

**Solution**

# **Routing Traffic to Backend Servers in Different VPCs**

**Issue** 1.0.0  
**Date** 2023-09-04



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# 1 Solution Overview

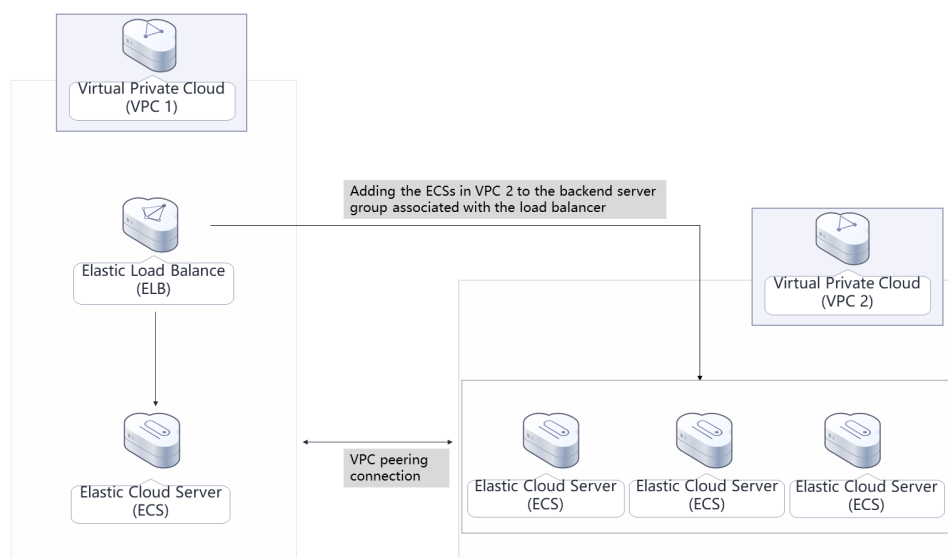
## Application Scenarios

You can use ELB to route traffic to backend servers in different VPCs connected over a VPC peering connection.

## Solution Architecture

The following figure shows the solution architecture.

Figure 1-1 Architecture



To use this solution, you need to:

- Create two ECSs in different VPCs for running services.
- Configure a security group to control traffic to and from the two ECSs.
- Use **Elastic Load Balance (ELB)** to distribute incoming traffic to the two ECSs. To achieve this, create a dedicated load balancer.

## Advantages

- **Flexibility**  
You can deploy services across VPCs and use ELB to route requests to servers in different VPCs.
- **Robust performance**  
A dedicated load balancer can handle up to tens of millions of concurrent requests, meeting your requirements for handling a massive number of requests.
- **High availability**  
The health statuses of servers are regularly monitored to ensure that traffic is distributed only to healthy servers.

## Constraints

- Before deploying this solution, ensure that you have registered with Huawei Cloud and your account is not in arrears or frozen. You can estimate the total price according to [2 Resource and Cost Planning](#).
- After this solution is deployed, log in to the [ECS console](#) to reset your password. For details, see [Resetting the Password for Logging In to an ECS on the Management Console](#).
- Only IPv4 addresses can be added as backend servers.
- Security group rules configured for IP as backend servers must allow traffic from the subnet of the load balancer. Otherwise, health checks will fail.

# 2 Resource and Cost Planning

This solution deploys the resources listed in the following table. The costs are only estimates and may differ from the final prices. For details, see [pricing details](#).

**Table 2-1** Resource and cost planning (yearly/monthly)

Huawei Cloud Service	Example Configuration	Estimated Monthly Cost
Elastic Cloud Server (ECS)	<ul style="list-style-type: none"><li>• Region: AP-Singapore</li><li>• Billing Mode: Yearly/Monthly</li><li>• Specifications: x86 computing   General computing   s6.small.1   1 vCPU   1 GiB</li><li>• Image: CentOS 8.2 64bit</li><li>• System Disk: General Purpose SSD   40 GB</li><li>• Quantity: 2</li></ul>	\$13.78 USD x 2 = \$27.56 USD
Elastic IP (EIP)	<ul style="list-style-type: none"><li>• Region: AP-Singapore</li><li>• Billing Mode: Yearly/Monthly</li><li>• Routing Type: Dynamic BGP</li><li>• Billed By: Bandwidth</li><li>• Bandwidth: 5 Mbit/s</li><li>• Required Duration: 1 month</li><li>• Quantity: 1</li></ul>	\$57.00 USD

Huawei Cloud Service	Example Configuration	Estimated Monthly Cost
Elastic Load Balance (ELB)	Create a dedicated load balancer. <ul style="list-style-type: none"> <li>Number of AZs: 2</li> <li>Region: AP-Singapore</li> <li>Billing Mode: Yearly/Monthly</li> <li>Specifications: Network load balancing (TCP/UDP): Small I/ Application load balancing (HTTP/HTTPS): Small I</li> <li>Quantity: 1</li> </ul>	\$403.20 USD
Total		\$487.76 USD

**Table 2-2** Resource planning and costs (pay-per-use)

Huawei Cloud Service	Example Configuration	Estimated Monthly Cost
Elastic Cloud Server (ECS)	<ul style="list-style-type: none"> <li>Pay-per-use: \$0.02 USD/Hour</li> <li>Region: AP-Singapore</li> <li>Billing Mode: Pay-per-use</li> <li>Specifications: x86 computing   General computing   s6.small.1   1 vCPU   1 GiB</li> <li>Image: CentOS 8.2 64bit</li> <li>System Disk: General Purpose SSD   40 GB</li> <li>Quantity: 2</li> </ul>	\$0.02 USD x 24 x 30 x 2 = \$28.80 USD
Elastic IP (EIP)	<ul style="list-style-type: none"> <li>Pay-per-use: \$0.13 USD/Hour (5 Mbit/s)</li> <li>Region: AP-Singapore</li> <li>Billed By: Bandwidth</li> <li>Routing Type: Dynamic BGP</li> <li>Required Duration: 1 month</li> <li>Quantity: 1</li> </ul>	\$0.13 USD x 24 x 30 = \$93.60 USD

Huawei Cloud Service	Example Configuration	Estimated Monthly Cost
Elastic Load Balance (ELB)	Create a dedicated load balancer. <ul style="list-style-type: none"><li>• Number of AZs: 2</li><li>• Region: AP-Singapore</li><li>• Billing Mode: Pay-per-use</li><li>• Specifications: Network load balancing (TCP/UDP): Small I/ Application load balancing (HTTP/HTTPS): Small I</li><li>• Quantity: 1</li></ul>	\$0.28 USD x 24 x 30 = \$403.20 USD
Total		\$525.60 USD



# 3 Procedure

---

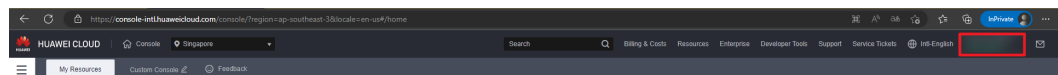
- [3.1 Preparations](#)
- [3.2 Quick Deployment](#)
- [3.3 Getting Started](#)
- [3.4 Quick Uninstallation](#)

## 3.1 Preparations

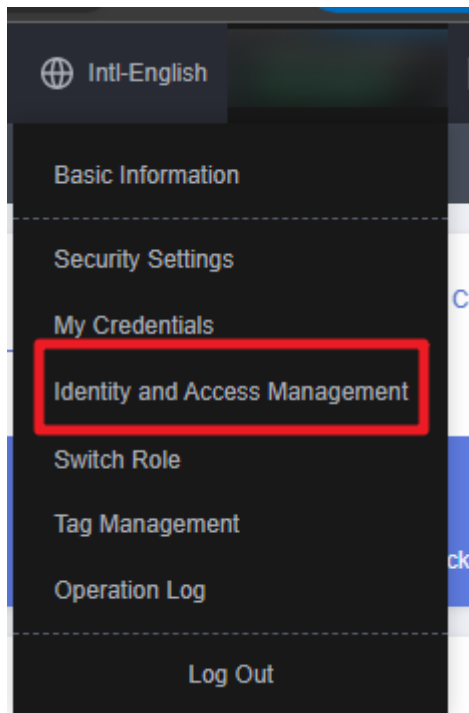
### (Optional) Creating the rf\_admin\_trust Agency

- Step 1** Log in to the [Huawei Cloud console](#), hover your cursor over the account name, and choose **Identity and Access Management**.

**Figure 3-1** Console page

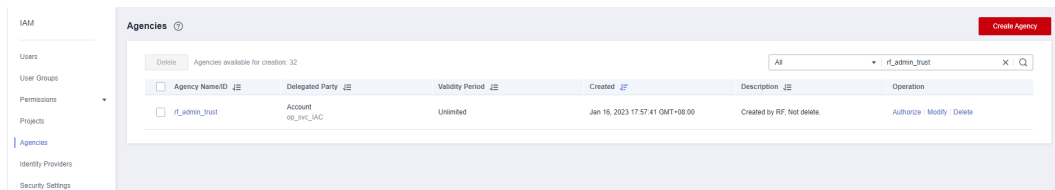


**Figure 3-2** Identity and access management page



**Step 2** Choose **Agencies** in the left navigation pane and search for the **rf\_admin\_trust** agency.

**Figure 3-3** Agencies



- If the agency is found, skip the following steps.
- If the agency is not found, perform the following steps to create it.

**Step 3** Click **Create Agency** in the upper right corner of the page. On the displayed page, enter **rf\_admin\_trust** for **Agency Name**, select **Cloud service** for **Agency Type** and **RFS** for **Cloud Service**, and click **Next**.

**Figure 3-4** Creating the rf\_admin\_trust agency

Agencies / Create Agency

\* Agency Name

\* Agency Type  Account  
Delegate another HUAWEI CLOUD account to perform operations on your resources.  
 Cloud service  
Delegate a cloud service to access your resources in other cloud services.

\* Cloud Service

\* Validity Period

Description   
0/255

**Step 4** Search for **Tenant Administrator**, select it in the search results, and click **Next**.

**Figure 3-5** Selecting a policy/role

Authorize Agency

1 Select Policy/Role 2 Select Scope 3 Finish

Assign selected permissions to rf\_admin\_trust1. Create Policy

View Selected (1) Copy Permissions from Another Project

Policy/Role Name	Type
<input type="checkbox"/> DME AdministratorAccess Data Model Engine tenant administrator with full permissions.	System-defined policy
<input checked="" type="checkbox"/> Tenant Administrator Tenant Administrator (Exclude IAM)	System-defined role
<input type="checkbox"/> CS Tenant Admin Cloud Stream Service Tenant Administrator, can manage multiple CS users	System-defined role

**Step 5** Select **All resources** and click **OK**.

**Figure 3-6** Setting the authorization scope

Authorize Agency

1 Select Policy/Role 2 Select Scope 3 Finish

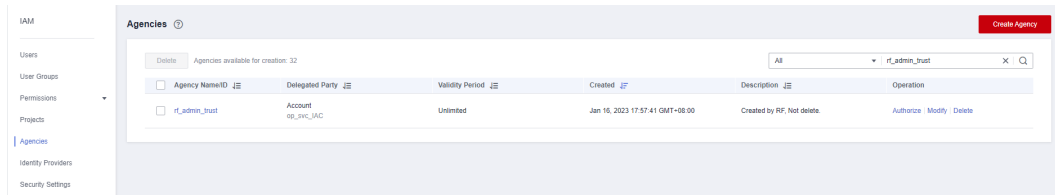
**i** The following are recommended scopes for the permissions you selected. Select the desired scope requiring minimum authorization.

Scope

All resources  
IAM users will be able to use all resources, including those in enterprise projects, region-specific projects, and global services under your account based on assigned permissions.  
[Show More](#)

**Step 6** Check that the **rf\_admin\_trust** agency is displayed in the agency list.

**Figure 3-7 Agencies**



----End

## 3.2 Quick Deployment

This section describes how you can quickly deploy this solution.

**Table 3-1** Parameters required for deploying this solution

Parameter	Type	Mandatory	Description	Default Value
vpc_name	string	Yes	VPC name. This template uses a newly created VPC and the VPC name must be unique. The name can contain 1 to 56 characters, including letters, digits, underscores (_), hyphens (-), and periods (.).	cross-vpc-backend-to-elb-demo
secgroup_name	string	Yes	Security group name. This template uses a newly created security group. To modify security group rules, see <a href="#">(Optional) Modifying Security Group Rules</a> . The value can contain 1 to 62 characters, including letters, digits, underscores (_), hyphens (-), and periods (.).	cross-vpc-backend-to-elb-demo
ecs_name	string	Yes	ECS name, which must be unique. The name can contain 1 to 59 characters, including letters, digits, underscores (_), hyphens (-), and periods (.).	cross-vpc-backend-to-elb-demo
ecs_flavor	string	Yes	ECS flavor. For more flavors, see <a href="#">A Summary List of x86 ECS Specifications</a> .	s6.small.1 (s6 1 vCPU 1 GiB)

Parameter	Type	Mandatory	Description	Default Value
ecs_password	string	Yes	Initial password of the ECS. Log in to the ECS console to change the password by following <a href="#">Resetting the Password for Logging In to an ECS on the Management Console</a> . The password can contain 8 to 26 characters, including at least three of the following character types: uppercase letters, lowercase letters, digits, and special characters (!@\$%^&*_+[]{};,:./?). Passwords cannot contain any username or the username spelled backwards. The administrator username is <b>root</b> .	Left blank
charging_mode	String	Yes	Billing mode. The value can be <b>prePaid</b> (yearly/monthly) or <b>postPaid</b> (pay-per-use).	postPaid
charging_unit	String	Yes	Billing period type. The value can be <b>year</b> or <b>month</b> . This parameter is mandatory when <b>charging_mode</b> is set to <b>prePaid</b> .	month
charging_period	number	Yes	Billing period. When <b>charging_unit</b> is set to <b>year</b> , the value ranges from <b>1</b> to <b>3</b> . When <b>charging_unit</b> is set to <b>month</b> , the value ranges from <b>1</b> to <b>9</b> . This parameter is mandatory when <b>charging_mode</b> is set to <b>prePaid</b> .	1

**Step 1** Log in to [Practical Application of Huawei Cloud Solutions](#) and select **Routing Traffic to Backend Servers in Different VPCs**.

Figure 3-8 Selecting a solution

**Solution Architecture**

This solution allows you to deploy VPCs, subnets, ECSs, and a dedicated load balancer with just a few clicks. You can use this load balancer to route traffic to backend servers in different VPCs.

The diagram shows two Virtual Private Clouds (VPC 1 and VPC 2) connected via a VPC peering connection. VPC 1 contains an Elastic Load Balance (ELB) and an Elastic Cloud Server (ECS). VPC 2 contains three Elastic Cloud Servers (ECS). An arrow indicates that ECSs in VPC 2 are added to the backend server group of the ELB in VPC 1.

**Routing Traffic to Backend Servers in Different VPCs**

Version: 1.0.0  
Last Updated: August 2023  
Built By: Huawei Cloud  
Time Required for Deployment: About 10 minutes  
Time Required for Uninstallation: About 10 minutes

**Estimated Cost** ▾  
**View Source Code** ▾

Data Center: AP-Singapore ▾

**View Deployment Guide**

**Deploy**

**Step 2** On the **Select Template** page, click **Next**.

Figure 3-9 Selecting a template

**Create Stack**

1 Select Template 2 Configure Parameters 3 Configure Stack 4 Confirm Configurations

Creation Mode: Existing templates | Visual Designer

Template Source: My Templates | URL | Upload Template

Template URL:

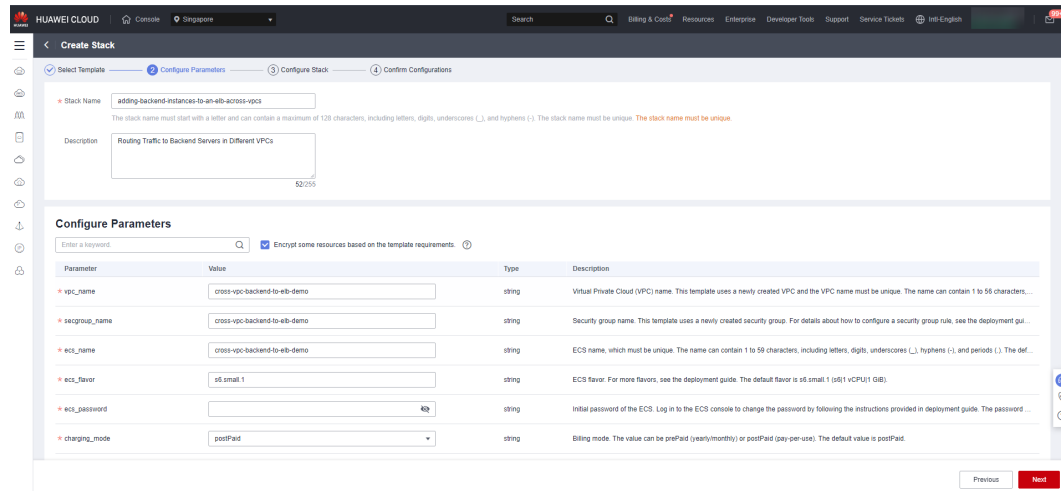
The URL must contain at least the deployment code file, and the file size cannot exceed 1 MB.

RF3 only uses the data you upload for resource management. Your template will not be encrypted. KMS and DEW are recommended for encryption of sensitive variables. Currently, the RF3 console can automatically use KMS to encrypt your sensitive variables.

**Next**

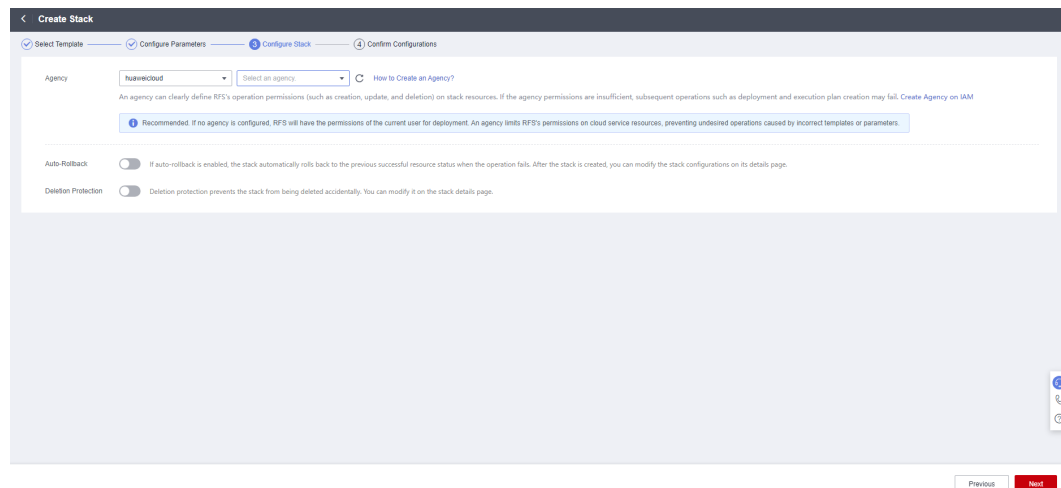
**Step 3** On the **Configure Parameters** page, enter a stack name, configure parameters based on [Table 3-1](#), and click **Next**.

Figure 3-10 Configuring parameters



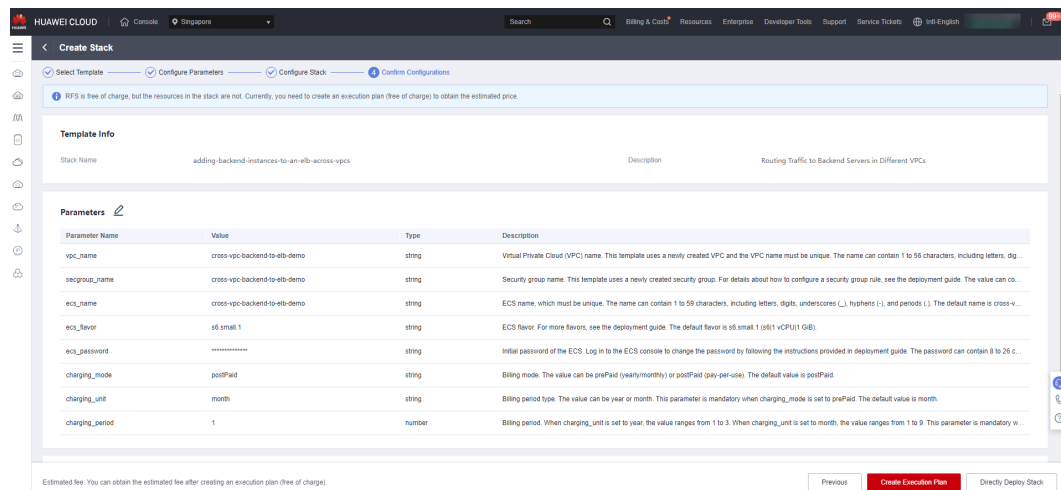
**Step 4** On the **Configure Stack** page, select the **rf\_admin\_trust** agency and click **Next**.

Figure 3-11 Configuring a stack



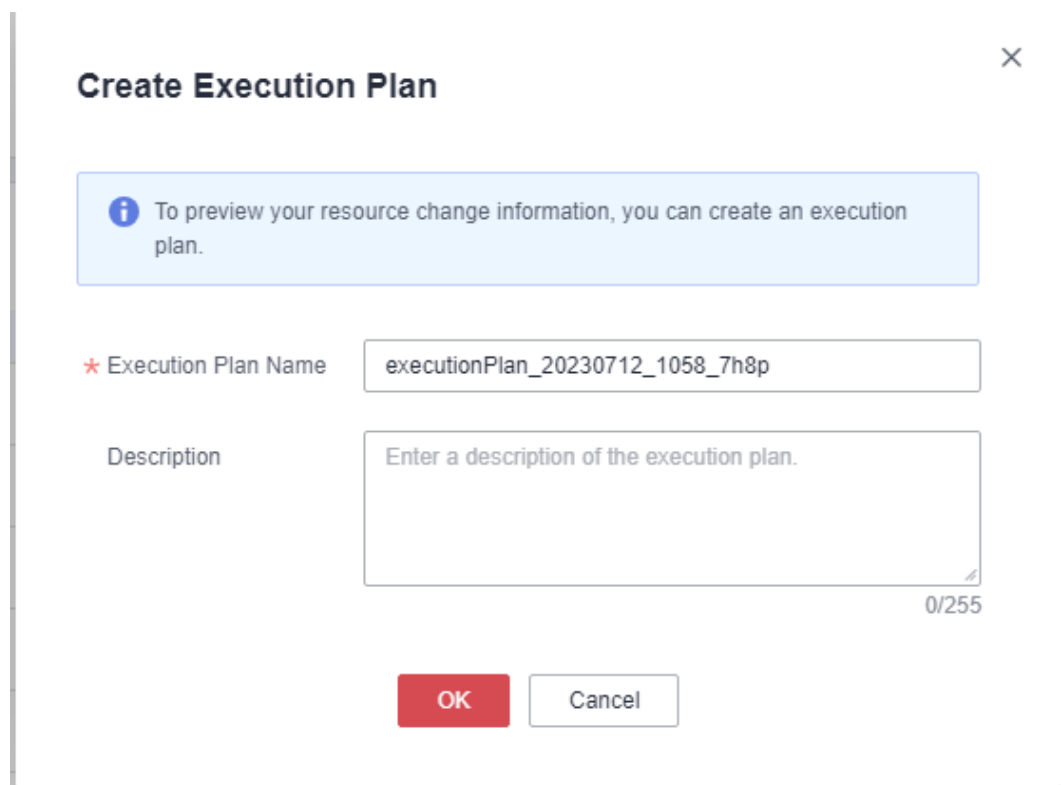
**Step 5** On the **Confirm Configurations** page, click **Create Execution Plan**.

Figure 3-12 Confirming configurations



**Step 6** In the displayed **Create Execution Plan** dialog box, enter an execution plan name and click **OK**.

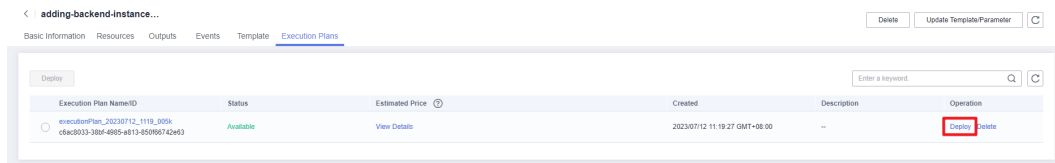
Figure 3-13 Creating an execution plan



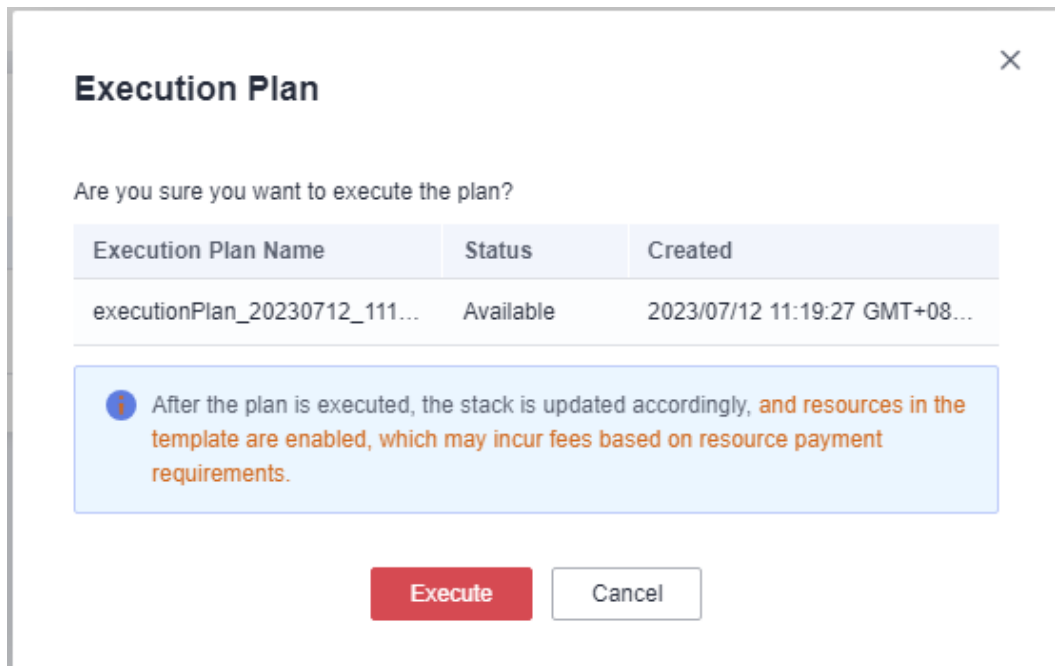
**Step 7** Wait until the status of the execution plan changes to **Available** and click **Deploy** in the **Operation** column. In the displayed dialog box, click **Execute**.



**Figure 3-14** Execution plan created



**Figure 3-15** Executing the plan



**Step 8** Wait until the deployment is complete and click the **Events** tab to view details.

**Figure 3-16** Resources created



----End

## 3.3 Getting Started

### (Optional) Modifying Security Group Rules

A security group is a collection of access control rules to control traffic to and from cloud resources, such as cloud servers, containers, and databases. Cloud resources associated with the same security group have the same security requirements and are mutually trusted within a VPC.

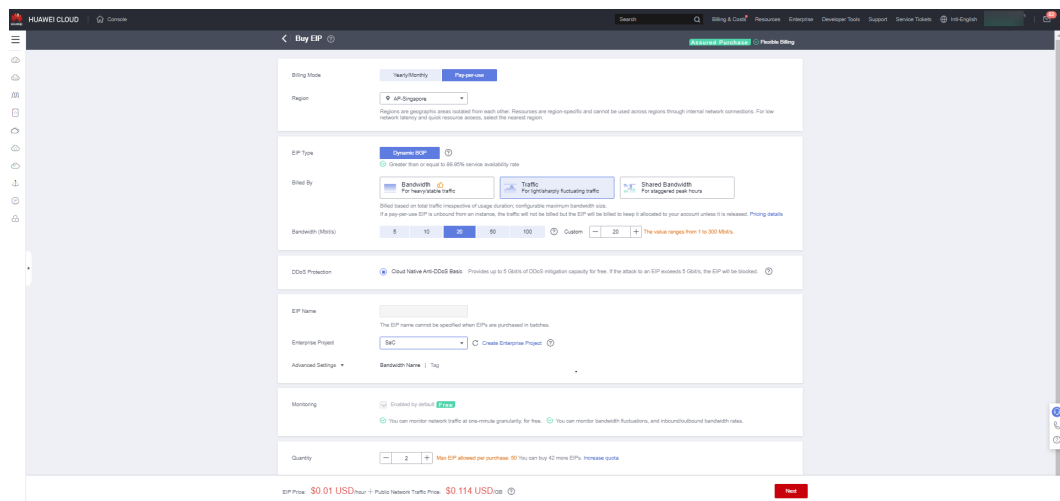
You can modify security group rules, for example, by adding, modifying, or deleting a TCP port, as follows:

- **Add an inbound rule** and configure a TCP port if needed.
- Inappropriate security group settings may cause serious security risks. You can **modify security group rules** to ensure the network security of your ECSs.
- If the source or destination IP address of an inbound or outbound security group rule changes, or a port needs to be disabled, you can **delete the security group rule**.

## Viewing Your Resources and Testing Network Connectivity

**Step 1** Log in to the **EIP console**, create two EIPs, and bind them to the two ECSs created in **Figure 3-16** respectively.

**Figure 3-17** Creating EIPs



**Step 2** Log in to the two ECSs created in **Figure 3-16**, deploy the httpd service on each ECS, and run the command below. Note that you can configure the message in the double quotation marks in the second line whatever you like. If the load balancer routes the request to the ECSs, this message will be returned.

```
yum -y install httpd
echo "www.test01.com" > /var/www/html/index.html
chmod 777 /var/www/html/index.html
systemctl start httpd
curl localhost
```

Figure 3-18 Logging in to the ECSs

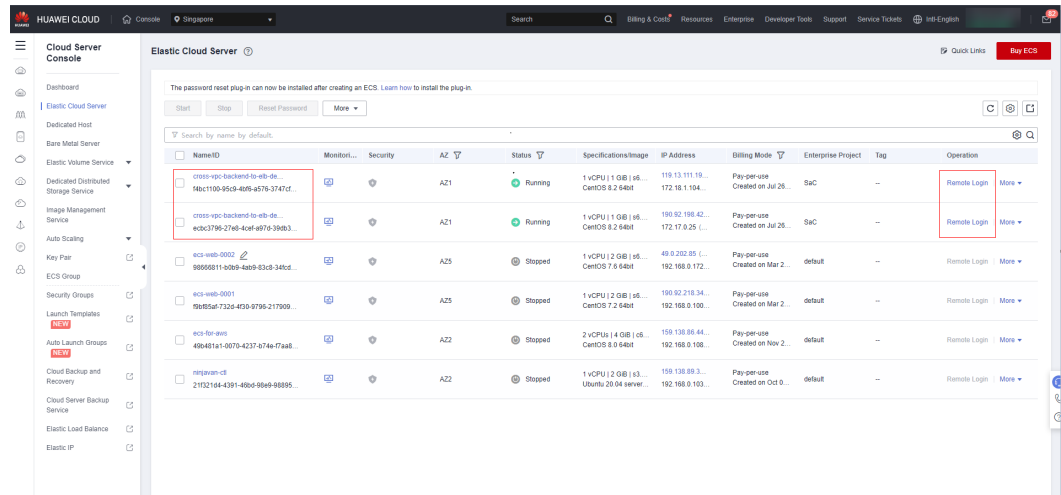


Figure 3-19 Installing the httpd service

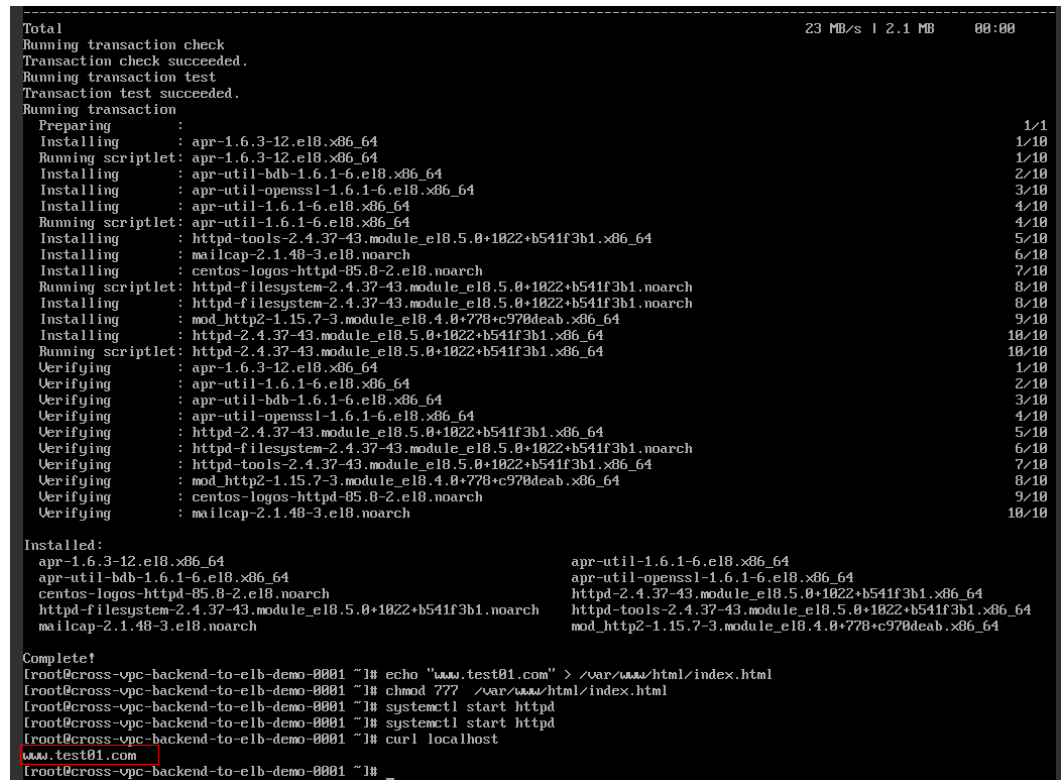


Figure 3-20 Installing the httpd service

```

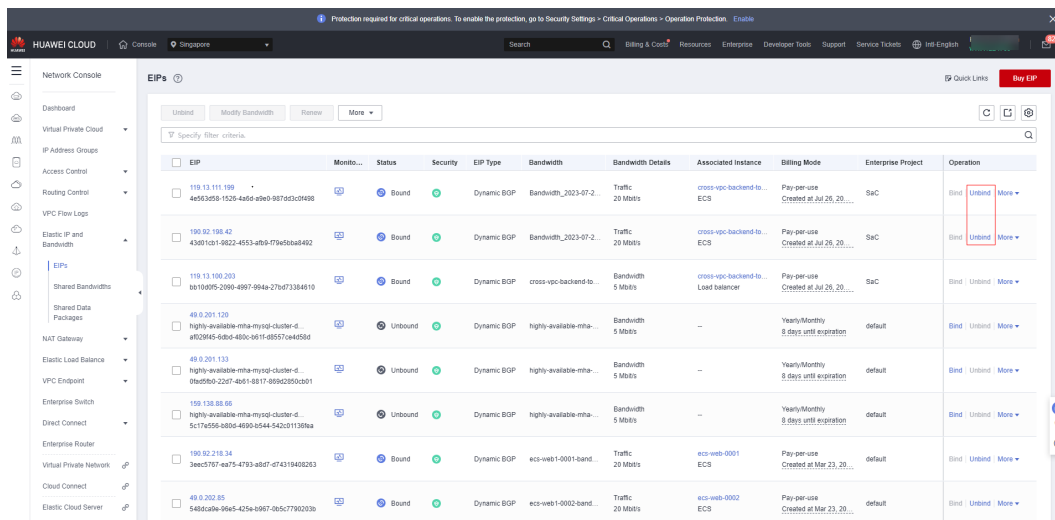
Total                                                                                               22 MB/s | 2.1 MB   00:00
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing                                                                                                                                                                1/1
  Installing                                                                                                                                                                1/10
Running scriptlet: apr-1.6.3-12.el8.x86_64
  Installing                                                                                                                                                                2/10
  Installing                                                                                                                                                                3/10
  Installing                                                                                                                                                                4/10
Running scriptlet: apr-util-1.6.1-6.el8.x86_64
  Installing                                                                                                                                                                5/10
  Installing                                                                                                                                                                6/10
  Installing                                                                                                                                                                7/10
Running scriptlet: httpd-tools-2.4.37-43.module_el8.5.0+1022+b541f3b1.x86_64
  Installing                                                                                                                                                                8/10
  Installing                                                                                                                                                                9/10
  Installing                                                                                                                                                               10/10
Running scriptlet: httpd-2.4.37-43.module_el8.5.0+1022+b541f3b1.x86_64
  Verifying                                                                                                                                                                1/10
  Verifying                                                                                                                                                                2/10
  Verifying                                                                                                                                                                3/10
  Verifying                                                                                                                                                                4/10
  Verifying                                                                                                                                                                5/10
  Verifying                                                                                                                                                                6/10
  Verifying                                                                                                                                                                7/10
  Verifying                                                                                                                                                                8/10
  Verifying                                                                                                                                                                9/10
  Verifying                                                                                                                                                               10/10

Installed:
apr-1.6.3-12.el8.x86_64
apr-util-bdb-1.6.1-6.el8.x86_64
centos-logos-httpd-05.8-2.el8.noarch
httpd-filesystem-2.4.37-43.module_el8.5.0+1022+b541f3b1.noarch
mailcap-2.1.40-3.el8.noarch
apr-util-1.6.1-6.el8.x86_64
apr-util-openssl-1.6.1-6.el8.x86_64
httpd-2.4.37-43.module_el8.5.0+1022+b541f3b1.x86_64
httpd-tools-2.4.37-43.module_el8.5.0+1022+b541f3b1.x86_64
mod_http2-1.15.7-3.module_el8.4.0+778+c970deab.x86_64

Complete!
root@cross-vc-backend-to-elb-demo-0011 ~]# echo "www.test01.com" > /var/www/html/index.html
root@cross-vc-backend-to-elb-demo-0011 ~]# echo "www.test02.com" > /var/www/html/index.html
root@cross-vc-backend-to-elb-demo-0011 ~]# chmod 777 /var/www/html/index.html
root@cross-vc-backend-to-elb-demo-0011 ~]# systemctl start httpd
root@cross-vc-backend-to-elb-demo-0011 ~]# curl localhost
www.test02.com
root@cross-vc-backend-to-elb-demo-0011 ~]#
    
```

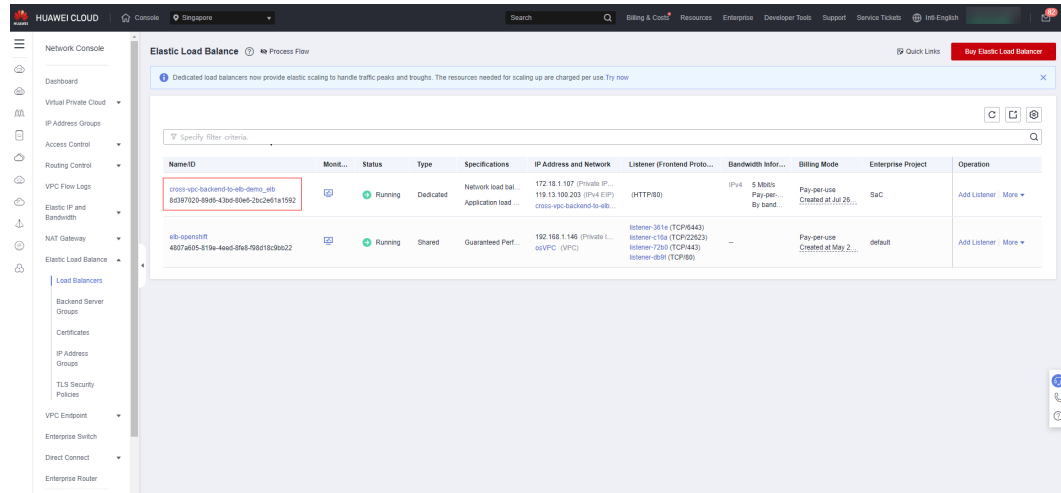
Step 3 Unbind the EIPs bound to the two ECSs in Step 2 and release the EIPs.

Figure 3-21 Unbinding and releasing the EIPs



Step 4 On the ELB console, view the dedicated load balancer you have created for deploying this solution.

Figure 3-22 Viewing the load balancer



**Step 5** Enter the EIP address assigned in **Step 4** in the address box of your browser to access the dedicated load balancer. If the following two pages are displayed, the load balancer routes the requests to the two ECSs.

Figure 3-23 Verifying that the request is routed to one ECS

www.test01.com

Figure 3-24 Verifying that the request is routed to the other ECS

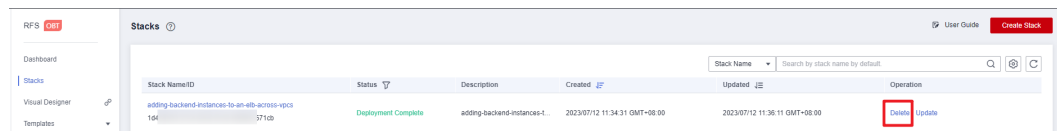
www.test02.com

----End

## 3.4 Quick Uninstallation

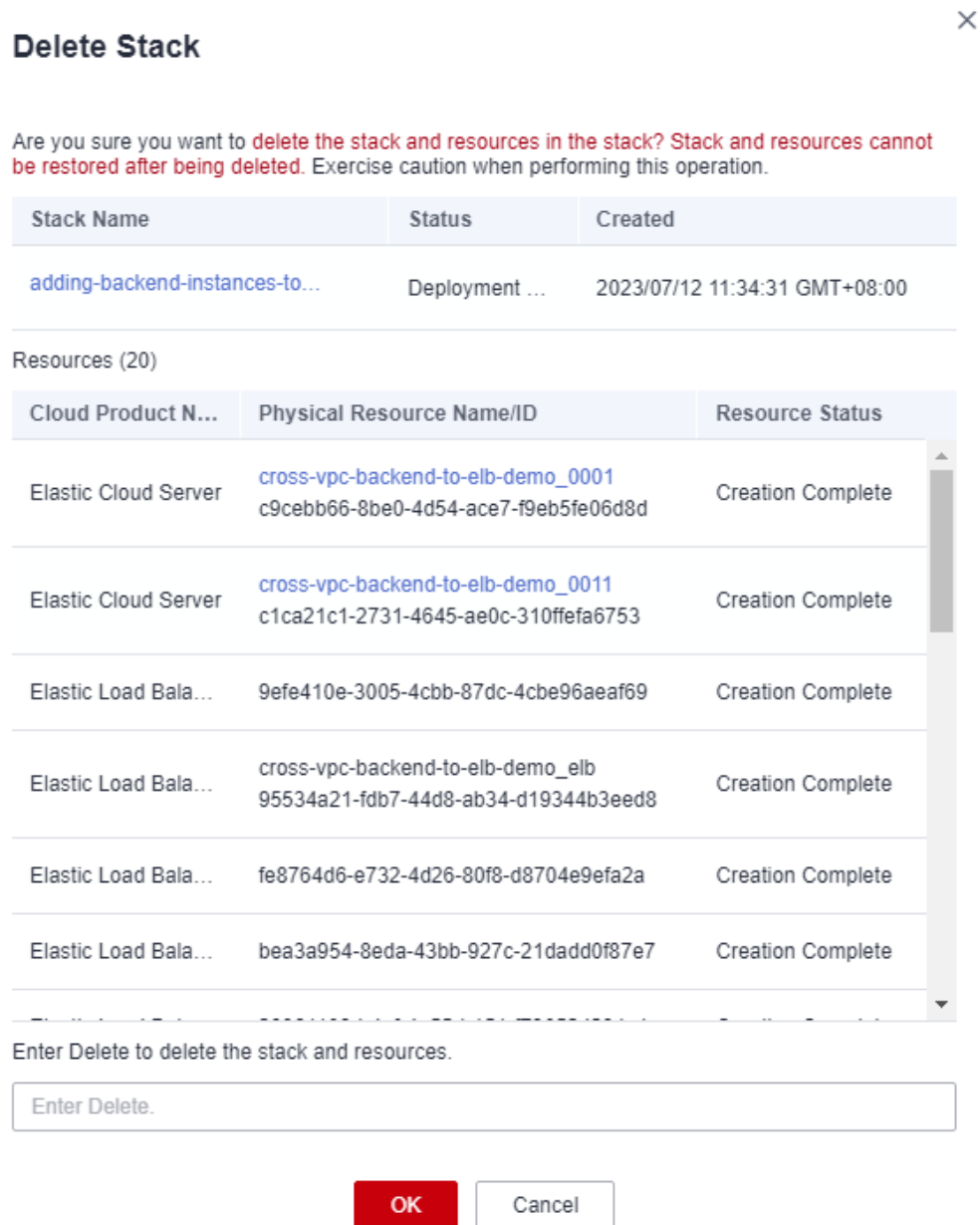
**Step 1** Click **Delete** in the row where the solution stack is.

**Figure 3-25** Uninstalling the solution



**Step 2** Enter **Delete** and click **OK**.

Figure 3-26 Confirming the uninstallation



----End

# 4 Appendix

---

## Terms

- **Virtual Private Cloud (VPC)**: an isolated and private virtual network environment. You can use VPC, along with **EIP**, **Cloud Connect**, and **Direct Connect** to establish a reliable, secure, and efficient communication channel for your cloud resources to communicate with each other, the internet, and on-premises networks.
- **Elastic Cloud Server (ECS)**: secure, scalable, on-demand computing resources that enable you to flexibly deploy applications and workloads.
- **Elastic Load Balance (ELB)**: automatically distributes incoming traffic across multiple servers to balance workloads, increasing service capabilities and fault tolerance of your applications.
- **Elastic IP (EIP)**: provides static public IP addresses and scalable bandwidths that enable your cloud resources to communicate with the Internet. You can easily bind an EIP to an ECS, BMS, virtual IP address, NAT gateway, or load balancer, enabling immediate Internet access.



# 5 Change History

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Released on	Description
2023-07-30	The issue is the first official release.