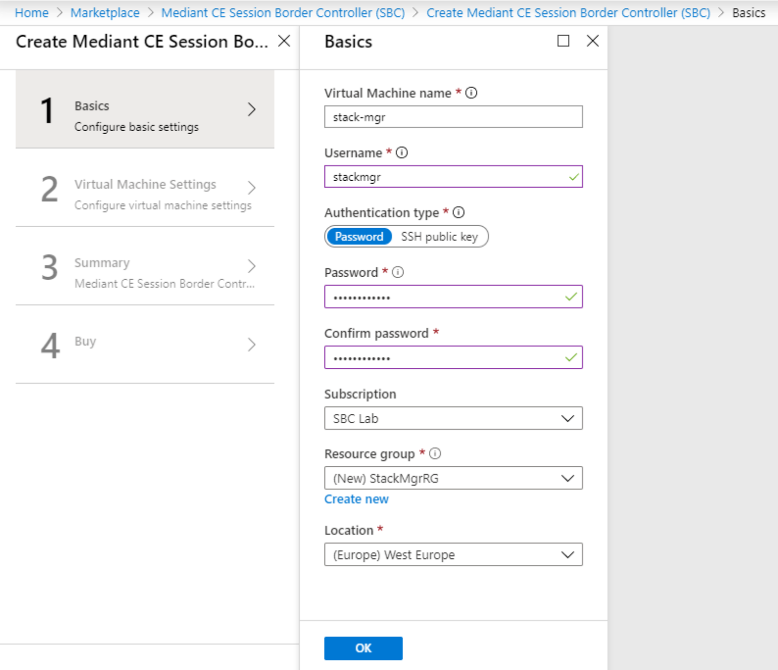
This offer creates Stack Manager virtual machine that is used to deploy Mediant CE cluster and manage its complete lifecycle. Refer to the Mediant CE Installation Manual and Stack Manager User Manual for detailed instructions on how to proceed with the Mediant CE deployment.

Useful Links
Mediant Cloud Edition (CE) SBC - Installation Manual
Stack Manager for Mediant CE SBC - User Manual

5. Click **Create**; a configuration wizard starts with the Basics page (Step 1).

6. In the **Basics** step, do the following:

Figure 2-9: Basics – Step 1



Home > Marketplace > Mediant CE Session Border Controller (SBC) > Create Mediant CE Session Border Controller (SBC) > Basics
Create Mediant CE Session Bo...
1 Basics
Configure basic settings
2 Virtual Machine Settings
Configure virtual machine settings
3 Summary
Mediant CE Session Border Contr...
4 Buy
Basics
Create new
OK

Virtual Machine name * ⓘ: stack-mgr

Username * ⓘ: stackmgr

Authentication type * ⓘ: Password | SSH public key

Password * ⓘ: ••••••••••••

Confirm password *: ••••••••••••

Subscription: SBC Lab

Resource group * ⓘ: (New) StackMgrRG

Location *: (Europe) West Europe

a. In the 'Virtual Machine name' field, enter a unique name for the new virtual machine.

b. In the 'Username' field, enter a username.
In the 'Authentication type' field, choose an appropriate authentication type, and then enter the 'Password' or 'SSH public key' accordingly. These credentials are used to connect to the deployed Stack Manager's CLI interface through SSH.

Note: Azure imposes some limitations on the username and password. For example, it prohibits the use of "Admin" for the username and requires the use of strong passwords that meet the following policy:

- A minimum of 12 characters.
- Use of three out of four of the following: lowercase characters, uppercase characters, numbers, and symbols.

c. From the 'Subscription' drop-down list, select a proper subscription for your deployment.

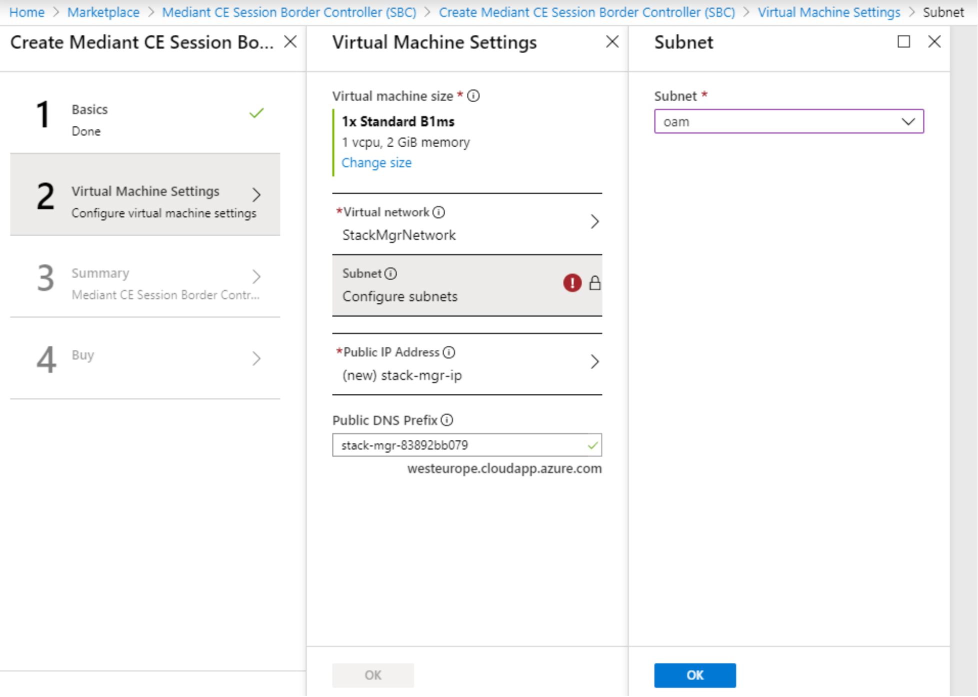
d. Under 'Resource group', click **Create new**, and then enter a new Resource Group name for your deployment.

e. From the 'Location' drop-down list, select a proper location for your deployment.

f. Click **OK**; the Virtual Machine Settings page (Step 2) appears.

7. In the Virtual Machine Settings step, do the following:

Figure 2-10: Virtual Machine Settings – Step 2



Home > Marketplace > Mediant CE Session Border Controller (SBC) > Create Mediant CE Session Border Controller (SBC) > Virtual Machine Settings > Subnet

Create Mediant CE Session Bo...

1 Basics – Done

2 Virtual Machine Settings – Configure virtual machine settings

3 Summary – Mediant CE Session Border Contr...

4 Buy

Virtual Machine Settings

Virtual machine size *: 1x Standard B1ms, 1 vcpu, 2 GiB memory (Change size)

*Virtual network: StackMgrNetwork

Subnet: Configure subnets

*Public IP Address: (new) stack-mgr-ip

Public DNS Prefix: stack-mgr-83892bb079 .westeurope.cloudapp.azure.com

Subnet

Subnet *: oam

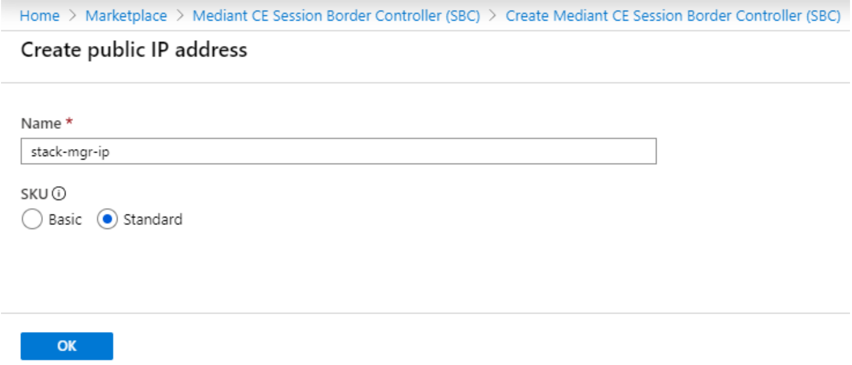
a. Choose the Virtual machine size. Standard_B1ms instance is recommended for most deployments.

b. Choose the virtual network where Stack Manager will be deployed. Specify the same network where you intend to deploy the Mediant VE/CE stack(s).

c. Configure the subnet that Stack Manager will be connected to. Specify the same subnet that will be used for carrying management traffic for the deployed Mediant VE/CE stack(s).

d. Configure a Public IP address to use Standard SKU:

Figure 2-11: Virtual Machine Settings Step – Creating Public IP Address



Home > Marketplace > Mediant CE Session Border Controller (SBC) > Create Mediant CE Session Border Controller (SBC)

Create public IP address

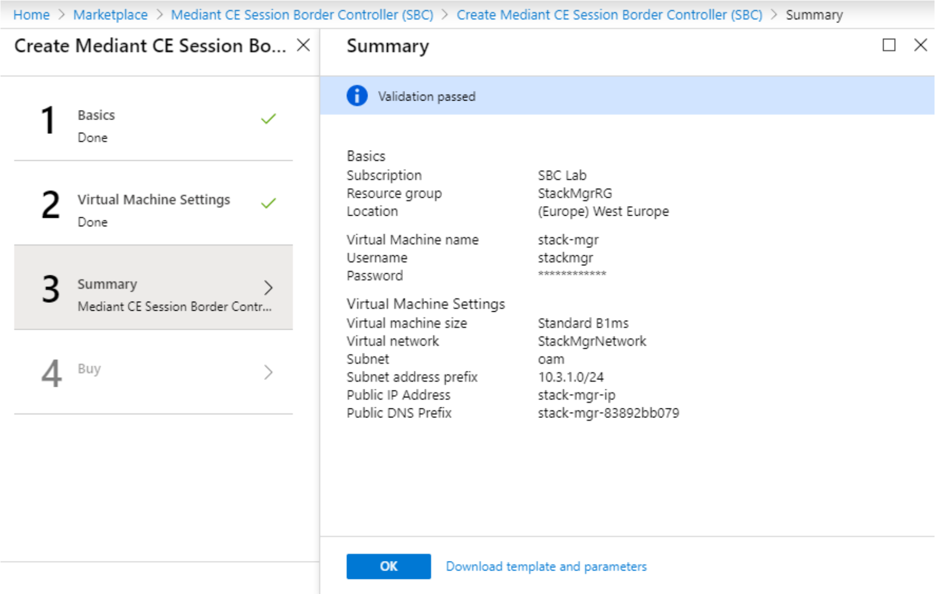
Name *: stack-mgr-ip

SKU: ○ Basic ● Standard

e. Click **OK**.; the Summary page (Step 3) appears.

8. In the Summary step, review your virtual machine configuration.

Figure 2-12: Summary – Step 3


Home > Marketplace > Mediant CE Session Border Controller (SBC) > Create Mediant CE Session Border Controller (SBC) > Summary
Create Mediant CE Session Bo...
1 Basics Done
2 Virtual Machine Settings Done
3 Summary Mediant CE Session Border Contr...
4 Buy
Summary
OK
Download template and parameters

Validation passed

Basics

Subscription	SBC Lab
Resource group	StackMgrRG
Location	(Europe) West Europe
Virtual Machine name	stack-mgr
Username	stackmgr
Password	************

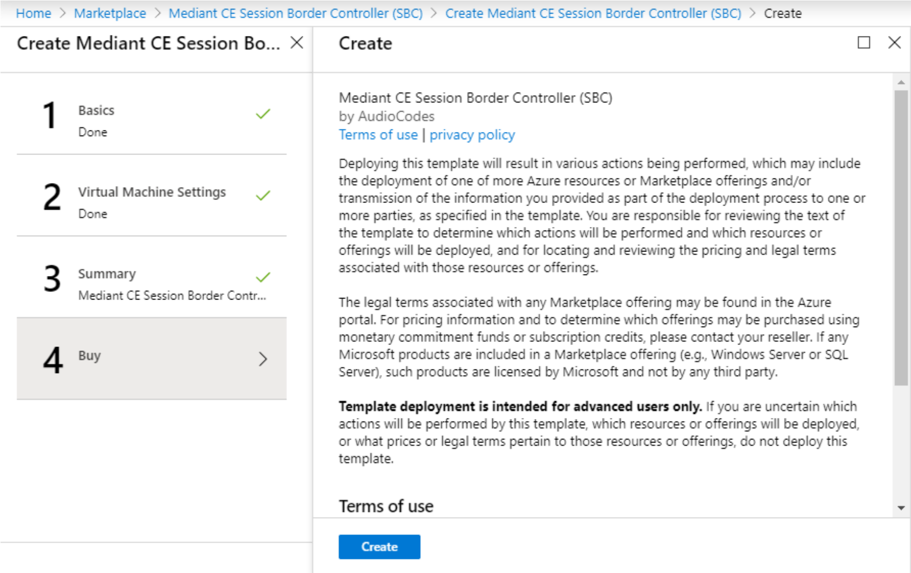
Virtual Machine Settings

Virtual machine size	Standard B1ms
Virtual network	StackMgrNetwork
Subnet	oam
Subnet address prefix	10.3.1.0/24
Public IP Address	stack-mgr-ip
Public DNS Prefix	stack-mgr-83892bb079

9. Click **OK**; the Buy page (Step 4) appears.

10. Review the Mediant CE SBC terms of use.

Figure 2-13: Buy – Step 4


Home > Marketplace > Mediant CE Session Border Controller (SBC) > Create Mediant CE Session Border Controller (SBC) > Create
Create Mediant CE Session Bo...
1 Basics Done
2 Virtual Machine Settings Done
3 Summary Mediant CE Session Border Contr...
4 Buy
Create
Create

Mediant CE Session Border Controller (SBC)
by AudioCodes
Terms of use | privacy policy

Deploying this template will result in various actions being performed, which may include the deployment of one of more Azure resources or Marketplace offerings and/or transmission of the information you provided as part of the deployment process to one or more parties, as specified in the template. You are responsible for reviewing the text of the template to determine which actions will be performed and which resources or offerings will be deployed, and for locating and reviewing the pricing and legal terms associated with those resources or offerings.

The legal terms associated with any Marketplace offering may be found in the Azure portal. For pricing information and to determine which offerings may be purchased using monetary commitment funds or subscription credits, please contact your reseller. If any Microsoft products are included in a Marketplace offering (e.g., Windows Server or SQL Server), such products are licensed by Microsoft and not by any third party.

Template deployment is intended for advanced users only. If you are uncertain which actions will be performed by this template, which resources or offerings will be deployed, or what prices or legal terms pertain to those resources or offerings, do not deploy this template.

Terms of use

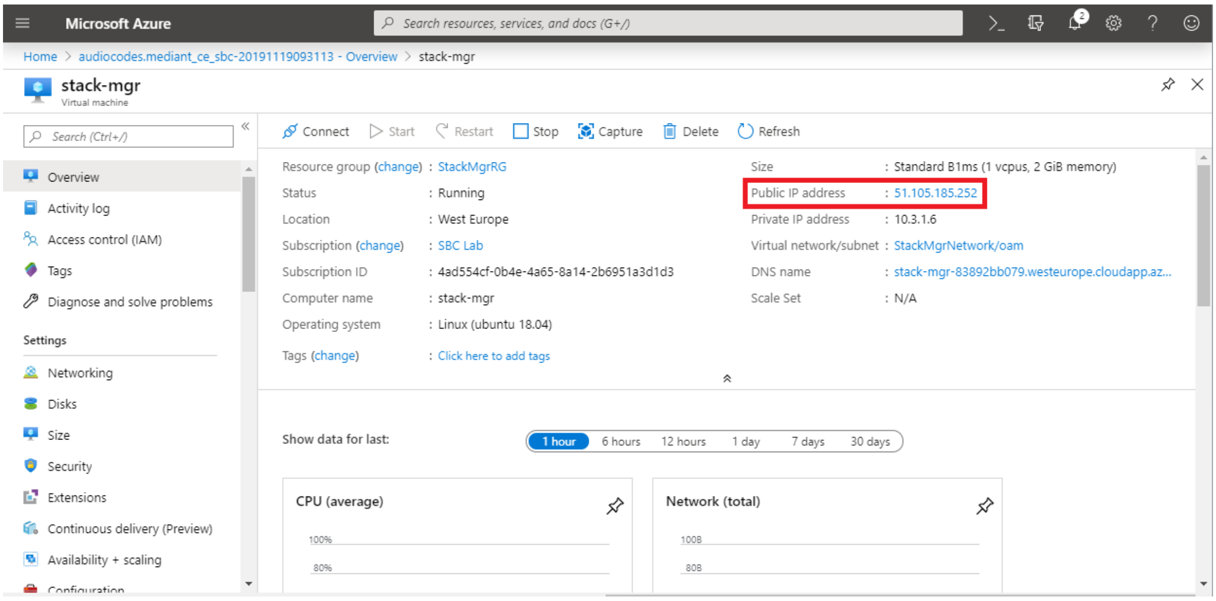
11. Click **Create** to start the virtual machine deployment.

12. Wait until the virtual machine deployment is complete, and then open the Virtual Machines screen (**All services** > **Virtual Machines**).

13. Select the Stack Manager virtual machine.

14. In the Overview screen, view the public IP address assigned to it.

Figure 2-14: Determining Public IP Address



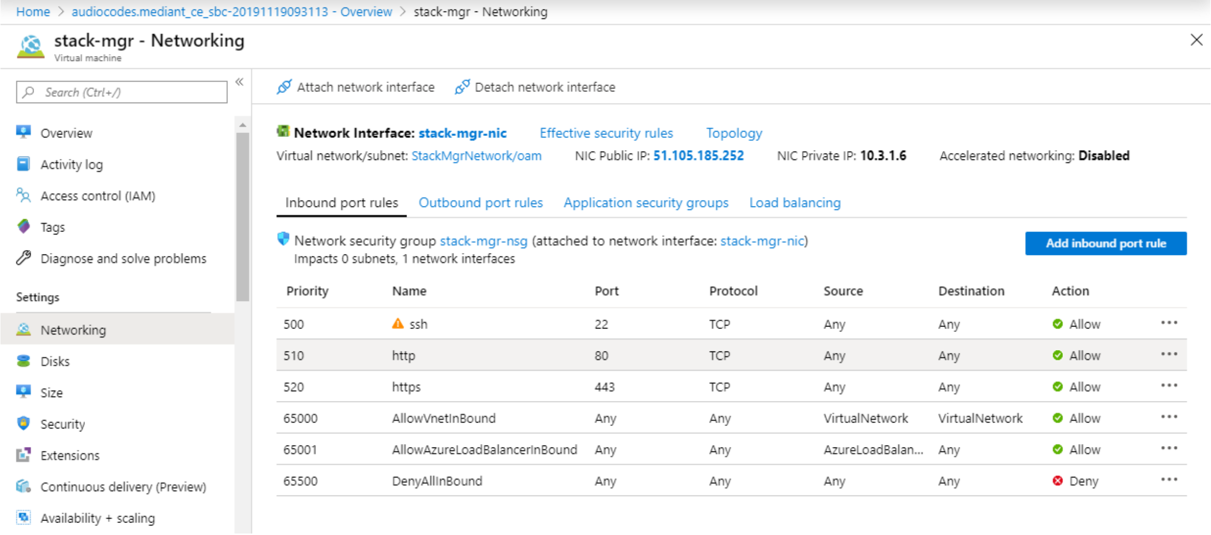
Resource group (change)	: StackMgrRG
Status	: Running
Location	: West Europe
Subscription (change)	: SBC Lab
Subscription ID	: 4ad554cf-0b4e-4a65-8a14-2b6951a3d1d3
Computer name	: stack-mgr
Operating system	: Linux (ubuntu 18.04)
Tags (change)	: Click here to add tags
Size	: Standard B1ms (1 vcpus, 2 GiB memory)
Public IP address	: 51.105.185.252
Private IP address	: 10.3.1.6
Virtual network/subnet	: StackMgrNetwork/oam
DNS name	: stack-mgr-83892bb079.westeurope.cloudapp.az...
Scale Set	: N/A

15. In the Networking screen, verify that the following ports are open for inbound traffic:

Port	Protocol	Purpose
22	TCP	SSH connection to Stack Manager’s CLI interface.
80	TCP	HTTP connection to Stack Manager’s Web interface.
443	TCP	HTTPS connection to Stack Manager’s Web interface.

16. If any port is missing, click **Add inbound port rule** and then add the port.

Figure 2-15: Checking Inbound Port Rules



Network Interface: stack-mgr-nic

Virtual network/subnet: StackMgrNetwork/oam NIC Public IP: 51.105.185.252 NIC Private IP: 10.3.1.6 Accelerated networking: Disabled

Network security group stack-mgr-nsg (attached to network interface: stack-mgr-nic)
Impacts 0 subnets, 1 network interfaces

Priority	Name	Port	Protocol	Source	Destination	Action
500	⚠ ssh	22	TCP	Any	Any	✓ Allow
510	http	80	TCP	Any	Any	✓ Allow
520	https	443	TCP	Any	Any	✓ Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	✓ Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalan...	Any	✓ Allow
65500	DenyAllInBound	Any	Any	Any	Any	✗ Deny

17. Continue with post-installation configuration, as described in Section 2.8.2, Post-Installation Configuration on Microsoft Azure.

2.4.4 Creating Google Cloud Virtual Machine

The following procedure describes how to create a new Google Cloud virtual machine (VM) for running the Stack Manager application.

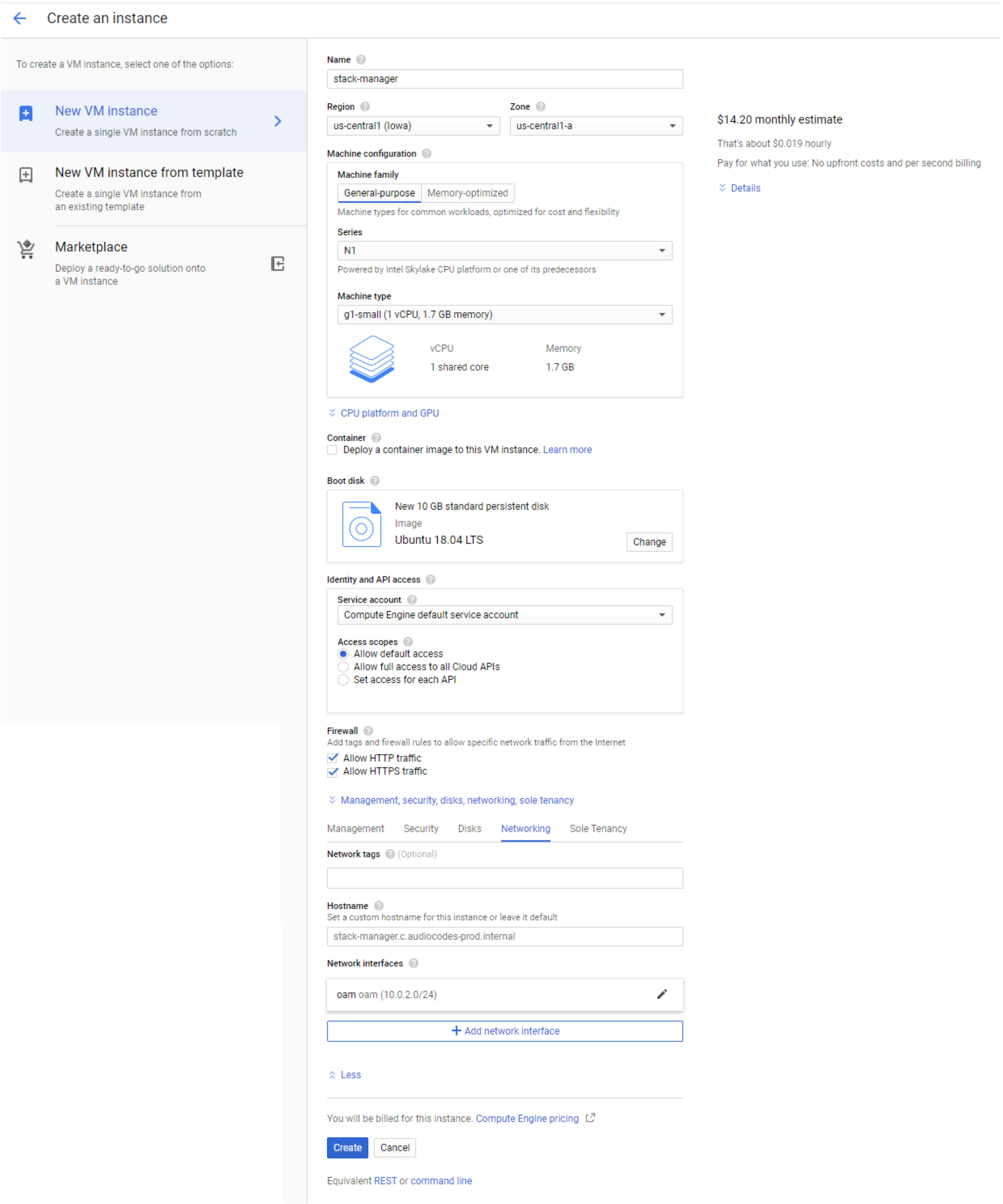
➢ **To create a new Google Cloud virtual machine for running Stack Manager application:**

1. Open the Google Cloud Console at https://console.cloud.google.com/compute.
2. On the VM Instances page, click **Create Instance**.
3. In the 'Name' field, enter a unique name for the new virtual machine.
4. Choose the Region and Zone where Stack Manager will be deployed.
5. Under the ‘Machine Type’ group, choose **g1-small** (1 shared vCPU, 1.7 GB memory).
6. Under the ‘Boot disk’ group, choose **Ubuntu 18.04 LTS** or any other supported operating system.
7. Under the ‘Firewall’ group, select the **Allow HTTP traffic** and **Allow HTTPS traffic** check boxes.
8. Click **Management, security, disks, networking, sole tenancy**.
9. In the **Networking** tab for the ‘Network interface’, choose the "Main Network" for connecting to the management interface of the deployed Mediant VE/CE stack(s).
10. If you want to be able to connect to Stack Manager’s CLI interface through a regular SSH client (and not through the Google Cloud dashboard), configure the SSH keys under the **Security** tab. Note that the username is provided as the last part of the encoded key. For example, in the following SSH key, "admin" is the username:

    ```
    ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAA…0Sknr admin
    ```

11. Click **Create**.

Figure 2-16: Create Google Cloud Instance



Create an instance

To create a VM instance, select one of the options:

New VM instance
Create a single VM instance from scratch

New VM instance from template
Create a single VM instance from an existing template

Marketplace
Deploy a ready-to-go solution onto a VM instance

Name: stack-manager

Region: us-central1 (Iowa)

Zone: us-central1-a

Machine configuration

Machine family: General-purpose | Memory-optimized
Machine types for common workloads, optimized for cost and flexibility

Series: N1
Powered by Intel Skylake CPU platform or one of its predecessors

Machine type: g1-small (1 vCPU, 1.7 GB memory)

vCPU	Memory
1 shared core	1.7 GB

CPU platform and GPU

Container
□ Deploy a container image to this VM instance. Learn more

Boot disk
New 10 GB standard persistent disk
Image
Ubuntu 18.04 LTS
Change

Identity and API access

Service account: Compute Engine default service account

Access scopes
● Allow default access
○ Allow full access to all Cloud APIs
○ Set access for each API

Firewall
Add tags and firewall rules to allow specific network traffic from the Internet
☑ Allow HTTP traffic
☑ Allow HTTPS traffic

Management, security, disks, networking, sole tenancy

Management | Security | Disks | Networking | Sole Tenancy

Network tags (Optional)

Hostname
Set a custom hostname for this instance or leave it default
stack-manager.c.audiocodes-prod.internal

Network interfaces
oam oam (10.0.2.0/24)

+ Add network interface

Less

You will be billed for this instance. Compute Engine pricing

Create | Cancel

Equivalent REST or command line

$14.20 monthly estimate
That's about $0.019 hourly
Pay for what you use: No upfront costs and per second billing
Details

12. By default, new Google Cloud virtual machines are assigned with ephemeral External IP addresses that change when the instance is stopped or started. If you wish Stack Manager's External IP address to remain unchanged, allocate an External IP address and attach it to the virtual machine.

13. Continue with Stack Manager installation, as described in Section 2.4.6, Installing Stack Manager Application.

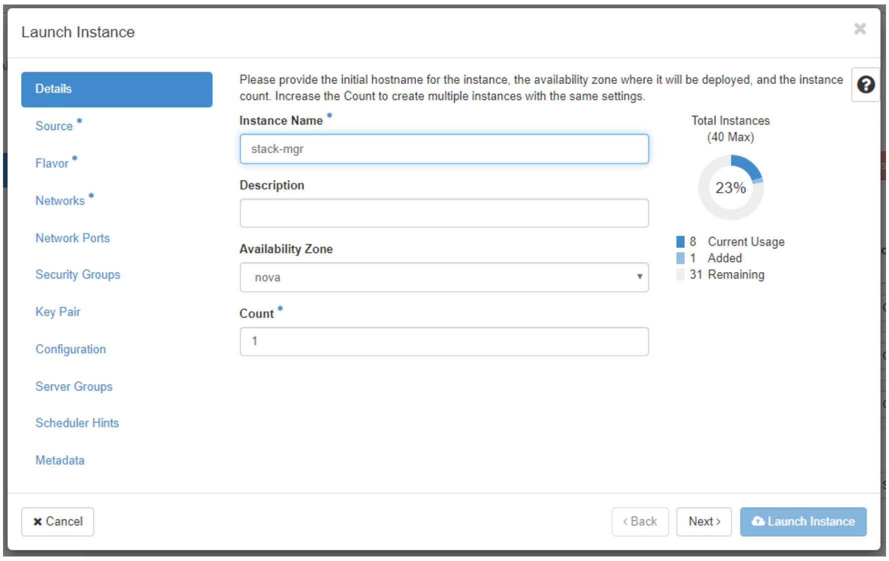
2.4.5 Creating OpenStack Instance

The following procedure describes how to create a new OpenStack instance for running the Stack Manager application.

➢ **To create an OpenStack instance for running Stack Manager application:**

1. Open the OpenStack dashboard.
2. On the Instances page, click **Launch Instance**; the Launch Instance wizard starts with the Details page.
3. In the 'Instance Name' field, enter a unique name for the new instance.

Figure 2-17: Launch Instance Wizard - Details Page



Launch Instance

Please provide the initial hostname for the instance, the availability zone where it will be deployed, and the instance count. Increase the Count to create multiple instances with the same settings.

Instance Name *: stack-mgr

Description:

Availability Zone: nova

Count *: 1

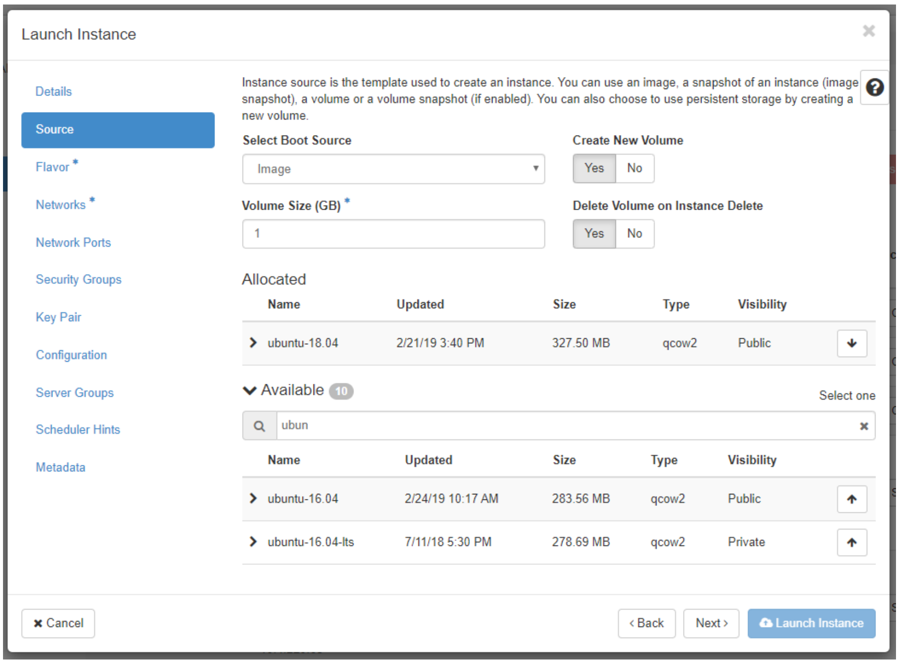
Total Instances (40 Max)

23%

8 Current Usage
1 Added
31 Remaining

4. Click **Next**; the Source wizard page appears.
5. Select one of the supported operating system images (e.g., Ubuntu 18.04).

Figure 2-18: Launch Instance Wizard - Source Page



Launch Instance

Instance source is the template used to create an instance. You can use an image, a snapshot of an instance (image snapshot), a volume or a volume snapshot (if enabled). You can also choose to use persistent storage by creating a new volume.

Select Boot Source: Image

Create New Volume: Yes No

Volume Size (GB) *: 1

Delete Volume on Instance Delete: Yes No

Allocated

Name	Updated	Size	Type	Visibility
ubuntu-18.04	2/21/19 3:40 PM	327.50 MB	qcow2	Public

Available 10 — Select one

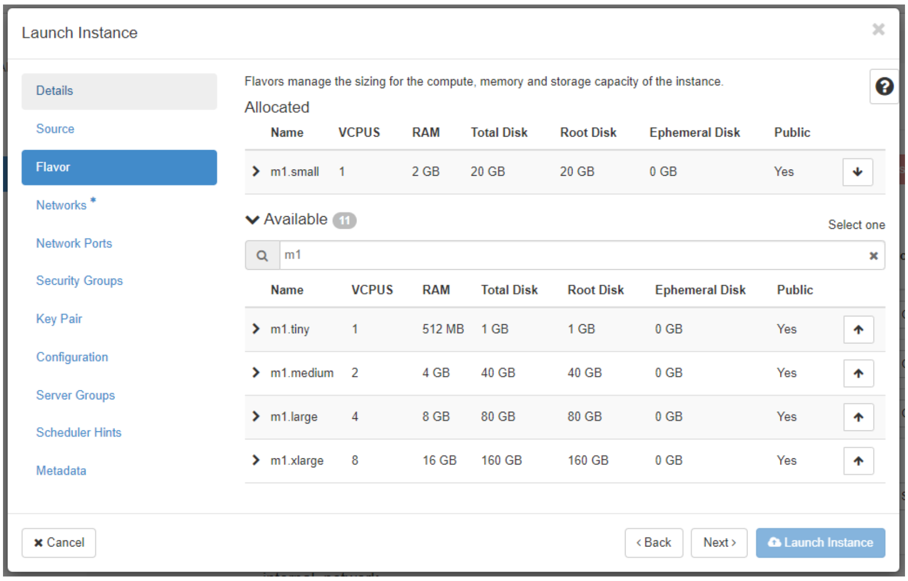
ubun

Name	Updated	Size	Type	Visibility
ubuntu-16.04	2/24/19 10:17 AM	283.56 MB	qcow2	Public
ubuntu-16.04-lts	7/11/18 5:30 PM	278.69 MB	qcow2	Private

6. Click **Next**; the Flavor wizard page appears.

7. Select the flavor that provides 1 vCPU and 2 GB of RAM.

Figure 2-19: Launch Instance Wizard - Flavor Page



Launch Instance

Flavors manage the sizing for the compute, memory and storage capacity of the instance.

Allocated

Name	VCPUS	RAM	Total Disk	Root Disk	Ephemeral Disk	Public
m1.small	1	2 GB	20 GB	20 GB	0 GB	Yes

Available 11 Select one

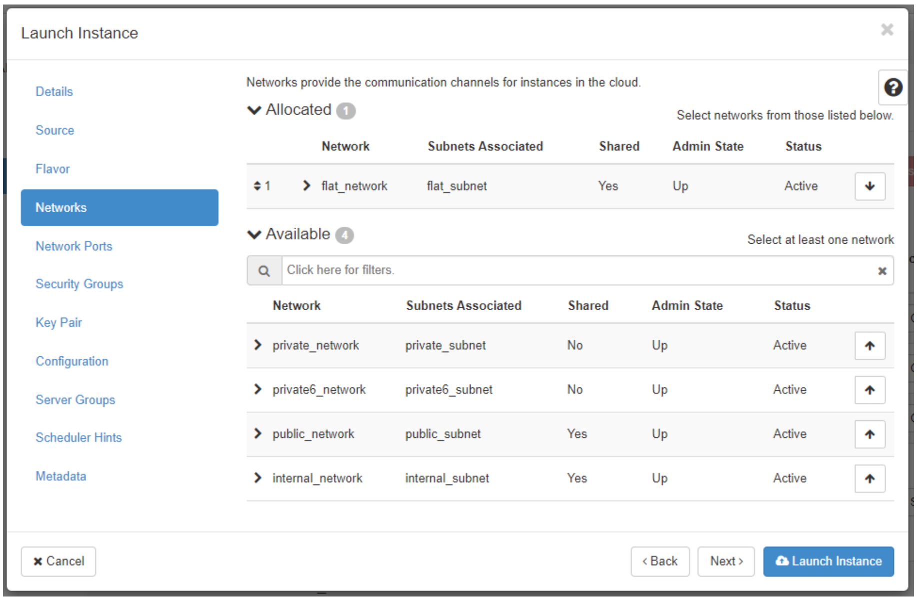
m1

Name	VCPUS	RAM	Total Disk	Root Disk	Ephemeral Disk	Public
m1.tiny	1	512 MB	1 GB	1 GB	0 GB	Yes
m1.medium	2	4 GB	40 GB	40 GB	0 GB	Yes
m1.large	4	8 GB	80 GB	80 GB	0 GB	Yes
m1.xlarge	8	16 GB	160 GB	160 GB	0 GB	Yes

8. Click **Next**; the Networks wizard page appears.

9. Select the "Main Network" that will be used for connecting to the management interface of the deployed Mediant VE/CE stack(s).

Figure 2-20: Launch Instance Wizard - Networks Page



Launch Instance

Networks provide the communication channels for instances in the cloud.

Allocated 1 Select networks from those listed below.

	Network	Subnets Associated	Shared	Admin State	Status
1	flat_network	flat_subnet	Yes	Up	Active

Available 4 Select at least one network

Click here for filters.

Network	Subnets Associated	Shared	Admin State	Status
private_network	private_subnet	No	Up	Active
private6_network	private6_subnet	No	Up	Active
public_network	public_subnet	Yes	Up	Active
internal_network	internal_subnet	Yes	Up	Active

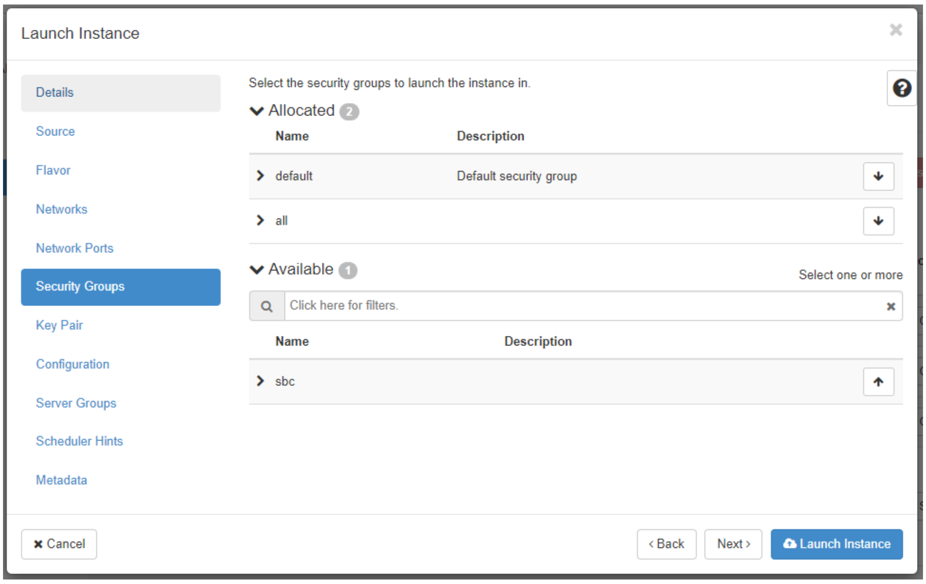
10. Click **Next**; the Network Ports wizard page appears.

11. Click **Next**; the Security Groups wizard page appears.

12. Select a security group that enables the following ports and protocols to communicate with the Stack Manager instance:

Port	Protocol	Purpose
22	TCP	SSH connection to Stack Manager’s CLI interface.
80	TCP	HTTP connection to Stack Manager’s Web interface.
443	TCP	HTTPS connection to Stack Manager’s Web interface.

Figure 2-21: Launch Instance Wizard - Security Groups Page



Launch Instance

Details
Source
Flavor
Networks
Network Ports
Security Groups
Key Pair
Configuration
Server Groups
Scheduler Hints
Metadata

Select the security groups to launch the instance in.

Allocated 2

Name	Description
default	Default security group
all	

Available 1 — Select one or more

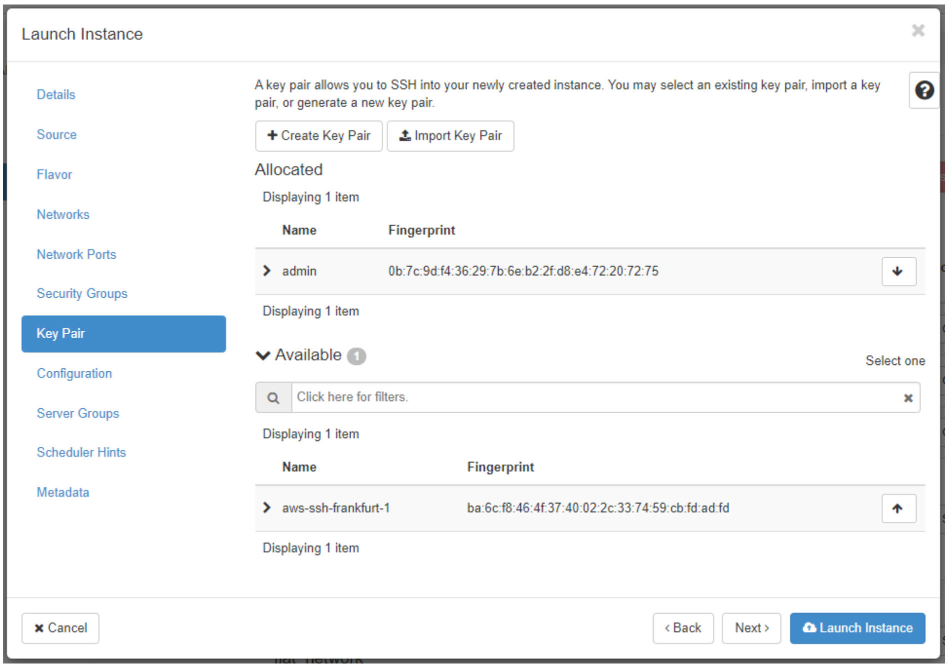
Click here for filters.

Name	Description
sbc	

13. Click **Next**; the Key Pair wizard page appears.

    Select an existing key pair or create a new one. Make sure that you have private key that matches the selected pair because you will need it to connect the deployed instance through SSH.

Figure 2-22: Launch Instance Wizard - Key Pair Page



Launch Instance

Details
Source
Flavor
Networks
Network Ports
Security Groups
Key Pair
Configuration
Server Groups
Scheduler Hints
Metadata

A key pair allows you to SSH into your newly created instance. You may select an existing key pair, import a key pair, or generate a new key pair.

Allocated

Displaying 1 item

Name	Fingerprint
admin	0b:7c:9d:f4:36:29:7b:6e:b2:2f:d8:e4:72:20:72:75

Displaying 1 item

Available 1 — Select one

Click here for filters.

Displaying 1 item

Name	Fingerprint
aws-ssh-frankfurt-1	ba:6c:f8:46:4f:37:40:02:2c:33:74:59:cb:fd:ad:fd

Displaying 1 item

14. Click **Launch Instance**.

15. Continue with Stack Manager installation, as described in Section 2.4.6, Installing Stack Manager Application.

2.4.6 Installing Stack Manager Application

The following procedure describes how to install the Stack Manager application after successfully creating the instance / virtual machine.

Note: This step is not needed if you are deploying Stack Manager from Azure Marketplace.

➢ **To install Stack Manager application:**

1. Log in to the launched virtual instance / machine through SSH, using the credentials obtained during the launch.
2. Run the following command to download the latest installation package:

```
$ curl http://redirect.audiocodes.com/install/stack_mgr/stack_
mgr.zip --output stack_mgr.zip
```

   Alternatively, you may download the installation package manually from http://redirect.audiocodes.com/install/index.html and then transfer it to the virtual instance / machine through an SCP/SFTP client (e.g., WinSCP).

3. Run the following commands to start the installation:

```
$ unzip stack_mgr.zip
$ sudo bash stack_mgr/install.sh
```

Note: If the `unzip` command above fails due to the lack of “unzip” package, install it using distribution-specific package manager. For example, for Ubuntu Linux, type `sudo apt install unzip`.

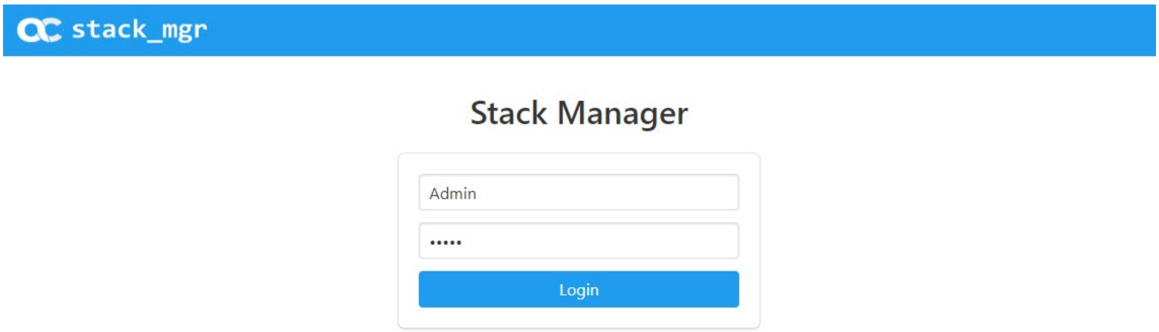
4. Continue with post-installation configuration, as described in Section 2.8, Post-installation Configuration.

2.5 Accessing the Web Interface

Stack Manager’s Web interface is accessed by connecting to the virtual machine through HTTP/HTTPS, using one of the supported web browsers:

- Google Chrome
- Firefox
- Microsoft Edge

Figure 2-23: Web Interface of Stack Manager



The default login credentials of the Web Interface are:

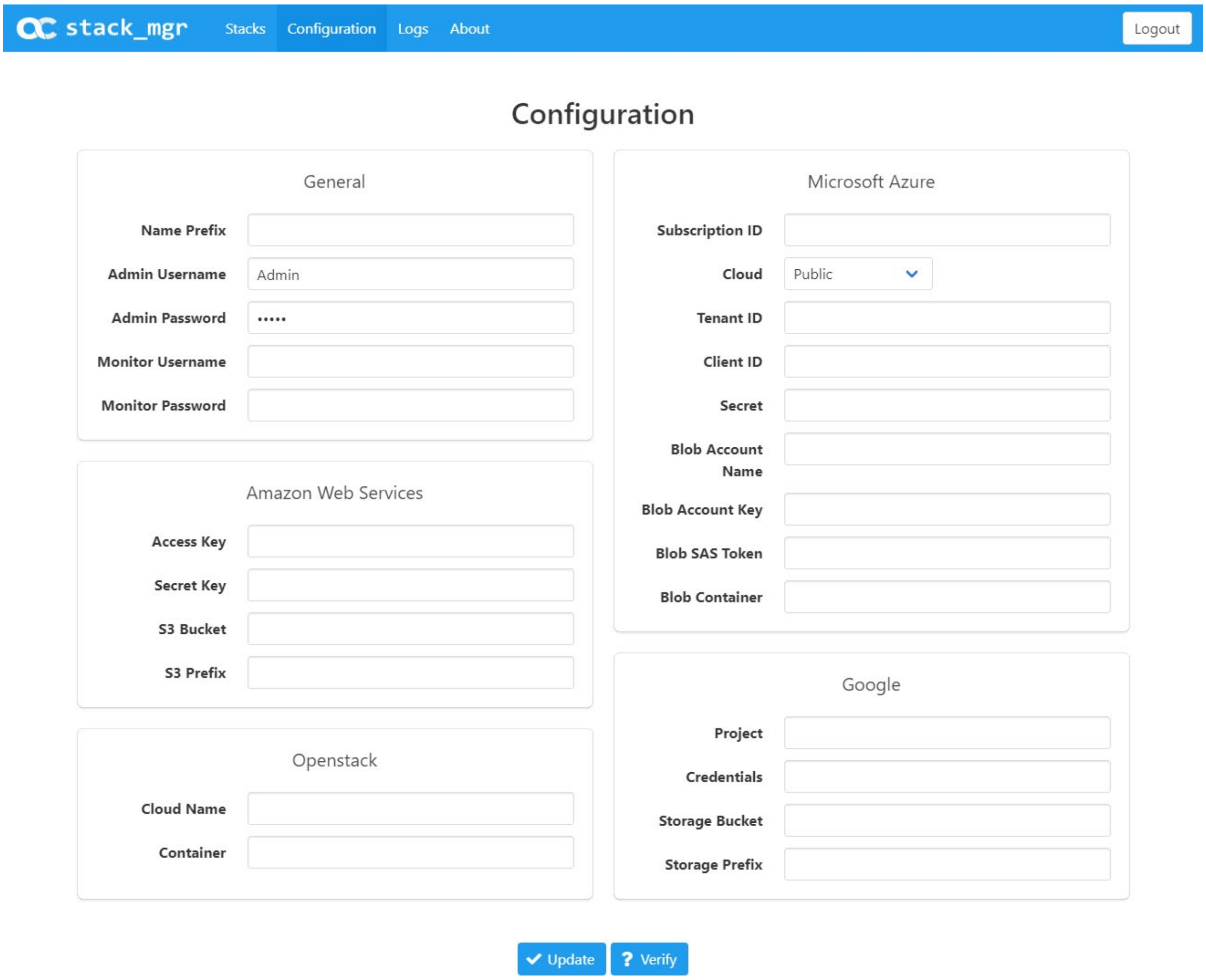
- Username: **Admin**
- Password: **Admin**

It is recommended to change the login credentials on first login.

➢ To change default Web credentials:

1. Log in to the Web interface.
2. Open the Configuration page.
3. In the 'Admin Username' field, enter the new username.
4. In the 'Admin Password' field, enter the new password.

Figure 2-24: Changing Web Login Credentials



Configuration

General

Name Prefix	
Admin Username	Admin
Admin Password	•••••
Monitor Username	
Monitor Password	

Amazon Web Services

Access Key	
Secret Key	
S3 Bucket	
S3 Prefix	

Openstack

Cloud Name	
Container	

Microsoft Azure

Subscription ID	
Cloud	Public
Tenant ID	
Client ID	
Secret	
Blob Account Name	
Blob Account Key	
Blob SAS Token	
Blob Container	

Google

Project	
Credentials	
Storage Bucket	
Storage Prefix	

5. Click **Update**.

2.6 Accessing the CLI

Stack Manager’s CLI interface is accessed by switching to the *stack_mgr* user, using the following command:

```
$ stack_mgr_cli
```

If the above command doesn’t function, close the current SSH session and then open a new one. If the problem persists, use the following alternative syntax:

```
$ sudo su - stack_mgr
```

2.7 Upgrading Stack Manager

To upgrade the Stack Manager application to the latest version, log in to the virtual instance (machine) through SSH as a regular user (e.g., *ubuntu*), and then run the following command:

```
$ sudo /opt/stack_mgr/update.sh
```

The command 1) checks if a new Stack Manager application version was published on AudioCodes website, 2) if yes, downloads it, and then 3) updates the current installation. All configuration and created stacks are preserved. The upgrade operation has no effect on Mediant VE/CE stacks service.

The **update.sh** script supports the following optional parameters:

- **--force:** Performs an upgrade even if the current Stack Manager version is later or equal to the one published on AudioCodes website. (This may be useful if the upgrade operation failed and needs to be re-run.)
- **--test:** Checks if a new version is available, but doesn't perform an upgrade.
- **--verify:** Similar to --**test**, but also outputs the change log for the new version.

Alternatively, you can upgrade Stack Manager by installing a new version using the regular installation procedure (see Section 2.4.6, Installing Stack Manager Application for details). All existing configuration and stacks are preserved.

Note: When upgrading Stack Manager through the regular installation procedure, make sure that you log in as a regular user (e.g., "ubuntu") and that you do not enter Stack Manager's CLI (via the "stack_mgr_cli" command).

2.8 Post-installation Configuration

The following procedures describe post-installation configuration that ensures that Stack Manager is able to properly access cloud / virtual infrastructure APIs.

The instructions depend on the cloud / virtual environment.

After performing the configuration, verify that Stack Manager is able to operate normally, as described in Section 2.8.5, Verifying Configuration.

For production environments, it is also recommended to configure Stack Manager to store its run-time data on cloud storage services, as described in Section 2.9, Runtime Data.

> **Note:** The instructions described in this section use the Web interface to configure Stack Manager. The same tasks may be performed through CLI, using the `configure` command, as described in Section Global Configuration.

2.8.1 Post-installation Configuration on Amazon Web Services (AWS)

The following procedure describes post-installation configuration of the Stack Manager application in the Amazon Web Services (AWS) environment, which consists of the following step:

- Enabling Stack Manager virtual machine access to AWS APIs

2.8.1.1 Enabling Access to AWS API via IAM Role (Recommended Method)

Before using Stack Manager, you need to ensure that it has access to the AWS API. The recommended method for achieving this is to create an IAM role, as described in Section 2.3.1.1, IAM Role for Stack Manager, and then to attach it to the Stack Manager's virtual instance during its creation, as described in Section 2.4.2, Creating Amazon Web Services (AWS) Instance.

2.8.1.2 Enabling Access to AWS API via AWS Access Key (Alternative Method)

This section describes an alternative method for enabling Stack Manager access to AWS APIs. For typical deployments, please use the recommended method instead, as described in Section 2.8.1.1, Enabling Access to AWS API via IAM Role (Recommended Method).

➢ **To configure Stack Manager access to AWS API using access key:**

1. Obtain the AWS access key with permissions listed in Section 2.3.1.1, IAM Role for Stack Manager. For more information on how to do this, refer to AWS documentation at https://docs.aws.amazon.com/general/latest/gr/aws-sec-cred-types.html#access-keys-and-secret-access-keys.
2. Log in to the Stack Manager Web interface.
3. Open the Configuration page.
4. Enter the access key values in the 'AWS Access Key' and 'AWS Secret Key' fields.
5. Click **Update**.

2.8.2 Post-Installation Configuration on Microsoft Azure

The following procedure describes post-installation configuration of the Stack Manager application in Microsoft Azure environment, which includes the following steps:

1. Configuring the Azure Subscription ID.
2. Enabling Stack Manager virtual machine access to Azure APIs.

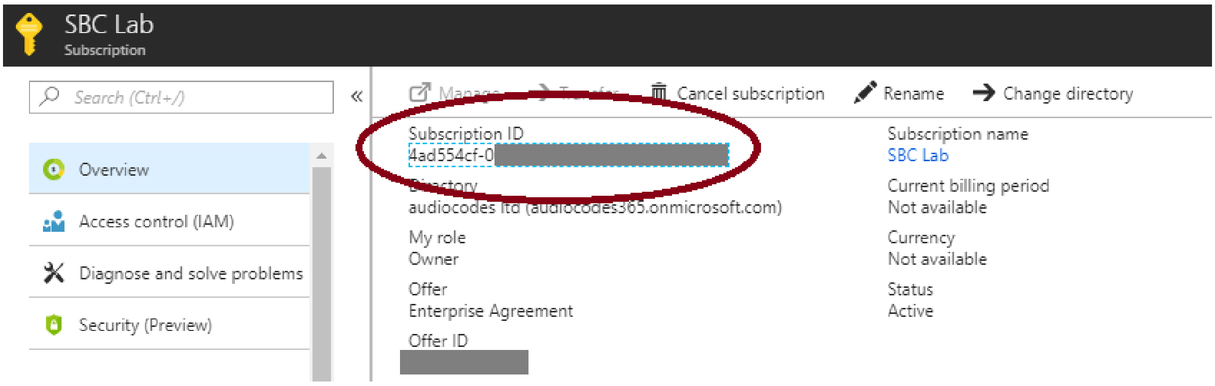
2.8.2.1 Configuring the Azure Subscription ID

After installing Stack Manager, you need to configure the Subscription ID where it will operate.

➢ **To configure Azure Subscription ID:**

1. Open the Azure portal at https://portal.azure.com/.
2. Navigate to Subscriptions (**All services** > **Subscriptions**).
3. Locate your Azure Subscription ID.

Figure 2-25: Locating Subscription ID



Subscription ID
4ad554cf-0[redacted]

Directory
audiocodes ltd (audiocodes365.onmicrosoft.com)

My role
Owner

Offer
Enterprise Agreement

Offer ID
[redacted]

Subscription name
SBC Lab

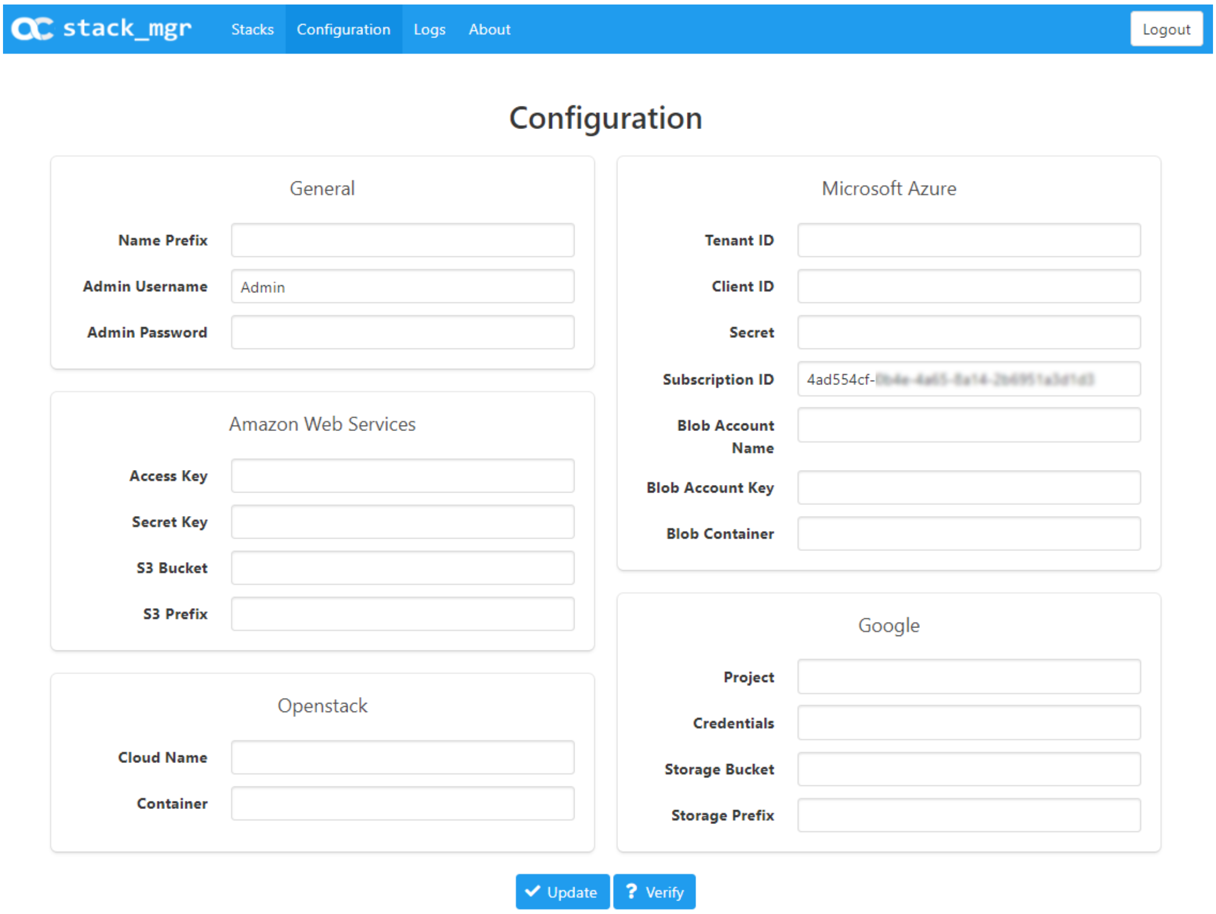
Current billing period
Not available

Currency
Not available

Status
Active

4. Log in to the Stack Manager Web interface.
5. Open the Configuration page.
6. Enter the Azure subscription ID in the 'Azure Subscription ID' field.

Figure 2-26: Configuring Azure Subscription ID



Configuration

General

Name Prefix

Admin Username: Admin

Admin Password

Amazon Web Services

Access Key

Secret Key

S3 Bucket

S3 Prefix

Openstack

Cloud Name

Container

Microsoft Azure

Tenant ID

Client ID

Secret

Subscription ID: 4ad554cf-[redacted]

Blob Account Name

Blob Account Key

Blob Container

Google

Project

Credentials

Storage Bucket

Storage Prefix

7. Click **Update**.

2.8.2.2 Enabling Access to Azure APIs via Managed Service Identity (Recommended Method)

Before using Stack Manager, you need to ensure that it has access to Azure APIs. This section describes the recommended method for achieving this through the Managed Service Identity. The method consist of two steps:

1. Enabling Managed Service Identity for the Stack Manager virtual machine.
2. Assigning a proper IAM role to the Stack Manager virtual machine.

An alternative method is to use the service principal, as described in Section 2.8.2.3, Enabling Access to Azure APIs via Service Principal (Alternative Method).

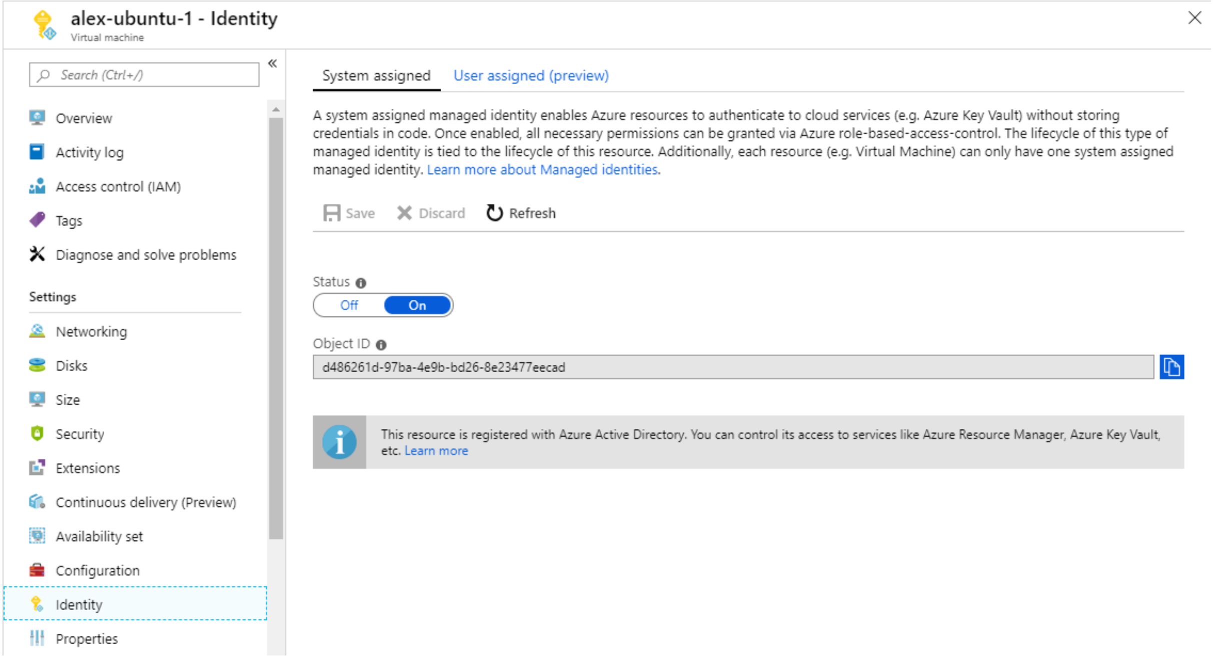
Managed Service Identity (MSI) enables the assignment of access control (IAM) roles to a specific Azure virtual machine deployed in Azure.

➢ To enable Managed Service Identity:

1. Open the Azure portal at http://portal.azure.com.
1. Navigate to the Virtual Machines page.
2. Select the Stack Manager virtual machine.

3. In the Navigation menu, click **Identity**, and then enable Managed Service Identity.

Figure 2-27: Configuring Virtual Machine's Managed Service Identity



A system assigned managed identity enables Azure resources to authenticate to cloud services (e.g. Azure Key Vault) without storing credentials in code. Once enabled, all necessary permissions can be granted via Azure role-based-access-control. The lifecycle of this type of managed identity is tied to the lifecycle of this resource. Additionally, each resource (e.g. Virtual Machine) can only have one system assigned managed identity. Learn more about Managed identities.

Status: Off [✓ On]

Object ID: d486261d-97ba-4e9b-bd26-8e23477eecad

This resource is registered with Azure Active Directory. You can control its access to services like Azure Resource Manager, Azure Key Vault, etc. Learn more

Once you have performed the above procedure, you should grant the Stack Manager virtual machine permissions to access all needed Azure APIs for successful stack deployment and management. There are several ways to achieve this:

- Option 1 (recommended): Assign Stack Manager with the "Contributor" role at the Subscription level.
- Option 2: Assign Stack Manager with custom IAM roles at Subscription, Network and Resource Group levels.

2.8.2.2.1 Option 1: "Contributor" Role at Subscription Level

This method provides Stack Manager with complete access to Subscription resources, including the ability to create new Resource Groups. This method is recommended for most users, as it's simple to provision and doesn't impose any restrictions on Stack Manager functionality.

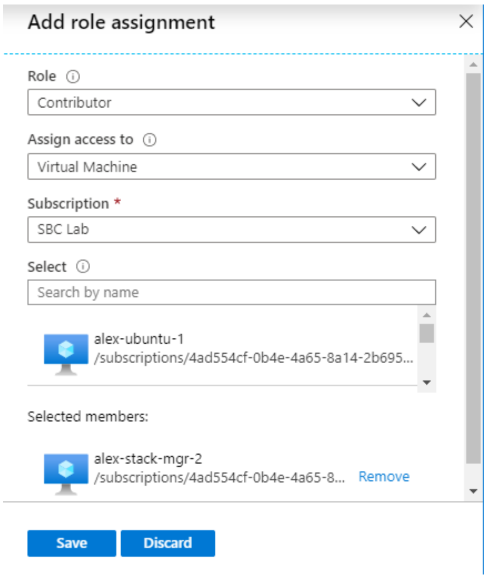
➢ **To assign Stack Manager with "Contributor" role at Subscription level:**

1. Open the Azure portal at http://portal.azure.com.
2. Navigate to the Subscriptions page.
3. Select your subscription.
4. In the Navigation menu, click **Access Control (IAM)**, and then click **Add a role assignment**:
   a. From the 'Role' drop-down list, select **Contributor**.
   b. From the 'Assign access to' drop-down list, select **Virtual Machine**.

c. From the 'Select' drop-down list, select the name of Stack Manager's virtual machine.

d. Click **Save**.

Figure 2-28: Adding Role Assignment



Add role assignment

Role: Contributor

Assign access to: Virtual Machine

Subscription *: SBC Lab

Select: Search by name

alex-ubuntu-1
/subscriptions/4ad554cf-0b4e-4a65-8a14-2b695...

Selected members:

alex-stack-mgr-2
/subscriptions/4ad554cf-0b4e-4a65-8... Remove

2.8.2.2.2 Option 2: Custom IAM Roles at Subscription, Network and Resource Group Levels

This method limits Stack Manager administrative access to the specific pre-defined Resource Group(s). It is more complicated to provision and slightly complicates stack creation. Therefore, this method is recommended for advanced users who want to minimize IAM permissions granted to the Stack Manager.

With this method, Stack Manager is assigned the following IAM roles:

Scope	IAM Role
Subscription	Custom IAM role that includes read-only access for specific resources only (e.g., virtual networks and subnets). This is needed for displaying "Create new stack" Web UI dialog and validating stack configuration during create, modify, update, and heal operations.
Virtual Network	Custom IAM role that grants Stack Manager the ability to deploy new virtual machines into the specific Virtual Network(s). The role is assigned only for specific Virtual Networks where new stacks will be deployed.
Resource Group	Custom IAM role that grants Stack Manager the ability to create, modify and delete stack resources (e.g., virtual machines, network interfaces, load balancers). The role is assigned only for specific Resource Group(s) that must be pre-created prior to stack deployment.

Note: When using this method, an empty Resource Group must be manually created prior to stack deployment. The name of this Resource Group must be specified during new stack creation through the Advanced Config parameter **resource_group**.

➢ To assign Stack Manager with custom IAM roles at Subscription, Network and Resource Group levels:

1. Create the following three custom IAM roles:

   - **Custom IAM Role 'Stack Manager Subscription Role':**

```
{
    "properties": {
        "roleName": "Stack Manager Subscription Role",
        "description": "Subscription role for AudioCodes Stack Manager.",
        "assignableScopes": [
            "/subscriptions/{subscriptionId}"
        ],
        "permissions": [
            {
                "actions": [
                    "Microsoft.Network/virtualNetworks/read",
                    "Microsoft.Network/virtualNetworks/subnets/read",
                    "Microsoft.Network/publicIPAddresses/read",
                    "Microsoft.Compute/images/read",
                    "Microsoft.Compute/skus/read",
                    "Microsoft.Compute/virtualMachines/vmSizes/read",
                    "Microsoft.MarketplaceOrdering/offertypes/publishers/
offers/plans/agreements/read",
                    "Microsoft.MarketplaceOrdering/offertypes/publishers/
offers/plans/agreements/write"
                ],
                "notActions": [],
                "dataActions": [],
                "notDataActions": []
            }
        ]
    }
}
```

   - **Custom IAM Role 'Stack Manager Network Role':**

```
{
    "properties": {
        "roleName": "Stack Manager Network Role",
        "description": "Network role for AudioCodes Stack Manager.",
        "assignableScopes": [
            "/subscriptions/{subscriptionId}"
        ],
        "permissions": [
            {
                "actions": [
                  "Microsoft.Network/virtualNetworks/subnets/join/action"
                ],
                "notActions": [],
                "dataActions": [],
                "notDataActions": []
            }
        ]
    }
}
```

- **Custom IAM Role 'Stack Manager Resource Group Role':**

```
{
    "properties": {
        "roleName": "Stack Manager Resource Group Role",
        "description": "",
        "assignableScopes": [
            "/subscriptions/{subscriptionId}/resourcegroups/{rgName}"
        ],
        "permissions": [
          {
            "actions": [
                "Microsoft.Compute/availabilitySets/*",
                "Microsoft.Compute/proximityPlacementGroups/*",
                "Microsoft.Compute/locations/*",
                "Microsoft.Compute/virtualMachines/*",
                "Microsoft.Compute/disks/write",
                "Microsoft.Compute/disks/read",
                "Microsoft.Compute/disks/delete",
                "Microsoft.Network/networkInterfaces/*",
                "Microsoft.Network/networkSecurityGroups/*",
                "Microsoft.Network/publicIPAddresses/*",
                "Microsoft.Resources/deployments/*",
                "Microsoft.Storage/storageAccounts/*",
                "Microsoft.Network/loadBalancers/*",
                "Microsoft.Network/loadBalancers/backendAddressPools/*",
                "Microsoft.Network/loadBalancers/probes/*",
                "Microsoft.Network/loadBalancers/outboundRules/*",
                "Microsoft.Network/loadBalancers/loadBalancingRules/*",
            "Microsoft.Network/loadBalancers/frontendIPConfigurations/*",
                "Microsoft.Resources/subscriptions/resourceGroups/read"
            ],
            "notActions": [],
            "dataActions": [],
            "notDataActions": []
          }
        ]
    }
}
```

Refer to Azure documentation at https://docs.microsoft.com/en-us/azure/role-based-access-control/custom-roles for detailed instructions on how to create custom IAM roles.

2. Open the Azure portal at [http://portal.azure.com.](http://portal.azure.com)
3. Navigate to the Subscriptions page.
4. Select your subscription.
5. In the Navigation menu, click **Access Control (IAM)**, and then click **Add a role assignment**:
    a. From the 'Role' drop-down list, select **Stack Manager Subscription Role**.
    b. From the 'Assign access to' drop-down list, select **Virtual Machine**.
    c. From the 'Select' drop-down list, select the name of Stack Manager’s virtual machine.
    d. Click **Save**.
6. Navigate to the Virtual Networks page.
7. Select the network where new stacks will be deployed.
8. In the Navigation menu, click **Access Control (IAM)**, and then click **Add a role assignment**:
    a. From the 'Role' drop-down list, select **Stack Manager Network Role**.
    b. From the 'Assign access to' drop-down list, select **Virtual Machine**.
    c. From the 'Select' drop-down list, select the name of Stack Manager’s virtual machine.
    d. Click **Save**.
9. Navigate to the Resource Groups page.
10. Click **Add** to create a new Resource Group(s) where new stacks will be deployed. Each stack will require a dedicated Resource Group that must be empty prior to stack creation.
    a. Enter the Resource Group name.
    b. From the 'Region' drop-down list, select the region where the new stack will be deployed.
    c. Click **Create**.
11. Select the created Resource Group(s).
12. In the Navigation menu, click **Access Control (IAM)**, and then click **Add a role assignment**:
    a. From the 'Role' drop-down list, select **Stack Manager Resource Group Role**.
    b. From the 'Assign access to' drop-down list, select **Virtual Machine**.
    c. From the 'Select' drop-down list, select the name of Stack Manager’s virtual machine.
    d. Click **Save**.
13. Restart the Stack Manager virtual machine to apply the new IAM credentials.

2.8.2.2.2.1 Advanced Restriction of Custom IAM Roles

Custom IAM roles, described in the previous section, may further be restricted if you choose to pre-create some Azure resources (e.g., public IP addresses) and/or are willing to deploy the new stack via the CLI interface.

The following permissions may be dropped from the Stack Manager Subscription Role:

Permission	What happens when it is dropped
Microsoft.Network/ virtualNetworks/read	You will be unable to create the new stack through the Web interface. Use the CLI or REST interface to create the new stack. After initial creation, further stack management may be performed through all management interfaces, including Web interface. Stack Manager will not be able to validate the Virtual Network name prior to stack deployment. If the wrong name is provided, stack deployment will fail.
Microsoft.Network/ virtualNetworks/subnets/read	You will be unable to create the new stack through the Web interface. Use the CLI or REST interfaces to create the new stack. After initial creation, further stack management may be performed through all management interfaces, including Web interface. Stack Manager will not be able to validate Subnet names prior to stack deployment. If wrong names are provided, stack deployment will fail. You must specify the CIDR for each subnet through the Advanced Config parameters: **cluster_subnet_cidr**, **main_subnet_cidr**, **additional1_subnet_cidr**, **additional2_subnet_cidr**. Otherwise, Stack Manager will not be able to properly configure network interfaces for deployed stack components.
Microsoft.Network/ publicIPAddresses/read	Stack Manager will not be able to validate predefined Public IP addresses provided via **public_ip_*** Advanced Config parameters. If wrong names are provided, stack deployment will fail.
Microsoft.Compute/ images/read	Stack Manager will not be able to validate custom VM images provided via **sc_image_id** / **mc_image_id** Advanced Config parameters. If wrong names are provided, stack deployment will fail.
Microsoft.Compute/ skus/read	Stack Manager will not be able to validate instance types (VM sizes) provided via **sc_instance_type** / **mc_instance_type** Advanced Config parameters. If wrong names are provided, stack deployment will fail.
Microsoft.MarketplaceOrdering/ offertypes/publishers/offers/ plans/agreements/read Microsoft.MarketplaceOrdering/ offertypes/publishers/offers/ plans/agreements/write	Stack Manager will not be able to automatically accept publisher agreement for Mediant VE/CE Marketplace offer. You need to manually accept the agreement prior to new stack deployment through the following CLI command: **az vm image terms accept \** **--publisher audiocodes \** **--offer mediantsessionbordercontroller \** **--sku mediantvesbcazure**

Permission	What happens when it is dropped
	If you are deploying SBC version based on CentOS 6, use **--sku mediantvirtualsbcazure** in the above command. If agreement is not accepted stack deployment will fail.

The following permissions may be dropped from the Stack Manager Resource Group Role:

Permission	What happens when it is dropped
Microsoft.Network/ networkSecurityGroups/*	You must precreate network security groups and provide them via **cluster_nsg_id** / **oam_nsg_id** / **signaling_nsg_id** / **media_nsg_id** Advanced Config parameters during the new stack creation. Stack Manager VM must be granted with **Microsoft.Network/networkSecurityGroups/actions/join** permission in the Resource Group where network security groups reside.
Microsoft.Network/ publicIPAddresses/*	You must precreate public IP addresses and provide them via **public_ip_*** Advanced Config parameters during the new stack creation. Stack Manager VM must be granted with **Microsoft.Network/publicIPAddresses/read** and **Microsoft.Network/publicIPAddresses/actions/join** permissions in the Resource Group where public IP addresses reside.
Microsoft.Storage/ storageAccounts/*	You must precreate diagnostics Storage Account and provide it via **diag_account** Advanced Config parameters during the new stack creation. Stack Manager VM must be granted with **Microsoft.Storage/storageAccounts/read** permission in the Resource Group where Storage Account resides.

2.8.2.3 Enabling Access to Azure APIs via Service Principal (Alternative Method)

This section describes an alternative method for enabling Stack Manager access to Azure APIs. For typical deployments, please use the recommended method instead, as described in Section 2.8.2.2, Enabling Access to Azure APIs via Managed Service Identity (Recommended Method).

➢ **To configure Stack Manager access to Azure API using Service Principal:**

1. Create an Azure Service Principal, as described in the Azure documentation at https://docs.microsoft.com/en-us/azure/active-directory/develop/app-objects-and-service-principals. Assign an appropriate IAM role(s) to the created Azure Service Principal, as described in the previous section.
2. Log in to the Stack Manager Web interface.
3. Open the Configuration page.
4. Enter the values in the 'Azure Tenant ID', 'Azure Client ID' and 'Azure Secret' fields.
5. Click **Update**.

2.8.3 Post-Installation Configuration on Google Cloud

The following procedure describes post-installation configuration of the Stack Manager application in Google Cloud environment, which includes the following steps:

1. Configuring Google Project ID.
2. Enabling Google Cloud APIs in the Project.
3. Enabling Stack Manager virtual machine access to Google Cloud APIs.

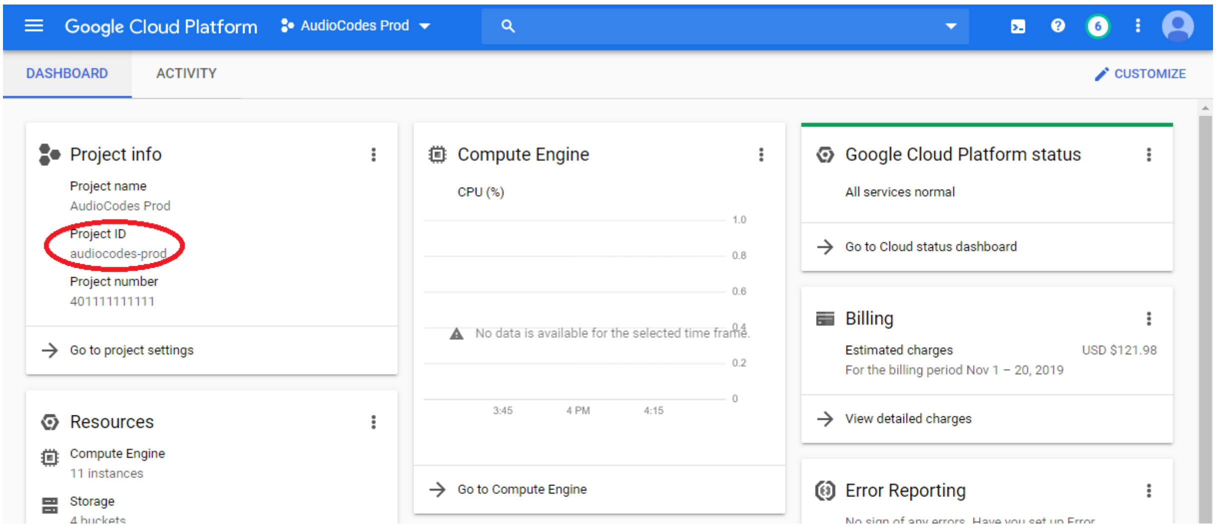
2.8.3.1 Configuring Google Project ID

After installing Stack Manager, you need to configure the Project ID where it will operate.

➢ **To configure Google Project ID:**

1. In Google Cloud Platform Console, go to the **Home** > **Dashboard** (https://console.cloud.google.com/home/dashboard), and then determine your project ID.

Figure 2-29: Determining Google Project ID



Project name
AudioCodes Prod

Project ID
audiocodes-prod

Project number
401111111111

No data is available for the selected time frame.

All services normal

Estimated charges USD $121.98
For the billing period Nov 1 – 20, 2019

Compute Engine
11 instances

Storage
4 buckets

No sign of any errors. Have you set up Error

2. Log in to the Stack Manager Web interface.
3. Open the Configuration page.
4. In the 'Google Project' field, enter the Project ID.
5. Click **Update**.

2.8.3.2 Enabling APIs in Project

The following Google Cloud APIs must be enabled in the Project for normal Stack Manager operation:

- Compute Engine API
- Cloud Deployment Manager V2 API
- Cloud Resource Manager API

➢ **To enable APIs in the project:**

1. In the Google Cloud Platform Console, go to the **API & Services** > **Dashboard** page (https://console.cloud.google.com/apis/dashboard).

2. Click **Enable APIs And Services**.
3. Type the API name, and then select it from the list.
4. Click **Enable** to enable the API.
5. Repeat the above steps for all APIs required by the Stack Manager.

2.8.3.3 Creating a Service Account

Service Accounts are used to manage application permissions.

➢ **To create a Service Account:**

1. In the Google Cloud Platform Console, go to the **IAM & admin** > **Service Accounts** page (https://console.cloud.google.com/iam-admin/serviceaccounts).
2. Click **Create service account**.
3. Enter the service account name, for example, "stack-mgr", and provide a description.
4. Click **Create** to create the account.
5. On the **Service account permissions (optional)** page displayed immediately afterwards, assign the following IAM roles to the service account, and then click **Continue**.
   a. Compute Engine > Compute Admin.
   b. Deployment Manager > Deployment Manager Editor.
6. On the **Grant users access to this service account (optional)** page displayed immediately afterwards, click **Done**.
7. Go to the **IAM & admin** > **IAM** page (https://console.cloud.google.com/iam-admin/iam).
8. Verify that the service account has been successfully created and is assigned with Compute Admin and Deployment Manager Editor roles.

2.8.3.4 Enabling Access to Google Cloud APIs via Service Account (Recommended Method)

Before using Stack Manager, you need to ensure that it has access to Google Cloud API. This section describes the recommended method for achieving this through the Service Account assigned to the Stack Manager virtual machine.

An alternative method is to use the configuration file, as described in Section 2.8.3.5, Enabling Access to Google Cloud APIs via Configuration File (Alternative Method).

➢ **To assign Service Account to Stack Manager virtual machine:**

1. In the Google Cloud Platform Console, go to the **Compute Engine** > **VM Instances** page (https://console.cloud.google.com/compute/instances).
2. Click the Stack Manager VM.
3. On the VM instance details page, click **Edit**.
4. For **Service account**, select the Service Account that you created in Section 2.8.3.3, Creating a Service Account.
5. Click **Save**.

2.8.3.5 Enabling Access to Google Cloud APIs via Configuration File (Alternative Method)

This section describes an alternative method for enabling Stack Manager access to Google Cloud APIs. For typical deployments, please use the recommended method instead, as described in Section 2.8.3.4, Enabling Access to Google Cloud APIs via Service Account (Recommended Method).

➢ **To enable access to Google Cloud APIs via configuration file:**

1. In the Google Cloud Platform Console, go to the **IAM & admin** > **Service Accounts** page (https://console.cloud.google.com/iam-admin/serviceaccounts).
2. Click the Service Account that you created in Section 2.8.3.3, Creating a Service Account.
3. Click **Edit**.
4. Click **Create Key**.
5. Choose the JSON key type, and then click **Create**.
6. The credentials file, which contains the generated key, is downloaded and saved to your computer. Move the file to a permanent location and write down its complete name and path.
7. Log in to the Stack Manager Web interface.
8. Open the Configuration page.
9. In the 'Google Credentials' field, enter the complete path to the credentials file.
10. Click **Update**.

2.8.4 Post-installation Configuration on OpenStack

The following procedure describes post-installation configuration of the Stack Manager application in the OpenStack environment.

➢ **To perform post-installation configuration of Stack Manager in OpenStack environment:**

1. Obtain credentials for application access to your OpenStack installation.
2. Create the configuration file **clouds.yaml**, which will be used by Stack Manager to access OpenStack APIs. Below shows an example OpenStack configuration file:

```
clouds:
  openstack-se2:
    region_name: RegionOne
    auth:
      auth_url: http://10.4.220.50:5000/v3
      username: admin
      password: 123456
      project_name: admin
      project_domain_name: Default
      user_domain_name: Default
```

   Change the configuration parameters to match your OpenStack installation. Refer to the **openstacksdk** documentation at http://docs.openstack.org/openstacksdk for more information.
3. Place the file in one of the following locations:
   - /var/stack_mgr/.config/openstack
   - /etc/openstack

   Make sure that the file is readable by user **stack_mgr**.
4. Log in to the Stack Manager Web interface.
5. Open the Configuration page.
6. In the 'OpenStack Cloud Name' field, enter the value ("openstack-se2" in the example above).
7. Click **Update**.

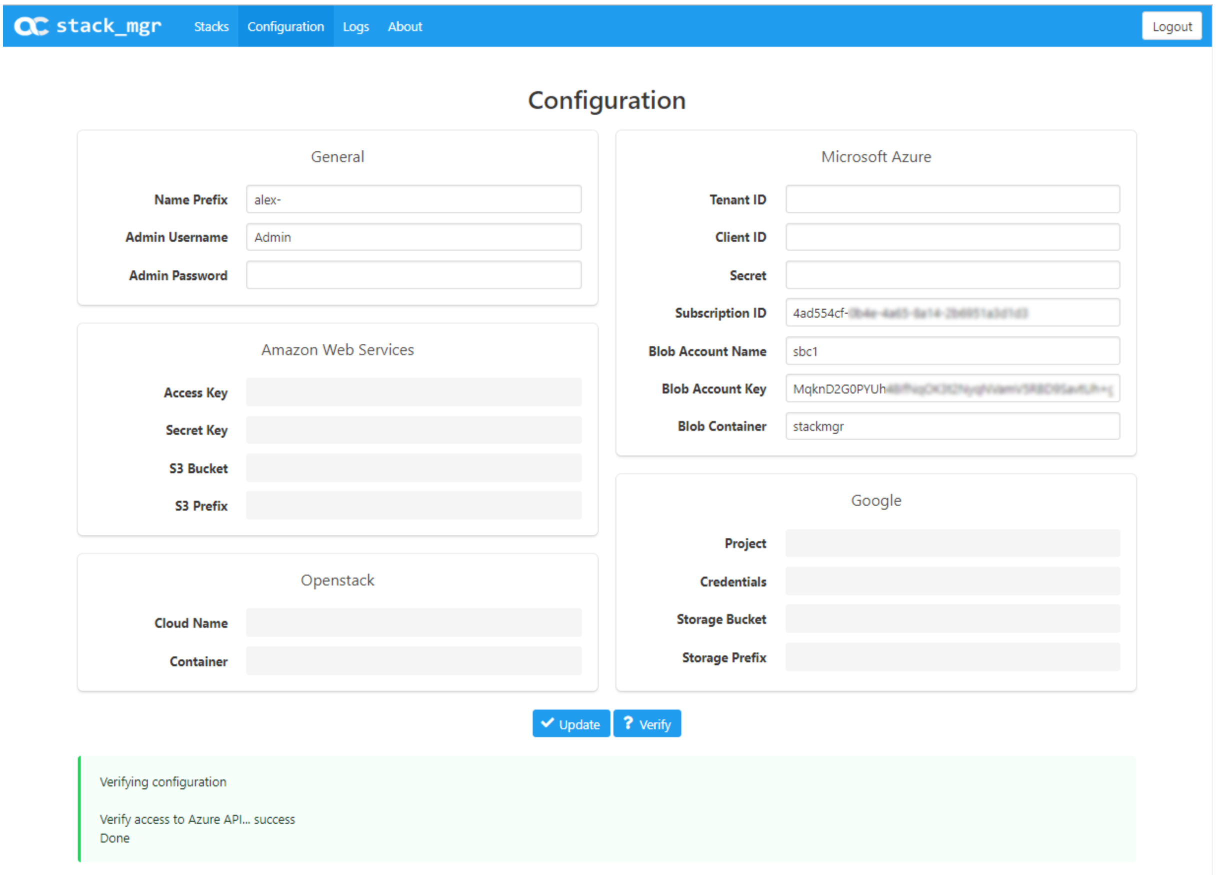
2.8.5 Verifying Configuration

After completing post-installation configuration, perform the following steps to verify that Stack Manager can operate normally.

➢ **To verify Stack Manager configuration:**

1. Log in to the Stack Manager Web interface.
2. Open the Configuration page.
3. Click **Verify**.
4. Wait until the operation completes, and then check its output.

Figure 2-30: Verifying Stack Manager Configuration



Configuration

General

Name Prefix	alex-
Admin Username	Admin
Admin Password	

Amazon Web Services

Access Key	
Secret Key	
S3 Bucket	
S3 Prefix	

Openstack

Cloud Name	
Container	

Microsoft Azure

Tenant ID	
Client ID	
Secret	
Subscription ID	4ad554cf-[redacted]
Blob Account Name	sbc1
Blob Account Key	MqknD2G0PYUh[redacted]
Blob Container	stackmgr

Google

Project	
Credentials	
Storage Bucket	
Storage Prefix	

```
Verifying configuration

Verify access to Azure API... success
Done
```

2.9 Runtime Data

Stack Manager uses *stack descriptors* to keep information about created stacks, including their configuration and references to all corresponding resources. By default, Stack Manager stores this information on the local file system in the */opt/stack_mgr/data* directory.

However, you may configure Stack Manager to store the *stack descriptors* in the cloud storage services, namely:

- AWS Simple Cloud Storage Service (S3)
- Microsoft Azure Storage Service
- Google Cloud Storage Service
- OpenStack Object Storage Service (swift)

Doing so significantly improves runtime data availability and provides service continuity if the Stack Manager instance must be rebuilt.

Note: *Stack descriptors* are for internal Stack Manager use and should **not** be manipulated by the user.

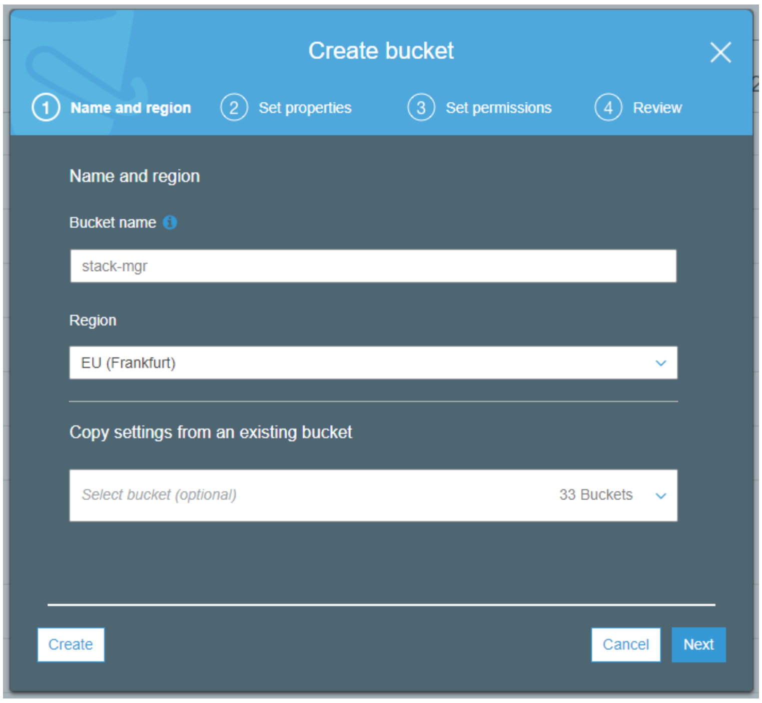
2.9.1 Storing Runtime Data on AWS S3

The procedure below describes how to configure Stack Manager to store its runtime data on AWS S3.

➢ **To configure Stack Manager to store runtime data on AWS S3:**

1. Open the AWS S3 Console at http://console.aws.amazon.com/s3.
2. Create a new S3 bucket in the same region where the Stack Manager instance is deployed. Enter the bucket name (e.g., "stack-mgr").

Figure 2-31: Create Bucket



Create bucket

Name and region

Bucket name: stack-mgr

Region: EU (Frankfurt)

Copy settings from an existing bucket: Select bucket (optional) 33 Buckets

3. Create a new IAM policy that allows the Stack Manager instance to access data in the created S3 bucket. In the 'Bucket name' field, replace **stack-mgr** with the actual name of the bucket that you created.

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "s3:ListBucket"
            ],
            "Resource": "arn:aws:s3:::stack-mgr"
        },
        {
            "Effect": "Allow",
            "Action": [
                "s3:PutObject",
                "s3:GetObject",
                "s3:DeleteObject"
            ],
            "Resource": "arn:aws:s3:::stack-mgr/*"
        }
    ]
}
```

4. Attach the created IAM policy to the Stack Manager instance (*in addition* to the policy created in Section 2.3.1.1, IAM Role for Stack Manager).
5. Log in to the Stack Manager Web interface.
6. Open the Configuration page.
7. In the 'AWS S3 Bucket' field, enter the value ("stack-mgr" in the example above).
8. If you want Stack Manager runtime data to be stored in some folder(s), configure the 'AWS S3 Prefix' field to some value that ends with "/" (e.g., "stack-mgr/").
9. Click **Update**.
10. Click **Verify** to verify configuration.

2.9.2 Storing Runtime Data on Azure Storage Service

The procedure below describes how to configure Stack Manager to store its runtime data on Microsoft Azure Storage Service.

➢ **To configure Stack Manager to store runtime data on Azure Storage Service:**

1. Open the Azure portal at https://portal.azure.com/.
2. Navigate to the Storage Accounts page (**All services > Storage Accounts**).
3. Create a new Storage Account in the same location where the Stack Manager virtual machine is deployed.
4. Locate the access key for the Storage Account under the **Access keys** tab.
5. Go to the **Blobs service**, and then create a new container.
6. Log in to the Stack Manager Web interface.
7. Open the Configuration page.
8. In the 'Azure Blob Account Name', 'Azure Blob Account Key', and 'Azure Blob Container' fields, enter the values.
9. Click **Update**.
10. Click **Verify** to verify configuration.

> **Note:** Instead of using the Access Key as described above, Stack Manager may be configured to access Azure Storage Service using a shared access signature (SAS) token. For this you need to use the 'Azure Blob SAS token' configuration parameter.

2.9.3 Storing Runtime Data on Google Cloud Storage Service

The procedure below describes how to configure Stack Manager to store its runtime data on Google Cloud Storage Service.

➢ **To configure Stack Manager to store runtime data on Google Cloud Storage Service:**

1. In the Google Cloud Platform Console, go to the **Storage** > **Browser** page (https://console.cloud.google.com/storage/browser).
2. Create a bucket where Stack Manager runtime data will be stored.
3. Create folder(s) inside the bucket, if needed.
4. Go to the **IAM & admin** > **IAM** page (https://console.cloud.google.com/iam-admin/iam).

   Assign the following IAM role to the Stack Manager service account: Storage > Storage Object Admin.
5. Log in to the Stack Manager Web interface.
6. Open the Configuration page.
7. In the 'Google Storage Bucket' field, enter the value.
8. If you want Stack Manager runtime data to be stored in some folder(s), configure the 'Google Storage Prefix' field to some value that ends with "/" (e.g., "stack-mgr/").
9. Click **Update**.
10. Click **Verify** to verify configuration.

2.9.4 Storing Runtime Data on OpenStack Object Storage Service

The procedure below describes how to configure Stack Manager to store its runtime data on OpenStack Object Storage Service (swift).

➢ **To configure Stack Manager to store runtime data on OpenStack Object Storage Service (swift):**

1. Open the OpenStack dashboard.
2. Navigate to **Object Store** > **Containers** page.
3. Create a new Object Storage (swift) container.
4. Log in to the Stack Manager Web interface.
5. Open the Configuration page.
6. In the 'Openstack Container' field, enter the value.
7. Click **Update**.
8. Click **Verify** to verify configuration.

2.9.5 Migrating Runtime Data from Local Disk to Storage Service

If you started working with Stack Manager while it was configured to store run-time data on local disk and later decided to migrate to the cloud-specific storage service, use the following procedure to migrate the data:

1. Download all .json files from the */opt/stack_mgr/data* folder to your computer.
2. Remove the .json extension from all the downloaded files.
3. Upload all the files to the proper container / folder on the storage service.

2.10 Resource Naming

By default, resources created by Stack Manager (e.g., virtual machines) use the following naming convention: <stack name>-<resource name>

For example, for stack 'stack1', the corresponding resources are named "stack1-sc-1", "stack1-mc-1" and so on.

It is possible to define additional prefixes that will be added to created resources. The prefix would typically end with a dash "-". For example, if you configure it as "lab1-", the corresponding resources are named "lab1-stack1-sc-1", and so on.

➢ **To configure a name prefix:**

1. Log in to the Stack Manager Web interface.
2. Open the Configuration page.
3. In the 'Name Prefix' field, enter the value (e.g., "lab1-").
4. Click **Update**.

Note: The 'Name Prefix' field should be configured *prior* to any Mediant VE/CE stack creation. **Do not** change it if some stacks already exist.

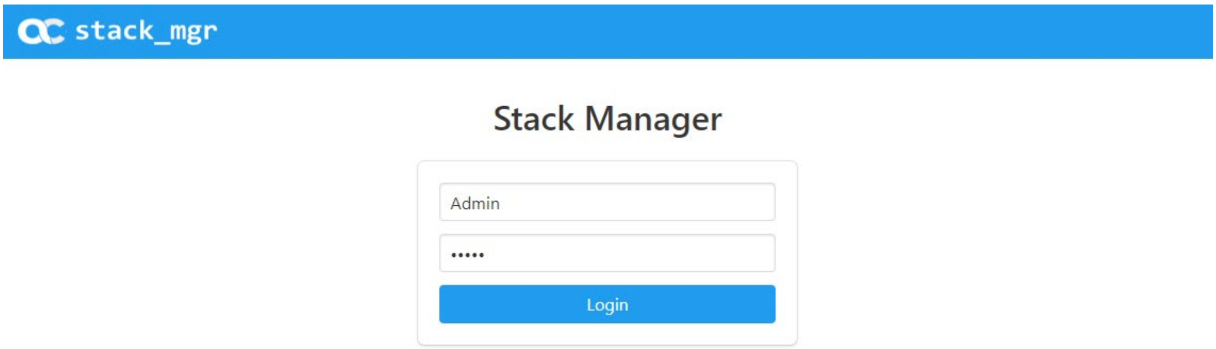
3 Web Interface

3.1 Accessing the Web Interface

Stack Manager's Web interface is accessed by connecting to the virtual machine through HTTP/HTTPS, using one of the supported web browsers:

- Google Chrome
- Firefox
- Microsoft Edge

Figure 3-1: Accessing Web Interface



The default login credentials of the Web interface are:

- Username: **Admin**
- Password: **Admin**

It is recommended to change the default login credentials on first login.

➢ To change the default Web credentials:

1. Log in to the Web interface.
2. Open the Configuration page.
3. In the 'Admin Username' and 'Admin Password' fields, enter the new username and password respectively.
4. Click **Update**.

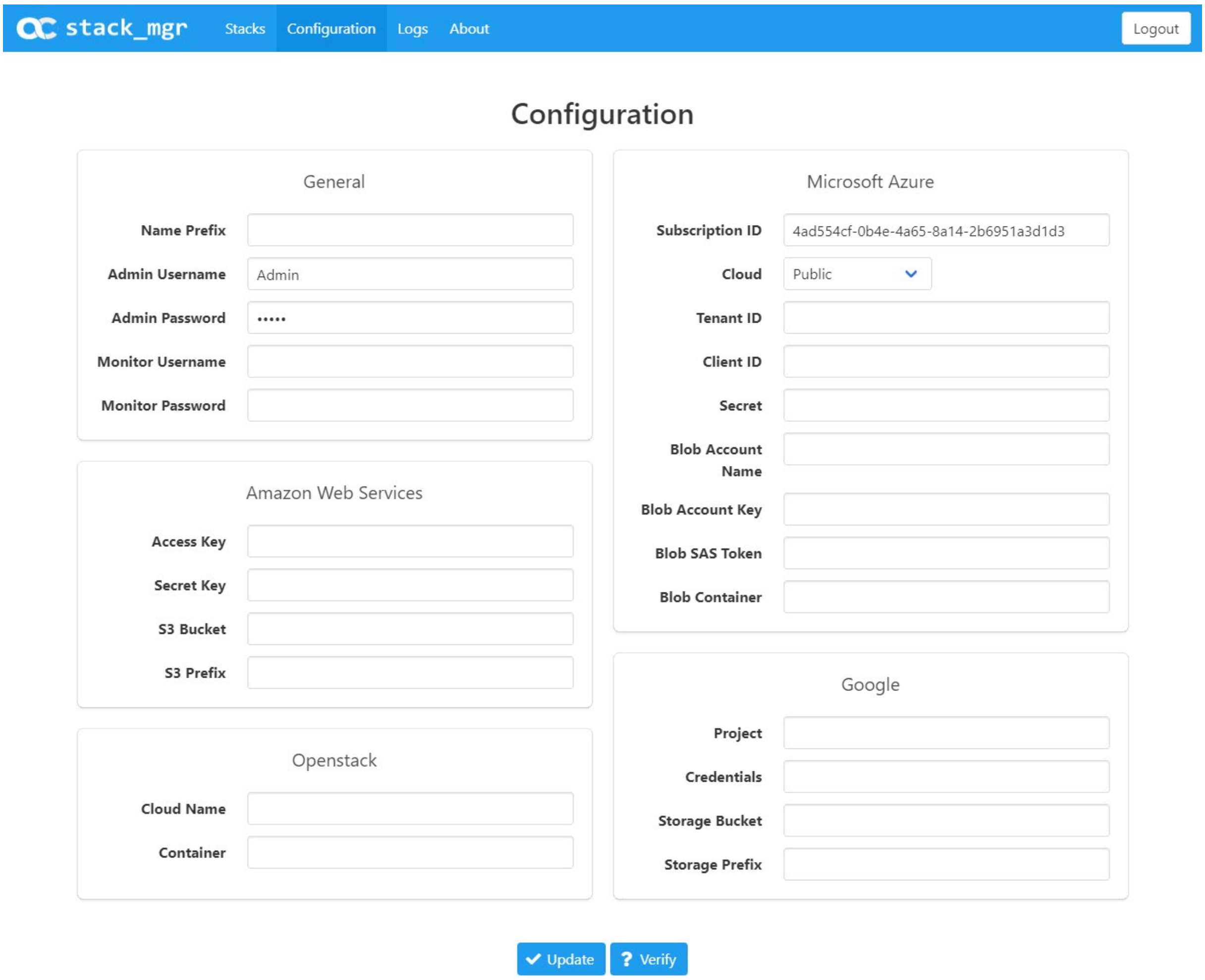
3.2 Global Configuration

The Configuration page contains global configuration parameters of the Stack Manager application. All the parameters are described in Section 2, Deployment.

If you change the value of a parameter, click **Update** to update configuration.

To verify current configuration, click **Verify**. See Section 2.8.5, Verifying Configuration for more information.

Figure 3-2: Configuration Page



Configuration

General

Name Prefix	
Admin Username	Admin
Admin Password	•••••
Monitor Username	
Monitor Password	

Amazon Web Services

Access Key	
Secret Key	
S3 Bucket	
S3 Prefix	

Openstack

Cloud Name	
Container	

Microsoft Azure

Subscription ID	4ad554cf-0b4e-4a65-8a14-2b6951a3d1d3
Cloud	Public
Tenant ID	
Client ID	
Secret	
Blob Account Name	
Blob Account Key	
Blob SAS Token	
Blob Container	

Google

Project	
Credentials	
Storage Bucket	
Storage Prefix	

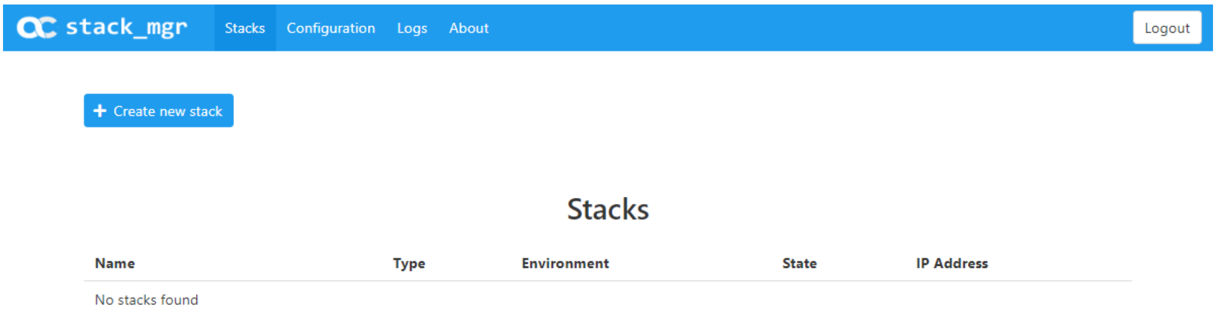
3.3 Creating a New Stack

The procedure below describes how to create a new stack.

➢ **To create a new Mediant VE/CE stack:**

1. Open the Stacks page.

Figure 3-3: Creating a New Stack

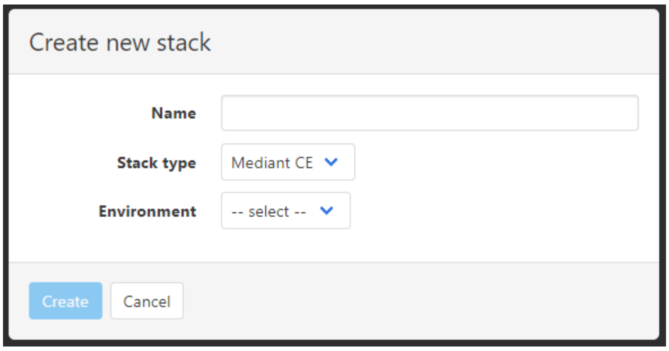


Stacks

Name	Type	Environment	State	IP Address
No stacks found				

2. Click **Create new stack**; the Create new stack dialog box appears.

Figure 3-4: Create New Stack Dialog



Name:

Stack type: Mediant CE

Environment: -- select --

3. In the 'Name' field, enter the stack name.
4. From the 'Environment' drop-down list, select the public cloud / virtual environment; the dialog box is updated with the relevant parameters.
5. Refer to the following sections for detailed instructions for each public cloud / virtual environment.

Note: Prior to creating a new Mediant CE stack, make sure that all pre-requisites specified in the *Mediant Cloud Edition Installation Manual* are met. The document can be downloaded from AudioCodes website at https://www.audiocodes.com/library/technical-documents.

3.3.1 Creating Mediant CE in Amazon Web Services (AWS) Environment

The following configuration parameters should be configured (in the Create new stack dialog) for Mediant CE stack in Amazon Web Services (AWS) environment:

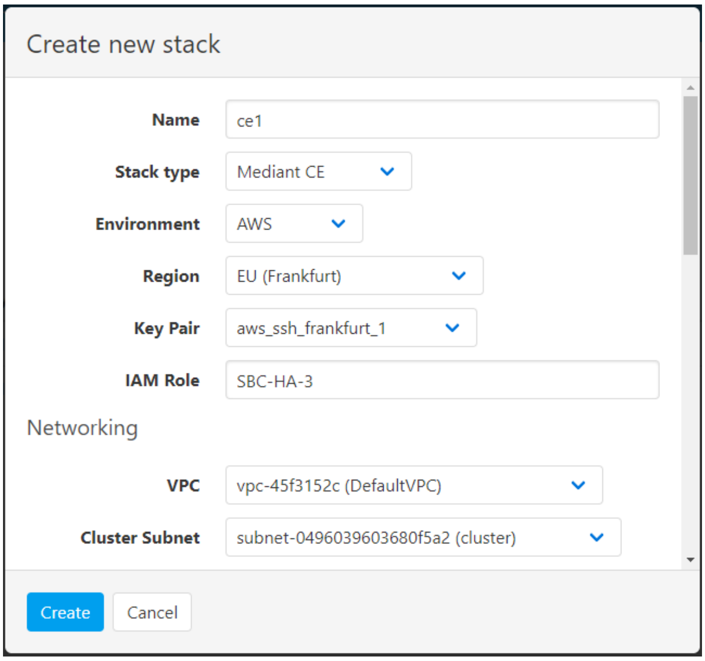
- 'Name': Defines the stack name, which can contain lowercase or uppercase letters, digits, and the dash symbol.
- 'Stack type': **Mediant CE**.
- 'Environment': **AWS**.
- 'Region': Defines the region where Mediant CE is to be deployed.
- 'Key Pair': Defines the key pair for logging in to the Mediant CE CLI through SSH. Alternatively, you can log in using the password specified below.
- 'IAM Role': Defines the name of the IAM role that enables Mediant CE access to AWS APIs for network reconfiguration in case of SC switchover. Refer to *Mediant Cloud Edition Installation Manual* for detailed instructions on how to create it.
- **Networking:**
    - 'VPC': Defines the Virtual Private Cloud where Mediant CE is to be deployed.
    - 'Cluster Subnet': Defines the subnet within the VPC for internal communication between Mediant CE components. The subnet must have a private EC2 endpoint or NAT Gateway configured as the default route. Refer to *Mediant Cloud Edition Installation Manual* for detailed instructions on how to create it.
    - 'Main Subnet': Defines the subnet within the VPC for carrying management traffic (e.g., connecting to the Mediant CE Web or SSH interface). The subnet can also be used for carrying signaling and media traffic.
    - '1st and 2nd Additional Subnet': Defines additional subnets for carrying signaling and media traffic. If not needed, leave them as **-- none --**.
    - ‘Public IPs’: Defines subnets (and corresponding Mediant CE network interfaces) for which Elastic IPs are assigned.

Note: All specified subnets must reside in the same Availability Zone.

- **Media Components:**
    - 'Profile': Defines the operational mode of MCs (forwarding or transcoding). This implicitly determines MC instance types.
    - 'Max Number': Defines the total number of MCs that will be created. It also defines the higher boundary for scale-out operation.
    - 'Min Number': Defines the number of MCs that will be initially active after Mediant CE creation. It also defines the lower boundary for scale-in operation.
- **Admin User:**
    - 'Username': Defines the username for logging in to the Mediant CE Web or SSH interface.
    - 'Password': Defines the password for logging in to the Mediant CE Web or SSH interface.

- **Additional Config:**
  - 'OS Version': Defines the OS version for the deployed SBC software:
    - **6**: This version corresponds to the 7.20A stream.
    - **8:** This version corresponds to the new 7.20CO stream, which provides significantly better performance and capacity (refer to the *SBC-Gateway Series Release Notes* for details) and supports deployment on gen-5 instances (m5/c5/r5).
  - 'Management ports': Defines a comma-separated list of inbound ports and corresponding transport protocols for the management interface, for example, "22/tcp,80/tcp,443/tcp,161/udp".
  - 'Signaling ports': Defines a comma-separated list of inbound ports and corresponding transport protocols for signaling interfaces, for example, "5060/udp,5060/tcp,5061/tcp".
  - For additional configuration parameters, see Section 3.3.8 Advanced Configuration.

Figure 3-5: Configuring Mediant CE in AWS Environment



Create new stack

Name: ce1

Stack type: Mediant CE

Environment: AWS

Region: EU (Frankfurt)

Key Pair: aws_ssh_frankfurt_1

IAM Role: SBC-HA-3

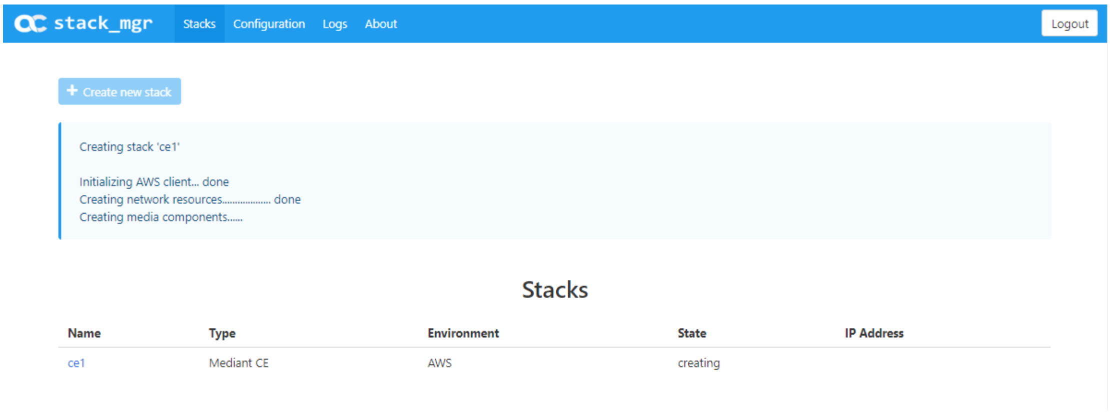
Networking

VPC: vpc-45f3152c (DefaultVPC)

Cluster Subnet: subnet-0496039603680f5a2 (cluster)

Once you have configured all the above parameters, click **Create** to create the Mediant CE stack instance. The operation progress is displayed at the top of the page.

Figure 3-6: Creating Mediant CE in AWS environment



```
Creating stack 'ce1'

Initializing AWS client... done
Creating network resources.................. done
Creating media components......
```

Stacks

Name	Type	Environment	State	IP Address
ce1	Mediant CE	AWS	creating	

3.3.1.1 Troubleshooting

The following table lists common problems during Mediant CE stack creation in the AWS environment and their corresponding solutions.

Table 3-1: Troubleshooting Mediant CE Stack Creation in AWS Environment

Problem	Reason	Solution
Mediant CE stack creation freezes at the "Creating media components" step for more than 10 minutes. No Media Component instances are shown in the AWS dashboard.	You haven't subscribed to the Mediant VE offer in AWS Marketplace.	Subscribe to Mediant VE offer in AWS Marketplace, as described in *Mediant Cloud Edition Installation Manual*.
	The IAM role specified during Mediant CE stack creation doesn’t exist.	Create an IAM role for Mediant CE, as described in *Mediant Cloud Edition Installation Manual* and specify its name in the Mediant CE Create stack dialog box.

3.3.2 Creating Mediant CE in Azure Environment

The following configuration parameters should be configured (in the Create new stack dialog) for Mediant CE stack in the Azure environment:

- 'Name': Defines the stack name, which can contain lowercase or uppercase letters, digits, and the dash symbol.
- 'Stack type': **Mediant CE**.
- 'Environment': **Azure**.
- 'Region': Defines the region where Mediant CE is to be deployed.
- **Networking:**
  - 'Virtual Network': Defines the virtual network where Mediant CE is to be deployed.
  - 'Cluster Subnet': Defines the subnet used for internal communication between Mediant CE components.
  - 'Main Subnet': Defines the subnet for carrying management traffic (e.g., connecting to the Mediant CE Web or SSH interface). The subnet can also be used for carrying signaling and media traffic.
  - 1st and 2nd Additional Subnet': Defines additional subnets for carrying signaling and media traffic. If not needed, leave them as **-- none --.**
  - ‘Public IPs’: Defines subnets (and corresponding Mediant CE network interfaces) for which Public IPs are assigned.
- **Media Components:**
  - 'Profile': Defines the operational mode of MCs (forwarding or transcoding). This implicitly determines MC instance types (VM size).
  - 'Max Number': Defines the total number of MCs that will be created. It also defines the higher boundary for scale-out operation.
  - 'Min Number': Defines the number of MCs that will be initially active after Mediant CE creation. It also defines the lower boundary for scale-in operation.
- **Admin User:**
  - 'Username': Defines the username for logging in to the Mediant CE Web or SSH interface.
  - 'Password': Defines the password for logging in to the Mediant CE Web or SSH interface.

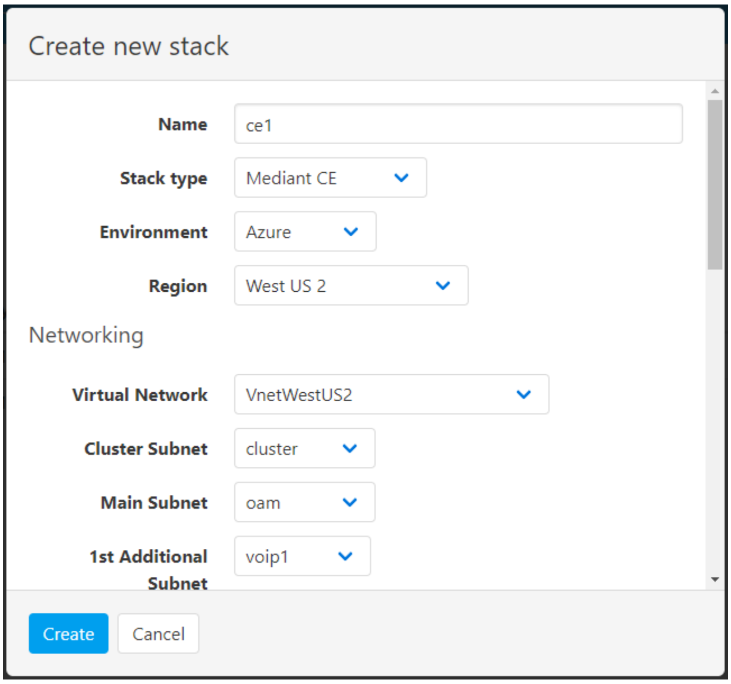
Note: Azure imposes some limitations on the username and password. For example, it prohibits the use of "Admin" for username and requires the use of strong passwords that meet the following policy:

- A minimum of 12 characters.
- Use of three out of four of the following: lowercase characters, uppercase characters, numbers, and symbols.

- **Additional Config:**
  - 'OS Version': Defines the OS version for the deployed SBC software:
    - **6**: This version corresponds to the 7.20A stream.
    - **8:** This version corresponds to the new 7.20CO stream, which provides significantly better performance and capacity (refer to the *SBC-Gateway Series Release Notes* for details).

- 'Management ports': Defines a comma-separated list of inbound ports and corresponding transport protocols for the management interface, for example, "22/tcp,80/tcp,443/tcp,161/udp".
- 'Signaling ports': Defines a comma-separated list of inbound ports and corresponding transport protocols for signaling interfaces, for example, "5060/udp,5060/tcp,5061/tcp".
- For additional configuration parameters, see Section 3.3.8 Advanced Configuration.

Figure 3-7: Configuring Mediant CE in Azure Environment



Create new stack

Name: ce1

Stack type: Mediant CE

Environment: Azure

Region: West US 2

Networking

Virtual Network: VnetWestUS2

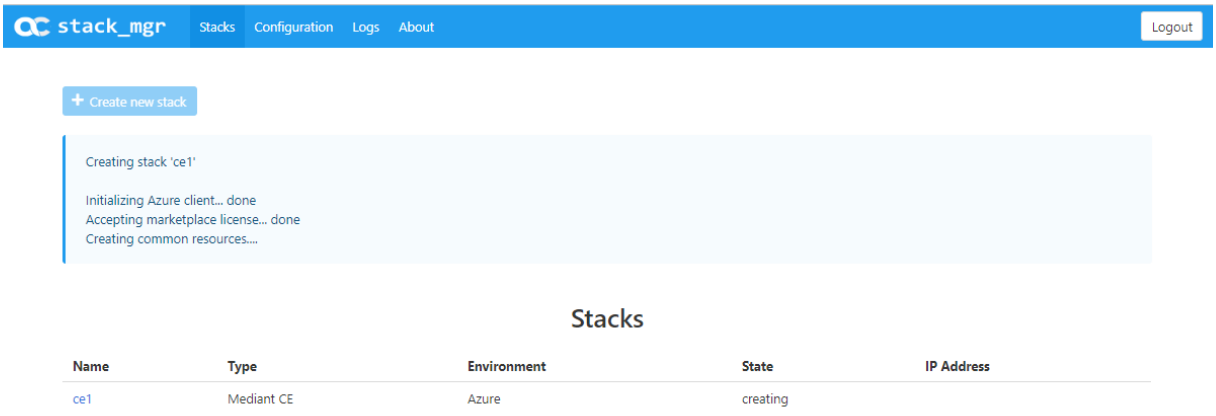
Cluster Subnet: cluster

Main Subnet: oam

1st Additional Subnet: voip1

Once you have configured all the above parameters, click **Create** to create the Mediant CE stack instance. The operation progress is displayed at the top of the page.

Figure 3-8: Creating Mediant CE in Azure Environment



```
Creating stack 'ce1'

Initializing Azure client... done
Accepting marketplace license... done
Creating common resources....
```

Stacks

Name	Type	Environment	State	IP Address
ce1	Mediant CE	Azure	creating	

Note: If Stack Manager is assigned with custom IAM roles at Subscription, Network and Resource Group levels, as described in Section 2.8.2.2.2, Option 2: Custom IAM Roles at Subscription, Network and Resource Group Levels, an empty Resource Group must be manually created prior to stack deployment and Stack Manager must be assigned with "Contributor" role in it. The name of this Resource Group must be specified during stack creation by the Advanced Config parameter **resource_group**.

3.3.2.1 Troubleshooting

The following table lists common problems during Mediant CE stack creation in the Azure environment and their corresponding solutions.

Table 3-2: Troubleshooting Mediant CE Stack Creation in Azure Environment

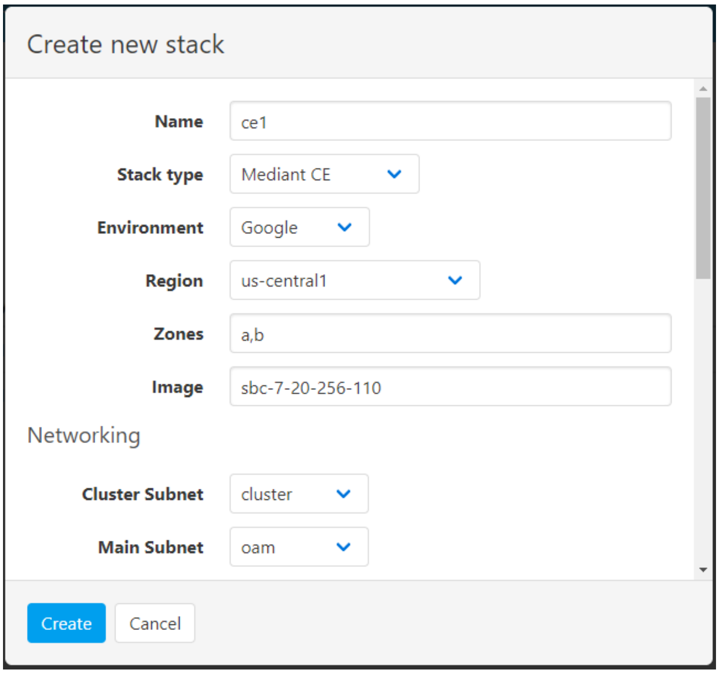
Problem	Reason	Solution
Mediant CE stack creation fails with error message "Legal terms have not been accepted for this item on this subscription"	You haven't subscribed to the Mediant VE offer in Azure Marketplace.	Subscribe to Mediant VE offer in Azure Marketplace, by deploying a demo instance of it. Refer to *Mediant Cloud Edition Installation Manual* for detailed description.
Mediant CE stack creation fails with error message "Creating resource group <stack_name> failed”	Stack Manager creates a new Resource Group for each stack with the same name as the stack name (unless **resource_group** advanced config parameter is used). If your subscription already has such a resource group, stack creation will fail.	Use a different stack name that doesn’t match the name of any existing Resource Group in your subscription. Alternatively, you may configure the 'Name Prefix' parameter in the Stack Manager configuration screen.

3.3.3 Creating Mediant CE in Google Cloud Environment

The following configuration parameters should be configured (in the Create new stack dialog) for Mediant CE stack in Google Cloud environment:

- 'Name': Defines the stack name, which can contain lowercase or uppercase letters, digits, and the dash symbol.
- 'Stack type': **Mediant CE**.
- 'Environment': **Google**.
- 'Region': Defines the region where Mediant CE is to be deployed.
- 'Zones': Defines a comma-separated list of two Availability Zones within the specified Region. Mediant CE components will be evenly spread across these two zones.
- 'Image': Defines the name of the Mediant VE/CE image. Refer to *Mediant Cloud Edition Installation Manual* for detailed instructions on how to upload it to your account.
- **Networking:**
  - 'Cluster Subnet': Defines the subnet used for internal communication between Mediant CE components.
  - 'Main Subnet': Defines the subnet for carrying management traffic (e.g. connecting to the Mediant CE Web or SSH interface) and signaling traffic. The subnet can also be used for carrying media traffic.
  - 1st and 2nd Additional Subnet': Defines additional subnets used for carrying media traffic. If not needed leave them as **-- none --**.
  - ‘Public IPs’: Defines subnets (and corresponding Mediant CE network interfaces) for which External IPs are assigned.
- **Media Components:**
  - 'Profile': Defines the operational mode of MCs (forwarding or transcoding). This implicitly determines MC instance types. Note that the profile must be specified during Mediant CE creation and cannot be altered afterwards.
  - 'Max Number': Defines the total number of MCs that will be created. It also defines the higher boundary for scale-out operation.
  - 'Min Number': Defines the number of MCs that will be initially active after Mediant CE creation. It also defines the lower boundary for scale-in operation.
- **Admin User:**
  - 'Username': Defines the username for logging in to the Mediant CE Web or SSH interface.
  - 'Password': Defines the password for logging in to the Mediant CE Web or SSH interface.
- **Additional Config:** For additional configuration parameters, see Section 3.3.8 Advanced Configuration.

Figure 3-9: Configuring Mediant CE in Google Cloud Environment



Create new stack

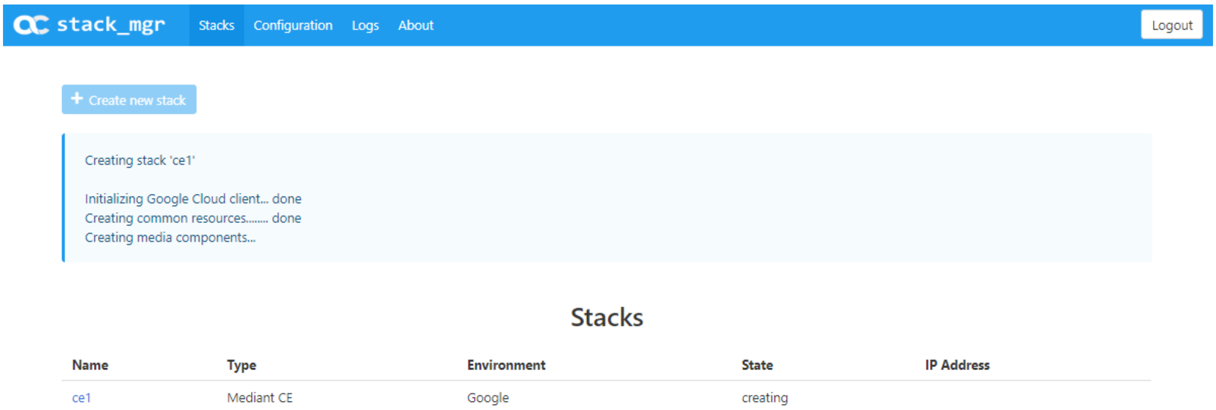
Name: ce1
Stack type: Mediant CE
Environment: Google
Region: us-central1
Zones: a,b
Image: sbc-7-20-256-110

Networking

Cluster Subnet: cluster
Main Subnet: oam

Once you have configured all the above parameters, click **Create** to create the Mediant CE stack instance. The operation progress is displayed at the top of the page.

Figure 3-10: Creating Mediant CE in Google Cloud Environment



```
Creating stack 'ce1'

Initializing Google Cloud client... done
Creating common resources....... done
Creating media components...
```

Stacks

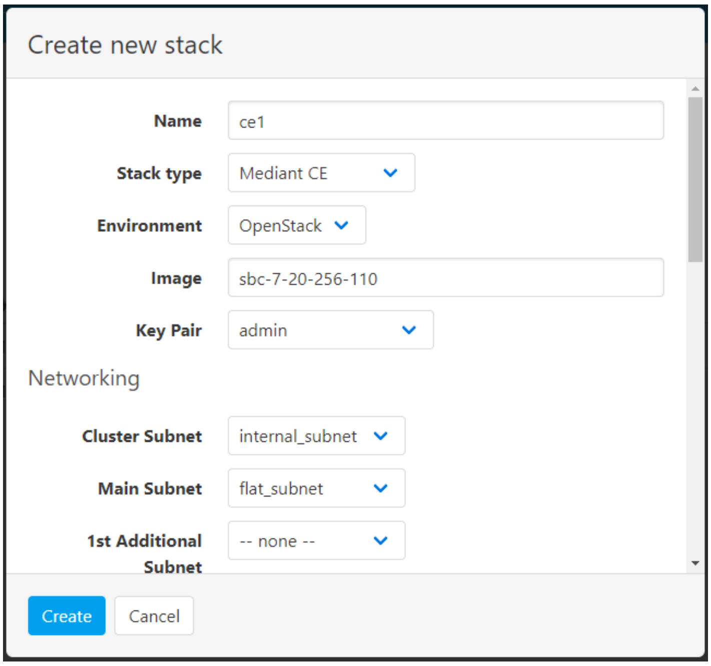
Name	Type	Environment	State	IP Address
ce1	Mediant CE	Google	creating	

3.3.4 Creating Mediant CE in OpenStack Environment

The following configuration parameters should be configured (in the Create new stack dialog) for Mediant CE stack in OpenStack environment:

- 'Name': Defines the stack name, which can contain lowercase or uppercase letters, digits, and the dash symbol.
- 'Stack type': **Mediant CE**.
- 'Environment': **OpenStack**.
- 'Image': Defines the name of the Mediant VE/CE image. Refer to *Mediant Cloud Edition Installation Manual* for detailed instructions on how to upload it to your account.
- 'Key Pair': Defines the key pair for logging in to the Mediant CE CLI through SSH. Alternatively, you can log in using the password specified below.
- **Networking:**
  - 'Cluster Subnet': Defines the subnet for internal communication between Mediant CE components.
  - 'Main Subnet': Defines the subnet for carrying management traffic (e.g., connecting to the Mediant CE Web or SSH interface). The subnet can also be used for carrying signaling and media traffic.
  - '1st and 2nd Additional Subnet': Defines additional subnets for carrying signaling and media traffic. If not needed, leave them as **-- none --**.
  - ‘Public IPs’: Defines subnets (and corresponding Mediant CE network interfaces) for which Floating IPs are assigned.
- **Signaling Components:**
  - 'Flavor': Defines the flavor for SC instances. Refer to *Mediant Cloud Edition Installation Manual* for recommended flavors.
- **Media Components:**
  - 'Flavor': Defines the flavor for MC instances. Refer to *Mediant Cloud Edition Installation Manual* for recommended flavors.
  - 'Profile': Defines the operational mode of MCs (forwarding or transcoding). Note that the profile must be specified during Mediant CE creation and cannot be altered afterwards.
  - 'Max Number': Defines the total number of MCs that will be created. It also defines the higher boundary for scale-out operation.
  - 'Min Number': Defines the number of MCs that will be initially active after Mediant CE creation. It also defines the lower boundary for scale-in operation.
- **Admin User:**
  - 'Username': Defines the username for logging in to the Mediant CE Web or SSH interface.
  - 'Password': Defines the password for logging in to the Mediant CE Web or SSH interface.
  - **Additional Config:** For additional configuration parameters, see Section 3.3.8 Advanced Configuration.

Figure 3-11: Configuring Mediant CE in OpenStack Environment



Create new stack

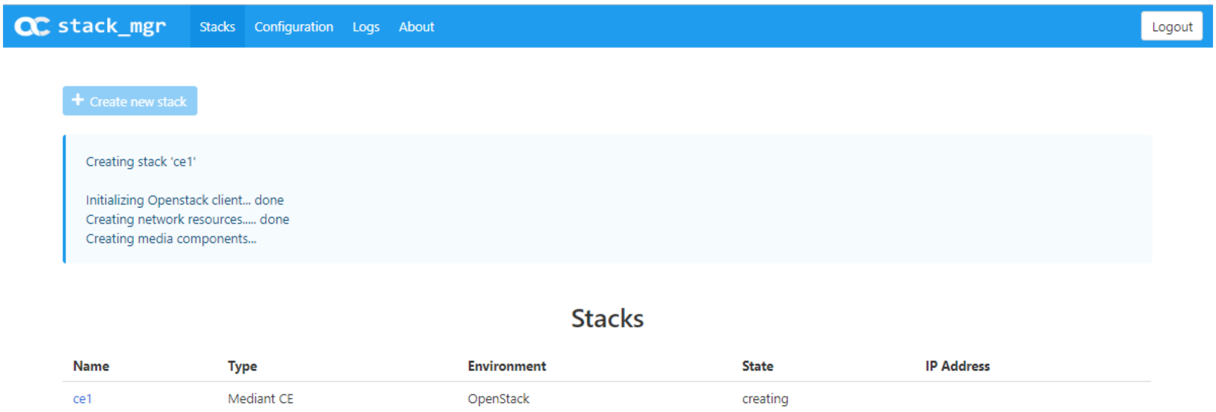
Name	ce1
Stack type	Mediant CE
Environment	OpenStack
Image	sbc-7-20-256-110
Key Pair	admin

Networking

Cluster Subnet	internal_subnet
Main Subnet	flat_subnet
1st Additional Subnet	-- none --

Once you have configured all the above parameters, click **Create** to create the Mediant CE stack instance. The operation progress is displayed at the top of the page.

Figure 3-12: Creating Mediant CE in OpenStack Environment



```
Creating stack 'ce1'

Initializing Openstack client... done
Creating network resources..... done
Creating media components...
```

Stacks

Name	Type	Environment	State	IP Address
ce1	Mediant CE	OpenStack	creating	

3.3.5 Creating Mediant VE in Amazon Web Services (AWS) Environment

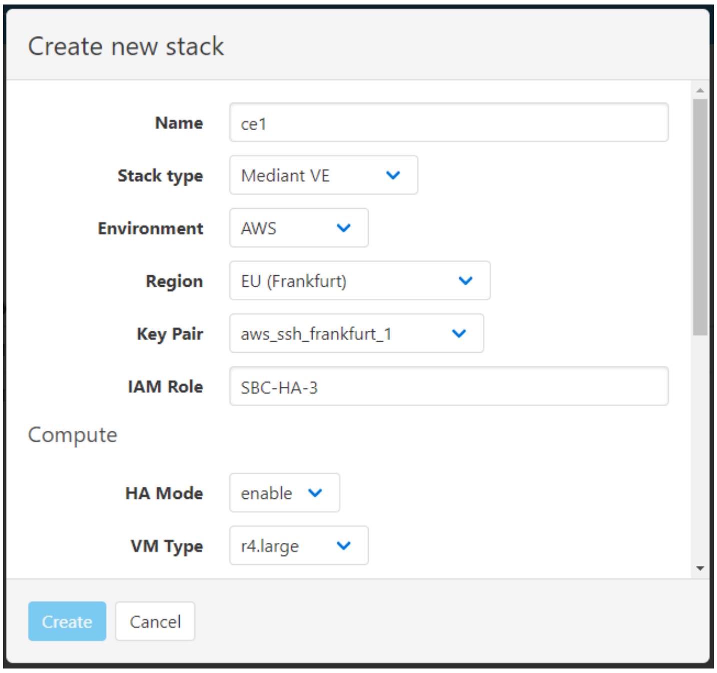
The following configuration parameters should be configured (in the Create new stack dialog) for Mediant VE stack in Amazon Web Services (AWS) environment:

- 'Name': Defines the stack name, which can contain lowercase or uppercase letters, digits, and the dash symbol.
- 'Stack type': **Mediant VE**.
- 'Environment': **AWS**.
- 'Region': Defines the region where Mediant VE is to be deployed.
- 'Key Pair': Defines the key pair for logging in to the Mediant VE CLI through SSH. Alternatively, you can log in using the password specified below.
- 'IAM Role': Defines the name of the IAM role that enables Mediant VE access to AWS APIs for network reconfiguration in case of SC switchover. Refer to *Mediant Virtual Edition SBC for Amazon AWS Installation Manual* for detailed instructions on how to create it.
- **Compute:**
  - 'HA Mode': Defines whether Mediant VE is deployed in HA mode (that includes two EC2 instances operating in Active/Standby mode) or as a single EC2 instance.
  - 'VM Type': Defines instance type used for Mediant VE deployment.
- **Networking:**
  - 'VPC': Defines the Virtual Private Cloud where Mediant VE is to be deployed.
  - 'HA Subnet': (for HA deployment only) Defines the subnet within the VPC for internal communication between Mediant VE instances. The subnet must have a private EC2 endpoint or NAT Gateway configured as the default route. Refer to *Mediant Virtual Edition SBC for Amazon AWS Installation Manual* for detailed instructions on how to create it.
  - 'Main Subnet': Defines the subnet within the VPC for carrying management traffic (e.g., connecting to the Mediant VE Web or SSH interface). The subnet can also be used for carrying signaling and media traffic.
  - '1st and 2nd Additional Subnet': Defines additional subnets for carrying signaling and media traffic. If not needed, leave them as **-- none --**.
  - ‘Public IPs’: Defines subnets (and corresponding Mediant VE network interfaces) for which Elastic IPs are assigned.

Note: All specified subnets must reside in the same Availability Zone.

- **Admin User:**
  - 'Username': Defines the username for logging in to the Mediant VE Web or SSH interface.
  - 'Password': Defines the password for logging in to the Mediant VE Web or SSH interface.
- **Additional Config:** For additional configuration parameters, see Section 3.3.8 Advanced Configuration.

Figure 3-13: Configuring Mediant VE in AWS Environment



Create new stack

Name: ce1

Stack type: Mediant VE

Environment: AWS

Region: EU (Frankfurt)

Key Pair: aws_ssh_frankfurt_1

IAM Role: SBC-HA-3

Compute

HA Mode: enable

VM Type: r4.large

Once you have configured all the above parameters, click **Create** to create the Mediant VE stack instance. The operation progress is displayed at the top of the page.

3.3.5.1 Troubleshooting

The following table lists common problems during Mediant VE stack creation in the AWS environment and their corresponding solutions.

Table 3-3: Troubleshooting Mediant VE Stack Creation in AWS Environment

Problem	Reason	Solution
Mediant VE stack creation freezes at the "Creating stack " step for more than 10 minutes. No EC2 instances are shown in the AWS dashboard.	You haven't subscribed to the Mediant VE offer in AWS Marketplace.	Subscribe to Mediant VE offer in AWS Marketplace, as described in *Mediant Virtual Edition SBC for Amazon AWS Installation Manual*.
	The IAM role specified during Mediant VE stack creation doesn’t exist.	Create an IAM role for Mediant VE, as described in *Mediant Virtual Edition SBC for Amazon AWS Installation Manual* and specify its name in the Mediant VE Create stack dialog box.

3.3.6 Creating Mediant VE in Azure Environment

The following configuration parameters should be configured (in the Create new stack dialog) for Mediant VE stack in the Azure environment:

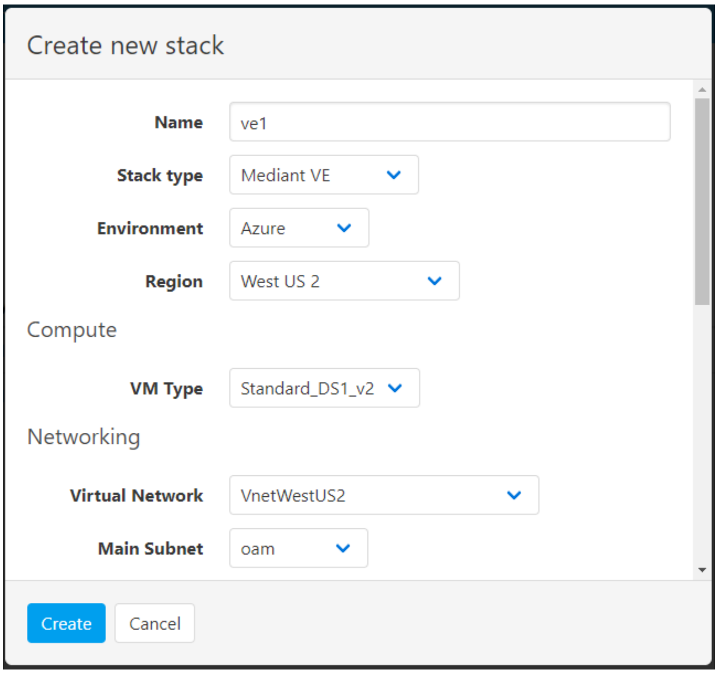
- 'Name': Defines the stack name, which can contain lowercase or uppercase letters, digits, and the dash symbol.
- 'Stack type': **Mediant VE**.
- 'Environment': **Azure**.
- 'Region': Defines the region where Mediant VE is to be deployed.
- **Compute:**
  - 'VM Type': Defines VM size used for Mediant VE deployment.
- **Networking:**
  - 'Virtual Network': Defines the virtual network where Mediant VE is to be deployed.
  - 'Main Subnet': Defines the subnet for carrying management traffic (e.g., connecting to the Mediant VE Web or SSH interface). The subnet can also be used for carrying signaling and media traffic.
  - 1st and 2nd Additional Subnet': Defines additional subnets for carrying signaling and media traffic. If not needed, leave them as **-- none --.**
  - ‘Public IPs’: Defines subnets (and corresponding Mediant VE network interfaces) for which Public IPs are assigned
- **Admin User:**
  - 'Username': Defines the username for logging in to the Mediant VE Web or SSH interface.
  - 'Password': Defines the password for logging in to the Mediant VE Web or SSH interface.

Note: Azure imposes some limitations on the username and password. For example, it prohibits the use of "Admin" for username and requires the use of strong passwords that meet the following policy:

- A minimum of 12 characters.
- Use of three out of four of the following: lowercase characters, uppercase characters, numbers, and symbols.

- **Additional Config:** For additional configuration parameters, see Section 3.3.8 Advanced Configuration.

Figure 3-14: Configuring Mediant VE in Azure Environment



Create new stack

Name: ve1

Stack type: Mediant VE

Environment: Azure

Region: West US 2

Compute

VM Type: Standard_DS1_v2

Networking

Virtual Network: VnetWestUS2

Main Subnet: oam

Once you have configured all the above parameters, click **Create** to create the Mediant VE stack instance. The operation progress is displayed at the top of the page.

3.3.6.1 Troubleshooting

The following table lists common problems during Mediant VE stack creation in the Azure environment and their corresponding solutions.

Table 3-4: Troubleshooting Mediant VE Stack Creation in Azure Environment

Problem	Reason	Solution
Mediant VE stack creation fails with the error message "Legal terms have not been accepted for this item on this subscription".	You haven't subscribed to the Mediant VE offer in Azure Marketplace.	Subscribe to Mediant VE offer in Azure Marketplace by deploying a demo instance of it. Refer to *Mediant Virtual Edition SBC for Azure Installation Manual* for detailed description.

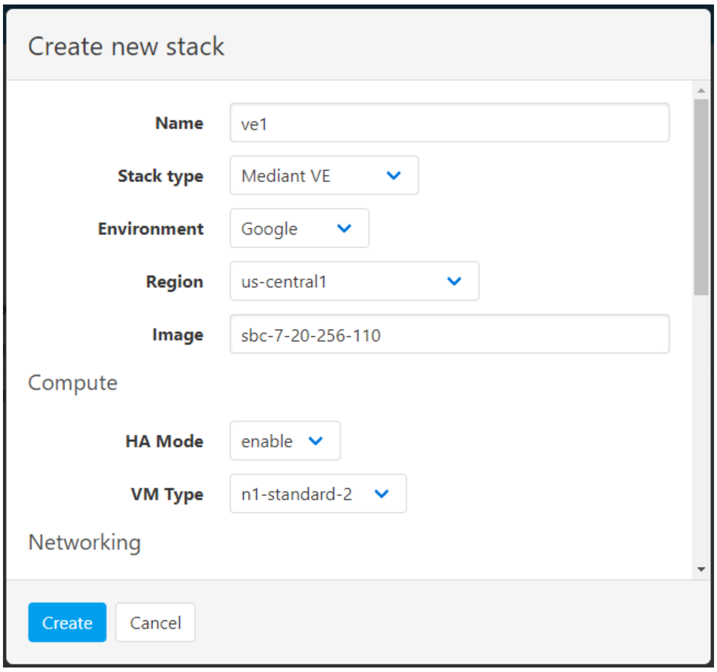
3.3.7 Creating Mediant VE in Google Cloud Environment

The following configuration parameters should be configured (in the Create new stack dialog) for Mediant CE stack in Google Cloud environment:

- 'Name': Defines the stack name, which can contain lowercase or uppercase letters, digits, and the dash symbol.
- 'Stack type': **Mediant VE**.
- 'Environment': **Google**.
- 'Region': Defines the region where Mediant VE is to be deployed.
- 'Zones': Defines a comma-separated list of two Availability Zones within the specified Region. Mediant VE components will be evenly spread across these two zones.
- 'Image': Defines the name of the Mediant VE/CE image. Refer to *Mediant Virtual Edition for Google Cloud Installation Manual* for detailed instructions on how to upload it to your account.
- **Compute:**
  - 'HA Mode': Defines whether Mediant VE is deployed in HA mode (that includes two VM instances operating in Active/Standby mode) or as a single VM instance.
  - 'VM Type': Defines machine type used for Mediant VE deployment.
- **Networking:**
  - 'HA Subnet': (for HA deployment only) Defines the subnet used for internal communication between Mediant VE components.
  - 'Main Subnet': Defines the subnet for carrying management traffic (e.g. connecting to the Mediant VE Web or SSH interface) and signaling traffic. The subnet can also be used for carrying media traffic.
  - 1st and 2nd Additional Subnet': Defines additional subnets used for carrying media traffic. If not needed leave them as **-- none --**.
  - ‘Public IPs’: Defines subnets (and corresponding Mediant VE network interfaces) for which External IPs are assigned.
- **Admin User:**
  - 'Username': Defines the username for logging in to the Mediant VE Web or SSH interface.
  - 'Password': Defines the password for logging in to the Mediant VE Web or SSH interface.

- **Additional Config:** For additional configuration parameters, see Section 3.3.8 Advanced Configuration.

igure 3-15: Configuring Mediant VE in Google Cloud Environment



Create new stack

Name: ve1

Stack type: Mediant VE

Environment: Google

Region: us-central1

Image: sbc-7-20-256-110

Compute

HA Mode: enable

VM Type: n1-standard-2

Networking

Once you have configured all the above parameters, click **Create** to create the Mediant VE stack instance. The operation progress is displayed at the top of the page.

3.3.8 Advanced Configuration

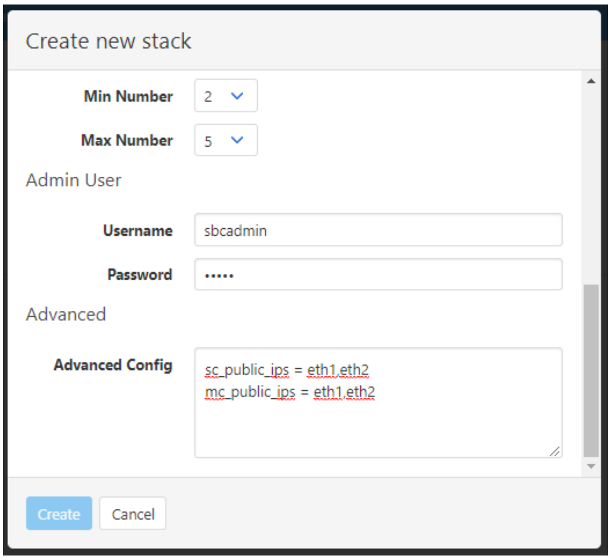
The Create new stack dialog includes the Advanced Config group that can be used to specify advanced configuration parameters during stack creation.

Specify parameters using the following format:

```
<parameter name> = <value>
```

You can specify multiple parameters on multiple lines.

Figure 3-16: Advanced Configuration Parameters



Create new stack

Min Number: 2

Max Number: 5

Admin User

Username: sbcadmin

Password: •••••

Advanced

Advanced Config:

```
sc_public_ips = eth1,eth2
mc_public_ips = eth1,eth2
```

3.3.8.1 Advanced Configuration for Mediant CE

The following table describes advanced parameters available for Mediant CE.

Table 3-5: Advanced Parameters Description

Parameter	Applicable Environment	Description
sc_ha_mode	All	Defines the number of SCs. Supported values: ▪ **enable** (default): Two SCs are created and operate in 1+1 HA mode. ▪ **disable**: One SC is created. Example: `sc_ha_mode = disable`

sc_public_ips	All	Defines the SC's network interface names for which public IP addresses are allocated and optionally, the number of corresponding IP addresses.
		During stack creation (via Web interface), Stack Manager lets you specify which subnets (and corresponding network interfaces) will be assigned with public (Elastic) IP addresses using the **Public IPs** parameter in the **Networking** section.
		When the **sc_public_ips** advanced configuration parameter is specified, it overrides any value configured by the **Public IPs** parameter. You will typically use this parameter when:
		▪ You need to create multiple IP addresses on the same network interface.
		▪ You need to configure IP addresses differently for Signaling and Media Components.
		
		Syntax: comma-separated list of interface names. Interface names are specified by corresponding subnet names: “main”, “additional1”, “additional2”. You may also use “all” to specify all interfaces. If more than one public IP address is required on the specific network interface, this may be specified as “<name>:<num>”, where <num> is the total number of public IP addresses to be created. Legacy interface names – “ethX” – are deprecated, but still supported.
		Examples:
		`sc_public_ips = main,additional1:2`
		`sc_public_ips = main:2`
		Notes:
		▪ In Azure, network interfaces listed in this parameter are placed behind the Public Load Balancer.
		▪ In Google Cloud, only the “main” interface is supported and is placed behind the Network Load Balancer.

Parameter	Applicable Environment	Description
		- Stack Manager implicitly creates all private IP addresses required for public IP address assignment

mc_public_ips	All	Defines the MC's network interface names for which public IP addresses are allocated and optionally, the number of corresponding IP addresses.
		During stack creation (via Web interface), Stack Manager lets you specify which subnets (and corresponding network interfaces) will be assigned with public (Elastic) IP addresses using the **Public IPs** parameter in the **Networking** section.
		When the **mc_public_ips** advanced configuration parameter is specified, it overrides any value configured by the **Public IPs** parameter. You will typically use this parameter when:
		- You need to create multiple IP addresses on the same network interface.
		- You need to configure IP addresses differently for Signaling and Media Components.
		Syntax: comma-separated list of interface names. Interface names are specified by corresponding subnet names: “main”, “additional1”, “additional2”. You may also use “all” to specify all interfaces. If more than one public IP address is required on the specific network interface, this may be specified as “<name>:<num>”, where <num> is the total number of public IP addresses to be created. Legacy interface names – “ethX” – are deprecated, but still supported.
		Examples:
		`mc_public_ips = main,additional1:2`
		`mc_public_ips = main:2`
		Notes:
		- Stack Manager implicitly creates all private IP addresses required for public IP address assignment.

sc_additional_ips	All	Defines the SC's network interface names for which additional private IP addresses are allocated and optionally, the number of corresponding IP addresses. Additional IP addresses are allocated *on top* of any private IP addresses created by Stack Manager by default and/or due to the public IP addresses assigned to the specific network interface. Syntax: comma-separated list of interface names. Interface names are specified by corresponding subnet names: “main”, “additional1”, “additional2”. You may also use “all” to specify all interfaces. If more than one additional private IP address is required on the specific network interface, this may be specified as “<name>:<num>”, where <num> is

Parameter	Applicable Environment	Description

		the total number of additional private IP addresses to be created. Legacy interface names – “ethX” – are deprecated, but still supported.
		Examples:
		`sc_additional_ips = additional1`
		`sc_additional_ips = main,additional1:2`
		Note:
		- In Azure, network interfaces listed in this parameter are placed behind the Internal Load Balancer.
		- In Google Cloud, only the “main” interface is supported and is placed behind the Internal Load Balancer.

mc_additional_ips	All	Defines the MC's network interface names for which additional private IP addresses are allocated and optionally, the number of corresponding IP addresses.
		Additional IP addresses are allocated *on top* of any private IP addresses created by Stack Manager by default and/or due to the public IP addresses assigned to the specific network interface.
		Syntax: comma-separated list of interface names. Interface names are specified by corresponding subnet names: “main”, “additional1”, “additional2”. You may also use “all” to specify all interfaces. If more than one additional private IP address is required on the specific network interface, this may be specified as “<name>:<num>”, where <num> is the total number of additional private IP addresses to be created. Legacy interface names – “ethX” – are deprecated, but still supported.
		Examples:
		`mc_additional_ips = additional1`
		`mc_additional_ips = main,additional1:2`

oam_ip	Azure	Defines which of the IP addresses on the “eth1” network interface, connected to the main subnet, is used for management traffic (Web, SSH, or SNMP). Syntax: - “default”: use the primary IP address on the “eth1” network interface, connected to the main subnet, for management traffic; ✓ If the public IP address is assigned to the main subnet, the primary IP address resides behind the Public Load Balancer and therefore, Mediant CE management should be performed via Load Balancer’s public IP address.

Parameter	Applicable Environment	Description

		▪ If the public IP address is not assigned to the main subnet, the primary IP address resides behind the Internal Load Balancer and therefore, Mediant CE management should be performed via Load Balancer’s internal IP address.
		▪ “internal”: if the “eth1” network interface, connected to the main subnet, has a secondary IP address that resides behind the Internal Load Balancer, use this IP address for Mediant CE management.
		For example, the following configuration:
		`sc_public_ips = main`
		`sc_additional_ips = main`
		`oam_ip = internal`
		creates two IP addresses on the “eth1” network interface, connected to the main subnet:
		▪ “eth1” – primary IP address, placed behind the Public Load Balancer and used for SIP traffic.
		▪ “eth1:1” – secondary IP address, placed behind the Internal Load Balancer and used for management traffic (Web, SSH, or SNMP).

sc_num_of_interfaces	All	Defines the number of network interfaces for SCs. By default, all components (SCs and MCs) are connected to all subnets specified during stack creation. If you want some subnets to be connected to MCs only, use this parameter to reduce the number of network interfaces for SCs. Example: `sc_num_of_interfaces = 2`
mc_num_of_interfaces	All	Defines the number of network interfaces for MCs. By default, all components (SCs and MCs) are connected to all subnets specified during stack creation. If you want some subnets to be connected to SCs only, use this parameter to reduce the number of network interfaces for MCs. Example: `mc_num_of_interfaces = 2`
sc_instance_type	All	Defines the instance type (virtual machine size / flavor) for SCs. Refer to the *Mediant Cloud Edition Installation Manual* for a list of officially supported and recommended instance types. Contact AudioCodes support if you want to use a different instance type and to verify that this configuration is allowed and supported. Example: `sc_instance_type = Standard_DS3_v2`

Parameter	Applicable Environment	Description
mc_instance_type	All	Defines the instance type (virtual machine size / flavor) for MCs. Refer to the *Mediant Cloud Edition Installation Manual* for a list of officially supported and recommended instance types. Contact AudioCodes support if you want to use a different instance type and to verify that this configuration is allowed and supported. Example: `mc_instance_type = c4.2xlarge`

sc_image_id	AWS
	Azure
		Defines the local image for SCs (instead of the default Marketplace image).
		Syntax:
		▪ AWS: AMI ID
		▪ Azure: Resource Group name / image name
		Examples:
		`sc_image_id = ami-9a50cff5`
		`sc_image_id =  rg1/image1`

mc_image_id	AWS
	Azure
		Defines the local image for MCs (instead of the default Marketplace image).
		Syntax:
		▪ AWS: AMI ID
		▪ Azure: Resource Group name / image name
		Examples:
		`sc_image_id = ami-9a50cff5`
		`sc_image_id = rg1/image1`

sc1_ha_name	All	Defines the name of the first SC on the Web interfaces Monitor page. Example: `sc1_ha_name = sc-1`
sc2_ha_name	All	Defines the name of the second SC on the Web interfaces Monitor page. Example: `sc2_ha_name = sc-2`

sc_tags	AWS, Azure, Google	Assigns tags to SCs.
		Syntax:
		▪ **AWS or Azure:** comma-separated list of name=value pairs
		▪ **Google:** comma-separated list of tags
		Examples:
		`sc_tags = type=sbc,role=sc`
		`sc_tags = sbc,sc`

mc_tags	AWS, Azure, Google	Assigns tags to MCs. Syntax: ▪ **AWS or Azure:** comma-separated list of name=value pairs

Parameter	Applicable Environment	Description

		▪ **Google:** comma-separated list of tags
		Examples:
		`mc_tags = type=sbc,role=mc`
		`mc_tags = sbc,mc`

sc_ini_params	All	Defines additional configuration parameters (in INI file format) for SCs. Syntax: multiple lines can be specified using \n as a line delimiter. Example: `sc_ini_params = EnableSyslog = 1\nSyslogServerIP = 10.1.2.3` **Note:** Use with caution and do not overwrite the default INI configuration parameters created by Stack Manager.
mc_ini_params	All	Defines additional configuration parameters (in INI file format) for MCs. Syntax: multiple lines can be specified using \n as a line delimiter. **Note:** Use with caution and do not overwrite the default INI configuration parameters created by Stack Manager.

availability_zones	Azure	Defines the deployment topology for the Azure environment.
		Syntax:
		▪ “auto” (default): Mediant CE components are deployed into a single Proximity Placement Group with two Availability Sets (each containing two fault and update domains) for Signaling and Media Components, respectively. This deployment topology minimizes network latency between Mediant CE components while still providing adequate redundancy at the infrastructure level.
		▪ comma-separated list of two zone names (e.g., “1,2”): Deployed Mediant CE components are evenly spread across the specified two Availability Zones. Note that such deployment topology may suffer from intermittent network latency between zones, which may affect internal communication between Mediant CE components and cause SC/MC switchovers.
		Examples:
		`availability_zones = auto`
		`availability_zones = 1,2`

storage_account_type	Azure	Defines the storage account type for managed disks. Valid values include: ▪ Standard_LRS ▪ Premium_LRS ▪ StandardSSD_LRS

Parameter	Applicable Environment	Description
		Example: `storage_account_type = Premium_LRS`
resource_group	Azure	Defines the name of the existing Resource Group. If not empty, stack resources will be deployed into this Resource Group instead of creating a new one. The Resource Group must be empty prior to stack creation. Example: `resource_group = SbcGroup1`
diag_account	Azure	Defines the name of the existing Storage Account. If not empty, the specified Storage Account is used to store VM's diagnostics data instead of creating a new one. Syntax: Resource Group name / account name Example: `diag_account = rg1/account1`

cluster_nsg_id	AWS, Azure	Defines the name of the existing Network Security Group (NSG) to be used on SC and MC interfaces connected to the Cluster Subnet, instead of creating a new one.
		Refer to the *Default Security Rules* chapter in the *Mediant CE Installation Manual* for a detailed list of rules that should be included in the Cluster NSG.
		Syntax:
		▪ **AWS:** Security Group ID
		▪ **Azure:** Resource Group name / NSG name
		`cluster_nsg_id = sg-11223344`
		`cluster_nsg_id = rg1/cluster-nsg`

oam_nsg_id	AWS, Azure	Defines the name of the existing Network Security Group (NSG) to be used on SC interfaces connected to the Main Subnet, instead of creating a new one.
		Refer to the *Default Security Rules* chapter in the *Mediant CE Installation Manual* for a detailed list of rules that should be included in the OAM NSG.
		Make sure that OAM NSG includes rules that enable Stack Manager to access deployed SBC instances using the HTTPS protocol (TCP/443).
		In an Azure environment, OAM NSG should include both management and signaling rules. In an AWS environment, OAM NSG should include only management rules, as both OAM NSG and Signaling NSG are assigned to the SC interfaces connected to the Main subnet.
		Syntax:
		▪ **AWS:** Security Group ID
		▪ **Azure:** Resource Group name / NSG name
		`oam_nsg_id = sg-22334455`
		`oam_nsg_id = rg1/oam-nsg`

Parameter	Applicable Environment	Description

signaling_nsg_id	AWS, Azure	Defines the name of the existing Network Security Group (NSG) to be used on SC interfaces connected to Additional1/2 Subnets, instead of creating a new one.
		Refer to the *Default Security Rules* chapter in the *Mediant CE Installation Manual* for a detailed list of rules that should be included in the Signaling NSG.
		Syntax:
		- **AWS:** Security Group ID
		- **Azure:** Resource Group name / NSG name
		`signaling_nsg_id = sg-33445566`
		`signaling_nsg_id = rg1/signaling-nsg`

media_nsg_id	AWS, Azure	Defines the name of the existing Network Security Group (NSG) to be used on MC interfaces connected to Main and Additional1/2 Subnets, instead of creating a new one.
		Refer to the *Default Security Rules* chapter in the *Mediant CE Installation Manual* for a detailed list of rules that should be included in the Media NSG.
		Syntax:
		- **AWS:** Security Group ID
		- **Azure:** Resource Group name / NSG name
		`media_nsg_id = sg-44556677`
		`media_nsg_id = rg1/media-nsg`

spot_instances	Azure	Enables the use of Azure Spot instances for testing environments. Keep in mind that Spot instances may be abruptly stopped and therefore, should never be used in production environment. Supported values: - **enable**: use Spot instances - **disable** (default): use regular instances Example: `spot_instances = enable`
use_proximity_ placement_group	Azure	Defines if deployed components are placed in the proximity placement group. Supported values: - **enable** (default): use proximity placement group - **disable**: do not use proximity placement group Example: `use_proximity_placement_group = disable`
use_placement_group	AWS	Defines if deployed components are placed in the placement group. Supported values: - **enable** (default): use placement group - **disable**: do not use placement group

Parameter	Applicable Environment	Description
		Example: `use_placement_group = disable`
mc_max_pps_limit	All	Defines the maximum Media Component's forwarding capacity in packets per second. Supported values: ▪ **auto** (default): Stack Manager automatically configures MC forwarding capacity based on the cloud environment and instance type used ▪ **<number>**: manually defines MC forwarding capacity Example: `mc_max_pps_limit = 280`
manage_via_https	All	Defines the protocol used by the Stack Manager when connecting to the deployed stack's management interface. Supported values: ▪ **enable** (default): use HTTPS protocol ▪ **disable**: use HTTP protocol Example: `manage_via_https = disable`
auto_start_time	All	Defines time of day when stack automatically starts. Supported syntax: ▪ **08:00** – time of day (24h) ▪ **1/08:00** – weekday (0=Sunday, 1=Monday, …, 6=Saturday) and time ▪ **0,1,2/08:00** – multiple weekdays and time ▪ **0-5/08:00** – range of weekdays and time ▪ **0,1/08:00|2-4/09:00** – multiple statements Example: `auto_start_time = 08:00`
auto_stop_time	All	Defines time of day when stack will be automatically stopped. Syntax is identical to **auto_start_time** parameter. Example: `auto_stop_time = 22:00`
oam_subnet_cidr, **main_subnet_cidr,** **additional1_subnet_cidr,** **additional2_subnet_cidr**	Azure	Defines the CIDR for a specific subnet. This may be used to override automatic subnet CIDR detection or to overcome Stack Manager's lack of permissions to read current subnet configuration. Syntax: Subnet IP / Prefix Length. Example: `oam_subnet_cidr = 10.2.3.0/24`

3.3.8.2 Advanced Configuration for Mediant VE

The following table describes advanced parameters available for Mediant VE.

Table 3-6: Advanced Parameters Description

Parameter	Applicable Environment	Description

public_ips	All	Defines the SC's network interface names for which public IP addresses are allocated and optionally, the number of corresponding IP addresses.
		During stack creation (via Web interface), Stack Manager lets you specify which subnets (and corresponding network interfaces) will be assigned with public (Elastic) IP addresses using the **Public IPs** parameter in the **Networking** section.
		When the **public_ips** advanced configuration parameters is specified, it overrides any value configured by the **Public IPs** parameter. You will typically use this parameter when you need to create multiple IP addresses on the same network interface.
		Syntax: comma-separated list of interface names. Interface names are specified by corresponding subnet names: “main”, “additional1”, “additional2”. You may also use “all” to specify all interfaces. If more than one public IP address is required on the specific network interface, this may be specified as “<name>:<num>”, where <num> is the total number of public IP addresses to be created. Legacy interface names – “ethX” – are deprecated, but still supported.
		Examples:
		`public_ips = main,additional1:2`
		`public_ips = main:2`
		Notes:
		- Stack Manager implicitly creates all private IP addresses required for public IP address assignment

additional_ips	All	Defines the network interface names for which additional private IP addresses are allocated and optionally, the number of corresponding IP addresses. Additional IP addresses are allocated *on top* of any private IP addresses created by Stack Manager by default and/or due to the public IP addresses assigned to the specific network interface. Syntax: comma-separated list of interface names. Interface names are specified by corresponding subnet names: “main”, “additional1”, “additional2”. You may also use “all” to specify all interfaces. If more than one additional private IP address is required on the specific network interface, this may be specified as “<name>:<num>”, where <num> is the total number of additional private IP addresses to

Parameter	Applicable Environment	Description

		be created. Legacy interface names – "ethX" – are deprecated, but still supported.
		Examples:
		`additional_ips = additional1`
		`additional_ips = main,additional1:2`

image_id	AWS
	Azure
		Defines the local image for SCs (instead of the default Marketplace image).
		Syntax:
		▪ **AWS:** AMI ID
		▪ **Azure:** Resource Group name / image name
		Examples:
		`image_id = ami-9a50cff5`
		`image_id = rg1/image1`

tags	AWS,
	Google
		Assigns tags to created instances.
		Syntax:
		▪ **AWS:** comma-separated list of name=value pairs
		▪ **Google:** comma-separated list of tags
		Examples:
		`tags = type=sbc,role=sc`
		`tags = sbc,sc`

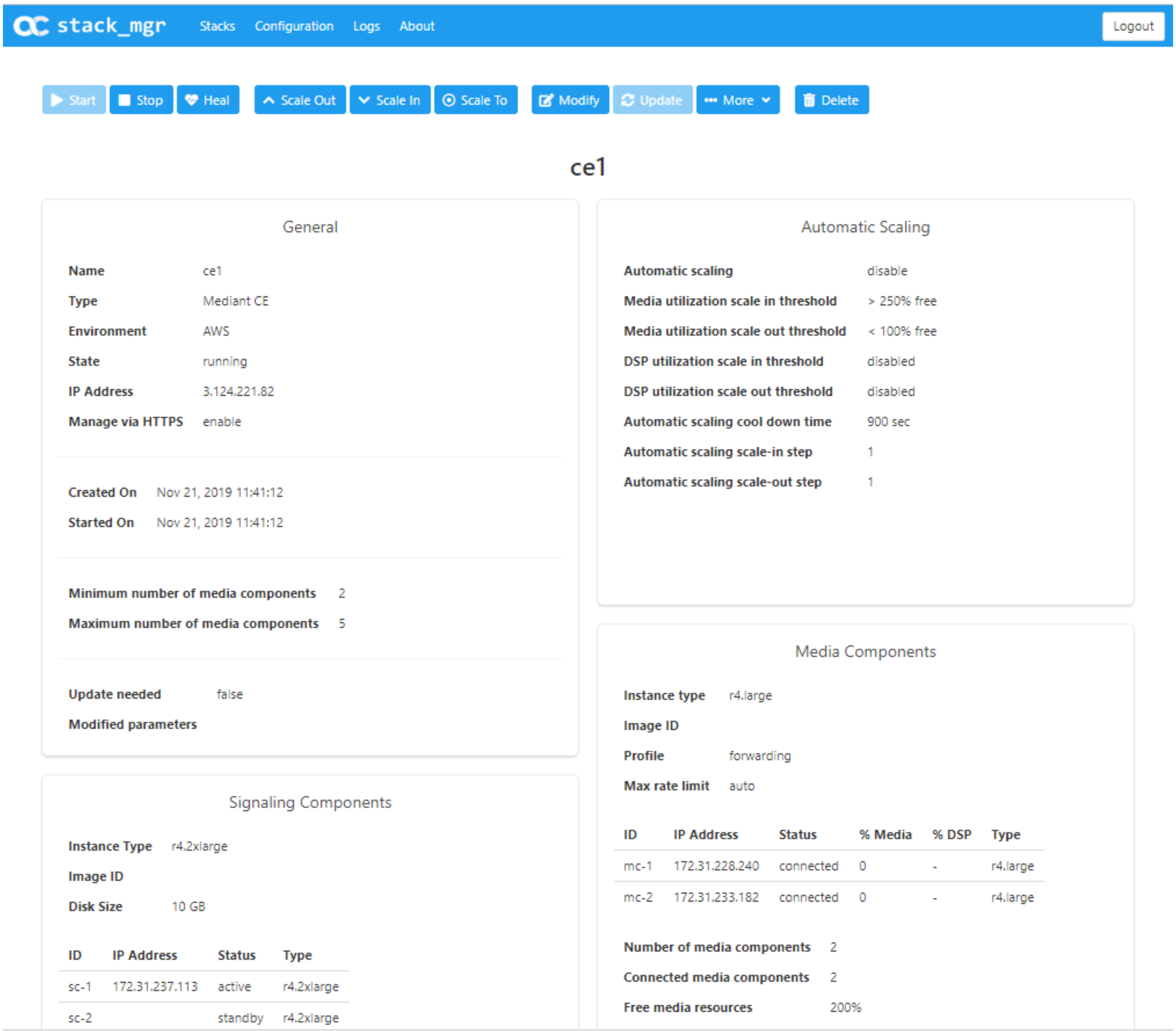
ini_params	All	Defines additional configuration parameters (in INI file format) for created instances. Syntax: multiple lines can be specified using \n as a line delimiter. Example: `ini_params = EnableSyslog = 1\nSyslogServerIP = 10.1.2.3` **Note:** Use with caution and do not overwrite the default INI configuration parameters created by Stack Manager.
spot_instances	Azure	Enables use of Azure spot instances for testing environments. Keep in mind that spot instances may be abruptly stopped and therefore should never be used in production environment. Supported values: ▪ **enable**: use spot instances ▪ **disable** (default): use regular instances Example: `spot_instances = enable`
manage_via_https	All	Defines the protocol used by the Stack Manager when connecting to the deployed stack's management interface Supported values: ▪ **enable** (default): use HTTPS protocol ▪ **disable**: use HTTP protocol Example: `manage_via_https = disable`

Parameter	Applicable Environment	Description
auto_start_time	All	Defines the time of day when stack automatically starts. Supported syntax: ▪ **08:00** – time of day (24h) ▪ **1/08:00** – weekday (0 is Sunday, 1 is Monday, 2 is Tuesday and so on) and time ▪ **0,1,2/08:00** – multiple weekdays and time ▪ **0-5/08:00** – range of weekdays and time ▪ **0,1/08:00|3-5/09:00** – multiple statements Example: `auto_start_time = 08:00`
auto_stop_time	All	Defines time of day when stack automatically stops. The syntax is identical to the **auto_start_time** parameter. Example: `auto_stop_time = 22:00`

3.4 Checking Stack State and Configuration

To check the state and configuration of the existing stack, open the Stacks page and then click the specific stack. The Stack Information page is displayed, which allows you to check the current stack state, inspect and modify its configuration, and perform actions such as scale-out, scale-in, and delete the stack if it's no longer needed.

Figure 3-17: Stack Information Page



ce1

General

Name	ce1
Type	Mediant CE
Environment	AWS
State	running
IP Address	3.124.221.82
Manage via HTTPS	enable
Created On	Nov 21, 2019 11:41:12
Started On	Nov 21, 2019 11:41:12
Minimum number of media components	2
Maximum number of media components	5
Update needed	false
Modified parameters	

Automatic Scaling

Automatic scaling	disable
Media utilization scale in threshold	> 250% free
Media utilization scale out threshold	< 100% free
DSP utilization scale in threshold	disabled
DSP utilization scale out threshold	disabled
Automatic scaling cool down time	900 sec
Automatic scaling scale-in step	1
Automatic scaling scale-out step	1

Signaling Components

Instance Type	r4.2xlarge
Image ID	
Disk Size	10 GB

ID	IP Address	Status	Type
sc-1	172.31.237.113	active	r4.2xlarge
sc-2		standby	r4.2xlarge

Media Components

Instance type	r4.large
Image ID	
Profile	forwarding
Max rate limit	auto

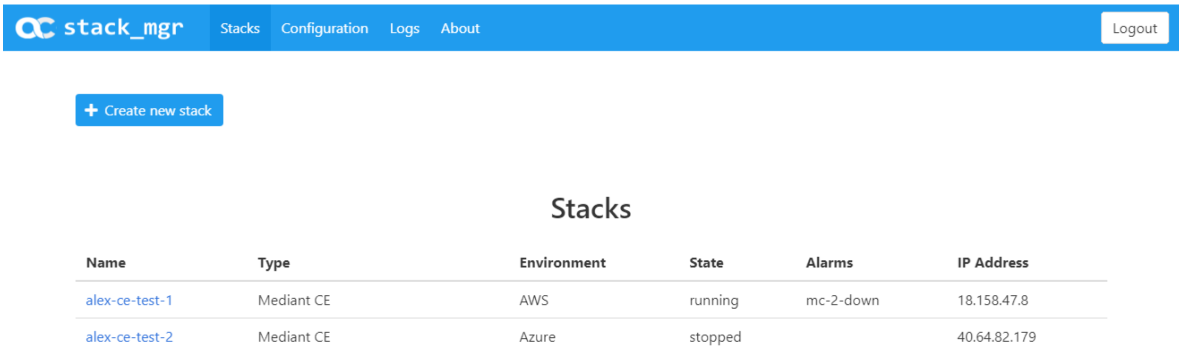
ID	IP Address	Status	% Media	% DSP	Type
mc-1	172.31.228.240	connected	0	-	r4.large
mc-2	172.31.233.182	connected	0	-	r4.large

Number of media components	2
Connected media components	2
Free media resources	200%

3.5 Active Alarms

Stack Manager periodically checks the state of all created stacks and raises alarms if it discovers any problem. Active alarms are displayed in Stacks summary screen and in the detailed Stack Information page.

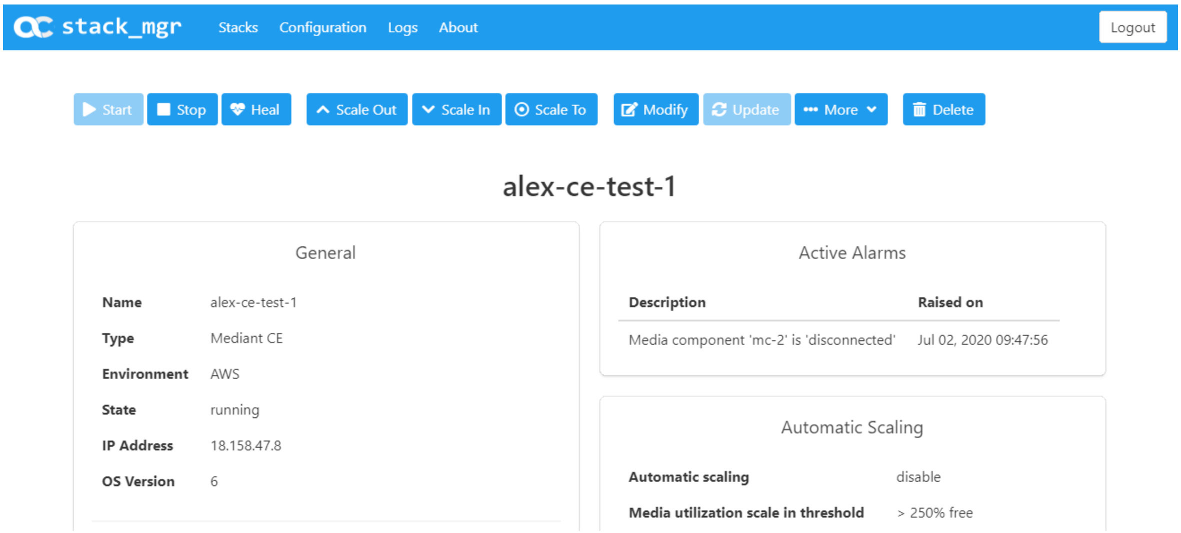
Figure 3-18: Active Alarms in Stacks Summary Screen



Stacks

Name	Type	Environment	State	Alarms	IP Address
alex-ce-test-1	Mediant CE	AWS	running	mc-2-down	18.158.47.8
alex-ce-test-2	Mediant CE	Azure	stopped		40.64.82.179

Figure 3-19: Active Alarms in Stack Information Page



alex-ce-test-1

General

Name	alex-ce-test-1
Type	Mediant CE
Environment	AWS
State	running
IP Address	18.158.47.8
OS Version	6

Active Alarms

Description	Raised on
Media component 'mc-2' is 'disconnected'	Jul 02, 2020 09:47:56

Automatic Scaling

Automatic scaling	disable
Media utilization scale in threshold	> 250% free

The following alarms are supported:

- **rest-api:** The alarm is raised when Stack Manager can't read the status of Mediant VE/CE via REST API
- **mc-status:** The alarm is raised when Stack Manager can't read the status of Mediant CE's Media Components via REST API.
- **mc-X-down:** The alarm is raised when Media Component mc-X is not in service (alarm description provides detailed Media Component state).
- **mc-X-missing:** The alarm is raised when Media Component mc-X is missing from Mediant CE's configuration and Stack Manager can't fix it.
- **sc-X-down:** The alarm is raised when Signaling Component sc-X is down.
- **sc-ha-alarm**: The alarm is raised when Signaling Components are not in HA synchronized state

To avoid false alarms, most of the alarms are raised only after the problem persists for 5 minutes.

3.6 Performing Operations on Stack

You can perform operations on the running stack (e.g., Scale Out), by clicking the corresponding button on the toolbar of the Stack Information page.

All operations, except for Delete and Heal, are serialized and can be performed one at a time. For example, if you started the *Scale Out* operation, you have to wait until it completes prior to starting the *Scale In* operation.

The stack state is updated accordingly when an operation is being performed.

3.7 Scaling Mediant CE Stack

Note: This section is applicable only to Mediant CE stacks.

The number of active MCs in the Mediant CE stack may vary to match the required service capacity. This is called scaling and ensures that the stack utilizes the optimal amount of resources at any point of time and elastically scales on demand. An operation that increases the amount of active MCs is called *Scale Out*; an operation that decreases the amount of active MCs is called *Scale In*.

To ensure fast and reliable scaling, Stack Manager pre-creates all needed MCs in advance (up to the maximum number) and stops/starts them accordingly during scale in/out operations.

Scaling decision can be triggered either manually—by running the *Scale In*, *Scale Out* or *Scale To* commands—or automatically based on the current cluster utilization.

The size of the cluster is configured by the following two configuration parameters:

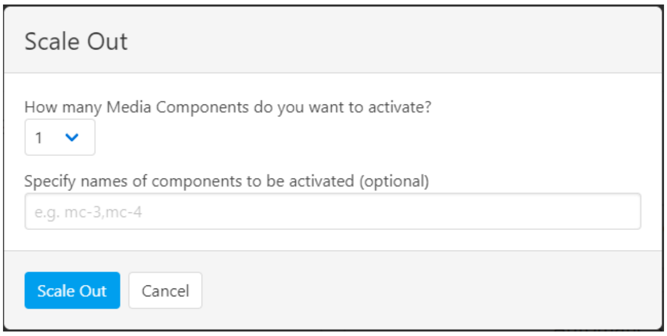
- Minimum Number of Media Components
- Maximum Number of Media Components

3.7.1 Scale Out Operation

The *Scale Out* operation increases the number of MCs in the Mediant CE stack, by starting additional pre-created "idle" MCs (for example, corresponding to the AWS EC2 instance state changes from *stopped* to *running*).

You must specify the number of MCs to add to the service. Alternatively, you may specify names of MCs that will be added to the service (e.g., "mc-3,mc-4").

Figure 3-20: Scale Out Operation



Scale Out

How many Media Components do you want to activate?

1

Specify names of components to be activated (optional)

e.g. mc-3,mc-4

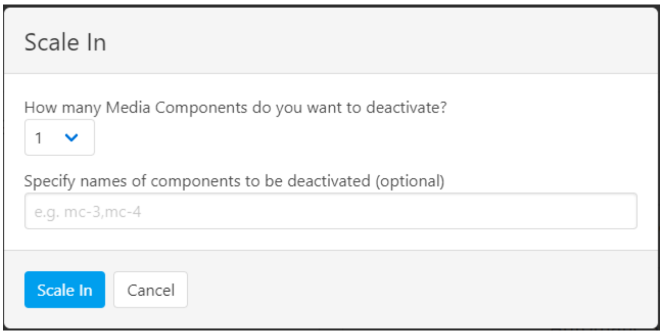
The *Scale Out* operation is not allowed when *Automatic Scaling* is enabled. Use the *Scale To* operation instead.

3.7.2 Scale In Operation

The *Scale In* operation decreases the number of MCs in the Mediant CE stack, by stopping a certain number of "active" MCs (for example, corresponding to the AWS EC2 instance state changes from *running* to *stopped*).

You must specify the number of MCs to be removed from the service. Alternatively, you may specify names of MCs that will be removed from the service (e.g., "mc-3,mc-4").

Figure 3-21: Scale In Operation



Scale In

How many Media Components do you want to deactivate?

1

Specify names of components to be deactivated (optional)

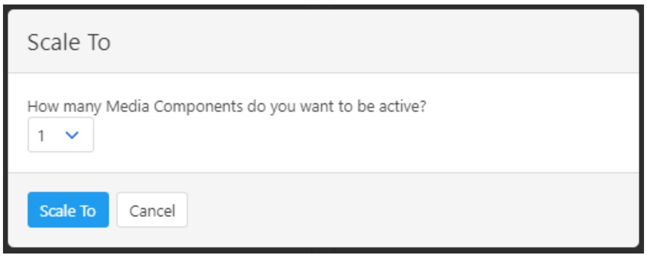
e.g. mc-3,mc-4

The *Scale In* operation is not allowed when *Automatic Scaling* is enabled. Use the *Scale To* operation instead.

3.7.3 Scale To Operation

The *Scale To* operation sets the number of MCs in the Mediant CE stack to the specified value. It essentially performs a *Scale In* or *Scale Out* operation, depending on the current stack state.

Figure 3-22: Scale To Operation



Scale To

How many Media Components do you want to be active?

1

In contrast to *Scale In* and *Scale Out* operations, the *Scale To* operation is allowed when *Automatic Scaling* is enabled. Regardless of whether it adds or removes MCs, for the purposes of calculating a cool down period, the *Scale To* operation is considered to be equivalent to the *Scale Out* operation. This means that the cluster size may be increased immediately after completing the *Scale To* command, if needed.

3.8 Automatic Scaling

Note: This section is applicable only to Mediant CE stacks.

Automatic Scaling adjusts the Mediant CE cluster size to the current service needs, by measuring current cluster utilization and changing its size accordingly. It is implemented by a background job performed by the Stack Manager.

For every stack that is in "running" state and has Automatic Scaling enabled, Stack Manager calculates the total amount of "free" media and DSP resources, using accumulative percentage points, where 100% corresponds to the capacity of a single MC. For example, for a cluster that is in the following state:

```
+------+---------------+-----------+--------+------+
| id   | IP address    | status    | %media | %dsp |
+------+---------------+-----------+--------+------+
| mc-1 | 172.31.78.116 | connected | 30     | 0    |
| mc-2 | 172.31.75.42  | connected | 40     | 0    |
| mc-3 | 172.31.65.5   | connected | 25     | 0    |
+------+---------------+-----------+--------+------+
```

Free media resources are calculated as follows:

free_media = (100-30) + (100-20) + (100-25) = 205 %

Note: The calculated number is the number of excessive MCs capacity in the Mediant CE cluster. For example, 100% corresponds to the state where the total amount of excessive capacity equals the capacity of a single MC. In this state, the failure of a single MC has no effect on traffic capacity, thus providing N+1 redundancy for the media cluster.

The calculated number is then compared against *Scale In* and *Scale Out Thresholds*, which are defined in the stack configuration. If the number is below the *Scale Out Threshold*, the *Scale Out* operation is triggered. If the number is above the *Scale In Threshold*, the *Scale In* operation is triggered.

It is possible to disable media or DSP thresholds, by setting them to 0 (zero).

If both media and DSP thresholds are used, the decision is made as follows:

- *Scale Out* is performed when *either* media or DSP utilization is below the threshold
- *Scale In* is performed when *both* media and DSP utilization are above the threshold

Maximum / Minimum Number of Media Components parameters define the maximum / minimum cluster size, and automatic scaling mechanism takes them into account when making its decisions.

Automatic scaling logs are collected in the *auto-job* log, which can be viewed through Web or CLI management interfaces:

```
$ stack_mgr log --name auto_job --lines 10
```

```
300% of media resources in stack 'stack1' are unused
MEDIA_UTIL_SCALE_IN_THRESHOLD is 250
Trigger automatic scale in

Choosing SBC media components to be removed...... done
Preparing SBC media component 'mc-3' for removal.... done

Initializing AWS client... done
Updating SBC cluster configuration.... done
Removing SBC media components............................ done
```

3.8.1 Cool Down Period

To prevent stack size 'bouncing', the *Automatic Scaling Cool Down Time* parameter defines the minimum time (in seconds) between consecutive *Scale Out* and *Scale In* decisions.

3.8.2 Auto Scale Step

The number of MCs to be added or removed by the automatic scaling mechanism can be configured using the *Automatic Scaling Scale-In / Scale-Out Step* parameters.

Both parameters are set to 1 by default, thus enabling Automatic Scaling to add or remove one MC at a time. If you change the *Automatic Scaling Scale-Out Step* parameter to a greater value (e.g., 2), your stack size will grow quickly to adjust to traffic demands, but will shrink slowly when traffic is reduced.

3.8.3 Changing Cluster Size at Specific Time of Day

In certain scenarios, service capacity is typically expected to change at certain times of day. For example, if the Contact Center starts to operate at 9:00 AM, it would be reasonable to expect that SBC traffic will surge at that time.

It is possible to change Mediant CE scaling while having *Automatic Scaling* enabled, using one of the following methods:

- Changing the *Minimum Number of Media Components* parameter, which defines the minimum cluster size
- Defining the target cluster size by the *Scale To operation*

If you choose to define the target cluster size by the *Scale To* operation, keep in mind that the cool-down period is calculated as if the *Scale Out* operation was performed. Therefore, cluster size will grow immediately if required and will not be reduced for the cool-down period even if traffic hasn’t started yet.

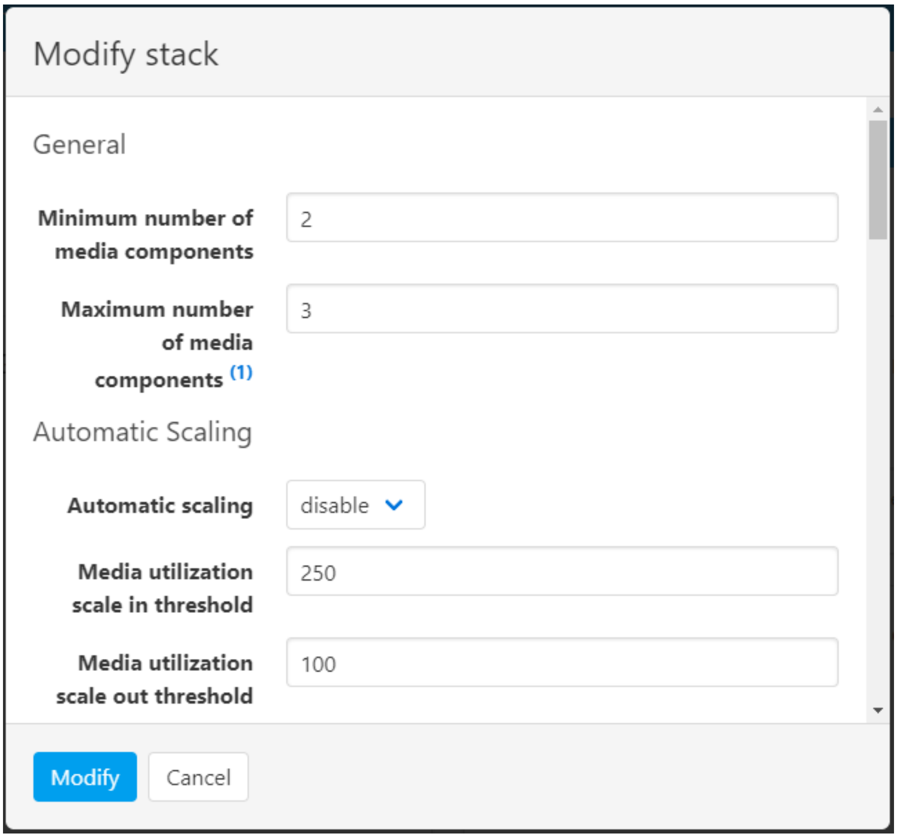
The corresponding operations may be programmed to run at a specified time of day using CLI and the cron scheduler. Make sure that commands are run by the *stack_mgr* user, and replace the **stack_mgr** command with the expression *"/usr/bin/python3 /opt/stack_mgr/bin/stack_mgr.py"*. For example:

```
$ cat /var/stack_mgr/scale_to.sh
#!/bin/bash
STACK_MGR="/usr/bin/python3 /opt/stack_mgr/bin/stack_mgr.py"
$STACK_MGR scale $1 -n $2 >> /var/log/stack_mgr/cron.log

$ cat /etc/cron.d/stack_mgr
* 9 * * * stack_mgr /var/stack_mgr/scale_to.sh stack1 10
```

3.9 Modifying Stack Configuration

To modify configuration of the existing Mediant VE/CE stack, open the Stack information page, and then click the **Modify** button on the toolbar to open the Modify stack dialog box. Change stack configuration parameters as desired, and then click **Modify** to apply your changes.

Figure 3-23: Modifying Stack Configuration



Modify stack

General

Minimum number of media components: 2

Maximum number of media components (1): 3

Automatic Scaling

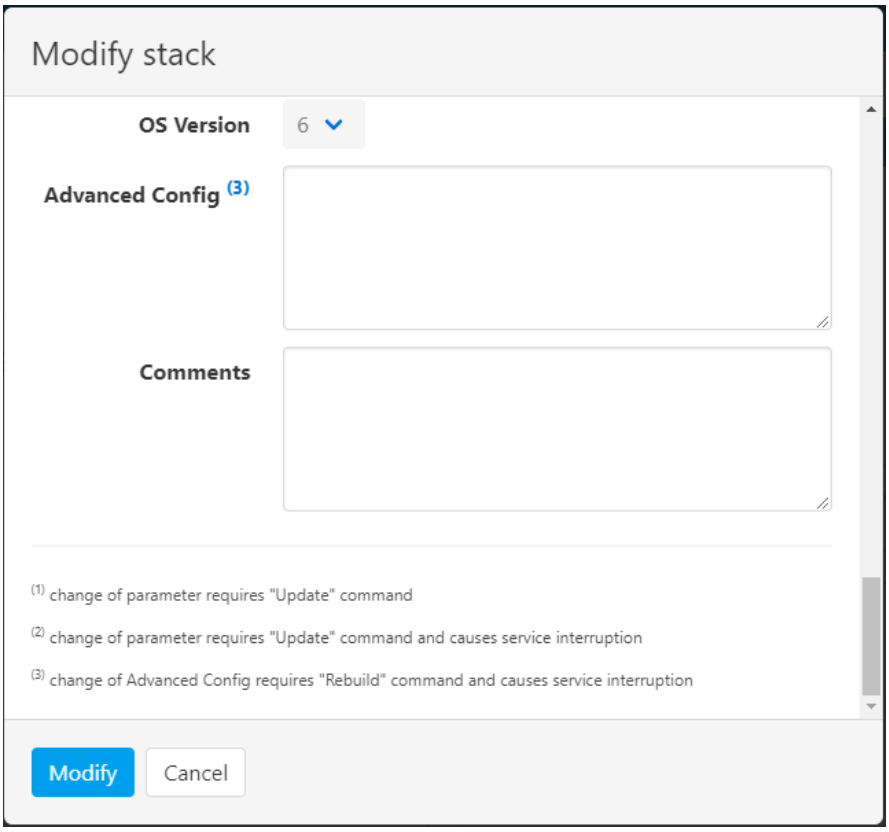
Automatic scaling: disable

Media utilization scale in threshold: 250

Media utilization scale out threshold: 100

Most of the parameters are applied immediately and have no adverse effect on service. However, change of some parameters may require an additional *Update* operation and may be service affecting. Such parameters are explicitly marked in the **Modify** screen and the detailed description is provided at the screen footnote.

Figure 3-24: Modify Screen Footnote



Modify stack

OS Version: 6

Advanced Config [3]

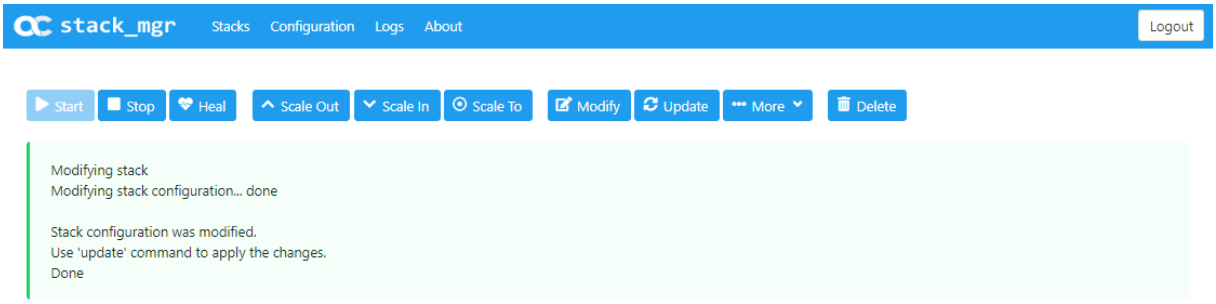
Comments

[1] change of parameter requires "Update" command

[2] change of parameter requires "Update" command and causes service interruption

[3] change of Advanced Config requires "Rebuild" command and causes service interruption

Figure 3-25: Modifying Parameter that Requires Update



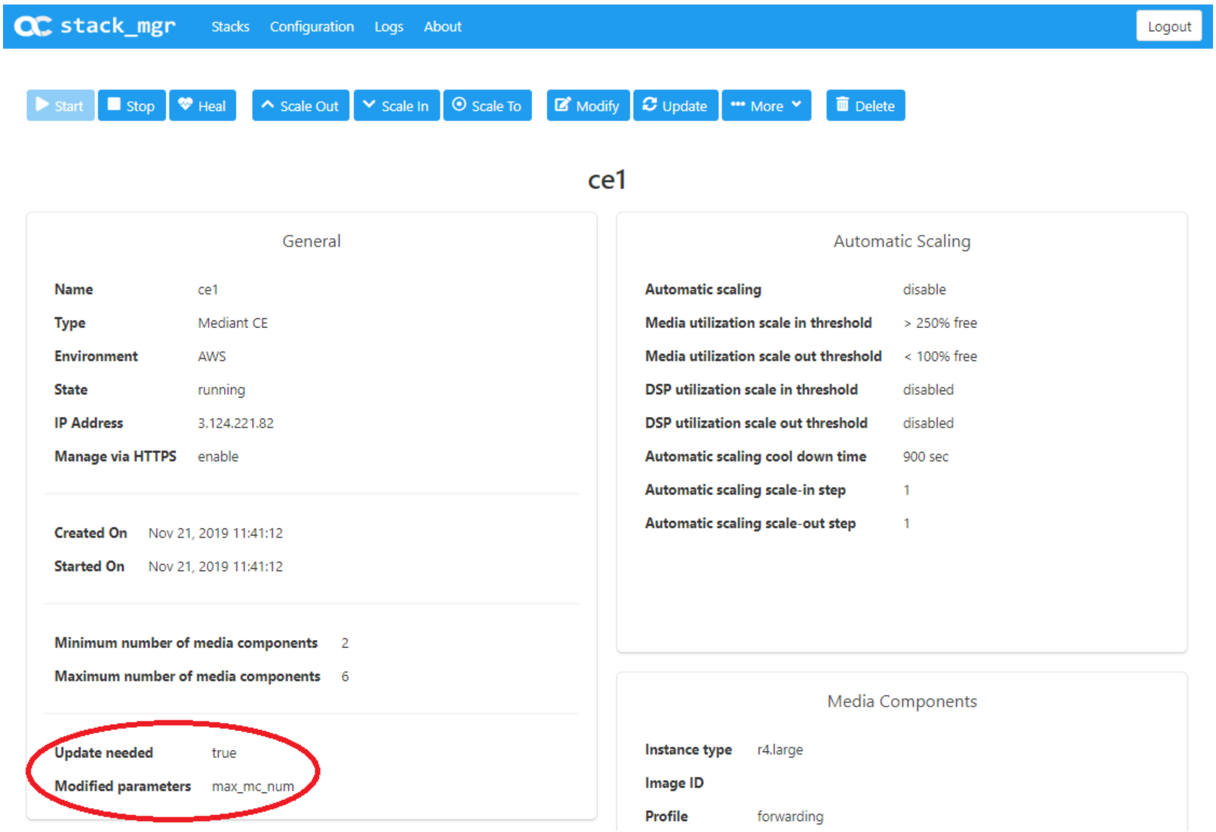
```
Modifying stack
Modifying stack configuration... done

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

3.9.1 Update Operation

The *Update* operation updates the stack to the new configuration. It is required when modified configuration requires applying some changes to the underlying virtual infrastructure resources, for example, when you resize the cluster.

The need to do an *Update* operation is indicated in the *Modify* operation output and on the Stack information page:

Figure 3-26: Stack in "Update Needed" State



ce1

General

Name	ce1
Type	Mediant CE
Environment	AWS
State	running
IP Address	3.124.221.82
Manage via HTTPS	enable
Created On	Nov 21, 2019 11:41:12
Started On	Nov 21, 2019 11:41:12
Minimum number of media components	2
Maximum number of media components	6
Update needed	true
Modified parameters	max_mc_num

Automatic Scaling

Automatic scaling	disable
Media utilization scale in threshold	> 250% free
Media utilization scale out threshold	< 100% free
DSP utilization scale in threshold	disabled
DSP utilization scale out threshold	disabled
Automatic scaling cool down time	900 sec
Automatic scaling scale-in step	1
Automatic scaling scale-out step	1

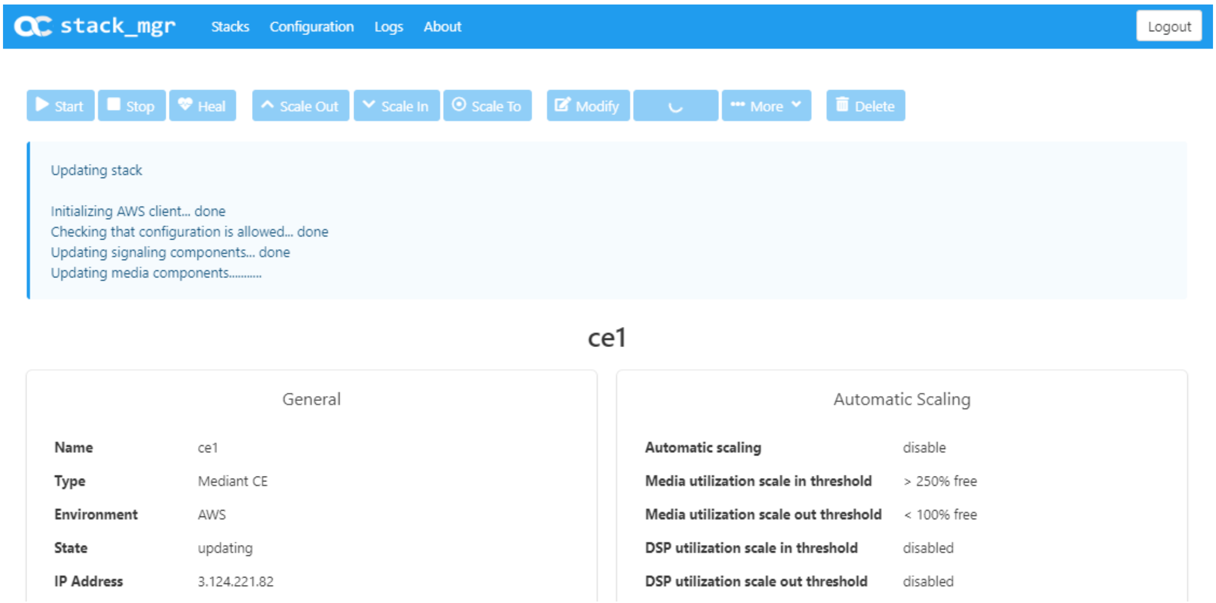
Media Components

Instance type	r4.large
Image ID	
Profile	forwarding

Click the **Update** button on the toolbar to start the *Update* operation and wait until it completes.

Note: The *Update* operation may be service affecting. It is therefore recommended to run it during a maintenance period.

Figure 3-27: Updating Stack Configuration



```
Updating stack

Initializing AWS client... done
Checking that configuration is allowed... done
Updating signaling components... done
Updating media components..........
```

ce1

General

Name	ce1
Type	Mediant CE
Environment	AWS
State	updating
IP Address	3.124.221.82

Automatic Scaling

Automatic scaling	disable
Media utilization scale in threshold	> 250% free
Media utilization scale out threshold	< 100% free
DSP utilization scale in threshold	disabled
DSP utilization scale out threshold	disabled

3.9.2 Modifiable Parameters for Mediant CE

The following table lists all stack configuration parameters that can be modified.

Table 3-7: Modifiable Stack Configuration Parameters

Group Name	Parameter	Applicable Environment	Requires Update	Service Affecting
General	**Minimum number of media components**	All	No	No
	Maximum number of media components	All	Yes	No
Automatic scaling	**Automatic scaling**	All	No	No
	Media utilization scale in threshold	All	No	No
	Media utilization scale out threshold	All	No	No
	DSP utilization scale in threshold	All	No	No
	DSP utilization scale out threshold	All	No	No
	Automatic scaling cool down time	All	No	No
	Automatic scaling scale-in step	All	No	No
	Automatic scaling scale-out step	All	No	No
Signaling Components	**Number of network interfaces**	AWS, Azure, Google	Yes	Yes
	Interfaces with public IP	AWS, Azure, Google	Yes	Yes

Group Name	Parameter	Applicable Environment	Requires Update	Service Affecting
	Interfaces with additional IP	AWS, Azure, Google	Yes	Yes
	Management ports	AWS, Azure, Google	Yes	No
	Signaling ports	AWS, Azure, Google	Yes	No
	Instance type	AWS, Azure, Google	Yes	Yes
Media Components	**Number of network interfaces**	AWS, Azure, Google	Yes	Yes
	Interfaces with public IP	AWS, Azure, Google	Yes	
	Interfaces with additional IP	AWS, Azure, Google	Yes	
	Instance type	AWS, Azure, Google	Yes	Yes
	Profile	AWS, Azure, Google	Yes	Yes
Network Subnets	**Additional 1 subnet**	AWS, Azure, Google	No (1)	No (1)
	Additional 2 subnet	AWS, Azure, Google	No (1)	No (1)
Advanced	**OS version**	Azure	Yes (3)	Yes (3)
	Advanced config	All	Yes (2)	Yes (2)
	Comments	All	No	No

(1) Modification of additional subnets is allowed only when they are not in use

(2) Modification of 'advanced config' parameters requires **Rebuild** operation and is limited to the following parameters: manage_via_https, mc_max_pps_limit, sc_image_id, mc_image_id, spot_instances, storage_account_type, oam_ip, private_ip_*, public_ip_*

(3) Modification of the 'OS version' parameter requires an **Update** operation, during which all VMs are rebuilt. During this operation, the serial number of signaling components changes and therefore, their local license will be invalidated. You need to obtain, activate and apply the new license to the signaling components to restore the service.

3.9.3 Modifiable Parameters for Mediant VE

The following table lists all stack configuration parameters that can be modified.

Table 3-8: Modifiable Stack Configuration Parameters

Group Name	Parameter	Applicable Environment	Requires Update	Service Affecting
Compute	**Instance type**	All	Yes	Yes
Networking	**Number of network interfaces**	AWS, Azure, Google	Yes	Yes
	Interfaces with public IP	AWS, Azure, Google	Yes	Yes
	Interfaces with additional IP	AWS, Azure, Google	Yes	Yes
	Additional 1 subnet	AWS, Azure, Google	No (1)	No (1)
	Additional 2 subnet	AWS, Azure, Google	No (1)	No (1)
Advanced	**OS version**	Azure	Yes (3)	Yes (3)
	Advanced config	All	Yes (2)	Yes (2)
	Comments	All	No	No

(1) Modification of additional subnets is allowed only when they are not in use.

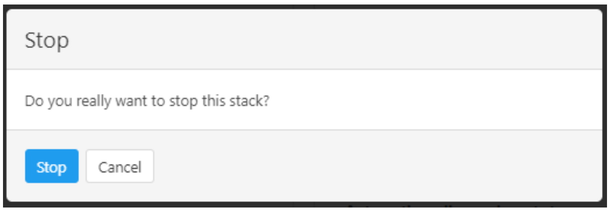
(2) Modification of ‘advanced config’ parameters requires **Rebuild** operation and is limited to the following parameters: manage_via_https, image_id, spot_instances, storage_account_type, private_ip_*, public_ip_*

(3) Modification of the ‘OS version’ parameter requires an **Update** operation, during which all VMs are rebuilt. During this operation, the serial number of components changes and therefore, their local license will be invalidated. You need to obtain, activate and apply the new license to the components to restore the service.

3.10 Stopping and Starting Stack

If you want to temporarily stop all Mediant CE components (e.g., in a lab environment) use the *Stop* operation. Use the *Start* operation afterwards to return all components back to service.

Figure 3-28: Stopping Stack



Stop

Do you really want to stop this stack?

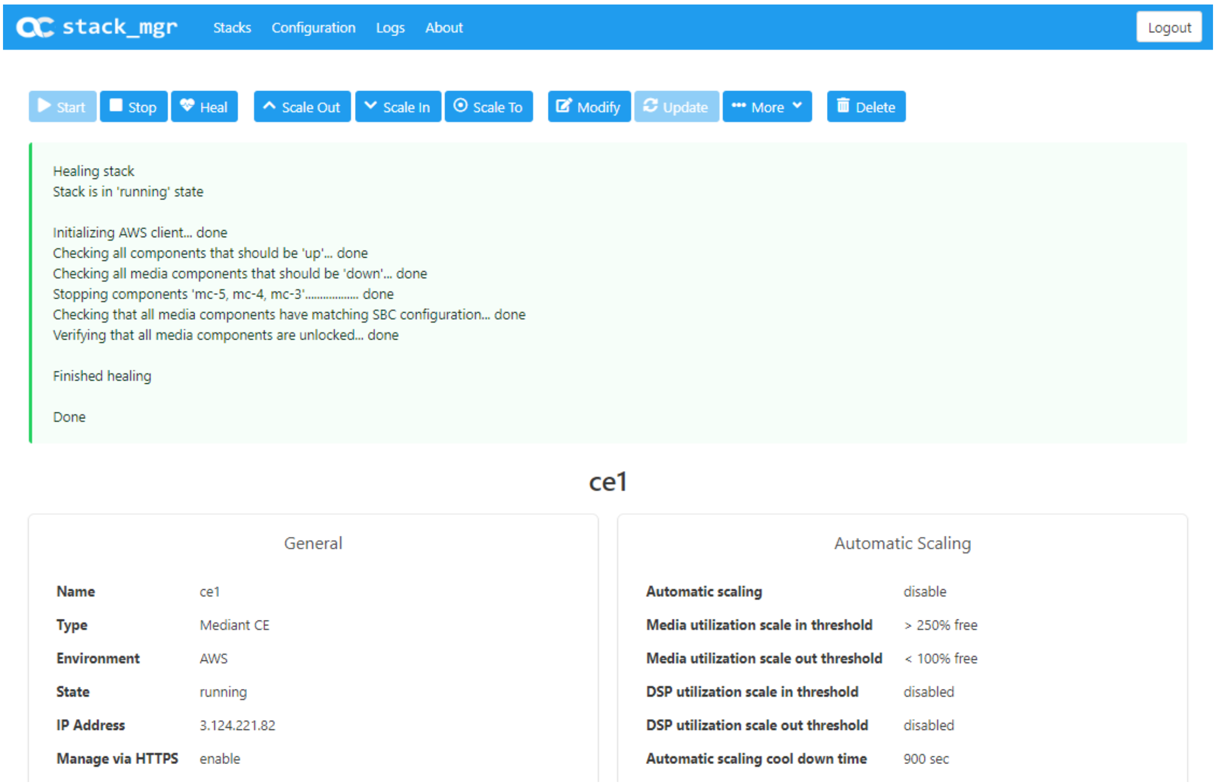
3.11 Healing Stack

The *Heal* operation verifies the state of all stack components and fixes any errors if detected. For example, it can remove MCs that are not properly registered in the SCs or remove orphaned entries from the "Media Components" configuration table.

The command is typically used after Stack Manager is interrupted in the middle of some operation, for example, during stack creation or *Scale Out*. It can also be useful when the output of some operation (e.g., *Scale In*) indicates an intermittent failure.

In most cases, Stack Manager heals itself automatically (see the following section). However, in some cases, manual healing is needed to ensure that the stack state matches its configuration.

Figure 3-29: Healing Stack



```
Healing stack
Stack is in 'running' state

Initializing AWS client... done
Checking all components that should be 'up'... done
Checking all media components that should be 'down'... done
Stopping components 'mc-5, mc-4, mc-3'.................. done
Checking that all media components have matching SBC configuration... done
Verifying that all media components are unlocked... done

Finished healing

Done
```

ce1

General

Name	ce1
Type	Mediant CE
Environment	AWS
State	running
IP Address	3.124.221.82
Manage via HTTPS	enable

Automatic Scaling

Automatic scaling	disable
Media utilization scale in threshold	> 250% free
Media utilization scale out threshold	< 100% free
DSP utilization scale in threshold	disabled
DSP utilization scale out threshold	disabled
Automatic scaling cool down time	900 sec

3.11.1 Automatic Healing

Stack Manager automatically triggers a *Heal* operation when it detects that an operation (e.g., *Scale In* or *Scale Out*) was interrupted.

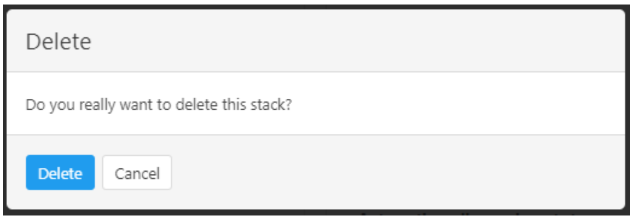
In addition to the above, for stacks that have Automatic Healing enabled, the operational state of all components is periodically monitored and *Stop, Start* or *Rebuild* operations are triggered if needed.

The automatic healing logs are collected in the *auto-job* log, which can be viewed through the Web or CLI management interfaces.

3.12 Deleting Stack

The *Delete* operation deletes the stack and releases all resources allocated during its creation.

Figure 3-30: Deleting a Stack



Delete

Do you really want to delete this stack?

3.13 Upgrading Software on Idle Media Components

Note: This section is applicable only to Mediant CE stacks.

Upgrading the MCs software is done through the Web interface (**Setup** > **IP Network** > **Cluster Manager Settings** > **Start Upgrade**), as described in the *Mediant Software User's Manual*. However, this is applicable only to "active" MCs.

To complete upgrade for "idle" MCs (that are in "stopped" state), click the **More** > **Update Idle MCs** button on the toolbar.

The operation temporarily starts "idle" MCs, waits until they complete software upgrade, and then shuts them down.

3.14 Rebuilding Stack

The *Rebuild* operation rebuilds specific stack components. The command is typically used when specific stack components stop operating correctly and their operation cannot be restored through regular backup/restore procedures.

Component names must be explicitly specified as the *Rebuild* operation parameter, for example:

- sc-1: Rebuilds the first SC instance
- mc-1,mc-2: Rebuilds the first two MC instances
- sc: Rebuilds all SC instances
- mc: Rebuilds all MC instances
- sbc-1: Rebuilds the first Mediant VE instance

The *Rebuild* operation deletes the corresponding virtual machines and creates new ones instead of them. Network interfaces are preserved and therefore, both private and public IP addresses remain unchanged.

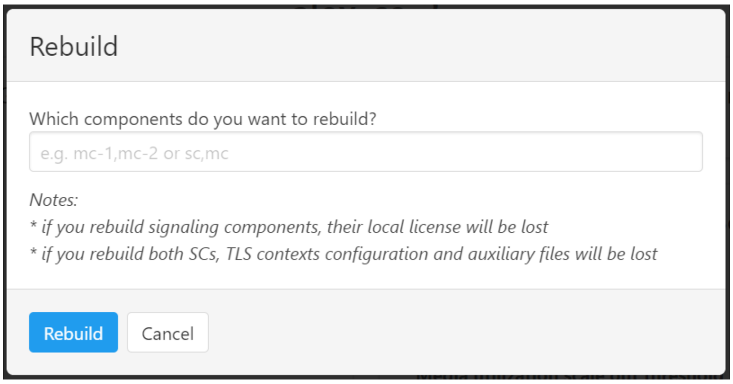
During the *rebuild* operation, the serial number of the rebuilt instances changes and therefore, their local license is lost. Obtain, activate and apply the new license to the rebuilt components to restore their service. Note that Media Components don't have a local license and therefore, this limitation doesn't apply to them.

The *Rebuild* operation uses a default Marketplace image for new instances initialization. As soon as these instances come up and establish connection with other cluster components, they automatically update their software version and align to the current stack configuration.

If you rebuild *both* Signalling Component of Mediant CE stack or all components of Mediant VE stack, the following parts of the SBC configuration will be lost and need to be manually restored from backup:

- TLS Contexts configuration (private key and certificates)
- Auxiliary files (e.g., Pre-recorded Tone files)

Figure 3-31: Rebuilding Stack



Rebuild

Which components do you want to rebuild?

e.g. mc-1,mc-2 or sc,mc

Notes:
** if you rebuild signaling components, their local license will be lost*
** if you rebuild both SCs, TLS contexts configuration and auxiliary files will be lost*

3.15 Upgrading Stack

The *Upgrade* operation upgrades all stack components, using a software load (CMP) file stored on some HTTP/HTTPS server.

It is especially useful for Mediant CE stacks, allowing upgrade via a single (although lengthy) operation, instead of the regular upgrade procedure that consists of the following steps:

- Upgrade Signaling Components: using the Software Upgrade wizard in Mediant CE's Web interface
- Upgrade "active" (currently running) Media Components: using the Cluster Management page in Mediant CE's Web interface
- Upgrade "idle" (currently stopped) Media Components: using Stack Manager, as described in Section 3.13

Note: The *Upgrade* operation does not support transition between software loads based on different OS versions (e.g., from software load based on CentOS 6 to a load based on CentOS 8). This is because such upgrade requires the use of a different image and can't be performed using a CMP file. Use the *Modify* and *Update* operations instead to perform such a transition. Refer to the *Mediant VE / CE Installation Manuals* for detailed instructions.

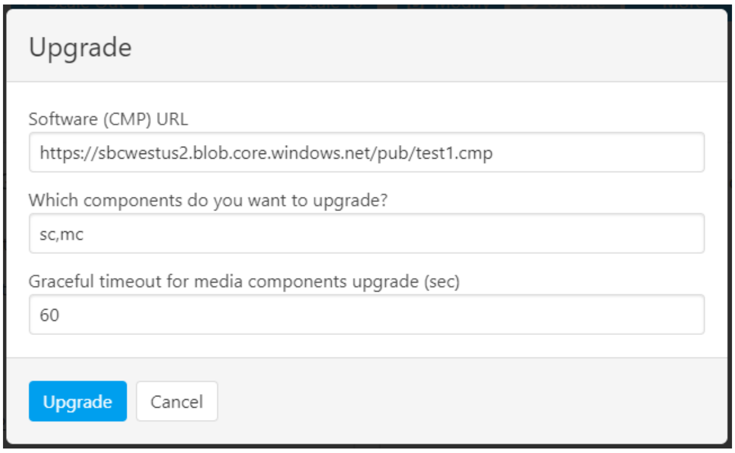
The *Upgrade* operation requires a software load (CMP) file to be available on some HTTP/HTTPS server and accessible by both Stack Manager and Mediant VE/CE stack components. You would typically use cloud-native storage services (e.g., AWS S3 or Azure Storage) for this purpose. Each Mediant VE/CE component accesses the specified URL directly, using its management interface. Therefore, you need to make sure that your network topology and security rules allow such access.

You may optionally specify which components you want to upgrade:

- sc: upgrades Signaling Components
- mc: upgrades Media Components
- sc,mc: upgrades all components

You may also specify a graceful timeout for Media Components upgrade, during which new calls will not be allocated to the Media Components, but existing calls will be allowed to end prior to starting the upgrade. Note that this value affects the total upgrade time and therefore, it is recommended to set it to a relatively low value.

Figure 3-32: Upgrading Stack



Upgrade

Software (CMP) URL: https://sbcwestus2.blob.core.windows.net/pub/test1.cmp

Which components do you want to upgrade?: sc,mc

Graceful timeout for media components upgrade (sec): 60

3.16 Stack Deployment Details

This section describes the methods that Stack Manager uses to deploy stacks in different virtualization environments. Understanding these details allows you to monitor stack behavior using the virtualization environment's management interfaces (e.g., AWS dashboard) and to troubleshoot various abnormal scenarios. It is also needed to alter some stack configuration, as described in Section 3.16.2, Adjusting Security Groups.

3.16.1 Use of Native Cloud Orchestration

Stack Manager uses native cloud orchestration services to perform stack deployment. This simplifies deployment of multiple stack components and provides tracking for all resources that correspond to the specific stack. Specifically the following services are used:

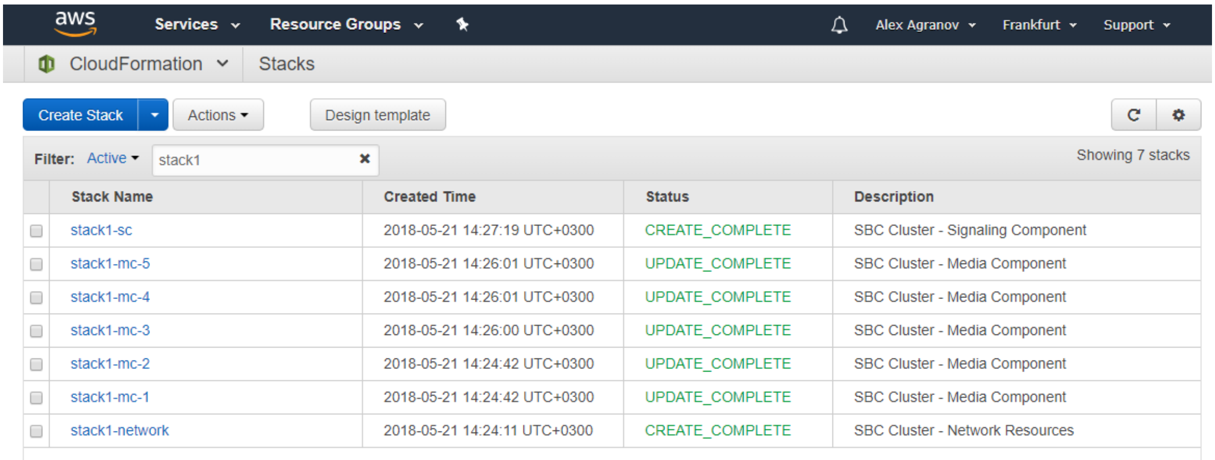
Virtual Environment	Orchestration Service
Amazon Web Services (AWS)	Cloud Formation
Microsoft Azure	Azure Resource Manager
Google Cloud	Deployment Manager
OpenStack	Heat Orchestration Service

In AWS, Google Cloud and OpenStack, multiple orchestration templates are used per Mediant CE stack instance:

- **<stack_name>-network:** Creates security groups and the cluster interface of SCs
- **<stack_name>-sc:** Creates SC instance(s)
- **<stack_name>-mc-N:** Creates MC instance mc-N (where *N* is 1, 2, etc.)

In Azure, the single Resource Group <stack_name> is used and all Mediant CE stack resources are placed into it.

Figure 3-33: Cloud Formation Templates in AWS Environment



Stack Name	Created Time	Status	Description
stack1-sc	2018-05-21 14:27:19 UTC+0300	CREATE_COMPLETE	SBC Cluster - Signaling Component
stack1-mc-5	2018-05-21 14:26:01 UTC+0300	UPDATE_COMPLETE	SBC Cluster - Media Component
stack1-mc-4	2018-05-21 14:26:01 UTC+0300	UPDATE_COMPLETE	SBC Cluster - Media Component
stack1-mc-3	2018-05-21 14:26:00 UTC+0300	UPDATE_COMPLETE	SBC Cluster - Media Component
stack1-mc-2	2018-05-21 14:24:42 UTC+0300	UPDATE_COMPLETE	SBC Cluster - Media Component
stack1-mc-1	2018-05-21 14:24:42 UTC+0300	UPDATE_COMPLETE	SBC Cluster - Media Component
stack1-network	2018-05-21 14:24:11 UTC+0300	CREATE_COMPLETE	SBC Cluster - Network Resources

Once all components are created, Stack Manager manages their state — specifically the state of MCs – by stopping and starting corresponding instances. Instances that correspond to "active" MCs are "started" and are expected to be in the "running" state. Instances that correspond to "inactive" MCs are "stopped" and are expected to be in the "stopped" state.

Stack Manager implements the *Update* command by changing the corresponding orchestration template and issuing *Update* to the specific native stack.

3.16.2 Adjusting Security Groups

Note: This section is not applicable to Google Cloud environment where Firewall Rules are defined at subnet level and are not managed by Stack Manager.

Stack Manager creates Security Groups required for normal Mediant VE/CE operation during stack creation. A list of allowed inbound ports is specified via "Management ports" and "Signaling ports" configuration parameters during stack creation.

If you need to adjust this configuration after the stack is created, for example, to allow signaling traffic on additional ports, use the *Modify* operation to change these configuration parameters and then *Update* to apply the changes.

For additional information and for a detailed list of rules in each Security Group, refer to *Mediant Virtual Edition for AWS/Azure/Google Installation Manual* and to *Mediant Cloud Edition Installation Manual.*

3.16.3 Using Pre-Defined Public IP Addresses

Stack Manager assigns Public (Elastic/External/Floating) IP addresses to deployed components based on the **Public IPs** configuration parameter and **sc_public_ips, mc_public_ips** and **public_ips** advanced configuration parameters, as described in Section 3.3.8, Advanced Configuration.

By default, it allocates new Public IP addresses and assigns them to the instances.

If you want to use pre-defined Public IP addresses instead, you need to add the following parameters to stack's Advanced Config section:

```
public_ip_<component name>_<interface name> = <ID>
```

where:

- <component name> is the name of the component to which you want to assign pre-defined Elastic IP address. Valid component names are:
  - **Mediant CE:** "sc", "mc-1", "mc-2", etc
  - **Mediant VE:** skip the `<component_name>` part and specify `public_ip_<interface_name>` instead
- <interface name> is the name of the network interface to which you want to assign pre-defined Elastic IP addresses; for example "eth0", "eth1", etc.
- <ID> is the environment-specific Public IP address identifier:
  - AWS: Allocation ID of pre-defined Elastic IP address
  - Azure: Resource Group/Name of pre-defined Public IP address
  - Google and OpenStack: Pre-defined external/floating IP address

For example:

```
AWS:
  public_ip_sc_eth1 = eipalloc-461b3468
  public_ip_mc-1_eth1 = eipalloc-37818019
  public_ip_mc-2_eth1 = eipalloc-f51f1edb
Azure:
  public_ip_sc_eth1 = Ce1ResourceGroup/ScPublicIP
  public_ip_mc-1_eth1 = Ce1ResourceGroup/Mc1PublicIP
```

Stack Manager uses pre-defined Public IP addresses for all user-defined components/interfaces as per the above configuration and allocates new Public IP addresses for all the rest.

3.16.4 Using Pre-Defined Private IP Addresses

Stack Manager assigns Private IP addresses to deployed components based on configured network interfaces and **sc_additional_ips**, **mc_additional_ips** and **additional_ips** advanced configuration parameters, as described in Section 3.3.8, Advanced Configuration.

By default, IP addresses are dynamically allocated from the corresponding subnets.

If you want to specify static private IP addresses instead, you can add the following parameters to the stack configuration file:

```
private_ip_<component name>_<interface name> = <private IPs>
```

where:

- <component name> is the name of the component to which you want to assign pre-defined private IP addresses. Valid component names are:
  - **Mediant CE:** "sc-1", “sc-2”, "mc-1", "mc-2", etc. For Azure, you can also use the "sc" component name to specify a pre-defined private IP address for the Internal Load Balancer.
  - **Mediant VE:** “sbc-1”, “sbc-2”
- <interface name> is the name of the network interface to which you want to assign pre-defined private IP addresses for example “eth0”, “eth1”, etc.
- <private IPs> is a comma-separated list of private IP addresses. The first address is the primary address while additional addresses are secondary addresses.

The **private_ip_...** configuration parameter must specify *all* private IP addresses on the specific network interface of the specific instance. It’s impossible to configure some IP addresses of the network interface statically and allocate others dynamically.

Adhere to the following rules when using the **private_ip_...** configuration parameter:

- **AWS:**
  - For "sc-1":
    - "eth0" must have two IP addresses.
    - Other interfaces must have two IP addresses plus additional IP addresses, as specified by **sc_public_ips** and **sc_additional_ips**.
  - For "sc-2":
    - All interfaces must have one IP address.
  - For "mc-1", "mc-2" etc.:
    - "eth0" must have one IP address.
    - Other interfaces must have one IP address plus additional IP addresses, as specified by **mc_public_ips** and **mc_additional_ips**.
- **Azure:**
  - For "sc-1" and "sc-2":
    - "eth0" must have two IP addresses.
    - Other interfaces must have one IP address plus additional IP addresses, as specified by **sc_public_ips** and **sc_additional_ips**.
  - For "sc":
    - Applicable only to configurations that use an Internal Load Balancer.
    - Specified IP address is assigned to the Internal Load Balancer interface.

        - One IP address must be specified.
    - For "mc-1", "mc-2" etc.:
        - "eth0" must have one IP address.
        - Other interfaces must have one IP address plus additional IP addresses, as specified by **mc_public_ips** and **mc_additional_ips**.
- **Google Cloud:**
    - For "sc-1" and "sc-2":
        - "eth0" must have one IP address.
        - "eth1" must have two IP addresses.
    - For "mc-1", "mc-2" etc.:
        - "eth1" must have one IP address.
        - Other interfaces must have one IP address plus additional IP addresses, as specified by **mc_public_ips** and **mc_additional_ips**.
- **OpenStack:**
    - For "sc-1":
        - "eth0" must have two IP addresses.
        - Other interfaces must have one IP address plus additional IP addresses, as specified by **sc_additional_ips**.
    - For "sc-2":
        - All interfaces must have one IP address.
    - For "mc-1", "mc-2" etc.:
        - "eth0" must have one IP address.
        - Other interfaces must have one IP address plus additional IP addresses, as specified by **mc_additional_ips**.

For example:

```
private_ip_sc-1_eth0 = 172.31.128.1,172.31.129.1
private_ip_sc-1_eth1 = 172.31.68.1,172.31.69.1
private_ip_sc-1_eth2 = 172.31.78.1,172.31.79.1

private_ip_sc-2_eth0 = 172.31.128.2
private_ip_sc-2_eth1 = 172.31.68.2
private_ip_sc-2_eth2 = 172.31.78.2

private_ip_mc-1_eth0 = 172.31.128.101
private_ip_mc-1_eth1 = 172.31.68.101
private_ip_mc-1_eth2 = 172.31.78.101

private_ip_mc-2_eth0 = 172.31.128.102
private_ip_mc-2_eth1 = 172.31.68.102
private_ip_mc-2_eth2 = 172.31.78.102
```

4 CLI Interface

4.1 Accessing CLI Interface

Stack Manager’s CLI is accessed by switching to the *stack_mgr* user, using the following command:

```
$ stack_mgr_cli
```

If the above command doesn’t work, use the following alternative command to do the same:

```
$ sudo su - stack_mgr
```

4.2 Invocation

Most of the Stack Manager CLI is provided using the **stack_mgr** command.

Auto-completion is available for sub-commands and optional parameters.

4.3 Usage Information

Brief usage information is provided by running the **stack_mgr** command without arguments:

```
$ stack_mgr

usage: stack_mgr [-h] [--version]
                 {create,delete,list,show,scale-out,scale-in,
                  scale,heal,auto-scale,auto-job,modify,
                  update,stop,start,upgrade,rebuild,purge,
                  configure,log}
                 ...
```

More detailed usage information is provided when '-h' or '--help' arguments are specified:

```
$ stack_mgr --help

usage: stack_mgr [-h] [--version]
                 {create,delete,list,show,scale-out,scale-in,
                  scale,heal,auto-scale,auto-job,modify,
                  update,stop,start,upgrade,rebuild,purge,
                  configure,log}
                 ...

AudioCodes Stack Manager

positional arguments:
  {create,delete,list,show,scale-out,scale-in,scale,heal,auto-
scale,auto-job,modify,update,stop,start,upgrade,
rebuild,purge,configure,log}
    create              create stack
    delete              delete stack
    list                list stacks
    show                show stack
    scale-out           scale out stack
    scale-in            scale in stack
    scale               scale stack
    heal                heal stack
    auto-scale          auto-scale stack
    auto-job            automatic job
    modify              modify stack configuration
    update              update stack
    stop                stop stack
    start               start stack
    upgrade             upgrade stack
    rebuild             rebuild stack components
    purge               purge stack
    configure           stack manager configuration
    log                 show logs

optional arguments:
  -h, --help            show this help message and exit
  --version             show program's version number and exit
```

4.4 Global Configuration

The **configure** command performs Stack Manager configuration:

```
$ stack_mgr configure --help
usage: stack_mgr configure [-h] [--aws-access-key ACCESS_KEY]
                           [--aws-secret-key SECRET_KEY]
                           [--aws-s3-bucket BUCKET]
                           [--aws-verify]
                           [--name-prefix PREFIX]
                           [--rest-api-username USERNAME]
                           [--rest-api-password PASSWORD]
                           [--monitor-username USERNAME]
                           [--monitor-password PASSWORD]
                           [--debug-log {enable,disable}]
                           [--azure-tenant-id ID]
                           [--azure-client-id ID]
                           [--azure-secret SECRET]
                           [--azure-subscription-id ID]
                           [--azure-blob-account-name NAME]
                           [--azure-blob-account-key KEY]
                           [--azure-blob-sas-token TOKEN]
                           [--azure-blob-container CONTAINER]
                           [--azure-verify]
                           [--openstack-cloud-name NAME]
                           [--openstack-container CONTAINER]
                           [--openstack-verify]
                           [--google-credentials CREDENTIALS]
                           [--google-project PROJECT]
                           [--google-storage-bucket BUCKET]
                           [--google-storage-prefix PREFIX]
                           [--google-verify]

optional arguments:
  -h, --help      show this help message and exit
  --aws-access-key AWS_ACCESS_KEY
                  AWS access key
  --aws-secret-key AWS_SECRET_KEY
                  AWS secret key
  --aws-s3-bucket AWS_S3_BUCKET
                  AWS S3 bucket name
  --aws-verify    Verify access to AWS API
  --name-prefix NAME_PREFIX
                  Prefix to be assigned to stacks and instances
  --rest-api-username REST_API_USERNAME
                  REST API username
  --rest-api-password REST_API_PASSWORD
                  REST API password
  --monitor-username MONITOR_USERNAME
                  Web monitor username
  --monitor-password MONITOR_PASSWORD
                  Web monitor password
  --debug-log {enable,disable}
                  debug log
  --azure-tenant-id AZURE_TENANT_ID
                  Azure tenant id
  --azure-client-id AZURE_CLIENT_ID
                  Azure client id
  --azure-secret AZURE_SECRET
                  Azure secret
  --azure-subscription-id AZURE_SUBSCRIPTION_ID
                  Azure subscription id
  --azure-blob-account-name AZURE_BLOB_ACCOUNT_NAME
                  Azure blob account name
  --azure-blob-account-key AZURE_BLOB_ACCOUNT_KEY
                  Azure blob account key
  --azure-blob-sas-token AZURE_BLOB_SAS_TOKEN
                  Azure blob SAS token
  --azure-blob-container AZURE_BLOB_CONTAINER
                  Azure blob container
  --azure-verify  Verify access to Azure API
  --openstack-cloud-name OPENSTACK_CLOUD_NAME
                  Openstack cloud name
  --openstack-container OPENSTACK_CONTAINER
                  Openstack container name
  --openstack-verify
                  Verify access to OpenStack API
  --google-credentials GOOGLE_CREDENTIALS
                  Google application credentials
  --google-project GOOGLE_PROJECT
                  Google project name
  --google-storage-bucket GOOGLE_STORAGE_BUCKET
```

```
                  Google storage bucket name
  --google-storage-prefix GOOGLE_STORAGE_PREFIX
                  Google storage file prefix
  --google-verify Verify access to Google API
```

To show current configuration, use the command without any arguments.

To update a specific configuration parameter(s), use the command with arguments.

4.5 Listing Available Stacks

The **list** command lists available stacks.

```
$ stack_mgr list --help
usage: stack_mgr list [-h] [--no-status]

optional arguments:
  -h, --help        show this help message and exit
  --no-status       do not show real-time status
```

```
$ stack_mgr list

+--------+-------------+-----+---------------+----------------+
|  name  | type        | vim | state         | ip             |
+--------+-------------+-------+-------------+----------------+
| stack1 | sbc-cluster | azure | running     | 51.143.59.195  |
| stack2 | sbc-cluster | azure | scaling-out | 51.143.61.128  |
+--------+-------------+-------+-------------+----------------+
```

4.6 Creating a New Stack

Creation of a new stack through CLI consists of the following steps:

1. Creating the stack configuration file, which can be done using one of the following methods:
    - SBC Cluster Configuration Tool (recommended) – see Section 4.6.1, Creating Stack Configuration File via SBC Cluster Configuration Tool (Recommended Method) for more information
    - Manually, by editing provided reference files – see Section 4.6.2, Creating Stack Configuration File Manually (Alternative Method) for more information
2. Creating the stack by the **create** command.

The stack configuration file contains configuration parameters of the created stack. The same configuration file can be used to create multiple stacks.

4.6.1 Creating Stack Configuration File via SBC Cluster Configuration Tool (Recommended Method)

The SBC Cluster Configuration Tool provides a simple interactive user interface (UI) for creating the configuration file.

- To create the stack configuration file for Mediant CE, type **sbc_cluster_config**
- To create the stack configuration file for Mediant VE, type **sbc_config**

You are prompted for the basic Mediant VE/CE configuration parameters, and a new configuration file will be created. You may use this file to create the Mediant VE/CE instance using the **`stack_mgr create`** command, as described in Section 4.6.3, Creating a New Stack. It is recommended to review the created file prior to the instance creation and modify it if needed.

Note: The following output is provided as an example only and therefore, may not be up to date.

```
$ sbc_cluster_config
------------------------------
SBC Cluster Configuration Tool
------------------------------

This tool creates configuration file that may be used to create
the Mediant CE cluster via "stack_mgr create" command.


Enter configuration file name: stack1.cfg



Virtual environments:
+---+-----------+
| # | vim       |
+---+-----------+
| 1 | aws       |
| 2 | azure     |
| 3 | google    |
| 4 | openstack |
+---+-----------+

Choose virtual environment: 1



List of AWS regions:
```

```
+----+-----------------+
| #  | name            |
+----+-----------------+
| 1  | ap-south-1      |
| 2  | ap-northeast-2 |
| 3  | ap-southeast-1 |
| 4  | ap-southeast-2 |
| 5  | ap-northeast-1 |
| 6  | ca-central-1    |
| 7  | eu-central-1    |
| 8  | eu-west-1       |
| 9  | eu-west-2       |
| 10 | eu-west-3       |
| 11 | eu-north-1      |
| 12 | sa-east-1       |
| 13 | us-east-1       |
| 14 | us-east-2       |
| 15 | us-west-1       |
| 16 | us-west-2       |
+----+-----------------+

Choose region: 7



List of AWS VPCs:
+---+-----------------------+----------------+------------------+
| # | id                    | name           | cidr block       |
+---+-----------------------+----------------+------------------+
| 1 | vpc-45f3152c          | DefaultVPC     | 172.31.0.0/16    |
| 2 | vpc-39d23352          | TestVPC        | 172.16.138.0/24 |
+---+-----------------------+----------------+------------------+

Choose VPC: 1



Key pair is used to provide secure access to the Mediant CE's CLI
interface
via SSH protocol. It is mandatory for AWS environment even though
SBC in its
default configuration supports SSH login using username/password.

+----+-------------------------+
| #  | name                    |
+----+-------------------------+
| 1  | infra-key               |
| 2  | sbc-ssh-key             |
| 3  | test-key                |
+----+-------------------------+

Choose key pair: 2
```

```
You must create IAM role that allows SBC to manage its IP
addresses.
The role must look as follows:
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Action": [
                "ec2:AssignPrivateIpAddresses",
                "ec2:UnassignPrivateIpAddresses",
                "ec2:AssociateAddress",
                "ec2:DescribeAddresses",
                "ec2:DescribeNetworkInterfaceAttribute",
                "ec2:DescribeNetworkInterfaces"
            ],
            "Effect": "Allow",
            "Resource": "*"
        }
    ]
}
Refer to the Mediant CE Installation Manual for additional
information.

Enter IAM role: SBC-HA-3



Mediant CE components may have 2, 3 or 4 network interfaces that
are connected as follows:

+-------+-------------+---------------------------------------+
| iface | subnet      | traffic                               |
+-------+-------------+---------------------------------------+
| eth0  | cluster     | internal cluster communication        |
| eth1  | main        | management (HTTP, SSH) + signaling    |
|       |             | SIP) + media (RTP)                    |
| eth2  | additional1 | signaling (SIP) + media (RTP)         |
| eth3  | additional2 | signaling (SIP) + media (RTP)         |
+-------+-------------+---------------------------------------+

Enter number of network interfaces (2, 3 or 4): 3



In order to communicate with signaling components from outside the
AWS cloud Elastic IP addresses must be assigned to the relevant
network interfaces.
```

```
Provide comma-separated list of SC network interfaces that will be
assigned with Elastic IP addresses. Specify interface by
corresponding subnet name.
For example: "main" or "main,additional1"

Notes:
  - if you want to access management interface via Internet
    assign Elastic IP to "main" interface
  - if all management and signaling communication happens
    inside the VPC and therefore you do not need Elastic IPs,
    press Enter to continue

Enter value: main



In order to communicate with media components from outside the AWS
cloud Elastic IP addresses must be assigned to the relevant
network interfaces.

Provide comma-separated list of MC network interfaces that will be
assigned with Elastic IP addresses. Specify interface by
corresponding subnet name.
For example: "main" or "main,additional1"

Notes:
  - if all media communication happens inside the VPC and
    therefore you do not need Elastic IPs, press Enter to
    continue

Enter value: main



Cluster subnet carries internal traffic between SBC cluster
components and is used for accessing AWS API. It must support
outbound access to EC2 API - either via private EC2 API endpoint
or via NAT Gateway configured as default route (refer to Mediant
CE Installation Manual for additional information). Use dedicated
subnet and protect it from unauthorized access.

+---+-------------+---------+-----------------+-----------------+
| # | id          | name    | cidr range      | avail zone      |
+---+-------------+---------+-----------------+-----------------+
| 1 | subnet-5d2d | voip2   | 172.31.224.0/20 | eu-central-1b   |
| 2 | subnet-ec6c | test    | 172.31.144.0/20 | eu-central-1b   |
| 3 | subnet-09a2 | cluster | 172.31.80.0/20  | eu-central-1b   |
| 4 | subnet-7c73 |         | 172.31.16.0/20  | eu-central-1a   |
| 5 | subnet-4e08 |         | 172.31.32.0/20  | eu-central-1c   |
| 6 | subnet-1538 | oam     | 172.31.64.0/20  | eu-central-1b   |
| 8 | subnet-fb63 | voip1   | 172.31.0.0/20   | eu-central-1b   |
+---+-------------+---------+-----------------+-----------------+
Cluster subnet: 3



Main subnet carries management (HTTP, SSH, etc), signaling (SIP)
and media (RTP) traffic.

+---+-------------+---------+-----------------+-----------------+
| # | id          | name    | cidr range      | avail zone      |
+---+-------------+---------+-----------------+-----------------+
| 1 | subnet-5d2d | voip2   | 172.31.224.0/20 | eu-central-1b   |
| 2 | subnet-ec6c | test    | 172.31.144.0/20 | eu-central-1b   |
| 3 | subnet-09a2 | cluster | 172.31.80.0/20  | eu-central-1b   |
| 4 | subnet-1538 | oam     | 172.31.64.0/20  | eu-central-1b   |
| 5 | subnet-fb63 | voip1   | 172.31.0.0/20   | eu-central-1b   |
+---+-------------+---------+-----------------+-----------------+


Main subnet: 4



Additional subnets (additional1, additional2) carry signaling
(SIP) and media (RTP) traffic. It is possible to specify the same
Subnet ID for both Main and additional subnets - in this case
Mediant CE components will have multiple network interfaces (ENIs)
connected to the same subnet.

+---+-------------+---------+-----------------+-----------------+
| # | id          | name    | cidr range      | avail zone      |
+---+-------------+---------+-----------------+-----------------+
| 1 | subnet-5d2d | voip2   | 172.31.224.0/20 | eu-central-1b   |
| 2 | subnet-ec6c | test    | 172.31.144.0/20 | eu-central-1b   |
| 3 | subnet-09a2 | cluster | 172.31.80.0/20  | eu-central-1b   |
| 4 | subnet-1538 | oam     | 172.31.64.0/20  | eu-central-1b   |
| 5 | subnet-fb63 | voip1   | 172.31.0.0/20   | eu-central-1b   |
+---+-------------+---------+-----------------+-----------------+

Additional subnet: 5



Instance type of Signaling Components (SC) is r4.2xlarge.
Instance type of Media Components (MC) depends on their profile.

+---+-------------+---------------+
| # | mc profile  | instance type |
+---+-------------+---------------+
| 1 | forwarding  | r4.large      |
| 2 | transcoding | c4.4xlarge    |
+---+-------------+---------------+
Choose media components profile: 1



The size of the cluster, and specifically the number of media
components, may vary to match the required service capacity. This
ensures that the cluster utilizes optimal amount of resources at
any point of time and elastically scales on demand.

The scaling decision may be done either manually - by executing
'scale-in' or 'scale-out' commands - or automatically based on the
current cluster utilization.

The size of the cluster is controlled by the following two
parameters:
  * Minimum Number of Media Components
  * Maximum Number of Media Components
To ensure the fast scaling, Stack Manager pre-creates all needed
media components in advance (up to the maximum number) and
stops/starts them accordingly during scale in/out operations.

Minimum Number of Media Components (0-21): 3
Maximum Number of Media Components (3-21): 5



Credentials for management interface.

Username: sbcadmin
Password: ********
Retype password: ********



Creating configuration file stack1.cfg
Done
```

Note: When selecting the region, VPC, subnets and other listed objects, enter either a corresponding row number (e.g., "1") or an Object ID (e.g., "vpc-45f3152c").

4.6.2 Creating Stack Configuration File Manually (Alternative Method)

As an alternative to running the SBC Cluster Configuration Tool (described in the previous section), you can create the stack configuration file manually by copying it from the */opt/stack_mgr/cfg* directory and then modifying it using a text editor tool.

You can edit the copied file in one of the following ways:

- On the server itself, by using, for example, a "vi" or "nano" editor:

```
$ cp /opt/stack_mgr/cfg/sbc-cluster-aws.cfg stack1.cfg
$ vi stack1.cfg
```

- By transferring the copied file from the server through SFTP/SCP to a computer, modifying it using a standard text editor (e.g., Notepad), and then transferring it back to the server.

When you create the stack configuration file manually, make sure that the following parameters are updated:

- **Amazon Web Services (AWS):**
  - **aws_region**: Defines the AWS region where the Mediant CE stack will be deployed.
  - **vpc_id**: Defines the VPC where the Mediant CE stack will be deployed**.**
  - ***_subnet_id**: Defines the subnet IDs for all applicable subnets.
  - **ssh_key_pair**: Defines the SSH key pair for connecting to the Mediant CE CLI.
  - ***_image_id**: Defines the AMI ID of the local copy of the Mediant VE/CE image.
  - **sc_iam_role**: Defines the SBC IAM Role name. Refer to the *Mediant Cloud Edition Installation Manual* for detailed instructions on how to create this role.
- **Microsoft Azure:**
  - **location**: Defines the Azure location where the Mediant CE stack will be deployed.
  - **vnet_id**: Defines the Virtual Network where the Mediant CE stack will be deployed**.**
  - ***_subnet_id**: Defines the subnet name for all applicable subnets.
- **Google Cloud:**
  - **region**: Defines the Google Cloud region where the Mediant CE stack will be deployed.
  - ***_subnet_id**: Defines the subnet name for all applicable subnets.
  - ***_image_id**: Defines the Image ID of the Mediant VE/CE image.
- **OpenStack:**
  - ***_subnet_id**: Defines the subnet name for all applicable subnets.
  - ***_image_id**: Defines the image name of the Mediant VE/CE image.
  - ***_instance_type**: Defines the flavor of the Mediant CE instances.

4.6.2.1 Sample Configuration File

The following is a sample configuration file for Mediant CE in the AWS cloud:

> **Note:** The file is provided as an example only and therefore, may not be up to date. Use files from the */opt/stack_mgr/cfg* directory when creating a new stack configuration file.

```
# ----------------
# Stack descriptor
# ----------------

# stack type
stack_type = sbc-cluster

# virtual infrastructure manager
vim = aws


# ------------------
# Generic parameters
# ------------------

# Initial cluster size
mc_num = 2

# Minimal cluster size
min_mc_num = 2

# Maximum cluster size
max_mc_num = 5


# --------------------------
# Auto-scaling configuration
# --------------------------

# Auto-scaling - enable/disable
auto_scale = disable

# Media utilization scale in threshold - in accumulative free
# percentage points (when auto-scaling is enabled and total
# amount of free resources in the cluster raises above this
# threshold, scale-in is triggered)
media_util_scale_in_threshold = 250

# Media utilization scale out threshold - in accumulative free
# percentage points (when auto-scaling is enabled and total
# amount of free resources in the cluster falls below this
# threshold, scale-in is triggered)
```

```
media_util_scale_out_threshold = 100

# DSP utilization scale in threshold - in accumulative free
# percentage points  (when auto-scaling is enabled and total
# amount of free resources in the cluster raises above this
# threshold, scale-in is triggered)
dsp_util_scale_in_threshold = 0

# DSP utilization scale out threshold - in accumulative free
# percentage points (when auto-scaling is enabled and total
# amount of free resources in the cluster falls below this
# threshold, scale-in is triggered)
dsp_util_scale_out_threshold = 0

# Auto-scaling cool down time in seconds
# (minimum time between two consecutive 'opposite' auto-scaling
# operations, e.g., scale-out after scale-in)
auto_scale_cooldown_time = 900

# Auto-scaling scale-in step
# (number of media instances to be removed)
auto_scale_in_step = 1

# Auto-scaling scale-out step
# (number of media instances to be added)
auto_scale_out_step = 1


# ---------------------
# Network configuration
# ---------------------

# AWS region name
# (use 'aws ec2 describe-regions' command to find all
# available regions)
aws_region = eu-central-1

# VPC where stack is deployed
vpc_id = vpc-45f3152c

# SBC cluster requires the following subnets:
#   - cluster     - used for internal communication between
#                   cluster nodes
#   - main        - used for management (HTTP, SSH), signaling
#                   (SIP) and media (RTP) traffic
#   - additional1 - (optional) used for signaling (SIP) and
#                    media (RTP) traffic
#   - additional2 - (optional) used for signaling (SIP) and
#                    media (RTP) traffic
#
# Notes:
```

```
#   - during normal cluster operation only active Signaling
#     component (SC) is accessed for management purposes (Web /
#     CLI / SNMP / REST)
#
# It is perfectly fine to specify the same value for all below
# subnet_ids  except for cluster_subnet_id.

cluster_subnet_id = subnet-be6e8bc3
main_subnet_id = subnet-1536d368
additional1_subnet_id =
additional2_subnet_id =

# Key Pair provides secure access to the SBC cluster's
# CLI interface via SSH protocol. It is mandatory for the AWS
# environment even though SBC in its default configuration
# supports SSH login using username/password.
ssh_key_pair = aws_ssh_frankfurt_1


# --------------------------------------
# Signaling Component (SC) configuration
# --------------------------------------

# 1+1 HA mode - enable / disable
sc_ha_mode = enable

# Signaling Components (SC) network interfaces are connected
# as follows:
#   - eth0: cluster
#   - eth1: main
#   - eth2: additional1
#   - eth3: additional2
#
# At least two network interfaces are required.
# Notes:
#   - Primary IP addresses are not used except for "eth0" (cluster
#     interface). Secondary IP addresses are used instead and
#     'float' across the two SC instances (in HA configuration).

# Number of network interfaces - valid values: 2, 3, 4
sc_num_of_interfaces = 2

# Comma-separated list of network interfaces will be assigned
# with Public IP addresses (Elastic IPs) and optionally number of
# corresponding public IP addresses.
# Network interfaces are specified by corresponding subnet name
# (main, additional1, additional2) or by interface name (ethX –
# deprecated)
# For example:
#   "main,additional1"   - assign one public IP address to
#                          interfaces connected to Main and
#                          1st Additional subnets
#   "main:2"             - assign two public IP addresses to
#                          interface connected to Main subnet
#   "main:2,additional1" - assign two public IP addresses to
#                          interface connected to Main subnet
#                          and one public IP address to interface
#                          connected to 1st Additional subnet
# Notes:
#   - if you need to access SBC management interface via Internet
#     assign Public IP to interface connected to Main subnet
#   - if all management and signaling communication happens inside
#     the VPC and therefore you do not need Public IPs, leave
#     this field blank
sc_public_ips = main

# Comma-separated list of network interfaces that will be assigned
# with additional private IP address and optionally, number of
# corresponding additional private IP addresses
#
# Network interfaces are specified by corresponding subnet name
# (main, additional1, additional2) or by interface name (ethX -
# deprecated)
# For example:
#   "main,additional1"   - assign one additional private IP
#                          address to interfaces connected to
#                          Main and 1st Additional subnets
#   "main:2"             - assign two additional private IP
#                          addresses to interface connected to
#                          Main subnet
#   "main:2,additional1" - assign two additional private IP
#                          addresses to interface connected to
#                          Main subnet and one additional
#                          private IP address to interface
#                          connected to 1st Additional subnet
sc_additional_ips =

# AWS instance type
# (recommended type is r4.2xlarge)
sc_instance_type = r4.2xlarge

# AWS image id
# If empty, Marketplace image is used (default)
# For custom image, specify AMI ID (e.g. ami-9a50cff5)
sc_image_id =

# AWS IAM role that allows SC components to automatically
# configure network interfaces and perform activity switchover
sc_iam_role = SBC-HA-3

# URL of initial SBC cluster configuration file
# For example: "https://s3-eu-central-1.amazonaws.com/ac/sc.ini"
# If you don't have such URL, leave value blank
sc_ini_file_url =

# Configuration file contains Admin user - true / false
# (change this to "false" if your configuration file doesn't
# contain WebUsers table and you want the Stack Manager to
# automatically create default Admin user).
sc_ini_file_contains_admin_user = true


# Comma-separated list of tags (name=value) to be assigned to
# Signaling Components
# For example:
#   sc_tags = type=sbc,role=sc
sc_tags =

# Names for HA configuration
sc1_ha_name = sc-1
sc2_ha_name = sc-2

# Additional Signaling Components configuration parameters
# If you need to add a few additional parameters to SC
# configuration file specify them here. Use \n as line delimiter.
# For example:
#   sc_ini_params = EnableSyslog = 1\nSyslogServerIP = 10.1.2.3
sc_ini_params =

# Comma-separated list of management ports and corresponding
# transport protocols (used to configure network security group).
# Each list element may be one of the following:
#   <port>/tcp        - e.g. 22/tcp
#   <port>/udp        - e.g. 161/udp
#   icmp              - all icmp
#   <code>/icmp       - e.g. 0/icmp
#   <port>/tcp/cidr   - e.g. 22/tcp/10.1.0.0/16
#   <port>/udp/cidr   - e.g. 161/udp/10.1.2.3/32
#   /icmp/cidr        - e.g. icmp/10.1.2.0/24
#   <code>/icmp/cidr - e.g. 0/icmp/10.1.2.0/24
sc_oam_ports = 22/tcp,80/tcp,443/tcp

# Comma-separated list of signaling ports and corresponding
# transport protocols (used to configure network security group).
# Each list element may be one of the following:
#   <port>/tcp        - e.g. 5061/tcp
#   <port>/udp        - e.g. 5060/udp
#   icmp              - all icmp
#   <code>/icmp       - e.g. 0/icmp
#   <port>/tcp/cidr   - e.g. 5061/tcp/10.1.0.0/16
#   <port>/udp/cidr   - e.g. 5060/udp/10.1.2.3/32
#   /icmp/cidr        - e.g. icmp/10.1.2.0/24
#   <code>/icmp/cidr - e.g. 0/icmp/10.1.2.0/24
```

```
sc_signaling_ports = 5060/udp,5060/tcp,5061/tcp


# ----------------------------------
# Media Component (MC) configuration
# ----------------------------------

# Media Components (MC) network interfaces are connected
# as follows:
#   - eth0: cluster
#   - eth1: main
#   - eth2: additional1
#   - eth3: additional2
#
# At least two network interfaces are required.
# Primary IP addresses are available on all interfaces.

# Number of network interfaces - valid values: 2, 3, 4
mc_num_of_interfaces = 2

# Comma-separated list of network interfaces will be assigned
# with Public IP addresses (Elastic IPs) and optionally number of
# corresponding public IP addresses.
# Network interfaces are specified by corresponding subnet name
# (main, additional1, additional2) or by interface name (ethX –
# deprecated)
# For example:
#   "main,additional1"   - assign one public IP address to
#                          interfaces connected to Main and
#                          1st Additional subnets
#   "main:2"             - assign two public IP addresses to
#                          interface connected to Main subnet
#   "main:2,additional1" - assign two public IP addresses to
#                          interface connected to Main subnet
#                          and one public IP address to interface
#                          connected to 1st Additional subnet
# Notes:
#   - if all media communication happens inside the VPC and
#     therefore you do not need Public IPs, leave this field
#     blank
mc_public_ips = main

# Comma-separated list of network interfaces that will be assigned
# with additional private IP address and optionally number of
# corresponding additional private IP addresses
#
# Network interfaces are specified by corresponding subnet name
# (main, additional1, additional2) or by interface name (ethX –
# deprecated)
# For example:
#   "main,additional1"   - assign one additional private IP
#                          address to interfaces connected to
#                          Main and 1st Additional subnets
#   "main:2"             - assign two additional private IP
#                          addresses to interface connected to
#                          Main subnet
#   "main:2,additional1" - assign two additional private IP
#                          addresses to interface connected to
#                          Main subnet and one additional
#                          private IP address to interface
#                          connected to 1st Additional subnet
mc_additional_ips =

# AWS instance type
# Recommended types are:
#   - r4.large for media forwarding
#   - c4.4xlarge for transcoding
mc_instance_type = r4.large

# AWS image id
# If empty, Marketplace image is used (default)
# For custom image, specify AMI ID (e.g. ami-9a50cff5)
mc_image_id =

# Media component profile - forwarding / transcoding
mc_profile = forwarding

# Media component max rate limit (in kpps)
# In addition to numeric values the following special string
# values are supported:
#   - "auto" means that PPS limit is automatically calculated
#     based on instance type
#   - "unlimited" means that no limit is imposed
mc_max_pps_limit = auto

# Comma-separated list of tags (name=value) to be assigned to
# media components
# For example:
#   mc_tags = type=sbc,role=mc
mc_tags =

# Additional Media Components configuration parameters
# If you need to add a few additional parameters to MC
# configuration file specify them here. Use \n as line delimiter.
mc_ini_params =


# ------------------------
# Additional configuration
# ------------------------

# Prefix to be added to all created components
# (note that there is also global stack_mgr configuration
# parameter with a similar name, but this one overrides it if
# set to non-empty value)
name_prefix =

# Manage SBC cluster via HTTPS or HTTP protocol - valid values:
# enable / disable
# (change this to Disable if, for example, your firewall
# intercepts HTTPS connections and blocks them due to self-signed
# certificate being used)
manage_via_https = enable
```

Sample configuration files for additional environments are available in the */opt/stack_mgr/cfg* directory.

4.6.3 Creating a New Stack

After creating the stack configuration file, use the **`create`** command to create a new stack.

Specify the stack name and provide the stack configuration file.

```
$ stack_mgr create --help
usage: stack_mgr create [-h] name cfg_file

positional arguments:
  name                  Name of the stack; may contain letters,
                        numbers and dash symbol only (spaces
                        are not allowed)
  cfg_file              configuration file

optional arguments:
  -h, --help            Show this help message and exit
```

Note: Prior to creating a Mediant CE stack instance(s), make sure that all pre-requisites specified in the *Mediant Cloud Edition Installation Manual* are met. The document can be downloaded from AudioCodes website at https://www.audiocodes.com/library/technical-documents.

The *create* process takes a few minutes and detailed progress information is displayed on the console:

```
$ stack_mgr create stack1 sbc-cluster.cfg
Initializing AWS client... done
Creating SBC network resources....................... done
Creating SBC media components............................ done
Creating SBC signaling components.................... done
Waiting until signaling components are ready............ done
Waiting until media components are ready.... done
Removing media components 'mc-3, mc-4, mc-5' from SBC
configuration
Removing media components 'mc-3, mc-4, mc-5'... done
Stopping components 'mc-3, mc-4, mc-5'........... done
```

```
Use http://52.58.15.164 to connect to the management interface.
Stack 'stack1' is successfully created
```

After the **create** command completes, you can connect to the Mediant CE's management interface through Web or SSH. The corresponding URL is shown in the summary following the stack creation.

Use the credentials provided in the stack configuration file to log in to the Mediant CE management interface.

4.7 Checking Stack State and Configuration

The **show** command displays detailed information about a specific stack.

You must specify a valid stack name.

```
$ stack_mgr show --help
usage: stack_mgr show [-h] name

positional arguments:
  name         name of the stack

optional arguments:
  -h, --help   show this help message and exit
  --no-status   do not show real-time status
  --idle-mcs    show 'idle' media components
```

```
$ stack_mgr show stack1

Name           : stack1
Type           : sbc-cluster
VIM            : aws
State          : idle

Created at     : May 09, 2018 08:55:29

Region         : eu-central-1
VPC            : vpc-45f3152c

--------------------
Signaling Components
--------------------

Instance type : r4.2xlarge
Image ID      :

+------+---------------+---------+------------+---------------+
| id   | IP address    | status  | type       | version       |
+------+---------------+---------+------------+---------------+
| sc-1 | 172.31.65.177 | active  | r4.2xlarge | 7.20A.252.274 |
| sc-2 |               | standby | r4.2xlarge | 7.20A.252.274 |
+------+---------------+---------+------------+---------------+

Network configuration:
```

```
+-----------+-------------+-----------------+---------+
| interface | subnet      | id              | status |
+-----------+-------------+-----------------+---------+
| eth0      | cluster     | subnet-be6e8bc3 | in-use |
| eth1      | oam         | subnet-1536d368 | in-use |
| eth2      | additional1 |                 |         |
| eth3      | additional2 |                 |         |
+-----------+-------------+-----------------+---------+
SC number of network interfaces       : 2
SC interfaces with public IPs         : all
SC interfaces with additional IPs     :


----------------
Media Components
----------------

Instance type  : r4.large
Image ID       :
Profile        : forwarding
Max rate limit : auto

+------+---------------+-----------+--------+------+----------+---
------------+
| id   | IP address    | status    | %media | %dsp | type     |
version       |
+------+---------------+-----------+--------+------+----------+---
------------+
| mc-1 | 172.31.69.170 | connected | 0      | -    | r4.large |
7.20A.252.274 |
| mc-2 | 172.31.76.92  | connected | 0      | -    | r4.large |
7.20A.252.274 |
+------+---------------+-----------+--------+------+----------+---
------------+

Number of media components            : 2
Connected media components            : 2
Free media resources                  : 200%
Free DSP resources                    : -

Network configuration:
+-----------+--------------+-----------------+---------+
| interface | subnet       | id              | status |
+-----------+--------------+-----------------+---------+
| eth0      | cluster      | subnet-be6e8bc3 | in-use |
| eth1      | oam          | subnet-1536d368 | in-use |
| eth2      | additional1  |                 |         |
| eth3      | additional2  |                 |         |
+-----------+--------------+-----------------+---------+
MC number of network interfaces       : 2
MC interfaces with public IPs         : all
MC interfaces with additional IPs     :
```

```
Min number of media components         : 2
Max number of media components         : 10

Automatic scaling                      : enable
Media utilization scale in threshold   : 250%
Media utilization scale out threshold  : 100%
DSP utilization scale in threshold     : 0 (disabled)
DSP utilization scale out threshold    : 0 (disabled)
Automatic scaling cool down time       : 900 sec
Automatic scaling scale-out step       : 1
Automatic scaling scale-in step        : 1

Management IP address                  : 52.58.15.164
Use HTTPS for cluster management       : enable
```

Unless the **--no-status** argument is specified, Stack Manager collects the following additional information:

- For SCs:
  - Runtime status (running/stopped), using the cloud-specific API
  - Active instance that currently holds the "public IP", using the cloud-specific API
- For MCs:
  - Runtime status (running/stopped), using the cloud-specific API
  - Connectivity status (connected/disconnected), using the SBC REST API
  - Media and DSP utilization, using the
  - SBC REST API

If the **--no-status** argument is specified or the Stack Manager fails to communicate with the SBC cluster, it displays an internal state of the component instead.

4.7.1 Checking Idle Media Components

The number and detailed status of MCs reported by the **`show`** command corresponds to the "active" (running) MCs. "Inactive" (stopped) MCs can be viewed by adding the **`--idle-mcs`** argument to the **`show`** command, or by using the virtual environment's (e.g., AWS EC2) dashboard – corresponding instances are in the "stopped" state.

```
$ stack_mgr show stack1 --idle-mcs

...
----------------
Media Components
----------------

Instance type  : r4.large
Image ID       : ami-d771563c
Profile        : forwarding
Max rate limit : auto
```

```
+------+---------------+-----------+--------+------+----------+
| id   | IP address    | status    | %media | %dsp | type     |
+------+---------------+-----------+--------+------+----------+
| mc-1 | 172.31.67.240 | connected | 0      | -    | r4.large |
| mc-2 | 172.31.67.15  | connected | 0      | -    | r4.large |
| mc-3 | 172.31.70.66  | down      | -      | -    | r4.large |
| mc-4 | 172.31.75.108 | down      | -      | -    | r4.large |
| mc-5 | 172.31.67.179 | down      | -      | -    | r4.large |
+------+---------------+-----------+--------+------+----------+

Number of media components            : 2
Connected media components            : 2
Free media resources                  : 200%
Free DSP resources                    : -
...
```

4.8 Scaling Mediant CE Stack

The number of active MCs in the Mediant CE stack may vary to match the required service capacity. This is called scaling and ensures that the stack utilizes the optimal number of resources at any point of time and elastically scales on demand. Operation that increases the number of active MCs is called *Scale Out*. Operation that decreases the number of active MCs is called *Scale In*.

4.8.1 Scale Out Operation

The *Scale Out* operation increases the number of MCs in the Mediant CE stack by starting additional pre-created "idle" MCs (for example, corresponding to the AWS EC2 instance state changes from *stopped* to *running*).

You must specify a valid stack name and may optionally specify a number of MCs to be added to the service. If the number of MCs is not specified, one MC is added.

```
$ stack_mgr scale-out --help
usage: stack_mgr scale-out [-h] [-n num] name

positional arguments:
  name                 of the stack

optional arguments:
  -h, --help           show this help message and exit
  -n num, --num   number of media components to be added
```

The **`scale-out`** command is not allowed when *Automatic Scaling* is enabled. Use the **`scale`** command instead.

```
$ stack_mgr scale-out stack1
The following media components will be brought into service: mc-3
Checking that configuration is allowed... done

Initializing AWS client... done
Starting components 'mc-3'........... done
Successfully started 'mc-3'
```

```
Adding media components 'mc-3' to SBC configuration... done
Waiting until media components are ready...... done
```

4.8.2 Scale In Operation

The *Scale In* operation decreases the number of MCs in the Mediant CE stack by stopping a certain number of "active" MCs (for example, corresponding to the AWS EC2 instance state changes from *running* to *stopped*).

You must specify the valid stack name and may optionally specify one of the following:

- Number of MCs to be removed from the service
- Names of specific MCs to be removed from the service

If none of the above parameters are specified, one MC is removed.

If you do not specify MC names, Stack Manager automatically removes MCs with the lowest media utilization:

```
$ stack_mgr scale-in --help
usage: stack_mgr scale-in [-h] [-n num] [-i ids] name

positional arguments:
  name                 name of the stack

optional arguments:
  -h, --help           show this help message and exit
  -n num, --num num    number of media components to be removed
  -i ids, --ids ids    comma-separated list of media component
                       ids to be removed, e.g. mc-3,mc-4
```

The **`scale-in`** command is not allowed when *Automatic Scaling* is enabled. Use **`scale`** command instead.

```
$ stack_mgr scale-in stack1
Choosing media components to be taken out of service...... done
The following media components will be taken out of service: mc-3
Checking that configuration is allowed... done

Initializing AWS client... done
Removing media components 'mc-3' from SBC configuration
Locking media component 'mc-3'.... done
Removing media components 'mc-3'... done
Stopping components 'mc-3'.................. done
```

4.8.3 Scale To Operation

Scale To operation sets the number of MCs in the Mediant CE stack to the specified value. It essentially performs *Scale In* or *Scale Out* operation, depending on the current stack state.

You must specify the valid stack name and a number of active MCs in the cluster.

```
$ stack_mgr scale --help
usage: stack_mgr scale [-h] [-n num] name

positional arguments:
  name                name of the stack

optional arguments:
  -h, --help          show this help message and exit
  -n num, --num num   number of media components
```

Contrary to *Scale In* and *Scale Out* operations, the *Scale To* operation is allowed when *Automatic Scaling* is enabled. Regardless of whether it adds or removes MCs, for the purposes of calculating a cool down period, the *Scale To* operation is considered to be equivalent to the *Scale Out* operation. This means that cluster size may be increased immediately after completing the **`Scale To`** command, if needed.

```
$ stack_mgr scale stack1 -n 3
The following media components will be brought into service: mc-3
Checking that configuration is allowed... done

Initializing AWS client... done
Starting components 'mc-3'........... done
Successfully started 'mc-3'
Adding media components 'mc-3' to SBC configuration... done
Waiting until media components are ready...... done
```

4.9 Modifying Stack Configuration

The **`modify`** command modifies the configuration of the stack.

```
$ stack_mgr modify --help
usage: stack_mgr modify [-h] [--max-mc-num MAX_MC_NUM]
                        [--min-mc-num MIN_MC_NUM]
                        [--auto-scale {enable,disable}]
                        [--media-util-scale-in-threshold VALUE]
                        [--media-util-scale-out-threshold VALUE]
                        [--dsp-util-scale-in-threshold VALUE]
                        [--dsp-util-scale-out-threshold VALUE]
                        [--auto-scale-cooldown-time TIME]
                        [--auto-scale-in-step {1,2,3,4,5}]
                        [--auto-scale-out-step {1,2,3,4,5}]
                        [--auto-heal {enable,disable}]
                        [--manage-via-https {enable,disable}]
                        [--management-ip MANAGEMENT_IP]
                        [--username USERNAME]
                        [--password PASSWORD]
                        [--sc-num-of-interfaces {2,3,4}]
                        [--sc-public-ips SC_PUBLIC_IPS]
                        [--sc-additional-ips SC_ADDITIONAL_IPS]
                        [--mc-num-of-interfaces {2,3,4}]
                        [--mc-public-ips MC_PUBLIC_IPS]
                        [--mc-additional-ips MC_ADDITIONAL_IPS]
                        [--additional1-subnet-id SUBNET_ID]
                        [--additional2-subnet-id SUBNET_ID]
                        [--sc-instance-type SC_INSTANCE_TYPE]
                        [--mc-instance-type MC_INSTANCE_TYPE]
                        [--sc-image-id SC_IMAGE_ID]
                        [--mc-image-id MC_IMAGE_ID]
                        [--mc-profile {forwarding,transcoding}]
                        [--os-type {6,8}]
                        [--advanced-config ADVANCED_CONFIG]
                        [--comments COMMENTS]
                        [--sc-oam-ports SC_OAM_PORTS]
                        [--sc-signaling-ports SC_SIGNALING_PORTS]
                        name

positional arguments:
  name                  name of the stack

optional arguments:
  -h, --help            show this help message and exit
  --max-mc-num MAX_MC_NUM
                        maximum number of media components
  --min-mc-num MIN_MC_NUM
                        minimum number of media components
  --auto-scale {enable,disable}
                        auto scaling
  --media-util-scale-in-threshold MEDIA_UTIL_SCALE_IN_THRESHOLD
                        media utilization scale in threshold
                        (in accumulative free percentage points)
  --media-util-scale-out-threshold MEDIA_UTIL_SCALE_OUT_THRESHOLD
                        media utilization scale out threshold
                        (in accumulative free percentage points)
  --dsp-util-scale-in-threshold DSP_UTIL_SCALE_IN_THRESHOLD
                        dsp utilization scale in threshold
                        (in accumulative free percentage points)
  --dsp-util-scale-out-threshold DSP_UTIL_SCALE_OUT_THRESHOLD
                        dsp utilization scale out threshold
                        (in accumulative free percentage points)
  --auto-scale-cooldown-time AUTO_SCALE_COOLDOWN_TIME
                        auto scaling cooldown time (in seconds)
  --auto-scale-in-step {1,2,3,4,5}
                        auto scaling scale-in step
  --auto-scale-out-step {1,2,3,4,5}
                        auto scaling scale-out step
  --auto-heal {enable,disable}
                        auto healing
  --manage-via-https {enable,disable}
                        use HTTPS or HTTP protocol for
                        cluster management
  --management-ip MANAGEMENT_IP
                        management IP address
  --username USERNAME   management username
  --password PASSWORD   management password
  --sc-num-of-interfaces {2,3,4}
                        number of interfaces for signaling
                        components
  --sc-public-ips SC_PUBLIC_IPS
                        SC interfaces that will be assigned
                        with public IP addresses
  --sc-additional-ips SC_ADDITIONAL_IPS
                        SC interfaces that will be assigned
                        with additional IP addresses
  --mc-num-of-interfaces {2,3,4}
                        number of interfaces for media components
  --mc-public-ips MC_PUBLIC_IPS
                        MC interfaces that will be assigned
                        with public IP addresses
  --mc-additional-ips MC_ADDITIONAL_IPS
                        MC interfaces that will be assigned
                        with additional IP addresses
  --additional1-subnet-id ADDITIONAL1_SUBNET_ID
                        additional 1 subnet id
  --additional2-subnet-id ADDITIONAL2_SUBNET_ID
                        additional 2 subnet id
  --sc-instance-type SC_INSTANCE_TYPE
                        signaling component instance type
  --mc-instance-type MC_INSTANCE_TYPE
                        media component instance type
  --sc-image-id SC_IMAGE_ID
                        signaling component image id
  --mc-image-id MC_IMAGE_ID
                        media component image id
  --mc-profile {forwarding,transcoding}
                        media components profile
  --os-type {6,8}       OS type
  --advanced-config ADVANCED_CONFIG
                        advanced configuration parameters
  --comments COMMENTS   free textual description
  --sc-oam-ports SC_OAM_PORTS
                        comma-separated list of management ports
                        - e.g. 22/tcp,80/tcp,443/tcp
  --sc-signaling-ports SC_SIGNALING_PORTS
                        comma-separated list of signaling ports
                        - e.g. 5060/udp,5060/tcp,5061/tcp
```

The **`modify`** command is not allowed when some other operation is performed, for example, when the **`scale-in`** command is in progress.

```
$ stack_mgr modify stack1 --max-mc-num 5
Modifying stack configuration... done
```

The **`modify`** command has no effect on the stack service and completes without any delay. Some modifications require the **`update`** command to apply the changes. This is indicated in the **`modify`** command response:

```
$ stack_mgr modify stack1 --mc-num-of-interfaces 4
Modifying stack configuration... done

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

The indication is also provided in the output of the **show** command:

```
$ stack_mgr show stack1

<skipped>

Stack configuration changed           : update is needed
The following parameters were changed : mc_num_of_interfaces
```

For a detailed list of modifiable parameters and their effect on service, see Section 3.9.2.

4.9.1 Update Operation

The **update** command updates stack configuration. It is typically used after the **modify** command when the output of the latter indicates that an update is needed. For example, the **update** command is needed when the number of network interfaces on signaling or MCs is changed.

Note: The *Update* operation may be service affecting cause. It is therefore recommended to run it during periods of maintenance.

```
$ stack_mgr update --help
positional arguments:
  name          name of the stack

optional arguments:
  -h, --help    show this help message and exit
  -f, --force   force update even if it's not needed
```

Usually, the **update** command does nothing unless the 'update is needed' flag was turned on by the **modify** command. This behavior may be overridden by providing the '--force' argument.

```
$ stack_mgr update stack1

Initializing AWS client... done
Checking that configuration is allowed... done
Updating signaling components... done
Updating media components... done
Updating SBC cluster configuration... done
Wait for new configuration to be applied...... done
```

4.10 Stopping and Starting the Stack

4.10.1 Stopping Stack

The **stop** command stops all stack components (both signaling and media). It is typically used to temporarily shut down stacks in a lab environment.

```
$ stack_mgr stop --help
usage: stack_mgr stop [-h] name

positional arguments:
  name        Defines the name of the stack

optional arguments:
  -h, --help  Show this help message and exit
  -i ids, --ids ids  comma-separated list of component id's,
                     e.g. "mc-1,mc-3"
```

```
$ stack_mgr stop stack1
Initializing AWS client... done
Stopping stack components................................. done
```

The **stop** command can also be used to stop specific components by using the ***--ids*** argument. This option is primarily used for debugging.

4.10.2 Starting Stack

The **start** command starts all stack components. It is typically used after the **stop** command, to restore the stack to its operational state.

```
$ stack_mgr start --help
usage: stack_mgr start [-h] name

positional arguments:
  name        Defines the name of the stack

optional arguments:
  -h, --help  Show this help message and exit
  -i ids, --ids ids  comma-separated list of component id's,
                     e.g. "mc-1,mc-3"
```

```
$ stack_mgr start stack1
Initializing AWS client... done
Starting stack components................................. done
```

The **start** command can also be used to start specific components by using the **--ids** argument. This option is primarily used for debugging.

4.11 Deleting Stack

The **delete** command deletes the existing stack. You must specify the stack name.

```
$ stack_mgr delete --help
usage: stack_mgr delete [-h] name

positional arguments:
  name        name of the stack

optional arguments:
  -h, --help  show this help message and exit
```

The *delete* process takes a few minutes and detailed progress information is displayed on the console:

```
$ stack_mgr delete stack1

Initializing AWS client... done
Deleting signaling components........................... done
Deleting media components............................... done
Deleting network resources.................... done

Stack 'stack1' is successfully deleted
```

4.11.1 Purging Deleted Stack

The deleted stack is displayed by the **list** command (with the status "deleted") for 30 minutes after deletion:

```

$ stack_mgr list

+--------+-------------+-----+---------+
|  name  | type        | vim | state   |
+--------+-------------+-----+---------+
| stack1 | sbc-cluster | aws | deleted |
+--------+-------------+-----+---------+
```

If you want to immediately remove the deleted stack from the list, use the **purge** command:

```
$ stack_mgr purge stack1
Stack 'alex1' is purged

$ stack_mgr list
No stacks exist
```

4.12 Healing Stack

The *Heal* operation verifies the state of all stack components and fixes any errors if detected. For example, it may remove MCs that are not properly registered in the SCs or remove orphaned entries from the "Media Components" configuration table.

```
$ stack_mgr heal stack1

Checking media components status... done
'mc-3' should be removed
Removing media components........................... done
```

4.13 Rebuilding Stack

The *Rebuild* operation rebuilds specific stack components. You must specify the stack name and component names to be rebuilt.

```
$ stack_mgr rebuild --help
usage: stack_mgr rebuild [-h] [-i ids] name

positional arguments:
  name                  name of the stack

optional arguments:
  -h, --help            show this help message and exit
  -i ids, --ids ids     comma-separated list of component id's to
                        be rebuilt, e.g. "sc-2,mc-3"
```

The *Rebuild* operation deletes the corresponding virtual machine and creates a new one instead of it. Network interfaces are preserved and therefore, both private and public IP addresses remain unchanged.

If you rebuild SC instances, you need to generate and apply a new license to them. This is because the instance’s serial number changes during the rebuild operation.

```
$ stack_mgr rebuild stack1 --ids mc-2

Initializing AWS client... done
Waiting until signaling components are ready... done
Terminating component 'mc-2'................. done
Rebuilding media component 'mc-2'..................done
Removing media components 'mc-2' from SBC configuration... done
Adding media components 'mc-2' to SBC configuration... done
Checking that all media components have matching SBC
configuration... done
Verifying that all media components are unlocked... done
```

4.14 Upgrade Stack

The *Upgrade* operation upgrades all stack components. You must specify the stack name and publicly accessible HTTP URL with software load (CMP).

```
$ stack_mgr upgrade --help
usage: stack_mgr upgrade [-h] [-i ids] [--cmp-url URL]
                         [--graceful-timeout TIMEOUT]
                         name

positional arguments:
  name                  name of the stack

optional arguments:
  -h, --help            show this help message and exit
  --cmp-url URL         SBC software load URL
  -i ids, --ids ids     comma-separated list of component id's,
                        e.g. "sc,mc"
  --graceful-timeout TIMEOUT
                        graceful timeout for media components
                        upgrade (in seconds)
```

The *upgrade* process takes considerable amount of time and detailed progress information is displayed on the console:

```
$ stack_mgr upgrade alex-test-2 --cmp-url
https://sbc2.blob.core.windows.net/pub/test1.cmp

Initializing AWS client... done
Checking that configuration is allowed... done
Checking URL https://sbc2.blob.core.windows.net/pub/test1.cmp...
done
Upgrading signaling components.................. done
Version after upgrade: 7.20A.256.511
Upgrading media components.................. done
```

4.15 Multiple Operations

Stack Manager limits every stack to a single operation (create, scale-out, scale-in, or update) at a time. Attempting to run some commands while other commands are in progress, results in the following output:

```
$ stack_mgr scale-out stack1

ERROR: stack 'stack1' is not in 'running' state (current state is
'scaling-in')
```

This limitation does not apply to the **`show`** and **`list`** commands, which can be performed in any state.

For different stacks, multiple operations can be performed simultaneously. For example, you can *scale-out* **stack1** while **stack2** is being *deleted*.

5 REST API

5.1 Overview

The REST API is available under the */api/v1* path.

The following table provides a brief overview of the functionality supported using the REST API. Detailed information for each command is provided in subsequent sections.

Table 5-1: Supported Functionality by REST API

Method	Path	Command
GET	/api/v1/stacks	`list stacks`
GET	/api/v1/stacks/<stack_name>	`show stack`
POST	/api/v1/stacks/<stack_name>	`create stack`
DELETE	/api/v1/stacks/<stack_name>	`delete stack`
PUT	/api/v1/stacks/<stack_name>	`modify stack`
PURGE	/api/v1/stacks/<stack_name>	`purge stack`
POST	/api/v1/stacks/<stack_name>/heal	`heal stack`
POST	/api/v1/stacks/<stack_name>/scale-in	`scale-in stack`
POST	/api/v1/stacks/<stack_name>/scale-out	`scale-out stack`
POST	/api/v1/stacks/<stack_name>/scale	`scale stack`
POST	/api/v1/stacks/<stack_name>/update	`update stack`
GET	/api/v1/config	`get global configuration`
PUT	/api/v1/config	`update global configuration`

5.2 Asynchronous Tasks

Most of the POST commands are performed asynchronously. A typical response contains a reference to an asynchronous task URL.

```
POST /api/v1/stack/<name>/scale-out

202 Accepted
Content-Type: application/json
{
    "description": "task accepted",
    "url": "/api/v1/tasks/1"
}
```

The REST client should poll this URL to get task status and detailed command output.

```
GET /api/v1/tasks/1

200 OK
Content-Type: application/json
{
    "status": "in_progress",
    "output": "Removing SBC media components... "
}
```

```
GET /api/v1/tasks/1

200 OK
Content-Type: application/json
{
    "status": "success",
    "output": "Removing SBC media components....... done"
}
```

Valid task status values are:

idle	The task didn't start execution yet
in_progress	The task is being executed
success	The task has successfully completed
failed	The task has failed

Note: The 'output' element may contain newline "\n" characters.

5.3 Authentication

Most of the REST API endpoints require basic HTTP authentication.

Use the same credentials (username/password) that are used for accessing the Web interface. Refer to Section 3.1, Accessing the Web Interface for more details .

5.4 Discovery

Method:	GET
Path:	/api/v1
Arguments:	None
Description:	Returns supported API structure

```
GET /api/v1

200 OK
Content-Type: application/json
{
    "items": [
        {
            "description": "list of available stacks",
            "id": "stacks",
            "url": "/api/v1/stacks"
        },
        {
            "description": "global configuration",
            "id": "config",
            "url": "/api/v1/config"
        },
        {
            "description": "application version",
            "id": "version",
            "url": "/api/v1/version"
        }
    ]
}
```

5.5 Global Configuration

Method:	GET
Path:	/api/v1/config
Arguments:	None
Description:	Returns Stack Manager’s global configuration

```
GET /api/v1/config

200 OK
Content-Type: application/json
{
    "aws_access_key": "ABCDEDFGHIJKLMN",
    "aws_prefix": "",
    "aws_secret_key": "123456789012345678901234567890",
    "rest_api_password": "",
    "rest_api_username": "",
    ...
}
```

5.5.1 Updating Global Configuration

Method:	PUT
Path:	/api/v1/config
Arguments:	None
Content Type:	application/json
Content:	Dictionary of parameter value/pairs
Description:	Updates Stack Manager's global configuration

```
PUT /api/v1/config
Content-Type: application/json
{
    "aws_access_key": "ABCDEDFGHIJKLMN",
    "aws_secret_key": "12345678901234567890"
}

200 OK
Content-Type: application/json
{
    "description": "success"
}
```

5.6 Listing Available Stacks

Method:	GET
Path:	/api/v1/stacks
Arguments:	None
Description:	Returns a list of all available stacks and basic information per stack

```
GET /api/v1/stacks

200 OK
Content-Type: application/json
{
    "stacks": [
        {
            "created_at": "Mar 14, 2018 16:59:15",
            "deleted_at": "",
            "id": "stack1",
            "management_ip": "51.124.138.162",
            "state": "running",
            "type": "sbc-cluster",
            "url": "/api/v1/stacks/alex1",
            "vim": "aws"
        }
    ]
}
```

5.7 Creating New Stack

Method: POST

Path: /api/v1/stacks/<stack_name>

Arguments: none

Content: configuration parameters as JSON dictionary

or

file – configuration file as `multipart/form-data`

Content type: application/json or multipart/form-data

Description: Creates new stack

Response: URL of asynchronous task (as described in 5.2)

```
POST /api/v1/stacks/stack1
Content-Type: application/json
{
    "stack_type": "sbc-cluster",
    "vim": "aws",
    "mc_num": 3,
    "min_mc_num": 2,
    "max_mc_num": 10,
    "auto_scale": "enable",
    "media_util_scale_in_threshold": 250,
    "media_util_scale_out_threshold": 100,
    "dsp_util_scale_in_threshold": 0,
    "dsp_util_scale_out_threshold": 0,
    "auto_scale_cooldown_time": 900,
    "auto_scale_in_step": 1,
    "auto_scale_out_step": 1,
    "aws_region": "eu-central-1",
    "vpc_id": "vpc-45f3152c",
    "cluster_subnet_id": "subnet-be6e8bc3",
    "oam_subnet_id": "subnet-1536d368",
    "additional1_subnet_id": "",
    "additional2_subnet_id": "",
    "ssh_key_pair": "aws_ssh_frankfurt_1",
    "sc_ha_mode": "enable",
    "sc_num_of_interfaces": 2,
    "sc_public_ips": "main",
    "sc_additional_ips": "",
    "sc_image_id": "ami-d771563c",
    "sc_instance_type": "r4.2xlarge",
    "sc_iam_role": "SBC-HA-3",
    "sc_disk_size": 100,
    "sc_ini_file_contains_admin_user": "true",
    "sc_ini_file_url": "",
    "mc_num_of_interfaces": 3,
    "mc_public_ips": "main",
    "mc_additional_ips": "",
    "mc_image_id": "ami-d771563c",
    "mc_instance_type": "r4.large",
    "mc_profile": "forwarding",
    "mc_max_pps_limit": "auto",
    "name_prefix": "",
    "manage_via_https": "enable"
}

202 Accepted
Content-Type: application/json
{
    "description": "task accepted",
    "url": "/api/v1/tasks/1"
}
```

```
POST /api/v1/stacks/stack1
Content-Type: multipart/form-data; boundary=----
WebKitFormBoundary7MA4YWxkTrZu0gW

------WebKitFormBoundary7MA4YWxkTrZu0gW
Content-Disposition: form-data; name="cfg"; filename="stack1.cfg"
Content-Type: application/octet-stream

<configuration file>
------WebKitFormBoundary7MA4YWxkTrZu0gW--


202 Accepted
Content-Type: application/json
{
    "description": "task accepted",
    "url": "/api/v1/tasks/1"
}
```

5.8 Checking Stack State and Configuration

Method: GET

Path: /api/v1/stacks/<stack_name>

Arguments: *?no_status=True* Do not include real-time status information (connection status and media/dsp utilization) in the response.

Description: Returns detailed information of the specific stack.
Unless *?no-status=True* argument is provided, the command queries the active SC for real-time connection status and media/dsp utilization per MC. This may result in a delay in response (up to 30 seconds), for example, if connection with the active SC is unavailable.

```
GET /api/v1/stacks/stack1

200 OK
Content-Type: application/json
{
    "additional1_subnet_id": "subnet-1536d368",
    "additional2_subnet_id": "",
    "admin_password": "Admin#123456",
    "admin_username": "sbcadmin",
    "advanced_config": "",
    "alarms": [
        {
            "name": "mc-2-down",
            "raised_at": "Jul 02, 2020 09:47:56",
            "severity": "MINOR",
            "text": "Media component 'mc-2' is 'disconnected'"
        }
    ],
    "auto_heal": "enable",
    "auto_scale": "enable",
    "auto_scale_cooldown_time": 900,
    "auto_scale_in_step": 1,
    "auto_scale_out_step": 1,
    "aws_region": "eu-central-1",
    "cluster_subnet_id": "subnet-be6e8bc3",
    "comments ": "",
    "common_network_config": [
        {
            "id": "subnet-be6e8bc3",
            "interface": "eth0",
            "status": "in-use",
            "subnet": "cluster"
        },
        {
            "id": "subnet-1536d368",
            " cron scheduler ": "eth1",
            "status": "in-use",
            "subnet": "main"
        }
    ],
    "common_tags ": 2,
    "connected_mc_num": 2,
    "created_at": "May 09, 2018 08:55:29",
    "deleted_at": "",
    "dsp_util_scale_in_threshold": 0,
    "dsp_util_scale_out_threshold": 0,
    "free_dsp_resources": -1,
    "free_media_resources": 200,
    "id": "stack1",
    "manage_via_https": "enable",
    "management_ip": "18.197.127.204",
    "max_mc_num": 10,
    "mc_additional_ips": "",
    "mc_image_id": "",
    "mc_instance_type": "r4.large",
    "mc_max_pps_limit": "auto",
    "mc_network_config": [
        {
            "id": "subnet-1536d368",
            "interface": "eth2",
            "status": "in-use",
            "subnet": "additional1"
        },
        {
            "id": "",
            "interface": "eth3",
            "status": "",
            "subnet": "additional2"
        }
    ],
    "mc_num": 2,
    "mc_num_of_interfaces": 3,
    "mc_profile": "forwarding",
    "mc_public_ips": "main",
    "media_components": [
        {
            "created_at": "May 09, 2018 08:55:59",
            "dsp_util": -1,
            "id": "mc-1",
            "instance_type": "r4.large",
            "ip": "172.31.67.240",
            "media_util": 0,
            "status": "connected",
            "version": "7.20A.252.274"
        },
        {
            "created_at": "May 09, 2018 08:55:59",
            "dsp_util": -1,
            "id": "mc-2",
            "instance_type": "r4.large",
            "ip": "172.31.67.15",
            "media_util": 0,
            "status": "connected",
            "version": "7.20A.252.274"
        }
    ],
    "media_util_scale_in_threshold": 250,
    "media_util_scale_out_threshold": 100,
    "min_mc_num": 2,
    "name_prefix": "",
    "oam_subnet_id": "subnet-1536d368",
    "sc_additional_ips": "",
    "sc_ha_mode": "enable",
    "sc_iam_role": "SBC-HA-3",
    "sc_image_id": "ami-d771563c",
    "sc_ini_file_contains_admin_user": "true",
    "sc_ini_file_url": "",
    "sc_instance_type": "r4.2xlarge",
    "sc_network_config": [
        {
            "id": "",
            "interface": "eth2",
            "status": "",
            "subnet": "additional1"
        },
        {
            "id": "",
            "interface": "eth3",
            "status": "",
            "subnet": "additional2"
        }
    ],
    "sc_num_of_interfaces": 2,
    "sc_oam_ports": "22/tcp,80/tcp,443/tcp",
    "sc_public_ips": "main",
    "sc_signaling_ports": "5060/udp,5060/tcp,5061/tcp",
    "signaling_components": [
        {
            "created_at": "May 09, 2018 08:57:19",
            "id": "sc-1",
            "instance_type": "r4.2xlarge",
            "ip": "172.31.71.211",
            "status": "running",
            "version": "7.20A.252.274"
        },
        {
            "created_at": "May 09, 2018 08:57:19",
            "id": "sc-2",
            "instance_type": "r4.2xlarge",
            "ip": "",
            "status": "running",
            "version": "7.20A.252.274"
        }
    ],
    "ssh_key_pair": "aws_ssh_frankfurt_1",
    "stack_type": "sbc-cluster",
    "started_at": "May 09, 2018 08:46:59",
    "state": "running",
    "state_task_url": "",
    "stopped_at": "",
    "update_needed": false,
    "update_reason": "",
    "vim": "aws",
    "vpc_id": "vpc-45f3152c"
}
```

5.9 Scaling Mediant CE Stack

5.9.1 Scale Out Operation

Method: POST

Path: /api/v1/stacks/<stack_name>/scale-out

Arguments:

?num=2 Defines the number of MCs to add

Description: Scales out the stack

Response: URL of asynchronous task (as described in Section 5.2)

```
POST /api/v1/stacks/stack1/scale-out

202 Accepted
Content-Type: application/json
{
    "description": "task accepted",
    "url": "/api/v1/tasks/1"
}
```

5.9.2 Scale In Operation

Method: POST

Path: /api/v1/stacks/<stack_name>/scale-in

Arguments:

?num=2 Defines the number of MCs to remove

?ids=mc-1,mc-2 Comma-separated list of IDs of MCs to remove

Description: Scales in the stack

Response: URL of asynchronous task (as described in 5.2)

```
POST /api/v1/stacks/stack1/scale-in

202 Accepted
Content-Type: application/json
{
    "description": "task accepted",
    "url": "/api/v1/tasks/1"
}
```

5.9.3 Scale To Operation

Method: POST

Path: /api/v1/stacks/<stack_name>/scale

Arguments:

?num=2 Defines the number of MCs

Description: Scales the stack to the specified number of MCs

Response: URL of asynchronous task (as described in Section 5.2)

```
POST /api/v1/stacks/stack1/scale?num=2

202 Accepted
Content-Type: application/json
{
    "description": "task accepted",
    "url": "/api/v1/tasks/1"
}
```

5.10 Modifying Stack Configuration

Method:	PUT
Path:	/api/v1/stacks/<stack_name>
Arguments:	None
Content type:	application/json
Content:	Dictionary of parameter value/pairs
Description:	Modifies the stack configuration

```
PUT /api/v1/stacks/stack1
Content-Type: application/json
{
    "auto_scale ": "enable",
    "media_util_scale_in_threshold": 230
}

200 OK
Content-Type: application/json
{
    "description": "stack configuration was modified"
}
```

Some modify actions require stack updates to be run to apply them. This is indicated using the *update_needed* attribute in the response. The 'update_needed' flag is set on the stack.

```
PUT /api/v1/stacks/stack1
Content-Type: application/json
{
    "max_mc_num": 10
}

200 OK
Content-Type: application/json
{
    "description": "stack configuration was modified; stack must
be updated to apply the changes",
    "update_needed": True,
    "url": "/api/v1/stacks/stack1/update"
}
```

5.10.1 Update Operation

Method: POST

Path: /api/v1/stacks/<stack_name>/update

Arguments:

?force=True	Forces update even if it's not needed
?reset=True	Resets 'update is needed' flag without performing the update

Description: Updates the stack

Response: URL of asynchronous task (as described in Section 5.2)

```
POST /api/v1/stacks/stack1/update

202 Accepted
Content-Type: application/json
{
    "description": "task accepted",
    "url": "/api/v1/tasks/1"
}
```

5.11 Stopping and Starting Stack

5.11.1 Stopping Stack

Method: POST

Path: /api/v1/stacks/<stack_name>/stop

Arguments:

?ids=mc-1,mc-3 Comma-separated list of component IDs to be stopped

Description: Stops stack components

Response: URL of asynchronous task (as described in 5.2)

```
POST /api/v1/stacks/stack1/stop

202 Accepted
Content-Type: application/json
{
    "description": "task accepted",
    "url": "/api/v1/tasks/1"
}
```

5.11.2 Starting Stack

Method: POST

Path: /api/v1/stacks/<stack_name>/start

Arguments:

?ids=mc-1,mc-3 Comma-separated list of component IDs to be started

Description: Starts stack components

Response: URL of asynchronous task (as described in 5.2)

```
POST /api/v1/stacks/stack1/start

202 Accepted
Content-Type: application/json
{
    "description": "task accepted",
    "url": "/api/v1/tasks/1"
}
```

5.12 Deleting Stack

Method: DELETE

Path: /api/v1/stacks/<stack_name>

Arguments: none

Description: Deletes stack

Response: URL of asynchronous task (as described in 5.2)

```
DELETE /api/v1/stacks/stack1

202 Accepted
Content-Type: application/json
{
    "description": "task accepted",
    "url": "/api/v1/tasks/1"
}
```

5.12.1 Purging Deleted Stack

Method: PURGE

Path: /api/v1/stacks/<stack_name>

Arguments: none

Description: Purges deleted stack

```
PURGE /api/v1/stacks/stack1

200 OK
Content-Type: application/json
{
    "description": "stack was purged"
}
```

5.13 Healing Stack

Method: POST

Path: /api/v1/stacks/<stack_name>/heal

Arguments: none

Description: Heals the stack

Response: URL of asynchronous task (as described in Section 5.2)

```
POST /api/v1/stacks/stack1/heal

202 Accepted
Content-Type: application/json
{
    "description": "task accepted",
    "url": "/api/v1/tasks/1"
}
```

5.14 Rebuilding Stack

Method: POST

Path: /api/v1/stacks/<stack_name>/rebuild

Arguments:

?ids=mc-1,mc-3 Comma-separated list of component IDs to be rebuilt

Description: Rebuilds stack components

Response: URL of asynchronous task (as described in Section 5.2)

```
POST /api/v1/stacks/stack1/rebuild?ids=mc-1

202 Accepted
Content-Type: application/json
{
    "description": "task accepted",
    "url": "/api/v1/tasks/1"
}
```

5.15 Upgrading Stack

Method: POST

Path: /api/v1/stacks/<stack_name>/upgrade

Arguments:

?ids=sc.mc Comma-separated list of component types to be rebuilt (sc/mc)

&cmp_url=<URL> Publicly accessible HTTP URL with software load (CMP)

&graceful_timeout=60 Graceful timeout for MC updates (in seconds)

Description: Upgrades stack components

Response: URL of asynchronous task (as described in Section 5.2)

```
POST
/api/v1/stacks/stack1/upgrade?ids=sc,mc&cmp_url=<URL>&graceful_tim
eout=60

202 Accepted
Content-Type: application/json
{
    "description": "task accepted",
    "url": "/api/v1/tasks/1"
}
```

6 Operational Logs

Stack Manager stores its logs in the */var/log/stack_mgr* directory. The following files are created:

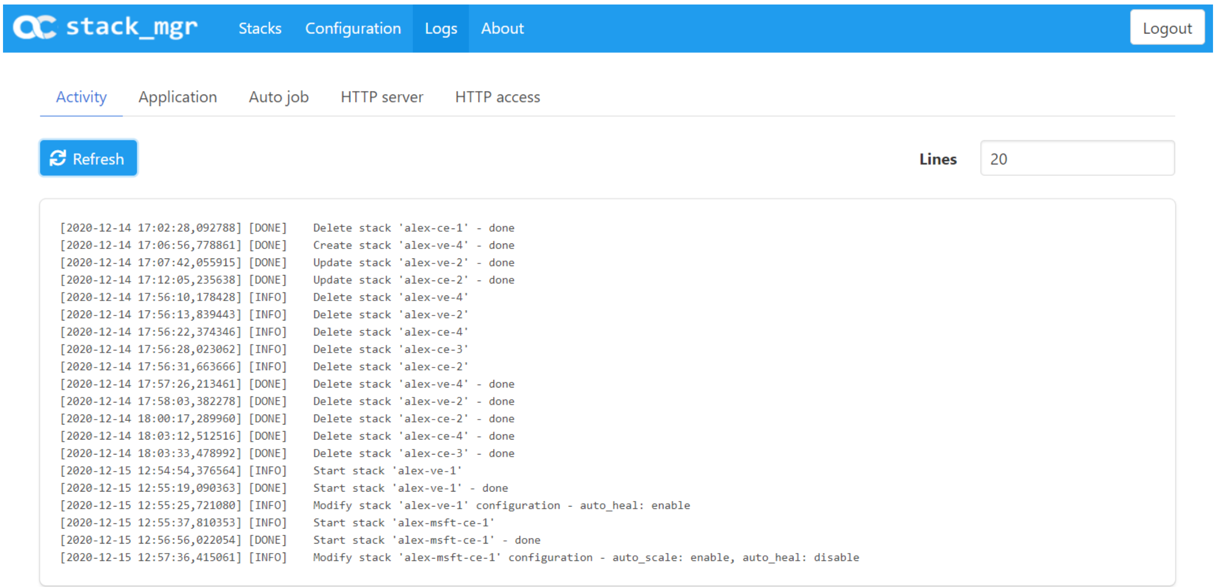
- **stack_mgr.log:** Application log file, which contains logs for operations triggered through the CLI interface.
- **http.log:** HTTP server log file, which contains logs for operations triggered through the HTTP or REST interface.
- **http_access.log:** HTTP server access log.
- **auto_job.log:** Automatic scaling and healing logs.

Log files are rotated daily. Up to seven copies of each file are stored.

In addition to above logs, Stack Manager maintains Activity Log that records summary of all operations and configuration changes.

To view logs through the Web interface, open the Logs page, and then choose the corresponding log.

Figure 6-1: Viewing logs in Web Interface



```
[2020-12-14 17:02:28,092788] [DONE]    Delete stack 'alex-ce-1' - done
[2020-12-14 17:06:56,778861] [DONE]    Create stack 'alex-ve-4' - done
[2020-12-14 17:07:42,055915] [DONE]    Update stack 'alex-ve-2' - done
[2020-12-14 17:12:05,235638] [DONE]    Update stack 'alex-ce-2' - done
[2020-12-14 17:56:10,178428] [INFO]    Delete stack 'alex-ve-4'
[2020-12-14 17:56:13,839443] [INFO]    Delete stack 'alex-ve-2'
[2020-12-14 17:56:22,374346] [INFO]    Delete stack 'alex-ce-4'
[2020-12-14 17:56:28,023062] [INFO]    Delete stack 'alex-ce-3'
[2020-12-14 17:56:31,663666] [INFO]    Delete stack 'alex-ce-2'
[2020-12-14 17:57:26,213461] [DONE]    Delete stack 'alex-ve-4' - done
[2020-12-14 17:58:03,382278] [DONE]    Delete stack 'alex-ve-2' - done
[2020-12-14 18:00:17,289960] [DONE]    Delete stack 'alex-ce-2' - done
[2020-12-14 18:03:12,512516] [DONE]    Delete stack 'alex-ce-4' - done
[2020-12-14 18:03:33,478992] [DONE]    Delete stack 'alex-ce-3' - done
[2020-12-15 12:54:54,376564] [INFO]    Start stack 'alex-ve-1'
[2020-12-15 12:55:19,090363] [DONE]    Start stack 'alex-ve-1' - done
[2020-12-15 12:55:25,721080] [INFO]    Modify stack 'alex-ve-1' configuration - auto_heal: enable
[2020-12-15 12:55:37,810353] [INFO]    Start stack 'alex-msft-ce-1'
[2020-12-15 12:56:56,022054] [DONE]    Start stack 'alex-msft-ce-1' - done
[2020-12-15 12:57:36,415061] [INFO]    Modify stack 'alex-msft-ce-1' configuration - auto_scale: enable, auto_heal: disable
```

To view logs through CLI, use the following command:

```
$ stack_mgr log --help
usage: stack_mgr log [-h] [--name  {activity_log,stack_mgr,
auto_job,http,http_access}] [--lines LINES]

optional arguments:
  -h, --help            show this help message and exit
  --name {activity_log,stack_mgr,auto_job,http,http_access}
                        log name
  --lines LINES         number of lines
```

```
$ stack_mgr log --name activity_log --lines 10
[2020-12-14 17:58:03] [INFO]    Delete stack 'test-ce-2'
[2020-12-14 18:00:17] [DONE]    Delete stack 'test-ce-2' - done
[2020-12-14 18:03:12] [INFO]    Delete stack 'test-ce-3'
[2020-12-14 18:03:33] [DONE]    Delete stack 'test-ce-3' - done
[2020-12-15 12:54:54] [INFO]    Start stack 'test-ve-1'
[2020-12-15 12:55:19] [DONE]    Start stack 'test-ve-1' - done
[2020-12-15 12:55:25] [INFO]    Modify stack 'test-ve-1'
configuration - auto_heal: enable
[2020-12-15 12:55:37] [INFO]    Start stack 'test-ce-1'
[2020-12-15 12:56:56] [DONE]    Start stack 'test-ce-1' - done
[2020-12-15 12:57:36] [INFO]    Modify stack 'test-ce-1'
configuration - auto_scale: enable
```

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