HCIA Cloud Service Certification Training

HCIA-Cloud Service Lab Guide for HUAWEI CLOUD Service Engineers

Version: V2.2

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Huawei Certification System

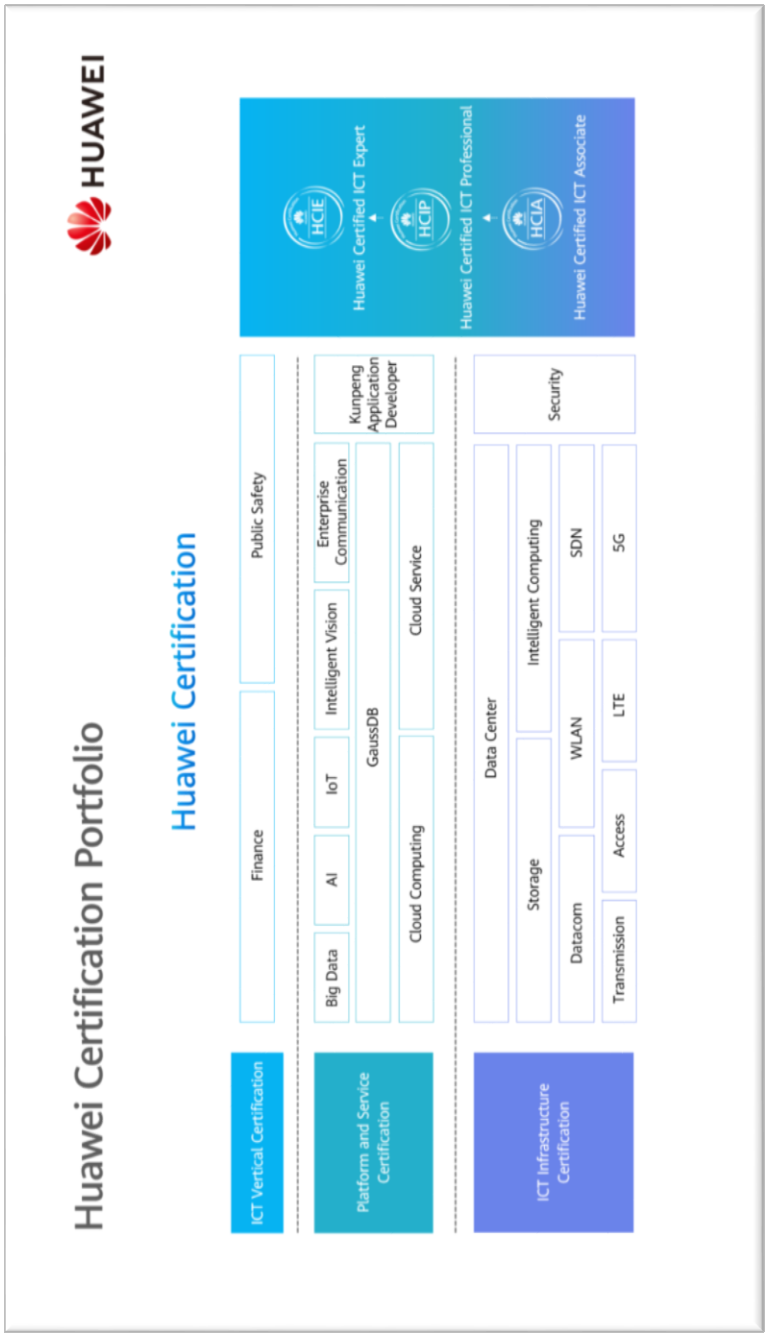
Based on the "Platform+Ecosystem" strategy and the cloud-pipe-device synergy, the Huawei certification system covers Information and Communications Technology (ICT) architecture certification, platform and service certification, and industry ICT certification for all ICT technologies, which is unique in the industry.

The Huawei certification system offers three levels of certification: Huawei Certified ICT Associate (HCIA), Huawei Certified ICT Professional (HCIP), and Huawei Certified ICT Expert (HCIE). The certification covers all ICT fields and complies with the industry trend of ICT convergence. With its leading talent development system and certification standards, Huawei is committed to fostering new ICT talents in the digital era and building a sound ICT talent ecosystem.

HCIA-Cloud Service (Huawei Certified ICT Associate-Cloud Service) certification is designed for developing engineers who understand the cutting-edge Cloud information and who are familiar with eight HUAWEI CLOUD products. This document is intended for candidates who take the HCIA-Cloud Service exam or technical personnel who want to understand basic cloud services and how to use, manage, and maintain HUAWEI CLOUD products. The HCIA-Cloud Service certification covers the basic knowledge of IaaS, PaaS, and SaaS, including the operation and use of cloud products such as computing, storage, network, management & governance, and relational database services in HUAWEI CLOUD.

Passing the HCIA-Cloud Service certification proves that you have a certain understanding of HUAWEI CLOUD products and technologies, and you can independently use HUAWEI CLOUD products.

Enterprises with engineers who have passed HCIA-Cloud Service certification have mastered the scenarios and usage of various HUAWEI CLOUD products, facilitating their cloud transformation in the ICT environment.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Cloud Service
Kunpeng Application Developer
ICT Infrastructure Certification
Data Center
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About This Document

Overview

This document provides a training course for HCIA-Cloud Service certification. It is intended for candidates who are preparing for the HCIA-Cloud Service exam or readers who want to understand basic cloud services and technologies related to the use, management, and maintenance of HUAWEI CLOUD products.

Description

This document consists of six chapters, introducing operations on computing, storage, network, management, and relational database services, and scenario-specific operations. Those operations cover the usage of main cloud products in HUAWEI CLOUD and help you understand the functions and positions of these products in the HUAWEI CLOUD architecture.

experiment	Content
1	This chapter describes operations on Elastic Cloud Server (ECS), Image Management Service (IMS), and Auto Scaling (AS), including creating and logging in to an ECS, modifying the specifications of a Linux ECS and verifying the modification, creating a Windows system disk image from an ECS, modifying the system disk image, creating a shared image, adding or deleting tenants who share the image, replicating an image within a region, creating an AS configuration, an AS group, and an AS policy, and verifying the elastic scaling function. This chapter also describes operations on ECSs and containers, including creating and logging in to an ECS, performing basic container operations, building a container image using Dockerfile, and building a private registry.
2	This chapter describes operations on Elastic Volume Service (EVS), Object Storage Service (OBS), Scalable File Service (SFS), and Cloud Backup and Recovery (CBR)
3	This chapter presents network services, including verifying that two ECSs in a Virtual Private Cloud (VPC) can communicate with each other by default and that communication can be controlled by security groups, enabling Internet access after binding an EIP to the ECS, distributing traffic using Elastic Load Balance (ELB), creating a VPC peering connection to enable ECSs in different VPCs in the same region to communicate with each other, and creating a VPN connection to enable ECSs in different regions to communicate with each other.
4	This chapter introduces management services, including creating an IAM

experiment	Content
	user account and assigning permissions to the account, using Cloud Trace Service (CTS) to acquire operation records of resources, monitoring resources using Cloud Eye, and using Log Tank Service (LTS) to view and search for logs.
5	This chapter describes basic operations on Relational Database Service (RDS), including buying an RDS MySQL DB instance, and connecting to a MySQL through DAS, a private network, or a public network.
6	This chapter describes how to deploy a website with cloud resources. ECSs function as service nodes. VPC provides network resources for ECSs. AS can be used based on service requirements. AS dynamically adds and deletes ECSs using images of the service nodes to ensure stable and efficient running of services. ELB automatically distributes incoming traffic across multiple ECSs to balance their workloads. Cloud Eye monitors the status of services in real time.

Lab Environment Overview

All operations described in this document are performed on HUAWEI CLOUD (https://www.huaweicloud.com/intl/en-us/) . You need to register a HUAWEI CLOUD account and perform identity authentication in advance. All the products described in this document are operated and used on HUAWEI CLOUD. Obtain the latest product documentation from HUAWEI CLOUD Help Center.

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1 Compute Services

1.1 ECS, IMS, and AS

1.1.1 Introduction

The ECS service provides scalable, on-demand cloud servers for secure, flexible, and efficient application environments, ensuring reliable, uninterrupted services.

IMS provides full lifecycle management for images to help users deploy services quickly.

AS automatically adjusts resources based on business requirements and configured AS policies. You can configure a scheduled, periodic, or alarm policy to change the number of user resources along with service traffic, reducing costs and ensuring stable service running.

This exercise involves the ECS, IMS and AS services, including creating and logging in to ECSs, modifying ECS specifications, creating Windows private images, creating shared images, and automatically scaling resources.

1.1.2 Objectives

Upon completion of this exercise, you will be able to:

- Create and log in to an ECS.
- Modify the specifications of an ECS.
- Create a Windows system disk image using an ECS.
- Modify image attributes and share images.
- Create an AS configuration, AS configuration group, and AS policy.

1.1.3 Tasks

ECSs are mainly used as web servers, small-sized database servers, and servers that handle a large number of I/Os. Generally, the ECS service is used together with other cloud products. In this exercise, ECS is used together with IMS and AS.

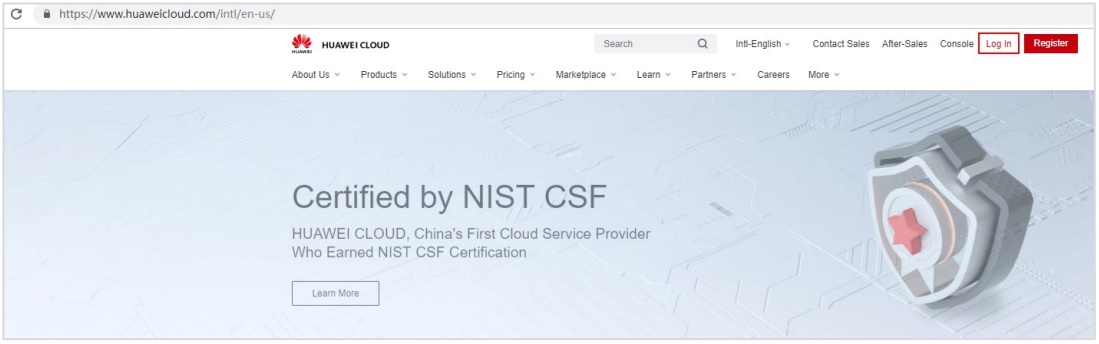
1.1.4 ECS Lifecycle Management

1.1.4.1 Creating Two ECSs Running Different OSs

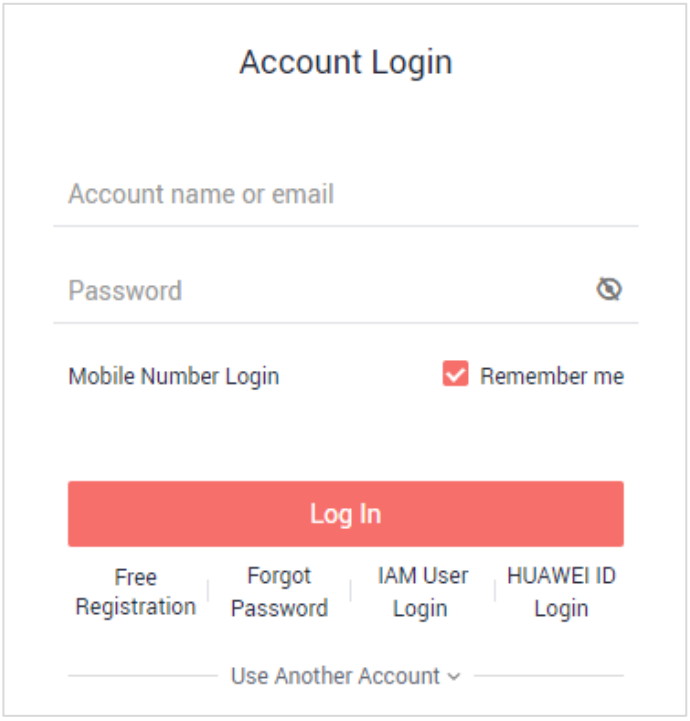
Step 1 Open a browser and navigate to HUAWEI CLOUD.

Step 2 Register an account and perform real-name authentication as prompted.

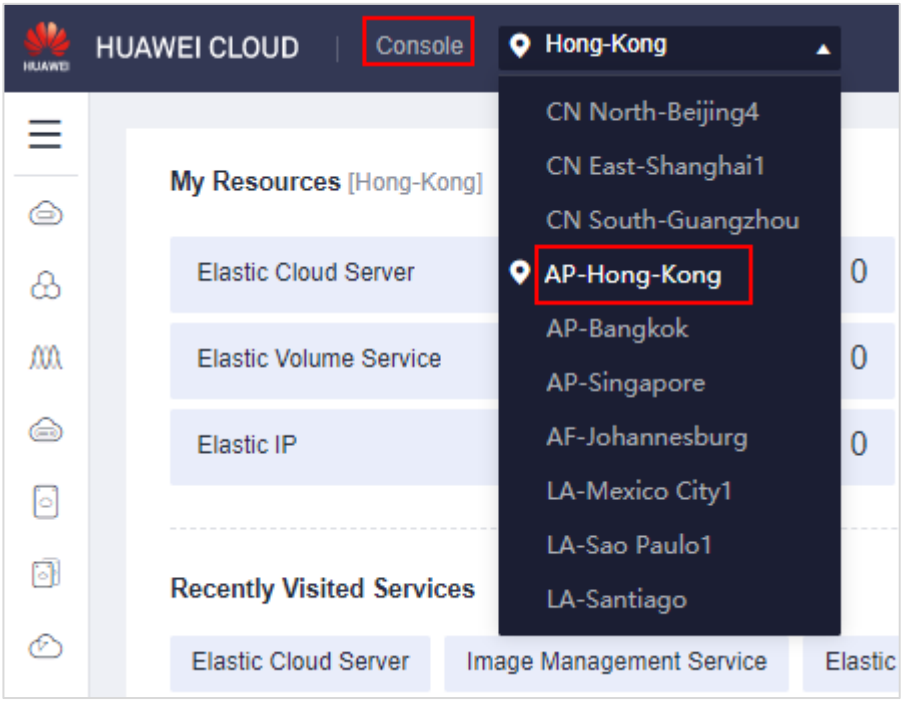
If you already have an account, click **Log In** in the top right corner of the page.



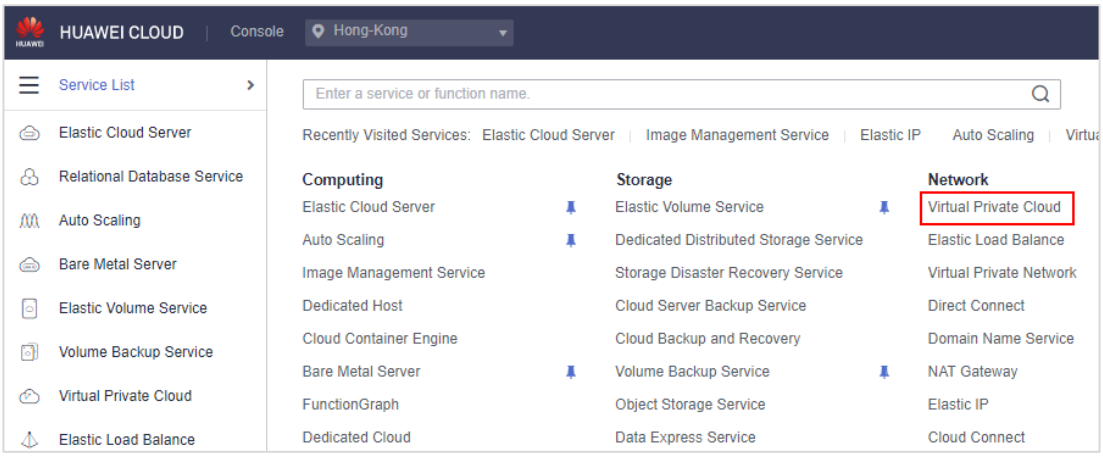
Step 3 Enter the username and password and click **Log In**.



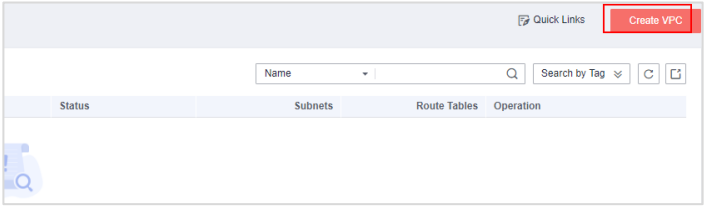
Step 4 On the management console, set the target region to AP-Hong Kong.



Step 5 In the **Service List**, click **Virtual Private Cloud** under **Network** to switch to **Network Console.**

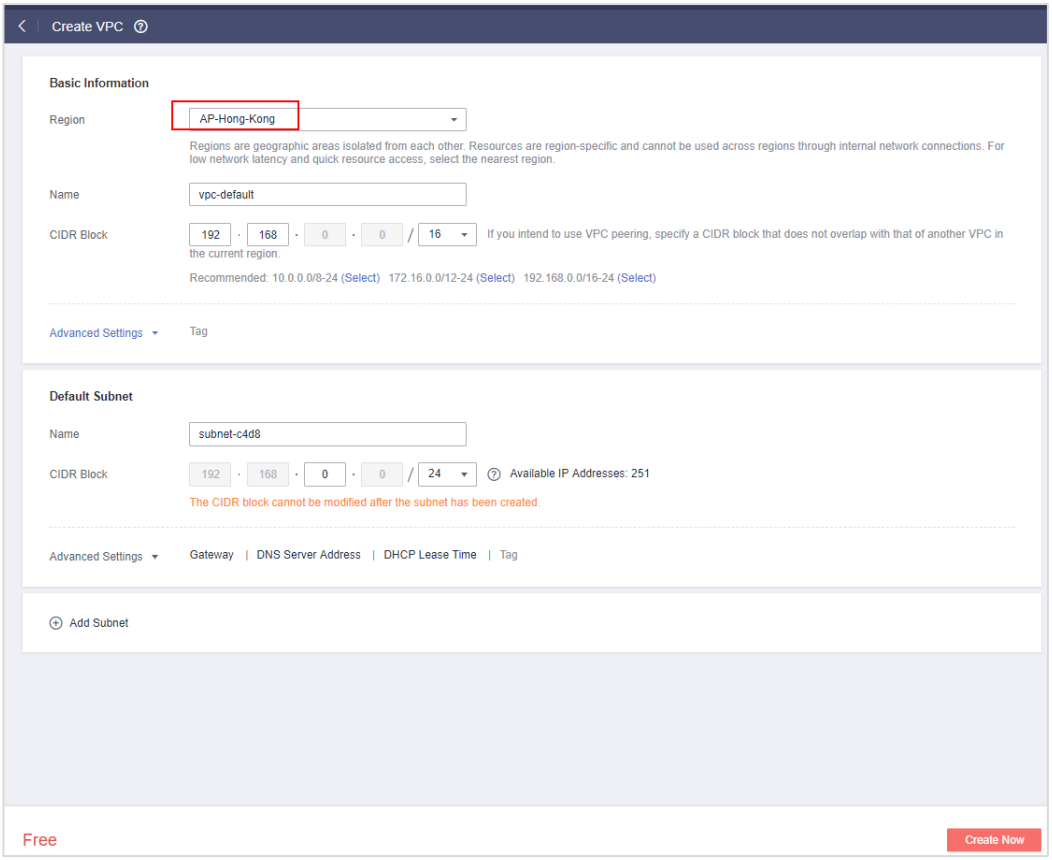


Step 6 Click **Create VPC**, set the parameters, and click **Create Now**.

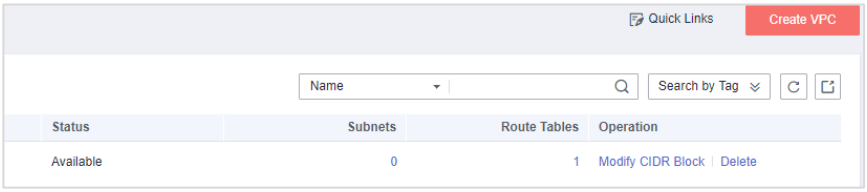


- **Region**: AP-Hong Kong

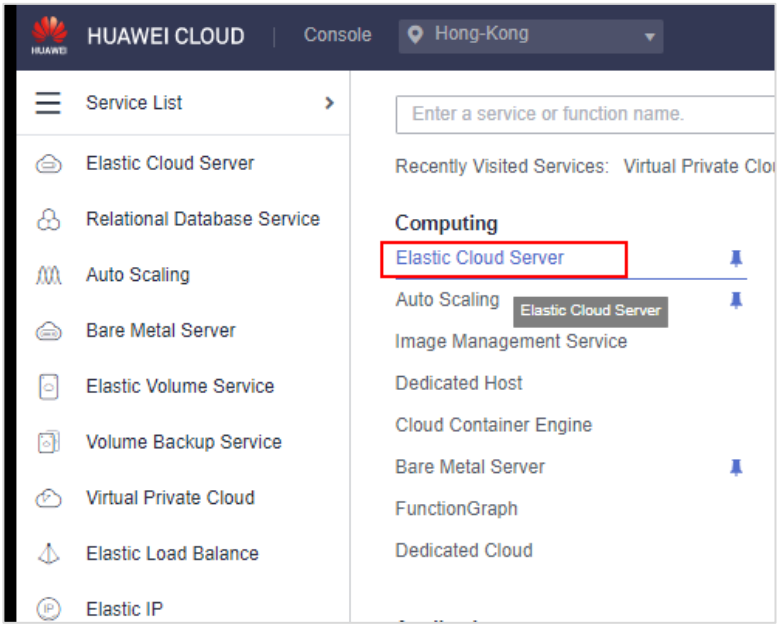
- **Name**: Enter a name.
- Other parameters: Retain their default settings.



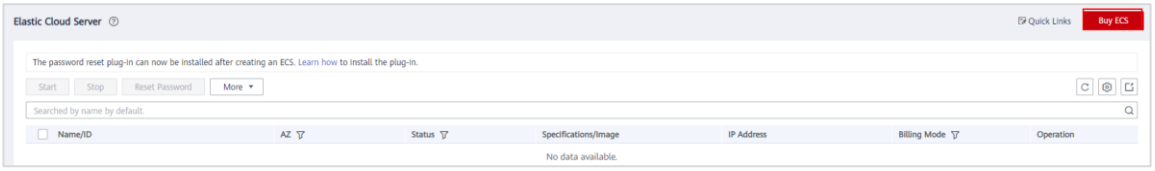
Step 7 Switch back to the VPC page to view the created VPC.



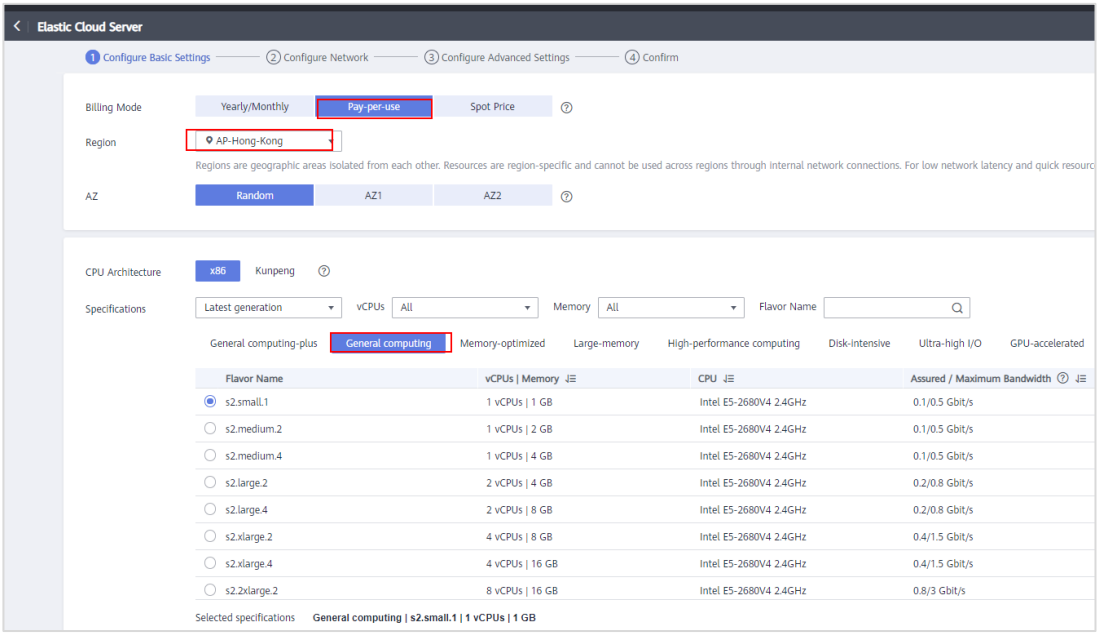
Step 8 Switch back to the console homepage. In the **Service List**, click **Elastic Cloud Server** under **Computing**.



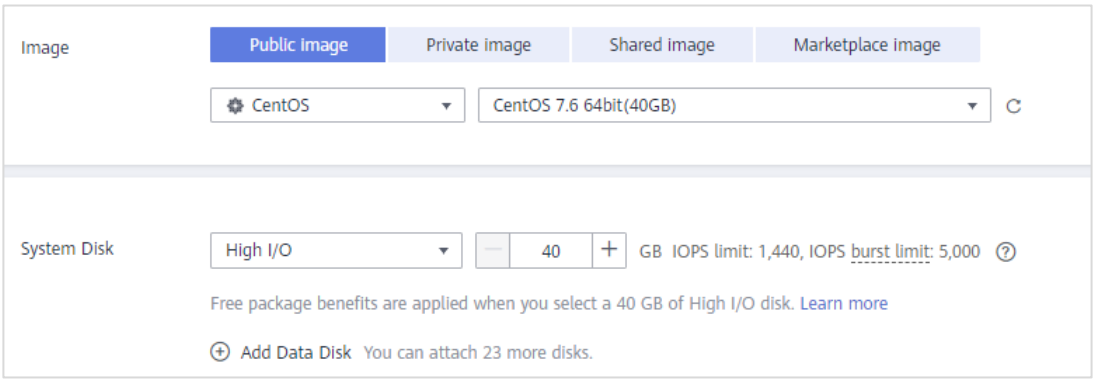
Step 9 Click **Buy ECS** and configure basic settings.



- **Billing Mode: Pay-per-use**
- **Region**: AP-Hong Kong
- **AZ**: **Random**
- **CPU Architecture: x86**
- **Specifications**: **General computing | s6.small.1 | 1 vCPUs | 1 GB** (You can change the specifications by selecting a different flavor, if required.)

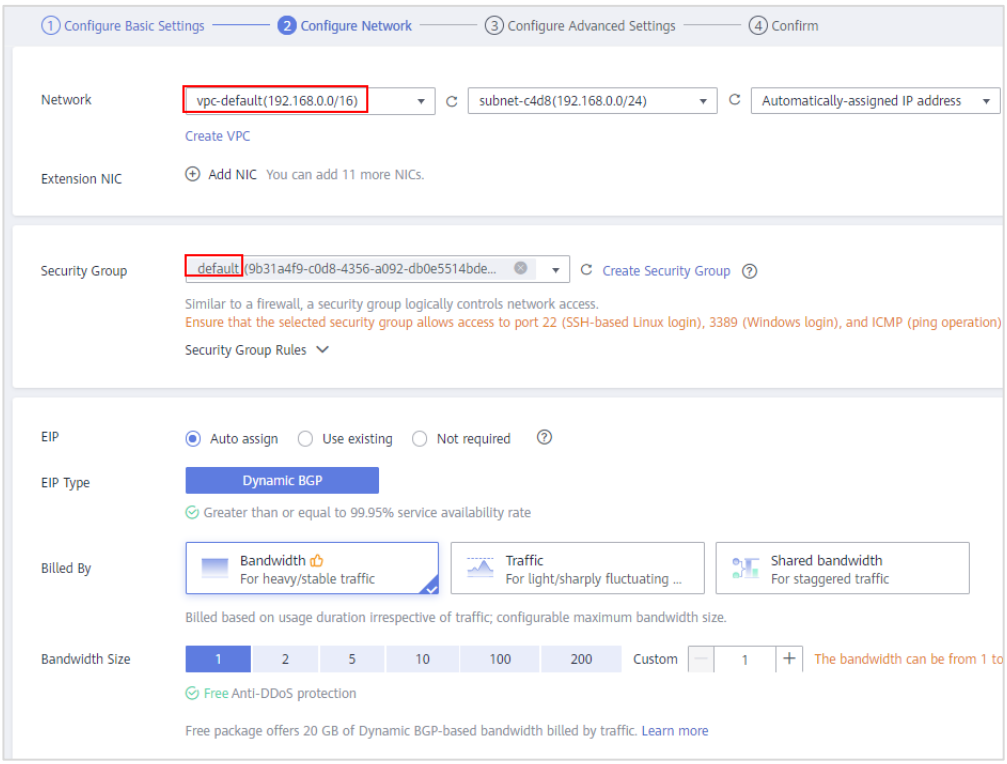


- **Image:** public image, CentOS 7.6 64bit (40GB)
- **System Disk:** high I/O, 40 GB



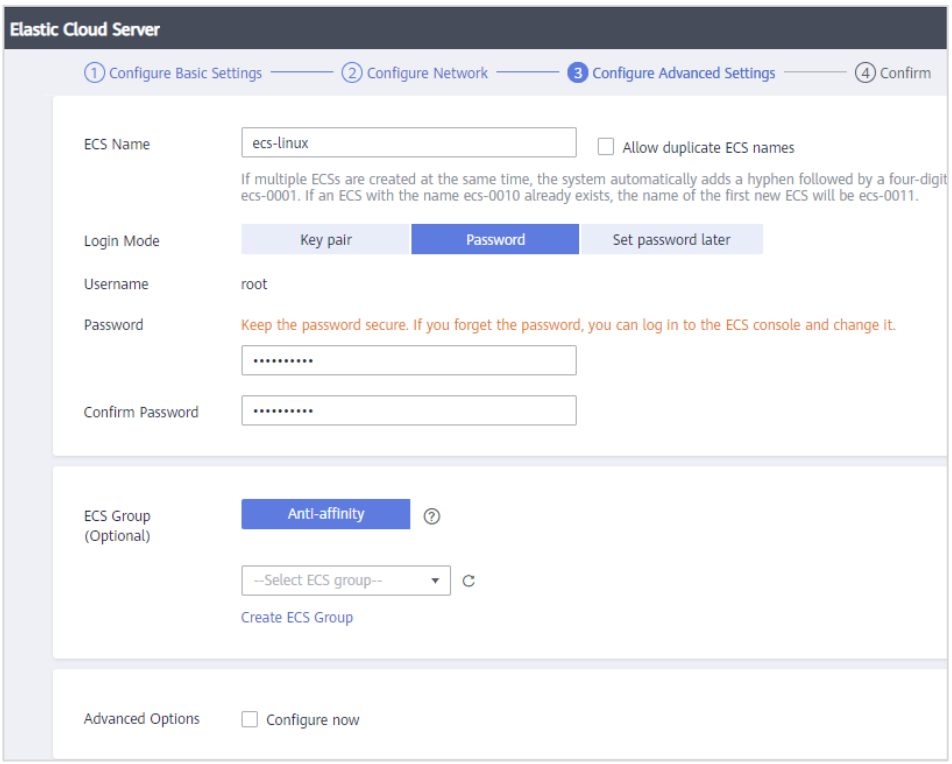
Step 10 Click **Next: Configure Network**.

- **Network**: Select the VPC created in Step 5.
- **Extension NIC**: Default setting
- **Security Group**: Default or create a new one
- **EIP**: **Auto Assign**
- **EIP Type**: **Dynamic BGP**
- **Billed By**: **Bandwidth**
- **Bandwidth Size**: **1 Mbit/s** (You can specify another bandwidth size, if required.)

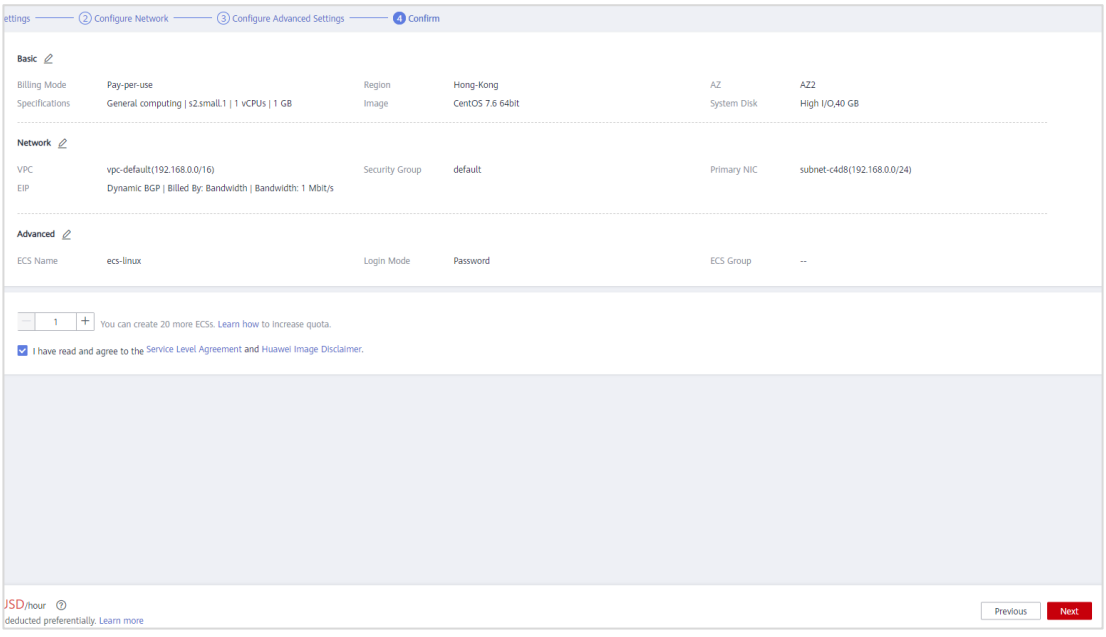


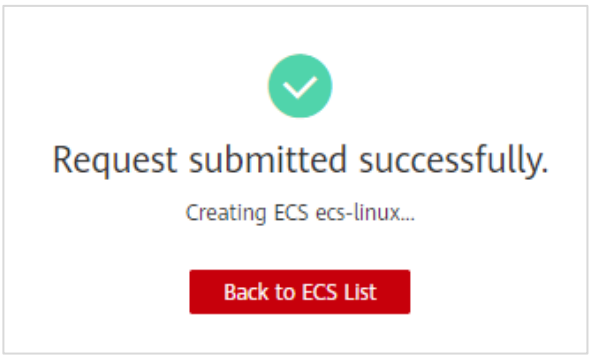
Step 11 Click **Next: Configure Advanced Settings**.

- **ECS Name**: **ecs-Linux**
- **Login Mode**: **Password**
- **Password**: Enter a password, for example, **Huawei@123**.
- **Confirm Password**: Enter the password again.
- **ECS Group (Optional)**: Default
- **Advanced Options**: Default

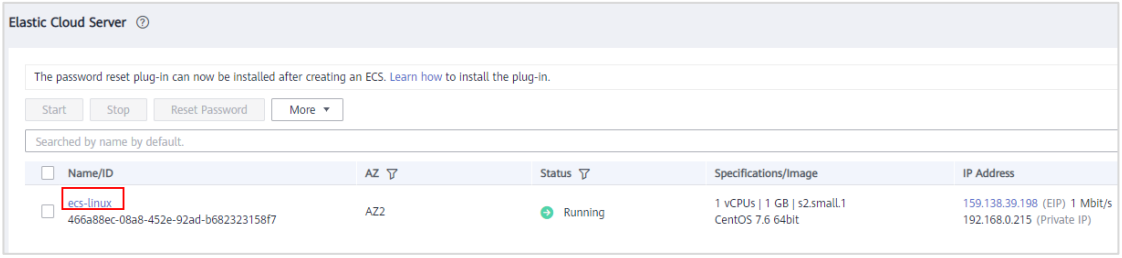


Step 12 Click **Next: Confirm**. After confirming parameter settings, read the service agreement, select the check box, and click **Next**.



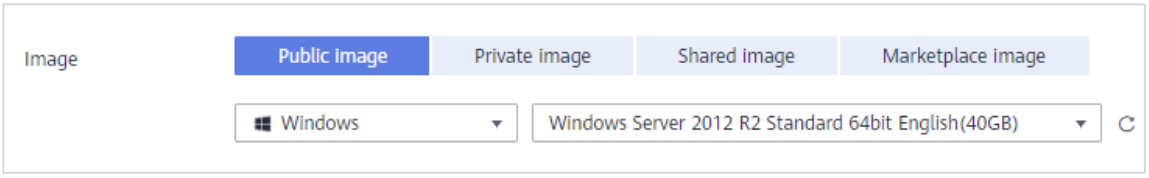


The purchased ECS is displayed on the **Elastic Cloud Server** page.

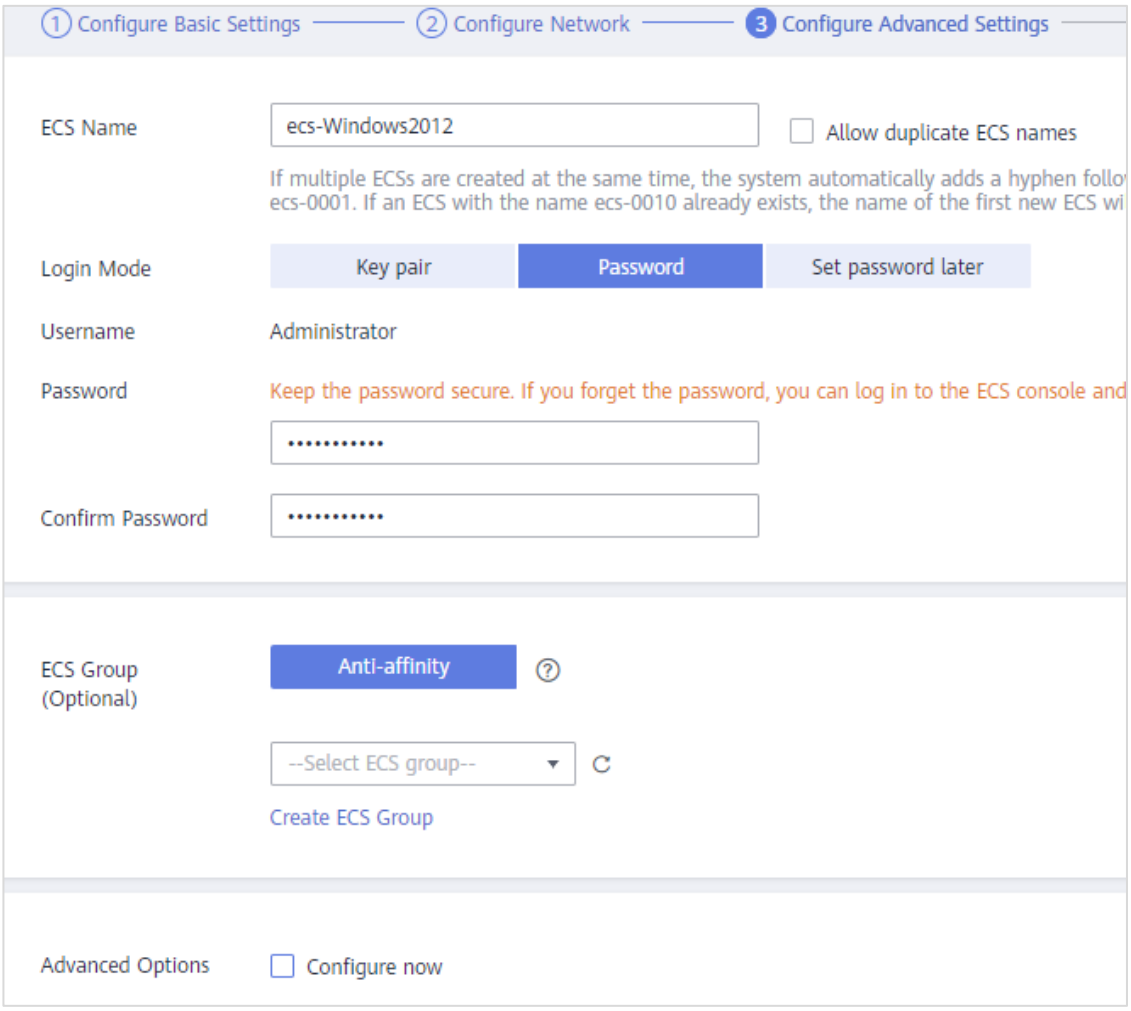


Step 13 Repeat the preceding operations to create another ECS with the following parameter settings:

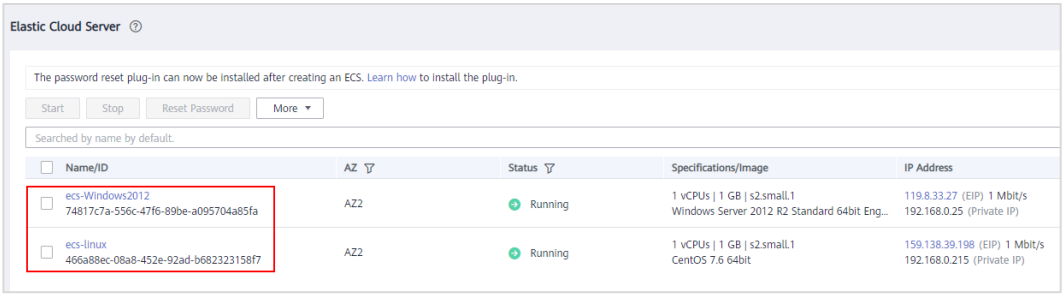
- **Billing Mode**: **Pay-per-use**
- **Image**: public image, Windows Server 2012 R2 Standard 64bit English (40GB)



- **ECS Name**: **ecs-Windows2012**
- Other parameters: same as those of **ecs-Linux**



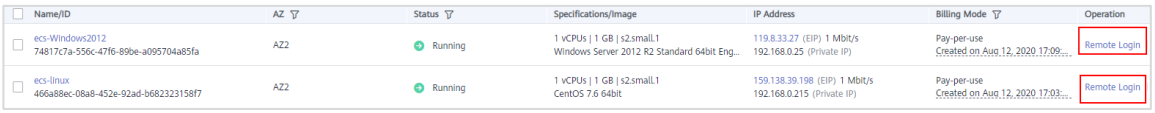
The purchased ECSs are displayed on the **Elastic Cloud Server** page.



----End

1.1.4.2 Logging In to the ECSs

Step 1 On the **Elastic Cloud Server** page, click **Remote Login** in the **Operation** column of each ECS.

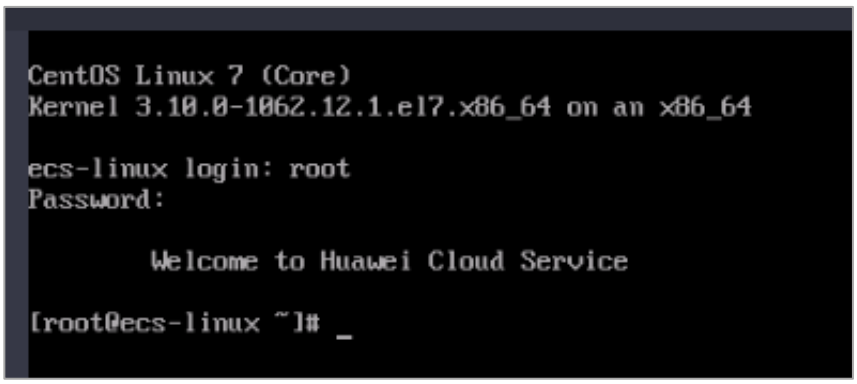


Step 2 Enter login information.

- Linux

  Username: root

  Password: Enter a password, for example, **Huawei@123**.

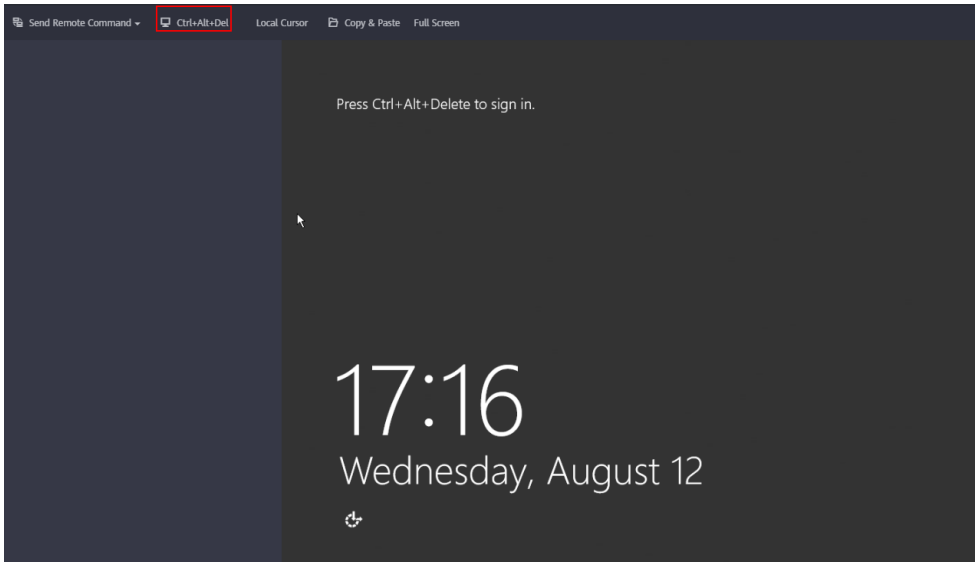


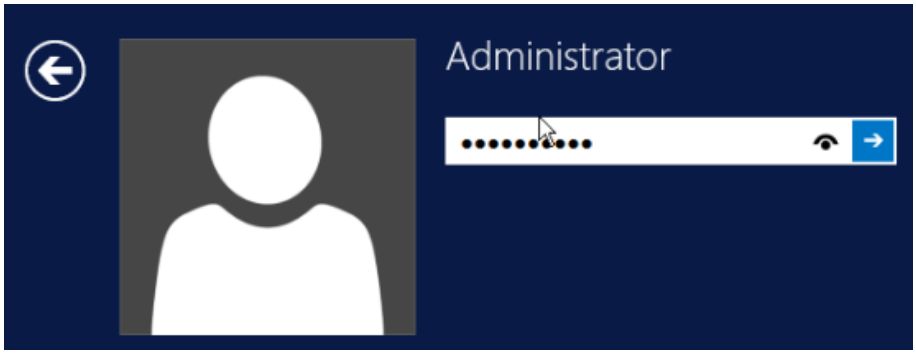
- Windows

  Username: Administrator

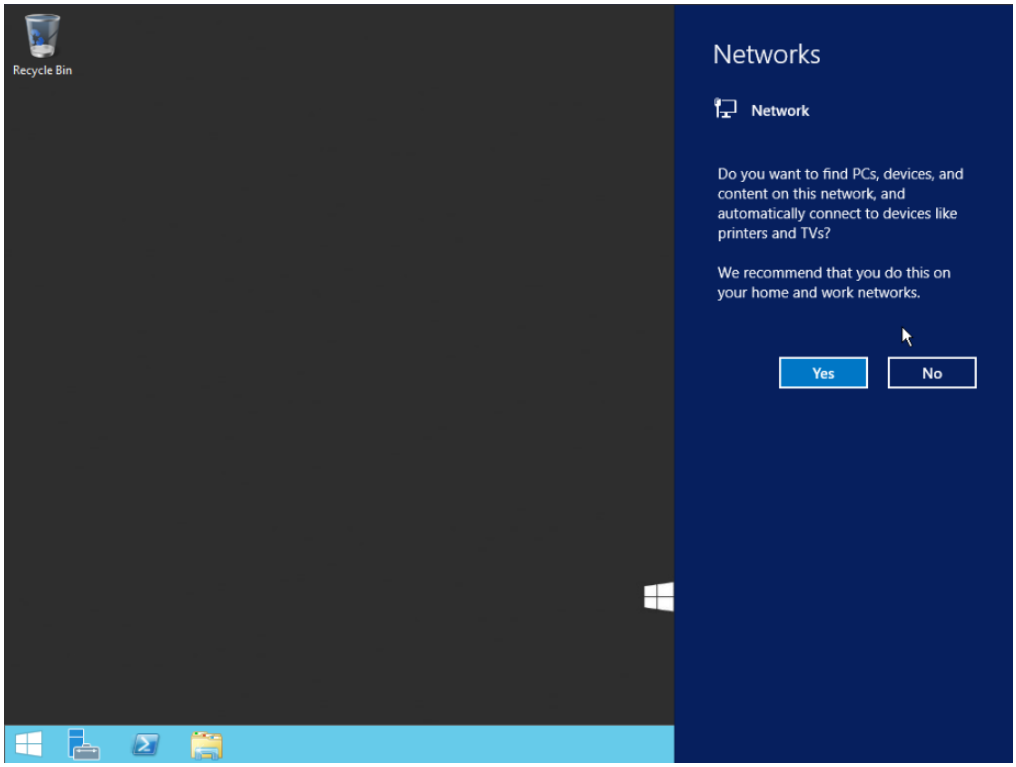
  Password: Enter a password, for example, **Huawei@123**.

  If **Press Ctrl+Alt+Delete to sign in** is displayed, click **Ctrl+Alt+Del** in the upper left of the remote login page.





If a page similar to the following is displayed, the ECSs are logged in.



For more details about parameter settings, see Purchasing an ECS.

----End

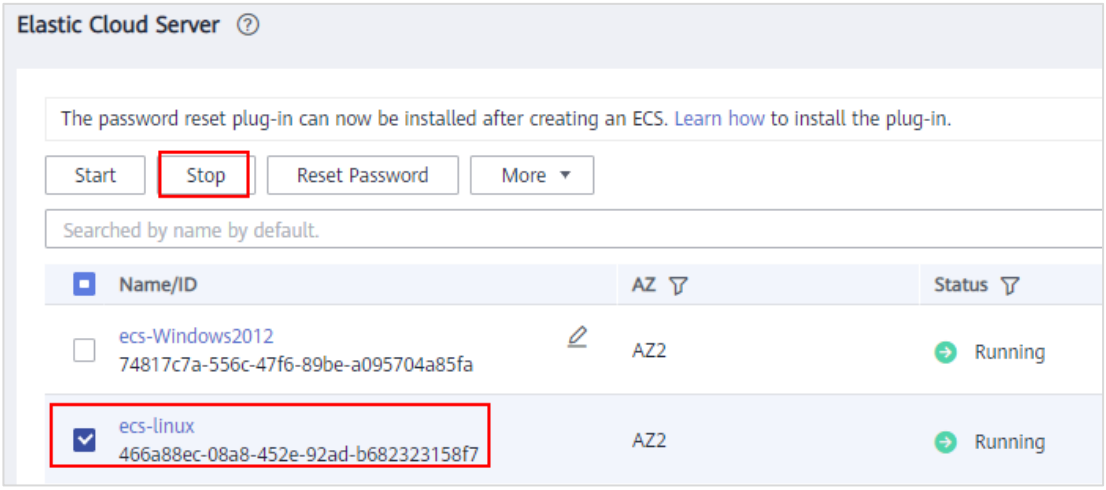
1.1.4.3 Modifying ECS Specifications (Linux)

If the specifications of an ECS fail to meet your service requirements, you can modify the ECS specifications at any time.

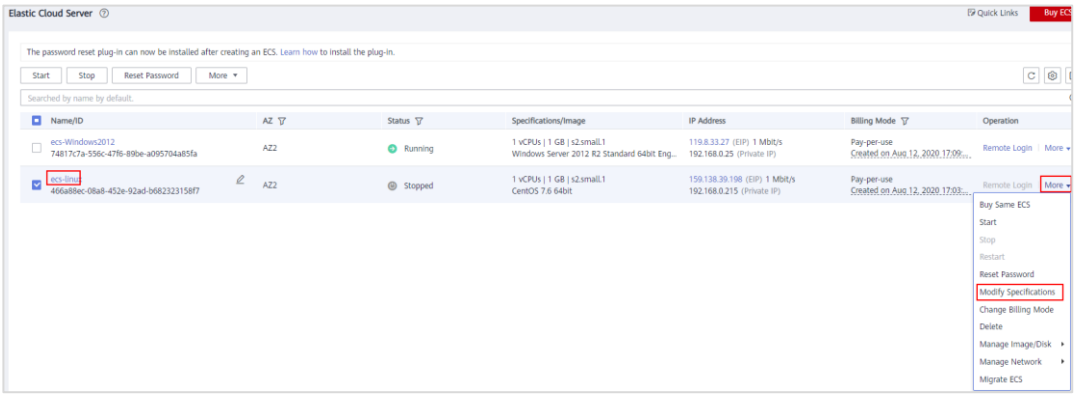
The following operations use a Linux ECS as an example.

Step 1 On the **Elastic Cloud Server** page, check the status of the target ECS.

Ensure that the ECS is stopped.

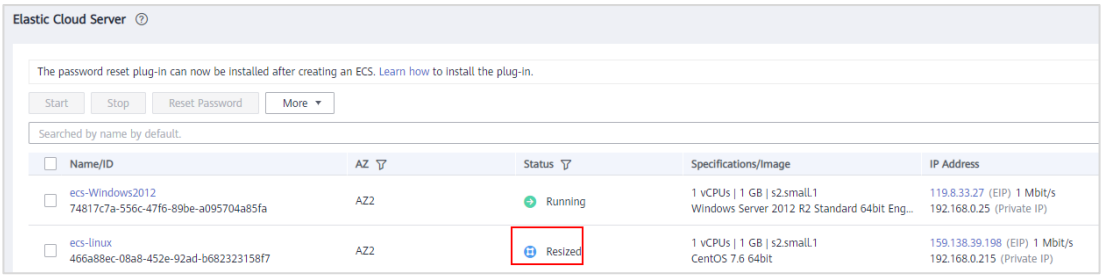


Step 2 Click **More** in the **Operation** column and select **Modify Specifications**.

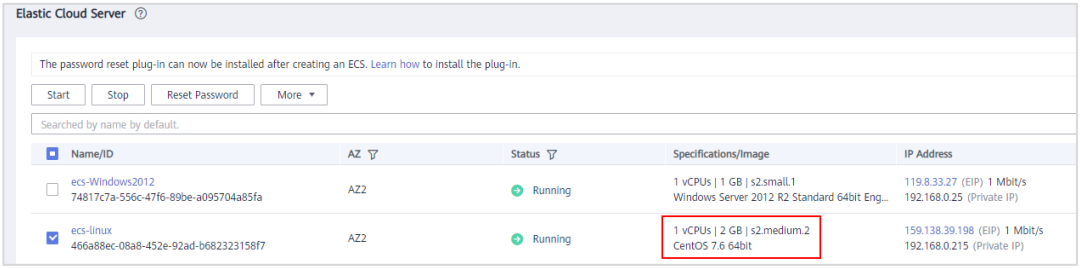


Step 3 On the **Modify ECS Specifications** page, select the desired ECS type, vCPUs, and memory and click **Next**. After confirming parameter settings, read the service agreement, select the check box, and click **Submit**.

The status of the ECS changes to **Resizing** on the **Elastic Cloud Server** page.



Step 4 After the ECS status changes to **Running**, check whether its specifications have been modified.



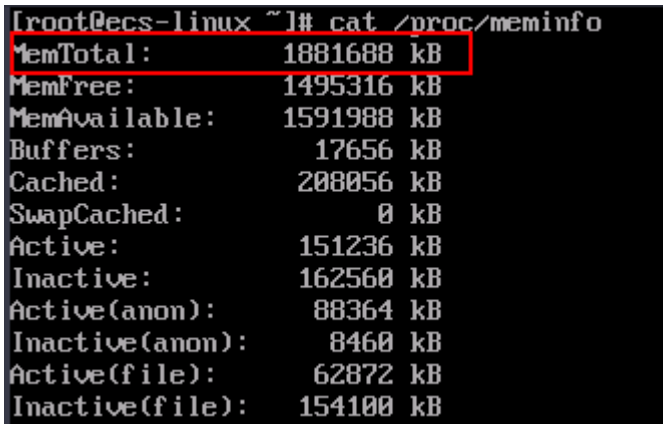
Step 5 (Optional) Log in to the modified ECS and check its specifications on the CLI.

- Run the **cat /proc/cpuinfo| grep "processor"| wc -l** command to view vCPUs (originally 1 vCPU).

  Manually run this command. Pay attention to the command format if you copy-paste the command.

- Run the **cat /proc/meminfo** command to view memory.

  MemTotal shows the total memory size.



The specifications modification is successful.

----End

1.1.5 Creating a Windows System Disk Image Using an ECS

If you have created an ECS and configured it (such as by installing software and deploying an application environment) based on your business requirements, you can create a system disk image with the configured ECS. Then, the configurations will be applied to all the new ECSs created from this image.

For example, the process of creating a Windows system disk image using an ECS is as follows:

1. Log in to a Windows ECS.

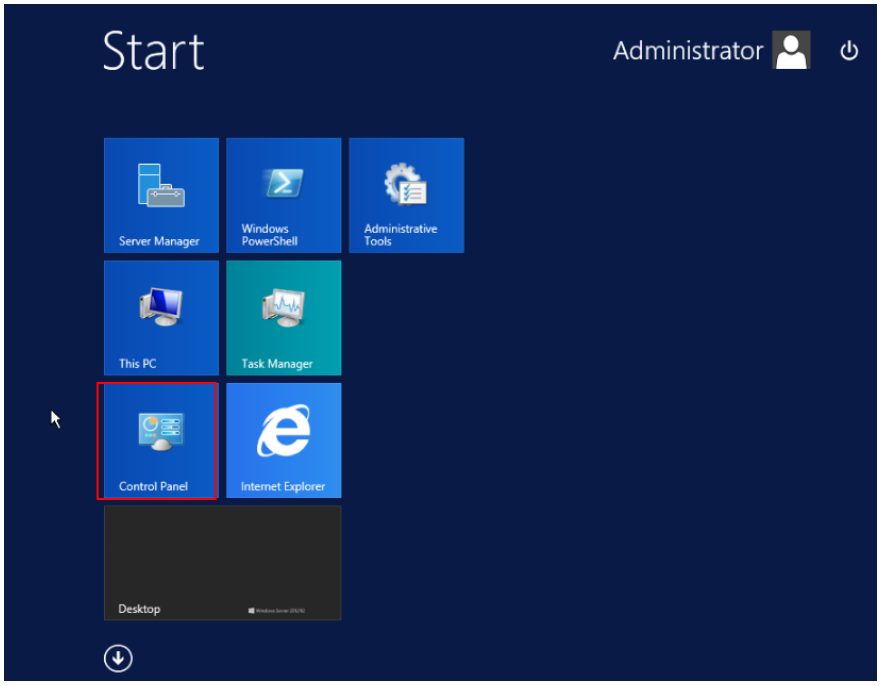
2. Configure the ECS.
3. Use the ECS to create a system disk image.

1.1.5.1 Configuring a Windows ECS

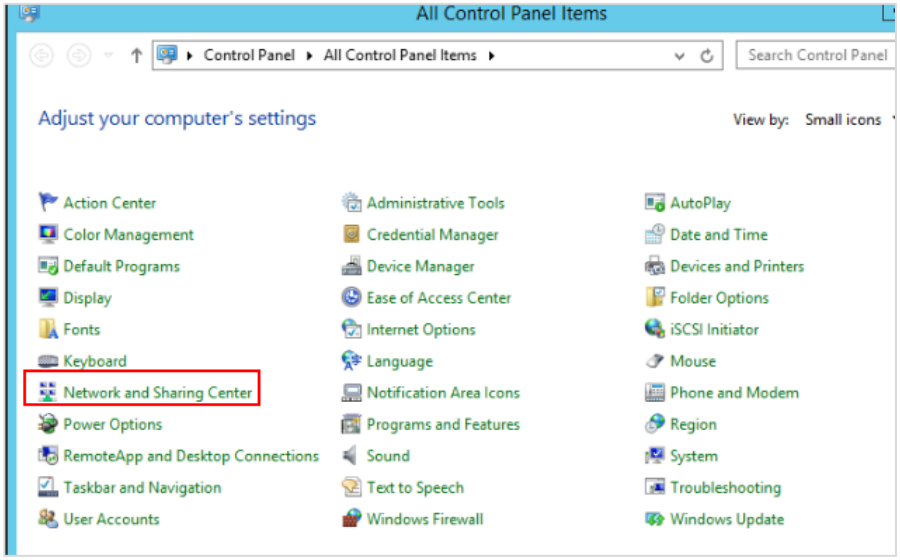
Step 1 Log in to the ECS (**ecs-Windows2012** is used as an example).

Step 2 Configure DHCP for the ECS NICs.

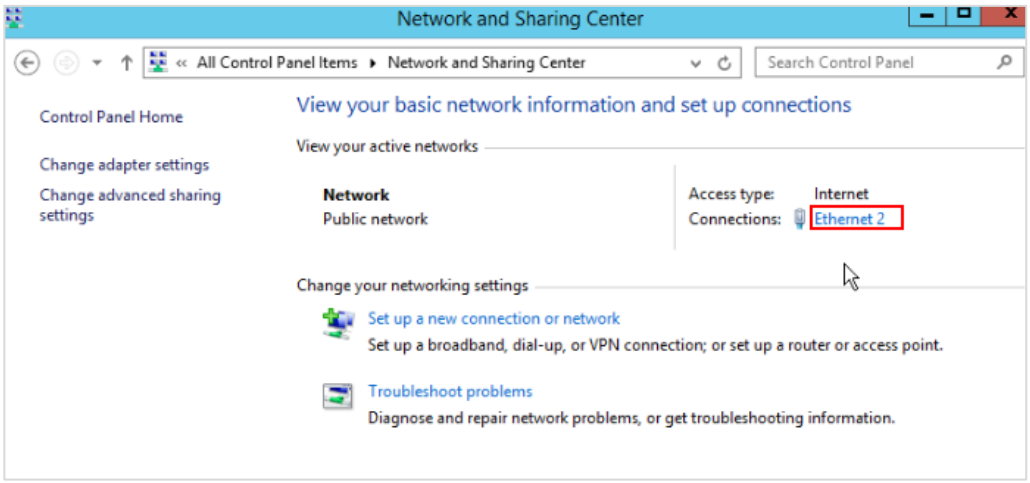
1. Choose **Start** > **Control Panel**.



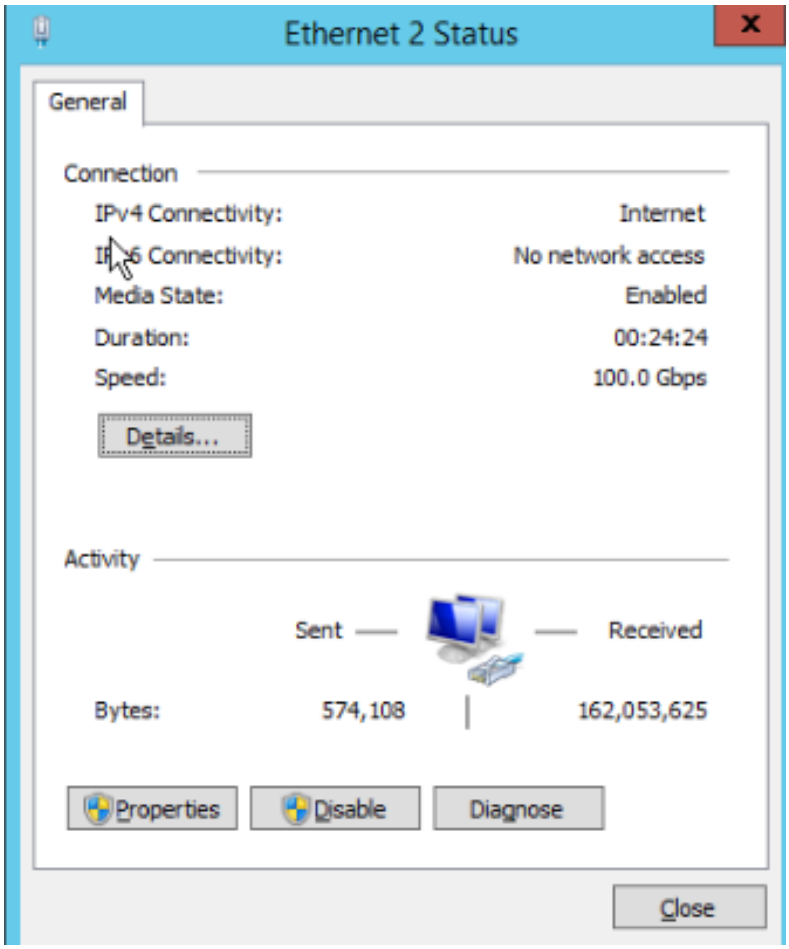
2. Click **Network and Sharing Center**.



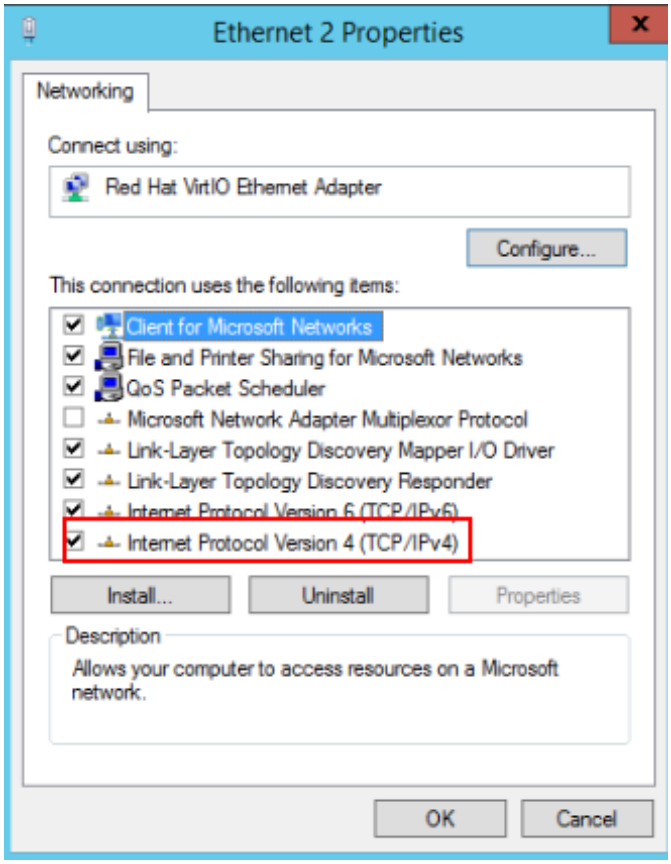
3. Click the connection (for example, **Ethernet 2**).



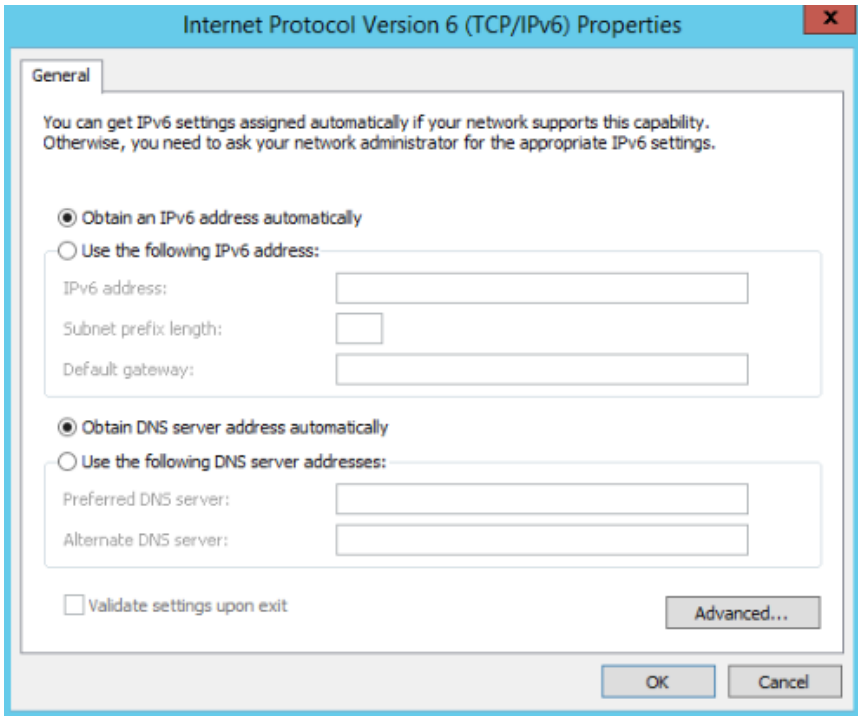
4. Click **Properties**.



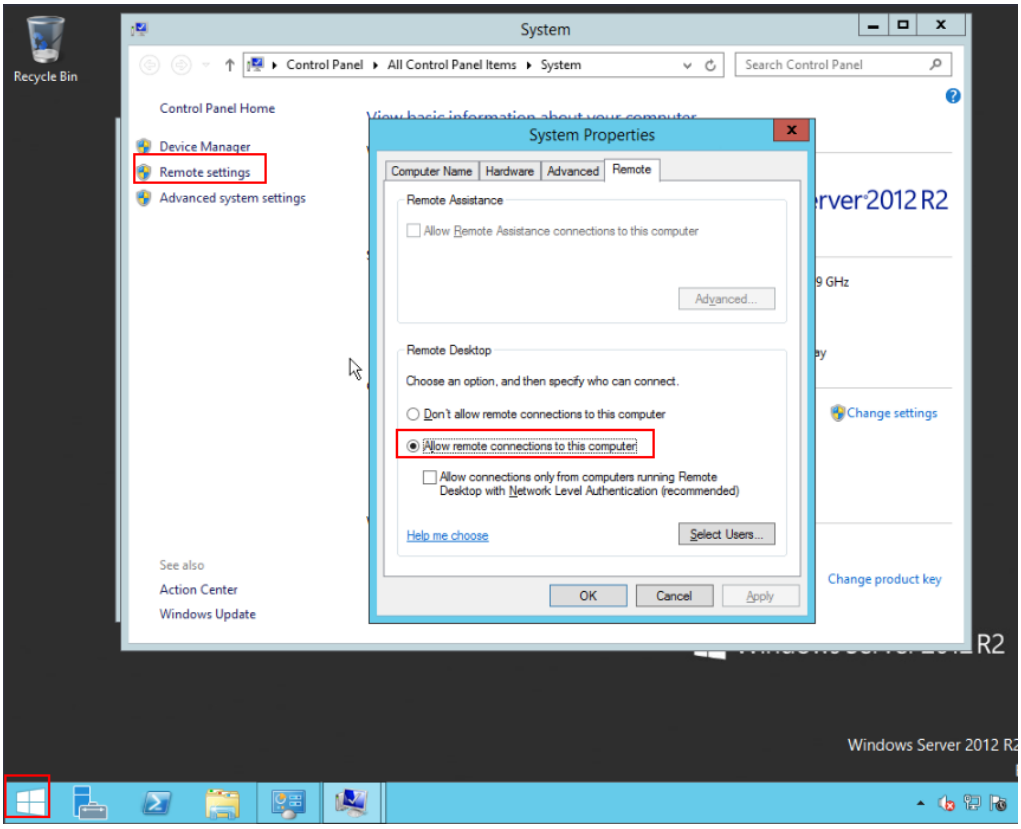
5. Double-click **Internet Protocol Version 4 (TCP/IPv4)**.



6. If **Obtain an IPv6 address automatically** and **Obtain DNS server address automatically** are selected, DHCP has been configured. Otherwise, select the two check boxes and click **OK**.

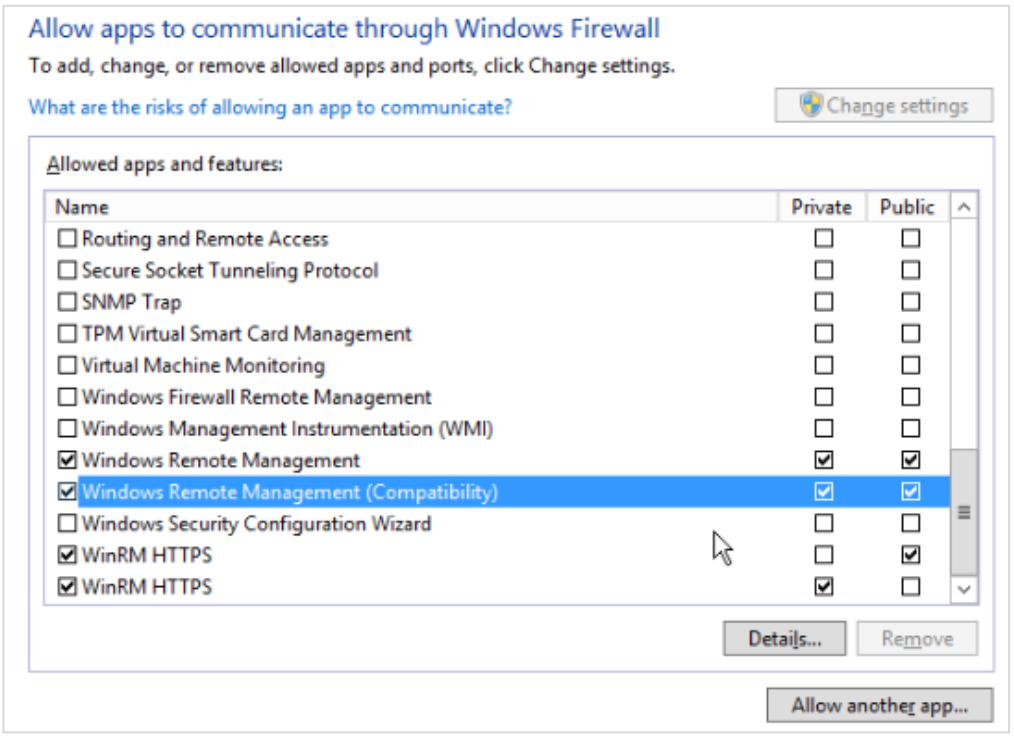


Step 3 Click **Start**, right-click **Computer**, and choose **Properties**. In the left navigation pane of the **System** page, click **Remote settings**. Select **Allow remote connections to this computer**. Click **OK**.



Step 4 Go to **Start** > **Control Panel** and navigate to **Windows Firewall**. In the left pane, select **Allow an app or feature through Windows Firewall**.

Step 5 Select apps that are allowed by Windows Firewall for **Remote Desktop** based on your network requirements and click **Allow another app...**.

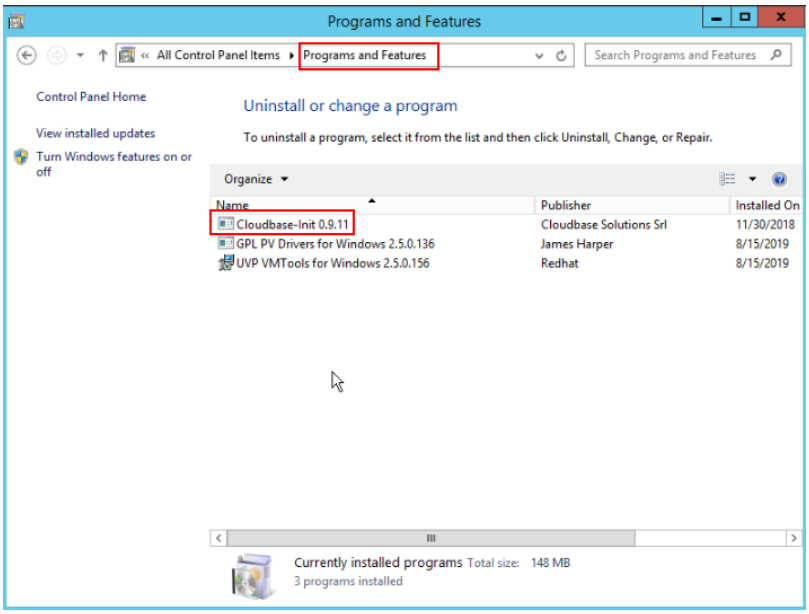


Step 6 Install Cloudbase-Init on the ECS.

NOTE

If Cloudbase-Init is not configured for the ECS, custom information cannot be injected into the new ECSs created from the private image and you can only log in to the ECSs with the password specified in the image.

In this exercise, the ECS is created from public image **windows2012 R2** for which Cloudbase-Init is installed by default. You can go to **Control Panel** > **Programs and Features** to check whether Cloudbase-Init has been installed on the ECS.

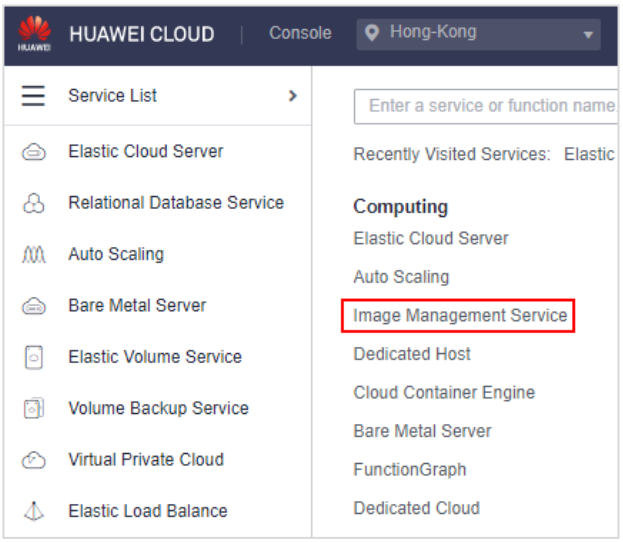


For the ECSs created from a private image or an external image file, install and configure Cloudbase-Init for them by referring to IMS User Guide.

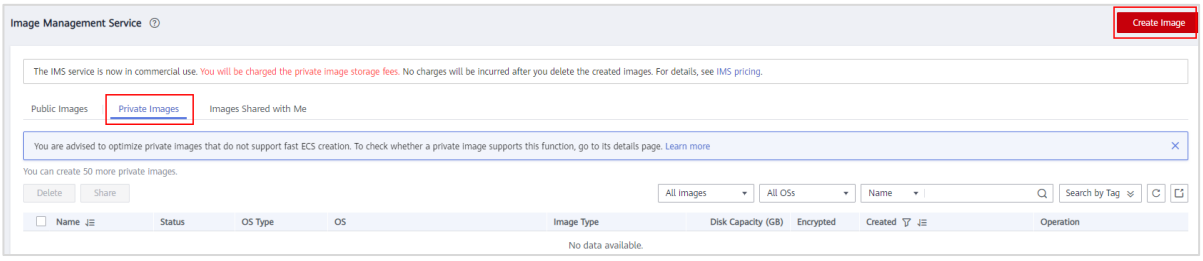
----End

1.1.5.2 Creating a Windows Private Image

Step 1 Go back to the HUAWEI CLOUD management console and choose **Computing** > **Image Management Service** in **Service List**.

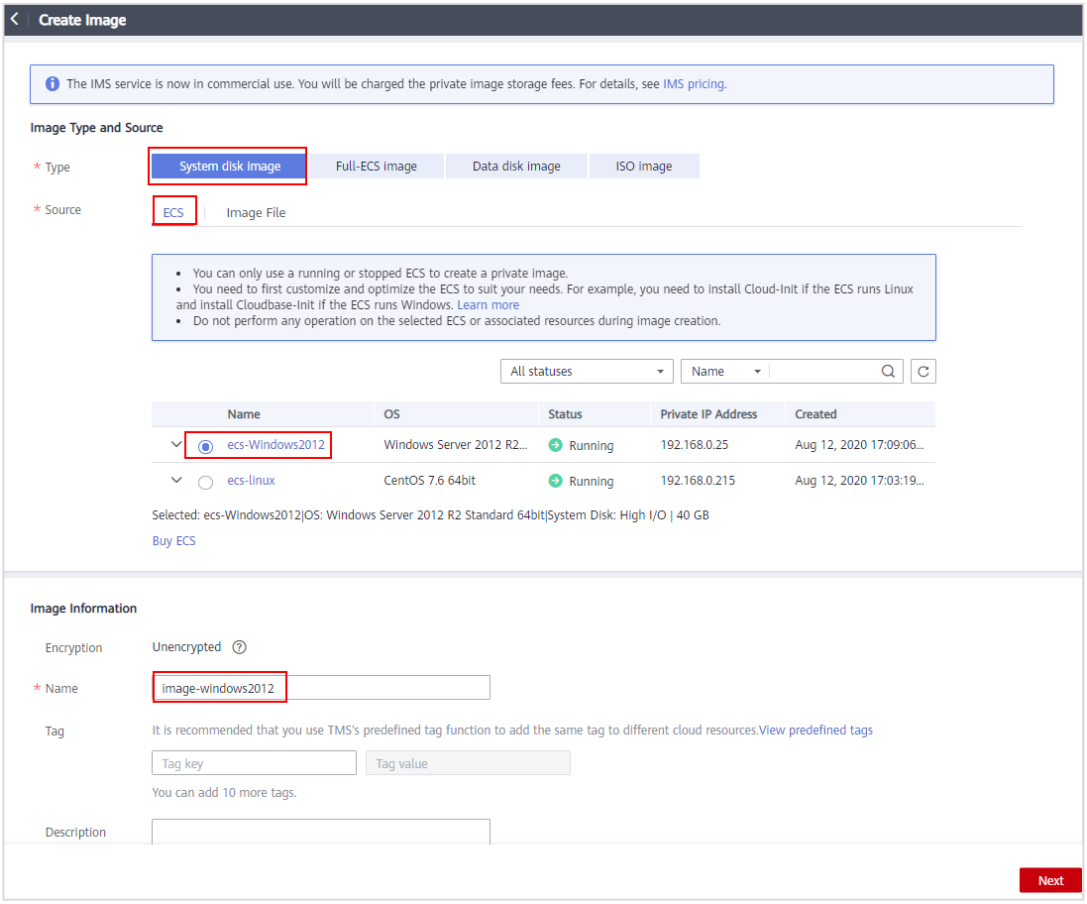


Step 2 On the **Image Management Service** page, click **Create Image**.



Step 3 Set parameters on the **Create Image** page and click **Next**.

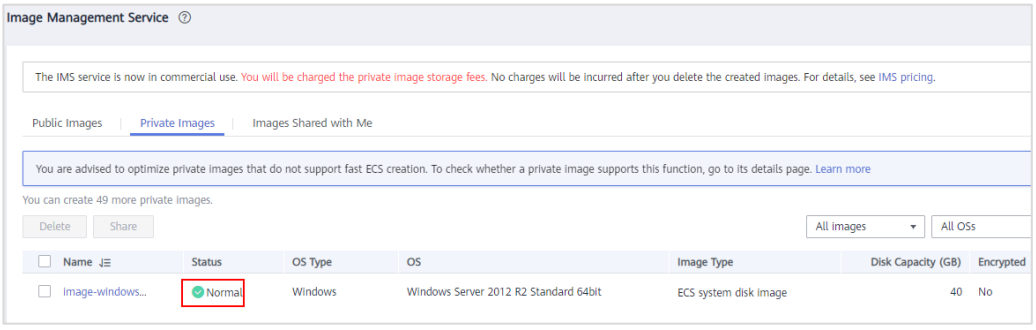
- **Type**: Select **System Disk Image**.
- **Source**: Select **ECS** and then the desired ECS, for example, **ecs-Windows2012**.
- **Name**: Enter a name, for example, **image-windows2012**.



Step 4 Confirm the settings. Then, select **I have read and agree to the Huawei Image Disclaimer** and click **Submit**.

Step 5 Switch back to the **Private Images** tab page to view the image status.

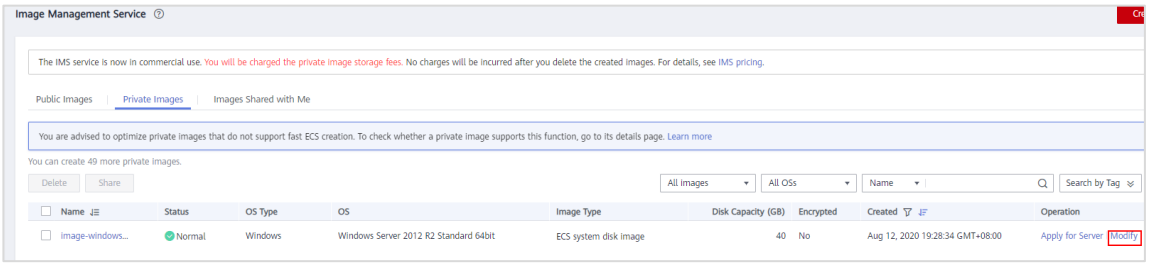
The time required for creating an image varies depending on the image file size. Generally, it takes about 10 to 20 minutes. The image is created successfully when its status changes to **Normal**.



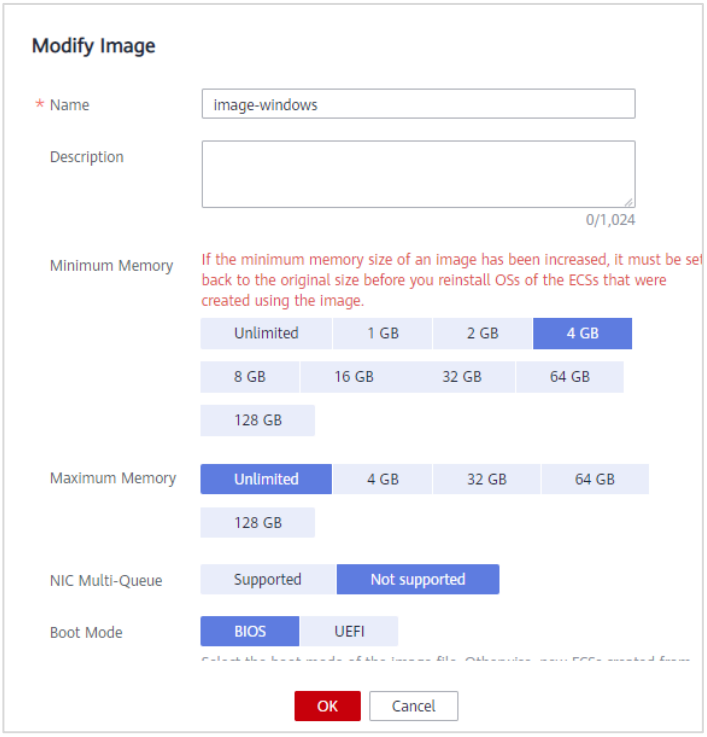
----End

1.1.5.3 Modifying Image Information

Step 1 Locate the row that contains the image to be modified and click **Modify** in the **Operation** column.



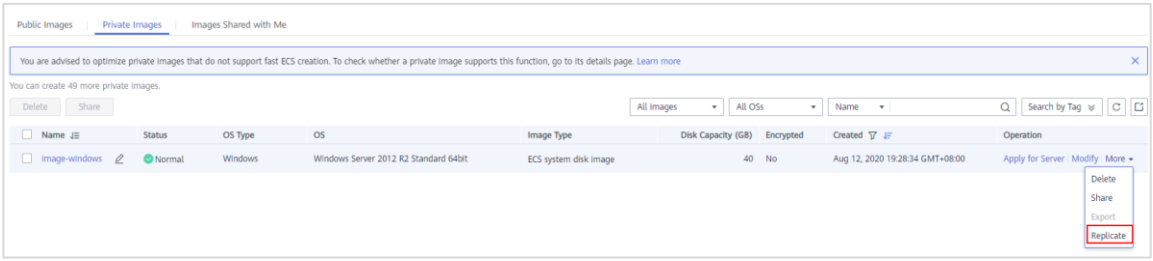
Step 2 You can modify the image name, memory, and other information.



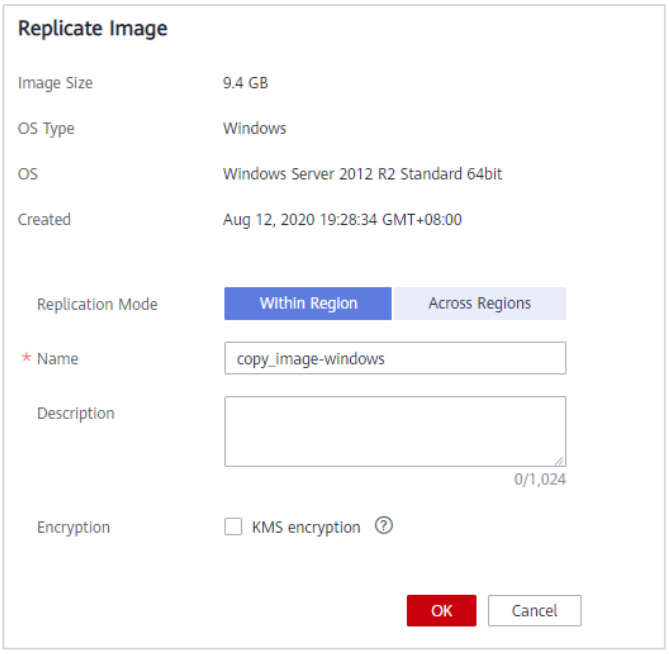
----End

1.1.5.4 In-Region Image Replication

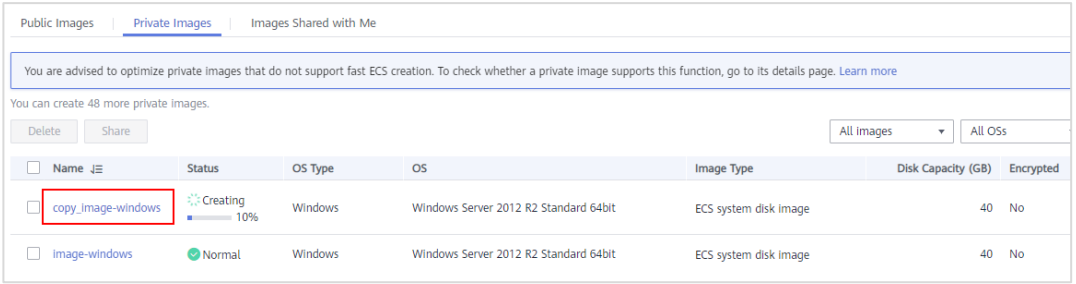
Step 1 Locate the row that contains the image to be replicated and choose **More** > **Replicate** in the **Operation** column.



Step 2 In the displayed **Replicate Image** dialog box, enter a new name for the image and click **OK**.



The new image is displayed on the **Private Image** tab page and its status is **Creating**.



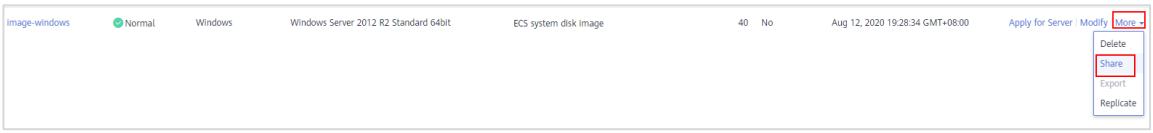
----End

1.1.5.5 Creating a Shared Image

You can share your images with another user. Before sharing the images, you need to obtain the account name of the user (if the user is a DeC or multi-project user, you also

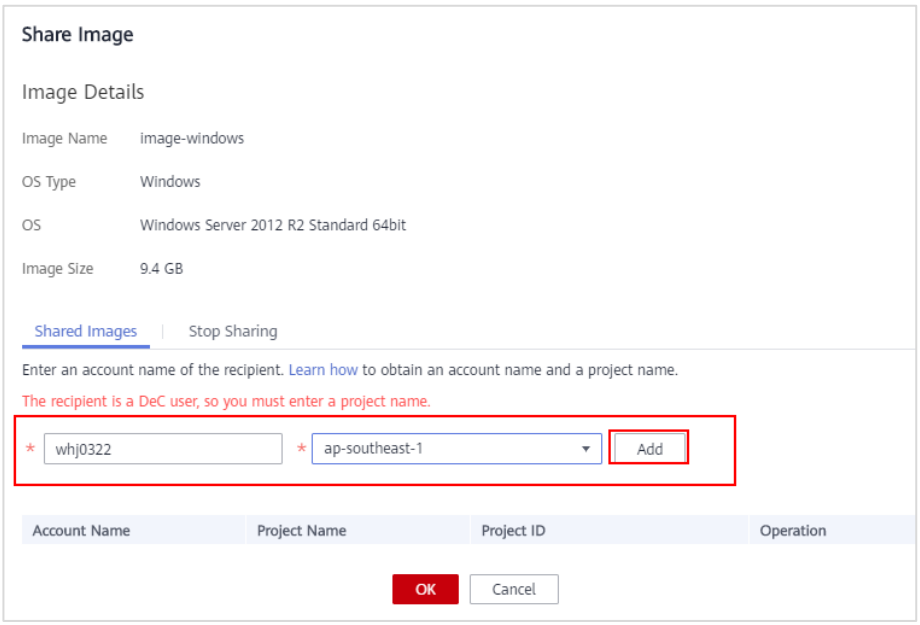
need to obtain their project name). In this exercise, sharing a single image is used as an example.

Step 1 On the **Private Images** tab page, select the private image to be shared and choose **More** > **Share** in the **Operation** column.

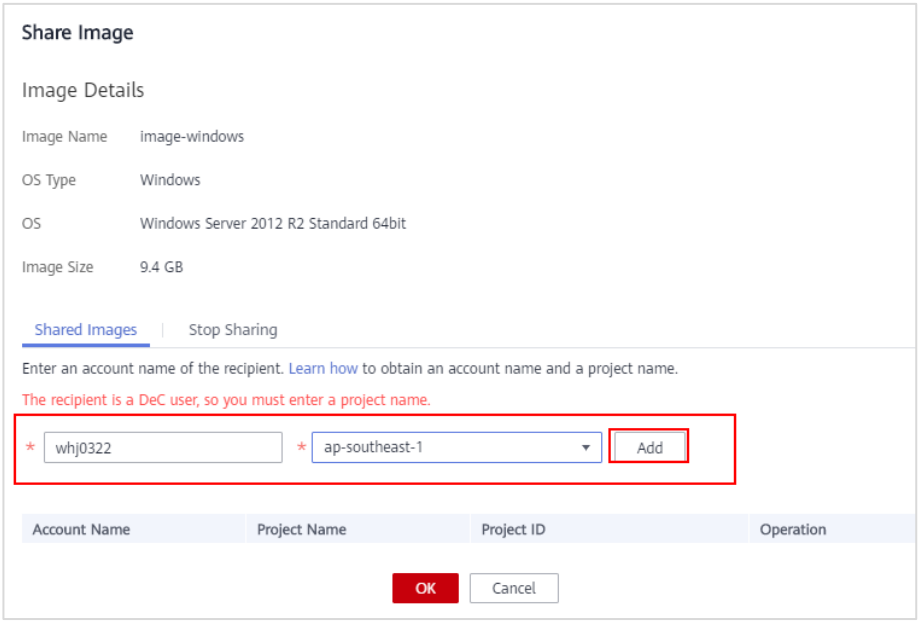


Step 2 Click the **Shared Images** tab, enter the account name of the target user and click **Add**.

If the user is a DeC or multi-project user, you also need to enter their project name. To share the image with multiple users, enter their account names (and project names).



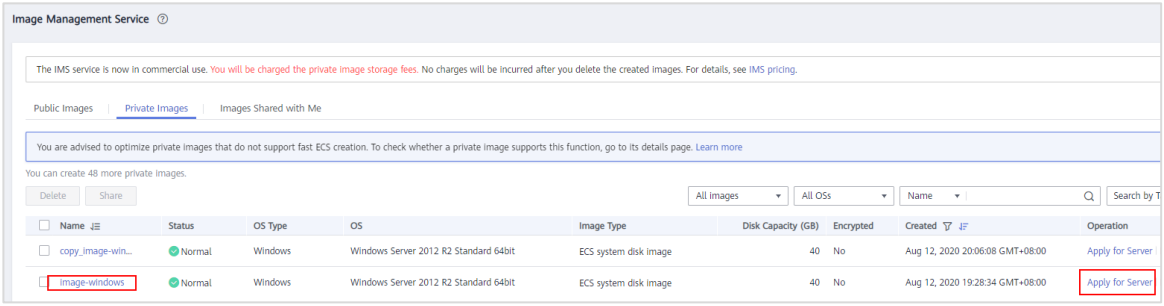
Step 3 Go to the image details page to check whether the image has been successfully shared with the user. On this page, you can also add or remove users who can use the shared image.



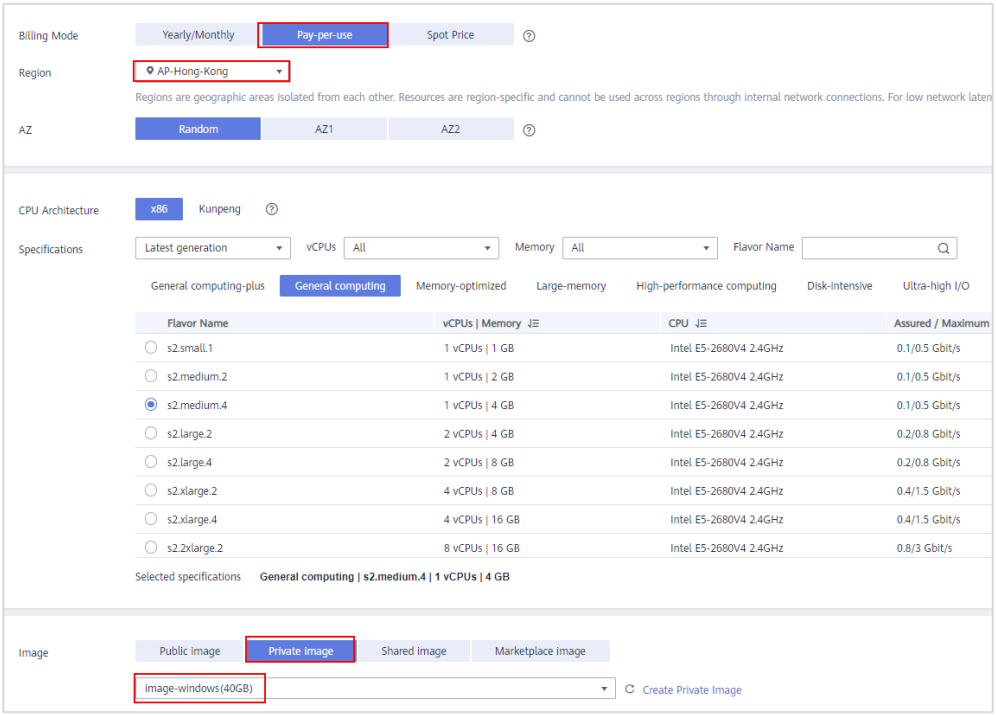
----End

1.1.5.6 Applying for an ECS Using a Private Image

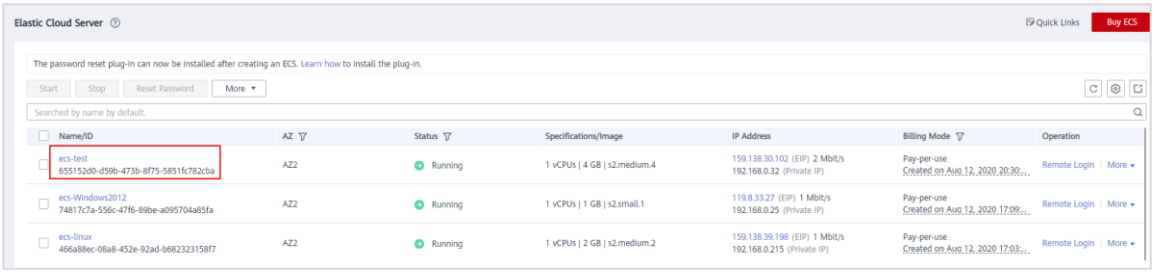
Step 1 On the **Private Images** tab page, locate the target image and click **Apply for Server** in the **Operation** column.



Step 2 Set **Billing Mode** to **Pay-per-use** and **Image** to **Private image**. Set other parameters as needed.



Step 3 Go back to the ECS list to view the ECS purchased using the private image.



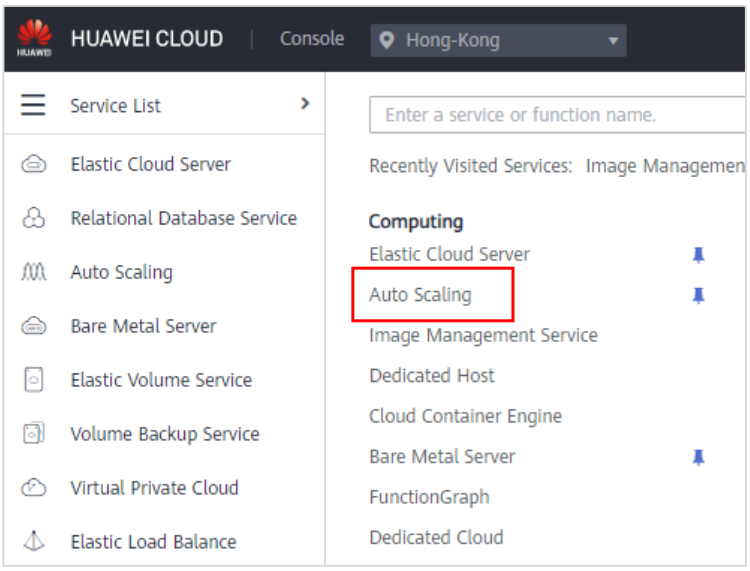
----End

1.1.6 AS Operations

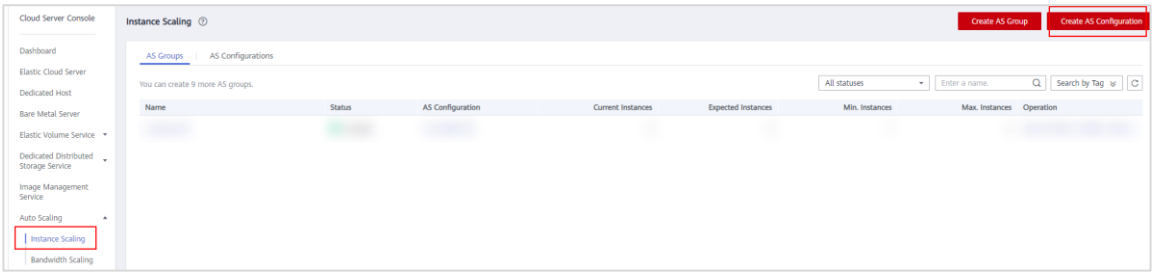
AS automatically adjusts resources based on your service requirements and configured AS policies. In this section, bandwidth scaling is performed.

1.1.6.1 Creating an AS Configuration

Step 1 Log in to the management console. On the homepage, choose **Service List** > **Computing** > **Auto Scaling**.

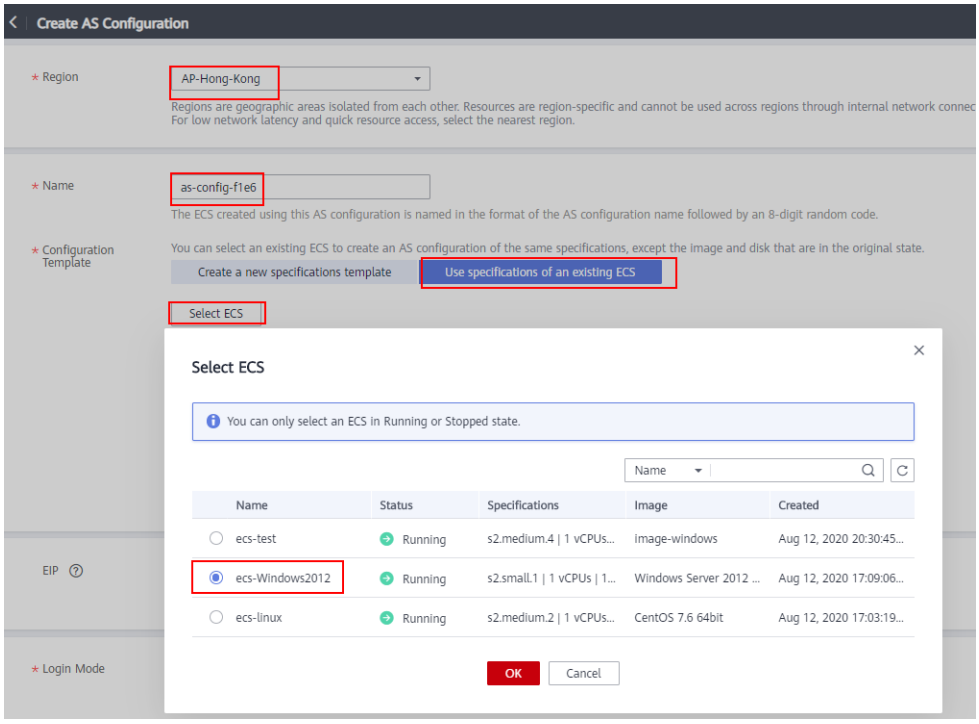


Step 2 Click **Create AS Configuration**.

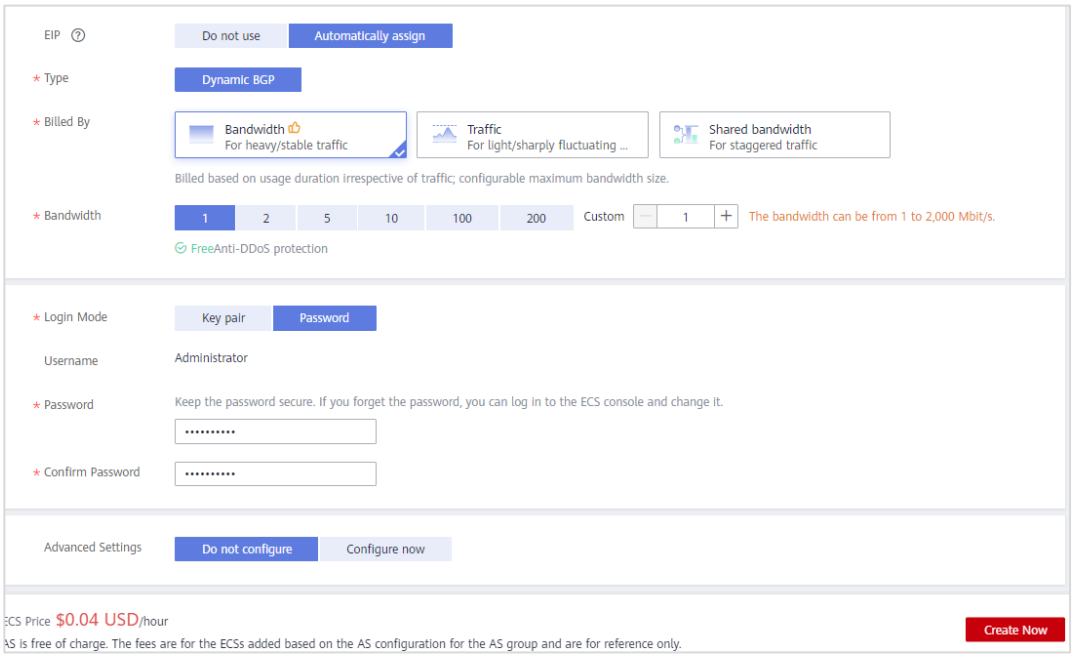


Step 3 Set the following parameters:

- **Region**: **AP-Hong Kong**
- **Name**: Use the default name **as-config-f1e6** here.
- **Configuration Template**: Select **Use the specifications of an existing ECS**. Click **Select ECS**. In the **Select ECS** dialog box, select an existing ECS, for example, **ecs-Windows2012**.

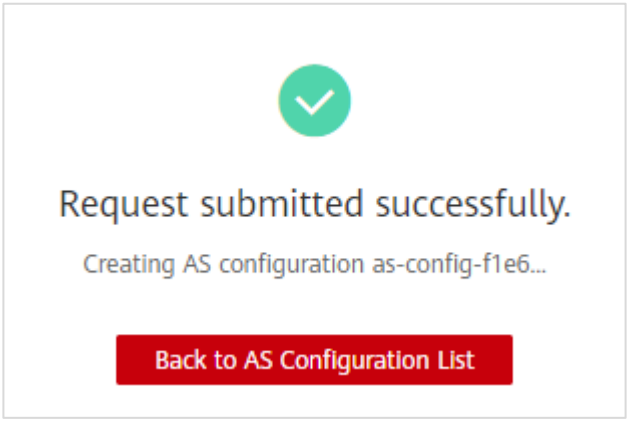


- **EIP**: **Automatically assign**
- **Type**: **Dynamic BGP**
- **Billed By**: **Bandwidth**
- **Bandwidth**: 1 Mbit/s
- **Login Mode**: **Password**
- **Password**: Enter a desired password.
- Enter the password again for **Confirm Password**.

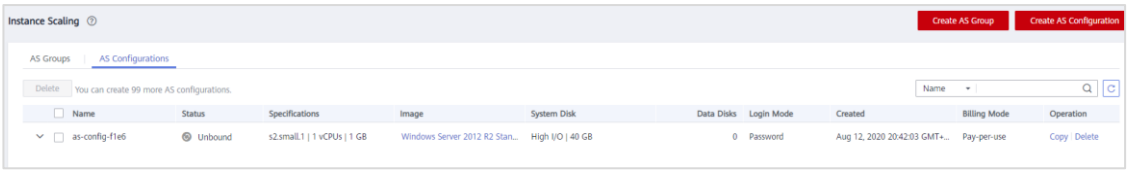


Step 4 Click **Create Now**.

The following page is displayed.



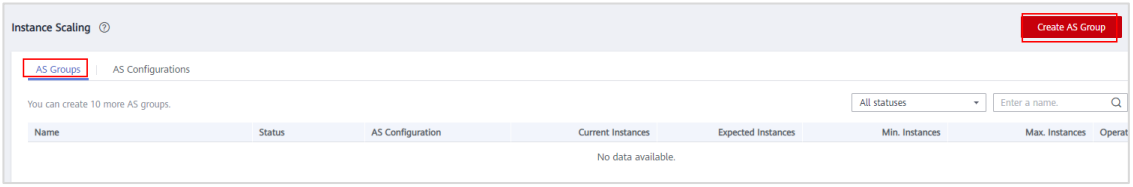
Step 5 In the AS Configuration list, view the created AS configuration **as-config-f1e6**.



----End

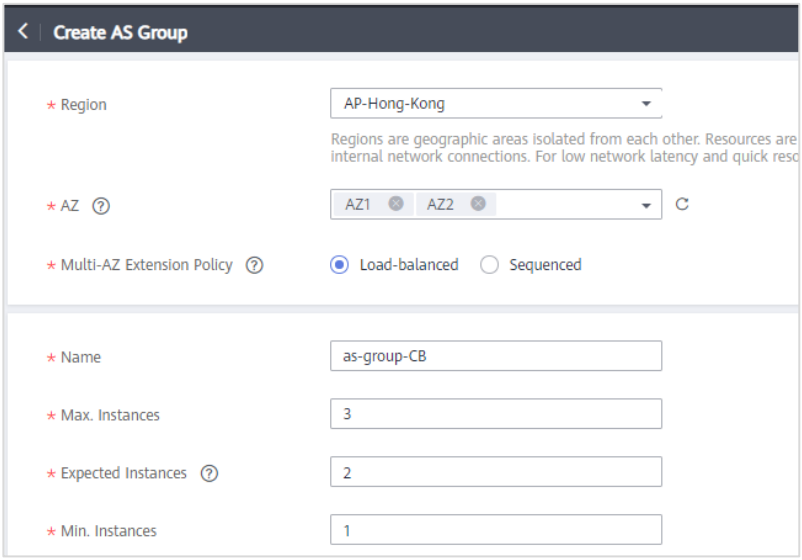
1.1.6.2 Creating an AS Group

Step 1 On the AS console, click **Create AS Group**.

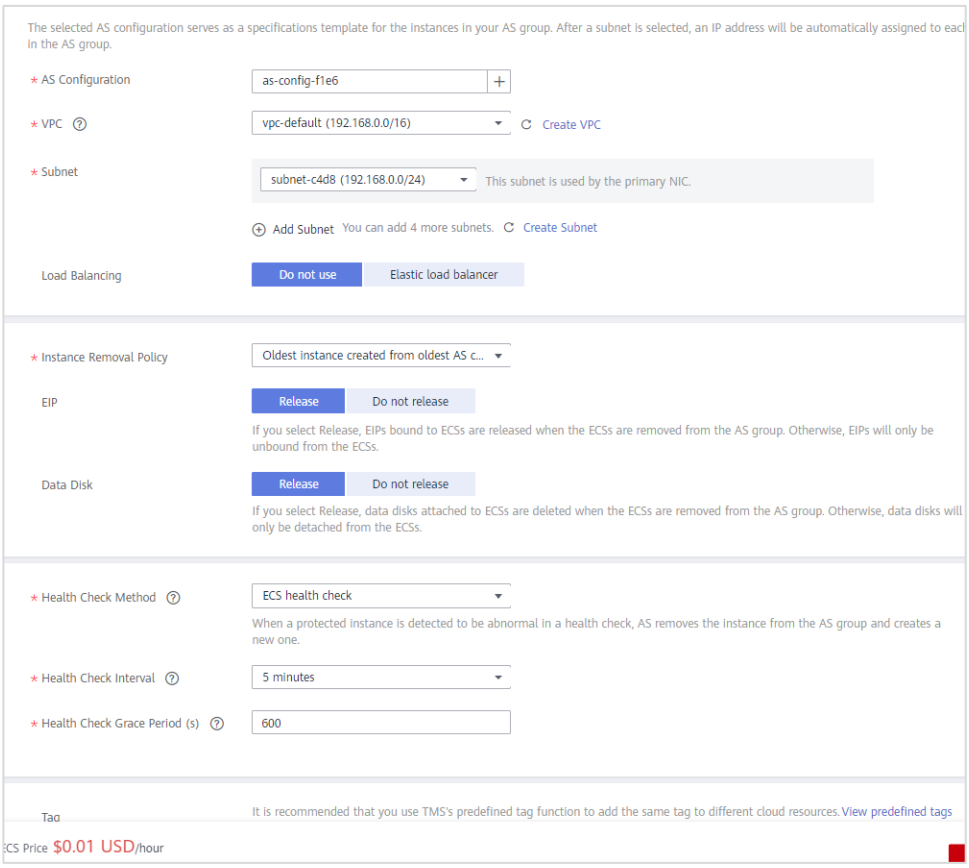


Step 2 Set the following parameters and then click **Create Now**.

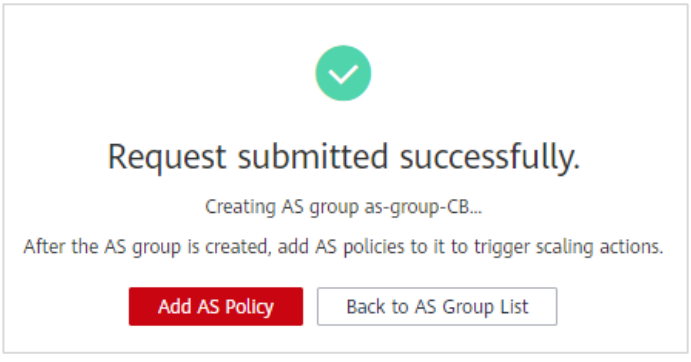
- **Region**: AP-Hong Kong
- **AZ**: Select all AZs. All AZs in the same region can communicate with each other over an intranet.
- **Multi-AZ Expansion Policy**: **Load-balanced**
- **Name**: for example, **as-group-CB**
- **Max. Instances**: **3**
- **Expected Instances**: **2**
- **Min. Instances**: **1**

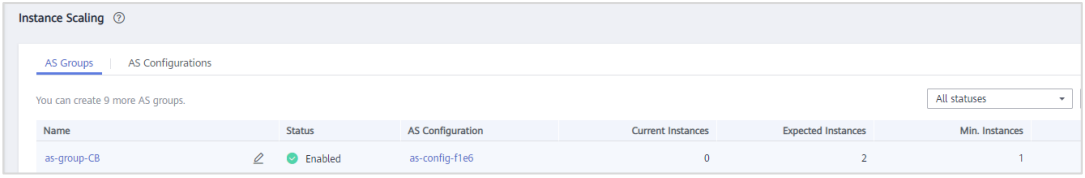


- **AS Configuration**: Select the created AS configuration **as-config-f1e6**.
- **VPC**: Select an existing VPC from the drop-down list for **VPC**. If no VPC is available, click **Create VPC**.
- **Subnet**: Retain the default value. The system automatically selects a subnet in the VPC.
- **Load Balancing**: **Do not use**
- **AS configuration Instance Removal Policy**: **Oldest instance created from oldest AS configuration**
- **EIP**: **Release**
- **Data Disk**: **Release**
- **Health Check Method**: **ECS health check**
- **Health Check Interval**: **5 minutes**
- **Health Check Grace Period (s)**: **600**
- **Tag**: not required

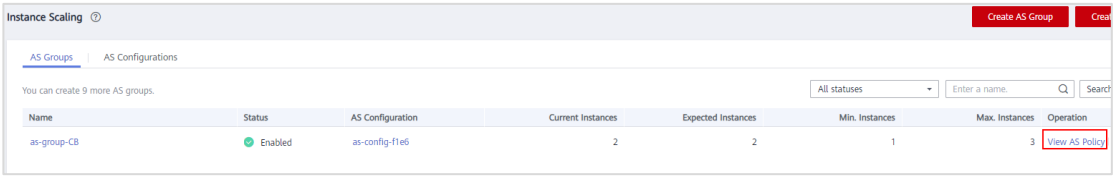


Step 3 Click **Back to AS Group List** to view the created AS group **as-group-CB**.

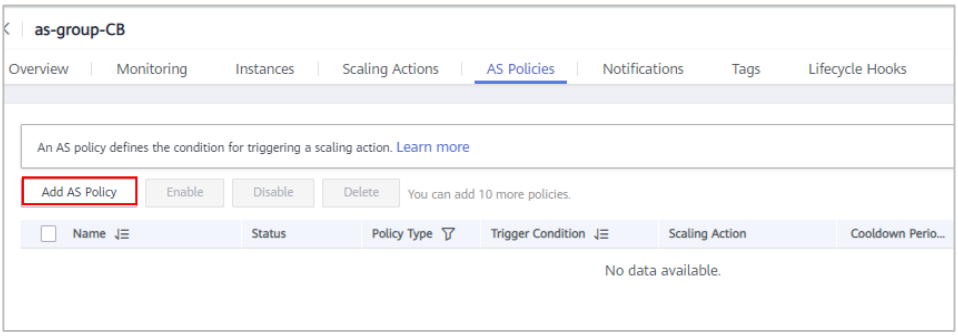




Step 4 Locate the row that contains the target AS group and click **View AS Policy** in the **Operation** column.

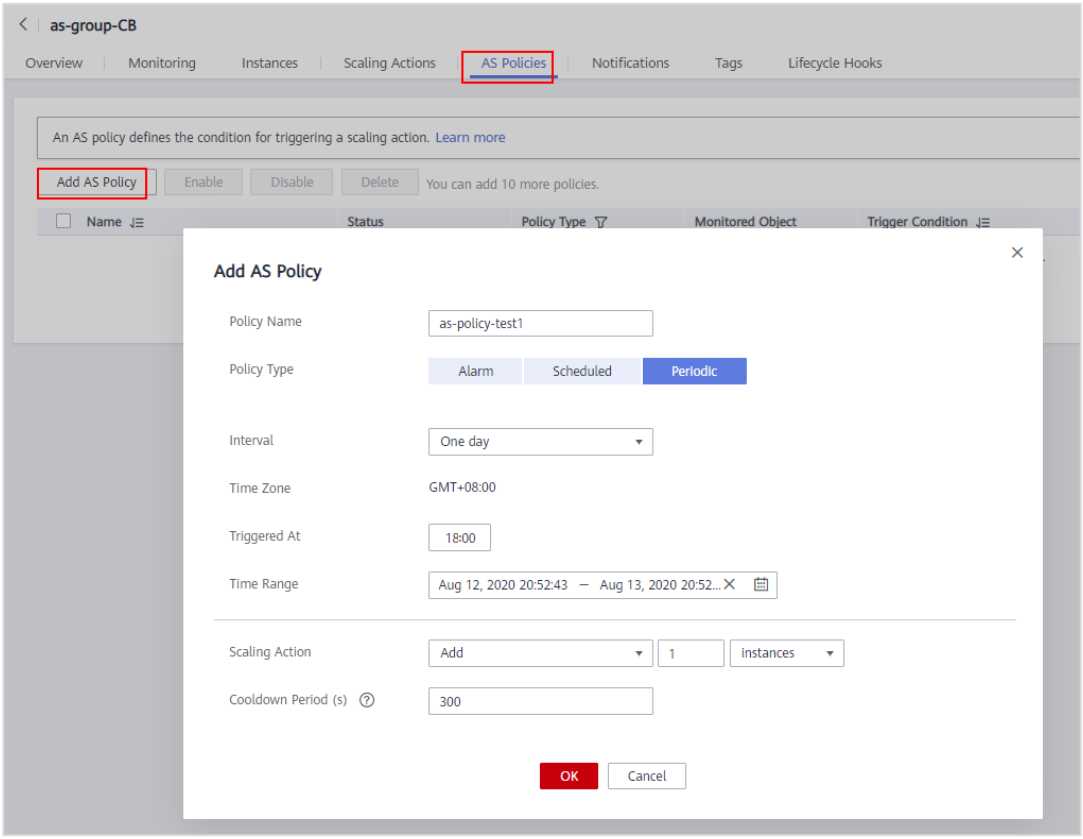


Step 5 Click **Add AS Policy**.

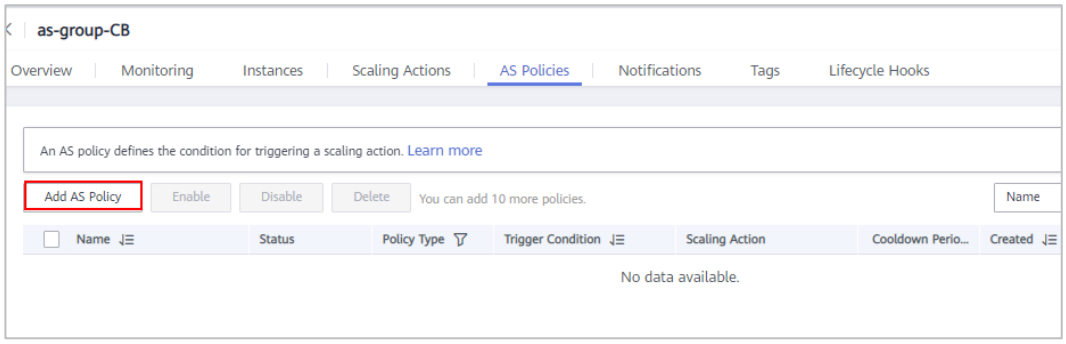


Step 6 In the **Add AS Policy** dialog box, set the following parameters:

- **Policy Name**: for example, **as-policy-test1**
- **Policy Type**: **Periodic**
- **Interval**: **One day**
- **Triggered At**: **18:00**
- **Time Range**: Retain the default value.
- **Scaling Action**: **Add 1 instance**
- **Cooldown Period (s)**: **900**

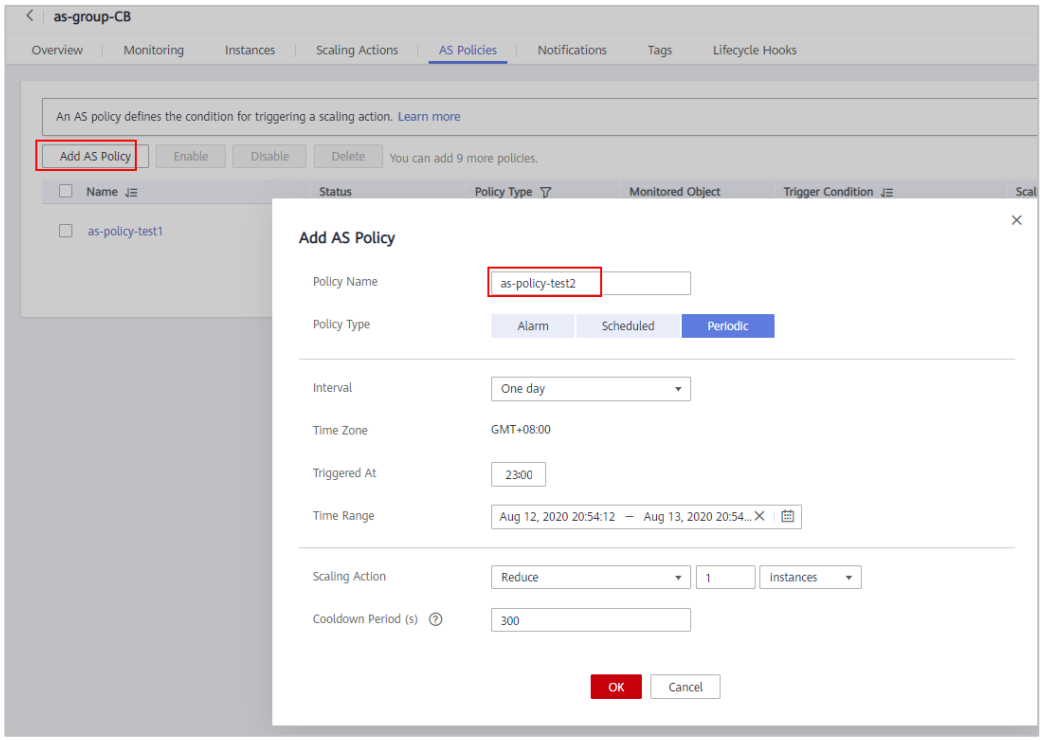


Step 7 Click **OK** and then click **Add AS Policy** again.



Step 8 Set the following parameters:

- **Policy Name**: for example, **as-policy-test2**
- **Policy Type**: **Periodic**
- **Interval**: **One day**
- **Triggered At**: **23:00**
- **Time Range**: Retain the default value.
- **Scaling Action**: **Reduce 1 instance**
- **Cooldown Period (s)**: **900**

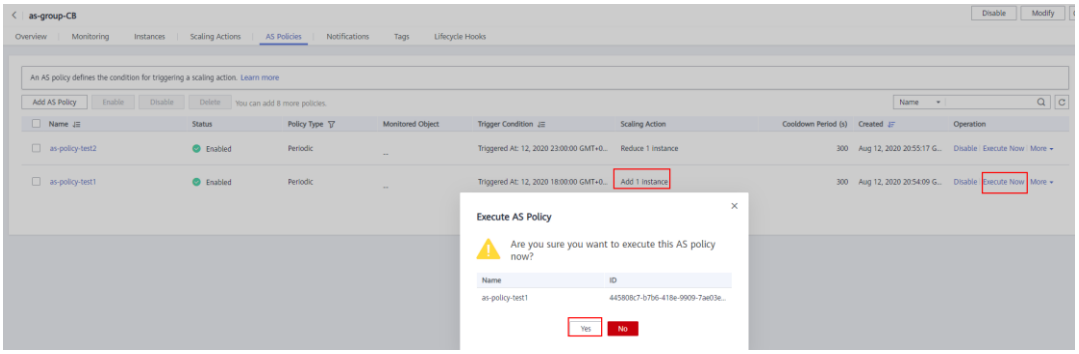


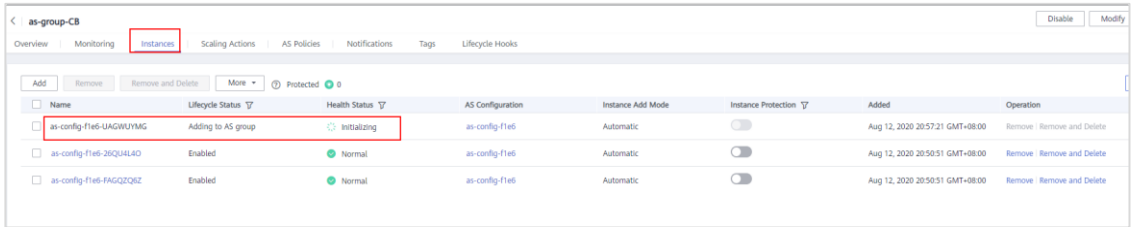
Step 9 Click **OK**.

Step 10 Wait till the triggering times of both AS policies expire.

Step 11 Click the **Monitoring** tab and reserve the changes in the number of instances triggered by the two periodic policies as shown in the following figure.

Considering time restrictions, you can click **Execute Now** to make the created policy **as-policy-test1** take effect immediately. A new instance is then added.



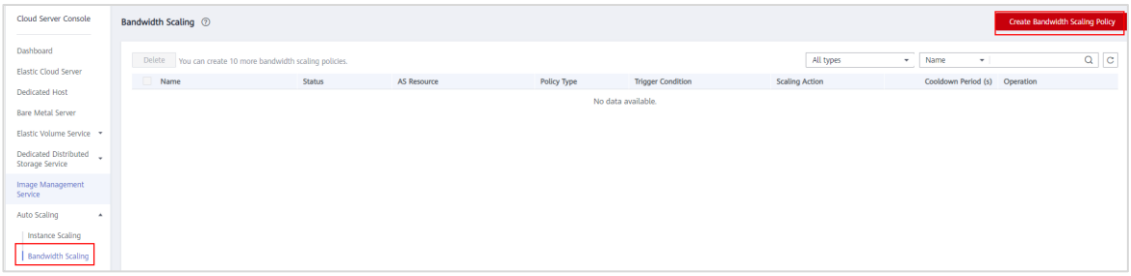


----End

1.1.6.3 (Optional) Creating a Bandwidth Scaling Policy

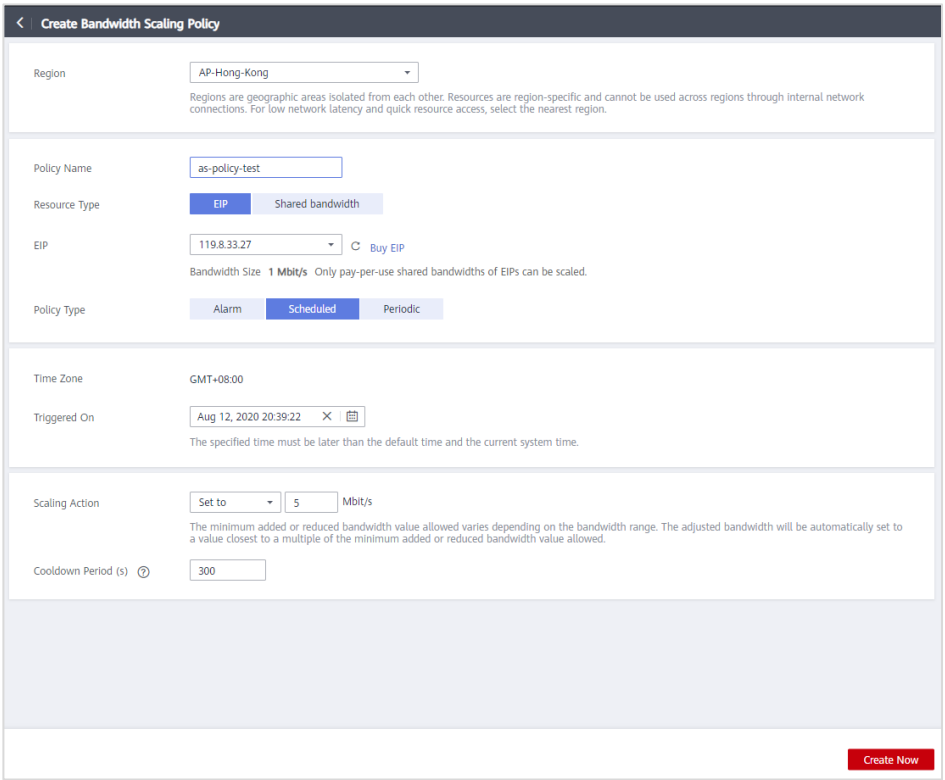
Step 1 On the management console, choose **Service List** > **Computing** > **Auto Scaling**.

Step 2 In the left navigation pane, choose **Bandwidth Scaling**. Click **Create Bandwidth Scaling Policy**.



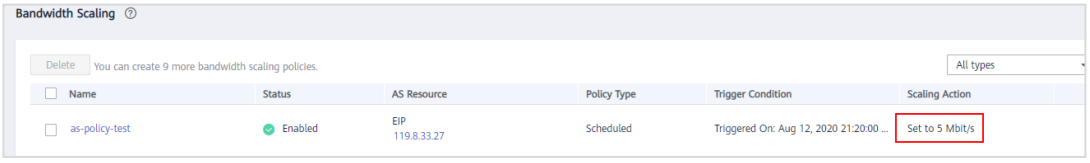
Step 3 Set the following parameters:

- **Region**: **AP-Hong Kong**
- **Policy Name**: for example, **as-policy-test**
- **Resource Type**: **EIP**. Select an existing EIP or create a new one.
- **Policy Type**: **Scheduled**
- **Triggered On**: Retain the default setting. Generally, the value is several minutes later than the current time.
- **Scaling Action**: **Set to 5 Mbit/s**
- **Cooldown Period (s)**: **300**



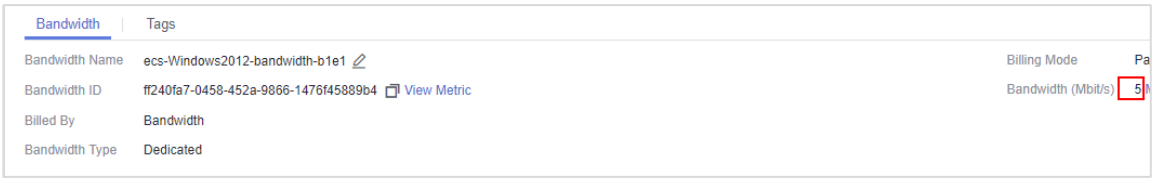
Step 4 Click **Create Now**.

Step 5 Wait for a short while and then return to the page that displays the bandwidth scaling policy list.



Step 6 Locate the row that contains the target policy and click the EIP.

On the page that displays the details about the EIP, the bandwidth has been changed to 5 Mbit/s.



----End

1.2 Container Operations

1.2.1 Introduction

This exercise involves ECSs and Docker containers, including creating and logging in to an ECS, creating, viewing, and running a Docker container, building a Docker image, and setting up a private registry.

1.2.2 Objectives

Upon completion of this exercise, you will be able to:

- Create, view, enter, and run a container.
- Build a container image.
- Set up a private registry.

1.2.3 Tasks

In this exercise, you will perform container-related operations on the ECS.

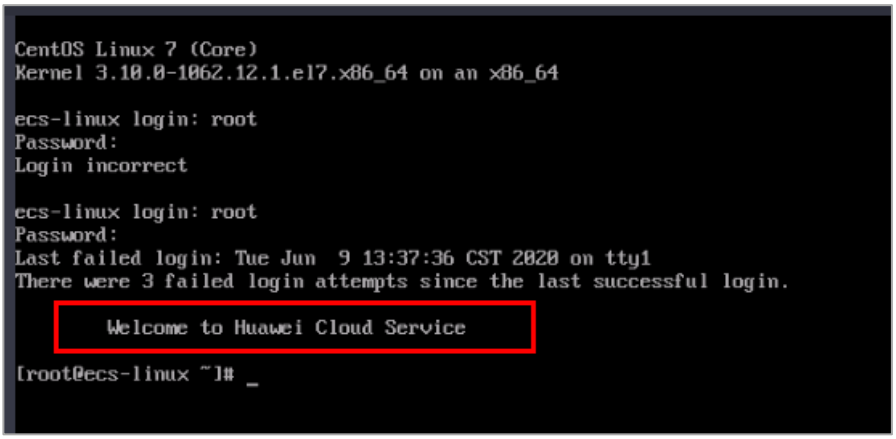
1.2.4 Basic Container Operations

1.2.4.1 Logging In to the ECS

Step 1 Create a Linux ECS. If an existing Linux ECS is available, skip this step.

Step 2 Log in to the ECS.

- **Username**: **root**
- **Password**: Enter the password you set when creating the ECS.



If information highlighted in the red box is displayed, you have logged in to the ECS successfully.

----End

1.2.4.2 Installing the Docker Environment

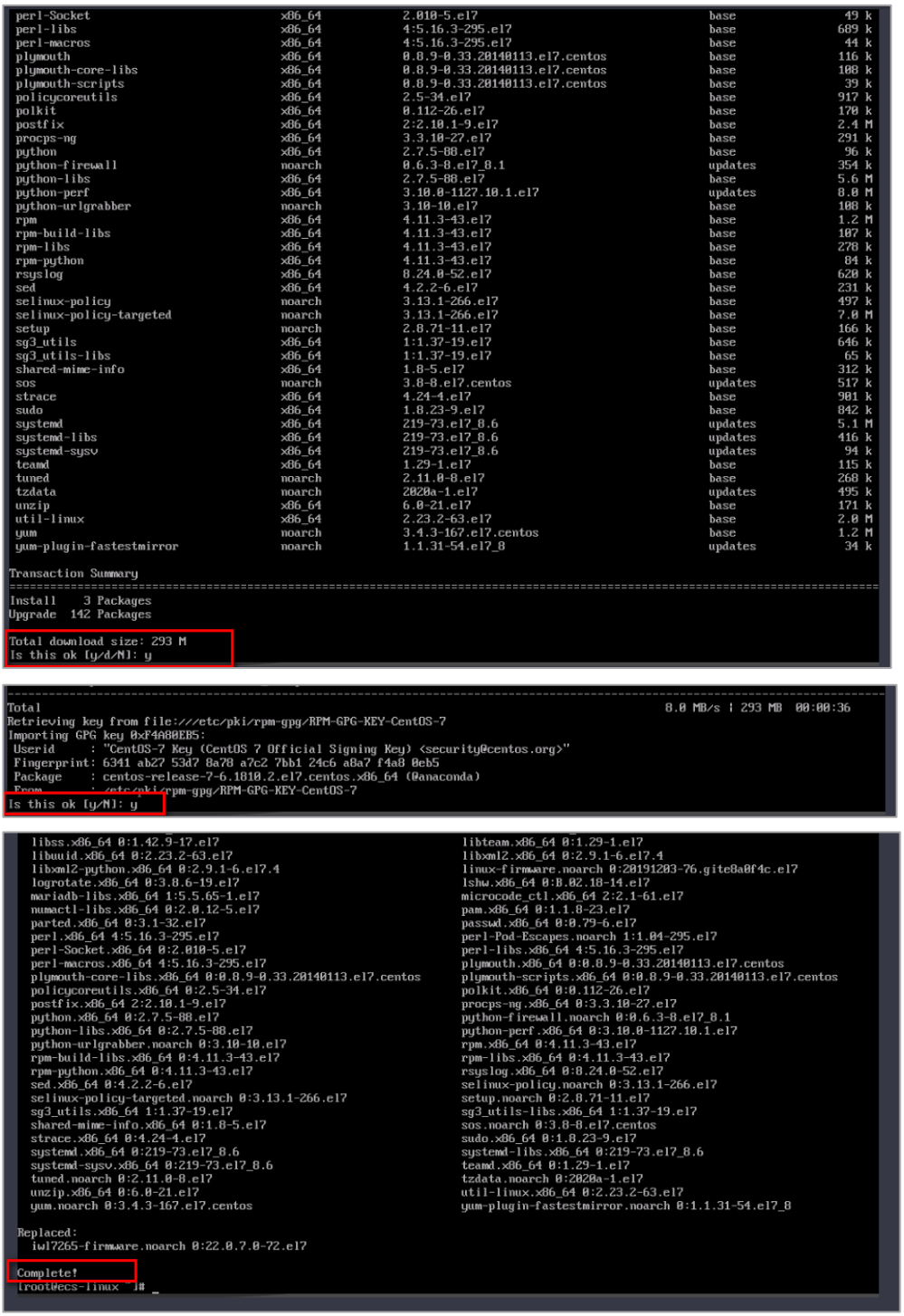
Step 1 Check the kernel version of the system.

uname -r

Step 2 Log in to CentOS as user **root**. Update the Yellowdog Updater, Modified (YUM) package to the latest version.

sudo yum update

YUM is a free, open-source RPM package management tool in Linux. Enter **y** in the subsequent operations.



Step 3 Install the required software package (**yum-util** provides **yum-config-manager** functionality).

sudo yum install –y yum-utils device-mapper-persistent-data lvm2

```
[root@ecs-linux ~]# sudo yum install -y yum-utils device-mapper-persistent-data lvm2
Loaded plugins: fastestmirror
Loading mirror speeds from cached hostfile
 * base: mirror.bit.edu.cn
 * epel: mirrors.bfsu.edu.cn
 * extras: mirror.bit.edu.cn
 * updates: mirrors.bfsu.edu.cn
Resolving Dependencies
--->Ruacingetrevice-mappel-pk     ent-data.x86_64 0:0.8.5-2.el7 will be installed
--> Processing Dependency: libaio.so.1(LIBAIO_0.4)(64bit) for package: device-mapper-persistent-data-0.8.5-2.el7.x86_64
--> Processing Dependency: libaio.so.1(LIBAIO_0.1)(64bit) for package: device-mapper-persistent-data-0.8.5-2.el7.x86_64
--> Processing Dependency: libaio.so.1()(64bit) for package: device-mapper-persistent-data-0.8.5-2.el7.x86_64
---> Package lvm2.x86_64 7:2.02.186-7.el7_8.2 will be installed
--> Processing Dependency: lvm2-libs = 7:2.02.186-7.el7_8.2 for package: 7:lvm2-2.02.186-7.el7_8.2.x86_64
--> Processing Dependency: liblvm2app.so.2.2(Base)(64bit) for package: 7:lvm2-2.02.186-7.el7_8.2.x86_64
--> Processing Dependency: libdevmapper-event.so.1.02(Base)(64bit) for package: 7:lvm2-2.02.186-7.el7_8.2.x86_64
--> Processing Dependency: liblvm2app.so.2.2()(64bit) for package: 7:lvm2-2.02.186-7.el7_8.2.x86_64
--> Processing Dependency: libdevmapper-event.so.1.02()(64bit) for package: 7:lvm2-2.02.186-7.el7_8.2.x86_64
---> Package yum-utils.noarch 0:1.1.31-54.el7_8 will be installed
--> Processing Dependency: python-kitchen for package: yum-utils-1.1.31-54.el7_8.noarch
--> Running transaction check
---> Package device-mapper-event-libs.x86_64 7:1.02.164-7.el7_8.2 will be installed
---> Package libaio.x86_64 0:0.3.109-13.el7 will be installed
---> Package lvm2-libs.x86_64 7:2.02.186-7.el7_8.2 will be installed
--> Processing Dependency: device-mapper-event = 7:1.02.164-7.el7_8.2 for package: 7:lvm2-libs-2.02.186-7.el7_8.2.x86_64
---> Package python-kitchen.noarch 0:1.1.1-5.el7 will be installed
--> Processing Dependency: python-chardet for package: python-kitchen-1.1.1-5.el7.noarch
--> Running transaction check
---> Package device-mapper-event.x86_64 7:1.02.164-7.el7_8.2 will be installed
---> Package python-chardet.noarch 0:2.2.1-3.el7 will be installed
--> Finished Dependency Resolution
```

```
Installed:
  device-mapper-persistent-data.x86_64 0:0.8.5-2.el7   lvm2.x86_64 7:2.02.186-7.el7_8.2   yum-utils.noarch 0:1.1.31-54.el7_8

Dependency Installed:
  device-mapper-event.x86_64 7:1.02.164-7.el7_8.2          device-mapper-event-libs.x86_64 7:1.02.164-7.el7_8.2
  libaio.x86_64 0:0.3.109-13.el7                           lvm2-libs.x86_64 7:2.02.186-7.el7_8.2
  python-chardet.noarch 0:2.2.1-3.el7                      python-kitchen.noarch 0:1.1.1-5.el7

Complete!
[root@ecs-linux ~]# _
```

Step 4 Set the **yum** source.

sudo yum-config-manager \--add-repo \https://download.docker.com/linux/centos/docker-ce.repo

```
[root@ecs-linux ~]#  sudo yum-config-manager \--add-repo \https://download.docker.com/linux/centos/docker-ce.repo
Loaded plugins: fastestmirror
adding repo from: https://download.docker.com/linux/centos/docker-ce.repo
grabbing file https://download.docker.com/linux/centos/docker-ce.repo to /etc/yum.repos.d/docker-ce.repo
repo saved to /etc/yum.repos.d/docker-ce.repo
[root@ecs-linux ~]#
```

Step 5 View Docker versions in all repositories and select a specific version for installation.

yum list docker-ce --showduplicates | sort -r

```
[root@ecs-linux ~]# yum list docker-ce --showduplicates | sort -r
 * updates: mirrors.bfsu.edu.cn
Loading mirror speeds from cached hostfile
Loaded plugins: fastestmirror
 * extras: mirror.bit.edu.cn
 * epel: mirrors.bfsu.edu.cn
docker-ce.x86_64            3:19.03.9-3.el7                     docker-ce-stable
docker-ce.x86_64            3:19.03.8-3.el7                     docker-ce-stable
docker-ce.x86_64            3:19.03.7-3.el7                     docker-ce-stable
docker-ce.x86_64            3:19.03.6-3.el7                     docker-ce-stable
docker-ce.x86_64            3:19.03.5-3.el7                     docker-ce-stable
docker-ce.x86_64            3:19.03.4-3.el7                     docker-ce-stable
docker-ce.x86_64            3:19.03.3-3.el7                     docker-ce-stable
docker-ce.x86_64            3:19.03.2-3.el7                     docker-ce-stable
docker-ce.x86_64            3:19.03.1-3.el7                     docker-ce-stable
docker-ce.x86_64            3:19.03.11-3.el7                    docker-ce-stable
docker-ce.x86_64            3:19.03.10-3.el7                    docker-ce-stable
docker-ce.x86_64            3:19.03.0-3.el7                     docker-ce-stable
docker-ce.x86_64            3:18.09.9-3.el7                     docker-ce-stable
docker-ce.x86_64            3:18.09.8-3.el7                     docker-ce-stable
docker-ce.x86_64            3:18.09.7-3.el7                     docker-ce-stable
docker-ce.x86_64            3:18.09.6-3.el7                     docker-ce-stable
docker-ce.x86_64            3:18.09.5-3.el7                     docker-ce-stable
docker-ce.x86_64            3:18.09.4-3.el7                     docker-ce-stable
docker-ce.x86_64            3:18.09.3-3.el7                     docker-ce-stable
docker-ce.x86_64            3:18.09.2-3.el7                     docker-ce-stable
docker-ce.x86_64            3:18.09.1-3.el7                     docker-ce-stable
docker-ce.x86_64            3:18.09.0-3.el7                     docker-ce-stable
docker-ce.x86_64            18.06.3.ce-3.el7                    docker-ce-stable
docker-ce.x86_64            18.06.2.ce-3.el7                    docker-ce-stable
docker-ce.x86_64            18.06.1.ce-3.el7                    docker-ce-stable
docker-ce.x86_64            18.06.0.ce-3.el7                    docker-ce-stable
docker-ce.x86_64            18.03.1.ce-1.el7.centos             docker-ce-stable
docker-ce.x86_64            18.03.0.ce-1.el7.centos             docker-ce-stable
docker-ce.x86_64            17.12.1.ce-1.el7.centos             docker-ce-stable
docker-ce.x86_64            17.12.0.ce-1.el7.centos             docker-ce-stable
docker-ce.x86_64            17.09.1.ce-1.el7.centos             docker-ce-stable
docker-ce.x86_64            17.09.0.ce-1.el7.centos             docker-ce-stable
docker-ce.x86_64            17.06.2.ce-1.el7.centos             docker-ce-stable
docker-ce.x86_64            17.06.1.ce-1.el7.centos             docker-ce-stable
docker-ce.x86_64            17.06.0.ce-1.el7.centos             docker-ce-stable
docker-ce.x86_64            17.03.3.ce-1.el7                    docker-ce-stable
docker-ce.x86_64            17.03.2.ce-1.el7.centos             docker-ce-stable
docker-ce.x86_64            17.03.1.ce-1.el7.centos             docker-ce-stable
docker-ce.x86_64            17.03.0.ce-1.el7.centos             docker-ce-stable
 * base: mirror.bit.edu.cn
Available Packages
[root@ecs-linux ~]#
```

Step 6 Install Docker. Enter **y** in the subsequent operations. (The installation duration depends on the bandwidth of the ECS. If a small bandwidth is used, you may need to wait for 5 to 10 minutes.)

```
sudo yum install docker-ce
```

```
---> Package docker-ce-cli.x86_64 1:19.03.11-3.el7 will be installed
---> Package libcgroup.x86_64 0:0.41-21.el7 will be installed
--> Running transaction check
---> Package policycoreutils-python.x86_64 0:2.5-34.el7 will be installed
--> Processing Dependency: setools-libs >= 3.3.8-4 for package: policycoreutils-python-2.5-34.el7.x86_64
--> Processing Dependency: libsemanage-python >= 2.5-14 for package: policycoreutils-python-2.5-34.el7.x86_64
--> Processing Dependency: audit-libs-python >= 2.1.3-4 for package: policycoreutils-python-2.5-34.el7.x86_64
--> Processing Dependency: python-IPy for package: policycoreutils-python-2.5-34.el7.x86_64
--> Processing Dependency: libqpol.so.1(VERS_1.4)(64bit) for package: policycoreutils-python-2.5-34.el7.x86_64
--> Processing Dependency: libqpol.so.1(VERS_1.2)(64bit) for package: policycoreutils-python-2.5-34.el7.x86_64
--> Processing Dependency: libapol.so.4(VERS_4.0)(64bit) for package: policycoreutils-python-2.5-34.el7.x86_64
--> Processing Dependency: checkpolicy for package: policycoreutils-python-2.5-34.el7.x86_64
--> Processing Dependency: libqpol.so.1()(64bit) for package: policycoreutils-python-2.5-34.el7.x86_64
--> Processing Dependency: libapol.so.4()(64bit) for package: policycoreutils-python-2.5-34.el7.x86_64
--> Running transaction check
---> Package audit-libs-python.x86_64 0:2.8.5-4.el7 will be installed
---> Package checkpolicy.x86_64 0:2.5-8.el7 will be installed
---> Package libsemanage-python.x86_64 0:2.5-14.el7 will be installed
---> Package python-IPy.noarch 0:0.75-6.el7 will be installed
---> Package setools-libs.x86_64 0:3.3.8-4.el7 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

================================================================================
 Package                Arch          Version                   Repository   Size
================================================================================
Installing:
 docker-ce              x86_64        3:19.03.11-3.el7          docker-ce-stable
                                                                               24 M
Installing for dependencies:
 audit-libs-python      x86_64        2.8.5-4.el7               base         76 k
 checkpolicy            x86_64        2.5-8.el7                 base        295 k
 container-selinux      noarch        2:2.119.1-1.c57a6f9.el7   extras       40 k
 containerd.io          x86_64        1.2.13-3.2.el7            docker-ce-stable
                                                                               25 M
 docker-ce-cli          x86_64        1:19.03.11-3.el7          docker-ce-stable
                                                                               38 M
 libcgroup              x86_64        0.41-21.el7               base         66 k
 libsemanage-python     x86_64        2.5-14.el7                base        113 k
 policycoreutils-python x86_64        2.5-34.el7                base        457 k
 python-IPy             noarch        0.75-6.el7                base         32 k
 setools-libs           x86_64        3.3.8-4.el7               base        620 k

Transaction Summary
================================================================================
Install  1 Package (+10 Dependent packages)

Total download size: 89 M
Installed size: 365 M
Is this ok [y/d/N]: y_
```

```
Downloading packages:
(1/11): audit-libs-python-2.8.5-4.el7.x86_64.rpm                |  76 kB  00:00:00
(2/11): container-selinux-2.119.1-1.c57a6f9.el7.noarch.rpm      |  40 kB  00:00:00
(3/11): checkpolicy-2.5-8.el7.x86_64.rpm                        | 295 kB  00:00:00
warning: /var/cache/yum/x86_64/7/docker-ce-stable/packages/docker-ce-19.03.11-3.el7.x86_64.rpm: Header V4 RSA/SHA512 Signature,
key ID 621e9f35: NOKEY
Public key for docker-ce-19.03.11-3.el7.x86_64.rpm is not installed
(4/11): docker-ce-19.03.11-3.el7.x86_64.rpm                     |  24 MB  00:00:05
(5/11): libcgroup-0.41-21.el7.x86_64.rpm                        |  66 kB  00:00:00
(6/11): python-IPy-0.75-6.el7.noarch.rpm                        |  32 kB  00:00:00
(7/11): libsemanage-python-2.5-14.el7.x86_64.rpm                | 113 kB  00:00:00
(8/11): setools-libs-3.3.8-4.el7.x86_64.rpm                     | 620 kB  00:00:00
(9/11): docker-ce-cli-19.03.11-3.el7.x86_64.rpm                 |  38 MB  00:00:05
(10/11): containerd.io-1.2.13-3.2.el7.x86_64.rpm                |  25 MB  00:00:11
(11/11): policycoreutils-python-2.5-34.el7.x86_64.rpm           | 457 kB  00:00:24
--------------------------------------------------------------------------------
Total                                           2.9 MB/s |  89 MB  00:00:30
Retrieving key from https://download.docker.com/linux/centos/gpg
Importing GPG key 0x621E9F35:
 Userid     : "Docker Release (CE rpm) <docker@docker.com>"
 Fingerprint: 060a 61c5 1b55 8a7f 742b 77aa c52f eb6b 621e 9f35
 From       : https://download.docker.com/linux/centos/gpg
Is this ok [y/N]: y
```

```
Installed:
  docker-ce.x86_64 3:19.03.11-3.el7

Dependency Installed:
  audit-libs-python.x86_64 0:2.8.5-4.el7
  checkpolicy.x86_64 0:2.5-8.el7
  container-selinux.noarch 2:2.119.1-1.c57a6f9.el7
  containerd.io.x86_64 0:1.2.13-3.2.el7
  docker-ce-cli.x86_64 1:19.03.11-3.el7
  libcgroup.x86_64 0:0.41-21.el7
  libsemanage-python.x86_64 0:2.5-14.el7
  policycoreutils-python.x86_64 0:2.5-34.el7
  python-IPy.noarch 0:0.75-6.el7
  setools-libs.x86_64 0:3.3.8-4.el7

Complete!
[root@ecs-linux ~]#
```

NOTE

If an error occurs during the installation, you can manually input the command. Pay attention to the command format and the space between commands. You can also install Docker in other methods.

Step 7 Start Docker and add it to the startup items list.

```
sudo systemctl start docker
sudo systemctl enable docker
```

```
[root@ecs-linux ~]# sudo systemctl start docker
```

```
Croot@ecs-linux ~]# sudo systemctl enable docker
Created symlink from /etc/systemd/system/multi-user.target.wants/docker.service to /usr/lib/systemd/system/docker.service.
[root@ecs-linux ~]# _
```

Step 8 Check whether the installation is successful. If the command output contains **client** and **service**, Docker is installed and started successfully.

docker version

```
[root@ecs-linux ~]# docker version
Client: Docker Engine - Community
 Version:           19.03.11
 API version:       1.40
 Go version:        go1.13.10
 Git commit:        42e35e61f3
 Built:             Mon Jun  1 09:13:48 2020
 OS/Arch:           linux/amd64
 Experimental:      false

Server: Docker Engine - Community
 Engine:
  Version:          19.03.11
  API version:      1.40 (minimum version 1.12)
  Go version:       go1.13.10
  Git commit:       42e35e61f3
  Built:            Mon Jun  1 09:12:26 2020
  OS/Arch:          linux/amd64
  Experimental:     false
 containerd:
  Version:          1.2.13
  GitCommit:        7ad184331fa3e55e52b890ea95e65ba581ae3429
 runc:
  Version:          1.0.0-rc10
  GitCommit:        dc9208a3303feef5b3839f4323d9beb36df0a9dd
 docker-init:
  Version:          0.18.0
  GitCommit:        fec3683
```

----End

1.2.4.3 Running a Container

Step 1 Create an httpd container named **huawei**.

docker create --name huawei httpd

```
[root@ecs-linux ~]# docker create --name huawei httpd
Unable to find image 'httpd:latest' locally
latest: Pulling from library/httpd
8559a31e96f4: Pull complete                                                 .
bd517d441028: Pull complete                                                 i
f67007e59c3c: Pull complete                                                 8  6
83c578481926: Pull complete
f3cbcb88690d: Pull complete
Digest: sha256:f5edf1ab099b35909635f3340b0f0a2cd3f57bd797990b94b6bcd31cf202f219
Status: Downloaded newer image for httpd:latest
965afc7d0ae00b366e56088dcd1ea8a29bae3aaa22572b77e8eed6ba3c728bf4
```

Step 2 View the container status.

docker ps -a

```
[root@ecs-linux ~]# docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS               NAMES
965afc7d0ae0        httpd               "httpd-foreground"  About a minute ago  Created                                 huawei
```

Step 3 Start the **huawei** container.

docker start huawei

```
[root@ecs-linux ~]# docker start huawei
```

Step 4 Check the **huawei** container status again. The status is **Up**.

docker container ls

```
[root@ecs-linux ~]# docker container ls                                                 STATUS              PORTS               NAMES
CONTAINER ID        IMAGE               COMMAND             CREATED          o      STATUSd             PORTS               NAMESi
481ed6c71826        httpd               "httpd-foreground"  6 minutes ago       Up 14 seconds       80/tcp              huawei
[root@ecs-linux ~]#
```

Step 5 Stop the **huawei** container and verify that the container is in the **Exited** state.

docker stop huawei
docker ps –a

```
[root@ecs-linux ~]# docker stop huawei                  n               c6
huawei                                                  b         a
[root@ecs-linux ~]# docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS                          PORTS
     NAMES                                                                                  PORTS               NAMES
481ed6c71826        httpd               "httpd-foreground"  8 minutes ago       Exiteds(0)nAbout a minutepago               huawei
     huawei
[root@ecs-linux ~]#
```

Step 6 Delete the **huawei** container and check the container information.

docker rm huawei
docker ps –a

```
[root@ecs-linux ~]# docker rm huawei
huawei                                                                                                              NAMES
[root@ecs-linux ~]# docker ps -a                                                                    s   n           p   huawei
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS               NAMES
[root@ecs-linux ~]#
```

The container is deleted successfully.

----End

1.2.4.4 Entering a Container Using the **docker exec** Command

Step 1 Run an httpd container named **httpd1** at the backend and map its service port 80 to port 8080 of the host machine.

docker run --name httpd1 -d -p 8080:80 httpd

```
[root@ecs-linux ~]# docker run --name httpd1 -d -p 8080:80 httpd
1f1dcd65d2c0de40ad42c0f8e8d0cefda98c85ba0f1630bdb556a1d4d1f0d4e0
```

Step 2 Access the container **httpd1**.

curl 127.0.0.1:8080

```
[root@ecs-linux ~]# curl 127.0.0.1:8080
<html><body><h1>It works!</h1></body></html>
```

Step 3 Enter the container **httpd1**.

docker exec -it httpd1 bash

```
[root@ecs-linux ~]# docker exec -it httpd1 bash
root@1f1dcd65d2c0:/usr/local/apache2# ls
bin  build  cgi-bin  conf  error  htdocs  icons  include  logs  modules
```

Step 4 Modify the static files in the **httpd1** container and enter **exit** to exit.

cd htdocs
ls
echo "update to httpd" > index.html
exit

```
root@1f1dcd65d2c0:/usr/local/apache2# cd htdocs
root@1f1dcd65d2c0:/usr/local/apache2/htdocs# ls
index.html
root@1f1dcd65d2c0:/usr/local/apache2/htdocs# echo "update to httpd" > index.html
root@1f1dcd65d2c0:/usr/local/apache2/htdocs# exit
exit
[root@ecs-linux ~]#
```

Step 5 Access the container **httpd1** again. If the container can be accessed, the **exit** does not end the container process.

curl 127.0.0.1:8080

```
[root@ecs-linux ~]# curl 127.0.0.1:8080
update to httpd
[root@ecs-linux ~]#
```

----End

1.2.5 (Optional) Building a Container Image Through Dockerfile

Step 1 Create a **dockerfile** folder in the **/root** directory.

mkdir dockerfile

```
[root@ecs-linux ~]# mkdir dockerfile
[root@ecs-linux ~]#
```

Step 2 Create a Dockerfile file named **dockerfile1**.

cd dockerfile
touch dockerfile1

```
[root@ecs-linux ~]# mkdir dockerfile
[root@ecs-linux ~]# cd dockerfile/
[root@ecs-linux dockerfile]# touch dockerfile1
```

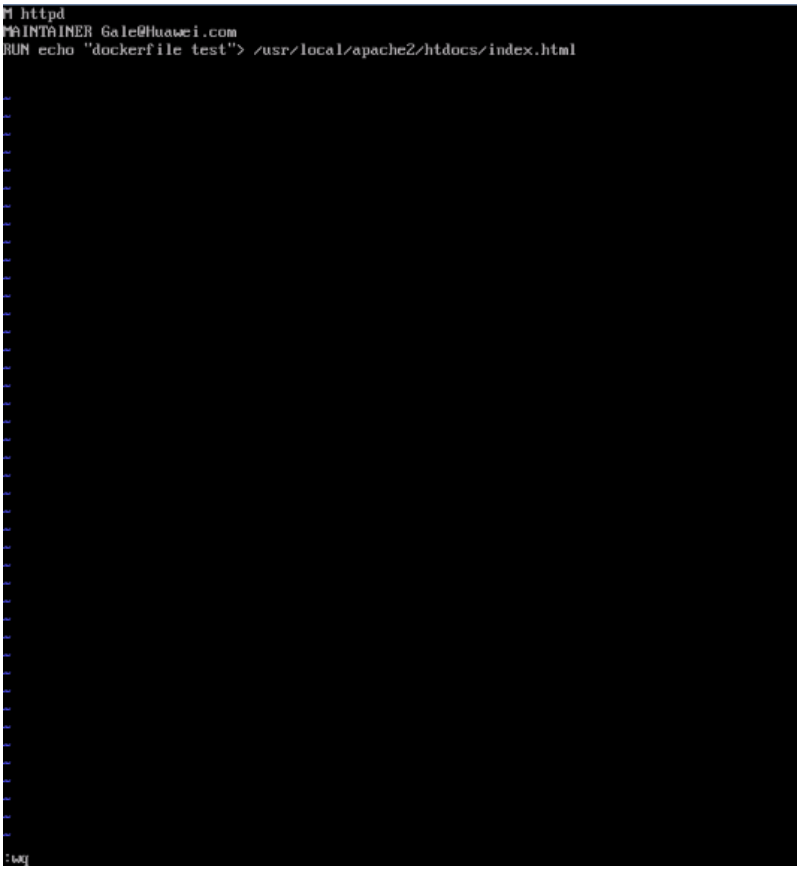
Step 3 Edit the **dockerfile1** file using the vi editor.

vi dockerfile1

Enter the following content:

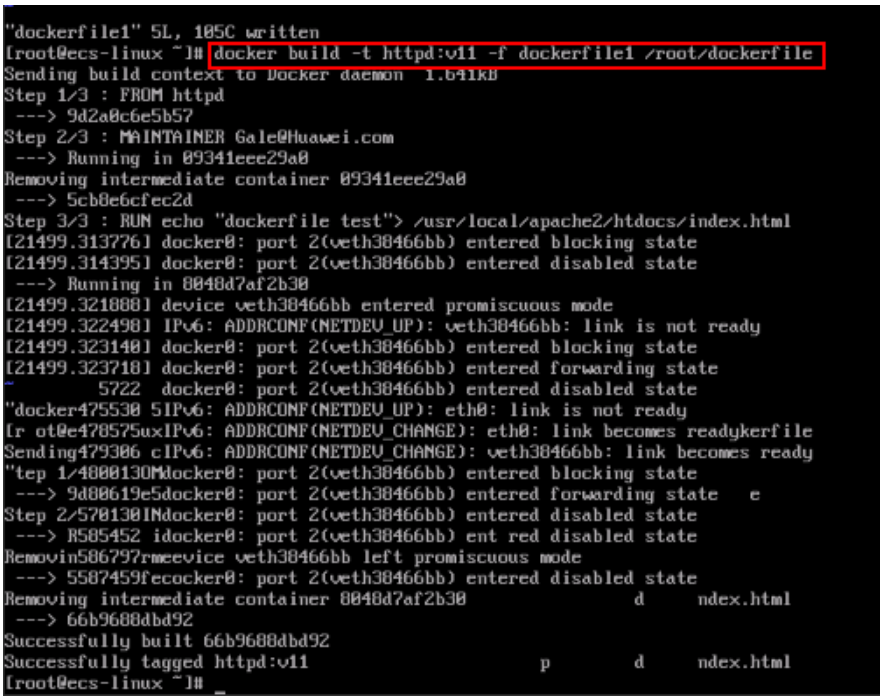
FROM httpd
MAINTAINER Gale@Huawei.com
RUN echo "dockerfile test"> /usr/local/apache2/htdocs/index.html

Press **Esc** and run the **:wq** command to save the configuration and exit.



Step 4 Build an image named **httpd:v11**.

docker build -t httpd:v11 -f dockerfile1 /root/dockerfile



Step 5 View the built image.

docker images

```
[root@ecs-linux ~]# docker images                                   d     ndex.html
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
httpd               v11                 66b9688dbd92        50 seconds ago      166MB
httpd               latest              9d2a0c6e5b57        6 days ago.   1     166MB
[root@ecs-linux ~]#
```

Step 6 Run a container created from the image **httpd:v11**.

docker run -d -p 8081:80 httpd:v11

```
[root@ecs-linux ~]# docker run -d -p 8081:80 httpd:v11
1b057ac2bb6569ae1c0d3cf5450e0122542b6e77ceede772d9ea5154aa9268e5
```

Step 7 Access the container.

curl 127.0.0.1:8081

```
[root@ecs-linux ~]# curl 127.0.0.1:8081    0       v
dockerfile test                            2       3         f       .   l
[root@ecs-linux ~]#
```

----End

1.2.6 (Optional) Setting Up a Private Registry

Step 1 Create a **myregistry** folder in the **/root** directory to store the private registry.

mkdir myregistry

```
[root@ecs-linux ~]# mkdir myregistry
```

Step 2 Run a registry container and map the host's port 1000 to the container's port 5000 and mount the folder created in the preceding step as the image storage folder.

docker run -d -p 1000:5000 -v /root/myregistry:/var/lib/registry registry

```
[root@ecs-linux ~]# docker run -d -p 8081:80 httpd:v11
144e58476db5dd2da4b71e8103285e8e4ff0fce5bd92ba8f35f3f056043726f5
[21586.525316] docker0: port 2(veth354e108) entered blocking state
[21586.526071] docker0: port 2(veth354e108) entered disabled state
[21586.533969] device veth354e108 entered promiscuous mode
[21586.534716] IPv6: ADDRCONF(NETDEV_UP): veth354e108: link is not ready
[21586.535477] docker0: port 2(veth354e108) entered blocking state
[21586.536187] docker0: port 2(veth354e108) entered forwarding state
[21586.540286] docker0: port 2(veth354e108) entered disabled state
[21586.693402] IPv6: ADDRCONF(NETDEV_UP): eth0: link is not ready
[21586.696602] IPv6: ADDRCONF(NETDEV_CHANGE): eth0: link becomes ready
[21586.697432] IPv6: ADDRCONF(NETDEV_CHANGE): veth354e108: link becomes ready
[21586.698269] docker0: port 2(veth354e108) entered blocking state
[21586.698987] docker0: port 2(veth354e108) entered forwarding state
[root@ecs-linux ~]# curl 127.0.0.1:8081
dockerfile test
[root@ecs-linux ~]# mkdir myregistry
[root@ecs-linux ~]# docker run -d -p 1000:5000 -v /root/myregistry:/var/lib/registry registry
Unable to find image 'registry:latest' locally
latest: Pulling from library/registry
cbdbe7a5bc2a: Pull complete
47112e65547d: Pull complete
46bcb632e506: Pull complete
c1cc712bcecd: Pull complete
3db6272dcbfa: Pull complete
Digest: sha256:8be26f81ffea54106bae012c6f349df70f4d5e7e2ec01b143c46e2c03b9e551d
Status: Downloaded newer image for registry:latest
a653960809d1d04fa838219df54191a0e301b1ea8fe0f0004444e89495f7e6ca
[root@ecs-linux ~]#
```

Step 3 Change the format of **httpd:v11** to the format required by the registry.

docker tag httpd:v11 127.0.0.1:1000/michael/httpd:v11
docker images

```
[root@ecs-linux ~]# docker tag httpd:v11 127.0.0.1:1000/michael/httpd:v11
[root@ecs-linux ~]# docker images
REPOSITORY                          TAG                 IMAGE ID            CREATED             SIZE
127.0.0.1:1000/michael/httpd        v11                 66b9688dbd92        7 minutes ago       166MB
httpd                               v11                 66b9688dbd92        7 minutes ago       166MB
httpd                               latest              9d2a0c6e5b57        6 days ago          166MB
registry                            latest              2d4f4b5309b1        5 weeks ago         26.2MB
[root@ecs-linux ~]#
```

Step 4 Upload the **michael/httpd:v11** image to the registry.

docker push 127.0.0.1:1000/michael/httpd:v11

```
root@ecs-linux ~]# docker push 127.0.0.1:1000/michael/httpd:v11
he push refers to repository [127.0.0.1:1000/michael/httpd]
e8624b4d9d6: Pushed
e6cfff37f35: Pushed
070e6411b20: Pushed
292ec64305a: Pushed
8b213d315e5: Pushed
5ef25a32043: Pushed
v11: digest: sha256:295bd56850af35be402acfc5cda765631db8bc0636b6aacbc083cdbf1dc49c10 size: 1574
root@ecs-linux ~]#
```

Step 5 View the image in the registry.

curl 127.0.0.1:1000/v2/_catalog

```
[root@ecs-linux ~]# curl 127.0.0.1:1000/v2/_catalog
{"repositories":["michael/httpd"]}
```

Step 6 Delete the **httpd:v11** image from the host.

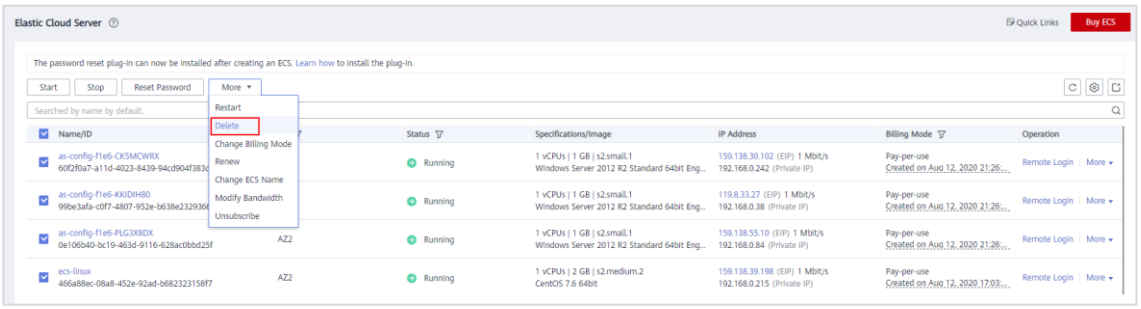
docker rmi httpd:v11

```
[root@ecs-linux sha256]# docker rmi httpd:v11
Untagged: httpd:v11
```

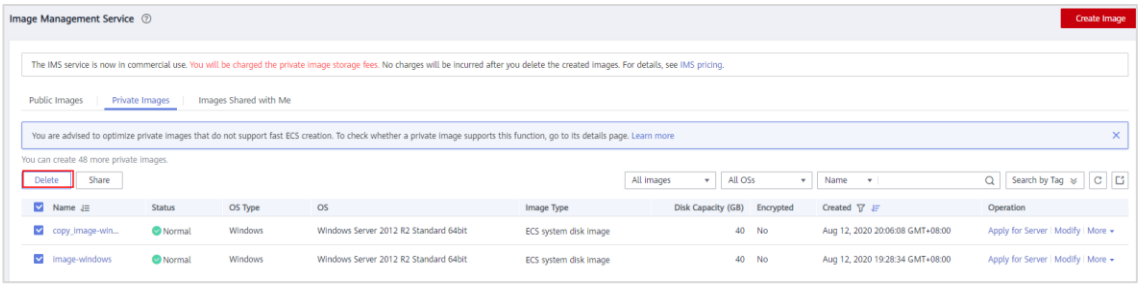
----End

1.3 Deleting Resources

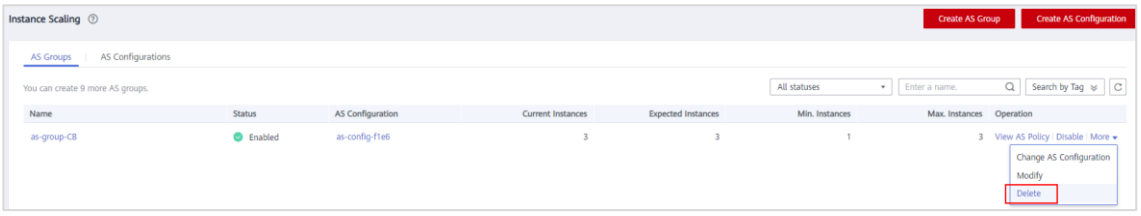
Step 1 Delete the ECSs.

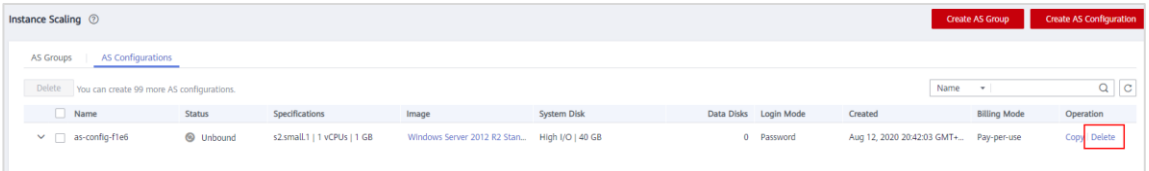


Step 2 Delete the private images.



Step 3 Delete the AS group and configuration.





Step 4 Delete the subnet and then delete the VPC.

----End

2 Storage Services

2.1 EVS

2.1.1 Introduction

EVS provides persistent block storage for computing services such as ECS and BMS. EVS offers high availability and durability with extremely little latency thanks to advanced data redundancy and cache acceleration capabilities. You can format your EVS disks, create file systems on them, attach them to ECSs, and use them for persistent data storage. This section describes how to purchase an EVS disk and then attach the disk to an ECS.

2.1.2 Objectives

Upon completion of this section, you will be able to:

- Purchase an EVS disk.
- Attach an EVS disk to an ECS.
- Initialize the EVS disk (on a Windows or Linux server).
- Use snapshots.

2.1.3 Tasks

You can expand the capacity of an EVS disk to meet the requirements of the service system or production environment. You can attach an EVS disk to an ECS or detach it when it is no longer needed. This example describes how to attach an EVS disk to a Windows or Linux server.

- A system disk is automatically created and attached when an ECS is purchased. System disks cannot be purchased separately.
- If you purchase a data disk when creating an ECS, the system automatically attaches the data disk to the ECS. You can also purchase a data disk separately and attach it to the ECS later.

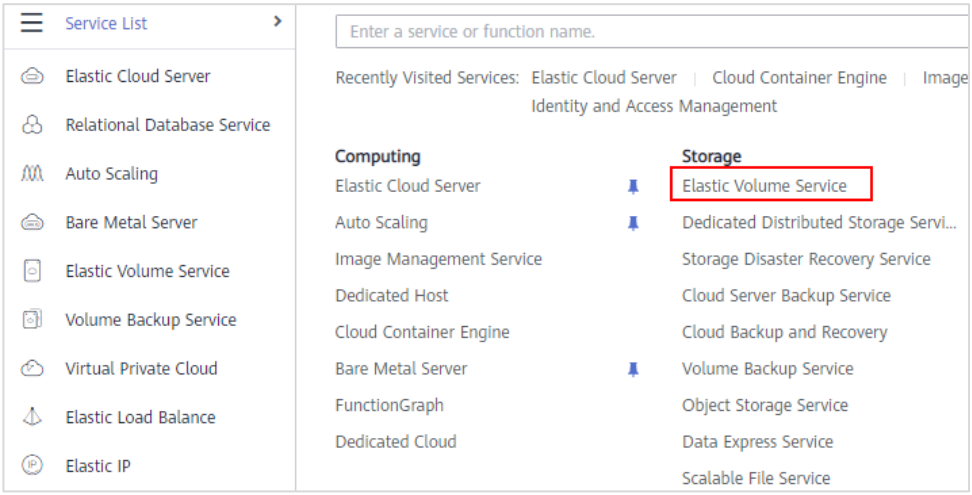
2.1.4 Attaching an EVS Disk to a Windows ECS

2.1.4.1 Purchasing an EVS Disk

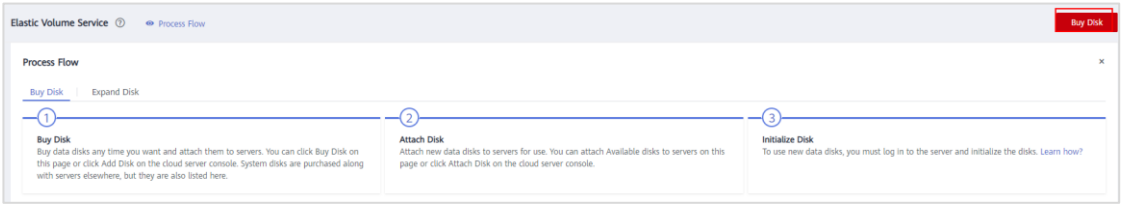
In this section, an ECS running Windows Server 2012 R2 Standard 64bit English (40GB) purchased in the AP-Hong Kong region will be used as an example to illustrate the process.

Step 1 In the AP-Hong Kong region, buy an ECS running Windows Server 2012 R2 Standard 64bit English (40GB) by referring to instructions in section 1.1.4.1. You can also use an existing ECS running Windows Server 2012.

Step 2 Log in to the management console and choose **Service List** > **Storage** > **Elastic Volume Service**.

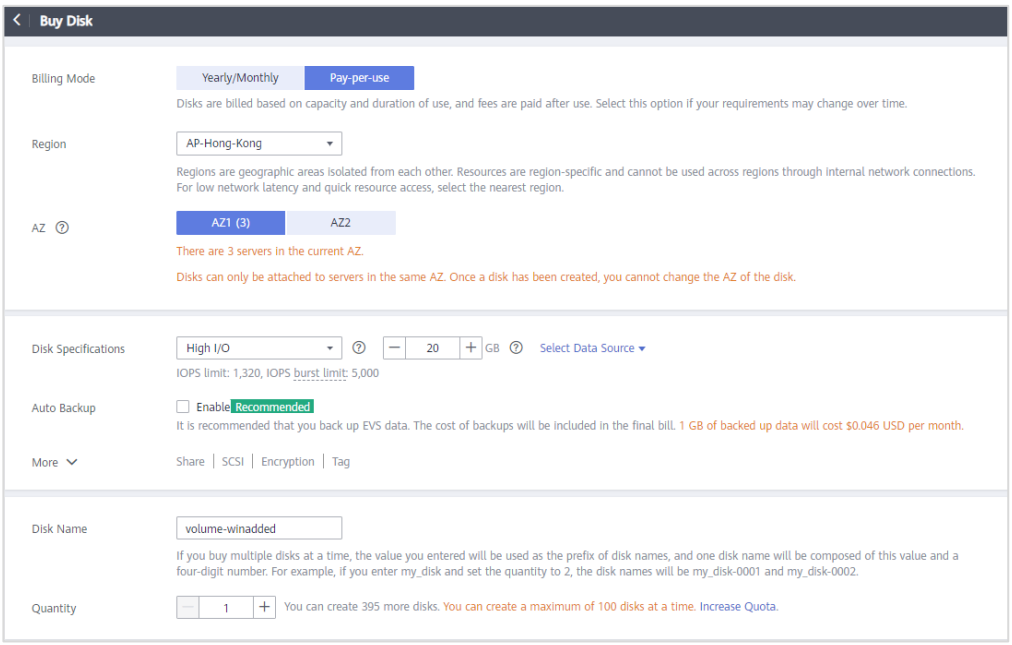


Step 3 Click **Buy Disk**.



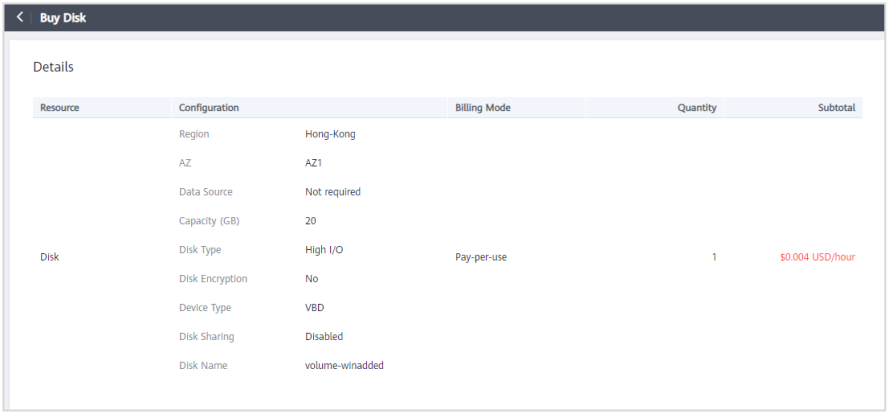
Step 4 Configure the basic information about the EVS disk.

- **Billing Mode**: **Pay-per-use**
- **Region**: **AP-Hong Kong**
- **AZ**: Select the AZ where the ECS is located.
- **Disk Specifications**: Select **Common I/O**. If **Common I/O** is unavailable, select an available one.
- **Capacity**: **20 GB**
- **Auto Backup**: Deselect it.
- **More**: Skip this parameter.
- **Disk Name: volume-winadded** (user-defined)

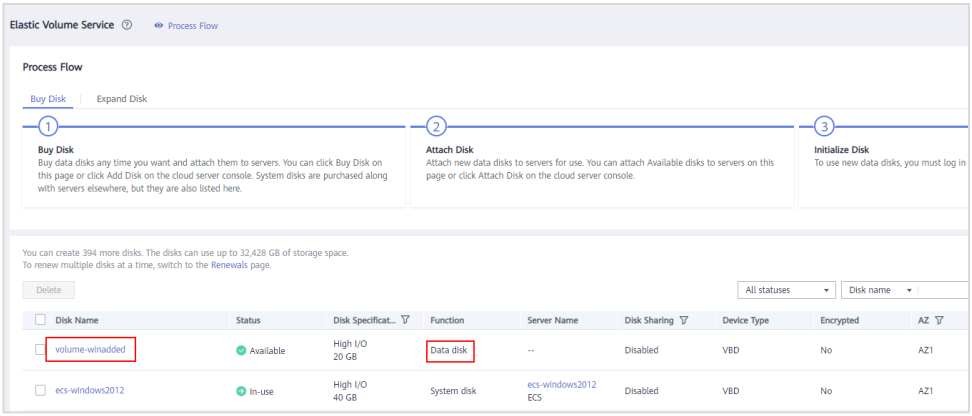


Step 5 Click **Next**.

Step 6 On the **Details** page, confirm the disk configuration and click **Submit** to start the creation. If you need to modify the configuration, click **Previous** to modify parameters.



Step 7 Return to the disk list and take note of the disk status on the **Elastic Volume Service** page. When the disk status changes to **Available**, the disk creation is complete.



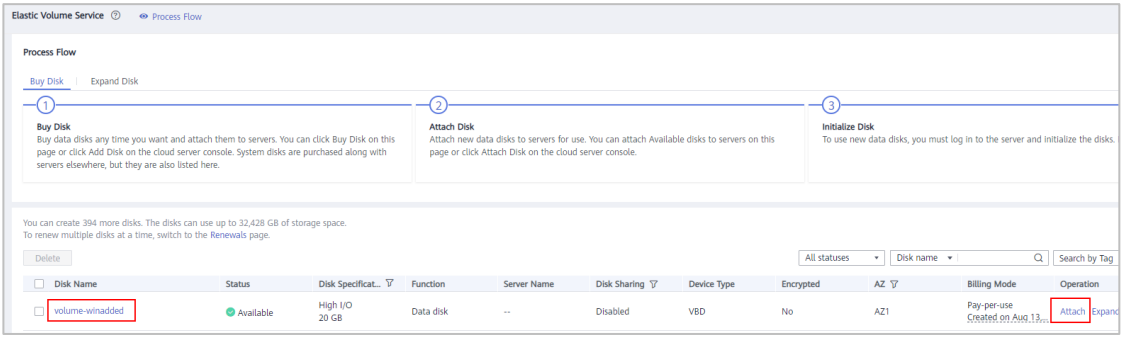
----End

2.1.4.2 Attaching an EVS Disk to an ECS

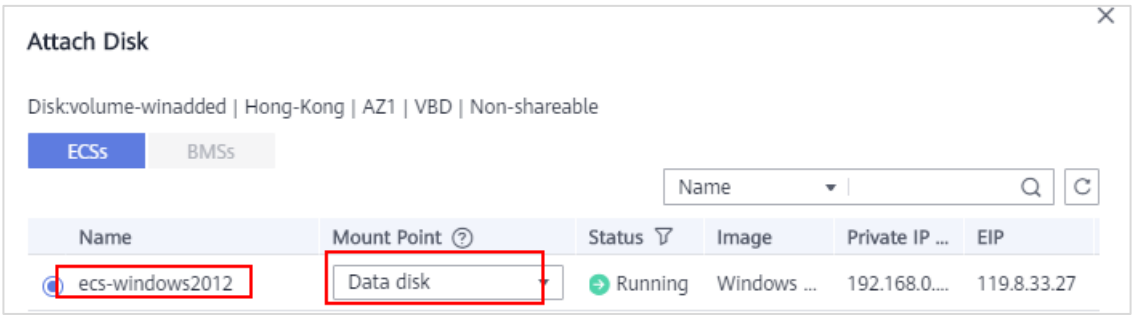
EVS disks purchased separately are automatically data disks. In the disk list, the function of such disks is displayed as **Data disk**, and the status is displayed as **Available**. Now you need to attach the data disk to an ECS.

A system disk is purchased and attached to an ECS automatically when you purchase the ECS. In the disk list, the function of such a disk is displayed as **System disk**, and the status is displayed as **In-use**. If a system disk is detached from an ECS, the disk function changes to **Bootable disk**, and the status changes to **Available**. A non-shared EVS disk is like an SSD or SATA disk purchased for a regular PC. After being attached to an ECS, it functions as regular hard drive, like a D or E drive on a PC.)

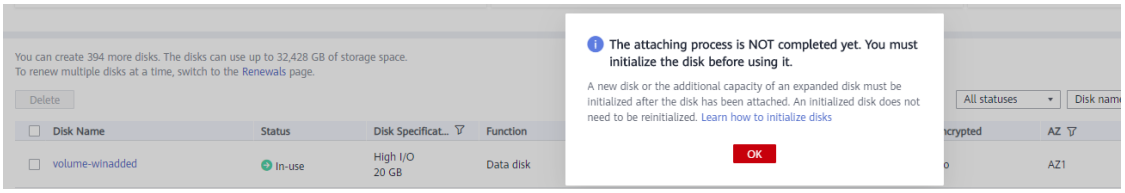
Step 1 Locate the disk in the list and click **Attach**. The **Attach Disk** dialog box is displayed.



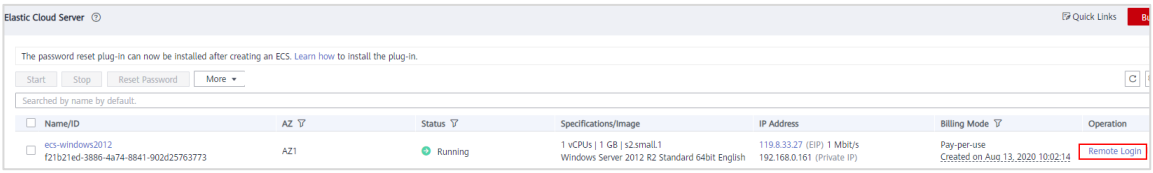
Step 2 Select the target Windows ECS and select a mount point from the drop-down list. Ensure that the EVS disk and ECS are in the same AZ.



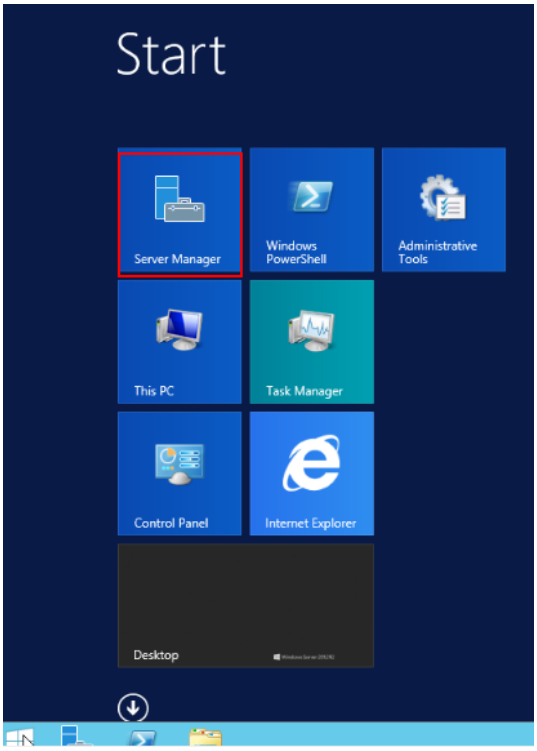
Step 3 Return to the disk list page. The status of the disk is **Attaching**, indicating that the disk is being attached to the ECS. When the disk status changes to **In-use**, the disk has been attached to the ECS, but will still need to be initialized before it can be used.



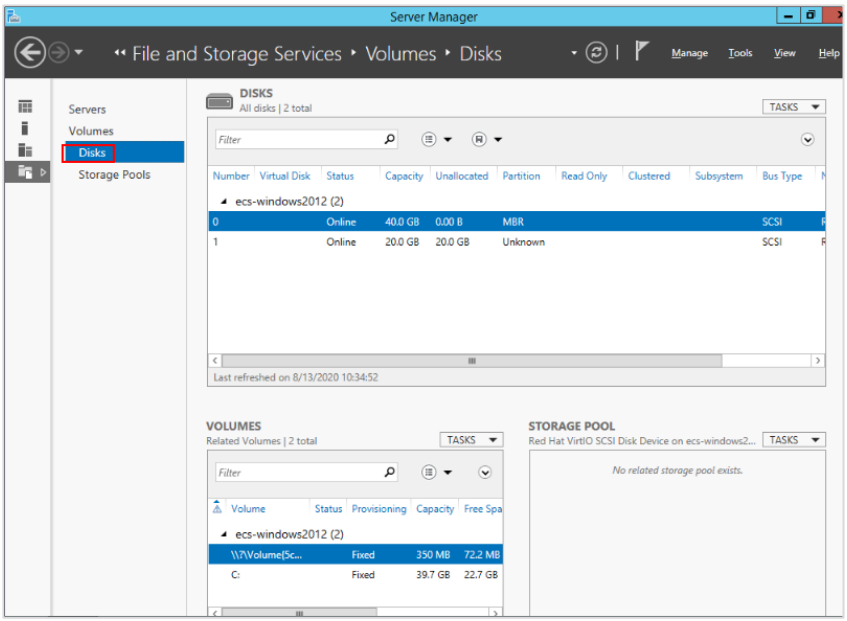
Step 4 Switch to the ECS list, select the Windows ECS that the EVS disk was attached to, and click **Remote Login**.



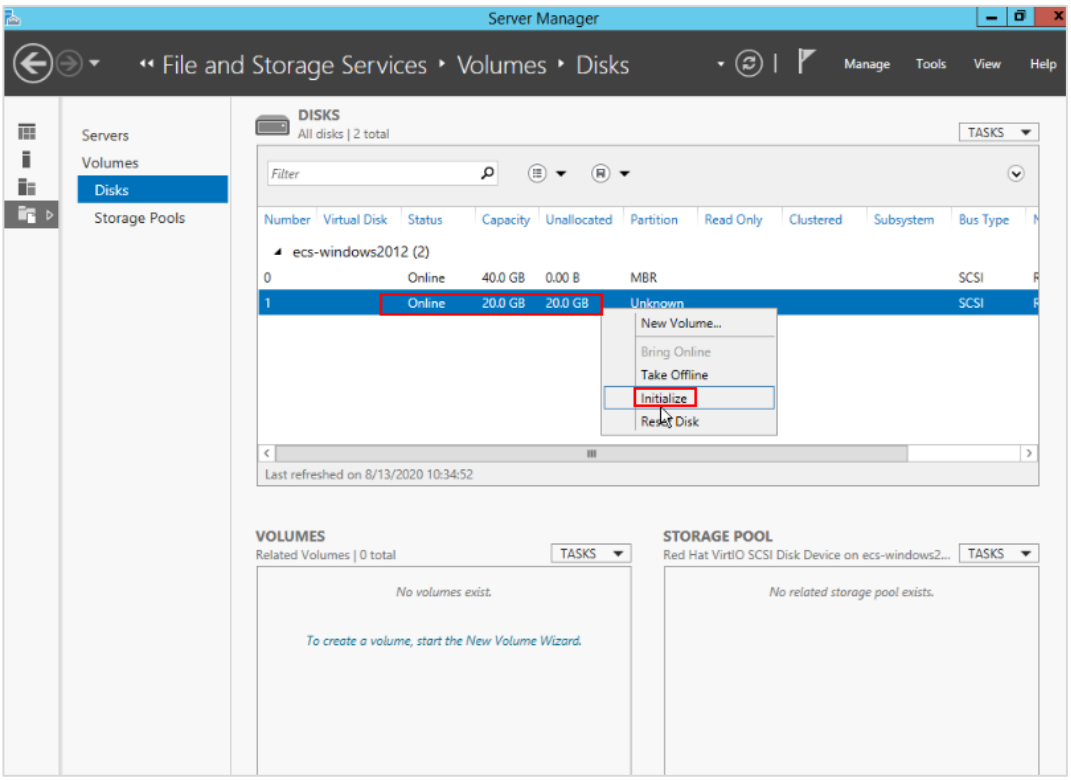
Step 5 On the ECS desktop, choose **Start** > **Server Manager**.

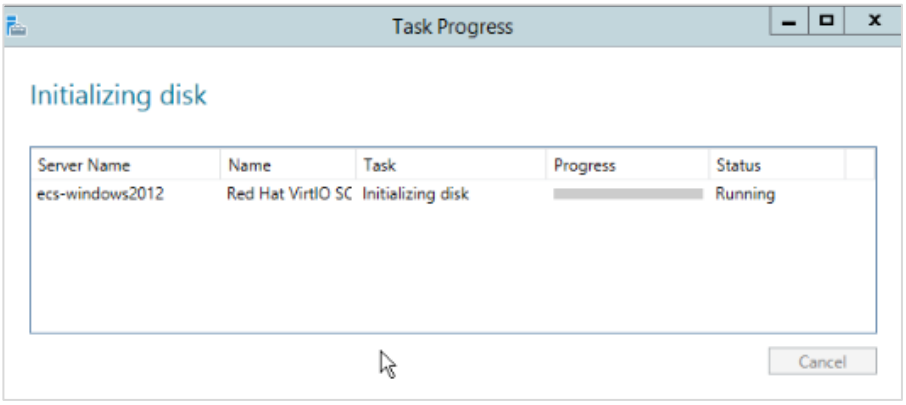


Step 6 In the left navigation pane, choose **File and Storage Services** > **Disks**.

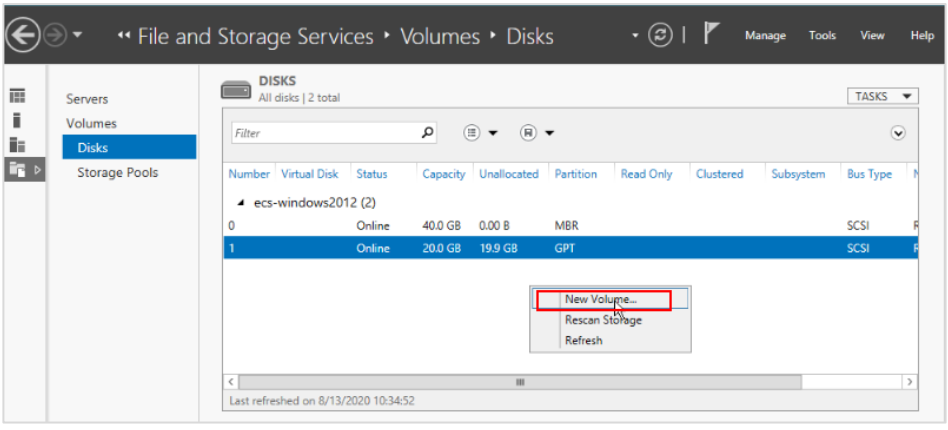


Step 7 If the newly attached disk is in the **Offline** state, right-click in the disk and choose **Bring Online** from the shortcut menu. If the newly attached disk has not been initialized, right-click the disk and choose **Initialize** from the displayed menu.

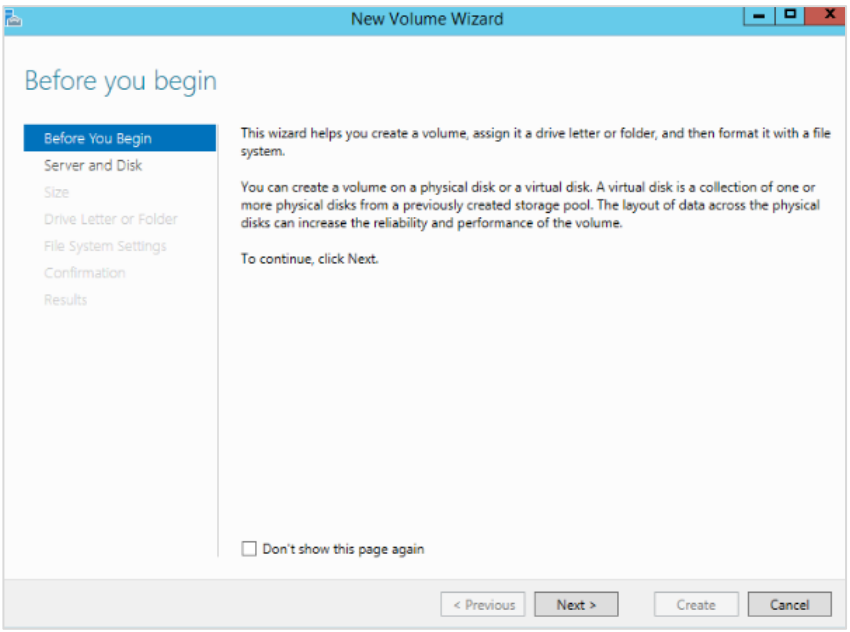


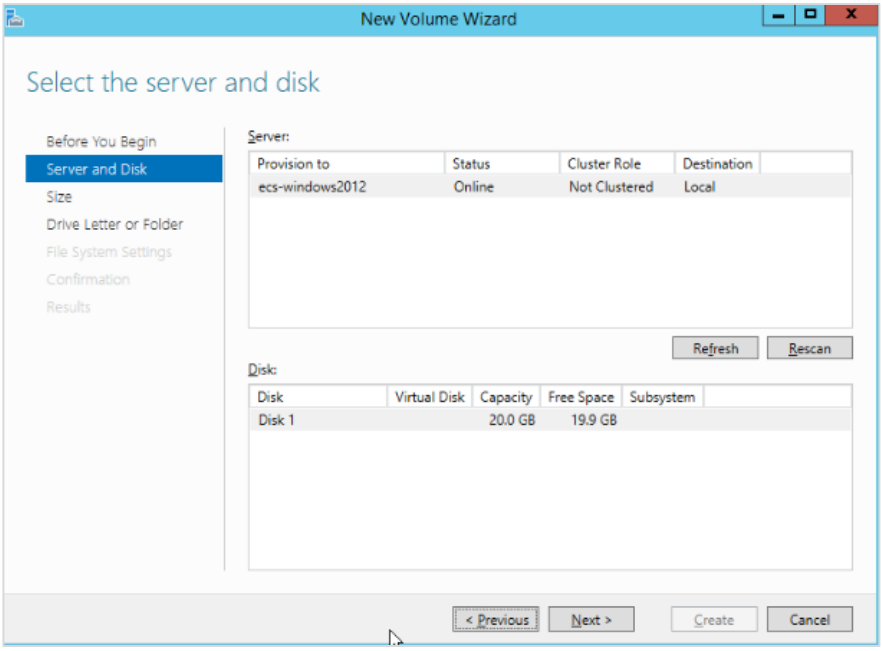


Step 8 Right-click at the unallocated partition and choose **New Volume** from the shortcut menu.

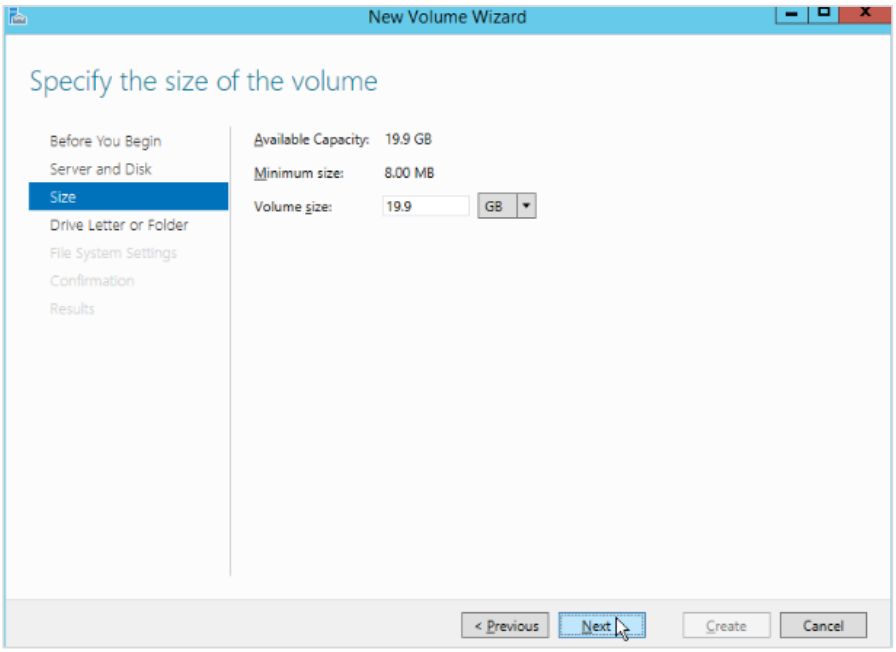


Step 9 On the displayed **New Volume Wizard**, click **Next**.

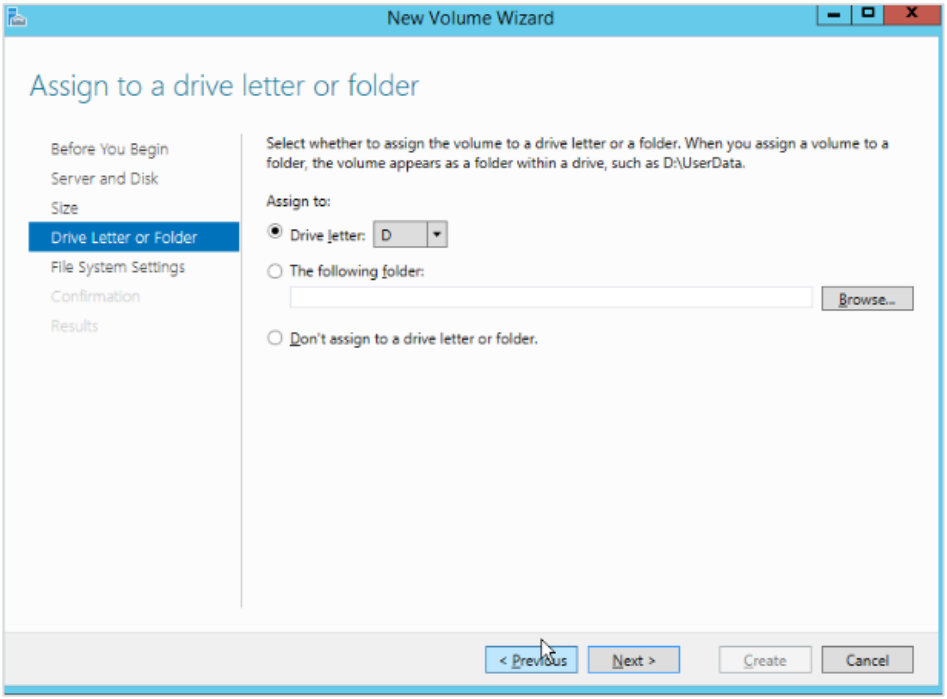




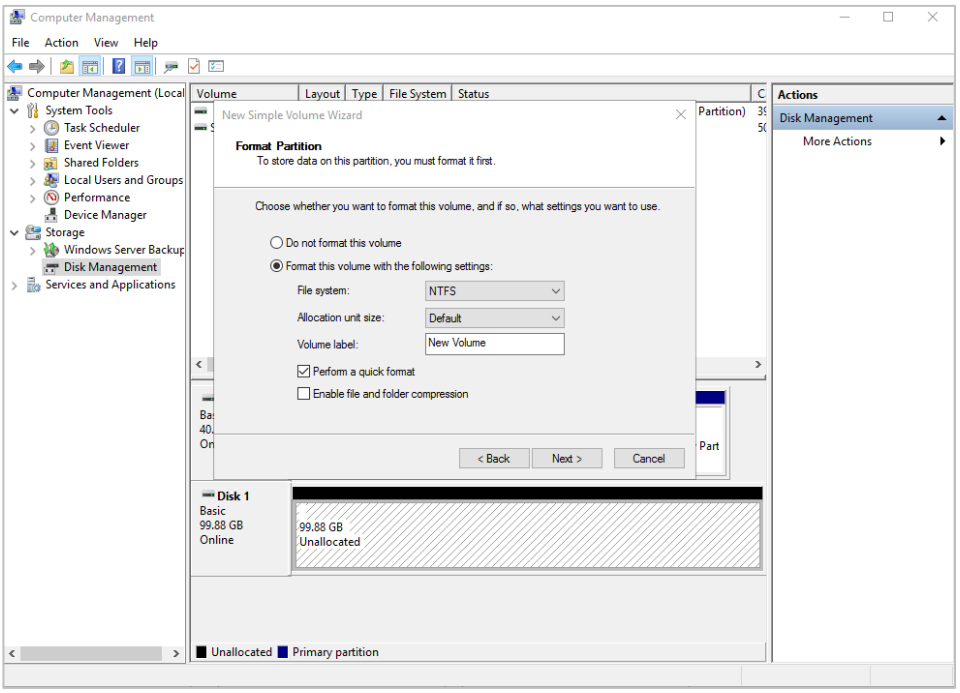
Step 10 Specify the volume size and click **Next**. The default value is the maximum size.



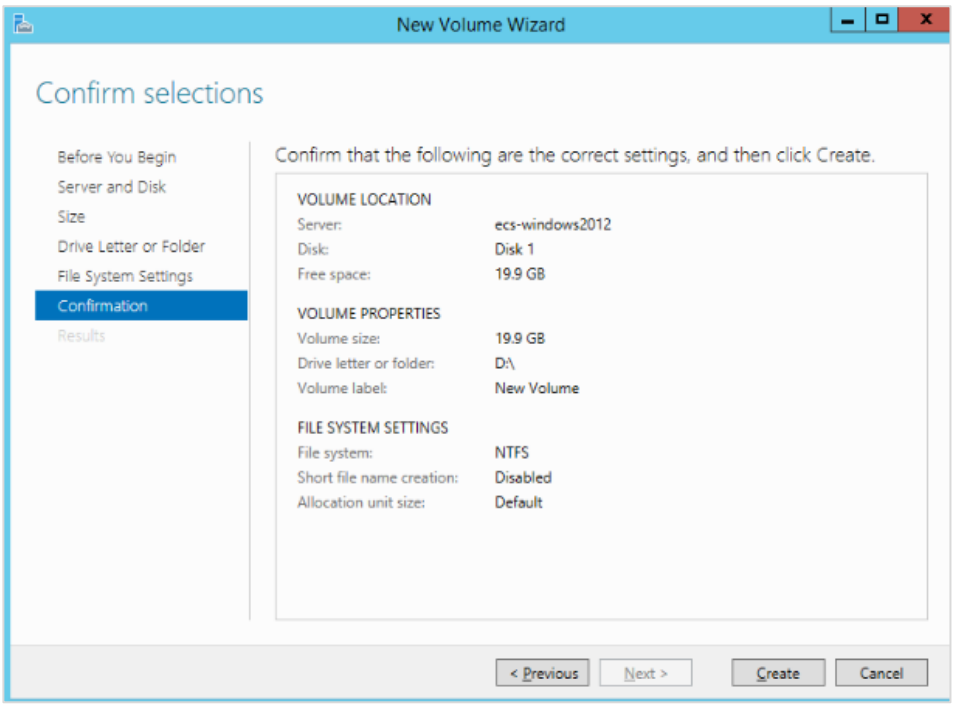
Step 11 Assign a drive letter and click **Next**.



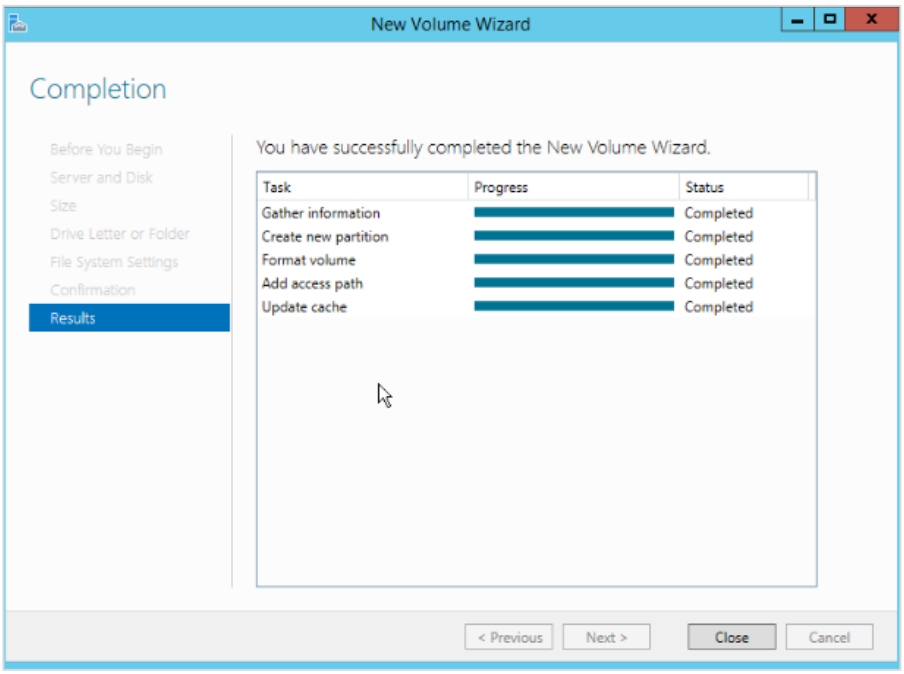
Step 12 Select **Format this volume with the following settings**, set parameters based on actual requirements, and select **Perform a quick format**. Then click **Next**.



Step 13 Confirm the settings and click **Create**.

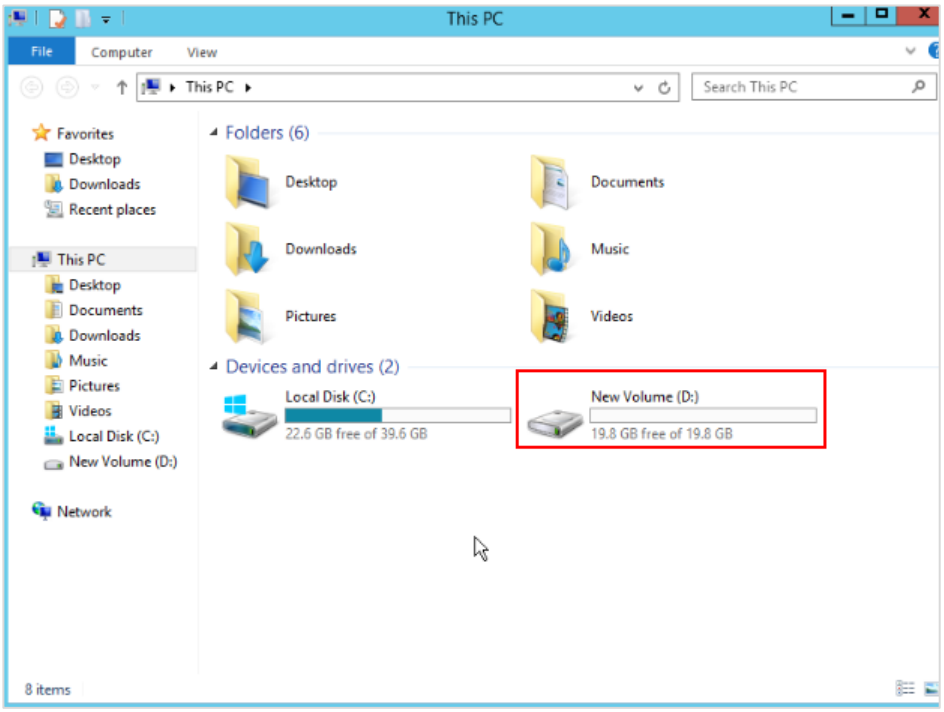


Step 14 After the creation is complete, click **Close**.



Step 15 Switch to **This PC**.

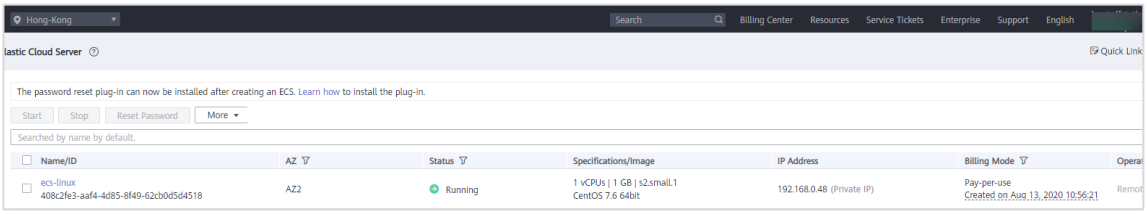
If a new drive is displayed, the disk has been successfully attached to the ECS.



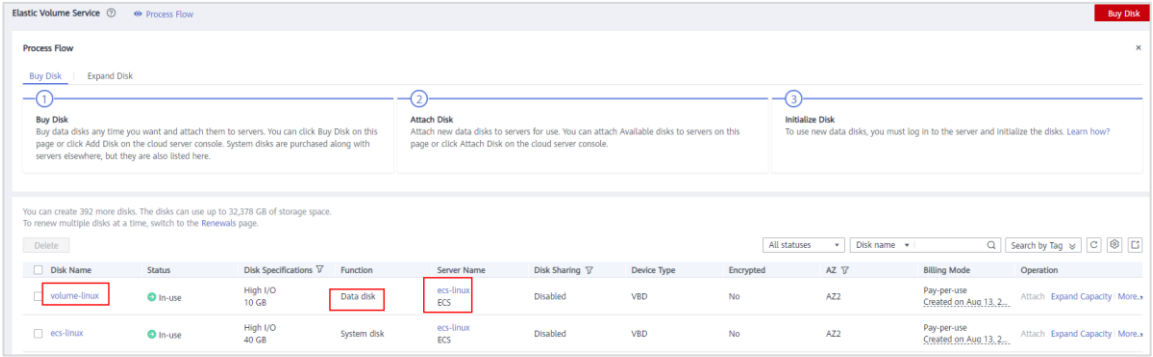
----End

2.1.5 Attaching an EVS Disk to a Linux ECS

Step 1 Buy a Linux ECS by referring to instructions in section 1.1.4.1. In this example, an ECS running CentOS 7.6 64-bit is used, but the tool used, fdisk, should be the same regardless of which Linux distribution you select.



Step 2 Purchase a non-shared EVS disk and attach it to an ECS by referring to instructions in section 2.1.4. Ensure that the data disk is in the same AZ as the Linux ECS.



Step 3 Remotely log in to the Linux ECS and run the following command to view the newly added data disk:

fdisk -l

```
[root@ecs-linux ~]# 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: 0x0002af06

   Device Boot      Start         End      Blocks   Id  System
/dev/vda1   *        2048    83886079    41942016   83  Linux

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**.

Step 4 Use fdisk, the disk partitioning tool, to partition the new data disk. In the example here, we are partitioning disk **/dev/vdb**, so the command is as follows:

fdisk /dev/vdb

```
[root@ecs-linux ~]# 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 0x35a056c7.

Command (m for help):
```

Enter **n** and press **Enter** to create a partition.

```
Command (m for help): n
Partition type:
   p   primary (0 primary, 0 extended, 4 free)
   e   extended
```

Step 5 In this example, a primary partition is created. Therefore, enter **p** and press **Enter** to create a primary partition. Primary partition number 1 is used in this example. Enter **1** and press **Enter**.

```
Select (default p): p
Partition number (1-4, default 1): 1
First sector (2048-20971519, default 2048):
```

First sector indicates the start cylinder number. The value range is **2048** to **20971519**, and the default value is **2048**.

Step 6 Select the default first cylinder number **2048** and press **Enter**.

```
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): 1
First sector (2048-20971519, default 2048):
Using default value 2048
Last sector, +sectors or +size{K,M,G} (2048-20971519, default 20971519):
```

Last sector indicates the last cylinder number. The value range is **2048** to **20971519**, and the default value is **20971519**.

Step 7 Select the default last cylinder number **20971519** and press **Enter**.

```
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): 1
First sector (2048-20971519, default 2048):
Using default value 2048
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):
```

A primary partition has been created for a 10 GB data disk.

Step 8 Enter **p** and press **Enter** to view the details of the new 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: 0x35a056c7

   Device Boot      Start         End      Blocks   Id  System
/dev/vdb1            2048    20971519    10484736   83  Linux

Command (m for help):
```

Details about the **dev/vdb1** partition are displayed.

Step 9 Enter **w** and press **Enter** to write the changes to the partition table.

```
Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.
```

Note that if you want to exit fdisk without keeping the changes made before, input **q**.

Step 10 Run the following command to synchronize the new partition table to the OS:

```
partprobe
```

Step 11 Run the following command to create an ext4 file system format for the created partition:

mkfs -t ext4 /dev/vdb1

```
[root@ecs-linux ~]# 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=0 blocks, Stripe width=0 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
```

The formatting takes little time. Do not exit until the task status changes to **done**.

Step 12 Run the following command to create a mount point **/mnt/sdc**:

mkdir /mnt/sdc

```
[root@ecs-linux ~]# mkdir /mnt/sdc
[root@ecs-linux ~]#
```

Step 13 Run the following command to mount the new partition to the mount point created in the previous step:

mount /dev/vdb1 /mnt/sdc

```
[root@ecs-linux ~]# mkdir /mnt/sdc
[root@ecs-linux ~]# mount /dev/vdb1 /mnt/sdc
[root@ecs-linux ~]#
```

Step 14 Run the following command to view the results:

df -TH

```
[root@ecs-linux ~]# df -TH
Filesystem     Type      Size  Used Avail Use% Mounted on
devtmpfs       devtmpfs  509M     0  509M   0% /dev
tmpfs          tmpfs     520M     0  520M   0% /dev/shm
tmpfs          tmpfs     520M  7.1M  513M   2% /run
tmpfs          tmpfs     520M     0  520M   0% /sys/fs/cgroup
/dev/vda1      ext4       43G  2.2G   38G   6% /
tmpfs          tmpfs     104M     0  104M   0% /run/user/0
/dev/vdb1      ext4       11G   38M  9.9G   1% /mnt/sdc
```

The new partition **/dev/xvdb1** is mounted to **/mnt/sdc**.

----End

2.2 OBS

2.2.1 Introduction

OBS is a stable, secure, efficient, and easy-to-use cloud storage service. It supports standard REST APIs, and can store unstructured data of any amount and types. This section describes how to use OBS Browser+ to manage object storage.

2.2.2 Objectives

Upon the completion of this section, you will be able to:

- Install OBS Browser+.
- Use basic OBS Browser+ functions, such as creating buckets and folders, uploading, downloading, and deleting files or folders, and deleting buckets.

2.2.3 Tasks

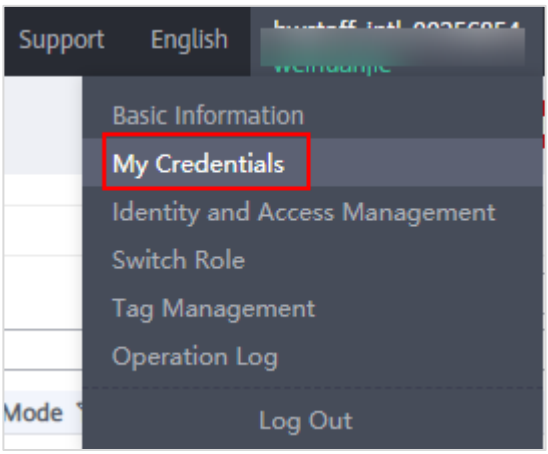
When you log in to the OBS console using your HUAWEI CLOUD account or as an IAM user, OBS authenticates your account or IAM user credentials.

When you access OBS using the tools (OBS Browser+ or obsutil), SDKs, or APIs, instead of your HUAWEI CLOUD account or IAM user account, OBS requires the access keys (AK and SK) for authentication. Therefore, you need to obtain the access keys (AK and SK) before you access OBS using any methods other than OBS Console.

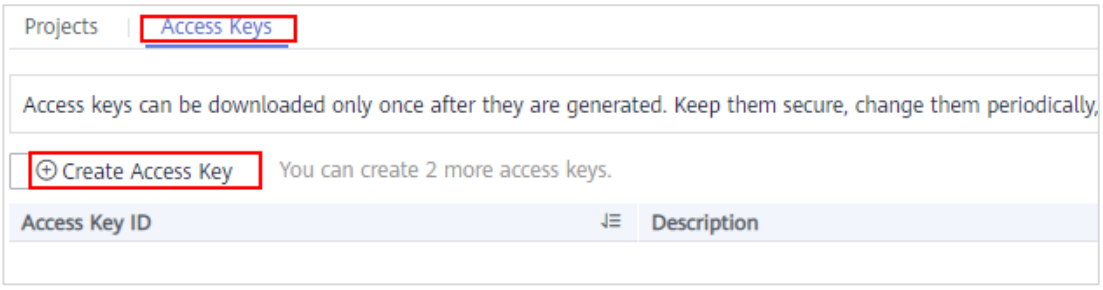
2.2.4 Preparations

2.2.4.1 Obtaining AK and SK

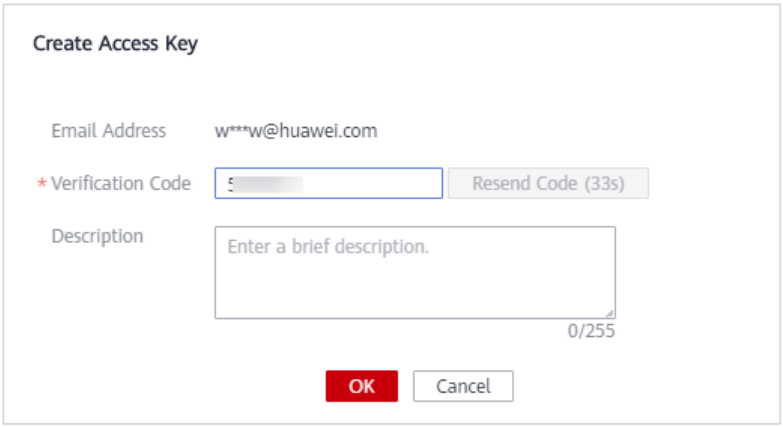
Step 1 In the upper right corner of the console homepage, select **My Credentials** under the username.



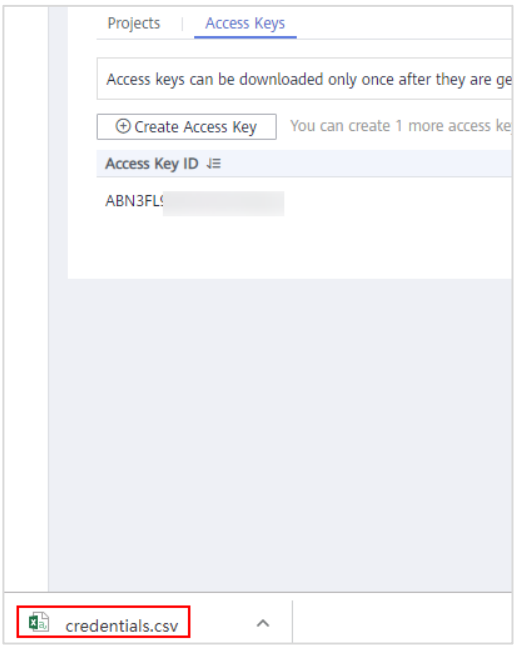
Step 2 Select **Access Keys** and then click **Create Access Key**.



Step 3 In the **Create Access Key** dialog box, enter the email or SMS verification code. Click **OK** to automatically download the file.



Step 4 Save the key file when prompted.



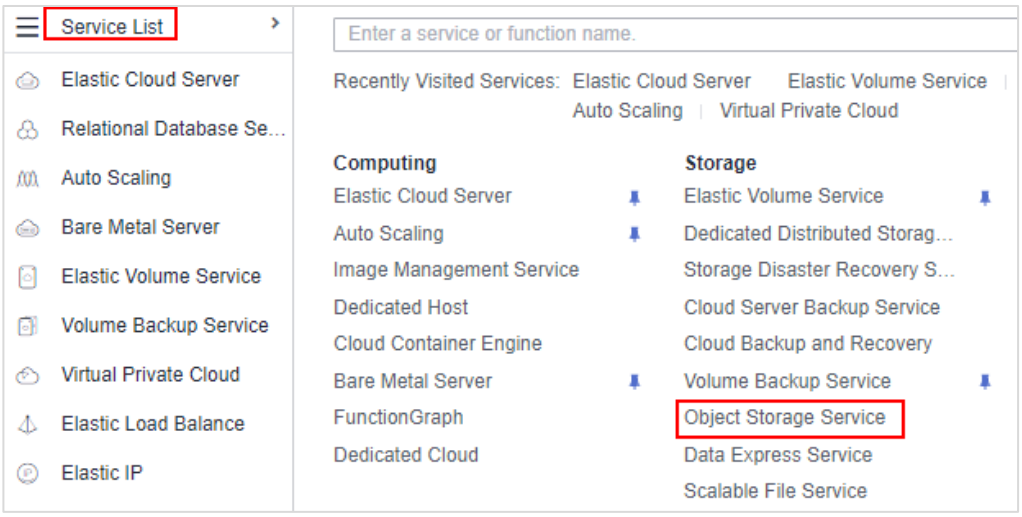
Keep the access keys properly.

Step 5 Open the downloaded file, **credentials.csv**, to obtain the AK and SK pair.

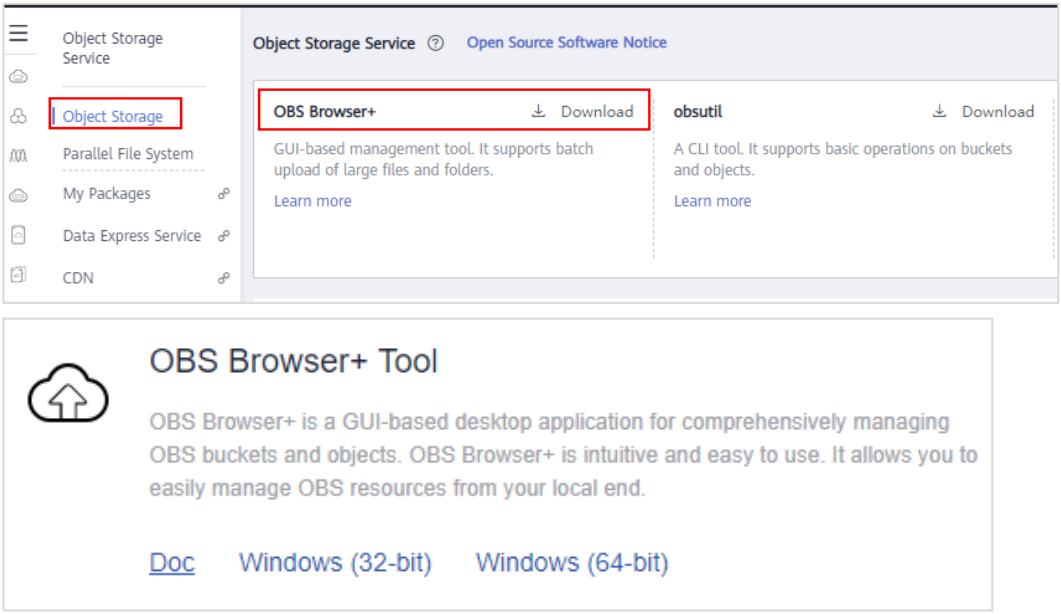
----End

2.2.4.2 Downloading and Initializing OBS Browser+

Step 1 On the console homepage, choose **Service List** > **Storage** > **Object Storage Service**.



Step 2 On the OBS console, download the OBS Browser+ software package based on the operating system of your local PC.

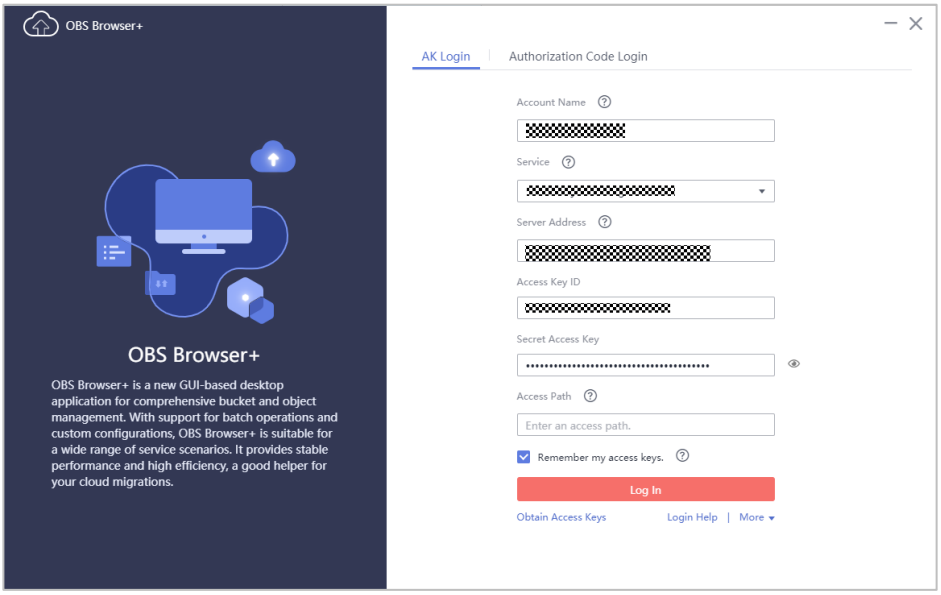


Step 3 Decompress the downloaded software package and install it.

----End

2.2.4.3 Logging In to OBS Browser+

Enter the account information and log in to OBS Browser+ using the AK.



OBS Browser+ can save the login details for up to 100 accounts. If a proxy is required to access your network environment, configure the network proxy before login.

2.2.5 Using OBS Browser+

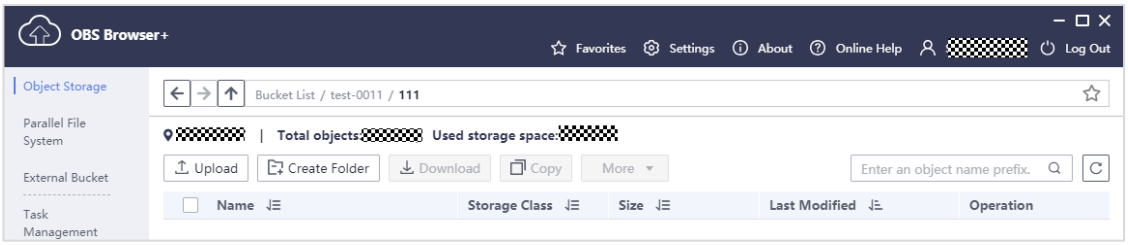
Step 1 Create a bucket.

The bucket name must be globally unique.

Step 2 Create a folder in the bucket.

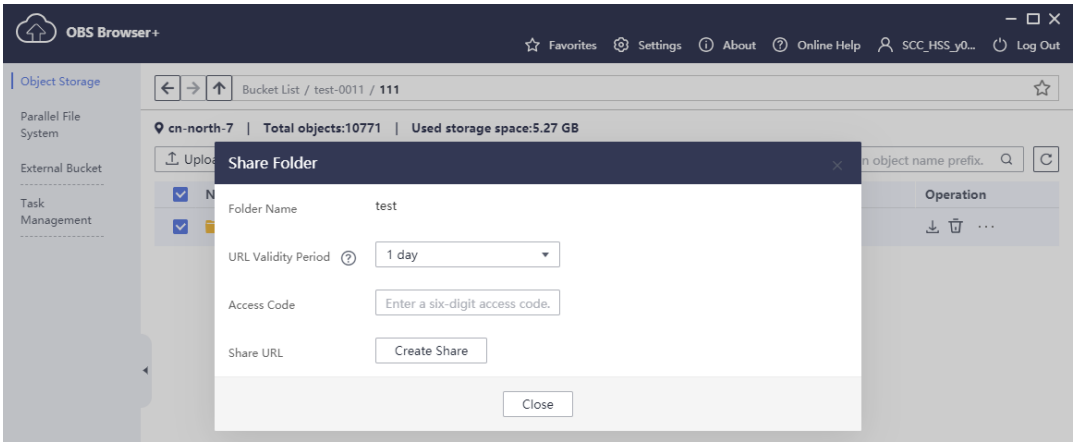
Step 3 Drag a file from a local path and drop it to the created folder.

OBS Browser+ supports drag-and-drop upload. Drag one or more files or folders into the object list of a bucket or a parallel file system on OBS Browser+. You can even drag a file or folder directly to a specified folder on OBS Browser+. This drag-and-drop functionality makes it easy to upload files to OBS. For details, see OBS Best Practices.



Step 4 Share a folder with another account.

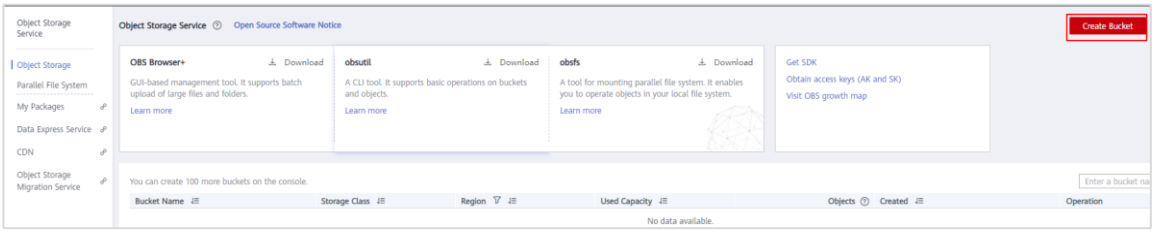
OBS Browser+ provides folder sharing and authorization code login functions, allowing you to easily share a folder with other accounts for a specific length of time. To share a folder, log in to OBS Browser+, right-click the folder you want to share and choose **Share**, or click **More** > **Share** in the operation column.



----End

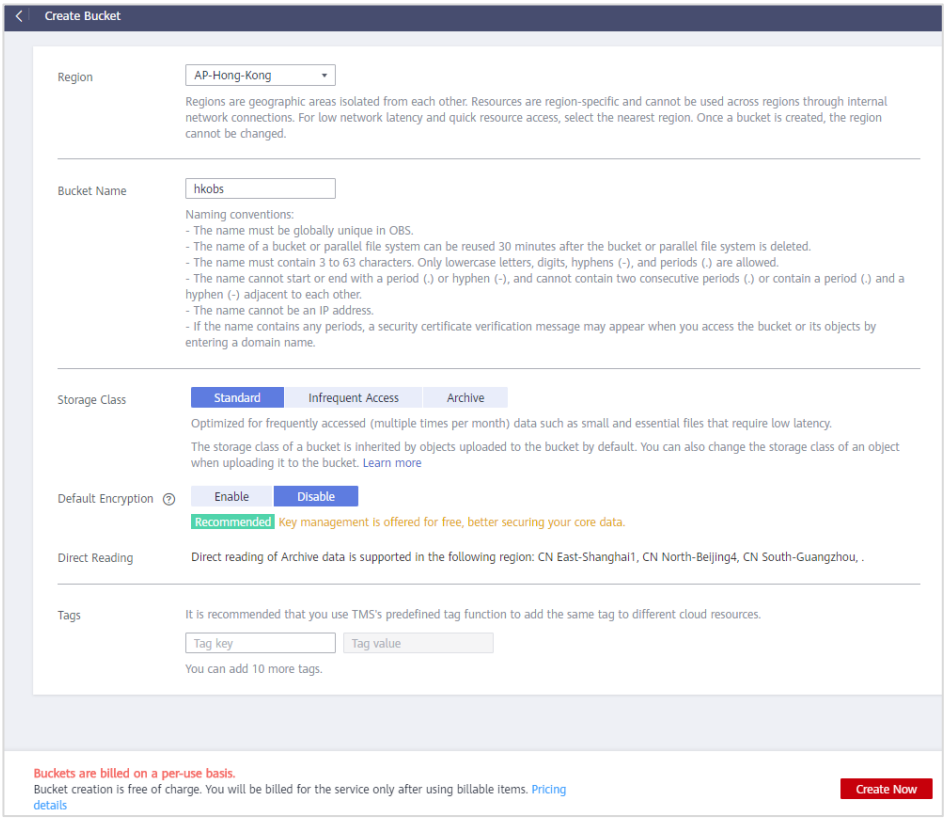
2.2.6 Versioning

Step 1 Log in to the OBS console and click **Create Bucket**.

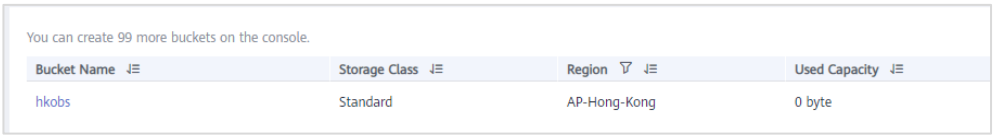


Step 2 Set the bucket information as follows:

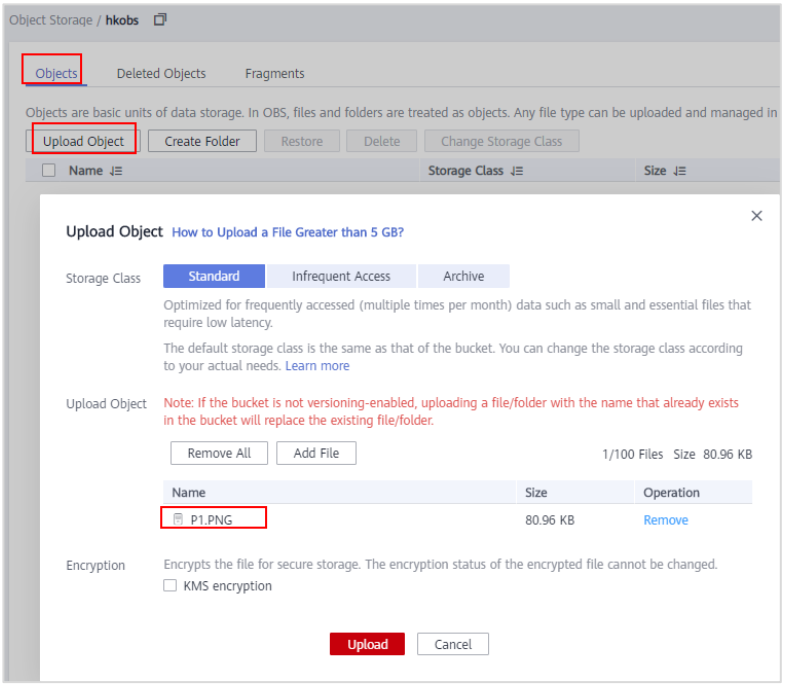
- **Region**: **AP-Hong Kong**
- **Bucket Name**: Enter a name that is globally unique.
- **Storage Class**: **Standard**
- **Default Encryption**: **Disable**



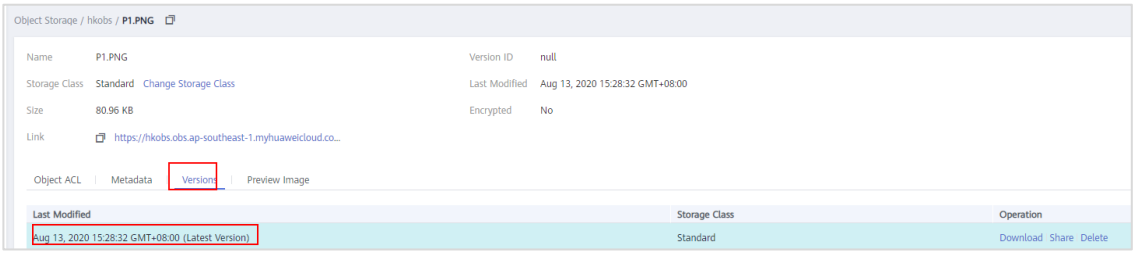
Step 3 Switch back to the bucket list and view the newly created bucket.



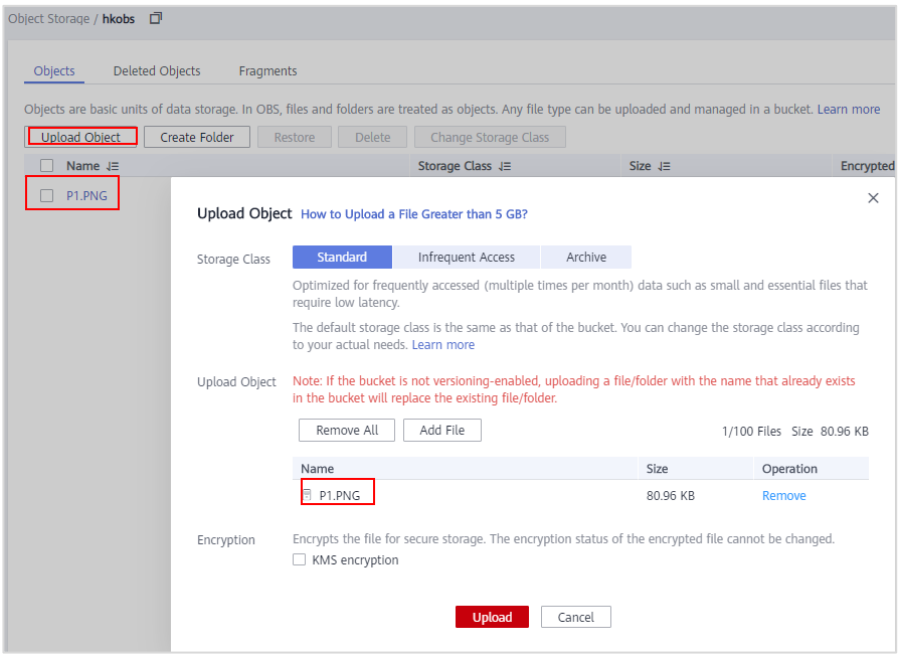
Step 4 Click the bucket name. On the **Objects** tab page, click **Upload Object** upload a file from a local path.



Step 5 Click the file name to go to the details page, where you can see any versions that exist.

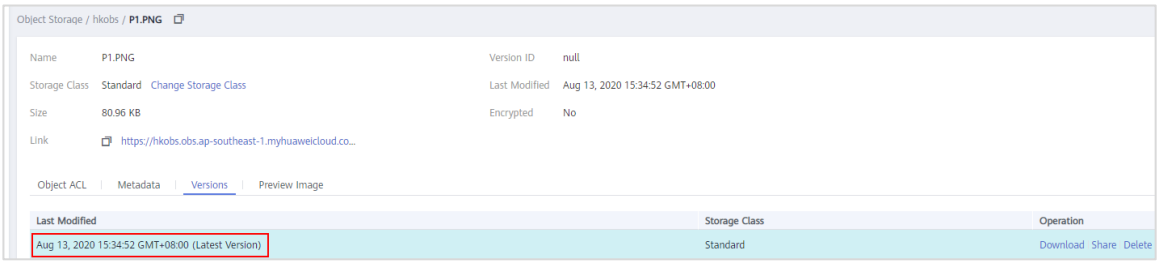


Step 6 Return to the bucket list and upload a file with the same name to the bucket.

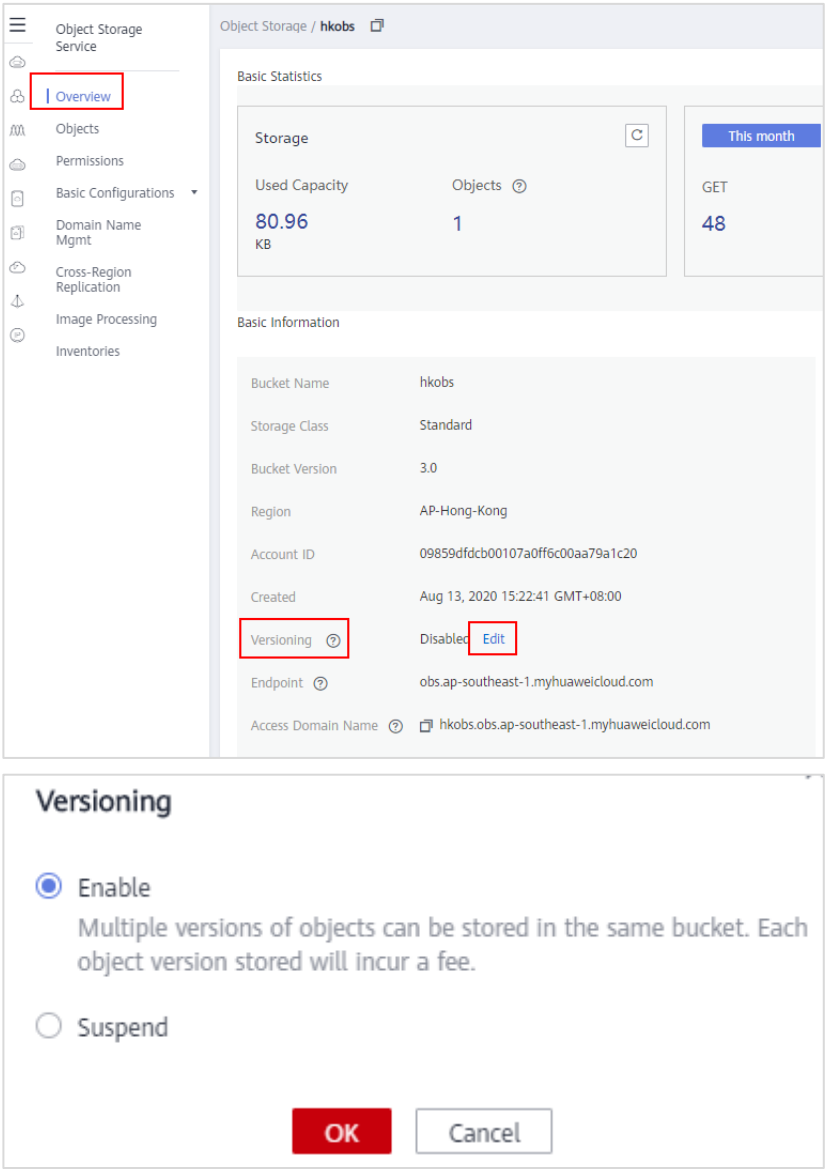


Step 7 Confirm that only one file is displayed in the object list of the bucket.

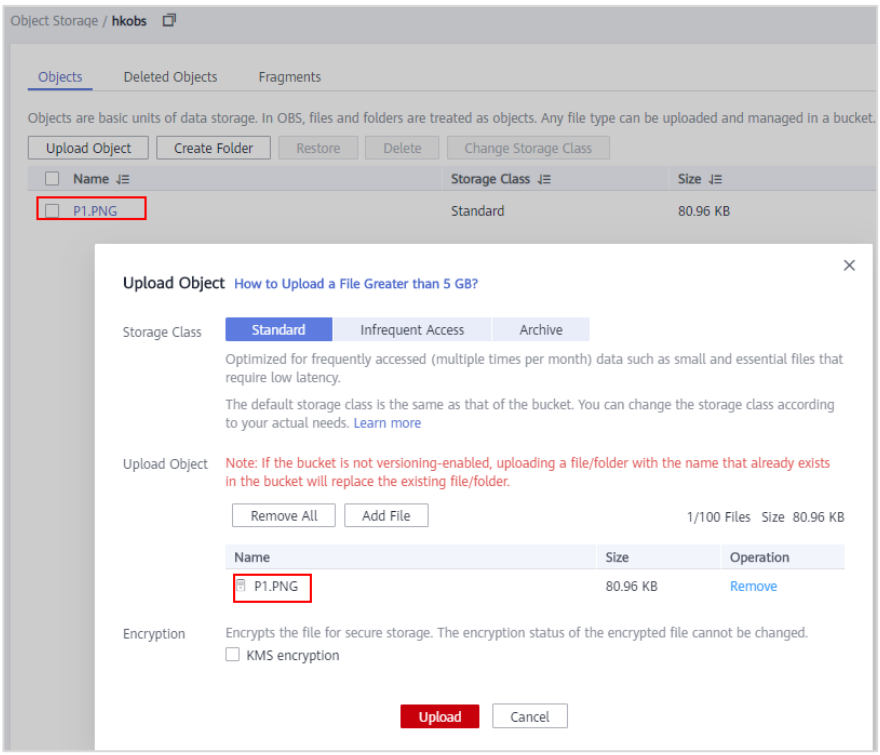
On the details page of the file, only the latest object version is displayed.



Step 8 On the **Overview** page of the bucket, click **Edit** next to **Versioning** in the **Basic Information** area to enable versioning.

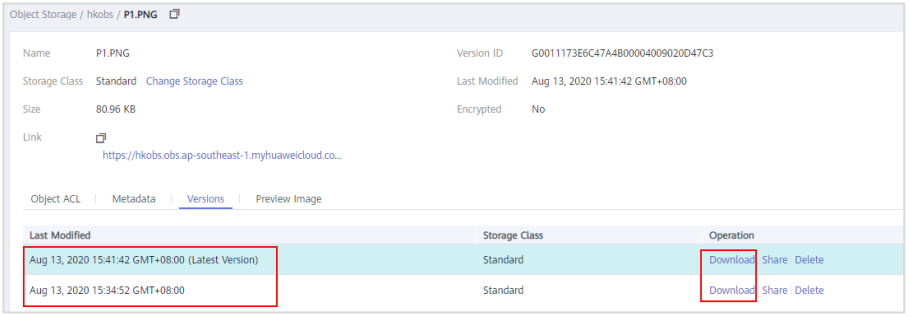


Step 9 Upload two files with the same name.

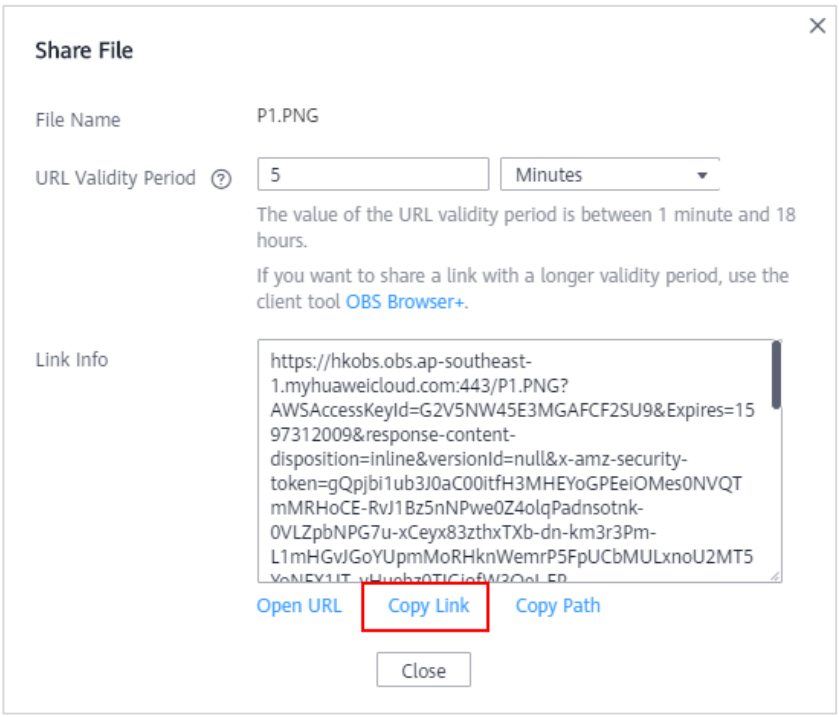


Step 10 Click the file name to go to its details page and view the file versions.

There are now two files, one for each of the two files you uploaded in the previous step. You can download, share, and delete different versions of that file.

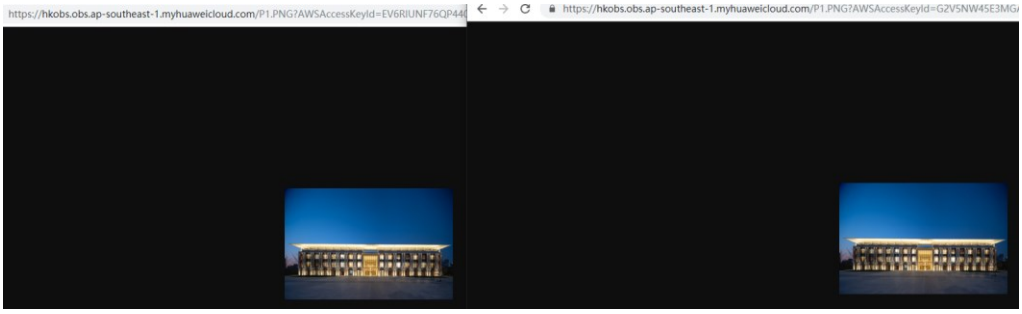


Step 11 Locate the target file, click **Share** in the operation column. In the displayed dialog box, enter the URL validity period and copy the URL to share the file.



Note that the maximum validity period is 18 hours.

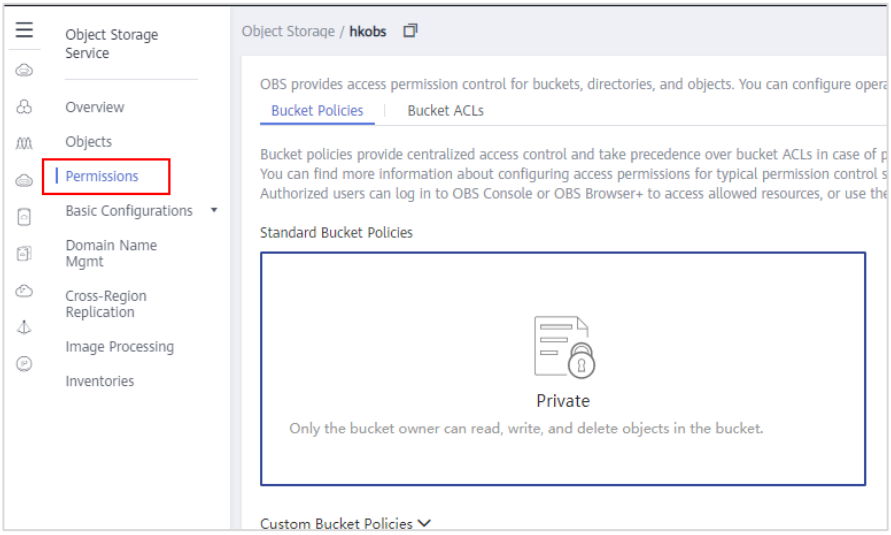
Two files with the same name (different versions) are displayed through the link.



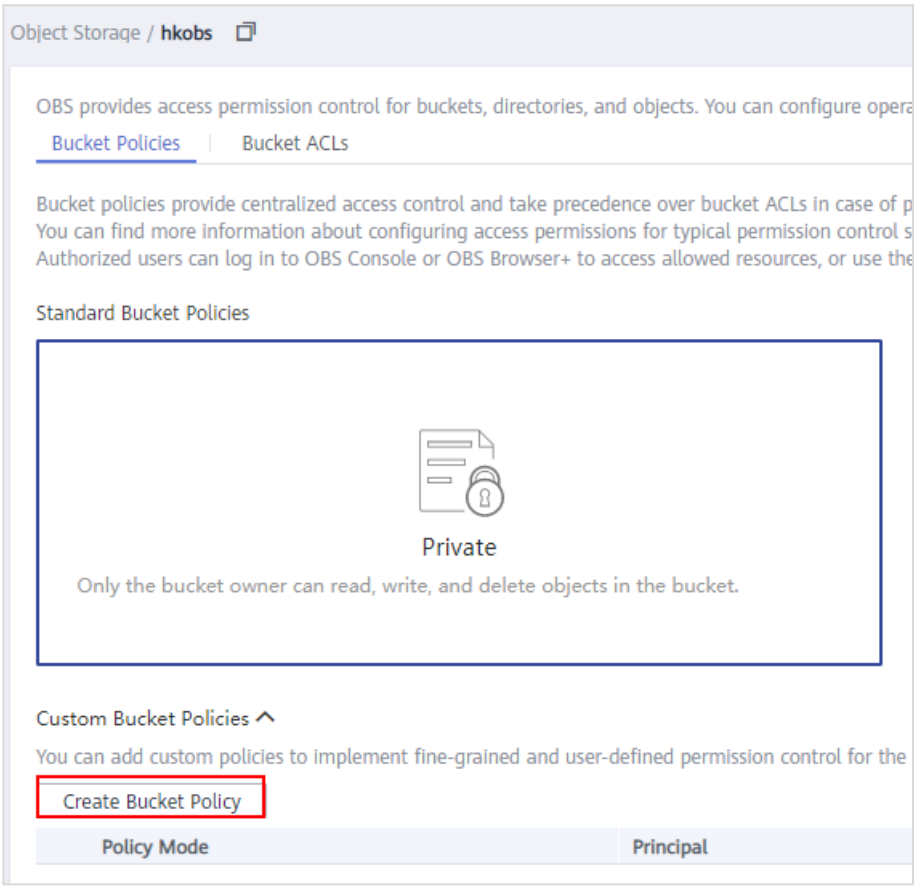
----End

2.2.7 OBS Permission Control Operations

Step 1 In the bucket list, click the destination bucket and click **Permissions**.



Step 2 Choose **Bucket Policies** > **Custom Bucket Policies**.

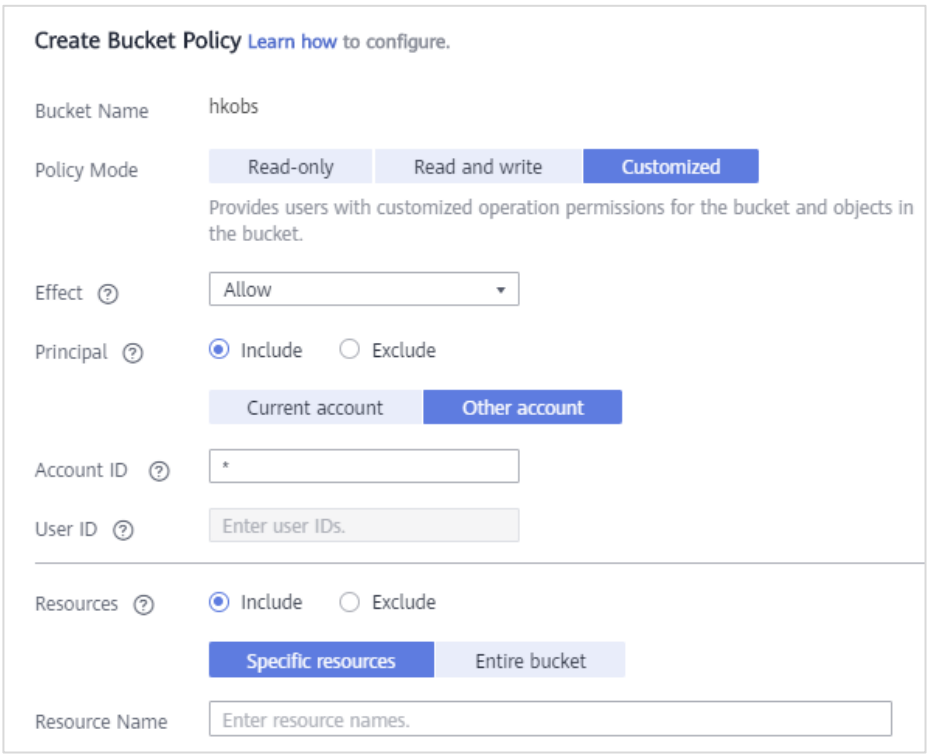


Step 3 Click **Create Bucket Policy**. The **Create Bucket Policy** dialog box is displayed. Configure the following parameters:

- **Bucket Name**

- **Policy Mode**: **Customized**
- **Effect**: **Allow**
- **Principal**: **Include**
- **Account ID**: ***** (indicating all anonymous users)
- **Resources**: **Include**, **Specific resources**
- **Actions**: **Include**
- **Conditions**:
  - **Conditional Operator**: **DateGreaterThan**; **Key**: **CurrentTime**; **Value**: **2020-06-11T19:00:00Z**
  - **Conditional Operator**: **DateLessThan**; **Key**: **CurrentTime**; **Value**: **2020-06-11T20:00:30Z**

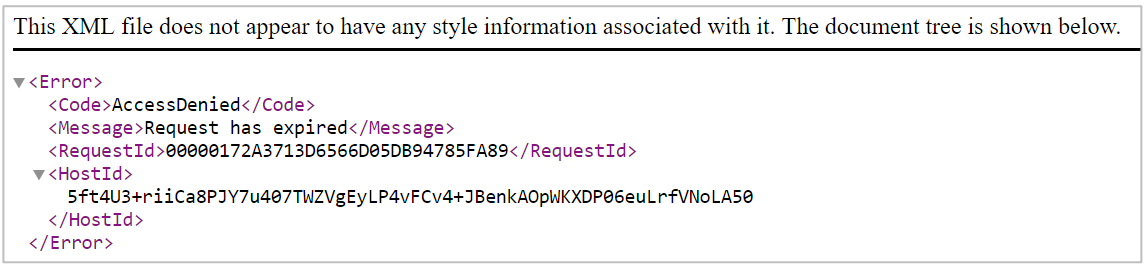
If it is only for verification, you can shorten the interval as needed.



Step 4 Verify the OBS permissions.

During the specified time period, any user can access the specified resources in the bucket. Outside the specified time period, only the bucket owner can access the bucket.

The following information will appear if users other than the bucket owner have accessed the bucket outside the specified time period.



----End

2.2.8 Deleting Resources

Delete all OBS resources on the console. You cannot delete a bucket with objects in it. You need to empty the bucket first.

2.3 SFS

2.3.1 Introduction

SFS is a network attached storage (NAS) service that provides scalable, high-performance file storage. With SFS, you can enjoy shared file access spanning ECSs, BMSs, and containers created on Cloud Container Engine (CCE) and Cloud Container Instance (CCI). This section describes basic operations of SFS.

2.3.2 Objectives

- Learn how to create a shared folder.
- Learn how to mount file systems to Linux ECSs and Windows ECSs.
- Learn how to share a file system across ECSs in different VPCs.

2.3.3 Creating a File System

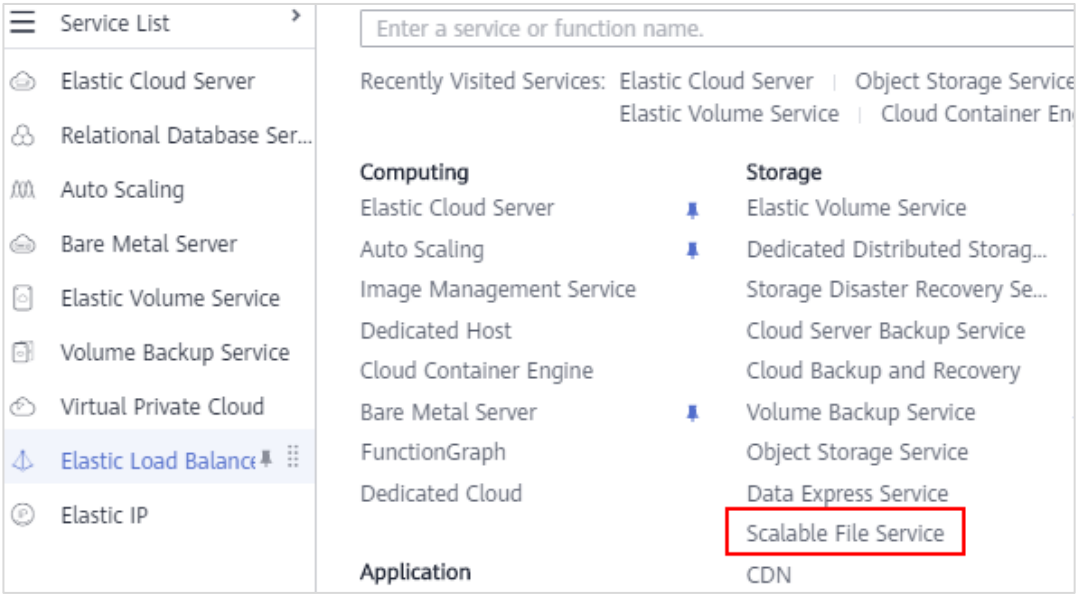
Prerequisites

- Three VPCs have been created, one for a Linux ECS, one for a Windows ECS, and one for the file system that will be created.
  - VPCs: **vpc-test-linux**, **vpc-test-windows**, and a third VPC of your own choosing
  - Region: AP-Hong Kong

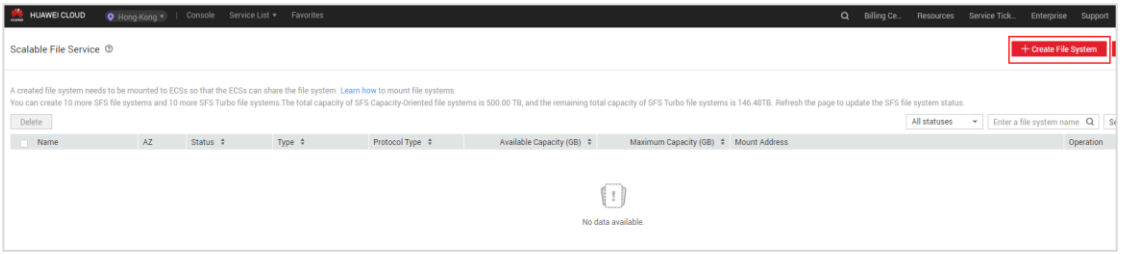
- Two ECSs have been purchased, one Linux and one Windows, each with an EIP bound. The Linux ECS runs CentOS 7.4 and will be deployed in **vpc-test-linux**, and the Windows ECS runs Windows Server 2012 and will be deployed in **vpc-test-windows**.

Procedure

Step 1 Log in to the management console and choose **Service List** > **Storage** > **Scalable File Service**.



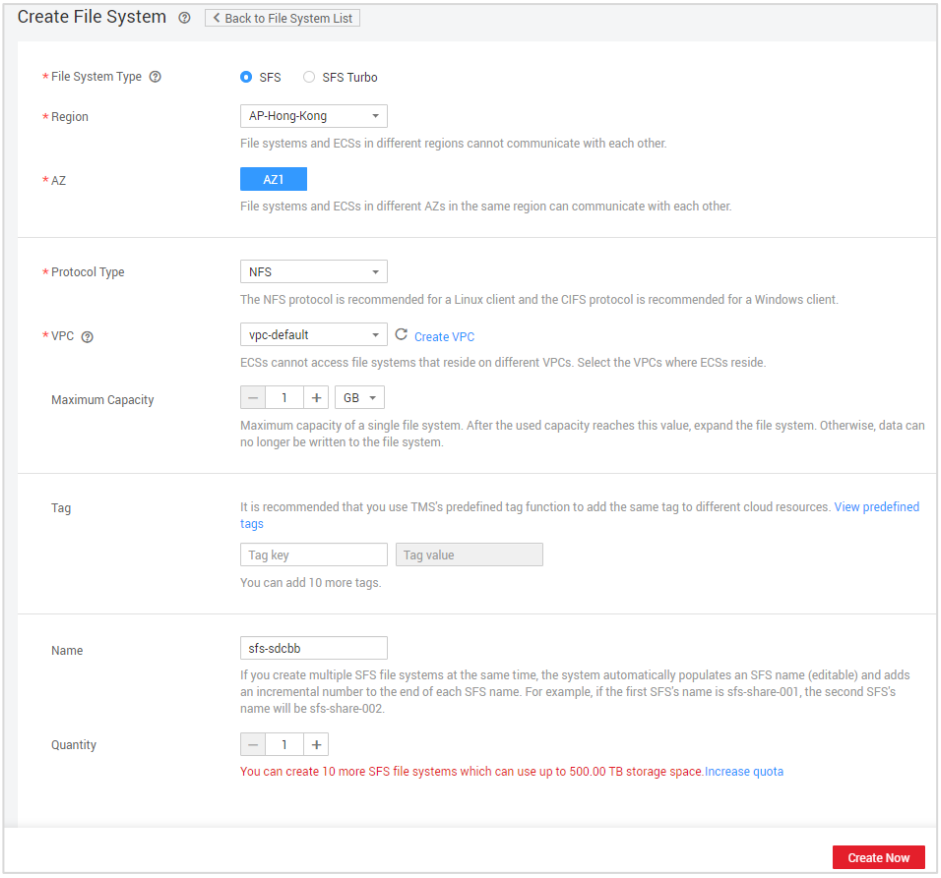
Step 2 On the SFS console, click **Create File System**.



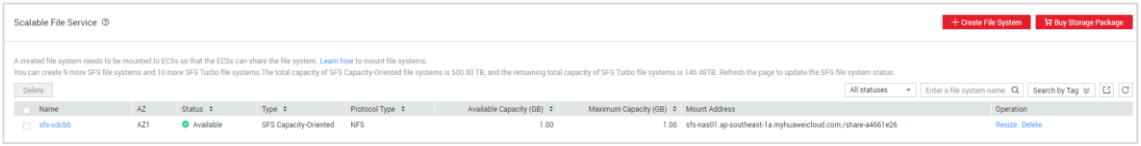
Step 3 On the page displayed, enter the name, type, and VPC of the file system, confirm the settings, and click **Create Now**.

- **File System Type**: **SFS**
- **Region**: **AP-Hong Kong**
- **AZ**: Keep the default value.
- **Protocol Type**: **NFS**
- **VPC**: Use an existing VPC or create a new one. This VPC must be different from the VPCs of the two ECSs.
- **Maximum Capacity**: **1 GB**

- **Name**: **sfs-sdcbb**
- **Quantity**: **1**



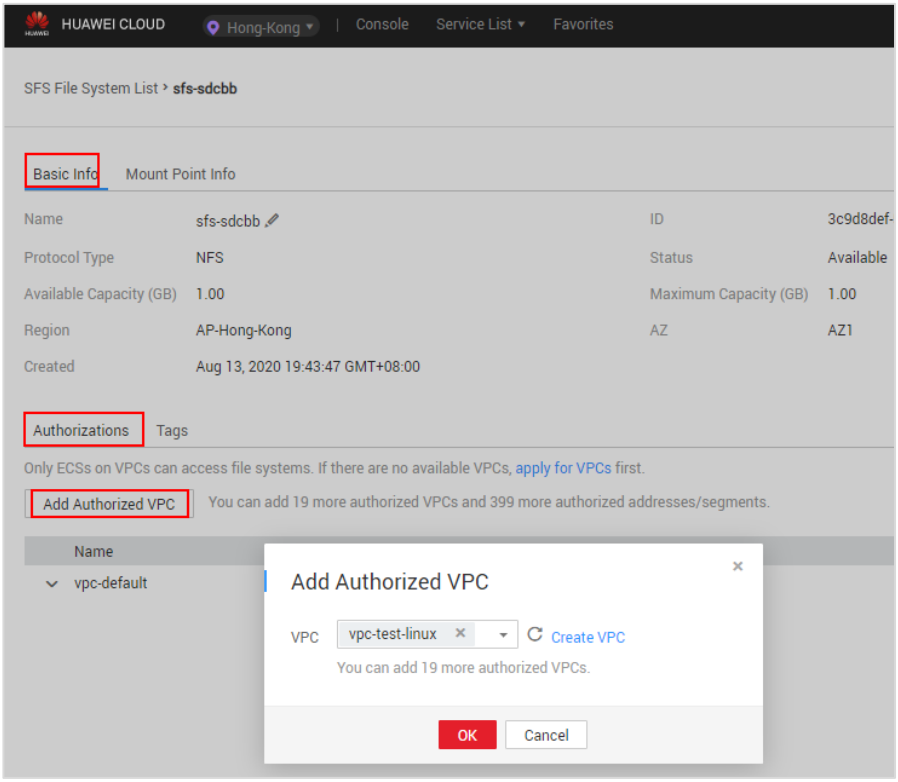
Step 4 Return to the SFS homepage and view the created SFS file system.

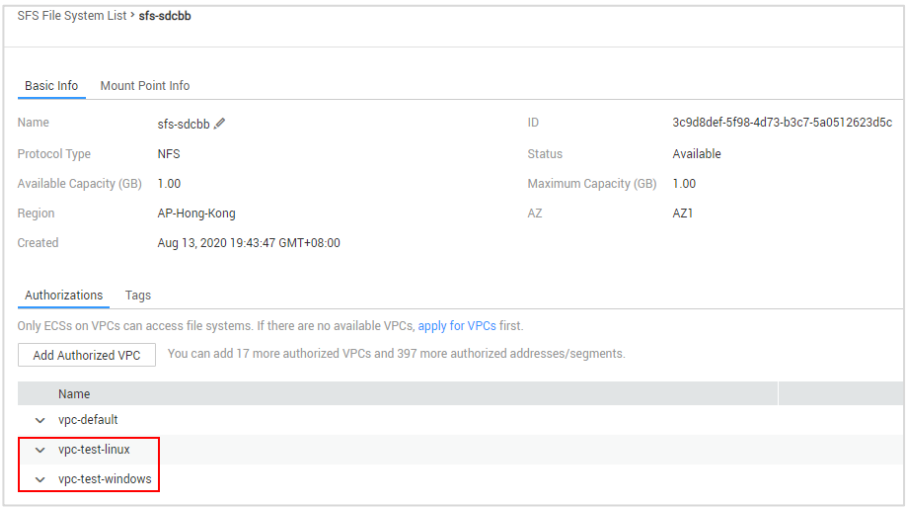


Step 5 Grant permissions.

Normally, files can only be shared among ECSs within a single VPC. If you want to share the file system across multiple VPCs, you must specifically authorize access for those other VPCs.

On the SFS homepage, click the name of the file system name you want to grant access to. On the displayed page, choose **Basic Info** > **Authorizations** > **Add Authorized VPC** to authorize a VPC to access the file system. Add the two VPCs, **vpc-test-linux** and **vpc-test-windows**.





----End

2.3.4 Mounting a File System to an ECS (Linux)

Step 1 Log in to the ECS console. Locate the row that contains the Linux ECS you prepared for this exercise (CentOS 7.4) and click **Remote Login**.

Step 2 Log in to the ECS as user **root**.

```
CentOS Linux 7 (Core)
Kernel 3.10.0-1062.12.1.el7.x86_64 on an x86_64

ecs-linux login: root
Password:

        Welcome to Huawei Cloud Service

[root@ecs-linux ~]#
```

Step 3 Check whether the NFS software package has been installed in the OS.

rpm -qa|grep nfs

The NFS software package is usually included in the OS. If information similar to the following is displayed, the NFS software package is already installed. The command output varies according to operating systems.

```
[root@ecs-256845 ~]# rpm -qa|grep nfs
libnfsidmap-0.25-19.el7.x86_64
nfs-utils-1.3.0-0.66.el7.x86_64
```

If no command output is displayed, install the NFS software package.

```
[root@ecs-linux ~]# rpm -qa|grep nfs
[root@ecs-linux ~]#
```

As CentOS is used here, you can run the following command to install the package:

sudo yum -y install nfs-utils

```
Installed:
  nfs-utils.x86_64 1:1.3.0-0.66.el7

Dependency Installed:
  gssproxy.x86_64 0:0.7.0-28.el7                keyutils.x86_64 0:1.5.8-3.el7                libbasicobjects.x86_64 0:0.1.1-32.el7
  libcollection.x86_64 0:0.7.0-32.el7           libevent.x86_64 0:2.0.21-4.el7               libini_config.x86_64 0:1.3.1-32.el7
  libnfsidmap.x86_64 0:0.25-19.el7              libpath_utils.x86_64 0:0.2.1-32.el7          libref_array.x86_64 0:0.1.5-32.el7
  libtirpc.x86_64 0:0.2.4-0.16.el7              libverto-libevent.x86_64 0:0.2.5-4.el7       quota.x86_64 1:4.01-19.el7
  quota-nls.noarch 1:4.01-19.el7                rpcbind.x86_64 0:0.2.0-49.el7                tcp_wrappers.x86_64 0:7.6-77.el7

Complete!
```

For details about other OSs, see Mounting an NFS File System to ECSs (Linux).

Step 4 Install the bind-utils software package.

yum install bind-utils

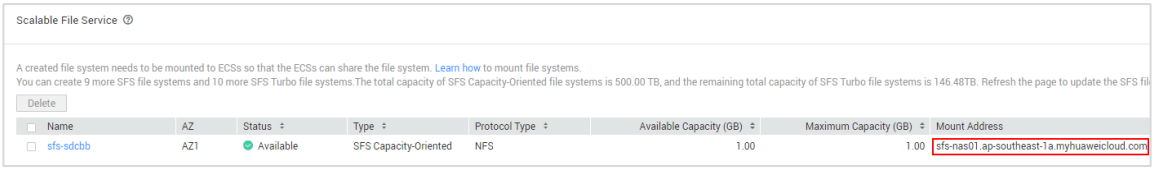
```
Installed:
  bind-utils.x86_64 32:9.11.4-16.P2.el7_8.6

Dependency Installed:
  bind-libs.x86_64 32:9.11.4-16.P2.el7_8.6

Dependency Updated:
  bind-libs-lite.x86_64 32:9.11.4-16.P2.el7_8.6
  bind-license.noarch 32:9.11.4-16.P2.el7_8.6

Complete!
```

Step 5 Log in to the SFS console, click the file system to be mounted, and view the mount address.



The part of the address in the red box is the domain name of the file system.

Step 6 On the page for logging in to the Linux ECS, run the following command to check whether the file system domain name can be resolved:

nslookup *sfs-nas01.ap-southeast-1a.myhuaweicloud.com* (Replace it with the actual address.)

If the domain name can be resolved, information similar to the following is displayed:

```
[root@ecs-linux ~]# nslookup sfs-nas01.ap-southeast-1a.myhuaweicloud.com
Server:         100.125.3.250
Address:        100.125.3.250#53

Non-authoritative answer:
Name:   sfs-nas01.ap-southeast-1a.myhuaweicloud.com
Address: 100.125.96.42
Name:   sfs-nas01.ap-southeast-1a.myhuaweicloud.com
Address: 100.125.96.44
Name:   sfs-nas01.ap-southeast-1a.myhuaweicloud.com
Address: 100.125.96.45
Name:   sfs-nas01.ap-southeast-1a.myhuaweicloud.com
Address: 100.125.96.52
Name:   sfs-nas01.ap-southeast-1a.myhuaweicloud.com
Address: 100.125.96.40
Name:   sfs-nas01.ap-southeast-1a.myhuaweicloud.com
Address: 100.125.96.43
Name:   sfs-nas01.ap-southeast-1a.myhuaweicloud.com
Address: 100.125.96.51
Name:   sfs-nas01.ap-southeast-1a.myhuaweicloud.com
Address: 100.125.96.46
Name:   sfs-nas01.ap-southeast-1a.myhuaweicloud.com
Address: 100.125.96.50
Name:   sfs-nas01.ap-southeast-1a.myhuaweicloud.com
Address: 100.125.96.49
Name:   sfs-nas01.ap-southeast-1a.myhuaweicloud.com
Address: 100.125.96.47
Name:   sfs-nas01.ap-southeast-1a.myhuaweicloud.com
Address: 100.125.96.41

[root@ecs-linux ~]#
```

Step 7 Create a local directory for the mount.

mkdir /*[Directory name]*

Example:

mkdir /localfolder

```
[root@ecs-linux ~]# mkdir /localfolder
[root@ecs-linux ~]#
```

Step 8 Mount the created file system to the local path.

mount -t nfs -o vers=3,nolock ***[SFS file system path] [Local path]***

Example:

mount -t nfs -o vers=3,timeo=600,nolock sfs-nas01.ap-southeast-1a.myhuaweicloud.com:/share-a4661e26 **/localfolder**

```
[root@ecs-linux ~]# mount -t nfs -o vers=3,timeo=600,nolock sfs-nas01.ap-southeast-1a.myhuaweicloud.com:/share-a4661e26 /localfo
lder
[root@ecs-linux ~]#
```

Step 9 Check the mounted file system.

mount -l

```
[root@ecs-linux ~]# mount -l
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime)
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
devtmpfs on /dev type devtmpfs (rw,nosuid,size=496820k,nr_inodes=124205,mode=755)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,nodev,mode=755)
tmpfs on /sys/fs/cgroup type tmpfs (ro,nosuid,nodev,noexec,mode=755)
cgroup on /sys/fs/cgroup/systemd type cgroup (rw,nosuid,nodev,noexec,relatime,xattr,release_agent=/usr/lib
ps-agent,name=systemd)
pstore on /sys/fs/pstore type pstore (rw,nosuid,nodev,noexec,relatime)
cgroup on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,devices)
cgroup on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,cpuset)
cgroup on /sys/fs/cgroup/cpu,cpuacct type cgroup (rw,nosuid,nodev,noexec,relatime,cpuacct,cpu)
cgroup on /sys/fs/cgroup/freezer type cgroup (rw,nosuid,nodev,noexec,relatime,freezer)
cgroup on /sys/fs/cgroup/perf_event type cgroup (rw,nosuid,nodev,noexec,relatime,perf_event)
cgroup on /sys/fs/cgroup/net_cls,net_prio type cgroup (rw,nosuid,nodev,noexec,relatime,net_prio,net_cls)
cgroup on /sys/fs/cgroup/blkio type cgroup (rw,nosuid,nodev,noexec,relatime,blkio)
cgroup on /sys/fs/cgroup/hugetlb type cgroup (rw,nosuid,nodev,noexec,relatime,hugetlb)
cgroup on /sys/fs/cgroup/pids type cgroup (rw,nosuid,nodev,noexec,relatime,pids)
cgroup on /sys/fs/cgroup/memory type cgroup (rw,nosuid,nodev,noexec,relatime,memory)
configfs on /sys/kernel/config type configfs (rw,relatime)
/dev/vda1 on / type ext4 (rw,relatime,data=ordered)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=26,pgrp=1,timeout=0,minproto=5,maxproto=
2)
debugfs on /sys/kernel/debug type debugfs (rw,relatime)
hugetlbfs on /dev/hugepages type hugetlbfs (rw,relatime)
mqueue on /dev/mqueue type mqueue (rw,relatime)
tmpfs on /run/user/0 type tmpfs (rw,nosuid,nodev,relatime,size=101436k,mode=700)
sfs-nas01.ap-southeast-1a.myhuaweicloud.com:/share-a4661e26 on /localfolder type nfs (rw,relatime,vers=3,r
8576,namlen=255,hard,nolock,proto=tcp,timeo=600,retrans=2,sec=sys,mountaddr=100.125.96.51,mountvers=3,moun
udp,local_lock=all,addr=100.125.96.51)
[root@ecs-linux ~]#
```

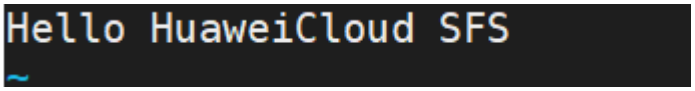
----End

2.3.4.2 Creating a File in the Local Path

Step 1 Run the following commands to create the **new** file in the **localfolder** directory:

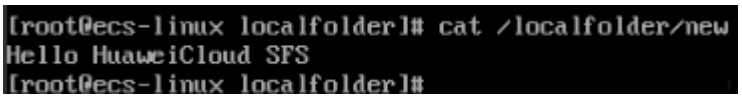
```
cd /localfolder
vim new
```

Step 2 Edit the **new** file, input **ecs**, and run the **:wq** command to save the file.



Step 3 Run the following command to view the file content:

```
cat /localfolder/new
```

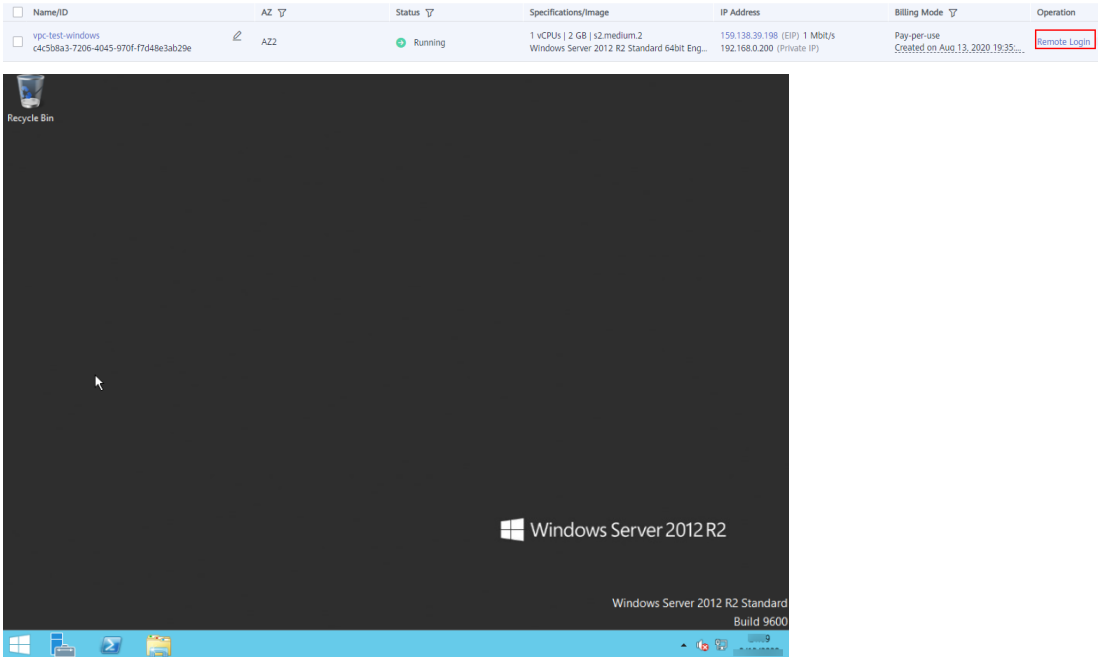


----End

2.3.5 Mounting a File System to an ECS (Windows)

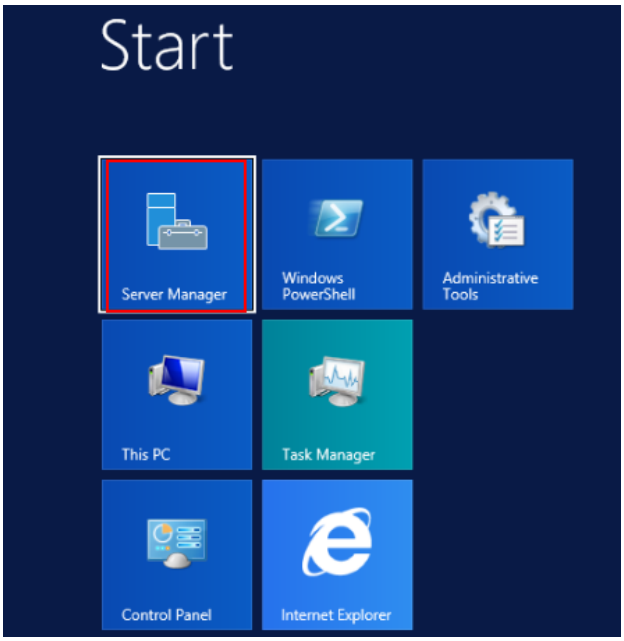
2.3.5.1 Logging In to a Windows ECS

Log in to the ECS console. Locate the row that contains the ECS that you wish to mount the file system to and click **Remote Login**. In this example, **ecs-windows** is used.

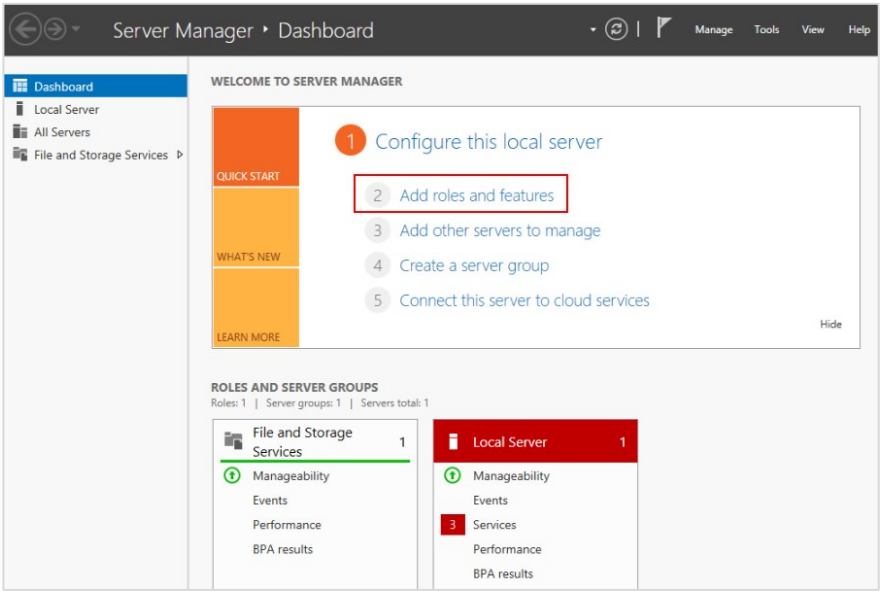


2.3.5.2 Installing the NFS client

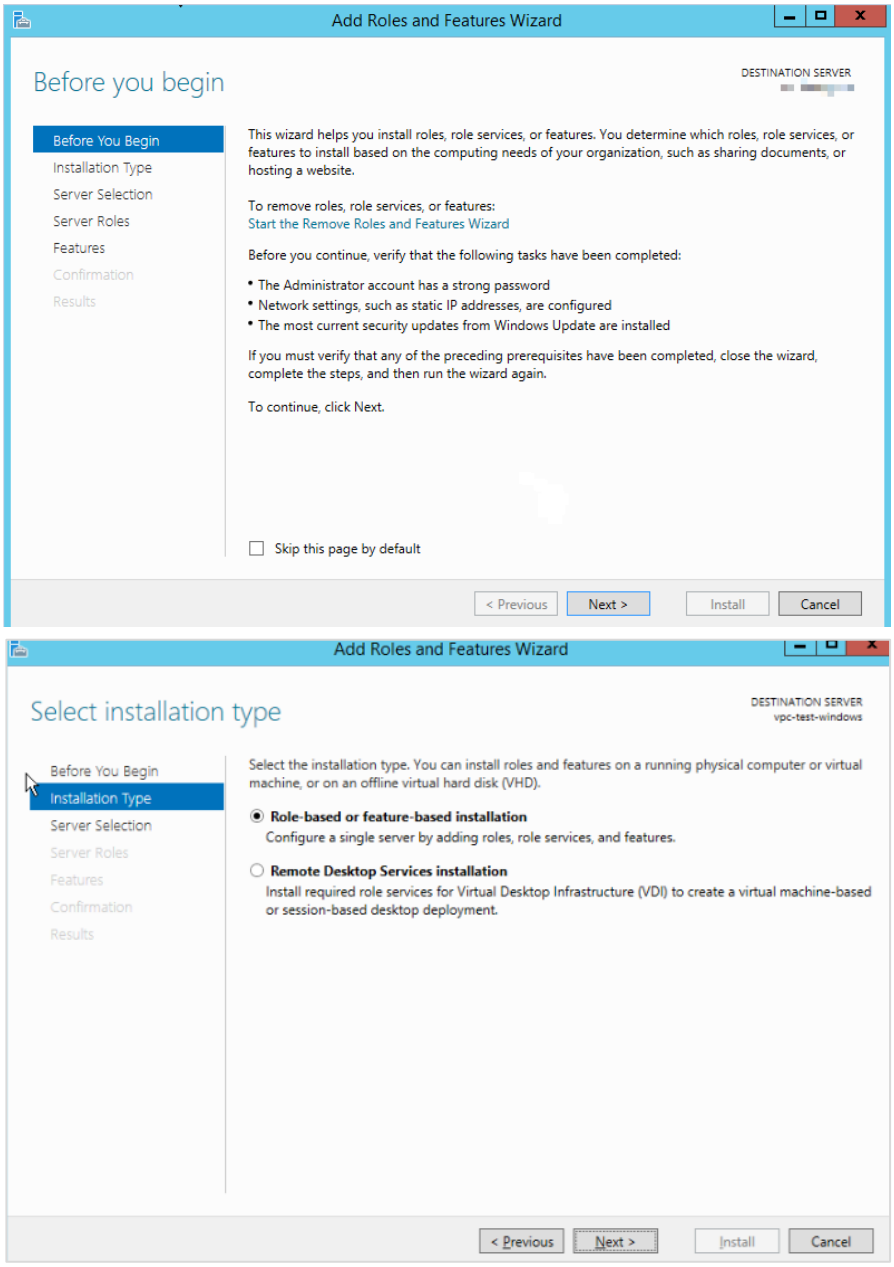
Step 1 Click **Server Manager** in the lower left corner.



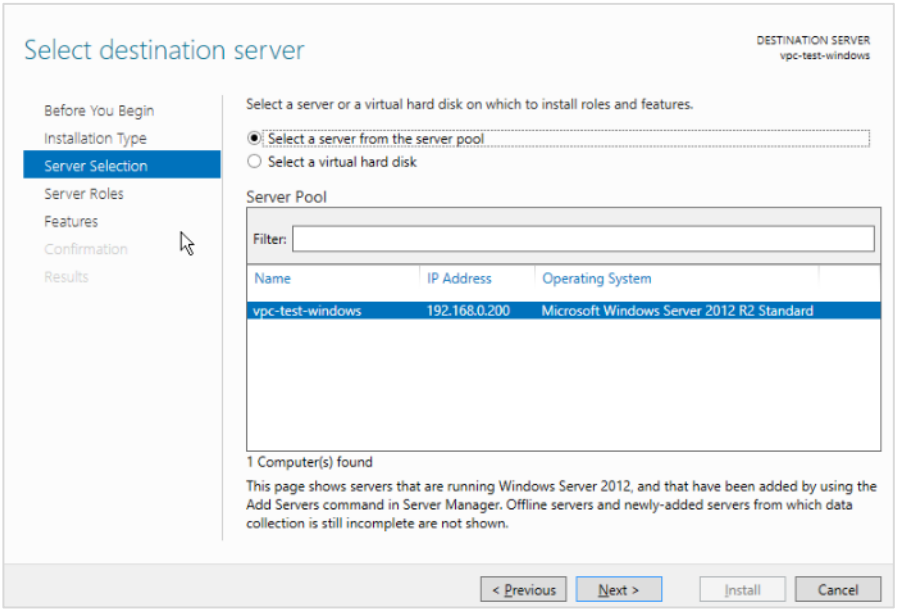
The **Server Manager** window is displayed.



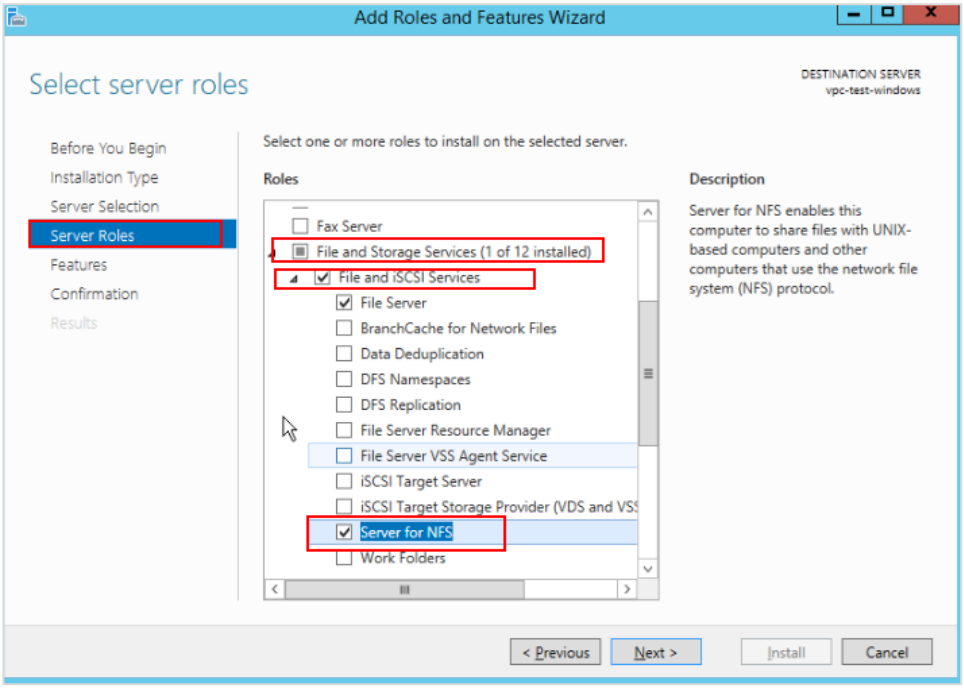
Step 2 Click **Next**.


Add Roles and Features Wizard
Before you begin
DESTINATION SERVER
Before You Begin
Installation Type
Server Selection
Server Roles
Features
Confirmation
Results
This wizard helps you install roles, role services, or features. You determine which roles, role services, or features to install based on the computing needs of your organization, such as sharing documents, or hosting a website.
To remove roles, role services, or features:
Start the Remove Roles and Features Wizard
Before you continue, verify that the following tasks have been completed:
• The Administrator account has a strong password
• Network settings, such as static IP addresses, are configured
• The most current security updates from Windows Update are installed
If you must verify that any of the preceding prerequisites have been completed, close the wizard, complete the steps, and then run the wizard again.
To continue, click Next.
Skip this page by default
< Previous
Next >
Install
Cancel

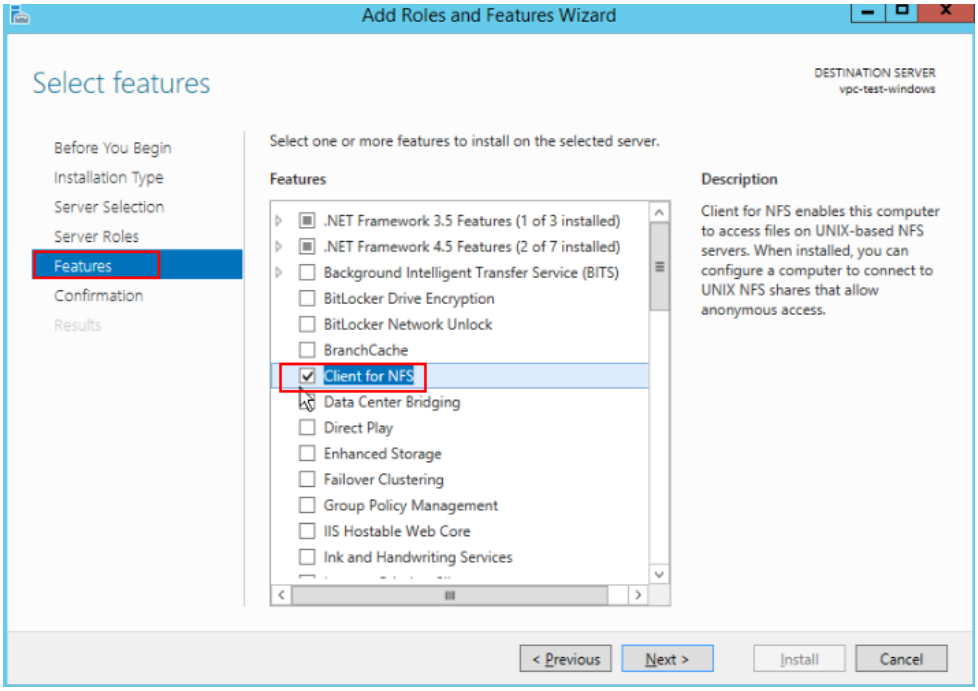
Add Roles and Features Wizard
Select installation type
DESTINATION SERVER
vpc-test-windows
Before You Begin
Installation Type
Server Selection
Server Roles
Features
Confirmation
Results
Select the installation type. You can install roles and features on a running physical computer or virtual machine, or on an offline virtual hard disk (VHD).
Role-based or feature-based installation
Configure a single server by adding roles, role services, and features.
Remote Desktop Services installation
Install required role services for Virtual Desktop Infrastructure (VDI) to create a virtual machine-based or session-based desktop deployment.
< Previous
Next >
Install
Cancel



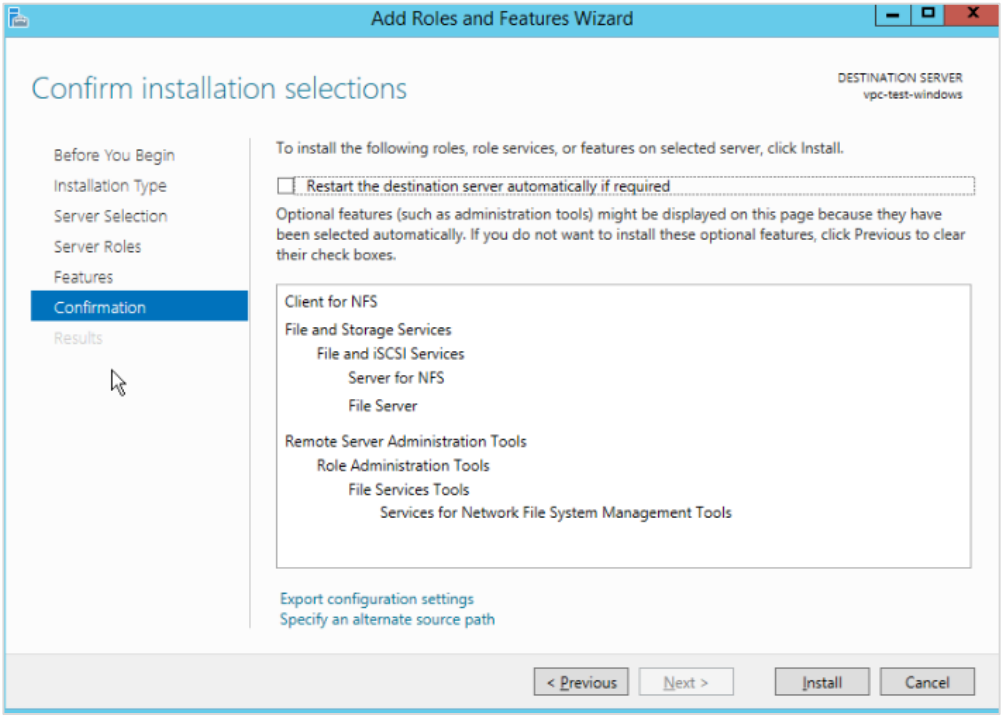
Step 3 Click **Next** when prompted, and on the **Server Roles** page, select **Server for NFS**.



Step 4 In the **Features** area, select **Client for NFS**.



Step 5 Confirm the settings and click **Install**.

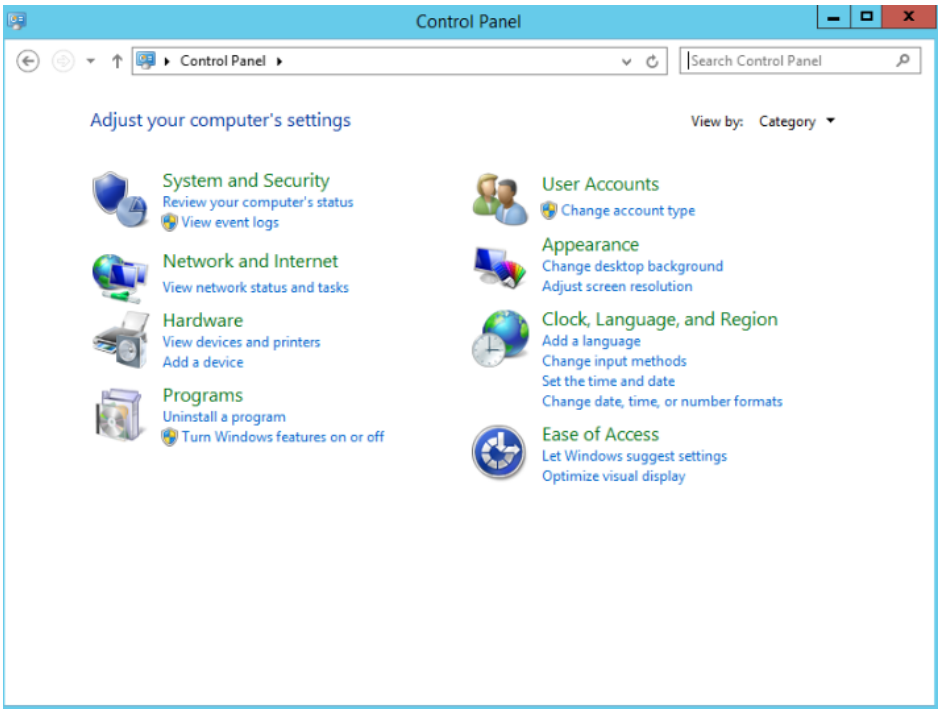


Step 6 If you are installing the NFS client for the first time, after the installation is complete, restart the client and log in to the ECS again when prompted.

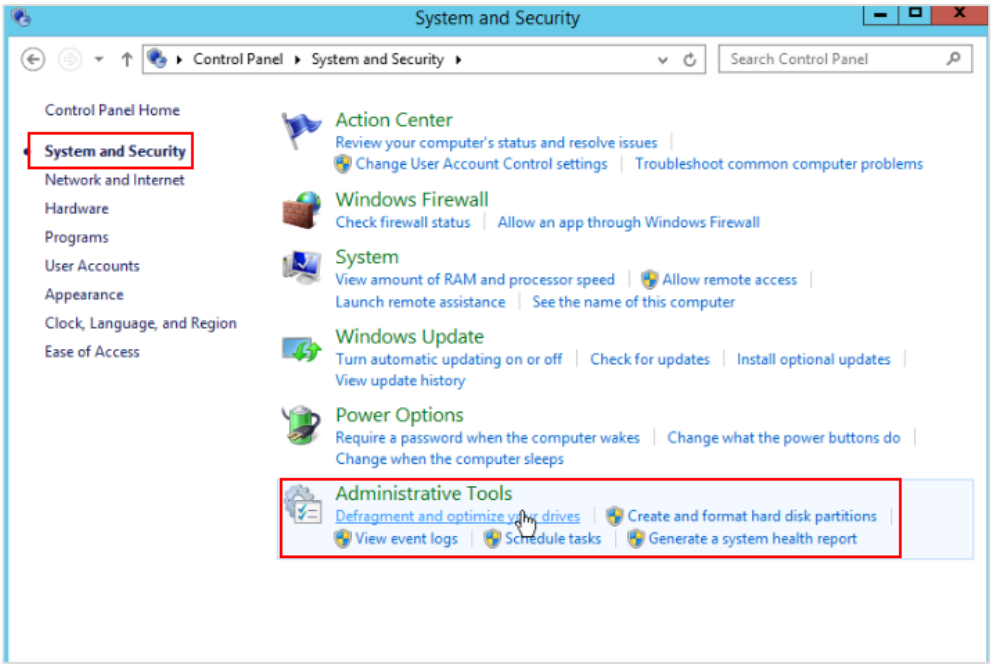
----End

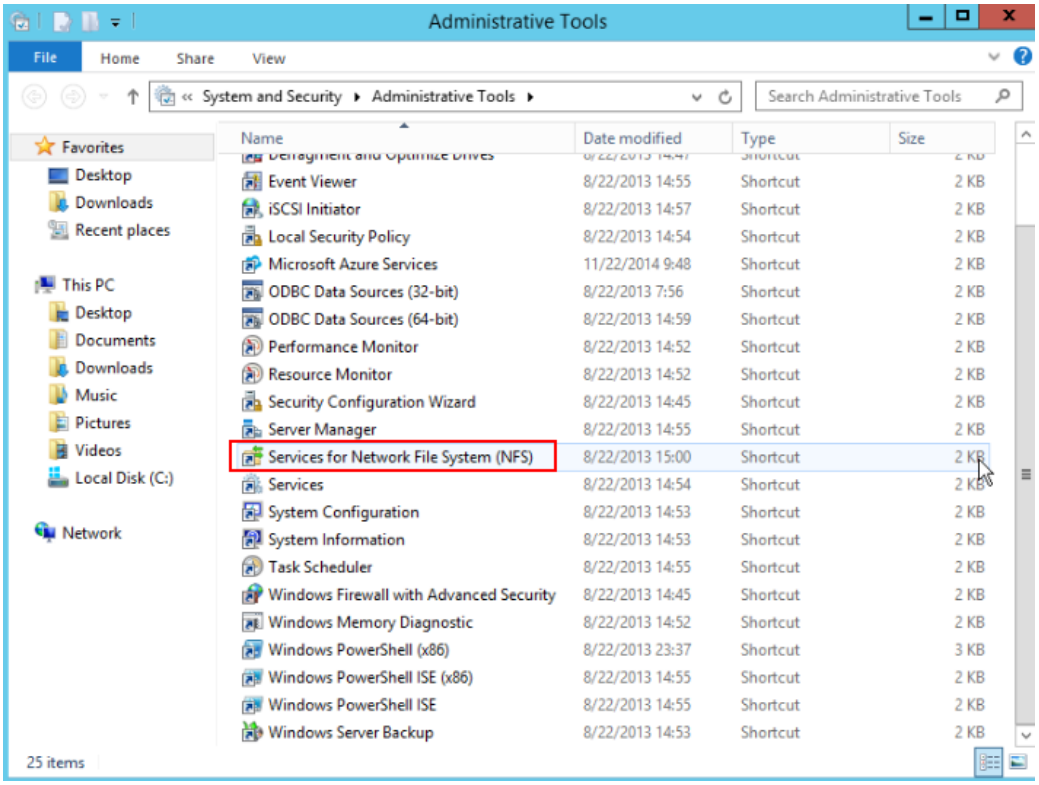
2.3.5.3 Mounting the File System

Step 1 Click **Control Panel** and select view by **Category**.

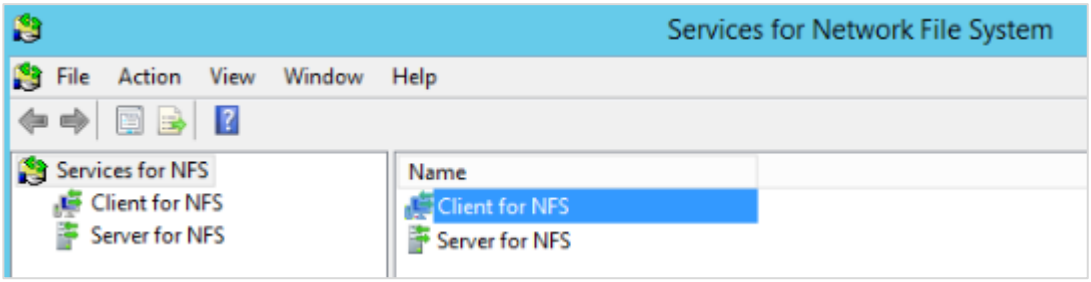


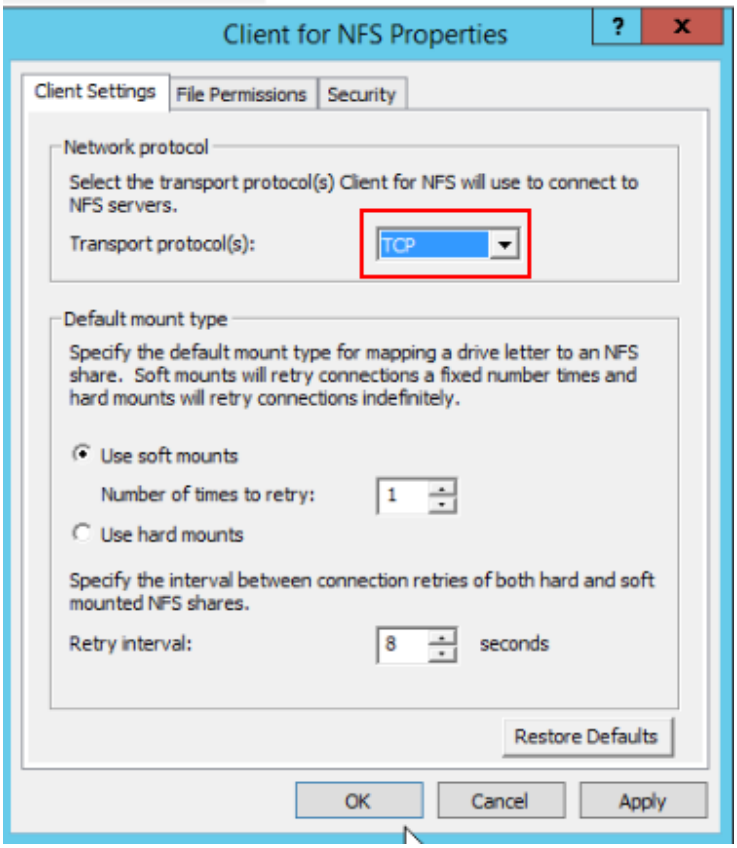
Step 2 Choose **System and Security** > **Administrative Tools**.





Step 3 Double-click **Services for Network File System (NFS)**. On the displayed window, right-click **Client for NFS**, select **Properties** from the shortcut menu, change the transport protocol to **TCP**, and select **Use hard mounts**.





Step 4 Run the following command in the Command Prompt of the Windows Server 2012 (**X** is the drive letter of the free disk).

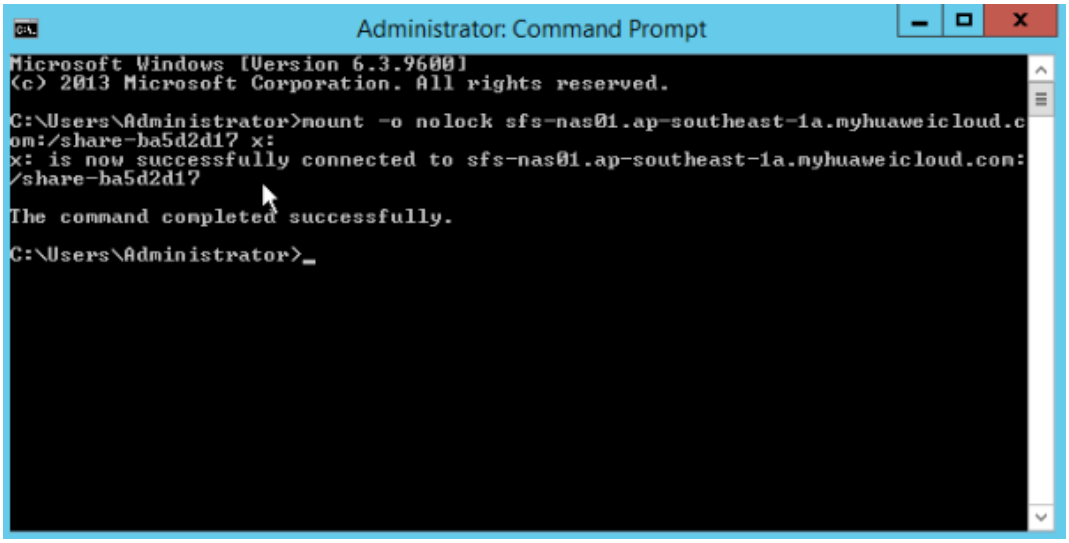
Run the following command in the SFS file system:

mount -o nolock *[mount point]* **X**

An example command is provided as follows:

mount -o nolock sfs-nas01.ap-southeast-1a.myhuaweicloud.com:/share-ba5d2d17 X

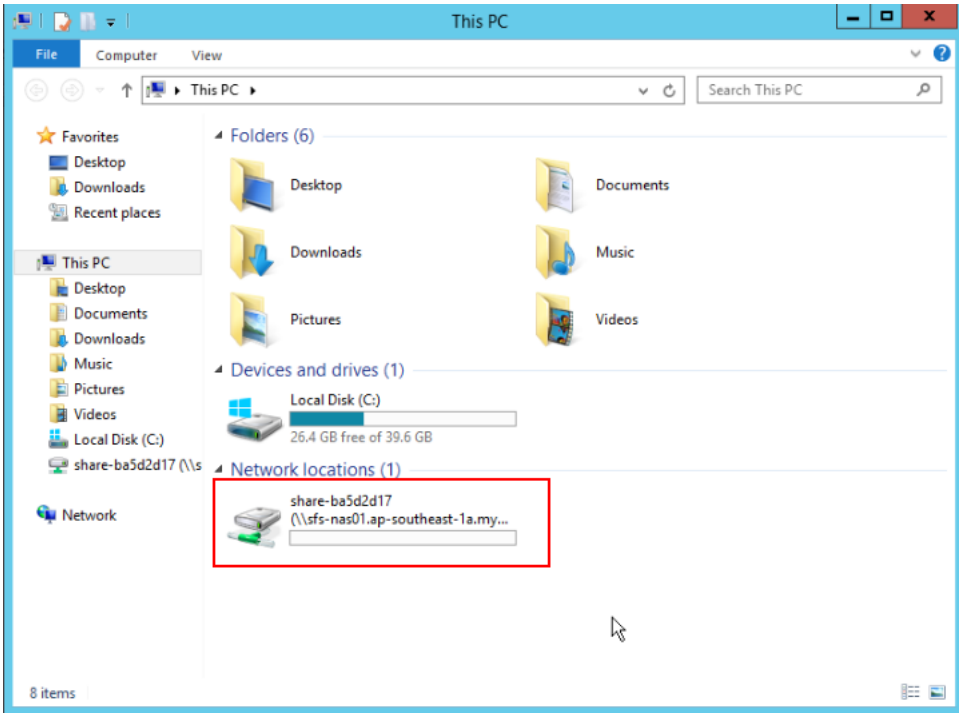
Obtain the mount point on the SFS file system details page.



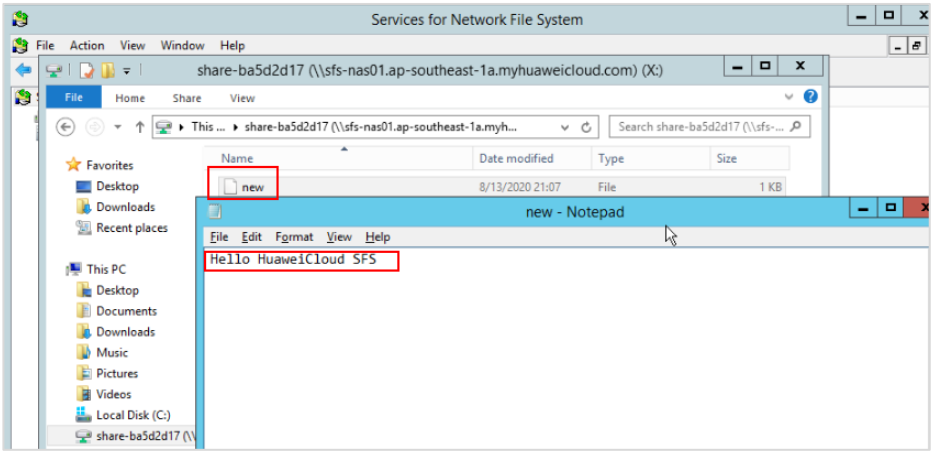
----End

2.3.5.4 Verification

Step 1 On the Windows ECS, click **This PC** to view the mounted file system.



Step 2 Access the file system and view the **new** file which was created on the Linux ECS, indicating that the file has been shared with the Windows system.



----End

2.3.6 Deleting Resources

2.3.6.1 Unmounting the File System (Linux)

Step 1 Log in to Linux ECS and run the following command to confirm that the directory was successfully unmounted:

umount /localfolder

```
[root@ecs-linux ~]# umount /localfolder
```

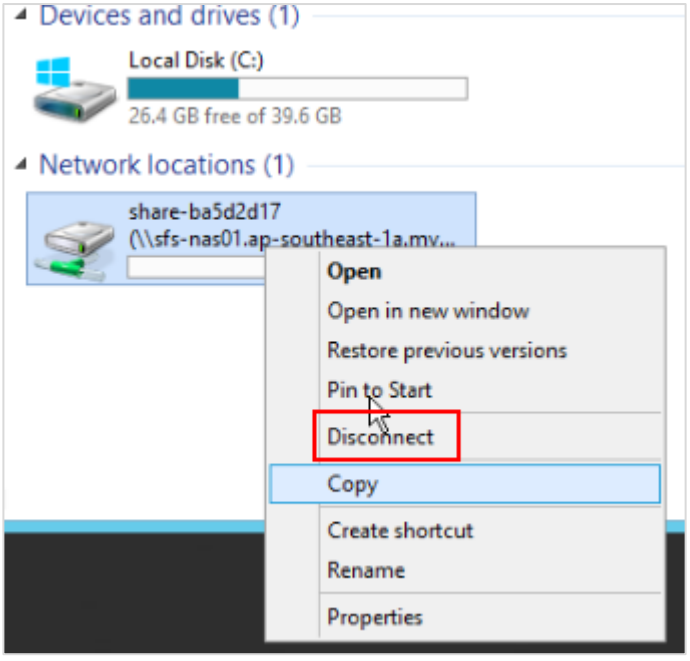
Step 2 Run the following command to check whether the uninstallation is successful:

mount-l

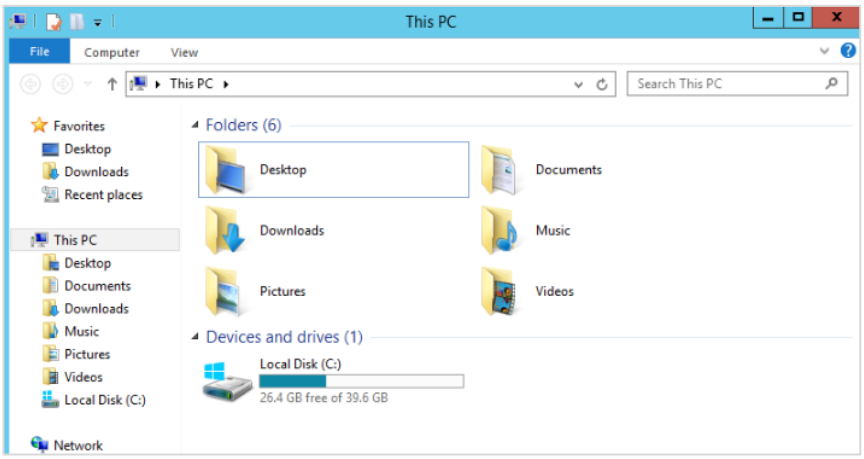
----End

2.3.6.2 Unmounting the File System (Windows)

Step 1 Log in to ecs-windows. On the **This PC** page, right-click the file system to be unmounted and choose **Disconnect** from the shortcut menu.



Step 2 If the mounted file system is not shown as a network location anymore, the file system was successfully unmounted.

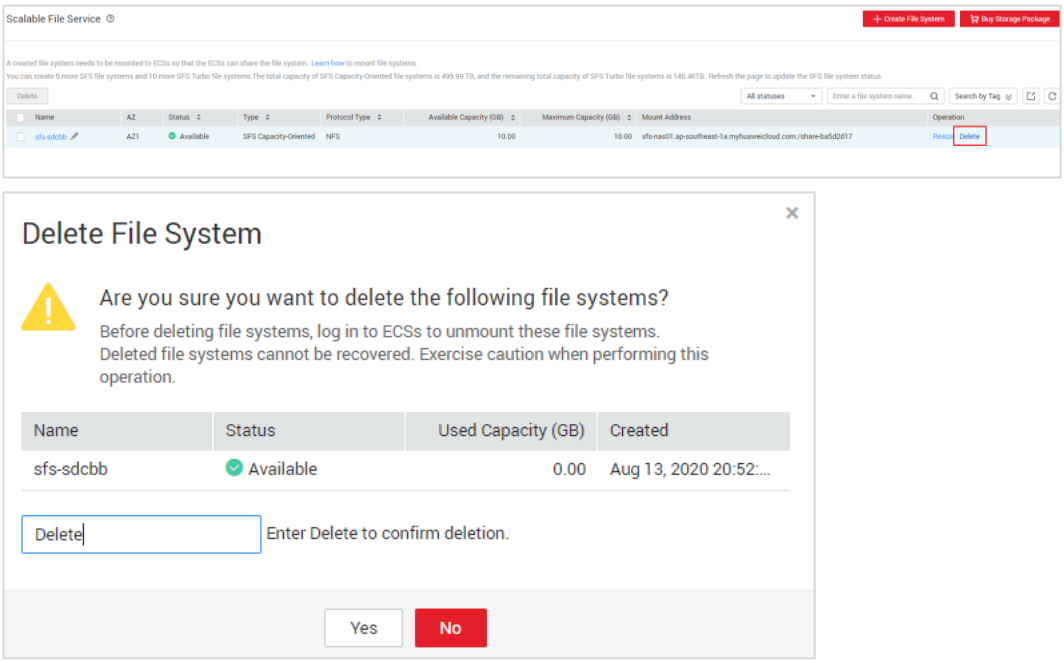


----End

2.3.6.3 Deleting the File System

Step 1 Log in to the SFS console.

Step 2 In the list of file systems, click **Delete** at the end of the row where the desired file system resides.



The status of the file system changes to **Deleting**. Refresh the page after a few moments. Once the file system has been deleted, it will no longer be displayed in the list.

Step 3 Delete the Windows ECS and the VPCs you created and verify that the resources have been deleted. You can leave the Linux ECS for now as it will be used for subsequent exercises.

----End

2.4 CBR

2.4.1 Introduction

CBR enables you to back up ECSs, Hyper Elastic Cloud Servers (HECSs), BMSs, EVS disks, SFS Turbo file systems, and on-premises VMware virtual environments with ease. If there is a virus intrusion, accidental deletion, or software or hardware fault, you can restore data to any point in the past when the data was backed up.

CBR protects your services by ensuring the security and consistency of your data.

2.4.2 Objectives

Upon completion of this section, you will be able to:

- Purchase a vault.
- Create a cloud server backup.
- Use a cloud server backup to restore data.

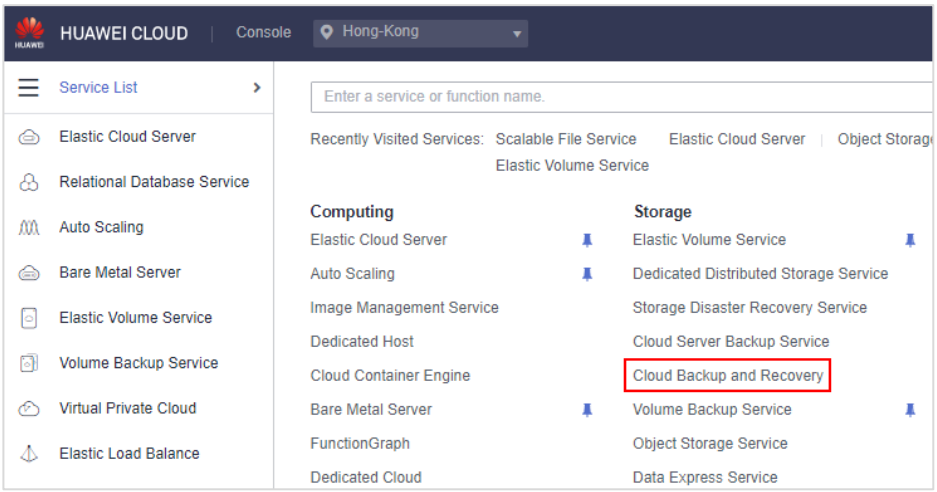
2.4.3 Tasks

Purchase a CBR vault on HUAWEI CLOUD and back up a cloud server to prevent data loss caused by disk faults or misoperations. Then use the created backup to restore data.

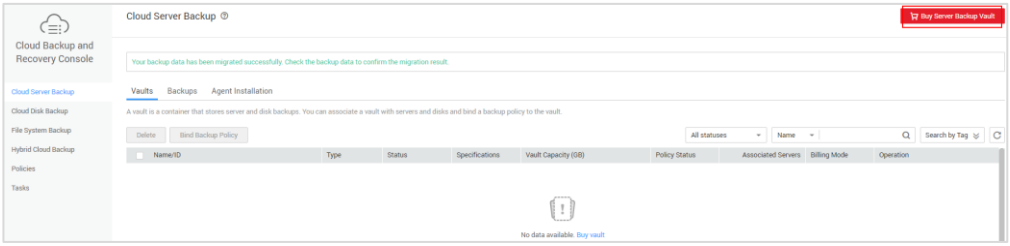
For this exercise, you must have a Linux server available.

2.4.4 Purchasing a Server Backup Vault

Step 1 Go to the CBR home page.

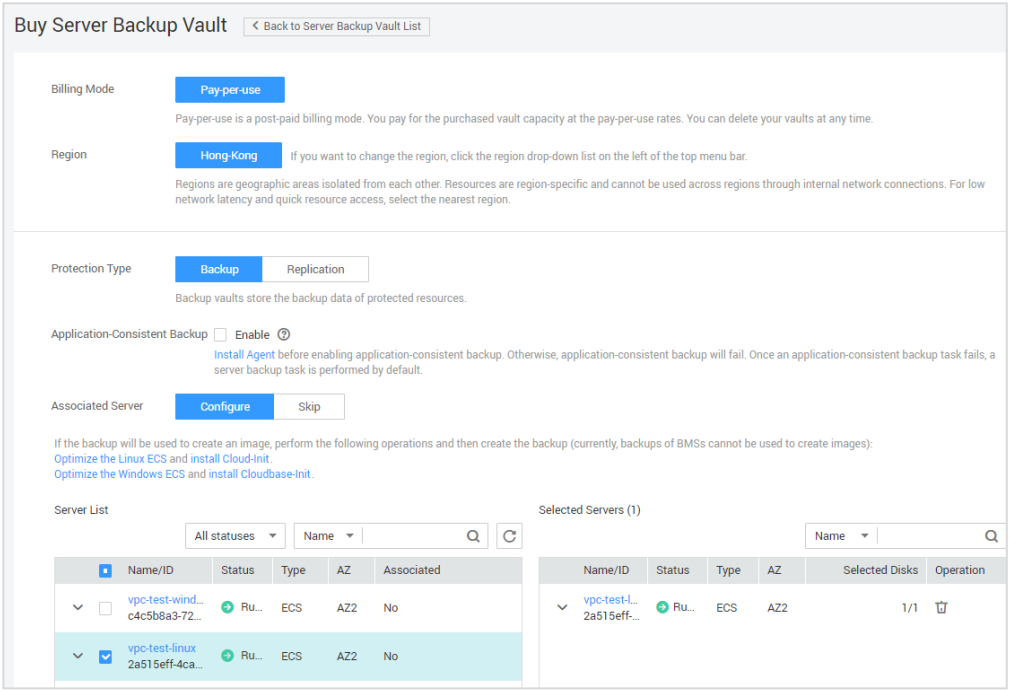


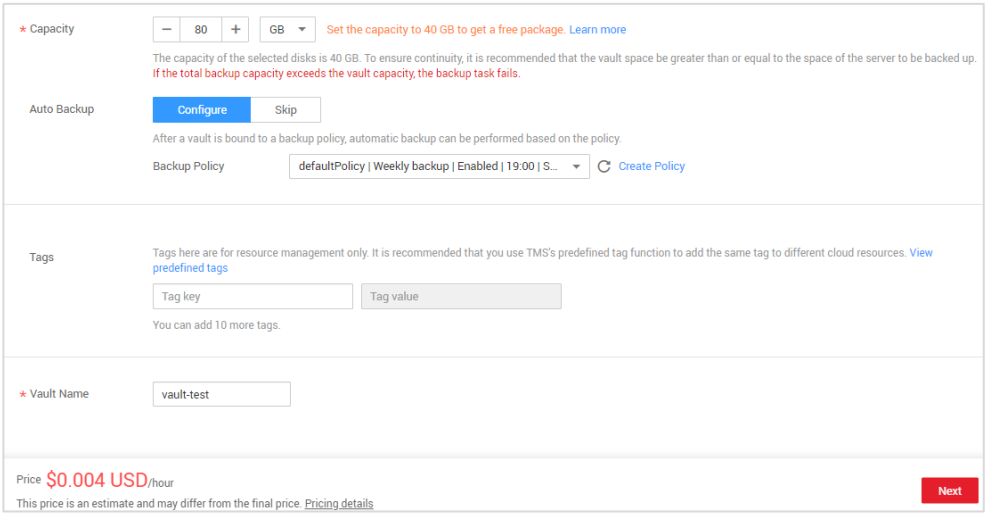
Step 2 Click **Buy Server Backup Vault**.



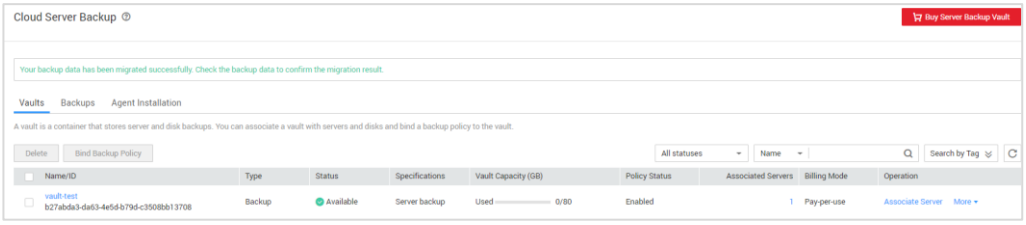
Step 3 Select the server to be backed up, configure other parameters based on your needs, confirm the settings, and submit the request.

- **Billing Mode**: **Pay-per-use**
- **Region**: **Hong-Kong**
- **Protection Type**: **Backup**
- **Associated Server**: In this example, select the Linux ECS purchased in section 2.3.
- **Capacity**: **80 GB** (Adjust the value based on site requirements.)
- **Auto Backup**: Select **Configure** and create a backup policy.
- **Vault Name**: **vault-test**





Step 4 Return to the **Cloud Server Backup** page. You can see the vault you created in the vault list.



----End

2.4.5 Restoring Data Using a Cloud Server Backup

If a disk on a server fails or server data is lost due to misoperations, you can use a backup to restore the server to its former state.

Prerequisites

- Disks on the server to be restored are running properly.
- The server to be restored has at least one backup.
- The backup status is **Available**.

Procedure

Step 1 Log in to Linux server and use **vim** to create a file.

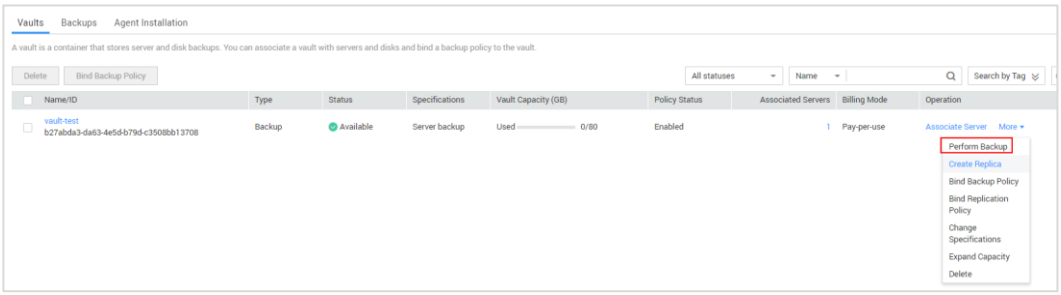
vim /root/test

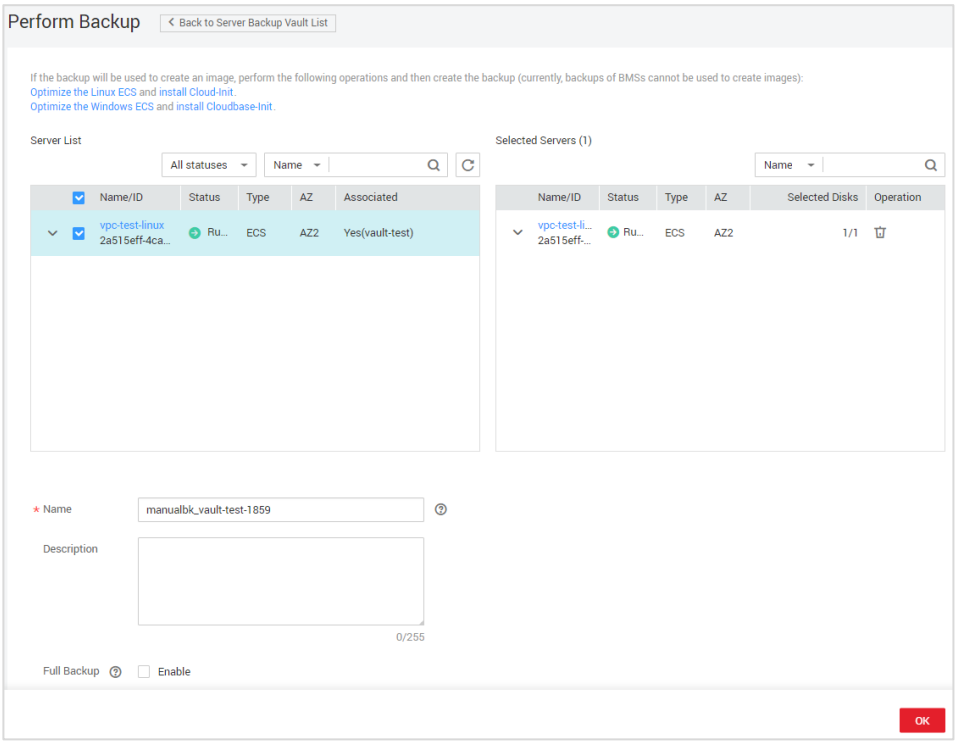
```
[root@ecs-linux ~]# vim /root/test
```

Step 2 Input **i** and enter **hello world!**, press **Esc**, input **:wq** to save the file and exit.

Step 3 On the **Cloud Server Backup** page, click **Vaults** and locate the vault that the server is associated to.

Step 4 Choose **More** > **Perform Backup** in the **Operation** column. In the server list, select the server you want to back up. After the server is selected, it appears in the list of **Selected Servers**.





Step 5 Log back in to the server again and delete the file you created in Step 1.

rm –rf /root/test

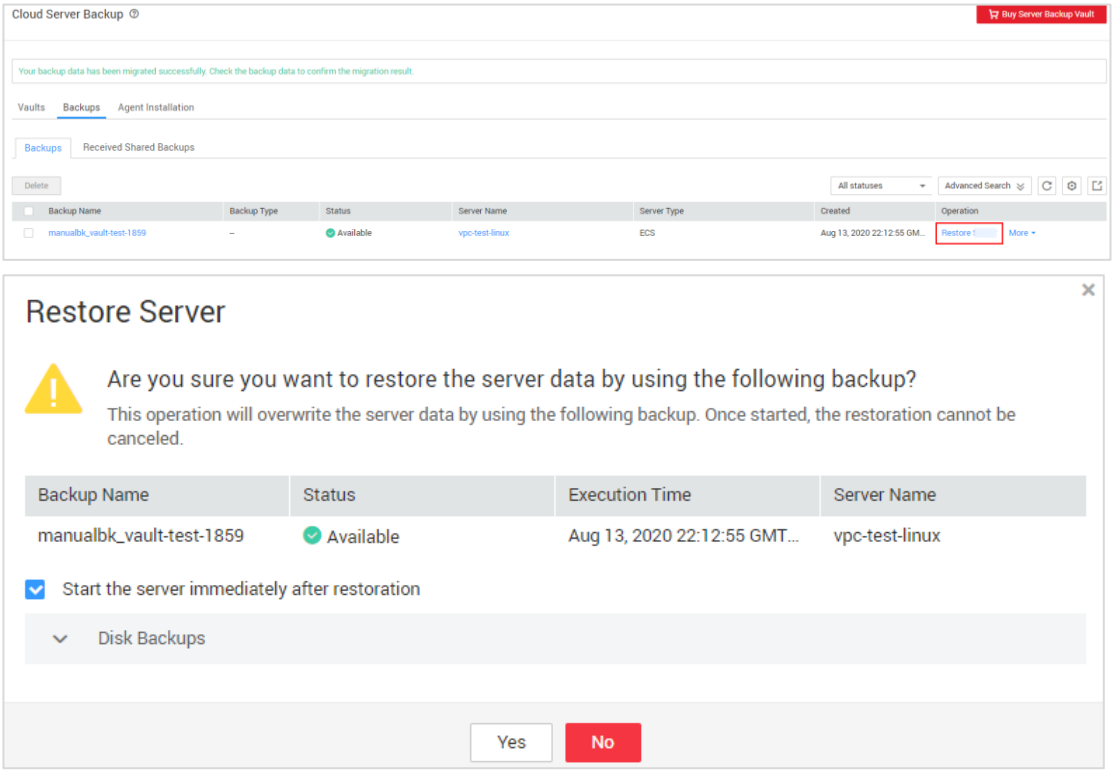
Step 6 Confirm that the file has been deleted.

cat /root/test

```
[root@ecs-linux ~]# cat /root/test
cat: /root/test: No such file or directory
```

If the preceding message is displayed, the file has been deleted.

Step 7 Log in to the CBR console. On the **Cloud Server Backup** tab page, click **Backups**, locate the backup of your server, and click **Restore Server** in the row where the backup resides. In the displayed **Restore Server** dialog box, click **Yes**.



Step 8 Log in to the server and confirm that the file has been restored.

cat /root/test

```
[root@ecs-linux ~]# cat /root/test
hello world!
```

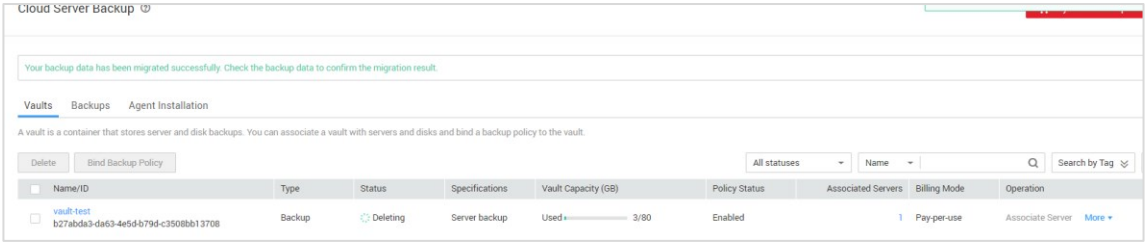
If the preceding message is displayed, the file has been restored.

----End

2.4.6 Deleting Resources

Step 1 Delete the ECS and VPCs.

Step 2 Delete the vault and backup.



Make sure that all the resources you created have been deleted.

----End

3 Network Services

3.1 Introduction

In this exercise, we will verify that two ECSs in a VPC can communicate with each other by default, security groups can be used to control communication between ECSs, ECSs can access the Internet after an EIP is bound to each, and that ELB can distribute traffic across backend servers. You will also create a VPC peering connection to enable ECSs in different VPCs in the same region to communicate with each other, and create a VPN connection to enable ECSs in different regions to communicate with each other.

3.1.1 Objectives

Upon completion of this exercise, you will be able to:

- Have a good command of VPC functions
- Understand how to use ELB to distribute traffic.
- Create a VPC peering connection to enable communication between ECSs in different VPCs of the same region.
- Create a VPN connection to enable ECSs in different regions to communicate with each other.

3.1.2 Tasks

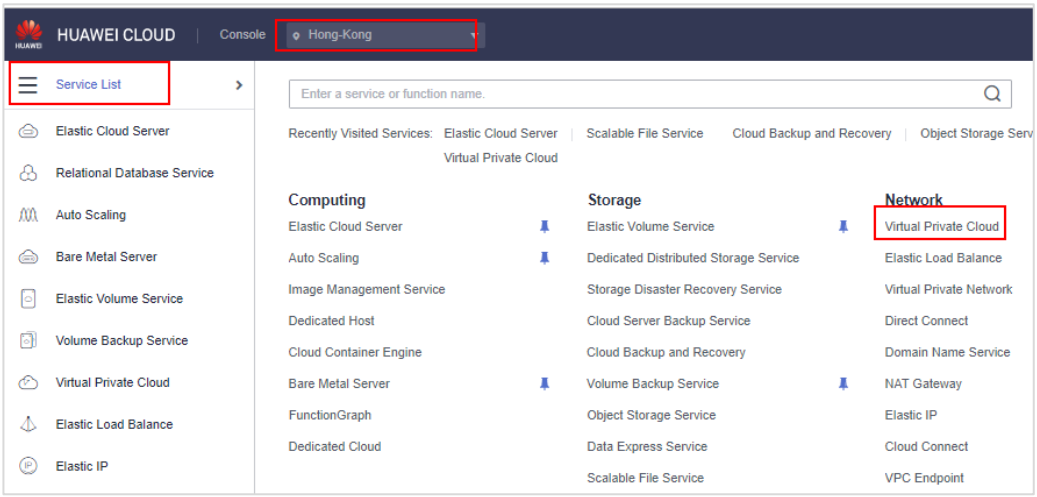
- Prepare resources.
- Verify that two ECSs in a VPC can communicate with each other by default.
- Verify that security groups can be used to control communication.
- Access the Internet through ECS after an EIP is bound to the ECS.
- Use ELB to distribute traffic.
- Create a VPC peering connection to enable communication between ECSs in different VPCs of the same region.
- Create a VPN connection to enable ECSs in different regions to communicate with each other.

3.2 Preparing Resources

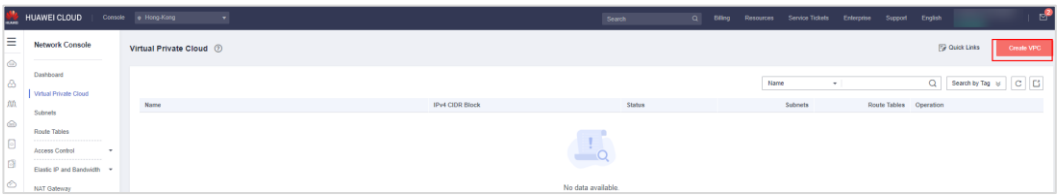
3.2.1 Creating VPCs

Create three VPCs, with two in AP-Hong Kong, and one in CN South-Guangzhou.

Step 1 Log in to the management console and select the AP-Hong Kong region. Click **Service List**. Under **Network**, select **Virtual Private Cloud**.

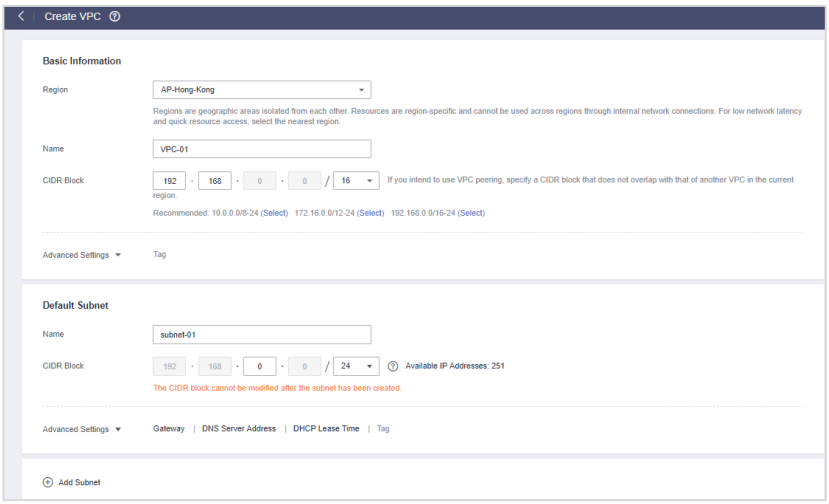


Step 2 Click **Create VPC**.

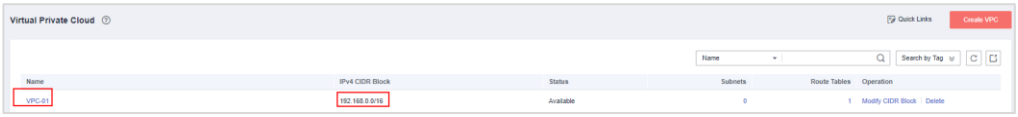


Set the following parameters, and click **Create Now**.

- **Region**: **AP-Hong Kong**
- **Name**: **VPC-01**
- **CIDR Block**: Use the default CIDR block, for example, 192.168.0.0/16.
- Default subnet name: **subnet-01**
- Other parameters: Retain their default settings.

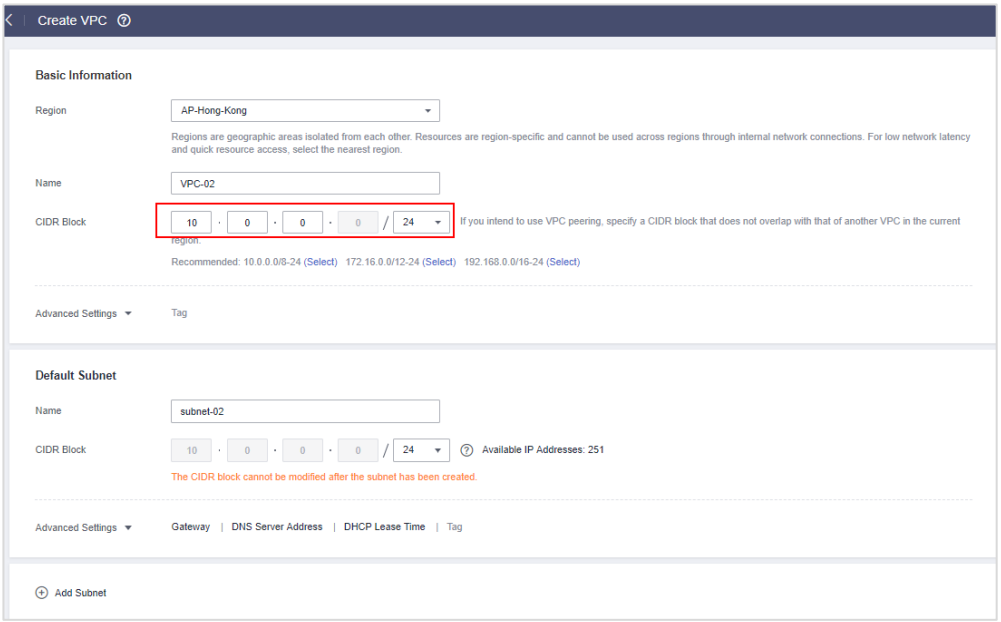


Step 3 View the created VPC in the VPC list.

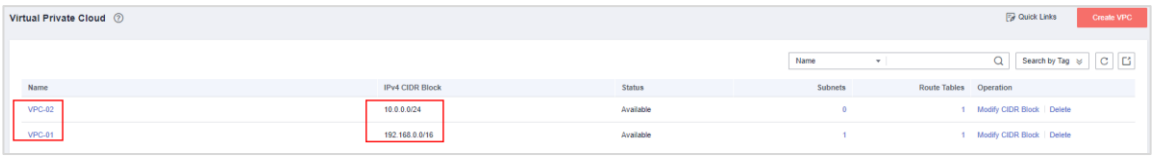


Step 4 Click **Create VPC** again and set the following parameters.

- **Region**: **AP-Hong Kong**
- **Name**: **VPC-02**
- CIDR Block: Set a CIDR block different from that of **VPC-01**, for example, 10.0.0.0/24.
- Default subnet name: **subnet-02**
- Other parameters: Retain their default settings.

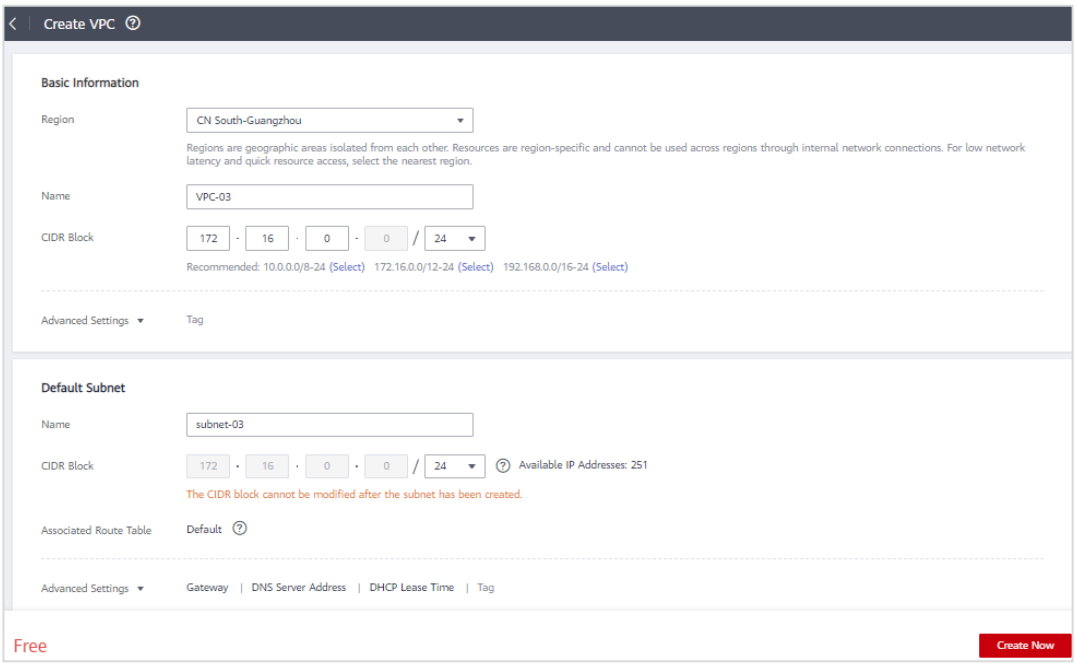


Step 5 View the created VPC in the VPC list.

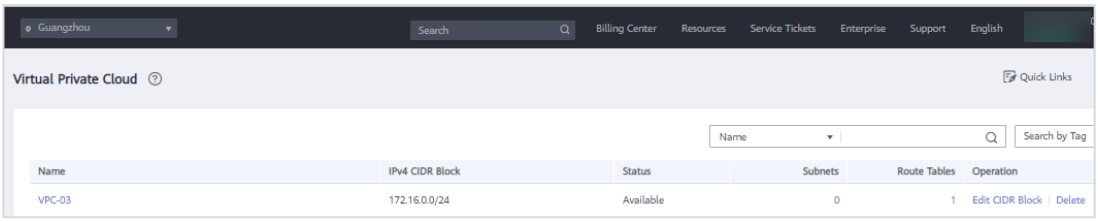


Step 6 Switch the region to CN South-Guangzhou and create a VPC by setting the following parameters:

- **Name**: **VPC-03**
- **CIDR Block**: Set a CIDR block different from those of **VPC-01** and **VPC-02**, for example, 172.16.0.0/24.
- Default subnet name: **subnet-03**
- Other parameters: Retain their default settings.



Step 7 View the created VPC in the VPC list.



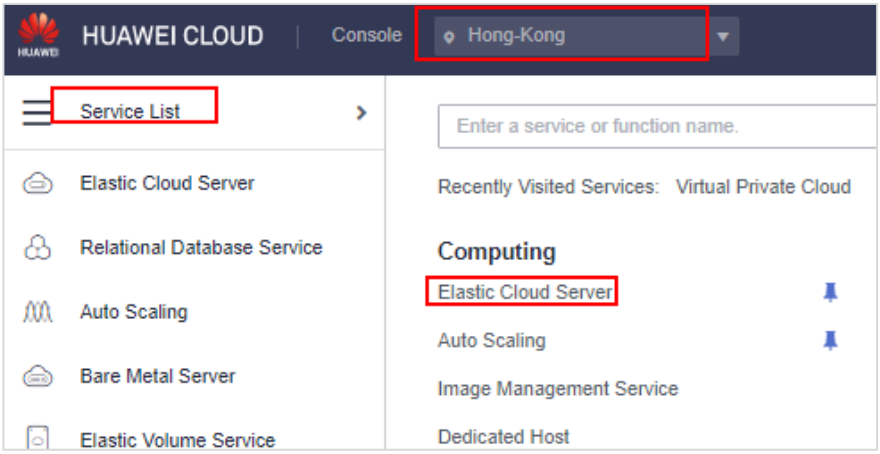
----End

3.2.2 Buying ECSs

Buy four Linux ECSs, two ECSs in **VPC-01**, one ECS in **VPC-02**, and one ECS in **VPC-03**.

Do not buy EIPs when you purchase ECSs.

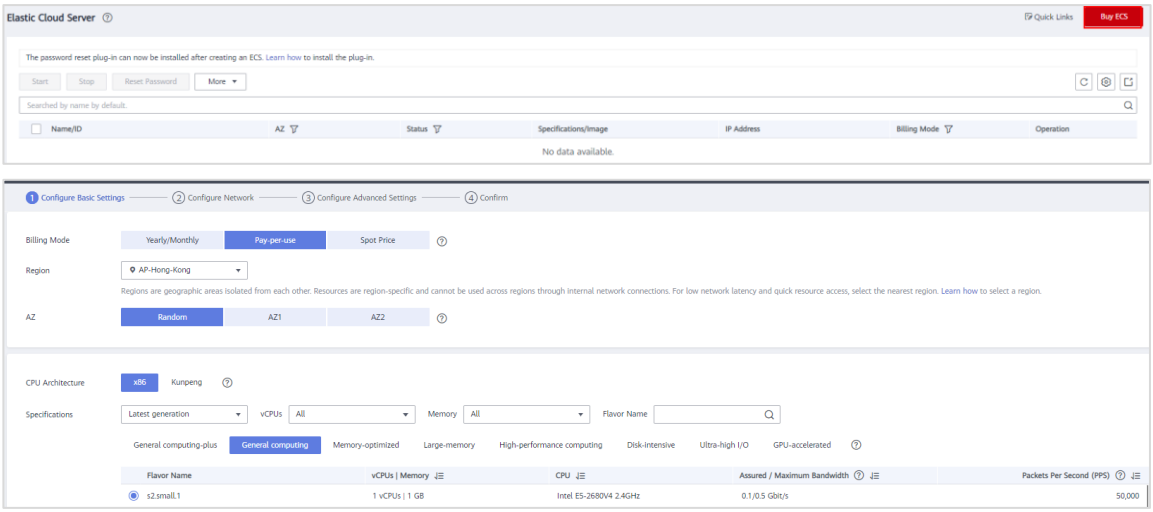
Step 1 Select the AP-Hong Kong region, click **Service List**. Under **Computing**, select **Elastic Cloud Server**.

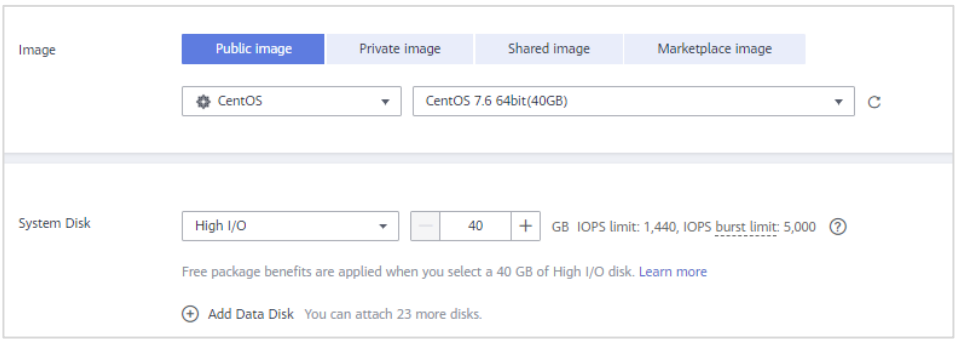


Step 2 Click **Buy ECS** and set the following parameters.

Basic settings:

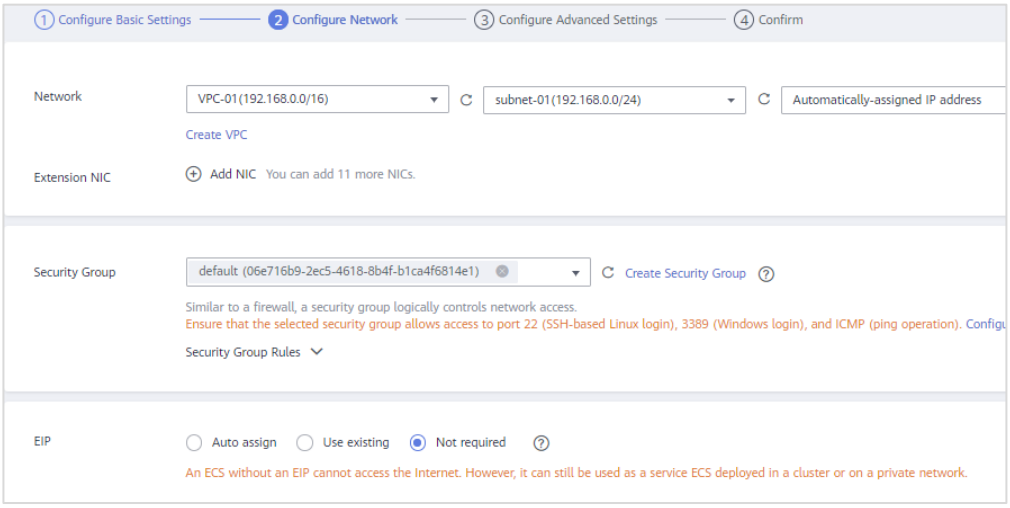
- **Billing Mode**: **Pay-per-use**
- **Region**: **AP-Hong Kong**
- **AZ**: any AZ
- **CPU Architecture**: **x86**
- Specifications: **General computing**, **s6.small.1**, 1 vCPU | 1 GB
- **Image**: public image, CentOS 7.6 64bit (40GB)
- **System Disk**: high I/O, 40 GB





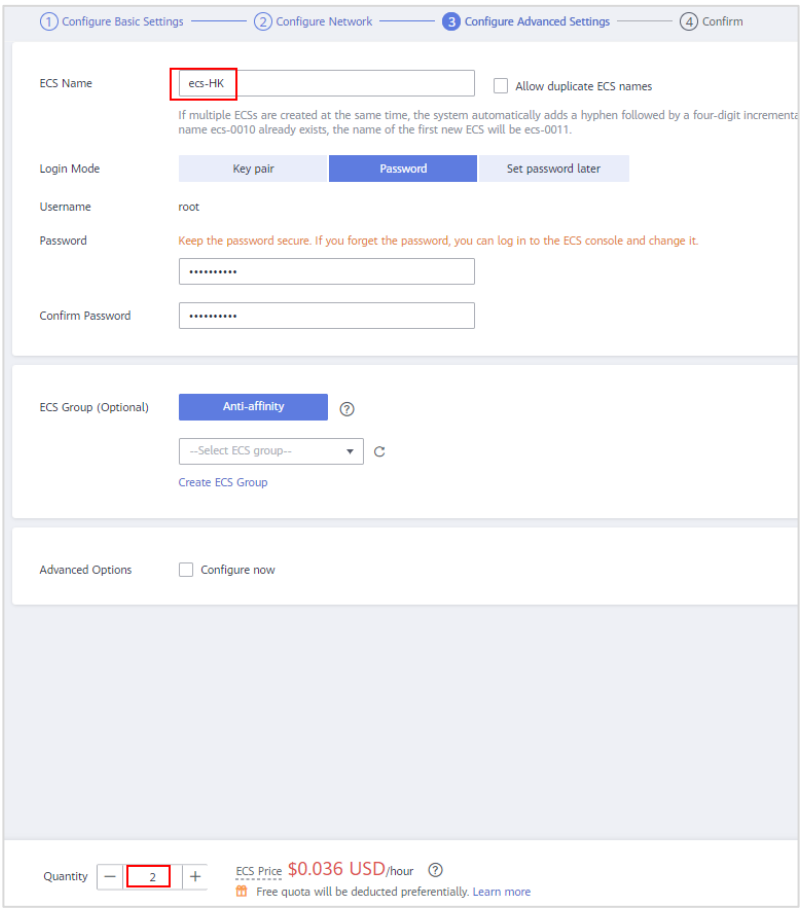
Network configuration:

- **Network**: **VPC-01**
- **Security Group**: **sys-default**
- **EIP**: **Not required**

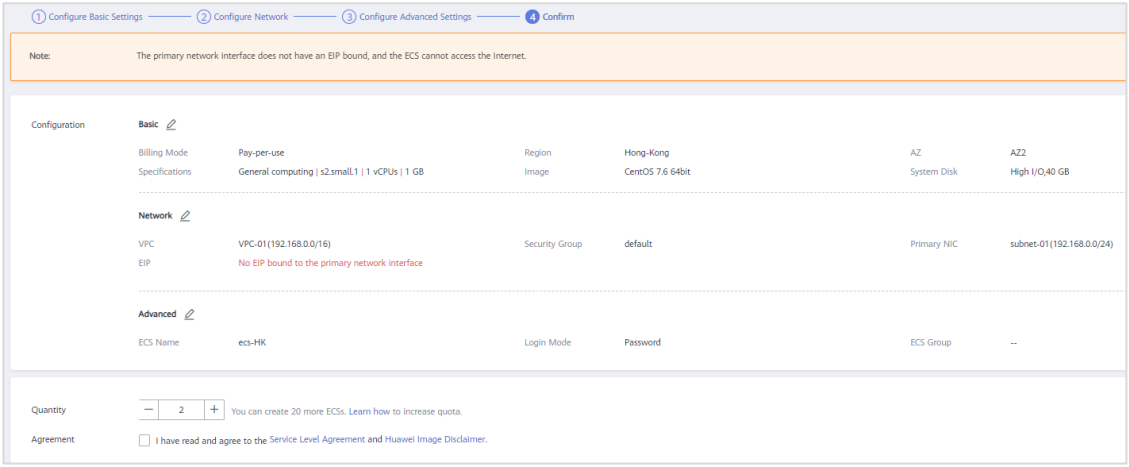


Advanced settings:

- **ECS Name**: for example, **ecs-HK**
- **Login Mode**: **Password**, for example, **Huawei@123!**
- **Quantity**: **2**

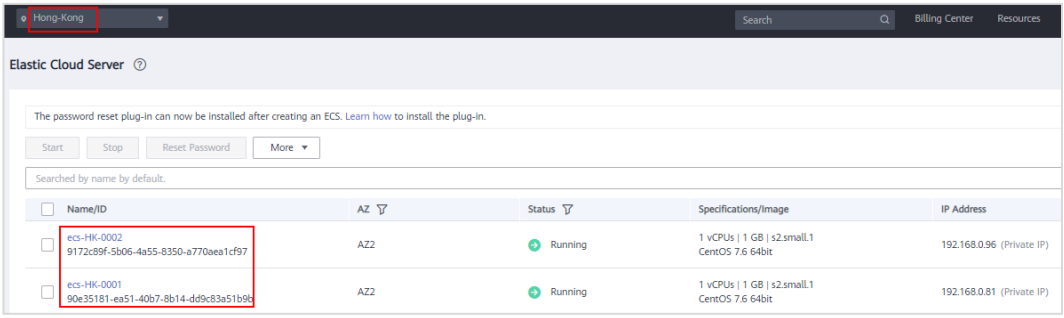


Step 3 Confirm the configuration and click **Buy Now**.

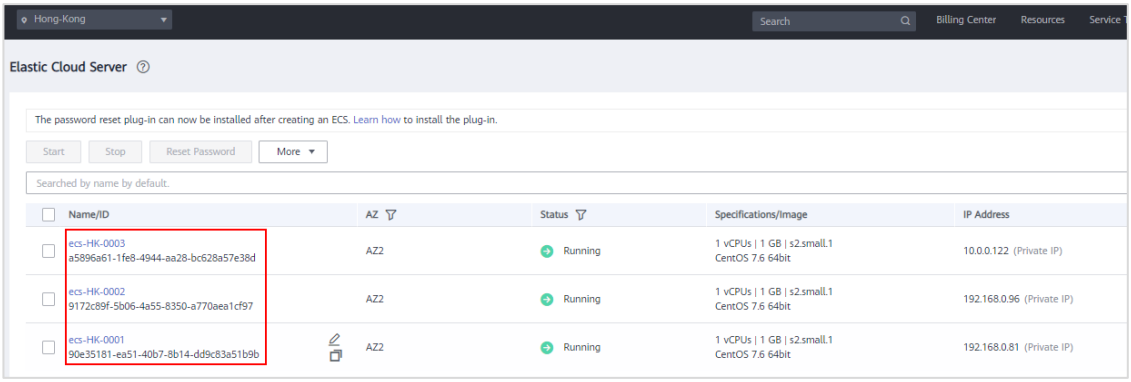


Step 4 View the purchased ECSs in the ECS list.

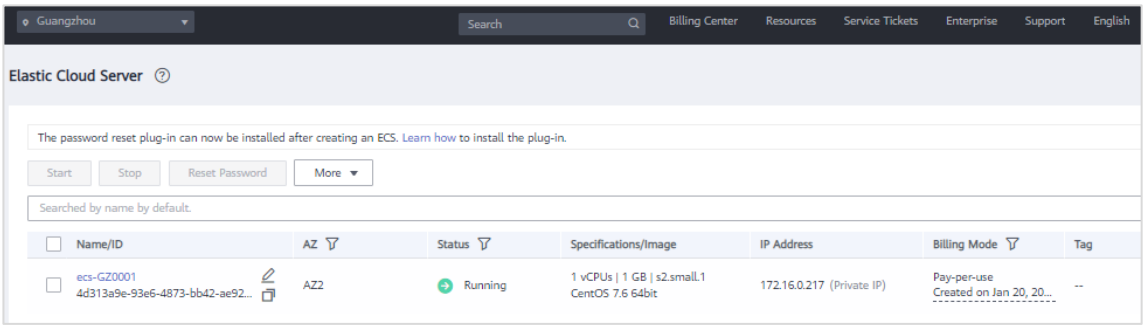
Two ECSs are automatically named by the system. One is **ecs-HK-0001**, and the other is **ecs-HK-0002**.



Step 5 Repeat Step 2 and Step 3 to buy an ECS named **ecs-HK-0003** in VPC-02.



Step 6 Switch the region to CN South-Guangzhou and repeat Step 2 and Step 3 to buy an ECS in **VPC-03**.



----End

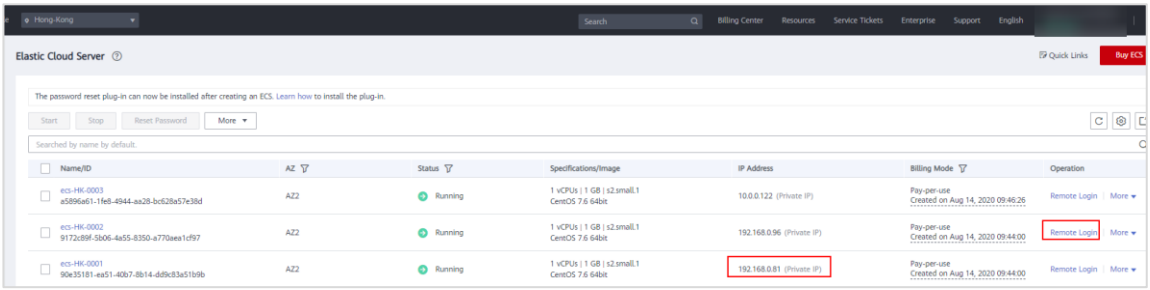
3.3 Verifying Network Service Functions

- Verify that two ECSs in a VPC can communicate with each other by default.
- Verify that the security groups can control traffic from and to the ECSs in the VPCs.
- Verify that the ECS that has an EIP bound can access the Internet.
- Verify that ELB can distribute traffic across ECSs.
- Create a VPC peering connection to enable communication between ECSs in different VPCs of the same region.

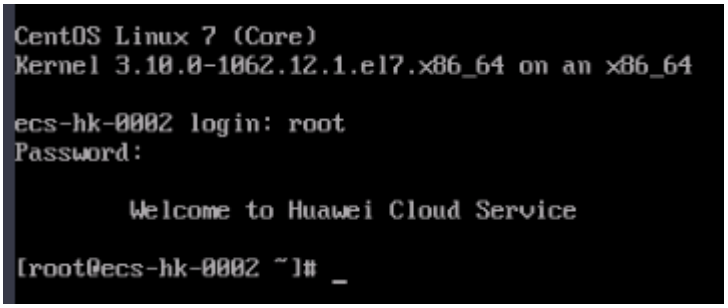
- Buy a VPN connection to enable communication between ECSs in different regions.

3.3.1 Communication Between Two ECSs in a VPC

Step 1 On the ECS console, Switch the region to AP-Hong Kong, record the private IP address of **ecs-HK-0001**, and log in to **ecs-HK-0002** remotely.

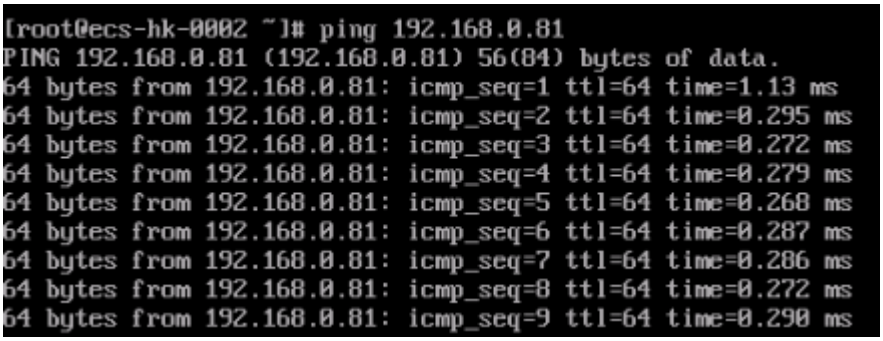


Step 2 Enter the username (**root** for Linux ECSs by default) and password.



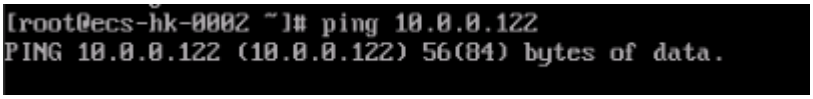
Step 3 Ping the private IP address of **ecs-HK-0001**.

If **ecs-HK-0001** can be pinged, the two ECSs can communicate with each other, as shown in the following page.



Step 4 Ping the private IP address of **ecs-HK-0003**.

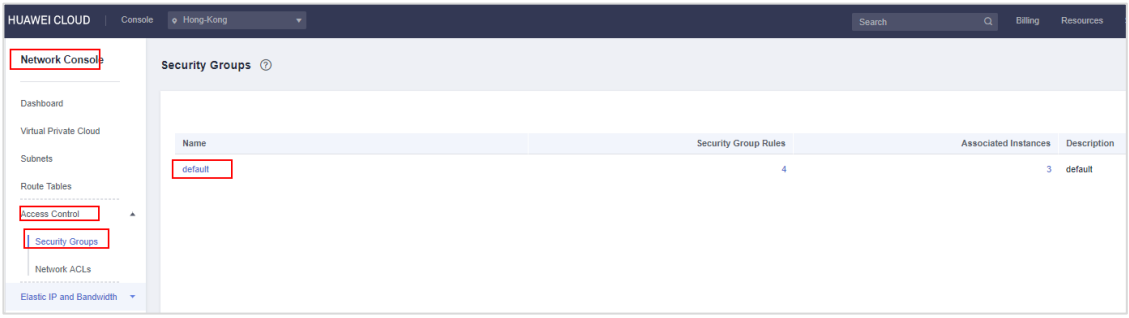
If the following page is displayed, **ecs-HK-0002** cannot communicate with **ecs-HK-0003** because the two ECSs are in different VPCs.



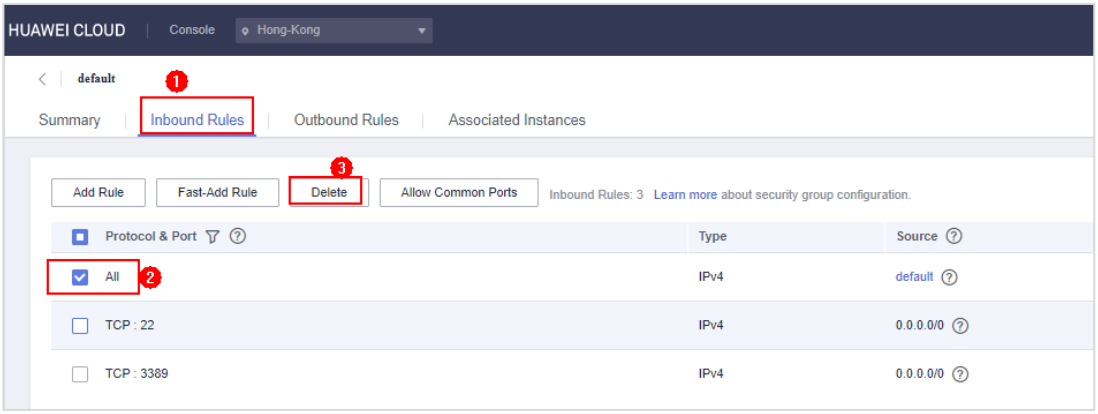
----End

3.3.2 Traffic Control by Security Groups

Step 1 Switch to the network console. In the left navigation pane, choose **Security Groups**.



Step 2 Click the security group name and then delete the **All** rule.

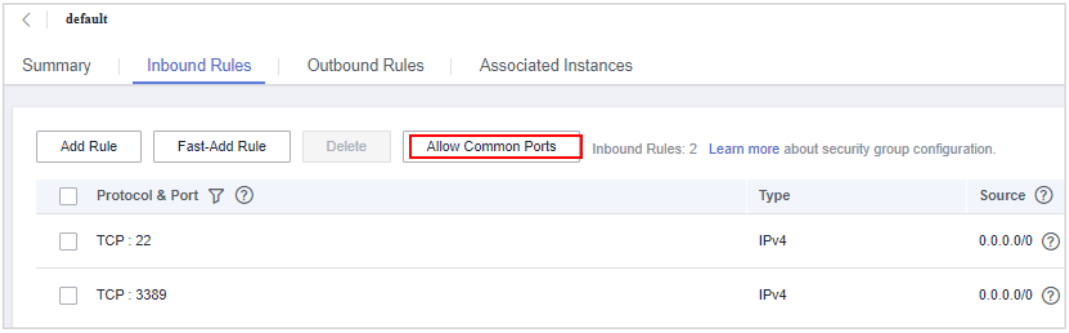


Step 3 Go back to the CLI of **ecs-HK-0002** and ping the private IP address of **ecs-HK-0001**.

You can see that the two ECSs cannot communicate with each other.

```
[root@ecs-hk-0002 ~]# ping 192.168.0.81
PING 192.168.0.81 (192.168.0.81) 56(84) bytes of data.
```

Step 4 Go back to the security group details page and add an inbound rule. Select **Allow Common Ports**.



Step 5 Go back to the CLI of **ecs-HK-0002** and ping the private IP address of **ecs-HK-0001**.

You can see that two ECSs can now communicate with each other, indicating that the added inbound security group rule has taken effect.

```
[root@ecs-hk-0002 ~]# ping 192.168.0.81
PING 192.168.0.81 (192.168.0.81) 56(84) bytes of data.
64 bytes from 192.168.0.81: icmp_seq=59 ttl=64 time=0.616 ms
64 bytes from 192.168.0.81: icmp_seq=60 ttl=64 time=0.285 ms
64 bytes from 192.168.0.81: icmp_seq=61 ttl=64 time=0.305 ms
64 bytes from 192.168.0.81: icmp_seq=62 ttl=64 time=0.329 ms
64 bytes from 192.168.0.81: icmp_seq=63 ttl=64 time=0.311 ms
64 bytes from 192.168.0.81: icmp_seq=64 ttl=64 time=0.383 ms
64 bytes from 192.168.0.81: icmp_seq=65 ttl=64 time=0.325 ms
64 bytes from 192.168.0.81: icmp_seq=66 ttl=64 time=0.325 ms
64 bytes from 192.168.0.81: icmp_seq=67 ttl=64 time=0.317 ms
```

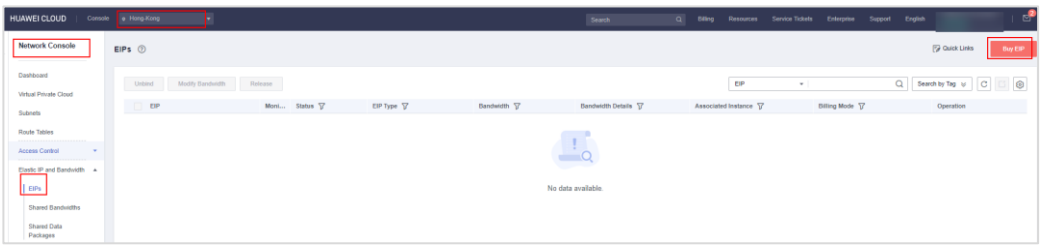
----End

3.3.3 Access to the Internet

Step 1 On the CLI of **ecs-HK-0002**, ping **baidu.com**. You can see that **ecs-HK-0002** fails to access the website.

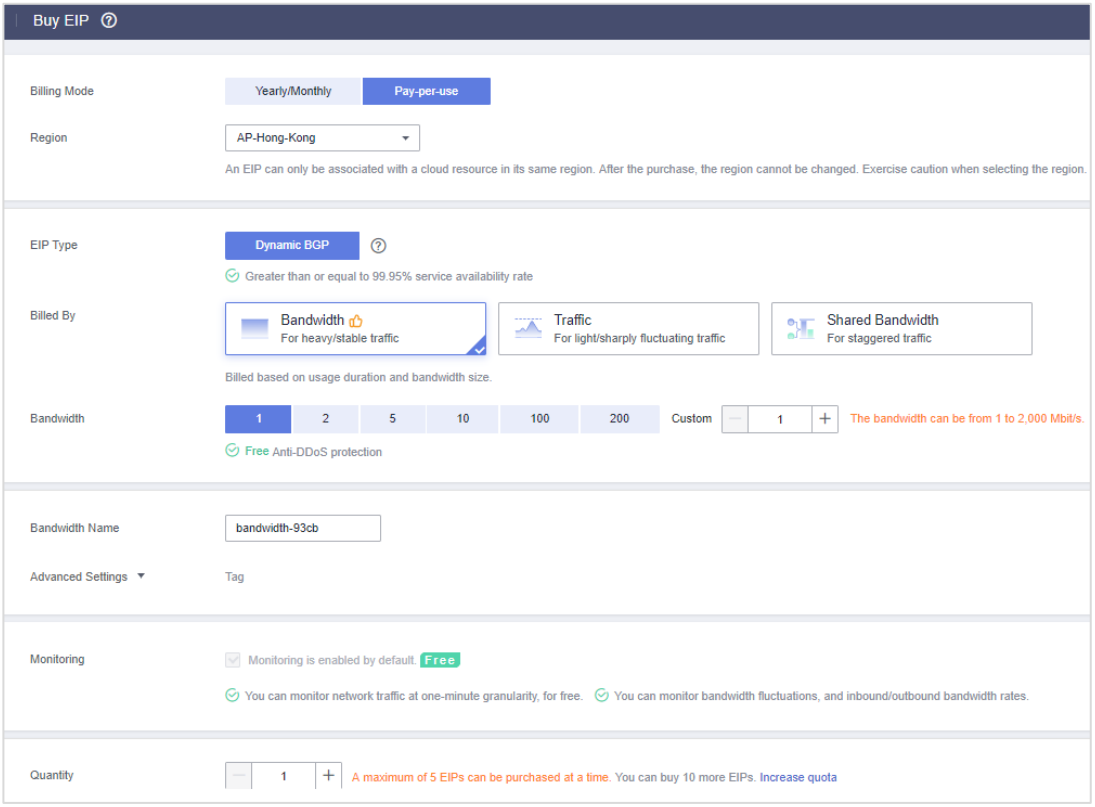
```
[root@ecs-hk-0002 ~]# ping baidu.com
PING baidu.com (220.181.38.148) 56(84) bytes of data.
```

Step 2 Switch back to the network console, choose **Elastic IP** > **Buy EIP**.

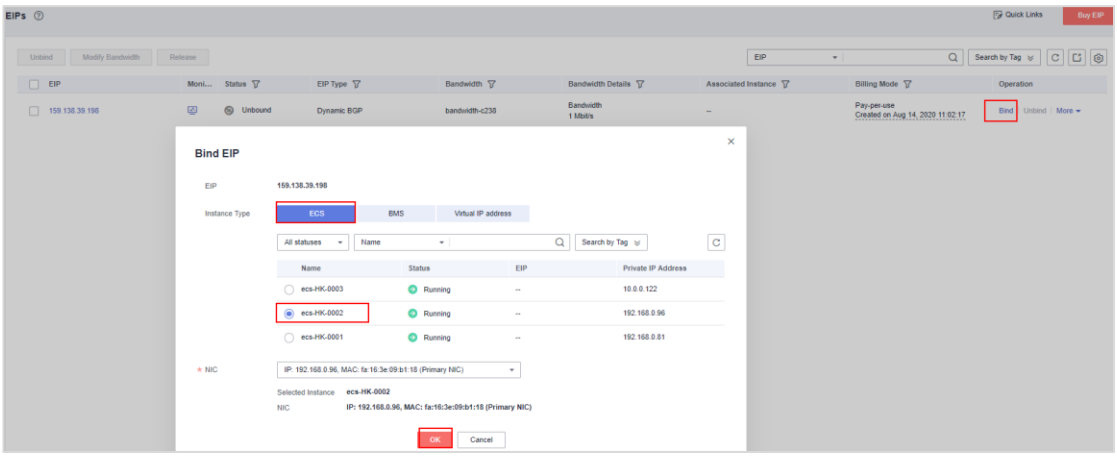


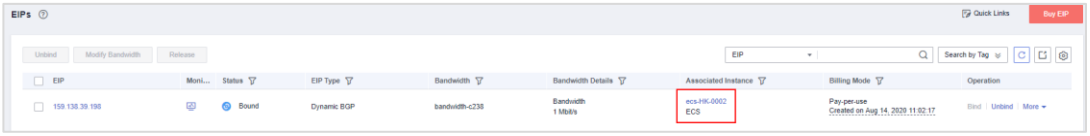
Step 3 Set the following parameters, click **Buy Now**, confirm the configuration, and click **Submit**.

- **Billing Mode**: **Pay-per-use**
- **Region**: AP-Hong Kong
- **EIP Type**: **Dynamic BGP**
- **Billed By**: **Bandwidth**
- **Bandwidth**: 1 Mbit/s
- Other parameters: Retain their default settings.



Step 4 On the **Elastic IP** page, locate the purchase EIP and click **Bind** in the **Operation** column. Select **ecs-HK-0002** and bind the EIP to it.





Step 5 Go back to the CLI of **ecs-HK-0002** and ping **baidu.com**. You can see that **ecs-HK-0002** can now access the website.

```
64 bytes from 39.156.69.79 (39.156.69.79): icmp_seq=1661 ttl=45 time=7.15 ms
64 bytes from 39.156.69.79 (39.156.69.79): icmp_seq=1662 ttl=45 time=7.13 ms
64 bytes from 39.156.69.79 (39.156.69.79): icmp_seq=1663 ttl=45 time=7.12 ms
64 bytes from 39.156.69.79 (39.156.69.79): icmp_seq=1664 ttl=45 time=7.09 ms
64 bytes from 39.156.69.79 (39.156.69.79): icmp_seq=1665 ttl=45 time=7.00 ms
64 bytes from 39.156.69.79 (39.156.69.79): icmp_seq=1666 ttl=45 time=7.03 ms
64 bytes from 39.156.69.79 (39.156.69.79): icmp_seq=1667 ttl=45 time=7.14 ms
64 bytes from 39.156.69.79 (39.156.69.79): icmp_seq=1668 ttl=45 time=7.05 ms
64 bytes from 39.156.69.79 (39.156.69.79): icmp_seq=1669 ttl=45 time=7.08 ms
64 bytes from 39.156.69.79 (39.156.69.79): icmp_seq=1670 ttl=45 time=7.11 ms
64 bytes from 39.156.69.79 (39.156.69.79): icmp_seq=1671 ttl=45 time=7.02 ms
64 bytes from 39.156.69.79 (39.156.69.79): icmp_seq=1672 ttl=45 time=7.03 ms
64 bytes from 39.156.69.79 (39.156.69.79): icmp_seq=1673 ttl=45 time=7.07 ms
64 bytes from 39.156.69.79 (39.156.69.79): icmp_seq=1674 ttl=45 time=7.03 ms
64 bytes from 39.156.69.79 (39.156.69.79): icmp_seq=1675 ttl=45 time=7.19 ms
```

----End

3.3.4 Traffic Distribution

Do as follows:

- Enable the HTTP service on **ecs-HK-0001** and **ecs-HK-0002**.
- Buy and configure a load balancer.
- Achieve load balancing when HTTP web pages of VMs are accessed through the load balancer.

Step 1 Remotely log in to **ecs-HK-0001** and **ecs-HK-0002**, and enable port 8889 used by the HTTP service.

- Run command **nohup python -m SimpleHTTPServer 8889 > /dev/null 2>&1 &** to enable the port.
- Run command **curl 127.0.0.1:8889** to verify that the port has been enabled.

```
[root@ecs-hk-0001 ~]# nohup python -m SimpleHTTPServer 8889 > /dev/null 2>&1 &
[1] 11654
[root@ecs-hk-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=".cshrc">.cshrc</a>
<li><a href=".history">.history</a>
<li><a href=".pki/">.pki/</a>
<li><a href=".ssh/">.ssh/</a>
<li><a href=".tcshrc">.tcshrc</a>
</ul>
<hr>
</body>
</html>
[root@ecs-hk-0001 ~]#
```

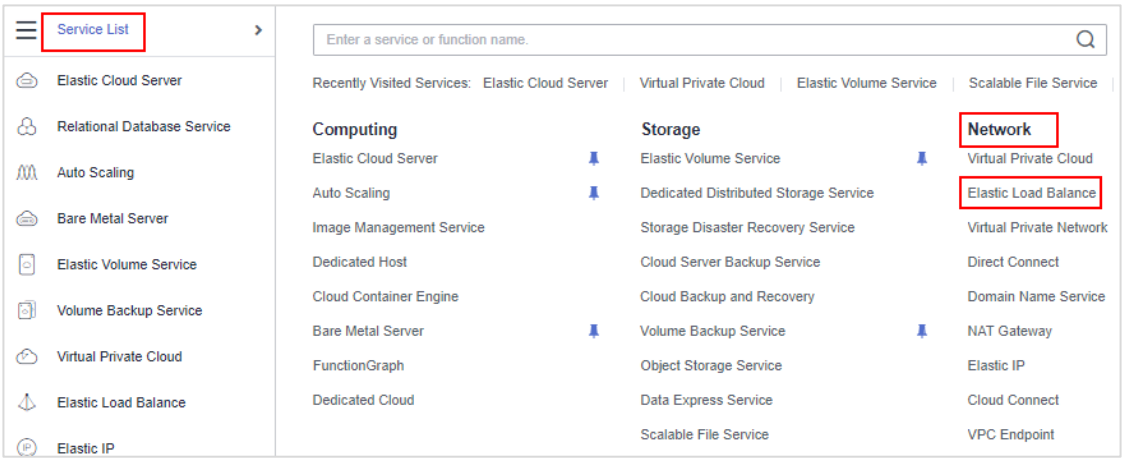
```
[root@ecs-hk-0002 ~]# curl 127.0.0.1:8889
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 3.2 Final//EN"><html>
<title>Directory listing for /</title>
<body>
<h2>Directory listing for /</h2>
<hr>
<ul>
<li><a href=".bash_history">.bash_history</a>
<li><a href=".bash_logout">.bash_logout</a>
<li><a href=".bash_profile">.bash_profile</a>
<li><a href=".bashrc">.bashrc</a>
<li><a href=".cshrc">.cshrc</a>
<li><a href=".history">.history</a>
<li><a href=".pki/">.pki/</a>
<li><a href=".ssh/">.ssh/</a>
<li><a href=".tcshrc">.tcshrc</a>
</ul>
<hr>
</body>
</html>
[root@ecs-hk-0002 ~]#
```

Step 2 Run the **touch** command on **ecs-HK-0001** and **ecs-HK-000**2 to create empty files named **SERVER1** and **SERVER2**, respectively. Run the **ll** command to check whether the files are created.

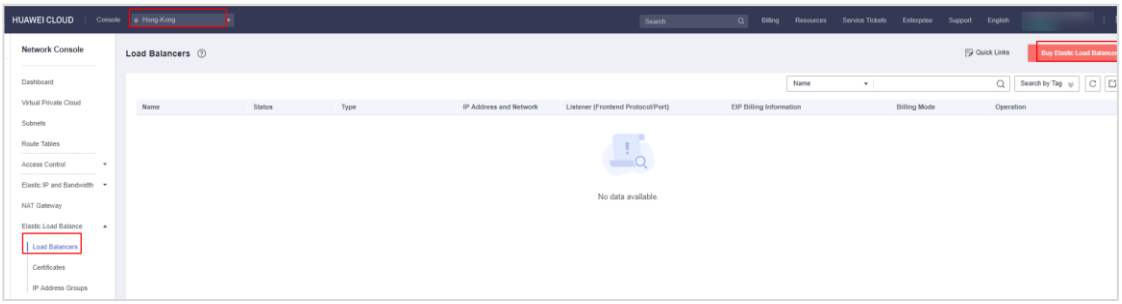
```
[root@ecs-hk-0001 ~]# touch SERVER1
[root@ecs-hk-0001 ~]# ll
total 0
-rw-r--r-- 1 root root 0 Aug 14 11:12 SERVER1
[root@ecs-hk-0001 ~]#
```

```
[root@ecs-hk-0002 ~]# touch SERVER2
[root@ecs-hk-0002 ~]# ll
total 0
-rw-r--r-- 1 root root 0 Aug 14 11:12 SERVER2
[root@ecs-hk-0002 ~]# _
```

Step 3 Go back to the console, and choose **Service List** > **Network** > **Elastic Load Balance**.

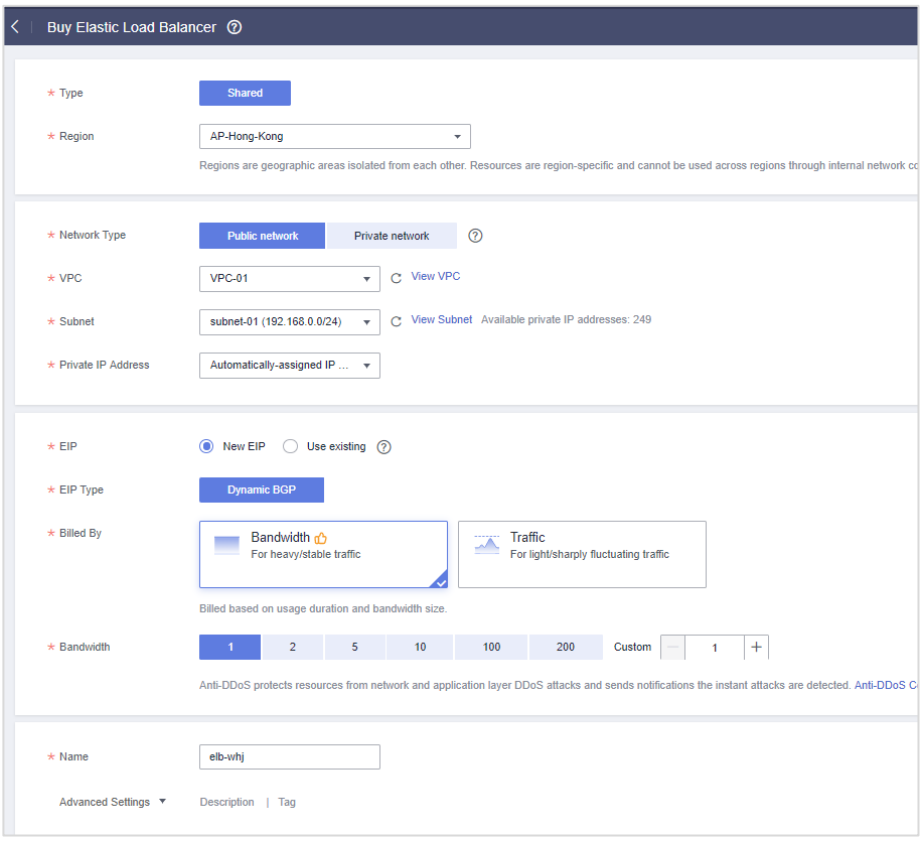


Step 4 Click **Buy Elastic Load Balancer**.

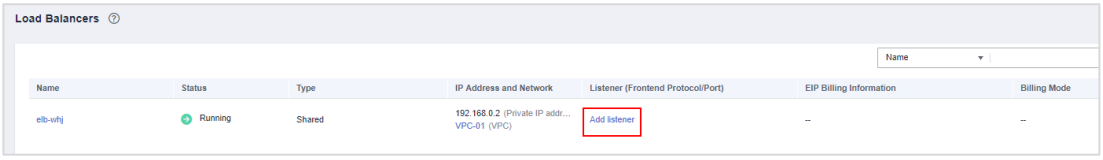


Step 5 Set the following parameters, confirm the configuration, and click Submit.

- **Type**: **Shared**
- **Region**: AP-Hong Kong
- **Network Type**: **Public network**
- **VPC**: **VPC-01**
- **EIP**: **New EIP**
- **EIP Type**: **Dynamic BGP**
- **Billed By**: **Bandwidth**
- **Bandwidth**: 1 Mbit/s
- **Name**: for example, **elb-name**

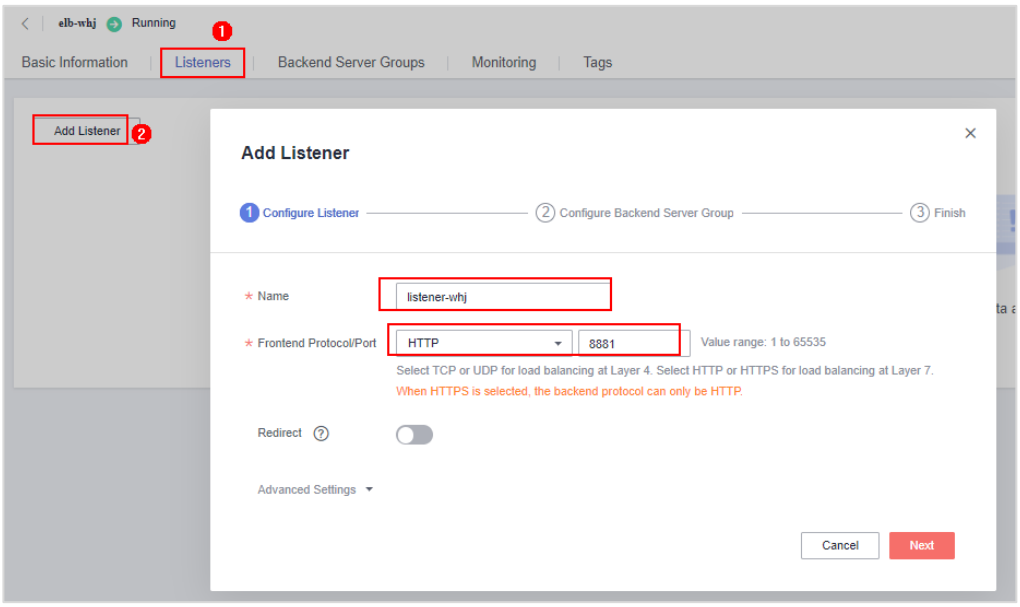


Step 6 In the load balancer list, locate the purchase load balancer, click **Add listener**, and configure the listener.



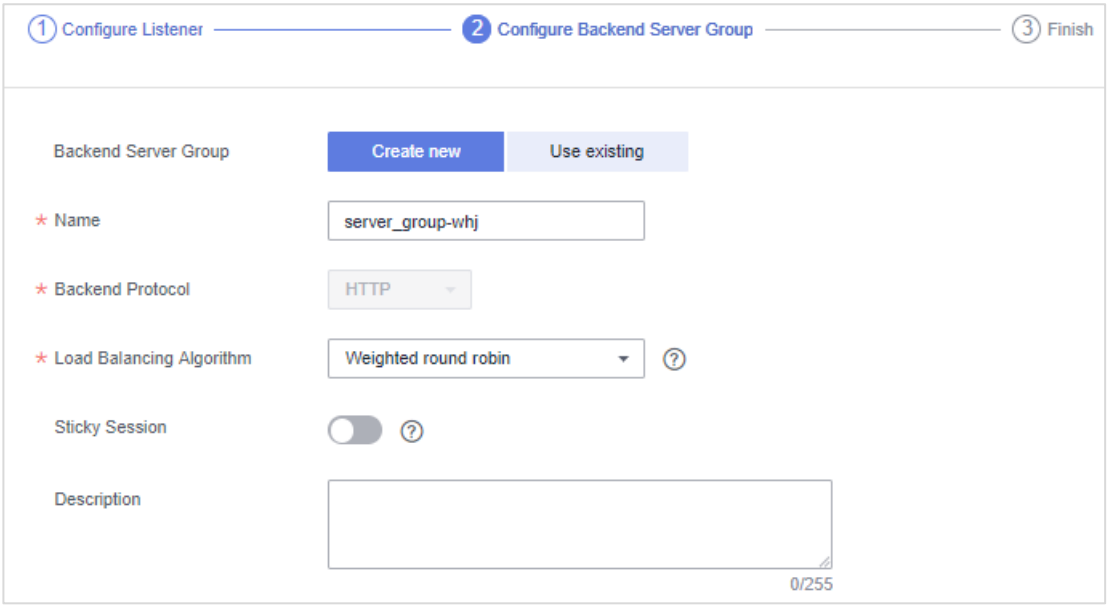
Set the following parameters to configure the listener:

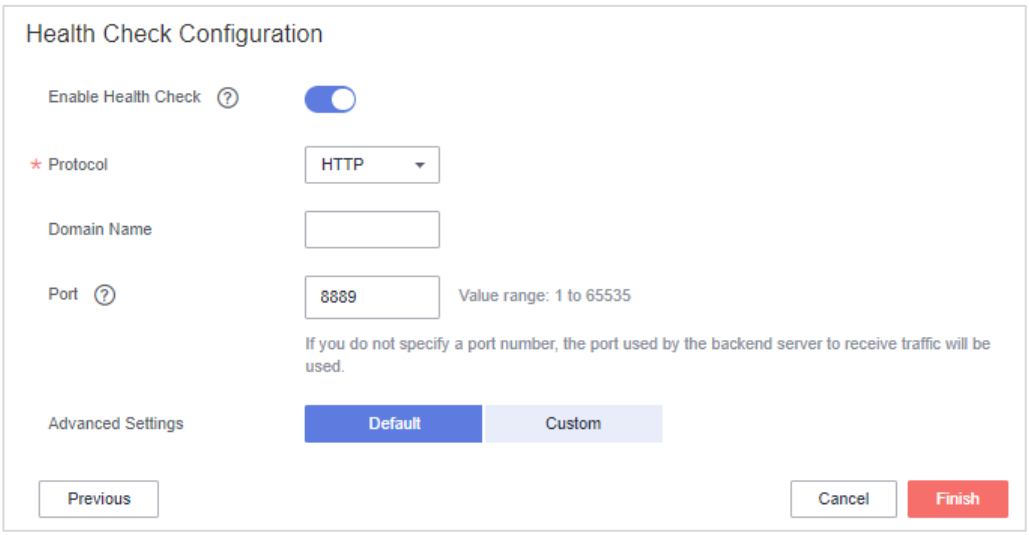
- **Name**: Enter a name.
- **Frontend Protocol/Port**: HTTP/8881



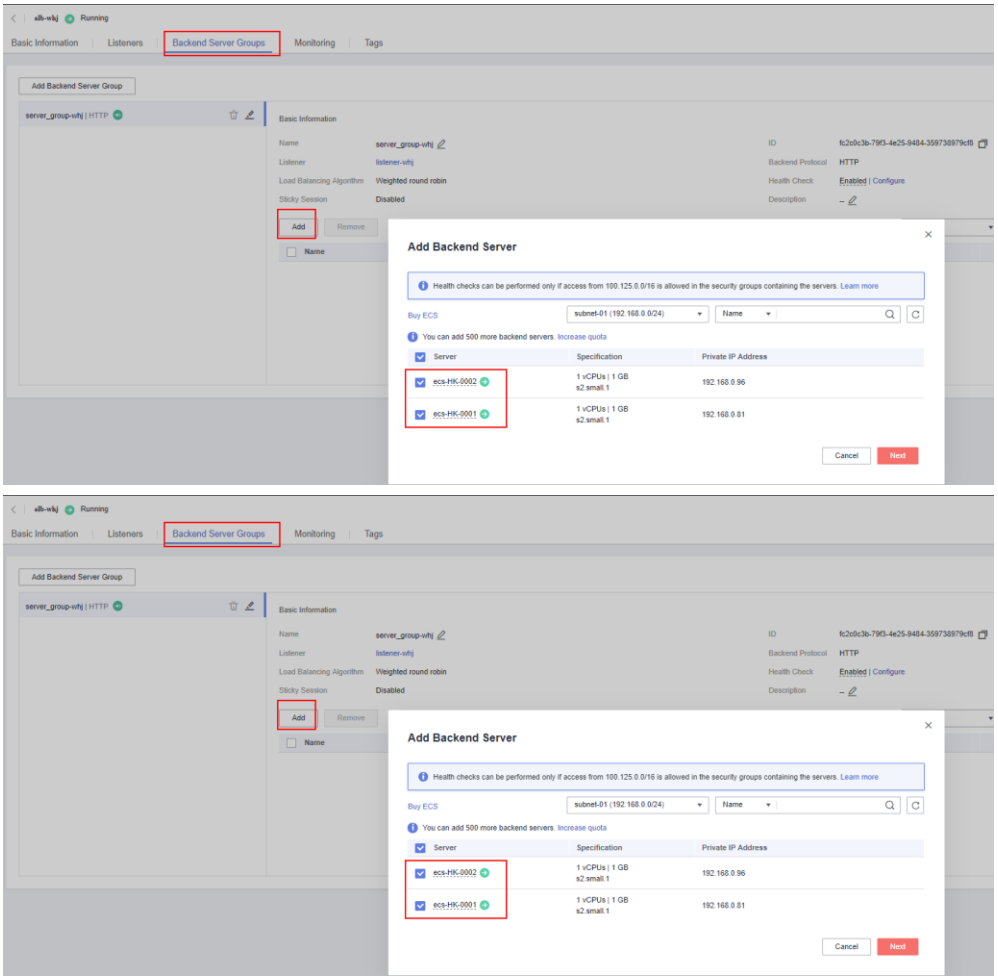
Set the following parameters to configure a backend server group:

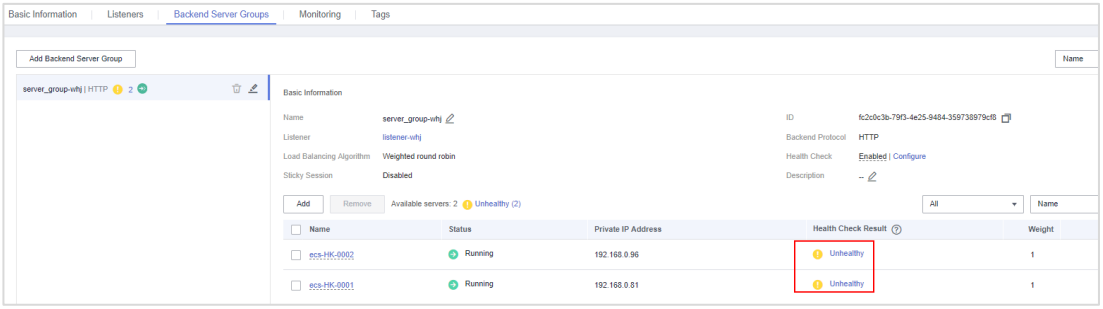
- **Backend Server Group**: **Create New**
- **Name**: Enter a name.
- **Load Balancing Algorithm**: **Weighted round robin**
- Health check configuration: Enable the health check function. Set **Protocol** to **HTTP** and **Port** to **8889**.





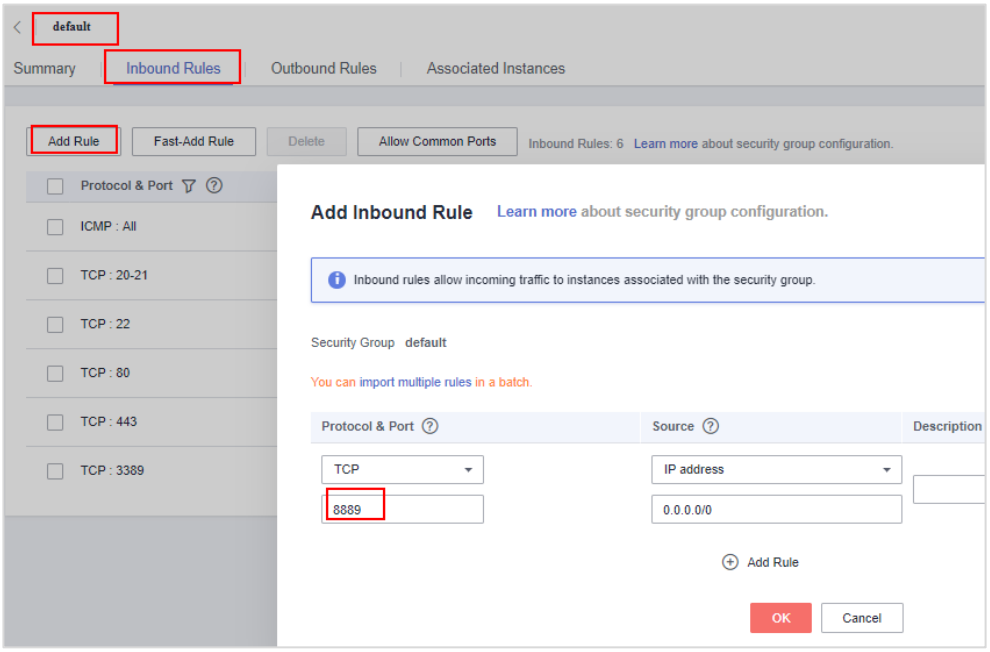
Step 7 Add **ecs-HK-0001** and **ecs-HK-0002** to the backend server group.



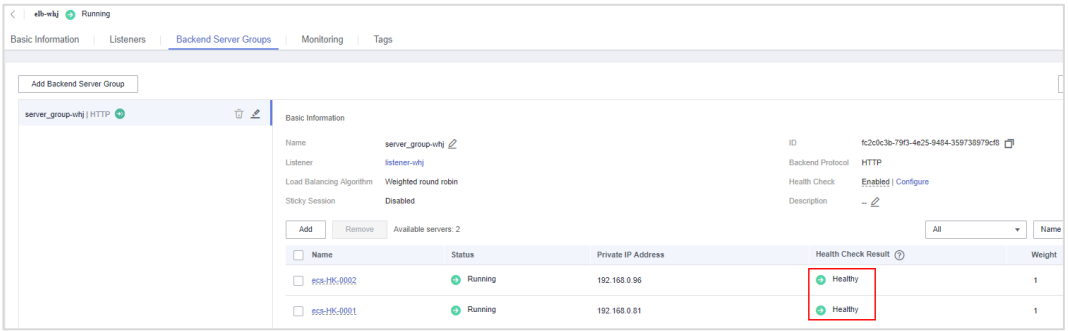


Step 8 Check the health check result of the two ECSs. If the ECSs are detected unhealthy, troubleshoot the issue by referring to the ELB documentation.

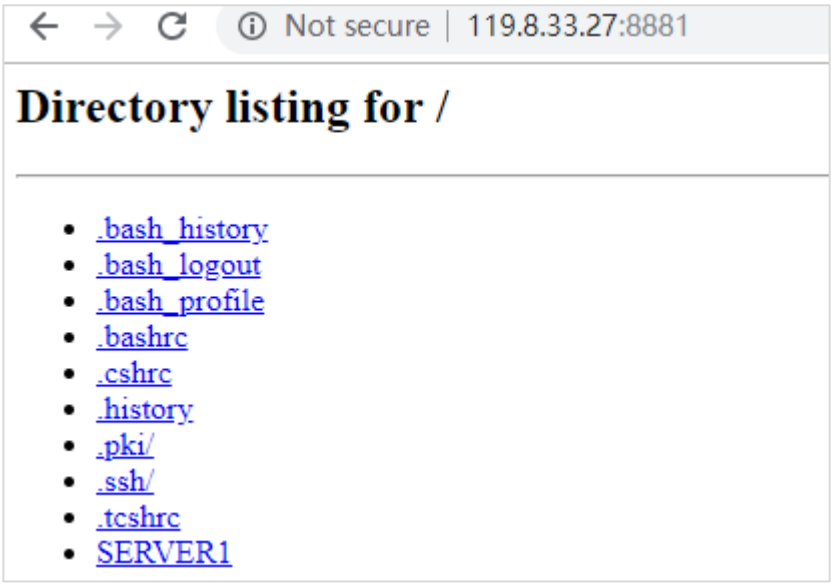
The health check result is **Unhealthy** because the security group denies communication through HTTP port 8889. Go to the VPC console, choose **Access Control** > **Security Groups**, click the security group name, and add an inbound rule.



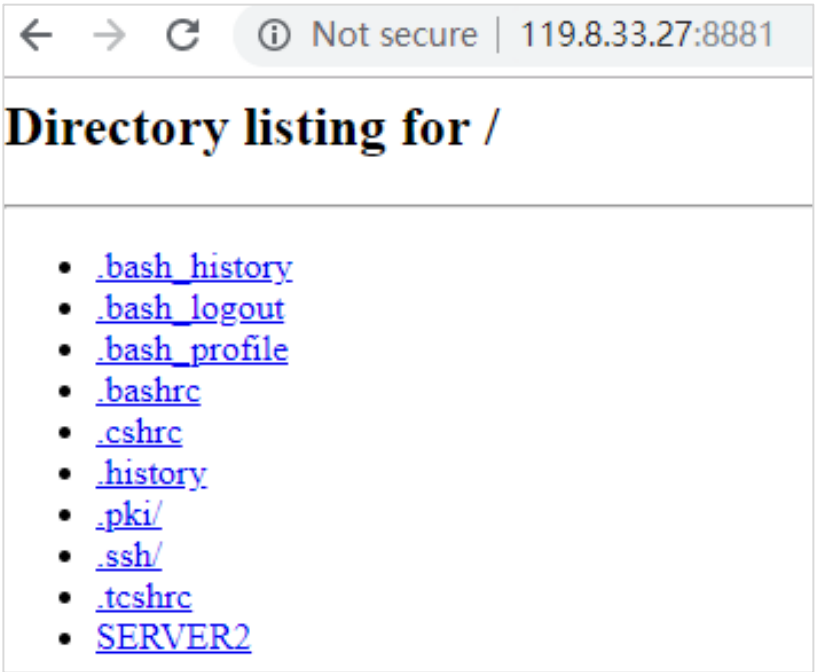
Step 9 Go back to the **Backend Server Groups** page, wait for 3 to 5 minutes, refresh the page, and check the health check result of the two ECSs. If the health check result changes to **Healthy**, the two ECSs can receive requests from the load balancer.



Step 10 In the browser address box, enter **http://***EIP bound to the load balancer*:**8881** to check whether the ECSs can be accessed. **SERVER1** in the following figure is the backend server corresponding to **ecs-hk-0001**.



Step 11 Refresh the browser, verify that the two ECSs appear in turn.



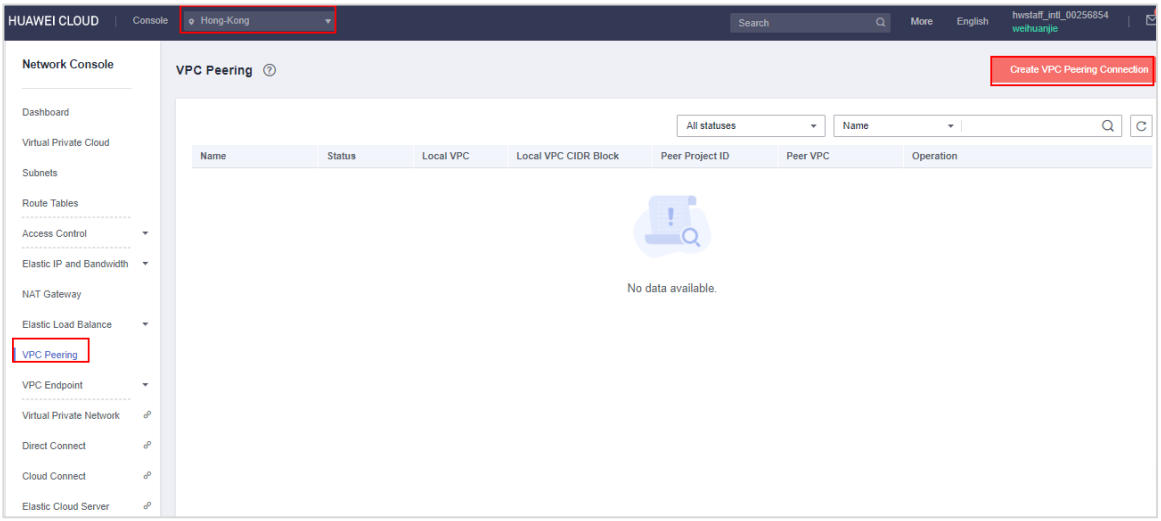
Through this process, you can see that ELB can well distribute traffic across backend servers.

----End

3.3.5 Communication Between ECSs in Different VPCs of the Same Region

Create a VPC peering connection in AP-Hong Kong and configure VPC routes at both ends of the VPC peering connection.

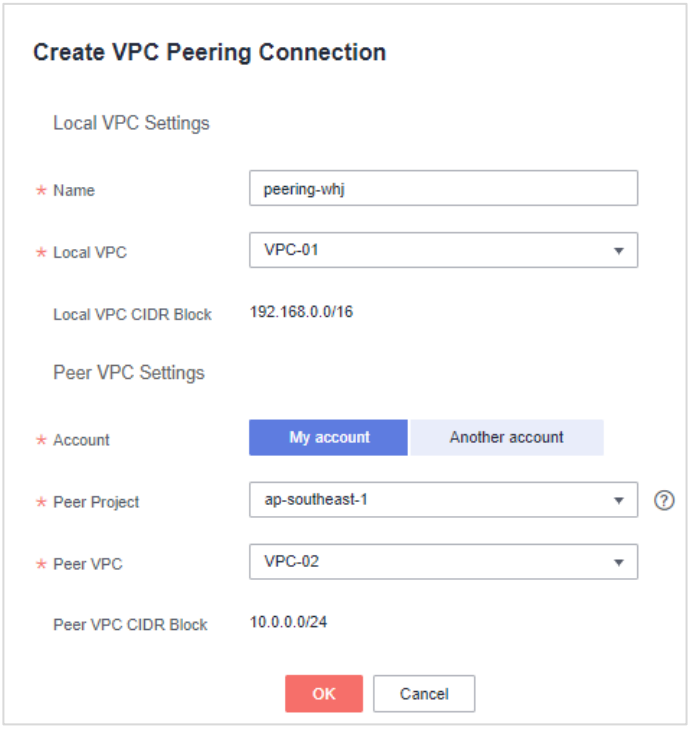
Step 1 In the navigation pane on the VPC console, choose **VPC Peering**. Click **Create VPC Peering Connection**.



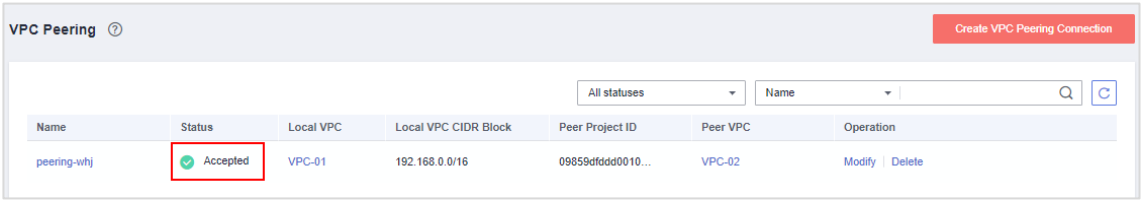
Step 2 Set the following parameters and click **OK**.

- **Name**: for example, **peering-name**
- **Local VPC**: **VPC-01**
- **Peer VPC**: **VPC-02**

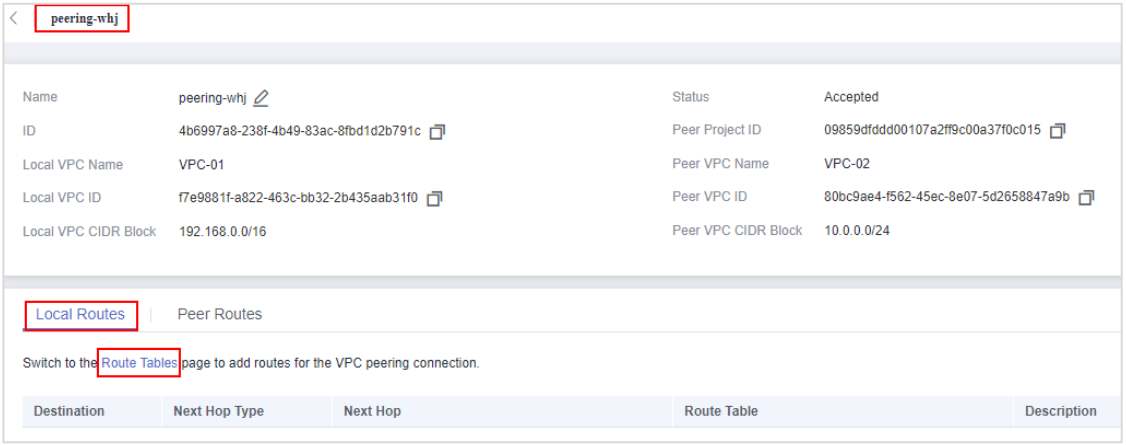
Ensure that the two VPCs do not conflict with each other.



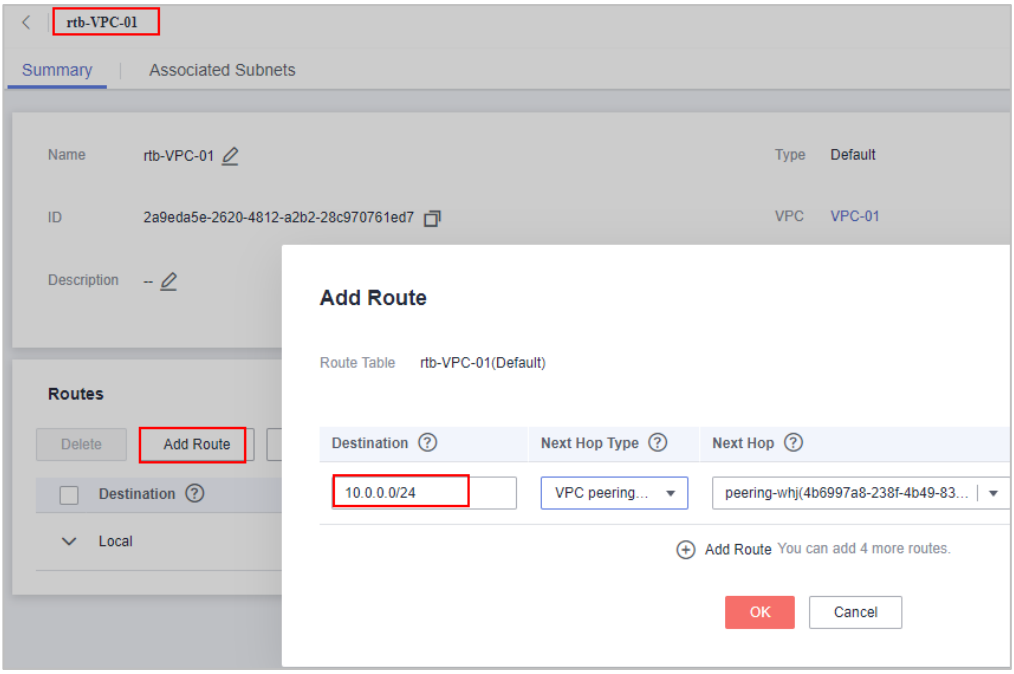
Step 3 In the VPC peering connection list, verify that the created VPC peering connection is in the **Accepted** state.



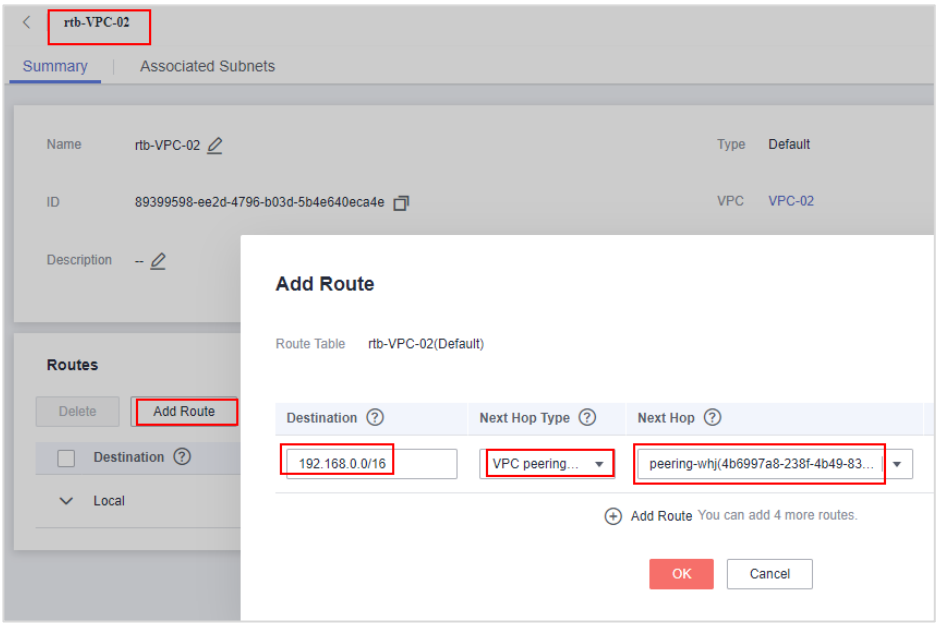
Step 4 Click the name of the VPC peering connection and view the routes. Under **Local Routes**, click **Route Tables** to add routes.

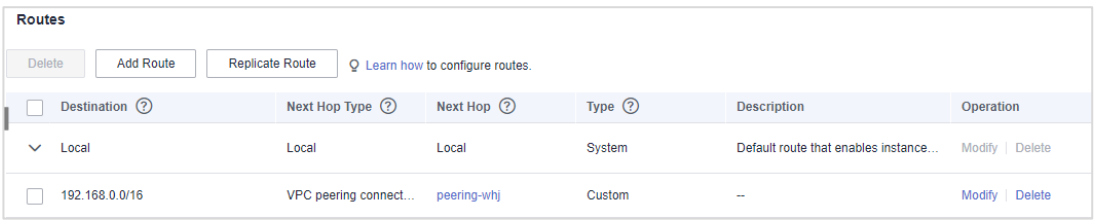


Step 5 In route table **rtb-VPC-01**, click **Add Route**. Set **Destination** to the CIDR Block of **VPC-02** and **Next Hop Type** to **VPC peering connection**.



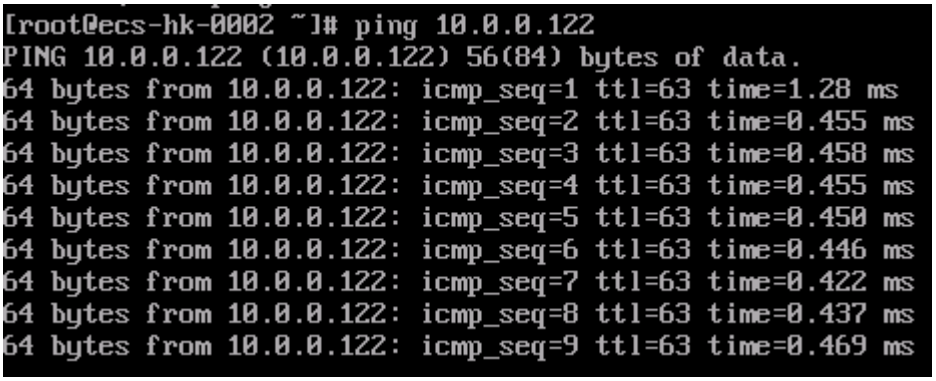
Step 6 In route table **rtb-VPC-02**, click **Add Route**. Set **Destination** to the CIDR Block of **VPC-01** and **Next Hop Type** to **VPC peering connection**.





Step 7 Switch to the ECS console, remotely log in to **ecs-HK-0002**, and access **ecs-HK-0003** in **VPC-02**.

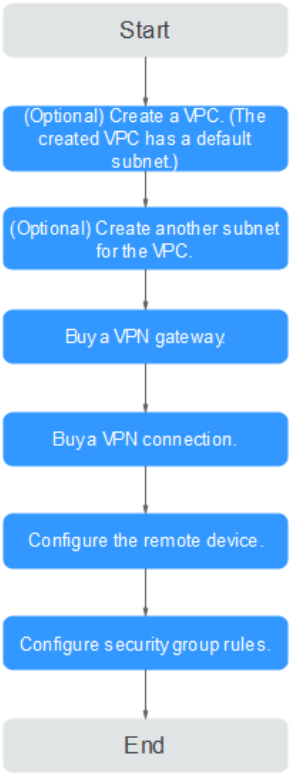
If the following information is displayed, ECSs in **VPC-01** and **VPC-02** in the same region can communicate with each other after the VPC peering connection is created.



----End

3.3.6 (Optional) Communication Between ECSs in Different Regions

By default, your on-premises data center or private network cannot communicate with ECSs on the cloud. To enable communication between them, you can create a VPN connection. In this example, the VPC in the CN South-Guangzhou region servers as the on-premises network.



Pay attention the following when configuring a VPN connection:

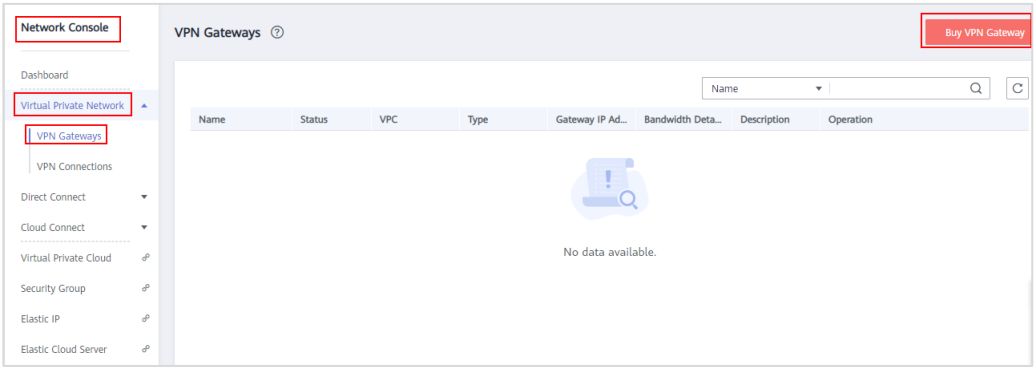
- Local and remote subnets cannot overlap.
- Different local subnets cannot overlap.
- Local and remote subnets use the same IKE and IPsec policies and PSK.
- The subnet and gateway configuration on the cloud must be the same as the subnet and gateway configuration on the on-premises network.
- The security groups containing the ECSs in the VPC that you want to access allow traffic from and to the on-premises network.
- After a VPN connection is created, its status changes to **Normal** only after the servers on both ends of the VPN connection communicate with each other.

Do as follows:

- Buy a VPN gateway in AP-Hong Kong and CN South-Guangzhou, respectively.
- Configure the VPN connection.
- Modify security group rules.

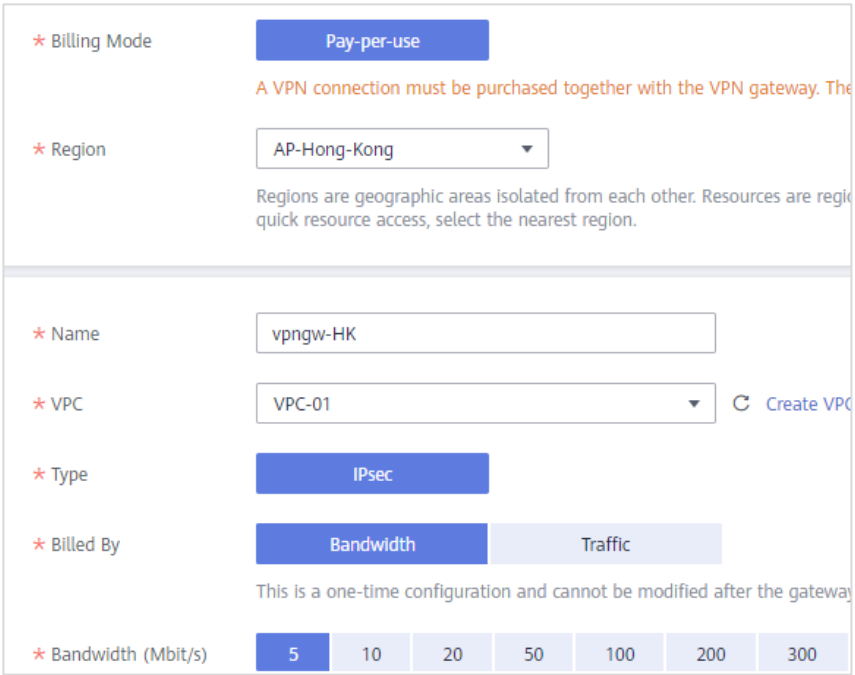
- Enable communication between **ecs-HK-0001** in AP-Hong Kong and **ecs-GZ-0001** in CN South-Guangzhou.
- View the VPN connection status.

Step 1 Select the AP-Hong Kong region. On the network console, choose **Virtual Private Network** > **VPN Gateways**. Click **Buy VPN Gateway**.



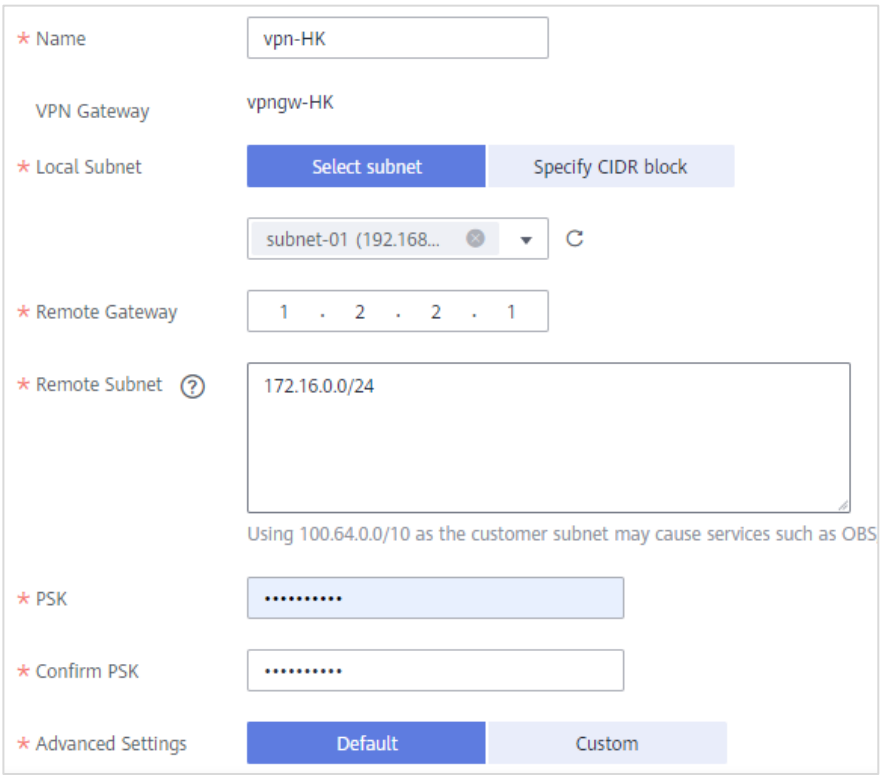
Step 2 Set the following parameters and click **Buy Now**.

- **Billing Mode**: **Pay-per-use**
- **Name**: **vpngw-HK**
- **VPC**: VPC-01
- **Type**: **IPsec**
- **Billed By**: **Bandwidth**
- **Bandwidth**: 5 Mbit/s



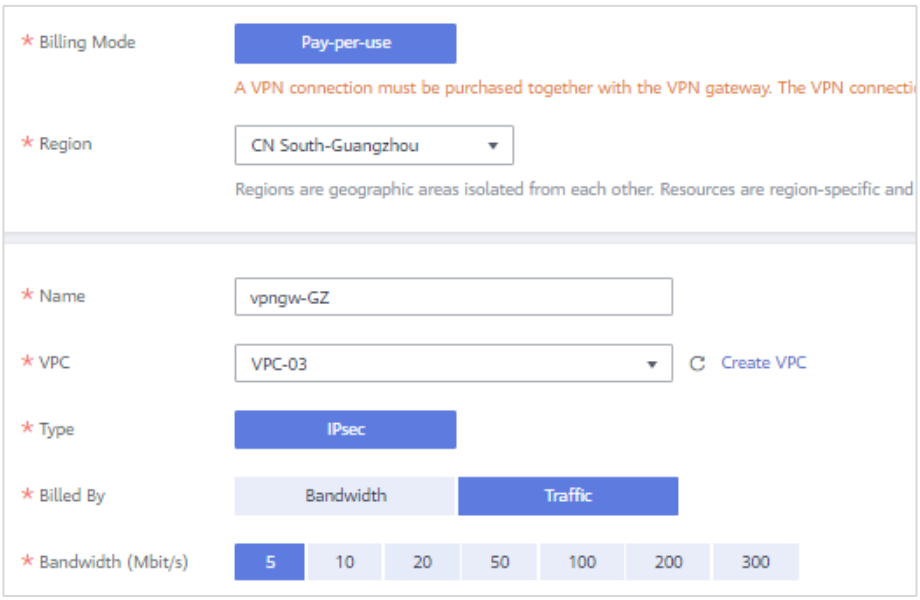
Step 3 In the left navigation pane, choose **VPN Connections**. Click **Create VPN Connection**, set the parameters, and click **Buy Now**.

- **Name**: **vpn-HK**
- **Local Subnet**: Select the subnet of **VPC-01.**
- **Remote Gateway**: Enter any IP address and modify it after you have created the VPN connection in CN South-Guangzhou.
- **Remote Subnet**: Enter the subnet of **VPC-03** (in CN South-Guangzhou).
- **PSK**: Enter a value.
- **Advanced Settings**: Retain their default settings.



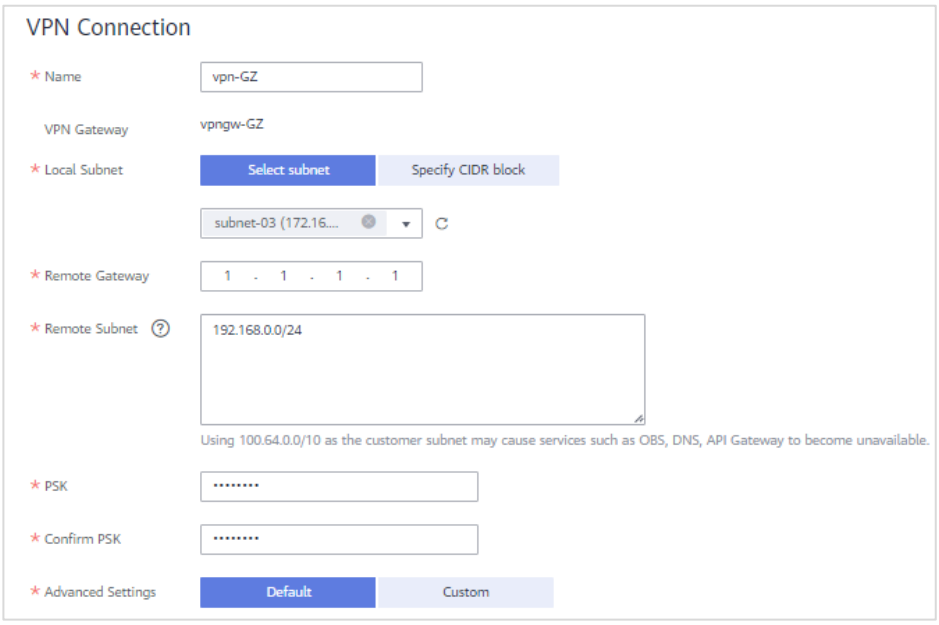
Step 4 Switch the region to CN South-Guangzhou, click **Buy VPN Gateway,** set the following parameters, and click **Buy Now**.

- **Billing Mode**: **Pay-per-use**
- **Name**: **vpngw-GZ**
- **VPC**: VPC-03
- **Type**: IPsec
- **Billed By**: **Bandwidth**
- **Bandwidth**: 5 Mbit/s

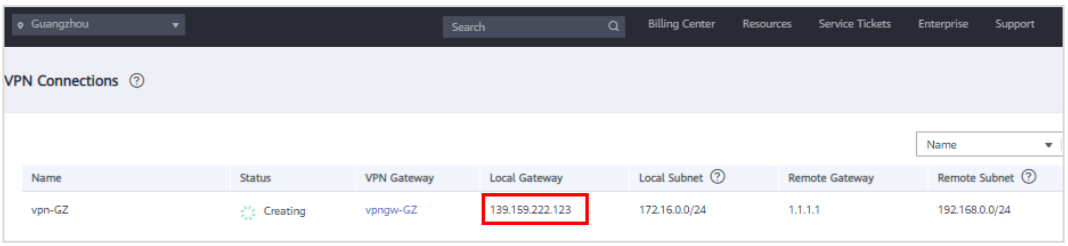


Step 5 In the left navigation pane, choose **VPN Connections**. Click **Create VPN Connection**, set the following parameters, and click **Buy Now**.

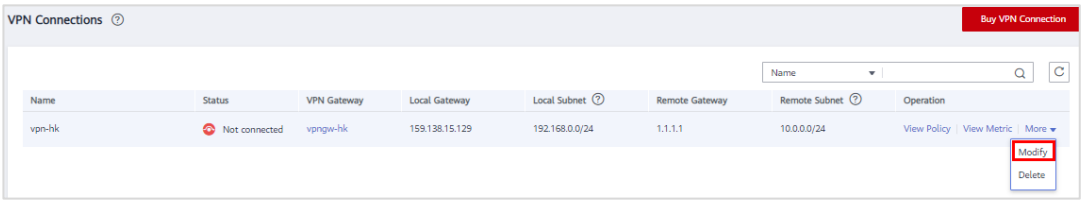
- **Name**: **vpn-GZ**
- **Local Subnet**: Select the subnet of **VPC-03**.
- **Remote Gateway**: Enter any IP address and modify it after you have created the VPN connection in CN South-Guangzhou.
- **Remote Subnet**: Enter the subnets of **VPC-01**.
- **PSK**: Set this to the value set for the VPN connection in AP-Hong Kong.
- **Advanced Settings**: Retain their default settings.

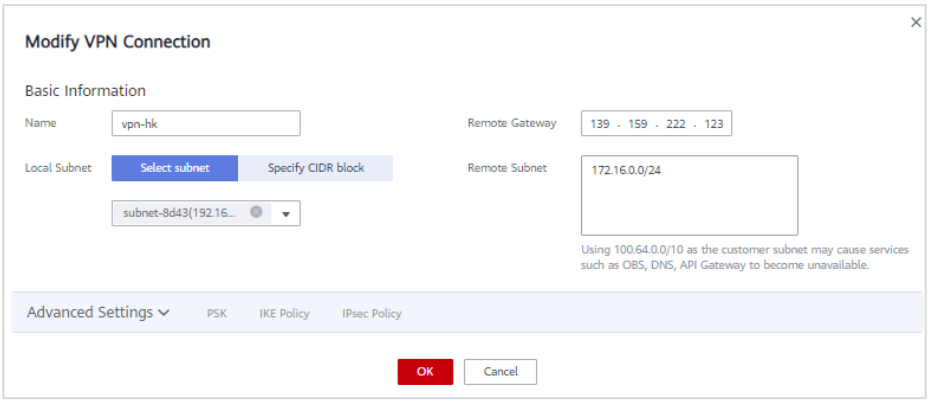


Step 6 On the **VPN Connections** page, locate vpn-GZ and record its local gateway.

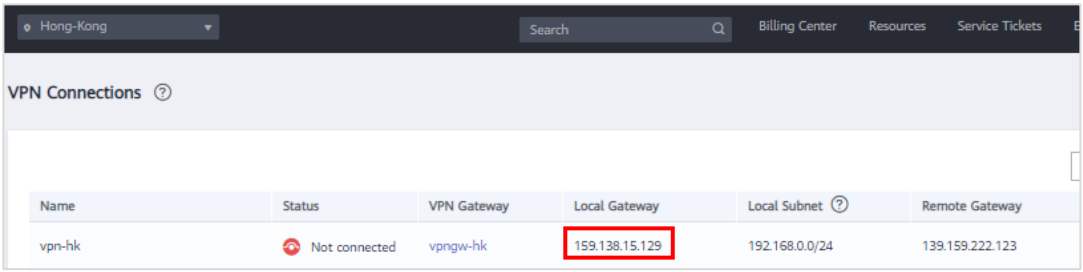


Step 7 Switch back to the AP-Hong Kong region, locate **vpn-HK**, choose **More** > **Modify** in the **Operation** column, and set its remote gateway to the local gateway of **vpn-GZ**.

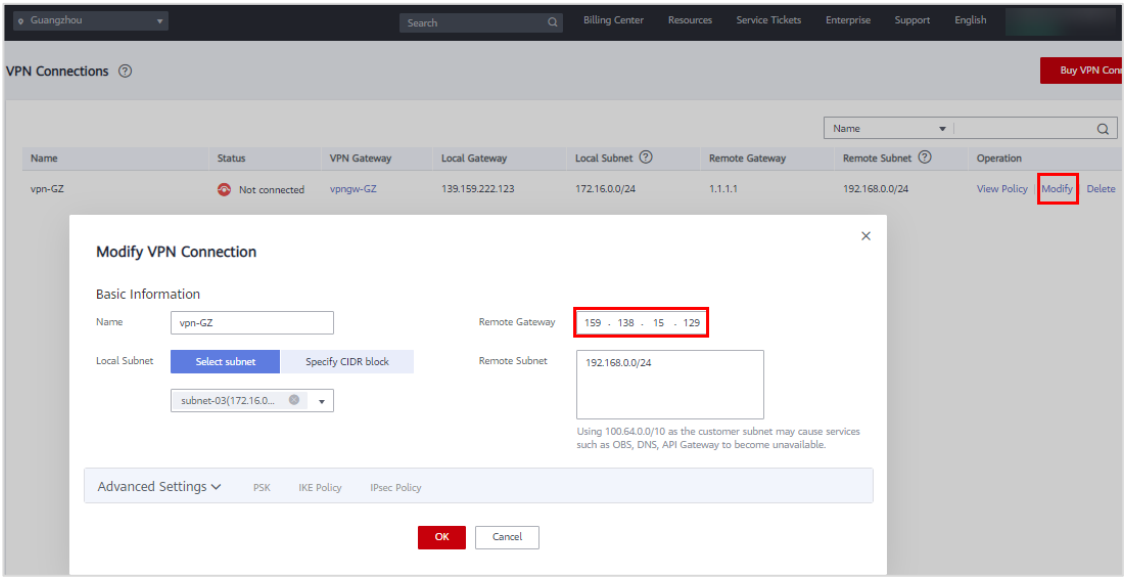




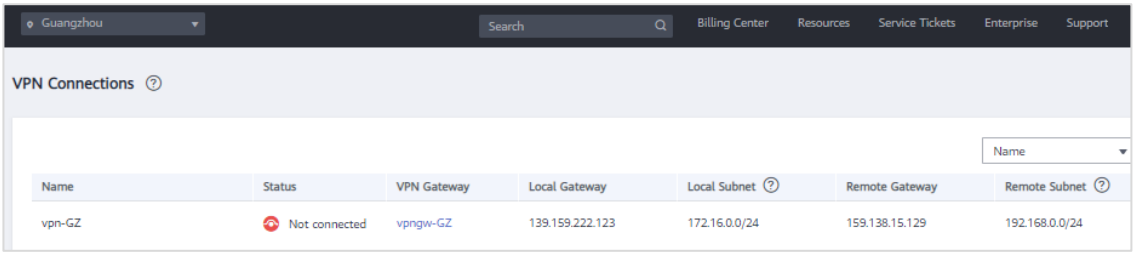
Step 8 Record the local gateway of **vpn-HK**.



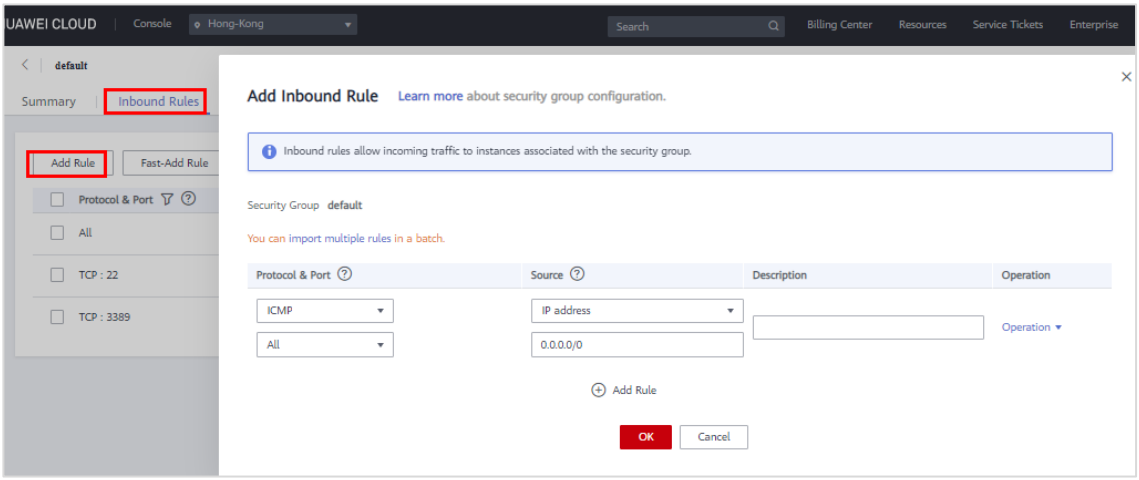
Step 9 Switch to the CN South-Guangzhou region, locate **vpn-GZ**, choose **More** > **Modify** in the **Operation** column, and set its remote gateway of to the local gateway of **vpn-HK**.

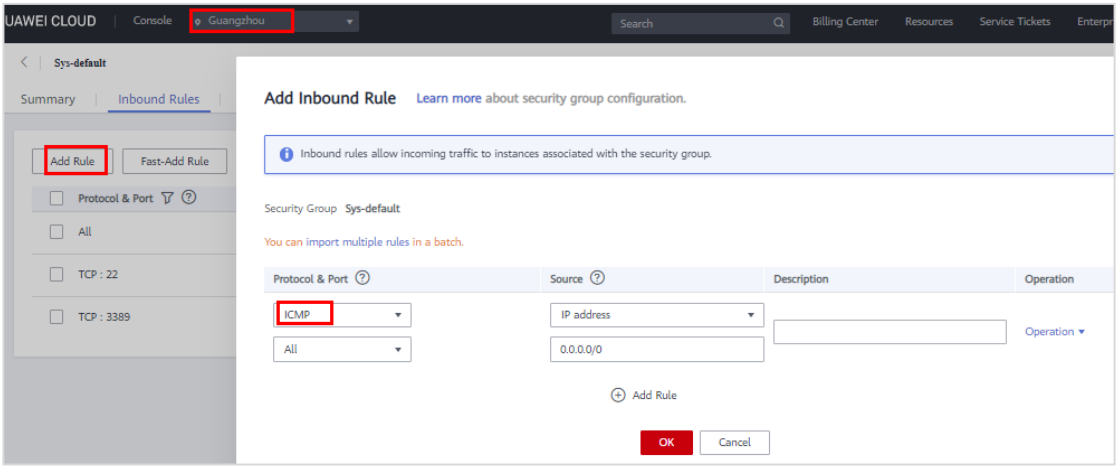


Step 10 Verify that the VPN connection status is **Not Connected**.

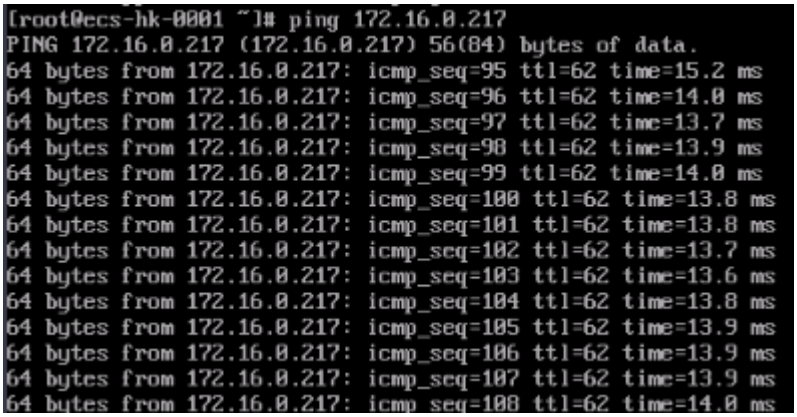


Step 11 Configure security group rules in AP-Hong Kong and CN South-Guangzhou to allow access from and to the peer end.

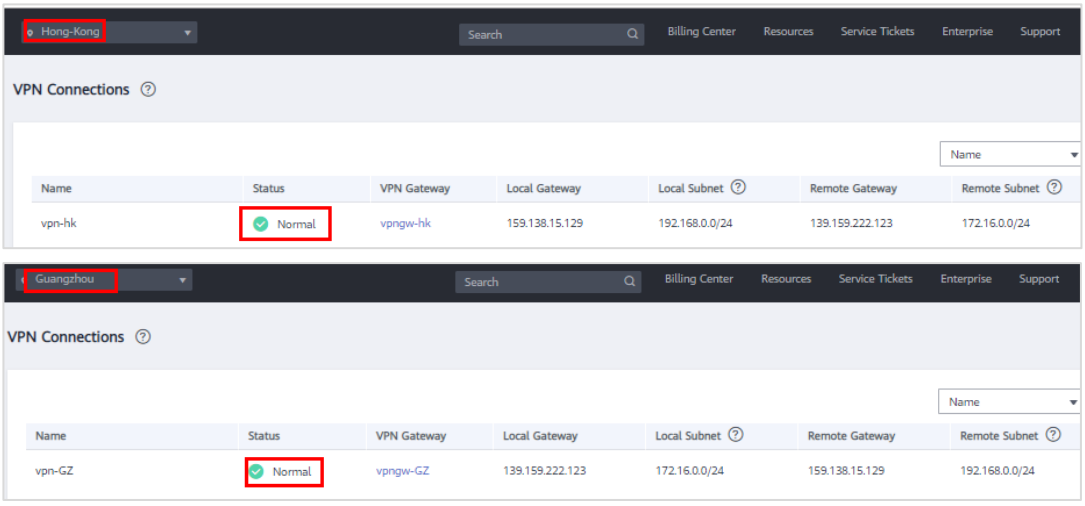




Step 12 Remotely log in to **ecs-HK-0001** in **VPC-01** and ping **ecs-GZ-0001** in **VPC-03** of CN South-Guangzhou. ECSs in different regions can communicate with each other.



Step 13 Go to the **VPN Connections** page and check whether the statuses of the VPN connection in the two regions are normal.

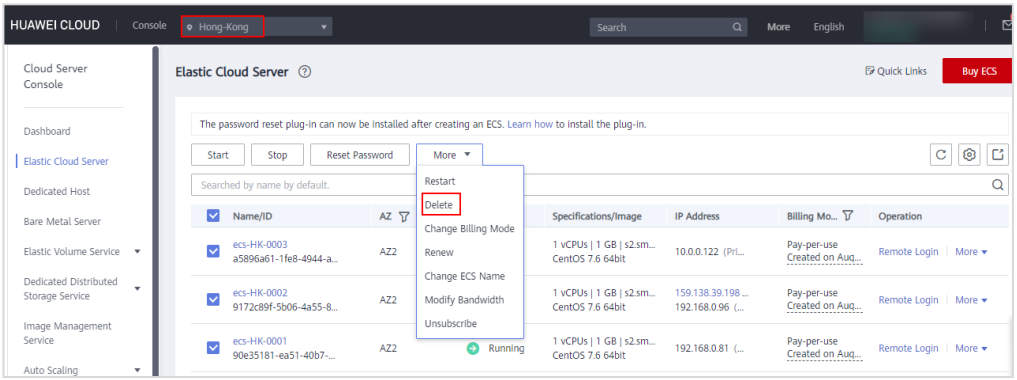


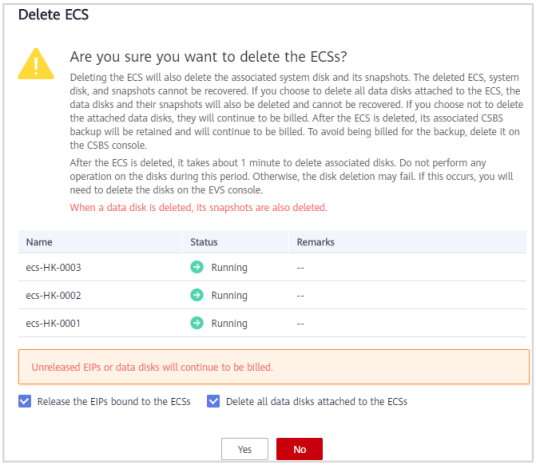
Through this process, you can see that a VPN connection can be used to enable communication between the on-premises data center and the VPCs.

----End

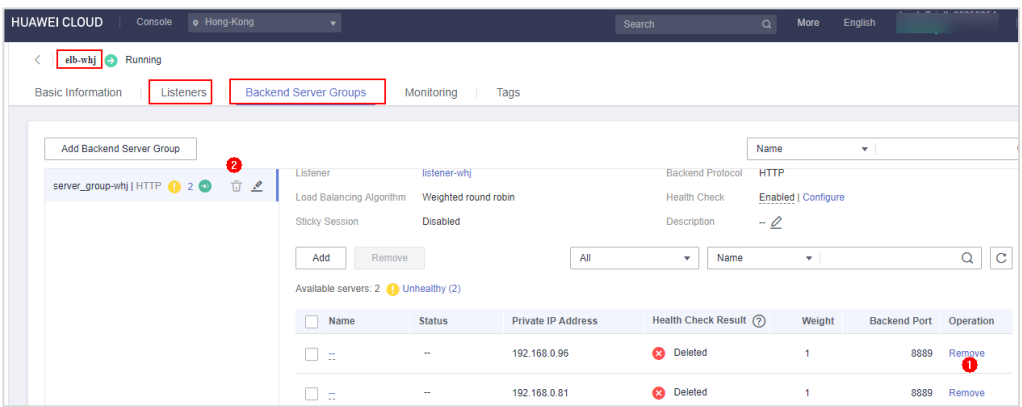
3.4 Deleting Resources

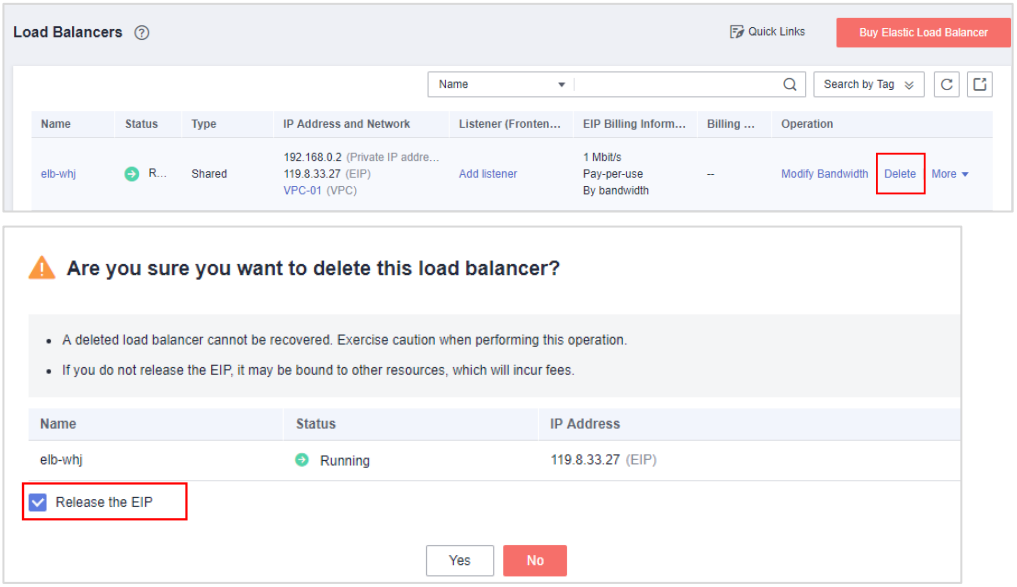
Step 1 Delete the ECSs in the two regions.



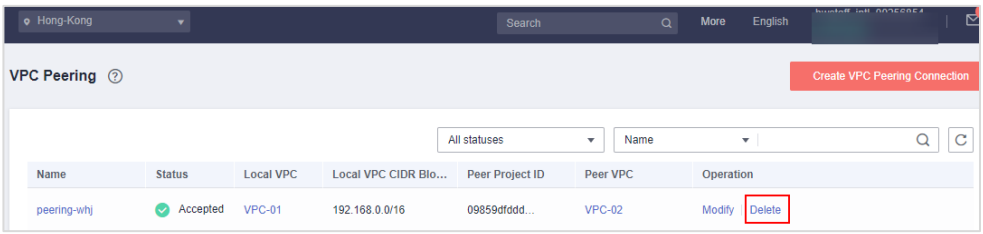


Step 2 Delete the load balancer in AP-Hong Kong. Remove the backend servers, delete the listener, and then delete the load balancer.

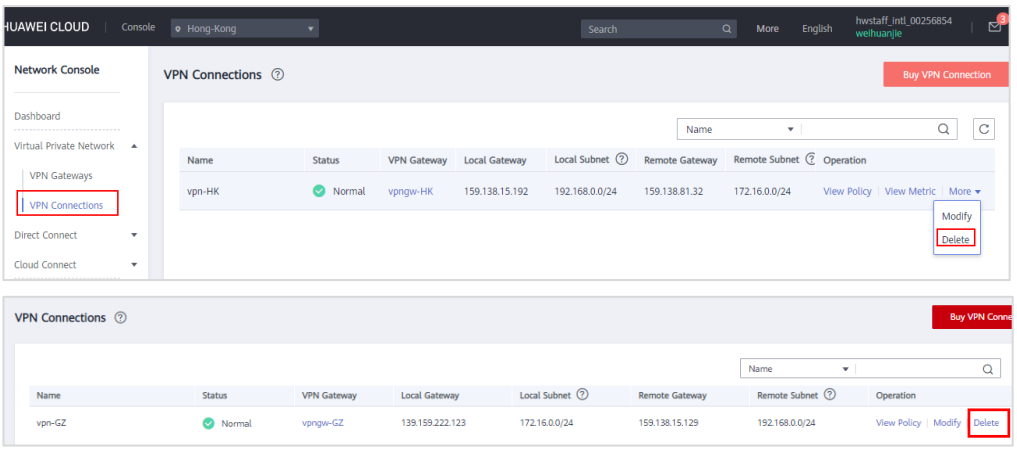




Step 3 Delete the VPC peering connection in AP-Hong Kong.



Step 4 Delete the VPN connection and VPN gateways in the two regions. If you delete the VPN connection first, the gateways will be automatically deleted.



Step 5 Delete the VPCs in the two regions. Delete the subnets in the VPCs and then delete the VPCs.

----End

4 Management Services

4.1 Introduction

In this exercise, you will perform the following operations:

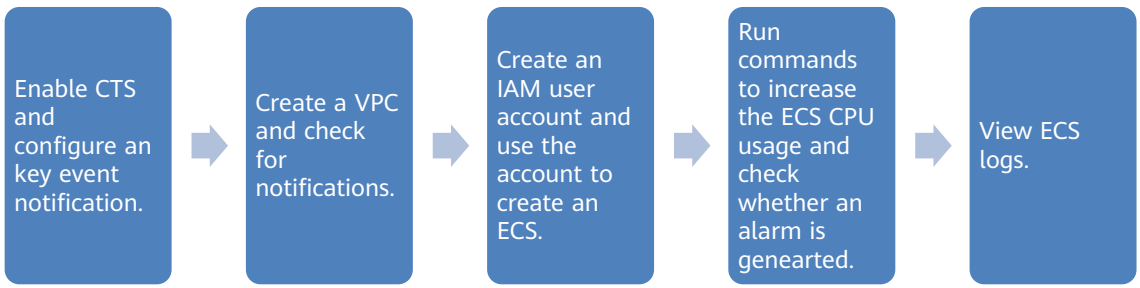
- View the CTS console and enable notification for key events.
- Use a HUAWEI CLOUD account to create an IAM user account, and use this IAM user account to buy an ECS and view logs.
- Increase the ECS CPU usage and then check whether an alarm is generated for the ECS.

4.1.1 Objectives

Upon completion of this exercise, you will be able to:

- Create an IAM user account and assign permissions to the account.
- Use CTS.
- Create an alarm rule to monitor ECSs on Cloud Eye.
- View cloud logs.

4.1.2 Process

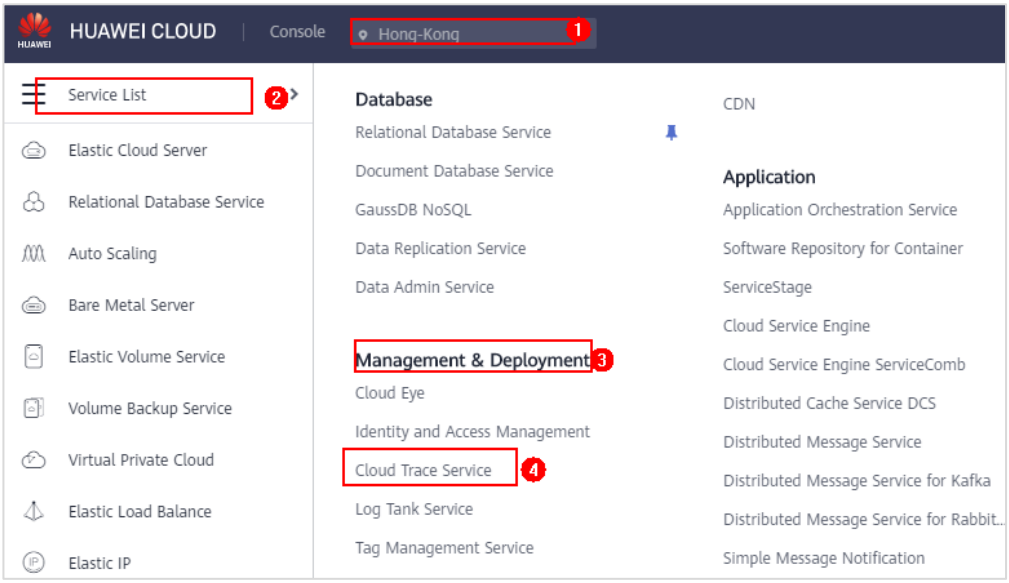


4.2 CTS

4.2.1 Enabling CTS and Viewing the Default Tracker

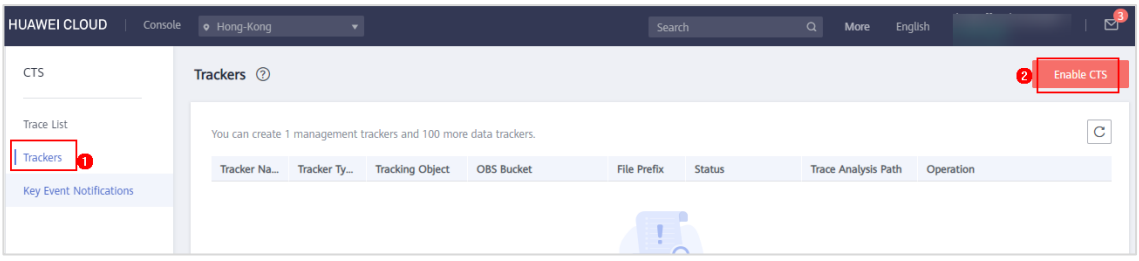
For this exercise, operations are performed in the AP-Hong Kong region.

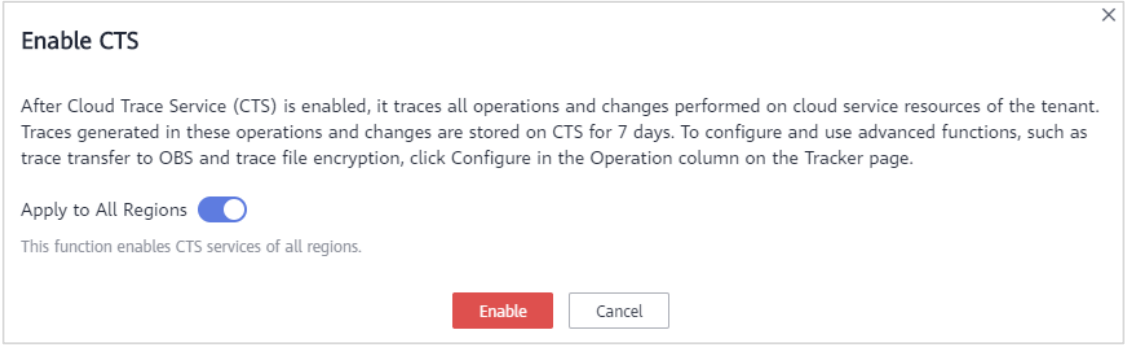
Step 1 Log in to the management console, select the AP-**Hong Kong** region, and click **Service List**. Under **Management & Deployment**, select **Cloud Trace Service**.



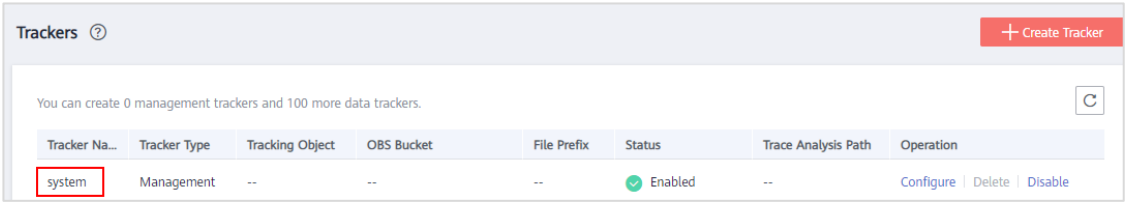
Step 2 In the left navigation pane, choose **Trackers**, and click **Enable CTS** in the upper right corner. Enable **Apply to All Regions**. Click **Enable**.

A default tracker is created. The tracker will automatically identify and associate all of the cloud services that you use, and records all of your operations related to these services.





The tracker is now in the **Enabled** state.

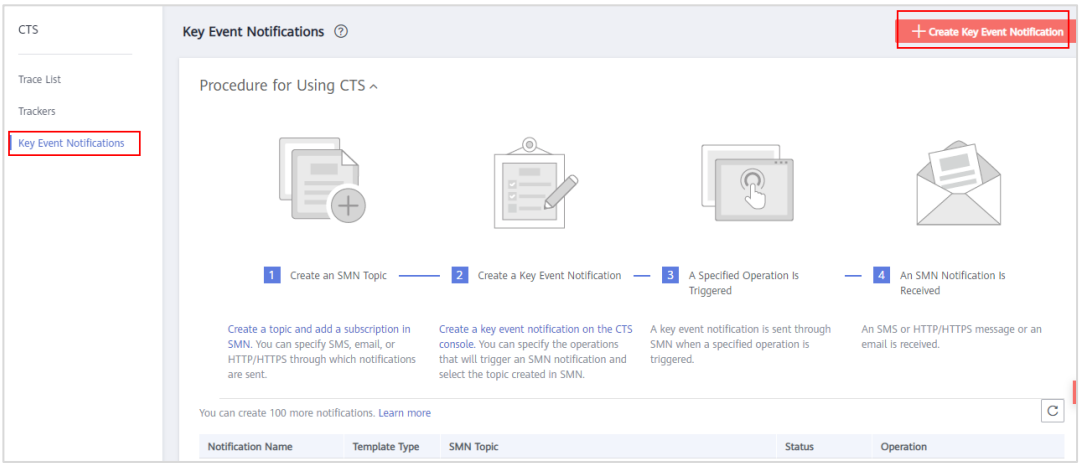


----End

4.2.2 Creating a Key Event Notification

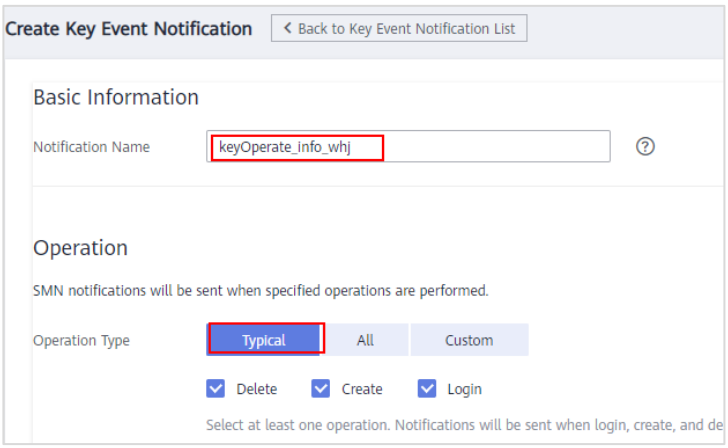
To be notified of key operations, you can configure key event notifications on CTS, and then Simple Message Notification (SMN) will send notifications when they occur. SMN can be configured to broadcast messages to email addresses, phone numbers, and HTTP/HTTPS servers.

Step 1 On the CTS console, click **Key Event Notifications**. In the left navigation pane, click **Create Key Event Notification**.

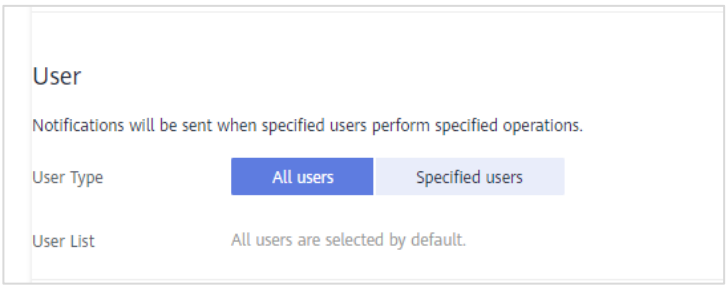


Step 2 On the displayed page, specify required parameters.

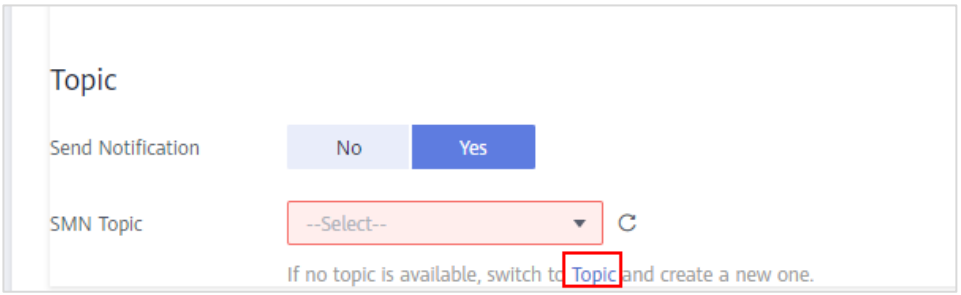
- **Notification Name**: Enter a notification name.
- **Operation Type**: **Typical**



- **User Type**: **All users**

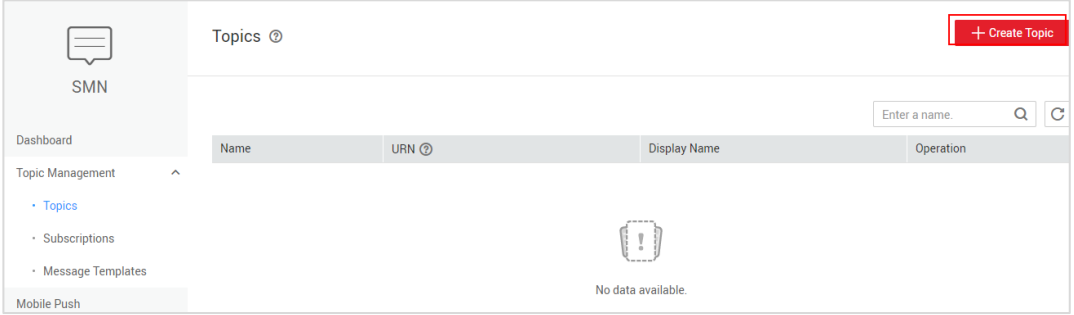


- **Send Notification**: **Yes**
- **SMN Topic**: Click **Topic** to create an SMN topic.

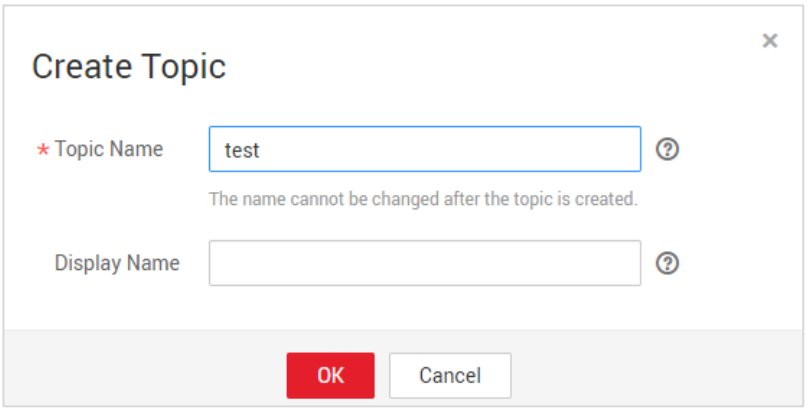


Step 3 On the displayed **Topics** page, click **Create Topic** in the upper right corner.

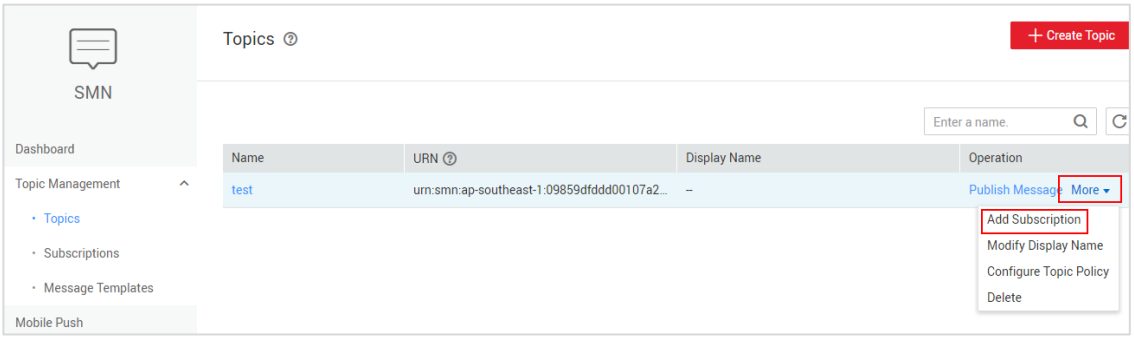
A topic is a specified event to publish messages and subscribe to notifications.



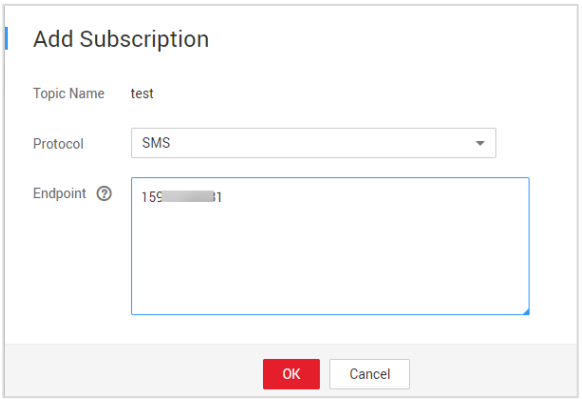
Step 4 Set the topic name and click **OK**.



Step 5 To receive notifications for a specific topic, locate the topic, click **More** in the **Operation** column, and choose **Add Subscription**.

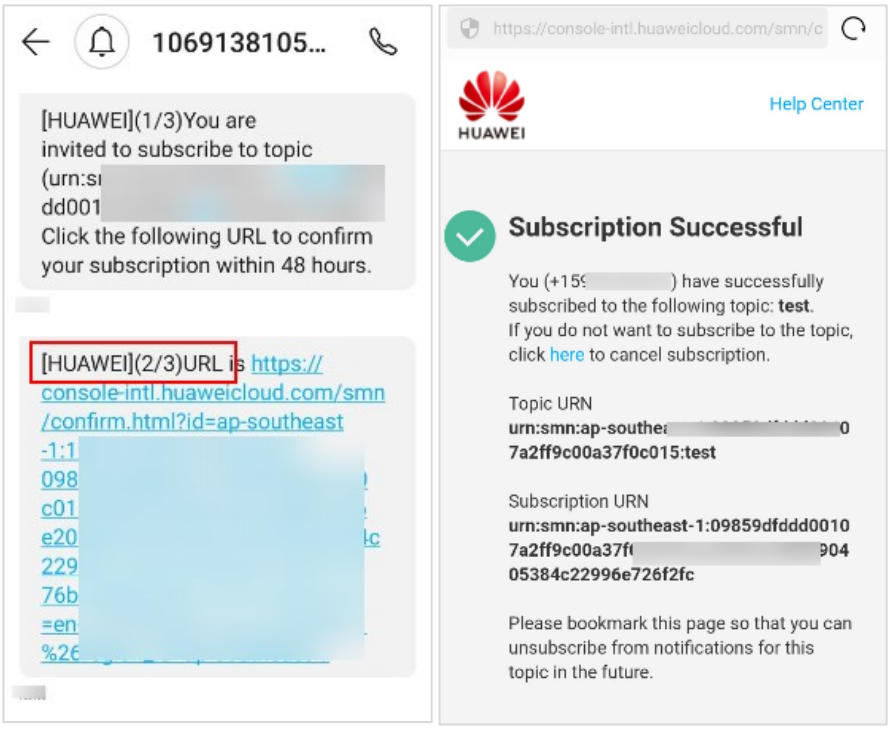


Step 6 For **Protocol**, select **SMS** or **Email**. For **Endpoint**, enter your mobile number or email address. Click **OK**. The following uses **SMS** as an example.

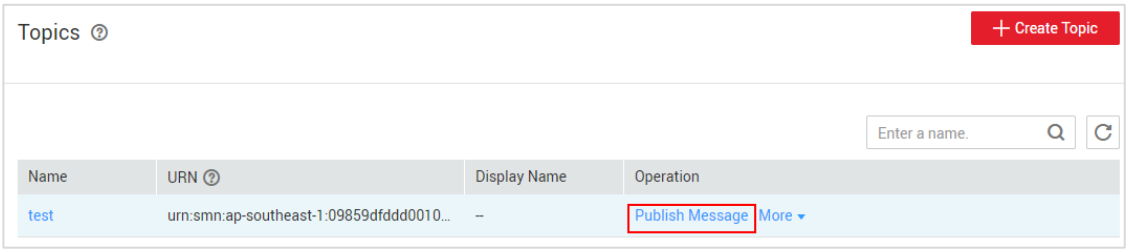


Step 7 The entered mobile phone number will receive an SMS message from HUAWEI CLOUD. You can click the link to confirm the subscription.

After the confirmation, you will receive a message indicating that you have successfully subscribed to the topic.

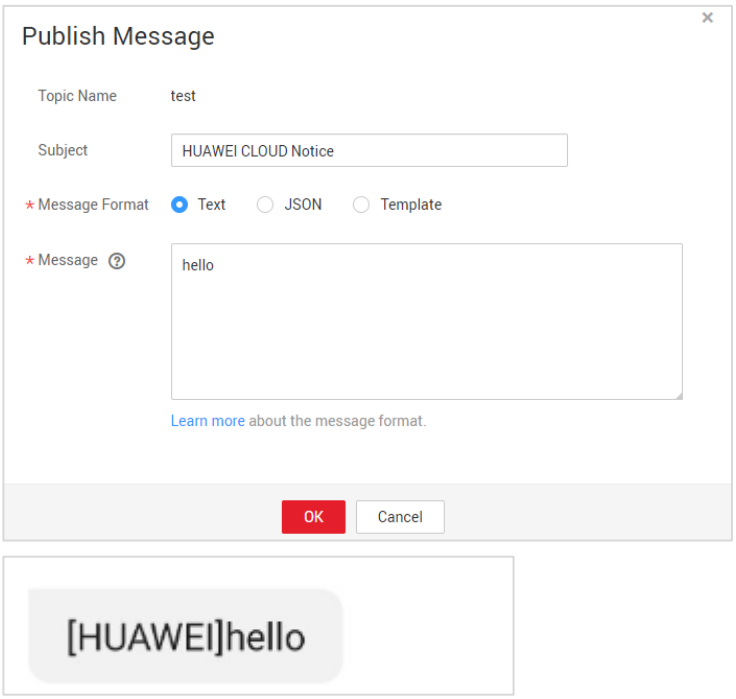


Step 8 Click **Publish Message** to check whether you can receive SMS messages.

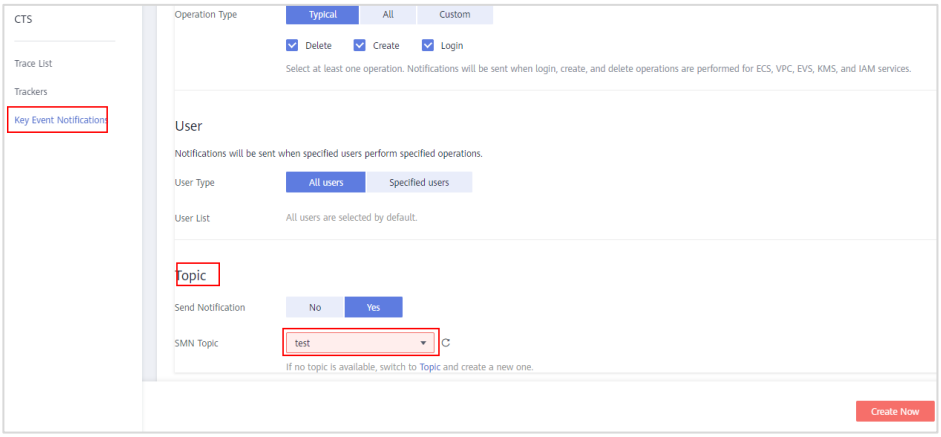


Step 9 Enter a subject. Set **Message Format** to **Text** and **Message** to **hello**. Click **OK**.

If you receive an SMS message containing *hello* from HUAWEI CLOUD, you have successfully subscribed to the topic.



Step 10 Go back to CTS console. On the **Create Key Event Notification** page, set **Topic** to the created SMN topic and click **Create Now**.

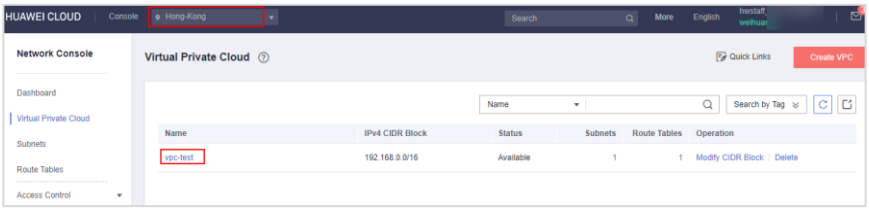


If the key event notification status is **Enabled**, the key event notification was successfully created.

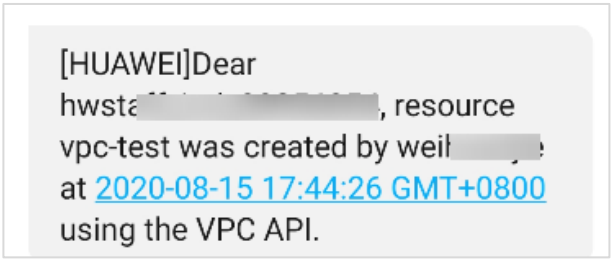
----End

4.2.3 Viewing VPC Creation Records

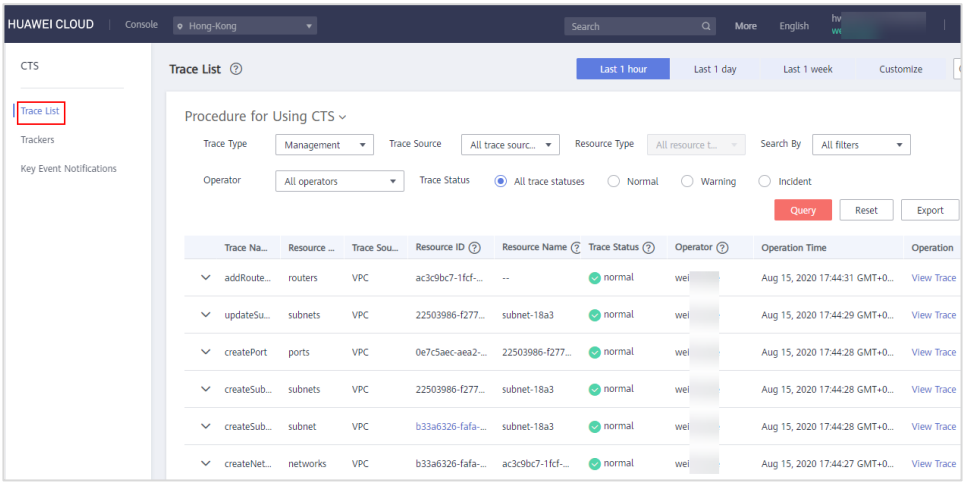
Step 1 Create a VPC in the AP-Hong Kong region by referring to section 3.2.1.



Step 2 Check whether you receive an SMS message from HUAWEI CLOUD indicating that the VPC has been created.



Step 3 Go back to CTS console and choose **Trace List**. In the trace list, view the VPC operation time and trace status.



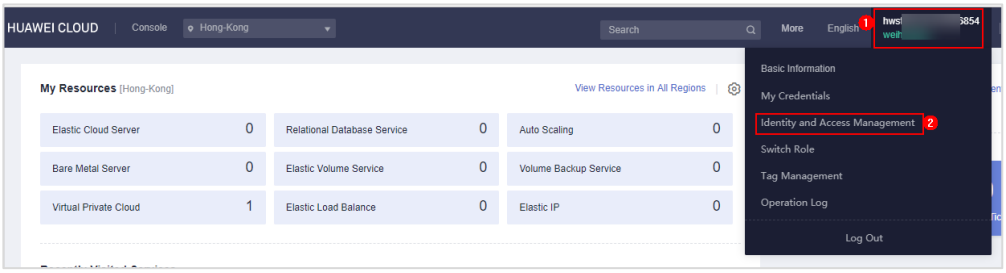
----End

4.3 Creating an IAM User Account and Performing Related Operations

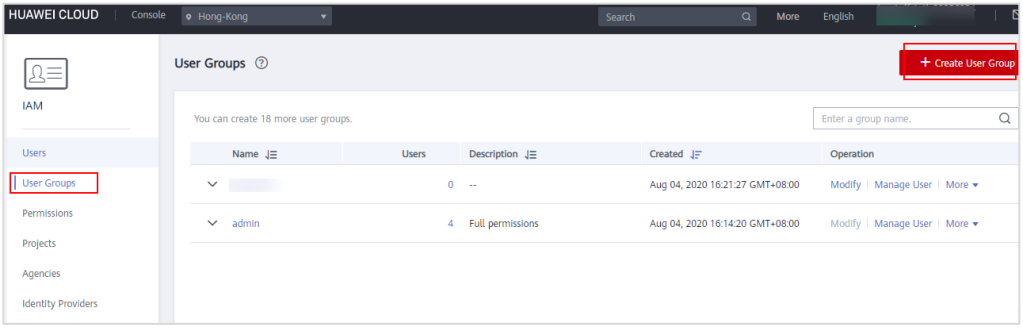
4.3.1 Creating an IAM Account and Assigning Permissions

IAM provides identity authentication and permissions management. With IAM, you can create users for employees, applications, or systems in your organization, and control the users' access to specified resources in your account.

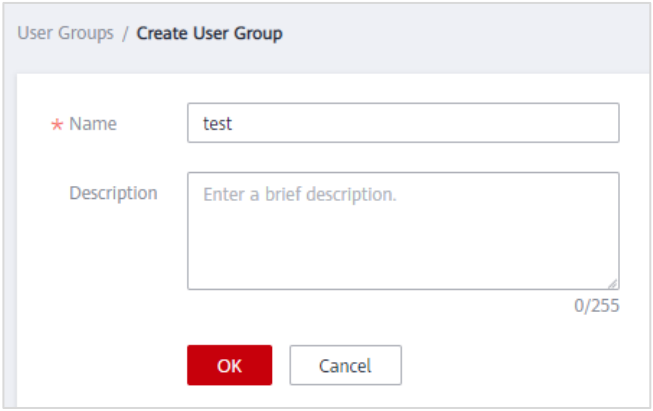
Step 1 On the management console, under the username, click **Identity and Access Management**.



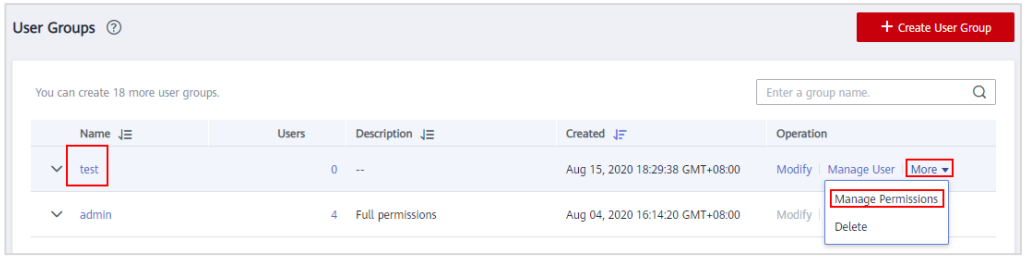
Step 2 In the left navigation pane, choose **User Groups**, and click **Create User Group**. (A user group is a collection of users, and every user belonging to a user group has the permissions assigned to the user group.)



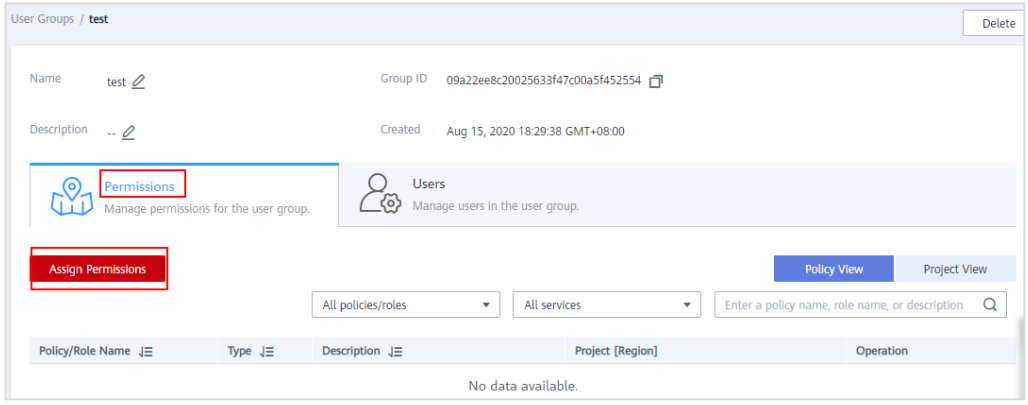
Step 3 Enter a user group name and click **OK**.



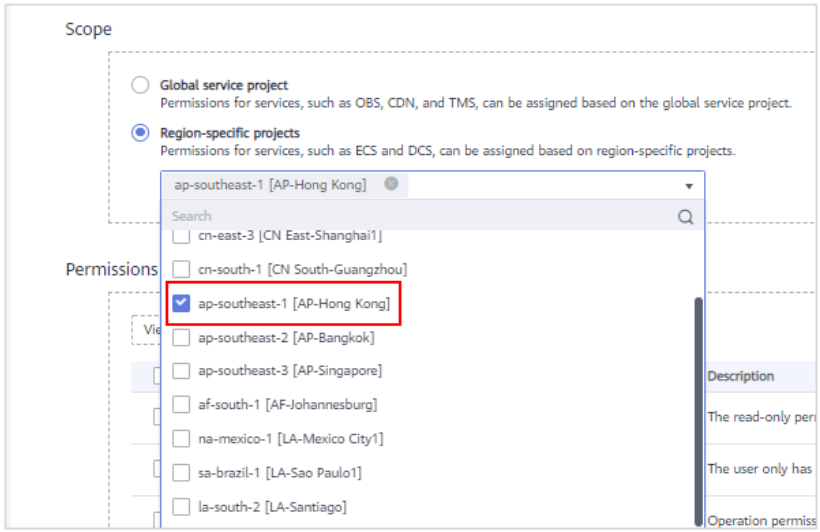
Step 4 Locate the created user group, in the **Operation** column, click **More**, and choose **Manage Permissions** to assign permissions to the user group.

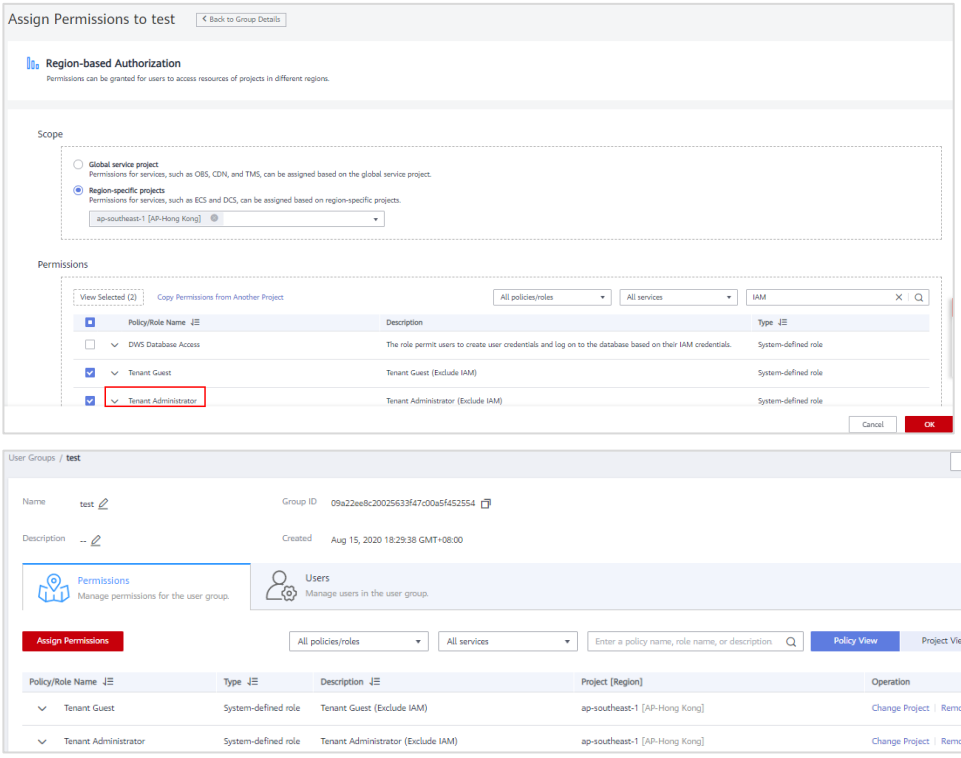


Step 5 Click **Assign Permissions**.

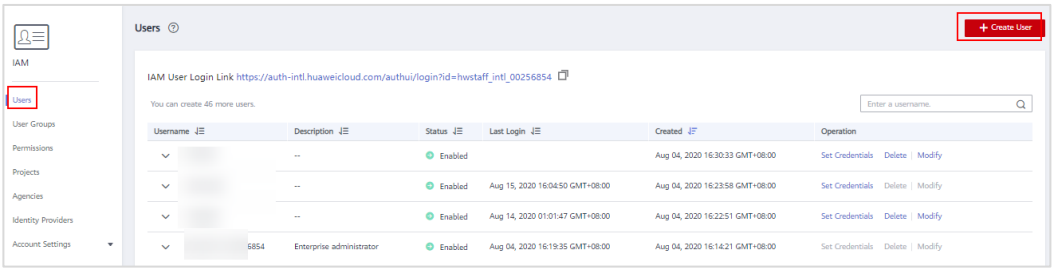


Step 6 For **Scope**, select **Region-specific projects**, select **AP-Hong Kong**. In the **Permissions** area, search for IAM, select **Tenant Guest** and **Tenant Administrator**, and click **OK**.



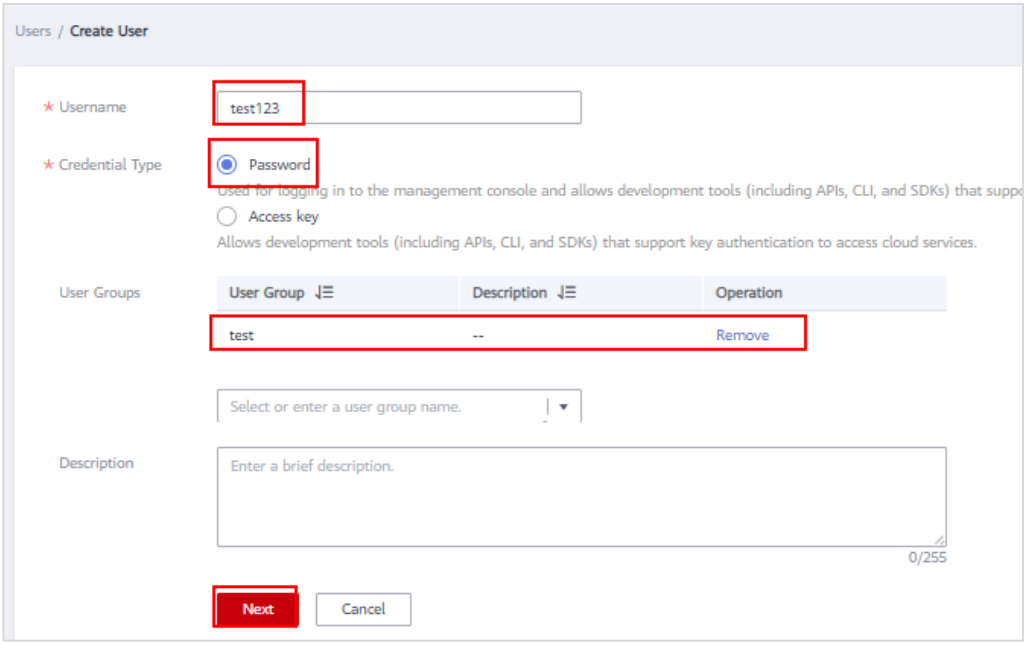


Step 7 In the left navigation pane, choose **Users**, and click **Create User**.

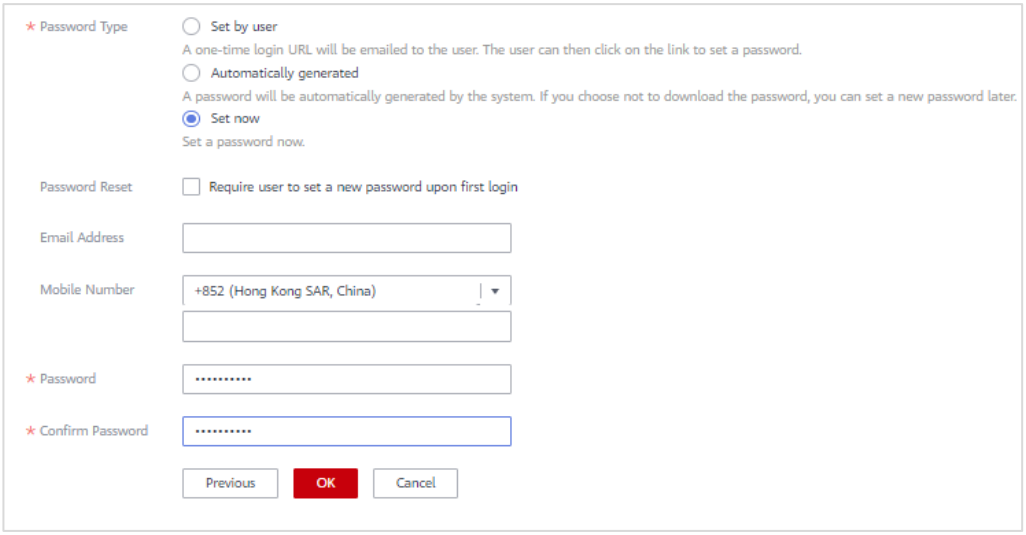


Step 8 Set the following parameters.

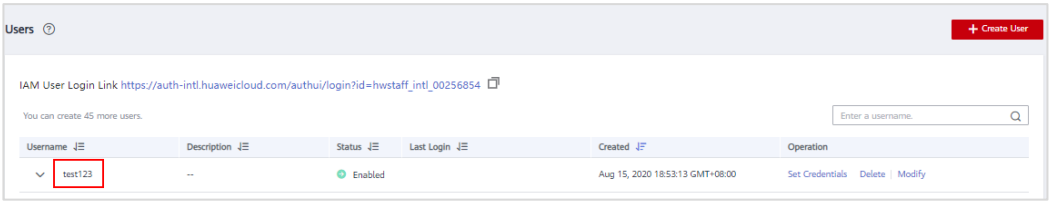
- **Username**: Set a username, for example, **test123**.
- **Credential Type**: **Password**
- **User Groups**: Select a created user group, for example, **test**.



- **Password Type**: **Set now**
- **Password Reset**: Deselect it.
- **Password**: Enter a password, for example, **Huawei@123**.



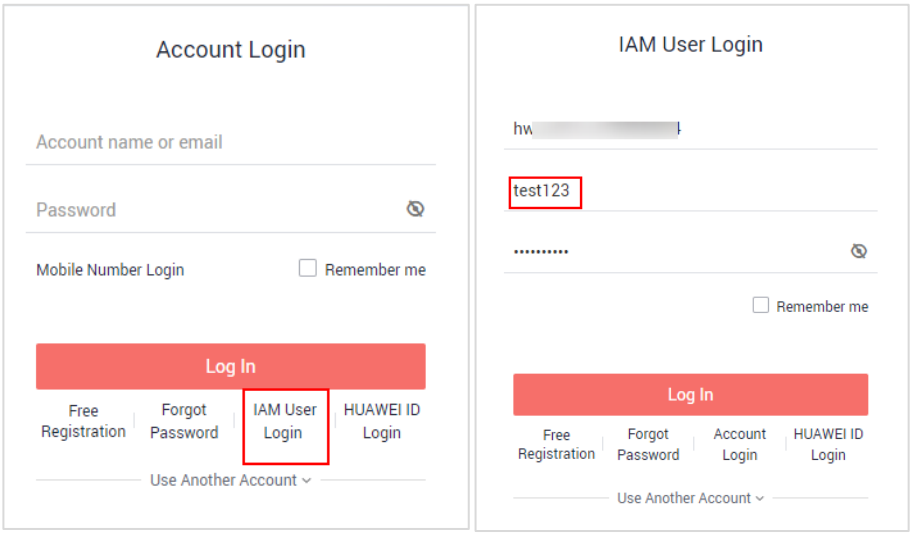
If the following page is displayed, the account was successfully created.



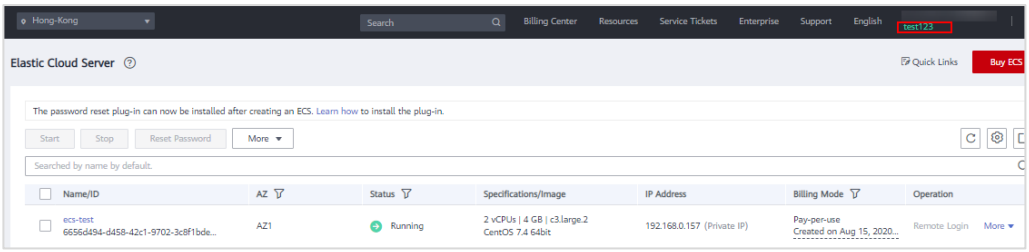
----End

4.3.2 Buying an ECS Using the IAM User Account

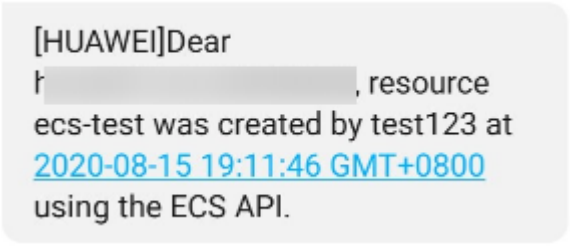
Step 1 Log out of the current account and log in again using the IAM user account.



Step 2 In the AP-Hong Kong region, create a Linux ECS named **ecs-test** by referring to section 1.1.4.

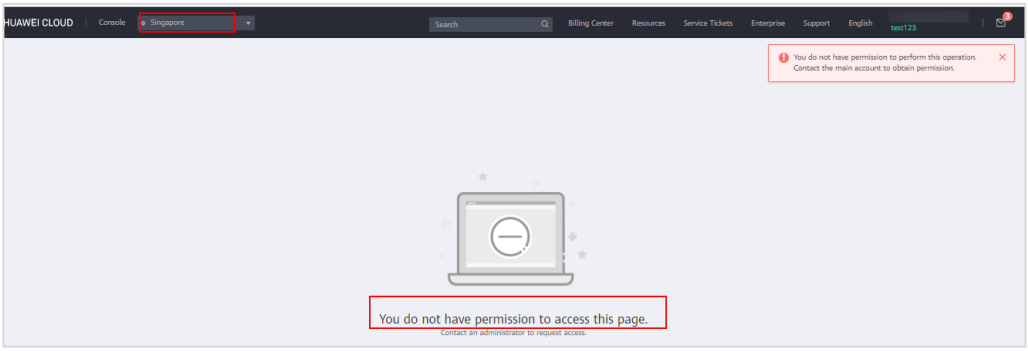


Step 3 After the ECS is created, check whether you have received an SMS message from HUAWEI CLOUD, indicating that the ECS creation operator is **test123**.

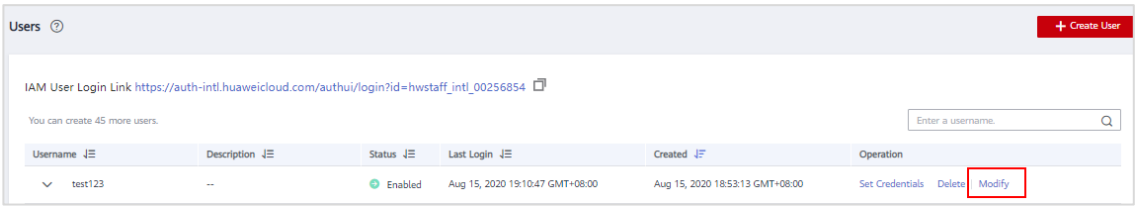


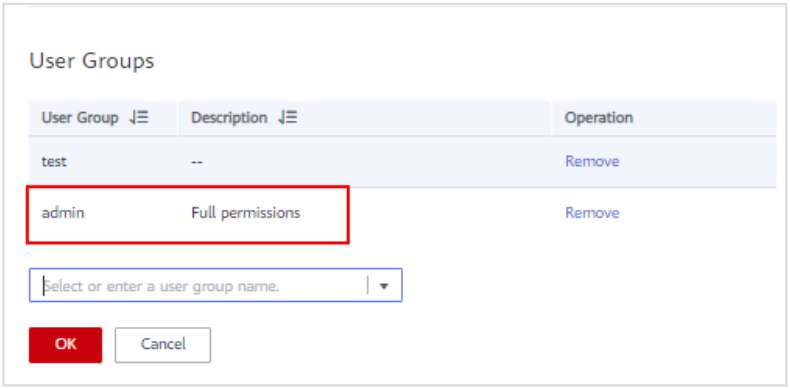
Step 4 Switch to another region and view the ECS list.

If the system displays a message saying "You do not have permission to access this page. Contact an administrator to request access", this account only has permissions in the AP-Hong Kong region.

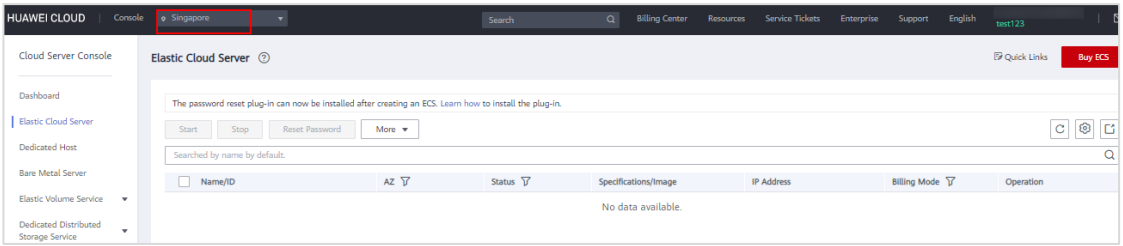


Step 5 Switch to the HUAWEI Cloud account and add **test123** to the **admin** user group.





Step 6 Log in to the IAM console as user **test123**. Switch to another region, check whether you can access all of the ECSs.



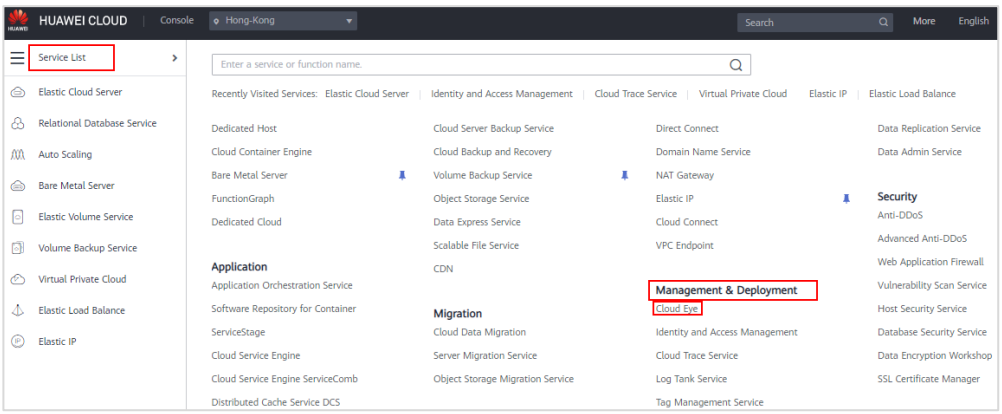
----End

4.4 Cloud Eye

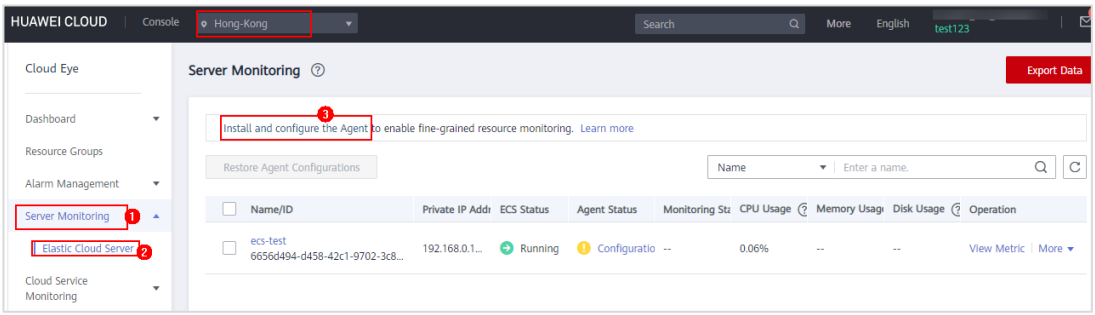
4.4.1 Monitoring an ECS

Cloud Eye is a multi-dimensional resource monitoring platform. In Cloud Eye, server monitoring performs basic monitoring, OS monitoring, and process monitoring for servers.

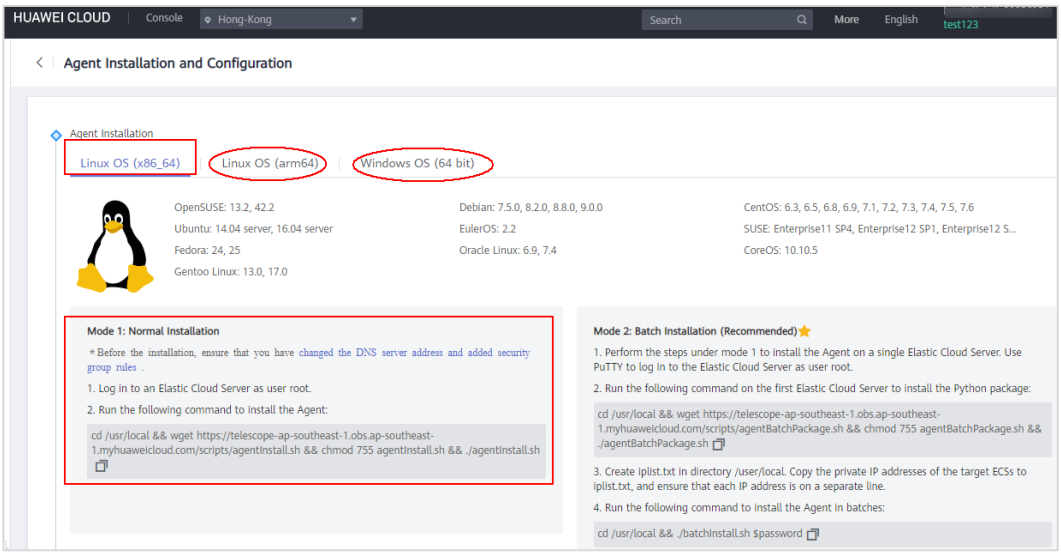
Step 1 Log in to the management console as user **test123**, switch to the AP-Hong Kong region. Click **Service List**, and under **Management & Deployment**, select **Cloud Eye**.



Step 2 In the left navigation pane, choose **Server Monitoring**, and click **Install and configure the Agent**.

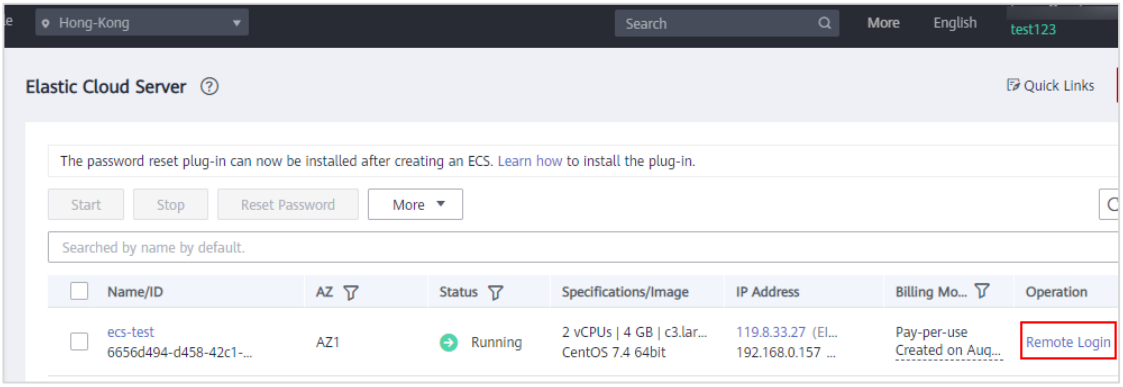


Step 3 On **Agent Installation and Configuration** page, install the Agent based on the ECS OS type.



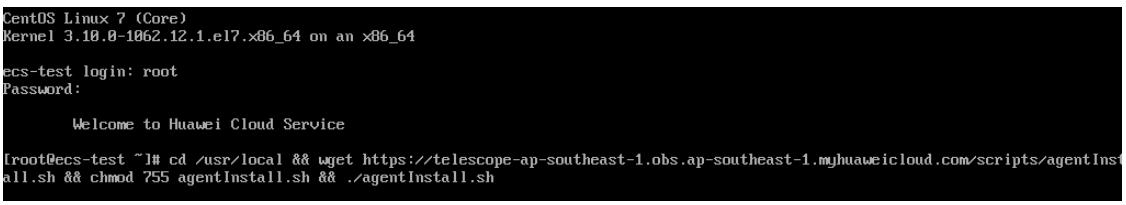
Go back to ECS console and locate the Linux **ecs-test** created in section 4.3.2. This ECS is running Linux OS (x86_64), so **Mode 1** is used to install the Agent.

Step 4 Click **Remote Login** to log in to **ecs-test**.



Step 5 Run the following command to install the Agent on **ecs-test**:

cd /usr/local && wget https://telescope-ap-southeast-1.obs.ap-southeast-1.myhuaweicloud.com/scripts/agentInstall.sh && chmod 755 agentInstall.sh && ./agentInstall.sh

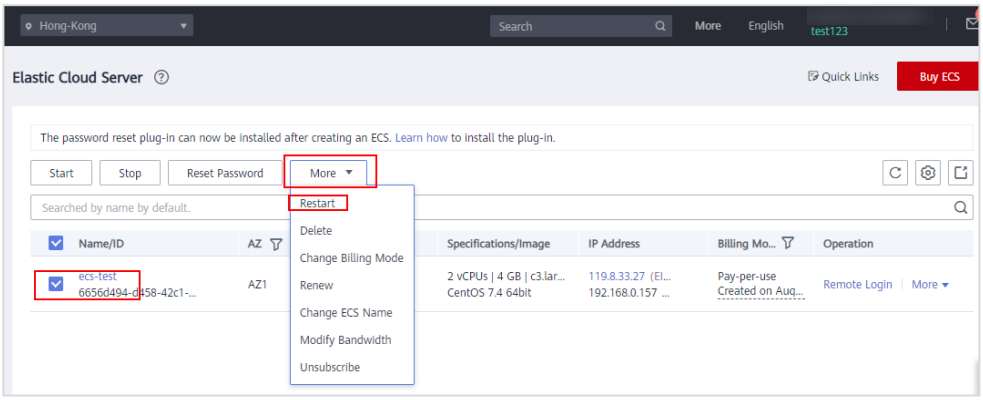


Step 6 Press **Enter**.

If the following information is displayed, the Agent has been installed.

```
/bin/curl
ces flag NOT FOUND in __support_agent_list
Current user is root.
Current linux release version : CENTOS
Start to install telescope...
In chkconfig
Success to install telescope to dir: /usr/local/telescope.
Starting telescope...
Telescope process starts successfully.
[root@ecs-test local]#
```

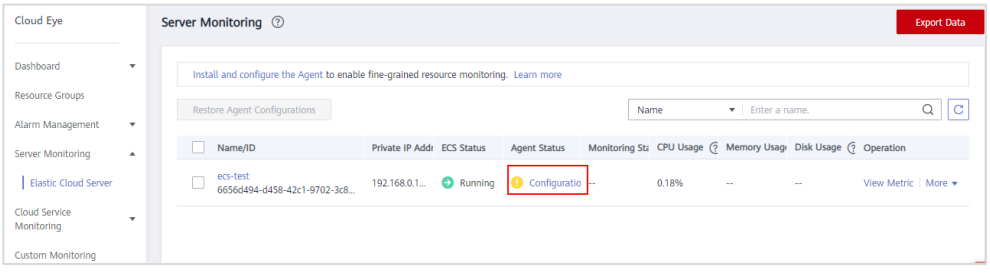
Step 7 Go back to ECS list, locate **ecs-test**, click **More** in the **Operation** column, and click **Restart**.

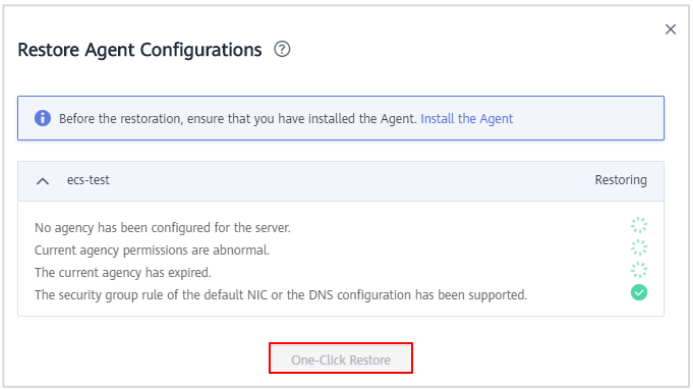


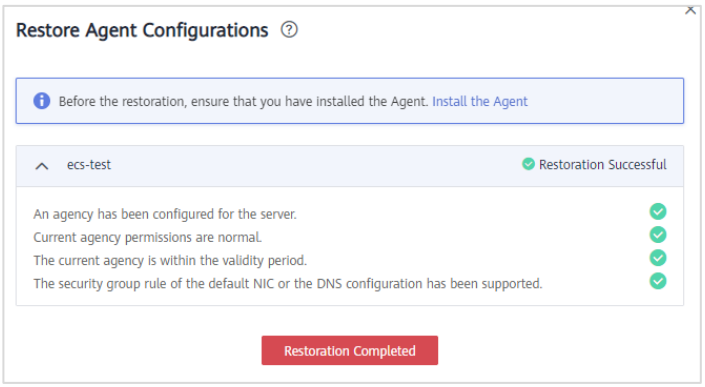
Step 8 After **ecs-test** is restarted, go back to the Cloud Eye **Server Monitoring** page and refresh the page.

The **Agent Status** will be **Configuration error**. Click **Configuration error**.

On the displayed **Restore Agent Configurations** dialog box, click **One-Click Restore**.

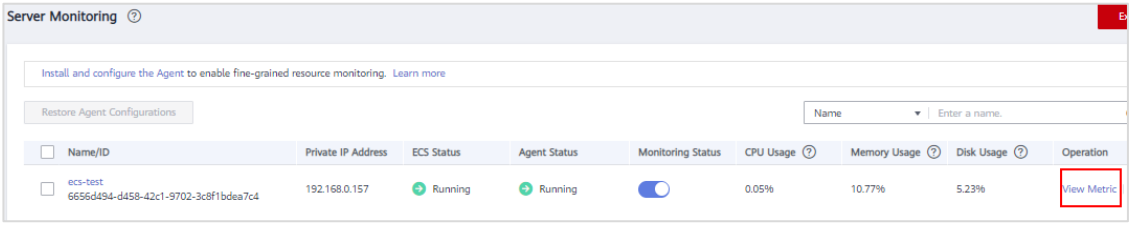




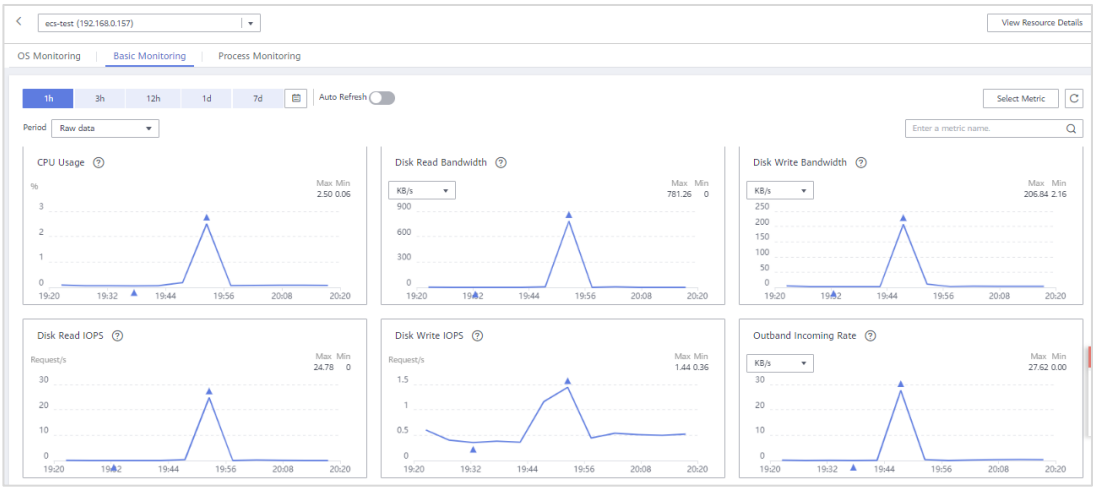


Step 9 Wait for 3 to 5 minutes.

If the **Agent Status** changes to **Running** and **Monitoring Status** is enabled, the ECS is being monitored. Click **View Metric**.



On the displayed page, you can view the ECS status.

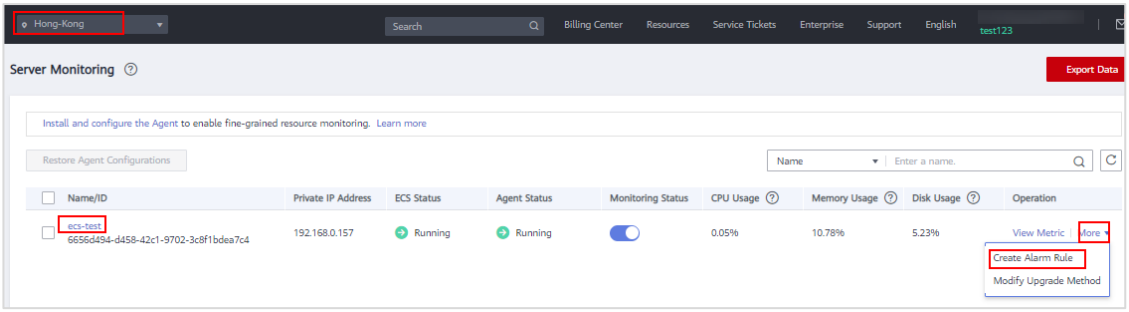


----End

4.4.2 Creating an Alarm Rule

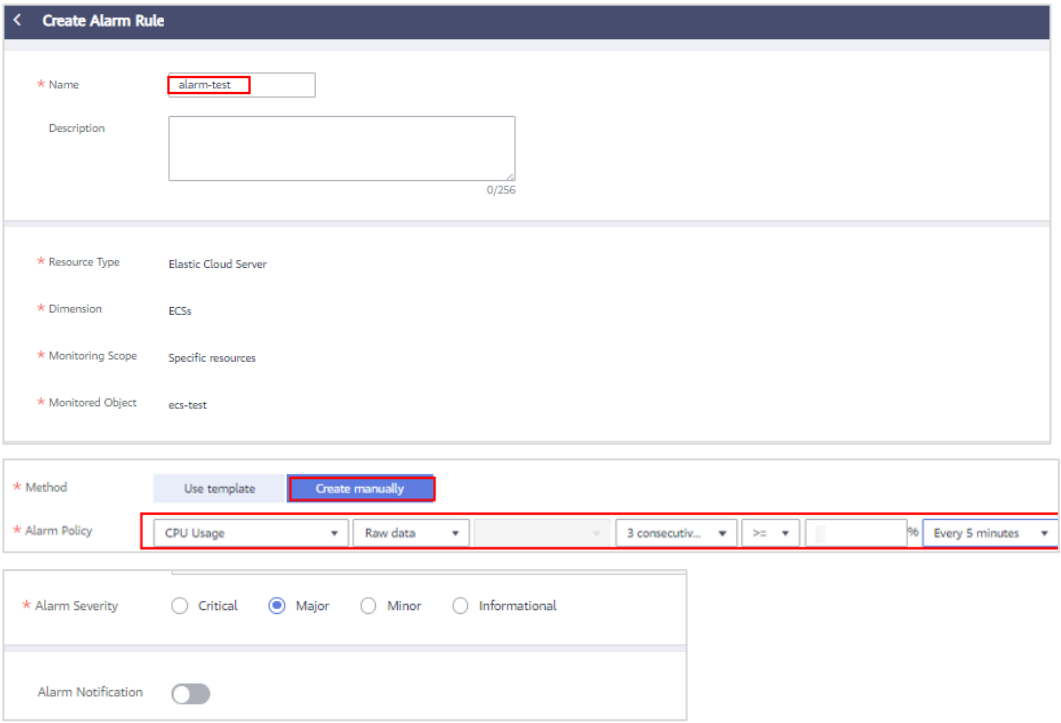
You can flexibly configure alarm rules and notifications on Cloud Eye to learn about the resource running status and performance in a timely manner and to prevent potential service losses.

Step 1 On the **Server Monitoring** page, locate **ces-test** in the ECS list. In the **Operation** column, choose **More** > **Create Alarm Rule**.



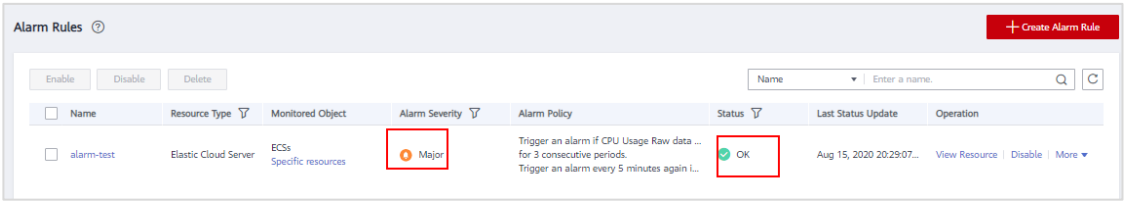
Step 2 Set the following parameters:

- **Name**: The system generates a name randomly but you can change it.
- **Method**: **Create manually**
- **Alarm Policy**: **(Agent) CPU Usage (recommended)**, **Raw data**, **3 consecutive periods**, **>=**, **0.5**, **Every 5 minutes**. In this exercise, set a small threshold to receive the alarm notifications as soon as possible.
- **Alarm Severity**: **Major**



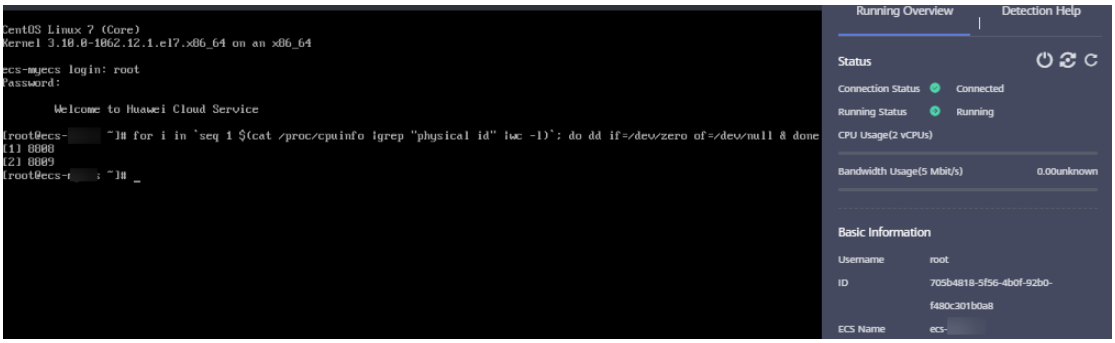
Step 3 Go to the **Alarm Rules** page.

If the alarm rule is displayed in the alarm rule list, the alarm rule has been created.



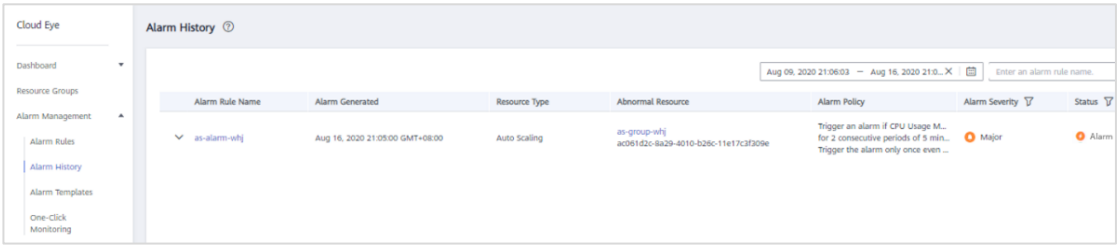
Step 4 Go back to ECS console, locate **ecs-linux**, and click **Remote Login**. Run the following command to increase the ECS CPU usage:

for i in `seq 1 $(cat /proc/cpuinfo |grep "physical id" |wc -l)`; do dd if=/dev/zero of=/dev/null & done



Wait for 5 to 10 minutes, then you can see the CPU increase.

Step 5 Refresh the **Alarm History** page to view the alarm rule status.



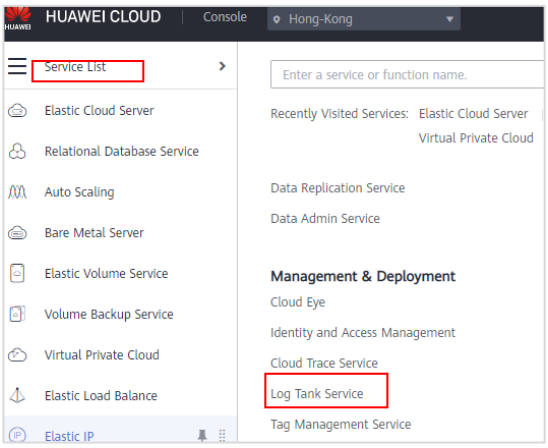
----End

4.5 LTS

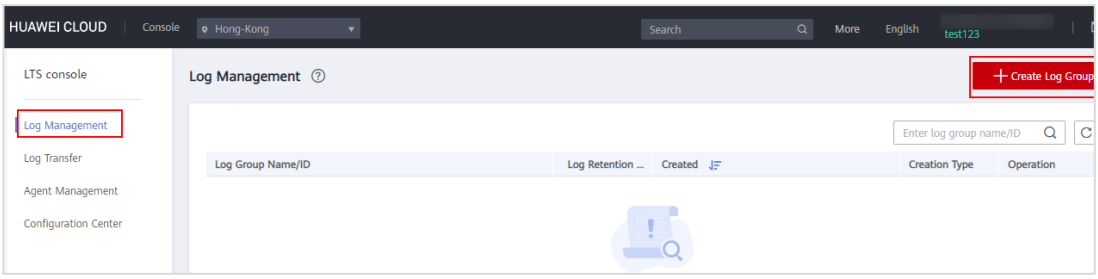
4.5.1 Creating Log Groups and Log Streams

A log group is a basic unit for managing logs. A log stream is a basic unit for reading and writing logs. Therefore, you must create a log group and a log stream before using LTS.

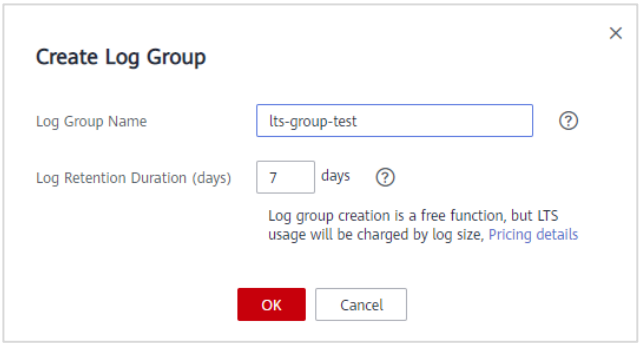
Step 1 Log in to the management console as user **test123**. Click **Service List**. Under **Management & Deployment**, select **Log Tank Service**.



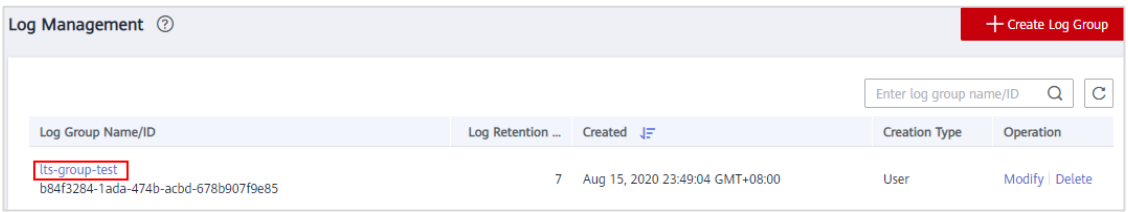
Step 2 In the left navigation pane, choose **Log Management**. In the upper right corner, click **Create Log Group**.



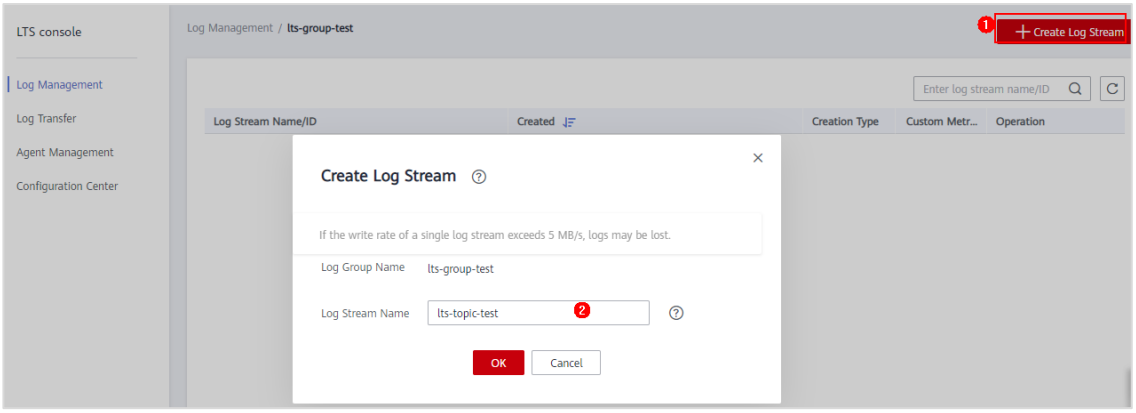
Step 3 Set **Log Group Name** and **Log Retention Duration (days)**, and click **OK**.

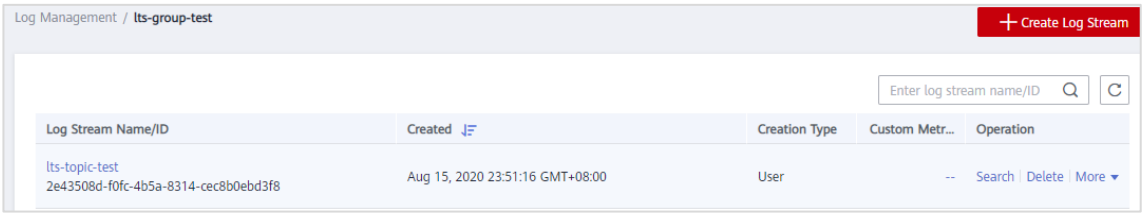


Step 4 On the **Log Management** page, click the name of the created log group.



Step 5 In the upper right corner, click **Create Log Stream**, enter the log stream name, and click **OK**.



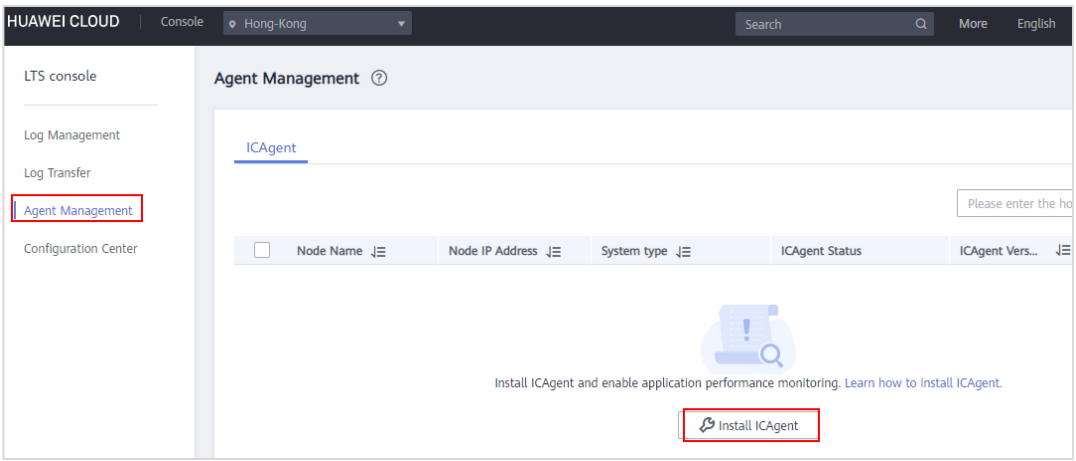


----End

4.5.2 Installing the ICAgent

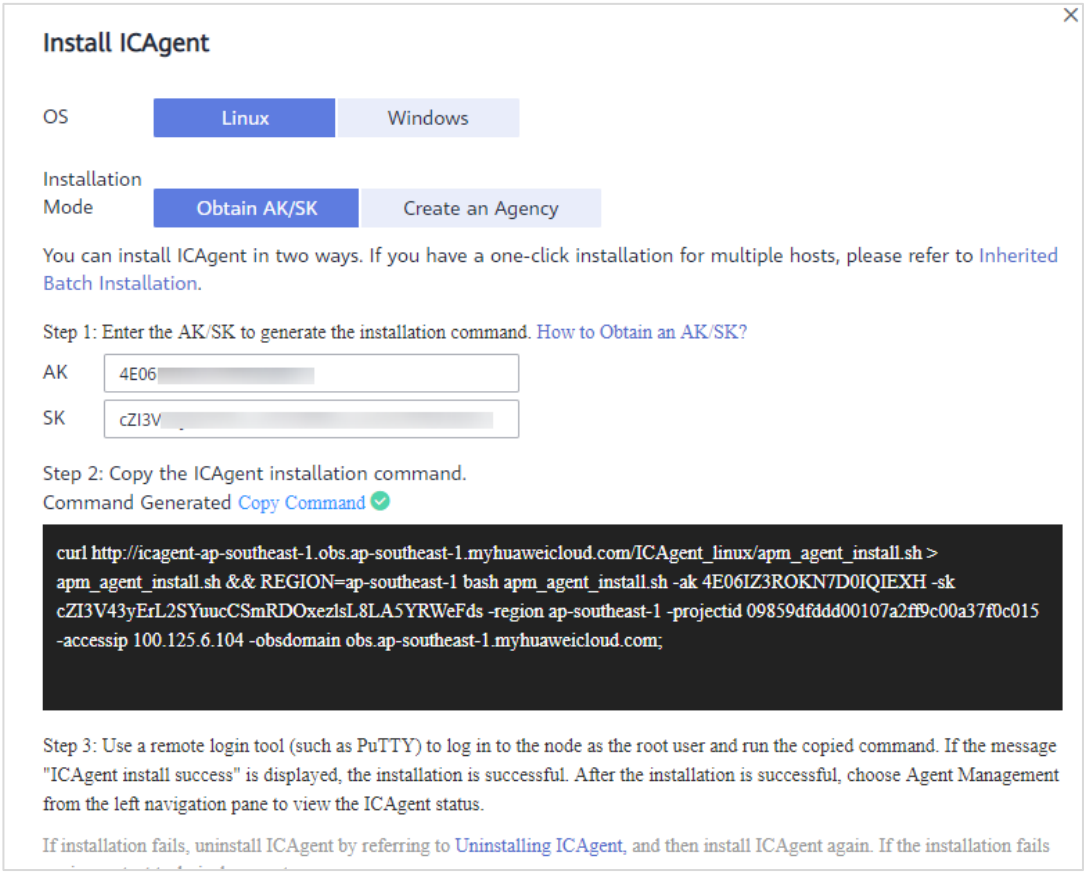
ICAgent is a tool used by LTS to collect logs. It runs on servers where logs are collected.

Step 1 In the left navigation pane, choose **Agent Management**, and click **Install ICAgent**.



Step 2 Set the following parameters.

- **OS**: **Linux**
- **Installation Mode**: **Obtain AK/SK**
- **AK/SK**: Enter the AK/SK.



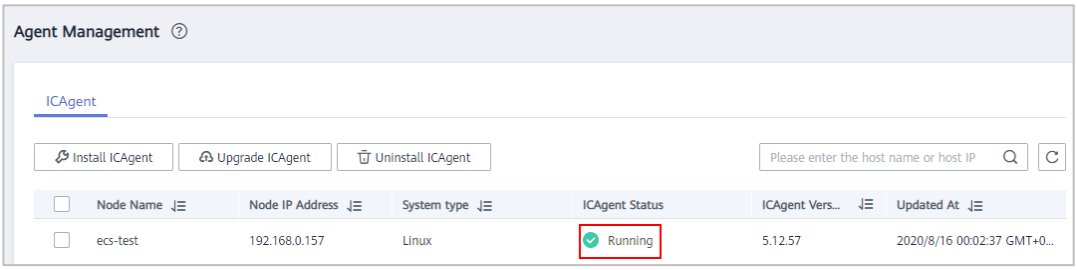
Step 3 Copy the ICAgent installation command and run it on **ecs-test**.

If the following information is displayed, the installation was successful.

```
[root@ecs-test ~]# curl http://icagent-ap-southeast-1.obs.ap-southeast-1.myhuaweicloud.com/ICAgent_linux/apm_agent_install.sh >
apm_agent_install.sh && REGION=ap-southeast-1 bash apm_agent_install.sh -ak 4E06IZ3ROKN7D0IQIEXH -sk cZI3V43yErL2SYuucCSmRDOxezl
sL8LA5YRWeFds -region ap-southeast-1 -projectid 09859dfddd00107a2ff9c00a37f0c015 -accessip 100.125.6.104 -obsdomain obs.ap-south
east-1.myhuaweicloud.com;
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100  7051  100  7051    0     0   127k      0 --:--:-- --:--:-- --:--:--  129k
start to install ICAgent.
begin to download install package from icagent-ap-southeast-1.obs.ap-southeast-1.myhuaweicloud.com.
################################################################################ 100.0%
download success.
start install package.
start install ICAgent...
################################################################################ 100.0%
no crontab for root
starting ICAgent...
ICAgent install success.
[root@ecs-test ~]#
```

Step 4 Refresh the **ICAgent** page.

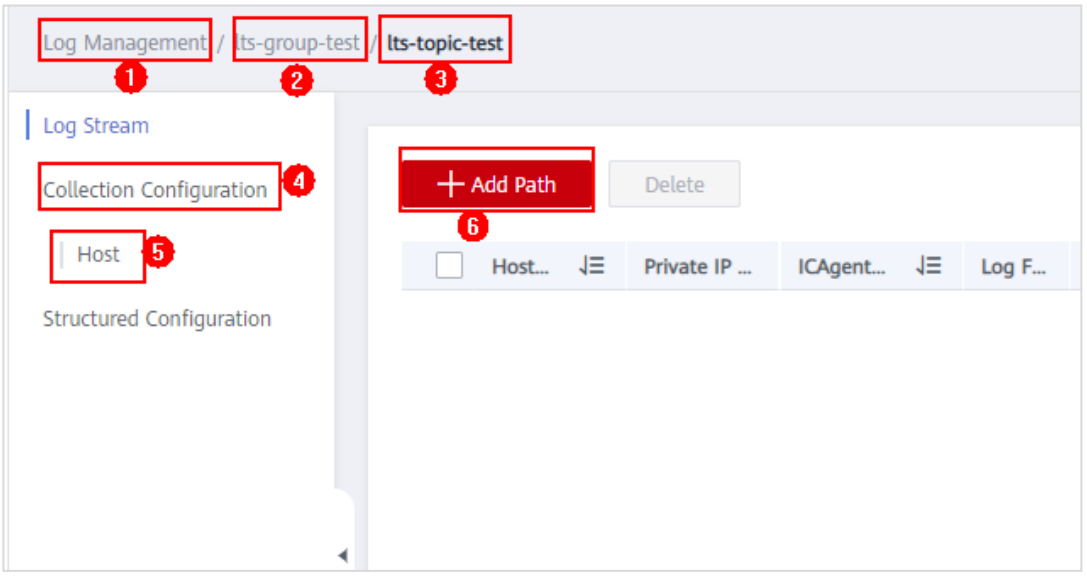
When the ICAgent status changes to **Running**, the ICAgent has been installed.



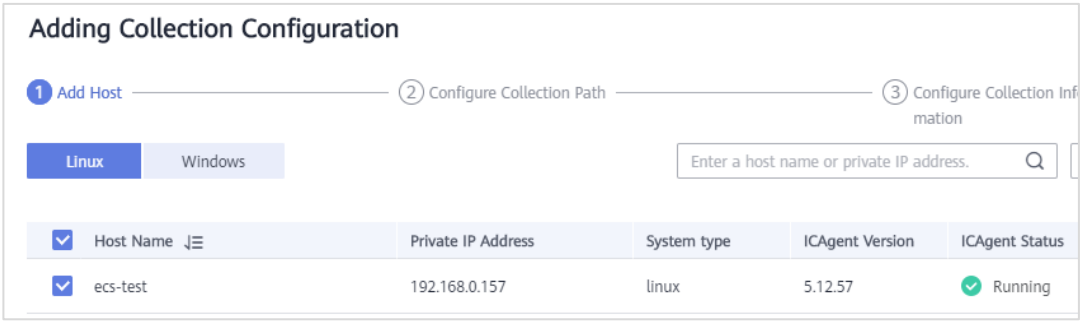
----End

4.5.3 Configuring Log Collection Rules

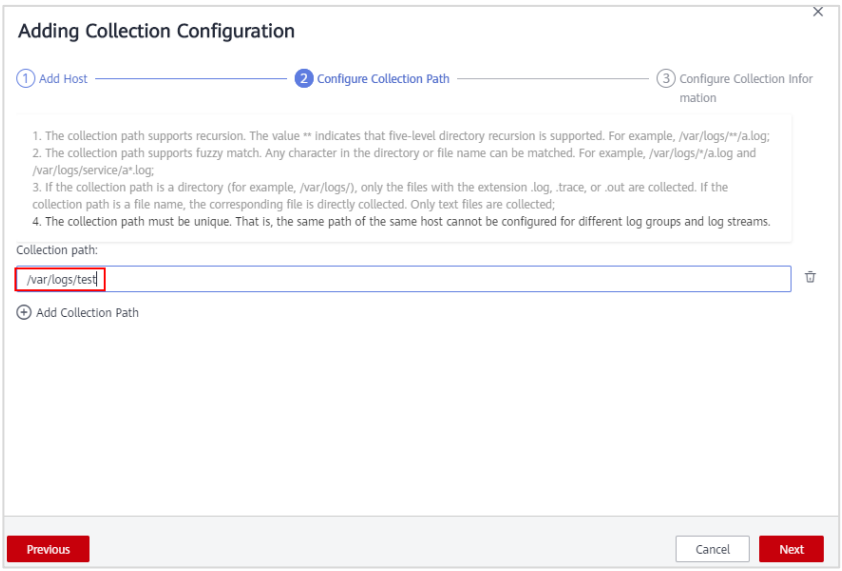
Step 1 Go to the **Log Management** page, click the name of the created log group and the name of the created log stream. On the displayed **Log Stream** page, choose **Collection Configuration** > **Host**, and click **Add Path**.



Step 2 In **Adding Collection Configuration** dialog box, select **ces-test**.

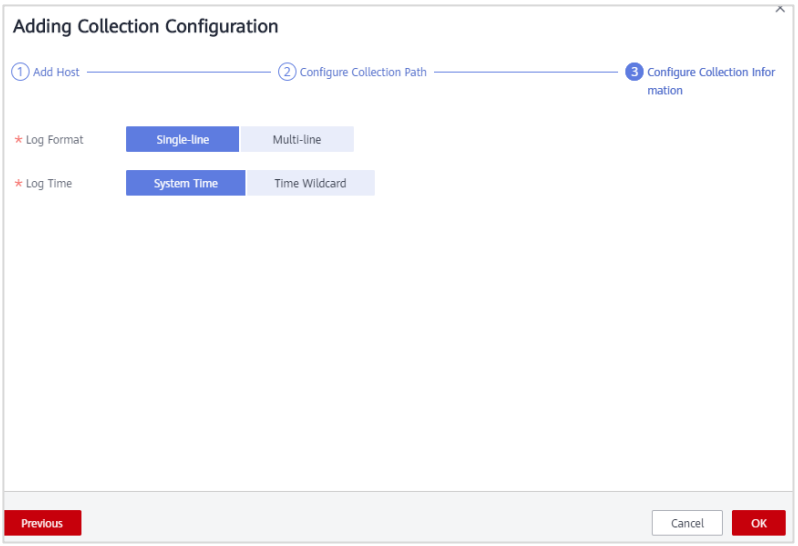


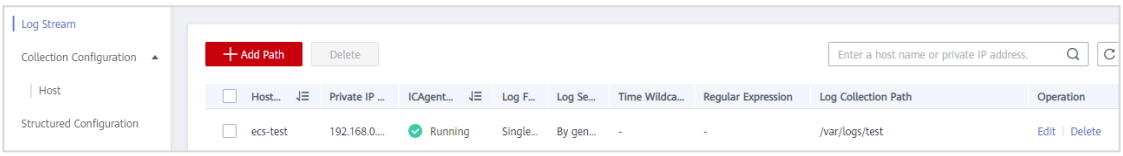
Step 3 Configure the collection path by entering one ECS log path.



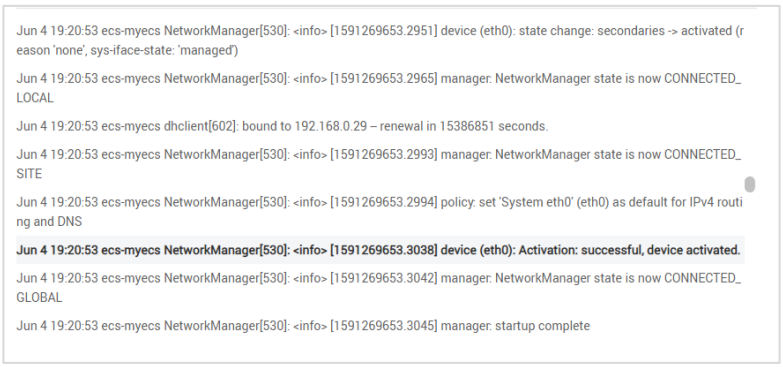
Step 4 Set the following parameters and then click **OK**.

- **Log Format**: **Single-line**
- **Log Time**: **System Time**





Step 5 Wait for about 1 minute. On the **Log Stream** page, select the **Real-Time Logs** tab and view related logs.



----End

4.6 Deleting Resources

Step 1 Delete all of the resources created for these exercises using the IAM user account (for example, **test123**). That includes any ECSs, alarm rules, cloud logs, and VPCs.

Step 2 Use the HUAWEI CLOUD account to log in to the management console and delete all of the resources used for these exercises, such as user groups and IAM user accounts, trackers and key event notifications in CTS, and also the VPC.

----End

5 RDS

5.1 Introduction

RDS is a cloud-based web service that is reliable, scalable, easy to manage, and ready for immediate use out of the box. This exercise introduces how to buy RDS for MySQL databases, how to perform basic operations, and how to connect to DB instances.

5.1.1 Objectives

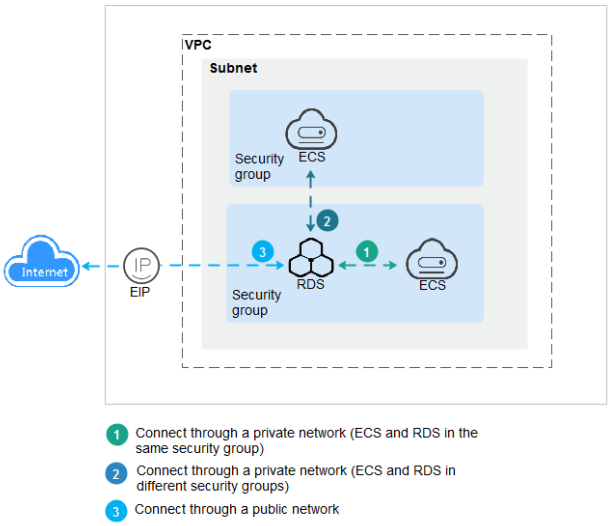
Upon completion of this exercise, you will be able to:

- Buy an RDS MySQL DB instance and perform basic operations.
- Master the method for changing the RDS MySQL database port.
- Master the method for connecting to an RDS MySQL DB instance.

5.1.2 Tasks

- Buy an RDS MySQL DB instance.
- Connect to a MySQL DB instance through DAS.
- Connect to a MySQL DB instance through a private network.
- Connect to a MySQL DB instance through a public network.

5.1.3 Exercise Architecture



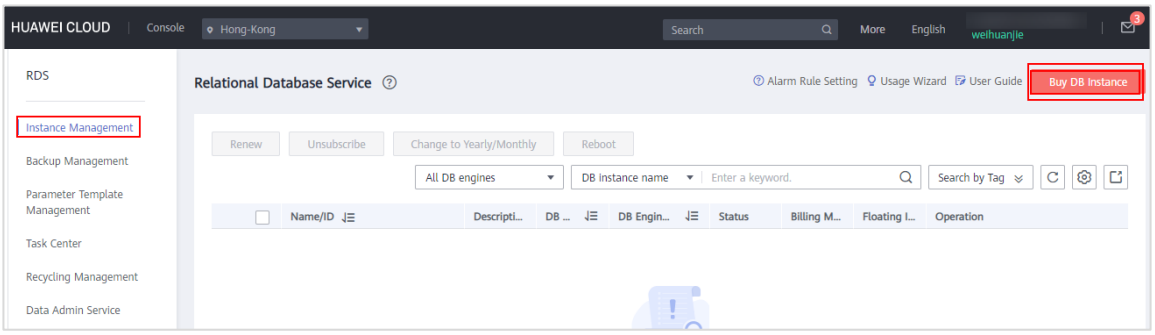
5.2 Buying an RDS MySQL DB Instance and Performing Basic Operations

RDS provides a comprehensive performance monitoring system, multiple layers of security, and a professional database management platform, allowing you to easily set, operate, and scale a relational database in the cloud. On the RDS console, you can execute all necessary tasks without any programming. This console simplifies the O&M process, and reduces routine O&M workload. Therefore, engineers can focus on application and business development.

5.2.1 Logging In to the Management Console

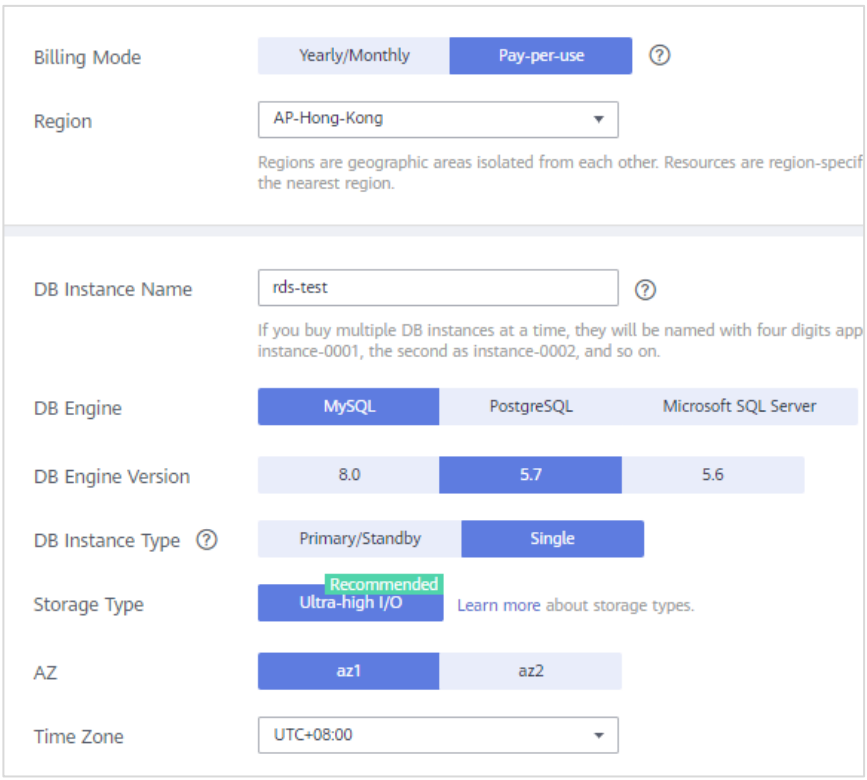
Step 1 Log in to HUAWEI CLOUD, click **Console** in the upper right corner of the menu bar, and select AP-Hong Kong.

Step 2 Choose **Service List** > **Database** > **Relational Database Service** to go to the RDS console. On the displayed page, click **Buy DB Instance**.

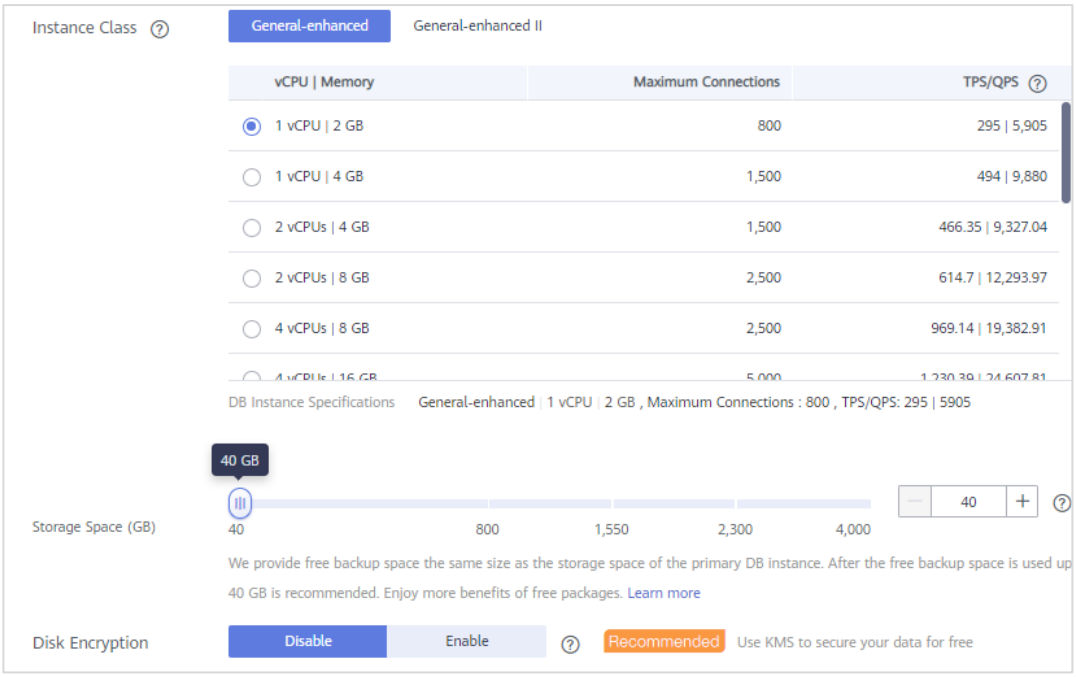


Step 3 Set the following parameters:

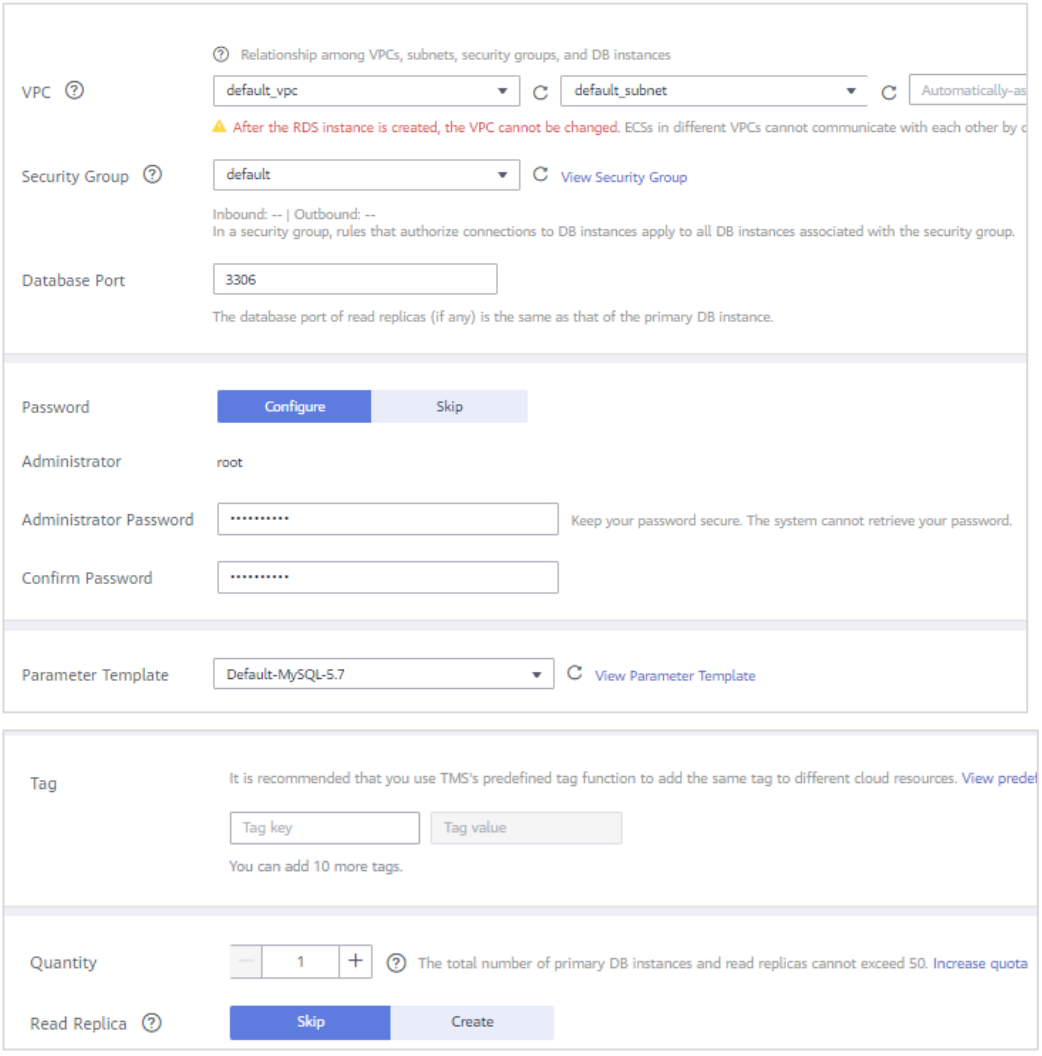
- **Billing Mode**: **Pay-per-use**
- **Region**: **CN North-Beijing4**
- **DB Instance name**: **rds-test**
- **DB Engine**: **MySQL**
- **DB Engine Version**: **5.7**
- **DB Instance Type**: **Single**
- **Storage Type**: **Ultra-high I/O**
- **AZ**: optional
- **Time Zone**: by default



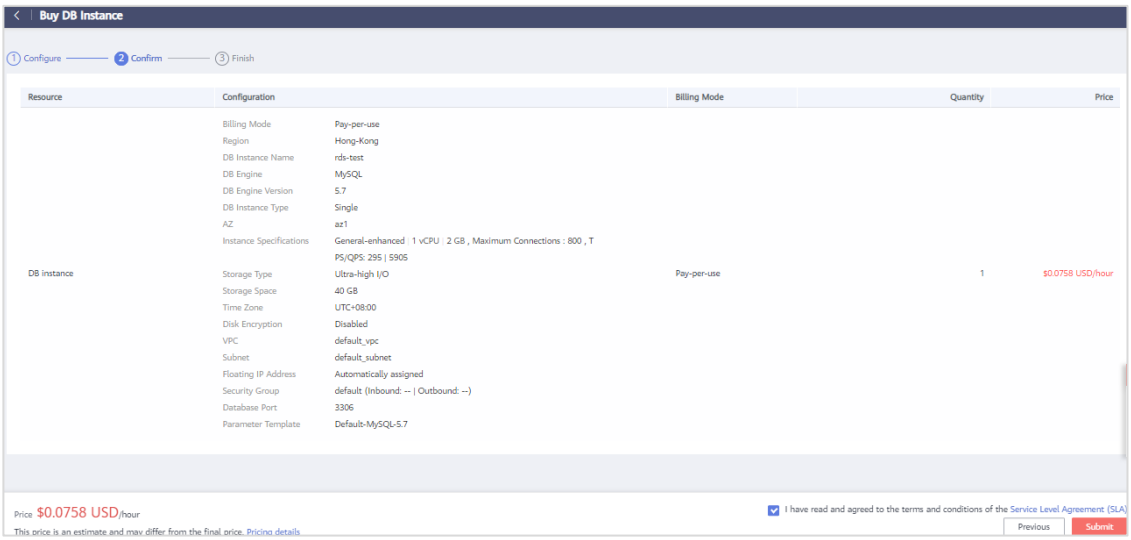
- **Instance Class**: **General-enhanced** (1 vCPU and 2 GB memory, minimal specifications on the page)
- **Storage Space**: **40 GB**
- **Disk Encryption**: **Disable**



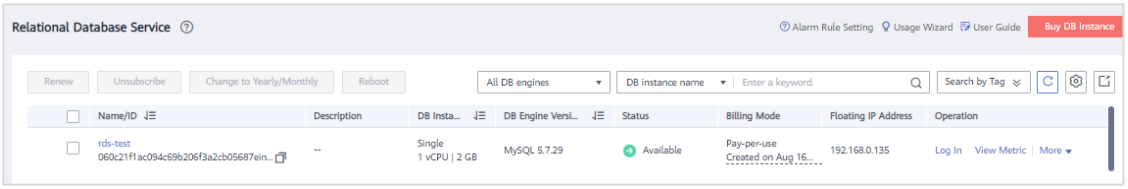
- **VPC**: Select an existing VPC. Alternatively, create a VPC, refresh the page later, and add the created VPC.
- **Security Group**: **sys-default**
- **Administrator**: **root**
- **Database Port**: **3306** (default value)
- **Administrator Password**: user-defined
- **Parameter Template**: by default
- **Quantity**: **1**
- **Read Replica**: **Skip**



Step 4 Click **Next**. On the displayed page, confirm the specifications and click **Submit**. If you need to modify your settings, click **Previous**.



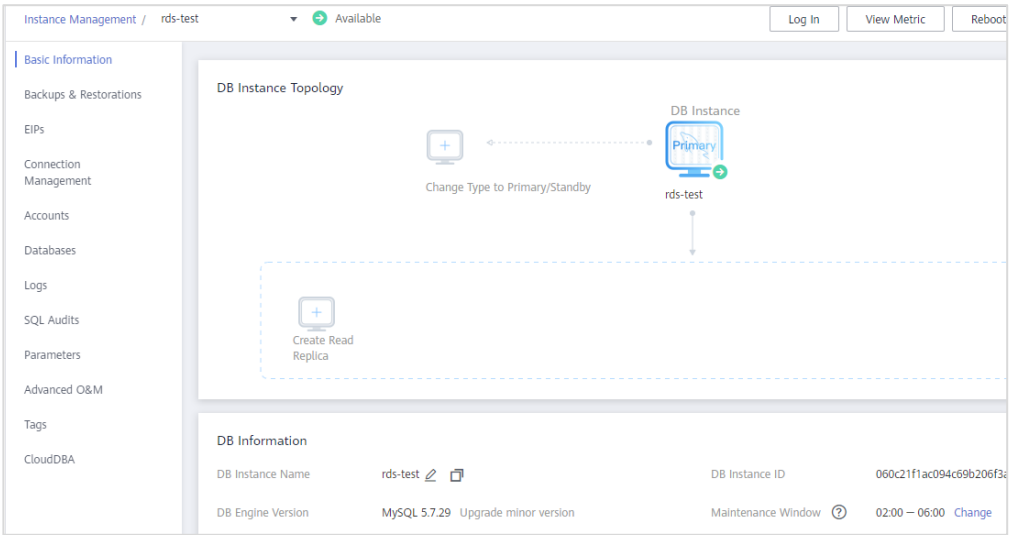
Step 5 Creating a DB instance takes about 5 to 9 minutes. During the process, the instance status displayed in the DB instance list is **Creating**. You can periodically refresh the list to see if the creation is finished. Once the DB instance is ready, the status changes to **Available**.



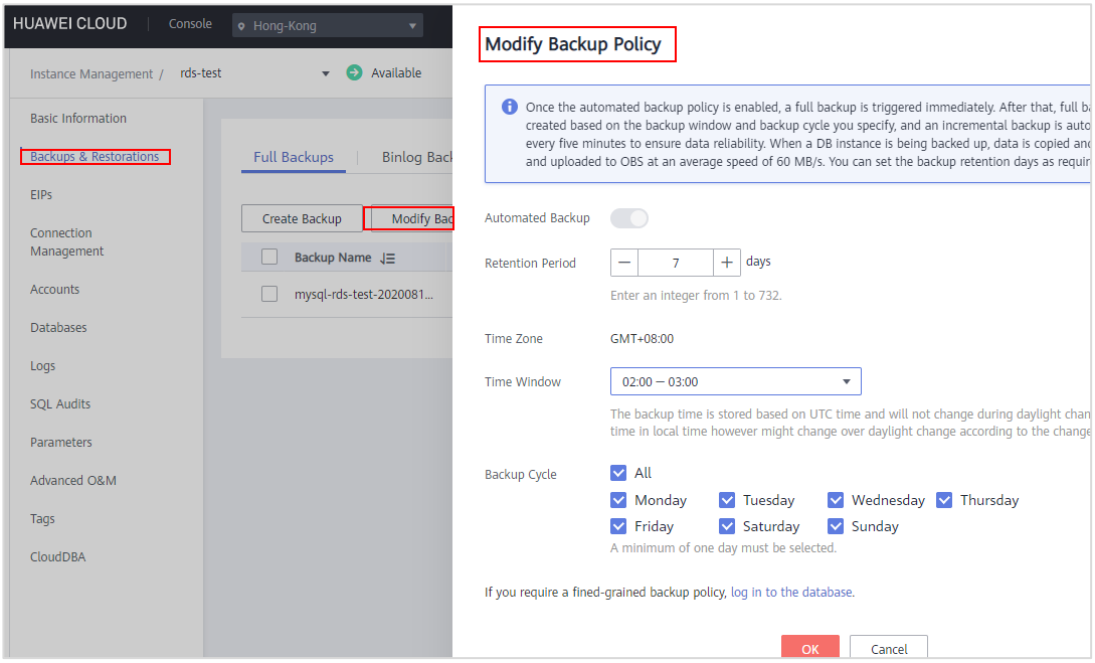
----End

5.2.2 Modifying the Automated Backup Policy for an RDS MySQL DB Instance

Step 1 Click a DB instance to view its details.



Step 2 On the **Backup & Restoration** page, click **Modify Backup Policy** and modify the backup policy based on service requirements.



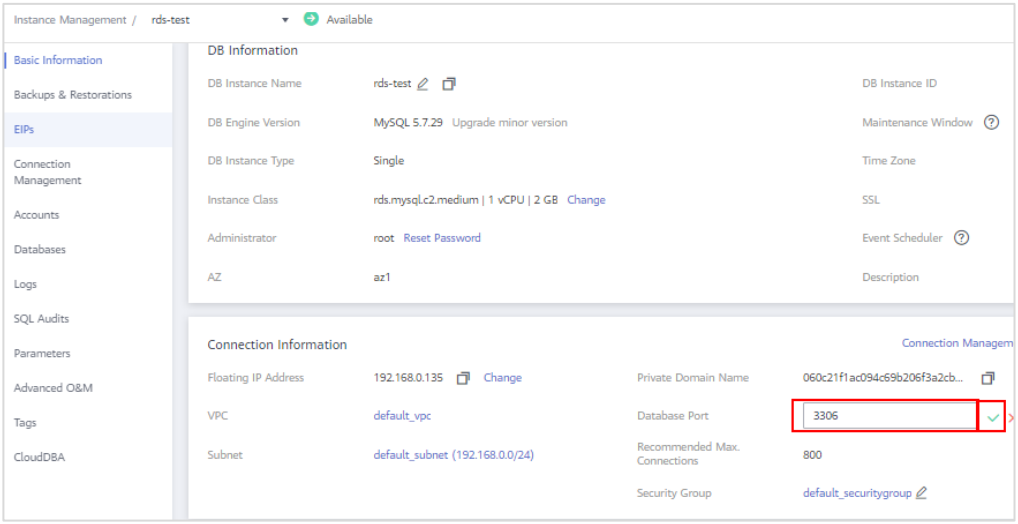
----End

5.2.3 Changing the Database Port of an RDS MySQL DB Instance

After a MySQL DB instance is created, the default database port is 3306. You can change the database port if needed.

Step 1 On the **Instance Management** page, click the target DB instance.

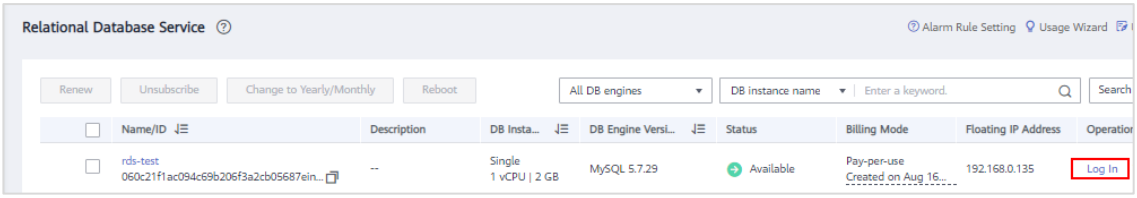
Step 2 In the **Connection Information** area on the **Basic Information** page, click  in the **Database Port** field to change the database port if needed.



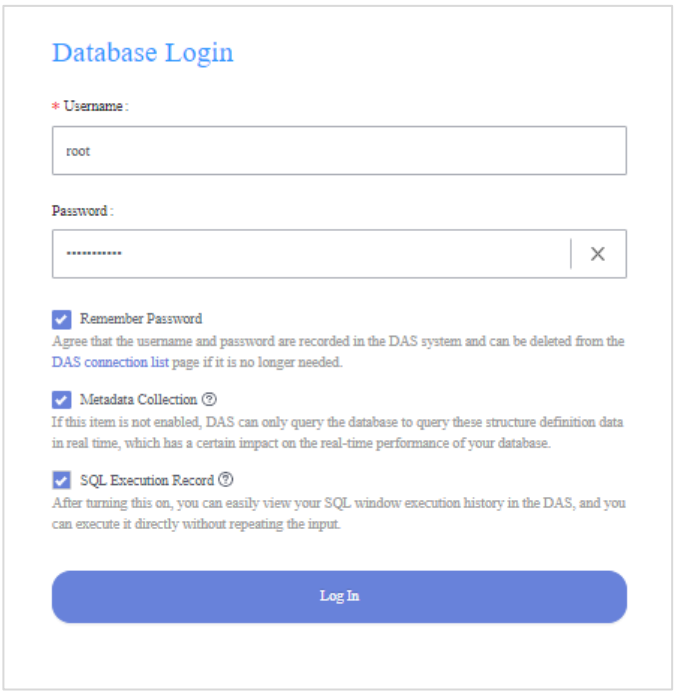
----End

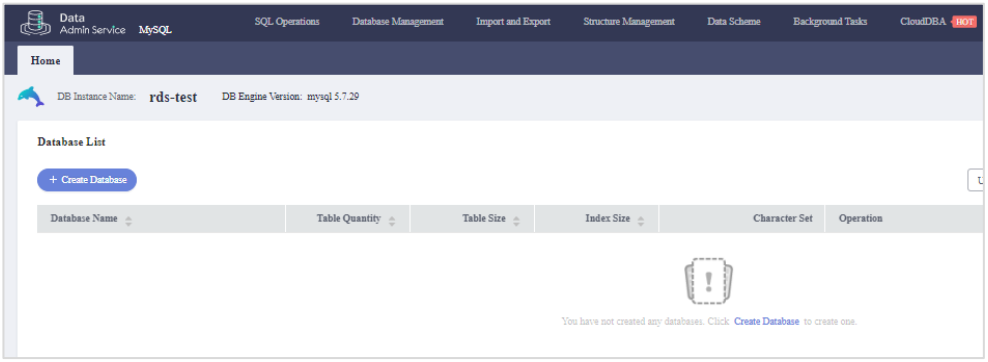
5.3 Connecting to a MySQL DB Instance Through DAS

Step 1 Go back to the RDS instance list, locate the target DB instance you want to log in and click **Log In** in the **Operation** column.

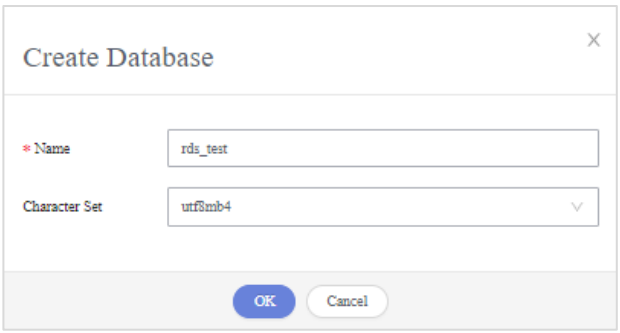


Step 2 Provide the username and password. The username is **root**. The password is the one you set when the instance was created.

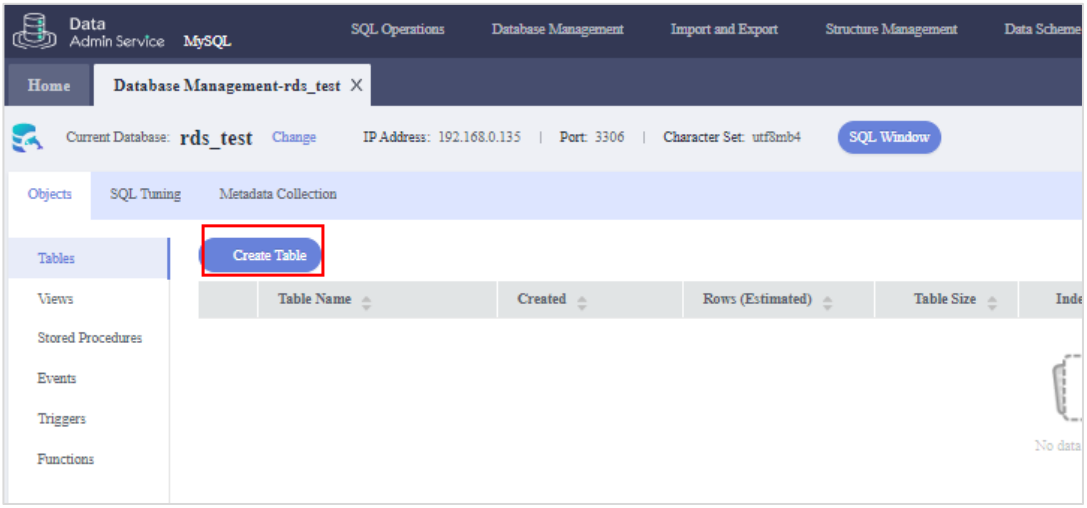




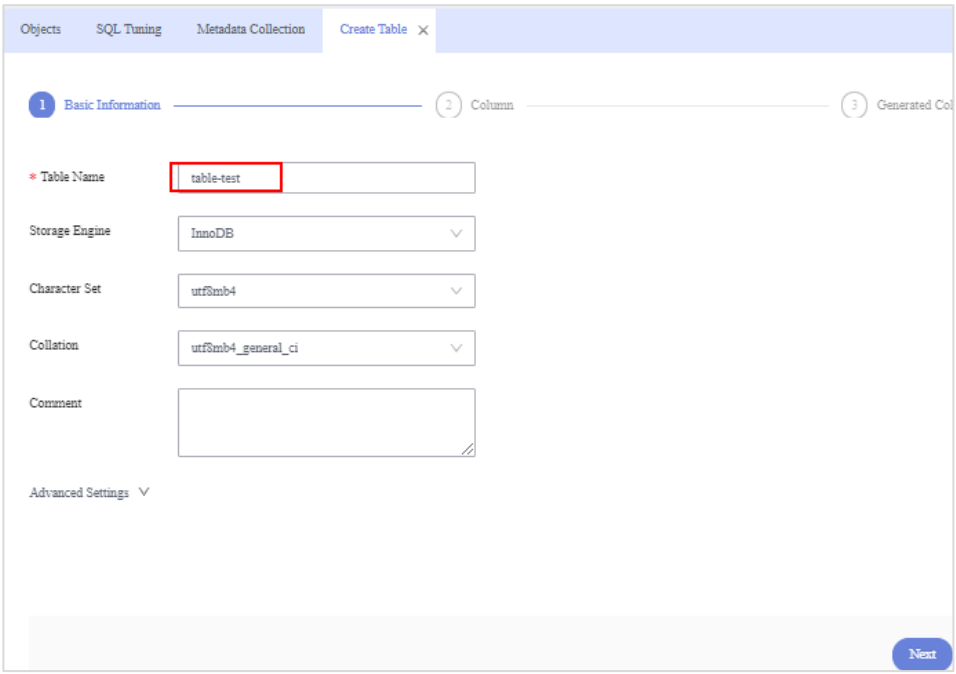
Step 3 Click **Create Database**, specify **Name**, and click **OK**.



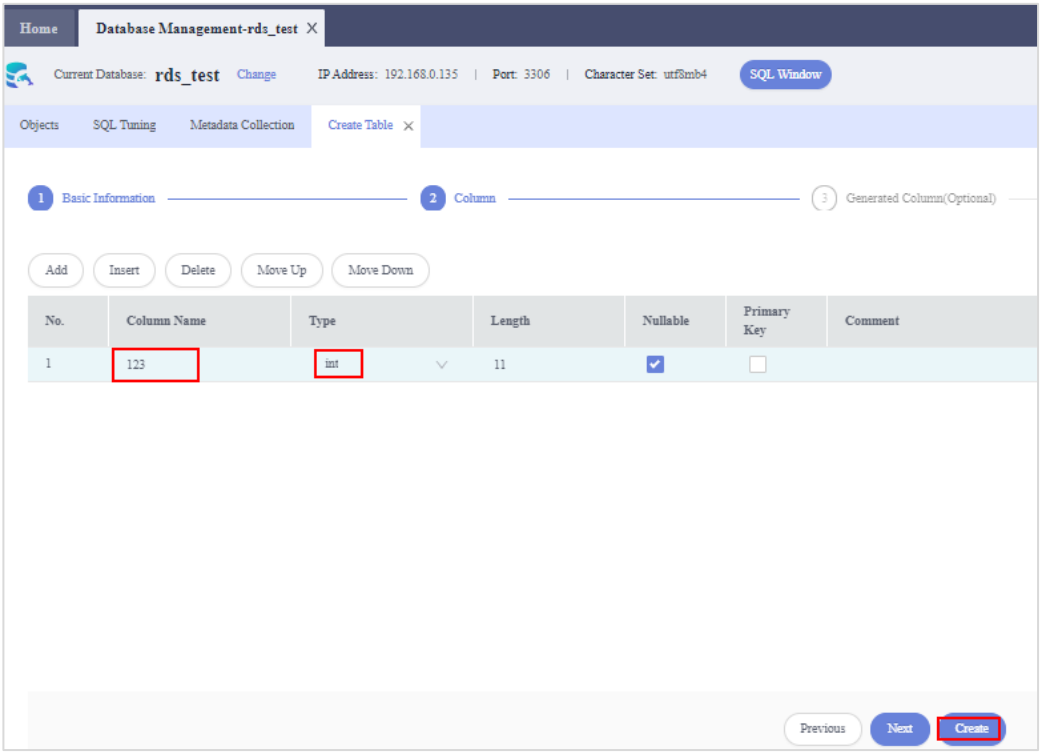
Step 4 Click the name of the created database. On the displayed page, click **Create Table**.

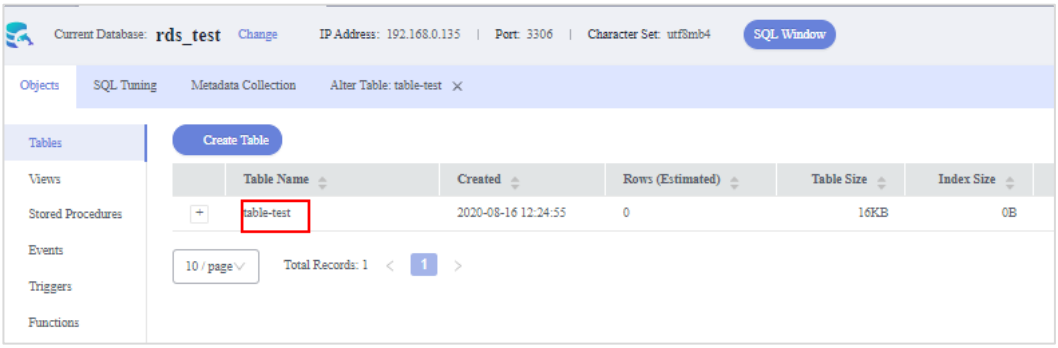


Step 5 Enter the basic information when prompted and click **Next**.



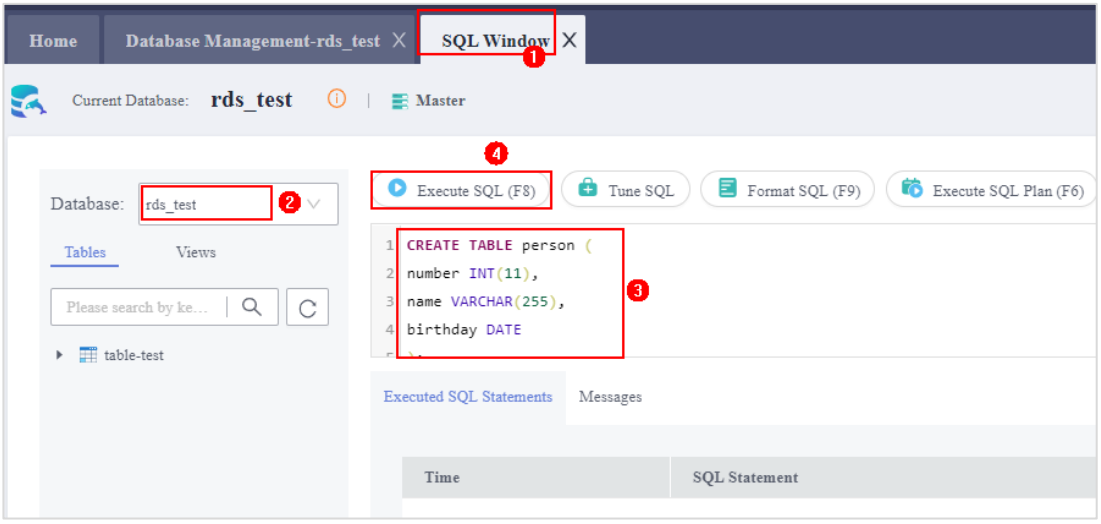
Step 6 Specify **Column Name**, **Type**, and other information. Click **Create**.



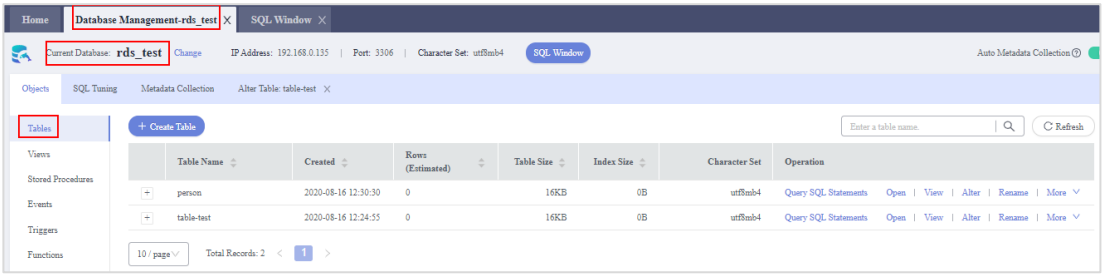


Step 7 You can also use SQL statements to create a table. An example is illustrated in the following figure. Click **SQL Window**, select database **rds_test**, clear any existing SQL statements, and copy the following statements into the window to create a table named **person**. Then, click **Execute** to create the table.

```
CREATE TABLE person (
number INT(11),
name VARCHAR(255),
birthday DATE
);
```



Step 8 Go back to the table list and check that table **person** has been created.

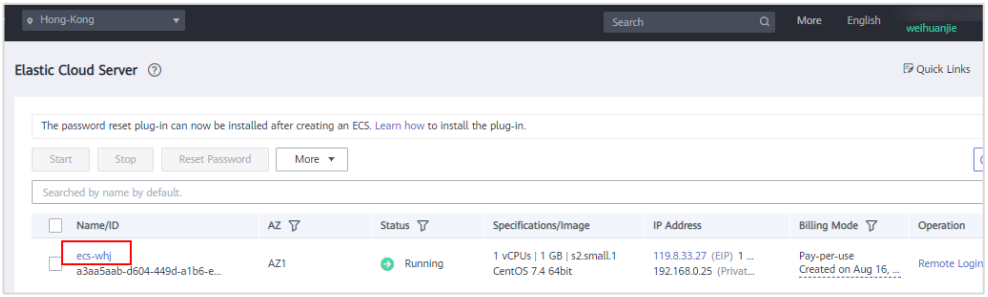


Step 9 Click **More** in the **Operation** column and drop or maintain the table as required. In this exercise, the table is not dropped.

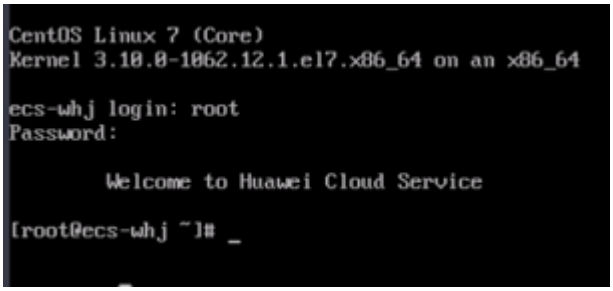
----End

5.4 Connecting to a MySQL DB Instance Through a Private Network

Step 1 Go back to the HUAWEI CLOUD console, select AP-Hong Kong. Click **Service List** and choose **Elastic Cloud Server** In the left navigation pane. Buy a Linux ECS (with an EIP) by referring to section 1.1.4. The following uses an ECS running CentOS as an example. Ensure that the VPC and security group of the ECS are the same as those of the RDS DB instance.

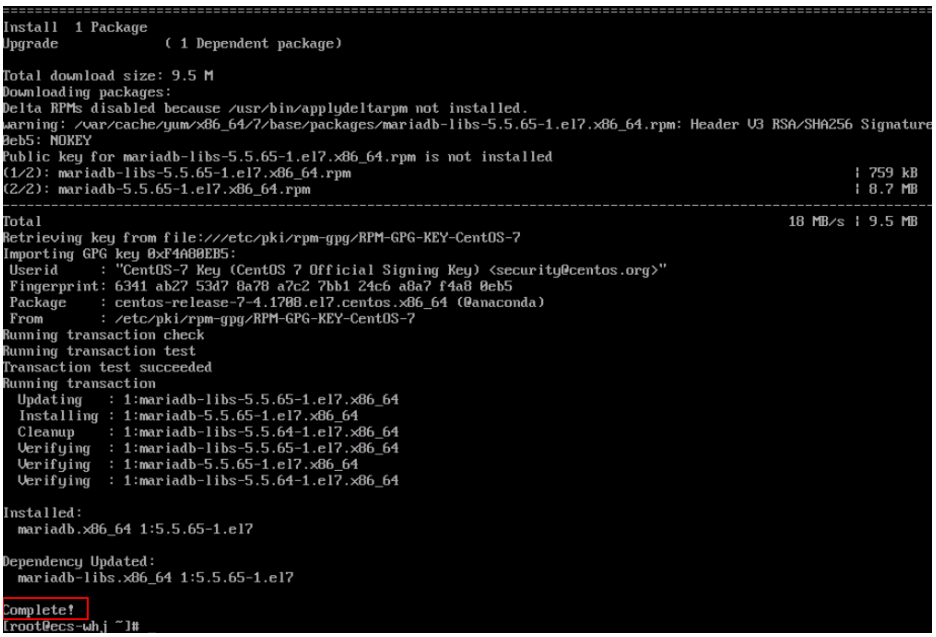


Step 2 Enter the username and password to log in to the ECS.



Step 3 Run the following command to install the MySQL client. The installation is complete if information in the following figure is displayed.

yum install mysql -y



Step 4 Run the following command to connect to the MySQL database on the target host: (Note: If the ECS and RDS DB instance are in the same security group, the ECS and RDS DB instance can communicate with each other by default. You do not need to set security group rules. You can ping the RDS private IP address on the ECS for verification. If the

ECS and RDS DB instance are in different security groups, you need to set security group rules for the ECS and RDS DB instance, respectively.)

mysql -h RDS private IP address -uroot -p RDS instance password

```
[root@ecs-whj ~]# mysql -h 192.168.0.136 -uroot -phuawei@123!
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MySQL connection id is 64594
Server version: 5.7.29-2-log MySQL Community Server - (GPL)

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MySQL [(none)]> [  253.592196] psmouse serio1: VMMouse at isa0060/serio1/input0 lost sync at byte 1
[  253.632212] psmouse serio1: VMMouse at isa0060/serio1/input0 - driver resynced.
```

Step 5 Run the following command to view the databases. You can see the default database and the database created on the DAS console. (Operations on MySQL databases must comply with the standard SQL syntax and end with semicolons (;).)

show databases;

```
MySQL [(none)]> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| performance_schema |
| rds_test           |
| sys                |
+--------------------+
5 rows in set (0.01 sec)

MySQL [(none)]>
```

Step 6 Run the following command to use the database:

***use** rds_test* **#the database created on DAS**

```
MySQL [(none)]> use rds_test
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
MySQL [rds_test]>
```

Step 7 Run the following command to view the tables created on the DAS in the database:

show tables;

```
MySQL [rds_test]> show tables;
+--------------------+
| Tables_in_rds_test |
+--------------------+
| person             |
| table-test         |
+--------------------+
2 rows in set (0.00 sec)

MySQL [rds_test]>
```

Step 8 Run the following command to exit:

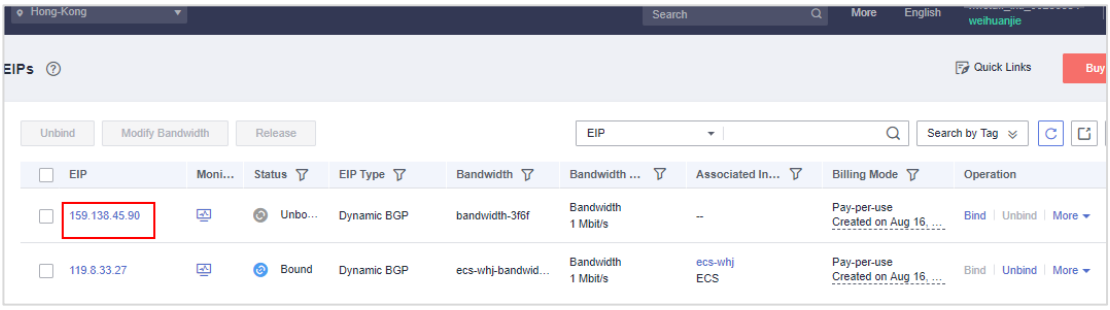
exit;

```
MySQL [rds_test]> exit;
Bye
[root@ecs-whj ~]#
```

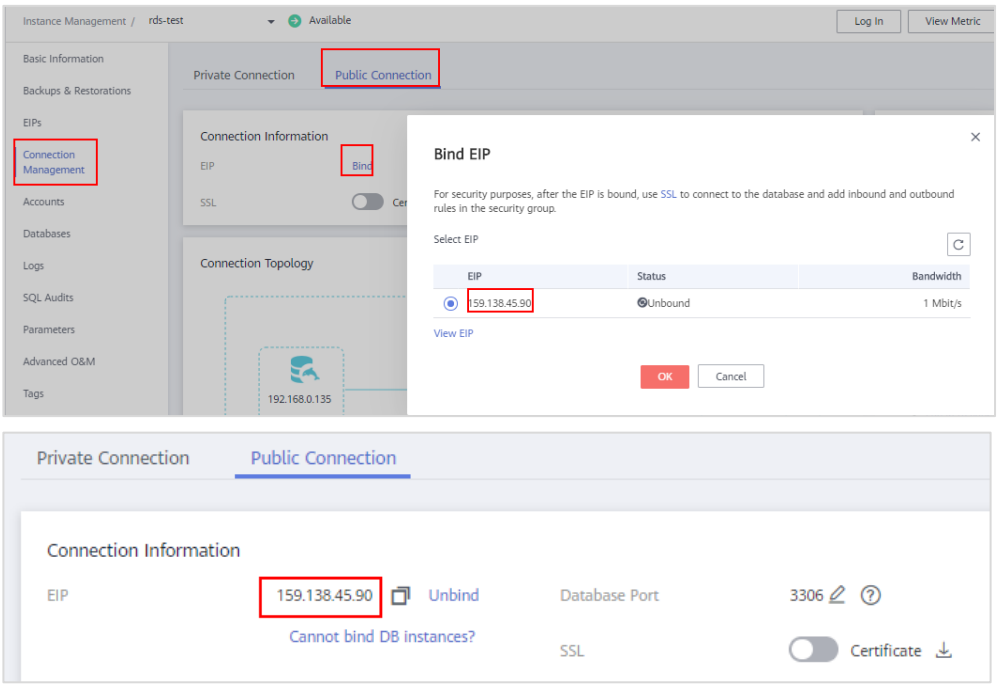
----End

5.5 Connecting to a MySQL DB Instance Through a Public Network

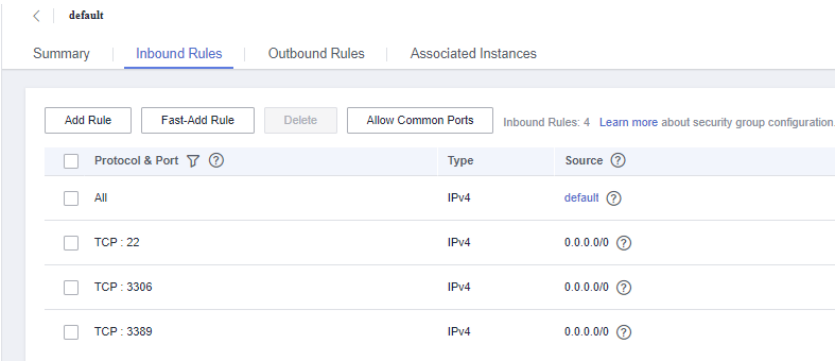
Step 1 Buy an EIP on the network console by referring to section 3.2.



Step 2 Go back to the RDS console. On the **Instance Management** page, click the target DB instance. On the displayed page, choose **Connection Management** > **Public Connection**, and click **Bind** in the **EIP** field.



Step 3 Click the security group. On the **Inbound Rules** page, add an inbound rule for port 3306.



Step 4 On the ECS, check whether the RDS DB instance can connect to the MySQL database through the EIP bound to the RDS DB instance. If information similar to the following figure is displayed, the connection was successful. If the connection failed, check whether they are in the same security group and whether the security group policy is configured correctly.)

ping RDS-EIP

```
[root@ecs-whj ~]# ping 121.36.46.92
PING 121.36.46.92 (121.36.46.92) 56(84) bytes of data.
64 bytes from 121.36.46.92: icmp_seq=34 ttl=55 time=3.08 ms
64 bytes from 121.36.46.92: icmp_seq=35 ttl=55 time=2.48 ms
64 bytes from 121.36.46.92: icmp_seq=36 ttl=55 time=2.52 ms
64 bytes from 121.36.46.92: icmp_seq=37 ttl=55 time=2.42 ms
64 bytes from 121.36.46.92: icmp_seq=38 ttl=55 time=2.44 ms
64 bytes from 121.36.46.92: icmp_seq=39 ttl=55 time=2.39 ms
64 bytes from 121.36.46.92: icmp_seq=40 ttl=55 time=2.75 ms
64 bytes from 121.36.46.92: icmp_seq=41 ttl=55 time=2.51 ms
64 bytes from 121.36.46.92: icmp_seq=42 ttl=55 time=2.54 ms
64 bytes from 121.36.46.92: icmp_seq=43 ttl=55 time=2.39 ms
64 bytes from 121.36.46.92: icmp_seq=44 ttl=55 time=2.59 ms
64 bytes from 121.36.46.92: icmp_seq=45 ttl=55 time=2.39 ms
64 bytes from 121.36.46.92: icmp_seq=46 ttl=55 time=2.43 ms
64 bytes from 121.36.46.92: icmp_seq=47 ttl=55 time=2.80 ms
64 bytes from 121.36.46.92: icmp_seq=48 ttl=55 time=2.38 ms
64 bytes from 121.36.46.92: icmp_seq=49 ttl=55 time=2.45 ms
```

Step 5 Run the following command to connect to the RDS DB instance again:

mysql -h RDS-EIP -P 3306 (database port number) -uroot -p RDS instance password

```
[root@ecs-whj ~]# mysql -h 192.168.0.135 -P 3306 -uroot -phuawei@123!
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MySQL connection id is 11374
Server version: 5.7.29-5-log MySQL Community Server - (GPL)

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MySQL [(none)]>
```

Step 6 Run the following command to view the databases. You can see the default database and the database created on the DAS console. (Operations on MySQL databases must comply with the SQL statement standard and end with semicolons (;).)

show databases;

```
MySQL [(none)]> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| performance_schema |
| rds_test           |
| sys                |
+--------------------+
5 rows in set (0.00 sec)

MySQL [(none)]>
```

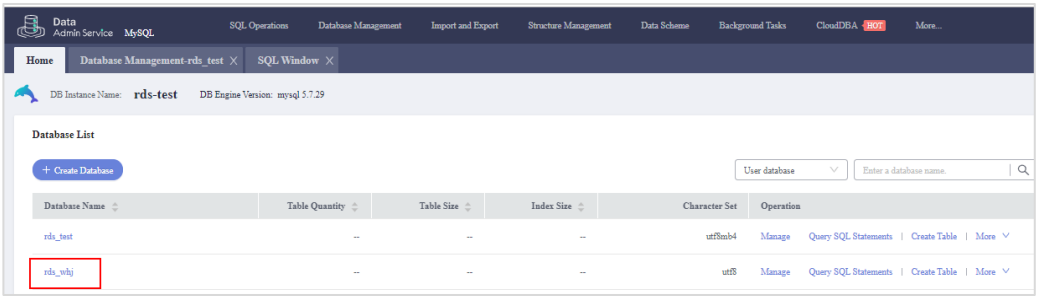
Step 7 Run the following command to create another database:

create database rds_whj; #rds_whj is the name of the created database.

```
MySQL [(none)]> create database rds_whj;
Query OK, 1 row affected (0.00 sec)

MySQL [(none)]>
```

Step 8 Go back to the DAS console. You can see the created database is already in the database list.



Step 9 Go back to the ECS login page and run the following command to exit:

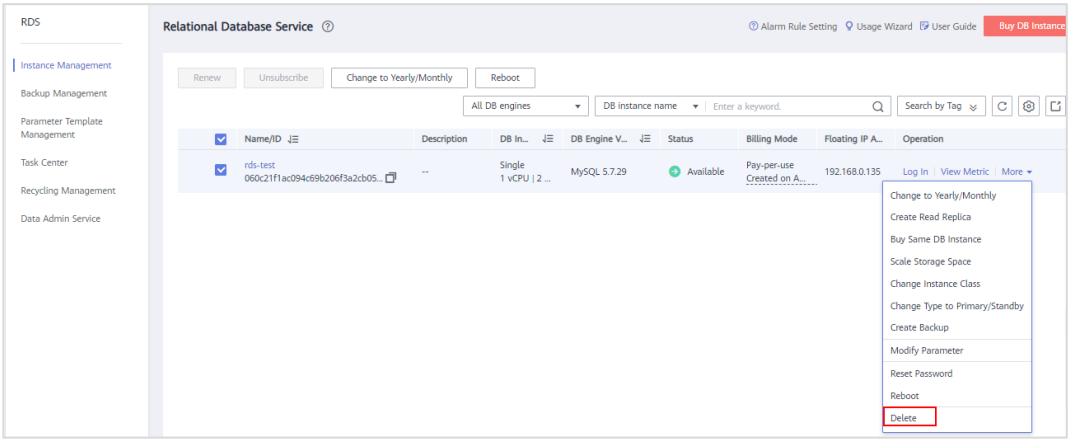
exit;

```
MySQL [(none)]> exit;
Bye
[root@ecs-whj ~]#
```

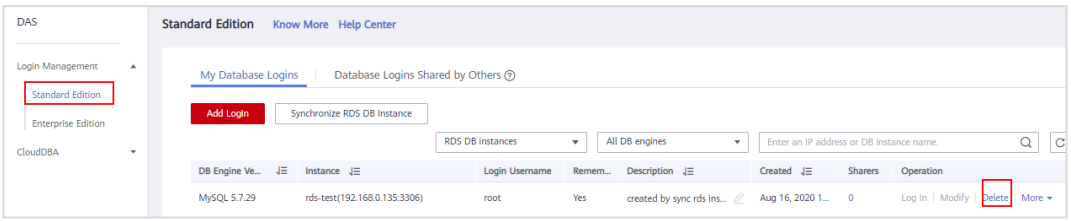
----End

5.6 Deleting Resources

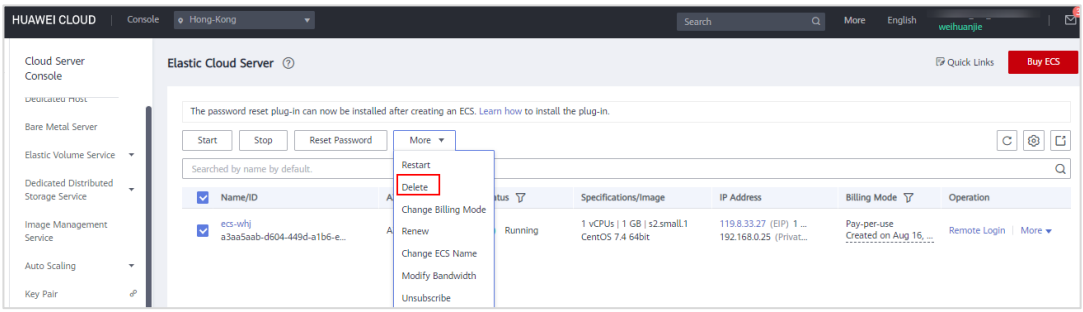
Step 1 Delete the RDS DB instance created in this exercise.

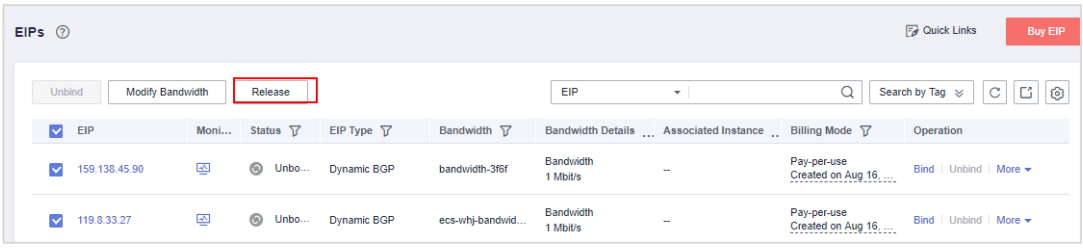


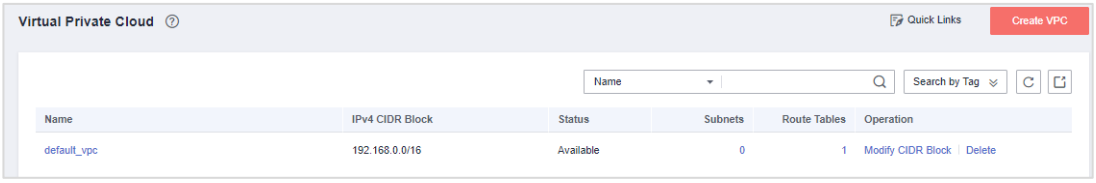
Step 2 Delete DAS resources.



Step 3 Delete the ECS and related EIP and VPC resources.







Check whether there are still any resources that have not been deleted in the account. If there are, delete them. Make sure that all resources created in this exercise are deleted.

6 Comprehensive Exercises: HA Architecture for Enterprise ECSs

6.1 Application Scenario

An enterprise intends to deploy their website on HUAWEI CLOUD with the following requirements:

- Data nodes and service nodes are deployed separately, and service nodes are deployed on ECSs.
- The number of ECSs can be dynamically adjusted based on service traffic.
- Service traffic can be automatically distributed to the ECSs.
- Service statuses can be monitored.

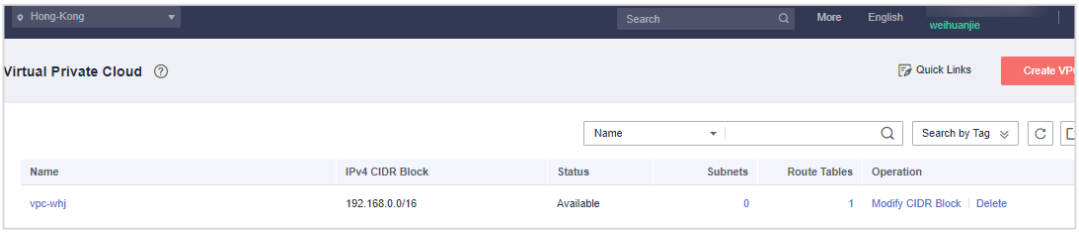
6.2 Solution

Requirement	Solution	Involved Services
Service nodes are deployed on ECSs.	Buy ECSs as service nodes. Use the VPC service to provide network resources for the ECSs.	ECS and VPC
The number of ECSs can be dynamically adjusted based on service traffic.	Use AS to dynamically increase or decrease the number of ECSs based on service traffic to ensure stable service running. ECSs are created based on the existing AS configuration (service node configuration).	AS and IMS
Service traffic can be automatically distributed across the ECSs.	Use ELB to automatically distribute service traffic across multiple ECSs for better fault tolerance.	ELB
Service statuses can be monitored.	Use Cloud Eye to monitor service statuses.	Cloud Eye

6.3 Preparations

Step 1 Create a VPC.

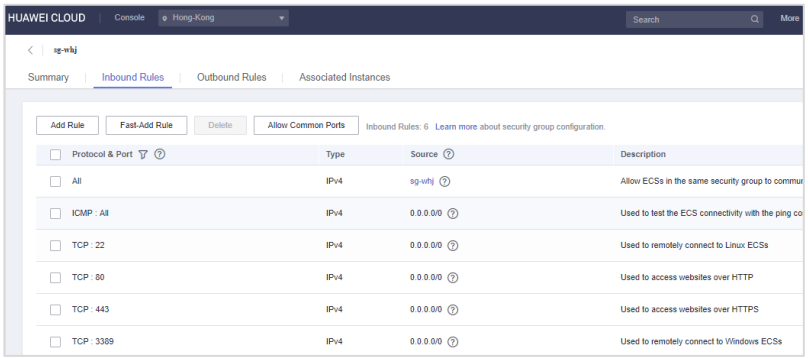
- Visit the HUAWEI CLOUD official website and click **Log In** in the upper right corner. Enter username and password, and then click **Login**.
- On the management console, switch the region to AP-Hong Kong. In the left navigation pane, choose **Service List** > **Network** > **Virtual Private Cloud**. Create a VPC. For details, see section 3.2.1.



Step 2 Create and configure a security group.

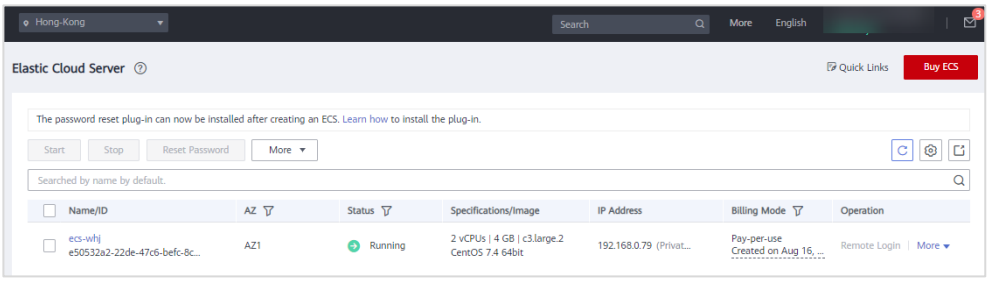
1. On the network console, choose **Access Control** > **Security Groups** and create a security group.

2. Click the security group name. On the page that is displayed, click **Inbound Rules** and then **Add Rule** to add an inbound rule with the following parameter settings:
   - **Protocol & Port**: **All**
   - **IP address** in **Source**: **0.0.0.0/0**



Step 3 Buy a Linux ECS in the AP-Hong Kong region.

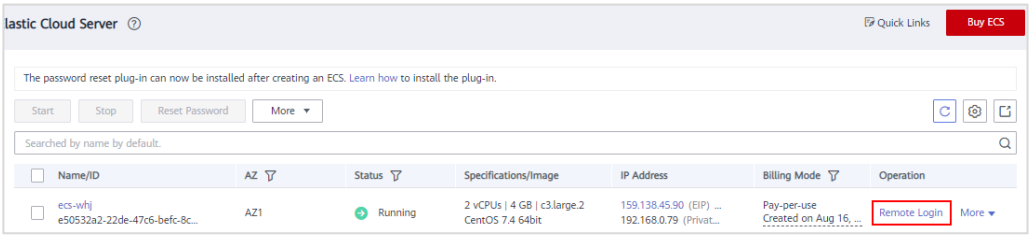
When setting parameters for the ECS, select the VPC and security group created in Step 1 and Step 2 of this procedure.



----End

6.4 Setting Up the Apache HTTP Server

Step 1 Switch back to the **Elastic Cloud Server** page and click **Remote Login** in the **Operation** column of the purchased ECS.



Step 2 In the VNC window, enter the username (**root** for Linux by default) and password for login.

Step 3 Run the following command to install LAMP and enable desired processes:

yum install -y httpd php php-fpm php-server php-mysql mysql

```
[root@ecs-whj ~]# yum install -y httpd php php-fpm php-server php-mysql mysql
```

After the command is successfully executed, "Complete!" is displayed.

```
Installed:
  httpd.x86_64 0:2.4.6-93.el7.centos  mariadb.x86_64 1:5.5.65-1.el7  php.x86_64 0:5.4.16-48.el7  php-fpm.x86_64 0:5.4.16-48.el7
  php-mysql.x86_64 0:5.4.16-48.el7

Dependency Installed:
  apr.x86_64 0:1.4.8-5.el7              apr-util.x86_64 0:1.5.2-6.el7        httpd-tools.x86_64 0:2.4.6-93.el7.centos
  libzip.x86_64 0:0.10.1-8.el7          mailcap.noarch 0:2.1.41-2.el7        php-cli.x86_64 0:5.4.16-48.el7
  php-common.x86_64 0:5.4.16-48.el7     php-pdo.x86_64 0:5.4.16-48.el7

Dependency Updated:
  mariadb-libs.x86_64 1:5.5.65-1.el7

Complete!
[root@ecs-whj ~]#
```

Step 4 Run the following command to configure httpd:

vim /etc/httpd/conf/httpd.conf

```
#
# This is the main Apache HTTP server configuration file.  It contains the
# configuration directives that give the server its instructions.
# See <URL:http://httpd.apache.org/docs/2.4/> for detailed information.
# In particular, see
# <URL:http://httpd.apache.org/docs/2.4/mod/directives.html>
# for a discussion of each configuration directive.
#
# Do NOT simply read the instructions in here without understanding
# what they do.  They're here only as hints or reminders.  If you are unsure
# consult the online docs. You have been warned.
#
# Configuration and logfile names: If the filenames you specify for many
# of the server's control files begin with "/" (or "drive:/" for Win32), the
# server will use that explicit path.  If the filenames do *not* begin
# with "/", the value of ServerRoot is prepended -- so 'log/access_log'
# with ServerRoot set to '/www' will be interpreted by the
# server as '/www/log/access_log', where as '/log/access_log' will be
# interpreted as '/log/access_log'.

#
# ServerRoot: The top of the directory tree under which the server's
# configuration, error, and log files are kept.
#
# Do not add a slash at the end of the directory path.  If you point
# ServerRoot at a non-local disk, be sure to specify a local disk on the
# Mutex directive, if file-based mutexes are used.  If you wish to share the
# same ServerRoot for multiple httpd daemons, you will need to change at
# least PidFile.
#
ServerRoot "/etc/httpd"

#
# Listen: Allows you to bind Apache to specific IP addresses and/or
# ports, instead of the default. See also the <VirtualHost>
# directive.
#
# Change this to Listen on specific IP addresses as shown below to
# prevent Apache from glomming onto all bound IP addresses.
#
#Listen 12.34.56.78:80
Listen 80

#
# Dynamic Shared Object (DSO) Support
#
# To be able to use the functionality of a module which was built as a DSO you
"/etc/httpd/conf/httpd.conf" 353L, 11753C
```

Step 5 In the configuration file, press **Shift+G** to go to the last line of the configuration file, press **I** to enter the editing mode, move the cursor to the end of the configuration file, and press **Enter**. Then, copy and paste the following code:

ServerName localhost:80

```
# Supplemental configuration
#
# Load config files in the "/etc/httpd/conf.d" directory, if any.
IncludeOptional conf.d/*.conf
ServerName localhost:80
```

Step 6 Press **Esc** to exit the editing mode, enter **:wq**, and press **Enter** to save and exit the configuration file.

```
# Supplemental configuration
#
# Load config files in the "/etc/httpd/conf.d" directory, if any.
IncludeOptional conf.d/*.conf
ServerName localhost:80
:wq
```

Step 7 Run the following command to download the WordPress installation software:

wget -c https://hciacloud.obs.ap-southeast-1.myhuaweicloud.com/wordpress-5.3.1.tar.gz

If information similar to the following is displayed, the WordPress installation package has been downloaded.

```
[root@ecs-whj ~]# wget -c https://hciacloud.obs.ap-southeast-1.myhuaweicloud.com/wordpress-5.3.1.tar.gz
--2020-08-16 18:44:23--  https://hciacloud.obs.ap-southeast-1.myhuaweicloud.com/wordpress-5.3.1.tar.gz
Resolving hciacloud.obs.ap-southeast-1.myhuaweicloud.com (hciacloud.obs.ap-southeast-1.myhuaweicloud.com)... 100.125.100.3, 100.
125.100.2
Connecting to hciacloud.obs.ap-southeast-1.myhuaweicloud.com (hciacloud.obs.ap-southeast-1.myhuaweicloud.com)|100.125.100.3|:443
... connected.
HTTP request sent, awaiting response... 200 OK
Length: 12388850 (12M) [application/octet-stream]
Saving to: 'wordpress-5.3.1.tar.gz'

100%[======================================================================================>] 12,388,850  --.-K/s   in 0.05s

2020-08-16 18:44:23 (225 MB/s) - 'wordpress-5.3.1.tar.gz' saved [12388850/12388850]

[root@ecs-whj ~]#
```

Step 8 Run the following command to decompress the WordPress installation package to the **/var/www/html** directory:

tar -zxvf wordpress-5.3.1.tar.gz -C /var/www/html

```
wordpress/wp-admin/widgets.php
wordpress/wp-admin/setup-config.php
wordpress/wp-admin/install.php
wordpress/wp-admin/admin-header.php
wordpress/wp-admin/post-new.php
wordpress/wp-admin/themes.php
wordpress/wp-admin/options-reading.php
wordpress/wp-trackback.php
wordpress/wp-comments-post.php
[root@ecs-whj ~]#
```

Step 9 Run the following command to grant the read and write permissions to the directory where the file locates:

chmod -R 777 /var/www/html

```
[root@ecs-whj ~]# chmod -R 777 /var/www/html
[root@ecs-whj ~]#
```

Step 10 Run the following command to enable httpd:

systemctl start httpd.service

```
[root@ecs-whj ~]# systemctl start httpd.service
[root@ecs-whj ~]#
```

Step 11 Run the following command to enable php-fpm:

systemctl start php-fpm.service

```
[root@ecs-whj ~]# systemctl start httpd.service
[root@ecs-whj ~]# systemctl start php-fpm.service
[root@ecs-whj ~]#
```

Step 12 Run the following command to check the httpd status, which is **active (running)**:

systemctl status httpd

```
● httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; disabled; vendor preset: disabled)
   Active: active (running) since Wed 2020-06-17 15:36:31 CST; 2min 35s ago
     Docs: man:httpd(8)
           man:apachectl(8)
 Main PID: 1442 (httpd)
   Status: "Total requests: 0; Current requests/sec: 0; Current traffic:   0 B/sec"
   CGroup: /system.slice/httpd.service
           ├─1442 /usr/sbin/httpd -DFOREGROUND
           ├─1444 /usr/sbin/httpd -DFOREGROUND
           ├─1445 /usr/sbin/httpd -DFOREGROUND
           ├─1446 /usr/sbin/httpd -DFOREGROUND
           ├─1447 /usr/sbin/httpd -DFOREGROUND
           └─1448 /usr/sbin/httpd -DFOREGROUND

Jun 17 15:36:31 ecs-whj systemd[1]: Starting The Apache HTTP Server...
Jun 17 15:36:31 ecs-whj systemd[1]: Started The Apache HTTP Server.
[root@ecs-whj ~]#
```

Step 13 Run the following command to check the php-fpm status, which is **active (running)**:

systemctl status php-fpm

```
[root@ecs-whj ~]# systemctl status php-fpm
● php-fpm.service - The PHP FastCGI Process Manager
   Loaded: loaded (/usr/lib/systemd/system/php-fpm.service; disabled; vendor preset: disabled)
   Active: active (running) since Wed 2020-06-17 15:37:50 CST; 4min 32s ago
 Main PID: 1455 (php-fpm)
   Status: "Processes active: 0, idle: 5, Requests: 0, slow: 0, Traffic: 0req/sec"
   CGroup: /system.slice/php-fpm.service
           ├─1455 php-fpm: master process (/etc/php-fpm.conf)
           ├─1457 php-fpm: pool www
           ├─1458 php-fpm: pool www
           ├─1459 php-fpm: pool www
           ├─1460 php-fpm: pool www
           └─1461 php-fpm: pool www

Jun 17 15:37:50 ecs-whj systemd[1]: Starting The PHP FastCGI Process Manager...
Jun 17 15:37:50 ecs-whj systemd[1]: Started The PHP FastCGI Process Manager.
[root@ecs-whj ~]#
```

Step 14 Run the following command to set httpd to automatically start upon system startup:

systemctl enable httpd

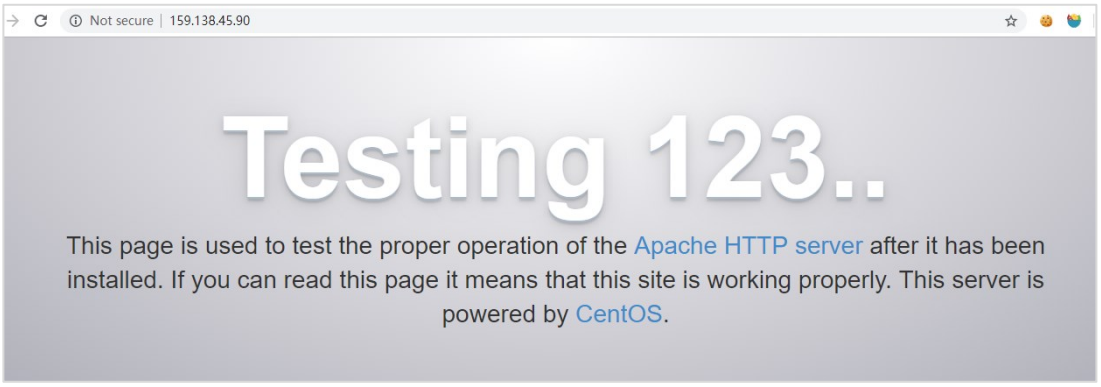
```
[root@ecs-whj ~]# systemctl enable httpd
Created symlink from /etc/systemd/system/multi-user.target.wants/httpd.service to /usr/lib/systemd/system/httpd.service.
[root@ecs-whj ~]#
```

Step 15 Run the following command to set php-fpm to automatically start upon system startup:

systemctl enable php-fpm

Step 16 In the browser, enter the EIP bound to the ECS.

If the following information is displayed, LAMP has been installed.

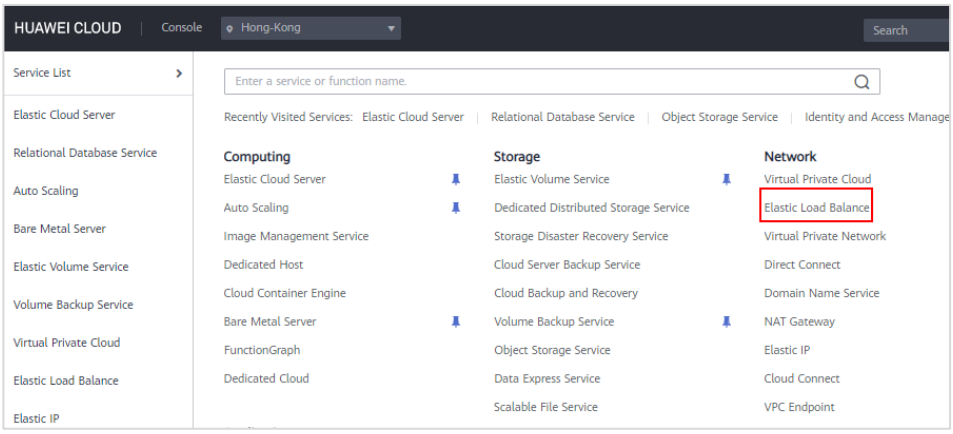


----End

6.5 Configuring Server-Level HA

6.5.1 Configuring ELB

Step 1 Log in to the management console and choose **Service List** > **Network** > **Elastic Load Balance**.

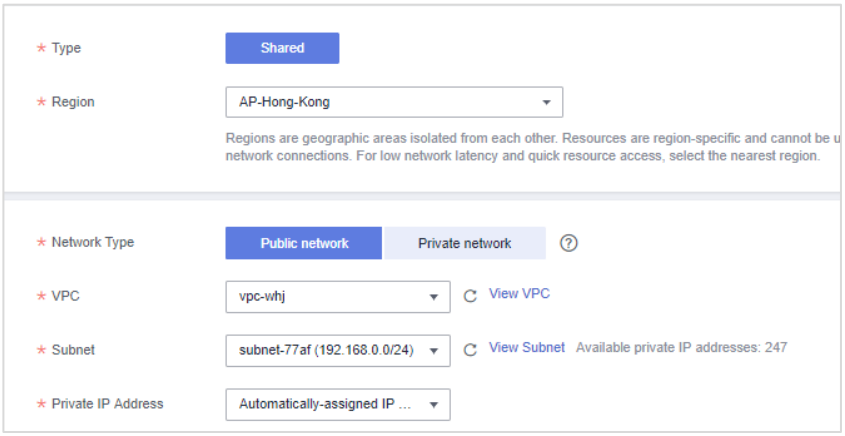


Step 2 Click **Buy Elastic Load Balancer**.

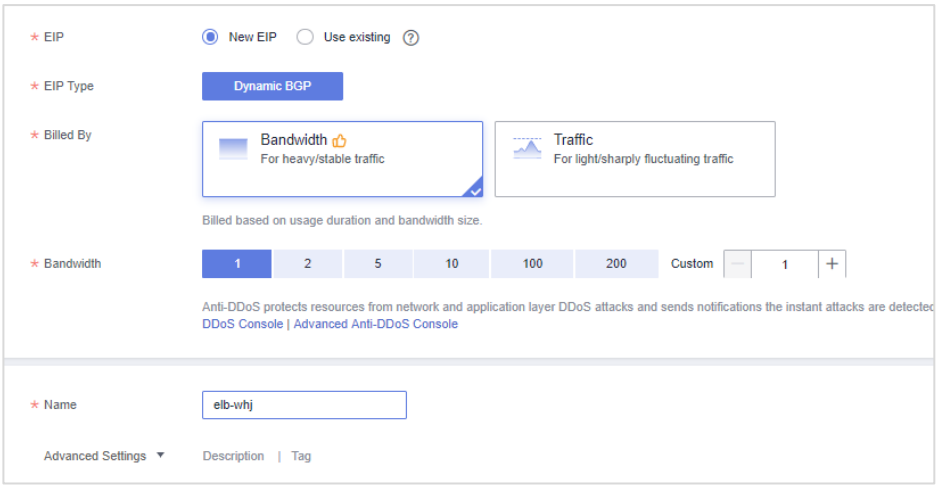
Step 3 Set parameters as follows:

- **Type**: **Shared**
- **Region**: AP-Hong Kong

- **Network Type**: **Public network**
- **VPC**: Select the created VPC from the drop-down list.
- **Subnet**: Select the created subnet from the drop-down list.

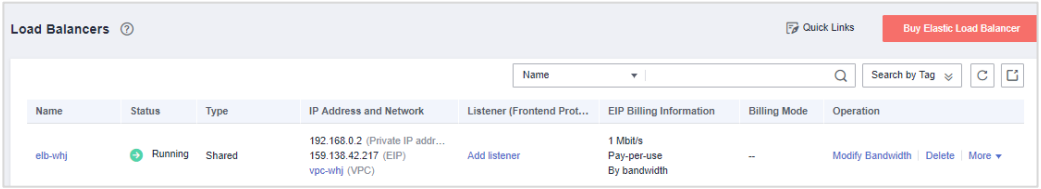


- **EIP**: **New EIP**
- **EIP Type**: **Dynamic BGP**
- **Billed By**: **Bandwidth**
- **Bandwidth**: 1 Mbit/s
- **Name**: Enter a name.

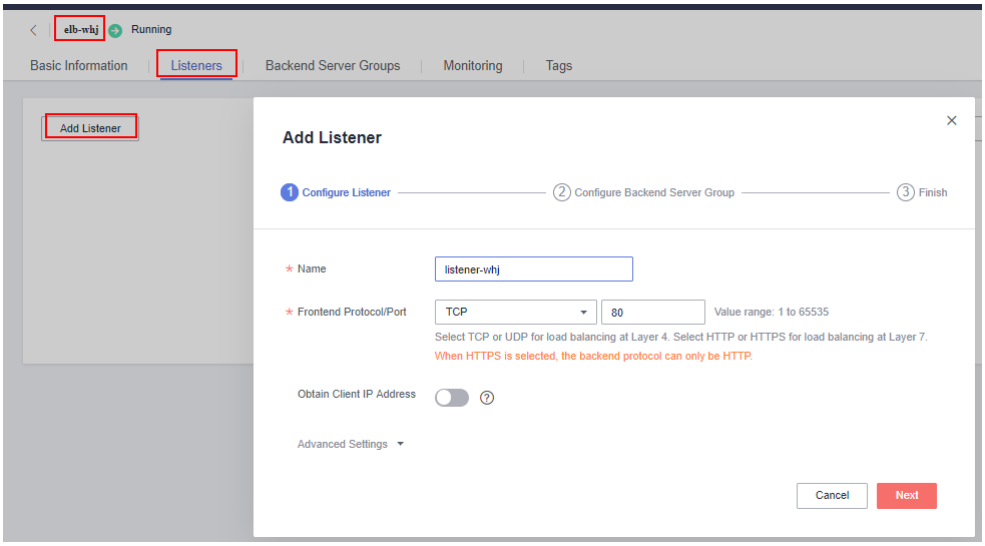


Step 4 Click **Next**, confirm parameter settings, and click **Submit**.

Step 5 Switch back to the network console and verify that the created load balancer is in the **Running** state.

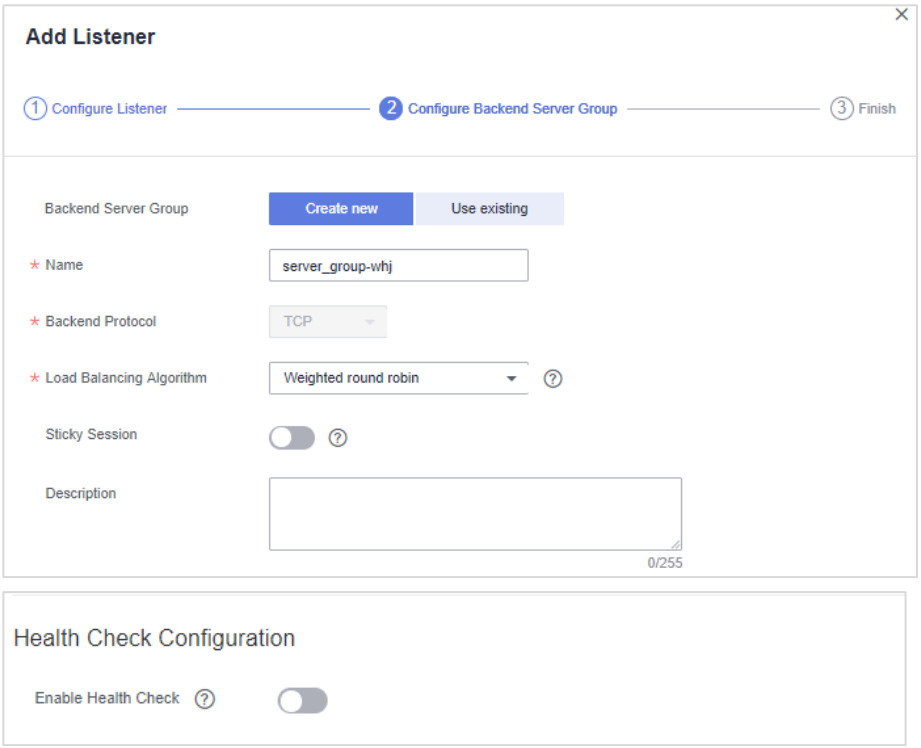


Step 6 Click the name of the load balancer to view its details. Click **Listeners** and then **Add Listener**. Set the **Name** and **Frontend Protocol/Port** and click **Next**.

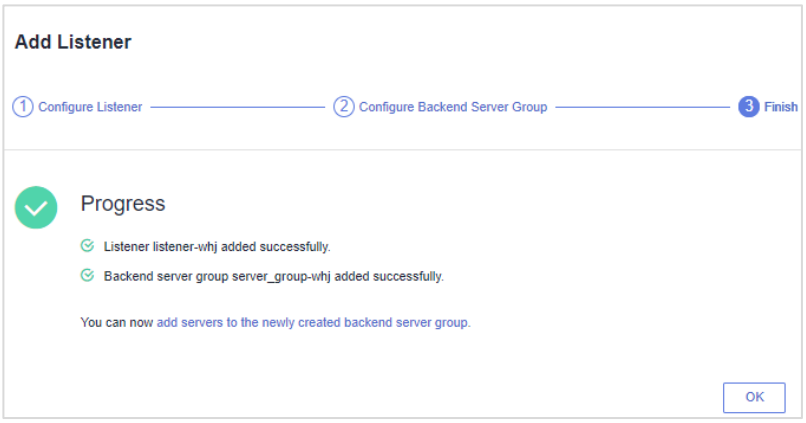


Step 7 Configure the backend server group.

- **Backend Server Group**: **Create New**
- **Name**: Enter a name.
- Health check configuration: Kee the health check function disabled.
- Other parameters: Retain their default settings.



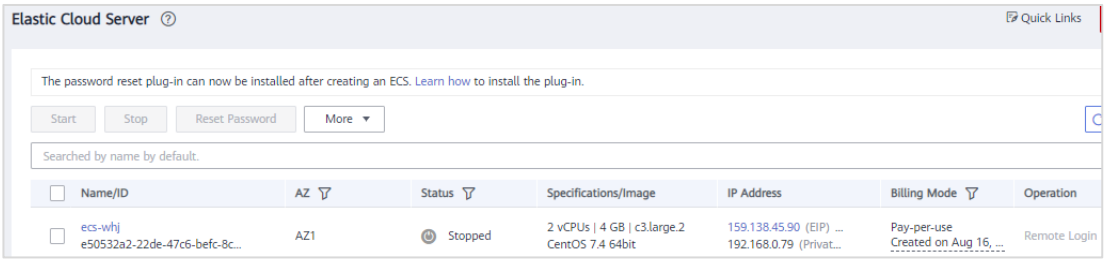
Step 8 Click **OK**.



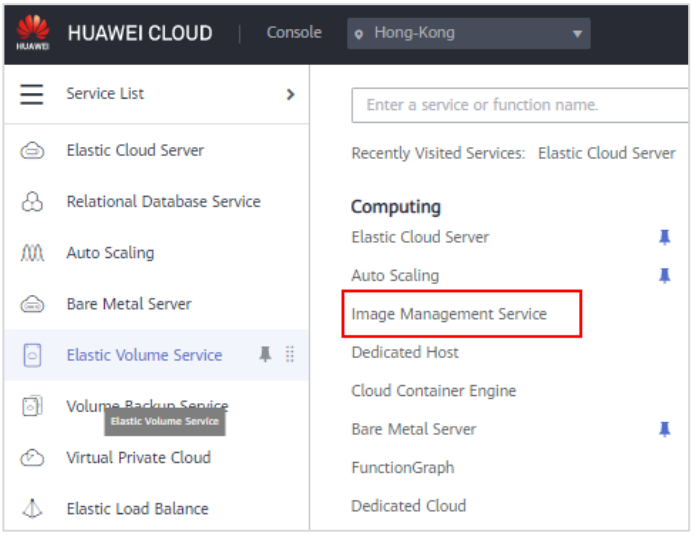
----End

6.5.2 Creating an Image

Step 1 Switch back to the **Elastic Cloud Server** page and stop the ECS.

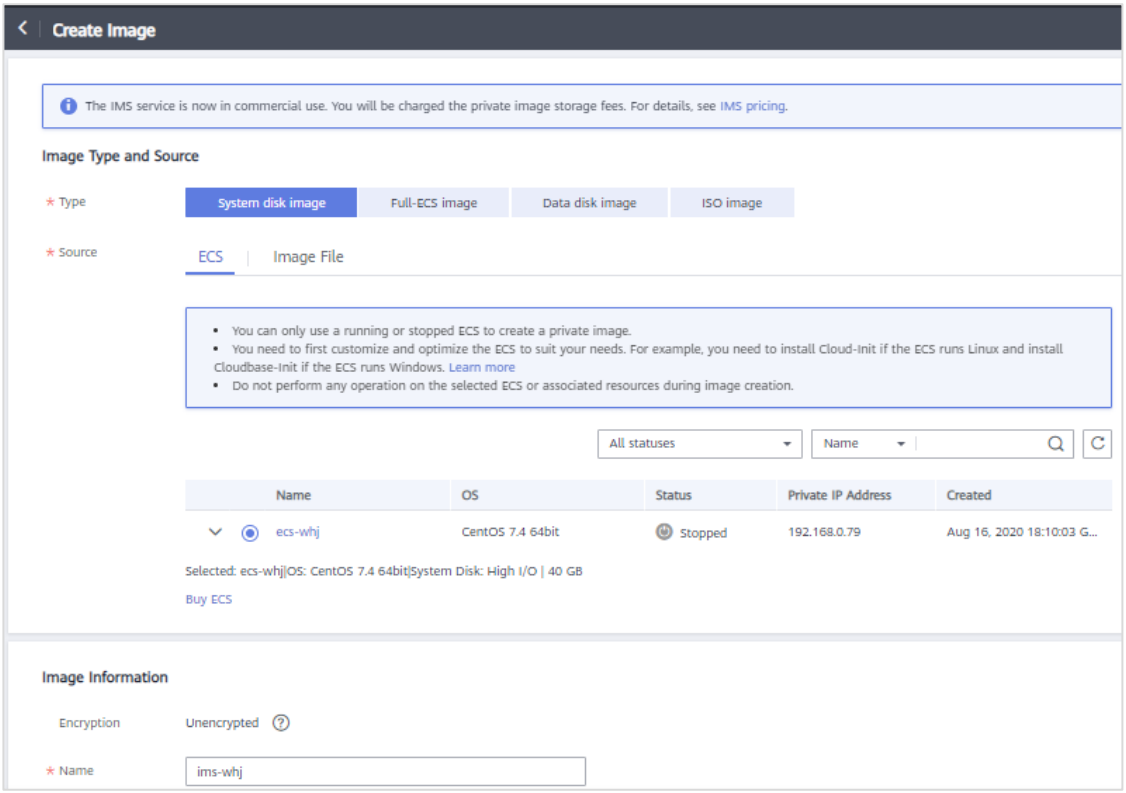


Step 2 In the left navigation pane, choose **Service List** > **Computing** > **Image Management Service**.

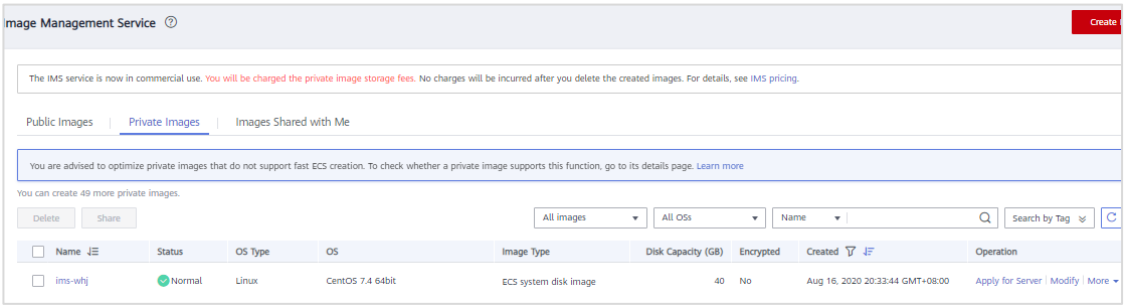


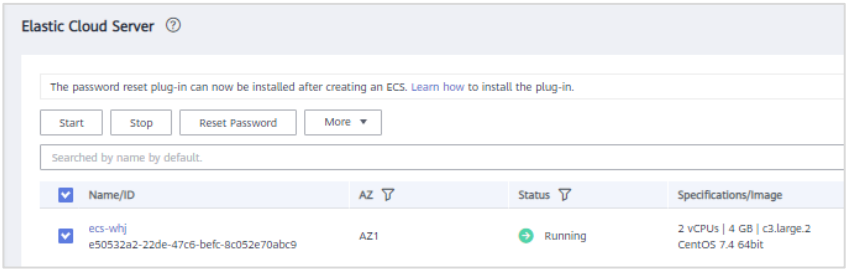
Step 3 Click **Create Image** in the upper right corner of the page.

- **Type: System disk image**
- **Source**: Click **ECS** and then select the purchased ECS.
- **Name**: Enter a name.



Step 4 Wait until the image status becomes **Normal**. Then, switch back to the **Elastic Cloud Server** page and start the ECS.

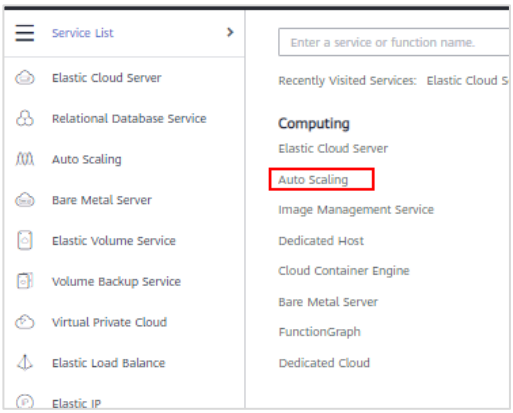




----End

6.5.3 Configuring AS

Step 1 In the left navigation pane, choose **Service List** > **Computing** > **Auto Scaling**.

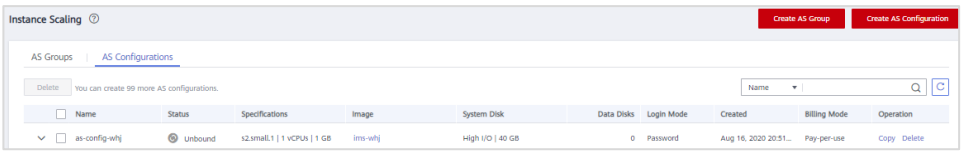


Step 2 Click **Create AS Configuration**.

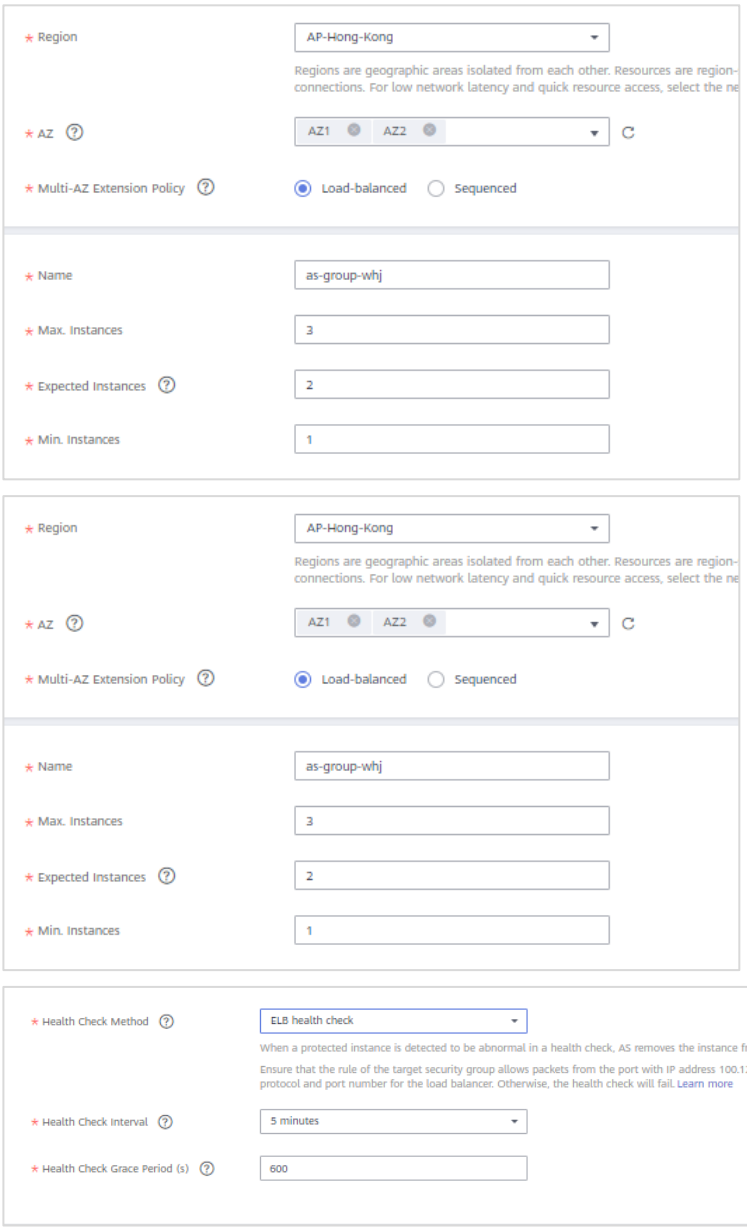
Step 3 Set AS configuration parameters.

- **Image**: Select the created system disk image from the drop-down list.
- **Security Group**: Select the created security group, which is the same as that of the ECS.
- **EIP**: **Do not use**
- Other parameters: Set them as required.

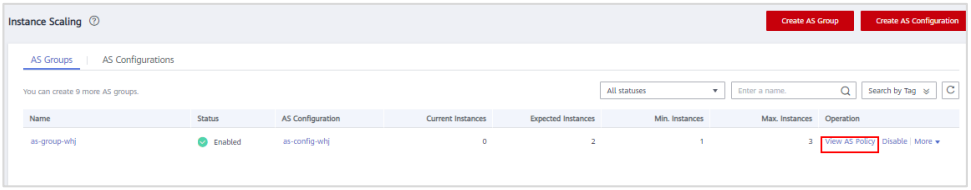
Step 4 Click **Create Now**.



Step 5 Click **Create AS Group**, set the parameters as shown in the following figures, and click **Create Now**.

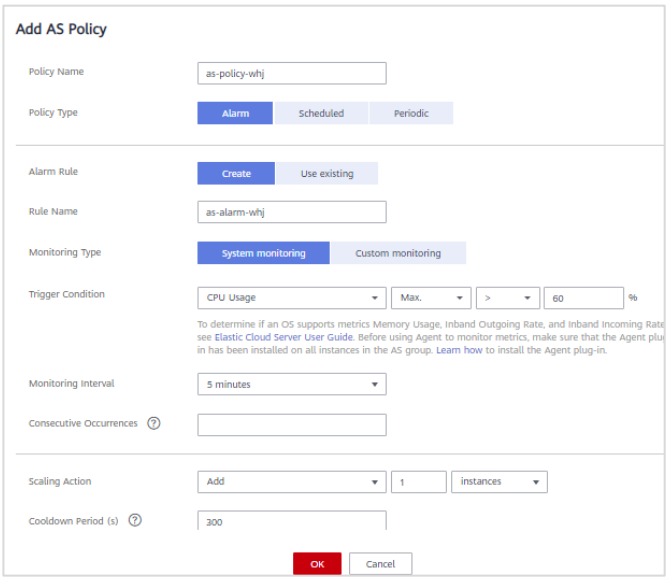


Step 6 Click **View AS Policy**.



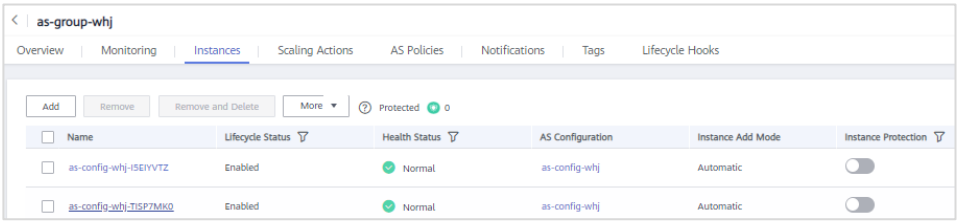
Step 7 Click **Add AS Policy**.

For example, when **CPU Usage** is greater than or equal to **60**, AS automatically adds 1 instance.



Step 8 Go back to the **Instances** tab on the AS group page and check whether the number of instances is changed.

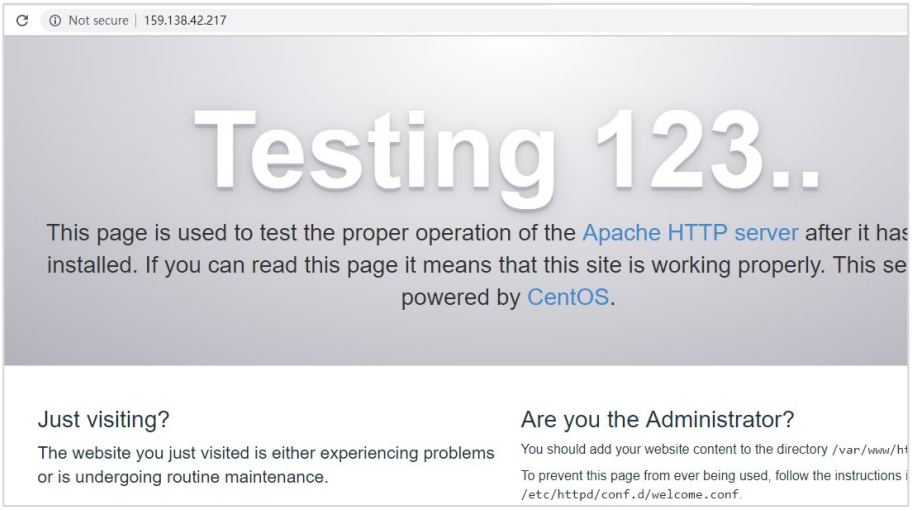
On the **AS Policies** tab on the AS group page, click **Execute Now** in the **Operation** column of the created AS policy to trigger the AS policy.



----End

6.6 Visiting the Website

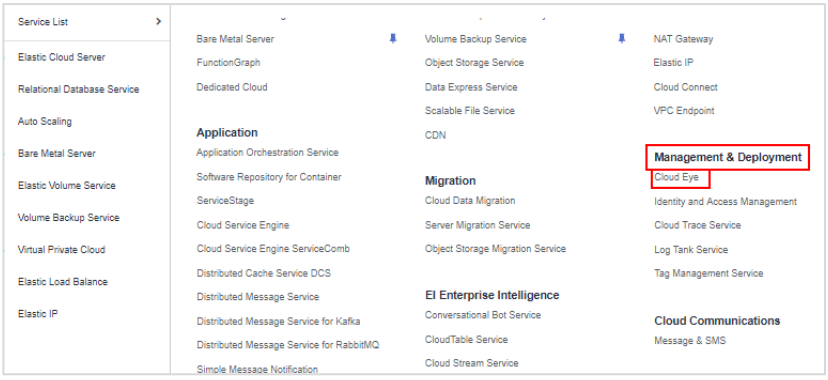
In the address box of the browser, enter **http://***EIP bound to the load balancer/Port number* to access the website.



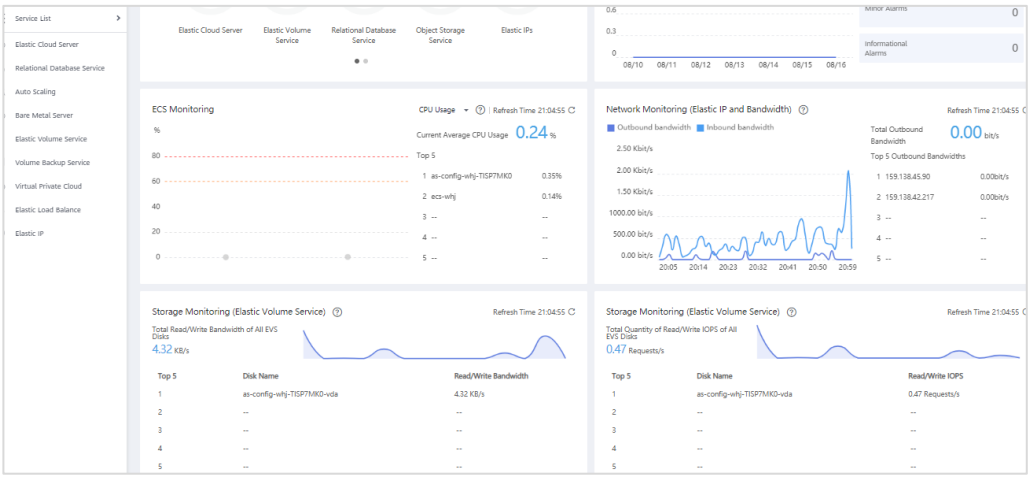
When the preceding page is displayed, server-level HA has been configured.

6.7 Monitoring Resources

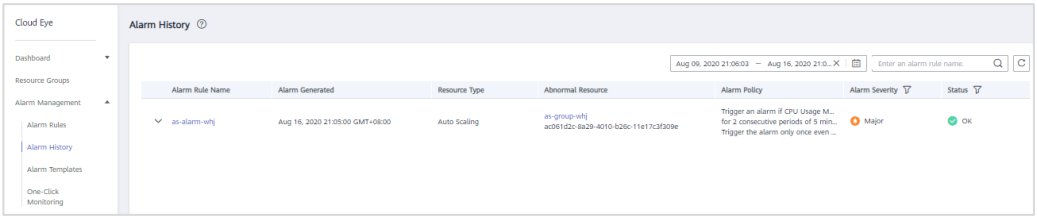
Step 1 Switch back to the management console and choose **Service List** > **Management & Deployment** > **Cloud Eye**.



Step 2 View resource usage.



Step 3 In the left navigation pane, choose **Alarm Management** > **Alarm History** to view alarms and handle them.



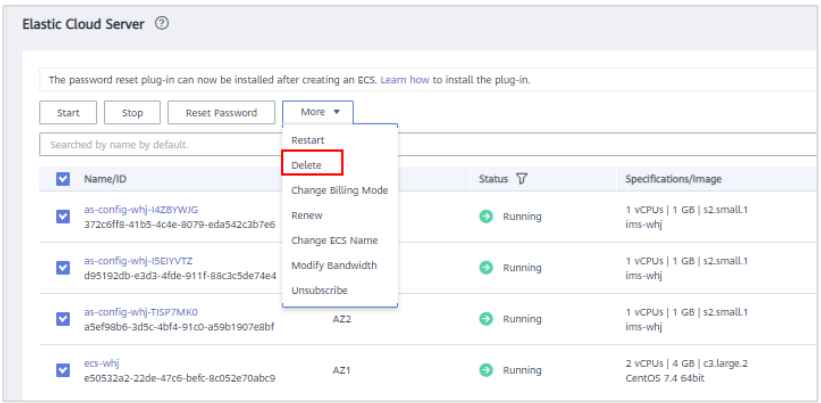
Step 4 In the left navigation pane, click **Server Monitoring** or **Cloud Service Monitoring** to view monitoring information.

Before monitoring an ECS, make sure that the Agent has been installed on the target ECS. For details, see 4.4.1.

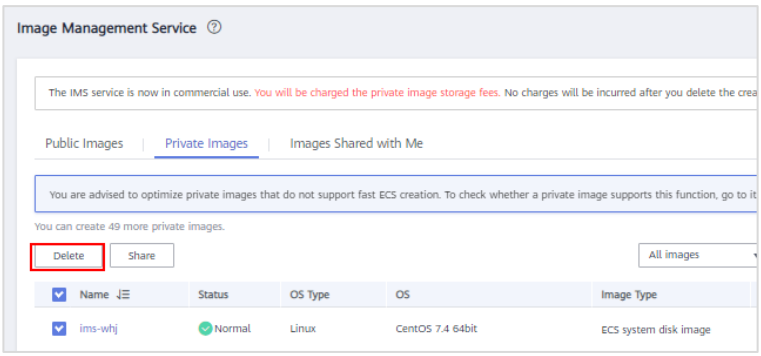
----End

6.8 Deleting Resources

Step 1 Delete the ECSs used in these exercises.

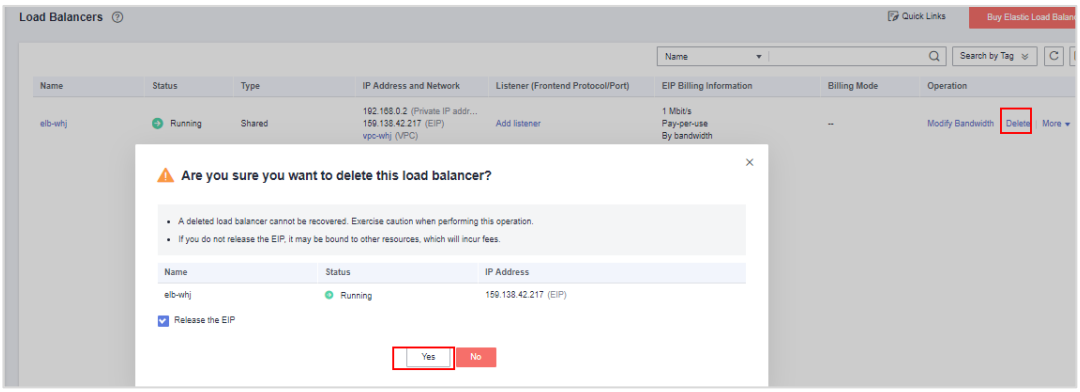


Step 2 Go to the IMS console and delete the private image.



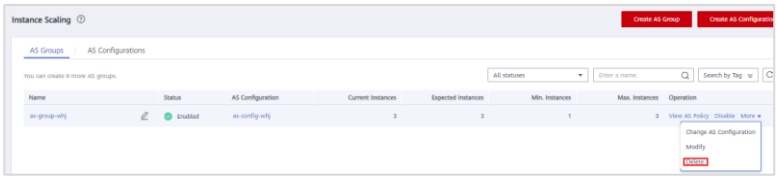
Step 3 Delete the load balancer.

Access the network console, choose **Elastic Load Balance** > **Load Balancers**, and click **Delete** in the **Operation** column of the target load balancer.

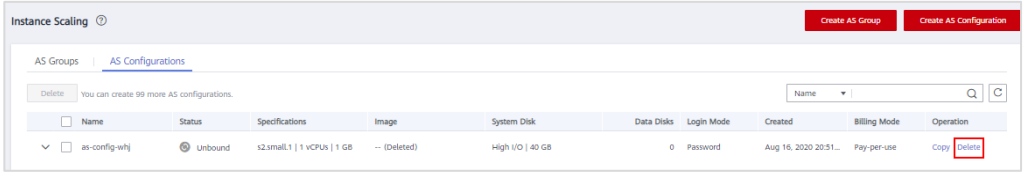


Step 4 Delete AS resources.

- Delete the AS group.



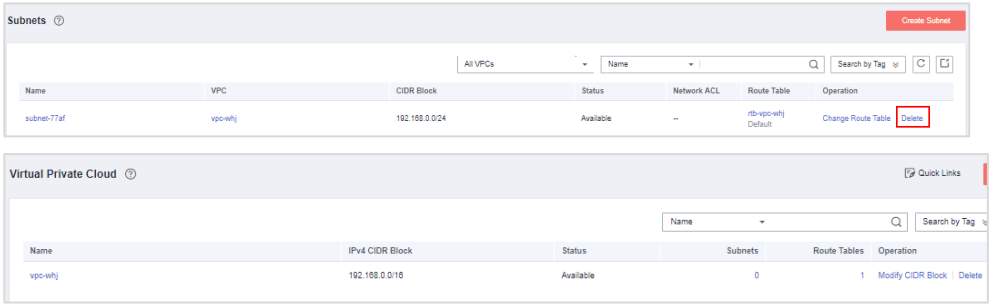
- Delete the AS configuration.



Step 5 Delete VPC resources.

- Delete the security group.

- Delete the subnet and VPC.



Step 6 Go back to the management console, choose **Resources** > **My Resources** in the upper part of the page, and verify that all the resources you purchased have been deleted.

----End