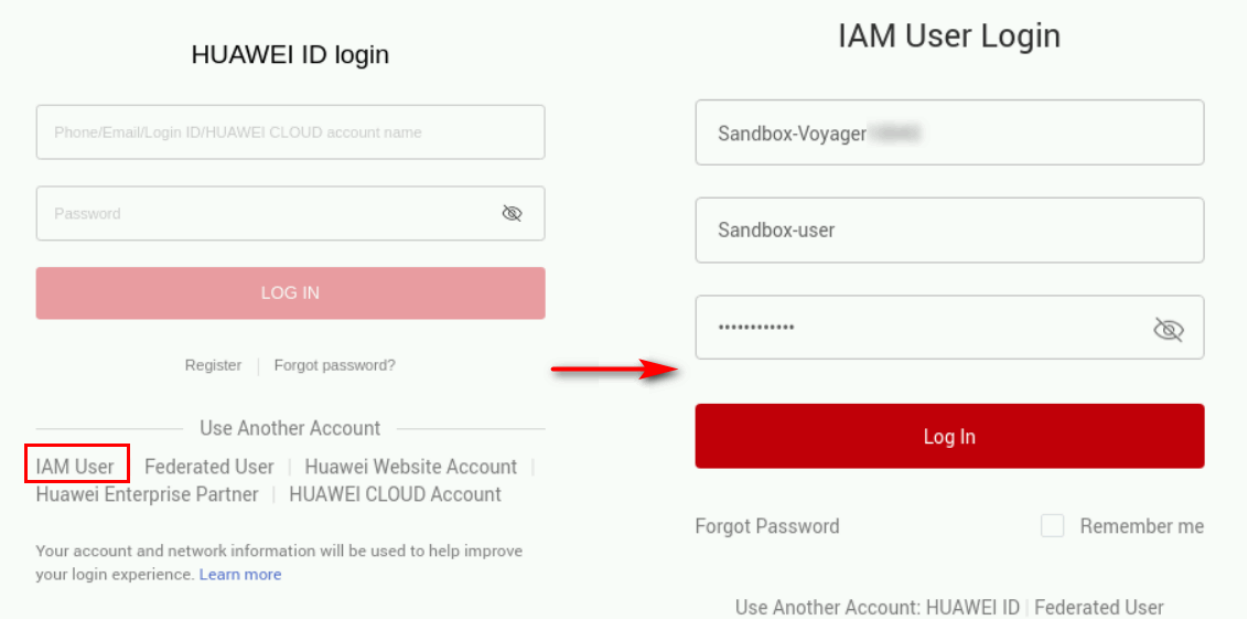
LAB : Deploying an Enterprise Web

An enterprise intends to deploy their website on HUAWEI CLOUD and they have the following requirements:

1.Database nodes and service nodes are deployed on separate ECSs.

2.ECSs are added or removed as incoming traffic changes over time.

Prerequisites: Log in to HUAWEI CLOUD.Go to the [Lab Desktop] and open the Google Chrome browser to access the HUAWEI CLOUD login page. Select IAM User Login. In the login dialog box, enter the assigned HUAWEI CLOUD lab account and password to log in to HUAWEI CLOUD, as shown in the following figure.

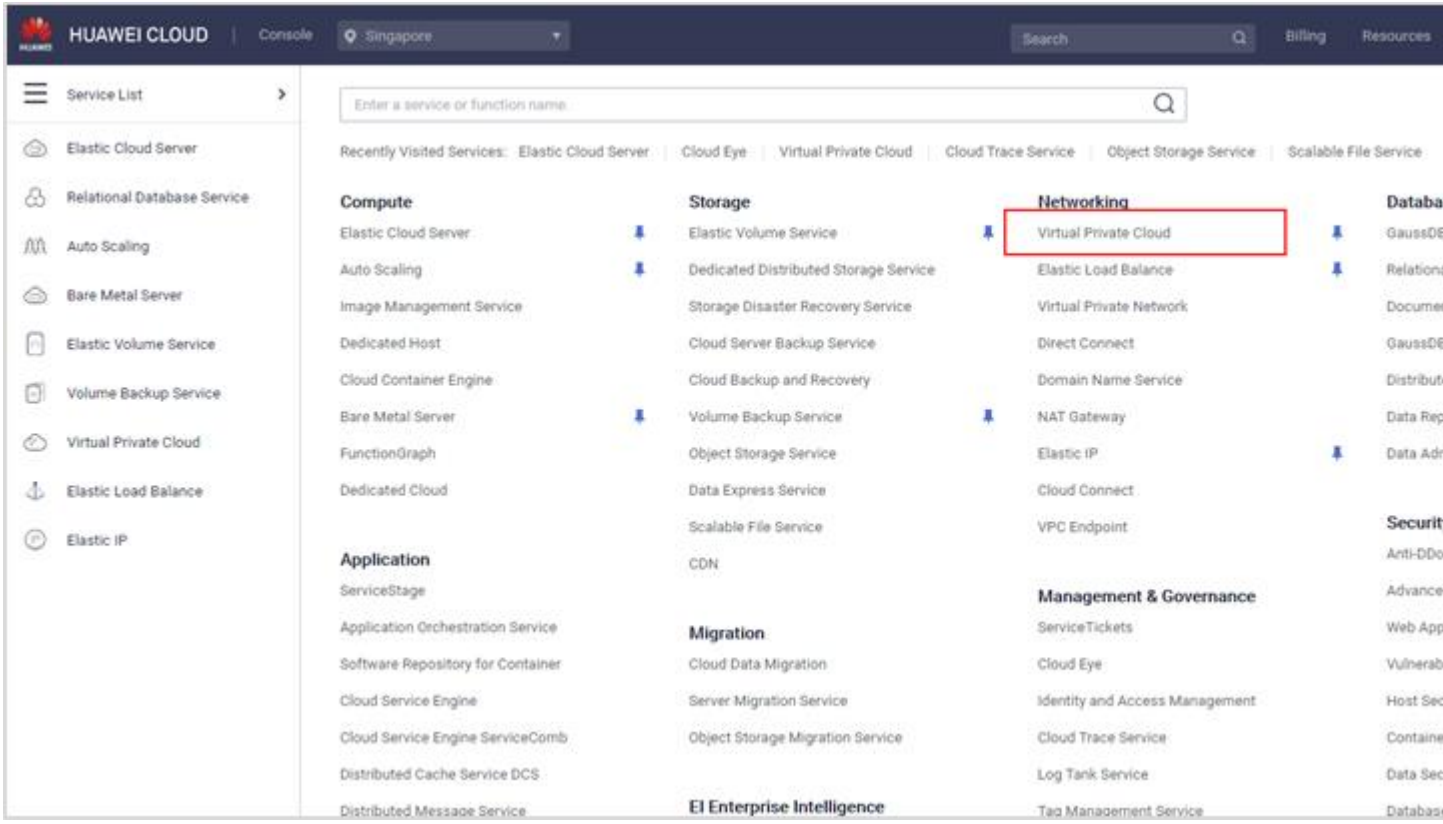


Note: For details about the account information, see the upper part of the lab manual. Do not use your HUAWEI CLOUD account to log in.

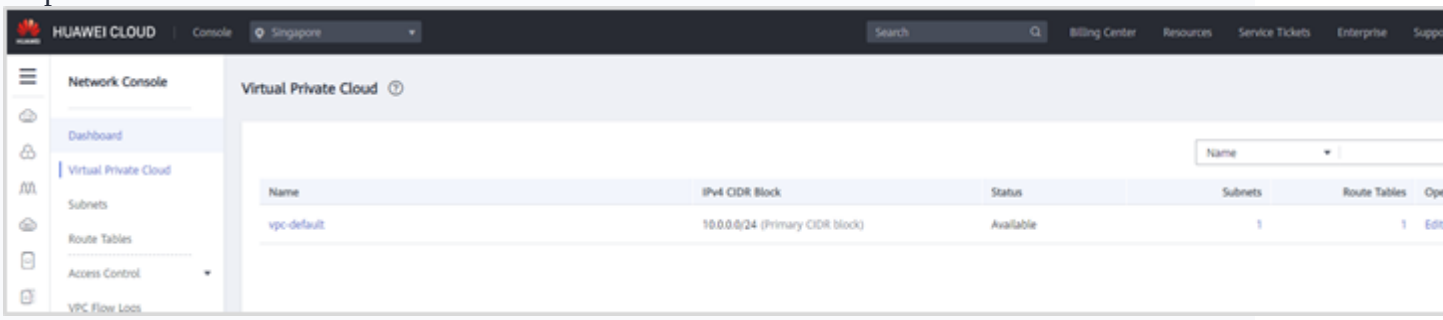
1.Tasks

1.1 Creating a VPC

Step 1 Switch to the management console, and select the **AP-Singapore** region. In the left navigation pane, choose **Service List > Networking > Virtual Private Cloud**.

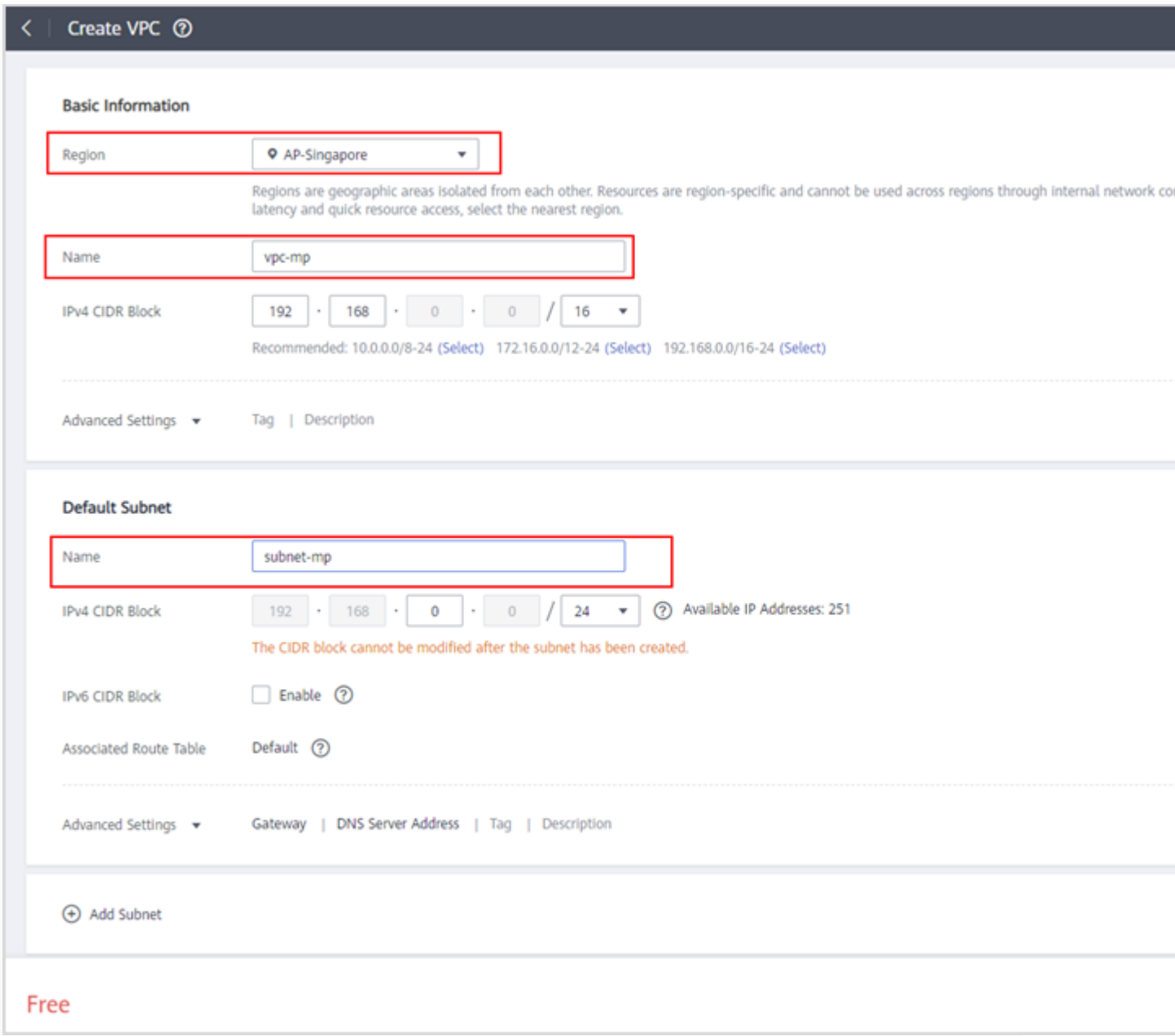


Step 2 Click **Create VPC**.

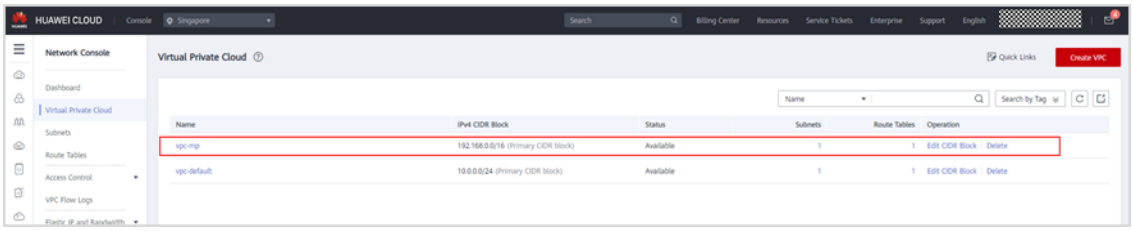


Step 3 Configure the parameters as follows, and click **Create Now**.

- **Region**: **AP-Singapore**
- **Name**: **vpc-mp** (Change it as needed.)
- Retain the default settings for other parameters.

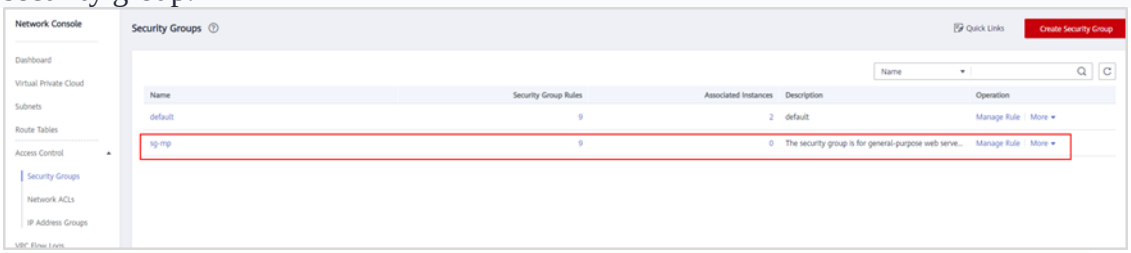


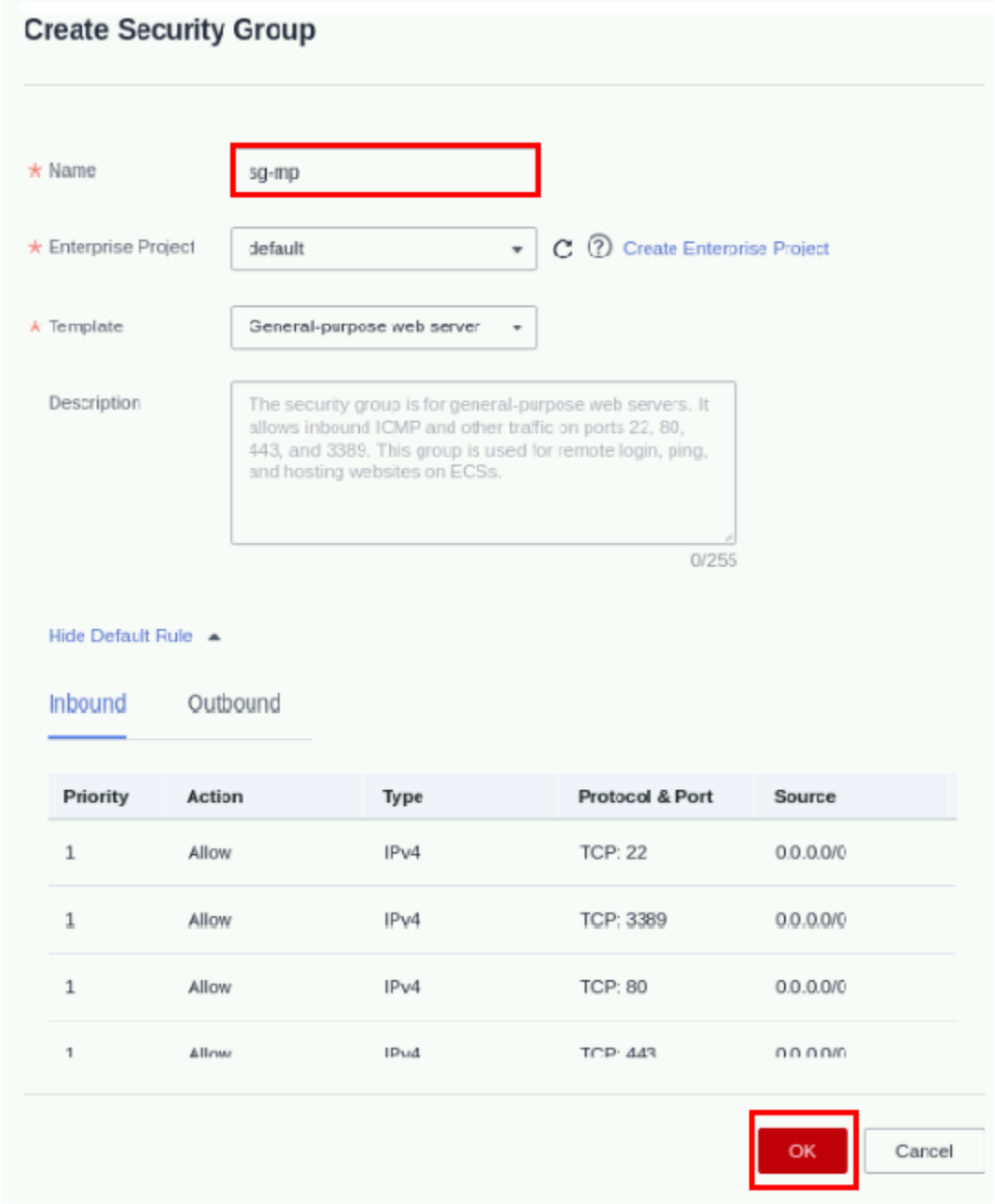
Step 4 View the created VPC in the VPC list.



1.2 Creating and Configuring a Security Group

Step 1 On the **Network Console**, choose **Access Control > Security Groups** and create a security group.

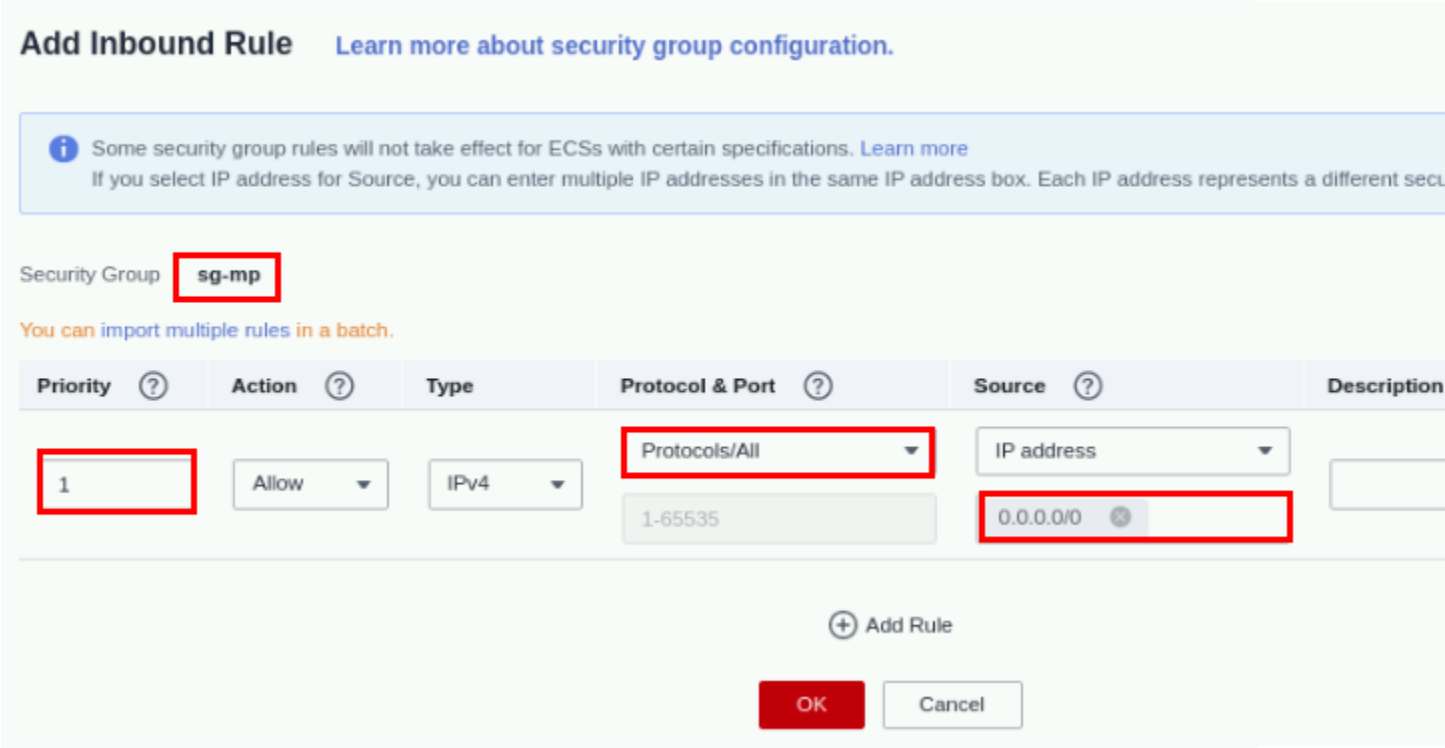




Step 2 Click the security group name.

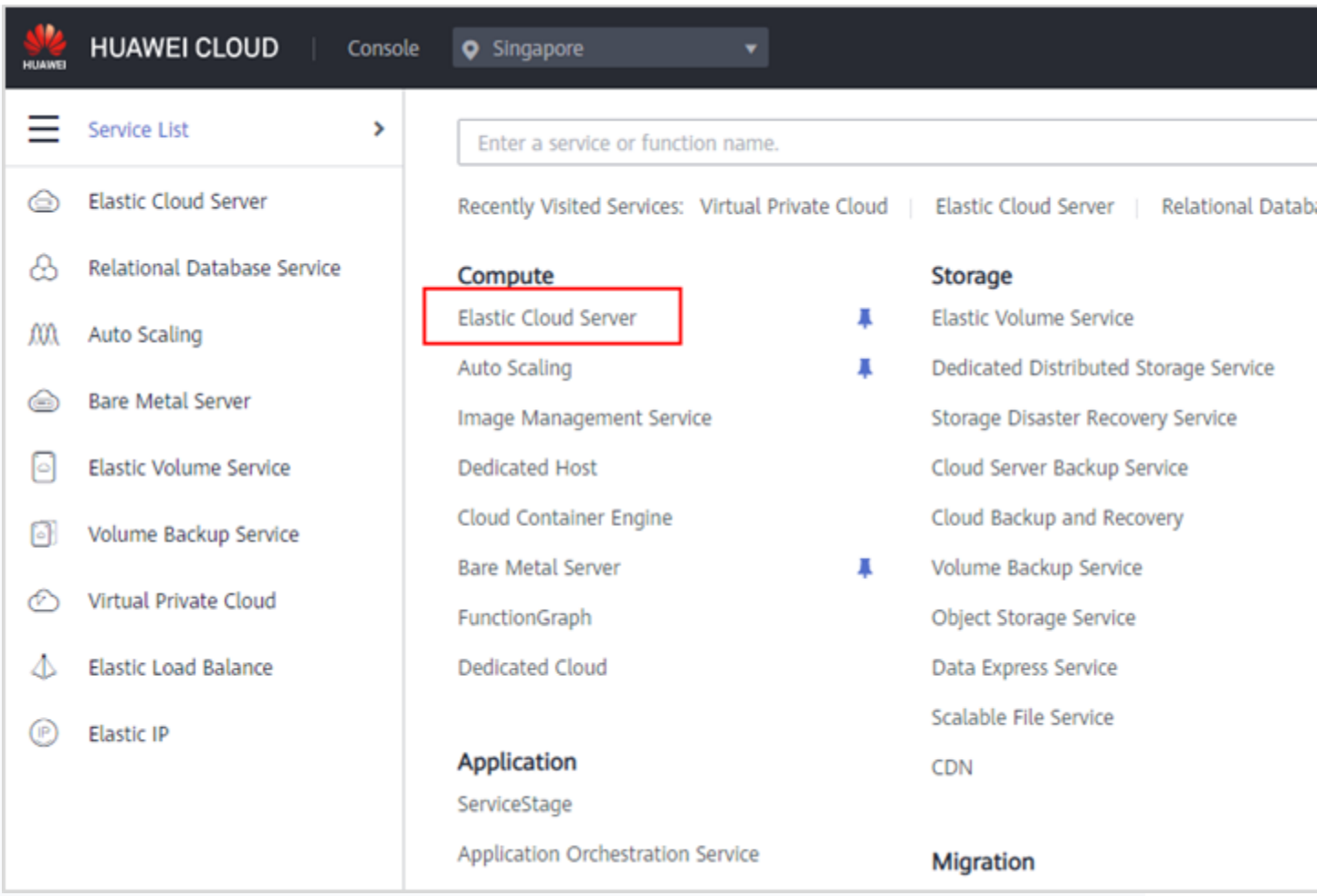
Step 3 Click **Inbound Rules** and then **Add Rule** to add an inbound rule with the following parameter settings:

- **Protocol & Port: All**
- **IP address** in **Source**: 0.0.0.0/0



1.3 Buying an ECS

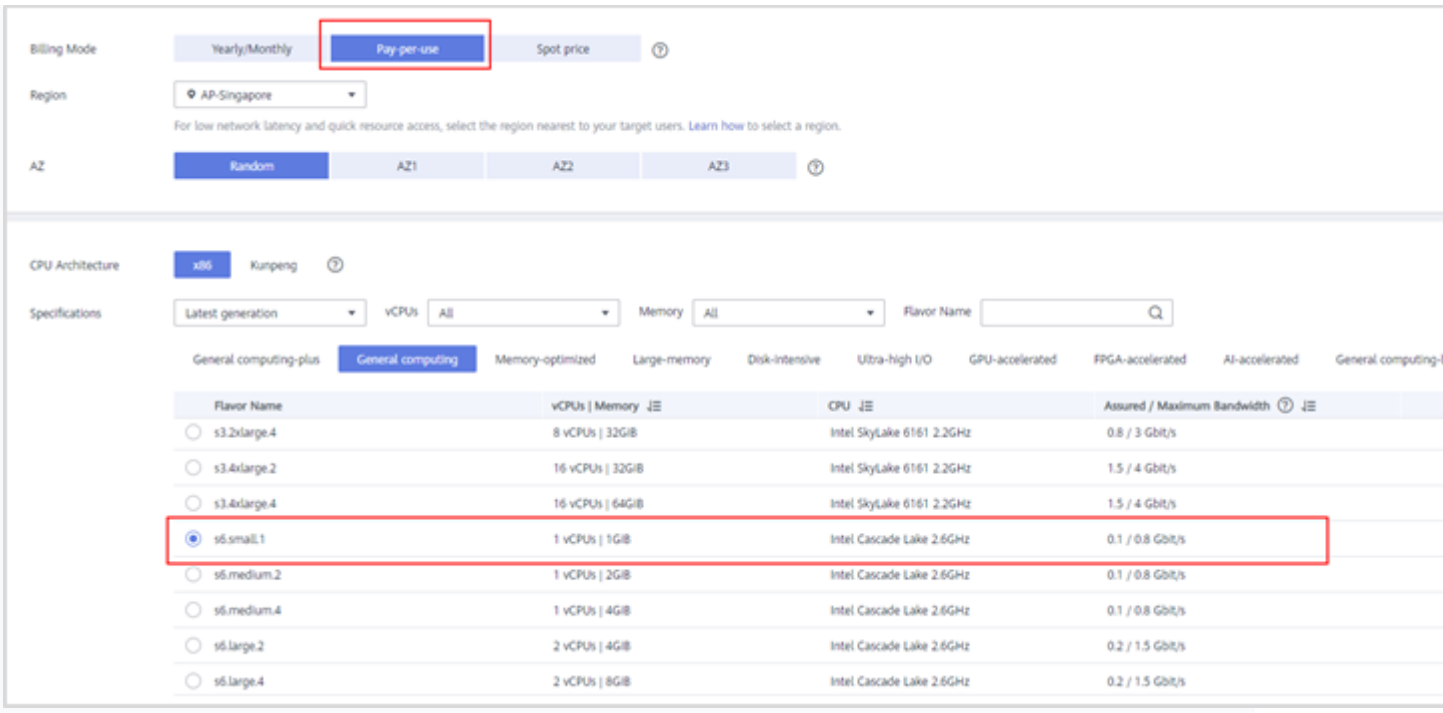
Step 1 In the service list, choose **Compute > Elastic Cloud Server**.



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

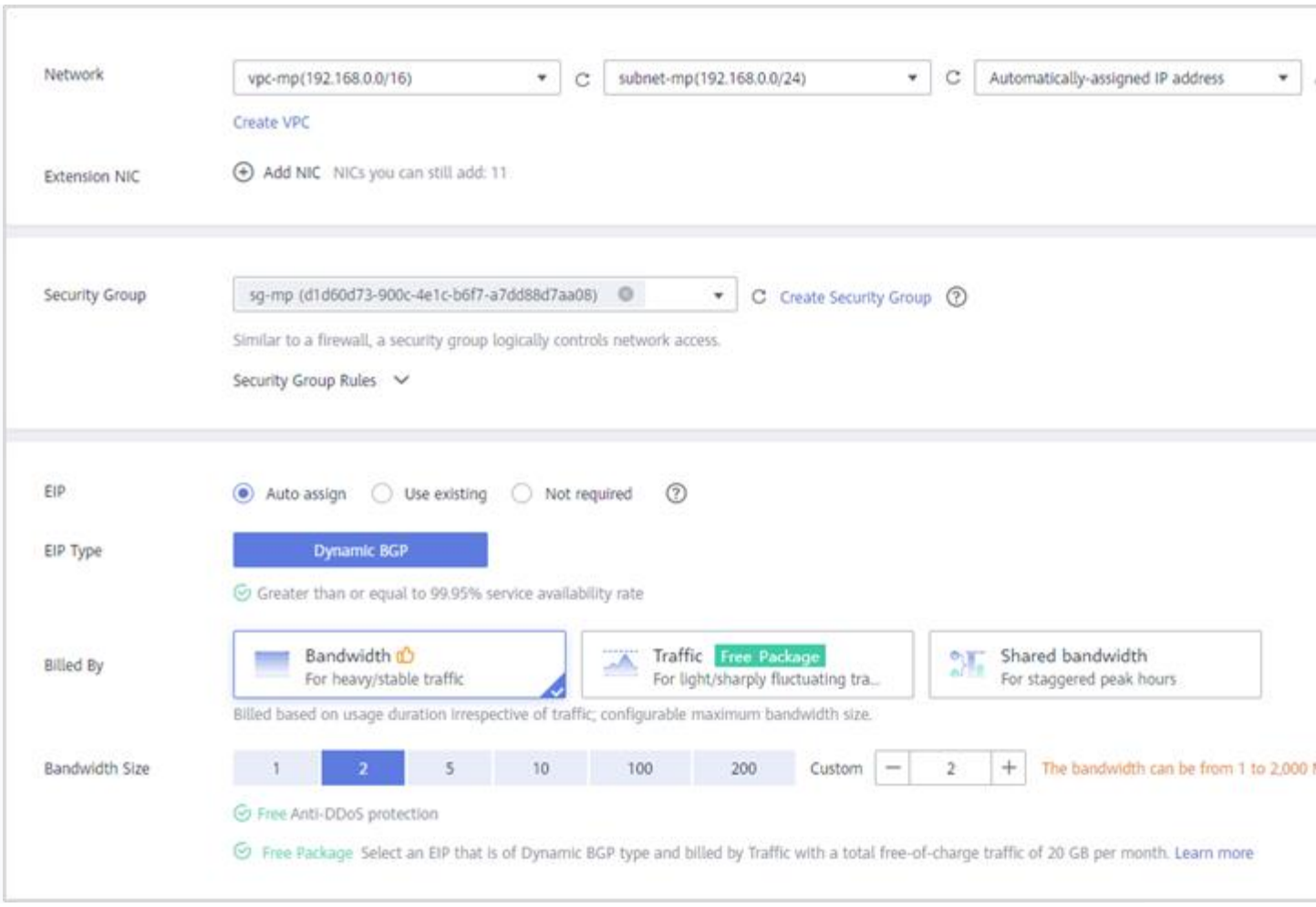
Basic settings:

- **Billing Mode: Pay-per-use**
- **Region: AP-Singapore**
- **AZ: Random**
- **CPU Architecture: x86**
- **Specifications: General computing, s6.small.1 1 vCPUs | 1 GB**
- **Image: Public image, CentOS 7.6 64bit (40 GB)**
- **System Disk: High I/O, 40 GB**



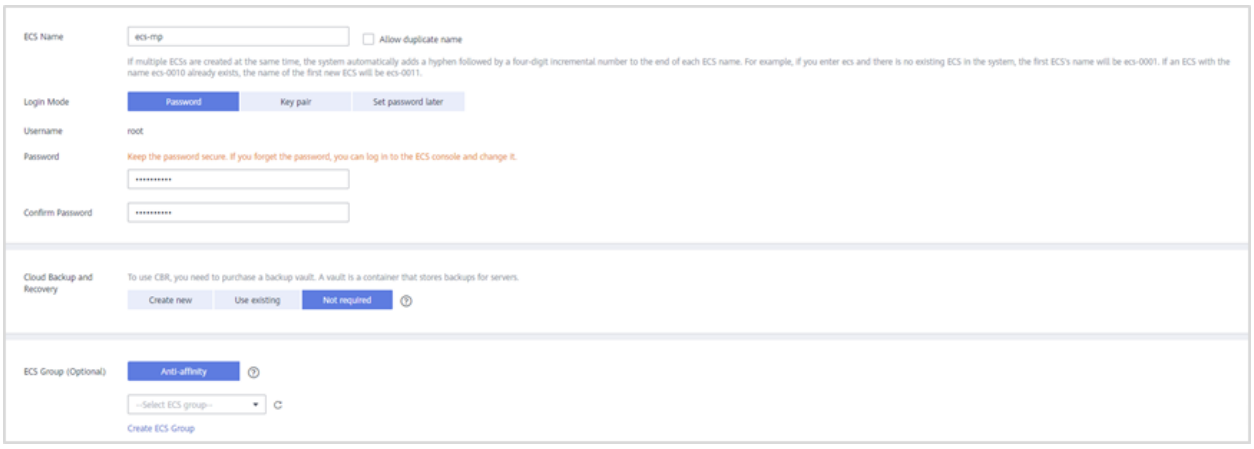
Network configuration:

- **Network**: Select the VPC you have created.
- **Security Group**: Select the security group you have created.
- **EIP: Auto assign, Dynamic BGP, Billed by Bandwidth, 2 Mbit/s**

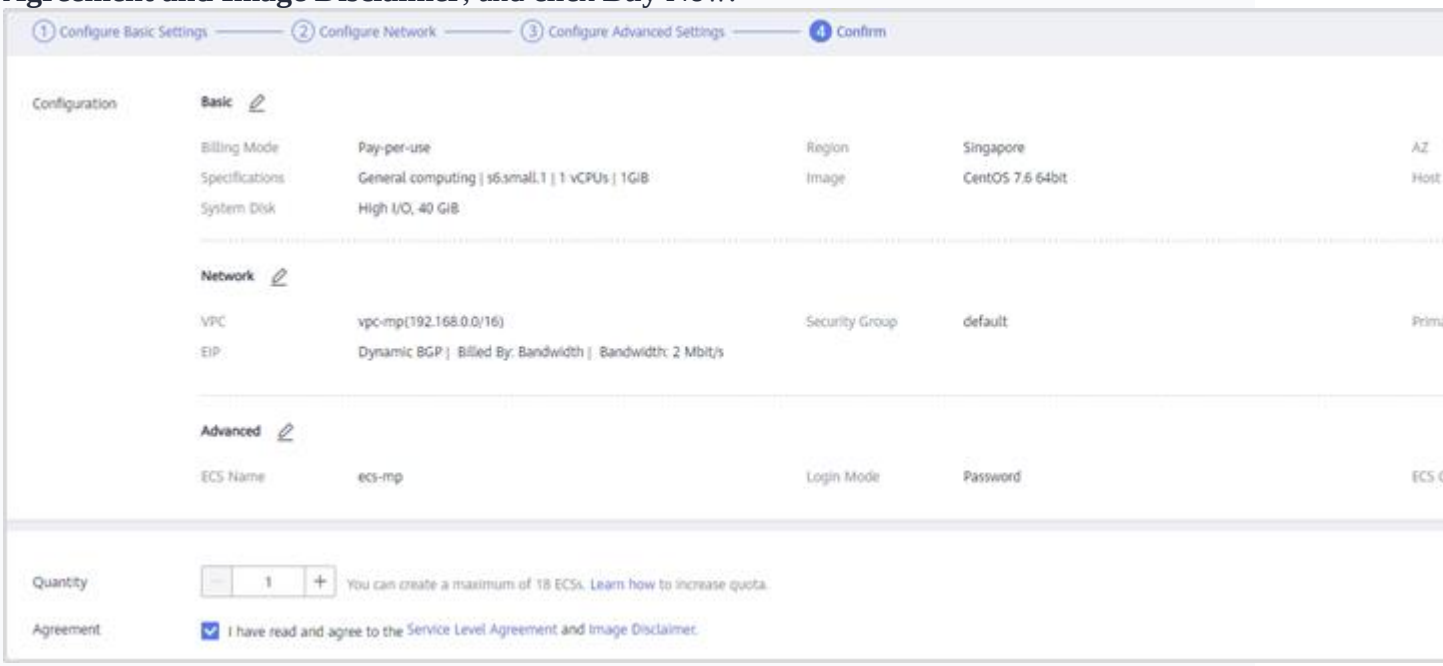


Advanced settings:

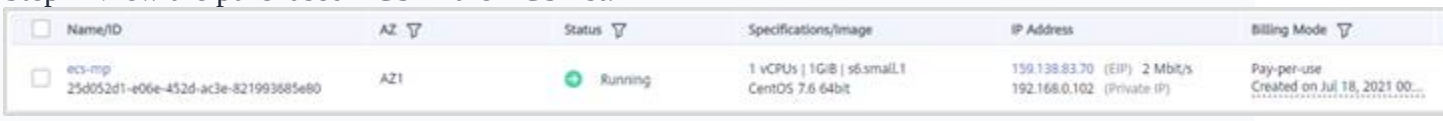
- ECS Name: ecs-mp (Change it as needed.)
- Login Mode:Password, for example, Huawei@123!
- Cloud Backup and Recovery: Not required



Step 3 Confirm the configuration, select **I have read and agree to the Service Level Agreement and Image Disclaimer**, and click **Buy Now**.

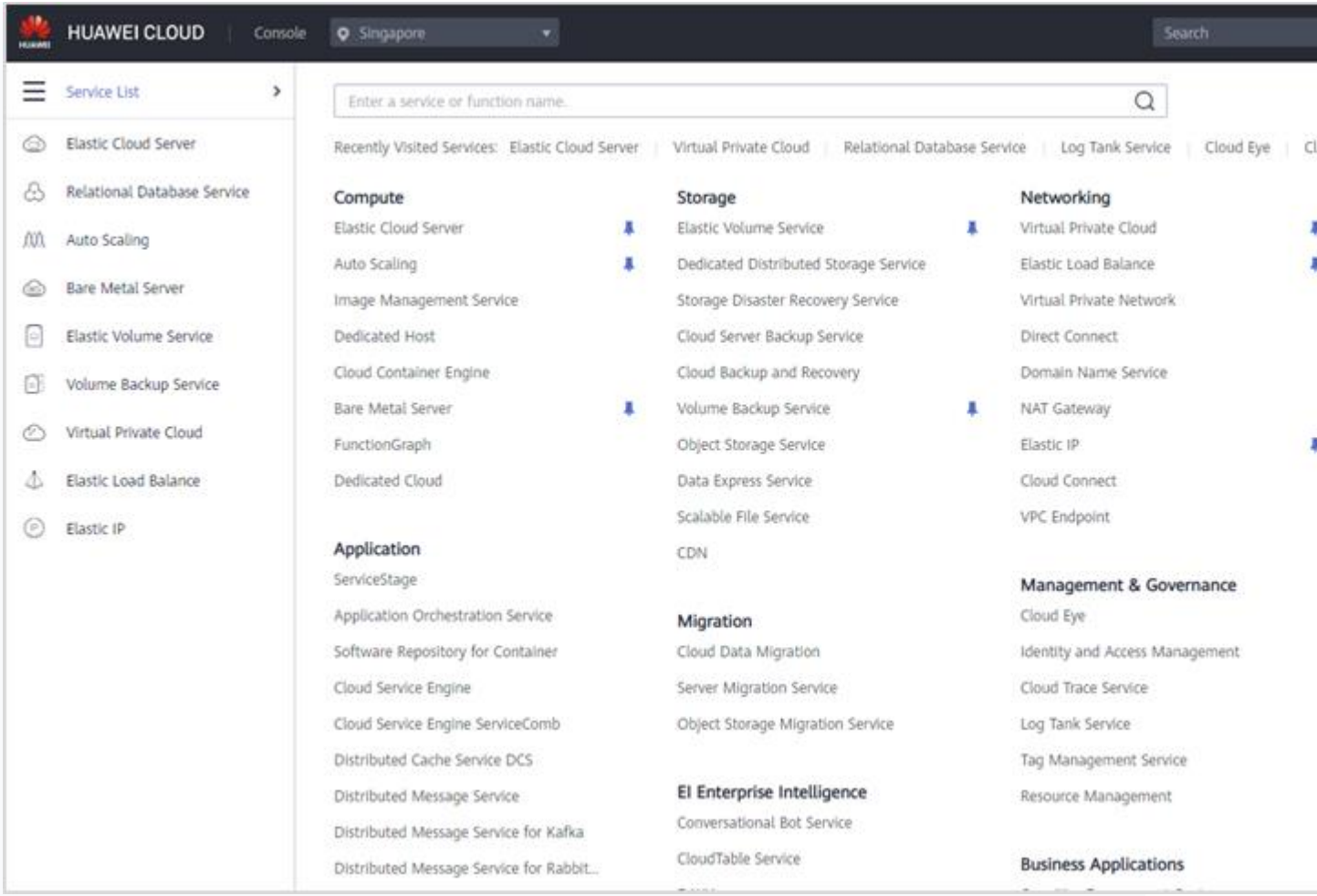


Step 4 View the purchased ECS in the ECS list.

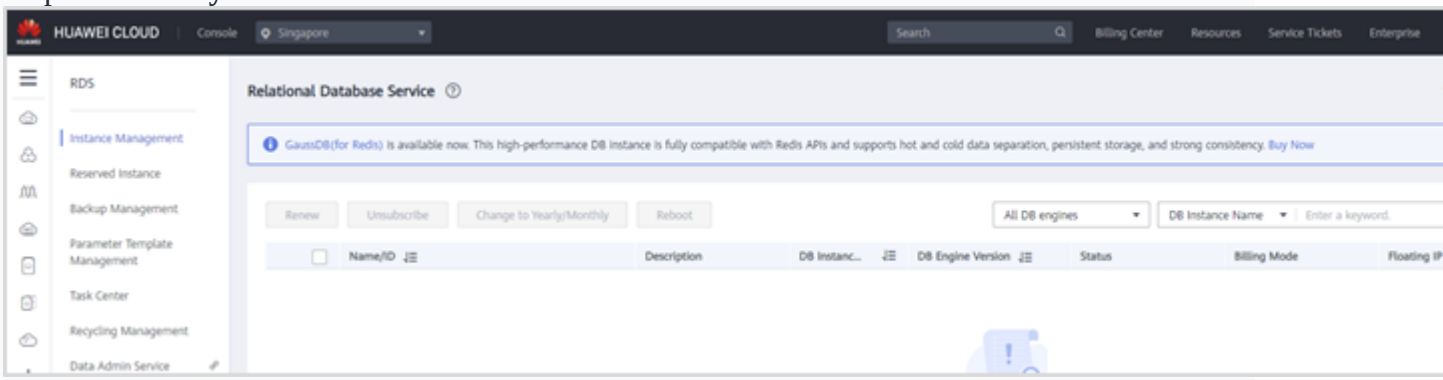


1.4 Buying an RDS DB Instance

Step 1 Go back to the service list, and choose **Database > Relational Database Service**.



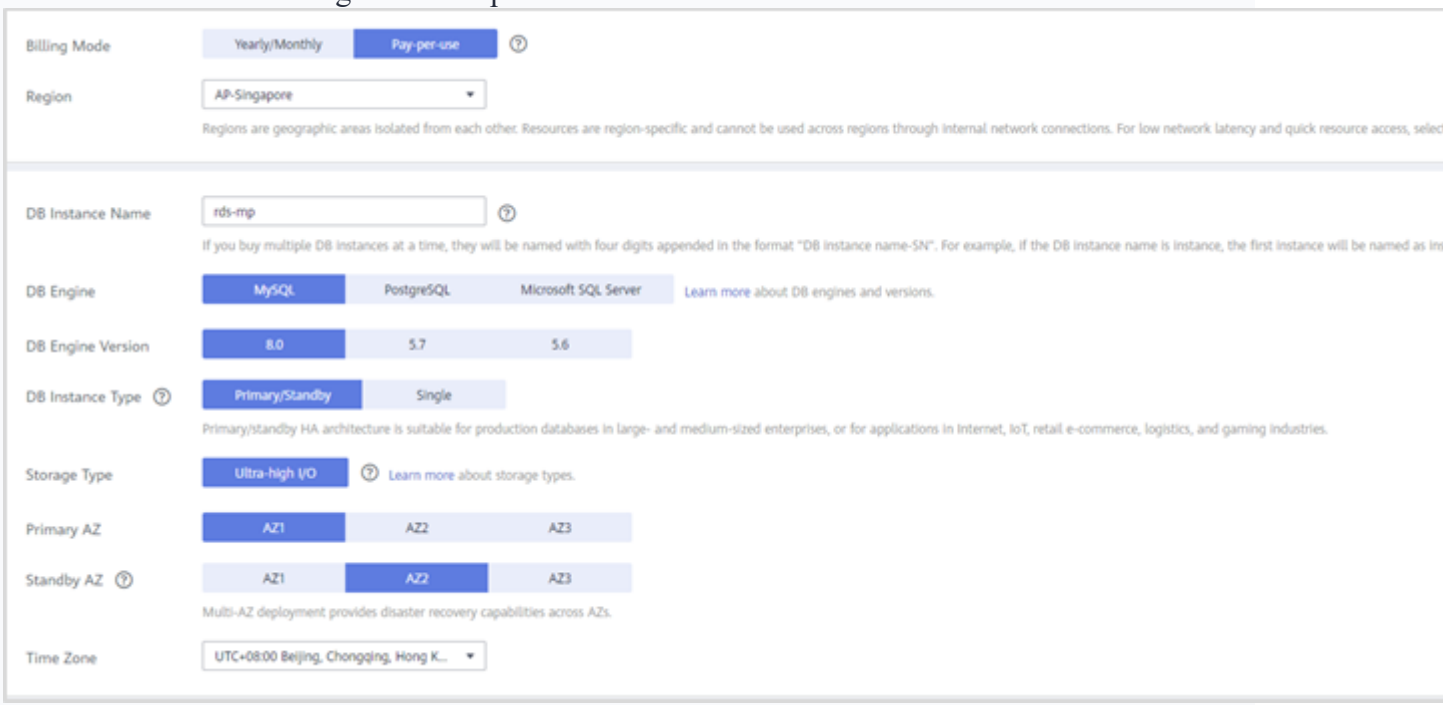
Step 2 Click **Buy DB Instance**.

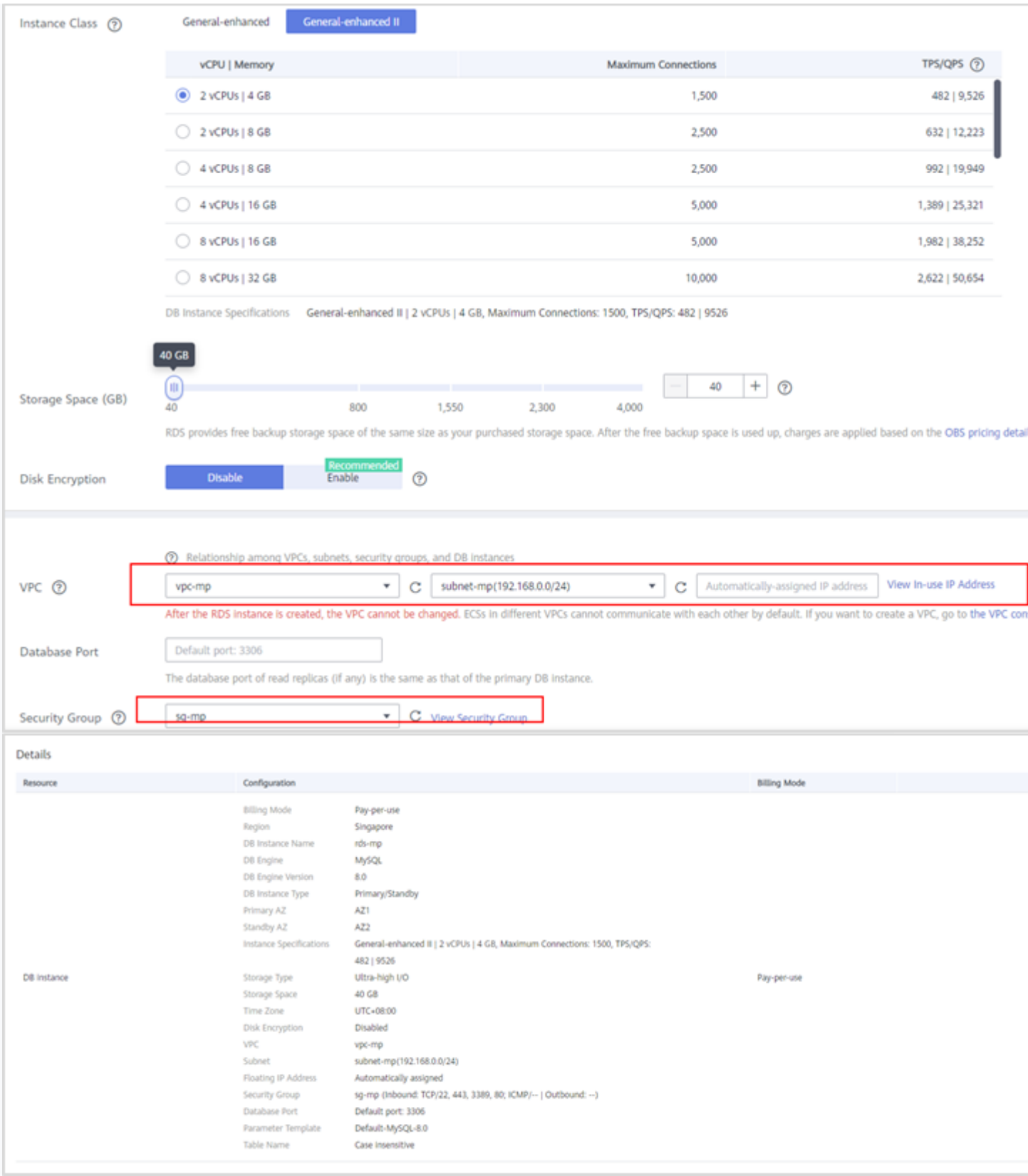


Step 3 Set the parameters as follows and click **Next**.

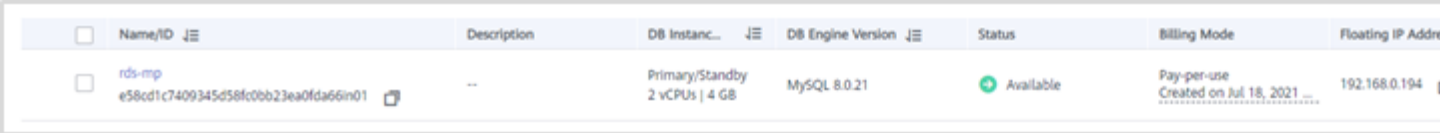
- **Billing Mode: Pay-per-use**
- **Region: AP-Singapore**
- Instance parameters: **rds**-name (customizable), **MySQL, 8.0, Primary/Standby, Cloud SSD**
- Performance specifications: **2 vCPUs | 4 GB**. Determine the specifications based on real-world service requirements.
- **VPC, Security Group**, and **Password**: Select the VPC and security group you have created. Set the password, for example, **Huawei!@#$.**

- Retain the default settings for other parameters.

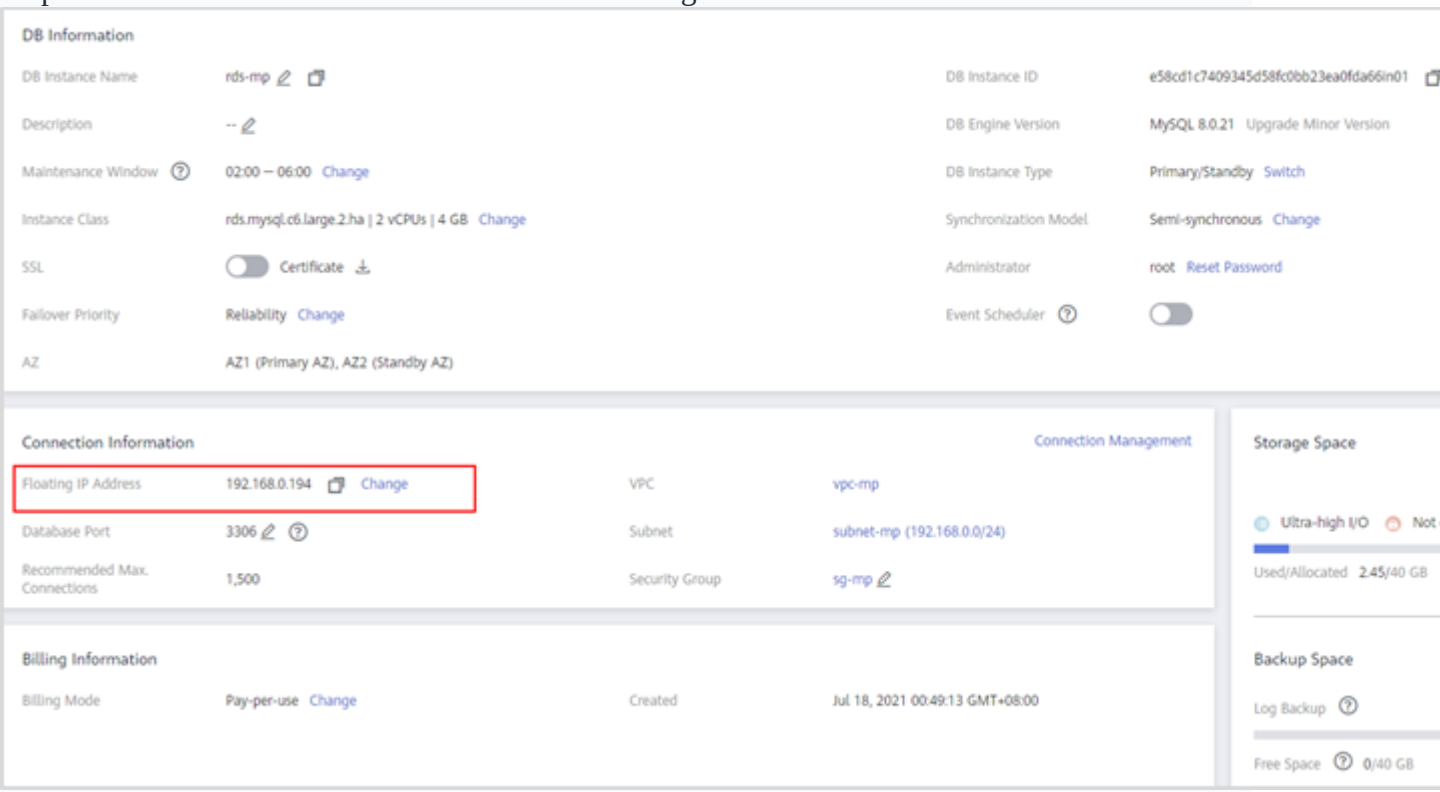




Step 4 Confirm the configuration, and click **Submit**. Go to the RDS DB instance list, and wait for the creation to complete, which takes 6 to 10 minutes.



Step 5 Click the DB instance name to view its floating IP address.

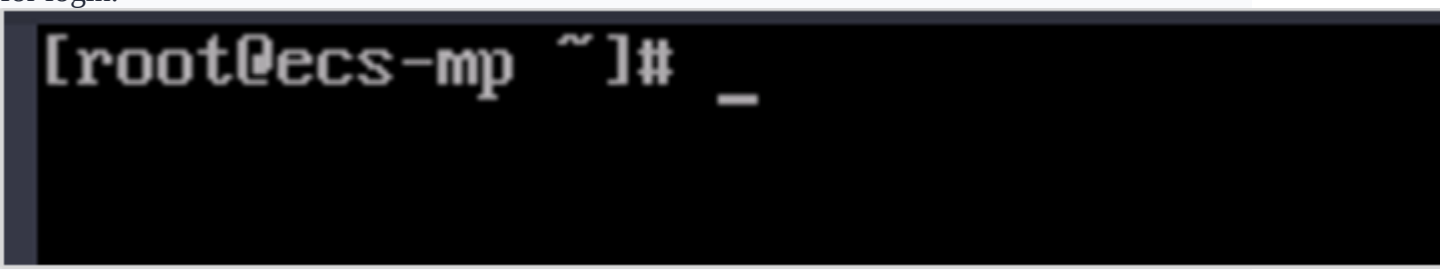


2.Setting Up the Linux, Apache, MySQL, PHP (LAMP) Environment

2.1 Installing LAMP

Step 1 Go back to the ECS console and click **Remote Login** in the **Operation** column of the purchased ECS.

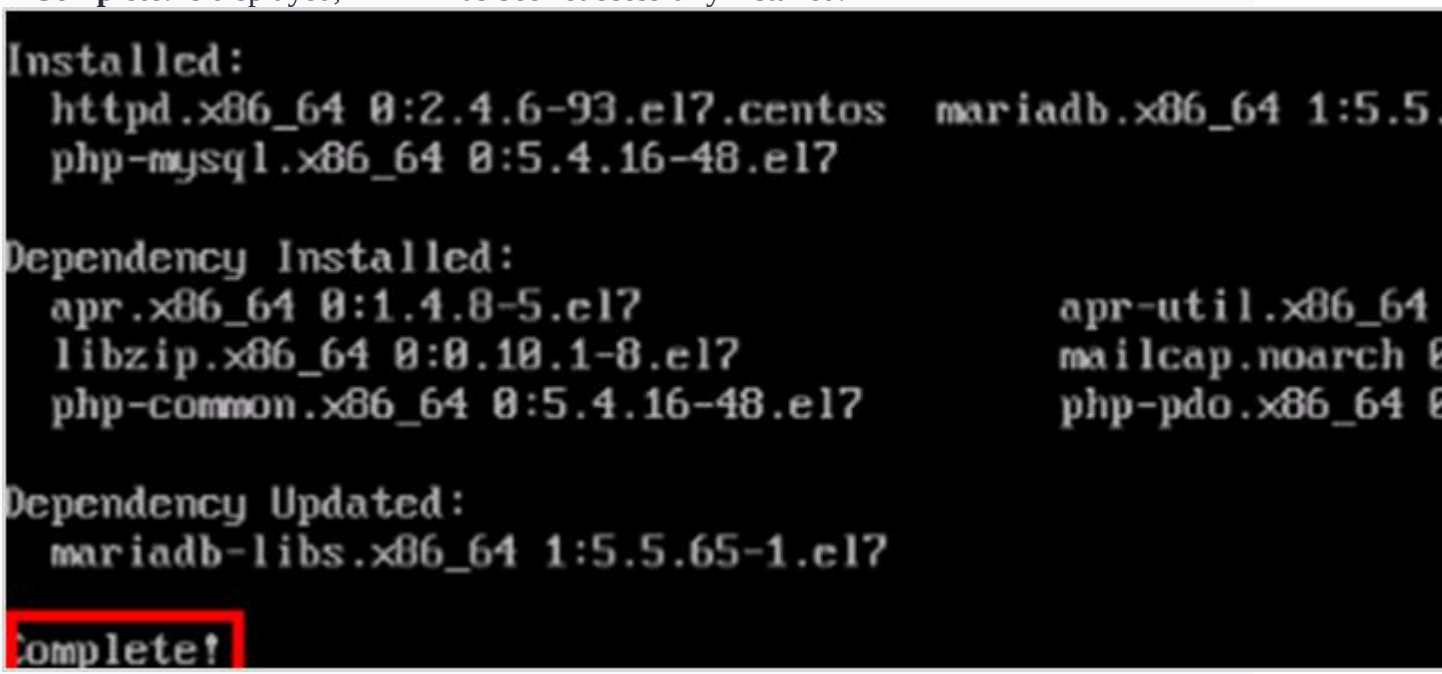
Step 2 In the **VNC** window, enter the username (**root** for Linux ECSs by default) and password for login.



Step 3 Run the following command to install LAMP and enable the services you will need:

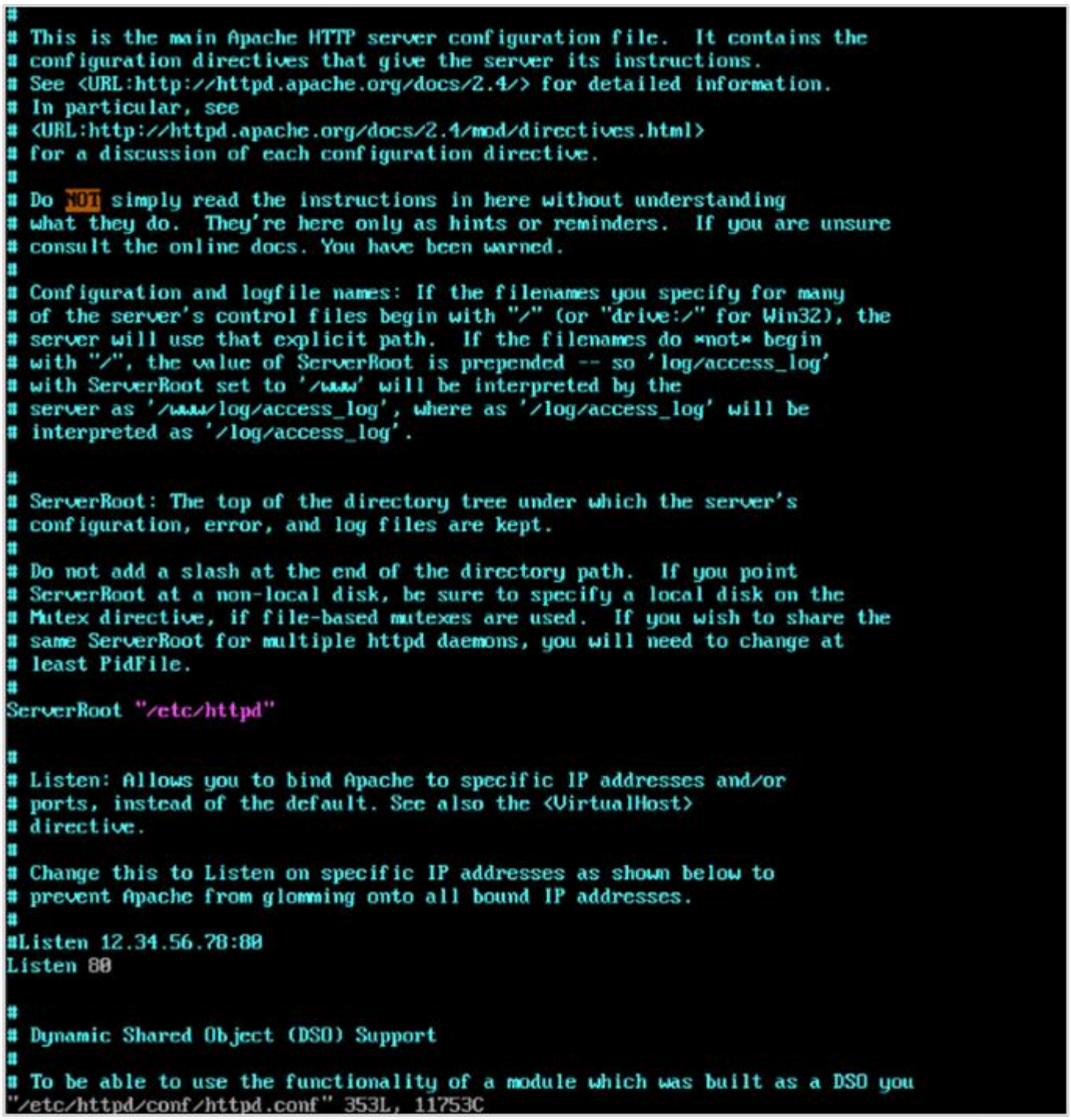
Copy Codeyum install -y httpd php php-fpm php-mysql mysql

If **Complete!** is displayed, LAMP has been successfully installed.



Step 4 Configure httpd:

Copy Codevim /etc/httpd/conf/httpd.conf



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 content:

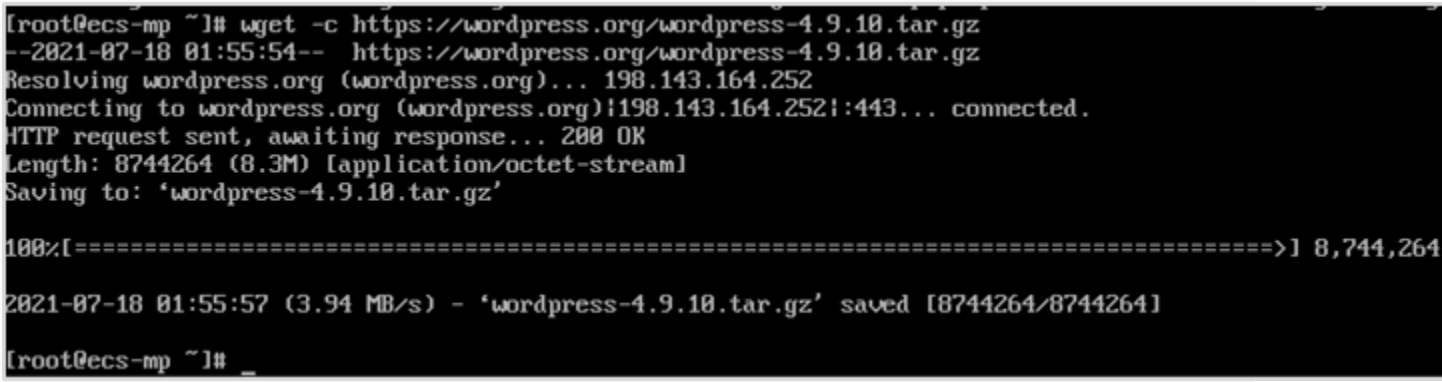
Copy CodeServerName localhost:80

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

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

Copy Codewget -c https://koolabsfiles.obs.ap-southeast-3.myhuaweicloud.com:443/20220731/wordpress-4.9.10.tar.gz

If **wordpress-4.9.10.tar.gz** is displayed, the WordPress installation package has been downloaded.



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

Copy Codetar -zxvf wordpress-4.9.10.tar.gz -C /var/www/html

The command output similar to the following is displayed.

```
wordpress/wp-admin/js/code-editor.min.js
wordpress/wp-admin/js/set-post-thumbnail.js
wordpress/wp-admin/options-permalink.php
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-mp ~]# _
```

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

Copy Codechmod -R 777 /var/www/html

```
[root@ecs-mp ~]# chmod -R 777 /var/www
[root@ecs-mp ~]# _
```

Step 10 Run the following command to enable httpd:

Copy Codesystemctl start httpd.service

```
[root@ecs-mp ~]# systemctl start httpd
[root@ecs-mp ~]#
```

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

Copy Codesystemctl start php-fpm.service

```
[root@ecs-mp ~]# systemctl start php-fp
[root@ecs-mp ~]# _
```

Step 12 Run the following command to check the httpd status, which should be **active (running)** and highlighted:

Copy Codesystemctl status httpd

```
[root@ecs-mp ~]# systemctl status httpd
● httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; disabled; vendor preset: disabl
   Active: active (running) since Sun 2021-07-18 00:50:10 CST; 30s ago
     Docs: man:httpd(8)
           man:apachectl(8)
 Main PID: 1656 (httpd)
   Status: "Total requests: 0; Current requests/sec: 0; Current traffic:   0 B/sec"
   CGroup: /system.slice/httpd.service
           ├─1656 /usr/sbin/httpd -DFOREGROUND
           ├─1658 /usr/sbin/httpd -DFOREGROUND
           ├─1659 /usr/sbin/httpd -DFOREGROUND
           ├─1660 /usr/sbin/httpd -DFOREGROUND
           ├─1661 /usr/sbin/httpd -DFOREGROUND
           └─1662 /usr/sbin/httpd -DFOREGROUND

Jul 18 00:50:10 ecs-mp systemd[1]: Starting The Apache HTTP Server...
Jul 18 00:50:10 ecs-mp systemd[1]: Started The Apache HTTP Server.
[root@ecs-mp ~]#
```

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

Copy Codesystemctl status php-fpm

```
[root@ecs-mp ~]# systemctl status php-fpm
● php-fpm.service - The PHP FastCGI Process Manager
   Loaded: loaded (/usr/lib/systemd/system/php-fpm.service; disabled; vendor pr
   Active: active (running) since Sun 2021-07-18 00:50:23 CST; 52s ago
 Main PID: 1669 (php-fpm)
   Status: "Processes active: 0, idle: 5, Requests: 0, slow: 0, Traffic: 0req/s
   CGroup: /system.slice/php-fpm.service
           ├─1669 php-fpm: master process (/etc/php-fpm.conf)
           ├─1671 php-fpm: pool www
           ├─1672 php-fpm: pool www
           ├─1673 php-fpm: pool www
           ├─1674 php-fpm: pool www
           └─1675 php-fpm: pool www

Jul 18 00:50:23 ecs-mp systemd[1]: Starting The PHP FastCGI Process Manager...
Jul 18 00:50:23 ecs-mp systemd[1]: Started The PHP FastCGI Process Manager.
[root@ecs-mp ~]#
```

Step 14 Run the following command to make httpd automatically start at boot. If information similar to what shown in the figure is displayed, httpd has been configured to automatically start at boot.

Copy Codesystemctl enable httpd

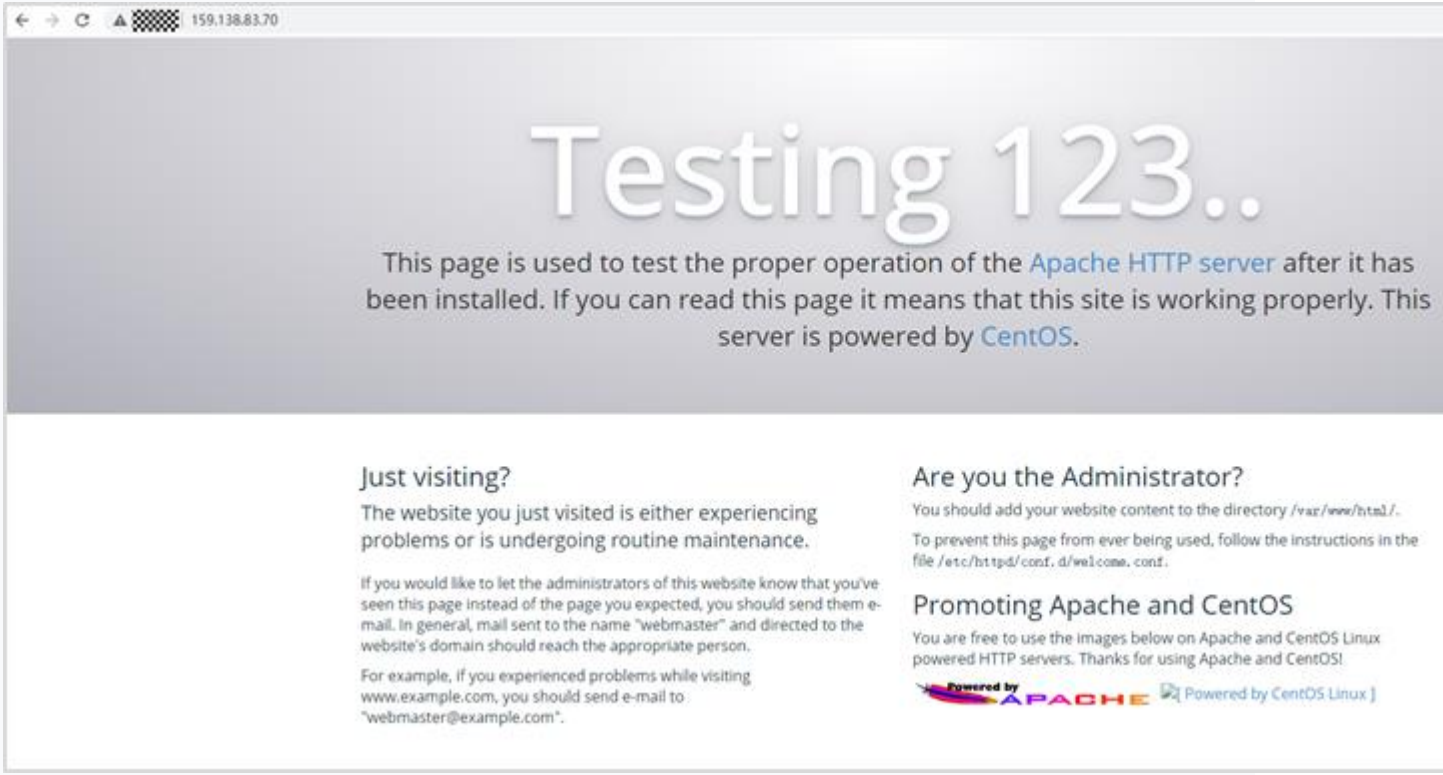
```
[root@ecs-mp ~]# systemctl enable httpd
Created symlink from /etc/systemd/system/multi-user.target.wants/httpd.service to /usr/lib/system
[root@ecs-mp ~]# _
```

Step 15 Run the following command to configure php-fpm automatically start upon system boot. If information similar to what shown in the figure is displayed, php-fpm has been configured to automatically start upon system boot.

Copy Codesystemctl enable php-fpm

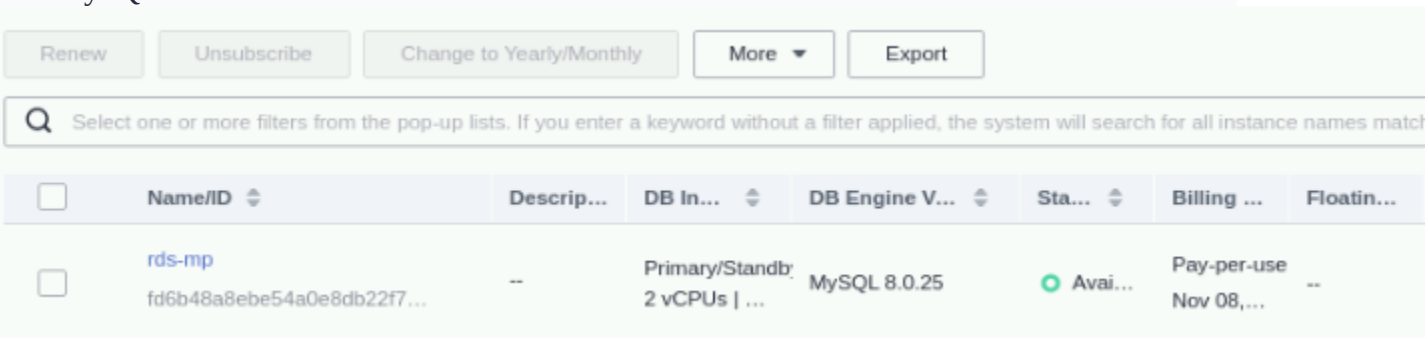
```
[root@ecs-mp ~]# systemctl enable php-fpm
Created symlink from /etc/systemd/system/multi-user.target.wants/php-fpm.service to /usr/lib/systemd
[root@ecs-mp ~]#
```

Step 16 In the browser, access the EIP bound to the ECS. If the following figure is displayed, LAMP has been installed.



2.2 Creating a Database for WordPress

Step 1 Go back to the RDS console and click **Log In** in the **Operation** column of the created RDS MySQL database instance.



Step 2 Enter the username (**root** by default) and password (you set when purchasing the RDS instance). Select **Remember Password**, enable **Collect Metadata Periodically** and **Show Executed SQL Statements**. If the connection test is successful, click **Log In**.

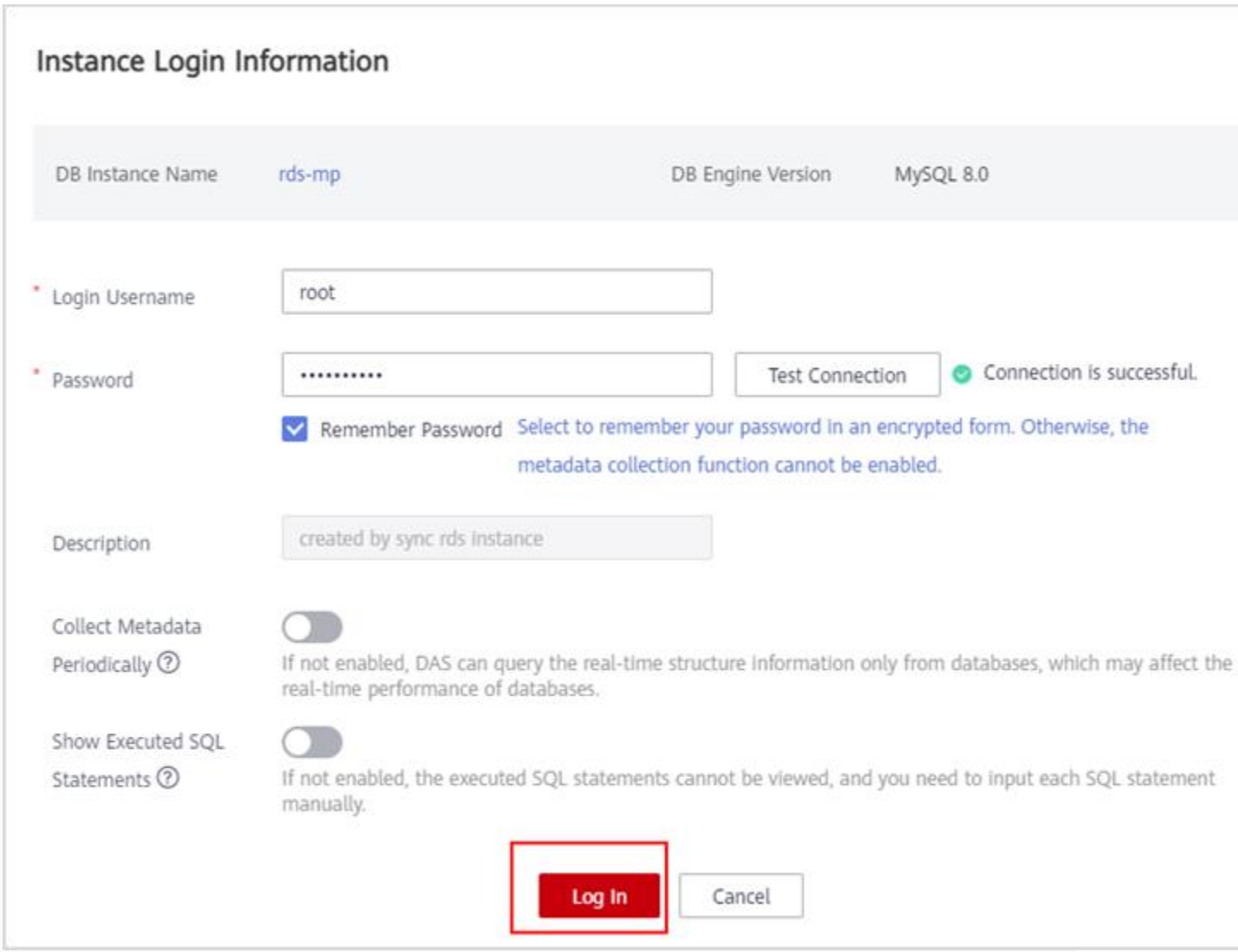
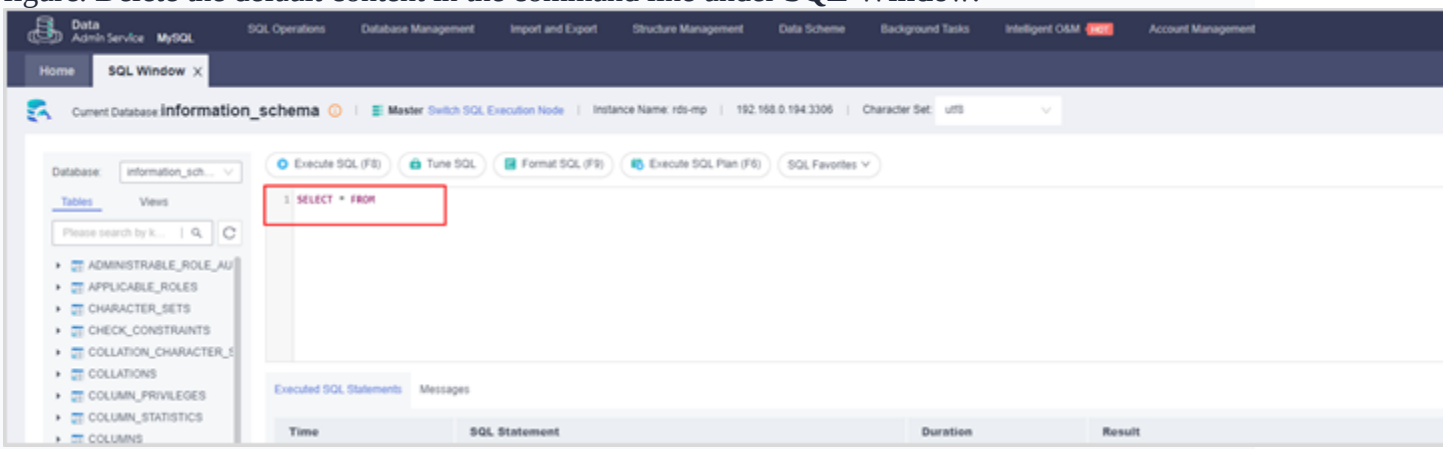


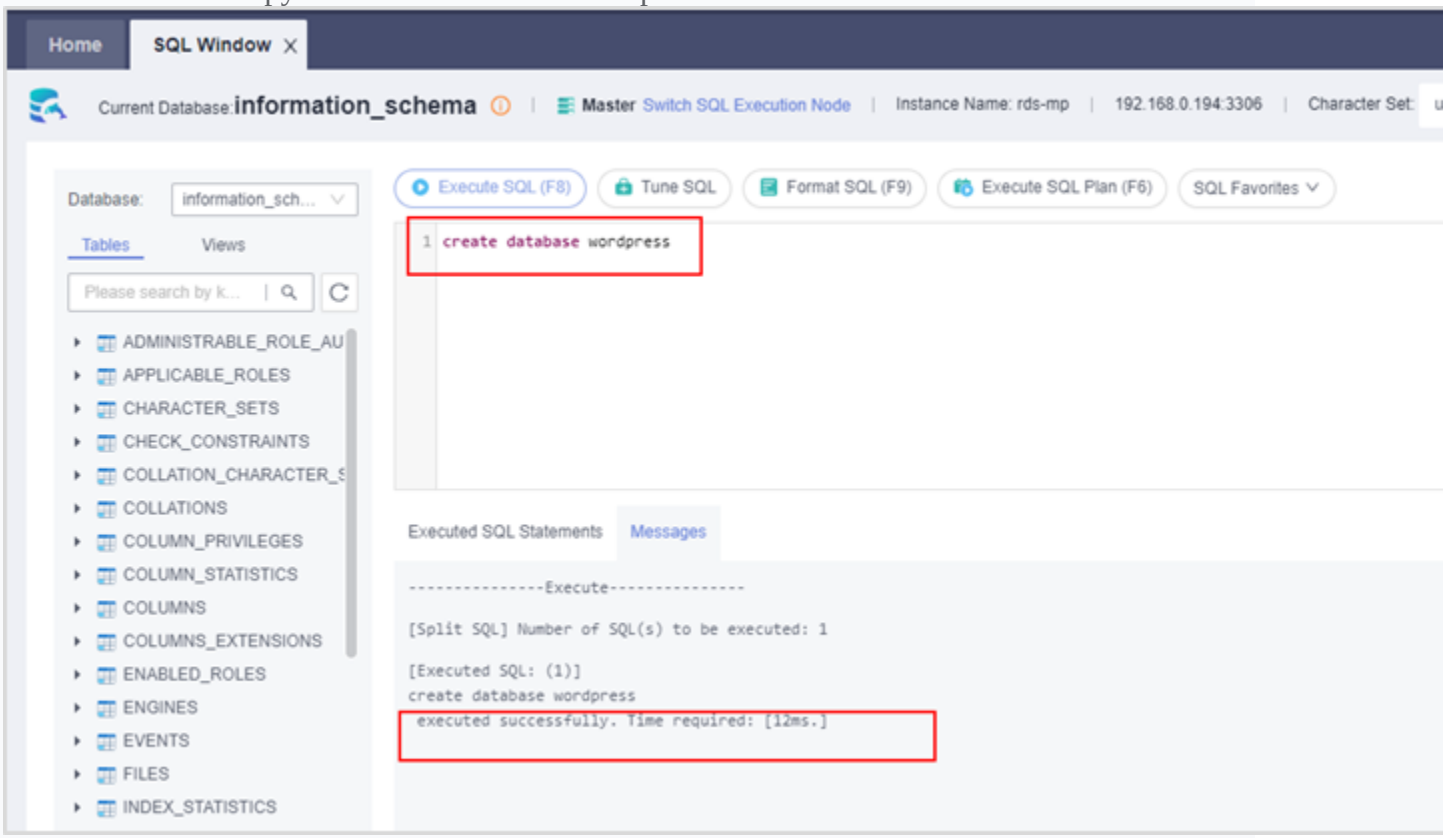
Figure 1-2

Step 3 On the top menu bar, choose **SQL Operations > SQL Query**, as shown in the following figure. Delete the default content in the command line under **SQL Window**.



Step 4 Enter the following SQL statement and click **Execute SQL**. If the following information is displayed, the database for WordPress has been created.

Copy Codecreate database wordpress



2.3 Installing WordPress

Step 1 In the address box of the browser, enter **http://**ECS EIP/**wordpress** to access the WordPress installation wizard.

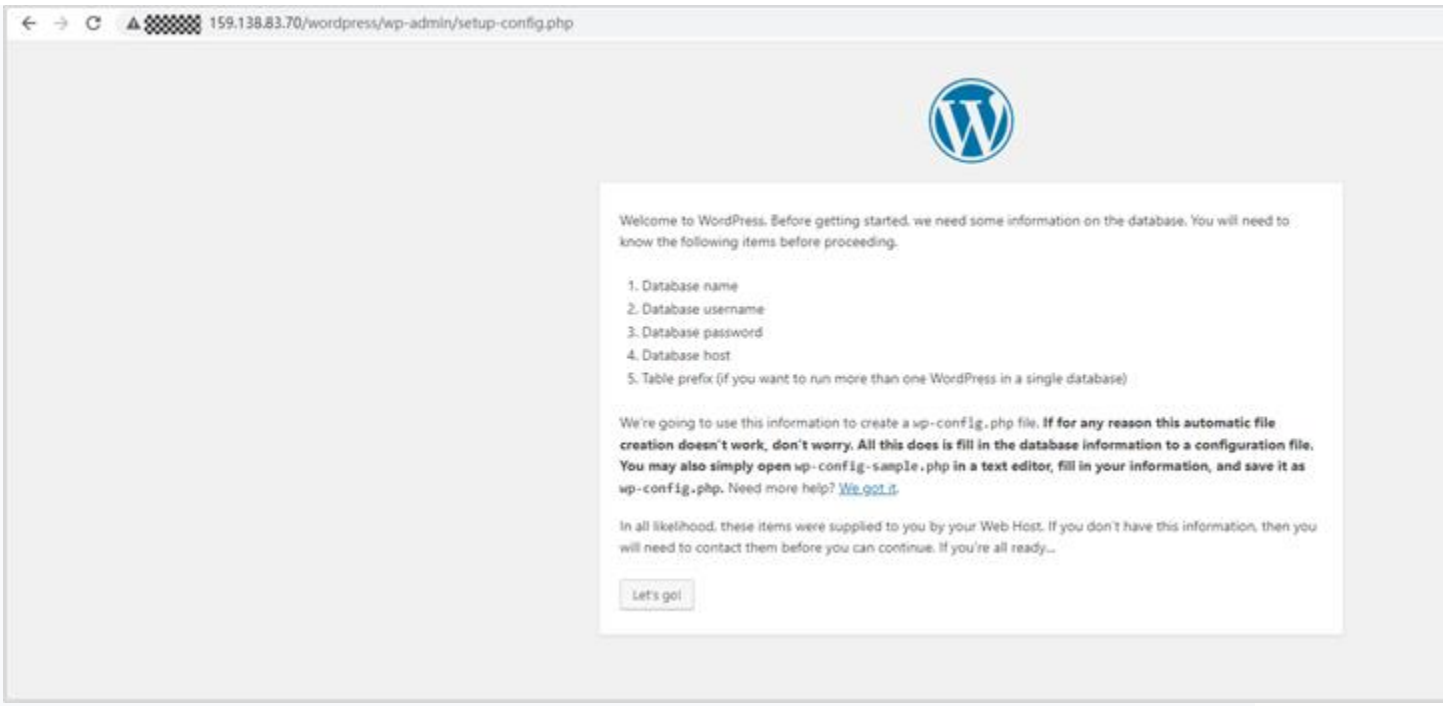
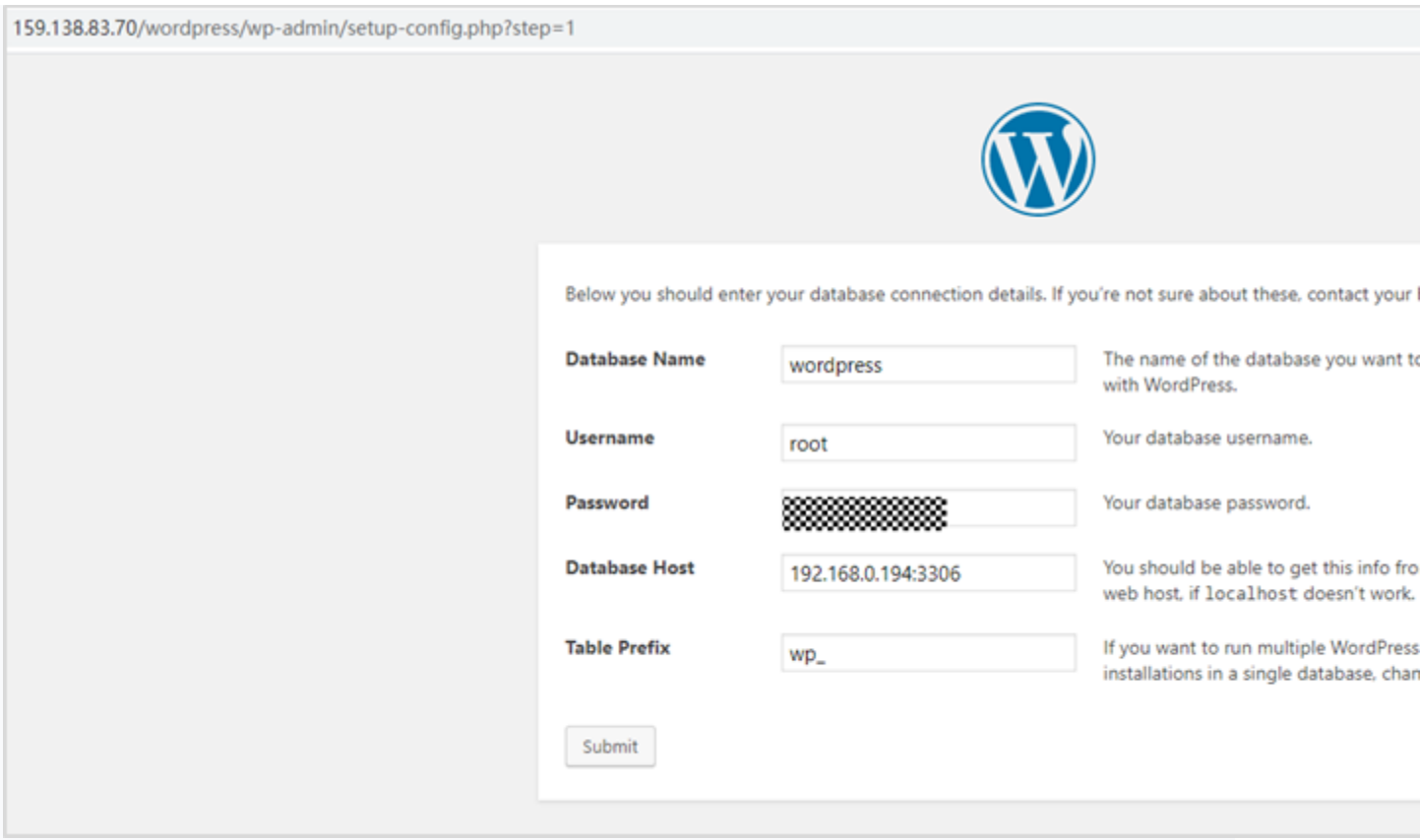


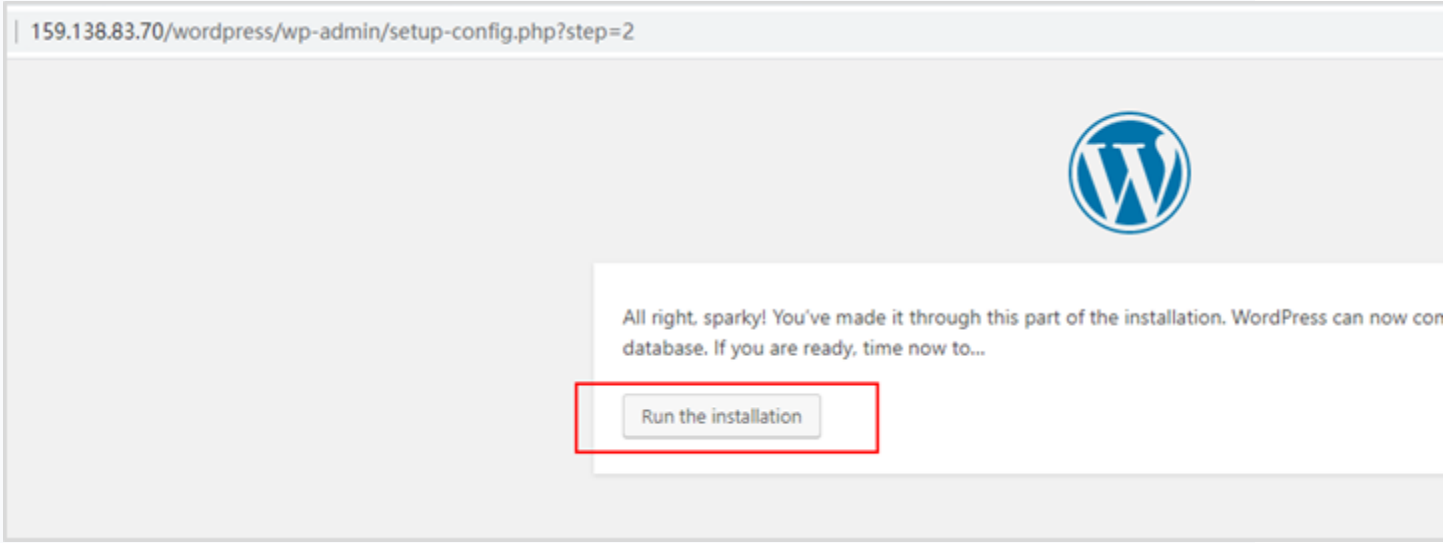
Figure 1-3 Opening the WordPress installation wizard

Step 2 Click **Let's go!**. in the displayed page, enter the database access information, and click **Submit**.

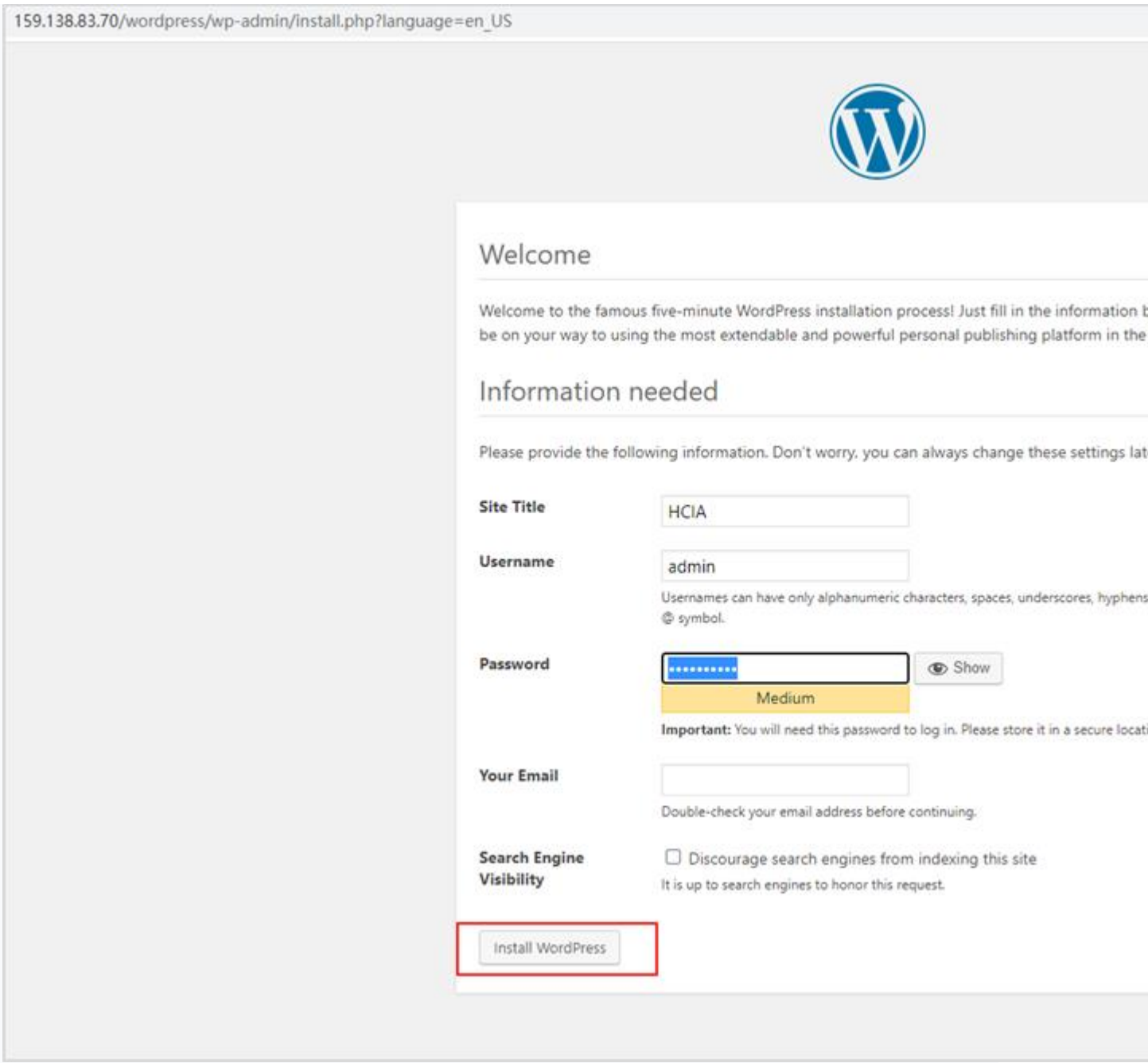
- **Database Name: wordpress**
- **Username: root**
- **Password**: Enter the password you set.
- **Database Host**: Enter the database floating IP address and port number obtained in section Buying an RDS DB Instance.
- **Table Prefix**: Retain the default settings.

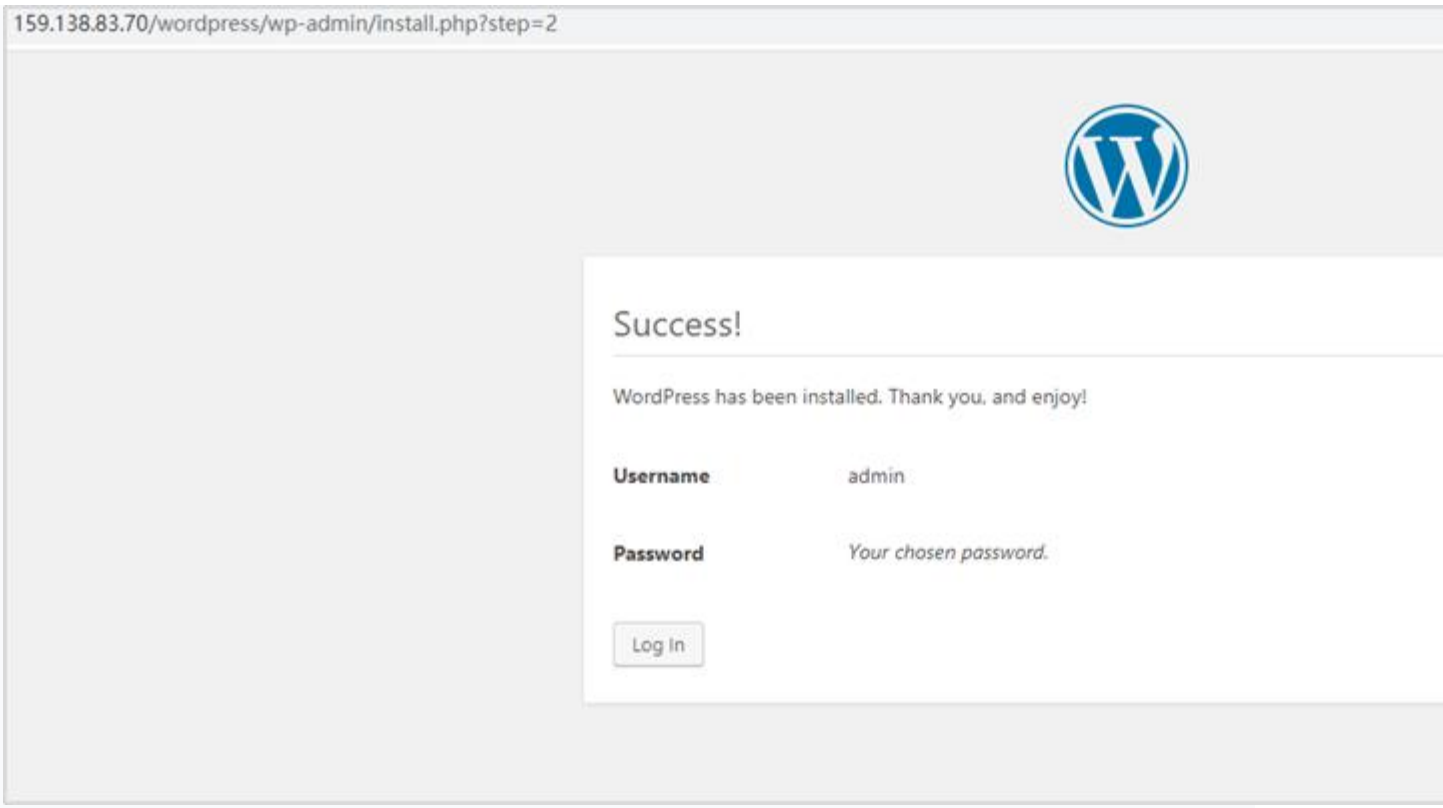


● Click **Run the installation**.

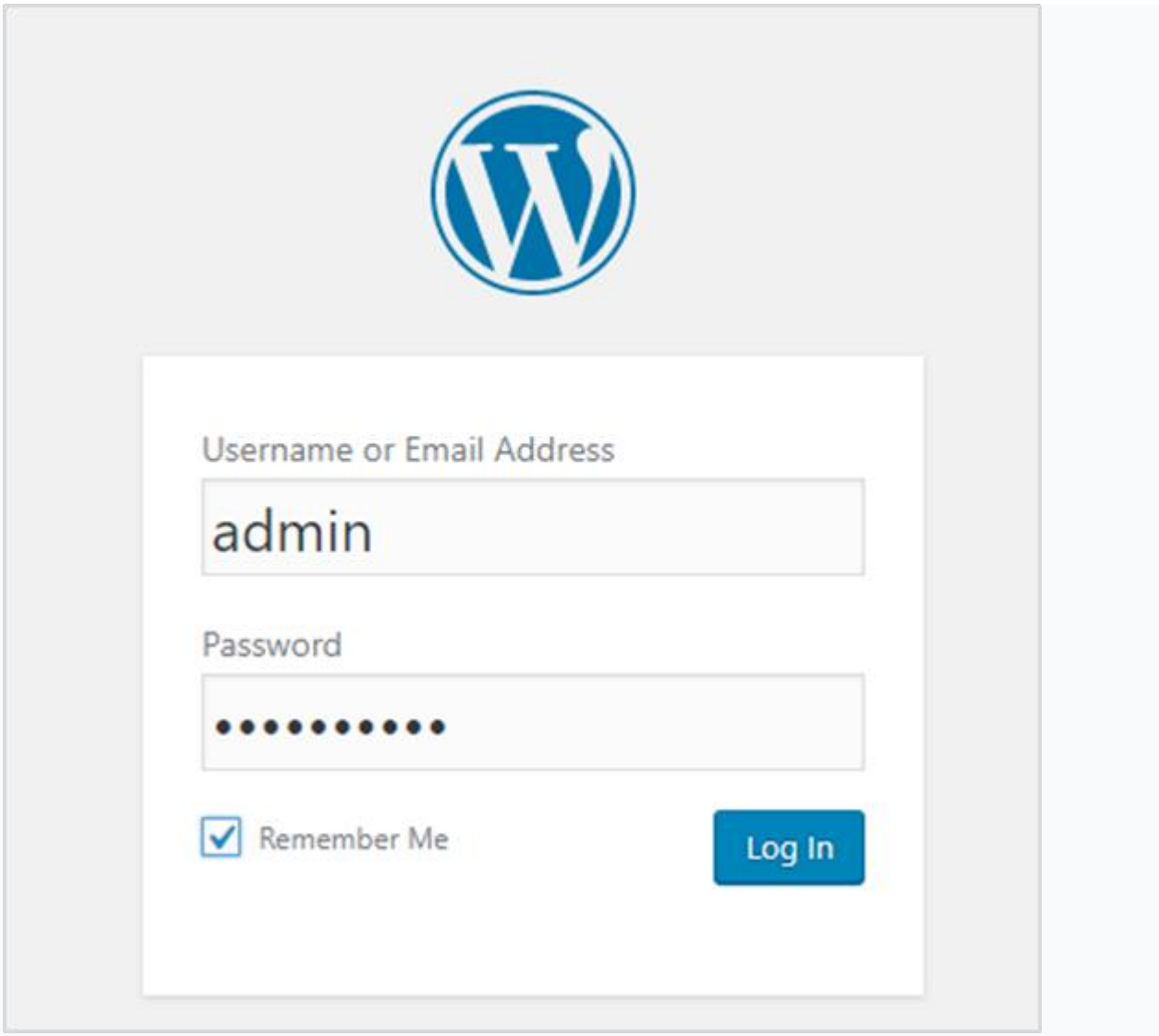


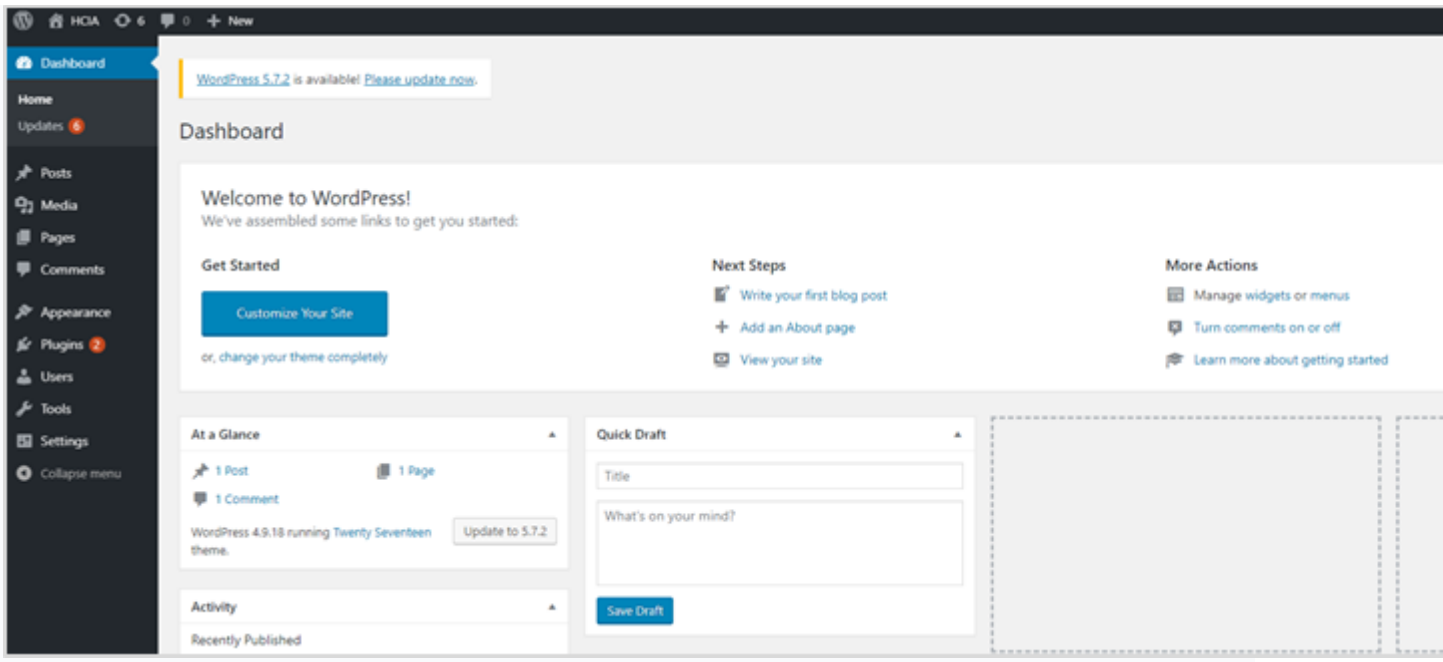
● Set **Site Title, Username, Password**, and **Your Email**, and click **Install WordPress**.


159.138.83.70/wordpress/wp-admin/install.php?language=en_US
Welcome
Welcome to the famous five-minute WordPress installation process! Just fill in the information b
be on your way to using the most extendable and powerful personal publishing platform in the
Information needed
Please provide the following information. Don't worry, you can always change these settings lat
Site Title
HCIA
Username
admin
Usernames can have only alphanumeric characters, spaces, underscores, hyphens
@ symbol.
Password
Show
Medium
Important: You will need this password to log in. Please store it in a secure locati
Your Email
Double-check your email address before continuing.
Search Engine Visibility
Discourage search engines from indexing this site
It is up to search engines to honor this request.
Install WordPress



Step 3 Enter the user name and password on the displayed login page. Then, click **Log In**.


Username or Email Address
admin
Password
Remember Me
Log In



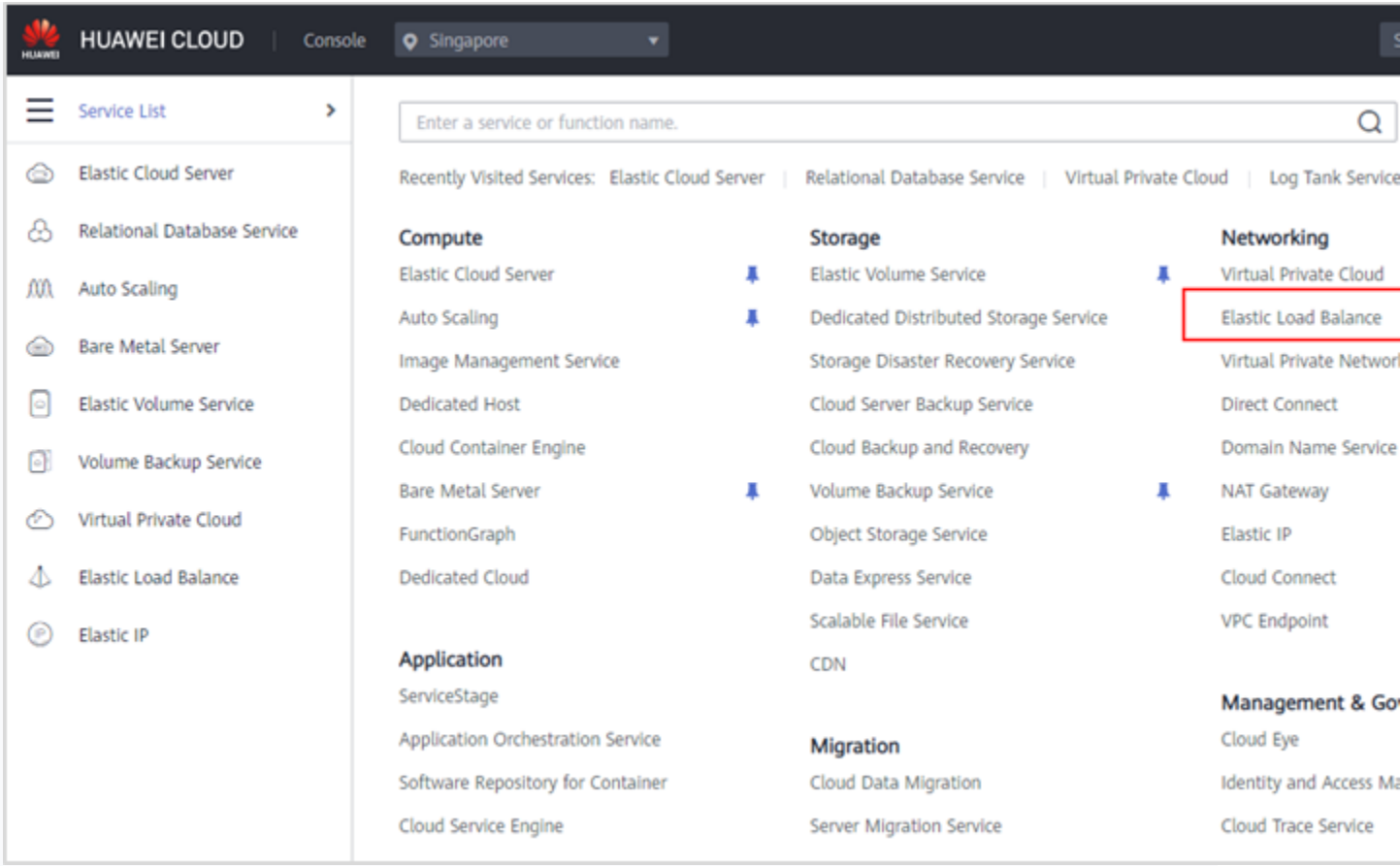
Now the initial configurations of the WordPress website server and its back-end database instance are complete. Next, we will configure ELB and AS for the WordPress website server.

3.Achieving High Availability for Web Servers

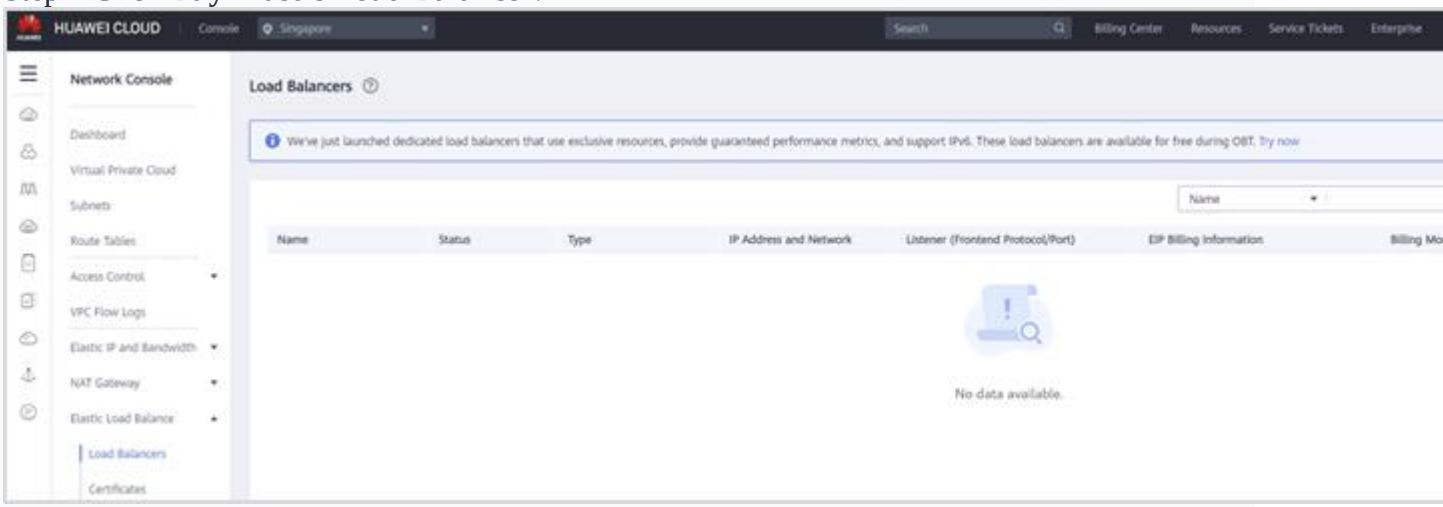
To ensure high availability, enterprises usually deploy their applications on more than one server, use ELB to distribute incoming traffic across these servers, and use AS to scale in or out servers on demand. In this exercise, we will use the website you built in the preceding exercise as an example to describe how you can configure ELB to distribute incoming traffic across the web servers, and we will use AS to improve the availability of the website.

3.1 Creating a Shared Load Balancer

Step 1 On the management console, hover on the upper left to display **Service List** and choose **Networking > Elastic Load Balance**.



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



Step 3 Configure the parameters as follows and click **Next**.

- **Type: Shared load balancer**
- **Region: AP-Singapore**
- **Name: elb-mp** (Change it as needed.)
- **Network type: Public network**
- **VPC**: the VPC and subnet you created
- **EIP: New EIP, Dynamic BGP, Bandwith, 2 Mbit/s**

Basic Information

Type

Dedicated load balancer

Dedicated load balancers can handle Layer 4 and Layer 7 requests. They support multiple protocols and advanced forwarding policies. A dedicated load balancer deployed in a single AZ can establish up to 20 million concurrent connections.

They work well for heavy-traffic and highly concurrent services, such as large websites, cloud-native applications, IoV, and multi-AZ disaster recovery applications.

Shared load balancer

Shared load balancers also work at both Laye
and can forward HTTP or HTTPS requests ba
names or URLs. A shared load balancer can
50,000 concurrent connections.

They are good for services with low traffic, su
websites and common HA applications.

The load balancer type cannot be changed after it is selected. View Differences Between Dedicated and Shared Load

Billing Mode: Yearly/Monthly | Pay-per-use

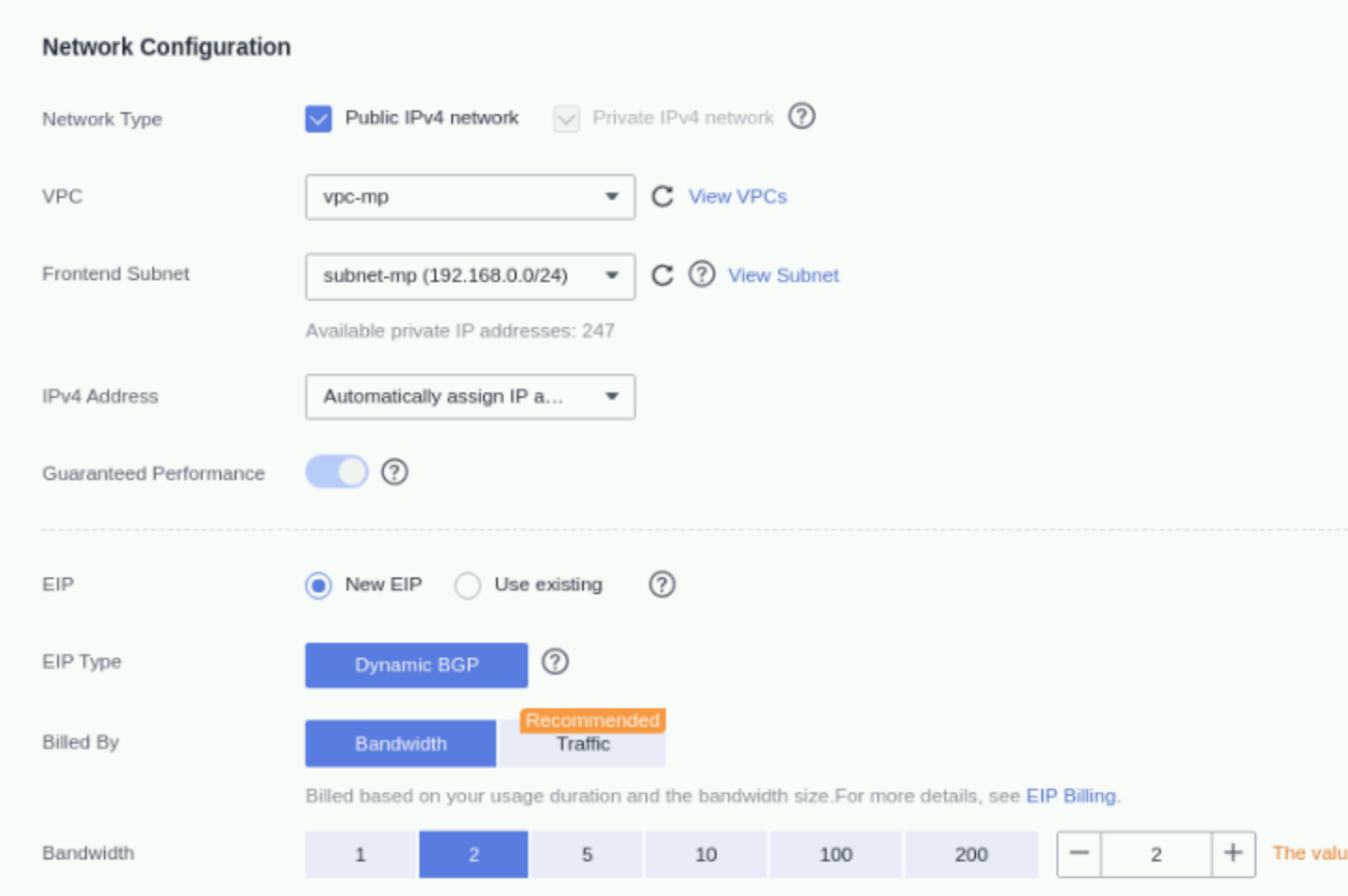
Region: AP-Singapore

Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across reg
select the nearest region.

Name: elb-mp

Enterprise Project: default | Create Enterprise Project

More | Description | Tag

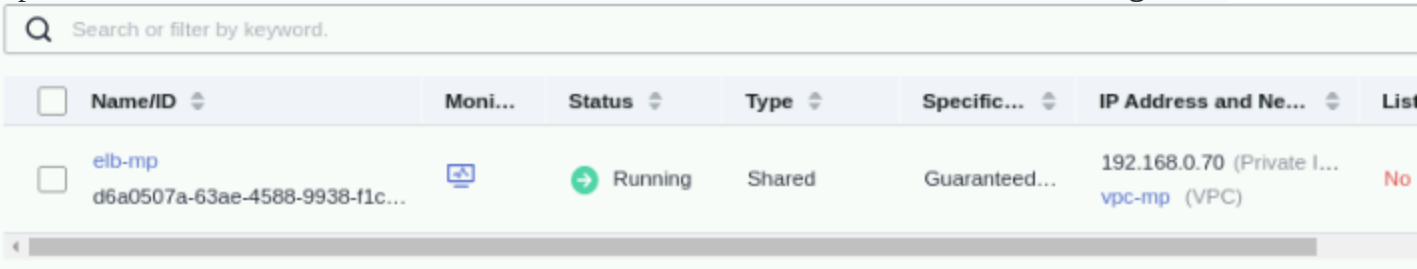


Step 4 Confirm the configuration and submit your request.

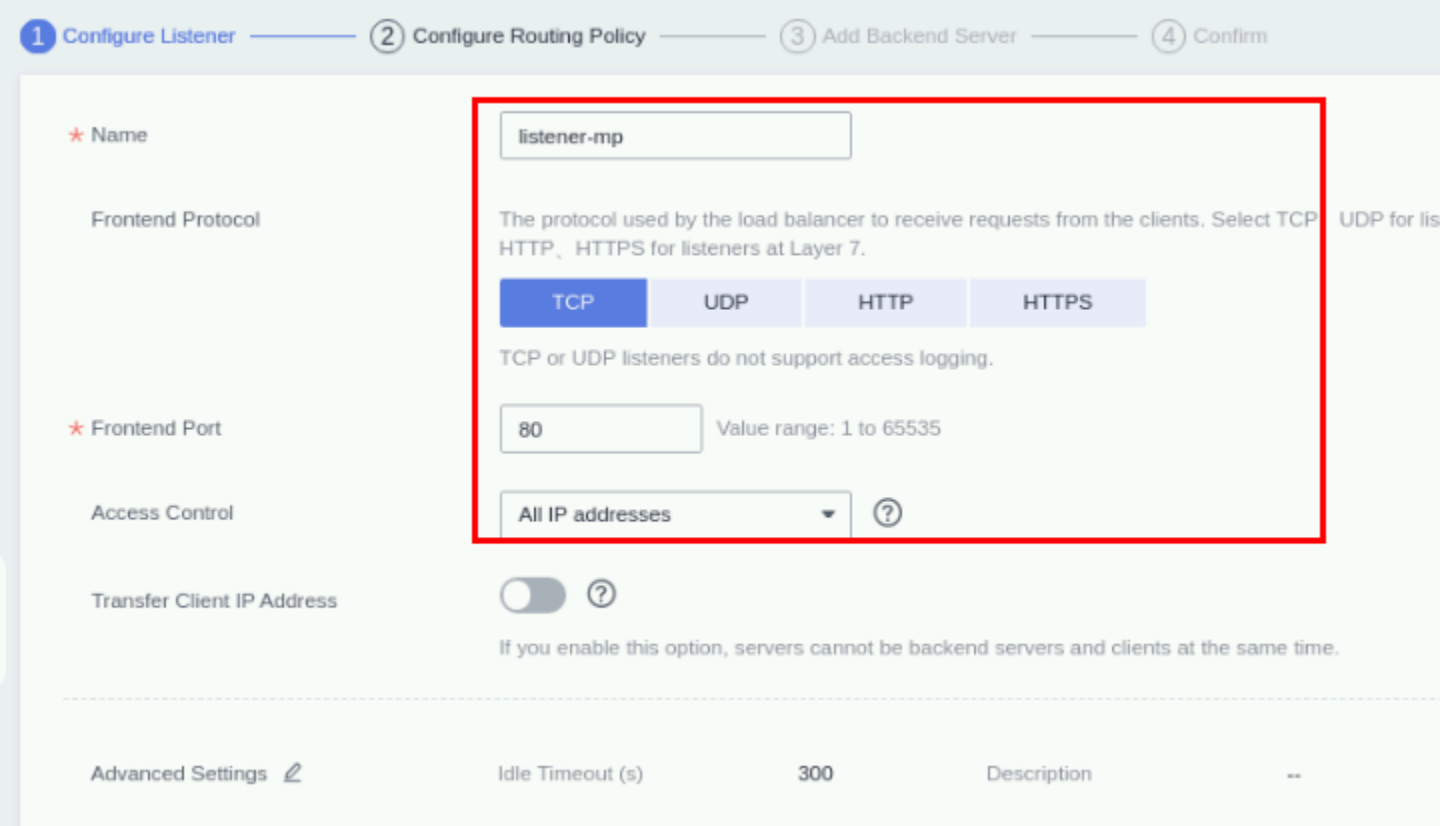
Resource	Configuration		B
Elastic load balancer	Region	Singapore	
	Name	elb-mp	
	Network Type	Public IPv4 network,Private IPv4 network	
	VPC	vpc-mp	
	Type	Shared	
	Frontend Subnet	subnet-mp (192.168.0.0/24)	P
	Guaranteed Performance	Enabled	
	Enterprise Project	default	
	Tag	--	
	Description	--	
EIP	EIP Type	Dynamic BGP	P
Bandwidth	Bandwidth Size	2 Mbit/s	
	Billed By	Bandwidth	P

Price: ¥(hour + EIP Reservation Price: Free

Step 5 Go back to the load balancer list and ensure that the load balancer is in the **Running** state.

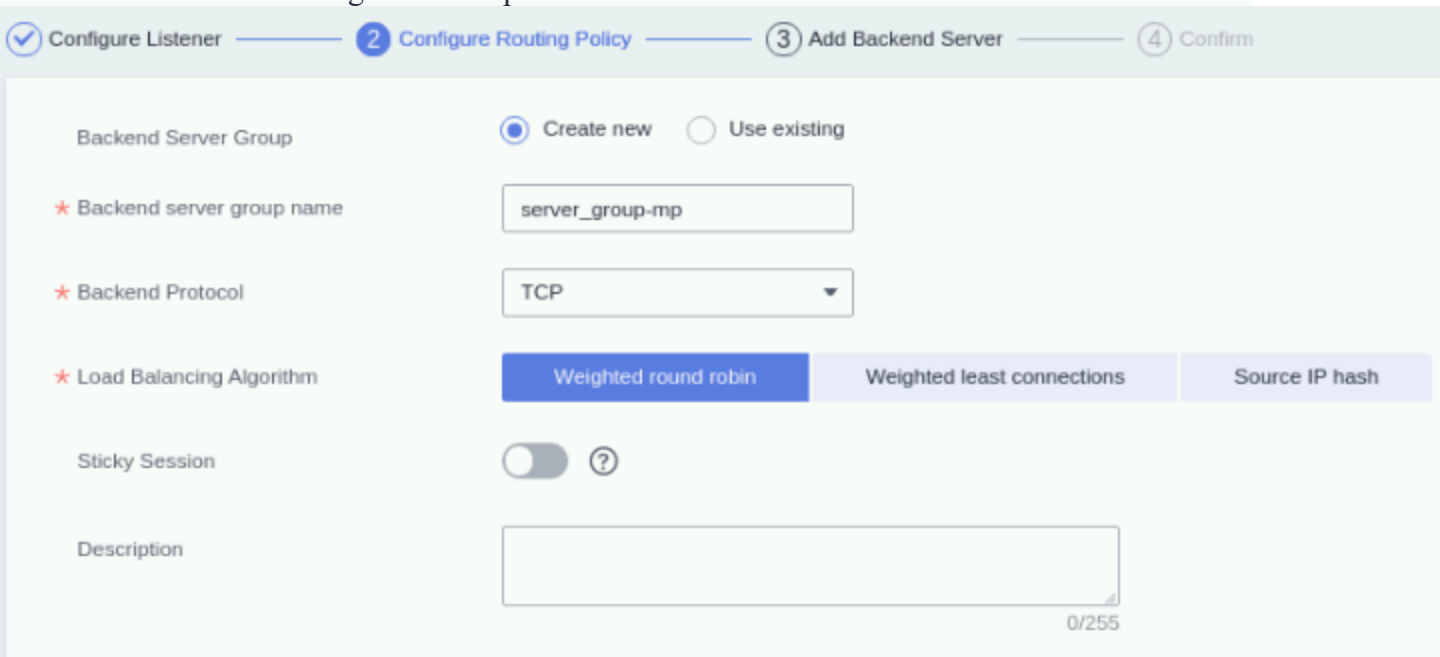


Step 6 Click the name of the load balancer. Under **Listeners**, click **Add Listener**. Configure the name, protocol, and port for the listener.



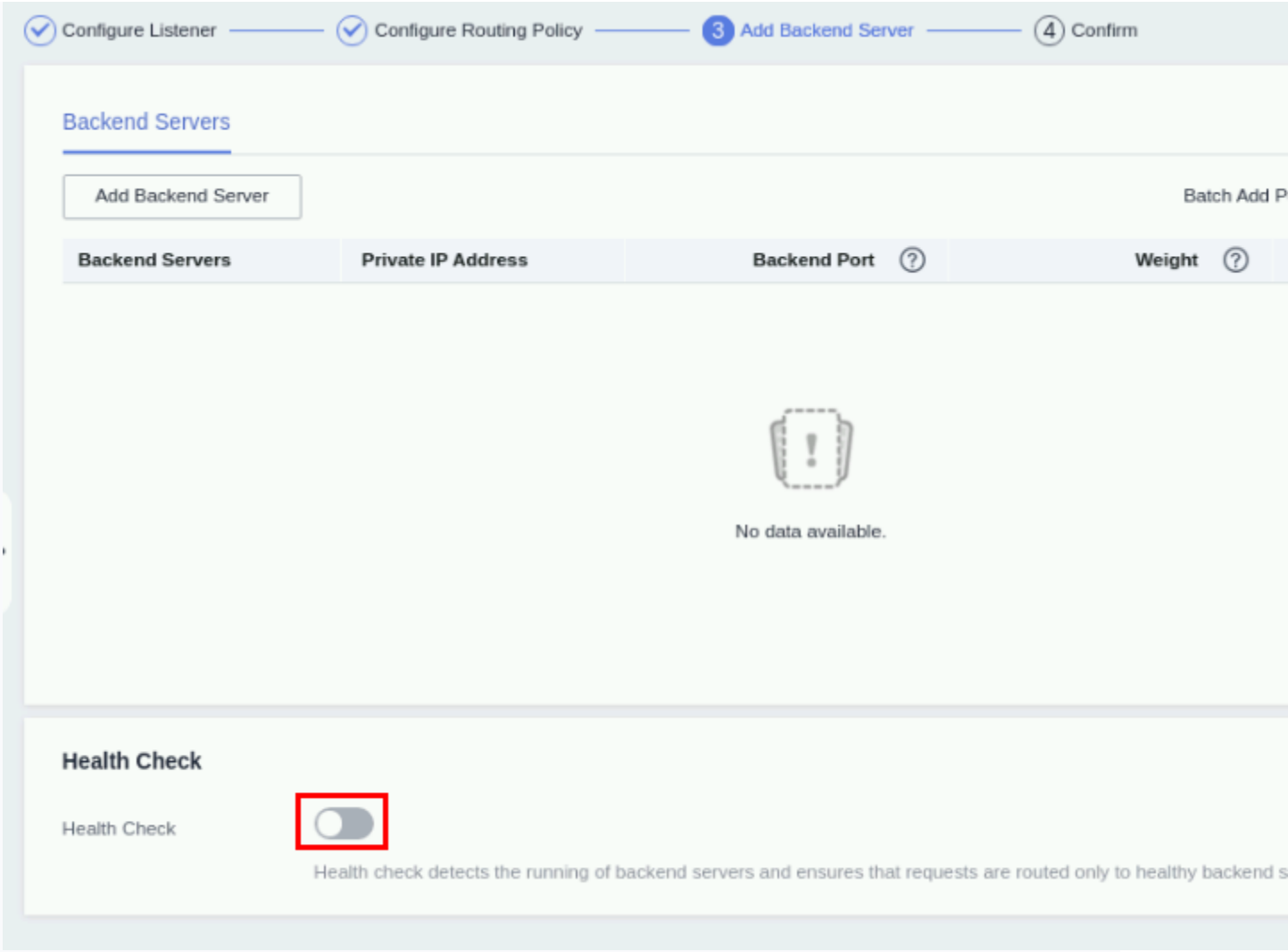
Step 7 Click Next, configure the backend server group, and click **Finish**.

- **Name: listener-mp** (Change it as needed.)
- Remain the default settings for other parameters.



Step 8 Click Next, close **Health Check** and click Next.

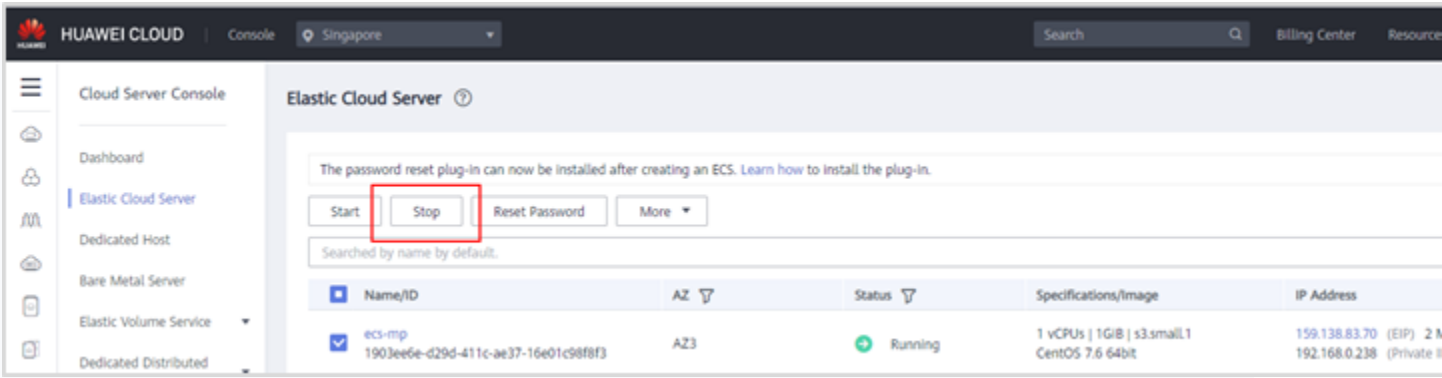
- **Health Check**: disabled



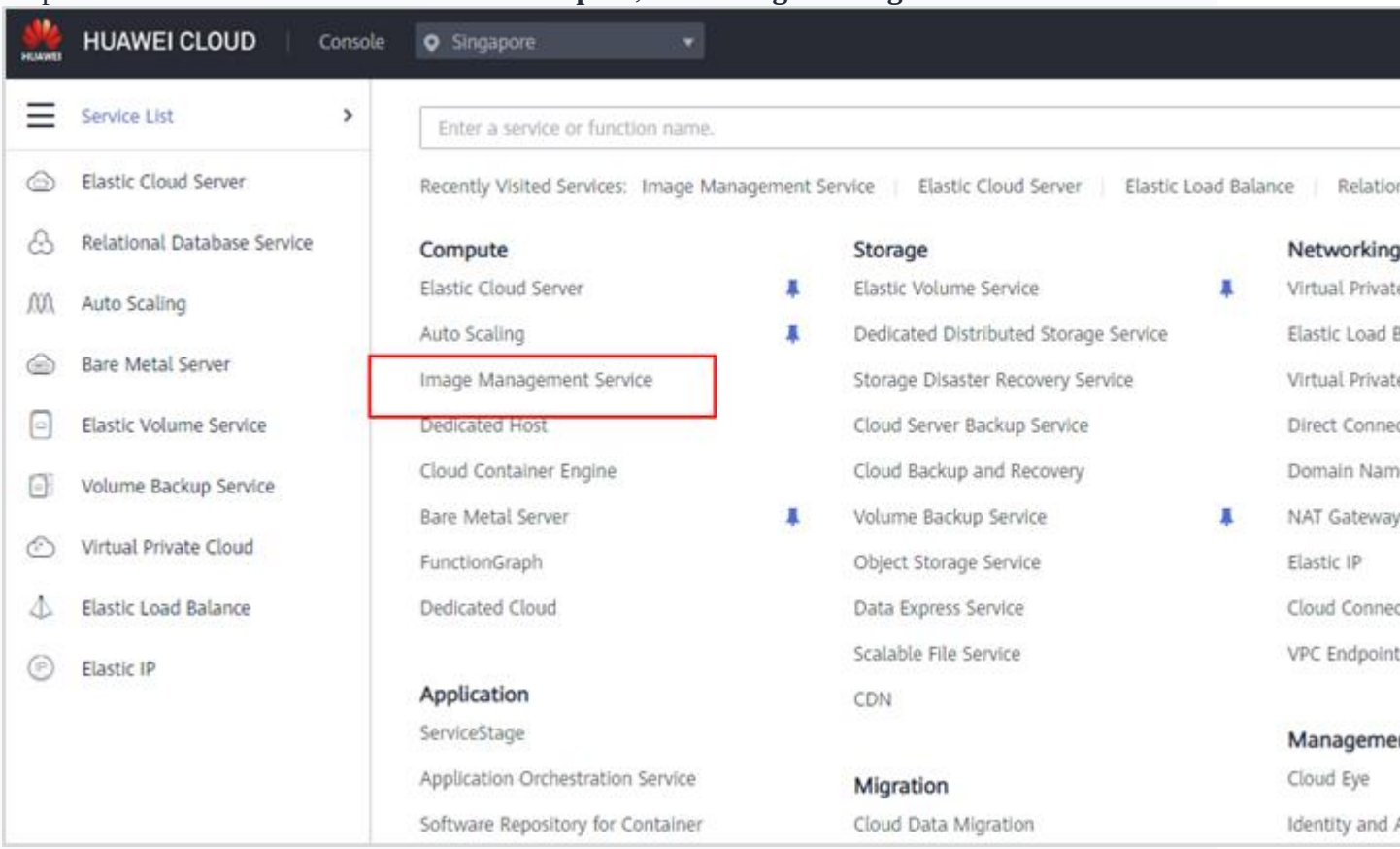
Now that the ELB configuration is complete, we need to configure some backend servers for AS. They will be added to or removed from the backend server group based on how much traffic there is. Before you configure AS, create a private image on the IMS console. This image will be used by the system to create these ECSs.

3.2 Creating an Image

Step 1 Go back to the ECS console, locate the ECS you created, and choose **More** > **Stop** in the **Operation** column.

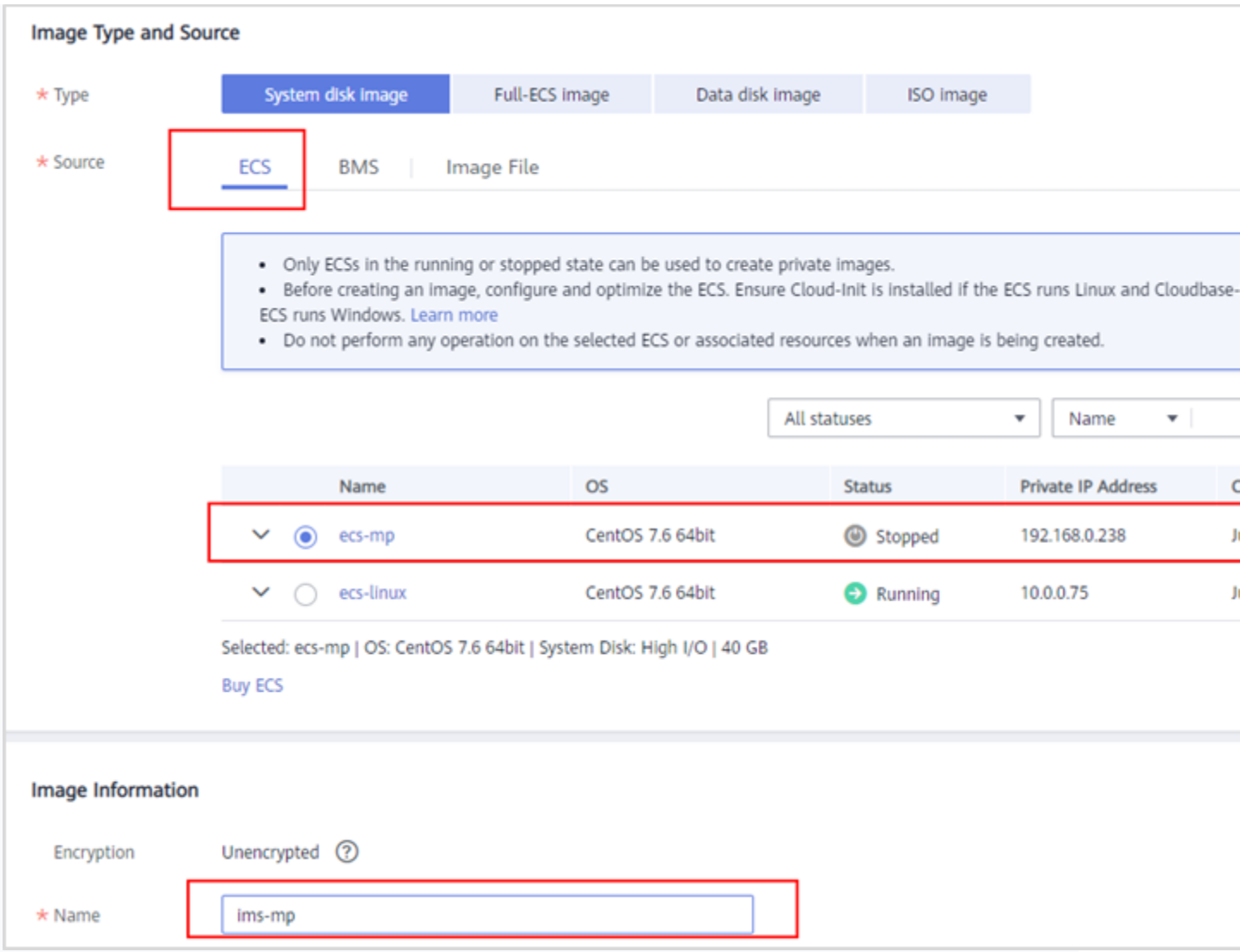


Step 2 Go back to the service list. Under **Compute**, click **Image Management Service.**

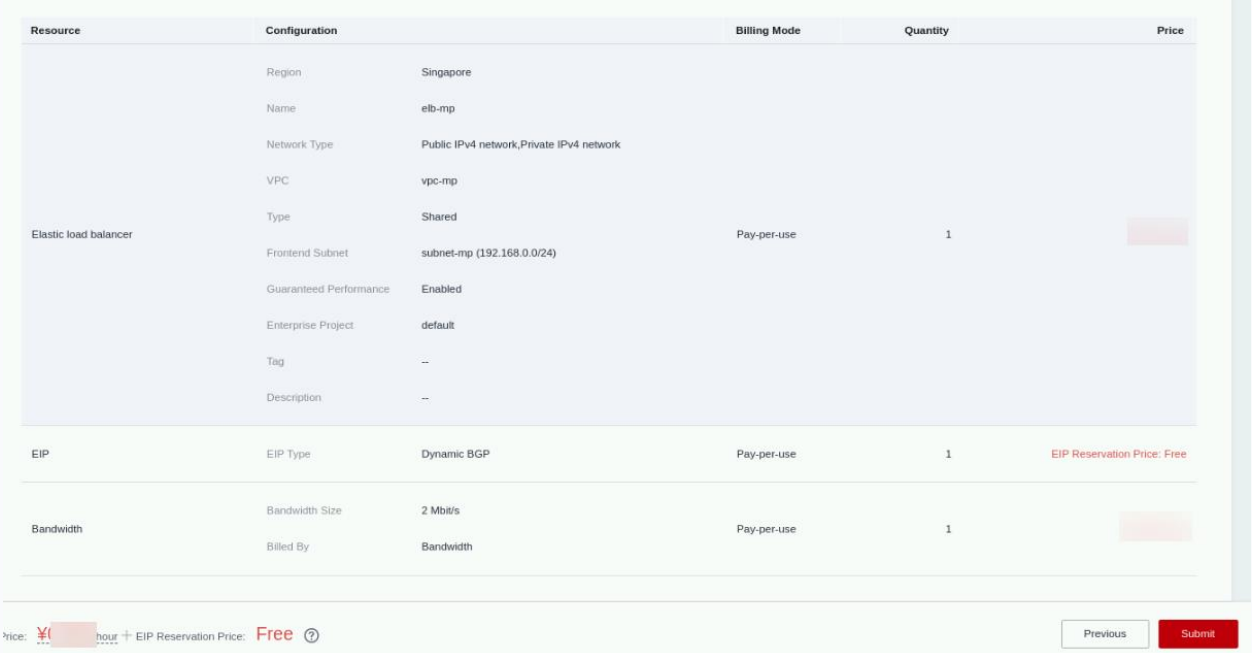


Step 3 Click **Create Image** and configure the parameters as follows:

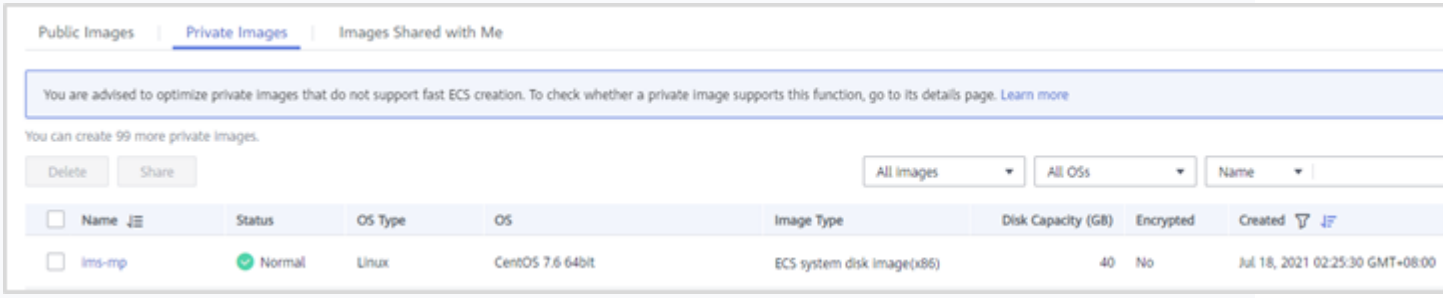
- **Type: System disk image**
- **Source**: the ECS you created
- **Name: ims-mp** (Change it as needed.)



Step 4 Click **Next**, confirm the configuration, and click **Submit**.

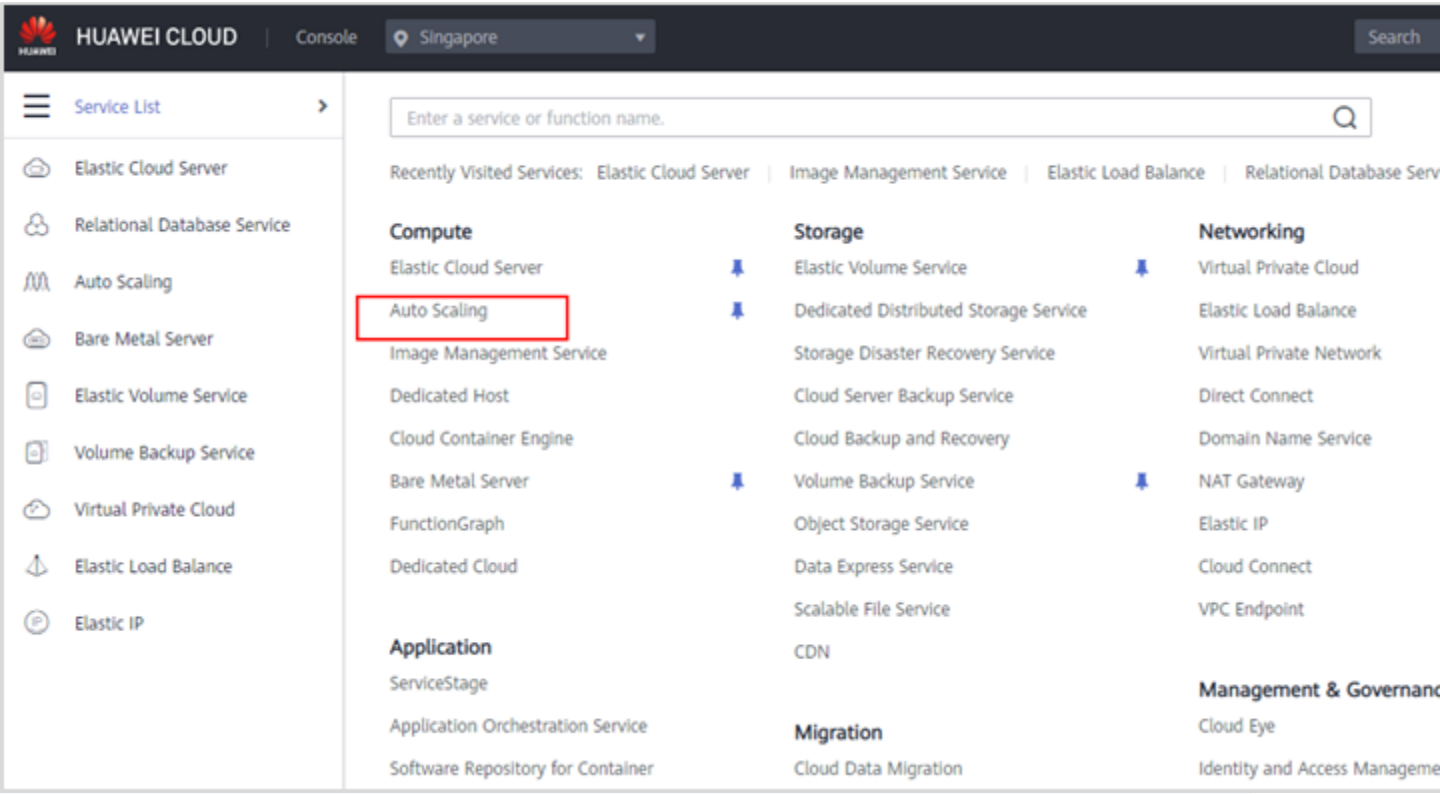


Step 5 Wait until the image status becomes **Normal**. Then, switch back to the ECS console, and start the ECS.

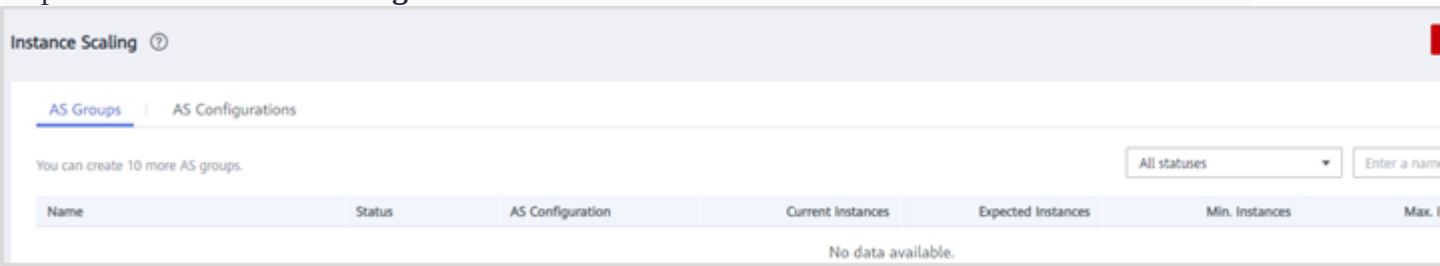


3.3 Configuring AS

Step 1 Go back to the service list. Under **Compute**, click **Auto Scaling**.



Step 2 Click **Create AS Configuration**.



Step 3 Configure the parameters as shown in the following figures and then click **Create Now**. Select the system disk image and security group you just created and set **EIP** to **Do not use**.

* Billing Mode: Pay-per-use | Spot price

* Region: AP-Singapore

Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across re
latency and quick resource access, select the nearest region.

* Name: as-config-mp

The ECS created using this AS configuration is named in the format of the AS configuration name followed by an 8-di

* Configuration Template: Create new template | Use existing ECS

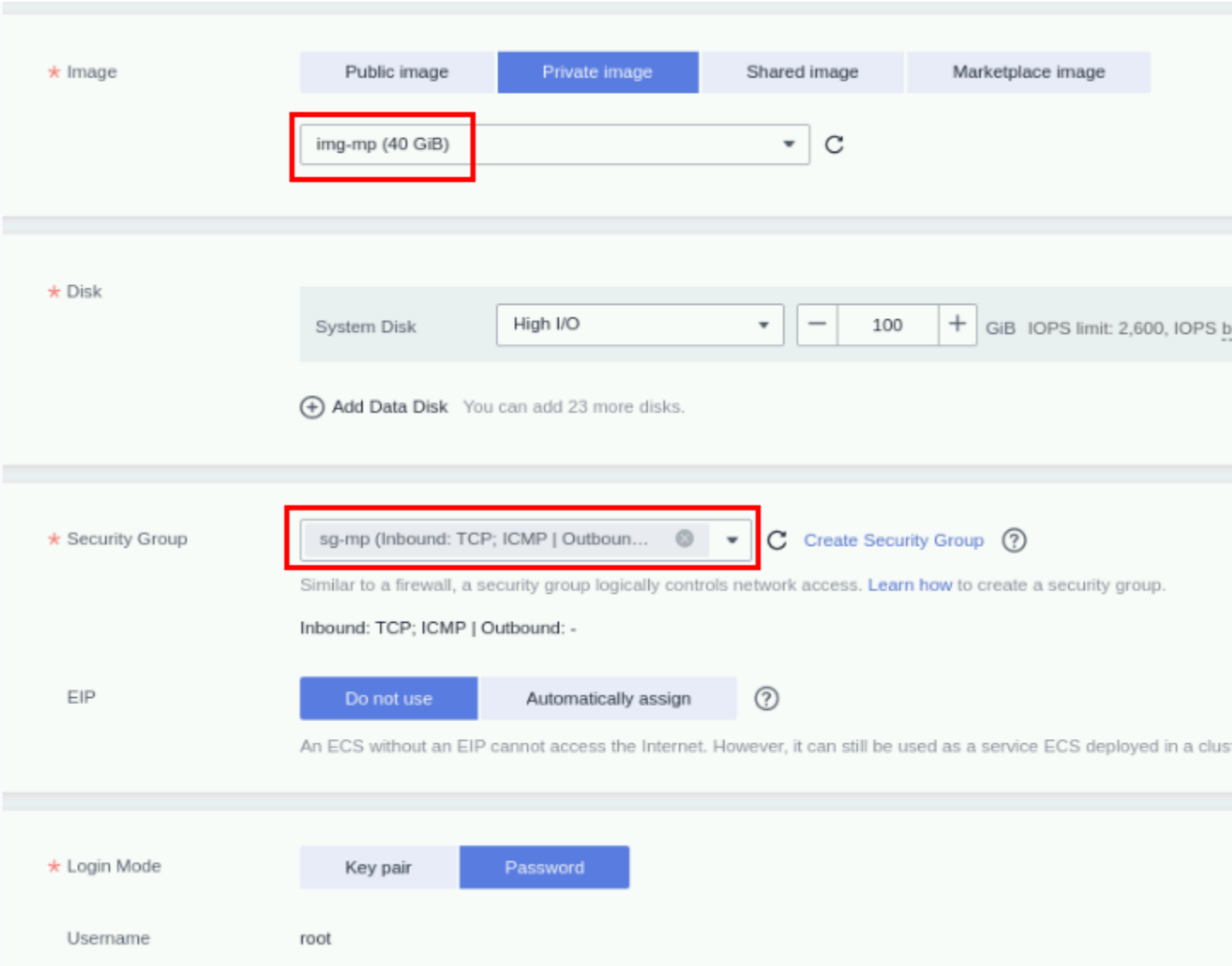
CPU Architecture: x86 | Kunpeng

* Specifications: Latest generation | vCPUs: All | Memory (GiB): All

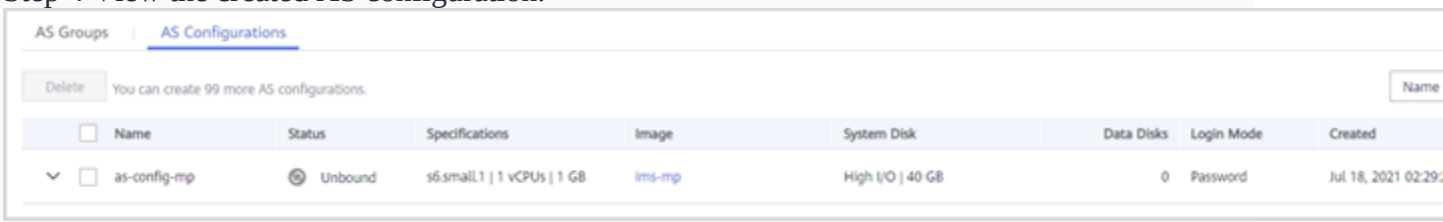
General computing | General computing-plus | Memory-optimized | Large-memory | Disk
General computing-basic | AI-accelerated

Learn more about ECS types.

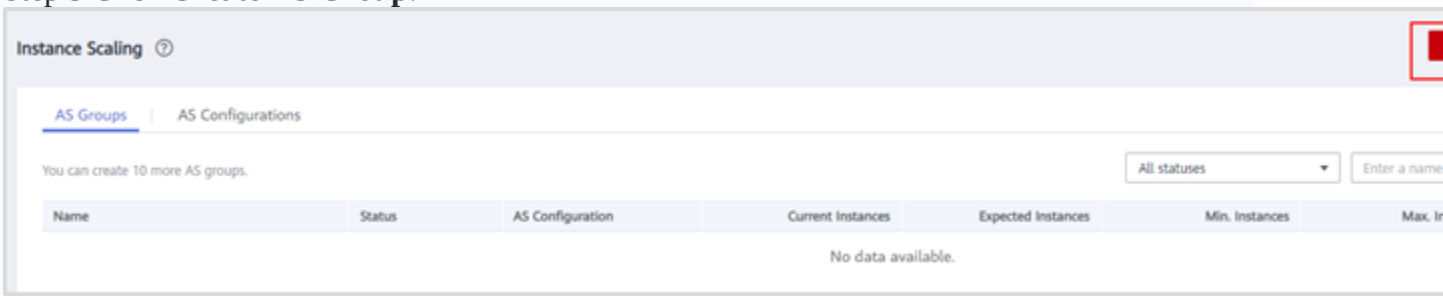
ECS Type	Flavor Name	vCPUs | Memor...	CPU
General computing s6	s6.small.1 (Sold out i...	1 vCPUs | 1 GiB	Intel Cascade Lake 2



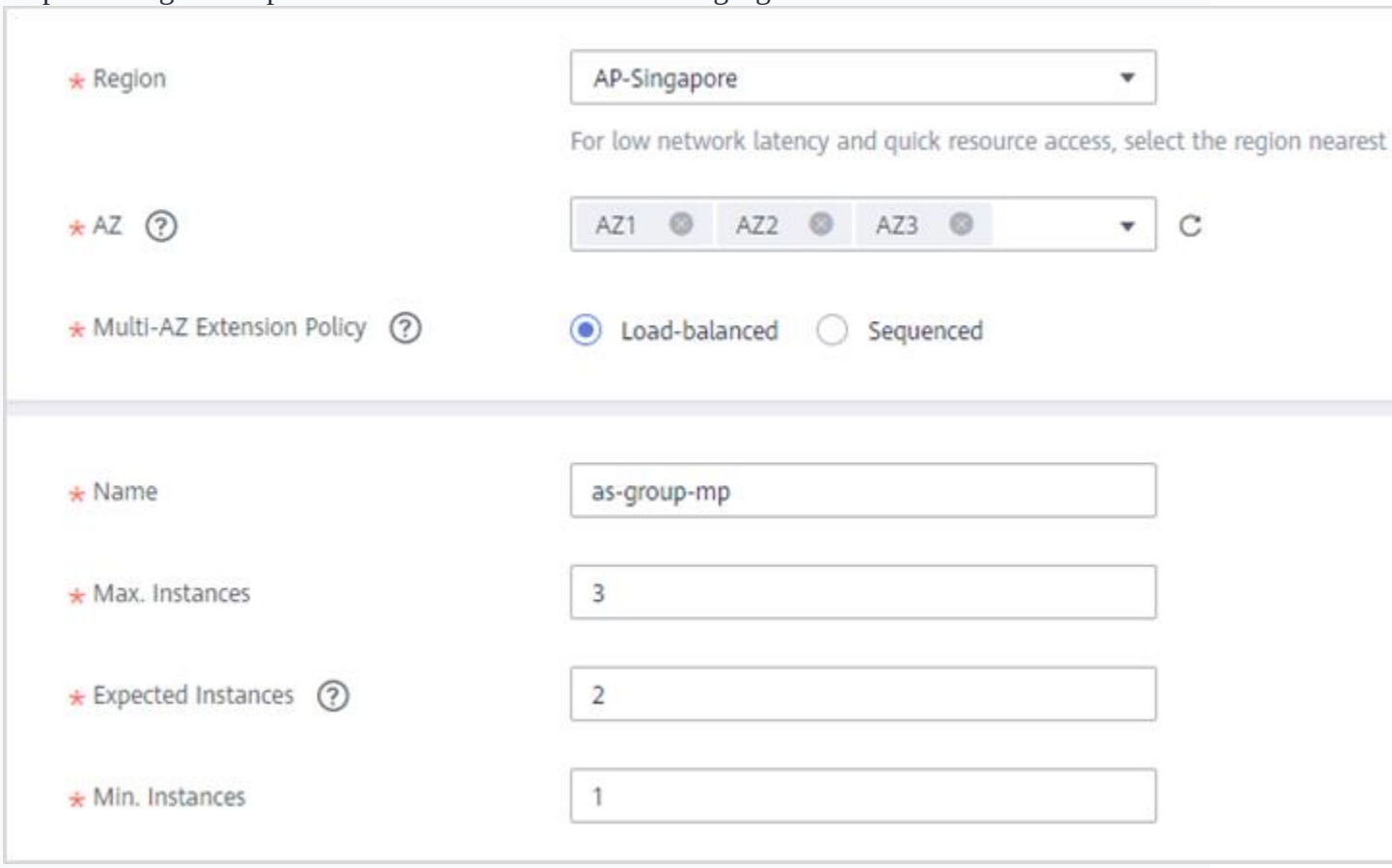
Step 4 View the created AS configuration.



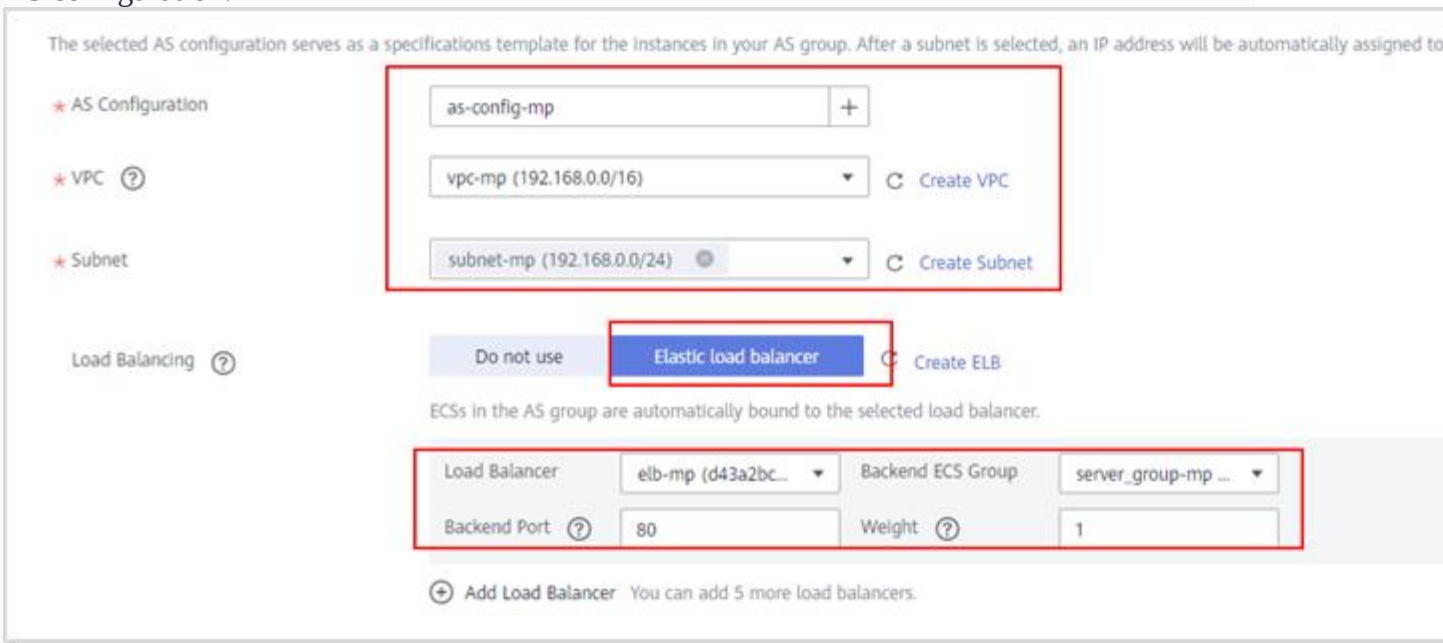
Step 5 Click **Create AS Group**.

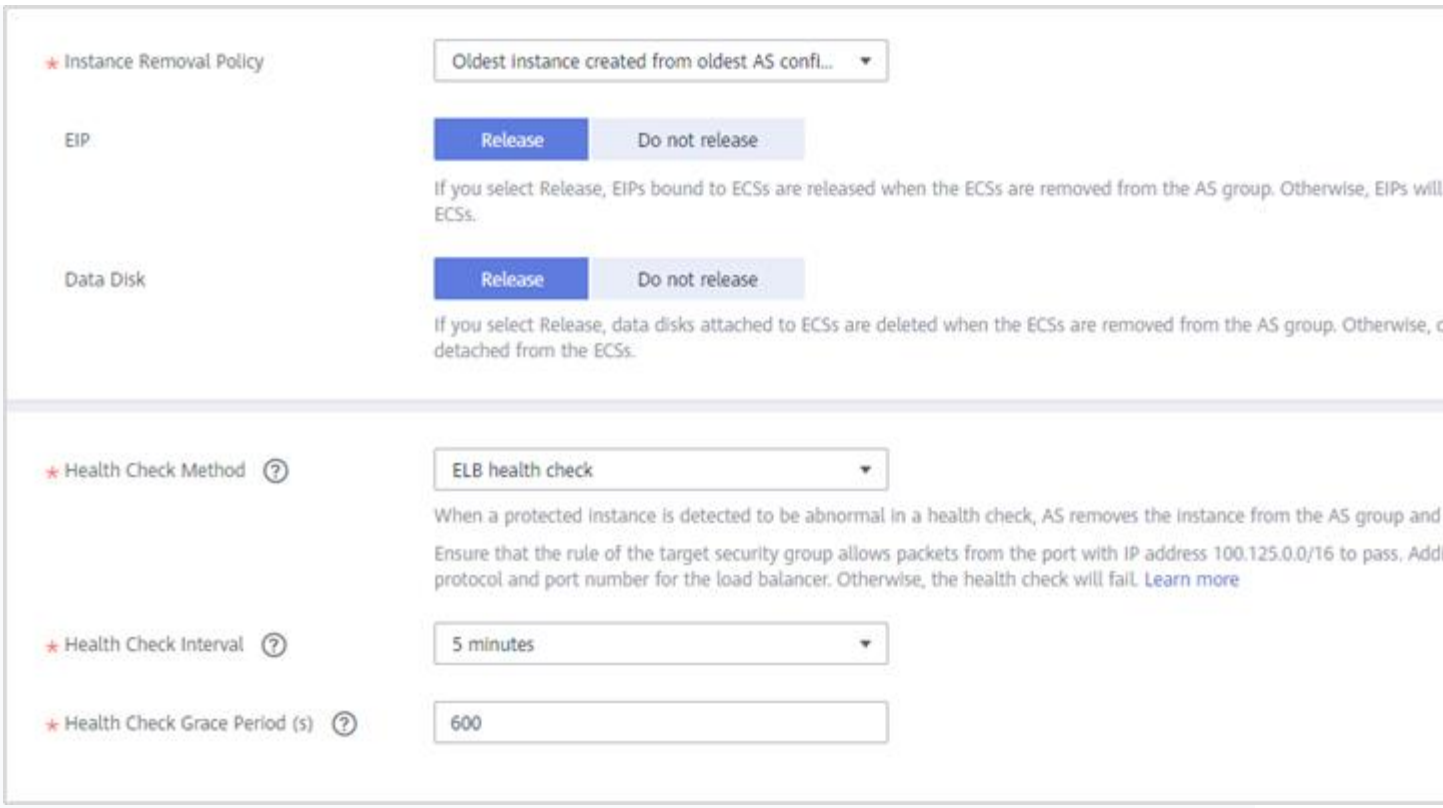


Step 6 Configure the parameters as shown in the following figure.

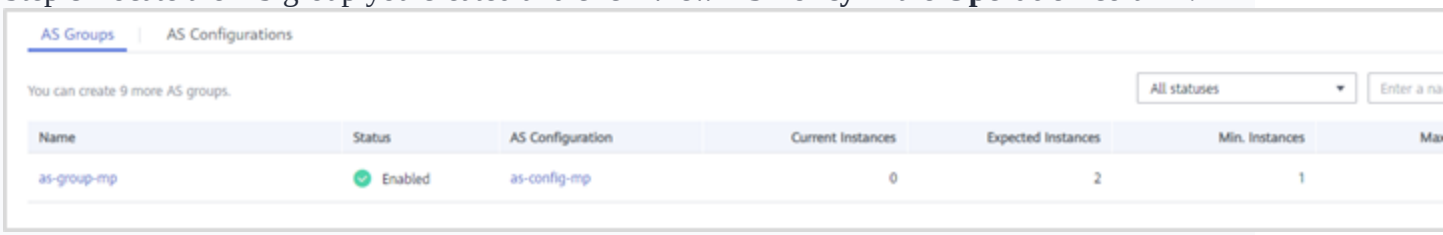


Step 7 Select the AS configuration and load balancer you just created. AS will dynamically adjust the number of ECSs in the backend server group using the image configured or used in the AS configuration.



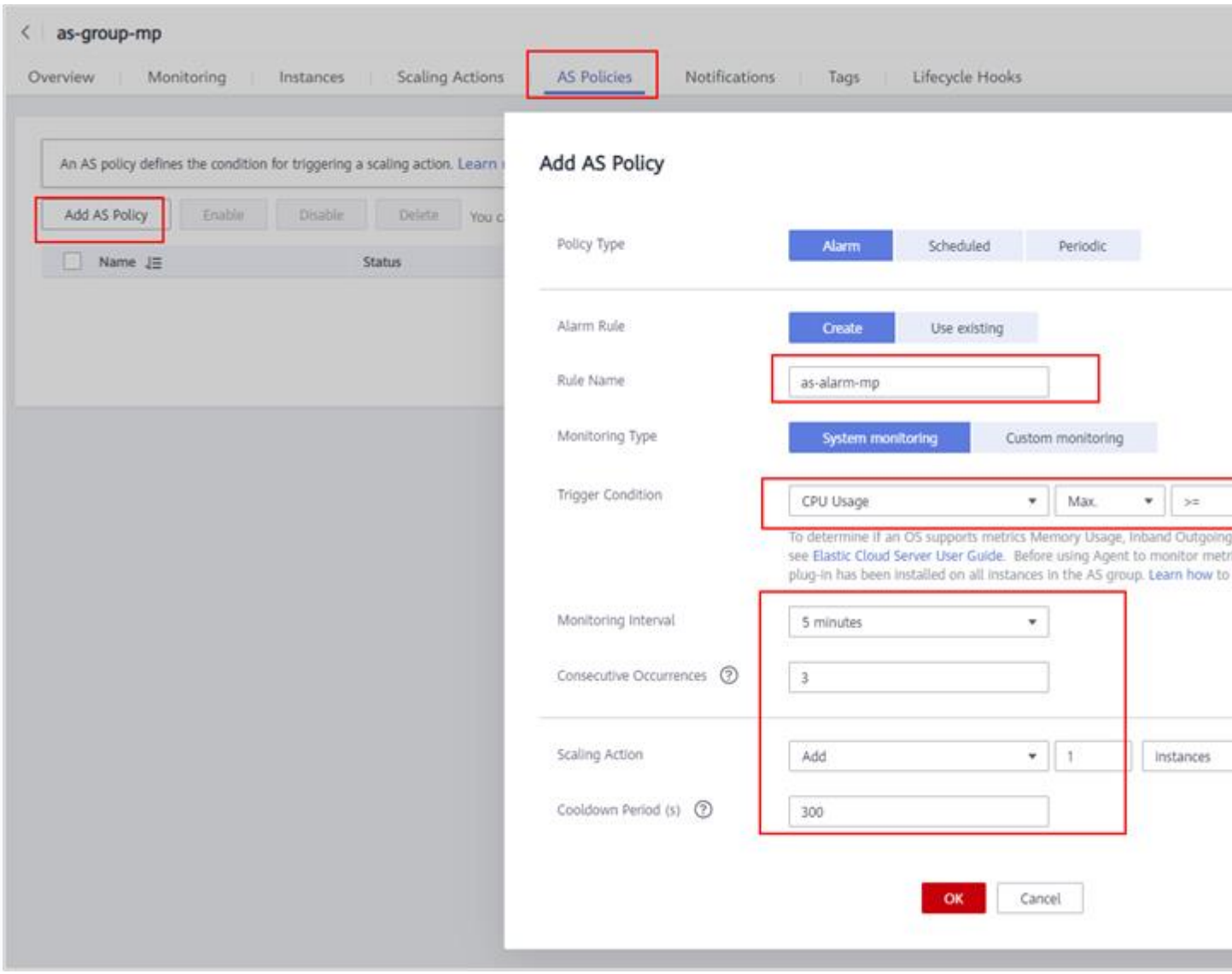


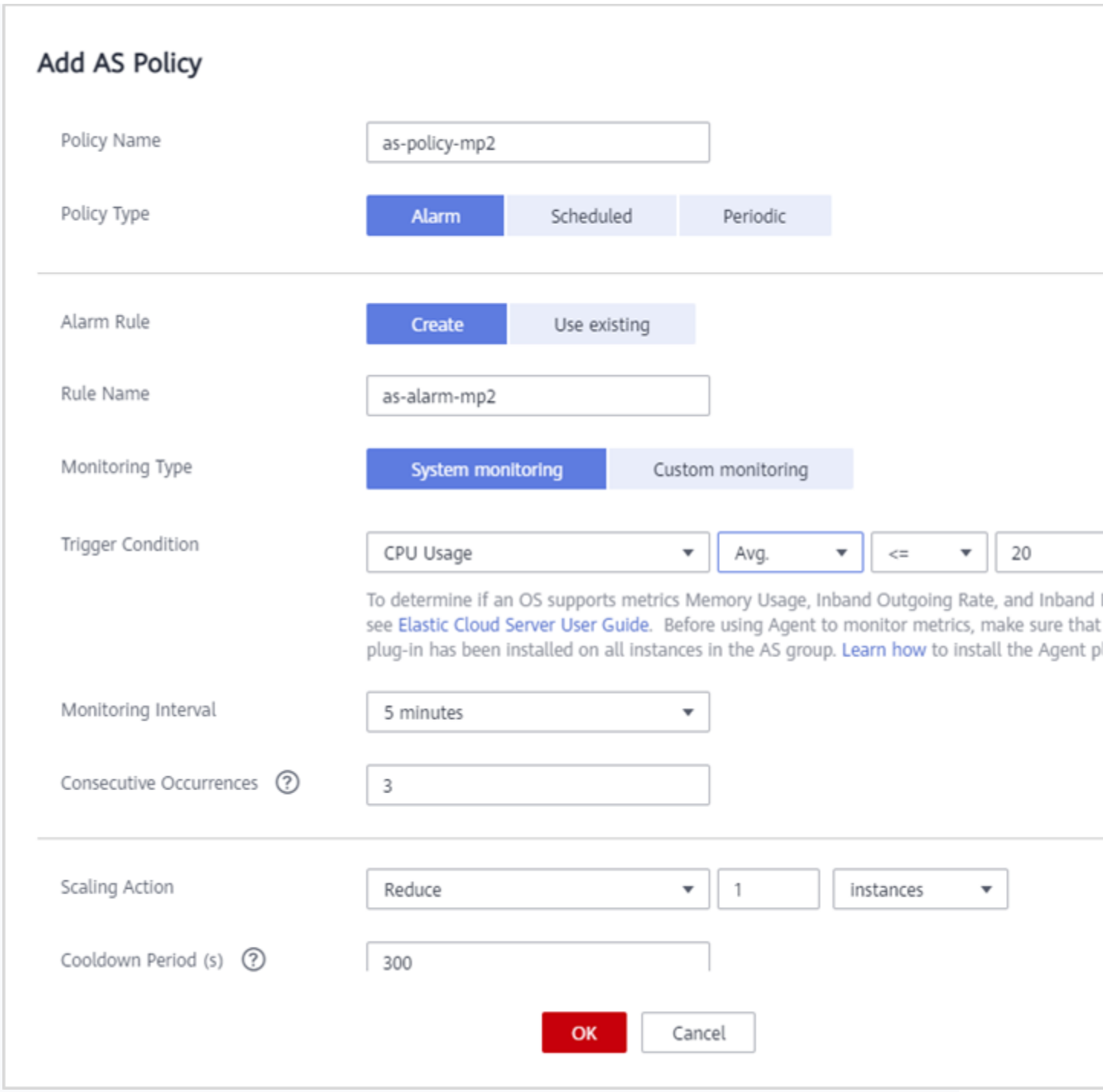
Step 8 Locate the AS group you created and click **View AS Policy** in the **Operation** column.



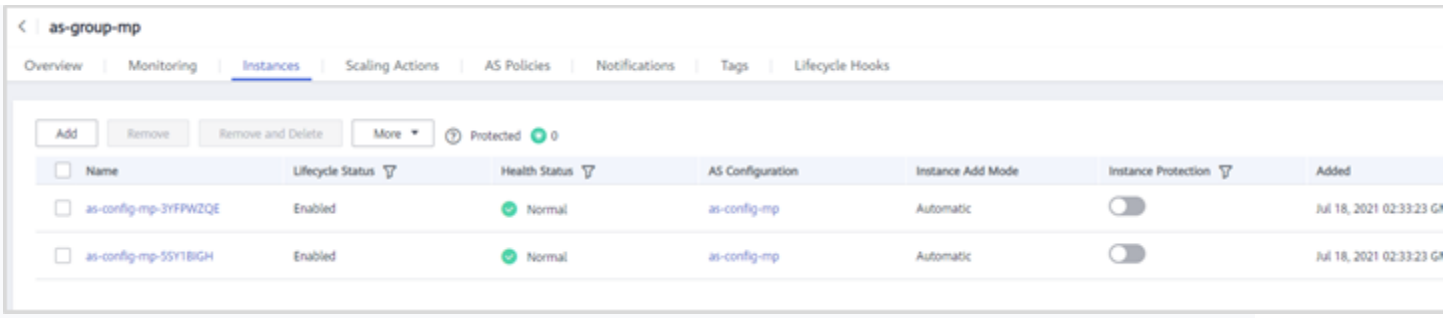
Step 9 Under AS Policies, click **Add AS Policy**.

- **Trigger Condition: CPU Usage, Max., >=, 60. Scaling Action: Add, 1, instances**
- **Trigger Condition: CPU Usage, Avg., <=, 20. Scaling Action: Reduce, 1, instances**

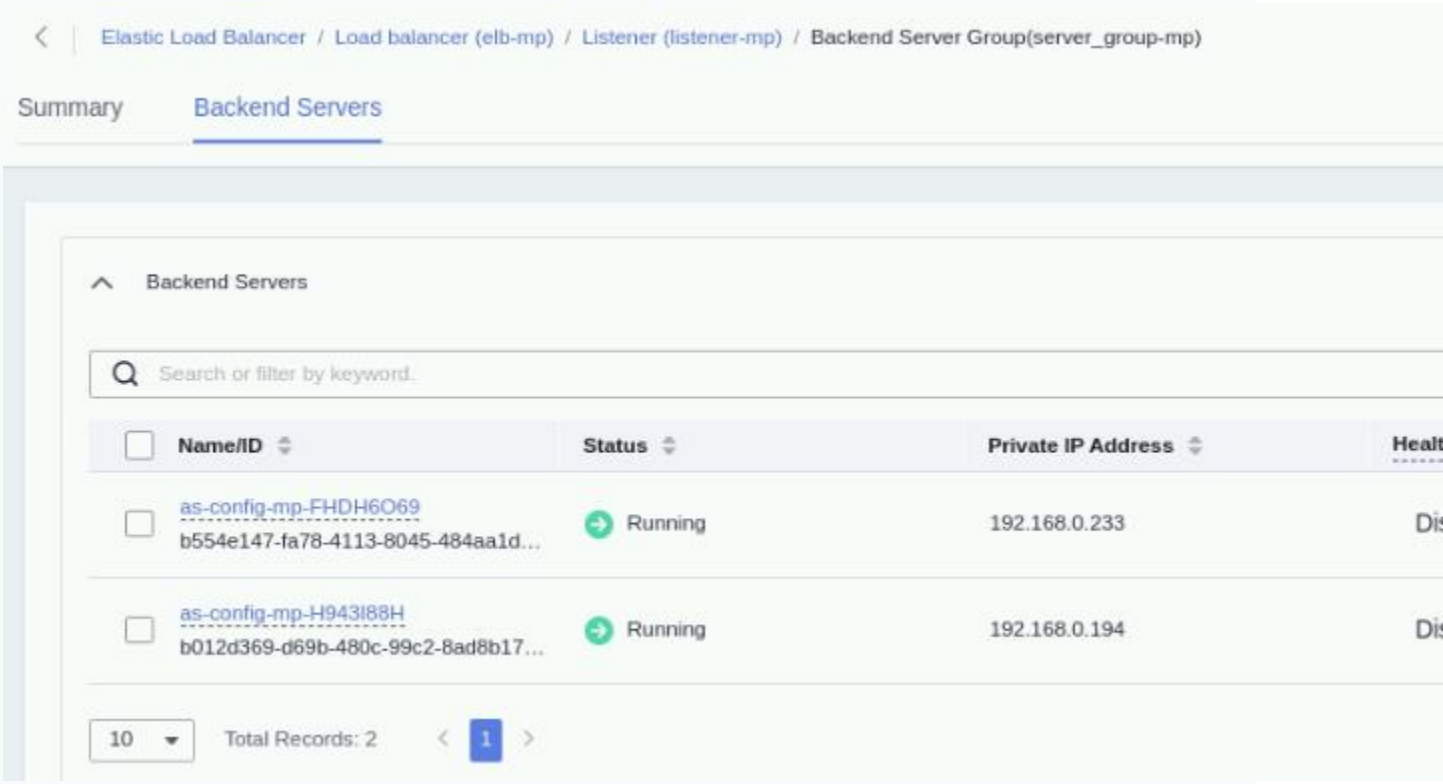

as-group-mp
Overview
Monitoring
Instances
Scaling Actions
AS Policies
Notifications
Tags
Lifecycle Hooks
An AS policy defines the condition for triggering a scaling action. Learn
Add AS Policy
Enable
Disable
Delete
Name
Status
Add AS Policy
Policy Type
Alarm
Scheduled
Periodic
Alarm Rule
Create
Use existing
Rule Name
as-alarm-mp
Monitoring Type
System monitoring
Custom monitoring
Trigger Condition
CPU Usage
Max.
>=
To determine if an OS supports metrics Memory Usage, Inband Outgoing
see Elastic Cloud Server User Guide. Before using Agent to monitor metr
plug-in has been installed on all instances in the AS group. Learn how to
Monitoring Interval
5 minutes
Consecutive Occurrences
3
Scaling Action
Add
1
Instances
Cooldown Period (s)
300
OK
Cancel



Step 10 Wait for about 2 minutes and check whether the AS policy has taken effect. As we can see in the following figure, two ECSs have been added to the AS group. The AS policy has taken effect.



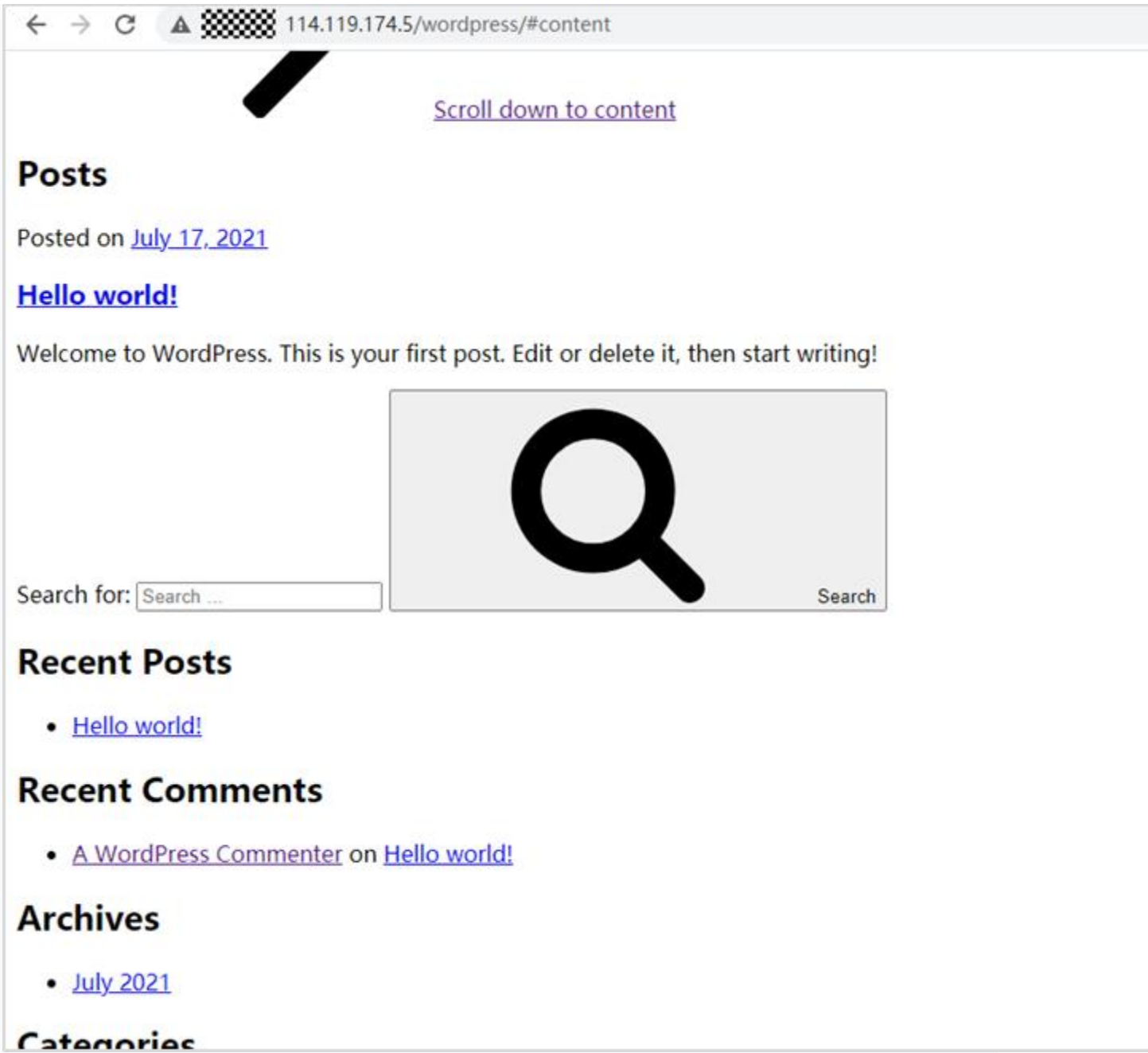
Step 11 Switch back to the ELB console and click the load balancer name, **elb-mp**. Locate the backend server group associated with the load balancer and view the two ECSs added by the AS service.



Step 12 Verify that web servers where the website is deployed can be accessed using the EIP bound to the load balancer. We have finished configuring AS and verified that AS can dynamically adjust the number of ECSs in the backend server group associated with the load balancer based on the configured AS policy.

4.Visiting the Website

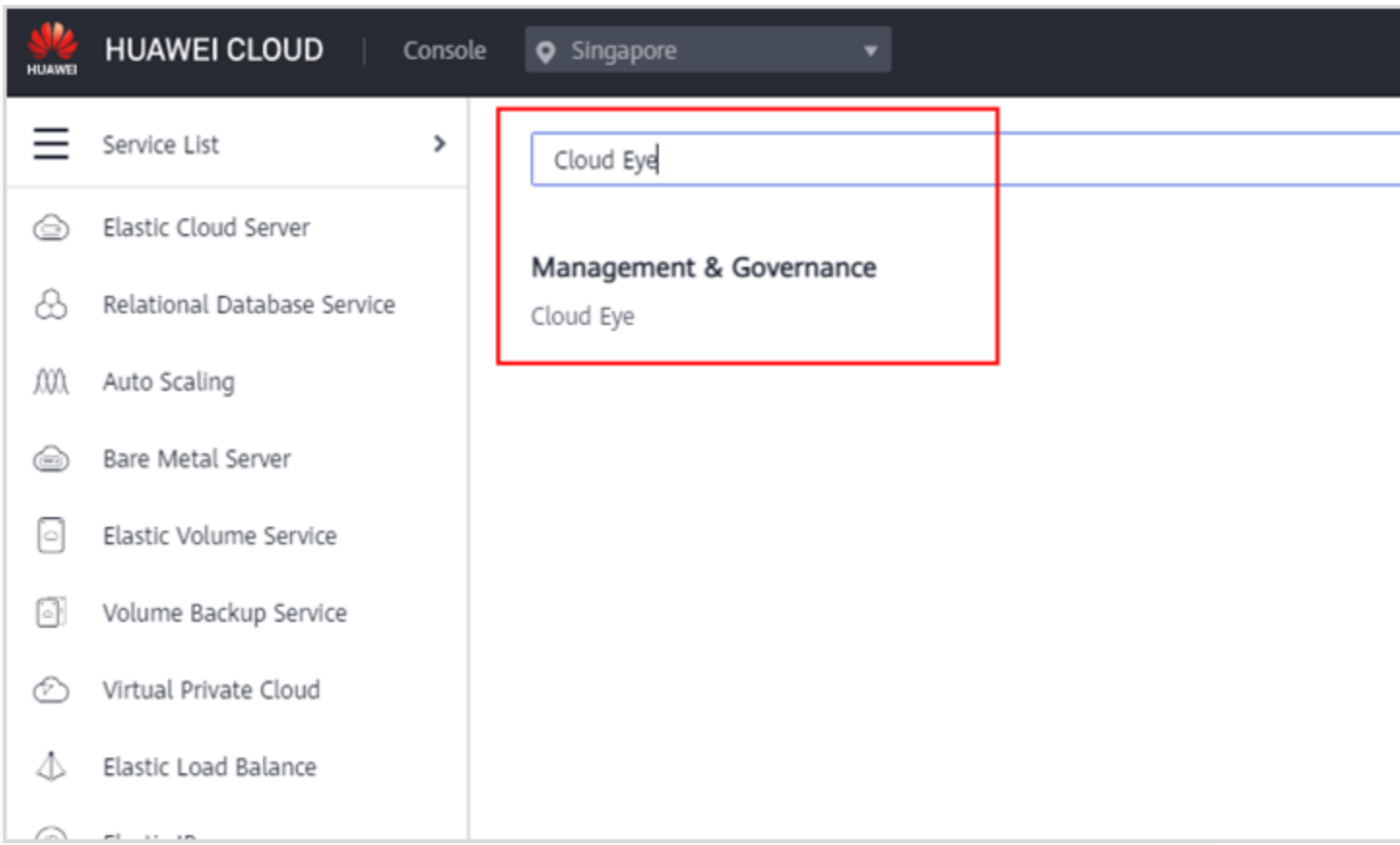
Step 1 In the address box of the browser on your PC, enter **http://**Load balancer's EIP**/wordpress/**, and press **Enter**.



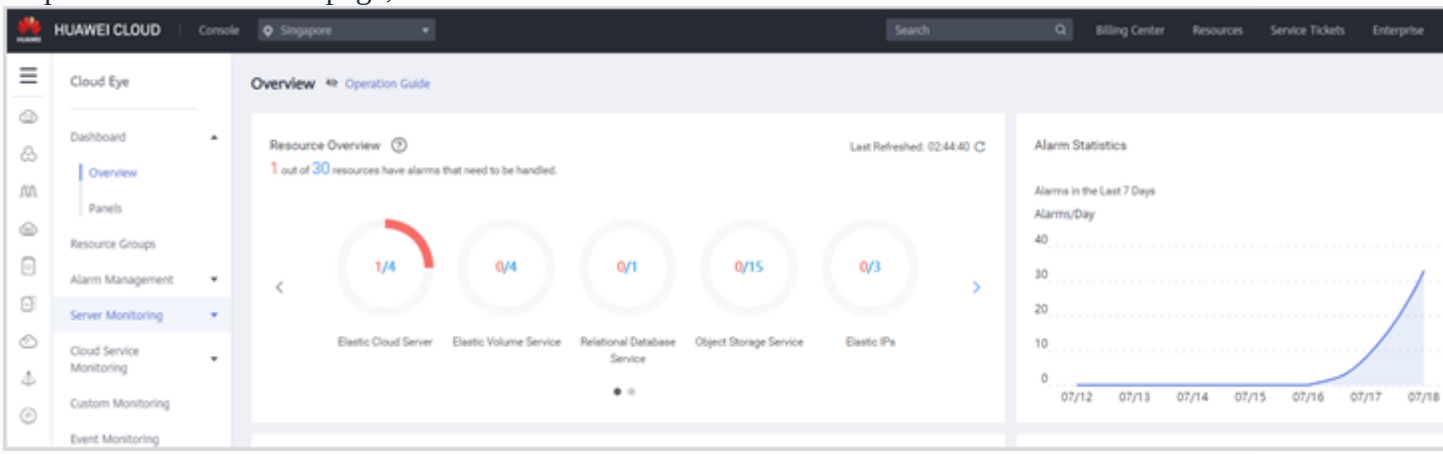
Step 2 Check whether the website can be accessed. If the website can be accessed, web servers where the website is deployed can provide Internet-accessible services using the load balancer's EIP.

5.Monitoring Resources

Step 1 On the service list page, choose **Management & Governance > Cloud Eye**.

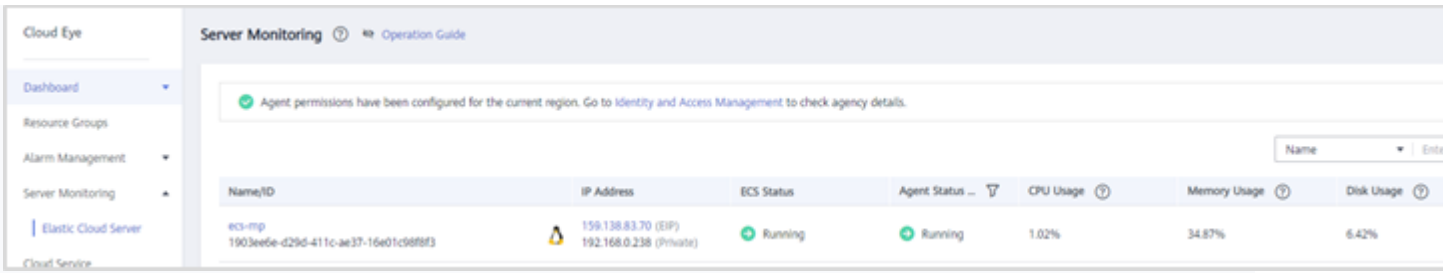


Step 2 On the **Overview** page, view overall resource information and alarm statistics.



Step 3 In the left navigation pane, choose **Alarm Management > Alarm Records**. View service alarms and handle any faults in a timely manner.

Step 4 In the left navigation pane, choose **Server Monitoring > Elastic Cloud Server** and then view ECS monitoring information.



Step 5 Click the name of an ECS to view its monitoring details.