

Solution

Quick Deployment for a High-Availability MongoDB Database

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1 Solution Overview

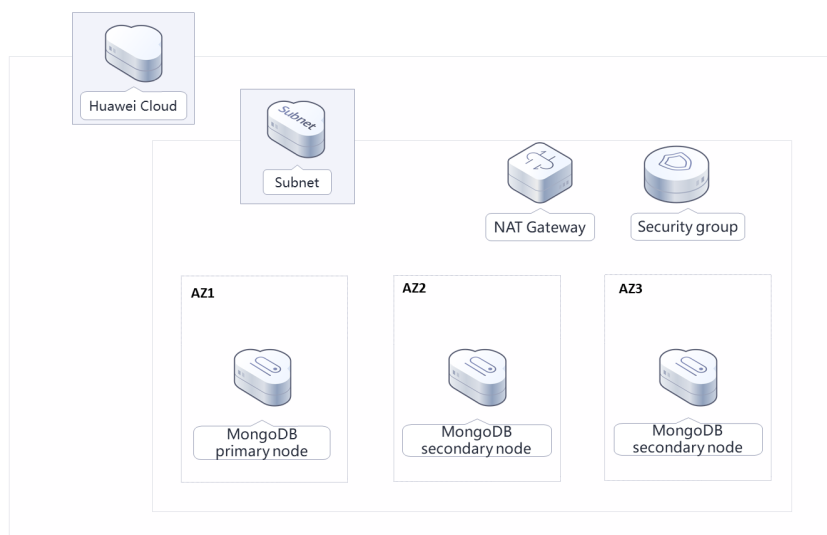
Application Scenarios

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:

- 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](#).

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)	<ul style="list-style-type: none">• 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)	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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

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

Huawei Cloud Service	Example Configuration	Estimated Monthly Cost
Elastic Cloud Server (ECS)	<ul style="list-style-type: none"> ● 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)	<ul style="list-style-type: none"> ● 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	<ul style="list-style-type: none"> ● 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

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

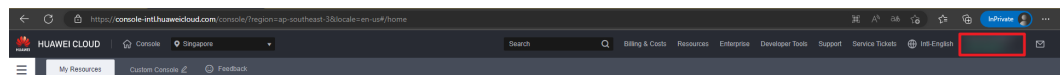
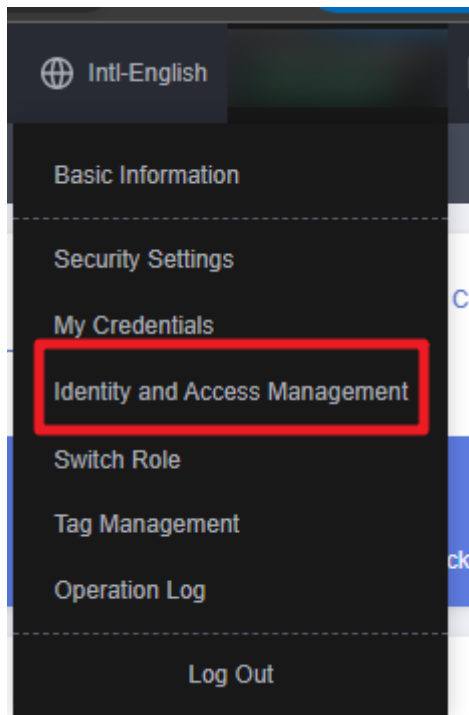
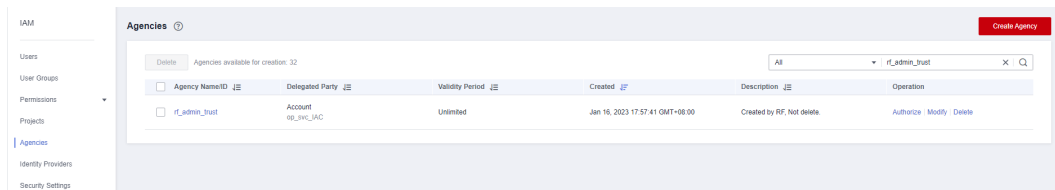


Figure 3-2 Identity and Access Management



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**.

Figure 3-4 Create 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** and select it in the search results.

Figure 3-5 Select Policy

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 Select Scope

Authorize Agency

1 Select Policy/Role 2 Select Scope 3 Finish

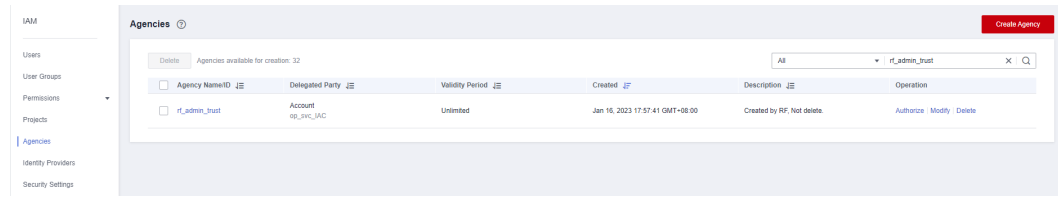
i The following are recommended scopes for the permissions you selected. Select the desired scope requiring minimum authorization.

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 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

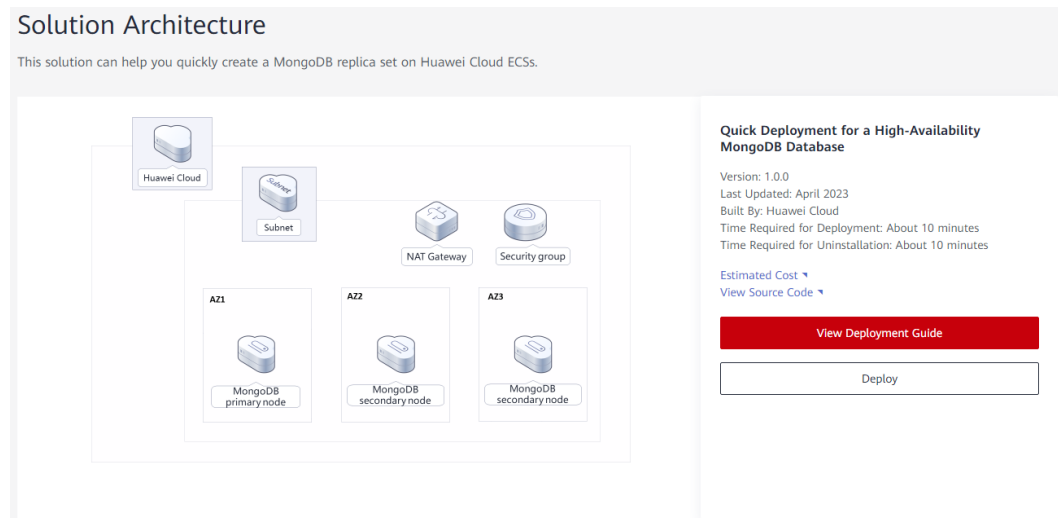
ecs_name	String	Yes	Elastic Cloud Server (ECS) name, which must be unique. It can include 1 to 60 characters and can contain letters, digits, underscores (_), hyphens (-), and periods (.).	deploy-a-highly-available-mongodb
ecs_flavor	String	Yes	ECS flavor. For details, see A Summary List of x86 ECS Specifications .	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

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

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

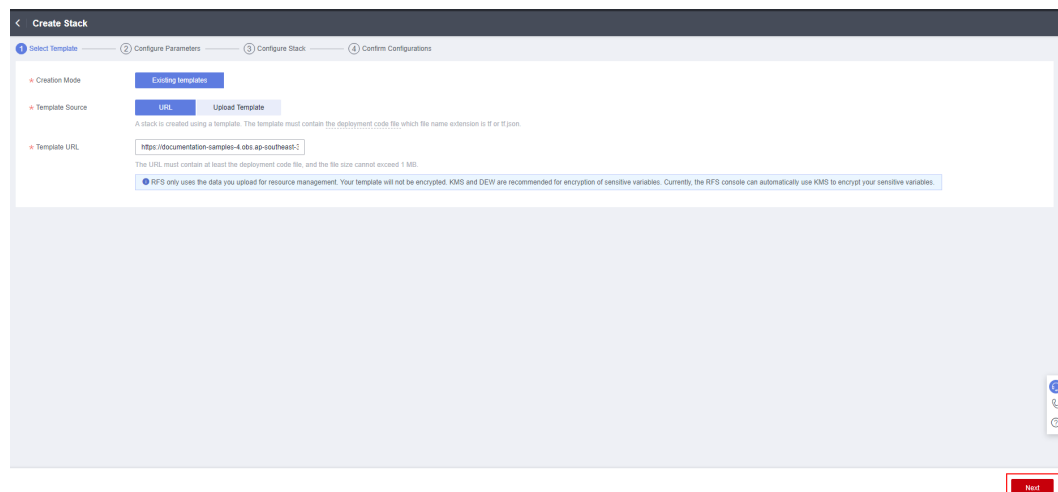
Step 1 Log in to Huawei Cloud Solution Best Practices, choose **Quick Deployment for a High-Availability MongoDB Database**, and click **Deploy**.

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**.

Figure 3-10 Configure Parameters

Parameter	Value	Type	Description
vpc_name	deploy-a-highly-available-mongodb_demo	string	Name of a new VPC that this template will create. The name can include 1 to 52 characters, and can contain only digits, letters, underscores (_), hyphens (-), and periods (.). No ...
secgroup_name	deploy-a-highly-available-mongodb_demo	string	Name of a new security group that this template will create. The name can include 1 to 64 characters and can contain only digits, letters, underscores (_), hyphens (-), and periods (...)
ecs_name	deploy-a-highly-available-mongodb_demo	string	ECS name. The name can include 1 to 60 characters and can contain only letters, digits, underscores (_), hyphens (-), and periods (.). The default value is deploy-a-highly-availa...
ecs_flavor	t3.medium.2	string	ECS flavor. The default value is t3.medium.2 (t3-tCPUx2GB). Configure other specifications by referring to the Deployment Guide.
ecs_password		string	ECS initial password. The password can include 8 to 26 characters and must contain three of the following: uppercase letters, lowercase letters, digits, and special characters (pe...
system_disk_size	40	number	ECS system disk size, in GiB. The value ranges from 40 to 1024. The system disk size can only be increased.
data_disk_size	100	number	ECS data disk size, in GiB. The value ranges from 10 to 32768.

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

Figure 3-11 Configure Stack

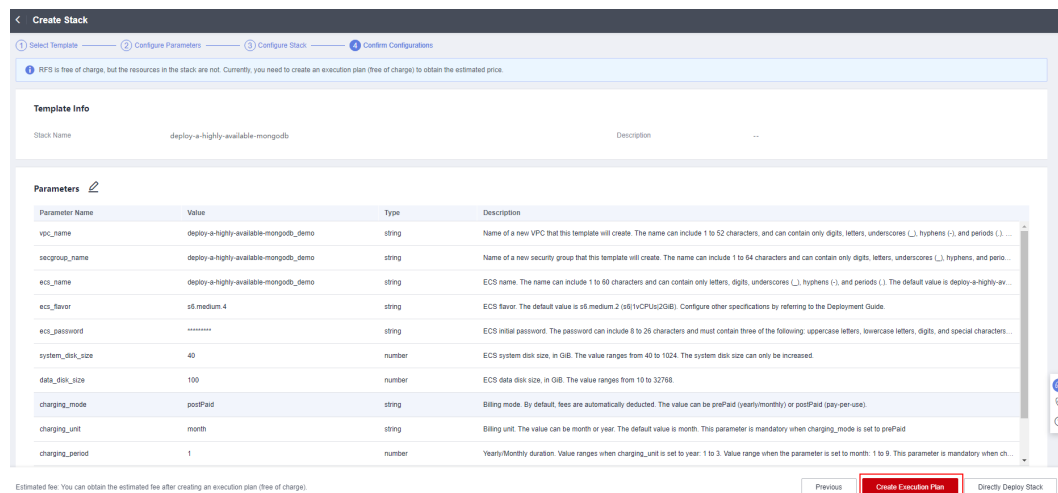
Agency: huaweicloud | rf_admin_trust

Auto-Rollback: If auto-rollback is enabled, the stack automatically rolls back to the previous successful resource status when the operation fails. After the stack is created, you can modify the stack configurations on its details page.

Deletion Protection: Deletion protection prevents the stack from being deleted accidentally. You can modify it on the stack details page.

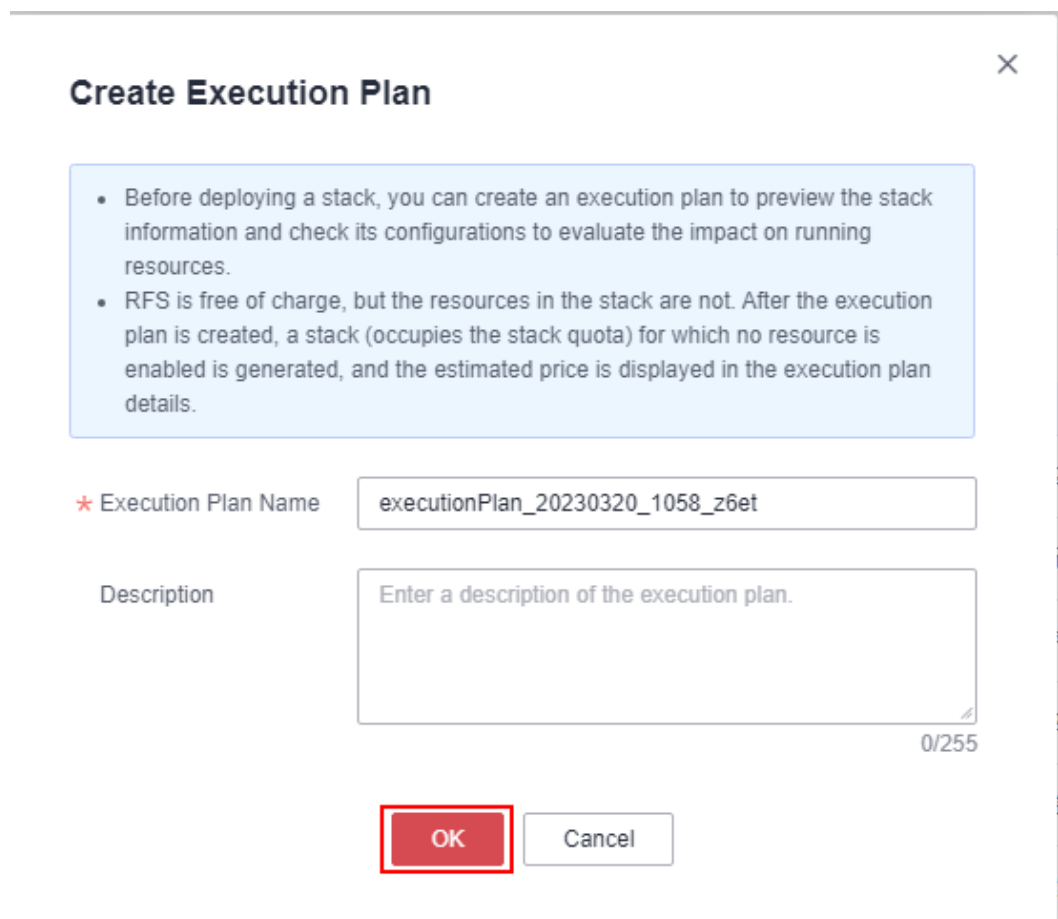
Step 5 On the **Confirm Configurations** page, click **Create Execution Plan**.

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**.

Figure 3-14 Execution plan created

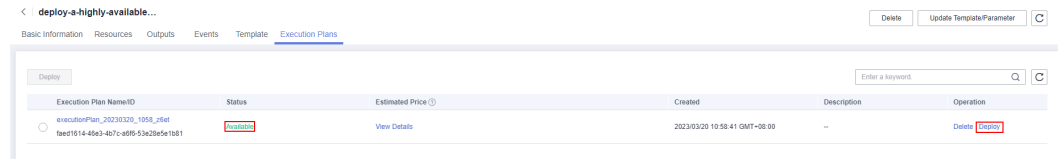
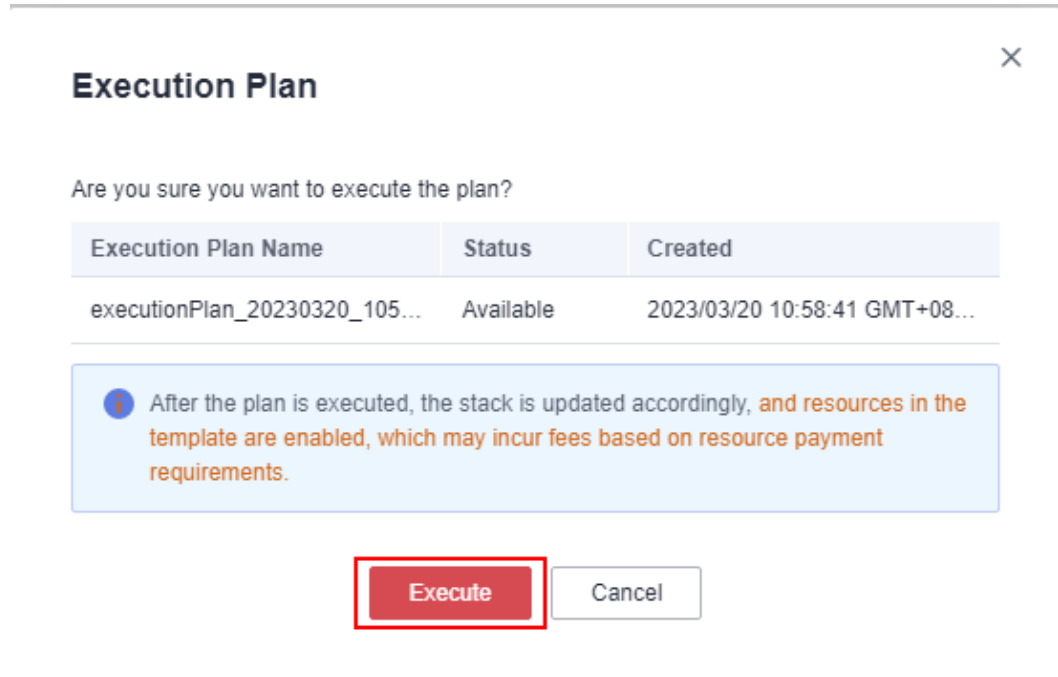
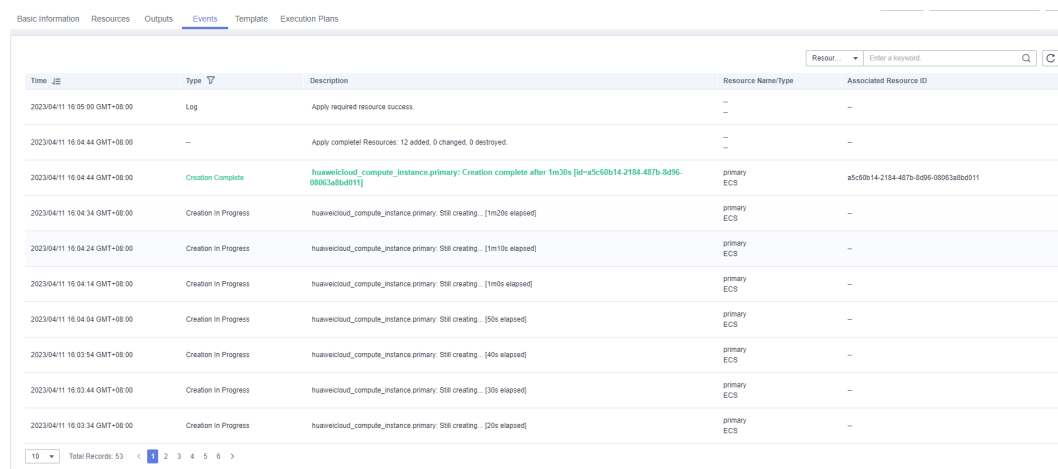


Figure 3-15 Confirming the execution plan



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

Figure 3-16 Resources created



----End

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.

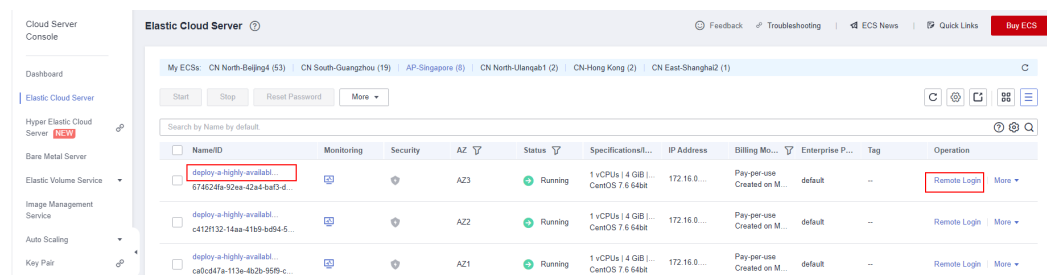
You can modify the security group policy, for example, by adding, modifying, or deleting a TCP port, as follows:

- 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

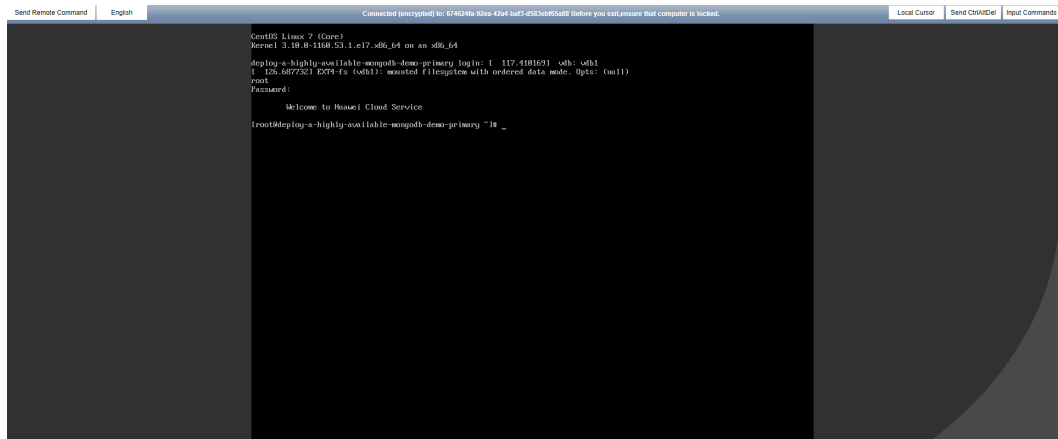
Step 1 Log in to the **Elastic Cloud Server (ECS)** console, select the created ECS whose suffix is **primary**, and click **Remote Login** to log in to the Linux ECS.

Figure 3-17 Logging in to the ECS console



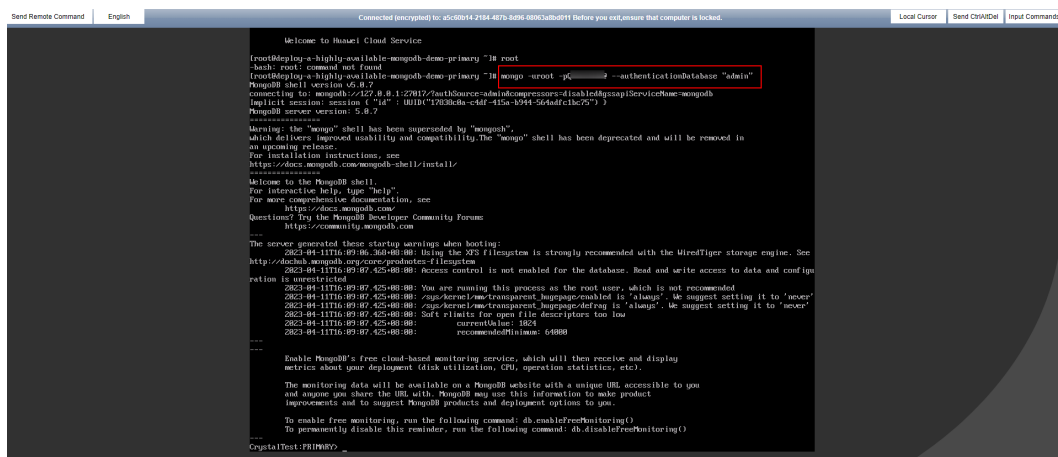
Step 2 On the ECS, enter the username and password and press **Enter**.

Figure 3-18 Logging in to a Linux ECS



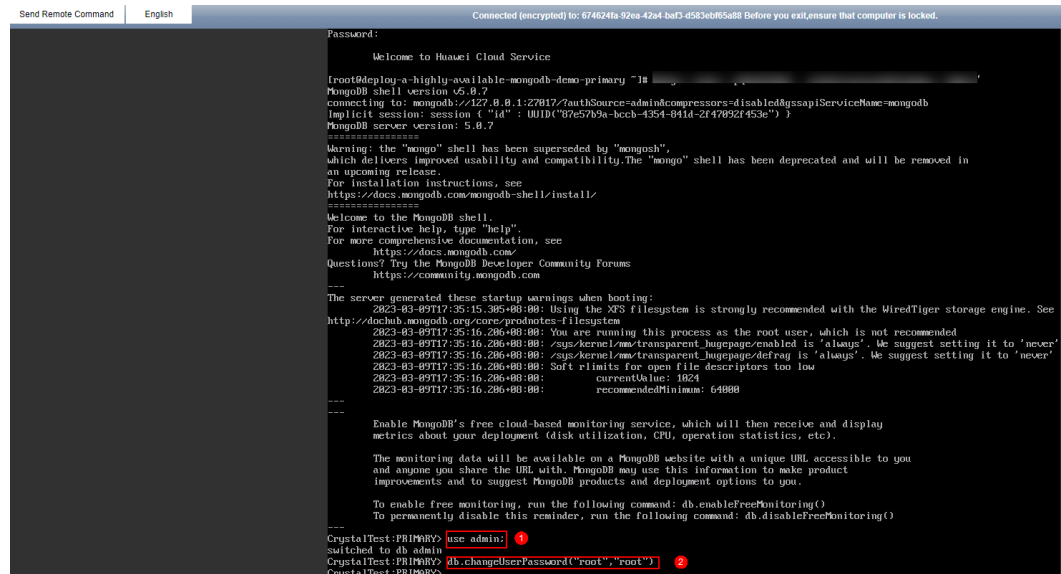
Step 3 Run `mongo -uroot -pPassword --authenticationDatabase "admin"` to log in to the database.

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.

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

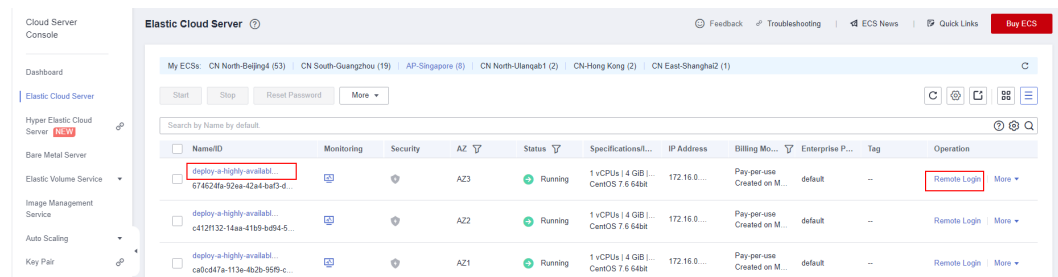


----End

Verifying the MongoDB Database

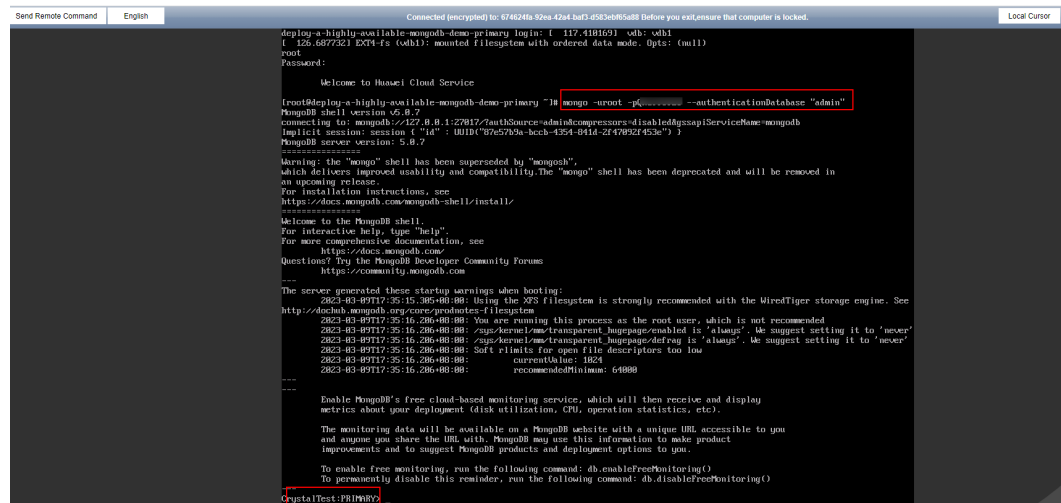
- Step 1** On the **Elastic Cloud Server (ECS)** console, select the created ECS whose suffix is **primary**, and click **Remote Login** to log in to the Linux ECS.

Figure 3-21 Logging in to the ECS console



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

Figure 3-22 Database connection



```
Send Remote Command English Connected (encrypted) to: 9746246c-92ea-42e4-ba7d-d583e605a88 Before you exit ensure that computer is locked. Local Cursor
deploy-a-highly-available-mongodb-demo-primary login: l 117.4181691 odb: vdb1
l 126.687732l EXT4-fs (vdb1): mounted filesystem with ordered data mode. Opts: (null)
root
Password:
Welcome to Huawei Cloud Service
[root@deploy-a-highly-available-mongodb-demo-primary ~]# mongo -u root -p [password] --authenticationDatabase "admin"
MongoDB shell version 5.8.7
connecting to: mongodb://127.0.0.1:27017/?authSource=admin&compressors=disabled&gssapiServiceName=mongodb
Implicit session: session "14" - UUID("676c793c-bccb-4554-891d-2447892f453c")
MongoDB server version: 5.8.7
-----
Warning: the "mongo" shell has been superseded by "mongosh",
which delivers improved usability and compatibility. The "mongo" shell has been deprecated and will be removed in
an upcoming release.
For installation instructions, see
https://docs.mongodb.com/mongodb-shell/install/
-----
Welcome to the MongoDB shell.
For interactive help, type "help".
For more comprehensive documentation, see
https://docs.mongodb.com
Questions? Try the MongoDB Developer Community Forums
https://community.mongodb.com
-----
The server generated these startup warnings when booting:
2023-03-20T11:15:36.885+08:00: Using the XFS filesystem is strongly recommended with the WiredTiger storage engine. See
http://docs.mongodb.com/manual/products/filesystem
2023-03-20T11:15:36.886+08:00: You are running this process as the root user, which is not recommended
2023-03-20T11:15:36.886+08:00: /sys/kernel/mm/transparent_hugepage/enabled is 'always'. We suggest setting it to 'never'
2023-03-20T11:15:36.886+08:00: /sys/kernel/mm/transparent_hugepage/defrag is 'always'. We suggest setting it to 'never'
2023-03-20T11:15:36.886+08:00: Soft rlimits for open file descriptors too low
currentValue: 1624
recommendedInum: 64000
-----
Enable MongoDB's free cloud-based monitoring service, which will then receive and display
metrics about your deployment (disk utilization, CPU, operation statistics, etc).

The monitoring data will be available on a MongoDB website with a unique URL accessible to you
and anyone you share the URL with. MongoDB may use this information to make product
improvements and to suggest MongoDB products and deployment options to you.

To enable free monitoring, run the following command: db.enableFreeMonitoring()
To permanently disable this reminder, run the following command: db.disableFreeMonitoring()

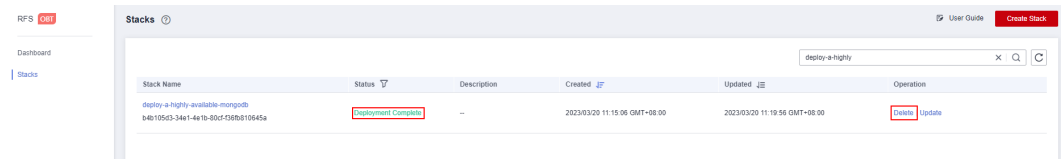
CrystalTest:PR1M8R2
```

----End

3.4 Quick Uninstallation

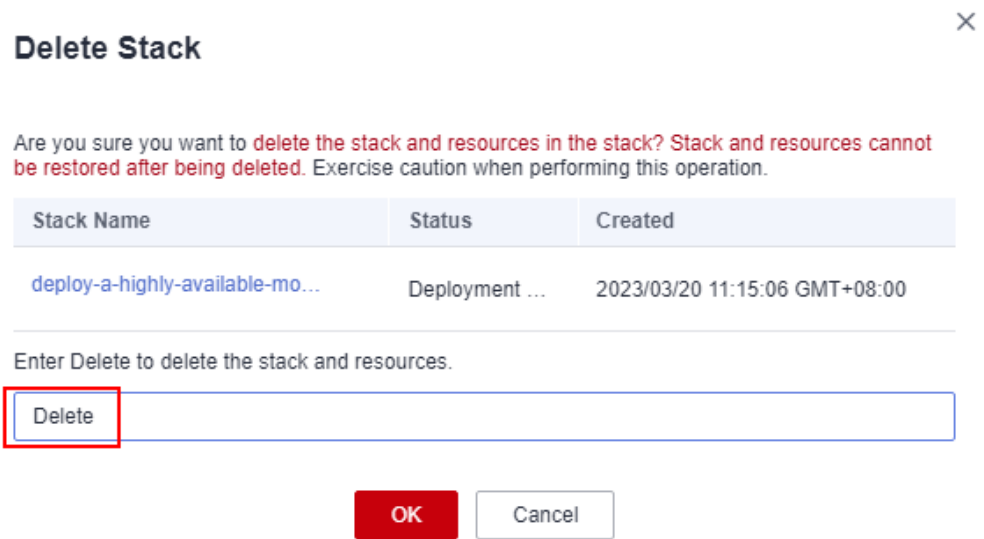
Step 1 Click **Delete** in the row where the solution stack is.

Figure 3-23 Uninstalling the solution



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

Figure 3-24 Confirming the uninstallation



----End

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.

5 Change History

Table 5-1 Change history

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