Solution

Quick Deployment for a High-Availability MongoDB Database

Issue 1.0.0

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HUAWEI

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1 Solution Overview

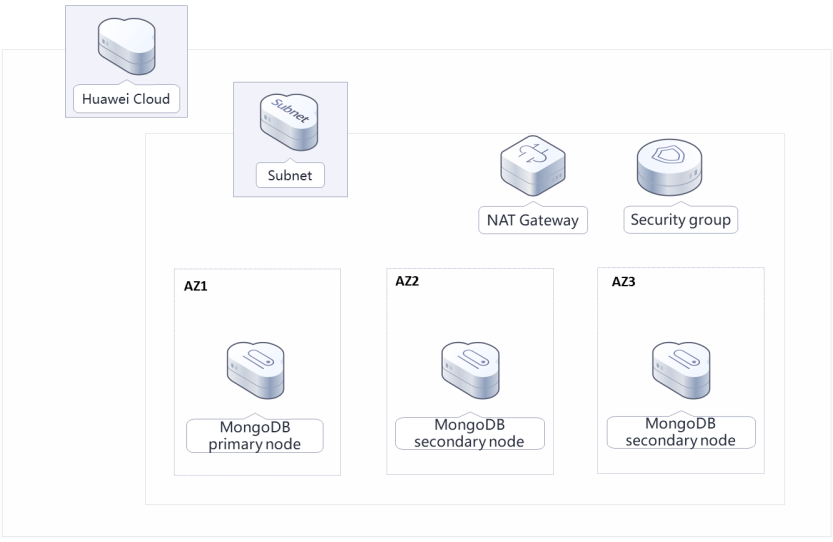
Application Scenarios

This solution helps you create a highly available MongoDB replica set on Huawei Cloud ECSs. MongoDB is an open-source NoSQL database, where key-value pairs are stored as a document. Each MongoDB replica set contains primary and secondary nodes so that the replica set can recover automatically once a fault occurs.

Solution Architecture

This solution can help you quickly create a MongoDB replica set on Huawei Cloud ECSs. The solution architecture is illustrated below.

Figure 1-1 Architecture



This solution will:

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- Create three ECSs. These ECSs will be used for deploying one primary node and two secondary nodes for a MongoDB replica set at different AZs.
- Create a public NAT gateway and configure SNAT rules so that database nodes can access Internet unidirectionally, making O&M easy while ensuring database access security.

Advantages

- High availability

  ECSs can be deployed across AZs, so a MongoDB replica set deployed on these ECSs can work in primary/secondary mode to provide disaster recovery and automatic fault recovery.

- One-click deployment

  You can create ECSs running MongoDB with just a few clicks.

- Open source and customization

  This solution is open-source and free for commercial use. You can also make custom development based on source code.

Constraints

- Before deploying this solution, you need to sign up with Huawei Cloud. Ensure that your account balance is sufficient based on price estimates in **Table 2-1**.
- It takes about 2 to 3 minutes to set up a MongoDB replica set. After the replica set is deployed, you can verify this solution by referring to **3.3 Getting Started**.

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2 Resource and Cost Planning

This solution will deploy 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)	• Region: AP-Singapore • Billing Mode: Yearly/Monthly • Specifications: x86 | ECS | s6.medium.2 | 1 vCPU | 2 GiB • Image: CentOS 7.6 64bit • System Disk: High I/O | 40 GiB • Data Disk: General Purpose SSD | 100 GiB • Quantity: 3	$98.64 USD
Elastic IP (EIP)	• Region: AP-Singapore • Billing Mode: Yearly/Monthly • Routing Type: Dynamic BGP • Billed By: Bandwidth • Bandwidth: 5 Mbit/s • EIP Quantity: 1	$57.00 USD
NAT Gateway	• Pay-per-use: $2.44 USD • Region: AP-Singapore • Billing Mode: Pay-per-use • Specifications: Small • Required Duration: 1 day	$2.44 USD*30 = $73.2 USD
Total		$228.84 USD

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Table 2-2 Resource and cost planning (pay-per-use)

Huawei Cloud Service	Example Configuration	Estimated Monthly Cost
Elastic Cloud Server (ECS)	• Pay-per-use: $0.05 USD/hour • Region: AP-Singapore • Billing Mode: Pay-per-use • Specifications: x86 | ECS | s6.medium.2 | 1 vCPU | 2 GiB • Image: CentOS 7.6 64bit • System Disk: High I/O | 40 GiB • Data Disk: General Purpose SSD | 100 GiB • Quantity: 3	$2.44 USD*30 = $73.2 USD
Elastic IP (EIP)	• Pay-per-use: $0.13 USD • Region: AP-Singapore • Billing Mode: Pay-per-use • Routing Type: Dynamic BGP • Billed By: Bandwidth • Bandwidth: 5 Mbit/s • EIP Quantity: 1	$0.13 USD*24*30 ≈$93.6 USD
NAT Gateway	• Pay-per-use: $2.44 USD • Region: AP-Singapore • Billing Mode: Pay-per-use • Specifications: Small • Required Duration: 1 day	$2.44 USD*30 = $73.2 USD
Total		$274.8 USD

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3 Procedure

3.1 Preparations
3.2 Quick Deployment
3.3 Getting Started
3.4 Quick Uninstallation

3.1 Preparations

Creating the rf_admin_trust Agency

Step 1 Access the Huawei Cloud official website, log in to the **console**, move your mouse over the account name, and choose **Identity and Access Management**.

Figure 3-1 Console page

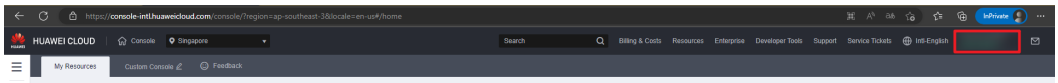

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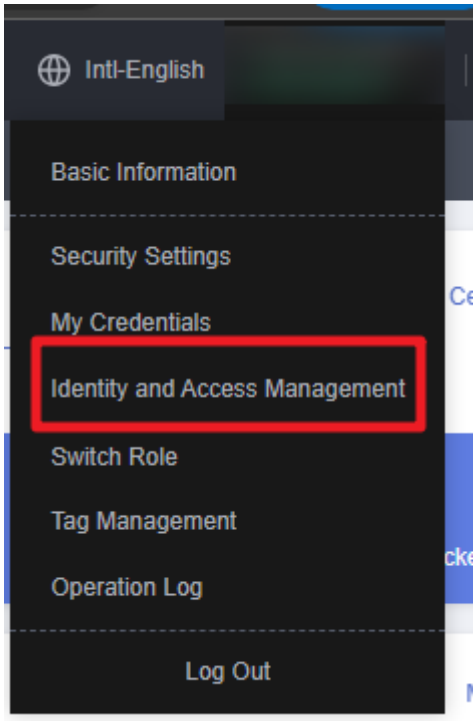
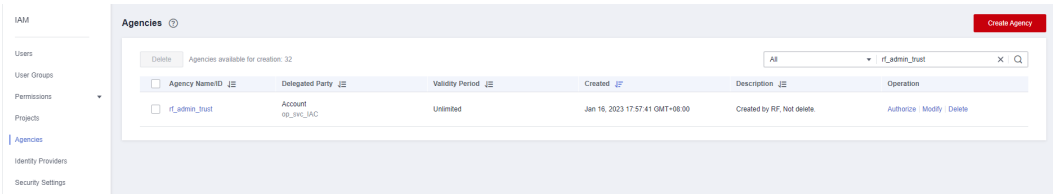
Figure 3-2 Identity and Access Management



Step 2 Choose **Agencies** in the left navigation pane and search for the **rf_admin_trust** agency.

Figure 3-3 Agency list



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

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**, select **RFS** for **Cloud Service**, and click **Next**.

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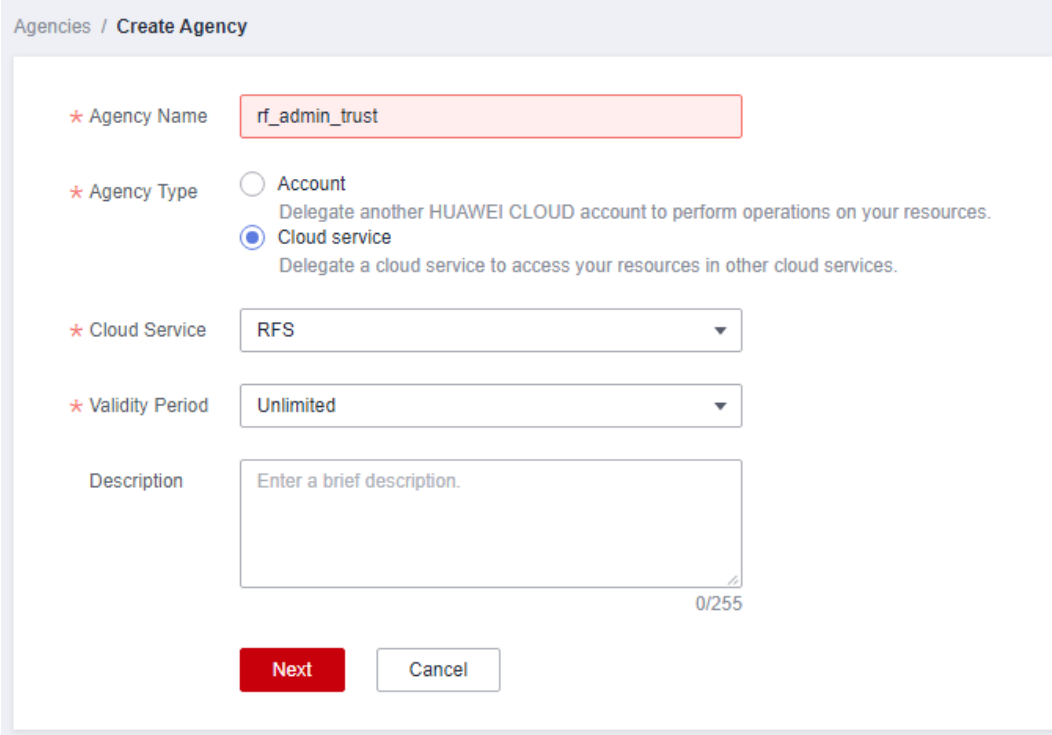
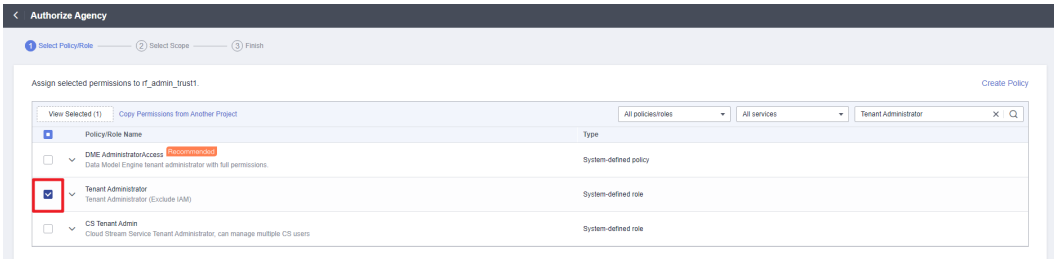
Figure 3-4 Create Agency



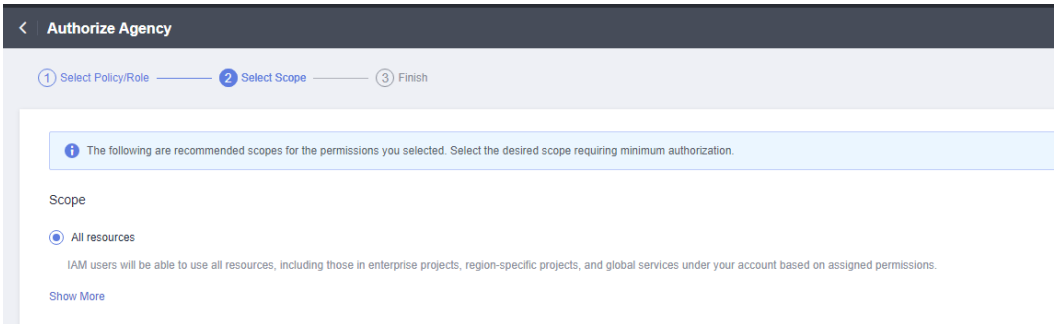
Step 4 Search for **Tenant Administrator** and select it in the search results.

Figure 3-5 Select Policy



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

Figure 3-6 Select Scope



Step 6 Check that the **rf_admin_trust** agency is displayed in the agency list.

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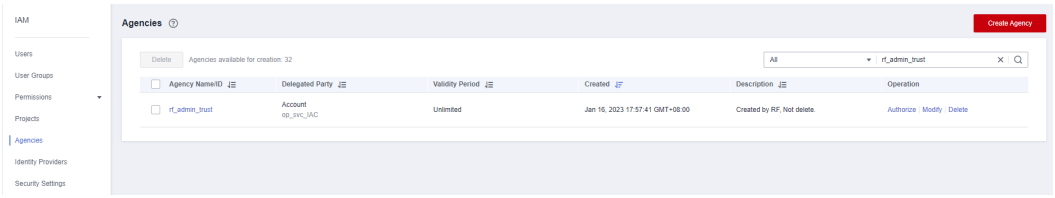
Figure 3-7 Agency list



----End

3.2 Quick Deployment

This section describes how to quickly deploy this solution.

Table 3-1 Parameter description

Parameter	Type	Mandatory	Description	Default Value
vpc_name	String	Yes	Virtual Private Cloud (VPC) name. You can select a template and create a VPC with the unique name. The name can include 1 to 52 characters and can contain letters, digits, underscores (_), hyphens (-), and periods (.).	deploy-a-highly-available-mongodb
secgroup_name	String	Yes	Security group name. A new security group needs to be created. For details about how to configure a security group rule, see **(Optional) Modifying Security Group Rules**. The name can include 1 to 64 characters and can contain letters, digits, underscores (_), hyphens (-), and periods (.).	deploy-a-highly-available-mongodb

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ecs_name	String	Yes	Elastic Cloud Server (ECS) name, which must be unique. It can include 1 to 60 characters and can contain letters, digits, underscores (_), hyphens (-), and periods (.).	deploy-a-highly-available-mongodb
ecs_flavor	String	Yes	ECS flavor. For details, see **A Summary List of x86 ECS Specifications**.	s6.medium.2
ecs_password	String	Yes	ECS initial password. After an ECS is created, log in to the ECS console and change the password by referring to **Resetting the Password for Logging In to an ECS on the Management Console**. The password can include 8 to 26 characters and must contain at least three of the following character types: uppercase letters, lowercase letters, digits, and special characters (!@$ %^-_=+[{}]:,./?). The password cannot contain any username or the username spelled backwards. The administrator username is **root**.	Left blank

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system_disk_size	String	Yes	ECS system disk size, in GiB. The value ranges from 40 to 1024. The system disk size cannot be scaled down.	40
data_disk_size	String	Yes	ECS data disk size, in GiB. The value ranges from 10 to 32768.	100
charging_mode	String	Yes	Billing mode. By default, fees are automatically deducted. The value can be **prePaid** (yearly/monthly) or **postPaid** (pay-per-use).	postPaid
charging_unit	String	Yes	Billing period unit. This parameter is mandatory when the billing mode is set to **prePaid**. The value can be **month** or **year**. The default value is **month**.	month
charging_period	number	Yes	Billing period. When **charging_unit** is set to **year**, the value ranges from **1** to **3**. When **charging_unit** is set to **month**, the value ranges from **1** to **9**. This parameter is mandatory when **charging_mode** is set to **prePaid**.	1

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eip_bandwidth_size	number	Yes	Elastic IP (EIP) bandwidth size, in Mbit/s. This template uses an EIP billed by bandwidth. The value ranges from 1 to 2000.	5
mongodb_password	String	Yes	Password of user **root** of the MongoDB database. After a MongoDB database is created, you can change its password by referring to **(Optional) Changing the Password of the MongoDB Database**. The password can include 4 to 12 characters and can contain at least three of the following character types: uppercase letters, lowercase letters, digits, and special characters @%^-=	Left blank

Step 1 Log in to Huawei Cloud Solution Best Practices, choose **Quick Deployment for a High-Availability MongoDB Database**, and click **Deploy**.

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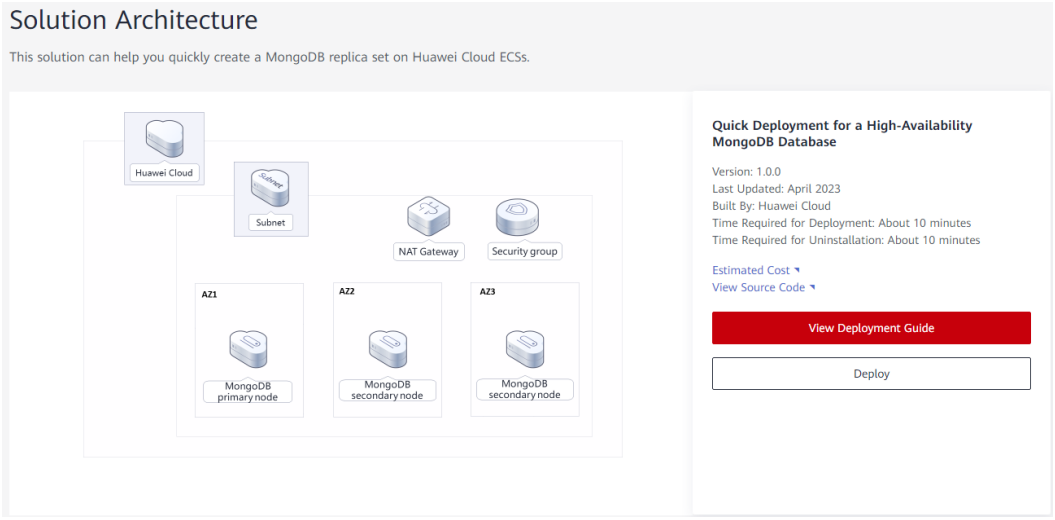
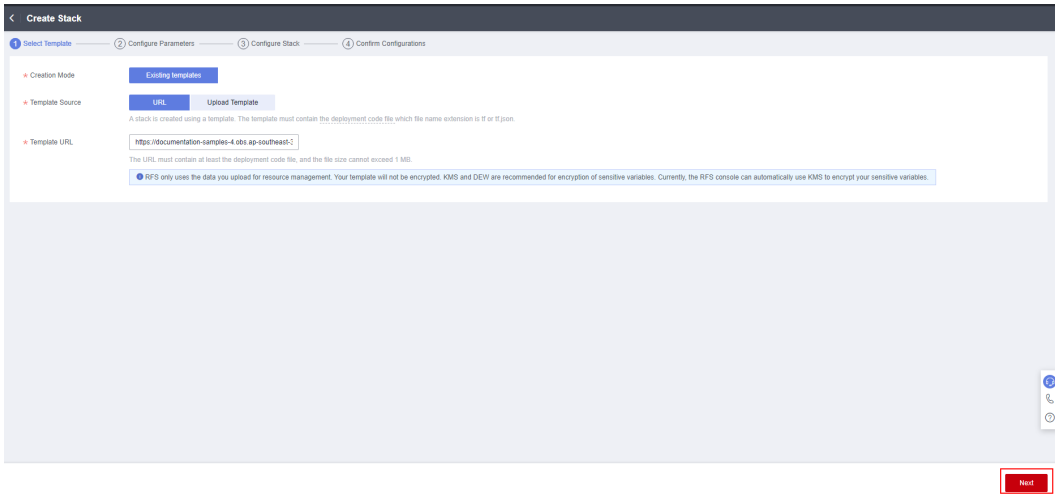
Figure 3-8 Selecting a solution



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

Figure 3-9 Select Template



Step 3 On the **Configure Parameters** page, configure parameters by referring to **Table 3-1** and click **Next**.

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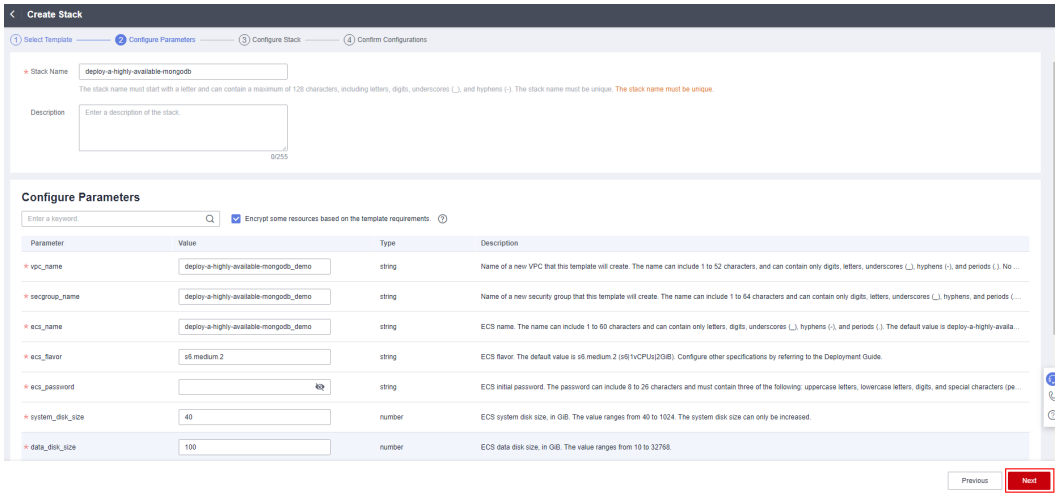
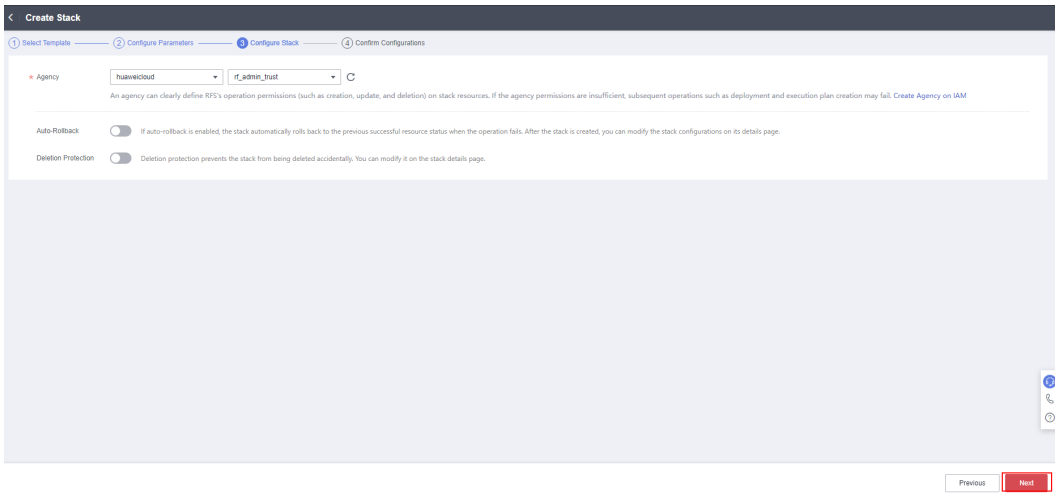
Figure 3-10 Configure Parameters



Step 4 On the **Configure Stack** page, select the **rf_admin_trust** agency and click **Next**.

Figure 3-11 Configure Stack



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

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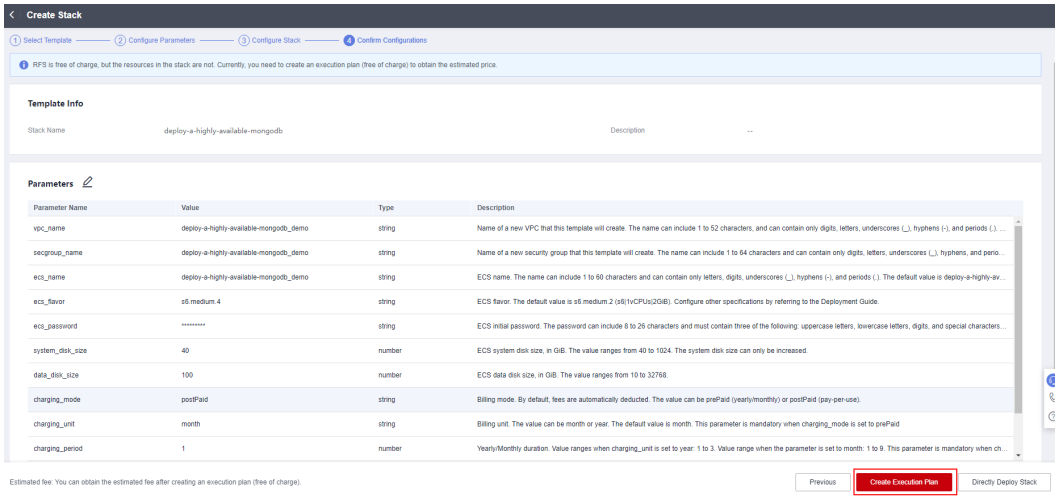
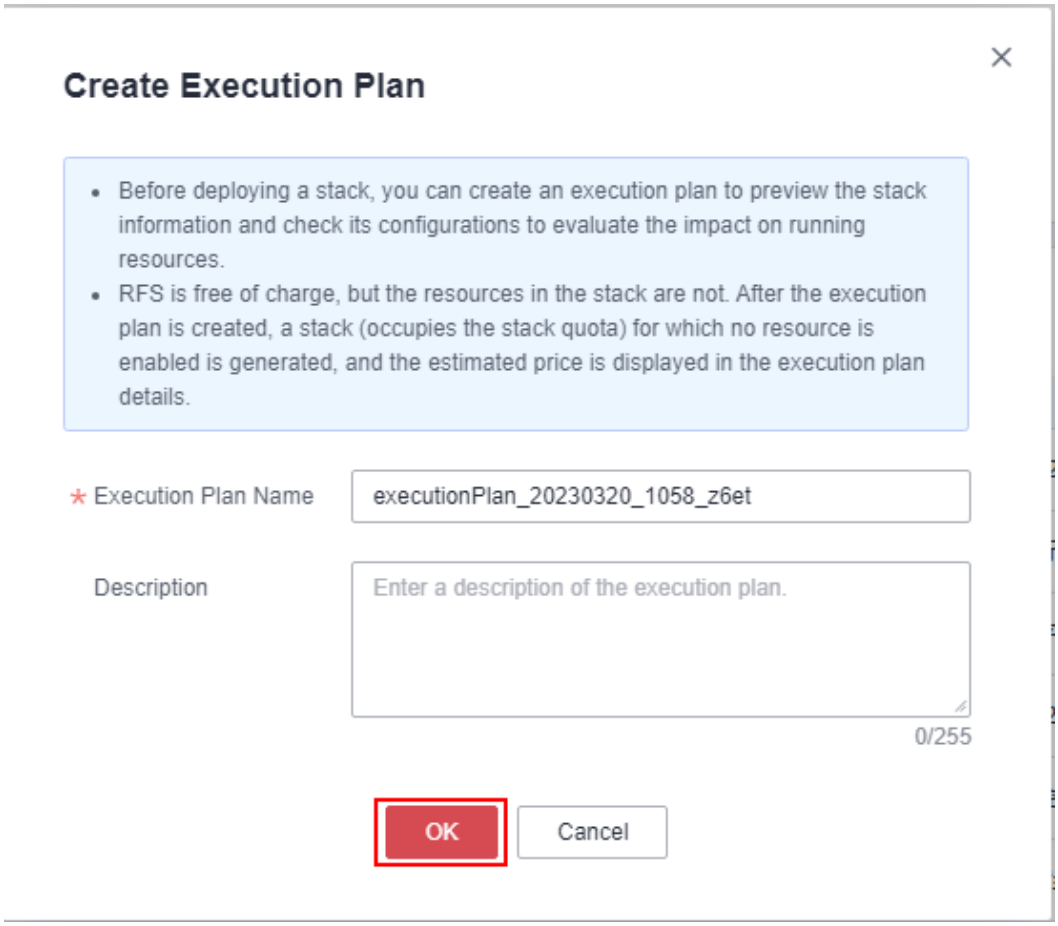
Figure 3-12 Confirm Configurations



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

Figure 3-13 Create 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**.

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Figure 3-14 Execution plan created

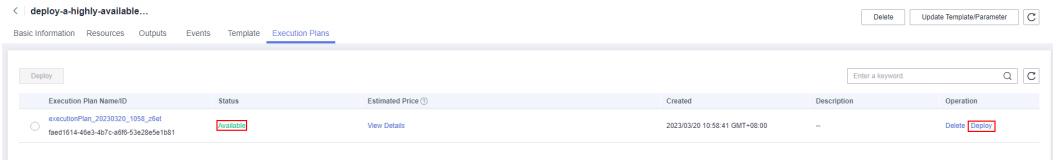
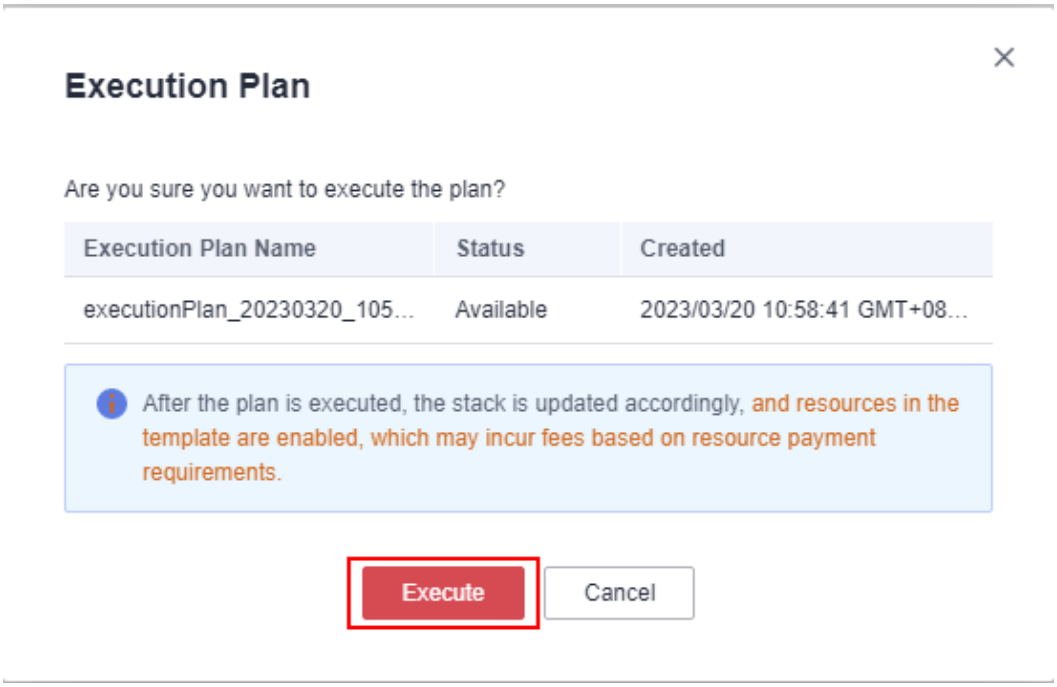
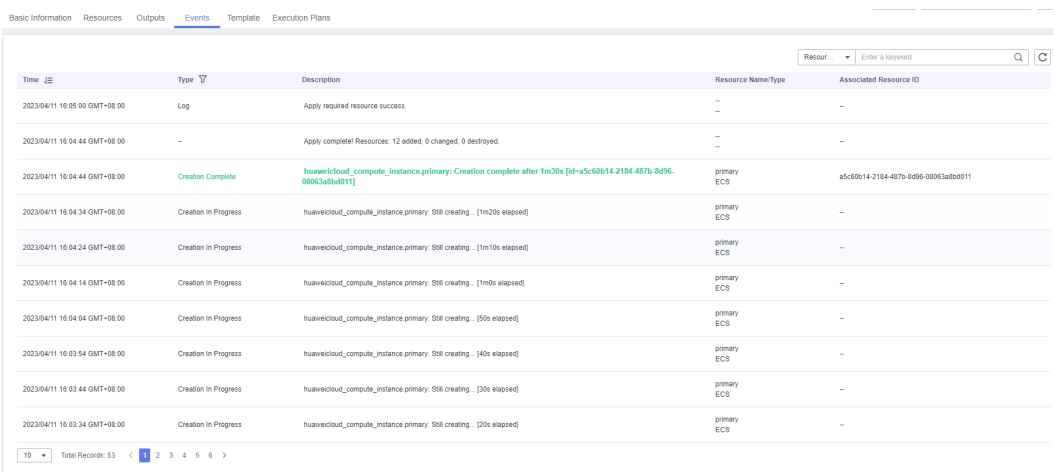


Figure 3-15 Confirming the execution plan



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

Figure 3-16 Resources created



----End

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3.3 Getting Started

(Optional) Modifying Security Group Rules

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

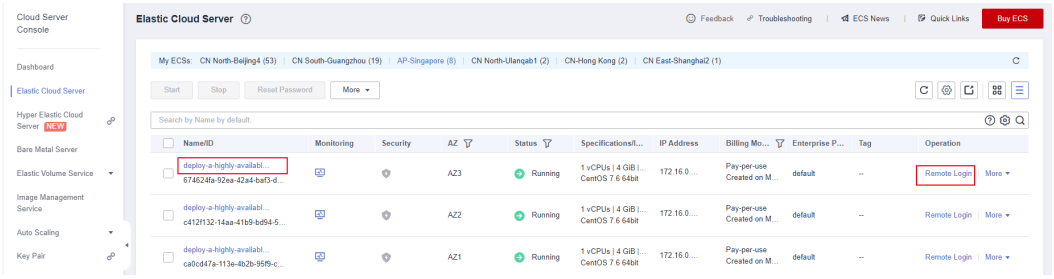
You can modify the security group policy, for example, by adding, modifying, or deleting a TCP port, as follows:

- Adding a security group rule: **Add an inbound rule** and enable a TCP port if needed.
- Modifying a security group rule: Inappropriate security group settings can be a serious security risk. You can **modify security group rules** to ensure the network security of your ECSs.
- Deleting a security group rule: If the source or destination IP address of an inbound or outbound security group rule changes, or a port does not need to be enabled, you can **delete the security group rule**.

(Optional) Changing the Password of the MongoDB Database

Step 1 Log in to the **Elastic Cloud Server (ECS)** console, select the created ECS whose suffix is **primary**, and click **Remote Login** to log in to the Linux ECS.

Figure 3-17 Logging in to the ECS console



Step 2 On the ECS, enter the username and password and press **Enter**.

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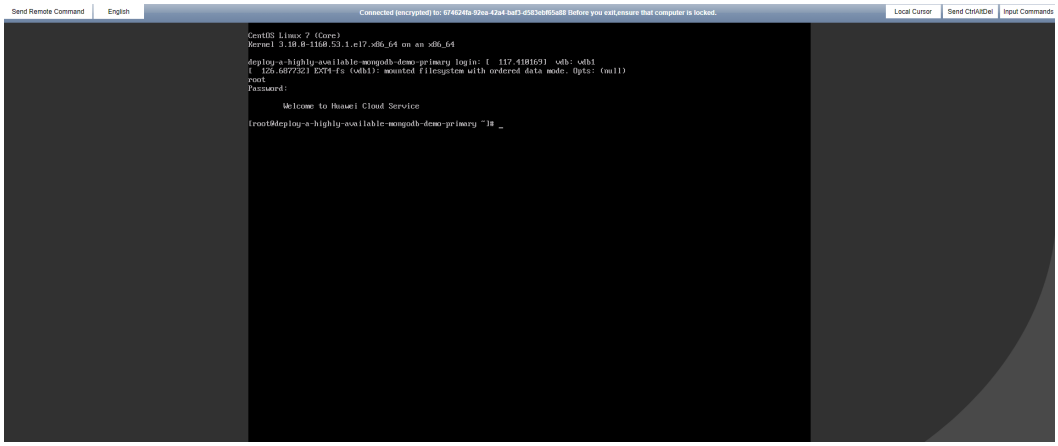
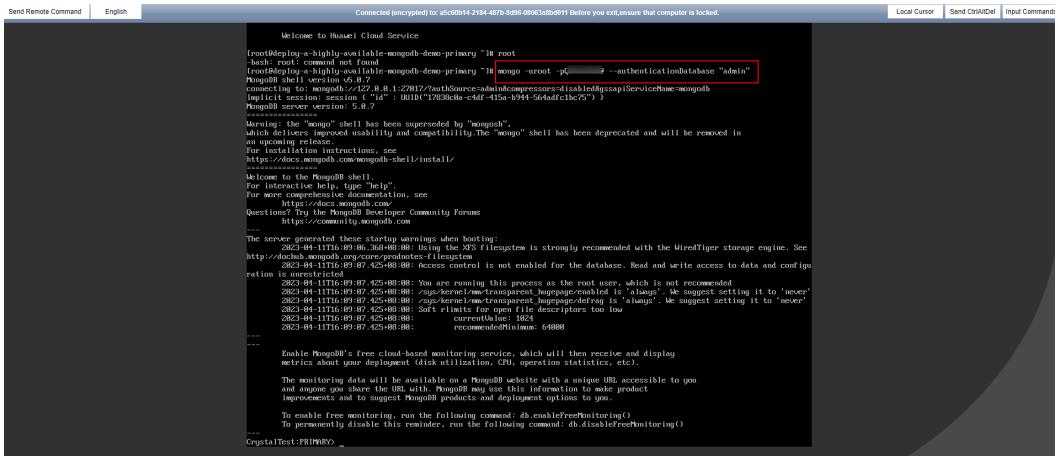
Figure 3-18 Logging in to a Linux ECS



Step 3 Run **mongo -uroot -p***Password* **--authenticationDatabase "admin"** to log in to the database.

Figure 3-19 Logging in to the MongoDB database



Step 4 Switch to the admin database, enter **db.changeUserPassword("root","***new password***")**, and press **Enter**. After the password is changed, enter **exit** to exit the MongoDB database.

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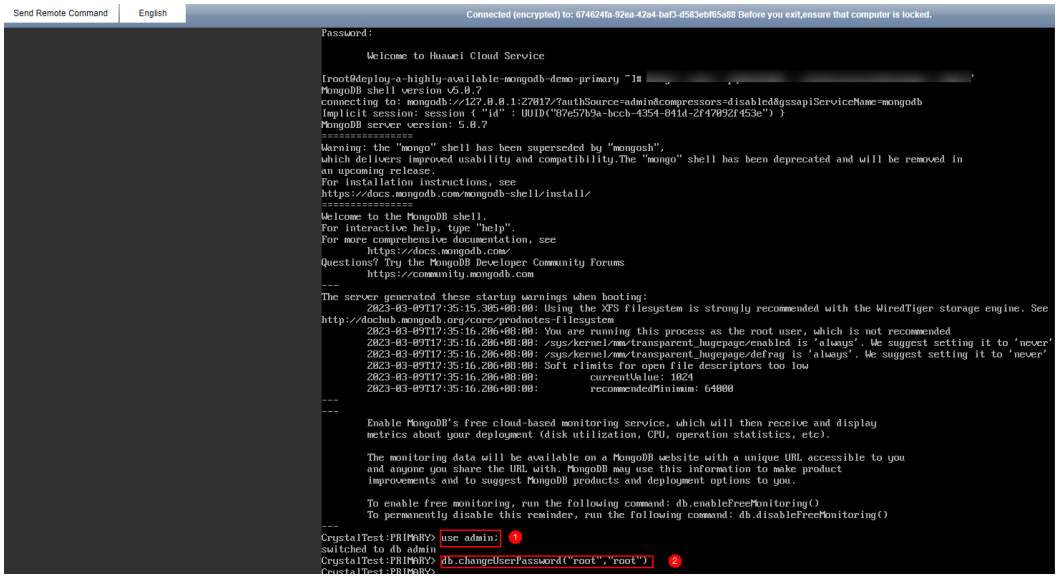
Figure 3-20 Switching to the admin database and changing the password of user **root**

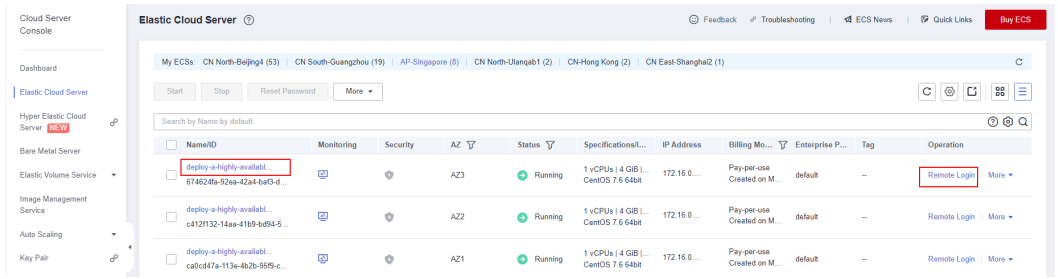


----End

Verifying the MongoDB Database

Step 1 On the **Elastic Cloud Server (ECS)** console, select the created ECS whose suffix is **primary**, and click **Remote Login** to log in to the Linux ECS.

Figure 3-21 Logging in to the ECS console



Step 2 Run **mongo -uroot -p***Password* **--authenticationDatabase "admin"** to log in to the MongoDB database. If the output contains **PRIMARY**, the MongoDB database is deployed successfully.

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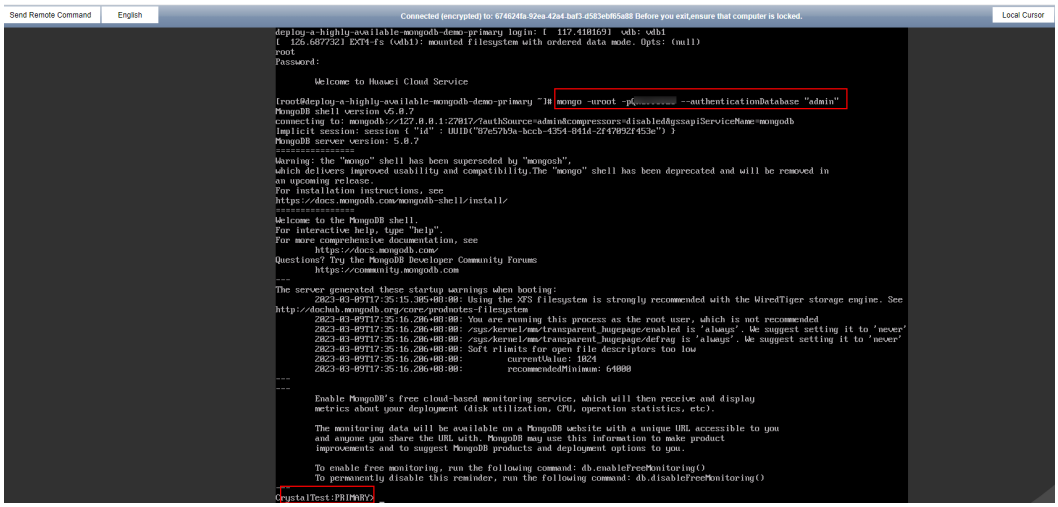
Figure 3-22 Database connection

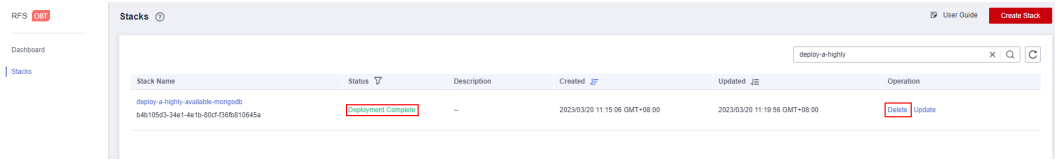


----End

3.4 Quick Uninstallation

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

Figure 3-23 Uninstalling the solution



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

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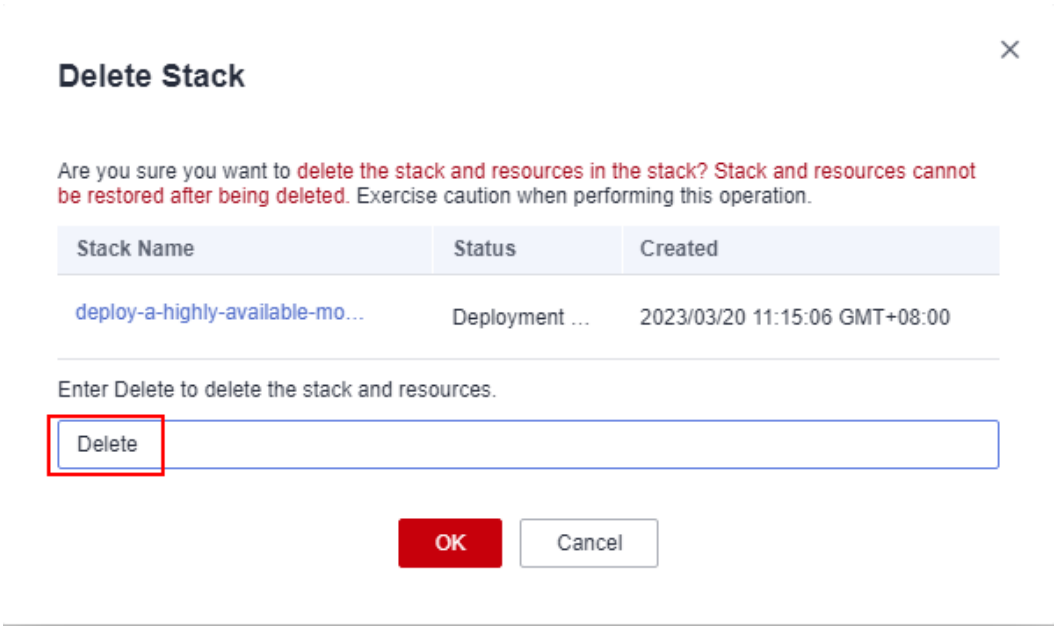
Figure 3-24 Confirming the uninstallation



----End

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4 Appendix

Terms

- **Elastic Cloud Server (ECS)**: ECS provides secure, scalable, on-demand compute resources, enabling you to flexibly deploy applications and workloads.
- **Elastic IP (EIP)**: 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.
- **NAT Gateway**: Public NAT gateways translate private IP addresses into EIPs, and are used by cloud servers in a VPC for secure, cost-effective Internet access. Private NAT gateways translate between private IP addresses, and are used between VPCs or your VPC and on-premises data center to keep legacy networks running after cloud migration.

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5 Change History

Table 5-1 Change history

Released On	Description
2023-04-30	This issue is the first official release.

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