

Solution

Quickly Deploying a Highly Available Pulsar Cluster

Issue 1.0.0
Date 2024-06-27



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1 Solution Overview

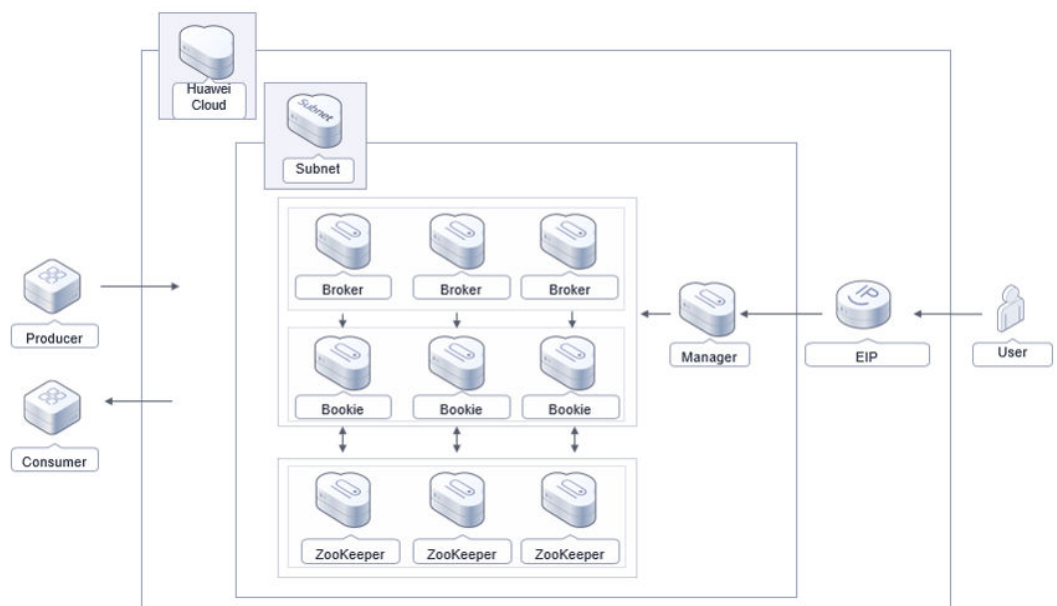
Application Scenarios

This solution helps you quickly deploy a highly available Pulsar cluster on Huawei Cloud based on Apache Pulsar. Apache Pulsar is the top-level, open-source project of the Apache Software Foundation. It is a next-generation cloud-native distributed message flow platform. It integrates messaging, storage, and lightweight functional computing. It uses decoupled storage and computing to support multi-tenancy, persistent storage, and multi-equipment room and cross-region data replication. Apache Pulsar features strong consistency, high throughput, low latency, and high scalability, and has other streaming data storage characteristics.

Solution Architecture

The following figure shows the solution architecture.

Figure 1 Solution architecture



To use this solution, you need to:

- Create ten **Elastic Cloud Servers (ECSs)** and use three of them to deploy three ZooKeeper nodes, three to deploy three bookie nodes, three to deploy three broker nodes, and the remaining one to create a manager node.
- Create an **Elastic IP (EIP)** and associate it with the manager node so that the manager node can be accessed from the public network.
- Create a **Virtual Private Cloud (VPC)** and a subnet for configuring the network of nodes.
- Create a security group to control network access to Pulsar nodes.

Advantages

- High availability and reliability

The solution uses cluster deployment, decoupled storage and computing, data redundancy, and strong data consistency. These features all help improve system reliability and ensure good performance.

- Open-source customizability

This solution and Pulsar are both open-source and free for commercial use. You can even use the source code for secondary development.

- Easy deployment

This solution helps you easily deploy a Pulsar cluster using ECSs and install Pulsar Manager, a web-based GUI management and monitoring tool, to quickly use Distributed Message Service (DMS) on the cloud.

Constraints

- Before deploying this solution, sign up for a HUAWEI ID, enable Huawei Cloud services, and complete real-name authentication. Ensure that your account is not in arrears or frozen. If you select yearly/monthly billing, ensure that your account has sufficient balance. If you do not have sufficient balance, you can go to Billing Center to pay for the order manually.
- Before deploying this solution, ensure that your account has sufficient IAM permissions. For details, see **3.1 Preparations**.

2 Resource Planning and Costs

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 [Price Calculator](#).

Table 2-1 Resource planning and costs (pay-per-use)

Huawei Cloud Service	Configuration Example	Estimated Monthly Cost
ECS (Manager)	<ul style="list-style-type: none">• Region: AP-Singapore• Pay-per-use: \$0.11 USD/hour• Specifications: general computing-plus ECS c7n.large.2 2 vCPUs 4 GiB• Image: CentOS 7.9 64bit• System disk: general-purpose SSD 100 GB• Quantity: 1• Required duration: 720 hours	\$78.26 USD

Huawei Cloud Service	Configuration Example	Estimated Monthly Cost
ECS (ZooKeeper)	<ul style="list-style-type: none"> ● Region: AP-Singapore ● Pay-per-use: \$0.13 USD/hour ● Specifications: general computing-plus ECS c7n.large.4 2 vCPUs 8 GiB ● Image: CentOS 7.9 64bit ● System disk: general-purpose SSD 100 GB ● Quantity: 3 ● Required duration: 720 hours 	\$280.15 USD
ECS (Bookie)	<ul style="list-style-type: none"> ● Region: AP-Singapore ● Pay-per-use: \$0.20 USD/hour ● Specifications: general computing-plus ECS c7n.xlarge.2 4 vCPUs 8 GiB ● Image: CentOS 7.9 64bit ● System disk: general-purpose SSD 100 GB ● Quantity: 3 ● Required duration: 720 hours 	\$435.67 USD
ECS (Broker)	<ul style="list-style-type: none"> ● Region: AP-Singapore ● Pay-per-use: \$0.20 USD/hour ● Specifications: general computing-plus ECS c7n.xlarge.2 4 vCPUs 8 GiB ● Image: CentOS 7.9 64bit ● System disk: general-purpose SSD 100 GB ● Quantity: 3 ● Required duration: 720 hours 	\$435.67 USD

Huawei Cloud Service	Configuration Example	Estimated Monthly Cost
Elastic IP (EIP)	<ul style="list-style-type: none"> Region: AP-Singapore Pay-per-use: \$0.12 USD/GB/hour Routing type: dynamic BGP Billed by: traffic Bandwidth: 300 Mbit/s Quantity: 1 Required duration: 1 hour 	\$0.12 USD/GB/hour
Total	-	\$1229.75 USD + Public network traffic price (\$0.12 USD/GB/hour)

Table 2-2 Resource planning and costs (yearly/monthly)

Huawei Cloud Service	Configuration Example	Estimated Monthly Cost
ECS (Manager)	<ul style="list-style-type: none"> Region: AP-Singapore Specifications: general computing-plus ECS c7n.large.2 2 vCPUs 4 GiB Image: CentOS 7.9 64bit System disk: general-purpose SSD 100 GB Quantity: 1 	\$60.28 USD
ECS (ZooKeeper)	<ul style="list-style-type: none"> Region: AP-Singapore Specifications: general computing-plus ECS c7n.large.4 2 vCPUs 8 GiB Image: CentOS 7.9 64bit System disk: general-purpose SSD 100 GB Quantity: 3 	\$213.96 USD

Huawei Cloud Service	Configuration Example	Estimated Monthly Cost
ECS (Bookie)	<ul style="list-style-type: none"> ● Region: AP-Singapore ● Specifications: general computing-plus ECS c7n.xlarge.2 4 vCPUs 8 GiB ● Image: CentOS 7.9 64bit ● System disk: general-purpose SSD 100 GB ● Quantity: 3 	\$327.48 USD
ECS (Broker)	<ul style="list-style-type: none"> ● Region: AP-Singapore ● Specifications: general computing-plus ECS c7n.xlarge.2 4 vCPUs 8 GiB ● Image: CentOS 7.9 64bit ● System disk: general-purpose SSD 100 GB ● Quantity: 3 	\$327.48 USD
EIP	<ul style="list-style-type: none"> ● Region: AP-Singapore ● Pay-per-use: \$0.12 USD/GB/hour ● Routing type: dynamic BGP ● Billed by: traffic ● Bandwidth: 300 Mbit/s ● Quantity: 1 ● Required duration: 1 hour 	\$0.12 USD/GB/hour
Total	-	\$929.20 USD + Public network traffic price (\$0.12 USD/GB/hour)

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** Access the Huawei Cloud official website, log in to the [console](#), hover your mouse over the account name in the upper right corner, and choose **Identity and Access Management**.

Figure 3-1 Huawei Cloud console

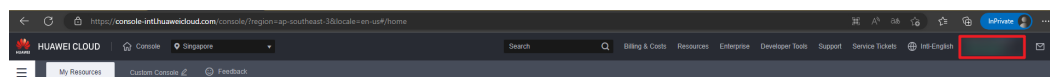
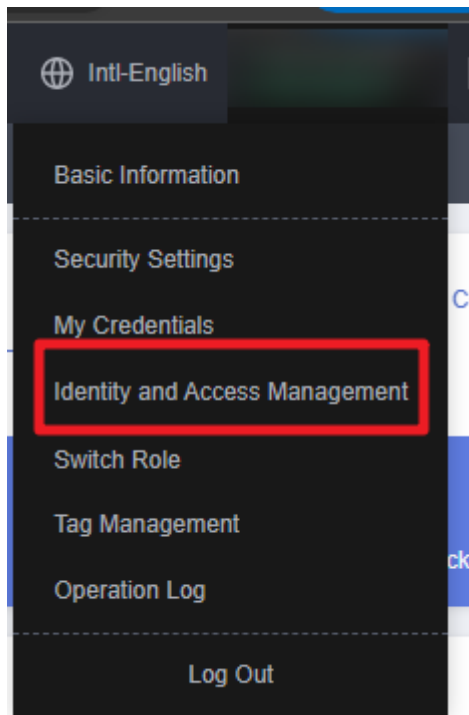
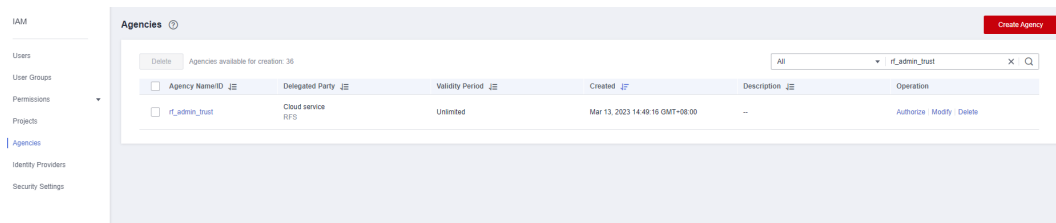


Figure 3-2 Identity and Access Management



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

Figure 3-3 Agency list



- If the agency is found, you can skip this section.
- 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, set **Agency Name** to **rf_admin_trust**, **Agency Type** to **Cloud service**, and **Cloud Service** to **RFS**, and click **Next**.

Figure 3-4 Creating an 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

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

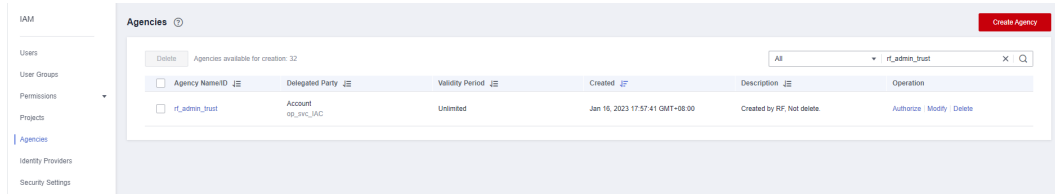
i The following are recommended scopes for the permissions you selected. Select the desired scope requiring minimum authorization.

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 Agency list



----End

3.2 Quick Deployment

This section describes how to quickly deploy this solution.

Table 3-1 Parameter description

Parameter Name	Type	Mandatory	Description	Default Value
enterprise_project_id	string	Yes	Enterprise project ID. Visit https://console/intl.huaweicloud.com/eps/ to find the ID. 0 indicates the default enterprise project. Value range: 0 or a string of characters in UUID format	0
vpc_name	string	Yes	Virtual Private Cloud (VPC) name. It must be unique. It can contain 1 to 64 characters. Only letters, digits, underscores (_), hyphens (-), and periods (.) are allowed.	vpc-pulsar-cluster
security_group_name	string	Yes	Security group name. For details about how to modify security group rules, see (Optional) Modifying Security Group Rules . The value can contain 1 to 64 characters. Only letters, digits, underscores (_), hyphens (-), and periods (.) are allowed.	sg-pulsar-cluster

Parameter Name	Type	Mandatory	Description	Default Value
ecs_name	string	Yes	Prefix of the ECS name. It must be unique. The naming rules are {ecs_name}-zookeeper-0X, {ecs_name}-bookie-0X, {ecs_name}-broker-0X, and {ecs_name}-manager. X is an integer from 1 to 3. The value can contain 1 to 51 characters. Only letters, digits, underscores (_), hyphens (-), and periods (.) are allowed.	pulsar-cluster
ecs_password	string	Yes	Initial ECS password. After a Pulsar cluster is created and deployed, 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 . It can contain 8 to 26 characters and must include at least three of the following character types: uppercase letters, lowercase letters, digits, and special characters (!@\$%^_-=+[]{};./?). The password cannot contain the username or the username spelled backwards. The administrator username is root .	None
pulsar_manager_flavor	string	Yes	ECS flavor of the manager node. You are advised to use an ECS with at least 2 vCPUs and 4 GB of memory. For more flavors, see A Summary List of x86 ECS Specifications .	c7n.large.2
pulsar_zookeeper_flavor	string	Yes	ECS flavor of the ZooKeeper node. You are advised to use an ECS with at least 2 vCPUs and 8 GB of memory. For more flavors, see A Summary List of x86 ECS Specifications .	c7n.large.4
pulsar_zookeeper_ecs_count	number	Yes	Number of ECSs running the ZooKeeper nodes. The value is an integer between 0 and 10.	3

Parameter Name	Type	Mandatory	Description	Default Value
pulsar_bookie_broker_flavor	string	Yes	ECS flavor of bookie and broker nodes. You are advised to use an ECS with at least 4 vCPUs and 8 GB of memory. For more flavors, see A Summary List of x86 ECS Specifications .	c7n.xlarge.2
pulsar_bookie_ecs_count	number	Yes	Number of ECSs running the bookie nodes. The value is an integer between 0 and 10.	3
pulsar_broker_ecs_count	number	Yes	Number of ECSs running the broker nodes. The value must be an integer between 0 and 10.	3
ecs_disk_size	number	Yes	System disk size of components, in GB. The default disk type is general-purpose SSD. The disk size cannot be decreased. Value range: 40 to 1,024	100
charge_mode	string	Yes	Billing mode. The value can be postPaid (for pay-per-use) or prePaid (for yearly/monthly). Billing is automatic by default.	postPaid
charge_period_unit	string	Yes	Type of an ECS subscription term. This parameter is valid only when charge_mode is set to prePaid (yearly/monthly). The value can be month or year .	month
charge_period	string	Yes	Subscription term. This parameter is valid only when charge_mode is set to prePaid (yearly/monthly). If charge_period_unit is set to month , the value range is 1 to 9. If charge_period_unit is set to year , the value range is 1 to 3.	1

Step 1 Access [Huawei Cloud Quick-Start Guides](#) and choose **Quickly Deploying a Highly Available Pulsar Cluster**. Select your desired region from the **Data Center** drop-down list and then click **Deploy**.

Figure 3-8 Selecting a solution

Solution Architecture
Deploy a highly available Pulsar cluster based on Huawei Cloud ECSs. By default, there are three ZooKeeper nodes, three BookKeeper nodes, three broker nodes, and one manager node.

The diagram shows a cloud architecture with a Huawei Cloud icon, a Subnet, three Broker nodes, three ZooKeeper nodes, and a Manager node. It also includes Producer and Consumer components connected to the Brokers. A Stack ID (RFS) and a User icon are also shown.

Quickly Deploying a Highly Available Pulsar Cluster
Version: 1.0.0
Last Updated: June 2024
Built By: Huawei Cloud
Time Required for Deployment: About 20 minutes
Time Required for Uninstallation: About 5 minutes

Estimated Cost
[View Source Code](#)

Data Center: AP-Singapore, AP-Singapore, CN-Hong Kong

[View Depts](#)

[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: <https://documentation-samples-4.obs.ap-southeast-2>

[Next](#)

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

Figure 3-10 Configuring parameters

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

Stack Name: building-an-ha-pulsar-cluster
Description: Quickly Deploying a Highly Available Pulsar Cluster

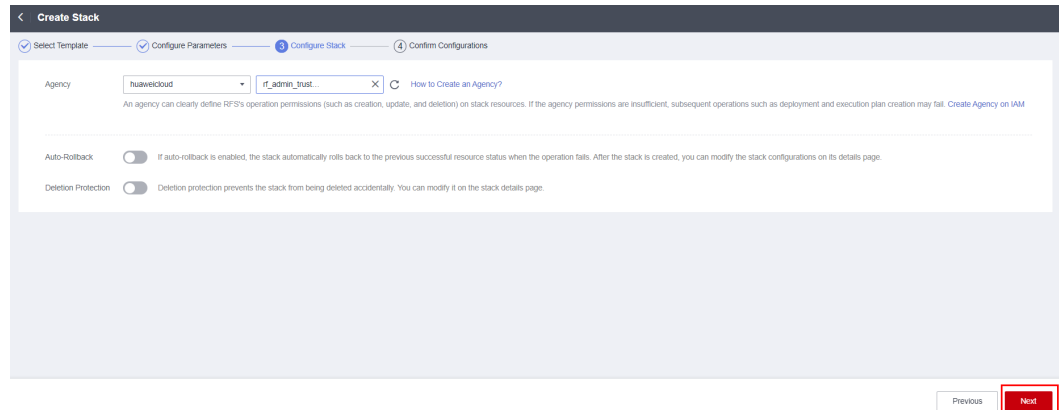
Configure Parameters

Parameter	Value	Type	Description
enterprise_project_id	0	string	Enterprise project ID. Visit https://console/entry/huaweicloud/com/eps/ and refer to the deployment guide to find the ID. 0 (the default value) indicates the def...
vpc_name	vpc-pulsar-cluster	string	Virtual Private Cloud (VPC) name. This template uses a newly created VPC and the VPC name must be unique. The value can contain 1 to 64 character...
security_group_name	sg-pulsar-cluster	string	Security group name. This template uses a newly created security group. For details about how to set security group rules, see the deployment guide. The...
ecs_name	pulsar-cluster	string	Prefix of the Elastic Cloud Server (ECS) name, which must be unique. The naming rules are {ecs_name}-zookeeper-0X, {ecs_name}-bookie-0X, {ecs_na...
ecs_password		string	Initial password of ECSs. After the Pulsar cluster is created, refer to the deployment guide and log in to the ECS console to change the password. It must...

[Previous](#) [Next](#)

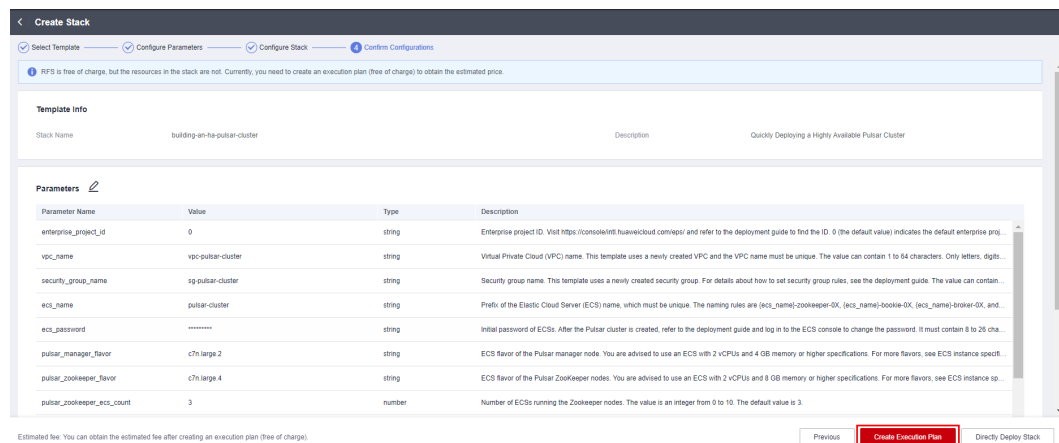
Step 4 On the **Configure Stack** page, select **rf_admin_trust** from the **Agency** drop-down list and click **Next**. This step is optional if you use an account (HUAWEI ID) or use an IAM user in the **admin** user group.

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 dialog box, enter an execution plan name and click **OK**.

Figure 3-13 Creating an execution plan

Create Execution Plan ✕

i To preview your resource billing information, you can create an execution plan.

★ Execution Plan Name

Description 0/255

OK Cancel

Step 7 Click **Deploy** in the **Operation** column. In the displayed dialog box, click **Execute**.

Figure 3-14 An execution plan created

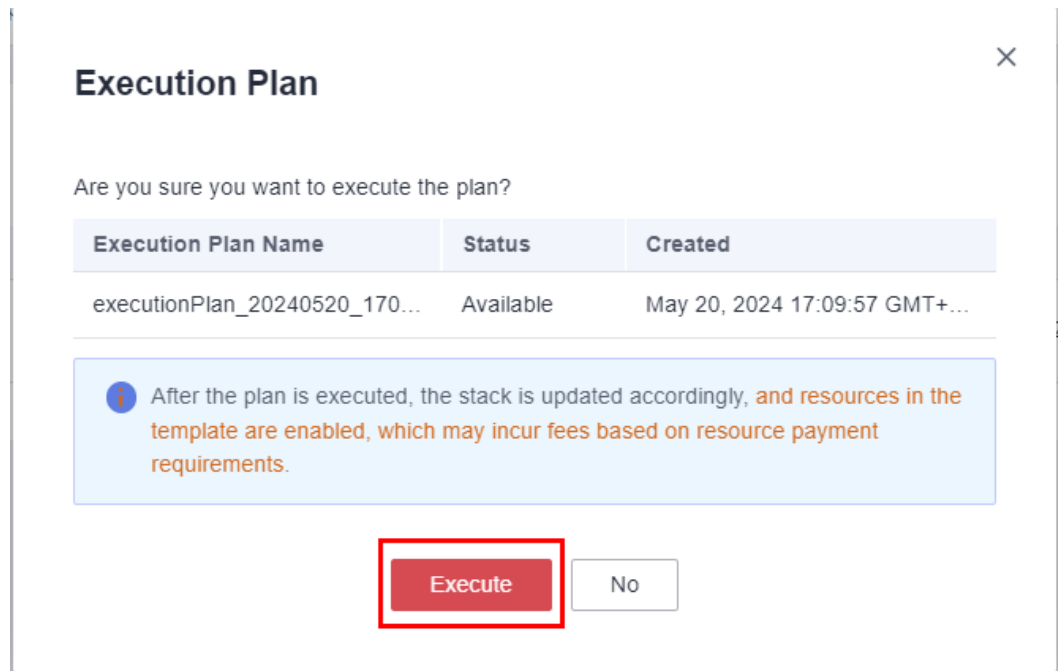
< building-an-ha-pulsar-cluster Delete Update Template/Parameter C

Basic Information Resources Outputs Events Template Execution Plans

Deploy Q

Execution Plan Name/ID	Status	Estimated Price	Created	Description	Operation
executionPlan_20240520_1709_rwlp 85c145d2-14b3-42db-bd85-6065650c87c	Available	View Details	May 20, 2024 17:09:57 GMT+08:00	--	Deploy Delete

Figure 3-15 Confirming the execution plan



Step 8 (Optional) If you select yearly/monthly billing and your account balance is insufficient, log in to the Billing Center to pay for the order manually. You can refer to [Table 2-2](#) to see the total price.

Step 9 Wait until the message **Apply required resource success** is displayed. It will take about 20 minutes for the environment to be deployed in the background.

Figure 3-16 Checking the deployment

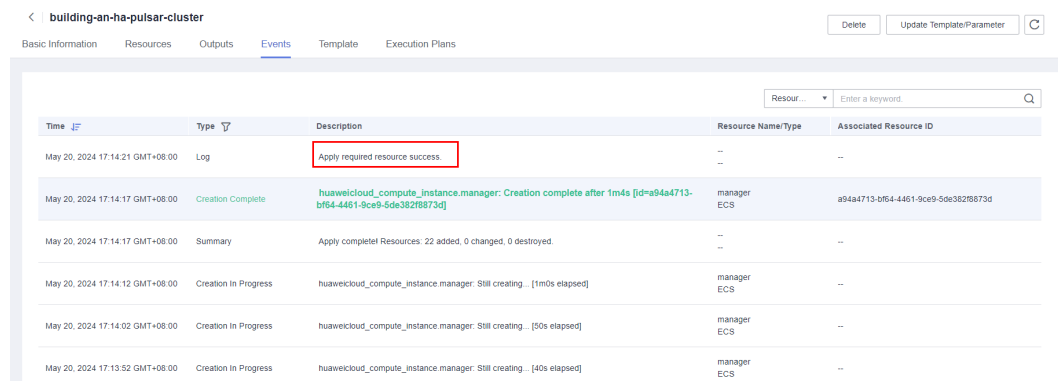
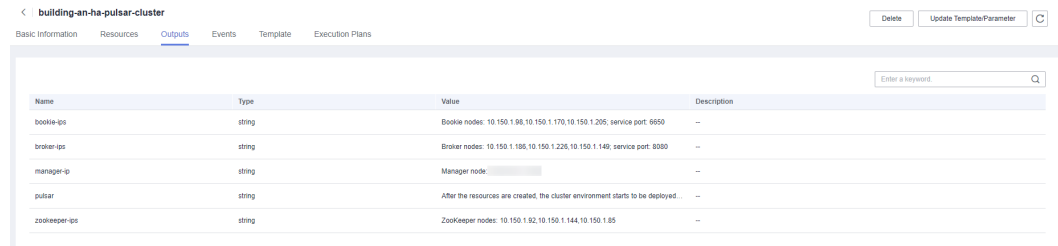


Figure 3-17 Final results



Name	Type	Value	Description
bookie-ips	string	Bookie nodes: 10.150.1.98,10.150.1.170,10.150.1.205; service port: 6650	--
broker-ips	string	Broker nodes: 10.150.1.186,10.150.1.226,10.150.1.149; service port: 8080	--
manager-ip	string	Manager node: [REDACTED]	--
pulsar	string	After the resources are created, the cluster environment starts to be deployed.	--
zookeeper-ips	string	ZooKeeper nodes: 10.150.1.92,10.150.1.144,10.150.1.85	--

----End

3.3 Getting Started

This section describes how to use Pulsar. For details, see [Pulsar Overview](#).

By default, all service ports involved in this solution are accessible within the same subnet. You can modify the security group rules if needed. The service ports are as follows:

- 9527 for the Pulsar manager node
- 2181, 2888, and 3888 for Pulsar ZooKeeper nodes
- 8000, 3181, 4181 for Pulsar bookie nodes
- 6650, 6651, 8080, 8443 for Pulsar broker nodes

NOTE

- By default, this solution uses Pulsar 3.1.0 and deploys Java JDK-21 and Pulsar Manager 0.4.0.
- A cluster named **pulsar-cluster** has been created in Pulsar by default.

(Optional) Modifying Security Group Rules

A security group is a collection of access control rules for 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 given VPC.

You can modify security group rules, 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 may introduce serious security risks. 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 needs to be disabled, you can [delete the security group rule](#).

Procedure

Step 1 Log in to the **ECS console** to check whether the ECSs have been successfully created and check the EIP of the manager node.

Figure 3-18 Checking ECSs and the EIP (marked as **Manager-ip**) of the Pulsar manager node

NameID	Monit...	Se...	Status	AZ	Specifications/Image	OS Type	Manager-ip	Billing Mode	Enterprise Pro...	Tag	Operation
pulsar-cluster-man...			Running	AZ1	2 vCPUs 4 GiB c7n.large.2 CentOS 7.9 64bit	Linux	10.150.1.138	Pay-per-use Created on May 20...	default		Remote Login More
pulsar-cluster-zoo...			Running	AZ1	2 vCPUs 8 GiB c7n.large.4 CentOS 7.9 64bit	Linux	10.150.1.177	Pay-per-use Created on May 20...	default		Remote Login More
pulsar-cluster-zoo...			Running	AZ1	4 vCPUs 8 GiB c7n.xlarge.2 CentOS 7.9 64bit	Linux	10.150.1.58	Pay-per-use Created on May 20...	default		Remote Login More
pulsar-cluster-brk...			Running	AZ1	4 vCPUs 8 GiB c7n.xlarge.2 CentOS 7.9 64bit	Linux	10.150.1.110	Pay-per-use Created on May 20...	default		Remote Login More
pulsar-cluster-zoo...			Running	AZ1	2 vCPUs 8 GiB c7n.large.4 CentOS 7.9 64bit	Linux	10.150.1.144	Pay-per-use Created on May 20...	default		Remote Login More
pulsar-cluster-zoo...			Running	AZ1	2 vCPUs 8 GiB c7n.large.4 CentOS 7.9 64bit	Linux	10.150.1.55	Pay-per-use Created on May 20...	default		Remote Login More
pulsar-cluster-zoo...			Running	AZ1	4 vCPUs 8 GiB c7n.xlarge.2 CentOS 7.9 64bit	Linux	10.150.1.123	Pay-per-use Created on May 20...	default		Remote Login More
pulsar-cluster-brk...			Running	AZ1	4 vCPUs 8 GiB c7n.xlarge.2 CentOS 7.9 64bit	Linux	10.150.1.239	Pay-per-use Created on May 20...	default		Remote Login More

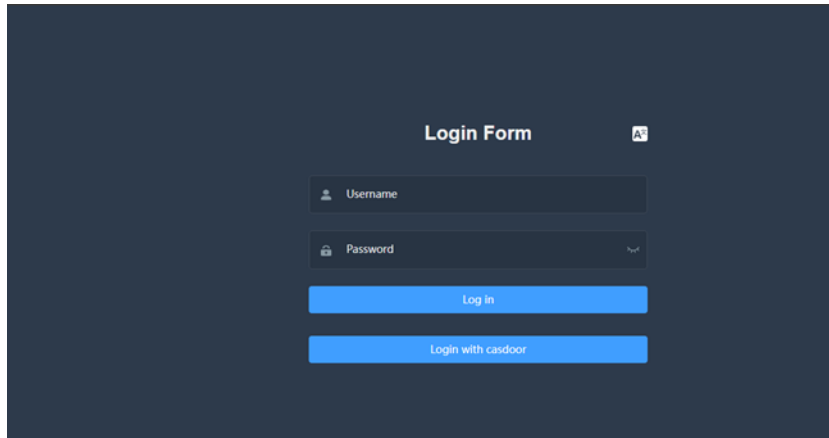
Step 2 Log in to the **Pulsar Manager**.

After ECSs are created, the environment starts to be deployed in the background. About 20 minutes later, the Pulsar cluster is created. Then, you can log in to the **Pulsar Manager** at <http://manager-ip:9527>.

CAUTION

- Before logging in, ensure that port 9527 has been enabled on the Pulsar manager node for the client. If it is not enabled, **modify security group rules**.
- By default, admin is configured as the administrative user of the Pulsar cluster, and JSON Web Token (JWT) authentication is enabled.
- The default username and password are used for login.
 - Default username: admin
 - Default password: password used for creating ECSs

Figure 3-19 Pulsar Manager login page



Step 3 (Optional) Check whether the Pulsar cluster has been deployed.

Figure 3-20 Logging in to any ZooKeeper node and connecting to the ZooKeeper server

```
WATCHER::
WatchedEvent state:Closed type:None path:null
2023-11-15T16:15:19.699+0800 [main] INFO org.apache.zookeeper.ZooKeeper - Session: 0x10000085d46000b closed
2023-11-15T16:15:19.699+0800 [main-EventThread] INFO org.apache.zookeeper.client.txn - EventThread shut down for session: 0x10000085d46000b
2023-11-15T16:15:19.701+0800 [main] INFO org.apache.zookeeper.util.ServiceUtils - Exiting JVM with code 0
[root@pulsar-cluster-zookeeper zookeeper]# pwd
/usr/local/pulsar/zookeeper
[root@pulsar-cluster-zookeeper zookeeper]# ./bin/pulsar zookeeper-shell
Connecting to localhost:2181
2023-11-15T16:17:18.434+0800 [main] INFO org.apache.zookeeper.ZooKeeper - Client environment:zookeeper.version=3.8.1-74db005175a4ec545697012f9069cb9dccc8dda7, built on 2023-01-25
2023-11-15T16:17:18.439+0800 [main] INFO org.apache.zookeeper.ZooKeeper - Client environment:host.name=localhost
2023-11-15T16:17:18.439+0800 [main] INFO org.apache.zookeeper.ZooKeeper - Client environment:java.version=21
2023-11-15T16:17:18.439+0800 [main] INFO org.apache.zookeeper.ZooKeeper - Client environment:java.vendor=Oracle Corporation
2023-11-15T16:17:18.439+0800 [main] INFO org.apache.zookeeper.ZooKeeper - Client environment:java.home=/usr/local/java/jdk-21
```

Figure 3-21 Checking whether the active ZooKeeper node is the same as the existing ZooKeeper node

```
Invalid path string /zookeeper/quota/zookeeper_limits cause
[zk: localhost:2181(CONNECTED) 33] get /zookeeper/config
server.1=10.150.1.7:2888:3888:participant
server.2=10.150.1.216:2888:3888:participant
server.3=10.150.1.175:2888:3888:participant
version=0
[zk: localhost:2181(CONNECTED) 34]
```

Figure 3-22 Checking whether the active bookie node is the same as the existing bookie node

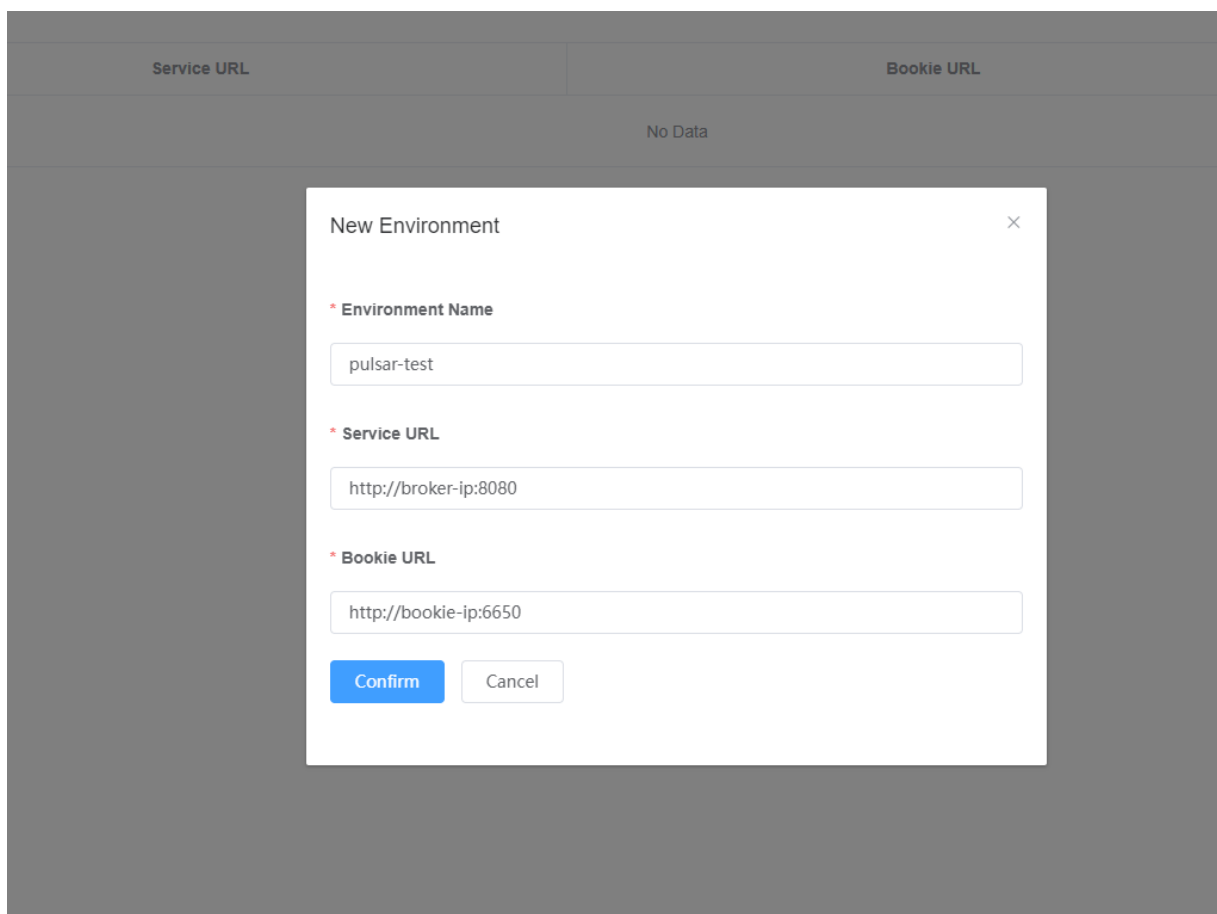
```
[zk: localhost:2181(CONNECTED) 19] ls /ledgers/available
[10.150.1.215:3181, 10.150.1.220:3181, 10.150.1.60:3181, readonly]
[zk: localhost:2181(CONNECTED) 20] ls /loadbalance/
```

Figure 3-23 Checking whether the active broker node is the same as the existing broker node

```
[broker-time-average, brokers, leader]  
[zk: localhost:2181(CONNECTED) 22] ls /loadbalance/brokers  
[10.150.1.10:8080, 10.150.1.117:8080, 10.150.1.66:8080]  
[zk: localhost:2181(CONNECTED) 23]
```

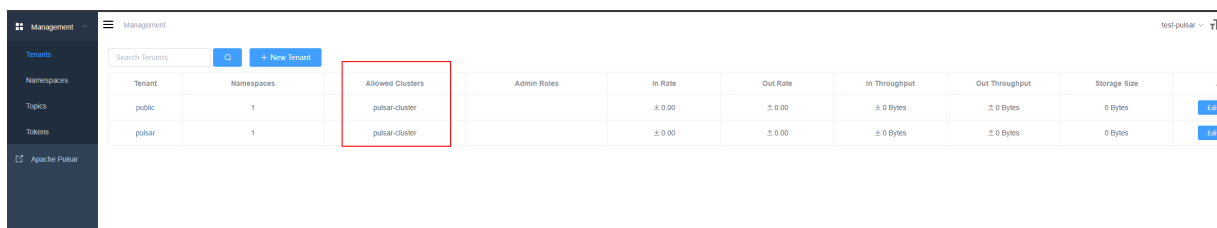
Step 4 Add the new environment to Pulsar Manager.

Figure 3-24 Adding the new environment with any broker or bookie node



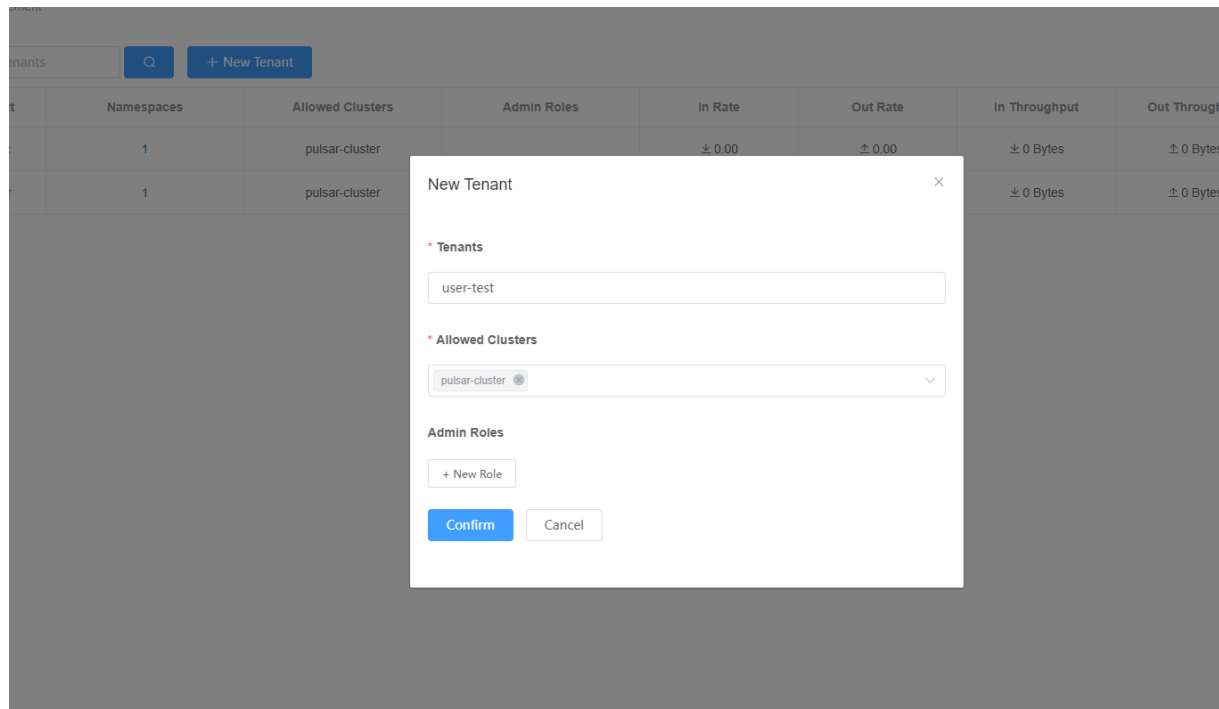
Step 5 View Pulsar details.

Figure 3-25 Viewing Pulsar details (built-in cluster name: pulsar-cluster)



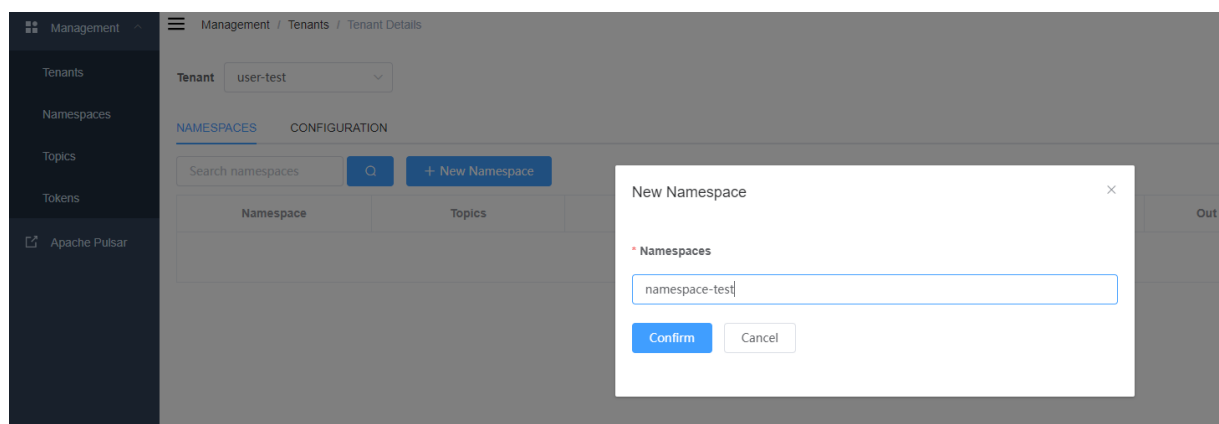
Step 6 Add a new tenant.

Figure 3-26 Adding a new tenant



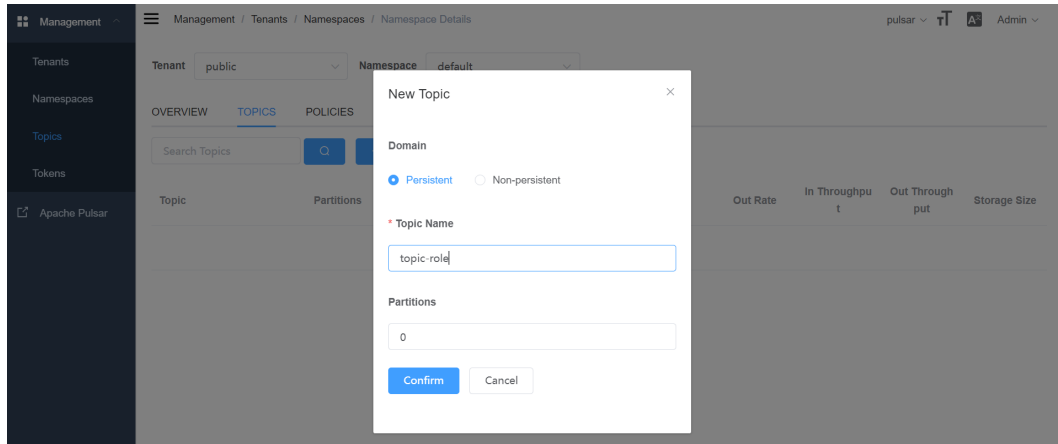
Step 7 Create a namespace.

Figure 3-27 Creating a namespace



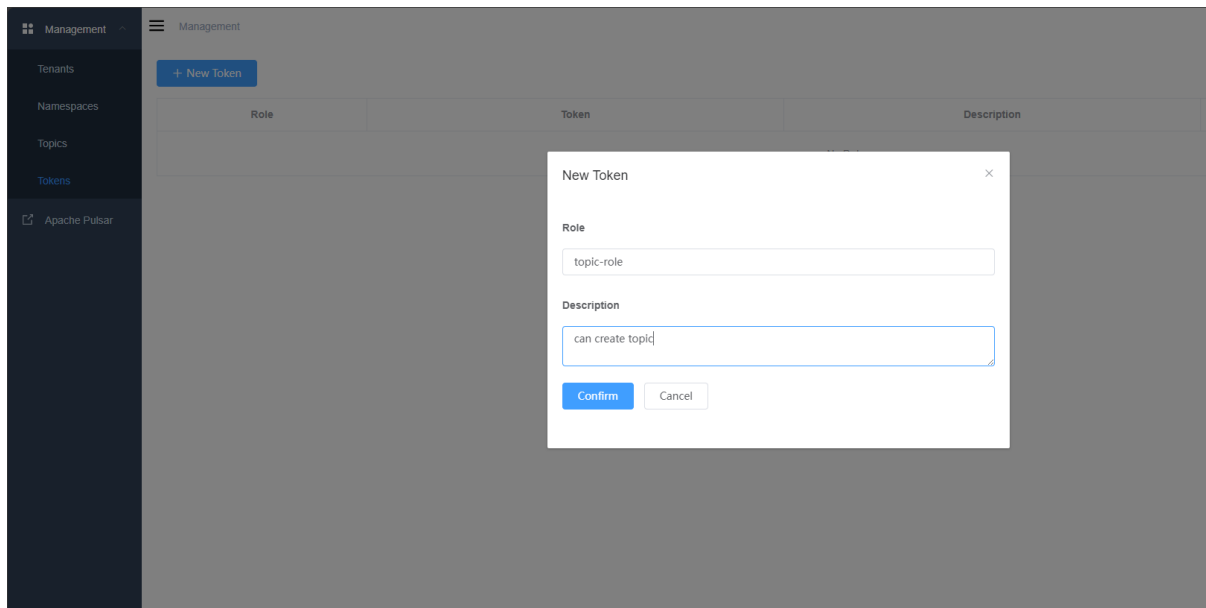
Step 8 Add a topic.

Figure 3-28 Adding a topic



Step 9 Generate a token.

Figure 3-29 Generating a token



The Pulsar cluster has been deployed. You can now integrate the Pulsar applications into your applications.

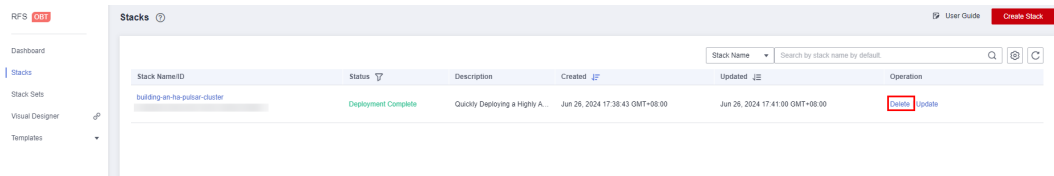
----End

3.4 Quick Uninstallation

Deleting a Stack

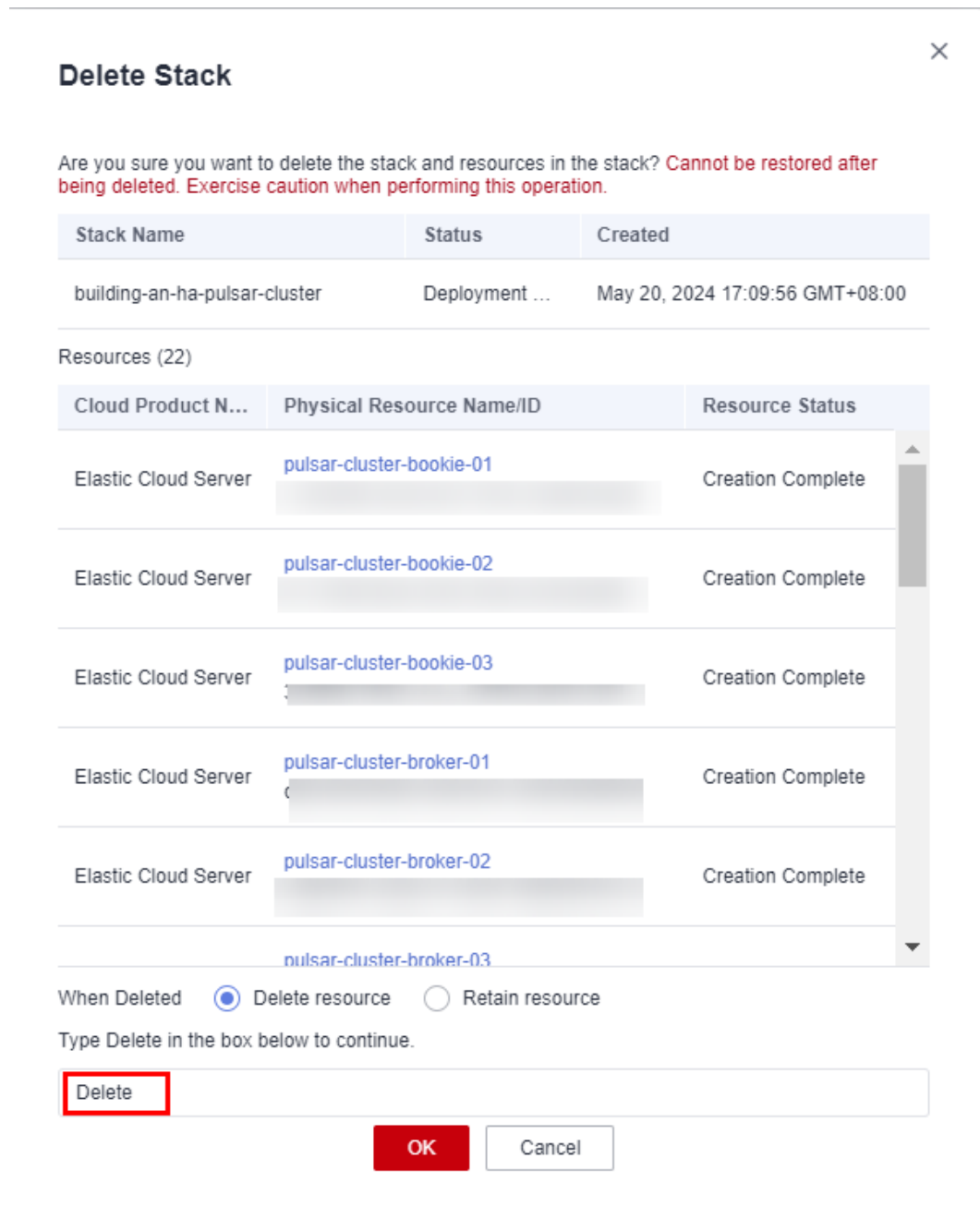
Step 1 Log in to the RFS console, locate the stack you created for the solution and click **Delete** in the **Operation** column.

Figure 3-30 Deleting a stack



Step 2 In the displayed dialog box, type "Delete" and click **OK**.

Figure 3-31 Confirming the deletion



----End

4 Appendix

Concepts, cloud service introduction, and terms:

- **Elastic IP (EIP)**: EIP enables your cloud resources to communicate with the Internet using static public IP addresses and scalable bandwidth.
- **Virtual Private Cloud (VPC)**: VPC enables you to provision logically isolated virtual private networks for cloud resources, such as cloud servers, containers, and databases. You can create custom subnets, security groups, network ACLs, route tables, and assign EIPs and bandwidths.
- **Elastic Cloud Server (ECS)**: An ECS is a basic computing unit that consists of vCPUs, memory, OS, and Elastic Volume Service (EVS) disks. After an ECS is created, you can use it just like a local computer or physical server.

5 Change History

Table 5-1 Change history

Released On	Description
2023-11-30	This issue is the first official release.