

Huawei Certified Cloud Computing Training

HCIP-Cloud Computing

OpenStack

Lab Guide

ISSUE: 5.0



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Huawei Certification System

The Huawei certification system is a platform for shared growth, part of a thriving partner ecosystem. There are two types of certification: one for ICT architectures and applications, and one for cloud services and platforms. There are three levels of certification available:

Huawei Certified ICT Associate (HCIA)

Huawei Certified ICT Professional (HCIP)

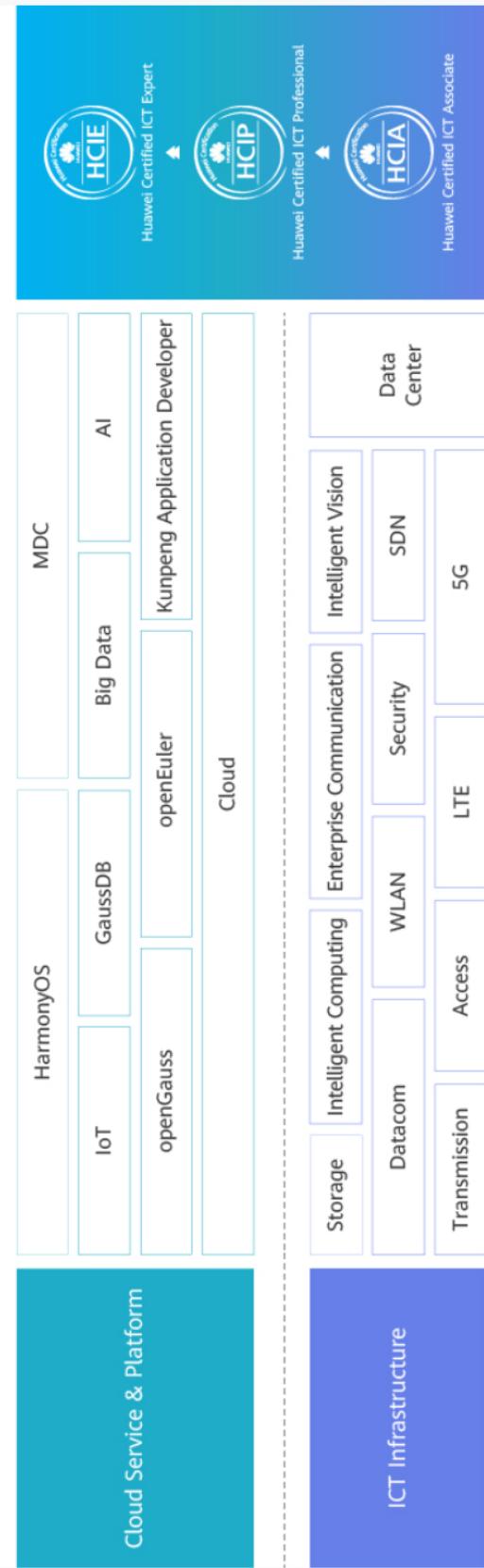
Huawei Certified ICT Expert (HCIE)

Huawei certification courses cover the entire ICT domain, with a focus on how today's architecture generates cloud-pipe-device synergy. The courses present the latest developments of all essential ICT aspects to foster a thriving ICT talent ecosystem for the digital age.

HCIP-Cloud Computing is designed for engineers of Huawei offices and rep offices, and people who are interested in open source and HUAWEI CLOUD Stack. The HCIP-Cloud Computing course focuses on OpenStack, including its architecture and management of the dashboard, identity, images, compute, storage, network, orchestration, and telemetry; as well as HUAWEI CLOUD Stack, including its architecture and components, resource management, services, operations and O&M.

Huawei certification helps you unlock opportunities to advance your career and take one more step towards the top of the industry. This course enables you to keep abreast of the latest developments of OpenStack and HUAWEI CLOUD Stack.

Huawei Certification



About This Document

Overview

This document is intended for trainees preparing for the HCIP-Cloud Computing V5.0 certification exam and those who are interested in Stack-related technologies, such as environment installation, dashboard, identity management, image management, compute management, storage management, network management, orchestration management, HUAWEI CLOUD Stack resource management and basic services, and HUAWEI CLOUD Stack operations and O&M.

About the Exercises

This document covers 8 exercises and provides summary to help trainees better understand the exercise operations.

- Exercise 1: OpenStack environment installation using automated installation script.
- Exercise 2: OpenStack dashboard management, where trainees can get familiar with basic operations such as creating users and assigning roles.
- Exercise 3: OpenStack identity management, including projects, roles, users, services, and endpoints.
- Exercise 4: OpenStack image management, including image pulling, registration, creation, sharing, and format conversion.
- Exercise 5: OpenStack compute management, including the management of hypervisor and host aggregate, flavors, key pairs and server groups, and server instance provisioning and lifecycle.
- Exercise 6: OpenStack storage management, including volume type and QoS management, and volume creation and lifecycle management.
- Exercise 7: OpenStack network management, including creating networks, subnets, routes and security groups, assigning floating IP addresses, and testing server instance connectivity.
- Exercise 8: OpenStack orchestration management, including compiling a HOT, creating a stack using the template, and creating a simple and customized server instance.

Knowledge Required

This course is for Huawei's intermediate-level certification. To better understand this course, you should:

- Have basic knowledge of the Linux operating system.
- Understand the basics of cloud computing.

Lab Environment Overview

Networking

This exercise is performed on the HUAWEI CLOUD ECS running a specified Ubuntu OS and installed with DevStack (the deployment tool recommended by OpenStack). DevStack is a series of extensible scripts used to quickly build a complete OpenStack environment based on the latest version of everything from git master. It is used interactively as a development environment and as the basis for most of the OpenStack project's functional tests. For details about how to deploy OpenStack on DevStack, see <https://docs.openstack.org/devstack/latest/>. The lab environment of this course has been optimized.

Devices

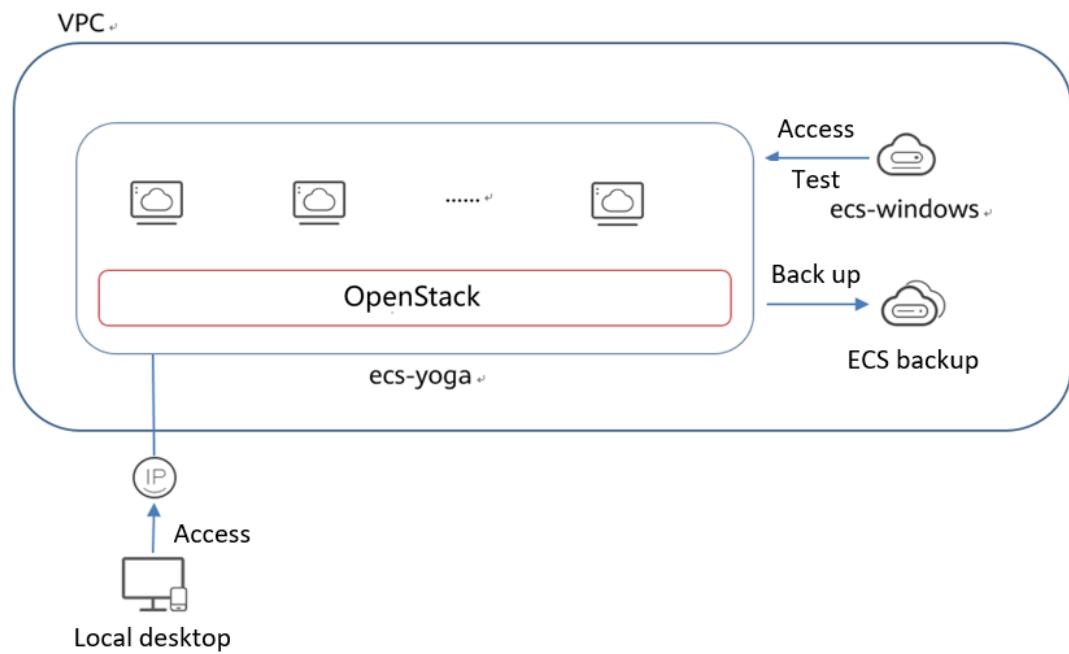
- HUAWEI CLOUD account
- One ECS: 4 vCPUs | 8 GiB, 64-bit Ubuntu 20.04
- One ECS: s6.xlarge.2, 4 vCPUs | 8 GiB, 64-bit Windows Server 2016 Standard in English
- OBS bucket, standard(single-AZ), on-demand region selection, and on-demand storage package purchase
- Private image, ECS system disk image, 40 GB disk capacity

Lab Environment Preparations

Registering with HUAWEI CLOUD

See https://support.huaweicloud.com/intl/en-us/usermanual-account/en-us_topic_0069252244.html to register with HUAWEI CLOUD.

Topology



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1

OpenStack Environment Installation

1.1 Overview

1.1.1 About This Exercise

In this exercise, you need to purchase a HUAWEI CLOUD ECS, install Ubuntu 20.04 Server on the ECS, bind an EIP to the ECS, run the automated installation script, and install DevStack on Ubuntu. DevStack is a group of scripts and utilities used to quickly deploy the OpenStack development environment from the Git source code tree. (To prevent errors during the installation caused by future updates on the OpenStack official website or DevStack, The system disk image package for installing the OpenStack Yoga development environment has been uploaded to the Huawei certification official website: <https://e.huawei.com/en/talent/portal/#/>.)

1.1.2 Objectives

- Install the OpenStack development environment.

Process



Figure 1-1 OpenStack installation process

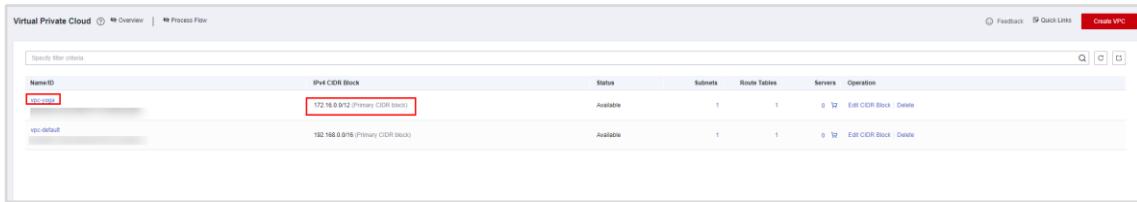
1.2 Installing the Lab Environment

1.2.1 Preparations

Register a HUAWEI CLOUD account and top up the account.

1.2.2 Installation Procedure

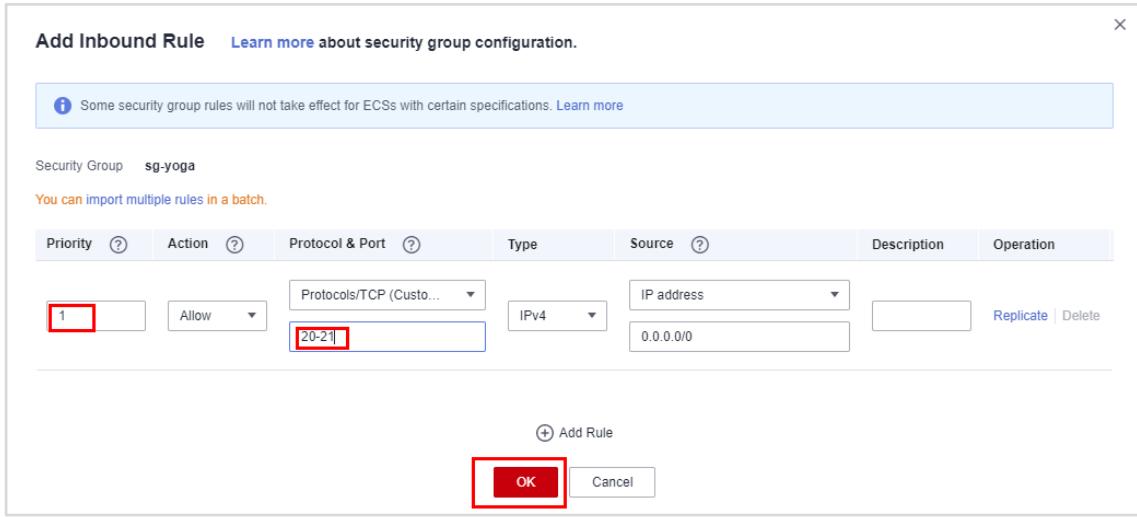
- Step 1 Log in to HUAWEI CLOUD, create a VPC in the **CN-Hong Kong** (select as required)region, as shown in the following figure, customize the name, and use the specified network segment (172.16.0.0/12) and subnet (172.16.0.0/24).



The screenshot shows the VPC interface with two IPv4 CDR blocks listed:

- IPv4 CDR Block:** 172.16.0.0/12 (Primary CDR block). Status: Available. Subnets: 1. Route Tables: 1. Servers: 0. Operation: Edit CDR Block | Delete.
- vpc-default:** 192.168.0.0/16 (Primary CDR block). Status: Available. Subnets: 1. Route Tables: 1. Servers: 0. Operation: Edit CDR Block | Delete.

- Step 2** Create a security group. Enter a name for the security group and select **General-purpose web server** as the template. The rules for adding inbound packets are as follows:



Add Inbound Rule Learn more about security group configuration.

Some security group rules will not take effect for ECSSs with certain specifications. Learn more

Security Group: sg-yoga

You can import multiple rules in a batch.

Priority	Action	Protocol & Port	Type	Source	Description	Operation
1	Allow	Protocols/TCP (Custom)	IPv4	IP address	0.0.0.0/0	Replicate Delete
20-21						

+ Add Rule

OK Cancel



Security Groups

sg-yoga

Associated Instances: Description: Operation: Manage Rule | Manage Instance | More

- Step 3** Create a bucket, select a region as required, customize the bucket name, default storage class, and bucket policy. For details about other parameters, see the following figure.

Create Bucket

Region: CN-Hong Kong

Bucket Name: hcipbox01

Default Storage Class: Standard (highlighted)

- Standard: High performance, reliability, and availability
 - Multi-AZ
 - Single-AZ
 - Image
- Infrequent Access: High reliability, low cost, and few access
 - Multi-AZ
 - Single-AZ
 - Image
- Archive: For data accessed once a year
 - Single-AZ

If you do not specify a storage class during object upload, any objects you upload inherit this default storage class.

Bucket Policy: Private (highlighted)

Default Encryption: Recommended (highlighted)

Direct Reading: Direct reading of Archive data is supported in the following region: CN East-Shanghai1, CN North-Beijing4, CN South-Guangzhou, CN Southwest-Guiyang1, AP-Jakarta.

Tags: Tag key, Tag value

Buy Packages to Save More

Standard (Single-AZ) 500 GB 1 year \$31.23 USD saved \$93.69 USD	Standard (Single-AZ) 100 GB 1 year \$6.21 USD saved \$18.63 USD	Standard (Single-AZ) 100 GB 1 month \$2.07 USD (highlighted)
--	---	--

Create: Bucket price: Free Use: Billing: Pay-per-use/Resource packages Pricing details Create Now

Click **Create Now**. In the displayed dialog box, click **OK**.



OK (highlighted) **Cancel**

On the displayed page, select **I have read and agree to the Service Level Agreement** and click **Submit**.

Buy OBS Package

Bucket hcipbox01 created successfully. View details
Please confirm whether you want to purchase the following packages to cover the Standard storage fees of bucket hcipbox01.

Packag Type	Specifications	Effective Time	Quantity	Required Duration	Price (USD)
CN-Hong Kong					
OBS Standard storage	Single-AZ storage 100 GB Free read requests per month: 240,000 Free write requests per month: 60,000	Immediately after payment	1	1 month	\$2.07 USD

Agreement I have read and agree to the Service Level Agreement

Price: \$2.07 USD [?](#) [Submit](#)

On the displayed page, click **Comfirm**.

Buy Object Storage Service

Confirm the orders in 7 days. Otherwise, the order will be automatically canceled.

Order No.	Product Name	Service Provider	Order Amount	Total
CS2212211037RMKV8	Object Storage Service	HUAWEI CLOUD	\$2.07 USD	\$2.07 USD

Select Payment Method Payable: \$2.07 USD (tax excluded)

Monthly Settlement

You are a budgeted customer. HUAWEI CLOUD will deduct this payment from your budget, and assign the actual payment amount (calculated based on the internal price) to the beneficiary department or project of your account.

The internal price is different from the price displayed above. You can search Huawei W3 for the related cloud service settlement rules.

Monthly Settlement \$2.07 USD

This amount does not include tax. The tax will be included in the final bill generated in the following month.

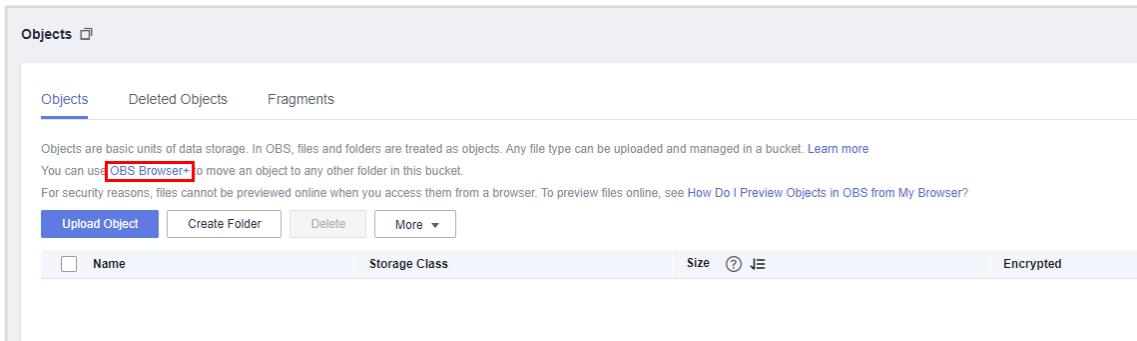
[Confirm](#)

Return to the OBS page and view the purchase result.

Object Storage Service Open Source Software Notice

OBS Browser* Download	obsutil Download	obsts Download	Get SDKs Obtain Access Keys (AK/SK) Visit OBS growth map											
A account and all the IAM users under it can create a total of 100 buckets and parallel file systems. You are advised to create folders in the buckets to organize your data and reduce how many buckets you need. Learn more														
You can create 97 more buckets.														
Specify filter criteria:														
<table border="1"> <thead> <tr> <th>Bucket Name</th> <th>Quick Links</th> <th>Storage Class</th> <th>Region</th> <th>Data Redundancy Policy</th> <th>Used Capacity</th> </tr> </thead> <tbody> <tr> <td>hcipbox01</td> <td>Standard</td> <td>CN-Hong Kong</td> <td>Single-AZ storage</td> <td>0 byte</td> </tr> </tbody> </table>				Bucket Name	Quick Links	Storage Class	Region	Data Redundancy Policy	Used Capacity	hcipbox01	Standard	CN-Hong Kong	Single-AZ storage	0 byte
Bucket Name	Quick Links	Storage Class	Region	Data Redundancy Policy	Used Capacity									
hcipbox01	Standard	CN-Hong Kong	Single-AZ storage	0 byte										

- Step 4 Download the image package ecs-yoga.qcow2 from the Huawei certification official website to the local PC and upload it to the bucket purchased in step 3. If the image size exceeds 5 GB, the graphical management tool OBS Browser+ is required. (You can click the bucket name to go to the object page and click **OBS Browser+** to download and install it.)



On the displayed page, select a proper version as required. Install the tool by yourself.



OBS Browser+ Tool

OBS Browser+ is a GUI-based desktop application for comprehensively managing OBS buckets and objects. OBS Browser+ is intuitive and easy to use. It allows you to easily manage OBS resources from your local end.

[Doc](#) [Windows \(32-bit\)](#) [Windows \(64-bit\)](#)

- Step 5 Open OBS Browser+, enter the Account Name, AK, and SK, and click **Login In**.

AK Login | Account Login | Authorization Code Login

Account Name ?

Service ?

HUAWEI CLOUD OBS (default)

Access Key ID

 IAR

Secret Access Key

Access Path ?

Enter an access path (eg: obs://bucket/folder)

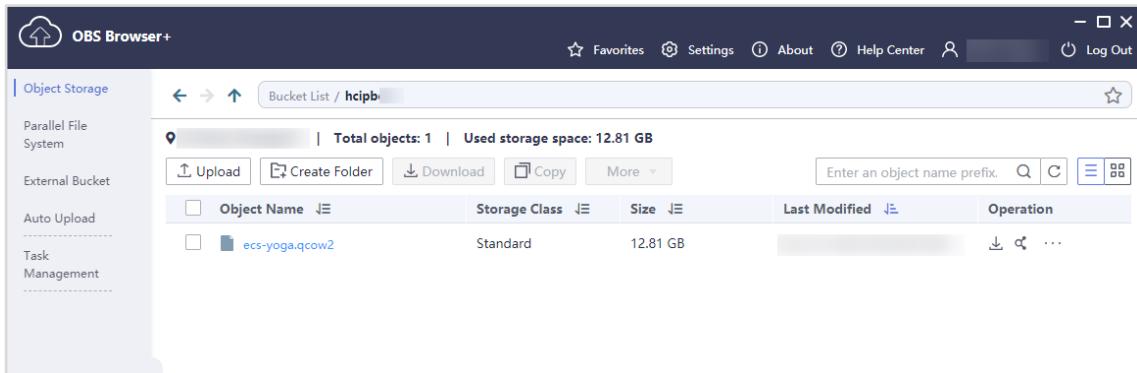
Remember my access keys. ?

Log In

[Obtain Access Keys](#) [Login Help](#) | [More](#) ▾

i The network proxy is enabled. Please check whether the current network environment requires a proxy. [Configure proxy](#) X

- Step 6** Click the bucket name and drag the ecs-yoga.qcow2 image package to the displayed page. You can view the upload progress on the **Task Management** page. Wait for several minutes (depending on the network speed) until the object is uploaded to the OBS bucket.



Step 7 In the Hong Kong area, click **Image Management Service**. On the displayed **Private Images** page, click **Create Image**. Set the parameters as shown in the following figure and click **Next**.

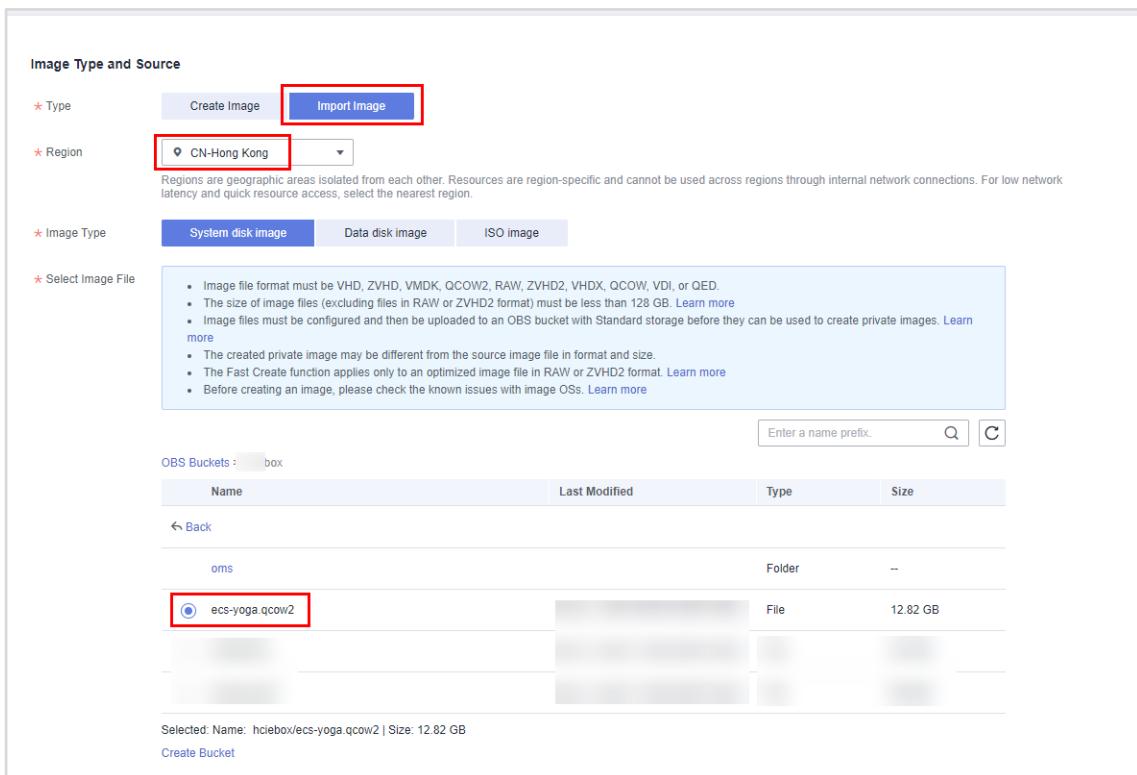


Image Information

Enable automatic configuration [Learn more](#)

* Function ECS system disk image BMS system disk image

Architecture x86 ARM

If the system detects an architecture type different from that you set, the architecture type detected by the system prevails. If the system fails to detect the architecture type, the architecture type you set prevails.

Boot Mode BIOS UEFI

The boot mode must be the same as that of the OS contained in the image file. Otherwise, ECSS created from this system disk image will fail to start.

OS

If the OS in the image file is different from the one you selected, the OS in the image file will be used to create the image. If IMS fails to detect the OS in the image file, the one you selected will be used to create the image. [View supported OSs](#)

* System Disk (GB) Ensure that the system disk size is greater than the image file size.

+ Add Data Disk You can add 3 more data disks.

* Name

Encryption KMS encryption [?](#)

Tag It is recommended that you use TMS's predefined tag function to add the same tag to different cloud resources. [View predefined tags](#) C

You can add 10 more tags.

Description

Protocol I have read and agree to the [Statement of Commitment to Image Creation and Image Disclaimer](#).

Next

Step 8 On the displayed page, confirm the parameters and click **Submit**.

Details

Resource	Configuration	Quantity
System disk image	Region: CN-Hong Kong	
	Image Type: ECS system disk image	
	Name: ecs-yoga-image	
	Source: Image File (ecs-yoga.qcow2)	
	OS: Ubuntu 20.04 server 64bit	
	System Disk (GB): 40	1
	Architecture: x86	
Boot Mode: BIOS		

Submit

Step 9 Wait until the private image is created.

Public Images Private Images **Shared Images**

Image creation Create Now **Image importing** Import Now **Replicate image** **Shared Images** **Image exporting**

You can create 49 more private images.

Name	Status	OS Type	OS	Image Type	Disk Capacity (GB)	Encrypted	Created	Operation
ecs-yoga-image	Creating 5%	Linux	Ubuntu 20.04 server 64bit	ECS system disk image	40	No		Apply for Server

Click **Apply for Server**.

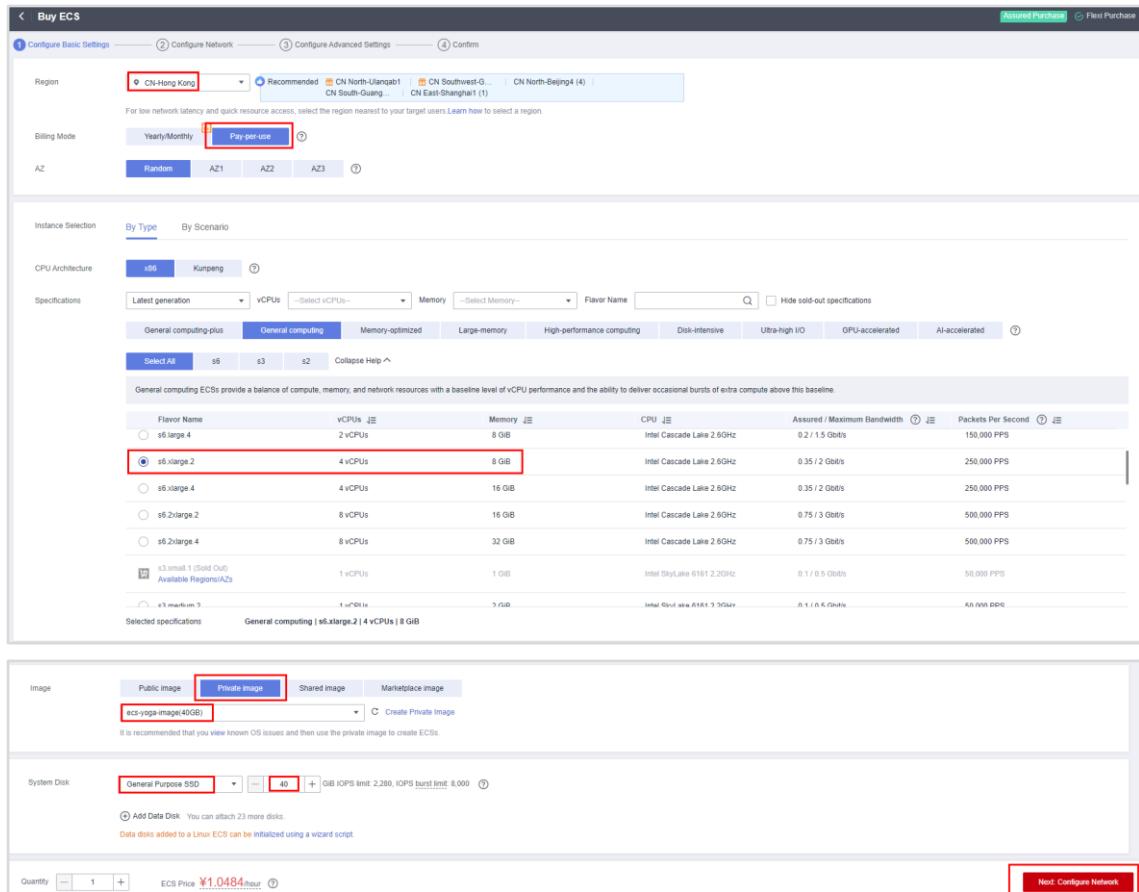
Public Images Private Images **Shared Images**

Image creation Create Now **Image importing** Import Now **Replicate image** **Shared Images** **Image exporting**

You can create 49 more private images.

Name	Status	OS Type	OS	Image Type	Disk Capacity (GB)	Encrypted	Created	Operation
ecs-yoga-image	Normal	Linux	Ubuntu 20.04 server 64bit	ECS system disk image(BB)	40	No		Apply for Server

Step 10 On the displayed Buy ECS page, set the parameters as shown in the following figure and click **Next: Configure Network**.



The screenshot shows the 'Buy ECS' interface. Step 1: Configure Basic Settings is completed. Step 2: Configure Network is highlighted. Step 3: Configure Advanced Settings and Step 4: Confirm are visible at the top.

Region: CN-Hong Kong (selected)

Billing Mode: Pay per use (selected)

AZ: Random, AZ1, AZ2, AZ3

Instance Selection: By Type

CPU Architecture: x86, Kunpeng

Specifications:

Flavor Name	vCPUs	Memory	CPU	Assured / Maximum Bandwidth	PPS
s6 large 4	2 vCPUs	8 GB	Intel Cascade Lake 2.6GHz	0.2 / 1.5 Gbps	150,000 PPS
s6.xlarge.2	4 vCPUs	8 GB	Intel Cascade Lake 2.6GHz	0.35 / 2 Gbps	250,000 PPS
s6.xlarge.4	4 vCPUs	16 GB	Intel Cascade Lake 2.6GHz	0.35 / 2 Gbps	250,000 PPS
s6.2xlarge.2	8 vCPUs	16 GB	Intel Cascade Lake 2.6GHz	0.75 / 2 Gbps	500,000 PPS
s6.2xlarge.4	8 vCPUs	32 GB	Intel Cascade Lake 2.6GHz	0.75 / 3 Gbps	500,000 PPS
s3.small.1 (Sold Out)	1 vCPU	1 GB	Intel Skylake 6161 2.2GHz	0.1 / 0.5 Gbps	50,000 PPS
e7.medium.2	4 vCPUs	7 GB	Intel Skylake A161 3.7GHz	0.1 / 0.5 Gbps	50,000 PPS

Selected specifications: General computing | s6.xlarge.2 | 4 vCPUs | 8 GB

Image: Public image, Private image (selected), Shared image, Marketplace image

System Disk: General Purpose SSD, 40 GB, + 1 GB IOPS limit: 2,280, IOPS burst limit: 8,000

Quantity: 1, ECS Price: ¥1,0484/hour

Next: Configure Network

On the displayed page, select the specified VPC, subnet, manually assign IP address (172.16.0.107), and security group. Set other parameters as shown in the following figure. Click **Next: Configure Advanced Settings**.

The screenshot shows the 'Buy ECS' configuration page. In the Network section, 'vpc-yoga(172.16.0.0/12)' is selected for the VPC, and 'subnet-yoga(172.16.0.0/24)' is selected for the subnet. Under 'Extension NIC', 'Add NIC' is selected. In the Security Group section, 'sg-yoga' is selected, and its inbound rules are listed:

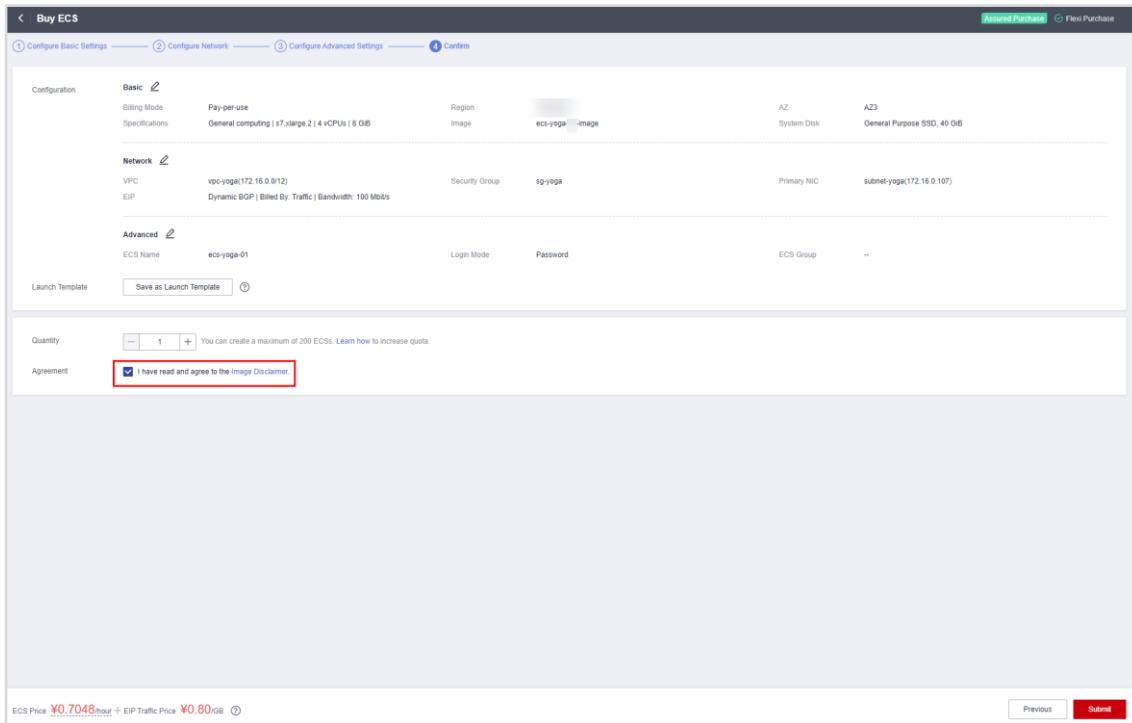
Security Group Name	Priority	Action	Protocol & Port	Type	Source	Description
sg-yoga	1	Permit	TCP: 20-21	IPv4	0.0.0.0/0	—
	1	Permit	All	IPv6	sg-yoga	Allow EC2s in the same security group to communicate ...
	1	Permit	TCP: 3389	IPv4	0.0.0.0/0	Used to remotely connect to Windows EC2s
	1	Permit	ICMP: All	IPv4	0.0.0.0/0	Used to test the EC2 connectivity with the ping command
	1	Permit	TCP: 80	IPv4	0.0.0.0/0	Used to access websites over HTTP

In the EIP section, 'Auto assign' is selected, and 'Dynamic BGP' is chosen as the EIP Type. Under 'Billed By', 'Traffic' is selected. The 'Bandwidth Size' is set to 100. The 'Release Option' section has 'Release with ECS' checked. At the bottom, the quantity is set to 1, and the total price is shown as ¥1,048/hour + EIP Traffic Price ¥1,045/GB.

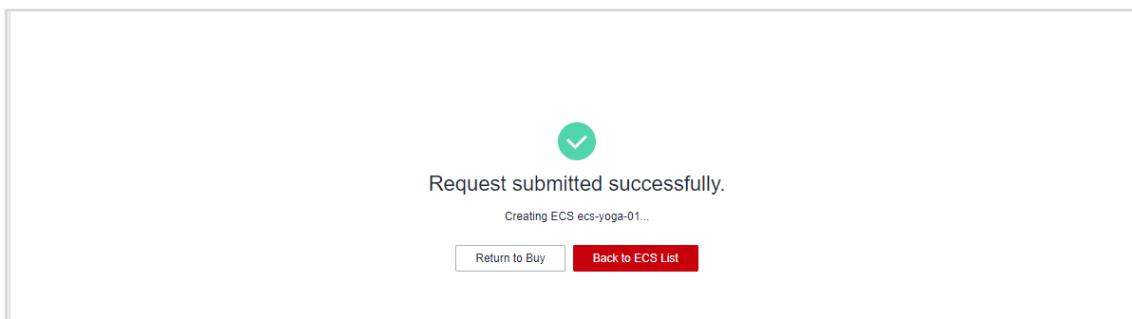
On the displayed page, specify the password, set the ECS name and other parameters as shown in the following figure. Click **Next: Confirm**.

The screenshot shows the 'Buy ECS' configuration page. In the 'Configure Basic Settings' step, the 'ECS Name' is set to 'ecs-yoga-01'. The 'Login Mode' is set to 'Password'. The 'Username' is 'root', and the 'Password' and 'Confirm Password' fields both contain '123456'. Under 'Cloud Backup and Recovery', 'Create new' is selected. In the 'ECS Group (Optional)' section, 'Anti-affinity' is selected, and 'Select ECS group...' is shown. The 'Advanced Options' section has 'Configure now' checked. At the bottom, the quantity is set to 1, and the total price is shown as ¥0.7048/hour + EIP Traffic Price ¥0.80/GB.

On the displayed page, select **I have read and agree to the Image Disclaimer**, confirm the configuration, and click **Submit**.



On the displayed page, click **Back to ECS List** to check whether the ECS is created.



Elastic Cloud Server										
My ECSs:										
	Name/ID	Monitor...	Security	AZ	Status	Specifications/Image	IP Address	Billing Mode	Tag	Operation
<input type="checkbox"/>	ecs-yoga-01			AZ3		4 vCPUs 8 GB s7... ecs-yoga-01-image	19 (EL... 172.16.0.107 (Priv...)	Pay-per-use	-	Remote Login More

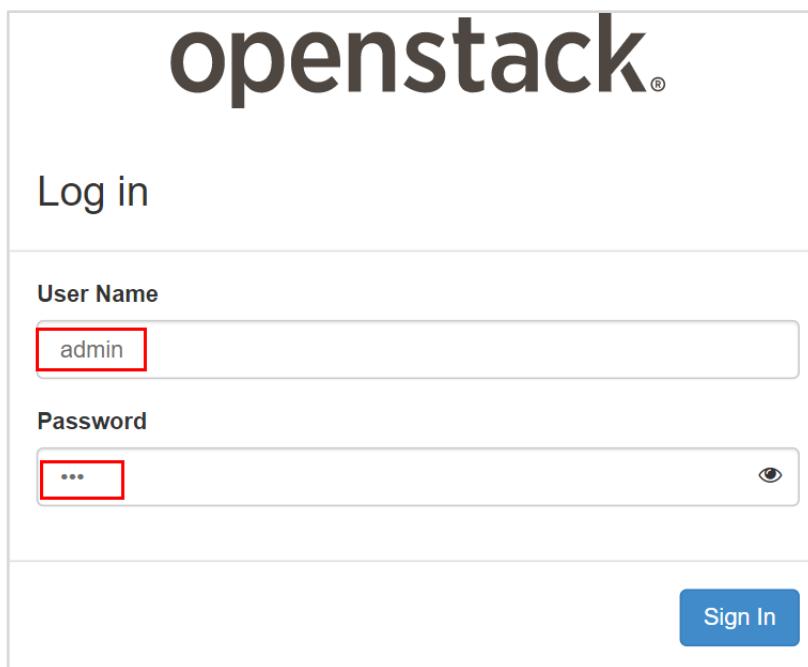
1.3 Verifying the Result

1.3.1 Logging In to OpenStack

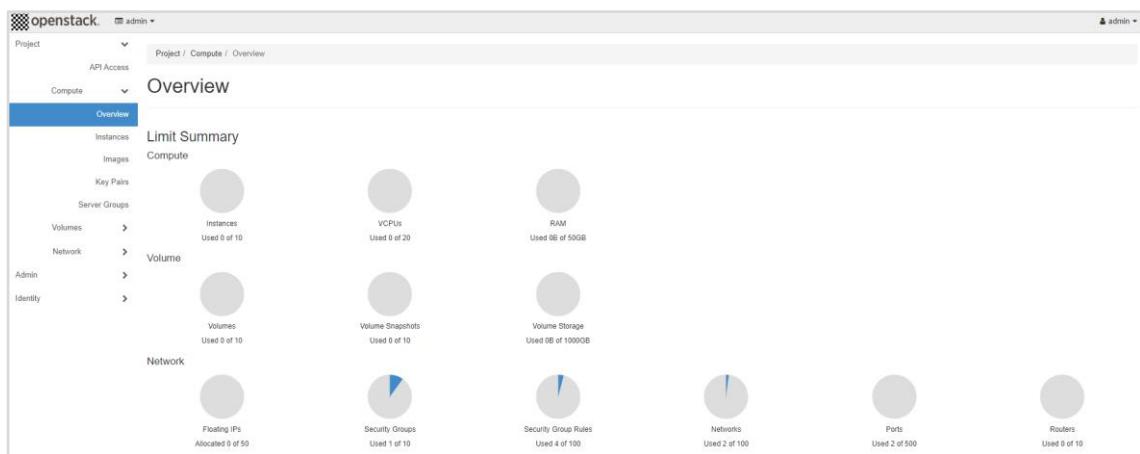
Step 1 Confirm the EIP address of the ECS.

	Name/ID	Monitor...	Security	AZ	Status	Specifications/Image	IP Address	Billing Mode	Tag	Operation
<input type="checkbox"/>	ecs-yoga-01			AZ3		4 vCPUs 8 GB s7... ecs-yoga-01-image	19 (EL... 172.16.0.107 (Priv...)	Pay-per-use	-	Remote Login More

- Step 2 Enter the login address **http://EIP address** in the address box of the browser. On the login page, enter the username and password in 1.3.2. (After the login is successful, do not create instances. If the ECS used in this experiment needs to be started, started, or restarted, perform related operations by referring to Appendix 1 at the bottom of this document to ensure that instances can be created in the OpenStack development environment. Each time the ECS is started, shut down, or restarted, perform the operations described in Appendix 1)



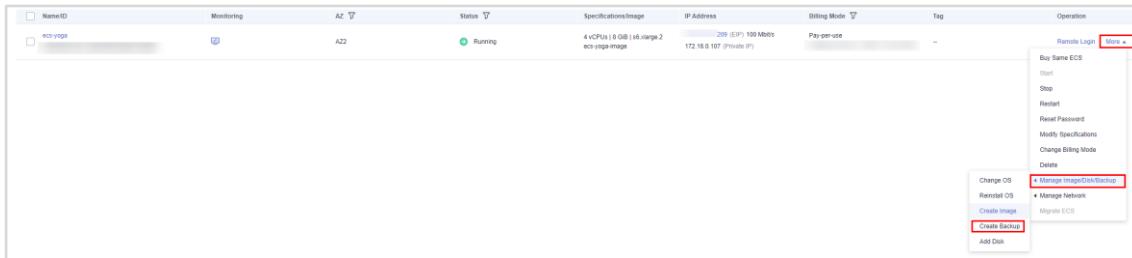
- Step 3 Click **Sign In**. The **Overview** page of the admin project is displayed.



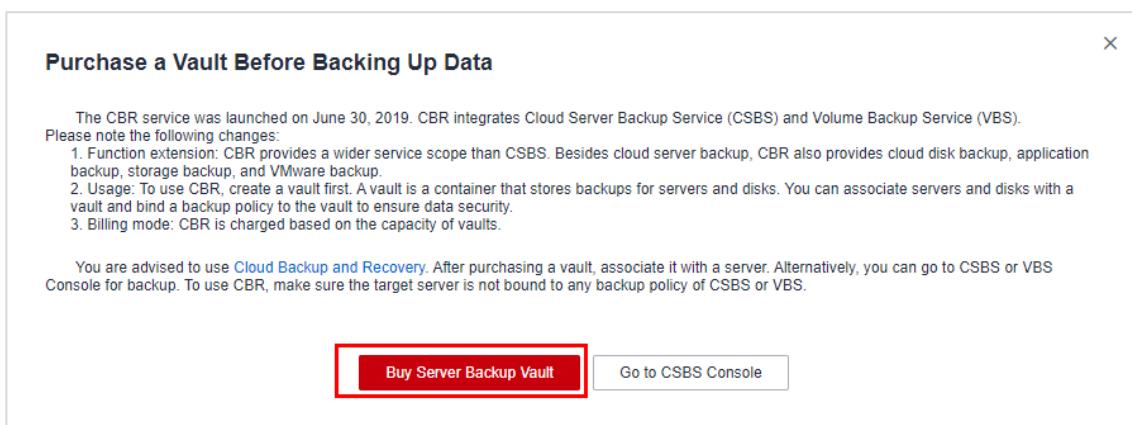
1.3.2 (Optional) Creating a Backup

To prevent environment exceptions caused by misoperations during the exercise, create a backup immediately after the environment is set up.

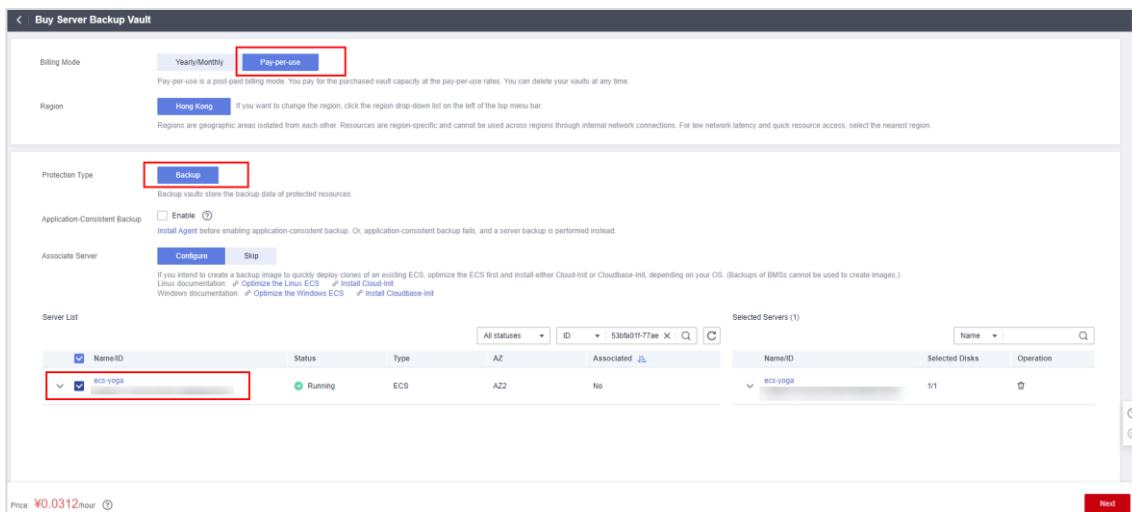
- Step 1** Return to the ECS page and click **More** in the **Operation** column of the target ECS. Choose **Manage Image/Disk/Backup > Create Backup**.

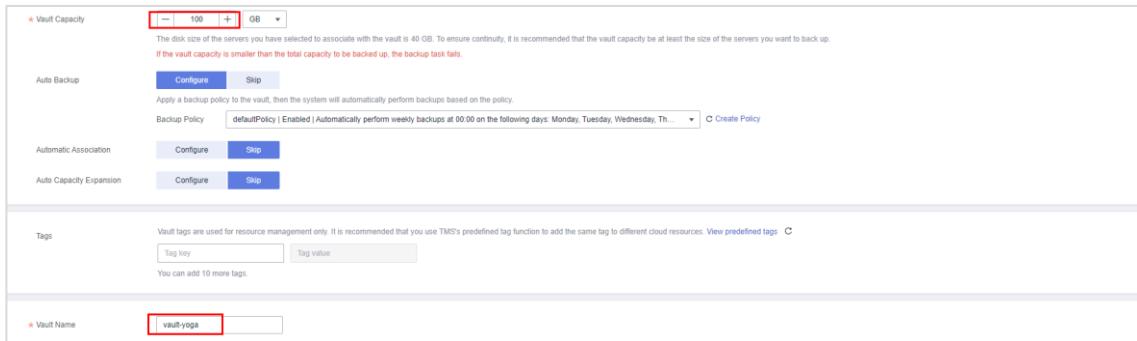


- Step 2** The **Purchase a Vault Before Backing Up Data** page is displayed. Click **Buy Server Backup Vault**.



- Step 3** On the configuration page, set **Billing Mode** to **Pay-per-use** and **Protection Type** to **Backup**. Do not configure **Auto Backup**. Change the vault name, select the ECS where OpenStack has been installed from the server list, retain the default values for other parameters, and click **Next**.

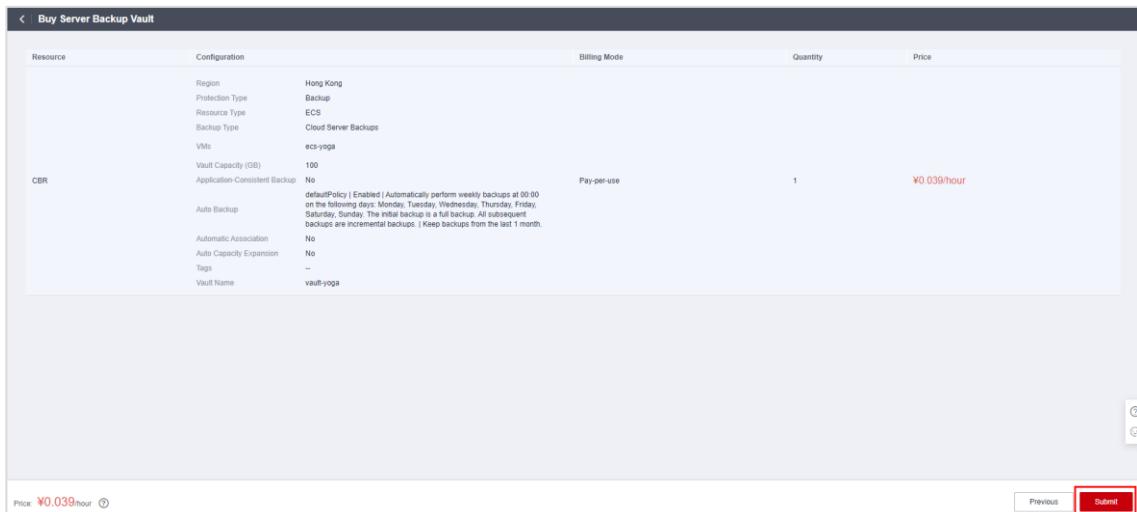




The screenshot shows the configuration page for a vault. Key settings include:

- Vault Capacity:** 100 GB (highlighted with a red box)
- Auto Backup:** Configure (button)
- Backup Policy:** defaultPolicy | Enabled | Automatically perform weekly backups at 00:00 on the following days: Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday. The initial backup is a full backup. All subsequent backups are incremental backups. | Keep backups from the last 1 month.
- Automatic Association:** Configure (button)
- Auto Capacity Expansion:** Configure (button)
- Tags:** Tag key and Tag value input fields
- Vault Name:** vault-yoga (highlighted with a red box)

Step 4 Confirm the backup configuration and click **Submit**.



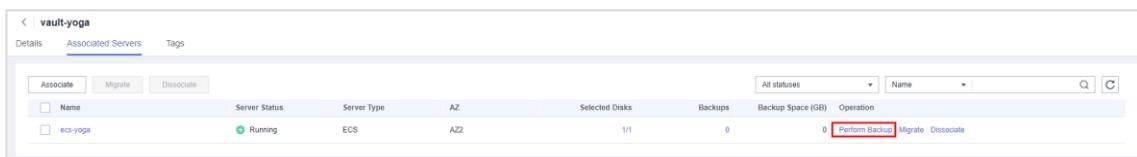
The screenshot shows a summary of the backup configuration:

Resource	Configuration	Billing Mode	Quantity	Price
Region	Hong Kong			
Protection Type	Backup			
Resource Type	ECS			
Backup Type	Cloud Server Backups			
VMs	ecs-yoga			
Vault Capacity (GB)	100			
Application-Consistent Backup	No			
Auto Backup	defaultPolicy Enabled Automatically perform weekly backups at 00:00 on the following days: Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday. The initial backup is a full backup. All subsequent backups are incremental backups. Keep backups from the last 1 month.	Pay-per-use	1	¥0.039/hour
Automatic Association	No			
Auto Capacity Expansion	No			
Tags	--			
Vault Name	vault-yoga			

Price: ¥0.039/hour

Buttons: Previous, Submit (highlighted with a red box)

View the associated server and click **Perform Backup**.



The screenshot shows the 'Associated Servers' tab for the vault 'vault-yoga'. It lists one server:

Name	Server Status	Server Type	AZ	Selected Disks	Backups	Backup Space (GB)	Operation
ecs-yoga	Running	ECS	AZ2	1/1	0	0	Perform Backup (highlighted with a red box)

Change the backup name and click **Yes**.

Perform Backup

⚠ Are you sure you want to perform backup now?
Backup will be performed for the selected resources immediately.

Name/ID	Status	Server Type	AZ	Backups
ecs-yoga 53bfa01f-77ae-481...	Running	ECS	AZ2	0

*** Name:** (Red box)

Description: (Red box)
0/255

Full Backup: **Enable:**

Yes (Red box) **No**

Return to the **Backups** tab page and wait until the backup is created.

Vaults	Backups	Agent Installation
<input type="button" value="Delete"/>	<input type="checkbox"/> Backup Name: ecs-yoga_01	Backup Type: -- Status: Creating Server Name: ecs-yoga Server Type: ECS Created: Operation: Restore Server Create Image More

Vaults	Backups	Agent Installation
<input type="button" value="Delete"/>	<input type="checkbox"/> Backup Name: ecs-yoga_01	Backup Type: Full backup Status: Available Server Name: ecs-yoga Server Type: ECS Created: Operation: Restore Server Create Image More

1.3.3 (Optional) Phased resource deletion.

After the lab environment is installed and verified, you can delete private image and OBS bucket as required.

1.4 Quiz

1. DevStack is used to install OpenStack. What components are installed by default? How can I view them?

Answer: Choose **Admin > System > System Information** or click **API Access** to view the components.

2

OpenStack Dashboard Management

2.1 Overview

2.1.1 About This Exercise

This exercise describes how to log in to OpenStack using the OpenStack dashboard and CLI and perform some basic operations, enabling you to quickly understand basic OpenStack functions.

2.1.2 Prerequisites

OpenStack has been installed.

You have obtained the default login information of OpenStack.

2.1.3 Objectives

Be familiar with how to log in to the OpenStack dashboard.

Be familiar with the content displayed on the OpenStack dashboard.

Have general knowledge of basic OpenStack functions, such as changing the login password of the default user, creating a user, binding the user to a main project, and assigning a role.

Be familiar with how to log in to the OpenStack CLI client.

2.1.4 Process

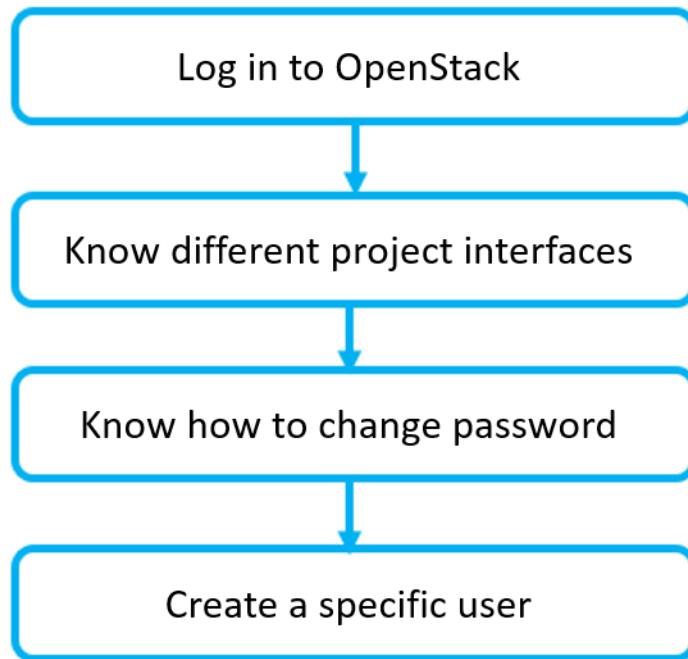
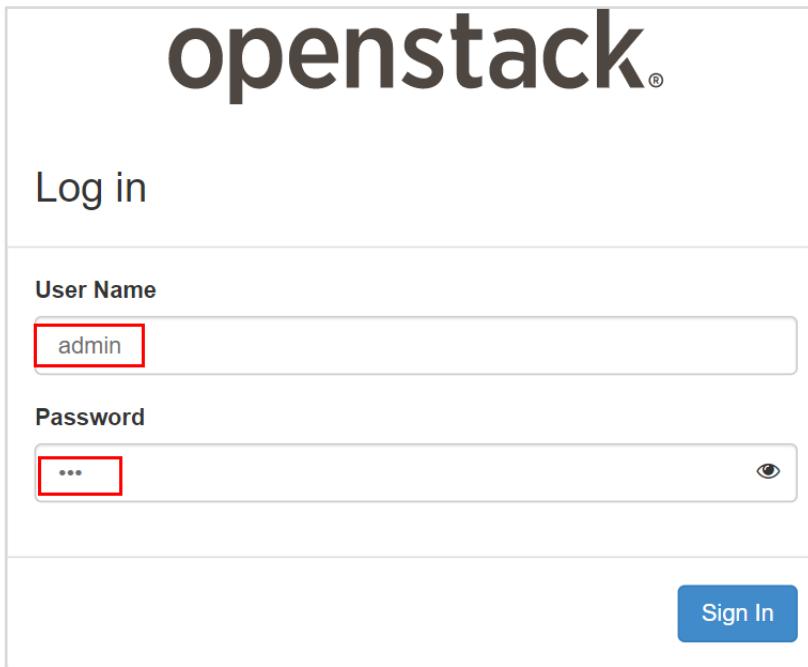


Figure 2-1 OpenStack dashboard management process

2.2 Logging In to the OpenStack Dashboard

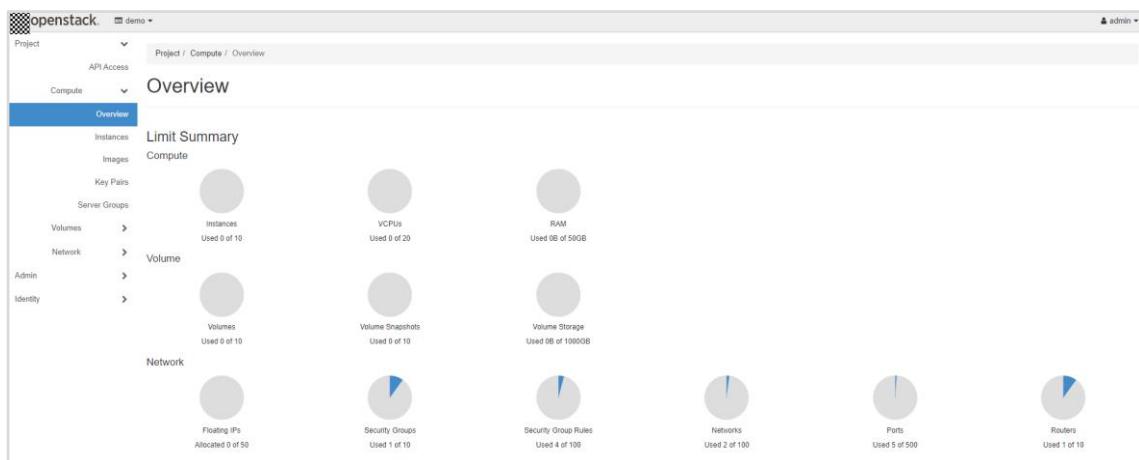
2.2.1 Procedure

- Step 1 Enter **http://EIP address** in the address box of the browser, enter the username and password, and click **Sign In**.

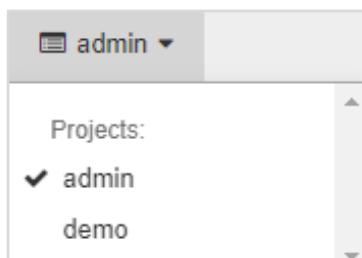


The image shows the OpenStack login interface. At the top, the word "openstack." is displayed in a large, lowercase, sans-serif font. Below it, the word "Log in" is centered. There are two input fields: "User Name" containing "admin" and "Password" containing "•••". To the right of the password field is an "eye" icon for password visibility. A blue "Sign In" button is located at the bottom right of the form.

Step 2 After the login is successful, click **admin** in the upper left corner and select **demo** from the drop-down list. The demo project overview page is displayed. You can view the **Compute**, **Volume**, and **Network** of the demo project.



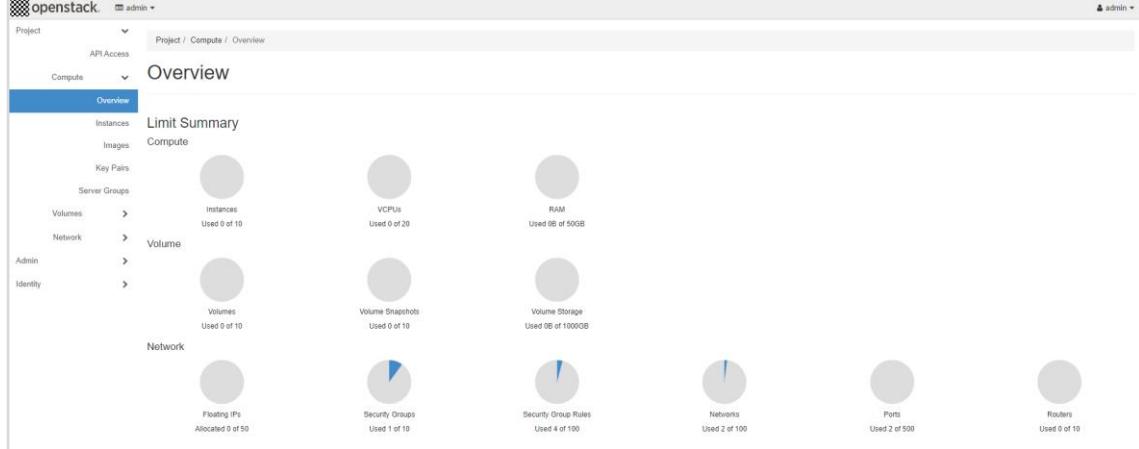
Click **demo** in the upper left corner and select **admin** from the drop-down list.



After you select **admin**, the switchover is performed immediately. A message indicating the switchover result is displayed in the upper right corner.

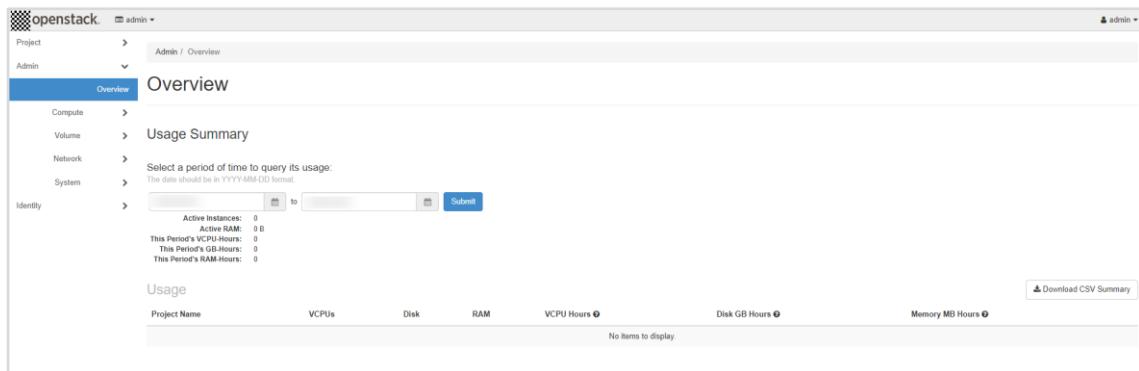
Success: Switch to project "admin" successful.

You can view the **Compute**, **Volume**, and **Network** of the admin project.



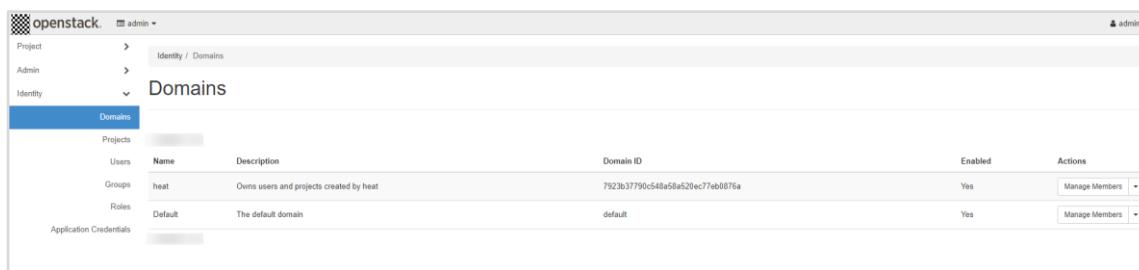
The screenshot shows the OpenStack Admin Overview page. The navigation pane on the left includes Project, Admin, Compute, Volume, Network, and Identity sections. Under Identity, Domains is selected. The main area displays a 'Limit Summary' for Compute, Volume, and Network resources. For Compute, it shows Instances (Used 0 of 10), VCPUs (Used 0 of 20), RAM (Used 98 of 500GB). For Volume, it shows Volumes (Used 0 of 10), Volume Snapshots (Used 0 of 10), Volume Storage (Used 98 of 1000GB). For Network, it shows Floating IPs (Allocated 0 of 50), Security Groups (Used 1 of 10), Security Group Rules (Used 4 of 100), Networks (Used 2 of 100), Ports (Used 2 of 500), and Routers (Used 0 of 10).

Step 3 Click **Admin** in the navigation pane on the left and choose **Overview** to view the system usage summary. You can view the global compute, volume, network, and system information in the admin directory.



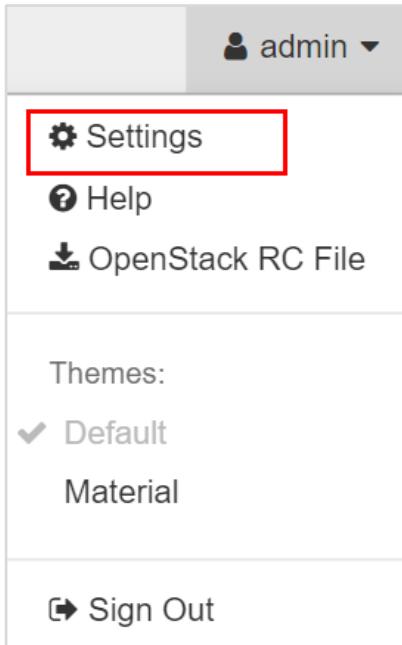
The screenshot shows the OpenStack Admin Overview page. The navigation pane on the left includes Project, Admin, Compute, Volume, Network, and System sections. Under Admin, Overview is selected. The main area displays a 'Usage Summary' section with fields for selecting a time period and a 'Submit' button. Below it is a table for 'Usage' with columns for Project Name, VCPUs, Disk, RAM, VCPU Hours, Disk GB Hours, and Memory MB Hours. A 'Download CSV Summary' button is also present.

Step 4 In the navigation pane, choose **Identity > Domains** to view the **Domains** page. You can view the project, user, group, role, and application credential pages.

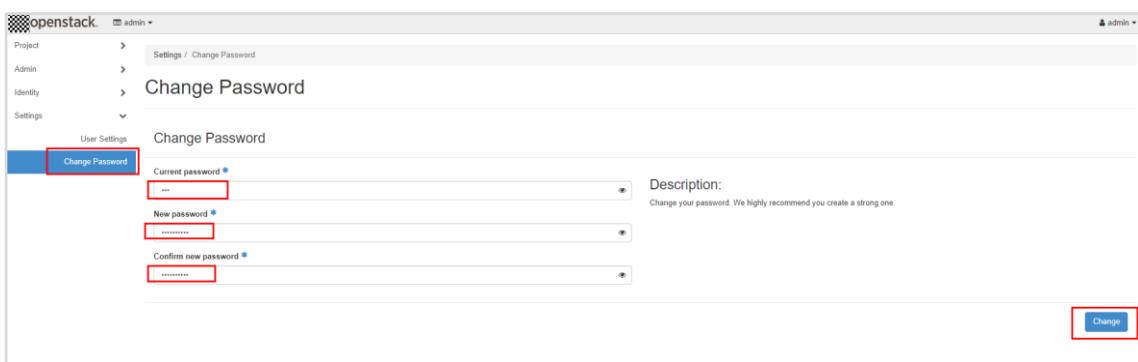


The screenshot shows the OpenStack Identity Domains page. The navigation pane on the left includes Project, Admin, and Identity sections. Under Identity, Domains is selected. The main area displays a table for 'Domains' with columns for Name, Description, Domain ID, Enabled, and Actions. It lists two domains: 'heat' (Description: 'Owns users and projects created by heat', Domain ID: 7923b37790c540a50a520ec77eb0876a, Enabled: Yes, Actions: Manage Members) and 'Default' (Description: 'The default domain', Domain ID: default, Enabled: Yes, Actions: Manage Members).

Step 5 To change the login password of user **admin**, click **admin** in the upper right corner and click **Settings** in the displayed dialog box.

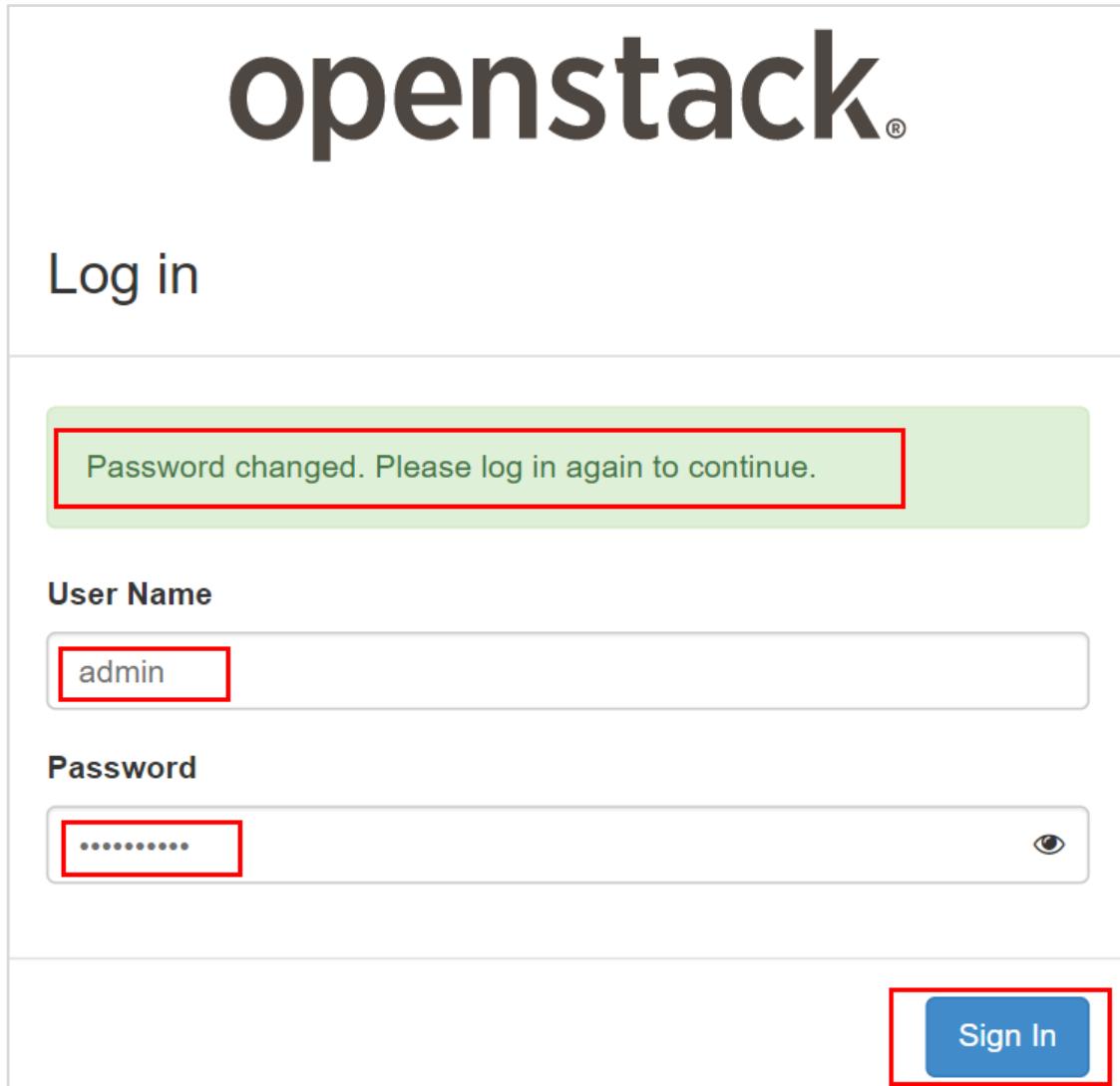


- Step 6 On the displayed page, click **Change Password**, enter the current password as required, enter a new password, and click **Change**.

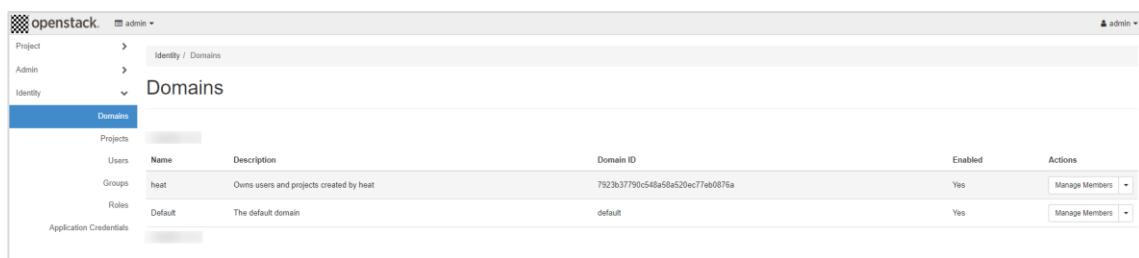


The screenshot shows the 'Change Password' form. The URL in the browser is 'openstack/settings/change_password'. The left sidebar shows 'User Settings' with a 'Change Password' link. The main form has three input fields: 'Current password *' (redacted), 'New password *' (redacted), and 'Confirm new password *' (redacted). A 'Description' field below the inputs says 'Change your password. We highly recommend you create a strong one.' A 'Change' button at the bottom right is also highlighted with a red box.

- Step 7 Return to the OpenStack login page, enter the username and the login password defined in step 6, and click **Sign In**.



Step 8 This exercise uses project **demo** as an example to describe how to create an operator user and open **Identity**.



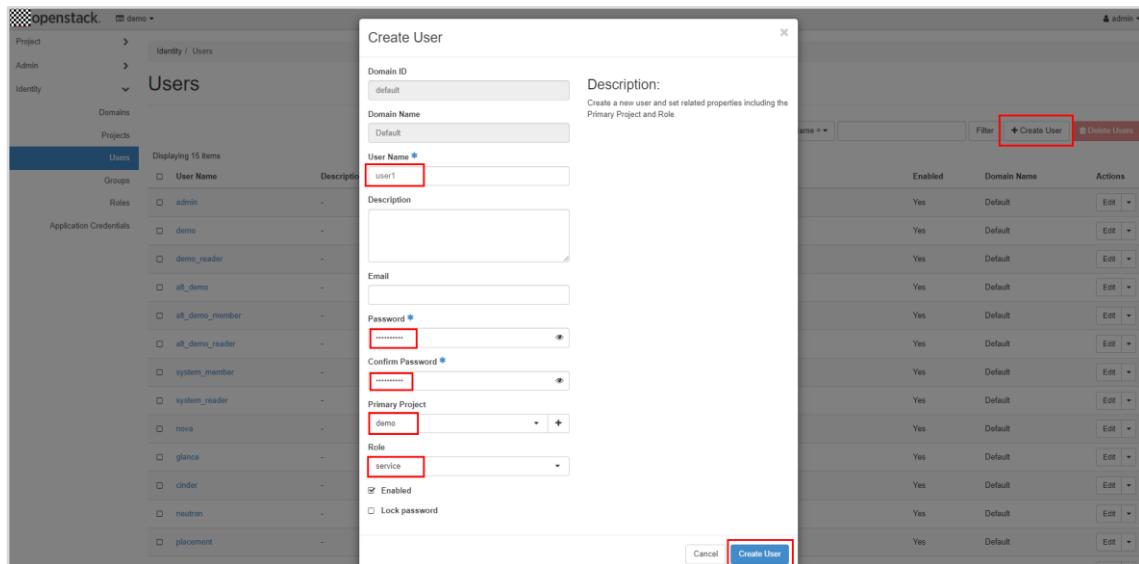
The screenshot shows the OpenStack Identity Domains page. The left sidebar has a "Domains" section selected. The main content area displays a table of domains:

Name	Description	Domain ID	Enabled	Actions
heat	Owns users and projects created by heat	7923b37790c548a58a520ec77eb0076a	Yes	<button>Manage Members</button>
Default	The default domain	default	Yes	<button>Manage Members</button>

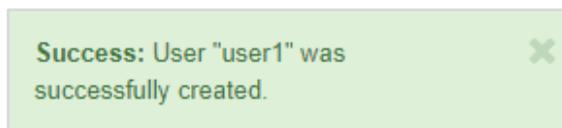
Step 9 Click **Users**. You can click **admin** in the upper left corner to switch to the **demo** project.



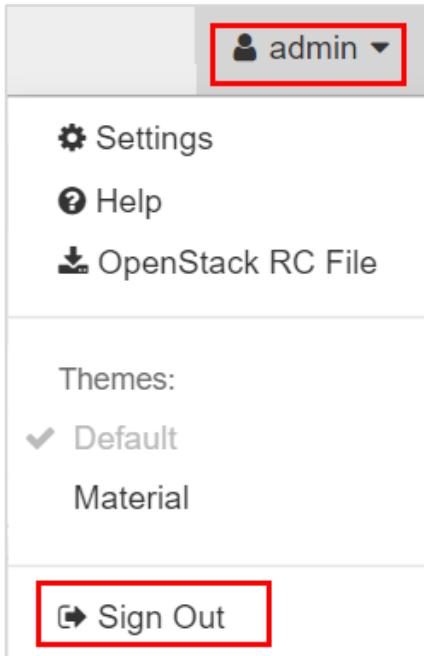
- Step 10** In the right pane, click **Create User** in the upper right corner. In the **Create User** dialog box, set **User Name** to **user1**, enter a login password, set **Primary Project** to **demo**, set **Role** to **service**, and click **Create User**.



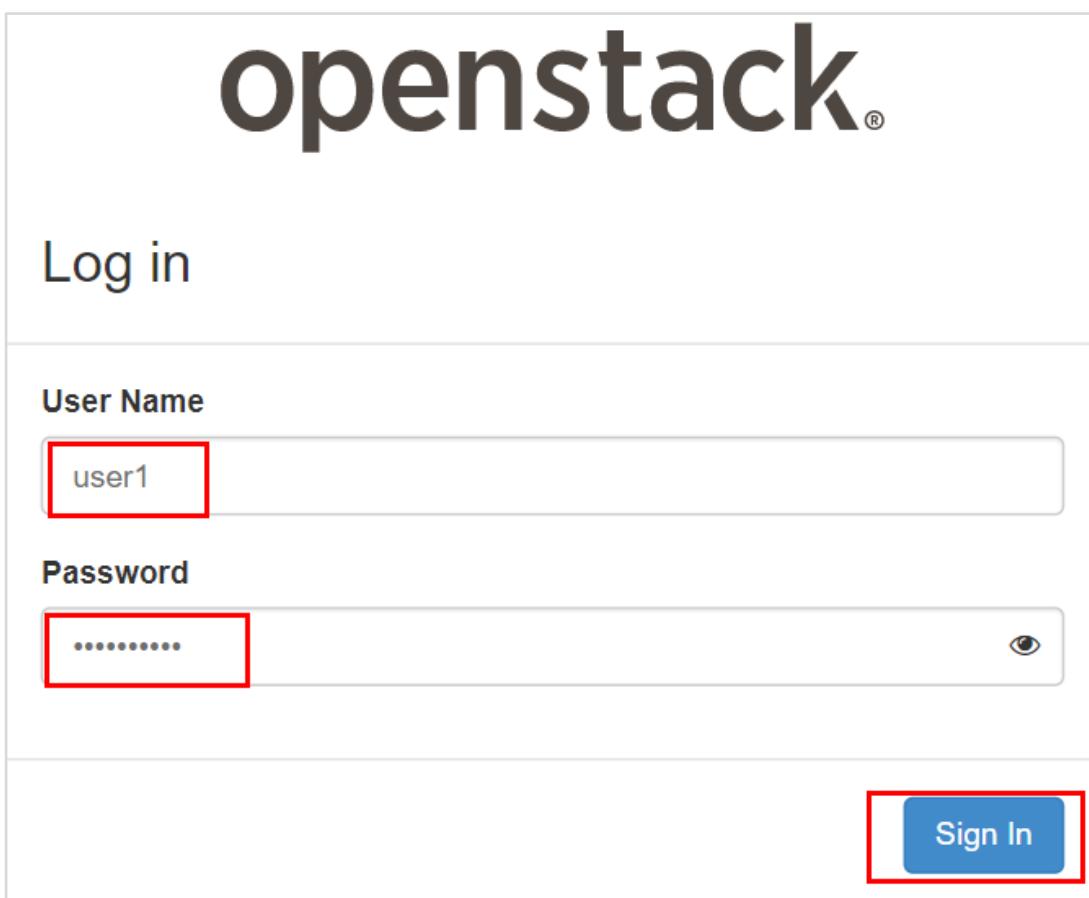
A success message is displayed in the upper right corner.



- Step 11** Click **admin** in the upper right corner. In the displayed dialog box, click **Sign Out** to return to the login page.



- Step 12 On the login page, enter the new username **user1** and the password defined in step 10, and click **Sign In**.



Log in

User Name

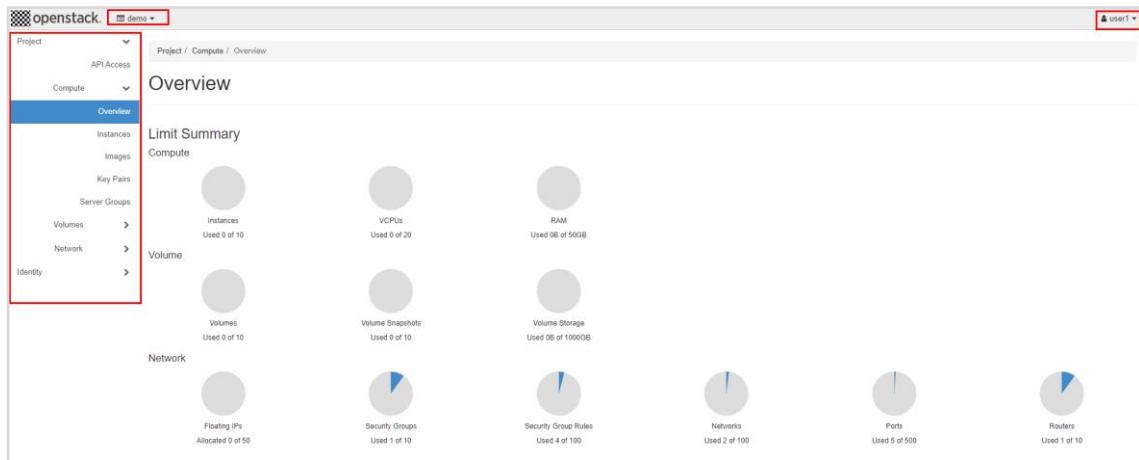
user1

Password

.....

Sign In

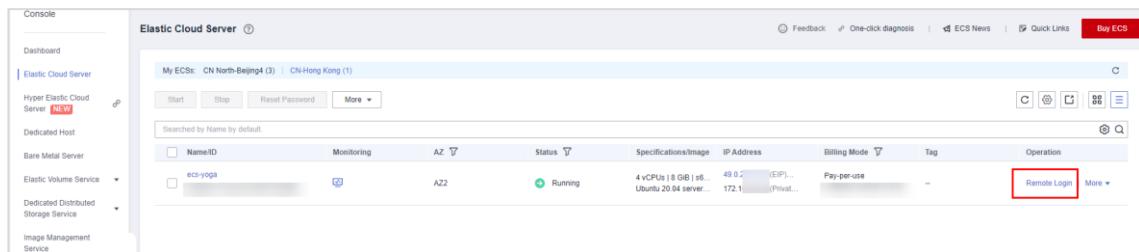
- Step 13 The page of **user1** whose role is **service** is displayed.



2.3 Logging In to the OpenStack Client (CLI)

2.3.1 Procedure

Step 1 Log in to the ECS console, locate the ECS running OpenStack, and click **Remote Login**.



Enter the username **root** and the password and press **Enter**.

```
Ubuntu 20.04.4 LTS ecs-yoga tty1
ecs-yoga login: root
Password:
Welcome to Ubuntu 20.04.4 LTS (GNU/Linux 5.4.0-100-generic x86_64)

 * Documentation: https://help.ubuntu.com
 * Management: https://landscape.canonical.com
 * Support: https://ubuntu.com/advantage

System information as of [REDACTED]

System load: 0.06      Users logged in: 0
Usage of /: 33.3% of 39.12GB  IPv4 address for br-ex: 172
Memory usage: 67%
Swap usage: 0%
Processes: 230          IPv4 address for eth0: 172
                        IPv4 address for virbr0: 192

* Super-optimized for small spaces - read how we shrank the memory
  footprint of MicroK8s to make it the smallest full K8s around.

https://ubuntu.com/blog/microk8s-memory-optimisation

132 updates can be applied immediately.
82 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

New release '22.04.1 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

*** System restart required ***

      Welcome to Huawei Cloud Service

Last login:
root@ecs-yoga:~# _
```

Alternatively, you can use the local SSH to log in to the client and enter the EIP address of the ECS for login.

Step 2 Switch to the **stack** user and go to the **devstack** directory.

```
su - stack
cd devstack
```

```
root@ecs-yoga:~# su - stack
stack@ecs-yoga:~$ cd devstack/
stack@ecs-yoga:~/devstack$
```

View the files in the current directory.

```
stack@ecs-yoga:~/devstack$ ls
clean.sh      extras.d      FUTURE.rst   lib      openrc      run_tests.sh  stackrc    tox.ini
CONTRIBUTING.rst  files       gate        LICENSE  playbooks   samples     stack.sh  unstack.sh
data          functions     HACKING.rst  local.conf README.rst  setup.cfg  tests
doc           functions-common inc      Makefile  roles      setup.py   tools
```

Step 3 Run the **vim admin-openrc.sh** command to create the **admin-openrc.sh** definition file of environment variables and enter the following code. Replace **ADMIN_PASS** with the password of the admin user. Replace **ECS_IP** with the **private IP address** of the ECS.

```
stack@ecs-yoga:~/devstack$ vim admin-openrc.sh
```

```
export OS_PROJECT_DOMAIN_NAME=Default
export OS_USER_DOMAIN_NAME=Default
export OS_PROJECT_NAME=admin
export OS_USERNAME=admin
export OS_PASSWORD=ADMIN_PASS
export OS_AUTH_URL=http://ECS_IP/identity
```

```
export OS_IDENTITY_API_VERSION=3  
export OS_IMAGE_API_VERSION=2
```

```
export OS_PROJECT_DOMAIN_NAME=Default  
export OS_USER_DOMAIN_NAME=Default  
export OS_PROJECT_NAME=admin  
export OS_USERNAME=admin  
export OS_PASSWORD=h34lly4n0t42332  
export OS_AUTH_URL=http://172.16.6.123/identity  
export OS_IDENTITY_API_VERSION=3  
export OS_IMAGE_API_VERSION=2
```

After the editing is complete, press **Esc**, enter **:wq**, and press **Enter** to exit. Check the files in the current directory again.

```
stack@ecs-yoga:~/devstack$ ls  
admin-openrc.sh doc functions-common inc Makefile roles setup.py tools  
clean.sh extras.d FUTURE.rst lib openrc run_tests.sh stackrc tox.ini  
CONTRIBUTING.rst files gate LICENSE playbooks samples stack.sh unstack.sh  
data functions HACKING.rst local.conf README.rst setup.cfg tests
```

Step 4 Run the **admin-openrc.sh** command to enter the administrator view.

```
. admin-openrc.sh
```

```
stack@ecs-yoga:~/devstack$ . admin-openrc.sh  
stack@ecs-yoga:~/devstack$ █
```

Step 5 Run the following command to view the current OpenStack project list and check whether the login is successful:

```
openstack project list
```

If the following information is displayed, the environment variables have been imported.

```
stack@ecs-yoga:~/devstack$ openstack project list  
+-----+-----+  
| ID | Name |  
+-----+-----+  
| 1485c326cc77417291b92c033797035b | invisible_to_admin |  
| 1d127fe445b74c1ab90511eb037312a6 | alt_demo |  
| 3638b3c3bbe64ed99321a647812e9371 | demo |  
| 701416c42bbe4db3ab77b7810bc6f212 | admin |  
| 7365d65564e64a069bc28b26ba1f8b2d | service |  
+-----+-----+
```

If the following information is displayed, the environment variables cannot be imported. Check whether the **admin-openrc.sh** file contains error information.

```
stack@ecs-yoga:~/devstack$ openstack project list
The request you have made requires authentication. (HTTP 401) (Request-ID: req-00b77748-f815-4c6e-9d4b-cfe290ced8c7)
```

Step 6 If you want to switch to another user, create the **demo-openrc.sh** file and enter the following code. The **demo** user is used as an example.

```
stack@ecs-yoga:~/devstack$ vim demo-openrc.sh
```

```
export OS_PROJECT_DOMAIN_NAME=Default
export OS_USER_DOMAIN_NAME=Default
export OS_PROJECT_NAME=demo
export OS_USERNAME=demo
export OS_PASSWORD=wei
export OS_AUTH_URL=http://ECS\_IP/identity
export OS_IDENTITY_API_VERSION=3
export OS_IMAGE_API_VERSION=2
```

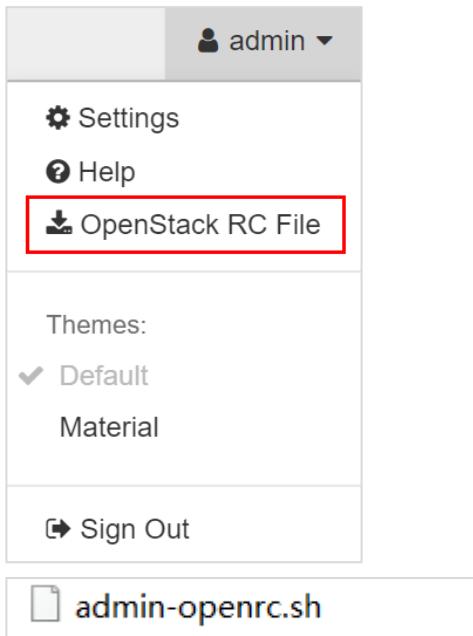
```
export OS_PROJECT_DOMAIN_NAME=Default
export OS_USER_DOMAIN_NAME=Default
export OS_PROJECT_NAME=demo
export OS_USERNAME=demo
export OS_PASSWORD=wei
export OS_AUTH_URL=http://172.16.0.80/identity
export OS_IDENTITY_API_VERSION=3
export OS_IMAGE_API_VERSION=2
```

Step 7 Execute the file and view the project list.

```
stack@ecs-yoga:~/devstack$ . demo-openrc.sh
stack@ecs-yoga:~/devstack$ openstack project list
+-----+-----+
| ID      | Name    |
+-----+-----+
| 1485c326cc77417291b92c033797035b | invisible_to_admin |
| 3638b3c3bbe64ed99321a647812e9371 | demo               |
+-----+-----+
```

Step 8 (Optional) In the preceding steps, you need to create an environment variable file and edit the environment variable parameters based on the information about the user to log in. You can also export the **OpenStack RC** file from the dashboard, upload the file to the **/opt/stack/devstack** directory, and execute the file. Log in to the dashboard of the corresponding user, move the cursor to the username in the

upper right corner, and select **OpenStack RC File** from the drop-down list to download the file.



Use WinSCP to upload the downloaded file to the **devstack** directory of the ECS. If the file is **admin-openrc.sh**, run the **rm admin-openrc.sh** command to delete the original file in advance.

```
stack@ecs-yoga:~/devstack$ ls
admin-openrc.sh  data      extras.d  functions-common  HACKING.rst  LICENSE  openrc   roles      setup.cfg  stack.sh  tox.ini
clean.sh         demo-openrc.sh  files     FUTURE.rst      inc       local.conf  playbooks  run_tests.sh  setup.py  tests    unstack.sh
CONTRIBUTING.rst  doc      functions  gate        lib      Makefile   README.rst  samples   stackrc   tools
stack@ecs-yoga:~/devstack$ rm admin-openrc.sh
stack@ecs-yoga:~/devstack$ ls
clean.sh         data      doc      files      functions-common  gate      inc      LICENSE  Makefile  playbooks  roles      samples   setup.py  stack.sh  tools      unstack.sh
CONTRIBUTING.rst  demo-openrc.sh  extras.d  functions  FUTURE.rst  HACKING.rst  lib      local.conf  openrc   README.rst  run_tests.sh  setup.cfg  stackrc   tests    tox.ini
```

After the upload is successful, run the file. Enter the password of user **admin**.

```
stack@ecs-yoga:~/devstack$ ls
admin-openrc.sh  data      extras.d  functions-common  HACKING.rst  LICENSE  openrc   roles      setup.cfg  stack.sh  tox.ini
clean.sh         demo-openrc.sh  files     FUTURE.rst      inc       local.conf  playbooks  run_tests.sh  setup.py  tests    unstack.sh
CONTRIBUTING.rst  doc      functions  gate        lib      Makefile   README.rst  samples   stackrc   tools
stack@ecs-yoga:~/devstack$ . admin-openrc.sh
Please enter your OpenStack Password for project admin as user admin:
[REDACTED]
```

View the OpenStack project list to check whether the environment variables have been imported.

```
stack@ecs-yoga:~/devstack$ . admin-openrc.sh
Please enter your OpenStack Password for project admin as user admin:
stack@ecs-yoga:~/devstack$ openstack project list
+-----+-----+
| ID          | Name      |
+-----+-----+
| 1485c326cc77417291b92c033797035b | invisible_to_admin |
| 1d127fe445b74c1ab90511eb037312a6 | alt_demo      |
| 3638b3c3bbe64ed99321a647812e9371 | demo        |
| 701416c42bbe4db3ab77b7810bc6f212 | admin        |
| 7365d65564e64a069bc28b26ba1f8b2d | service      |
+-----+-----+
```

2.4 Quiz

1. What are the differences between a user with the **service** role and a user with the **admin** role in the same project after logging in to the OpenStack homepage? Why are these differences?

Answer: There is no **Domains**, **Groups**, or **Roles** under **Identity** for the **service** role. This means that users of different roles in the same project have different permissions. Therefore, the resources that can be viewed and managed are different.

2. You can view the users of the **admin** and **demo** projects to understand why only the **admin** user can switch between the **admin** and **demo** projects.

3 OpenStack Identity Management

3.1 Overview

3.1.1 About This Exercise

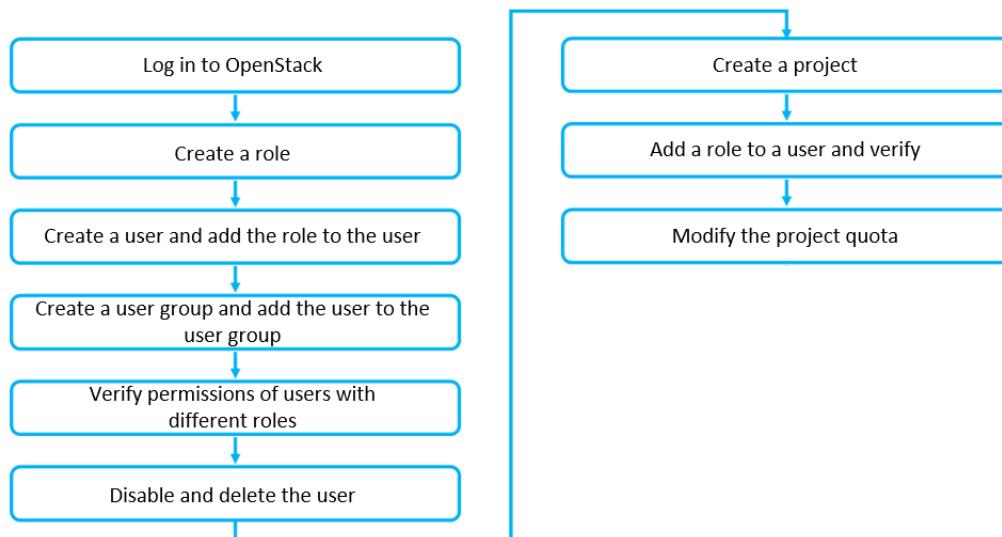
This exercise introduces how to create roles, users, groups, and projects on the OpenStack dashboard and using the OpenStack CLI, verify the permission differences among users with different roles, and create services and service API endpoints using the OpenStack CLI.

3.1.2 Objectives

Upon completion of this exercise, you will be familiar with the following operations on the OpenStack dashboard or using the OpenStack CLI:

- Creating roles, users, and user groups
- Disabling and deleting users
- Creating projects and modifying project quotas

3.1.3 Process

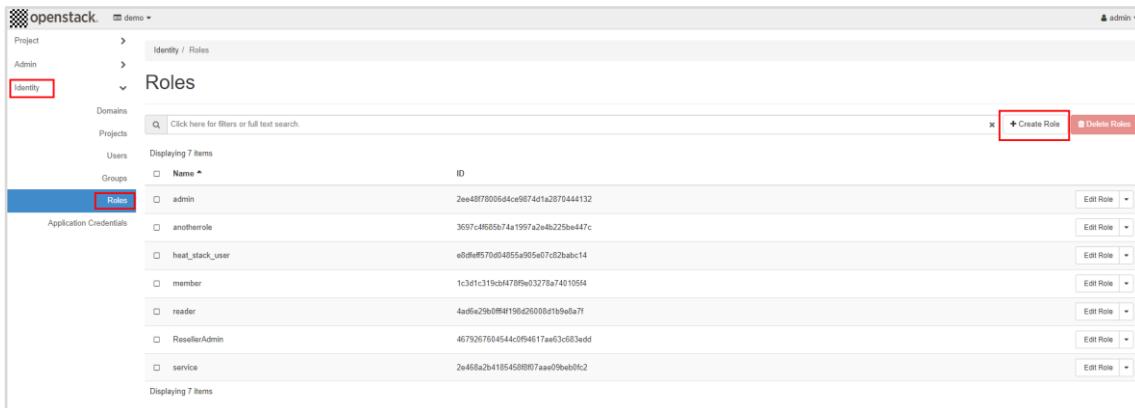


3.2 Operations on the OpenStack Dashboard

3.2.1 Creating a Role, User, and User Group

3.2.1.1 Procedure

- Step 1** Log in to the OpenStack dashboard as the **admin** user. In the navigation pane, choose **Identity > Roles**. The role list is displayed. Click **Create Role** in the upper right corner of the page.



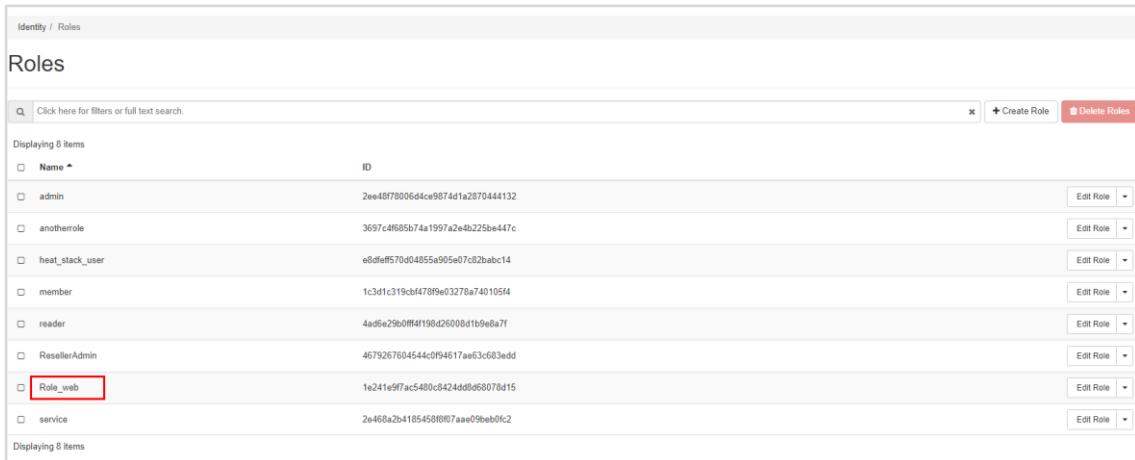
Name	ID	Action
admin	2ee48f78006d4ce9874d1a2870444132	Edit Role
anotherole	3697c4f685b74a1997a2e4b225be447c	Edit Role
heat_stack_user	e8dff570d04855a905e07c82babcc14	Edit Role
member	1c3d1c319cb478f9e0327ba740105f4	Edit Role
reader	4ad6e29b0ff4198d26008db1b5e8a7f	Edit Role
ResellerAdmin	4679267604544cf94617ae63c683edd	Edit Role
service	2e468a2b4185458fb07aae09eb0fc2	Edit Role

- Step 2** In the displayed **Create Role** dialog box, specify **Name** to **Role_web** and click **Submit**.



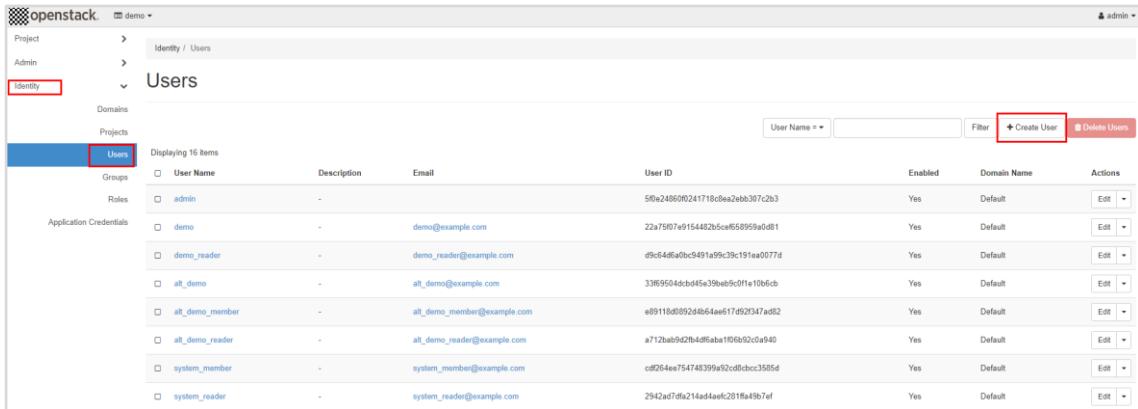
Name *	Role_web
<input type="button" value="Cancel"/> <input style="background-color: #0070C0; color: white; border: 1px solid #0070C0;" type="button" value="Submit"/>	

View the created role in the role list.



Name	ID	Action
admin	2ee48f78006d4ce9874d1a2870444132	Edit Role
anotherole	3697c4f685b74a1997a2e4b225be447c	Edit Role
heat_stack_user	e8dff570d04855a905e07c82babcc14	Edit Role
member	1c3d1c319cb478f9e0327ba740105f4	Edit Role
reader	4ad6e29b0ff4198d26008db1b5e8a7f	Edit Role
ResellerAdmin	4679267604544cf94617ae63c683edd	Edit Role
Role_web	1e241e97ac5480c8424ddbd58078d15	Edit Role
service	2e468a2b4185458fb07aae09eb0fc2	Edit Role

Step 3 In the navigation pane, choose **Identity > Users**. The user list is displayed. Click **Create User** in the upper right corner of the page.



User Name	Description	Email	User ID	Enabled	Domain Name	Actions
admin	-		50e24860f0241718c0ea2eb307c2b3	Yes	Default	<button>Edit</button>
demo	-	demo@example.com	22a7507e9154482b5ceff58959a0d81	Yes	Default	<button>Edit</button>
demo_reader	-	demo_reader@example.com	d9c64d5a0bc9491a99c39c191ea0077d	Yes	Default	<button>Edit</button>
alt_demo	-	alt_demo@example.com	330695046cd45e39ea89c0f1e10b6cb	Yes	Default	<button>Edit</button>
alt_demo_member	-	alt_demo_member@example.com	e8911bd0892d4b64ae617d92f347ad52	Yes	Default	<button>Edit</button>
alt_demo_reader	-	alt_demo_reader@example.com	a712bab9d2fb4dfabaf109b92cda940	Yes	Default	<button>Edit</button>
system_member	-	system_member@example.com	cd0264ee754748399e92cd8cbcc3585d	Yes	Default	<button>Edit</button>
system_reader	-	system_reader@example.com	2942ad7dfa214ad4ae201ffa49b7ef	Yes	Default	<button>Edit</button>

Step 4 In the displayed **Create User** dialog box, specify the following information:

- **User Name:** **User_web_01**
- **Password:** Configure and record a password.
- **Primary Project:** **demo** created by the system
- **Role:** the newly created **Role_web**
- Retain the default values for other parameters.

Create User

Domain ID	Description:	
default	Create a new user and set related properties including the Primary Project and Role.	
Domain Name	Default	
User Name *	User_web_01	
Description		
Email		
Password *	*****	
Confirm Password *	*****	
Primary Project	demo	+ [Add]
Role	Role_web	
<input checked="" type="checkbox"/> Enabled	<input type="checkbox"/> Lock password	
<input type="button" value="Cancel"/> <input style="background-color: #0072bc; color: white; border: 1px solid #0072bc; padding: 5px; border-radius: 5px; font-weight: bold; margin-left: 10px;" type="button" value="Create User"/>		

Step 5 Click **Create User**. View the created user in the user list.

Users	Displaying 17 items						
Groups	User Name	Description	Email	User ID	Enabled	Domain Name	Actions
Roles	admin	-		5f0e24860f0241718c0ea2ebb307c2b3	Yes	Default	<input type="button" value="Edit"/>
Application Credentials	demo	-	demo@example.com	22a7507e9154482b5ce6f68955a081	Yes	Default	<input type="button" value="Edit"/>
	demo_reader	-	demo_reader@example.com	d5c64d8a9bc5491a9939c191aa0777d	Yes	Default	<input type="button" value="Edit"/>
	alt_demo	-	alt_demo@example.com	336f65446cd2d45e379baec0d91e10bdcb	Yes	Default	<input type="button" value="Edit"/>
	alt_demo_member	-	alt_demo_member@example.com	e8911dd08924db54ee517d92f747ad82	Yes	Default	<input type="button" value="Edit"/>
	alt_demo_reader	-	alt_demo_reader@example.com	a712ba5d52b4df6aba1f6b92c0a940	Yes	Default	<input type="button" value="Edit"/>
	system_member	-	system_member@example.com	c0264ee754740399a92cd8dbc3585d	Yes	Default	<input type="button" value="Edit"/>
	system_reader	-	system_reader@example.com	2942ad7de214ad4ae6281fffa987ef	Yes	Default	<input type="button" value="Edit"/>
	nova	-		e0ae6747fb4496788057ea06471cdcb	Yes	Default	<input type="button" value="Edit"/>
	glance	-		cc149c2f2b46a99824bf79f2c0d492	Yes	Default	<input type="button" value="Edit"/>
	cinder	-		e91f7d7e274a4d500899cc0d8ab030	Yes	Default	<input type="button" value="Edit"/>
	neutron	-		720974fc65144696addcb493952568	Yes	Default	<input type="button" value="Edit"/>
	placement	-		937337e9da90478848325e0933d0575c	Yes	Default	<input type="button" value="Edit"/>
	heat	-		0d4344be6154a0cf941ac42344d9bc1	Yes	Default	<input type="button" value="Edit"/>
	heat_domain_admin	-		545axd44a9b448205054315e2789a4	Yes	heat	<input type="button" value="Edit"/>
	user1	-		a7f56defa87434b2d22b35380484703	Yes	Default	<input type="button" value="Edit"/>
	User_web_01	-		facd44f498e2428ab929da6ad291374	Yes	Default	<input type="button" value="Edit"/>

Step 6 Create the **User_web_02** user and select the **admin** role by following the instructions provided in steps 3 to 5.

Create User

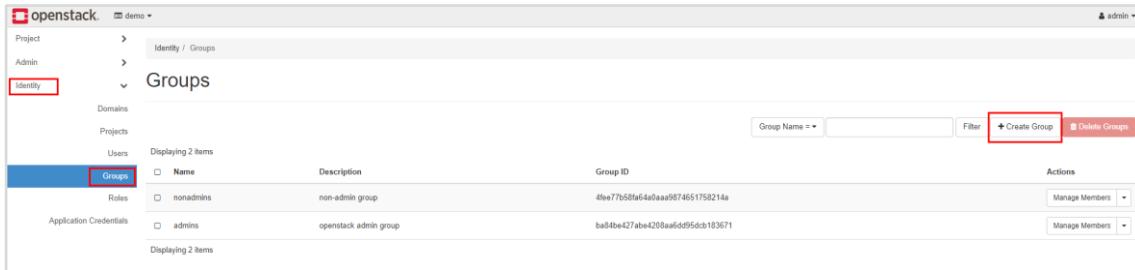
Domain ID	default	Description:
Domain Name	Default	Create a new user and set related properties including the Primary Project and Role.
User Name *	User_web_02	
Description		
Email		
Password *	*****	<input type="button" value=""/>
Confirm Password *	*****	<input type="button" value=""/>
Primary Project	demo	<input type="button" value=""/>
Role	admin	<input type="button" value=""/>
<input checked="" type="checkbox"/> Enabled		
<input type="checkbox"/> Lock password		
		<input type="button" value="Cancel"/> <input type="button" value="Create User"/>

View the created user in the user list.

Roles	admin	-	5fe240f0d241710c0eae2eb3072cb3	Yes	Default	<input type="button" value="Edit"/>
Application Credentials	demo	-	22a7507e9154a02bc5e05b9595a0d81	Yes	Default	<input type="button" value="Edit"/>
	demo_reader	-	d9c64d1a0bc9491a99c39c191ea0077d	Yes	Default	<input type="button" value="Edit"/>
	alt_demo	-	3369504ddcd45a39eb0c0f1a10b6cb	Yes	Default	<input type="button" value="Edit"/>
	alt_demo_member	-	e89110d892d4b64ae17d92947ad82	Yes	Default	<input type="button" value="Edit"/>
	alt_demo_reader	-	a712ab59d2b4d9fa01f6b52c940	Yes	Default	<input type="button" value="Edit"/>
	system_member	-	cfd254ee754748399a92c8cbc3585d	Yes	Default	<input type="button" value="Edit"/>
	system_reader	-	2942ad7dfa214a4ae281fb49b7ef	Yes	Default	<input type="button" value="Edit"/>
	nova	-	e0aae67d47fb4d857800d7a86471ccdc	Yes	Default	<input type="button" value="Edit"/>
	glance	-	c149c2b2f046a99624b7b652c0b492	Yes	Default	<input type="button" value="Edit"/>
	cinder	-	e91f7d7ea27a4f050089fce8bab830	Yes	Default	<input type="button" value="Edit"/>
	neutron	-	720f74fc65144698ad5cb49395256f6	Yes	Default	<input type="button" value="Edit"/>
	placement	-	937337e9da984780d3253e093da575c	Yes	Default	<input type="button" value="Edit"/>
	heat	-	0c6434ab6154a0cf941ac42344d9bc1	Yes	Default	<input type="button" value="Edit"/>
	heat_domain_admin	-	545adb444a9b44920b94219d27789ad4	Yes	heat	<input type="button" value="Edit"/>
	user1	-	a7f56defaeb743fbcd22b3530804703	Yes	Default	<input type="button" value="Edit"/>
	User_web_01	-	facd44909a242ffab929da6d391374	Yes	Default	<input type="button" value="Edit"/>
	User_web_02	-	71fa3ce456dd483402aa10b07568e0f2	Yes	Default	<input type="button" value="Edit"/>

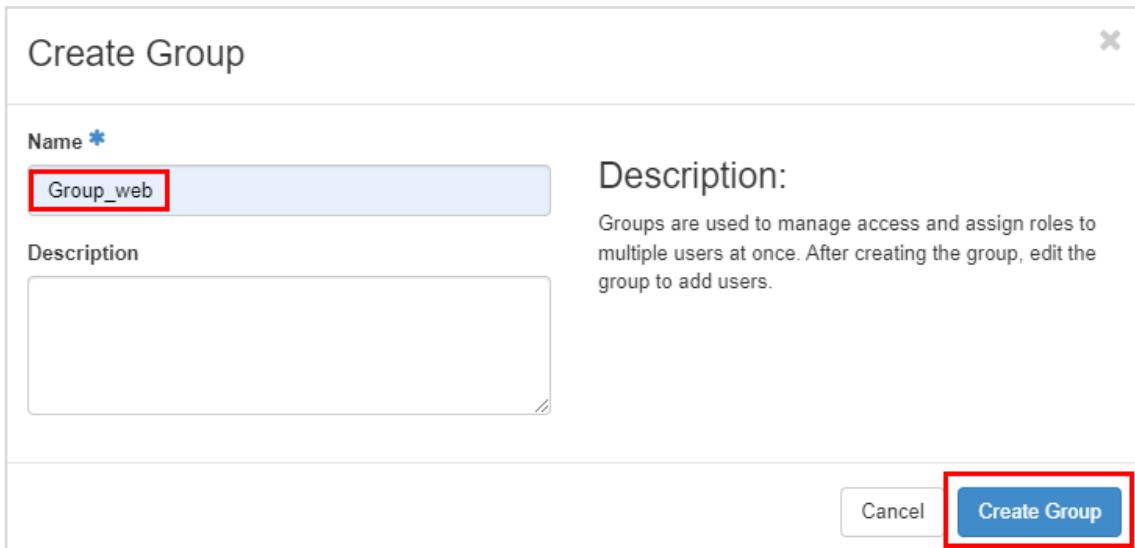
Displaying 18 items

Step 7 In the navigation pane, choose **Identity > Groups**. In the user group list, click **Create Group** in the upper right corner of the page.



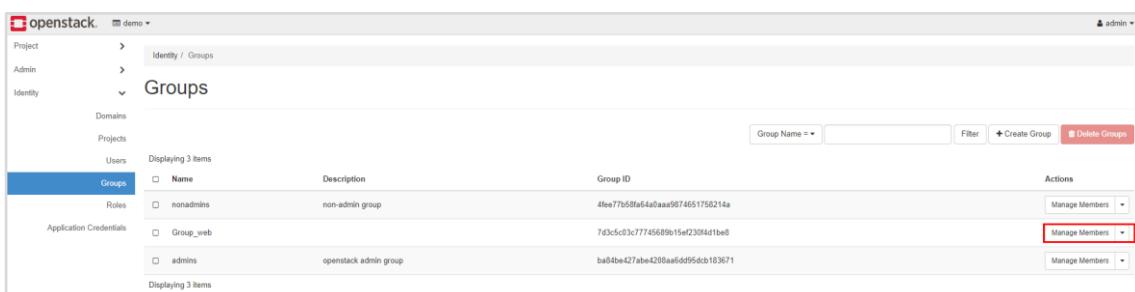
The screenshot shows the OpenStack Identity Groups page. The 'Groups' tab is selected. There are two items displayed: 'nonadmins' (non-admin group) and 'admins' (openstack admin group). At the top right, there is a 'Create Group' button, which is highlighted with a red box.

Step 8 In the displayed **Create Group** dialog box, specify **Name** to **Group_web**, and click **Create Group**.



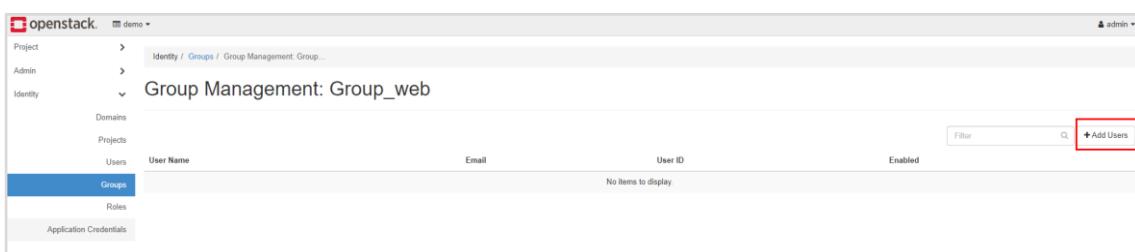
The screenshot shows the 'Create Group' dialog box. The 'Name' field is filled with 'Group_web'. The 'Description' field is empty. At the bottom right, there are 'Cancel' and 'Create Group' buttons, with 'Create Group' highlighted with a red box.

Step 9 Return to the user group list, locate the created group, and click **Manage Members** in the **Actions** column.



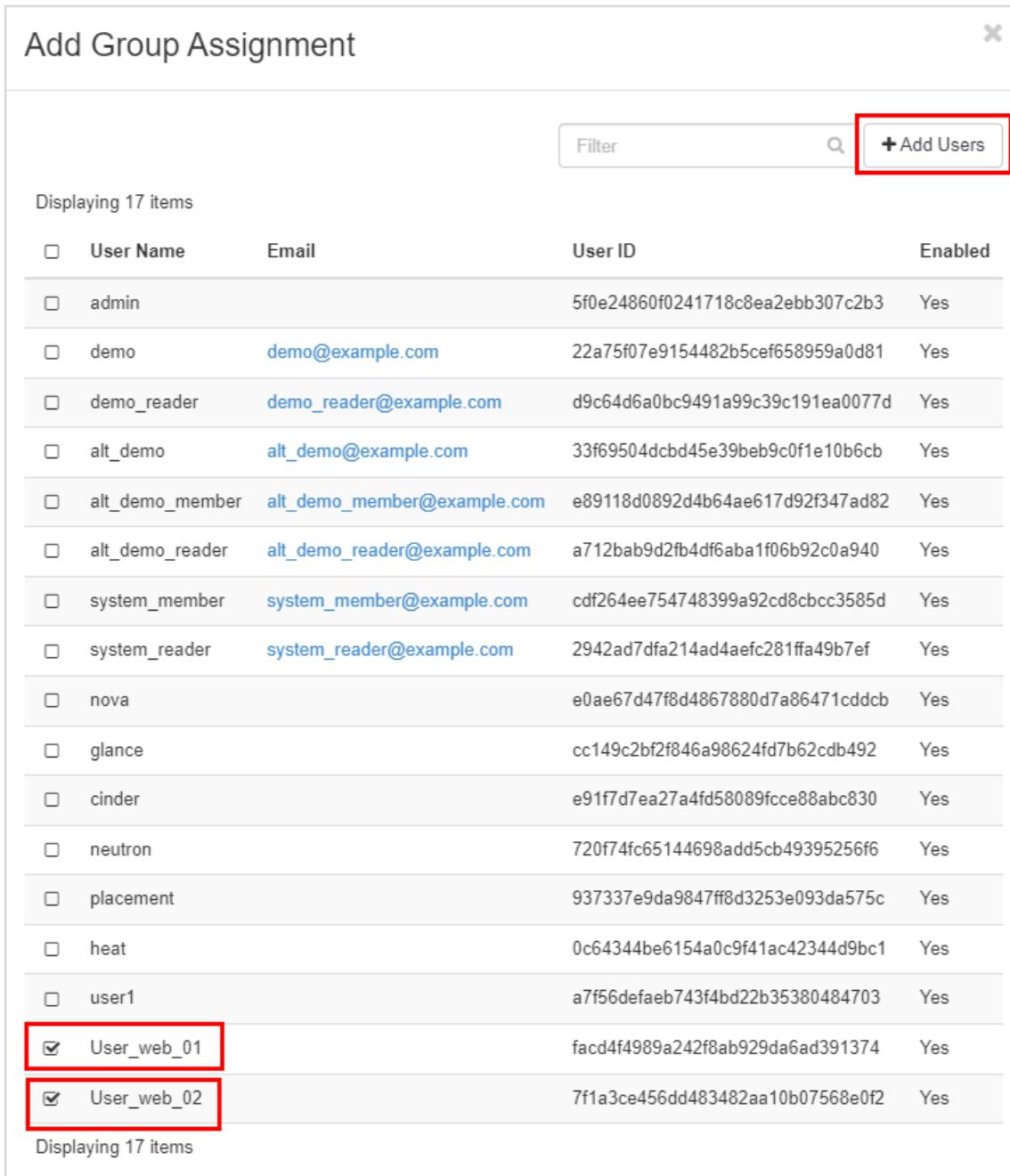
The screenshot shows the OpenStack Identity Groups page. The 'Groups' tab is selected. There are three items displayed: 'nonadmins' (non-admin group), 'Group_web' (which is the newly created group), and 'admins' (openstack admin group). In the 'Actions' column for 'Group_web', there is a 'Manage Members' link, which is highlighted with a red box.

Step 10 In the displayed user group member list page, click **Add Users** in the upper right corner of the page.



The screenshot shows the 'Group Management: Group_web' page. At the top right, there is a 'Filter' input field and a 'Add Users' button, which is highlighted with a red box.

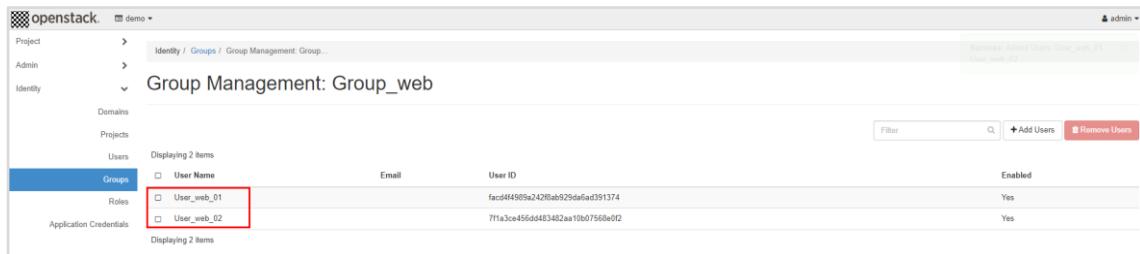
- Step 11 In the displayed **Add Group Assignment** dialog box, select the **User_web_01** and **User_web_02** users to be added to the user group from the user list and click **Add Users** in the upper right corner of the page.



The screenshot shows the 'Add Group Assignment' dialog box. At the top right, there is a 'Filter' input field and a 'Search' icon. To its right, a button labeled '+ Add Users' is highlighted with a red box. Below this, a table displays 17 user entries. The columns are: User Name, Email, User ID, and Enabled. The 'User Name' column contains checkboxes. The rows list various users, including 'admin', 'demo', 'demo_reader', 'alt_demo', 'alt_demo_member', 'alt_demo_reader', 'system_member', 'system_reader', 'nova', 'glance', 'cinder', 'neutron', 'placement', 'heat', 'user1', 'User_web_01', and 'User_web_02'. The 'User_web_01' and 'User_web_02' rows have their checkboxes checked and are also highlighted with red boxes. The 'Enabled' column shows 'Yes' for most users except 'nova' and 'glance' which show 'No'.

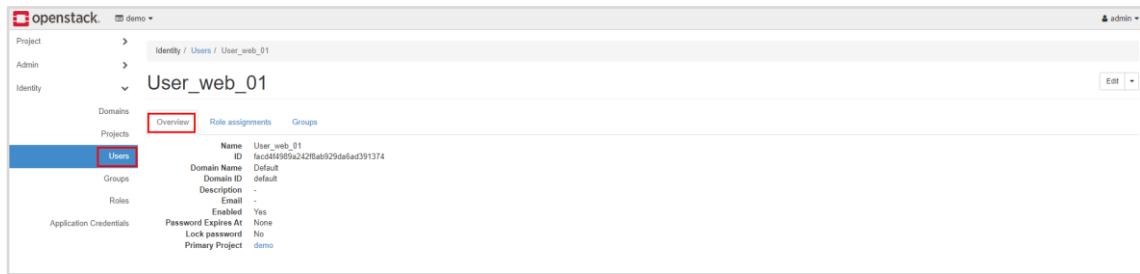
User Name	Email	User ID	Enabled
admin		5f0e24860f0241718c8ea2ebb307c2b3	Yes
demo	demo@example.com	22a75f07e9154482b5cef658959a0d81	Yes
demo_reader	demo_reader@example.com	d9c64d6a0bc9491a99c39c191ea0077d	Yes
alt_demo	alt_demo@example.com	33f69504dcdb45e39beb9c0f1e10b6cb	Yes
alt_demo_member	alt_demo_member@example.com	e89118d0892d4b64ae617d92f347ad82	Yes
alt_demo_reader	alt_demo_reader@example.com	a712bab9d2fb4df6aba1f06b92c0a940	Yes
system_member	system_member@example.com	cdf264ee754748399a92cd8cbcc3585d	Yes
system_reader	system_reader@example.com	2942ad7dfa214ad4aefc281ffa49b7ef	Yes
nova		e0ae67d47f8d4867880d7a86471cddcb	No
glance		cc149c2bf2f846a98624fd7b62cdb492	Yes
cinder		e91f7d7ea27a4fd58089fcce88abc830	Yes
neutron		720f74fc65144698add5cb49395256f6	Yes
placement		937337e9da9847ff8d3253e093da575c	Yes
heat		0c64344be6154a0c9f41ac42344d9bc1	Yes
user1		a7f56defaeb743f4bd22b35380484703	Yes
<input checked="" type="checkbox"/> User_web_01		facd4f4989a242f8ab929da6ad391374	Yes
<input checked="" type="checkbox"/> User_web_02		7f1a3ce456dd483482aa10b07568e0f2	Yes

- Step 12 Return to the user group member list and view the users newly added, as shown in the following figure.



User Name	Email	User ID	Enabled
User_web_01		facd4f4989e242fbab929daefad391374	Yes
User_web_02		7f1a3ce456dd483482aa10b0756be02	Yes

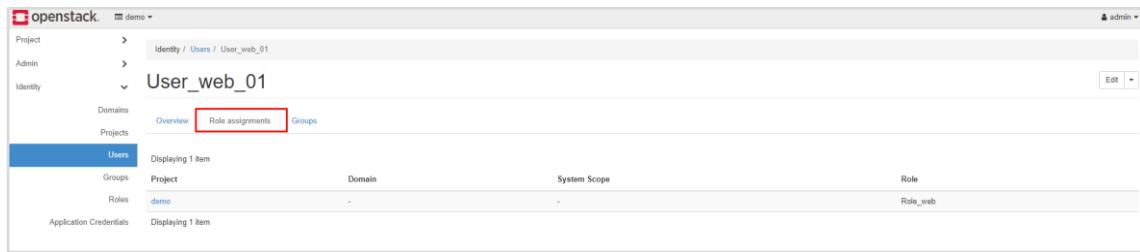
Step 13 Choose **Identity > Users**. In the displayed user list, click **User_web_01**. The **Overview** tab page of **User_web_01** is displayed.



Overview Tab Data:

Name	User_web_01
ID	facd4f4989e242fbab929daefad391374
Domain Name	Default
Domain ID	default
Description	-
Email	-
Enabled	Yes
Password Expires At	None
Lock password	No
Primary Project	demo

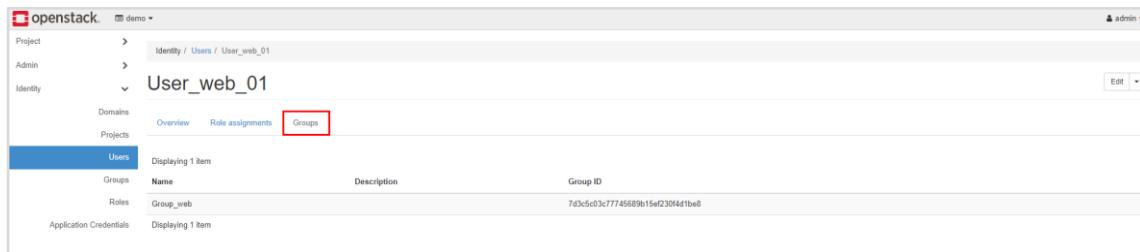
Step 14 Click the **Role assignments** tab to view the role assignment details of the user.



Role assignments Tab Data:

Project	demo	System Scope	Role
Domain	-	-	Role_web

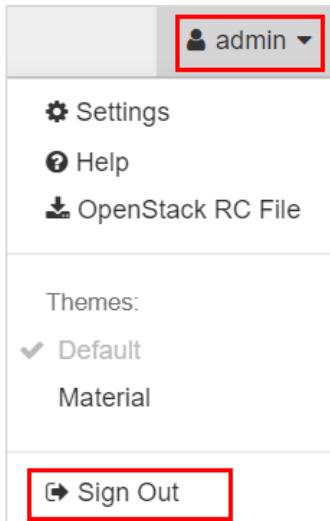
Step 15 Click the **Groups** tab to view the user group allocation details of the user.



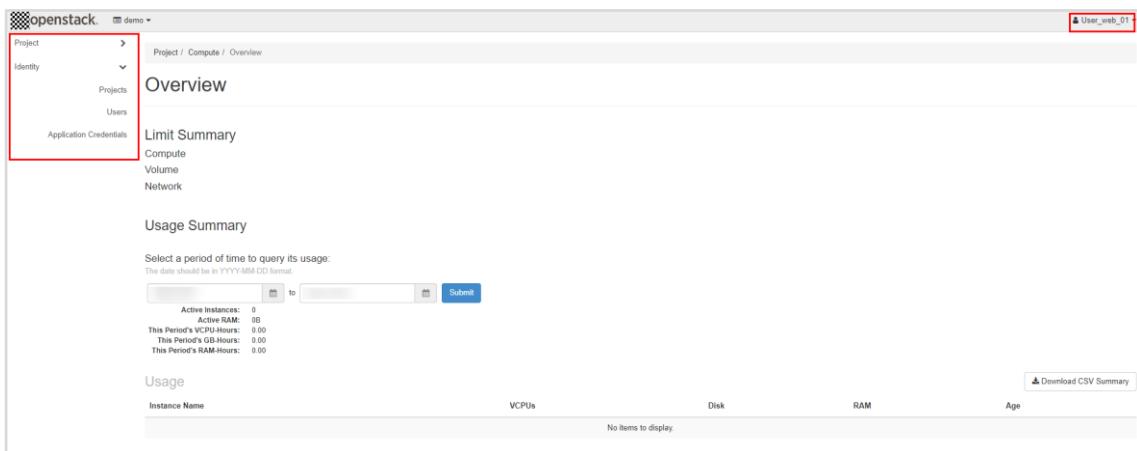
Groups Tab Data:

Name	Description	Group ID
Group_web		7d3c5e03c7745689b15ef2304d1be8

Step 16 Click **admin** in the upper right corner of the page and select **Sign Out** from the drop-down list to log out of the **admin** user.

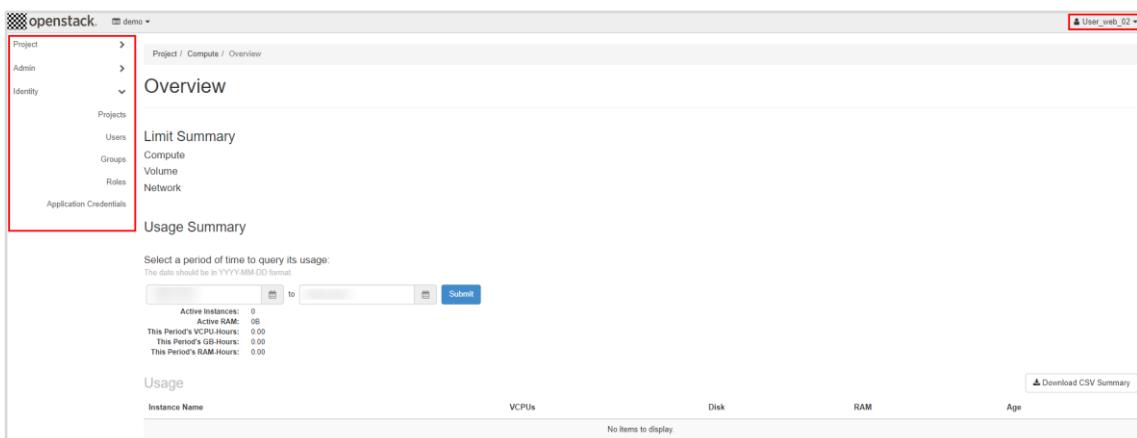


Step 17 Return to the OpenStack dashboard page, enter the usernames and passwords of **User_web_01** and **User_web_02**, and check the differences of the navigation panes and menu bars between the two users.



This screenshot shows the OpenStack dashboard for the user 'User_web_01'. The navigation pane on the left is different from the admin view, showing 'Project', 'Identity', 'Projects', 'Users', and 'Application Credentials'. The main content area displays the 'Overview' page with sections for 'Limit Summary' and 'Usage Summary'. The 'Usage' section shows no items to display. A red box highlights the 'Project' item in the navigation bar.

The preceding figure shows the login page of **User_web_01**.



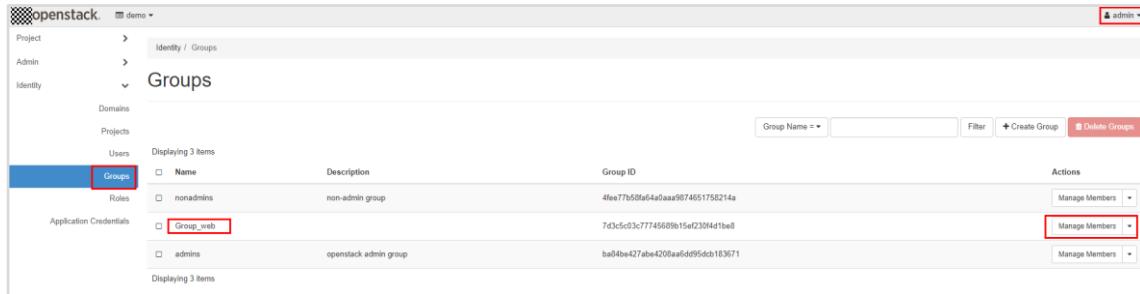
This screenshot shows the OpenStack dashboard for the user 'User_web_02'. The navigation pane on the left is similar to the previous user's, showing 'Project', 'Admin', 'Identity', 'Projects', 'Users', 'Groups', 'Roles', and 'Application Credentials'. The main content area displays the 'Overview' page with sections for 'Limit Summary' and 'Usage Summary'. The 'Usage' section shows no items to display. A red box highlights the 'Project' item in the navigation bar.

The preceding figure shows the login page of **User_web_02**.

3.2.2 Disabling or Deleting a User

3.2.2.1 Procedure

- Step 1** Log in to the OpenStack dashboard as the **admin** user. Choose **Identity > Groups**. The user group list is displayed. Click **Manage Members** in the row containing the user group **Group_web**.



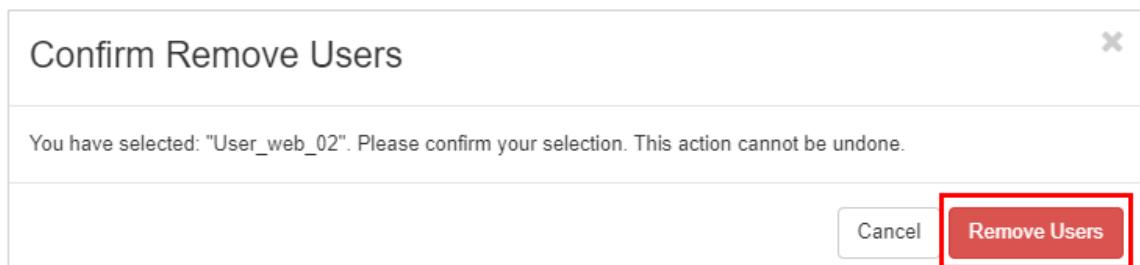
Name	Description	Group ID	Actions
nonadmins	non-admin group	4fe77b59fa64a0aaa9874651758214a	Manage Members
Group_web		7d3c5c03c77745689b15e2f2094d1ba8	Manage Members
admins	openstack admin group	ba04be427abe4208aaafdd95dch183671	Manage Members

- Step 2** The user group member list is displayed. Select in front of **User_web_02** and click **Remove Users** in the upper right corner of the page.



User Name	Email	User ID	Enabled
User_web_01	fac0d44989a242fbab929da1ad391374		Yes
User_web_02	7f1a3ce456dd4834032aa10b07568e0f2		Yes

- Step 3** In the displayed **Confirm Remove Users** dialog box, click **Remove Users**.



- Step 4** Choose **Identity > Users** to check whether **User_web_02** exists in the list.

openstack - demo -						
Project		Identity / Users				
Admin		Users				
Identity						
Groups	User Name	Description	Email	User ID	Enabled	Domain Name
Application Credentials	demo	-	demo@example.com	5f62e80d02411710cfa2e0b307c0b3	Yes	Default
	demo_reader	-	demo_reader@example.com	dcf4d5ab5c94919fc93fc191a020710	Yes	Default
	alt_demo	-	alt_demo@example.com	2f89f94c04e2b30e0cf1e108a0b	Yes	Default
	alt_demo_member	-	alt_demo_member@example.com	c91910909248404845c19129247c5f2	Yes	Default
	alt_demo_reader	-	alt_demo_reader@example.com	a712be94d9491a09a1609c2e0a940	Yes	Default
	system_member	-	system_member@example.com	cd04e475a474079a5a2020cc205f6	Yes	Default
	system_reader	-	system_reader@example.com	2942e7fda71a04a0e2039a907ef	Yes	Default
	nova	-	-	a710f7d98b7805705c1734747c0e8	Yes	Default
	glance	-	-	cc15a2c2d4d6163246347c3a0a112	Yes	Default
	cinder	-	-	a717f7a7c2e1f080501e0a0a0a030	Yes	Default
	neutron	-	-	7207164511605a0c5c495627a46	Yes	Default
	placement	-	-	937374a6a617031b35a3b3a7f7e	Yes	Default
	heat	-	-	5f34318aef154a0d9ff1ec17344d9c1	Yes	Default
	heat_domain_admin	-	-	545a614a48452905315a0779a0c1	Yes	heat
	user1	-	-	a7956d5e02739b42761308a0713	Yes	Default
	User_web_01	-	-	ba04f5fb8a24296a95a0a031734	Yes	Default
	User_web_02	-	-	7f1a3c46c65d4873422a1091560e02	Yes	Default

As shown in the preceding figure you can delete a user from a group, but cannot delete the user from the system in steps 1 to 3.

(Optional) Use **User_web_02** and its password to log in to the OpenStack dashboard.

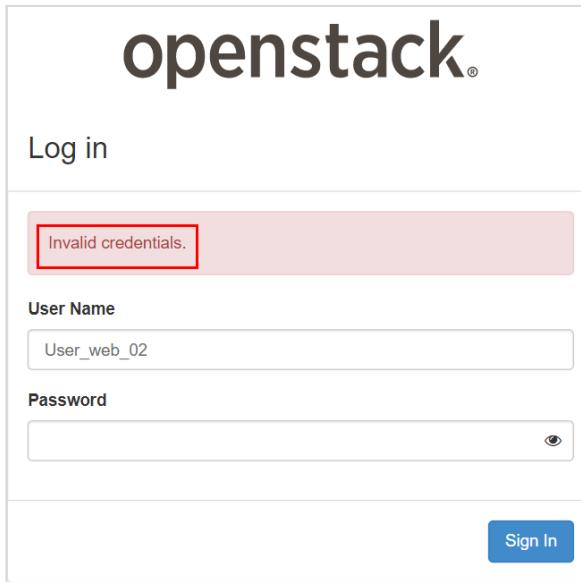
- Step 5** In the navigation pane, choose **Identity > Users**. The user list is displayed. Click in the row containing the **User_web_02** user. Select **Disable User** from the drop-down list to disable the **User_web_02** user.

User_web_02	7f1a3c46c65d4873422a1091560e02	Yes	Default	Edit
Displaying 10 items				Change Password Delete User Delete User

- Step 6** Return to the user list page. Check the **Enabled** column of the **User_web_02** user. The status of the user changes from **Yes** to **No**.

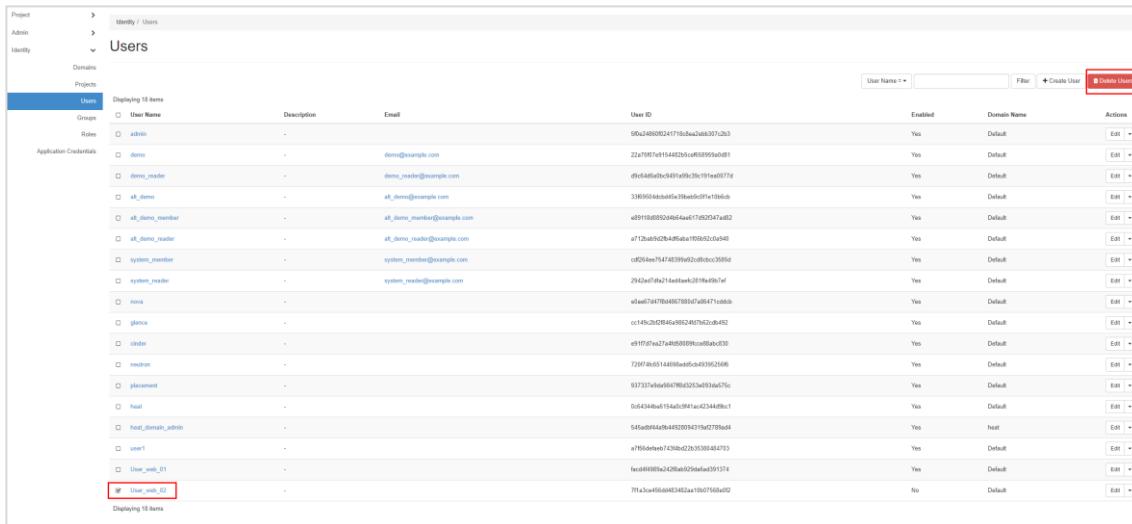
openstack - demo -						
Project		Identity / Users				
Admin		Users				
Identity						
Groups	User Name	Description	Email	User ID	Enabled	Domain Name
Application Credentials	demo	-	demo@example.com	5f62e80d02411710cfa2e0b307c0b3	Yes	Default
	demo_reader	-	demo_reader@example.com	dcf4d5ab5c94919fc93fc191a020710	Yes	Default
	alt_demo	-	alt_demo@example.com	2f89f94c04e2b30e0cf1e108a0b	Yes	Default
	alt_demo_member	-	alt_demo_member@example.com	a91910909248404845c19129247c5f2	Yes	Default
	alt_demo_reader	-	alt_demo_reader@example.com	a712be94d9491a09a1609c2e0a940	Yes	Default
	system_member	-	system_member@example.com	cd04e475a474079a5a2020cc205f6	Yes	Default
	system_reader	-	system_reader@example.com	2942e7fda71a04a0e2039a907ef	Yes	Default
	nova	-	-	a710f7d98b7805705c1734747c0e8	Yes	Default
	glance	-	-	cc15a2c2d4d6163246347c3a0a112	Yes	Default
	cinder	-	-	a717f7a7c2e1f080501e0a0a0a030	Yes	Default
	neutron	-	-	7207164511605a0c5c495627a46	Yes	Default
	placement	-	-	937374a6a617031b35a3b3a7f7e	Yes	Default
	heat	-	-	5f34318aef154a0d9ff1ec17344d9c1	Yes	Default
	heat_domain_admin	-	-	545a614a48452905315a0779a0c1	Yes	heat
	user1	-	-	a7956d5e02739b42761308a0713	Yes	Default
	User_web_01	-	-	ba04f5fb8a24296a95a0a031734	Yes	Default
	User_web_02	-	-	7f1a3c46c65d4873422a1091560e02	No	Default

- Step 7** (Optional) Log out of the **admin** user, enter the username **User_web_02** and its password, and check whether the login is normal.



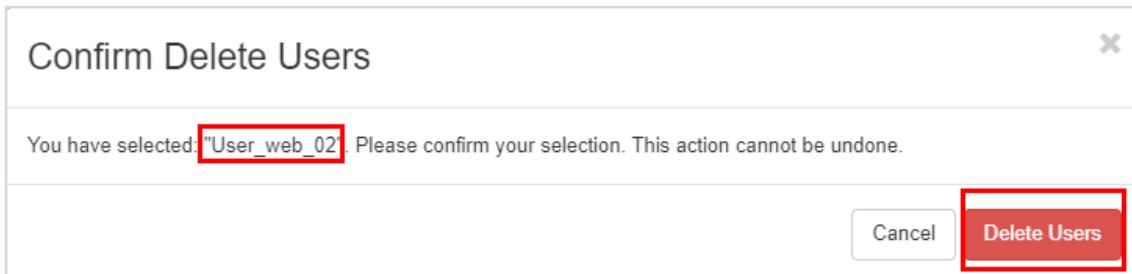
The screenshot shows the OpenStack login interface. At the top, the word "openstack." is displayed in a large, lowercase font. Below it, a "Log in" button is visible. A red rectangular box highlights an error message in a pink box: "Invalid credentials.". Below the message are fields for "User Name" (containing "User_web_02") and "Password". To the right of the password field is an "eye" icon for password visibility. At the bottom right is a blue "Sign In" button.

Step 8 Select  on the left of the **User_web_02** user to be deleted and click **Delete Users** in the upper right corner of the page to delete the user.



The screenshot shows the OpenStack Identity service's "Users" management page. The left sidebar has a tree structure: Project > Admin > Identity > Users. The main area lists 18 users under the "Users" tab. One user, "User_web_02", is highlighted with a red box and has a small "select" icon to its left. The columns include User ID, Enabled, Domain Name, and Actions. The "Actions" column contains edit and delete icons. At the top right of the user list, there are filters and a "Delete Users" button.

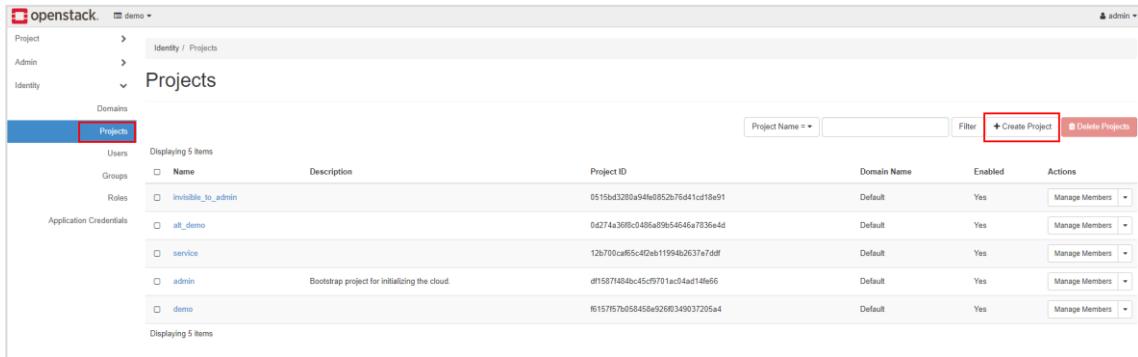
Step 9 In the displayed **Confirm Delete Users** dialog box, click **Delete Users**.



3.2.3 Creating a Project and Modifying the Project Quota

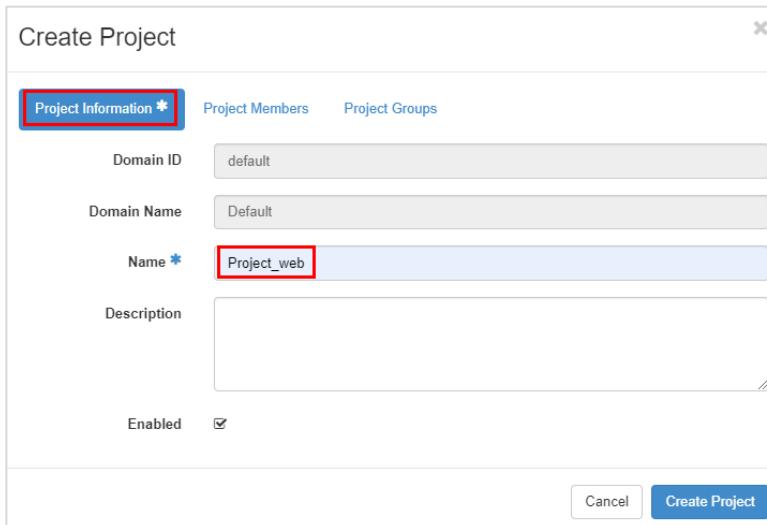
3.2.3.1 Procedure

- Step 1 Log in to the OpenStack dashboard as the **admin** user and choose **Identity > Projects**. The project list is displayed. Click **Create Project** in the upper right corner of the page.



The screenshot shows the OpenStack Identity interface with the 'Projects' tab selected. The left sidebar includes 'Project', 'Admin', 'Identity', 'Domains', and 'Application Credentials'. Under 'Domains', 'Projects' is highlighted. The main area displays a table of projects with columns: Name, Description, Project ID, Domain Name, Enabled, and Actions. The table shows five entries: 'invisible_to_admin', 'alt_demo', 'service', 'admin', and 'demo'. A red box highlights the 'Create Project' button in the top right corner of the table header.

- Step 2 In the displayed **Create Project** dialog box, click the **Project Information** tab. In the **Project Information** tab page, specify **Name** to **Project_web**, and retain the default values for other parameters.



The screenshot shows the 'Create Project' dialog box with the 'Project Information' tab selected. The form fields are: Domain ID (default), Domain Name (Default), Name * (Project_web, highlighted with a red box), Description (empty), and Enabled (checked). At the bottom are 'Cancel' and 'Create Project' buttons. A red box highlights the 'Project Information' tab.

- Step 3 Click the **Project Members** tab. In **All Users** list on the left, click **+** next to **User_web_01**. The selected user is displayed on the right.

Create Project

Project Information * Project Members Project Groups

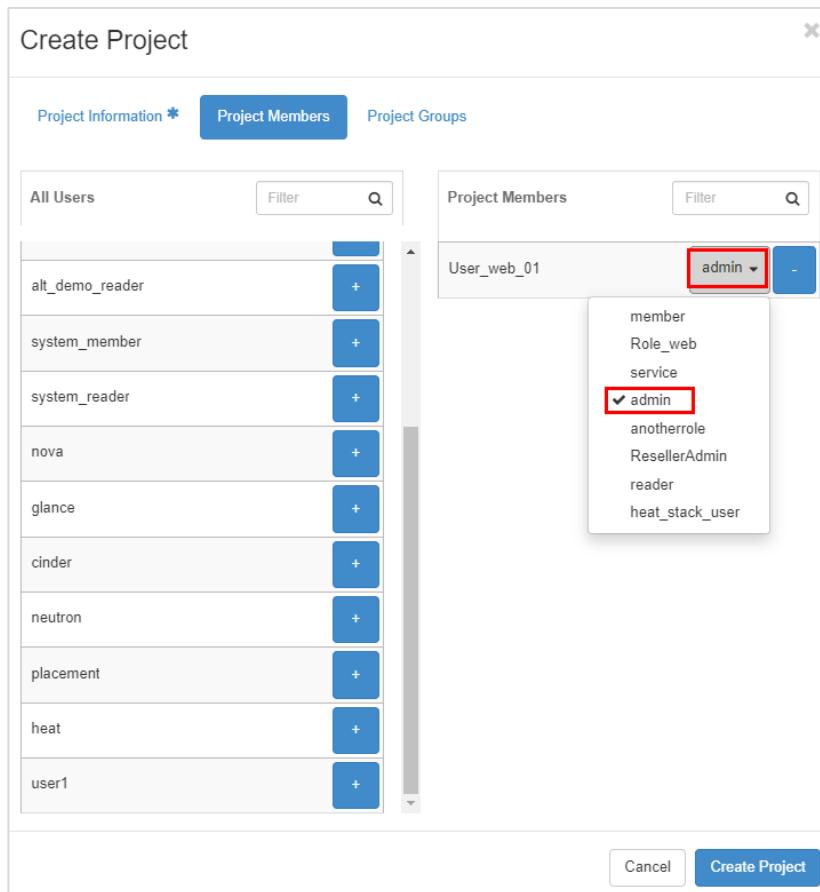
All Users	Filter	Q
system_member	+	
system_reader	+	
nova	+	
glance	+	
cinder	+	
neutron	+	
placement	+	
heat	+	
user1	+	
User_web_01	+	

Project Members Filter Q

No users.

Cancel Create Project

Click  next to the selected user and select only the **admin** role from the drop-down list.



Step 4 Click **Create Project**.

Create Project

Project Information *

Project Members

Project Groups

All Users	Filter	Search
alt_demo_reader	+	
system_member	+	
system_reader	+	
nova	+	
glance	+	
cinder	+	
neutron	+	
placement	+	
heat	+	
user1	+	

Project Members	Filter	Search
User_web_01	admin	-

Create Project

Step 5 Return to the project list and click **Project_web**. The **Overview** tab page of **Project_web** is displayed.

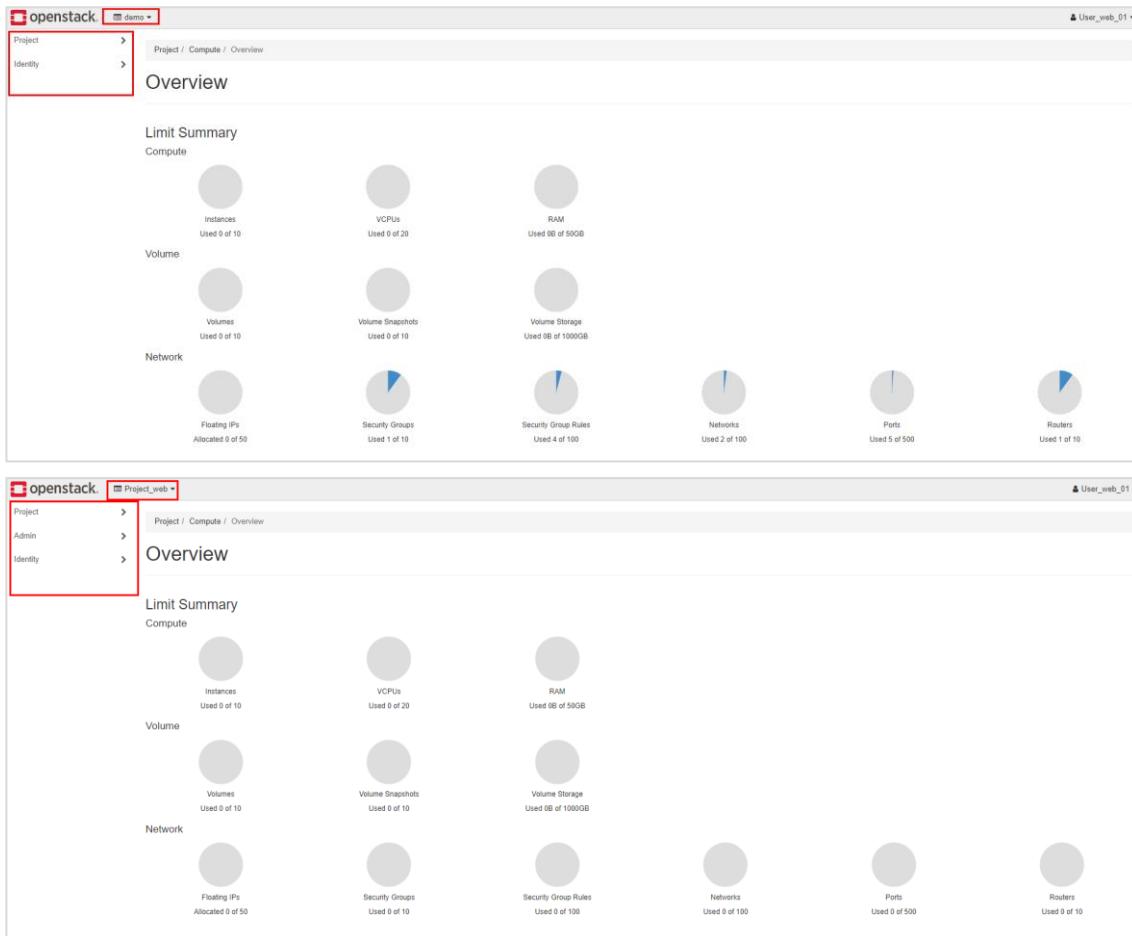
Project		Identity / Projects			
Admin	>				
Identity	>				
Projects	>				
Domains					
Projects					
Users		Displaying 6 items			
Groups	<input type="checkbox"/>	Name	Description	Project ID	Domain Name
Roles	<input type="checkbox"/>	invisible_to_admin		0515bd3280a94fe0852b76d41cd19e91	Default
Application Credentials	<input type="checkbox"/>	alt_demo		0d274a3080cd486a95f4546a7836e4d	Default
	<input type="checkbox"/>	service		12b708ca05c4f2eb11994b2637e7df	Default
	<input checked="" type="checkbox"/>	Project_web		4195a7a11db54a0255124ee199dbc39	Default
	<input type="checkbox"/>	admin	Bootstrap project for initializing the cloud.	dff1587485bc45cf9701ac04ad14fe66	Default
	<input type="checkbox"/>	demo		f615757b058458e926f0349037205a4	Default
		Displaying 6 items			

Step 6 Click the **Users** tab to view the user and role assignment details of the project.

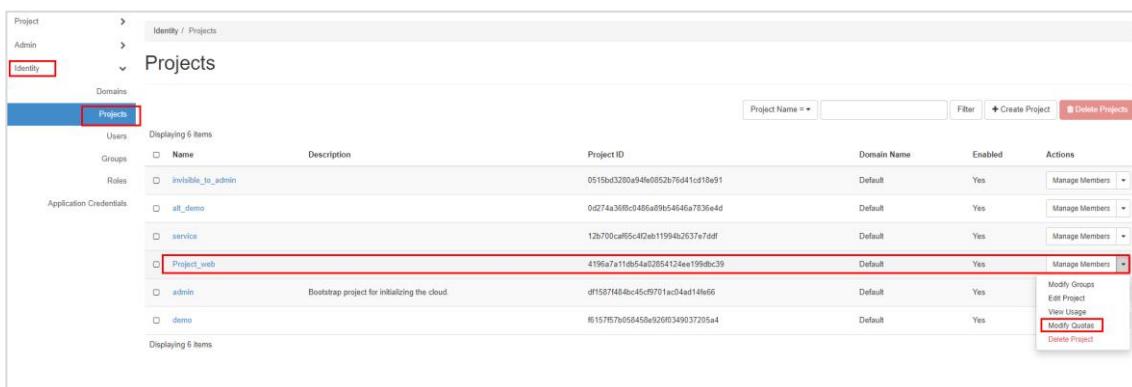
The screenshot shows a user management interface for a project. The left sidebar has a 'Projects' section with 'Project_web' selected. The main area shows a table of users. One user, 'User_web_01', is highlighted with a red box around their name in the 'User Name' column. Another red box highlights the 'admin' role in the 'Roles from Groups' column for the same user. The table includes columns for User Name, Description, Email, User ID, Enabled, Domain Name, Roles, and Roles from Groups.

User Name	Description	Email	User ID	Enabled	Domain Name	Roles	Roles from Groups
User_web_01	-	facd484989a242fbab929da6ad391374	Yes	-	admin		

Step 7 Log out of the **admin** user and return to the OpenStack dashboard. Enter the username and password of **User_web_01**, switch to **Project_web**, and check the changes in the navigation bar and menus.



Step 8 Log in to the OpenStack dashboard as the **admin** user. In the navigation pane, choose **Identity > Projects**. In the project list, view the created project **Project_web**. In the **Actions** column of the project to work on, click next to **Manage Members**, and select **Modify Quotas**.



Step 9 In the displayed **Edit Quotas** dialog box, modify the default quotas of the project on the **Compute**, **Volume**, and **Network** tab pages. For example, modify the

quantity of **Instances** to 5, the quantity of **Volumes** to 5, and the quantity of **Networks** to 5. Click **Save**.

Edit Quotas

Compute * Volume * Network *

Instances *	5
VCpus *	20
RAM (MB) *	51200
Metadata Items *	128
Key Pairs *	100
Server Groups *	10
Server Group Members *	10
Injected Files *	5
Injected File Content (B) *	10240
Length of Injected File Path *	255

Cancel Save

Edit Quotas

Compute * Volume * Network *

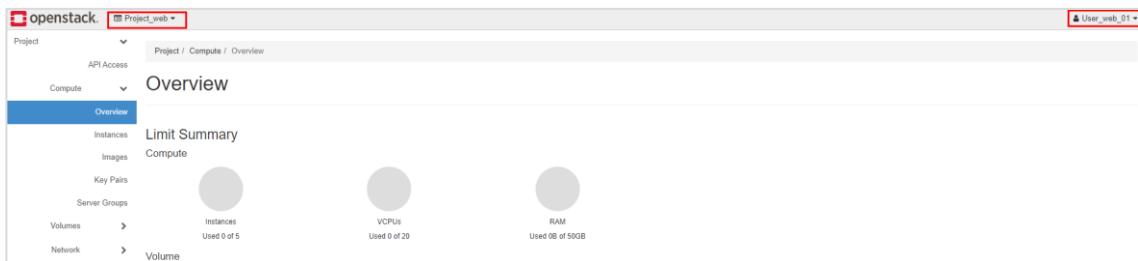
Volumes *	5
Volume Snapshots *	10
Total Size of Volumes and Snapshots (GiB) *	1000

Cancel Save

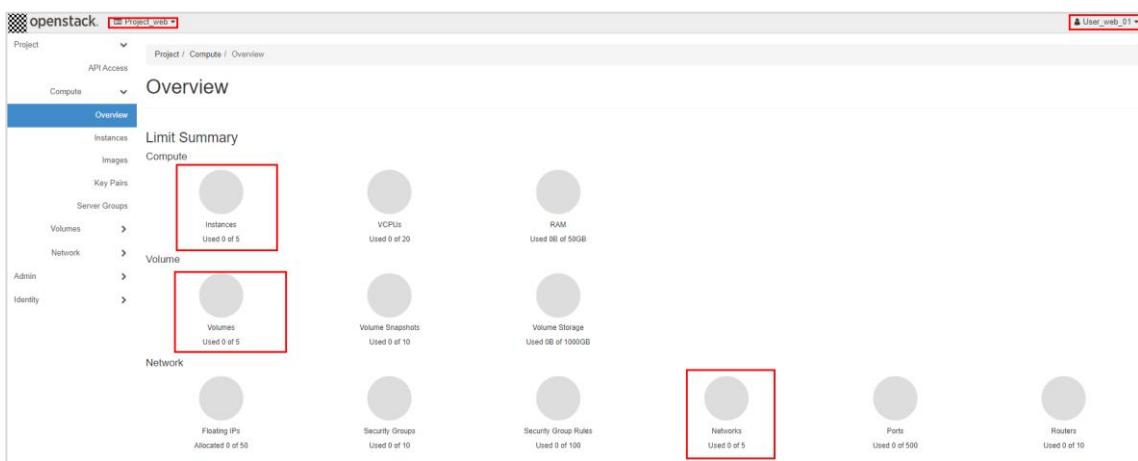
Edit Quotas

Compute *	Volume *	Network *
Networks *	5	
Subnets *	100	
Ports *	500	
Routers *	10	
Floating IPs *	50	
Security Groups *	10	
Security Group Rules *	100	

Step 10 Log in to the OpenStack dashboard as the **User_web_01** user, click the project name in the upper left corner of the page, and select **Project_web** as the current project from the drop-down list.



Step 11 In the navigation pane, choose **Project > Compute > Overview** to view the quota changes of **Project_web**.



3.3 Operations Using OpenStack CLI

3.3.1 Creating a Role, User, and User Group

Step 1 Remotely log in to the ECS. Run the following commands to switch to user **stack**, go to the **devstack** directory, and import environment variables of user **admin**:

```
su - stack  
cd devstack/  
. admin-openrc.sh
```

```
root@ecs-yoga:~# su - stack  
stack@ecs-yoga:~$ cd devstack/  
stack@ecs-yoga:~/devstack$ . admin-openrc.sh  
stack@ecs-yoga:~/devstack$
```

Step 2 Run the following command to create the **Role_cli** role:

```
openstack role create Role_cli
```

```
stack@ecs-yoga:~/devstack$ openstack role create Role_cli  
+-----+-----+  
| Field      | Value          |  
+-----+-----+  
| description | None           |  
| domain_id   | None           |  
| id          | d3e9de0b078a4a029587f704f6a9e210 |  
| name        | Role_cli       |  
| options     | {}             |  
+-----+-----+
```

Step 3 Run the following command to create the **User_cli_01** user and set the password:

```
openstack user create --domain default --project admin --password-prompt User_cli_01
```

Enter the password of the **User_cli_01** user as prompted and confirm the password.

```
stack@ecs-yoga:~/devstack$ openstack user create --domain default --project admin --pass  
word-prompt User_cli_01  
User Password:  
Repeat User Password:  
+-----+-----+  
| Field | Value |  
+-----+-----+  
| default_project_id | 8642f6a2c9ce4e8c99f4bc608b757422 |  
| domain_id | default |  
| enabled | True |  
| id | cd3b7da5b4f142fca2920cc63091175c |  
| name | User_cli_01 |  
| options | {} |  
| password_expires_at | None |  
+-----+-----+
```

- Step 4 Run the following command to add the **Role_cli** role to the **admin** project for the **User_cli_01** user:

```
openstack role add --project admin --user User_cli_01 Role_cli
```

```
stack@ecs-yoga:~/devstack$ openstack role add --project admin --user User_cli_01 Role_cli
```

- Step 5 Run the following command to create the **User_cli_02** user by following the instructions provided in steps 3 to 4:

```
openstack user create --domain default --project admin --password-prompt User_cli_02
```

Enter the password of the **User_cli_02** user as prompted and confirm the password.

```
stack@ecs-yoga:~/devstack$ openstack user create --domain default --project admin --pass  
word-prompt User_cli_02  
User Password:  
Repeat User Password:  
+-----+-----+  
| Field | Value |  
+-----+-----+  
| default_project_id | 8642f6a2c9ce4e8c99f4bc608b757422 |  
| domain_id | default |  
| enabled | True |  
| id | 15dad5b14204e4c9c5b3ed6bc988d03 |  
| name | User_cli_02 |  
| options | {} |  
| password_expires_at | None |  
+-----+-----+
```

- Step 6 Run the following command to add the **admin** role to the **admin** project for the **User_cli_02** user:

```
openstack role add --project admin --user User_cli_02 admin
```

```
stack@ecs-yoga:~/devstack$ openstack role add --project admin --user User_cli_02 admin
```

- Step 7 Run the following command to check the role assignment details:

```
openstack role assignment list --names | grep User_cli
```

```
stack@ecs-yoga:~/devstack$ openstack role assignment list --names | grep User_cli
| admin      | User_cli_02@Default    |                                | admin@Default
|           | False          |                                |
| Role_cli   | User_cli_01@Default    |                                | admin@Default
|           | False          |                                |
```

Step 8 Run the following command to create the **Group_cli** user group:

```
openstack group create Group_cli
```

```
stack@ecs-yoga:~/devstack$ openstack group create Group_cli
+-----+-----+
| Field      | Value          |
+-----+-----+
| description |               |
| domain_id   | default        |
| id          | c7bb30a9a5ae46a4bb0ba147d2eb0b42 |
| name        | Group_cli      |
+-----+-----+
```

Step 9 Run the following command to add the **User_cli_01** and **User_cli_02** users to the **Group_cli** user group:

```
openstack group add user Group_cli User_cli_01 User_cli_02
```

```
stack@ecs-yoga:~/devstack$ openstack group add user Group_cli User_cli_01 User_cli_02
```

Step 10 Run the following commands to edit the environment variable *User_cli_01-openrc.sh* of the **User_cli_01** user:

```
vim User_cli_01-openrc.sh
```

```
stack@ecs-yoga:~/devstack$ vim User_cli_01-openrc.sh
```

Copy the following code to change the username and password. Change *ECS_IP* to the private IP address of ECS-yoga and save the change.

```
export OS_PROJECT_DOMAIN_NAME=Default
export OS_USER_DOMAIN_NAME=Default
export OS_PROJECT_NAME=admin
export OS_USERNAME=User_cli_01
export OS_PASSWORD=PASS
export OS_AUTH_URL=http://ECS_IP/identity
export OS_IDENTITY_API_VERSION=3
export OS_IMAGE_API_VERSION=2
```

```
export OS_PROJECT_DOMAIN_NAME=Default
export OS_USER_DOMAIN_NAME=Default
export OS_PROJECT_NAME=admin
export OS_USERNAME=User_cli_01
export OS_PASSWORD=[REDACTED]
export OS_AUTH_URL=http://172.16[REDACTED]/identity
export OS_IDENTITY_API_VERSION=3
export OS_IMAGE_API_VERSION=2
```

- Step 11 Run the following command to import the environment variable *User_cli_01-openrc.sh* of the **User_cli_01** user:

```
. User_cli_01-openrc.sh
```

```
stack@ecs-yoga:~/devstack$ . User_cli_01-openrc.sh
```

- Step 12 Run the following command to view the project list. Only the **admin** project is displayed.

```
openstack project list
```

```
stack@ecs-yoga:~/devstack$ openstack project list
+-----+-----+
| ID          | Name   |
+-----+-----+
| 8642f6a2c9ce4e8c99f4bc608b757422 | admin |
+-----+-----+
```

- Step 13 Edit and import the environment variable *User_cli_02-openrc.sh* of the **User_cli_02** user by following the instructions provided in steps 10 to 12. View the project list. All projects are displayed.

```
stack@ecs-yoga:~/devstack$ . User_cli_02-openrc.sh
stack@ecs-yoga:~/devstack$ openstack project list
+-----+-----+
| ID | Name |
+-----+-----+
| 05eeb515855d47dfaac8ec045dc17582 | demo |
| 2f927117bb94415f9209f2f08ce9f818 | service |
| 4be02c10ea0240608453f9ef4bee8198 | invisible_to_admin |
| 7082e345f3084424a68897bb4822e753 | alt_demo |
| 7d0c30e9350745e6bcb9142699da6d6b | Project_web |
| 8642f6a2c9ce4e8c99f4bc608b757422 | admin |
+-----+
```

3.3.2 Disabling or Deleting a User

Step 1 Run the following command to import the environment variable *admin-openrc.sh*:

```
. admin-openrc.sh
```

```
stack@ecs-yoga:~/devstack$ . admin-openrc.sh
```

Step 2 Run the following command to remove the **User_cli_02** user from the **Group_cli** user group:

```
openstack group remove user Group_cli User_cli_02
```

```
stack@ecs-yoga:~/devstack$ openstack group remove user Group_cli User_cli_02
```

Step 3 Run the following command to check whether the **Group_cli** user group contains the **User_cli_02** user:

```
openstack group contains user Group_cli User_cli_02
```

```
stack@ecs-yoga:~/devstack$ openstack group contains user Group_cli User_cli_02
User_cli_02 not in group Group_cli
stack@ecs-yoga:~/devstack$
```

Step 4 Run the following command to disable the **User_cli_02** user:

```
openstack user set --disable User_cli_02
```

```
stack@ecs-yoga:~/devstack$ openstack user set --disable User_cli_02
stack@ecs-yoga:~/devstack$
```

Step 5 Run the following command to check whether the **User_cli_02** user has been disabled:

```
openstack user show User_cli_02
```

```
stack@ecs-yoga:~/devstack$ openstack user show User_cli_02
+-----+-----+
| Field          | Value        |
+-----+-----+
| default_project_id | 8642f6a2c9ce4e8c99f4bc608b757422 |
| domain_id      | default      |
| enabled         | False        |
| id              | 15dad5b14204e4c9c5b3ed6bc988d03 |
| name            | User_cli_02  |
| options          | {}           |
| password_expires_at | None         |
+-----+-----+
```

Step 6 Run the following command to delete the **User_cli_02** user:

```
openstack user delete User_cli_02
```

```
stack@ecs-yoga:~/devstack$ openstack user delete User_cli_02
stack@ecs-yoga:~/devstack$
```

Step 7 Run the following command to check the user list:

```
openstack user list
```

```
stack@ecs-yoga:~/devstack$ openstack user list
+-----+-----+
| ID      | Name   |
+-----+-----+
| 80a53ea43ea44385968244e150e8fdd6 | admin  |
| a13b7b2d538542d48e5b29e50133c65f | demo   |
| 10e5cf0e6f754bcc83584ba737425a85 | demo_reader |
| 0684d74827364a6e837988e1d611a012 | alt_demo |
| 2e3bbce5aa804919bb13f893e9bde754 | alt_demo_member |
| 819454d6f44944ec9c8323a4593a1a9c | alt_demo_reader |
| e55aed64712648feb43d4c9f625276f | system_member |
| 85b74874d6284dda9a15735b3057ae10 | system_reader |
| 33c6fc2aa9834bd3a3f93ff759e95736 | nova   |
| 95cbaa303279403998cad9f00ffecb65 | cinder  |
| cbdab7dd36354bfe92f3fe69e0620f51 | glance  |
| ff8f6f3a54bb4712b22c29517673f71b | neutron |
| cb16059d1a1b46588ff07f0df039cb37 | placement |
| 1b8ef52efcfb4471bde151136449e3d6 | user1   |
| 4a4d0d8ff37343f982196f97c48cc502 | User_web_01 |
| 583d21ade0a04573a763608a81bbb3 | User_cli_01 |
+-----+-----+
```

3.3.3 Creating a Project and Modifying the Project Quota

Step 1 Run the following command to create the **Project_cli** project:

```
openstack project create --domain default Project_cli
```

```
stack@ecs-yoga:~/devstack$ openstack project create --domain default project_cli
+-----+-----+
| Field    | Value   |
+-----+-----+
| description |          |
| domain_id  | default  |
| enabled     | True    |
| id          | 0722a04a26dc4d0aa52a52edf3b3ed18 |
| is_domain   | False   |
| name        | project_cli |
| options     | {}      |
| parent_id   | default  |
| tags         | []      |
+-----+-----+
```

Step 2 Run the following command to add the **admin** role to the **Project_cli** project for the **User_cli_01** user:

```
openstack role add --project Project_cli --user User_cli_01 admin
```

```
stack@ecs-yoga:~/devstack$ openstack role add --project project_cli --user User_cli_01 admin
stack@ecs-yoga:~/devstack$
```

Step 3 Run the following command to check the role assignment details:

```
openstack role assignment list --names | grep User_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack role assignment list --names | grep User_cli_01
| Role_cli      | User_cli_01@Default          |           | admin@Default          |           |           | False   |
| admin         | User_cli_01@Default          |           | project_cli@Default    |           |           | False   |
stack@ecs-yoga:~/devstack$
```

Step 4 Run the following command to modify the environment variable **User_cli_01-openrc.sh** of the **User_cli_01** user and change the value of **OS_PROJECT_NAME** to **Project_cli**:

```
vim User_cli_01-openrc.sh
```

```
export OS_PROJECT_DOMAIN_NAME=Default
export OS_USER_DOMAIN_NAME=Default
export OS_PROJECT_NAME=Project_cli
export OS_USERNAME=User_cli_01
export OS_PASSWORD=K0n3r1c77
export OS_AUTH_URL=http://172.10.0.0/identity
export OS_IDENTITY_API_VERSION=3
export OS_IMAGE_API_VERSION=2
```

Step 5 Run the following command to import the environment variable of the **User_cli_01** user:

```
. User_cli_01-openrc.sh
```

```
stack@ecs-yoga:~/devstack$ . User_cli_01-openrc.sh
stack@ecs-yoga:~/devstack$
```

Step 6 Run the following command to view the project list:

```
openstack project list
```

```
stack@ecs-yoga:~/devstack$ openstack project list
```

ID	Name
05eeb515855d47dfaac8ec045dc17582	demo
0722a04a26dc4d0aa52a52edf3b3ed18	project_cli
2f927117bb94415f9209f2f08ce9f818	service
4be02c10ea0240608453f9ef4bee8198	invisible_to_admin
7082e345f3084424a68897bb4822e753	alt_demo
7d0c30e9350745e6bcb9142699da6d6b	Project_web
8642f6a2c9ce4e8c99f4bc608b757422	admin

Question and verification:

Is it feasible to run the following commands to add the **admin** role to the **Project_cli** project for the **User_cli_01** user in step 2?

```
openstack role add --project Project_cli --group Group_cli admin  
openstack role assignment list --names | grep Group_cli
```

```
stack@ecs-yoga:~/devstack$ openstack role add --project Project_cli --group Group_cli admin  
stack@ecs-yoga:~/devstack$ openstack role assignment list --names | grep Group_cli  
| admin      |          | Group_cli@Default | project_cli@Default      |  
|           | False    |
```

Step 7 Run the following command to check the default quota of the **Project_cli** project:

```
openstack quota show Project_cli
```

```
stack@ecs-yoga:~/devstack$ openstack quota show Project_cli
+-----+
| Field          | Value
|
+-----+
| backup-gigabytes | 1000
|
| backups        | 10
|
| cores          | 20
|
| fixed-ips      | -1
|
| floating-ips   | 50
```

- Step 8 Run the following command to modify the default quota of the **Project_cli** project. For example, modify the quantity of **instance** to 5, the quantity of **volumes** to 5, and the quantity of **networks** to 10.

```
openstack quota set --instance 5 --volumes 5 --networks 10 Project_cli
```

```
stack@ecs-yoga:~/devstack$ openstack quota set --instance 5 --volumes 5 --networks 10 Project_cli
stack@ecs-yoga:~/devstack$
```

- Step 9 Run the following command to check the quota changes of the **Project_cli** project:

```
openstack quota show Project_cli | grep -E "instances|volumes|networks"
```

```
stack@ecs-yoga:~/devstack$ openstack quota show Project_cli | grep -E "instances|volumes|networks"
| instances          | 5
|
| networks          | 10
|
| volumes           | 5
|
| volumes__DEFAULT__| -1
|
| volumes_lvmdriver-1 | -1
|
```

4 OpenStack Image Management

4.1 Overview

4.1.1 About This Exercise

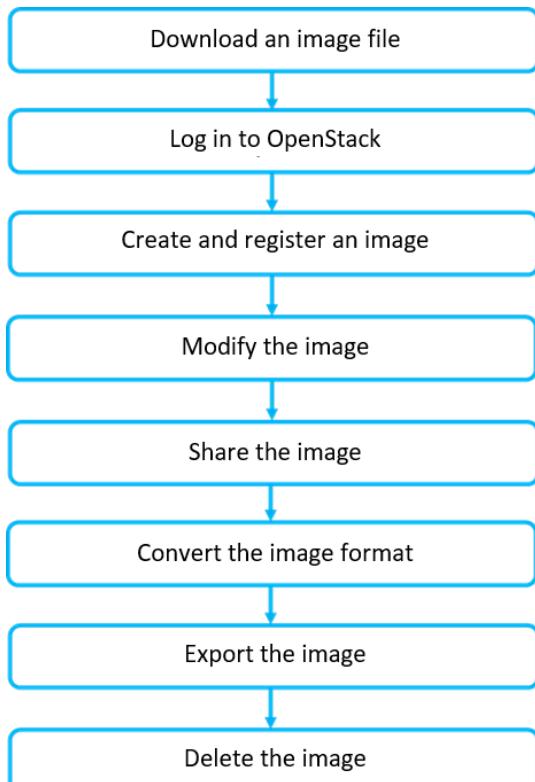
This exercise introduces how to pull, create, register, and share images, and convert image formats on the OpenStack dashboard and using the OpenStack CLI.

4.1.2 Objectives

Upon completion of this exercise, you will be familiar with the following operations on the OpenStack dashboard or using the OpenStack CLI:

- Pulling images
- Creating, registering, and modifying images
- Sharing images, converting image formats, and exporting and deleting images

4.1.3 Process



4.2 Operations on the OpenStack Dashboard

4.2.1 Pulling an Image (CirrOS)

CirrOS image is a small (about 12 MB) Linux image in the qcow2 format. You can register the image after pulling it. This exercise uses the CirrOs image as an example. For details about how to obtain other images, visit <https://docs.openstack.org/image-guide/obtain-images.html>.

4.2.1.1 Pulling a CirrOs Image

- Step 1 Enter <http://download.cirros-cloud.net/0.5.2/> in the address box of the browser on the local desktop, select **cirros-0.5.2-x86_64-disk.img**, and pull the CirrOs image to the local PC.

cirros-0.5.2-powerpc-lxc.tar.gz	2021-03-05 14:17 5.2M
cirros-0.5.2-powerpc-lxc.tar.xz	2021-03-05 14:17
3.3M_cirros-0.5.2-powerpc-1xd.tar.xz	2021-03-05 14:17 568
cirros-0.5.2-powerpc-rootfs.img.gz	2021-03-05 14:17 14M
cirros-0.5.2-powerpc-uec.tar.gz	2021-03-05 14:17 14M
cirros-0.5.2-ppc64-disk.img	2021-03-05 14:18 21M
cirros-0.5.2-ppc64-initramfs	2021-03-05 14:17
6.1M_cirros-0.5.2-ppc64-kernel	2021-03-05 14:17 26M
cirros-0.5.2-ppc64-lxc.tar.gz	2021-03-05 14:17 5.4M
cirros-0.5.2-ppc64-lxc.tar.xz	2021-03-05 14:17 3.5M
cirros-0.5.2-ppc64-1xd.tar.xz	2021-03-05 14:17 568
cirros-0.5.2-ppc64-rootfs.img.gz	2021-03-05 14:18 20M
cirros-0.5.2-ppc64-uec.tar.gz	2021-03-05 14:18 15M
cirros-0.5.2-ppc64e-disk.img	2021-03-05 14:18 17M
cirros-0.5.2-ppc64e-initramfs	2021-03-05 14:18 6.1M
cirros-0.5.2-ppc64e-内核	2021-03-05 14:18 26M
cirros-0.5.2-ppc64e-lxc.tar.gz	2021-03-05 14:18 5.3M
cirros-0.5.2-ppc64e-lxc.tar.xz	2021-03-05 14:18 3.5M
cirros-0.5.2-ppc64e-1xd.tar.xz	2021-03-05 14:18 568
cirros-0.5.2-ppc64e-rootfs.img.gz	2021-03-05 14:18 16M
cirros-0.5.2-ppc64e-uec.tar.gz	2021-03-05 14:18 16M
cirros-0.5.2-source.tar.gz	2021-03-05 14:17 541K
cirros-0.5.2-x86_64-disk.img	2021-03-05 14:17 16M
cirros-0.5.2-x86_64-initramfs	2021-03-05 14:17 6.2M
cirros-0.5.2-x86_64-kernel	2021-03-05 14:17 8.7M
cirros-0.5.2-x86_64-lxc.tar.gz	2021-03-05 14:17 5.5M
cirros-0.5.2-x86_64-lxc.tar.xz	2021-03-05 14:17 3.9M
cirros-0.5.2-x86_64-1xd.tar.xz	2021-03-05 14:17 568
cirros-0.5.2-x86_64-rootfs.img.gz	2021-03-05 14:17 15M
cirros-0.5.2-x86_64-uec.tar.gz	2021-03-05 14:17 15M

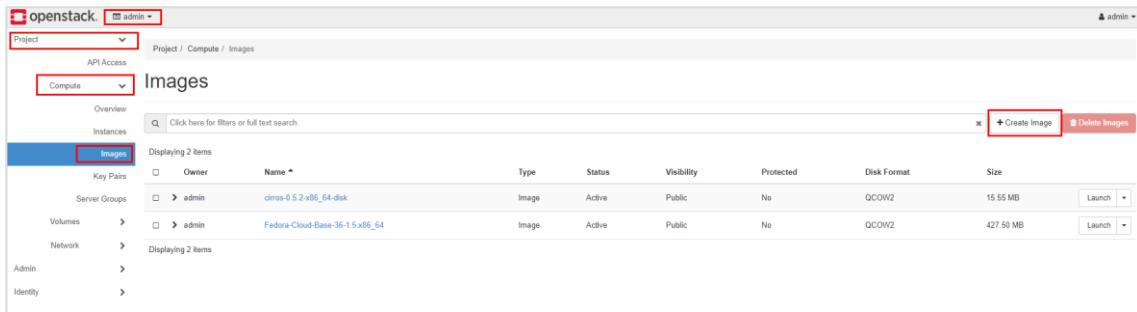
Wait about 10 minutes until the image file is downloaded.

4.2.2 Creating and Registering an Image

4.2.2.1 Procedure

After the OpenStack environment is set up, Glance has a public **cirros-0.5.2-x86_64-disk** image by default (if Heat has been installed, there is also a basic image **Fedora-Cloud-Base-36-1.5.x86_64**), which can be used to create VMs. In this exercise, the image file downloaded in section 4.2.1.1 is used to create and register an image.

- Step 1 Log in to the OpenStack dashboard as the **admin** user. In the navigation pane, choose **Project > Compute > Images**. The image list is displayed. Click **Create Image** in the upper right corner of the page.



The screenshot shows the OpenStack dashboard with the 'openstack' project selected. The navigation pane on the left has 'Compute' selected under 'API Access'. The main content area shows the 'Images' list with two items: 'cirros-0.5.2-x86_64-disk' and 'Fedora-Cloud-Base-36-1.5.x86_64'. A red box highlights the 'Create Image' button in the top right corner of the list table.

- Step 2 In the displayed **Create Image** dialog box, specify the following information:

- **Image Name:** customized, for example, **Img_web**
- **File:** **cirros-0.4.0-x86_64-disk** (Click **Browse**. In the displayed dialog box, select the path of the CirrOS image file and click **Open** to specify the **File**.)
- **Format:** Select **QCOW2 - QEMU Emulator**.
- **Minimum Disk (GB):** Set this parameter to **1 GB**.
- **Minimum RAM (MB):** Set this parameter to **128 MB**.
- **Visibility:** **Shared** indicates that the image can be shared with other projects. **Public** indicates that the image can be shared with other projects. **Private** indicates that the image is private and can be used only by the project to which the image belongs. Set this parameter to **Private**.
- **Protected:** **Yes** indicates that the image cannot be deleted, and **No** indicates that the image can be deleted. Set this parameter to **Yes**.

Create Image

Image Details

Metadata

Specify an image to upload to the Image Service.

Image Name

Image Description

Image Source

File*

Browse...

...

Format*

QCOW2 - QEMU Emulator

Image Requirements

Kernel

Ramdisk

Architecture

Minimum Disk (GB)

Minimum RAM (MB)

Image Sharing

Visibility

Private
Shared
Community
Public

Protected

Yes
No

Cancel

Back

Next >

Create Image

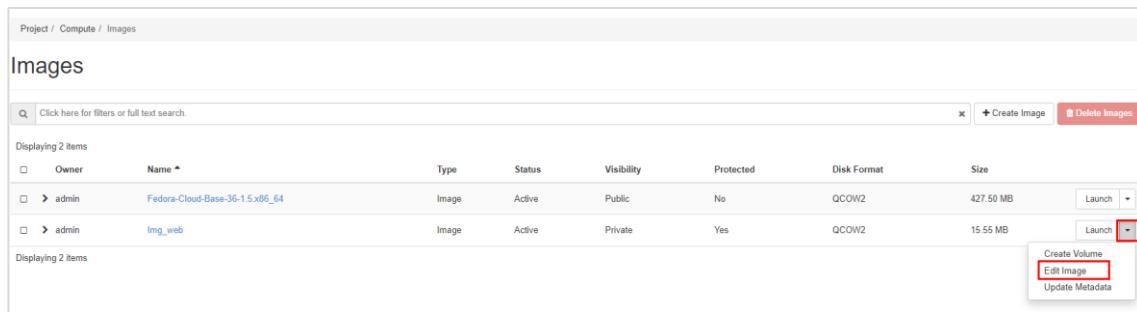
Step 3 Click **Create Image**.

Step 4 Return to the image list. When the status of the created image changes to **Active**, the image is registered successfully. You can view the image **Visibility** and **Protected**.

Images							
Project / Compute / Images							
Images							
Click here for filters or full text search.							
Owner	Name *	Type	Status	Visibility	Protected	Disk Format	Size
admin	Fedora-Cloud-Base-36-1.5.x86_64	Image	Active	Public	No	QCOW2	427.50 MB
admin	Img_web	Image	Active	Private	Yes	QCOW2	15.55 MB

4.2.3 Modifying an Image

Step 1 Log in to the OpenStack Dashboard as the **admin** user and choose **Project > Compute > Images**. Locate the row that contains the **Img_web** image to be operated, click **⋮**, and select **Edit Image** from the drop-down list.



Owner	Name	Type	Status	Visibility	Protected	Disk Format	Size
admin	Fedora-Cloud-Base-36-1.5.x86_64	Image	Active	Public	No	QCOW2	427.50 MB
admin	img_web	Image	Active	Private	Yes	QCOW2	15.55 MB

Step 2 In the displayed **Edit Image** dialog box, set **Visibility** to **Public** and **Protected** to **No**, and click **Update Image**.

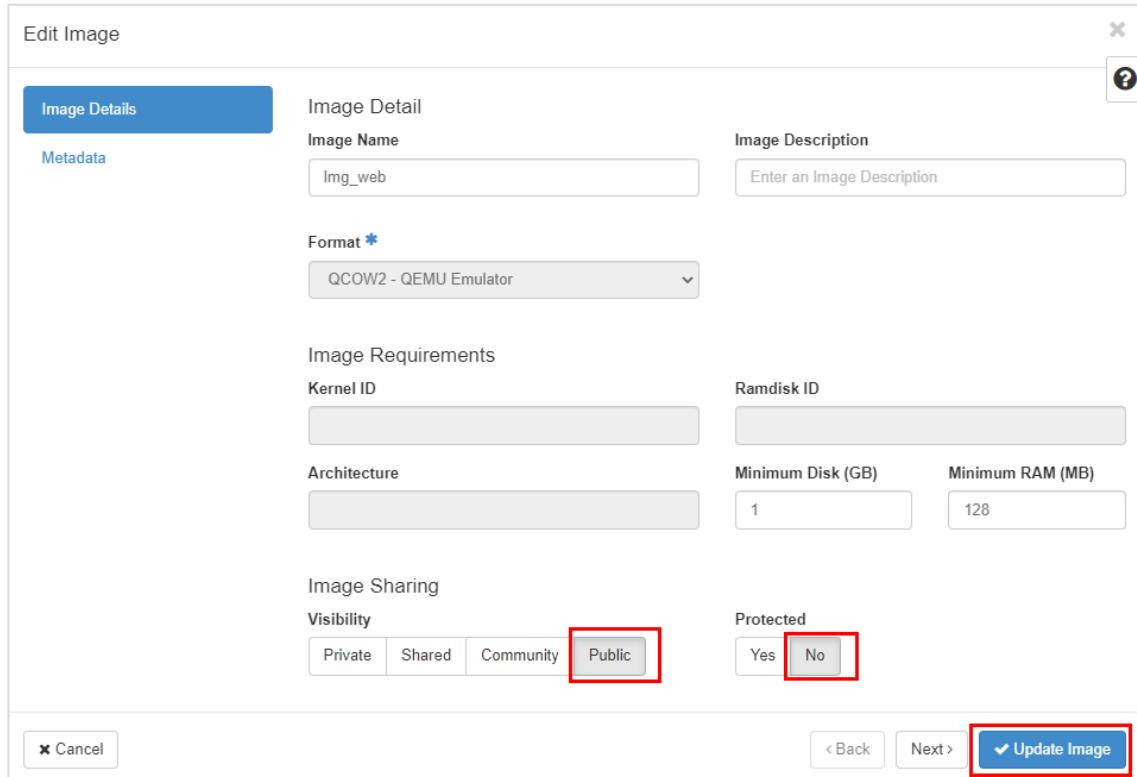


Image Details

Image Name: img_web

Image Description: Enter an Image Description

Format: QCOW2 - QEMU Emulator

Image Requirements

Kernel ID: [Input field]

Ramdisk ID: [Input field]

Architecture: [Input field]

Minimum Disk (GB): 1

Minimum RAM (MB): 128

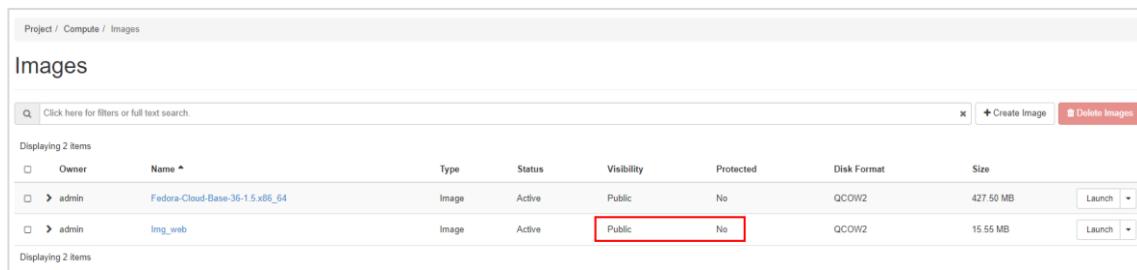
Image Sharing

Visibility: Private, Shared, Community, **Public** (highlighted)

Protected: Yes, **No** (highlighted)

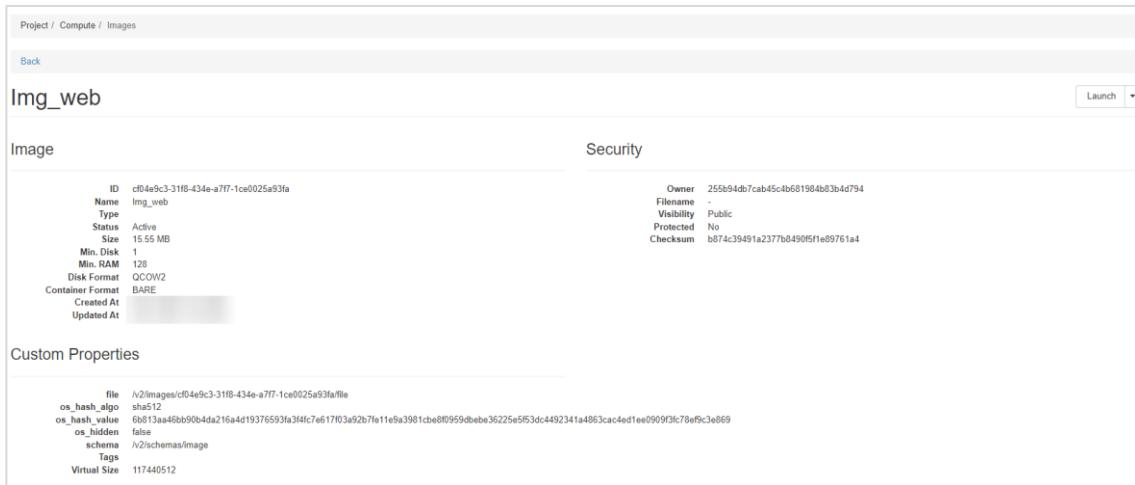
Buttons: Cancel, Back, Next, **Update Image** (highlighted)

Step 3 Return to the image list and check the changes of **Visibility** and **Protected** again.



Owner	Name	Type	Status	Visibility	Protected	Disk Format	Size
admin	Fedora-Cloud-Base-36-1.5.x86_64	Image	Active	Public	No	QCOW2	427.50 MB
admin	img_web	Image	Active	Public	No	QCOW2	15.55 MB

Step 4 Click **Img_web** to check the image details.



ID	cf04e9c3-31fb-434e-a7f7-1ce0025a93fa	Owner	256b94db7cab45c4b681984b83b4d794
Name	Img_web	Filename	-
Type	Active	Visibility	Public
Status	Active	Protected	No
Size	15.95 MB	Checksum	b574c39491a2377b8490f5f1e89761a4
Min. Disk	1		
Min. RAM	128		
Disk Format	QCOW2		
Container Format	BARE		
Created At			
Updated At			

Custom Properties

file	/v2/images/cf04e9c3-31fb-434e-a7f7-1ce0025a93fa/file
os_hash_algo	sha512
os_hash_value	6b0513aa46bb90b4da216a4d19376593fa34fc7e61703a92b7fe11e9a3981cbe8ff959dbebe36225e5f53dc4492341a4863cac4ed1ee0909f3fc70ef9c3e869
os_hidden	false
schema	/v2/schemas/image
Tags	
Virtual Size	117440512

4.3 Operations on OpenStack CLI

4.3.1 Pulling an Image (CirrOS)

Step 1 Remotely log in to the ECS. Run the following commands to switch to user **stack** and go to the **devstack** directory: Import the environment variables of user **admin**.

```
su - stack
cd devstack/
. admin-openrc.sh
```

```
root@ecs-yoga:~# su - stack
stack@ecs-yoga:~$ cd devstack/
stack@ecs-yoga:~/devstack$ . admin-openrc.sh
stack@ecs-yoga:~/devstack$
```

Step 2 Run the following command to pull the CirrOS image:

```
wget http://download.cirros-cloud.net/0.5.2/cirros-0.5.2-x86_64-disk.img
```

```
stack@ecs-yoga:~/devstack$ wget http://download.cirros-cloud.net/0.5.2/cirros-0.5.2-x86_64-disk.img
--20[=====[5-- http://download.cirros-cloud.net/0.5.2/cirros-0.5.2-x86_64-disk.img
Resolving download.cirros-cloud.net (download.cirros-cloud.net)... 64.90.42.85, 2607:f298:6:a036::bd6:a72a
Connecting to download.cirros-cloud.net (download.cirros-cloud.net)|64.90.42.85|:80... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://github.com/cirros-dev/cirros/releases/download/0.5.2/cirros-0.5.2-x86_64-disk.img [following]
--20[=====[07-- https://github.com/cirros-dev/cirros/releases/download/0.5.2/cirros-0.5.2-x86_64-disk.img
Resolving github.com (github.com)... 20.205.243.166
Connecting to github.com (github.com)|20.205.243.166|:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://objects.githubusercontent.com/github-production-release-asset-2e65be/219785102/f2390680-7ddd-11eb-9791-2818cd182911?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAIWNYAX4CSVEH53A%2F20220824%2Fus-east-1%2Fs3%2Faws4_re
quest&X-Amz-Date=20220824T084708Z&X-Amz-Expires=300&X-Amz-Signature=6373ca1b24c515adf52308d06ba05a2129b29cfa83a09a37cb29f
b77b4c295e0&X-Amz-SignedHeaders=host&actor_id=0&key_id=0&repo_id=219785102&response-content-disposition=attachment%3B%20f
ilename%3Dcirros-0.5.2-x86_64-disk.img&response-content-type=application%2Foctet-stream [following]
--20[=====[08-- https://objects.githubusercontent.com/github-production-release-asset-2e65be/219785102/f2390680-
7ddd-11eb-9791-2818cd182911?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAIWNYAX4CSVEH53A%2F20220824%2Fus-east-1
%2Fs3%2Faws4_request&X-Amz-Date=20220824T084708Z&X-Amz-Expires=300&X-Amz-Signature=6373ca1b24c515adf52308d06ba05a2129b29c
fa83a09a37cb29fb77b4c295e0&X-Amz-SignedHeaders=host&actor_id=0&key_id=0&repo_id=219785102&response-content-disposition=at
tachment%3B%20filename%3Dcirros-0.5.2-x86_64-disk.img&response-content-type=application%2Foctet-stream
Resolving objects.githubusercontent.com (objects.githubusercontent.com)... 185.199.110.133, 185.199.109.133, 185.199.108.
133, ...
Connecting to objects.githubusercontent.com (objects.githubusercontent.com)|185.199.110.133|:443... connected.
```

Step 3 Wait until the image file is downloaded.

```
133, ...
Connecting to objects.githubusercontent.com (objects.githubusercontent.com)|185.199.110.133|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 16300544 (16M) [application/octet-stream]
Saving to: 'cirros-0.5.2-x86_64-disk.img'

cirros-0.5 15% 2.43M 11.3KB/s eta
                                         cirros-0.5.2-x86_64-disk.img
100%[=====] 8.64 KB/s - 'cirros-0.5.2-x86_64-disk.img' saved [16300544/16300544]
```

Step 4 Run the following command to check the image file downloaded:

```
ls
```

```
stack@ecs-yoga:~/devstack$ ls
admin-openrc.sh      files      lib      roles      tests
cirros-0.5.2-x86_64-disk.img  functions  LICENSE  run_tests.sh  tools
clean.sh              functions-common local.conf samples  tox.ini
CONTRIBUTING.rst    FUTURE.rst   Makefile  setup.cfg   unstack.sh
data                  gate       openrc   setup.py    User_cli_01-openrc.sh
doc                   HACKING.rst  playbooks stackrc   User_cli_02-openrc.sh
extras.d              inc        README.rst stack.sh
```

Step 5 Run the following command to check the details of the image file:

```
qemu-img info cirros-0.5.2-x86_64-disk.img
```

```
stack@ecs-yoga:~/devstack$ qemu-img info cirros-0.5.2-x86_64-disk.img
image: cirros-0.5.2-x86_64-disk.img
file format: qcow2
virtual size: 112 MiB (117440512 bytes)
disk size: 15.5 MiB
cluster_size: 65536
Format specific information:
    compat: 1.1
    lazy refcounts: false
    refcount bits: 16
    corrupt: false
```

4.3.2 Creating and Registering an Image

- Step 1 Run the following command to import the environment variables of the **admin** user:

```
. admin-openrc.sh
```

- Step 2 Run the following command to create the **Img_cli** image in the **qcow2** format and set the image to **private**:

```
openstack image create --disk-format qcow2 --container-format bare --min-disk 1 --min-ram 128 --private --file ./cirros-0.5.2-x86_64-disk.img Img_cli
```

```
stack@ecs-yoga:~/devstack$ openstack image create --disk-format qcow2 --container-format bare --min-disk 1 --min-ram 128 --private --file ./cirros-0.5.2-x86_64-disk.img Img_cli
+-----+
| Field      | Value
+-----+
| container_format | bare
| created_at   | 2016-01-05T12:42:28Z
| disk_format  | qcow2
| file        | /var/lib/openstack/images/1/ledb891f-b949-41ec-baa9-f12b67e76c8e/file
| id          | ledb891f-b949-41ec-baa9-f12b67e76c8e
| min_disk    | 1
| min_ram     | 128
| name        | Img_cli
| owner        | 8642f6a2c9ce4e8c99f4bc688b757422
| properties   | os_hidden='False', owner_specified.openstack.md5='', owner_specified.openstack.object='images/Img_cli', owner_specified.openstack.sha256=''
| protected   | False
| schema       | /v2/schemas/image
| status       | queued
| tags         |
| updated_at  | 2016-01-05T12:42:28Z
| visibility   | private
+-----+
```

- Step 3 Run the following command to view the image list:

```
openstack image list
```

```
stack@ecs-yoga:~/devstack$ openstack image list
+-----+-----+-----+
| ID            | Name           | Status |
+-----+-----+-----+
| d6af2d55-ee54-4aea-abc8-1a8b91544554 | Fedora-Cloud-Base-36-1.5.x86_64 | active |
| 71feb34d-a92a-4ff0-9c31-3989d2b5e562 | Img_cli        | active |
| 73788247-4ed1-4c5c-a724-f1187c662b5a | Img_web        | active |
| 4ba57258-c4a4-4bf8-ae53-143d24135dad | cirros-0.5.2-x86_64-disk | active |
+-----+-----+-----+
```

- Step 4 Run the following command to remove the **admin** role of the **User_cli_01** user from the **Project_cli** project:

```
openstack role remove --project Project_cli --user User_cli_01 admin
```

```
stack@ecs-yoga:~/devstack$ openstack role remove --project Project_cli --user User_cli_01 admin
stack@ecs-yoga:~/devstack$
```

- Step 5 Run the following command to check whether the role of the **Group_cli** user group exists:

```
openstack role assignment list --names | grep Group_cli
```

```
stack@ecs-yoga:~/devstack$ openstack role assignment list --names | grep Group_cli
| admin           |                               | Group_cli@Default | project_cli@Default      |       |       | False   |
stack@ecs-yoga:~/devstack$
```

- Step 6 If any command output is displayed, run the following command to remove the role of the **Group_cli** user group:

```
openstack role remove --project Project_cli --group Group_cli admin
```

```
stack@ecs-yoga:~/devstack$ openstack role remove --project Project_cli --group Group_cli admin
stack@ecs-yoga:~/devstack$
```

- Step 7 Run the following command to add the **Role_cli** role of the **User_cli_01** user in the **Project_cli** project:

```
openstack role add --project Project_cli --user User_cli_01 Role_cli
```

```
stack@ecs-yoga:~/devstack$ openstack role add --project Project_cli --user User_cli_01 Role_cli
stack@ecs-yoga:~/devstack$
```

- Step 8 Run the following command to check the role assignment details:

```
openstack role assignment list --names | grep User_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack role assignment list --names | grep User_cli_01
| Role_cli    | User_cli_01@Default   |                               | project_cli@Default      |       |       | False   |
| Role_cli    | User_cli_01@Default   |                               | admin@Default            |       |       | False   |
stack@ecs-yoga:~/devstack$
```

- Step 9 Run the following command to import the environment variables of the **User_cli_01** user:

```
. User_cli_01-openrc.sh
```

```
stack@ecs-yoga:~/devstack$ . User_cli_01-openrc.sh
stack@ecs-yoga:~/devstack$
```

- Step 10 Run the following command to check whether the **Img_cli** image is displayed in the image list:

```
openstack image list
```

```
stack@ecs-yoga:~/devstack$ openstack image list
+-----+-----+-----+
| ID          | Name            | Status |
+-----+-----+-----+
| d6af2d55-ee54-4aea-abc8-1a8b91544554 | Fedora-Cloud-Base-36-1.5.x86_64 | active |
| 73788247-4ed1-4c5c-a724-f1187c662b5a | Img_web          | active |
| 4ba57258-c4a4-4bf8-ae53-143d24135dad | cirros-0.5.2-x86_64-disk    | active |
+-----+-----+-----+
```

4.3.3 Modifying an Image

- Step 1 Run the following command to import the environment variables of the **admin** user:

```
. admin-openrc.sh
```

```
stack@ecs-yoga:~/devstack$ . admin-openrc.sh
stack@ecs-yoga:~/devstack$
```

- Step 2 Run the following command to set the **Img_cli** image to **public**:

```
openstack image set --public Img_cli
```

```
stack@ecs-yoga:~/devstack$ openstack image set --public Img_cli
stack@ecs-yoga:~/devstack$
```

- Step 3 Run the following command to view details about the **Img_cli** image. The image visibility has changed to **public**.

```
openstack image show Img_cli
```

```
stack@decs-yoga:~/devstack$ openstack image show Img_cli
+-----+
| Field      | Value
+-----+
| checksum   | b874c39491a2377b8490f5fle89761a4
| container_format | bare
| created_at | 2015-08-08T00:00:00Z
| disk_format | qcow2
| file       | /v2/images/ledb091f-b949-41ec-baa9-f12b67e76c0e/file
| id         | ledb091f-b949-41ec-baa9-f12b67e76c0e
| min_disk   | 1
| min_ram   | 128
| name       | Img_cli
| owner      | 8642f6a2c9ce4e8c99f4bc608b757422
| properties  | os_hash_algo='sha512', os_hash_value='6b813aa46bb90b4da216a4d19376593fa3f4fc7e617f03a92b7fe11e9a3981cbe8f0959
owner_specified.openstack.md5='', owner_specified.openstack.object='images/Img_cli', owner_specified.openstack.sha256=''
| protected  | False
| schema     | /v2/schemas/image
| size       | 16308544
| status     | active
| tags       |
| updated_at | 2015-08-08T00:00:00Z
| virtual_size | 117440512
| visibility  | public
+-----+
```

- Step 4** Run the following commands to import the environment variables of the **User_cli_01** user and check whether the **Img_cli** image is displayed in the image list:

```
. User_cli_01-openrc.sh
openstack image list
```

```
stack@decs-yoga:~/devstack$ openstack image list
+-----+-----+-----+
| ID           | Name          | Status |
+-----+-----+-----+
| d6af2d55-ee54-4aea-abc8-1a8b91544554 | Fedora-Cloud-Base-36-1.5.x86_64 | active |
| 71feb34d-a92a-4ff0-9c31-3989d2b5e562 | Img_cli        | active |
| 73788247-4ed1-4c5c-a724-f1187c662b5a | img_web        | active |
| 4ba57258-c4a4-4bf8-ae53-143d24135dad | cirros-0.5.2-x86_64-disk | active |
+-----+-----+-----+
```

4.3.4 Sharing an Image

The OpenStack image service allows sharing an image among specified users without disclosing it to all users.

- Step 1** Run the following command to import the environment variables of the **admin** user:

```
. admin-openrc.sh
```

- Step 2** Run the following command to set the image to **shared**:

```
openstack image set --shared Img_cli
```

```
stack@ecs-yoga:~/devstack$ openstack image set --shared Img_cli
stack@ecs-yoga:~/devstack$
```

- Step 3 Run the following commands to import the environment variables of the **User_cli_01** user and check whether the **Img_cli** image is displayed in the image list:

```
. User_cli_01-openrc.sh
openstack image list
```

```
stack@ecs-yoga:~/devstack$ openstack image list
+---+ | ID | Name | Status | +---+
| d6af2d55-ee54-4aea-abc8-1a8b91544554 | Fedora-Cloud-Base-36-1.5.x86_64 | active |
| 73788247-4ed1-4c5c-a724-f1187c662b5a | Img_web | active |
| 4ba57258-c4a4-4bf8-ae53-143d24135dad | cirros-0.5.2-x86_64-disk | active |
+---+
```

- Step 4 Run the following commands to import the environment variables of the **admin** user and check the image list and project list:

```
. admin-openrc.sh
openstack image list
openstack project list
```

```
stack@ecs-yoga:~/devstack$ . admin-openrc.sh
stack@ecs-yoga:~/devstack$ openstack image list
+---+ | ID | Name | Status | +---+
| d6af2d55-ee54-4aea-abc8-1a8b91544554 | Fedora-Cloud-Base-36-1.5.x86_64 | active |
| 71feb34d-a92a-4ff0-9c31-3989d2b5e562 | Img_cli | active |
| 73788247-4ed1-4c5c-a724-f1187c662b5a | Img_web | active |
| 4ba57258-c4a4-4bf8-ae53-143d24135dad | cirros-0.5.2-x86_64-disk | active |
+---+
stack@ecs-yoga:~/devstack$ openstack project list
+---+ | ID | Name | +---+
| 431b085a0a1c4c09a59472f6ef58775d | admin | 
| 5b876f0d886d4ccb88a4d84de6268745 | service | 
| 66bc2acbeae34ee6b28fc6750b30d0c4 | project_cli | 
| 86a78883e86a414683e69d0749792fac | alt_demo | 
| 881e8daaeb724de1a26aa698e452b0a6 | Project_web | 
| adb64b1c62cd4cf5adb32e792403c21a | demo | 
| ffb1dbd64bfd4809a84efc951c18a8f4 | invisible_to_admin | 
+---+
```

Record the IDs of the **Img_cli** image and the **Project_cli** project.

- Step 5 Run the following command to add the **Img_cli** image to the **Project_cli** project:

```
openstack image add project IMAGE_ID PROJECT_ID
```

```
stack@ecs-yoga:~/devstack$ openstack image add projec ledb091f-b949-41ec-baa9-f12b67e76c0e 0722a04a26dc4d0aa52a52edf3b3ed18
+-----+
| Field      | Value
+-----+
| created_at | 2020-06-10T10:40:00Z
| image_id   | ledb091f-b949-41ec-baa9-f12b67e76c0e
| member_id  | 0722a04a26dc4d0aa52a52edf3b3ed18
| schema     | /v2/schemas/member
| status     | pending
| updated_at | 2020-06-10T10:40:00Z
+-----+
stack@ecs-yoga:~/devstack$
```

The command output indicates that the status is **pending**.

Step 6 Run the following commands to import the environment variables of the **User_cli_01** user and check whether the shared image can be displayed:

```
. User_cli_01-openrc.sh
openstack image list
```

```
stack@ecs-yoga:~/devstack$ . User_cli_01-openrc.sh
stack@ecs-yoga:~/devstack$ openstack image list

+-----+-----+-----+
| ID           | Name          | Status |
+-----+-----+-----+
| d6af2d55-ee54-4aea-abc8-1a8b91544554 | Fedora-Cloud-Base-36-1.5.x86_64 | active |
| 73788247-4ed1-4c5c-a724-f1187c662b5a | Img_web       | active |
| 4ba57258-c4a4-4bf8-ae53-143d24135dad | cirros-0.5.2-x86_64-disk    | active |
+-----+-----+-----+
```

Conclusion: If the status is **pending**, the user cannot check the shared image.

Step 7 Run the following command to update the status to **accept** to receive the shared image:

```
openstack image set --accept IMAGE_ID
```

```
stack@ecs-yoga:~/devstack$ openstack image set --accept ledb091f-b949-41ec-baa9-f12b67e76c0e
stack@ecs-yoga:~/devstack$
```

Step 8 Run the following command to check whether the shared image is displayed:

```
openstack image list
```

```
stack@ecs-yoga:~/devstack$ openstack image list
+-----+-----+-----+
| ID           | Name          | Status |
+-----+-----+-----+
| d6af2d55-ee54-4aea-abc8-1a8b91544554 | Fedora-Cloud-Base-36-1.5.x86_64 | active |
| 71feb34d-a92a-4ff0-9c31-3989d2b5e562 | Img_cli       | active |
| 73788247-4ed1-4c5c-a724-f1187c662b5a | Img_web       | active |
| 4ba57258-c4a4-4bf8-ae53-143d24135dad | cirros-0.5.2-x86_64-disk    | active |
+-----+-----+-----+
```

When the status is **accept**, the shared image can be checked and used.

4.3.5 Converting the Image Format

Images in qcow2 format can be compressed. Therefore, images in other formats are converted to qcow2 format and then pushed to OpenStack. The following procedures take the Ubuntu image in VMDK format as an example to describe how to convert an image. In this exercise, the Ubuntu image file has been downloaded to the local **Downloads** folder using a browser. The download address is <http://cloud->

[images.ubuntu.com/bionic/current/](http://cloud-images.ubuntu.com/bionic/current/). You can select **bionic-server-cloudimg-amd64.vmdk** to download the file. You can also run the **wget** command to download the file to the VM. The download address is <http://cloud-images.ubuntu.com/bionic/current/bionic-server-cloudimg-amd64.vmdk>, but the download may take a long time.

Step 1 Run the following command to pull the image:

```
 wget http://cloud-images.ubuntu.com/bionic/current/bionic-server-cloudimg-amd64.vmdk
```

```
stack@ecs-yoga:~/devstack$ wget http://cloud-images.ubuntu.com/bionic/current/bionic-server-cloudimg-amd64.vmdk
--2022-08-26 11:28:43--  http://cloud-images.ubuntu.com/bionic/current/bionic-server-cloudimg-amd64.vmdk
Resolving cloud-images.ubuntu.com (cloud-images.ubuntu.com)... 185.125.190.37, 185.125.190.40, 2620:2d:4000:1::17, ...
Connecting to cloud-images.ubuntu.com (cloud-images.ubuntu.com)|185.125.190.37|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 372763136 (355M)
Saving to: 'bionic-server-cloudimg-amd64.vmdk'

bionic-server-cloudimg-amd64.vmdk          100%[=====] 355.49M  2.70MB/s   in 2m 20s

2022-08-26 11:31:04 (2.54 MB/s) - 'bionic-server-cloudimg-amd64.vmdk' saved [372763136/372763136]
```

Step 2 Run the following commands to import environment variables and view the current directory:

```
. admin-openrc.sh
ls
```

```
stack@ecs-yoga:~/devstack$ . admin-openrc.sh
stack@ecs-yoga:~/devstack$ ls
admin-openrc.sh      data      functions-common  lib      playbooks      setup.cfg  tools
bionic-server-cloudimg-amd64.vmdk  doc       FUTURE.rst      LICENSE  README.rst    setup.py  tox.ini
cirros-0.5.2-x86_64-disk.img  extras.d   gate        local.conf  roles      stackrc  unstack.sh
clean.sh            files     HACKING.rst    Makefile  run_tests.sh  stack.sh User_cli_01-openrc.sh
CONTRIBUTING.rst      functions  inc        openrc   samples      tests   User_cli_02-openrc.sh
```

Step 3 Run the following command to check the image file details:

```
qemu-img info bionic-server-cloudimg-amd64.vmdk
```

```
stack@ecs-yoga:~/devstack$ qemu-img info bionic-server-cloudimg-amd64.vmdk
image: bionic-server-cloudimg-amd64.vmdk
file format: vmdk
virtual size: 10 GiB (10737418240 bytes)
disk size: 356 MiB
cluster_size: 65536
Format specific information:
cid: 2119925927
parent cid: 4294967295
create type: streamOptimized
extents:
[0]:
compressed: true
virtual size: 10737418240
filename: bionic-server-cloudimg-amd64.vmdk
cluster size: 65536
format:
```

Step 4 Run the following command to convert the image format from **vmdk** to **qcow2**:

```
qemu-img convert -f vmdk -O qcow2 -c -p bionic-server-cloudimg-amd64.vmdk bionic-server-
cloudimg-amd64.qcow2
```

In the preceding command:

- f: specifies the disk image format.
- O: specifies the output format.
- c: indicates that the target can only be compressed in the qcow2 format.
- p: indicates the conversion progress.

Wait until the image format is converted.

```
stack@ecs-yoga:~/devstack$ qemu-img convert -f vmdk -O qcow2 -c -p bionic-server-cloudimg-amd64.vmdk bionic-server-cloudimg-amd64.qcow2
(100.00/100%)
stack@ecs-yoga:~/devstack$
```

Step 5 Run the following command to view the image details after conversion:

```
qemu-img info bionic-server-cloudimg-amd64.qcow2
```

```
stack@ecs-yoga:~/devstack$ qemu-img info bionic-server-cloudimg-amd64.qcow2
image: bionic-server-cloudimg-amd64.qcow2
file format: qcow2
virtual size: 10 GiB (10737418240 bytes)
disk size: 372 MiB
cluster_size: 65536
Format specific information:
  compat: 1.1
  lazy refcounts: false
  refcount bits: 16
  corrupt: false
```

Step 6 Run the following command to create the **Ubuntu_cli** image in the **qcow2** format and set the image status to **public**:

```
openstack image create --disk-format qcow2 --container-format bare --min-disk 1 --min-ram 128 --public --file ./bionic-server-cloudimg-amd64.qcow2 Ubuntu_cli
```

```
stack@ecs-yoga:~/devstack$ openstack image create --disk-format qcow2 --container-format bare --min-disk 1 --min-ram 128 --public --file ./bionic-server-cloudimg-amd64.qcow2 Ubuntu_cli
+-----+
| Field      | Value
+-----+
| container_format | bare
| created_at    | [REDACTED]
| disk_format   | qcow2
| file          | /v2/images/c4ef70f0-3e18-4e25-9073-dlaefabfe76e/file
| id            | c4ef70f0-3e18-4e25-9073-dlaefabfe76e
| min_disk      | 1
| min_ram       | 128
| name          | Ubuntu_cli
| owner          | 8642f6a2c9ce4e8c99f4bc608b757422
| properties     | os_hidden='False', owner_specified.openstack.md5='', owner_specified.openstack.object='images/Ubuntu_cli', owner_specified.openstack.sha256=''
| protected      | False
| schema         | /v2/schemas/image
| status          | queued
| tags           |
| updated_at    | [REDACTED]
| visibility     | public
+-----+
```

4.3.6 Exporting an Image

Step 1 Run the following command to view the image list:

```
openstack image list
```

```
stack@decs-yoga:~/devstack$ openstack image list
+---+-----+-----+-----+
| ID | Name | Status |
+---+-----+-----+-----+
| d6af2d55-ee54-4aea-abc8-1a8b91544554 | Fedora-Cloud-Base-36-1.5.x86_64 | active |
| 71feb34d-a92a-4ff0-9c31-3989d2b5e562 | Img_cli | active |
| 73788247-4ed1-4c5c-a724-f1187c662b5a | Img_web | active |
| b86a7658-0b03-4ee3-afb9-2f679141273e | Ubuntu_cli | active |
| 4ba57258-c4a4-4bf8-ae53-143d24135dad | cirros-0.5.2-x86_64-disk | active |
+---+-----+-----+-----+
```

Step 2 Run the following command to save the **Ubuntu_cli** image to the local PC:

```
openstack image save --file Ubuntu.qcow2 Ubuntu_cli
```

```
stack@decs-yoga:~/devstack$ openstack image save --file Ubuntu.qcow2 Ubuntu_cli
stack@decs-yoga:~/devstack$
```

Step 3 Run the following command to view the image file saved:

```
ls
```

```
stack@decs-yoga:~/devstack$ ls
admin-openrc.sh          doc           HACKING.rst   playbooks    stackrc      User_cli_01-openrc.sh
bionic-server-cloudimg-amd64.qcow2 extras.d     inc          README.rst  stack.sh     User_cli_02-openrc.sh
bionic-server-cloudimg-amd64.vmdk  files        lib          roles       tests
cirros-0.5.2-x86_64-disk.img functions   LICENSE     run_tests.sh tools
clean.sh                 functions-common local.conf   samples    tox.ini
CONTRIBUTING.rst         FUTURE.rst   Makefile    setup.cfg  setup.py
data                     gate        openrc     setup.sh   Ubuntu.qcow2
                                         |                         |           |           unstack.sh
```

4.3.7 Deleting an Image

Step 1 Run the following command to delete the **Ubuntu_cli** image:

```
openstack image delete Ubuntu_cli
```

```
stack@decs-yoga:~/devstack$ openstack image delete Ubuntu_cli
stack@decs-yoga:~/devstack$
```

Step 2 Run the following command to view the image list again:

```
openstack image list
```

```
stack@ecs-yoga:~/devstack$ openstack image list
+---+-----+-----+
| ID          | Name      | Status |
+---+-----+-----+
| d6af2d55-ee54-4aea-abc8-1a8b91544554 | Fedora-Cloud-Base-36-1.5.x86_64 | active |
| 71feb34d-a92a-4ff0-9c31-3989d2b5e562 | Img_cli   | active |
| 73788247-4ed1-4c5c-a724-f1187c662b5a | Img_web   | active |
| 4ba57258-c4a4-4bf8-ae53-143d24135dad | cirros-0.5.2-x86_64-disk | active |
+---+-----+-----+
```

5

OpenStack Compute Management

5.1 Overview

5.1.1 About This Exercise

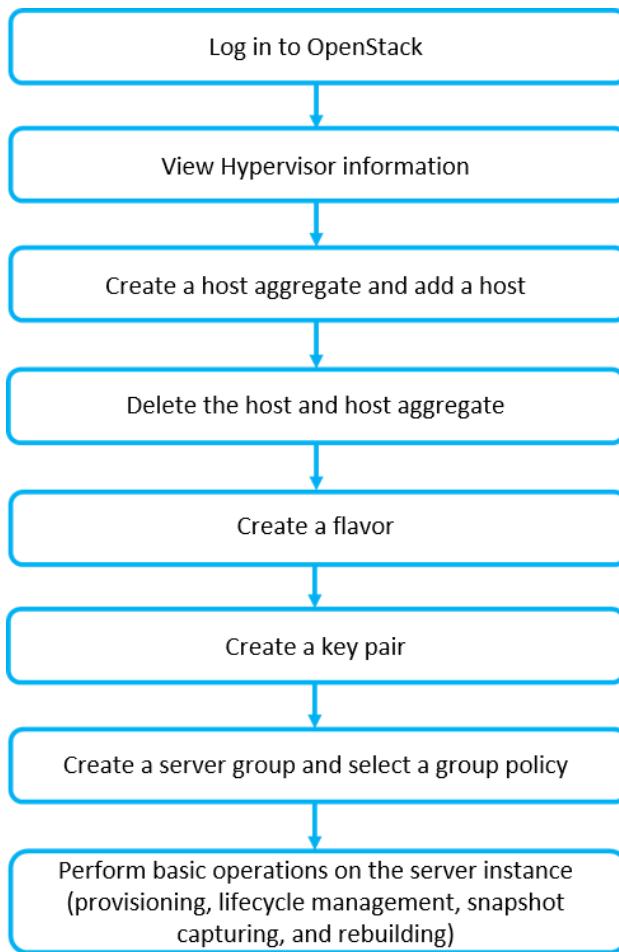
This exercise introduces how to manage hypervisors, host aggregates, flavors, key pairs, and server groups on the OpenStack dashboard and using the OpenStack CLI. In addition, it introduces basic operations on server instances, such as instance provisioning, lifecycle management, snapshot capturing, and rebuilding.

5.1.2 Objectives

Upon completion of this exercise, you will be familiar with the following operations on the OpenStack dashboard or using the OpenStack CLI:

- Creating host aggregates
- Creating a flavor
- Creating a key pair and server group
- Provisioning a server instance, manage the lifecycle of a server instance, taking a snapshot, and rebuilding a server instance

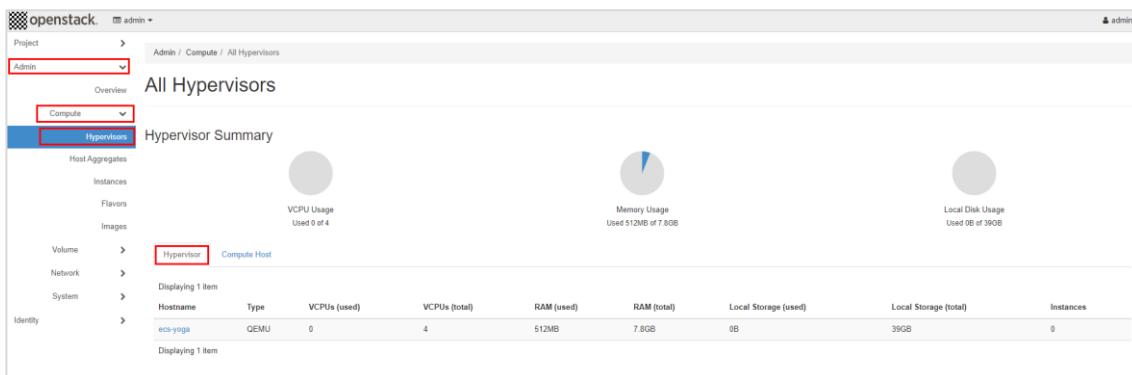
5.1.3 Process



5.2 Operations on the OpenStack Dashboard

5.2.1 Managing a Hypervisor and Host Aggregate

Step 1 Log in to the OpenStack dashboard as user **admin**. In the navigation pane, choose **Admin > Compute > Hypervisors**. The hypervisor list is displayed.

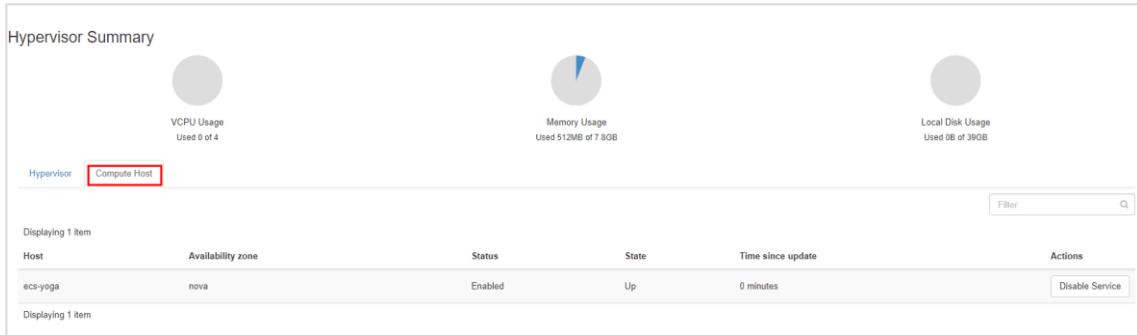


The screenshot shows the OpenStack dashboard with the following details:

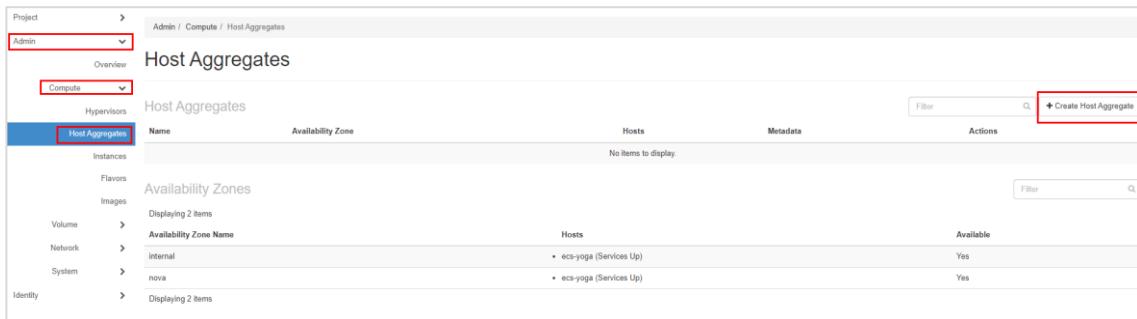
- Project:** Admin
- Navigation:** Admin / Compute / All Hypervisors
- Left Sidebar:** Compute (selected), Hypervisors (selected), Host Aggregates, Instances, Flavors, Images, Volume, Network, System, Identity.
- Hypervisor Summary:** Hypervisor: ecs-yoga, Type: QEMU, VCPUs (used): 0, VCPUs (total): 4, RAM (used): 512MB, RAM (total): 7.8GB, Local Storage (used): 0B, Local Storage (total): 39GB, Instances: 0.
- Table:** Hypervisor (1 item)

Hostname	Type	VCPUs (used)	VCPUs (total)	RAM (used)	RAM (total)	Local Storage (used)	Local Storage (total)	Instances
ecs-yoga	QEMU	0	4	512MB	7.8GB	0B	39GB	0

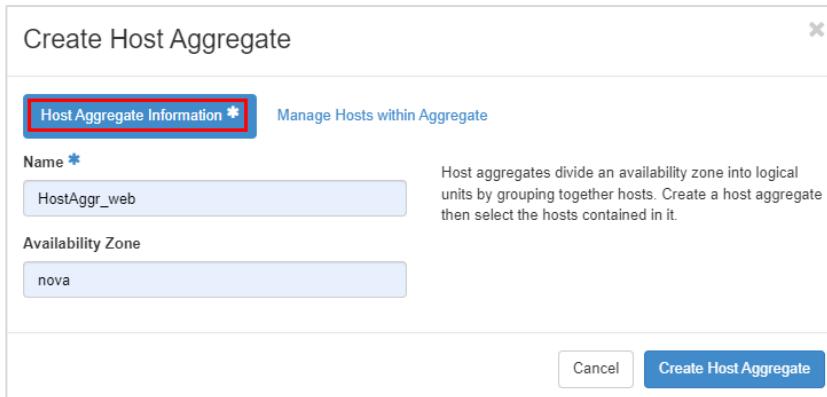
- Step 2** Click the **Compute Host** tab to go to the compute host list and view the compute node details.



- Step 3** In the navigation pane, choose **Admin > Compute > Host Aggregates**. In the host aggregate list, click **Create Host Aggregate** in the upper right corner of the page.



- Step 4** In the displayed **Create Host Aggregate** dialog box, specify **Name** to **HostAggr_web** and **Availability Zone** to **nova** on the displayed **Host Aggregate Information** tab page.



The screenshot shows the 'Create Host Aggregate' dialog box. It has two tabs: 'Host Aggregate Information *' (selected and highlighted with a red border) and 'Manage Hosts within Aggregate'. The 'Host Aggregate Information' tab contains fields for 'Name *' (set to 'HostAggr_web') and 'Availability Zone' (set to 'nova'). A descriptive text explains that host aggregates divide an availability zone into logical units by grouping hosts. The 'Manage Hosts within Aggregate' tab shows a list of hosts: 'internal' and 'nova', both marked as 'Available' (Yes). At the bottom are 'Cancel' and 'Create Host Aggregate' buttons.

- Step 5** Click the **Manage Hosts within Aggregate** tab. Click **+** next to **ecs-yoga** on the left. The selected host is displayed on the right. Click **Create Host Aggregate**.

Create Host Aggregate

Host Aggregate Information * **Manage Hosts within Aggregate**

Add hosts to this aggregate. Hosts can be in multiple aggregates.

All available hosts	Selected hosts
Filter <input type="text"/> <input type="button" value="Search"/>	Filter <input type="text"/> <input type="button" value="Search"/>
ecs-yoga <input style="background-color: #0070C0; color: white; border: 1px solid #0070C0; padding: 2px 5px; border-radius: 5px; font-weight: bold; font-size: inherit; margin-right: 10px;" type="button" value="+"/>	No host selected.

Create Host Aggregate

Host Aggregate Information * **Manage Hosts within Aggregate**

Add hosts to this aggregate. Hosts can be in multiple aggregates.

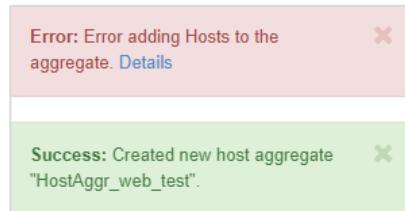
All available hosts	Selected hosts
Filter <input type="text"/> <input type="button" value="Search"/>	Filter <input type="text"/> <input type="button" value="Search"/>
No hosts found.	ecs-yoga <input style="background-color: #0070C0; color: white; border: 1px solid #0070C0; padding: 2px 5px; border-radius: 5px; font-weight: bold; font-size: inherit; margin-left: 10px;" type="button" value="-"/>

Step 6 Return to the host aggregate list and the host aggregate newly created is displayed.

Name	Availability Zone	Hosts	Metadata	Actions
HostAggr_web	nova	ecs-yoga	availability_zone = nova	<input style="background-color: #0070C0; color: white; border: 1px solid #0070C0; padding: 2px 5px; border-radius: 5px; font-weight: bold; font-size: inherit;" type="button" value="Edit Host Aggregate"/>

Verification:

1. Create the **HostAggr_web_test** host aggregate, set the AZ to **AZ_web**, and add the **ecs-yoga** host by repeating steps 3 to 6. Check whether the host can be added to different AZs.

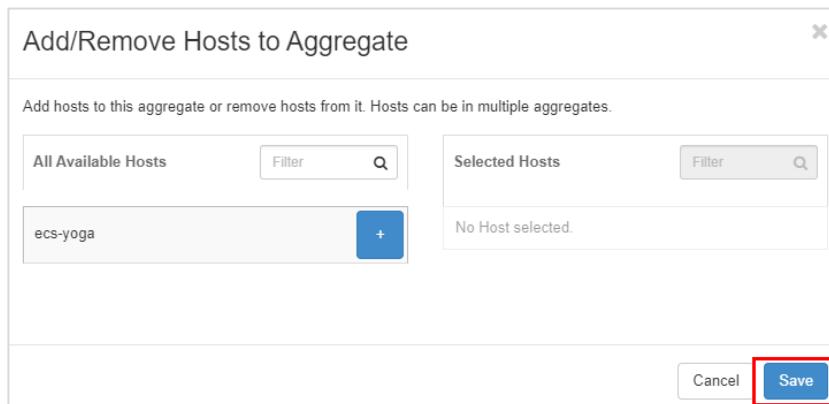
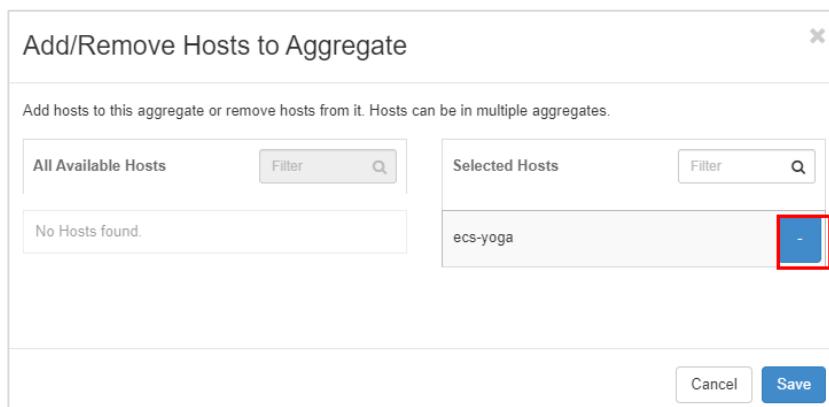


2. Click **Edit Host Aggregate** in the **Actions** column of the **HostAggr_web_test** host aggregate row, set the AZ to **nova**, and click **Submit**. Click in the **Actions** column of the row containing the **HostAggr_web_test**. Select **Manage Hosts** from the drop-down list and add **ecs-yoga** host. Check whether the host can be added to different host aggregates.

Step 7 Click in **Actions** column of the row containing the **HostAggr_web_test** host aggregate, and select **Manage Hosts** from the drop-down list.



Step 8 In the displayed **Add/Remove Hosts to Aggregate** dialog box, click next to the selected host on the right. The selected host is displayed in **All Available Hosts** list on the left. Click **Save**.

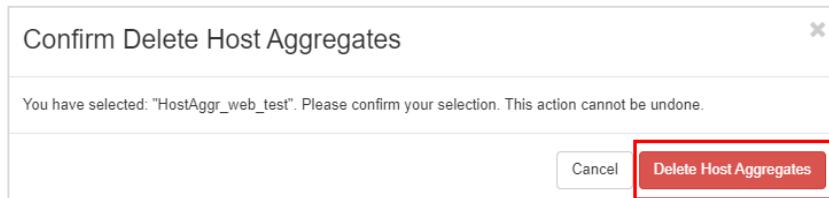


Step 9 Return to the host aggregate list, select **HostAggr_web_test**, and click **Delete Host Aggregates**.

Host Aggregates				
Host Aggregates Displaying 2 items				
Name	Availability Zone	Hosts	Metadata	Actions
HostAggr_web	nova	ecs-yoga	availability_zone = nova	<button>Edit Host Aggregate</button>
<input checked="" type="checkbox"/> HostAggr_web_test	nova		availability_zone = nova	<button>Edit Host Aggregate</button>

Displaying 2 items

Step 10 In the displayed **Confirm Delete Host Aggregates** dialog box, click **Delete Host Aggregates**.



5.2.2 Managing a Flavor

Step 1 In the navigation pane, choose **Admin > Compute > Flavors**. The flavor list is displayed. Click **Create Flavor** in the upper right corner of the page.

Flavors								
Displaying 14 items								
Flavor Name	VCPUs	RAM	Root Disk	Ephemeral Disk	Swap Disk	RX/TX factor	ID	Actions
cirros256	1	256MB	1GB	0GB	0MB	1.0	c1	<button>Update Metadata</button>
ds1G	1	1GB	10GB	0GB	0MB	1.0	d2	<button>Update Metadata</button>
ds2G	2	2GB	10GB	0GB	0MB	1.0	d3	<button>Update Metadata</button>
ds4G	4	4GB	20GB	0GB	0MB	1.0	d4	<button>Update Metadata</button>
ds512M	1	512MB	5GB	0GB	0MB	1.0	d1	<button>Update Metadata</button>

Step 2 In the displayed **Create Flavor** dialog box, specify the following information on the **Flavor Information** tab page:

- Name:** indicates the flavor, for example, **Flavor_web**.
- VCPUs:** indicates the quantity of vCPUs, for example, **1**.
- RAM (MB):** indicates the RAM size, for example, **128**.
- Root Disk (GB):** indicates the root disk size, for example, **1**.
- Retain the default values for other parameters.

Create Flavor

Flavor Information * Flavor Access

Name *

ID

VCPUs *

RAM (MB) *

Root Disk (GB) *

Ephemeral Disk (GB)

Swap Disk (MB)

RX/TX Factor

Cancel Create Flavor

Flavors define the sizes for RAM, disk, number of cores, and other resources and can be selected when users deploy instances.

- Step 3 On the **Flavor Access** tab, click  next to the project name in the project list on the left, for example, **Project_web**. The selected project is displayed on the right, indicating that the flavor to be created can be used by the **Project_web** project. Click **Create Flavor**.

Create Flavor

Flavor Information * **Flavor Access**

Select the projects where the flavors will be used. If no projects are selected, then the flavor will be available in all projects.

All Projects	Selected Projects
invisible_to_admin	No projects selected. All projects can use the flavor.
alt_demo	
service	
Project_web	
admin	
demo	

Cancel **Create Flavor**

Create Flavor

Flavor Information * **Flavor Access**

Select the projects where the flavors will be used. If no projects are selected, then the flavor will be available in all projects.

All Projects	Selected Projects
invisible_to_admin	Project_web
alt_demo	
service	
admin	
demo	

Cancel **Create Flavor**

<input type="checkbox"/> Flavor_web	1	128MB	1GB	0GB	0MB	1.0	187c0dd4-495e-4046-bbaf-4034e233f6c2	No	No	Modify Access
-------------------------------------	---	-------	-----	-----	-----	-----	--------------------------------------	----	----	---------------

Step 4 If you do not select any project when creating the **Flavor_web_test** flavor in step 3, the flavor is available to all projects by default. That is, the flavor is **Public**.

Flavor Name	VCPUs	RAM	Root Disk	Ephemeral Disk	Swap Disk	RX/TX factor	ID	Public	Metadata	Actions
Flavor_web	1	128MB	1GB	0GB	0MB	1.0	187c0dd4-495e-4046-bbaf-4034e233f6c2	No	No	Modify Access
Flavor_web_test	1	128MB	1GB	0GB	0MB	1.0	32996926-0e1e-4888-906f-b922807e040b	Yes	No	Update Metadata

Verification:

Is the flavor a **Public** one if the selected project is deleted after the **Flavor_web** flavor creation?

The procedure is as follows:

Click **Modify Access** in the row containing **Flavor_web**.

Displaying 2 items										
Flavor Name	VCPUs	RAM	Root Disk	Ephemeral Disk	Swap Disk	RX/TX factor	ID	Public	Metadata	Actions
Flavor_web	1	128MB	1GB	0GB	0MB	1.0	187c0dd4-495e-4046-bbaf-4034e233fc2	No	No	Modify Access
Flavor_web_test	1	128MB	1GB	0GB	0MB	1.0	32996926-0e1e-4f88-906f-b922807e040b	Yes	No	Update Metadata

In the displayed **Edit Flavor** dialog box, click  next to the selected project on the right to delete the project, and click **Save**.

Edit Flavor

Select the projects where the flavors will be used. If no projects are selected, then the flavor will be available in all projects.

All Projects	Selected Projects
invisible_to_admin	
alt_demo	
service	
admin	
demo	

Cancel **Save**

Edit Flavor

Select the projects where the flavors will be used. If no projects are selected, then the flavor will be available in all projects.

All Projects	Selected Projects
invisible_to_admin	
alt_demo	
service	
admin	
demo	
Project_web	

Cancel **Save**

Return to the flavor list and check the flavor state in the **Public** column.

Flavors								
								+ Create Flavor Delete Flavors
Flavor Name	VCPUs	RAM	Root Disk	Ephemeral Disk	Swap Disk	RX/TX factor	ID	Public Actions
Flavor_web	1	128MB	1GB	0GB	0MB	1.0	187c0dd4-495e-4046-bba1-4034e233fc2	No Modify Access
Flavor_web_test	1	128MB	1GB	0GB	0MB	1.0	32996926-0e1e-4fb8-906f-b922807e040b	Yes Update Metadata

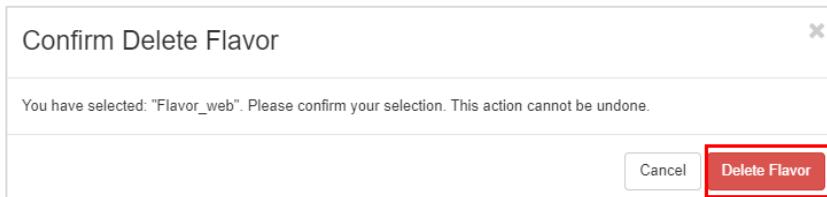
Conclusion:

1. If the **Flavor_web** flavor is **Private**, the flavor is unavailable to any project and is not **Public** after the selected projects are removed (the **admin** user can view the flavor but cannot use it, while other users cannot view or use the flavor).
2. After a flavor is created, it cannot be changed (including changed to **Public** and **Private**). You can only create another one.

Step 5 Click in the row containing the flavor to be deleted, and select **Delete Flavor** from the drop-down list.

Displaying 2 items								
Flavor Name	VCPUs	RAM	Root Disk	Ephemeral Disk	Swap Disk	RX/TX factor	ID	Public Actions
Flavor_web	1	128MB	1GB	0GB	0MB	1.0	187c0dd4-495e-4046-bba1-4034e233fc2	No Modify Access
Flavor_web_test	1	128MB	1GB	0GB	0MB	1.0	32996926-0e1e-4fb8-906f-b922807e040b	Yes Update Metadata Delete Flavor

Step 6 In the displayed **Confirm Delete Flavor** dialog box, click **Delete Flavor**.



5.2.3 Managing a Key Pair and Server Group

Step 1 In the navigation pane, choose **Project > Compute > Key Pairs**. The key pair list is displayed. Click **Create Key Pair** in the upper right corner of the page.

Project	API Access	Compute	Key Pairs	Instances	Images	Server Groups	Volumes	Network	Admin
Project / Compute / Key Pairs									
<input type="button" value="Create Key Pair"/>									
Displaying 0 items									
<input type="checkbox"/> Name <input type="checkbox"/> Type <input type="checkbox"/> Fingerprint No items to display.									
<input type="button" value="Import Public Key"/> <input type="button" value="Delete Key Pairs"/>									

Step 2 In the displayed **Create Key Pair** dialog box, set **Key Pair Name** to **KeyPair_web** and **Key Type** to **SSH Key**, and click **Create Key Pair**.

Create Key Pair

Key Pair Name *

Key Type *

SSH Key

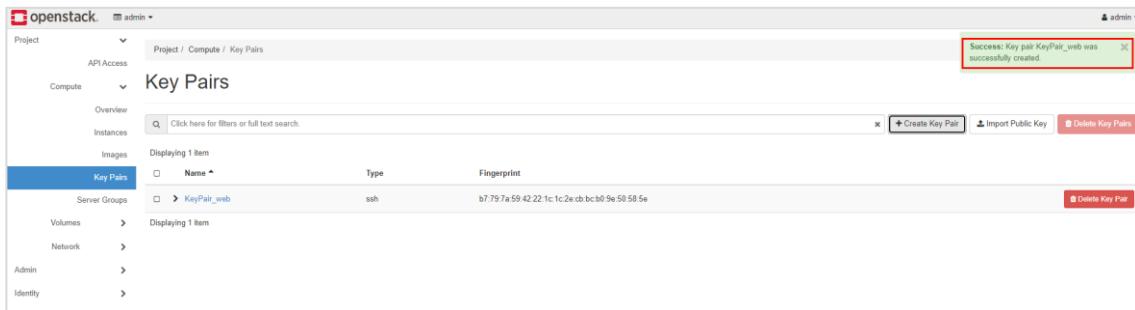
SSH Key (selected)

X509 Certificate

Cancel

Create Key Pair (button with a red border)

- Step 3** A message is displayed, indicating that the key pair has been created and asking you to download the key pair.



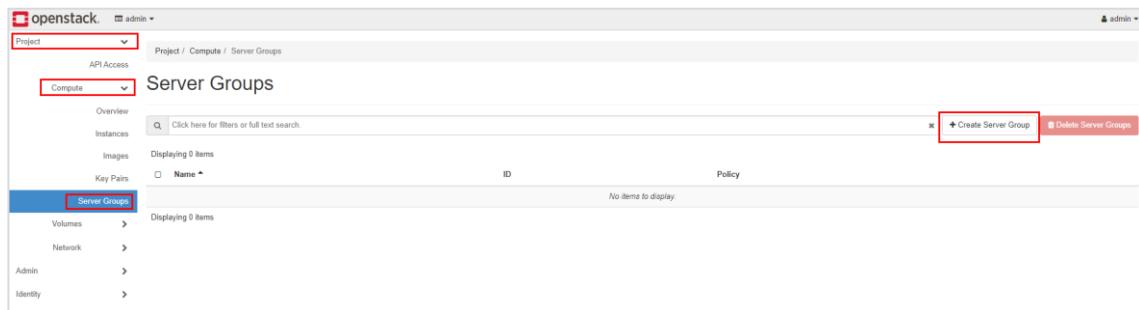
- Step 4** Open the downloaded **KeyPair_web.pem** file, as shown in the following figure.

```
-----BEGIN RSA PRIVATE KEY-----
MIIEpjIBAAKCAQEAuRr1UPnHboGfuad8KutsWgsbj37CMzmJKRC5eZhA8KiaZ4Ye
ygGdas0dN+hdunUQziC705Pmle0XNDDjVYLOU3tDrvdLBZ0D4mQMHOmUKqgTol9
385GcVtkvFU7EbU7zQ2N9//BXk3v6l36ZWu31RQV4CxliDWf+uhcSj4kNZwXtvu
VO8QXpWEbt9POMiUiKxQzrw9mqp4RBEHfiiWcZWuD/Pzl8iH9377bKtP1qVR9Ktv
ZDmaHTWnlidUvMzrsW1wgPwfZlpiKRxao0P0iUw/+eXmvGuLtGUdJOtjO+vkJYA
DCKGDpcnN+3qaDAr/6EJgKEUvTmnwnwAkwwvrwIDAQABAoIBAQCMl1KNLB+GnvaH
eerQHc0IRNLrFCPnPjLIWH30p0hazwMXhKeVGlr4Ud2oAWLJeq5DNUaVpphx+k1V
1WHkBbN3goppn5H8WbDegunYGeov0AvKBxTnivbvWst7G8bAsbtRvOsbtOs02mO/
xBCKo0tCI6+EbzFsBNpF1JoJwEjIOWJBzQHptI/fy58WoekrgKXIYcSsx2r9tR
ksvQjYH3hQMp28RUzleFj6Z5212hxr4dZkz4RYzWrofl6lw222uqZ5wtj10jh
brmw+ +A3X0cTL2bAqUCdAPLTzz0PLfuWONf1XJMTYD8f7LGMZFCJTYTBq41Em/U
4XpNW4PRAoGBAPEg538PFt26VFlnTIPq6gA+OgaRhOnJnUT2J1ARszxMehyxfHZ
aQzSp1BRoX89d3Bm/kjb0A9KCAayuMGq396bRcTjLly3y28EUqGholb0GY427coy
bF75DRCTBYU4hvrqUriW8v4PaWXU7+rHF3tqK4xMu+eJuwM5709m/E/NAoGBAMSF
hcCD7nehabEk8HdlvMziObC4QE7+DyUUTJmby/cNkmI4gBi7PLez+Vg1x94iPPvx
SQkp3Qhn7iWJGmDMO4HVIDCm5w8RQ0KnrbssxyjWRRLVMcPaH0HxjXM1nrKq8sv8
oDRyQguLBId57HCg+bcyRxKn5BhGXKAtvqKcaqlrAoGBAK80/YDxcegC8C9WQ97G
3uj2TitfqXhGqyPkylQbmH8EAua+gs6z7wUGO9S8u+A8yYDDFZnTPscdP9++FUmD
489Ye8WoXZO5aPrt66y7ZAUrcTZl61e0c9l+nSOh8KzwegPwJ9NAu6engyofl4Uw
zPs8FhCH4TFIMy1w91Z2uncxaGBAJSWoFq/Zj7tvZZo56hfNDF1m0kTBwy66CN
ij1cPwu9J0YmuJ43h/H5G/duhEqshGMjjxvesAwVM/sqhUmVpgEHSKsD2hFFSYA
w3ZM8QjfeqbTI90NvzSM/vZtRGczAFbsYX2Hhm8MuByaxN9o1HwoexpJP11tfMm
o00wFzWhAoGBAPAOj3nIA15KzB/1oVKRRcgNukLyB+3L36e1Jge5oRfytilP5tJ
tH3s5tWd+JyedDRS1puacAuVYI76HS4VEKW+JiRSLLkGskQNk3Oqr1BTZ6GhuP/V
aHmWSOru/ws1pclxiNcod7oiKJvqm9xwpp0sYYuUpa8iO0crijWbxhMq
-----END RSA PRIVATE KEY-----
```

- Step 5** Return to the key pair list. The created key pair is displayed.



Step 6 In the navigation pane, choose **Project > Compute > Server Groups**. The server group list is displayed. Click **Create Server Group** in the upper right corner of the page.



Step 7 In the displayed **Create Server Group** dialog box, specify **Name** to **ServerGroup_web** and select a policy type. There are four policy types:

Affinity: All the servers in the same server group must run on the same host.

Anti Affinity: All the servers in the same server group must run on different hosts.

Soft Anti Affinity: If host resources scheduled by servers in a group are sufficient, the anti-affinity policy is used. If host resources scheduled by servers in a group are insufficient, the soft anti-affinity rule is automatically ignored.

Soft Affinity: If host resources scheduled by servers in a group are sufficient, the affinity policy is used. If host resources scheduled by servers in a group are insufficient, the soft affinity rule is automatically ignored.

Specify **Policy** to **Affinity** because there is only one compute node in the lab environment, and click **Submit**.





Create Server Group

Name *

ServerGroup_web

Policy *

Affinity

Cancel

Submit

Step 8 Return to the server group list. The server group created is displayed.



Project / Compute / Server Groups

Server Groups

Click here for filters or full text search.

Displaying 1 item

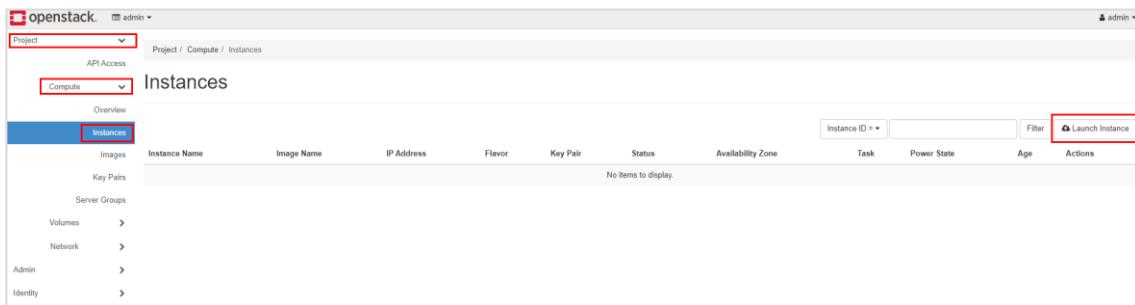
Name	ID	Policy
ServerGroup_web	edd9b72-15f9-4a21-b857-5940b1a7c21b	Affinity

Delete Server Group

5.2.4 Performing Operations on a Server Instance

5.2.4.1 Provisioning a Server Instance

Step 1 Log in to the OpenStack dashboard as the **admin** user. In the navigation pane, choose **Project > Compute > Instances**. The instance list is displayed. Click **Launch Instance** in the upper right corner of the page.



Step 2 In the displayed **Launch Instance** dialog box, click the **Details** tab. Set **Instance Name** to **Instance_web_01**, **Availability Zone** to **nova** and **Count** to **1**. Then, click **Next**.

Launch Instance

Details

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.

Source *	Project Name	Total Instances (10 Max)
Flavor *	admin	<div><div style="width: 10%;">10%</div></div>
Networks *	Instance Name *	0 Current Usage 1 Added 9 Remaining
Network Ports	Instance_Web_01	
Security Groups	Description	
Key Pair	Availability Zone	
Configuration	nova	
Server Groups	Count *	
Scheduler Hints	1	
Metadata		

Step 3 On the **Source** tab page, select **No** for **Create New Volume**. Click  at the end of the image **Img_web** in the list under **Available**. The selected image is displayed in the list under **Allocated**. Retain the default settings for other parameters and click **Next**.

Launch Instance

Source *	Select Boot Source	Create New Volume				
Flavor *	Image	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>				
Networks *	Allocated Displaying 0 items					
Network Ports	Name	Updated	Size	Format	Visibility	
Security Groups	Select an item from Available items below					
Key Pair	Displaying 0 items					
Configuration	Available <small>?</small>					
Server Groups	Select one					
Scheduler Hints	Click here for filters or full text search.					
Metadata	Displaying 2 items					
	Name	Updated	Size	Format	Visibility	
	▶ Fedora-Cloud-Base-36-1.5.x86_64	9/24/22 8:47 AM	427.50 MB	QCOW2	Public	<input type="button" value="▲"/>
	▶ Img_web	10/8/22 7:27 AM	15.55 MB	QCOW2	Public	<input checked="" type="button" value="▲"/>
	Displaying 2 items					

Cancel **Back** **Next >** **Launch Instance**

Launch Instance

Source	Select Boot Source	Create New Volume				
Flavor *	Image	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>				
Networks *	Allocated Displaying 1 item					
Network Ports	Name	Updated	Size	Format	Visibility	
Security Groups	▶ Img_web	10/8/22 7:27 AM	15.55 MB	QCOW2	Public	<input type="button" value="▼"/>
Key Pair	Displaying 1 item					
Configuration	Available <small>1</small>					
Server Groups	Select one					
Scheduler Hints	Click here for filters or full text search.					
Metadata	Displaying 1 item					
	Name	Updated	Size	Format	Visibility	
	▶ Fedora-Cloud-Base-36-1.5.x86_64	9/24/22 8:47 AM	427.50 MB	QCOW2	Public	<input type="button" value="▲"/>
	Displaying 1 item					

Cancel **Back** **Next >** **Launch Instance**

Step 4 On the **Flavor** tab page, click  next to **Flavor_web_test** in the list under **Available**. The selected flavor is displayed in the list under **Allocated**. Click **Next**.

Launch Instance

Allocated							
	Name	VCPUS	RAM	Total Disk	Root Disk	Ephemeral Disk	Public
Flavor *	Select an item from Available items below						
Networks *	▼ Available 15 Select one						
Network Ports	<input type="text"/> Click here for filters or full text search.						
Security Groups							
	Name	VCPUS	RAM	Total Disk	Root Disk	Ephemeral Disk	Public
> m1.heat_micro	1	128 MB	1 GB	1 GB	0 GB	Yes	
> m1.nano	1	128 MB	1 GB	1 GB	0 GB	Yes	
> Flavor_web_test	1	128 MB	1 GB	1 GB	0 GB	Yes	
> m1.micro	1	192 MB	1 GB	1 GB	0 GB	Yes	
> cirros256	1	256 MB	1 GB	1 GB	0 GB	Yes	
> m1.tiny	1	512 MB	1 GB	1 GB	0 GB	Yes	
> ds512M	1	512 MB	5 GB	5 GB	0 GB	Yes	
> m1.heat_int	1	512 MB	10 GB	10 GB	0 GB	Yes	
> ds1G	1	1 GB	10 GB	10 GB	0 GB	Yes	
> m1.small	1	2 GB	20 GB	20 GB	0 GB	Yes	
> ds2G	2	2 GB	10 GB	10 GB	0 GB	Yes	
> m1.medium	2	4 GB	40 GB	40 GB	0 GB	Yes	
> ds4G	4	4 GB	20 GB	20 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	

 Cancel	 Back	 Next	 Launch Instance
--	--	--	---

Launch Instance

Allocated						
Name	VCPUS	RAM	Total Disk	Root Disk	Ephemeral Disk	Public
Flavor_web_test	1	128 MB	1 GB	1 GB	0 GB	Yes

Networks *

Available 14 Select one

Name	VCPUS	RAM	Total Disk	Root Disk	Ephemeral Disk	Public
m1.heat_micro	1	128 MB	1 GB	1 GB	0 GB	Yes
m1.nano	1	128 MB	1 GB	1 GB	0 GB	Yes
m1.micro	1	192 MB	1 GB	1 GB	0 GB	Yes
cirros256	1	256 MB	1 GB	1 GB	0 GB	Yes
m1.tiny	1	512 MB	1 GB	1 GB	0 GB	Yes
ds512M	1	512 MB	5 GB	5 GB	0 GB	Yes
m1.heat_int	1	512 MB	10 GB	10 GB	0 GB	Yes
ds1G	1	1 GB	10 GB	10 GB	0 GB	Yes
m1.small	1	2 GB	20 GB	20 GB	0 GB	Yes
ds2G	2	2 GB	10 GB	10 GB	0 GB	Yes
m1.medium	2	4 GB	40 GB	40 GB	0 GB	Yes
ds4G	4	4 GB	20 GB	20 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

Next >

Step 5 On the **Networks** tab page, click  next to **shared** in the **Available** list. The selected network is displayed in the **Allocated** list. Click **Next** in the three dialog boxes displayed one by one.

Launch Instance

Allocated					Select networks from those listed below.
Network	Subnets Associated	Shared	Admin State	Status	
Select an item from Available items below					
Available 2					
Select at least one network					
<input type="text"/> Click here for filters or full text search.					
Network	Subnets Associated	Shared	Admin State	Status	
shared	shared-subnet	Yes	Up	Active	
public	ipv6-public-subnet public-subnet	No	Up	Active	

Networks *

- Network Ports
- Security Groups
- Key Pair
- Configuration
- Server Groups
- Scheduler Hints
- Metadata

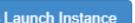
 Cancel  Back  Next  Launch Instance

Launch Instance

Allocated 1					Select networks from those listed below.
Network	Subnets Associated	Shared	Admin State	Status	
shared	shared-subnet	Yes	Up	Active	
Available 1					
Select at least one network					
<input type="text"/> Click here for filters or full text search.					
Network	Subnets Associated	Shared	Admin State	Status	
public	ipv6-public-subnet public-subnet	No	Up	Active	

Networks

- Network Ports
- Security Groups
- Key Pair
- Configuration
- Server Groups
- Scheduler Hints
- Metadata

 Cancel  Back  Next  Launch Instance

Step 6 On the **Key Pair** tab page, the created **KeyPair_web** key pair is displayed in the list under **Allocated**. Click **Next** in the two dialog boxes displayed one by one.

Launch Instance

Key Pair	<input type="button" value="Create Key Pair"/> <input type="button" value="Import Key Pair"/>	
Available	<input type="checkbox"/> Click here for filters or full text search.	
Allocated	<input type="button" value="Up"/>	
Displaying 1 item	<input type="button" value="Down"/>	
Name	Type	Fingerprint
KeyPair_web	ssh	bf:7e:e8:38:84:f4:f9:b6:db:10:7a:23:32:3c:7f:d2
Displaying 1 item	<input type="button" value="Up"/>	
Available	<input type="checkbox"/> Click here for filters or full text search.	
Displaying 0 items	<input type="button" value="Down"/>	
Name	Type	Fingerprint
No items to display.		
Displaying 0 items	<input type="button" value="Up"/>	
<input type="checkbox"/> Set admin password	<input type="button" value="Up"/>	
<input type="button" value="Cancel"/>	<input type="button" value="Back"/> <input type="button" value="Next"/> <input type="button" value="Launch Instance"/>	

Step 7 On the **Server Groups** tab page, click next to **ServerGroup_web** in the list under **Available**. The selected server group and policy are displayed in the list under **Allocated**. Click **Launch Instance**.

Launch Instance

Available	<input type="checkbox"/> Click here for filters or full text search.
Allocated	<input type="button" value="Up"/>
Name	Policy
ServerGroup_web	Affinity
Displaying 1 item	<input type="button" value="Up"/>
Name	Policy
ServerGroup_web	Affinity
Displaying 1 item	<input type="button" value="Up"/>
Available	<input type="checkbox"/> Click here for filters or full text search.
Displaying 0 items	<input type="button" value="Up"/>
Name	Policy
Select a server group from the available groups below.	
Displaying 0 items	<input type="button" value="Up"/>
Details	Select the server group to launch the instance in.
Source	Displaying 0 items
Flavor	
Networks	
Network Ports	
Security Groups	
Key Pair	
Configuration	
Server Groups	
Scheduler Hints	
Metadata	
<input type="button" value="Cancel"/>	<input type="button" value="Back"/> <input type="button" value="Next"/> <input type="button" value="Launch Instance"/>

Launch Instance

Details	Select the server group to launch the instance in
Source	Allocated Displaying 1 item
Flavor	Name Policy
Networks	ServerGroup_web Affinity
Network Ports	Displaying 1 item
Security Groups	Available 0 Select one
Key Pair	<input type="text"/> Click here for filters or full text search.
Configuration	Displaying 0 items
Server Groups	Name Policy
Scheduler Hints	No items to display.
Metadata	Displaying 0 items

Step 8 Return to the server instance list. The created server instance is displayed and its status is **Active**.

Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Img_web	192.168.233.3	Flavor_web_test	KeyPair_web	Active	nova	None	Running	0 minutes	<input type="button" value="Create Snapshot"/>

5.2.4.2 Starting, Stopping, and Restarting a Server Instance

Step 1 In the navigation pane, choose **Project > Compute > Instances**. The instance list is displayed. On the displayed page, click in the **Actions** column of the row containing the server instance to be stopped, and select **Shut Off Instance** from the drop-down list to stop the server instance.

Project API Access Compute Instances Overview Instances Images Key Pairs Server Groups Volumes Network Admin Identity

Instances

Displaying 1 item

Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Img_web	192.168.233.3	Flavor_web_test	KeyPair_web	Active	nova	None	Running	0 minutes	<input type="button" value="Create Snapshot"/>

Step 2 In the displayed **Confirm Shut Off Instance** dialog box, click **Shut Off Instance**.

Confirm Shut Off Instance

You have selected: "Instance_web_01". Please confirm your selection. The instance(s) will be shut off.

[Cancel](#)

[Shut Off Instance](#)

Step 3 Return to the server instance list. The server instance status changes to **Shutdown**.

Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Img_web	192.168.233.3	Flavor_web_test	KeyPair_web	Shutdown	nova	None	Shut Down	4 minutes	Start Instance

Step 4 Click **Start Instance** in the **Actions** column of the row containing the server instance to be started to start the server instance.

Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Img_web	192.168.233.3	Flavor_web_test	KeyPair_web	Shutdown	nova	None	Shut Down	4 minutes	Start Instance

Step 5 Wait until the server instance status changes to **Active**. The server instance has been started.

Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Img_web	192.168.233.3	Flavor_web_test	KeyPair_web	Shutdown	nova	Powering On	Shut Down	6 minutes	Start Instance

Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Img_web	192.168.233.3	Flavor_web_test	KeyPair_web	Active	nova	None	Running	6 minutes	Create Snapshot

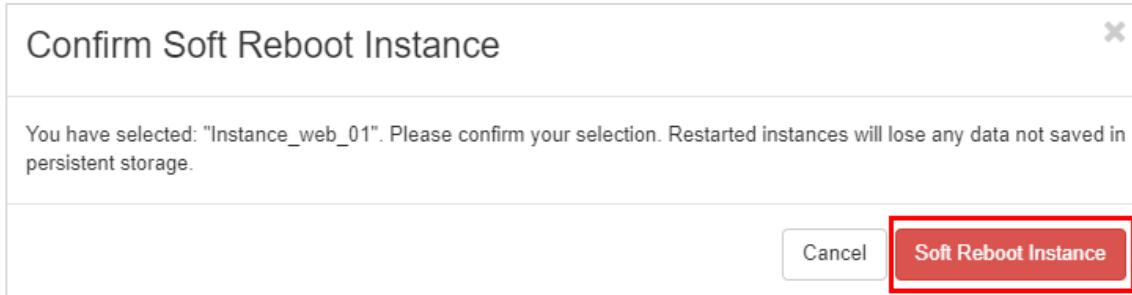
Step 6 Click  in **Actions** column of the row containing the server instance to be soft-rebooted, and select **Soft Reboot Instance** from the drop-down list. The server instance has been soft-rebooted.

Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Img_web	192.168.233.3	Flavor_web_test	KeyPair_web	Active	nova	None	Running	6 minutes	Create Snapshot

Displaying 1 item

Actions
Associate Floating IP Attach Interface Detach Interface Edit Instance Attach Volume Detach Volume Update Metadata Edit Security Groups Edit Port Security Groups Console View Log Rescue Instance Pause Instance Suspend Instance Shelve Instance Resize Instance Lock Instance Soft Reboot Instance Hard Reboot Instance Shut Off Instance Rebuild Instance Delete Instance

Step 7 In the displayed **Confirm Soft Reboot Instance** dialog box, click **Soft Reboot Instance**.

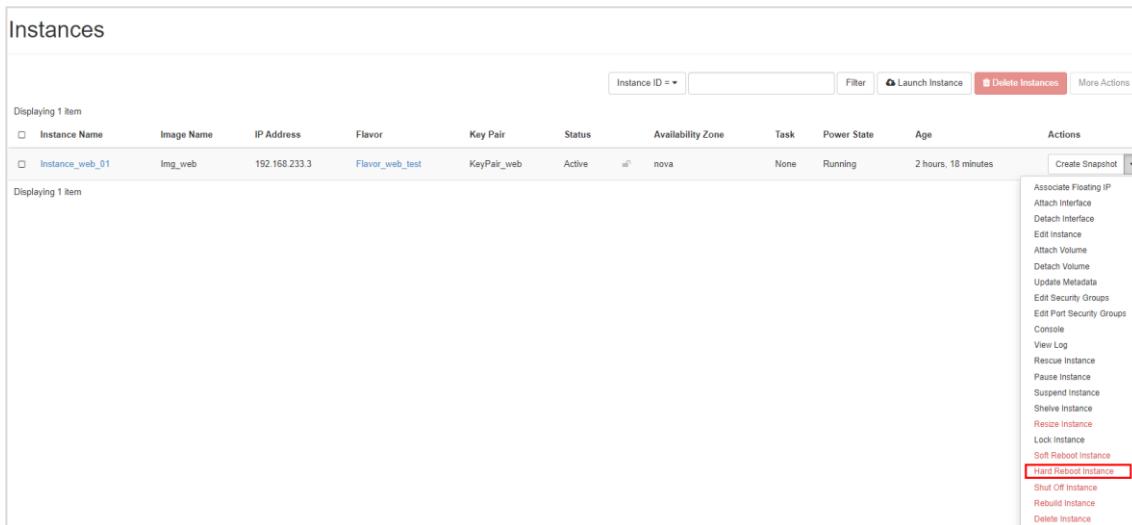


Step 8 Wait until the server instance status changes to **Active**. The server instance has been started.

Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Img_web	192.168.233.3	Flavor_web_test	KeyPair_web	Reboot	■	nova	Reboot Started	Running	9 minutes Associate Floating IP ▾

Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Img_web	192.168.233.3	Flavor_web_test	KeyPair_web	Active	■	nova	None	Running	9 minutes Create Snapshot ▾

Step 9 Select **Hard Reboot Instance** from the drop-down list to hard-reboot the server instance by repeating steps 6 to 8.



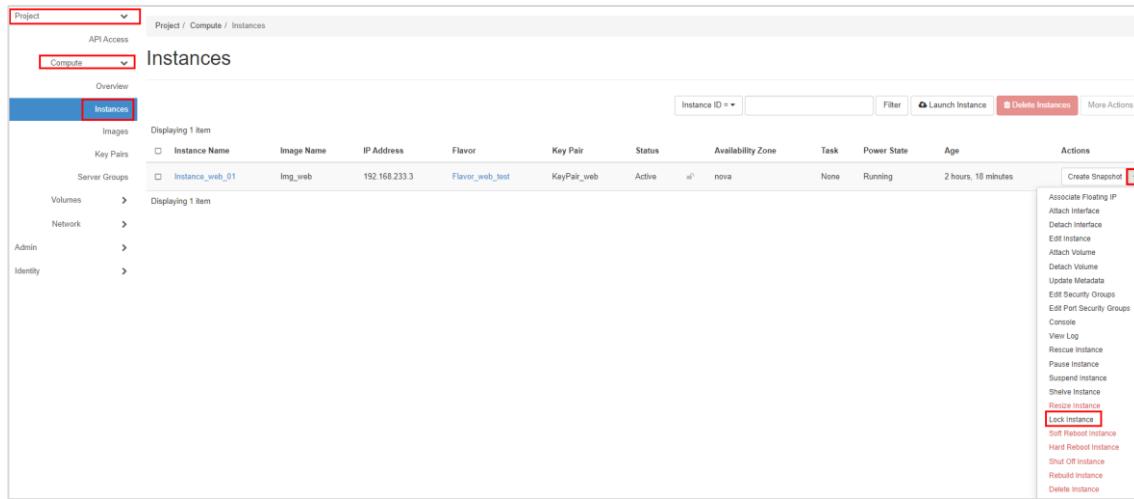
Instances										
Instance ID = <input type="text"/> Filter Delete Instances More Actions ▾										
Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Img_web	192.168.233.3	Flavor_web_test	KeyPair_web	Active	■	nova	None	Running	2 hours, 18 minutes Create Snapshot ▾

Displaying 1 item

Associate Floating IP
 Attach Interface
 Detach Interface
 Edit Instance
 Attach Volume
 Detach Volume
 Update Metadata
 Edit Security Groups
 Edit Port Security Groups
 Console
 View Log
 Rescue Instance
 Pause Instance
 Suspend Instance
 Shelve Instance
 Resize Instance
 Lock Instance
 Soft Reboot Instance
Hard Reboot Instance
 Shut Off Instance
 Rebuild Instance
 Delete Instance

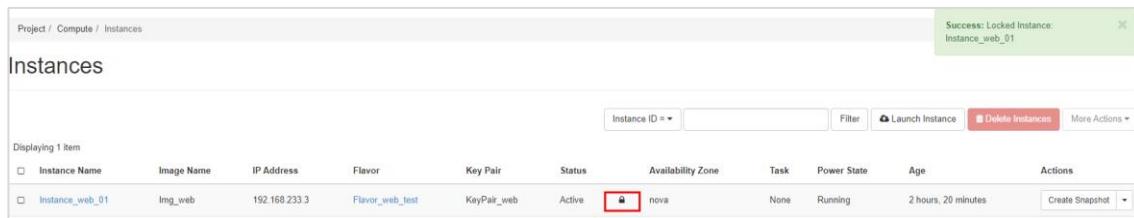
5.2.4.3 Locking and Unlocking a Server Instance

Step 1 In the navigation pane, choose **Project > Compute > Instances**. The instance list is displayed. On the displayed page, click ▾ in the **Actions** column of the row containing the server instance to be locked and select **Lock Instance** from the drop-down list to lock the server instance.



The screenshot shows the OpenStack Compute dashboard with the 'Instances' tab selected. A context menu is open over the first instance, listing various actions like Associate Floating IP, Attach Interface, Detach Interface, Edit Instance, Attach Volume, Detach Volume, Update Metadata, Edit Security Groups, Edit Port Security Groups, Console, View Log, Rescue Instance, Pause Instance, Suspend Instance, Shelve Instance, Resize Instance, Lock Instance, Soft Reboot Instance, Hard Reboot Instance, Shut Off Instance, Rebuild Instance, and Delete Instance. The 'Lock Instance' option is highlighted with a red box.

Step 2 Return to the server instance list and view the lock icon next to the server instance.

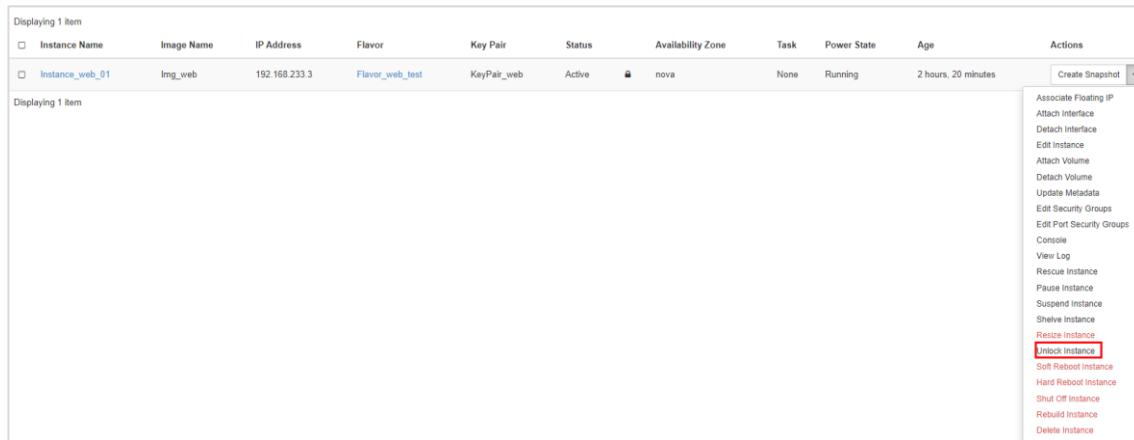


The screenshot shows the OpenStack Compute dashboard with the 'Instances' tab selected. The status column for the instance 'Instance_web_01' shows a lock icon, indicating it is locked. A success message at the top right says 'Success: Locked Instance: Instance_web_01'.

Verification:

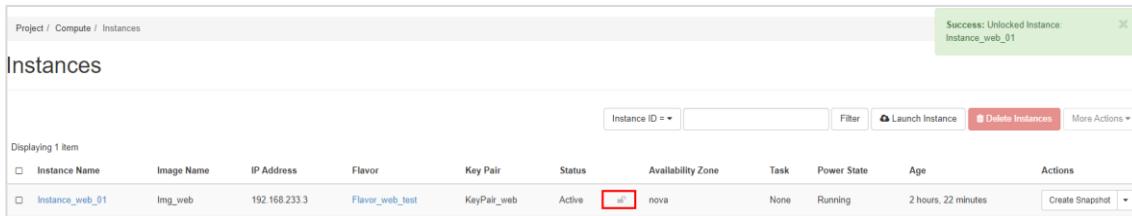
Can the **admin** user shut off a locked server instance? How about a common user, for example, **User_web_01**? (log in as the **User_web_01** user and then switch to the **admin** project).

Step 3 Log in to the OpenStack dashboard as the **admin** user again. In the navigation pane, choose **Project > Compute > Instances**. The instance list is displayed. On the displayed page, click ▾ in the **Actions** column of the row containing the server instance to be unlocked and select **Unlock Instance** from the drop-down list to unlock the server instance.



The screenshot shows the OpenStack Compute dashboard with the 'Instances' tab selected. The status column for the instance 'Instance_web_01' now shows a padlock icon, indicating it is unlocked. A context menu is open over the first instance, listing various actions like Associate Floating IP, Attach Interface, Detach Interface, Edit Instance, Attach Volume, Detach Volume, Update Metadata, Edit Security Groups, Edit Port Security Groups, Console, View Log, Rescue Instance, Pause Instance, Suspend Instance, Shelve Instance, Resize Instance, Lock Instance, Soft Reboot Instance, Hard Reboot Instance, Shut Off Instance, Rebuild Instance, and Delete Instance. The 'Lock Instance' option is highlighted with a red box.

Step 4 Return to the server instance list and view the lock icon next to the server instance.



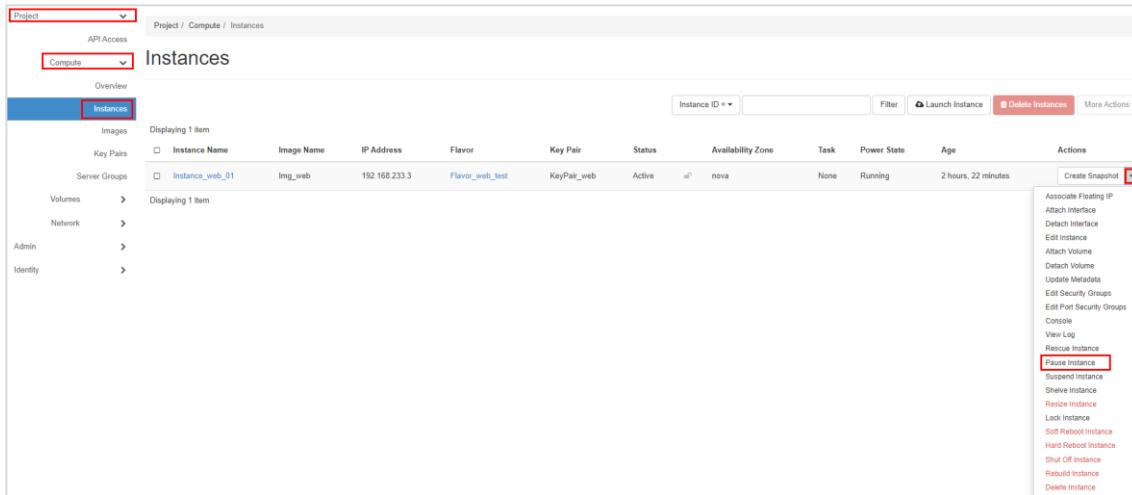
The screenshot shows the 'Instances' page in the OpenStack Compute interface. A green success message at the top right says 'Success: Unlocked Instance: Instance_web_01'. The table lists one item: 'Instance web_01' with status 'Active'. The 'Actions' column for this row has a dropdown menu open, with the 'Unlock Instance' option highlighted.

Verification:

Lock the server instance again. Check whether the **User_web_01** user can unlock a server instance locked by the **admin** user (specifically, log in as the **User_web_01** user and then switch to the **admin** user).

5.2.4.4 Pausing, Suspending, and Resuming a Server Instance

- Step 1** In the navigation pane, choose **Project > Compute > Instances**. The instance list is displayed. On the displayed page, click ▾ in the **Actions** column of the row containing the server instance to be paused and select **Pause Instance** from the drop-down list to pause the server instance.



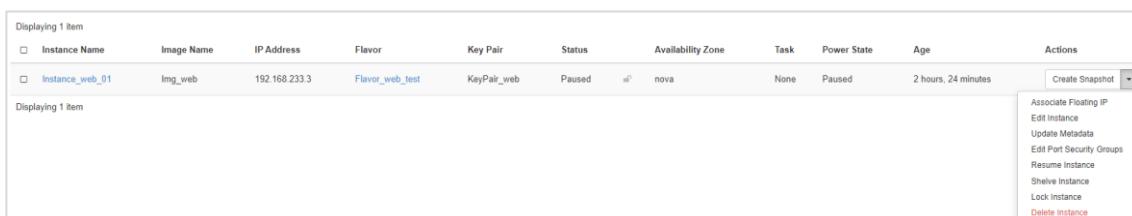
The screenshot shows the 'Instances' page in the OpenStack Compute interface. A context menu is open over the 'Instance web_01' row. The 'Actions' dropdown menu is visible on the right, with the 'Pause Instance' option highlighted.

- Step 2** Return to the server instance list. The server instance status changes to **Paused**, and the power state changes to **Paused**.



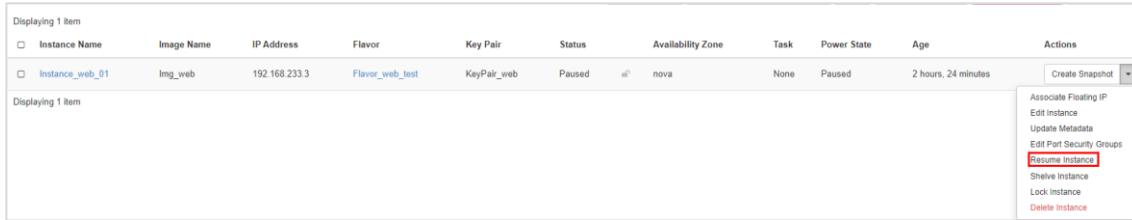
The screenshot shows the 'Instances' page in the OpenStack Compute interface. The table now shows 'Instance web_01' with status 'Paused' and power state 'Paused'. The 'Actions' column for this row has a dropdown menu open, with the 'Resume Instance' option highlighted.

- Step 3** Click ▾ in the **Actions** column of the row containing the server instance to be operated, and view the operations that can be performed when the server instance is **Paused**.



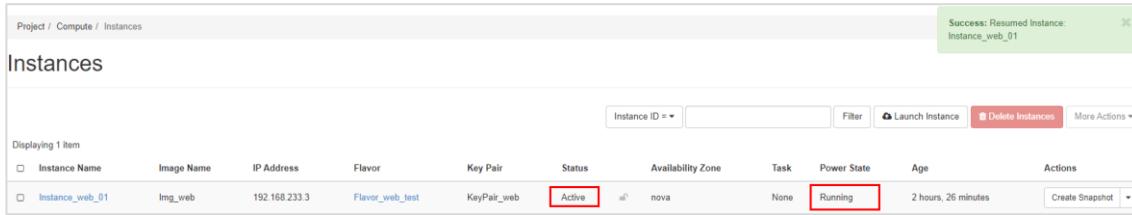
The screenshot shows the 'Instances' page in the OpenStack Compute interface. The table shows 'Instance web_01' with status 'Paused' and power state 'Paused'. The 'Actions' column for this row has a dropdown menu open, showing various options including 'Associate Floating IP', 'Edit Instance', 'Update Metadata', 'Edit Port Security Groups', 'Resume Instance', 'Shelve Instance', 'Lock Instance', and 'Delete Instance'.

Step 4 Select **Resume Instance** from the drop-down list to resume the server instance.



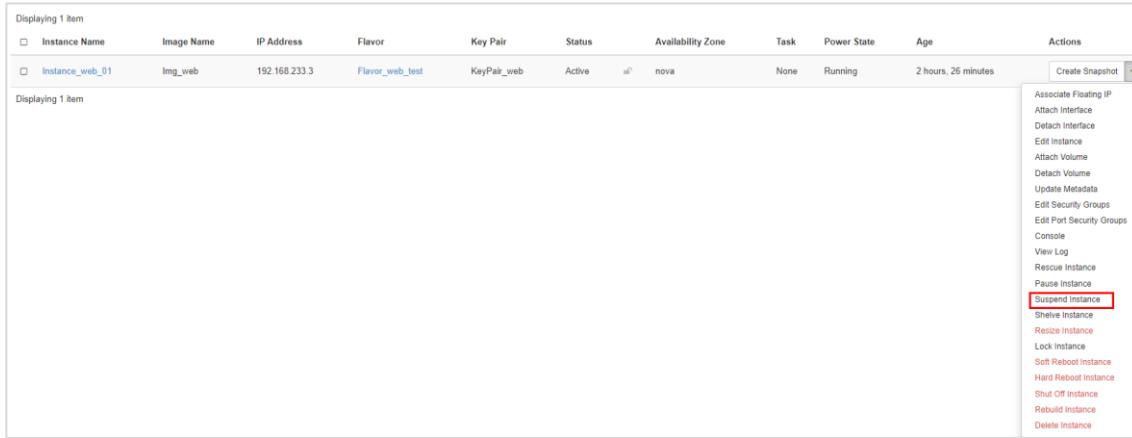
The screenshot shows the OpenStack Instances list. A context menu is open over the first row, which contains the server instance 'Instance_web_01'. The menu includes options like 'Associate Floating IP', 'Edit Instance', 'Update Metadata', 'Edit Port Security Groups', 'Resume Instance' (which is highlighted with a red box), 'Shelve Instance', 'Lock Instance', and 'Delete Instance'.

Step 5 Return to the server instance list. The status of the server instance changes to **Active** and the power state changes to **Running**.



The screenshot shows the OpenStack Instances list again. The server instance 'Instance_web_01' now has its 'Status' field set to 'Active' and its 'Power State' field set to 'Running', both of which are highlighted with red boxes. A success message at the top right indicates 'Success: Resumed Instance: Instance_web_01'.

Step 6 Click in the **Actions** column of the row containing the server instance to be suspended and select **Suspend Instance** from the drop-down list to suspend the server instance.



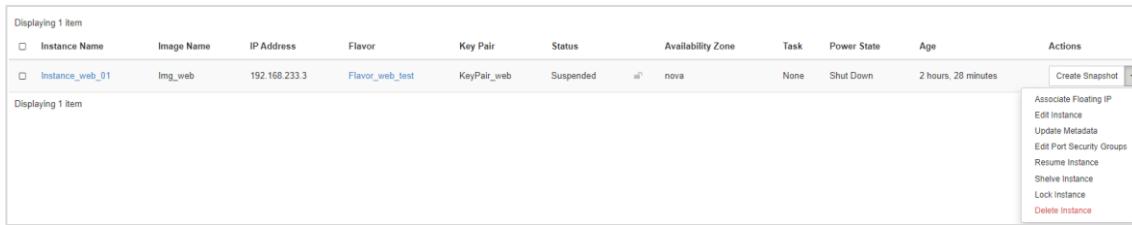
The screenshot shows the OpenStack Instances list. A context menu is open over the first row, which contains the server instance 'Instance_web_01'. The menu includes options like 'Associate Floating IP', 'Attach Interface', 'Detach Interface', 'Edit Instance', 'Detach Volume', 'Attach Volume', 'Detach Volume', 'Update Metadata', 'Edit Security Groups', 'Edit Port Security Groups', 'Console', 'View Log', 'Rescue Instance', 'Pause Instance', 'Suspend Instance' (which is highlighted with a red box), 'Shelve Instance', 'Resize Instance', 'Lock Instance', 'Soft Reboot Instance', 'Hard Reboot Instance', 'Shutdown Instance', 'Rebuild Instance', and 'Delete Instance'.

Step 7 Return to the server instance list and observe the change process of the server instance until the server instance status changes to **Suspended** and the power state changes to **Shut Down**.



The screenshot shows the OpenStack Instances list again. The server instance 'Instance_web_01' now has its 'Status' field set to 'Suspended' and its 'Power State' field set to 'Shut Down', both of which are highlighted with red boxes.

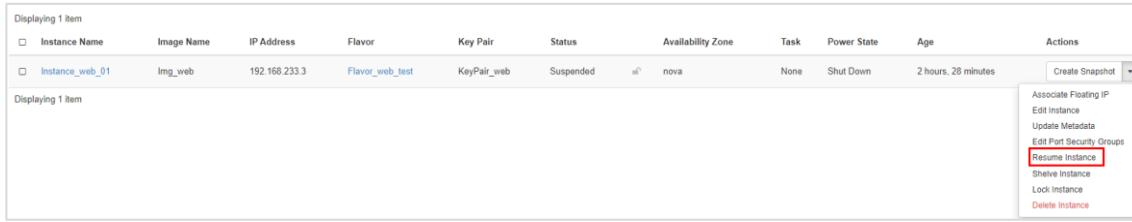
Step 8 Click in the **Actions** column of the row containing the server instance to be operated, and view the operations that can be performed when the server instance is **Suspended**.



Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Img_web	192.168.233.3	Flavor_web_test	KeyPair_web	Suspended	nova	None	Shut Down	2 hours, 28 minutes	<button>Create Snapshot</button>

Displaying 1 item

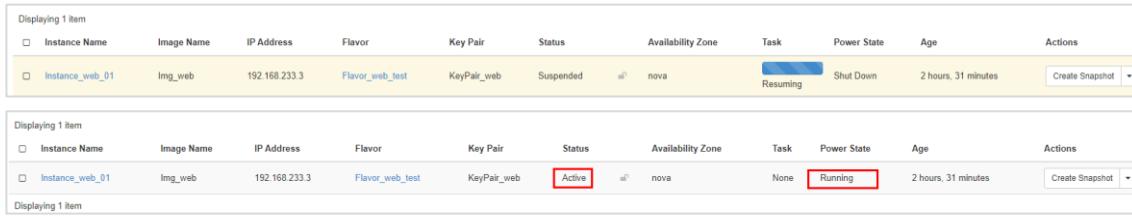
Step 9 Select **Resume Instance** from the drop-down list to resume the server instance.



Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Img_web	192.168.233.3	Flavor_web_test	KeyPair_web	Suspended	nova	None	Shut Down	2 hours, 28 minutes	<button>Create Snapshot</button>

Displaying 1 item

Step 10 Return to the server instance list and observe the change process of the server instance. Wait until the server instance status changes to **Active** and the power state changes to **Running**.



Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Img_web	192.168.233.3	Flavor_web_test	KeyPair_web	Suspended	nova	Resuming	Shut Down	2 hours, 31 minutes	<button>Create Snapshot</button>

Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Img_web	192.168.233.3	Flavor_web_test	KeyPair_web	Active	nova	None	Running	2 hours, 31 minutes	<button>Create Snapshot</button>

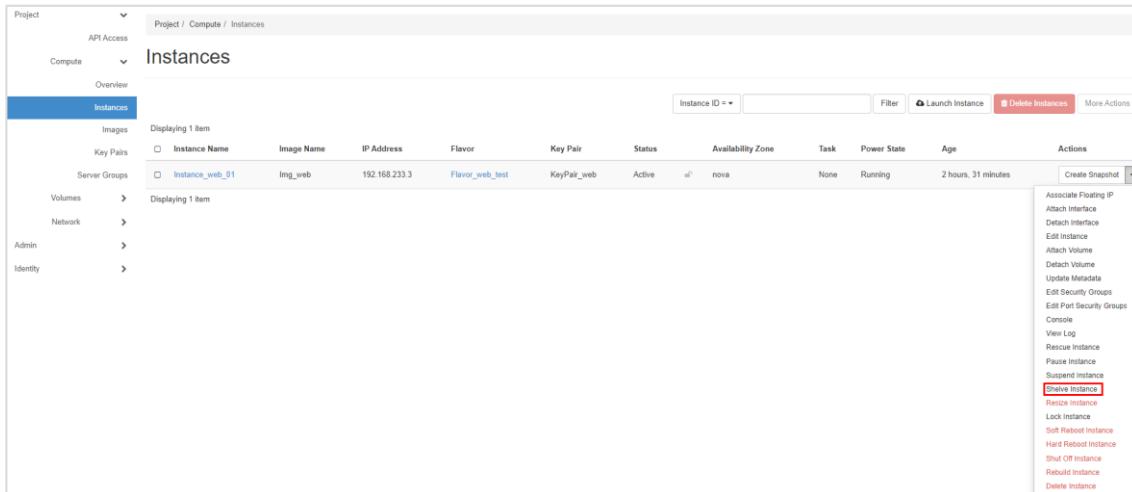
Displaying 1 item

Question:

What are the characteristics and application scenarios of paused and suspended server instances, respectively?

5.2.4.5 Shelving and Unshelving a Server Instance

Step 1 In the navigation pane, choose **Project > Compute > Instances**. The instance list is displayed. On the displayed page, click ▾ in the **Actions** column of the row containing the server instance to be shelved and select **Shelve Instance** from the drop-down list to shelve the server instance.

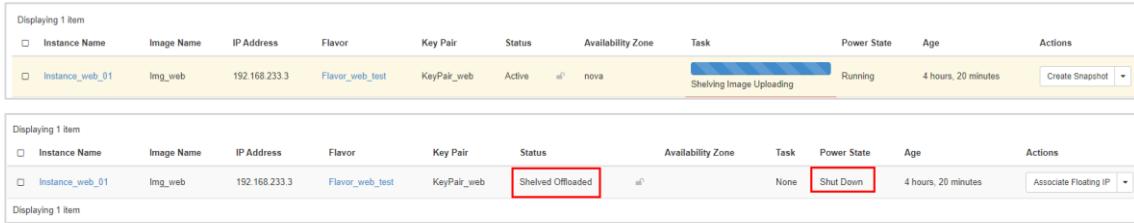


Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Img_web	192.168.233.3	Flavor_web_test	KeyPair_web	Active	nova	None	Running	2 hours, 31 minutes	<button>Create Snapshot</button>

Displaying 1 item

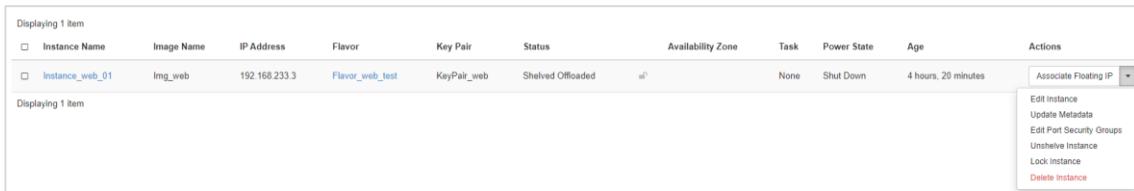
Associate Floating IP
Attach Interface
Detach Interface
Edit Instance
Edit Volume
Detach Volume
Update Metadata
Edit Security Groups
Edit Port Security Groups
Console
View Log
Recover Instance
Pause Instance
Suspend Instance
Shelve Instance
Unshelve Instance
Lock Instance
Set Reset Instance
Hard Reset Instance
Shut Off Instance
Rebuild Instance
Delete Instance

- Step 2** Return to the server instance list and observe the change process of the server instance until the server instance status changes to **Shelved Offloaded** and the power state changes to **Shut Down**.



Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Img_web	192.168.233.3	Flavor_web_test	KeyPair_web	Active	az1	Shelving Image Uploading	Running	4 hours, 20 minutes	<button>Create Snapshot</button>
Instance_web_01	Img_web	192.168.233.3	Flavor_web_test	KeyPair_web	Shelved Offloaded	az1		Shut Down	4 hours, 20 minutes	<button>Associate Floating IP</button>

- Step 3** Click in the **Actions** column of the row containing the server instance to be operated, and view the operations that can be performed when the server instance is **Shelved Offloaded**.



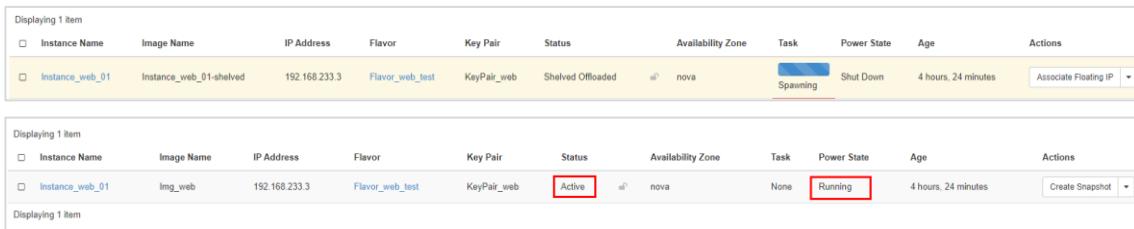
Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Img_web	192.168.233.3	Flavor_web_test	KeyPair_web	Shelved Offloaded	az1	None	Shut Down	4 hours, 20 minutes	<button>Associate Floating IP</button>

- Step 4** Select **Unshelve Instance** in the drop-down list to unshelve the server instance.



Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Img_web	192.168.233.3	Flavor_web_test	KeyPair_web	Shelved Offloaded	az1	None	Shut Down	4 hours, 20 minutes	<button>Associate Floating IP</button>

- Step 5** Return to the server instance list and observe the change process of the server instance. Wait until the server instance status changes to **Active** and the power state changes to **Running**.



Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Instance_web_01-shelved	192.168.233.3	Flavor_web_test	KeyPair_web	Shelved Offloaded	az1	nova	Spawning	Shut Down	4 hours, 24 minutes
Instance_web_01	Img_web	192.168.233.3	Flavor_web_test	KeyPair_web	Active	az1	nova	Running	4 hours, 24 minutes	<button>Create Snapshot</button>

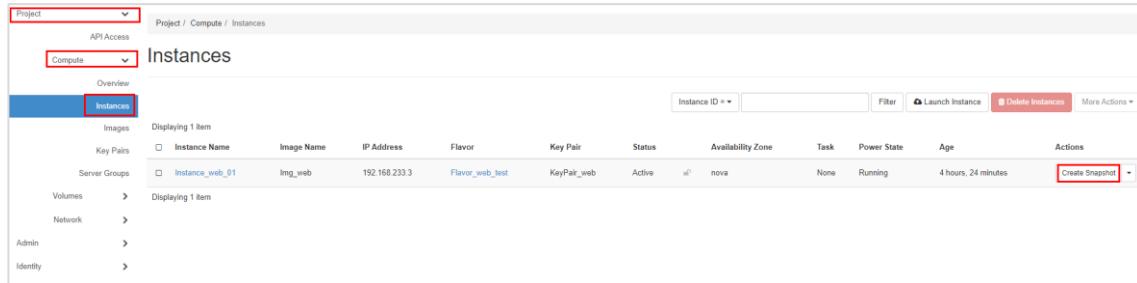
Question:

Compare the paused and suspended server instances with the shelved ones and their application scenarios.

5.2.4.6 Adjusting a Server Instance Flavor, Creating a Snapshot, and Rebuilding a Server Instance

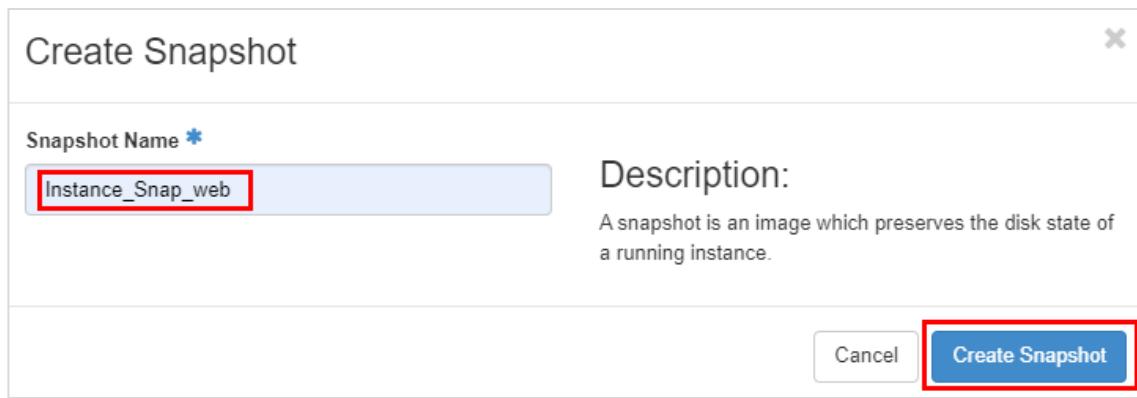
- Step 1** In the navigation pane, choose **Project > Compute > Instances**. The instance list is displayed. On the displayed page, click **Create Snapshot** in the **Actions** column of

the row containing the target server instance to create a snapshot for the server instance.



Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Img_web	192.168.233.3	Flavor_web_test	KeyPair_web	Active	nova	None	Running	4 hours, 24 minutes	Create Snapshot

Step 2 In the displayed **Create Snapshot** dialog box, specify **Snapshot Name** to **Instance_Snap_web** and click **Create Snapshot**.

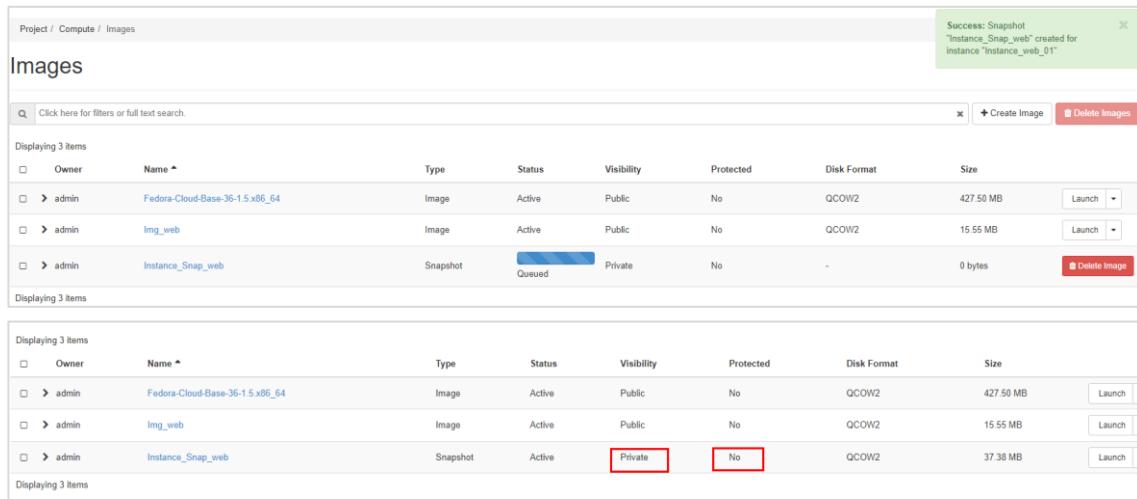


Snapshot Name *
Instance_Snap_web

Description:
A snapshot is an image which preserves the disk state of a running instance.

Create Snapshot

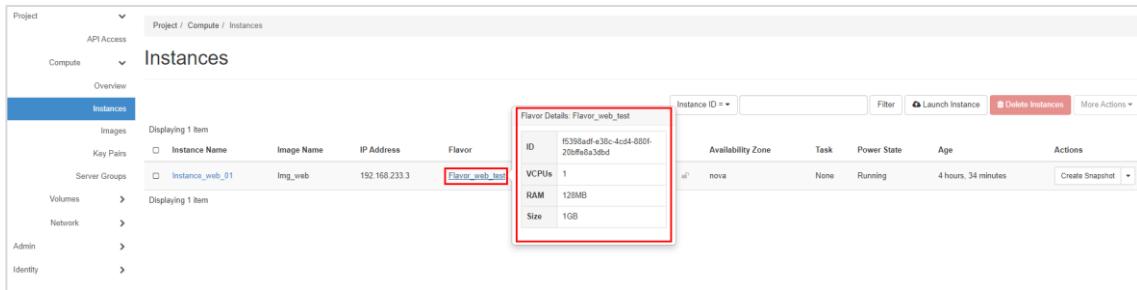
Step 3 The **Instance_Snap_web** image is displayed in the image list. Wait until the image status changes to **Active**. The image has been registered. The **Type** is **Snapshot**, the **Visibility** is **Private**, and the **Protected** is **No**. (Note: if the image remains **Queued** for a long time, refresh the page.)



Owner	Name	Type	Status	Visibility	Protected	Disk Format	Size
admin	Fedora-Cloud-Base-36-1.5.x86_64	Image	Active	Public	No	QCOW2	427.50 MB
admin	Img_web	Image	Active	Public	No	QCOW2	15.55 MB
admin	Instance_Snap_web	Snapshot	Queued	Private	No	-	0 bytes

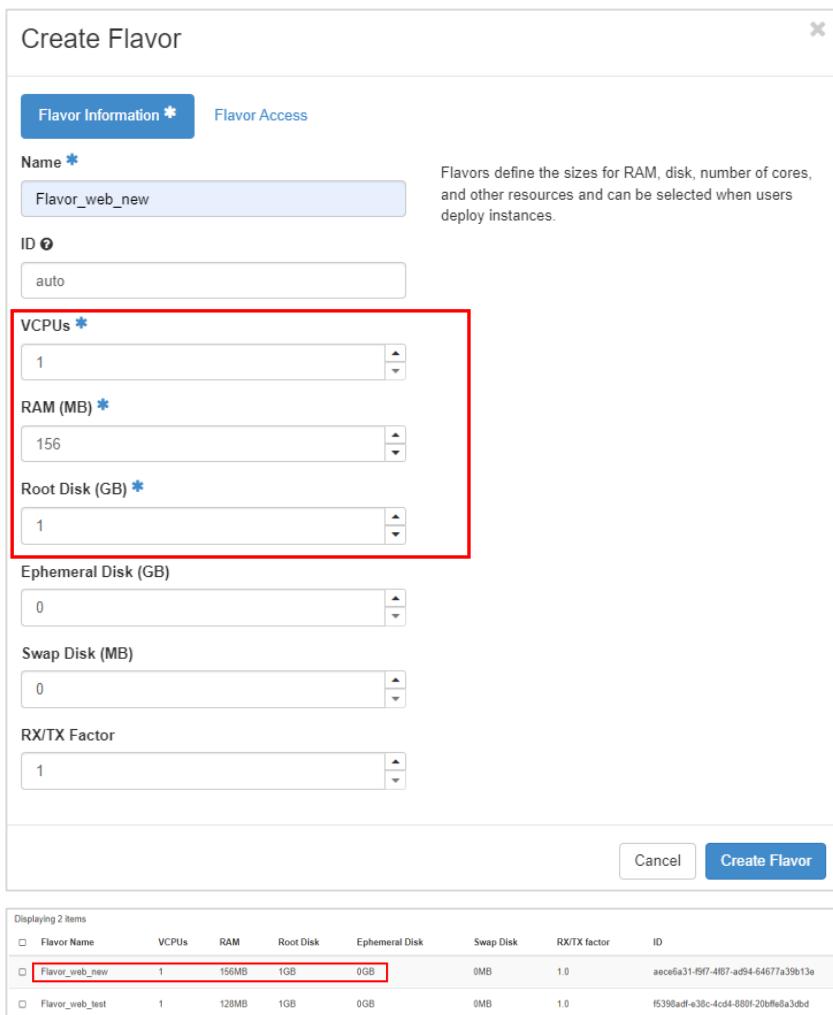
Owner	Name	Type	Status	Visibility	Protected	Disk Format	Size
admin	Fedora-Cloud-Base-36-1.5.x86_64	Image	Active	Public	No	QCOW2	427.50 MB
admin	Img_web	Image	Active	Public	No	QCOW2	15.55 MB
admin	Instance_Snap_web	Snapshot	Active	Private	No	QCOW2	37.38 MB

Step 4 Choose **Project > Compute > Instances**. The instance list is displayed. On the displayed page, move the pointer to the **Flavor_web_test** flavor of the target server instance and the flavor details are displayed on the right.



Flavor Details: Flavor_web_test			
ID	f539badf-e38c-4cd4-880f-20bffe8a3dbd	Availability Zone	nova
VCPUs	1	Task	None
RAM	128MB	Power State	Running
Size	1GB	Age	4 hours, 34 minutes
		Actions	
		Create Snapshot	

- Step 5** In the navigation pane, choose **Admin > Compute > Flavors**. On the displayed page, create the **Flavor_web_new** flavor, set **RAM (MB)** to **156**, and set **VCPUs** and **Root Disk (GB)** to the same values as those of **Flavor_web_test** by following the instructions provided in 5.2.2.



Create Flavor

Flavor Information *

Name *
Flavor_web_new

ID
auto

VCPUs *
1

RAM (MB) *
156

Root Disk (GB) *
1

Ephemeral Disk (GB)
0

Swap Disk (MB)
0

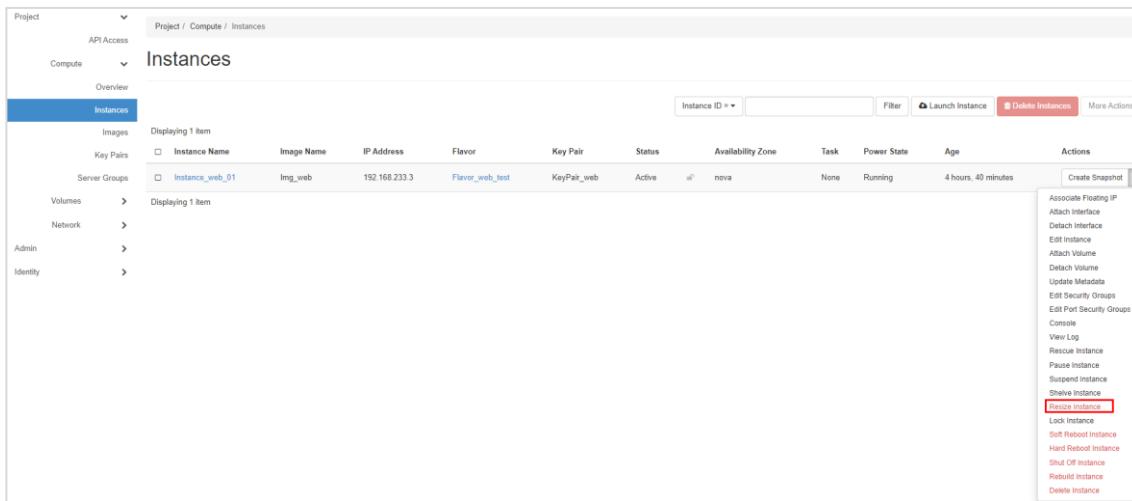
RX/TX Factor
1

Create Flavor

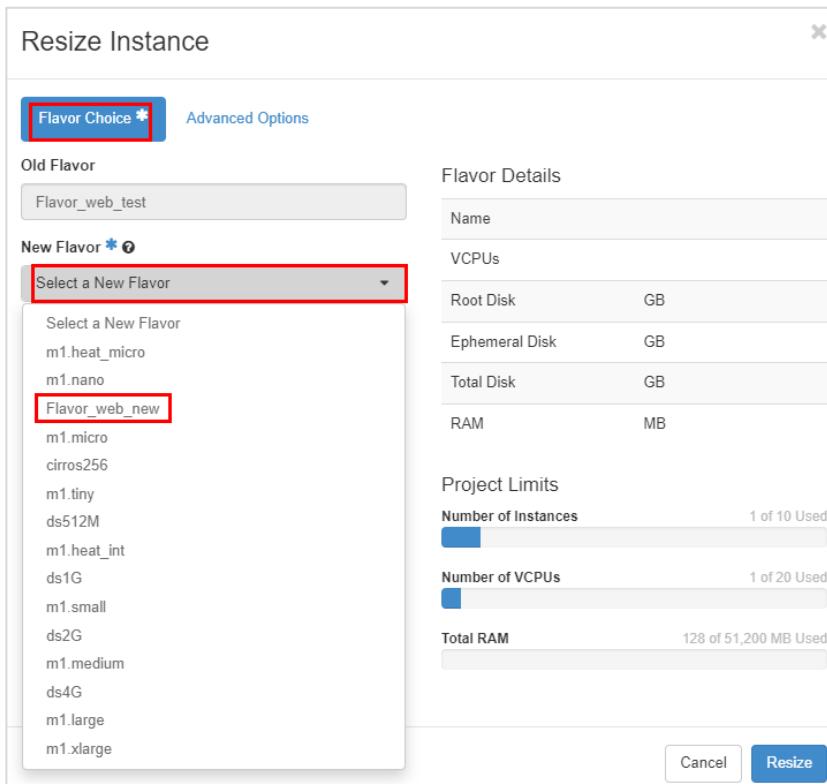
Flavor List

Flavor Name	VCPUs	RAM	Root Disk	Ephemeral Disk	Swap Disk	RX/TX factor	ID	Public	Metadata	Actions
Flavor_web_new	1	156MB	1GB	0GB	0MB	1.0	aece6a31-19f7-4fb7-ad54-64677a39b13e	Yes	No	Update Metadata
Flavor_web_test	1	128MB	1GB	0GB	0MB	1.0	f539badf-e38c-4cd4-880f-20bffe8a3dbd	Yes	No	Update Metadata

- Step 6** In the navigation pane, choose **Project > Compute > Instances** to return to the instance list. On the displayed page, click in the **Actions** column of the row containing the target server instance, and select **Resize Instance** from the drop-down list to adjust the server instance flavors.



- Step 7** In the displayed **Resize Instance** dialog box, click the **Flavor Choice** tab. On the **Flavor Choice** tab page, select **Flavor_web_new** for **New Flavor**. The **Flavor Details** is displayed in the right pane. Click **Resize**.



The screenshot shows the 'Resize Instance' dialog box. The 'Flavor Choice' tab is active and highlighted with a red box. Below it, the 'Old Flavor' field contains 'Flavor_web_test'. The 'New Flavor' field has a dropdown menu open, also highlighted with a red box. Inside the dropdown, 'Flavor_web_new' is listed and highlighted with a red box. To the right, the 'Flavor Details' section displays project limits: 1 of 10 instances used, 1 of 20 VCPUs used, and 128 of 51,200 MB RAM used. At the bottom right of the dialog are 'Cancel' and 'Resize' buttons.

Resize Instance

Flavor Choice * Advanced Options

Old Flavor		Flavor Details	
Flavor_web_test		Name	Flavor_web_new
New Flavor *		VCPUs	1
Flavor_web_new		Root Disk	1 GB
		Ephemeral Disk	0 GB
		Total Disk	1 GB
		RAM	156 MB
Project Limits			
Number of Instances		1 of 10 Used	
Number of VCPUs		1 of 20 Used	
Total RAM		128 of 51,200 MB Used	
<input type="button" value="Cancel"/> <input style="border: 2px solid red; background-color: #0070C0; color: white; border-radius: 5px; padding: 5px; margin-left: 10px;" type="button" value="Resize"/>			

Step 8 Return to the instance list. The server instance status is **Confirm or Revert Resize/Migrate**. Click **Confirm Resize/Migrate** in the **Actions** column.

Instances										
Instance ID: <input type="text"/> Filter: <input type="button" value="Launch Instance"/> Delete Instances More Actions										
Displaying 1 item										
Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Img_web	192.168.233.3	Flavor_web_new	KeyPair_web	Confirm or Revert Resize/Migrate	nova	None	Running	4 hours, 44 minutes	<input style="border: 2px solid red; background-color: #0070C0; color: white; border-radius: 5px;" type="button" value="Confirm Resize/Migrate"/>

Step 9 Wait until the server instance status changes to **Active**, indicating that the server instance has been resized.

Instances										
Instance ID: <input type="text"/> Filter: <input type="button" value="Launch Instance"/> Delete Instances More Actions										
Displaying 1 item										
Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Img_web	192.168.233.3	Flavor_web_new	KeyPair_web	Active	nova	None	Running	4 hours, 45 minutes	<input type="button" value="Create Snapshot"/>

Step 10 Check whether the server instance flavor has changed to **Flavor_web_new**.

Instances										
Instance ID: <input type="text"/> Filter: <input type="button" value="Launch Instance"/> Delete Instances More Actions										
Displaying 1 item										
Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Img_web	192.168.233.3	Flavor_web_new	KeyPair_web	Active	nova	None	Running	4 hours, 45 minutes	<input type="button" value="Create Snapshot"/>

Flavor Details: Flavor_web_new

ID	None
VCPUs	1
RAM	156MB
Size	1GB

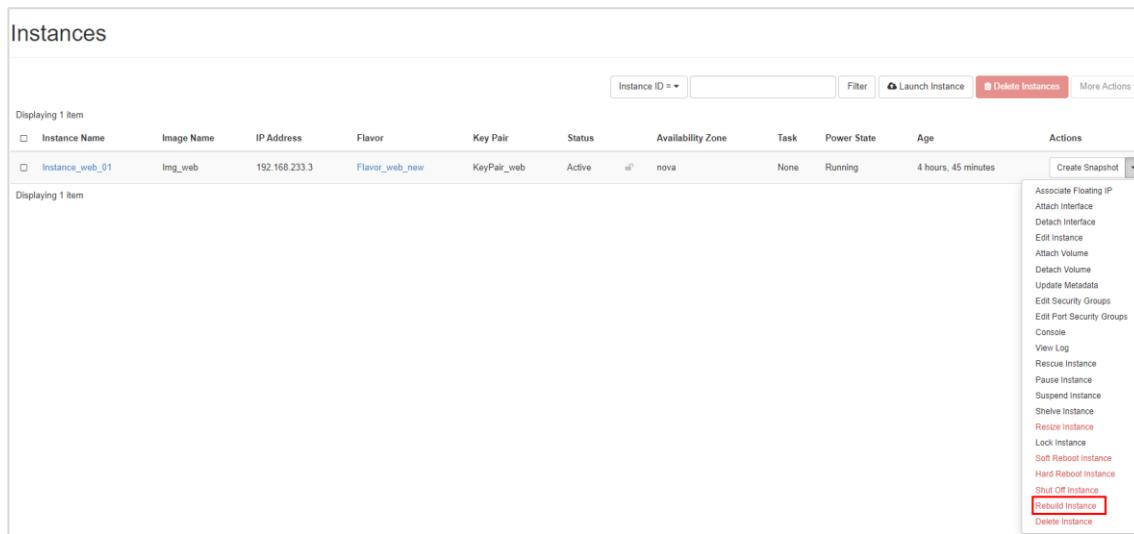
Verification:

Assuming that **RAM (MB)** is set to **64** in step 5, check whether the server instance can be resized.

Question:

How can the server instance be restored to the status before the **Resize** after it fails to be resized and cannot be started?

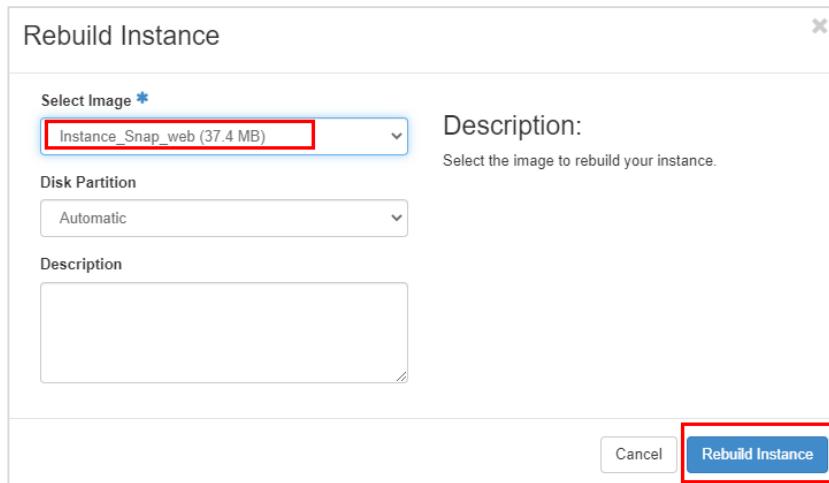
Step 11 Click ▾ in the **Actions** column of row containing the server instance to be rebuilt and select **Rebuild Instance** from the drop-down list to rebuild the server instance.



The screenshot shows a table of server instances. One row is selected, and a context menu is open next to the 'Actions' column. The menu contains various options like Associate Floating IP, Attach Interface, Detach Interface, Edit Instance, Attach Volume, Detach Volume, Update Metadata, Edit Security Groups, Edit Port Security Groups, Console, View Log, Rescue Instance, Pause Instance, Suspend Instance, Shelve Instance, **Resize Instance**, Lock Instance, Soft Reboot Instance, Hard Reboot Instance, Shut Off Instance, **Rebuild Instance** (which is highlighted with a red box), and Delete Instance.

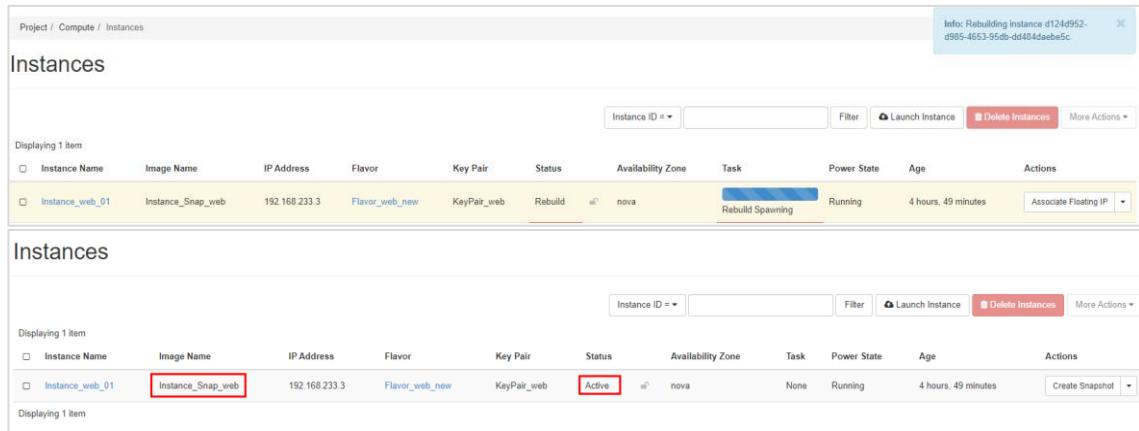
Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Img_web	192.168.233.3	Flavor_web_new	KeyPair_web	Active	nova	None	Running	4 hours, 45 minutes	Create Snapshot

Step 12 In the displayed **Rebuild Instance** dialog box, select **Instance_Snap_web** for **Select Image** and click **Rebuild Instance**.



The dialog box has a title 'Rebuild Instance'. It contains a 'Select Image *' dropdown where 'Instance_Snap_web (37.4 MB)' is selected. Below it is a 'Disk Partition' dropdown set to 'Automatic'. There is a 'Description' text area and a 'Cancel' button. At the bottom right is a large blue 'Rebuild Instance' button, which is also highlighted with a red box.

Step 13 Return to the server instance list, wait until the server instance status changes to **Active** and the image name changes to **Instance_Snap_web**. The server instance has been rebuilt.



The screenshot shows the 'Instances' page in the OpenStack Compute interface. It displays a single server instance named 'Instance_web_01'. The instance details are as follows:

Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_01	Instance_Snap_web	192.168.233.3	Flavor_web_new	KeyPair_web	Rebuild	us-west-1A	Rebuild Spawning	Running	4 hours, 49 minutes	Associate Floating IP

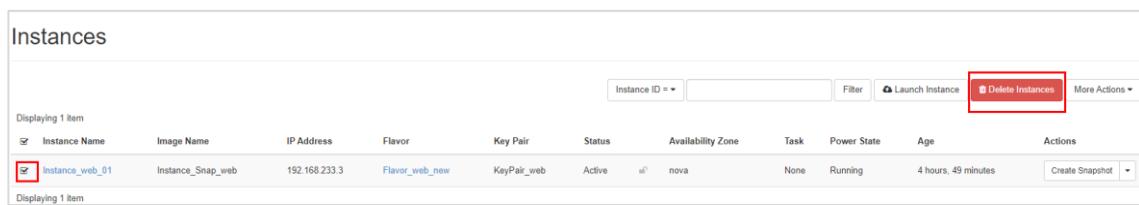
Below this, another table shows the same instance again, with the 'Status' column highlighted in red to indicate it is 'Active'.

Verification:

Click **Instance_web_01**. On the displayed page, click the **Console** tab, and click **Click here to show only console** to open the **Console** page. Check whether you can log in to the server instance. (Enter the login username and password as prompted.)

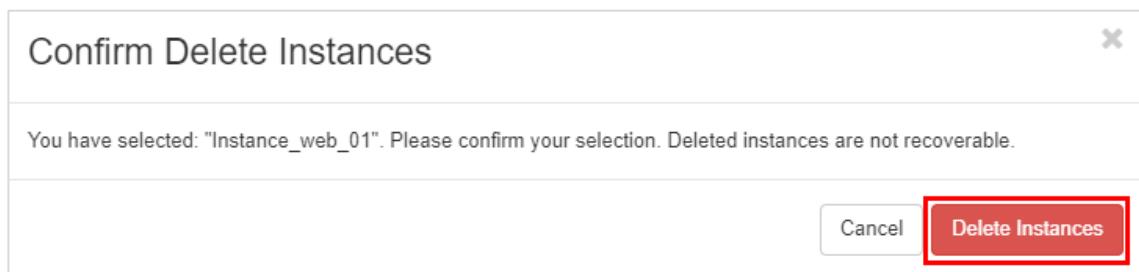
5.2.4.7 Deleting a Server Instance

Step 1 In the navigation pane, choose **Project > Compute > Instances**. The instance list is displayed. Select the server instance to be deleted and click **Delete Instances**.



The screenshot shows the 'Instances' page with the 'Delete Instances' button highlighted in red. The instance 'Instance_web_01' is selected.

Step 2 In the displayed **Confirm Delete Instances** dialog box, click **Delete Instances**. (Do not delete the instance and use it in 6.2.2.)



The screenshot shows the 'Confirm Delete Instances' dialog box. It contains the message: 'You have selected: "Instance_web_01". Please confirm your selection. Deleted instances are not recoverable.' At the bottom right, the 'Delete Instances' button is highlighted in red.



The screenshot shows the 'Instances' page again. The status bar at the top indicates 'Info: Scheduled deletion of Instance: Instance_web_01'. The main table below shows the header row but is empty, indicating 'No items to display.'

5.3 Operations using the OpenStack CLI

5.3.1 Managing a Hypervisor, Host Aggregate, and an Availability Zone

- Step 1 Remotely log in to the ECS. Run the following command to import the environment variables of the **admin** user:

```
su - stack  
cd devstack  
. admin-openrc.sh
```

```
root@ecs-yoga:~# su - stack  
stack@ecs-yoga:~$ cd devstack/  
stack@ecs-yoga:~/devstack$ . admin-openrc.sh
```

- Step 2 Run the following command to view the OpenStack hypervisor list:

```
openstack hypervisor list --long
```

```
stack@ecs-yoga:~/devstack$ openstack hypervisor list --long  
+-----+-----+-----+-----+-----+-----+-----+  
| ID | Hypervisor Hostname | Hypervisor Type | Host IP | State | vCPUs Used | vCPUs | Memory MB Used | Memory MB |  
+-----+-----+-----+-----+-----+-----+-----+  
| 1 | ecs-yoga | QEMU | 172.16.0.160 | up | 0 | 4 | 512 | 7956 |  
+-----+-----+-----+-----+-----+-----+-----+
```

- Step 3 Run the following command to check the OpenStack host list:

```
openstack host list
```

```
stack@ecs-yoga:~/devstack$ openstack host list  
+-----+-----+-----+  
| Host Name | Service | Zone |  
+-----+-----+-----+  
| ecs-yoga | scheduler | internal |  
| ecs-yoga | conductor | internal |  
| ecs-yoga | conductor | internal |  
| ecs-yoga | compute | nova |  
+-----+-----+-----+
```

- Step 4 Run the following command to create the **HostAggr_cli** host aggregate:

```
openstack aggregate create --zone nova HostAggr_cli
```

```
stack@ecs-yoga:~/devstack$ openstack aggregate create --zone nova HostAggr_cli
+-----+-----+
| Field | Value |
+-----+-----+
| availability_zone | nova |
| created_at | 2023-03-10T08:36:51.652154 |
| deleted_at | None |
| hosts | None |
| id | 2 |
| is_deleted | False |
| name | HostAggr_cli |
| properties | None |
| updated_at | None |
| uuid | e66a8ae2-af98-4f17-a8aa-93a57d715f15 |
+-----+-----+
```

- Step 5 Run the following command to add the **ecs-yoga** host to the **HostAggr_cli** host aggregate:

```
openstack aggregate add host HostAggr_cli ecs-yoga
```

```
stack@ecs-yoga:~/devstack$ openstack aggregate add host HostAggr_cli ecs-yoga
+-----+-----+
| Field | Value |
+-----+-----+
| availability_zone | nova |
| created_at | 2023-03-10T08:36:51.652154 |
| deleted_at | None |
| hosts | ecs-yoga |
| id | 2 |
| is_deleted | False |
| name | HostAggr_cli |
| properties | availability_zone='nova' |
| updated_at | None |
| uuid | None |
+-----+-----+
```

Verification:

- Run the following commands to check whether a host can be added to different AZs:

```
openstack aggregate create --zone AZ_cli HostAggr_cli_test
openstack aggregate add host HostAggr_cli_test ecs-yoga
```

```
stack@ecs-yoga:~/devstack$ openstack aggregate create --zone AZ_cli HostAggr_cli_test
+-----+-----+
| Field | Value |
+-----+-----+
| availability_zone | AZ_cli |
| created_at | 2023-03-10T08:36:51.652154 |
| deleted_at | None |
| hosts | None |
| id | 3 |
| is_deleted | False |
| name | HostAggr_cli_test |
| properties | None |
| updated_at | None |
| uuid | c1fdb64-a4c1-452b-9fc6-b4c631d9c61d |
+-----+-----+
stack@ecs-yoga:~/devstack$ openstack aggregate add host HostAggr_cli_test ecs-yoga
ConflictException: 409: Client Error for url: http://172.16.0.160/compute/v2.1/os-aggregates/3/action, Cannot add host to aggregate 3. Reason: One or more hosts already in availability zone(s) ['nova', 'nova'].
```

- Run the following commands to check whether a host can be added to different host aggregates:

```
openstack aggregate set --zone nova HostAggr_cli_test
openstack aggregate show HostAggr_cli_test
```

```
openstack aggregate add host HostAggr_cli_test ecs-yoga
```

```
stack@ecs-yoga:~/devstack$ openstack aggregate set --zone nova HostAggr_cli_test
stack@ecs-yoga:~/devstack$ openstack aggregate show HostAggr_cli_test
+-----+-----+
| Field | Value |
+-----+-----+
| availability_zone | nova |
| created_at | 2018-02-28T09:39:00Z |
| deleted_at | None |
| hosts | |
| id | 3 |
| is_deleted | False |
| name | HostAggr_cli_test |
| properties | |
| updated_at | None |
| uuid | c1f1db64-a4c1-452b-9fc6-b4c631d9c61d |
+-----+
stack@ecs-yoga:~/devstack$ openstack aggregate add host HostAggr_cli_test ecs-yoga
+-----+-----+
| Field | Value |
+-----+-----+
| availability_zone | nova |
| created_at | 2018-02-28T09:39:00Z |
| deleted_at | None |
| hosts | ecs-yoga |
| id | 3 |
| is_deleted | False |
| name | HostAggr_cli_test |
| properties | availability_zone='nova' |
| updated_at | None |
| uuid | None |
+-----+
```

Step 6 Run the following command to remove the **ecs-yoga** host from the **HostAggr_cli_test** host aggregate:

```
openstack aggregate remove host HostAggr_cli_test ecs-yoga
```

```
stack@ecs-yoga:~/devstack$ openstack aggregate remove host HostAggr_cli_test ecs-yoga
+-----+-----+
| Field | Value |
+-----+-----+
| availability_zone | nova |
| created_at | 2018-02-28T09:39:00Z |
| deleted_at | None |
| hosts | |
| id | 3 |
| is_deleted | False |
| name | HostAggr_cli_test |
| properties | availability_zone='nova' |
| updated_at | None |
| uuid | None |
+-----+
```

Step 7 Run the following command to delete the **HostAggr_cli_test** host aggregate:

```
openstack aggregate delete HostAggr_cli_test
```

```
stack@ecs-yoga:~/devstack$ openstack aggregate delete HostAggr_cli_test
stack@ecs-yoga:~/devstack$
```

Step 8 Run the following command to view the host aggregate list:

```
openstack aggregate list
```

```
stack@ecs-yoga:~/devstack$ openstack aggregate list
+---+-----+-----+
| ID | Name      | Availability Zone |
+---+-----+-----+
| 1  | HostAggr_web | nova          |
| 2  | HostAggr_cli | nova          |
+---+-----+-----+
```

5.3.2 Managing a Flavor

Step 1 Run the following command to create the **Flavor_cli** flavor configured as follows:

- **VCPUs**: indicates the quantity of vCPUs, for example, **1**.
- **RAM (MB)**: indicates the RAM size, for example, **128**.
- **Root Disk (GB)**: indicates the root disk size, for example, **1**.
- The flavor is only for the **Project_cli** project.
- Retain the default values for other parameters.

```
openstack flavor create --vcpus 1 --ram 128 --disk 1 --private --project Project_cli Flavor_cli
```

```
stack@ecs-yoga:~/devstack$ openstack flavor create --vcpus 1 --ram 128 --disk 1 --private --project Project_cli Flavor_cli
+-----+-----+
| Field        | Value   |
+-----+-----+
| OS-FLV-DISABLED:disabled | False
| OS-FLV-EXT-DATA:ephemeral | 0
| description    | None
| disk          | 1
| id            | 52da5728-3a6c-4908-ad7b-bf735e22acfd
| name          | Flavor_cli
| os-flavor-access:is_public | False
| properties    |
| ram           | 128
| rxtx_factor   | 1.0
| swap          |
| vcpus         | 1
+-----+-----+
```

Step 2 Run the following command to remove the **Flavor_cli** flavor from the **Project_cli** project:

```
openstack flavor unset --project Project_cli Flavor_cli
```

```
stack@ecs-yoga:~/devstack$ openstack flavor unset --project Project_cli Flavor_cli
stack@ecs-yoga:~/devstack$
```

Step 3 Run the following command to view the **Flavor_cli** flavor details:

```
openstack flavor show Flavor_cli
```

openstack flavor show Flavor_cli	
Field	Value
OS-FLV-DISABLED:disabled	False
OS-FLV-EXT-DATA:ephemeral	0
access_project_ids	[]
description	None
disk	1
id	52da5728-3a6c-4908-ad7b-bf735e22acfd
name	Flavor_cli
os-flavor-access:is_public	False
properties	
ram	128
rxtx_factor	1.0
swap	
vcpus	1

The **Flavor_cli** flavor is still not **Public**. To change the flavor to **Public**, delete the original flavor first and create a new one.

Step 4 Run the following command to delete the **Flavor_cli** flavor:

```
openstack flavor delete Flavor_cli
```

```
stack@ecs-yoga:~/devstack$ openstack flavor delete Flavor_cli
stack@ecs-yoga:~/devstack$
```

Step 5 Run the following command to create the **Flavor_cli** flavor configured as follows:

- VCPUs**: indicates the quantity of vCPUs, for example, **1**.
- RAM (MB)**: indicates the RAM size, for example, **128**.
- Root Disk (GB)**: indicates the root disk size, for example, **1**.
- Retain the default values for other parameters.

```
openstack flavor create --vcpus 1 --ram 128 --disk 1 Flavor_cli
```

openstack flavor create --vcpus 1 --ram 128 --disk 1 Flavor_cli	
Field	Value
OS-FLV-DISABLED:disabled	False
OS-FLV-EXT-DATA:ephemeral	0
description	None
disk	1
id	d32b0f6e-ab2c-4b3e-97b0-52991dcde324
name	Flavor_cli
os-flavor-access:is_public	True
properties	
ram	128
rxtx_factor	1.0
swap	
vcpus	1

The command output indicates that the default value of the flavor is **Public**.

5.3.3 Managing a Key Pair and Server Group

Step 1 Run the following command to create the **KeyPair_cli** key pair:

```
openstack keypair create KeyPair_cli
```

```
stack@ecs-yoga:~/devstack$ openstack keypair create KeyPair_cli
-----BEGIN RSA PRIVATE KEY-----
MIIEowIBAAKCAQEAnKsurR2ZadHPK4xabX6zh/foF5MqGkYwoFPdwgluxRjlvfL
3AafC97vFygdyMJLh/yEmQ9W9ezD6Lm2aoRxRXGTvkHMTvUA+ud55Syie5Sa1/re
pp5T5L1AdK2UBvEMWV+G17ktS8TEpq/i4TorZkvbjhtVe0orq0tBnTNGBg9cKoXV
gpYZbzq6S3HGg/VcT/SS0TMoVU0g3BWl+7c7eda60kTvR674Szwu6azq6ds9xN6
3aFq0Mi5fs+/wy0StD0j8z0mWqs8SvKIEoS0CXIeyo6Aalu45urZz02NOIzk7Hw
2B7mecBYMTb5kUdlKfWhINoInL1QEGOUzNVqwIDAQABAoIBAE1yPc+sGyN5aQ0h
A66u/HbRcWIjn4d89JVs0Mspu1Lgn6EteAjZKRSoVkmlyc150wm6fCMn29fhb0
fx1mvUT2nIpucKpcMOXW+WTs/sFOgpcZGY/TD994ngL0mq4DB+Hj1Tt/WFnqS7
u88U31Fha8mF75rTzoSN3jCkoQ/rD+RtPTcK+fYeTh41Wigj6fTk4rUvLb2xgY
TdM6l4HBzM00FtXdROXWuoLh/l3SX2KucxoKSds+Mn7dPfvSw61wCToUvef7gg/I
8TPPrU/4w+yfE30Ymyj1OHZXw2KAB5dnbc4W/HkWNitcP+YE67WkVWWX+t/ApRVq
HQDMq5EcgYEAYoA4ATDK4r8lCrAsGgOaZeLr93VfFMxNSTApzxkVF9LsPdaz/WM4t
MWHGc1h40UhMidWz7JLJjeSKH7+8YdmKw/F94Q1icxPdAnHeKPzzpXHOv53XLr
j6UQ5fy60qtZHqQ085/rTaexBzdQV9xVS4fDrjGY8muQr/oL+3zoSkCgYEAxg8v
2KYFFTtY/DeefT99LDjnJ+xhol28y62ls9WzUut4aV+MwkDQoZYUi/g40JIU2Uuf
9791TfBtNaxAmZjAEub63Jm6KKAGrbCrwA40m/+654Vhwc4qguSRq4LsAi67M8M
qN+hOLLE/r1ImSGj9aeYMXf+LMBvasDZmNjNrMCqYB6eSPmLHF4xCyOE1EJBsbZ
+m3Gw7KW5h2UN0n8vab6xiwqetARENmqdT1GQ+sGgJixCN/32zyxS/wftVrGdxiu
/vZF5Cvssr0Id21Ea0Obb0iE+H+umE3aGfZncvw3MCT8d3L9sPxtaw+F269fBEa
e10WLtDmR3NasaCnZF4mSQKBgFytwJrlXR2GUGmbcPska0w4Pv6jdiu0KKSmCzl
ymrzyr2s01YEXFwwi7SAWV/34eq7qkUtjXaWsDDSCtnU85Qkx6Cwwr6920ItmMD
fExEGgqRR8u0ooJxtDQjH075Vtb3MBpZwuxzLYjtRU1rswVCuoowqpEg1zWu+eXHQ
8h0nAoGBAiyyaoP3rGZRksJz6EKAfscJbqR4+n18WN4Wg4nAGspYr2aJYfQ5s4kF
hC84ZOSpoEoqrS6xCah0yt+S807nSAvF5ZpRg0J6YDQktpyklukH16Y1ecr+qXQv
7f6NSYSn+BmFyF9LCbq+w0uyg9JdWGYFX/LZw5yTL5MK60cBPzz7
-----END RSA PRIVATE KEY-----
```



```
stack@ecs-yoga:~/devstack$ 
```

Step 2 Run the following command to create the **ServerGroup_cli** server group and set the **policies to affinity**:

```
openstack server group create --policy affinity ServerGroup_cli
```

```
stack@ecs-yoga:~/devstack$ openstack server group create --policy affinity ServerGroup_cli
+-----+-----+
| Field | Value |
+-----+-----+
| id    | 9f1753c2-5d81-4bb4-9db8-fbd60fb51fdd |
| members |          |
| name   | ServerGroup_cli |
| policies | affinity      |
+-----+-----+
```

Record the ID of the **ServerGroup_cli** server group.

5.3.4 Performing Operations on a Server Instance

5.3.4.1 Provisioning a Server Instance

Step 1 Run the following command to create the **Instance_cli_01** server instance configured as follows:

- Availability zone: **nova**
- Image: **Img_cli**

- Flavor: **Flavor_cli**
- Key pair: **KeyPair_cli**
- Server group: **ServerGroup_cli**
- Network: **shared**

```
openstack server create --availability-zone nova --image Img_cli --flavor Flavor_cli --network shared - -key-name KeyPair_cli --hint group=SERVER_GROUP_ID Instance_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack server create --availability-zone nova --image Img_cli --flavor Flavor_cli --network sha red --key-name KeyPair_cli --hint group=9f1753c2-5d81-4bb4-9db8-fbd60fb51fd Instance_cli_01
+-----+
| Field          | Value
+-----+
| OS-DCF:diskConfig | MANUAL
| OS-EXT-AZ:availability_zone | nova
| OS-EXT-SRV-ATTR:host | None
| OS-EXT-SRV-ATTR:hypervisor_hostname | None
| OS-EXT-SRV-ATTR:instance_name |
| OS-EXT-STS:power_state | NOSTATE
| OS-EXT-STS:task_state | scheduling
| OS-EXT-STS:vm_state | building
| OS-SRV-USG:launched_at | None
| OS-SRV-USG:terminated_at | None
| accessIPv4 |
| accessIPv6 |
| addresses |
| adminPass | wsU82JajvsuW
| config_drive |
| created | #####
| flavor | Flavor_cli (d52b0f6e-ab2c-4b3e-97b0-52991dcde324)
| hostId |
| id | 68615f4c-9c49-42fc-b12b-1cb0ebfe8efe
| image | Img_cli (4b9b23e7-17bf-487d-b308-e969d9173e6b)
| key_name | KeyPair_cli
| name | Instance_cli_01
| progress | 0
| project_id | 243072681e504e67be431e0df8c6fd7f
| properties |
| security_groups |
| status | name='default'
| updated | BUILD
| user_id | 282####49Z
| user_id | df6bc330f73e4ea3b56b2e6cc0cf251f
| volumes_attached |
+-----+
stack@ecs-yoga:~/devstack$
```

- Step 2** Run the following command to check the **openstack server list**. If the **Instance_cli_01** server instance status is **ACTIVE**, the server instance has been created.

```
openstack server list
```

```
stack@ecs-yoga:~/devstack$ openstack server list
+-----+-----+-----+-----+-----+
| ID      | Name     | Status  | Networks | Image   | Flavor  |
+-----+-----+-----+-----+-----+
| 68615f4c-9c49-42fc-b12b-1cb0ebfe8efe | Instance_cli_01 | ACTIVE  | shared-192.168.233.135 | Img_cli | Flavor_cli |
+-----+-----+-----+-----+-----+
```

5.3.4.2 Starting, Stopping, and Restarting a Server Instance

- Step 1** Run the following command to stop the **Instance_cli_01** server instance:

```
openstack server stop Instance_cli_01
```

- Step 2** Run the following command to check the status of the **Instance_cli_01** server instance:

```
openstack server show Instance_cli_01 | grep status
```

```
stack@ecs-yoga:~/devstack$ openstack server stop Instance_cli_01
stack@ecs-yoga:~/devstack$ openstack server show Instance_cli_01 | grep status
| status
| SHUTOFF
```

Step 3 Run the following command to start the **Instance_cli_01** server instance:

```
openstack server start Instance_cli_01
```

Step 4 Check the status of the **Instance_cli_01** server instance by repeating step 2.

```
stack@ecs-yoga:~/devstack$ openstack server start Instance_cli_01
stack@ecs-yoga:~/devstack$ openstack server show Instance_cli_01 | grep status
| status
| ACTIVE
```

Step 5 Run the following command to soft-reboot the **Instance_cli_01** server instance:

```
openstack server reboot Instance_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack server reboot Instance_cli_01
stack@ecs-yoga:~/devstack$ openstack server show Instance_cli_01 | grep status
| status
| REBOOT
```

The **openstack server reboot --soft Instance_cli_01** command is equivalent to the command executed in this step. After you execute it, no output is displayed.

Step 6 Run the following command to hard-reboot the **Instance_cli_01** server instance:

```
openstack server reboot --hard Instance_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack server reboot --hard Instance_cli_01
stack@ecs-yoga:~/devstack$ openstack server show Instance_cli_01 | grep status
| status
| HARD_REBOOT
```



```
stack@ecs-yoga:~/devstack$ openstack server show Instance_cli_01 | grep status
| status
| ACTIVE
```

5.3.4.3 Locking and Unlocking a Server Instance

Step 1 Run the following command to lock the **Instance_cli_01** server instance:

```
openstack server lock Instance_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack server lock Instance_cli_01
stack@ecs-yoga:~/devstack$
```

Step 2 Run the following command to unlock the **Instance_cli_01** server instance:

```
openstack server unlock Instance_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack server unlock Instance_cli_01
stack@ecs-yoga:~/devstack$
```

5.3.4.4 Pausing, Suspending, and Resuming a Server Instance

Step 1 Run the following command to pause the **Instance_cli_01** server instance:

```
openstack server pause Instance_cli_01
```

- Step 2 Run the following command to check the status of the **Instance_cli_01** server instance:

```
openstack server show Instance_cli_01 | grep status
```

```
stack@decs-yoga:~/devstack$ openstack server pause Instance_cli_01
stack@decs-yoga:~/devstack$ openstack server show Instance_cli_01 | grep status
| status
| PAUSED
```

- Step 3 Run the following command to resume the **Instance_cli_01** server instance:

```
openstack server unpause Instance_cli_01
```

- Step 4 Check the status of the **Instance_cli_01** server instance by repeating step 2.

```
stack@decs-yoga:~/devstack$ openstack server unpause Instance_cli_01
stack@decs-yoga:~/devstack$ openstack server show Instance_cli_01 | grep status
| status
| ACTIVE
```

- Step 5 Run the following command to suspend the **Instance_cli_01** server instance:

```
openstack server suspend Instance_cli_01
```

- Step 6 Check the status of the **Instance_cli_01** server instance by repeating step 2.

```
stack@decs-yoga:~/devstack$ openstack server suspend Instance_cli_01
stack@decs-yoga:~/devstack$ openstack server show Instance_cli_01 | grep status
| status
| SUSPENDED
```

- Step 7 Run the following command to resume the **Instance_cli_01** server instance:

```
openstack server resume Instance_cli_01
```

- Step 8 Check the status of the **Instance_cli_01** server instance by repeating step 2.

```
stack@decs-yoga:~/devstack$ openstack server resume Instance_cli_01
stack@decs-yoga:~/devstack$ openstack server show Instance_cli_01 | grep status
| status
| ACTIVE
```

5.3.4.5 Shelving and Unshelving a Server Instance

- Step 1 Run the following command to shelve the **Instance_cli_01** server instance:

```
openstack server shelve Instance_cli_01
```

- Step 2 Run the following command to check the status of the **Instance_cli_01** server instance:

```
openstack server show Instance_cli_01 | grep status
```

```
stack@decs-yoga:~/devstack$ openstack server shelve Instance_cli_01
stack@decs-yoga:~/devstack$ openstack server show Instance_cli_01 | grep status
| status
| SHELVED
```

- Step 3 Run the following command to unshelve the **Instance_cli_01** server instance:

```
openstack server unshelve Instance_cli_01
```

Step 4 Check the status of the **Instance_cli_01** server instance by repeating step 2.

```
stack@ecs-yoga:~/devstack$ openstack server unshelve Instance_cli_01
stack@ecs-yoga:~/devstack$ openstack server show Instance_cli_01 | grep status
| status                                | ACTIVE
```

5.3.4.6 Adjusting a Server Instance Flavor, Creating a Snapshot, and Rebuilding a Server Instance

Step 1 Run the following command to create the **Instance_Snap_cli** snapshot for the **Instance_cli_01** server instance:

```
openstack server image create --name Instance_Snap_cli Instance_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack server image create --name Instance_Snap_cli Instance_cli_01
+-----+
| Field      | Value
+-----+
| created_at | 2018-01-12T10:29Z
| file       | /v2/images/e4330e57-1107-4a27-a563-bda93254c6c0/file
| id         | e4330e57-1107-4a27-a563-bda93254c6c0
| min_disk   | 1
| min_ram   | 128
| name       | Instance_Snap_cli
| owner      | 243072681e504e67be431e0df8c6fd7f
| properties | base_image_ref='4b9b23e7-17bf-487d-b308-e969d9173e6b', boot_roles='member,admin,reader', clean_attempts='1', image_type='snapshot', instance_uuid='68615f4c-9c49-42fc-b12b-1cb0ebfe8efe', os_hidden='False', owner_project_name='admin', protected=False
| schema     | /v2/schemas/image
| status     | queued
| tags       |
| updated_at | 2018-01-12T10:29Z
| visibility | private
+-----+
```

Step 2 Run the following command to view the image list:

```
openstack image list
```

```
stack@ecs-yoga:~/devstack$ openstack image list
+-----+-----+
| ID          | Name      | Status |
+-----+-----+
| d6af2d55-ee54-4aea-abc8-1a8b91544554 | Fedora-Cloud-Base-36-1.5.x86_64 | active |
| 71feb34d-a92a-4ff0-9c31-3989d2b5e562 | Img_cli    | active |
| 73788247-4ed1-4c5c-a724-f1187c662b5a | Img_web    | active |
| 10e719c2-af9f-46c1-913a-85580ea6733b | Instance_Snap_cli | active |
| 7a6d7895-0ed4-4508-b41a-716cc9739413 | Instance_Snap_web | active |
| 4ba57258-c4a4-4bf8-ae53-143d24135dad | cirros-0.5.2-x86_64-disk | active |
+-----+-----+
```

Step 3 Run the following command to check the **flavor** of the **Instance_cli_01** server instance:

```
openstack server show Instance_cli_01 | grep flavor
```

```
stack@ecs-yoga:~/devstack$ openstack server show Instance_cli_01 | grep flavor
| flavor           | Flavor_cli (d32b0f6e-ab2c-4b3e-97b0-52991dcde324) |
```

Step 4 Run the following command to view the flavor details:

```
openstack flavor show Flavor_cli
```

```
stack@ecs-yoga:~/devstack$ openstack flavor show Flavor_cli
+-----+-----+
| Field          | Value   |
+-----+-----+
| OS-FLV-DISABLED:disabled | False |
| OS-FLV-EXT-DATA:ephemeral | 0     |
| access_project_ids       | None  |
| description             | None  |
| disk                    | 1     |
| id                      | d32b0f6e-ab2c-4b3e-97b0-52991dcde324 |
| name                    | Flavor_cli |
| os-flavor-access:is_public | True |
| properties              |       |
| ram                     | 128   |
| rxtx_factor             | 1.0   |
| swap                   |       |
| vcpus                  | 1     |
+-----+-----+
```

Step 5 Run the following command to create the **Flavor_cli_new** flavor, set **ram** to 156 MB, and set **vcpus** and **disk** to the same values as those of **Flave_cli**.

```
openstack flavor create --vcpus 1 --ram 156 --disk 1 Flavor_cli_new
```

```
stack@ecs-yoga:~/devstack$ openstack flavor create --vcpus 1 --ram 156 --disk 1 Flavor_cli_new
+-----+-----+
| Field | Value |
+-----+-----+
| OS-FLV-DISABLED:disabled | False
| OS-FLV-EXT-DATA:ephemeral | 0
| description | None
| disk | 1
| id | 11684e54-f185-4f67-bc32-fa1091fc5428
| name | Flavor_cli_new
| os-flavor-access:is_public | True
| properties |
| ram | 156
| rxtx_factor | 1.0
| swap |
| vcpus | 1
+-----+
```

Step 6 Run the following command to resize the **Instance_cli_01** server instance:

```
openstack server resize --flavor Flavor_cli_new Instance_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack server resize --flavor Flavor_cli_new Instance_cli_01
stack@ecs-yoga:~/devstack$
```

Step 7 Run the following command to check the status of the **Instance_cli_01** server instance:

```
openstack server list | grep Instance_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack server list | grep Instance_cli_01
| 68615f4c-9c49-42fc-b12b-1cb0ebfe8efe | Instance_cli_01 | VERIFY_RESIZE | shared=192.168.233.135 | img_cli | Flavor_cli_new |
```

Step 8 Run the following command to confirm the server resize:

```
openstack server resize confirm Instance_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack server resize confirm Instance_cli_01
stack@ecs-yoga:~/devstack$
```

Step 9 Check the status of the **Instance_cli_01** server instance again by repeating step 8.

```
stack@ecs-yoga:~/devstack$ openstack server list | grep Instance_cli_01
| 68615f4c-9c49-42fc-b12b-1cb0ebfe8efe | Instance_cli_01 | ACTIVE | shared=192.168.233.135 | img_cli | Flavor_cli_new |
```

Step 10 Check the flavor of the **Instance_cli_01** server instance again by repeating step 4.

```
stack@ecs-yoga:~/devstack$ openstack server show Instance_cli_01 | grep flavor
| flavor | Flavor_cli_new (11684e54-f185-4f67-bc32-fa1091fc5428) |
stack@ecs-yoga:~/devstack$
```

If the flavor changes from **Flavor_cli** to **Flavor_cli_new**, the **Resize** is successful.

Step 11 Run the following command to restore the **Instance_Snap_cli** snapshot:

```
openstack server rebuild --image Instance_Snap_cli Instance_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack server rebuild --image Instance_Snap_cli Instance_cli_01
+-----+-----+
| Field | Value |
+-----+-----+
| OS-DCF:diskConfig | MANUAL
| accessIPv4 |
| accessIPv6 |
| addresses | shared=192.168.233.135
| adminPass | z6PrUcy5YhwF
| created | 2020-03-20T25:58:49Z
| flavor | Flavor_cli_new (11684e54-f185-4f67-bc32-fa1091fc5428)
| hostId | 27a39e46eb2fadef12086c51793de3a760caf49dbb07413a79fe3e23f
| id | 68615f4c-9c49-42fc-b12b-1cb0ebfe8efe
| image | Instance_Snap_cli (e4330e57-1107-4a27-a563-bda93254c6c0)
| name | Instance_cli_01
| progress | 0
| project_id | 243072681e504e67be431e0df8c6fd7f
| properties |
| status | REBUILD
| updated | 2020-03-20T25:57:29Z
| user_id | df6bc330f73e4ea3b5bb2e6cc0cf25bf
+-----+
```

Step 12 Run the following command to check the image of the **Instance_cli_01** server instance:

```
openstack server show Instance_cli_01 | grep image
```

```
stack@ecs-yoga:~/devstack$ openstack server show Instance_cli_01 | grep image
| image | Instance_Snap_cli (e4330e57-1107-4a27-a563-bda93254c6c0) |
stack@ecs-yoga:~/devstack$
```

If the image changes from **Img_cli** to **Instance_Snap_cli**, the snapshot has been restored.

5.3.4.7 Deleting a Server Instance

Step 1 Run the following command to delete the **Instance_cli_01** server instance:

```
openstack server delete Instance_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack server delete Instance_cli_01
stack@ecs-yoga:~/devstack$
```

Step 2 Run the following command to check whether the **Instance_cli_01** server instance has been deleted in the OpenStack server list:

```
openstack server list
```

```
stack@ecs-yoga:~/devstack$ openstack server list
stack@ecs-yoga:~/devstack$
```

If the instance list is empty, the server instance has been deleted.

6 OpenStack Storage Management

6.1 Overview

6.1.1 About This Exercise

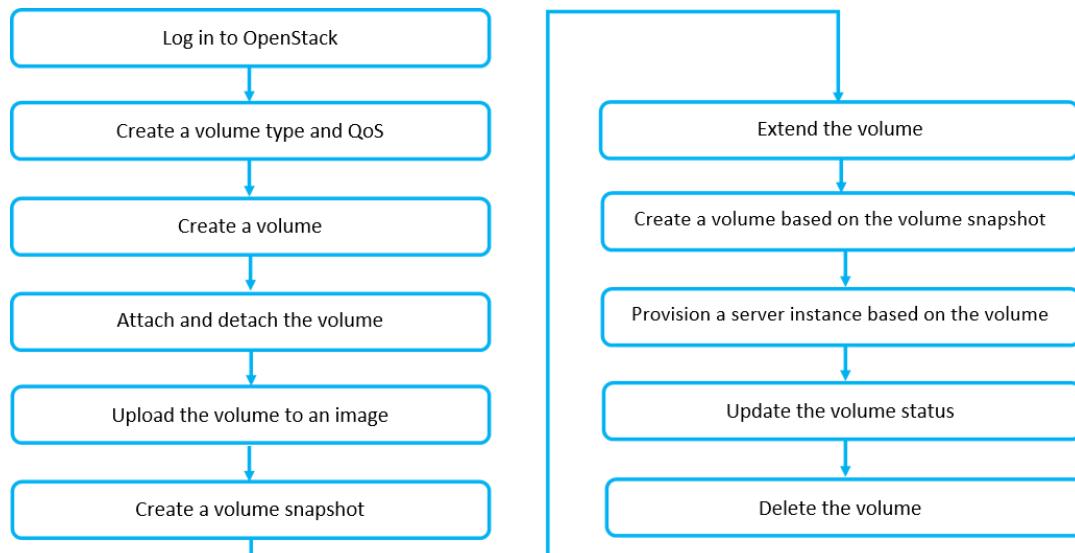
This exercise introduces how to create and manage volume types and QoS on the OpenStack dashboard and using the OpenStack CLI, as well as basic operations such as creating, attaching, and detaching volumes, uploading volumes to images, creating volume snapshots, creating volumes based on volume snapshots, provisioning server instances based on volumes, extending volumes, updating the volume status, and deleting volumes.

6.1.2 Objectives

Upon completion of this exercise, you will be familiar with the following operations on the OpenStack dashboard or using the OpenStack CLI:

- Creating and managing volume types and QoS
- Creating, attaching, and detaching volumes, taking snapshots for volumes, extending volumes, updating the volume status, and deleting volumes
- Uploading a volume to an image, creating a volume based on a volume snapshot, and provisioning a server instance based on a volume

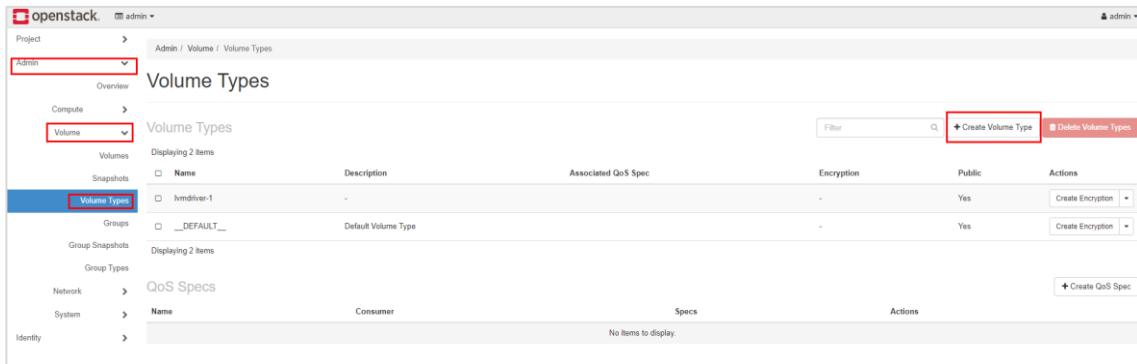
6.1.3 Process



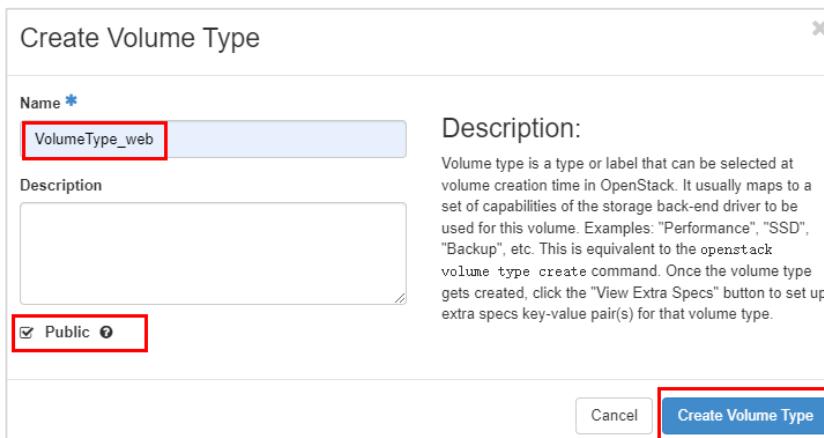
6.2 Operations on the OpenStack Dashboard

6.2.1 Managing a Volume Types and QoS

- Step 1** Log in to the OpenStack dashboard as user **admin**. In the navigation pane, choose **Admin > Volume > Volume Types**. The volume type list is displayed. Click **Create Volume Type** in the upper right corner of the page.

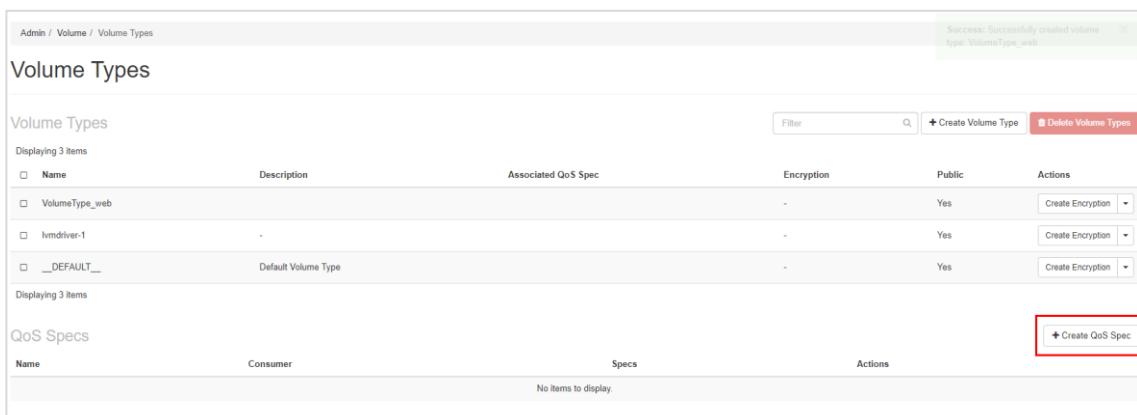


- Step 2** In the displayed **Create Volume Type** dialog box, specify the **Name** to **VolumeType_web**, select **Public**, and click **Create Volume Type**.

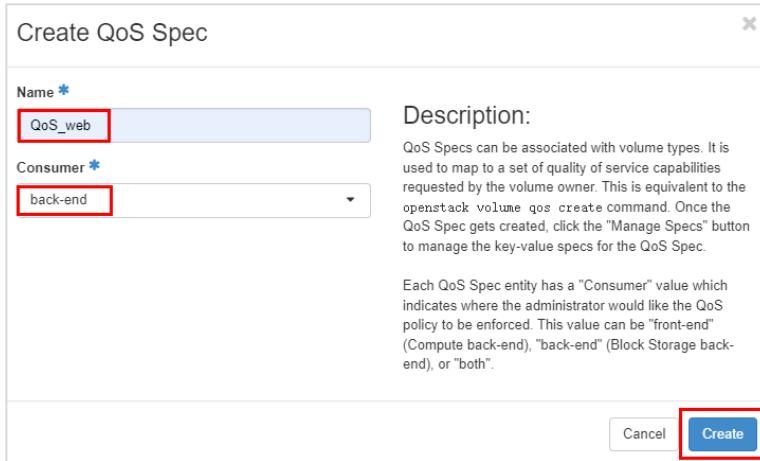


Name *	VolumeType_web
Description	(empty text area)
<input checked="" type="checkbox"/> Public	
<input type="button" value="Create Volume Type"/>	

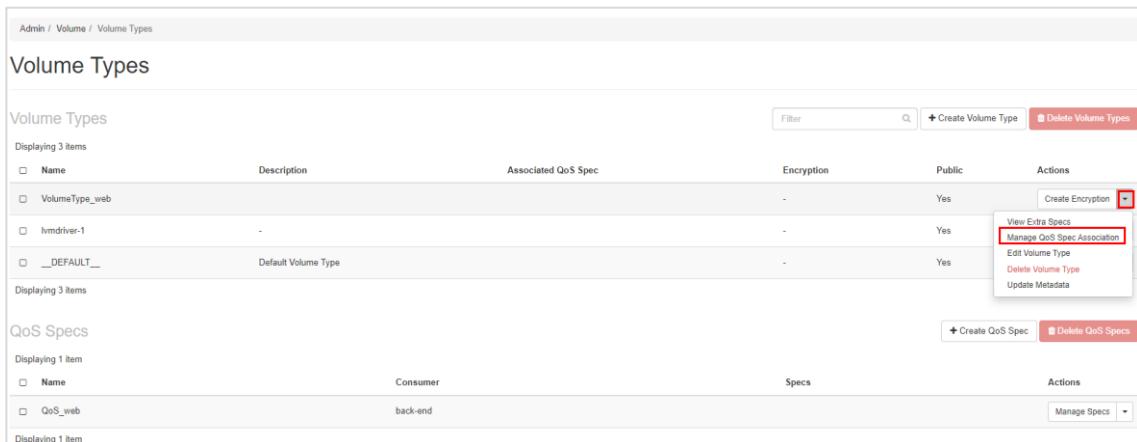
- Step 3** Return to the volume type list and click **Create QoS Spec**.



- Step 4** In the displayed **Create QoS Spec** dialog box, specify the Name to **QoS_web**, set Consumer to **back-end**, and click **Create**.



- Step 5** Return to the volume type list and view the created volume type. Click  in the **Actions** column of the row containing the target volume type, and select **Manage QoS Spec Association** from the drop-down list.



Name	Description	Associated QoS Spec	Encryption	Public	Actions
VolumeType_web	-	-	Yes	Yes	 Create Encryption
lvmdriver-1	-	-	Yes	Yes	 View Extra Specs Manage QoS Spec Association Edit Volume Type Delete Volume Type Update Metadata
DEFAULT	Default Volume Type	-	Yes	Yes	

Name	Consumer	Specs	Actions
QoS_web	back-end		 Manage Specs

- Step 6** In the displayed **Associate QoS Spec with Volume Type** dialog box, select **QoS_web** for **QoS Spec to be associated**, and click **Associate**.

Associate QoS Spec with Volume Type

QoS Spec to be associated *

QoS_web

Description:

Add, modify or remove the QoS Spec associated with this volume type.
 "None" indicates that no QoS Spec is currently associated. Conversely, setting the QoS Spec to "None" will remove the current association.

This is equivalent to the openstack volume qos associate and openstack volume qos disassociate commands.

Cancel Associate

Step 7 Return to the volume type list. The **QoS_web** for **Associated QoS Spec** for the volume type is displayed.

Volume Types					
Volume Types					
Name	Description	Associated QoS Spec	Encryption	Public	Actions
VolumeType_web	-	QoS_web	-	Yes	Create Encryption
lvmdriver-1	-	-	-	Yes	Create Encryption
DEFAULT	Default Volume Type	-	-	Yes	Create Encryption

6.2.2 Managing Volumes

6.2.2.1 Creating a Volume

Step 1 In the navigation pane, choose **Project > Volumes > Volumes**. The volume list is displayed. Click **Create Volume** in the upper part of the page.

Project / Volumes / Volumes

+ Create Volume

Name	Description	Size	Status	Group	Type	Attached To	Availability Zone	Bootable	Encrypted	Actions
No items to display.										

Step 2 In the displayed **Create Volume** dialog box, specify the following information:

- Volume Name:** Enter a value, for example, **Volume_web_01**.
- Volume Source:** Select **Image**.
- Use image as a source:** Select **Img_web**.
- Type:** Select **VolumeType_web**.
- Size (GiB):** Set this parameter to 1.
- Availability Zone:** Select **nova**.

- Retain the default values for other parameters.

Create Volume

Volume Name	<input type="text" value="Volume_web_01"/>	Description:
		Volumes are block devices that can be attached to instances.
Description		
Volume Source	<input type="text" value="Image"/>	Volume Type Description:
		VolumeType_web
		No description available.
Type	<input type="text" value="VolumeType_web"/>	Volume Limits
Size (GiB) *	<input type="text" value="1"/>	Total Gibibytes 0 of 1,000 GiB Used
Availability Zone	<input type="text" value="nova"/>	Number of Volumes 0 of 10 Used
Group	<input type="text" value="No group"/>	
		<input type="button" value="Cancel"/> <input type="button" value="Create Volume"/>

Step 3 Click **Create Volume**.

Step 4 Return to the volume list, and the status of the created volume is **Available**.

Name	Description	Size	Status	Group	Type	Attached To	Availability Zone	Bootable	Encrypted	Actions
Volume_web_01	-	1GiB	Creating	-	VolumeType_web	nova	No	No		<input type="button" value="Update Metadata"/>

Displaying 1 item										
Name	Description	Size	Status	Group	Type	Attached To	Availability Zone	Bootable	Encrypted	Actions
Volume_web_01	-	1GiB	Available	-	VolumeType_web	nova	Yes	No		<input type="button" value="Edit Volume"/>

Displaying 1 item

6.2.2.2 Attaching and Detaching a Volume

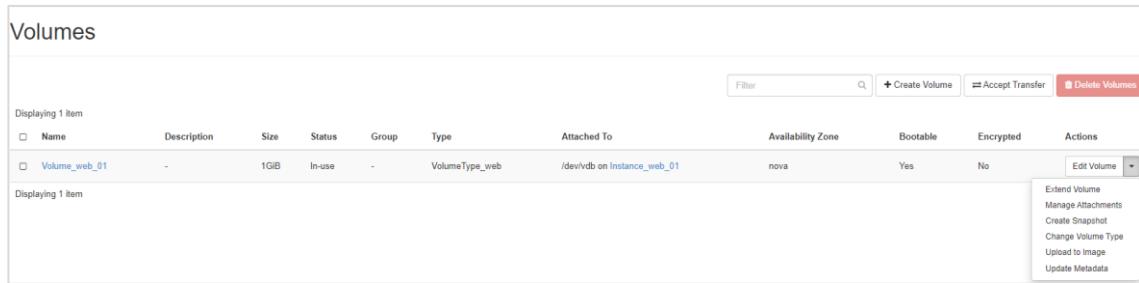
Step 1 In the navigation pane, choose **Project > Volumes > Volumes**. The volume list is displayed. Click  in the **Actions** column of the row containing the target volume and select **Manage Attachments** from the drop-down list.

Step 2 Provision **Instance_web_01** by following the instructions provided in 5.2.4.1.

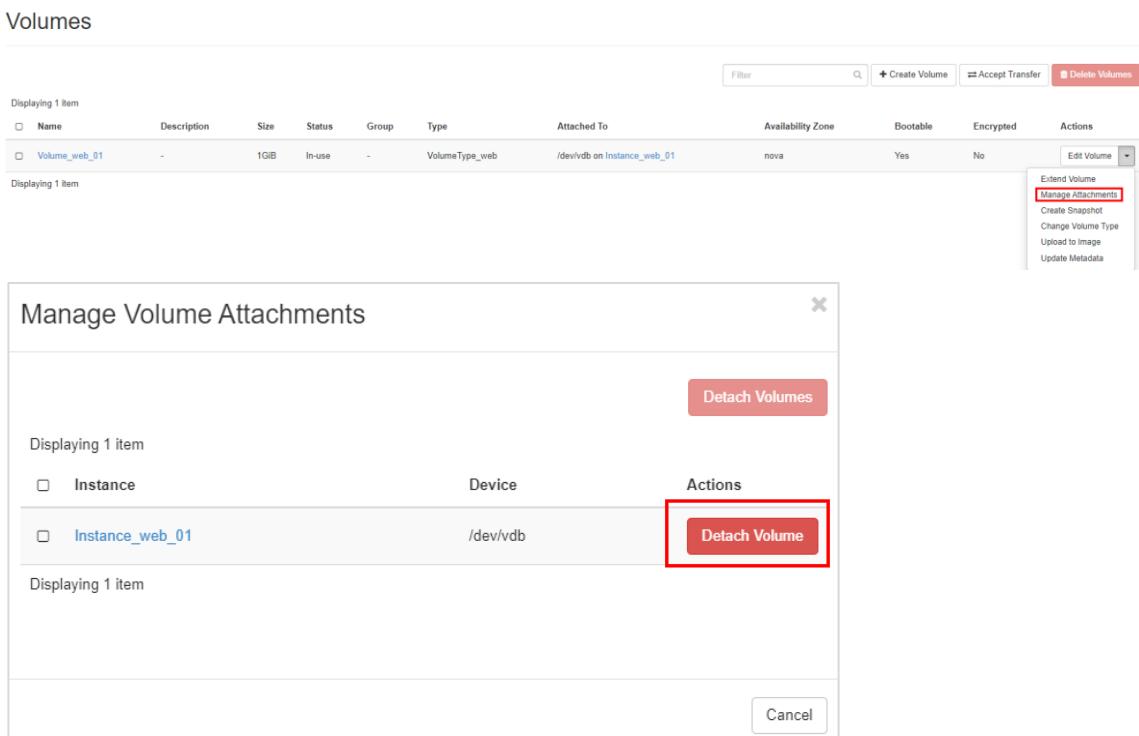
Step 3 In the displayed **Manage Volume Attachments** dialog box, select **Instance_web_01** for **Attach To Instance** and click **Attach Volume**.

Step 4 Return to the volume list and view the volume status and attachment status.

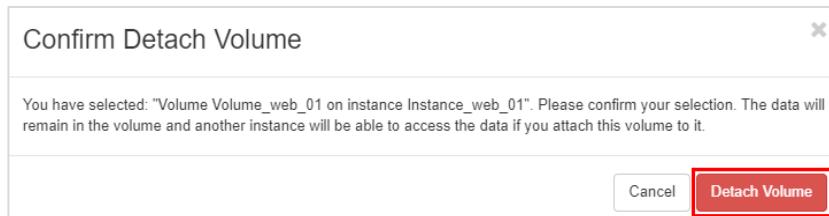
Step 5 Click in the **Actions** column of the row containing the target volume to view the operations that can be performed on an attached volume.



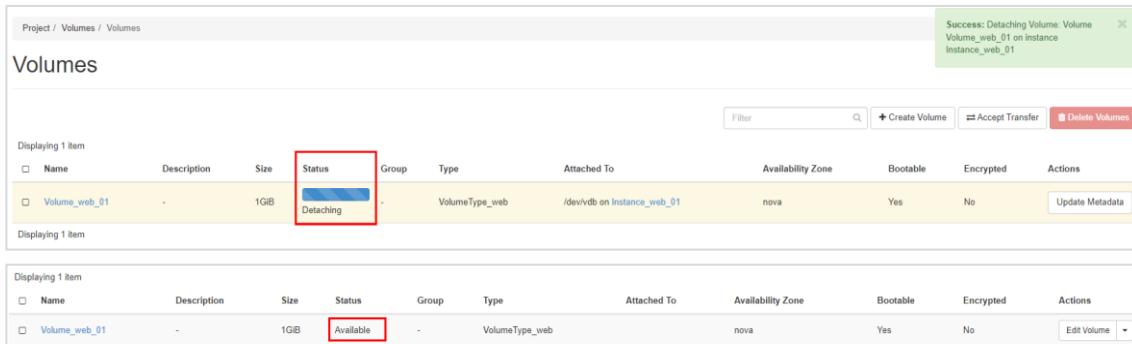
Step 6 Select **Manage Attachments** from the drop-down list. In the displayed **Manage Volume Attachments** dialog box, click **Detach Volume** in the **Actions** column of the row containing the server instance to which the volume is attached.



Step 7 In the displayed **Confirm Detach Volume** dialog box, click **Detach Volume**.

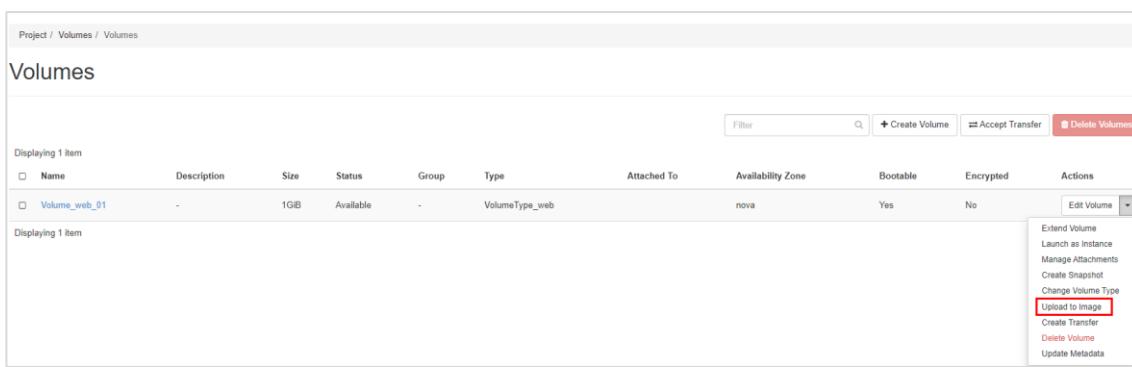


Step 8 Return to the volume list and view the volume status and attachment status.

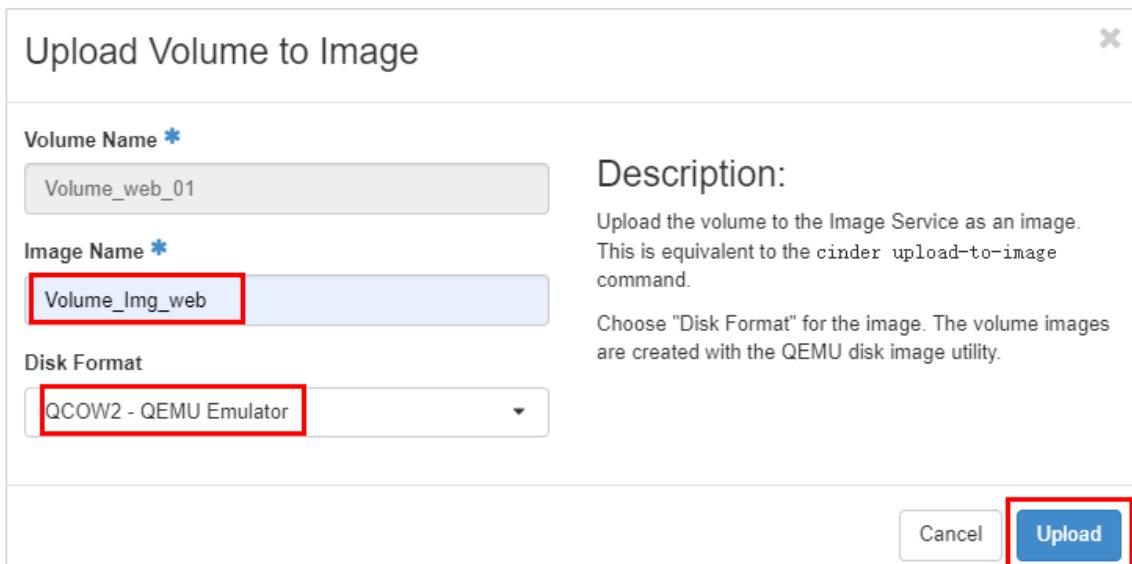


6.2.2.3 Uploading a Volume to an Image

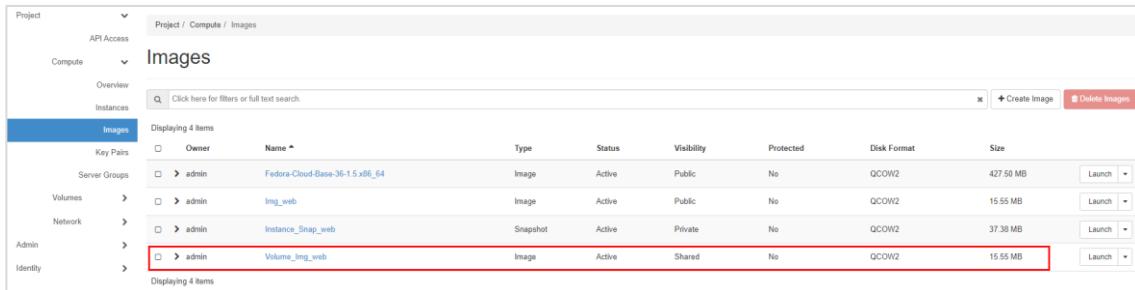
- Step 1** In the navigation pane, choose **Project > Volumes > Volumes**. The volume list is displayed. Click ▾ in the **Actions** column, and select **Upload to Image**.



- Step 2** In the displayed **Upload Volume to Image** dialog box, specify the **Image Name** to **Volume_Img_web**, select **QCOW2 – QEMU Emulator** from the **Disk Format** dropdown list and click **Upload**.



- Step 3** In the navigation pane, choose **Project > Compute > Images**. The image list is displayed. View the created image. The image type is **Image** and the **Visibility** is **Shared**.

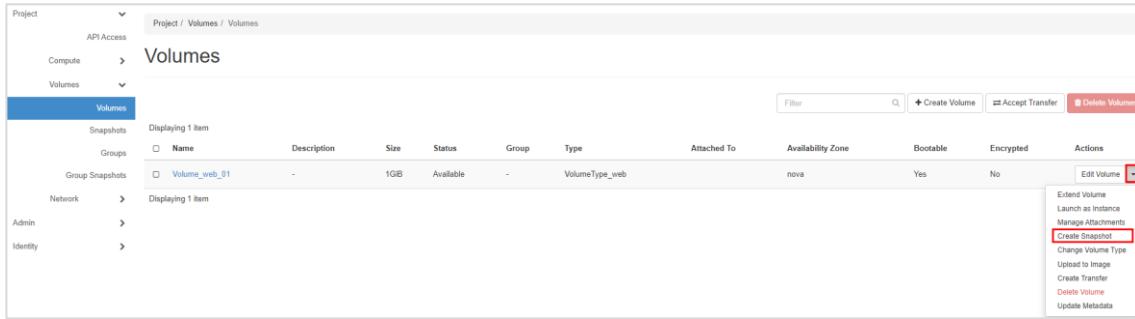


The screenshot shows the OpenStack Compute interface with the 'Images' tab selected. The table displays four items:

Owner	Name	Type	Status	Visibility	Protected	Disk Format	Size
admin	Fedora-Cloud-Base-30-1.x86_64	Image	Active	Public	No	QCOW2	427.50 MB
admin	Img_web	Image	Active	Public	No	QCOW2	15.55 MB
admin	Instance_Snap_web	Snapshot	Active	Private	No	QCOW2	37.38 MB
admin	Volume_Img_web	Image	Active	Shared	No	QCOW2	15.55 MB

6.2.2.4 Creating a Volume Snapshot

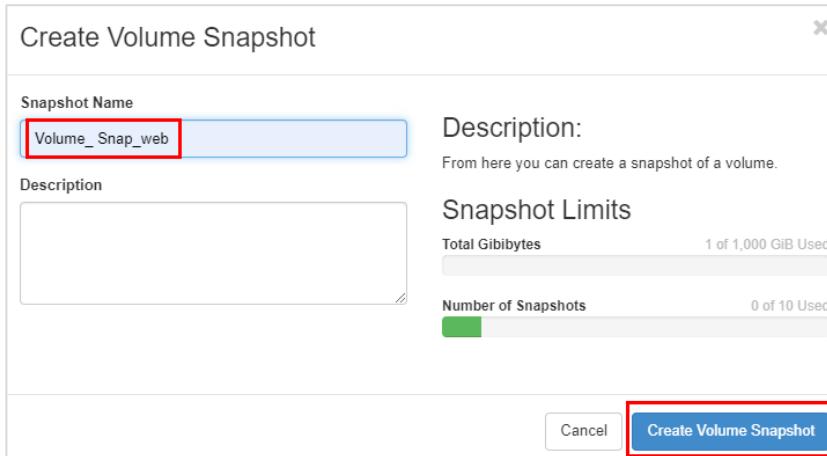
- Step 1** In the navigation pane, choose **Project > Volumes > Volumes**. The volume list is displayed. Click  in the **Actions** column of the row containing the target volume and select **Create Snapshot** from the drop-down list.



The screenshot shows the OpenStack Compute interface with the 'Volumes' tab selected. The table displays one item:

Name	Description	Size	Status	Group	Type	Attached To	Availability Zone	Bootable	Encrypted	Actions
Volume_web_01	-	1GB	Available	-	VolumeType_web	nova	Yes	No		Edit Volume Extend Volume Launch as Instance Manage Attachments Create Snapshot Change Volume Type Upload to Image Create Transfer Delete Volume Update Metadata

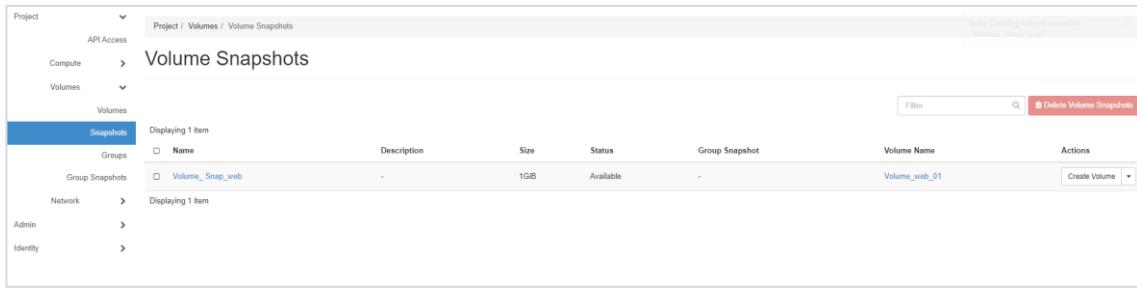
- Step 2** The **Create Volume Snapshot** dialog box is displayed. Enter the snapshot name, for example, **Volume_Snap_web**, and click **Create Volume Snapshot**.



The dialog box has the following fields:

- Snapshot Name:** Volume_Snap_web
- Description:** From here you can create a snapshot of a volume.
- Snapshot Limits:**
 - Total Gibibytes: 1 of 1,000 GiB Used
 - Number of Snapshots: 0 of 10 Used
- Buttons:** Cancel, Create Volume Snapshot

- Step 3** The volume snapshot list is displayed automatically, and the created volume snapshot is displayed.



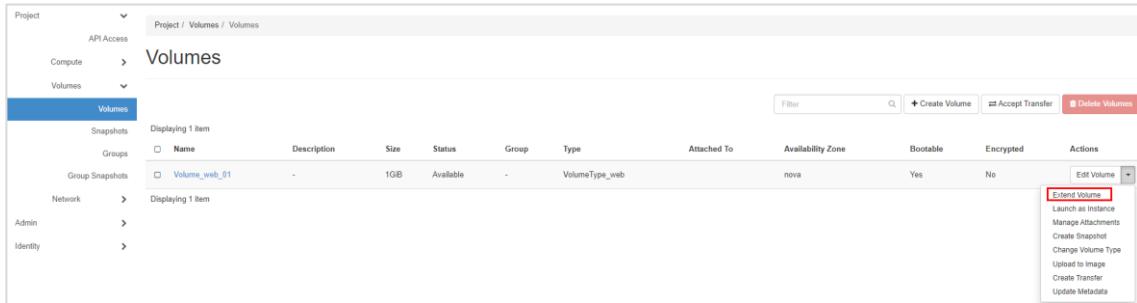
The screenshot shows the 'Volume Snapshots' page under the 'Volumes' section of the navigation pane. It displays a single item: 'Volume_Snap_web'. The table columns include Name, Description, Size, Status, Group Snapshot, Volume Name, and Actions. The 'Actions' column for this row contains a 'Create Volume' button.

Question and verification:

Can I create a snapshot for a volume that has been attached? If yes, what is the impact?

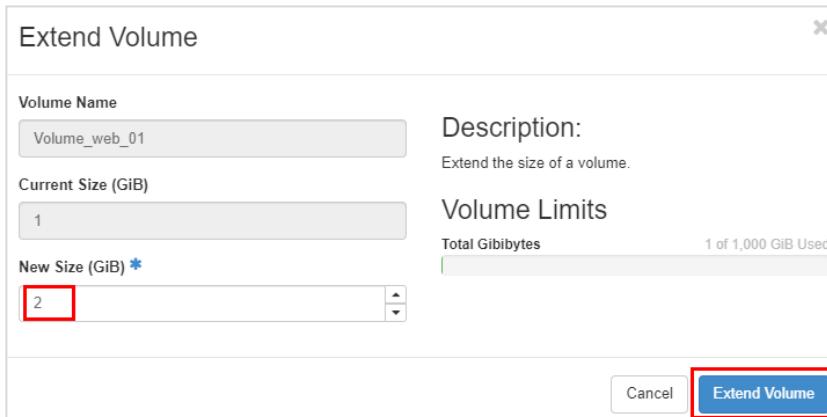
6.2.2.5 Extending a Volume

- Step 1** In the navigation pane, choose **Project > Volumes > Volumes**. The volume list is displayed. Click  in the **Actions** column of the row containing the target volume, and select **Extend Volume** from the drop-down list.



The screenshot shows the 'Volumes' page under the 'Volumes' section of the navigation pane. It displays a single item: 'Volume_web_01'. The table columns include Name, Description, Size, Status, Group, Type, Attached To, Availability Zone, Bootable, Encrypted, and Actions. The 'Actions' column for this row contains a 'Extend Volume' button, which is highlighted with a red box.

- Step 2** In the displayed **Extend Volume** dialog box, select **2** under **New Size (GiB)**, and click **Extend Volume**.



The screenshot shows the 'Extend Volume' dialog box. It includes fields for 'Volume Name' (Volume_web_01), 'Current Size (GiB)' (1), 'New Size (GiB)' (2), and a 'Description' text area with the placeholder 'Extend the size of a volume.' Below these are 'Volume Limits' showing 'Total Gibibytes' (1 of 1,000 GiB Used). At the bottom are 'Cancel' and 'Extend Volume' buttons, with 'Extend Volume' highlighted by a red box.

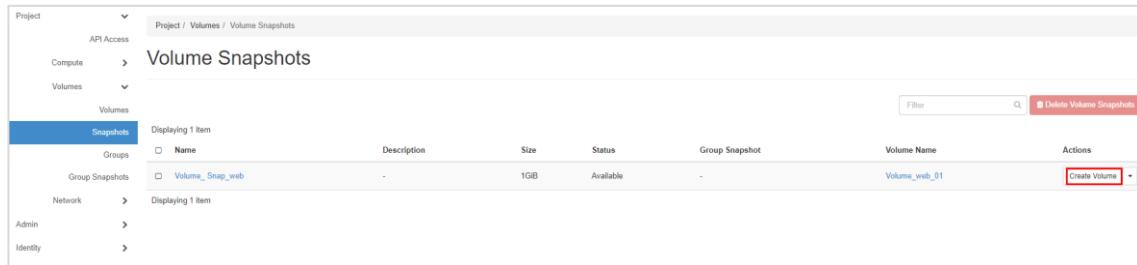
- Step 3** Return to the volume list and view the volume size after the capacity expansion.



The screenshot shows the 'Volumes' page under the 'Volumes' section of the navigation pane. It displays a single item: 'Volume_web_01'. The table columns include Name, Description, Size, Status, Group, Type, Attached To, Availability Zone, Bootable, Encrypted, and Actions. The 'Size' column for this row is highlighted with a red box and shows the value '2GiB'.

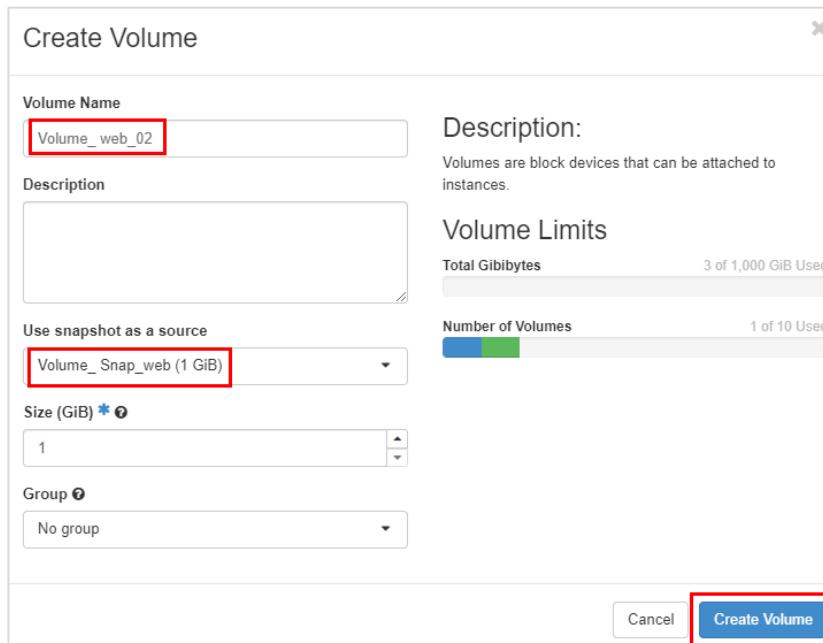
6.2.2.6 Creating a Volume Based on a Volume Snapshot

- Step 1** In the navigation pane, choose **Project > Volumes > Snapshots**. The volume snapshot list is displayed. Click **Create Volume** in the **Actions** column of the row containing the target volume.



Name	Description	Size	Status	Group Snapshot	Volume Name	Actions
Volume_Snap_web	-	1GB	Available	-	Volume_web_01	Create Volume

- Step 2** In the displayed **Create Volume** dialog box, enter the volume name **Volume_web_02**. **Volume_Snap_web** is automatically selected for **Use snapshot as a source**. Click **Create Volume**.



Volume Name: Volume_web_02

Description: Volumes are block devices that can be attached to instances.

Volume Limits:

- Total Gibibytes: 3 of 1,000 GiB Used
- Number of Volumes: 1 of 10 Used

Use snapshot as a source: Volume_Snap_web (1 GiB)

Size (GiB): 1

Group: No group

Create Volume

- Step 3** The volume list is displayed, and the volume newly created is displayed.

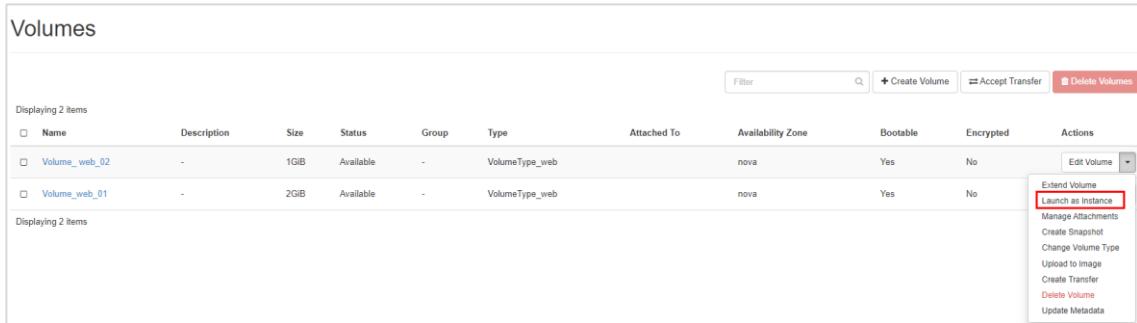


Name	Description	Size	Status	Group	Type	Attached To	Availability Zone	Bootable	Encrypted	Actions
Volume_web_02	-	1GiB	Available	-	VolumeType_web	-	nova	Yes	No	Edit Volume
Volume_web_01	-	2GiB	Available	-	VolumeType_web	-	nova	Yes	No	Edit Volume

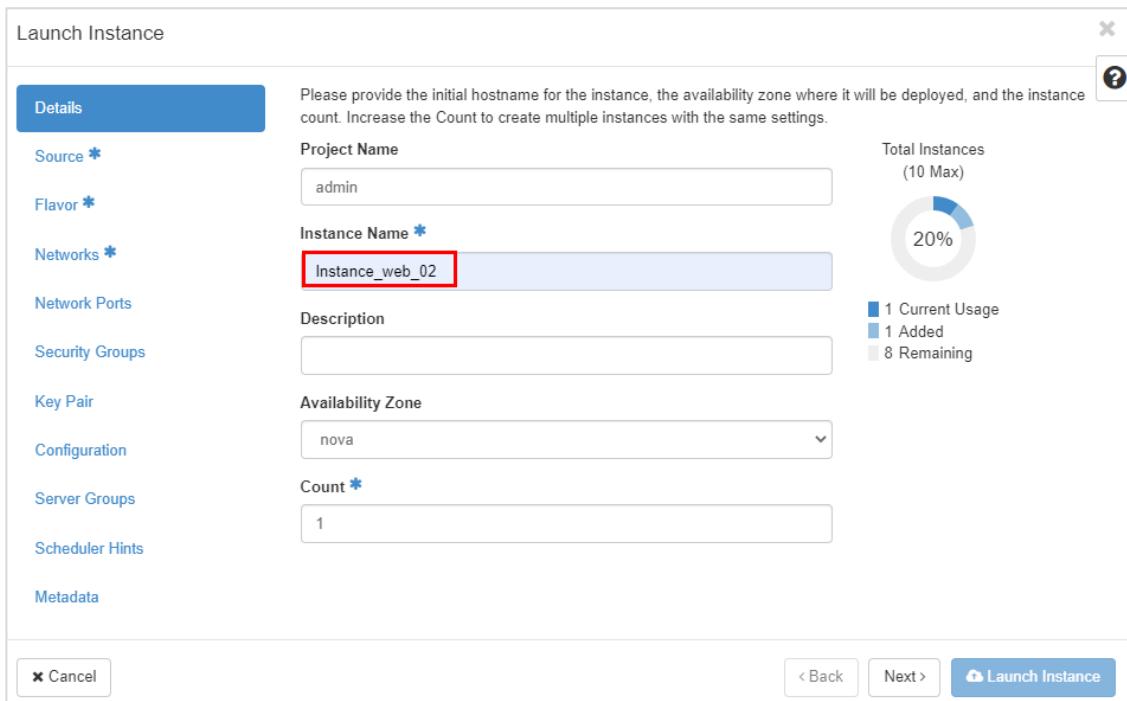
The newly created volume **Volume_web_02** is resumed to the status when the snapshot of the **Volume_web_01** volume was created.

6.2.2.7 Provisioning a Server Instance Based on a Volume

Step 1 Click ▾ in the **Actions** column of the row containing the target volume, and select **Launch as Instance** from the drop-down list.



Step 2 In the displayed **Launch Instance** dialog box, click the **Details** tab. On the **Details** tab page, specify **Instance Name** to **Instance_web_02**. Retain the default values for other parameters. Click **Next**.



Step 3 On the **Source** tab page, select **Volume** for **Select Boot Source**, select **Volume_web_02** in the list under the **Available** area, and click **Next**.

Launch Instance

Source	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.
Flavor *	Select Boot Source Volume Delete Volume on Instance Delete Yes No
Networks *	Allocated Displaying 1 item
Security Groups	Name Description Size Type Availability Zone
Key Pair	Volume_web_02 - 1 GB QCOW2 nova
Configuration	Displaying 1 item
Server Groups	Available 1 Select one
Scheduler Hints	Click here for filters or full text search.
Metadata	Displaying 1 item
	Name Description Size Type Availability Zone
	Volume_web_01 - 2 GB QCOW2 nova
	Displaying 1 item

Cancel **Next >** **Launch Instance**

Step 4 On the **Flavor** tab page, click  next to **Flavor_web_test** in the **Available** list. The selected flavor is displayed in the **Allocated** list. Click **Next**.

Launch Instance

Flavor	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
Available 15	Flavor_web_test 1 128 MB 1 GB 1 GB 0 GB Yes
Networks *	Available 15 Select one
Network Ports	Expand to see available items
Security Groups	
Key Pair	
Configuration	
Server Groups	
Scheduler Hints	
Metadata	

Cancel **Next >** **Launch Instance**

Step 5 Click the **Networks** tab. In the **Available** list, click  next to **Shared**. The selected flavor is displayed in the **Allocated** list. Click **Launch Instance**.

Launch Instance

Details					
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	
shared	shared-subnet	Yes	Up	Active	
Available 1 Select at least one network					
<input type="text"/> Click here for filters or full text search.					
Network	Subnets Associated	Shared	Admin State	Status	
public	ipv6-public-subnet public-subnet	No	Up	Active	

Step 6 Return to the volume list and view the volume status and attachment status.

Project / Volumes / Volumes

Volumes

Name	Description	Size	Status	Group	Type	Attached To	Availability Zone	Bootable	Encrypted	Actions
Volume_web_02	-	1GB	Reserved	-	VolumeType_web		nova	Yes	No	<input type="button" value="Update Metadata"/>
Volume_web_01	-	2GB	Available	-	VolumeType_web		nova	Yes	No	<input type="button" value="Edit Volume"/>

Displaying 2 items

Volumes

Name	Description	Size	Status	Group	Type	Attached To	Availability Zone	Bootable	Encrypted	Actions
Volume_web_02	-	1GB	In-use	-	VolumeType_web	/dev/vda on instance_web_02	nova	Yes	No	<input type="button" value="Edit Volume"/>
Volume_web_01	-	2GB	Available	-	VolumeType_web		nova	Yes	No	<input type="button" value="Edit Volume"/>

Displaying 2 items

Step 7 In the navigation pane, choose Project > Compute > Instances. The instance list is displayed. View the created instance.

Project / Compute / Instances

Instances

Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_02	Img_web	192.168.233.57	Flavor_web_test	KeyPair_web	Active	nova	None	Running	14 minutes	<input type="button" value="Create Snapshot"/>
Instance_web_01	Img_web	192.168.233.163	Flavor_web_test	KeyPair_web	Active	nova	None	Running	1 hour, 4 minutes	<input type="button" value="Create Snapshot"/>

Question:

Can all volumes in the **Available** status be used to provision server instances?

Step 8 In the navigation pane, choose **Project > Volumes > Volumes**. The volume list is displayed. Click **Edit Volume** in the **Actions** column of the row containing the target volume.

Volumes											
Filter <input type="text"/> + Create Volume Accept Transfer Delete Volumes											
Name	Description	Size	Status	Group	Type	Attached To	Availability Zone	Bootable	Encrypted	Actions	
Volume_web_02	-	1GiB	In-use	-	VolumeType_web	/dev/vda on Instance_web_02	nova	Yes	No	Edit Volume	
Volume_web_01	-	2GiB	Available	-	VolumeType_web		nova	Yes	No	Edit Volume	

Step 9 In the displayed **Edit Volume** dialog box, deselect **Bootable** and click **Submit**.

Edit Volume

Volume Name: Volume_web_01

Description:

The "Bootable" flag specifies that this volume can be used to launch an instance

Bootable Submit

Step 10 Return to the volume list and view the volume changes. Click ⋮ in the **Actions** column of the row containing the target volume to view the operations supported.

Volumes											
Filter <input type="text"/> + Create Volume Accept Transfer Delete Volumes											
Name	Description	Size	Status	Group	Type	Attached To	Availability Zone	Bootable	Encrypted	Actions	
Volume_web_02	-	1GiB	In-use	-	VolumeType_web	/dev/vda on Instance_web_02	nova	Yes	No	Edit Volume	
Volume_web_01	-	2GiB	Available	-	VolumeType_web		nova	No	No	Edit Volume	

Displaying 2 items

⋮

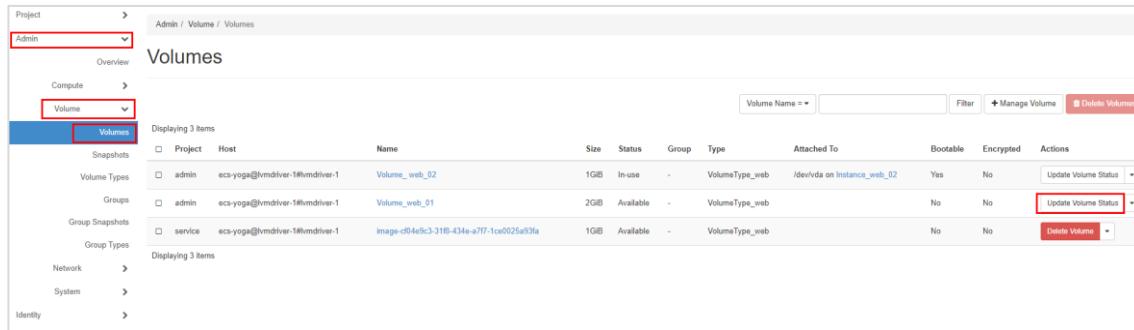
Extend Volume
Manage Attachments
Create Snapshot
Change Volume Type
Upload to Image
Create Transfer
Update Metadata

Conclusion:

If a volume is not a boot volume, it cannot be used to provision server instances.

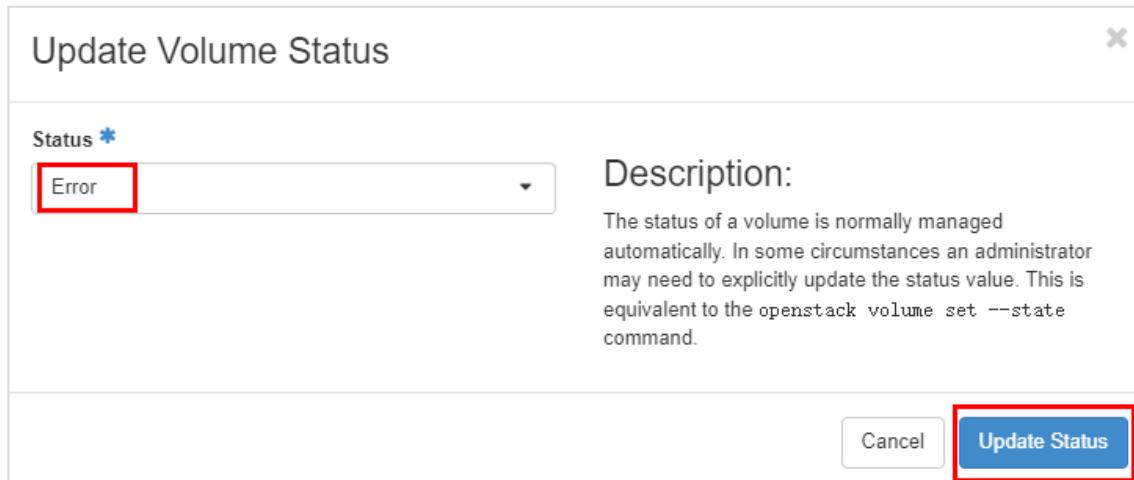
6.2.2.8 Updating the Volume Status

Step 1 In the navigation pane, choose **Admin > Volumes > Volumes**. The volume list is displayed. Click **Update Volume Status** in the **Actions** column of the row containing the target volume.



Project	Host	Name	Size	Status	Group	Type	Attached To	Bootable	Encrypted	Actions
admin	ecs-yoga@lvmdriver-1#lvmdriver-1	Volume_web_02	1GB	In-use	-	VolumeType_web	/dev/vda on Instance_web_02	Yes	No	<button>Update Volume Status</button>
admin	ecs-yoga@lvmdriver-1#lvmdriver-1	Volume_web_01	2GB	Available	-	VolumeType_web		No	No	<button>Update Volume Status</button>
service	ecs-yoga@lvmdriver-1#lvmdriver-1	image-cf04e9c3-31b-434e-a77-1ca0025a93fa	1GB	Available	-	VolumeType_web		No	No	<button>Delete Volume</button>

Step 2 The **Update Volume Status** dialog box is displayed. Select **Error** for **Status** and click **Update Status**.



Status *

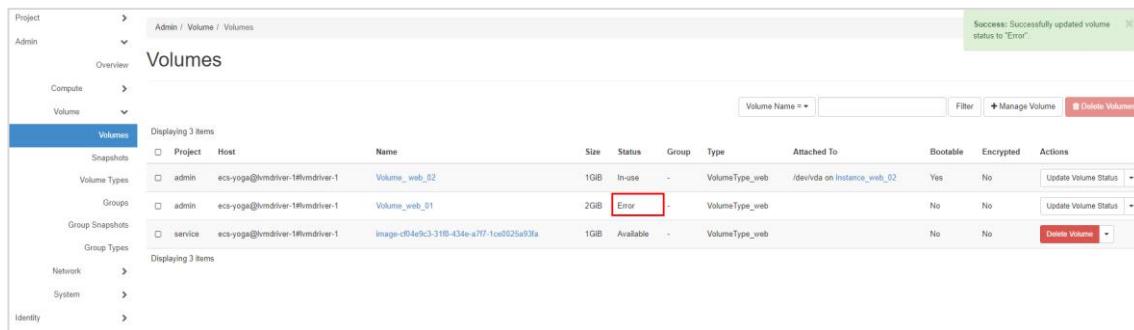
Error

Description:

The status of a volume is normally managed automatically. In some circumstances an administrator may need to explicitly update the status value. This is equivalent to the openstack volume set --state command.

Cancel Update Status

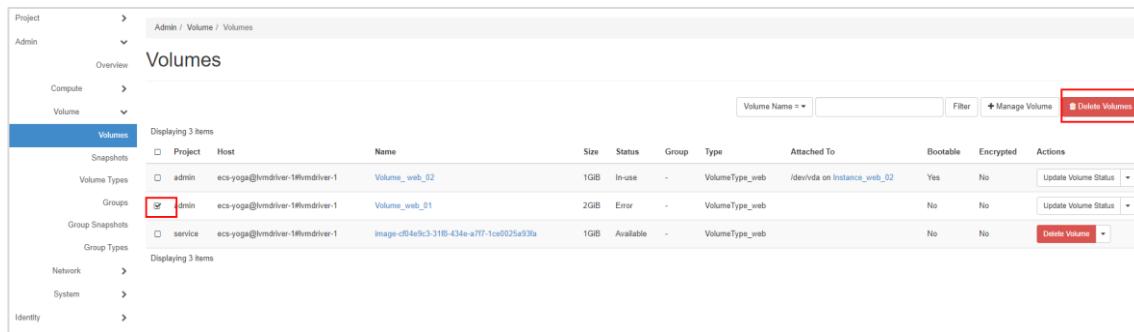
Step 3 Return to the volume list and view the volume status.



Project	Host	Name	Size	Status	Group	Type	Attached To	Bootable	Encrypted	Actions
admin	ecs-yoga@lvmdriver-1#lvmdriver-1	Volume_web_02	1GB	In-use	-	VolumeType_web	/dev/vda on Instance_web_02	Yes	No	<button>Update Volume Status</button>
admin	ecs-yoga@lvmdriver-1#lvmdriver-1	Volume_web_01	2GB	Error	-	VolumeType_web		No	No	<button>Update Volume Status</button>
service	ecs-yoga@lvmdriver-1#lvmdriver-1	image-cf04e9c3-31b-434e-a77-1ca0025a93fa	1GB	Available	-	VolumeType_web		No	No	<button>Delete Volume</button>

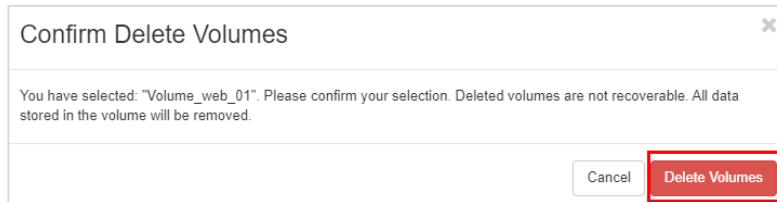
6.2.2.9 Deleting a Volume

Step 1 In the navigation pane, choose **Admin > Volumes > Volumes**. The volume list is displayed. Select the volume to be deleted and click **Delete Volumes**.



Project	Host	Name	Size	Status	Group	Type	Attached To	Bootable	Encrypted	Actions
admin	ecs-yoga@lvmdriver-1#lvmdriver-1	Volume_web_02	1GiB	In-use	-	VolumeType_web	/dev/vda on Instance_web_02	Yes	No	<button>Update Volume Status</button>
admin	ecs-yoga@lvmdriver-1#lvmdriver-1	Volume_web_01	2GiB	Error	-	VolumeType_web		No	No	<button>Update Volume Status</button>
service	ecs-yoga@lvmdriver-1#lvmdriver-1	image-cf04e9c3-31ff-434e-a7f7-1ca0025e93fa	1GiB	Available	-	VolumeType_web		No	No	<button>Delete Volume</button>

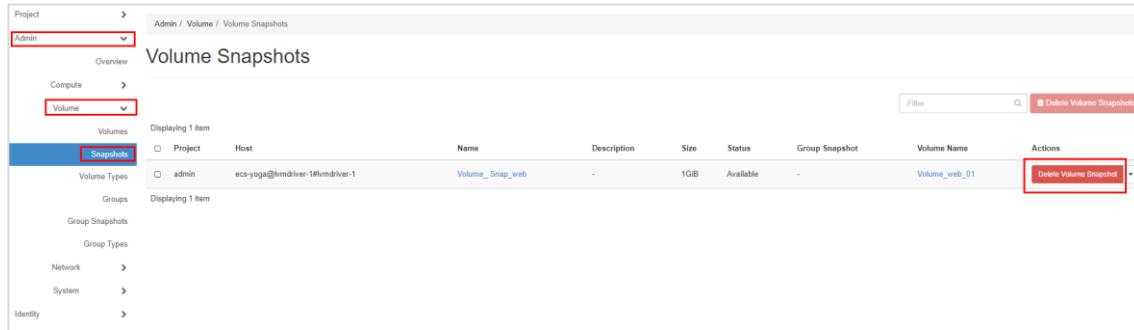
Step 2 In the displayed **Confirm Delete Volumes** dialog box, click **Delete Volumes**.



Step 3 The following message is displayed, indicating that the volume cannot be deleted.

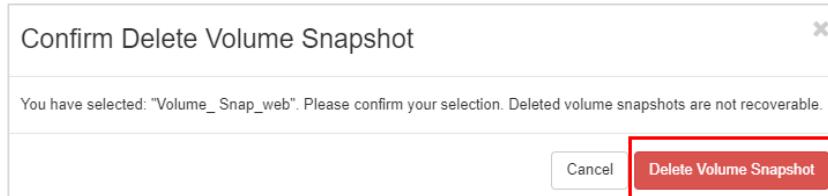


Step 4 Choose **Admin > Volumes > Snapshots**. The volume snapshot list is displayed. Click **Delete Volume Snapshot** in the **Actions** column of the row containing the **Volume_web_01** snapshot.

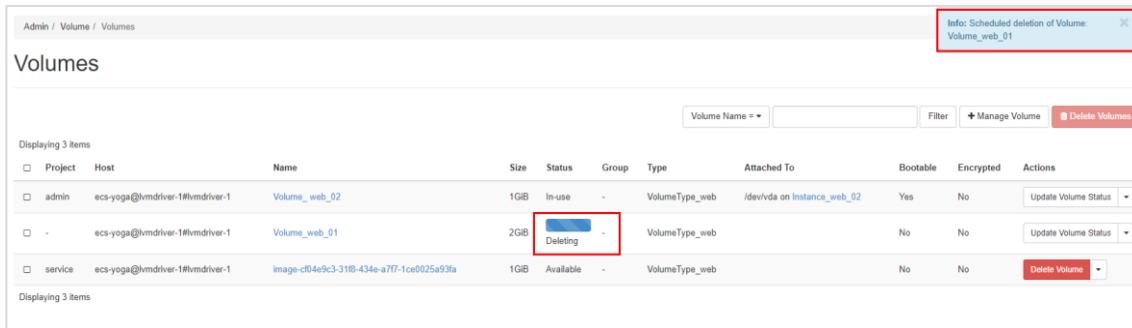


Project	Host	Name	Description	Size	Status	Group Snapshot	Volume Name	Actions
admin	ecs-yoga@lvmdriver-1#lvmdriver-1	Volume_Snap_web	-	1GiB	Available	-	Volume_web_01	<button>Delete Volume Snapshot</button>

Step 5 In the displayed **Confirm Delete Volume Snapshot** dialog box, click **Delete Volume Snapshot**.



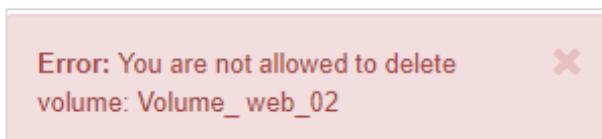
Step 6 Delete the **Volume_web_01** volume again by repeating steps 1 to 2 and check whether the deletion is successful.



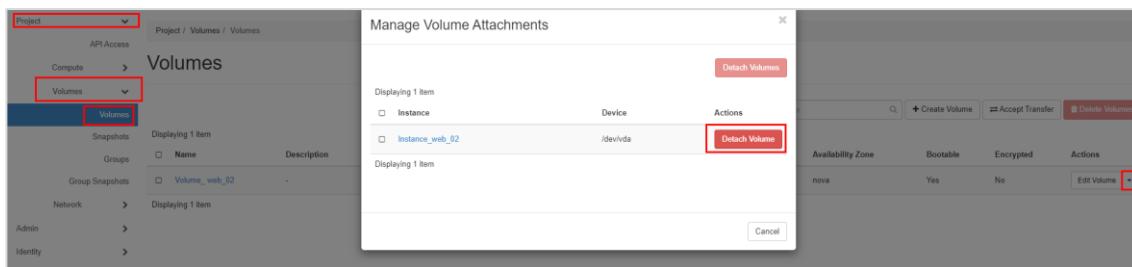
Project	Host	Name	Size	Status	Group	Type	Attached To	Bootable	Encrypted	Actions
admin	ecs-yoga@lvmdriver-1#lvmdriver-1	Volume_web_02	1GB	In-use	-	VolumeType_web	/dev/vda on Instance_web_02	Yes	No	<button>Update Volume Status</button>
-	ecs-yoga@lvmdriver-1#lvmdriver-1	Volume_web_01	2GB	Deleting	-	VolumeType_web		No	No	<button>Update Volume Status</button>
service	ecs-yoga@lvmdriver-1#lvmdriver-1	image-cf04e9c3-3118-434e-a7f7-1ce0025a93fa	1GB	Available	-	VolumeType_web		No	No	<button>Delete Volume</button>

Step 7 Delete the **Volume_web_02** volume by repeating steps 1 to 2 and check whether the deletion is successful.

Step 8 The following message is displayed, indicating that the volume cannot be deleted.



Step 9 Detach the **Volume_web_02** volume by following the instructions provided in 6.2.2.2 and check whether the operation is successful.



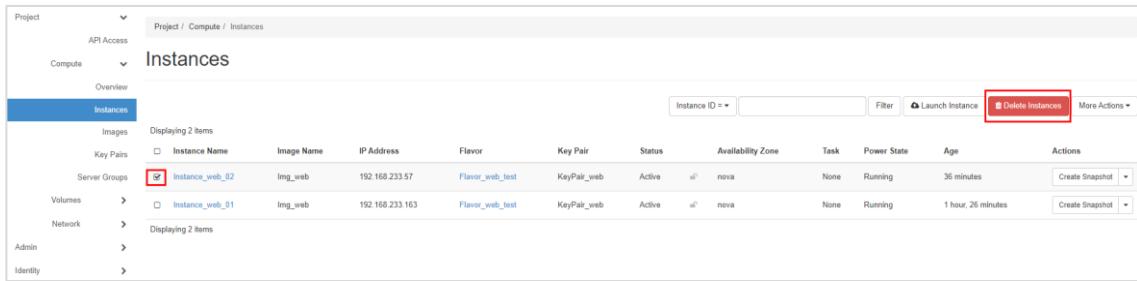
Step 10 The following message is displayed, indicating that the volume cannot be detached.



Question:

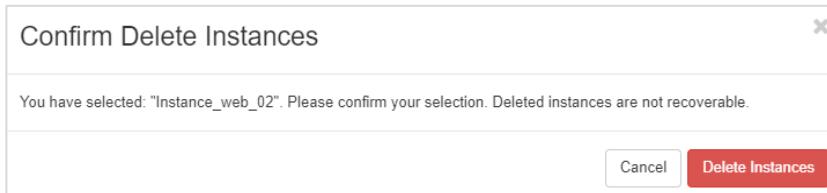
1. Think about the scenarios in which volumes cannot be detached and deleted based on the preceding verification results.
2. What can I do to delete the **Volume_web_02** volume?

Step 11 In the navigation pane, choose **Project > Compute > Instances**. The instance list is displayed. Select **Instance_web_02** and click **Delete Instances**.

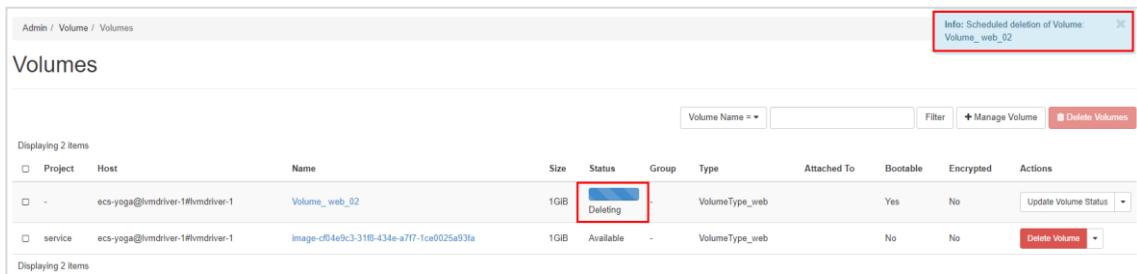


The screenshot shows the OpenStack Compute Instances page. On the left, there's a sidebar with 'Project', 'API Access', 'Compute' (selected), 'Overview', 'Instances' (selected), 'Images', 'Key Pairs', 'Server Groups', 'Volumes' (with 'Instance_web_02' listed), 'Network', 'Admin', and 'Identity'. The main area displays two instances: 'Instance_web_02' (IP: 192.168.233.57) and 'Instance_web_01' (IP: 192.168.233.163). At the top right, there are buttons for 'Delete Instances' (highlighted with a red box), 'Launch Instance', 'Filter', and 'More Actions'. Below the instances, there are sections for 'Displaying 2 items' and 'Actions'.

Step 12 In the displayed **Confirm Delete Instances** dialog box, click **Delete Instances**.



Step 13 Delete the **Volume_web_02** volume again by repeating steps 1 to 2 and check whether the deletion is successful.



The screenshot shows the OpenStack Admin Volumes page. The top bar includes 'Admin / Volume / Volumes' and an 'Info: Scheduled deletion of Volume: Volume_web_02' message. The main area shows 'Volumes' with two items: 'Volume_web_02' (Size: 1GB, Status: Deleting, Group: VolumeType_web) and 'image-clf04e9c3-31fb-434e-a7f7-1ca0025a93fa' (Size: 1GB, Status: Available, Group: -). There are buttons for 'Manage Volume' and 'Delete Volumes' at the top right.

6.3 Operations on OpenStack CLI

6.3.1 Managing a Volume Types and QoS

Step 1 Remotely log in to the ECS. Run the following command to import the environment variables of the **admin** user:

```
su - stack
cd devstack
.admin-openrc.sh
```

```
root@ecs-yoga:~# su - stack
stack@ecs-yoga:~$ cd devstack/
stack@ecs-yoga:~/devstack$ . admin-openrc.sh
```

Step 2 Run the following command to create the **public VolumeType_cli** volume type:

```
openstack volume type create --public VolumeType_cli
```

```
stack@ecs-yoga:~/devstack$ openstack volume type create --public VolumeType_cli
+-----+-----+
| Field | Value |
+-----+-----+
| description | None |
| id | 2fba8327-fa68-435a-a503-561d88da5d4e |
| is_public | True |
| name | VolumeType_cli |
+-----+-----+
```

Step 3 Run the following command to view the volume type list:

```
openstack volume type list
```

```
stack@ecs-yoga:~/devstack$ openstack volume type list
+-----+-----+-----+
| ID | Name | Is Public |
+-----+-----+-----+
| 2fba8327-fa68-435a-a503-561d88da5d4e | VolumeType_cli | True |
| 5bfbe5a9-89de-4d7b-9dec-86af6b5a37d8 | VolumeType_web | True |
| 405e349c-e8c4-417d-9447-66fdd3478a70 | lvmdriver-1 | True |
| 86f42c8b-4391-42af-a7f6-b8a09aa3faa9 | __DEFAULT__ | True |
+-----+-----+-----+
```

Step 4 Run the following command to create the **back-end QoS_cli** volume QoS:

```
openstack volume qos create --consume back-end QoS_cli
```

```
stack@ecs-yoga:~/devstack$ openstack volume qos create --consume back-end QoS_cli
+-----+-----+
| Field | Value |
+-----+-----+
| consumer | back-end |
| id | 978958c7-8eee-4532-ab7f-df26dd4cbe8d |
| name | QoS_cli |
| properties | |
+-----+-----+
```

Step 5 Run the following command to check the volume qos list:

```
openstack volume qos list
```

```
stack@ecs-yoga:~/devstack$ openstack volume qos list
+-----+-----+-----+-----+
| ID | Name | Consumer | Associations | Properties |
+-----+-----+-----+-----+
| 978958c7-8eee-4532-ab7f-df26dd4cbe8d | QoS_cli | back-end | | |
| 7987d40f-f0c7-4291-87bf-dc4afb1df6df | QoS_web | back-end | VolumeType_web | |
+-----+-----+-----+-----+
```

Step 6 Run the following command to allocate the **QoS_cli** volume QoS to the **VolumeType_cli** volume type:

```
openstack volume qos associate QoS_cli VolumeType_cli
```

```
stack@ecs-yoga:~/devstack$ openstack volume qos associate QoS_cli VolumeType_cli
stack@ecs-yoga:~/devstack$ 
```

- Step 7 Run the following command to check the volume type allocated by the volume QoS:

```
openstack volume qos show QoS_cli
```

```
stack@ecs-yoga:~/devstack$ openstack volume qos show QoS_cli
+-----+-----+
| Field      | Value
+-----+-----+
| associations | VolumeType_cli
| consumer     | back-end
| id           | 978958c7-8eee-4532-ab7f-df26dd4cbe8d
| name         | QoS_cli
| properties   |
+-----+-----+
```

6.3.2 Managing Volumes

6.3.2.1 Creating a Volume

- Step 1 Run the following command to create the **Volume_cli_01** volume with the requirements configured as follows:

- Volume name: **Volume_web_01**
- Volume source: **Img_cli**.
- Volume type: **VolumeType_web**
- Size: **1** GB.
- Availability zone: **nova**
- Enter **bootable** to start the volume.

```
openstack volume create --image Img_cli --type VolumeType_cli --size 1 --availability-zone nova --bootable Volume_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack volume create --image Img_cli --type VolumeType_cli --size 1 --availability-zone nova --bootable Volume_cli_01
+-----+-----+
| Field      | Value
+-----+-----+
| attachments | []
| availability_zone | nova
| bootable    | false
| consistencygroup_id | None
| created_at  | 2020-07-16T16:59:45Z
| description | None
| encrypted   | False
| id          | a800073c-a0ac-4146-a9bc-7d545c6a1384
| migration_status | None
| multiattach | False
| name        | Volume_cli_01
| properties  | None
| replication_status | None
| size        | 1
| snapshot_id | None
| source_volid | None
| status       | creating
| type        | VolumeType_cli
| updated_at  | None
| user_id     | df6bc530f73e4ea3b56b2e6cc0cf251f
+-----+-----+
```

- Step 2 Run the following command to check the volume list:

```
openstack volume list
```

```
stack@ecs-yoga:~/devstack$ openstack volume list
+-----+-----+-----+-----+
| ID | Name | Status | Size | Attached to |
+-----+-----+-----+-----+
| a806073c-a0ac-4146-a9bc-7d545c6a1384 | Volume_cli_01 | available | 1 | |
+-----+-----+-----+-----+
```

6.3.2.2 Attaching and Detaching a Volume

- Step 1** Provision the **Instance_cli_01** server instance by following the instructions provided in 5.3.4.1.

```
stack@ecs-yoga:~/devstack$ openstack server create --availability-zone nova --image Img_cli --flavor Flavor_cli --network shared --key-name KeyPair_cli --hint group=9f1753c2-5d81-4bb4-9db8-fbd60fb51fdd Instance_cli_01
+-----+-----+
| Field | Value |
+-----+-----+
| OS-DCF:diskConfig | MANUAL |
| OS-EXT-AZ:availability_zone | nova |
| OS-EXT-SRV-ATTR:host | None |
| OS-EXT-SRV-ATTR:hypervisor_hostname | None |
| OS-EXT-SRV-ATTR:instance_name | |
| OS-EXT-STS:power_state | NOSTATE |
| OS-EXT-STS:task_state | scheduling |
| OS-EXT-STS:vm_state | building |
| OS-SRV-USG:launched_at | None |
| OS-SRV-USG:terminated_at | None |
| accessIPv4 | |
| accessIPv6 | |
| addresses | |
| adminPass | yVTYTP5CN7uM |
| config_drive | |
| created | 2023-04-23T23:04Z |
| flavor | Flavor_cli (d52b0f6e-ab2c-4b3e-97b0-52991dcde324) |
| hostId | |
| id | 7f78a676-9013-4cbe-9e44-c01c08535a9a |
| image | Img_cli (4b9b23e7-17bf-487d-b308-e969d9173e6b) |
| key_name | KeyPair_cli |
| name | Instance_cli_01 |
| progress | 0 |
| project_id | 243072681e504e67be431e0df8c6fd7f |
| properties | |
| security_groups | name='default' |
| status | BUILD |
| updated | 2023-04-23T23:04Z |
| user_id | df6bc350f73e4ea3b56b2e6cc0cf251f |
| volumes_attached | |
+-----+-----+
```

- Step 2** Run the following command to attach the **Volume_cli_01** volume to the **Instance_cli_01** server instance:

```
openstack server add volume Instance_cli_01 Volume_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack server add volume Instance_cli_01 Volume_cli_01
+-----+-----+
| Field | Value |
+-----+-----+
| ID | a806073c-a0ac-4146-a9bc-7d545c6a1384 |
| Server ID | 7f78a676-9013-4cbe-9e44-c01c08535a9a |
| Volume ID | a806073c-a0ac-4146-a9bc-7d545c6a1384 |
| Device | /dev/vdb |
| Tag | None |
| Delete On Termination | False |
+-----+-----+
```

- Step 3** Run the following command to check the volume attachment status:

```
openstack volume list
```

```
stack@ecs-yoga:~/devstack$ openstack volume list
+-----+-----+-----+-----+
| ID | Name | Status | Size | Attached to |
+-----+-----+-----+-----+
| a806073c-a0ac-4146-a9bc-7d545c6a1384 | Volume_cli_01 | in-use | 1 | Attached to Instance_cli_01 on /dev/vdb |
+-----+-----+-----+-----+
```

- Step 4 Run the following command to detach the **Volume_cli_01** volume from the **Instance_cli_01** server instance:

```
openstack server remove volume Instance_cli_01 Volume_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack server remove volume Instance_cli_01 Volume_cli_01
stack@ecs-yoga:~/devstack$
```

- Step 5 Check the volume attachment status by repeating step 3.

```
openstack volume list
```

```
stack@ecs-yoga:~/devstack$ openstack volume list
+---+-----+-----+-----+-----+
| ID           | Name      | Status    | Size | Attached to |
+---+-----+-----+-----+-----+
| a806073c-a0ac-4146-a9bc-7d545c6a1384 | Volume_cli_01 | available | 1   |               |
+---+-----+-----+-----+-----+
```

6.3.2.3 Uploading a Volume to an Image

- Step 1 Run the following command to upload the **Volume_cli_01** volume to the **Volume_Img_cli** image in the **qcow2** format:

```
openstack image create --volume Volume_cli_01 --disk-format qcow2 Volume_Img_cli
```

```
+-----+-----+
| Field          | Value        |
+-----+-----+
| container_format | bare         |
| disk_format     | qcow2       |
| display_description | None        |
| id              | fb619edd-b5e0-4bf0-a71d-3022a6ea1931 |
| image_id        | bb9878ed-f859-4e0a-ac72-8b36ea8c6325 |
| image_name      | Volume_Img_cli |
| protected       | False        |
| size            | 1            |
| status          | uploading    |
| updated_at      | 2019-07-23T10:30:00Z |
| visibility      | shared       |
| volume_type     | VolumeType_cli |
+-----+-----+
```

- Step 2 Run the following command to check the image newly created:

```
openstack image list
```

openstack image list		
ID	Name	Status
d6af2d55-ee54-4aea-abc8-1a8b91544554	Fedora-Cloud-Base-36-1.5.x86_64	active
71feb34d-a92a-4ff0-9c31-3989d2b5e562	Img_cli	active
73788247-4ed1-4c5c-a724-f1187c662b5a	Img_web	active
10e719c2-af9f-46c1-913a-85580ea6733b	Instance_Snap_cli	active
7a6d7895-0ed4-4588-b41a-716cc9739413	Instance_Snap_web	active
b3c8a0c4-f2b1-4716-b863-26f2cbbffaf8	Volume_Img_cli	active
d6615e8e-b51d-4417-b382-dc48de522d90	Volume_Img_web	active
4ba57258-c4a4-4bf8-ae53-143d24135dad	cirros-0.5.2-x86_64-disk	active

6.3.2.4 Creating a Volume Snapshot

Step 1 Run the following command to create the **Volume_Snap_cli** snapshot for the **Volume_cli_01** volume:

```
openstack volume snapshot create --volume Volume_cli_01 Volume_Snap_cli
```

openstack volume snapshot create --volume Volume_cli_01 Volume_Snap_cli	
Field	Value
created_at	2019-06-21T19:21:21.980Z
description	None
id	640c4329-b6e9-47d5-a0d0-c01927c760bb
name	Volume_Snap_cli
properties	
size	1
status	creating
updated_at	None
volume_id	a806073c-a0ac-4146-a9bc-7d545c6a1384

Step 2 Run the following command to check the volume snapshot newly created:

```
openstack volume snapshot list
```

openstack volume snapshot list				
ID	Name	Description	Status	Size
640c4329-b6e9-47d5-a0d0-c01927c760bb	Volume_Snap_cli	None	available	1

Question:

Can snapshots be created for attached volumes? If yes, which command should be executed?

6.3.2.5 Extending a Volume

Step 1 Run the following command to expand the **Volume_cli_01** volume to 2 GB:

```
openstack volume set --size 2 Volume_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack volume set --size 2 Volume_cli_01
stack@ecs-yoga:~/devstack$
```

Step 2 Run the following command to check the volume newly added:

```
openstack volume show Volume_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack volume show Volume_cli_01
+-----+-----+
| Field          | Value
+-----+-----+
| attachments    | []
| availability_zone | nova
| bootable        | true
| consistencygroup_id | None
| created_at      | 2016-07-16T16:59:00Z
| description      | None
| encrypted        | False
| id              | a806073c-a0ac-4146-a9bc-7d545c6a1384
| migration_status | None
| multiattach      | False
| name            | Volume_cli_01
| os-vol-host-attr:host | ecs-yoga@lvmdriver-1#lvmdriver-1
| os-vol-mig-status-attr:migstat | None
| os-vol-mig-status-attr:name_id | None
```

```
| os-vol-mig-status-attr:migstat | None
| os-vol-mig-status-attr:name_id | None
| os-vol-tenant-attr:tenant_id | 243072681e504e67be431e0df8c6fd7f
| properties |
| replication_status | None
| size | 2
| snapshot_id | None
| source_volid | None
| status | available
| type | VolumeType_cli
```

6.3.2.6 Creating a Volume Based on a Volume Snapshot

- Step 1 Run the following command to create the **Volume_cli_02** volume based on the **Volume_Snap_cli** volume snapshot:

```
openstack volume create --snapshot Volume_Snap_cli Volume_cli_02
```

```
stack@decs-yoga:~/devstack$ openstack volume create --snapshot Volume_Snap_cli Volume_cli_02
+-----+-----+
| Field | Value |
+-----+-----+
| attachments | []
| availability_zone | nova
| bootable | true
| consistencygroup_id | None
| created_at | 2016-01-04 14:46:797516
| description | None
| encrypted | False
| id | 482aabba-c7fc-4319-bfec-097cafab9f3c
| migration_status | None
| multiattach | False
| name | Volume_cli_02
| properties |
| replication_status | None
| size | 1
| snapshot_id | 640c4329-b6e9-47d5-a0d0-c01927c760bb
| source_volid | None
| status | creating
| type | VolumeType_cli
| updated_at | None
| user_id | df6bc330f73e4ea3b56b2e6cc0cf251f
+-----+-----+
```

- Step 2 Run the following command to check the volume newly created:

```
openstack volume list
```

```
stack@ecs-yoga:~/devstack$ openstack volume list
+---+-----+-----+-----+-----+
| ID | Name | Status | Size | Attached to |
+---+-----+-----+-----+-----+
| 482aabba-c7fc-4319-bfec-097cafab9f3c | Volume_cli_02 | available | 1 | |
| a806073c-a0ac-4146-a9bc-7d545c6a1384 | Volume_cli_01 | available | 2 | |
+---+-----+-----+-----+-----+
```

6.3.2.7 Provisioning a Server Instance Based on a Volume

- Step 1** Run the following command to provision the **Instance_cli_02** server instance based on the **Volume_cli_02** volume and set the **flavor** to **Flavor_cli**:

```
openstack server create --volume Volume_cli_02 --flavor Flavor_cli --network shared Instance_cli_02
```

```
stack@ecs-yoga:~/devstack$ openstack server create --volume Volume_cli_02 --flavor Flavor_cli --network shared Instance_cli_02
+-----+-----+
| Field | Value |
+-----+-----+
| OS-DCF:diskConfig | MANUAL |
| OS-EXT-AZ:availability_zone | None |
| OS-EXT-SRV-ATTR:host | None |
| OS-EXT-SRV-ATTR:hypervisor_hostname | None |
| OS-EXT-SIS:power_state | NOSTATE |
| OS-EXT-SIS:task_state | scheduling |
| OS-EXT-SIS:vm_state | building |
| OS-SRV-USO:launched_at | None |
| OS-SRV-USO:terminated_at | None |
| accessIPv4 | |
| accessIPv6 | |
| addresses | zmNSxtfIA5ob |
| adminPass | |
| config_drive | |
| created | 2018-07-10T10:18Z |
| flavor | Flavor_cli (d32b0f6e-ab2c-4b3e-97b0-52991dcde324) |
| hostId | |
| id | ad9d6f4e-cb8a-4200-9f0e-93d8aaaf6cc81 |
| image | N/A (booted from volume) |
| key_name | None |
| name | Instance_cli_02 |
| progress | 0 |
| project_id | 243072681e504e67be431e0df8c6fd7f |
| properties | name='default' |
| security_groups | BUILD |
| status | 2018-07-10T10:18Z |
| updated | df6bc530f73e4ea3b56b2e6cc0cf251f |
| user_id | |
| volumes_attached | |
```

- Step 2** Run the following command to check the server list:

```
openstack server list
```

```
stack@ecs-yoga:~/devstack$ openstack server list
+-----+-----+-----+-----+-----+
| ID | Name | Status | Networks | Image | Flavor |
+-----+-----+-----+-----+-----+
| ad9d6f4e-cb8a-4200-9f0e-93d8aaaf6cc81 | Instance_cli_02 | ACTIVE | shared=192.168.233.91 | N/A (booted from volume) | Flavor_cli |
| 7178a070-9a13-4c08-9e44-c01c08550a9d | Instance_cli_01 | ACTIVE | shared=192.168.233.70 | img_cti | Flavor_cli |
| 1fb76660-f277-489b-b68f-bb8cef8835 | Instance_web_01 | ACTIVE | shared=192.168.233.4 | img_web | Flavor_web_test |
+-----+-----+-----+-----+-----+
```

- Step 3** Run the following command to set the **Volume_cli_02** volume to **non-bootable**:

```
openstack volume set --non-bootable Volume_cli_02
```

```
stack@ecs-yoga:~/devstack$ openstack volume set --non-bootable Volume_cli_02
stack@ecs-yoga:~/devstack$
```

- Step 4** Provision the server instance again and check whether the server instance can be provisioned successfully.

```
openstack server create --volume Volume_cli_02 --flavor Flavor_cli Instance_cli_03
```

```
stack@ecs-yoga:~/devstack$ openstack server create --volume Volume_cli_02 --flavor Flavor cli Instance cli_03
Block Device 4b2aaabba-c7fc-4519-bfec-097cafab9f5c is not bootable. (HTTP 400) (Request-ID: req-53faa89f-c0d0-408c-837b-8f3badc521cb)
stack@ecs-yoga:~/devstack$
```

Conclusion:

If the volume is **non-bootable**, the volume cannot be used to provision server instances.

6.3.2.8 Updating the Volume Status

Step 1 Run the following command to check the **Volume_cli_01** volume status:

```
openstack volume list | grep Volume_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack volume list | grep Volume_cli_01
| a806073c-a0ac-4146-a9bc-7d545c6a1384 | Volume_cli_01 | available | 2 |
```

Step 2 Run the following command to update the **Volume_cli_01** volume status:

```
openstack volume set --state error Volume_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack volume set --state error Volume_cli_01
stack@ecs-yoga:~/devstack$
```

Step 3 Check the volume status by repeating step 1.

```
stack@ecs-yoga:~/devstack$ openstack volume list | grep Volume_cli_01
| a806073c-a0ac-4146-a9bc-7d545c6a1384 | Volume_cli_01 | error | 2 |
```

6.3.2.9 Deleting a Volume

Step 1 Run the following command to delete the **Volume_cli_01** volume:

```
openstack volume delete Volume_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack volume delete Volume_cli_01
Failed to delete volume with name or ID 'Volume_cli_01': Invalid volume: Volume status must be available or error or error_restoring or error_ex
tending or error_managing and must not be migrating, attached, belong to a group, have snapshots or be disassociated from snapshots after volume
transfer. (HTTP 400) (Request-ID: req-7f8ae0ac-f9de-4152-adfa-4915721b985)
1 of 1 volumes failed to delete.
```

The volume cannot be deleted. According to the cause as prompted, the **Volume_cli_01** volume contains the **Volume_Snap_cli** volume snapshot. You need to delete the volume snapshot before deleting the volume.

Step 2 Run the following command to delete the **Volume_Snap_cli** volume snapshot:

```
openstack volume snapshot delete Volume_Snap_cli
```

```
stack@ecs-yoga:~/devstack$ openstack volume snapshot delete Volume_Snap_cli
stack@ecs-yoga:~/devstack$
```

Step 3 Delete the volume again by repeating step 1 and check whether an error is reported.

```
stack@ecs-yoga:~/devstack$ openstack volume delete Volume_cli_01
stack@ecs-yoga:~/devstack$
```

Step 4 Run the following command to check the volume list:

```
openstack volume list
```

```
stack@ecs-yoga:~/devstack$ openstack volume list
+-----+-----+-----+-----+
| ID      | Name     | Status | Size | Attached to
+-----+-----+-----+-----+
| 482aabba-c7fc-4319-bfec-097cafab9f3c | Volume_cli_02 | in-use | 1 | Attached to Instance_cli_02 on /dev/vda |
+-----+-----+-----+-----+
```

- Step 5 Run the following command to delete the **Volume_cli_02** volume and check whether the deletion is successful:

```
openstack volume delete Volume_cli_02
```

```
stack@ecs-yoga:~/devstack$ openstack volume delete Volume_cli_02
Failed to delete volume with name or ID 'Volume cli 02': Invalid volume: Volume status must be available or error or error_restoring or error_ex
tending or error_managing and must not be migrating, attached, belong to a group, have snapshots or be disassociated from snapshots after volume
transfer. (HTTP 400) (Request-ID: req-fa42a818-2cbe-414f-a251-3b2efbb0b589a)
1 of 1 volumes failed to delete.
```

The volume cannot be deleted. According to the cause as prompted, the **Volume_cli_02** volume is in the **in-use** status. You need to detach the volume from the server instance and change the volume status to **available** before deleting the volume.

- Step 6 Run the following command to detach the **Volume_cli_02** volume from the **Instance_cli_02** server instance:

```
openstack server remove volume Instance_cli_02 Volume_cli_02
```

```
stack@ecs-yoga:~/devstack$ openstack server remove volume Instance_cli_02 Volume_cli_02
BadRequestException: 400: Client Error for url: http://172.16.0.108/compute/v2.1/servers/ad9d6f4e-cb8a-4200-9f0e-93d6aaaf6cc81/os-volume_attachme
nts/482aabba-c7fc-4319-bfec-097cafab9f3c, Cannot detach a root device volume
stack@ecs-yoga:~/devstack$
```

According to the cause of the failure to delete the volume as prompted, the volume to be deleted is a system volume and cannot be detached. You need to delete the server instance before deleting the volume.

- Step 7 Run the following command to delete the **Instance_cli_02** server instance:

```
openstack server delete Instance_cli_02
```

```
stack@ecs-yoga:~/devstack$ openstack server delete Instance_cli_02
stack@ecs-yoga:~/devstack$
```

- Step 8 Run the following command to check the **Volume_cli_02** volume status:

```
openstack volume list | grep Volume_cli_02
```

```
stack@ecs-yoga:~/devstack$ openstack volume list | grep Volume_cli_02
| 482aabba-c7fc-4319-bfec-097cafab9f3c | Volume_cli_02 | available | 1 |
```

- Step 9 Run the following command to delete the **Volume_cli_02** volume again and check whether the deletion is successful:

```
openstack volume delete Volume_cli_02
```

```
stack@ecs-yoga:~/devstack$ openstack volume delete Volume_cli_02
stack@ecs-yoga:~/devstack$
```

Step 10 Run the following command to check whether the volume has been deleted:

```
openstack volume list
```

```
stack@ecs-yoga:~/devstack$ openstack volume list
stack@ecs-yoga:~/devstack$ 
```

7

OpenStack Network Management

7.1 Overview

7.1.1 About This Exercise

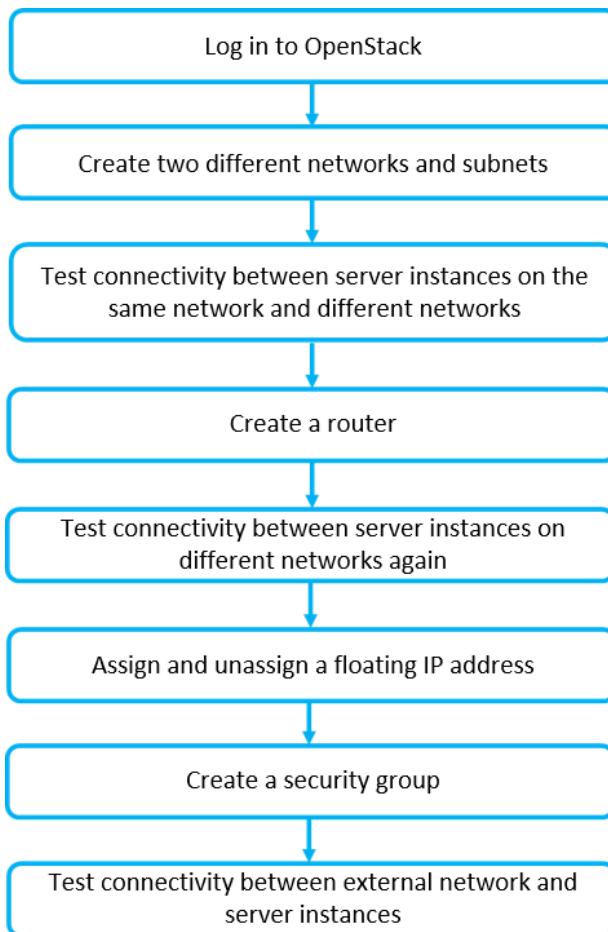
This exercise introduces how to create networks, subnets, routers, security groups, and floating IP addresses and test the connectivity of server instances on the OpenStack dashboard or using the OpenStack CLI.

7.1.2 Objectives

Upon completion of this exercise, you will be familiar with the following operations on the OpenStack dashboard or using the OpenStack CLI:

- Creating networks and subnets
- Creating routers and security groups
- Assigning a floating IP address
- Testing the connectivity of a server instance

7.1.3 Process



7.2 Operations on the OpenStack Dashboard

7.2.1 (Optional) Checking the OpenStack Environment Configuration

Step 1 On the ECS where the OpenStack is located, run the following command to check the route. If the route exists, go to 7.2.2.

```
netstat -rn
```

```
root@ecs-yoga:~# netstat -rn
Kernel IP routing table
Destination     Gateway         Genmask         Flags   MSS Window irtt Iface
0.0.0.0         172.16.0.1     0.0.0.0         UG        0 0          0 eth0
169.254.169.254 172.16.0.254  255.255.255.255 UGH       0 0          0 eth0
172.16.0.0      0.0.0.0        255.255.255.0   U         0 0          0 eth0
:
192.168.122.0   0.0.0.0        255.255.255.0   U         0 0          0 virbr0
```

If no route points to the **172.24.4.0/24** network segment, you need to manually add the IP address of br-ex and start the bridge.

- Step 2 Run the following command to add the IP address **172.24.4.1** for the br-ex bridge, set the subnet mask to **255.255.255.0**, and start the bridge:

```
ifconfig br-ex 172.24.4.1 netmask 255.255.255.0 up
```

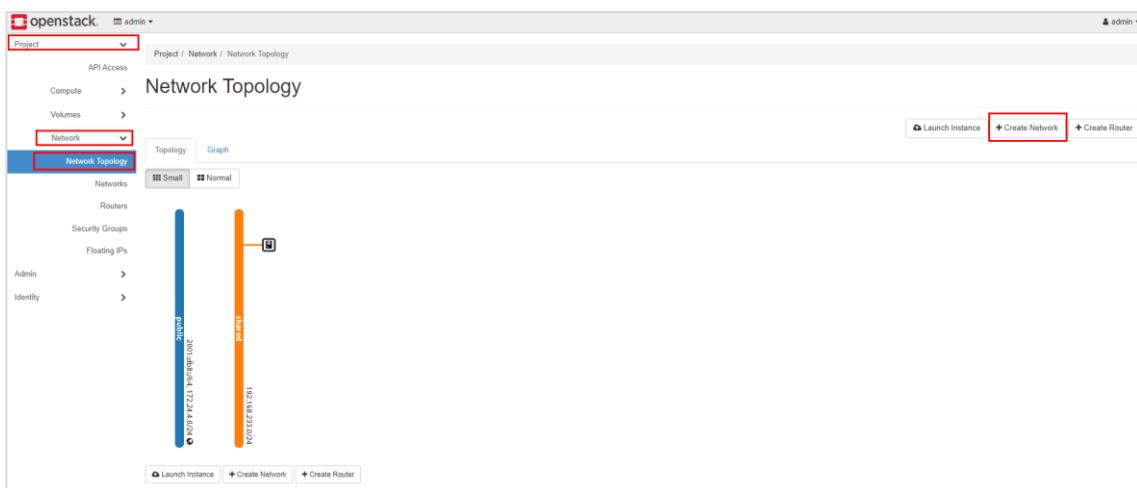
```
root@ecs-yoga:~# ifconfig br-ex 172.24.4.1 netmask 255.255.255.0 up
```

Check the route again.

```
root@ecs-yoga:~# netstat -rn
Kernel IP routing table
Destination     Gateway         Genmask        Flags   MSS Window irtt Iface
0.0.0.0         172.16.0.1    0.0.0.0       UG        0 0          0 eth0
169.254.169.254 172.16.0.254 255.255.255.255 UGH      0 0          0 eth0
172.16.0.0     0.0.0.0       255.255.255.0  U        0 0          0 eth0
172.24.4.0     0.0.0.0       255.255.255.0  U        0 0          0 br-ex
192.168.122.0  0.0.0.0       255.255.255.0  U        0 0          0 virbr0
```

7.2.2 Creating a Network

- Step 1 Log in to the OpenStack dashboard as the **admin** user. In the navigation pane, choose **Project > Network > Network Topology**. On the displayed page, click **Create Network**.



- Step 2 The **Create Network** page is displayed. On the **Network** tab page, specify **Network Name** to **Network_web_01** and select **Shared** to share the network. Retain the default values for other parameters and click **Next**.

Create Network

Network **Subnet** **Subnet Details**

Network Name
Network_web_01

Create a new network. In addition, a subnet associated with the network can be created in the following steps of this wizard.

Enable Admin State

Shared

Create Subnet

Availability Zone Hints

MTU

Next »

Step 3 On the **Subnet** tab page, specify **Subnet Name** to **Subnet_web_01**, **Network Address** to **192.168.1.0/24**, and **Gateway IP** to **192.168.1.1**. Retain the default values for other parameters, and click **Next**.

Create Network

Network **Subnet** **Subnet Details**

Subnet Name
Subnet_web_01

Creates a subnet associated with the network. You need to enter a valid "Network Address" and "Gateway IP". If you did not enter the "Gateway IP", the first value of a network will be assigned by default. If you do not want gateway please check the "Disable Gateway" checkbox. Advanced configuration is available by clicking on the "Subnet Details" tab.

Network Address
192.168.1.0/24

IP Version
IPv4

Gateway IP
192.168.1.1

Disable Gateway

Next »

Step 4 On the **Subnet Details** tab page, specify **Allocation Pools** to **192.168.1.100,192.168.1.200**, retain the default values for other parameters, and click **Create**.

Create Network

Network Subnet Subnet Details

Enable DHCP Specify additional attributes for the subnet.

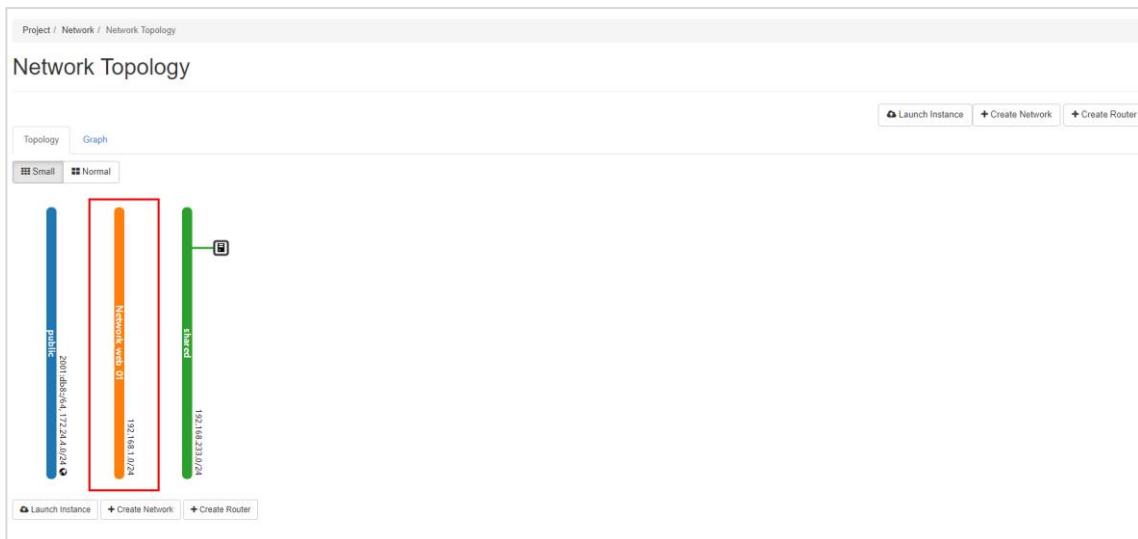
Allocation Pools ?
192.168.1.100,192.168.1.200

DNS Name Servers ?

Host Routes ?

Create

Step 5 Return to the **Network Topology** page to view the network topology changes.



Step 6 In the navigation pane, choose **Project > Network > Networks**. In the network list, view the created network.

Project

API Access

Compute

Volumes

Network

Network Topology

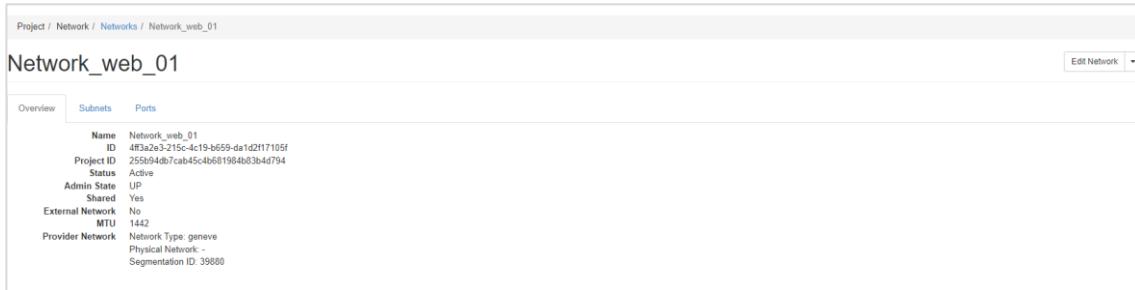
Networks

Displaying 3 items

Name	Subnets Associated	Shared	External	Status	Admin State	Availability Zones	Actions
Network_web_01	Subnet_web_01 192.168.1.0/24	Yes	No	Active	UP	-	Edit Network
shared	shared-subnet 192.168.233.0/24	Yes	No	Active	UP	-	Edit Network
public	ipv6-public-subnet 2001:db8::/64 public-subnet 172.24.0.0/24	No	Yes	Active	UP	-	Edit Network

Displaying 3 items

Step 7 Click **Network_web_01** to go to the **Overview** tab page of the network and view network details.



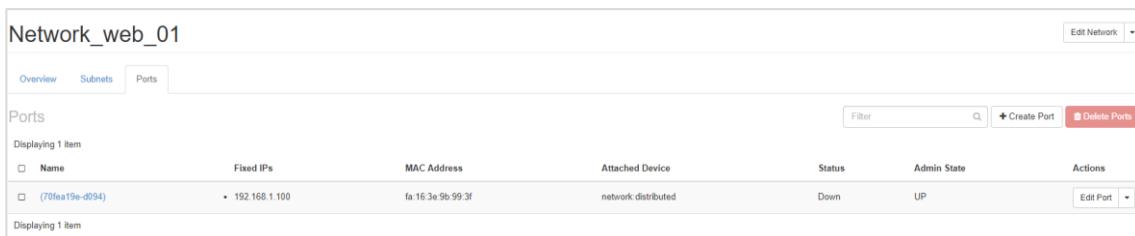
Name	Value
Name	Network_web_01
ID	4f3aa2e3-215c-4c19-b659-da1d2f17105f
Project ID	255b94db7cab45cb681984b83b4d794
Status	Active
Admin State	UP
Shared	Yes
External Network	lo
MTU	1442
Provider Network	Network Type: geneve Physical Network: Segmentation ID: 39880

Step 8 Click the **Subnets** tab to view the network subnet details.



Name	Network Address	IP Version	Gateway IP	Actions
Subnet_web_01	192.168.1.0/24	IPv4	192.168.1.1	Edit Subnet

Step 9 Click the **Ports** tab to view the network port details.

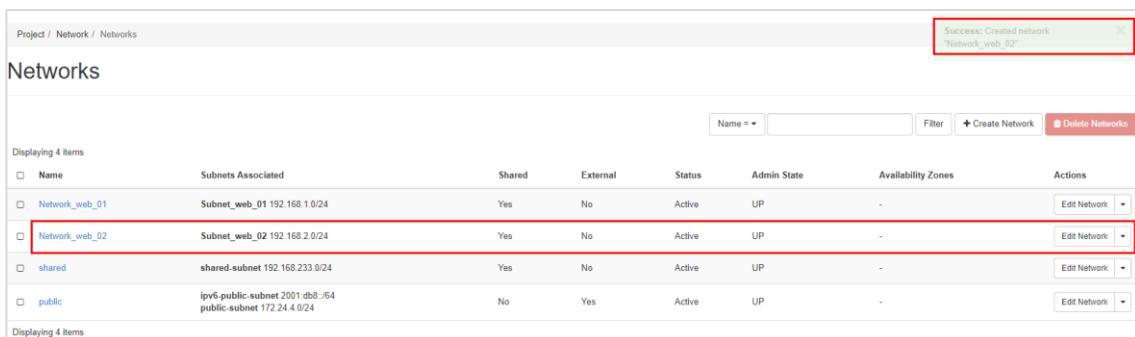


Name	Fixed IPs	MAC Address	Attached Device	Status	Admin State	Actions
(70fea19e-d094)	192.168.1.100	fa 16 3e 9b 99 3f	network.distributed	Down	UP	Edit Port

Question:

Why is the fixed IP address of the network port **192.168.1.100** in the preceding figure?

Step 10 In the navigation pane, choose **Project > Network > Networks** to return to the network list. Click **Create Network** in the upper right corner of the page. On the displayed page, create the **Network_web_02** network, **Subnet_web_02** subnet, **192.168.2.0/24** network address, **192.168.2.1** gateway IP address, and the **192.168.2.100,192.168.2.200** start and end IP address by repeating steps 2 to 4.



Name	Subnets Associated	Shared	External	Status	Admin State	Availability Zones	Actions
Network_web_01	Subnet_web_01 192.168.1.0/24	Yes	No	Active	UP	-	Edit Network
Network_web_02	Subnet_web_02 192.168.2.0/24	Yes	No	Active	UP	-	Edit Network
shared	shared-subnet 192.168.233.0/24	Yes	No	Active	UP	-	Edit Network
public	ipv6-public-subnet 2001:db8::/64 public-subnet 172.24.4.0/24	No	Yes	Active	UP	-	Edit Network

Success: Created network "Network_web_02"

7.2.3 Verification: Mutual Access of Server Instances

Step 1 In the navigation pane, choose **Project > Compute > Instances**. The instance list is displayed. Click **Launch Instance** in the upper part of the page. Provision the following two server instances by following the instructions provided in 5.2.4.1.

- Server instance name: **Instance_web_test**
- Quantity: **2**
- Boot source: **Image**
- Create New Volume: Select **No**.
- Image: **Img_web**
- Flavor: **Flavor_web_test**
- Network: **Network_web_01**
- Retain the default values for other parameters.

Instances												
		Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Server Groups		Instance_web_test-2	Img_web	192.168.1.170	Flavor_web_test	-	Active	nova	None	Running	0 minutes	Create Snapshot
Volumes		Instance_web_test-1	Img_web	192.168.1.143	Flavor_web_test	-	Active	nova	None	Running	0 minutes	Create Snapshot
Network		Instance_web_01	Img_web	192.168.233.163	Flavor_web_test	KeyValuePair_web	Active	nova	None	Running	1 hour, 53 minutes	Create Snapshot
Displaying 3 items												

Record the IP addresses of the two server instances.

Step 2 Go to the ECS console and create an ECS running Windows OS with the following specifications:

- **Billing Mode: Pay-per-use**
- **Region:** The region must be the same as that of the ECS where OpenStack is located.
- **Specifications: s6.xlarge.2 4 vCPUs | 8 GiB**
- **Image: Public image, Windows Server 2016 Standard 64-bit (English)**
- **System Disk: General Purpose SSD | 40 GiB**
- **Network:** Select the same VPC and subnet as the ECS where the OpenStack is located.
- **Security Group:** The security group is the same as that of the ECS where OpenStack is located.
- **EIP:** Select **Auto assign**, which is billed by traffic. The bandwidth size is **5 Mbit/s**.
- **Password:** Customize one.
- **Cloud Backup and Recovery: Not required**
- Retain the default values for other parameters.

Name/ID	Monitoring	AZ	Status	Specifications/Image	IP Address	Billing Mode	Tag	Operation
ecs-windows		AZ2	Running	4 vCPUs 8 GiB s6... (Marketplace) Win...	172.16.0.148 (Private)	Pay-per-use	--	Remote Login More ▾
ecs-yoga		AZ2	Running	4 vCPUs 8 GiB s6... Ubuntu 20.04 server...	172.16.0.177 (Private)	Pay-per-use	--	Remote Login More ▾

Step 3 Click **Remote Login** of the target ECS to log in to the Windows server.

Name/ID	Monitoring	AZ	Status	Specifications/Image	IP Address	Billing Mode	Tag	Operation
ecs-windows	[]	AZ2	Running	4 vCPUs 8 GiB s6... (EIP)...	172.16.0.148 (Privat...)	Pay-per-use	-	Remote Login More ▾
ecs-yoga	[]	AZ2	Running	4 vCPUs 8 GiB s6... Ubuntu 20.04 server...	172.16.0.177 (Privat...)	Pay-per-use	-	Remote Login More ▾

Step 4 In other modes, click **Log In**. Alternatively, use the remote login software on a local computer to log in to the ECS.

Logging In to a Windows ECS

RDP-based Login Failed to log in?

Use this login mode if your ECS has an EIP bound.
RDP-based login allows you to copy-paste data across local and remote PCs.
Ensure that the port used for RDP-based logins (port 3389 by default) is allowed to access in the security group.

1. Click Download RDP File and download the file.
2. Run the downloaded RDP file and enter the login password as prompted. If your ECS is authenticated using a key pair, [obtain the password](#) before the login.

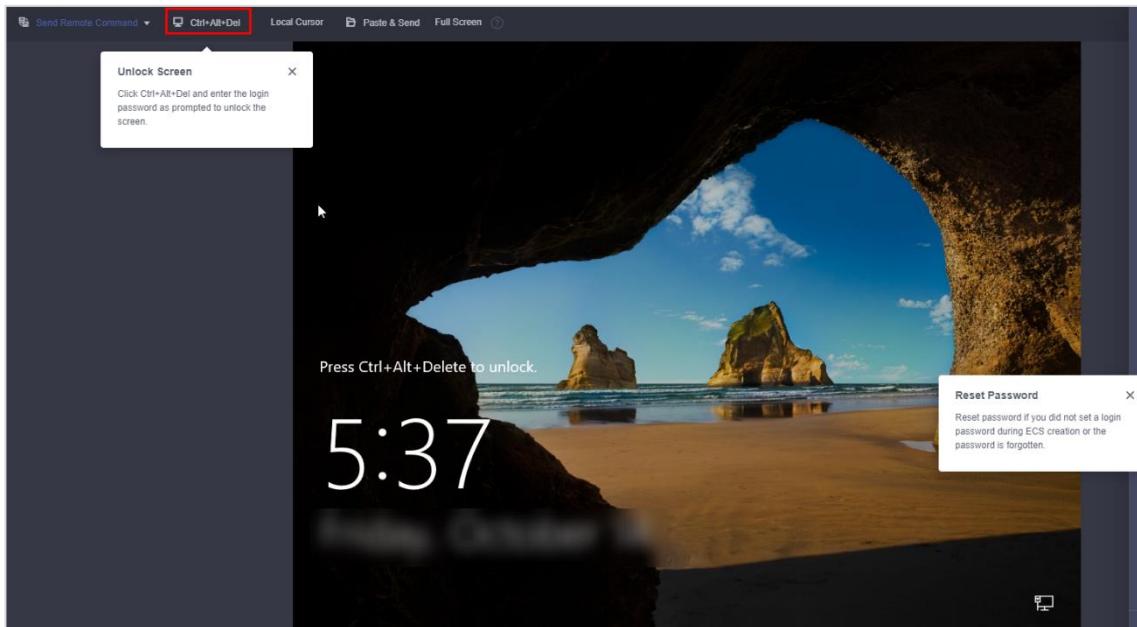
For more details, see [Logging In to a Windows ECS Using an RDP File](#)

[Download RDP File](#)

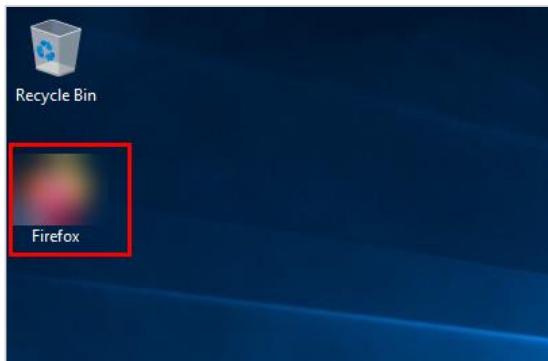
Other Login Modes

- Log in using Remote Login on the management console.
[Log In](#)
- Log in from a Linux PC. [Learn more](#)
 - a) Install a remote access tool, such as rdesktop.

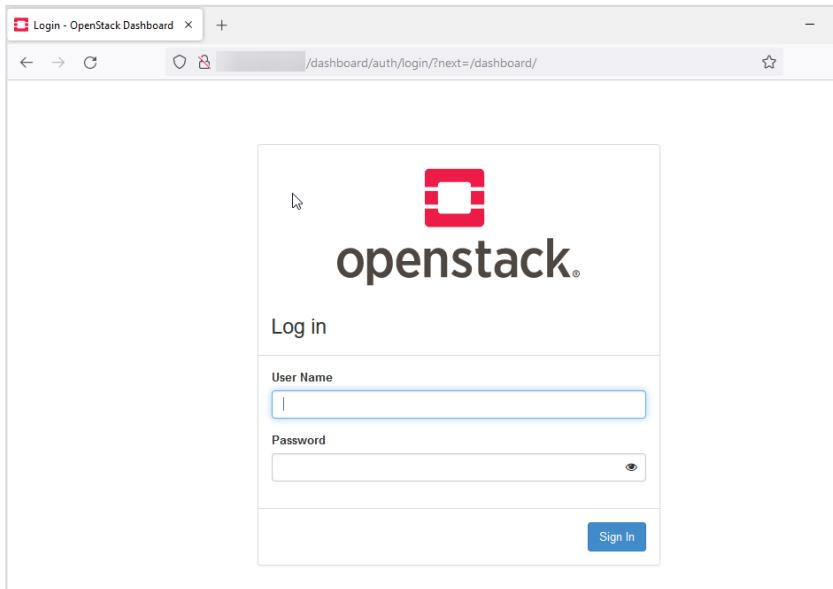
Step 5 Click **Ctrl+Alt+Del** in the upper left corner of the page to unlock the desktop.



Step 6 Enter the password you set to log in to the ECS. Download and install Firefox on the ECS.



Step 7 Open the Firefox browser, enter the EIP of the ECS where OpenStack is deployed in the address box, and log in to the OpenStack dashboard as user **admin**.



- Step 8** In the navigation pane, choose **Project > Compute > Instances**. The instance list is displayed. Click the names of the two newly created server instances to go to the server instance overview page. Click the **Console** tab and click **Click here to show only console**.

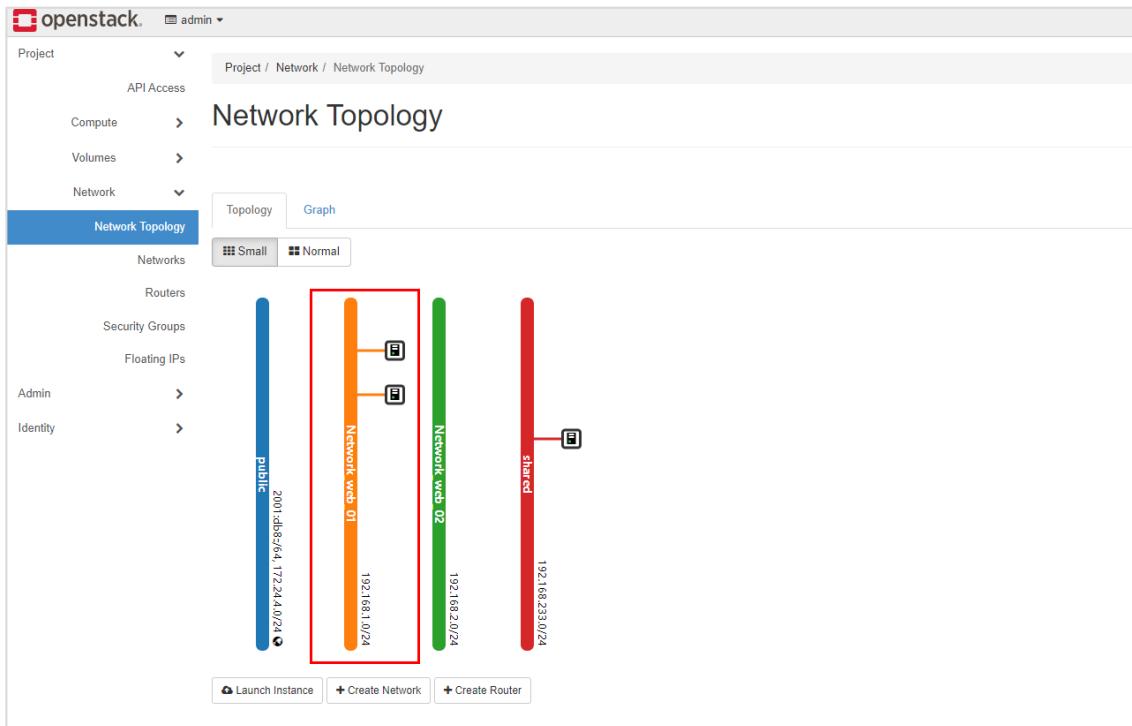


- Step 9** Log in to the server instances using the usernames and passwords as prompted. View and ping the IP addresses of the server instances to check whether they can communicate with each other.

```
login as [cirros] user. default password: [gocubsgo]. use 'sudo' for root.  
instance-web-test-1 login:[cirros]  
Password: [REDACTED]  
$  
$ _
```

```
$ ping 192.168.1.170
PING 192.168.1.170 (192.168.1.170): 56 data bytes
64 bytes from 192.168.1.170: seq=0 ttl=64 time=17.541 ms
64 bytes from 192.168.1.170: seq=1 ttl=64 time=1.227 ms
64 bytes from 192.168.1.170: seq=2 ttl=64 time=0.883 ms
64 bytes from 192.168.1.170: seq=3 ttl=64 time=1.058 ms
64 bytes from 192.168.1.170: seq=4 ttl=64 time=0.870 ms
64 bytes from 192.168.1.170: seq=5 ttl=64 time=0.804 ms
```

- Step 10** In the navigation pane, choose **Project > Network > Network Topology**. On the **Network Topology** page, view the current network topology.



Conclusion:

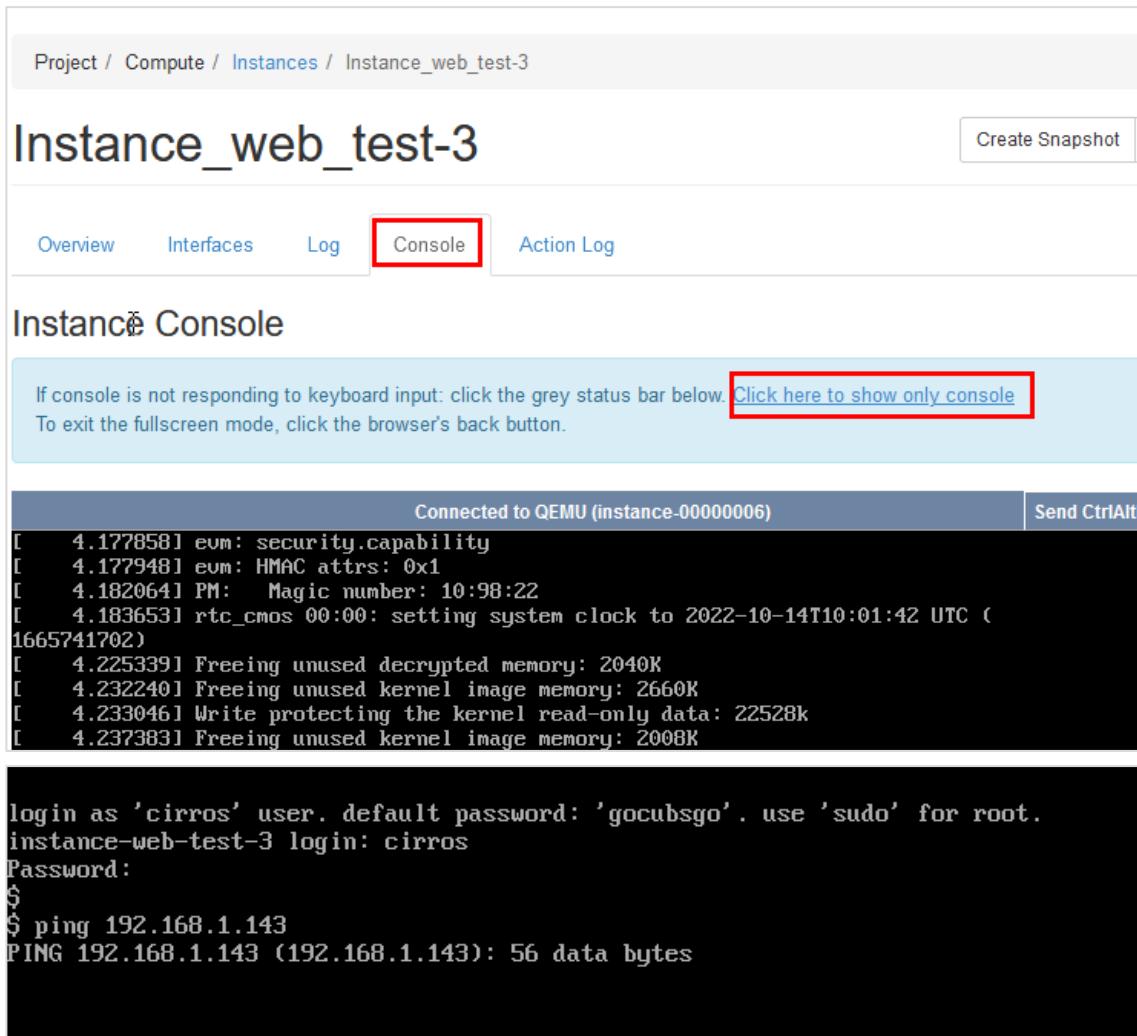
The result shows that the server instances on the same network can communicate with each other by default.

- Step 11** Provision the **Instance_web_test-3** server instance by repeating step 1, set **Network** to **Network_web_02**, and set other parameters to the same values as those of the **Instance_web_test-1** and **Instance_web_test-2** server instances.

Displaying 4 Items										
Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_test-3	Img_web	192.168.2.155	Flavor_web_test	-	Active	nova	None	Running	0 minutes	<button>Create Snapshot</button>
Instance_web_test-2	Img_web	192.168.1.170	Flavor_web_test	-	Active	nova	None	Running	1 hour, 14 minutes	<button>Create Snapshot</button>
Instance_web_test-1	Img_web	192.168.1.143	Flavor_web_test	-	Active	nova	None	Running	1 hour, 14 minutes	<button>Create Snapshot</button>
Instance_web_01	Img_web	192.168.2.0/24	Flavor_web_test	KeyValuePair_web	Active	nova	None	Running	3 hours, 7 minutes	<button>Create Snapshot</button>

- Step 12** On a Windows server, log in to the OpenStack dashboard. Click the newly created server instance **Instance_web_test-3** to go to the **Overview** page of the server instance. On the displayed page, click the **Console** tab, and click **Click here to show only console**. On the displayed page, log in to the server instance using the username and password as prompted. View and ping the IP address of

Instance_web_test-3 with that of **Instance_web_test-1** to check whether the two server instances can communicate with each other.



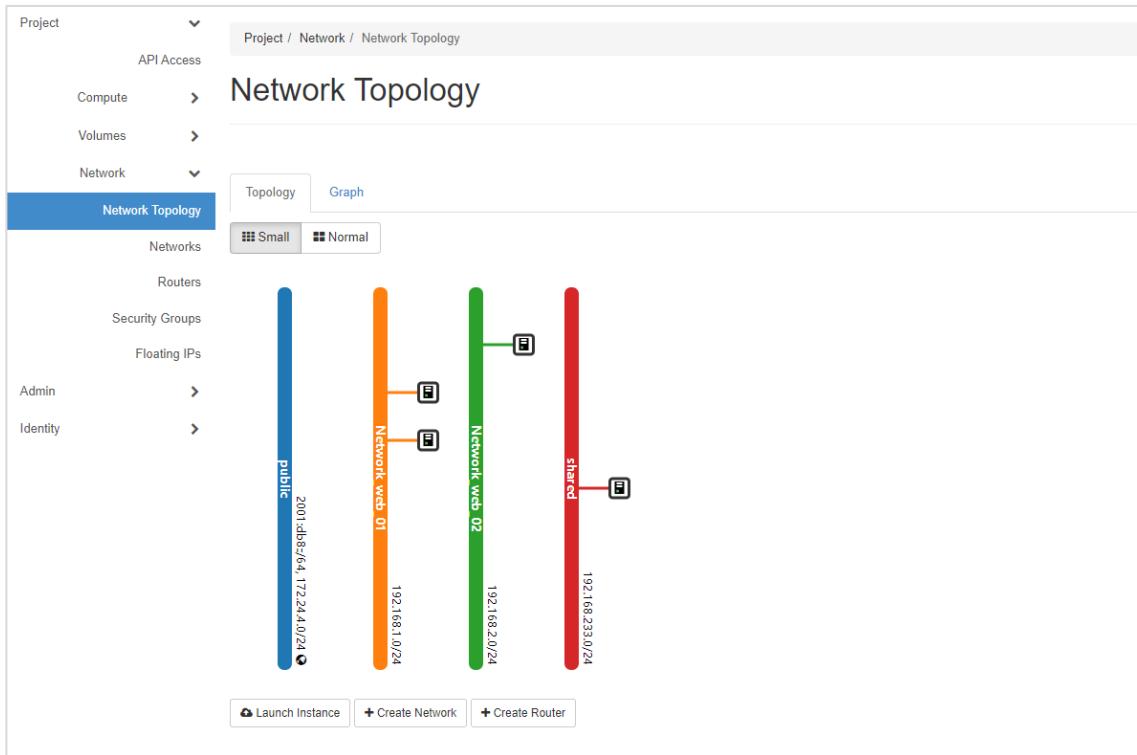
The screenshot shows the OpenStack instance details page for 'Instance_web_test-3'. The 'Console' tab is selected, indicated by a red box. The terminal window displays the kernel boot logs and a user session:

```
Connected to QEMU (instance-00000006) | Send CtrlAltDel
[    4.177858] eum: security.capability
[    4.177948] eum: HMAC attrs: 0x1
[    4.182064] PM: Magic number: 10:98:22
[    4.183653] rtc_cmos 00:00: setting system clock to 2022-10-14T10:01:42 UTC (+1665741702)
[    4.225339] Freeing unused decrypted memory: 2040K
[    4.232240] Freeing unused kernel image memory: 2660K
[    4.233046] Write protecting the kernel read-only data: 22528k
[    4.237383] Freeing unused kernel image memory: 2008K

login as 'cirros' user. default password: 'gocubsgo'. use 'sudo' for root.
instance-web-test-3 login: cirros
Password:
$ ping 192.168.1.143
PING 192.168.1.143 (192.168.1.143): 56 data bytes
```

As shown in the preceding figure, the two server instances cannot communicate with each other.

Step 13 In the navigation pane, choose **Project > Network > Network Topology**. On the **Network Topology** page, view the current network topology.



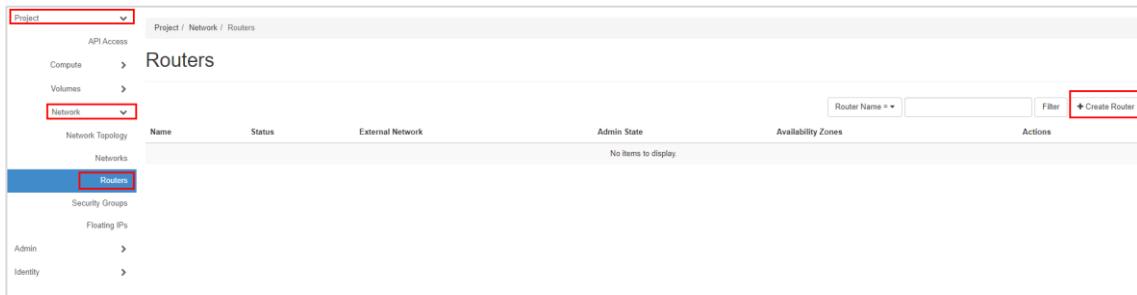
As shown in the network topology, the **Instance_web_test-1** and **Instance_web_test-3** server instances are on different networks, which are isolated from each other. As a result, the two server instances cannot communicate with each other.

Conclusion:

The server instances on different networks cannot communicate with each other by default.

7.2.4 Creating a Router

- Step 1** In the navigation pane, choose **Project > Network > Routers**. The router list is displayed. Click **Create Router** in the upper right corner of the page.



- Step 2** In the displayed **Create Router** dialog box, specify **Router Name** to **Router_web**, and select **public** for **External Network**. Retain the default values for other parameters, and click **Create Router**.

Create Router

Router Name

Enable Admin State ?

External Network

Enable SNAT

Availability Zone Hints ?

Description:
Creates a router with specified parameters.
Enable SNAT will only have an effect if an external network is set.

Step 3 Return to the router list and view the router newly created.

Project / Network / Routers

Success: Router Router_web was successfully created.

Routers

	Router Name	Filter	+ Create Router	Delete Routers	
Displaying 1 item					
Name	Status	External Network	Admin State	Availability Zones	Actions
<input type="checkbox"/> Router_web	Active	public	UP	-	<button>Clear Gateway</button> <button>⋮</button>

Displaying 1 item

Step 4 Click **Router_web**. The **Overview** tab page of the router is displayed.

Router_web		Clear Gateway
Overview	Interfaces	Static Routes
Name	Router_web	
ID	a0e1800e-6e64-49e2-8446-f475f55981cb	
Description		
Project ID	255b94db7cab45c4b681984b83b4d794	
Status	Active	
Admin State	UP	
External Gateway		
Network Name	public	
Network ID	813f0666-6a1d-43d5-a3d3-e74de4ad37ac	
External Fixed IPs		
•	Submit ID	c3becbf0-855b-4463-996e-0ff40cccfb4c
•	IP Address	172.24.4.246
•	Subnet ID	b02749e4-c124-475a-ba5a-ad5293554da2
•	IP Address	2001:db8:246
SNAT	Enabled	

Step 5 Click the **Interfaces** tab. The interface list is displayed. Click **Add Interface** in the upper part of the page.

Project / Network / Routers / Router_web

Router_web

[Clear Gateway](#)

[Overview](#) **Interfaces** [Static Routes](#)

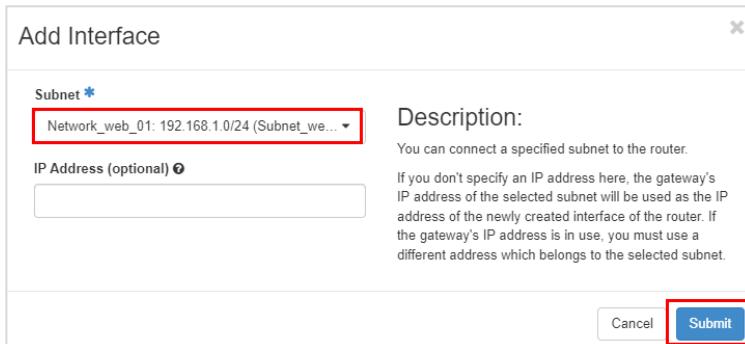
[+ Add Interface](#) [Delete Interfaces](#)

Displaying 1 item

<input type="checkbox"/>	Name	Fixed IPs	Status	Type	Admin State	Actions
<input type="checkbox"/>	(43b37305-c099)	<ul style="list-style-type: none">• 172.24.4.246• 2001:db8:245	Active	External Gateway	UP	Delete Interface

Displaying 1 item

- Step 6** In the displayed **Add Interface** dialog box, select **Network_web_01:192.168.1.0/24 (Subnet_web_01)** for **Subnet** and click **Submit**.



- Step 7** Return to the interface list and view the added interface. The interface is in the **Active** state.

Router_web						
	Overview	Interfaces	Static Routes	Actions		
Displaying 2 items						
Name	Fixed IPs	Status	Type	Admin State	Actions	
(27192854-44a4)	• 192.168.1.1	Active	Internal Interface	UP	<button>Delete Interface</button>	<button>Clear Gateway</button>
(43b37305-c099)	• 172.24.4.246 • 2001:db8:245	Active	External Gateway	UP	<button>Delete Interface</button>	<button>Clear Gateway</button>
Displaying 2 items						

- Step 8** Select **Network_web_02: 192.168.2.0/24 (Subnet_web_02)** for **Subnet** to add the interface by repeating steps 5 to 7.

Router_web						
	Overview	Interfaces	Static Routes	Actions		
Displaying 3 items						
Name	Fixed IPs	Status	Type	Admin State	Actions	
(27192854-44a4)	• 192.168.1.1	Active	Internal Interface	UP	<button>Delete Interface</button>	<button>Clear Gateway</button>
(43b37305-c099)	• 172.24.4.246 • 2001:db8:245	Active	External Gateway	UP	<button>Delete Interface</button>	<button>Clear Gateway</button>
(d92e526c-43e9)	• 192.168.2.1	Active	Internal Interface	UP	<button>Delete Interface</button>	<button>Clear Gateway</button>
Displaying 3 items						

- Step 9** In the navigation pane, choose **Project > Network > Network Topology**. On the **Network Topology** page, view the current network topology.



As shown in the network topology, the **Network_web_01** and **Network_web_02** networks are interconnected through the **Router_web** router. Check whether the **Instance_web_test-3** and **Instance_web_test-1** server instances can communicate with each other.

- Step 10 On a Windows server, log in to the OpenStack dashboard. In the navigation pane, choose **Project > Compute > Instances**. The instance list is displayed. Click the

Instance_web_test-3 and **Instance_web_test-1** server instances, respectively. On the displayed page, click the **Console** tab and click **Click here to show only console**. Ping the two server instances to check whether they can communicate with each other.

```
$ hostname  
instance-web-test-3  
$ ping 192.168.1.143  
PING 192.168.1.143 (192.168.1.143): 56 data bytes  
64 bytes from 192.168.1.143: seq=0 ttl=63 time=5.037 ms  
64 bytes from 192.168.1.143: seq=1 ttl=63 time=1.130 ms  
64 bytes from 192.168.1.143: seq=2 ttl=63 time=0.892 ms  
64 bytes from 192.168.1.143: seq=3 ttl=63 time=1.044 ms  
64 bytes from 192.168.1.143: seq=4 ttl=63 time=0.855 ms  
64 bytes from 192.168.1.143: seq=5 ttl=63 time=0.822 ms
```

As shown in the preceding figure, the two server instances can communicate with each other.

Conclusion:

Server instances on different networks can communicate with each other by connecting to the same router.

7.2.5 Managing a Floating IP Address

Step 1 On the ECS where OpenStack is located, check whether **Instance_web_test-3** can be pinged.

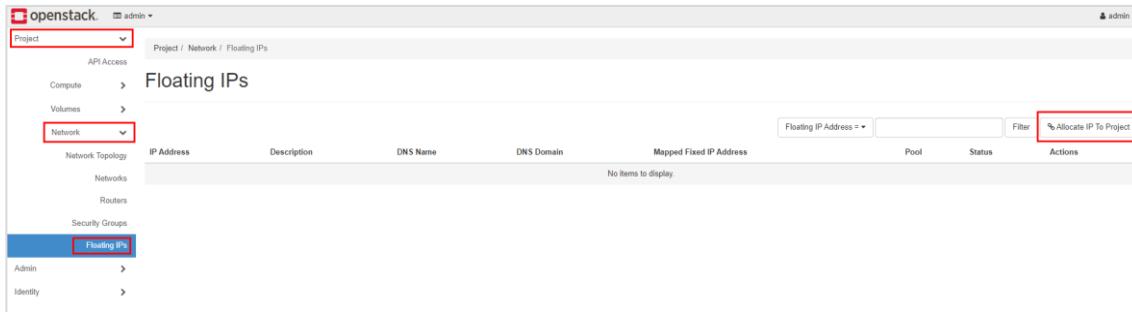
```
root@ecs-yoga:~#  
root@ecs-yoga:~#  
root@ecs-yoga:~# ping 192.168.2.155  
PING 192.168.2.155 (192.168.2.155) 56(84) bytes of data.
```

As shown in the preceding figure, the server instance cannot be pinged.

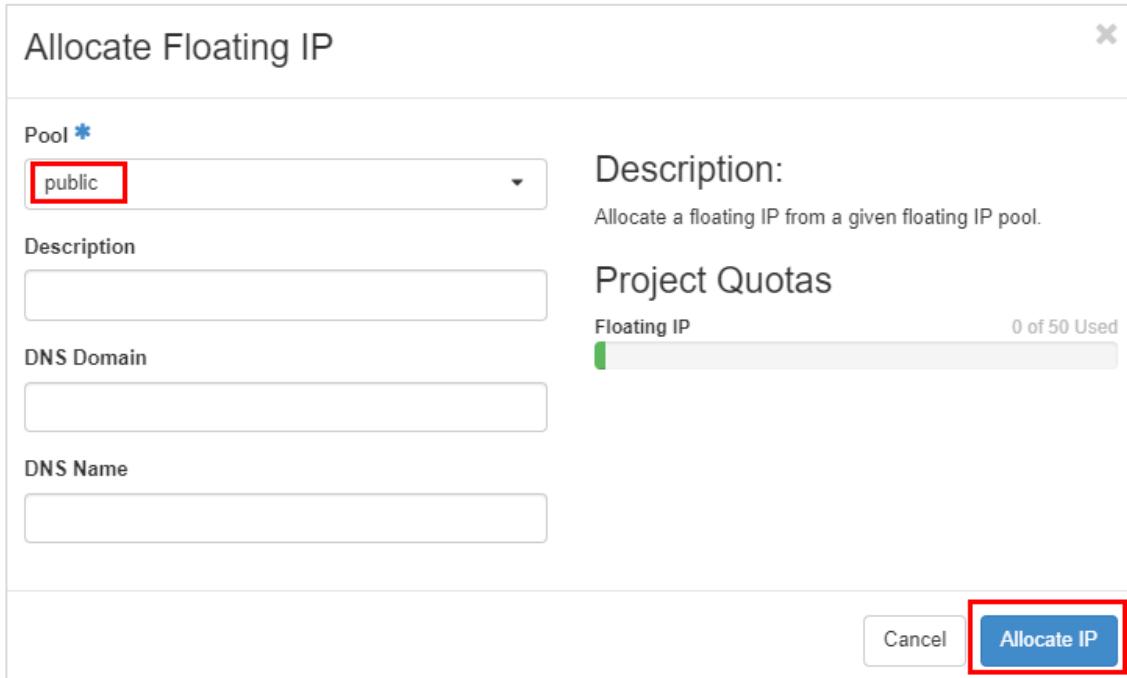
Conclusion:

The **Network_web_02** network of the **Instance_web_test-3** server instance is an internal network of OpenStack and cannot interconnect with the external network. To access a server instance from external network, you must assign a floating IP address through the external network. The procedure is as follows:

Step 2 In the navigation pane, choose **Project > Network > Floating IPs**. The floating IP address list is displayed. Click **Allocate IP to Project** in the upper part of the page.



Step 3 The **Allocate Floating IP** dialog box is displayed. **public** is selected for **Pool** by default. Click **Allocate IP**.



Pool *
public

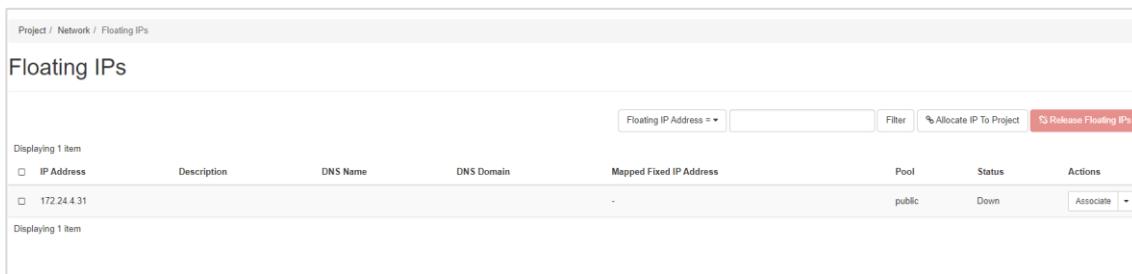
Description:
Allocate a floating IP from a given floating IP pool.

Project Quotas

Floating IP	0 of 50 Used
-------------	--------------

Allocate IP

Step 4 Return to the floating IP address list and view the floating IP address newly assigned.



IP Address	Description	DNS Name	Mapped Fixed IP Address	Pool	Status	Actions
172.24.4.31				public	Down	Associate

Step 5 In the navigation pane, choose **Project > Compute > Instances**. The instance list is displayed. Click in the **Actions** column of the row containing the **Instance_web_test-3** server instance, and select **Associate Floating IP** from the drop-down list.

Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_test-3	Img_web	192.168.2.155	Flavor_web_test	-	Active	us1 nova	None	Running	30 minutes	Create Snapshot
Instance_web_test-2	Img_web	192.168.1.170	Flavor_web_test	-	Active	us1 nova	None	Running	1 hour, 44 minutes	Associate Floating IP
Instance_web_test-1	Img_web	192.168.1.143	Flavor_web_test	-	Active	us1 nova	None	Running	1 hour, 44 minutes	Attach Interface
Instance_web_01	Img_web	192.168.233.163	Flavor_web_test	KeyPair_web	Active	us1 nova	None	Running	3 hours, 38 minutes	Detach Interface

- Step 6** In the displayed **Manage Floating IP Associations** dialog box, set **IP Address** to the floating IP address newly assigned. **Port to be associated** has defaulted to **Instance_web_test-3: 192.168.2.111**. Click **Associate**.

Manage Floating IP Associations

IP Address *

172.24.4.31

Select the IP address you wish to associate with the selected instance or port.

Port to be associated *

Instance_web_test-3: 192.168.2.155

Cancel Associate

- Step 7** Return to the server instance list and view the floating IP address assigned to the server instance.

Instance Name	Image Name	IP Address	Flavor	Key Pair	Status	Availability Zone	Task	Power State	Age	Actions
Instance_web_test-3	Img_web	192.168.2.155 (172.24.4.31)	Flavor_web_test	-	Active	us1 nova	None	Running	33 minutes	Create Snapshot
Instance_web_test-2	Img_web	192.168.1.170	Flavor_web_test	-	Active	us1 nova	None	Running	1 hour, 47 minutes	Create Snapshot
Instance_web_test-1	Img_web	192.168.1.143	Flavor_web_test	-	Active	us1 nova	None	Running	1 hour, 47 minutes	Create Snapshot
Instance_web_01	Img_web	192.168.233.163	Flavor_web_test	KeyPair_web	Active	us1 nova	None	Running	3 hours, 41 minutes	Create Snapshot

- Step 8** Check whether the **Instance_web_test-3** server instance can be pinged from the external network by repeating step 2.

```
root@ecs-yoga:~# ping 172.24.4.31 -c 5
PING 172.24.4.31 (172.24.4.31) 56(84) bytes of data.

--- 172.24.4.31 ping statistics ---
5 packets transmitted, 0 received, 100% packet loss, time 4097ms
```

As shown in the preceding figure, the server instance cannot be pinged.

Question:

What is the possible cause for the failure to access the floating IP address of a server instance from the external network?

- Step 9** Create another floating IP address by repeating steps 3 to 5. Check whether the status of the floating IP address is **Down**. If yes, click **Associate** in the **Actions** column of the row containing the floating IP address.

Floating IPs							
<input type="button" value="Floating IP Address ="/> <input type="text"/> Filter <input type="button" value="Allocate IP To Project"/> <input type="button" value="Release Floating IPs"/>							
IP Address	Description	DNS Name	DNS Domain	Mapped Fixed IP Address	Pool	Status	Actions
<input type="checkbox"/> 172.24.4.101				-	public	Down	<input type="button" value="Associate"/>
<input type="checkbox"/> 172.24.4.31				Instance_web_test-3 192.168.2.155	public	Active	<input type="button" value="Disassociate"/>

- Step 10** In the displayed **Manage Floating IP Associations** dialog box, an IP address is automatically selected for **IP Address**. Select **Instance_web_test-1: 192.168.1.106** for **Port to be associated** and click **Associate**.

Manage Floating IP Associations

IP Address *	172.24.4.101	Select the IP address you wish to associate with the selected instance or port.
Port to be associated *	Instance_web_test-1: 192.168.1.143	
<input type="button" value="Cancel"/> <input style="background-color: #0072BC; color: white; border: 1px solid #0072BC; padding: 5px; border-radius: 5px;" type="button" value="Associate"/>		

- Step 11** Return to the floating IP address list and check the floating IP address assignment details. The status of the floating IP address changes to **Active**. Click **Disassociate** in the **Actions** column.

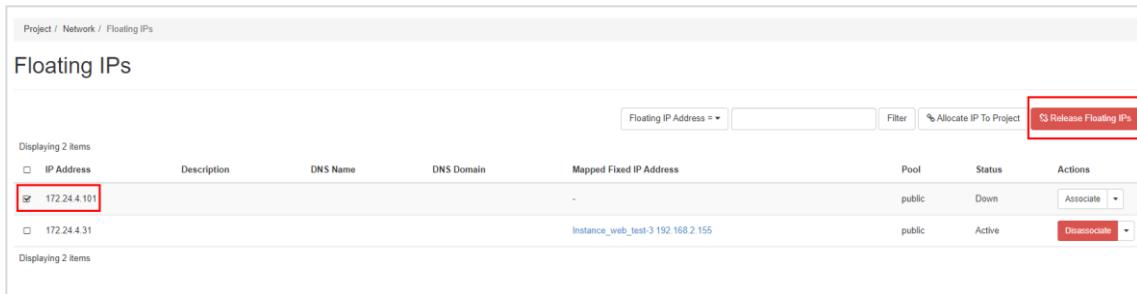
Floating IPs							
<input type="button" value="Floating IP Address ="/> <input type="text"/> Filter <input type="button" value="Allocate IP To Project"/> <input type="button" value="Release Floating IPs"/>							
IP Address	Description	DNS Name	DNS Domain	Mapped Fixed IP Address	Pool	Status	Actions
<input type="checkbox"/> 172.24.4.101				Instance_web_test-1 192.168.1.143	public	Active	<input type="button" value="Disassociate"/>
<input type="checkbox"/> 172.24.4.31				Instance_web_test-3 192.168.2.155	public	Active	<input type="button" value="Disassociate"/>

- Step 12** In the displayed **Confirm Disassociate** dialog box, click **Disassociate**.

Confirm Disassociate

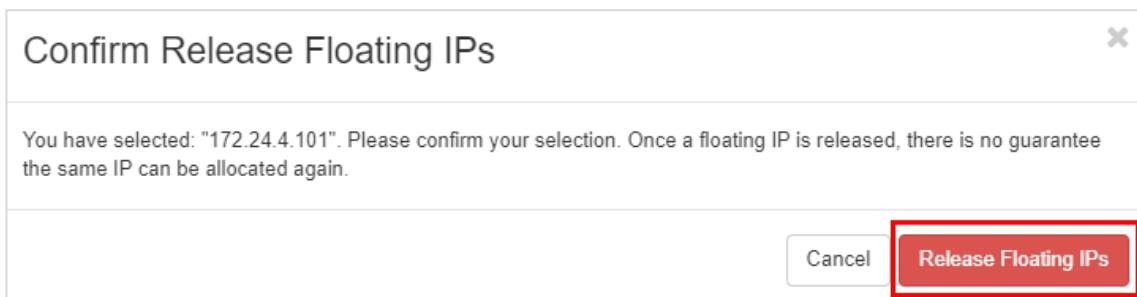
You have selected: "172.24.4.101". Please confirm your selection.
<input type="button" value="Cancel"/> <input style="background-color: #0072BC; color: white; border: 1px solid #0072BC; padding: 5px; border-radius: 5px;" type="button" value="Disassociate"/>

- Step 13 Return to the floating IP address list. Select the floating IP address to be released, and click **Release Floating IPs**.



IP Address	Description	DNS Name	DNS Domain	Mapped Fixed IP Address	Pool	Status	Actions
172.24.4.101				-	public	Down	<input type="button" value="Associate"/>
172.24.4.31				Instance_web_test-3 192.168.2.155	public	Active	<input type="button" value="Disassociate"/>

- Step 14 In the displayed **Confirm Release Floating IPs** dialog box, click **Release Floating IPs**.



You have selected: "172.24.4.101". Please confirm your selection. Once a floating IP is released, there is no guarantee the same IP can be allocated again.

Verification:

Can an assigned floating IP address be released directly if steps 12 and 13 are not performed?

7.2.6 Creating a Security Group

- Step 1 Select the **Overview** tab page of the **Instance_web_test-3** server instance to view the security groups of the server instance.

Project / Compute / Instances / Instance_web_test-3

Instance_web_test-3

- [Overview](#)
- [Interfaces](#)
- [Log](#)
- [Console](#)
- [Action Log](#)

Name	Instance_web_test-3
ID	eccba05-ea02-4ade-b1d0-7a18a5447623
Description	-
Project ID	255b94db7cab45c4b681984b83b4d794
Status	Active
Locked	False
Availability Zone	nova
Created	
Age	48 minutes
Host	ecs-yoga
Instance Name	instance-0000006
Reservation ID	r-cojbrddn
Launch Index	-
Hostname	instance-web-test-3
Kernel ID	-
Ramdisk ID	-
Device Name	/dev/vda
User Data	-

Specs

Flavor	Not available
--------	---------------

IP Addresses

Network_web_02	192.168.2.155, 172.24.4.31
----------------	----------------------------

Security Groups

default	ALLOW IPv6 to ::/0 ALLOW IPv4 to 0.0.0.0/0 ALLOW IPv6 from default ALLOW IPv4 from default
---------	---

As shown in the preceding figure, all security groups are **default**.

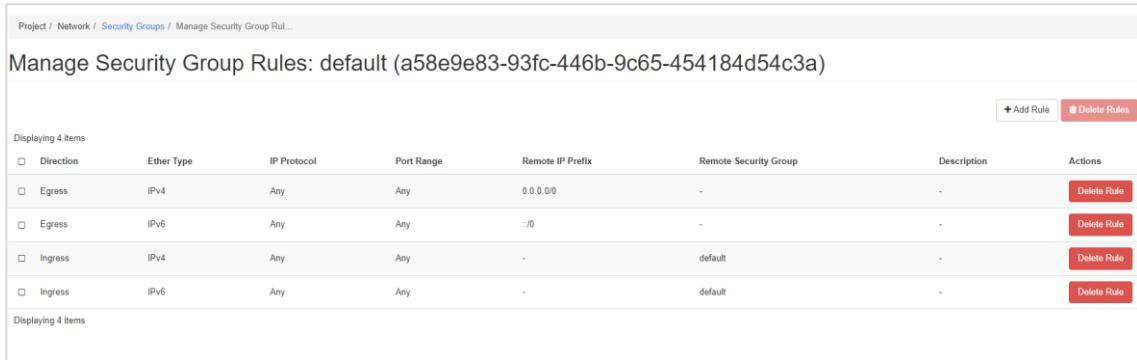
- Step 2** In the navigation pane, choose **Project > Network > Security Groups**. In the displayed security group list, locate the row that contains the default security group and click **Manage Rules** in the **Actions** column.

Project / Network / Security Groups

Security Groups

Name	Security Group ID	Description	Shared	Actions
default	a58e9b393fc446b9c65454184d54c3a	Default security group	False	Manage Rules

- Step 3** In the displayed dialog box, view the default security group rules, as shown in the following figure.



Direction	Ether Type	IP Protocol	Port Range	Remote IP Prefix	Remote Security Group	Description	Actions
Egress	IPv4	Any	Any	0.0.0.0/0	-	-	<button>Delete Rule</button>
Egress	IPv6	Any	Any	::/0	-	-	<button>Delete Rule</button>
Ingress	IPv4	Any	Any	-	default	-	<button>Delete Rule</button>
Ingress	IPv6	Any	Any	-	default	-	<button>Delete Rule</button>

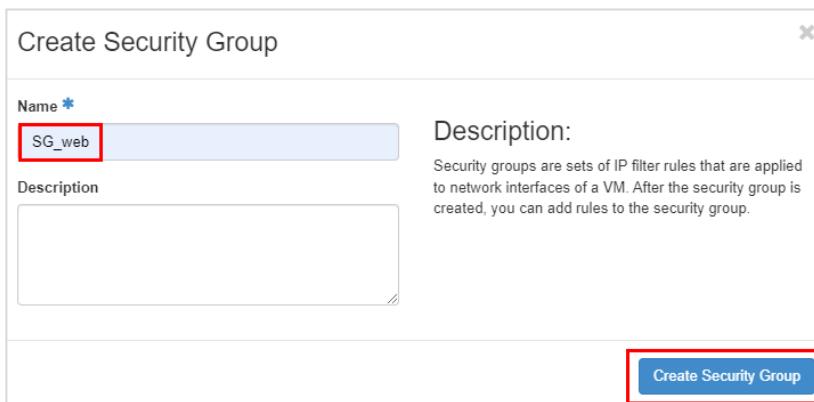
As shown in the preceding figure, the default security group of the server instance allows all **Egress** traffic but forbids all **Ingress** traffic. The preceding information indicates that the **Instance_web_test-3** server instance cannot be accessed from external network by default. You need to change the security group rule.

- Step 4** In the navigation pane, choose **Project > Network > Security Groups** to return to the security group list. Click **Create Security Group** in the upper part of the page.



Name	Security Group ID	Description	Shared	Actions
default	a58e9e83-93fc-446b-9c65-454184d54c3a	Default security group	False	<button>Manage Rules</button>

- Step 5** In the displayed **Create Security Group** dialog box, specify **Name** to **SG_web** and click **Create Security Group**.



Create Security Group

Name *: SG_web

Description:
Security groups are sets of IP filter rules that are applied to network interfaces of a VM. After the security group is created, you can add rules to the security group.

Create Security Group

- Step 6** The **Manage Security Group Rules: SG_web** page is displayed automatically. Click **Add Rule** to add a security group rule.

Manage Security Group Rules: SG_web (3ed2e166-5487-4dc0-aec5-af177ea79b98)							
+ Add Rule Delete Rules							
Displaying 2 items							
Direction	Ether Type	IP Protocol	Port Range	Remote IP Prefix	Remote Security Group	Description	Actions
Egress	IPv4	Any	Any	0.0.0.0/0	-	-	Delete Rule
Egress	IPv6	Any	Any	::/0	-	-	Delete Rule

Step 7 In the displayed **Add Rule** dialog box, set **Rule** to **All ICMP**, **Direction** to **Ingress**, **Remote** to **CIDR**, and **CIDR** to **0.0.0.0/0**. Then, click **Add**.

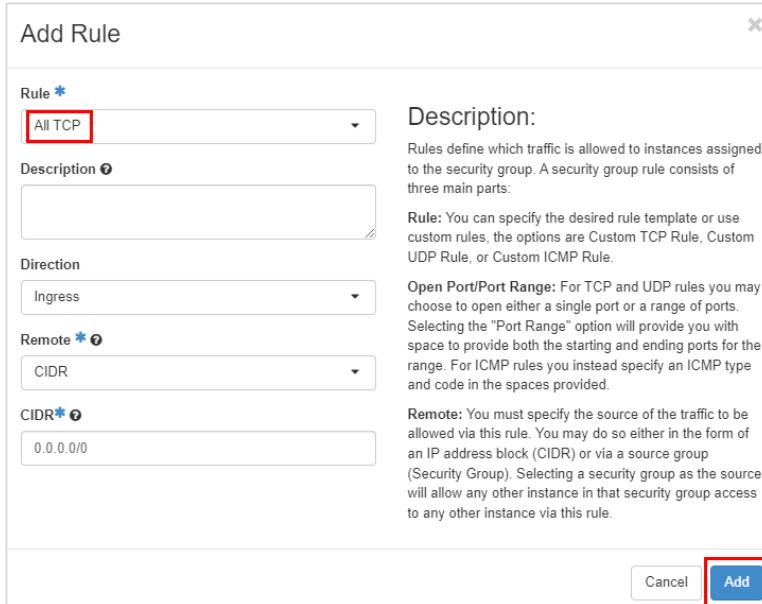
Add Rule

Rule * <div style="border: 1px solid #ccc; padding: 2px; width: 100%;">All ICMP</div>	Description: Rules define which traffic is allowed to instances assigned to the security group. A security group rule consists of three main parts: Rule: You can specify the desired rule template or use custom rules, the options are Custom TCP Rule, Custom UDP Rule, or Custom ICMP Rule. Open Port/Port Range: For TCP and UDP rules you may choose to open either a single port or a range of ports. Selecting the "Port Range" option will provide you with space to provide both the starting and ending ports for the range. For ICMP rules you instead specify an ICMP type and code in the spaces provided. Remote: You must specify the source of the traffic to be allowed via this rule. You may do so either in the form of an IP address block (CIDR) or via a source group (Security Group). Selecting a security group as the source will allow any other instance in that security group access to any other instance via this rule.
Direction <div style="border: 1px solid #ccc; padding: 2px; width: 100%;">Ingress</div>	
Remote * <div style="border: 1px solid #ccc; padding: 2px; width: 100%;">CIDR</div>	
CIDR* <div style="border: 1px solid #ccc; padding: 2px; width: 100%;">0.0.0.0/0</div>	
Cancel	<input style="background-color: #0072bc; color: white; border: 1px solid #0072bc; padding: 5px 10px; border-radius: 5px; font-weight: bold; margin-right: 10px;" type="button" value="Add"/>

Step 8 Return to the **Manage Security Group Rules: SG_web** page and view the security group rule newly added.

Manage Security Group Rules: SG_web (3ed2e166-5487-4dc0-aec5-af177ea79b98)							
Success: Successfully added rule ALLOW IPv4 icmp from 0.0.0.0/0							
Displaying 3 items							
Direction	Ether Type	IP Protocol	Port Range	Remote IP Prefix	Remote Security Group	Description	Actions
Egress	IPv4	Any	Any	0.0.0.0/0	-	-	Delete Rule
Egress	IPv6	Any	Any	::/0	-	-	Delete Rule
Ingress	IPv4	ICMP	Any	0.0.0.0/0	-	-	Delete Rule

Step 9 Add a TCP rule by repeating steps 6 to 7, as shown in the following figure.



Add Rule

Rule *
All TCP

Description (empty)

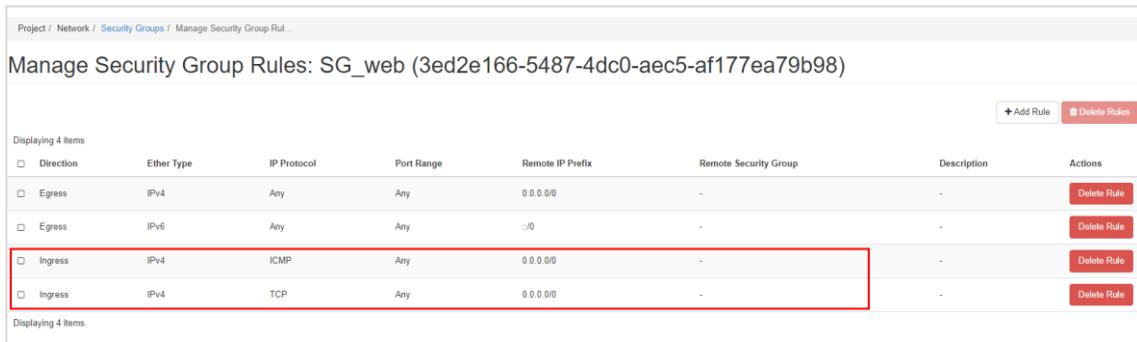
Direction
Ingress

Remote * ?
CIDR
0.0.0.0/0

Description:
Rules define which traffic is allowed to instances assigned to the security group. A security group rule consists of three main parts:
Rule: You can specify the desired rule template or use custom rules, the options are Custom TCP Rule, Custom UDP Rule, or Custom ICMP Rule.
Open Port/Port Range: For TCP and UDP rules you may choose to open either a single port or a range of ports. Selecting the "Port Range" option will provide you with space to provide both the starting and ending ports for the range. For ICMP rules you instead specify an ICMP type and code in the spaces provided.
Remote: You must specify the source of the traffic to be allowed via this rule. You may do so either in the form of an IP address block (CIDR) or via a source group (Security Group). Selecting a security group as the source will allow any other instance in that security group access to any other instance via this rule.

Add

Step 10 Return to the **Manage Security Group Rules: SG_web** page and view the security group rule list.



Project / Network / Security Groups / Manage Security Group Rule...

Manage Security Group Rules: SG_web (3ed2e166-5487-4dc0-aec5-af177ea79b98)

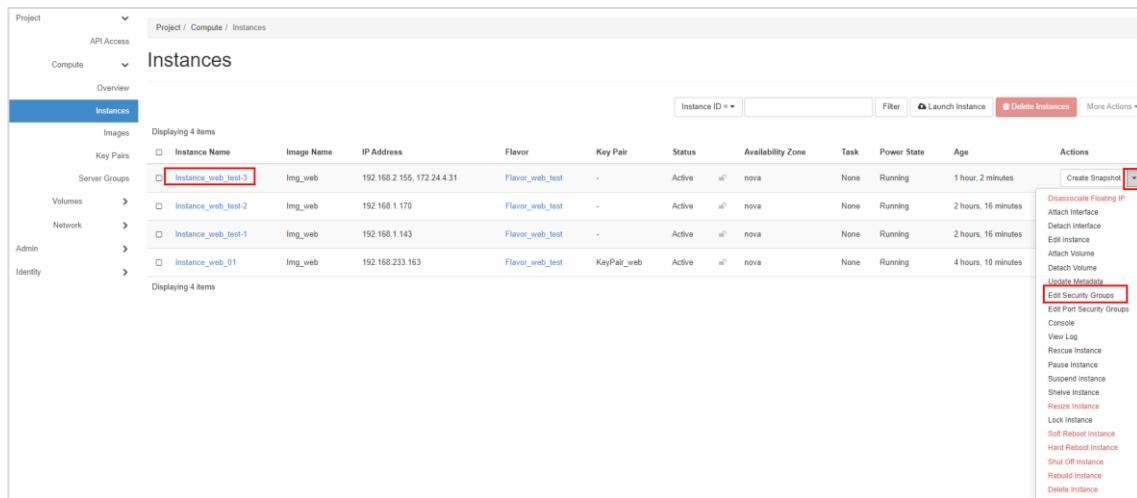
+ Add Rule | Delete Rules

Displaying 4 items

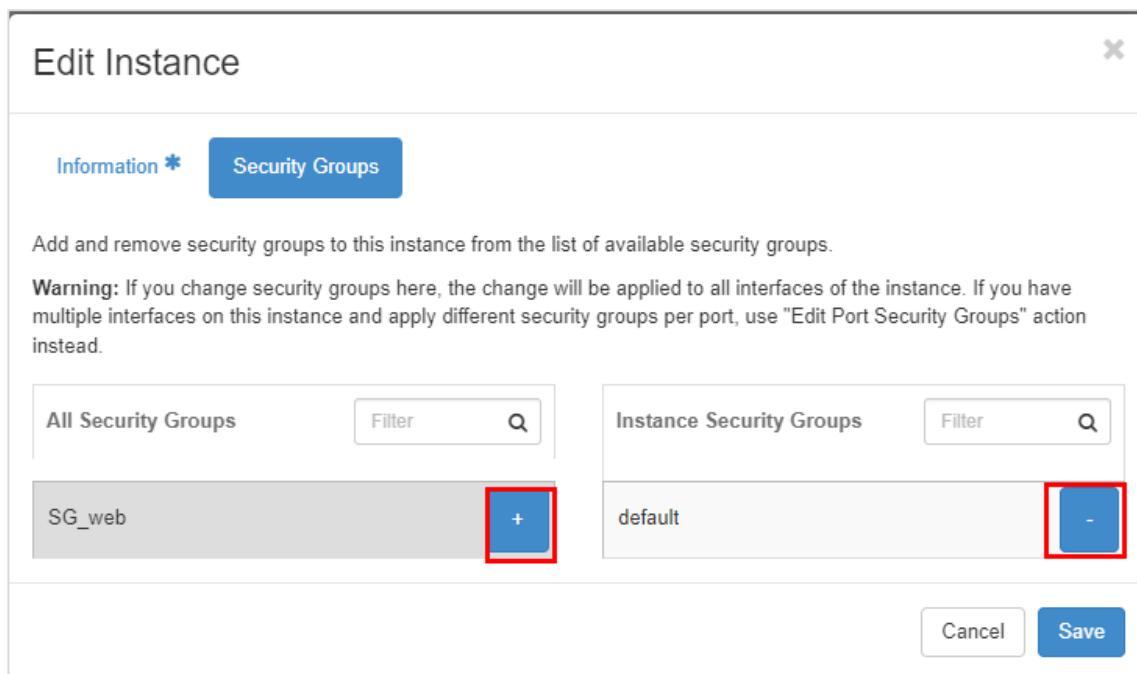
Direction	Ether Type	IP Protocol	Port Range	Remote IP Prefix	Remote Security Group	Description	Actions
Egress	IPv4	Any	Any	0.0.0.0/0	-	-	Delete Rule
Egress	IPv6	Any	Any	::/0	-	-	Delete Rule
Ingress	IPv4	ICMP	Any	0.0.0.0/0	-	-	Delete Rule
Ingress	IPv4	TCP	Any	0.0.0.0/0	-	-	Delete Rule

Displaying 4 items

Step 11 In the navigation pane, choose **Project > Compute > Instances**. The instance list is displayed. Locate the row that contains **Instance_web_test-3**, click  in the **Actions** column, and select **Edit Security Groups**.



Step 12 The **Edit Instance** dialog box is displayed. On the **Security Groups** tab page, click  next to **default** to remove the default security group and click  next to **SG_web** to add the security group. Click **Save**.



Edit Instance

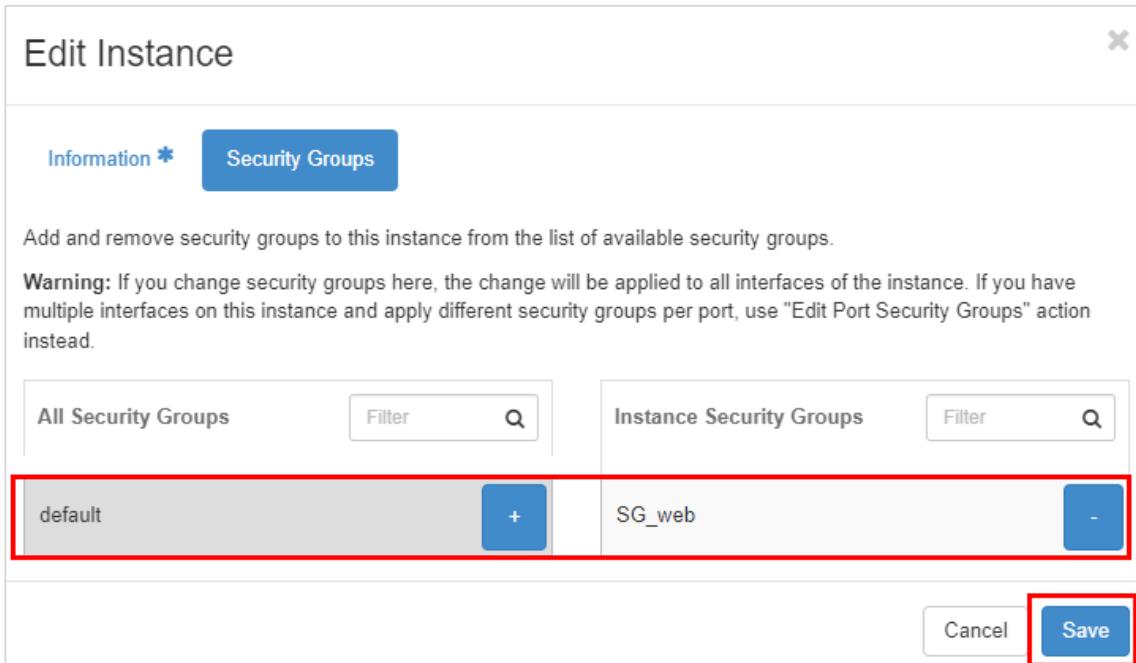
[Information *](#) [Security Groups](#)

Add and remove security groups to this instance from the list of available security groups.

Warning: If you change security groups here, the change will be applied to all interfaces of the instance. If you have multiple interfaces on this instance and apply different security groups per port, use "Edit Port Security Groups" action instead.

All Security Groups	Filter	Instance Security Groups	Filter
default	+	SG_web	-

[Cancel](#) [Save](#)



Step 13 Return to the instance list. Click the **Instance_web_test-3** server instance, and repeat step 1 to view the security group rules applied to the server instance.

Project / Compute / Instances / Instance_web_test-3

Instance_web_test-3

Overview Interfaces Log Console Action Log

Name	Instance_web_test-3
ID	eccbaf05-ea02-4ade-b1d0-7a18a5447623
Description	-
Project ID	255b94db7cab45c4b681984b83b4d794
Status	Active
Locked	False
Availability Zone	nova
Created	[REDACTED]
Age	1 hour, 6 minutes
Host	ecs-yoga
Instance Name	instance-00000006
Reservation ID	r-cojbrddn
Launch Index	-
Hostname	instance-web-test-3
Kernel ID	-
Ramdisk ID	-
Device Name	/dev/vda
User Data	-

Specs

Flavor	Not available
--------	---------------

IP Addresses

Network_web_02	192.168.2.155, 172.24.4.31
----------------	----------------------------

Security Groups

SG_web	ALLOW IPv4 to 0.0.0.0/0 ALLOW IPv4 icmp from 0.0.0.0/0 ALLOW IPv6 to ::/0 ALLOW IPv4 tcp from 0.0.0.0/0
--------	--

Step 14 Check whether the floating IP address of the **Instance_web_test-3** server instance can be pinged from external network.

```
root@ecs-yoga:~# ping 172.24.4.31 -c 5
PING 172.24.4.31 (172.24.4.31) 56(84) bytes of data.
64 bytes from 172.24.4.31: icmp_seq=1 ttl=63 time=1.58 ms
64 bytes from 172.24.4.31: icmp_seq=2 ttl=63 time=0.608 ms
64 bytes from 172.24.4.31: icmp_seq=3 ttl=63 time=0.346 ms
64 bytes from 172.24.4.31: icmp_seq=4 ttl=63 time=0.321 ms
64 bytes from 172.24.4.31: icmp_seq=5 ttl=63 time=0.345 ms

--- 172.24.4.31 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4065ms
rtt min/avg/max/mdev = 0.321/0.640/1.584/0.483 ms
root@ecs-yoga:~#
```

As shown in the preceding figure, the floating IP address of the server instance can be pinged from external network.

- Step 15 Use SSH to log in to the **Instance_web_test-3** server instance and check whether the login is successful. (The password of the **CirrOS** user is **gocubsgo**.)

```
root@ecs-yoga:~# ssh cirros@172.24.4.31
The authenticity of host '172.24.4.31 (172.24.4.31)' can't be established.
ECDSA key fingerprint is SHA256:m2ZLk78Q3sknkscQiU0jZ0ffIEYTPaSYWWRXM6c25i4.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '172.24.4.31' (ECDSA) to the list of known hosts.
cirros@172.24.4.31's password:
$
```

As shown in the preceding figure, the login to the **Instance_web_test-3** server instance is successful.

7.3 Operations Using the OpenStack CLI

7.3.1 Creating a Network

- Step 1 Log in to the ECS where OpenStack is deployed and run the following command to import environment variables of user **admin**:

```
su - stack
cd devstack
.admin-openrc.sh
```

```
root@ecs-yoga:~# su - stack
stack@ecs-yoga:~$ cd devstack/
stack@ecs-yoga:~/devstack$ . admin-openrc.sh
```

- Step 2 Run the following command to create the **share Network_cli_01** network and set **shared** to **True**:

```
openstack network create --share Network_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack network create --share Network_cli_01
+-----+-----+
| Field | Value |
+-----+-----+
| admin_state_up | UP |
| availability_zone_hints | |
| availability_zones | [REDACTED] |
| created_at | 2022-07-26T13:55:55Z |
| description | |
| dns_domain | None |
| id | a7be5db6-ffaa-4f75-a918-3eccc2207cd5 |
| ipv4_address_scope | None |
| ipv6_address_scope | None |
| is_default | False |
| is_vlan_transparent | None |
| mtu | 1442 |
| name | Network_cli_01 |
| port_security_enabled | True |
| project_id | 243072681e504e67be431e0df8c6fd7f |
| provider:network_type | geneve |
| provider:physical_network | None |
| provider:segmentation_id | 56809 |
| qos_policy_id | None |
| revision_number | 1 |
| router:external | Internal |
| segments | None |
| shared | True |
| status | ACTIVE |
| subnets | |
| tags | |
| updated_at | 2022-07-26T13:55:55Z |
+-----+
stack@ecs-yoga:~/devstack$
```

Step 3 Run the following command to view the network list:

```
openstack network list
```

```
stack@ecs-yoga:~/devstack$ openstack network list
+-----+-----+-----+
| ID | Name | Subnets |
+-----+-----+-----+
| 38d1fe0e-e56e-4044-8183-656ea9eaed7a | Network_web_01 | 7381257e-1b63-4bef-b993-9e5d948160f1 |
| 41b555ca-2730-4384-be7d-b2ff5a2d941e | shared | fc727d99-5515-4a5b-bdd8-30a13fe85120 |
| 81562ed4-fdd7-473c-b191-b95f151a894 | public | 2f74146d-e683-4989-8119-03915a0390d9, 7d81e9de-0b6c-44d2-88f0-7a2d2ebdd3fb |
| a7be5db6-ffaa-4f75-a918-3eccc2207cd5 | Network_cli_01 | [REDACTED] |
| aab52ada-0fea-4eeb-979e-c9cf5b9e46bc4f | Network_web_02 | 6f764d8a-c0f2-4008-9ba2-3adaa6ee99ab |
| e3e028f9-19dd-41c0-9ea3-6c587662bc80 | private | 19a9d93c-842c-4be2-aa82-e0834a742e3c, 3bfed272-ecb9-41be-90e9-a5688ef1838b |
+-----+-----+-----+
```

Step 4 Run the following command to create the **Subnet_cli_01** subnet for the **Network_cli_01** network with the following configuration:

- Network address: **192.168.3.0/24**
- Subnet address pool: **192.168.3.100~192.168.3.200**
- Gateway address: **192.168.3.1**

```
openstack subnet create --network Network_cli_01 --subnet-range 192.168.3.0/24 --allocation-pool start=192.168.3.100,end=192.168.3.200 --gateway 192.168.3.1 Subnet_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack subnet create --network Network_cli_01 --subnet-range 192.168.3.0/24 --allocation-pool start=192.1
68.3.100,end=192.168.3.200 --gateway 192.168.3.1 Subnet_cli_01
+-----+
| Field          | Value
+-----+
| allocation_pools | 192.168.3.100-192.168.3.200
| cidr           | 192.168.3.0/24
| created_at     | 2022-08-22T02:35Z
| description     |
| dns_nameservers |
| dns_publish_fixed_ip | None
| enable_dhcp     | True
| gateway_ip      | 192.168.3.1
| host_routes     |
| id              | f355335d-1147-4a28-aabc-f272d0d97bd7
| ip_version       | 4
| ipv6_address_mode | None
| ipv6_ra_mode     | None
| name             | Subnet_cli_01
| network_id       | a/bebdbb-ffaa-4f75-a918-3eccc2287cd5
| project_id       | 2438/2581e594eb7be451e0df8c6fd7f
| revision_number  | 0
| segment_id       | None
| service_types    |
| subnetpool_id    | None
| tags             |
| updated_at       | 2022-08-22T02:35Z
+-----+
```

Step 5 Run the following command to view the network subnet list:

```
openstack subnet list
```

```
stack@ecs-yoga:~/devstack$ openstack subnet list
+-----+-----+-----+-----+
| ID      | Name        | Network      | Subnet      |
+-----+-----+-----+-----+
| 19ad93c-842c-4be2-aa82-e0034a742e5c | ipv6-private-subnet | e3e02879-19dd-41c8-9ea5-6c5876625c80 | fd9c:18e6:f6bc::/64
| 2f74146d-e685-4989-8119-03913a0390d9 | ipv6-public-subnet | 81562ed4-f0d7-473c-b191-b95f15a1a894 | 2001:db8::/64
| 36fed272-ecb9-41be-98e9-a5b88ef1838b | private-subnet   | e3e02879-19dd-41c8-9ea5-6c5876625c80 | 10.0.0.0/26
| 6f7b4d8a-c0f2-40d8-9ba2-3adaa6ee99ab | Subnet_web_02    | aa552ada-0fea-4e6b-979e-c9cf1e466c4f | 192.168.2.0/24
| 7381257e-1bb3-4bef-b993-9e5d948160f1 | Subnet_web_01    | 38d1fe0e-e56e-4044-8183-656ea9eaed7a | 192.168.1.0/24
| 7d81e9de-0bbc-44d2-88f0-7a2d2ebdd3f4 | public-subnet   | 81362ed4-f0d7-473c-b191-b95f15a1a894 | 172.24.4.0/24
| f355335d-1147-4a28-aabc-f272d0d97bd7 | Subnet_cli_01    | a7be5dbb-ffaa-4f75-a918-3eccc2287cd5 | 192.168.3.0/24
| fc727d09-5515-4a5b-bdd8-30a13fe85120 | snared-subnet   | 410553ca-2750-4384-be7d-b2ff2a2d941e | 192.168.233.0/24
+-----+-----+-----+-----+
```

Step 6 Run the following command to view the port list of the **Network_cli_01** network:

```
openstack port list --network Network_cli_01 --long
```

```
stack@ecs-yoga:~/devstack$ openstack port list --network Network_cli_01 --long
+-----+-----+-----+-----+
| ID      | Name        | MAC Address | Fixed IP Addresses
| Status | Security Groups | Device Owner | Tags |
+-----+-----+-----+-----+
| 4c30e2ba-3269-4212-9521-0c5820e72b72 | fa:16:3e:f1:93:69 | ip_address='192.168.3.100', subnet_id='f355335d-1147-4a28-aabc-f272d0d97bd7' |
| DOWN   | None        | network:distributed |      |
+-----+-----+-----+-----+
stack@ecs-yoga:~/devstack$
```

Step 7 Run the following commands to create the **Network_cli_02** network and the **Subnet_cli_02** subnet. The subnet configuration requirements are as follows. Other configurations are the same as those of the **Network_cli_01** network and the **Subnet_cli_01** subnet.

- Network address: **192.168.4.0/24**
- Subnet address pool: **192.168.4.100~192.168.4.200**
- Gateway address: **192.168.4.1**

```
openstack network create --share Network_cli_02
```

```
stack@ecs-yoga:~/devstack$ openstack network create --share Network_cli_02
+-----+-----+
| Field | Value |
+-----+-----+
| admin_state_up | UP |
| availability_zone_hints | |
| availability_zones | |
| created_at | 2018-07-20T07:46Z |
| description | |
| dns_domain | None |
| id | 975ad298-f575-4e34-ab85-a589b13ed2ac |
| ipv4_address_scope | None |
| ipv6_address_scope | None |
| is_default | False |
| is_vlan_transparent | None |
| mtu | 1442 |
| name | Network_cli_02 |
| port_security_enabled | True |
| project_id | 243072681e504e67be431e0df8c6fd7f |
| provider:network_type | geneve |
| provider:physical_network | None |
| provider:segmentation_id | 6433 |
| qos_policy_id | None |
| revision_number | 1 |
| router:external | Internal |
| segments | None |
| shared | True |
| status | ACTIVE |
| subnets | |
| tags | |
| updated_at | 2018-07-20T07:46Z |
+-----+
```

```
openstack subnet create --network Network_cli_02 --subnet-range 192.168.4.0/24 --allocation-pool start=192.168.4.100,end=192.168.4.200 --gateway 192.168.4.1 Subnet_cli_02
```

```
stack@ecs-yoga:~/devstack$ openstack subnet create --network Network_cli_02 --subnet-range 192.168.4.0/24 --allocation-pool start=192.168.4.100,end=192.168.4.200 --gateway 192.168.4.1 Subnet_cli_02
+-----+-----+
| Field | Value |
+-----+-----+
| allocation_pools | 192.168.4.100-192.168.4.200 |
| cidr | 192.168.4.0/24 |
| created_at | 2018-07-20T07:46Z |
| description | |
| dns_nameservers | |
| dns_publish_fixed_ip | None |
| enable_dhcp | True |
| gateway_ip | 192.168.4.1 |
| host_routes | |
| id | e83509f6-ba60-450e-978f-7c97392f8a42 |
| ip_version | 4 |
| ipv6_address_mode | None |
| ipv6_ra_mode | None |
| name | Subnet_cli_02 |
| network_id | 975ad298-f575-4e34-ab85-a589b13ed2ac |
| project_id | 243072681e504e67be431e0df8c6fd7f |
| revision_number | 0 |
| segment_id | None |
| service_types | |
| subnetpool_id | None |
| tags | |
| updated_at | 2018-07-20T07:46Z |
+-----+
```

Step 8 Run the following commands to view the network and subnet lists, respectively:

```
openstack network list
```

```
stack@ecs-yoga:~/devstack$ openstack network list
+-----+-----+-----+
| ID | Name | Subnets |
+-----+-----+-----+
| 38d1fe9e-e55e-4044-8183-b55ea90eaed7a | Network_web_01 | 7381257e-1b63-4bef-b993-9ab5d949168f1 |
| 410553ca-2730-4384-be7d-b2ff5a2d941e | shared | fc27d09-5515-4a5b-bdd9-30a15fe85120 |
| 81362ed4-f0d7-473c-b191-b95f15ala894 | public | 2f74146d-e883-4989-8119-03915a8390d9, 7d81e9de-0b6c-44d2-88f0-7a2d2ebdd3f5 |
| 975ad298-f575-4e34-ab85-a589b13ed2ac | Network_cli_02 | d27fb843-1731-419e-b5b0-c4308e1c86b6 |
| a/b6edb6-ffaa-4f75-a918-3eccc2287cd5 | Network_cli_01 | f35b535d-1147-4a28-aabc-f272d0d97bd7 |
| a5b52ada-0fea-4ee5-979e-c9cf5e46bc4f | Network_web_02 | 6f764d8a-c0f2-40d8-9ba2-3adaa6ee99ab |
| e3e028ca-f9dd-41c9-9ea3-bc587652c80 | private | 19a9d93c-842c-4be2-aa82-e0034a742e3c, 36fed272-ecb9-41be-90e9-a5688ef1838b |
+-----+
```

openstack subnet list

ID	Name	Network	Subnet
19a9d93c-842c-4be2-aa82-e0034a742e3c	ipv6-private-subnet	e3e028f9-19dd-41c0-9ea3-6c5876625c80	fd9c:15e6:f6bc::/64
2f74146d-e883-4989-8119-03913ab590d9	ipv6-public-subnet	81362ed4-f0d7-473c-b195f15a1a894	2001:db8::/64
36fed272-ecb9-41be-90e9-a5688ef1838b	private-subnet	e3e028f9-19dd-41c0-9ea3-6c5876625c80	10.0.0.0/26
6f764d8a-c0f2-40d8-9ba2-3ada6ee99ab	Subnet_web_02	a3552ada-0fea-4ee5-979e-c9cf5e466c4f	192.168.2.0/24
75812570-1b63-4bef-b993-9e5d948160f1	Subnet_web_01	38d1fe0e-e56e-4044-8183-656ea9eaed7a	192.168.1.0/24
7d81e9de-005c-44d2-88f0-7a2d2ebdd3f5	public-subnet	81362ed4-f0d7-473c-b195f15a1a894	172.24.4.0/24
d277bb45-1731-419e-b3b0-c4308e1c88b6	Subnet_cli_02	975ad298-f575-4e34-ab55-a589b1ed2ac	192.168.4.0/24
f55b535d-1147-4a28-aabc-f272d0d97bd7	Subnet_cli_01	a/b85db6-ffaa-4f75-a918-3eccc220/cd5	192.168.3.0/24
fc27d09-5515-4a5b-bdd8-30a13fe85120	shared-subnet	410853ca-2730-4384-be7d-b2ff5a2d941e	192.168.233.0/24

7.3.2 Verification: Mutual Access of Server Instances

Step 1 Run the following command to provision two **Instance_cli_test** server instances with the following configuration:

- Server instance name: **Instance_cli_test**
- Quantity: **2**
- Boot source: **Image**
- Image: **Img_cli**
- Flavor: **Flavor_cli**
- Network: **Network_cli_01**
- Retain the default values for other parameters.

openstack server create --image Img_cli --flavor Flavor_cli --network Network_cli_01 --min 2 --max 2 Instance_cli_test

Field	Value
OS-DCF:diskConfig	MANUAL
OS-EXT-AZ:availability_zone	
OS-EXT-SRV-ATTR:host	None
OS-EXT-SRV-ATTR:hypervisor_hostname	None
OS-EXT-SRV-ATTR:instance_name	
OS-EXT-STS:power_state	NOSTATE
OS-EXT-STS:task_state	scheduling
OS-EXT-STS:vm_state	building
OS-SRV-USG:launched_at	None
OS-SRV-USG:terminated_at	None
accessIPv4	
accessIPv6	
addresses	
adminPass	6Q8nrL8JCovd
config_drive	
created	2023-07-20T10:45:12.000000Z
flavor	Flavor_cli (d32b0f6e-ab2c-4b3e-97b0-52991dcde324)
hostId	
id	0ba888c4-1c57-4870-b729-0866f43ee75d
image	Img_cli (4b9b23e7-1/bf-487d-b308-e969d9173e6b)
key_name	None
name	Instance_cli_test-1
progress	0
project_id	24s072681e5b4e6/be431e0df8c6fd7f
properties	
security_groups	name='default'
status	BUILD
updated	2023-07-20T10:45:12.000000Z
user_id	df6bc330f73e4ea3b5b2e6cc80cf251f
volumes_attached	

Step 2 Run the following command to check the server instance list:

openstack server list

ID	Name	Status	Networks	Image	Flavor
0ba888c4-1c37-4870-b729-8866f43ee75d	Instance_cli_test-1	ACTIVE	Network_cli_01=192.168.3.197	Img_cli	Flavor_cli
0ff3475-4645-46da-8dd6-34859151b6f5	Instance_cli_test-2	ACTIVE	Network_cli_01=192.168.3.145	Img_cli	Flavor_cli
07b784ca-f40e-4d7c-8291-0f2185fc2a2d	Instance_web_test-3	ACTIVE	Network_web_02=172.24.4.199, 192.168.2.111	Img_web	Flavor_web_test
1213c9ce-573b-4493-822a-ddeaaad8a3e	Instance_web_test-2	ACTIVE	Network_web_01=192.168.1.192	Img_web	Flavor_web_test
4798b28f-78f4-4421-9319-31e82924c724	Instance_web_test-1	ACTIVE	Network_web_01=192.168.1.106	Img_web	Flavor_web_test
7f78a676-9013-4cbe-9e44-c81c0855a9a	Instance_cli_01	ACTIVE	shared=192.168.233.75	Img_cli	Flavor_cli
1fb78e66-f277-489b-bb8f-bb0cfef08353	Instance_web_01	ACTIVE	shared=192.168.233.4	Img_web	Flavor_web_test

Step 3 Check whether the **Instance_web_cli-1** and **Instance_cli_cli-2** server instances can ping each other by performing steps 2 to 9 in 7.2.2.

```
login as 'cirros' user. default password: 'gocubsgo'. use 'sudo' for root.
instance-cli-test-1 login: cirros
Password:
$ ping 192.168.3.145
PING 192.168.3.145 (192.168.3.145): 56 data bytes
64 bytes from 192.168.3.145: seq=0 ttl=64 time=22.151 ms
64 bytes from 192.168.3.145: seq=1 ttl=64 time=1.453 ms
64 bytes from 192.168.3.145: seq=2 ttl=64 time=1.130 ms
64 bytes from 192.168.3.145: seq=3 ttl=64 time=3.739 ms
64 bytes from 192.168.3.145: seq=4 ttl=64 time=0.886 ms
```

Step 4 Run the following command to provision the **Instance_cli_test-3** server instance with the following configuration:

- Server instance name: **Instance_cli_test-3**
- Boot source: **Image**
- Image: **Img_cli**
- Flavor: **Flavor_cli**
- Network: **Network_cli_02**
- Retain the default values for other parameters.

```
openstack server create --image Img_cli --flavor Flavor_cli --network Network_cli_02 Instance_cli_test-3
```

Field	Value
OS-DCF:diskConfig	MANUAL
OS-EXT-AZ:availability_zone	None
OS-EXT-SRV-ATTR:host	None
OS-EXT-SRV-ATTR:hypervisor_hostname	None
OS-EXT-SRV-ATTR:instance_name	None
OS-EXT-STS:power_state	NOSTATE
OS-EXT-STS:task_state	scheduling
OS-EXT-STS:vm_state	building
OS-SRV-USG:launched_at	None
OS-SRV-USG:terminated_at	None
accessIPv4	
accessIPv6	
addresses	aH9qyXQre8xQ
adminPass	
config_drive	
created	2023-07-17T12:43Z
flavor	Flavor_cli (d52b0f6e-ab2c-4b3e-97b0-52991dcde324)
hostId	
id	e4895a68-6192-43d5-91d8-86c3630712d8
image	Img_cli (4b9b230e-17bf-487d-b308-e969d9173e6b)
key_name	None
name	Instance_cli_test-3
progress	0
project_id	243072681e504e67be431e0df8c6fd7f
properties	
security_groups	name='default'
status	BUILD
updated	2023-07-17T12:42Z
user_id	df6bc350f73e4ea3b5b2e6cc0cf251f
volumes_attached	

ID	Name	Status	Networks	Image	Flavor
c34aff06-47f7-4f45-8171-f5103b7182ed	Instance_cli_test-3	ACTIVE	Network_cli_02=192.168.4.157	Img_cli	Flavor_cli
0ba88bc4-1c37-4870-b729-0866f43ee7bd	Instance_cli_test-1	ACTIVE	Network_cli_01=192.168.3.197	Img_cli	Flavor_cli
0fff3475-4645-46da-8bd6-3405915bbfb5	Instance_cli_test-2	ACTIVE	Network_cli_01=192.168.3.145	Img_cli	Flavor_cli
07b764ca-f40e-4d7c-8291-0f21857c2a2d	Instance_web_test-3	ACTIVE	Network_web_02=172.24.4.199, 192.168.2.111	Img_web	Flavor_web_test
1213c9ce-573b-4493-822a-dddeaaaf8a3e	Instance_web_test-2	ACTIVE	Network_web_01=192.168.1.192	Img_web	Flavor_web_test
479bb28f-78f4-4421-9319-31e82524c724	Instance_web_test-1	ACTIVE	Network_web_01=192.168.1.106	Img_web	Flavor_web_test
7178a676-9813-4cbe-9e44-c01c0855b59a	Instance_cli_01	ACTIVE	shared=192.168.233.75	Img_cli	Flavor_cli
1f676e66-f277-489b-b68f-8b0cffeb8353	Instance_web_01	ACTIVE	shared=192.168.233.4	Img_web	Flavor_web_test

Step 5 Check whether the **Instance_cli_test-3** and **Instance_cli_test-1** server instances can ping each other by performing step 12 in 7.2.2.

```
$ hostname
instance-cli-test-1
$ ping 192.168.4.157 -c 5
PING 192.168.4.157 (192.168.4.157): 56 data bytes

--- 192.168.4.157 ping statistics ---
5 packets transmitted, 0 packets received, 100% packet loss
$
```

7.3.3 Creating a Router

Step 1 Run the following command to create the **Router_cli** router:

```
openstack router create --project admin Router_cli
```

```
stack@ecs-yoga:~/devstack$ openstack router create --project admin Router_cli
+-----+-----+
| Field          | Value   |
+-----+-----+
| admin_state_up | UP      |
| availability_zone_hints |           |
| availability_zones |           |
| created_at     | 2018-07-10T10:45:00Z |
| description    |           |
| external_gateway_info | null   |
| flavor_id      | None    |
| id             | 9fbce2b4-84fe-4f2f-82d2-b1bb5a7054a5 |
| name           | Router_cli |
| project_id     | 243072681e504e67be431e0df8c6fd7f |
| revision_number | 0       |
| routes         |           |
| status          | ACTIVE   |
| tags            |           |
| updated_at     | 2018-07-10T10:45:00Z |
+-----+-----+
stack@ecs-yoga:~/devstack$
```

Step 2 Run the following command to view the router list:

```
openstack router list
```

ID	Name	Status	State	Project
3294d948-54d4-4bbd-9dd1-85e882e0cf8f	router1	ACTIVE	UP	c2c4a66bc3fb49bab2ad4c0bf7e0d6c
5b4f4b36-5828-4ff8-aa58-61cc0db22d49	Router_web	ACTIVE	UP	5984995ac304483887af30f826eb92df
c7670ee2-0d12-43ef-a22a-484cf63df107	Router_cli	ACTIVE	UP	5984995ac304483887af30f826eb92df

- Step 3 Run the following command to set the external network of router **Router_cli** to **public**:

```
openstack router set --external-gateway public Router_cli
```

```
stack@ecs-yoga:~/devstack$ openstack router set --external-gateway public Router_cli
stack@ecs-yoga:~/devstack$
```

- Step 4 Run the following commands to add the ports of the **Subnet_cli_01** and **Subnet_cli_02** subnets on the **Router_cli** router:

```
openstack router add subnet Router_cli Subnet_cli_01
```

```
stack@ecs-yoga:~/devstack$ openstack router add subnet Router_cli Subnet_cli_01
stack@ecs-yoga:~/devstack$
```

```
openstack router add subnet Router_cli Subnet_cli_02
```

```
stack@ecs-yoga:~/devstack$ openstack router add subnet Router_cli Subnet_cli_02
stack@ecs-yoga:~/devstack$
```

- Step 5 Run the following command to check the port details of the **Router_cli** router:

```
openstack router show Router_cli | grep interfaces_info
```

```
stack@ecs-yoga:~/devstack$ openstack router show Router_cli | grep interfaces_info
| interfaces_info | [{"port_id": "26ab5c3db-b5fd-4b19-a344-bdc95b09b882", "ip_address": "192.168.4.1", "subnet_id": "e83509f6-ba69-4586-9781-7c07392f8a42"}, {"port_id": "36213fc3-8d4d-45f6-a830-61fcfd20c3d42", "ip_address": "192.168.3.1", "subnet_id": "f355335d-1147-4a28-aabc-f272d0d97bd7"}]
stack@ecs-yoga:~/devstack$
```

- Step 6 Check whether the **Instance_web_test-3** and **Instance_web_test-1** server instances can ping each other by performing step 12 in 7.2.2.

```
$ hostname
instance-cli-test-1
$ ping 192.168.4.157 -c 5
PING 192.168.4.157 (192.168.4.157): 56 data bytes
64 bytes from 192.168.4.157: seq=0 ttl=63 time=11.080 ms
64 bytes from 192.168.4.157: seq=1 ttl=63 time=1.826 ms
64 bytes from 192.168.4.157: seq=2 ttl=63 time=1.008 ms
64 bytes from 192.168.4.157: seq=3 ttl=63 time=1.236 ms
64 bytes from 192.168.4.157: seq=4 ttl=63 time=0.969 ms

--- 192.168.4.157 ping statistics ---
5 packets transmitted, 5 packets received, 0% packet loss
round-trip min/avg/max = 0.969/3.223/11.080 ms
$
```

7.3.4 Managing a Floating IP Address

- Step 1 Check whether the **Instance_cli_test-3** server instance can be pinged from external network by repeating step 1 in 7.2.4.

```
stack@ecs-yoga:~/devstack$ ping 192.168.4.157 -c 5
PING 192.168.4.157 (192.168.4.157) 56(84) bytes of data.

--- 192.168.4.157 ping statistics ---
5 packets transmitted, 0 received, 100% packet loss, time 4096ms

stack@ecs-yoga:~/devstack$ 
```

Step 2 Run the following command to check the network port of the **Instance_cli_test-3** server instance to be assigned:

```
openstack port list --server Instance_cli_test-3
```

```
stack@ecs-yoga:~/devstack$ openstack port list --server Instance_cli_test-3
+-----+
| ID           | Name | MAC Address      | Fixed IP Addresses |
| Status       |      |                 |                    |
+-----+
| af0d544e-9991-4219-bc79-8b34052ab48c | fa:16:3e:90:2f:29 | ip_address='192.168.4.157', subnet_id='e83509f6-ba60-4500-978f-7c97392f8a42' |
| ACTIVE       |      |                 |                    |
+-----+
```

Record the network port ID of the **Instance_cli_test-3** server instance to be assigned.

Step 3 Run the following command to create and assign a floating IP address of the **public** external network to the network port of the **Instance_cli_test-3** server instance:

```
openstack floating ip create --port PORT_ID public
```

```
stack@ecs-yoga:~/devstack$ openstack floating ip create --port af0d544e-9991-4219-bc79-8b34052ab48c public
+-----+
| field          | Value           |
+-----+
| created_at     | 2022-09-01T07:41:40Z
| description    | 
| dns_domain     | 
| dns_name       | 
| fixed_ip_address | 192.168.4.157
| floating_ip_address | 172.24.4.229
| floating_network_id | 81362ed4-f0d7-475c-b191-b95f1b1a894
| id             | 3d7db845-e238-461e-bcb5-dbb8897d64b
| name           | 172.24.4.229
| port_details   | {"name": "", "network_id": "975ad298-f575-4e54-ab8b-a589b15ed2ac", "mac_address": "fa:16:3e:90:2f:29", "admin_state_up": true, "status": "ACTIVE", "device_id": "c54aff00-47f7-45b1-71-f51b5b182ed", "device_owner": "compute:nova"}
| port_id        | af0d544e-9991-4219-bc79-8b34052ab48c
| project_id     | 243872681e504e67be451e0df8c5fd7
| qos_policy_id  | None
| revision_number | 0
| router_id      | 9fbce2b4-84fe-412f-82d2-b1bb5a7054e5
| status          | DOWN
| subnet_id      | None
| tags            | []
| updated_at     | 2022-09-01T07:41:40Z
+-----+
```

Step 4 Run the following command to view the floating IP address list and the network port status:

```
openstack floating ip list --long
```

```
stack@ecs-yoga:~/devstack$ openstack floating ip list --long
+-----+-----+-----+-----+-----+-----+-----+-----+
| ID           | Floating IP Address | Fixed IP Address | Port          | Floating Network | Project        | Router        |
| Status       | Description | Tags | DNS Name | DNS Domain |               |               |
+-----+-----+-----+-----+-----+-----+-----+-----+
| 5867bddf-9980-4c42-b0f8-c1d9f1904eef | 172.24.4.199 | 192.168.2.111 | 2/d58fb5-a9b5-44d1-93ee-/89b52ba9/bb | 81362ed4-f0d7-475c-b191-b95f1b1a894 | 243872681e504e67be451e0df8c5fd7 | 484bc488-5457-46e1-8457-4b2ec59b014 | ACTIVE |
| 3d7db845-e238-461e-bcb5-dbb8897d64b | 172.24.4.229 | 192.168.4.157 | af0d544e-9991-4219-bc79-8b34052ab48c | 81362ed4-f0d7-475c-b191-b95f1b1a894 | 243872681e504e67be451e0df8c5fd7 | 9fbce23d-44fe-4721-8222-b1db5a70543 | ACTIVE |
+-----+-----+-----+-----+-----+-----+-----+-----+
```

- Step 5 Check whether the **Instance_web_test-3** server instance can be pinged from external network by repeating step 1.

```
stack@ecs-yoga:~/devstack$ ping 192.168.4.157 -c 5
PING 192.168.4.157 (192.168.4.157) 56(84) bytes of data.

--- 192.168.4.157 ping statistics ---
5 packets transmitted, 0 received, 100% packet loss, time 4082ms

stack@ecs-yoga:~/devstack$ 
```

- Step 6 Run the following commands to create a floating IP address and check the network port status:

```
openstack floating ip create public
```

```
stack@ecs-yoga:~/devstack$ openstack floating ip create public
+-----+-----+
| Field          | Value
+-----+-----+
| created_at     | 2020-04-29T10:45:00Z
| description    |
| dns_domain     |
| dns_name       |
| fixed_ip_address | None
| floating_ip_address | 172.24.4.54
| floating_network_id | 81362ed4-f0d7-473c-b191-b95f15a1a894
| id             | e6a38cc1-80cd-4733-b5cf-97102cca6856
| name           | 172.24.4.54
| port_details   | None
| port_id        | None
| project_id     | 243072681e504e67be431e0df8c6fd7f
| qos_policy_id  | None
| revision_number | 0
| router_id      | None
| status          | DOWN
| subnet_id      | None
| tags            | []
| updated_at     | 2020-04-29T10:45:00Z
+-----+
```

```
openstack floating ip list --long
```

```
stack@ecs-yoga:~/devstack$ openstack floating ip list --long
+-----+-----+-----+-----+-----+-----+
| ID              | Floating IP Address | Fixed IP Address | Port
| Status          | Description          | Tags            | DNS Name | DNS Domain |
+-----+-----+-----+-----+-----+-----+
| 38670dd7-990d-4c42-b5f0-c7d69f964eef | 172.24.4.199 | 192.168.2.111 | 27d50fb3
| 08-5457-4ee1-8437-4b2ecc396014 | ACTIVE | [] | | |
| 3d7da643-e238-461e-bcb5-dbb88997d64b | 172.24.4.229 | 192.168.4.157 | af0d344e
| b4-84fe-4f2f-82d2-b1bb5a7054a5 | ACTIVE | [] | | |
| e6a38cc1-80cd-4733-b5cf-97102cca6856 | 172.24.4.54 | None | None |
| DOWN | | | | |
+-----+-----+-----+-----+-----+-----+
```

Record the floating IP address newly created.

- Step 7** Run the following command to assign a floating IP address to the **Instance_cli_test-1** server instance:

```
openstack server add floating ip Instance_cli_test-1 FLOATING_IP
```

```
stack@ecs-yoga:~/devstack$ openstack server add floating ip Instance_cli_test-1 172.24.4.54
stack@ecs-yoga:~/devstack$ openstack floating ip list --long
+-----+-----+-----+-----+
| ID | Floating IP Address | Fixed IP Address | Port |
| Status | Description | Tags | DNS Name | DNS Domain |
+-----+-----+-----+-----+
| 38670dd7-990d-4c42-b5f0-c7d69f964eef | 172.24.4.199 | 192.168.2.111 | 27d50fb308-5457-4ee1-8437-4b2ecc396014 | ACTIVE | [] | | |
| 3d7da643-e238-461e-bcb5-dbb88997d64b | 172.24.4.229 | 192.168.4.157 | af0d344eb4-84fe-4f2f-82d2-b1bb5a7054a5 | ACTIVE | [] | | |
| e6a38cc1-80cd-4733-b5cf-97102cca6856 | 172.24.4.54 | 192.168.3.197 | 9bc8e310b4-84fe-4f2f-82d2-b1bb5a7054a5 | ACTIVE | [] | | |
+-----+-----+-----+-----+
```

- Step 8** Run the following command to unassign the floating IP address from the **Instance_cli_test-1** server instance:

```
openstack server remove floating ip Instance_cli_test-1 FLOATING_IP
```

```
stack@ecs-yoga:~/devstack$ openstack server remove floating ip Instance_cli_test-1 172.24.4.54
stack@ecs-yoga:~/devstack$ openstack floating ip list --long
+-----+-----+-----+-----+
| ID | Floating IP Address | Fixed IP Address | Port |
| Status | Description | Tags | DNS Name | DNS Domain |
+-----+-----+-----+-----+
| 38670dd7-990d-4c42-b5f0-c7d69f964eef | 172.24.4.199 | 192.168.2.111 | 27d50fb3-a905-44d1-93ee-78908-5457-4ee1-8437-4b2ecc396014 | ACTIVE | [] | | |
| 3d7da643-e238-461e-bcb5-dbb88997d64b | 172.24.4.229 | 192.168.4.157 | af0d344e-9991-4219-bc79-8b3b4-84fe-4f2f-82d2-b1bb5a7054a5 | ACTIVE | [] | | |
| e6a38cc1-80cd-4733-b5cf-97102cca6856 | 172.24.4.54 | None | None | DOWN | [] | | |
+-----+-----+-----+-----+
stack@ecs-yoga:~/devstack$
```

- Step 9** Run the following command to release all unassigned floating IP addresses:

```
openstack floating ip delete FLOATING_IP
```

```
stack@ecs-yoga:~/devstack$ openstack floating ip delete 172.24.4.54
stack@ecs-yoga:~/devstack$
```

- Step 10** Run the following command to view the floating IP list:

```
openstack floating ip list
```

```
stack@ecs-yoga:~/devstack$ openstack floating ip list
+-----+-----+-----+-----+-----+-----+
| ID | Floating IP Address | Fixed IP Address | Port | Floating Network | Project |
+-----+-----+-----+-----+-----+-----+
| 38670dd7-990d-4c42-b5f0-c7d69f964eef | 172.24.4.199 | 192.168.2.111 | 27d50fb3-0895-44d1-93ee-78908-5457-4ee1-8437-4b2ecc396014 | 243872681e594e87be4218d78c5fd7f | |
| 3d7da643-e238-461e-bcb5-dbb88997d64b | 172.24.4.229 | 192.168.4.157 | af0d344e-9991-4219-bc79-8b3b4-84fe-4f2f-82d2-b1bb5a7054a5 | 81362ed4-f8d7-475c-b191-b95f15a1a894 | 243872681e594e87be4218d78c5fd7f |
```

Verification:

Can an assigned floating IP address be released directly if step 8 is not performed?

7.3.5 Creating a Security Group

- Step 1** Run the following command to check the security group to which the **Instance_cli_test-3** server instance belongs:

```
openstack server show Instance_cli_test-3
```

Field	Value
OS-DCF:diskConfig	MANUAL
OS-EXT-AZ:availability_zone	nova
OS-EXT-SRV-ATTR:host	ecs-yoga
OS-EXT-SRV-ATTR:hypervisor_hostname	ecs-yoga
OS-EXT-SRV-ATTR:instance_name	instance-0000000d
OS-EXT-STS:power_state	Running
OS-EXT-STS:task_state	None
OS-EXT-STS:vm_state	active
OS-SRV-USG:Launched_at	2022-09-01T07:34:46Z
OS-SRV-USG:terminated_at	None
accessIPv4	
accessIPv6	
addresses	Network_cli_02=172.24.4.229, 192.168.4.157
config_drive	
created	2022-09-01T07:34:46Z
flavor	Flavor_cli (d32b0f6e-ab2c-4b3e-97b0-52991dcde324)
hostId	27a39e46eb2fadef12086c51793de3a760caf49dbb07413a79fe3e23f
id	c34aff06-47f7-4f45-8171-f5103b7182ed
image	Img_cli (4b9b23e7-17bf-487d-b308-e969d9173e6b)
key_name	None
name	Instance_cli_test-3
progress	0
project_id	243072681e504e67be431e0df8c6fd7f
properties	
security_groups	name='default'
status	ACTIVE
updated	2022-09-01T07:34:46Z
user_id	df6bc350f73e4ea3b56b2e6cc0cf251f
volumes_attached	

Record the name and project ID of the security group to which the **Instance_cli_test-3** server instance belongs.

- Step 2** Run the following command to check the ID of the security group to which the **Instance_cli_test-3** server instance belongs:

```
openstack security group list --project PROJECT_ID
```

ID	Name	Description	Project	Tags
54e280bf-346c-4cd8-85a8-2118755e4a63	SG_web		243072681e504e67be431e0df8c6fd7f	[]
d32be157-ce36-417d-b118-a32c8e0760e6	default	Default security group	243072681e504e67be431e0df8c6fd7f	[]

Record the ID of the security group to which the **Instance_cli_test-3** server instance belongs.

- Step 3** Run the following command to check the security group rule ID of the **Instance_cli_test-3** server instance:

```
openstack security group rule list | grep SECURITY_GROUP_ID
```

2027/3b-25b9-422c-83ac-c08a5163b82 None	IPv6	::/0	egress	None	None	d32be157-ce36-417d-b118-a32c8e0760e6
05211a06-b162-45c7-9de6-617da811c844 None	IPv6	::/0	ingress	d32be157-ce36-417d-b118-a32c8e0760e6	None	d32be157-ce36-417d-b118-a32c8e0760e6
c1b1a292-7aa4-4c1a-8451-51e451194b2 None	IPv4	0.0.0.0/0	ingress	d32be157-ce36-417d-b118-a32c8e0760e6	None	d32be157-ce36-417d-b118-a32c8e0760e6
c50e9a72-062a-4cc1-988a-d17922875cf8 None	IPv4	0.0.0.0/0	egress	None	None	d32be157-ce36-417d-b118-a32c8e0760e6

Record the security group rule ID of the **Instance_cli_test-3** server instance.

Step 4 Run the following command to check the security group rule details of the **Instance_cli_test-3** server instance (the first rule is used as an example):

```
openstack security group rule show SECURITY_GROUP_RULE_ID
```

```
stack@ecs-yoga:~/devstack$ openstack security group rule show 2beb7736-25b9-422c-83ac-c80a63163b82
+-----+
| Field          | Value
+-----+
| created_at     | 2022-09-01T07:57:26Z
| description     | None
| direction       | egress
| ether_type      | IPv6
| id              | 2beb7736-25b9-422c-83ac-c80a63163b82
| name            | None
| port_range_max | None
| port_range_min | None
| project_id      | 243072681e504e67be431e0df8c6fd7f
| protocol        | None
| remote_address_group_id | None
| remote_group_id | None
| remote_ip_prefix | ::/0
| revision_number | 0
| security_group_id | d32bel57-ce36-417d-b118-a32c8e0760e6
| tags            | []
| tenant_id       | 243072681e504e67be431e0df8c6fd7f
| updated_at      | 2022-09-01T07:57:26Z
+-----+
```

Step 5 Run the following command to create the **SG_cli** security group:

```
openstack security group create SG_cli
```

```
stack@ecs-yoga:~/devstack$ openstack security group create SG_cli
+-----+
| Field          | Value
+-----+
| created_at     | 2022-09-01T07:54:28Z
| description     | SG_cli
| id              | a51224ef-f728-4593-850f-c46af4ec702e
| name            | SG_cli
| project_id      | 243072681e504e67be431e0df8c6fd7f
| revision_number | 1
| rules           | created_at='2022-09-01T07:54:28Z', direction='egress', ethertype='IPv6', id='34db355d-2b29-42b5-b90d-2092c7f', updated_at='2022-09-01T07:54:28Z' |
|                   | created_at='2022-09-01T07:54:28Z', direction='egress', ethertype='IPv4', id='a5cc14f1-64be-4816-b556-ece127f', updated_at='2022-09-01T07:54:28Z' |
| stateful        | True
| tags            | []
| updated_at      | 2022-09-01T07:54:28Z
+-----+
```

Step 6 Run the following command to check the security group list:

```
openstack security group list
```

```
stack@ecs-yoga:~/devstack$ openstack security group list
+-----+-----+-----+-----+
| ID      | Name   | Description | Project | Tags |
+-----+-----+-----+-----+
| 54e280bf-345c-47cd-85a8-2110755e4a63 | SG web |           | 243072681e504e67be431e0df8c6fd7f | []   |
| a51224ef-f728-4593-850f-c46af4ec702e | SG cli | SG cli    | 243072681e504e67be431e0df8c6fd7f | []   |
| c0170190-1a87-49dc-b0b6-c0e91cc99100 | default | Default security group | b0c7105105404a20675770944e799051 | []   |
| d32bel57-ce36-417d-b118-a32c8e0760e6 | default | Default security group | 243072681e504e67be431e0df8c6fd7f | []   |
| df9791a1-1a8f-4984-8512-25276b6552f04 | default | Default security group | e999d410680f40b8b9a04330f69aa86d | []   |
+-----+-----+-----+-----+
```

Record the ID of the **SG_cli** security group.

Step 7 Run the following command to add the **icmp** rule for the **SG_cli** security group with the following configuration:

- Rule: all **icmp**
- Direction: **ingress**
- Remote end: **CIDR**
- CIDR: **0.0.0.0/0**

```
openstack security group rule create --protocol icmp --ingress --remote-ip 0.0.0.0/0 SG_cli
```

```
stack@ecs-yoga:~/devstack$ openstack security group rule create --protocol icmp --ingress --remote-ip 0.0.0.0/0 SG_cli
+-----+-----+
| Field | Value |
+-----+-----+
| created_at | 2023-06-26T10:42:00Z |
| description | None |
| direction | ingress |
| ether_type | IPv4 |
| id | fb832592-46de-491f-837d-a4a0cd67565f |
| name | None |
| port_range_max | None |
| port_range_min | None |
| project_id | 243072681e504e67be431e0df8c6fd7f |
| protocol | icmp |
| remote_address_group_id | None |
| remote_group_id | None |
| remote_ip_prefix | 0.0.0.0/0 |
| revision_number | 0 |
| security_group_id | a51224ef-f728-4593-850f-c46af4ec702e |
| tags | [] |
| tenant_id | 243072681e504e67be431e0df8c6fd7f |
| updated_at | 2023-06-26T10:42:00Z |
+-----+-----+
```

Step 8 Run the following command to add the **tcp** rule for the **SG_cli** security group with the following configuration:

- Rule: all **tcp**
- Direction: **ingress**
- Remote end: **CIDR**
- CIDR: **0.0.0.0/0**

```
openstack security group rule create --protocol tcp --ingress --remote-ip 0.0.0.0/0 SG_cli
```

```
stack@ecs-yoga:~/devstack$ openstack security group rule create --protocol tcp --ingress --remote-ip 0.0.0.0/0 SG_cli
+-----+-----+
| Field | Value |
+-----+-----+
| created_at | 2023-06-26T10:42:00Z |
| description | None |
| direction | ingress |
| ether_type | IPv4 |
| id | 2da50622-6829-478e-a76e-c9718db49c77 |
| name | None |
| port_range_max | None |
| port_range_min | None |
| project_id | 243072681e504e67be431e0df8c6fd7f |
| protocol | tcp |
| remote_address_group_id | None |
| remote_group_id | None |
| remote_ip_prefix | 0.0.0.0/0 |
| revision_number | 0 |
| security_group_id | a51224ef-f728-4593-850f-c46af4ec702e |
| tags | [] |
| tenant_id | 243072681e504e67be431e0df8c6fd7f |
| updated_at | 2023-06-26T10:42:00Z |
+-----+-----+
```

Step 9 Run the following command to view the **rule list** of the **SG_cli** security group:

```
openstack security group rule list | grep SECURITY_GROUP_ID
```

2fae0622-8829-478e-a70e-c918db49c77 tcp	IPv4	0.0.0.0/0	ingress None	None	a51224ef-f728-4593
34db55bd-2b29-42b5-b90d-2892c2f259a8 None	IPv6	::/0	egress None	None	a51224ef-f728-4593
abcc14f1-840e-4810-b556-ece12d097000 None	IPv4	0.0.0.0/0	egress None	None	a51224ef-f728-4593
fdb852592-48de-491f-857d-a4a9cd075b5f icmp	IPv4	0.0.0.0/0	ingress None	None	a51224ef-f728-4593

- Step 10 Run the following command to remove the **default** security group to which the server instance belongs:

```
openstack server remove security group Instance_cli_test-3 default
```

```
stack@ecs-yoga:~/devstack$ openstack server remove security group Instance_cli_test-3 default
stack@ecs-yoga:~/devstack$ 
```

- Step 11 Run the following command to add the **SG_cli** security group for the server instance:

```
openstack server add security group Instance_cli_test-3 SG_cli
```

```
stack@ecs-yoga:~/devstack$ openstack server add security group Instance_cli_test-3 SG_cli
stack@ecs-yoga:~/devstack$ 
```

- Step 12 Run the following command to check the security group of the **Instance_cli_test-3** server instance:

```
openstack server show Instance_cli_test-3 | grep security_groups
```

```
stack@ecs-yoga:~/devstack$ openstack server show Instance_cli_test-3 | grep security_groups
| security_groups | name='SG_cli' |
stack@ecs-yoga:~/devstack$ 
```

- Step 13 Check whether the **Instance_cli_test-3** server instance can be pinged from external network by performing step 14 in 7.2.5.

```
stack@ecs-yoga:~/devstack$ ping 127.24.4.229 -c 5
PING 127.24.4.229 (127.24.4.229) 56(84) bytes of data.
64 bytes from 127.24.4.229: icmp_seq=1 ttl=64 time=0.054 ms
64 bytes from 127.24.4.229: icmp_seq=2 ttl=64 time=0.027 ms
64 bytes from 127.24.4.229: icmp_seq=3 ttl=64 time=0.034 ms
64 bytes from 127.24.4.229: icmp_seq=4 ttl=64 time=0.043 ms
64 bytes from 127.24.4.229: icmp_seq=5 ttl=64 time=0.028 ms

--- 127.24.4.229 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4104ms
rtt min/avg/max/mdev = 0.027/0.037/0.054/0.010 ms
stack@ecs-yoga:~/devstack$ 
```

- Step 14 Use SSH to log in to the **Instance_cli_test-3** server instance and check whether the login is successful by performing step 15 in 7.2.5.

```
stack@ecs-yoga:~/devstack$ ssh cirros@172.24.4.229
The authenticity of host '172.24.4.229 (172.24.4.229)' can't be established.
ECDSA key fingerprint is SHA256:EeoaoZvEguUC9zZCzeuXjHnwEIh1tzUmXaTByRDVxEu4.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '172.24.4.229' (ECDSA) to the list of known hosts.
cirros@172.24.4.229's password:
$ 
```

8

OpenStack Orchestration Management

8.1 Overview

8.1.1 About This Exercise

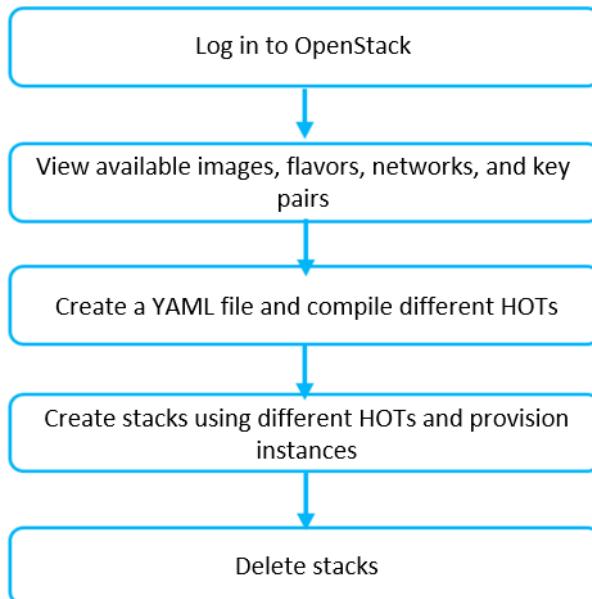
This exercise introduces how to compile a Heat Orchestration Template (HOT) to provision a simple or customized server instance, as well as how to compile a HOT with nested stacks to provision a server instance using the OpenStack CLI.

8.1.2 Objectives

Upon completion of this exercise, you will be familiar with the following operations on the OpenStack dashboard or using the OpenStack CLI:

- Compiling a HOT
- Compiling a HOT to create a simple or customized server instance
- Creating a server instance using a HOT with a stack
- Deleting a stack

8.1.3 Process



8.2 Operations Using the OpenStack CLI

8.2.1 Compiling a HOT to Create a Simple Server Instance

- Step 1 Run the following command to import the environment variables of the **admin** user:

```
su - stack  
cd devstack  
. admin-openrc.sh
```

```
root@ecs-yoga:~# su - stack  
stack@ecs-yoga:~$ cd devstack/  
stack@ecs-yoga:~/devstack$ . admin-openrc.sh
```

- Step 2 Run the following commands to view the server instance list. To ensure sufficient resources, delete all server instances first.

```
openstack server list
```

```
stack@ecs-yoga:~/devstack$ openstack server list  
+-----+-----+-----+-----+  
| ID      | Name    | Status | Networks   | Image     | Flavor   |  
+-----+-----+-----+-----+  
| 51dbc5ad-23bb-4cf6-bd11-cdccca488412d | Instance_cli_test-3 | ACTIVE | NetworkK cli 02=172.24.4.88, 192.168.4.176 | Img_cli | Flavor_cli |  
| 2e392d4a-1e1a-48ef-b547-85f743f82599 | Instance_cli_test-1 | ACTIVE | NetworkK cli 01=192.168.3.162 | Img_cli | Flavor_cli |  
| 48f24142-188d-4878-9c7c-a97725f5907d | Instance_cli_test-2 | ACTIVE | NetworkK cli 01=192.168.3.172 | Img_cli | Flavor_cli |  
| 4003534c3-1c86-44e4-9931-4cd5dd7fd8f6 | Instance_web_test-3 | ACTIVE | NetworkK web 02=172.24.4.182, 192.168.2.196 | Img_web | Flavor_web_test |  
| 5/2deaecc-d7c4-4b44-915d-4237883b51f | Instance_web_test-2 | ACTIVE | NetworkK web 01=192.168.1.181 | Img_web | Flavor_web_test |  
| a91d5988-9cd5-4bd4-9360-ae58188bbc56b | Instance_web_test-1 | ACTIVE | NetworkK web 01=192.168.1.155 | Img_web | Flavor_web_test |  
| e5775ec9-695e-428b-875f-7cc98b5bae9ad | Instance_web_01     | ACTIVE | shared=192.168.235.98 | Img_web | Flavor_web_test |  
| 3ccaaecd7-acc0-4e04-aee1-d0e0931bdc9b | Instance_cli_01     | ACTIVE | shared=192.168.235.85 | Img_cli | Flavor_cli |  
+-----+-----+-----+-----+
```

```
openstack server delete INSTANCE_NAME/ID
```

```
stack@ecs-yoga:~/devstack$ openstack server delete Instance_cli_01  
stack@ecs-yoga:~/devstack$ openstack server delete Instance_web_01  
stack@ecs-yoga:~/devstack$ openstack server delete Instance_web_test-1  
stack@ecs-yoga:~/devstack$ openstack server delete Instance_web_test-2  
stack@ecs-yoga:~/devstack$ openstack server delete Instance_web_test-3  
stack@ecs-yoga:~/devstack$ openstack server delete Instance_cli_test-1  
stack@ecs-yoga:~/devstack$ openstack server delete Instance_cli_test-2  
stack@ecs-yoga:~/devstack$ openstack server delete Instance_cli_test-3  
stack@ecs-yoga:~/devstack$
```

- Step 3 View the server instance list again and check whether the server instances have been deleted.

```
stack@ecs-yoga:~/devstack$ openstack server list  
  
stack@ecs-yoga:~/devstack$
```

- Step 4 Run the following command to view the available image list:

```
openstack image list
```

openstack network list		
ID	Name	Subnets
16a82d50-e715-43a5-9054-ba1365b03817	heat-net	68624e06-4541-48af-84da-a17f06f2abb
b2cec72f-377c-49f6-86df-3d5bd6a29b93	public	7dbe652d-ffda-468a-9099-ac5b4217fcc, efd3cd2a-aaf9-49fd-9988-e5a281ef405f
43af1119-00dc-44ef-bc1e-8163d08b4438	Network_web_01	54ed268a-a3b3-4663-a814-943184b16e72
619aa2d7-de98-423c-b039-156b8e0615fa	private	11d2ea75-6a2a-4f2a-b9e6-e0a08c2d712e, ddaf9e4e-66ee-4279-b608-142f81a2ee8d
8846f521-0546-487d-853b-ecb10fad46eb	Network_web_02	c9afa06a-55bd-40df-967e-d5cad3646014
d74d3c6-455e-437f-9d8f-ead1252f44f	Network_cli_02	2b3ef716-6987-42d3-92a0-8ed0b73fd10a
f27ff8e9-0282-4f0a-8f2a-e5d8ad5c25de	Network_cli_01	8fcfdc2ba-e9e4-435f-8787-0f21801e13149
fceeeaa58-6535-4d1a-a26f-5f8d3707ca7e	shared	f11beebb-562d-4162-b707-53ab407ad825

Step 5 Run the following command to view the available flavor list:

```
openstack flavor list
```

openstack flavor list							
ID	Name	RAM	Disk	Ephemeral	VCPUs	Is Public	
1	m1.tiny	512	1	0	1	True	
1b819ed0-30f6-46a9-8e50-e1d70aa52fd3	Flavor_web_new	156	1	0	1	True	
2	m1.small	2848	20	0	1	True	
3	m1.medium	4896	40	0	2	True	
4	m1.large	8192	80	0	4	True	
42	m1.nano	128	1	0	1	True	
5	m1.xlarge	16384	160	0	8	True	
5e19c1b6-f16b-4566-b8c1-40192b8a2bfe	Flavor_web_test	128	1	0	1	True	
75cf8e10-d594-4b50-a03e-87c73d1e6b2b	m1.heat_int	512	10	0	1	True	
84	m1.micro	192	1	0	1	True	
a7104b8e-40d7-447c-9f21-c7a00bfff8e57	Flavor_cli	128	1	0	1	True	
c1	cirros256	256	1	0	1	True	
d1	ds512M	512	5	0	1	True	
d2	ds1G	1024	10	0	1	True	
d3	ds2G	2848	10	0	2	True	
d4	ds4G	4096	20	0	4	True	
db4504e2-608b-4a14-a608-51308b1e8996	Flavor_cli_new	156	1	0	1	True	
df98f98e-d43d-4ac5-b908-cc6d819ef66a	m1.heat_micro	128	1	0	1	True	

Step 6 Run the following command to view the available keypair list:

```
openstack keypair list
```

openstack keypair list		
Name	Fingerprint	Type
KeyPair_cli	8a:6f:8c:9d:87:6f:cd:00:8e:a0:52:5a:c1:ed:e6:9a	ssh
KeyPair_web	0d:f2:48:fc:a6:64:73:75:6c:cf:56:08:77:09:29:b4	ssh

Step 7 Run the following command to view the available network list:

```
openstack network list
```

openstack network list		
ID	Name	Subnets
38d1fe0e-056e-0444-8183-b56ea9eae7a	Network_web_01	7381257e-1b63-4bef-b993-9eb9d948160f1
41b553ca-273b-4384-be7d-b2ff5a2d941e	shared	fc727d09-5515-4a5b-bdd8-30a15fe85120
81362ed4-f0d7-473c-b191-b951ba1894	public	2774146d-e683-4989-8119-03913a0590d9, d81e9de-0b6c-44d2-88f0-7a2d2ebdd3f5
975ad298-f575-4e34-ab85-a589b15ed2ac	Network_cli_02	e83589f6-ba00-450e-978f-7c97392f8a42
a7bc0db5-ffa5-4f75-a918-3eccc2207cd5	Network_cli_01	f35535d-1147-4a28-aabc-f272d0d97bd7
a552ada-0fea-4e65-979e-c9cf5a66bc4f	Network_web_02	6f764d8a-c0f2-4008-9ba2-3adaa6ee99ab
e3e028f9-19dd-41c8-9ea3-6cb876625c80	private	19a9d95c-842c-4be2-aa82-e0034a742e5c, 36fed272-ecb9-41be-90e9-a5688ef1838b

Step 8 Run the following command to create and open the **demo-template.yaml** file as a HOT:

```
vim demo-template.yaml
```

Press **i** to enter the insert mode, and then enter the following information (note: Each colon must be followed by a space. Even if there is no character after the colon, a space is also required):

```
heat_template_version: 2015-10-15

parameters:
  NetID:
    type: string
    description: Network ID to use for the instance.

resources:
  server:
    type: OS::Nova::Server
    properties:
      image: Img_cli
      flavor: Flavor_cli
      key_name: KeyPair_cli
      networks:
        - network: {get_param: NetID}

outputs:
  instance_name:
    description: Name of the instance.
    value: {get_attr: [server,name]}
  instance_ip:
    description: IP address of the instance.
    value: {get_attr: [server,first_address]}
```

In **resources.server**, **image**, **flavor**, **key_name**, and **networks** are available image, flavor, and key pair in the environment, respectively. After entering the information, enter **:wq** and press **Enter** to save the settings and exit.

Step 9 Run the following command to view the available network list:

```
openstack network list
```

ID	Name	Subnets
16a82d50-e715-43e5-9054-baf363b03817	heat-net	68624e06-4541-48af-84da-a17f06f2abbb
2bcec72f-377c-49f6-86df-3d58d6a29b03	public	7db6e52d-ffda-468a-9090-ac5b42117fcc, efd3cd2a-aefd-40fd-0988-e5a281ef405f
43ef1119-00dc-44ef-bc1e-8163d08b4438	Network_web_01	54ad268a-a3b3-4663-a814-943184b16e72
619na2d7-de98-423c-b030-156b8e9615fa	private	11d2ea75-6a2a-4f2a-b9e6-e9a08c2d712e, ddef0e4e-66ee-4279-b608-142f81a2ee8d
8846f521-0546-487d-853b-ec810fad46eb	Network_web_02	c0afa06a-55bd-48df-967e-d6cad3646014
d74d3c6-455e-437f-9d8f-ead12528f4f	Network_cli_02	2b3ef716-6987-42d3-92a0-8ed0b73fd10a
f27ff8e9-0282-4f0a-8f2a-e5d8ad5c25de	Network_cli_01	8fcfc2ba-e9e4-435f-8787-0f2181e13149
fceeee58-6535-4d1a-a26f-5f8d3707ca7e	shared	f11beebb-562d-4162-b707-53ab407ad825

Record the ID of **shared**.

Step 10 Run the following command to set the environment variable **NET_ID**:

```
export NET_ID=NETWORK_ID
```

```
stack@ecs-yoga2:~/devstack$ export NET_ID=fcaeea58-6535-4d1a-a26f-5f8d3707ca7e
```

- Step 11 Run the following command to use the **demo-template.yaml** HOT to create the **Stack_demo** stack.

```
openstack stack create -t demo-template.yaml --parameter "NetID=$NET_ID" Stack_demo
```

```
stack@ecs-yoga:~/devstack$ openstack stack create -t demo-template.yaml --parameter "NetID=$NET_ID" Stack_demo
+-----+-----+
| Field | Value |
+-----+-----+
| id | 4a09f37a-b763-4ebc-87fe-ccb57fdde49e4 |
| stack_name | Stack_demo |
| description | No description |
| creation_time | [REDACTED] |
| updated_time | None |
| stack_status | CREATE_IN_PROGRESS |
| stack_status_reason | Stack CREATE started |
+-----+-----+
```

- Step 12 Wait for a few minutes and run the following command to view the stack creation process:

```
openstack stack event list Stack_demo
```

```
stack@ecs-yoga:~/devstack$ openstack stack event list Stack_demo
[REDACTED] 41:13Z [Stack_demo]: CREATE_IN_PROGRESS Stack CREATE started
[REDACTED] 41:13Z [Stack_demo.server]: CREATE_IN_PROGRESS state changed
[REDACTED] 41:17Z [Stack_demo.server]: CREATE_COMPLETE state changed
[REDACTED] 41:17Z [Stack_demo]: CREATE_COMPLETE Stack CREATE completed successfully
stack@ecs-yoga:~/devstack$
```

- Step 13 Run the following command to view the **stack list**. If the status of the **Stack_demo** stack is **CREATE_COMPLETE**, the stack has been created.

```
openstack stack list
```

```
stack@ecs-yoga:~/devstack$ openstack stack list
+-----+-----+-----+-----+
| ID | Stack Name | Project | Stack Status | Creation Time | Updated Time |
+-----+-----+-----+-----+
| 4a09f37a-b763-4ebc-87fe-ccb57fdde49e4 | Stack_demo | 431b085a0a1c4c09a59472f6ef58775d | CREATE_COMPLETE | 20[REDACTED] | None |
+-----+-----+-----+-----+
```

- Step 14 Run the following command to view the stack details:

```
openstack stack show Stack_demo
```

```
stack@ecs-yoga:~/devstack$ openstack stack show Stack_demo
+-----+-----+
| Field | Value |
+-----+-----+
| id | 4a89f57a-a7b3-4ebc-87fe-cc57fdde49e4
| stack_name | Stack_demo
| description | No description
| creation_time | 2016-01-05T15:51:52Z
| updated_time | None
| stack_status | CREATE_COMPLETE
| stack_status_reason | Stack CREATE completed successfully
| parameters | NetID: 6b090451-8282-4c0e-95c8-d4d0105c0656
| OS::project_id: 451b085a0a1c4c89a59472f6ef58775d
| OS::stack_id: 4a89f57a-b7b3-4ebc-87fe-cc57fdde49e4
| OS::stack_name: Stack_demo
|
| outputs | - description: IP address of the instance.
| | output_key: instance_ip
| | output_value: 192.168.233.16
| | - description: Name of the instance.
| | output_key: instance_name
| | output_value: Stack_demo-server-dp43bt2dojnh
|
| links | - href: http://172.16.0.169/heat-api/v1/451b085a0a1c4c89a59472f6ef58775d	stacks/Stack_demo/4a89f57a-b7b3-4ebc-87fe-cc57fdde49e4
| | rel: self
|
| deletion_time | None
| notification_topics | []
| capabilities | []
| disable_rollback | True
| timeout_mins | None
| stack_owner | admin
| parent | None
| stack_user_project_id | 4eaf2b9eed2945ea9adef1fa546baef77
| tags | []
+-----+-----+
```

Step 15 Run the following command to check the **instance_name** and **instance_ip** displayed after the stack is created:

```
openstack stack output show --all Stack_demo
```

```
stack@ecs-yoga:~/devstack$ openstack stack output show --all Stack_demo
+-----+-----+
| Field | Value |
+-----+-----+
| instance_ip | {
| | "output_key": "instance_ip",
| | "description": "IP address of the instance.",
| | "output_value": "192.168.233.16"
| }
| instance_name | {
| | "output_key": "instance_name",
| | "description": "Name of the instance.",
| | "output_value": "Stack_demo-server-dp43bt2dojnh"
| }
+-----+-----+
```

Step 16 Run the following command to view the server list and check whether the server instance is **ACTIVE**:

```
openstack server list
```

```
stack@ecs-yoga:~/devstack$ openstack server list
+-----+-----+-----+-----+-----+
| ID | Name | Status | Networks | Image | Flavor |
+-----+-----+-----+-----+-----+
| 37fa20d7-435c-80ab-c1e310018af3 | Stack_demo-server-dp43bt2dojnh | ACTIVE | shared=192.168.233.16 | Img_cli | Flavor_cli |
+-----+-----+-----+-----+-----+
```

8.2.2 Compiling a HOT to Create a Customized Server Instance

Step 1 Run the following command to create and open the **hello_world.yaml** file as a HOT:

```
vim hello_world.yaml
```

Press **i** to enter the insert mode, and then enter the following information:

```
# This is a hello world HOT template just defining a single compute server.

heat_template_version: 2013-05-23

description: Hello world HOT template that just defines a single server, contains just base features to
verify base HOT support.

parameters:
image:
type: string
description: Image ID or image name to use for the server.
constraints:
- custom_constraint: glance.image

flavor:
type: string
description: Flavor for the server to be created.
constraints:
- custom_constraint: nova.flavor

key_name:
type: string
description: Name of an existing key pair to use for the server.
constraints:
- custom_constraint: nova.keypair

NetID:
type: string
description:

admin_pass:
type: string
description: Admin password.
hidden: true
constraints:
- length: {min: 6, max: 8}
  description: Password length must be between 6 and 8 characters.
- allowed_pattern: "[a-zA-Z0-9]+"
  description: Password must consist of characters and numbers only.
- allowed_pattern: "[A-Z][a-zA-Z0-9]*"
  description: Password must start with an uppercase character.

db_port:
type: number
description: Database port number.
default: 50000
constraints:
- range: {min: 40000, max: 60000}
  description: Port number must be between 40000 and 60000.

resources:
server:
```

```

type: OS::Nova::Server
properties:
    key_name: {get_param: key_name}
    image: {get_param: image}
    flavor: {get_param: flavor}
    networks:
        - network: {get_param: NetID}
    admin_pass: {get_param: admin_pass}
    user_data:
        str_replace:
            template: |
                #!/bin/bash
                echo db_port
    params:
        db_port: {get_param: db_port}

outputs:
    server_networks:
        description: The networks of the deployed server.
        value: {get_attr: [server,networks]}

```

Enter :wq and press **Enter** to save the settings and exit.

Question:

What are the differences between the **demo-template.yaml** and **hello_world.yaml** HOTs?

- Step 2** Run the following command to set **HOT template** to **hello_world.yaml**, **stack_name** to **Stack_helloworld_cli**, **key_name** to **KeyPair_cli**, **image** to **Img_cli**, **flavor** to **Flavor_cli**, **admin_pass** to **Huawei12**, and **NetID** to **Network_cli_01**.

```

openstack stack create -t hello_world.yaml --parameter image=Img_cli --parameter flavor=Flavor_cli -
--parameter key_name=KeyPair_cli --parameter NetID=Network_cli_01 --parameter
admin_pass=Huawei12 Stack_helloworld_cli

```

```

stack@decs-yoga:~/devstack$ openstack stack create -t hello_world.yaml --parameter image=Img_cli --parameter flavor=Flavor_cli --parameter key_name=KeyP
air_cli --parameter NetID=Network_cli_01 --parameter admin_pass=Huawei12 Stack_helloworld_cli
+-----+-----+
| Field | Value |
+-----+-----+
| id | 47f17461-2b3c-4177-9d53-339cb95cbdc |
| stack_name | Stack_helloworld_cli |
| description | Hello world HOT template that just defines a single server,contains just base features to verify base HOT support. |
| creation_time | [REDACTED] |
| updated_time | None |
| stack_status | CREATE_IN_PROGRESS |
| stack_status_reason | Stack CREATE started |
+-----+-----+

```

- Step 3** Refer to step 2. Run the following command to set **HOT template** to **hello_world.yaml**, **stack_name** to **Stack_helloworld_web**, **key_name** to **KeyPair_web**, **image** to **Img_web**, **flavor** to **Flavor_web_test**, **admin_pass** to **Huawei12**, and **NetID** to **Network_web_01**.

```

openstack stack create -t hello_world.yaml --parameter image=Img_web --parameter
flavor=Flavor_web_test --parameter key_name=KeyPair_web --parameter NetID=Network_web_01 --
parameter admin_pass=Huawei12 Stack_helloworld_web

```

```
stack@ecs-yoga:~/devstack$ openstack stack create -t hello_world.yaml --parameter image=Img_web --parameter flavor=Flavor_web_test --parameter key_name=KeyPair_web --parameter NetID=Network_web_01 --parameter admin_pass=Huawei12 Stack_helloworld_web
+-----+-----+
| Field | Value |
+-----+-----+
| id | b4e7ceff-475b-44f5-b98b-2d22e8cdb830 |
| stack_name | Stack_helloworld_web |
| description | Hello world HOT template that just defines a single server,contains just base features to verify base HOT support. |
| creation_time | [REDACTED] |
| updated_time | None |
| stack_status | CREATE_IN_PROGRESS |
| stack_status_reason | Stack CREATE started |
```

Step 4 Run the following commands to check the creation process of the two stacks:

```
openstack stack event list Stack_helloworld_cli
```

```
stack@ecs-yoga:~/devstack$ openstack stack event list Stack_helloworld_cli
[REDACTED] 0:53:35Z [Stack_helloworld_cli]: CREATE_IN_PROGRESS Stack CREATE started
[REDACTED] 0:53:34Z [Stack_helloworld_cli.server]: CREATE_IN_PROGRESS state changed
[REDACTED] 0:53:39Z [Stack_helloworld_cli.server]: CREATE_COMPLETE state changed
[REDACTED] 0:53:39Z [Stack_helloworld_cli]: CREATE_COMPLETE Stack CREATE completed successfully
stack@ecs-yoga:~/devstack$
```

```
openstack stack event list Stack_helloworld_web
```

```
stack@ecs-yoga:~/devstack$ openstack stack event list Stack_helloworld_web
[REDACTED] 0:02Z [Stack_helloworld_web]: CREATE_IN_PROGRESS Stack CREATE started
[REDACTED] 0:02Z [Stack_helloworld_web.server]: CREATE_IN_PROGRESS state changed
[REDACTED] 0:06Z [Stack_helloworld_web.server]: CREATE_COMPLETE state changed
[REDACTED] 0:06Z [Stack_helloworld_web]: CREATE_COMPLETE Stack CREATE completed successfully
stack@ecs-yoga:~/devstack$
```

Step 5 Run the following command to view the stack list:

```
openstack stack list
```

ID	Stack Name	Project	Stack Status	Creation Time	Updated Time
b4e7ceff-475b-44f5-b98b-2d22e8cdb830	Stack_helloworld_web	431b085a0a1c4c09a59472f6ef58775d	CREATE_COMPLETE	[REDACTED]	0:02Z None
47f17461-2b3c-4177-9d53-339cba95c5dc	Stack_helloworld_cli	431b085a0a1c4c09a59472f6ef58775d	CREATE_COMPLETE	[REDACTED]	0:02Z None
4a09f57a-b753-4ebc-87fe-cc57fdde49e4	Stack_demo	431bd85a0a1c4c09a59472f6ef58775d	CREATE_COMPLETE	[REDACTED]	0:06Z None

Step 6 Run the following command to view the **server list** and compare the details about the server instances created using the two stacks:

```
openstack server list
```

ID	Name	Status	Networks	Image	Flavor
a16019f8-543f-4178-a2da-d582e527056	Stack_helloworld_web-server-mpzwryde66ix	ACTIVE	Network_web_01=192.168.1.104	Img_web	Flavor_web_test
c723561-4b5f-47f0-a99a-0e4dc8e8c0ed	Stack_helloworld_cli-server-zh3asjfnqo7o	ACTIVE	Network_cli_01=192.168.3.126	Img_cli	Flavor_cli
57fa28d7-3858-435c-80a5-c1e510018af3	Stack_demo-server-dp43dt2dojnh	ACTIVE	shared=192.168.233.16	Img_cli	Flavor_cli

8.2.3 Compiling a Nested HOT to Create a Server Instance

Step 1 Run the following command to create and open the **my_nova.yaml** file:

```
vim my_nova.yaml
```

- Step 2 Press **i** to enter the insert mode and enter the following information to define the HOT sub-profile:

```
heat_template_version: 2015-04-30

parameters:
  key_name:
    type: string
    description: KeyPair name
  NetID:
    type: string

resources:
  server:
    type: OS::Nova::Server
    properties:
      image: Img_cli
      flavor: Flavor_cli
      key_name: {get_param: key_name}
    networks:
      - network: {get_param: NetID}
```

Enter :wq and press **Enter** to save settings and exit.

- Step 3 Run the following command to create and open the **main.yaml** file:

```
vi main.yaml
```

- Step 4 Press **i** to enter the insert mode and enter the following information to define the HOT main-profile:

```
heat_template_version: 2015-04-30

resources:
  my_server:
    type: my_nova.yaml
    properties:
      key_name: KeyPair_cli
      NetID: Network_cli_01
```

Enter :wq and press **Enter** to save the settings and exit.

- Step 5 Run the following command to use the **main.yaml** HOT main-profile to create the **Stack_nest** stack.

```
openstack stack create -t main.yaml Stack_nest
```

```
stack@ecs-yoga:~/devstack$ openstack stack create -t main.yaml Stack_nest
+-----+-----+
| Field | Value |
+-----+-----+
| id | 83fb62df-4dd2-40b5-bc3a-3b03c2806d37 |
| stack_name | Stack_nest |
| description | No description |
| creation_time | [REDACTED] |
| updated_time | None |
| stack_status | CREATE_IN_PROGRESS |
| stack_status_reason | Stack CREATE started |
+-----+-----+
```

Step 6 Run the following command to check the stack creation process:

```
openstack stack event list Stack_nest
```

```
stack@ecs-yoga:~/devstack$ openstack stack event list Stack_nest
[REDACTED] [REDACTED]: CREATE_IN_PROGRESS Stack CREATE started
[REDACTED] [REDACTED]: CREATE_IN_PROGRESS state changed
[REDACTED] [REDACTED]: CREATE_COMPLETE state changed
[REDACTED] [REDACTED]: CREATE_COMPLETE Stack CREATE completed successfully
```

Step 7 Run the following command to check the stack list:

```
openstack stack list
```

```
stack@ecs-yoga:~/devstack$ openstack stack list
+-----+-----+-----+-----+-----+
| ID | Stack Name | Project | Stack Status | Creation Time | Updated Time |
+-----+-----+-----+-----+-----+
| 83fb62df-4dd2-40b5-bc3a-3b03c2806d37 | Stack_nest | 451b085a0a1c4c09a594/2f6ef5877bd | CREATE_COMPLETE | 2017-07-17T17:46:11Z | None |
| b407ceff-473b-44f5-b98b-2d22e8cd83b | Stack_helloworld_web | 451b085a0a1c4c09a594/2f6ef5877bd | CREATE_COMPLETE | 2017-07-17T17:46:11Z | None |
| 47f17461-2b3c-4177-9d53-539cb95c5dc | Stack_helloworld_cli | 451b085a0a1c4c09a594/2f6ef5877bd | CREATE_COMPLETE | 2017-07-17T17:46:11Z | None |
| 4a09f57-a-b/63-4ebc-8/fe-ccb5/fdd49e4 | Stack_demo | 451b085a0a1c4c09a594/2f6ef5877bd | CREATE_COMPLETE | 2017-07-17T17:46:11Z | None |
+-----+-----+-----+-----+-----+
```

Step 8 Run the following command to check the server instance list:

```
openstack server list
```

```
stack@ecs-yoga:~/devstack$ openstack server list
+-----+-----+-----+-----+-----+
| ID | Name | Status | Networks | Image | Flavor |
+-----+-----+-----+-----+-----+
| 3bb0c55b-fee7-48fe-b5ac-572e58c6e16b | Stack_nest-my_server-hmlbjrolavk-server-a50fp/u6scu | ACTIVE | Network cli 01=192.168.3.185 | img_cli | Flavor_cli |
| a1bb8198-b45f-4178-a2da-d7682e027e05b | Stack_helloworld_web-server-mpzryde68ix | ACTIVE | Network web 01=192.168.1.104 | img_web | Flavor_web_test |
| cf213be1-4b5f-47fb-a99a-0e4bc8c80edd | Stack_helloworld_cli-server-zn3asjfnqo7o | ACTIVE | Network cli 01=192.168.3.126 | img_cli | Flavor_cli |
| 57fa28d7-5b58-455c-80a5-c1e510018af5 | Stack_demo-server-dp4sbt2dojnh | ACTIVE | shared=192.168.255.16 | img_cli | Flavor_cli |
+-----+-----+-----+-----+-----+
```

Step 9 Log in to the OpenStack dashboard as the **admin** user and choose **Project > Compute > Instances** to view the created instances and their details.

8.2.4 Deleting a Stack

Step 1 Run the following command to delete the **Stack_demo** stack:

```
openstack stack delete Stack_demo
```

Step 2 When the "Are you sure you want to delete this stack (s) [y/N]?" message is displayed, enter **y** or press **Enter**.

```
stack@decs-yoga:~/devstack$ openstack stack delete Stack_demo  
Are you sure you want to delete this stack(s) [y/N]? y  
stack@decs-yoga:~/devstack$
```

Step 3 Run the following command to delete the **Stack_nest** stack:

```
openstack stack delete --yes Stack_nest
```

```
stack@decs-yoga:~/devstack$ openstack stack delete --yes Stack_nest  
stack@decs-yoga:~/devstack$
```

Question:

What are the differences between the methods of deleting stacks in step 1 and step 3?
Which method is recommended in real-world scenarios?

Step 4 Delete the **Stack_helloworld_web** and **Stack_helloworld_cli** stacks by repeating step 1 or step 3.

Step 5 Run the following command to check the **stack list** and check whether the stacks have been deleted:

```
openstack stack list
```

```
stack@decs-yoga:~/devstack$ openstack stack list  
stack@decs-yoga:~/devstack$
```

The **stack list** is empty.

Step 6 Run the following command to view the **server list** and check whether the server instance has been deleted:

```
openstack server list
```

```
stack@decs-yoga:~/devstack$ openstack server list  
stack@decs-yoga:~/devstack$
```

The **server list** is empty.

Conclusion:

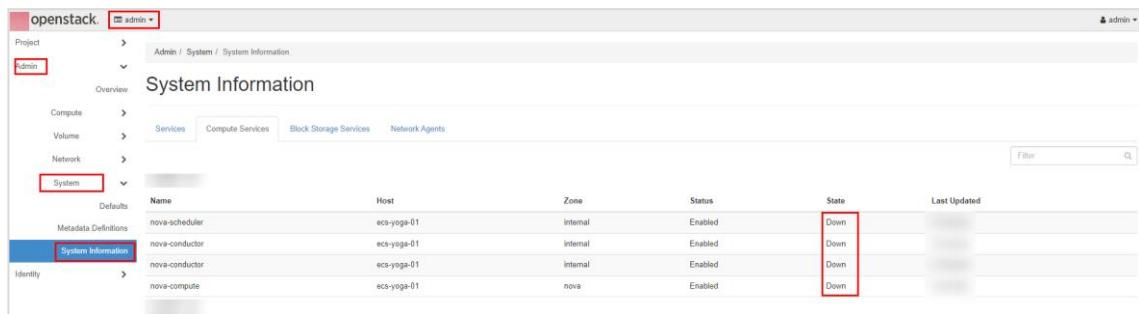
As shown in the preceding figure, a server instance created by a stack will be deleted when the stack is deleted.

9 Appendix 1

9.1 Restart Nova-related services.

9.1.1 Check the compute services state on the OpenStack Dashboard.

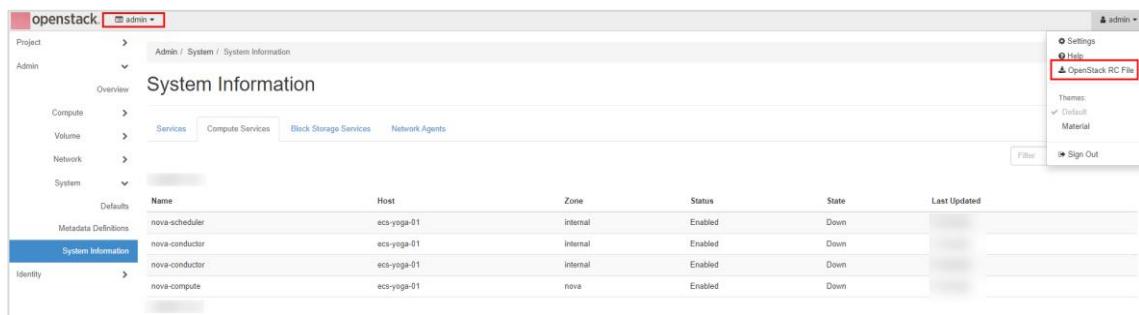
If the preceding ECS is stopped, started, or restarted, Nova-related services in the OpenStack development environment on the ECS may be in the Down state. (This problem usually occurs after the ECS is shut down, started, or restarted for the second time. If the state of Nova-related services is Down, perform the following operations)



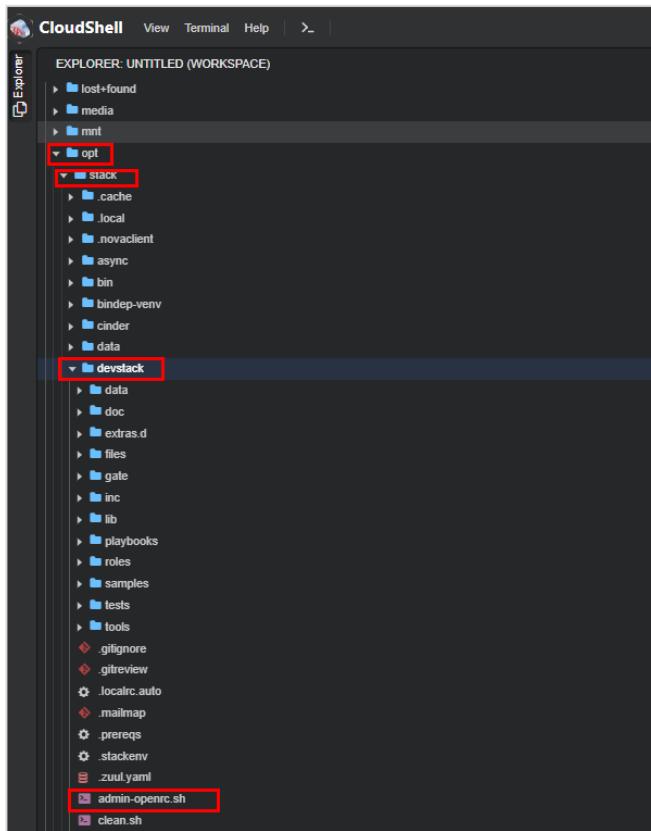
Name	Host	Zone	Status	State	Last Updated
nova-scheduler	eci-yoga-01	internal	Enabled	Down	
nova-conductor	eci-yoga-01	internal	Enabled	Down	
nova-conductor	eci-yoga-01	internal	Enabled	Down	
nova-compute	eci-yoga-01	nova	Enabled	Down	

9.1.2 Run the following command to check the state of Nova-related services.

Refer to step 8 in section 2.3.1. Enable environment variables and upload the downloaded admin-openrc.sh file to the /opt/stack/devstack directory.



Name	Host	Zone	Status	State	Last Updated
nova-scheduler	eci-yoga-01	internal	Enabled	Down	
nova-conductor	eci-yoga-01	internal	Enabled	Down	
nova-conductor	eci-yoga-01	internal	Enabled	Down	
nova-compute	eci-yoga-01	nova	Enabled	Down	



Run the following commands to enable and verify the environment variables: (The password to be entered is wei.)

```
su - stack
cd devstack/
.admin-openrc.sh
```

```
Welcome to Huawei Cloud Service

Last login:
root@ecs-yoga-01:~# su - stack
stack@ecs-yoga-01:~$ cd devstack/
stack@ecs-yoga-01:~/devstack$ ll
total 388
drwxrwxr-x 15 stack stack 4096 May 17 15:56 .
drwxr-xr-x 23 stack stack 4096 Dec 19 17:57 ../
-rw-r--r-- 1 root root 1939 May 17 15:56 admin-openrc.sh
-rw-rwxr-x 1 stack stack 3337 May 13 2022 clean.sh*
-rw-rw-r-- 1 stack stack 687 May 13 2022 CONTRIBUTING.rst
drwxrwxr-x 2 stack stack 4096 May 13 2022 date/
drwxrwxr-x 3 stack stack 4096 May 13 2022 doc/
drwxrwxr-x 2 stack stack 4096 May 13 2022 extras.d/
drwxrwxr-x 9 stack stack 4096 Sep 1 2022 files/
-rw-rw-r-- 1 stack stack 31442 May 13 2022 functions
-rw-rw-r-- 1 stack stack 78236 May 13 2022 functions-common
-rw-rw-r-- 1 stack stack 3774 May 13 2022 FUTURE.rst
drwxrwxr-x 2 stack stack 4096 May 13 2022 gate/
drwxrwxr-x 8 stack stack 4096 May 13 2022 git/
-rw-rw-r-- 1 stack stack 422 May 13 2022 .gitignore
-rw-rw-r-- 1 stack stack 181 May 13 2022 .gitreview
-rw-rw-r-- 1 stack stack 11799 May 13 2022 HACKING.rst
drwxrwxr-x 2 stack stack 4096 May 13 2022 inc/
drwxrwxr-x 8 stack stack 4096 May 13 2022 lib/
-rw-rw-r-- 1 stack stack 10143 May 13 2022 LICENSE
-rw-rw-r-- 1 stack stack 516 Sep 1 2022 local.conf
-rw-rw-r-- 1 stack stack 528 Dec 18 20:46 .localrc.auto
-rw-rw-r-- 1 stack stack 348 May 13 2022 .mailmap
-rw-rw-r-- 1 stack stack 2408 May 13 2022 Makefile
-rw-rw-r-- 1 stack stack 4038 May 13 2022 openrc
drwxrwxr-x 4 stack stack 4096 May 13 2022 playbooks/
-rw-r--r-- 1 stack stack 43 Dec 18 20:47 .prereqs
-rw-rw-r-- 1 stack stack 3938 May 13 2022 README.rst
drwxrwxr-x 21 stack stack 4096 May 13 2022 roles/
-rw-rwxr-x 1 stack stack 1188 May 13 2022 run_tests.sh*
drwxrwxr-x 2 stack stack 4096 May 13 2022 samples/
-rw-rw-r-- 1 stack stack 368 May 13 2022 setup.cfg
-rw-rwxr-x 1 stack stack 781 May 13 2022 setup.py*
-rw-r--r-- 1 stack stack 509 Dec 18 20:58 .stackenv
-rw-rw-r-- 1 stack stack 36589 May 13 2022 stackrc
-rw-rwxr-x 1 stack stack 45884 May 13 2022 stack.sh*
drwxrwxr-x 2 stack stack 4096 May 13 2022 tests/
drwxrwxr-x 2 stack stack 4096 May 13 2022 tools/
-rw-rw-r-- 1 stack stack 1826 May 13 2022 tox.ini
-rw-rwxr-x 1 stack stack 3007 May 13 2022 unstack.sh*
-rw-rw-r-- 1 stack stack 20123 May 13 2022 zuul.yaml
stack@ecs-yoga-01:~/devstack$ . admin-openrc.sh
Please enter your OpenStack Password for project admin as user admin:
stack@ecs-yoga-01:~/devstack$ openstack host list
+-----+-----+-----+
| Host Name | Service | Zone |
+-----+-----+-----+
| ecs-yoga-01 | scheduler | internal |
| ecs-yoga-01 | conductor | internal |
| ecs-yoga-01 | conductor | internal |
| ecs-yoga-01 | compute | nova |
+-----+-----+-----+
stack@ecs-yoga-01:~/devstack$
```

Run the following command to check the state of Nova-related services: (There is a high probability that the Nova-related services go Down after the ECS is restarted. You can also view the result on the preceding page. This section describes how to verify the Nova-related services.)

```
nova service-list
```

	Id	Binary	Host	Zone	Status	State	Updated_at	Disabled Reason	Forced down
	-9b41-e1087968f1ab	nova-scheduler	ecs-yoga-01	internal	enabled	down	-1707:09:50.000000	-	False
	-913b-8ebdf787879b	nova-conductor	ecs-yoga-01	internal	enabled	down	-1707:09:50.000000	-	False
	-9aed-127e234155bd	nova-conductor	ecs-yoga-01	internal	enabled	down	-1707:09:50.000000	-	False
	-b76c-9de82d35629af	nova-compute	ecs-yoga-01	nova	enabled	down	-1707:09:49.000000	-	False

9.1.3 Viewing and Restarting Nova-related Services

Run the following command to check the state of Nova-related services in the OpenStack development environment deployed using devstack.

```

stack@ecos-yoga-01:/etc/init$ systemctl status devstack-super-cond.service devstack-n-sch.service devstack-n-cond-cell1.service devstack-n-api.service
● devstack-super-cond.service - Devstack devstack-super-cond.service
   Loaded: loaded (/etc/init/systemd/system/devstack-super-cond.service; enabled; vendor preset: enabled)
   Active: failed (Exit code: -13 15:12:08 CST) In 5min ago
     Process: 947 Start=2023-05-17 15:12:08 CST; -13 15:12:08 CST; In 5min ago
      Main PID: 947 (code=exited, status=1/FAILURE)

May 17 15:12:08 ecos-yoga-01 nova-conductor[743]: E8000 nova
File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/identity/base.py", line 271, in get_endpoint_data
    service_catalog = self.get_access(self.session, service_catalog)
File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/identity/base.py", line 134, in get_access
    File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/identity/generic/base.py", line 206, in get_auth_ref
        raise exceptions.DiscoveryFailure()
May 17 15:12:08 ecos-yoga-01 nova-conductor[743]: E8000 nova
File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/identity/generic/base.py", line 159, in _do_create_plugin
    File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/identity/base.py", line 158, in _do_create_plugin
        raise exceptions.DiscoveryFailure()
May 17 15:12:08 ecos-yoga-01 nova-conductor[743]: E8000 nova
File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/exceptions/discovery.DiscoveryFailure: Could not find versioned Identity endpoints when attempting to authenticate. Please check that your auth_url is correct. Unable to establish connection to http://172.16.8.187/"; code=exited, status=1/FAILURE

● devstack-n-sch.service - Devstack devstack-n-sch.service
   Loaded: loaded (/etc/init/systemd/system/devstack-n-sch.service; enabled; vendor preset: enabled)
   Active: failed (Exit code: -13 15:12:08 CST) In 5min ago
     Process: 948 Start=2023-05-17 15:12:08 CST; -13 15:12:08 CST; In 5min ago
      Main PID: 948 (code=exited, status=1/FAILURE)

May 17 15:12:08 ecos-yoga-01 nova-scheduler[743]: E8000 nova
File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/identity/base.py", line 271, in get_endpoint_data
    service_catalog = self.get_access(self.session, service_catalog)
File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/identity/base.py", line 134, in get_access
    File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/identity/generic/base.py", line 206, in get_auth_ref
        raise exceptions.DiscoveryFailure()
May 17 15:12:08 ecos-yoga-01 nova-scheduler[743]: E8000 nova
File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/identity/generic/base.py", line 159, in _do_create_plugin
    File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/identity/base.py", line 158, in _do_create_plugin
        raise exceptions.DiscoveryFailure()
May 17 15:12:08 ecos-yoga-01 nova-scheduler[743]: E8000 nova
File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/exceptions/discovery.DiscoveryFailure: Could not find versioned Identity endpoints when attempting to authenticate. Please check that your auth_url is correct. Unable to establish connection to http://172.16.8.187/"; code=exited, status=1/FAILURE

● devstack-n-cond-cell1.service - Devstack devstack-n-cond-cell1.service
   Loaded: loaded (/etc/init/systemd/system/devstack-n-cond-cell1.service; enabled; vendor preset: enabled)
   Active: failed (Exit code: -13 15:12:08 CST) In 5min ago
     Process: 949 Start=2023-05-17 15:12:08 CST; -13 15:12:08 CST; In 5min ago
      Main PID: 949 (code=exited, status=1/FAILURE)

May 17 15:12:08 ecos-yoga-01 nova-conductor[793]: E8000 nova
File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/identity/base.py", line 271, in get_endpoint_data
    service_catalog = self.get_access(self.session, service_catalog)
File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/identity/base.py", line 134, in get_access
    File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/identity/generic/base.py", line 206, in get_auth_ref
        raise exceptions.DiscoveryFailure()
May 17 15:12:08 ecos-yoga-01 nova-conductor[793]: E8000 nova
File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/identity/generic/base.py", line 159, in _do_create_plugin
    File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/identity/base.py", line 158, in _do_create_plugin
        raise exceptions.DiscoveryFailure()
May 17 15:12:08 ecos-yoga-01 nova-conductor[793]: E8000 nova
File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/exceptions/discovery.DiscoveryFailure: Could not find versioned Identity endpoints when attempting to authenticate. Please check that your auth_url is correct. Unable to establish connection to http://172.16.8.187/"; code=exited, status=1/FAILURE

● devstack-n-api.service - Devstack devstack-n-api.service
   Loaded: loaded (/etc/init/systemd/system/devstack-n-api.service; enabled; vendor preset: enabled)
   Active: failed (Exit code: -13 15:12:08 CST) In 5min ago
     Process: 950 Start=2023-05-17 15:12:08 CST; -13 15:12:08 CST; In 5min ago
      Main PID: 950 (code=exited, status=1/FAILURE)

May 17 15:12:08 ecos-yoga-01 nova-conductor[793]: E8000 nova
File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/identity/base.py", line 271, in get_endpoint_data
    service_catalog = self.get_access(self.session, service_catalog)
File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/identity/base.py", line 134, in get_access
    File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/identity/generic/base.py", line 206, in get_auth_ref
        raise exceptions.DiscoveryFailure()
May 17 15:12:08 ecos-yoga-01 nova-conductor[793]: E8000 nova
File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/identity/generic/base.py", line 159, in _do_create_plugin
    File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/identity/base.py", line 158, in _do_create_plugin
        raise exceptions.DiscoveryFailure()
May 17 15:12:08 ecos-yoga-01 nova-conductor[793]: E8000 nova
File "/usr/local/lib/python/3.8/dist-packages/keytomeauthn/exceptions/discovery.DiscoveryFailure: Could not find versioned Identity endpoints when attempting to authenticate. Please check that your auth_url is correct. Unable to establish connection to http://172.16.8.187/"; code=exited, status=1/FAILURE

```

As shown in the preceding figure, only the devstack@n-api.service service is active, and other Nova-related services are failed. Run the following command to restart Nova-related services: (You can restart services that fail to be restarted separately or all services at the same time. You need to enter the password of user root for each service. The password is customized during ECS creation.)

```
systemctl restart devstack@n-super-cond.service devstack@n-sch.service devstack@n-cond-cell1.service devstack@n-api.service
```

```

stack@ecos-yoga-01:/devstack$ systemctl restart devstack@n-super-cond.service devstack@n-sch.service devstack@n-cond-cell1.service devstack@n-api.service
*** AUTHENTICATING FOR org.freedesktop.systemd-manage-units ***
Authentication is required to restart 'devstack@n-super-cond.service'.
Authenticating as: root
Password:
*** AUTHENTICATION COMPLETE ***
*** AUTHENTICATING FOR org.freedesktop.systemd-manage-units ***
Authentication is required to restart 'devstack@n-sch.service'.
Authenticating as: root
Password:
*** AUTHENTICATION COMPLETE ***
*** AUTHENTICATING FOR org.freedesktop.systemd-manage-units ***
Authentication is required to restart 'devstack@n-cond-cell1.service'.
Authenticating as: root
Password:
*** AUTHENTICATION COMPLETE ***
*** AUTHENTICATING FOR org.freedesktop.systemd-manage-units ***
Authentication is required to restart 'devstack@n-api.service'.
Authenticating as: root
Password:
*** AUTHENTICATION COMPLETE ***

```

Run the following command to check whether the state of Nova-related services are active.

```
systemctl status devstack@n-super-cond.service devstack@n-sch.service devstack@n-cond-cell1.service devstack@n-api.service
```

```

stack@ec2-54-227-11-11:~/devstack$ systemctl status devstack@super-cond.service devstack@sch.service devstack@nova-cell.service devstack@api.service
● devstack@super-cond.service - DevStack DevStack@super-cond service
   Loaded: loaded (/etc/systemd/system/devstack@super-cond.service; enabled; vendor preset: enabled)
   Active: active (running) since Wed 2023-05-17 16:23:16 CST; 4min 8s ago
     Main PID: 15785 (python3)
      Tasks: 5 (limit: 9442)
     Memory: 7.7M
        CPU: 0.000 CPU(s) used
     CGroup: /system.slice/system-devstack.slice/devstack@super-cond.service
           └─15785 /usr/bin/python3 -u /etc/nova/nova.conf --config-file /etc/nova/nova.conf --config-file /etc/nova/nova-conductor --config-file /etc/nova/nova.conf

May 17 16:23:07 ec2-yoga-01 nova-conductor[15783]: DEBUG oslo_service.service [None res=4200a3c5-4f90-490c-914b-d0dc0b54 None None] oslo_limit.split_loggers = False ((pid=15785) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680)
May 17 16:23:07 ec2-yoga-01 nova-conductor[15783]: DEBUG oslo_service.service [None res=4200a3c5-4f90-490c-914b-d0dc0b54 None None] oslo_limit.status_code_retries = None ((pid=15785) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680)
May 17 16:23:07 ec2-yoga-01 nova-conductor[15783]: DEBUG oslo_service.service [None res=4200a3c5-4f90-490c-914b-d0dc0b54 None None] oslo_limit.retry_delay = None ((pid=15785) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680)
May 17 16:23:07 ec2-yoga-01 nova-conductor[15783]: DEBUG oslo_service.service [None res=4200a3c5-4f90-490c-914b-d0dc0b54 None None] oslo_limit.timeout = None ((pid=15785) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680)
May 17 16:23:07 ec2-yoga-01 nova-conductor[15783]: DEBUG oslo_service.service [None res=4200a3c5-4f90-490c-914b-d0dc0b54 None None] oslo_limit.valid_interface = None ((pid=15785) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680)
May 17 16:23:07 ec2-yoga-01 nova-conductor[15783]: DEBUG oslo_service.service [None res=4200a3c5-4f90-490c-914b-d0dc0b54 None None] oslo_reports_file.event_handler = None ((pid=15785) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680)
May 17 16:23:07 ec2-yoga-01 nova-conductor[15783]: DEBUG oslo_service.service [None res=4200a3c5-4f90-490c-914b-d0dc0b54 None None] oslo_reports.log_dir = None ((pid=15785) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680)
May 17 16:23:07 ec2-yoga-01 nova-conductor[15783]: DEBUG oslo_service.service [None res=4200a3c5-4f90-490c-914b-d0dc0b54 None None] ..... (((pid=15785) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680))

● devstack@sch.service - DevStack DevStack@sch service
   Loaded: loaded (/etc/systemd/system/devstack@sch.service; enabled; vendor preset: enabled)
   Active: active (running) since Wed 2023-05-17 16:23:12 CST; 4min 8s ago
     Main PID: 15812 (python3)
      Tasks: 3 (limit: 9442)
     Memory: 7.7M
        CPU: 0.000 CPU(s) used
     CGroup: /system.slice/system-devstack.slice/devstack@sch.service
           └─15812 /usr/bin/python3 -u /etc/nova/nova-scheduler --config-file /etc/nova/nova.conf

May 17 16:23:11 ec2-yoga-01 nova-scheduler[15794]: DEBUG oslo_service.service [None res=4200a3c5-f511-4f97-86e6-fa14d08c0b03 None None] oslo_limit.split_loggers = False ((pid=15794) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680)
May 17 16:23:11 ec2-yoga-01 nova-scheduler[15794]: DEBUG oslo_service.service [None res=4200a3c5-f511-4f97-86e6-fa14d08c0b03 None None] oslo_limit.status_code_retires = None ((pid=15794) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680)
May 17 16:23:11 ec2-yoga-01 nova-scheduler[15794]: DEBUG oslo_service.service [None res=4200a3c5-f511-4f97-86e6-fa14d08c0b03 None None] oslo_limit.retry_delay = None ((pid=15794) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680)
May 17 16:23:11 ec2-yoga-01 nova-scheduler[15794]: DEBUG oslo_service.service [None res=4200a3c5-f511-4f97-86e6-fa14d08c0b03 None None] oslo_limit.timeout = None ((pid=15794) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680)
May 17 16:23:11 ec2-yoga-01 nova-scheduler[15794]: DEBUG oslo_service.service [None res=4200a3c5-f511-4f97-86e6-fa14d08c0b03 None None] oslo_limit.valid_interface = None ((pid=15794) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680)
May 17 16:23:11 ec2-yoga-01 nova-scheduler[15794]: DEBUG oslo_service.service [None res=4200a3c5-f511-4f97-86e6-fa14d08c0b03 None None] oslo_reports_file.event_handler = None ((pid=15794) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680)
May 17 16:23:11 ec2-yoga-01 nova-scheduler[15794]: DEBUG oslo_service.service [None res=4200a3c5-f511-4f97-86e6-fa14d08c0b03 None None] oslo_reports.log_dir = None ((pid=15794) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680)
May 17 16:23:11 ec2-yoga-01 nova-scheduler[15794]: DEBUG oslo_service.service [None res=4200a3c5-f511-4f97-86e6-fa14d08c0b03 None None] ..... (((pid=15794) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680))

● devstack@nova-cell.service - DevStack DevStack@nova-cell service
   Loaded: loaded (/etc/systemd/system/devstack@nova-cell.service; enabled; vendor preset: enabled)
   Active: active (running) since Wed 2023-05-17 16:23:16 CST; 4min 8s ago
     Main PID: 15817 (python3)
      Tasks: 6 (limit: 9442)
     Memory: 138.7M
        CPU: 0.000 CPU(s) used
     CGroup: /system.slice/system-devstack.slice/devstack@nova-cell.service
           └─15817 /usr/bin/python3 -u /etc/nova/nova_cell.conf --config-file /etc/nova/nova.conf --config-file /etc/nova/nova-cell.conf

May 17 16:23:10 ec2-yoga-01 nova-conductor[15817]: DEBUG oslo_service.service [None res=3ba011a-c155-4f98-96a0-9012eab0b7 None None] oslo_limit.split_loggers = False ((pid=15817) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680)
May 17 16:23:10 ec2-yoga-01 nova-conductor[15817]: DEBUG oslo_service.service [None res=3ba011a-c155-4f98-96a0-9012eab0b7 None None] oslo_limit.status_code_retires = None ((pid=15817) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680)
May 17 16:23:10 ec2-yoga-01 nova-conductor[15817]: DEBUG oslo_service.service [None res=3ba011a-c155-4f98-96a0-9012eab0b7 None None] oslo_limit.retry_delay = None ((pid=15817) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680)
May 17 16:23:10 ec2-yoga-01 nova-conductor[15817]: DEBUG oslo_service.service [None res=3ba011a-c155-4f98-96a0-9012eab0b7 None None] oslo_limit.timeout = None ((pid=15817) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680)
May 17 16:23:10 ec2-yoga-01 nova-conductor[15817]: DEBUG oslo_service.service [None res=3ba011a-c155-4f98-96a0-9012eab0b7 None None] oslo_limit.valid_interface = None ((pid=15817) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680)
May 17 16:23:10 ec2-yoga-01 nova-conductor[15817]: DEBUG oslo_service.service [None res=3ba011a-c155-4f98-96a0-9012eab0b7 None None] oslo_reports_file.event_handler = None ((pid=15817) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680)
May 17 16:23:10 ec2-yoga-01 nova-conductor[15817]: DEBUG oslo_service.service [None res=3ba011a-c155-4f98-96a0-9012eab0b7 None None] oslo_reports.log_dir = None ((pid=15817) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680)
May 17 16:23:10 ec2-yoga-01 nova-conductor[15817]: DEBUG oslo_service.service [None res=3ba011a-c155-4f98-96a0-9012eab0b7 None None] ..... (((pid=15817) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680))

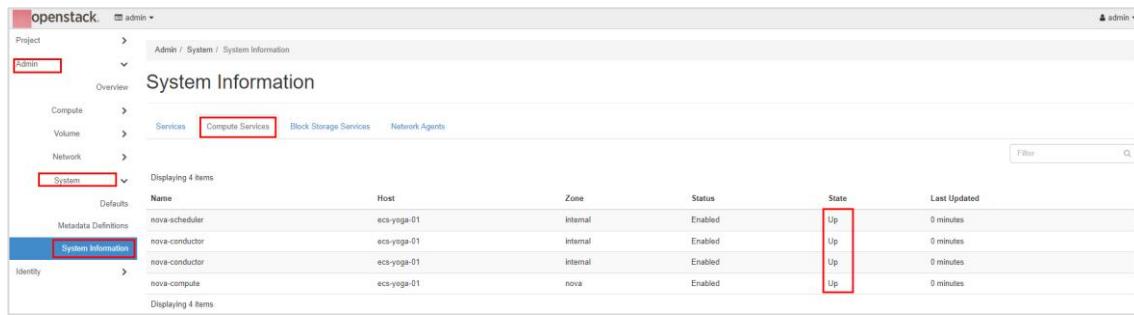
● devstack@api.service - DevStack DevStack@api service
   Loaded: loaded (/etc/systemd/system/devstack@api.service; enabled; vendor preset: enabled)
   Active: active (running) since Wed 2023-05-17 16:23:16 CST; 4min 8s ago
     Main PID: 15852 (comctl)
      Tasks: 1 (limit: 9442)
     Memory: 0.0B
        CPU: 0.000 CPU(s) used
     CGroup: /system.slice/system-devstack.slice/devstack@api.service
           └─15852 /usr/bin/python3 -u /etc/nova/nova-api.conf --config-file /etc/nova/nova.conf

May 17 16:23:10 ec2-yoga-01 nova-conductor[15852]: DEBUG oslo_service.service [None res=4200a3c5-4f90-490c-914b-d0dc0b54 None None] oslo_limit.split_loggers = False ((pid=15852) log_opt_values /usr/local/lib/python3.8/dist-packages/oslo_config/cfg.py:2680)

```

9.1.4 Viewing the Compute Services State

Log in to the OpenStack dashboard again and check whether the compute services state is up. (The dashboard needs to be refreshed, and the service startup takes time.)



Name	Host	Zone	Status	State	Last Updated
nova-scheduler	ec2-yoga-01	internal	Enabled	Up	0 minutes
nova-conductor	ec2-yoga-01	internal	Enabled	Up	0 minutes
nova-conductor	ec2-yoga-01	internal	Enabled	Up	0 minutes
nova-compute	ec2-yoga-01	nova	Enabled	Up	0 minutes

9.1.5 Verifying OpenStack Instance Creation

On the OpenStack dashboard, create an instance and view the result. (If an instance is being scheduled, delete the instance. If the instance cannot be deleted, refresh the page for multiple times and delete it again.)

Huawei Certified Cloud Computing Training

HCIP-Cloud Computing

HUAWEI CLOUD Stack Lab Guide (Resource Management and General Cloud Services)

ISSUE: 5.0



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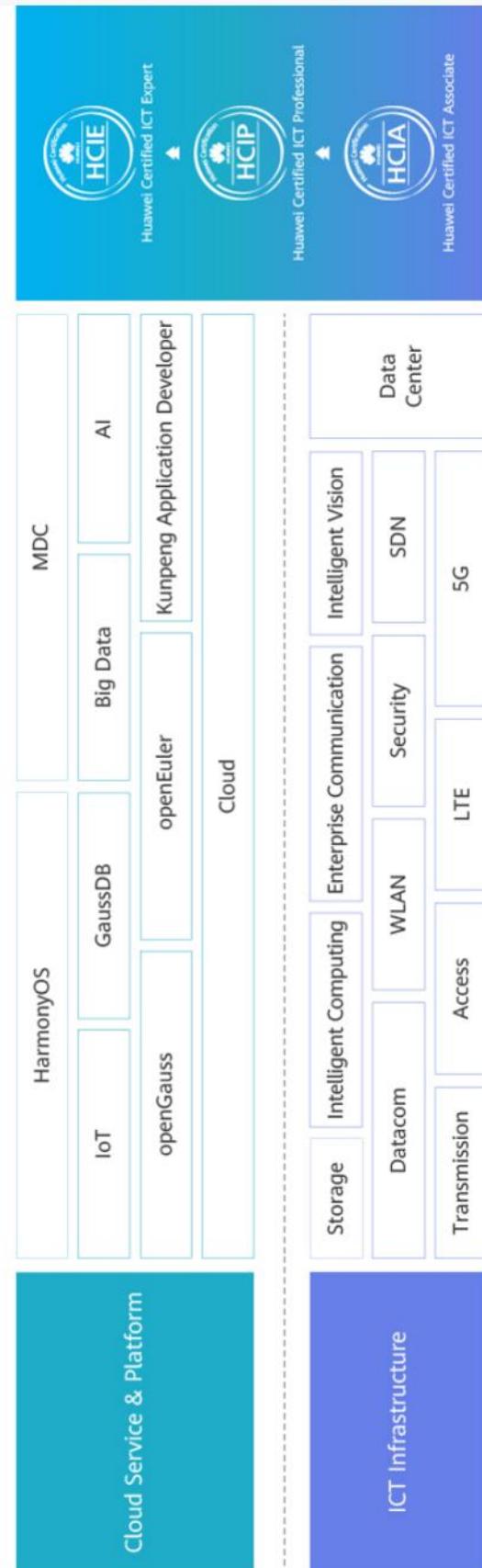
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- Huawei Certified ICT Professional (HCIP)
- Huawei Certified ICT Expert (HCIE)

Huawei certification courses cover the entire ICT domain, with a focus on how today's architecture generates cloud-pipe-device synergy. The courses present the latest developments of all essential ICT aspects to foster a thriving ICT talent ecosystem for the digital age.

HCIP-Cloud Computing is mainly oriented to enterprise cloud management SREs, cloud computing O&M engineers, and OpenStack engineers. The HCIP-Cloud Computing course covers the OpenStack cloud management platform, HUAWEI CLOUD Stack architecture and components, HUAWEI CLOUD Stack resource management and infrastructure services, HUAWEI CLOUD Stack O&M, and scenario practices. This course helps trainees deeply understand open source OpenStack principles and apply them to HUAWEI CLOUD Stack O&M practices.

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Huawei Certification





About This Document

Overview

This document is intended for HCIP-Cloud Computing certification training courses. It describes Service OM resource management and how to use and manage HUAWEI CLOUD Stack general cloud services. It is intended for trainees who are going to take the HCIP-Cloud Computing exam or readers who want to understand cloud computing and HUAWEI CLOUD Stack technologies.

About the Exercises

This document consists of 10 exercises, starting from basic cloud service configurations, and describes how to configure, implement, and manage HUAWEI CLOUD Stack compute, storage, and network services.

- Exercise 1: Cloud resource preparations. This exercise describes how to perform the configurations on Service OM as an administrator before using general cloud services.
- Exercise 2: Tenant preparations on HUAWEI CLOUD Stack ManageOne Operation Portal. This exercise describes how to perform the configurations on HUAWEI CLOUD Stack ManageOne Operation Portal as an operation administrator before using general cloud services.
- Exercise 3: Elastic Cloud Server (ECS). This exercise describes how to apply for and manage ECSs.
- Exercise 4: Image Management Service (IMS). This exercise describes how tenants create private images and manage shared images.
- Exercise 5: Auto Scaling (AS). This exercise describes how to apply for, configure, and manage the AS service.
- Exercise 6: Elastic Volume Service (EVS). This exercise describes how to use EVS disks.
- Exercise 7: Virtual Private Cloud (VPC). This exercise describes how tenants apply for and manage VPCs.
- Exercise 8: VPC Peering. This exercise describes how to use VPC peering connections.
- Exercise 9: Elastic IP (EIP). This exercise describes how to use EIPs and how shared bandwidths work.
- Exercise 10: Elastic Load Balance (ELB). This exercise describes how to create and manage load balancers.

Knowledge Required

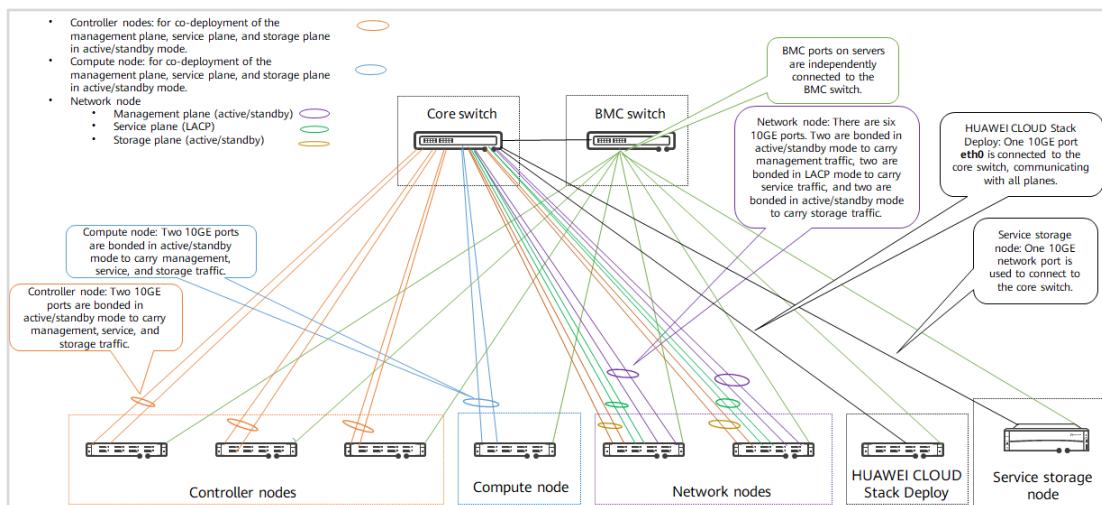
To better understand this certification course, familiarize yourself with the following:

Basic knowledge of cloud computing and the usage of the HUAWEI CLOUD Stack platform.

Lab Environment Overview

Networking Description

These exercises are intended for engineers who are going to take the HCIP-Cloud Computing certification exam. Trainees share one HUAWEI CLOUD Stack 8.1.1 lab environment.



The following network configurations are recommended:

- Server BMC management plane network: BMC ports on servers are independently connected to the BMC switch.
- Controller node: Two 10GE ports on each server are bonded in active/standby mode to carry management, service, and storage traffic.
- Network node: There are six 10GE ports. Two are bonded in active/standby mode to carry management traffic, two are bonded in LACP mode to carry service traffic, and two are bonded in active/standby mode to carry storage traffic.
- Compute node: Two 10GE ports on each server are bonded in active/standby mode to carry management, service, and storage traffic.
- HUAWEI CLOUD Stack Deploy: One 10GE port is connected to the core switch, communicating with all planes.
- Service storage: One 10GE port is connected to the core switch.

Table 1-1 HUAWEI CLOUD Stack deployment requirements

Solution	Host	Deployment Mode
HUAWEI CLOUD Stack Deploy	Server 06	HUAWEI CLOUD Stack Deploy is deployed on a physical server.
HUAWEI CLOUD Stack 8.1.1 controller node	Server 01 Server 02 Server 03	FusionSphere OpenStack controller nodes are automatically deployed using HUAWEI CLOUD Stack Deploy 8.1.1.
HUAWEI CLOUD Stack 8.1.1 compute node	Server 07	FusionSphere OpenStack compute nodes are automatically deployed using HUAWEI CLOUD Stack Deploy 8.1.1.
HUAWEI CLOUD Stack 8.1.1 network node	Server 04 Server 05	Active and standby VMs of NEs, such as active and standby vRouters, ENAT, and BR are automatically deployed on FusionSphere OpenStack network nodes.
HUAWEI CLOUD Stack 8.1.1 cloud service VMs	Server 01 Server 02 Server 03	Active and standby VMs of cloud services, such as LVS, Nginx, NTP, HAProxy, API Gateway, TaskCenter, and DNS, are automatically deployed on FusionSphere OpenStack controller nodes.
ManageOne Maintenance Portal	Server 01 Server 02 Server 03	Active and standby OperationCenter VMs are automatically deployed on FusionSphere OpenStack controller nodes.
ManageOne Operation Portal	Server 01 Server 02 Server 03	Active and standby ServiceCenter VMs are automatically deployed on FusionSphere OpenStack controller nodes.
ManageOne Deployment Portal	Server 01 Server 02 Server 03	Active and standby CloudOpera VMs are automatically deployed on FusionSphere OpenStack controller nodes.

Solution	Host	Deployment Mode
FusionStorage	Server 01 Server 02 Server 03	Active and standby VMs of FusionStorage Manager are automatically deployed on FusionSphere OpenStack controller nodes.
Service Storage	IP SAN service storage	Uses IP SAN service storage to provide resources for service partitions.

Lab Environment Introduction

A trainee uses the HUAWEI CLOUD Stack 8.1.1 environment through a jump server. The jump server contains all installation packages and tools required for these exercises. Each trainee must be familiar with how to use the HUAWEI CLOUD Stack 8.1.1 platforms.

These exercises involve four platforms of HUAWEI CLOUD Stack 8.1.1: ManageOne Maintenance Portal, ManageOne Operation Portal, Service OM, and the FusionSphere OpenStack web client. ManageOne Maintenance Portal is responsible for alarm management and performance monitoring of underlying physical resources and cloud services. Service OM is responsible for configuring and managing cloud resources. ManageOne Operation Portal is responsible for provisioning and managing cloud services. The FusionSphere OpenStack web client is responsible for deploying and upgrading the IaaS cloud platform.

Lab Environment Preparations

Checking Installation Packages and Tools

Before these exercises, each group of trainees should check whether the installation packages and tools involved in these exercises are complete, which are listed in the following table.

Table 1-2 Installation packages and tools required in these exercises

Installation Package or Tool	Description
EulerOS-V2.0SP5-x86_64-dvd.iso	EulerOS installation package, which is used to create images
EulerOS_Cloud-init.rar	Cloud-Init installation package, which is used to install Cloud-Init
FusionSphere_OpenStack_Image_Tool-	UVP VMTools installation package, which is



8.1.1.zip	used to install UVP VMTools
FusionSphere_SIA-8.0.20-GuestOSDriver_X86.zip	Hardware and guest OS compatibility adaptation package, which is used to install UVP VMTools
MobaXterm	Remote login tool

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1

Cloud Resource Preparations

1.1 Overview

1.1.1 About This Exercise

Prepare for provisioning compute, storage, and network resources in the HUAWEI CLOUD Stack environment.

1.1.2 Objectives

- Prepare for using cloud computing general services on Service OM.
- Create flavors.
- Register images.
- Create disk types.
- Create external networks.

1.1.3 Process

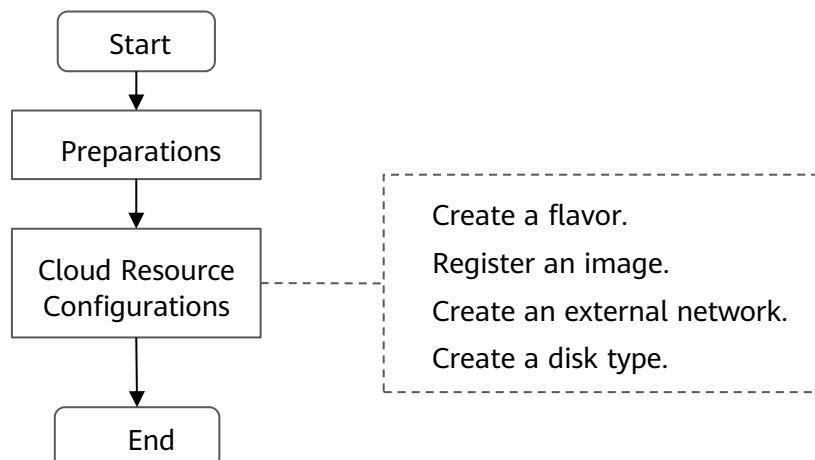
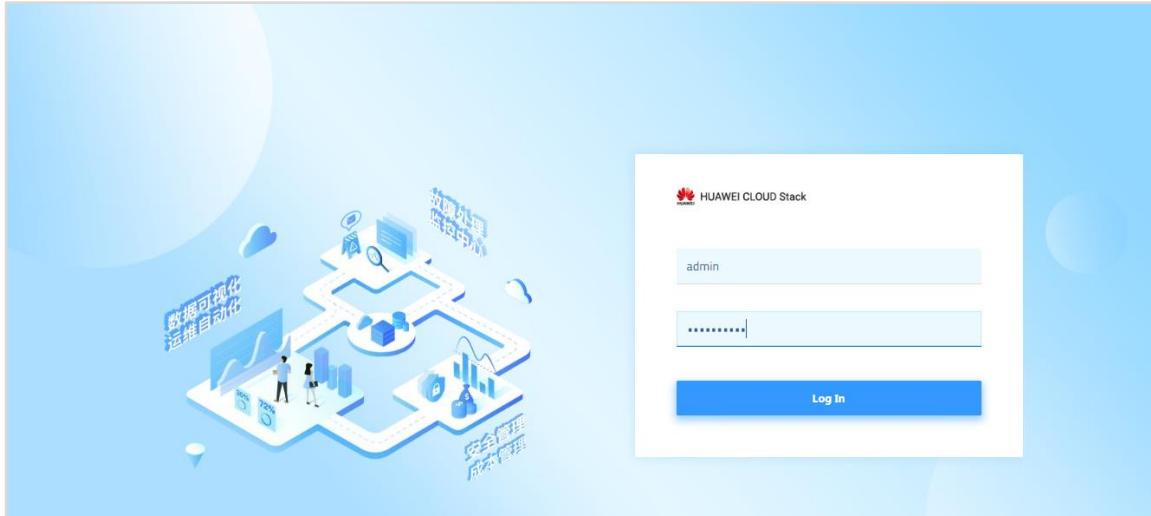


Figure 1-1 Cloud resource preparation process

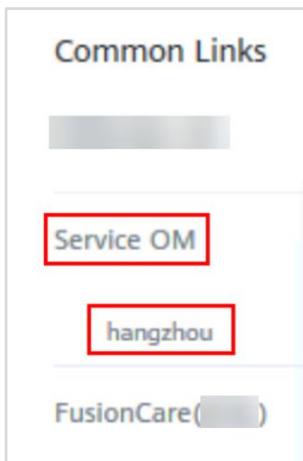
1.2 Procedure

1.2.1 Creating a Flavor

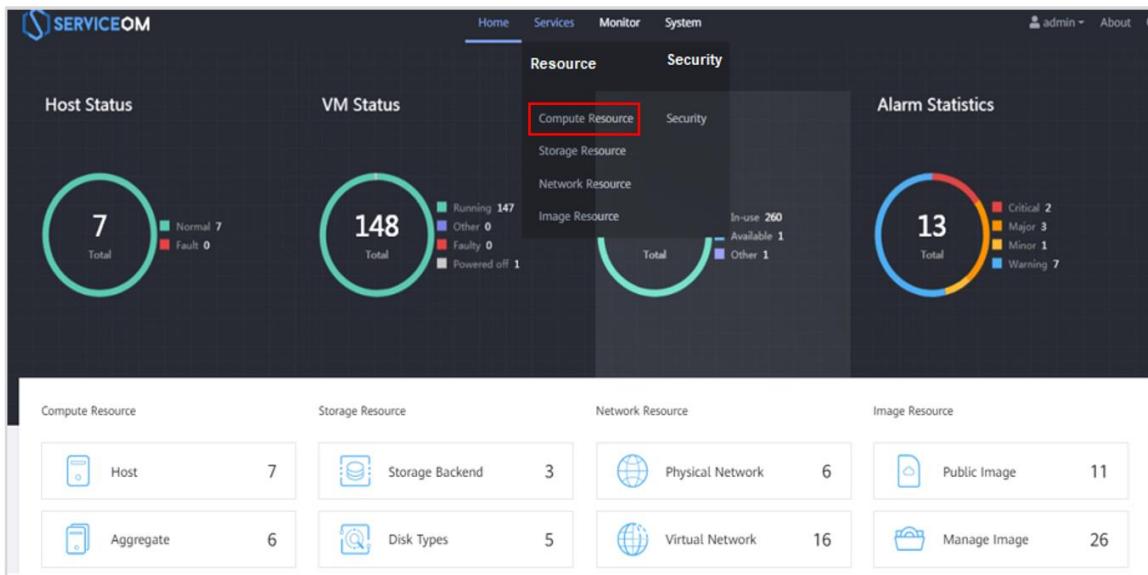
Step 1 Log in to ManageOne Maintenance Portal as an administrator. For the login address, username, and password, contact the trainer.



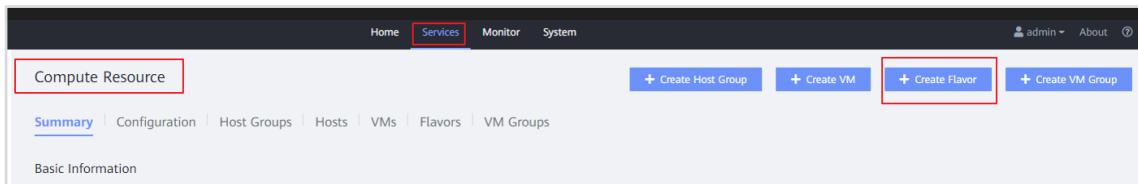
Step 2 In the lower right corner of the homepage, choose **Service OM** under **Common Links** and click the region name **hangzhou** to switch to Service OM.



Step 3 On the top menu bar, choose **Services > Resource > Compute Resource**.



Step 4 Click **Create Flavor** in the upper right corner.



Step 5 Configure the basic information. Select a CPU architecture and boot device as required, enter **zhangsan** in the **Name** text box, set the number of vCPUs and memory size, select a virtualization type, and select an AZ. Then, go to the next step.

The screenshot shows the 'Configure Basic Information' step of the flavor creation wizard with the following fields:

- ① Configure Basic Information
- ② Feature Configuration
- ③ Associate Host Group
- ④ Custom Tag
- ⑤ Confirm Information

★ CPU Architecture	<input checked="" type="radio"/> X86 <input type="radio"/> ARM
★ CPU Vendor	<input checked="" type="radio"/> Intel <input type="radio"/> Hygon
★ Boot Device	Cloud disk
★ Name	zhangsan
Display Name	zhangsan

vCPUs: 2

Memory: 4 GB

Virtualization Type: KVM

Availability Zone: az0.dc0

Step 6 Retain the default values for parameters in the **Advanced Features** area and select **General-Purpose** in the **General Resource Features** area.

Advanced Features

CPU Mode: vCPU Bound to Physical Thread NUMA Affinity CPU QoS

Huge Page Memory(MB): Not configured

TPM-based Trust: Yes No
VMs can be created on TPM-based trusted hosts or other hosts.

Resource Features

If no resource feature is selected, this flavor will not be displayed on the tenant portal and cannot be used to create ECSs. For existing flavors, their resource features can be modified.

General Resource Features

General-Purpose Dedicated General-Purpose Memory-optimized General Computing-Plus(X86)

Storage Resource Features

Disk-intensive

Step 7 Set **CPU Model** and **Associate Host group** as required.

Flavors

Create Flavor

Feature Configuration

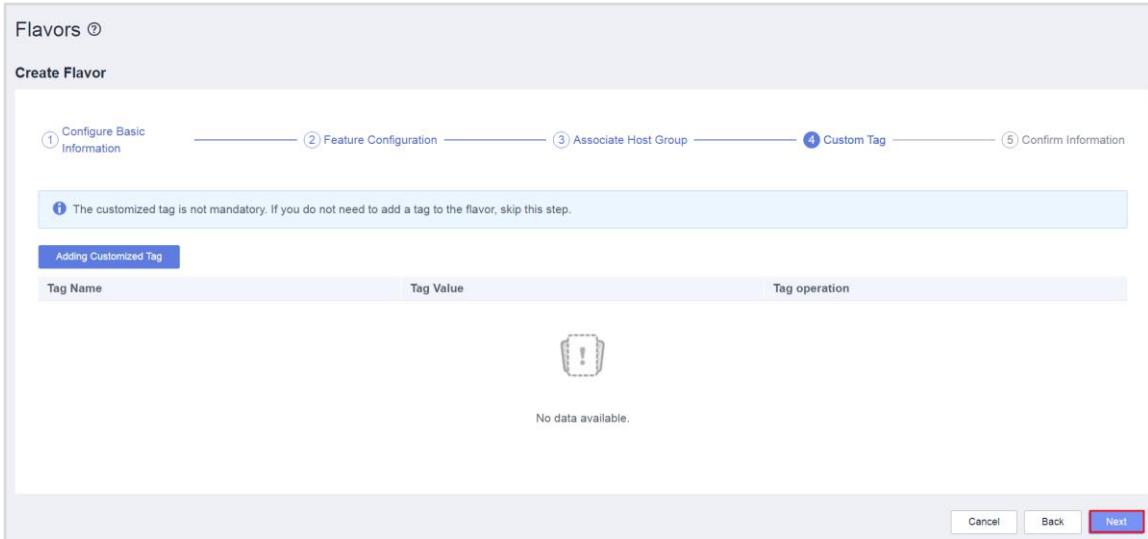
CPU Model: Same as host group

Associate Host Group: No Yes

If no host group is associated, the system schedules an appropriate host group based on the resource types and user-defined label you have selected for the flavor.

Next

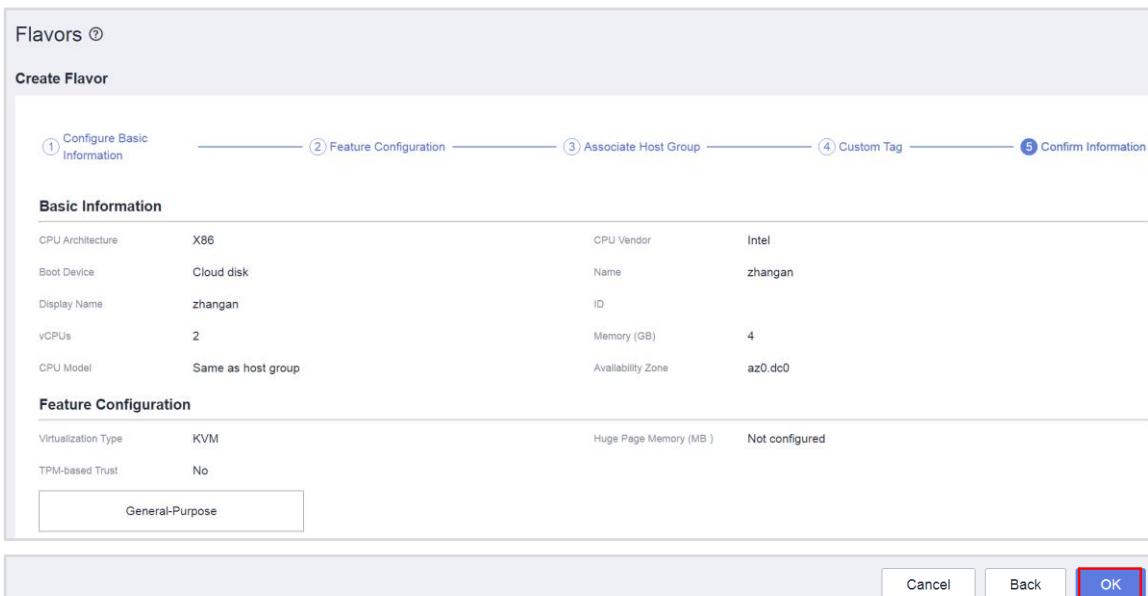
Step 8 On the **Custom Tag** page, retain the default settings and click **Next**. On the **Confirm Information** page, click **OK**.



Tag Name	Tag Value	Tag operation

No data available.

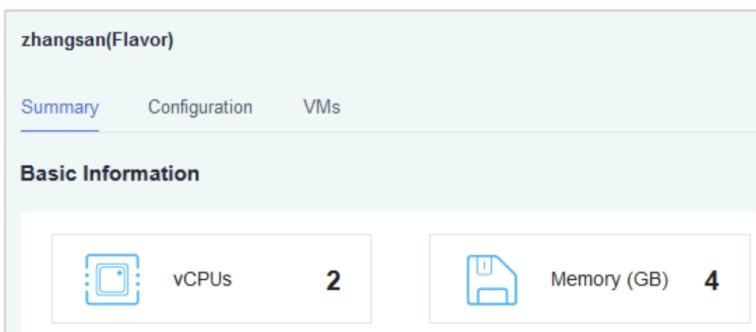
Cancel Back Next



Basic Information	Feature Configuration	Associate Host Group	Custom Tag	Confirm Information
CPU Architecture: X86 Boot Device: Cloud disk Display Name: zhangan vCPUs: 2 CPU Model: Same as host group	Virtualization Type: KVM TPM-based Trust: No General-Purpose	CPU Vendor: Intel Name: zhangan ID: Memory (GB): 4 Availability Zone: az0.dc0	Huge Page Memory (MB): Not configured	OK

Cancel Back OK

Step 9 Verify that the flavor is successfully created.

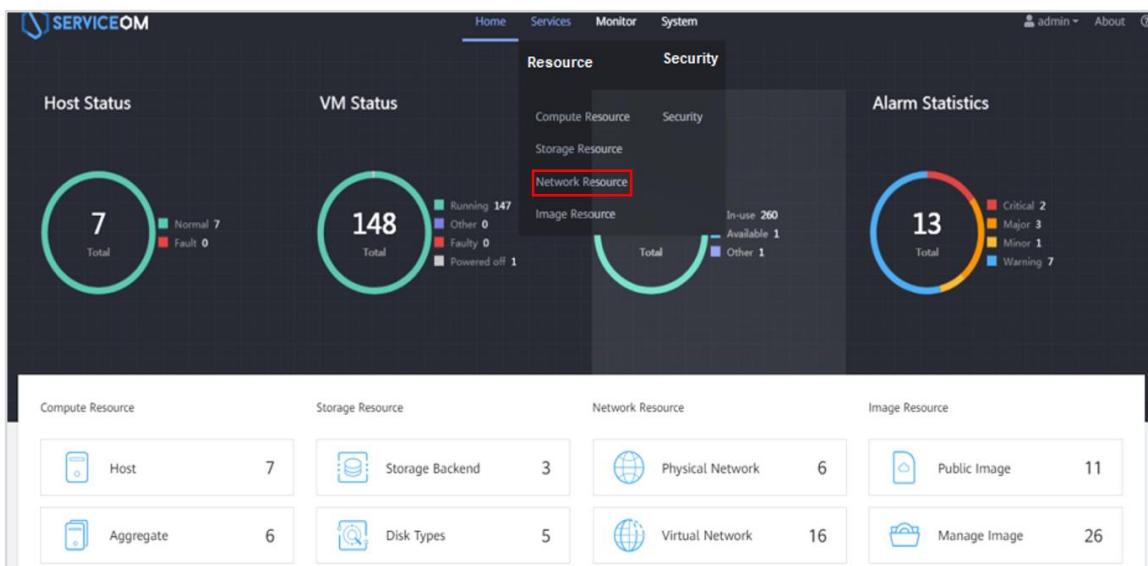


vCPUs	Memory (GB)
2	4

1.2.2 (Optional) Creating External Networks

Trainees only need to understand how to create an external network on Service OM. Obtain the external network used in the exercises from the trainer to ensure that the correct IP address segments are obtained and the connectivity tests are passed.

Step 1 On the top menu bar, choose **Services > Resource > Network Resource**.



Step 2 Choose **External Networks** in the navigation pane, and click **Create External Network** in the upper right corner.

The screenshot shows the 'External Networks' list page. At the top right is a red button labeled 'Create External Network'. The table below lists two entries:

Name	ID	Physical Network	Network Type	VLAN ID	Resource Label	Created At	Description	Operation
rainbow	7ce1a5ba-2b84-47...	physnet1	VLAN	3948	Used For: EIP Group: group1 Display Name: rainbow			Modify Set Resource Label More ▾
error	83ded422-1d7f-4f...	physnet1	VLAN	3952	Used For: EIP Group: group1 Display Name: error			Modify Set Resource Label More ▾

Step 3 Set parameters. Enter a name (for example, zs-EIP) based on your name in pinyin, set **Network Type**, **Sharing Type**, **Display Name**, **Used For**, and **Group** as required, and click **Create Now**.

< Create External Network

i After creating an external network, create subnets for it so that it can work properly.

Basic Information

* Name	zs-EIP
* Network Type	LOCAL
* Sharing Type	Unshared
Description	

Resource label configuration

* Display Name	zs-EIP
This is the external network name displayed on the tenant portal.	
* Used For	<input checked="" type="checkbox"/> EIP
Group	group1
In a multi-egress scenario, you need to ensure that the internet, VPC type network, and loca	

Create Now

Step 4 Locate the created **zs-EIP** external network, and choose **More > Create IPv4 Subnet** in the **Operation** column.

External Networks								Create External Network	
Name	ID	Physical Network	Network Type	VLAN ID	Resource Label	Created At	Description	Operation	
zs-EIP	37ebafb2-2210-4b15-bcf...	--	LOCAL		Used For: EIP Group: group1 Display Name: zs-EIP			Modify Set Resource Label More ▾	
rainbow	7ce1a0ba-2b84-479f-846...	physnet1	VLAN	3948	Used For: EIP Group: group1 Display Name: rainbow			Modify Set Resource Label More ▾	
error	83ded422-1d7f-4f37-9dce...	physnet1	VLAN	3952	Used For: EIP Group: group1 Display Name: error			Modify Set Resource Label More ▾	

Step 5 Set the parameters. Enter a name (for example, zs-eip) based on your name in pinyin, set **Subnet IP Address** (for example, 10.200.16.0/24) based on the site requirements, and click **OK**.

Create IPv4 Subnet

★ Name: zs-eip

★ Subnet IP Address: 10 . 200 . 16 . 0 / 24

Gateway:

Allocation Pools: -

+ Add

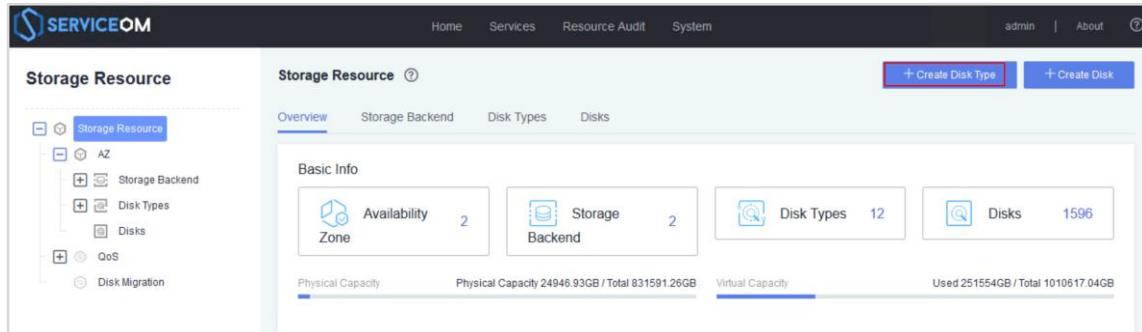
Preferred DNS Server: |

Alternate DNS Server:

OK **Cancel**

1.2.3 Creating a Disk Type

Step 1 On the top menu bar, choose **Services > Resource > Storage Resource**. Click **Create Disk Type** in the upper right corner.



The screenshot shows the ServiceOM interface for managing storage resources. The left sidebar has a tree view under 'Storage Resource' with nodes like 'AZ', 'Storage Backend', 'Disk Types', 'Disks', 'QoS', and 'Disk Migration'. The main area is titled 'Storage Resource' with tabs for 'Overview', 'Storage Backend', 'Disk Types', and 'Disks'. The 'Overview' tab is selected. It displays basic information: 'Availability Zone' (2), 'Storage Backend' (2), 'Disk Types' (12), and 'Disks' (1596). Below this, it shows 'Physical Capacity' (24948.93GB / Total 831591.26GB) and 'Virtual Capacity' (Used 251554GB / Total 1010617.04GB).

Step 2 Enter the disk type name, select an AZ, and click **Next**.

< | Create Disk Type

① Configure Basic Information ————— ② Select Storage Backend ————— ③ Select Configuration Mode

Configure Basic Information

* Name zhangsan

* Availability Zone az0.dc0 (必填)

Additional Info

You can create 10 pieces of additional information.

Next

Step 3 Select a storage backend as required and click **Next**.

< | Create Disk Type

① Configure Basic Information ————— ② Select Storage Backend —————

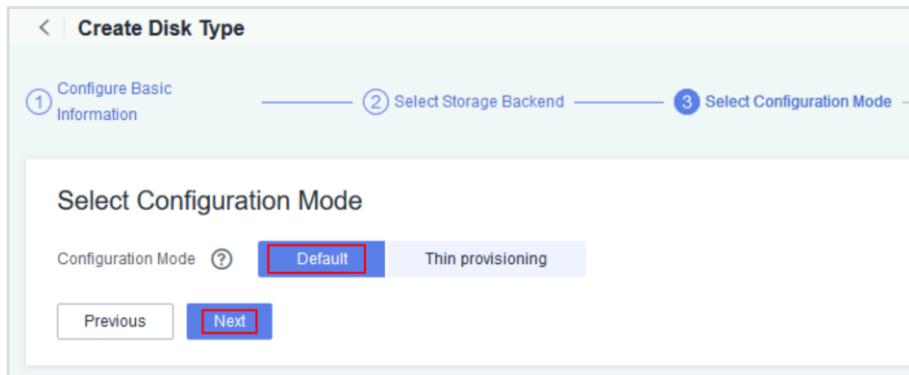
Select Storage Backend

Storage Ba...	AZ	Type	Physical S...
<input checked="" type="checkbox"/> bussiness..	az0.dc0	Huawei Dis...	3830.68/73...

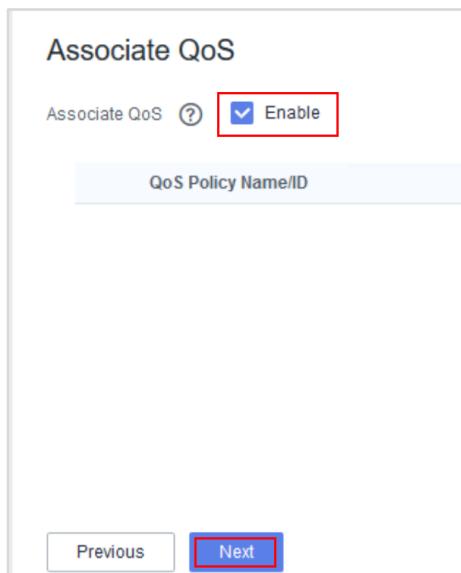
Storage ID (必填)

Previous Next

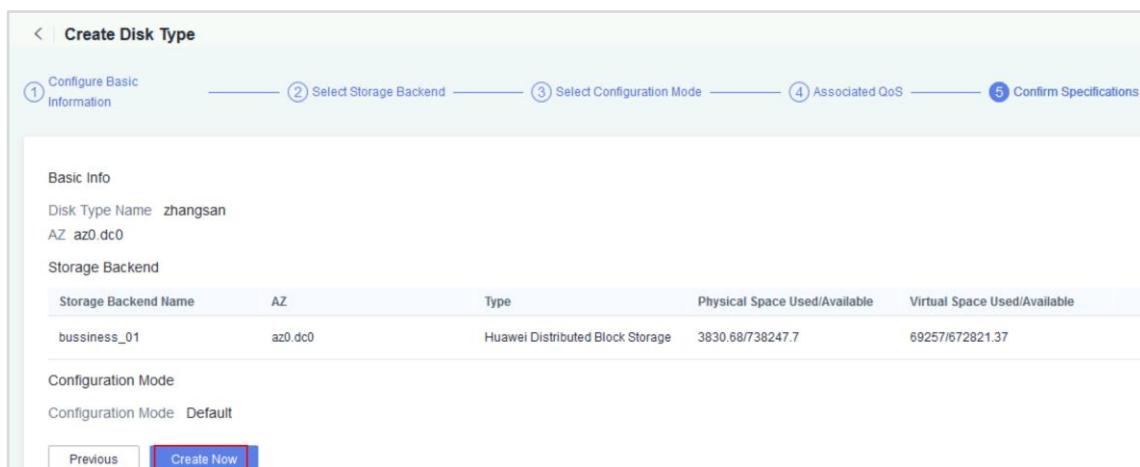
Step 4 Select the default configuration mode and click **Next**.



Step 5 Deselect **Associate QoS** and click **Next**.



Step 6 After confirming the specifications, click **Create Now**.



Step 7 Set the resource label, select AZs, and click **OK**. On Service OM, confirm that the disk type is successfully created.

Set Resource Tag

* Default Name zhangan

Label

* Name

Availability Zones bms hcs811 manage-az

SERVICEOM

Home Services Resource Audit

Storage Resource

Name	Value
zhangan	<input type="text" value="zhangan"/>
Overview	<input type="button" value="Overview"/>
Disk	<input type="button" value="Disk"/>

Category	Value
Name	zhangan
Availability Zone	az0.dco
Storage Device SN	fa16c8ac625eb1f5

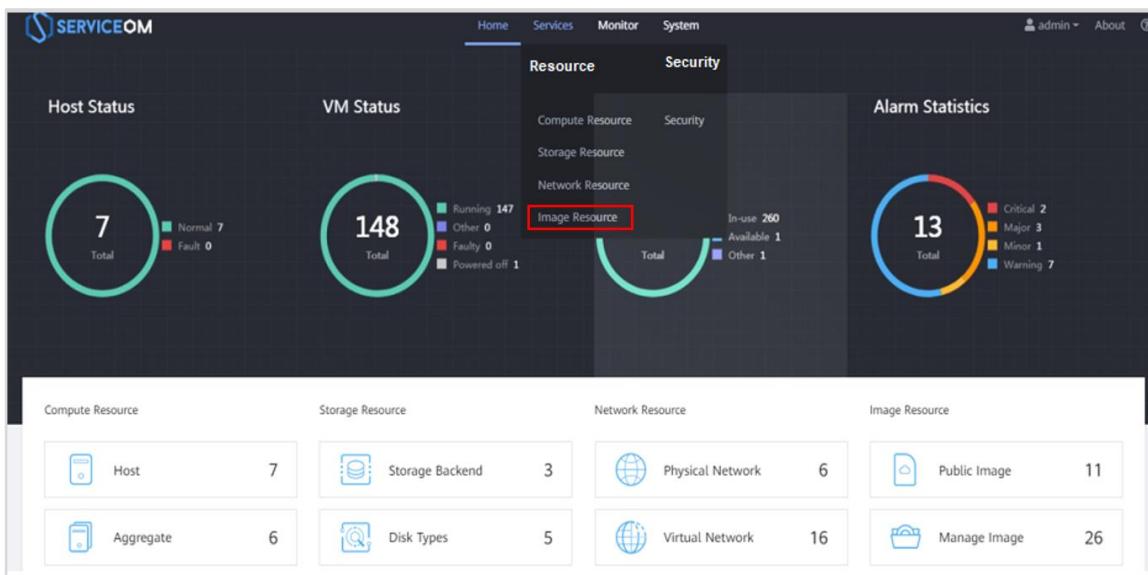
Storage Resource

- Storage Resource
 - AZ
 - + Storage Backend
 - Disk Types
 - @ zhangan
 - @ csjg_ykg
 - @ gzy1

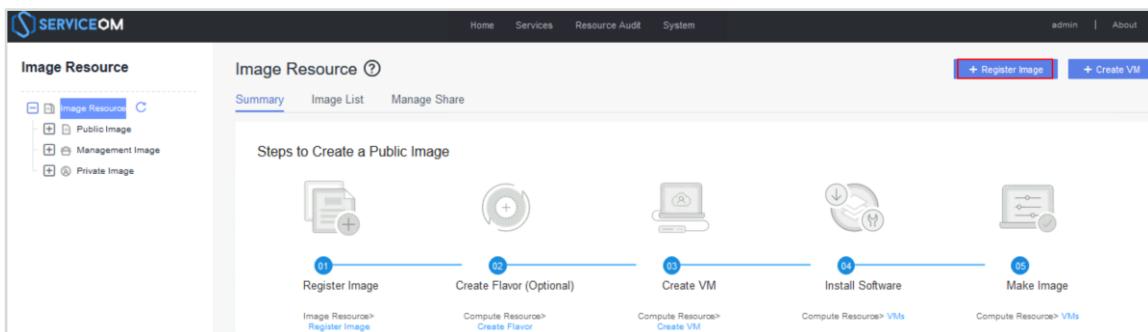
1.2.4 Creating a KVM Public Image Using an ISO Image

1.2.4.1 Registering an Image

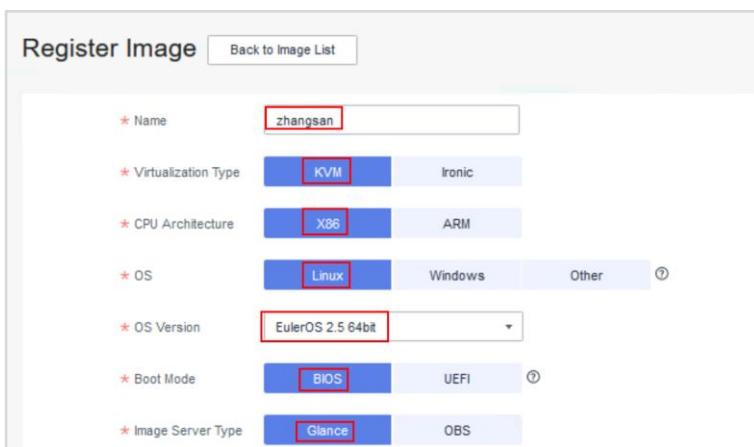
Step 1 On the top menu bar, choose **Services > Resource > Image Resource**.



Step 2 Click **Register Image** in the upper right corner.



Step 3 Set parameters. Configure **Name**, **Virtualization Type**, **CPU Architecture**, **OS Version**, **Boot Mode**, **Image Server Type**, **Upload Mode**, **Image File** (obtain **EulerOS-V2.0SP5-x86_64-dvd.iso** from the trainer), **Disk Format**, **Hash Algorithm**, **Image Type**, **Min Disk**, **Min Memory**, and **Disk Device Type** as required, and retain the default values for other parameters. Then, click **Register**.



The screenshot shows the "Register Image" configuration form:

Parameter	Value
Name	zhangsan
Virtualization Type	KVM
CPU Architecture	X86
OS	Linux
OS Version	EulerOS 2.5 64bit
Boot Mode	BIOS
Image Server Type	Glance

* Upload Mode ?

* Image File ?

* Disk Format ?

* Hash Algorithm ?

Set the image hash digest value

* Image Type ?

* Min Disk (GB) ?

* Min Memory ?

* Disk Device Type ?

Step 4 Verify that the image is successfully registered in the image list.

Image Resource ?							<input type="button" value="+ Register Image"/>	<input type="button" value="+ Create VM"/>
Summary	<u>Image List</u>	Manage Share						
Image Cache Space (MB) ① 9883.00							All	All Statuses
Name	Status	Virtualizat.....	OS	OS Version	Disk Format...	Operation	Name	zh
zhangsan	Registration Succeeded	KVM	Linux	EulerOS 2.5 64bit	iso	Modify Delete More	X	Q

1.2.4.2 Creating an Image VM

Step 1 Click **Create VM** in the upper right corner.

Image Resource ?							<input type="button" value="+ Register Image"/>	<input type="button" value="+ Create VM"/>
Summary	<u>Image List</u>	Manage Share						
Image Cache Space (MB) ① 9883.00							All	All Statuses
Name	Status	Virtualizat.....	OS	OS Version	Disk Format...	Operation	Name	zh
zhangsan	Registration Succeeded	KVM	Linux	EulerOS 2.5 64bit	iso	Modify Delete More	X	Q

Step 2 On the **Create Image VM** page, select an AZ for **Availability Zone** as required and click **Next: Select Image**.

Create Image VM

① Select Availability Zone —— ② Select Image —— ③ Select VM Specifications —— ④ Select Storage —— ⑤ Select Network —— ⑥ Configure Basic Information —— ⑦ Confirm Information

* Project: dc_system_dc0(D:bc9de1b394834346b90ba0f9d12eb633)

* Availability Zone: az0.dc0

Cancel **Next: Select Image**

Step 3 On the **Select Image** page, select the registered image **zhangsan** and click **Next: Select VM Specifications**.

Create Image VM

① Select Availability Zone —— ② Select Image —— ③ Select VM Specifications —— ④ Select Storage —— ⑤ Select Network —— ⑥ Configure Basic Information —— ⑦ Confirm Information

Select	Image Name	OS	Version	Min Memory (MB)	Min Disk (GB)	Description
<input checked="" type="radio"/>	zhangsan	Linux	EulerOS 2.6 64bit	0	40	--
<input type="radio"/>	image-ManageOne-811			0	0	--
<input type="radio"/>	image-kvm-euler			0	0	--

Total Records: 23 < 1 2 3 >

Cancel **Back** **Next: Select VM Specifications**

Step 4 Set parameters such as **Disk Type**, **System Disk**, and **Select Flavor** as required, and click **Next: Select Storage**.

Create Image VM

① Select Availability Zone —— ② Select Image —— ③ Select VM Specifications —— ④ Select Storage —— ⑤ Select Network —— ⑥ Configure Basic Information —— ⑦ Confirm Information

Disk Type: **Cloud disk** Local disk

* System Disk(GB): **40**

Select Flavor:

Select	Flavor Name	vCPUs	Memory (MB)	CPU Vendor	Tag
<input type="radio"/>	guzhang	4	4096	Intel	ecs:perfomancetype=normal;ecs...
<input checked="" type="radio"/>	zhangsan	2	4096	Intel	ecs:perfomancetype=normal;ecs...
<input type="radio"/>	Flavor_zhangjinhui001	2	8192	Intel	ecs:perfomancetype=normal;ecs...

Cancel **Back** **Next: Select Storage**

Step 5 Select a storage SLA as required and click **Next: Select Network**.

Create Image VM

① Select Availability Zone —— ② Select Image —— ③ Select VM Specifications —— ④ Select Storage —— ⑤ Select Network —— ⑥ Configure Basic Information —— ⑦ Confirm Information

Select	Storage Medium Name	ID	Availability Zone
<input type="radio"/>	SSD	fd0bfe88-480f-410d-bf92-16d99f945cdc	az0.dc0
<input checked="" type="radio"/>	business_type_01	efaa49b95-d11c-4610-a84-d6043aa7c16d	az0.dc0

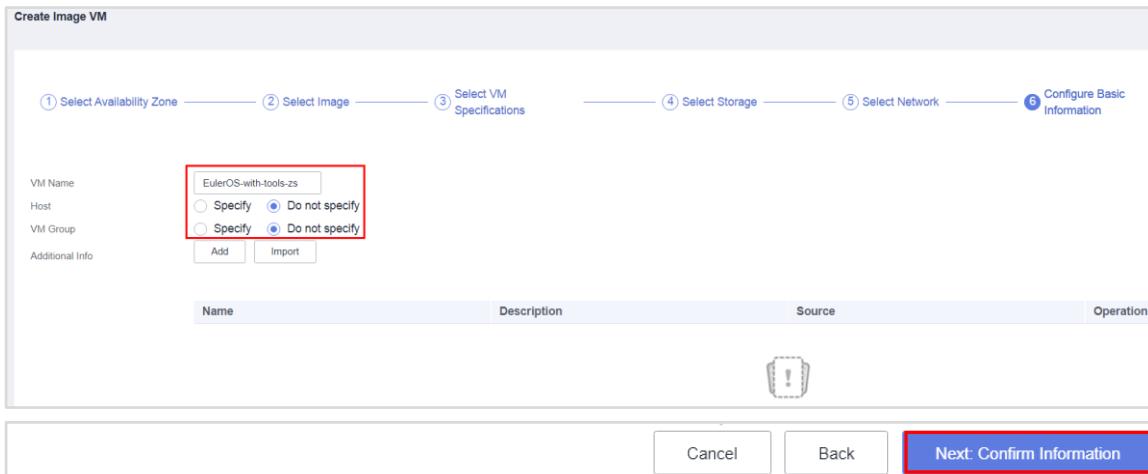
10 Total Records: 12 < 1 2 >

Step 6 Set parameters such as **Sharing Type**, **Select Network**, **IPv4 Subnet**, and **Security Group** as required, and click **Next: Configure Basic Information**.

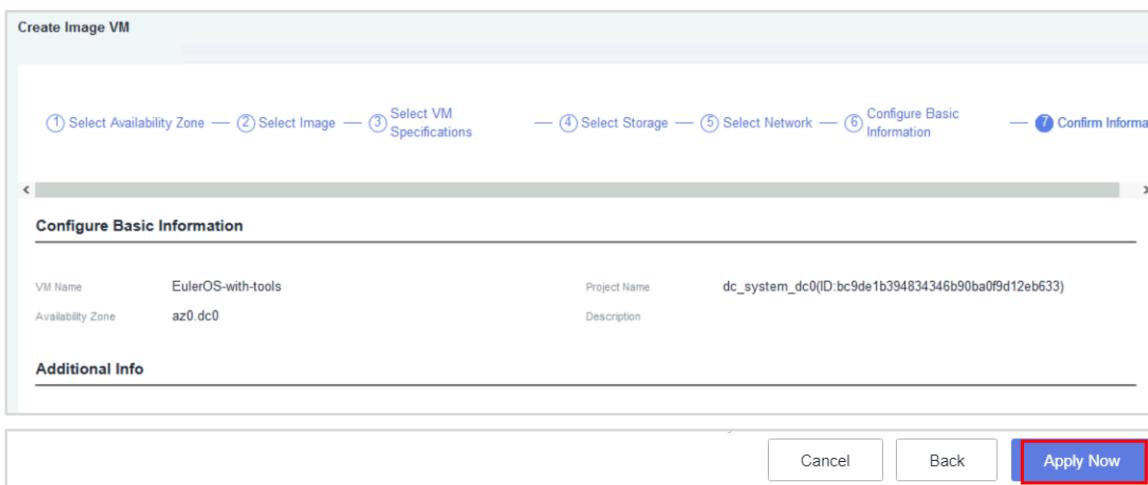
NIC1

Port Type	Common software switch			
Sharing Type	<input checked="" type="radio"/> Unshared Network <input type="radio"/> Shared Network			
Select Network	Project	<input style="border: 2px solid red; border-radius: 5px; width: 150px; height: 25px; vertical-align: middle;" type="text" value="service (ID: 445729c6...)"/> <input style="width: 20px; height: 25px; vertical-align: middle;" type="button" value="..."/>	Network	<input style="border: 2px solid red; border-radius: 5px; width: 150px; height: 25px; vertical-align: middle;" type="text" value="external_om (VLAN I..."/> <input style="width: 20px; height: 25px; vertical-align: middle;" type="button" value="..."/>
IPv4 Subnet	<input type="radio"/> Do not specify <input type="radio"/> Specify			
Security Group	<input type="radio"/> On <input checked="" type="radio"/> Off			

Step 7 Set parameters such as **VM Name**, **Host**, and **VM Group** as required, and click **Next: Confirm Information**.



Step 8 Confirm the basic information about the VM and click **Apply Now**.



Step 9 After switching to the **Compute Resource** page, wait for 3 to 10 minutes and verify that the VM is successfully created.

Name	Host ID	Availability Zone	Status	Power St...	Flavor
EulerOS-with-Tools-zs	A2440E2D-DC48...	az0.dc0	Running	Running	2vCPUs 4GB
ecs_gcy_euler	E7460E2D-DC48...	az0.dc0	Powered...	Stopped	2vCPUs 8GB

1.2.4.3 Installing an OS

Step 1 Click **VNC Login** in the **Operation** column of the target VM. In the **Configure Keyboard Layout for VNC Login** dialog box, select **Use current keyboard layout: English keyboard** and click **VNC Login**.

The screenshot shows the 'Compute Resource' interface with the 'VMs' tab selected. It displays two VMs:

Name	Host ID	Availability Zone	Status	Power Status	Flavor	Operation
EulerOS-with-Tools-zs	A2440E2D-DC48-C1B9...	az0.dc0	Running	Running	2vCPUs 4GB	VNC Login
ecs_gcy_euler	E7460E2D-DC48-4592...	az0.dc0	Powered off	Stopped	2vCPUs 8GB	VNC Login

A modal window titled 'Configure Keyboard Layout for VNC Login' is open, showing two options:

- Use current keyboard layout: English keyboard
- Use another keyboard layout: English keyboard

Buttons at the bottom are 'VNC Login' (highlighted with a red box) and 'Cancel'.

Step 2 Install the EulerOS.

The screenshot shows the 'WELCOME TO EULEROS V2.0SP5.' screen. It asks 'What language would you like to use during the installation process?' with a dropdown menu.

The dropdown menu has 'English' selected (highlighted with a red box). Other options include 'Chinese' and a list of English variants:

- English (United States)
- English (United Kingdom)
- English (India)
- English (Australia)
- English (Canada)
- English (Denmark)
- English (Ireland)
- English (New Zealand)
- English (Nigeria)
- English (Hong Kong SAR China)
- English (Philippines)
- English (Singapore)
- English (South Africa)
- English (Zambia)
- English (Zimbabwe)
- English (Botswana)
- English (Antigua & Barbuda)

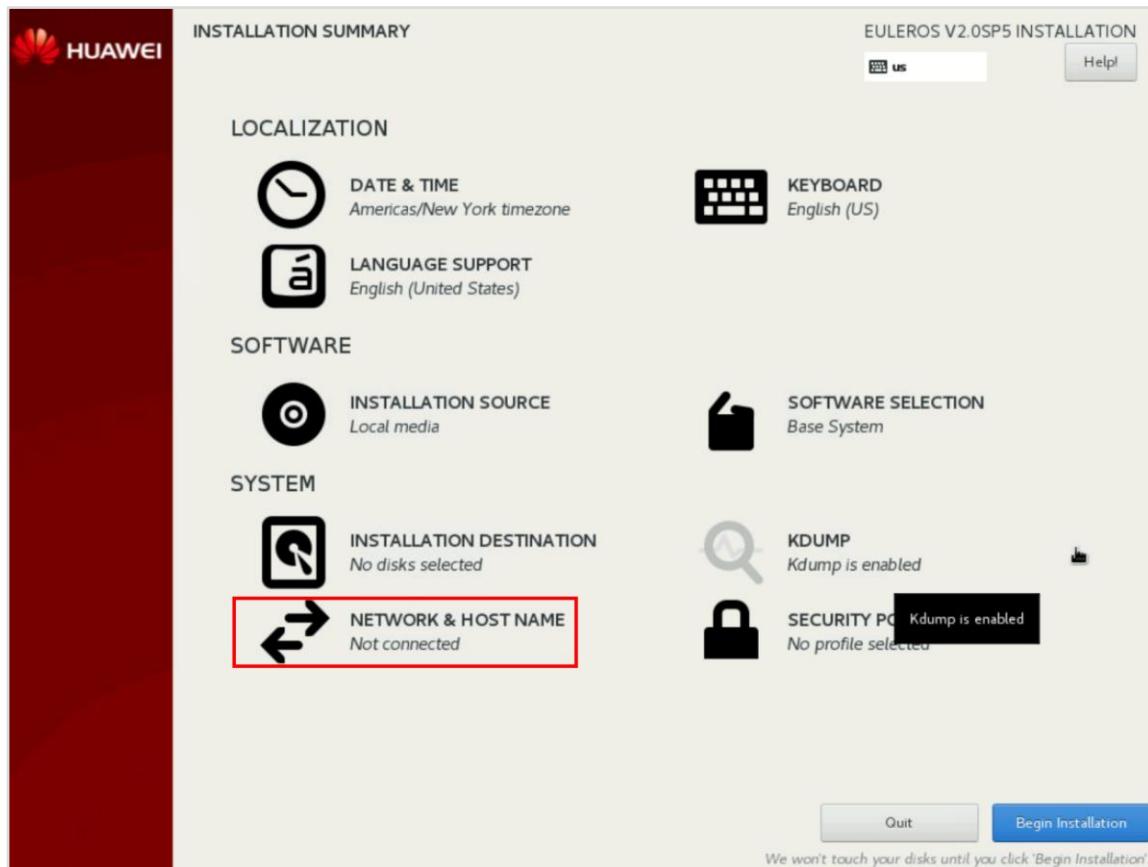
At the bottom right are 'Quit' and 'Continue' buttons, with 'Continue' highlighted with a red box.

Select an OS language as required and click **Continue**.

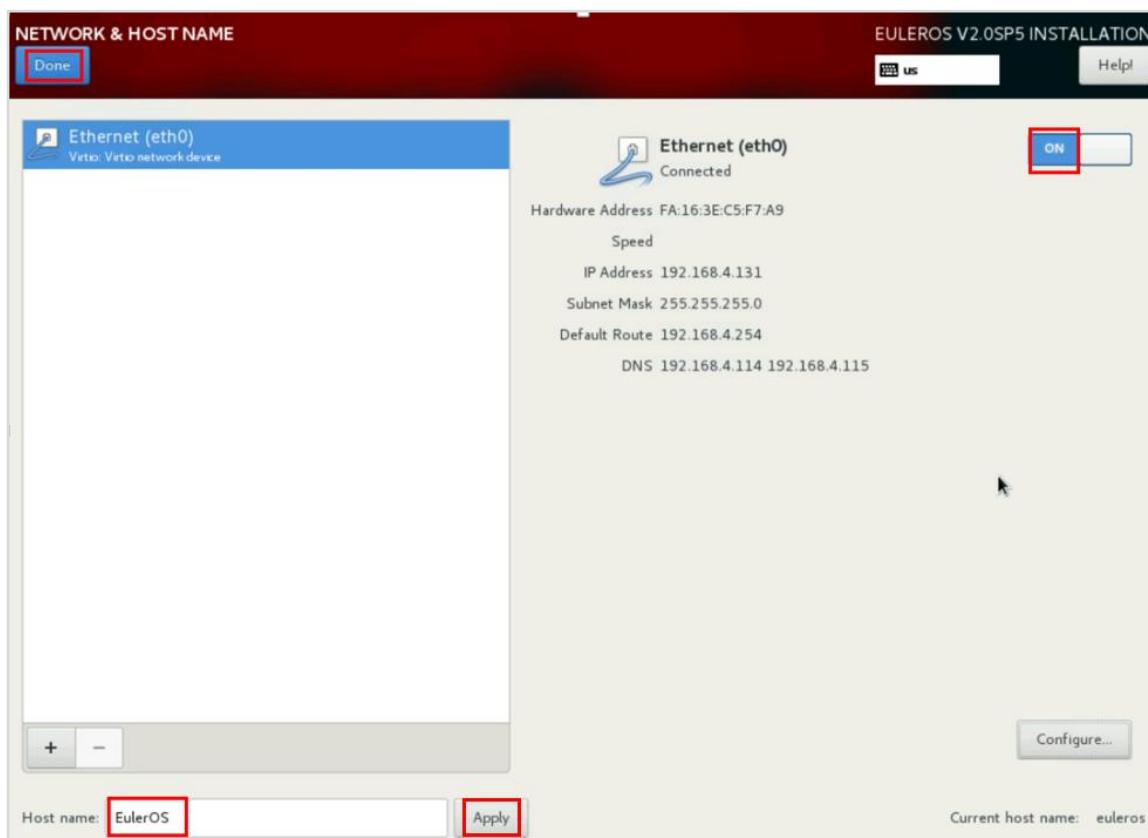


Click **INSTALLATION DESTINATION**, select a disk, and click **Done**.

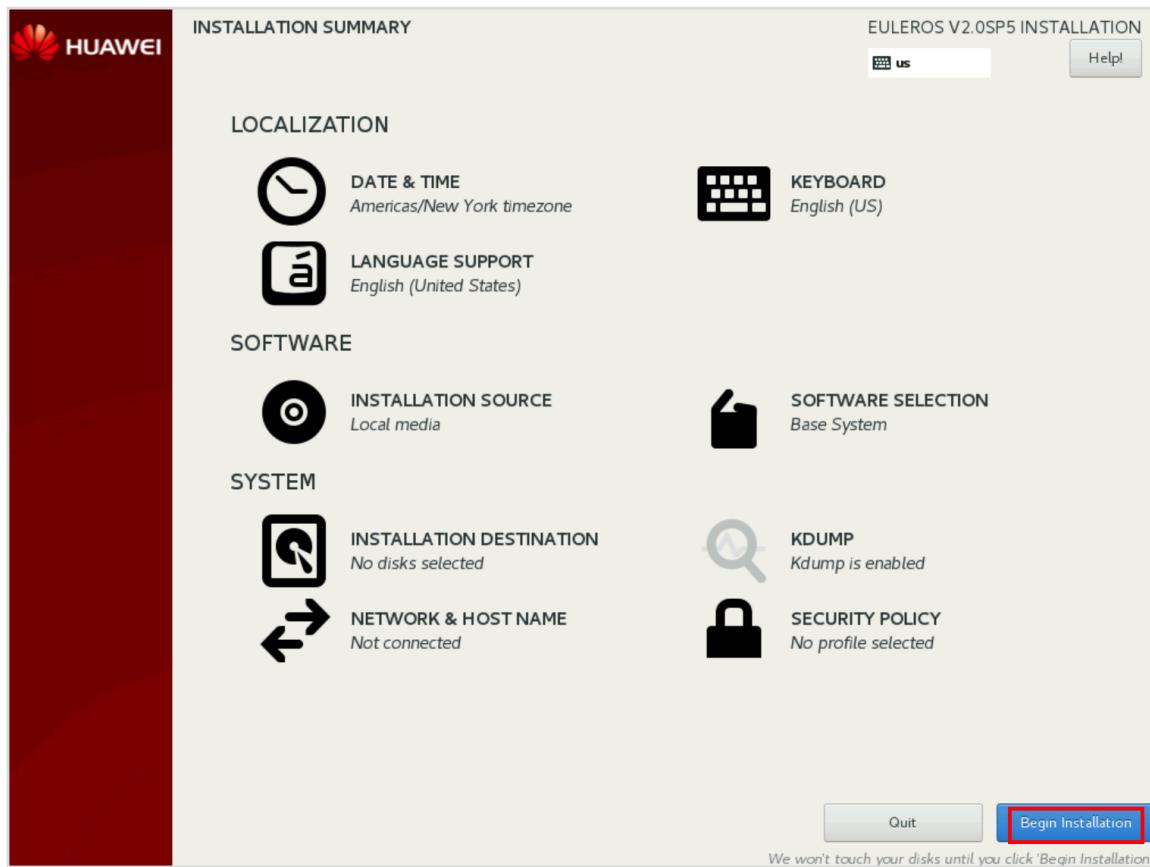




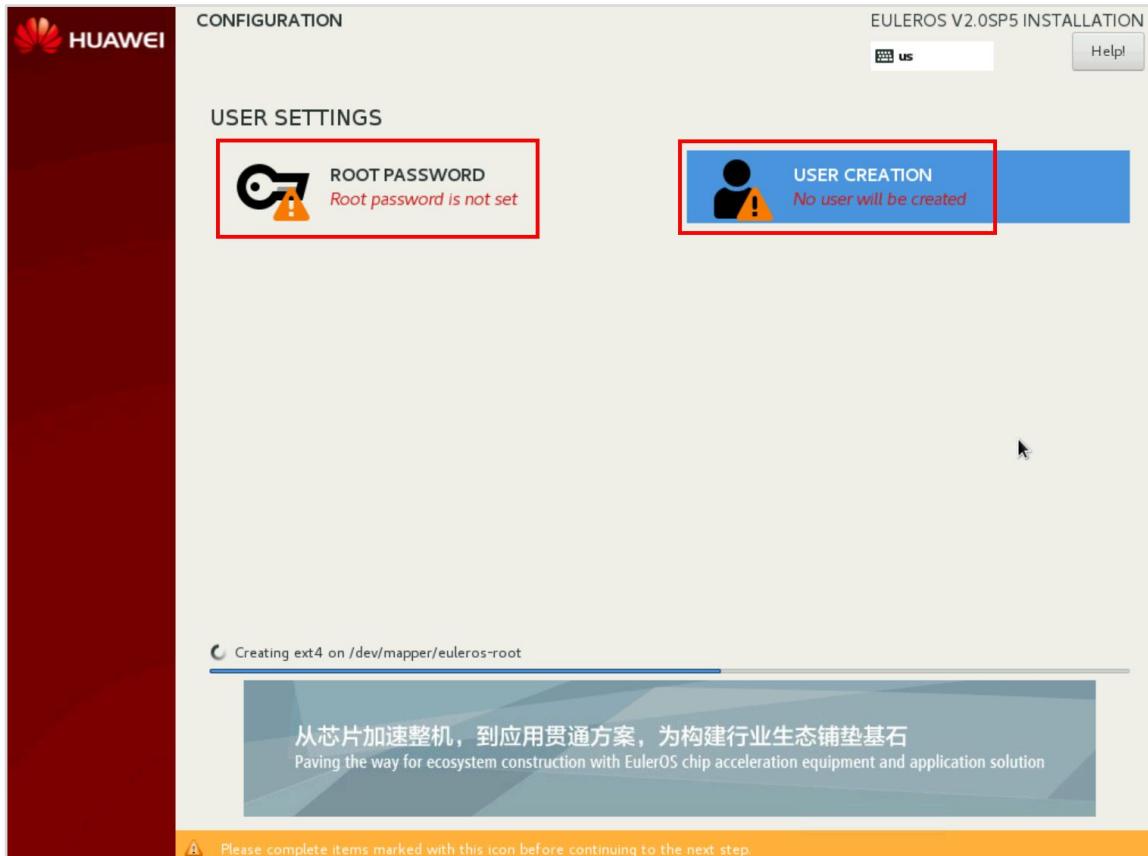
Click NETWORK & HOST NAME.



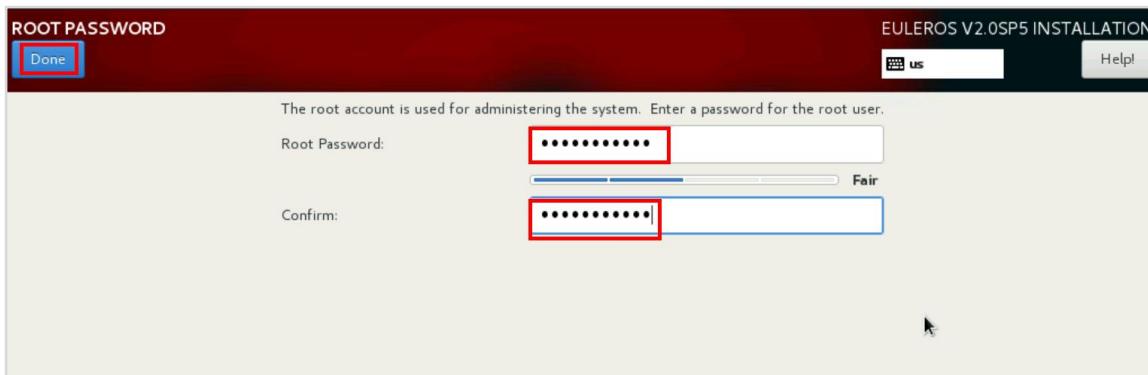
Set Host name and click **Apply**. Set Ethernet (eth0) to **ON** and click **Done**.



Click **Begin Installation**.

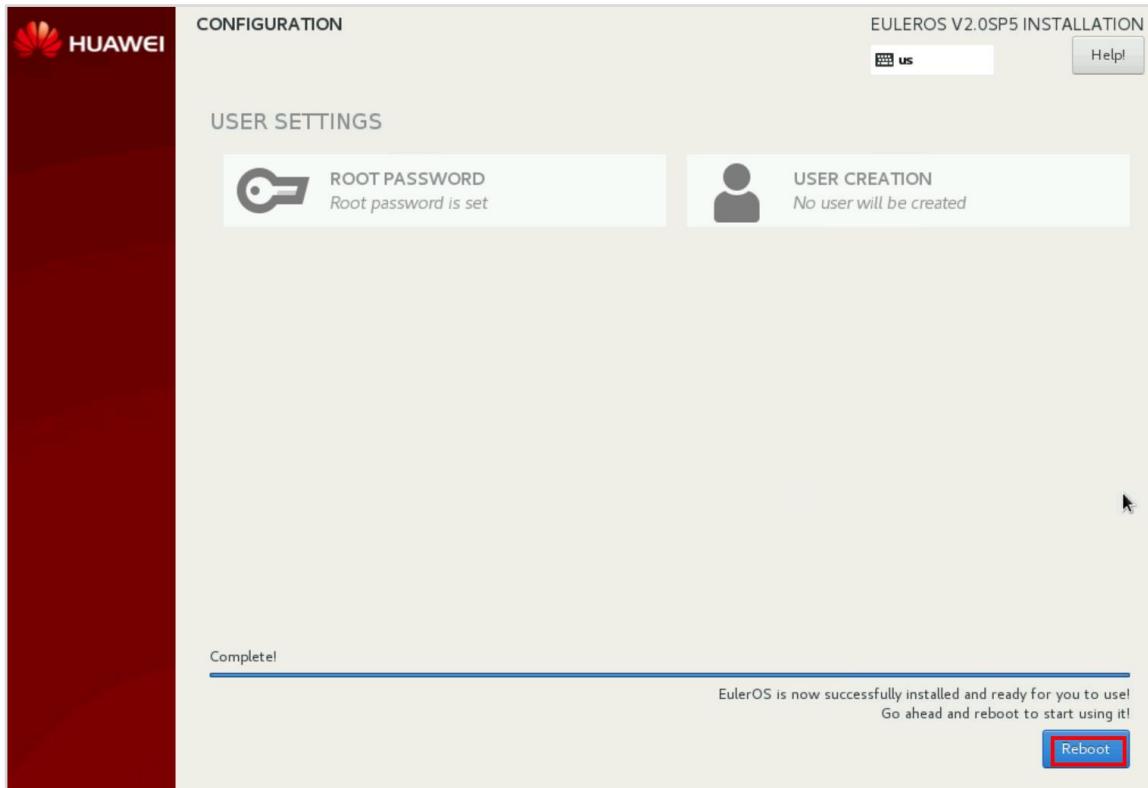


(Mandatory) Click **ROOT PASSWORD** on the left to configure a password for the system administrator. (Optional) Click **USER CREATION** on the right to configure a username and password.



After setting the password for the system administrator, click **Done** in the upper left corner.

Step 3 Verify that the OS is successfully installed and restart the OS.



1.2.4.4 Installing Cloud-Init

Step 1 Enter the username and password for logging in to the newly created VM.

```
Authorized users only. All activities may be monitored and reported.  
EulerOS login: root  
Password:  
  
Authorized users only. All activities may be monitored and reported.  
[root@EulerOS ~]# _
```

Step 2 Modify the configuration file for remote login.

```
Authorized users only. All activities may be monitored and reported.  
[root@EulerOS ~]# cd /etc/ssh/  
[root@EulerOS ssh]# ls  
moduli  sshd_config  ssh_host_ecdsa_key.pub  ssh_host_ed25519_key.pub  ssh_host_rsa_key.pub  
ssh_config  ssh_host_ecdsa_key  ssh_host_ed25519_key      ssh_host_rsa_key  
[root@EulerOS ssh]#
```

Locate the configuration file **sshd_config**.

```
[root@EulerOS ~]# cd /etc/ssh/
[root@EulerOS ssh]# ls
moduli      sshd_config      ssh_host_ecdsa_key.pub  ssh_host_ed25519_key.pub  ssh_host_rsa_key.pub
ssh_config  ssh_host_ecdsa_key  ssh_host_ed25519_key  ssh_host_rsa_key
[root@EulerOS ssh]# vim sshd_config
```

Run the **vim** command to edit the configuration file.

```
#PermitTunnel no
#ChrootDirectory none
#VersionAddendum none

# no default banner path
#Banner none

# Accept locale-related environment variables
AcceptEnv LANG LC_CTYPE LC_NUMERIC LC_TIME LC_COLLATE LC_MONETARY LC_MESSAGES
AcceptEnv LC_PAPER LC_NAME LC_ADDRESS LC_TELEPHONE LC_MEASUREMENT
AcceptEnv LC_IDENTIFICATION LC_ALL LANGUAGE
AcceptEnv XMODIFIERS

# override default of no subsystems
Subsystem sftp /usr/libexec.openssh/sftp-server -l INFO -f AUTH

# Example of overriding settings on a per-user basis
#Match User anoncvs
#    X11Forwarding no
#    AllowTcpForwarding no
#    PermitTTY no
#    ForceCommand cvs server

#CheckUserSplash yes
Protocol 2
LogLevel VERBOSE
MaxAuthTries 3
PubkeyAuthentication yes
RSAAuthentication yes
IgnoreRhosts yes
RhostsRSAAuthentication no
HostbasedAuthentication no
PermitRootLogin yes
PermitEmptyPasswords no
PermitUserEnvironment no
Ciphers aes128-ctr,aes192-ctr,aes256-ctr,chacha20-poly1305@openssh.com,aes128-gcm@openssh.com,aes256-gcm@openssh.com
ClientAliveInterval 300
ClientAliveCountMax 0
Banner /etc/issue.net
MACs hmac-sha2-256,hmac-sha2-512,hmac-sha2-512-ctr@openssh.com,hmac-sha2-256-ctr@openssh.com,hmac-sha1-ctr@openssh.com
StrictModes yes
AllowTcpForwarding no
AllowAgentForwarding no
GatewayPorts no
PermitTunnel no
KexAlgorithms ecdh-sha2-nistp256,ecdh-sha2-nistp384,ecdh-sha2-nistp521,diffie-hellman-group-exchange-sha256,diffie-hellman-group-exchange-sha1,diffie-hellman-group14-sha1,curve25519-sha256,curve25519-sha256@libssh.org
-- INSERT --
```

150,20 Bot

If **PermitRootLogin** is set to **no**, press **i** to enter editing mode and set the parameter to **yes**.

```
#CheckUserSplash yes
Protocol 2
LogLevel VERBOSE
MaxAuthTries 3
PubkeyAuthentication yes
RSAAuthentication yes
IgnoreRhosts yes
RhostsRSAAuthentication no
HostbasedAuthentication no
PermitRootLogin yes
PermitEmptyPasswords no
PermitUserEnvironment no
Ciphers aes128-ctr,aes192-ctr,aes256-ctr,chacha20-poly1305@openssh.com,aes128-gcm@openssh.com,aes256-gcm@openssh.com
ClientAliveInterval 300
ClientAliveCountMax 0
Banner /etc/issue.net
MACs hmac-sha2-256,hmac-sha2-512,hmac-sha2-512-ctr@openssh.com,hmac-sha2-256-ctr@openssh.com,hmac-sha1-ctr@openssh.com
StrictModes yes
AllowTcpForwarding no
AllowAgentForwarding no
GatewayPorts no
PermitTunnel no
KexAlgorithms ecdh-sha2-nistp256,ecdh-sha2-nistp384,ecdh-sha2-nistp521,diffie-hellman-group-exchange-sha256,diffie-hellman-group-exchange-sha1,diffie-hellman-group14-sha1,curve25519-sha256,curve25519-sha256@libssh.org
:wq
```

Press **Esc**, enter **:wq**, and press **Enter** to save the configuration.

Step 3 Restart the sshd service.

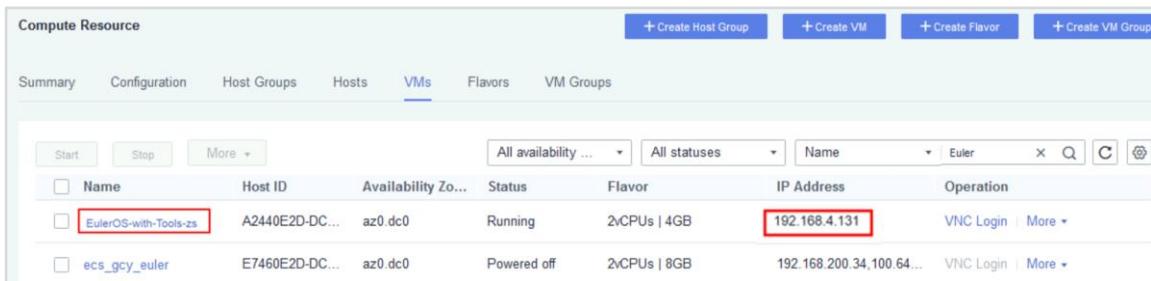
```
[root@euleros-with-tools-zs ssh]# service sshd restart
Redirecting to /bin/systemctl restart sshd.service
[root@euleros-with-tools-zs ssh]#
```

Step 4 Confirm the IP address of the VM.

Method 1: Enter **ip addr** on the VNC console and press **Enter**.

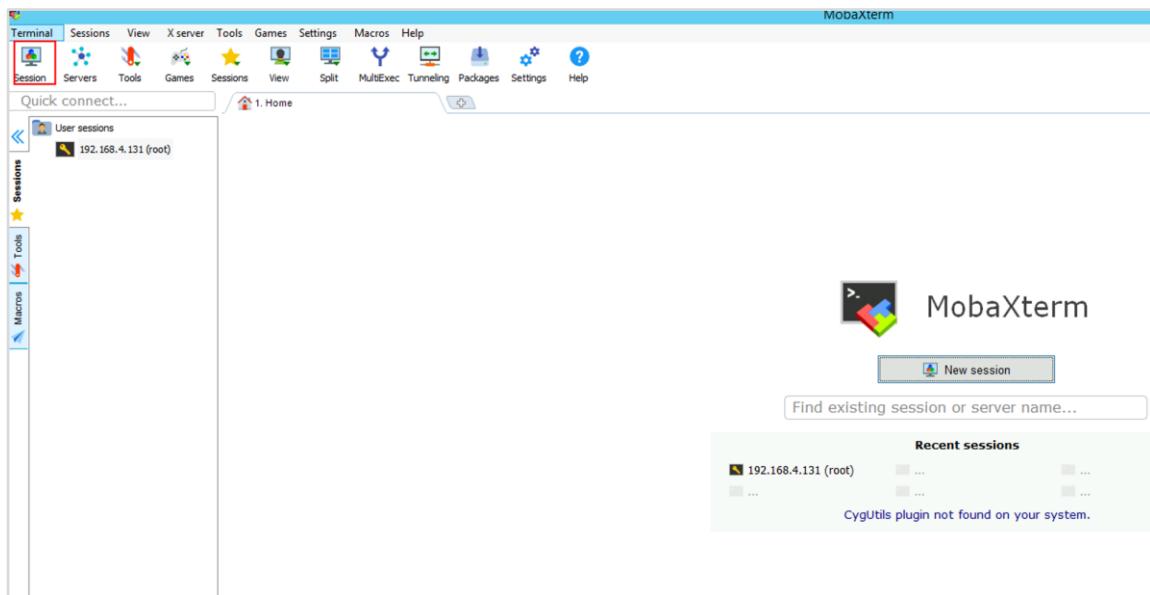
```
[root@EulerOS ssh]# ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: eth0: <>BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether fa:16:3e:c5:f7:a9 brd ff:ff:ff:ff:ff:ff
    inet 192.168.4.131/24 brd 192.168.4.255 scope global noprefixroute eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::2e93:b75d:d4ec:622b/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
[root@EulerOS ssh]# _
```

Method 2: Return to Service OM, go to the **Compute Resource** page, click the **VMs** tab, and view the IP address of the created VM.

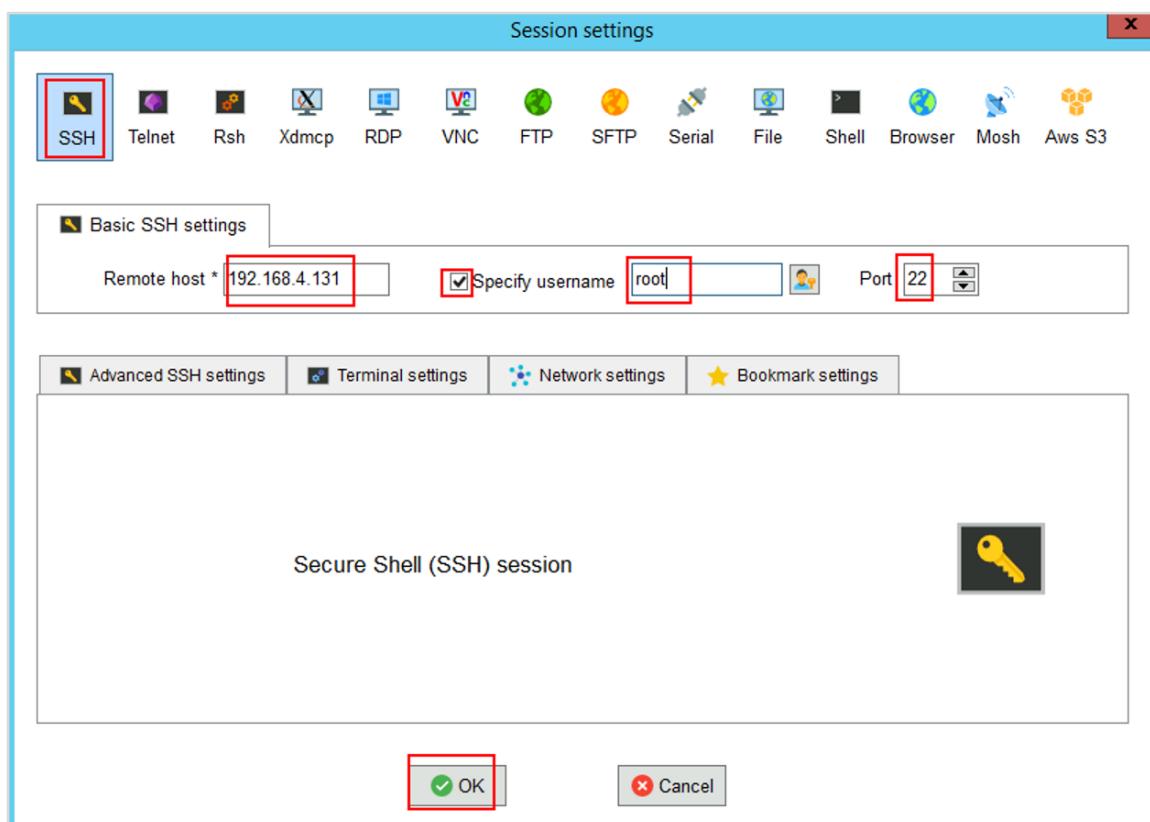


Name	Host ID	Availability Zon...	Status	Flavor	IP Address	Operation
EulerOS-with-Tools-zs	A2440E2D-DC...	az0.dc0	Running	2vCPUs 4GB	192.168.4.131	VNC Login More
ecs_gcy_euler	E7460E2D-DC...	az0.dc0	Powered off	2vCPUs 8GB	192.168.200.34,100.64...	VNC Login More

Step 5 Open the remote login software **MobaXterm** on the desktop and log in to the newly created VM EulerOS-with-Tools-zs. If MobaXterm is not available, contact the trainer to obtain it.



Click Session.



In the displayed dialog box, click **SSH**, set the IP address, username, and port number of the VM, and click **OK**.

```
• MobaXterm 10.9 •
(SSH client, X-server and networking tools)

> SSH session to root@192.168.4.131
  • SSH compression : ✓
  • SSH-browser : ✓
  • X11-forwarding : ✗ (disabled or not supported by server)
  • DISPLAY : 172.19.251.120:0.0

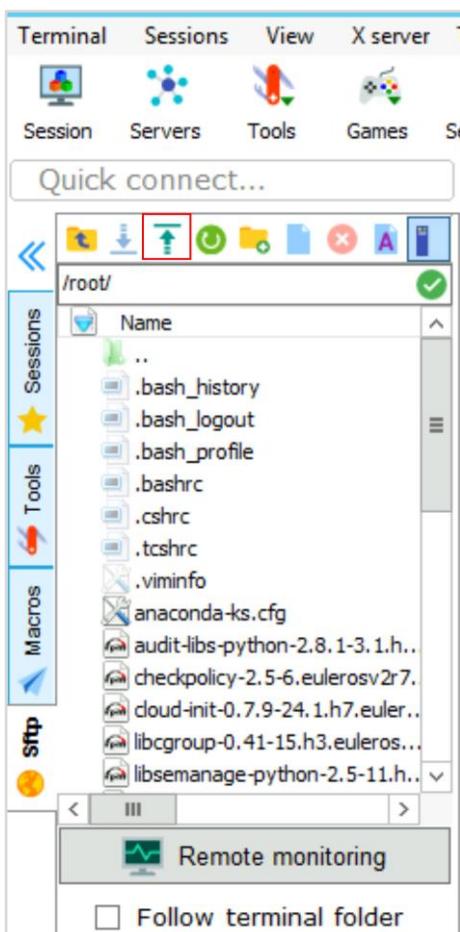
> For more info, ctrl+click on help or visit our website

Authorized users only. All activities may be monitored and reported.
Last login: [REDACTED] from 172.19.130.124

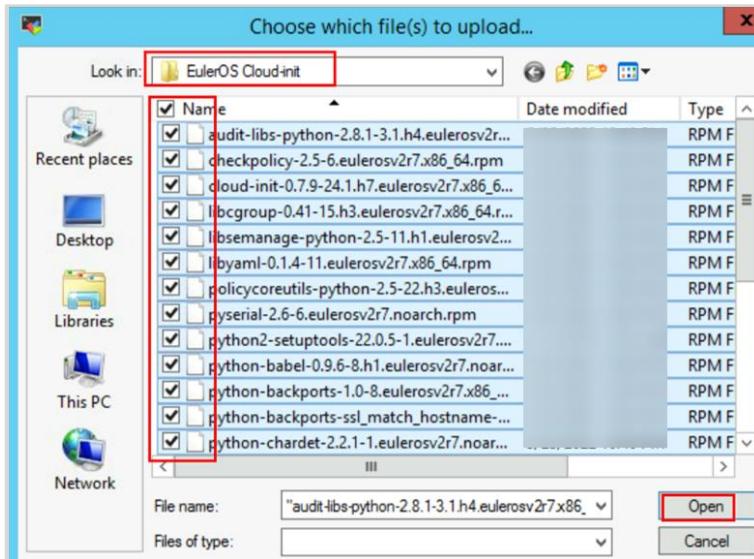
Authorized users only. All activities may be monitored and reported.
[root@EulerOS ~]# [REDACTED]
```

After you enter the password, the page similar to the preceding figure is displayed.

Step 6 Upload the Cloud-Init installation package (obtained from the trainer) and install Cloud-Init.



Click the upload icon on MobaXterm.



Select all RPM packages in the **EulerOS Cloud-init** file (obtained from the trainer) and click **Open** to upload all packages to the target VM.

```
[root@EulerOS ~]# rpm -Uvh --force --nodeps *.rpm
warning: audit-libs-python-2.8.1-3.1.h4.eulerosv2r7.x86_64.rpm: Header V4 RSA/SHA256
Preparing...                                           #####
Updating / installing...
 1:setools-libs-3.3.8-2.eulerosv2r7 ##### [ 4%]
 2:python-six-1.9.0-2.eulerosv2r7 ##### [ 8%]
 3:python-prettytable-0.7.2-3.eulero##### [12%]
 4:python-markupsafe-0.11-10.eulerosv2r7 ##### [16%]
 5:python-jsonpointer-1.9.2-eulerosv2r7 ##### [20%]
 6:python-jsonpatch-1.2-4.eulerosv2r7 ##### [24%]
 7:python-IPy-0.75-6.eulerosv2r7 ##### [28%]
 8:python-ipaddress-1.0.16-2.eulerosv2r7 ##### [32%]
 9:python-chardet-2.2.1-1.eulerosv2r7 ##### [36%]
10:python-backports-1.0-8.eulerosv2r7 ##### [40%]
11:python-backports-ssl_match_hostname-1.0-1.eulerosv2r7 ##### [44%]
12:python-urllib3-1.10.2-2.h3.eulero##### [48%]
13:python-requests-2.6.0-1.h1.eulero##### [52%]
14:python-babel-0.9.6-8.h1.eulerosv2r7 ##### [56%]
15:python-jinja2-2.7.2-2.h3.eulerosv2r7 ##### [60%]
16:python2-setuptools-22.0.5-1.euler##### [64%]
17:pyserial-2.6-6.eulerosv2r7 ##### [68%]
18:libyaml-0.1.4-11.eulerosv2r7 ##### [72%]
19:pyYAML-3.10-11.h6.eulerosv2r7 ##### [76%]
20:libsemanage-python-2.5-11.h1.eule##### [80%]
21:libcgroup-0.41-15.h3.eulerosv2r7 ##### [84%]
22:checkpolicy-2.5-6.eulerosv2r7 ##### [88%]
23:audit-libs-python-2.8.1-3.1.h4.eu##### [92%]
24:policycoreutils-python-2.5-22.h3.##### [96%]
25:cloud-init-0.7.9-24.1.h7.eulerosv2r7 ##### [100%]
[root@EulerOS ~]#
```

Run the **rpm -Uvh --force --nodeps *.rpm** command to install the RPM packages.

```
Authorized users only. All activities may be monitored and reported.
[root@EulerOS ~]# cloud-init -v
cloud-init 0.7.9
[root@EulerOS ~]#
```

Run the **cloud-init -v** command to check whether the tool has been installed successfully.

Step 7 After Cloud-Init is installed, open the **cloud.cfg** file in the vim editor.

```
[root@EulerOS cloud]# cd
[root@EulerOS ~]# vim /etc/cloud/cloud.cfg
```

Step 8 Perform the following operations to allow the **root** user to remotely log in to the ECS using the password:

```
users:
  - default

  disable_root: 0
  ssh_pauth: 1

mount_default_fields: [~, ~, 'auto', 'defaults,nofail', '0', '2']
resize_rootfs_tmp: /dev
ssh_deletekeys: 0
ssh_genkeytypes: ~
syslog_fix_perms: ~

cloud_init_modules:
  - migrator
  - bootcmd
  - write-files
  - growpart
  - resizefs
  - set_hostname
  - update_hostname
  - update_etc_hosts
  - rsyslog
  - users-groups
  - ssh
```

Enter **i**, set **disable_root** to **0** and **ssh_pauth** to **1**.

Step 9 To prevent Cloud-Init from automatically locking the ECS password, disable the password locking function. Set **lock_passwd** to **False**.

```
system_info:
  default_user:
    name: euleros
    lock_passwd: False
    gecos: Cloud User
    groups: [wheel, adm, systemd-journal]
    shell: /bin/bash
  distro: rhel
  paths:
    cloud_dir: /var/lib/cloud
    templates_dir: /etc/cloud/templates
  ssh_svcname: sshd

# vim:syntax=yaml
-- INSERT --
```

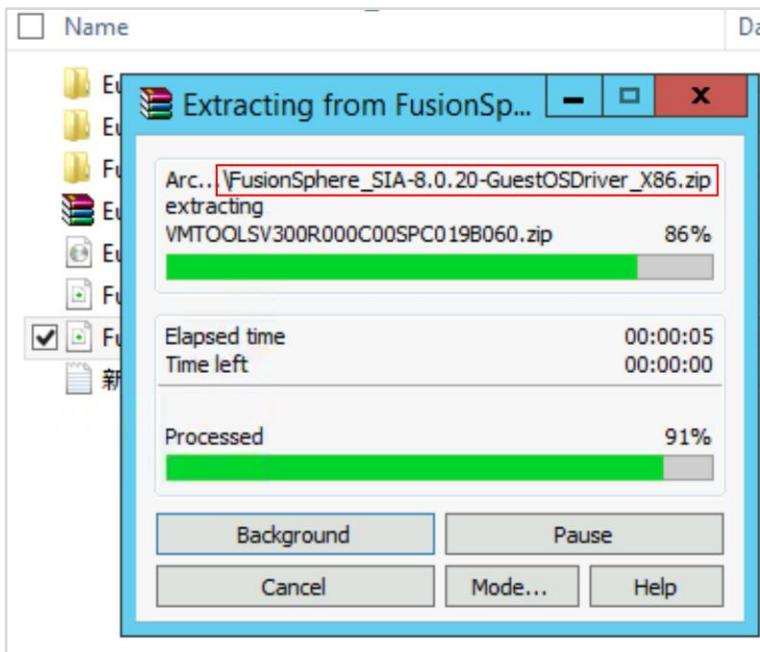
Step 10 Press **Esc**, enter **:wq!**, and then press **Enter** to save the file and exit.

```
distro: rhel
paths:
  cloud_dir: /var/lib/cloud
  templates_dir: /etc/cloud/templates
  ssh_svcname: sshd

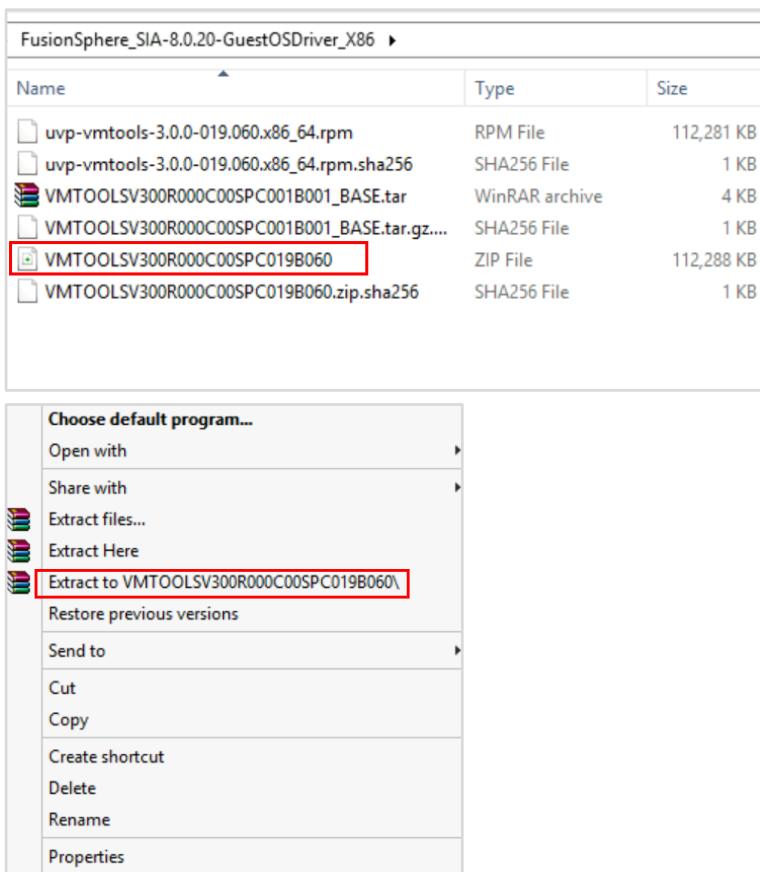
# vim:syntax=yaml
:wq!
```

1.2.4.5 Installing UVP VMTools

Step 1 Obtain the **FusionSphere_SIA-XXX.zip** package and decompress it.



Step 2 Open the decompressed file and decompress the selected package.



Name	Type	Size
VMTOOLSV300R000C00SPC019B060	File folder	
uvp-vmtools-3.0.0-019.060.x86_64.rpm	RPM File	112,281 KB
uvp-vmtools-3.0.0-019.060.x86_64.rpm.sha256	SHA256 File	1 KB
VMTOOLSV300R000C00SPC001B001_BASE.tar	WinRAR archive	4 KB
VMTOOLSV300R000C00SPC001B001_BASE.tar.gz....	SHA256 File	1 KB
VMTOOLSV300R000C00SPC019B060	ZIP File	112,288 KB
VMTOOLSV300R000C00SPC019B060.zip.sha256	SHA256 File	1 KB

Step 3 Go to the decompressed folder and upload the selected file to the FusionSphere OpenStack web client.

Confirm the file to be uploaded.

Name	Type	Size
list	File	1 KB
list.cms	CMS File	6 KB
list.cms	Certificate Revoca...	8 KB
ModuleCfg	XML Document	1 KB
VMTOOLSV300R000C00SPC019B060.tar	WinRAR archive	112,260 KB
VMTOOLSV300R000C00SPC019B060.ta...	SHA256 File	1 KB

Log in to ManageOne Maintenance Portal. In the lower right corner of the homepage, choose **FusionSphere CPS** under **Common Links** and click **hangzhou**.



In the navigation pane on the left, choose **O&M > Third-Party Packages**.

FusionSphere
Cloud Provisioning Service

Third-Party Packages

Package Name	Status	Update Time
MLNX_OFED_LINUX-5.4-3.0.3.0-euleros2.0sp10-x86_64_combined.tar.gz	available	[Redacted]
GCN_EGF_2.0.RC1.SPC100B053_Cold.tar.gz	available	-
GCN_EVS_2.1.RC2.B055_Cold.tar.gz	available	-
FusionSphere_Border_Router_8.1.1.tar.gz	available	-
FusionSphere_Upgrade_8.1.1.tar.gz	available	-
FusionSphere_Nova_8.1.1.tar.gz	available	-
FusionSphere_Dxextend_8.1.1.tar.gz	available	-
FusionSphere_ELB_V3_8.1.1.tar.gz	available	-
FusionSphere_Keystone_8.1.1.tar.gz	available	-
FusionSphere_Nat_Gateway_8.1.1.tar.gz	available	-
FusionSphere_FusionPlatform_8.1.1.tar.gz	available	-
FusionSphere_Ironic_8.1.1.tar.gz	available	-
FusionSphere_Cinder_8.1.1.tar.gz	available	-

Third-Party Packages

In the lower part of the **Third-Party Packages** page, click the icon for uploading files, select the file to be uploaded, click **Open**, confirm the information, and click **Upload**. (If the file has been uploaded, skip this step.)

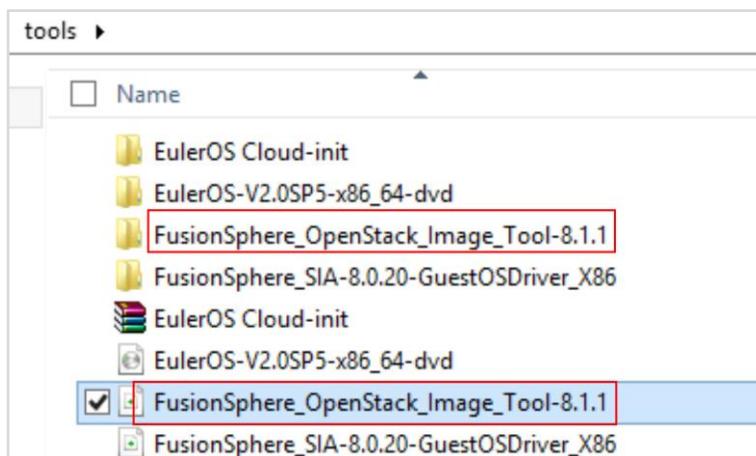
File Explorer window showing the file **VMTOOLSV300R000C00SPC019B060.MF** selected for upload.

Upload

Verify that the file has been uploaded successfully.

	FusionSphere_OpenStack_Image_Tool-8.1.1.zip	available	-
Third-Party Packages	FusionSphere_Cinder_8.1.1.tar.gz	available	-
Storage Disaster Recovery	FusionSphere_Baremetal_Gateway_8.1.1.tar.gz	available	-
Certificate Management	FusionSphere_Vrouter_8.1.1.tar.gz	available	-
Service Management	FusionSphere_Pecado_8.1.1.tar.gz	available	-
Component Maintenance	FusionSphere_Cascading_Neutron_8.1.1.tar.gz	available	-
Cloud Service	FusionSphere_NAT_Server_8.1.1.tar.gz	available	-
	FusionSphere_Ceilometer_8.1.1.tar.gz	available	-
	FusionSphere_Glance_8.1.1.tar.gz	available	-
	FusionSphere_ELB_V3_Control_8.1.1.tar.gz	available	-
	FusionSphere_Swift_Nginx_8.1.1.tar.gz	available	-
	FusionSphere_VPC_ENDPOINT-8.1.1.tar.gz	available	[REDACTED]
	Csp_Hostguard_3.0.18.tar.gz	available	[REDACTED]
	CloudNetvMonitorAgent_1.20.0.tar.gz	available	[REDACTED]
	VMTOOLSV300R000C00SPC019B060.tar.gz	available	[REDACTED]

Step 4 Obtain the **FusionSphere_OpenStack_Image_Tool-8.1.1.zip** software package and decompress it to the local PC.

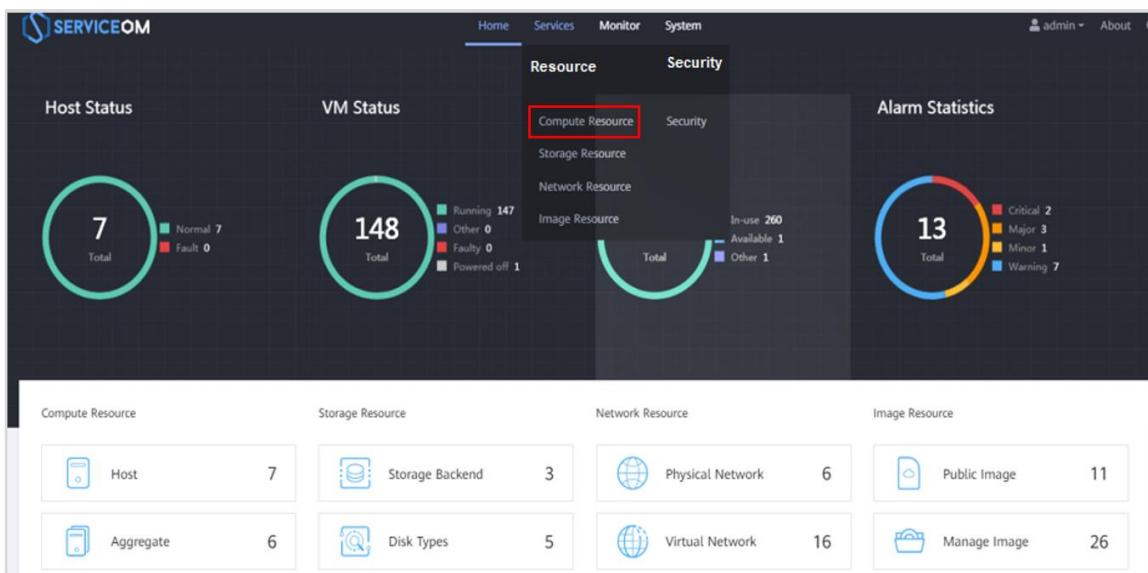


Step 5 In the decompressed folder, decompress the **FusionSphere_OpenStack_Image_Tool-XXX.tar** file, and open the decompressed file.

FusionSphere_OpenStack_Image_Tool-8.1.1		
Name	Type	Size
FusionSphere_OpenStack_Image_Tool-8.1.1	File folder	
FusionSphere_OpenStack_Image_Tool-8.1.1.tar	WinRAR archive	15,122 KB
FusionSphere_OpenStack_Image_Tool-8.1.1.tar....	CMS File	6 KB
FusionSphere_OpenStack_Image_Tool-8.1.1.tar....	SHA256 File	1 KB
Image_Tools_Service_list	File	1 KB
Image_Tools_Service_list.cms	CMS File	6 KB
Image_Tools_Service_list.cms	Certificate Revoca...	8 KB

Name	Type	Size	Count
image-tools	Disc Image File	8,074 KB	3
image-tools.iso.sha256	SHA256 File	1 KB	3
image-tools	WinRAR archive	7,670 KB	3
image-tools.tar.sha256	SHA256 File	1 KB	3

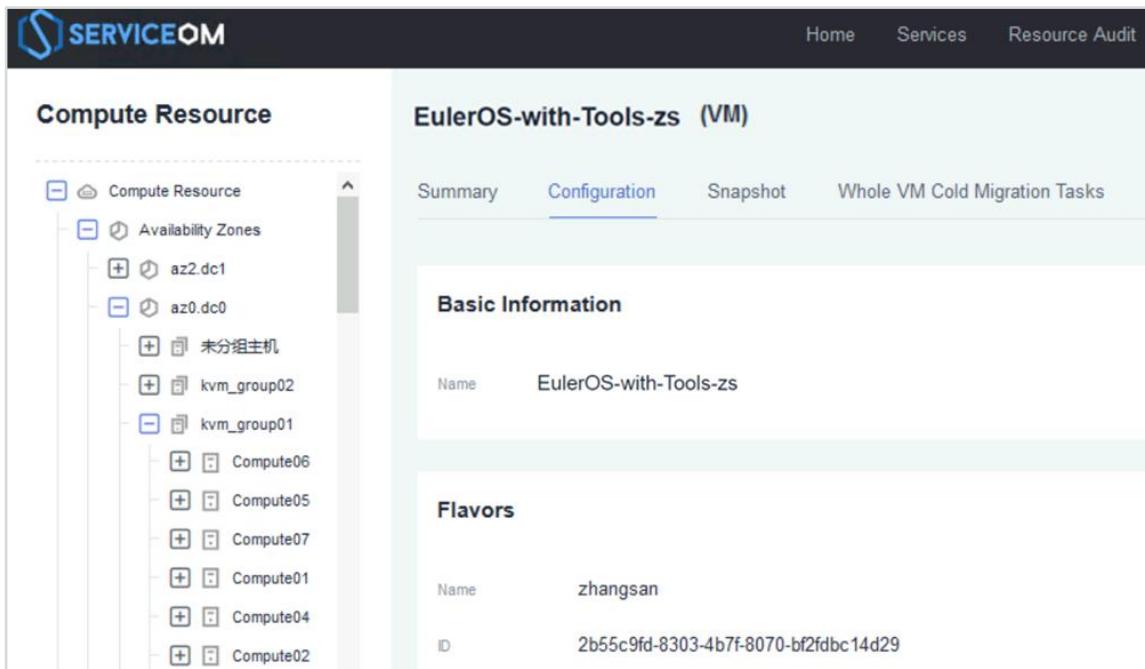
Step 6 Return to Service OM. On the top menu bar, choose **Services > Resource > Compute Resource**.



Step 7 On the **Compute Resource** page, click the **VMs** tab and click the name of the created VM **EulerOS-with-Tools-zs**.

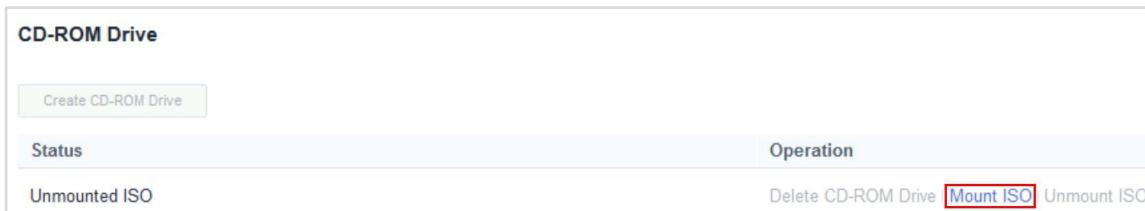
Compute Resource							
VMs		Flavors		VM Groups			
Start Stop More		All availability ... All statuses		Name Euler		Operation	
Name	Host ID	Availability Zo...	Status	Power Status	Flavor		
EulerOS-with-Tools-zs	A2440E2D-DC48-C1B9...	az0 dc0	Running	Running	2vCPUs 4GB	VNC Login	More
ecs_gcy_euler	E7460E2D-DC48-4592...	az0 dc0	Powered off	Stopped	2vCPUs 8GB	VNC Login	More

Step 8 Click the **Configuration** tab.



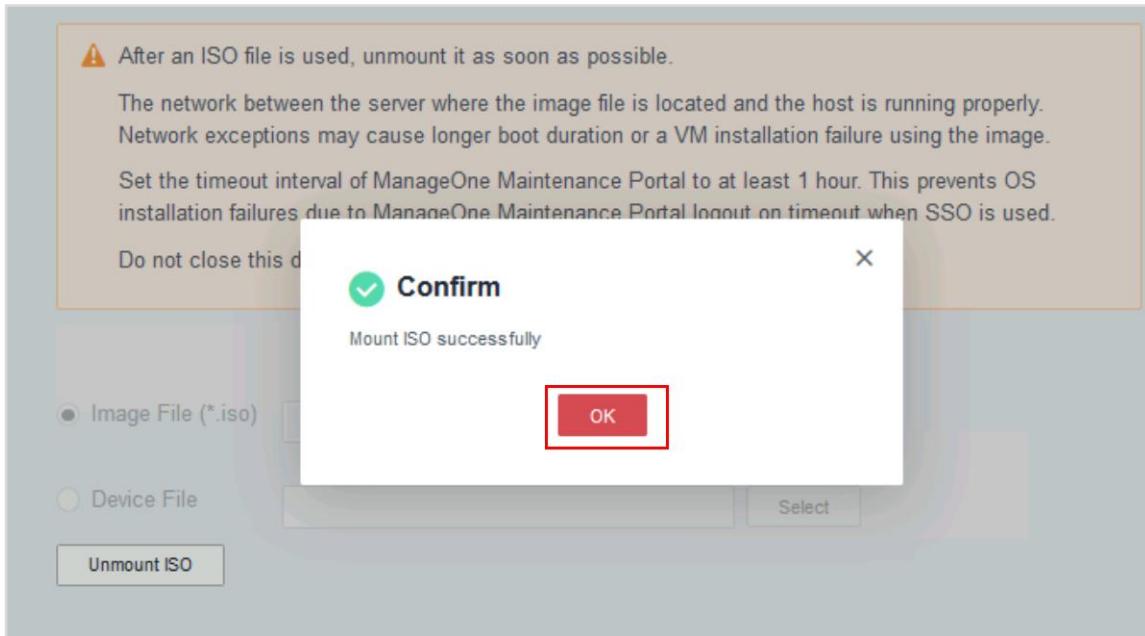
The screenshot shows the HUAWEI CLOUD ServiceOM interface. On the left, the 'Compute Resource' sidebar lists Availability Zones: az2.dc1 and az0.dc0. az0.dc0 contains several hosts: 未分组主机, kvm_group02, kvm_group01, Compute06, Compute05, Compute07, Compute01, Compute04, and Compute02. On the right, the 'EulerOS-with-Tools-zs (VM)' details page is shown with tabs for Summary, Configuration (selected), Snapshot, and Whole VM Cold Migration Tasks. The 'Basic Information' section shows Name: EulerOS-with-Tools-zs. The 'Flavors' section shows Name: zhangsan and ID: 2b55c9fd-8303-4b7f-8070-bf2fdbcb14d29.

Step 9 At the bottom of the page, click **Mount ISO**.



The screenshot shows the 'CD-ROM Drive' management interface. It has a 'Status' column with 'Unmounted ISO' and an 'Operation' column with buttons for 'Delete CD-ROM Drive', 'Mount ISO' (which is highlighted with a red box), and 'Unmount ISO'.

Step 10 In the displayed dialog box, select the **image-tools** file decompressed in Step 5 for **Image File** and click **Mount ISO**. If the message "Mount ISO successfully" is displayed, the ISO file is successfully mounted. Click **OK**. (Do not close the dialog box.)



- Step 11 On the VM where the OS is installed, run the following commands as the **root** user to copy the image script to the VM:

```
mkdir -p /mnt/image-tools  
mount /dev/sr1 /mnt/image-tools  
mkdir -p /opt/image-tools  
cp -r /mnt/image-tools/linux /opt/image-tools
```

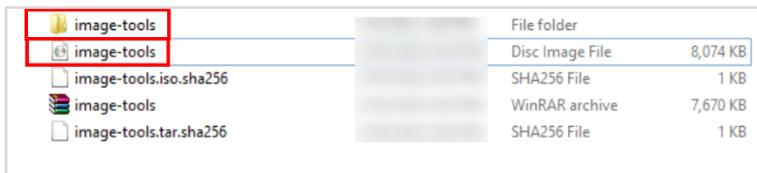
```
[root@EulerOS ~]# mkdir -p /mnt/image-tools  
[root@EulerOS ~]# mount /dev/sr1 /mnt/image-tools  
mount: /dev/sr1 is write-protected, mounting read-only
```

```
[root@EulerOS image-tools]# mkdir -p /opt/image-tools  
[root@EulerOS image-tools]# cp -r /mnt/image-tools/linux /opt/image-tools  
[root@EulerOS image-tools]#
```

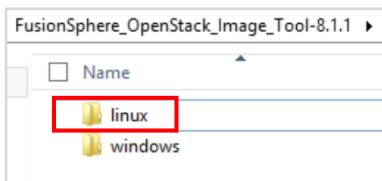
- Step 12 (Optional) If information similar to that shown the following figure is displayed and errors related to the **cp** commands occur, use MobaXterm to copy the **linux** file to the **/opt/image-tools** directory.

```
cp: error reading '/mnt/image-tools/linux/cloud-init/cloudinit_scripts/offdeploy-cloud-init.sh': Input/output error  
cp: failed to extend '/opt/image-tools/linux/cloud-init/cloudinit_scripts/offdeploy-cloud-init.sh': Input/output error  
cp: cannot stat '/mnt/image-tools/linux/cloud-init/cloudinit_depend': Input/output error  
cp: error reading '/mnt/image-tools/linux/install-vmtools.sh': Input/output error  
cp: failed to extend '/opt/image-tools/linux/install-vmtools.sh': Input/output error  
cp: error reading '/mnt/image-tools/linux/install-cloud-init.sh': Input/output error  
cp: failed to extend '/opt/image-tools/linux/install-cloud-init.sh': Input/output error  
cp: cannot stat '/mnt/image-tools/linux/reset-pwd': Input/output error  
cp: error reading '/mnt/image-tools/linux/reset-pwd.sh': Input/output error  
cp: failed to extend '/opt/image-tools/linux/reset-pwd.sh': Input/output error
```

Decompress **image-tools**.



Open the MobaXterm software and upload the **linux** file in the decompressed **image-tools** package to the **/opt/image-tools** directory. For details, see Step 6 in section 1.2.4.4.

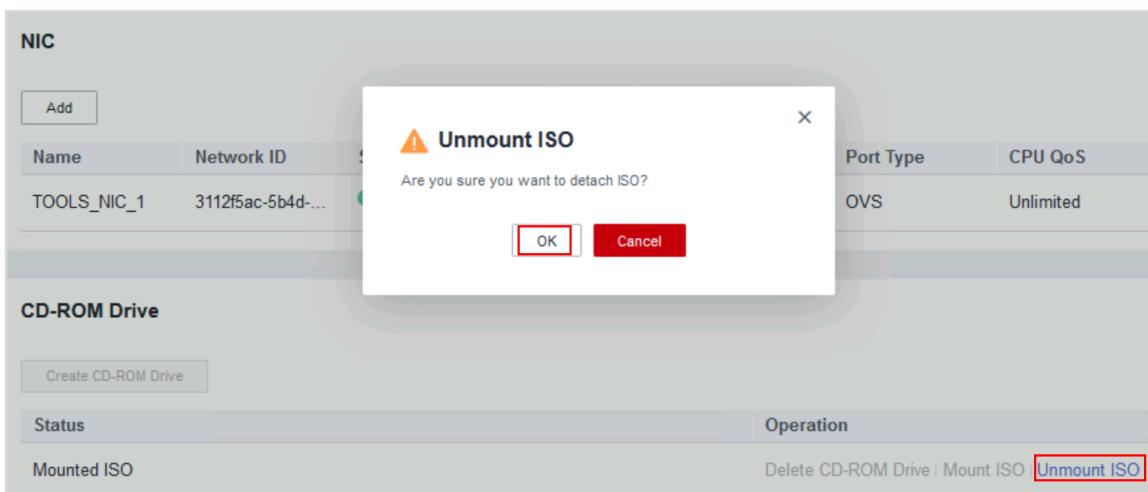


Step 13 Run the following commands as the **root** user to grant the execute permission to the script:

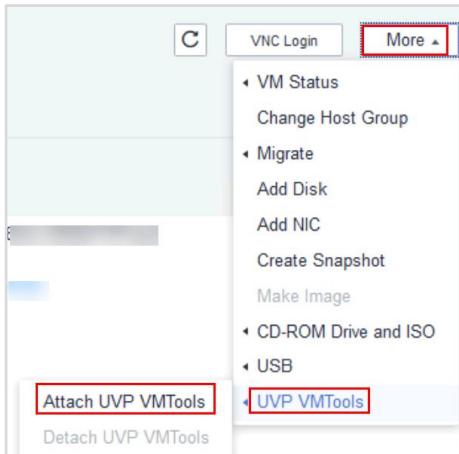
```
cd /opt/image-tools/linux  
chmod +x *.sh  
umount /mnt/image-tools
```

```
[root@EulerOS image-tools]# cd /opt/image-tools/linux  
[root@EulerOS linux]# chmod +x *.sh  
[root@EulerOS linux]# umount /mnt/image-tools  
[root@EulerOS linux]# _
```

Step 14 Unmount the ISO file on Service OM.



Step 15 On Service OM, click the name of the created VM to switch to the **Summary** page. Choose **More > Attach UVP VMTools** in the upper right corner of the page.



Step 16 Run the following commands on the VM as the **root** user to install UVP VMTools:

```
cd /opt/image-tools/linux  
./install-vmtools.sh
```

```
[root@EulerOS image-tools]# cd /opt/image-tools/linux  
[root@EulerOS linux]# ./install-vmtools.sh
```

If information shown in the following figure is displayed, UVP VMTools is successfully installed:

```
The UVP VMTools is installed successfully.  
Reboot the system for the installation to take effect.  
Successfully installed vmtools.
```

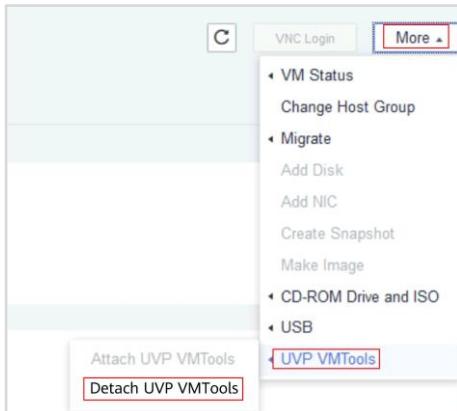
The functions of UVP VMTools are available only after the VM is restarted. Run the **reboot** command to restart the VM.

```
[root@euleros-with-tools-zs ~]#  
[root@euleros-with-tools-zs ~]#  
[root@euleros-with-tools-zs ~]# reboot
```

Verify that the VM is restarted successfully and log in to the VM again.

```
Authorized users only. All activities may be monitored and reported.  
euleros-with-tools-zs login: root  
Password:  
Last login: [REDACTED] on tty1  
  
Authorized users only. All activities may be monitored and reported.  
[root@euleros-with-tools-zs ~]#
```

Step 17 On Service OM, click the name of the created VM to switch to the **Summary** page. Choose **More > Detach UVP VMTools** in the upper right corner of the page.



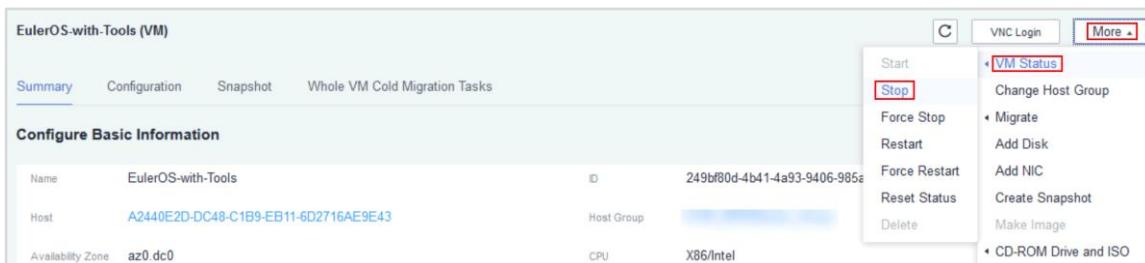
1.2.4.6 Generating a Public Image

- Step 1** Run the following commands as the **root** user to clear the cache of the VM or modify the configuration:

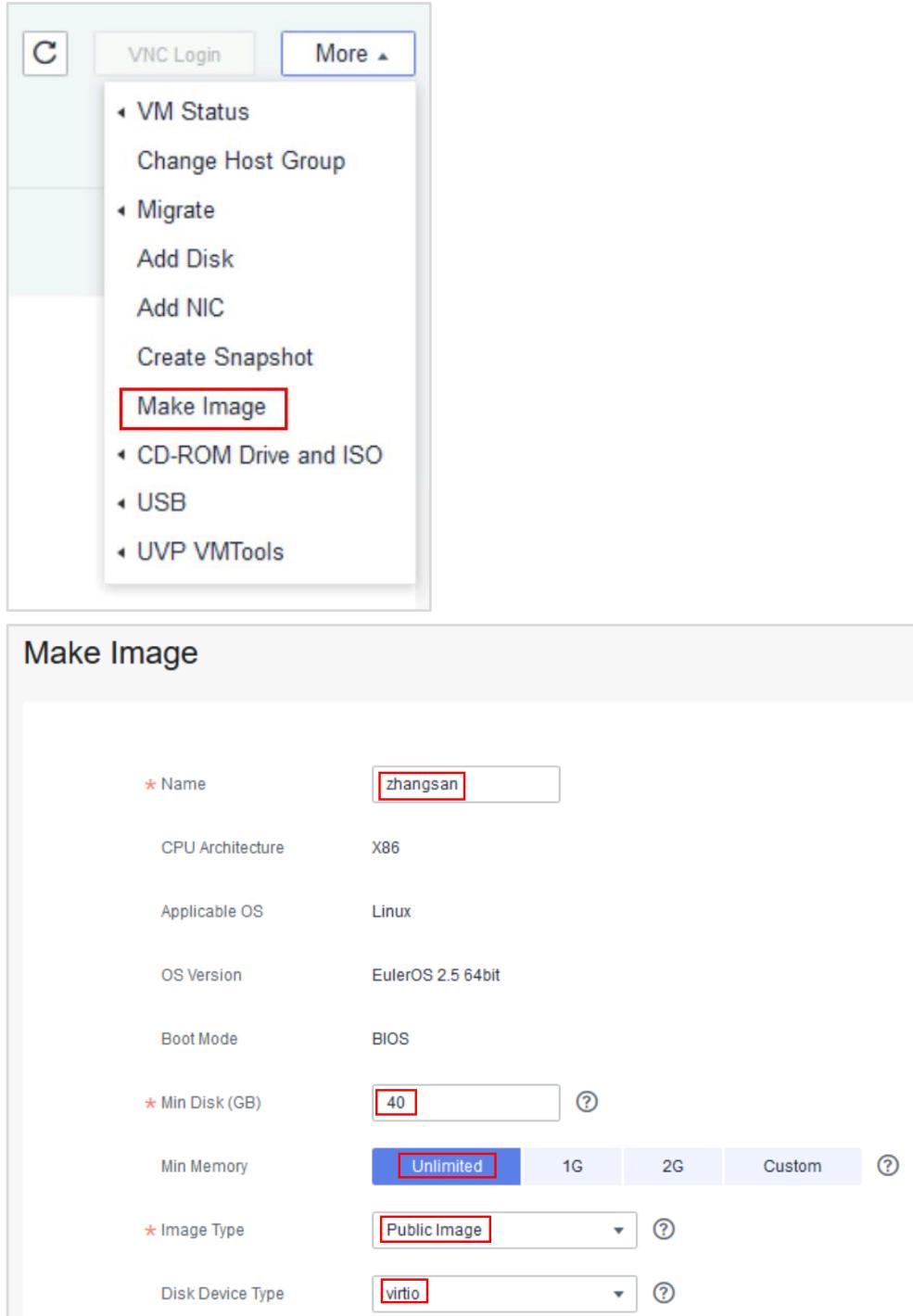
```
rm -rf /etc/udev/rules.d/70-persistent-net.rules
rm -rf /var/lib/cloud/*
```

```
Authorized users only. All activities may be monitored and reported.
[root@EulerOS ~]# rm -rf /etc/udev/rules.d/70-persistent-net.rules
[root@EulerOS ~]# rm -rf /var/lib/cloud/*
[root@EulerOS ~]#
```

- Step 2** On Service OM, choose **Services > Resource > Compute Resource** and click **VMs**. Click the name of the created VM to switch to the **Summary** page. Choose **More > VM Status > Stop** in the upper right corner of the page.



- Step 3** Choose **More > Make Image** in the upper right corner of the page. In the displayed dialog box, modify or set image attributes.



The screenshot shows a user interface for managing a virtual machine (VM). At the top, there is a navigation bar with a 'C' icon, 'VNC Login' button, and a 'More ▾' button. Below the navigation bar is a sidebar menu with the following options:

- VM Status
- Change Host Group
- Migrate
- Add Disk
- Add NIC
- Create Snapshot
- Make Image** (This option is highlighted with a red box.)
- CD-ROM Drive and ISO
- USB
- UVP VMTools

The main content area is titled "Make Image". It contains the following configuration fields:

* Name	<input type="text" value="zhangsan"/>
CPU Architecture	X86
Applicable OS	Linux
OS Version	EulerOS 2.5 64bit
Boot Mode	BIOS
* Min Disk (GB)	<input type="text" value="40"/> ?
Min Memory	<input type="button" value="Unlimited"/> <input type="button" value="1G"/> <input type="button" value="2G"/> <input type="button" value="Custom"/> ?
* Image Type	<input type="button" value="Public Image"/> ?
Disk Device Type	<input type="button" value="virtio"/> ?

VM Configuration Dialog Box Screenshot:

- Hash Algorithm: SHA-256
- Cloud-Init Support: Yes (selected)
- Static IP Address Support: Yes (selected)
- Instance Type: Large-memory
- Additional CDR Field: [empty input field]
- Description: [empty text area]
- Buttons: Cancel, OK (highlighted with a red box)

Step 4 On Service OM, choose **Services > Resource > Image Resource**, click **Public Image**, and verify that the VM image has been created.

Image Resource List Screenshot:

Name	Status	Task Status	Image Type	Virtualiz...	CPU Archi...	OS	OS Version	Disk Fo...
zhangsan	Registration Succe...	-	Public Image	KVM	X86	Linux	EulerOS 2.5 64bit	qcow2

1.2.4.7 Downloading a Public Image

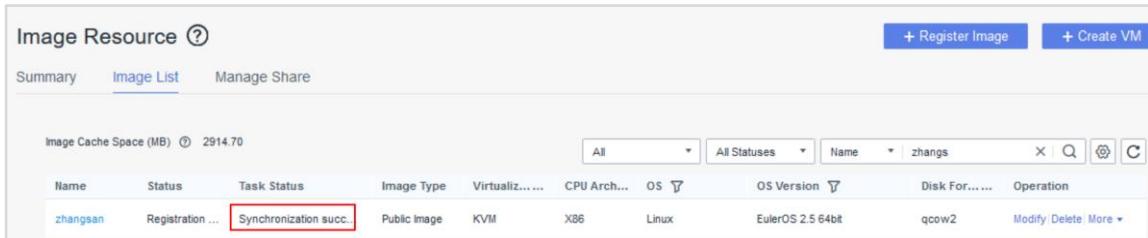
Created images can be used in other regions. If required, download the created KVM image to the local PC.

Step 1 On Service OM, choose **Services > Resource > Image Resource**. Click the **Image List** tab. In the row that contains the image, choose **More > Synchronize** to synchronize the image to FusionSphere OpenStack.

Image Resource List Screenshot (with More menu open):

Name	Status	Task Status	Image Type	Virtualiz...	CPU Archi...	OS	OS Version	Disk For....	Operation
zhangsan	Registration ...	-	Public Image	KVM	X86	Linux	EulerOS 2.5 64bit	qcow2	Modify Delete More Synchronize

Step 2 Wait until **Synchronization succeeded** is displayed for **Task Status** in the image list.



Name	Status	Task Status	Image Type	Virtualiz.....	CPU Arch...	OS	OS Version	Disk For.....	Operation
zhangsan	Registration ...	Synchronization succ...	Public Image	KVM	X86	Linux	EulerOS 2.5 64bit	qcow2	Modify Delete More ▾

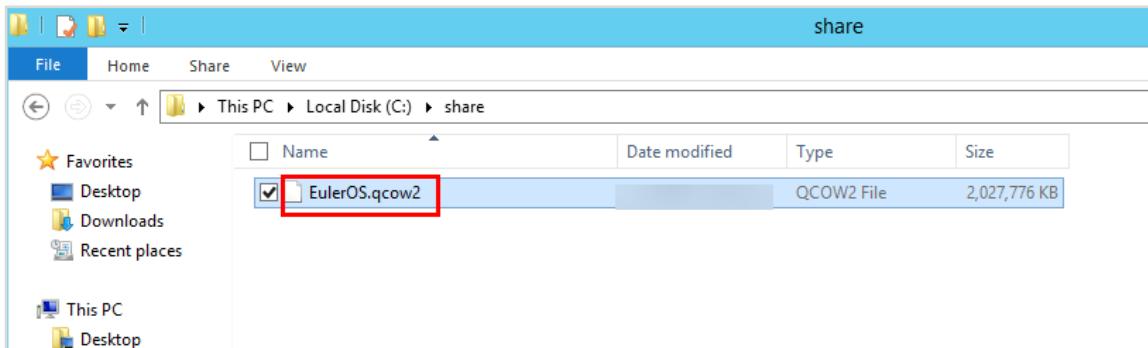
Step 3 Locate the row that contains the target image, click **More**, and choose **Download** to download the image file to the local PC.



Name	Status	Task Status	Image Type	Virtualiz.....	CPU Arch...	OS	OS Version	Disk For.....	Operation
zhangsan	Registration ...	Synchronization succ...	Public Image	KVM	X86	Linux	EulerOS 2.5 64bit	qcow2	Modify Delete More ▾

You can view the downloaded image in the lower part of the browser. You can register a public image based on the QCOW2 image file for ECSs to use.

Step 4 Copy the downloaded image file to the **share** folder in drive C and rename it **EulerOS.qcow2**. If no **share** folder is available, create one.



Name	Date modified	Type	Size
EulerOS.qcow2		QCOW2 File	2,027,776 KB

1.2.5 Quiz

[Question 1] What do administrators need to prepare before provisioning cloud service resources?

[Answer]

The overall procedure for provisioning resources is as follows:

1. Before using cloud resources, ensure that the software has been installed and the required cloud services have been connected to ManageOne.
2. Log in to ManageOne as the operation administrator of your enterprise, create VDCs and VDC administrators and VDC operators in accordance with the VDC tenant model. Make sure that the configuration of external networks is complete.
3. Before creating some cloud services, complete the configurations. Otherwise, these cloud services will fail to be created.

4. Log in to ManageOne as a VDC administrator or VDC operator to create and manage cloud service resources.

[Question 2] A company needs to enable all tenants on ManageOne Operation Portal to provision service VMs in batches based on the new OS and software. How does the background administrator configure the OS and software?

[Answer]

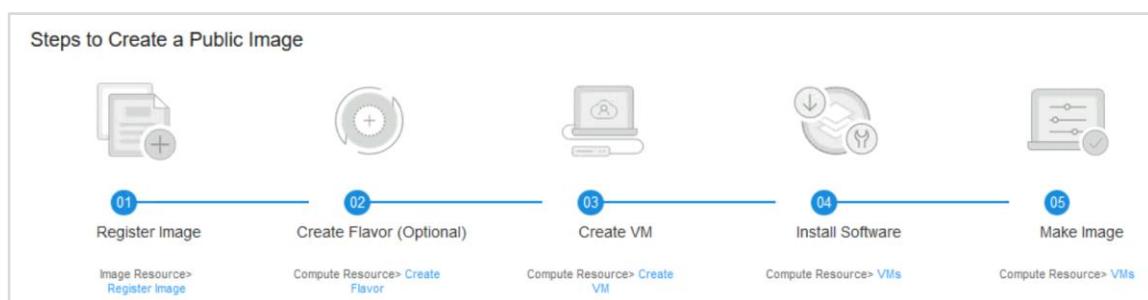
The administrator must have the permission to perform operations on Service OM, consult the company to obtain the image installation packages of the new OS and software as well as installation precautions. After obtaining the installation packages, the administrator needs to create a public image on Service OM.

A public image can be created in any of the following methods:

Method 1: If the local image provided by the company meets the requirements, the administrator can register the image with Service OM. After the image is registered, tenants can apply for ECSs using the image on ManageOne Operation Portal. In this case, the company needs to provide a local image that has the new OS and software installed.

Method 2: If the image provided by the company does not meet the requirements (for example, Cloud-Init and UVP VMTools are not installed), the administrator needs to register the image with Service OM, use the image to create an ECS, install the required software, and then use the ECS to create an image.

Method 3: If no local image is available, the administrator needs to create an image using an ISO file, register the image with Service OM, create a VM, install the required software, and then create an image.



2

Tenant Preparations on HUAWEI CLOUD Stack Operation Portal

2.1 Overview

2.1.1 About This Exercise

Create a VDC, VDC administrator, and VPC, and perform other operations to prepare for using common cloud services.

2.1.2 Objectives

- Create tenants, VDCs, and VDC administrators.
- Allocate external networks.
- Create VPCs.

2.1.3 Process

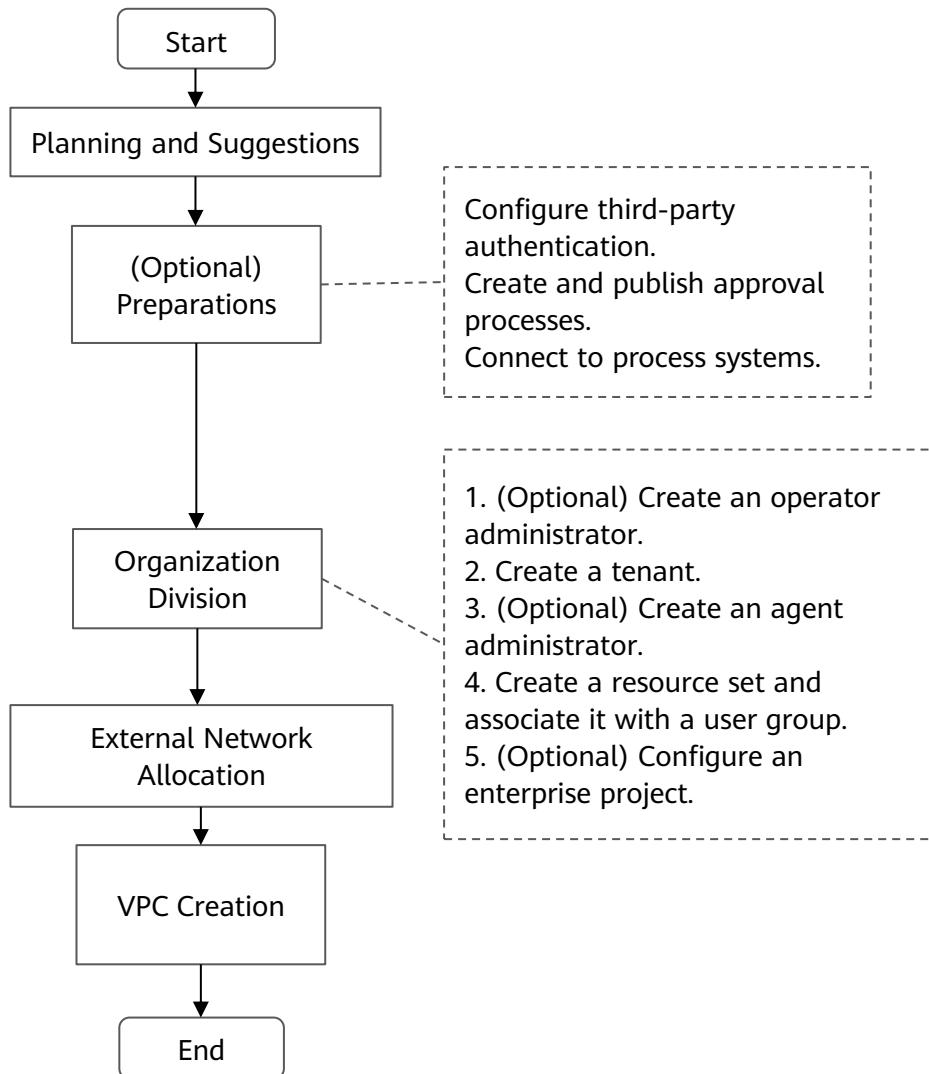
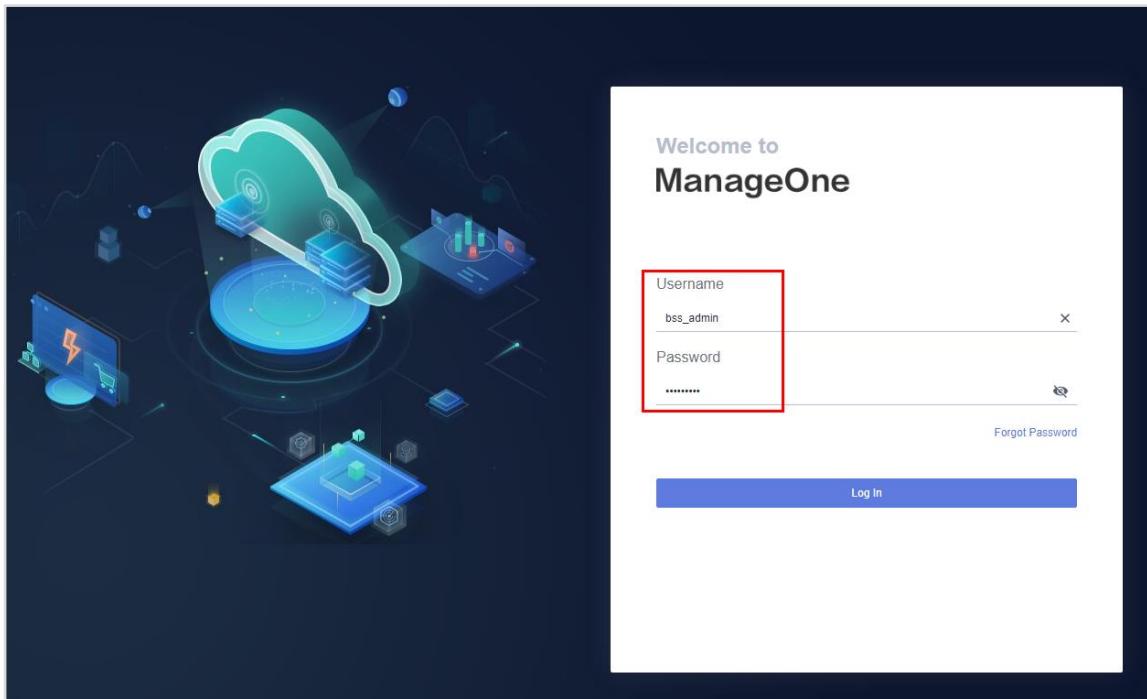


Figure 2-1 Establishing a VDC tenant model and creating a VPC

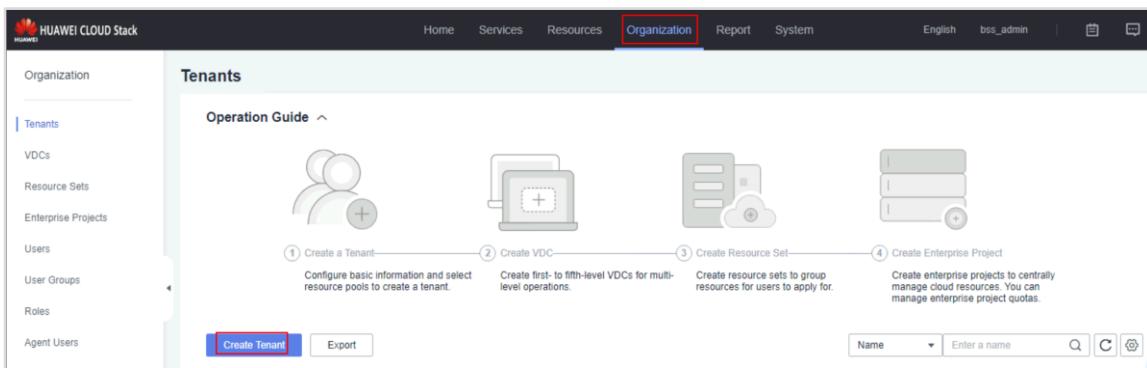
2.2 Procedure

2.2.1 Creating a First-Level VDC and Its Administrator

Step 1 Log in to ManageOne Operation Portal as an operation administrator.



Step 2 Choose **Organization** from the main menu. On the displayed page, click **Create Tenant**.



Step 3 Set **Tenant Name** (your name is recommended) and **Username**, enter a password, and click **Next**.

< | Create a Tenant

① Configure Basic Parameters ————— ② Select Resource Pools ————— ③ Finish

Basic Information

* Tenant Name	zhangsan
Business Director	Enter a business director name.
Business Director's Mobile Number	Business Director's Mobile Number
Business Director's Email	Business Director's Email
Associate Quota Modification with Approval ?	No Yes
Description	Enter a description.

Authentication Details

* Authentication Mode ?	Local
* Two-Factor Authentication ?	Close Enable

Authentication Details

* Authentication Mode ?	Local	
* Two-Factor Authentication ?	Close	Enable

Administrator Information

Create Administrator ?	Yes	No
* Username ?	<input type="text" value="zhangsan"/>	
Alias	<input type="text" value="Enter an alias"/>	
Description	<input type="text" value="Enter a description."/>	
* Password Generation Method ?	Set now	Set by user
Set a password now.		
	<input type="password" value="*****"/>	<input type="password" value="*****"/>
Mobile Number ?	<input type="text" value="+86 (Chinese mainl..."/>	
Email ?	<input type="text" value="Enter an email address."/>	

[Cancel](#) [Next](#) [Finish](#)

Step 4 On the **Select Resource Pools** page, select resource pools and the **zs-EIP** and **dummy_external_network** networks, and click **Finish**.

Select Resource Pools [?](#)

Available		Selected	Network Allocation
<input type="checkbox"/> <input checked="" type="checkbox"/> Private Cloud	<input type="checkbox"/> <input checked="" type="checkbox"/> hangzhou	<input type="checkbox"/> <input checked="" type="checkbox"/> Private Cloud	<input type="checkbox"/> <input checked="" type="checkbox"/> hangzhou
		<input type="checkbox"/> <input checked="" type="checkbox"/> OpenStack_zj-hz-1	<input type="checkbox"/> <input checked="" type="checkbox"/> Network Egress Type
		<input type="checkbox"/> <input checked="" type="checkbox"/> Name	Descriptio
		<input type="checkbox"/> <input checked="" type="checkbox"/> test01	Op
		<input type="checkbox"/> <input checked="" type="checkbox"/> External_Net01	View Same-Group Network
		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> zs-VPN	View Same-Group Network
		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> zs-EIP	View Same-Group Network

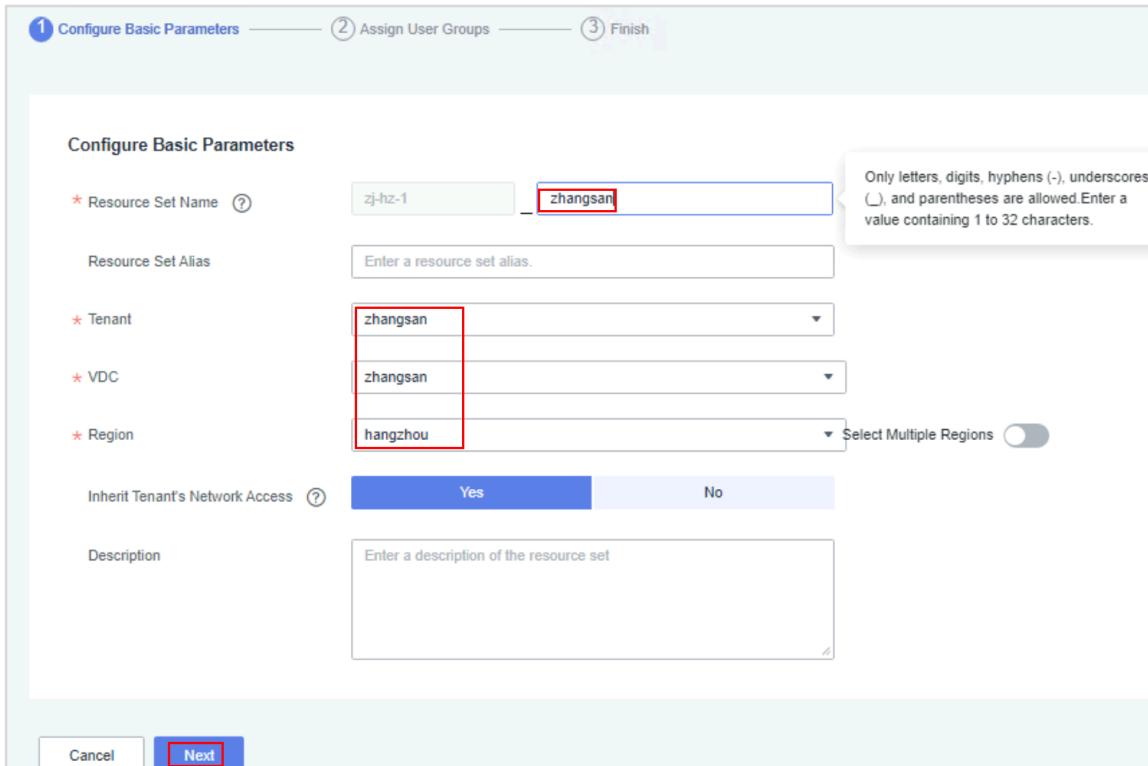
Step 5 Verify that the tenant is displayed in the tenant list.

Name	Business Director	VDCs	Enterprise Projects
zhangyin	--	1	1
zhangsan	--	1	1

2.2.2 Creating a Resource Set

Step 1 Click the name of the created tenant. In the navigation pane, choose **Resource Sets**. Click **Create Resource Set**.

Step 2 Set **Resource Set Name**, **Tenant**, and **Region**, and retain the default settings for other parameters.



The screenshot shows the 'Configure Basic Parameters' step of a three-step wizard. The steps are: ① Configure Basic Parameters, ② Assign User Groups, and ③ Finish. The current step is ①.

Configure Basic Parameters

* Resource Set Name: zj-hz-1 (highlighted with a red box) zhangsan (highlighted with a red box)
Only letters, digits, hyphens (-), underscores (_), and parentheses are allowed. Enter a value containing 1 to 32 characters.

Resource Set Alias: Enter a resource set alias.

* Tenant: zhangsan (highlighted with a red box)

* VDC: zhangsan

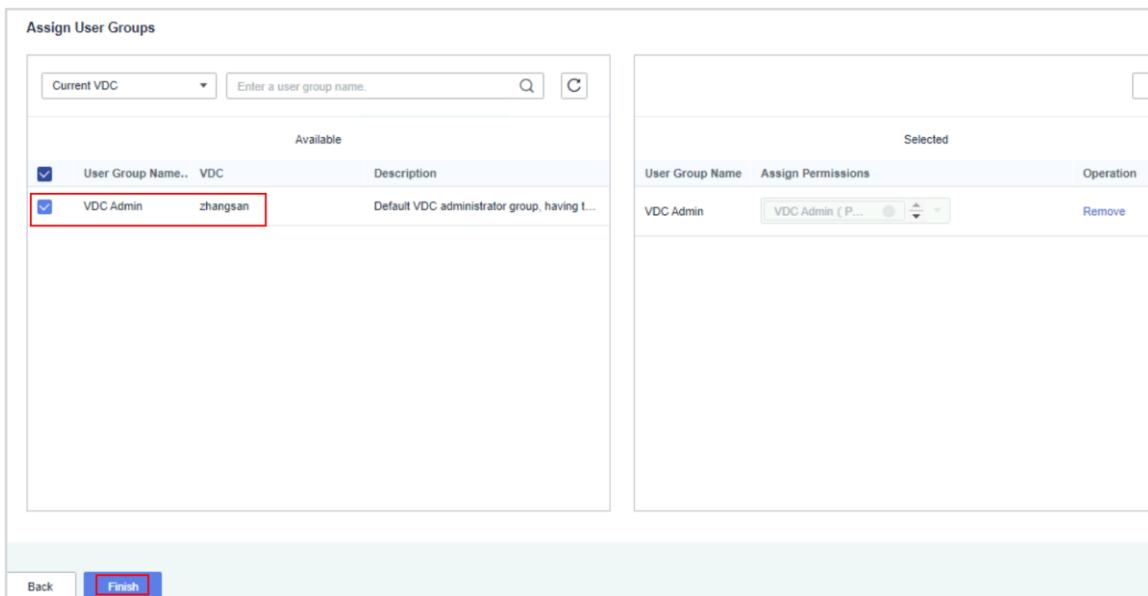
* Region: hangzhou

Inherit Tenant's Network Access: Yes (highlighted with a red box) No

Description: Enter a description of the resource set

Buttons at the bottom: Cancel (grayed out), Next (highlighted with a red box), Finish (grayed out).

Step 3 On the **Assign User Groups** page, select **VDC Admin**.



The screenshot shows the 'Assign User Groups' page. It has two main sections: 'Available' and 'Selected'.

Available

User Group Name..	VDC	Description
<input checked="" type="checkbox"/> VDC Admin	zhangsan	Default VDC administrator group, having t...

Selected

User Group Name	Assign Permissions	Operation
VDC Admin	VDC Admin (P...)	Remove

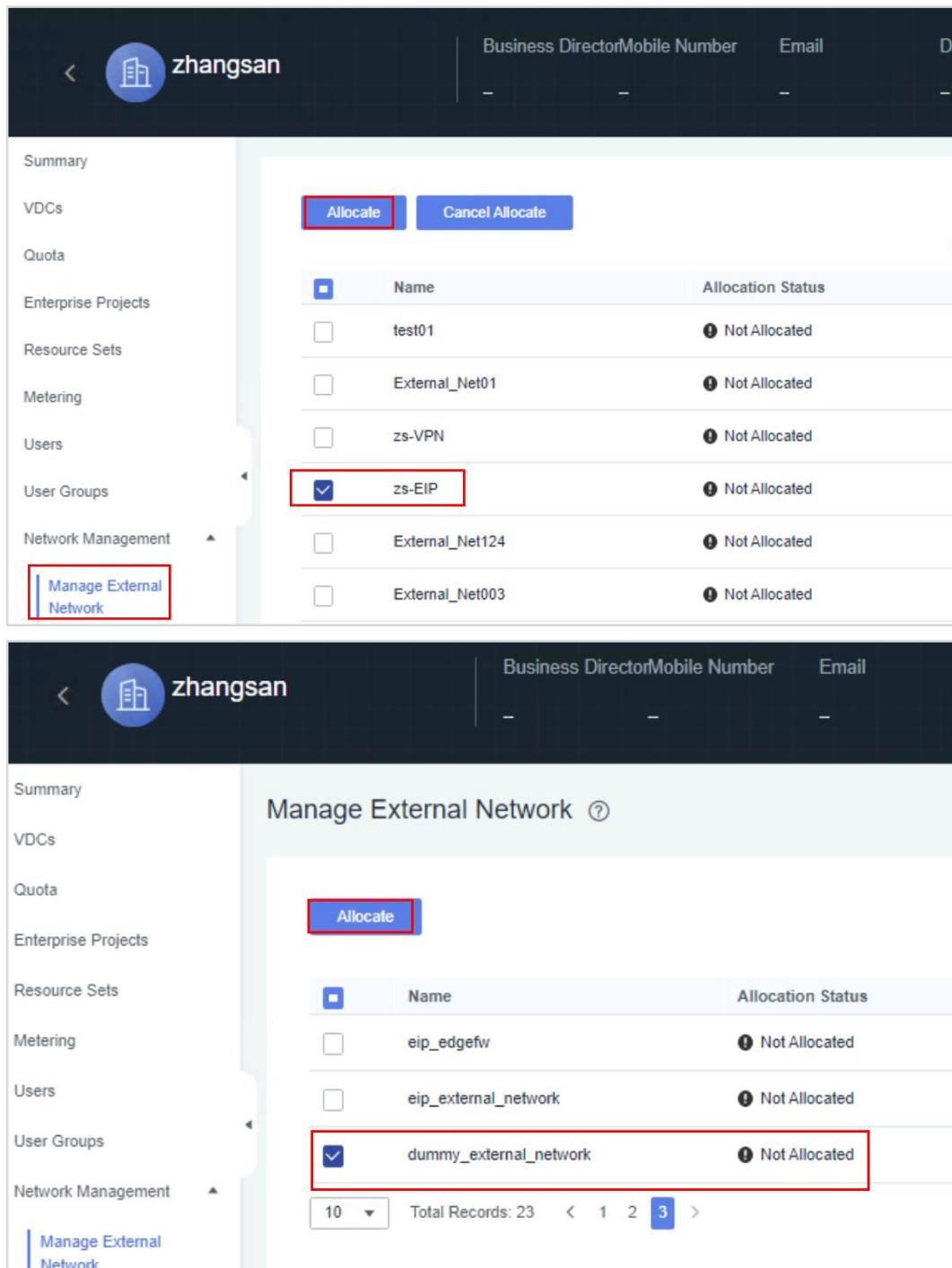
Buttons at the bottom: Back (grayed out), Finish (highlighted with a red box).

Click **Finish**. Verify that the resource set is displayed in the resource set list.

2.2.3 (Optional) Dividing External Networks

If you did not allocate external networks to a tenant during tenant creation using an operation administrator account, you can allocate external networks to the tenant on the management page of the created tenant now.

Click the name of the created tenant. In the navigation pane, choose **Network Management > Manage External Network**. Select external networks **zs-EIP** and **dummy_external_network** and click **Allocate**. In the displayed dialog box, click **OK**.



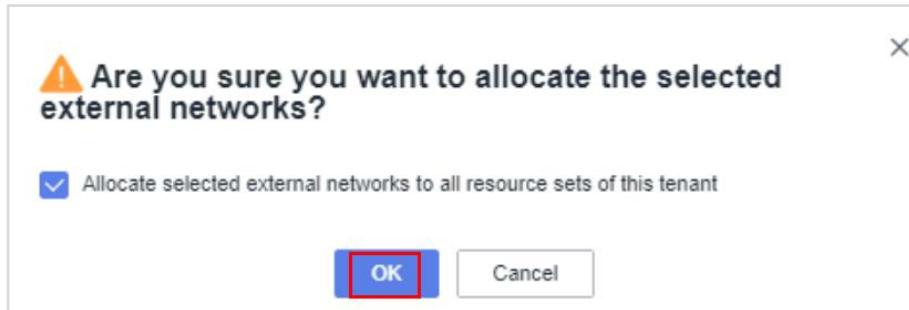
The screenshot shows two consecutive screenshots of the 'Manage External Network' dialog box for the tenant 'zhangsan'.

Screenshot 1: The 'Allocate' button is highlighted with a red box. The table lists external networks with their allocation status:

Name	Allocation Status
test01	Not Allocated
External_Net01	Not Allocated
zs-VPN	Not Allocated
zs-EIP	Not Allocated
External_Net124	Not Allocated
External_Net003	Not Allocated

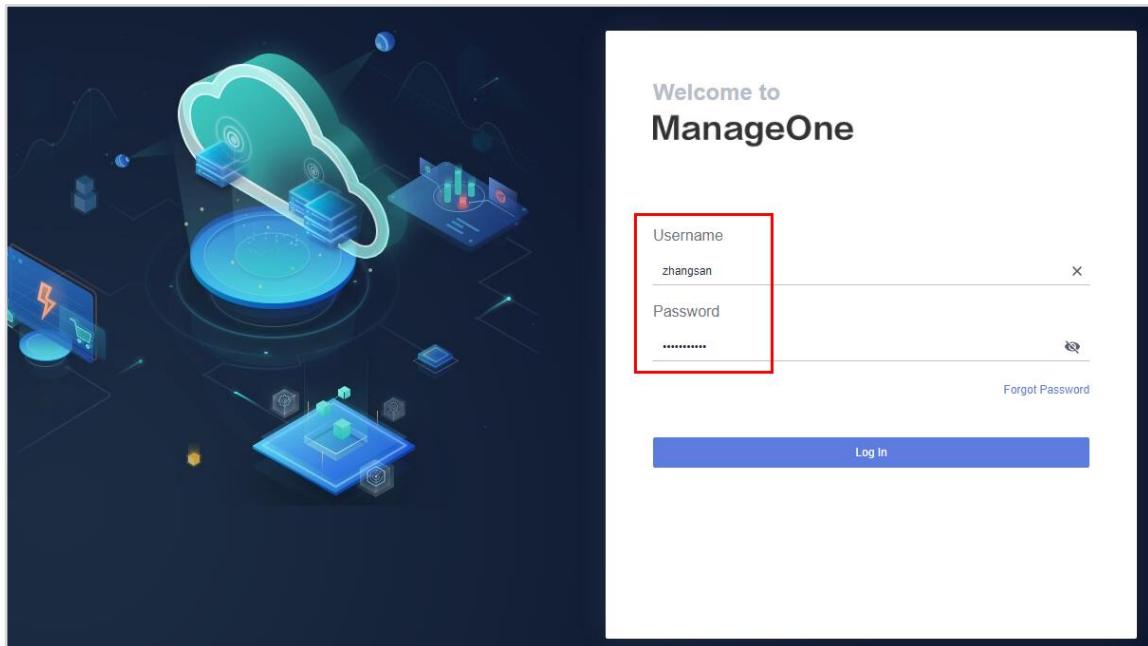
Screenshot 2: The 'Allocate' button is highlighted with a red box. The table lists external networks with their allocation status, showing that 'zs-EIP' and 'dummy_external_network' have been successfully allocated:

Name	Allocation Status
eip_edgefw	Not Allocated
eip_external_network	Not Allocated
dummy_external_network	Not Allocated



2.2.4 Creating a VPC

- Step 1 Log in to ManageOne Operation Portal as the newly created VDC administrator (for example, **zhangsan**) and change the password. The password of any account needs to be changed upon the first login using that account.



To improve account security, enter a new password.

Change Password

* Old Password (Red box)

* New Password

* Confirm Password (Blue box)

Contact Information

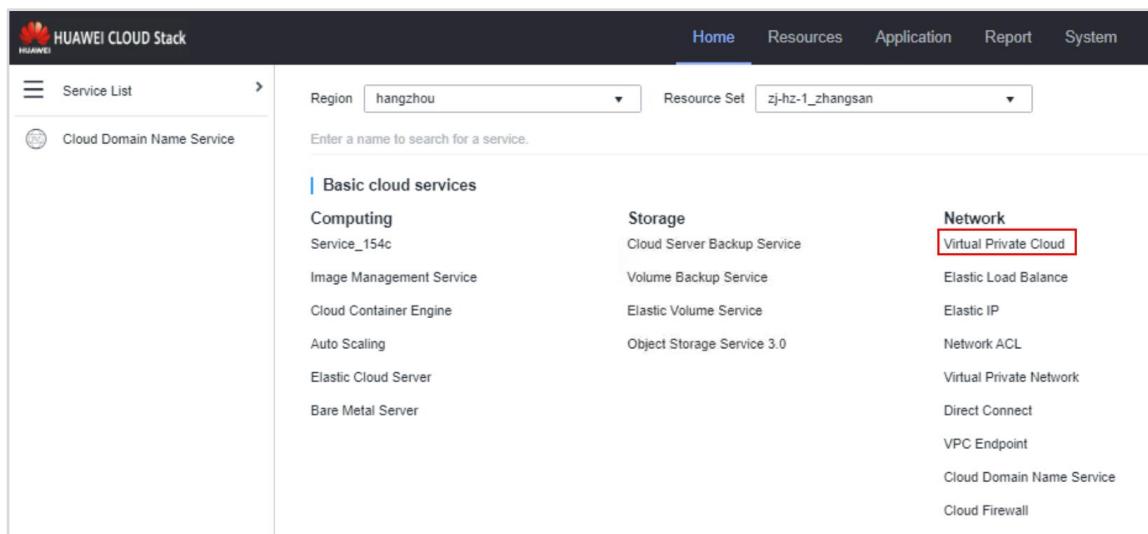
You can use the specified email address or mobile number to retrieve the password if you forget it. No mail or SMS server is configured. You cannot retrieve your password. Please configure a mail or SMS server on ManageOne Maintenance Portal first.

Phone Number

Email Address

OK (Red box) **Cancel**

Step 2 Click the **Service List** icon. Select **Virtual Private Cloud**.



The screenshot shows the HUAWEI CLOUD Stack Service List interface. The top navigation bar includes Home, Resources, Application, Report, and System. The left sidebar has a 'Service List' icon. The main area shows a search bar with 'hangzhou' in the Region dropdown and 'zj-hz-1_zhangsan' in the Resource Set dropdown. Below the search bar is a text input field for searching services. A table lists basic cloud services under three categories: Computing, Storage, and Network. The 'Network' column contains several items, with 'Virtual Private Cloud' highlighted by a red box. Other items in the Network column include Elastic Load Balance, Elastic IP, Network ACL, Virtual Private Network, Direct Connect, VPC Endpoint, Cloud Domain Name Service, and Cloud Firewall.

Basic cloud services		
Computing	Storage	Network
Service_154c	Cloud Server Backup Service	Virtual Private Cloud (highlighted)
Image Management Service	Volume Backup Service	Elastic Load Balance
Cloud Container Engine	Elastic Volume Service	Elastic IP
Auto Scaling	Object Storage Service 3.0	Network ACL
Elastic Cloud Server		Virtual Private Network
Bare Metal Server		Direct Connect
		VPC Endpoint
		Cloud Domain Name Service
		Cloud Firewall

Step 3 On the displayed page, click **Apply for VPC** in the upper right corner. In the displayed **Select Service** dialog box, click **Apply Now** in the **VPC** card.

Step 4 Set the parameters such as **Name, **External Network**, and **Required Duration**.**

Name	External Network	CIDR Block	Required Duration
vpc-zs1	hcs811(az0.d...)		Never

Step 5 In the **Subnet Settings area, set the parameters such as **Name**, **CIDR Block**, and **Gateway**. Click **Apply Now**.**

Subnet Settings

* Name

* DHCP ⓘ If the subnet has a cloud server with a critical service, use a fixed

IPv4 Address Configuration

* CIDR Block

Unavailable CIDR blocks: 100.127.0.0/23, 10.200.5.0/24, 100.64.0.0/17, 169.25
etwork segment that begins with 0, 127, or a number ranging from 224 to 255

* Gateway

Allocation Pools ⓘ

+ Adding an Automatically Assigned Address Pool It is recommended that a

DNS Server Address 1

Step 6 Verify that the VPC is displayed in the VPC list.

Virtual Private Clouds ⓘ				
	Name	IPv4 CIDR Block	Status	Subnets
	vpc-VPN	--	Normal	1
	vpc-zs2-1	--	Normal	2
	vpc-zs1	--	Normal	1

3 ECS

3.1 Overview

3.1.1 About This Exercise

Create and manage ECSs.

3.1.2 Objectives

- Learn how to create and publish ECSs.
- Learn how to apply for ECSs.
- Learn how to manage ECSs.

3.1.3 Process

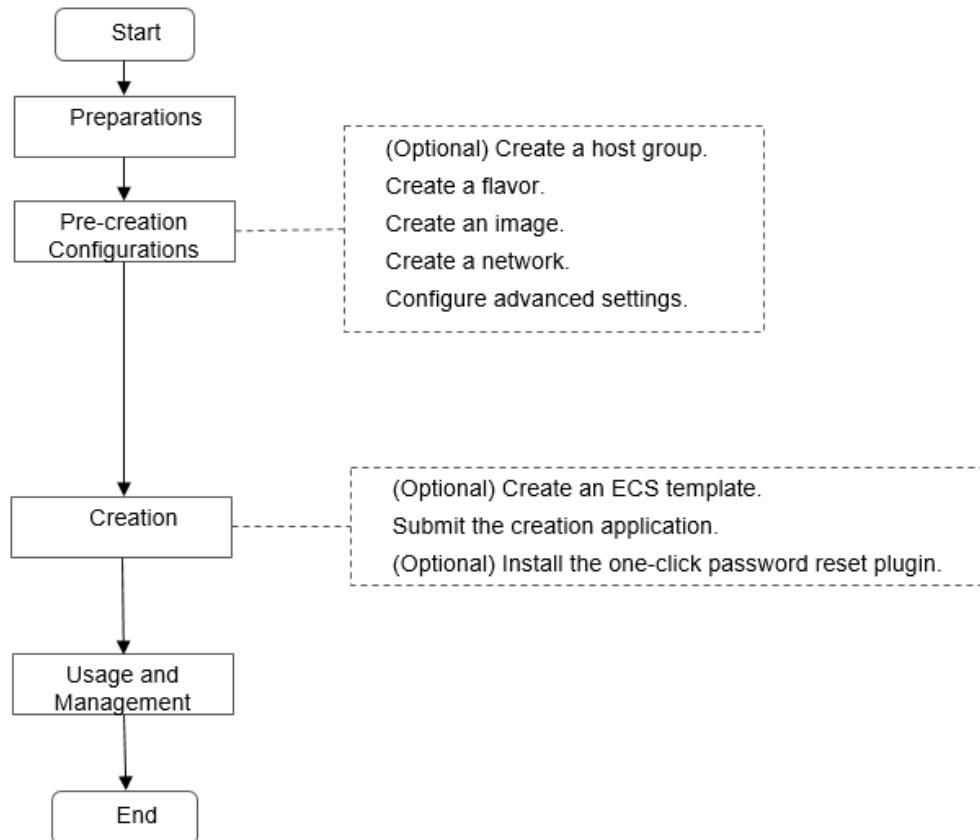
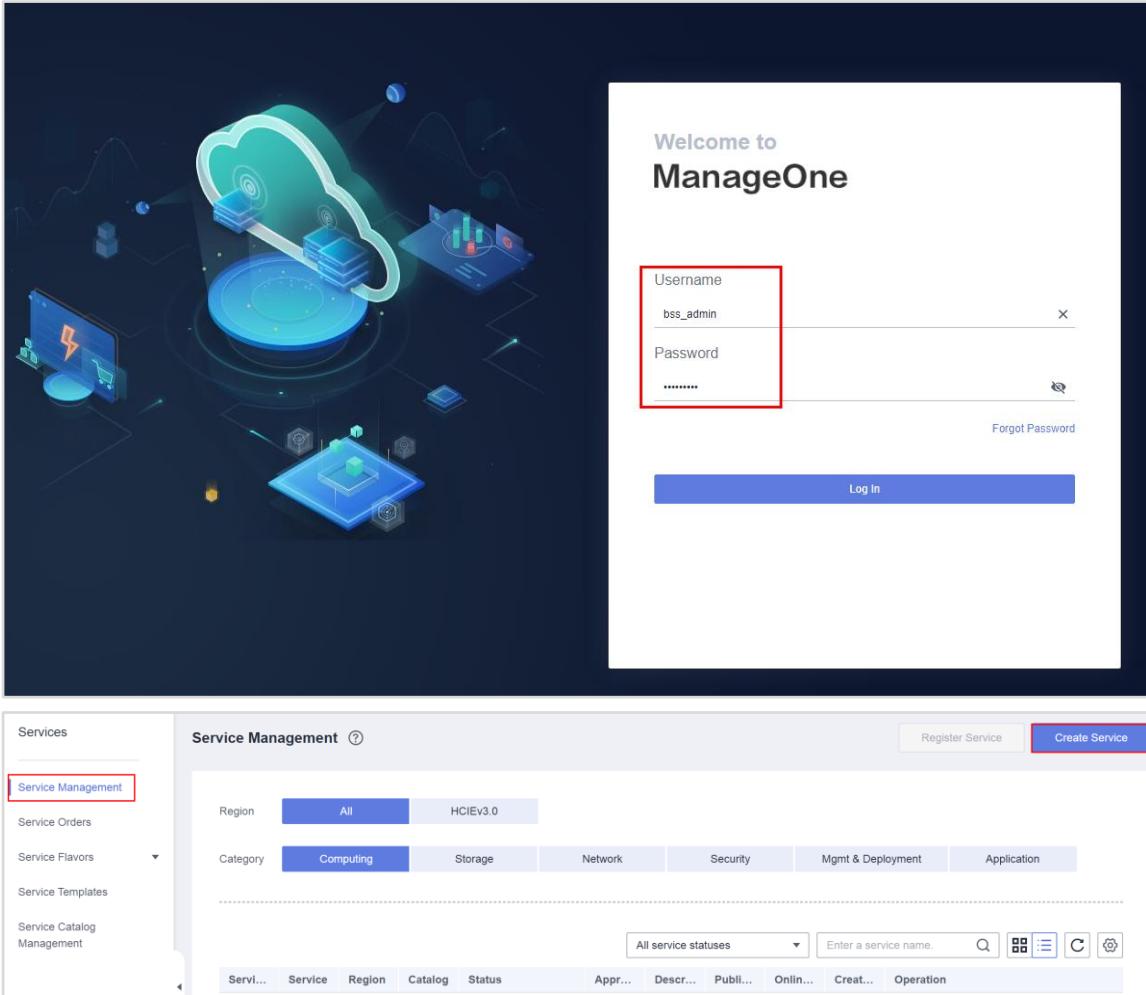


Figure 3-1 Flowchart for creating and managing an ECS

3.2 Procedure

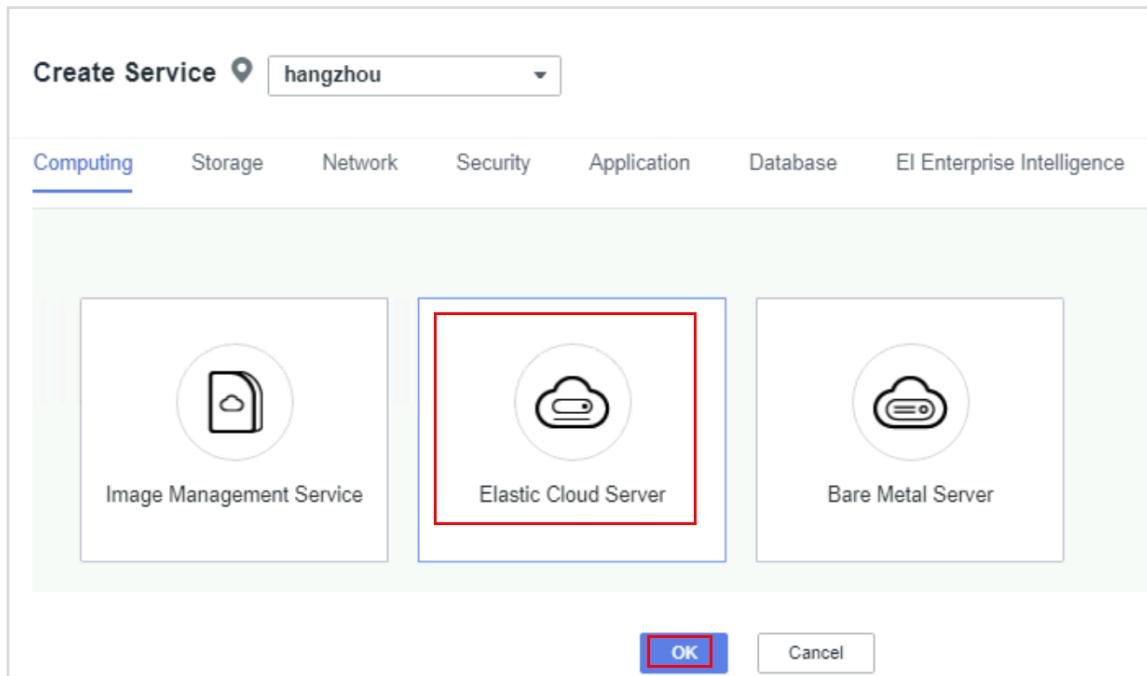
3.2.1 Applying for an ECS Using a Customized Template

- Step 1 Log in to ManageOne Operation Portal as the operation administrator. Choose **Services > Service Management**. On the displayed page, click **Create Service** in the upper right corner.

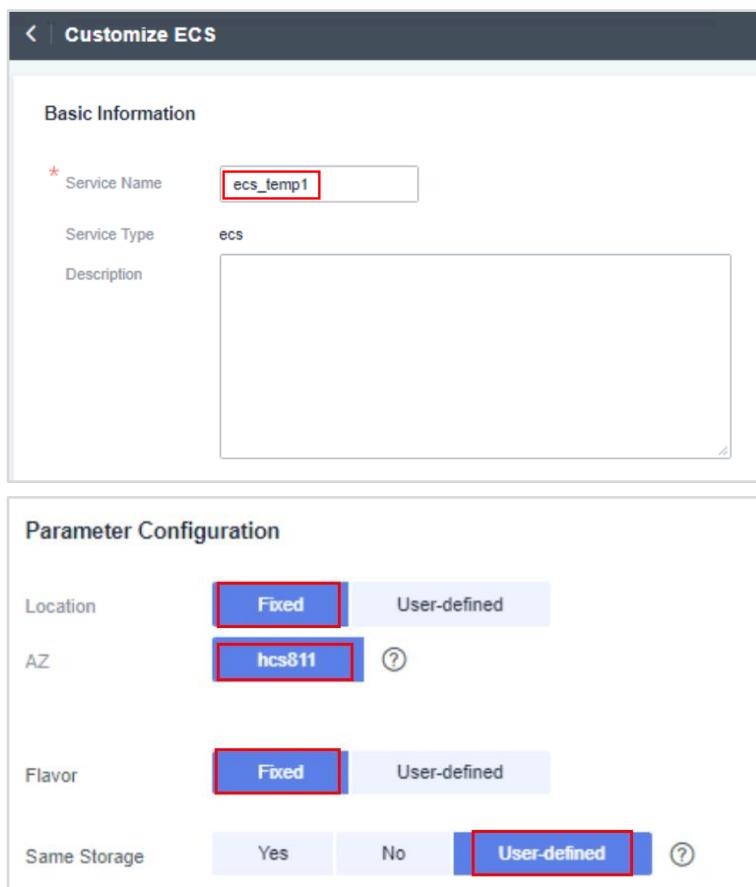


The image consists of two screenshots of the ManageOne Operation Portal. The top screenshot shows the login screen with a red box highlighting the 'Username' and 'Password' input fields. The bottom screenshot shows the 'Service Management' tab selected in the sidebar, with the 'Computing' tab highlighted in the main content area.

- Step 2 Select the default region, and click the **Computing** tab. On the displayed tab page, click the **Elastic Cloud Server** card, and click **OK**.



- Step 3** Enter the service name, select the flavor, image, and disk type as required to complete parameter settings for **Basic Information** and **Parameter Configuration**, and click **OK**.



Basic Information

* Service Name	ecs_temp1
Service Type	ecs
Description	(Large empty text area)

Parameter Configuration

Location	Fixed	User-defined		
AZ	hcs811	(?)		
Flavor	Fixed	User-defined		
Same Storage	Yes	No	User-defined	(?)

ECS Type **General-purpose** Memory-optimized

vCPUs: All Memory: All Flavor: zhangsan

Flavor	vCPUs/Memory	CPU Vendor
zhangsan	2vCPUs 4 GB	Intel

Selected Flavor:zhangsan | 2 vCPUs | 4 GB | Intel
If you need to create a flavor, contact the administrator to create one on Service OM. Click [here](#) to view the creation method. If the created flavor is not displayed, click [here](#) to locate the problem.

Disk: **zhangsan**

Image: **Fixed** User-defined

Image Type: **Public Image**

Boot Mode: **BIOS** UEFI

Image: EulerOS **zhangsan(40GB)**

If a new image is needed, contact the administrator to create, upload, and register the image on Service OM. Click [here](#) to view detailed operations.

Step 4 On the **Service Management** page, locate the row that contains the created service, and click **Publish** in the **Operation** column.

Service Management [?](#) [Register Service](#)

Region: All hangzhou

Category: **Computing** Storage Network Security Mgmt & Deployment Application Database EI Enterprise Intelligence

Service Na...	Service	Region	Catalog	Status	Approval	Description	Publish Sc...	Online Scope	Created At	Operation
ecs_temp1	Elastic Cloud Compute	hangzhou	Basic cloud...	Unpublished	Not required	--	--	--	...	Publish More ▼

Step 5 Configure the approval process and visible scope if required. (This configuration is not required in this exercise.) Click **OK** to publish the service.

Configure Publishing

Visible Scope	All VDCs	Some VDCs			
Configure Approval	Approval It...	Approve	Name	Approval Type...	Approver
Request	<input type="checkbox"/> Yes				
Change	<input type="checkbox"/> Yes				
Delete	<input type="checkbox"/> Yes				
Extend	<input type="checkbox"/> Yes				
Add to recyc...	<input type="checkbox"/> Yes				
Restore fro...	<input type="checkbox"/> Yes				
Clone	<input type="checkbox"/> Yes				
<input style="background-color: #0072bc; color: white; border: 1px solid #0072bc; padding: 5px; margin-right: 10px;" type="button" value="OK"/> <input style="border: 1px solid #ccc; padding: 5px;" type="button" value="Cancel"/>					

Step 6 Locate the row that contains the published service, click **More** and choose **Bring Online** in the **Operation** column.

Service Management

Service Management										Register Service	
Region	All	hangzhou	Category	Computing	Storage	Network	Security	Mgmt & Deployment	Application	Database	EI Enterprise Intellig
Service Na...	Service	Region	Catalog	Status	Approval	Description	Publish Sc...	Online Scope	Created At	Operation	
ecs_temp1	Elastic Clou...	hangzhou	Basic cloud ...	Published	Not required	--	All VDCs	--		Unpublish More Bring Online Modify Publish Scope	

Step 7 Configure the approval process for bringing the service online if required. (This configuration is not required in this exercise.) Click **OK** to bring the service online.

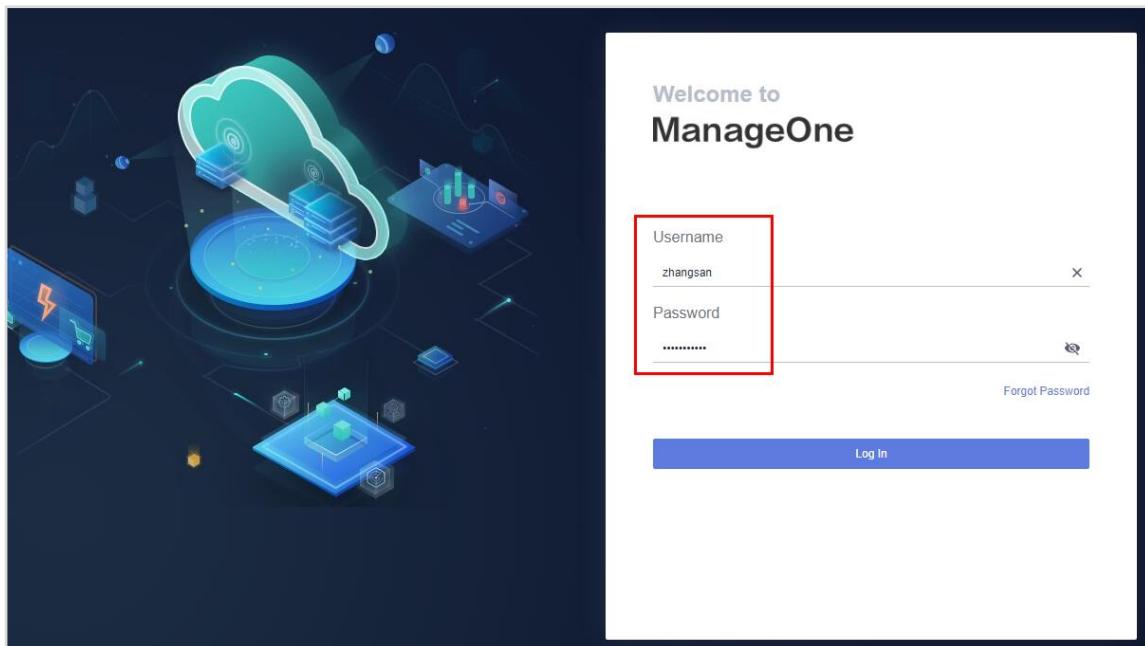
Set Online

Visible Scope All VDCs Some VDCs

Configure Approval	Approval It...	Approve	Name	Approval Type...	Approver
Request	<input type="checkbox"/>	Yes			
Change	<input type="checkbox"/>	Yes			
Delete	<input type="checkbox"/>	Yes			
Extend	<input type="checkbox"/>	Yes			
Add to recyc...	<input type="checkbox"/>	Yes			
Restore fro...	<input type="checkbox"/>	Yes			
Clone	<input type="checkbox"/>	Yes			

OK Cancel

Step 8 Log in to ManageOne Operation Portal as a VDC administrator or VDC operator.



Step 9 Click **Service List** and choose **Elastic Cloud Server**. On the displayed page, click **Apply for ECS** in the upper right corner.

The screenshot shows the HUAWEI CLOUD Stack interface. On the left, there's a sidebar with 'Service List' and a list of services: Cloud Domain Name Service, Computing (Service_154c), Image Management Service, Cloud Container Engine, Auto Scaling, Elastic Cloud Server (which is highlighted with a red box), and Bare Metal Server.

The main area has 'Region' set to 'hangzhou' and 'Resource Set' set to 'zj-hz-1_zhangsan'. It displays a search bar and a section titled 'Basic cloud services' with two columns: 'Computing' and 'Storage'. Under 'Computing', there are Service_154c, Image Management Service, Cloud Container Engine, Auto Scaling, and Elastic Cloud Server. Under 'Storage', there are Cloud Server Backup Service, Volume Backup Service, Elastic Volume Service, and Object Storage Service 3.0.

This screenshot shows the 'Elastic Cloud Server' management page. The left sidebar has 'Elastic Cloud Server' selected. The main area lists two servers: 'as-config-qj_B2T8R' and 'as-config-qj_XP0Y1', both in 'Running' status. There are tabs for 'Export', 'Tags Management', and 'Operation'. A red box highlights the 'Elastic Cloud Server' tab in the sidebar.

Step 10 In the card of the published service **ecs_temp1**, click **Apply Now**.

This screenshot shows the 'Select Service' page. It lists four services: 'yz2', 'ecs_cjq', 'ecs_temp1' (which has its 'Apply Now' button highlighted with a red box), and 'ecs_linux001'. Each service card includes a small icon, the service name, and an 'Apply Now' button.

Step 11 On the **Configure Basic Settings** page, check the settings for **AZ**, **Creation Method**, **ECS Type**, **Flavor**, **Boot Mode**, **Image**, **Same Storage**, **System Disk**, and **Quantity**. Retain the default values for other parameters. After the configuration is complete, click **Next**.

The selected image is a static injection image, and a static injection drive will be generated.
If a new image is needed, contact the administrator to create, upload, and register the image on Service OM. Click [here](#) to view detailed operations.

Step 12 Select the created VPC, retain the default values for other parameters, and click **Next**.

Step 13 Configure **ECS Name**, **Password**, and **Confirm Password**, retain the default values for other parameters, and click **Next**.

ECS Name: ecs-temp1

ECS Initial Status: Started

Description: 0/63

Login Mode: Password

Username: root

Password: Keep your password secure. The system cannot retrieve your password.

Confirm Password:

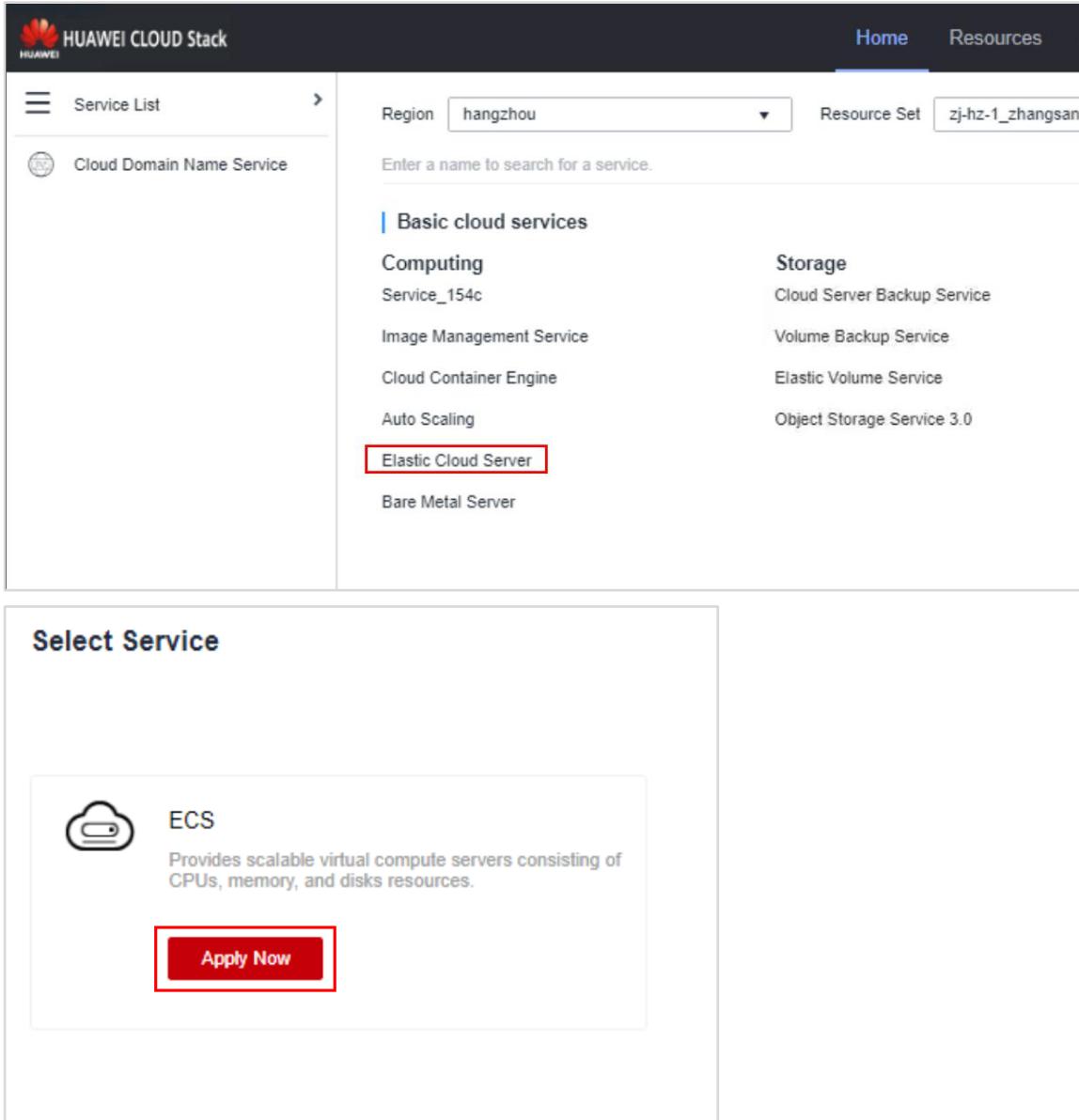
Next: Confirm

Step 14 Confirm the configurations and click **Apply Now** in the lower part of the page to confirm that the ECS has been created.

Name	Status	Flavor	Image	Private IP	EIP	AZ	CPU Arc...	Expires	Creator	MAC Add...	Operation
ecs-temp1	Running	2 vCPUs 4 GB	zhangsan	192.168.123.8	--	hcs811	X86/Intel	Never	zhangsan	fa:16:3e:7...	Remote Login

3.2.2 Applying for an ECS Using the Default Template

Step 1 Click **Service List** and choose **Elastic Cloud Server**. On the displayed page, click **Apply for ECS** in the upper right corner. Select **ECS** and click **Apply Now**.



The screenshot shows the HUAWEI CLOUD Stack Service List interface. The left sidebar has a 'Service List' icon and a 'Cloud Domain Name Service' entry. The main area has 'Region' set to 'hangzhou' and 'Resource Set' set to 'zj-hz-1_zhangsan'. A search bar says 'Enter a name to search for a service.' Below it, under 'Basic cloud services', there are two columns: 'Computing' (Service_154c, Image Management Service, Cloud Container Engine, Auto Scaling) and 'Storage' (Cloud Server Backup Service, Volume Backup Service, Elastic Volume Service, Object Storage Service 3.0). The 'Elastic Cloud Server' option is highlighted with a red border. A separate 'Select Service' window is shown below, featuring an ECS icon, a description of ECS as providing scalable virtual compute servers, and a large red 'Apply Now' button.

Step 2 Configure the ECS flavor, image, and system disk type, retain the default values for other parameters, and click **Next**.

Elastic Cloud Server

Configure Basic Settings Configure Network Configure Advanced Settings

AZ: hcs811

Creation Method: New Create from Template

ECS Type: General-purpose

vCPUs	Memory	Flavor	Search
2 vCPUs	4 GB	2vCPUs 4 GB	Intel
gzy	2vCPUs 4 GB	Intel	
2C4G	2vCPUs 4 GB	Intel	
zhangsan	2vCPUs 4 GB	Intel	

Boot Mode: BIOS

Image Type: Public Image

Image: EulerOS zhangsan(40GB)

The selected image is a static injection image, and a static injection drive will be generated.
If a new image is needed, contact the administrator to create, upload, and register the image on Service OM. Click [here](#) to view detailed operations.

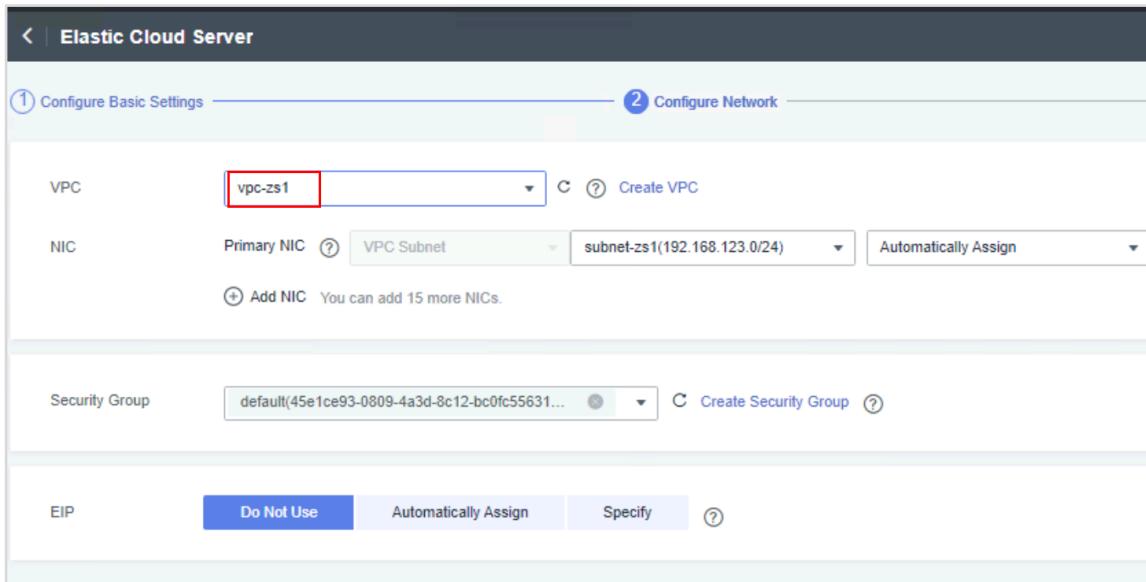
Same Storage: No

System Disk: zhangsan (40 GB)

Add Data Disk: You can add 59 more EVS disks in total: up to 59 more SCSI disks and 23 more VBD disks.

Quantity: 1

Step 3 Select the created VPC, retain the default values for other parameters, and click **Next**.



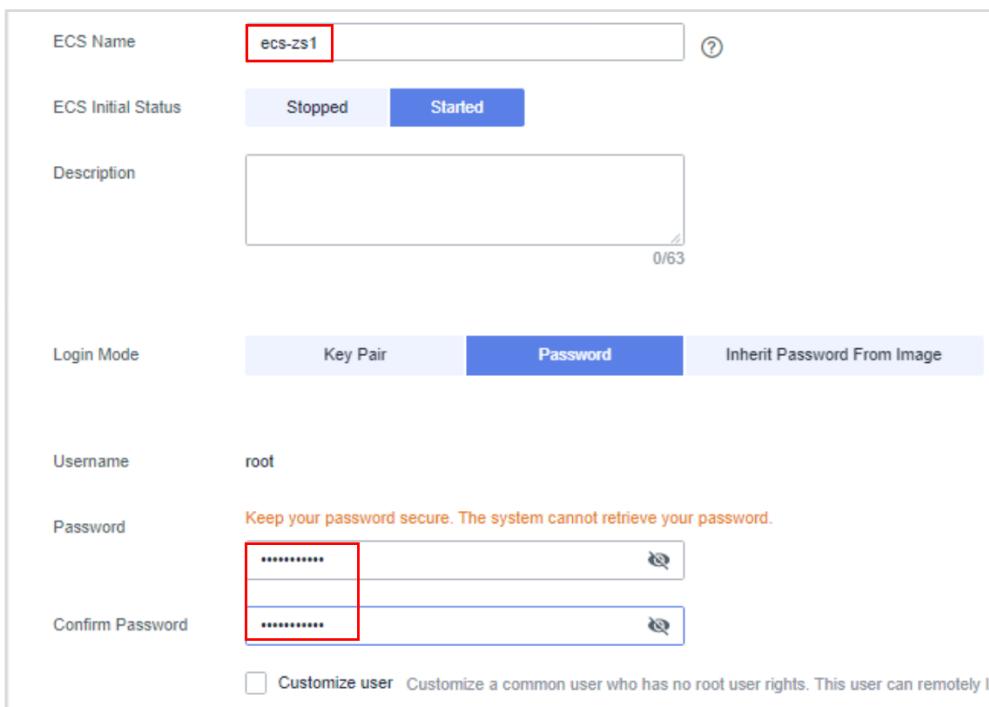
① Configure Basic Settings ② Configure Network

VPC: vpc-zs1 (highlighted with a red box)

NIC: Primary NIC: VPC Subnet (subnet-zs1(192.168.123.0/24))

EIP: Do Not Use

Step 4 Configure **ECS Name**, **Password**, and **Confirm Password**, and click **Next**.



ECS Name: ecs-zs1

ECS Initial Status: Started

Description: (empty)

Login Mode: Password

Username: root

Password: ***** (highlighted with a red box)

Confirm Password: ***** (highlighted with a red box)

Keep your password secure. The system cannot retrieve your password.

Customize user

Step 5 After confirming the configuration, click **Apply Now** to confirm that the new ECS has been created.

Elastic Cloud Server

Configure Basic Settings Configure Network Configure Advanced Settings Confirm

Configuration	Basic
Region	hangzhou(zj-ho-1,zhangsan)
Image	zhangsan
AZ	hcs811
System Disk	zhangsan,40 GB
Flavor	zhangsan 2 vCPUs 4 GB Intel
Quantity	1

Network	Advanced
VPC	vpc-zs1
EIP	Not required
Primary NIC	subnet-zs1(192.168.123.0/24)
Security Group	default45e1ce93-0809-4a3d-8c12-bc0fc556316f

ECS Name	ecs-zs1	Login Mode	Password
----------	---------	------------	----------

Previous Add to Cart Apply Now

Elastic Cloud Server

You are advised to install the password resetting plug-in so that you can conveniently reset the password if required. To determine whether to install the plug-in and obtain the address and method for downloading the plug-in, click here.

Export Tags Management Operation ▾ All statuses Name zs1

Name	Status	Flavor	Image	Private I...	EIP	AZ	CPU Arc...	Expires
ecs-zs1	Running	2 vCPUs 4 GB	zhangsan	192.168.123.2	10.200.16...	hcs811	X86/Intel	Never

3.2.3 Managing ECSs

3.2.3.1 Changing a Flavor

- Step 1** On the ECS overview page of ManageOne Operation Portal, view and take a note of an ECS flavor. Locate the row that contains the target ECS, click **More** in the **Operation** column, and choose **Change Settings > Change Flavor**.

Elastic Cloud Server

You are advised to install the password resetting plug-in so that you can conveniently reset the password if required. To determine whether to install the plug-in and obtain the address and method for downloading the plug-in, click here.

Export Tags Management Operation ▾ All statuses Name zs1 X Q Search by Tag C E O

Name	Status	Flavor	Image	Private I...	EIP	AZ	CPU Arc...	Expires	Creator	MAC Add...	Operation
ecs-zs1	Running	2 vCPUs 4 GB	zhangsan	192.168.123.2	10.200.16...	hcs811	X86/Intel	Never	zhangsan	fa:16:3e:d...	Remote Login More ▾

20 Total Records: 1 < >

Reset Password Change Flavor Watchdog HA Add/Edit Tag Agency

◀ Change Status ▲ Change Settings ▲ Disk ▲ NIC ▲ Clone ▲ Apply for Snapshot ▲ OS and Image ▲ CD-ROM Drive And ISO

- Step 2** Select another flavor and click **Yes**. (If there is no other flavor, create a flavor by referring to section 1.2.1.)

Change Flavor

Current Flavor: General-purpose | 2 vCPUs | 4 GB (zhangsan) | Intel

* Change Method: Online Offline ?
The ECS must restart for the flavor change to take effect, which will interrupt services.

* ECS Type: General-purpose

vCPUs	All	Memory	All	vCPUs/Memory	CPU Vendor
<input checked="" type="radio"/>	Flavor_win123	2vCPUs 8 GB			Intel
<input type="radio"/>	csjc_ykg	2vCPUs 4 GB			Intel
<input type="radio"/>	gzy	2vCPUs 4 GB			Intel

Price: \$0.0 USD/Hour

Step 3 Verify that the flavor is successfully changed.

<input type="checkbox"/>	Name	Status	Flavor	Image
<input type="checkbox"/>	ecs-zs1	Running	2 vCPUs 8 GB	zhangsan

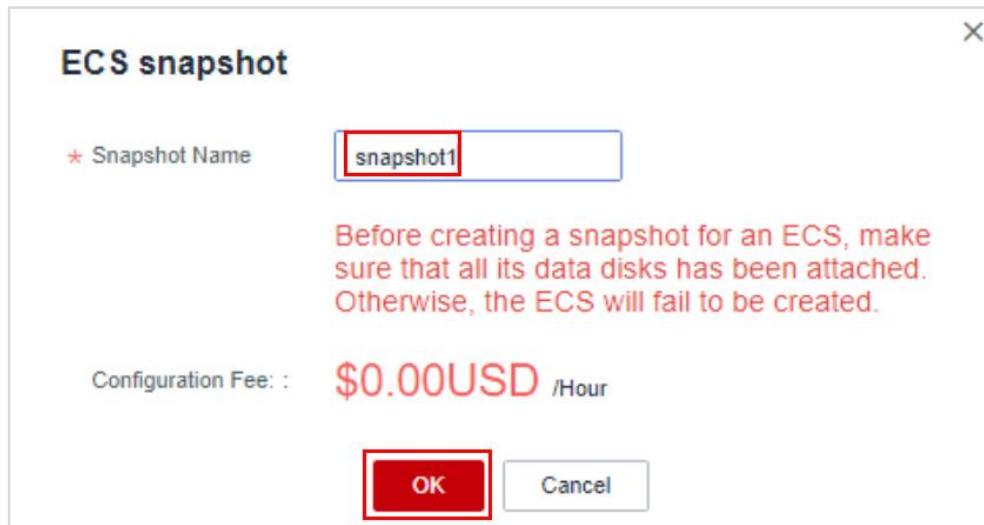
3.2.3.2 Creating and Rolling Back an ECS Snapshot

Step 1 Click the target ECS name **ecs-temp1**. On the page displayed, click the **ECS Snapshot** tab and click **Apply for Snapshot**.

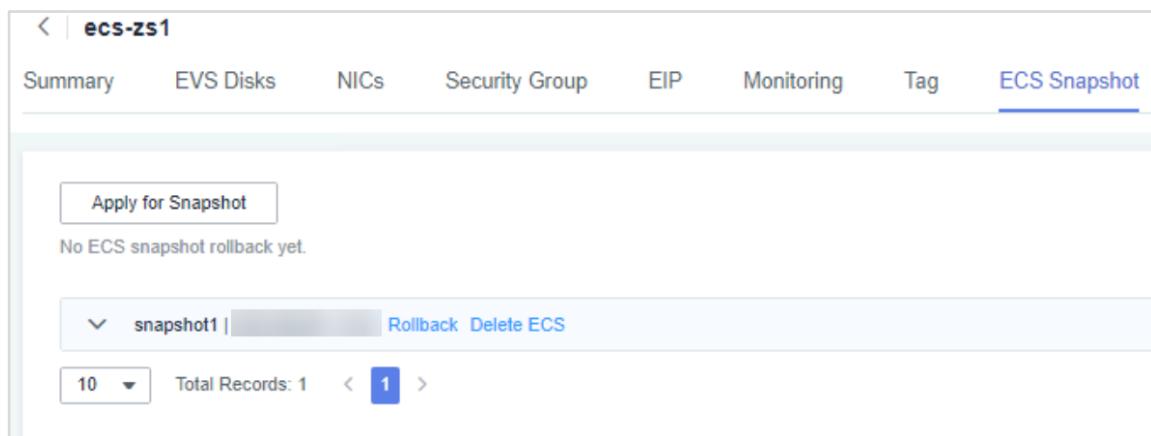
< **ecs-zs1**

Summary	EVS Disks	NICs	Security Group	EIP	Monitoring	Tag	ECS Snapshot	CD-ROM Drive	ECS Group
<input type="button" value="Apply for Snapshot"/>	No ECS snapshot rollback yet.								
10	Total Records: 0	<	1	>					

Step 2 In the displayed dialog box, enter the snapshot name, for example, **snapshot1**, and click **OK**.



- Step 3 Wait until the snapshot is created. If the information shown in the following figure is displayed, the snapshot is created successfully.



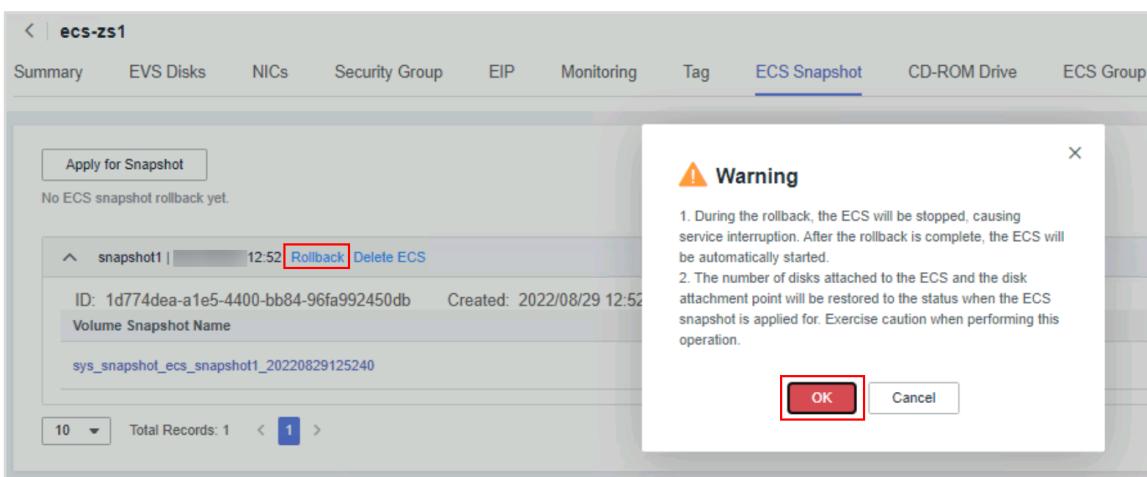
- Step 4 Click **Remote Login** in the upper right corner of the page to remotely log in to the ECS as the **root** user and run the **ls** command. The command output shows that no file exist in the current directory.

```
Authorized users only. All activities may be monitored and reported.  
Hint: Caps Lock on  
  
ecs-temp1 login: root  
Password:  
Last login: Thu May 19 02:57:10 on tty1  
  
Welcome to Huawei Cloud Service  
[root@ecs-temp1 ~]# ls  
[root@ecs-temp1 ~]# _
```

- Step 5 Create a file directory.

```
Authorized users only. All activities may be monitored and reported.  
Hint: Caps Lock on  
  
ecs-temp1 login: root  
Password:  
Last login: Thu May 19 02:57:10 on tty1  
  
        Welcome to Huawei Cloud Service  
  
[root@ecs-temp1 ~]# ls  
[root@ecs-temp1 ~]# mkdir zs  
[root@ecs-temp1 ~]# ls  
zs  
[root@ecs-temp1 ~]# -
```

- Step 6 Return to the **ECS Snapshot** tab page, click **Rollback** in the row where the created snapshot is located, and click **OK**.



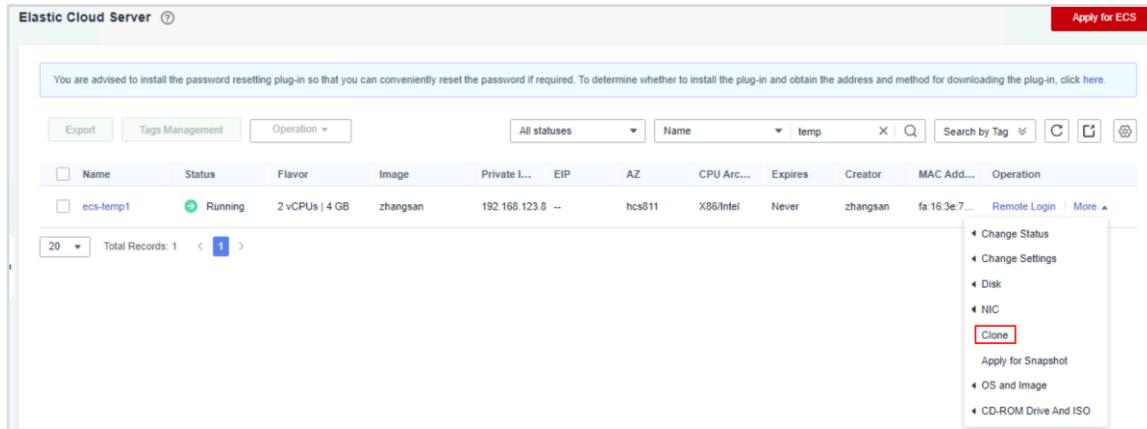
- Step 7 Return to the ECS list and check the ECS status during the snapshot rollback. Wait until the status changes to **Running**. Click **Remote Login** in the row that contains the ECS to log in to the ECS, and run the **ls** command to check whether the snapshot rollback is successful.

```
Authorized users only. All activities may be monitored and reported.  
ecs-temp1 login: root  
Password:  
Last login: Thu May 19 02:57:10 on tty1  
  
        Welcome to Huawei Cloud Service  
  
[root@ecs-temp1 ~]# ls  
[root@ecs-temp1 ~]# -
```

If no newly created directories exist, the ECS snapshot rollback is successful.

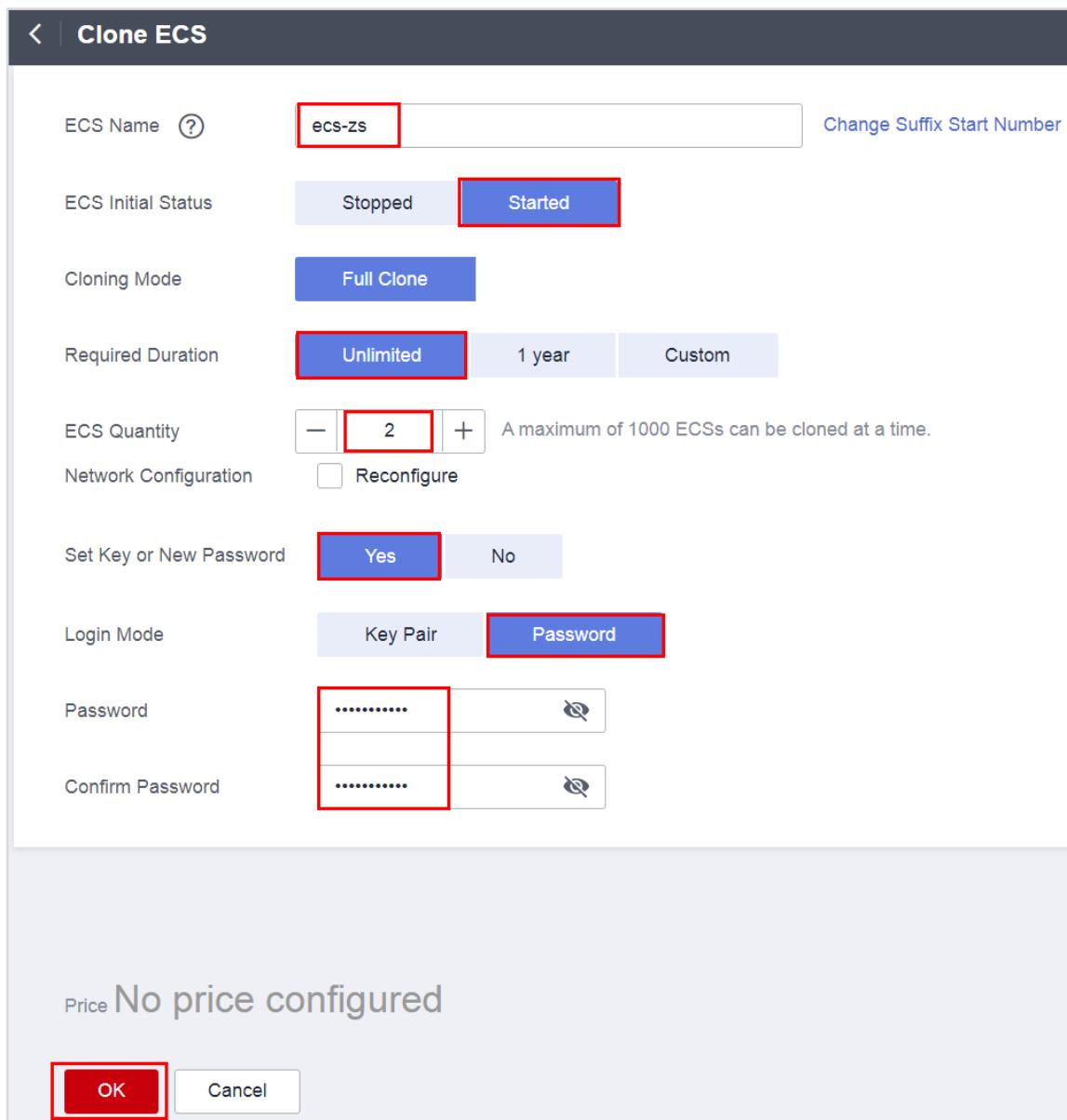
3.2.3.3 Cloning ECSs in Batches

- Step 1 Return to the ECS list, locate the row that contains the ECS **ecs-temp1**, click **More** in the **Operation** column, and choose **Clone**.



The screenshot shows the HUAWEI CLOUD management console for Elastic Cloud Server. A single instance named 'ecs-temp1' is listed, showing it is running with 2 vCPUs and 4 GB of memory. The context menu on the right is expanded, and the 'Clone' option is highlighted with a red box.

Step 2 In the displayed **Clone ECS** dialog box, set parameters as required and click **OK**.



The 'Clone ECS' dialog box contains the following settings:

- ECS Name: ecs-zs
- ECS Initial Status: Started
- Cloning Mode: Full Clone
- Required Duration: Unlimited
- ECS Quantity: 2
- Set Key or New Password: Yes
- Login Mode: Password
- Password and Confirm Password fields are filled with masked text.

At the bottom, there are 'OK' and 'Cancel' buttons, with 'OK' highlighted with a red box.

- Step 3** Observe the status of the three ECSs during the cloning process. If the status changes to **Running**, the cloning is complete.

<input type="checkbox"/>	Name	Status	Flavor	Image	Private I...	EIP	AZ
<input type="checkbox"/>	ecs-vpc2-2	Running	2 vCPUs 4 GB	zhangsan	192.168.122.2	--	hcs811
<input type="checkbox"/>	ecs-vpn	Running	2 vCPUs 4 GB	zhangsan	192.168.100.1	10.200.1...	hcs811
<input type="checkbox"/>	ecs-VPC2	Running	2 vCPUs 4 GB	zhangsan	192.168.121.2	--	hcs811
<input type="checkbox"/>	ecs_linux01	Running	2 vCPUs 4 GB	zhangsan	192.168.123.1	--	hcs811
<input type="checkbox"/>	ecs-zs-0001	Running	2 vCPUs 4 GB	zhangsan	192.168.123.1	--	hcs811
<input type="checkbox"/>	ecs-zs-0002	Running	2 vCPUs 4 GB	zhangsan	192.168.123.1	--	hcs811
<input type="checkbox"/>	ecs-zs1	Running	2 vCPUs 8 GB	zhangsan	192.168.123.2	10.200.1...	hcs811
<input type="checkbox"/>	ecs-temp1	Running	2 vCPUs 4 GB	zhangsan	192.168.123.8	--	hcs811

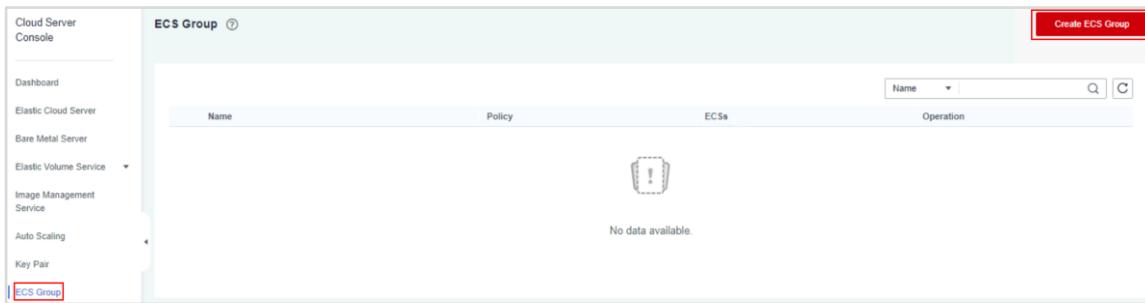
3.2.3.4 Creating an ECS Group

- Step 1** Log in to Service OM through ManageOne Maintenance Portal, choose **Services > Resource > Compute Resource**, click the **VMs** tab, and view the host where the cloned ECSs are running.

Compute Resource							
Summary		Configuration		Host Groups		Hosts	
Start		Stop		More		VMs	
<input type="checkbox"/>	Name	Host ID		Host Gr...	Availabi...	Status	Power ...
<input type="checkbox"/>	ecs-zs	4F5C3409-E268-F2A9-EB11-288200D282AE		kvm_gro...	az0.dc0	Running	Running
<input type="checkbox"/>	ecs-zs-0001	69603409-E268-E588-EB11-2982ACACED16		kvm_gro...	az0.dc0	Running	Running
<input type="checkbox"/>	ecs-zs-0002	D2460E2D-DC48-8F9C-EB11-6B279E557C83		KVM_M...	az0.dc0	Running	Running
<input type="checkbox"/>	ecs-zs1	D2460E2D-DC48-8F9C-EB11-6B279E557C83		KVM_M...	az0.dc0	Running	Running

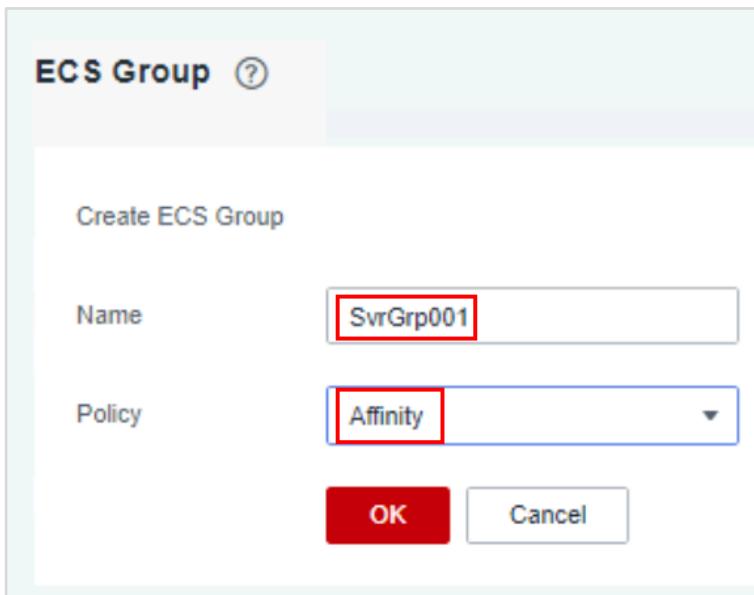
As shown in the preceding figure, the two ECSs are running on different hosts (the two ECSs may also run on the same host). In this scenario, if you want two ECSs to run on the same host, create an ECS group on ManageOne Operation Portal and configure the affinity policy.

- Step 2** Return to the **Cloud Server Console** page on ManageOne Operation Portal, choose **ECS Group** in the navigation pane on the left. On the page displayed, click **Create ECS Group** in the upper right corner.



The screenshot shows the Cloud Server Console interface. On the left, there's a sidebar with options like Dashboard, Elastic Cloud Server, Bare Metal Server, etc., and 'ECS Group' is highlighted with a red box. The main area is titled 'ECS Group' and shows a table with columns 'Name', 'Policy', 'ECSs', and 'Operation'. A message 'No data available.' is displayed. In the top right, there's a search bar and a 'Create ECS Group' button.

- Step 3 In the displayed **Create ECS Group** dialog box, enter the ECS group name, for example, **SvrGrp001**, set **Policy** to **Affinity**, and click **OK**.



[Question] In this scenario, if two ECSs are running on the same host and the two ECSs work in active/standby mode, how do I configure the ECS group policy to ensure high reliability?

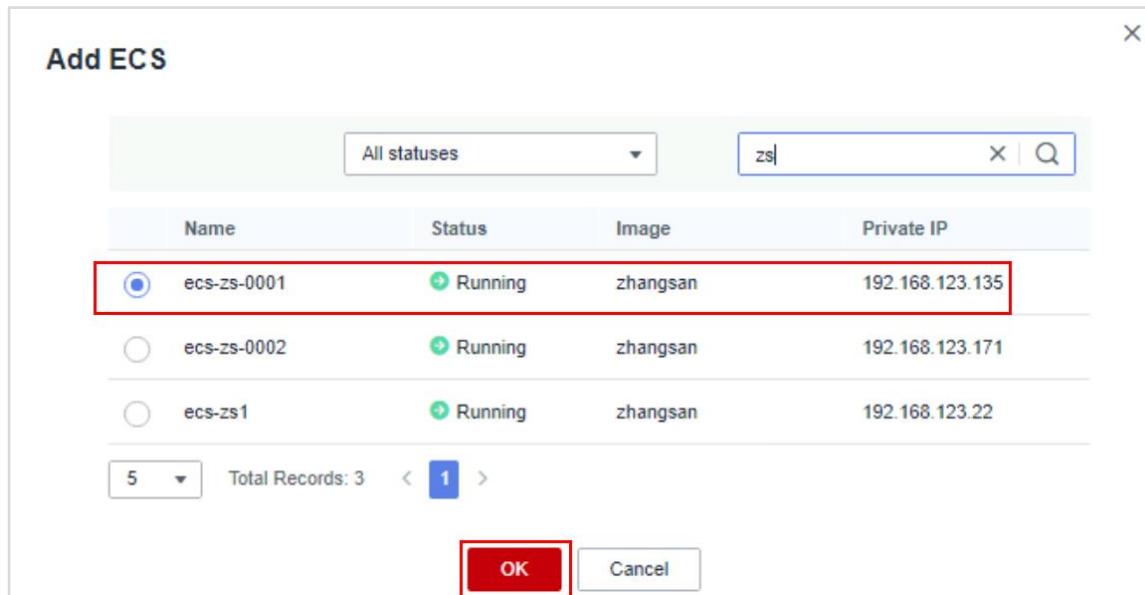
[Answer] Two ECSs are deployed in active/standby mode. To ensure high service reliability, the active and standby ECSs must run on two hosts, respectively. In this case, the policy of the ECS group must be set to **Anti-affinity**.

- Step 4 Return to the ECS group list, and click **Adding an ECS** in the **Operation** column of the newly created ECS group.

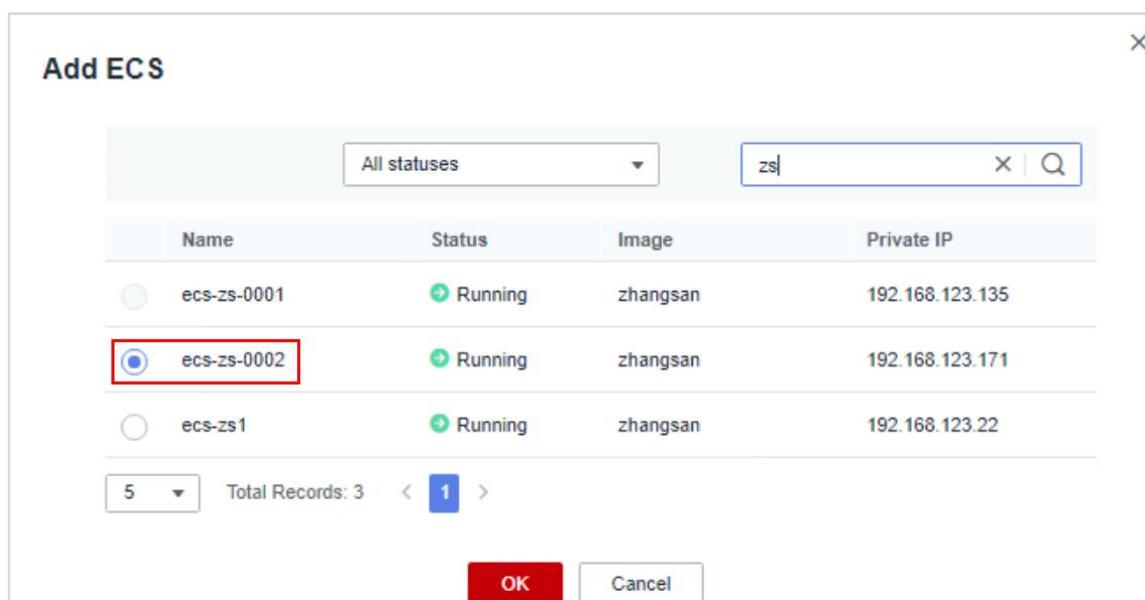


The screenshot shows the 'ECS Group' list again. The table has columns 'Name', 'Policy', 'ECSs', and 'Operation'. A single row is visible for 'SvrGrp001' with 'Affinity' in the Policy column and '0' in the ECSs column. In the 'Operation' column, there's a link 'Adding an ECS' which is highlighted with a red box.

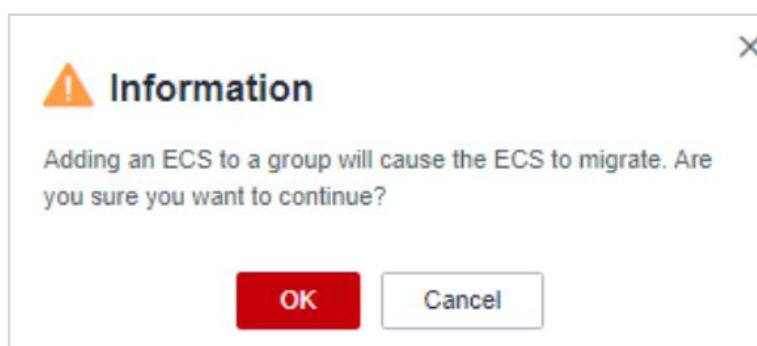
- Step 5 In the displayed **Add ECS** dialog box, select a cloned ECS from the ECS list, and click **OK**.



Step 6 Repeat Step 4 and Step 5 to add the other cloned ECS to the ECS group.



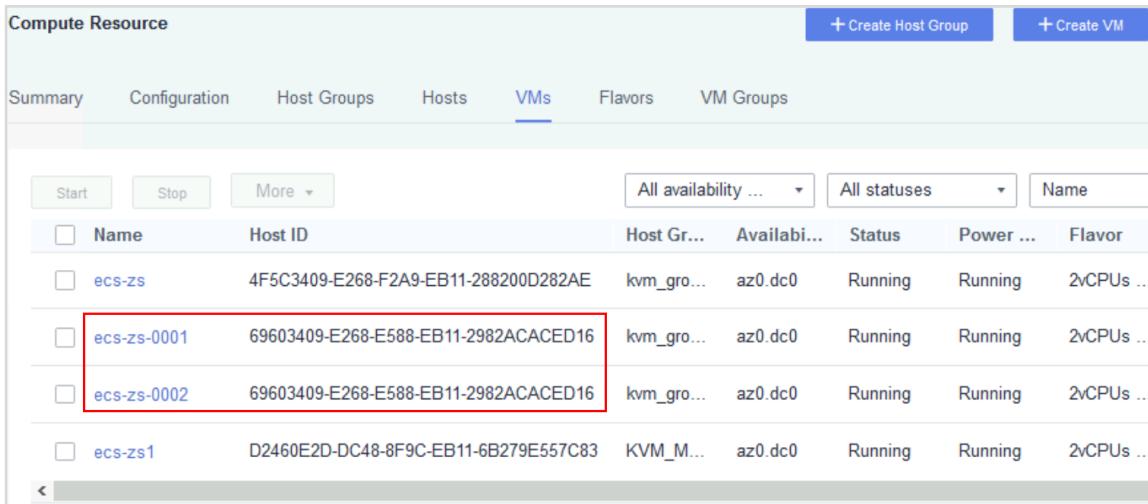
Step 7 In the displayed dialog box, click OK.



Step 8 Return to the ECS group list and view the group status.

Name	Policy	Policy Status	VMs	Operation
SvrGrp001	Affinity	Normal		Delete

Step 9 Return to the VM list on Service OM and view the hosts where the two ECSs added to the ECS group are running.



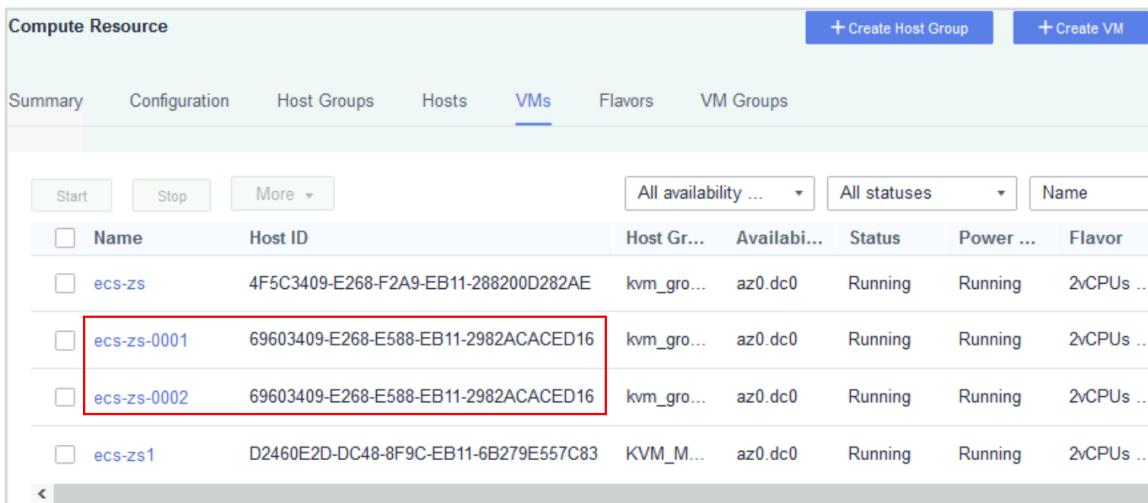
The screenshot shows the 'Compute Resource' interface with the 'VMs' tab selected. The table lists several VMs, including 'ecs-zs', 'ecs-zs-0001', 'ecs-zs-0002', and 'ecs-zs1'. The rows for 'ecs-zs-0001' and 'ecs-zs-0002' are highlighted with a red box, indicating they are running on the same host. The host ID for both is 69603409-E268-E588-EB11-2982ACACED16.

Name	Host ID	Host Gr...	Availabi...	Status	Power ...	Flavor
ecs-zs	4F5C3409-E268-F2A9-EB11-288200D282AE	kvm_gro...	az0.dc0	Running	Running	2vCPUs ...
ecs-zs-0001	69603409-E268-E588-EB11-2982ACACED16	kvm_gro...	az0.dc0	Running	Running	2vCPUs ...
ecs-zs-0002	69603409-E268-E588-EB11-2982ACACED16	kvm_gro...	az0.dc0	Running	Running	2vCPUs ...
ecs-zs1	D2460E2D-DC48-8F9C-EB11-6B279E557C83	KVM_M...	az0.dc0	Running	Running	2vCPUs ...

As shown in the figure, the two ECSs are running on the same host.

3.2.3.5 Configuring Resource Release upon ECS Shutdown

Step 1 In the VM list on Service OM, record the ID of the host where the ECSs are running.



This screenshot is identical to the one above, showing the 'Compute Resource' interface with the 'VMs' tab selected. It lists the same VMs and highlights the same two ECS instances ('ecs-zs-0001' and 'ecs-zs-0002') running on the same host with ID 69603409-E268-E588-EB11-2982ACACED16.

Name	Host ID	Host Gr...	Availabi...	Status	Power ...	Flavor
ecs-zs	4F5C3409-E268-F2A9-EB11-288200D282AE	kvm_gro...	az0.dc0	Running	Running	2vCPUs ...
ecs-zs-0001	69603409-E268-E588-EB11-2982ACACED16	kvm_gro...	az0.dc0	Running	Running	2vCPUs ...
ecs-zs-0002	69603409-E268-E588-EB11-2982ACACED16	kvm_gro...	az0.dc0	Running	Running	2vCPUs ...
ecs-zs1	D2460E2D-DC48-8F9C-EB11-6B279E557C83	KVM_M...	az0.dc0	Running	Running	2vCPUs ...

Step 2 After the **Summary** page of the host is displayed, take a note of the vCPU and memory usage of the host.

Compute Resource										
+ Create Host Group + Create VM + Create Flavor										
Summary Configuration Host Groups Hosts VMs Flavors VM Groups										
All availability zones All service status All isolation status All host groups All vendors Name 09										
Host Name	Host ID	Status	Serv...	Host...	Avai...	Man...	Used/Total vCPUs	Allocated/Total Memory (GB)	Alloc...	
Controller09	8184ED33-2594-69BC-...	● A...	● A...	man...	man...	10.2...	<div style="width: 230px; height: 10px; background-color: #3399FF;"></div> 230/252	<div style="width: 529.88px; height: 10px; background-color: #3399FF;"></div> 529.88/681.31	<div style="width: 100px; height: 10px; background-color: #3399FF;"></div>	
Compute09	69603409-E268-E588-...	● A...	● A...	kvm...	az0...	10.2...	<div style="width: 56px; height: 10px; background-color: #3399FF;"></div> 56/258	<div style="width: 287.55px; height: 10px; background-color: #3399FF;"></div> 287.55/486.27	<div style="width: 100px; height: 10px; background-color: #3399FF;"></div>	

In the navigation pane on the left, click the name of the host group to which the VM belongs, and click the **Configuration** tab. Select a custom tag and click **Editing Customized Tag** on the right.

Compute Resource

- [Compute Resource
- [Availability Zones
- [az2.dc1
- [az0.dc0
- [kvm_group02 C
- [kvm_group01

kvm_group02(Host Group)

Summary	 Configuration	Hosts	GPU	VMs
Basic Settings				
Name	kvm_group02			
Virtualization Type	KVM			

Custom Tag		
Tag Name	Tag Value	Tag operation
cpu_allocation_ratio	3.0	Delete
stopped_release_delay	60	Delete
enable_stopped_release_resource	True	Delete

5 Total Records: 3 < 1 >

Step 3 Add the following tags to the tag list to enable the function of releasing resources upon ECS shutdown and set the waiting time for releasing resources to 60s (you can click **Adding Customized Tag** to add multiple tags):

enable_stopped_release_resource: True

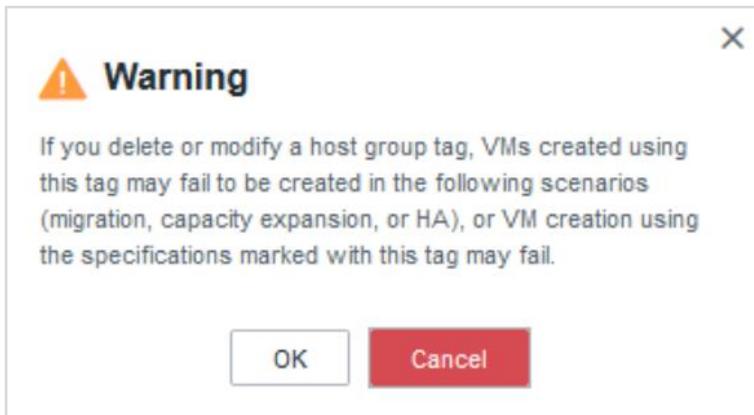
stopped_release_delay: 60

Custom Tag

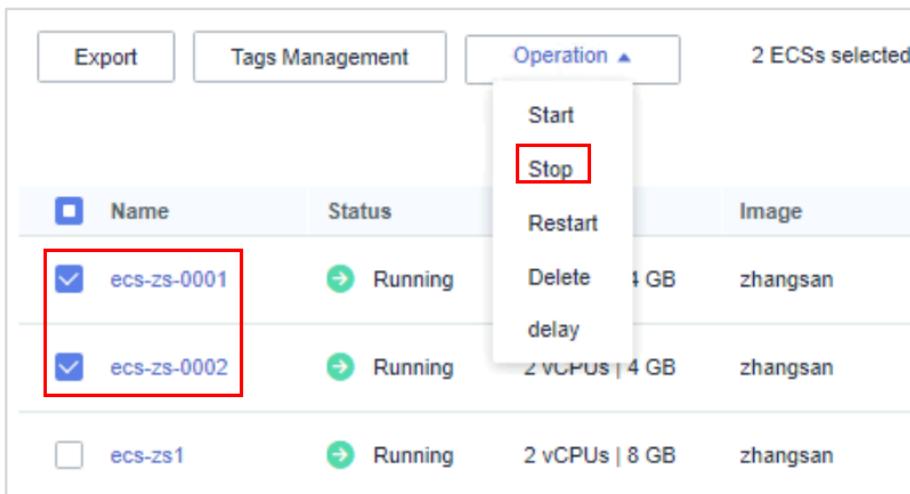
 Adding Customized Tag			
Tag Name	Tag Value	Tag Description	Tag operation
cpu_allocation_ratio	3.0	CPU overcommitment ratio (optional sett...)	Delete
stopped_release_delay	60	Resource release delay upon VM shutdo... Delete	Delete
enable_stopped_release_resource	True	Enables or disables resource release up... Delete	Delete

OK
[Cancel](#)

Step 4 Click **OK**. In the displayed dialog box, click **OK**.



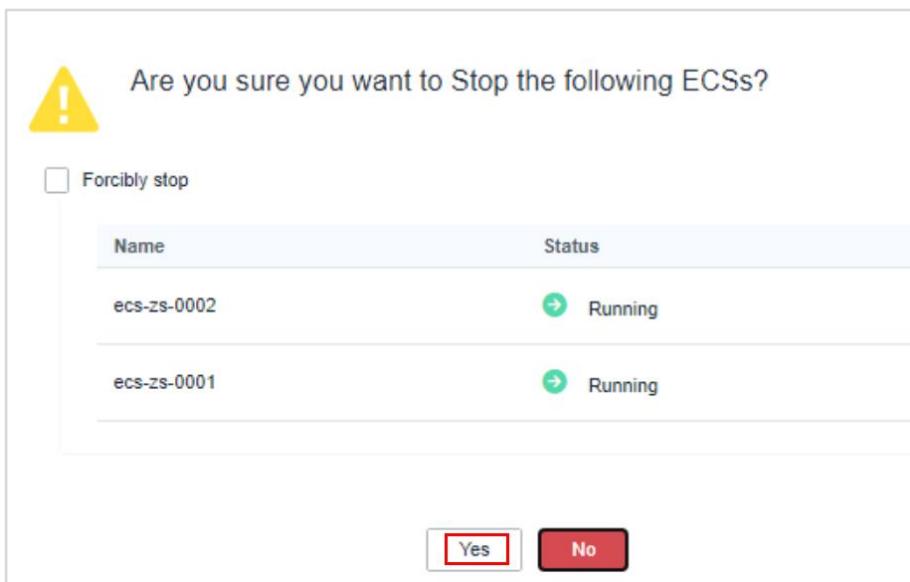
Step 5 Return to the ECS list on ManageOne Operation Portal, select the two cloned ECSs, and stop them.



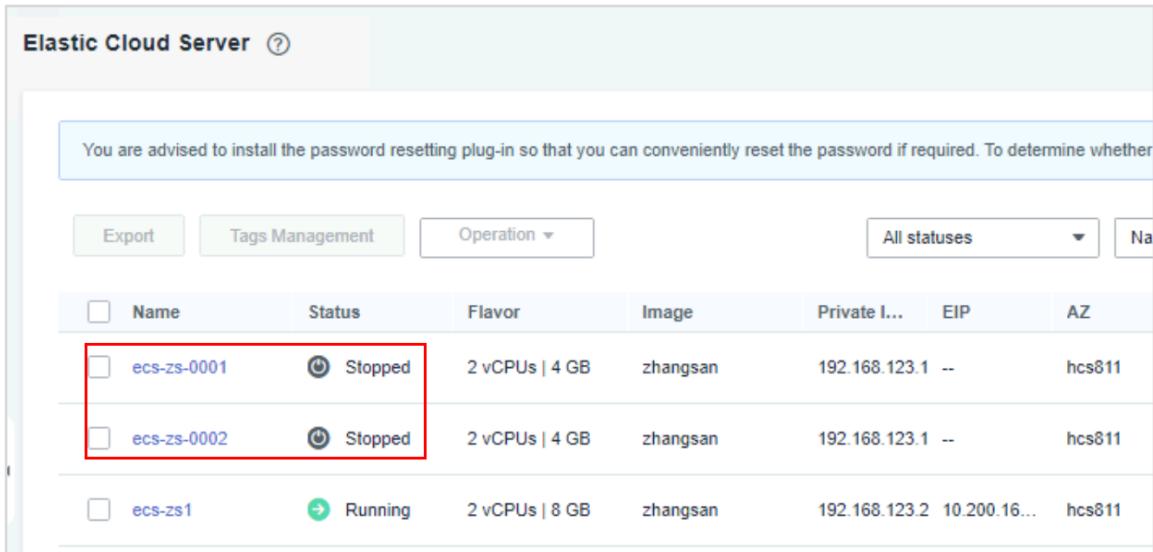
The screenshot shows the ManageOne Operation Portal interface for managing ECS instances. The top navigation bar includes "Export", "Tags Management", and "Operation". A dropdown menu under "Operation" shows options: Start, Stop (which is highlighted with a red box), Restart, Delete, delay, and Image. Below this, a table lists three ECS instances:

Name	Status	Image
ecs-zs-0001	Running	zhangsan
ecs-zs-0002	Running	zhangsan
ecs-zs1	Running	2 vCPUs 8 GB

Step 6 In the displayed dialog box, click **Yes**.



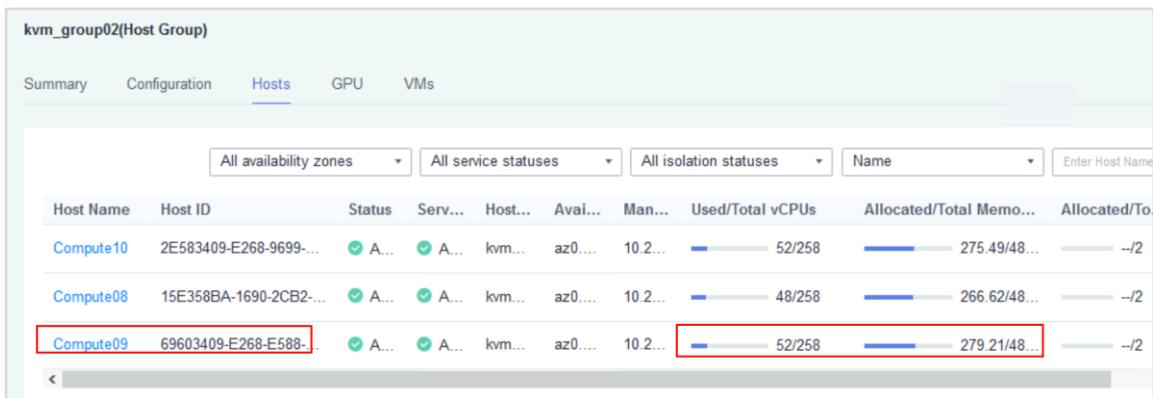
- Step 7 Wait until the ECSs are in the **Stopped** state and take a note of the information about the vCPUs and memory of the ECSs.



The screenshot shows the 'Elastic Cloud Server' interface. At the top, there is a message: 'You are advised to install the password resetting plug-in so that you can conveniently reset the password if required. To determine whether'. Below this are several buttons: 'Export', 'Tags Management', 'Operation', 'All statuses' (with a dropdown arrow), and 'Name' (with a dropdown arrow). The main area is a table with the following columns: Name, Status, Flavor, Image, Private IP, EIP, and AZ. There are three rows:

Name	Status	Flavor	Image	Private IP	EIP	AZ
ecs-zs-0001	Stopped	2 vCPUs 4 GB	zhangsan	192.168.123.1	--	hcs811
ecs-zs-0002	Stopped	2 vCPUs 4 GB	zhangsan	192.168.123.1	--	hcs811
ecs-zs1	Running	2 vCPUs 8 GB	zhangsan	192.168.123.2	10.200.16...	hcs811

- Step 8 Return to Service OM, view the vCPU and memory usage of the host again, and check whether the ECS resources have been released. (After the ECSs are stopped, wait for 60 seconds and refresh the page.)



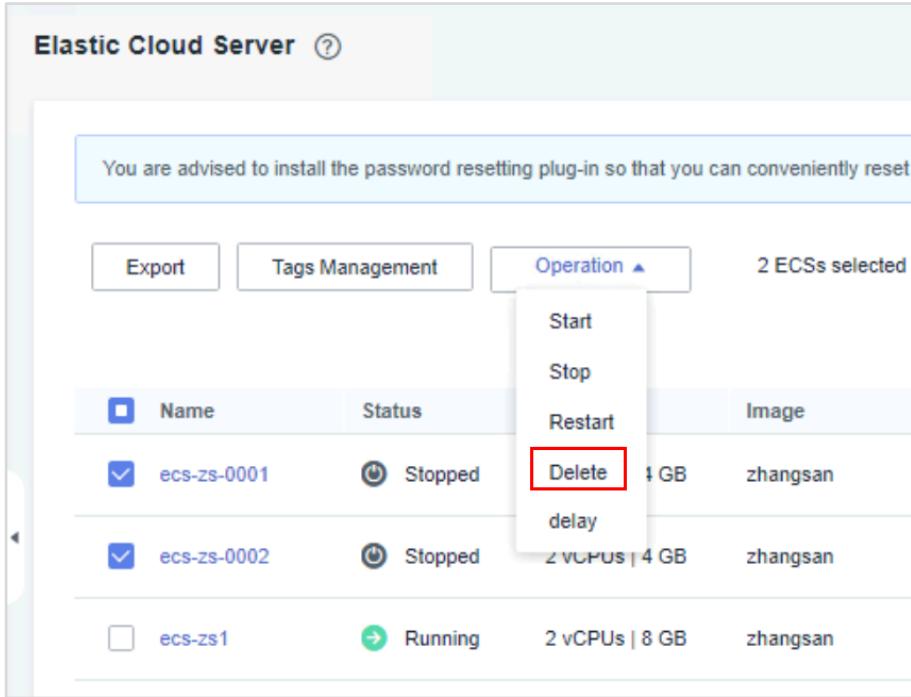
The screenshot shows the 'kvm_group02(Host Group)' interface in Service OM. At the top, there are tabs: 'Summary', 'Configuration', 'Hosts' (which is selected), 'GPU', and 'VMs'. Below this are several dropdown filters: 'All availability zones', 'All service statuses', 'All isolation statuses', 'Name', and 'Enter Host Name'. The main table has columns: Host Name, Host ID, Status, Serv..., Host..., Aval..., Man..., Used/Total vCPUs, Allocated/Total Memo..., and Allocated/To... . There are three hosts listed:

Host Name	Host ID	Status	Serv...	Host...	Aval...	Man...	Used/Total vCPUs	Allocated/Total Memo...	Allocated/To...
Compute10	2E583409-E268-9699...	✓ A...	✓ A...	kvm...	az0....	10.2...	52/258	275.49/48...	-/2
Compute08	15E358BA-1690-2CB2...	✓ A...	✓ A...	kvm...	az0....	10.2...	48/258	266.62/48...	-/2
Compute09	69603409-E268-E588...	✓ A...	✓ A...	kvm...	az0....	10.2...	52/258	279.21/48...	-/2

As shown in the preceding figure, the vCPUs and memory of ECSs **ecs-zs-0001** and **ecs-zs-0002** have been released.

3.2.3.6 Deleting and Restoring ECSs

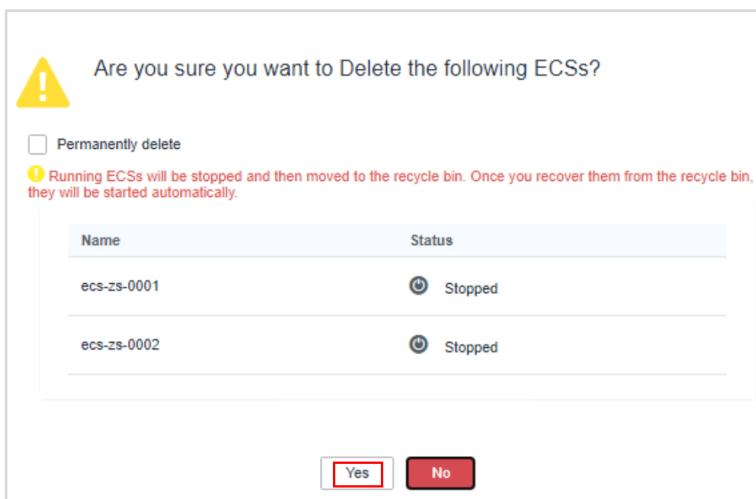
- Step 1 In the ECS list, select the ECSs to be deleted, click **Operation**, and choose **Delete**.



The screenshot shows the 'Elastic Cloud Server' interface. At the top, there are buttons for 'Export' and 'Tags Management'. A message box says: 'You are advised to install the password resetting plug-in so that you can conveniently reset...'. Below this, there is an 'Operation' dropdown menu with options: Start, Stop, Restart, Delete, delay, and Image. The 'Delete' option is highlighted with a red box. A status bar at the top right indicates '2 ECSS selected'. The main table lists three ECS instances:

Name	Status	Image
ecs-zs-0001	Stopped	delay z vCPUs 4 GB zhangsan
ecs-zs-0002	Stopped	delay z vCPUs 4 GB zhangsan
ecs-zs1	Running	2 vCPUs 8 GB zhangsan

Step 2 In the displayed dialog box, click Yes.

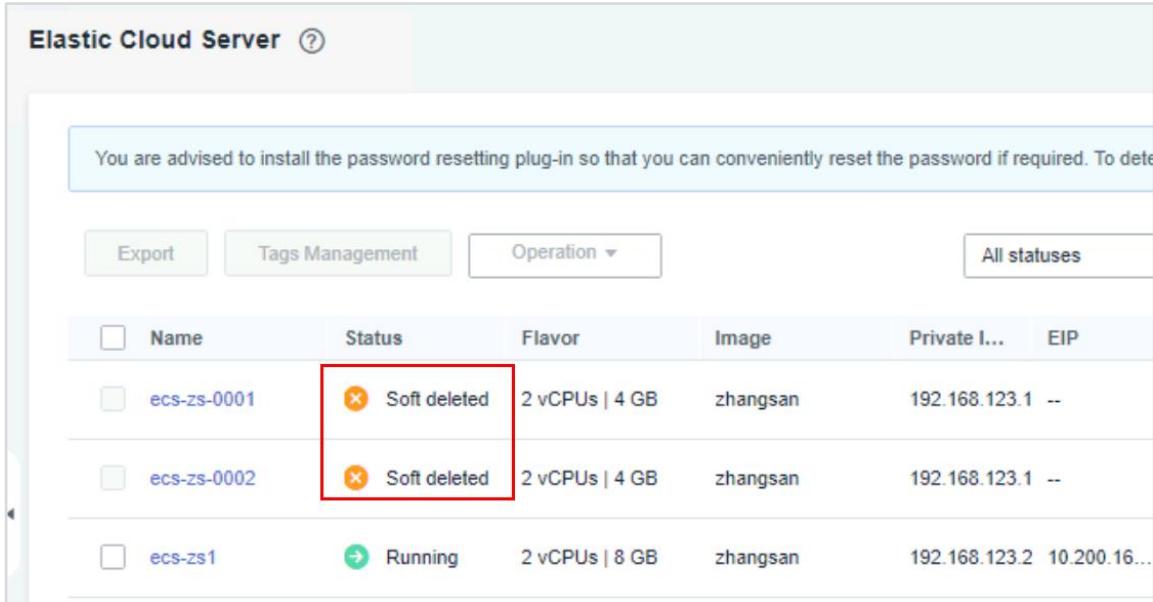


The dialog box contains a yellow warning icon and the text: 'Are you sure you want to Delete the following ECSS?'. It includes a checkbox for 'Permanently delete' and a note: 'Running ECSSs will be stopped and then moved to the recycle bin. Once you recover them from the recycle bin, they will be started automatically.' The table below shows the selected ECSs:

Name	Status
ecs-zs-0001	Stopped
ecs-zs-0002	Stopped

At the bottom are 'Yes' and 'No' buttons, with 'Yes' highlighted with a red box.

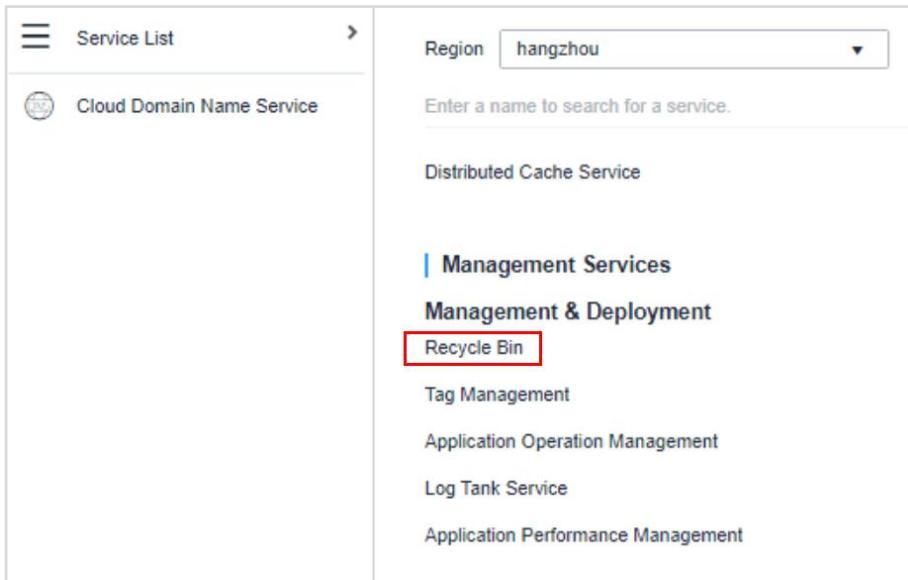
Step 3 Check the status of the ECSS after they are deleted.



The screenshot shows a list of three Elastic Cloud Servers. The first two entries are highlighted with a red box around their status column, which displays "Soft deleted". The third entry is "Running".

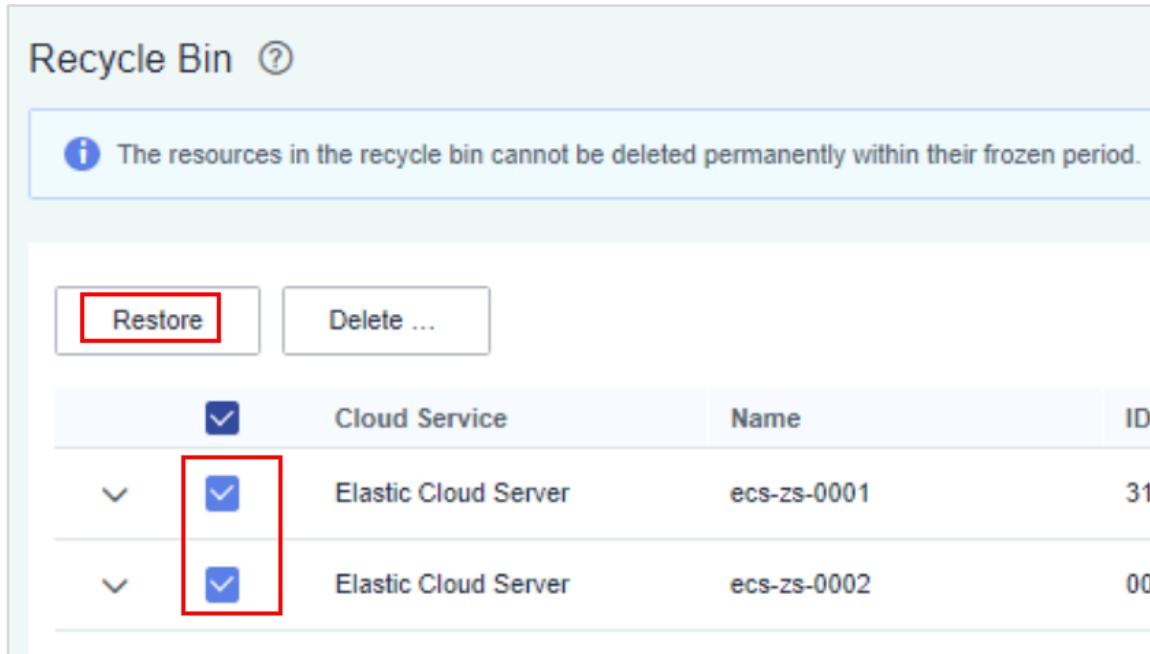
Name	Status	Flavor	Image	Private IP	EIP
ecs-zs-0001	Soft deleted	2 vCPUs 4 GB	zhangsan	192.168.123.1	--
ecs-zs-0002	Soft deleted	2 vCPUs 4 GB	zhangsan	192.168.123.1	--
ecs-zs1	Running	2 vCPUs 8 GB	zhangsan	192.168.123.2	10.200.16...

Step 4 Choose Service List > Recycle Bin.



The screenshot shows the "Service List" interface. On the left, there's a sidebar with "Service List" and a list of services: "Cloud Domain Name Service", "Distributed Cache Service", "Management Services", "Management & Deployment", "Recycle Bin" (which is highlighted with a red box), "Tag Management", "Application Operation Management", "Log Tank Service", and "Application Performance Management". On the right, there's a search bar with "hangzhou" selected in the "Region" dropdown.

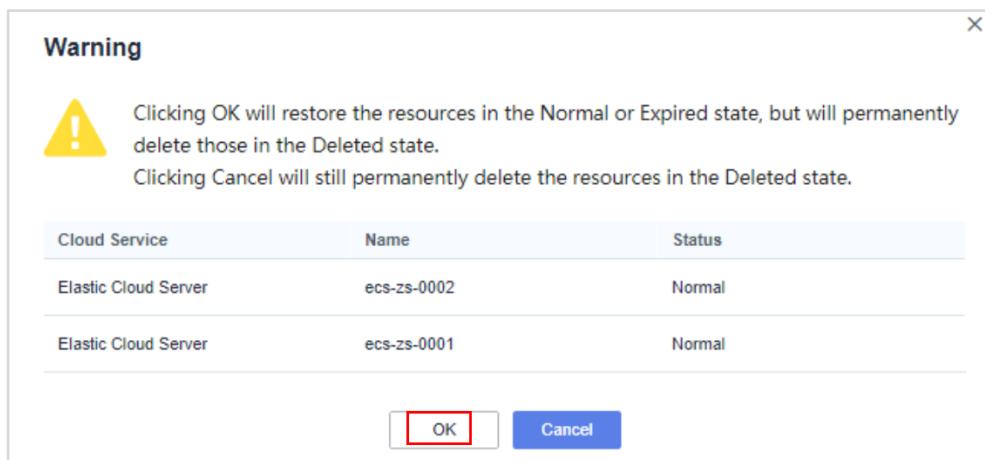
Step 5 On the page displayed, select the ECSs to be restored, and click **Restore.**



The screenshot shows the 'Recycle Bin' interface. At the top, there is a message: 'The resources in the recycle bin cannot be deleted permanently within their frozen period.' Below this are two buttons: 'Restore' (highlighted with a red box) and 'Delete ...'. A table lists two resources:

	Cloud Service	Name	ID
<input checked="" type="checkbox"/>	Elastic Cloud Server	ecs-zs-0001	31
<input checked="" type="checkbox"/>	Elastic Cloud Server	ecs-zs-0002	00

Step 6 In the displayed dialog box, click **OK**.

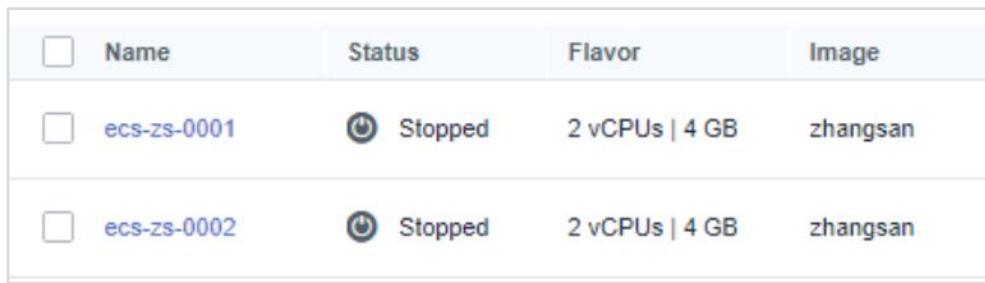


The dialog box is titled 'Warning'. It contains a yellow warning icon and the text: 'Clicking OK will restore the resources in the Normal or Expired state, but will permanently delete those in the Deleted state. Clicking Cancel will still permanently delete the resources in the Deleted state.' Below the text is a table showing the resources to be restored:

Cloud Service	Name	Status
Elastic Cloud Server	ecs-zs-0002	Normal
Elastic Cloud Server	ecs-zs-0001	Normal

At the bottom are two buttons: 'OK' (highlighted with a red box) and 'Cancel'.

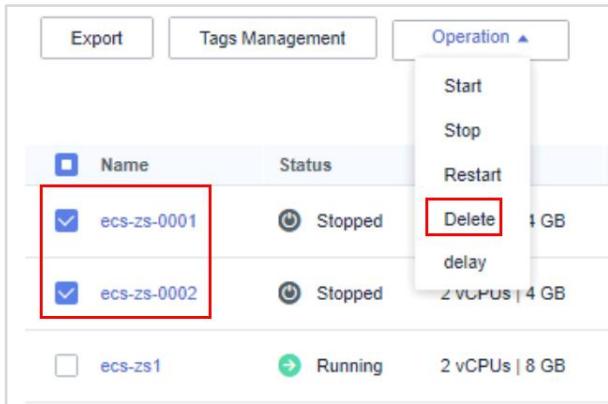
Step 7 Return to the ECS list and view the restored ECSs.



The screenshot shows the ECS list. There are two entries, both of which have been restored:

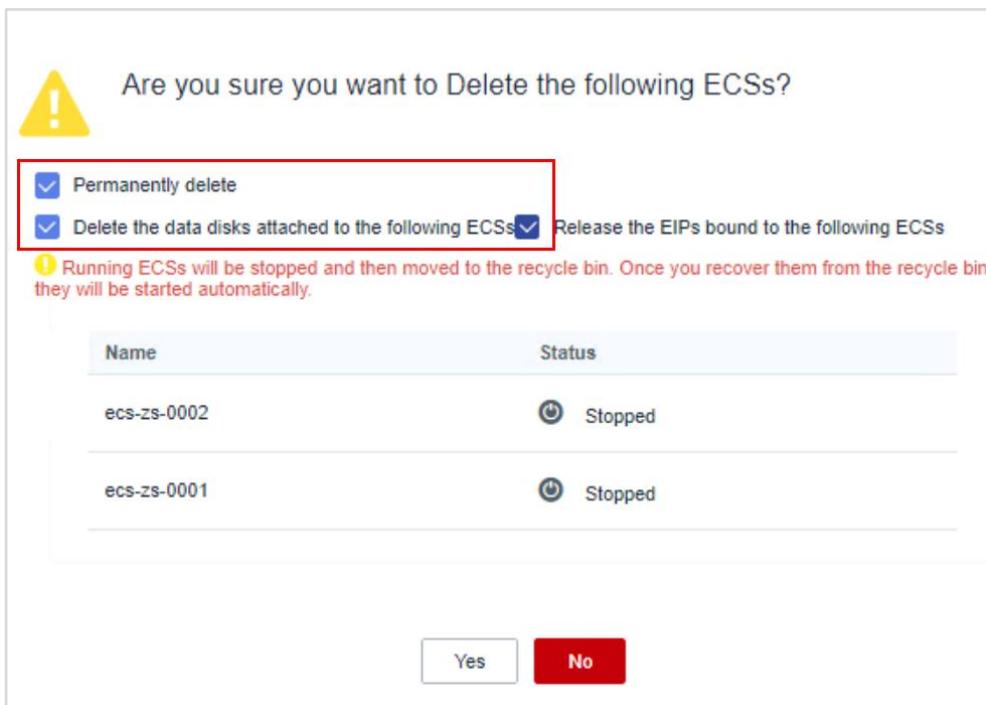
<input type="checkbox"/>	Name	Status	Flavor	Image
<input type="checkbox"/>	ecs-zs-0001	Stopped	2 vCPUs 4 GB	zhangsan
<input type="checkbox"/>	ecs-zs-0002	Stopped	2 vCPUs 4 GB	zhangsan

Step 8 Select the ECSs to be deleted and delete them again.



Name	Status
ecs-zs-0001	Stopped
ecs-zs-0002	Stopped
ecs-zs1	Running

- Step 9 In the displayed ECS deletion dialog box, select **Permanently delete, Delete the data disks attached to the following ECSs, and Release the EIPs bound to the following ECSs**, and click **Yes**. Check whether the selected ECSs have been deleted.



⚠ Are you sure you want to Delete the following ECSs?

Permanently delete
 Delete the data disks attached to the following ECSs Release the EIPs bound to the following ECSs

💡 Running ECSs will be stopped and then moved to the recycle bin. Once you recover them from the recycle bin they will be started automatically.

Name	Status
ecs-zs-0002	Stopped
ecs-zs-0001	Stopped

Yes No

3.2.4 Quiz

[Question] In the preceding exercises, what is the difference between applying for an ECS using a customized template and applying for an ECS using the default template?

[Answer]

The two methods are essentially the same. However, some configurations such as the flavor, image, and disk in the template in exercise 4.2.1 are pre-configured by the administrator, while those in exercise 4.2.2 are customized by the user who applies for the ECS.

4 IMS

4.1 Overview

4.1.1 About This Exercise

This exercise guides VDC administrators or operators to create private images and manage shared images.

4.1.2 Objectives

- Learn how to apply for a private image using an image file.
- Learn how to apply for a private image based on an ECS.
- Learn how to share a private image with other users.
- Learn how to accept or reject shared images.

4.1.3 Prerequisites

A public image has been registered with Service OM.

4.1.4 Process

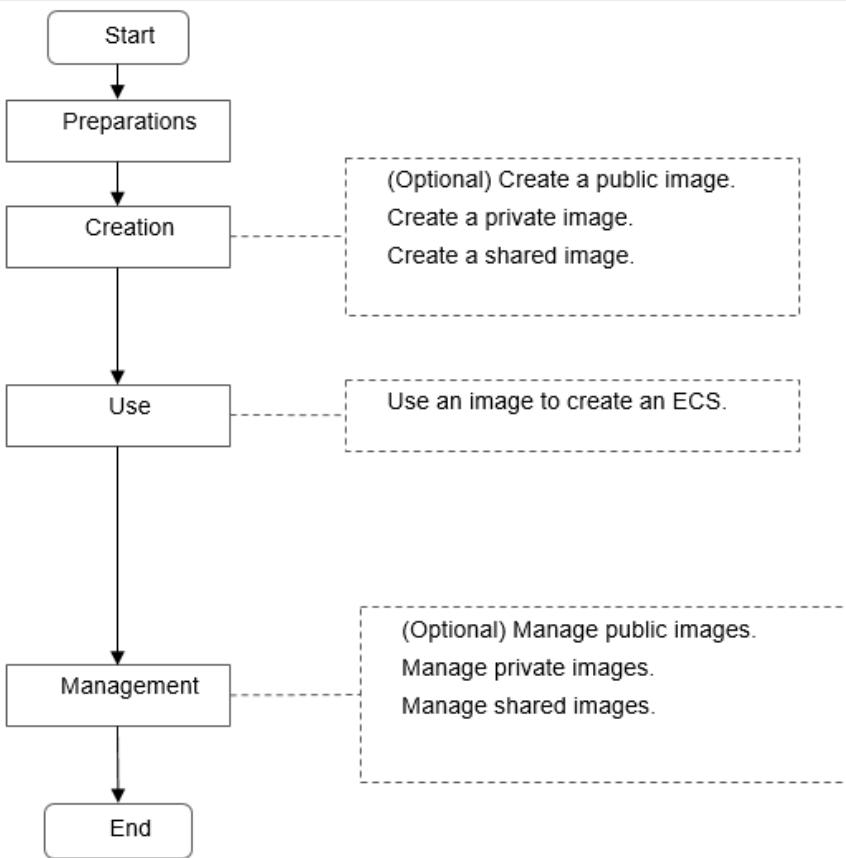
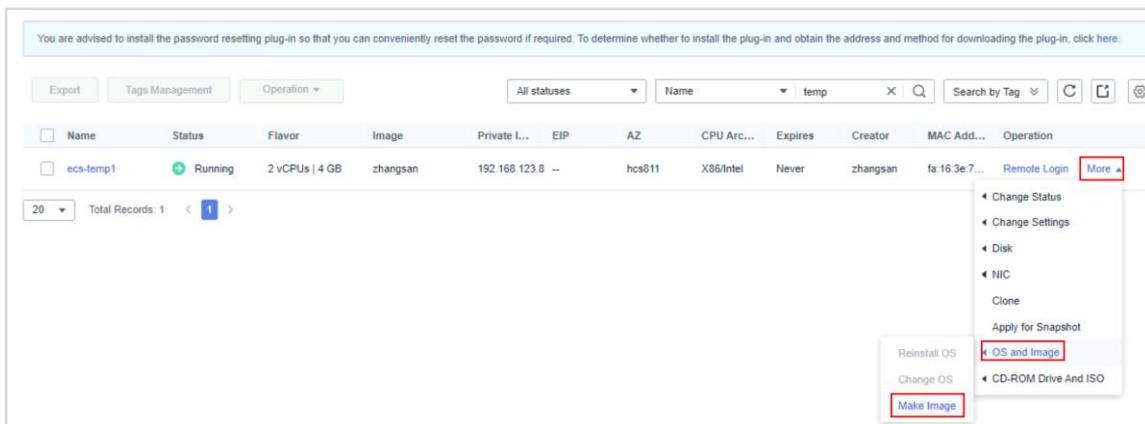


Figure 4-1 Flowchart for enabling and using IMS

4.2 Procedure

4.2.1 Creating a Private Image from an ECS

Step 1 In the ECS list, select a created ECS, click **More** in the **Operation** column of the ECS, and choose **OS and Image > Make Image**.



Step 2 On the page for requesting a private image, set parameters as required and click **Next**.

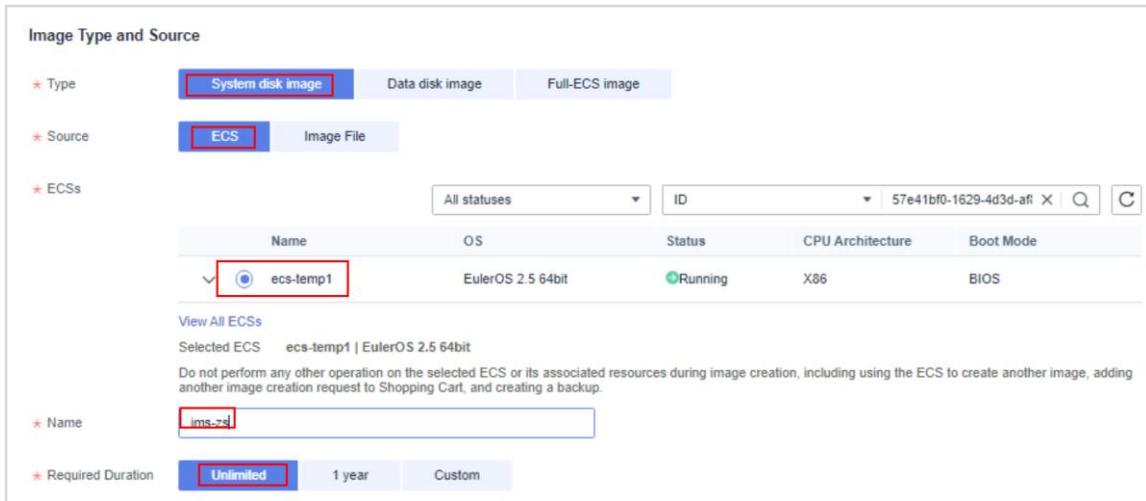


Image Type and Source

* Type System disk image Data disk image Full-ECS image

* Source ECS Image File

* ECSS All statuses ID 57e41bf0-1629-4d3d-aef C

Name	OS	Status	CPU Architecture	Boot Mode
ecs-temp1	EulerOS 2.5 64bit	Running	X86	BIOS

[View All ECSS](#)

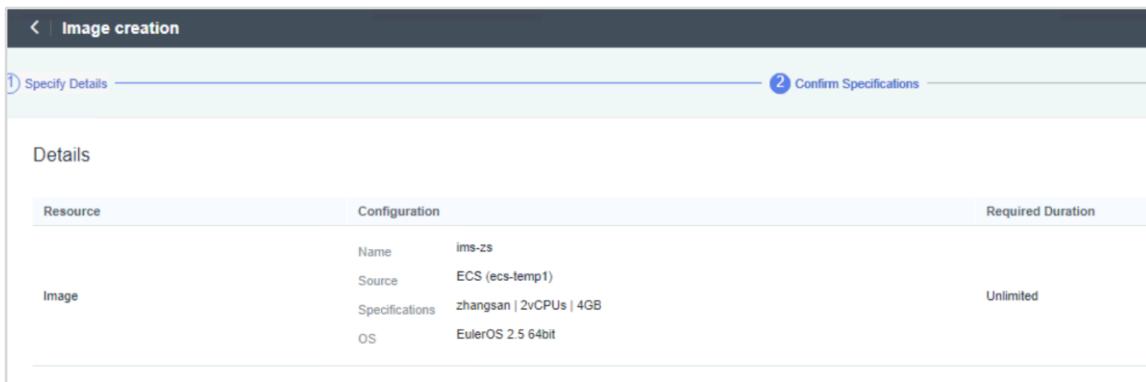
Selected ECS ecs-temp1 | EulerOS 2.5 64bit

Do not perform any other operation on the selected ECS or its associated resources during image creation, including using the ECS to create another image, adding another image creation request to Shopping Cart, and creating a backup.

* Name

* Required Duration Unlimited 1 year Custom

Step 3 On the **Confirm Specifications** page, click **Submit**.



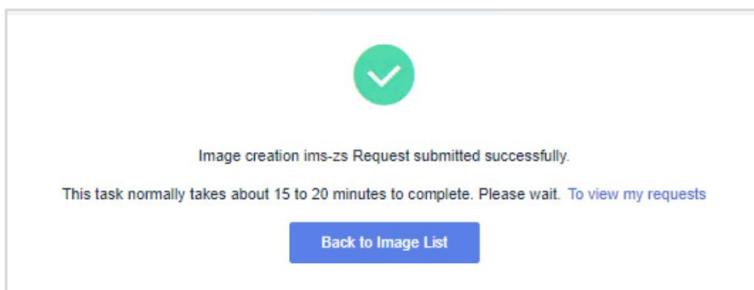
< Image creation

① Specify Details ② Confirm Specifications

Details

Resource	Configuration	Required Duration
Image	Name: ims-zs Source: ECS (ecs-temp1) Specifications: zhangsan 2vCPUs 4GB OS: EulerOS 2.5 64bit	Unlimited

Step 4 Return to the private image list. If the status of the private image changes to **Normal**, the private image is created.

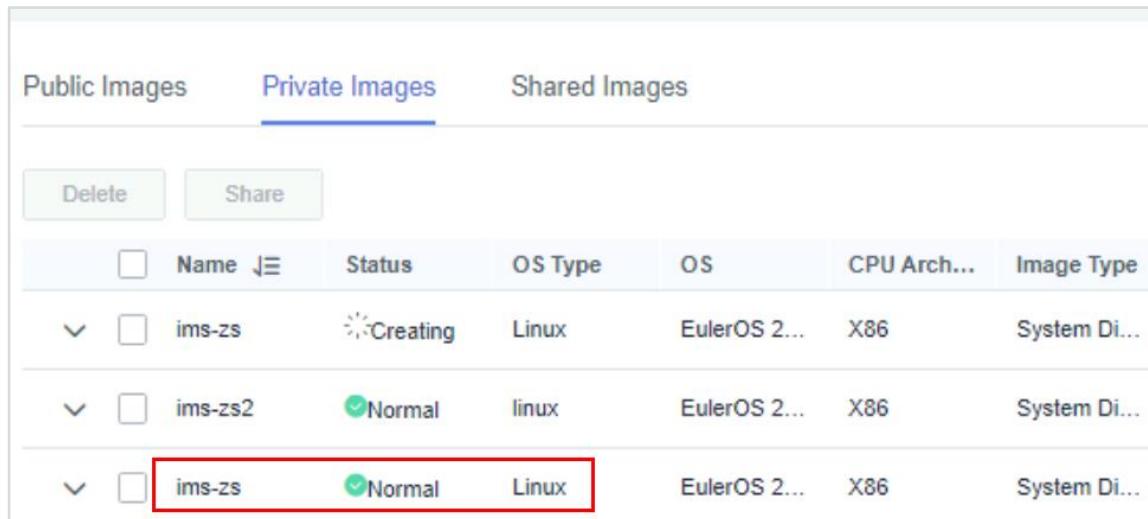


✓

Image creation ims-zs Request submitted successfully.

This task normally takes about 15 to 20 minutes to complete. Please wait. [To view my requests](#)

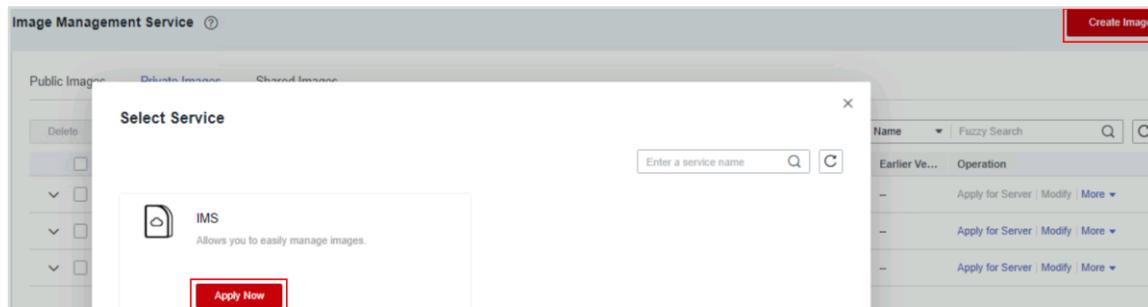
[Back to Image List](#)



Private Images						
		Name	Status	OS Type	OS	CPU Arch...
▼	<input type="checkbox"/>	ims-zs	Creating	Linux	EulerOS 2...	X86
▼	<input type="checkbox"/>	ims-zs2	Normal	linux	EulerOS 2...	X86
▼	<input type="checkbox"/>	ims-zs	Normal	Linux	EulerOS 2...	X86

4.2.2 Applying for a Private Image Using an Image File

Step 1 On the **Image Management Service** page, click **Create Image** in the upper right corner. In the displayed dialog box, click **Apply Now** in the **IMS** service card.



Step 2 On the page for creating a private image, set parameters as required and click **Next**.

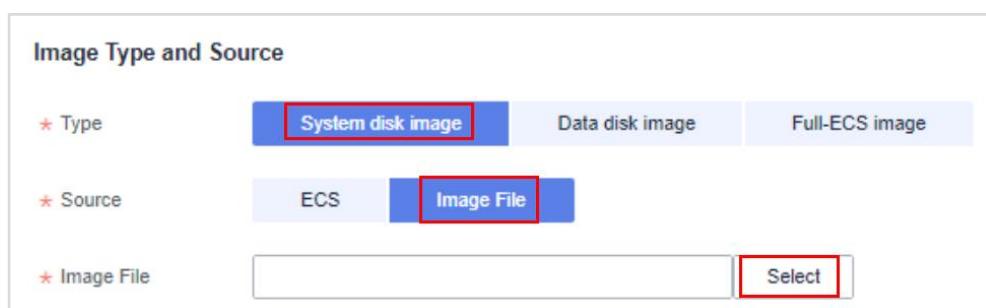
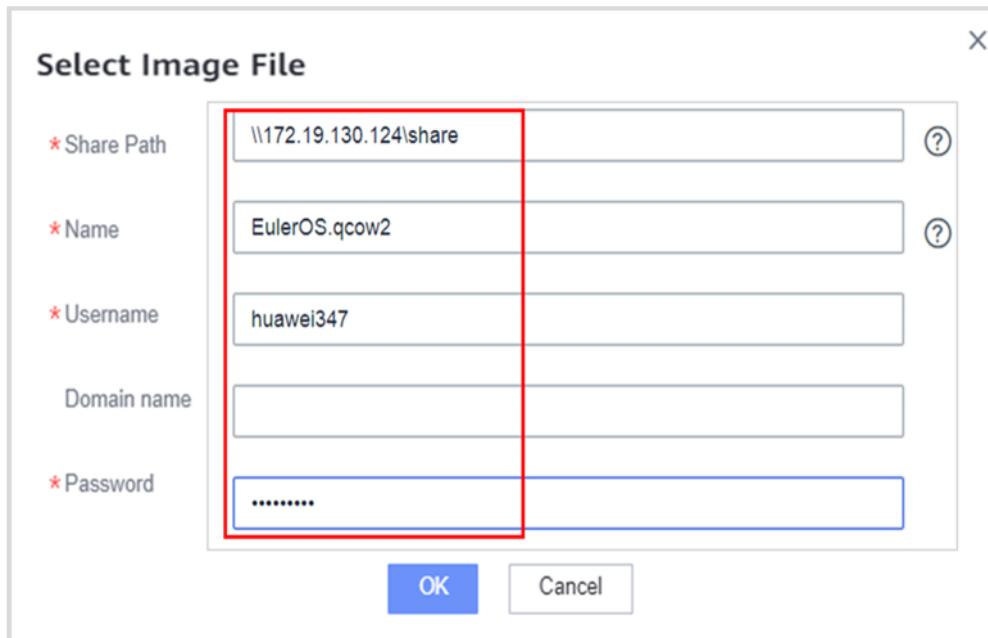


Image Type and Source

★ Type **System disk image** Data disk image Full-ECS image

★ Source **Image File** ECS

★ Image File **Select**

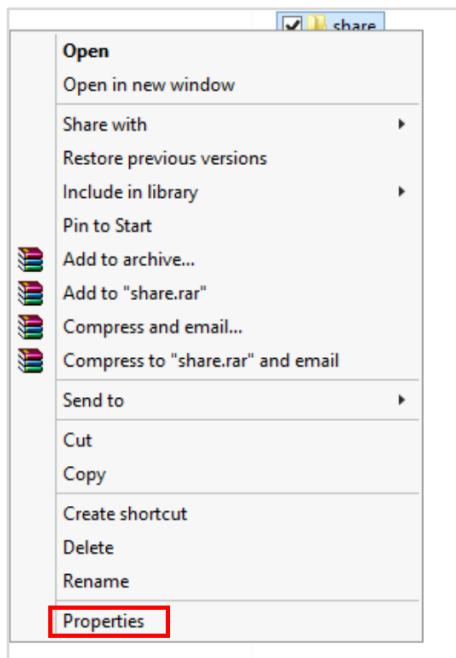


Select the **EulerOS.qcow2** image file and set the username and password as required.

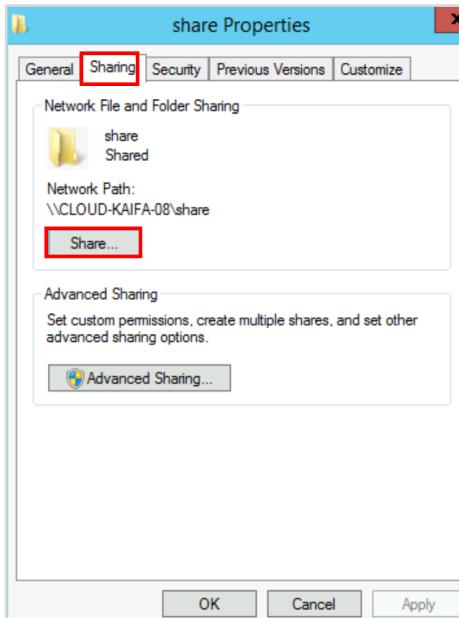
Set the **share** folder in drive C as a shared folder and record the shared path. (You can see the following operations to confirm the shared path.)

- Set the **share** folder in drive C as a shared folder. (If the file has been shared, skip this step.)

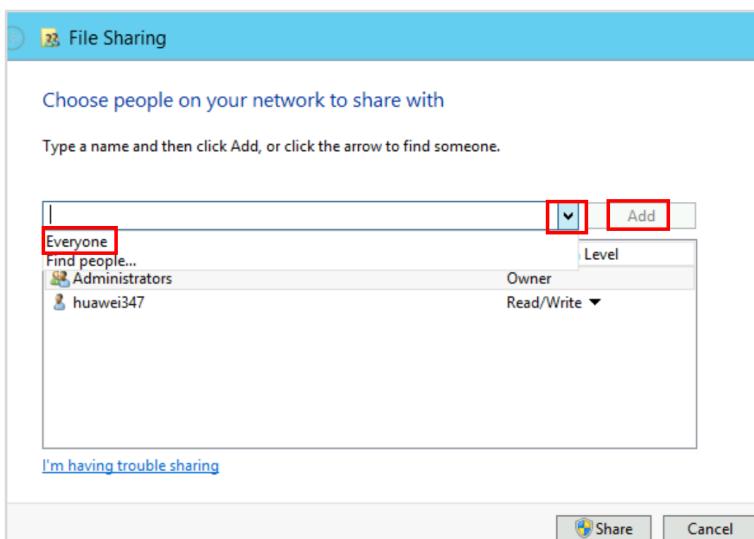
Right-click the **share** folder and choose **Properties** from the shortcut menu.



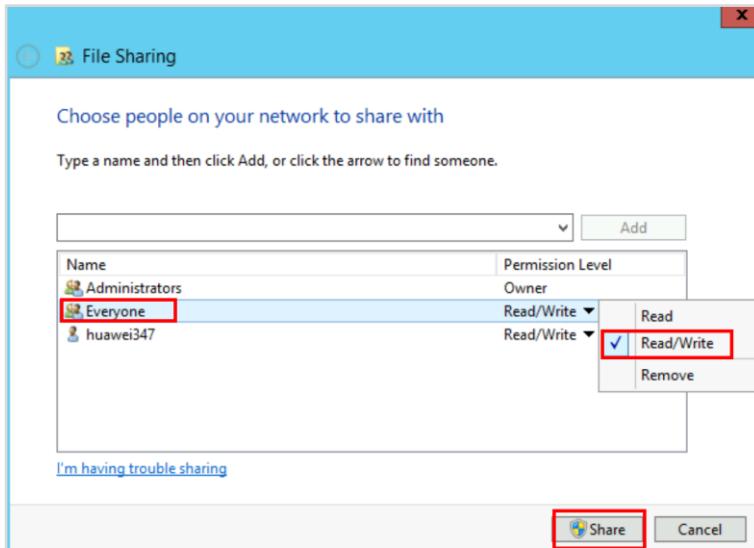
On the **Sharing** tab page, click **Share**.



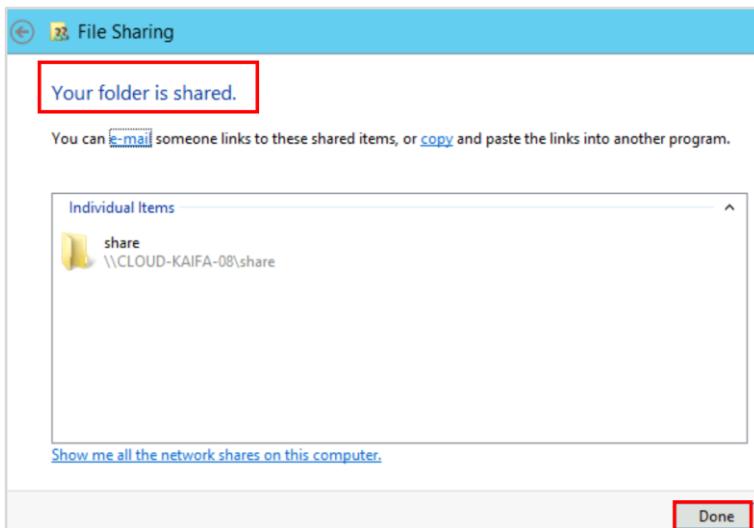
Set the name of the user with whom you want to share the folder. In this example, select **Everyone** and click **Add**.



After the user is added, select **Read/Write** under **Permission Level** for the user and click **Share** in the lower right corner of the dialog box.

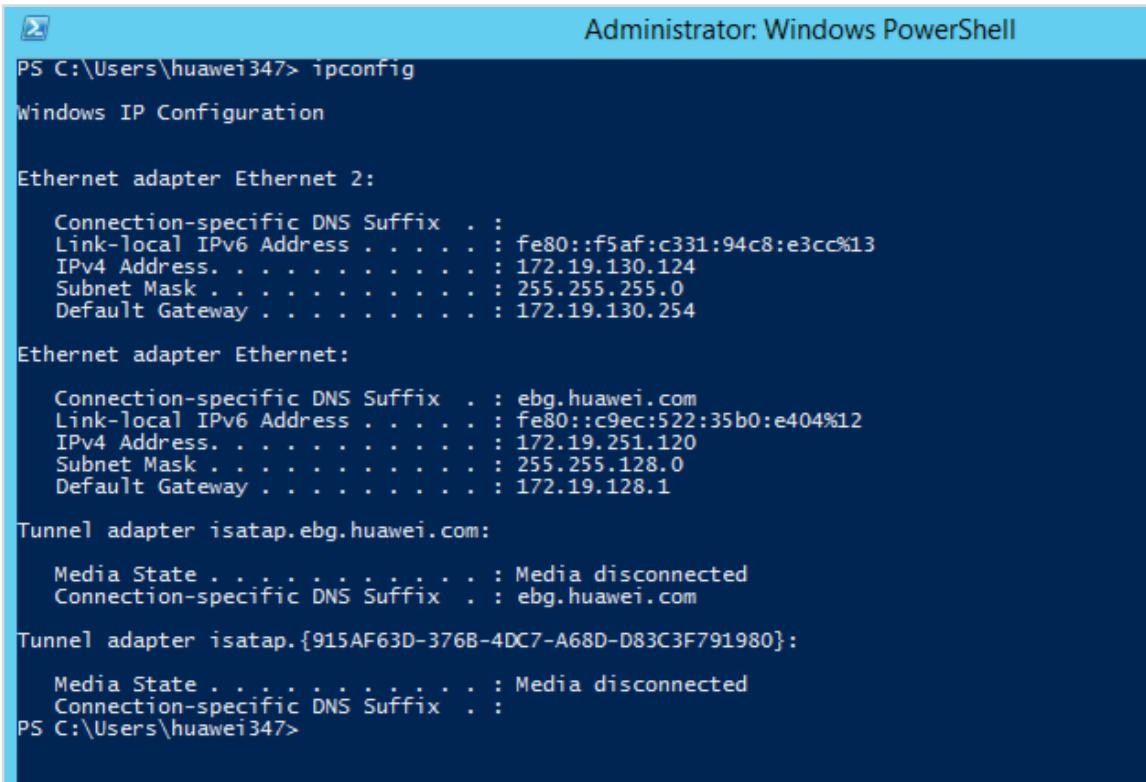


Confirm that the file is shared successfully and click **Done** in the lower right corner of the dialog box that is displayed.



- Confirm the shared path. (The shared path consists of the local host IP address and folder path. You only need to confirm the host IP address.)

Open Windows PowerShell, run the **ipconfig** command, and check the IP address of the local host. If there are multiple IPv4 addresses, check the correct shared path in the window for selecting an image file.



```
Administrator: Windows PowerShell
PS C:\Users\huawei347> ipconfig

Windows IP Configuration

Ethernet adapter Ethernet 2:

  Connection-specific DNS Suffix . . . . . : fe80::f5af:c331:94c8:e3cc%13
  Link-local IPv6 Address . . . . . : fe80::f5af:c331:94c8:e3cc%13
  IPv4 Address. . . . . : 172.19.130.124
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : 172.19.130.254

Ethernet adapter Ethernet:

  Connection-specific DNS Suffix . . . . . : ebg.huawei.com
  Link-local IPv6 Address . . . . . : fe80::c9ec:522:35b0:e404%12
  IPv4 Address. . . . . : 172.19.251.120
  Subnet Mask . . . . . : 255.255.128.0
  Default Gateway . . . . . : 172.19.128.1

Tunnel adapter isatap.ebg.huawei.com:

  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . . . . . : ebg.huawei.com

Tunnel adapter isatap.{915AF63D-376B-4DC7-A68D-D83C3F791980}:

  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . . . . . :
PS C:\Users\huawei347>
```

After the local image file is uploaded, set **Architecture**, **Boot Mode**, **OS**, **Name**, and **Required Duration** as required, select **Support Cloud-Init**, and click **Next**.



★ Architecture	X86	ARM	
★ Boot Mode	BIOS	UEFI	
★ OS	EulerOS	EulerOS 2.5 64bit	
★ Name	ims-zs2		
★ Required Duration	Unlimited	1 year	Custom
Description	0/1,024		
<input checked="" type="checkbox"/> Support Cloud-Init ?			

Step 3 Confirm the information and click **Submit**

Resource	Configuration	Required Duration
Image	Name: ims-zs2 Source: Specifications: Flavor_Linux123 2vCPUs 8GB OS: EulerOS 2.5 64bit	Unlimited

Name	Status	OS Type	OS	CPU Arch...	Image Type
ims-zs	Normal	Linux	EulerOS 2...	X86	System Di...
ims-zs2	Normal	linux	EulerOS 2...	X86	System Di...
ims-zs	Normal	Linux	EulerOS 2...	X86	System Di...

4.2.3 Sharing a Private Image

- Step 1** Log in to ManageOne Operation Portal as the operation administrator **bss_admin** and create the tenant **lisi**. For details, see section 2. 2. 1 .
- Step 2** Log in to ManageOne Operation Portal as the VDC administrator **zhangsan**. In the private image list, locate the row that contains the newly created private image, click **More** in the **Operation** column, and choose **Share**.

Name	Status	OS Type	OS	CPU Arch...	Image Type	Created	Disk Capa...	Encrypted	Expired On	Earlier Ve...	Operation
ims-zs	Normal	Linux	EulerOS 2...	X86	System Di...	2022-08-2...	40	No encrypt...	Never	--	Apply for Server Modify More
ims-zs2	Normal	linux	EulerOS 2...	X86	System Di...	2022-05-1...	40	No encrypt...	Never	--	Apply f... Share
ims-zs	Normal	Linux	EulerOS 2...	X86	System Di...	2022-05-1...	40	No encrypt...	Never	--	Apply f...

- Step 3** In the displayed **Share Image** dialog box, enter the tenant name **lisi** and resource set name, click **Add**, and then click **OK**.

Share Image

Name	OS	Disk Capac...	Tenants Available
ims-zs	EulerOS 2.5 64bit	40	128

Enter an account name of the recipient. [Learn more about how to obtain a tenant name and a resource set name?](#)
If the image is shared to this project for the first time, a message will be displayed on the shared image page of this project, indicating that a shared image is waiting to be accepted. Otherwise, no message will be displayed.

* Enter an account name. * Enter a project name. **Add**

ims_term_tenantNam...	Project Name	Project ID	Operation
lisi	zj-hz-1_lisi	8589b705e1594be2be335e646179f130	Delete

The image has been shared with 1 tenants and can still be shared with 127 tenants.

OK **Cancel**

4.2.4 Accepting or Rejecting a Shared Image

Step 1 Log in to ManageOne Operation Portal as the VDC administrator **lisi** (create a tenant if no tenant has been created), click the **Shared Images** tab, and click **Tenant zhangsan has shared 1 image with you** above the list to view details. Select the shared image to be accepted and click **Accept**.

Image Management Service

Public Images Private Images **Shared Images**

▲ Tenant zhangsan has shared 1 images with you. **Reject All** C

Shared images need to be accepted before they can be used.

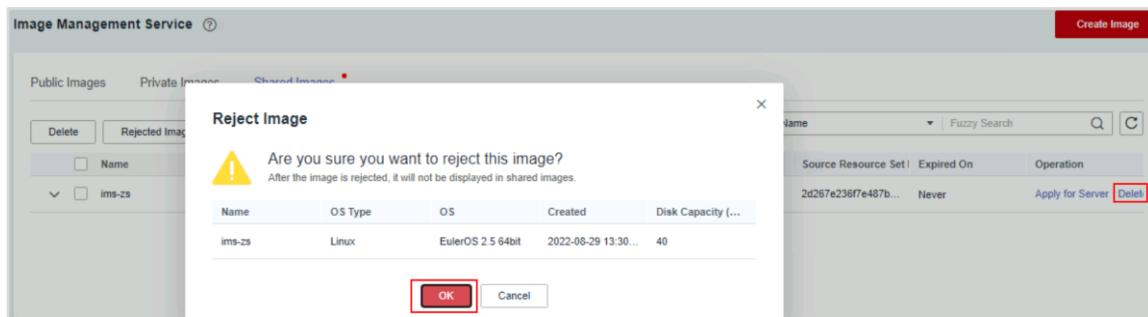
<input checked="" type="checkbox"/> Name	ID	OS
<input checked="" type="checkbox"/> ims-zs	3d7b57ef-1c94-41e5-8986-8cb500066686	EulerOS 2.5 64bit

Accept **Reject**

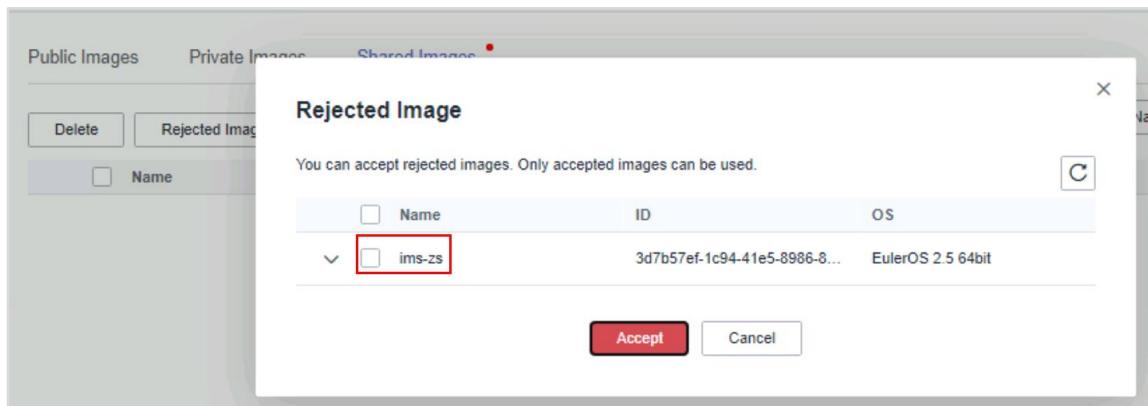
Step 2 Refresh the list and view the shared image you have accepted.

Shared Images				
Delete		Rejected Image		
<input type="checkbox"/>	Name	OS Type	OS	CPU Architecture
<input checked="" type="checkbox"/>	ims-zs	Linux	EulerOS 2.5 64bit	X86

Step 3 Locate the row that contains the shared image and click **Delete** in the **Operation** column. In the displayed dialog box, click **OK**.



Step 4 Click **Rejected Images** to view the image you have rejected.



5 AS

5.1 Overview

5.1.1 About This Exercise

This exercise guides VDC administrators or operators to create and manage AS groups, AS configurations, and AS policies.

5.1.2 Objectives

- Learn how to create an AS group.
- Learn how to create an AS configuration.
- Learn how to create an AS policy.

5.1.3 Prerequisites

A template for an AS instance (that is, an ECS) has been created on ManageOne Operation Portal.

5.1.4 Process

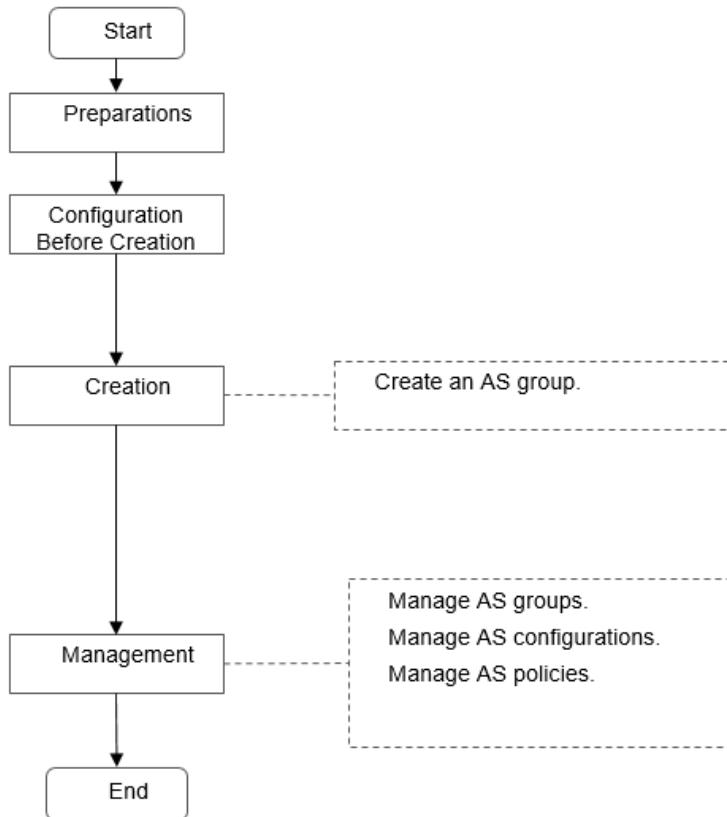


Figure 5-1 AS operation flowchart

5.2 Procedure

5.2.1 Quickly Creating an AS Group

Step 1 Log in to ManageOne Operation Portal as a VDC administrator or operator, click **Service List**, and choose **Auto Scaling** under **Computing**.

The screenshot shows the 'Service List' interface. At the top, there are dropdown menus for 'Region' (set to 'hangzhou') and 'Resource Set' (set to 'zj-hz-1_zhangsan'). Below these, a search bar says 'Enter a name to search for a service.' A section titled 'Basic cloud services' lists various services in two columns. The 'Auto Scaling' service is highlighted with a red box.

Computing	Storage
Service_154c	Cloud Server Backup Service
Image Management Service	Volume Backup Service
Cloud Container Engine	Elastic Volume Service
Auto Scaling	Object Storage Service 3.0
Elastic Cloud Server	
Bare Metal Server	

Step 2 On the Auto Scaling page, click Create AS Group.

The screenshot shows the 'Auto Scaling' page. On the left, there's a sidebar with 'Auto Scaling' highlighted with a red box. The main area shows a table of existing AS groups. At the top right, there are two buttons: 'Create AS Group' (highlighted with a red box) and 'Create AS Configuration'.

Name	AS Configuration	Status	Current Instances	Expected Instances	Min. Instances	Max. Instances	Operation
as-group-cjq	as-config-cjq	Enabled	3	3	1	3	AS Policy / More ▾

Step 3 On the Create AS Group page, set AS Group Name, Max. Instances, Expected Instances, Min. Instances, Cooling Duration (s), VPC, and NIC as required, select the default security group, select Do not use for Load Balancing, set Health Check Method, Health Check Interval, and Instance Removal Policy as required, and set Release EIP on Instance Removal to Yes.

The screenshot shows the 'Specify Details' step of the 'Create AS Group' wizard. It has two tabs: 'Specify Details' (selected) and 'AS Configuration'. Under 'Specify Details', there are four input fields with red boxes around them:

- AS Group Name: as-group-001
- Max. Instances: 5
- Expected Instances: 3
- Min. Instances: 2

Below these fields is a 'Cooling Duration (s)' field with a value of 900.

AS Configuration Page Screenshot:

- AZ:** hcs811
- VPC:** vpc-zs1
- NIC:** Primary NIC: subnet-zs1(192.168.123.0/24)
- Security Group:** default(45e1ce93-0809-4a3d-8c12-bc0fc55631...)
- Load Balancing:** Do not use
- Health Check Method:** ECS health check (highlighted by a red box)
- Health Check Interval:** 5 minutes
- Instance Removal Policy:** Oldest instance created based on the oldest ...
- Release EIP on Instance Removal:** Yes (highlighted by a red box)

Step 4 Click **Next**. On the **AS Configuration** page, set parameters as required and click **Create AS Configuration**.

AS Configuration Step Screenshot:

- Specify Details:** Create AS Configuration (highlighted by a red box)
- Configuration Name:** as-config-001
- Configuration Template:** Use specifications of an existing ECS (highlighted by a red box)
- Elastic IP Address:** Do Not Use

Click **Select ECS**. In the displayed dialog box, select the target ECS and click **OK**.

Select ECS

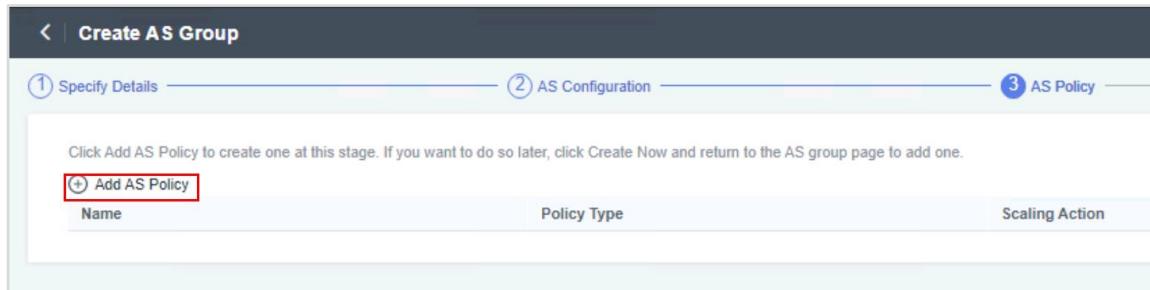
ID	Name	Specifications	Image
31ec74f3-7342-45eb-a...	ecs-zs-0001	2vCPUs 4GB	zhangsan
00370616-7fad-483f-af...	ecs-zs-0002	2vCPUs 4GB	zhangsan
a6d8adcc-1728-437f-8...	ecs-zs1	2vCPUs 8GB	zhangsan

OK **Cancel**

After you select an ECS, the following page is displayed.

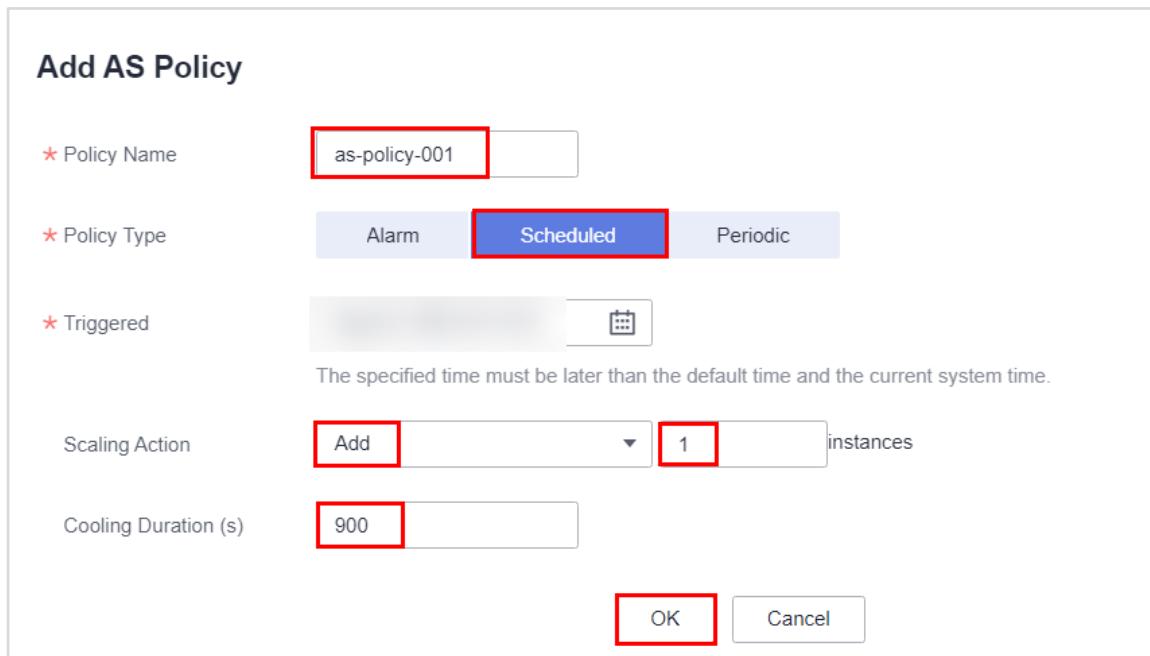
Use Existing AS Configuration		Create AS Configuration												
You can select Use Existing AS Configuration and then select an existing AS configuration from the following table. Or you can select Create AS Configuration.														
★ Configuration Name	as-config-001													
★ Configuration Template	Create a specifications template	Use specifications of an existing ECS												
Select ECS														
<table border="1"> <tr> <td>★ ECS ID</td> <td>00370616-7fad-483f-af00-c2dabe55404f</td> </tr> <tr> <td>★ vCPUs</td> <td>2</td> </tr> <tr> <td>★ Memory</td> <td>4 GB</td> </tr> <tr> <td>★ Image Type</td> <td>Public Image Linux</td> </tr> </table>			★ ECS ID	00370616-7fad-483f-af00-c2dabe55404f	★ vCPUs	2	★ Memory	4 GB	★ Image Type	Public Image Linux				
★ ECS ID	00370616-7fad-483f-af00-c2dabe55404f													
★ vCPUs	2													
★ Memory	4 GB													
★ Image Type	Public Image Linux													
<table border="1"> <tr> <td>★ Login Mode</td> <td>Key Pair</td> <td>Password</td> </tr> <tr> <td>Username</td> <td colspan="2">root</td> </tr> <tr> <td>★ Password</td> <td>*****</td> <td>Keep your password</td> </tr> <tr> <td>★ Confirm Password</td> <td>*****</td> <td></td> </tr> </table>			★ Login Mode	Key Pair	Password	Username	root		★ Password	*****	Keep your password	★ Confirm Password	*****	
★ Login Mode	Key Pair	Password												
Username	root													
★ Password	*****	Keep your password												
★ Confirm Password	*****													

Step 5 Click **Next**. On the **AS Policy** page, click **Add AS Policy**.



Name	Policy Type	Scaling Action
as-policy-001	Scheduled	Add 1 instances

Step 6 In the displayed dialog box, set parameters as required.



Add AS Policy

* Policy Name: as-policy-001

* Policy Type: **Scheduled**

* Triggered:

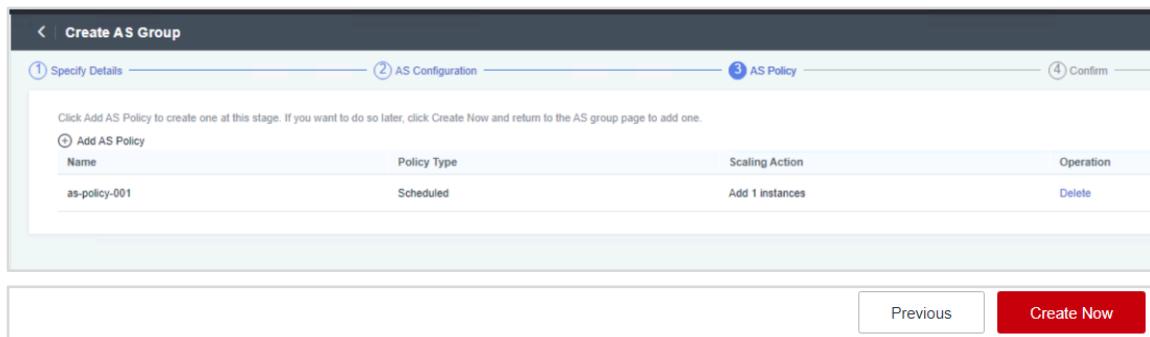
The specified time must be later than the default time and the current system time.

Scaling Action: Add 1 instances

Cooling Duration (s): 900

OK **Cancel**

Return to the **AS Policy** page and click **Create Now** in the lower right corner.



Name	Policy Type	Scaling Action	Operation
as-policy-001	Scheduled	Add 1 instances	Delete

Previous **Create Now**

Step 7 On the page for confirming configuration details, click **Confirm Creation**.

The screenshot shows the final step of creating an AS group. It displays the configuration details for the AS group, including its name, basic information, AS configuration, and AS policy. The AS group has 3 expected instances and 3 current instances. The AS configuration specifies a system disk of 40 G and an image of 'ygb'. The AS policy adds 1 instance.

Configuration Details			
Service Name	Basic Information	AS Configuration	AS Policy
AS	AS Group Name: as-group-001 Min. Instances: 2 Expected Instances: 3 Max. Instances: 5 Cooling Duration (s): 900 AZ: hc811 VPC: vpc-zs1 NIC: subnet-zs1(192.168.123.0/24)(Primary NIC) Security Group: default(45fce93-0809-4a3d-8c...) Listener: -- Health Check Method: ECS health check Health Check Interval: 5 minutes Instance Removal Policy: Oldest instance create... Release EIP on Instance Removal: No	Create AS Configuration Configuration Name: as-config-001 Specifications: s3-pod-mgr-medium.2 1 vCPUs 2 GB Image: ygb System Disk: volume1 40 G	Policy Name: as-policy-001 Scaling Action: Add 1 Instance Policy Type: Scheduled Policy Name: as-policy-001 Scaling Action: Add 1 Instance Policy Type: Scheduled

Buttons at the bottom: Previous (greyed out), Confirm Creation (red).

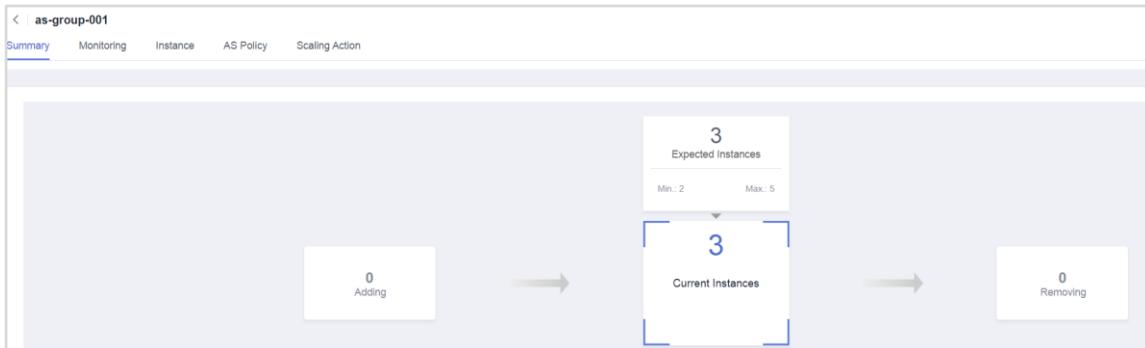
- Step 8** Return to the AS group list, wait for several minutes until the number of current instances becomes stable, and check the newly created AS group and the number of instances.

The screenshot shows the AS Group list. It lists two AS groups: 'as-group-001' and 'as-group-cjq'. Both are enabled and have 3 current instances and 3 expected instances. The 'as-group-001' row is highlighted with a red box.

Name	AS Configuration	Status	Current Instances	Expected Instances	Min. Instances	Max. Instances	Operation
as-group-001	as-config-001	Enabled	3	3	2	5	AS Policy: More ▾
as-group-cjq	as-config-cjq	Enabled	3	3	1	3	AS Policy: More ▾

5.2.2 Managing an AS Policy

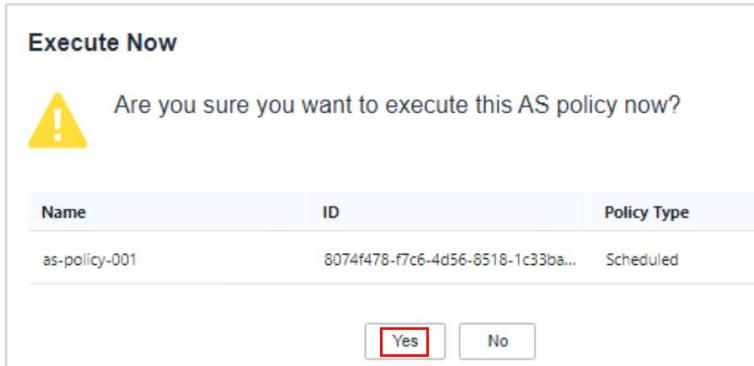
- Step 1** In the AS group list, click the name of the target AS group to view its details. Pay attention to the number of instances.



As shown in the preceding figure, there are three instances in the AS group, which is the expected number of instances set in Step 3 in section 5.2.1 Quickly Creating an AS Group.

- Step 2** Click the **AS Policy** tab, locate the row that contains the target AS policy, and click **Execute Now** in the **Operation** column to manually trigger a scaling action.

Step 3 In the displayed dialog box, click Yes.



Step 4 Return to the **Instance** tab page and check the AS instance changes in the AS group.

Name	Instance ID	Lifecycle Status	Health Status	AS Configuration
as-config-001_17DK...	c721ad34-672d-4a59...	Adding to AS group	Initializing	as-config-001
as-config-001_7JK1B...	972c16a9-9c27-4d2b...	Enabled	Normal	as-config-001
as-config-001_806JH...	372e33e7-eccf-436f...	Enabled	Normal	as-config-001
as-config-001_PZ171...		Enabled	Normal	as-config-001

As shown in the preceding figure, when an AS policy is executed immediately, the AS group performs the corresponding action based on the configured AS policy.

Step 5 When the time set in Step 6 in section 5.2.1 Quickly Creating an AS Group is reached, return to the AS instance list and check the AS instance changes in the AS group.

Name	Instance ID	Lifecycle Status	Health Status	AS Configuration
as-config-001_CIDDD...	Adding to AS group	Initializing	as-config-001	
as-config-001_17DK...	6a6ad60e-8c52-4356...	Enabled	Normal	as-config-001
as-config-001_7JK1B...	c721ad34-672d-4a59...	Enabled	Normal	as-config-001
as-config-001_806JH...	972c16a9-9c27-4d2b...	Enabled	Normal	as-config-001
as-config-001_PZ171...	372e33e7-eccf-436f...	Enabled	Normal	as-config-001

As shown in the preceding figure, when the configured scaling policy conditions are met, the AS group performs the corresponding action based on the configured scaling policy.

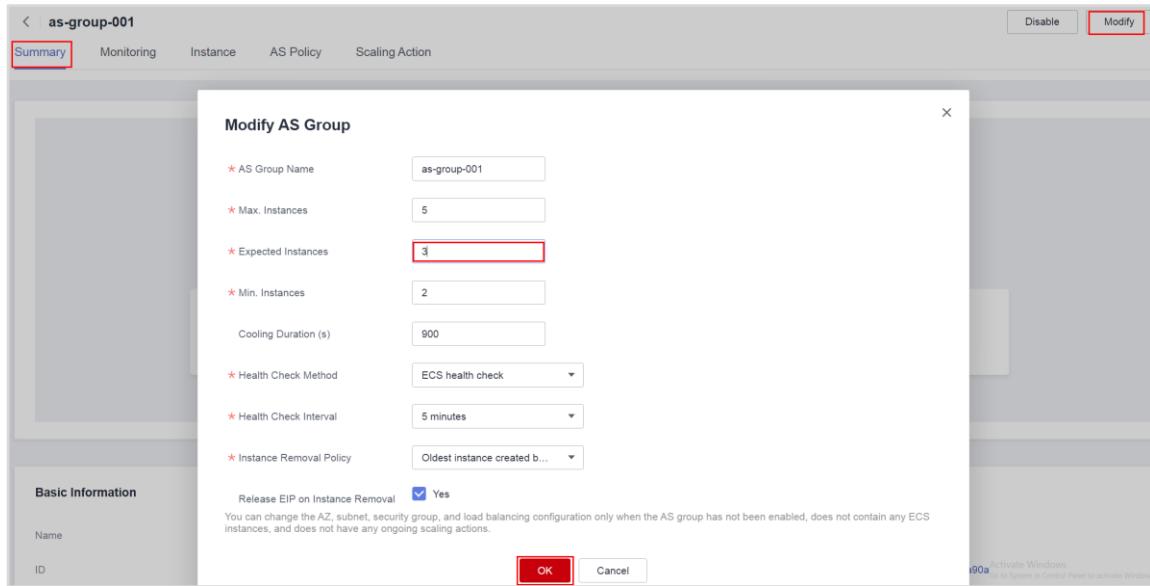
View information on the **Summary** tab page of the AS group.

[Question] Will the AS instances in the AS group be added if I execute the AS policy again? Why?

[Answer] No. When the number of compute instances reaches the preset threshold, no compute instances will be added.

5.2.3 Modifying an AS Group

- Step 1 On the **Summary** tab page of an AS group, click **Modify** in the upper right corner. In the displayed **Modify AS Group** dialog box, set **Expected Instances** to 3 and click **OK**.



Step 2 Return to the **Instance** tab page and check the AS instance changes in the AS group.

as-group-001				
Summary	Monitoring	Instance	AS Policy	Scaling Action
Add Remove Remove and Delete ?				
Name	Instance ID	Lifecycle Status	Health Status	AS Configuration
as-config-001_CIDDX...	82bb0271-f7ee-401e...	Enabled	Normal	as-config-001
as-config-001_17DK...	6a6ad60e-8c52-4356...	Enabled	Normal	as-config-001
as-config-001_7JK1B...	c721ad34-672d-4a59...	Removing from AS gr...	Normal	as-config-001
as-config-001_806JH...	972c16a9-9c27-4d2b...	Removing from AS gr...	Normal	as-config-001
as-config-001_PZ171...	372e33e7-eccf-436f...	Enabled	Normal	as-config-001

[Question] What is the relationship between the expected number of instances in an AS group and the number of instances to be scaled in the AS group?

[Answer] The number of instances to be scaled in an AS group is stable at the expected number of instances in the AS group.

5.2.4 Performing a Health Check

Step 1 Click an instance name in the instance list.

< | as-group-001

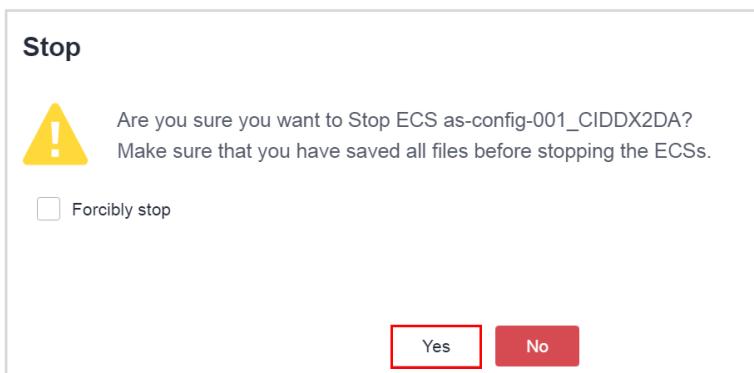
Summary	Monitoring	Instance	AS Policy	Scaling Action
Add	Remove	Remove and Delete	?	
Name	Instance ID	Lifecycle Status	Health Status	
<input type="checkbox"/> as-config-001_CIDDX...	82bb0271-f7ee-401e-...	Enabled	✓ Normal	
<input type="checkbox"/> as-config-001_17DK...	6a6ad60e-8c52-4356...	Enabled	✓ Normal	
<input type="checkbox"/> as-config-001_7JK1B...	c721ad34-672d-4a59...	Removing from AS gr...	✓ Normal	
<input type="checkbox"/> as-config-001_806JH...	972c16a9-9c27-4d2b...	Removing from AS gr...	✓ Normal	
<input type="checkbox"/> as-config-001_PZ171...	372e33e7-eccf-436f...	Enabled	✓ Normal	

Step 2 In the ECS list, stop the AS instance to simulate an AS instance fault.

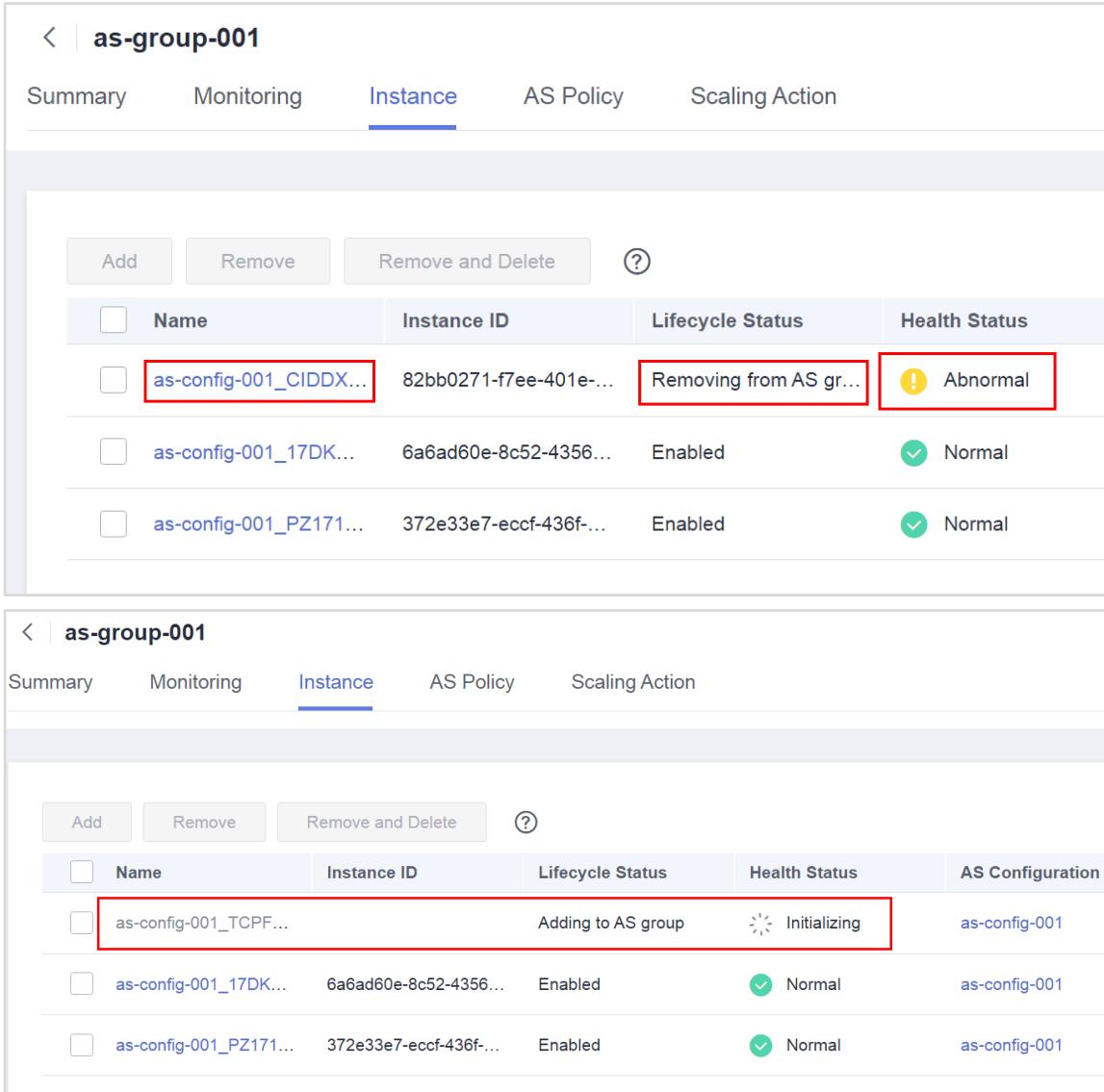
< as-config-001_CIDDX2DA

Summary	EVS Disks	NICs	Security Group	EIP	Monitoring	Tag	ECS Snapshot	CD-ROM Drive	ECS Group	Remote Login	More ▾
ECS Information										Stop	Change Status
Name	<input type="text" value="as-config-001_CIDDX2DA"/>									VPC	vpc-zs1
Status	Running									Flavor	zhengsan 2 vCPUs 4 GB
										Restart	delay
										Delete	Change Settings
										Disk	NIC
										Clone	Apply for Snapshot

Step 3 In the displayed dialog box, click Yes.



Step 4 In the navigation pane on the left, choose **Auto Scaling**. On the **Instance** tab page, observe the change of the instance in the AS group.



Name	Instance ID	Lifecycle Status	Health Status
as-config-001_CIDDX...	82bb0271-f7ee-401e-...	Removing from AS gr...	Abnormal
as-config-001_17DK...	6a6ad60e-8c52-4356...	Enabled	Normal
as-config-001_PZ171...	372e33e7-eccf-436f-...	Enabled	Normal

Name	Instance ID	Lifecycle Status	Health Status	AS Configuration
as-config-001_TCPF...		Adding to AS group	Initializing	as-config-001
as-config-001_17DK...	6a6ad60e-8c52-4356...	Enabled	Normal	as-config-001
as-config-001_PZ171...	372e33e7-eccf-436f-...	Enabled	Normal	as-config-001

- Step 5 In the navigation pane on the left, click **Elastic Cloud Server** to return to the ECS list and view AS instances and stopped faulty instances.

Elastic Cloud Server

You are advised to install the password resetting plug-in so that you can conveniently reset the password if required. Downloading the plug-in, click [here](#).

Name	Status	Flavor	Image	Private IP	EIP
as-config-001_TCPF	Running	2 vCPUs 4 GB	EulerOS-Cloud-i...	192.168.1	--
as-config-001_17DK	Running	2 vCPUs 4 GB	EulerOS-Cloud-i...	192.168.1	--
as-config-001_PZ17	Running	2 vCPUs 4 GB	EulerOS-Cloud-i...	192.168.1	--
ecs-zs1	Running	2 vCPUs 4 GB	EulerOS-Cloud-i...	192.168.1	--
ecs-temp1	Running Cloning	2 vCPUs 4 GB	EulerOS-Cloud-i...	192.168.1	--

20 Total Records: 5 < 1 >

As shown in the preceding figure, the faulty AS instance that fails the health check is removed from the AS group and deleted. In addition, a scaling action is triggered to add a new instance.

5.2.5 Deleting an AS Group

- Step 1** In the AS policy list, locate the row that contains the target AS policy, click **More** in the **Operation** column, and choose **Delete** to delete the AS policy.

< as-group-001

Name	Status	Policy Type	Trigger Condition	Scaling Action	Cooling Duration (s)	Created	Operation
as-policy-001	Enabled	Scheduled			900		Delete

- Step 2** In the displayed dialog box, click **Yes**.

Delete

 Are you sure you want to delete this AS policy?

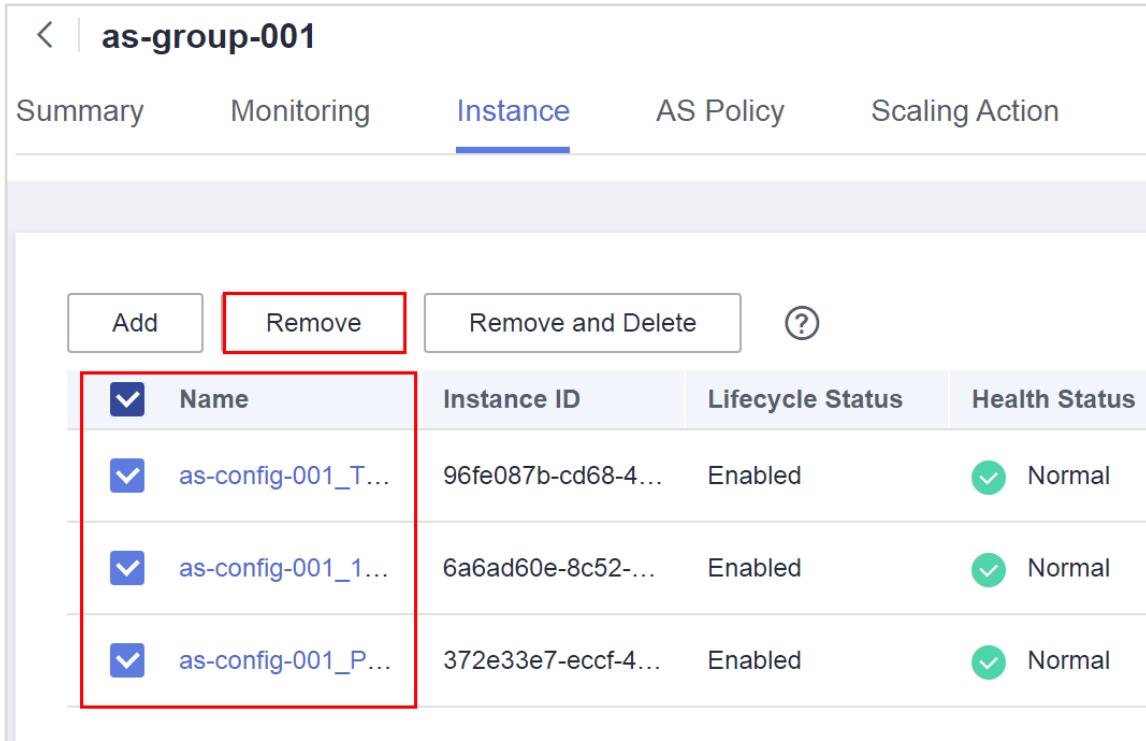
Name	ID	Policy Type
as-policy-001	46151e57-e073-4a23-8314-3a8ca...	Scheduled

- Step 3 On the **Summary** tab page of the target AS group, click **Modify** in the upper right corner. In the displayed **Modify AS Group** dialog box, set **Min. Instances** to **0** and click **OK**.

Modify AS Group

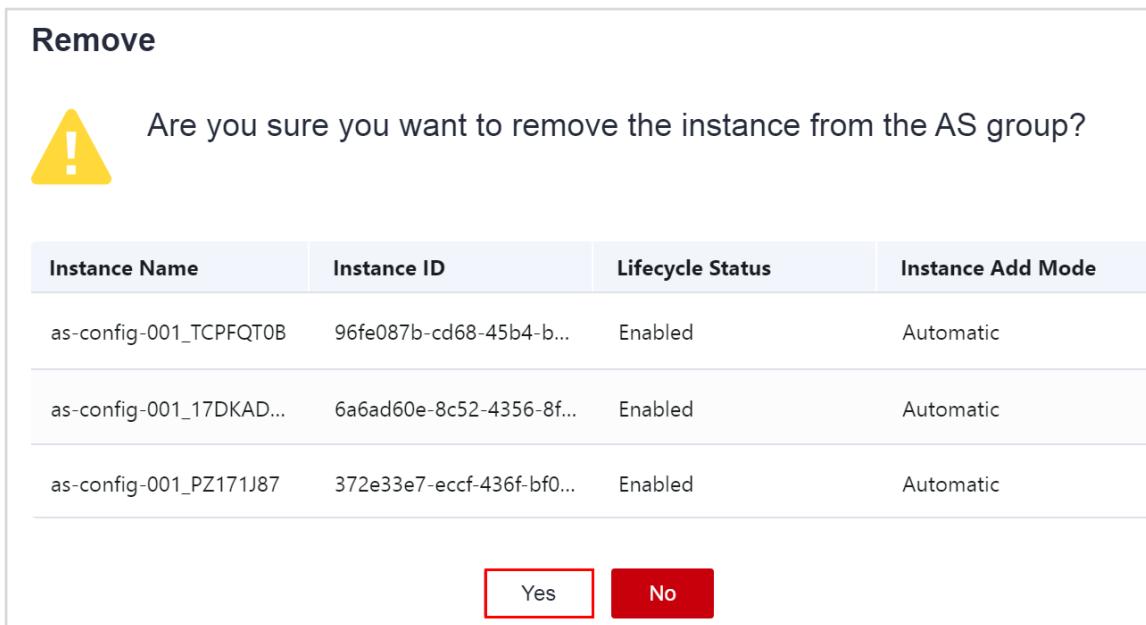
* AS Group Name	as-group-001
* Max. Instances	5
* Expected Instances	3
* Min. Instances	<input type="text" value="0"/>
Cooling Duration (s)	900
* Health Check Method	ECS health check
* Health Check Interval	5 minutes
* Instance Removal Policy	Oldest instance created b...
Release EIP on Instance Removal	<input checked="" type="checkbox"/> Yes
You can change the AZ, subnet, security group, and load balancing configuration only when the AS group has no running instances, and does not have any ongoing scaling actions.	
<input type="button" value="OK"/>	<input type="button" value="Cancel"/>

- Step 4 Return to the AS instance list, select all instances, and click **Remove** above the list. (After an AS group is removed, the instances will be retained for use in subsequent exercises. You can also click **Remove and Delete**.)



Name	Instance ID	Lifecycle Status	Health Status
as-config-001_T...	96fe087b-cd68-45b4-b...	Enabled	Normal
as-config-001_1...	6a6ad60e-8c52-4356-8f...	Enabled	Normal
as-config-001_P...	372e33e7-eccf-436f-bf0...	Enabled	Normal

- Step 5 In the displayed dialog box, click **Yes**.



Instance Name	Instance ID	Lifecycle Status	Instance Add Mode
as-config-001_TCPFQT0B	96fe087b-cd68-45b4-b...	Enabled	Automatic
as-config-001_17DKAD...	6a6ad60e-8c52-4356-8f...	Enabled	Automatic
as-config-001_PZ171J87	372e33e7-eccf-436f-bf0...	Enabled	Automatic

- Step 6 Go back to the **Auto Scaling** page, click **More** in the **Operation** column of the AS group, and choose **Delete**. In the displayed dialog box, confirm the deletion.

Auto Scaling

Name	AS Configuration	Status	Current Inst...	Expected Inst...	Min. Instan...	Max. Instan...	Operation
as-group-...	as-config-001	Ena...	0	0	0	5	AS Policy More ▾

Delete

Are you sure you want to delete this AS group?

AS Group Name	AS Group ID
as-group-001	428a5efb-7475-4256-b60a-2c7db65ed...

Yes **No**

Step 7 Click the **AS Configuration** tab. In the AS configuration list, locate the row that contains the target AS configuration and click **Delete** in the **Operation** column. In the displayed dialog box, confirm the deletion.

Name	Specifications	Image	Elastic IP Ad...	AZ	System Di...	Da...	Login Mode	Created	Operation
as-config-001	zhangsan 2 vC...	.	Do Not Use	zhangsan ...	--	Password			Delete

Delete AS Configuration

Are you sure you want to delete the following AS configurations?

Name	ID
as-config-001	c793463b-7262-40cc-9556-0224b2bfa9...

Yes **No**

6 EVS

6.1 Overview

6.1.1 About This Exercise

Understand how to use Elastic Volume Service (EVS) by performing basic operations, such as creating, attaching, and initializing EVS disks.

6.1.2 Objectives

- Understand the basic process of applying for and using an EVS disk.
- Master the methods of applying for, attaching, and initializing EVS disks.
- Be familiar with how to expand the capacity of an EVS disk.
- Understand how to manage snapshots and EVS disks.

6.1.3 Prerequisites

The administrator has created a disk type on Service OM. An ECS has been created.

6.1.4 Process

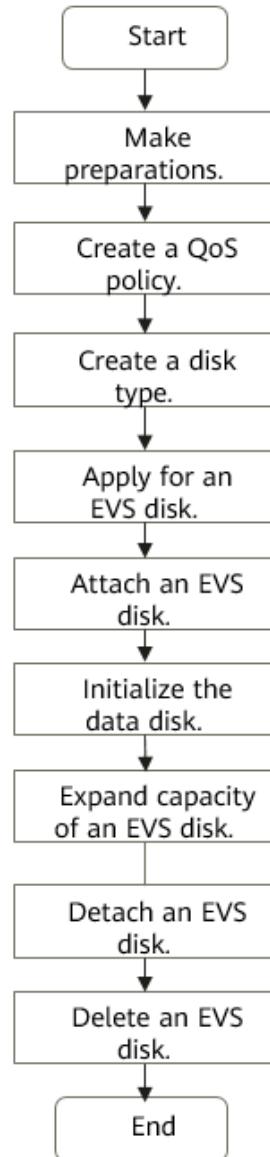
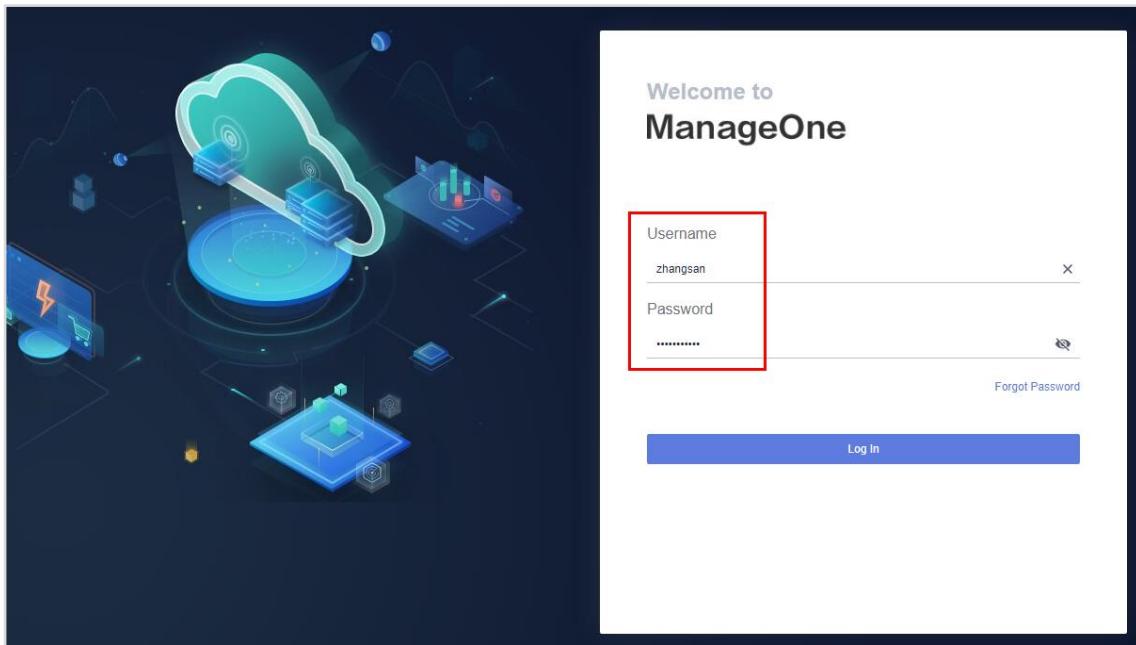


Figure 6-1 Process for applying for and using an EVS disk

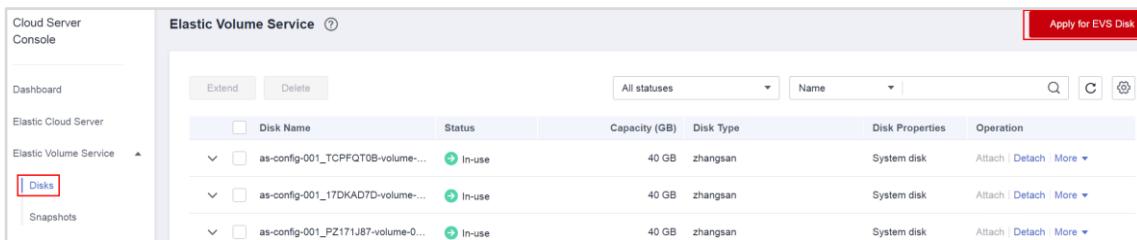
6.2 Procedure

6.2.1 Applying for an EVS Disk

Step 1 Log in to ManageOne Operation Portal as a VDC administrator or VDC operator.

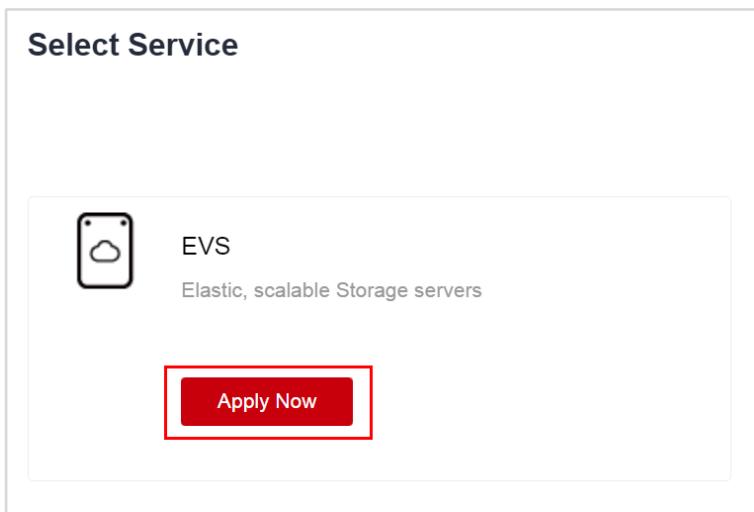


Step 2 Choose **Service List > Storage > Elastic Volume Service** and click **Apply for EVS Disk** in the upper right corner.



Disk Name	Status	Capacity (GB)	Disk Type	Disk Properties	Operation
as-config-001_TCPFQT0B-volume-0...	In-use	40 GB	zhangsan	System disk	Attach Detach More ▾
as-config-001_17DKAD7D-volume-0...	In-use	40 GB	zhangsan	System disk	Attach Detach More ▾
as-config-001_PZ171J87-volume-0...	In-use	40 GB	zhangsan	System disk	Attach Detach More ▾

Step 3 Select **EVS** and click **Apply Now**.



Step 4 In the **Apply for EVS Disk** dialog box, specify the parameters as prompted and click **Next**.

Apply for EVS Disk

1 Specify Details **2 Confirm Specifications**

AZ

Data source

Disk

If you need to create a disk type, contact the administrator to create it on Service OM. If '--' is displayed after a feature, it indicates that the feature is not supported. If '---' is displayed after a feature, it indicates that the feature is not supported.

Disk Type	Configuration Mode	SmartTier	Deduplication and Co...
<input type="radio"/> SATA	--	Initial Allocation Policy Relocation policy	Deduplication -- Compression --
<input type="radio"/> SAS	Thin	Initial Allocation Policy Relocation policy	Deduplication -- Compression --
<input type="radio"/> rainbow	--	Initial Allocation Policy Relocation policy	Deduplication -- Compression --
<input checked="" type="radio"/> zhangsan	--	Initial Allocation Policy Relocation policy	Deduplication -- Compression --

Capacity (GB)

IOPS Upper Limit of the Disk--
Bandwidth Upper Limit of the Disk (MB/s)--

Device Type

Share

Disk Name

Quantity You can apply for a maximum of 100 disks.

Required Duration

Step 5 Confirm the specifications and click **Apply now**.

[Apply for EVS Disk](#)

① Specify Details ② Confirm Specifications

Type	Specifications
Region	Region
AZ	AZ
Data source	Do not specify
Disk	Data disk
Image	--
Disk Type	zhangsan
IOPS Upper Limit of the Disk	--
Bandwidth Upper Limit of the Disk (MB/s)	--
Capacity (GB)	10
Device Type	VBD
Share	No
Disk Name	volume-zs

[Back](#) [Add to Cart](#) [Apply now](#)

Step 6 Confirm that the EVS disk is successfully created.

[Elastic Volume Service](#)

Disk Name	Status	Capacity (GB)	Disk Type
volume-zs	Available	10 GB	zhangsan
as-config-001_TCPFQT0B-vol...	In-use	40 GB	zhangsan

6.2.2 Attaching an EVS Disk

A created EVS disk can be used by an instance only after being attached to the instance. The EVS disk created together with an instance is automatically attached to the instance.

Prerequisites: A Linux ECS has been applied for.

Step 1 On the **Elastic Volume Service** page, select the target EVS disk and click **Attach**.

[Elastic Volume Service](#)

Disk Name	Status	Capacity (GB)	Disk Type	Disk Properties	Operation
volume-zs	Available	10 GB	zhangsan	Data disk	Attach Detach More
as-config-001_TCPFQT0B-vol...	In-use	40 GB	zhangsan	System disk	Attach Detach More

Step 2 Select the ECS to which the EVS disk is to be attached and click **OK**.

If you have applied for device-level snapshot for the ECS to which the disk is attached, the disk attached after the device-level snapshot is taken will be detached during the snapshot rollback.

After the disk is successfully attached, you need to log in to the ECS to initialize the disk before using it. [Initialization operations](#)

If you need to specify the disk attaching address, attach the disk on the [ECS page](#).

Name	Status	Image	Private IP Add...	EIP	AZ	Disk Properties
ecs_linux01	Running	EulerOS-Cloud...	192.168.123.241	--	杭州	Data ...

Disk Name	Status	Capacity (GB)	Disk Type
volume-zs	In-use	10 GB	zhangsan
as-config-001_TCPFQT0B-vol...	In-use	40 GB	zhangsan

6.2.3 Initializing an EVS Disk (Linux)

After attaching a data disk to an instance, you need to log in to the instance to partition and initialize the disk before it becomes available. This section uses an instance running EulerOS 2.5 64-bit as an example to describe how to create a primary partition on the data disk using fdisk, set the partition style to **MBR** and the file system format to **ext4**, mount the file system to the **/mnt/sdc** directory, and configure automatic attachment upon system start.

Step 1 Select the target Linux ECS and click **Remote Login**.

Name	Status	Flavor	Private IP Address	Creator	Operation
ecs_linux01	Running	2 vCPUs 4 GB	192.168.123.241	zhangsan	Remote Login

Step 2 Run the following command on the ECS to view the newly added data disk:

```
fdisk -l
```

The command output is as follows:

```
[root@ecs-linux01 ~]# fdisk -l

Disk /dev/vda: 42.9 GB, 42949672960 bytes, 83886080 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0x000af11b

      Device Boot      Start        End      Blocks   Id  System
/dev/vda1  *          2048     2099199     1048576   83  Linux
/dev/vda2          2099200    10485759    4193280   8e  Linux LVM

Disk /dev/mapper/cl-root: 3753 MB, 3753902080 bytes, 7331840 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/mapper/cl-swap: 536 MB, 536870912 bytes, 1048576 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/vdb: 10.7 GB, 10737418240 bytes, 20971520 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
```

The command output shows that the ECS has two disks, system disk **/dev/vda** and data disk **/dev/vdb**.

Run the following command to allocate partitions for the data disk using fdisk:

```
fdisk /dev/vdb
```

The command output is as follows:

```
[root@ecs-linux01 ~]# fdisk /dev/vdb
Welcome to fdisk (util-linux 2.23.2).

Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table
Building a new DOS disklabel with disk identifier 0x3c23dc79.

Command (m for help):
```

Step 3 Enter **n** and press **Enter**.

Entering **n** creates a partition.

There are two types of disk partitions:

Choosing **p** creates a primary partition.

Choosing **e** creates an extended partition.

```
Command (m for help): n
Partition type:
    p  primary (0 primary, 0 extended, 4 free)
    e  extended
Select (default p):
```

Step 4 Enter **p** and press **Enter**. The following describes how to create a primary partition.

In the information similar to that shown in the following figure, **Partition number** indicates the serial number of the primary partition. The value ranges from 1 to 4.

```
Command (m for help): n
Partition type:
    p  primary (0 primary, 0 extended, 4 free)
    e  extended
Select (default p): p
Partition number (1-4, default 1):
```

Step 5 Enter the number of the primary partition (for example, **1**), and press **Enter**.

For example, select **1** as the partition number.

In the information similar to that shown in the following figure, **First sector** indicates the start sector number. The value ranges from **2048** to **20971519**, and the default value is **2048**.

```
Partition number (1-4, default 1): 1
First sector (2048-20971519, default 2048): _
```

Step 6 Press **Enter**.

The default first sector number **2048** is used as an example.

In the information similar to that shown in the following figure, **Last sector** indicates the end sector number. The value ranges from **2048** to **20971519**, and the default value is **20971519**.

```
Partition number (1-4, default 1): 1
First sector (2048-20971519, default 2048):
Using default value 2048
Last sector, +sectors or +size{K,M,G} (2048-20971519, default 20971519): _
```



Step 7 Press **Enter**.

The default last sector number **20971519** is used as an example.

If information similar to that shown in the following figure is displayed, a partition is created for a 10 GB data disk.

```
Last sector, +sectors or +size{K,M,G} (2048-20971519, default 20971519):  
Using default value 20971519  
Partition 1 of type Linux and of size 10 GiB is set  
  
Command (m for help): _
```

Step 8 Enter **p** and press **Enter** to view the details about the created partition.

```
Command (m for help): p  
  
Disk /dev/vdb: 10.7 GB, 10737418240 bytes, 20971520 sectors  
Units = sectors of 1 * 512 = 512 bytes  
Sector size (logical/physical): 512 bytes / 512 bytes  
I/O size (minimum/optimal): 512 bytes / 512 bytes  
Disk label type: dos  
Disk identifier: 0xe949485d  
  
Device Boot Start End Blocks Id System  
/dev/vdb1 2048 20971519 10484736 83 Linux  
  
Command (m for help): _
```

Step 9 Enter **w** and press **Enter** to write the partition result into the partition table.

If information similar to that shown in the following figure is displayed, the partition is successfully created.

```
Command (m for help): w  
The partition table has been altered!  
  
Calling ioctl() to re-read partition table.  
Syncing disks.  
[root@ecs-linux01 ~]# _
```

Step 10 Run the following command to synchronize the new partition table to the data disk:

```
partprobe
```

Step 11 Run the following command to set the required format for the file system of the newly created partition:

```
mkfs -t ext4 /dev/vdb1
```

```
[root@ecs-linux01 ~]# mkfs -t ext4 /dev/vdb1
mke2fs 1.42.9 (28-Dec-2013)
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=8 blocks, Stripe width=8 blocks
655360 inodes, 2621184 blocks
131059 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=2151677952
80 block groups
32768 blocks per group, 32768 fragments per group
8192 inodes per group
Superblock backups stored on blocks:
      32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632

Allocating group tables: done
Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done
```

Step 12 Run the following commands to create a mount directory:

```
mkdir /mnt/sdc
mount /dev/vdb1 /mnt/sdc
```

Step 13 Run the following command to view the result:

```
df -TH
```

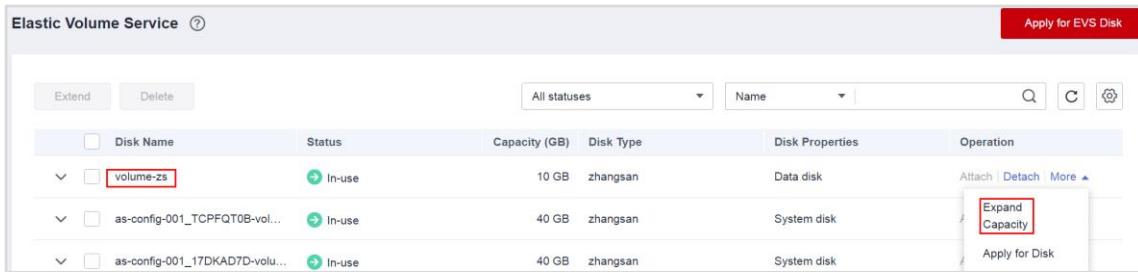
```
[root@ecs-linux01 ~]# df -TH
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/mapper/cl-root  xfs   3.8G  1.2G  2.6G  32% /
devtmpfs        devtmpfs 4.1G   0  4.1G  0% /dev
tmpfs           tmpfs   4.1G   0  4.1G  0% /dev/shm
tmpfs           tmpfs   4.1G  8.9M  4.1G  1% /run
tmpfs           tmpfs   4.1G   0  4.1G  0% /sys/fs/cgroup
/dev/vda1        xfs   1.1G 166M  899M  16% /boot
tmpfs           tmpfs  817M   0  817M  0% /run/user/0
/dev/vdb1        ext4   11G  38M  9.9G  1% /mnt/sdc
```

In the command output, the newly created **/dev/vdb1** partition has been mounted on **/mnt/sdc**.

6.2.4 Expanding Capacity of an EVS Disk (Linux)

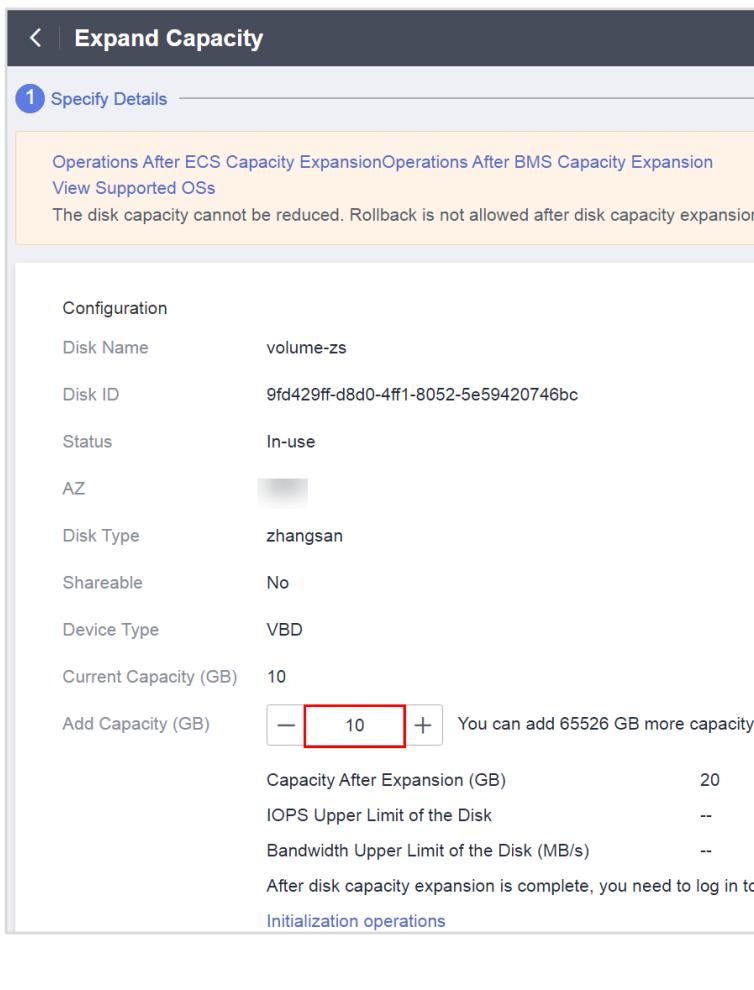
You can expand EVS disk capacity if the disk capacity becomes insufficient. For system disks, you can only expand the capacity of existing disks. For data disks, you can either expand the capacity of existing disks or add new disks and attach them to instances to expand the actual capacity.

Step 1 In the EVS disk list, locate the row that contains the target disk and choose **More > Expand Capacity**.



Disk Name	Status	Capacity (GB)	Disk Type	Disk Properties	Operation
volume-zs	In-use	10 GB	zhangsan	Data disk	Attach Detach More
as-config-001_TCPFQT0B-vol...	In-use	40 GB	zhangsan	System disk	
as-config-001_17DKAD7D-volu...	In-use	40 GB	zhangsan	System disk	

Step 2 Set **Add Capacity (GB)** as prompted and click **Next**.



1 Specify Details

Operations After ECS Capacity Expansion Operations After BMS Capacity Expansion
View Supported OSs

The disk capacity cannot be reduced. Rollback is not allowed after disk capacity expansion.

Configuration

Disk Name: volume-zs
Disk ID: 9fd429ff-d8d0-4ff1-8052-5e59420746bc
Status: In-use
AZ: 
Disk Type: zhangsan
Shareable: No
Device Type: VBD
Current Capacity (GB): 10
Add Capacity (GB): You can add 65526 GB more capacity.
Capacity After Expansion (GB): 20
IOPS Upper Limit of the Disk: --
Bandwidth Upper Limit of the Disk (MB/s): --
After disk capacity expansion is complete, you need to log in to [Initialization operations](#)

Next

Step 3 Confirm the EVS disk information and click **Apply Now**.

Type	Specifications
Disk Name	volume-zs
Disk ID	9fd429ff-d8d0-4ff1-8052-5e59420746bc
Status	In-use
AZ	[redacted]
Disk Type	zhangsan
Shareable	No
Device Type	VBD
Current Capacity (GB)	10
Add Capacity (GB)	10
IOPS Upper Limit of the Disk	--
Bandwidth Upper Limit of the Disk (MB/s)	--

[Back](#) [Apply Now](#)

Step 4 View the storage capacity change information on the console.

Disk Name	Status	Capacity (GB)	Disk Type	Disk Properties
volume-zs	In-use	20 GB	zhangsan	Data disk

Step 5 Log in to the Linux ECS and run the **fdisk -l** command to view the disk information.

```

Device      Boot   Start     End   Blocks   Id  System
/dev/vda1  *      2048 2099199 1048576  83  Linux
/dev/vda2      2099200 10485759 4193280  8e  Linux LVM

Disk /dev/vdb: 21.5 GB, 21474836480 bytes, 41943040 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0xe949485d

Device      Boot   Start     End   Blocks   Id  System
/dev/vdb1      2048 20971519 10484736  83  Linux

```

Step 6 For details about how to add partitions after capacity expansion, see 6.2.3 Initializing an EVS Disk (Linux).

6.2.5 Managing Snapshots (Linux)

A snapshot can capture the data and status of a disk at a certain time point. If a service change or application software upgrade is required, you can create a snapshot for the disk in advance. If a fault occurs during the change or upgrade, you can use the snapshot to quickly restore disk data, ensuring service continuity and security. You can also use snapshots for routine backup of disk data.

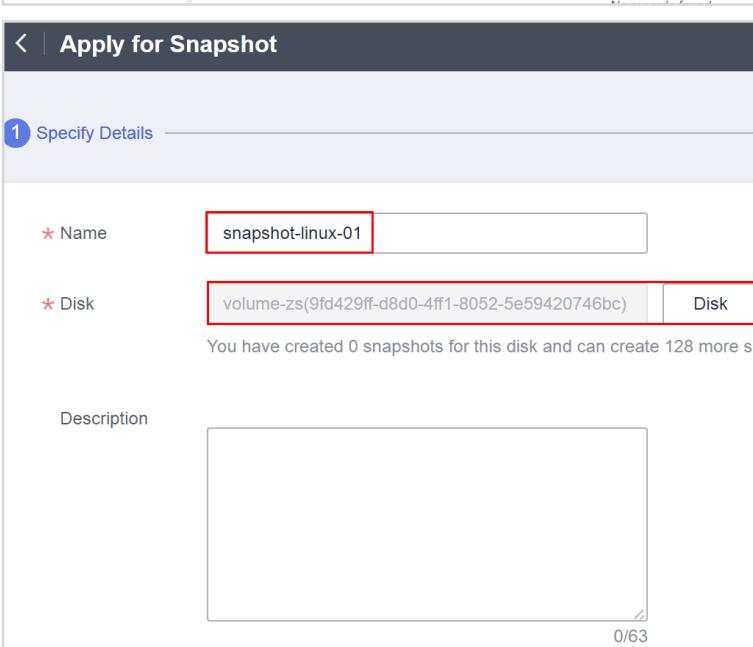
Step 1 Create the **test** directory in **/mnt/sdc**.

```
[root@ecs-linux01 sdc]# mkdir test  
[root@ecs-linux01 sdc]# ls  
lost+found test
```

Step 2 In the navigation pane on the left of **Cloud Server Console**, choose **Elastic Volume Service > Snapshots**. Then, click **Apply for Snapshot** and create a snapshot.



The screenshot shows the Cloud Server Console interface. On the left, there is a navigation sidebar with 'Cloud Server Console' at the top, followed by 'Dashboard', 'Elastic Cloud Server', and 'Elastic Volume Service'. Under 'Elastic Volume Service', 'Disks' is listed, and 'Schemas' is highlighted with a red box. To the right, a 'Snapshot' tab is active, showing a table with columns: Delete, Name, Status, Created, Disk Name, and Operation. A red box highlights the 'Name' column header. Below the table, there is a button labeled 'Apply for Snapshot'.



The screenshot shows the 'Apply for Snapshot' dialog box. At the top, it says 'Apply for Snapshot'. Below that, it says '1 Specify Details'. It has fields for 'Name' (snapshot-linux-01) and 'Disk' (volume-zs(9fd429ff-d8d0-4ff1-8052-5e59420746bc)). There is a note: 'You have created 0 snapshots for this disk and can create 128 more snapshots.' Below the disk selection, there is a 'Description' field with a placeholder 'Enter description...' and a character limit of '0/63'.

Step 3 View the snapshot on the console after it is successfully applied for.

Snapshot ?				
Delete		All statuses		Name
<input type="checkbox"/>	Name	Status	Created	Disk Name
▼	<input type="checkbox"/> snapshot-linux-01	Available		volume-zs

Step 4 Delete the **test** directory.

```
[root@ecs-linux01 sdc]# rm -rf test
[root@ecs-linux01 sdc]# ls
lost+found
```

Step 5 Run the **umount** command to cancel the association between the disk to be detached and the file system.

```
[root@ecs-linux01 ~]# umount /dev/vdb1
[root@ecs-linux01 ~]# df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/mapper/cl-root  3.5G  1.2G  2.4G  32% /
devtmpfs        3.8G    0  3.8G   0% /dev
tmpfs          3.9G    0  3.9G   0% /dev/shm
tmpfs          3.9G  8.4M  3.8G   1% /run
tmpfs          3.9G    0  3.9G   0% /sys/fs/cgroup
/dev/vda1       1014M 158M  857M  16% /boot
tmpfs          780M    0  780M   0% /run/user/0
[root@ecs-linux01 ~]#
```

Step 6 Detach the EVS disk.

Elastic Volume Service ?						Apply for EVS Disk
Extend		Delete	All statuses	Name	Operation	
<input type="checkbox"/>	Disk Name	Status	Capacity (GB)	Disk Type	Disk Properties	Operation
▼	<input type="checkbox"/> volume-zs	In-use	20 GB	zhangsan	Data disk	Attach Detach More ▾
▼	<input type="checkbox"/> as-config-001_TCPFQT0B-vol...	In-use	40 GB	zhangsan	System disk	Attach Detach More ▾

Step 7 In the snapshot list, locate the row that contains the target snapshot and click **Rollback data** on the right.

The screenshot shows the 'Snapshot' page in the Cloud Server Console. On the left, there's a sidebar with 'Dashboard', 'Elastic Cloud Server', 'Elastic Volume Service', 'Disks', and 'Snapshots'. The 'Snapshots' item is highlighted with a red box. The main area has a table titled 'Snapshot' with columns: Name, Status, Created, Disk Name, and Operation. One row is visible, showing 'snapshot-linux-01' with 'Available' status, 'Created' date, 'volume-zs' disk name, and 'Rollback data' and 'Apply for Disk' buttons.

Step 8 Perform the rollback.

The screenshot shows the 'Rollback data' dialog box. It contains a warning message: 'Are you sure you want to roll back the disk to the following snapshot? A snapshot can be used to roll back its source disk only when the snapshot is in the Available state and the source disk is in the Available or Rollback failed state.' Below this, there are two tables: 'Snapshots' and 'Disk'. The 'Snapshots' table shows 'snapshot-linux-01' as Available. The 'Disk' table shows 'volume-zs' as Available. At the bottom are 'OK' and 'Cancel' buttons, with 'OK' highlighted by a red box.

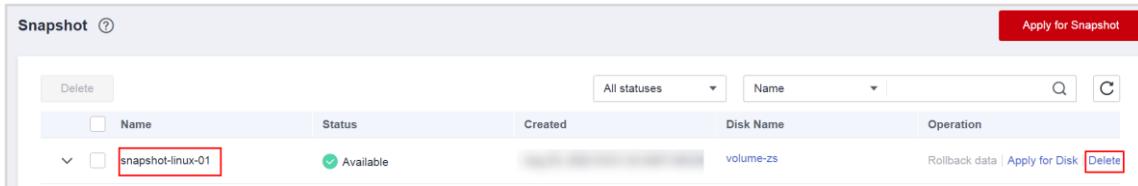
Step 9 Attach the disk again. For details, see 6.2.2 Attaching an EVS Disk. Attach /dev/vdb1 to the /mnt/sdc directory again.

```
[root@ecs-linux01 ~]# mount /dev/vdb1 /mnt/sdc
[root@ecs-linux01 ~]# df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/mapper/cl-root  3.5G  1.2G  2.4G  32% /
devtmpfs        3.8G    0  3.8G   0% /dev
tmpfs          3.9G    0  3.9G   0% /dev/shm
tmpfs          3.9G  8.4M  3.8G   1% /run
tmpfs          3.9G    0  3.9G   0% /sys/fs/cgroup
/dev/vda1     1014M 158M  857M  16% /boot
tmpfs          780M    0  780M   0% /run/user/0
/dev/vdb1       9.8G  37M  9.2G   1% /mnt/sdc
```

Step 10 Verify that the test directory has been restored.

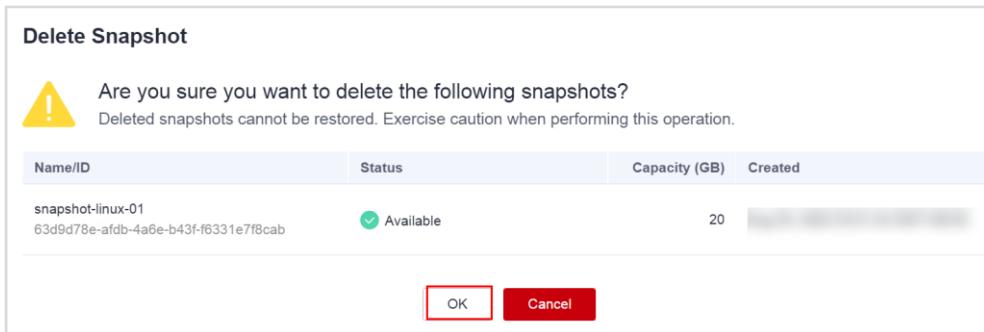
```
[root@ecs-linux01 ~]# cd /mnt/sdc
[root@ecs-linux01 sdc]# ll
total 20
drwx----- 2 root root 16384 Mar 19 14:31 lost+found
drwxr-xr-x  2 root root  4096 Mar 19 14:34 test
```

Step 11 Select the snapshot to be deleted and click **Delete**.



Name	Status	Created	Disk Name	Operation
snapshot-linux-01	Available		volume-zs	Rollback data Apply for Disk Delete

Step 12 In the displayed dialog box, click **OK**.



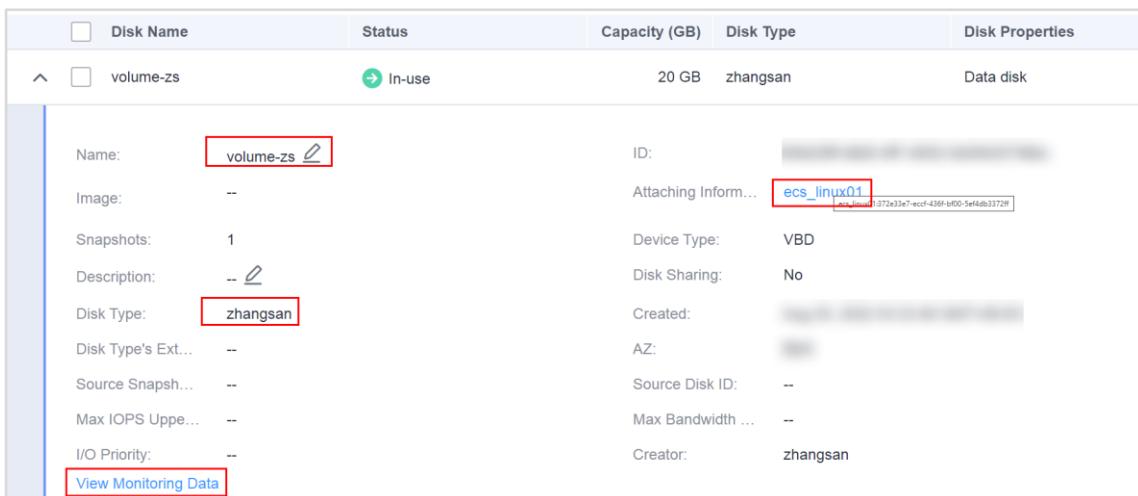
Are you sure you want to delete the following snapshots?
Deleted snapshots cannot be restored. Exercise caution when performing this operation.

Name/ID	Status	Capacity (GB)	Created
snapshot-linux-01 63d9d78e-afdb-4a6e-b43f-f6331e7f8cab	Available	20	

OK **Cancel**

6.2.6 Managing EVS Disks

Step 1 On the **Elastic Volume Service** page, click the icon in front of the target disk to view its details.



Disk Name	Status	Capacity (GB)	Disk Type	Disk Properties
volume-zs	In-use	20 GB	zhangsan	Data disk

Name: volume-zs **L**

Image: --

Snapshots: 1

Description: -- **L**

Disk Type: zhangsan **R**

Disk Type's Ext...: --

Source Snapsh...: --

Max IOPS Uppe...: --

I/O Priority: --

ID: [REDACTED]

Attaching Inform...: **ecs_linux01** [REDACTED]

Device Type: VBD

Disk Sharing: No

Created: [REDACTED]

AZ: [REDACTED]

Source Disk ID: --

Max Bandwidth ...: --

Creator: zhangsan

View Monitoring Data

Step 2 Click **View Monitoring Data** to view the read and write rates of the EVS disk.



7 VPC

7.1 Overview

7.1.1 About This Exercise

Manage the lifecycle of a VPC.

7.1.2 Objectives

- Learn how to apply for a VPC.
- Learn how to manage a VPC.

7.1.3 Process

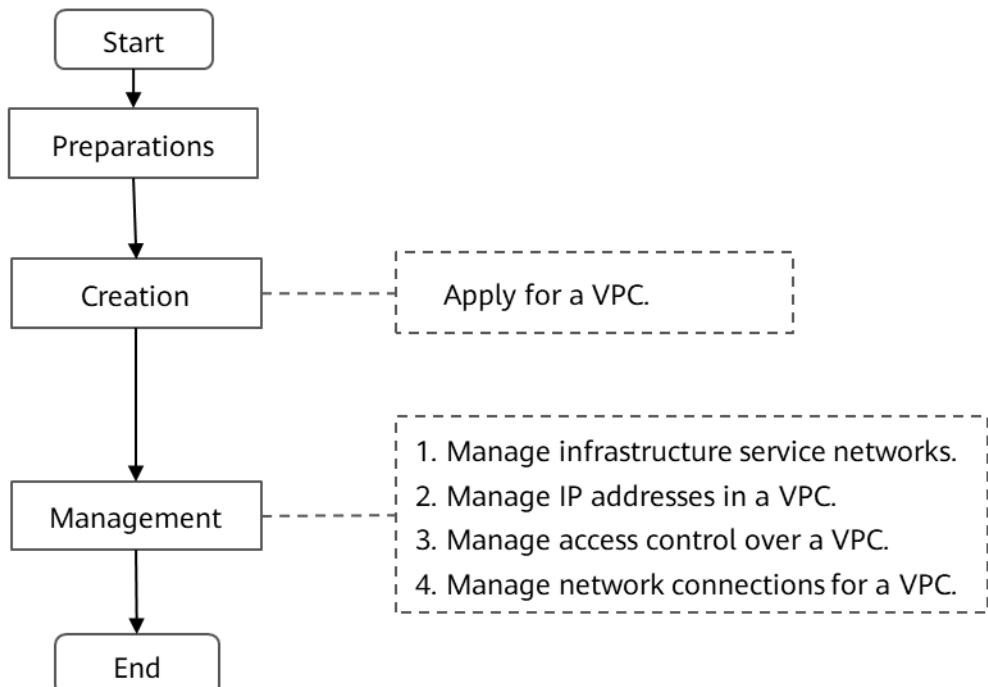
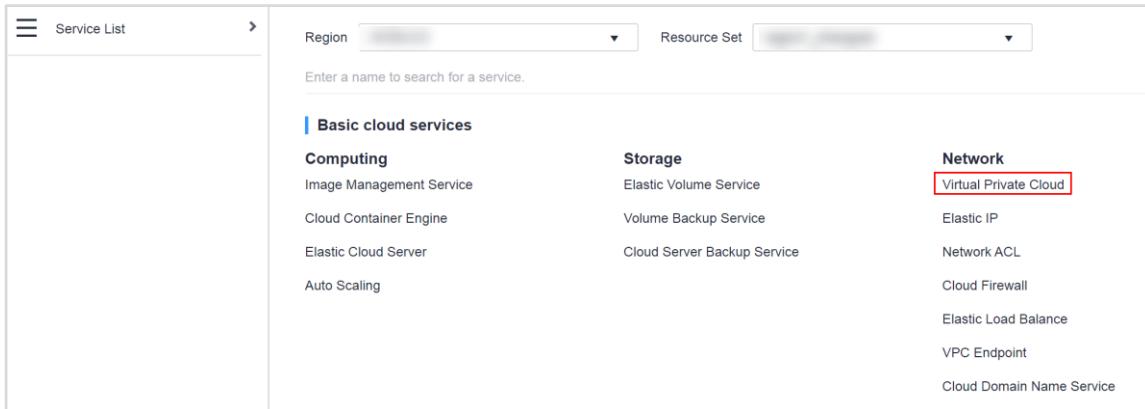


Figure 7-1 VPC operation process

7.2 Procedure

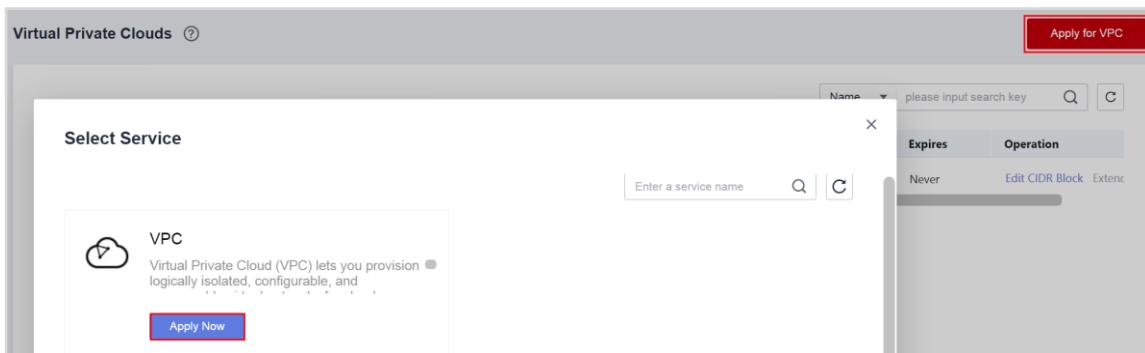
7.2.1 Applying for a VPC

- Step 1 Log in to ManageOne Operation Portal as a VDC administrator, click **Service List**, and choose **Network > Virtual Private Cloud**.



The screenshot shows the ManageOne Service List interface. At the top, there are dropdown menus for Region and Resource Set. Below them is a search bar with placeholder text "Enter a name to search for a service.". Under the heading "Basic cloud services", there are three columns: Computing, Storage, and Network. The "Network" column contains several options: Virtual Private Cloud (which is highlighted with a red box), Elastic IP, Network ACL, Cloud Firewall, Elastic Load Balance, VPC Endpoint, and Cloud Domain Name Service.

- Step 2 On the displayed page, click **Apply for VPC** in the upper right corner. In the displayed dialog box, select **VPC** and click **Apply Now**.



The screenshot shows a dialog box titled "Virtual Private Clouds". It has a header with "Virtual Private Clouds" and a red button "Apply for VPC". Below the header is a search bar with placeholder text "please input search key" and a "Name" dropdown. A "Select Service" section contains a card for "VPC" with a description: "Virtual Private Cloud (VPC) lets you provision logically isolated, configurable, and". At the bottom of this section is a blue "Apply Now" button. To the right of the "Select Service" section is a sidebar with tabs "Name", "Expires", and "Operation". The "Expires" tab is active, showing "Never". There are also buttons for "Edit CIDR Block" and "Extend".

- Step 3 On the displayed page, set **Name**, **External Network**, and **Required Duration** in the **Basic Information** area and **Name**, **CIDR Block**, and **Gateway** in the **Subnet Settings** area, retain the default values for other parameters, and click **Apply Now**.

< Apply for VPC ?

Basic Information

Region

Select your region and then project from the top menu bar.

* Name

* External Network (az0.dc0) × dummy_external_network ?

Group : group1

AZ :

CIDR Block /

CIDR Block is mandatory if Subscribe to EI&PaaS Services is set to Yes.

Unavailable CIDR blocks: 100.127.0.0/23, 192.168.21.0/24, 192.168.26.0/24, 169.254.0.0 with 0, 127, or a number ranging from 224 to 255

* Required Duration placeholder

You can set **Required Duration** to **1 year** or **Custom**.

Subnet Settings

* Name

* DHCP ⓘ If the subnet has a cloud server with a critical service, use :

IPv4 Address Configuration

* CIDR Block

Unavailable CIDR blocks: 100.127.0.0/23, 192.168.21.0/24, 192.168.26.0/24 with 0, 127, or a number ranging from 224 to 255

* Gateway

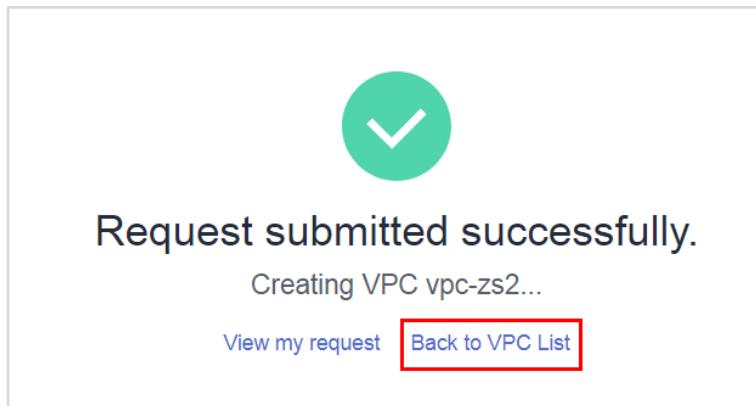
Allocation Pools -

⊕ Adding an Automatically Assigned Address Pool It is recommended th

DNS Server Address 1



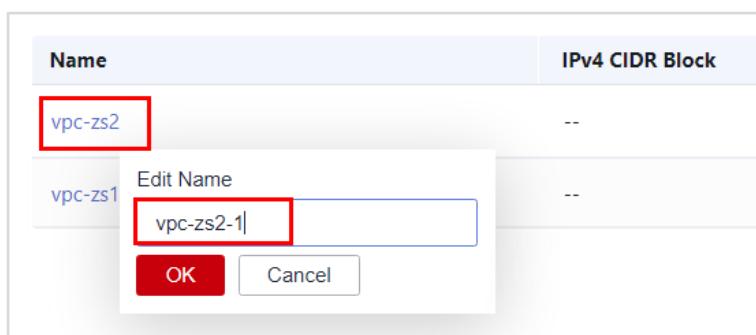
Step 4 On the displayed page, click **Back to VPC List** to view the application result.



Virtual Private Clouds <small>(?)</small>			
Name	IPv4 CIDR Block	Status	Subnets
vpc-zs2	--	Normal	1
vpc-zs1	--	Normal	1

7.2.2 Managing a VPC

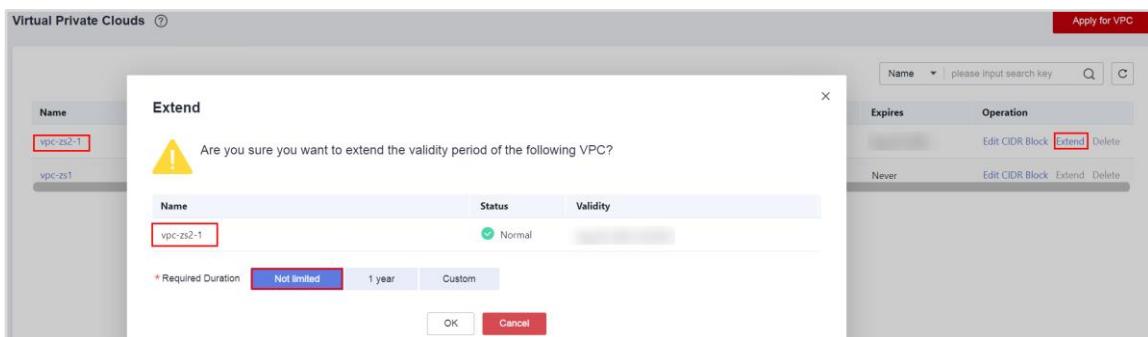
Step 1 In the VPC list, move the cursor to the right of the VPC (for example, **vpc-zs2**) to be modified, click the icon on the right, and change the VPC name.



Click **OK** and view the VPC list.

Name	IPv4 CIDR Block	Status
vpc-zs2-1	--	Normal
vpc-zs1	--	Normal

- Step 2** Extend the validity period of a VPC. Locate the row containing the target VPC (**vpc-zs2-1** in this example) and click **Extend** in the **Operation** column. In the displayed **Extend** dialog box, set **Required Duration** (for example, **Not limited**) and click **OK**.



Return to the VPC list and view the result.

Name	IPv4 CIDR Block	Status	Subnets	External Network	AZ/Group	Expires	Operation
vpc-zs2-1	--	Normal	1	dummy_external_netw...		Never	Edit CIDR Block Extend Delete
vpc-zs1	--	Normal	1	dummy_external_netw...	杭州/group1	Never	Edit CIDR Block Extend Delete

- Step 3** Click **vpc-zs2-1** to go to the details page. In the **Networking Components** area on the right, click **1** following **Subnets** to go to the **Subnets** page. In the upper right corner of the page, click **Create Subnet**. In the displayed dialog box, set **Name**, **CIDR Block**, and **Gateway** as required, and click **OK**.

Subnets

Name	Status	CIDR Block	Allocation P...	Gateway	DHCP	DNS Server ...	NTP Server ...	Static Route	IPv6 Access ...	IPv4 Multic...	IPv4
subnet-zs2	Normal	192.168.121....	192.168.121....	192.168.121.1	Enabled	192.168.21.1...	--	0	--	--	--

Create Subnet

* VPC: vpc-zs2-1

IPv4 CIDR Block: --
The VPC already contains 1 subnets.

* Name: subnet-zs2-2

* DHCP: Enabled

If the subnet has a cloud server with a critical service, use a fixed IP address for that server.

IPv4 Address Configuration

* CIDR Block: 192 . 168 . 122 . 0 / 24
Unavailable CIDR blocks: 100.127.0.0/23, 192.168.21.0/24, 192.168.26.0/24, 169.254.0.0/16, 192.168.128.0/20, 10.200.16.0/24, 127.0.0.0/8; any network segment that begins with 0, 127, or a number ranging from 224 to 255

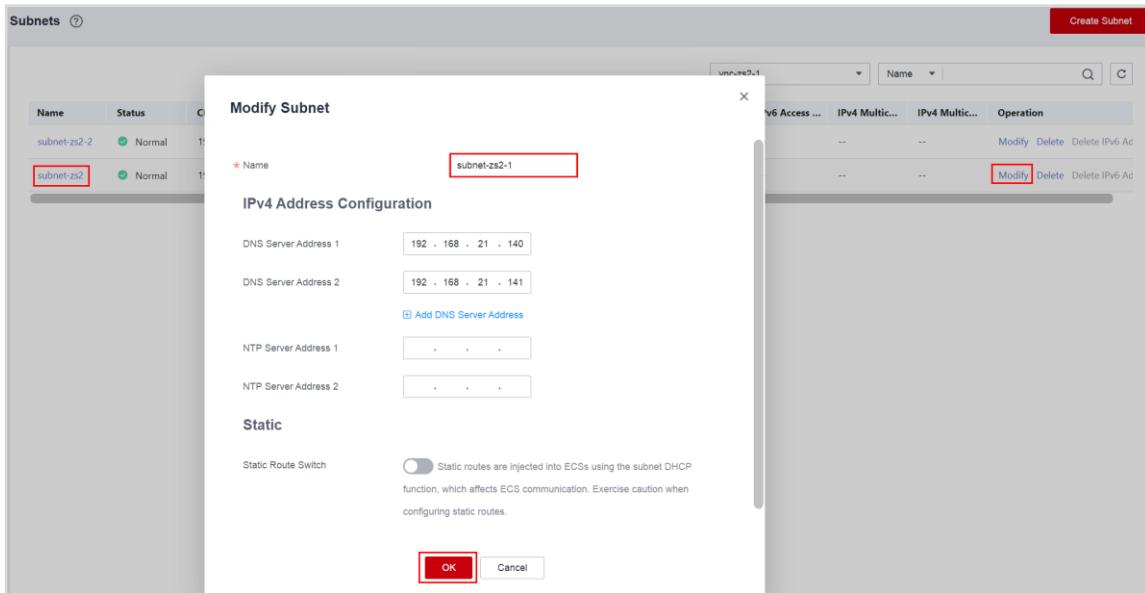
* Gateway: 192 . 168 . 122 . 1

OK **Cancel**

Return to the subnet list and view the result.

Name	Status	CIDR Block	Allocation P...	Gateway	DHCP	DNS Server ...
subnet-zs2-2	Normal	192.168.122....	192.168.122....	192.168.122.1	Enabled	192.168.21.1...
subnet-zs2	Normal	192.168.121....	192.168.121....	192.168.121.1	Enabled	192.168.21.1...

- Step 4** Modify the subnet information. Locate the row containing the target subnet (for example, **subnet-zs2**), click **Modify** in the **Operation** column. In the displayed dialog box, modify parameters (for example, the subnet name) as required, and click **OK**.



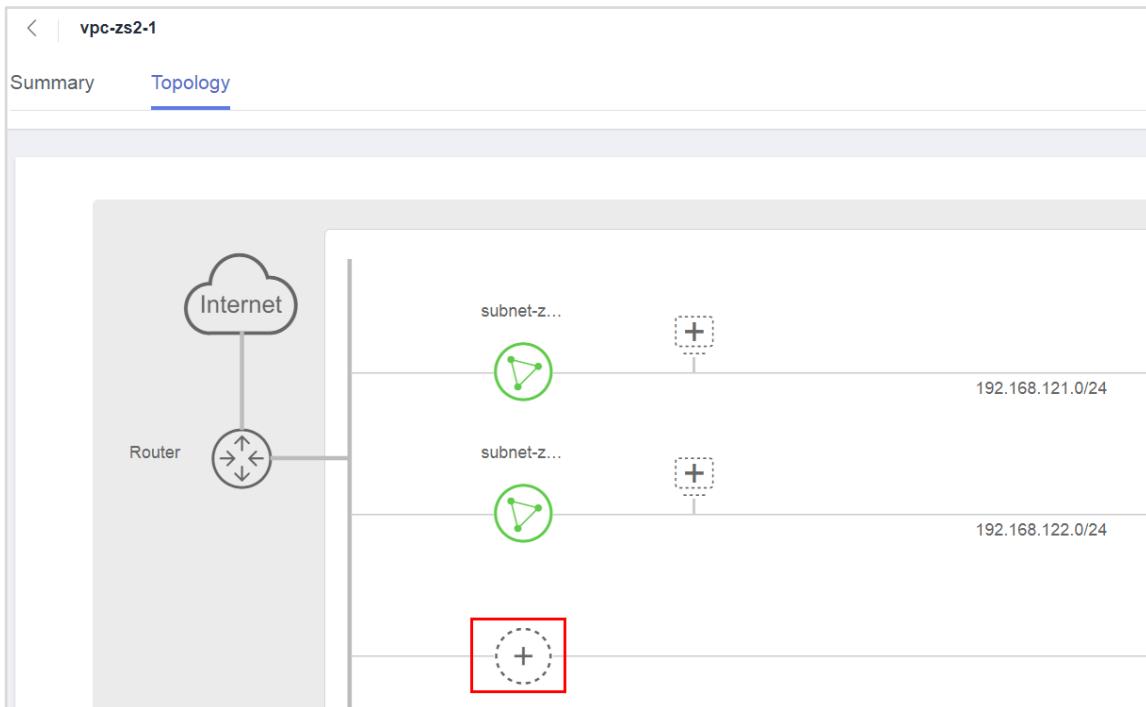
Return to the subnet list and view the result.

Name	Status	CIDR Block	Allocation P...	Gateway	DHCP
subnet-zs2-2	Normal	192.168.122....	192.168.122....	192.168.122.1	Enabled
subnet-zs2-1	Normal	192.168.121....	192.168.121....	192.168.121.1	Enabled

7.2.3 Quiz

[Question 1] In addition to the preceding method, is there any other method to create a subnet?

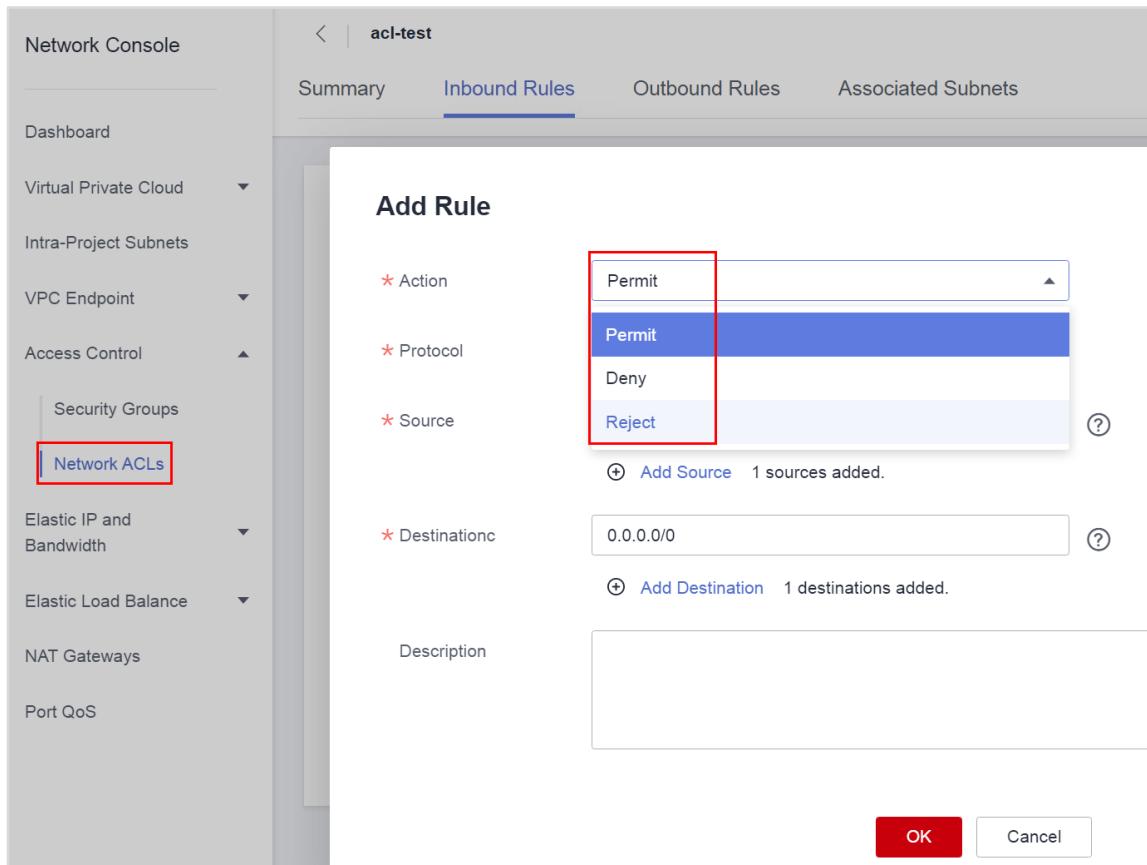
[Answer] Tenants can also create and configure subnets on the VPC topology page.



[Question 2] Which services provide access control for VPC traffic?

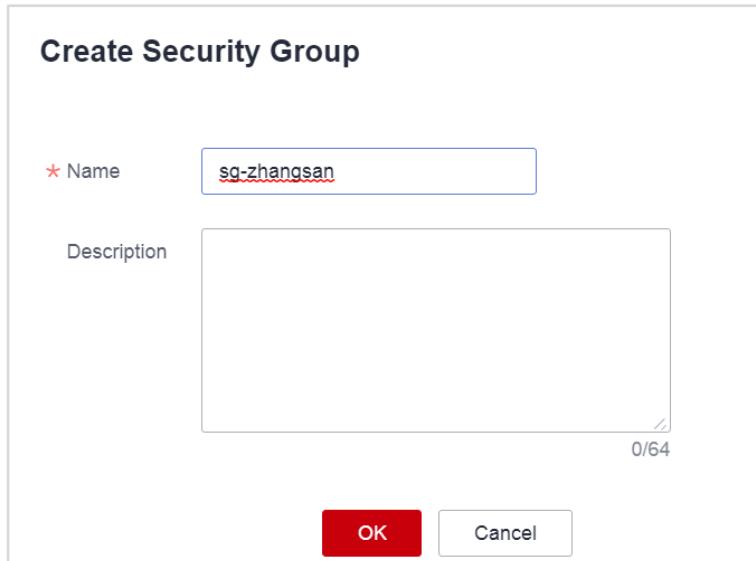
[Answer]

Security Group and Network ACL are used to control the access to networks in a VPC. Security groups control the traffic to and from compute instances, and network ACLs control the traffic to and from subnets. In HUAWEI CLOUD Stack, security groups are configured with whitelists, and network ACLs are configured **Permit**, **Deny**, or **Reject** policies.



- [Verification] Enable the port for remote login in a security group so that you can remotely log in to the associated ECS.

Create a security group and do not add any inbound rules.



Create Security Group

* Name

Description

OK Cancel

Click the name of a created security group and delete all inbound rules.

Add an ECS (for example, ecs-zs-0001. If no ECS is available, create one by referring to section 3.2.) to security group sg-zhangsan and ensure that ecs-zs-0001 is associated with only sg-zhangsan (if there are other associated security groups, delete them).

NIC	Cloud Server	Binding Status	Operation
192.168.123.210	as-config-001_TCPFQT0B	Unbound	Bind NIC Unbind NIC
192.168.123.235	ecs-zs-0002	Unbound	Bind NIC Unbind NIC
192.168.123.224	as-config-001_17DKAD7D	Unbound	Bind NIC Unbind NIC
192.168.123.72	ecs-zs1	Unbound	Bind NIC Unbind NIC
192.168.123.229	ecs-temp1	Unbound	Bind NIC Unbind NIC
192.168.123.241	ecs_linux01	Unbound	Bind NIC Unbind NIC
192.168.123. [redacted]	ecs-zs-0001	Unbound	Bind NIC Unbind NIC

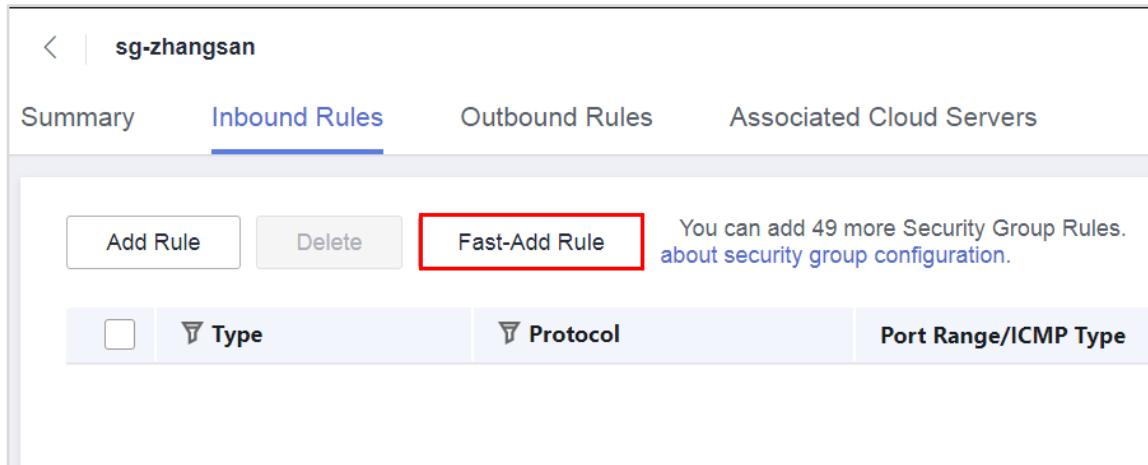
On the ECS console, select another ECS, for example, ecs-zs-0002, and remotely log in to ecs-zs-0002. (The two ECSs must be in the same VPC. If no ECS is available, create one by referring to section 3.2.) Then, remotely log in to ecs-zs-0001 from ecs-zs-0002 over SSH.

When there is no inbound rule configured:

```
Authorized users only. All activities may be monitored and reported.  
ecs-zs-0002 login: root  
Password:  
Last login: [REDACTED] on tty1  
  
Welcome to Huawei Cloud Service  
  
[root@ecs-zs-0002 ~]# ssh root@192.168.123.135  
^C
```

According to the verification result, you cannot remotely log in to ecs-zs-0001.

Enable the common remote login protocols in sg-zhangsan.



The screenshot shows the 'sg-zhangsan' security group configuration page. The 'Inbound Rules' tab is active. At the top, there are buttons for 'Add Rule', 'Delete', and 'Fast-Add Rule' (which is highlighted with a red box). To the right, a note says 'You can add 49 more Security Group Rules.' and provides a link 'about security group configuration.'. Below these buttons are three columns: 'Type' (with a checkbox icon), 'Protocol' (with a network icon), and 'Port Range/ICMP Type'.

Fast-Add Inbound Rule

Security Group **sg-zhangsan**

★ Protocols and Ports

Remote Login and Ping:

<input checked="" type="checkbox"/> SSH (22)	<input checked="" type="checkbox"/> RDP (3389)	<input checked="" type="checkbox"/> FTP (20-21)	<input checked="" type="checkbox"/> Telnet (23)
--	--	---	---

Web Service:

<input type="checkbox"/> HTTP (80)	<input type="checkbox"/> HTTPS (443)	<input type="checkbox"/> HTTP_ALT (8080)
------------------------------------	--------------------------------------	--

Database:

<input type="checkbox"/> MySQL (3306)	<input type="checkbox"/> MS SQL (1433)	<input type="checkbox"/> PostgreSQL (5432)	<input type="checkbox"/> Oracle (1521)	<input type="checkbox"/> Redis (6379)
<input type="checkbox"/> mongoDB(27017)				

Network

<input type="checkbox"/> DNS (TCP/53)	<input type="checkbox"/> DNS(UDP/53)	<input type="checkbox"/> NTP(123)
---------------------------------------	--------------------------------------	-----------------------------------

Permission Control

<input type="checkbox"/> LDAP (389)			
-------------------------------------	--	--	--

OK Cancel

< | **sg-zhangsan** | >

Summary **Inbound Rules** Outbound Rules Associated Cloud Servers Export Rule

Add Rule Delete Fast-Add Rule You can add 45 more Security Group Rules. If no rules are added to the security group, the ECSs associated with it may not be allowed to access internal or external networks. [Learn more about security group configuration.](#)

Type	Protocol	Port Range/ICMP Type	Remote End	Description	Operation
IPv4	TCP	22	0.0.0.0/0	SSH (22)	Modify Clone Delete
IPv4	TCP	3389	0.0.0.0/0	RDP (3389)	Modify Clone Delete
IPv4	TCP	20-21	0.0.0.0/0	FTP (20-21)	Modify Clone Delete
IPv4	TCP	23	0.0.0.0/0	Telnet (23)	Modify Clone Delete

When an inbound rule that enables port 22 for remote login is added:

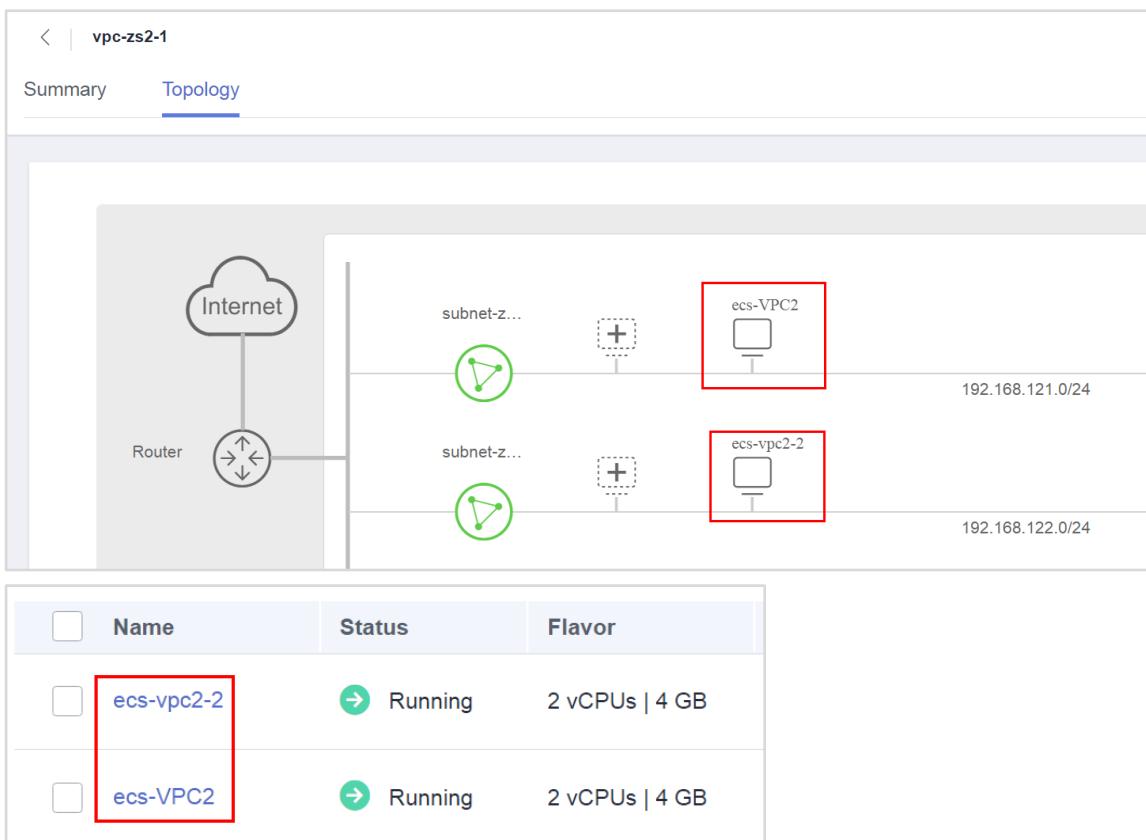
```
Authorized users only. All activities may be monitored and reported.  
Hint: Caps Lock on  
  
ecs-zs-0002 login: root  
Password:  
Last login: [REDACTED] on tty1  
  
Welcome to Huawei Cloud Service  
  
[root@ecs-zs-0002 ~]# ssh -p 22 root@192.168.123.135  
  
Authorized users only. All activities may be monitored and reported.  
root@192.168.123.135's password:  
Last login: [REDACTED] from 192.168.123.171  
  
Welcome to Huawei Cloud Service  
  
[root@ecs-zs-0001 ~]#
```

According to the verification result, you can remotely log in to ecs-zs-0001 from ecs-zs-0002.

All ECSs in the subsequent exercise must be associated with the default security group. In this lab environment, the default security group allows all inbound and outbound traffic.

- [Verification] Use network ACLs to control the traffic to and from subnets.

Select an ECS from each of the two subnets of vpc-zs2-1 (if no ECS is available, create them first by referring to section 3.2).



The screenshot shows the VPC topology and the list of ECS instances.

VPC Topology:

- An Internet connection is connected to a Router.
- The Router connects to two subnets: subnet-zs... and subnet-zs... (both represented by green icons).
- Subnet 1 (subnet-zs...) contains an ECS instance named "ecs-VPC2" (represented by a white icon in a red box).
- Subnet 2 (subnet-zs...) contains an ECS instance named "ecs-vpc2-2" (represented by a white icon in a red box).
- The IP range for Subnet 1 is 192.168.121.0/24.
- The IP range for Subnet 2 is 192.168.122.0/24.

ECS List:

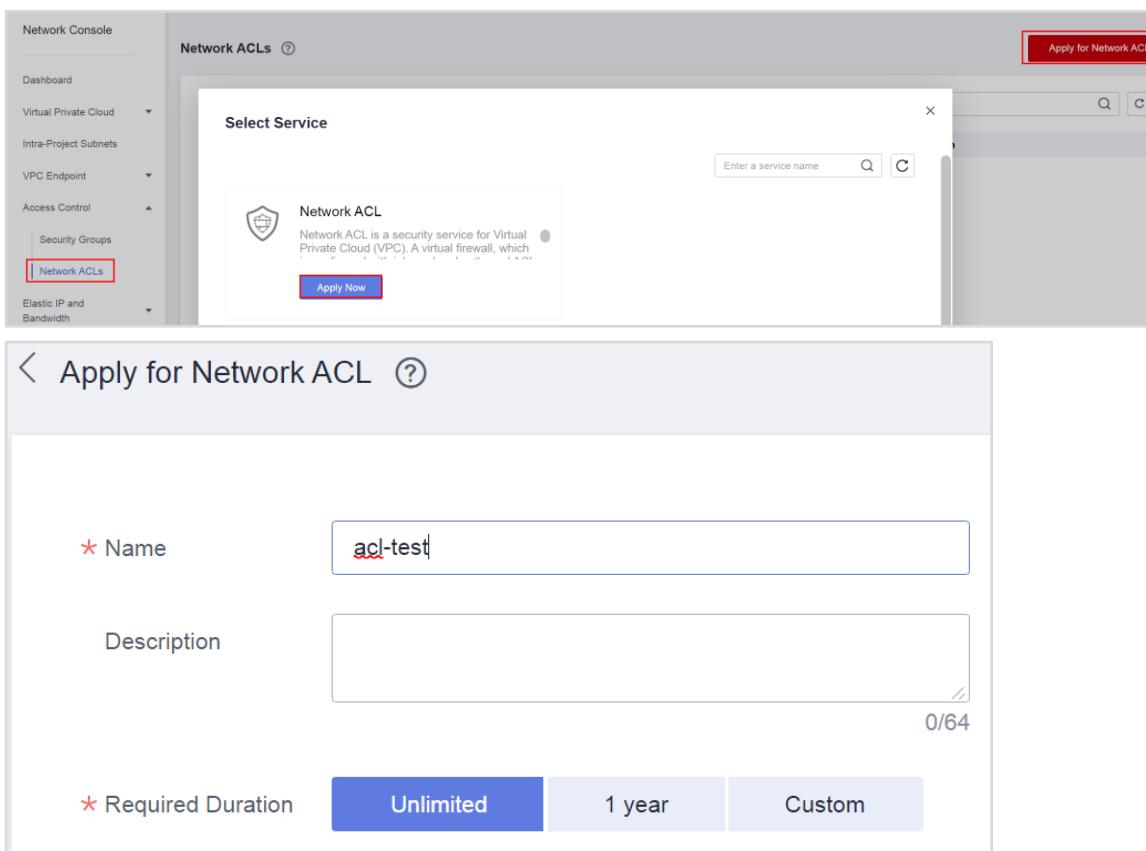
<input type="checkbox"/>	Name	Status	Flavor
<input type="checkbox"/>	ecs-vpc2-2	Running	2 vCPUs 4 GB
<input type="checkbox"/>	ecs-VPC2	Running	2 vCPUs 4 GB

Remotely log in to ecs-VPC2 and ping the private IP address of ecs-vpc2-2 to check the connectivity between the two subnets.

```
Authorized users only. All activities may be monitored and reported.  
ecs-vpc2 login: root  
Password:  
Last failed login: [REDACTED] on tty1  
There was 1 failed login attempt since the last successful login.  
Last login: [REDACTED] on tty1  
  
Welcome to Huawei Cloud Service  
  
[root@ecs-vpc2 ~]# ping 192.168.122.25  
PING 192.168.122.25 (192.168.122.25) 56(84) bytes of data.  
64 bytes from 192.168.122.25: icmp_seq=1 ttl=64 time=0.746 ms  
64 bytes from 192.168.122.25: icmp_seq=2 ttl=64 time=0.347 ms  
64 bytes from 192.168.122.25: icmp_seq=3 ttl=64 time=0.312 ms  
64 bytes from 192.168.122.25: icmp_seq=4 ttl=64 time=0.349 ms  
^C  
--- 192.168.122.25 ping statistics ---  
4 packets transmitted, 4 received, 0% packet loss, time 2999ms  
rtt min/avg/max/mdev = 0.312/0.438/0.746/0.179 ms  
[root@ecs-vpc2 ~]# _
```

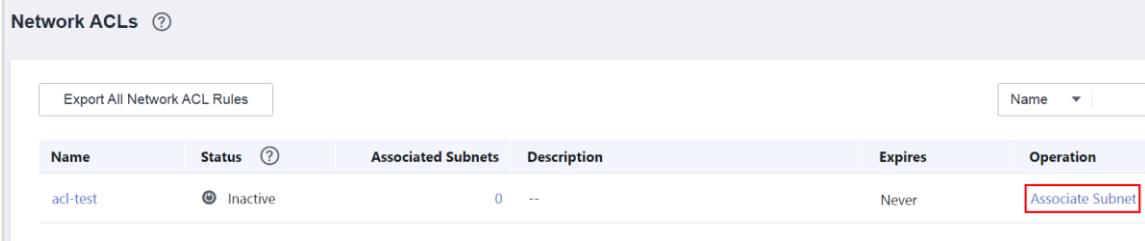
According to the verification result, different subnets in the same VPC can communicate with each other by default.

Create a network ACL and associate it with the two subnets in vpc-zs2-1.



The screenshot shows the HUAWEI CLOUD Network Console interface. On the left, there is a sidebar with navigation links: Dashboard, Virtual Private Cloud, Intra-Project Subnets, VPC Endpoint, Access Control (Security Groups, Network ACLs), and Elastic IP and Bandwidth. The 'Network ACLs' link is highlighted with a red box. The main area shows a 'Select Service' dialog box with the title 'Network ACL'. It describes a Network ACL as a security service for Virtual Private Cloud (VPC). A 'Network ACL' icon is shown. Below the description is a 'Apply Now' button. To the right of the dialog, there is a search bar and a 'Apply for Network ACL' button. At the bottom of the main window, there is a form for creating a new Network ACL. The 'Name' field is filled with 'acl-test'. The 'Description' field is empty. Below the fields, there is a section for 'Required Duration' with three options: 'Unlimited' (selected), '1 year', and 'Custom'.

Enter the network ACL name, select the required duration, and click **Create Now** to create a network ACL and associate it with the two subnets in vpc-zs2-1.



Network ACLs

Name	Status	Associated Subnets	Description	Expires	Operation
acl-test	Inactive	0	--	Never	Associate Subnet

Associate Subnet

VPC: vpc-zs2-1

Name	IPv4 CIDR Block
subnet-zs2-2	192.168.122.0/24
subnet-zs2-1	192.168.121.0/24

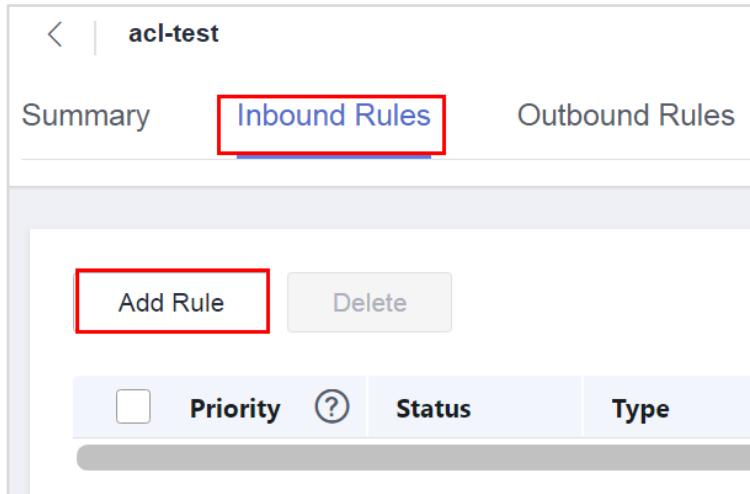
OK Cancel

Verify the network connectivity between the two subnets in vpc-zs2-1 again.

```
[root@ecs-vpc2 ~]# ping 192.168.122.25
PING 192.168.122.25 (192.168.122.25) 56(84) bytes of data.
^C
--- 192.168.122.25 ping statistics ---
38 packets transmitted, 0 received, 100% packet loss, time 36999ms
```

According to the verification result, the two subnets in vpc-zs2-1 cannot communicate with each other after they are associated with the network ACL.

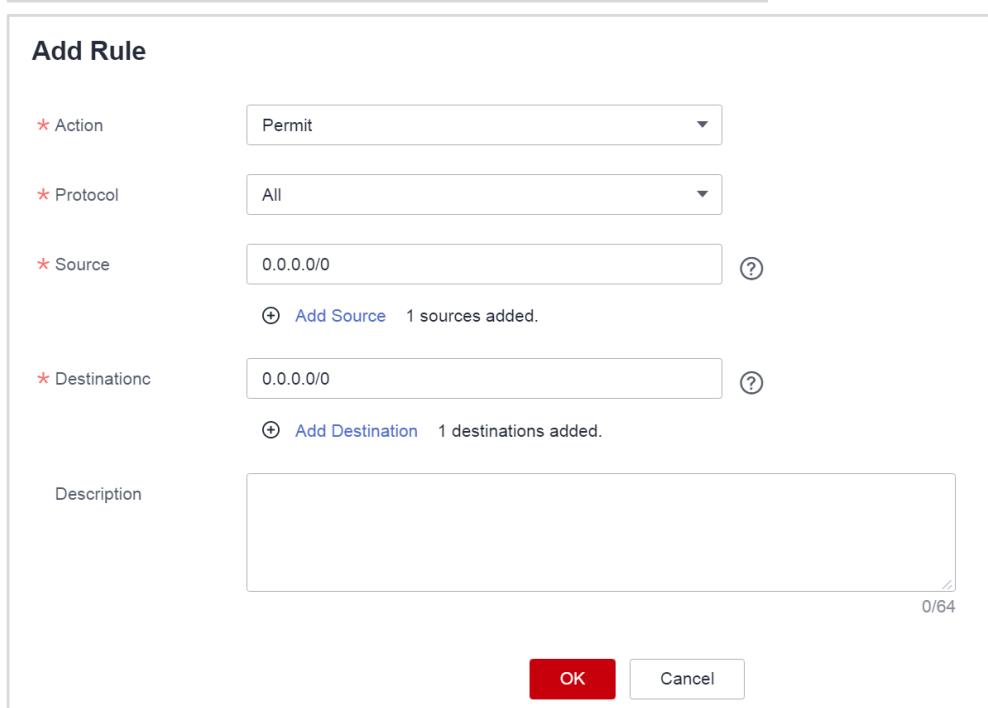
Add inbound and outbound rules to the network ACL to allow all traffic. Verify the network connectivity between the two subnets in vpc-zs2-1 again.



Inbound Rules

Add Rule

<input type="checkbox"/>	Priority	Status	Type



Add Rule

* Action: Permit

* Protocol: All

* Source: 0.0.0.0/0

+ Add Source 1 sources added.

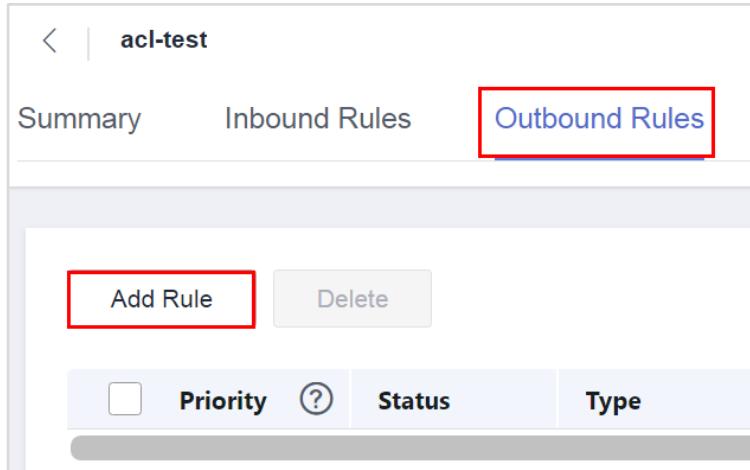
* Destination: 0.0.0.0/0

+ Add Destination 1 destinations added.

Description:

0/64

OK Cancel



Outbound Rules

Add Rule

<input type="checkbox"/>	Priority	Status	Type

Add Rule

* Action: Permit

* Protocol: All

* Source: 0.0.0.0/0

+ Add Source 1 sources added.

* Destination: 0.0.0.0/0

+ Add Destination 1 destinations added.

Description:

0/64

OK Cancel

```
Authorized users only. All activities may be monitored and reported.
Hint: Caps Lock on

ecs-vpc2 login: root
Password:
Last login: [REDACTED] on tty1

Welcome to Huawei Cloud Service

[root@ecs-vpc2 ~]# ping 192.168.122.25
PING 192.168.122.25 (192.168.122.25) 56(84) bytes of data.
64 bytes from 192.168.122.25: icmp_seq=1 ttl=64 time=0.885 ms
64 bytes from 192.168.122.25: icmp_seq=2 ttl=64 time=0.328 ms
64 bytes from 192.168.122.25: icmp_seq=3 ttl=64 time=0.333 ms
64 bytes from 192.168.122.25: icmp_seq=4 ttl=64 time=0.297 ms
^C
--- 192.168.122.25 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3000ms
rtt min/avg/max/mdev = 0.297/0.460/0.885/0.246 ms
[root@ecs-vpc2 ~]#
```

As shown in the preceding figure, after the inbound and outbound rules are added, the two subnets in vpc-zs2-1 can communicate with each other.

8 VPC Peering

8.1 Overview

8.1.1 About This Exercise

Create VPC peering connections, check connectivity, and use VPC peering connections.

8.1.2 Objectives

- Learn how to create and use VPC peering connections.
- Understand the restrictions on using VPC peering connections.

8.1.3 Process

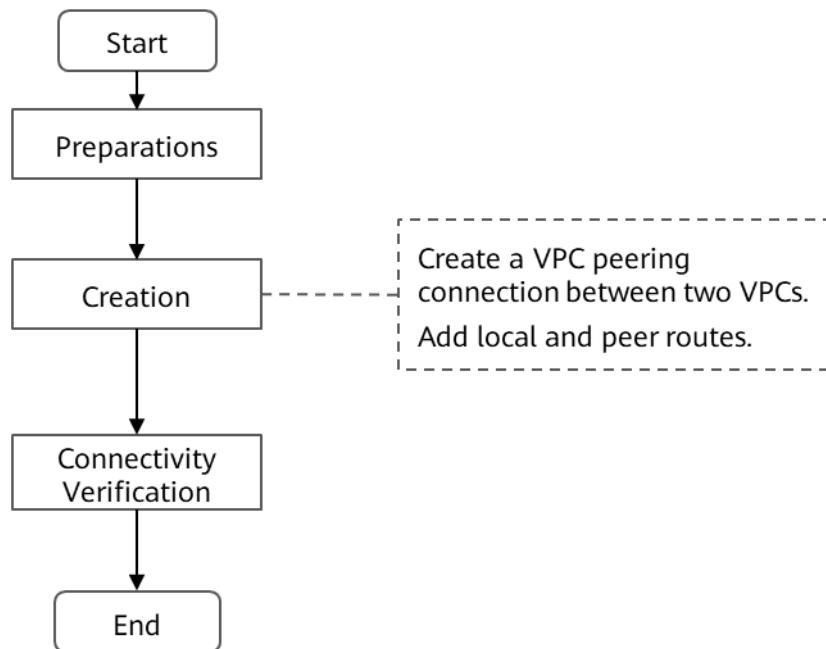
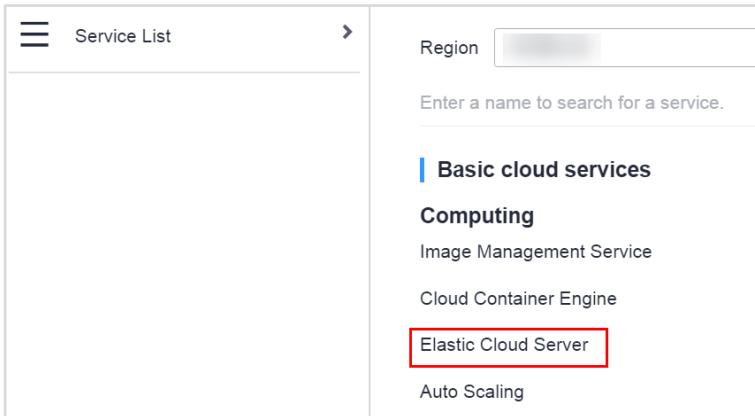


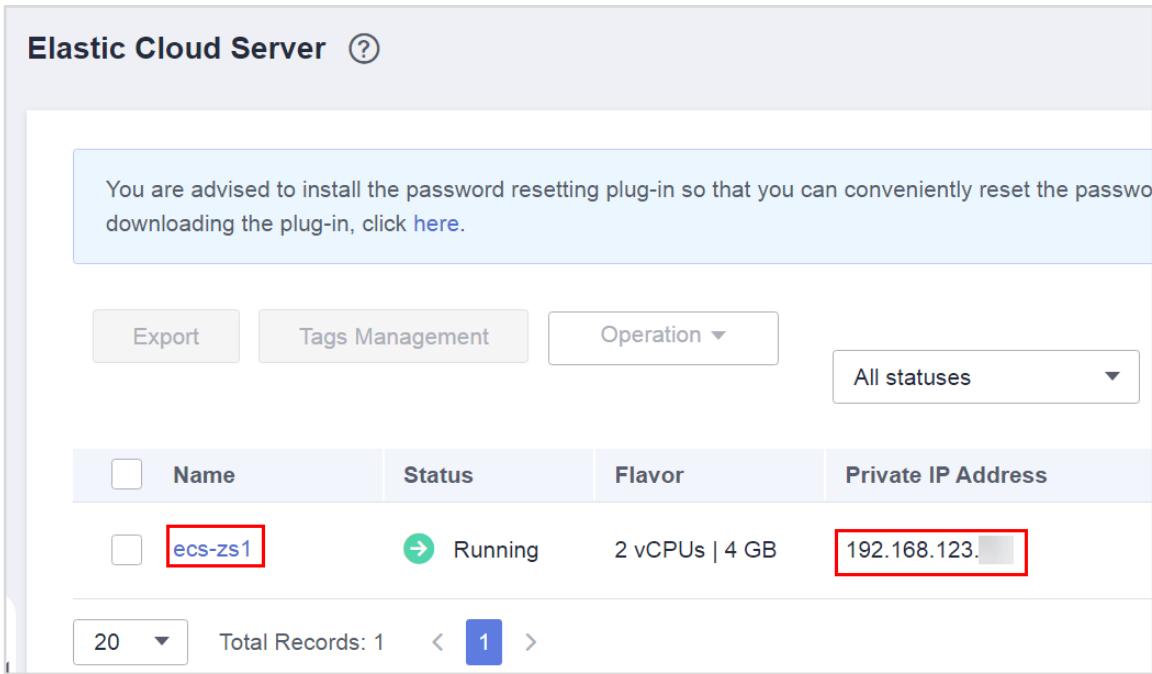
Figure 8-1 VPC peering connection operation process

8.2 Procedure

- Step 1 Choose **Elastic Cloud Server** from the service list, click the name of the target ECS, and check the VPC and private IP address of the ECS.



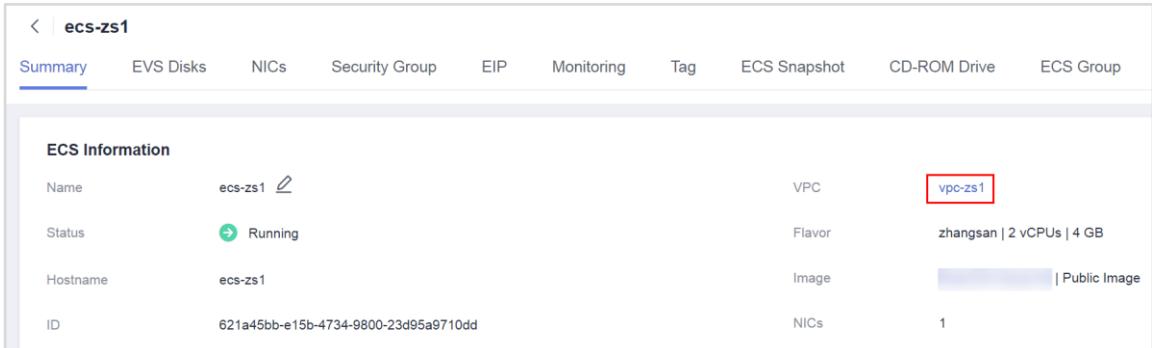
The screenshot shows the 'Service List' interface. In the 'Basic cloud services' section, 'Elastic Cloud Server' is highlighted with a red box.



The screenshot shows the 'Elastic Cloud Server' list page. A message at the top advises installing a password resetting plug-in. Below are buttons for 'Export', 'Tags Management', 'Operation', and a dropdown for 'All statuses'. The table lists one instance:

<input type="checkbox"/>	Name	Status	Flavor	Private IP Address
<input type="checkbox"/>	ecs-zs1	Running	2 vCPUs 4 GB	192.168.123. [REDACTED]

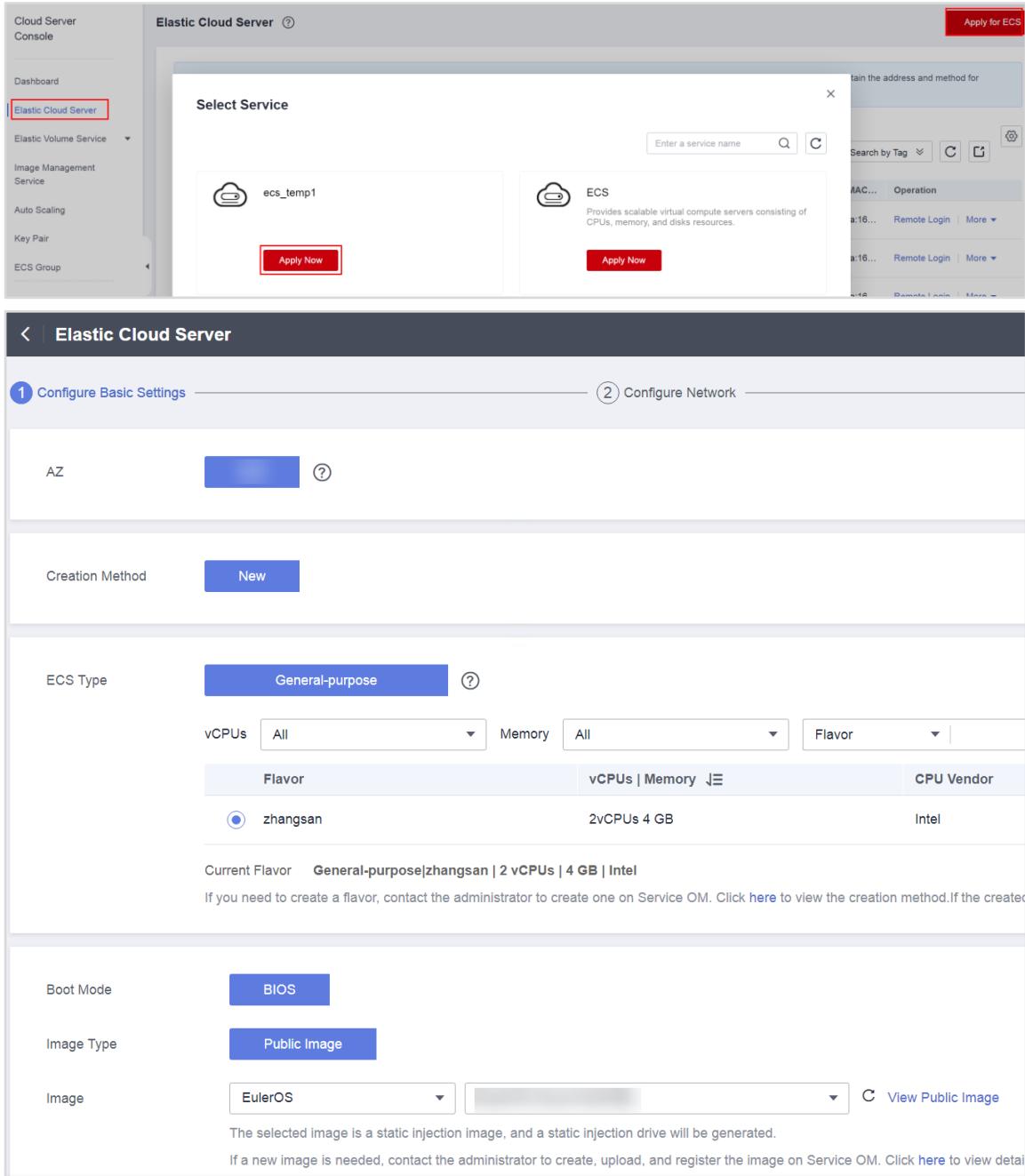
At the bottom, there are pagination controls: '20' (dropdown), 'Total Records: 1', and a page number '1'.



The screenshot shows the details for the 'ecs-zs1' instance. The 'Summary' tab is selected. The 'ECS Information' table includes:

Name	ecs-zs1	VPC	vpc-zs1
Status	Running	Flavor	zhangsan 2 vCPUs 4 GB
Hostname	ecs-zs1	Image	[REDACTED] Public Image
ID	621a45bb-e15b-4734-9800-23d95a9710dd	NICs	1

Step 2 Create an ECS in the VPC created in section 7.2 . For details, see section 3.2.1 .



The screenshot shows the HUAWEI CLOUD Stack Lab Guide interface for creating an Elastic Cloud Server (ECS). The left sidebar shows navigation options like Cloud Server Console, Dashboard, and various services. The main area is titled "Elastic Cloud Server" and displays a "Select Service" dialog with two options: "ecs_temp1" and "ECS". The "ECS" option is selected and described as providing scalable virtual compute servers. Below this, the "Elastic Cloud Server" creation wizard is shown, currently at step 1: Configure Basic Settings. The configuration fields include:

- AZ: Region 1
- Creation Method: New
- ECS Type: General-purpose
- Flavor: zhangsan (2vCPUs | 4 GB)
- CPU Vendor: Intel
- Boot Mode: BIOS
- Image Type: Public Image
- Image: EulerOS

Notes at the bottom indicate that the selected image is a static injection image and that new images can be created by contacting the administrator.

Same Storage Yes No ⓘ

System Disk zhangsan - 40 + GB

+ Add Data Disk You can add 59 more EVS disks in total: up to 59 m

Quantity - 1 + You can apply for a maximum of 1000 ECSs at

< Elastic Cloud Server

① Configure Basic Settings ② Configure Network

VPC vpc-zs2-1 ⓘ Create VPC

NIC Primary NIC ⓘ VPC Subnet subnet-zs2-1(192.168.121.0/24) Automatically Assign

+ Add NIC You can add 15 more NICs.

Security Group default(2322c55d-a662-4a18-8b48-3b0123481f2a) ⓘ Create Security Group

EIP Do Not Use Automatically Assign Specify ⓘ

Select subnet-zs2-1 in vpc-zs2-1.

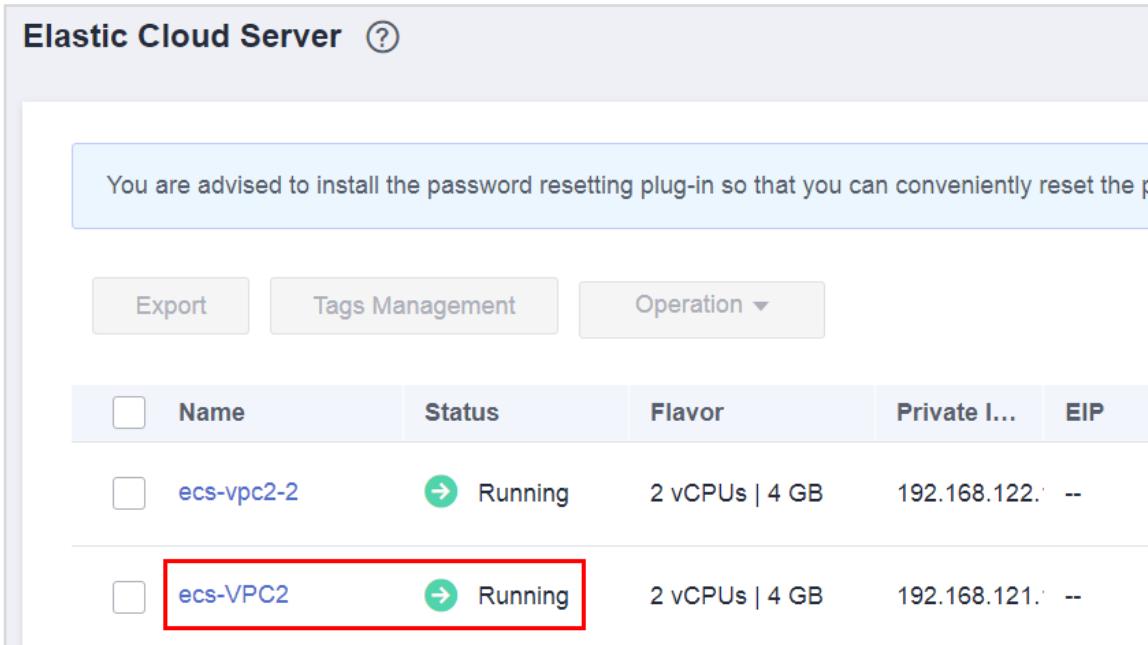
① Configure Basic Settings → ② Configure Network

ECS Name	ecs-VPC2
ECS Initial Status	Stopped <input checked="" type="button"/> Started
Description	0/63
Login Mode	Key Pair <input checked="" type="button"/> Password Inherit Password From Image
Username	root
Password	Keep your password secure. The system cannot retrieve your password. ██████████ <input type="button"/>
Confirm Password	██████████ <input type="button"/>
<input type="checkbox"/> Customize user Customize a common user who has no root user rights. This user can remotely log in	
Advanced Options	<input type="checkbox"/> Configure

① Configure Basic Settings → ② Configure Network → ③ Configure Advanced Settings → ④ Confirm

Configuration	Basic		
Region	[redacted]		
System Disk	zhangsan, 40 GB	AZ	[redacted]
	Quantity	1	Flavor zhangsan 2 vCPUs 4 GB Intel
Network	VPC		
VPC	vpc-zs2-1	Primary NIC	subnet-zs2-1(192.168.121.0/24)
EIP	Not required	Security Group	default(2322c55d-a662-4a18-8b48-3b012348ff2a)
Advanced	ECS Name		
ECS Name	ecs-VPC2	Login Mode	Password
Required Duration	<input checked="" type="button"/> Unlimited	1 year	Custom

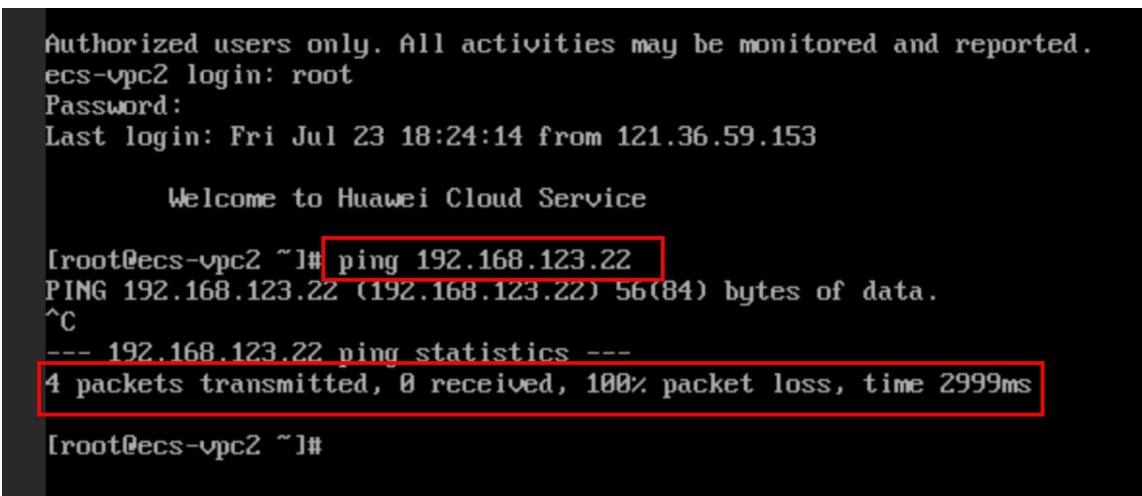
Confirm the configuration information and then create an ECS.



<input type="checkbox"/>	Name	Status	Flavor	Private I...	EIP
<input type="checkbox"/>	ecs-vpc2-2	Running	2 vCPUs 4 GB	192.168.122.1	--
<input type="checkbox"/>	ecs-VPC2	Running	2 vCPUs 4 GB	192.168.121.1	--

Verify that the ECS is successfully created.

- Step 3 Log in to the ECS and then ping the IP address of the ecs-zs1 instance in another VPC.



```
Authorized users only. All activities may be monitored and reported.
ecs-vpc2 login: root
Password:
Last login: Fri Jul 23 18:24:14 from 121.36.59.153

Welcome to Huawei Cloud Service

[root@ecs-vpc2 ~]# ping 192.168.123.22
PING 192.168.123.22 (192.168.123.22) 56(84) bytes of data.
^C
--- 192.168.123.22 ping statistics ---
4 packets transmitted, 0 received, 100% packet loss, time 2999ms

[root@ecs-vpc2 ~]#
```

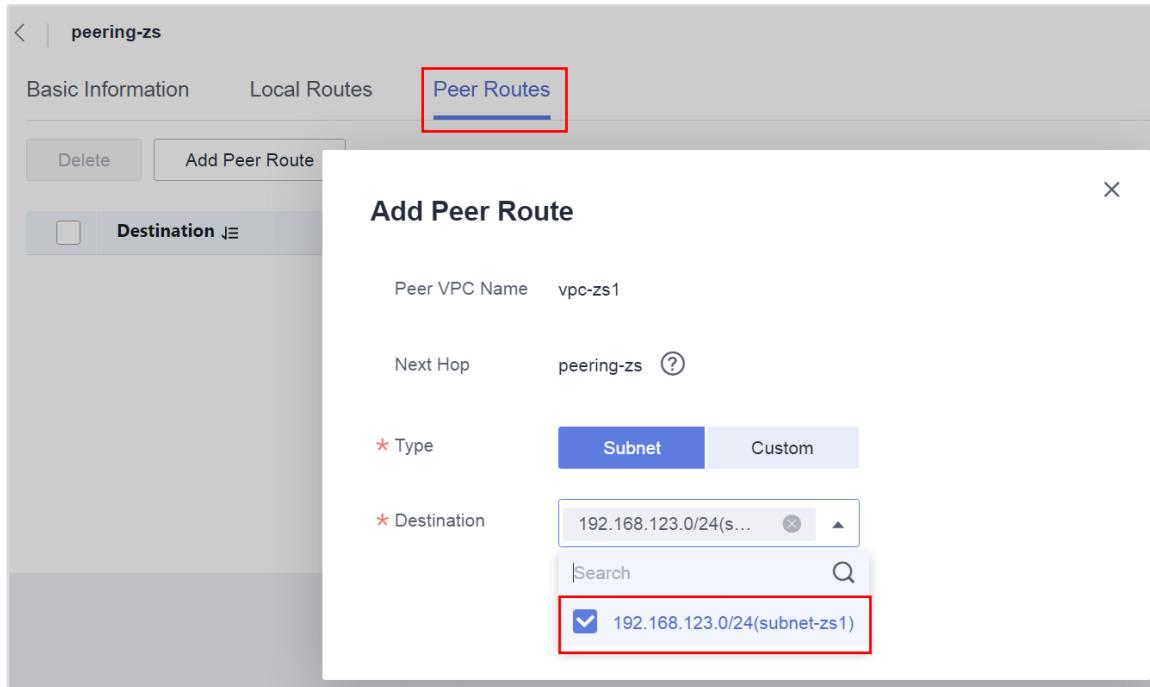
Two instances in different VPCs cannot communicate with each other.

- Step 4 On the **VPC Peering** page, click **Create VPC Peering Connection** to create a VPC peering connection between the two VPCs.

The screenshot shows the Network Console interface for creating a VPC peering connection. In the 'Create VPC Peering Connection' dialog, the 'Name' is set to 'peering-zs', 'Local VPC' is 'vpc-zs1', 'Peer VPC Settings' show 'Associated Projects' selected with 'Project Name' as 'zhangsan' and 'Peer VPC' as 'vpc-zs2-1'. The 'OK' button is highlighted. Below the dialog, the 'VPC Peering' list shows one entry: 'peering-zs' with status 'Accepted', local VPC 'vpc-zs1', peer tenant name 'zhangsan', and peer VPC 'vpc-zs2-1'.

Step 5 Click the name of the VPC peering connection. In the displayed dialog box, add local and peer routes.

The screenshot shows the 'peering-zs' VPC peering connection details. The 'Local Routes' tab is selected. An 'Add Local Route' dialog is open, showing 'Peer VPC Name' as 'vpc-zs2-1', 'Next Hop' as 'peering-zs', 'Type' as 'Subnet', and 'Destination' as '192.168.121.0/24'. Two subnets are listed: '192.168.122.0/24(subnet-zs2-2)' and '192.168.121.0/24(subnet-zs2-1)', with the latter being checked.



Step 6 Log in to the ECS again and repeat Step 4 to check the connectivity between the ECSs.

```

Authorized users only. All activities may be monitored and reported.
ecs-vpc2 login: root
Password:
Last login: Fri May 27 12:28:29 on tty1

        Welcome to Huawei Cloud Service

[root@ecs-vpc2 ~]# ping 192.168.123.22
PING 192.168.123.22 (192.168.123.22) 56(84) bytes of data.
64 bytes from 192.168.123.22: icmp_seq=1 ttl=63 time=6.37 ms
64 bytes from 192.168.123.22: icmp_seq=2 ttl=63 time=0.313 ms
64 bytes from 192.168.123.22: icmp_seq=3 ttl=63 time=0.257 ms
64 bytes from 192.168.123.22: icmp_seq=4 ttl=63 time=0.268 ms
^C
--- 192.168.123.22 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3001ms
rtt min/avg/max/mdev = 0.257/1.804/6.379/2.641 ms
[root@ecs-vpc2 ~]#

```

The two instances in different VPCs can communicate with each other.

8.2.1 Quiz

[Question] If there are peering connections between VPC 1 and VPC 2 and between VPC 2 and VPC 3, do those connections enable communications between VPC 1 and VPC 3?

[Answer] No. Peering relationships are not transitive. You can try to create three VPCs, create instances in the three VPCs, and establish VPC peering connections based on the preceding assumption to verify the final result.

9 EIP

9.1 Overview

9.1.1 About This Exercise

Manage the lifecycle of EIPs.

9.1.2 Objectives

- Apply for EIPs.
- Manage EIPs.

9.1.3 Process

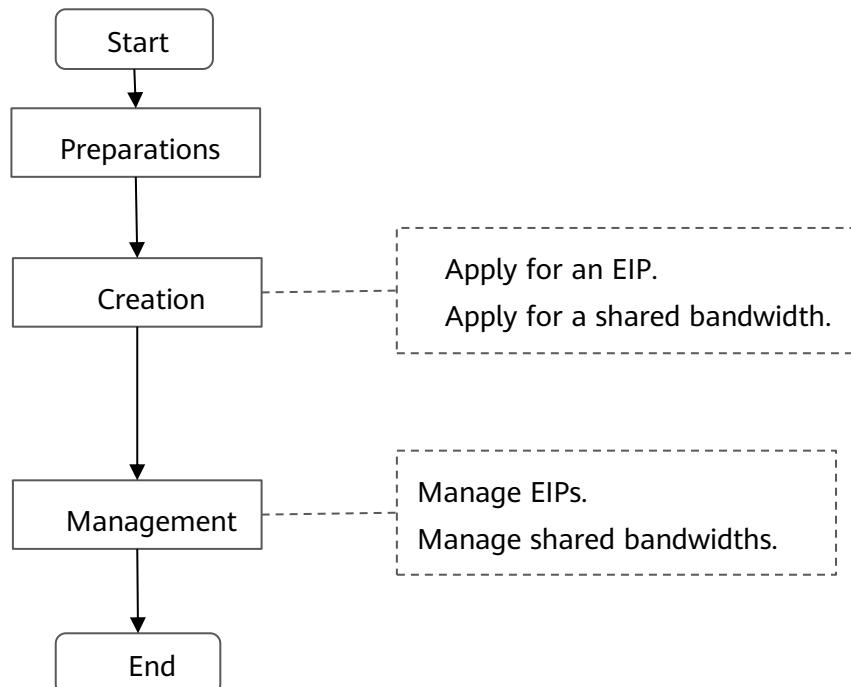
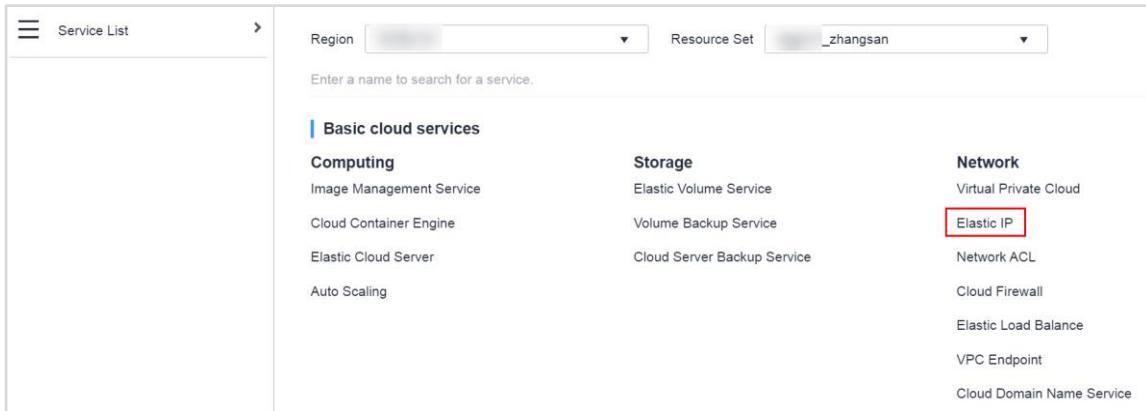


Figure 9-1 EIP operation process

9.2 Procedure

9.2.1 Applying for EIPs

Step 1 Log in to ManageOne Operation Portal as a VDC administrator, click **Service List**, and choose **Network > Elastic IP**.



The screenshot shows the ManageOne Service List interface. On the left, there's a sidebar with 'Service List' and a search bar. The main area has tabs for 'Basic cloud services' (Computing, Storage, Network), 'Advanced cloud services' (Virtual Private Cloud, Network ACL, Cloud Firewall, Elastic Load Balance, VPC Endpoint, Cloud Domain Name Service), and 'Cloud Marketplace'. The 'Network' tab is selected. Within the 'Network' section, 'Elastic IP' is highlighted with a red box.

Step 2 On the displayed page, click **Apply for EIP** in the upper right corner. In the displayed dialog box, select **EIP** and click **Apply Now**.



The screenshot shows the ManageOne Network Console. The left sidebar has 'EIPs' highlighted with a red box. A modal dialog box titled 'Select Service' is open, showing an 'EIP' option with a description: 'An EIP is an internet-reachable IP address. To let an ECS, BMS, virtual IP address, or elastic load balancer access the Internet, you need to apply for an EIP.' Below it is a 'Apply Now' button. The background shows the 'EIPs' list with columns like 'Name', 'Status', 'Allocation Status', and 'Last Operation'.

Step 3 On the displayed page, configure basic information, such as **External Network**, **Subnet**, **Assignment Mode**, **Bandwidth Type**, **Bandwidth Name**, **Bandwidth (Mbit/s)**, **Quantity**, and **Required Duration**. Then, click **Apply Now**.

< Apply for EIP ?

* External Network	zs-EIP(group1)	(?)						
* Subnet	zs-eip(10.200.16.0/24)							
Assignment Mode	Automatic	Manual						
* IP Address								
Allocation Pools:10.200.16.1-10.200.16.254								
Bandwidth Type	Exclusive bandwidth	Shared Bandwidth						
* Bandwidth Name	bandwidth-zs							
* Bandwidth (Mbit/s)	1	2	5	10	100	200	300	Custom
Description	0/64							
<input type="button" value="Add to Cart"/> <input type="button" value="Apply Now"/>								

Step 4 On the displayed page, click **Back to EIP List** to view the result.

EIPs ?

EIPs									
<input type="button" value="All"/> <input type="button" value="EIP"/>									
EIP	Status	Bound IP Ad...	External Net...	Group	Bandwidth	Bandwidth/...	Expires	Operation	
10.200.16.9	Unbound	--	zs-EIP	group1	bandwidth-zs	5 Mbit/s	De...	Unlimited	Bind Unbind

9.2.2 Managing EIPs

Step 1 Locate the row that contains the EIP to be bound and click **Bind** in the **Operation** column. In the displayed dialog box, select the target ECS and click **OK**.

EIPs ?

EIPs									
<input type="button" value="All"/> <input type="button" value="EIP"/>									
EIP	Status	Bound IP Ad...	External Net...	Group	Bandwidth	Bandwidth/...	Expires	Operation	
10.200.16.9	Unbound	--	zs-EIP	group1	bandwidth-zs	5 Mbit/s	De...	Unlimited	Bind Unbind

Bind to EIP

Info: If a cloud server is configured with the NAT Gateway service and then bound with an EIP, data of the cloud server is forwarded using the EIP and the NAT Gateway service is interrupted.

EIP	10.200.16.7										
* Virtual Private Clouds	vpc-zs1										
* Subnet	subnet-zs1(192.168.123.0..)										
* Instance Type	ECS										
Virtual IP address											
<input type="text" value="Name"/> zs1 <input type="button" value="OK"/> <input type="button" value="Cancel"/>											
<table border="1"> <thead> <tr> <th></th> <th>Name</th> <th>EIP</th> <th>Private IP Address</th> <th>MAC Address</th> </tr> </thead> <tbody> <tr> <td><input checked="" type="checkbox"/></td> <td>ecs-zs1</td> <td>--</td> <td>192.168.123.7</td> <td>[REDACTED]</td> </tr> </tbody> </table>			Name	EIP	Private IP Address	MAC Address	<input checked="" type="checkbox"/>	ecs-zs1	--	192.168.123.7	[REDACTED]
	Name	EIP	Private IP Address	MAC Address							
<input checked="" type="checkbox"/>	ecs-zs1	--	192.168.123.7	[REDACTED]							

Step 2 Return to the EIP list, check the result, and ensure that the EIP is bound.

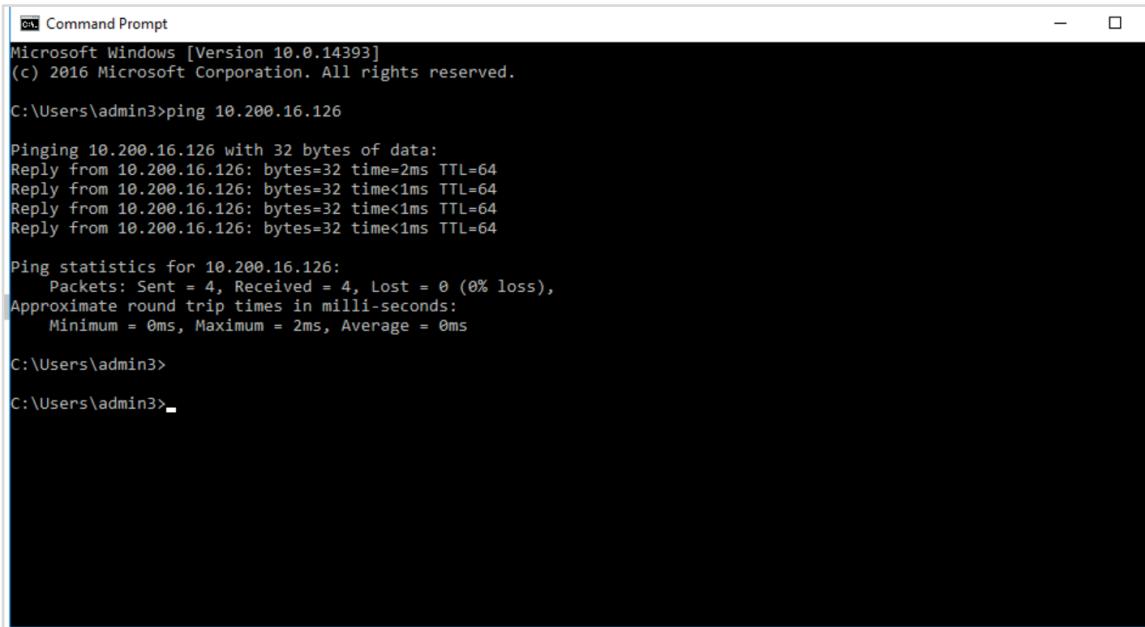
EIPs

Success: EIP 10.200.16.97 binding successfully

EIP	Status	Bound IP Ad...	External Net...	Group	Bandwidth	Bandwidth/...	Expires	Operation
10.200.16.7	Bound	192.168.123.72	zs-EIP	group1	bandwidth-zs	5 Mbit/s	De...	Unlimited

Step 3 Verify the connectivity of the EIP. (Networks in a VPC are private networks and cannot communicate with external networks. You can bind an EIP to an ECS in a VPC to connect the ECS on the cloud to external networks.)

In this exercise, you can open the **cmd** window on the desktop and run the **ping** command to verify the connectivity of the EIP.



```
Microsoft Windows [Version 10.0.14393]
(c) 2016 Microsoft Corporation. All rights reserved.

C:\Users\admin3>ping 10.200.16.126

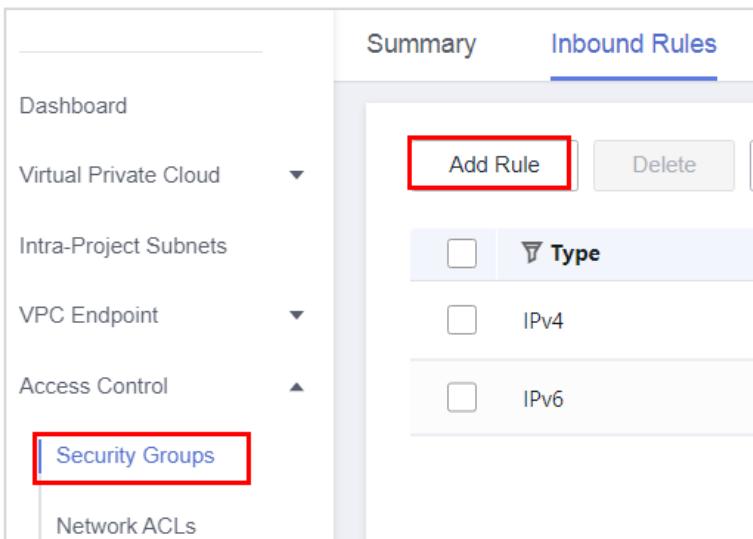
Pinging 10.200.16.126 with 32 bytes of data:
Reply from 10.200.16.126: bytes=32 time=2ms TTL=64
Reply from 10.200.16.126: bytes=32 time<1ms TTL=64
Reply from 10.200.16.126: bytes=32 time<1ms TTL=64
Reply from 10.200.16.126: bytes=32 time<1ms TTL=64

Ping statistics for 10.200.16.126:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 2ms, Average = 0ms

C:\Users\admin3>
C:\Users\admin3>
```

As shown in the preceding figure, the ECS bound to the EIP can communicate with external networks (local networks).

If the connectivity test fails, check the configuration of the security group associated with the ECS, ensure that the security group allows traffic from all ports to pass through, and verify the EIP connectivity again.



Choose **Access Control > Security Groups** in the navigation pane, click the **Inbound Rules** tab, and click **Add Rule**.

Add Inbound Rule

Security Group **default**

Protocol	Port Range/ICMP Type	Source	Description	Operation
ANY	Any	IP address		Clone Delete
		0.0.0.0/0		

Set parameters as shown in the preceding figure to allow traffic from all ports.

Add Rule	Delete	Fast-Add Rule	You can add 45 more Security Group Rules. If no rules are added to the security group, the ECSs associated with it may not be allowed to access internal network resources.			
Type	Protocol	Port Range/ICMP Type	Remote End	?		
<input type="checkbox"/> IPv4	ANY	Any	default(2322c55d-a662-4a18-8b48-3b0123481f2a)	?		
<input type="checkbox"/> IPv6	ANY	Any	default(2322c55d-a662-4a18-8b48-3b0123481f2a)	?		
<input type="checkbox"/> IPv4	ANY	Any	0.0.0.0/0	?		

Ensure that traffic from all ports are allowed to pass through.

Step 4 In the EIP list, locate the row that contains the EIP to be unbind and click **Unbind** in the **Operation** column. In the displayed dialog box, click **OK**.

EIPs

EIP	Status	Bound IP Address	External Network	Group	Bandwidth
10.200.16	Bound	192.168.123	zs-EIP	group1	bandwidth-zs

Bind
Unbind

Unbind EIP

⚠ Are you sure you want to unbind this EIP?

OK
Cancel

EIPs

EIP	Status	Bound IP Address	External Network	Group	Bandwidth
10.200.16	Unbound	--	zs-EIP	group1	bandwidth-zs

Return to the EIP list, check the result, and ensure that the EIP status becomes **Unbound**.

Step 5 Repeat all steps in section 9.2.1 to apply for a new EIP as required and check the expiration time of the EIP.

< Apply for EIP ②

External Network	zs-EIP(group1)	(?)						
Subnet	zs-eip(10.200.16.0/24)							
Assignment Mode	Automatic	Manual						
IP Address	Allocation Pools:10.200.16.1-10.200.16.254							
Bandwidth Type Exclusive bandwidth Shared Bandwidth								
Bandwidth Name	bandwidth-zs2							
Bandwidth (Mbit/s)	1	2	5	10	100	200	300	Custom
Description	0/64							
Required Duration	Unlimited	1 year	Custom					
Expires 2023-08-30 23:59:59								
Quantity	-	1	+					
You can apply for a maximum of 100 EIPs this time.								
			Add to Cart	Apply Now				

EIPs ③

EIP	Status	Bound IP Address	External Network	Group	Bandwidth	Bandwidth/Bandwidth Type	Expires	Operation
10.200.16	Unbound	--	zs-EIP	group1	bandwidth-zs2	5 Mbit/s Dedicated Bandwidth	202	Bind Unbind
10.200.16	Unbound	--	zs-EIP	group1	bandwidth-zs	5 Mbit/s Dedicated Bandwidth	Unlimited	Bind Unbind

Return to the EIP list and check the result. You are expected to find that the EIP has an expiration time limit.

- Step 6** Extend the validity period of the EIP. Locate the row that contains the EIP to be extended, choose **More > Extend** in the **Operation** column. (Note that you cannot extend the validity period of an EIP whose expiration time is **Unlimited**.)

EIP	Status	Bound IP Ad...	External Net...	Group	Bandwidth	Bandwidth/...	Expires	Operation
10.200.16.1	Unbound	--	zs-EIP	group1	bandwidth-zs2	5 Mbit/s	De...	Bind Unbind More ▾
10.200.16.1	Unbound	--	zs-EIP	group1	bandwidth-zs	5 Mbit/s	De...	Bind Modify Band... Add to Share... Extend Release

Extend

Are you sure you want to delay the following EIPs?

EIP	Bandwidth	Bandwidth Size (Mbit/s)	Expires
10.200.16.1	bandwidth-zs2	5 Mbit/s Dedicated Bandwidth	2030

* Required Duration Not limited 1 year Custom Expires 2030 X

OK Cancel

In the displayed dialog box, change the required duration and click **OK**.

EIP	Status	Bound IP Ad...	External Net...	Group	Bandwidth	Bandwidth/...	Expires
10.200.16.1	Unbound	--	zs-EIP	group1	bandwidth-zs2	5 Mbit/s De...	2023
10.200.16.1	Unbound	--	zs-EIP	group1	bandwidth-zs	5 Mbit/s De...	Unlimited

Return to the EIP list and check the result. You are expected to find that the expiration time of the EIP has been changed.

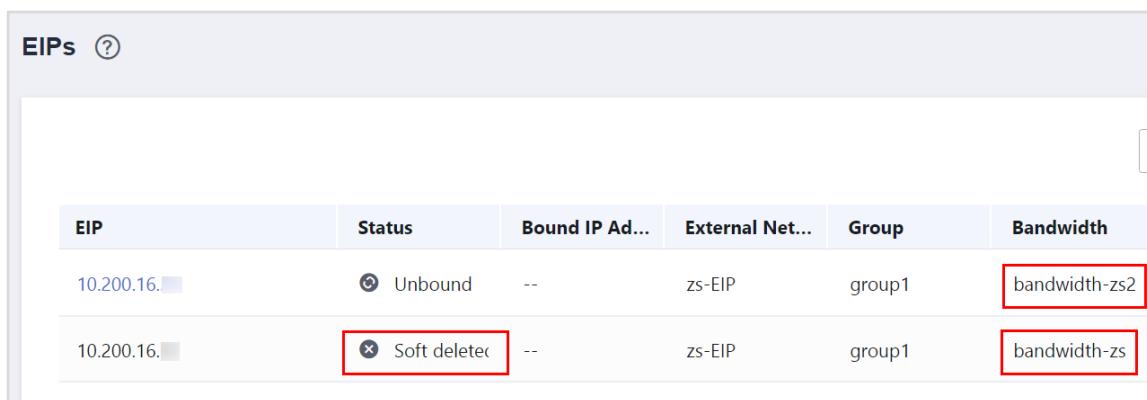
Step 7 Soft delete an EIP. Locate the row that contains the target EIP, choose **More > Release** in the **Operation** column.

EIP	Status	Bound IP Ad...	External Net...	Group	Bandwidth	Bandwidth/...	Expires	Operation
10.200.16.1	Unbound	--	zs-EIP	group1	bandwidth-zs2	5 Mbit/s De...	Bind Unbind More ▾	Bind Unbind More ▾
10.200.16.1	Unbound	--	zs-EIP	group1	bandwidth-zs	5 Mbit/s De...	Unlimited	Bind Unbind More ▾

Modify Band... Add to Share... Extend Release



In the displayed dialog box, deselect **Permanently release**, and click **OK**.

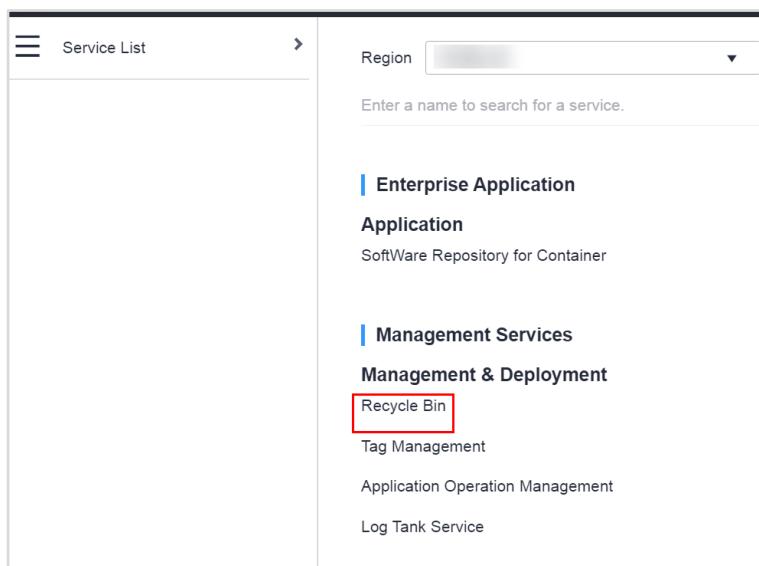


The screenshot shows the "EIPs" page. The table has columns: EIP, Status, Bound IP Ad..., External Net..., Group, and Bandwidth. There are two entries: one with status "Unbound" and another with status "Soft deleted". The "Soft deleted" entry's status and its associated bandwidth value are highlighted with red boxes.

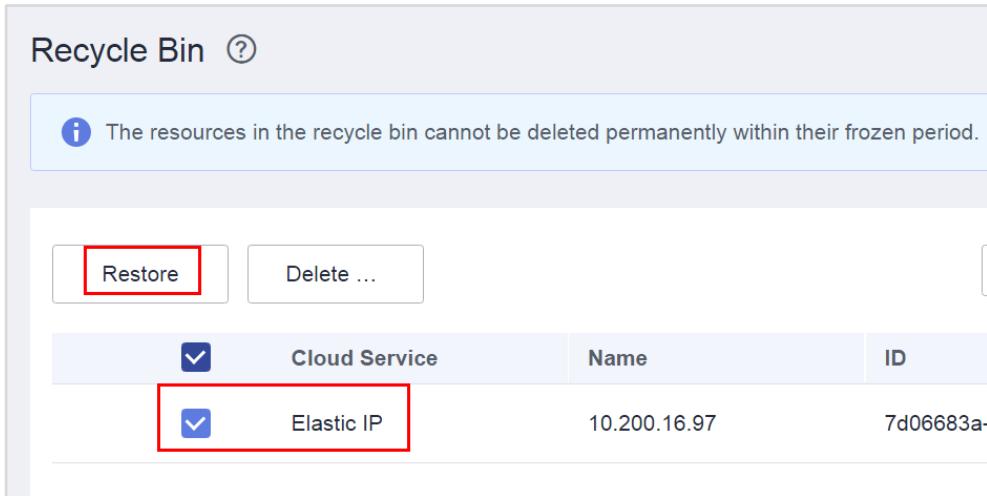
EIP	Status	Bound IP Ad...	External Net...	Group	Bandwidth
10.200.16.97	Unbound	--	zs-EIP	group1	bandwidth-zs2
10.200.16.97	Soft deleted	--	zs-EIP	group1	bandwidth-zs

On the **EIPs** page, check the status of the released EIP. You can find that the status of the EIP has been changed to **Soft deleted**.

Step 8 Click **Service List** in the upper left corner and click **Recycle Bin** to restore the EIP.

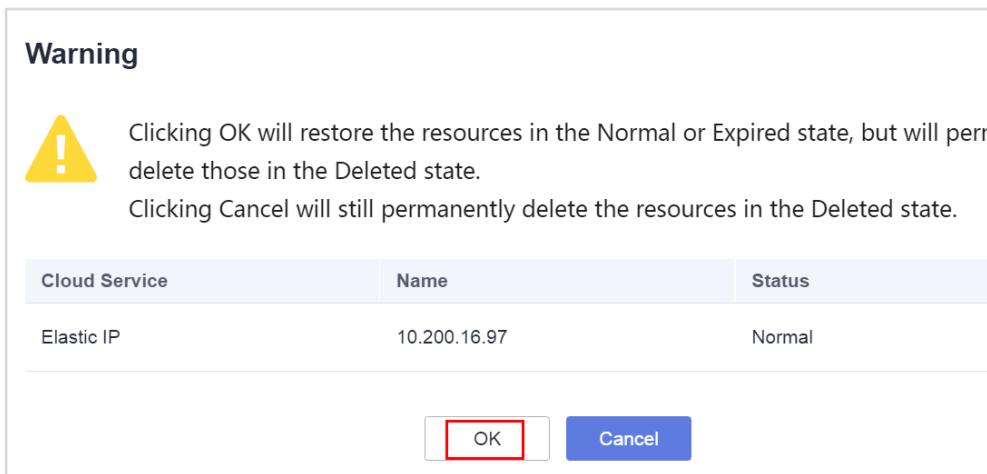


The sidebar shows a "Service List" header with a "Region" dropdown and a search bar. Below are sections for "Enterprise Application" (Application, SoftWare Repository for Container), "Management Services" (Management & Deployment, Recycle Bin, Tag Management, Application Operation Management, Log Tank Service), and "Cloud Services" (Cloud Container Engine, Cloud Container Registry, Cloud Container Network, Cloud Container Storage, Cloud Container Security).



The screenshot shows the 'Recycle Bin' interface. At the top, there is a message: 'The resources in the recycle bin cannot be deleted permanently within their frozen period.' Below this are two buttons: 'Restore' (highlighted with a red box) and 'Delete ...'. A table lists resources, with one row for an 'Elastic IP' highlighted with a red box. The table columns are 'Cloud Service', 'Name', and 'ID'. The 'Elastic IP' row contains 'Elastic IP', '10.200.16.97', and '7d06683a-'.

On the displayed page, select the target EIP and click **Restore**.



The dialog box has a yellow warning icon and the title 'Warning'. It contains the text: 'Clicking OK will restore the resources in the Normal or Expired state, but will not delete those in the Deleted state.' and 'Clicking Cancel will still permanently delete the resources in the Deleted state.' Below the text is a table with columns 'Cloud Service', 'Name', and 'Status'. One row is shown: 'Elastic IP', '10.200.16.97', and 'Normal'. At the bottom are 'OK' and 'Cancel' buttons, with 'OK' highlighted with a red box.

In the displayed dialog box, click **OK**.



The screenshot shows the 'EIPs' page. At the top right is a dropdown menu set to 'All'. The main table has columns: 'EIP', 'Status', 'Bound IP Ad...', 'External Net...', 'Group', 'Bandwidth', and 'Bandwidth/...'. Two rows are visible: one for '10.200.16.97' which is unbound and part of 'group1', and another row highlighted with a red box for '10.200.16.97' which is also unbound and part of 'group1'.

Go to the **EIPs** page and check the result.

Step 9 Locate the row that contains the EIP to be permanently deleted and choose **More > Release** in the **Operation** column.

EIP	Status	Bound IP Ad...	External Net...	Group	Bandwidth	Bandwidth/...	Expires	Operation
10.200.16.1	Unbound	--	zs-EIP	group1	bandwidth-zs2	5 Mbit/s	De...	Bind Unbind More
10.200.16.97	Unbound	--	zs-EIP	group1	bandwidth-zs	5 Mbit/s	De...	Bind Unbind More

[Modify Band...](#)
[Add to Share...](#)
[Extend](#)
[Release](#)

Release EIP

⚠ Are you sure you want to release EIP 10.200.16.97?

Permanently release

EIP	Bandwidth	Bandwidth Size (Mbit/s)	Expires
10.200.16.97	bandwidth-zs	5 Mbit/s Dedicated Bandwidth	Unlimited

[OK](#) [Cancel](#)

In the displayed dialog box, select **Permanently release**, and click **OK**.

EIPs ②

✓ EIP 10.200.16.97 is being released.

EIP	Status	Bound IP Ad...	External Net...	Group	Bandwidth	Bandwidth/...	Expires	Operation
10.200.16.1	Unbound	--	zs-EIP	group1	bandwidth-zs2	5 Mbit/s	De...	Bind Unbind More

Return to the EIP list and check the result.

9.2.3 Shared Bandwidth

Step 1 Access **Network Console** and choose **Elastic IP and Bandwidth > Shared Bandwidths** in the navigation pane. On the displayed page, click **Create Shared Bandwidth** in the upper right corner. In the displayed dialog box, set **Name** and **Bandwidth (Mbit/s)**, and click **OK**.

Network Console
Shared Bandwidths ②
[Create Shared Bandwidth](#)

Create Shared Bandwidth

* Name

* Bandwidth (Mbit/s)

1	2	5	10	100	200	300	Custom
---	---	---	----	-----	-----	-----	--------

Description

[OK](#) [Cancel](#)

Name	Bandwidth (Mbit/s)	EIP
bandwidth-share	100	--

Return to the **Shared Bandwidths** console and ensure that the shared bandwidth has been created.

- Step 2** Locate the row that contains the shared bandwidth to be modified, and click **Modify** in the **Operation** column. In the displayed dialog box, change the values for **Name** and **Bandwidth (Mbit/s)** as required, and click **OK**.

Return to the **Shared Bandwidths** page and check the result.

Name	Bandwidth (Mbit/s)
bandwidth-share	200

- Step 3** Locate the row that contains the target shared bandwidth, choose **More > Add EIP** in the **Operation** column.

In the displayed dialog box, select the target EIP and click **OK**.

Add EIP

i After an EIP is added to a shared bandwidth, the original bandwidth size used by the EIP will become invalid, and the new EIP 200Mbit/s, the same as that of the shared bandwidth.
 All EIPs added to a shared bandwidth must belong to the same group.
 Up to 1000 EIPs can be added to one shared bandwidth.
 This operation is not allowed because the EIP has been soft deleted or expired.

1000 more EIPs can be added to the shared bandwidth.

group1 All Statuses EIP

EIP	Status	Group	Bandwidth
10.200.16.	Unbound	group1	bandwidth-zs2 5 Mbit/s

OK Cancel

Return to the shared bandwidth list and check the result.

Shared Bandwidths

Name	Bandwidth (Mbit/s)	EIP
bandwidth-share	200	10.200.16.

Check the bandwidth size after the EIP is added to the shared bandwidth. Click the added EIP to check the result.

EIPs

EIP	Status	Bound IP Ad...	External Net...	Group	Bandwidth	Bandwidth/...
10.200.16.	Unbound	--	zs-EIP	group1	bandwidth-sh...	200 Mbit/s...

Step 4 Return to the **Shared Bandwidths** page, locate the row that contains the target shared bandwidth, choose **More > Remove EIP** in the **Operation** column.

Name	Bandwidth (Mbit/s)	EIP	Description	Operation
bandwidth-share	200	10.200.16.	--	Modify Bandwidth Delete More

In the displayed dialog box, select the EIP to be removed, configure the name and size of the dedicated bandwidth for the EIP after the EIP is removed from the shared bandwidth, and click **OK**.

Remove EIP

i After removing an EIP from a shared bandwidth, create a dedicated bandwidth for the EIP. This operation is not allowed because the EIP has been soft deleted or expired.

★ Name	bandwidth-zs2						
★ Bandwidth (Mbit/s)	1 2 5 10 100 200 300						
Description	0/64						
All Statuses	EIP						
<table border="1"> <thead> <tr> <th>EIP</th> <th>Status</th> <th>Bound IP Address</th> </tr> </thead> <tbody> <tr> <td>10.200.16.</td> <td>Unbound</td> <td></td> </tr> </tbody> </table>		EIP	Status	Bound IP Address	10.200.16.	Unbound	
EIP	Status	Bound IP Address					
10.200.16.	Unbound						
<input type="button" value="OK"/> <input type="button" value="Cancel"/>							

Return to the **EIPs** page and check the result.

EIP	Status	Bound IP Ad...	External Net...	Group	Bandwidth	Bandwidth/...
10.200.16.	Unbound	zs-EIP	--	group1	bandwidth-zs2	10 Mbit/s

10 ELB

10.1 Overview

10.1.1 About This Exercise

Manage the lifecycle of ELB.

10.1.2 Objectives

- Apply for load balancers.
- Use ELB to distribute traffic and implement layer-4 and layer-7 load balancing.
- Manage load balancers.

10.1.3 Process

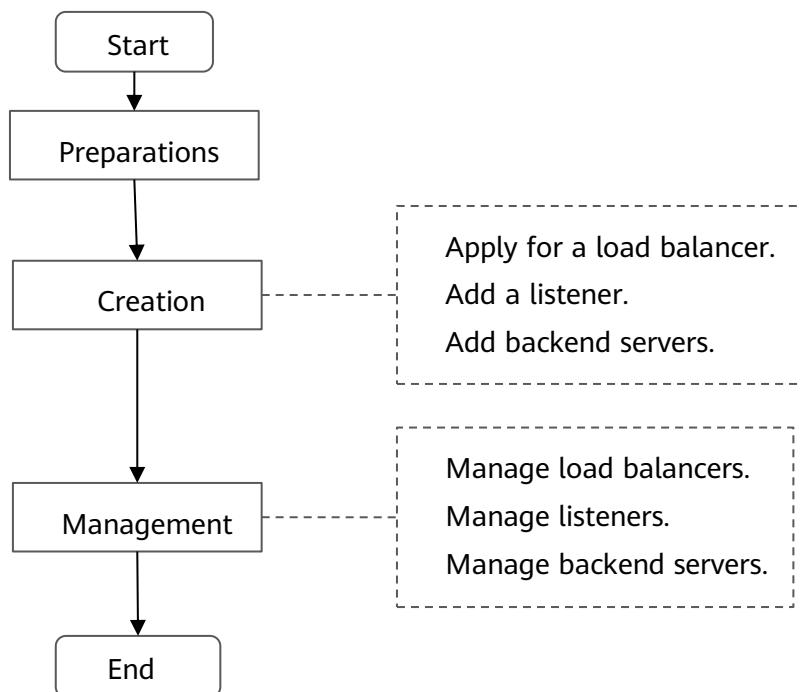
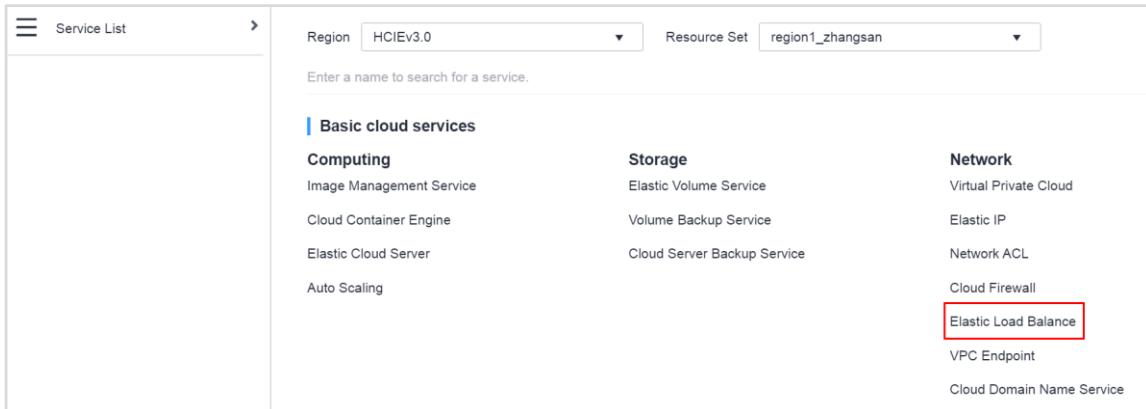


Figure 10-1 ELB operation process

10.2 Procedure

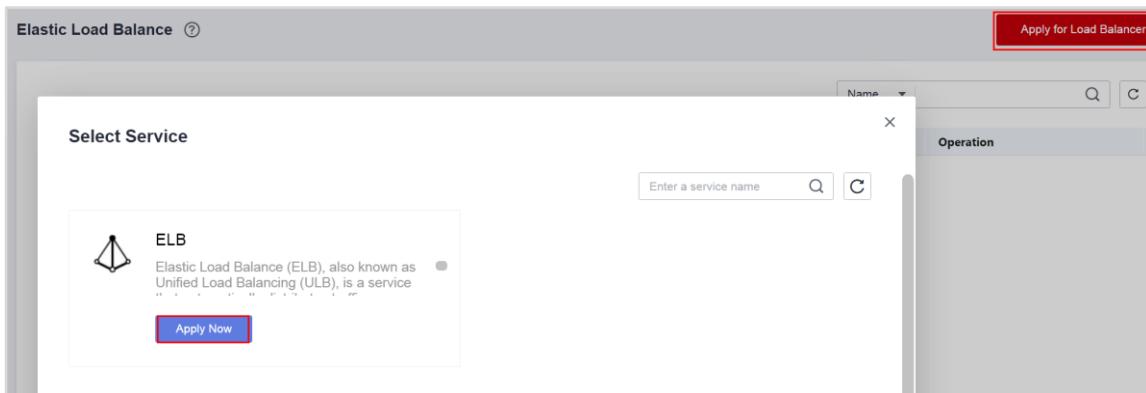
10.2.1 Applying for Load Balancers

Step 1 Log in to ManageOne Operation Portal as a VDC administrator, click **Service List** in the upper left corner, and select **Elastic Load Balance**.



The screenshot shows the ManageOne Service List interface. At the top, there are dropdown menus for Region (HClEv3.0) and Resource Set (region1_zhangsan). A search bar below them contains the placeholder "Enter a name to search for a service." The main area is titled "Basic cloud services" and lists categories: Computing, Storage, and Network. Under Computing, options include Image Management Service, Cloud Container Engine, Elastic Cloud Server, and Auto Scaling. Under Storage, options include Elastic Volume Service, Volume Backup Service, and Cloud Server Backup Service. Under Network, options include Virtual Private Cloud, Elastic IP, Network ACL, Cloud Firewall, and two items: "Elastic Load Balance" (which is highlighted with a red box) and VPC Endpoint.

Step 2 On the displayed page, click **Apply for Load Balancer** in the upper right corner. In the displayed dialog box, click **Apply Now**.



The screenshot shows the "Elastic Load Balance" configuration dialog box. At the top, it says "Elastic Load Balance" and has a "Select Service" section. Below it, there's a card for "ELB" which describes it as "Elastic Load Balance (ELB), also known as Unified Load Balancing (ULB), is a service". At the bottom of this card is a red "Apply Now" button. To the right of the card, there's a sidebar with a search bar and a "Operation" tab. At the very top right of the dialog box is a red "Apply for Load Balancer" button.

Step 3 On the displayed page, set parameters such as **Name**, **VPC**, **Subnet**, and **Required Duration**, and click **Apply Now**.

< Apply for Load Balancer ?

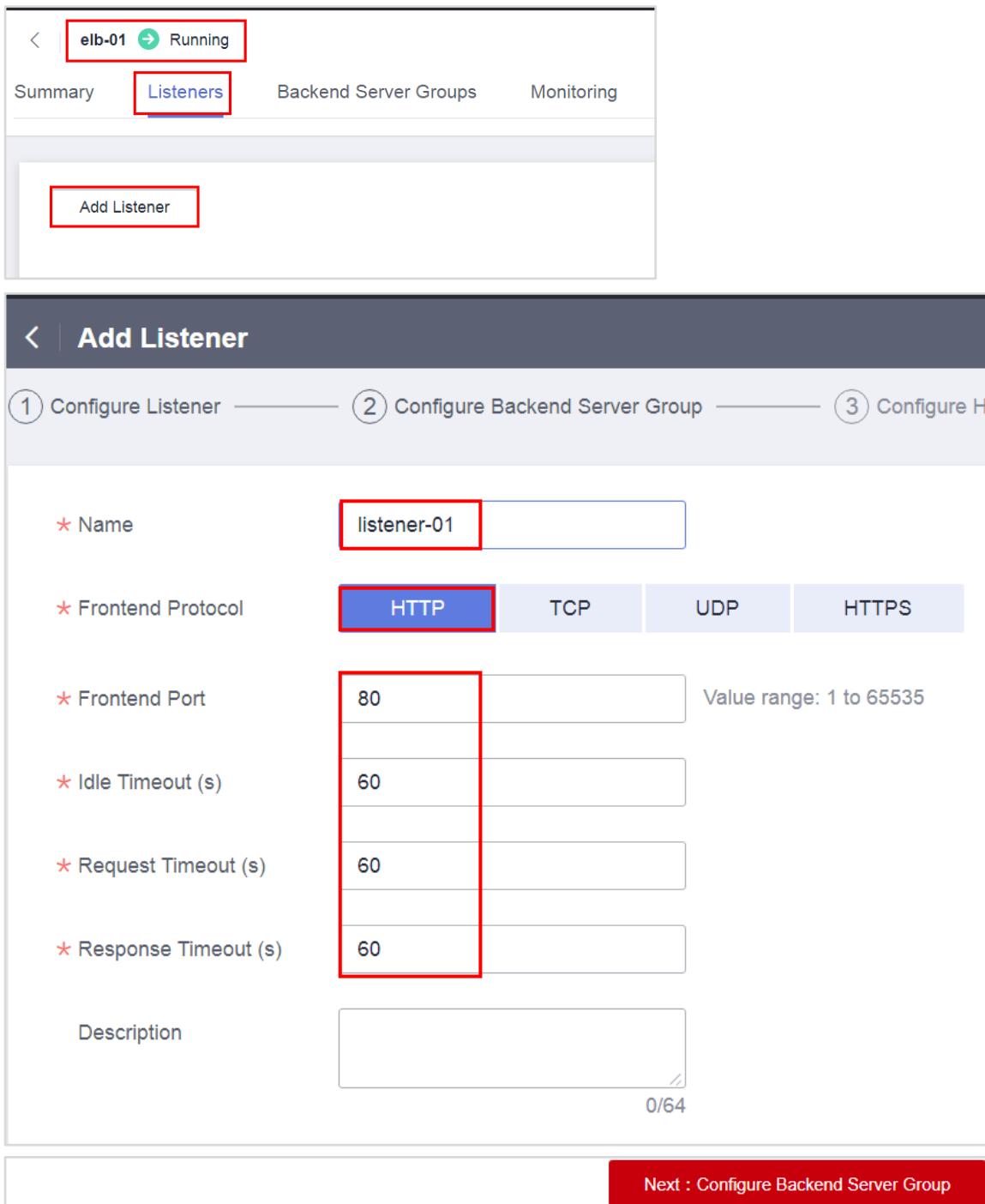
* Region	
* Name	elb-01
Network Type	IPv4
* VPC	vpc-zs1
* Subnet	subnet-zs1(192.168.123.0...)
* IP Address	Automatic
EIP	<input checked="" type="radio"/> Not Required <input type="radio"/> New <input type="radio"/> Existing ?
Description	0/64
* Required Duration	<input checked="" type="radio"/> Not limited <input type="radio"/> 1 year <input type="radio"/> Custom
Add to Cart Apply Now	

Step 4 Return to the **Elastic Load Balance** page and check the result.

Elastic Load Balance ?

Name	Status	EIP	IP Address	Subnet	Listener (Frontend Protocol/Port) / Health C...	Validity
elb-01	Running	--	192.168.123.4	subnet-zs1	Add listener	Never

Step 5 Click the name of the created load balancer. On the displayed details page, click the **Listeners** tab, and click **Add Listener**. On the displayed page, set **Name**, **Frontend Protocol**, **Frontend Port**, **Idle Timeout (s)**, **Request Timeout (s)**, and **Response Timeout (s)** as required, click **Next: Configure Backend Server Group**.



The screenshot shows the 'Add Listener' configuration screen. At the top, there's a navigation bar with tabs: 'Summary' (highlighted), 'Listeners' (highlighted with a red box), 'Backend Server Groups', and 'Monitoring'. Below the tabs is a button labeled 'Add Listener' (highlighted with a red box). The main form has three steps: 1) Configure Listener, 2) Configure Backend Server Group, and 3) Configure Health Check. Step 1 is active. The configuration fields include:

- Name:** listener-01 (highlighted with a red box)
- Frontend Protocol:** HTTP (highlighted with a red box)
- Frontend Port:** 80 (highlighted with a red box)
- Idle Timeout (s):** 60
- Request Timeout (s):** 60
- Response Timeout (s):** 60
- Description:** (empty text area)

At the bottom right of the form is a button labeled 'Next : Configure Backend Server Group'.

Step 6 Set **Backend Server Group**, **Name**, **Backend Protocol**, **Load Balancing Algorithm**, and **Sticky Session Type**, and click **Next: Configure Health Check**.

< | Add Listener

① Configure Listener ————— ② Configure Backend Server Group ————— ③ Configure Health Check

* Backend Server Group	New	Existing	Not Required
* Name	pool-01		
* Backend Protocol	HTTP		
* Load Balancing Algorithm	Weighted round robin	?	
Sticky Session Type	Not Required		
Description	0/64		
Previous Next : Configure Health Check			

Step 7 Set **Protocol**, **Interval (s)**, **Timeout (s)**, **Check Path**, **Maximum Retries**, and **Expected Code**, and click **Next : Confirm**.

< | Add Listener

① Configure Listener ————— ② Configure Backend Server Group ————— ③ Configure Health Check ————— ④ Confirm

Health Check Configuration

★ Protocol	HTTP
Port	80
If you do not specify a port number, the port used by the backend server to receive traffic will be used.	
★ Interval (s)	5
★ Timeout (s)	3
★ Check Path	/index.html
★ Maximum Retries	3
★ Expected Code	200
HTTP Body Matched Rule	Not required
HTTP Body Matched Content	0/1,024

Previous Next: Confirm

Step 8 Confirm the parameters and click **Submit**. Then, check whether the listener is created.

Add Listener

(1) Configure Listener —— (2) Configure Backend Server Group —— (3) Configure Health Check —— (4) Confirm

Configure Listener			
Name	listener-01	Frontend Protocol	HTTP
Frontend Port	80	Idle Timeout (s)	60
Request Timeout (s)	60	Response Timeout (s)	60
Description	--		
Configure Backend Server Group			
Name	pool-01	Backend Protocol	HTTP
Load Balancing Algorithm	Weighted round robin	Sticky Session Type	Not Required
Description	--		
Configure Health Check			
Health Check Protocol	HTTP	Health Check Port	80
Interval (s)	5	Timeout (s)	3
Check Path	/index.html	Maximum Retries	3
Expected Code	200	HTTP Body Matched Rule	Not required
HTTP Body Matched Content	--		

Previous
Submit

elb-01 Running

[Summary](#) [Listeners](#) [Backend Server Groups](#) [Monitoring](#)

Add Listener								
listener-01 HTTP/80	Edit Delete More	Basic Information	Forwarding Policies	Backend Server Groups				
		Name listener-01 Edit Frontend Protocol/Port HTTP/80 Access Control Disabled Configure Idle Timeout (s) 60 Edit Response Timeout (s) 60 Edit Description --						

Step 9 (Optional) Locate the target listener and click **Configure Access Control**. In the displayed dialog box, set parameters as prompted and click **OK**.

Step 10 (Optional) Click the target listener, click the **Forwarding Policies** tab, click **Add Forwarding Policy**, set parameters as prompted, and click **Save**.

If no forwarding object is available in the **Backend Server Group** drop-down list, click **View Backend Server Group** next to this parameter and add a backend server group.

Add Backend Server Group

* Name: pool-02

* Backend Protocol: HTTP

* Load Balancing Algorithm: Weighted round robin

Sticky Session Type: Not Required

Description: 0/64

Health Check Configuration

* Protocol: HTTP

Port: 80 (Value range: 1 to 65535)

If you do not specify a port number, the port used by the backend server to receive traffic will be used.

* Interval (s): 5 (Value range: 1 to 50)

OK Cancel

Return to the **Forwarding Policies** tab page, select the backend server group, and click **Save**.

listener-01 | HTTP/80

Basic Information Forwarding Policies Backend Server Groups

Add Forwarding Policy

Priority --

If: Domain name is www.test.com

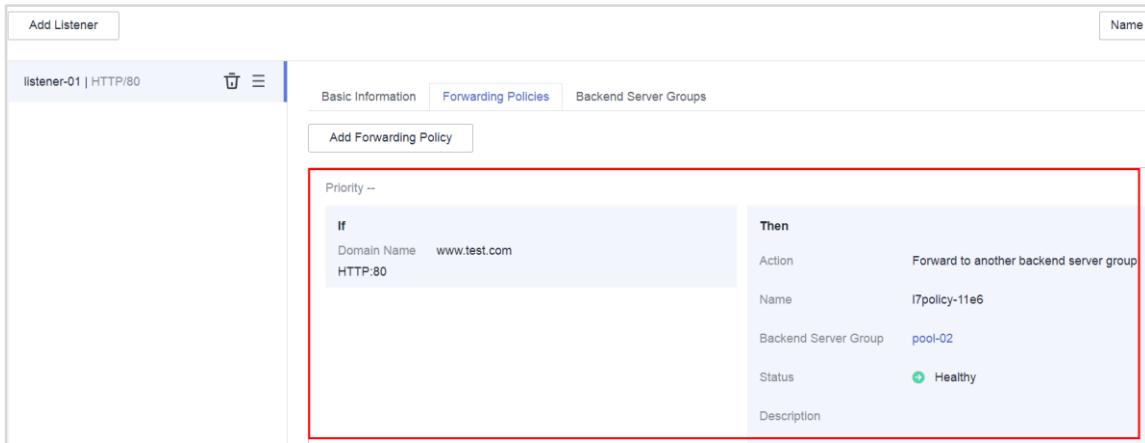
+ Add Forwarding Rule

Then:

- Action: Forward to another backend...
- Name: l7policy-11e6
- Backend Server Group: pool-02(8bf8f797-2333-45...)

Save Cancel

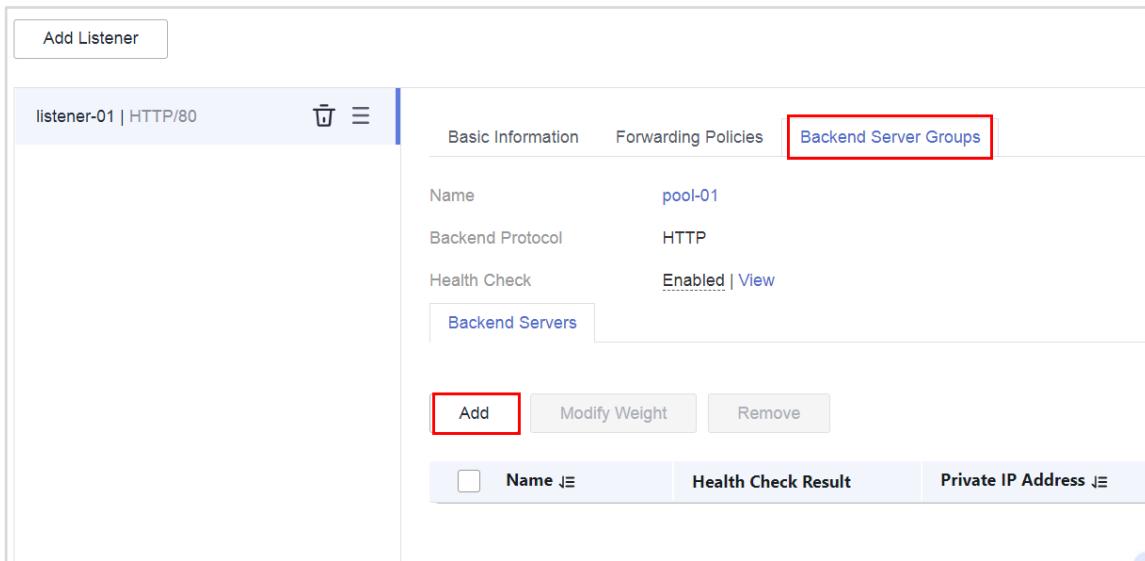
Ensure that the forwarding policy has been created.



The screenshot shows the 'Forwarding Policies' tab for 'listener-01 | HTTP/80'. A red box highlights the 'Then' section of a policy rule:

Action	Description
Name	l7policy-11e6
Backend Server Group	pool-02
Status	Healthy
Description	

Step 11 Click the **Backend Server Groups** tab and click **Add** under the **Backend Servers** tab. In the displayed **Add Backend Server** dialog box, set parameters as prompted and click **OK**.



The screenshot shows the 'Backend Server Groups' tab for 'listener-01 | HTTP/80'. A red box highlights the 'Add' button in the 'Backend Servers' section:

Name	Backend Protocol	Health Check
pool-01	HTTP	Enabled View

Buttons: Add, Modify Weight, Remove.

Add Backend Server

★ Backend Port	123	Name	subnet-zs1 (192.168.123....)	Name	zs
Server name	Private IP Address	Weight			
<input checked="" type="checkbox"/> ecs-zs1		1			
<input checked="" type="checkbox"/> ecs-zs-0001		1			
<input checked="" type="checkbox"/> ecs-zs-0002		1			

OK **Cancel**

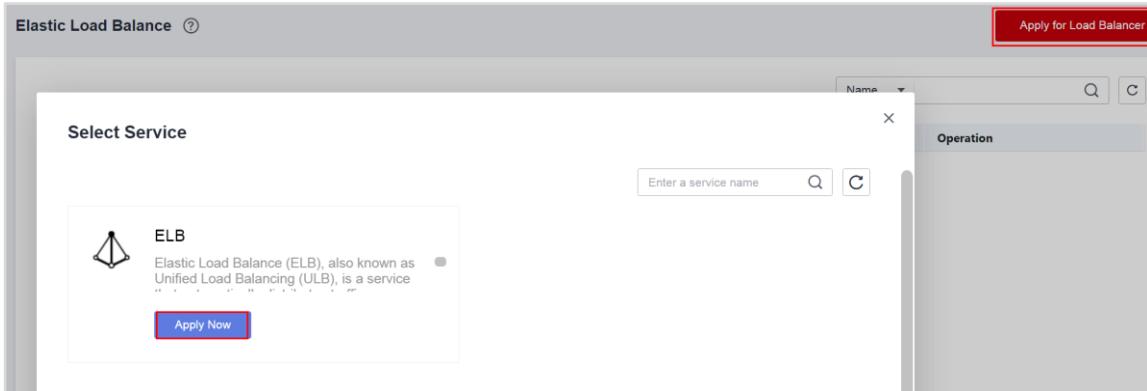
Check the quantity of backend servers.

Basic Information

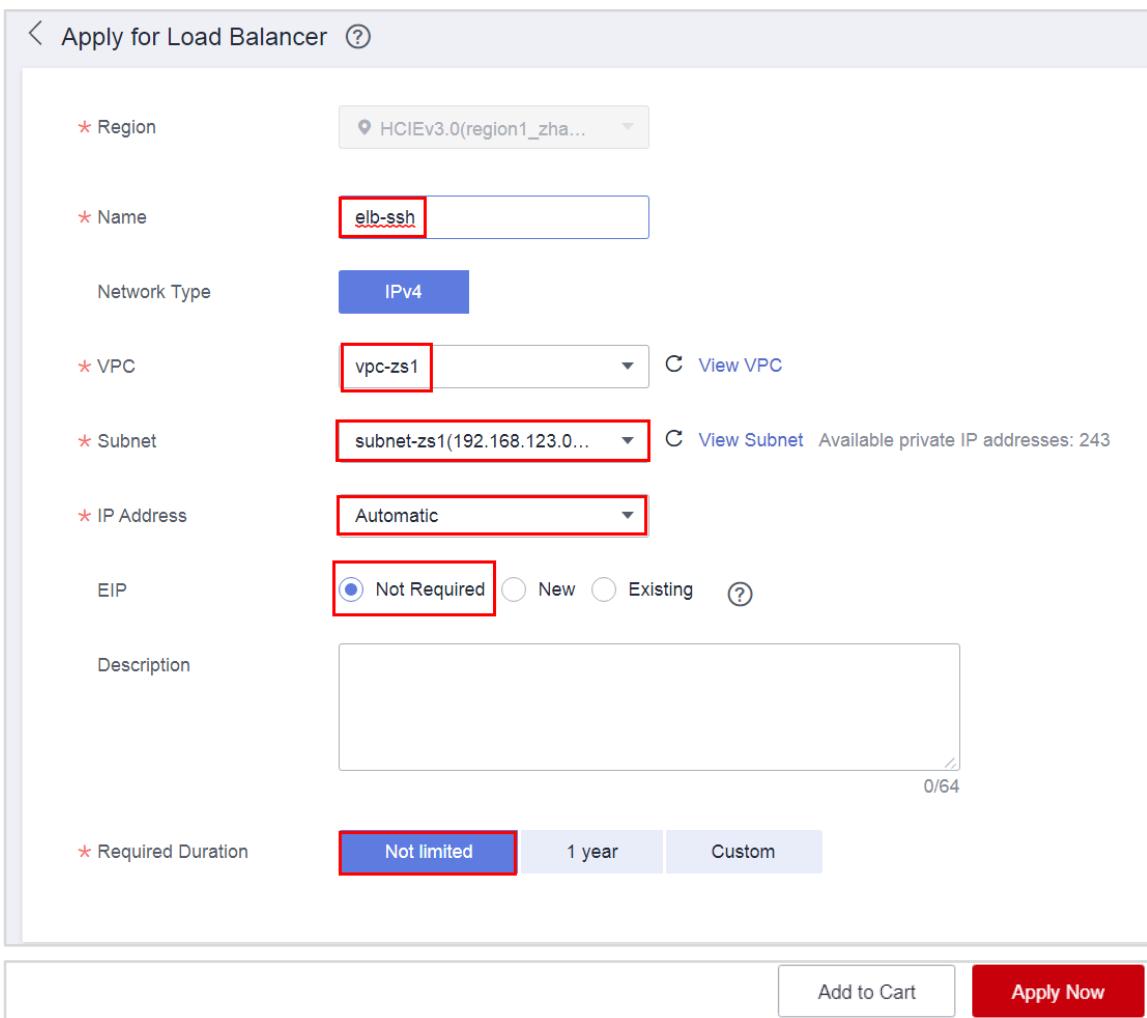
Name	pool-01	
Listeners	listener-01 / 51c65bce-a174-46c2-8cbe-a084caf910d5	
Load Balancing Algorithm	Weighted round robin	
Sticky Session	Disabled	
Backend Servers		
Add Modify Weight Remove		
Name	Health Check Result	Private IP Address
<input type="checkbox"/> ecs-zs-0002	! Offline	
<input type="checkbox"/> ecs-zs1	! Offline	
<input type="checkbox"/> ecs-zs-0001	! Offline	

10.2.2 Implementing Layer-4 Load Balancing

- Step 1 Access **Network Console**, choose **Elastic Load Balance > Load Balancers** in the navigation pane. On the displayed page, click **Apply for Load Balancer**. In the displayed dialog box, select **Elastic Load Balance** and click **Apply Now**.



Step 2 Set parameters such as **Name**, **VPC**, **Subnet**, **IP Address**, and **EIP** as required, and click **Apply Now**.



The screenshot shows the 'Apply for Load Balancer' configuration page. The following fields are highlighted with red boxes:

- Name:** elb-ssh
- VPC:** vpc-zs1
- Subnet:** subnet-zs1(192.168.123.0...)
- IP Address:** Automatic
- EIP:** Not Required
- Required Duration:** Not limited

At the bottom right of the form, there are 'Add to Cart' and 'Apply Now' buttons.

Step 3 Ensure that the load balancer **elb-ssh** has been created.

Elastic Load Balance ?				
Name	Status	EIP	IP Address	Subnet
elb-ssh	Running	--	192.168.123.	subnet-zs1

Step 4 Click **Add Listener** and set parameters as required. For details, see 10.2.1 Step 5Step 5 to Step 8 in section 10.2.1 .

Name	Status	EIP	IP Address	Subnet	Listener (Frontend Protocol/Port) / Health ...
elb-ssh	Running	--	192.168.123.	subnet-zs1	Add listener
elb-01	Running	--	192.168.123.4	subnet-zs1	listener-01(HTTP/80)/ Offline

Add Listener

① Configure Listener —— ② Configure Backend Server Group —— ③ Configure Health Check

* Name

* Frontend Protocol

* Frontend Port Value range: 1 to 65535

* Idle Timeout (s)

Description
 0/64

Configure the listener as required. Then, go to the next step.

Add Listener

① Configure Listener ————— ② Configure Backend Server Group ————— ③ Complete

* Backend Server Group	New	Existing	Not Required
* Name	pool-ssh		
* Backend Protocol	TCP		
* Load Balancing Algorithm	Weighted round robin	?	
Sticky Session Type	Not Required		
Description	0/64		

Configure the backend server group as required. Then, go to the next step.

Add Listener

① Configure Listener —— ② Configure Backend Server Group —— ③ Configure Health Check —— ④ Confirm

Health Check Configuration

* Protocol	TCP	
Port	22	(?) Value range: 1 to 65535 If you do not specify a port number, the port used by the backend server to receive traffic.
* Interval (s)	5	Value range: 1 to 50
* Timeout (s)	3	(?) Value range: 1 to 50
* Maximum Retries	3	Value range: 1 to 10
TCP Socket Matched Rule	Not required	(?)

TCP Socket Matched Content
0/1,024

Configure the health check as required. Then, go to the next step.

Add Listener

① Configure Listener —— ② Configure Backend Server Group —— ③ Configure Health Check —— ④ Confirm

Configure Listener

Name	listener-ssh	Frontend Protocol	TCP
Frontend Port	22	Idle Timeout (s)	60
Description	--		

Configure Backend Server Group

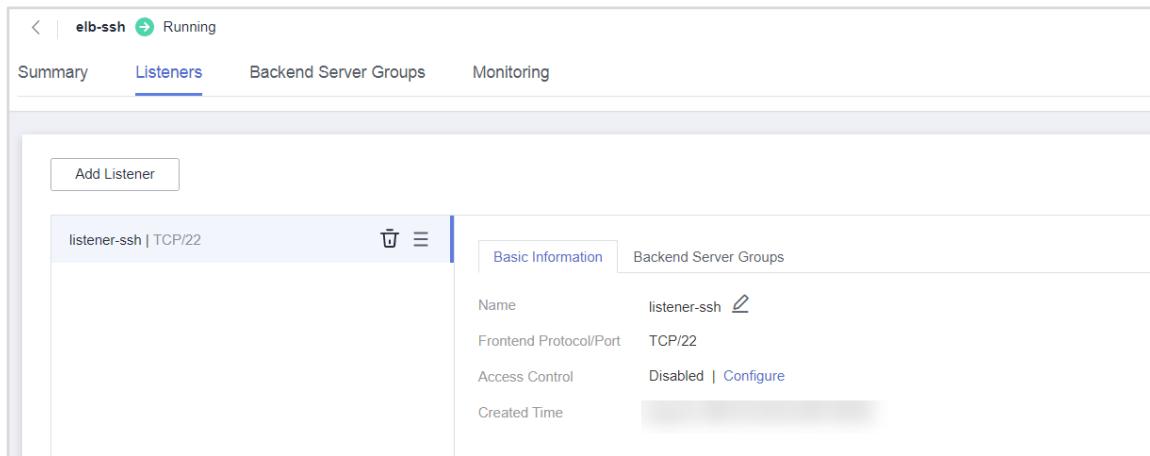
Name	pool-ssh	Backend Protocol	TCP
Load Balancing Algorithm	Weighted round robin	Sticky Session Type	Not Required
Description	--		

Configure Health Check

Health Check Protocol	TCP	Health Check Port	22
Interval (s)	5	Timeout (s)	3
Maximum Retries	3	TCP Socket Matched Rule	Not required
TCP Socket Matched Content	--		

[Previous](#)[Submit](#)

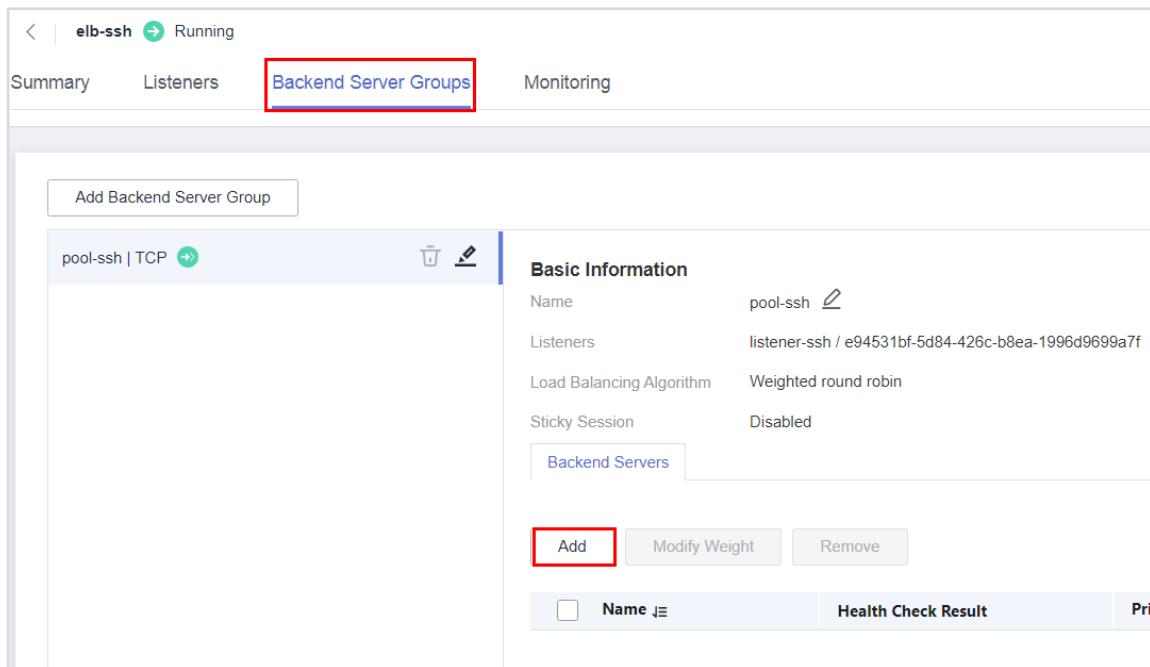
Confirm the configurations and click **Submit**. Ensure that the listener has been created.



The screenshot shows the 'Listeners' tab selected in the navigation bar. A new listener named 'listener-ssh | TCP/22' is being configured. The 'Basic Information' panel shows the following details:

Name	listener-ssh
Frontend Protocol/Port	TCP/22
Access Control	Disabled Configure
Created Time	[Redacted]

Step 5 Click the **Backend Server Groups** tab and click the target backend server group. On the displayed page, click **Add** under the **Backend Servers** tab, and add two ECSs in the same VPC.



The screenshot shows the 'Backend Server Groups' tab selected in the navigation bar. A new backend server group named 'pool-ssh | TCP' is being configured. The 'Basic Information' panel shows the following details:

Name	pool-ssh
Listeners	listener-ssh / e94531bf-5d84-426c-b8ea-1996d9699a7f
Load Balancing Algorithm	Weighted round robin
Sticky Session	Disabled

The 'Backend Servers' tab is selected. The 'Add' button is highlighted with a red box. Below the table, there are buttons for 'Modify Weight' and 'Remove'.

Add Backend Server

* Backend Port	22	subnet-zs1 (192.168.123....)	Name	zs	X	Q
Server name	Private IP Address	Weight				
<input type="checkbox"/> ecs-zs1		1				
<input checked="" type="checkbox"/> ecs-zs-0001		1				
<input checked="" type="checkbox"/> ecs-zs-0002		1				

OK Cancel

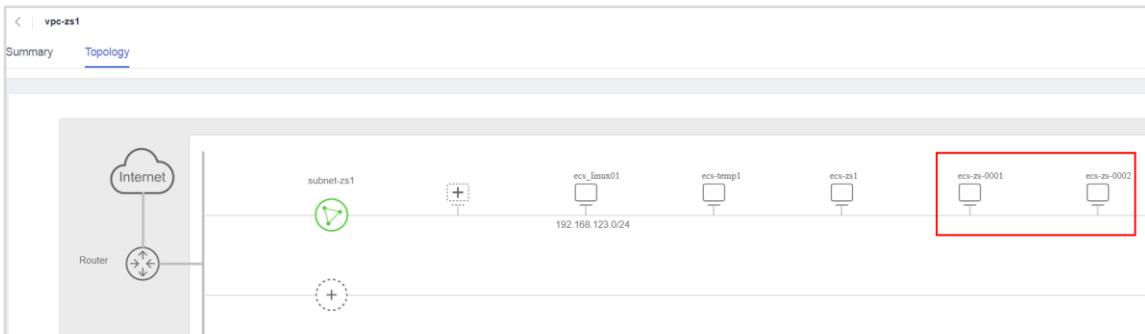
Set **Backend Port** to **22**, select the two created ECSs that belong to the same VPC, and click **OK**. Ensure that the backend ECSs have been added.

Basic Information

Name	pool-ssh	ID	576d68bc-dc9f-4801-ad94-d84feed1e1d7		
Listeners	listener-ssh / e94531bf-5d84-426c-b8ea-1996d9699a7f	Backend Protocol	TCP		
Load Balancing Algorithm	Weighted round robin	Health Check	Enabled View		
Sticky Session	Disabled	Description	--		
Backend Servers					
<input type="button" value="Add"/> <input type="button" value="Modify Weight"/> <input type="button" value="Remove"/>		All health c... ID			
Name	Health Check Result	Private IP Address	Weight	Backend Port	Operation
<input type="checkbox"/> ecs-zs-0002	Healthy		1	22	<input type="button" value="Remove"/>
<input type="checkbox"/> ecs-zs-0001	Healthy		1	22	<input type="button" value="Remove"/>

[Question] How can I quickly determine whether two ECSs belong to the same VPC?

[Answer] Go to the **Elastic Cloud Server** page, click the names of the target ECSs one by one, view the VPCs to which the target ECSs belong in the basic information about the ECSs, and check whether the two ECSs belong to the same VPC. You can also go to the VPC topology page and check whether the target VPC contains the two target ECSs to determine whether the two ECSs belong to the same VPC.



Step 6 Click the **Summary** tab in the upper left corner of the page and check the value of **IP Address** of the load balancer.

elb-ssh Running

Summary Listeners Backend Server Groups Monitoring

Name	elb-ssh
Status	Running
IP Address	192.168.123
QoS	Network Type Bind Application Type Bind
EIP	Bind
Description	--

Step 7 Choose **Service List > Elastic Cloud Server** and select an ECS (ensure that the backend server in Step 5 and the selected ECS are in the same VPC).

Service List Region

Enter a name to search for a service.

Basic cloud services

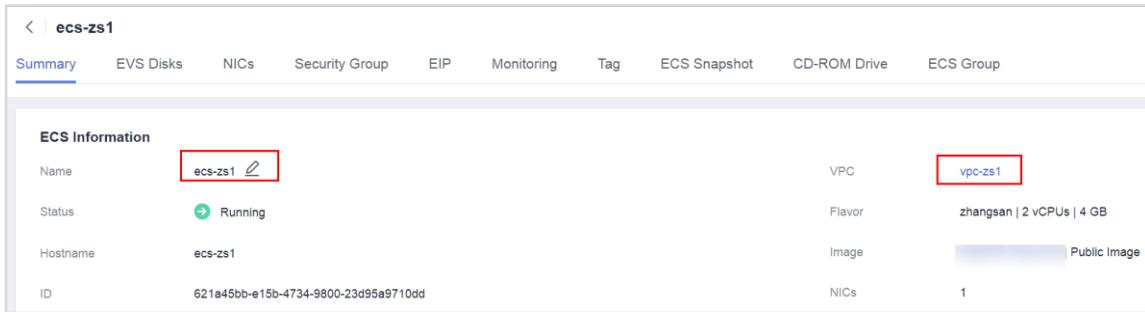
Computing

- Image Management Service
- Cloud Container Engine
- Elastic Cloud Server**
- Auto Scaling

Elastic Cloud Server

You are advised to install the password resetting plug-in so that you can conveniently reset the password if required. To determine which password plug-in to install, see the documentation for your operating system.

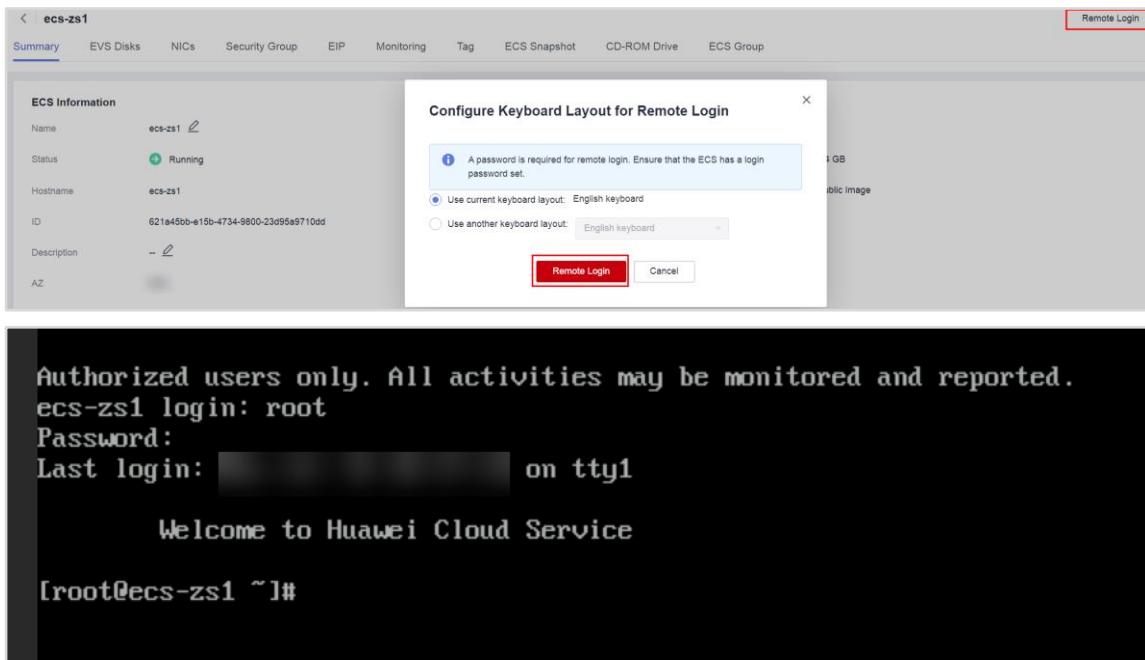
<input type="checkbox"/>	Name	Status	Flavor	Image	Private IP A...	EIP
<input type="checkbox"/>	ecs-zs-0002	Running	2 vCPUs 4 GB	[Redacted]	[Redacted]	-
<input type="checkbox"/>	ecs-zs-0001	Running	2 vCPUs 4 GB	[Redacted]	[Redacted]	-
<input type="checkbox"/>	ecs-zs1	Running	2 vCPUs 4 GB	[Redacted]	[Redacted]	-



ECS Information

Name	ecs-zs1	VPC	vpc-zs1
Status	Running	Flavor	zhangsan 2 vCPUs 4 GB
Hostname	ecs-zs1	Image	Public Image
ID	621a45bb-e15b-4734-9800-23d95a9710dd	NICs	1

Step 8 Remotely log in to the selected ECS.



Configure Keyboard Layout for Remote Login

A password is required for remote login. Ensure that the ECS has a login password set.

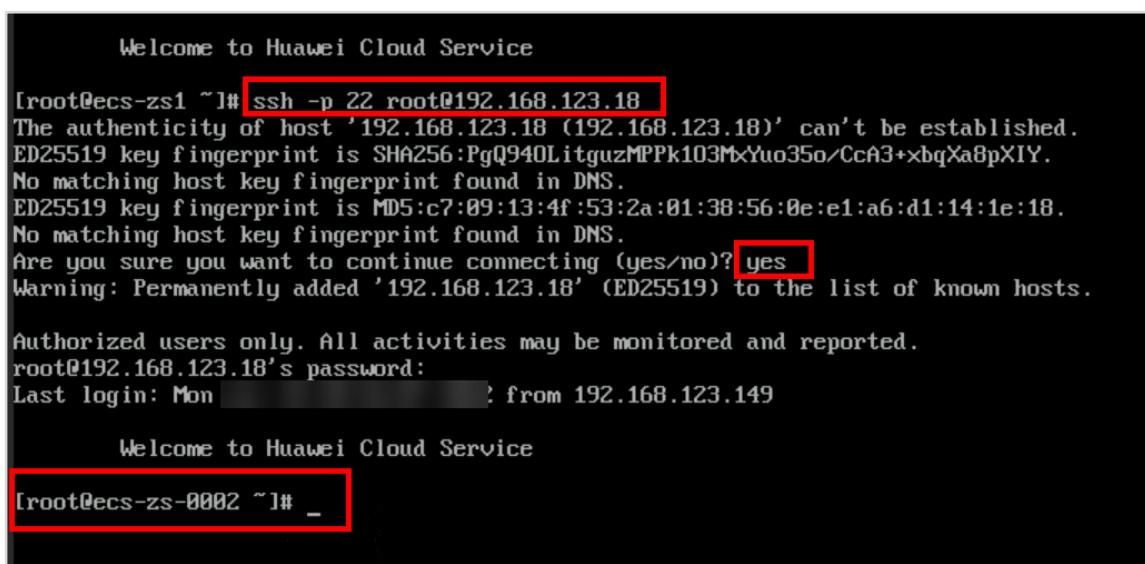
Use current keyboard layout: English keyboard

Use another keyboard layout: English keyboard

Remote Login Cancel

```
Authorized users only. All activities may be monitored and reported.  
ecs-zs1 login: root  
Password:  
Last login: [REDACTED] on tty1  
  
Welcome to Huawei Cloud Service  
  
[root@ecs-zs1 ~]#
```

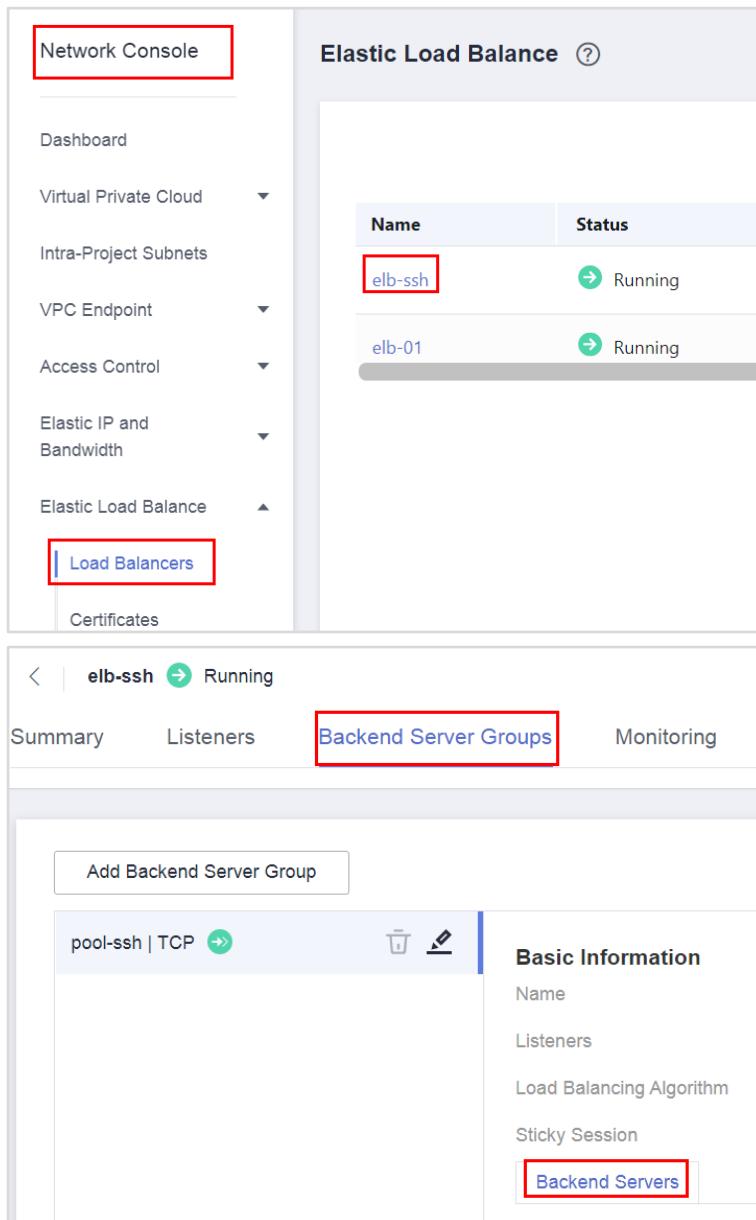
Step 9 On the selected ECS, use the load balancer service IP address (private IP address) to remotely log in to the backend server.



```
Welcome to Huawei Cloud Service  
[root@ecs-zs1 ~]# ssh -p 22 root@192.168.123.18  
The authenticity of host '192.168.123.18 (192.168.123.18)' can't be established.  
ED25519 key fingerprint is SHA256:PgQ940LitguzMPPk103MxYuo35o/CcA3+xbqXa8pXIY.  
No matching host key fingerprint found in DNS.  
ED25519 key fingerprint is MD5:c7:09:13:4f:53:2a:01:38:56:0e:e1:a6:d1:14:1e:18.  
No matching host key fingerprint found in DNS.  
Are you sure you want to continue connecting (yes/no)? yes  
Warning: Permanently added '192.168.123.18' (ED25519) to the list of known hosts.  
  
Authorized users only. All activities may be monitored and reported.  
root@192.168.123.18's password:  
Last login: Mon [REDACTED] : from 192.168.123.149  
  
Welcome to Huawei Cloud Service  
[root@ecs-zs1 ~]# _
```

You can use the load balancer service IP address to remotely log in to backend server ecs-zs-0002 (or the other ECS).

Step 10 Access **Network Console**, choose **Elastic Load Balance > Load Balancers** in the navigation pane, click the name of the new load balancer, and click the **Backend Server Groups** tab.



The screenshot displays the HUAWEI CLOUD Network Console interface. On the left, a sidebar menu lists various cloud services: Dashboard, Virtual Private Cloud, Intra-Project Subnets, VPC Endpoint, Access Control, Elastic IP and Bandwidth, and Elastic Load Balance. Under 'Elastic Load Balance', the 'Load Balancers' option is selected and highlighted with a red box. The main content area is titled 'Elastic Load Balance'. It shows a table with two rows:

Name	Status
elb-ssh	Running
elb-01	Running

Below this, a detailed view of the 'elb-ssh' load balancer is shown. The top bar includes back and forward navigation, the load balancer name ('elb-ssh'), and its status ('Running'). Below this are tabs for 'Summary', 'Listeners', 'Backend Server Groups' (which is highlighted with a red box), and 'Monitoring'. The 'Summary' section contains a button labeled 'Add Backend Server Group'. The 'Backend Server Groups' section shows one group named 'pool-ssh | TCP' with a green 'Running' status. To the right, a 'Basic Information' panel is visible, containing fields for 'Name', 'Listeners', 'Load Balancing Algorithm', 'Sticky Session', and a 'Backend Servers' section (which is also highlighted with a red box).

Step 11 Change the weight of a backend server.

Name	Health Check Result	Private IP Address	Weight	Backend Port	Operation
ecs-zs-0002	Healthy	[REDACTED]	1	22	Remove
ecs-zs-0001	Healthy	[REDACTED]	1	22	Remove

Increase the weight of the ECS that is not accessed in Step 9. In this example, increase the weight of ecs-zs-0001 from 1 to 10 to increase the frequency of the ECS being accessed by the load balancer.

Step 12 On the ECS console, select another ECS. (The ECS belongs to the same VPC as the first three compute instances in section 10.2.2.)

Name	VPC
ecs-temp1	vpc-zs1
Status	Running
Hostname	ecs-temp1
ID	4ca70e3f-aae2-4ed8-bcd4-d6898d512b71

Step 13 Remotely log in to the selected ECS.

```
Authorized users only. All activities may be monitored and reported.  
Hint: Caps Lock on  
  
ecs-temp1 login: root  
Password:  
Last failed login: [REDACTED] on tty1  
There were 2 failed login attempts since the last successful login.  
Last login: [REDACTED] on tty1  
  
        Welcome to Huawei Cloud Service  
  
[root@ecs-temp1 ~]# _
```

- Step 14 On the selected ECS, use the load balancer service IP address (private IP address) to remotely log in to the backend server.

```
[root@ecs-temp1 ~]# ssh -p 22 root@192.168.123.18  
The authenticity of host '192.168.123.18 (192.168.123.18)' can't be established.  
ED25519 key fingerprint is SHA256:CZfrQHwA7Z6ubBZUGW5hqpxFU/24teHEmoKcupkvJA.  
No matching host key fingerprint found in DNS.  
ED25519 key fingerprint is MD5:4c:0b:78:a6:76:6b:e1:bd:1f:73:18:50:9c:02:09:ad.  
No matching host key fingerprint found in DNS.  
Are you sure you want to continue connecting (yes/no)? yes  
Warning: Permanently added '192.168.123.18' (ED25519) to the list of known hosts.  
  
Authorized users only. All activities may be monitored and reported.  
root@192.168.123.18's password:  
Last failed login: [REDACTED] from 192.168.123.22 on ssh:notty  
There was 1 failed login attempt since the last successful login.  
Last login: [REDACTED] from 192.168.123.22  
  
        Welcome to Huawei Cloud Service  
  
[root@ecs-zs-0001 ~]#
```

To sum up, you can use the load balancer service IP address (private IP address) to remotely log in to a backend server associated with the load balancer to implement layer-4 load balancing.

10.2.3 Implementing Layer-7 Load Balancing

- Step 1 Remotely log in to ecs-zs-0001 and ecs-zs-002 (the two ECSs are in the same VPC) one by one. Enable the HTTP service on port 8889.

- Run the following command to enable the service on each ECS:

```
nohup python -m SimpleHTTPServer 8889 > /dev/null 2>&1 &
```

- Run the following command to verify that the service has been enabled:

```
curl 127.0.0.1:8889
```

For ecs-zs-0001:

<input type="checkbox"/>	Name	Status	Flavor	Expires	Creator	Operation
<input type="checkbox"/>	ecs-zs-0002	Running	2 vCPUs 4 GB	Never	zhangsan	Remote Login More ▾
<input type="checkbox"/>	ecs-zs-0001	Running	2 vCPUs 4 GB	Never	zhangsan	Remote Login More ▾
<input type="checkbox"/>	ecs-zs1	Running	2 vCPUs 4 GB	Never	zhangsan	Remote Login More ▾

```

Authorized users only. All activities may be monitored and reported.
ecs-zs-0001 login: root
Password:
Last login: [REDACTED] from 192.168.123.81

Welcome to Huawei Cloud Service

[root@ecs-zs-0001 ~]#

```

```

[root@ecs-zs-0001 ~]# nohup python -m SimpleHTTPServer 8889 > /dev/null 2>&1 &
[2] 11329
[root@ecs-zs-0001 ~]# curl 127.0.0.1:8889
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 3.2 Final//EN"><html>
<title>Directory listing for /</title>
<body>
<h2>Directory listing for /</h2>
<hr>
<ul>
<li><a href=".bash_history">.bash_history</a>
<li><a href=".bash_logout">.bash_logout</a>
<li><a href=".bash_profile">.bash_profile</a>
<li><a href=".bashrc">.bashrc</a>
<li><a href=".cache/">.cache</a>
<li><a href=".cshrc">.cshrc</a>
<li><a href=".history">.history</a>
<li><a href=".ssh/">.ssh</a>
<li><a href=".tcshrc">.tcshrc</a>
<li><a href="service1">service1</a>
</ul>
<hr>
</body>
</html>
[2]+  Exit 1                  nohup python -m SimpleHTTPServer 8889 > /dev/null 2>&1
[root@ecs-zs-0001 ~]#

```

For ecs-zs-0002:

<input type="checkbox"/>	Name	Status	Flavor	Expires	Creator	Operation
<input type="checkbox"/>	ecs-zs-0002	Running	2 vCPUs 4 GB	Never	zhangsan	Remote Login
<input type="checkbox"/>	ecs-zs-0001	Running	2 vCPUs 4 GB	Never	zhangsan	Remote Login
<input type="checkbox"/>	ecs-zs1	Running	2 vCPUs 4 GB	Never	zhangsan	Remote Login

```
Authorized users only. All activities may be monitored and reported.  
Hint: Caps Lock on  
  
ecs-zs-0002 login: root  
Password:  
Last failed login: [REDACTED] from 192.168.123.22 on ssh:notty  
There were 11 failed login attempts since the last successful login.  
Last login: [REDACTED] from 192.168.123.22  
  
Welcome to Huawei Cloud Service  
  
[root@ecs-zs-0002 ~]# _  
  
[root@ecs-zs-0002 ~]# nohup python -m SimpleHTTPServer 8889 > /dev/null 2>&1 &  
[1] 18321  
[root@ecs-zs-0002 ~]# curl 127.0.0.1:8889  
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 3.2 Final//EN"><html>  
<title>Directory listing for /</title>  
<body>  
<h2>Directory listing for /</h2>  
<hr>  
<ul>  
<li><a href=".bash_history">.bash_history</a>  
<li><a href=".bash_logout">.bash_logout</a>  
<li><a href=".bash_profile">.bash_profile</a>  
<li><a href=".bashrc">.bashrc</a>  
<li><a href=".cache/">.cache/</a>  
<li><a href=".cshrc">.cshrc</a>  
<li><a href=".history">.history</a>  
<li><a href=".ssh/">.ssh/</a>  
<li><a href=".tcshrc">.tcshrc</a>  
<li><a href="service2">service2</a>  
</ul>  
<hr>  
</body>  
</html>  
[1]+ Exit 1 nohup python -m SimpleHTTPServer 8889 > /dev/null 2>&1  
[root@ecs-zs-0002 ~]#
```

Step 2 Run the **vi** command on the two ECSs one by one to create and edit the **index.html** file.

For ecs-zs-0001:

```
[root@ecs-zs-0001 ~]# vi index.html  
  
Welcome to ecs-0001!  
~
```

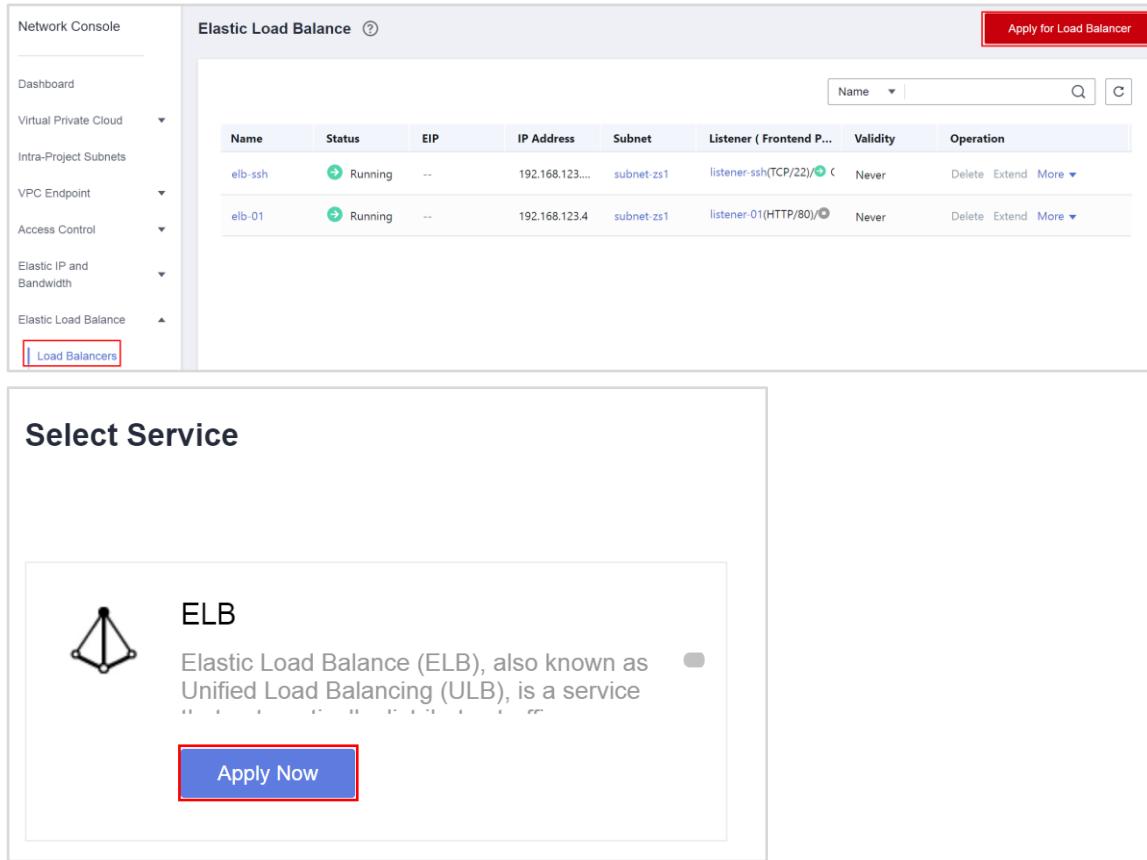
Enter **i** and add **Welcome to ecs-0001!**. Press **Esc** and enter **:wq!** to save the modification and exit.

For ecs-zs-0002:

```
[root@ecs-zs-0002 ~]# vi index.html  
  
Welcome to ecs-0002!  
~
```

Enter **i** and add **Welcome to ecs-0002!**. Press **Esc** and enter **:wq!** to save the modification and exit.

Step 3 Access **Network Console**, choose **Elastic Load Balance > Load Balancers** in the navigation pane. On the displayed page, click **Apply for Load Balancer**. In the displayed dialog box, select the **Elastic Load Balance** service and click **Apply Now**.



The screenshot shows the HUAWEI CLOUD Network Console. The left sidebar has a tree structure with 'Elastic Load Balance' expanded, and 'Load Balancers' is highlighted with a red box. The main area is titled 'Elastic Load Balance' and shows a table of load balancers:

Name	Status	EIP	IP Address	Subnet	Listener (Frontend P...)	Validity	Operation
elb-ssh	Running	--	192.168.123....	subnet-zs1	listener-ssh(TCP/22)/ ✓	Never	Delete Extend More ▾
elb-01	Running	--	192.168.123.4	subnet-zs1	listener-01(HTTP/80)/ ○	Never	Delete Extend More ▾

To the right of the table is a red button labeled 'Apply for Load Balancer'. Below this, a modal window titled 'Select Service' is displayed, also with a red box around its 'Apply Now' button. The modal contains an icon of a triangle with lines, the text 'ELB', and a brief description: 'Elastic Load Balance (ELB), also known as Unified Load Balancing (ULB), is a service'.

Step 4 Set parameters such as **Name**, **VPC**, **Subnet**, **IP Address**, and **EIP** as required, and click **Apply Now**.

Apply for Load Balancer ?

* Region

* Name elb-http

Network Type IPv4

* VPC vpc-zs1 C [View VPC](#)

* Subnet subnet-zs1(192.168.123.0...) C [View Subnet](#)

* IP Address Automatic

EIP Not Required New Existing ?

* External Network zs-EIP C

* Subnet zs-eip(10.200.16.0/24) C

EIP Automatic

* Bandwidth Size 1 2 5 10 100 200 300

Bandwidth Description --Select-- 0/64

Description 0/64

* Required Duration Not limited 1 year Custom



Step 5 Ensure that the load balancer **elb-http** has been created.

Name	Status	EIP	IP Address	Subnet	Listener (Frontend Protocol/Port) / Health Check Result
elb-http	Running	10.200.16.■■■	192.168.123.■■■	subnet-zs1	Add listener
elb-ssh	Running	--	192.168.123.■■■	subnet-zs1	listener-ssh(TCP/22)/● Online
elb-01	Running	--	192.168.123.■■■	subnet-zs1	listener-01(HTTP/80)/● Offline

Step 6 Click **Add Listener** and set parameters as required. For details, see Step 5 to Step 8 in section 10.2.1 .

Name	Status	EIP	IP Address	Subnet	Listener (Frontend Protocol/Port) / Health Check Result
elb-http	Running	■■■■■	■■■■■	subnet-zs1	Add listener
elb-ssh	Running	■■■■■	■■■■■	subnet-zs1	listener-ssh(TCP/22)/● Online
elb-01	Running	■■■■■	■■■■■	subnet-zs1	listener-01(HTTP/80)/● Offline

< | Add Listener

① Configure Listener ————— ② Configure Backend Server Group ————— ③ Configure He

★ Name	listener-http			
★ Frontend Protocol	HTTP	TCP	UDP	HTTPS
★ Frontend Port	8888	Value range: 1 to 65535		
★ Idle Timeout (s)	60			
★ Request Timeout (s)	60			
★ Response Timeout (s)	60			
Description	0/64			

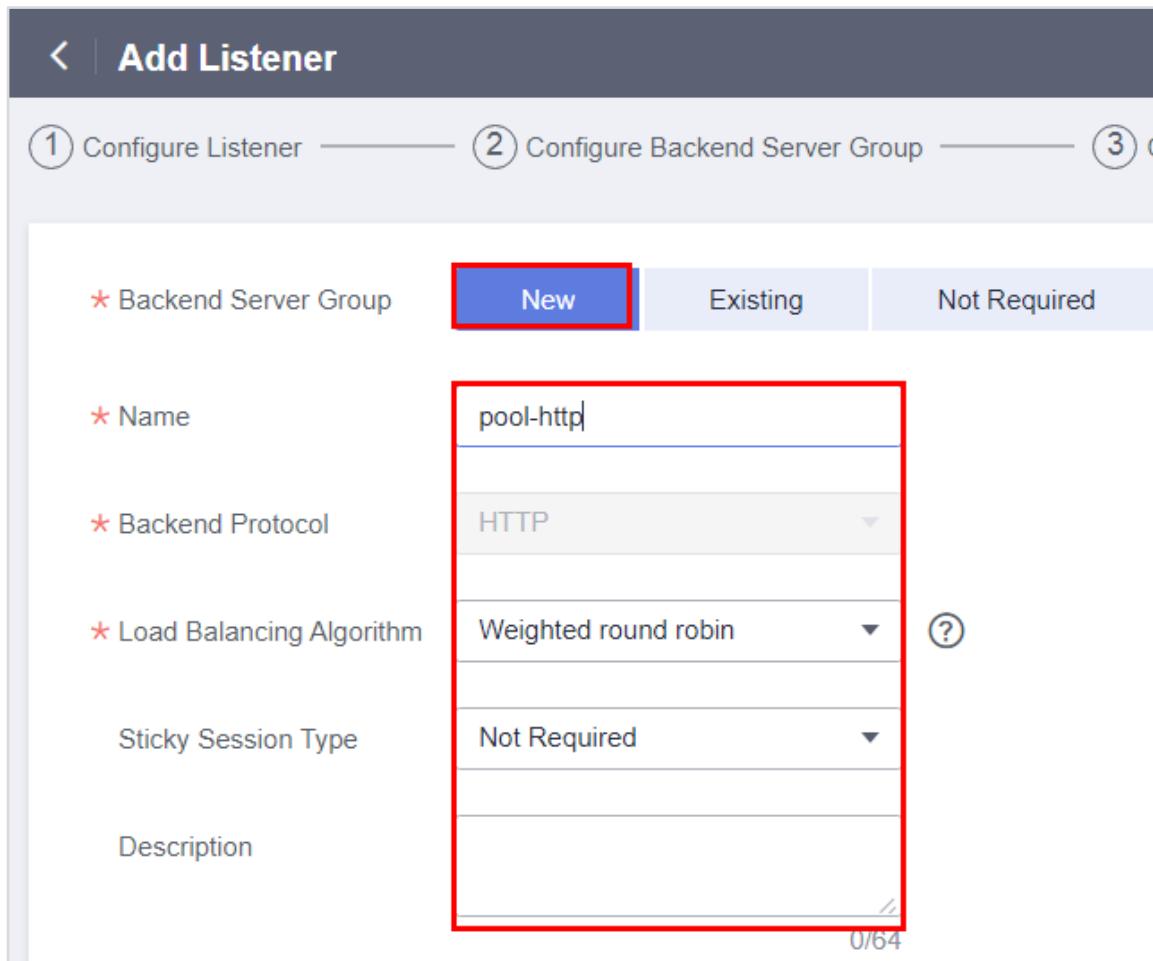
Configure the listener as required. Then, go to the next step.

< | Add Listener

① Configure Listener ————— ② Configure Backend Server Group ————— ③

Backend Server Group	New	Existing	Not Required
★ Name	pool-http		
★ Backend Protocol	HTTP		
★ Load Balancing Algorithm	Weighted round robin	(?)	
Sticky Session Type	Not Required		
Description			

0/64



Configure the backend server group as required. Then, go to the next step.

< | Add Listener

① Configure Listener ————— ② Configure Backend Server Group ————— ③ Configure Health Check

Health Check Configuration

★ Protocol	HTTP
Port	8889
If you do not specify a port number, the port used by the backend server to receive	
★ Interval (s)	5
★ Timeout (s)	3
★ Check Path	/
★ Maximum Retries	3
★ Expected Code	200
HTTP Body Matched Rule	Not required
HTTP Body Matched Content	0/1,024

Configure the health check as required. Then, go to the next step.

Add Listener

① Configure Listener ————— ② Configure Backend Server Group ————— ③ Configure Health Check ————— ④ Confirm

Name	listener-http	Frontend Protocol	HTTP
Frontend Port	8888	Idle Timeout (s)	60
Request Timeout (s)	60	Response Timeout (s)	60
Description	--		
Configure Backend Server Group			
Name	pool-http	Backend Protocol	HTTP
Load Balancing Algorithm	Weighted round robin	Sticky Session Type	Not Required
Description	--		
Configure Health Check			
Health Check Protocol	HTTP	Health Check Port	8889
Interval (s)	5	Timeout (s)	3
Check Path	/	Maximum Retries	3
Expected Code	200	HTTP Body Matched Rule	Not required
HTTP Body Matched Content	--		

Previous Submit

Confirm the configurations and click **Submit**. Ensure that the listener has been created.

elb-http Running

Summary **Listeners** Backend Server Groups Monitoring

Add Listener

listener-http HTTP/8888		⋮	Basic Information	Forwarding Policies	Backend Server Groups
Name	listener-http		Name	listener-http	
Frontend Protocol/Port	HTTP/8888		Frontend Protocol/Port	HTTP/8888	
Access Control	Disabled Configure		Access Control	Disabled Configure	
Idle Timeout (s)	60		Idle Timeout (s)	60	
Response Timeout (s)	60		Response Timeout (s)	60	
Description	--		Description	--	

Step 7 Click the **Backend Server Groups** tab and click the target backend server group. On the displayed page, click **Add** under the **Backend Servers** tab, and add two ECSs ecs-zs-0001 and ecs-zs-0002 in the same VPC. For details, see Step 5 in section 10.2.2 .

The screenshot shows two pages from the HUAWEI CLOUD Stack Lab Guide.

The top page displays the 'Backend Server Groups' tab for a listener named 'listener-http | HTTP/8888'. It lists a single backend server group 'pool-http' with 'HTTP' as the backend protocol. The 'Health Check' status is 'Enabled | View'. Below this, there are buttons for 'Add', 'Modify Weight', and 'Remove'. A red box highlights the 'Backend Servers' link under 'Health Check'.

The bottom page is a modal dialog titled 'Add Backend Server'. It shows a table with columns: 'Server name', 'Private IP Address', and 'Weight'. Three servers are listed: 'ecs-zs1' (weight 1), 'ecs-zs-0001' (selected and highlighted with a red box, weight 1), and 'ecs-zs-0002' (selected and highlighted with a red box, weight 1). The 'OK' button at the bottom right is also highlighted with a red box.

Return to the load balancer backend server group details page. Wait for 3 to 5 minutes until the health check result of the two newly added ECSs is **Healthy**. (If the health check result is **Unhealthy**, check the running status of the ECSs and whether their security groups allow traffic to pass through.)

The screenshot shows the 'Backend Servers' table for the 'pool-http' backend server group. It lists two servers: 'ecs-zs-0002' and 'ecs-zs-0001', both of which have a 'Health Check Result' of 'Healthy'. The 'Weight' column shows values of 1 for both servers, and the 'Backend Port' column shows 8889. A red box highlights the 'ecs-zs-0001' row.

- Step 8** Remotely log in to an ECS on the ECS console. (The ECS can be any ECS except ecs-zs-0001 and ecs-zs-0002, and the ECS must be in the same VPC as ecs-zs-0001 and ecs-zs-0002.)

```
Authorized users only. All activities may be monitored and reported.  
ecs-zs1 login: root  
Password:
```

```
Last login: [REDACTED] on tty1
```

```
Welcome to Huawei Cloud Service
```

```
[root@ecs-zs1 ~]# _
```

- Step 9 On the ecs-zs1 console, enter the elb-http port link (<http://EIP bound to elb>-[http:8888](http://8888)) to check whether the service can be accessed.

```
Welcome to Huawei Cloud Service  
[root@ecs-zs1 ~]# curl http://10.200.16.230:8888  
Welcome to ecs-0002!  
[root@ecs-zs1 ~]# _
```

- Step 10 Run the **curl** command multiple times to check the pages that can be accessed by ecs-zs1.

```
[root@ecs-zs1 ~]# curl http://10.200.16.230:8888  
Welcome to ecs-0002!  
[root@ecs-zs1 ~]# curl http://10.200.16.230:8888  
Welcome to ecs-0002!  
[root@ecs-zs1 ~]# curl http://10.200.16.230:8888  
Welcome to ecs-0001!  
[root@ecs-zs1 ~]# curl http://10.200.16.230:8888  
Welcome to ecs-0001!  
[root@ecs-zs1 ~]# curl http://10.200.16.230:8888  
Welcome to ecs-0002!  
[root@ecs-zs1 ~]# _
```

You can see that ecs-zs1 can access backend servers ecs-zs-0001 and ecs-zs-0002 at a frequency of 1:1, achieving load balancing.

10.2.4 Managing Load Balancers

- Step 1 Access **Network Console**, and choose **Elastic Load Balance > Load Balancers** to view the configuration details of a load balancer, including the load balancer name, status, EIP, service IP address, subnet, and expiration time.

Elastic Load Balance									
Name	Status	EIP	IP Address	Subnet	Listener (Frontend Protocol/Port) / Health Check Result	Validity	Operation		
elb-http	Running	10.200.16.1	192.168.123	subnet-zs1	Listener-01(HTTP(8888)/--)	Never	Delete Extend More		
elb-ssh	Running	--	192.168.123	subnet-zs1	Listener-01(TCP(22)/--)	Never	Delete Extend More		
elb-01	Running	--	192.168.123	subnet-zs1	Listener-01(HTTP(80)/○ Offline)	Never	Delete Extend More		

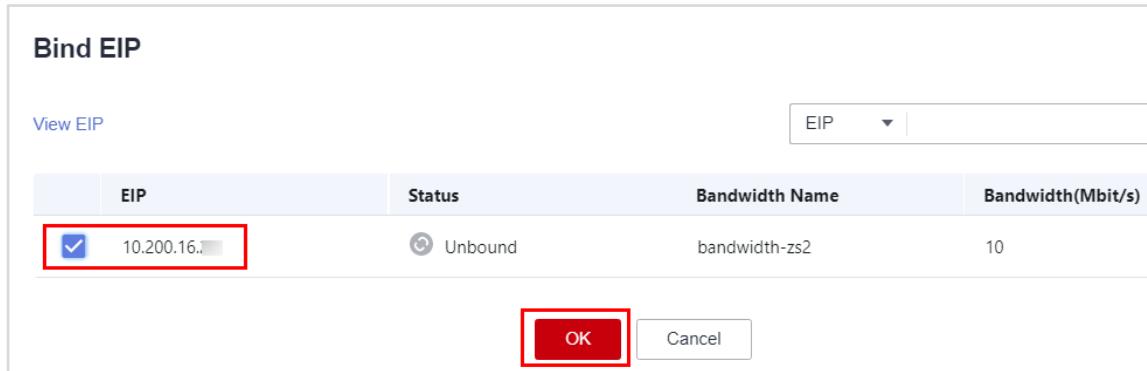
Click the name of the target load balancer. On the displayed **Summary** tab page, view details about the load balancer.

Name	elb-01	Status	Running	ID	db1ef7c2-6c1f-45a6-8304-3a027c4538c3
IP Address	192.168.123	VPC	vpc-zs1	Subnet	subnet-zs1
QoS	Bind	Network Type	Bind	Hybrid Load Balancing	Disabled
EIP	Bind	Application Type	Bind	Created Time	
Description	--			Validity	Never

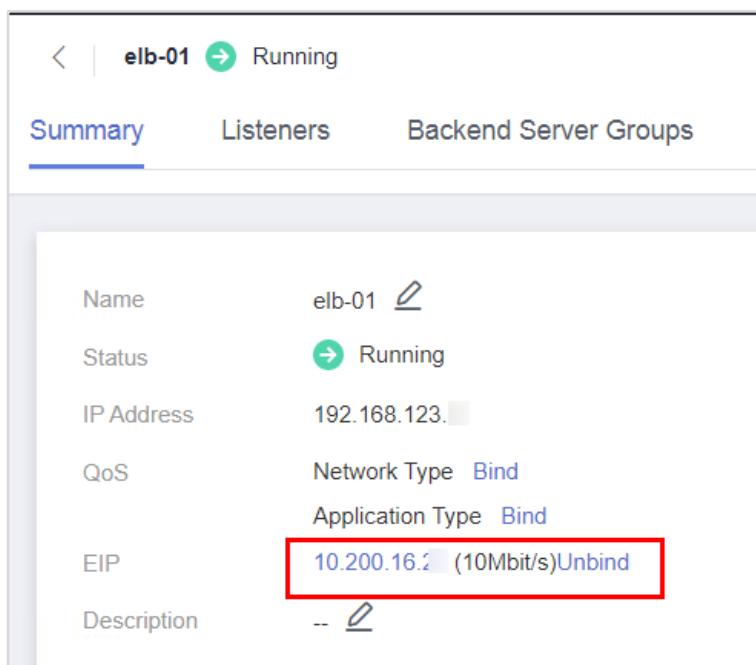
Step 2 On the **Summary** tab page, click **Bind** next to **EIP** to bind an EIP.

Name	elb-01	Status	Running		
Summary	elb-01	Listeners	elb-01	Backend Server Groups	elb-01
Name	elb-01	Status	Running	IP Address	192.168.123
QoS	Bind	Network Type	Bind	Application Type	Bind
EIP	Bind	Description	--		

On the displayed page, select the target EIP and click **OK**.



Check the status for EIP.



elb-01 Running

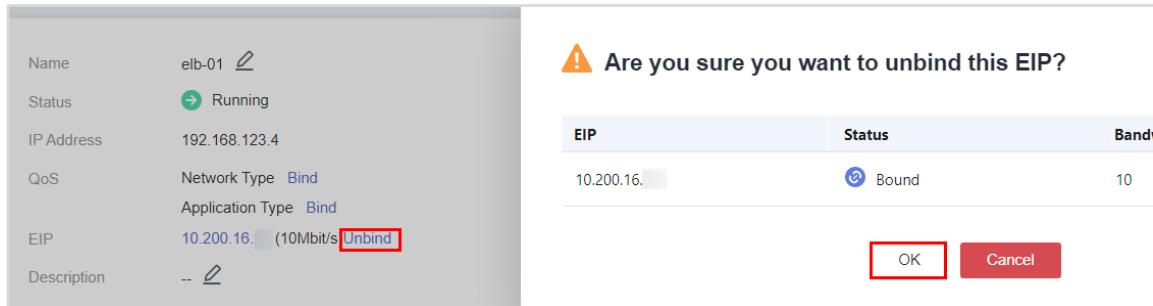
Summary Listeners Backend Server Groups

Name: elb-01 Status: Running IP Address: 192.168.123.1 QoS: Network Type Bind Application Type Bind

EIP: **10.200.16.1 (10Mbit/s) Unbind** Bind

Description: --

(Optional) Click **Unbind** next to **EIP** to unbind the EIP. In the displayed dialog box, click **OK**.



Check the status for EIP.

Name	elb-01
Status	Running
IP Address	192.168.123.4
QoS	Network Type Bind Application Type Bind
EIP	Bind
Description	--
ID	db1ef7c2-6c1f-45a6-9304-3a027c4538c3
VPC	vpc-zs1
Subnet	subnet-zs1
Hybrid Load Balancing	Disabled
Created Time	[Redacted]
Validity	Never

Step 3 Click the **Listeners** tab, locate the target listener, and click **Modify Listener**.

Name	listener-01
Frontend Protocol/Port	HTTP/80
Access Control	Enabled Configure
Idle Timeout (s)	60
Response Timeout (s)	60
Description	--

On the displayed **Modify Listener** page, modify the listener configuration. For details, see Step 5 to Step 8 in section 10.2.1 .

Modify Listener

① Configure Listener —— ② Configure Backend Server Group —— ③ Configure Health Check —— ④ Finish

* Name	listener-01-new	
* Frontend Protocol	HTTP	
* Frontend Port	80	Value range: 1 to 65535
* Idle Timeout (s)	120	
* Request Timeout (s)	60	
* Response Timeout (s)	60	
Description	0/64	

Cancel **Next**

Modify Listener

① Configure Listener —— ② Configure Backend Server Group —— ③ Configure Health Check —— ④ Finish

Backend Server Group	<input checked="" type="checkbox"/>
* Backend Server Group	pool-01(270edfca-801b-4...)

C View Backend Server Group ?

Protocol:HTTP | Load Balancing Algorithm : Weighted round robin | Sticky Session : Disabled | Health Check : Enabled

Previous Cancel **Next**

Modify Listener

① Configure Listener —— ② Configure Backend Server Group —— ③ Configure Health Check —— ④ Finish

Health Check Configuration

* Protocol	HTTP
Port	80
If you do not specify a port number, the port used by the backend server to receive traffic will be used.	
* Interval (s)	5
Value range: 1 to 50	
* Timeout (s)	3
Value range: 1 to 50	
* Check Path	/index.html
Maximum length: 80 characters	
* Maximum Retries	3
Value range: 1 to 10	
* Expected Code	200

Previous Cancel **Submit**

Modify Listener

① Configure Listener —— ② Configure Backend Server Group —— ③ Configure Health Check —— ④ Finish

✓ Listener listener-01-new modified successfully.
 ✓ Health check settings changed successfully.

Previous **Finish**

Check the modification on the listener.

Add Listener												
listener-01-new HTTP/80												
<table border="1"> <thead> <tr> <th>Basic Information</th> <th>Forwarding Policies</th> <th>Backend Server Groups</th> </tr> </thead> <tbody> <tr> <td>Name listener-01-new</td> <td>Forwarding Policies</td> <td>Backend Server Groups</td> </tr> <tr> <td>Frontend Protocol/Port HTTP/80</td> <td>Access Control Enabled Configure</td> <td></td> </tr> <tr> <td>Idle Timeout (s) 120</td> <td>Response Timeout (s) 60</td> <td>Description --</td> </tr> </tbody> </table>	Basic Information	Forwarding Policies	Backend Server Groups	Name listener-01-new	Forwarding Policies	Backend Server Groups	Frontend Protocol/Port HTTP/80	Access Control Enabled Configure		Idle Timeout (s) 120	Response Timeout (s) 60	Description --
Basic Information	Forwarding Policies	Backend Server Groups										
Name listener-01-new	Forwarding Policies	Backend Server Groups										
Frontend Protocol/Port HTTP/80	Access Control Enabled Configure											
Idle Timeout (s) 120	Response Timeout (s) 60	Description --										

- Step 4** On the load balancer details page, click the **Backend Server Groups** tab. Locate the target backend server group and click the modification icon. In the displayed dialog box, modify the configuration as required (modifying the name is used as an example) and click **OK**.

Modify Backend Server Group

* Name: pool-01-new

Backend Protocol: HTTP

* Load Balancing Algorithm: Weighted round robin

Sticky Session Type: Not Required

Description: (empty)

Health Check Configuration

* Protocol: HTTP

Port: 80

If you do not specify a port number, the port used by the backend server to receive traffic will be used.

* Interval (s): 5

OK Cancel

Check the new name of the backend server group.

elb-01 Running

Summary Listeners Backend Server Groups Monitoring

Add Backend Server Group

pool-01-new | HTTP

pool-02 | HTTP

Basic Information

Name: pool-01-new

Listeners: listener-01-new / 51c65bc

Load Balancing Algorithm: Weighted round robin

Sticky Session: Disabled

Backend Servers

- Step 5** Click the **Backend Server Groups** tab and click the target backend server group in the list. On the **Backend Servers** tab on the **Basic Information** page, select the target backend servers and click **Modify Weight**.

Backend Server Groups

Name	Listeners	Load Balancing Algorithm	Sticky Session
pool-01-new HTTP	listener-01-new / 51c65bce-a174-46c2-8cb	Weighted round robin	Disabled
pool-02 HTTP			

Basic Information

Name	pool-01-new
Listeners	listener-01-new / 51c65bce-a174-46c2-8cb
Load Balancing Algorithm	Weighted round robin
Sticky Session	Disabled

Backend Servers

Name	Health Check Result
ecs-zs-0002	Offline
ecs-zs1	Offline
ecs-zs-0001	Offline

Add Modify Weight Remove

In the dialog box that is displayed, set a new weight for each backend server and click **OK**.

Modify Weight

Batch Modify Weights

The weighted round robin algorithm is used. For each backend server, you can assign a weight from 0 to 100 to indicate the proportion of new requests that will be sent to the backend server. The larger the value is, the larger the proportion of requests that the backend server will process.

- The value 0 indicates that the backend server will not accept new requests.

Name	Private IP Address	Current Weight	New Weight	Operation
ecs-zs-0002	192.168.123.235(P...)	1	1	Remove
ecs-zs1	192.168.123.72(Pr...)	1	2	Remove
ecs-zs-0001	192.168.123.155(P...)	1	3	Remove

OK Cancel

Check the new weight of each backend server.

Basic Information

Name	pool-01-new	ID	270edfca-801b-449
Listeners	listener-01-new / 51c65bce-a174-46c2-8cbe-a084caf910d5	Backend Protocol	HTTP
Load Balancing Algorithm	Weighted round robin	Health Check	Enabled View
Sticky Session	Disabled	Description	--

Backend Servers

Add	Modify Weight	Remove	All health	
<input type="checkbox"/>	Name	Health Check Result	Private IP Address	Weight
<input type="checkbox"/>	ecs-zs-0002	! Offline	[REDACTED]	1
<input type="checkbox"/>	ecs-zs1	! Offline	[REDACTED]	2
<input type="checkbox"/>	ecs-zs-0001	! Offline	[REDACTED]	3

Step 6 On the **Backend Servers** tab page on the **Basic Information** page, select the target ECS and click **Remove** to remove it.

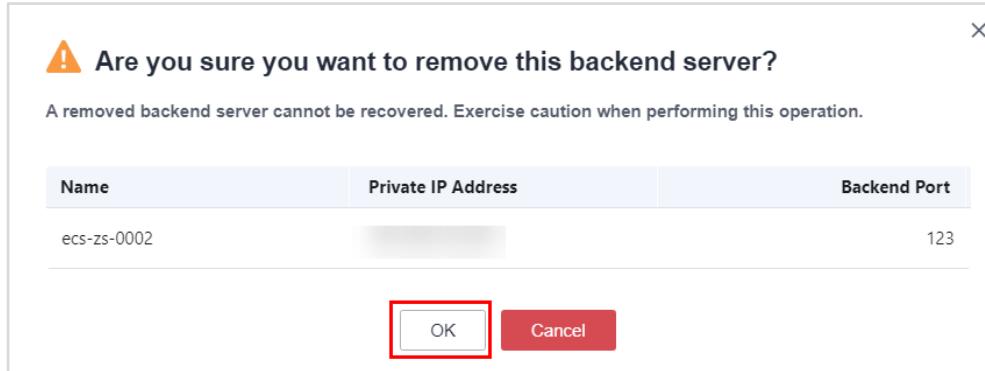
Basic Information

Name	pool-01-new
Listeners	listener-01-new / 51c65bce-a174-46c2-8cbe-a084caf910d5
Load Balancing Algorithm	Weighted round robin
Sticky Session	Disabled

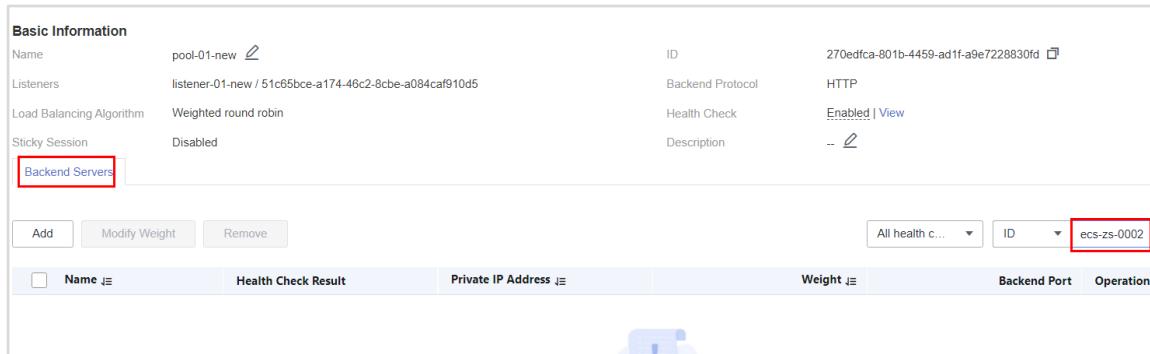
Backend Servers

Add	Modify Weight	Remove	
<input checked="" type="checkbox"/>	Name	Health Check Result	Private IP Address
<input checked="" type="checkbox"/>	ecs-zs-0002	! Offline	[REDACTED]
<input type="checkbox"/>	ecs-zs1	! Offline	[REDACTED]
<input type="checkbox"/>	ecs-zs-0001	! Offline	[REDACTED]

In the displayed dialog box, click **OK**.



Check the result of the backend server removal.



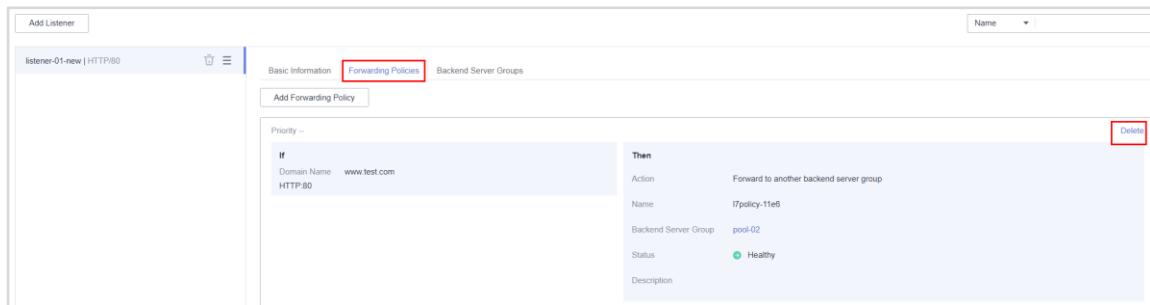
Basic Information

Name: pool-01-new	ID: 270edfca-801b-4459-ad1f-a9e7228830fd
Listeners: listener-01-new / 51c65bce-a174-46c2-8cbe-a084caf910d5	Backend Protocol: HTTP
Load Balancing Algorithm: Weighted round robin	Health Check: Enabled View
Sticky Session: Disabled	Description: ..

Backend Servers

Name	Health Check Result	Private IP Address	Weight	Backend Port	Operation
ecs-zs-0002	Pass		100	123	Remove

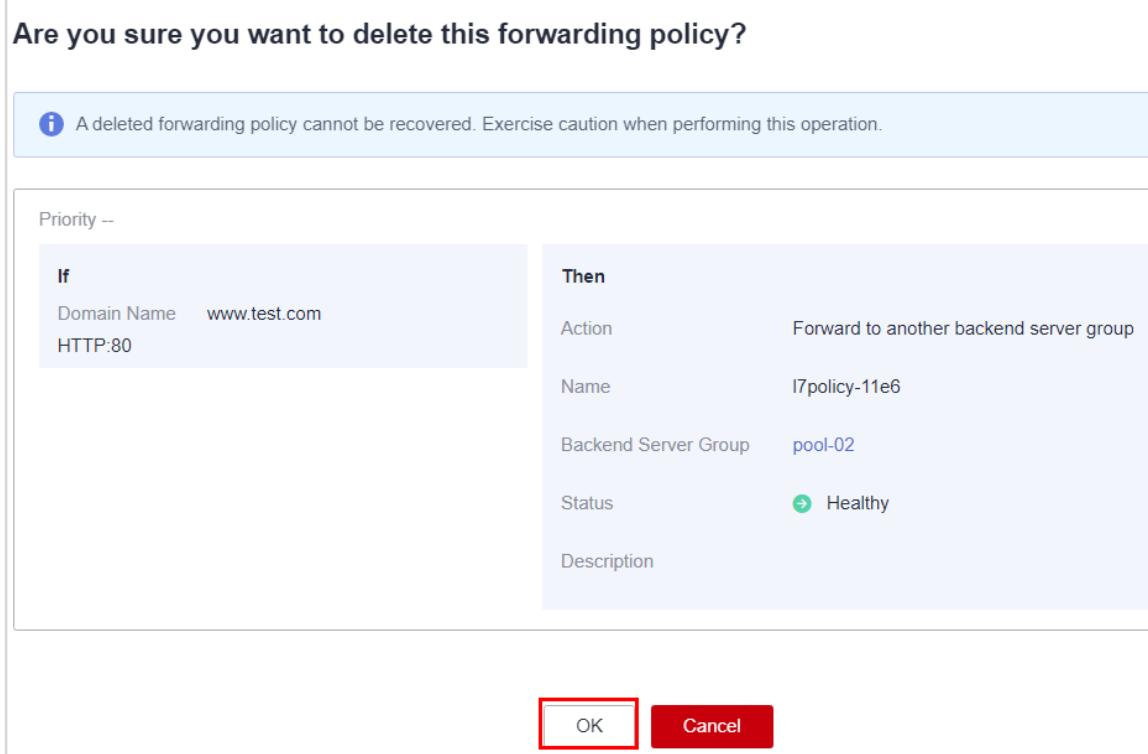
- Step 7** Click the target listener, click the **Forwarding Policies** tab on the right, locate the target forwarding policy, and click **Delete** to delete it. In the displayed dialog box, click **OK**.



Forwarding Policies

Priority	If	Then
1	Domain Name: www.test.com HTTP:80	Action: Forward to another backend server group Name: l7policy-11e6 Backend Server Group: pool-02 Status: Healthy

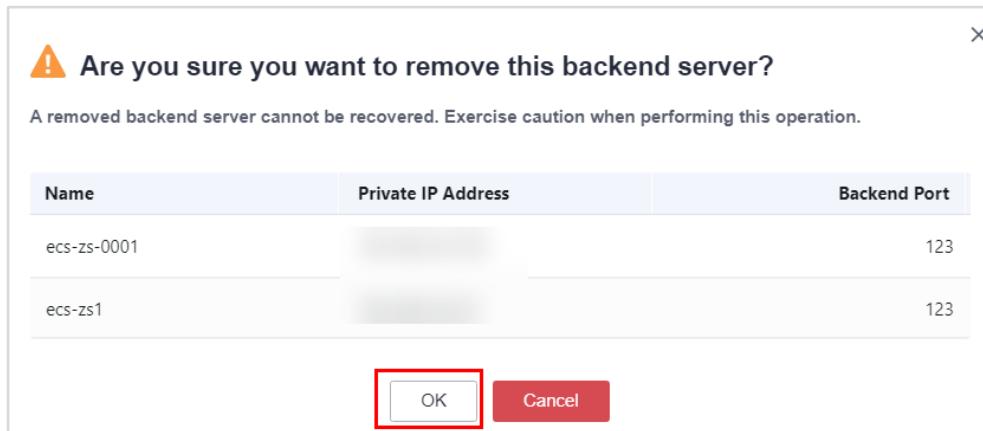
Delete



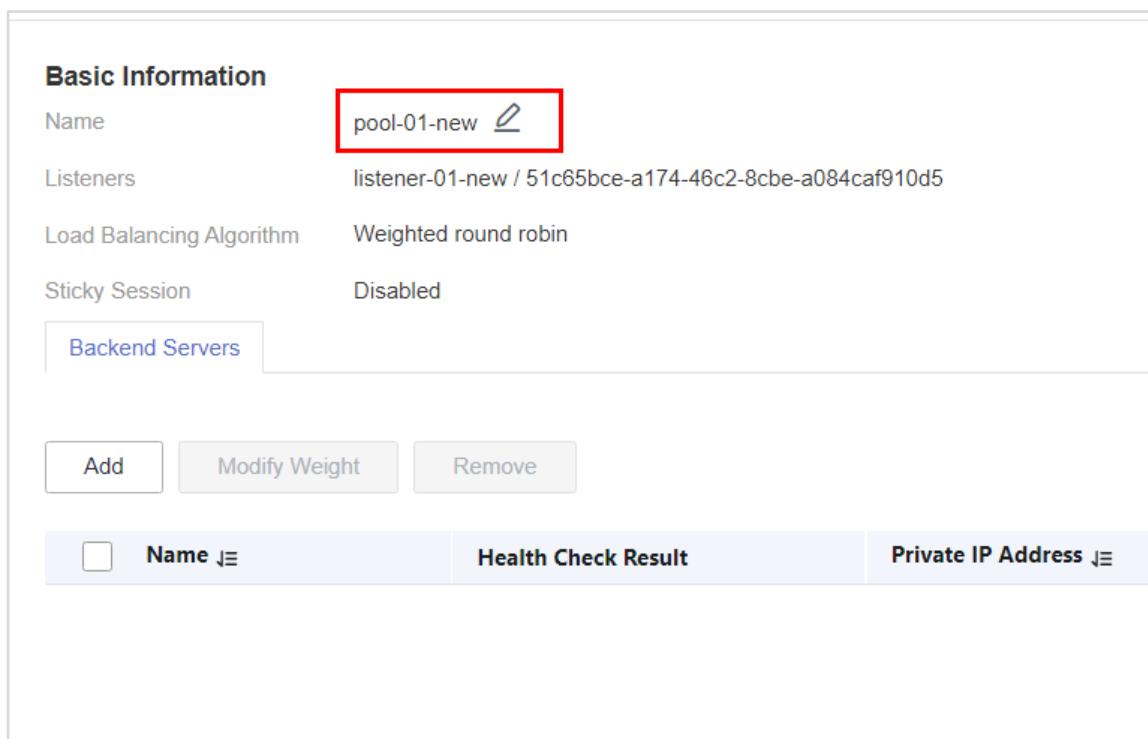
Step 8 Locate the target listener and click the deletion icon to delete the listener. (Ensure that the forwarding policies have been deleted and all backend servers in the backend server group have been removed.)

A screenshot of the HUAWEI CLOUD Stack Lab interface showing the "Backend Server Groups" tab for a listener named "elb-01". The "Basic Information" panel on the right shows the group name is "pool-01-new | HTTP" and the load balancing algorithm is "Weighted round robin". The "Backend Servers" table lists two servers: "ecs-zs-0001" and "ecs-zs1", both marked as "Offline". The "Remove" button at the bottom of the table is highlighted by a red rectangle.

Click the **Backend Server Groups** tab, click the backend server group associated with the listener, and remove all backend servers added to the backend server group.

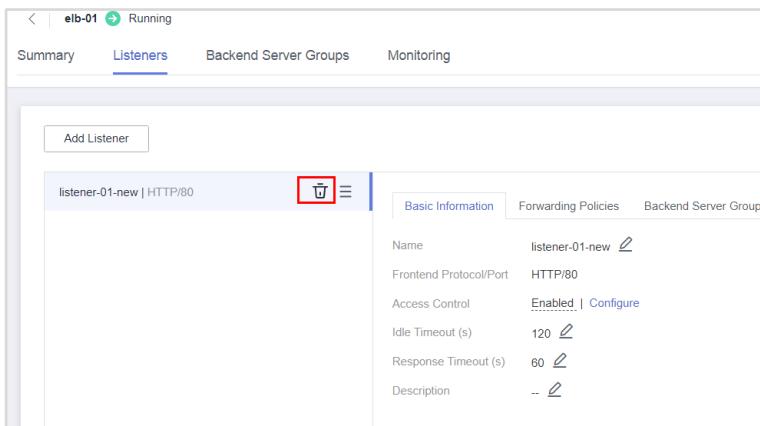


Ensure that all backend servers have been removed.

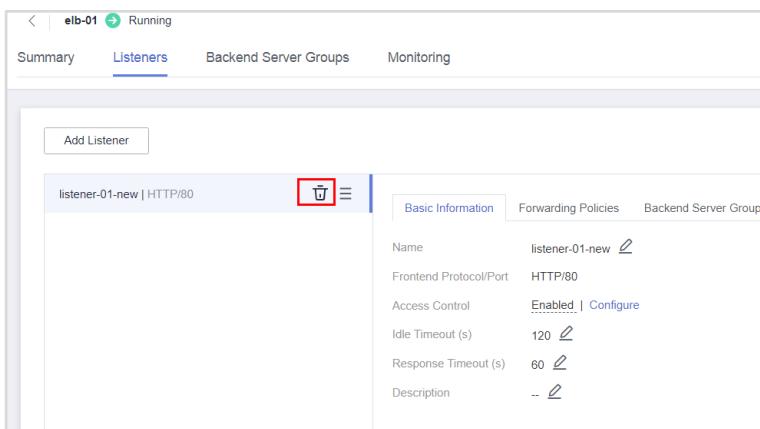


The screenshot shows the 'Basic Information' section of the Backend Server Groups configuration page. It includes fields for Name (pool-01-new), Listeners (listener-01-new / 51c65bce-a174-46c2-8cbe-a084caf910d5), Load Balancing Algorithm (Weighted round robin), and Sticky Session (Disabled). Below this is a table titled 'Backend Servers' with columns: Name, Health Check Result, and Private IP Address. At the bottom of the table are buttons for Add, Modify Weight, and Remove.

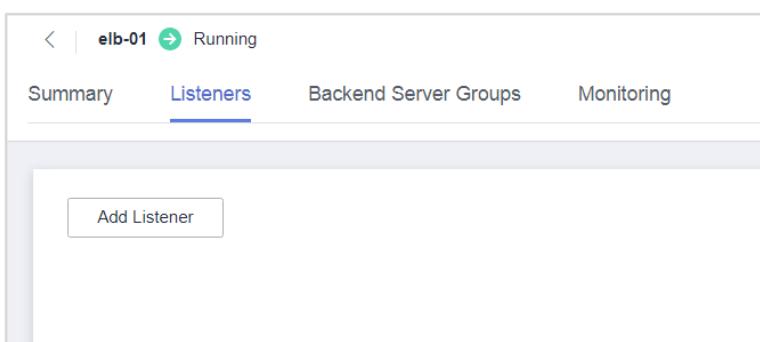
Go to the **Listeners** tab page and delete the listener.



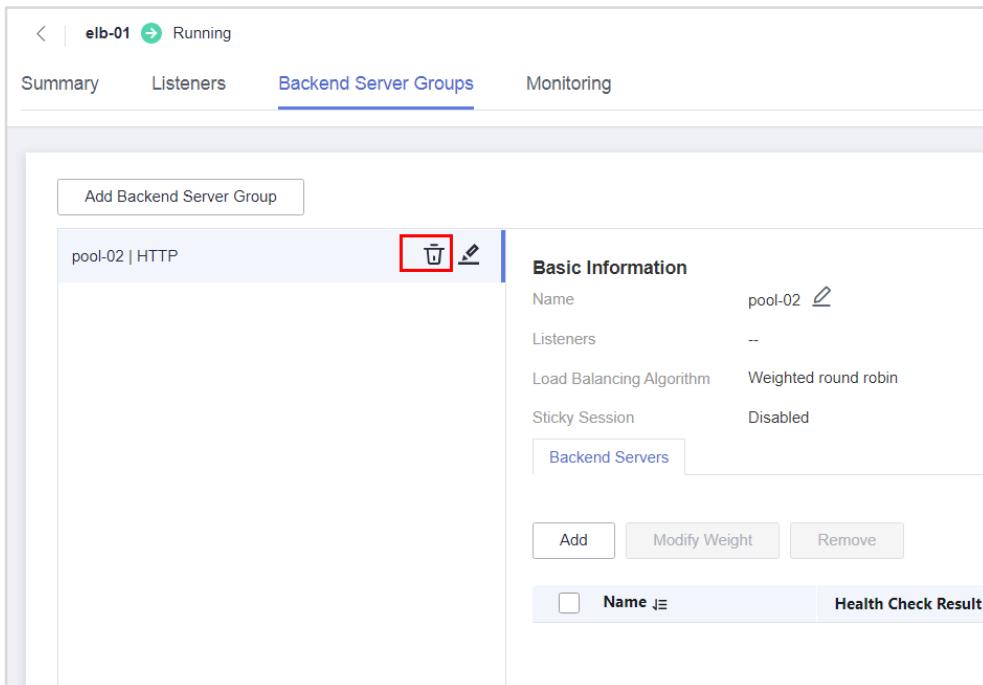
In the displayed dialog box, click **OK**.



Check the result of the listener deletion.

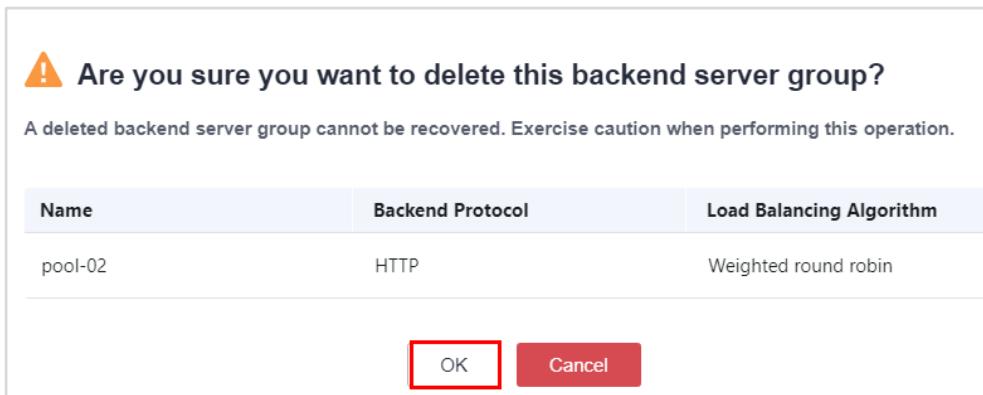


- Step 9** On the **Backend Server Groups** tab page, locate the target backend server group and click the deletion icon to delete it. (Ensure that the forwarding policy associated with the backend server group has been deleted and all backend servers in the backend server group have been removed.)



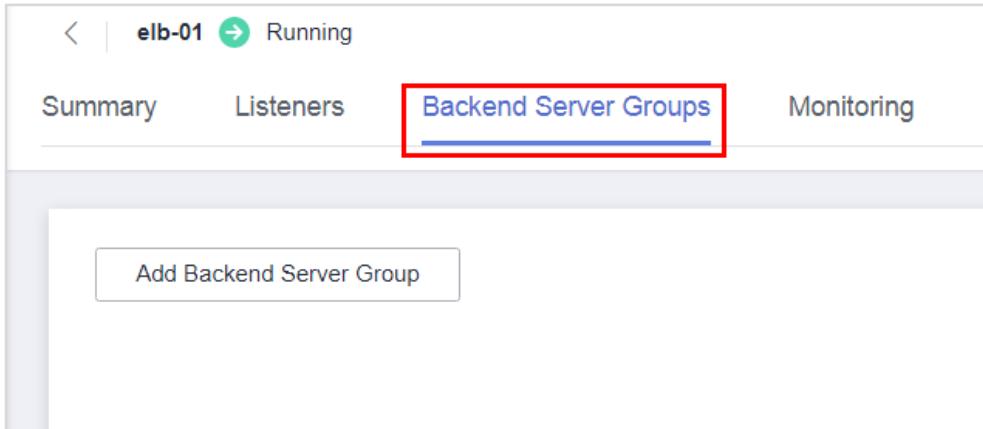
The screenshot shows the Backend Server Groups page for a load balancer named 'elb-01'. The status is 'Running'. The 'Backend Server Groups' tab is selected. A table lists one group: 'pool-02 | HTTP'. To the right of this row is a red box highlighting the delete icon (a trash can). On the right side of the page, there's a 'Basic Information' panel with fields for Name (pool-02), Listener (HTTP), Load Balancing Algorithm (Weighted round robin), and Sticky Session (Disabled). Below this are buttons for 'Add', 'Modify Weight', and 'Remove'. At the bottom is a search bar for 'Name' and a 'Health Check Result' section.

In the displayed dialog box, click **OK**.



A delete confirmation dialog box is shown. It contains the message: '⚠ Are you sure you want to delete this backend server group?'. Below it, a note says: 'A deleted backend server group cannot be recovered. Exercise caution when performing this operation.' The dialog has a table with columns 'Name', 'Backend Protocol', and 'Load Balancing Algorithm'. One row is listed: 'pool-02', 'HTTP', and 'Weighted round robin'. At the bottom are two buttons: 'OK' (highlighted with a red box) and 'Cancel'.

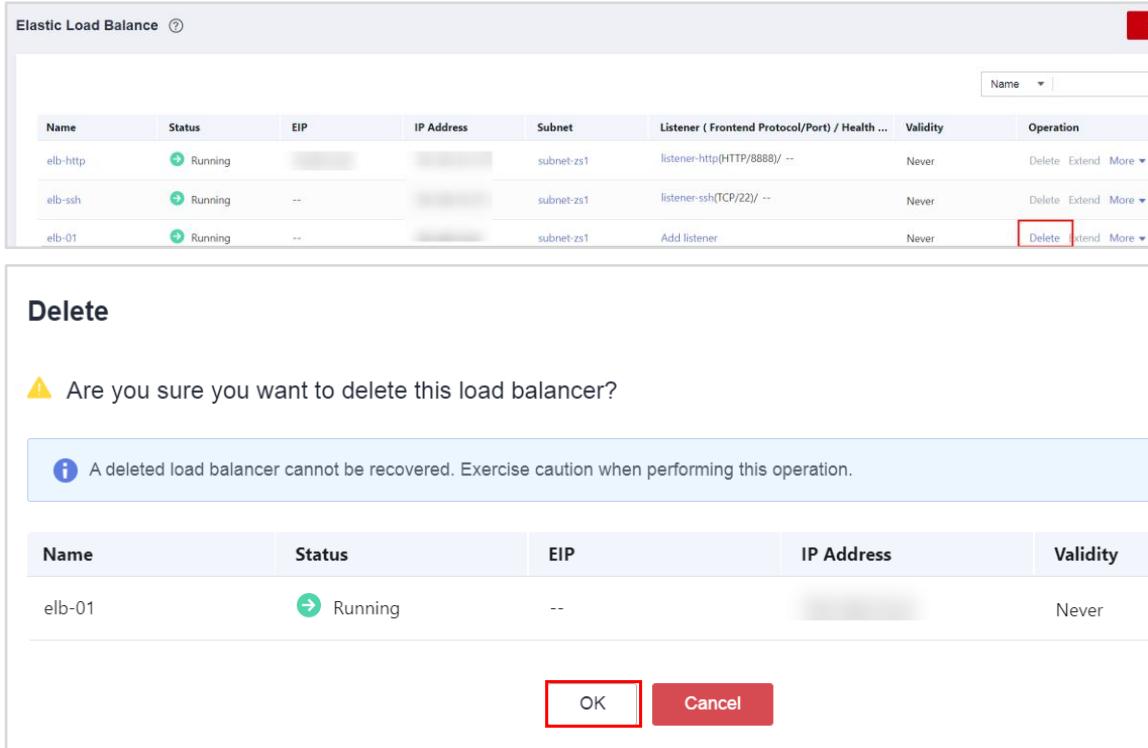
Check the result of the backend server group deletion.



The screenshot shows the Backend Server Groups page for a load balancer named 'elb-01'. The status is 'Running'. The 'Backend Server Groups' tab is selected and highlighted with a red box. The 'Summary', 'Listeners', and 'Monitoring' tabs are also visible. Below the tabs is a 'Add Backend Server Group' button.

- Step 10 In the load balancer list, locate the row that contains the target load balancer and click **Delete** in the **Operation** column. In the displayed dialog box, click **OK**. (If a listener is added to the load balancer, delete the listener first. If a backend server

group is added to the load balancer, remove the backend servers in the backend server group and delete the backend server group. If an EIP is bound to the load balancer, unbind the EIP from the load balancer first.)



The screenshot shows the HUAWEI CLOUD Elastic Load Balance interface. At the top, there is a table listing three load balancers:

Name	Status	EIP	IP Address	Subnet	Listener (Frontend Protocol/Port) / Health ...	Validity	Operation
elb-http	Running	[REDACTED]	[REDACTED]	subnet-zs1	listener-http(HTTP/8888)/ --	Never	Delete Extend More ▾
elb-ssh	Running	--	[REDACTED]	subnet-zs1	listener-ssh(TCP/22)/ --	Never	Delete Extend More ▾
elb-01	Running	--	[REDACTED]	subnet-zs1	Add listener	Never	Delete Extend More ▾

A modal window titled "Delete" is open, asking "Are you sure you want to delete this load balancer?". It includes a note: "A deleted load balancer cannot be recovered. Exercise caution when performing this operation." Below the note is another table:

Name	Status	EIP	IP Address	Validity
elb-01	Running	--	[REDACTED]	Never

At the bottom of the modal are "OK" and "Cancel" buttons, with "OK" highlighted by a red box.

Check the result of the load balancer deletion.



The screenshot shows the HUAWEI CLOUD Elastic Load Balance interface after the deletion. The search bar at the top has "elb-01" entered. The main table now shows only two load balancers:

Name	Status	EIP	IP Address	Subnet	Listener (Frontend Protocol/Port) / Health ...	Validity	Operation
elb-01	Deleted	[REDACTED]	[REDACTED]	subnet-zs1	listener-ssh(TCP/22)/ --	Never	
elb-ssh	Running	--	[REDACTED]	subnet-zs1	listener-ssh(TCP/22)/ --	Never	Delete Extend More ▾

11 Acronyms and Abbreviations

Table 11-1 Acronyms and abbreviations in this document

Acronym or Abbreviation	Full Name	Description
AZ	Availability Zone	An AZ is a logical zone of physical resources, including compute, storage, and network resources.
AS	Auto Scaling	AS automatically scales resources to keep up with service demands based on pre-configured AS policies.
ECS	Elastic Cloud Service	An ECS is a compute server that consists of vCPUs, memory, OS, and EVS disks and allows on-demand allocation and elastic scaling.
EIP	Elastic IP Address	An EIP is a static IP address that can be directly accessed from an extranet. The extranet can be the Internet or an enterprise LAN.
ELB	Elastic Load Balance	ELB distributes incoming traffic across multiple backend servers based on specified forwarding policies.
EVS	Elastic Volume Service	EVS is a virtual block storage service that provides block storage for ECSs and BMSs.
IMS	Image Management Service	IMS allows you to easily create images and manage image lifecycles.
VPC	Virtual Private Cloud	A VPC provides an isolated virtual network for cloud servers.

Huawei Certified Cloud Computing Training

HCIP-Cloud Computing

HUAWEI CLOUD Stack Lab Guide (Operation)

ISSUE: 5.0



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HCIP-Cloud Computing is mainly oriented to enterprise cloud management SREs, cloud computing O&M engineers, and OpenStack engineers. The HCIP-Cloud Computing course covers the OpenStack cloud management platform, HUAWEI CLOUD Stack architecture and components, HUAWEI CLOUD Stack resource management and infrastructure services, HUAWEI CLOUD Stack O&M, and scenario practices. This course helps trainees deeply understand open source OpenStack principles and apply them to HUAWEI CLOUD Stack O&M practices.

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Huawei Certification



About This Document

Overview

This document is intended for HCIP-Cloud Computing certification training courses. It describes how to use and manage HUAWEI CLOUD Stack Operation Portal. It is intended for trainees who are going to take the HCIP-Cloud Computing exam or readers who want to understand cloud computing and HUAWEI CLOUD Stack technologies.

About the Exercises

This document consists of four exercises, including VDC tenant modeling, service publishing and rollout, service application, and operation management, to instruct trainees to learn about HUAWEI CLOUD Stack operations. The lab environment is HUAWEI CLOUD Stack 8.1.1.

- Exercise 1: VDC tenant modeling. This exercise aims to help trainees complete VDC tenant modeling and create and associate tenants, user groups, enterprise projects, and resource sets.
- Exercise 2: service publishing and rollout. This exercise helps trainees master the methods of creating, publishing, and rolling out a service and introduces basic operations of Service Builder.
- Exercise 3: service application. This exercise guides trainees through the ECS application and order approval process, and describes how to set up WordPress based on Service Builder.
- Exercise 4: operation management. This exercise focuses on three management operations performed by operation administrators, VDC administrators, and agent administrators.

The screenshots in this document are for reference only. The operation page may vary according to the actual environment.

Knowledge Required

This course is for Huawei's professional certification. To better understand this course, familiarize yourself with the following requirements:

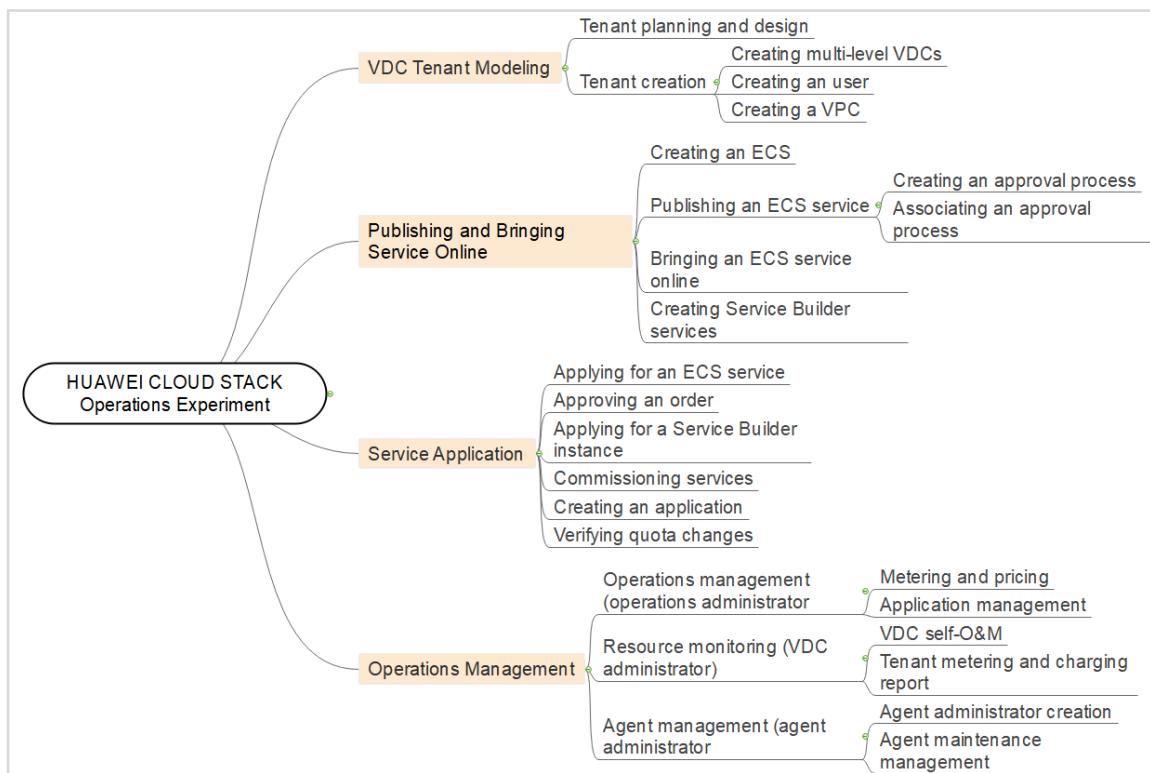
- Have basic network understanding.
- Have basic knowledge of the operating system.

Prerequisites

1. The operation administrator corresponding to each trainee has been created and assigned.
2. Computing and networking resources have been configured on Service OM, including creating specifications and external networks, and registering images.

Process

HUAWEI CLOUD Stack operations experiment process:



Lab Environment

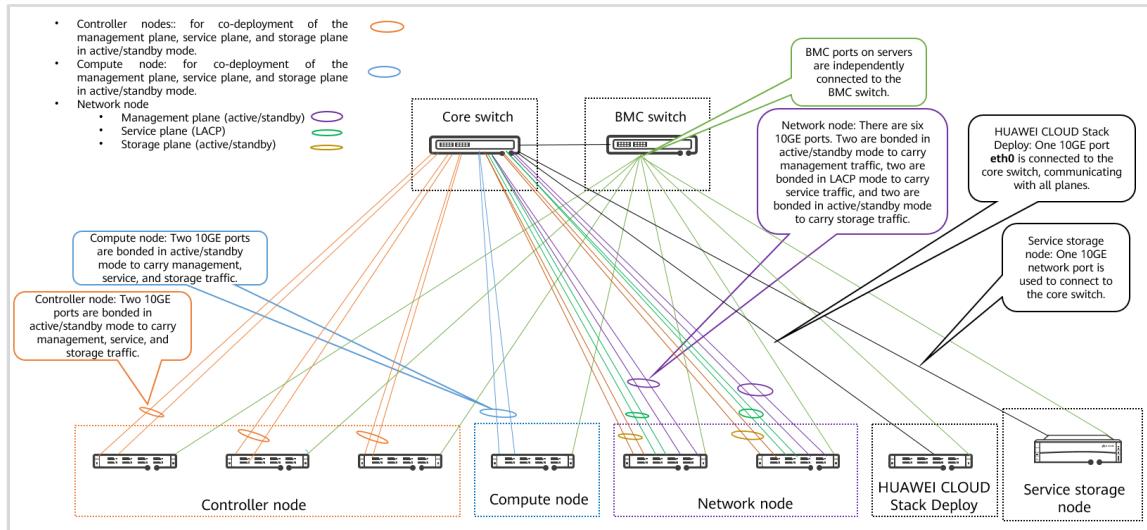
Networking Description

This exercise is intended for engineers who are going to take the HCIP-Cloud Computing certification exam. Trainees share one HUAWEI CLOUD Stack 8.1.1 lab environment.

A trainee uses the HUAWEI CLOUD Stack 8.1.1 environment through a jump server. The jump server contains all installation packages and tools required for these exercises. Each trainee must be familiar with how to use the HUAWEI CLOUD Stack 8.1.1 platforms.

This exercise involves ManageOne Operation Portal of HUAWEI CLOUD Stack 8.1.1.

The following figure shows the HCIP-Cloud Computing V5.0 exercise topology.



The following network configurations are recommended:

- Server BMC management plane network: BMC ports on servers are independently connected to the BMC switch.
- Controller node: Two 10GE ports on each server are bonded in active/standby mode to carry management, service, and storage traffic.
- Network node: There are six 10GE ports. Two are bonded in active/standby mode to carry management traffic, two are bonded in LACP mode to carry service traffic, and two are bonded in active/standby mode to carry storage traffic.
- Compute node: Two 10GE ports on all servers are bonded in active/standby mode to carry management, service, and storage traffic.
- HUAWEI CLOUD Stack Deploy: One 10GE port is connected to the core switch, communicating with all planes.
- Service storage: One 10GE port is connected to the core switch.

Table 1-1 HUAWEI CLOUD Stack deployment requirements

Solution	Host	Deployment Mode
HUAWEI CLOUD Stack Deploy	Server 06	HUAWEI CLOUD Stack Deploy is deployed on a physical server.
HUAWEI CLOUD Stack 8.1.1 controller node	Server 01 Server 02 Server 03	FusionSphere OpenStack controller nodes are automatically deployed using HUAWEI CLOUD Stack Deploy 8.1.1.
HUAWEI CLOUD Stack 8.1.1 compute node	Server 07	FusionSphere OpenStack compute nodes are automatically deployed using HUAWEI CLOUD Stack Deploy 8.1.1.

Solution	Host	Deployment Mode
HUAWEI CLOUD Stack 8.1.1 network node	Server 04 Server 05	Active and standby VMs of NEs, such as active and standby vRouters, ENAT, and BR are automatically deployed on FusionSphere OpenStack network nodes.
HUAWEI CLOUD Stack 8.1.1 cloud service VMs	Server 01 Server 02 Server 03	Active and standby VMs of cloud services, such as LVS, Nginx, NTP, HAProxy, API Gateway, Task Center, and DNS, are automatically deployed on FusionSphere OpenStack controller nodes.
ManageOne Maintenance Portal	Server 01 Server 02 Server 03	Active and standby OperationCenter VMs are automatically deployed on FusionSphere OpenStack controller nodes.
ManageOne Operation Portal	Server 01 Server 02 Server 03	Active and standby ServiceCenter VMs are automatically deployed on FusionSphere OpenStack controller nodes.
ManageOne Deployment Portal	Server 01 Server 02 Server 03	Active and standby CloudOpera VMs are automatically deployed on FusionSphere OpenStack controller nodes.
FusionStorage	Server 01 Server 02 Server 03	Active and standby VMs of FusionStorage Manager are automatically deployed on FusionSphere OpenStack controller nodes.
Service Storage	IP SAN service storage	Uses IP SAN service storage to provide resources for service partitions.

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1

VDC Tenant Modeling

1.1 Overview

1.1.1 About This Exercise

This exercise takes the enterprise digitalization as an example to guide trainees through VDC tenant modeling, and creation and association of tenants, user groups, enterprise projects, and resource sets.

1.1.2 Objectives

- Master VDC tenant planning and design methods.
- Master the methods of creating tenants, user groups, enterprise projects, and resource sets.
- Create VPCs.

1.2 Scenario Drill

1.2.1 Tenant Planning and Design

1.2.1.1 Case Description

The product department of a bank plans to complete the data center digitalization plan this year. The bank has subsidiaries in Shenzhen (subsidiary 1) and Chengdu (subsidiary 2). The product department of Shenzhen Company has two secondary departments: service department and marketing department. At the beginning of the year, the two tier-2 departments established two annual projects respectively. The initiated projects under the service department are maintenance project 1 and maintenance project 2. The initiated projects under the marketing department are innovation project 1 and innovation project 2.

You are responsible for the cloud migration project of the bank. Please make an overall plan for cloud migration tenants based on the known background and the following requirements:

1. Quota Management
 - a Cloud resource quotas of each company must be managed. Specifically, the subsidiary 1 has 200 vCPUs and 100 GB memory. The subsidiary 2 has 400 vCPUs and 200 GB memory.

- b The subsidiary 2 requires quota control for its service department and marketing department. The quota of the service department is 200 vCPUs and 100 GB memory. The quota of the marketing department is 200 vCPUs and 100 GB memory.
 - c Quota control is also required for projects under the service department and marketing department. The quota of each project is 100 vCPUs and 50 GB memory.
2. Required Permissions
 - a In a department, resources of a project can be managed or used by multiple employees.
 - b The resource monitor of the product department can check all project resources, but cannot operate or manage them.
 3. Other Possible Permissions and Data Security Requirements

1.2.1.2 Case Analysis

- An operation administrator creates two first-level VDCs (product department 1 and product department 2) for two subsidiaries (subsidiary 1 and subsidiary 2) and two first-level VDC administrators for the VDCs.
- An operation administrator allocates 200 CPUs and 100 GB memory to product department 1 of subsidiary 1 and 400 CPUs and 200 GB memory to product department 2 of subsidiary 2.
- Product department B in subsidiary 2 has two departments: service department and marketing department. The two departments correspond to level-2 VDCs. The resource quota of the service department in subsidiary 2 is 200 vCPUs and 100 GB memory. Maintenance project 1 and maintenance project 2 are allocated and associated with resource set 1 and resource set 2, respectively. The resource quota of the marketing department is 200 vCPUs and 100 GB memory. Innovation project 1 and innovation project 2 are allocated, which are associated with resource set 3 and resource set 4. In addition, a resource monitor group needs to be set to monitor all resources in read-only mode.
- The first-level VDC administrator of subsidiary 2 can associate resource sets with users in lower-level VDCs. One user can manage or use resources in multiple resource sets. Resources in one resource set can be managed or used by multiple users. However, users and resource sets in different VDCs (regardless of whether they are the same level) are isolated.

Overall tenant model of the case (for reference):

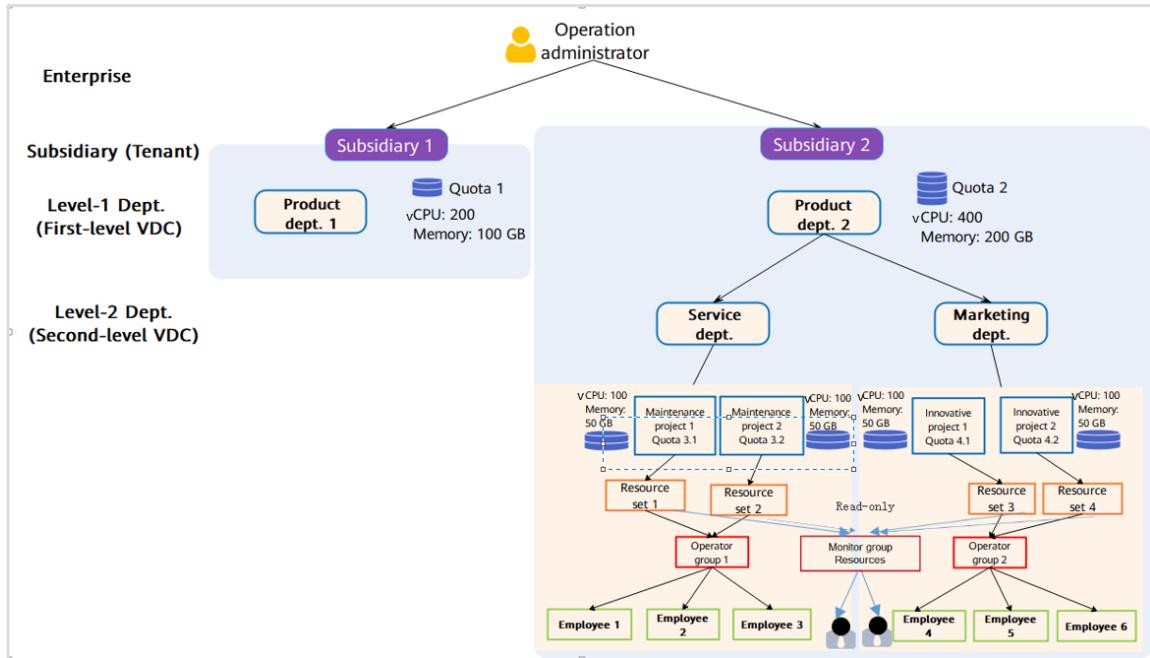


Figure 1-1 Overall tenant model (for reference)

1.2.2 Creating a Tenant

1.2.2.1 Background

Based on service requirements, innovation project 2 of the marketing department of subsidiary 2 is in urgent need of rollout. If you are the cloud migration owner of this project, draw the tenant model related to this project and plan the tenant creation process and service provisioning process.

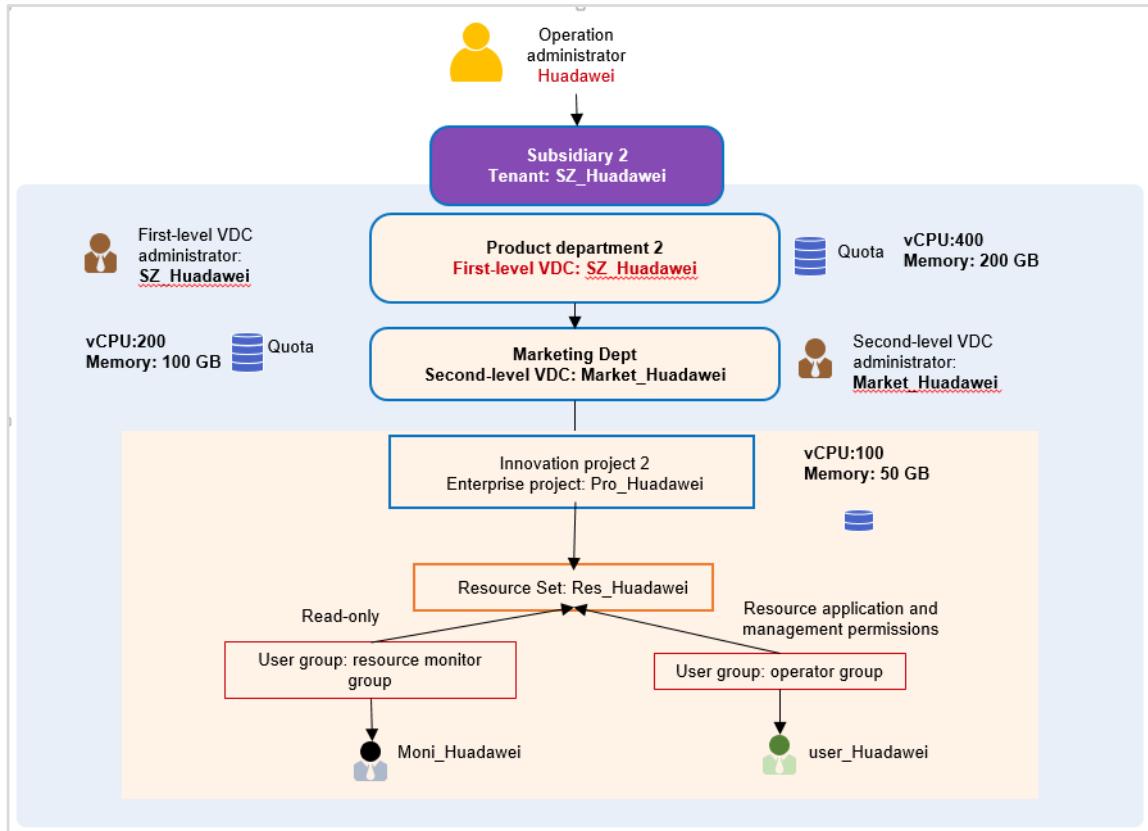


Figure 1-2 Tenant model related to innovation project 2 (Reference Answer)

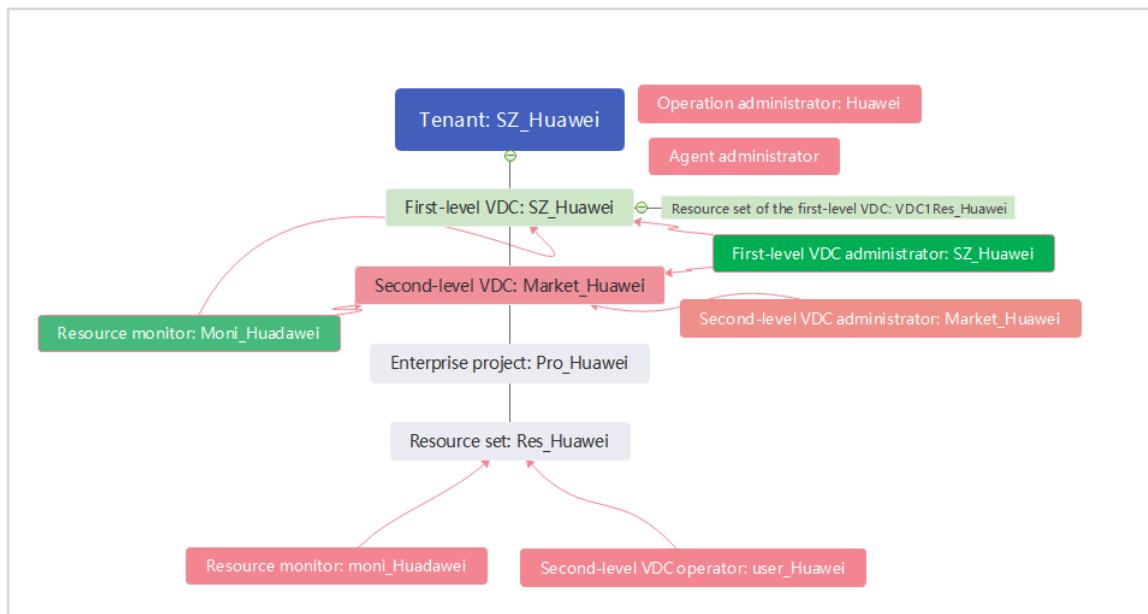


Figure 1-3 HUAWEI CLOUD Stack tenant architecture (Reference Answer)

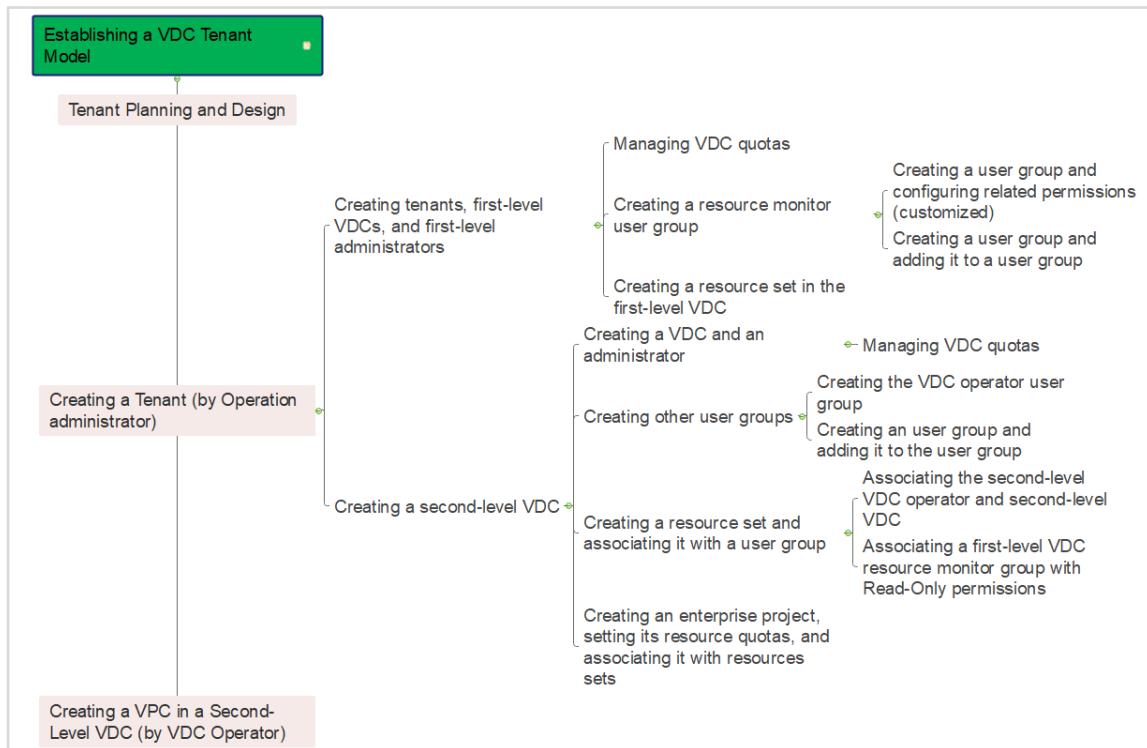


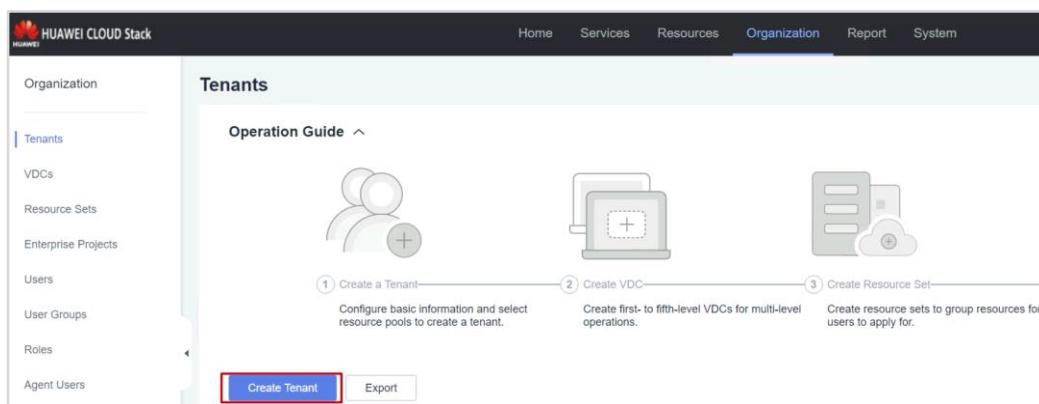
Figure 1-4 Tenant creation process (Reference Answer)

1.2.2.2 Creating a First-Level VDC

1.2.2.2.1 Creating a Tenant, First-Level VDC, and First-Level VDC Administrator

Step 1 Create a tenant.

Log in to ManageOne Operation Portal as an operation administrator. The account and password of the operation administrator are provided by the trainer. Choose **Organization** from the main menu. On the displayed page, click **Create Tenant**.



Step 2 Set the related parameters as follows:

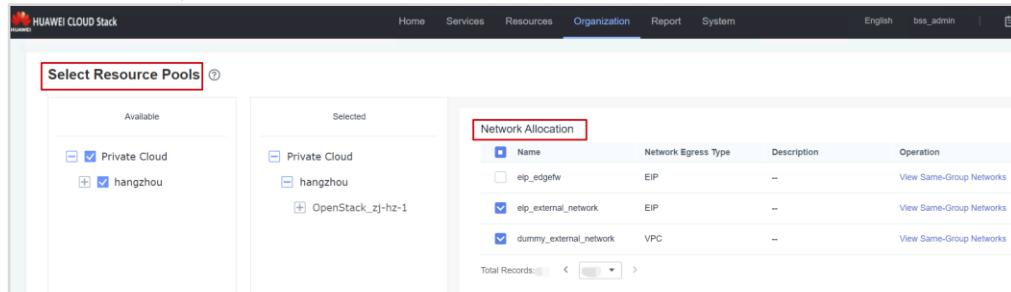
- **Tenant Name:** *SZ_Trainee name* (for example, *SZ_Huawei*)
- **User name:** *SZ_Trainee name* (for example, *SZ_Huawei*)
- **Password Generation Method:** The password is defined by trainees (change the password upon the first login).

- Retain the default value for other settings.

Step 3 Perform resource pool authorization and network allocation.

Go to the next step and perform resource pool authorization. On the **Select Resource Pools** page, select a resource pool and external network resources required by the VPC, EIP, and VPN services.

Click **Finish**. The tenant, first-level VDC, and first-level VDC administrator are created, and resource pools are allocated.

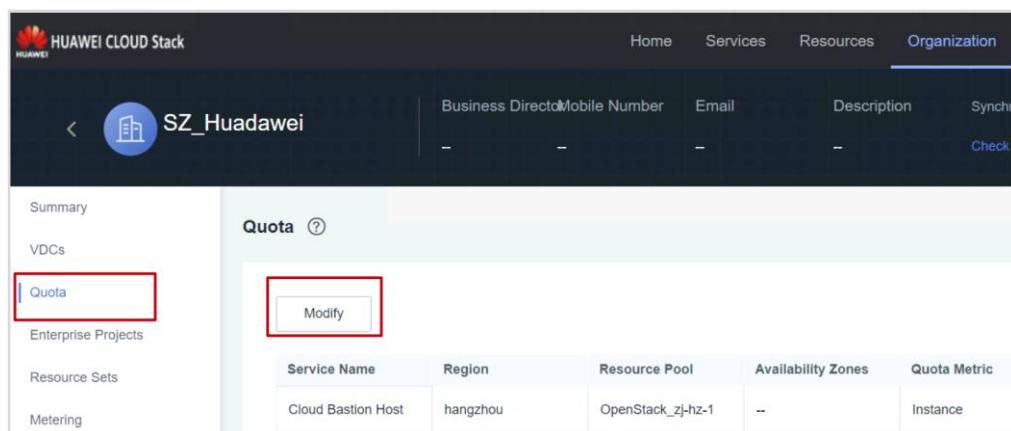


Name	Network Egress Type	Description	Operation
eip_edgefw	EIP	--	View Same-Group Networks
eip_external_network	EIP	--	View Same-Group Networks
dummy_external_network	VPC	--	View Same-Group Networks

1.2.2.2 Managing the First-level VDC Quotas

Step 1 Go to the page for quota modification.

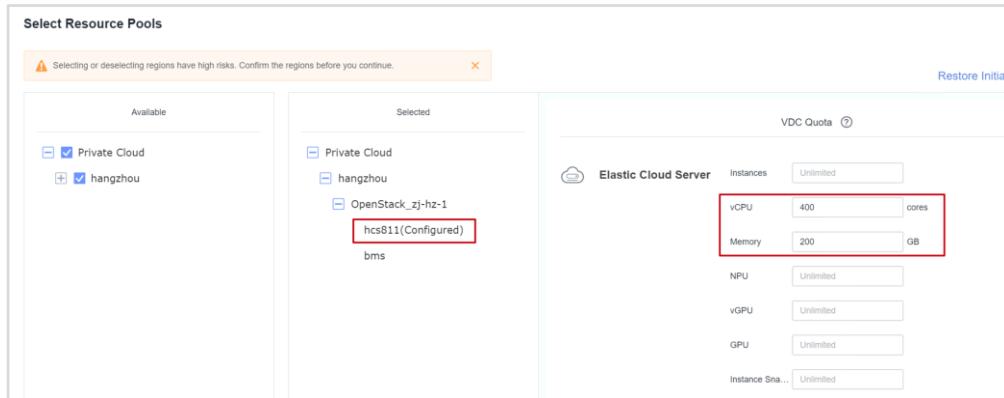
Select the created tenant, choose **Quota**, and click **Modify**.



Service Name	Region	Resource Pool	Availability Zones	Quota Metric
Cloud Bastion Host	hangzhou	OpenStack_zj-hz-1	--	Instance

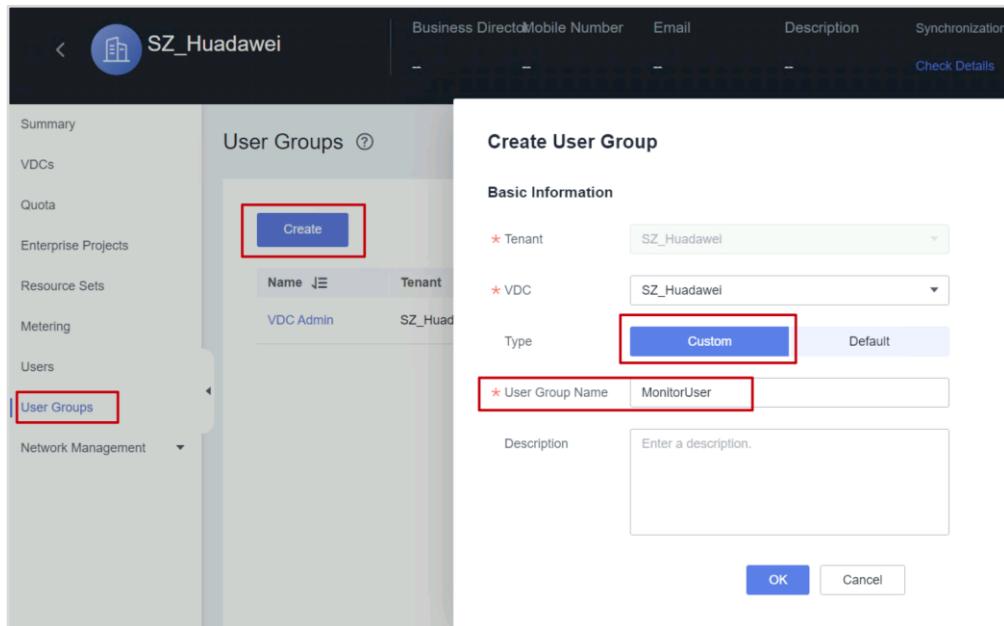
Step 2 Modify a quota.

According to the planning requirements, the first-level VDC quota of product department B is 400 vCPUs and 200 GB memory. Modify the quota as follows:



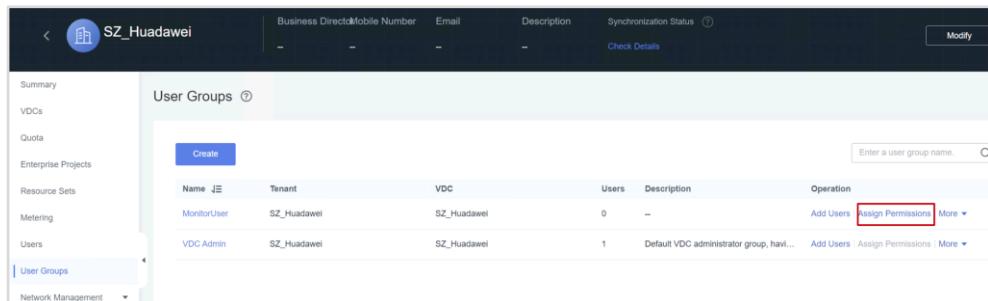
1.2.2.2.3 Creating a Resource Monitor User Group

Step 1 In the navigation pane, choose **User Groups** and click **Create**. In the displayed dialog box, select **Custom** and enter **MonitorUser** for **User Group Name**.

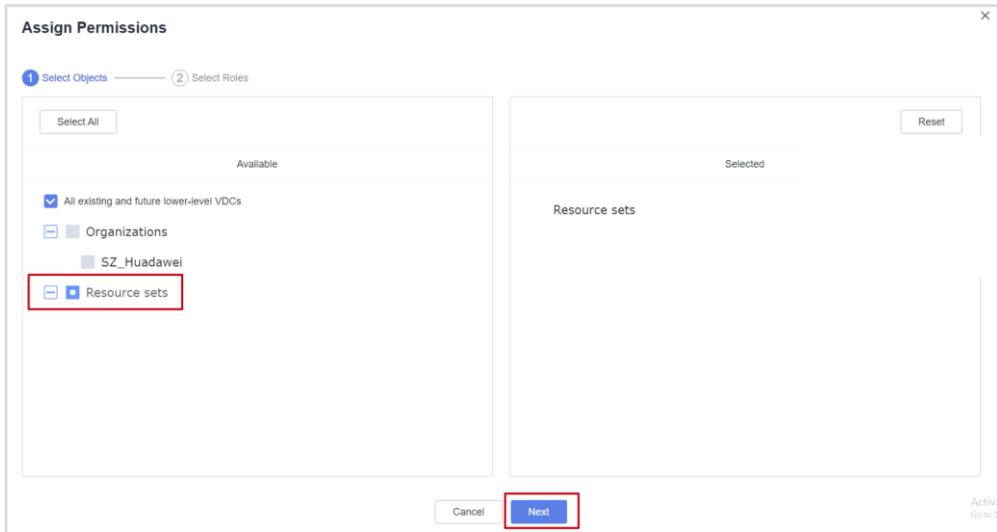


Step 2 Associate permissions

Return to the **User Groups** page, locate **MonitorUser**, and click **Assign Permissions**.

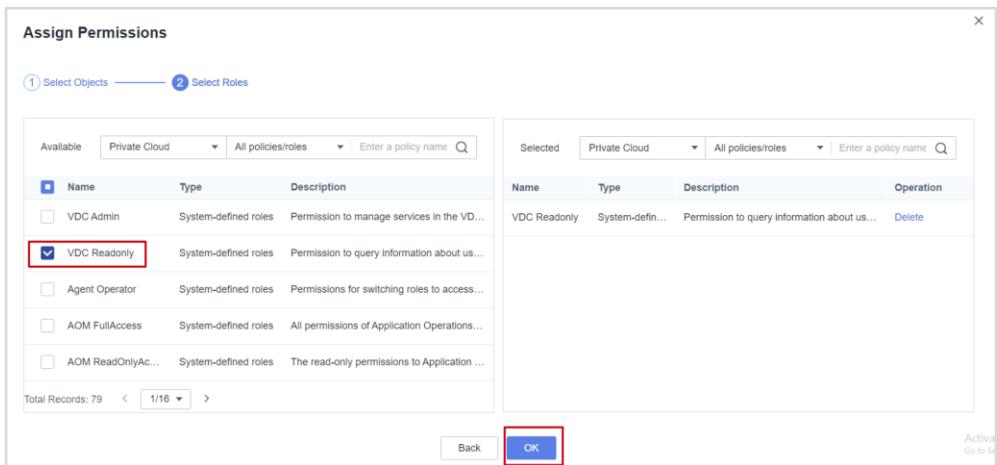


On the **Assign Permissions** page, select **Resource sets**, perform authorization based on the resource set, and click **Next**.



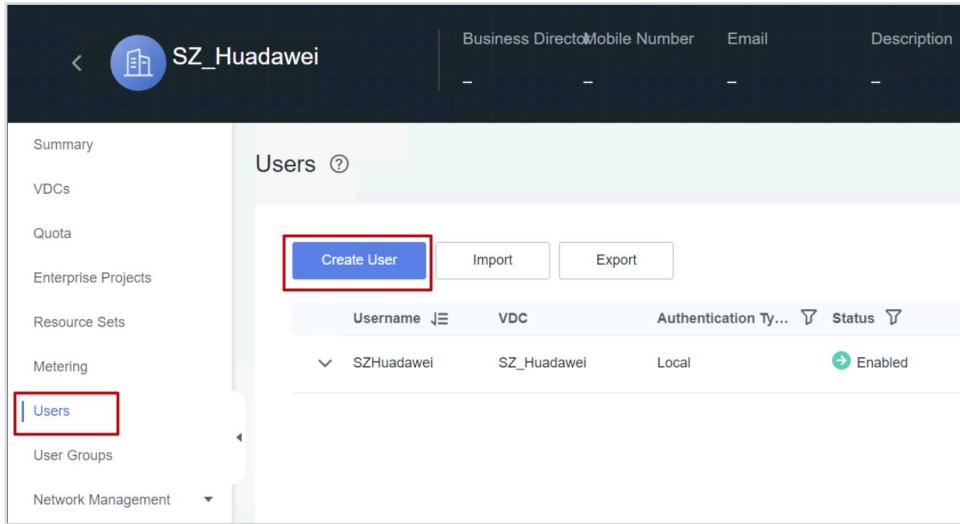
According to the tenant model planning, the resource monitor user group can check resources of all enterprise projects but cannot operate or manage them. First, assign the read-only permission on the resource set in the first-level VDC to the resource monitor. After the second-level VDC is created, assign the read-only permission on the resource set to the user group.

The monitor can only perform checks but cannot perform management or operations. Therefore, select **VDC Readonly** and click **OK**.



Step 3 Add a resource monitor user.

Return to the tenant management page, choose **Users > Create User**.



The screenshot shows the 'Users' section of the HUAWEI CLOUD Stack Lab Guide (Operation). On the left, there is a sidebar with links: Summary, VDCs, Quota, Enterprise Projects, Resource Sets, Metering, **Users** (which is highlighted with a red box), User Groups, and Network Management. The main area is titled 'Users' with a question mark icon. It contains three buttons: 'Create User' (highlighted with a red box), 'Import', and 'Export'. Below these buttons is a table with columns: Username, VDC, Authentication Type, and Status. One row is visible, showing 'SZHuadawei' as the Username, 'SZ_Huadawei' as the VDC, 'Local' as the Authentication Type, and 'Enabled' with a green circular icon.

Set the related parameters as follows:

- **VDC:** *SZ_Trainee name* (first-level VDC)
- **User name:** *Moni_Trainee name* (for example, Moni_Huadawei)
- **Password Generation Method:** The password is defined by trainees (change the password upon the first login).
- Retain the default value for other settings.

After the configuration is complete, click **Next**.

Basic Information

* Username ?	Moni ...
Alias	Enter an alias
* Tenant	SZ_Huadawei ▼
* VDC	SZ_Huadawei ▼
Mobile Number ?	+86 (Chinese mai... ▼)
Email ?	Enter an email address. ↻
Description	Enter a description.

Authentication Details

* Password Generation Method ?	Set now	Set by user
Set a password now. 		

Cancel	Next	Finish
--------	------	--------

Select the **MonitorUser** user group and click **Add to User Groups**.

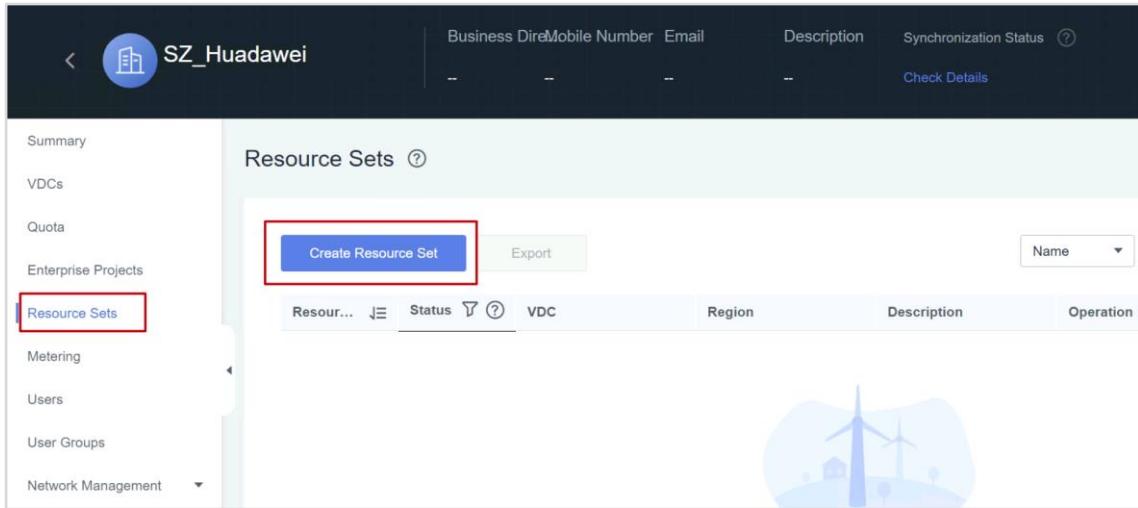
< Create User

① Configure Basic Details	② Add to User Groups ?																								
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3">Available User Groups (2)</th> <th colspan="3">Selected User Groups (1)</th> </tr> <tr> <th></th> <th>User Group Name...</th> <th>VDC</th> <th>User Group Name...</th> <th>VDC</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><input checked="" type="checkbox"/></td> <td>MonitorUser</td> <td>SZ_Huadawei</td> <td><input checked="" type="checkbox"/></td> <td>MonitorUser</td> <td>SZ_Huadawei</td> </tr> <tr> <td><input type="checkbox"/></td> <td>VDC Admin</td> <td>SZ_Huadawei</td> <td colspan="3">Default VDC administrator gr...</td> </tr> </tbody> </table>		Available User Groups (2)			Selected User Groups (1)				User Group Name...	VDC	User Group Name...	VDC	Description	<input checked="" type="checkbox"/>	MonitorUser	SZ_Huadawei	<input checked="" type="checkbox"/>	MonitorUser	SZ_Huadawei	<input type="checkbox"/>	VDC Admin	SZ_Huadawei	Default VDC administrator gr...		
Available User Groups (2)			Selected User Groups (1)																						
	User Group Name...	VDC	User Group Name...	VDC	Description																				
<input checked="" type="checkbox"/>	MonitorUser	SZ_Huadawei	<input checked="" type="checkbox"/>	MonitorUser	SZ_Huadawei																				
<input type="checkbox"/>	VDC Admin	SZ_Huadawei	Default VDC administrator gr...																						

1.2.2.2.4 Creating a Resource Set

Step 1 Create a resource set in the first-level VDC.

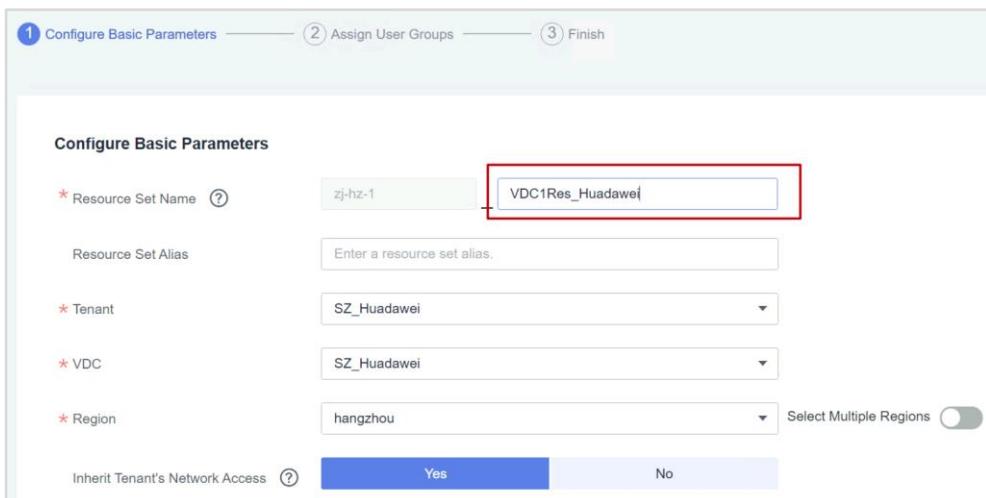
To better manage first-level VDCs, you need to create resource sets. On the tenant management page, in the navigation pane, choose **Resource Sets** and click **Create Resource Set**.



The screenshot shows the 'Resource Sets' page in the tenant management interface. On the left, there is a sidebar with various options: Summary, VDCs, Quota, Enterprise Projects, Resource Sets (which is selected and highlighted with a red box), Metering, Users, User Groups, and Network Management. The main area is titled 'Resource Sets' and contains a table with columns: Resource..., Status, VDC, Region, Description, and Operation. At the top of the main area, there is a 'Create Resource Set' button, which is also highlighted with a red box. There is also an 'Export' button and a search bar labeled 'Name'.

Step 2 Set the parameters as follows:

- **Resource Set Name:** `VDC1Res_Trainee name`, for example, `VDC1Res_Huadawei`;
- **User Groups:** VDC administrator
- Retain the default value for other settings.



The screenshot shows the 'Configure Basic Parameters' step of a wizard. The steps are indicated by numbered circles at the top: ① Configure Basic Parameters, ② Assign User Groups, ③ Finish. The main form has the following fields:

- * Resource Set Name: `zj-hz-1` (highlighted with a red box)
- Resource Set Alias: `Enter a resource set alias.`
- * Tenant: `SZ_Huadawei`
- * VDC: `SZ_Huadawei`
- * Region: `hangzhou`
- Inherit Tenant's Network Access: `Yes` (highlighted with a red box)
- Select Multiple Regions: `Off`

Click **Next**. The **Assign User Groups** step is displayed. Set the permissions of the resource set for each user group. Based on the design of the resource monitor, add the **VDC Readonly** permission to **MintorUser** and click **Finish**.

User Group...	Assign Permissions	Operation
MonitorUser	VDC Readonly(Priv...)	Remove
VDC Admin	VDC Admin (Per...)	Remove

1.2.2.3 Creating a Second-Level VDC

1.2.2.3.1 Creating a Second-Level VDC and an Administrator

Step 1 Create Second-level VDCs.

Go to the tenant management page, and in the navigation pane, choose **VDCs**. Click **Create VDC**.

VDC Name	Re...	In-Use ECS Q...	In-Use EVS S...	Enterprise Pr...	Description	Operation
SZ_Huadawei	1	0	0	1		Create

Step 2 Set the related parameters as follows:

- VDC Name:** *Market_Trainee name* (for example, Market_Huadawei)
- Username:** *Market_Trainee name* (for example, Market_Huadawei)
- Password Generation Method:** The password is defined by trainees (change the password upon the first login).
- Retain the default value for other settings.

Basic Information

* VDC Name	Market_Huawei
Description	Enter a description.
* Tenant	SZ_Huawei
* Upper-Level VDC (?)	SZ_Huawei
Business Director	Enter a business director name.
Business Director's Mobile Number	Business Director's Mobile Number
Business Director's Email	Business Director's Email

Administrator Information

Create Administrator (?)	Yes No
* Username (?)	Market
Alias	Enter an alias
Description	Enter a description.
* Password Generation Method (?)	Set now Set by user
Set a password now.	

Mobile Number (?)	Enter a mobile number.
Email (?)	Enter an email address.

Cancel Next Finish

Click **Next**. The quota setting page is displayed.

Step 3 Perform resource pool authorization and set VDC quotas.

Click **Next**. On the **Select Resource Pools** page, select a proper resource pool to perform resource pool authorization.

According to the plan, the quota of the second-level VDC for the marketing department is 200 vCPUs and 100 GB memory. Set the quota as follows:

Click **Finish**. The second-level VDC, administrator, and quota are configured.

1.2.2.3.2 Creating an Operator User Group

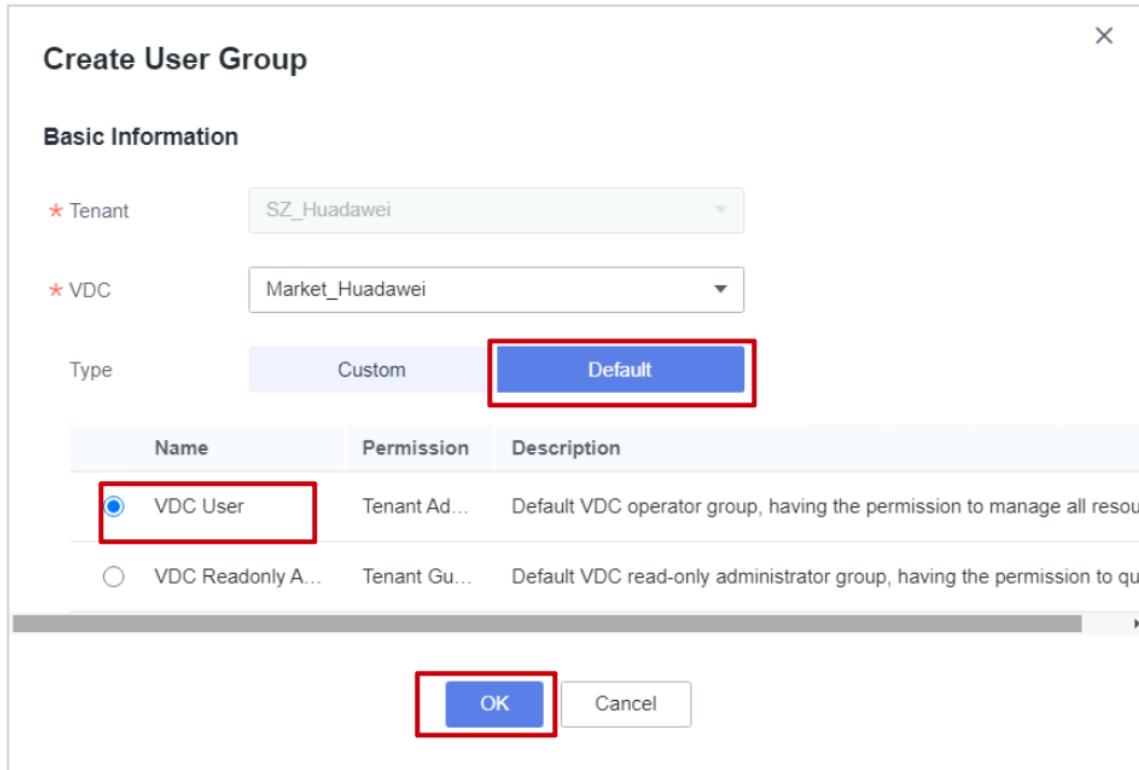
Go to the tenant management page. In the navigation pane, choose **VDCs** and select the created second-level VDC.

Step 1 Go to the second-level VDC management page. In the navigation pane, choose **User Groups**. Click **Create**.

Step 2 Create an operator user group.

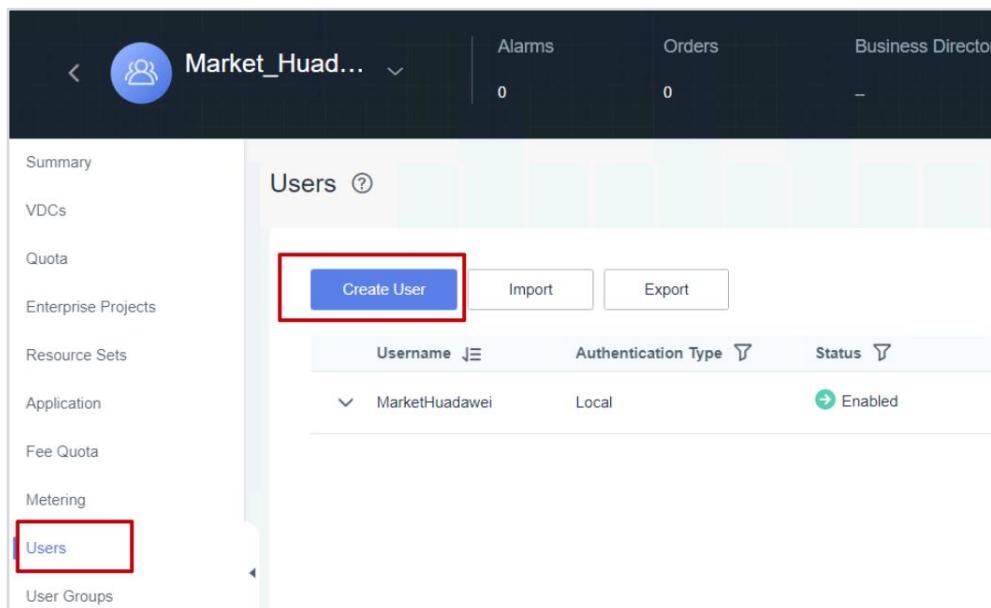
According to the plan for innovation project 2, in addition to the VDC administrator, the operator group used to apply for services is required in the second-level VDC. Therefore, you also need to create the VDC operator user group.

Select **Default** for **Type**, select **VDC User**, and click **OK**.



Step 3 Create an operator user.

Return to the VDC management page. In the navigation page, choose **Users**, and click **Create User**.



Set the related parameters as follows:

- **VDC: Market_Trainee name** (second-level VDC)
- **Username:** user_Trainee name (for example, user_Huadawei)
- **Password Generation Method:** The password is defined by trainees (change the password upon the first login).
- Retain the default value for other settings.

The screenshot shows the 'Create User' interface. It has two tabs at the top: 'Configure Basic Details' (selected) and 'Add to User Groups'. The 'Basic Information' section contains fields for 'Username' (user), 'Alias' (Enter an alias), 'Tenant' (SZ_Huadawei), and 'VDC' (Market_Huadawei). The 'Username' field is highlighted with a red border.

Click **Next** to add the user to the user group.

Select **VDC User** and click **Finish**.

The screenshot shows the 'Add to User Groups' interface. It has two tabs: 'Configure Basic Details' (selected) and 'Add to User Groups'. On the right, there's a table titled 'Selected User Groups (1)' showing 'VDC User' selected. On the left, there's a table titled 'Available User Groups (2)' showing 'VDC Admin' and 'VDC User' listed. The 'VDC User' row is highlighted with a red border.

1.2.2.3.3 Creating a Resource Set and Associating It with a User Group

Step 1 Create a resource set and associate it with a second-level VDC user group.

To better manage second-level VDCs, you need to create a resource set. On the second-level VDC management page, in the navigation pane, choose **Resource Sets** and click **Create Resource Set**.

The screenshot shows the 'Resource Sets' interface. The left sidebar has a menu with 'Resource Sets' highlighted and a red border. The main area shows a table with a 'Create Resource Set' button highlighted with a red border. The table columns are 'Resource Set Name', 'Status', 'Region', and 'Description'.

Set the related parameters as follows:

- **Resource Set Name:** *Res_Trainee name* (for example, Res_Huadawei)
- **Tenant:** *SZ_Trainee name*
- **VDC:** *Market_Huadawei* (second-level VDC)
- **User Group Name:** **VDC Admin**
- Retain the default value for other settings.

Configure Basic Parameters

★ Resource Set Name	<input type="text" value="zj-hz-1"/>	<input type="text" value="Res_Huadawei"/>
Resource Set Alias	<input type="text" value="Enter a resource set alias."/>	
★ Tenant	<input type="text" value="SZ_Huadawei"/>	
★ VDC	<input type="text" value="Market_Huadawei"/>	
★ Region	<input type="text" value="hangzhou"/>	Select Multiple Regions <input type="checkbox"/>
Inherit Tenant's Network Access	<input type="radio" value="Yes"/>	<input type="radio" value="No"/>

Click **Next**, select **VDC Admin** and **VDC User** for **User Group Name**, and click **Finish**.

Assign User Groups

Current VDC	Enter a user group name.	<input type="button" value="Search"/>	<input type="button" value="Clear"/>
Available			
User Group Name...	VDC	Description	
<input checked="" type="checkbox"/> VDC Admin	Market_Huadawei	Default VDC administrator group, having the perm...	
<input checked="" type="checkbox"/> VDC User	Market_Huadawei	Default VDC operator group, having the permis...	
Selected			
User Group Name	Assign Permissions	Operation	
VDC Admin	<input type="button" value="VDC Admin (Pe..."/>	<input type="button" value="Remove"/>	
VDC User	<input type="button" value="VDC User (Per..."/>	<input type="button" value="Remove"/>	

The configuration of operator groups, operators, and related permissions in the second-level VDC is complete.

Step 2 Associate the resource monitor with the first-level VDC user group.

To enable users in the resource monitor group to check resources in innovation project 2, the read-only permission on resource sets in the second-level VDC needs to be assigned to the resource monitor user group.

Return to the tenant page, in the navigation pane, select **User Groups**, and click **Assign Permissions** for **MonitorUser**.

Name	Tenant	VDC	Users	Description	Operation
MonitorUser	SZ_Huadawei	SZ_Huadawei	1	--	Add Users Assign Permissions More ▾
VDC Admin	SZ_Huadawei	SZ_Huadawei	1	Default VDC administrator group, havi...	Add Users Assign Permissions More ▾
VDC Admin	SZ_Huadawei	Market_Huadawei	1	Default VDC administrator group, havi...	Add Users Assign Permissions More ▾
VDC User	SZ_Huadawei	Market_Huadawei	1	Default VDC operator group, having th...	Add Users Assign Permissions More ▾

Select the resource set corresponding to the second-level VDC and click **Next**.

The monitor can only perform inspection but cannot perform management or operations. Therefore, select **VDC Readonly** on the **Assign Permissions** page and click **OK**.

1.2.2.3.4 Configuring Enterprise Projects and Quotas and Associating Resource Sets

Step 1 Configure enterprise projects and manage resource quotas.

To match the project initiation of each tier-2 department at the beginning of the year, enterprise projects and their quotas need to be configured and associated with resource sets.

When creating a VDC, the system creates an enterprise project with the same name by default. Therefore, the default enterprise project is used to manage resources of innovation project 2. To configure resources related to innovation project 1, you need to manually create an enterprise project. This exercise does not involve related operations.

On the tenant management page, in the navigation pane choose **Enterprise Projects**, and select an enterprise project related to the second-level VDC.

Project Name	Status	Owner	Timeline	VDC	Default
Market_Huawei	Running	--	--	Market_Huawei	Yes
SZ_Huawei	Running	--	--	SZ_Huawei	Yes

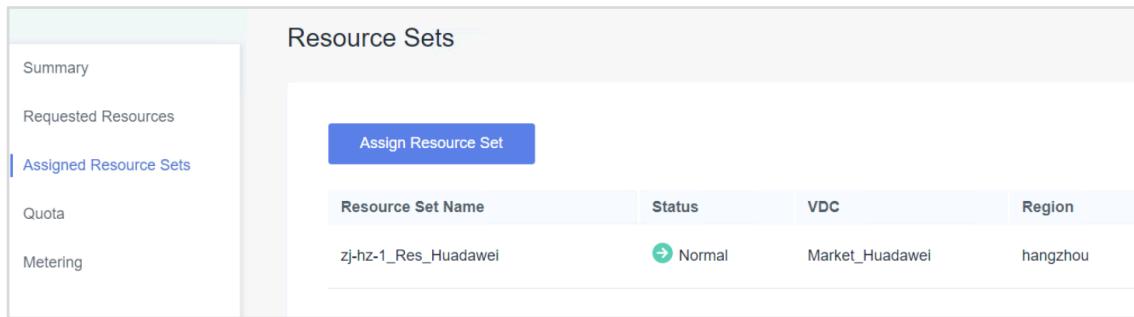
Choose **Quota** and click **Change Allocated Quota**.

Service Name	Region	Resource Pool	Availability Zones
Cloud Bastion Host	hangzhou	OpenStack_zj-hz-1	--
Data Lake Governor	hangzhou	OpenStack_zj-hz-1	--

According to the plan, set 100 for **vCPU** and 50 for **Memory**, and click **Save**.

Instances	Unlimited	Unlimited	0
vCPU	200 cores	100 cores	0 cores
NPU	Unlimited	Unlimited	0
Memory	100 GB	50 GB	0 GB
vGPU	Unlimited	Unlimited	0
GPU	Unlimited	Unlimited	0

By default, the system is associated with the unique resource set in the VDC.



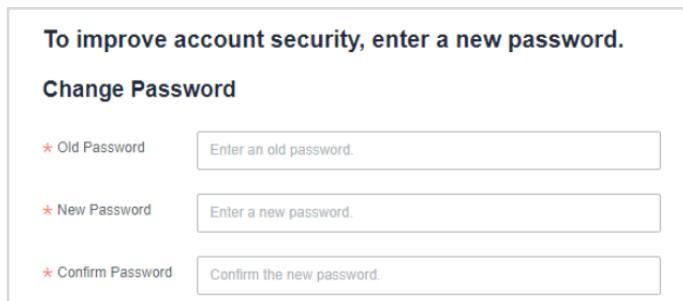
Resource Set Name	Status	VDC	Region
zj-hz-1_Res_Huadawei	Normal	Market_Huadawei	hangzhou

The operations related to the operation administrator are complete.

1.2.2.4 Creating VPCs

This exercise focuses on operations related to innovation project 2. Therefore, the following operations are related to second-level VDCs.

- Step 1** Log in to ManageOne Operation Portal as the VDC operator (for example, user_Trainee name of the second-level VDC). Change the password upon the first login.



To improve account security, enter a new password.

Change Password

* Old Password

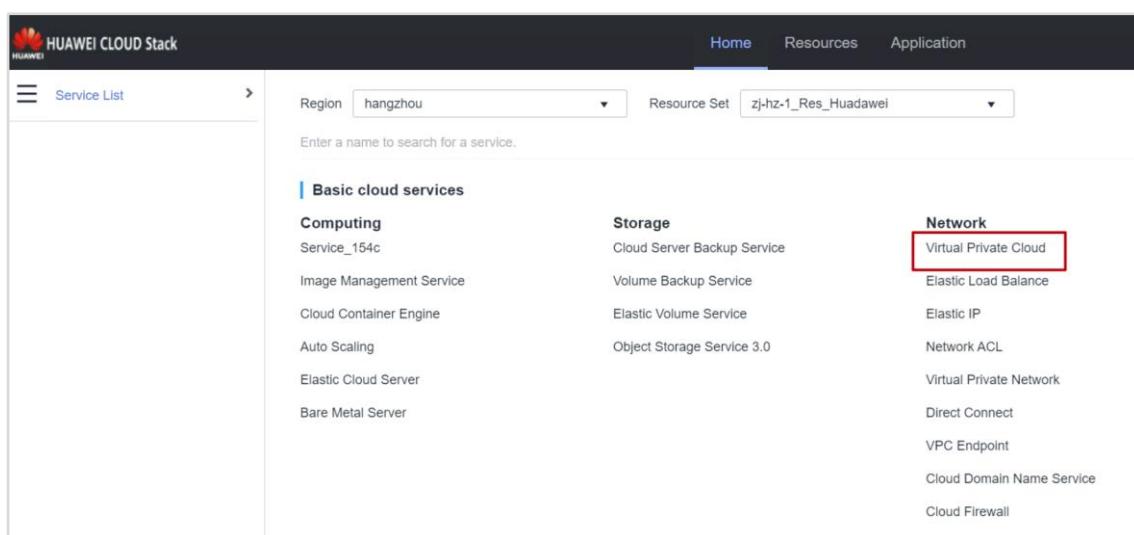
* New Password

* Confirm Password

[Question 1] To apply for cloud resources (such as ECS), which of the following services does a user need to apply for after logging in to ManageOne Operation Portal as a VDC administrator or operator for the first time?

[Answer] Create a VPC first.

- Step 2** Click  in the upper left corner and choose **Virtual Private Cloud**.



HUAWEI CLOUD Stack

Home Resources Application

Service List > Region: hangzhou Resource Set: zj-hz-1_Res_Huadawei

Enter a name to search for a service.

Basic cloud services

Computing	Storage	Network
Service_154c	Cloud Server Backup Service	Virtual Private Cloud
Image Management Service	Volume Backup Service	Elastic Load Balance
Cloud Container Engine	Elastic Volume Service	Elastic IP
Auto Scaling	Object Storage Service 3.0	Network ACL
Elastic Cloud Server		Virtual Private Network
Bare Metal Server		Direct Connect

Step 3 On the displayed page, click **Apply for VPC** in the upper right corner. In the displayed **Select Service** dialog box, click **Apply Now** in the **VPC** pane.

Step 4 Configure basic information, such as **Name**, **External Network**, and **Required Duration**.

Region	hangzhou(zj-hz-1_Res...)
* Name	vpc-Huadawei
* External Network	hcs811(az0.dc0) (selected) dummy_external_network bms(az2.dc1)
CIDR Block	cidr-block-field
* Required Duration	Never (selected) 1 year Custom

Step 5 Enter **subnet 1** for **Name** and set parameters in the **IPv4 Address Configuration**, and click **Apply Now**.

Subnet Settings

* Name: subnet-1

* DHCP: ⓘ If the subnet has a cloud server with a critical service, use a fixed IP address for that server.

IPv4 Address Configuration

* CIDR Block: 192 . 168 . 0 . 0 / 24
Unavailable CIDR blocks: 100.127.0.0/23, 10.200.5.0/24, 100.64.0.0/17, 169.254.0.0/16, 192.168.240.0/20, 192.168.24.0/24, 10.200.60.0/24, 127.0.0.0/8; any network segment that begins with 0, 127, or a number ranging from 224 to 255

* Gateway: 192 . 168 . 0 . 1

Allocation Pools: . . . - . . . ⓘ ⓘ Adding an Automatically Assigned Address Pool It is recommended that a maximum of 100 address pools be automatically allocated.

DNS Server Address 1: 10 . 200 . 5 . 10

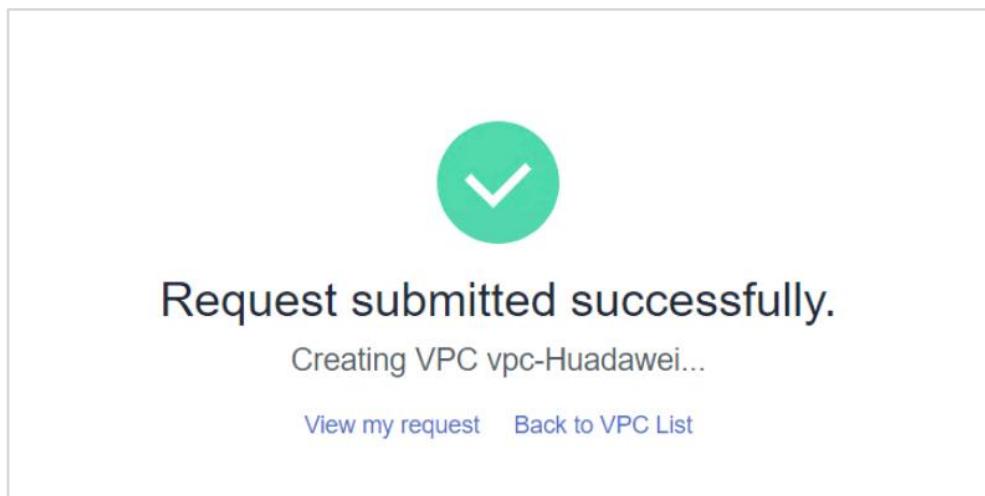
DNS Server Address 2: 10 . 200 . 5 . 11 ⓘ Add DNS Server Address

NTP Server Address 1: . . .

NTP Server Address 2: . . .

Static Route Switch: Static routes are injected into ECSs using the subnet DHCP function, which affects ECS communication. Exercise caution when configuring static routes.

Step 6 The VPC has been created.



2

Publishing and Bringing Service Online

2.1 Overview

2.1.1 About This Exercise

Operation administrators, VDC administrators, or agent administrators can create, publish, and bring services online. After a service is created and published, VDC administrators of different tenants in HUAWEI CLOUD Stack can view the service. Users can view and apply for the service only after the service is brought online.

2.1.2 Objectives

- Master the method of creating a service.
- Master the methods of releasing services.
- Master how to use Service Builder.

2.1.3 Exercise User Role

In this exercise, operation administrators create and publish services, and VDC administrators bring services online.

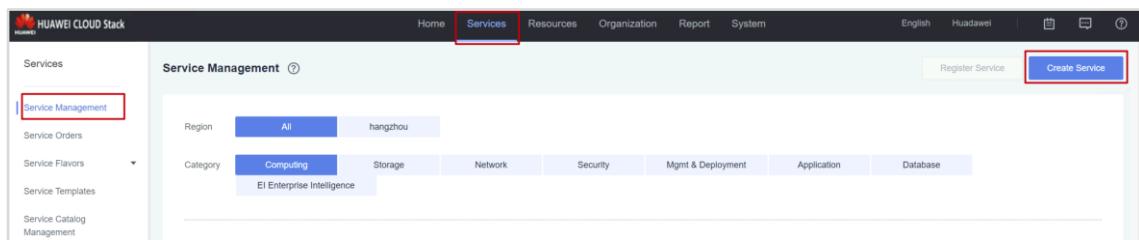
Service Builder is created, published, and brought online by the VDC administrator.

[Question 2] After the course, trainees can try to create and publish services by VDC administrators or agent administrators, and bring services online by operation administrators to understand the differences.

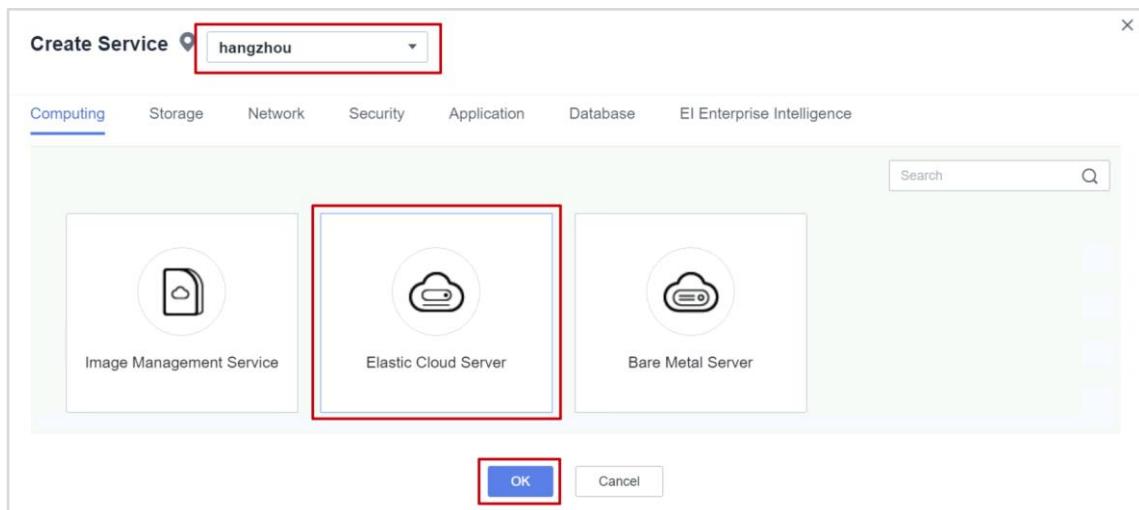
2.2 Configuration Procedure

2.2.1 Creating an ECS

- Step 1 Use a browser to log in to ManageOne Operation Portal as an operation administrator. Choose **Service Management** in the navigation pane. Click **Create Service** in the upper right corner.



Step 2 In the dialog box that is displayed, select a region from the drop-down list, on the **Computing** tab, click **Elastic Cloud Server**, and click **OK**.



Step 3 The page for creating a custom ECS service is displayed. The basic information and product parameters are as follows:

- **Service Name:** `ecs_Name`, for example, `ecs_Huadawei`.
- **Flavor:** 1 vCPU and 2 GB
- **Image:** any proper image
- Retain the default values for other parameters.

Service Name: ecs_Huadawei

Service Type: ecs

Description:

Parameter Configuration

Location: Fixed (selected), User-defined

AZ: hcs811 (selected), ?

Flavor: Fixed (selected), User-defined

Same Storage: Yes, No, User-defined (selected), ?

ECS Type: General-purpose (selected), Memory-optimized

vCPUs: All (dropdown), vCPUs/Memory: All (dropdown), Flavor: Fuzzy match (dropdown), Search icon (Q)

Flavor	vCPUs/Memory	CPU Vendor
s3-pod-mgr.medium.2	1vCPU 2 GB	Intel

Disk: volume1 (dropdown)

Image: Fixed (selected), User-defined

Image Type: Public Image (selected)

Boot Mode: BIOS (selected), UEFI

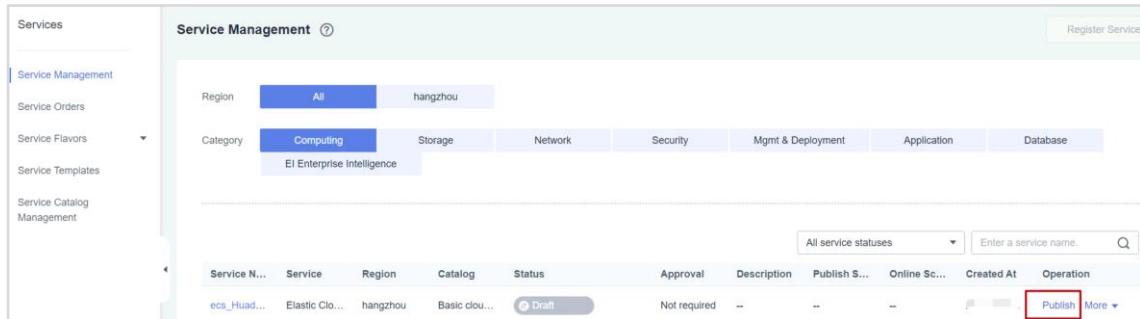
Image: CentOS (dropdown), bms_image1(40GB) (dropdown)

If a new image is needed, contact the administrator to create, upload, and register the image on Service OM.

Step 4 Click **OK**.

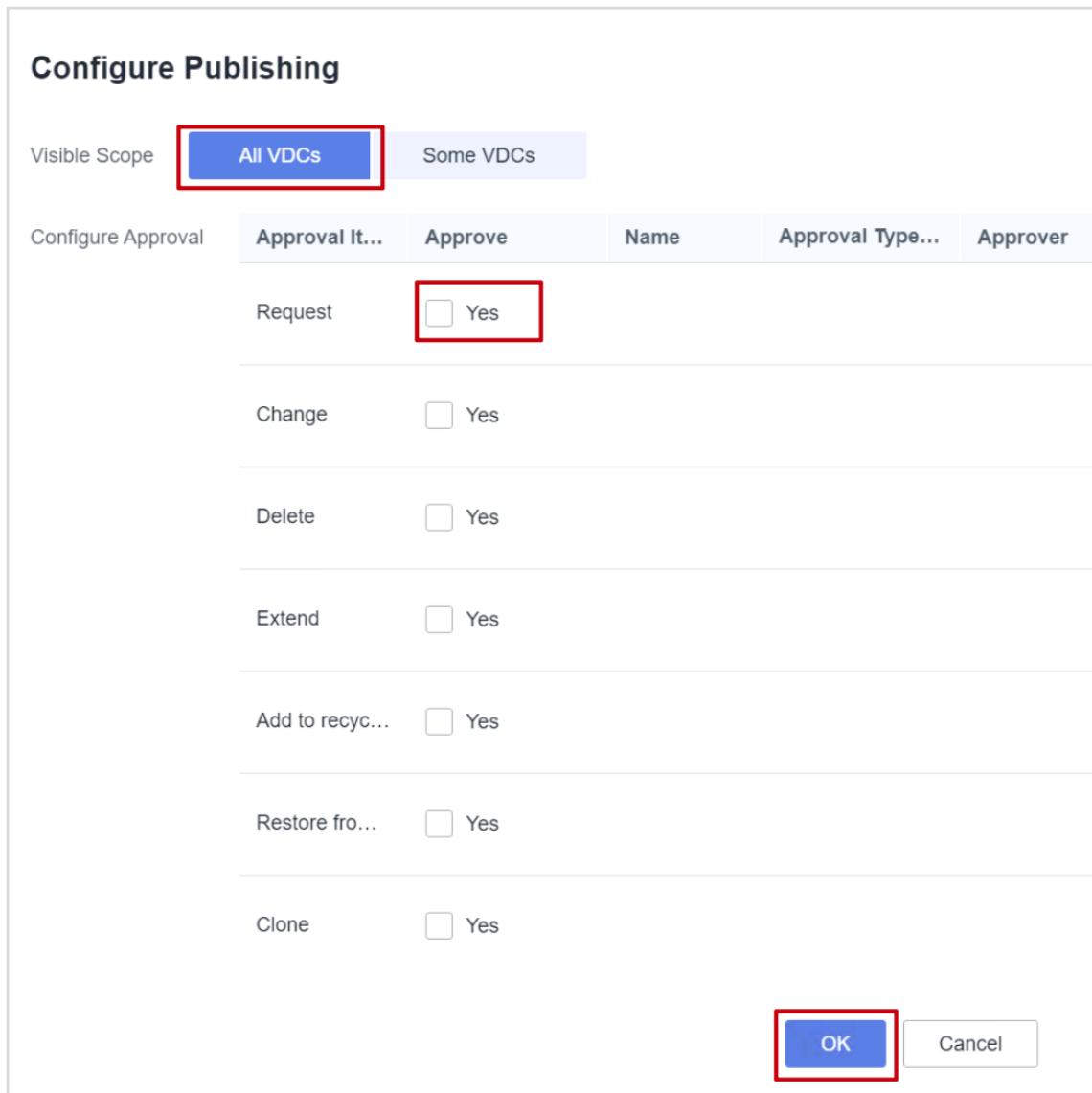
2.2.2 Publishing an ECS Service

Step 1 Return to the **Service Management** page, locate the row that contains the created ECS, and click **Publish**.



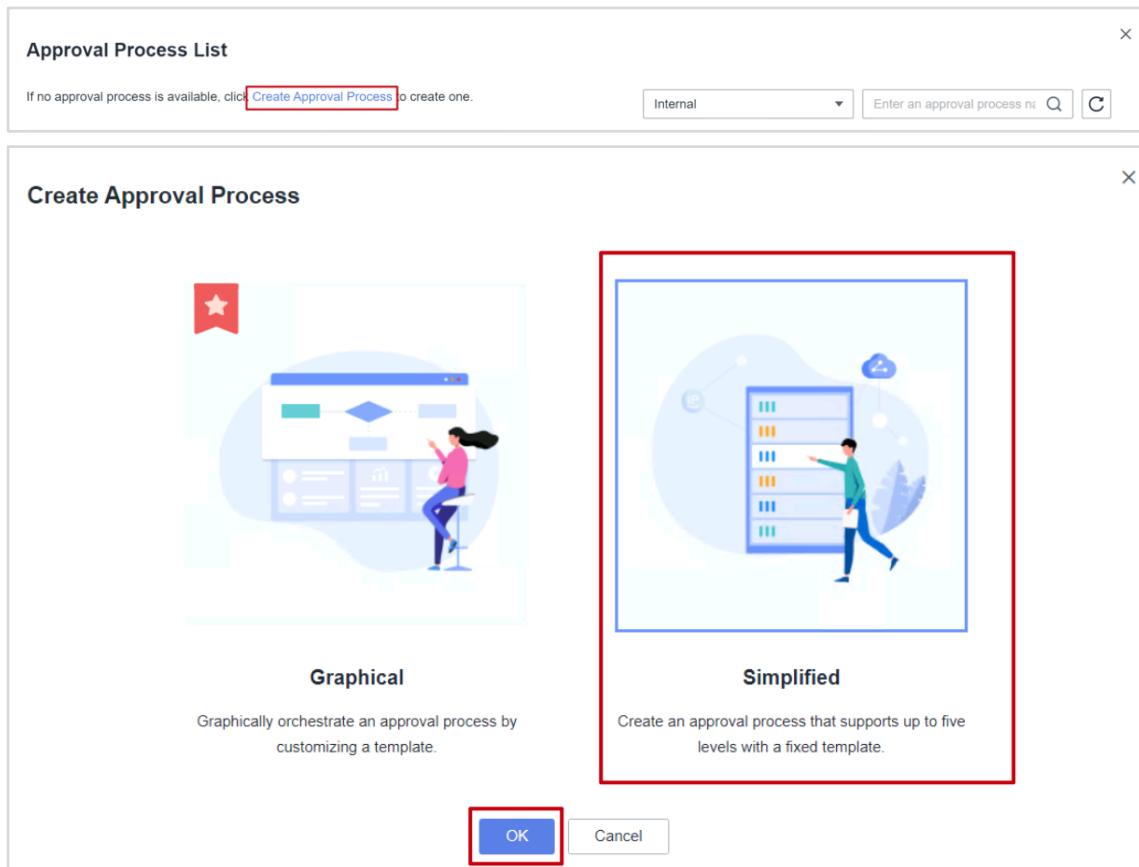
The screenshot shows the Service Management interface. On the left, there's a sidebar with options like Service Management, Service Orders, Service Flavors, Service Templates, and Service Catalog Management. The main area is titled 'Service Management' with a subtitle '(?)'. It has filters for Region (All/hangzhou) and Category (Computing/Storage/Network/Security/Mgmt & Deployment/Application/Database). Below these are search fields for 'All service statuses' and 'Enter a service name'. A table lists services with columns: Service N..., Service, Region, Catalog, Status, Approval, Description, Publish S..., Online Sc..., Created At, Operation. One row is visible: 'ecs_Huad...' (Elastic Cloud), Region 'hangzhou', Catalog 'Basic cloud...', Status 'Draft', Approval 'Not required', and an 'Operation' button with 'Publish' highlighted.

- Step 2 In the displayed **Configure Publishing** dialog box, set **Visible Scope** to **All VDCs** and select **Yes** for **Approve** in the **Configure Approval** area. After an approval process is selected for the operation of requesting a service, an order submitted by a user to request the service can be implemented only after it is approved by all approvers defined in the approval process.



The screenshot shows the 'Configure Publishing' dialog box. At the top, there are two tabs: 'Visible Scope' (with 'All VDCs' selected and highlighted with a red box) and 'Some VDCs'. Below this is a table with columns: 'Configure Approval' (Approval It...), 'Approve', 'Name', 'Approval Type...', and 'Approver'. The 'Approve' column contains several rows with checkboxes labeled 'Yes'. The first row under 'Request' has its checkbox highlighted with a red box. Other rows include 'Change', 'Delete', 'Extend', 'Add to recyc...', 'Restore fro...', and 'Clone', each with a 'Yes' checkbox. At the bottom right of the dialog are 'OK' and 'Cancel' buttons, with 'OK' also highlighted with a red box.

Step 3 In the displayed approval process list window, click **Create Approval Process** and select **Simplified**.



Step 4 Go to the **Create Approval Process** page and create an approval process.

Based on project requirements, the application for this service must be approved by the first-level VDC administrator (for example, SZ_Huadawei) and then by the operation administrator (for example, Huadawei). Therefore, you need to create a level-2 approval process.

Enter the following information for approval:

- Name: **ecs_NameApplication Process** (for example, ECS_Huadawei Application Process)
- **Approval Level: Level 2**

← Create Approval Process

Basic Information

★ Name: ecs_HuadweiApprovalProcess

★ Approval Level: Level 1, Level 2, Level 3, Level 4, Level 5 (Level 2 is selected)

★ Approver:

1: [Empty box] [Select Approvers](#)

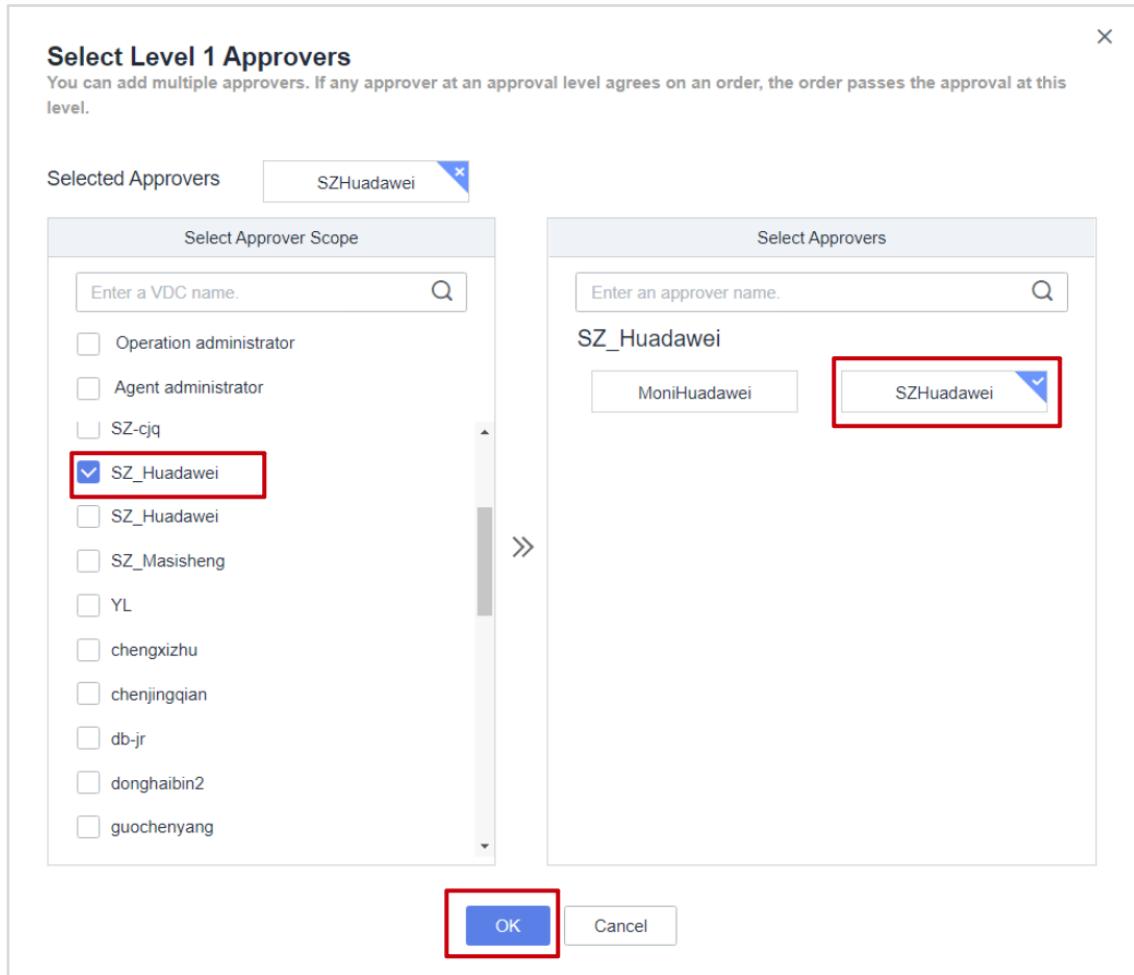
2: [Empty box] [Select Approvers](#)

Each number indicates the sequence number of an approval level. The biggest number indicates the last level of the approval process.

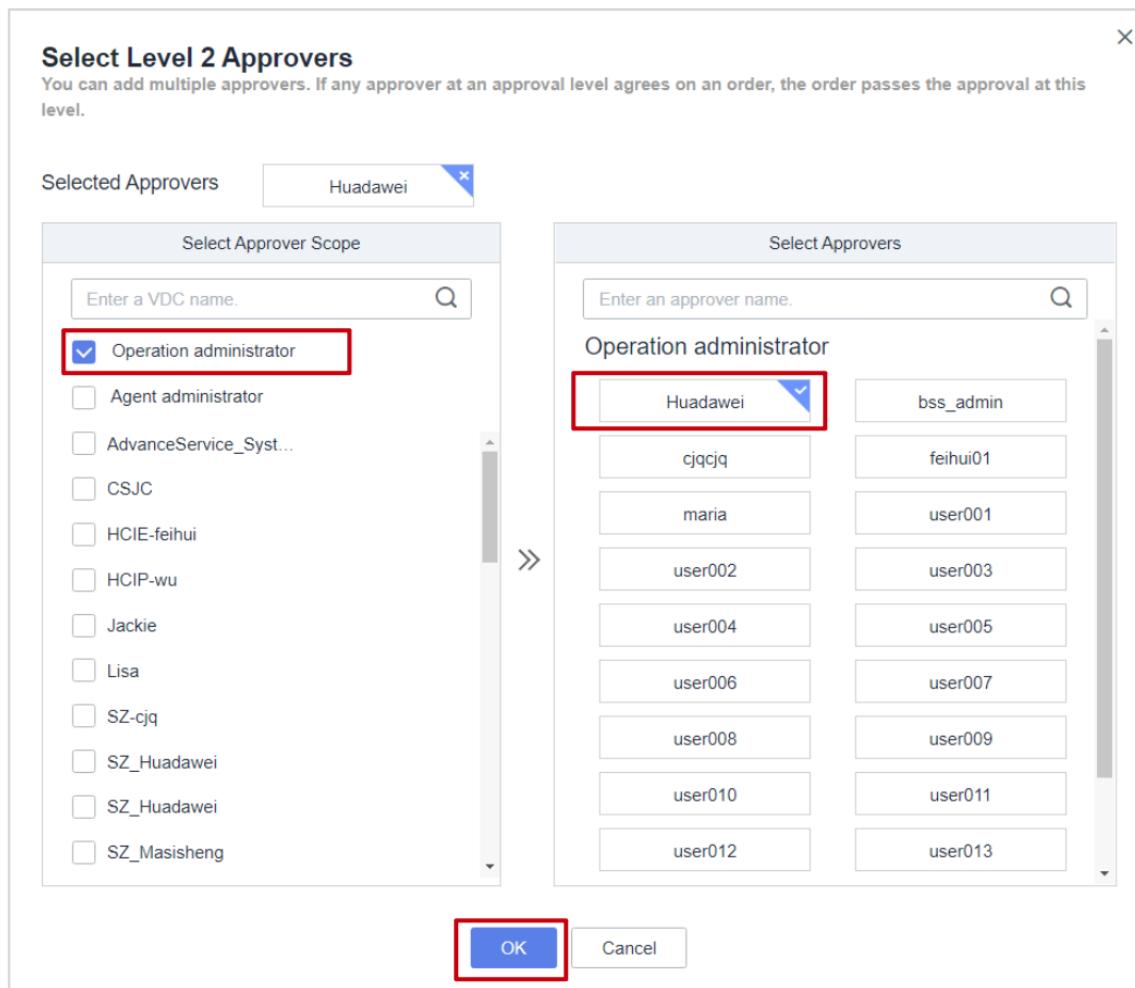
Remarks: Enter remarks.

Buttons: Create and Publish, Create, Cancel

- Add level 1 approvers: Click the first **Selected Approvers**. A dialog box is displayed. In the left pane, select the first-level VDC created in exercise 1, set the approver to the first-level VDC administrator, and click **OK**.



- Add level 2 approvers: Click the second **Selected Approvers**, select an operation administrator on the left pane, select the operation administrator corresponding to the trainee as the approver, and click **OK**.



After the creation is complete, click **Create and Publish**.

[← Create Approval Process](#)

Basic Information

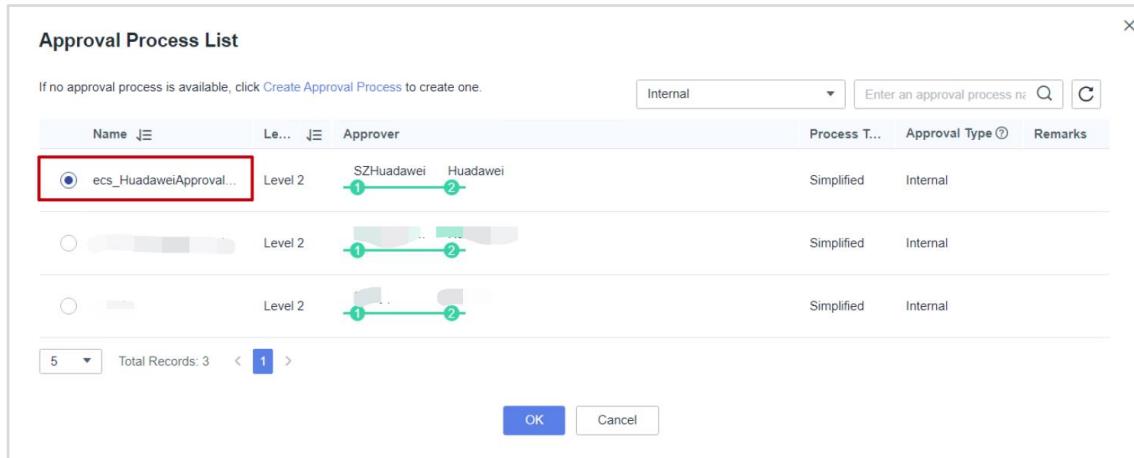
★ Name	ecs_HuadaweiApprovalProcess
★ Approval Level	Level 1 Level 2 Level 3 Level 4 Level 5
★ Approver	<div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 10px;"> 1 SZHuadawei </div> <div style="border: 1px solid #ccc; padding: 5px;"> 2 Huadawei </div>
	Select Approvers
	Select Approvers
<small>Each number indicates the sequence number of an approval level. The biggest number indicates the last level of the approval process.</small>	
Remarks	Enter remarks.
<input style="border: 2px solid red; padding: 5px; margin-right: 10px;" type="button" value="Create and Publish"/> <input type="button" value="Create"/> <input type="button" value="Cancel"/>	

Step 5 Return to the **Service Management** page and publish the service again. In the displayed **Approval Process List** dialog box, select the created approval process and click **OK**.

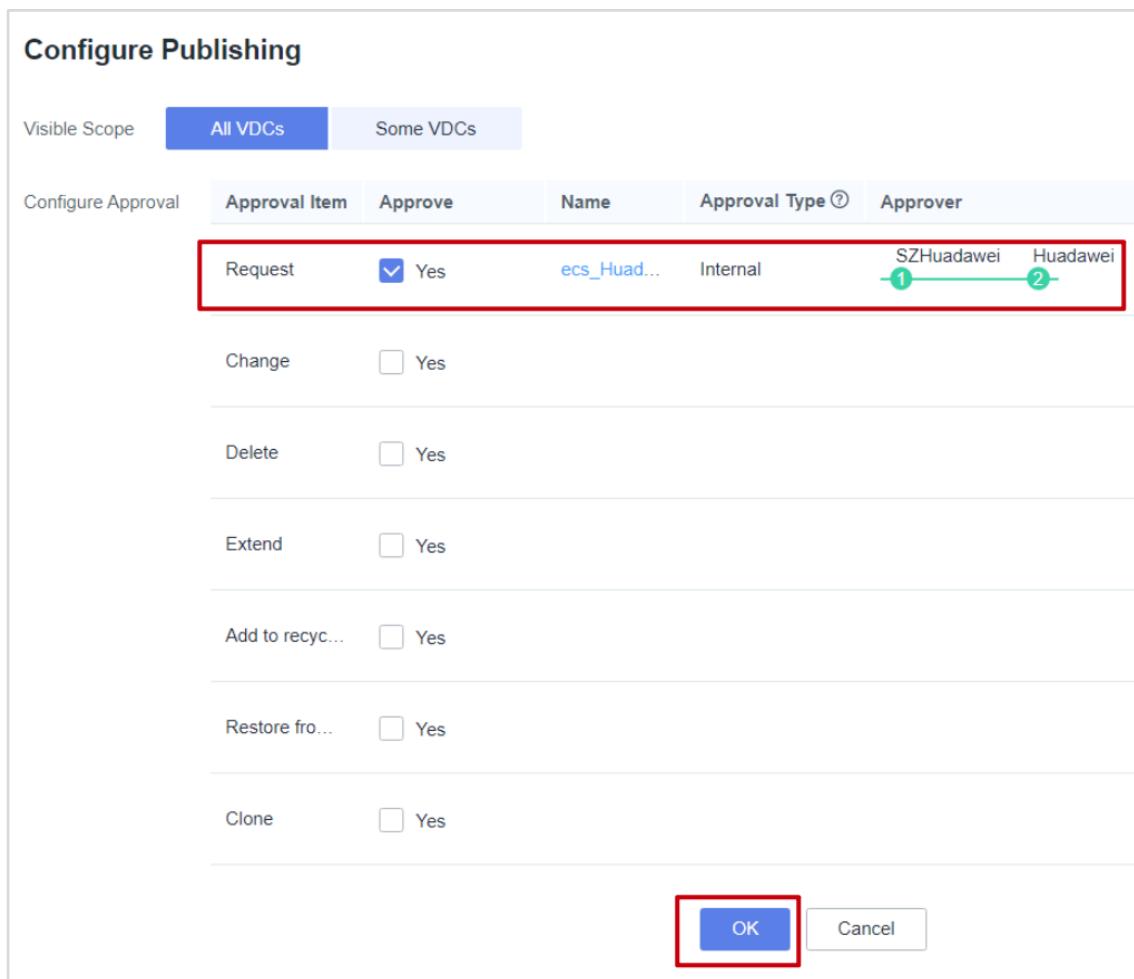
HUAWEI CLOUD Stack		Service Management																														
		Home Services Resources Organization Report System								English Huawei																						
Services		Service Management								Register Service																						
Service Management Service Orders Service Flavors Service Templates Service Catalog Management		Region: All hangzhou Category: Computing Storage Network Security Mgmt & Deployment Application Database EI Enterprise Intelligence								All service statuses	Enter a service name																					
		<table border="1"> <thead> <tr> <th>Service Name</th> <th>Service</th> <th>Region</th> <th>Catalog</th> <th>Status</th> <th>Approval</th> <th>Description</th> <th>Publish Scope</th> <th>Online Scope</th> <th>Created At</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>ecs_Huadawei</td> <td>Elastic Cloud Se...</td> <td>hangzhou</td> <td>Basic cloud serv...</td> <td>Unpublished</td> <td>Not required</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td><input type="button" value="Publish"/></td> </tr> </tbody> </table>								Service Name	Service	Region	Catalog	Status	Approval	Description	Publish Scope	Online Scope	Created At	Operation	ecs_Huadawei	Elastic Cloud Se...	hangzhou	Basic cloud serv...	Unpublished	Not required	—	—	—	—	<input type="button" value="Publish"/>	More
Service Name	Service	Region	Catalog	Status	Approval	Description	Publish Scope	Online Scope	Created At	Operation																						
ecs_Huadawei	Elastic Cloud Se...	hangzhou	Basic cloud serv...	Unpublished	Not required	—	—	—	—	<input type="button" value="Publish"/>																						

Configure Publishing

Visible Scope	All VDCs	Some VDCs			
Configure Approval	Approval Item	Approve	Name	Approval Type	Approver
Request	<input type="checkbox"/> Yes				



Step 6 In the displayed **Configure Publishing** dialog box, click **OK** to publish the ECS service.



2.2.3 Bringing the ECS Online

Step 1 To enable a second-level VDC operator to apply for the published service, log in to ManageOne Operation Portal as the second-level VDC administrator **Market_Trainee** name (for example, Market_Huadawei). Choose **System > Service**

Management from the main menu. Click **Bring Online** in the row where the created ECS service is located.

Service Name	Service	Region	Status	Service Type	Approval	Publish Scope	Operation
ecs_Huawei	Elastic Cloud Se...	hangzhou	Published	Common Service	View Details	--	Bring Online

Step 2 In the displayed dialog box, retain the approval settings and click **OK**.

[Question 3] If the approval process for applying for the service is modified, does the approval process take effect based on the last setting?

[Question 4] If you log in to the system as a first-level VDC administrator and bring a service online, can second-level VDC operators apply for the service? Why?

2.2.4 Creating Service Builder

2.2.4.1 Preparations

- Obtain the image **image_ubuntu_wordpress(40GB)** where the WordPress software is preinstalled. This image will be used during WordPress configuration. If it does not exist in the lab environment, contact the lab administrator to obtain it.
- Obtain the RTS template, **WordPress_RTS.zip**, from the trainer or administrator. The RTS template will be imported to create a vAPP template.

2.2.4.2 Creating a Template

Step 1 Use a browser to log in to ManageOne Operation Portal as a first-level VDC administrator. Choose **System** from the main menu. In the navigation pane, choose **Service Builder > Service Templates** and click **Import**.

Template Name	Service Type	Template Type	Source	Operation
Medium VPC Network Architecture ...	Network	Resource	System	Create Service Export Replicate
Typical Three-layered Website Tem...	Compute,Network	Resource	System	Create Service Export Replicate
Micro VPC Network Architecture Te...	Network	Resource	System	Create Service Export Replicate

Step 2 Enter the template parameter information, import the script file provided by the trainer, and click **Import File**.

< Import Template

Scenario	Compute	Network	Database	Middleware	Web Application
* Template Name	TemplateWordPress				
* Import Template	WordPress_RTS.zip				
<input type="button" value="Import File"/> Import File					
<small>The template must be compressed into a ZIP file. The ZIP file name cannot contain special characters /&<> or spaces. The name of any file inside the ZIP file cannot contain non-ASCII characters, special characters /&\$<> or spaces. View more rules for importing the template file.</small>					
* Main File	main.json				
Template Content	<pre> 1 { 2 "heat_template_version": "2013-05-23", 3 "description": "", 4 "parameter_groups": [5 { 6 "label": "Wordpress 1", 7 "description": "WordPres", 8 "parameters": [9 "availabilityZone", 10 "imageId", 11 "flavor", 12 "volumeType", 13 "volumeSize", 14 "wordpressServerName" 15], 16 }, 17 { 18 "label": "Wordpress 2", 19 "description": "WordPres", 20 }] } </pre>				
Description					
<input type="button" value="Import"/> <input type="button" value="Cancel"/>					

Step 3 Return to the **Service Template** tab and view the template creation result.

System		Service Template					
		All	Compute	Network	Database	Middleware	Web Application
		Create		Import		All sources	
		Template Name	All	Service Type	Template Type	Source	
		TemplateWordPress	Other	Resource	VDC		
		Elastic Cloud Server Template	Compute	Resource	System		
		HUAWEI CLOUD ELB Template	Compute,Network	Resource	System		

2.2.4.3 Creating Service Builder

Step 1 Locate the created template and click **Create Service**.

VDC List		All	Compute	Network	Database	Middleware	Web Application	Other
		Create	Import	All sources <input type="button" value="Enter a template name."/> Create Service Export More				
Template Name	Service Type	Template Type	Source	Created By	Operation			
TemplateWordPress	Other	Resource	VDC	SZHuadawei	Create Service Export More			
Elastic Cloud Server Template	Compute	Resource	System	--	Create Service Export Replicate			

Step 2 Set service parameters, including **Service Name**, **Version**, and **Category**.

Basic Information ▲

* Icon  [Upload](#)
Supported formats: .jpg, .jpeg, .jpe, .png, and .bmp. Max image size: 100 KB.

* Service Name [X](#)

* Version [X](#)

* Category [▼](#)

* Registered service catalog [▼](#) [▼](#)

Description

0/1,024

Step 3 Retain the default values of **Region**, **Resource Set**, and **Visible Scope**.

Location Information ▲

* Region [▼](#)

* Resource Set [▼](#)

Policy ▲

* Visible Scope [▼](#) [View Scope](#)

Set Approval [Select](#)

Step 4 Set parameters such as **AZ** and **Image**. The reference values are as follows:

Parameters ▾

You only need to set System parameters. Users set parameters when they apply for resources.

WordPressServerBasicConfiguration ⓘ

* AZ	System	hcs811	Select	?	<input type="checkbox"/> Invisible to users	
* image	System	image_ubuntu_wordpress	Select	?	<input type="checkbox"/> Invisible to users	
* flavor	System	Flavor_Linux01	Select	?	<input type="checkbox"/> Invisible to users	
* disktype	System	SAS	Select	?	<input type="checkbox"/> Invisible to users	
* system disk size	System	—	40	+	?	<input type="checkbox"/> Invisible to users
* server name	Tenant	vAPP-ecs-WordPress	X	?	<input type="checkbox"/> Invisible to users	

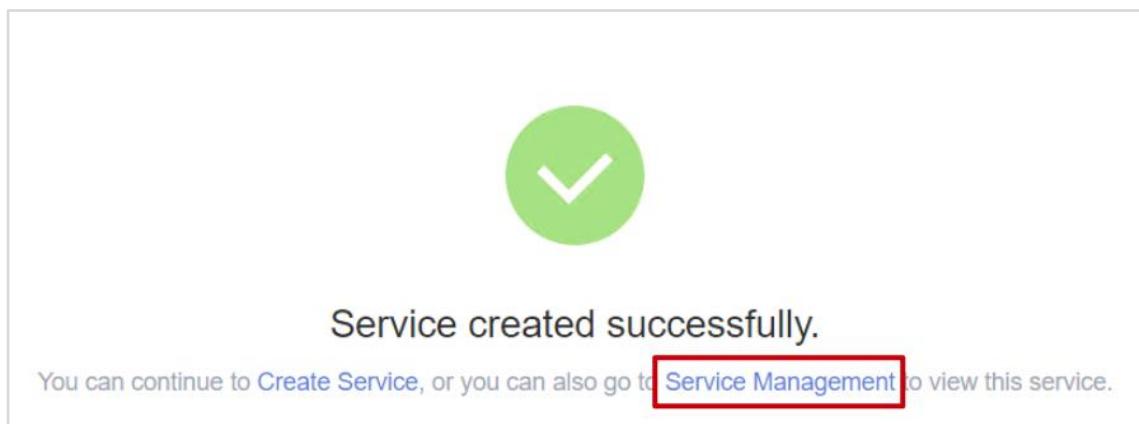
WordPressNetworkConfiguration ⓘ

* eip network	System	eip_external_network	Select	?	<input type="checkbox"/> Invisible to users
* Net Card	System	subnet-1	Select	?	<input type="checkbox"/> Invisible to users

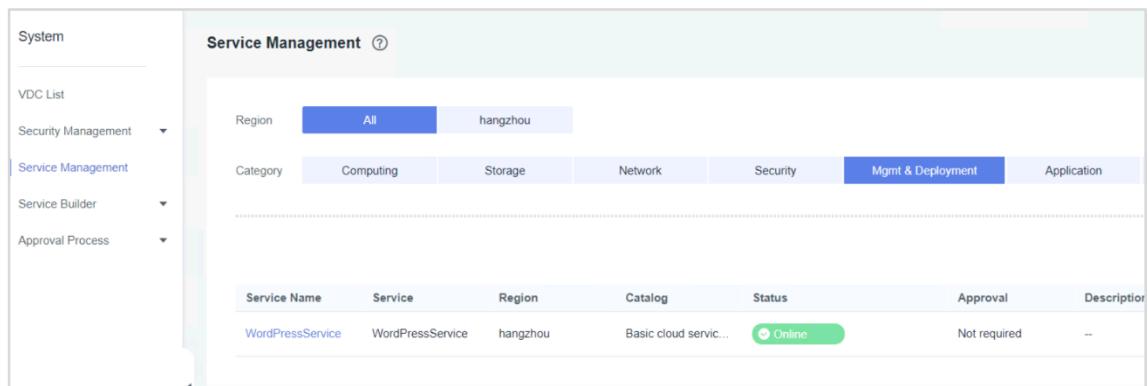
WordPressSoftwareConfiguration ⓘ

* DB Name	System	wordpress1	X	?	<input type="checkbox"/> Invisible to users
* UserName	System	wordpress1	X	?	<input type="checkbox"/> Invisible to users
* Password	Tenant			?	<input type="checkbox"/> Invisible to users

Step 5 Click **Create Now** and click **OK**. After a dialog box is displayed indicating that the service creation is successful, click **Service Management**.



Step 6 Return to the **Service Management** page. You can see that the service is automatically brought online under **Mgmt & Deployment**.



Service Name	Service	Region	Catalog	Status	Approval	Description
WordPressService	WordPressService	hangzhou	Basic cloud servic...	Online	Not required	--

3 Requesting an ECS

3.1 Overview

3.1.1 About This Exercise

This exercise guides trainees through the ECS application and order approval process, and describes how to set up WordPress based on Service Builder.

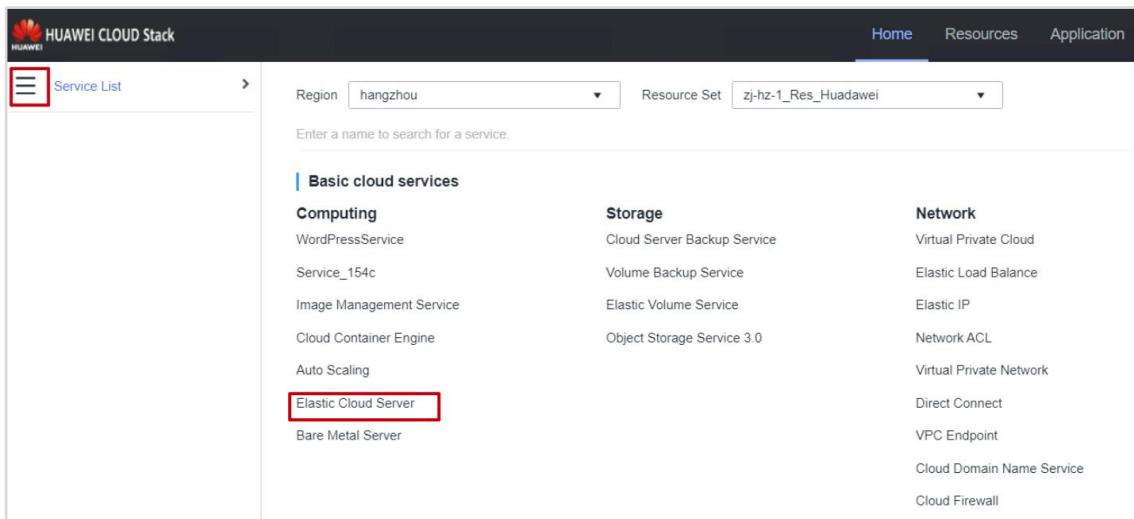
3.1.2 Objectives

- Request an ECS.
- Request a Service Builder instance.
- Approve orders.

3.2 Procedure

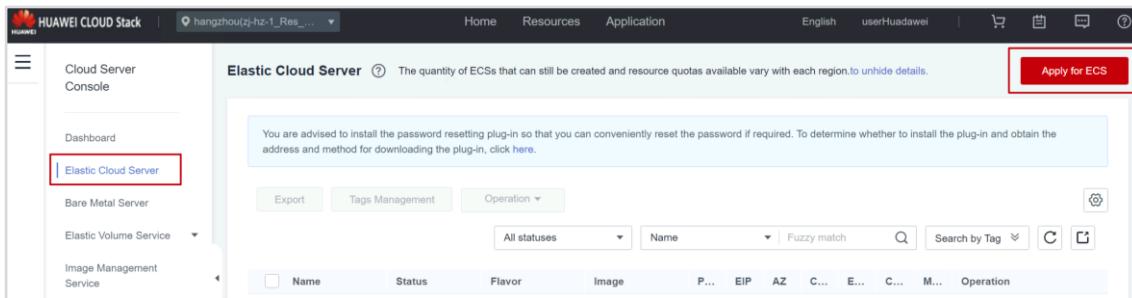
3.2.1 Applying for an ECS

- Step 1 Log in to the ManageOne Operation Portal as a second-level VDC operator account **user_Trainee** name (for example, user_Huadawei).
- Step 2 Click  and choose **Elastic Cloud Server**.



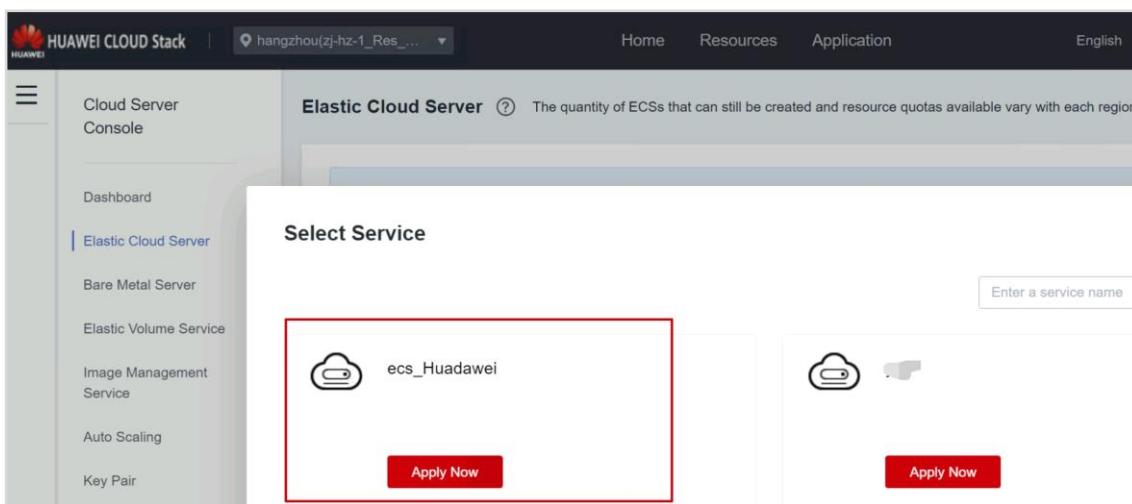
The screenshot shows the ManageOne Operation Portal interface for the HUAWEI CLOUD Stack. The top navigation bar includes the Huawei logo, the title 'HUAWEI CLOUD Stack', and links for 'Home', 'Resources', and 'Application'. On the left, there's a sidebar with a 'Service List' button (which is highlighted with a red box) and a search bar. The main content area is titled 'Basic cloud services' and lists several service categories and their sub-options. The 'Elastic Cloud Server' option under the 'Computing' section is also highlighted with a red box. Other visible service categories include Storage, Network, and others like WordPressService, Service_154c, Image Management Service, Cloud Container Engine, Auto Scaling, Bare Metal Server, and more. The top right of the main area shows dropdown menus for 'Region' (set to 'hangzhou') and 'Resource Set' (set to 'zj-hz-1_Res_Huadawei').

Step 3 On the displayed page, click **Apply for ECS** in the upper right corner.



The screenshot shows the HUAWEI CLOUD Stack interface. The left sidebar has 'Elastic Cloud Server' selected. The main panel displays the 'Elastic Cloud Server' section with a red box highlighting the 'Apply for ECS' button in the top right corner. Below it is a message about installing a password resetting plug-in.

Step 4 On the displayed page, select the published service **ecs_Trainee name** (for example, **ECS_Huadawei**) and click **Apply Now**.



The screenshot shows a 'Select Service' dialog box. It contains a search bar 'Enter a service name' and two service options. The first option, 'ecs_Huadawei', is highlighted with a red box and its 'Apply Now' button is also highlighted. The second option is partially visible.

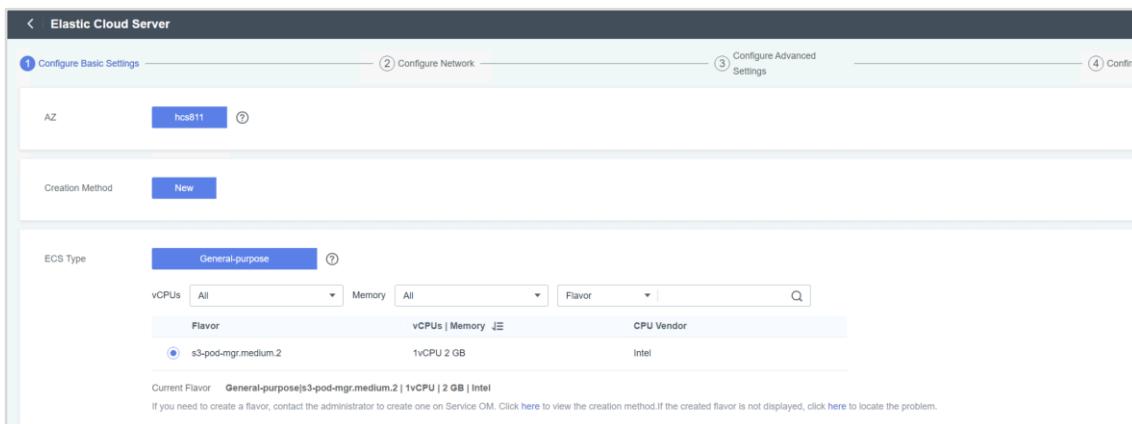
Step 5 Configure information such as flavors and images.

System Disk: 40 GB

Quantity: Select 1.

Retain the default values for other parameters.

Click **Next: Configure Network**.



The screenshot shows the 'Configure Basic Settings' step of the ECS creation wizard. It includes fields for AZ (set to 'hsa811'), Creation Method ('New'), ECS Type ('General-purpose'), and flavor selection. The 's3-pod-mgr.medium.2' flavor is selected. A note at the bottom states: 'Current Flavor General-purpose|s3-pod-mgr.medium.2 | 1vCPU | 2 GB | Intel'. Step numbers 1 through 4 are shown at the top of the wizard.

Boot Mode: BIOS
Image Type: Public Image
Image: CentOS
System Disk: volume1 (40 GB)
Data Disk: Add Data Disk
Quantity: 1
Price: \$0.00 USD/hour
Next: Configure Network

Step 6 Configure the network adapter information. Retain the default settings. Click **Next: Configure Advanced Settings**.

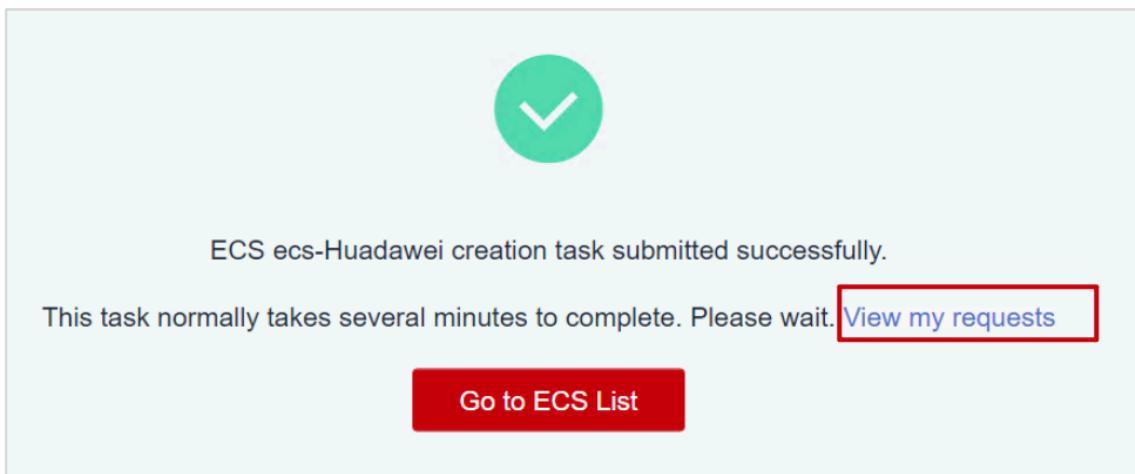
VPC: vpc-Huadawei
Primary NIC: subnet-1(192.168.0.0/24)
Security Group: default
EIP: Do Not Use
Price: \$0.00 USD/hour
Next: Configure Advanced Settings

Step 7 Configure information such as the ECS name and click **Next: Confirm**.

ECS Name: ecs-Huadawei
ECS Initial Status: Started
Description: 0/63
Advanced Options: Configure
Price: \$0.00 USD/hour
Next: Confirm

Step 8 Confirm the order information and click **Apply Now**.

Step 9 After the application is submitted, the VDC operator can click **View my requests**.



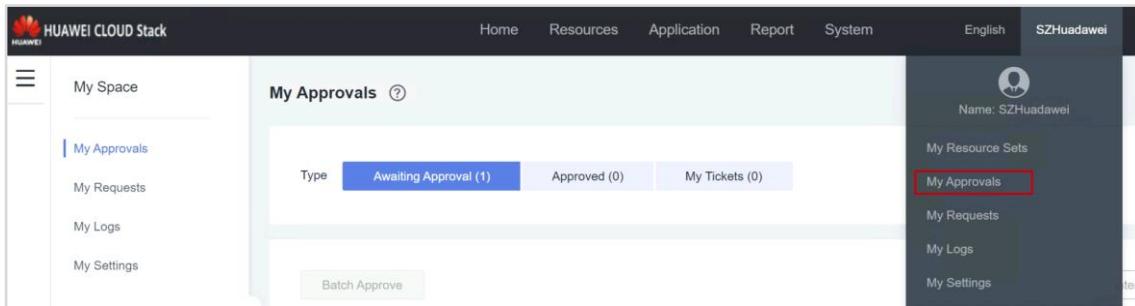
The resource application order is being approved, and the next approver is the first-level VDC administrator.

My Requests						
Order Number	Service Type	Order Type	Order Status	Current Approver	Operation	
20220824091409703538753	Elastic Cloud Server x 1	Apply for resource	Approving	SZHuadawei	Cancel	
20220824073920823746591	Virtual Private Cloud x 1	Apply for resource	Successful	--		

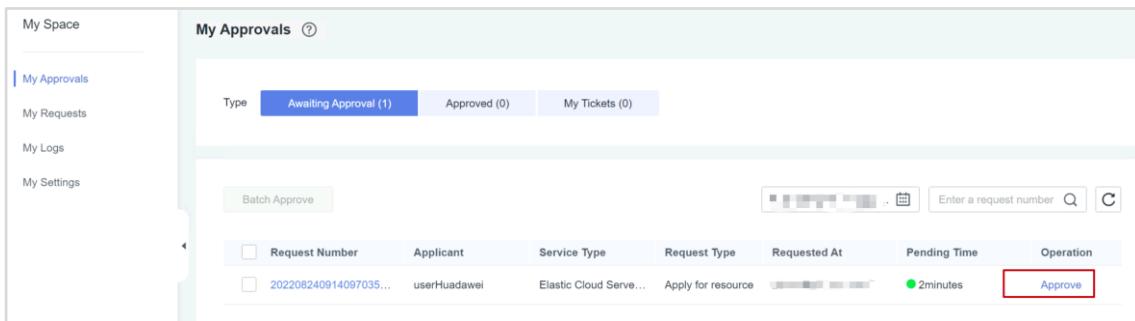
3.2.2 Approving an Order

Step 1 Log in to the first-level VDC administrator account to approve an order.

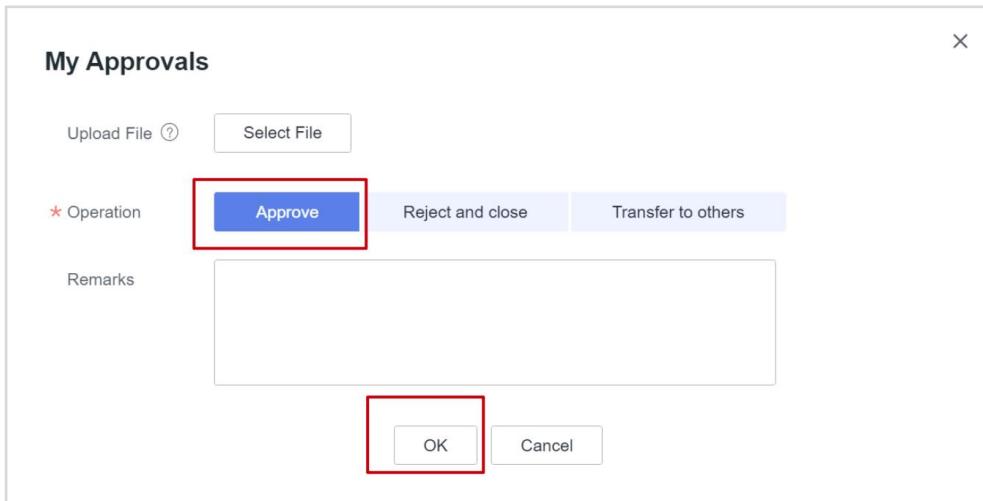
Select **My Approvals**.



The order to be approved by the first-level VDC administrator is displayed on the page. Select the ECS order applied by the second-level VDC administrator and click **Approve**.



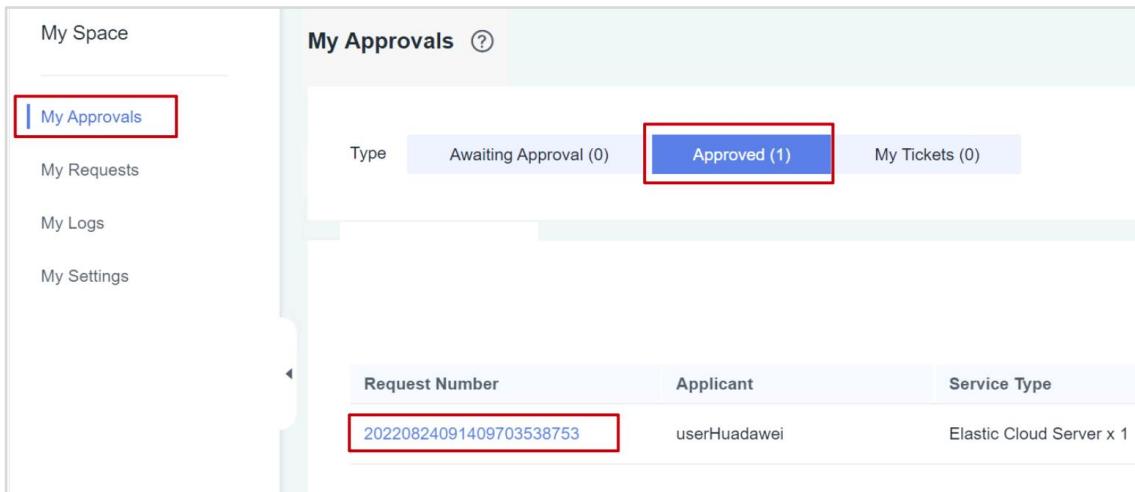
Click **Approve** and then **OK**.



Step 2 Approve the order.

[Question 5] If the approval process is suspended at a node, how to determine the owner of the next approval node?

[Answer] Take the approver of the first node as an example. After the first-level VDC approver approves the order, you can click **Approved** to view the order and click the order number to view details.



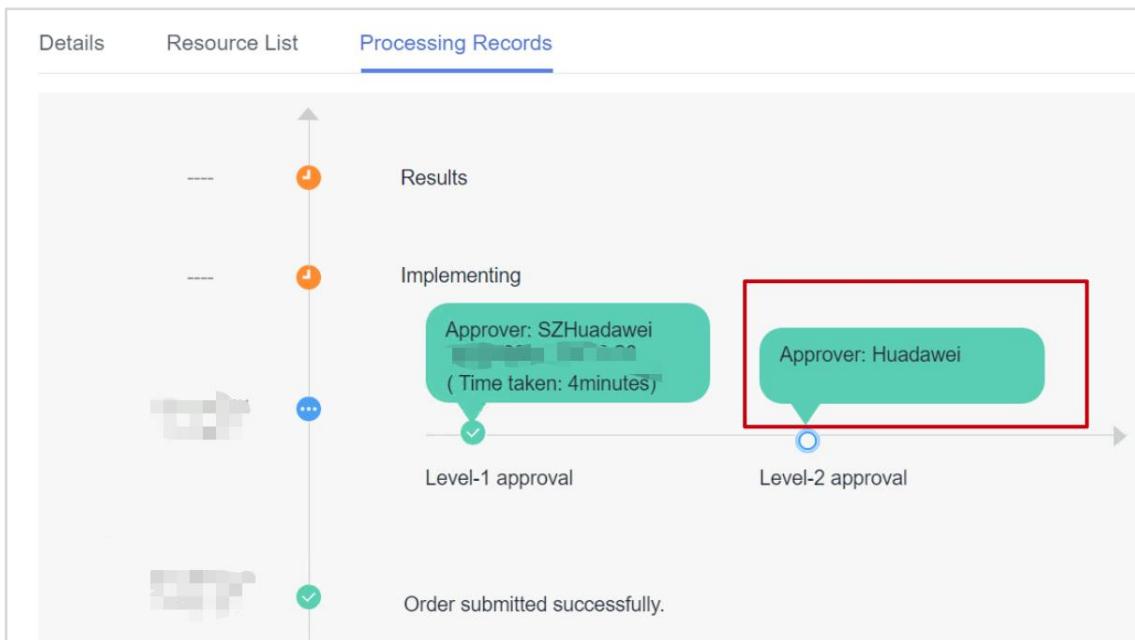
My Space

My Approvals ?

Type Awaiting Approval (0) Approved (1) My Tickets (0)

Request Number	Applicant	Service Type
20220824091409703538753	userHuadawei	Elastic Cloud Server x 1

Click **Processing Records** to view the detailed approval details and the approver of the next node.



Details Resource List Processing Records

Results

Implementing

Approver: SZHuadawei (Time taken: 4minutes)

Level-1 approval

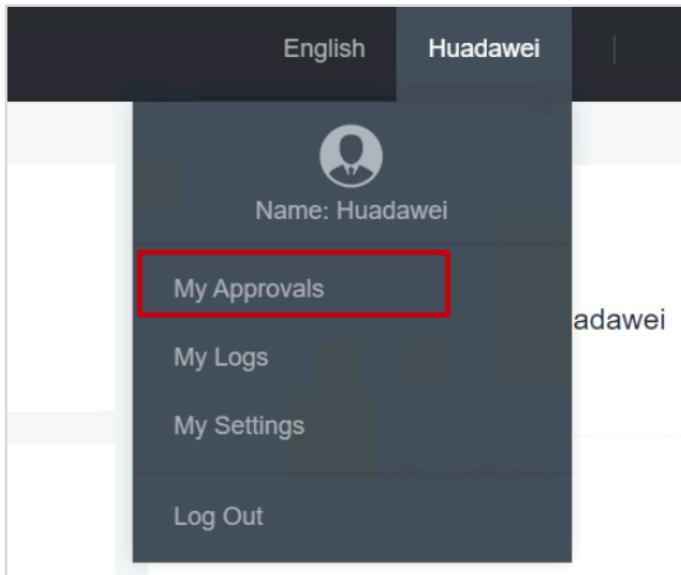
Level-2 approval

Order submitted successfully.

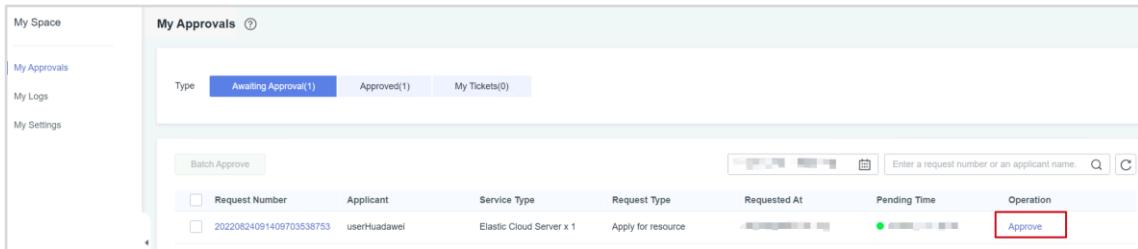
According to the processing record, the approver of the next node is **Huadawei**, that is, the operation administrator corresponding to the trainee.

Log in to the ManageOne Operation Portal as the operation administrator and approve the application.

Choose **My Approvals** in the navigation pane.

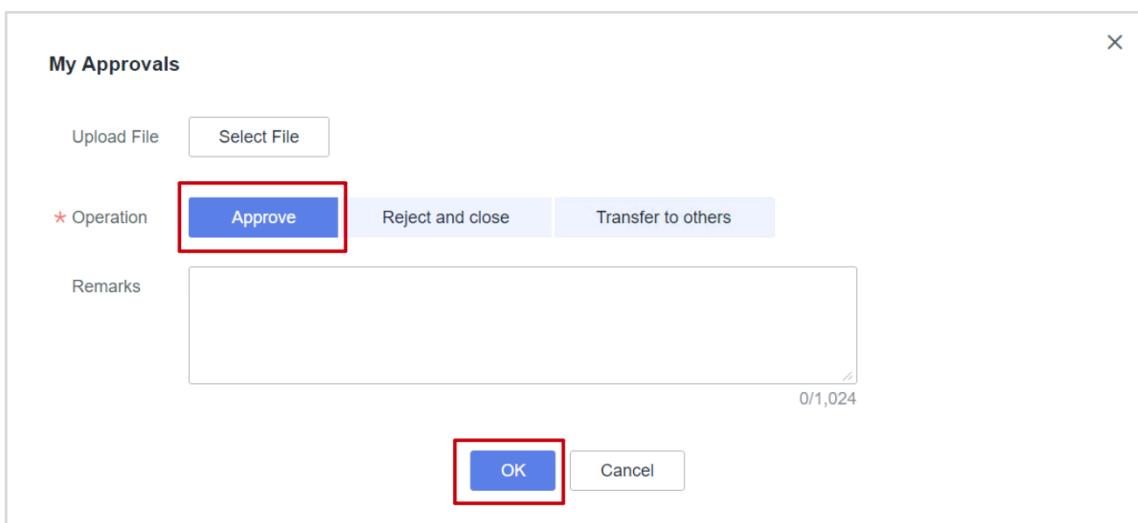


Select the order to be approved and click **Approve**.



The screenshot shows the 'My Approvals' section of the HUAWEI CLOUD Stack Lab Guide. It displays a list of pending approvals. One specific approval is selected, and its details are shown in the main pane: Request Number 20220824091409703538753, Applicant userHuadawei, Service Type Elastic Cloud Server x 1, Request Type Apply for resource, Requested At [redacted], Pending Time [redacted]. The 'Approve' button is highlighted with a red box.

Click **Approve** and then **OK**.

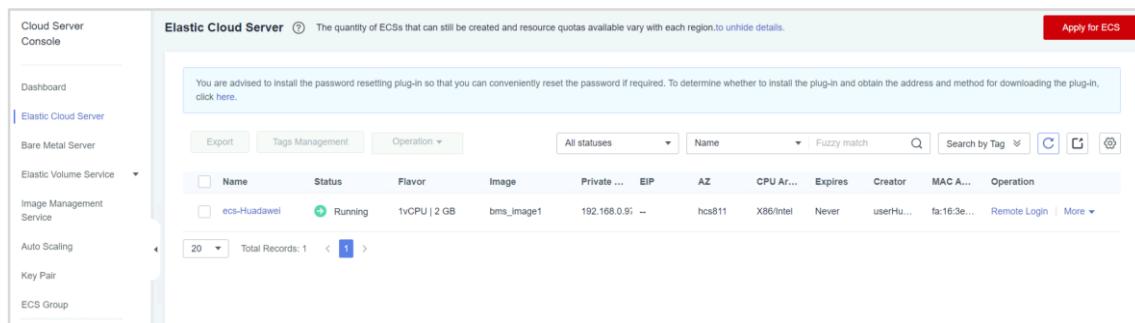


The screenshot shows a confirmation dialog titled 'My Approvals'. It contains fields for 'Upload File' and 'Select File', and buttons for 'Approve', 'Reject and close', and 'Transfer to others'. The 'Approve' button is highlighted with a red box. Below it is a 'Remarks' text area with a character limit of 1,024 characters. At the bottom are 'OK' and 'Cancel' buttons, with the 'OK' button highlighted with a red box.

The application approval process is complete.

After the ECS is provisioned, log in to the second-level VDC operator.

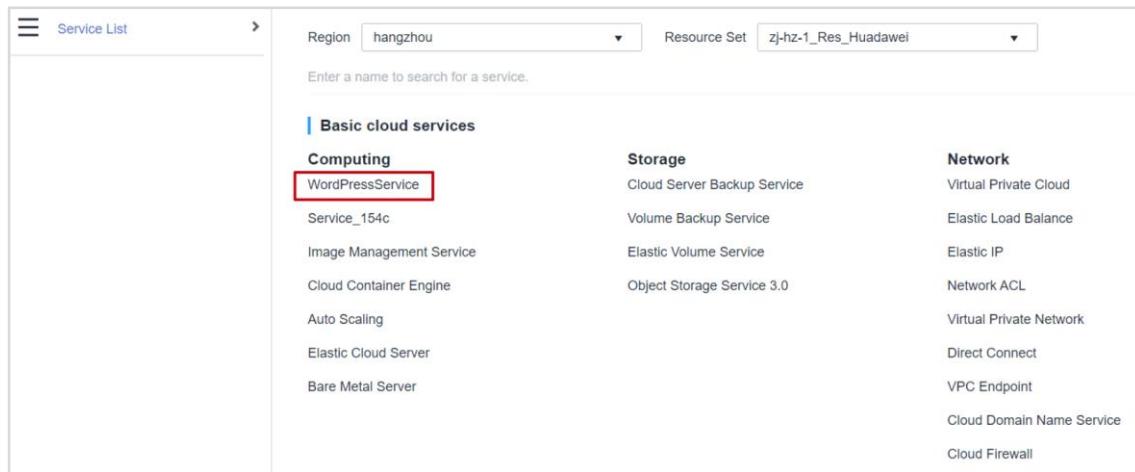
You can choose **Cloud Server Console > Elastic Cloud Server** to query ECSs and perform operations on them.



The screenshot shows the 'Elastic Cloud Server' section of the HUAWEI CLOUD Stack Lab Guide. On the left, there's a sidebar with links for Cloud Server Console, Dashboard, Bare Metal Server, Elastic Volume Service, Image Management Service, Auto Scaling, Key Pair, and ECS Group. The main area has a title 'Elastic Cloud Server' with a note about installing a password resetting plug-in. It features tabs for Export, Tags Management, and Operation. A search bar at the top right includes filters for All statuses, Name, Fuzzy match, and Search by Tag. Below the search is a table with columns: Name, Status, Flavor, Image, Private IP, EIP, AZ, CPU Ar..., Expires, Creator, MAC A..., and Operation. One row is visible: 'ecs-Huadawei' (Status: Running, Flavor: 1vCPU | 2 GB, Image: bms_image1, Private IP: 192.168.0.97, EIP: -, AZ: hcs811, CPU Ar...: X86/intel, Expires: Never, Creator: userHu..., MAC A...: fa:16:3e..., Operation: Remote Login). At the bottom, it says 'Total Records: 1'.

3.2.3 Requesting a Service Builder Instance

- Step 1 Use a browser to log in to ManageOne Operation Portal as a VDC operator.
- Step 2 Click **Service List** in the upper left corner and select the created Service Builder service.



The screenshot shows the 'Service List' page in the ManageOne Operation Portal. At the top, there are dropdowns for Region (hangzhou) and Resource Set (zj-hz-1_Res_Huadawei). Below that is a search bar with placeholder text 'Enter a name to search for a service.' The main area is titled 'Basic cloud services' and contains two columns of services. The first column under 'Computing' includes 'WordPressService' (which is highlighted with a red box), 'Service_154c', 'Image Management Service', 'Cloud Container Engine', 'Auto Scaling', 'Elastic Cloud Server', and 'Bare Metal Server'. The second column under 'Storage' includes 'Cloud Server Backup Service', 'Volume Backup Service', 'Elastic Volume Service', 'Object Storage Service 3.0', and 'Network' includes 'Virtual Private Cloud', 'Elastic Load Balance', 'Elastic IP', 'Network ACL', 'Virtual Private Network', 'Direct Connect', 'VPC Endpoint', 'Cloud Domain Name Service', and 'Cloud Firewall'.

- Step 3 In the dialog box that is displayed, enter related information.

← Apply for WordPressService

Application Information

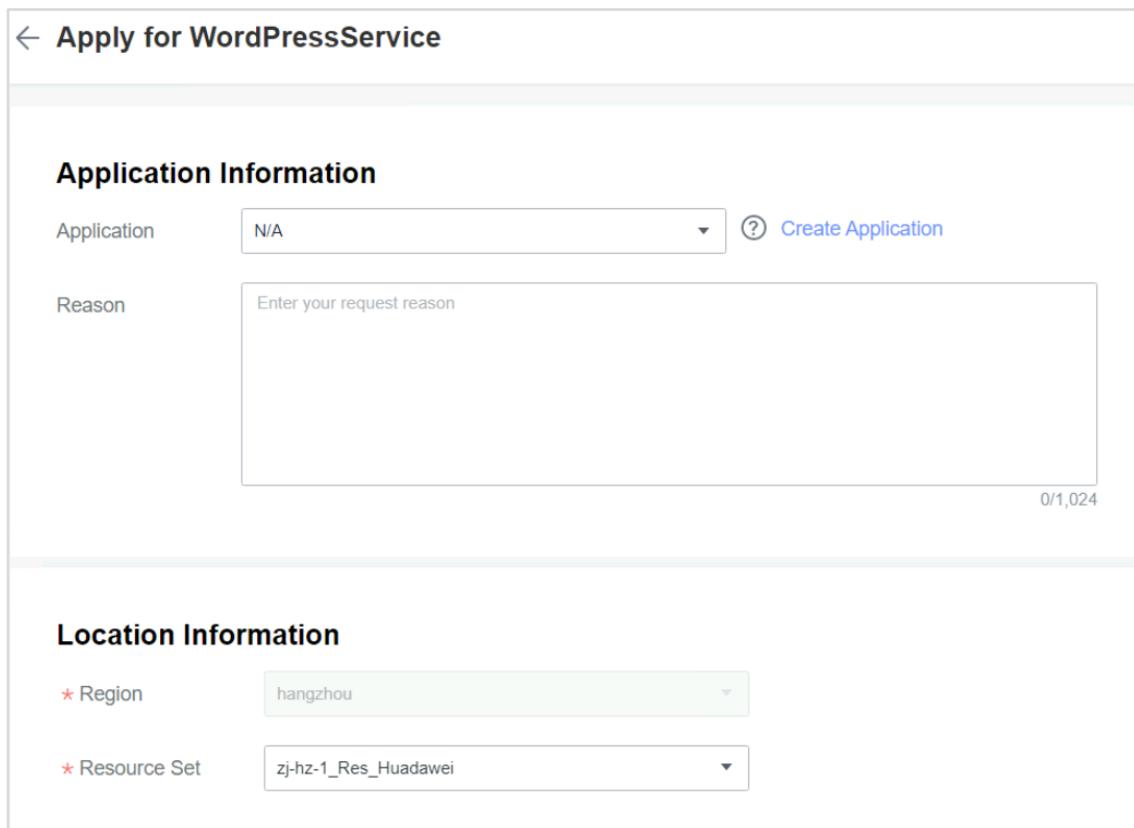
Application N/A [?](#) [Create Application](#)

Reason Enter your request reason
0/1,024

Location Information

* Region hangzhou

* Resource Set zj-hz-1_Res_Huadawei



Step 4 System parameters have been written into the template as fixed parameters. Retain the default values. Enter the server name, user password, and resource stack name. Set the timeout as long as possible.

Set Parameters [Show System Parameters](#)

WordPressServerBasicConfiguration [?](#)

* server name [X](#) [?](#)

WordPressNetworkConfiguration [?](#)

WordPressSoftwareConfiguration [?](#)

* Password [X](#) [?](#)

Basic Information

* Name

Description
0/1,024

* Timeout (min) [?](#)

Execution Time Immediate Scheduled

Duration Applied For Unlimited 1 year Customize

Step 5 Click **Apply Now** and wait for a while to complete the application.

WordPressService...	Stacks	
Stacks		
Name	Status	Description
Stack_WordPress	 Creation completed	--

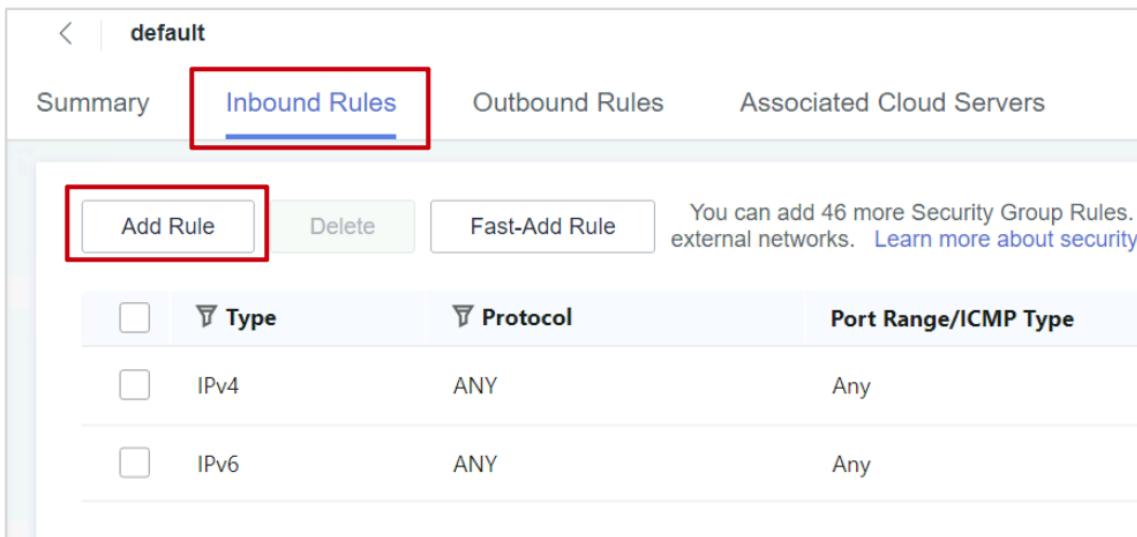
3.2.4 Commissioning a Service

Step 1 After the service is provisioned, log in to the second-level VDC operator, choose **Network Console > Dashboard > Security Groups**. On the displayed page, click **Configure Rule** in the **Operation** column to configure the security policy of the default security group.



Step 2 Add an inbound rule.

Click the **Inbound Rules** tab, and then click **Add Rule**.



Set **ANY** for **Protocol** and click **OK**.

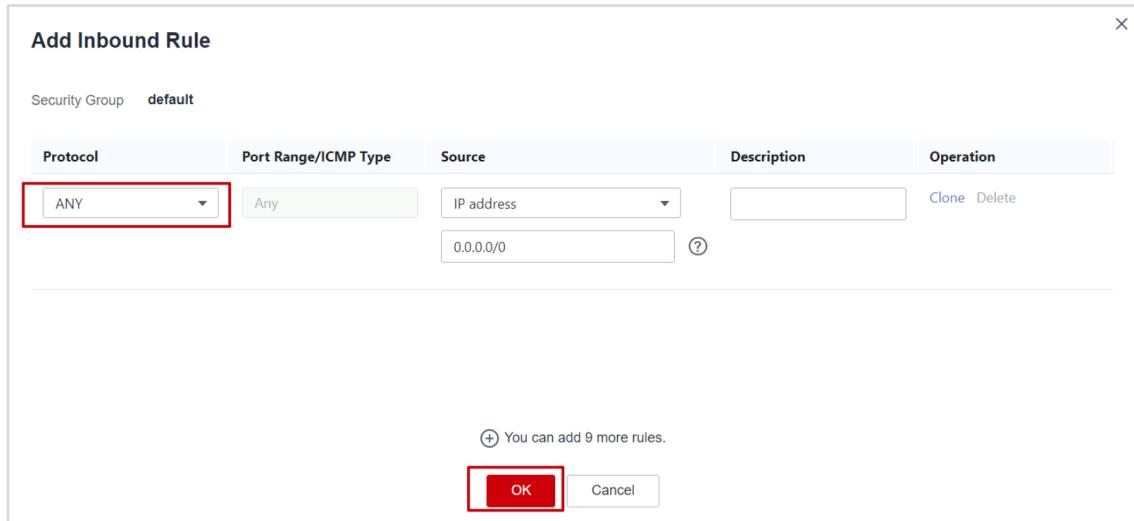
Add Inbound Rule

Security Group **default**

Protocol	Port Range/ICMP Type	Source	Description	Operation
ANY	Any	IP address		Clone Delete
		0.0.0.0/0		(?)

(+) You can add 9 more rules.

OK Cancel



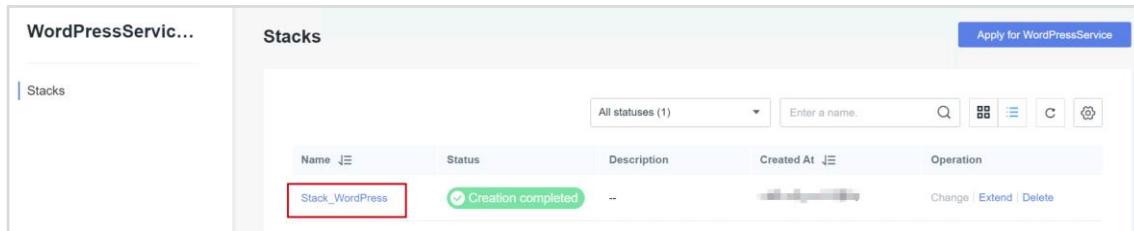
Step 3 Return to the WordPress console and select the created instance of Service Builder.

WordPressService... Stacks

Stacks

Name	Status	Description	Created At	Operation
Stack_WordPress	Creation completed	--	[REDACTED]	Change Extend Delete

Apply for WordPressService



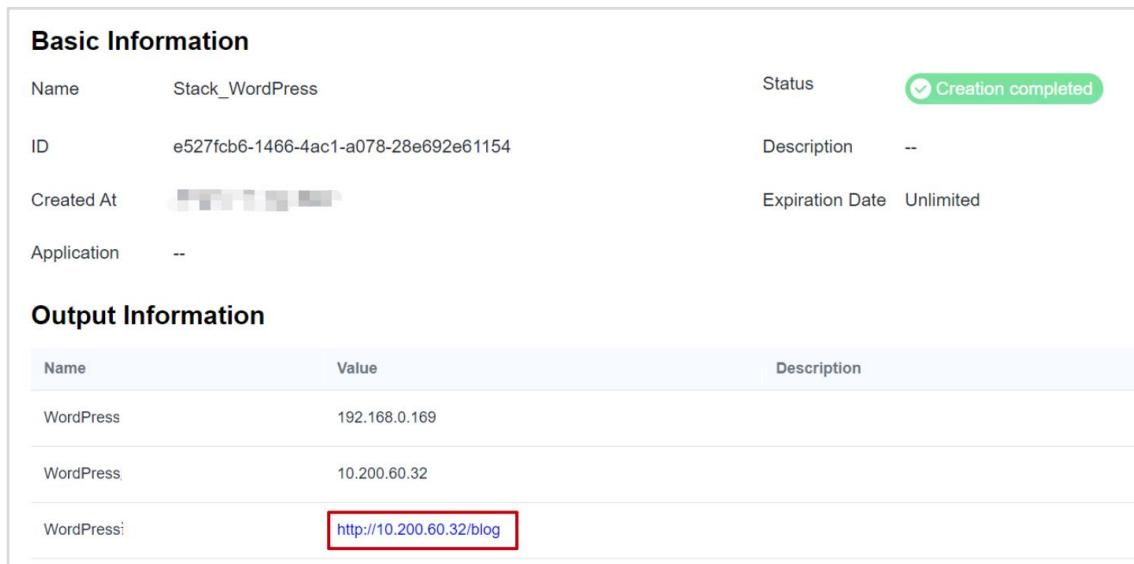
Step 4 Go to the **Basic Information** page of the Service Builder instance.

Basic Information

Name	Stack_WordPress	Status	Creation completed
ID	e527fcb6-1466-4ac1-a078-28e692e61154	Description	--
Created At	[REDACTED]	Expiration Date	Unlimited
Application	--		

Output Information

Name	Value	Description
WordPress	192.168.0.169	
WordPress	10.200.60.32	
WordPress:	http://10.200.60.32/blog	



Step 5 Click the URL of the WordPress access page in the preceding figure to check whether the WordPress page can be accessed.

Welcome

Welcome to the famous five-minute WordPress installation process! Just fill in the information below and you'll be on your way to using the most extendable and powerful personal publishing platform in the world.

Information needed

Please provide the following information. Don't worry, you can always change these settings later.

Site Title

Username Usernames can have only alphanumeric characters, spaces, underscores, hyphens, periods, and the @ symbol.

Password M)9o%\$v%*LI&ZU5)t  Hide Strong

Your Email Double-check your email address before continuing.

Search Engine Visibility Discourage search engines from indexing this site
It is up to search engines to honor this request.

Step 6 (Optional) Set parameters in the **Information needed** area as needed and click **Install WordPress**.

Welcome

Welcome to the famous five-minute WordPress installation process! Just fill in the information below and you'll be on your way to using the most extendable and powerful personal publishing platform in the world.

Information needed

Please provide the following information. Don't worry, you can always change these settings later.

Site Title (Red circle around the input field)

Username (Red circle around the input field)

Usernames can have only alphanumeric characters, spaces, underscores, hyphens, periods, and the @ symbol.

Password (Red circle around the input field) Strong Hide

Your Email (Red circle around the input field)

Double-check your email address before continuing.

Search Engine Visibility Discourage search engines from indexing this site
It is up to search engines to honor this request.

In the displayed dialog box, click **Log In**.

Success!

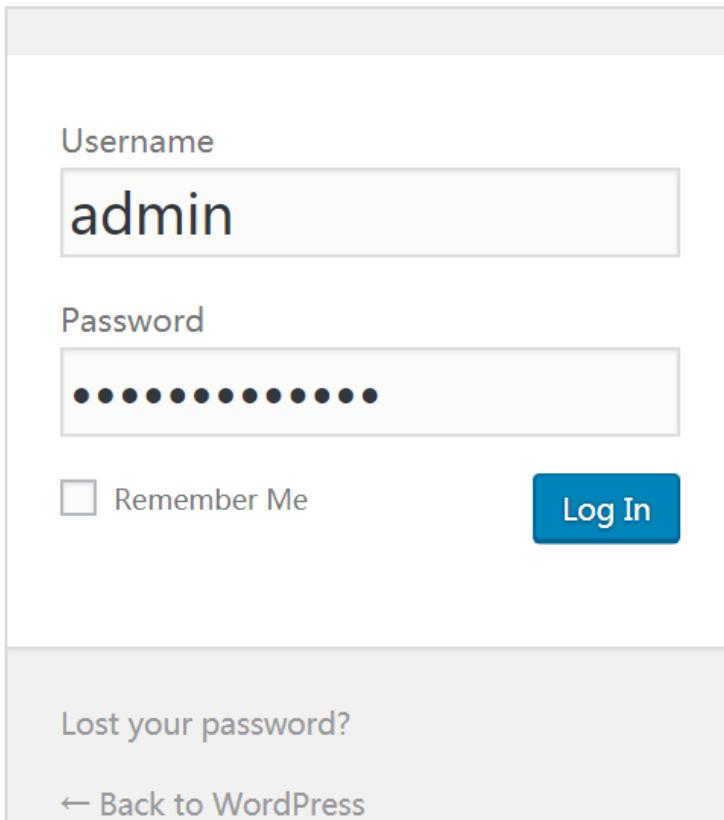
WordPress has been installed. Were you expecting more steps? Sorry to disappoint.

Username admin

Password Your chosen password.

(Red circle around the Log In button)

On the displayed page, enter **Username** and **Password** and click **Log In**.



Username
admin

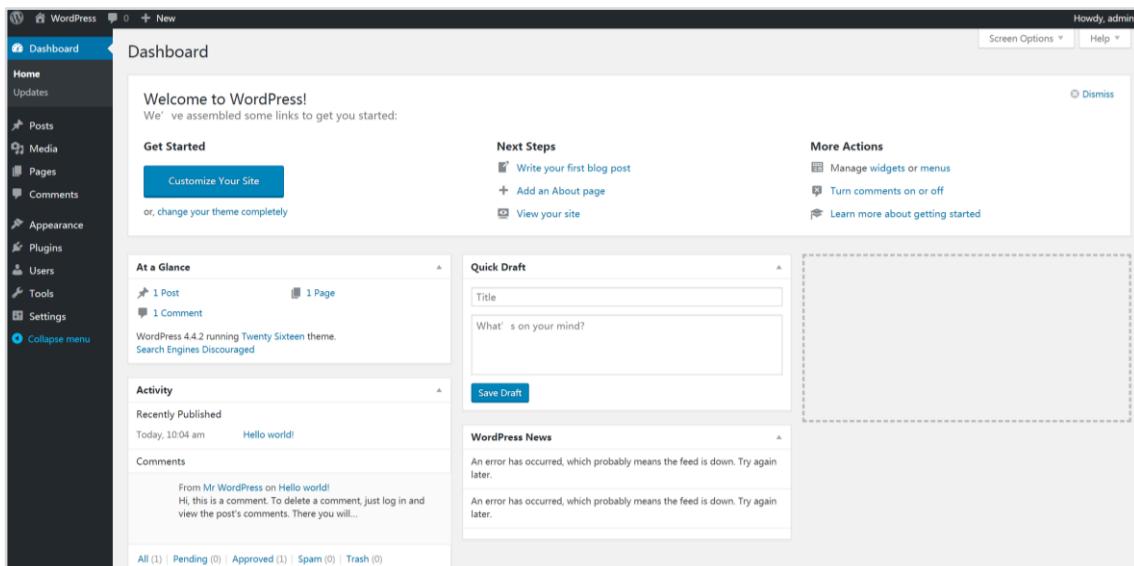
Password
••••••••••••••

Remember Me **Log In**

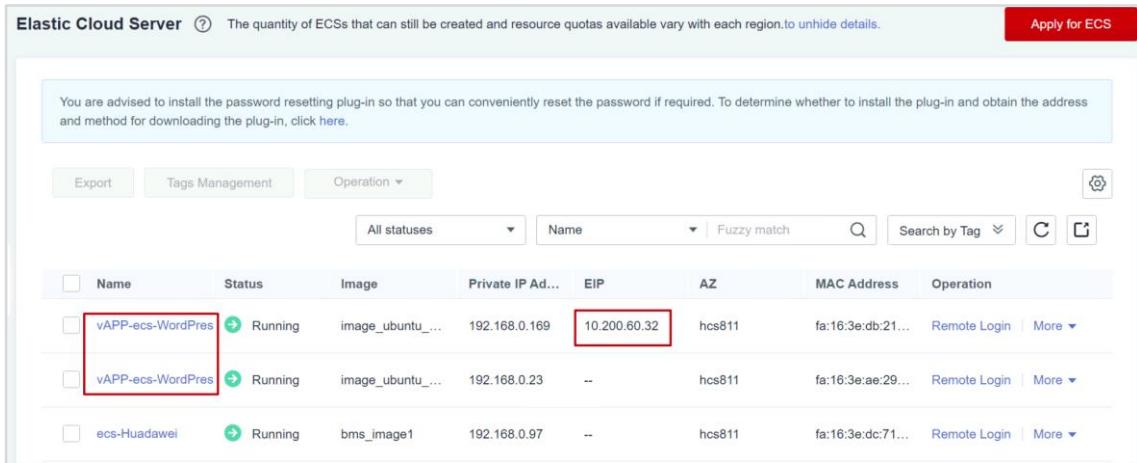
Lost your password?

← Back to WordPress

Step 7 Verify that the WordPress website can be normally accessed.



Step 8 (Optional) Go to the **Elastic Cloud Server** page and view the ECSs contained in the Service Builder instance.



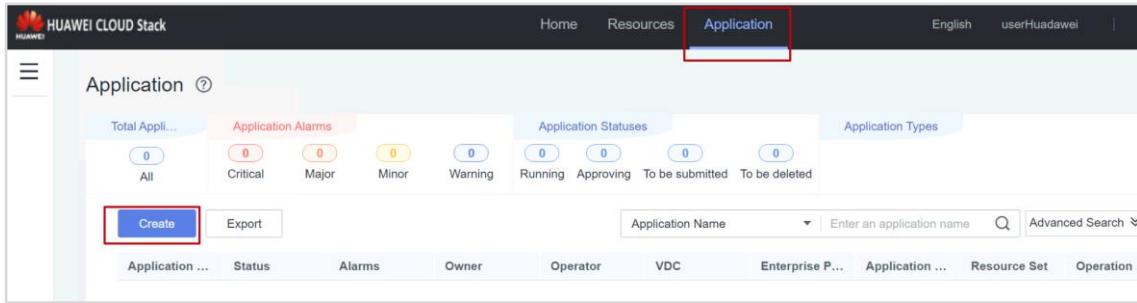
The screenshot shows the 'Elastic Cloud Server' section of the HUAWEI CLOUD Stack interface. It displays a list of three ECS instances:

Name	Status	Image	Private IP Ad...	EIP	AZ	MAC Address	Operation
vAPP-ecs-WordPres	Running	image_ubuntu_...	192.168.0.169	10.200.60.32	hcs811	fa:16:3e:db:21...	Remote Login More
vAPP-ecs-WordPres	Running	image_ubuntu_...	192.168.0.23	--	hcs811	fa:16:3e:ae:29...	Remote Login More
ecs-Huadawei	Running	bms_image1	192.168.0.97	--	hcs811	fa:16:3e:dc:71...	Remote Login More

3.2.5 Creating an Application

Step 1 Create an application.

Log in to ServiceCenter as a VDC operator (for example, user_Huadawei), choose **Application** from the main menu, and click **Create**.



The screenshot shows the 'Application' page of the ServiceCenter interface. The 'Application' tab is selected. At the bottom left, there is a prominent blue 'Create' button, which is highlighted with a red box.

Step 2 Set application creation parameters.

The parameters are as follows:

Application Name: APP_*Trainee name* (for example, APP_Huadawei)

Resource Set: the resource set corresponding to the second-level VDC

Retain the default values for other parameters.

[← Create Application](#)

Basic Information

* Application Name	APPHuawei										
Application Types	--Select--										
Version	Enter an application version										
* VDC	Market_Huawei										
Enterprise Project	Market_Huawei										
* Resource Set	<input type="text" value="All"/> Enter a resource set name <table border="1"> <thead> <tr> <th>Resource Set Name</th> <th>Enterprise Project</th> <th>Status</th> <th>Region</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>zj-hz-1_Res_Huawei</td> <td>Market_Huawei</td> <td>Normal</td> <td>hangzhou</td> <td>--</td> </tr> </tbody> </table>	Resource Set Name	Enterprise Project	Status	Region	Description	zj-hz-1_Res_Huawei	Market_Huawei	Normal	hangzhou	--
Resource Set Name	Enterprise Project	Status	Region	Description							
zj-hz-1_Res_Huawei	Market_Huawei	Normal	hangzhou	--							
Description	Enter a brief description										

Management Information

Owner	Name	Email	Phone	Operation
				+ Add

Operator	Name	Email	Phone	Operation
				+ Add

Extended Information

Attachment ?	Upload Attachment
Additional Attributes + Add	

[Submit](#) [Cancel](#)

Click Submit.

Step 3 Add resources.

On the **Application** page, select the created application.

Application ?										
Total Applications		Application Alarms			Application Statuses			Application Types		
All	Critical	Major	Minor	Warning	Running	Approving	To be submitted	To be deleted	OtherCategory	
Create	Export	Application Name	Enter an application name	Advanced Search	Edit Delete					
Application ...	Status	Alarms	Owner	Operator	VDC	Enterprise P...	Application ...	Resource Set	Operation	
APPHuawei	Running	Normal	--	--	Market_Huad...	Market_Huad...	--	zj-hz-1_Res_...	Edit Delete	

On the application page, click **Add Resource** in the upper right corner.

The screenshot shows the 'Basic Information' tab for the 'APPHuadawei' application. It displays basic details like Name, Application Types, Owner, VDC, Enterprise Project, and Resource Set. A circular dashboard shows 0 total resources. The 'Resources' section lists ECS, BMS, and EC... with counts of 0. The 'Edit' and 'Add Resource' buttons are at the top right.

Select the ECS created by the VDC operator.

The 'Add Resource' dialog shows filters for Service (ECS), Region (All), and Resource Set (zj-hz-1_Res_Huadawei). The 'Selected Resources' tab displays a table with columns: Name, Service, Region, Private IP, OS, Resource Set, and VDC. The third row, 'ecs-Huadawei', is selected and highlighted.

Name	Service	Region	Private IP	OS	Resource Set	VDC
vAPP-ecs-WordPress	Elastic Cloud Server	hangzhou	192.168.0.169	Ubuntu Server 18.04 64bit	zj-hz-1_Res_Huadawei	Market_Huadawei
vAPP-ecs-WordPress	Elastic Cloud Server	hangzhou	192.168.0.23	Ubuntu Server 18.04 64bit	zj-hz-1_Res_Huadawei	Market_Huadawei
ecs-Huadawei	Elastic Cloud Server	hangzhou	192.168.0.97	CentOS 7.6 64bit	zj-hz-1_Res_Huadawei	Market_Huadawei

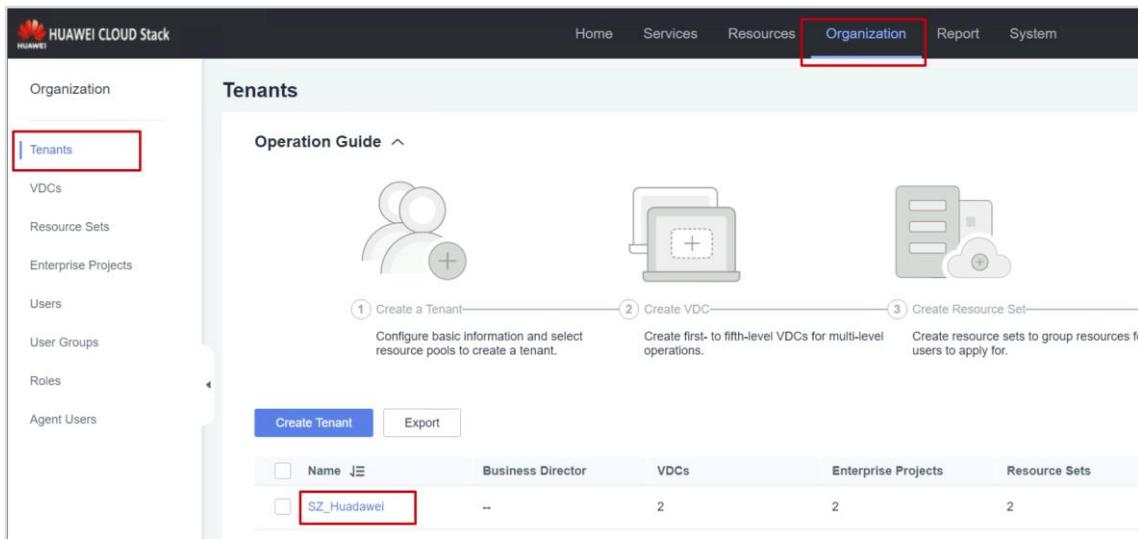
Click **OK** and confirm the submission.

The confirmation dialog asks if you want to view the task in the task center. The 'OK' button is highlighted with a red box. The main dialog shows the 'Available Resources' and 'Selected Resources' tabs, with the selected resources table identical to the previous screenshot.

3.2.6 Verifying Quota Changes

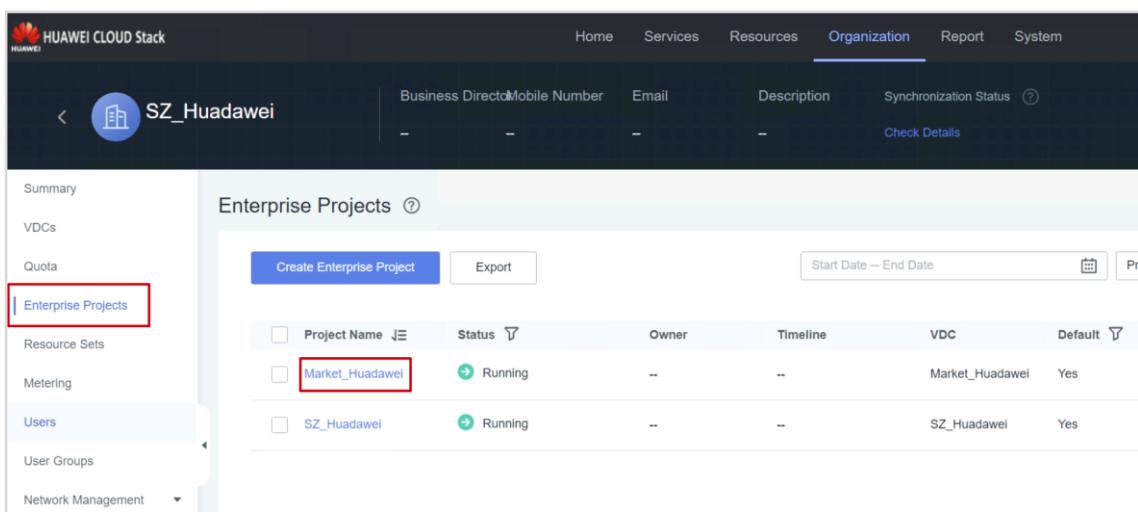
After you apply for many services, part of the ECS quota in Innovation Project 2 has been used. Therefore, let's verify the quota usage.

- Step 1** After applying for the service, log in to the system as the operation administrator corresponding to the trainee, choose **Organization** from the main menu, choose **Tenants** in the navigation pane, and select the corresponding tenant.



Name	Business Director	VDCs	Enterprise Projects	Resource Sets
SZ_Huadawei	--	2	2	2

- Step 2** In the navigation pane, choose **Enterprise Projects**. On the displayed page, select the enterprise project corresponding to Innovation Project 2.



Project Name	Status	Owner	Timeline	VDC	Default
Market_Huadawei	Running	--	--	Market_Huadawei	Yes
SZ_Huadawei	Running	--	--	SZ_Huadawei	Yes

- Step 3** In the navigation pane, choose **Quota**, and scroll down the displayed page and click **More**.

The screenshot shows the HUAWEI CLOUD Stack interface under the Organization tab. The tenant is set to Market_Huawei. On the left sidebar, the 'Quota' option is selected and highlighted with a red box. In the main content area, there is a table titled 'Quota' with columns for Service Name, Region, Resource Pool, Availability Zones, Quota Metric, and Total Quota. A 'Change Allocated Quota' button is visible above the table. A 'More' button is located at the bottom right of the table. The table data includes:

Service Name	Region	Resource Pool	Availability Zones	Quota Metric	Total Quota
Cloud Bastion Host	hangzhou	OpenStack_zj-hz-1	--	Instance	Unlimited
Data Lake Governor	hangzhou	OpenStack_zj-hz-1	--	Data Lake Factory - Pipelines	Unlimited
				instances	Unlimited
				vCPU	Unlimited
Data Warehouse Service	hangzhou	OpenStack_zj-hz-1	--	cluster manual snapshots	Unlimited
				volume gigabytes	Unlimited
				ram	Unlimited

Step 4 Check the ECS quota. (The quota usage may vary according to trainees' exercise operations.)

This screenshot shows the same HUAWEI CLOUD Stack interface, but the 'Elastic Cloud Server' service is selected in the sidebar, indicated by a red box. The main content area displays the quota details for the ECS service. The table data includes:

Quota Metric	Total Quota	Used
volume gigabytes	Unlimited	0 GB
ram	Unlimited	0 GB
Instances	Unlimited	3
vCPU	200 cores	5 cores
NPU	Unlimited	0
Memory	100 GB	18 GB
vGPU	Unlimited	0
GPU	Unlimited	0
Instance Snapshot	Unlimited	0

4 Operations Management

4.1 Overview

4.1.1 About This Exercise

In addition to tenant modeling, service release, rollout, and application, operation management is another important function of ManageOne Operation Portal.

The operation management exercise consists of operation management operations performed by operation administrators, resource monitoring operations performed by VDC administrators, and agent maintenance management performed by agent administrators.

4.1.2 Objectives

- Master the operation management operations of operation administrators.
- Master the resource monitoring operations of the VDC administrator.
- Master the agent maintenance management operations of agent administrators.

4.2 Operation Management (Operation Administrator)

4.2.1 Metering and Pricing

ManageOne allows enterprise administrators to view resource usage statistics and track expenditures for each department. The IT department can then review monthly, quarterly, and yearly metering reports and check the resource usage of each department against their budget.

Operation administrators configure HUAWEI CLOUD Stack service pricing and account balance settings.

4.2.1.1 Service Pricing

An operation administrator can set pricing for each service flavor.

Step 1 Enable the resource pricing and fee deduction switches.

To price the ECS service based on the company's budget, log in to the system as an operation administrator, choose **System > Basic Configuration > Charge Rate**, and toggle on the **Resource Charging** and **Fee Deduction** switches.

Step 2 Set the unit price.

On the **System** area, choose **Charge Rate**, select **ECS** on the left pane, and change the unit price of the ECS on the right pane.

Metric	Unit Price	Description
Flavor_zhangjihui	1/Numb...	
Flavor_zhangjihui	2/Numb...	

Click Save.

4.2.1.2 Account Management

An operation administrator can top up accounts each of which correspond to one VDC.

Step 1 Go to the page for configuring the VDC fee.

Choose **Organization** from the main menu. In the navigation pane, choose **VDCs**, and select the second-level VDC created by the trainee.

Tenant	Name	Business Director	Enterprise Projects	Resource Sets	Description
All tenants(47)	zhujie(4)	AdvanceService_Syst...	chenjingqian(2)	CSJC(2)	
SZ_EmmaHDW1(2)	SZ-cjq(2)	donghalbin2(1)	Jackie(1)	ipcc(1)	
Create VDC Export					
<input type="checkbox"/> Name Edit					
<input type="checkbox"/> Market_Huadawel					
<input type="checkbox"/> SZ_Huadawel					

Step 2 Manage the fee quota of the VDC.

Choose **Fee Quota** in the navigation pane and click **Top Up**.

Summary	Fee Quota
VDCs	
Quota	
Enterprise Projects	
Resource Sets	
Application	
Fee Quota	
Metering	
Users	

Account Balance
0.000000 USD [Top Up](#)

Once you successfully request a paid resource, the system deducts the resource fee and does not display the deducted amount.

Enter the recharge amount and click **OK**.

Top Up

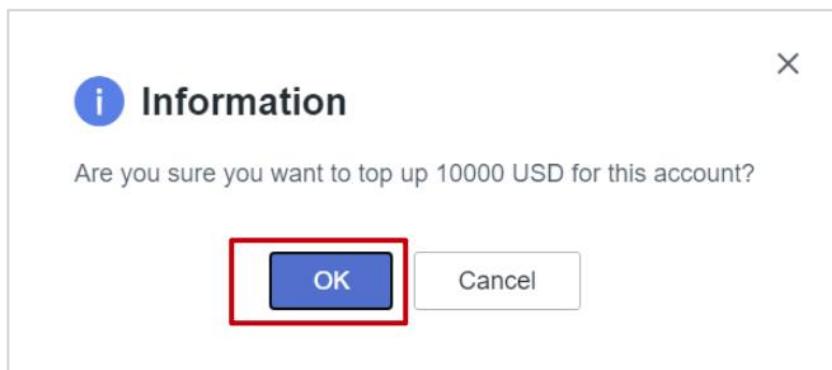
Because the balance may be deducted to a negative value, the balance may be less than the recharge amount when the user recharges the corresponding deduction.

Account Balance 0.000000 USD

Top-Up Amount USD

Ok **Cancel**

In the displayed dialog box, click **OK**.



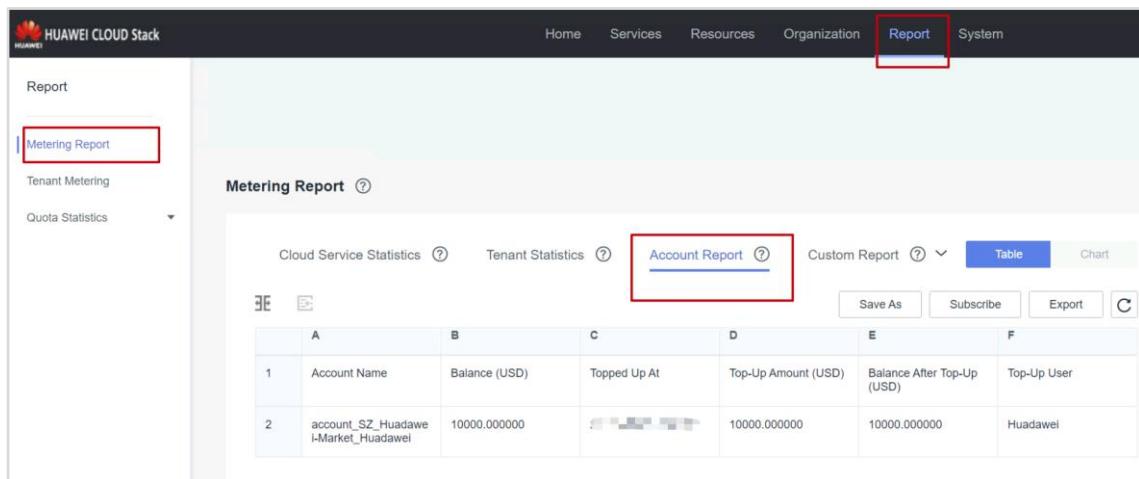
The fee quota of the VDC is recharged.

4.2.1.3 Metering Reports and Views

HUAWEI CLOUD Stack allows you to view the metering result of each VDC in reports. There are different types of reports, including **Cloud Resource Details**, **Cloud Service Statistics**, **Tenant Statistics**, **Account Report**, **HUAWEI CLOUD Bill**, and **Custom Report**. You can select required types of reports to view metering data of cloud service resources.

Step 1 View metering reports.

If the manager wants to view the account top-up records of all VDCs, including the balance, top-up amount, top-up time, and top-up user, choose **Report > Metering Report** and click the **Account Report** tab on the right pane.



	A	B	C	D	E	F
1	Account Name	Balance (USD)	Topped Up At	Top-Up Amount (USD)	Balance After Top-Up (USD)	Top-Up User
2	account_SZ_Huadawei-Market_Huadawei	10000.000000	[REDACTED]	10000.000000	10000.000000	Huadawei

Trainees can also set other dimensions, switch between tables and charts, and view metering summary reports of all tenants at different levels on the **Metering Report** page.

Step 2 View tenant metering data.

In the navigation pane, choose **Tenant Metering** to view the metering details of a single tenant.

Tenant Name	Status	Total Fee (USD)	Statistical Duration
AdvanceService_System_VDC	In-service	0.000000	2023-01-01 00:00:00 - 2023-01-01 23:59:59
CSJC	In-service	0.000000	2023-01-01 00:00:00 - 2023-01-01 23:59:59
HCIE-felihui	In-service	0.000000	2023-01-01 00:00:00 - 2023-01-01 23:59:59
HCIP-wu	In-service	0.000000	2023-01-01 00:00:00 - 2023-01-01 23:59:59
Jackie	In-service	2004.000000	2023-01-01 00:00:00 - 2023-01-01 23:59:59
Lisa	In-service	0.000000	2023-01-01 00:00:00 - 2023-01-01 23:59:59
SZ-cjq	In-service	0.000000	2023-01-01 00:00:00 - 2023-01-01 23:59:59

4.2.2 Application Management

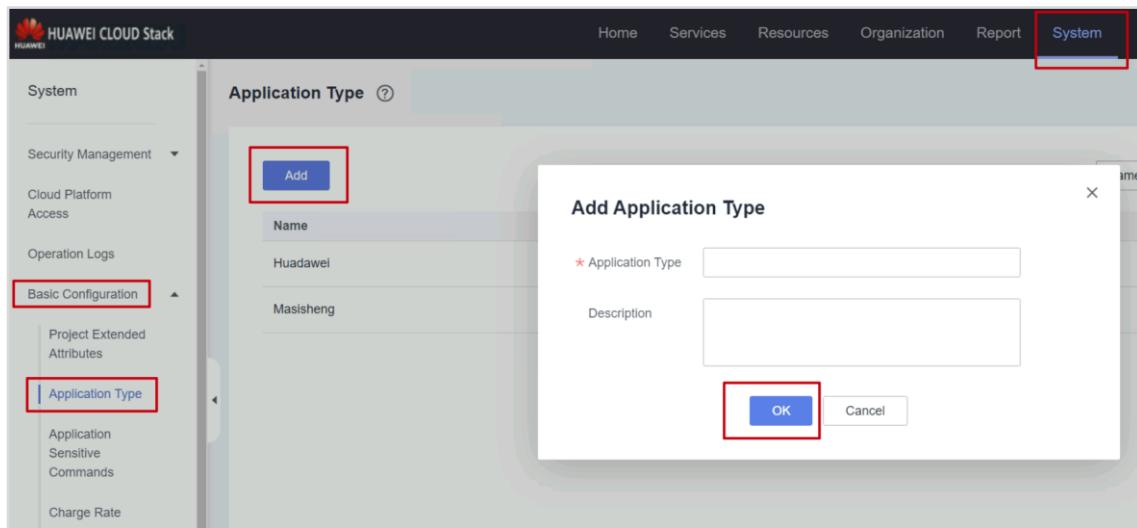
Step 1 Manages all tenant applications.

Log in to ManageOne Operation Portal as an operation administrator, choose **Resources > Applications**, and view applications of all tenants. Operation administrators can query, delete, and modify application types and sensitive commands as required. Preset application types cannot be modified or deleted.

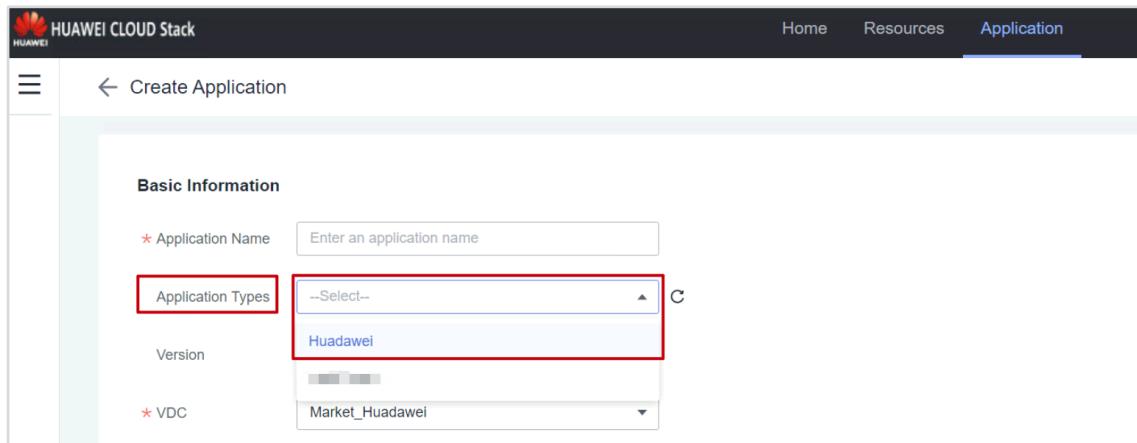
Application Name	Status	Alarms	Owner	Operator	VDC	Enterprise Pr...	Application Ty...	Resource Set	Operation
APPHuadawel	Running	Normal	--	--	Market_Huadaw...	Market_Huadaw...	--	zj-hz-1_Res_H...	Delete
APP_Masisheng	Running	Normal	--	--	Market_Masish...	Market_Masish...	--	zj-hz-1_Res_M...	Delete
APP_Huadawel	Running	Normal	--	--	Market_Huadaw...	Market_Huadaw...	--	zj-hz-1_Res_H...	Delete

Step 2 Manage application types.

Choose **System** from the main menu. In the navigation pane, choose **Basic Configuration > Application Type** and click **Add**. In the **Add Application Type** page that is displayed, set **Application Type** and **Description**, and click **OK**.



When creating an application as a VDC administrator, you can select an application type from the **Application Types** drop-down list.



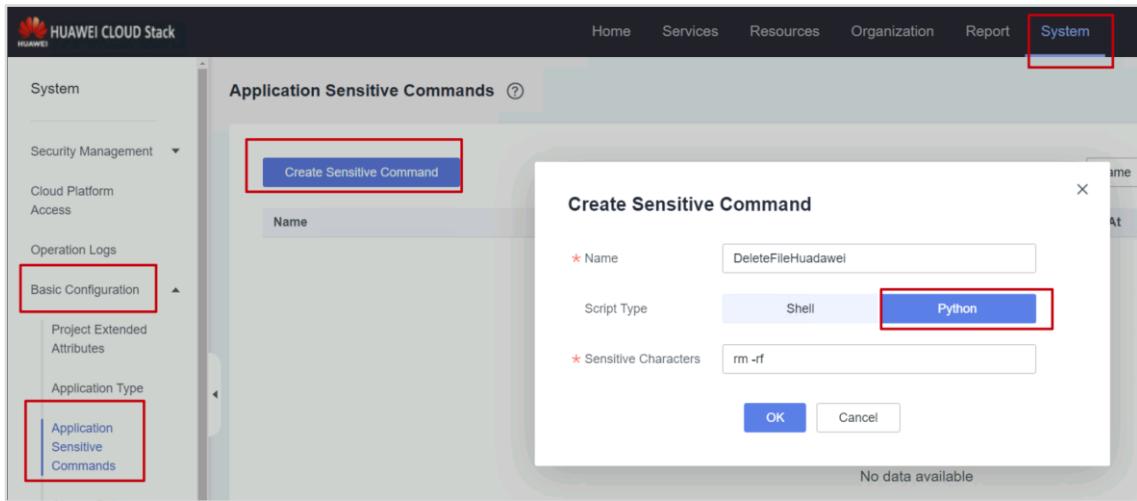
Step 3 Manage sensitive application commands.

Choose **System** from the main menu. In the navigation pane, choose **Basic Configuration > Application Sensitive Commands**. On the displayed page, click **Create Sensitive Command** to configure sensitive commands.

Set parameters as follows:

- **Name:** Enter **DeleteFileHuadawei**.
- **Script type:** Select **Python**.
- **Sensitive Characters:** Enter **rm -rf**.

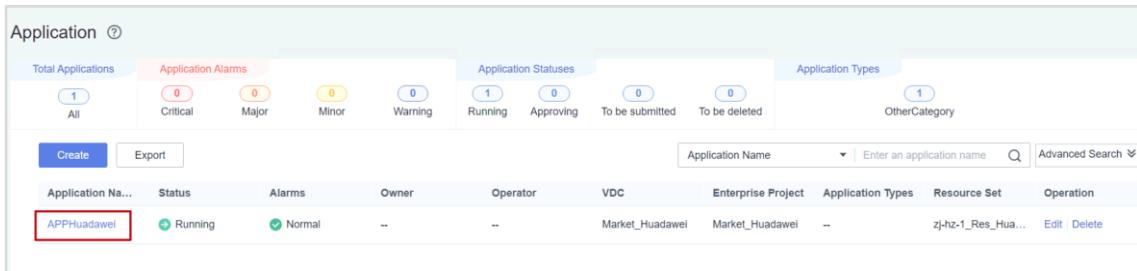
Click **OK**. The sensitive application is created.



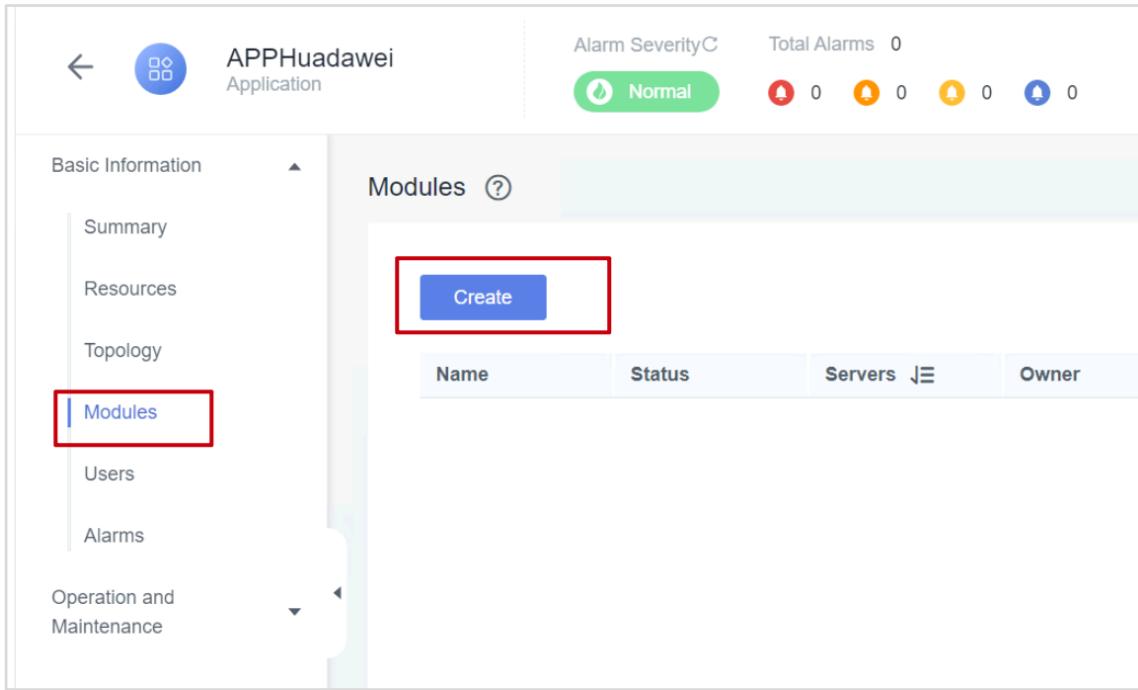
Step 4 Verify the validity of sensitive commands.

After sensitive commands are set for an application, the process management information in the application module and the execution script content in the deployment automatically check whether the sensitive commands exist. If yes, the system displays a message indicating the sensitive commands exist on the corresponding page.

Log in to ServiceCenter as a VDC operator (for example, user_Huadawei), choose **Application** from the main menu, and select the application created by the VDC operator.

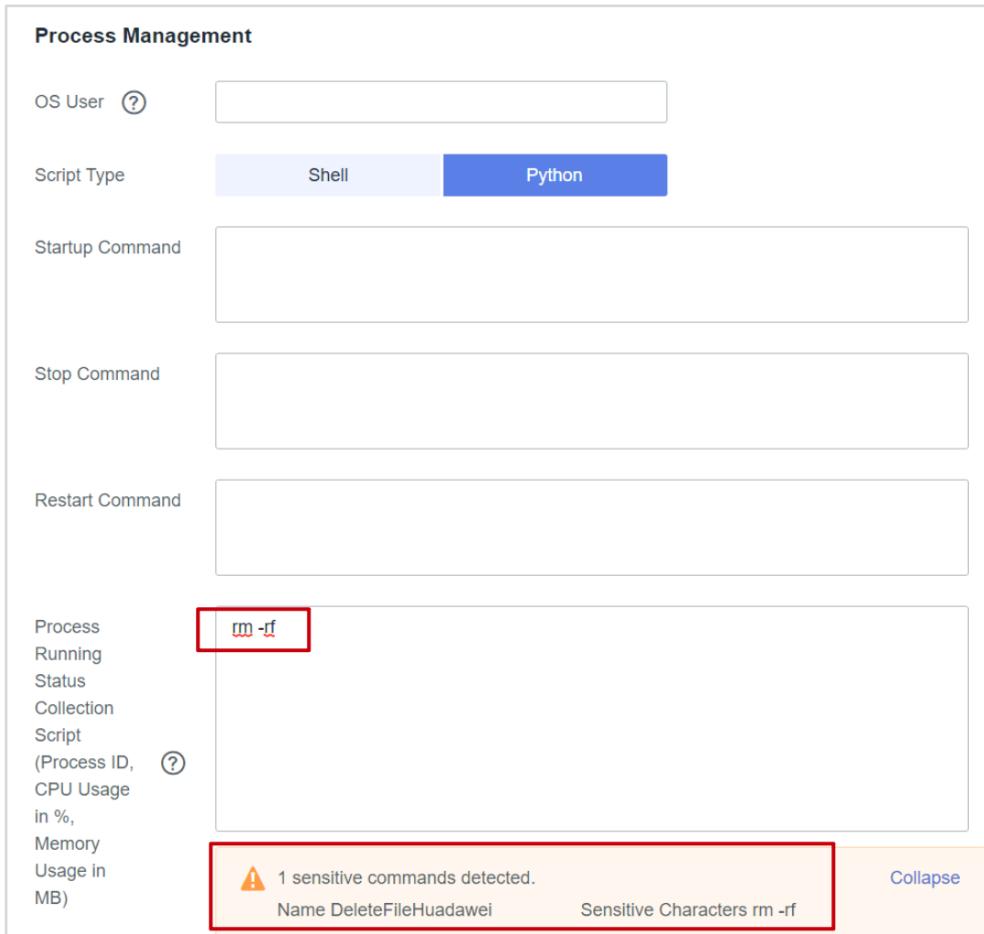


Select **Modules** and click **Create**.



The screenshot shows the 'Basic Information' tab selected on the left sidebar. The main area displays a table titled 'Modules' with columns for Name, Status, Servers, and Owner. A red box highlights the 'Create' button. The 'Modules' option in the sidebar is also highlighted with a red box.

On the **Process Management** page, select **Python** for **Script Type** and enter the sensitive command **rm -rf** for **Startup Command**. The system displays a message indicating that sensitive commands are detected.



The screenshot shows the 'Process Management' configuration page. The 'Script Type' is set to 'Python'. The 'Startup Command' field contains the command 'rm -rf'. A red box highlights the 'rm -rf' command. In the bottom right corner, a message box displays: '⚠ 1 sensitive commands detected.' with 'Name DeleteFileHuadawei' and 'Sensitive Characters rm -rf'. A 'Collapse' link is also visible.

4.3 Resource Monitoring (VDC Administrator)

VDC administrators can perform self-service O&M management for VDCs. Self O&M provides resource monitoring, alarm reporting, and notification functions. Alarm rules and notification policies can be set to learn the resource running status of each service in real time.

In addition, VDC administrators can view VDC metering and charging reports.

4.3.1 VDC Self-service Maintenance

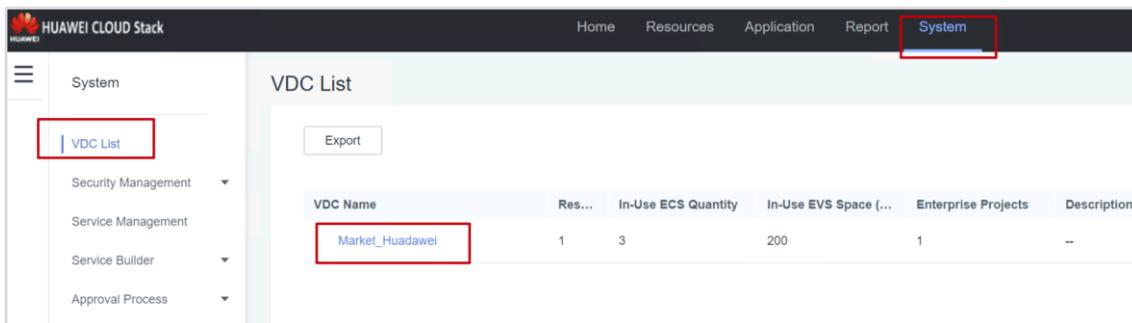
4.3.1.1 Threshold Settings

VDC administrators can customize thresholds for resources or services. The system automatically monitors and generates alarms based on the custom thresholds.

To better manage second-level VDCs and control the vCPU usage, administrators need to set thresholds for the VDCs.

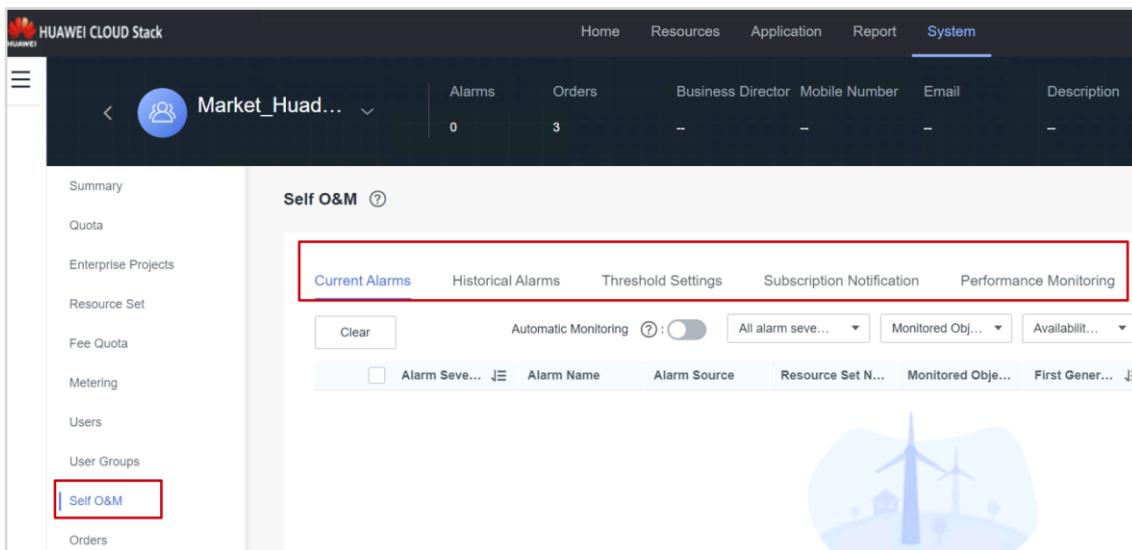
Step 1 Go to the page for VDC self-O&M.

Log in to the ManageOne Operation Portal as a second-level VDC administrator, choose **System** from the main menu. In the navigation pane, choose **VDC List**, and click the corresponding second-level VDC.



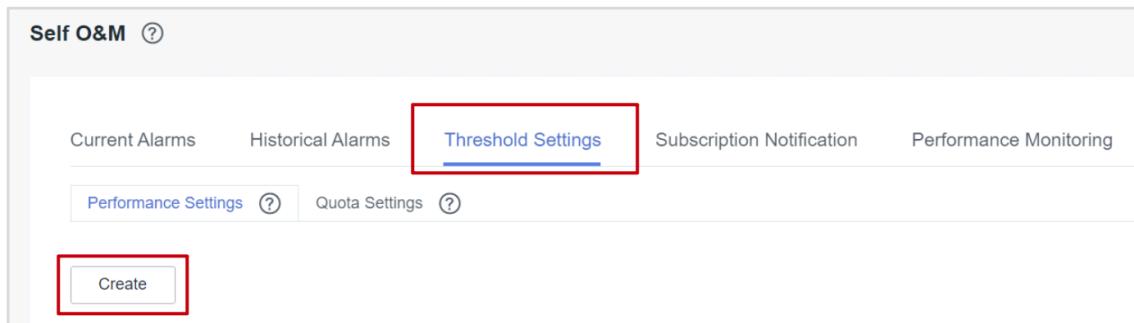
VDC Name	Res...	In-Use ECS Quantity	In-Use EVS Space (...)	Enterprise Projects	Description
Market_Huawei	1	3	200	1	--

In the navigation pane, choose **Self O&M**.

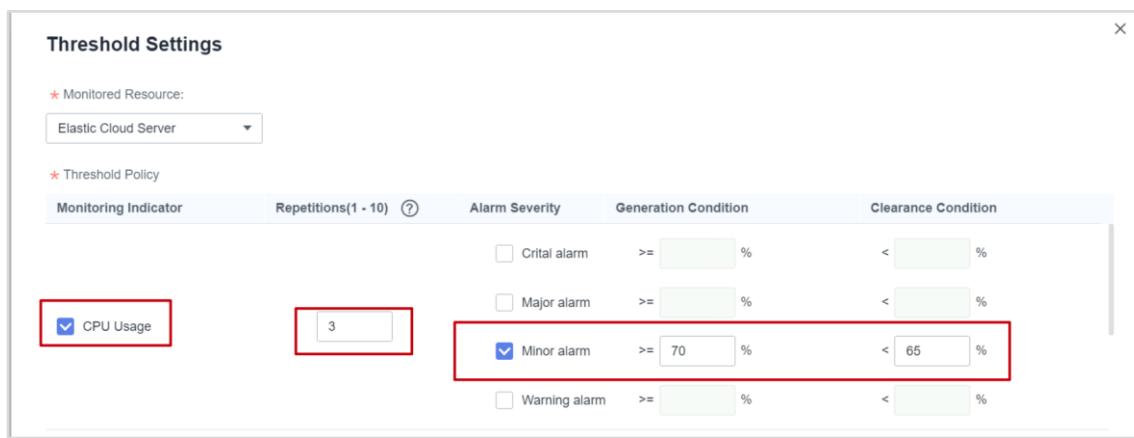


Step 2 Set the performance threshold.

Click the **Threshold Settings** tab under **Self O&M** and click **Create**.



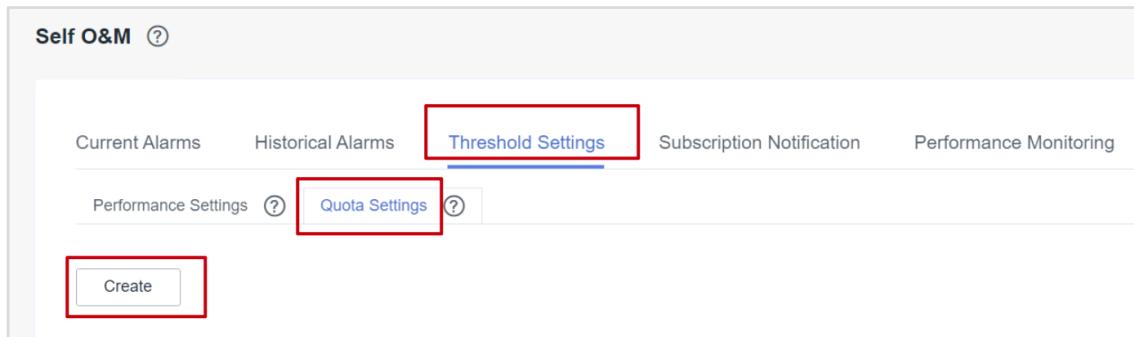
To control the CPU usage, set the performance thresholds as shown in the following figure.



Click **OK** to complete the performance threshold configuration.

Step 3 Set the quota threshold.

Click the **Quota Settings** tab under **Threshold Settings** and click **Create**.



Set the quota thresholds as shown in the following figure.

Threshold Settings

Monitored Service: **Elastic Cloud Server**

Threshold Policy:

Monitoring Indicator	Alarm Severity	Generation Condition	Clearance Condition
<input type="checkbox"/> Memory Quota Usage	<input type="checkbox"/> Critical alarm <input type="checkbox"/> Major alarm <input type="checkbox"/> Minor alarm <input type="checkbox"/> Warning alarm	\geq <input type="text" value="70"/> %	$<$ <input type="text" value="65"/> %
<input checked="" type="checkbox"/> vGPU Quota Usage	<input checked="" type="checkbox"/> Major alarm	\geq <input type="text" value="70"/> %	$<$ <input type="text" value="65"/> %
	<input type="checkbox"/> Minor alarm	\geq <input type="text"/> %	$<$ <input type="text"/> %
	<input type="checkbox"/> Warning alarm	\geq <input type="text"/> %	$<$ <input type="text"/> %

Click **OK**.

4.3.1.2 Performance Monitoring

To ensure that ECSs in a VDC are properly used, VDC administrators can view resource performance data evaluation on the **Performance Monitoring** page and expand the capacity if the usage is too high or reclaim resources if the usage is too low.

Step 1 Add key load metrics.

Click the **Performance Monitoring** tab and click **Add**.

Current Alarms Historical Alarms Threshold Settings Subscription Notification **Performance Monitoring**

Select Time: **Last day** Last week Last 30 days Last 90 days Customize

Avg. Value of Multi-Period Statistics

Elastic Cloud Se... **Add**

Set metrics as shown in the following figure.

Add Indicator

perfMonitor.perfMonitor_term_resource_type_label

Indicator

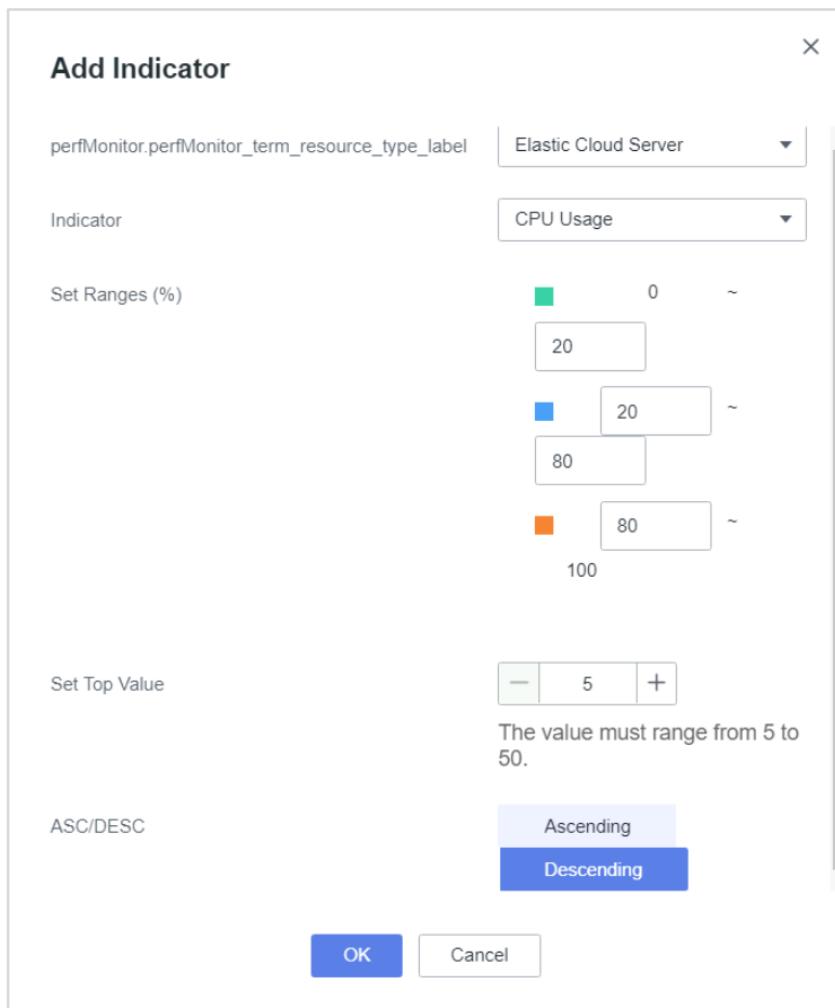
Set Ranges (%)

0 ~
20
20 ~
80
80 ~
100

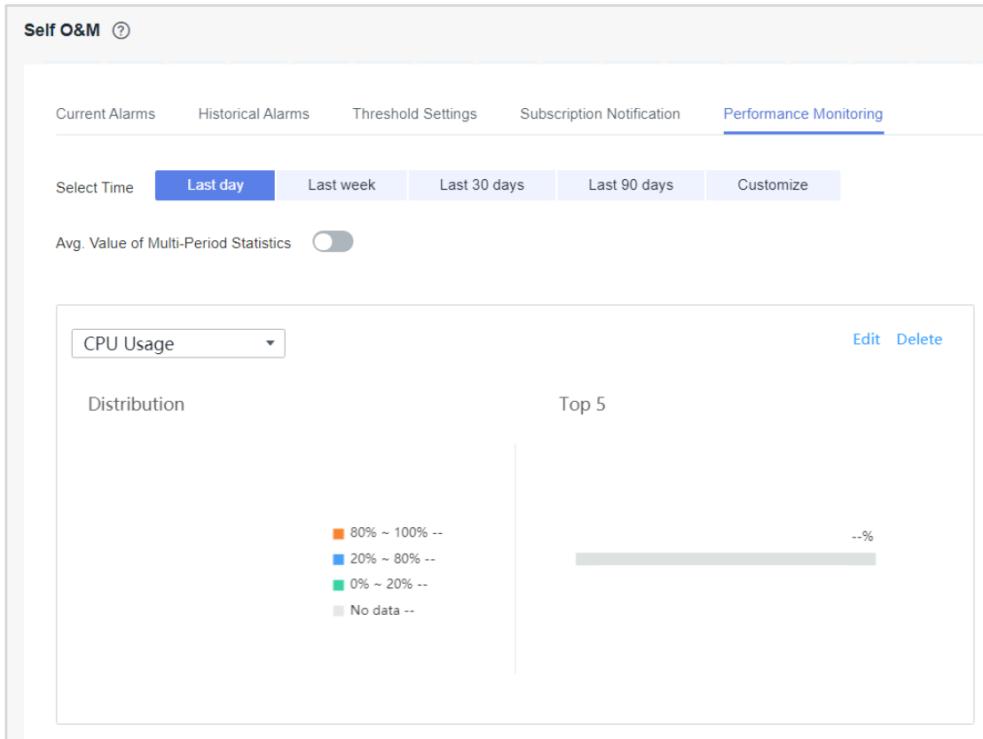
Set Top Value

The value must range from 5 to 50.

ASC/DESC



Click **OK**. After the metric information is added, you can view the monitoring information on the **Performance Monitoring** page.



Step 2 Perform other operations.

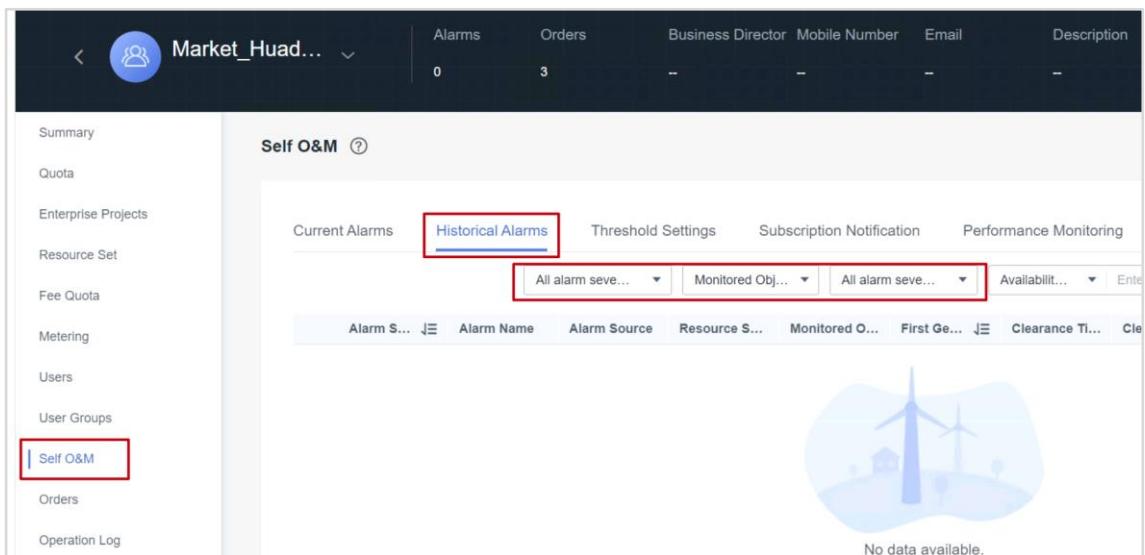
Trainees can try to edit or delete existing performance metrics.

4.3.1.3 Current Alarms and Historical Alarms

VDC administrators can view alarm details to eliminate potential risks of resources in VDCs in a timely manner.

Step 1 View alarms.

In the navigation pane, choose Self O&M. On the displayed page, click the **Historical Alarms** tab or the **Current Alarms** tab to view historical and current alarms of the VDC.

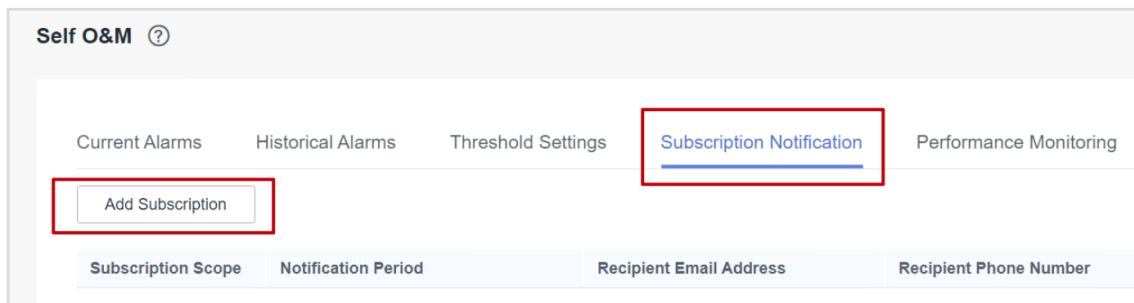


4.3.1.4 (Optional) Subscription Notification

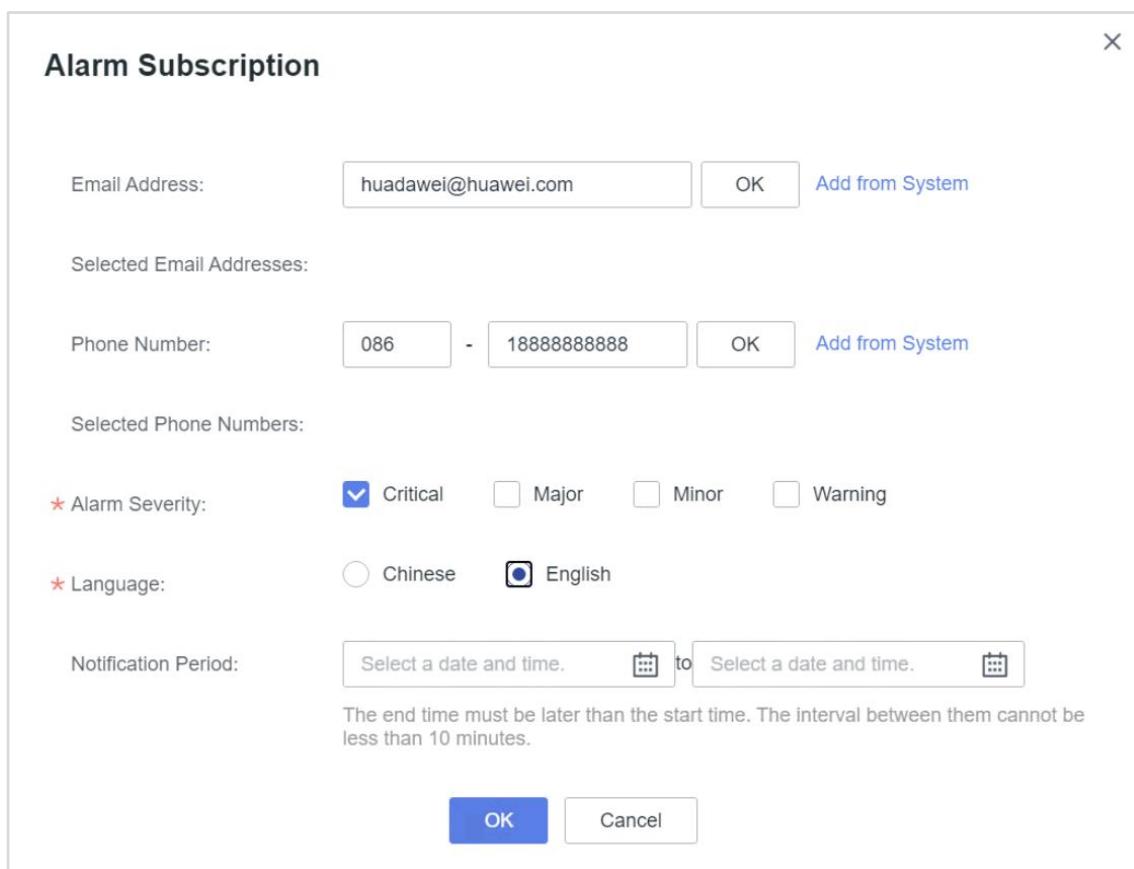
VDC administrators can enable the notification subscription function. When an alarm is generated, the system notifies related users by email or SMS message.

Add a subscription notification.

Click the **Subscription Notification** tab and click **Add Subscription**.



Set related parameters as shown in the following figure.



Enter the email address and mobile number, and click **OK**. The alarm subscription notification is configured.

[Question 6] According to the existing settings in this exercise, will the system push a notification to the administrator's mailbox or mobile phone when the memory usage of an ECS in the VDC exceeds 90%?

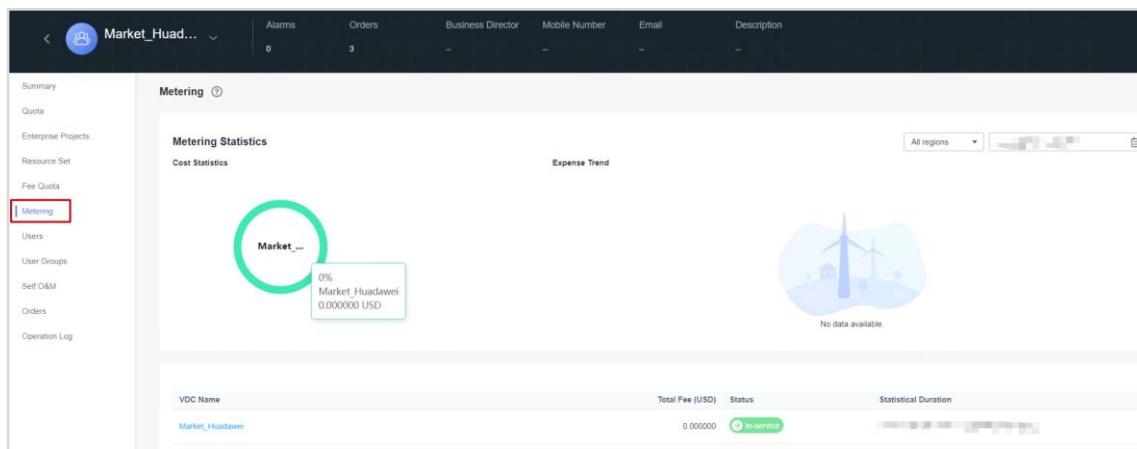
4.3.2 Tenant Metering and Charging Report

VDC administrators can view the metering summary and details of the VDCs to which the VDC administrators belong or their lower-level VDCs.

Step 1 Go to the page for VDC Metering.

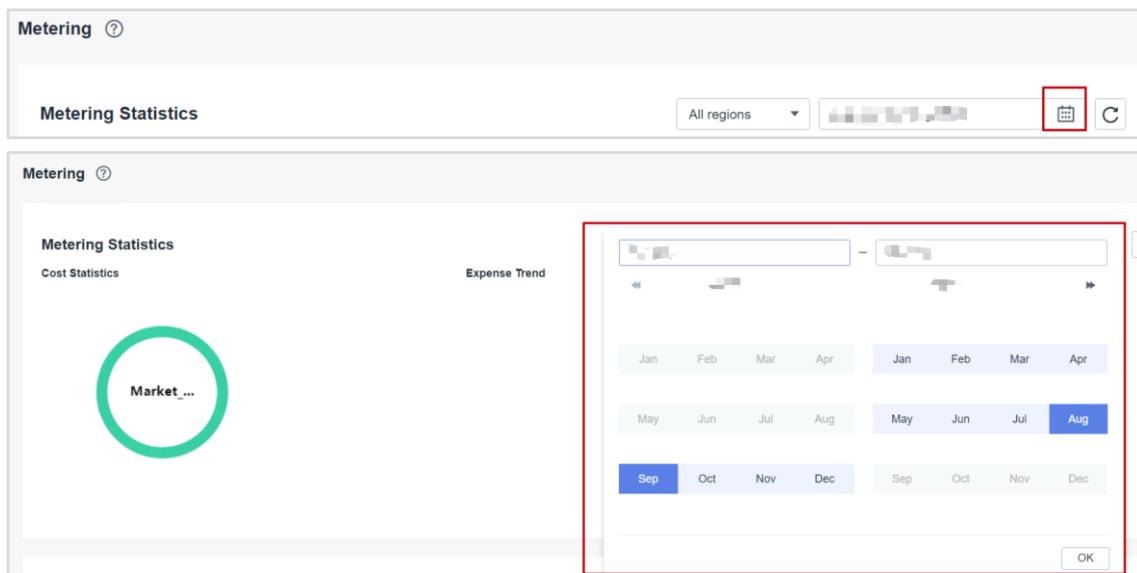
Choose **System** from the main menu. In the navigation pane, choose **Metering**.

In the **Metering Statistics** area, you can move the pointer to the pie chart to view the metering details.



Step 2 Modify the region and time segment of metering data.

Modify the metering time segment as required.

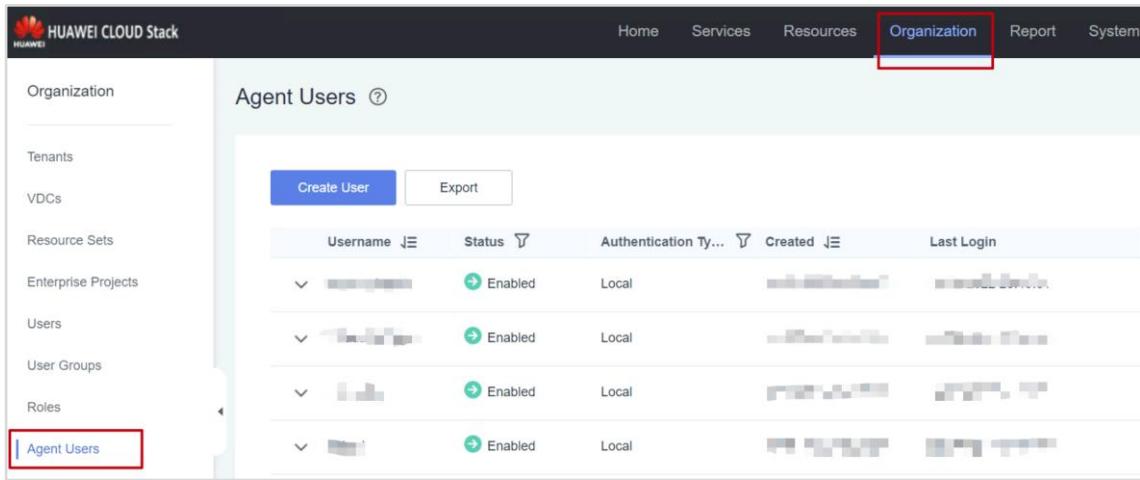


4.4 Agent Maintenance Management (Agent Administrator)

The agent administrator has permissions to perform agent maintenance operations on managed first-level VDCs. The permissions of an agent administrator are similar to those of a first-level VDC administrator.

4.4.1 Creating an Agent Administrator

Step 1 Log in to the ManageOne Operation Portal as an operation administrator, choose **Organization > Agent Users**, and click **Create User**.



Username	Status	Authentication Ty...	Created	Last Login
[REDACTED]	Enabled	Local	[REDACTED]	[REDACTED]
[REDACTED]	Enabled	Local	[REDACTED]	[REDACTED]
[REDACTED]	Enabled	Local	[REDACTED]	[REDACTED]
[REDACTED]	Enabled	Local	[REDACTED]	[REDACTED]

Step 2 Create an agent user.

Set the username and password, and click **Next**.

① Configure Basic Details ————— ② Select Tenants to Maintain

Basic Information

* Username Alias

Mobile Number Description

Authentication Details

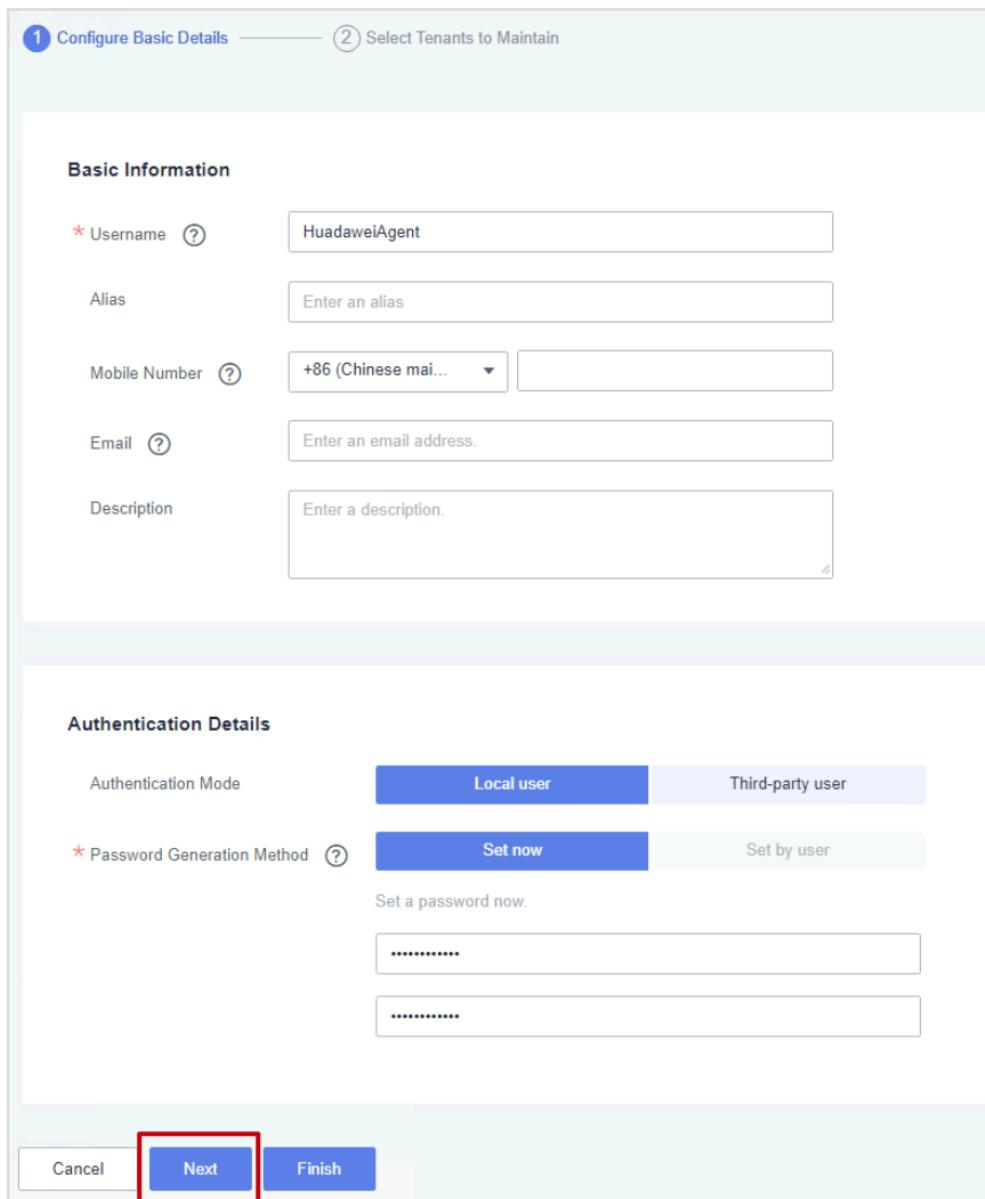
Authentication Mode Third-party user

* Password Generation Method Set by user

Set a password now.

.....
.....

Cancel



Set the managed service scope as required and click **Finish**.

① Configure Basic Details ————— ② Select Tenants to Maintain

Enter a tenant name.		
<input type="checkbox"/>	Tenant Name	Description
<input type="checkbox"/>	AdvanceService_System_VDC	--
<input type="checkbox"/>	CSJC	--
<input type="checkbox"/>	HCIE-feihui	--
<input type="checkbox"/>	HCIP-wu	--
<input type="checkbox"/>	Jackie	--
<input type="checkbox"/>	Lisa	--
<input type="checkbox"/>	SZ-cjq	--
<input type="checkbox"/>	SZ_EmmaHDW1	--
<input checked="" type="checkbox"/>	SZ_Huadawei	--
<input type="checkbox"/>	SZ_Masisheng	--

Total Records: 36 < 1/4 >

1 selected	Enter a tenant name.	Reset
Tenant Name	Description	Operation
SZ_Huadawei	--	Remove

Cancel Back **Finish**

4.4.2 Agent Maintenance Management

Step 1 Log in to ManageOne Operation Portal as the created agent administrator, select the tenant and resource set to be maintained, and click **OK**.

Select Delegating Tenant and Resource Set

Tenant Name	Resource Set	Description
<input checked="" type="radio"/> SZ_Huadawei	zj-hz-1_Res_Huadawei	--

OK

On the displayed page, choose **System > VDC List**. Agent administrators can manage VDCs.

VDC Name	Resource...	In-Use ECS Quantity	In-Use EVS Space (GB)	Enterprise Projects	Description	Operation
SZ_Huawei	1	0	0	1	--	Create NEW
Market_Huawei	1	3	200	1	--	Modify Create Delete NEW

Step 2 Apply for an ECS as an agent administrator. For details, see exercise 4.

Name	Status	Image	Private IP Address	EIP	AZ	Creator	MAC Address	Operation
ecs-Agent	Running	bms_image1	192.168.0.69	--	hcs811	HuadweiAgent	fa:16:3e:b0:4d:ab	Remote Login More ▾
vAPP-ecs-WordPres	Running	image_ubuntu_...	192.168.0.169	10.200.60.32	hcs811	userHuadwei	fa:16:3e:db:21:64	Remote Login More ▾
vAPP-ecs-WordPres	Running	image_ubuntu_...	192.168.0.23	--	hcs811	userHuadwei	fa:16:3e:ae:29:bb	Remote Login More ▾
ecs-Huadwei	Running	bms_image1	192.168.0.97	--	hcs811	userHuadwei	fa:16:3e:dc:71:03	Remote Login More ▾

As shown in the preceding figure, the creator is the agent administrator.

5 Suggested Answers

[Question 1] To apply for cloud resources (such as ECS), which of the following services needs to be applied for after the VDC is opened for the first time?

Answer: The answer has been provided in the preceding text. Note that a VPC needs to be created.

[Question 2] After the course, trainees can try to create and publish services by VDC administrators or agent administrators, and bring services online by operation administrators to experience the differences.

Answer:

The differences between publishing services are as follows:

When an operation administrator selects the visible scope, the options are described as follows:

All VDCs: The service to be published is visible to all VDC administrators.

Some VDCs: The administrator can select tenants in which all VDC administrators can view the template.

When a VDC administrator or an agent administrator selects the visible scope, the options are described as follows:

All VDCs: The service is visible to the VDC administrators of the VDC to which the current VDC administrator or agent administrator belongs and all its lower-level VDCs.

Some VDCs: The administrator can select VDCs in which all VDC administrators can view the service.

The differences between the online services are as follows:

Use an operation administrator account to bring online a preset service or a registered HUAWEI CLOUD service. When bringing a service online, you can select the online scope and configure approvals for resource operations. After the service is brought online, all users in the tenants you selected can request the service.

Use a VDC administrator account to bring online a service published by an operation administrator or an upper-level VDC administrator and visible to VDCs that the upper-level VDC administrator belongs to. When bringing a service online, configure approvals for resource operations. After the service is brought online, all users in the VDCs that the agent administrator belongs to can apply for the service.

Use an agent administrator account to bring online a service published by an operation administrator. When bringing a service online, they can configure approvals for service operations. After the service is brought online, all users in the VDCs that the agent administrator belongs to can apply for the service.

[Question 3] If the approval process for applying for the service is modified, does the approval process take effect based on the last setting?

Answer: Yes

[Question 4] If you log in to the system as a first-level VDC administrator and bring a service online, can second-level VDC operators apply for the service? Why?

Answer: No

VDC administrators can bring services published by operation administrators and upper-level VDC administrators online.

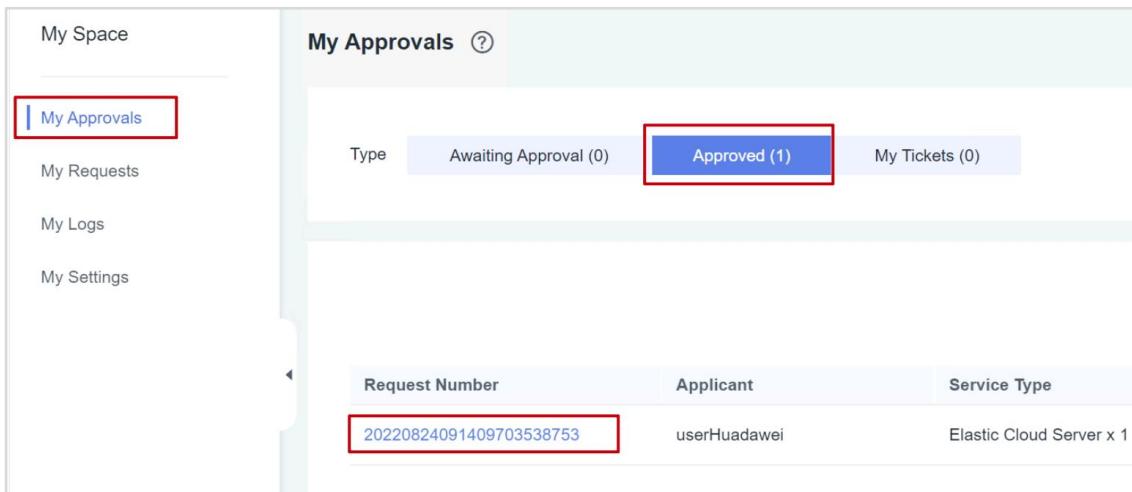
When bringing a service online, they can configure approvals for service operations. After the service is brought online, all users in the VDCs that the VDC administrator belongs to can request the service.

Therefore, if a service is brought online in a first-level VDC, only users in the first-level VDC can apply for the service. Users in the second-level VDC cannot apply for the service.

[Question 5] If the approval process is suspended at a node, how can you determine the owner of the next approval node?

Answer: The answer has been provided in the preceding text.

Take the approver of the first node as an example. After the first-level VDC approver approves an order, you can click **Approved** to check the order and click the order number to view details.



Request Number	Applicant	Service Type
20220824091409703538753	userHuadawei	Elastic Cloud Server x 1

Click **Processing Records** to view the detailed approval details and the approver of the next node.

[Question 6] According to the existing settings in this exercise, will the system push a notification to the administrator's mailbox or mobile phone when the memory usage of an ECS in the VDC exceeds 90%?

Answer: No

6

Acronyms and Abbreviations

Acronym or Abbreviation	Full Name	Description
AZ	Availability Zone	Used to isolate physical resources.
VPC	Virtual Private Cloud	A VPC provides an isolated virtual network for cloud servers. You can configure and manage the virtual network.
VDC	Virtual Data Center	A VDC is a new type of data center that applies cloud computing to Internet data center (IDC).
VM	Virtual Machine	Virtual machine (VM)
EIP	Elastic IP Address	The EIP service enables your cloud resources to communicate with the Internet using static public IP addresses and scalable bandwidths.
EVS	Elastic Volume Service	An EVS disk is a virtual block storage that is based on distributed architecture and can elastically scale up and down.
ECS	Elastic Cloud Server	An ECS is a computing server that consists of CPUs, memory, images, and Elastic Volume Service (EVS) disks and allows on-demand allocation and elastic scaling.

Huawei Certified Cloud Computing Training

HCIP-Cloud Computing

HUAWEI CLOUD Stack

Lab Guide (O&M)

ISSUE: 5.0



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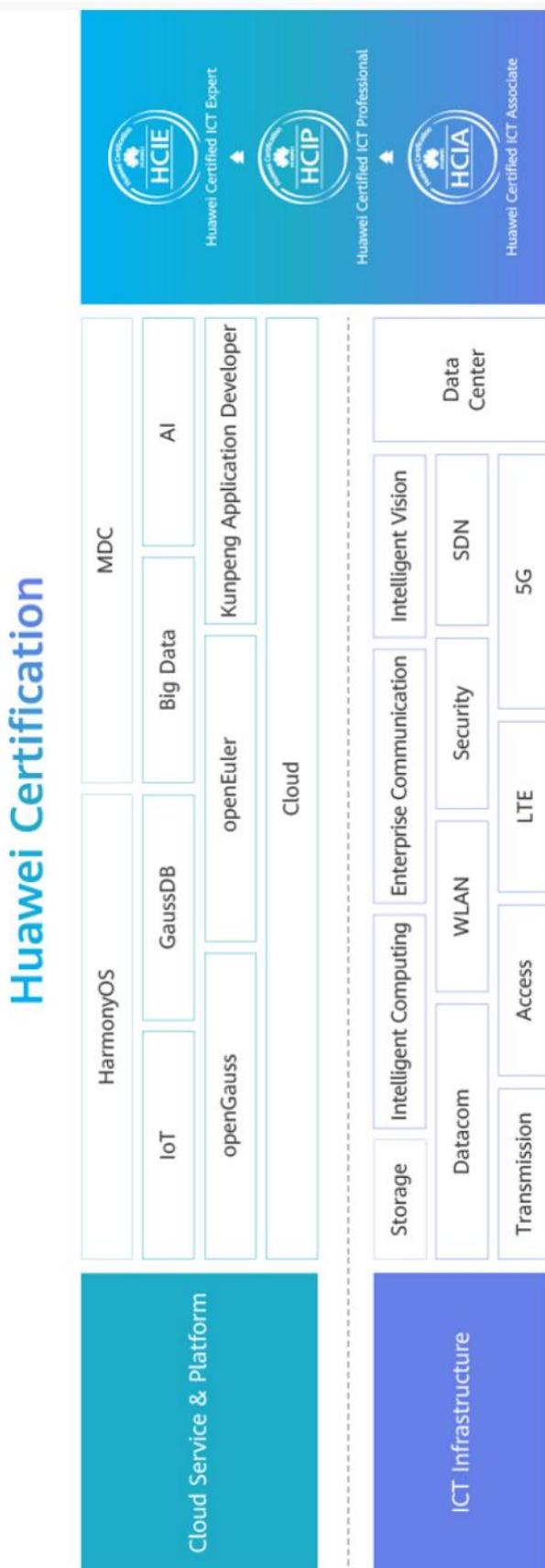
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About This Document

Overview

This document is an HCIP-Cloud Computing certification training course. It is intended for trainees who are preparing for the HCIP-Cloud Computing exam or readers who want to understand HUAWEI CLOUD Stack O&M basics, features, and tools.

About the Exercises

This course introduces four O&M exercises:

- HUAWEI CLOUD Stack routine monitoring, including dashboard, alarm, and resource monitoring
- Operations and configurations of FusionCare, manual health check tools, CloudNetDebug, and eSight
- Routine operations and configurations of AutoOps
- ManageOne report and capacity analysis, including multidimensional analysis reports, details reports, custom reports, periodic reports, resource capacity analysis and prediction, and capacity monitoring

Knowledge Required

The trainees should have basic knowledge about:

- Cloud computing and virtualization
- OSs

Lab Environment

The following network configurations are recommended:

- Server BMC management plane network: BMC ports on servers are independently connected to the BMC switch.
- Controller node: Two 10GE ports on each server are bonded in active/standby mode to carry management, service, and storage traffic.
- Network node: There are six 10GE ports. Two are bonded in active/standby mode to carry management traffic, two are bonded in LACP mode to carry service traffic, and two are bonded in active/standby mode to carry storage traffic.
- Compute node: Two 10GE ports on all servers are bonded in active/standby mode to carry management, service, and storage traffic.

- HUAWEI CLOUD Stack Deploy: One 10GE port is connected to the core switch, communicating with all planes.
- Service storage: One 10GE port is connected to the core switch.

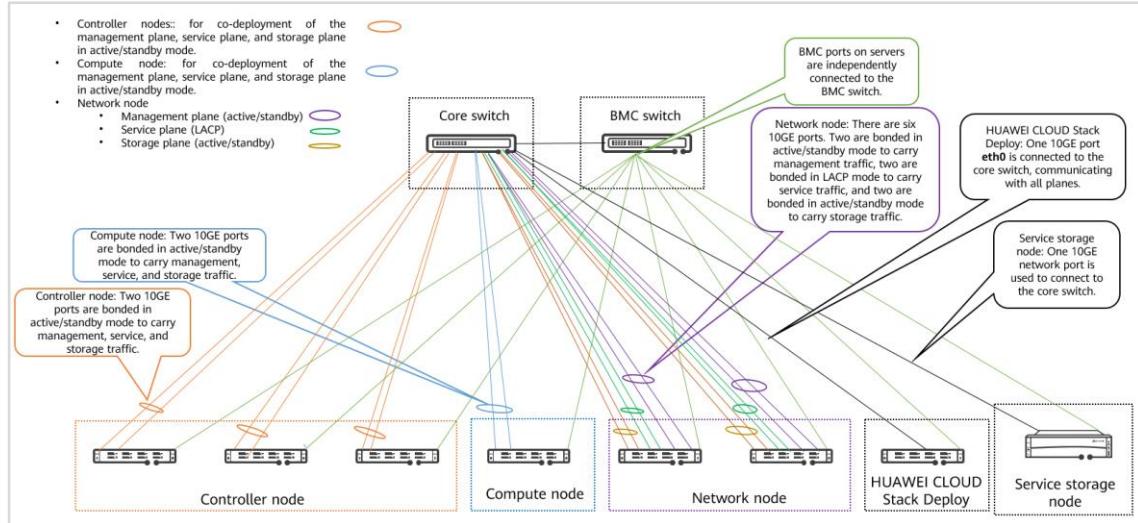


Table 1-1 HUAWEI CLOUD Stack deployment requirements

Solution	Host	Deployment Mode
HUAWEI CLOUD Stack Deploy	Server 06	HUAWEI CLOUD Stack Deploy is deployed on a physical server.
HUAWEI CLOUD Stack 8.1.1 controller node	Server 01 Server 02 Server 03	FusionSphere OpenStack controller nodes are automatically deployed using HUAWEI CLOUD Stack Deploy 8.1.1.
HUAWEI CLOUD Stack 8.1.1 compute node	Server 07	FusionSphere OpenStack compute nodes are automatically deployed using HUAWEI CLOUD Stack Deploy 8.1.1.
HUAWEI CLOUD Stack 8.1.1 network node	Server 04 Server 05	Active and standby VMs of NEs, such as active and standby vRouters, ENAT, and BR are automatically deployed on FusionSphere OpenStack network nodes.
HUAWEI CLOUD Stack 8.1.1 cloud service VMs	Server 01 Server 02 Server 03	Active and standby VMs of cloud services, such as LVS, Nginx, NTP, HAProxy, API Gateway, Task Center, and DNS, are automatically deployed on FusionSphere OpenStack controller nodes.

Solution	Host	Deployment Mode
ManageOne Maintenance Portal	Server 01 Server 02 Server 03	Active and standby OperationCenter VMs are automatically deployed on FusionSphere OpenStack controller nodes.
ManageOne Operation Portal	Server 01 Server 02 Server 03	Active and standby ServiceCenter VMs are automatically deployed on FusionSphere OpenStack controller nodes.
ManageOne Deployment Portal	Server 01 Server 02 Server 03	Active and standby CloudOpera VMs are automatically deployed on FusionSphere OpenStack controller nodes.
FusionStorage	Server 01 Server 02 Server 03	Active and standby VMs of FusionStorage Manager are automatically deployed on FusionSphere OpenStack controller nodes.
Service Storage	IP SAN service storage	Uses IP SAN service storage to provide resources for service partitions.

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1

HUAWEI CLOUD Stack Routine Monitoring

1.1 Overview

1.1.1 About This Exercise

Routine monitoring, including dashboard, alarm, and resource monitoring, allows you to view system resource usages and handle alarms to ensure system security and functionality and save O&M costs.

1.1.2 Objectives

Upon completion of this exercise, you will be able to:

- Understand functions of HUAWEI CLOUD Stack dashboard monitoring and how to create a dashboard.
- View, set, and handle HUAWEI CLOUD Stack alarms.
- Master methods of monitoring physical and cloud service resources in HUAWEI CLOUD Stack.

1.1.3 Plan

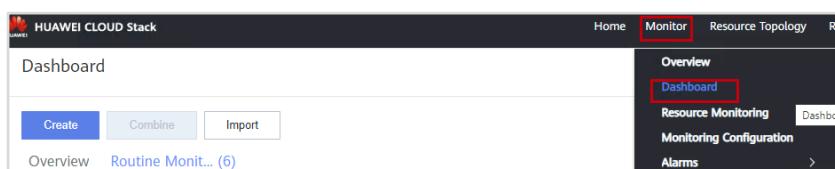
Use a browser to log in to ManageOne Maintenance Portal as an O&M administrator and get familiar with routine O&M monitoring operations of HUAWEI CLOUD Stack.

1.2 Tasks

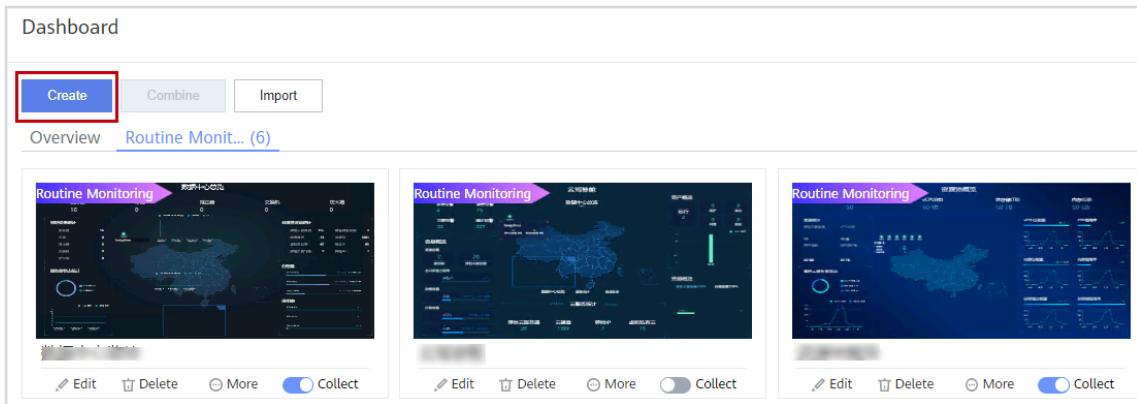
1.2.1 Dashboard Monitoring

1.2.1.1 Creating a Dashboard

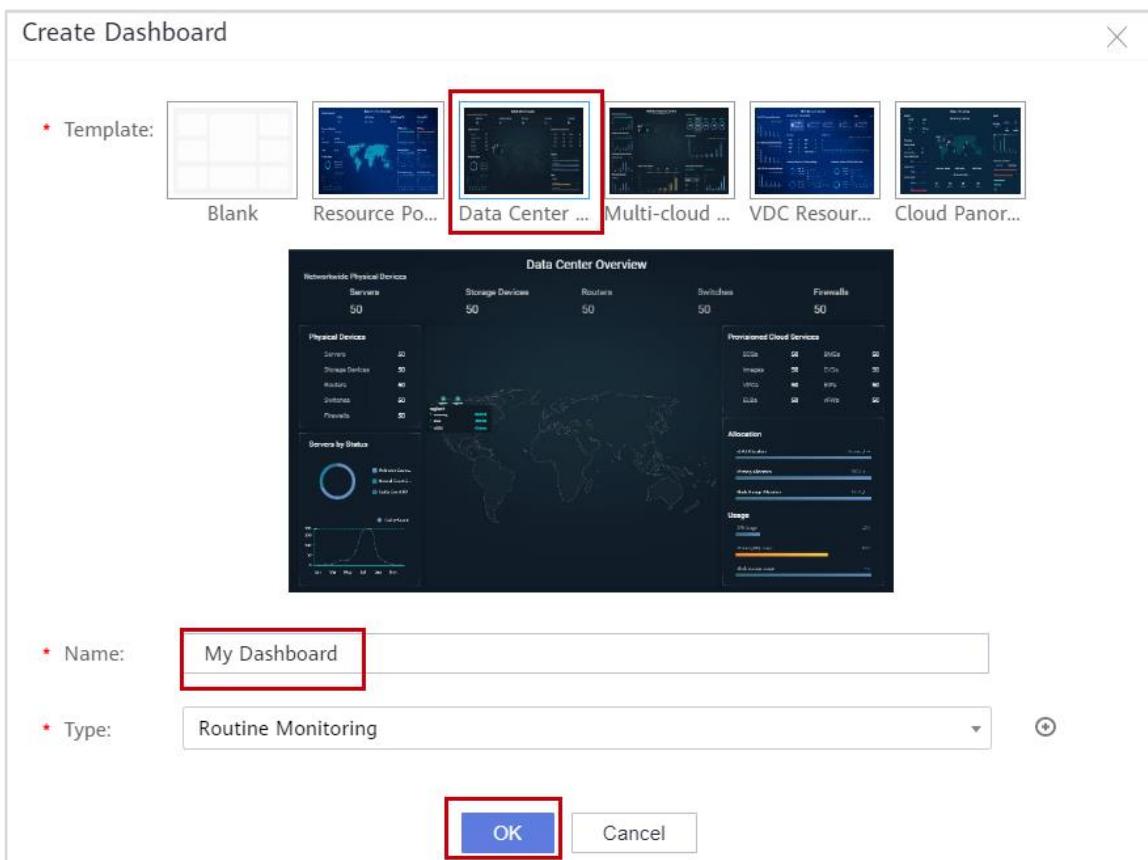
Step 1 Use a browser to log in to *ManageOne Maintenance Portal as an O&M administrator*. Choose **Monitor > Dashboard** from the main menu.



Step 2 Click **Create**.



Step 3 On the **Create Dashboard** page, select **Data Center Overview** for Template, Set Name to **My Dashboard** and Type to **Routine Monitoring**, and click **OK**.

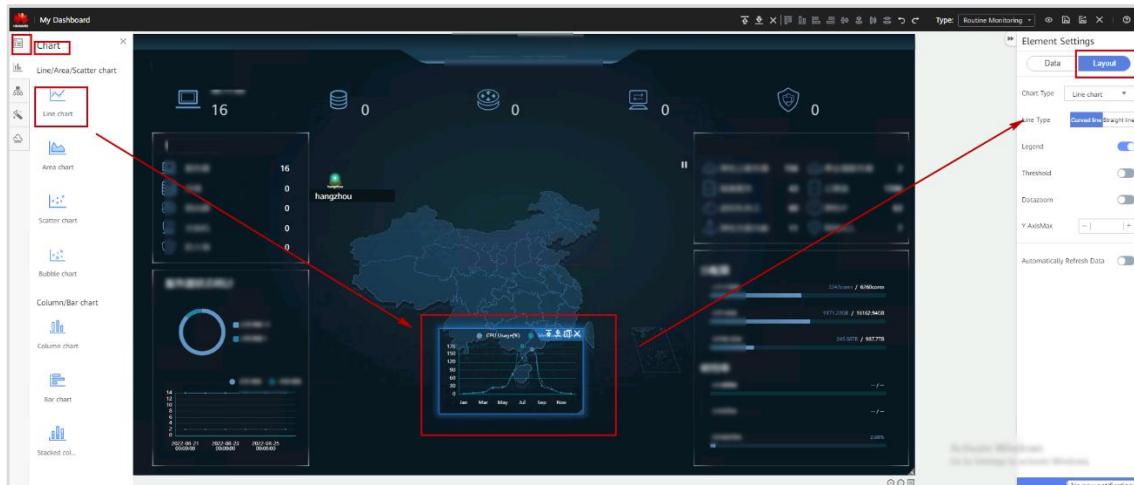


Step 4 Wait for several minutes until the dashboard list is displayed. Click the created dashboard to edit it.

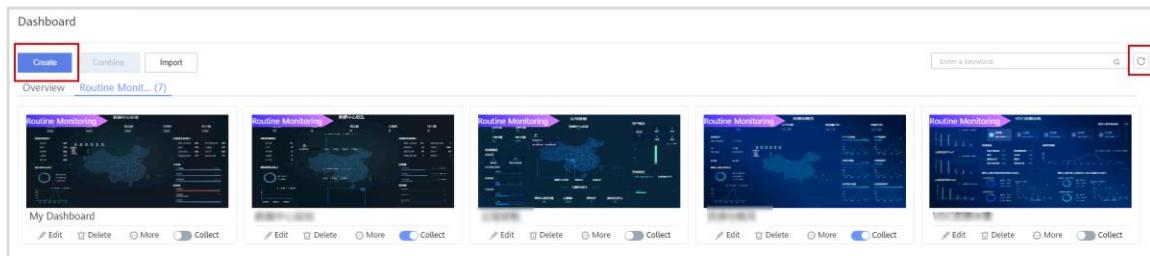
In the navigation pane, choose  . Drag and drop  to the central area.

In the right page, select **Layout** and set **Threshold** to **70**.

Click  in the upper right corner to save the settings.



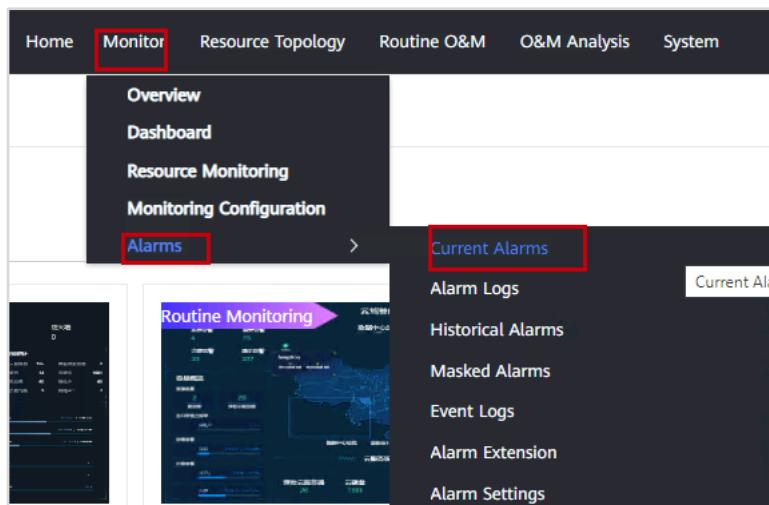
Step 5 Return to the **Dashboard** page and click in the upper right corner. The edited big screen is displayed.



1.2.2 Alarm Monitoring

1.2.2.1 Monitoring and Viewing Current Alarms

Step 1 Use a browser to log in to *ManageOne Maintenance Portal as an O&M administrator*. Choose **Monitor > Alarms > Current Alarms** from the main menu.



Step 2 Click **Filter** to expand parameters. Select **Critical** for **Severity** and **Unacknowledged and uncleared** for **Alarm status**.

The screenshot shows the HUAWEI CLOUD Stack Lab Guide (O&M) interface. At the top, there is a toolbar with buttons for 'Filter' (highlighted in red), 'Auto Refresh', 'Quick Filter', 'Combo Sorting', 'Export', 'Comment', 'Clear', 'Acknowledge', and a 'More' button. Below the toolbar is a table listing various alarms. The first few rows of the table are:

Operation	Alarm Serial ...	Severity	Name	Alarm Source	Last Occurred	Region	Type	Cleared On	Possible Causes	Other
✓	1238767	Major	Incorrect Metering SDRs	ManageOne-S...	Cloud...	...	HCIv3.0	Processing err...	ErrorSDR=[{"e...	Cloud
✓	1238780	Major	Incorrect Metering SDRs	ManageOne-S...	Cloud...	...	HCIv3.0	Processing err...	ErrorSDR=[{"e...	Cloud
✓	1238582	Critical	SDR Failed to Generate ...	SDR-PUB-SRV...	Cloud...	...	HCIv3.0	Operation alarm	unknown	Cloud

Below the table is a detailed search form for alarms. It includes fields for 'Alarm name', 'Alarm source', 'Severity' (with 'Critical' highlighted in red), 'Alarm status', 'Last occurred', 'Cleared', and 'Advanced settings'. The 'OK' button at the bottom right of the search form is also highlighted in red.

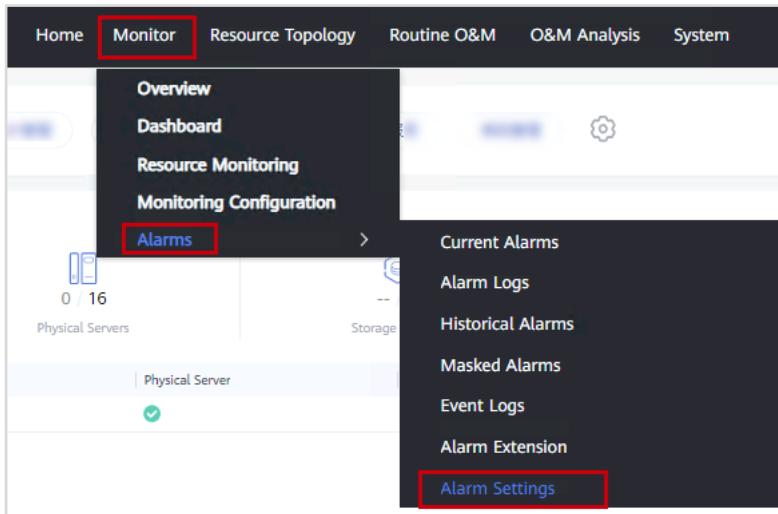
Step 3 Select the alarms to be exported, choose **Export > Selected**, set the file format to **XLSX**, and click **OK** to export the selected alarms to your local PC.

The screenshot shows the alarm export dialog. The 'Export' dropdown menu is open, and the 'Selected' option is highlighted in red. Below the export dialog is a 'Select File Format' dialog. It contains three radio buttons: 'CSV' (unchecked), 'XLSX' (checked and highlighted in red), and 'HTML' (unchecked). The 'OK' button at the bottom right of the 'Select File Format' dialog is also highlighted in red.

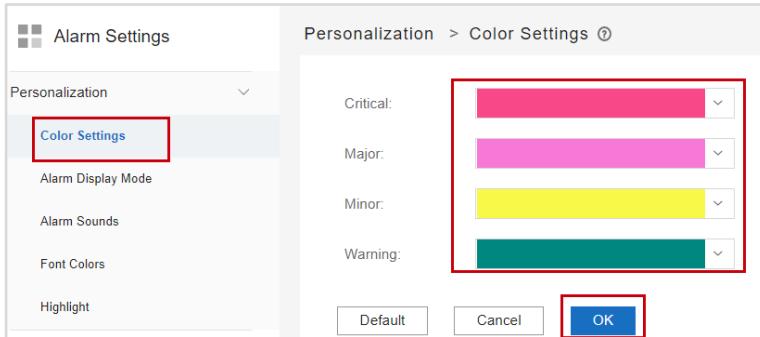
Step 4 In the lower left corner, click and open the saved current alarm details.

1.2.2.2 Setting Colors for Alarms or Events

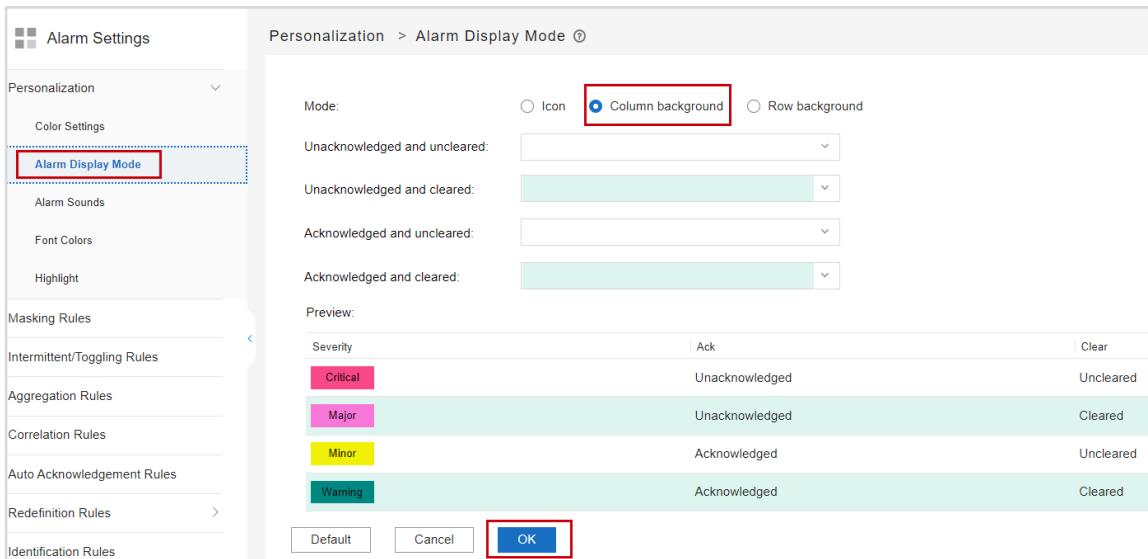
Step 1 Choose **Monitor > Alarms > Alarm Settings** from the main menu.



Step 2 In the navigation pane, choose **Personalization > Color Settings**. On the displayed page, set colors for different alarm or event severities and click **OK**.



Step 3 In the navigation pane, choose **Personalization > Alarm Display Mode**. On the displayed page, select **Column background** for **Mode** and click **OK**.



Step 4 Choose **Monitor > Alarms > Current Alarms** from the main menu. On the displayed page, colors of alarms at different severities are displayed as specified.

Operation	Alarm Serial Number	Severity	Name	Alarm Source	Location	Last Occurred	Region	Type	Cleared On	Possible Causes	Other Information
✓	1238767	Major	Incorrect Metering SDRs	ManageOne-Servi...	Cloud	2023-09-18 10:00:00	-	Processing error	...	ErrorSDR=[{"errC...	CloudService
✓	1238780	Major	Incorrect Metering SDRs	ManageOne-Servi...	Cloud	2023-09-18 10:00:00	-	Processing error	...	ErrorSDR=[{"errC...	CloudService
✓	1238582	Critical	SDR Failed to Generate a Tic...	SDR.PUB-SRV-0...	Cloud	2023-09-18 10:00:00	-	Operation alarm	unknown	Disk=sdbd, M...	CloudService
✓	1237875	Major	Disk IO Util Threshold Alarm	HSS-Mysql-Cloud...	Cloud	2023-09-18 10:00:00	-	HCIEv3.0	Integrity alarm	Disk=vdb, Mo...	CloudService
✓	1232829	Major	Failure to Back up Data	024769E7F0BF35...	Region	2023-09-18 10:00:00	-	HCIEv3.0	Operation alarm	unknown	FTP_Address
✓	1232632	Major	GaussdbHA_upload_to_remo...	IaaSPubDB_PUB...	Cloud	2023-09-18 10:00:00	-	HCIEv3.0	Integrity alarm	Monitor Unit I	CloudService
✓	1128923	Major	Physical Memory Used Rate ...	AOM-AOMES01_...	Cloud	2023-09-18 10:00:00	-	HCIEv3.0	Integrity alarm	Monitor Unit I	CloudService
✓	1096954	Major	Physical Memory Used Rate ...	AOM-AOMES02_...	Cloud	2023-09-18 10:00:00	-	HCIEv3.0	Integrity alarm	Monitor Unit I	CloudService
✓	1083149	Major	Physical Memory Used Rate ...	ManageOne-Servi...	Cloud	2023-09-18 10:00:00	-	HCIEv3.0	Integrity alarm	Monitor Unit I	CloudService
✓	1048741	Major	Volume Audit Alarm	024769E7F0BF35...	Region	2023-09-18 10:00:00	-	HCIEv3.0	Operation alarm	unknown	detail_info=[{e...
✓	9996560	Major	The Memory Usage Is Too High	OSS	Host	2023-09-18 10:00:00	-	Global	Over limit	1. The threshold i...	Generation th...
✓	943393	Major	Disk IO Util Threshold Alarm	64004B8A-F160...	Cloud	2023-09-18 10:00:00	-	HCIEv3.0	Integrity alarm	Disk=sda, M...	CloudService
✓	881580	Major	The Memory Usage Is Too High	OSS	Host	2023-09-18 10:00:00	-	Global	Over limit	1. The threshold i...	Generation th...
✓	873431	Warning	Incoming Network Dropped T...	AOM-Cassandra0...	Cloud	2023-09-18 10:00:00	-	HCIEv3.0	Integrity alarm	Nic=overlay_I	CloudService
✓	873375	Warning	Incoming Network Dropped T...	AOM-AOMES01_...	Cloud	2023-09-18 10:00:00	-	HCIEv3.0	Integrity alarm	Nic=overlay_I	CloudService
✓	873374	Warning	Incoming Network Dropped T...	AOM-AOMES01_...	Cloud	2023-09-18 10:00:00	-	HCIEv3.0	Integrity alarm	Nic=br_plc_4	CloudService
✓	873373	Warning	Incoming Network Dropped T...	AOM-AOMES01_...	Cloud	2023-09-18 10:00:00	-	HCIEv3.0	Integrity alarm	Nic=br_plc_5	CloudService

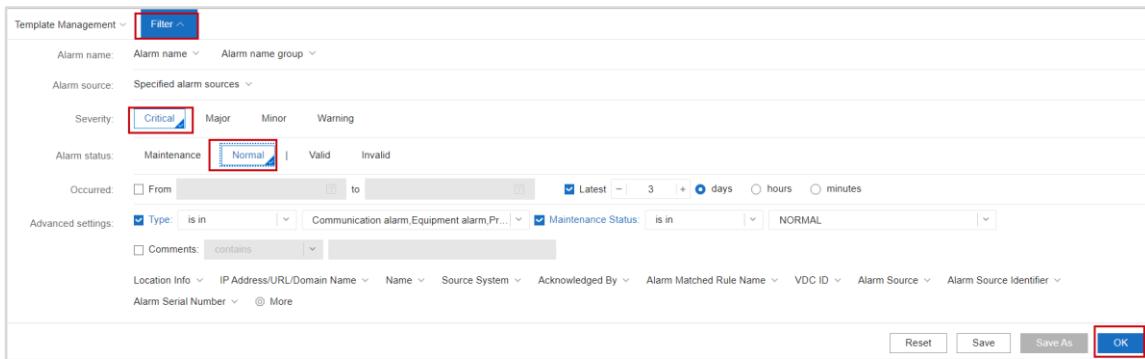
1.2.2.3 Viewing Historical Alarms

Step 1 Choose **Monitor > Alarms > Historical Alarms** from the main menu.

The screenshot shows the HUAWEI CLOUD Stack Lab Guide (O&M) interface. The top navigation bar has tabs: Home, Monitor (which is highlighted with a red box), Resource Topology, Routine O&M, O&M Analysis, and System. Below the navigation bar, there's a sidebar with sections: Overview, Dashboard, Resource Monitoring, Monitoring Configuration, and Alarms (which is also highlighted with a red box). The main content area is titled "Current Alarms" and includes sections for "Alarm Logs" and "Historical Alarms". A status bar at the bottom indicates "0 / 16 Physical Servers" and "Storage".

Step 2 Click **Filter** to expand parameters. Select **Critical** for **Severity** and **Normal** for **Alarm status**.

Operation	Alarm Serial Number	Severity	Name	Alarm Source	Location	Occurred	Region	Type	Cleared On	Possible Causes	Other Information
✓	1233143	Major	Disk IO Util Threshold Alarm	D70E4B8A-F160...	Cloud	2023-09-18 10:00:00	-	Integrity alarm	...	Disk=sdbd, M...	CloudService
✓	1233116	Major	Disk IO Util Threshold Alarm	D70E4B8A-F160...	Cloud	2023-09-18 10:00:00	-	Integrity alarm	...	Disk=sdas, M...	CloudService
✓	1232619	Major	Disk IO Wait Threshold Alarm	AOM-Etd01_regi...	Cloud	2023-09-18 10:00:00	-	Integrity alarm	...	Disk=vdb, Mo...	CloudService
✓	1232618	Major	Disk IO Util Threshold Alarm	3600E3FEBBCC...	Cloud	2023-09-18 10:00:00	-	Integrity alarm	...	Disk=sdb, Mo...	CloudService
✓	1232525	Major	Incorrect Metering SDRs	ManageOne-Servi...	Cloud	2023-09-18 10:00:00	-	Processing error	...	ErrorSDR=[{"errC...	CloudService
✓	1237164	Major	Incorrect Metering SDRs	ManageOne-Servi...	Cloud	2023-09-18 10:00:00	-	Processing error	...	ErrorSDR=[{"errC...	CloudService
✓	1236962	Critical	SDR Failed to Generate a Tic...	SDR.PUB-SRV-0...	Cloud	2023-09-18 10:00:00	-	Operation alarm	unknown	CloudService	CloudService
✓	1231128	Major	Disk IO Wait Threshold Alarm	AOM-Etd01_regi...	Cloud	2023-09-18 10:00:00	-	Integrity alarm	...	Disk=vdb, Mo...	CloudService
✓	1235454	Major	Incorrect Metering SDRs	ManageOne-Servi...	Cloud	2023-09-18 10:00:00	-	Processing error	...	ErrorSDR=[{"errC...	CloudService
✓	1235446	Major	Incorrect Metering SDRs	ManageOne-Servi...	Cloud	2023-09-18 10:00:00	-	Processing error	...	ErrorSDR=[{"errC...	CloudService
✓	1235269	Critical	SDR Failed to Generate a Tic...	SDR.PUB-SRV-0...	Cloud	2023-09-18 10:00:00	-	Operation alarm	unknown	CloudService	CloudService
✓	1230599	Critical	Certificate exception Alarm	TaskCenter_PUB...	Cloud	2023-09-18 10:00:00	-	Integrity alarm	...	Monitor Unit I	CloudService
✓	1229514	Warning	Incoming Network Dropped T...	AOM-Access01_...	Cloud	2023-09-18 10:00:00	-	Integrity alarm	...	Nic=overlay_I	CloudService
✓	1224541	Major	Disk IO Util Threshold Alarm	69E5189-63F0-1...	Cloud	2023-09-18 10:00:00	-	Integrity alarm	...	Disk=sdbd, M...	CloudService
✓	1229037	Major	Incorrect Metering SDRs	ManageOne-Servi...	Cloud	2023-09-18 10:00:00	-	Processing error	...	ErrorSDR=[{"errC...	CloudService
✓	1224190	Major	Incorrect Metering SDRs	ManageOne-Servi...	Cloud	2023-09-18 10:00:00	-	Processing error	...	ErrorSDR=[{"errC...	CloudService
✓	1223988	Critical	SDR Failed to Generate a Tic...	SDR.PUB-SRV-0...	Cloud	2023-09-18 10:00:00	-	HCIEv3.0	Operation alarm	unknown	CloudService



Step 3 Select the alarms to be exported, choose **Export > Selected**, set the file format to **XLSX**, and click **OK** to export the selected alarms to your local PC.

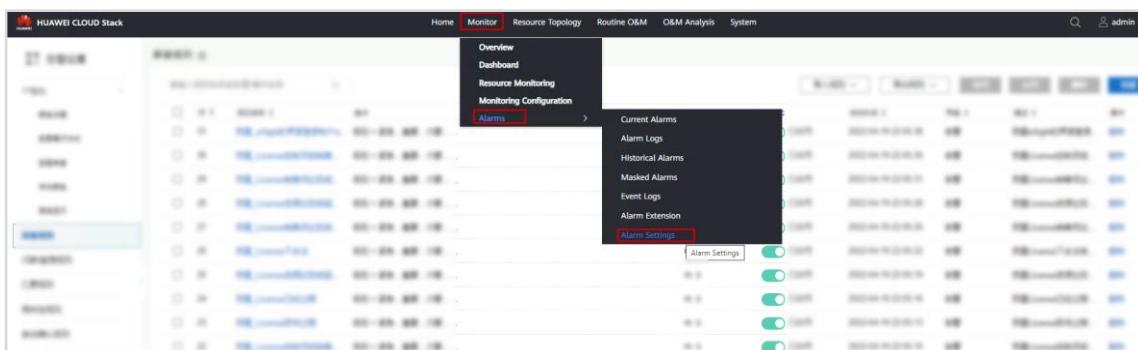
Step 4 In the lower left corner, click and open the saved historical alarm details.

1.2.2.4 Viewing Masked Alarms

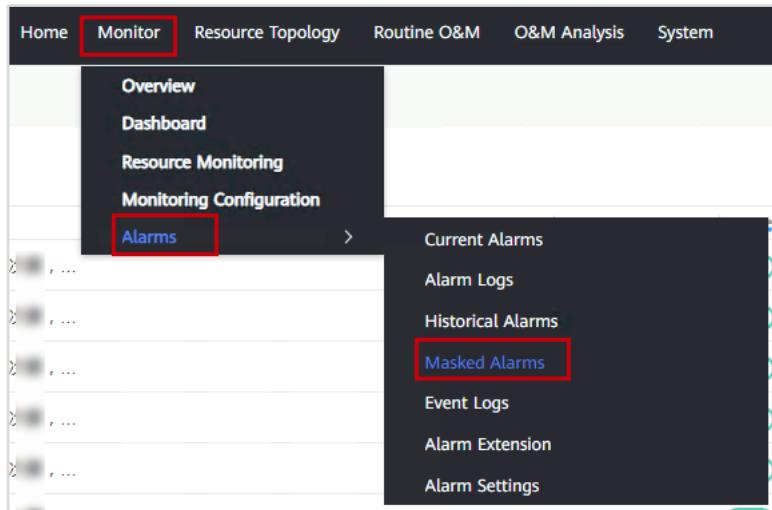
The system can also mask unimportant alarms, especially those generated during device O&M, test, or deployment. Therefore, you can spare more time to handle major alarms to ensure system functionality.

Custom alarm masking rules can be set in HUAWEI CLOUD Stack. Administrators can also view masked alarms if necessary.

Step 1 Choose **Monitor > Alarms > Alarm Settings** from the main menu. In the navigation pane, choose **Masking Rules** to view current alarm masking rules.



Step 2 Choose **Monitor > Alarms > Masked Alarms** from the main menu.

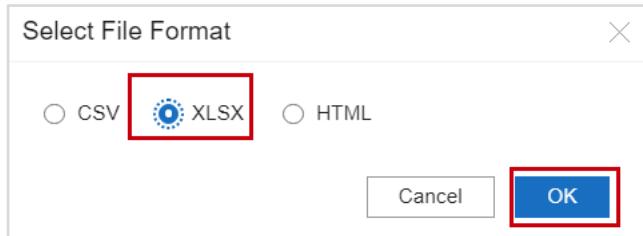


Step 3 Click Filter to expand parameters and select Critical for Severity.

The expanded filter dialog from the second screenshot:

Severity	Critical	Major	Minor	Warning
<input checked="" type="checkbox"/>				

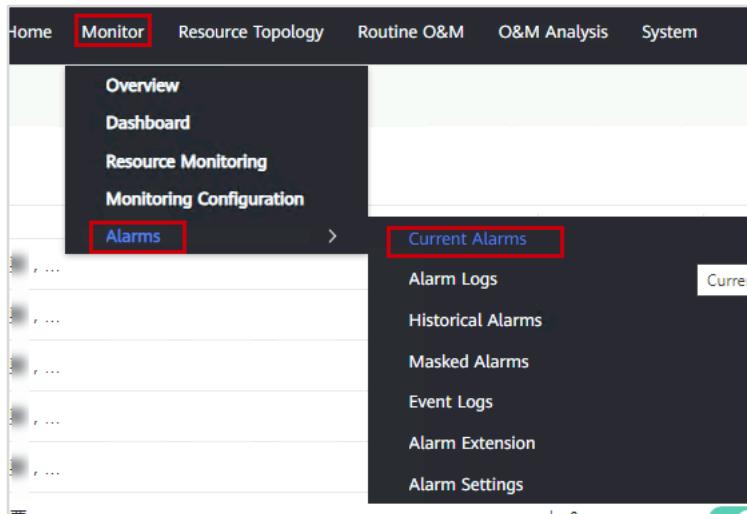
Step 4 Select the alarms to be exported, choose Export > Selected, set the file format to XLSX, and click OK to export the selected alarms to your local PC.



Step 5 In the lower left corner, click  and open the saved masked alarm details.

1.2.2.5 Handling Alarms

Step 1 Choose **Monitor > Alarms > Current Alarms** from the main menu.



Step 2 Click the alarm to be handled to view details and obtain key information, including the alarm name, severity, O&M experience, handling suggestions, and location information.

Template Management															Filter	Combo Sorting	Export	Comment
	Operation	Alarm Serial Nu...	Severity	Name	Alarm Source	L...	Occurred	Region	Type	Cleared On	Possible Causes	Other Informat...						
<input checked="" type="checkbox"/>	   	1236962	Critical	SDR Failed to Generate a Tic	SDR.PUB-SRV-0...	Clou...	2023-10-10 10:00:00	...	Operation alarm	2023-10-10 10:00:00	unknown	CloudService						

Alarm Details

Basic Information

Name:	SDR Failed to Generate a Ticket	Alarm Source Type:	IAAS
Source System Type:	IAAS	Manufacturer:	huawei
Handler:		Source System:	ServiceO
Alarm Source:	SDR;PUB-SRV-01,PUB-SRV-02	Severity:	Critical
Domain:		Type:	Operation alarm
VDC Name:		Duration:	1 hours 0 minutes 0 seconds
Alarm ID:	2000301	Occurrences:	1
VDC ID:		Occurred:	
Other Information:	CloudService=SDR, TotalFailedNum=345, FailedResources=volume,lts,logflow,waf.instance,cce.cluster,lts,ionindex,lts,instorage, FailedReason=FailStep processV3	Location Info:	CloudService=SDR, VmName=PUB-SRV-01,PUB-SRV-02

Comments

Enter the comments.

Step 3 Manually acknowledge alarms. Select one or more alarms and click in the **Operation** column.

Default template		Filter													
				Combo Sorting				Export		Comment		Acknowledge		...	
<input type="checkbox"/> Operation		Alarm Serial No.	Severity	Name	Alarm Source	Last Occurred	Region	Type	Cleared On	Possible Causes	Other Informa	22	81	16	128
<input type="checkbox"/>	<input checked="" type="checkbox"/>	1238767	Major	Incorrect Metering SDRs	ManageOne Servi...	Cloud...	RegionA	Processing error...		ErrorSDR=[{"errC...	CloudServic...				
<input type="checkbox"/>	<input checked="" type="checkbox"/>	1238780	Major	Incorrect Metering SDRs	ManageOne-Servi...	Cloud...	RegionB	Processing error...		ErrorSDR=[{"errC...	CloudServic...				
<input type="checkbox"/>	<input checked="" type="checkbox"/>	1238582	Critical	SDR Failed to Generate a Tic...	SDR;PUB-SRV-0...	Cloud...	RegionC	Operation alarm		unknown	CloudServic...				
<input type="checkbox"/>	<input checked="" type="checkbox"/>	1237875	Major	Disk IO Util Threshold Alarm	HSS-Mysp-Cloud...	Cloud...	RegionD	Integrity alarm			DiskIovd, M...				
<input type="checkbox"/>	<input checked="" type="checkbox"/>	1232829	Major	Failure to Back up Data	024789E7F0BF35...	Region...	RegionE	Operation alarm		unknown	FTP_Adress...				
<input type="checkbox"/>	<input checked="" type="checkbox"/>	1232632	Major	GaussdbHA_upload_to_re...	IaassPubDB_PUB...	Cloud...	RegionF	Integrity alarm			Monitor Unit				
<input type="checkbox"/>	<input checked="" type="checkbox"/>	1128923	Major	Physical Memory Used Rate	AOM-AOMES01...	Cloud...	RegionG	Integrity alarm			Monitor Unit				
<input type="checkbox"/>	<input checked="" type="checkbox"/>	1096954	Major	Physical Memory Used Rate ...	AOM-AOMES02...	Cloud...	RegionH	Integrity alarm			Monitor Unit				

Step 4 After acknowledging the alarm, click it again to go to the alarm details page. Drag the slider on the right to view **Acknowledged By** and **Acknowledgment Status**.

Alarm Details

Processing Status

Clearance Status:	<input checked="" type="checkbox"/> Uncleared	Acknowledgement Status:	<input checked="" type="checkbox"/> Acknowledged
Auto Clear:	No	Acknowledged On:	2022-10-11 10:10:00
Cleared On:		Acknowledged By:	admin
Cleared By:		Acknowledgement Status:	<input checked="" type="checkbox"/> Acknowledged
Clearance Type:	-		

Alarm Source

Availability Zone: Data Center: Tenant ID: default organization id

Comments

Enter the comments.

Step 5 Specify O&M personnel to handle alarms. Select an alarm and choose **...** > **Specify Handler** > **Other Users** to specify an alarm handler.

Operation	Alarm Serial No.	Severity	Name	Alarm Source	Last Occurred	Region	Type	Cleared On	Pos
	1238767	Major	Incorrect Metering SDRs	ManageOne-Servi...	Cloud...	Cloud...	Processing error...	Myself	unk
	1238780	Major	Incorrect Metering SDRs	ManageOne-Servi...	Cloud...	Cloud...	Processing error...	Other Users	unk
	1238582	Critical	SDR Failed to Generate a Tic...	SDR.PUB-SRV-0...	Cloud...	Cloud...	Operation alarm	Cancel	unk
	1237875	Major	Disk IO Unit Threshold Alarm	HSS-Mysql-Cloud...	Cloud...	Cloud...	Integrity alarm		unk
	1232829	Major	Failure to Back up Data	024769E7F0BF35...	Regi...	Cloud...	Operation alarm		unk
	1232632	Major	GaussdbHA_upload_to_remi...	IaasPubDB_PUB...	Cloud...	Cloud...	Integrity alarm		unk
	1128923	Major	Physical Memory Used Rate	AOM-AOMES01...	Cloud...	Cloud...	Integrity alarm		unk
	1096954	Major	Physical Memory Used Rate	AOM-AOMES02...	Cloud...	Cloud...	Integrity alarm		unk

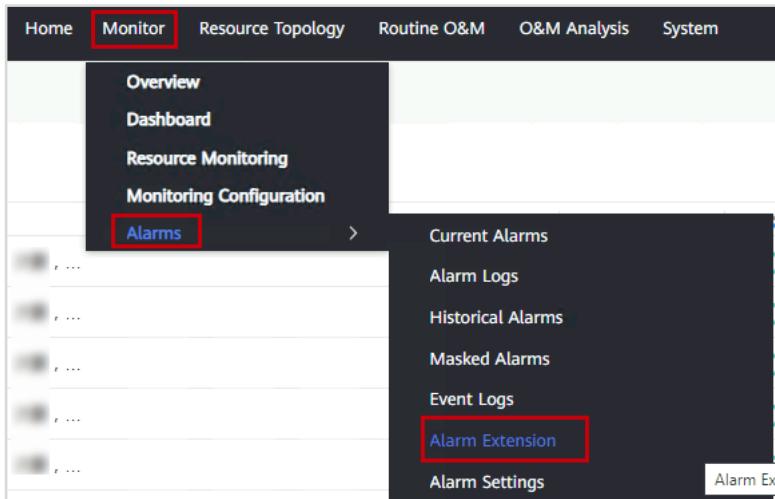
Step 6 Record alarm handling experience. After handling alarms, O&M personnel can record the handling experience for future reference. Click an alarm to go to the alarm details page. On the O&M experience page, click **Edit** to add remarks.

1.2.2.6 Alarm Extension

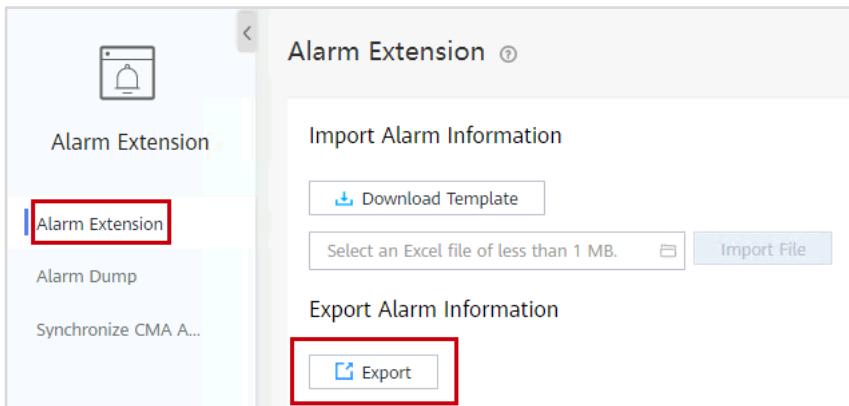
Alarms extension includes the following functions:

1. Static alarm information: Administrators need to configure static alarm information when ManageOne is deployed for the first time or a new alarm is generated. Administrators download the template on the **Alarm Extension** page, enter static alarm information in the template, and import the static alarm information to ManageOne so that administrators can set rules for the imported alarms on the **Alarm Settings** page. Static alarm information can be exported to a local computer as well. In this exercise, we only need to understand how to export static alarm information.
2. Alarm dump: To prevent insufficient database space due to excessive alarm data, you can manually create a dump task to dump unConcerned data such as historical alarms, masked alarms, and event logs. The dumped data is stored in a ZIP file in a path of a service deployment node, and you can log in to the node to view the ZIP file. The dumped alarms or events are automatically deleted from the database to release space. Alarm dump is irreversible. If you want to view the dumped data, log in to the service deployment node to view the ZIP file.
3. CMA alarm synchronization: To ensure that the status of alarms reported by CloudMonitorAlarm (CMA) on CloudScope is consistent with the alarm status on ManageOne, you can manually synchronize CMA alarms to the **Current Alarms** page of ManageOne.

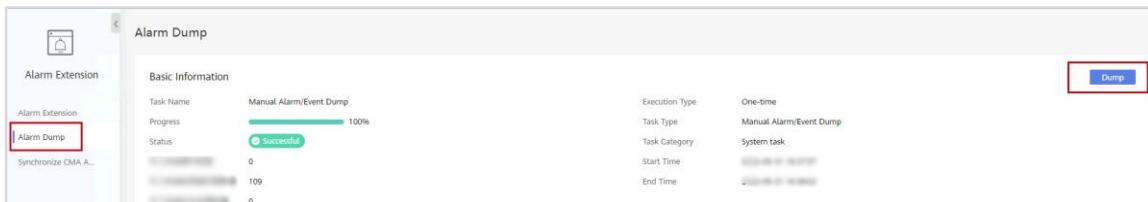
Step 1 Choose **Monitor > Alarms > Alarm Extension** from the main menu.



Step 2 Click **Export** to export the existing static alarm information to the local PC.



Step 3 Choose **Alarm Dump** in the navigation pane. Click **Dump** in the upper right corner.



Step 4 On the displayed page, select **Masked Alarms**, retain default values for other parameters, and click **OK**. Return to the **Alarm Dump** page. **Status** becomes **Successful**.

Dump

File

Path: /opt/share/Product/FMServices/ManualDump/FM

Format: CSV

Generation Time of Data

Start Time: []

End Time: []

Records That Meet the Dump Condition

Historical Alarms: []

Masked Alarms: []

Events: []

[Restore Defaults](#) [Delete Dump Files](#)

Alarm Dump

Basic Information

Task Name:	Manual Alarm/Event Dump	Execution Type:	One-time
Progress:	<div style="width: 100%; background-color: #00A0A0; height: 10px;"></div> 100%	Task Type:	Manual Alarm/Event Dump
Status:	Successful	Task Category:	System task
0		Start Time:	[]
109		End Time:	[]
0			

Step 5 Choose **Synchronize CMA Alarms** in the navigation pane. Click **Synchronize CMA Alarms**. CMA alarms are reported to the **Current Alarms** page of ManageOne. A message is displayed in the upper right corner, indicating that the synchronization task has been delivered.

Alarm Extension

- [Alarm Extension](#)
- [Alarm Dump](#)
- [Synchronize CMA A...](#)

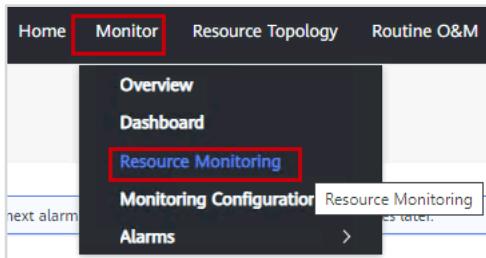
Synchronize CMA Alarms

CloudMonitorAlarm (CMA) alarms can only be manually synchronized. The next alarm synchronization can be performed 10 minutes later.

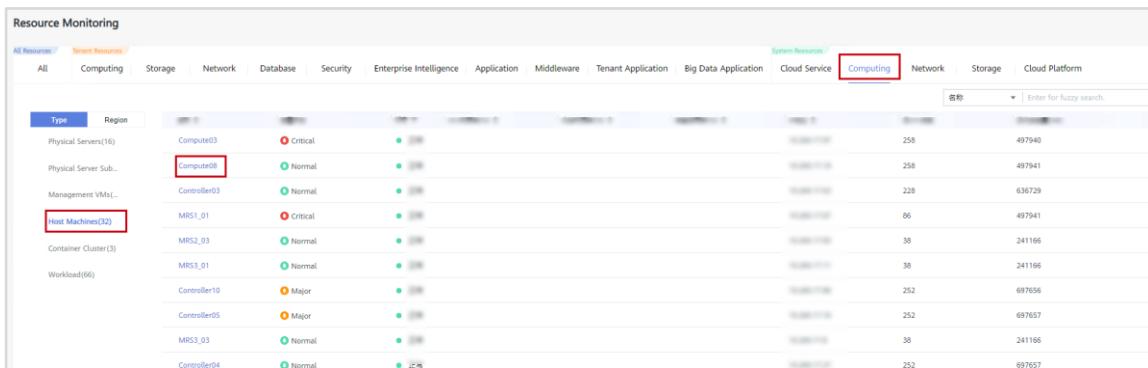
1.2.3 Resource Monitoring

1.2.3.1 Physical Resource Monitoring

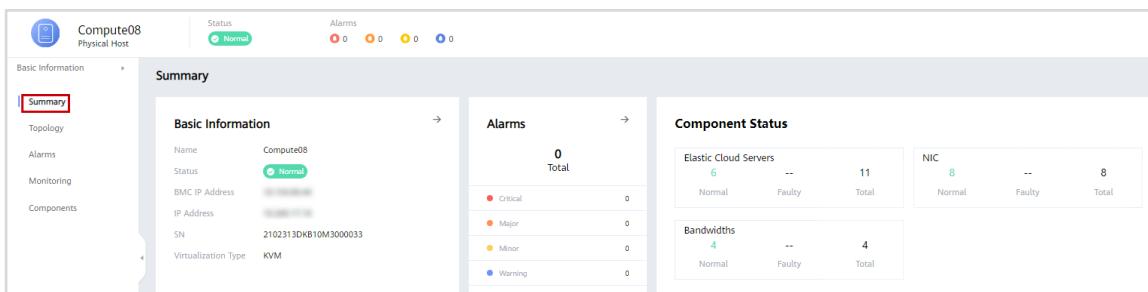
Step 1 Choose **Monitor > Resource Monitoring** from the main menu.



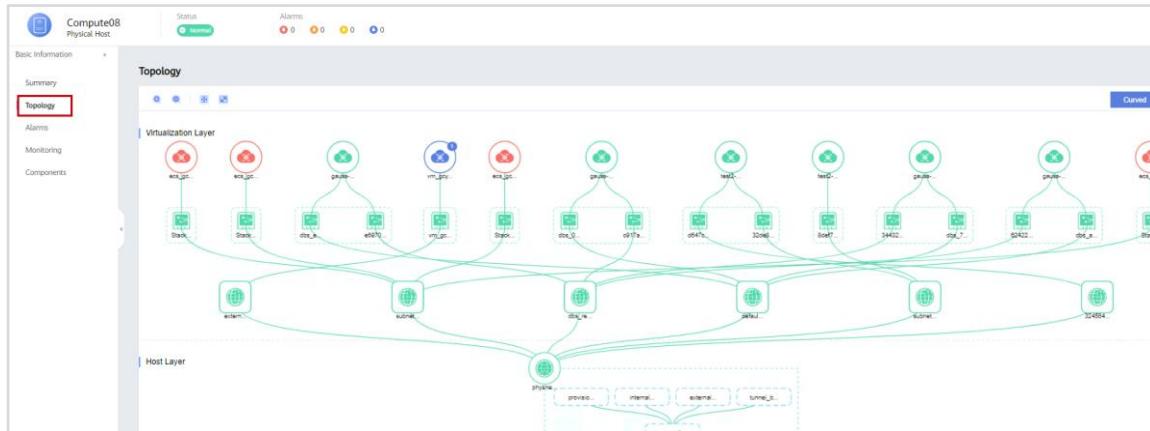
Step 2 Click **System Resources** and then the **Computing** tab. Choose **Host Machines** and click a host machine to go to its monitoring page.

A screenshot of the Resource Monitoring interface. The top navigation bar has tabs for All Resources, System Resources, and Computing, with Computing highlighted by a red box. Below this is a search bar. The main area shows a table of resources categorized by Type and Region. The 'Host Machines(32)' category is highlighted with a red box. One specific host machine, 'Compute08', is selected and highlighted with a red box in the list. The table columns include Name, Status, Alarms, IP Address, and Capacity.

Step 3 On the **Summary** page, view the resource overview, including the basic information, alarms, and component status.

A screenshot of the Compute08 host machine summary page. The left sidebar has a navigation pane with 'Summary' highlighted by a red box, followed by 'Topology', 'Alarms', 'Monitoring', and 'Components'. The main content area is divided into three sections: 'Basic Information' (Name: Compute08, Status: Normal), 'Alarms' (0 total, with categories: Critical, Major, Minor, Warning), and 'Component Status' (Elastic Cloud Servers: 6 Normal, 8 Faulty, Total 11; NIC: 8 Normal, 8 Faulty, Total 8; Bandwidths: 4 Normal, 4 Faulty, Total 4).

Step 4 Choose **Topology** in the navigation pane to view the host machine topology.



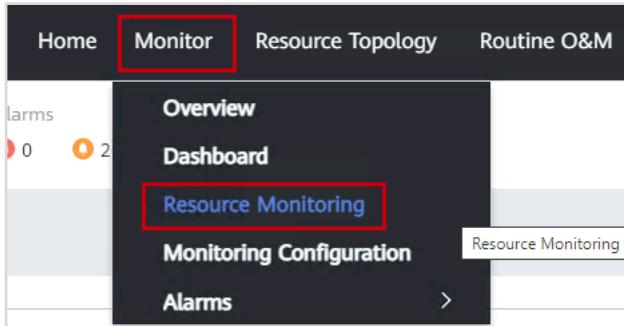
Step 5 Choose **Alarms** in the navigation pane to view host machine alarms.

Step 6 Choose **Monitoring** in the navigation pane to view the host machine monitoring status, such as CPU and memory usages.

Step 7 Choose **Components** in the navigation pane to view host machine components, such as management VMs, NICs, and bandwidths.

1.2.3.2 Cloud Service Resource Monitoring

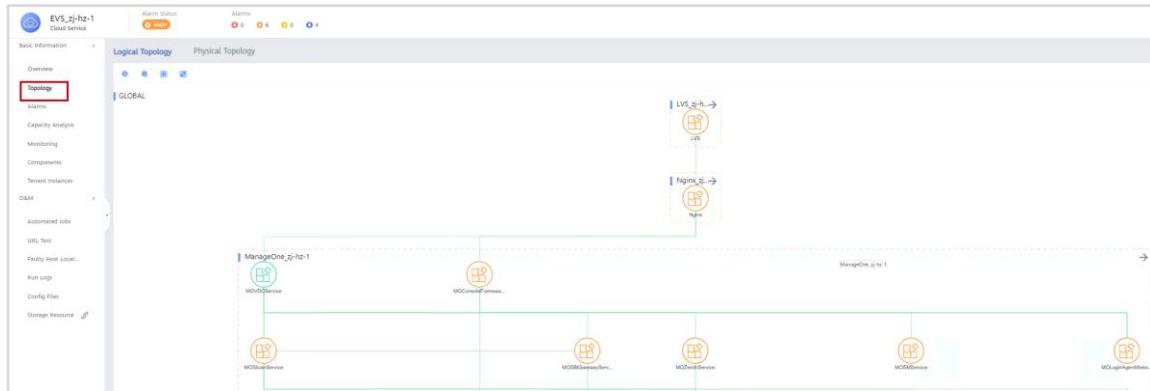
Step 1 Choose **Monitor > Resource Monitoring** from the main menu.



Step 2 In the navigation pane, choose **Cloud Services**. Select a cloud service (for example, EVS).

Step 3 Click the EVS disk to be monitored to go to its monitoring details page.

Step 4 Choose **Topology** in the navigation pane to view the EVS disk topology.



Step 5 Choose **Alarms** in the navigation pane to view the EVS disk alarms.

Step 6 Choose **Capacity Analysis** in the navigation pane to view capacity analysis information about the EVS disk, such as the disk allocation rate and usage.

Region	Resource Pool	Availability Zone	Management Area	StoragePool v1	StoragePool v2	StoragePool v3	Allocation Rate	StoragePool Total
hangzhou	OpenStack_zj...	manage-az		262.24 TB	178.02 TB	84.22 TB	67.88 %	87.41 TB
hangzhou	OpenStack_zj...	hcs811		725.45 TB	67.63 TB	657.82 TB	9.32 %	725.45 TB

Step 7 Choose **Components** in the navigation pane to view components of the EVS disk, such as management VMs, microservice instances, and host machines.

Step 8 Choose **Tenant Instances** in the navigation pane to view tenant instances that use the EVS disk, for example, EVS disk instances created by the tenant.

1.2.3.3 VDC Resource Monitoring

Step 1 Choose **Monitor > Resource Monitoring** from the main menu.

Step 2 In the navigation pane, choose **VDC**. Select a VDC to view its overview, including its name, status, and resource statistics.

Step 3 Click the **Resource** tab to view monitoring details of each cloud service resource in the VDC, such as the OS, flavors, creation time, region, and CPU usage of ECSSs.

Name	Status	OS Version	Flavor	Created	Elastic IP Addr.	Region	CPU Usage	Memory Usage	EVS Disk Us.	VDC Name	Operation
vAPP-ecs-W...	Running	Ubuntu Server...	Flavor_Linux0...	2023-07-11 11:11:11		hangzhou	--	--	--	Market_Masis...	Resource synchronization Historical Performance Associate with Tag
vAPP-ecs-W...	Running	Ubuntu Server...	Flavor_Linux0...	2023-07-11 11:11:10		hangzhou	--	--	--	Market_Masis...	Resource synchronization Historical Performance Associate with Tag

Step 4 Click the **Quota** tab to view the regions, resource pools, and AZs where cloud service resources are distributed in the VDC, as well as quotas and usages of each resource.

Cloud Service	Quota Metric	Region	Resource Pool	AZ	Used	Total
Virtual Private Cloud	Virtual Private Clouds	hangzhou	OpenStack_zj-hz-1	bms	1	Unlimited
	Elastic IP Addresses	hangzhou	OpenStack_zj-hz-1	bms	1	Unlimited
	Elastic Load Balancers	hangzhou	OpenStack_zj-hz-1	bms	0	Unlimited
	VPNS	hangzhou	OpenStack_zj-hz-1	bms	0	Unlimited
Image Management Se...	Network ACL	hangzhou	OpenStack_zj-hz-1	bms	0	Unlimited
	Images	hangzhou	OpenStack_zj-hz-1	bms	0	Unlimited
	vCPU	hangzhou	OpenStack_zj-hz-1	bms	--	--
	Elastic Cloud Server	Memory	hangzhou	OpenStack_zj-hz-1	bms	--
Instances		hangzhou	OpenStack_zj-hz-1	bms	--	--
GPU		hangzhou	OpenStack_zj-hz-1	bms	--	--
vCPU		hangzhou	OpenStack_zj-hz-1	bms	0cores	Unlimited
Bare Metal Server	Memory	hangzhou	OpenStack_zj-hz-1	bms	0GB	Unlimited
	Instances	hangzhou	OpenStack_zj-hz-1	bms	0	Unlimited
	Total Capacity	hangzhou	OpenStack_zj-hz-1	bms	0GB	Unlimited

2 Health Check

2.1 FusionCare

2.1.1 Overview

Routine health check aims to detect system vulnerabilities in advance, reduce potential system risks and O&M costs, and ensure long-term system security and stability.

In HUAWEI CLOUD Stack routine health checks, engineers mainly check alarms and use FusionCare to check systems. This exercise guides trainees to understand how to manually perform a health check method and how to use FusionCare, CloudNetDebug, and eSight.

2.1.2 Objectives

Upon completion of this exercise, you will be able to:

- Understand the health check process of HUAWEI CLOUD Stack.
- Know how to use FusionCare.
- Know how to use CloudNetDebug and eSight.
- Improve O&M efficiency using tools and standardize repetitive work.

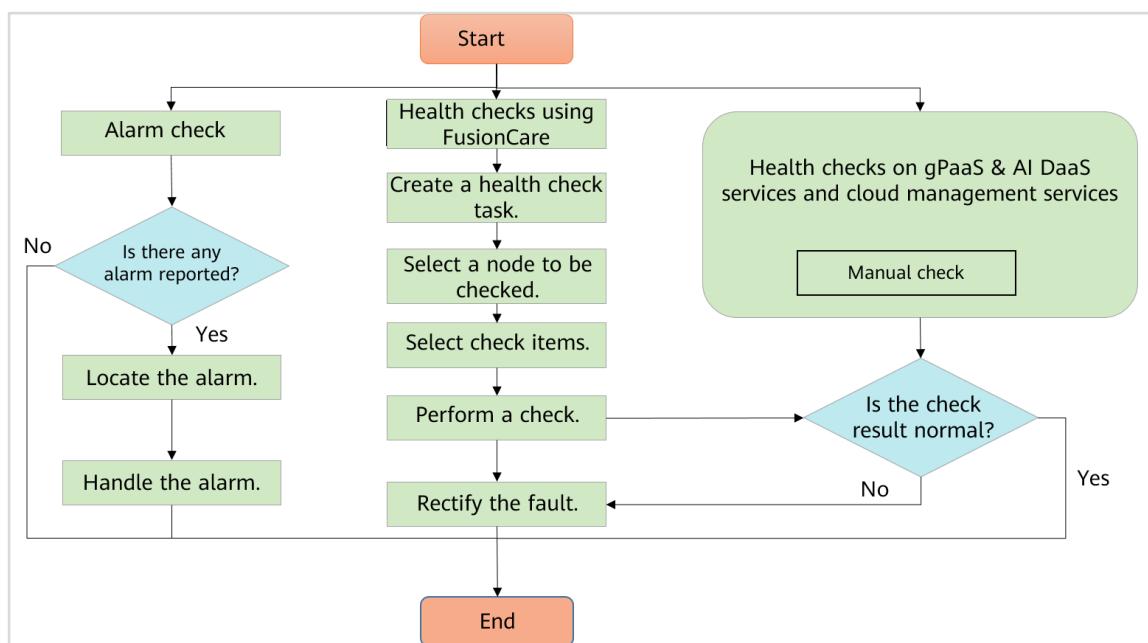


Figure 2-1 Health check

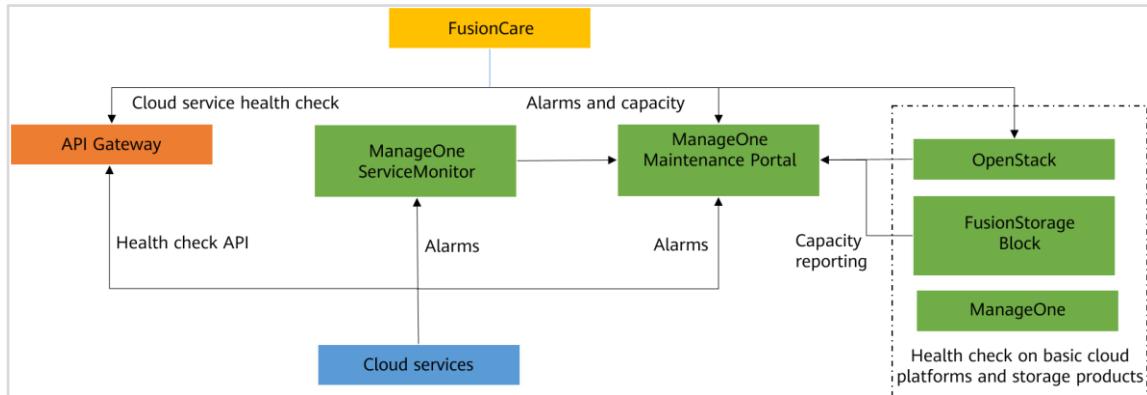


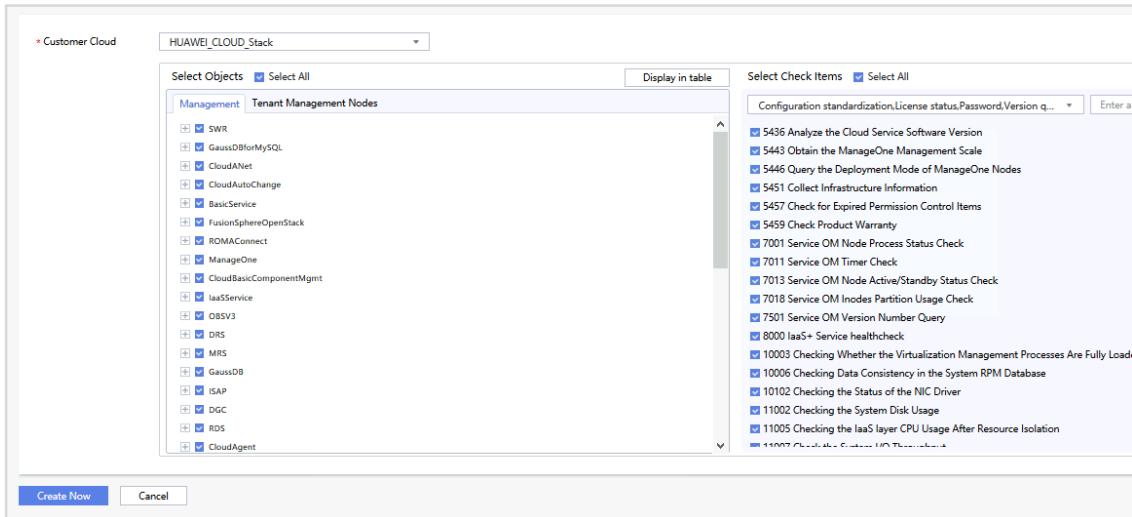
Figure 2-2 How FusionCare works

2.1.3 Health Check with FusionCare

- Step 1** Log in to ManageOne Maintenance Portal as an O&M administrator using a browser. In the **Common Links** area on the home page, click a region under **FusionCare**. The region display name has been configured in **region_display_name** (for example, **hangzhou**).

- Step 2** In the **Create Task** dialog box, enter a task name, set **Task Scenario** to **Routine health check**, **Task Policy** to **Real-time task**, and **Customer Cloud** to **HUAWEI_CLOUD_Stack**. By default, all objects are selected. To perform a global health check, select **Select All**. It will take about half an hour, during which you can also conduct other exercises.

← Create Task ⓘ	
* Task Name	test
* Task Scenario	Routine health check
* Task Policy	Real-time task
Check an environment to learn the health status in real time.	
<input type="checkbox"/> Send check report via email	



Step 3 When the progress of the health check task reaches 100% and **Status** becomes **Finished**, click the health check task to expand the result.

Step 4 On the **Object Check Details** tab page under **Component Check Result**, locate the failed health check and click **Details**.

Component Check Result Tenant Check Result IaaS+ Check Result						
Object Check Details		Check Item Fault Details				
Environment Name	Product Type	Object Name	Object Type	Object IP/ID	Status	Operation
HUAWEI_CLOUD_Stack	FusionSphereOpenStack	Network01	FusionSphereOpenStack	10.200.17.90	Passed	Details Retry
HUAWEI_CLOUD_Stack	FusionSphereOpenStack	Network02	FusionSphereOpenStack	10.200.17.60	Passed	Details Retry
HUAWEI_CLOUD_Stack	FusionSphereOpenStack	vpc_endpoint_vm_az0_dc0_g...	FusionSphereOpenStack	10.200.17.49	Passed	Details Retry
HUAWEI_CLOUD_Stack	FusionSphereOpenStack	vpc_endpoint_vm_az0_dc0_g...	FusionSphereOpenStack OM	10.200.17.70	Passed	Details Retry
HUAWEI_CLOUD_Stack	FusionSphereOpenStack	allinonefm0	FusionSphere OpenStack OM	10.200.16.243	Failed	Details Retry
HUAWEI_CLOUD_Stack	FusionSphereOpenStack	allinonefm1	FusionSphere OpenStack OM	10.200.16.244	Passed	Details Retry
HUAWEI_CLOUD_Stack	ManageOne	ManageOne-APS-Global-D...	VM	10.200.5.22	Passed	Details Retry
HUAWEI_CLOUD_Stack	ManageOne	ManageOne-APS-Global-D...	VM	10.200.5.23	Passed	Details Retry
HUAWEI_CLOUD_Stack	ManageOne	ManageOne-AutoOps01	VM	10.200.16.201	Passed	Details Retry
HUAWEI_CLOUD_Stack	ManageOne	ManageOne-AutoOps02	VM	10.200.16.202	Passed	Details Retry

Step 5 View the check details whose **Check Result** is **Failed**. You can click the check item ID to rectify the fault by following the online help suggestion.

Check Item ID	Check Item Name	Check Result	Process Information	Check Remark	Operation
7001	Service OM Node P...	Passed	cmd: procStatus=\$(gala...	The process status of Se...	Retry
7004	Service OM Disk Par...	Passed	cmd: df -h grep -v "^\./...	The disk partition usage ...	Retry
7011	Service OM Timer C...	Passed	cmd: grep "^\^6 \^* \^* \^*...	The timer of Service OM...	Retry
7012	Data Backup Mecha...	Passed	cmd: HA_Status=`Query...	The data backup mecha...	Retry
7013	Service OM Node A...	Passed	cmd: HA_Status=\$(Quer...	The active/standby statu...	Retry
7017	Service OM Key File...	Passed	/var/log/goku Current P...	The key file permission ...	Retry
7018	Service OM Inodes ...	Passed	cmd: df -il grep -v "^\./...	The inode usage of each...	Retry
7019	Service OM License ...	Failed	The license is default lic...	The default license is us...	Retry
7501	Service OM Version ...	Passed	`echo \$(getFMIInfo) aw...	Passed. Service OM Vers...	Retry
7502	PV Driver Version Q...	Passed	version=`grep vmtoolsV...	Passed. PV Driver Versio...	Retry

2019 Service OM License Information Query

Level
Major

Health check standards

- Failed to obtain the license information by accessing the database, and the check fails.
- If the queried license information fails to be parsed, the check fails.
- For version 8.0, if the default license is used, the check fails.

Impact If Rectified
N/A

Impact If Not Rectified
If the default license expires or the license cannot be parsed, FusionSphere OpenStack capacity expansion is affected.

Suggestion

- Check whether the default license is used in the current environment.
If yes, apply for a commercial license and import it. After the import is successful, perform this check item again.
If no, go to Step 3.
- Check whether the check succeeds.
If yes, no further action is required.
If no, go to Step 3.
- If a commercial license is imported, provide the original license file. Use PuTTY to log in to the node where the fault occurs, switch to the root user, collect logs in /var/log/goku/sh_logs/newhealthcheck.log, and contact technical support for assistance.
Note: In version 6.5.1, log in to the system as the galaxmanager user and run the su - root command to switch to the root user.

Step 6 Return to the **Health Check Tasks** page. Browse to the health check task created in step 3 and click **Export Report**. In the displayed dialog box, select **Basic Report** for **Report Type** to and click **OK** to export the health check report.

Health Check Tasks

2 All Task | 0 Executing | 2 Finished | 0 Not started

Create **Delete** Enter a task name. **Q**

Name	Task Policy	Object Check P...	Check Item Pas...	Created	Operation
alt...	Real-time task	50%	93.75%	admin	Modify Export Report
alt...	Real-time task	91.91%	99.09%	admin	Modify Export Report

Export Report

Report Type: **Basic Report** **Synthesis Report**

A basic report contains the health check results of all products supported by FusionCare. The report file is in .xlsx and .html format.

Cancel **OK**

2.2 Manual Health Check for Cloud Management Services

2.2.1 Overview

This exercise instructs trainees to use ManageOne OMMHService script to perform a manual health check, check whether active and standby ManageOne Service nodes are normal, and query ManageOne node information on ManageOne Deployment Portal.

2.2.2 Objectives

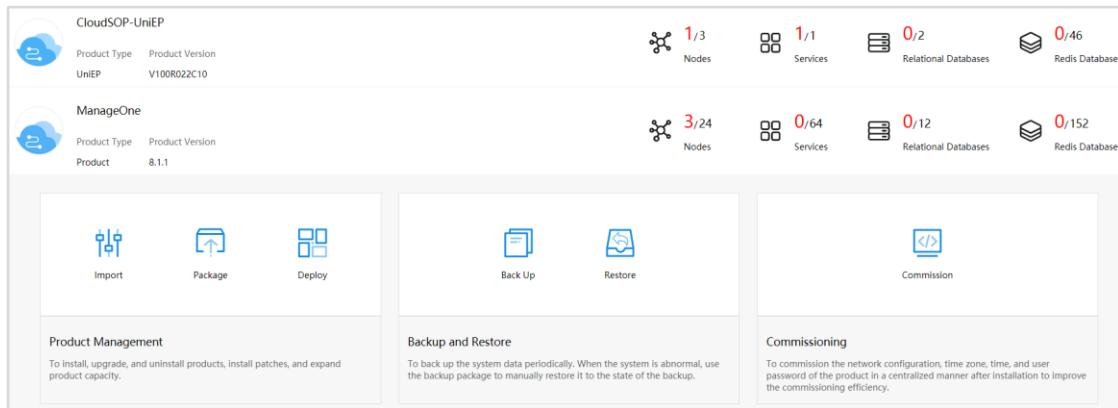
Upon completion of this exercise, you will be able to:

- Query ManageOne VM information on ManageOne Deployment Portal.
- Use the built-in service script to perform a manual health check.
- Determine whether a service is abnormal based on the manual health check result.

[Question 4]: Why is periodic health check required? What are the effective methods or tools?

2.2.3 Checking the ManageOne OMMHService Status

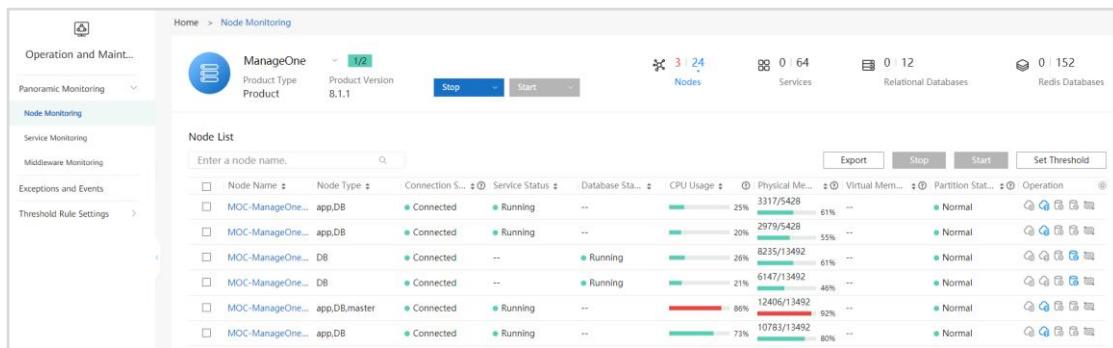
Step 1 Log in to ManageOne Deployment Portal as an administrator.



The screenshot shows the ManageOne Deployment Portal interface. At the top, it displays two products: CloudSOP-UniEP (Product Type: UniEP, Version: V100R022C10) and ManageOne (Product Type: Product, Version: 8.1.1). Below this, there are three main sections:

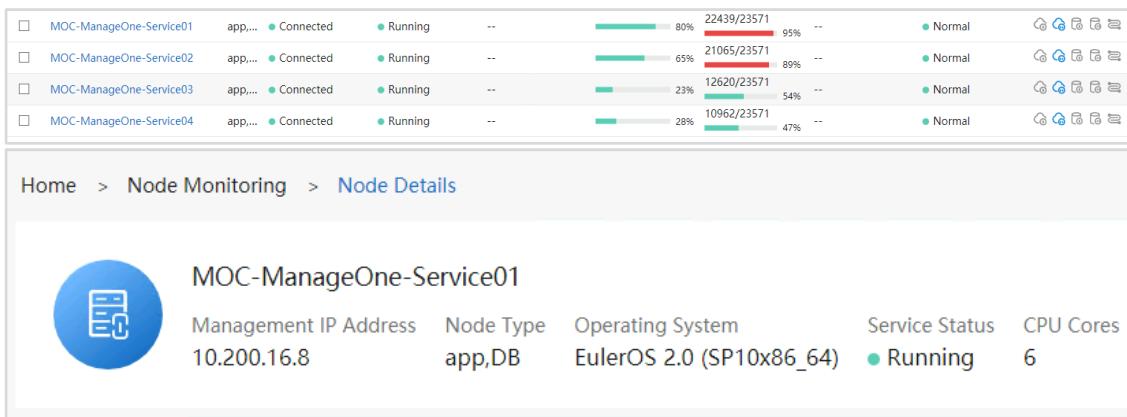
- Product Management:** Contains icons for Import, Package, and Deploy. A note says: "To install, upgrade, and uninstall products, install patches, and expand product capacity."
- Backup and Restore:** Contains icons for Back Up and Restore. A note says: "To back up the system data periodically. When the system is abnormal, use the backup package to manually restore it to the state of the backup."
- Commissioning:** Contains an icon for Commission. A note says: "To commission the network configuration, time zone, time, and user password of the product in a centralized manner after installation to improve the commissioning efficiency."

Step 2 Click ManageOne.



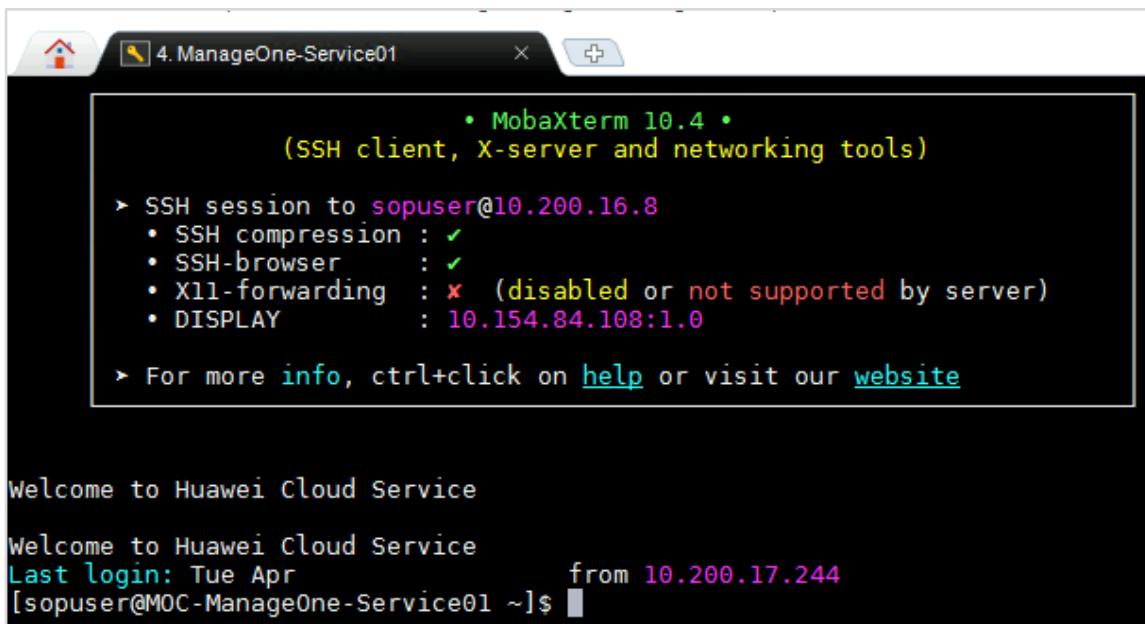
The screenshot shows the Node Monitoring section of the ManageOne Deployment Portal. On the left, there is a navigation sidebar with options like Operation and Maint..., Panoramic Monitoring, Node Monitoring (which is selected), Service Monitoring, Middleware Monitoring, Exceptions and Events, and Threshold Rule Settings. The main area shows a table titled "Node List" with the following columns: Node Name, Node Type, Connection Status, Service Status, Database Status, CPU Usage, Physical Memory, Virtual Memory, Partition Status, and Operation. There are 12 nodes listed, all of which are connected and running. The CPU usage and memory usage are also displayed for each node.

Step 3 In the node list, query MOC-ManageOne-Service01, MOC-ManageOne-Service02, MOC-ManageOne-Service03 and MOC-ManageOne-Service04 to obtain their management IP addresses.

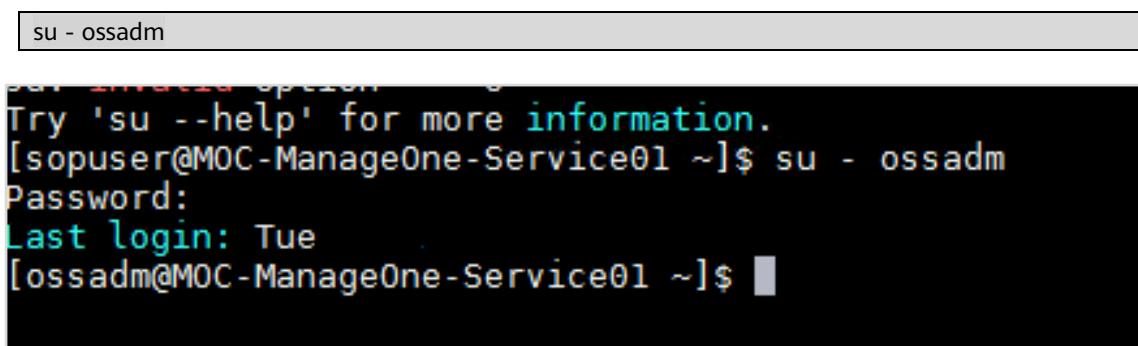


Node	Type	Status	CPU Cores
MOC-ManageOne-Service01	app, DB	Running	6
MOC-ManageOne-Service02	app, DB	Running	6
MOC-ManageOne-Service03	app, DB	Running	6
MOC-ManageOne-Service04	app, DB	Running	6

- Step 4 Use MobaXterm (or other remote login tools) to log in to the MOC-ManageOne-Service01 node using the management IP address obtained in step 3. For details about the default login account and password, see *HUAWEI CLOUD Stack Account List*.



- Step 5 Run the following command to switch to the **ossadm** user:



```
Try 'su --help' for more information.
[sopuser@MOC-ManageOne-Service01 ~]$ su - ossadm
Password:
Last login: Tue
[ossadm@MOC-ManageOne-Service01 ~]$
```

- Step 6 Run the following command to go to the directory where the OMMHAservice script is stored:

```
cd /opt/oss/Tenant name/apps/OMMHAService/bin
```

Tenant name can be **Product** or **manager**.

```
[ossadm@MOC-ManageOne-Service01 bin]$ ll
total 32
-r-xr-x--- 1 ossadm ossgroup 1713 May 22 configArbProxy.sh
-r-xr-x--- 1 ossadm ossgroup 1320 May 22 config.sh
-r-xr-x--- 1 ossadm ossgroup 1725 May 22 forbidden_switch.sh
-r-xr-x--- 1 ossadm ossgroup 247 May 22 monitor.sh
-r-xr-x--- 1 ossadm ossgroup 3459 May 22 start.sh
-r-xr-x--- 1 ossadm ossgroup 1870 May 22 status.sh
-r-xr-x--- 1 ossadm ossgroup 3257 May 22 stop.sh
-r-xr-x--- 1 ossadm ossgroup 1697 May 22 switchover.sh
[ossadm@MOC-ManageOne-Service01 bin]$ pwd
/opt/oss/Product/apps/OMMHAService/bin
[ossadm@MOC-ManageOne-Service01 bin]$ sh status.sh
```

Step 7 Run the following command:

```
sh status.sh
```

Parameters in the command output:

HAActive: indicates the node role. The value can be **active**, **standby**, or **NULL**. Generally, **NULL** indicates that OMMHA on the node is abnormal. In normal cases, the two nodes are in the **active** and **standby** state respectively.

HAAllResOK: indicates the status of all resources. The value can be **normal**, **exception**, or **abnormal**. In normal cases, the status of all resources is **normal**. If the resource status is **exception**, the system attempts to automatically restore the resources. After multiple automatic recovery failures, the resource status changes from **exception** to **abnormal**. In this case, the system stops automatically rectifying the fault.

HARunPhase: indicates the HA running period. **Activing** indicates that the standby node is being promoted to active. **Actived** indicates that the standby node has been promoted to active. **Deactivating** indicates that the active node is being demoted to standby.

Deactived indicates that the active node has been demoted to standby.

ResStatus indicates the resource status. **Standby_normal** indicates that the standby node is running properly. **Active_normal** indicates that the active node is running properly. **Raising_active** indicates that the standby node is being promoted to active. **Lowing_standby** indicates that the active node is being demoted to standby.

			HAVersion	StartTime	HAActive	HAAllResOK	HARunPhase
NodeName	hal1	HostName	V100R001C01		active	normal	Active
	hal2		V100R001C01		standby	normal	Inactive
NodeName	hal1	ResName	RMICritical	ResStatus	ResHStatus	ResType	
	hal1		RMFloatIP	Normal	Normal	Single_active	
	hal1		RMINic	Normal	Normal	Double_active	
	hal1	SwitchStatus	Normal	Normal	Normal	Double_active	
	hal2	RMICritical	Standby_normal	Normal	Normal	Active_standby	
	hal2	RMFloatIP	Stopped	Normal	Normal	Single_active	
	hal2	RMINic	Normal	Normal	Normal	Double_active	
	hal2	SwitchStatus	Normal	Normal	Normal	Double_active	

2.3 CloudNetDebug

2.3.1 Overview

This exercise instructs trainees to use CloudNetDebug to create probe and packet capture tasks to diagnose ECS disconnection on the HUAWEI CLOUD Stack platform.

2.3.2 Objectives

Upon completion of this exercise, you will be able to:

- Execute probe and packet capture tasks using CloudNetDebug.
- Master basic network knowledge.

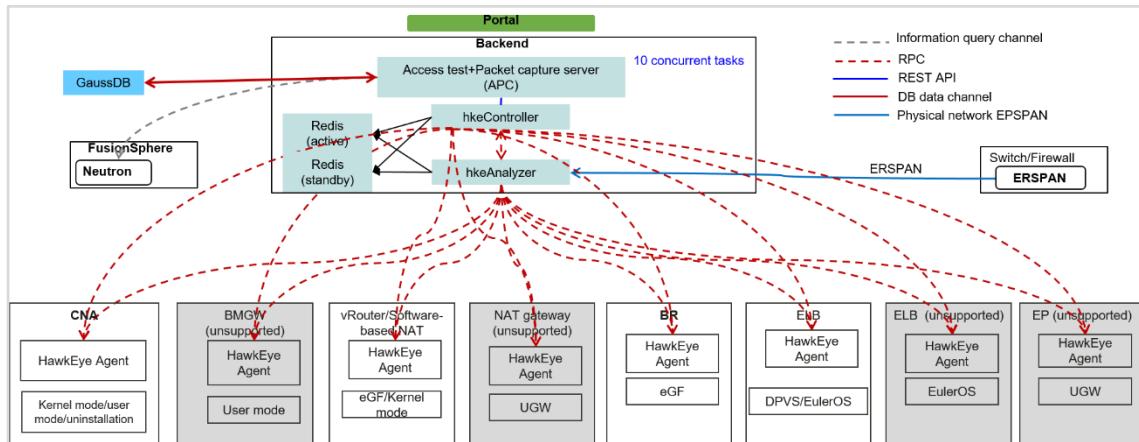


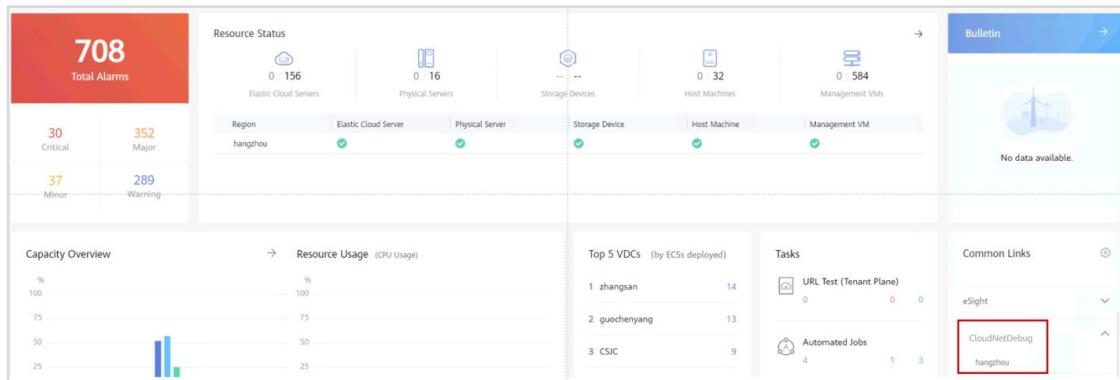
Figure 2-3 Logical architecture of CloudNetDebug

2.3.3 Prerequisites

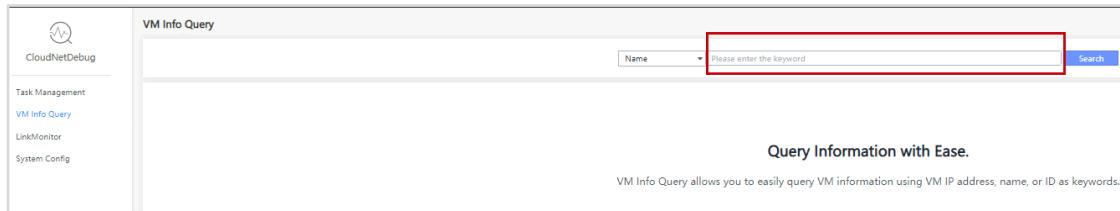
An administrator has created two VMs with unlimited flavors and OSs.

2.3.4 CloudNetDebug

- Step 1** Log in to ManageOne Maintenance Portal as an O&M administrator using a browser. In the **Common Links** area on the home page, click a region under **CloudNetDebug**. The region display name has been configured in **region_display_name** (for example, **hangzhou**).



- Step 2** Choose **VM Info Query** in the navigation pane, enter the VM IP address, and click **Search**.



Step 3 Choose **Task Management** in the navigation pane, click the **Probe Task** tab, and click **Create Task**.

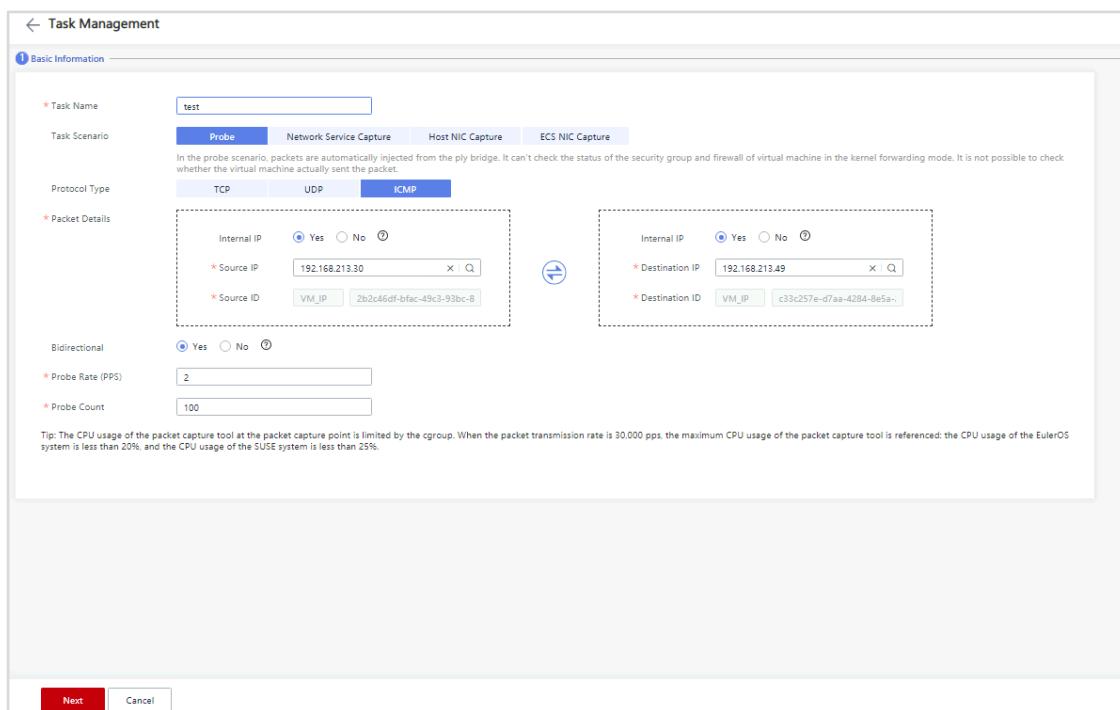


Step 4 Specify **Task Name**, set **Task Scenario** to **Probe** and **Protocol Type** to **ICMP**, enter the IP address of the VM in **Packet Details**, and click the magnifier icon on the right. After IDs are automatically displayed in **Source ID** and **Destination ID**, click **Next**.

Example:

Source IP: 192.168.213.30

Destination IP: 192.168.213.49



Step 5 After confirming the values of **Source IP** and **Destination IP** in **Packet Details** are correct, click **Create**. To modify the values, click **Previous**.

Task Management

Basic Information

Scenario Analysis

Task Scenario	Probe
Protocol Type	ICMP
Bi-directional	Yes
Traffic Type	VPC L2
Probe Rate (PPS)	2
Probe Count	100

Packet Details

Internal IP	Yes
Source IP	192.168.213.30
Source ID	2b2c46df-bfac-49c3-93bc-8e84a262d2a7

Internal IP	Yes
Destination IP	192.168.213.49
Destination ID	c33c257e-d7aa-4284-8e5a-2a9ac272a396

Probe Information

* Select an injection point.

Type	Device ID	Manager IP	Ingress Location	Egress Location
Compute	4E5E3409-E268-9CAD-EB11-27B20C105E30	10.200.17.38	ply3004d008-96	trunk0

Path Point

Type	Device ID	Manager IP	Ingress Location	Egress Location
End Point	Device ID	Manager IP	Ingress Location	Egress Location
Compute	805C3409-E268-ADA3-EB11-26B26206DC66	10.200.17.30	trunk0	ply29671fdd-fa

Buttons

Previous Create Cancel

Step 6 Return to the **Task Management** page and click **Execute**. Wait until **Status** of the probe task becomes **Success** and click **Probe Result**.

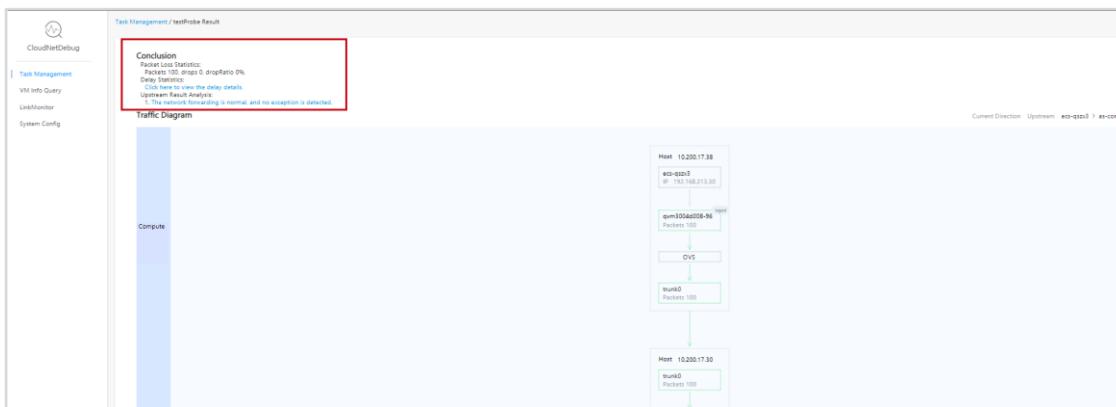
Probe Task Packet Capture Task

Task Name	Status	Traffic Type	Created Time	Executor	Operation
test	Unexecuted	VPC L2	2023-07-10 10:20:00	admin	Execute Probe Result Add Policy Copy Delete

Probe Task Packet Capture Task

Task Name	Status	Traffic Type	Created Time	Executor	Operation
test	Success	VPC L2	2023-07-10 10:20:00	admin	Execute Probe Result Add Policy Copy Delete

Step 7 Expand the probe result to view the conclusion.



Step 8 Create a packet capture task by referring to step 4. Specify **Task Name**, set **Task Scenario** to **Network Service Capture** and **Protocol Type** to **ANY**. Enter the VM IP address of the VM in **Packet Details** by referring to step 5. Click the magnifier icon on the right. After IDs are automatically displayed in **Source ID** and **Destination ID**, click **Next**.

① Basic Information

* Task Name	test02								
Task Scenario	Probe Network Service Capture Host NIC Capture ECS NIC Capture								
In the packet capture scenario, the task automatically captures real service packets. To ensure the validity of the captured packets, keep the service background traffic.									
Protocol Type	ANY TCP UDP ICMP ICMPV6								
* Packet Details	<table border="1"> <tr> <td>Internal IP <input checked="" type="radio"/> Yes <input type="radio"/> No</td> </tr> <tr> <td>* Source IP 192.168.213.30 <input type="button" value="X"/> <input type="button" value="Q"/></td> </tr> <tr> <td>* Source ID <input type="text" value="2b2c46df-bfac-49c3-93bc-8"/></td> </tr> <tr> <td>Source Port Enter an integer from 1 to 65535</td> </tr> </table> <table border="1"> <tr> <td>Internal IP <input checked="" type="radio"/> Yes <input type="radio"/> No</td> </tr> <tr> <td>* Destination IP 192.168.213.49 <input type="button" value="X"/> <input type="button" value="Q"/></td> </tr> <tr> <td>* Destination ID <input type="text" value="c33c257e-d7aa-4284-8e5a-2a9ac272a396"/></td> </tr> <tr> <td>Destination Port Enter an integer from 1 to 65535</td> </tr> </table>	Internal IP <input checked="" type="radio"/> Yes <input type="radio"/> No	* Source IP 192.168.213.30 <input type="button" value="X"/> <input type="button" value="Q"/>	* Source ID <input type="text" value="2b2c46df-bfac-49c3-93bc-8"/>	Source Port Enter an integer from 1 to 65535	Internal IP <input checked="" type="radio"/> Yes <input type="radio"/> No	* Destination IP 192.168.213.49 <input type="button" value="X"/> <input type="button" value="Q"/>	* Destination ID <input type="text" value="c33c257e-d7aa-4284-8e5a-2a9ac272a396"/>	Destination Port Enter an integer from 1 to 65535
Internal IP <input checked="" type="radio"/> Yes <input type="radio"/> No									
* Source IP 192.168.213.30 <input type="button" value="X"/> <input type="button" value="Q"/>									
* Source ID <input type="text" value="2b2c46df-bfac-49c3-93bc-8"/>									
Source Port Enter an integer from 1 to 65535									
Internal IP <input checked="" type="radio"/> Yes <input type="radio"/> No									
* Destination IP 192.168.213.49 <input type="button" value="X"/> <input type="button" value="Q"/>									
* Destination ID <input type="text" value="c33c257e-d7aa-4284-8e5a-2a9ac272a396"/>									
Destination Port Enter an integer from 1 to 65535									
Bidirectional	<input checked="" type="radio"/> Yes <input type="radio"/> No								
Packet Capture Duration	1 minute								
Maximum Number Of Packets	10000								
Packet Capture File Size (MB)	50								
Tip: The CPU usage of the packet capture tool at the packet capture point is limited by the cgroup. When the packet transmission rate is 30.000 pps, the maximum CPU usage of the packet capture tool is referenced: the CPU usage of the EulerOS system is less than 20% and the CPU usage of the SUSE system is less than 25%.									
<input type="button" value="Next"/> <input type="button" value="Cancel"/>									

Step 9 Select Capture Point and click Create.

← Task Management

① Basic Information

Scenario Analysis		
Task Scenario	Network Service Capture	
Protocol Type	ANY	
Bidirectional	Yes	
Traffic Type	VPC L2	
Packet Capture Duration	1 minute	
Maximum Number Of Packets	10000	
Packet Capture File Size (MB)	50	
Packet Details		
Internal IP	Yes	
Source IP	192.168.213.30	
Source ID	2b2c46df-bfac-49c3-93bc-8e84a262d2a7	
Source Port	..	
Internal IP	Yes	
Destination IP	192.168.213.49	
Destination ID	c33c257e-d7aa-4284-8e5a-2a9ac272a396	
Destination Port	..	
Capture Point Selection		
The captured points that user selected in a task cannot be greater than 10.		
<input checked="" type="checkbox"/> Capture Point <input type="checkbox"/> ecs-qszx3 <input type="checkbox"/> as-config-8697_XXKA9MBS		
Type	ID	IP
Source	2b2c46df-bfac-49c3-93bc-8e84a262d2a7	192.168.213.30
Destination	c33c257e-d7aa-4284-8e5a-2a9ac272a396	192.168.213.49
<input type="button" value="Previous"/> <input type="button" value="Create"/> <input type="button" value="Cancel"/>		

Step 10 Return to the **Task Management** page and click **Execute** for the packet capture task. Wait until **Status** becomes **Success** and click **Result File**.

Task Name	Status	Traffic Type	Created Time	Executor	Operation
test02	Unexecuted	VPC L2	2023-06-12 10:00:00	admin	Execute Result File Copy Delete

Task Name	Status	Traffic Type	Created Time	Executor	Operation
test02	Success	VPC L2	2023-06-12 10:00:00	admin	Download Result File Copy Delete

Step 11 Click **Download** to download the packet capture file to your local PC. Service applications are not installed on the VM in the lab environment. Therefore, you only need to:

Check whether packets are captured on the tap port of the source host. If this happens, the packets are sent from the source VM.

Check whether packets are captured on the tap port of the destination host. If this happens, the packets have been sent to the destination VM.

If the fault still exists, use the packet capture file to analyze application interaction packets and check whether interaction between source and destination VMs is normal.

Capture Point	File Download	File Size (Bytes)	Packets	Operation
HOST(10.200.17.38)	<input type="checkbox"/> ECS_192.168.213.30_tap30040008-96_fbee_1	24	0	Download
	<input type="checkbox"/> Compute_10.200.17.38_trunk0_fbee_1	24	0	Download
HOST(10.200.17.30)	<input type="checkbox"/> ECS_192.168.213.49_tap29671fdd-fa_fbee_1	24	0	Download
	<input type="checkbox"/> Compute_10.200.17.30_trunk0_fbee_2	24	0	Download

2.4 eSight NE Monitoring

2.4.1 Overview

This exercise consists of two parts. The following uses physical servers as an example to describe how to add a single physical device on eSight and how to add physical devices in batches through automatic discovery.

2.4.2 Objectives

Upon completion of this exercise, you will be able to:

- Understand how eSight monitors servers.
- Add a single server on eSight.
- Add servers in batches on eSight through automatic discover.

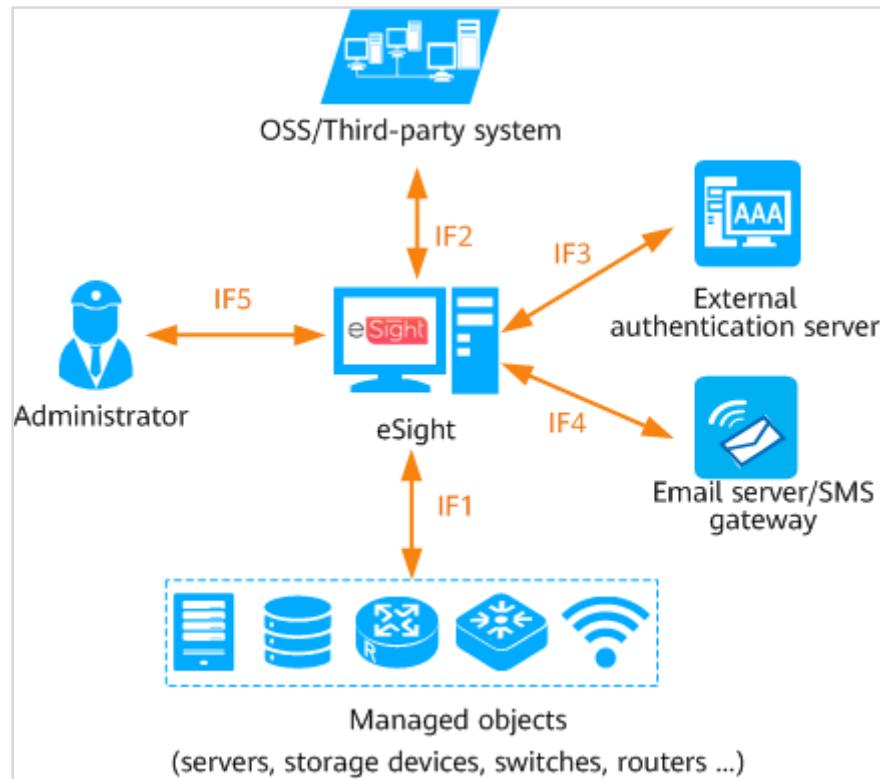
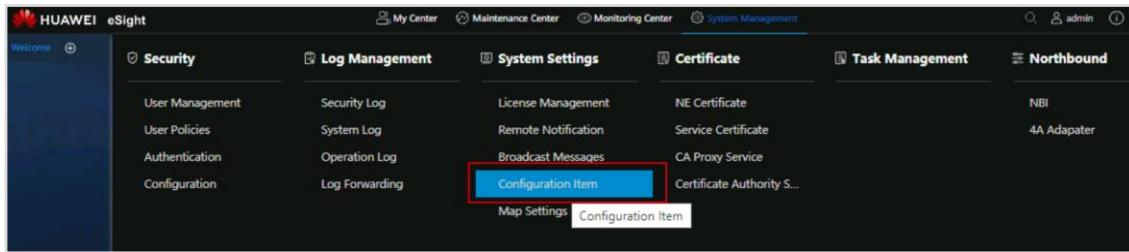


Figure 2-4 eSight monitoring management

2.4.3 Adding a Single Physical Device on eSight

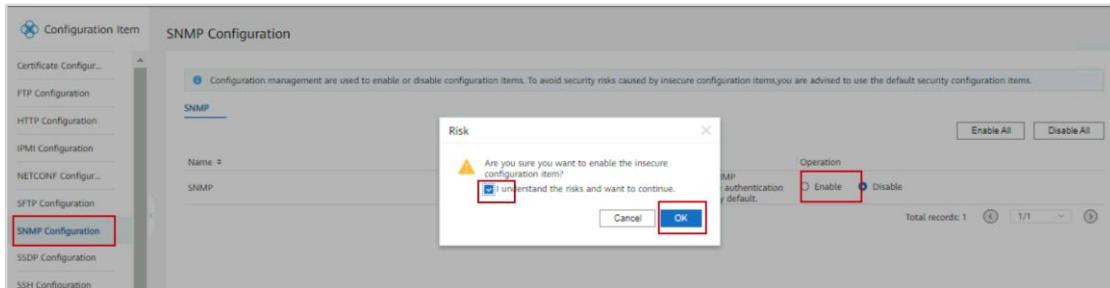
Step 1 Log in to ManageOne Maintenance Portal as an administrator using a browser. In the **Common Links** area on the home page, click a region under **eSight**. The region display name has been configured in **region_display_name** (for example, **hangzhou**).

Step 2 Choose **System Management > System Settings > Configuration Item** from the main menu.

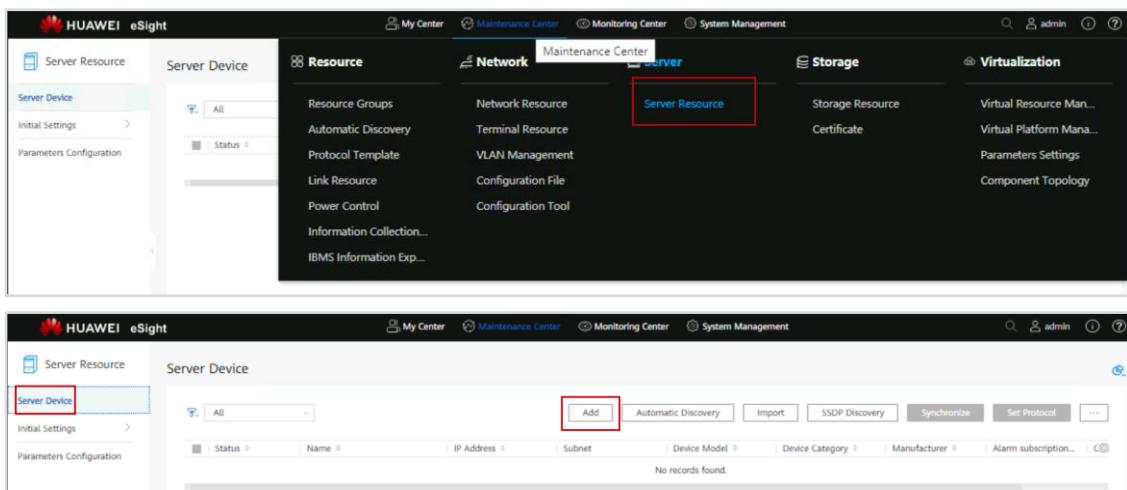


Step 3 Choose **SNMP Configuration** in the navigation pane. Click **Enable** for SNMP and click **Enable All**.

After you click **Enable All**, the **Risk** dialog box is displayed. Select **I understand the risks and want to continue.**



Step 4 On the eSight home page, choose **Maintenance Center > Server > Server Resource** from the main menu. On the **Server Device** page, click **Add**. The following describes how to add server RH2288H V.



Step 5 In the **Basic Information** area, enter the server BMC IP address in **IP address** and specify **Name**. Click ... on the right of **Subnet** to select a root subnet. Set **Protocol** to **SNMP** and select **Manually edit SNMP parameter**. Set **SNMP version** to **SNMPv3**, **NE port number** to default value **161**, and **Username** to the server BMC login account, for example, **root**. **Authentication** and **Data encryption** are the same as those of the server. **Authentication password** and **Encryption password** are passwords for logging in to the server BMC. After setting the parameters, click **Apply**.

Obtain the server BMC account and password from the administrator, log in to the server, choose **Configuration > System**, and query the SNMPv3 protocol.

The figure consists of three vertically stacked screenshots of a server management interface:

- iBMC Settings Page:** Shows the "iBMC Settings" tab selected. Under "Services", "SNMPv3" is checked. Configuration options include "Authentication Algorithm" (SHA512), "Encryption Algorithm" (AES), and "Engine ID" (0x80001f8803942533ed84b9121e). A "Save" button is at the bottom.
- Server Device Page:** Shows the "Server Device" page under "Server Resource". It includes sections for "Initial Settings" and "Parameters Configuration". In the "Access Protocol" section, it notes that blade servers support SNMPv3 and that third-party servers do not support alarm subscription. It also mentions non-security protocols being disabled by default. The "Protocol" dropdown shows "SNMP" selected.
- Manual Configuration Dialog:** A modal dialog for "Manually edit SNMP parameter". It has two radio button options: "Manually edit SNMP parameter" (selected) and "Manually select SNMP parameter template". Fields include:
 - SNMP version:** SNMPv3
 - NE port number:** 161
 - Username:** Administrator
 - Authentication:** HMAC-SHA2-512
 - Data encryption:** AES-128
 - Timeout period(s):** 10
 - Authentication password:** (redacted)
 - Encryption password:** (redacted)
 Below the fields are sections for "Auxiliary Protocol", "Operating System", and "Initial Settings (E9000/E9000H)". Buttons at the bottom are "Cancel", "OK", and "Apply".

Step 6 After the server is added, return to the **Server Device** page. Click the server to view its status and alarms. Perform a manual health check.

2.4.4 Adding Devices in Batches on eSight Through Automatic Discovery

Step 1 On the home page, choose **Maintenance Center > Server > Server Resource**. On the **Server Device** page, click **Automatic Discovery**.

Step 2 Click **By Network Segment**.

Step 3 Set **IP version** to **IPv4**. **Start IP Address** and **End IP Address** must contain the BMC IP address of the added server. Click the icon on the right to select the root subnet.

- Step 4** In the **Protocol Settings** area, select **REDFISH Protocol** for **Select protocol types**, set **Username** and **Password** to the BMC account and password of the server managed by eSight, and click **Next**.

The screenshot shows the 'Protocol Settings' configuration page. Under 'Select protocol types', 'REDFISH Protocol' is selected. Under 'REDFISH Protocol', 'Server' is selected as the resource type. The 'Username' field contains 'Administrator', the 'Password' field contains a masked value, the 'Port' field contains '443', and the 'Timeout period(s)' field contains '20'.

- Step 5** Select root subnet devices that are successfully discovered and click **Add Devices**.

Note: If the discovery fails, check whether the BMC login account and password of the failed server are different from those of the successfully discovered server.

The screenshots show the discovery process. The top screen displays the 'Discover Devices' step with a table of discovered devices:

Subnet	Resource Type	Device Name	Device Type	IP Address	Match Rate(%)	Protocol Type	Result
Root	Server	2288X V5-10.154.84.16	2288X V5	10.154.84.16	100	REDFISH	Discovered successfully
Root	Server	2288X V5-10.154.84.17	2288X V5	10.154.84.17	100	REDFISH	Discovered successfully
Root	Server	2288X V5-10.154.84.18	2288X V5	10.154.84.18	100	REDFISH	Discovered successfully

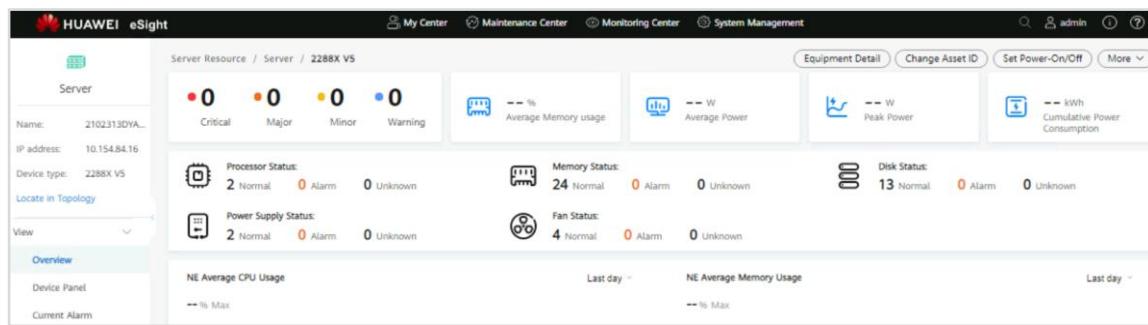
The bottom screen shows the 'Added Devices' step with a table of added devices:

Subnet	Resource Type	Device Name	Device Type	IP Address	Match Rate(%)	Protocol Type	Result
Root	Server	2288X V5-10.154.84.16	2288X V5	10.154.84.16	100	REDFISH	Added successfully
Root	Server	2288X V5-10.154.84.17	2288X V5	10.154.84.17	100	REDFISH	Added successfully
Root	Server	2288X V5-10.154.84.18	2288X V5	10.154.84.18	100	REDFISH	Added successfully

- Step 6** After the servers are added, return to the **Server Device** page. Click a server to view its status and alarms. Perform a manual health check.

The screenshot shows the 'Server Device' management interface. On the left, there's a sidebar with 'Server Resource' and 'Server Device' sections. The main area shows a table of servers:

Status	Name	IP Address	Subnet	Device Model	Device Category	Manufacturer	Alarm subscription
Online	2102313DYA10M4000010	10.154.84.18	/	2288X V5	Huawei	Subscribed	
Online	2102313DYA10M400007	10.154.84.17	/	2288X V5	Huawei	Subscribed	
Online	2102313DYA10M400008	10.154.84.16	/	2288X V5	Huawei	Subscribed	



3 AutoOps

3.1 AutoOps

3.1.1 Overview

AutoOps of HUAWEI CLOUD Stack automates the O&M process that was once a manual and repetitive one.

This exercise describes the routine configuration and operations of AutoOps based on actual O&M scenarios.

3.1.2 Objectives

Upon completion of this exercise, you will be able to:

- Understand the functions, features, and routine operations of AutoOps.
- Use AutoOps to install patches in batches.
- Use AutoOps to perform custom batch health checks.

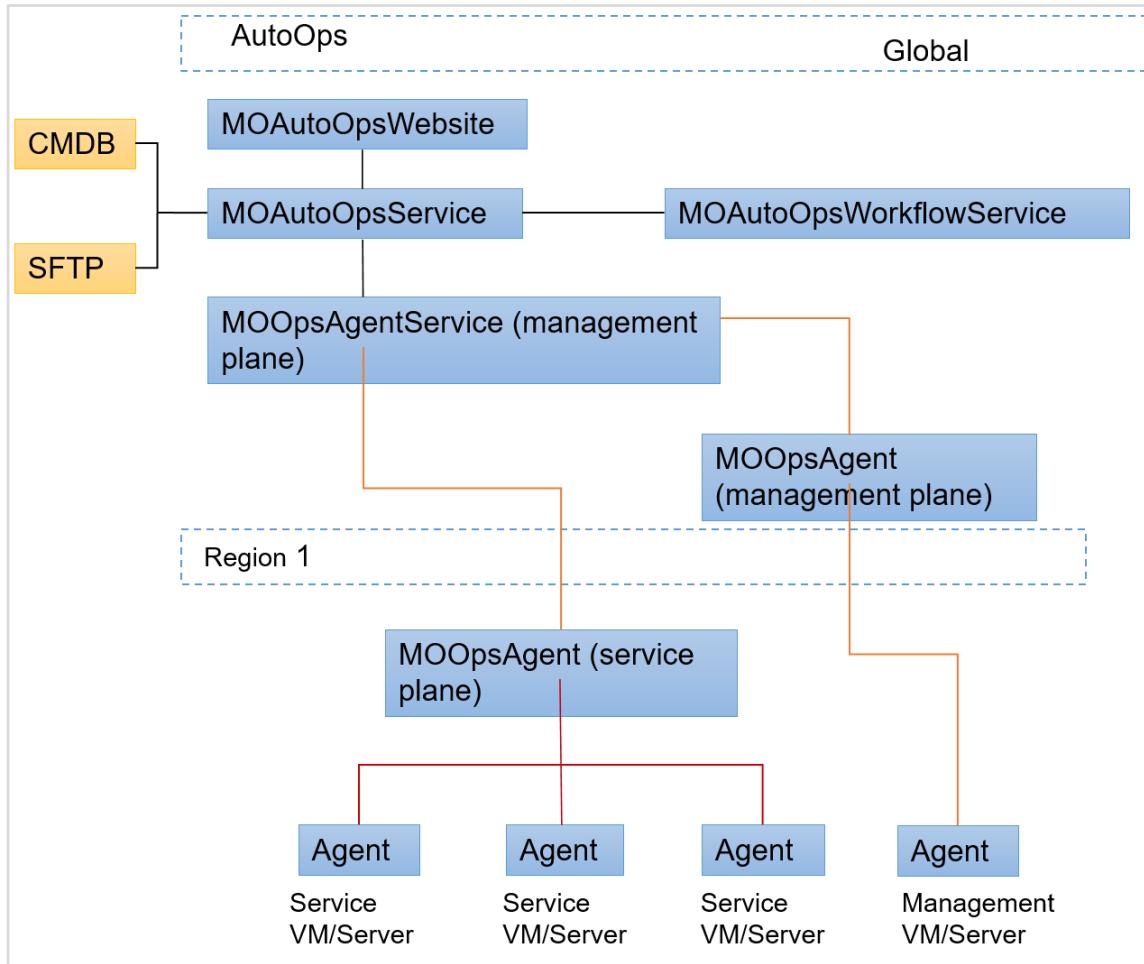


Figure 3-1 AutoOps architecture

3.1.3 Prerequisites

An operation administrator has created two ECs with unlimited flavors and OSs.

3.2 Installing Patches in Batches

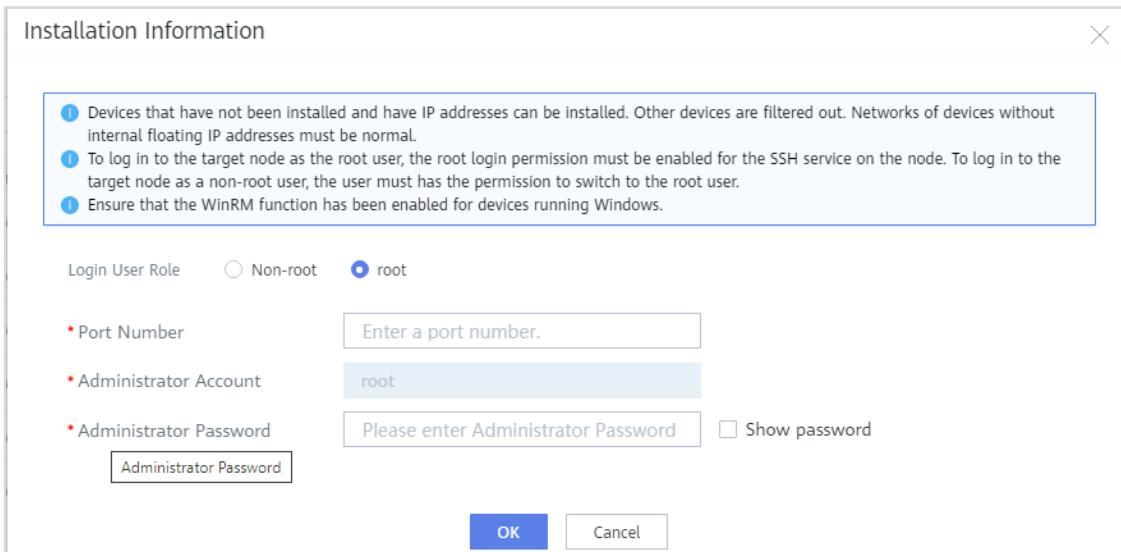
3.2.1 Installing Patches in Batches

- Step 1 Use a browser to log in to ManageOne Maintenance Portal as an O&M administrator. Choose **Routine O&M > Automated Jobs** from the main menu. Choose **Configuration > Device Management** in the navigation pane.

Step 2 Enter ECS information in the **ECS** search box, press the search icon, select the displayed devices, and click **Install Agent**.

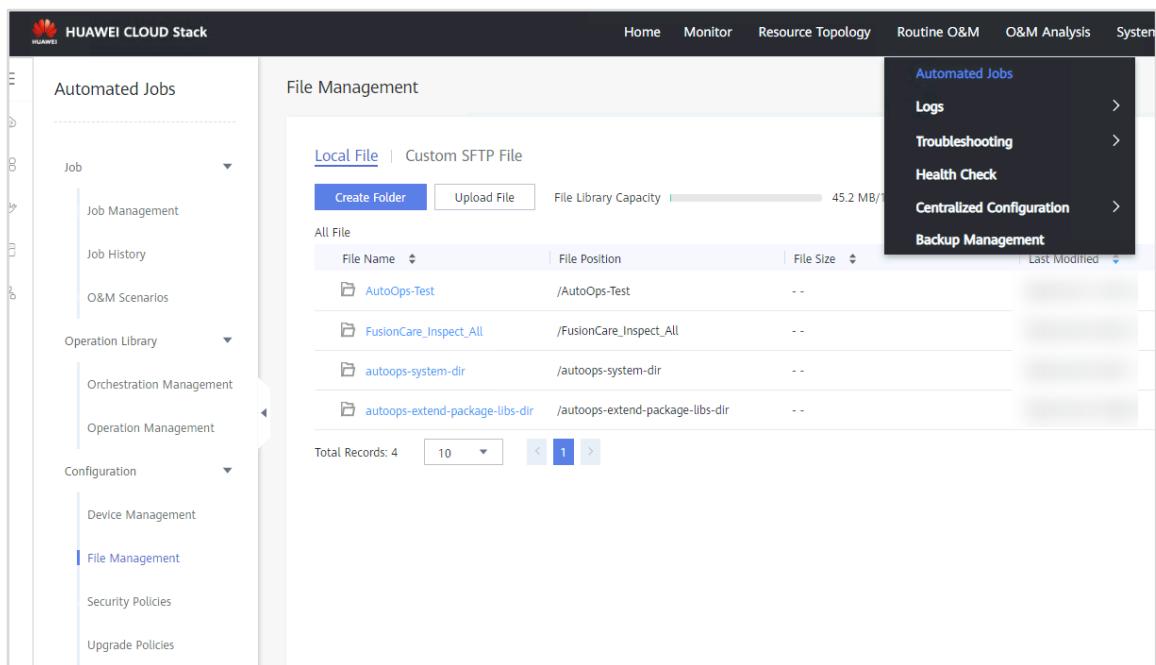
If **Agent Installation Status** becomes **Installed** and **Agent Running Status** becomes **Online**, the Agent has been installed. If the installation fails, contact the administrator to check whether the password of the **root** user for logging in to the ECS is correct.

Step 3 Set **Login User Role** to **root**, retain the default value **22** for **Port**, and enter the administrator password. Click **OK**.



The administrator password is the password of the **root** user of the ECS provisioned in the exercise preparation phase.

Step 4 Choose Routine O&M > Automated Jobs from the main menu. Choose Configuration > File Management in the navigation pane.



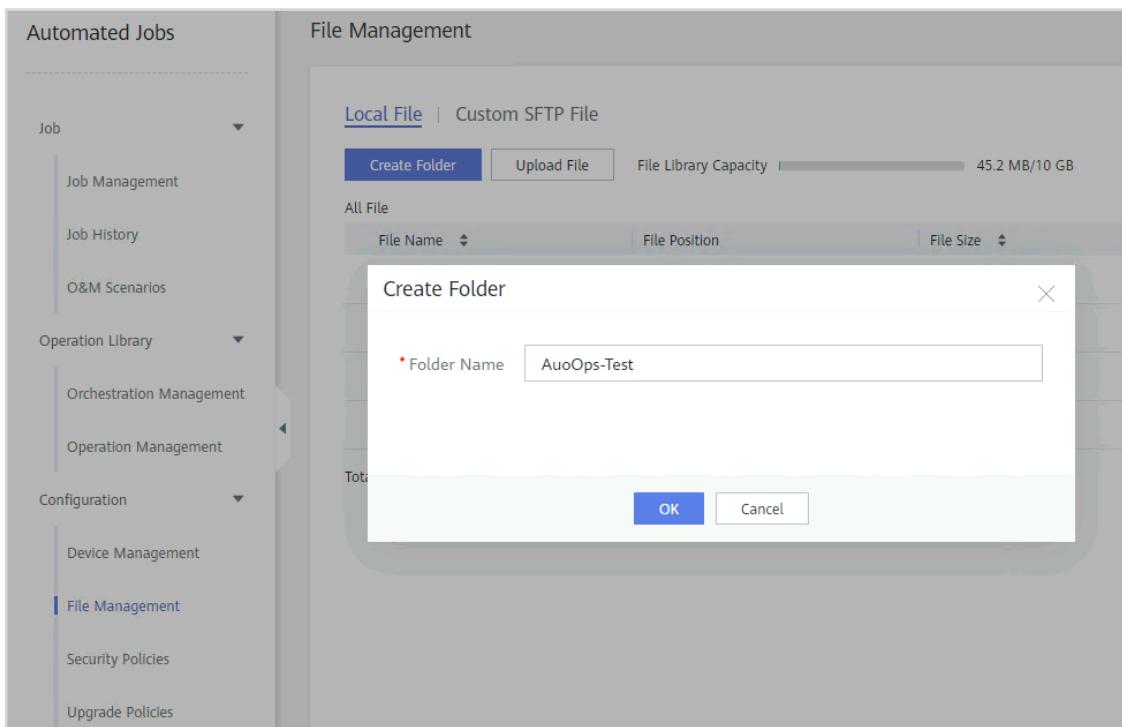
The interface shows the following structure:

- Left sidebar: Automated Jobs, Job (Job Management, Job History, O&M Scenarios), Operation Library (Orchestration Management, Operation Management), Configuration (Device Management, File Management, Security Policies, Upgrade Policies).
- Main area: File Management - Local File | Custom SFTP File. It displays a list of files in a table format:

File Name	File Position	File Size
AutoOps-Test	/AutoOps-Test	--
FusionCare_Inspect_All	/FusionCare_Inspect_All	--
autoops-system-dir	/autoops-system-dir	--
autoops-extend-package-libs-dir	/autoops-extend-package-libs-dir	--

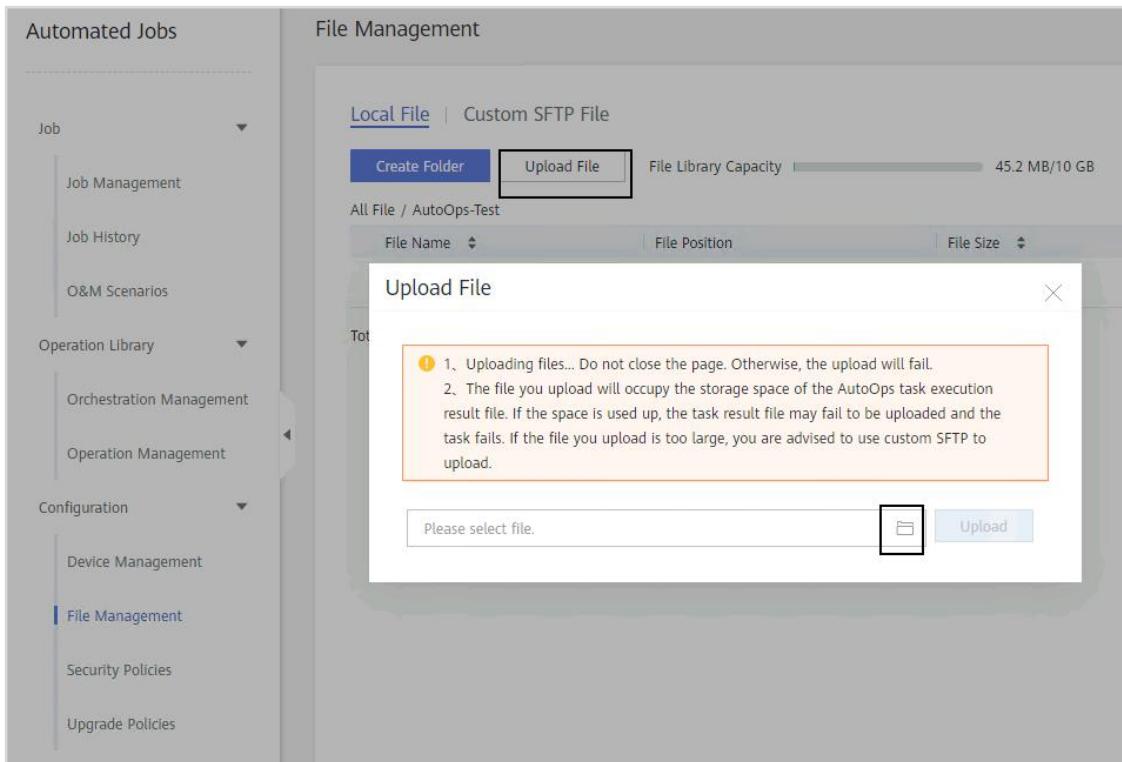
Total Records: 4
- Context menu (open over 'File Management'): Automated Jobs, Logs, Troubleshooting, Health Check, Centralized Configuration, Backup Management.

Step 5 Click Create Folder to create folder **AutoOps-Test used for storing the patch package. Click OK.**

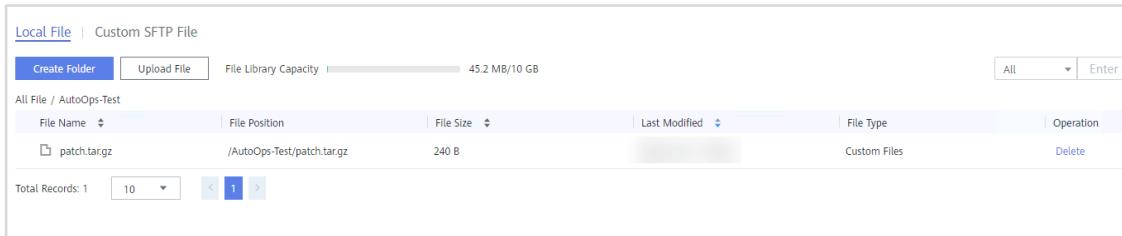


Step 6 Click the new folder, click **Upload File**, select **Local Disk (D:)/Software/patch.rar**, and click **Upload**.

You can download **patch.tar** from the public network contact an administrator to obtain it from a jump server.

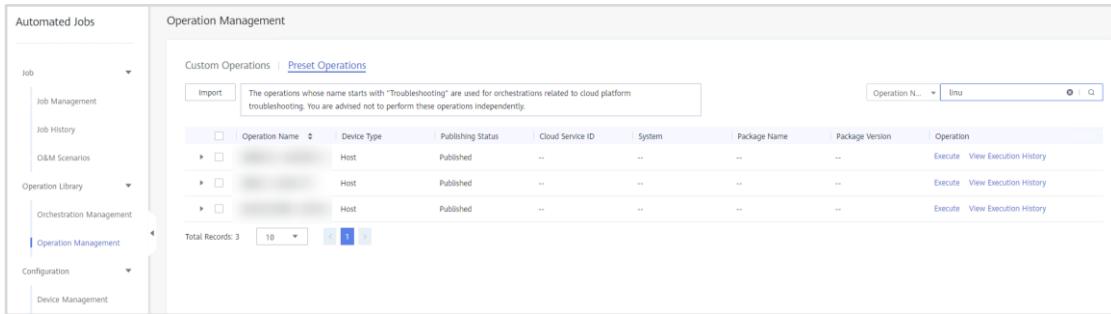


Step 7 View the uploaded file in the **All File** list.



The screenshot shows a file upload interface. At the top, there are buttons for 'Create Folder' and 'Upload File'. A progress bar indicates 'File Library Capacity' at 45.2 MB/10 GB. Below the progress bar, a search bar says 'All' and 'Enter a'. The main area displays a table with one row. The columns are 'File Name' (patch.tar.gz), 'File Position' (/AutoOps-Test/patch.tar.gz), 'File Size' (240 B), 'Last Modified', 'File Type' (Custom Files), and 'Operation' (Delete). At the bottom left, it says 'Total Records: 1' and '10' with navigation arrows.

- Step 8** Choose **Operation Management** in the navigation pane. On the **Preset Operations** tab, filter **linux** in the search box. Browse to **Install patches for Linux OSs in batches** and click **Execute**.



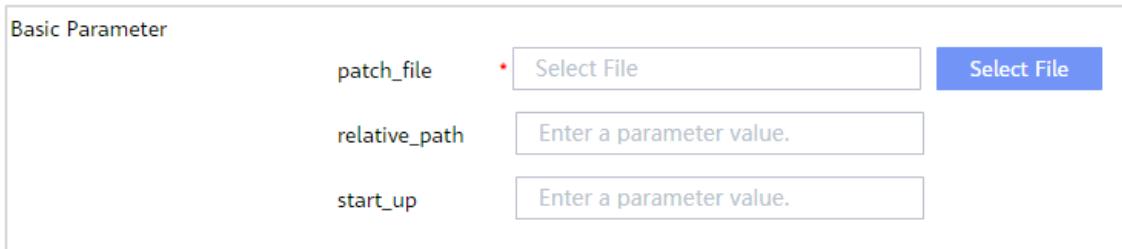
The screenshot shows the 'Operation Management' page. On the left, there's a sidebar with 'Automated Jobs' and several tabs: Job Management, Job History, O&M Scenarios, Operation Library, Orchestrations Management, Operation Management (which is selected), Configuration, and Device Management. The main area has a search bar for 'Operation N...' with 'imu' typed in. Below the search bar, there's a note: 'The operations whose name starts with "Troubleshooting" are used for orchestrations related to cloud platform troubleshooting. You are advised not to perform these operations independently.' A table lists three operations: 'Host' type, Published status, and 'imu' package name. Each row has 'Execute' and 'View Execution History' buttons. Navigation buttons at the bottom show 'Total Records: 3' and '10'.

- Step 9** Configure execution parameters. Click **Select File** in the **Basic Parameters** area and select the uploaded patch package.

Based on the path and name of the startup script in the patch package:

Set **relative_path** to **install**.

Set **start_up** to **start.sh**.



The screenshot shows a configuration form for 'Basic Parameter'. It has three fields: 'patch_file' with a 'Select File' button, 'relative_path' with a placeholder 'Enter a parameter value.', and 'start_up' with a placeholder 'Enter a parameter value.'

- Step 10** In the device list, locate the two ECSs to be prepared in 3.1.3 Prerequisites, select target devices, and click **Execute**.

Device List

Selected Devices: 0 [Clear](#)

Device Name	IP Address	Device Type	Availability Zone	VDC Name	OS Type
vrouter_vm_az0_dc0_group...	10.200.17.68	Management VM	az0.dc0	--	EulerOS
vrouter_vm_az0_dc0_group...	10.200.17.33	Management VM	az0.dc0	--	EulerOS
vpc_endpoint_vm_az0_dc0...	10.200.17.70	Management VM	az0.dc0	--	EulerOS
vpc_endpoint_vm_az0_dc0...	10.200.17.49	Management VM	az0.dc0	--	EulerOS
obsv3-oef-c	vpc_endpoint_vm_az0_dc0_group1_0	Management VM	manage-az	--	EulerOS
obsv3-oef-connector-01	10.200.5.81	Management VM	manage-az	--	EulerOS
natgw_vm_az0_dc0_group1...	10.200.17.56	Management VM	az0.dc0	--	EulerOS
natgw_vm_az0_dc0_group1...	10.200.17.93	Management VM	az0.dc0	--	EulerOS
isap-inst-siem-service-grou...	10.200.45.178	Management VM	az0.dc0	AdvanceService_Manage_V...	EulerOS
isap-inst-siem-service-grou...	10.200.45.141	Management VM	az0.dc0	AdvanceService_Manage_V...	EulerOS

Total Records: 603

10 < 1 2 3 4 ⋯ 61 > 1 Go

[Execute](#) [Cancel](#)

Step 11 After verifying that the script is correct, select **I'm sure that the previous script content has no service risk and determine to execute it.** and click **OK**. The **Job History** page is displayed. You can view the generated job.

Confirm Execution

This operation will be performed on the selected devices, and is irreversible. Exercise caution when performing this operation and evaluate the service impact.

Remark

```

1#!/bin/bash
2 ExitCode=1
3 suffix=${patch_file##*.}
4 if [ ${suffix##*.} = "rpm" ]; then
5     rpm -Fvh --nodeps $patch_file
6     if [ $? -eq 0 ]; then
7         ExitCode=0
8     fi
9 elif [ ${suffix##*.tar} = "gz" ]; then
10    tar -zxfv $patch_file && cd $relative_path/ && bash $start_up
11    if [ $? -eq 0 ]; then
12        ExitCode=0
13    fi
14 elif [ ${suffix##*.tar} = "bz2" ]; then
15    tar -jxvf $patch_file && cd $relative_path/ && bash $start_up
16    if [ $? -eq 0 ]; then
17        ExitCode=0
18    fi
19 else
20    echo "This format file is not supported."
21 fi

```

I'm sure that the previous script content has no service risk and determine to execute it.

[OK](#) [Cancel](#)

Step 12 After installing the patches, Choose **Job > Job History** in the navigation pane and click **Download** to view details.

Automated Jobs

Job History

Job	Job Name	Orchestration/Operation	Execution Policy	Start Time	Time Required	Job Status	Execution Duration	Operation
Job Management			Periodic		15.17s	Successful	--	Download Report Stop
Job History			Periodic		20.44s	Successful	--	Download Report Stop
O&M Scenarios			Periodic		18.74s	Successful	--	Download Report Stop

3.3 Designing Custom Batch Health Checks

3.3.1 Overview

This exercise instructs trainees to perform a routine health check on the CPU and memory usage of two Linux ECSs in batches.

3.3.2 Objectives

Upon completion of this exercise, you will be able to:

- Understand operations of AutoOps.
- Use AutoOps to design custom batch health checks.

3.3.3 Prerequisites

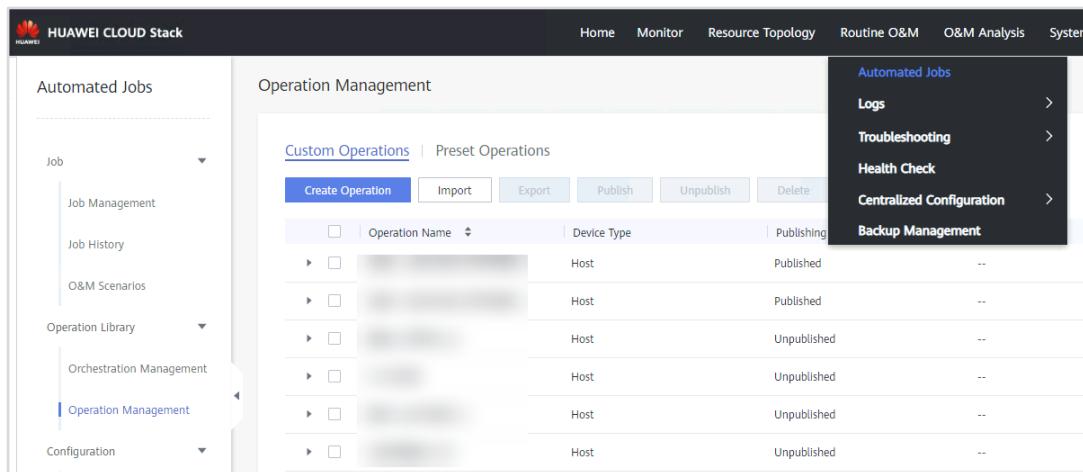
Two Linux ECSs have been created.

3.3.4 Designing Custom Health Check Scripts

Scripts for checking the CPU and memory usage of the Linux OS can be created in Python, Shell, or Bat format. The following uses a shell script as an example.

3.3.4.1 Procedure

- Step 1 Use a browser to log in to ManageOne Maintenance Portal as an O&M administrator. Choose **Routine O&M > Automated Jobs** from the main menu. Choose **Operation Library > Operation Management** in the navigation pane.



Operation Name	Device Type	Publishing	Action
Host	Host	Published	...
Host	Host	Published	...
Host	Host	Unpublished	...
Host	Host	Unpublished	...
Host	Host	Unpublished	...

- Step 2 On the **Operation Management** page, click the **Custom Operations** tab and click **Create Operation**.

	Operation Name	Device Type	Publishing Status
1	Host	Host	Published
2	Host	Host	Published
3	Host	Host	Unpublished
4	Host	Host	Unpublished
5	Host	Host	Unpublished
6	Host	Host	Unpublished
7	Host	Host	Unpublished

- Step 3** Set **Operation Name** to **Check the memory usage of the Linux OS** and **Execution Environment** to **Agent**. Select a health check object for **Device Type**. Enter **Check the memory usage of the Linux OS by running free** for **Operation Description**.

- Step 4** In the **Script Content** dialog box, select **Shell**, enter **free -h** on the CLI, and click **Save**. You can view the new health check operation on the **Operation Management** page.

Script Content

Exercise caution when performing high-risk operations and running commands.

Python Shell Batch ?

```
1 free -h
```

Save Cancel

free is a Linux command used to display the usage of the system memory, including the physical memory, swap memory, and kernel buffer memory. If **-h** is added, the output result is more readable.

Step 5 Return to the **Custom Operations** tab page, find **Check the memory usage of the Linux OS**, click **More**, and select **Publish**. If the operation is published successfully, **Published** is displayed in the **Publish Status** column.

Custom Operations Preset Operations					
<input type="checkbox"/>	Operation Name	Device Type	Publishing Status	Cloud Service ID	Last Modified By
<input type="checkbox"/>	Host	Host	Unpublished	--	admin
<input type="checkbox"/>	Host	Host	Published	--	admin
<input type="checkbox"/>	Host	Host	Unpublished	--	admin
<input type="checkbox"/>	Host	Host	Unpublished	--	admin

Step 6 Refer to step 3 to step 6 to create and publish a health check script for checking the CPU usage of the Linux OS.

Set **Operation Name** to **Check the CPU usage of the Linux OS**.

Set **Operation Description** to **Check the CPU usage of the Linux OS by running top**.

Select **Shell** and enter **top -b -n 1**.

Custom Operations Preset Operations					
Create Operation		Import	Export	Publish	Unpublish
<input type="checkbox"/>	Operation Name	Device Type	Publishing Status	Cloud Service ID	Last Modified By
<input checked="" type="checkbox"/>	Host	Published	--	admin	Execute Clone More
<input checked="" type="checkbox"/>	Host	Published	--	admin	Execute Clone More
<input checked="" type="checkbox"/>	Host	Published	--	admin	Execute Clone More
<input checked="" type="checkbox"/>	Host	Published	--	admin	Execute Clone More

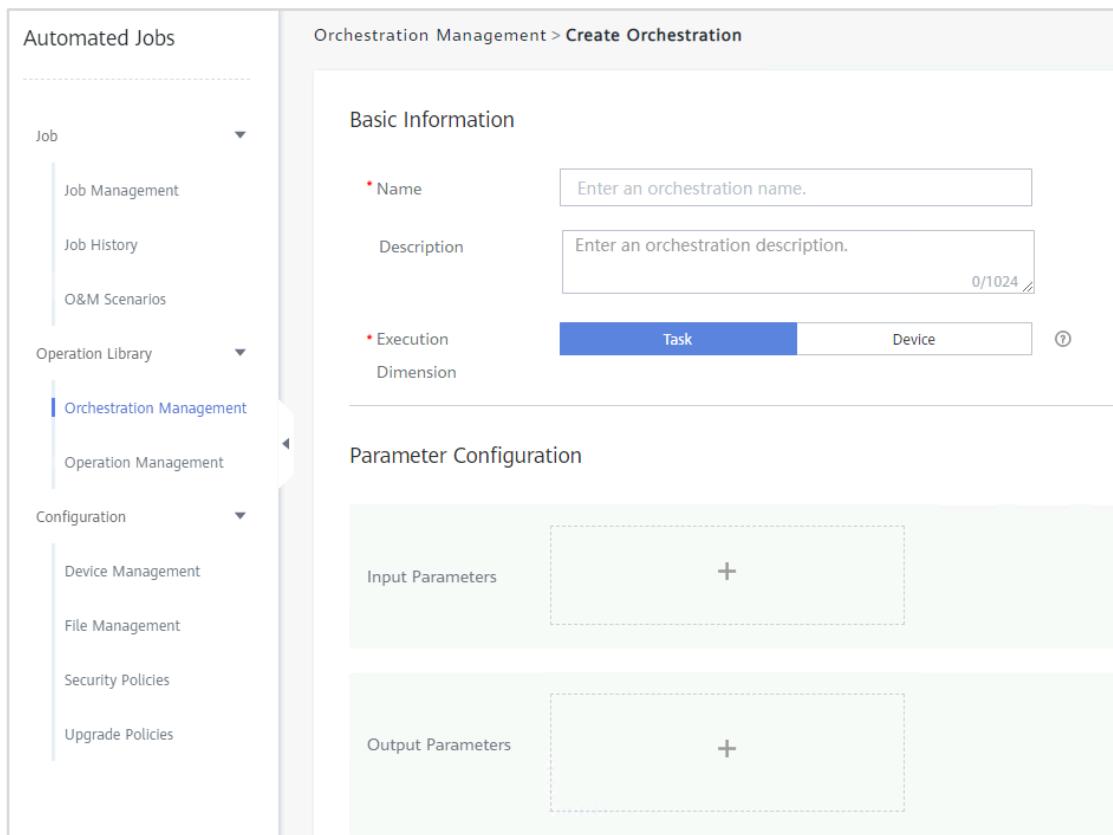
3.3.5 Orchestrating the Health Check Process

Graphically orchestrate and combine the operations for checking the CPU and memory usage of a Linux server.

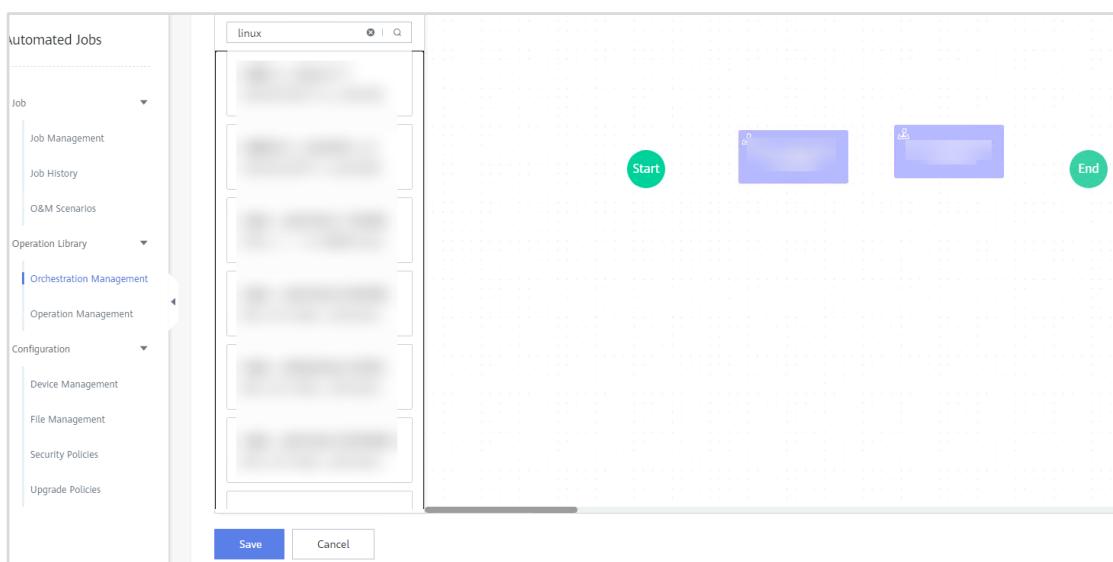
Step 1 Choose **Automated Jobs > Operation Library > Orchestration Management** in the navigation pane.

Automated Jobs		Orchestration Management						
		Custom Orchestrations Preset Orchestrations						
		Create Orchestration		Import	Export	Publish	Unpublish	Delete
<input type="checkbox"/>	Orchestration Name	Last Modified	Publishing Status	Execution Dimension	Cloud Service Version	Cloud Service ID	Last Modified By	Operation
<input checked="" type="checkbox"/>	Host	Published	Task	--	--	admin	Execute View Execution History More	
<input checked="" type="checkbox"/>	Host	Unpublished	Task	--	--	admin	Execute View Execution History More	
<input checked="" type="checkbox"/>	Host	Published	Task	--	--	admin	Execute View Execution History More	
<input checked="" type="checkbox"/>	Host	Unpublished	Device	--	--	admin	Execute View Execution History More	
<input checked="" type="checkbox"/>	Host	Unpublished	Task	--	--	admin	Execute View Execution History More	

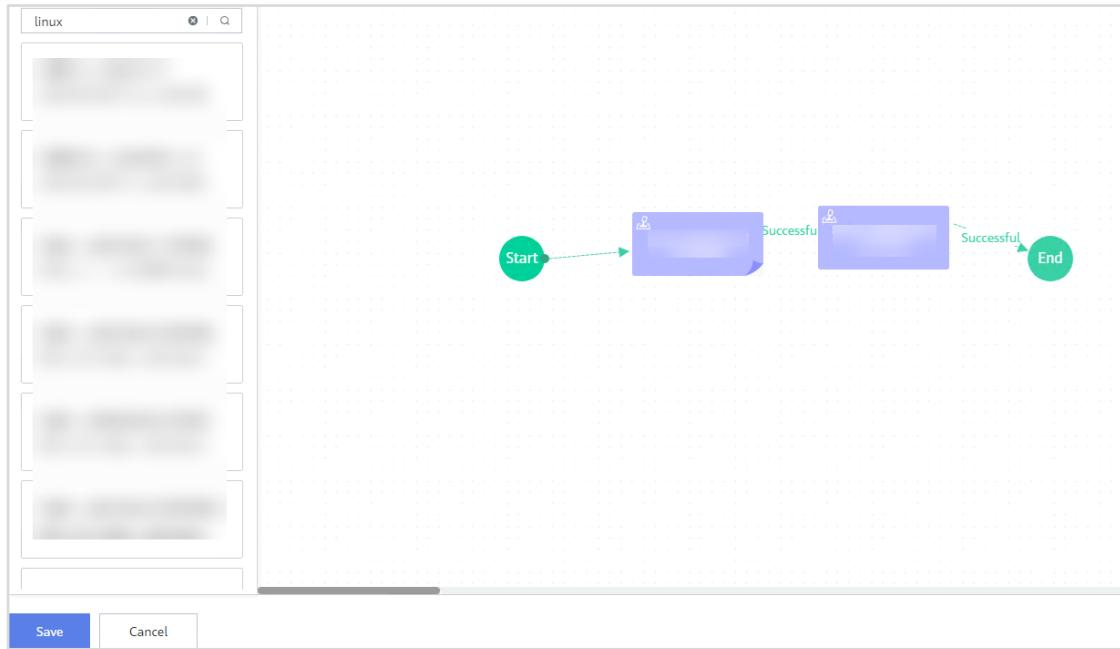
Step 2 Set basic information about the health check orchestration process. Click **Create Orchestration**. Set **Name** to **Linux OS health check orchestration**, **Description** to **Used for Linux OS health check**, and **Execution Dimension** to **Task**.



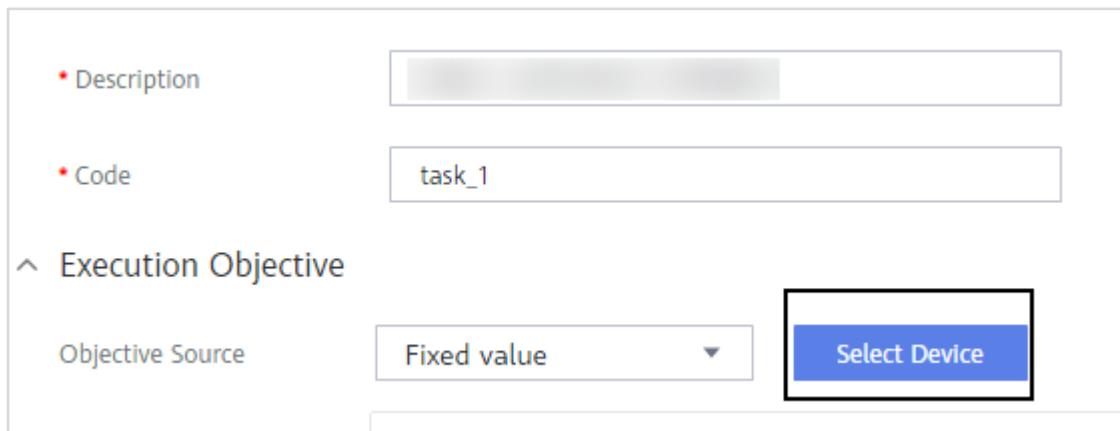
Step 3 In the operation area of the orchestration process, enter **Linux** in the search box. Drag and drop **Check the CPU usage of the Linux OS** and **Check the memory usage of the Linux OS** to the orchestration area.



Step 4 Drag and drop the green point next to **Start** to the **Check the CPU usage of the Linux OS** card. Drag and drop the green point next to **Check the CPU usage of the Linux OS** to the **Check the memory usage of the Linux OS** card. Connecting all required cards forms an orchestration process.



- Step 5** Set orchestration process parameters. Click the **Check the CPU usage of the Linux OS** card. In the displayed area, click the arrow icon on the right of **Objective Source**, select **Fixed value**, and click **Select Device**. Select the ECS created in 3. 3. 3 Prerequisites, confirm the information, and click **OK**. Set orchestration process parameters in the same way for the **Check the memory usage of the Linux OS**. Click **Save** to save the current orchestration process.

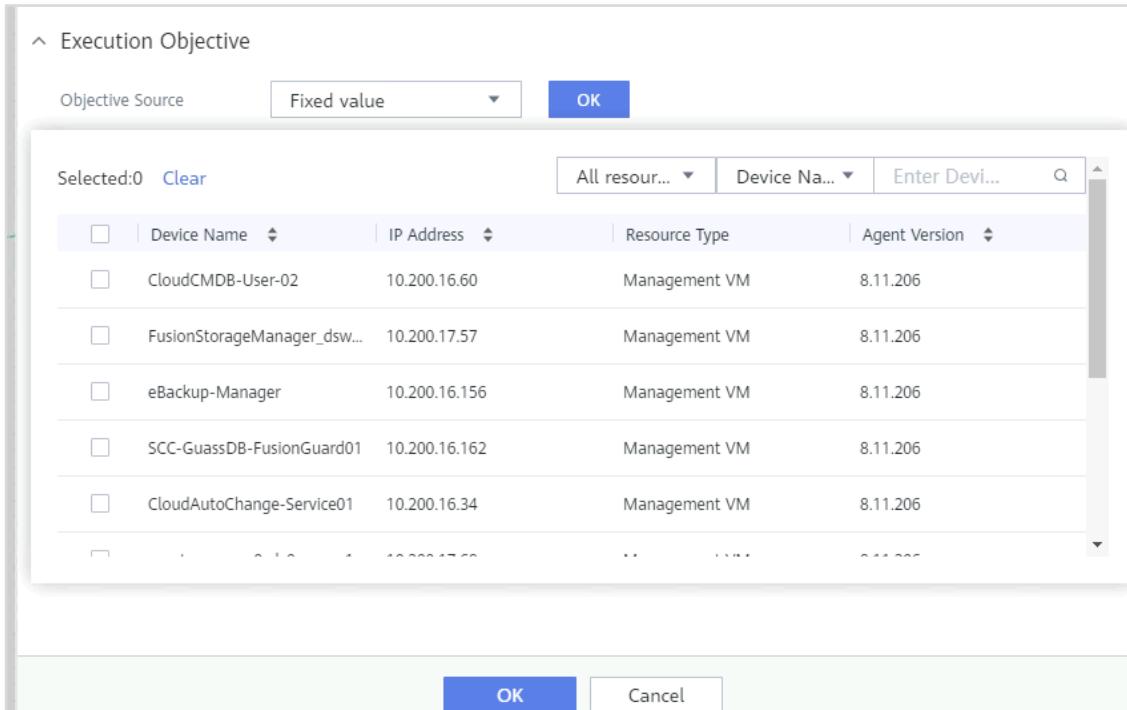


* Description

* Code

Execution Objective

Objective Source Fixed value Select Device



Step 6 Browse to the Linux OS health check orchestration, click **More** and select **Publish**. Click **OK** and check whether **Publishing Status** becomes **Published**.

Orchestration Name	Last Modified	Publishing Status	Execution Dimension	Cloud Service Version	Cloud Service ID	Last Modified By	Operation
CloudCMDB-User-02	2023-07-17 10:00:00	Unpublished	Task	--	--	admin	Execute View Execution History More
FusionStorageManager_dsw...	2023-07-17 10:00:00	Published	Task	--	--	admin	Execute View Execution History More

Step 7 Click **Execute** for the Linux OS health check orchestration. In the displayed dialog box, set **whether to suspend an execution exception** to **Yes** and click **Execute**.

The screenshot shows the HUAWEI CLOUD Stack Lab Guide (O&M) interface. At the top, there is a navigation bar with 'Custom Orchestrations' and 'Preset Orchestrations'. Below this is a table listing orchestrations with columns for Name, Last Modified, Publishing Status, Execution Dimension, Cloud Service Version, Cloud Service ID, Last Modified By, and Operation. A search bar at the top right filters by 'Orchestration Na...' and 'Linux'. The table shows two entries: one published Task and another published Task. The bottom of the table shows 'Total Records: 2' and a page number '1'. In the center, a modal dialog titled 'Orchestration Management > Execute Orchestration' is displayed. It contains fields for 'Orchestration Name' (blurred), 'Orchestration Description' (blurred), and a question 'Whether to suspend an execution exception' with radio buttons for 'Yes' (unselected), 'No' (selected), and a help icon. At the bottom are 'Execute' and 'cancel' buttons.

Step 8 Select I'm sure that the previous graph content has no service risk and determine to execute it. and click OK.

The screenshot shows the HUAWEI CLOUD Stack Lab Guide (O&M) interface with the 'Automated Jobs' sidebar open. The 'Orchestration Management' section is selected. A modal dialog titled 'Orchestration Management > Execute Orchestration' is open, showing the 'Confirm Execution' step. It displays the orchestration name, description, and the 'Whether to suspend an execution exception' setting (No). A warning message in an orange box states: 'This operation will be performed on the selected devices, and is irreversible. Exercise caution when performing this operation and evaluate the service impact.' There is a 'Remark' input field with placeholder 'Enter a remark.' and a graph visualization showing a flow from 'Start' to a central node and then to 'End', with arrows labeled 'Successful'. At the bottom of the dialog, a checkbox is checked with the text: 'I'm sure that the previous graph content has no service risk and determine to execute it.' Below the checkbox are 'OK' and 'Cancel' buttons.

Step 9 Wait for the execution result. If **Job Status** changes from **Executing** to **Successful**, the overall orchestration process is successfully executed. Click **Download** to view the health check details.

The screenshot shows two tables of job history. The top table has columns for Job Name, Orchestration/Operation, Execution Policy, Start Time, Time Required, Job Status, Execution Dime..., Operation, Task, Download, Report, and Stop. The bottom table has similar columns. Both tables show entries with status 'Successful'.

3.3.6 Performing a Health Check

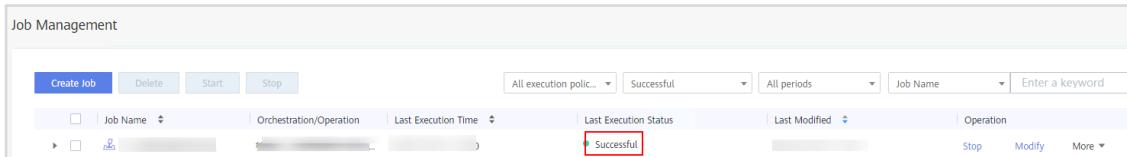
To perform a Linux OS health check and view the result, you can create a job on the **Job Management** page. You can specify execution parameters of each job for different scenarios. For example, you can select devices on which O&M operations are to be performed and set scheduled jobs for repeated use during O&M.

Step 1 Choose **Job > Job Management** in the navigation pane. Click **Create Job**. Set **Job Name** to **Linux OS health check job** and **Orchestration/Operation** to **Check the CPU usage of the Linux OS**. In **Device List**, select target devices, select **Scheduled (one-time)** for **Execution Policy**, and set **Execution Time** to a custom value, for example, 5 minutes later. Click **Save**.

The screenshot shows the 'Job Management > Create Job' dialog. It includes fields for Job Name, Orchestration/Operation (set to 'Operation'), Device List (listing various management VMs), and execution parameters. The 'Execution Policy' section shows 'Scheduled (one-time)' selected, and the 'Execution Time' field is set to '2'. At the bottom are 'Save' and 'Cancel' buttons.

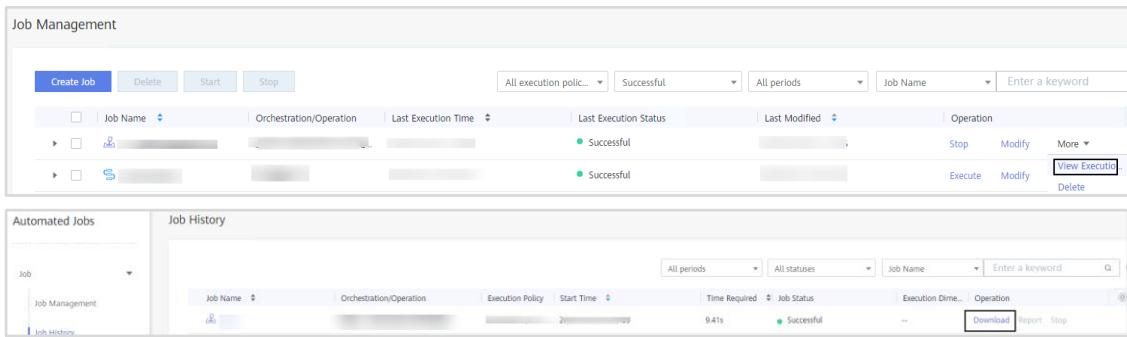
Step 2 Check the execution status. If **Last Execution Status** becomes **Successful**, the health check job is successfully executed.

The screenshot shows the 'Job Management' page with a table of jobs. The top row of the table has filters for 'All execution policies', 'All statuses', 'All periods', 'Job Name', and 'Enter a keyword'. The table columns include 'Job Name', 'Orchestration/Operation', 'Last Execution Time', 'Last Execution Status', 'Last Modified', 'Operation', 'Stop', 'Modify', and 'More'. One job entry shows 'Last Execution Status' as 'Successful'.



The screenshot shows the 'Job Management' interface. At the top, there are buttons for 'Create Job', 'Delete', 'Start', and 'Stop'. Below these are several dropdown filters: 'All execution polic...', 'Successful', 'All periods', 'Job Name', and 'Enter a keyword'. A red box highlights the 'Successful' filter. The main table lists jobs with columns for 'Job Name', 'Orchestration/Operation', 'Last Execution Time', 'Last Execution Status' (with a green dot next to 'Successful'), 'Last Modified', and 'Operation' (with buttons for 'Stop', 'Modify', and 'More').

Step 3 Click **More** and select **View Execution History** to go to the **Job History** page. Click **Download** and verify the execution result.



This screenshot shows the same 'Job Management' interface as above, but with a different focus. The 'More' button in the top right has been clicked, and a dropdown menu is open with 'View Execution History' highlighted by a red box. The rest of the interface remains the same, showing the list of automated jobs and their details.

[Question 5] What are main functions of AutoOps? How it can assist in O&M?

4 Operations Analysis

4.1 Operations Analysis

4.1.1 Overview

This exercise instructs trainees to use preset reports in typical scenarios, create custom reports, and manage periodic reports on ManageOne Maintenance Portal of HUAWEI CLOUD Stack, analyze capacity and resource data, and understand KPIs and health of NEs and services. These skills help make O&M decisions and cloud platform plans.

4.1.2 Process

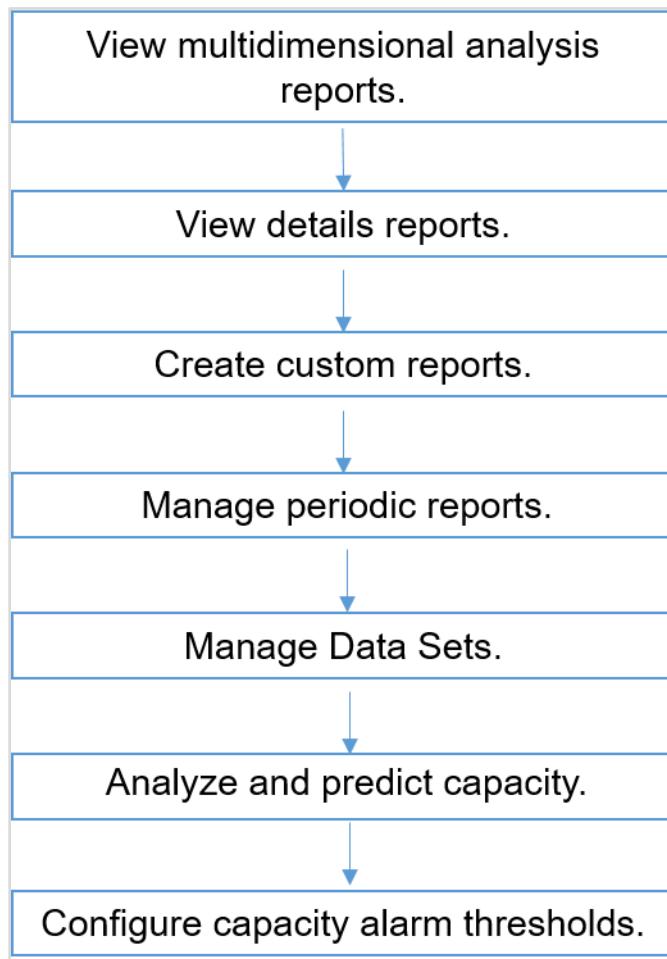


Figure 4-1 Process

4.1.3 Objectives

Upon completion of this exercise, you will be able to:

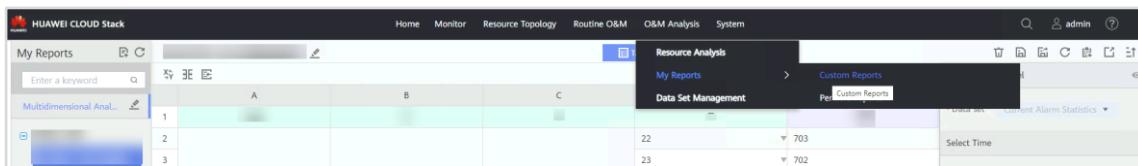
- View multidimensional analysis reports.
- View details reports.
- Create custom reports.
- Manage periodic reports.
- Manage data sets.
- View predicted resource capacity.
- Analyze cloud service capacity.
- Configure capacity monitoring.

4.2 Operations

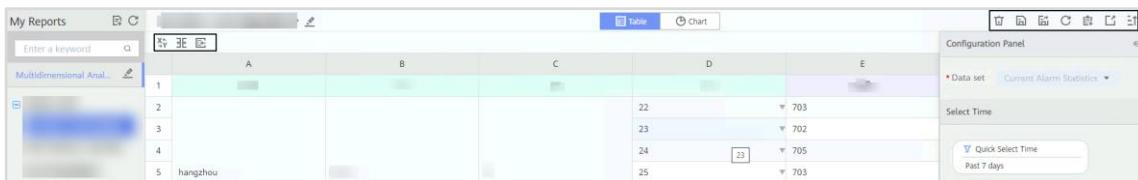
4.2.1 Viewing Multidimensional Analysis Reports

4.2.1.1 Procedure

- Step 1 Log in to ManageOne Maintenance Portal as an O&M administrator using a browser. Choose **O&M Analysis > My Reports > Custom Reports** from the main menu. In the navigation pane, select a report type in the **Multidimensional Analysis Reports** area. Click  next to the report type to view reports.



- Step 2 In the upper right corner, replace rows and columns, split cells, and summarize metrics in the report. In the upper right corner, click icons to delete, save, or save as the report, refresh, create, or export a periodic report, and export task details.



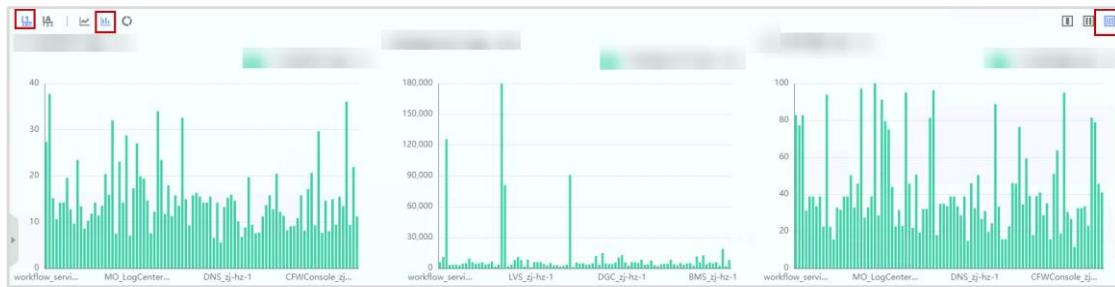
- Step 3 In the navigation pane, choose **Capacity Statistics Analysis Report > Resource Pool EVS Quantity Trends**, locate the arrow icon, and click **Drill up** or **Drill down**.

- Step 4** In the navigation pane, choose **Resource Usage Analysis Report > Cloud Platform Management System Resource Usage Analysis**. In the report on the right, click an underlined value, for example, 27.35 to view details about the value.

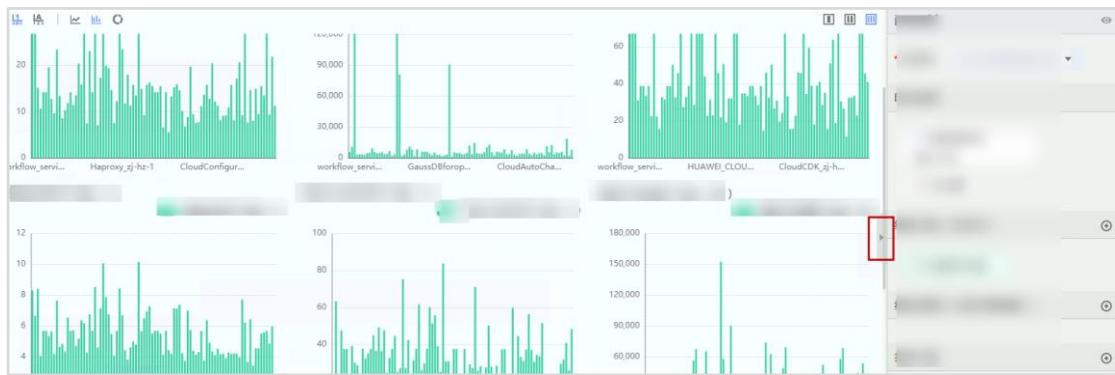
	A	B	C	D	E	F	
1							
2	workflow_service_zj-hz-1	<u>27.35</u>	5792.41	82.80	8.30	18.75	10800.42
3	eSight_zj-hz-1	37.72	10972.31	77.30	6.66	63.47	32327.68
4	eBackup_service1_zj-hz-1	15.15	125663.54	82.80	8.41	11.53	30584.18
5	WAF_zj-hz-1	10.63	3097.62	31.10	4.05	47.52	38867.17
6	VPN_zj-hz-1	14.19	3553.48	38.80	5.68	37.60	17238.98
7	VPC_zj-hz-1	14.19	3553.48	38.80	5.68	37.60	17238.98
8	VPC-Endpoint_zj-hz-1	19.54	2777.01	33.50	5.34	11.32	12052.21
9	TaskCenter_zj-hz-1	12.74	4541.27	38.80	5.65	39.21	21223.03

- Step 5** In the navigation pane, choose **Resource Usage Analysis Report > Cloud Platform Management System Resource Usage Analysis**. Click in the upper right corner to return to the report. Click **Chart** on the top of the page. The report is displayed in a chart. On the **Cloud Platform Management System Resource Usage Analysis** page, click icons in the upper left corner to display the report by indicator in a bar chart. Click the highlighted icon in the upper right corner to display reports in three columns.

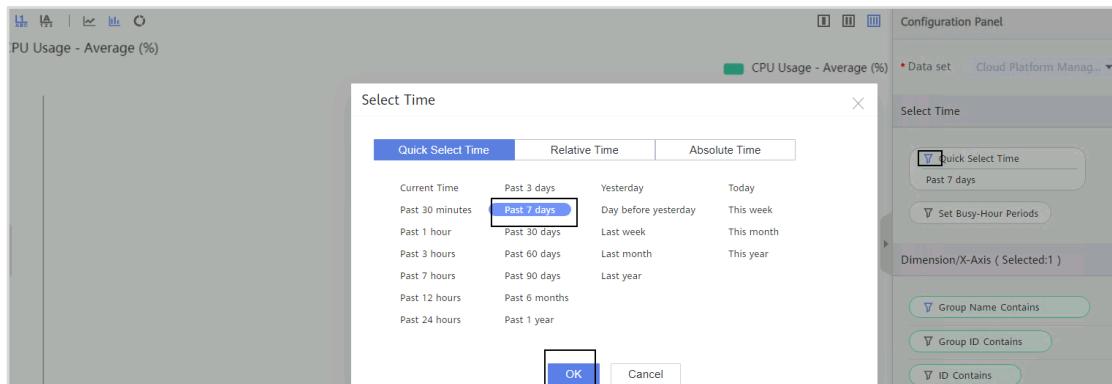
	A	B
1		
2	6FC7DAE71B9A3BC4B9FFE1AE5222399B	eBackup-Manager_zj-hz-1
3	40A0F264175732B085B7775614F3529C	eBackup-Workflow_zj-hz-1



Step 6 Click the arrow icon to expand the configuration panel. Configure the following parameters and click **Update**.



Select time: Click on the left of **Quick Select Time**. In the displayed dialog box, select **Quick Select Time** and **Past 7 days** and click **OK**.



Dimension/X-Axis: Click , select **Group Name**, and click next to **Group Name Contains**. In the displayed **Filter** dialog box, click to move all groups to the **Selected** area and click **OK**.

Select Dimension

Configuration Panel

* Data set Cloud Platform Manag...

Select Time

Quick Select Time
Past 7 days

Set Busy-Hour Periods

Dimension/X-Axis (Selected:1)

Group Name Contains

Dimension/Legend (Selected:1)

Filter

Enter a keyword

Available

Selected

Contains

CloudMiddleWare_zj-hz-1
CloudDB_zj-hz-1
CloudAutoDeploy-CDK-Clusters...
OpenStack_zj-hz-1
DBSPlatform_zj-hz-1
ManageOne_zj-hz-1
BasicService_zj-hz-1
CSP_zj-hz-1
ISAP_zj-hz-1

OK Cancel

Configuration Panel

* Data set Cloud Platform Manag...

Quick Select Time
Past 7 days

Set Busy-Hour Periods

Dimension/X-Axis (Selected:1)

Group Name Contains

Dimension/Legend (Selected:1)

Day Contains

Indicator/Y-Axis

Dimension/Legend: Click , select **Day**, and click next to **Day Contains**. In the displayed **Filter** dialog box, click to move all groups if there are any to the **Selected** area and click **OK**.

Select Dimension

<input type="checkbox"/> Year	<input type="checkbox"/> Month	<input type="checkbox"/> Week	<input checked="" type="checkbox"/> Day
<input type="checkbox"/> Week Day	<input type="checkbox"/> Hour	<input type="checkbox"/> Group ID	<input type="checkbox"/> ID
<input type="checkbox"/> Name	<input type="checkbox"/> IP Address		

Configuration Panel

- * Data set Cloud Platform Manag... ▾
- Quick Select Time Past 7 days
- Set Busy-Hour Periods

Dimension/X-Axis (Selected:1)

- Group Name Contains

Dimension/Legend (Selected:1)

- Day Contains

Indicator/Y-Axis

Filter

Enter a keyword <input type="text"/>	Contains <input type="button" value="Contains"/>
Available	Selected
<input type="button" value=">>"/>	1 29 30
<input type="button" value=">"/>	<input type="button" value="<"/>
<input type="button" value="<<"/>	
<input type="button" value="OK"/>	<input type="button" value="Cancel"/>

CPU Usage - Average (%)

Indicator/Y-Axis: Click next to **CPU Usage-Average (%)**. In the displayed dialog box, select **Top N**, set **Quantity** to 5, select **Partial desc**, and click **OK**. Return to the configuration panel and click on the right of other indicators to delete them.

Indicator/Y-Axis: Click next to **CPU Usage-Average (%)**, and click next to **CPU Usage-Average (%)**. In the displayed dialog box, select **Top N**, set **Quantity** to 5, select **Partial desc**, and click **OK**. Return to the configuration panel and click on the right of other indicators to delete them.

Select Indicator

- CPU Usage - Average (%)
- Available Physical Memory - Average (MB)
- Available Virtual Memory - Average (MB)
- Large-sized Files - Average
- Physical Memory Usage - Average (%)
- NTP Offset - Average (ms)
- Processes - Average
- Number of Running Processes - Average
- OS Operating Duration - Average (days)
- Physical Memory - Average (MB)
- Virtual Memory - Average (MB)
- Virtual Memory Usage - Average (%)
- Free Inodes - Average (%)
- Available Disk Capacity - Average (MB)
- Disk Capacity - Average (MB)
- Disk Usage - Average (%)
- Disk I/O Time Ratio - Average (%)

Configuration Panel

- ✖ Data set Cloud Platform Manag...
- Dimension/X-Axis (Selected:1)
- Group Name Contains
- Dimension/Legend (Selected:1)
- Day Contains
- Indicator/Y-Axis
- CPU Usage - Average (%)
- More Filters

Filter by Indicator - CPU Usage - Average (%)

Top N Top N sorting applies only to a single metric. If you enter 0 or the maximum value, all data is displayed.

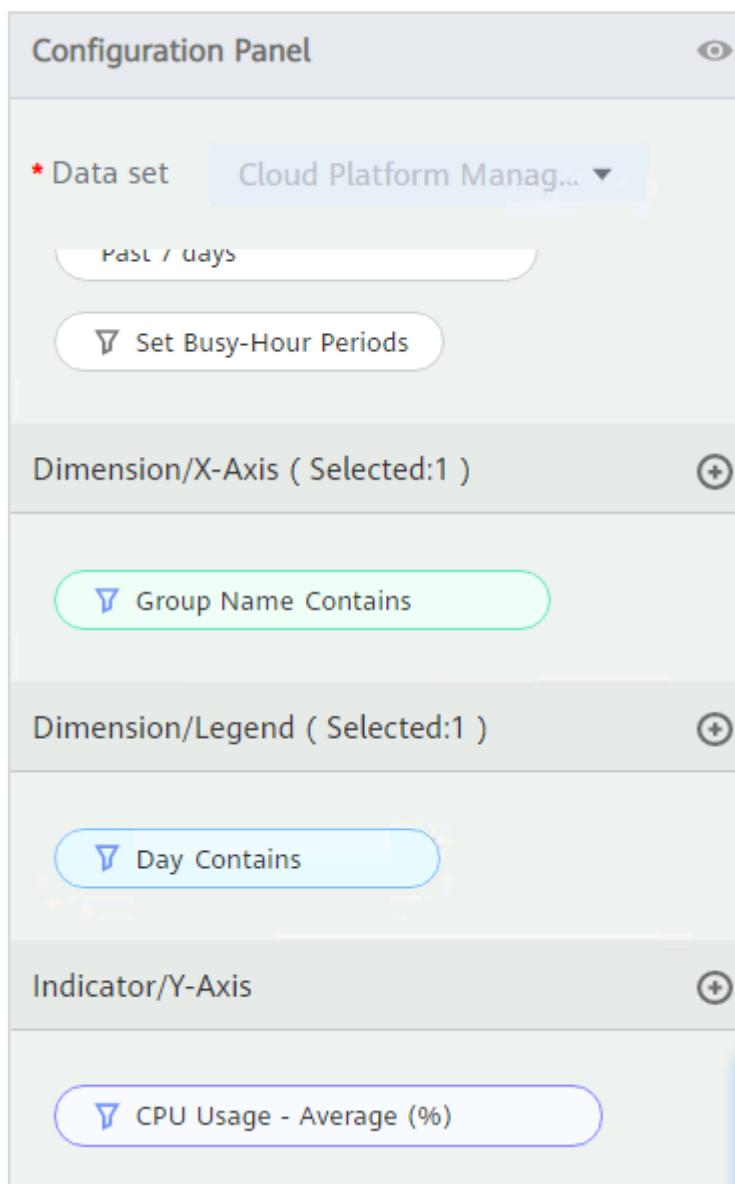
Quantity:

Global desc Global asc Partial desc Partial asc

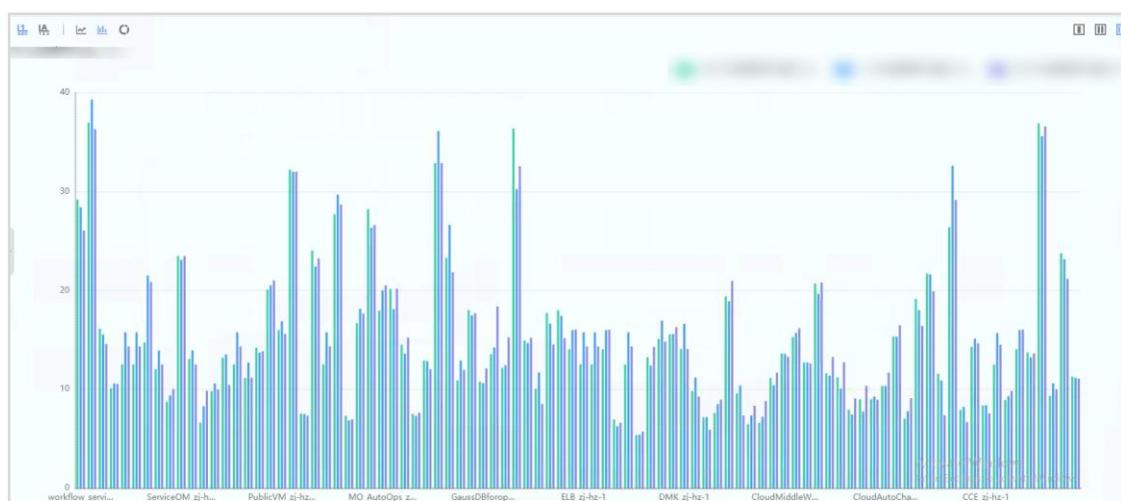
Condition

OK **Cancel**

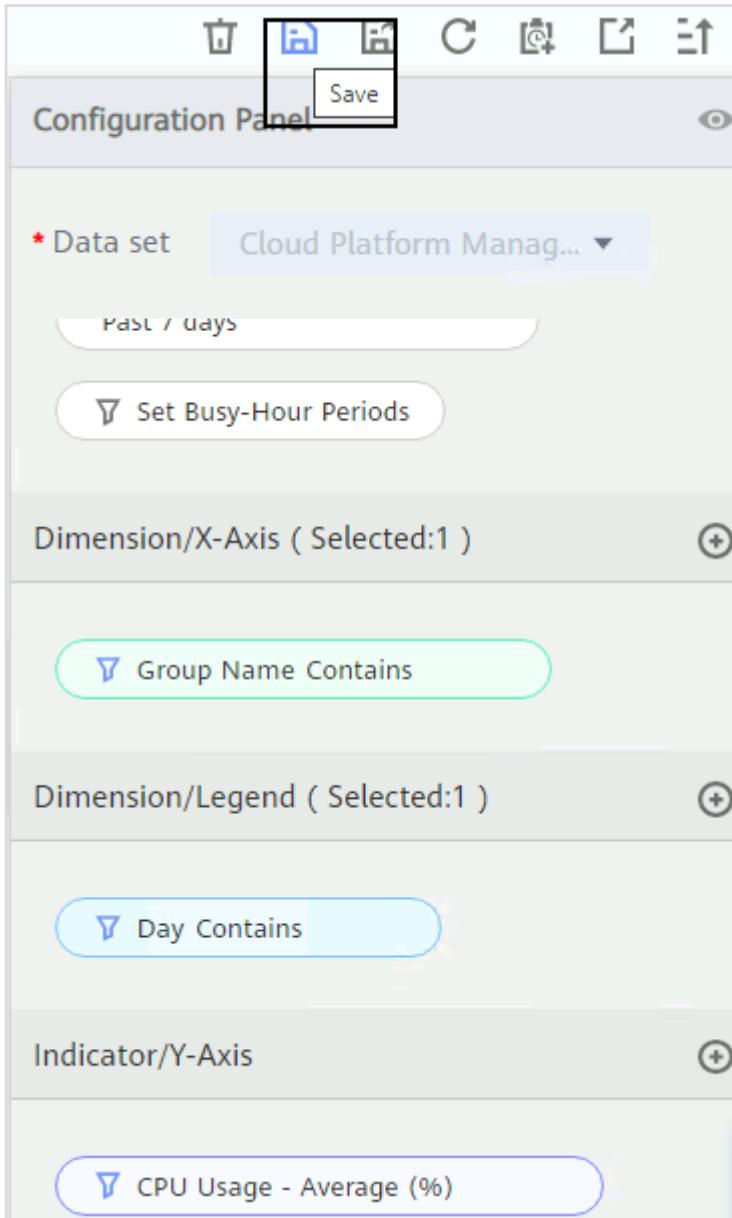
Retain the default settings for other parameters and click **Update**.



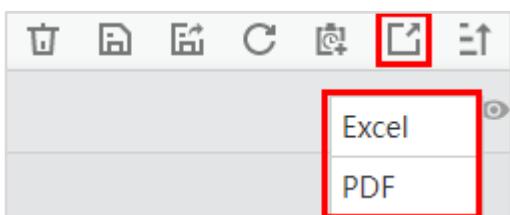
Step 7 View the updated chart.



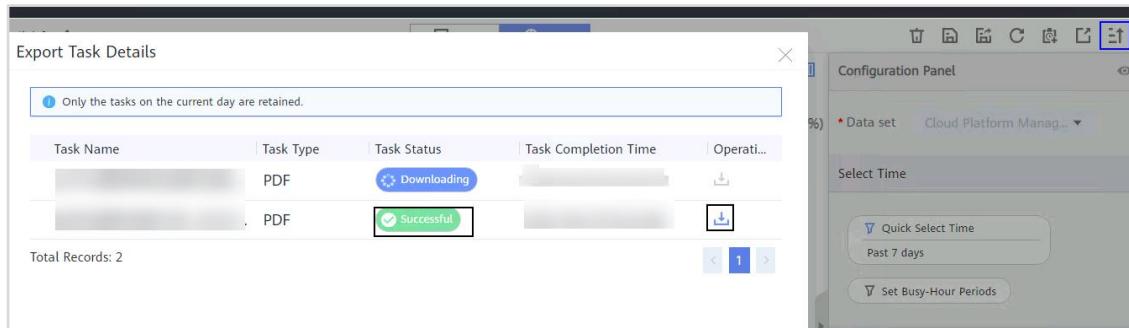
Step 8 Click  in the upper right corner to save the current settings.



Step 9 Click  in the upper right corner to export the report in Excel or PDF format.



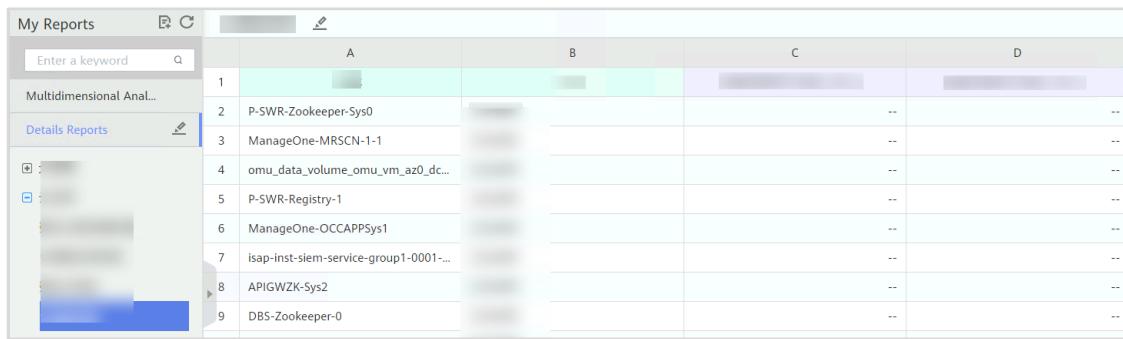
Step 10 Click  in the upper right corner. In the displayed dialog box, click  to download the exported report.



4.2.2 Viewing Details Reports

4.2.2.1 Procedure

Step 1 In the navigation pane, select a report type in the **Details Reports** area, click  next to the report type, and select an EVS disk details report.



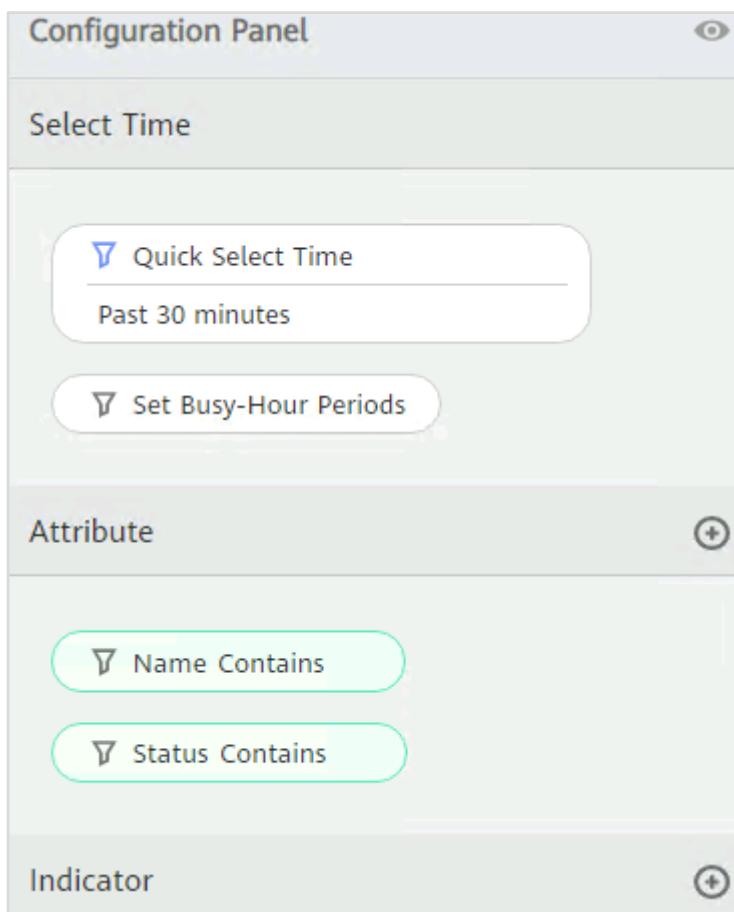
The screenshot shows the 'My Reports' interface. On the left, there's a navigation pane with sections for 'Multidimensional Anal...' and 'Details Reports'. Under 'Details Reports', there is a list of nine items, each with a small thumbnail and a title. The titles include: P-SWR-Zookeeper-Sys0, ManageOne-MRSCN-1-1, omu_data_volume_omu_vm_az0_dc..., P-SWR-Registry-1, ManageOne-OCCAPPSys1, isap-inst-siem-service-group1-0001..., APIGWZK-Sys2, and DBS-Zookeeper-0.

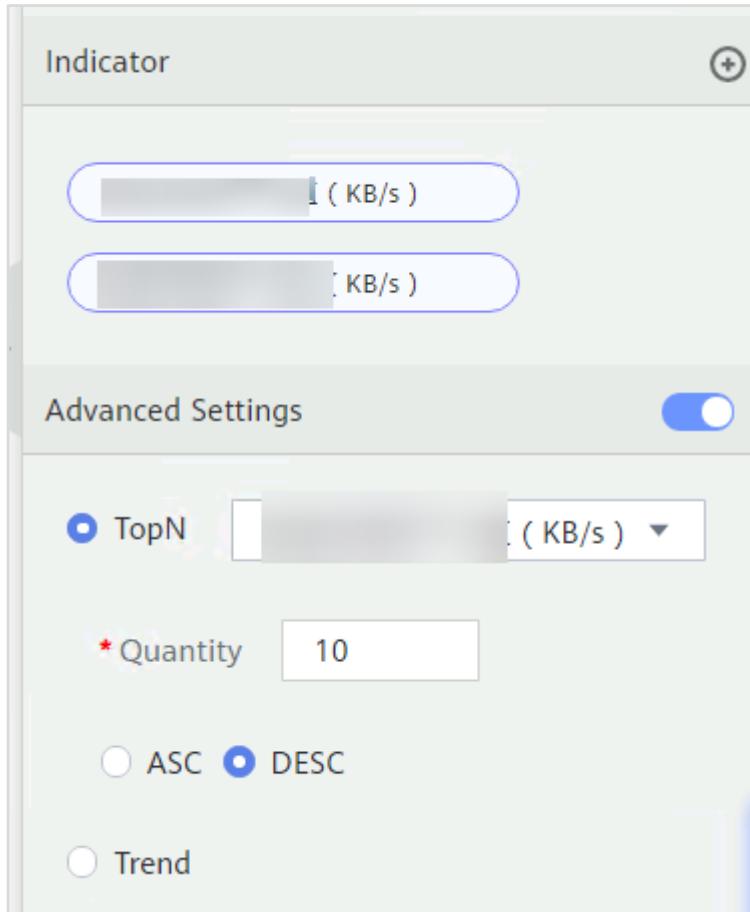
Step 2 On the configuration panel, filter values as follows and click **Update**.

Set **Quick Select Time** to **Past 30 minutes**.

Toggle on **Advanced Settings**, select **Top N Average Disk Read Rate (KB/s)**, set **Quantity** to **10**, and select **DESC**.

Retain the default settings for other parameters and click **Update**.





Step 3 View the report on the left of the page.

	Name	Status	(KB/s)	(KB/s)
2	ecs-Huawei-volume-0000		--	--
3	ecs-Huawei-volume-0000		--	--
4	vAPP_WordPress_sysVolume		--	--
5	vAPP_WordPress_sysVolume		--	--

Step 4 If you click **Chart** in the upper part of the page, the report is displayed in a chart. Select single indicator for multiple objects or single object for multiple indicators in the upper left corner. You can also click the highlighted icon in the upper right corner to display reports in two columns.

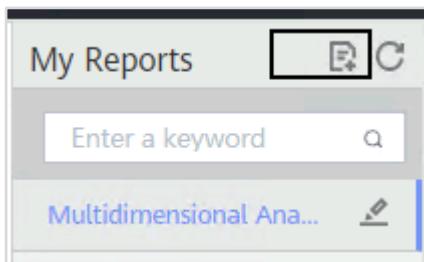


Step 5 Perform Step 9 and Step 10 in 4.2.1 Viewing Multidimensional Analysis Reports to save and export the current report.

4.2.3 Creating Custom Reports

4.2.3.1 Procedure

Step 1 Click in the navigation pane.



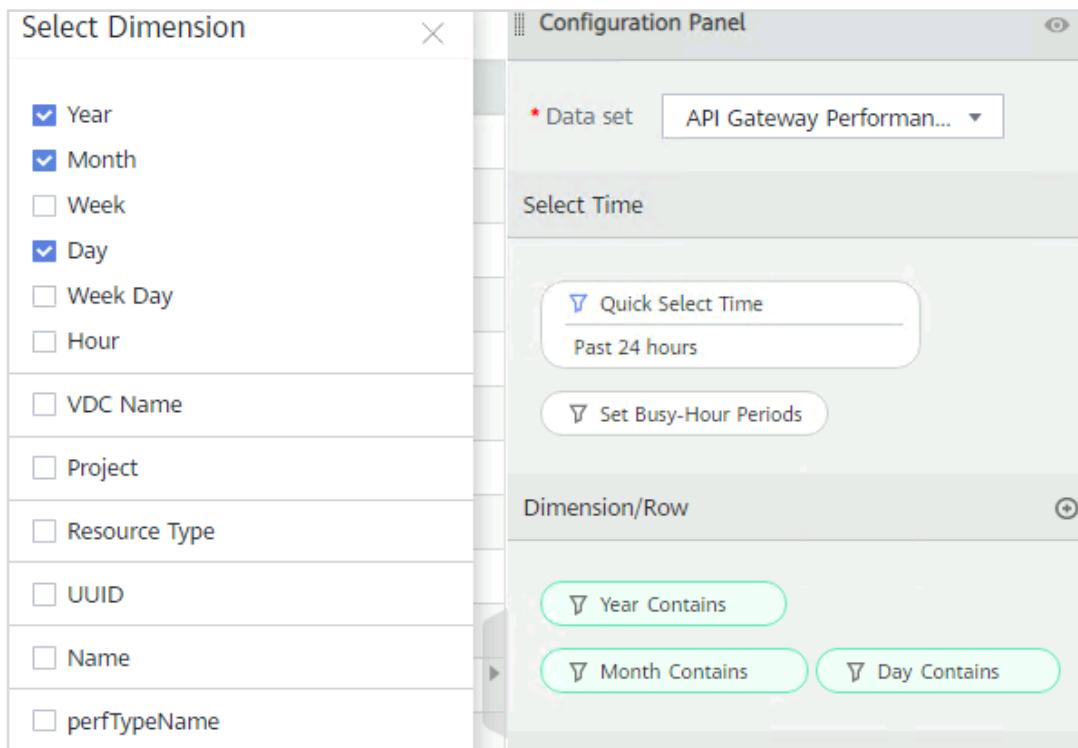
Step 2 Choose **Create Blank > Multidimensional Analysis Reports** or choose **Details Template** in the navigation pane.

Step 3 On the configuration panel, filter values as follows and click **Update**.

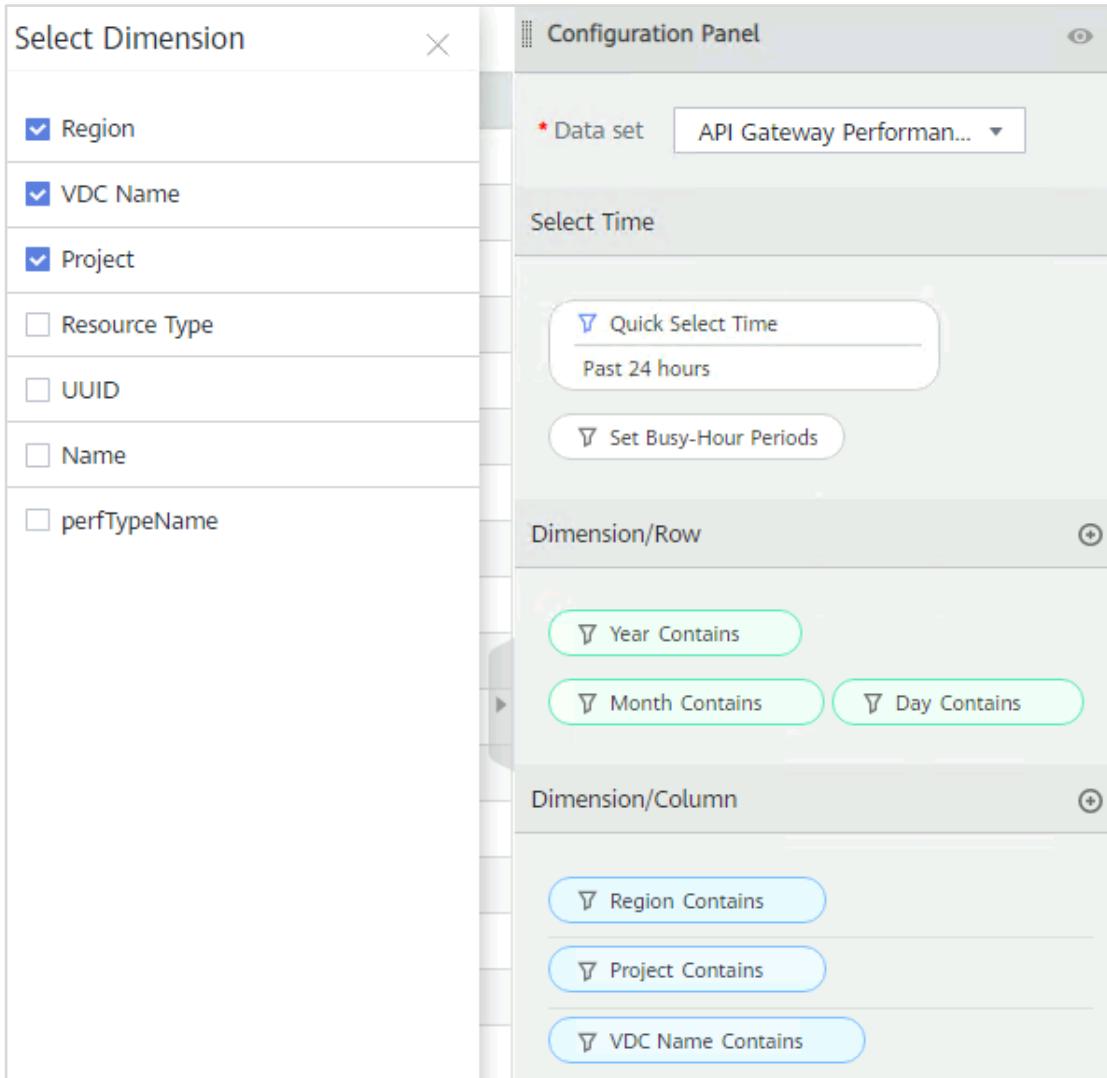
Data set: Computing Resource Capacity

Select Time: This month

Dimension/Row: Click  on the right. In the displayed **Select Dimension** dialog box, select **Year**, **Month**, and **Day**, and click .



Dimension/Column: Click  on the right. In the displayed **Select Dimension** dialog box, select **Region**, **VDC Name**, and **Project**, and click .



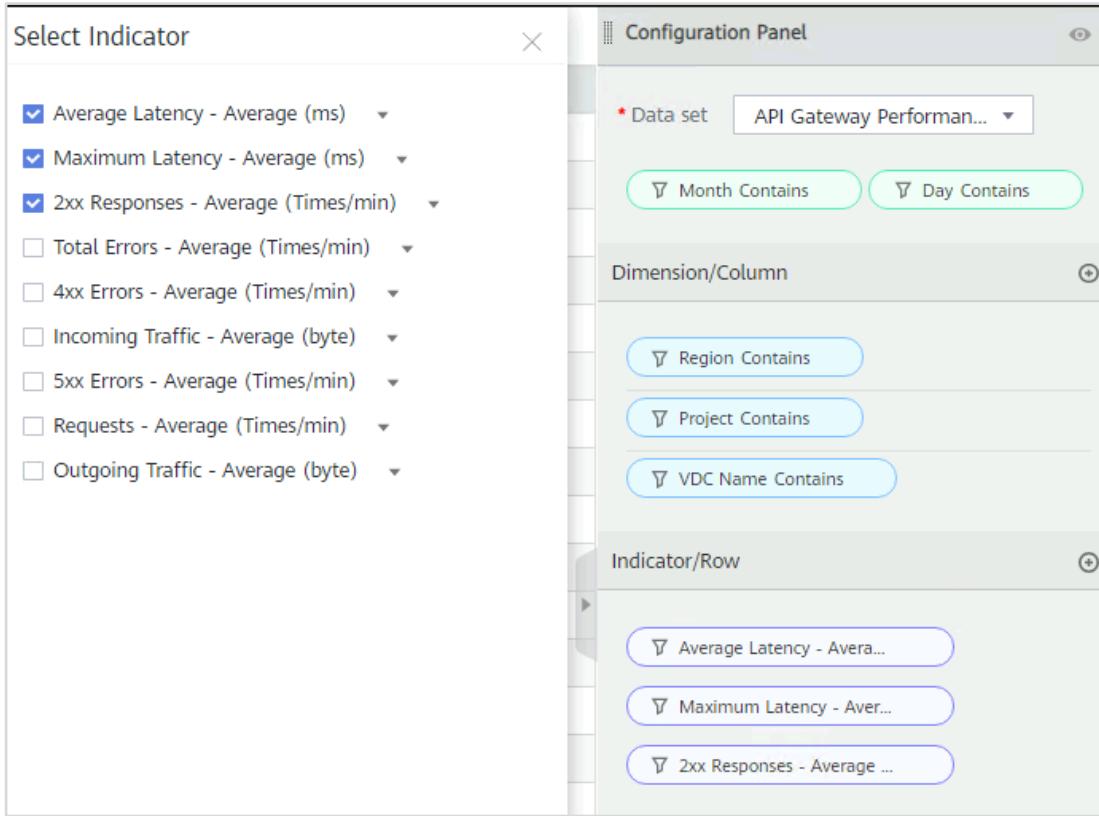
The screenshot shows the Configuration Panel interface. On the left, a 'Select Dimension' dialog box is open, listing various filtering options:

- Region
- VDC Name
- Project
- Resource Type
- UUID
- Name
- perfTypeName

On the right, the main panel has the following sections:

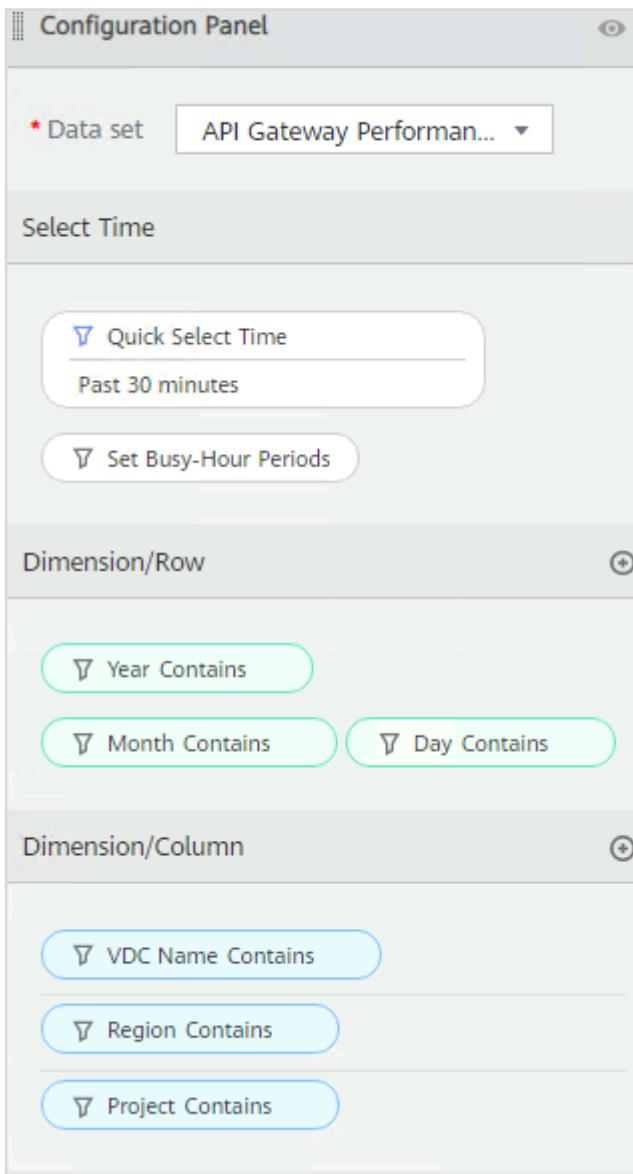
- Data set:** API Gateway Performan... (dropdown menu)
- Select Time:**
 - Quick Select Time (button) - Past 24 hours
 - Set Busy-Hour Periods (button)
- Dimension/Row:**
 - Year Contains
 - Month Contains
 - Day Contains
- Dimension/Column:**
 - Region Contains
 - Project Contains
 - VDC Name Contains

Indicator/Row: Click  on the right. In the displayed **Select Indicator** dialog box, select indicators shown in the following figure and click .

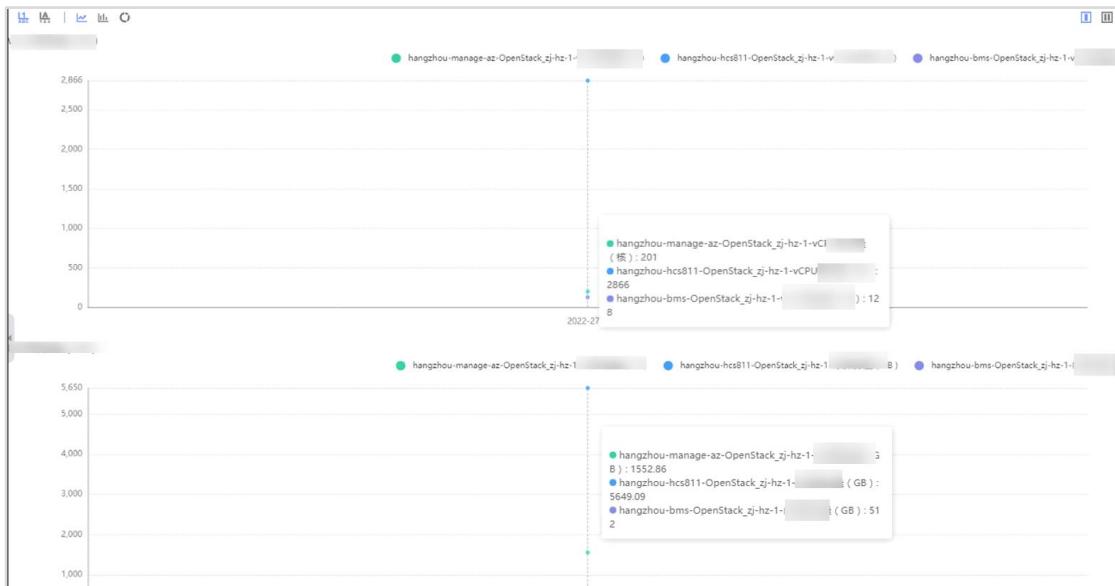


The screenshot shows the Configuration Panel interface. On the left, a 'Select Indicator' dialog box lists various performance metrics with checkboxes. The checked items are: Average Latency - Average (ms), Maximum Latency - Average (ms), and 2xx Responses - Average (Times/min). On the right, the main panel has three sections: 'Data set' (set to API Gateway Performan...), 'Dimension/Column' (with filters for Month Contains, Day Contains, Region Contains, Project Contains, and VDC Name Contains), and 'Indicator/Row' (with filters for Average Latency - Aver..., Maximum Latency - Aver..., and 2xx Responses - Average ...).

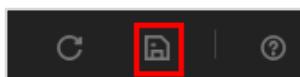
Step 4 The configured data is displayed in the report on the left of the page. In the upper left corner, click the corresponding button to convert rows and columns, split cells, and summarize indicator data.



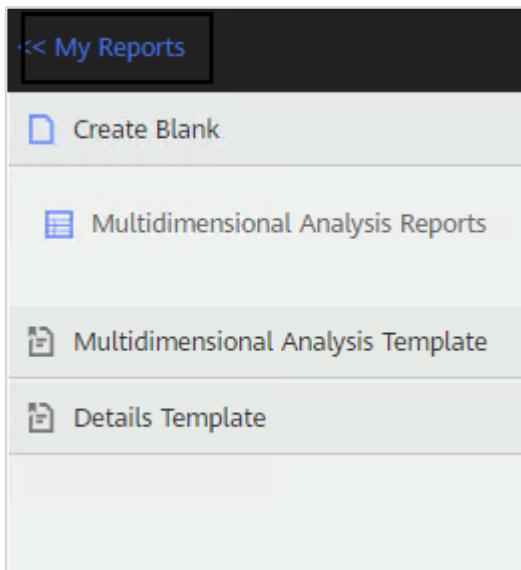
- Step 5** If you click **Chart** on the top of the page, the report is displayed in a chart. Click icons in the upper left corner to display the report by indicator or legend. Click icons in the upper right corner to display reports in one to three columns.



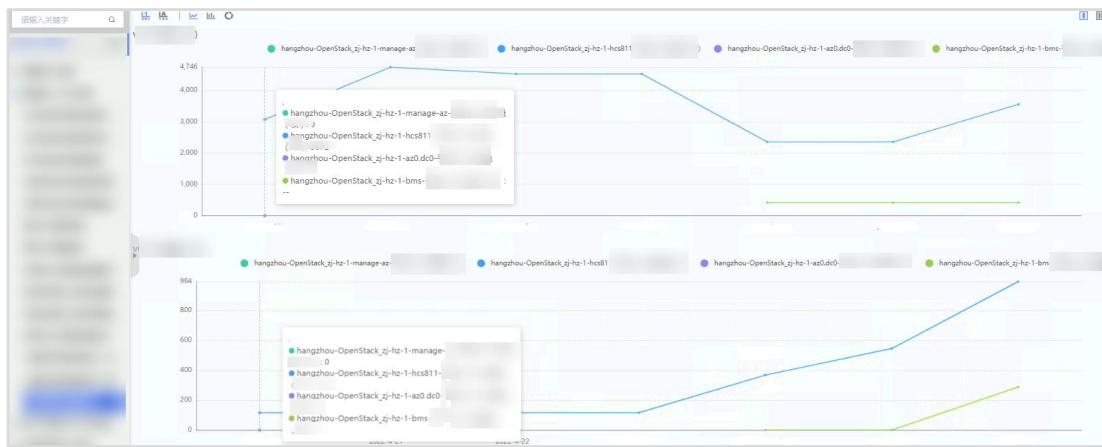
Step 6 Click  in the upper right corner to save the report.



Step 7 Click  in the upper left corner.



Step 8 Return to the **My Reports** page. In the navigation pane, choose **Capacity Statistics Analysis Report > Computing Resource Pool Capacity (vCPU and Memory)**.

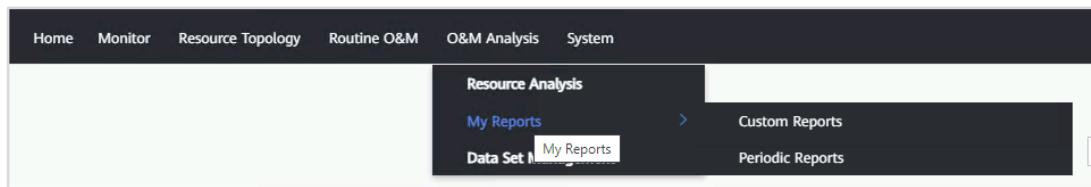


Step 9 Perform Step 9 and Step 10 in 4.2.1 Viewing Multidimensional Analysis Reports to save and export the current report.

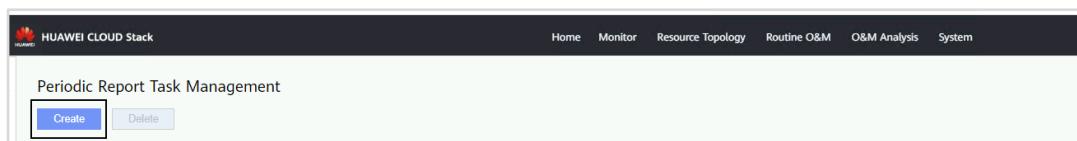
4.2.4 Managing Periodic Reports

4.2.4.1 Procedure

Step 1 Choose **O&M Analysis > My Reports > Periodic Reports** from the main menu.



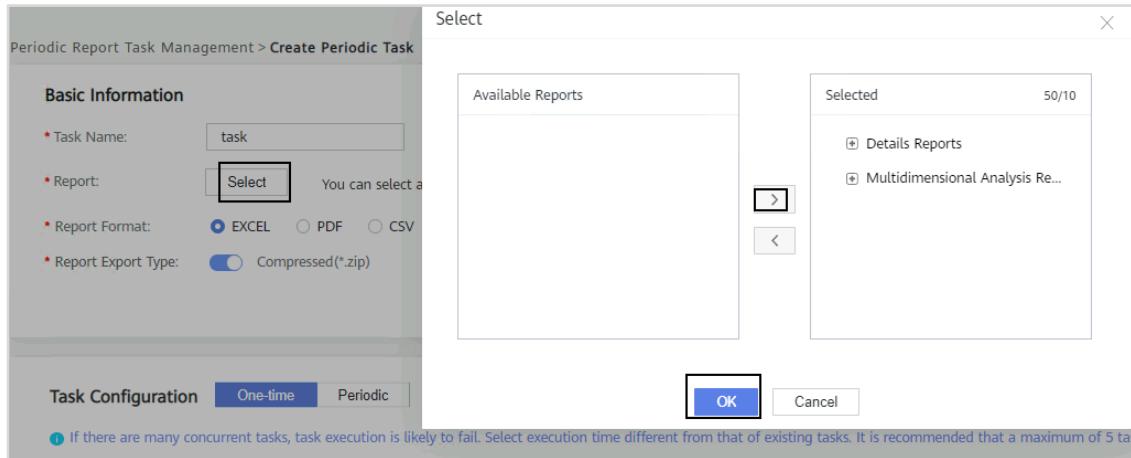
Step 2 On the **Periodic Report Task Management** page, click **Create**.



Step 3 On the **Create Periodic Task** page, configure the following information and click **OK**.

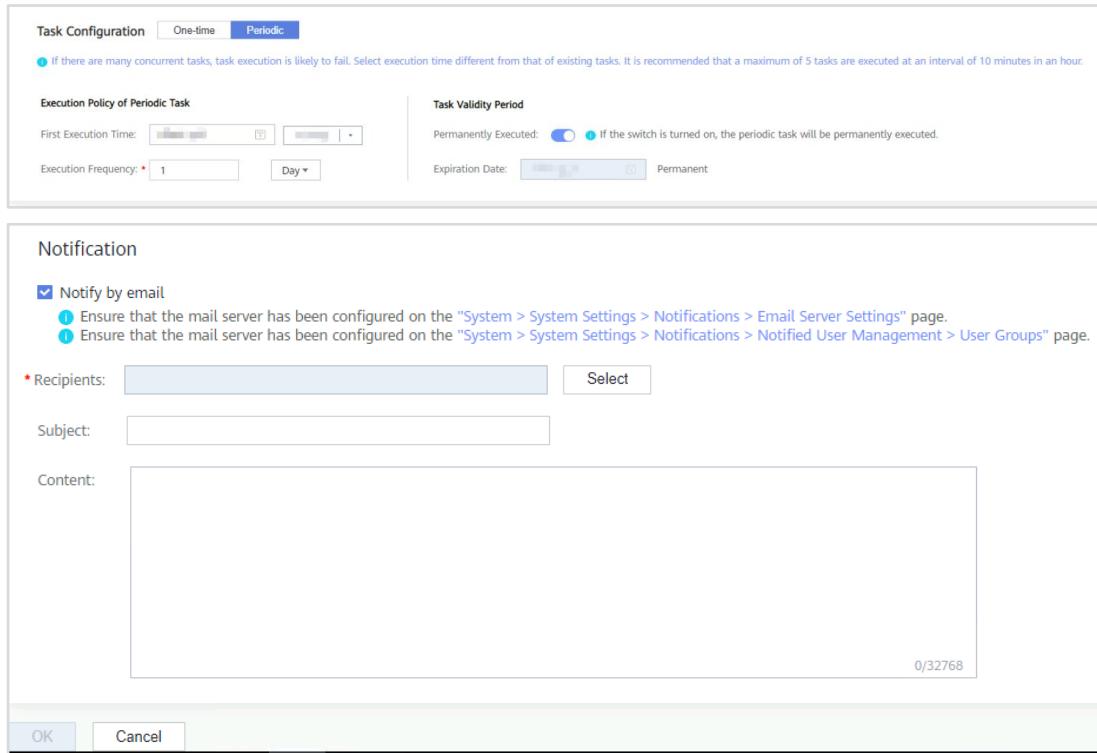
Set **Task Name** to **task**.

Click **Select** next to **Report**. In the **Available Reports** area, expand **Multidimensional Analysis Reports** and select **Alarm Statistics Reports**, click  to move the reports to **Selected**, and click **OK**.

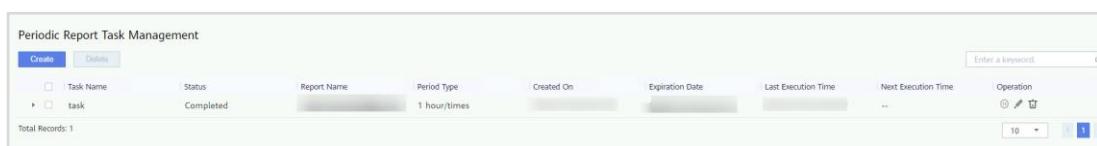


Task Configuration: Select **Periodic** and set **First Execution Time**, for example, to 00:00 next day. Set **Execution Frequency** to **1 Day**. Toggle on **Permanently Executed**.

Notification: Deselect **Notify by email** because the lab environment cannot communicate with the email server.



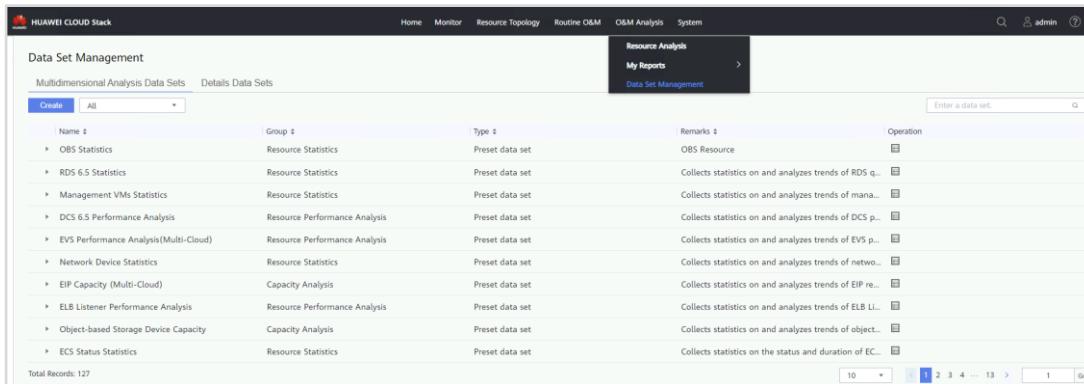
Step 4 Return to the **Periodic Report Task Management** page and view the created periodic report task.



4.2.5 Managing Data Sets

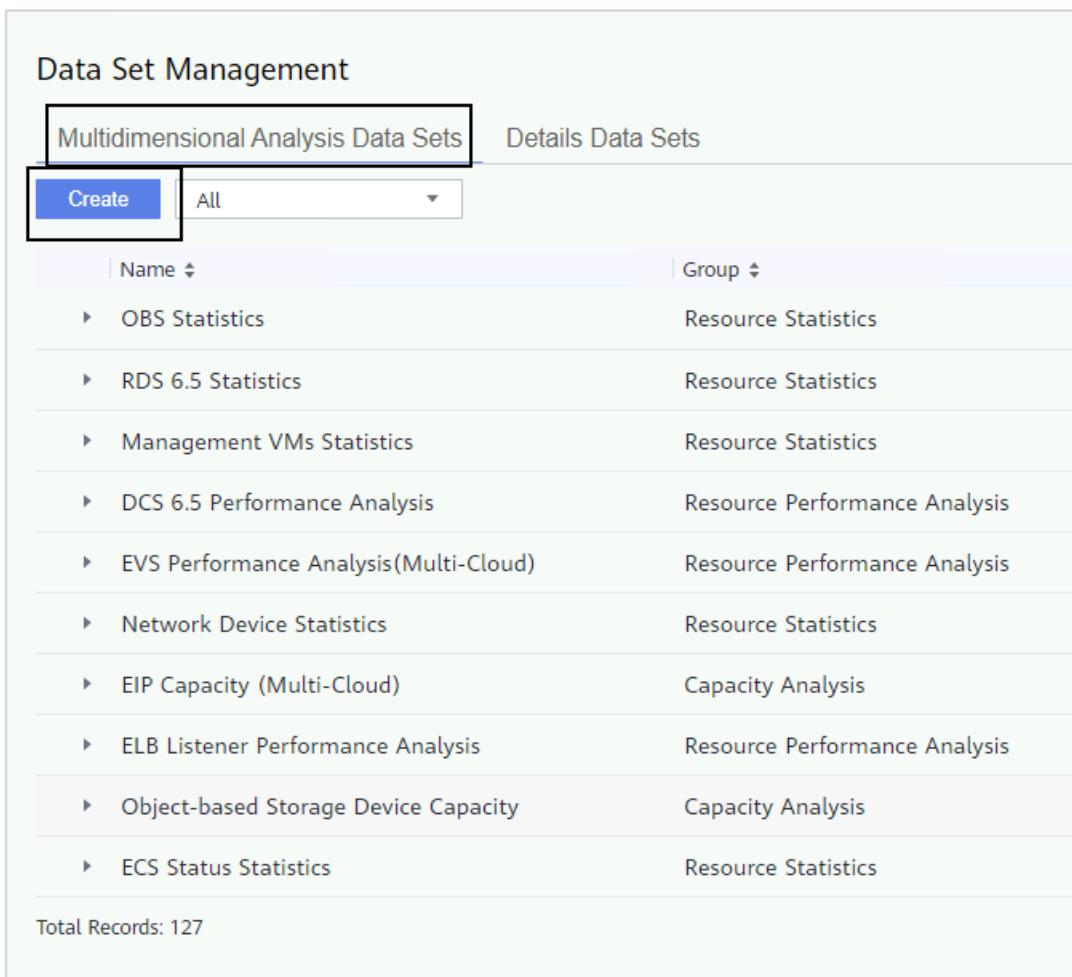
4.2.5.1 Procedure

Step 1 Choose **O&M Analysis > Data Set Management** from the main menu.



Name	Group	Type	Remarks	Operation
OBS Statistics	Resource Statistics	Preset data set	Collects statistics on and analyzes trends of RDS q...	[View]
RDS 6.5 Statistic	Resource Statistics	Preset data set	Collects statistics on and analyzes trends of mana...	[View]
Management VMs Statistics	Resource Statistics	Preset data set	Collects statistics on and analyzes trends of DCS p...	[View]
DCS 6.5 Performance Analysis	Resource Performance Analysis	Preset data set	Collects statistics on and analyzes trends of EVS p...	[View]
EVS Performance Analysis(Multi-Cloud)	Resource Performance Analysis	Preset data set	Collects statistics on and analyzes trends of netwo...	[View]
Network Device Statistics	Resource Statistics	Preset data set	Collects statistics on and analyzes trends of EIP re...	[View]
EIP Capacity (Multi-Cloud)	Capacity Analysis	Preset data set	Collects statistics on and analyzes trends of ELB Li...	[View]
ELB Listener Performance Analysis	Resource Performance Analysis	Preset data set	Collects statistics on and analyzes trends of object...	[View]
Object-based Storage Device Capacity	Capacity Analysis	Preset data set	Collects statistics on the status and duration of EC...	[View]
ECS Status Statistics	Resource Statistics	Preset data set	Collects statistics on the status and duration of EC...	[View]

Step 2 Click the **Multidimensional Analysis Data Sets** tab and click **Create**.



Name	Group	Type
OBS Statistics	Resource Statistics	
RDS 6.5 Statistics	Resource Statistics	
Management VMs Statistics	Resource Statistics	
DCS 6.5 Performance Analysis	Resource Performance Analysis	
EVS Performance Analysis(Multi-Cloud)	Resource Performance Analysis	
Network Device Statistics	Resource Statistics	
EIP Capacity (Multi-Cloud)	Capacity Analysis	
ELB Listener Performance Analysis	Resource Performance Analysis	
Object-based Storage Device Capacity	Capacity Analysis	
ECS Status Statistics	Resource Statistics	

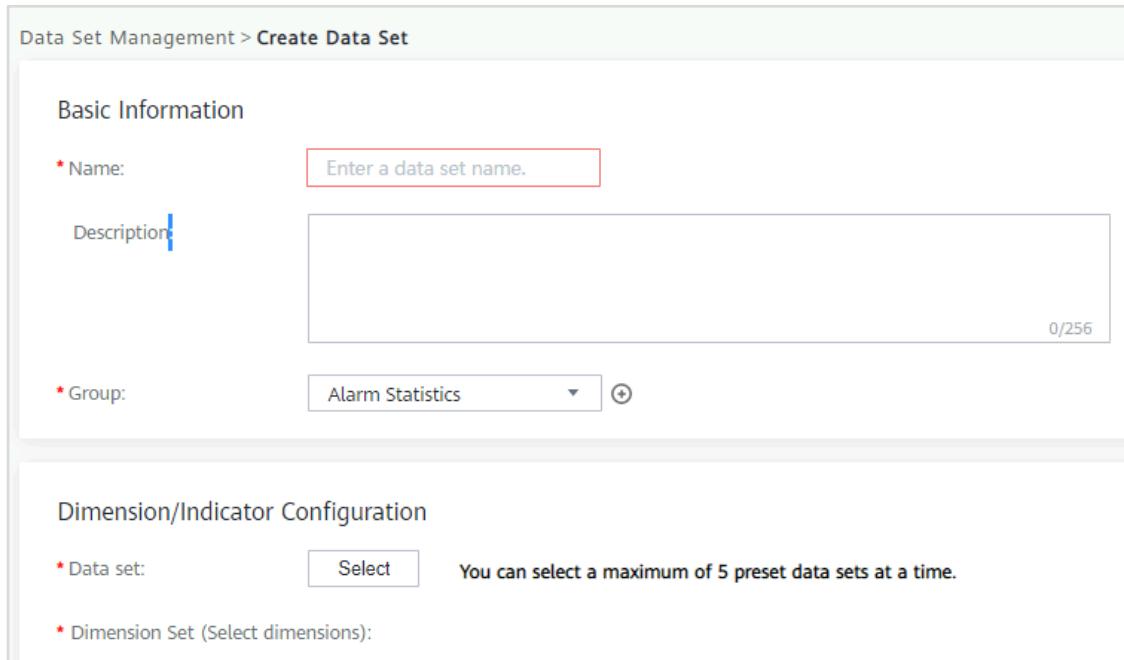
Step 3 On the **Create Data Set** page, configure the following information and click **OK**.

Set **Name** to **Current Critical Alarm Statistics**

Description: Statistics and analysis of current critical alarms by time and other dimensions

Select **Alarm Statistics** for **Group**.

Data set: Click **Select**. In the displayed **Select Data Set** dialog box, select **Alarm Statistics** from the drop-down list, select **Current Alarm Statistics**, and click **OK**.



The screenshot shows the 'Create Data Set' dialog box. The 'Basic Information' section contains fields for 'Name' (with placeholder 'Enter a data set name.'), 'Description' (with a large text area and character count '0/256'), and 'Group' (set to 'Alarm Statistics'). The 'Dimension/Indicator Configuration' section contains a 'Data set:' dropdown with 'Select' and a note 'You can select a maximum of 5 preset data sets at a time.', and a 'Dimension Set (Select dimensions):' field.

Dimension Set: Select **Year**, **Month**, **Day**, **Week Day**, and **Region**.

Indicator Set: Select **Critical Alarms** and click **OK**.

Dimension/Indicator Configuration

* Data set: You can select a maximum of 5 preset data sets at a time.

Selected Data Sets:

* Dimension Set (Select dimensions):

Dimension Name	Dimension Group	Level	Data Set Name
Year	Date	1	Current Alarm Statistics/Current Alarm Statistics (Multi-Cloud)
Month	Date	2	Current Alarm Statistics/Current Alarm Statistics (Multi-Cloud)
Day	Date	4	Current Alarm Statistics/Current Alarm Statistics (Multi-Cloud)
Region	--	--	Current Alarm Statistics/Current Alarm Statistics (Multi-Cloud)
NE Type	--	--	Current Alarm Statistics/Current Alarm Statistics (Multi-Cloud)

Indicator Set:

Indicator Name	Unit	Data Set Name
Total Alarms	--	Current Alarm Statistics (Multi-Cloud)/Current Alarm Statistics
Critical Alarms	--	Current Alarm Statistics (Multi-Cloud)/Current Alarm Statistics
Major Alarms	--	Current Alarm Statistics (Multi-Cloud)/Current Alarm Statistics
Minor Alarms	--	Current Alarm Statistics (Multi-Cloud)/Current Alarm Statistics
Warning Alarms	--	Current Alarm Statistics (Multi-Cloud)/Current Alarm Statistics

Select Data Set

Alarm Statistics Selected Data Sets: 2

Data Set Name	Group	Remarks
<input checked="" type="checkbox"/> Current Alarm Statistics (Multi-Cloud)	Alarm Statistics	Collects statistics on and analyzes trends of current alarm quantity distribution in multi-level clouds by time, multi-level cloud, and other dimensions.
<input checked="" type="checkbox"/> Current Alarm Statistics	Alarm Statistics	Collects statistics on and analyzes trends of current alarm quantity distribution by time and other dimensions.

Step 4 Return to the **Data Set Management** page, select **Alarm Statistics** from the drop-down list, and view the created custom data set. Click next to **Current Critical Alarm Statistics**.

Data Set Management

Multidimensional Analysis Data Sets Details Data Sets

Name	Group	Type	Remarks	Operation
Current Alarm Statistics (Multi-Cloud)	Alarm Statistics	Preset data set	Collects statistics on and analyzes trends of current alarm quantity distribution in multi-level clouds by time, multi-level cloud, and other dimensions.	
Current Alarm Statistics	Alarm Statistics	Preset data set	Collects statistics on and analyzes trends of current alarm quantity distribution by time and other dimensions.	

Total Records: 2

Step 5 View details about the data set. In the upper right corner of the dimension list, click **Add Dimension**.

Step 6 Return to the dimension list and view the added dimension. In the upper right corner, click **Add Indicator**.

Step 7 In the displayed dialog box, select **Total Alarms** on the preset indicators tab page and click **OK**.

Select Preset Indicator

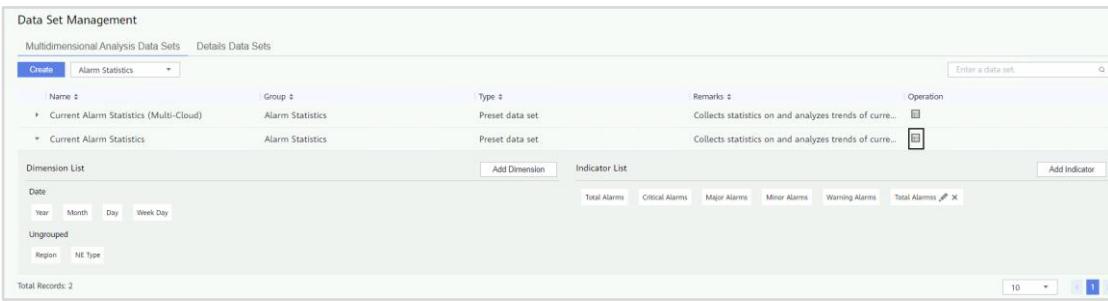
* Calculation Formula:

sum[Total Alarms]

Step 8 Return to the indicator list to view the added indicator.

Indicator List	Add Indicator
Total Alarms Critical Alarms Major Alarms Minor Alarms Warning Alarms	Total Alarms X

Step 9 Return to the **Data Set Management** page, view the data set name, and click in the row where the data set is located.



The screenshot shows the 'Data Set Management' interface. At the top, there are tabs for 'Multidimensional Analysis Data Sets' and 'Details Data Sets'. Below the tabs, there are sections for 'Create' and 'Alarm Statistics'. A search bar at the top right says 'Enter a data set.' There are two data sets listed:

Name	Group	Type	Remarks	Operation
Current Alarm Statistics (Multi-Cloud)	Alarm Statistics	Preset data set	Collects statistics on and analyzes trends of current alarms	<input type="checkbox"/>
Current Alarm Statistics	Alarm Statistics	Preset data set	Collects statistics on and analyzes trends of current alarms	<input type="checkbox"/>

Below the data sets, there are sections for 'Dimension List' and 'Indicator List'. Under 'Dimension List', there are buttons for 'Add Dimension' and 'Indicator List'. Under 'Indicator List', there are buttons for 'Add Indicator'. At the bottom left, it says 'Total Records: 2'. At the bottom right, there are navigation buttons for page number, first, previous, next, last, and refresh.

Step 10 On the configuration panel, filter data as follows and click **Update**.

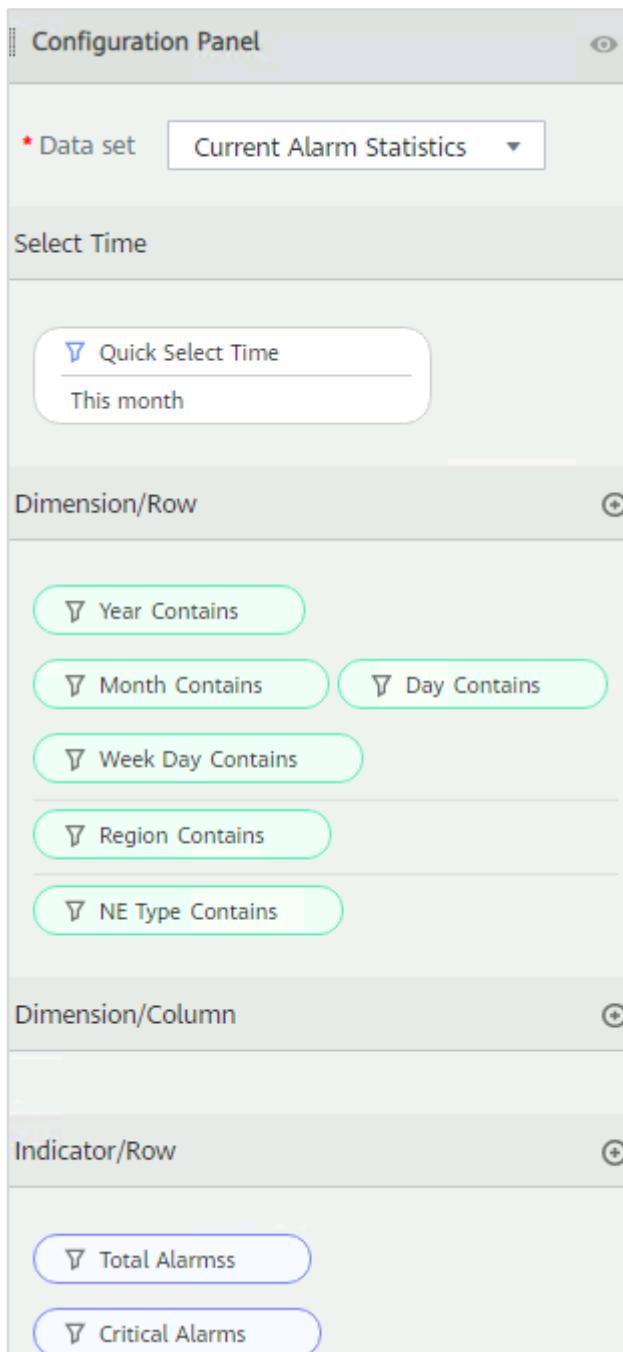
Data set: Current Critical Alarm and Total Number Statistics

Select Time: This month

Dimension/Row: Year Contains, Month Contains, Day Contains, Week Day Contains, Region Contains, and NE Type Contains.

Indicator/Row: Critical Alarms and Total Alarms

Retain the default values for other parameters.

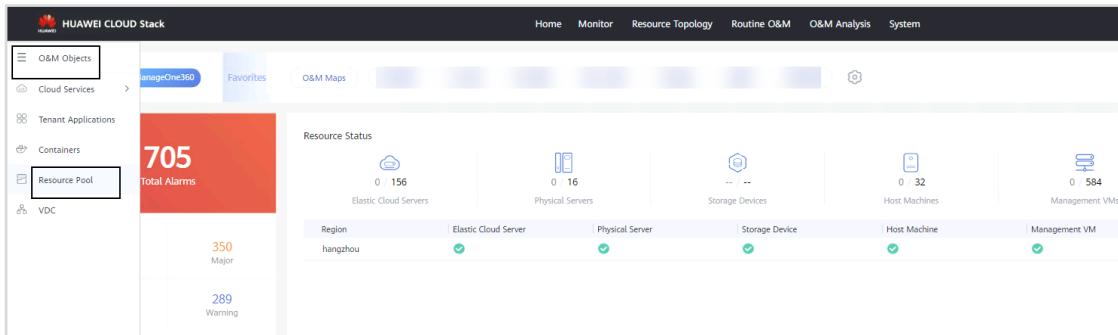


Step 11 Perform Step 9 and Step 10 in 4.2.1 Viewing Multidimensional Analysis Reports to save and export the current report.

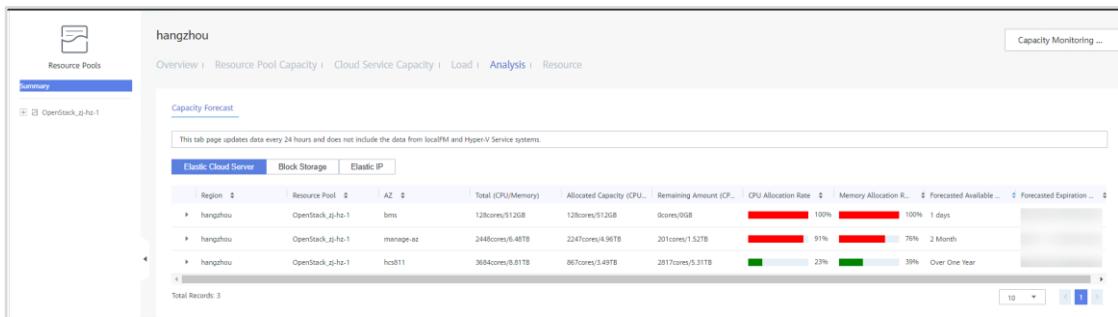
4.2.6 Analyzing and Predicting Capacity

4.2.6.1 Procedure

Step 1 Return to the home page, open the console on the left, choose **O&M Objects > Resource Pool**.



Step 2 Click the **Analysis** tab and then the **Capacity Forecast** tab to view the CPU allocation rate, memory allocation rate, forecasted available time, and forecasted expiration time of an ECS.

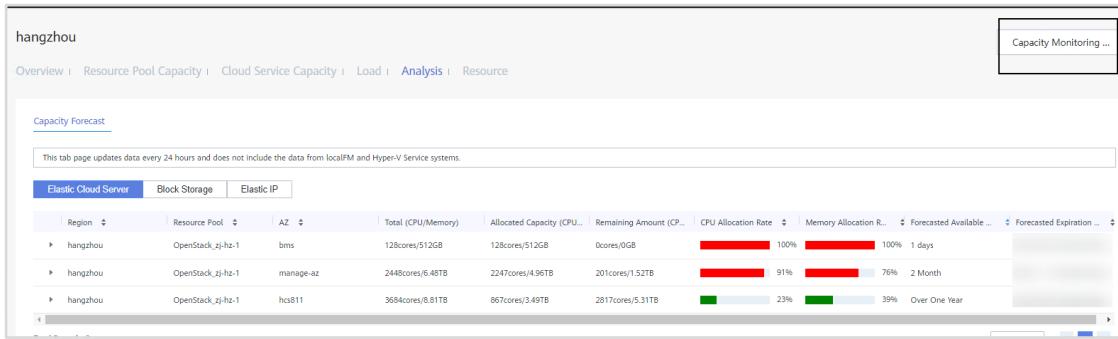


Step 3 Repeat Step 1 and Step 2 to view the capacity information and forecasted capacity of block storage and EIPs in the resource pool.

4.2.7 Configuring Capacity Alarm Thresholds

4.2.7.1 Procedure

Step 1 In the upper right corner, click **Capacity Monitoring Configuration**.



Step 2 In the navigation pane, choose **Resource Pool Capacity Threshold Maintenance**. Locate the row that contains the target capacity metric and click **Modify** in the **Operation** column.

The screenshot shows the 'Capacity Monitoring' interface under 'Capacity Threshold Maintenance'. It displays a table for 'Default Threshold Rule' with two rows: 'Block storage usage rate' and 'Datastore usage rate'. The 'Block storage usage rate' row has 'Warning (%)' set to 60, 'Minor (%)' to 70, 'Major (%)' to 80, and 'Critical (%)' to 90. The 'Datastore usage rate' row has 'Not configured' for all levels. An 'Operation' column on the right shows a 'Modify' button for the first row.

Capacity Metric	Warning (%)	Minor (%)	Major (%)	Critical (%)	Remarks	Operation
Block storage usage rate	Not configured	Not configured	Not configured	90	--	<input type="button" value="Modify"/>
Datastore usage rate	Not configured	Not configured	Not configured	90	--	

Step 3 Configure the following thresholds and click on the right:

Warning (%): for example, **60**

Minor (%): for example, **70**

Major (%): for example, **80**

Critical (%): for example, **90**

The screenshot shows the 'Capacity Monitoring' interface under 'Capacity Threshold Maintenance'. The 'Default Threshold Rule' table now has specific values: 'Block storage usage rate' with Warning at 60, Minor at 70, Major at 80, and Critical at 90. The 'Datastore usage rate' row remains 'Not configured'. The 'Operation' column shows a 'Modify' button for the first row.

Capacity Metric	Warning (%)	Minor (%)	Major (%)	Critical (%)	Remarks	Operation
Block storage usage rate	60	70	80	90	--	<input type="button" value="Modify"/>
Datastore usage rate	Not configured	Not configured	Not configured	90	--	

Step 4 Under **Custom Threshold Rule**, click **Add**.

The screenshot shows the 'Capacity Monitoring' interface under 'Capacity Threshold Maintenance'. It includes a 'Default Threshold Rule' table and a 'Customized Threshold Rule' section. In the 'Customized Threshold Rule' section, there is a blue-bordered 'Add' button.

Step 5 In the displayed **Add Threshold** dialog box, configure the following information and click **OK**.

Threshold Type: Datastore usage rate

Region: huawei

Resource pool: OpenStack_sa-fa-1

AZ: manage-az

Select **Combine thresholds**.

Threshold: Set **Suggestion** to **60%**, **Minor** to **70%**, **Major** to **80%**, and **Critical** to **90%**.

Add Threshold

Threshold Type

Applicable Scope hangzhou > OpenStack_zj-hz-1

Region

Resource pool

AZ

Combine thresholds

Threshold	Suggestion	<input type="text"/>	%	Minor	<input type="text"/>	%	Major	<input type="text"/>	%	Critical	<input type="text"/>	%
-----------	------------	----------------------	---	-------	----------------------	---	-------	----------------------	---	----------	----------------------	---

Remarks

Step 6 Return to the **Customized Threshold Rule** page to view the added threshold rule.

Customized Threshold Rule							
<input type="button" value="Add"/>	Capacity Metric	Applicable Scope	Warning (%)	Minor (%)	Major (%)	Critical (%)	Remarks
	Datastore usage rate	hangzhou > OpenStack_zj-hz-1	60	70	80	90	--
Total Records: 1							
<input type="button" value="Modify"/> <input type="button" value="Delete"/> <input type="button" value="1"/> <input type="button" value="2"/>							

[Question 6] What are the functions of reports during O&M?

5 Suggested Answers

[Question 1] On the **Alarm Settings** page, in addition to setting the alarm color and alarm display mode, which of the following custom settings are supported?

[Answer 1] You can also set the alarm sound, font color, and highlight.

[Question 2] How can you specify an event source to view events in the last three days?

[Answer 2] Choose **Monitor > Alarms > Event Logs** from the main menu. On the **Event Logs** page, click **Filter**. On the displayed page, specify the event source, set the occurrence time to last 3 days, and click **OK**. The desired events are displayed.

[Question 3] What else can the Resource Monitoring module monitor in addition to physical, cloud service, and VDC resources?

[Answer 3] Containers, resource pools, and tenant applications

[Question 4] Why is periodic health check required? What are the effective methods or tools?

[Answer 4]

Periodic health check can detect system vulnerabilities in advance, reduce potential system risks and O&M costs, and ensure long-term system security and stability.

In HUAWEI CLOUD routine health checks, engineers mainly check alarms and use FusionCare to check systems. For health checks that do not support FusionCare, for example, health check for gPaaS & AI DaaS services, you can manually perform a health check.

In addition to common health check tools, automated tools such as eSight, CloudNetDebug, and AutoOps can assist in O&M.

[Question 5] What are main functions of AutoOps? How can it assist in O&M?

[Answer 5]

AutoOps is an automated O&M tool of HUAWEI CLOUD Stack. It provides built-in scripts to collect fault information and processes O&M tasks in batches. If the built-in scripts do not meet service requirements, users can create custom scripts to collect HUAWEI CLOUD Stack platform information, change host passwords in batches, install patches in batches, and perform other operations.

[Question 6] What are the functions of reports during O&M?

[Answer 6]

Users can use preset reports in typical scenarios, create custom reports, and manage periodic reports on ManageOne Maintenance Portal of HUAWEI CLOUD Stack, analyze capacity and resource data, and understand KPIs and health of NEs and services. These skills help make O&M decisions and cloud platform plans.

6

Acronyms and Abbreviations

Acronym or Abbreviation	Full Name	Description
OC	Operation Center	OperationCenter is the only entry for ManageOne O&M management. It can manage and monitor cloud services, tenant resources, and infrastructures (compute, storage, and network devices) that the cloud services depend on.
CMDB	Configuration Management Database	Resource Management (CMDB) is used to store and manage a multitude of data about devices and systems in the enterprise IT architecture. It ensures data accuracy, timeliness, and effectiveness based on relevant processes, and provides unified O&M resource configuration data, implementing information sharing and maximizing the value of configuration information.
VM	Virtual Machine	A VM is the virtualization/emulation of a computer system, which runs in an independent environment and provides functionality of a physical computer.
ECS	Elastic Cloud Server	ECSs provide scalable, on-demand compute resources, which can be obtained by yourself at any time on the cloud.
VPC	Virtual Private Cloud	A VPC logically isolates networks and provides a secure network environment.
VDC	Virtual Data Center	A VDC is a new type of data center that applies cloud computing. VDCs can integrate physical resources using virtualization technologies and dynamically allocate and schedule resources to automatically deploy data centers.
EIP	Elastic IP Address	An EIP enables your cloud resources to communicate with the Internet using static public IP addresses and scalable bandwidths.