Data Replication Service

Best Practices

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HUAWEI CLOUD COMPUTING TECHNOLOGIES CO., LTD.

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Huawei Cloud Computing Technologies Co., Ltd.

Address: Huawei Cloud Data Center Jiaoxinggong Road Qianzhong Avenue Gui'an New District Gui Zhou 550029 People's Republic of China

Website: https://www.huaweicloud.com/intl/en-us/

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This document describes how to use Data Replication Service (DRS) to quickly migrate or synchronize databases in typical application scenarios.

| Function | Source DB Type | Destination DB | Cases |
|---------------------------|---|---|--|
| Real- Time Migratio | MySQL databases on other clouds | Huawei Cloud RDS for MySQL instances | Migrating MySQL Databases from Other Clouds to RDS for MySQL |
| n | | Huawei Cloud GaussDB(for MySQL) instances | From Other Cloud MySQL to GaussDB(for MySQL) |
| | MongoDB databases on other clouds | Huawei Cloud DDS instances | From Other Cloud MongoDB to DDS |
| | On-premises MySQL databases | Huawei Cloud RDS for MySQL instances | From ECS-hosted MySQL to RDS for MySQL |
| | MySQL databases on ECSs | Huawei Cloud GaussDB(for MySQL) instances | From ECS-hosted MySQL to GaussDB(for MySQL) |
| | MongoDB databases on ECSs | Huawei Cloud DDS instances | From ECS-hosted MongoDB to DDS |
| | On-premises MySQL databases | Huawei Cloud RDS for MySQL instances | From On-Premises MySQL to RDS for MySQL |
| | On-premises MongoDB databases | Huawei Cloud DDS instances | From On-Premises MongoDB to DDS |

Table 1-1 DRS best practices

| Function | Source DB Type | Destination DB | Cases |
|---------------------------|--|---|---|
| | RDS for MySQL instances | Distributed Database Middleware (DDM) instances | From RDS for MySQL to DDM |
| | MySQL schema and logic table | Distributed Database Middleware (DDM) instances | From MySQL Schema and Logic Table to DDM |
| Backup Migratio n | On-premises Microsoft SQL Server databases | Huawei Cloud RDS for SQL Server instances Migrating Microsoft SQL Server Backup Data to R SQL Server DB Instance | |
| Real- Time Synchron | PostgreSQL databases on other cloudsHuawei Cloud RDS for PostgreSQLFrom Other Cloud PostgreSQL to RDS for PostgreSQLPostgreSQLPostgreSQL | | From Other Cloud PostgreSQL to RDS for PostgreSQL |
| ization | PostgreSQL databases on ECSs | instances | From ECS-hosted PostgreSQL to RDS for PostgreSQL |
| | On-premises PostgreSQL databases | | From On-Premises PostgreSQL to RDS for PostgreSQL |
| | On-premises MySQL databases | Huawei Cloud distributed GaussDB instances | From On-premises MySQL to GaussDB Distributed |
| | On-premises Oracle databases | Huawei Cloud distributed GaussDB instances | From On-premises Oracle to GaussDB Distributed |
| | | Huawei Cloud primary/standby GaussDB instances | From On-premises Oracle to GaussDB Primary/Standby |
| | | Distributed Database Middleware (DDM) instances | From On-Premises Oracle to DDM |
| | Huawei Cloud RDS for MySQL instances | DMS for Kafka | From RDS for MySQL to Kafka |

| Function | Source DB Type | Destination DB | Cases |
|---------------------------------------|---|--|--|
| Real- Time Disaster Recovery | Huawei Cloud RDS for MySQL instances | Huawei Cloud RDS for MySQL instances | Configuring Remote Single- Active DR for an RDS for MySQL Instance Using DRS |

2 Real-Time Migration

2.1 Migrating MySQL Databases from Other Clouds to RDS for MySQL

2.1.1 Overview

Scenarios

This best practice includes the following tasks:

- Create an RDS for MySQL instance.
- Migrate data from a MySQL database on other clouds to RDS for MySQL.

Prerequisites

- You have registered with Huawei Cloud.
- Your account balance is at least \$0 USD.

Service List

- Virtual Private Cloud (VPC)
- RDS
- Data Replication Service (DRS)

Before You Start

- The resource planning in this best practice is for demonstration only. Adjust it as needed.
- All settings in this best practice are for reference only. For more information about MySQL migration, see **From MySQL to MySQL**.

2.1.2 Resource Planning

| Table 2 | -1 Resourc | e planning |
|---------|------------|------------|
|---------|------------|------------|

| Categor y | Subcatego ry | Planned Value | Description | |
|------------------------------|----------------------|-----------------------------------|---|--|
| VPC | VPC name | vpc-src-172 | Specify a name that is easy to identify. | |
| | Region | Test region | To achieve lower network latency, select the region nearest to you. | |
| | AZ | AZ3 | - | |
| | Subnet | 172.16.0.0/16 | Select a subnet with sufficient network resources. | |
| | Subnet name | subnet-src-172 | Specify a name that is easy to identify. | |
| MySQL on | Database version | MySQL 5.7 | - | |
| another cloud | IP address | 10.154.217.42 | Enter an IP address. | |
| | Port | 3306 | - | |
| RDS for MySQL instance | Instance name | rds-mysql | Specify a name that is easy to identify. | |
| | DB engine version | MySQL 5.7 | - | |
| | Instance type | Single | A single instance is used in this example. To improve service reliability, select a primary/ standby instance. | |
| | Storage type | Cloud SSD | - | |
| | AZ | AZ1 | AZ1 is selected in this example. To improve service reliability, select the primary/standby instance type and deploy the primary and standby instances in different AZs. | |
| | Instance class | General-purpose 2 vCPUs 8 GB | - | |
| DRS migratio n task | Task name | DRS-mysql | Specify a name that is easy to identify. | |

| Categor y | Subcatego ry | Planned Value | Description |
|--------------|------------------------------|----------------|---|
| | Source DB engine | MySQL | - |
| | Destinatio n DB engine | MySQL | - |
| | Network type | Public network | Public network is used in this example. |

2.1.3 Operation Process



Figure 2-1 Flowchart

2.1.4 Creating a VPC and Security Group

Create a VPC and security group for an RDS for MySQL instance

Creating a VPC

Step 1 Go to the **Create VPC** page.

| Step 2 | Configure | the basic | information, | subnet, | and IP | address. |
|--------|-----------|-----------|--------------|---------|--------|----------|
|--------|-----------|-----------|--------------|---------|--------|----------|

| Basic Information | |
|---|--|
| Region | Q v |
| | Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
| Name | vpc-DRStest |
| IPv4 CIDR Block | 10 · 10 · 0 · 0 / 24 • |
| | Recommended: 10.0.0.0/8-24 (Select) 172.16.0.0/12-24 (Select) 192.168.0.0/16-24 (Select) |
| Enterprise Project | default C Create Enterprise Project |
| Advanced Settings 💌 | Tag Description |
| Advanced Settings 👻 | Tag Description |
| Advanced Settings v Default Subnet | Tag Description subnet-drs01 |
| Advanced Settings 👻 Default Subnet Name IPv4 CIDR Block | Tag Description subnet-drs01 |
| Advanced Settings 👻 Default Subnet Name IPv4 CIDR Block | Tag Description subnet-drs01 |
| Advanced Settings 👻 Default Subnet Name IPV4 CIDR Block IPV6 CIDR Block | Tag Description subnet-drs01 |
| Advanced Settings 🔹 | Tag Description subnet-drs01 0 0 24 ② Available IP Addresses: 251 The CLOR block cannot be modified after the subnet has been created. Enable ③ Default ③ |

Step 3 Click Create Now.

Step 4 Return to the VPC list and check whether the VPC is created.

If the VPC status becomes available, the VPC has been created.

----End

Creating a Security Group

- **Step 1** Log in to the management console.
- **Step 2** Click in the upper left corner of the management console and select **CN-Hong Kong**.

Step 3 Under the service list, choose **Networking** > **Virtual Private Cloud**.

| NUANE | HUAWEI CLOUD Console | 2 | | | Search | Q | Billing Center | Resources | Service Tickets |
|--------------|-----------------------------|--|---------|-----------------------------------|-------------------------|---|----------------|-----------------|-----------------|
| ≡ | Service List > | Enter a service or function name. | | | Q | | | | × |
| ٨ | Elastic Cloud Server | Recently Visited Services: Relational Databa | ase Ser | vice Elastic Cloud Server | | | | | |
| ക | Relational Database Service | Compute | | Storage | Networking | | Databases | | 1 |
| <i>.</i> 00. | Auto Scaling | Elastic Cloud Server | ¥. | Elastic Volume Service | Virtual Private Cloud | | UGO | | I |
| | | Auto Scaling | ¥ – | Dedicated Distributed Storage Ser | Elastic Load Balance | | GaussDB | | |
| ۲ | Bare Metal Server | Image Management Service | | Storage Disaster Recovery Service | Virtual Private Network | | Relational D | itabase Service | |
| 0 | Elastic Volume Service | Dedicated Host | | Cloud Server Backup Service | Direct Connect | | Document D | atabase Service | I |
| ធា | Volume Backup Service | Cloud Container Engine | | Cloud Backup and Recovery | Enterprise Switch | | GaussDB(for | Cassandra) | I |
| <u> </u> | | Bare Metal Server | ¥. | Volume Backup Service | Domain Name Service | | GaussDB(for | Mongo) | I |
| Ø | Virtual Private Cloud | FunctionGraph | | Object Storage Service | NAT Gateway | | GaussDB(for | Influx) | I |
| 4 | Elastic Load Balance | Dedicated Cloud | | Data Express Service | Elastic IP | | GaussDB(for | Redis) | I |
| P | Flactic IP | | | Scalable File Service | Cloud Connect | | Distributed E | atabase Middlev | ware |
| 0 | Lustre in | Security & Compliance | | CDN | VPC Endpoint | | Data Replica | ion Service | I |

 \times

- **Step 4** In the navigation pane, choose **Access Control** > **Security Groups**.
- Step 5 Click Create Security Group.
- **Step 6** Configure parameters as needed.

| * Name | sg-DRS01 |
|----------------------|---|
| * Enterprise Project | default C Create Enterprise Project @ |
| * Template | General-purpose web server 💌 |
| Description | The security group is for general-purpose web servers and includes default rules that allow all inbound ICMP traffic and inbound traffic on ports 22, 80, 443, and 3389. The security group is used for remote login, ping, and hosting a website on ECSs. |
| | 0/255 |
| Show Default Rule | Ŧ |

- Step 7 Click OK.
- **Step 8** Return to the security group list and click the security group name (**sg-DRS01** in this example).
- **Step 9** Click the **Inbound Rules** tab, and then click **Add Rule**.

| Summary | Inbound Rules | Outbound R | ules Associ | iated Ins | stances | |
|----------|---------------|------------|--------------|-----------|------------------|------------|
| Add Rule | Fast-Add Rule | Delete | Allow Common | Ports | Inbound Rules: 9 | Learn more |

Step 10 Configure an inbound rule to allow access from database port 3306.



----End

2.1.5 Creating an RDS for MySQL Instance

Create an RDS for MySQL instance, and select the VPC and security group you configured for the instance.

- Step 1 Go to the Buy DB Instance page.
- **Step 2** Configure the instance name and basic information. Select **CN-Hong Kong** for **Region**.



Step 3 Configure instance specifications.

| Instance Class | General-purpose | | | |
|--------------------|---|---|------------------------------|---------------------------------|
| | vCPU Memory | Maximum Connections | TPS/QPS (?) | IPv6 |
| | O 2 vCPUs 4 GB | 1,500 | 334 6,673 | Not supported |
| | 2 vCPUs 8 GB | 2,500 | 552 11,039 | Not supported |
| | O 4 vCPUs 8 GB | 2,500 | 756 15,122 | Not supported |
| | ○ 4 vCPUs 16 GB | 5,000 | 1,062 21,249 | Not supported |
| | 0 8 vCPUs 16 GB | 5,000 | 1,338 26,756 | Not supported |
| | 0 8 vCPUs 32 GB | 10,000 | 2,117 42,335 | Not supported |
| | DB Instance Specifications General-purpose 2 | vCPUs 8 GB, Maximum Connections: 2500, TPS/QPS: 552 11039 | | |
| | 40 GB | | | |
| Storage Space (GB) | 40 800 | 1,550 2,300 4,000 | - 0 | |
| | RDS provides free backup storage space of the sar | me size as your purchased storage space. After the free backup space is use | d up, charges are applied ba | sed on the OBS pricing details. |
| Disk Encryption | Disable Enable | 0 | | |

Step 4 Select a VPC and security group for the instance and configure the database port.

The VPC and security group have been created in **Creating a VPC and Security Group**.

| | ⑦ Relationship among VPCs, subnets, security groups, and DB instances |
|------------------|---|
| VPC ⑦ | vpc-DRStest C subnet-drs01(10.0.0.0/24) C Automatically-assigned IP address View In-use IP Address |
| | After the RDS instance is created, the VPC cannot be changed. ECSs in different VPCs cannot communicate with each other by default. If you want to create a VPC, go to the VPC console. Available Private IP Addresses: 242 |
| Database Port | Default port: 3306 |
| | The database port of read replicas (if any) is the same as that of the primary DB instance. |
| Security Group 🕜 | sg-DRS01 C View Security Group |
| | Ensure that port 3306 of the security group allows traffic from your server IP address to the DB instance. |
| | Security Group Rules 🗸 Add Inbound Rule |

Step 5 Configure the password.

| Password | Configure | Skip | |
|------------------------|-----------|------|--------------------------------|
| Administrator | root | | |
| Administrator Password | ••••• | | Keep your password secure. The |
| Confirm Password | ••••• | | |

Step 6 Click Next.

Step 7 Confirm the settings.

- To modify your settings, click **Previous**.
- If you do not need to modify your settings, click **Submit**.

Step 8 Return to the instance list. If the instance status becomes available, the instance has been created.

----End

2.1.6 Configuring a MySQL Instance on Another Cloud

Prerequisites

- You have purchased a MySQL instance from another cloud vendor platform.
- Your account has the migration permissions listed in **Permission Requirements**.

Permission Requirements

Table 2-2 lists the permissions required for migrating data from a MySQL instance on another cloud to RDS for MySQL using DRS. For details about the permissions, see **Which MySQL Permissions Are Required for DRS?**

| Database | Full Migration Permission | Full+Incremental Migration Permission |
|----------------------------|---------------------------------|--|
| Source database (MySQL) | SELECT, SHOW VIEW, and EVENT | SELECT, SHOW VIEW, EVENT, LOCK TABLES, REPLICATION SLAVE, and REPLICATION CLIENT |

Table 2-2 Migration permissions

Network Configuration

You need to enable public accessibility for the source database.

Whitelist Settings

The EIP of the DRS replication instance must be on the whitelist of the source database for the connectivity between the DRS replication instance and the source database. To obtain the EIP of the DRS replication instance, see **Step 3** in **Creating a DRS Migration Task**. This method of configuring a whitelist varies depending on the cloud database vendors. For details, see their official documents.

2.1.7 Cloud Migration

2.1.7.1 Creating a DRS Migration Task

Creating a Migration Task

Step 1 Go to the **Create Migration Task** page.

Step 2 Configure parameters as needed.

1. Enter the migration task name. Select the region hosting the destination DB instance for **Region**.



 Configure the replication instance information.
 Select the RDS instance created in Creating an RDS for MySQL Instance as the destination database.



Step 3 Click Create Now.

It takes about 5 to 10 minutes to create a replication instance. After the replication instance is created, you can obtain its EIP.

O The replication instance is created. Its EIP is 122.9.214.142. Add this EIP to the source database whitelist so that it can access the source database.

Step 4 Configure the source and destination database information.

Source Database

| DRS migrates only some key parameters to | o the destination database. For the other parameters that o | annot be migrated, you need to use parameter templates to configure them on the destination database. |
|--|---|---|
| IP Address or Domain Name | | |
| Port | | |
| Database Username | root | |
| Database Password | ······ @ | |
| SSL Connection | | |
| | Test Connection | |
| | | |
| Destination Database | | |
| DB Instance Name | rds-bff6 (192.168.0.17) | |
| Database Username | root | |
| Database Password | ······ @ | |
| Migrate Definer to User | ● Yes ⑦ ○ No ⑦ | |
| | Test Connection Ø Test successful | |

Step 5 Click Next.

- **Step 6** On the **Set Task** page, configure parameters as required.
 - Set Flow Control to No.
 - Set Migration Object to All.
- **Step 7** Click **Next**. On the **Check Task** page, check the migration task.
 - If any check fails, review the cause and rectify the fault. After the fault is rectified, click **Check Again**.
 - If all check items are successful, click **Next**.
- **Step 8** Compare source and destination database parameters.
 - Click Next to skip the comparison if you do not want to compare the parameters.
 - Compare common parameters: If the parameter values in the list are inconsistent, click **Save Change** to change the destination database values to match those of the source database.
- **Step 9** Click **Submit** to submit the task.

Return to the **Online Migration Management** page and check the migration task status.

It takes several minutes to complete.

| Batch Op | view Abnormal Tasks | | All projects | • | All DB engines | ▼ All network |
|----------|-------------------------------|------------------------------|--------------|--------------|----------------|----------------|
| | Task Name/ID ↓Ξ | Status | Charging | Data Flow | DB Engine ↓Ξ | Migration Type |
| | 7e81bd7c-5423-44fc-b9d9-314ab | Starting | 🕲 No | To the cloud | MySQL | Full |

If the status changes to **Completed**, the migration task is complete.

----End

2.1.7.2 Checking Migration Results

You can use either of the following methods to check the migration results:

- 1. Use DRS to compare migration objects, users, and data of source and destination databases and obtain the migration results. For details, see **Checking the Migration Results on the DRS Console**.
- 2. Log in to the destination instance to check whether the databases, tables, and data are migrated. For details, see **Checking the Migration Results on the RDS Console**.

Checking the Migration Results on the DRS Console

- **Step 1** Log in to the management console.
- **Step 2** Click ^(Q) in the upper left corner and select your region.
- **Step 3** Under the service list, choose **Databases** > **Data Replication Service**.
- **Step 4** Click the DRS instance name.
- **Step 5** Click **Migration Comparison** in the navigation pane. Under the **Object-Level Comparison** tab, click **Compare** to check whether all objects have been migrated to the destination instance.
- **Step 6** Click the **Data-Level Comparison** tab. On the displayed page, click **Create Comparison Task** to check whether the databases and tables of the source and destination instances are the same.
- **Step 7** Click **Account-Level Comparison** and check whether the accounts and permissions of the source and destination instances are the same.

----End

Checking the Migration Results on the RDS Console

- **Step 1** Log in to the management console.
- **Step 2** Click ¹ in the upper left corner and select your region.
- **Step 3** Click the service list icon on the left and choose **Databases** > **Relational Database Service**.
- **Step 4** Locate the destination instance and click **Log In** in the **Operation** column.
- **Step 5** In the displayed dialog box, enter the password and click **Test Connection**.
- Step 6 After the connection test is successful, click Log In.
- **Step 7** Check whether the databases and tables of the source instance have been migrated.

----End

Performing a Performance Test

After the migration is complete, you can perform a performance test as required.

2.2 From Other Cloud MySQL to GaussDB(for MySQL)

2.2.1 Overview

Description

This section includes the following content:

- Create a GaussDB(for MySQL) instance.
- Migrate data from MySQL on other clouds to GaussDB(for MySQL).

Prerequisites

- You have registered with Huawei Cloud.
- Your account balance is greater than or equal to \$0 USD.

Deployment Architecture

In this example, the source is a MySQL database on other cloud platforms and the destination is a Huawei Cloud GaussDB(for MySQL) instance. Data is migrated from the source to the destination over a public network. For details about the deployment architecture, see **Figure 2-2**.

Figure 2-2 Deployment architecture



Service List

- Virtual Private Cloud (VPC)
- GaussDB(for MySQL)
- Data Replication Service (DRS)

Before You Start

- The resource planning in this best practice is for demonstration only. Adjust it as needed.
- All settings in this best practice are for reference only. For more information about MySQL migration, see From MySQL to GaussDB(for MySQL) Primary/ Standby.

2.2.2 Resource Planning

| Categor y | Subcatego ry | Plan | Description | |
|--------------------|----------------------|------------------------------|--|--|
| VPC | VPC name | vpc-DRStest | Specify a name that is easy to identify. | |
| | Region | AP-Singapore | To achieve lower network latency, select the region nearest to you. | |
| | AZ | AZ 1 | - | |
| | Subnet | 10.0.0/24 | Select a subnet with sufficient network resources. | |
| | Subnet name | subnet-drs01 | Specify a name that is easy to identify. | |
| Other cloud | DB engine version | MySQL 5.7 | - | |
| MySQL | IP address | 10.154.217.42 | Enter an IP address. | |
| | Port | 3306 | - | |
| GaussD B(for | Instance name | gauss-drstar | Specify a name that is easy to identify. | |
| MySQL) instance | DB engine version | MySQL 8.0 | - | |
| | AZ type | Single AZ | In this example, a single AZ is used. To improve service reliability, | |
| | ۸7 | ۸71 | Λ 71 is selected in this example | |
| | , | | To improve service reliability, deploy the instance across multiple AZs. | |
| | Instance class | Dedicated 4 vCPUs 16 GB | - | |

| Categor y | Subcatego ry | Plan | Description |
|-----------------|------------------------------|-----------------------|--|
| DRS migratio | Task name | DRS-test-migrate | Specify a name that is easy to identify. |
| n task | Source DB engine | MySQL | - |
| | Destinatio n DB engine | GaussDB(for MySQL) | - |
| | Network type | Public network | Public network is used in this example. |

2.2.3 Operation Process



Figure 2-3 Flowchart

2.2.4 Creating a VPC and Security Group

Create a VPC and security group for a GaussDB(for MySQL) instance.

Creating a VPC

- **Step 1** Log in to the **management console**.
- **Step 2** Click O in the upper left corner of the management console and select region AP-Singapore.
- **Step 3** Under the service list, choose **Networking** > **Virtual Private Cloud**.
- Step 4 Click Create VPC.

| Basic Information | |
|------------------------|---|
| Region | • |
| | Regions are geographic areas loolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
| Name | vpc-DRStest |
| IPv4 CIDR Block | |
| | Recommended: 10.0.0/8-24 (Select) 172.16.0.0/12-24 (Select) 192.168.0.0/16-24 (Select) |
| | The CDR block 10.0.0/24 overlaps with a CDR block of another VPC in the current region. If you intend to enable communication between VPCs or between a VPC and an on-premises data center, change the CDR block. View VPC CDR blocks in current region |
| Enterprise Project | default C Create Enterprise Project |
| Advanced Settings 🔻 | Tag Description |
| Default Subnet | |
| AZ | A21 • (?) |
| Name | subnet-drs01 |
| IPv4 CIDR Block | 10 · 0 · 0 / 24 · Ø Available IP Addresses: 251 |
| | The CIDR block cannot be modified after the subnet has been created. |
| IPv6 CIDR Block | 🗌 Enable 🔞 |
| Associated Route Table | Default 🕥 |
| Advanced Settings 💌 | Gateway DNS Server Address NTP Server Address DHCP Lease Time Tag Description |

- Step 5 Configure parameters as needed and click Create Now.
- **Step 6** Return to the VPC list and check whether the VPC is created.

If the VPC status becomes available, the VPC has been created.

----End

Creating a Security Group

- **Step 1** Log in to the **management console**.
- **Step 2** Click O in the upper left corner of the management console and select region AP-Singapore.
- **Step 3** Under the service list, choose **Networking** > **Virtual Private Cloud**.
- **Step 4** In the navigation pane, choose **Access Control** > **Security Groups**.
- Step 5 Click Create Security Group.
- **Step 6** Configure parameters as needed.

| * Name | sg-DRS01 |
|----------------------|---|
| ★ Enterprise Project | default C Create Enterprise Project |
| * Template | General-purpose web server 🔻 |
| Description | The security group is for general-purpose web servers and includes default rules that allow all inbound ICMP traffic and inbound traffic on ports 22, 80, 443, and 3389. The security group is used for remote login, ping, and hosting a website on ECSs. |
| | 0/255 |

- Step 7 Click OK.
- **Step 8** Return to the security group list and click the security group name (**sg-DRS01** in this example).
- Step 9 Click the Inbound Rules tab, and then click Add Rule.

| Summary | Inbound Rules | Outbound Rules Associated Instances |
|----------|---------------|-------------------------------------|
| | _ | - |
| Add Rule | Fast-Add Rule | Delete Allow Common Ports |

Step 10 Configure an inbound rule to allow access from database port 3306.

| Add Inbound Rule Learn more about security group configuration. Inbound rules allow incoming traffic to instances associated with the security group. | | | | | | |
|---|------------------------------------|---------------------|------------|---------------------------|-------------|-------------|
| ecurity Group s | g-DRS01 ultiple rules in a batc | h. | | | | |
| Priority 🕐 | Action | Protocol & Port (?) | Type | Source ⑦ | Description | Operation |
| 1-100 | Allow • | TCP • | IPv4 • | IP address • 0.0.0.0/0 | | Operation - |
| | | | 🕀 Add Rule | | | |
| | | | ОК | Cancel | | |

----End

2.2.5 Creating a GaussDB(for MySQL) Instance

This section describes how to create a Huawei Cloud GaussDB(for MySQL) instance.

- **Step 1** Log in to the **management console**.
- **Step 2** Click O in the upper left corner of the management console and select region AP-Singapore.

Step 3 Under the service list, choose **Databases** > **GaussDB(for MySQL)**.

- **Step 4** On the **Instances** page, click **Buy DB Instance**.
- **Step 5** Configure the instance name and basic information.

| Billing Mode | Vearly/Monthly Ray per use |
|-------------------|--|
| Region | Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
| DB Instance Name | gauss-distar |
| DB Engine | Gaum08(for MySQL) |
| DB Engine Version | Mj6QL8.0 |
| AZ Type | Single-AZ |
| AZ | a+ 44 a+ 46 a+ |
| Time Zone | UTC+08100 Beijing, Chongqing, Hong Kong • |

Step 6 Configure instance specifications.

| Instance Specifications | Dedicated General-purpose | |
|-------------------------|--|----------------------------------|
| CPU Architecture | x86 ⑦ | |
| | vCPUs Memory | Maximum Connections |
| | O 2 VCPUS 8 GB | 2,500 |
| | O 4 VCPUS 16 GB | 5,000 |
| | 8 vCPUs 32 GB | 10,000 |
| | O 16 vCPUs 64 G8 | 18,000 |
| | O 32 VCPUS 128 GB | 30,000 |
| | V vCPUs 32 GB (Sold Out) | 10,000 |
| | D8 Instance Specifications Dedicated x86 8 vCPUs 32 G8 | |
| Nodes | _ <u>2</u> + ⑦ | |
| Storage | Storage will be scaled up dynamically based on the amount of data that needs to be stored, and is billed hourly on a pay-per-use basis. | |
| DR Instance | Disabled Enabled | |
| Backup Space | GaussDB(for MySQL) provides free backup storage equal to the amount of your purchased storage space. After the free backup space is used u | p, you will be billed for the ad |

Step 7 Select a VPC and security group for the instance and configure the database port.

The VPC and security group have been created in **Creating a VPC and Security Group**.

| | Relationship among VPCs, subnets, security group | , and DB | Instances | | | |
|------------------|--|----------------|--|----------|--|--------------------------|
| VPC ⑦ | vpc-DRStest | C | subnet-drs01(10.0.0/24) * |] c | Automatically-assigned IP address | View In-use IP Address |
| | After the DB Instance is created, the VPC cannot b automatically assigned. Available IP addresses: 25 | e change I. | d. If you want to create a VPC, go to the VPC consol | e. If yo | u want to create DB Instances in batch | es, the IP addresses are |
| | Make sure that there are sufficient subnets and IP | addresse | 5. | | | |
| Security Group ③ | sg-DRS01 | c | View Security Group | | | |
| | Inbound: TCP/, 443, 3389, 22, 80; ICMP/ Outb | ound: | | | | |
| | In a security group, rules that authorize connection | ns to DB | instances apply to all DB instances associated with th | ne secu | rity group. | |
| | A The security group rule must allow access from | the 100 | 125.0.0/16 CIDR block. | | | |

Step 8 Configure the instance password.

| Administrator | root | |
|------------------------|------|--|
| Administrator Password | | Keep your password secure. The system cannot retrieve your password. |
| Confirm Password | |] |



Step 10 Return to the instance list. If the instance becomes **Available**, the instance has been created.

----End

2.2.6 Configuring a MySQL Instance on Other Clouds

Prerequisites

- You have purchased a MySQL instance on other platforms.
- The MySQL account has the migration permissions listed in Permission Requirements.

Permission Requirements

To migrate data from a MySQL database on other clouds to a GaussDB(for MySQL) instance, the following permissions are required.

| Tabl | e 2-4 | Required | permissions |
|------|-------|----------|-------------|
|------|-------|----------|-------------|

| Database | Full Migration Permission | Full+Incremental Migration Permission | |
|-------------------|---------------------------------|--|--|
| Source DB (MySQL) | SELECT, SHOW VIEW, and EVENT | SELECT, SHOW VIEW, EVENT, LOCK TABLES, REPLICATION SLAVE, and REPLICATION CLIENT | |

For details about MySQL authorization operations, see operation guide.

Network Configuration

Enable public accessibility for the source database. The method for enabling public accessibility depends on the cloud database vendor. For details, see the official documents of the corresponding cloud database vendor.

2.2.7 Creating a DRS Migration Task

This section describes how to create a DRS instance and migrate data from a MySQL database on other clouds to a GaussDB(for MySQL) instance.

Pre-migration Check

Before creating a migration task, check the migration conditions.

This section describes how to migrate data from a MySQL database to GaussDB(for MySQL). For details, see **Before You Start**.

Creating a Migration Task

- **Step 1** Log in to the **management console**.
- **Step 2** Click ^Q in the upper left corner of the management console and select region AP-Singapore.
- **Step 3** Under the service list, choose **Databases** > **Data Replication Service**.
- **Step 4** In the upper right corner, click **Create Migration Task**.
- **Step 5** Configure parameters as needed.
 - 1. Specify a migration task name.

| Region | Fegions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
|-------------|--|
| Project | The second se |
| ★ Task Name | DRS-7447 ⑦ |
| Description | 0 |
| | |
| | 0/256 |

2. Configure replication instance details as needed.

Select the GaussDB(for MySQL) instance created in **Creating a GaussDB(for MySQL) Instance** as the destination database.

| Replication Instance Details $ \odot $ | | | | |
|--|---|--|--|--|
| The following information cannot be no | offiel after you go to the next page. | | | |
| + Data Flow | To the cloud Out of the cloud Self-built to self-built | | | |
| | The destination database must be a database in the current cloud. If you want to migrate data between databases, select To the cloud. | | | |
| * Source DB Engine | My/QL My/SQL schema and logic table Microgo08 Fodis | | | |
| * Destination DB Engine | MgO2L DDM Countral (or MgO2L) | | | |
| * Network Type | Public network 🔹 🕐 | | | |
| | I understand that an EP will be automatically bound to the replication instance and released after the replication task is complete. | | | |
| + Destination DB Instance | Selicit an instance C View DB Instance View ViewEduble DB Instance | | | |
| Replication Instance Subnet | Select the submet | | | |
| * Migration Type | Full-incurrential Full | | | |
| | This migration type is suitable for scenarios where services can be interrupted. It migrates database objects and data, in a non-system database, to a destination database all at the same time. After the data migration is complete, the task automatically stops. | | | |
| * Destination DB Instance Access | Read-only Feed/Witte | | | |
| | During the migration, the distinction DB instance becomes read-only to ensure the integrity and soccess of data migration. When the task is complete, the DB instance becomes readable and writable. This process takes a few minutes. This option is recommended. | | | |

Step 6 Click Create Now.

It takes about 5 to 10 minutes to create a replication instance.

Step 7 Configure a whitelist for the source database to manage network access.

Add the EIP of the DRS replication instance to the whitelist of the source MySQL database to ensure that the source database can communicate with the DRS instance.

The method for configuring the whitelist depends on the cloud database vendor. For details, see the official documents of the corresponding cloud database vendor.

- **Step 8** Configure source and destination database information.
 - 1. Configure the source database information and click **Test Connection**. If a successful test message is returned, login to the destination is successful.

| Source Database | |
|--|---|
| System databases, users, parameters, a | d jobs will not be migrated. You need to manually import users and jobs to the destination database and configure parameters in parameter templates of the destination database |
| IP Address or Domain Name | |
| Port | 3306 |
| Database Username | root |
| Database Password | ····· & |
| SSL Connection | |
| | Test Connection Statistics |

2. Configure destination database information and click **Test Connection**. If a successful test message is returned, login to the destination is successful.

Destination Database

| DB Instance Name | gauss-drstar () | |
|-------------------------|------------------|---|
| Database Username | root | |
| | | |
| Database Password | ••••• | Ø |
| Migrate Definer to User | • Yes ⑦ | |
| | Test Connection | |

- Step 9 Click Next.
- **Step 10** On the **Set Task** page, select migration accounts and objects.
 - Select No for Migrate Account.
 - Select All for Migrate Object.
- **Step 11** Click **Next**. On the **Check Task** page, check the migration task.
 - If any check fails, review the cause and rectify the fault. After the fault is rectified, click **Check Again**.
 - If all check items are successful, click **Next**.
- Step 12 Click Submit.

Return to the **Online Migration Management** page and check the migration task status.

It takes several minutes to complete.

| Task Name/ID ↓Ξ | Status | Delay (?) | Charging | Data Flow | DB Engine ↓Ξ | Migration Type | Netwo | Operation |
|------------------------------------|--------|-----------|----------|--------------|----------------|----------------|--------|-----------|
| DRS-test-migrate 3634e419-9faf- | ↓ Star | | 🙆 No | To the cloud | MySQL-GaussDB(| Full | Public | Stop |

If the status changes to **Completed**, the migration task has been created.

- Currently, MySQL to GaussDB(for MySQL) migration supports two modes: full migration and full+incremental migration.
- If you create a full migration task, the task automatically stops after the full data is migrated to the destination.
- If you create a full+incremental migration task, a full migration is executed first. After the full migration is complete, an incremental migration starts.
- During the incremental migration, data is continuously migrated so the task will not automatically stop.

```
----End
```

2.2.8 Checking Migration Results

You can use either of the following methods to check the migration results:

- 1. DRS compares migration objects, users, and data and provide comparison results. For details, see **Checking the Migration Results on the DRS Console**.
- 2. Log in to the destination side to check whether the databases, tables, and data are migrated. Confirm the data migration status. For details, see **Checking the Migration Results on the GaussDB(for MySQL) Console**.

Checking the Migration Results on the DRS Console

- **Step 1** Log in to the management console.
- **Step 2** Click Singapore. Step 2 Click Singapore.
- **Step 3** Under the service list, choose **Databases** > **Data Replication Service**.
- **Step 4** Click the DRS instance name.
- **Step 5** Choose **Migration Comparison** and select **Object-Level Comparison** to check whether database objects are missing.
- **Step 6** Click **Data-Level Comparison** and check whether the number of rows of migrated objects is consistent.
- **Step 7** Click **Account-Level Comparison** and check whether the accounts and permissions of the source and destination instances are the same.

----End

Checking the Migration Results on the GaussDB(for MySQL) Console

- **Step 1** Log in to the management console.
- **Step 2** Click ^(Q) in the upper left corner of the management console and select region AP-Singapore.
- **Step 3** Under the service list, choose **Databases** > **GaussDB(for MySQL)**.
- **Step 4** On the **Instances** page, locate the destination instance, and click **Log In** in the **Operation** column.

 All poljects
 •)
 Sel Indiance name: •)
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 Sel

- **Step 5** In the dialog box that is displayed, enter the password and click **Test Connection**.
- Step 6 After the connection is successful, click Log In.
- **Step 7** Check whether the destination databases and tables are the same as the source instance. Check whether migration is complete.

----End

2.3 From Other Cloud MongoDB to DDS

DRS helps you migrate MongoDB databases from other cloud platforms to DDS on the current cloud. With DRS, you can migrate databases online with zero downtime and your services and databases can remain operational during migration.

This section describes how to use DRS to migrate MongoDB databases from another cloud to DDS on the current cloud. Migration scenarios include:

- Migrating MongoDB databases from another cloud to DDS on the current cloud.
- Migrating self-built MongoDB databases from servers on another cloud to DDS on the current cloud.

Diagram



Figure 2-4 Migrating MongoDB databases from other clouds



Figure 2-5 Migrating MongoDB databases from other cloud servers

Migration Process



Figure 2-6

Migration Suggestions (Important)

- Database migration is closely impacted by a wide range of environmental and operational factors. To ensure the migration goes smoothly, perform a test run before the actual migration to help you detect and resolve any potential issues in advance. Recommendations on how to minimize any potential impacts on your data base are provided in this section.
- It is strongly recommended that you start your migration task during off-peak hours. A less active database is easier to migrate successfully. If the data is fairly static, there is less likely to be any severe performance impacts during the migration.

Notes on Migration (Important)

NOTICE

Before creating a migration task, read the migration notes carefully.

For details, see **precautions** on using specific migration tasks in *Data Replication Service Real-Time Migration*.

Preparations

1. Permissions

Table 2-5 lists the permissions required for the source and destination databases when migrating a MongoDB database from another cloud to DDS on the current cloud.

| Database | Full Migration Permission | Full+Incremental Migration Permission | |
|-------------|--|---|--|
| Source | Replica set: The source database user must have the read permission for the database to be migrated. Single node: The source database user must have the read permission for the database to be migrated. Cluster: The source database user must have the read permission for the database sto be migrated and the config database. To migrate accounts and roles of the source database user must have the read permission for the database sto be migrated and the config database. To migrate accounts and roles of the source database user must have the read permission for the system.users and system.roles system tables of the admin database. | Replica set: The source database user must have the read permission for the databases to be migrated and the local database. Single node: The source database user must have the read permission for the databases to be migrated and the local database. Cluster: The source mongos node user must have the readAnyDatabase permission for the databases to be migrated and the config database. The source shard node user must have the readAnyDatabase permission for the admin database and the read permission for the source shard node user must have the readAnyDatabase permission for the source shard node user must have the read permission for the source shard node user must have the readAnyDatabase permission for the local database. To migrate accounts and roles of the source database user must have the read permission for the source database user must have the read permission for the local database. | |
| Destination | The destination database user must have the dbAdminAnyDatabase permission for the admin database and the readWrite permission for the destination database. If the destination database is a cluster instance, the migration account must have the read permission for the config database | | |

Table 2-5 Required permissions

- Source database permissions:

The source MongoDB database user must have all the required permissions listed in **Table 2-5**. If the permissions are insufficient, create a user that has all of the permissions on the source database.

- Destination database permissions:

If the destination database is a DDS database, the initial account can be used.

2. Network settings

Enable public accessibility for the source database.

- Source database network settings:

Any source database MongoDB instances will need to be accessible from the Internet.

- Destination database network settings: No settings are required.
- 3. Security rules
 - Source database security group settings:

The replication instance needs to be able to access the source MongoDB instance. That means that the EIP of the replication instance must be on the whitelist of the source MongoDB instance.

Before configuring the network whitelist, you need to obtain the EIP of the replication instance.

 After creating a replication instance on the DRS console, you can find the EIP on the Configure Source and Destination Databases page as shown in Figure 2-7.

Figure 2-7 EIP of the replication instance

You can also add 0.0.0/0 to the source database whitelist to allow any IP address to access the source database but this action may result in security risks.

If you do take this step, then once the migration is complete, you should delete this item from the whitelist or your system will insecure.

– Destination database security group settings:

By default, the destination database and the DRS replication instance are in the same VPC and can communicate with each other. No further configuration is required.

4. Other

You need to export the user information of the MongoDB database first and manually add it to the destination DDS DB instance because the user information will not be migrated.
Migration Procedure

Step 1 Create a migration task.

- Log in to the management console and choose Databases > Data Replication Service to go to the DRS console.
- 2. On the **Online Migration Management** page, click **Create Migration Task**.
- 3. On the **Replication Instance Information** page, configure the task details, description, and replication instance details and click **Next**.

| Replication Instance Details 💿 | | | | | |
|---|--|--|--|--|--|
| The following information cannot be modified after you go to the next page. | | | | | |
| * Data Flow | To the cloud Out of the cloud | | | | |
| | The destination database must be a database in the current cloud. If you want to migrate data between databases, select To the cloud. | | | | |
| * Source DB Engine | MySQL MySQL schema and logic table Mkorgs08 | | | | |
| * Destination DB Engine | Gauss08(for Mongo) DDG | | | | |
| * Network Type | Public network 🔹 🔹 | | | | |
| | V I understand that an EIP will be automatically bound to the replication instance and released after the replication task is complete. | | | | |
| * Destination DB Instance | ddo: C View DB Instance View Unnelectable DB Instance | | | | |
| Replication Instance Subnet | vpc- | | | | |
| * Migration Type | Full-Incremental Full | | | | |
| | This migration type allows you to migrate data with minimal downtime. After a full migration initializes the destination database, an incremental migration parses logs to ensure data consistency between the source and destination data | | | | |
| * Source DB Instance Type | Non-Cluster Cluster | | | | |
| * Obtain Incremental Data | colog drangeStream | | | | |
| | MongoDB 3.2 or later versions are supported. Incremental data is extracted from the source instance shard nodes. If you select this option, disable the balancer for the source instance, and specify the IP address of each shard node. | | | | |
| * Source Shard Quantity | - 2 + | | | | |
| * Destination DB Instance Access | Read-only Read/Write | | | | |
| | | | | | |

Figure 2-8 Replication instance information

Table 2-6 Task settings

| Parameter | Description | | | | | |
|-------------|--|--|--|--|--|--|
| Region | The region where the replication instance is deployed. You can change the region. To reduce latency and improve access speed, select the region closest to your workloads. | | | | | |
| Project | The project corresponds to the current region and can be changed. | | | | | |
| Task Name | The task name consists of 4 to 50 characters, starts with a letter, and can contain only letters (case-insensitive), digits, hyphens (-), and underscores (_). | | | | | |
| Description | The description consists of a maximum of 256 characters and cannot contain the following special characters: =<>&'\" | | | | | |

Table 2-7 Replication instance settings

| Parameter | Description |
|-----------|--------------|
| Data Flow | To the cloud |

| Parameter | Description |
|--------------------------------|--|
| Source DB Engine | Select MongoDB. |
| Destination DB Engine | Select DDS . |
| Network Type | Select Public network . |
| Destination DB Instance | The DDS DB instance you purchased. |
| Replication Instance Subnet | The subnet where the replication instance resides. You can also click View Subnet to go to the network console to view the subnet where the instance resides. |
| | By default, the DRS instance and the destination DB instance are in the same subnet. You need to select the subnet where the DRS instance resides, and there are available IP addresses for the subnet. To ensure that the replication instance is successfully created, only subnets with DHCP enabled are displayed. |
| Migration Type | - Full |
| | This migration type is suitable for scenarios where service interruption is acceptable. All objects in non- system databases are migrated to the destination database at one time. The objects include collections and indexes. |
| | - Full+Incremental |
| | The full+incremental migration type allows you to migrate data without interrupting services. After a full migration initializes the destination database, an incremental migration parses logs to ensure data consistency between the source and destination databases. |
| Source DB Instance Type | If you select Full+Incremental for Migration Type , set this parameter based on the source database. |
| | If the source database is a cluster instance, set this parameter to Cluster. |
| | If the source database is a replica set or a single node instance, set this parameter to Non-cluster. |

| Parameter | Description | | | | |
|-------------------------------|---|--|--|--|--|
| Obtain Incremental Data | This parameter is available for configuration if Source DB Instance Type is set to Cluster . You can determine how to capture data changes during the incremental synchronization. | | | | |
| | oplog: For MongoDB 3.2 or later, DRS directly connects to each shard of the source DB instance to extract data. If you select this mode, you must disable the balancer of the source instance. When testing the connection, you need to enter the connection information of each shard node of the source instance. | | | | |
| | changeStream: This method is recommended. For MongoDB 4.0 and later, DRS connects to mongos nodes of the source instance to extract data. If you select this method, you must enable the WiredTiger storage engine of the source instance. | | | | |
| | NOTE Only whitelisted users can use changeStream . To use this function, submit a service ticket. In the upper right corner of the management console, choose Service Tickets > Create Service Ticket to submit a service ticket. | | | | |
| Source Shard Quantity | If Source DB Instance Type is set to Cluster and Obtain Incremental Data is set to oplog , enter the number of source shard nodes. | | | | |
| | The default minimum number of source DB instances is 2 and the maximum number is 32. You can set this parameter based on the number of source database shards. | | | | |

4. On the **Configure Source and Destination Databases** page, wait until the replication instance is created. Then, specify source and destination database information and click **Test Connection** for both the source and destination databases to check whether they have been connected to the replication instance. After the connection tests are successful, select the check box before the agreement and click **Next**.

| Source Database | 2 | | | |
|-------------------------|--|-------------------------|----------|----------|
| mongos Address | | 0 | | |
| | Ensure that the entered addresses belong to the same | DB instance. | | |
| Authentication Database | | | | |
| mongos Username | | | | |
| mongos Password | | | | |
| SSL Connection | | | | |
| Sharded Database | IP Address or Domain Name | Authentication Database | Username | Password |
| | | | | |
| | | | | |
| | Test Connection STest successful | | | |

| | Parameter | Description |
|--|----------------------------|---|
| | mongos Address | IP address or domain name of the source database in the IP address/Domain name:Port format. The port of the source database. Range: 1 - 65534 |
| | | You can enter a maximum of three groups of IP addresses or domain names of the source database. Separate multiple values with commas (,). For example: 192.168.0.1:8080,192.168.0.2:8080. Ensure that the entered IP addresses or domain names belong to the same sharded cluster. |
| | | NOTE If multiple IP addresses or domain names are entered, the test connection is successful as long as one IP address or domain name is accessible. Therefore, you must ensure that the IP address or domain name is correct. |
| | Authentication Database | The name of the authentication database. For example: The default authentication database of Huawei Cloud DDS instance is admin . |
| | mongos Username | A username for the source database. |
| | mongos Password | The password for the source database username. |
| | SSL Connection | SSL encrypts the connections between the source and destination databases. If SSL is enabled, upload the SSL CA root certificate. |
| | Sharded Database | Enter the information about the sharded databases in the source database. |

Table 2-8 Source database settings

- Destination database configuration

Figure 2-10 Destination database information

| Destination Datab | ase |
|-------------------|------------------|
| DB Instance Name | dda-shard-wym-ta |
| Database Username | rwuser |
| Database Password | |
| | Test Connection |
| | |

| Parameter | Description |
|----------------------|--|
| DB Instance Name | The DB instance you selected when creating the migration task and cannot be changed. |
| Database Username | The username for accessing the destination database. |
| Database Password | The password for the database username. |

Table 2-9 Destination database settings

5. On the **Set Task** page, select migration objects and click **Next**.

Figure 2-11 Migration object

| Note: | Before the migration task is complete, you cannot change the usernames, passwords, and rights of any source database users. | | | | | | | |
|------------------|---|-----------------------------|----------|-----------------|-----------------------|----------|-------------------------------|---------|
| ★Migrate Account | Yes Confir | No m All Remarks | | | | | | С |
| | | Account | | Can Be Migrated | | Role | | Remarks |
| | | fastunit.testuser4 | | Yes | | fastunit | oletestő | |
| | ~ | fastunit.testuser3 | | Yes | | fastunit | oletest3,fastunit.roletest2,f | |
| | | fastunit.test8 | | Yes | | admin.cl | usterAdmin | |
| | \checkmark | fastunit.test1 | | Yes | | fastunit | ead | |
| | \checkmark | admin.testuser2 | | Yes | | admin.cl | usterAdmin | |
| | \checkmark | admin.test14 | | Yes | | fastunit | ead | |
| | | fastunit.test_inc_fastunit | | No | | admin.ro | ot,fastunit.read,admin.read | View |
| | | fastunit.test_full_fastunit | | No | | admin.rc | ot,fastunit.read,admin.read | View |
| | Role Infe | ormation | | | | | | |
| | | Role Name | Can Be | Migrated | Permission | | Inherited Role | Remarks |
| | | fastunit.roletest6 | Yes | | {"resource": {"db": ' | "fastu | fastunit.readWrite,fastuni | |
| | ~ | fastunit.roletest3 | Yes | | {"resource": {"db": ' | "fastu | fastunit.roletest2 | |
| | ~ | fastunit.roletest2 | Yes | | ("resource": ("db": " | "fastu | fastunit.roletest1 | |
| *Migrate Object | All | Tables Da | itabases | | | | | |

Table 2-10 Migration object

| Paramete r | Description |
|--------------------|--|
| Migrate Account | There are accounts that can be migrated completely and accounts that cannot be migrated. You can choose whether to migrate the accounts. Accounts that cannot be migrated or accounts that are not selected will not exist in the destination database. Ensure that your services will not be affected by these accounts. |
| | Yes If you choose to migrate accounts, see Migrating Accounts in Data Replication Service User Guide to migrate database users and roles. |
| | No During the migration, accounts and roles are not migrated. |

| Paramete r | Description |
|-------------------|---|
| Migrate Object | You can choose to migrate all objects, tables, or databases based on your service requirements. |
| | All: All objects in the source database are migrated to the destination database. After the migration, the object names will remain the same as those in the source database and cannot be modified. |
| | - Tables : The selected table-level objects will be migrated. |
| | Databases: The selected database-level objects will be migrated. |
| | If the source database is changed, click \bigcirc in the upper right corner before selecting migration objects to ensure that the objects to be selected are from the changed source database. |
| | NOTE |
| | If you choose not to migrate all of the databases, the migration may fail because the objects, such as stored procedures and views, in the database to be migrated may have dependencies on other objects that are not migrated. To ensure a successful migration, you are advised to migrate all of the databases. |
| | When you select an object, the spaces before and after the object name are not displayed. If there are two or more consecutive spaces in the middle of the object name, only one space is displayed. |
| | The search function can help you quickly select the required database objects. |

- 6. On the **Check Task** page, check the migration task.
 - If any check fails, review the cause and rectify the fault. After the fault is rectified, click **Check Again**.

For details about how to handle check failures, see **Checking Whether the Source Database Is Connected** in *Data Replication Service User Guide*.

- If all check items are successful, click **Next**.

Figure 2-12 Task Check

| Check Again | |
|--|---|
| Check success rate 100% All checks must pass before you can continue. If any check requires confirmation, | check and confirm the results before proceeding to the next step. |
| Check Item | Check Result |
| Destination database storage space | |
| Whether the destination database has sufficient storage space | Passed |
| Conflict | |
| Whether collections in both the source and destination databases are not capped | Passed |
| Whether the destination database contains a non-empty collection with the same name as that in the source database | Passed |
| Whether the same view names exist in both the source and destination databases | Passed |
| Object dependency | |
| Whether the source database referenced roles pass the check | Passed |
| Whether the source database referenced accounts pass the check | Passed |
| Database parameters | |
| Whether both the source and destination databases have enabled SSL | Passed |
| Whether the maximum number of chunks in the destination database is sufficient | Passed |
| Whether the maximum number of collections has been reached in the destination database | Passed |

NOTE

You can proceed to the next step only when all check items are successful. If any alarms are generated, view and confirm the alarm details first before proceeding to the next step.

7. On the displayed page, specify **Start Time**, **Send Notification**, **SMN Topic**, **Synchronization Delay Threshold**, and **Stop Abnormal Tasks After** and confirm that the configured information is correct and click **Submit** to submit the task.

Figure 2-13 Task startup settings

| Start Time | Start upon task creation | Start at a specified time | 0 |
|------------------------------------|--------------------------|------------------------------------|---|
| Send Notifications | ⑦ Please handle excep | tions within 48 hours of receiving | g SMS messages or emails. |
| * SMN Topic | | • C ? | |
| Synchronization Delay Threshold(s) | 0 | | |
| ★ Stop Abnormal Tasks After | 14 (?) Abn | ormal tasks run longer than the p | period you set (unit: day) will automatically stop. |

| Parameter | Description | |
|--|---|--|
| Start Time | Set Start Time to Start upon task creation or Start at a specified time based on site requirements. The Start at a specified time option is recommended. NOTE The migration task may affect the performance of the source and destination databases. You are advised to start the task in off-peak hours and reserve two to three days for data verification. | |
| Send Notification s | SMN topic. This parameter is optional. If an exception occurs during migration, the system will send a notification to the specified recipients. | |
| SMN Topic | This parameter is available only after you enable Send Notification and create a topic on the SMN console and add a subscriber. For details, see Simple Message Notification User Guide . | |
| Synchroniza tion Delay Threshold | During an incremental migration, a synchronization delay indicates a time difference (in seconds) of synchronization between the source and destination database. If the synchronization delay exceeds the threshold you specify, DRS will send alarms to the specified recipients. The value ranges from 0 to 3,600. To avoid repeated alarms caused by the fluctuation of delay, an alarm is sent only after the delay has exceeded the threshold for six minutes. NOTE In the early stages of an incremental migration, there is more delay because more data is waiting to be synchronized. In this situation, no notifications will be sent. Before setting the delay threshold, enable Send Notification. If the delay threshold is set to 0, no notifications will be sent to the recipient. | |
| Stop Abnormal Tasks After | Number of days after which an abnormal task is automatically stopped. The value must range from 14 to 100. The default value is 14 . NOTE Tasks in the abnormal state are still charged. If tasks remain in the abnormal state for a long time, they cannot be resumed. Abnormal tasks run longer than the period you set (unit: day) will automatically stop to avoid unnecessary fees. | |

Table 2-11 Task startup settings

8. After the task is submitted, go back to the **Online Migration Management** page to view the task status.

Step 2 Manage the migration task.

The migration task contains two phases: full migration and incremental migration. You can manage them in different phases.

• Full migration

- Viewing the migration progress: Click the target full migration task, and on the Migration Progress tab, you can see the migration progress of the structure, data, indexes, and migration objects. When the progress reaches 100%, the migration is complete.
- Viewing migration details: In the migration details, you can view the migration progress of a specific object. If the number of objects is the same as that of migrated objects, the migration is complete. You can view the migration progress of each object in detail. Currently, this function is available only to whitelisted users. You can submit a service ticket to apply for this function.
- Incremental Migration Permission
 - Viewing the synchronization delay: After the full migration is complete, an incremental migration starts. On the Online Migration Management page, click the target migration task. On the displayed page, click Migration Progress to view the synchronization delay of the incremental migration. If the synchronization delay is 0s, the destination database is being synchronized with the source database in real time. You can also view the data consistency on the Migration Comparison tab.

|--|

| Basic Information Migration Comparison Migration Progress Migration Logs | Note: Do not change the usernar synchronization or migration is cr Last Updated Jan 05, 2022 17:00 | nes, passwords, and permissions of source omplete, there may still be triggers or events 3:49 GMT+08:00 | and destination datal to be migrated befor | base users before the task has completed.Start the task and re the entire task is finished. | i get 7 days free. If the status indicates a |
|---|--|---|---|--|--|
| ταμο | Source Database | Full migration progress Structure migration Data migration Index migration | 100% 100% 100% | Waiting for incremental migration | Destination Database |

 Viewing the migration results: On the Online Migration Management page, click the target migration task. On the displayed page, click Migration Comparison and perform a migration comparison in accordance with the comparison process, which should help you determine an appropriate time for migration to minimize service downtime.

Figure 2-15 Database comparison process



For details, see **Comparing Migration Items** in *Data Replication Service User Guide*.

Step 3 Cut over services.

You are advised to start the cutover process during off-peak hours. At least one complete data comparison is performed during off-peak hours. To obtain accurate

comparison results, start data comparison at a specified time point during offpeak hours. If it is needed, select **Start at a specified time** for **Comparison Time**. Due to slight time difference and continuous operations on data, inconsistent comparison results may be generated, reducing the reliability and validity of the results.

- 1. Interrupt services first. If the workload is not heavy, you may not need to interrupt the services.
- 2. Run the following statement on the source database and check whether any new sessions execute SQL statements within the next 1 to 5 minutes. If there are no new statements executed, the service has been stopped. db.currentOp()

NOTE

The process list queried by the preceding statement includes the connection of the DRS replication instance. If no additional session executes SQL statements, the service has been stopped.

- 3. On the **Migration Progress** page, view the synchronization delay. When the delay is displayed as 0s and remains stable for a period, then you can perform a data-level comparison between the source and destination databases. For details about the time required, refer to the results of the previous comparison.
 - If there is enough time, compare all objects.
 - If there is not enough time, use the data-level comparison to compare the tables that are frequently used and that contain key business data or inconsistent data.
- 4. Determine an appropriate time to cut the services over to the destination database. After services are restored and available, the migration is complete.
- **Step 4** Stop or delete the migration task.
 - 1. Stopping the migration task. After databases and services are migrated to the destination database, to prevent operations on the source database from being synchronized to the destination database to overwrite data, you can stop the migration task. This operation only deletes the replication instance, and the migration task is still displayed in the task list. You can view or delete the task. DRS will not charge for this task after you stop it.
 - 2. Delete the migration task. After the migration task is complete, you can delete it. After the migration task is deleted, it will no longer be displayed in the task list.

----End

2.4 From ECS-hosted MySQL to RDS for MySQL

2.4.1 Overview

Scenarios

This chapter includes the following content:

• How to migrate data from self-managed MySQL databases to RDS for MySQL instances

RDS for MySQL Advantages

• More Services at Lower Costs

You pay for only RDS instances. There is no hardware or management investment needed.

• Ultimate User Experience

- Fully compatible with MySQL
- Excellent performance for high concurrency
- Support for a great number of connections and quicker response
- High Security
 - End-to-end database security, including network isolation, access control, transmission encryption, storage encryption, and anti-DDoS
 - Highest-level certification by the NIST-CSF, with 108 key security capabilities

• High Reliability

Multiple deployment and DR solutions, including data backup, data restoration, dual-host hot standby, remote DR, and intra-city DR

Service List

- Virtual Private Cloud (VPC)
- Elastic Cloud Server (ECS)
- RDS
- Data Replication Service (DRS)

Notes on Usage

- The resource planning in this best practice is for demonstration only. Adjust it as needed.
- All settings in this best practice are for reference only. For more information about MySQL migration, see **From MySQL to MySQL**.

Prerequisites

- You have registered with Huawei Cloud.
- Your account balance is greater than or equal to \$0 USD.

2.4.2 Resource Planning

| Category | Subcategor y | Planned Value | Remarks |
|-------------------|--------------------------|-----------------------------------|---|
| RDS | RDS instance name | rds-mysql | Customize a name for easy identification. |
| | DB engine version | MySQL 5.7 | - |
| | Instance type | Single | In this practice, select a single instance. |
| | | | To improve service reliability, selecting a primary/standby instance is recommended. |
| | Storage type | Cloud SSD | - |
| | AZ | AZ3 | In this practice, select a single instance. |
| | | | To improve service reliability, create a primary/standby instance and then deploy them in two different AZs. |
| | Specification s | General-purpose 4 vCPUs 8 GB | - |
| DRS | Task name | DRS-mysql | Custom |
| migration task | Source DB engine | MySQL | In this practice, the source is a MySQL database built on an ECS. |
| | Destination DB engine | MySQL | In this practice, the destination is an RDS for MySQL instance. |
| | Network type | VPC | In this practice, select the VPC network. |

 Table 2-12 Resource planning description

2.4.3 Operation Process

The following figure shows the process of creating a MySQL database on an ECS, buying an RDS for MySQL instance, and migrating data from the MySQL database to the RDS instance.

Figure 2-16 Flowchart



2.4.4 Cloud Migration

This topic describes how to migrate data from a self-managed MySQL database to an RDS instance. The involved tasks include buying an RDS instance and creating a DRS migration task.

2.4.4.1 Creating an RDS Instance

Create an RDS instance that is in the same VPC and security group as the selfmanaged MySQL database.

- Step 1 Go to the Buy DB Instance page.
- **Step 2** Configure the instance name and basic information. Select **CN-Hong Kong** for **Region**.

| Billing Mode | Yearly/Monthly Pay-per-use |
|-------------------|---|
| Region | Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
| | |
| DB Instance Name | In the multiple TRE instances at a time they will be named with four drivit amended in the format "TRE instance name SVI". For example, if the TRE instance name is instance will be named as instance.0001 the served as instance.0000 and so on |
| D8 Engine | Mysqu RestgresQL Learn more about D8 engines and versions. |
| D8 Engine Version | 80 57 56 |
| DB Instance Type | Primary/Standby Single |
| | Single-node architecture is cost-effective and suitable for developing and testing of microsites, and small- and medium-sized enterprises, or for learning about RDS. |
| Storage Type | Cloud SSD Learn more about storage types. |
| AZ | AZI AZ AZ AZ |
| Time Zone | (UTC-48:00) Beijing, Chongqing, Hong 🔻 |

Step 3 Select an instance class.

| Instance Class | General-purpose | | | |
|--------------------|---|--|--|---------------|
| | vCPU Memory | Maximum Connections | TPS/QPS (?) | IPv6 |
| | O 2 vCPUs 4 GB | 1,500 | 334 6,673 | Not supported |
| | O 2 vCPUs 8 GB | 2,500 | 552 11,039 | Not supported |
| | 4 vCPUs 8 GB | 2,500 | 756 15,122 | Not supported |
| | O 4 vCPUs 16 GB | 5,000 | 1,062 21,249 | Not supported |
| | O 8 vCPUs 16 GB | 5,000 | 1,338 26,756 | Not supported |
| | O 8 vCPUs 32 GB | 10,000 | 2,117 42,335 | Not supported |
| | DB Instance Specifications General-purpose 4 vCPUs 8 | GB, Maximum Connections: 2500, TPS/QPS: 756 15122 | | |
| | 40 GB | | | |
| Storage Space (GB) | | - 40 + | | |
| | 40 800 1,550 | 2,300 4,000 | | |
| | RDS provides free backup storage space of the same size a | your purchased storage space. After the free backup space is | used up, charges are applied based on the OBS pricing de | tails. |
| Disk Encryption | Disable Recommended Enable ⑦ | | | |

Step 4 Select a VPC and security group for the instance and configure the database port.

| | ⑦ Relationship among VPCs, subnets, security groups, and DB instances |
|---------------------|---|
| VPC 🕥 | C Automatically-assigned IP addre View In-use IP Address |
| | After the RDS instance is created, the VPC cannot be changed. ECSs in different VPCs cannot communicate with each other by default. If you want to create a VPC, go to the VPC console. Available Private IP Addresses: 230 |
| Database Port | |
| | The database port of read replicas (if any) is the same as that of the primary DB instance. |
| Security Group (?) | C View Security Group |
| | Ensure that port 3306 of the security group allows traffic from your server IP address to the DB instance. |
| | Security Group Rules 🖌 Add Inbound Rule |

Step 5 Configure the instance password.

| Password | Configure | Skip | |
|------------------------|-----------|------|------------------------------|
| Administrator | root | | |
| Administrator Password | ••••• | | Keep your password secure. T |
| Confirm Password | ••••• | | |

Step 6 Click Next.

Step 7 Confirm the settings.

• To modify your settings, click **Previous**.

- If you do not need to modify your settings, click Submit.
- **Step 8** Return to the instance list.

If the instance status becomes available, the instance has been created.

----End

2.4.4.2 Creating a Migration Task

This topic describes how to create a DRS migration task to migrate the **loadtest** database from the self-managed MySQL server to an RDS for MySQL instance.

Pre-migration Check

Before creating a migration task, check migration conditions to ensure smooth migration.

This example describes how to migrate data from a self-managed MySQL database to an RDS for MySQL instance. For more information, see **From MySQL** to MySQL.

Procedure

Migrate the **loadtest** database from a self-managed MySQL server to an RDS for MySQL instance.

Step 1 Go to the Create Migration Task page.

Step 2 Configure parameters as needed.

1. Specify a migration task name. Select **CN-Hong Kong** for **Region**.

| Region | Q | |
|-------------|--|--|
| | Regions are geographic areas isolated from each other. R | esources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
| Project | Ŧ | |
| * Task Name | DRS-Nysql | 0 |
| Description | | 0 |
| | | |
| | 0256 | |

2. Configure replication instance information.

Select the instance created in **Creating an RDS Instance** as the destination instance.

| Replication Instance De | etails 0 |
|---|---|
| The following information cannot be mod | field after you go to the next page. |
| * Data Flow | To the cloud Out of the cloud Self-built to self-built |
| | The destination database must be a database in the current cloud. If you want to miscule data between databases, select To the cloud. |
| * Source DB Engine | My054. Disole My052, schema and logic table MangoDB Redis |
| * Destination DB Engine | Nytós 0.001 Gaundibio Nytósi.) |
| * Network Type | ирс • Ø |
| * Destination DB Instance | Delect an induces |
| Replication Instance Subnet | Select the solved The IP address is advantically allocated built cant Wew Schede Yeer occupied P address |
| * Migration Type | Fullhoenetd Full |
| | This migration type is subbite for scenarios where services can be interrupted. It migrates delabore objects and data, in a non-option database, to a destination database at at the same time. After the data migration is complete, the task automatically stops. |
| * Destination DB Instance Access | Read only ResolVite |
| | During the migration, the destination DB instances can be configured to be writeble, their fibre data being migrated is modified, there may be data conflicts or other ensure, and the migration task cannot be resumed. |

3. Select default for Enterprise Project.

Step 3 Click Create Now.

It takes about 5 to 10 minutes to create a replication task.

Step 4 Configure task information.

1. Configure source database information.

2. Click **Test Connection**.

If a successful test message is returned, login to the source is successful.

| Source Database | | |
|--------------------------------------|---|--|
| DRS migrates only some key parameter | rs to the destination database. For the other parameters ti | hat cannot be migrated, you need to use parameter templates to configure them on the destination database. |
| IP Address or Domain Name | | |
| Port | 3306 | |
| Database Username | root | |
| Database Password | ······ (Q | |
| SSL Connection | | |
| | If you want to enable SSL connection, ensure that SSL h | as been enabled on the source database, related parameters have been correctly configured, and an SSL certificate has been uploaded. |
| Encryption Certificate | | Select |
| | Test Connection 📀 Test successful | |

3. Specify a username and password for the destination database.

4. Click Test Connection.

....

If a successful test message is returned, login to the destination is successful.

Destination Database

. .

| DB Instance Name | |
|-------------------------|-----------------------------------|
| Database Username | root |
| Database Password | ······ |
| Migrate Definer to User | 🔾 Yes 🕐 🖲 No 🥐 |
| | Test Connection 🥥 Test successful |

Step 5 Click Next.

Step 6 Confirm the migration user and migration objects.

Select All for Migration Object.

- Step 7 Click Next.
- Step 8 View pre-check results.
- Step 9 If the results of all check items are Passed, click Next.
- Step 10 Click Submit.

Return to the **Online Migration Management** page and check the migration task status.

It takes several minutes to complete.

| Batch O | perations 🔻 View Abnormal Tasks | | All projects | ٣ | All DB engines | ▼ All network1 | types v All statuses | | ▼ Enter a ta | sk name or ID | Q Search by Tag 🗧 🖸 🚳 C |
|---------|---|------------|--------------|--------------|----------------|----------------|----------------------------|------------|--------------|---------------|-------------------------|
| | Task NameID ↓Ξ | Status | Charging | Data Flow | DB Engine 4 | Migration Type | Created UF | Network | Description | Enterpris | Operation |
| | DRS-6351 7e81bd7c:5423-441c:b9d9-314ab | J Starting | li No | To the cloud | MySQL | Full | Jan 27, 2022 10:42:28 GMT+ | Public net | - | default | Edit Stop Speed |

If the status changes to **Completed**, the migration task is complete.

----End

2.4.4.3 Confirming Migration Results

You can check migration results with either of the following methods:

Automatic: Viewing Migration Results on the DRS Console. DRS automatically compares migration objects, users, and data of source and destination databases and provides migration results.

Manual: Viewing Migration Results on the RDS Console. You can log in to the destination instance to check whether the databases, tables, and data are migrated.

Viewing Migration Results on the DRS Console

- **Step 1** Log in to the management console.
- **Step 2** Click ^(Q) in the upper left corner and select **CN-Hong Kong**.
- Step 3 Click the service list icon on the left and choose Databases > Data Replication Service.
- **Step 4** Locate the required DRS instance and click its name.
- Step 5 Click Migration Comparison.

Before You Start 🔨 To minimize the impact on services, you are advised to perform a migration comparison in accordance to the following guidelines Compare Data - Double Chec Compare Data - Validate Al Stop Task Rows/Values During Cutover Level Compariso Object-Level Comparison Data-Level Comparison Only the migration objects that you have selected for comparison are displayed here. Comparison Time: Jan 26. 2022 16:33:52 GMT+08:00 Compare Source Database Destination Database ltem Result Operation Database Consistent View Details 7 7 Consistent Collection 48 48 View Details 75 75 Consistent View Details Index View 8 8 Consistent View Details

Step 6 Select **Compare Data - Validate All Rows/Values** and **Compare Data - Double Check During Cutover** to check whether the objects of the source database have been migrated to the destination database.

If any check fails, rectify the fault by referring to **Solutions to Failed Check Items**.

----End

Viewing Migration Results on the RDS Console

- **Step 1** Log in to the **management console**.
- **Step 2** Click ^(Q) in the upper left corner and select **CN-Hong Kong**.
- Step 3 Click the service list icon on the left and choose Databases > Relational Database Service.
- Step 4 Locate the required RDS instance and click Log In in the Operation column.
- **Step 5** In the displayed dialog box, enter the password and click **Test Connection**.
- Step 6 After the connection test is successful, click Log In.
- **Step 7** Check and confirm the destination database name and table name. Check whether the data migration is complete.

----End

2.5 From ECS-hosted MySQL to GaussDB(for MySQL)

2.5.1 Overview

This practice describes how to install a MySQL database (community edition) on a Huawei Cloud ECS and create a GaussDB(for MySQL) instance, and use DRS to migrate data from MySQL to GaussDB(for MySQL). With DRS, you can perform real-time migration tasks with minimal downtime. Services and databases remain operational during a migration.

Scenarios

- With the rapid increase of enterprise workloads, traditional databases have poor scalability and require distributed reconstruction.
- Building traditional databases requires purchasing and installing servers, systems, databases, and other software. Its O&M is expensive and difficult.
- Traditional databases are poor in complex queries.
- It is hard for traditional databases to smoothly migrate data with no downtime.

Prerequisites

- You have created Huawei ID and completed real-name authentication.
- Your account balance is at least \$0 USD.

Solution Architecture

In this practice, the source database is a ECS-hosted MySQL instance and the destination database is a GaussDB(for MySQL) instance. Figure 2-17 shows the deployment architecture when the ECS-hosted MySQL and GaussDB(for MySQL) instances are in the same VPC.

If the ECS-hosted MySQL and GaussDB(for MySQL) instances are not in the same VPC, you need to configure a **VPC peering connection** between the two VPCs. For details about the deployment architecture, see **Figure 2-18**.



Figure 2-17 Deployment architecture in the same VPC





GaussDB(for MySQL) Advantages

• Robust performance: GaussDB(for MySQL) decouples storage and compute and uses a "log as database" architecture and remote direct memory access (RDMA). It can deliver seven times the performance of open-source MySQL for certain service loads.

- Elastic scaling: In addition to a primary node, you can add up to 15 read replicas for a DB instance within minutes. You can also scale up or down CPU and memory specifications for a DB instance as needed.
- High reliability: DB instances can be deployed across AZs and there are three data copies under the shared distributed storage layer. A DB instance failover can be complete within seconds with a zero RPO.
- High security: With shared distributed storage, GaussDB(for MySQL) ensures zero data loss and service recovery within seconds. VPCs, security groups, SSL connections, and data encryption are used to strictly control secure access.
- High compatibility: GaussDB(for MySQL) is fully compatible with MySQL. You can easily migrate your MySQL databases to GaussDB(for MySQL) without reconstructing existing applications.
- Mass storage: Based on Huawei-developed data functions virtualization (DFV) distributed storage, GaussDB(for MySQL) supports up to 128 TB of storage.

Service List

- Virtual Private Cloud (VPC)
- Elastic Cloud Server (ECS)
- GaussDB(for MySQL)
- Data Replication Service (DRS)

Notes on Usage

The resources and test data in this practice are for demonstration only. Adjust them as needed.

For more information about GaussDB(for MySQL) data migration, see **From MySQL to GaussDB(for MySQL)**.

2.5.2 Prerequisites

- You have registered with Huawei Cloud.
- Your account balance is greater than or equal to \$0 USD.

2.5.3 Resource Planning

| 1 5 | | |
|-------------|---|--|
| Subcategory | Planned Value | Remarks |
| VPC name | vpc-mysql | Customize a name for easy identification. |
| Region | AP-Singapore | For low network latency and quick resource access, select the region nearest to you. |
| AZ | AZ3 | - |
| Subnet | 10.0.0/24 | Select a subnet with sufficient network resources. |
| | Subcategory VPC name Region AZ Subnet | SubcategoryPlanned ValueVPC namevpc-mysqlRegionAP-SingaporeAZAZ3Subnet10.0.0/24 |

 Table 2-13
 Resource planning

| Category | Subcategory | Planned Value | Remarks | |
|------------------------|----------------------------|-------------------------------|---|--|
| | Subnet name | subnet-mysql | Customize a name for easy identification. | |
| ECS (MySQL | ECS name | ecs-mysql | Customize a name for easy identification. | |
| server) | Specifications | s6.xlarge.2 4 vCPUs 8 GiB | Select specification based on service requirements. For details, see x86 ECS Specifications and Types | |
| | OS | CentOS 7.6 64 | - | |
| | System disk | General purpose SSD 40 GiB | - | |
| | Data disk | Ultra-high I/O, 100 GiB | - | |
| | EIP | Auto assign | Buy an EIP because the public network is selected for the migration task. | |
| ECS (MySQL | ECS name | ecs-client | Customize a name for easy identification. | |
| client) | Specifications | s6.xlarge.2 4 vCPUs 8 GiB | Select specification based on service requirements. For details, see x86 ECS Specifications and Types. | |
| | OS | CentOS 7.6 64 | - | |
| | System disk | General purpose SSD 40 GiB | - | |
| | Data disk | Not required | - | |
| | EIP | Auto assign | Buy an EIP as needed. If you do not need to access the client through a public network, you do not buy an EIP. | |
| GaussDB(f or MySQL) | Instance name | gauss-mysql | Customize a name for easy identification. | |
| | DB engine | GaussDB(for MySQL) | - | |
| | DB engine version | MySQL 8.0 | - | |
| | AZ type | Single-AZ | - | |
| | AZ | AZ6 | - | |
| | Instance specifications | Dedicated Edition | - | |
| | CPU architecture | x86 8 vCPUs 32 GB | - | |

| Category | Subcategory | Planned Value | Remarks | | |
|------------------|--------------------------|---------------------|--|--|--|
| DRS migration | Task name | DRS-gaussdbformysql | Customize a name for easy identification. | | |
| task | Source DB engine | MySQL | In this example, take a MySQL instance (community edition) installed on an ECS as the source database. | | |
| | Destination DB engine | GaussDB(for MySQL) | In this example, take a GaussDB(for MySQL) instance as the destination database. | | |
| | Network type | Public | In this example, select the public network. | | |

2.5.4 Operation Guide

Figure 2-19 shows the process of creating a MySQL server, buying a GaussDB(for MySQL) instance, and migrating data from the MySQL server to the GaussDB(for MySQL) instance.



2.5.5 Procedure

2.5.5.1 ECS-hosted MySQL Server

This chapter describes how to build a MySQL server. In this practice, the tasks involved are as follows:

- 1. Creating a VPC and security group
- 2. Creating an ECS (MySQL server)
- 3. Installing a MySQL database (community edition)
- 4. Creating an ECS (MySQL client)

2.5.5.1.1 Creating a VPC and Security Group

This section describes how to create a VPC and security group for your MySQL server and GaussDB(for MySQL) instance.

Creating a VPC

- **Step 1** Log in to the management console.
- **Step 2** Click I in the upper left corner of the management console and select **AP-Singapore**.
- **Step 3** Click in the upper left corner of the page and choose **Networking > Virtual Private Cloud**.

The VPC console is displayed.

- **Step 4** On the displayed page, click **Create VPC** in the upper right corner.
- **Step 5** Configure required parameters.

| Basic Information | |
|------------------------|--|
| Region | ▼ |
| | Regions are geographic areas isolated from each other. Resources are region-specific and can latency and quick resource access, select the nearest region. |
| Name | vpc-mysql |
| IPv4 CIDR Block | 10 · 0 · 0 · 0 / 24 · |
| | Recommended: 10.0.0.0/8-24 (Select) 172.16.0.0/12-24 (Select) 192.168.0.0/16-24 (Select) |
| Enterprise Project | default C Create Enterprise Project |
| | |
| Advanced Settings 🔻 | Tag Description |
| Default Subnet | |
| AZ | AZ3 • ? |
| Name | subnet-mysql |
| IPv4 CIDR Block | 10 · 0 · 0 · 0 / 24 • (?) Available IP Addresses: 251 |
| | The CIDR block cannot be modified after the subnet has been created. |
| IPv6 CIDR Block | Enable ? |
| Associated Route Table | Default (?) |
| Advanced Settings 🔻 | Gateway DNS Server Address NTP Server Address DHCP Lease Time Tag Description |

Step 6 Click Create Now.

Step 7 Return to the VPC list and check whether the VPC is created.

If the VPC status becomes available, the VPC has been created.

----End

Creating a Security Group

- **Step 1** Log in to the **management console**.
- **Step 2** Click in the upper left corner of the management console and select **AP-Singapore**.
- **Step 3** Click in the upper left corner of the page and choose **Networking > Virtual Private Cloud**.

The VPC console is displayed.

- **Step 4** In the navigation pane on the left, choose **Access Control** > **Security Groups**.
- **Step 5** Click **Create Security Group** in the upper right corner of the page.
- **Step 6** In the displayed dialog box, configure parameters as needed.

Create Security Group

| * Name | sg-mysql | |
|----------------------|--|---|
| ★ Enterprise Project | default 🔻 | C Create Enterprise Project 🧿 |
| * Template | General-purpose web server 🔻 |] |
| Description | The security group is for general-p servers and includes default rules all inbound ICMP traffic and inbou ports 22, 80, 443, and 3389. The s is used for remote login, ping, and website on ECSs. | burpose web that allow und traffic on ecurity group I hosting a |
| | | 0/255 |
| Show Default Rule | | |
| | OK Cancel | |

Х

Step 7 Click OK.

- **Step 8** Return to the security group list, locate the security group **sg-mysql**, and click its name.
- **Step 9** Click the **Inbound Rules** tab, and then click **Add Rule**.



Step 10 Configure an inbound rule to allow access from database port 3306.

| Add Inboun | d Rule Learn | more about sec | urity group configuration. | | | | | | |
|------------------------|--|----------------|--|------------|-------------|------------------|--|--|--|
| Some secult you select | Some security group rules will not take effect for ECSs with certain specifications. Learn more If you select IP address for Source, you can enter multiple IP addresses in the same IP address box. Each IP address represents a different security group rule. | | | | | | | | |
| Security Group | ecurity Group default_securitygroup fou can import multiple rules in a batch. | | | | | | | | |
| Priority (?) | Action (?) | Туре | Protocol & Port (?) | Source (?) | Description | Operation | | | |
| 1-100 | Allow • | IPv4 v | Protocols/TCP (Custo • | IP address | | Replicate Delete | | | |
| | | | Add Rule OK | e ncel | | | | | |

Step 11 Perform Step 9 to Step 10 to allow access from database port 22.

After the rules were configured, the figure similar to the following is displayed.

| Priority (?) | Action ⑦ | Туре | Protocol & Port (?) | Source (?) |
|--------------|----------|------|---------------------|-------------|
| 1 | Allow | IPv4 | TCP : 22 | 0.0.0.0/0 ⑦ |
| 1 | Allow | IPv4 | TCP : 3306 | 0.0.0.0/0 ⑦ |

----End

2.5.5.1.2 Creating an ECS (MySQL Server)

This section describes how to buy an ECS for installing a MySQL database (community edition).

- **Step 1** Log in to the management console.
- **Step 2** Click W in the upper left corner of the management console and select **AP-Singapore**.
- **Step 3** Click in the upper left corner of the page and choose **Compute** > **Elastic Cloud Server**.
- Step 4 Click Buy ECS.
- **Step 5** Configure ECS parameters.
 - 1. Set **Specifications** to **General computing** and select **s6.xlarge.2** with 4 vCPUs and 8 GiB.

| | | 饡 | | | | |
|------------------|----------------------|---------------|----------------|--------------------|------------------|-------|
| Billing Mode | Yearly/Monthly | Pa | y-per-use | Spot price | ? | |
| Region | CN South Cup | nazbou | - Recom | mended 🧌 CN | North-Ulangab | 1 |
| region | ♥ CN South-Gua | ngznou | | CN S | outh-Guang | i c |
| | For low network late | ncy and quick | resource acces | s, select the regi | on nearest to yo | ur ta |
| AZ | Random | AZ6 | AZ3 | AZ5 | AZ2 | |
| | | | | | | |
| | | | | | | |
| CPU Architecture | x86 | Kunpeng | ? | | | |
| Specifications | Latest generation | | vCPUs | Select vCPUs |) | • |
| | Flavor Na | me | vCPUs | 1≡ | Memory J⊒ | |
| | s6.xlarge.2 | 2 | 4 vCPU | S | 8 GiB | |

2. Select the image and disk specifications.

| Image | Public image | Private image | Shared image | Marketplace image |
|---------------|---------------------|------------------------|------------------|---|
| | CentOS | ▼ CentOS | 7.6 64bit(40GB) | |
| Host Security | V Enable ? | | | |
| | Basic (free) | Enterprise (additional | charges apply) | |
| | | | | |
| System Disk | General Purpose SSD | • | 40 + GiB IOPS li | mit: 2,280, IOPS <u>burst limit</u> : 8,000 |
| Data Disk | General Purpose SS | SD • 4 | 0 + GiB IOPS lin | nit: 2,280, IOPS <u>burst limit</u> : 8,000 |

Step 6 Click Next: Configure Network.

1. Select the VPC and security group created in **Creating a VPC and Security Group**.

| 1) Configure Basic Settings - | Configure Networ | k 3 d | Configure Advanced S | iettings (4) Confi | m | |
|-------------------------------|--|---|---|---|------------------------|-----------------------------------|
| Network | Create VPC | - C | | - | c | - A |
| Extension NIC | Add NIC NICs you can st | III add: 1 | | | | |
| Security Group | Similar to a firewall, a security g Ensure that the security country of the security group Rules Inbound Rules Outbo | roup logically control y group allows acces und Rules | s network access. is to port 22 (SSH-bar | C Create Security Group and Linux login), 3389 (Window | a login), and ICMP (pl | ng operation). Configure Security |
| | Security Group Name | Priority | Action | Protocol & Port ② | Туре | Source ⑦ |
| | | 4 | Permit | TCP: 3306 | IPv4 | 0.0.0/0 |
| | sg-mysqi | 1 | Permit | TCP: 22 | IPv4 | 0.0.0.0/0 |

2. Set **EIP** to **Auto assign**, **Billed by** to **Traffic**, and **Bandwidth Size** to **20**. The bandwidth size can be changed as required.

| EIP | Auto assi | ign 🔵 Use | existing | O Not requ | uired ? | | | | |
|----------------|-------------------------------|------------------------------|--------------|-----------------|----------------------|---------------|---------|------------|---|
| ЕІР Туре | D | ynamic BGP | | St | atic BGP | | | | |
| | Greater th | an or equal to | 99.95% ser | vice availabili | ty rate | | | | |
| Billed By | Ban For I | dwidth 🍁 neavy/stable tra | affic | | Traffic For light | /sharply fluc | tuating | traffic | |
| | Billed based of | on total traffic ir | respective o | of usage dura | tion; configurab | le maximum | bandw | idth size. | |
| Bandwidth Size | 5 | 10 | 20 | 50 | 100 | Custom | - | 20 | + |
| | 😔 Free Anti-I | DDoS protectio | n | | | | | | |
| Release Option | Release | with ECS ? | | | | | | | |

Step 7 Click Next: Configure Advanced Settings. Specify ECS Name and Password.

| ECS Name | ecs-mysql | | Allow duplicate name |
|------------------|---------------------------------|------------------------------|--------------------------------------|
| | If you are creating multiple EC | CSs at the same time, autom | atic naming and customizable nami |
| Description | | | |
| | | 0/ | 85 |
| Login Mode | Password | Key pair | Set password later |
| Username | root | | |
| Password | Keep the password secure. If | you forget the password, yo | u can log in to the ECS console and |
| | ••••• | 3 | 2 |
| Confirm Password | | <u>ي</u> | 2 |
| | | | |
| Cloud Backup and | To use CBR, you need to pure | chase a backup vault. A vaul | t is a container that stores backups |
| Recovery | Create new U | Jse existing Not re | equired ? |

Step 8 Click Next: Confirm.

- **Step 9** Select an enterprise project, select the **Agreement** option, and click **Submit**.
- **Step 10** Return to the ECS list page and view the creation progress.

When the ECS status changes to **Running**, the ECS has been created.

----End

2.5.5.1.3 Installing a MySQL Database (Community Edition)

This section describes how to initialize disks and install a MySQL database (community edition).

Log In to the ECS

- **Step 1** Log in to the management console.
- **Step 2** Click ^(Q) in the upper left corner of the management console and select **AP-Singapore**.
- **Step 3** Click in the upper left corner of the page and choose **Compute** > **Elastic Cloud Server**.
- Step 4 Locate the ECS ecs-mysql and click Remote Login in the Operation column.
- Step 5 Select CloudShell-based Login.



Step 6 Enter the password of user **root**.

NOTE

The password is the one you specified during the ECS creation.

----End

Initializing Disks

Step 1 Create the **mysql** folder.

mkdir /mysql

Step 2 View data disk information.

fdisk -l

The command output is as follows.

```
[root@ecs-mysql ~]# fdisk -1
Disk /dev/vda: 42.9 GB, 42949672960 bytes, 83886080 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0x000e3a31
   Device Boot
                                 End
                   Start
                                          Blocks
                                                   Id System
/dev/vda1
            *
                     2048
                            83886079
                                        41942016
                                                   83 Linux
Disk /dev/vdb: 107.4 GB, 107374182400 bytes, 209715200 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
```

Step 3 Initialize the data disk.

mkfs.ext4 /dev/vdb

Step 4 Attach the disk.

mount /dev/vdb /mysql

Step 5 Check whether the disk is attached.

df -h

If the following output is returned, the disk is attached.

| [root@ecs-mysql | ~]# d | f-h | | | |
|-----------------|-------|------|-------|------|----------------|
| Filesystem | Size | Used | Avail | Use% | Mounted on |
| devtmpfs | 3.9G | 0 | 3.9G | 0% | /dev |
| tmpfs | 3.9G | 0 | 3.9G | 0% | /dev/shm |
| tmpfs | 3.9G | 8.6M | 3.9G | 1% | /run |
| tmpfs | 3.9G | 0 | 3.9G | 0% | /sys/fs/cgroup |
| /dev/vda1 | 40G | 2.2G | 36G | 6% | / |
| tmpfs | 783M | 0 | 783M | 0% | /run/user/0 |
| /dev/vdb | 99G | 61M | 94G | 1% | /mysql |

Step 6 Create a folder and switch to the **install** folder.

mkdir -p /mysql/install/data

mkdir -p /mysql/install/tmp

mkdir -p /mysql/install/file

mkdir -p /mysql/install/log

cd /mysql/install

- Step 7 Download and install the MySQL client.
- **Step 8** Initialize the MySQL client.

/mysql/install/mysql-8.0.22/bin/mysqld --defaults-file= /etc/my.cnf -initialize-insecure

Step 9 Start the MySQL client.

nohup /mysql/install/mysql-8.0.22/bin/mysqld --defaults-file= /etc/my.cnf &

Step 10 Connect to the MySQL client.

/mysql/install/mysql-8.0.22/bin/mysql

Step 11 Create user **root** and assign the required permissions to it.

grant all privileges on *.* to 'root'@'%' identified by 'xxx' with grant option;FLUSH PRIVILEGES;

----End

2.5.5.1.4 Creating an ECS and Installing the MySQL Client on It

Step 1 This section describes how to create an ECS for the MySQL client. For details, see Creating an ECS (MySQL Server).

D NOTE

- This ECS must be in the same region, AZ, VPC, and security group as the ECS where the MySQL server is deployed.
- Data disks are not required.
- This ECS name is **ecs-client**.
- Other parameters are the same as those of the ECS where the MySQL server is deployed.
- Step 2 Download and install the MySQL client. For details, see How Can I Install the MySQL Client?

----End

2.5.5.1.5 Testing the ECS-hosted MySQL Performance

- **Step 1** Log in to the management console.
- **Step 2** Click Singapore. Singapore.
- **Step 3** Click in the upper left corner of the page and choose **Compute** > **Elastic Cloud Server**.
- **Step 4** In the ECS list, locate the ECS **ecs-client** and click **Remote Login** in the **Operation** column.
- **Step 5** On the displayed page, click **CloudShell**.
- Step 6 Enter the password you specify during the ECS ecs-client creation.
- **Step 7** Download sysbench.

wget -c https://github.com/akopytov/sysbench/archive/1.0.18.zip

Step 8 Install sysbench.

unzip 1.0.18.zip

cd sysbench-1.0.18

./autogen.sh

./configure

make

- make install
- **Step 9** Log in to the MySQL database and create test database **sbtest**.

mysql -u root -P 3306 -h < host> -p -e "create database sbtest"

Step 10 Import test background data to the **sbtest** database.

sysbench --db-driver=mysql --mysql-host=<host> --mysql-port=<port> --mysqluser=<user> --mysql-password=<password> --mysql-db=sbtest -table size=250000 --tables=25 --events=0 --time=600 oltp read write prepare

Step 11 Perform a pressure test.

sysbench --db-driver=mysql --mysql-host=<host> --mysql-port=<port> --mysqluser=<user> --mysql-password=<password> --mysql-db=sbtest -table_size=250000 --tables=25 --events=0 --time=600 --threads=<thread_num> --percentile=95 --report-interval=1 oltp_read_write run

NOTICE

Delete databases and tables to release storage space only after they are migrated using DRS.

```
sysbench --db-driver=mysql --mysql-host=<host> --mysql-port=<port> --mysql-
user=<user> --mysql-password=<password> --mysql-db=sbtest --
table_size=250000 --tables=25 --events=0 --time=600 oltp_read_write cleanup
```

----End

2.5.5.2 Cloud Migration

This chapter describes how to create a GaussDB(for MySQL) instance, create a DRS migration task, and migrate data from the ECS-hosted MySQL server to the GaussDB(for MySQL) instance.

2.5.5.2.1 Creating a GaussDB(for MySQL) Instance

This section describes how to create a GaussDB(for MySQL) instance. The GaussDB(for MySQL) instance must be in the same VPC and security group as the ECS-hosted MySQL server.

- **Step 1** Log in to the management console.
- **Step 2** Click Singapore. Singapore.
- Step 3 Click in the upper left corner of the page, choose Databases > GaussDB(for MySQL).
- **Step 4** In the upper right corner, click **Buy DB Instance**.
- **Step 5** Configure the instance name and basic information.

| Billing Mode | Tearly Northy Payser ear |
|-------------------|---|
| Region | regions are geographic areas loalated from each other. Resources are region-specific and carrent be used across regions through Internal instanck connections. For low rebunck latency and quick resource access, select the nearest region. |
| DB Instance Name | generated fyou by multiple DB instances and a time, they all be named with frow digits appended in the format "DB instance name SVF. For example, if the DB instance name is instance, the first instance will be named as instance.4000, the second as instance.4000, and so on |
| D8 Engine | GastRifer M/SQL |
| DB Engine Version | M5Q.80 |
| Storage Type | Stund |
| AZ Type | Single AZ Multi-AZ |
| AZ | cratifi-la |
| Time Zone | • |

Step 6 Configure instance specifications.

| Instance Specifications | Dedicated General-purpose | |
|-------------------------|--|--------------------------------|
| CPU Architecture | x86 ⑦ | |
| | vCPUs Memory | Maximum Connections |
| | O 2 VCPUS 8 G8 | 2,500 |
| | O 4 vCPUs 16 GB | 5,000 |
| | 8 vCPUs 32 GB | 10,000 |
| | ○ 16 vCPUs 64 GB | 18,000 |
| | ○ 32 vCPUs 128 GB | 30,000 |
| | 1 4 vCPUs 32 GB (Sold Out) | 10,000 |
| | DB Instance Specifications Dedicated x86 8 vCPUs 32 GB | |
| Nodes | | |
| Storage | Storage will be scaled up dynamically based on the amount of data that needs to be stored, and is billed hourly on a pay-per-use basis. | |
| DR Instance | Disabled Enabled | |
| Backup Space | GaussDB(for MySQL) provides free backup storage equal to the amount of your purchased storage space. After the free backup space is used up, | , you will be billed for the a |

Step 7 Select the VPC and security group.

The VPC and security group have been created in **Creating a VPC and Security Group**.

| | Relationship among VPCs, subnets, security groups, and DB instances | | | | | | |
|------------------|---|----------------------|---|----------|--|--------|--|
| VPC ③ | default_vpc • | - c | default_subnet(192.168.0.0/24) * | С | Automatically-assigned IP | ٣ | View In-use IP Address |
| | After the DB Instance is created, the VPC cannot b Make sure that there are sufficient subnets and IP | e change addresse | ed. If you want to create a VPC, go to the VPC console es. | . If you | want to create DB instances in batches, the II | addres | sses are automatically assigned. Available IP addresses: 250 |
| Security Group 🕐 | default_securitygroup | r C | View Security Group | | | | |
| | In a security group, rules that authorize connections to DB instances apply to all DB instances associated with the security group. | | | | | | |
| | A The security group rule must allow access from the 100.125.00/16 CIDR block. | | | | | | |
| | Ensure that port 3306 of the security group allows traffic from your server IP address to the DB Instance. | | | | | | |
| | Security Group Rules 🐱 Add Inbound Rule | | | | | | |

Step 8 Configure the instance password.

| Administrator | root | |
|------------------------|------|--|
| Administrator Password | | Keep your password secure. The system cannot retrieve your password. |
| Confirm Password | | |

Step 9 Configure an enterprise project.

| Parameter Template | Default-GaussDB-for-MySQL 8.0 View Parameter Template |
|----------------------|---|
| Table Name | Case sensitive Case insensitive ⑦ This option cannot be changed later. |
| Enterprise Project 🕥 | default C Create Enterprise Project |
| | |
| Tag | It is recommended that you use TMS's predefined tag function to add the same tag to different cloud resources. C View predefined tags Tag key Tag value You can add 20 more tags. |
| Quantity | 1 + (7) The total number of DB instances cannot exceed 1999. Increase quota |

- Step 10 Click Next.
- **Step 11** After confirming the settings, click **Submit**.
- **Step 12** Return to the instance list.

If the instance becomes **Available**, the instance has been created.

----End

2.5.5.2.2 Creating a DRS Migration Task

This section describes how to create a DRS migration task to migrate the **sbtest** database from the ECS-hosted MySQL server to the GaussDB(for MySQL) instance.

- **Step 1** Log in to the management console.
- **Step 2** Click Singapore. Singapore.
- Step 3 Click in the upper left corner of the page and choose Databases > Data Replication Service.
- **Step 4** In the upper right corner, click **Create Migration Task**.
- **Step 5** Configure parameters as needed.
 - 1. Specify a task name.

| Region | ♥ |
|-------------|--|
| | Regions are geographic areas isolated from each other. Resource access, select the nearest region. |
| Project | · |
| ★ Task Name | DRS-mysql ⑦ |
| Description | 0 |
| | |
| | 0/256 |

2. Configure replication instance details as needed.
Set **Destination DB Instance** to the GaussDB(for MySQL) instance created in **Creating a GaussDB(for MySQL) Instance**.

| Replication Instance Details ⑦ | | | | |
|--|--|--|--------------|--------------------------------|
| The following information cannot be modi | fied after you go to the ne | ext page. | | |
| * Data Flow | To the cloud | Out of the cloud | | |
| | The destination datab | ase must be a database in t | he current c | loud. If you want to migrate |
| * Source DB Engine | MySQL | MySQL schema and logic | c table | MongoDB |
| * Destination DB Engine | MySQL | DDM GaussD | B(for MySQI | L) Primary/Standby Ed |
| * Network Type | VPC | | • ? |) |
| * Destination DB Instance | gauss-f693 (172.16 | 0.169) | • C | View DB Instance View I |
| * Replication Instance Subnet | subnet-mysql(172.1 | 6.0.0/24) | • ? | View Subnets |
| * Migration Type | Full+Incrementa | Full | | |
| | This migration type al between the source a | ows you to migrate data wit nd destination databases. | h minimal d | owntime. After a full migratio |
| * Destination DB Instance Access | Read-only | Read/Write | | |

3. Set Enterprise Project to default.

| * Enterprise Project | default | C View Project Management |
|----------------------|-------------------------------|--|
| Tags | It is recommended that you us | e TMS's predefined tag function to add the same tag to different |
| | Tag key | Tag value |
| | You can add 10 more tags. | |

Step 6 Click Create Now.

It takes about 5 to 10 minutes to create a replication instance.

- **Step 7** Configure source and destination database information.
 - 1. Configure source database information.
 - 2. Click **Test Connection**.

If a successful connection message is returned, you have logged in to the source database.

Source Database

DRS migrates only some key parameters to the destination database. For the other parameters that can

| Source Database Type | self-built database | RDS DB instance |
|---------------------------|-----------------------------|-----------------|
| VPC | vpc-mysql(172.16.0.0/24) | • |
| Subnet | subnet-mysql(172.16.0.0/24) | Ŧ |
| IP Address or Domain Name | 172.16.0.35 | |
| Port | 3306 | |
| Database Username | root | |
| Database Password | Info@123 | 0 |

3. Configure the username and password for the destination database.

4. Click **Test Connection**.

If a successful connection message is returned, you have logged in to the destination database.

Destination Database

| DB Instance Name | gauss-f693 (172.16.0.169) | |
|-------------------------|---------------------------|---|
| Database Username | root | |
| Database Password | •••••• | Ø |
| Migrate Definer to User | • Yes ? | |

- Step 8 Click Next.
- **Step 9** Confirm the users, snapshots, and migration objects to be migrated.

Set Migrate Object to All.

- Step 10 Click Next.
- **Step 11** View pre-check results.
- Step 12 If the check is complete and the check success rate is 100%, click Next.
- Step 13 Click Submit.

Return to the **Online Migration Management** page and check the migration task status.

It takes several minutes to complete.

| All projects | ▼ All | DB engines | ▼ All n | etwork types | • | All statuses | Enter | a task name o | r ID Q |
|---------------|-----------------------------------|--------------------------|---------|--------------|--------------|----------------|---------------------------|---------------|-----------|
| Search by Tag | * 🖬 🛞 C | | | | | | | | |
| | Task Name/ID ↓Ξ | Status | Delay 🕐 | Charging | Data Flow | DB Engine ↓Ξ | Migration Type | Netwo | Operation |
| | DRS-test-migrate 3634e419-9faf | Star | - | 🕲 No | To the cloud | MySQL-GaussDB(| Full | Public | Stop |

If the status changes to **Completed**, the migration task has been created.

----End

2.5.5.2.3 Checking the Migration Results

You can check migration results with either of the following methods:

Method 1: (Automatically) View the migration results on the DRS console. DRS can compare migration objects, users, and data of source and destination databases and obtain the migration results.

Method 2 (manually): View the migration results on the GaussDB(for MySQL) console. Log in to the destination database to check whether the databases, tables, and data are migrated. Manually confirm the data migration status.

Viewing Migration Results on the DRS Console

- **Step 1** Log in to the **management console**.
- **Step 2** Click Singapore. Singapore.
- **Step 3** Click in the upper left corner of the page and choose **Databases** > **Data Replication Service**.
- **Step 4** Click the target DRS instance name.

Step 5 Click Migration Comparison.

| Before You Start 🤸 | | | | |
|---|--|------------------------------------|--------------|---------------------------|
| To minimize the impact on services, you are advised to pe | erform a migration comparison in accordance to the followi | ing guidelines. | | |
| Object Comparison / Account- Level Comparison | Compare Data - Validate Al Rovsy/Values | Compare Data - Dou During Cutor | ke Oreck | Stop Task |
| Object-Level Comparison Data-Level Compa | arison | | | |
| Only the migration objects that you have selected for con Comparison Time: Jan 26, 2022 16:33:52 GMT+08:00 | mparison are displayed here. | | | Compare Cancel Comparison |
| ltem | Source Database | Destination Database | Result | Operation |
| Database | 7 | 7 | 🔮 Consistent | View Details |
| Collection | 48 | 48 | 🔮 Consistent | View Details |
| Index | 75 | 75 | Consistent | View Details |
| View | 8 | 8 | Consistent | View Details |
| | | | | |

Step 6 Under the **Compare Data - Validate ALL Rows/Values** and **Compare Data -Double Check During Cutover** tabs, check whether the objects of the source database have been migrated to destination database.

----End

Viewing Migration Results on the GaussDB(for MySQL) Console

- **Step 1** Log in to the management console.
- **Step 2** Click I in the upper left corner of the management console and select **AP-Singapore**.
- Step 3 Click in the upper left corner of the page, choose Databases > GaussDB(for MySQL).
- **Step 4** Click **GaussDB(for MySQL)**. Locate the target instance and choose **More** > **Log In** in the **Operation** column.

- **Step 5** In the displayed dialog box, enter the password and click **Test Connection**.
- Step 6 After the connection test is successful, click Log In.
- **Step 7** Check and confirm the destination database name and table name. Check whether the data migration is complete.

----End

Testing GaussDB(for MySQL) Performance

After the migration is complete, test GaussDB(for MySQL) performance by referring to **Performance White Paper**.

2.6 From ECS-hosted MongoDB to DDS

DRS helps you migrate data from MongoDB databases on ECSs to DDS instances on the current cloud. With DRS, you can migrate databases online with zero downtime and your services and databases can remain operational during migration.

This section describes how to use DRS to migrate data from an ECS database to a DDS instance on the current cloud. The following network scenarios are supported:

- Source and destination databases are in the same VPC.
- Source and destination databases are in different VPCs.

Diagram



Figure 2-20 Source and destination databases in the same VPC



Figure 2-21 Source and destination databases in the same region and different VPCs

Migration Process



Migration Suggestions (Important)

• Database migration is closely impacted by a wide range of environmental and operational factors. To ensure the migration goes smoothly, perform a test run before the actual migration to help you detect and resolve any potential issues in advance. Recommendations on how to minimize any potential impacts on your data base are provided in this section.

• It is strongly recommended that you start your migration task during off-peak hours. A less active database is easier to migrate successfully. If the data is fairly static, there is less likely to be any severe performance impacts during the migration.

Notes on Migration (Important)

NOTICE

Before creating a migration task, read the migration notes carefully.

For details, see **precautions** on using specific migration tasks in *Data Replication Service Real-Time Migration*.

Preparations

1. Permissions:

Table 2-14 lists the permissions required for the source and destination databases when migrating data from a MongoDB database on an ECS to DDS on the current cloud.

| Database | Full Migration Permission | Full+Incremental Migration Permission |
|-------------|--|--|
| Source | Replica set: The source database user must have the read permission for the database to be migrated. Single node: The source database user must have the read permission for the database to be migrated. Cluster: The source database user must have the read permission for the database sto be migrated and the config database. To migrate accounts and roles of the source database user must have the read permission for the database, the source database user must have the read permission for the system.users and system.roles system tables of the admin database. | Replica set: The source database user must have the read permission for the databases to be migrated and the local database. Single node: The source database user must have the read permission for the databases to be migrated and the local database. Cluster: The source mongos node user must have the readAnyDatabase permission for the databases to be migrated and the config database. The source shard node user must have the readAnyDatabase permission for the admin database and the read permission for the source shard node user must have the readAnyDatabase permission for the source shard node user must have the readAnyDatabase permission for the source shard node user must have the readAnyDatabase permission for the source database and the read permission for the local database. To migrate accounts and roles of the source database user must have the read permission for the system.users and system.roles system tables of the admin database. |
| Destination | The destination database dbAdminAnyDatabase pe database and the readW destination database. If t is a cluster instance, the have the read permission | e user must have the ermission for the admin rite permission for the he destination database migration account must n for the config database. |

| Table 2-14 | Required | permissions |
|------------|----------|-------------|
| | Required | permissions |

- Source database permissions:

The source MongoDB database user must have all the required permissions listed in **Table 2-14**. If the permissions are insufficient, create a user that has all of the permissions on the source database.

- Destination database permissions:

The initial account of the DDS instance has the required permissions.

- 2. Network settings
 - The source database and destination DDS DB instance must be in the same region.
 - The source database and destination DDS DB instance can be either in the same VPC or different VPCs.
 - If the source and destination databases are in different VPCs, the subnets of the source and destination databases are required to be in different CIDR blocks. You need to create a VPC peering connection between the two VPCs.

For details, see **VPC Peering Connection Overview** in the *Virtual Private Cloud User Guide*.

- If the source and destination databases are in the same VPC, the networks are interconnected by default.
- 3. Security rules
 - In the same VPC, the network is connected by default. You do not need to set a security group.
 - In different VPCs, establish a VPC peering connection between the two VPCs. You do not need to set a security group.
- 4. Other

You need to export the user information of the MongoDB database first and manually add it to the destination DDS DB instance because the user information will not be migrated.

Migration Procedure

Step 1 Create a migration task.

- Log in to the management console and choose Databases > Data Replication Service to go to the DRS console.
- 2. On the **Online Migration Management** page, click **Create Migration Task**.
- 3. On the **Create Replication Instance** page, configure the task details, recipient, and replication instance and click **Next**.

Figure 2-23 Replication instance information

| Replication Instance De | Replication Instance Details 🗇 | | |
|--|--|--|--|
| The following information cannot be modifi | ed after you go to the next page. | | |
| * Data Flow | To the cloud Out of the cloud | | |
| | The destination database must be a database in the current cloud. If you want to migrate data between database, select To the cloud. | | |
| * Source DB Engine | MySOL MySOL schema and logic table MonyxOB | | |
| * Destination DB Engine | GiassDB(Ior Mongo) DDS | | |
| * Network Type | VFC • | | |
| * Destination DB Instance | Select an instance | | |
| Replication Instance Subnet | Select the submet Wew Submets Wew occupied IP address | | |
| * Migration Type | Full-Incomental Full | | |
| | This migration type allows you to migrate data with minimal countine. After a full migration initializes the destination database, an incremental migration parses logs to ensure data consistency between the source and destination databases. | | |
| * Source DB Instance Type | Non-cluster Cluster | | |

Table 2-15 Task settings

| Parameter | Description |
|-------------|--|
| Region | The region where the replication instance is deployed. You can change the region. To reduce latency and improve access speed, select the region closest to your workloads. |
| Project | The project corresponds to the current region and can be changed. |
| Task Name | The task name consists of 4 to 50 characters, starts with a letter, and can contain only letters (case-insensitive), digits, hyphens (-), and underscores (_). |
| Description | The description consists of a maximum of 256 characters and cannot contain the following special characters: =<>&'\" |

Table 2-16 Replication instance information

| Parameter | Description |
|----------------------------|------------------------------------|
| Data Flow | To the cloud |
| Source DB Engine | Select MongoDB. |
| Destination DB Engine | Select DDS . |
| Network Type | Select VPC. |
| Destination DB Instance | The DDS DB instance you purchased. |

| Parameter | Description |
|----------------------------|--|
| Migration Type | Select Full+Incremental as an example: |
| | Full: This migration type is suitable for scenarios where a service interruption is acceptable. All objects and data in non-system databases are migrated to the destination database at one time. The objects include tables, views, and stored procedures. |
| | NOTE If you perform a full migration, you are advised to stop operations on the source database. Otherwise, data generated in the source database during the migration will not be synchronized to the destination database. |
| | Full+Incremental: This migration type allows you to migrate data without interrupting services. After a full migration initializes the destination database, an incremental migration initiates and parses logs to ensure data consistency between the source and destination databases. |
| | NOTE If you select the Full+Incremental migration type, data generated during the full migration will be synchronized to the destination database with zero downtime, ensuring that both the source and destination databases remain accessible. |
| Source DB Instance Type | If you select Full+Incremental for Migration Type , set this parameter based on the source database. Non- cluster is selected as an example. |
| | If the source database is a cluster instance, set this parameter to Cluster. |
| | If the source database is a replica set or a single node instance, set this parameter to Non-cluster. |

| Parameter | Description |
|-------------------------------|---|
| Obtain Incremental Data | This parameter is available for configuration if Source DB Instance Type is set to Cluster . You can determine how to capture data changes during the incremental synchronization. |
| | oplog: For MongoDB 3.2 or later, DRS directly connects to each shard of the source DB instance to extract data. If you select this mode, you must disable the balancer of the source instance. When testing the connection, you need to enter the connection information of each shard node of the source instance. |
| | changeStream: This method is recommended. For MongoDB 4.0 and later, DRS connects to mongos nodes of the source instance to extract data. If you select this method, you must enable the WiredTiger storage engine of the source instance. |
| | Only whitelisted users can use changeStream . To use this function, submit a service ticket. In the upper right corner of the management console, choose Service Tickets > Create Service Ticket to submit a service ticket. |
| Source Shard Quantity | If Source DB Instance Type is set to Cluster and Obtain Incremental Data is set to oplog , enter the number of source shard nodes. |
| | The default minimum number of source DB instances is 2 and the maximum number is 32. You can set this parameter based on the number of source database shards. |

4. On the **Configure Source and Destination Databases** page, wait until the replication instance is created. Then, specify source and destination database information and click **Test Connection** for both the source and destination databases to check whether they have been connected to the replication instance. After the connection tests are successful, select the check box before the agreement and click **Next**.

Figure 2-24 Source and destination database details



| Source Database Type | Non-DDS DB instance | DDS DB instance |
|---------------------------|-----------------------------------|-----------------------------------|
| VPC | default_vpi | ▼ C View VPC |
| Subnet | default_subnet-1123(| • ? |
| IP Address or Domain Name | | 0 |
| | Ensure that the entered addresses | s belong to the same DB instance. |
| Authentication Database | | |
| Database Username | | |
| Database Password | | |
| SSL Connection | | |
| | Test Connection | |

Destination Database

| DB Instance Name | dds-jiqun20-1 |
|-------------------|-----------------|
| Database Username | |
| Database Password | |
| | Test Connection |

Table 2-17 Source database information

| Parameter | Description |
|-------------------------|---|
| Source Database Type | Select Self-built on ECS. |
| VPC | A dedicated virtual network in which the source database is located. It isolates networks for different services. You can select an existing VPC or create a VPC. For details on how to create a VPC, see Creating a VPC . |
| Subnet | A subnet provides dedicated network resources that are logically isolated from other networks, improving network security. The subnet must be in the AZ where the source database resides. You need to enable DHCP for creating the source database subnet. For details on how to create a VPC, see the Creating a VPC section in the <i>Virtual Private Cloud User Guide</i> . |

| Parameter | Description |
|------------------------------|--|
| IP Address or Domain Name | The IP address or domain name of the source database. |
| Port | The port of the source database. Range: 1 - 65535 |
| Database Username | A username for the source database. |
| Database Password | The password for the database username. |
| SSL Connection | To improve data security during the migration, you are advised to enable SSL to encrypt migration links and upload a CA certificate. |

Table 2-18 Destination database information

| Parameter | Description |
|----------------------|---|
| DB Instance Name | The DDS DB instance you have selected during the migration task creation is displayed by default and cannot be changed. |
| Database Username | The username for accessing the destination DDS DB instance. |
| Database Password | The password for the database username. |

5. On the **Set Task** page, select migration objects and click **Next**.

Figure 2-25 Migration object

| Note: | Before the | migration task is complete, yo | u cannot c | hange the username | s, passwords, and righ | ts of any : | source database users. | |
|-------------------------------------|---------------|--------------------------------|------------|--------------------|------------------------|-------------|--------------------------------|---------|
| Migrate Account | Yes Confir | No m All Remarks | | | | | | С |
| | Account | Account | | Can Be Migrated | | Role | | Remarks |
| | | fastunit.testuser4 | | Yes | | fastunit | roletestő | |
| | ~ | fastunit.testuser3 | | Yes | | fastunit | roletest3,fastunit.roletest2,f | |
| | | fastunit.test8 | | Yes | | admin.cl | usterAdmin | |
| | | fastunit.test1 | | Yes | | fastunit | read | |
| | | admin.testuser2 | | Yes | | admin.cl | usterAdmin | |
| | | admin.test14 | | Yes | | fastunit | read | |
| | | fastunit.test_inc_fastunit | | No | | admin.ro | ot,fastunit.read,admin.read | View |
| | | fastunit.test_full_fastunit | | No | | admin.ro | ot,fastunit.read,admin.read | View |
| | Role Infe | ormation | | | | | | |
| | | Role Name | Can Be I | Migrated | Permission | | Inherited Role | Remarks |
| | | fastunit.roletest6 | Yes | | {"resource": {"db": " | 'fastu | fastunit.readWrite,fastuni | |
| | ~ | fastunit.roletest3 | Yes | | {"resource": {"db": " | 'fastu | fastunit.roletest2 | |
| | ~ | fastunit.roletest2 | Yes | | {"resource": {"db": " | 'fastu | fastunit.roletest1 | |
| Migrate Object | All | Tables Da | tabases | | | | | |

| ct |
|----|
| (|

| Paramete r | Description |
|--------------------|---|
| Migrate Account | There are accounts that can be migrated completely and accounts that cannot be migrated. You can choose whether to migrate the accounts. Accounts that cannot be migrated or accounts that are not selected will not exist in the destination database. Ensure that your services will not be affected by these accounts. |
| | Yes If you choose to migrate accounts, see Migrating Accounts in Data Replication Service User Guide to migrate database users and roles. |
| | No During the migration, accounts and roles are not migrated. |
| Migrate Object | You can choose to migrate all objects, tables, or databases based on your service requirements. |
| | - All : All objects in the source database are migrated to the destination database. After the migration, the object names will remain the same as those in the source database and cannot be modified. |
| | - Tables : The selected table-level objects will be migrated. |
| | Databases: The selected database-level objects will be migrated. |
| | If the source database is changed, click $^{\bigcirc}$ in the upper right corner before selecting migration objects to ensure that the objects to be selected are from the changed source database. |
| | NOTE |
| | If you choose not to migrate all of the databases, the migration may fail because the objects, such as stored procedures and views, in the database to be migrated may have dependencies on other objects that are not migrated. To ensure a successful migration, you are advised to migrate all of the databases. |
| | When you select an object, the spaces before and after the object name are not displayed. If there are two or more consecutive spaces in the middle of the object name, only one space is displayed. |
| | The search function can help you quickly select the required database objects. |

- 6. On the **Check Task** page, check the migration task.
 - If any check fails, review the cause and rectify the fault. After the fault is rectified, click **Check Again**.

For details about how to handle check failures, see **Checking Whether the Source Database Is Connected** in *Data Replication Service User Guide*.

- If all check items are successful, click **Next**.

Figure 2-26 Task Check

| Check Again | |
|--|---|
| Check success rate 100% All checks must pass before you can continue. If any check requires confirmation, | check and confirm the results before proceeding to the next step. |
| Check Item | Check Result |
| Destination database storage space | |
| Whether the destination database has sufficient storage space | Passed |
| Conflict | |
| Whether collections in both the source and destination databases are not capped | Passed |
| Whether the destination database contains a non-empty collection with the same name as that in the source database | Passed |
| Whether the same view names exist in both the source and destination databases | Passed |
| Object dependency | |
| Whether the source database referenced roles pass the check | Passed |
| Whether the source database referenced accounts pass the check | 📀 Passed |
| Database parameters | |
| Whether both the source and destination databases have enabled SSL | Passed |
| Whether the maximum number of chunks in the destination database is sufficient | Passed |
| Whether the maximum number of collections has been reached in the destination database | Passed |

NOTE

You can proceed to the next step only when all check items are successful. If any alarms are generated, view and confirm the alarm details first before proceeding to the next step.

7. On the displayed page, specify **Start Time**, **Send Notification**, **SMN Topic**, **Synchronization Delay Threshold**, and **Stop Abnormal Tasks After** and confirm that the configured information is correct and click **Submit** to submit the task.

Figure 2-27 Task startup settings

| Start Time | Start upon task creation | Start at a specified time | 0 |
|------------------------------------|--------------------------|------------------------------------|---|
| Send Notifications | ⑦ Please handle excep | tions within 48 hours of receiving | g SMS messages or emails. |
| * SMN Topic | | • C ? | |
| Synchronization Delay Threshold(s) | 0 | | |
| ★ Stop Abnormal Tasks After | 14 (?) Abn | ormal tasks run longer than the p | period you set (unit: day) will automatically stop. |

| Parameter | Description |
|--|--|
| Start Time | Set Start Time to Start upon task creation or Start at a specified time based on site requirements. The Start at a specified time option is recommended. NOTE |
| | destination databases. You are advised to start the task in off-peak hours and reserve two to three days for data verification. |
| Send Notification s | SMN topic. This parameter is optional. If an exception occurs during migration, the system will send a notification to the specified recipients. |
| SMN Topic | This parameter is available only after you enable Send Notification and create a topic on the SMN console and add a subscriber. |
| | For details, see Simple Message Notification User Guide. |
| Synchroniza tion Delay Threshold | During an incremental migration, a synchronization delay indicates a time difference (in seconds) of synchronization between the source and destination database. |
| | If the synchronization delay exceeds the threshold you specify, DRS will send alarms to the specified recipients. The value ranges from 0 to 3,600. To avoid repeated alarms caused by the fluctuation of delay, an alarm is sent only after the delay has exceeded the threshold for six minutes. |
| | NOTE |
| | In the early stages of an incremental migration, there is more delay because more data is waiting to be synchronized. In this situation, no notifications will be sent. |
| | Before setting the delay threshold, enable Send Notification. If the delay threshold is set to 0, no notifications will be sent to the recipient. |
| Stop Abnormal Tasks After | Number of days after which an abnormal task is automatically stopped. The value must range from 14 to 100. The default value is 14 . |
| | NOTE Tasks in the abnormal state are still charged. If tasks remain in the abnormal state for a long time, they cannot be resumed. Abnormal tasks run longer than the period you set (unit: day) will automatically stop to avoid unnecessary fees. |

Table 2-20 Task startup settings

8. After the task is submitted, go back to the **Online Migration Management** page to view the task status.

Step 2 Manage the migration task.

The migration task contains two phases: full migration and incremental migration. You can manage them in different phases.

• Full migration

- Viewing the migration progress: Click the target full migration task, and on the Migration Progress tab, you can see the migration progress of the structure, data, indexes, and migration objects. When the progress reaches 100%, the migration is complete.
- Viewing migration details: In the migration details, you can view the migration progress of a specific object. If the number of objects is the same as that of migrated objects, the migration is complete. You can view the migration progress of each object in detail. Currently, this function is available only to whitelisted users. You can submit a service ticket to apply for this function.
- Incremental Migration Permission
 - Viewing the synchronization delay: After the full migration is complete, an incremental migration starts. On the Online Migration Management page, click the target migration task. On the displayed page, click Migration Progress to view the synchronization delay of the incremental migration. If the synchronization delay is 0s, the destination database is being synchronized with the source database in real time. You can also view the data consistency on the Migration Comparison tab.

|--|

| Basic Information | Note: [| Do not change the usernam | es, passwords, and permissions of source and de | stination data | base users before the task has completed. Start the task and o | et 7 days free. If the status indical | ites a |
|----------------------|---------|------------------------------|---|----------------|--|---------------------------------------|--------|
| Migration Comparison | synchr | onization or migration is co | mplete, there may still be triggers or events to be | nigrated befo | re the entire task is finished. | | |
| Migration Progress | | | | | | | С |
| Migration Logs | Last U | pdated Jan 05, 2022 17:08 | 49 GM1+08:00 | | | | |
| rags | 1 | Progress | | | | | <hr/> |
| | | | Full migration progress | | | | |
| | | | Structure migration | 100% | Waiting for incremental migration | _ | |
| | | | Data migration | 100% | | | |
| | | Source Database | Index migration | 100% | | Destination Database | |
| | | | | | | | J |

 Viewing the migration results: On the Online Migration Management page, click the target migration task. On the displayed page, click Migration Comparison and perform a migration comparison in accordance with the comparison process, which should help you determine an appropriate time for migration to minimize service downtime.

Figure 2-29 Database comparison process



For details, see **Comparing Migration Items** in *Data Replication Service User Guide*.

Step 3 Cut over services.

You are advised to start the cutover process during off-peak hours. At least one complete data comparison is performed during off-peak hours. To obtain accurate

comparison results, start data comparison at a specified time point during offpeak hours. If it is needed, select **Start at a specified time** for **Comparison Time**. Due to slight time difference and continuous operations on data, inconsistent comparison results may be generated, reducing the reliability and validity of the results.

- 1. Interrupt services first. If the workload is not heavy, you may not need to interrupt the services.
- 2. Run the following statement on the source database and check whether any new sessions execute SQL statements within the next 1 to 5 minutes. If there are no new statements executed, the service has been stopped. db.currentOp()

NOTE

The process list queried by the preceding statement includes the connection of the DRS replication instance. If no additional session executes SQL statements, the service has been stopped.

- 3. On the **Migration Progress** page, view the synchronization delay. When the delay is displayed as 0s and remains stable for a period, then you can perform a data-level comparison between the source and destination databases. For details about the time required, refer to the results of the previous comparison.
 - If there is enough time, compare all objects.
 - If there is not enough time, use the data-level comparison to compare the tables that are frequently used and that contain key business data or inconsistent data.
- 4. Determine an appropriate time to cut the services over to the destination database. After services are restored and available, the migration is complete.
- **Step 4** Stop or delete the migration task.
 - 1. Stopping the migration task. After databases and services are migrated to the destination database, to prevent operations on the source database from being synchronized to the destination database to overwrite data, you can stop the migration task. This operation only deletes the replication instance, and the migration task is still displayed in the task list. You can view or delete the task. DRS will not charge for this task after you stop it.
 - 2. Delete the migration task. After the migration task is complete, you can delete it. After the migration task is deleted, it will no longer be displayed in the task list.

----End

2.7 From On-Premises MySQL to RDS for MySQL

DRS supports data migration from on-premises MySQL databases to RDS for MySQL instances. With DRS, you can migrate databases online with zero downtime and your services and databases can remain operational during migration.

This section describes how to use DRS to migrate data from an on-premises MySQL database to an RDS for MySQL instance on the current cloud. The following network types are supported:

- Virtual Private Network (VPN)
- Public network

Diagram

Figure 2-30 VPN







Migration Process



Migration Suggestions (Important)

- Database migration is closely impacted by a wide range of environmental and operational factors. To ensure the migration goes smoothly, perform a test run before the actual migration to help you detect and resolve any potential issues in advance. Recommendations on how to minimize any potential impacts on your data base are provided in this section.
- It is strongly recommended that you start your migration task during off-peak hours. A less active database is easier to migrate successfully. If the data is fairly static, there is less likely to be any severe performance impacts during the migration.

Notes on Migration (Important)

NOTICE

Before creating a migration task, read the migration notes carefully.

For details, see **precautions** on using specific migration tasks in *Data Replication Service Real-Time Migration*.

Preparations

1. Permissions

Table 2-21 lists the permissions required for the source and destination databases when migrating data from on-premises MySQL databases to the RDS for MySQL instances on the current cloud.

| Table 2-21 Required permissions | Fable 2-2 | Required | permissions |
|---------------------------------|-----------|----------|-------------|
|---------------------------------|-----------|----------|-------------|

| Database | Full Migration | Full+Incremental Migration |
|-------------|--|--|
| Source | SELECT, SHOW VIEW, and EVENT | SELECT, SHOW VIEW, EVENT, LOCK TABLES, REPLICATION SLAVE, and REPLICATION CLIENT |
| Destination | SELECT, CREATE, ALTER, DROP, DELETE, INSERT, UPDATE, INDEX, EVENT, CREATE VIEW, CREATE ROUTINE, TRIGGER, REFERENCES, and WITH GRANT OPTION. | |
| | If the destination databa 8.0.14 to 8.0.18, the SESS permission is required. | se version is in the range ION_VARIABLES_ADMIN |
| | To migrate users, you mu INSERT, UPDATE, and DE MySQL database. | ist have the SELECT, LETE permissions for the |

– Source database permissions:

The source database user must have all the required permissions listed in **Table 2-21**. If the permissions are insufficient, create a user that has all of the permissions on the source database.

– Destination database permissions:

If the destination database is an RDS for MySQL database on the current cloud, the initial account can be used.

- 2. Network settings
 - Source database network settings:

You can migrate data from on-premises MySQL databases to an RDS for MySQL instance on the current cloud through a VPN or public network. Enable public accessibility or establish a VPN for the on-premises MySQL databases based on your service requirements. You are advised to migrate data through a public network, which is more convenient and costeffective.

- Destination database network settings:
 - If the source database attempts to access the destination database through a VPN, you need to enable the VPN service first so that the source database can communicate with the destination RDS for MySQL.

- If the source database attempts to access the destination database through a public network, you do not need to configure the destination database.
- 3. Security rules
 - a. Source database security group settings:
 - The replication instance needs to be able to access the source DB. That means that the EIP of the replication instance must be on the whitelist of the source MySQL DB instance. Before configuring the network whitelist, you need to obtain the EIP of the replication instance.

After creating a replication instance on the DRS console, you can find the EIP on the **Configure Source and Destination Databases** page.

Figure 2-33 EIP of the replication instance

Create Replication Instance Configure Source and Confirm Task
 Con

If the migration is performed over a VPN network, add the private IP address of the DRS replication instance to the network whitelist of the source MySQL database to enable the source MySQL database to communicate with the current cloud. The IP address on the **Configure Source and Destination Databases** page is the private IP address of the replication instance.

If you do take this step, then once the migration is complete, you should delete this item from the whitelist or your system will insecure.

b. Destination database security group settings:

By default, the destination database and the DRS replication instance are in the same VPC and can communicate with each other. No further configuration is required.

4. Other

DRS supports migration of some parameters that are closely related to services and performance. For details about these parameters, see **Parameters for Comparison**. If you need to migrate other parameters, configure them manually based on service requirements.

Migration Procedure

The following describes how to use DRS to migrate data from an on-premises MySQL database to an RDS for MySQL instance on the current cloud over a public network.

- **Step 1** Create a migration task.
 - Log in to the management console and choose Databases > Data Replication Service to go to the DRS console.
 - 2. On the **Online Migration Management** page, click **Create Migration Task**.
 - 3. On the **Create Replication Instance** page, configure the task details and the replication instance, and click **Next**.

Figure 2-34 Replication instance information

| Replication Instance Details 💿 | | |
|---------------------------------------|--|--|
| The following information cannot be m | ooned after you go to the next page. | |
| * Data Flow | To the cloud Out of the cloud Self-built to self-built | |
| | The destination database must be a database in the current cloud. If you want to migrate data between database, select To the cloud. | |
| * Source DB Engine | M/cX. MySQL schema and logic table Mixings08 Reds | |
| * Destination DB Engine | Mp2k DDM GaussDBHzr My52k) | |
| * Network Type | Public network • | |
| | 🗹 Lunderstand that an EIP will be automatically bound to the replication instance and released after the replication task is complete. | |
| * Destination DB Instance | Select as instance | |
| Replication Instance Subnet | Select the solvert | |
| * Migration Type | Full-Incenental Ful | |
| | This migration type allows you to migrate data with minimal downtime. After a full migration initializes the destination database, an incremental migration parses logs to ensure data condutincy between the source and destination databases. | |
| * Destination DB Instance Access | tead only tended with the second of the seco | |
| | | |

Table 2-22 Task settings

| Parameter | Description |
|-------------|--|
| Region | The region where the replication instance is deployed. You can change the region. To reduce latency and improve access speed, select the region closest to your workloads. |
| Project | The project corresponds to the current region and can be changed. |
| Task Name | The task name consists of 4 to 50 characters, starts with a letter, and can contain only letters (case-insensitive), digits, hyphens (-), and underscores (_). |
| Description | The description consists of a maximum of 256 characters and cannot contain the following special characters: =<>&'\" |

Table 2-23 Replication instance settings

| Parameter | Description | |
|----------------------------|--|--|
| Data Flow | Select To the cloud . | |
| Source DB Engine | Select MySQL . | |
| Destination DB Engine | Select MySQL . | |
| Network Type | Select Public network . Enabling SSL is recommended. It may slow down the migration by 20% to 30% but it ensures data security. | |
| Destination DB Instance | The RDS for MySQL instance you created. | |

| Parameter | Description |
|--------------------------------|---|
| Destination Database Access | You can select Read-only or Read/Write. Read-only During migration, the destination database is read-only. After the migration is complete, it restores to the read/write status. This option ensures the integrity and success rate of data migration. Read/Write During migration, the destination database can be queried or modified. Data may be modified when operations are performed or applications are connected. It should be noted that background processes can often generate or modify data, which may result in data conflicts, task faults, and upload |
| | failures. Do not select this option if you do not fully understand the risks. |
| Migration Type | Select Full+Incremental as an example. |
| | Full: This migration type is suitable for scenarios where service interruption is acceptable. All objects and data in non-system databases are migrated to the destination database at one time. The objects include tables, views, and stored procedures. NOTE If you are performing a full migration, do not perform operations on the source database. Otherwise, data generated in the source database during the migration will not be destined to the database. |
| | Full+Incremental: This migration type allows you to migrate data without interrupting services. After a full migration initializes the destination database, an incremental migration initiates and parses logs to ensure data consistency between the source and destination databases. |
| | NOTE If you select the Full+Incremental migration type, data generated during the full migration will be synchronized to the destination database with zero downtime, ensuring that the source database remain accessible. |

4. On the **Configure Source and Destination Databases** page, wait until the replication instance is created. Then, specify source and destination database information and click **Test Connection** for both the source and destination databases to check whether they have been connected to the replication instance. After the connection tests are successful, select the check box before the agreement and click **Next**.

| - | |
|---------------------------|--|
| Source Database | |
| IP Address or Domain Name | 1982 748 1982 110 |
| Port | 1006 |
| Database Username | toon |
| | DRS migrates only some key parameters to the destination database. For the other parameters that cannot be migrated, you need to use parameter templates to them on the destination database. |
| Database Password | |
| SSL Connection | |
| | If you want to enable SSL connection, ensure that SSL has been enabled on the source database, related parameters have been correctly configured, and an SSL o has been uploaded. |
| Ecountion Cartificate | Select O Text successful |

Figure 2-35 Source and destination database details

| Dalabase Fassword | |
|-------------------------|--|
| SSL Connection | |
| | If you want to enable SSL connection, ensure that SSL has been enabled on the source database, related parameters have been correctly configured, and an SSL certificate |
| | has been uploaded |
| | |
| Encryption Certificate | Select Select |
| | Test Connection |
| | |
| | |
| Destination Database | |
| DB Instance Name | ndu-hjm-test2 |
| | |
| Database Username | root |
| Database Password | |
| | |
| Migrate Definer to User | ○ Yes ⑦ ● No ⑦ |
| | Test Connection Test successful |
| | |

Table 2-24 Source database settings

| Parameter | Description |
|------------------------------|--|
| IP Address or Domain Name | The IP address or domain name of the source database. |
| Port | Enter an integer ranging from 1 to 65535, which indicates the port number of the source database. |
| Database Username | A username for the source database. |
| Database Password | The password for the database username. |
| SSL Connection | To improve data security during a migration on a public network, you are advised to enable SSL to encrypt migration links and upload a CA certificate. |

Table 2-25 Destination database settings

| Parameter | Description |
|---------------------|--|
| DB Instance Name | The RDS for MySQL instance you have selected during the replication instance creation is displayed by default and cannot be changed. |

| Parameter | Description |
|----------------------------|--|
| Database Username | The username for accessing the destination RDS for MySQL instance. |
| Database Password | The password for the database username. |
| Migrate Definer to User | Yes The Definers of all source database objects will be migrated to the user. Other users do not have permissions for database objects unless these users are authorized. For details on authorization, see How Do I Maintain the Original Service User Permission System After Definer Is Forcibly Converted During MySQL Migration? in Data Replication Service FAQs. |
| | No The Definers of all source database objects will not be changed. You need to migrate all accounts and permissions of the source database in the next step. |

5. On the **Set Task** page, set the flow control mode and select migration accounts and objects.

Figure 2-36 Migration object

| Note: | Before the | e migration task is complete, you c | annot change the use | ernames, passwords, and rights of a | ny source database users. | |
|-----------------------|--|--|--|-------------------------------------|-----------------------------------|-----------------|
| *Flow Control | Yes | No | | | | |
| *Filter DROP DATABASE | Yes | No | | | | |
| ★Migrate Account | Yes During a database. Confir | No database migration, you need to su Ensure that services are not affect m All Remarks | eparately migrate acco <mark>æd.</mark> | ounts and permissions. Certain acco | ounts cannot be migrated to the d | estination C |
| | | Account | Can Be Migrated | Permission | Password | Remarks |
| | ~ | ·@' | Yes | GRANT ALL PRIVILEGES ON *.* | | View |
| | |)'@' % | Yes | GRANT ALL PRIVILEGES ON *.* | | View |
| | | 1'@' | Yes | GRANT ALL PRIVILEGES ON *.* | | View |
| | | r'@'%' | No | GRANT SELECT, INSERT, UPD | | View |
| | | '@'%' | No | GRANT USAGE ON *.* GRAN | | View |
| | | :'@'%' | No | GRANT ALL PRIVILEGES ON *.* | | View |
| | | @'localhost' | No | GRANT USAGE ON *.* GRAN | | View |
| | Reset | Password Inified Password | | | | |
| *Migrate Object | All | Tables Databa | ases ⑦ | | | |

| Paramete r | Description |
|--------------------------------|--|
| Flow | You can choose whether to control the flow. |
| Control | You can customize the maximum migration speed. In addition, you can set the time range based on your service requirements. The traffic rate setting usually includes setting of a rate limiting time period and a traffic rate value. Flow can be controlled all day or during specific time ranges. The default value is All day. A maximum of three time ranges can be set, and they cannot overlap. The flow rate must be set based on the service scenario and |
| | cannot exceed 9,999 MB/s. |
| | If the migration speed is not limited, the outbound bandwidth of the source database is maximally used, which will increase the read burden on the source database. For example, if the outbound bandwidth of the source database is 100 MB/s and 80% bandwidth is used, the I/O consumption on the source database is 80 MB/s. NOTE |
| | Flow control mode takes effect only during a full migration. |
| | You can also change the flow control mode after creating a task. In the task list on the Online Migration Management page, locate the target task and choose More > Speed or Speed in the Operation column. |
| Filter DROP DATABAS E | During migration, executing DDL operations on the source database may affect the data migration performance to some extent. To reduce data migration risks, DRS allows you to filter out DDL operations. |
| | The database deletion operation can be filtered out by default. |
| | If you select Yes, the database deletion operation performed on the source database is not synchronized during data synchronization. |
| | If you select No, related operations are synchronized to the destination database during data synchronization. NOTE |
| | Only the database deletion operation can be filtered. |

Table 2-26 Migration types and objects-public network

| Paramete r | Description |
|--------------------|--|
| Migrate Account | During a database migration, accounts need to be migrated separately. |
| | There are accounts that can be migrated completely, accounts whose permissions need to be reduced, and accounts that cannot be migrated. You can choose whether to migrate the accounts based on your service requirements. If you select Yes , you can select the accounts to be migrated as required. |
| | Yes If you choose to migrate accounts, see Migrating Accounts in Data Replication Service User Guide to migrate database users, permissions, and passwords. |
| | No During the migration, accounts and permissions are not migrated. |
| Migrate Object | All database objects can be migrated. After the objects are migrated to the destination DB instance, the object names remain the same as those in the source database and cannot be modified. |
| | You can migrate all objects or specified objects based on your service requirements. |
| | All: All objects in the source database are migrated to the destination database. |
| | Self-defined: Only self-defined objects are migrated to the destination database. |
| | NOTE If you choose not to migrate all of the databases, the migration may fail because the objects, such as stored procedures and views, in the database to be migrated may have dependencies on other objects that are not migrated. To ensure a successful migration, you are advised to migrate all of the databases. |

- 6. Click **Next**. On the **Check Task** page, check the migration task.
 - If any check fails, review the cause and rectify the fault. After the fault is rectified, click **Check Again**.
 - If all check items are successful, click **Next**.
- 7. Compare the source and target parameters.

By comparing common and performance parameters for the source databases against those of the destination databases, you can help ensure that services will not change after a migration is completed. You can determine whether to use this function based on service requirements. It mainly ensures that services are not affected after a migration is completed.

- As this process is optional, you can click **Next** if you wish to skip this step.
- Compare common parameters:

If the parameter values in the list shown are inconsistent, you can click **Save Change** to change the destination database values to match those of the source database.

| | Figure | 2-37 | Modifying | common | parameters |
|--|--------|------|-----------|--------|------------|
|--|--------|------|-----------|--------|------------|

| Parameter Type Common parameters Performance parameter | rs. | | |
|--|--|---|--|
| Select the destination database parameters whose values you want to change to Save Change | be the same as those in the source database. Some changes take effect only a | fter you restart the destination database. You are advised to restart the destina | tion database before or after the migration. |
| Parameter Name | Source Database Value | Destination Database Value | Result |
| C character_set_server | utf5 | utf5 | Consistent |
| ② collation_server | utf8_general_cl | ut/8.general.cl | Consistent |
| () connect_timeout | 10 | 10 | O Consistent |
| C explicit_defaults_for_timestamp | Off | ON | 0 Inconsistent |
| (b) innode_fluck_log_at_tx_commit | 1 | 1 | Consistent |
| () innoda_lock_wait_timeout | 50 | 50 | Consistent |
| (b) max_connections | 800 | 800 | Consistent |
| ③ net_read_timeout | 30 | 30 | O Consistent |
| net_write_timeout | 60 | 60 | O Consistent |
| (2) br, isolation | REPEATABLE-READ | REPEATABLE-READ | Consistent |

Performance parameter values in both the source and destination can be the same or different.

- There is a value that is consistent, but you still want to change it in the destination, locate the parameter, enter the value in the Change To column, and click Save Change in the upper left corner.
- If you want to change a destination database value to match the source same:

1) Click Use Source Database Value.

The system automatically updates the destination database value to match the source.

| Figure 2-38 One-click modificatio | n |
|-----------------------------------|---|
|-----------------------------------|---|

| | - Str. | | | | | | | |
|-----------|---|--|--|-----------------------------|-------------------------|---------------------------------|--------------------------------|---|
| Select th | e destination database parameters you want to change. Some changes take effect Source Database Value Source Database Value | conly after you restart the destination of | latabase. You are advised to restart the | destination database before | or after the migration. | | | с |
| | Parameter Name | Source Database Value | Destination Database Value | Change To | | Allowed Destination Database Va | Result | |
| | D binlog, cache_size | 32768 | 32768 | 8 | * 4096 = 32768 | 4095~16777216 | Consistent | |
| | (binlog.stmt.cache_size) | 32768 | 32768 | 8 | * 4096 = 32768 | 4096~16777216 | Consistent | |
| | bulk_inset_buffer_size | 8388608 | 8389608 | | | 0-18446744073709551615 | Consistent | |
| 2 | Innode_buffer_pool_size Enter a value smaller than or equal to 70% of memory size of the destina | 536870912 | 805306368 | 4 | * 134217728 = 536870912 | 536870912-1717986918 | 0 Inconsistent | |
| | ② long_query_time | 1.000000 | 1.000000 | | | 0.03~3600 | Consistent | |
| | () read_buffer_size | 262144 | 262144 | 64 | * 4096 = 262144 | 8192-2147479552 | Consistent | |
| | () read_md_buffer_size | 524288 | 524288 | 128 | * 4096 = 524288 | 1~2147483547 | Consistent | |
| | () sort_buffer_size | 262144 | 262144 | | | 32708-18449744073709551615 | Consistent | |
| | () anc,binlog | 1 | 1 | | | 0~4294967295 | Consistent | |
| | | | | | | | | |

D NOTE

You can also manually enter parameter values.

2) Click Save Change to save your changes.

The system changes the parameter values based on your settings for the destination database values. After the modification, the comparison results are automatically updated.

| Parametr | er Type Common parameters Performance parameters | | | | | | |
|-----------|---|---|--|-----------------------------|---------------------------|---------------------------------|--------------------------------|
| Select th | e destination database parameters you want to change. Some changes take effect | only after you restart the destination of | latabase. You are advised to restart the | destination database before | e or after the migration. | | |
| Use S | iource Database Value Save Change | | | | | | C |
| | Parameter Name | Source Database Value | Destination Database Value | Change To | | Allowed Destination Database Va | Result |
| | (b) binlog.cache.size | 32768 | 32768 | 8 | * 4096 = 32768 | 4096~16777216 | Consistent |
| | Dinlog.stmt,cache_size | 32708 | 32768 | 8 | * 4096 = 32768 | 4096-16777216 | Consistent |
| | (bulk_inset_buffer_size) | 8388608 | 8388608 | | | 0~18446744073709551615 | Consistent |
| | Innod0_buffer_pool_size Enter a value smaller than or equal to 70% of memory size of the destina | 536870912 | 805306368 | 4 | * 134217728 = 536870912 | 536870912-1717986918 | 0 Inconsistent |
| | (b) long_query_time | 1.000000 | 1.000000 | | | 0.03-3900 | Consistent |
| | () read_buffer_size | 262144 | 262144 | 64 | - 4095 = 262144 | 8192-2147479552 | Consistent |
| | (2) read_md_buffer_size | 524288 | 524288 | 128 | * 4096 = 524288 | 1-2147483647 | Consistent |
| | (*) sort_buffer_size | 262144 | 262144 | | | 32768~18446744073709551615 | Consistent |
| | (1) sync, binlog | 1 | 1 | | | 0-4294967295 | Consistent |
| | | | | | | | |

Figure 2-39 Performance parameters

Some parameters in the destination database require a restart before the changes can take effect. The system will display these as being inconsistent. You will need to restart the destination database after either before the migration starts or after it has completed. To minimize the impact of this restart on your services, it is recommended that you schedule a specific time to restart the destination database after the migration is complete.

For details about parameter comparison, see **Parameters for Comparison** in *Data Replication Service User Guide*.

- 3) Click Next.
- 8. On the displayed page, specify **Start Time**, **Send Notification**, **SMN Topic**, **Synchronization Delay Threshold**, and **Stop Abnormal Tasks After** and confirm that the configured information is correct and click **Submit** to submit the task.

Figure 2-40 Task startup settings

| Start Time | Start upon task creation | Start at a specified time | 0 |
|------------------------------------|--------------------------|-------------------------------------|--|
| Send Notifications | Please handle exce | ptions within 48 hours of receiving | SMS messages or emails. |
| * SMN Topic | | • C (?) | |
| Synchronization Delay Threshold(s) | | | |
| * Stop Abnormal Tasks After | 14 (?) Abr | normal tasks run longer than the p | eriod you set (unit: day) will automatically stop. |

Table 2-27 Task startup settings

| Parameter | Description |
|------------|--|
| Start Time | Set Start Time to Start upon task creation or Start at a specified time based on site requirements. The Start at a specified time option is recommended. |
| | NOTE The migration task may affect the performance of the source and destination databases. You are advised to start the task in off-peak hours and reserve two to three days for data verification. |

| Parameter | Description | | | |
|--|---|--|--|--|
| Send Notification s | SMN topic. This parameter is optional. If an exception occurs during migration, the system will send a notification to the specified recipients. | | | |
| SMN Topic | This parameter is available only after you enable Send Notification and create a topic on the SMN console and add a subscriber. | | | |
| | For details, see Simple Message Notification User Guide. | | | |
| Synchroniza tion Delay Threshold | During an incremental migration, a synchronization delay indicates a time difference (in seconds) of synchronization between the source and destination database. | | | |
| | If the synchronization delay exceeds the threshold you specify, DRS will send alarms to the specified recipients. The value ranges from 0 to 3,600. To avoid repeated alarms caused by the fluctuation of delay, an alarm is sent only after the delay has exceeded the threshold for six minutes | | | |
| | NOTE | | | |
| | In the early stages of an incremental migration, there is more delay because more data is waiting to be synchronized. In this situation, no notifications will be sent. | | | |
| | Before setting the delay threshold, enable Send Notification. | | | |
| | If the delay threshold is set to 0, no notifications will be sent to the recipient. | | | |
| Stop Abnormal Tasks After | Number of days after which an abnormal task is automatically stopped. The value must range from 14 to 100. The default value is 14 . | | | |
| | NOTE Tasks in the abnormal state are still charged. If tasks remain in the abnormal state for a long time, they cannot be resumed. Abnormal tasks run longer than the period you set (unit: day) will automatically stop to avoid unnecessary fees. | | | |

- 9. After the task is submitted, go back to the **Online Migration Management** page to view the task status.
- **Step 2** Manage the migration task.

The migration task contains two phases: full migration and incremental migration. You can manage them in different phases.

- Full migration
 - Viewing the migration progress: Click the target full migration task, and on the Migration Progress tab, you can see the migration progress of the structure, data, indexes, and migration objects. When the progress reaches 100%, the migration is complete.
 - Viewing migration details: In the migration details, you can view the migration progress of a specific object. If the number of objects is the same as that of migrated objects, the migration is complete. You can view the migration progress of each object in detail. Currently, this

function is available only to whitelisted users. You can submit a service ticket to apply for this function.

- Incremental Migration Permission
 - Viewing the synchronization delay: After the full migration is complete, an incremental migration starts. On the Online Migration Management page, click the target migration task. On the displayed page, click Migration Progress to view the synchronization delay of the incremental migration. If the synchronization delay is 0s, the destination database is being synchronized with the source database in real time. You can also view the data consistency on the Migration Comparison tab.

Figure 2-41 Viewing the synchronization delay

| Basic Information Migration Comparison Migration Progress Migration Logs | Note: Do not change the usemames, passwords, and permissions of source and destination database users before the task has completed Start the task and get 7 days free. If the status indicates synchronization or migration is complete, there may still be triggers or events to be migrated before the entire task is finished. Last Updated Jan 05, 2022 17:08.49 GMT-08:00 | | | | | |
|---|---|---|--------------|-----------------------------------|----------------------|--|
| Tags | Progress Source Database | Full migration progress Structure migration Data migration Index migration | 100% 100% | Waiting for incremental migration | Destination Database | |

 Viewing the migration results: On the Online Migration Management page, click the target migration task. On the displayed page, click Migration Comparison and perform a migration comparison in accordance with the comparison process, which should help you determine an appropriate time for migration to minimize service downtime.

Figure 2-42 Database comparison process



For details, see **Comparing Migration Items** in *Data Replication Service User Guide*.

Step 3 Cut over services.

You are advised to start the cutover process during off-peak hours. At least one complete data comparison is performed during off-peak hours. To obtain accurate comparison results, start data comparison at a specified time point during off-peak hours. If it is needed, select **Start at a specified time** for **Comparison Time**. Due to slight time difference and continuous operations on data, inconsistent comparison results may be generated, reducing the reliability and validity of the results.

1. Interrupt services first. If the workload is not heavy, you may not need to interrupt the services.

2. Run the following statement on the source database and check whether any new sessions execute SQL statements within the next 1 to 5 minutes. If there are no new statements executed, the service has been stopped. show processlist

NOTE

The process list queried by the preceding statement includes the connection of the DRS replication instance. If no additional session executes SQL statements, the service has been stopped.

- 3. On the **Migration Progress** page, view the synchronization delay. When the delay is displayed as 0s and remains stable for a period, then you can perform a data-level comparison between the source and destination databases. For details about the time required, refer to the results of the previous comparison.
 - If there is enough time, compare all objects.
 - If there is not enough time, use the data-level comparison to compare the tables that are frequently used and that contain key business data or inconsistent data.
- 4. Determine an appropriate time to cut the services over to the destination database. After services are restored and available, the migration is complete.
- **Step 4** Stop or delete the migration task.
 - 1. Stopping the migration task. After databases and services are migrated to the destination database, to prevent operations on the source database from being synchronized to the destination database to overwrite data, you can stop the migration task. This operation only deletes the replication instance, and the migration task is still displayed in the task list. You can view or delete the task. DRS will not charge for this task after you stop it.
 - 2. Delete the migration task. After the migration task is complete, you can delete it. After the migration task is deleted, it will no longer be displayed in the task list.

----End

2.8 From On-Premises MongoDB to DDS

DRS helps you migrate data from on-premises MongoDB databases to DDS on the current cloud. With DRS, you can migrate databases online with zero downtime and your services and databases can remain operational during migration.

This section describes how to use DRS to migrate an on-premises MongoDB database to DDS on the current cloud. The following network types are supported:

- VPN
- Public network

Diagram



Figure 2-44 Public network+SSL connection



Migration Process



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Migration Suggestions (Important)

- Database migration is closely impacted by a wide range of environmental and operational factors. To ensure the migration goes smoothly, perform a test run before the actual migration to help you detect and resolve any potential issues in advance. Recommendations on how to minimize any potential impacts on your data base are provided in this section.
- It is strongly recommended that you start your migration task during off-peak hours. A less active database is easier to migrate successfully. If the data is fairly static, there is less likely to be any severe performance impacts during the migration.

Notes on Migration (Important)

NOTICE

Before creating a migration task, read the migration notes carefully.

For details, see **precautions** on using specific migration tasks in *Data Replication Service Real-Time Migration*.

Preparations

1. Permissions

Table 2-28 lists the permissions required for the source and destination databases when migrating data from on-premises MongoDB databases to DDS DB instances.

| Database | Full Migration Permission | Full+Incremental Migration Permission | |
|-------------|---|--|--|
| Source | Replica set: The source database user must have the read permission for the database to be migrated. Single node: The source database user must have the read permission for the database to be migrated. Cluster: The source database user must have the read permission for the database set to be migrated and the config database. To migrate accounts and roles of the source database user must have the read permission for the database and roles of the source database user must have the read permission for the system.users and system.roles system tables of the admin database. | Replica set: The source database user must have the read permission for the databases to be migrated and the local database. Single node: The source database user must have the read permission for the databases to be migrated and the local database. Cluster: The source mongos node user must have the readAnyDatabase permission for the databases to be migrated and the config database. The source shard node user must have the readAnyDatabase permission for the admin database and the read permission for the source shard node user must have the readAnyDatabase permission for the source shard node user must have the readAnyDatabase permission for the source shard node user must have the readAnyDatabase permission for the source database and the read permission for the local database. To migrate accounts and roles of the source database user must have the read permission for the source database user must have the read permission for the source database the source dat | |
| Destination | The destination database user must have the dbAdminAnyDatabase permission for the admin database and the readWrite permission for the destination database. If the destination database is a cluster instance, the migration account must have the read permission for the config database. | | |

Table 2-28 Required permissions
- Source database permissions:

The source database user must have all the required permissions listed in **Table 2-28**. If the permissions are insufficient, create a user that has all of the permissions on the source database.

– Destination database permissions:

If the destination database is a DDS database, the initial account can be used.

- 2. Network settings
 - Source database network settings:

You can migrate on-premises MongoDB databases to DDS through a VPN or public network. Enable public accessibility or establish a VPN for local MongoDB databases based on the site requirements. You are advised to migrate data through a public network, which is more convenient and cost-effective.

- Destination database network settings:
 - If the source database accesses the destination database through a VPN, enable the VPN service first so that the source database can communicate with the destination DDS network.
 - If you access the DDS DB instance through a public network, no network settings are required.
- 3. Security rules
 - a. Source database network settings:
 - The replication instance needs to be able to access the source DB. That means that the EIP of the replication instance must be on the whitelist of the source MongoDB instance. Before configuring the network whitelist for the source database, you need to obtain the EIP of the DRS replication instance.

After creating a replication instance on the DRS console, you can find the EIP on the **Configure Source and Destination Databases** page as shown in **Figure 2-46**.

Figure 2-46 EIP of the replication instance

You can also add 0.0.0.0/0 to the source database whitelist to allow any IP address to access the source database but this action may result in security risks.

If the migration is performed over a VPN network, add the private IP address of the DRS replication instance to the whitelist of the source database to enable the source database to communicate with the destination database.

If you do take this step, then once the migration is complete, you should delete this item from the whitelist or your system will insecure.

b. Destination database security group settings:

By default, the destination database and the DRS replication instance are in the same VPC and can communicate with each other. No further configuration is required.

4. Other

You need to export the user information of the MongoDB database first and manually add it to the destination DDS DB instance because the user information will not be migrated.

Migration Procedure

The following describes how to use DRS to migrate an on-premises MongoDB database to a DDS DB instance.

- **Step 1** Create a migration task.
 - 1. Log in to the management console and choose **Databases** > **Data Replication Service** to go to the DRS console.
 - 2. On the **Online Migration Management** page, click **Create Migration Task**.
 - 3. On the **Create Replication Instance** page, configure the task details, recipient, and replication instance and click **Next**.

| Replication Instance Details 💿 | | | | | |
|---|--|--|--|--|--|
| The following information cannot be modified after you go to the rest page. | | | | | |
| * Data Flow | To the cloud Out of the cloud | | | | |
| | The destination database must be a database in the current cloud. If you want to migrate data between databases, select To the cloud. | | | | |
| * Source DB Engine | MySQL MySQL scheme and logic table MongpUB | | | | |
| * Destination DB Engine | GaustiDR(for Monopo) DDS | | | | |
| * Network Type | Public network •) | | | | |
| | Indestand that an BP will be automatically bound to the replication instance and released after the replication task is complete. | | | | |
| * Destination DB Instance | ddd 🔹 🔹 🕻 View DB Instance View Unselectable DB Instance | | | | |
| Replication Instance Subnet | vpc· | | | | |
| * Migration Type | Full-Incremental Full | | | | |
| | This migration type allows you to migrate data with minimal downtime. After a full migration initializes the destination database, an incremental migration parses logs to ensure data consistency between the source and destination databases. | | | | |
| * Source DB Instance Type | Non-cluster Cluster | | | | |
| * Obtain Incremental Data | oplog durgeStream | | | | |
| | Mongc08 32 or later versions are supported. Incremental data is estracted from the source instance shard nodes. If you select this option, disable the balancer for the source instance, and specify the IP address of each shard node. | | | | |
| * Source Shard Quantity | - 2 + | | | | |
| * Destination DB Instance Access | Read-only Read/Witte | | | | |
| | Configuring the destination DR instance as read-only heirs ensure the migration is successful. Once the migration is complete the DR instance automatically changes to Read/Write. | | | | |

Figure 2-47 Replication instance information

Table 2-29 Task settings

| Parameter | Description |
|-----------|--|
| Region | The region where the replication instance is deployed. You can change the region. To reduce latency and improve access speed, select the region closest to your workloads. |
| Project | The project corresponds to the current region and can be changed. |

| Parameter | Description |
|-------------|--|
| Task Name | The task name consists of 4 to 50 characters, starts with a letter, and can contain only letters (case-insensitive), digits, hyphens (-), and underscores (_). |
| Description | The description consists of a maximum of 256 characters and cannot contain the following special characters: =<>&'\" |

Table 2-30 Replication instance settings

| Parameter | Description |
|----------------------------|---|
| Data Flow | Select To the cloud . |
| Source DB Engine | Select MongoDB. |
| Destination DB Engine | Select DDS . |
| Network Type | Select Public network . Enabling SSL is recommended. It may slow down the |
| | migration by 20% to 30% but it ensures data security. |
| Destination DB Instance | The DDS DB instance you purchased. |
| Migration Type | Full It migrates all data at one time. If you perform a full migration, you are advised to stop operations on the source database. Otherwise, data generated in the source database during the migration will not be synchronized to the destination database. Full+Incremental An incremental migration can keep data consistency after a full migration is complete. |
| Source DB Instance Type | If you select Full+Incremental for Migration Type, set this parameter based on the source database. If the source database is a cluster instance, set this parameter to Cluster. If the source database is a replica set or a single node instance, set this parameter to Non-cluster. |

| Parameter | Description |
|-------------------------------|---|
| Obtain Incremental Data | This parameter is available for configuration if Source DB Instance Type is set to Cluster . You can determine how to capture data changes during the incremental synchronization. |
| | oplog: For MongoDB 3.2 or later, DRS directly connects to each shard of the source DB instance to extract data. If you select this mode, you must disable the balancer of the source instance. When testing the connection, you need to enter the connection information of each shard node of the source instance. |
| | changeStream: This method is recommended. For MongoDB 4.0 and later, DRS connects to mongos nodes of the source instance to extract data. If you select this method, you must enable the WiredTiger storage engine of the source instance. |
| | NOTE Only whitelisted users can use changeStream . To use this function, submit a service ticket. In the upper right corner of the management console, choose Service Tickets > Create Service Ticket to submit a service ticket. |
| Source Shard Quantity | If Source DB Instance Type is set to Cluster and Obtain Incremental Data is set to oplog , enter the number of source shard nodes. |
| | The default minimum number of source DB instances is 2 and the maximum number is 32. You can set this parameter based on the number of source database shards. |

4. On the **Configure Source and Destination Databases** page, wait until the replication instance is created. Then, specify source and destination database information and click **Test Connection** for both the source and destination databases to check whether they have been connected to the replication instance. After the connection tests are successful, select the check box before the agreement and click **Next**.

| Figure 2-48 | Source | database | information |
|-------------|--------|----------|-------------|
|-------------|--------|----------|-------------|

| Source Database | | | | |
|-------------------------|--|-------------------------|----------|----------|
| mongos Address | | 0 | | |
| | Ensure that the entered addresses belong to the same | DB instance. | | |
| Authentication Database | | | | |
| mongos Username | | | | |
| mongos Password | | | | |
| SSL Connection | | | | |
| Sharded Database | IP Address or Domain Name | Authentication Database | Username | Password |
| | | | | |
| | | | | |
| | Test Connection 🥑 Test successful | | | |

| Parameter | Description |
|----------------------------|---|
| mongos Address | IP address or domain name of the source database in the IP address/Domain name:Port format. The port of the source database. Range: 1 - 65534 |
| | You can enter a maximum of three groups of IP addresses or domain names of the source database. Separate multiple values with commas (,). For example: 192.168.0.1:8080,192.168.0.2:8080. Ensure that the entered IP addresses or domain names belong to the same sharded cluster. |
| | NOTE If multiple IP addresses or domain names are entered, the test connection is successful as long as one IP address or domain name is accessible. Therefore, you must ensure that the IP address or domain name is correct. |
| Authentication Database | The name of the authentication database. For example: The default authentication database of Huawei Cloud DDS instance is admin . |
| mongos Username | A username for the source database. |
| mongos Password | The password for the source database username. |
| SSL Connection | SSL encrypts the connections between the source and destination databases. If SSL is enabled, upload the SSL CA root certificate. |
| Sharded Database | Enter the information about the sharded databases in the source database. |

Table 2-31 Source database settings

- Destination database configuration

Figure 2-49 Destination database information

| hard-wyrn-ta | | | | |
|---------------|--------------|--------------|--------------|--------------|
| | | | | |
| er | | | | |
| | | | | |
| st Connection | | | | |
| 51 | t Connection | t Connection | t Connection | t Connection |

| Parameter | Description |
|----------------------|--|
| DB Instance Name | The DB instance you selected when creating the migration task and cannot be changed. |
| Database Username | The username for accessing the destination database. |
| Database Password | The password for the database username. |

Table 2-32 Destination database settings

5. On the **Set Task** page, select migration objects and click **Next**.

Figure 2-50 Migration object

| Note: | Before the | the migration task is complete, you cannot change the usernames, passwords, and rights of any source database users. | | | | | | |
|------------------|---|--|----------|-----------------|-----------------------|----------|-------------------------------|---------|
| ★Migrate Account | Vigrate Account Ves No Confirm All Remarks | | | | | | С | |
| | | Account | | Can Be Migrated | | Role | | Remarks |
| | | fastunit.testuser4 | | Yes | | fastunit | oletestő | |
| | ~ | fastunit.testuser3 | | Yes | | fastunit | oletest3,fastunit.roletest2,f | |
| | | fastunit.test8 | | Yes | | admin.cl | idmin.clusterAdmin | |
| | | fastunit.test1 | | Yes fa | | fastunit | fastunit.read | |
| | \checkmark | admin.testuser2 | | Yes | | admin.cl | usterAdmin | |
| | admin.test14 | | | Yes | fastunit. admin.ro | | ead | |
| | | | | No | | | ot,fastunit.read,admin.read | View |
| | | fastunit.test_full_fastunit | | No | | admin.rc | ot,fastunit.read,admin.read | View |
| | Role Infe | ormation | | | | | | |
| | | Role Name | Can Be | Migrated | Permission | | Inherited Role | Remarks |
| | | fastunit.roletest6 | Yes | | {"resource": {"db": ' | "fastu | fastunit.readWrite,fastuni | |
| | ~ | fastunit.roletest3 | Yes | | {"resource": {"db": ' | "fastu | fastunit.roletest2 | |
| | ~ | fastunit.roletest2 | Yes | | ("resource": ("db": " | "fastu | fastunit.roletest1 | |
| *Migrate Object | All | Tables Da | itabases | | | | | |

Table 2-33 Migration object

| Paramete r | Description | | | | | |
|--------------------|--|--|--|--|--|--|
| Migrate Account | There are accounts that can be migrated completely and accounts that cannot be migrated. You can choose whether to migrate the accounts. Accounts that cannot be migrated or accounts that are not selected will not exist in the destination database. Ensure that your services will not be affected by these accounts. | | | | | |
| | Yes If you choose to migrate accounts, see Migrating Accounts in Data Replication Service User Guide to migrate database users and roles. | | | | | |
| | No During the migration, accounts and roles are not migrated. | | | | | |

| Paramete r | Description |
|-------------------|---|
| Migrate Object | You can choose to migrate all objects, tables, or databases based on your service requirements. |
| | All: All objects in the source database are migrated to the destination database. After the migration, the object names will remain the same as those in the source database and cannot be modified. |
| | - Tables : The selected table-level objects will be migrated. |
| | Databases: The selected database-level objects will be migrated. |
| | If the source database is changed, click \bigcirc in the upper right corner before selecting migration objects to ensure that the objects to be selected are from the changed source database. |
| | NOTE |
| | If you choose not to migrate all of the databases, the migration may fail because the objects, such as stored procedures and views, in the database to be migrated may have dependencies on other objects that are not migrated. To ensure a successful migration, you are advised to migrate all of the databases. |
| | When you select an object, the spaces before and after the object name are not displayed. If there are two or more consecutive spaces in the middle of the object name, only one space is displayed. |
| | The search function can help you quickly select the required database objects. |

- 6. On the **Check Task** page, check the migration task.
 - If any check fails, review the cause and rectify the fault. After the fault is rectified, click **Check Again**.

For details about how to handle check failures, see **Checking Whether the Source Database Is Connected** in *Data Replication Service User Guide*.

- If all check items are successful, click **Next**.

Figure 2-51 Task Check

| Check Again | |
|--|---|
| Check success rate 100% All checks must pass before you can continue. If any check requires confirmation, | check and confirm the results before proceeding to the next step. |
| Check Item | Check Result |
| Destination database storage space | |
| Whether the destination database has sufficient storage space | Passed |
| Conflict | |
| Whether collections in both the source and destination databases are not capped | Passed |
| Whether the destination database contains a non-empty collection with the same name as that in the source database | Passed |
| Whether the same view names exist in both the source and destination databases | Passed |
| Object dependency | |
| Whether the source database referenced roles pass the check | Passed |
| Whether the source database referenced accounts pass the check | 📀 Passed |
| Database parameters | |
| Whether both the source and destination databases have enabled SSL | Passed |
| Whether the maximum number of chunks in the destination database is sufficient | Passed |
| Whether the maximum number of collections has been reached in the destination database | Passed |

NOTE

You can proceed to the next step only when all check items are successful. If any alarms are generated, view and confirm the alarm details first before proceeding to the next step.

7. On the displayed page, specify **Start Time**, **Send Notification**, **SMN Topic**, **Synchronization Delay Threshold**, and **Stop Abnormal Tasks After** and confirm that the configured information is correct and click **Submit** to submit the task.

Figure 2-52 Task startup settings

| Start Time | Start upon task creation | Start at a specified time | 0 |
|------------------------------------|--------------------------|------------------------------------|---|
| Send Notifications | ⑦ Please handle excep | tions within 48 hours of receiving | g SMS messages or emails. |
| * SMN Topic | | • C ? | |
| Synchronization Delay Threshold(s) | 0 | | |
| ★ Stop Abnormal Tasks After | 14 (?) Abn | ormal tasks run longer than the p | period you set (unit: day) will automatically stop. |

| Parameter | Description |
|--|--|
| Start Time | Set Start Time to Start upon task creation or Start at a specified time based on site requirements. The Start at a specified time option is recommended. NOTE The migration task may affect the performance of the source and |
| | destination databases. You are advised to start the task in off-peak hours and reserve two to three days for data verification. |
| Send Notification s | SMN topic. This parameter is optional. If an exception occurs during migration, the system will send a notification to the specified recipients. |
| SMN Topic | This parameter is available only after you enable Send Notification and create a topic on the SMN console and add a subscriber. |
| | For details, see Simple Message Notification User Guide. |
| Synchroniza tion Delay Threshold | During an incremental migration, a synchronization delay indicates a time difference (in seconds) of synchronization between the source and destination database. |
| | If the synchronization delay exceeds the threshold you specify, DRS will send alarms to the specified recipients. The value ranges from 0 to 3,600. To avoid repeated alarms caused by the fluctuation of delay, an alarm is sent only after the delay has exceeded the threshold for six minutes. |
| | NOTE |
| | In the early stages of an incremental migration, there is more delay because more data is waiting to be synchronized. In this situation, no notifications will be sent. |
| | Before setting the delay threshold, enable Send Notification. If the delay threshold is set to 0, no notifications will be sent to the recipient. |
| Stop Abnormal Tasks After | Number of days after which an abnormal task is automatically stopped. The value must range from 14 to 100. The default value is 14 . |
| | NOTE Tasks in the abnormal state are still charged. If tasks remain in the abnormal state for a long time, they cannot be resumed. Abnormal tasks run longer than the period you set (unit: day) will automatically stop to avoid unnecessary fees. |

Table 2-34 Task startup settings

8. After the task is submitted, go back to the **Online Migration Management** page to view the task status.

Step 2 Manage the migration task.

The migration task contains two phases: full migration and incremental migration. You can manage them in different phases.

• Full migration

- Viewing the migration progress: Click the target full migration task, and on the Migration Progress tab, you can see the migration progress of the structure, data, indexes, and migration objects. When the progress reaches 100%, the migration is complete.
- Viewing migration details: In the migration details, you can view the migration progress of a specific object. If the number of objects is the same as that of migrated objects, the migration is complete. You can view the migration progress of each object in detail. Currently, this function is available only to whitelisted users. You can submit a service ticket to apply for this function.
- Incremental Migration Permission
 - Viewing the synchronization delay: After the full migration is complete, an incremental migration starts. On the Online Migration Management page, click the target migration task. On the displayed page, click Migration Progress to view the synchronization delay of the incremental migration. If the synchronization delay is 0s, the destination database is being synchronized with the source database in real time. You can also view the data consistency on the Migration Comparison tab.

| | Figure | 2-53 | Viewing | the | synchronization | delay |
|--|--------|------|---------|-----|-----------------|-------|
|--|--------|------|---------|-----|-----------------|-------|

| Basic Information | Note: [| Do not change the usernam | es, passwords, and permissions of source and de | stination data | base users before the task has completed. Start the task and o | et 7 days free. If the status indical | ites a |
|----------------------|---------|------------------------------|---|----------------|--|---------------------------------------|--------|
| Migration Comparison | synchr | onization or migration is co | mplete, there may still be triggers or events to be | nigrated befo | re the entire task is finished. | | |
| Migration Progress | | | | | | | С |
| Migration Logs | Last U | pdated Jan 05, 2022 17:08 | 49 GM1+08:00 | | | | |
| rags | 1 | Progress | | | | | <hr/> |
| | | | Full migration progress | | | | |
| | | | Structure migration | 100% | Waiting for incremental migration | _ | |
| | | | Data migration | 100% | | | |
| | | Source Database | Index migration | 100% | | Destination Database | |
| | | | | | | | J |

 Viewing the migration results: On the Online Migration Management page, click the target migration task. On the displayed page, click Migration Comparison and perform a migration comparison in accordance with the comparison process, which should help you determine an appropriate time for migration to minimize service downtime.

Figure 2-54 Database comparison process



For details, see **Comparing Migration Items** in *Data Replication Service User Guide*.

Step 3 Cut over services.

You are advised to start the cutover process during off-peak hours. At least one complete data comparison is performed during off-peak hours. To obtain accurate

comparison results, start data comparison at a specified time point during offpeak hours. If it is needed, select **Start at a specified time** for **Comparison Time**. Due to slight time difference and continuous operations on data, inconsistent comparison results may be generated, reducing the reliability and validity of the results.

- 1. Interrupt services first. If the workload is not heavy, you may not need to interrupt the services.
- 2. Run the following statement on the source database and check whether any new sessions execute SQL statements within the next 1 to 5 minutes. If there are no new statements executed, the service has been stopped. db.currentOp()

NOTE

The process list queried by the preceding statement includes the connection of the DRS replication instance. If no additional session executes SQL statements, the service has been stopped.

- 3. On the **Migration Progress** page, view the synchronization delay. When the delay is displayed as 0s and remains stable for a period, then you can perform a data-level comparison between the source and destination databases. For details about the time required, refer to the results of the previous comparison.
 - If there is enough time, compare all objects.
 - If there is not enough time, use the data-level comparison to compare the tables that are frequently used and that contain key business data or inconsistent data.
- 4. Determine an appropriate time to cut the services over to the destination database. After services are restored and available, the migration is complete.
- **Step 4** Stop or delete the migration task.
 - 1. Stopping the migration task. After databases and services are migrated to the destination database, to prevent operations on the source database from being synchronized to the destination database to overwrite data, you can stop the migration task. This operation only deletes the replication instance, and the migration task is still displayed in the task list. You can view or delete the task. DRS will not charge for this task after you stop it.
 - 2. Delete the migration task. After the migration task is complete, you can delete it. After the migration task is deleted, it will no longer be displayed in the task list.

----End

2.9 From RDS for MySQL to DDM

2.9.1 Overview

Description

This section describes:

- How to create an RDS for MySQL instance on Huawei Cloud.
- How to create a DDM instance on Huawei Cloud.
- How to migrate data from RDS for MySQL instances in different regions to DDM through a VPN.

Prerequisites

- You have registered with Huawei Cloud.
- Your account balance is greater than or equal to \$0 USD.

Service List

- Virtual Private Cloud (VPC)
- Virtual Private Network (VPN)
- Relational Database Service (RDS)
- Distributed Database Middleware (DDM)
- Data Replication Service (DRS)
- Data Admin Service (DAS)

Deployment Architecture

In this example, the source is a Huawei Cloud RDS for MySQL instance and the destination is a DDM instance in different regions of Huawei Cloud. Data is migrated from the source database to the destination database through a VPN. For details about the deployment architecture, see Figure 2-55.





Before You Start

- The resource planning in this best practice is for demonstration only. Adjust it as needed.
- The test data is for reference only. For more information about DRS, click here.

2.9.2 Resource Planning

| Table | 2-35 | Resource | planning |
|-------|------|----------|----------|
|-------|------|----------|----------|

| Categor y | Subcategor y | Plan | Description |
|---------------------------|-------------------------|-----------------------------------|---|
| Source VPC | VPC name | vpc-DRSsrc | Specify a name that is easy to identify. |
| | Region | AP-Singapore | To achieve lower network latency, select the region nearest to you. |
| | AZ | AZ2 | - |
| | Subnet | 10.0.0/24 | Select a subnet with sufficient network resources. |
| | Subnet name | subnet-drs01 | Specify a name that is easy to identify. |
| RDS (source databas | RDS instance name | rds-mysql-src | Specify a name that is easy to identify. |
| e) | Region | AP-Singapore | To achieve lower network latency, select the region nearest to you. |
| | DB engine version | MySQL 5.7 | - |
| | Instance type | Single | A single instance is used in this example. |
| | | | To improve service reliability, select a primary/standby instance. |
| | Storage type | SSD | - |
| | AZ | AZ2 | A single instance is used in this example. |
| | | | To improve service reliability, create a primary and standby instance and then locate them in two different AZs. |
| | Specificatio ns | General-purpose 4 vCPUs 8 GB | - |
| Source VPN | Gateway name | vpngw-src | Specify a name that is easy to identify. |

| Categor y | Subcategor y | Plan | Description |
|-------------------------|-----------------------------------|----------------|--|
| | Region | AP-Singapore | To achieve lower network latency, select the region nearest to you. |
| | Virtual Private Cloud (VPC) | vpc-DRSsrc | The value must be the same as the VPC of the source RDS DB instance. |
| | VPN connection name | vpn-src01 | Specify a name that is easy to identify. |
| | Local Subnet | subnet-drs01 | The value must be the same as the VPC subnet of the source RDS instance. |
| | Remote gateway | 123.60.251.207 | Specifies the peer VPN gateway. This parameter is set to the gateway address of the target VPN. After the target VPN is created, obtain the gateway information. |
| | Remote subnet | 172.16.0.0/24 | Specifies the peer VPN gateway. The value is the subnet of the destination VPN, which must be the same as the subnet of the VPC where the destination DDM instance resides. |
| Destinati on VPC | VPC name | vpc-DRStar | Specify a name that is easy to identify. |
| | Region | CN-Hong Kong | To achieve lower network latency, select the region nearest to you. |
| | AZ | AZ1 | - |
| | Subnet | 172.16.0.0/24 | Select a subnet with sufficient network resources. |
| | Subnet name | subnet-drs02 | Specify a name that is easy to identify. |
| DDM (destinat ion | DDM instance name | ddm-drs-tar | Specify a name that is easy to identify. |
| databas e) | AZ | AZ1 | You can select one or more AZs. You are advised to create the instance across different AZs to improve service reliability. |

| Categor y | Subcategor y | Plan | Description |
|-----------------------------------|-----------------------------------|-------------------------------------|---|
| | Node specification s | General-enhanced 8 vCPUs 16 GB | - |
| | Nodes | 1 | A single node has high availability risks. In practice, you are advised to create at least two nodes. |
| RDS instance associat | RDS instance name | rds-ddm01 | Specify a name that is easy to identify. |
| ed with the DDM instance | Region | CN-Hong Kong | To achieve lower network latency, select the region nearest to you. |
| | DB engine version | MySQL 5.7 | - |
| | Instance type | Single | A single instance is used in this example. To improve service reliability, select a primary/standby instance. |
| | Storage type | SSD | - |
| | AZ | AZ1 | A single instance is used in this example. To improve service reliability, create a primary and standby instance and then locate them in two different AZs |
| | Specificatio ns | General-purpose 4 vCPUs 8 GB | - |
| Destinati on VPN | Gateway name | vpngw-tar | Specify a name that is easy to identify. |
| | Region | CN-Hong Kong | To achieve lower network latency, select the region nearest to you. |
| | Virtual Private Cloud (VPC) | vpc-DRStar | The value must be the same as the VPC of the destination DDM instance. |

| Categor y | Subcategor y | Plan | Description |
|---------------------------|---------------------------|----------------|---|
| | VPN connection name | vpn-tar01 | Specify a name that is easy to identify. |
| | Local subnet | subnet-drs02 | The value must be the same as the VPC subnet of the destination DDM instance. |
| | Remote gateway | 123.60.236.84 | Specifies the peer VPN gateway. In this example, this parameter is set to the gateway address of the source VPN. After the source VPN is created, the gateway address is obtained. |
| | Remote subnet | 10.0.0/24 | Specifies the peer VPN gateway. The value is the subnet of the source VPN, which must be the same as the subnet of the VPC where the source RDS for MySQL instance is located. |
| DRS migratio n task | Task name | DRS-MySQLToDDM | Specify a name that is easy to identify. |
| | Source DB engine | MySQL | In this example, the source is an RDS for MySQL instance on Huawei Cloud. |
| | Destination DB engine | DDM | In this example, the destination database is DDM. |
| | Network type | VPN | In this example, VPN is used. |

2.9.3 Operation Process

Figure 2-56 shows the process of creating an RDS for MySQL instance and synchronizing data from an RDS for MySQL instance to DDM.



2.9.4 Preparing for the Source RDS for MySQL Instance

2.9.4.1 Creating a VPC and Security Group

Create a VPC and security group for an RDS for MySQL instance.

Creating a VPC

Step 1 Log in to the **management console**.

- **Step 2** Click O in the upper left corner of the management console and select AP-Singapore.
- **Step 3** Under the service list, choose **Networking** > **Virtual Private Cloud**.

The VPC console is displayed.

Step 4 Click Create VPC.

| Basic Information | |
|------------------------|---|
| Region | • • • |
| | Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
| Name | vpr-DRSsrc |
| IPv4 CIDR Block | |
| | Recommended: 10.0.0.0/8-24 (Select) 172.16.0.0/12-24 (Select) 192.168.0.0/16-24 (Select) |
| | A The CIDR block 10.0.0.0/24 overlaps with a CIDR block of another VPC in the current region. If you intend to enable communication between VPCs or between a VPC and an on-premises data center, change the CIDR block. View VPC CIDR blocks in current region |
| Advanced Settings 🔻 | Tag Description |
| Default Subnet | |
| AZ | AZ2 • 0 |
| Name | subnet-drs01 |
| IPv4 CIDR Block | 10 0 0 24 Image: Constraint of the second sec |
| IPv6 CIDR Block | 🗌 Enable 🕐 |
| Associated Route Table | Default 🛞 |
| Advanced Settings 👻 | Gateway DNS Server Address NTP Server Address DHCP Lease Time Tag Description |

- **Step 5** Configure parameters as needed and click **Create Now**.
- Step 6 Return to the VPC list and check whether the VPC is created.If the VPC status becomes available, the VPC has been created.----End

Creating a Security Group

- **Step 1** Log in to the **management console**.
- **Step 2** Click ^Q in the upper left corner of the management console and select AP-Singapore.
- Step 3 Under the service list, choose Networking > Virtual Private Cloud. The VPC console is displayed.

 \times

- **Step 4** In the navigation pane, choose **Access Control** > **Security Groups**.
- Step 5 Click Create Security Group.
- **Step 6** Configure parameters as needed.

Create Security Group

| * Name | sg-DRS01 | | | |
|---------------------|---|--|--|--|
| * Template | General-purpose web server 🔻 | | | |
| Description | The security group is for general-purpose web servers and includes default rules that allow all inbound ICMP traffic and inbound traffic on ports 22, 80, 443, and 3389. The security group is used for remote login, ping, and hosting a website on ECSs. | | | |
| | 0/255 | | | |
| Show Default Rule 🔻 | | | | |
| | OK Cancel | | | |

- Step 7 Click OK.
- **Step 8** Return to the security group list and click the security group name (**sg-DRS01** in this example).
- **Step 9** Click the **Inbound Rules** tab, and then click **Add Rule**.



Step 10 Configure an inbound rule to allow access from database port **3306**.

| Add Inbound | d Rule Learn | more about security group | configuration. | | | > |
|----------------|---------------------------------|---------------------------------|--------------------|--|-------------|-------------|
| 1 Inbound r | rules allow incomir | ng traffic to instances associa | ated with the secu | rity group. | | |
| Security Group | sg-DRS01 multiple rules in a | batch. | | | | |
| Priority ⑦ | Action | Protocol & Port ⑦ | Туре | Source ⑦ | Description | Operation |
| 1-100 | Allow 🔻 | TCP • | IPv4 v | IP address ▼ 0.0.0.0/0 | | Operation 🔻 |
| | | | (+) Add Rule | | | |
| | | | ОК | Cancel | | |

----End

2.9.4.2 Creating an RDS for MySQL Instance

Create an RDS for MySQL instance and construct test data.

Creating an Instance

- **Step 1** Log in to the management console.
- **Step 2** Click O in the upper left corner of the management console and select AP-Singapore.
- **Step 3** Under the service list, choose **Databases** > **Relational Database Service**.
- Step 4 Click Buy DB Instance.
- **Step 5** Configure the instance name and basic information.





| Instance Class | General-purpose Kunpeng general-enhanced | | |
|--------------------|---|--|----------------------------------|
| | vCPU Memory | Maximum Connections | TP5/QP5 ⑦ IPv6 |
| | 2 vCPUs 4 GB | 1,500 | 334 6,673 Not supported |
| | 2 vCPUs 8 GB | 2,500 | 552 11,039 Not supported |
| | 4 vCPUs 8 GB | 2,500 | 756 15,122 Not supported |
| | O 4 vCPUs 16 GB | 5,000 | 1,062 21,249 Not supported |
| | O 8 vCPUs 32 GB | 10,000 | 2,117 42,335 Not supported |
| | 8 vCPUs 16 GB (Sold Out) Apply for Resource | 5,000 | 1,338 26,756 Not supported |
| | DB Instance Specifications General-purpose 4 vCPUs 8 | GB, Maximum Connections: 2500, TPS/QPS: 756 15122 | |
| | 40 GB | | |
| Storage Space (GB) | (II) 40 800 1, | 550 2,300 4,000 | |
| | RDS provides free backup storage space of the same size a | your purchased storage space. After the free backup space is used up, charges are applied ba | ased on the OBS pricing details. |
| Disk Encryption | Disable Enable (2) | | |

Step 7 Select a VPC and security group for the instance and configure the database port.

The VPC and security group have been created in **Creating a VPC and Security Group**.

| | ⑦ Relationship among VPCs, subnets, security | groups, | and DB instances | | | |
|------------------|--|----------|---|--------|---|--|
| VPC ⑦ | vpc-DRSsrc 💌 |] c | subnet-drs01(10.0.0/24) 🔹 | С | Automatically-assigned IP address | View In-use IP Address |
| | After the RDS Instance is created, the VPC canno | t be ch | anged. ECSs in different VPCs cannot communicat | e with | each other by default. If you want to o | create a VPC, go to the VPC console. Available Private IP Addresses: 251 |
| Database Port | 3306 | | | | | |
| | The database port of read replicas (if any) is the | same | is that of the primary DB instance. | | | |
| Security Group 🕜 | sg-DRS01 * | c | View Security Group | | | |
| | Ensure that port 3306 of the security group allo | vs traff | c from your server IP address to the DB instance. | | | |
| | Security Group Rules 🐱 Add Inbound Rule | | | | | |

Step 8 Configure the instance password.

| Password | Configure | Skip | |
|------------------------|-----------|------|--|
| Administrator | root | | |
| Administrator Password | ••••• | | Keep your password secure. The system cannot retrieve your password. |
| Confirm Password | •••••• | | |

Step 9 Click Next.

- **Step 10** Confirm your settings.
 - To modify your settings, click **Previous**.
 - If you do not need to modify your settings, click **Submit**.
- **Step 11** Return to the instance list.

If the instance status becomes available, the instance has been created.

----End

Generating Test Data

Step 1 Log in to the **management console**.

- **Step 2** Click O in the upper left corner of the management console and select AP-Singapore.
- **Step 3** Under the service list, choose **Databases** > **Relational Database Service**.
- **Step 4** Select an RDS instance and choose **More** > **Log In**.

- **Step 5** In the dialog box that is displayed, enter the username and password of the instance and click **Test Connection**.
- **Step 6** After the connection is successful, click **Log In** to log in to the RDS instance.
- **Step 7** Click **Create Database** to create the **db_test** database.

| | Create Database | | | | | | |
|--------|--|--|---|--|--|--|--|
| | Name | db_test | | | | | |
| | Character Set | utf8mb4 | ~ | | | | |
| | | OK Cancel | | | | | |
| Step 8 | Run the following statements in db_test to create table table3_ : CREATE TABLE `db_test`.`table3_` (`Column1` INT(11) UNSIGNED NOT NULL, `Column2` TIME NULL, `Column3` CHAR NULL, PRIMARY KEY (`Column1`)) ENGINE = InnoDB DEFAULT CHARACTER SET = utf8mb4 | | | | | | |
| | SQL Preview Column1 Int(Column1 Int(Column2 TIME Column3 CHAR PRIMARY KEY (Column3 CHAR PRIMARY KEY (Column3 CHAR Column3 CHAR COLLATE = utf80 | <pre>est'.'table3_' (11) UNSIGNED NOT NULL, NULL, NULL, Solumn1') S TER SET = utf8mb4 bb4_general_ci;</pre> | X | | | | |
| | | Execute Back | | | | | |

Step 9 Run the following statements in table **table3**_ to insert three lines of data: INSERT INTO `db_test`.`table3_` (`Column1`, `Column2`, `Column3`) VALUES(1,'00:00:11','a'); INSERT INTO `db_test`.`table3_` (`Column1`, `Column2`, `Column3`) VALUES(2,'00:00:22','b'); INSERT INTO `db_test`.`table3_` (`Column1`, `Column2`, `Column3`) VALUES(5,'00:00:55','e');

| C | L Pi | evi | ew | | |
|---|--------|------|--------------------------------|--|--|
| 1 | INSERT | INTO | `db_test`.`table3_` | (`Column1`,`Column2`,`Column3`) VALUES(1,'00:00:11','a') | |
| 2 | INSERT | INTO | <pre>`db_test`.`table3_`</pre> | (`Column1`,`Column2`,`Column3`) VALUES(2,'00:00:22','b') | |
| 3 | INSERT | INTO | <pre>`db_test`.`table3_`</pre> | (`Column1`,`Column2`,`Column3`) VALUES(5,'00:00:55','e') | |
| | | | | | |
| | | | | Execute Back | |

----End

2.9.5 Preparing for the Destination DDM Instance

2.9.5.1 Creating a VPC and Security Group

Create a VPC and security group to prepare network resources and security groups for the destination DDM instance.

Creating a VPC

- **Step 1** Log in to the management console.
- **Step 2** Click O in the upper left corner of the management console and select CN-Hong Kong.
- Step 3 Under the service list, choose Networking > Virtual Private Cloud. The VPC console is displayed.
- Step 4 Click Create VPC.

| Basic Information | |
|------------------------|--|
| Region | • • |
| | Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
| Name | vpc-DRStar |
| IPv4 CIDR Block | 172 · 16 · 0 · 10 / 24 · |
| | Recommended: 10.0.0.0/8-24 (Select) 172.16.0.0/12-24 (Select) 192.168.0.0/16-24 (Select) |
| Advanced Settings 🔻 | Tag Description |
| Default Subnet | |
| AZ | AZ1 • () |
| Name | subnet-drs02 |
| IPv4 CIDR Block | 172 · 16 · 0 · 0 / 24 · 24 · 24 · 24 |
| | The CIDR block cannot be modified after the subnet has been created. |
| IPv6 CIDR Block | Enable 🕜 |
| Associated Route Table | Default 🛞 |
| Advanced Settings 🔻 | Gateway DNS Server Address NTP Server Address DHCP Lease Time Tag Description |

- **Step 5** Configure parameters as needed and click **Create Now**.
- **Step 6** Return to the VPC list and check whether the VPC is created.

If the VPC status becomes available, the VPC has been created.

----End

Creating a Security Group

- **Step 1** Log in to the management console.
- **Step 2** Click ⁽²⁾ in the upper left corner of the management console and select CN-Hong Kong.
- Step 3 Under the service list, choose Networking > Virtual Private Cloud. The VPC console is displayed.
- **Step 4** In the navigation pane, choose **Access Control** > **Security Groups**.
- Step 5 Click Create Security Group.

×

Step 6 Specify the security group name and other information, and click **OK**.

| Name | SG-DK202 |
|-------------|---|
| * Template | General-purpose web server 💌 |
| Description | The security group is for general-purpose web servers and includes default rules that allow all inbound ICMP traffic and inbound traffic o ports 22, 80, 443, and 3389. The security grou is used for remote login, ping, and hosting a website on ECSs. |
| | 0/ |
| | |

----End

2.9.5.2 Creating a DDM Instance

Step 1 Log in to the management console.

Create Security Group

- **Step 2** Click ^(Q) in the upper left corner of the management console and select CN-Hong Kong.
- Step 3 Click Service List on the left and choose Databases > Distributed Database Middleware.
- **Step 4** On the displayed page, in the upper right corner, click **Buy DDM Instance**.
- **Step 5** Specify the instance information and specifications as required.

| Billing Mode | Yearly/Monthly Pay-per-use |
|----------------|---|
| Region | |
| AZ | ✓ cn-north-4a 🗌 cn-north-4b 🗌 AZ7 🥎 |
| | |
| Instance Name | ddm-drs-tar |
| Time Zone | UTC+08:00 Beijing, Chong 🔻 |
| Node Class | General-enhanced Kunpeng general computing-plus (?) |
| | CPU/Memory |
| | 8 vCPUs 16 GB |
| | O 16 vCPUs 32 GB |
| | ○ 32 vCPUs 64 GB |
| | |
| Instance Nodes | |
| | Selecting at least 2 nodes is recommended because a single node cannot provide the same level of availability |

Step 6 Select a VPC and security group for the instance and configure the database port.The VPC and security group have been created in Creating a VPC and Security Group.

| VPC | vpc-DRStar | · C | subnet-drs02(172.16.0.0/24) | с | View VPC ⑦ |
|----------------|---|-----------|--|---------|---|
| | You cannot change its VPC after a DDM instance is | created | . Exercise caution when selecting a VPC. The DDM Insta | nce, ti | the ECS where the application is deployed, and the underlying DB instances must be in the same VPC. |
| Security Group | sg-DRS02 | • C | | | |
| | To ensure network connectivity, select the same sec | urity gro | oup as the associated DB instances, and the ECS where | your a | application is deployed. Learn more 🕐 |

- **Step 7** After the configuration is complete, click **Next** at the bottom of the page.
- **Step 8** Confirm your settings.
 - To modify your settings, click **Previous**.
 - If you do not need to modify your settings, click **Submit**.
- **Step 9** To view and manage the instance, go to the **Instances** page.

The default database port is **5066** and cab be changed after a DDM instance is created. If the status of the instance is **Running**, the instance has been created.

----End

2.9.5.3 Creating an RDS for MySQL Instance

Create an RDS for MySQL instance associated with the DDM instance.

Procedure

Step 1 Log in to the management console.

Step 2 Click O in the upper left corner of the management console and select CN-Hong Kong.

Step 3 Under the service list, choose **Databases** > **Relational Database Service**.

- Step 4 Click Buy DB Instance.
- **Step 5** Configure the instance name and basic information.

| Billing Mode | YearlyMonthly Payperuse |
|--------------------|--|
| Region | · · · · · |
| | Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
| DB Instance Manage | |
| Do instance Name | If you buy multiple DB instances at a time, they will be named with four digits appended in the format "DB instance name SV". For example, if the DB instance name is instance, the first instance will be named as instance-0001, the second as instance-0002, and so on. |
| DB Engine | MySQL PostgreSQL Microsoft SQL Server Learn more about D8 engines and versions. There is a limited-time offer for GaussD8(for Reds), Using GaussD8 |
| DB Engine Version | 80 57 56 |
| | We recommend that you use GaussDB(for MySQL). It is 100% compatible with MySQL and provides 128 TB massive storage. There is no need to deal with sharding and there is virtually no risk of data loss. |
| DB Instance Type | Primary/Standby Single |
| | Single-node architecture is cost-effective and suitable for developing and testing of microsites, and small- and medium-sized enterprises, or for learning about RDS. |
| Storage Type | Cloud SSD Learn more about storage types. |
| AZ | cn-north-4a AZ7 cn-north-4b cn-north-4c |
| Time Zone | UTC-48:00 Beijing, Chongging, Hong X * |

Step 6 Configure instance specifications.

| Instance Class | General-purpose Kunpeng general-enhanced | | | |
|--------------------|--|--|--|---------------|
| | vCPU Memory | Maximum Connections | TPS/QPS ⑦ | IPv6 |
| | 2 vCPUs 4 GB | 1,500 | 334 6,673 | Not supported |
| | 2 vCPUs 8 GB | 2,500 | 552 11,039 | Not supported |
| | 4 vCPUs 8 GB | 2,500 | 756 15,122 | Not supported |
| | 4 vCPUs 16 GB | 5,000 | 1,062 21,249 | Not supported |
| | O 8 vCPUs 32 GB | 10,000 | 2,117 42,335 | Not supported |
| | 8 vCPUs 16 GB (Sold Out) Apply for Resource | 5,000 | 1,338 26,756 | Not supported |
| | DB Instance Specifications General-purpose 4 vCPU | s 8 GB, Maximum Connections: 2500, TPS/QPS: 756 15122 | | |
| | 40 GB | | | |
| Storage Space (GB) | 40 800 | 1.550 2.300 4.000 | + 📀 | |
| | RDS provides free backup storage space of the same siz | e as your purchased storage space. After the free backup space i | is used up, charges are applied based on the OBS pricing | details. |
| Disk Encryption | Disable Enable (2) | | | |

Step 7 Select a VPC and security group for the instance and configure the database port.

The VPC and security group have been created in **Creating a VPC and Security Group**.

The RDS for MySQL instance must be in the same VPC and subnet as your DDM instance.

| | ⑦ Relationship among VPCs, subnets, security | groups, and D8 instances |
|----------------|---|--|
| VPC (?) | vpc-DRStar 💌 | C subnet-drs02(172.16.0.0/24) C Automatically-assigned IP address View In-use IP Address |
| | After the RDS instance is created, the VPC canno | it be changed. ECSs in different VPCs cannot communicate with each other by default. If you want to create a VPC, go to the VPC console. Available Private IP Addresses: 245 |
| Database Port | 3306 | |
| Security Group | sg-DRS02 💌 | C View Security Group |
| | Ensure that port 3306 of the security group allow Security Group Rules | vs traffic from your server IP address to the DB Instance. |

Step 8 Configure the instance password.

| Password | Configure | Skip | |
|------------------------|-----------|------|--|
| Administrator | root | | |
| Administrator Password | ••••• | | Keep your password secure. The system cannot retrieve your password. |
| Confirm Password | •••••• | | |

Step 9 Click Next.

- **Step 10** Confirm your settings.
 - To modify your settings, click **Previous**.
 - If you do not need to modify your settings, click **Submit**.
- **Step 11** Return to the instance list.

If the instance status becomes available, the instance has been created.

----End

2.9.5.4 Creating a Schema and Associating It with the RDS for MySQL Instance

- **Step 1** Log in to the management console.
- **Step 2** Click Sin the upper left corner of the management console and select CN-Hong Kong.
- Step 3 Click Service List on the left and choose Databases > Distributed Database Middleware.
- **Step 4** On the **Instances** page, locate the required DDM instance and click **Create Schema** in the **Operation** column.
- **Step 5** On the displayed page, specify a sharding mode, enter a schema name, set the number of shards, select the required DDM accounts, and click **Next**.

In this example, the schema is unsharded, and the schema name is **db_test**.

Currently, only data can be migrated from the source RDS for MySQL database to the destination DDM instance. Source table structures and other objects cannot be migrated, so you need to create schemas in the destination database based on the table structure of the source database.

| a sharang | Sharded Unsharded | | | |
|---|--|--|---|---|
| | One schema corresponds to only one data node, a | and only one shard is created on the | data node. | |
| * Schema Name | db_test | 0 | | |
| Account | Select | • C | | |
| | No accounts available. Create Account | | | |
| | | | | |
| | | | | |
| Data Nodos (| | | | |
| Data Nodes(| D | | | |
| Data Nodes(RDS for MySQ | D | for MySQL) | | |
| Data Nodes(RDS for MySQ | D L <u>5.7</u> RDS for MySQL 8.0 GaussDB(| for MySQL) | | |
| Data Nodes (RDS for MySQ Select only the data | L 5.7 RDS for MySQL 8.0 GaussDB(anodes that are in the same VPC as your DDM instance and tables. | for MySQL) and not in use by other DDM instar | ces. DDM will create databases on the sel | ected data nodes without affecting th |
| Data Nodes (RDS for MySQ Select only the dat existing databases | RDS for MySQL 8.0 GaussDB(anodes that are in the same VPC as your DDM instance and tables. | for MySQL) and not in use by other DDM instar | ces. DDM will create databases on the sel | ected data nodes without affecting th |
| Data Nodes (RDS for MySQ Select only the dat existing databases | RDS for MySQL 8.0 GaussDB(a nodes that are in the same VPC as your DDM instance and tables. Name | for MySQL) and not in use by other DDM instar Status | ces. DDM will create databases on the sel | ected data nodes without affecting th DB Engine |

----End

2.9.5.5 Creating a DDM Account

Step 1 Log in to the management console.

- **Step 2** Click ⁽²⁾ in the upper left corner of the management console and select CN-Hong Kong.
- Step 3 Click Service List on the left and choose Databases > Distributed Database Middleware.
- **Step 4** On the **Instances** page, click the target instance name.
- **Step 5** In the navigation pane, choose **Accounts**.
- **Step 6** On the displayed page, click **Create Account** and configure the required parameters.

For details about the permissions required by the DDM account, see Precautions

 \times

| Create | Account |
|--------|---------|
|--------|---------|

| | · · · | |
|--------------------|-----------------------------------|-------------------|
| * Username | ddm_user | (?) |
| * Password | | |
| ★ Confirm Password | | |
| Schema | db_test 💿 🔻 | |
| * Permissions | ✓ All | |
| | 🗹 CREATE 🔽 DROP 🔽 ALTER 🔽 INDEX 🛛 | 🗸 INSERT 🔽 DELETE |
| | VUPDATE V SELECT | |
| Description | Enter a description. | |
| | | |
| | 0/256 | |
| | -, | |
| | OK Cancel | |

Step 7 Click OK.

----End

2.9.5.6 Creating Table Structures in the Destination Database

Currently, only data can be migrated from the source RDS for MySQL database to the destination DDM instance. Source table structures and other objects cannot be migrated, so you need to create table structures and indexes in the destination database based on the table structures of the source schema. Objects that are not created in the destination database are not to be migrated. For more constraints, see **Before You Start**.

Procedure

- **Step 1** Log in to the management console.
- **Step 2** Click O in the upper left corner of the management console and select CN-Hong Kong.
- Step 3 Click Service List on the left and choose Databases > Distributed Database Middleware.
- **Step 4** On the **Instances** page, locate the required instance and click **Log In** in the **Operation** column.
- **Step 5** On the displayed page, enter the username and password created in **Creating a DDM Account**, and then click **Test Connection**.
- **Step 6** After the connection is successful, click **Log In** to log in to the DDM instance.

- Step 7 Click the db_test schema created in Creating a Schema and Associating It with the RDS for MySQL Instance.
- **Step 8** Run the following statements in database **db_test** to create table **table3**_ with the same structure as the source table:





----End

2.9.6 Creating and Configuring a VPN

2.9.6.1 Creating a VPN for the Source Database

- **Step 1** Log in to the management console.
- **Step 2** Click I in the upper left corner of the management console and select AP-Singapore.
- Step 3 Click Service List in the upper left corner. Under Networking, select Virtual Private Network.
- **Step 4** In the navigation pane on the left, choose **Virtual Private Network > VPN Gateway**.
- Step 5 On the VPN Gateways page, click Buy VPN Gateway.
- **Step 6** Configure the required parameters.

| * Billing Mode | Yearly/Monthly Pay-per-use |
|----------------------|--|
| | A VPN connection must be purchased together with the VPN gateway. The VPN connection and the gateway will be billed on a pay-per-use basis. |
| * Region | Τ |
| | Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
| | |
| * Name | Vpngw-src |
| * VPC | vpc-DRSsrc C Create VPC |
| * Туре | IPsec |
| ★ Billed By | Bandwidth Traffic |
| * Bandwidth (Mbit/s) | 5 10 20 50 100 200 300 ⁽²⁾ |
| | |
| | JTION |

The VPC connected to the VPN gateway must be the same as the VPC of the source RDS for MySQL instance, that is, the VPC created in **Creating a VPC and Security Group**.

Step 7 Specify the VPN connection information as prompted and click **Buy Now**.



- The local subnet must be the same as the subnet of the VPC where the source RDS for MySQL DB instance is located, that is, the subnet created in **Creating a VPC and Security Group**.
- The remote gateway and remote subnet are the gateway and subnet of the target VPN. The target VPN has not been created. You can enter any value and change it after the target VPN is created.
- Step 8 After the VPN gateway is created, view its information in the VPN gateway list. The status of the VPN gateway is Not connected. When a VPN connection uses this VPN gateway, the VPN gateway enters the Normal state.

| | | | | | | | Name 👻 | | QC |
|------------|-------------------------------------|-------------|----------------------|------------------|------------------|-------------------|---|-------------|----|
| Name | Status | VPN Gateway | Local Gateway | Local Subnet (?) | Remote Gateway | Remote Subnet (?) | Billing Mode | Operation | |
| vpn-src01 | Not connected | vpngw-src | 123.60.236.84 | 10.0.0.0/24 | 172.0.0.0 | 172.16.0.0/24 | Pay-per-use Assigned: Apr 13, 2022 09:17:25 GMT+08:00 | Operation 🔻 | |
| User Guide | Buy VPN Gateway | | Buy VPN Connection — | Config | re Remote Device | | | | |
| | | | | | | | | | |

----End

2.9.6.2 Creating a VPN for the Destination Database

- **Step 1** Log in to the **management console**.
- **Step 2** Click ⁽²⁾ in the upper left corner of the management console and select CN-Hong Kong.
- Step 3 Click Service List in the upper left corner. Under Networking, select Virtual Private Network.
- **Step 4** In the navigation pane on the left, choose **Virtual Private Network** > **VPN Gateway**.
- **Step 5** On the **VPN Gateways** page, click **Buy VPN Gateway**.
- **Step 6** Configure the required parameters.

| * Billing Mode | Yearly/Monthly Pay-per-use ⑦ |
|----------------------|--|
| | A VPN connection must be purchased together with the VPN gateway. The VPN connection and the gateway will be billed on a pay-per-use basis. |
| * Region | · · |
| | Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
| | |
| * Name | vpngu-tar |
| * VPC | vpc-DRStar C Create VPC |
| * Type | (Psec |
| * Billed By | Bandwidth Traffic |
| * Bandwidth (Mbit/s) | 5 10 20 50 100 200 300 ⑦ |

The VPC connected to the VPN gateway must be the same as the VPC of the destination DDM instance, that is, the VPC created in **Creating a VPC and Security Group**.

Step 7 Specify the VPN connection information as prompted.

| VPN Connection | | | | | | |
|---------------------|---------------------------------|---------------------------------|--|-------------------------|-------------------------------|------------------------|
| * Name | vpn-tar01 | | | | | |
| VPN Gateway | vpngw-tar | | _ | | | |
| * Local Subnet | Select subnet | Specify CIDR block | | | | |
| | subnet-drs02 (172.1 🔘 | • C | | | | |
| ★ Remote Gateway | 123 . 60 . 236 . | 84 ⑦ | | | | |
| * Remote Subnet 🕥 | 10.0.0/24 | | | | | |
| | | | | | | |
| | Using 100.64.0.0/10 as the cus | stomer subnet may cause servi | /ces such as OBS, DNS, API Gateway to become unavailable. | | | |
| * PSK | | 0 | | | | |
| * Confirm PSK | | | | | | |
| * Advanced Settings | Default | Custom | 0 | | | |
| | Default policy settings now inc | clude stronger encryption for e | enhanced security. The default IKE policy, encryption and DH alg | orithms (IKEv1, Group ! | i, and SHA1) are now IKEv2, G | roup 14, and SHA2-256. |
| | IKE Policy | | | | IPsec Policy | |
| | Authentication Algorithm | SHA2-256 | | | Authentication Algorithm | SHA2-256 |
| | Encryption Algorithm | AES-128 | | | Encryption Algorithm | AES-128 |
| | DH Algorithm | Group 14 | | | PFS ⑦ | DH Group 14 |
| | Version | v2 | | | Transfer Protocol | ESP |

- The local subnet must be the same as the subnet of the VPC where the destination DDM instance is located, that is, the subnet created in Creating a VPC and Security Group.
- The remote gateway and remote subnet are the gateway and subnet of the source VPN. Configure the parameters based on the information about the VPN created in Creating a VPN for the Source Database.

----End

2.9.6.3 Modifying the VPN Configuration for the Source Database

- **Step 1** Log in to the management console.
- **Step 2** Click I in the upper left corner of the management console and select AP-Singapore.
- Step 3 Click Service List in the upper left corner. Under Networking, select Virtual Private Network.
- **Step 4** In the navigation pane on the left, choose **Virtual Private Network > VPN Connections**.
- Step 5 On the VPN Connections page, locate the row that contains the VPN connection created in Creating a VPN for the Source Database and click Modify in the Operation column.

Step 6 On the **Modify VPN Connection** page, change the values of **Remote Gateway** and **Remote Subnet**.

| asic Informat | ion | | |
|---------------|----------------------------------|-------------------|---|
| ame | vpn-src01 | Remote Gateway | 123 . 60 . 251 . 207 |
| ocal Subnet | Select subnet Specify CIDR block | Remote Subnet ? | 172.16.0.0/24 |
| | subnet-drs01(10.0 🚳 🔻 | | |
| | | | Using 100.64.0.0/10 as the customer subnet may cause services such as OBS, DNS, API Gateway to become |

The remote gateway and remote subnet are the gateway and subnet of the destination VPN. Configure the parameters based on the information about the VPN created in **Creating a VPN for the Destination Database**.

Step 7 After the configuration is complete, view the VPN gateway information in the list. The VPN gateway status is **Normal**.

| | | | | | | | Name 💌 | | Q | С |
|-----------|----------|-------------|---------------|----------------|----------------|-------------------|---|-------------|---|---|
| Name | Status | VPN Gateway | Local Gateway | Local Subnet ⑦ | Remote Gateway | Remote Subnet (?) | Billing Mode | Operation | | |
| vpn-src01 | 🥝 Normal | vpngw-src | 123.60.236.84 | 10.0.0/24 | 123.60.251.207 | 172.16.0.0/24 | Pay-per-use Assigned: Apr 13, 2022 09:17:25 GMT+08:00 | Operation 👻 | | |

----End

2.9.7 Creating a DRS Migration Task

Create a DRS migration task to migrate data from RDS for MySQL databases in different regions to DDM.

Pre-Migration Check

Before creating a migration task, check the migration conditions.

This section describes how to migrate data from a MySQL database to DDM. For details, see **Before You Start**.

Creating a Migration Task

Step 1 Log in to the management console.

- **Step 2** Click ⁽²⁾ in the upper left corner of the management console and select CN-Hong Kong.
- **Step 3** Under the service list, choose **Databases** > **Data Replication Service**.

Step 4 In the upper right corner, click **Create Migration Task**.

- **Step 5** Configure the required parameters.
 - 1. Specify a migration task name.

| Region | Q (| | |
|-------------|---|--|--|
| | Regions are geographic areas isolated from each oth latency and quick resource access, select the neares | er. Resources are region-specific and cannot be used across regions through internal network connections. For low network t region. | |
| Project | | | |
| * Task Name | DRS-7447 | 0 | |
| Description | | 0 | |
| | | | |
| | 0/2 | 256 | |

- 2. Configure replication instance details as needed.
 - Select the DDM instance created in **Creating a DDM Instance** as the destination database.

| Replication Instance Details 💿 | | | | |
|---------------------------------------|--|--|--|--|
| The following information cannot be m | The following information cannot be modified after you go to the next page. | | | |
| * Data Flow | To the cloud Out of the cloud Stell-built to self-built. | | | |
| | The destination database must be a database in the current cloud. If you want to migrate data between database, select To the cloud. | | | |
| * Source DB Engine | MyPQL MySQL schema and logic table MongoOB Redis | | | |
| * Destination DB Engine | 14/52(L COM Gazet08/6r M/52(L) | | | |
| * Network Type | VPN or Direct Connect • | | | |
| * Destination DB Instance | No DB Instance available. | | | |
| Replication Instance Subnet | Soliest the solvent | | | |
| * Migration Type | Foll-Incomental Fail | | | |
| | This migration type allows you to migrate data with minimal dometime. After a full migration initializes the destination database, an incremental migration parses logs to ensure data consistency between the source and destination databases. | | | |

Step 6 Click Create Now.

It takes about 5 to 10 minutes to create a replication instance.

- **Step 7** Configure source and destination database information.
 - 1. Configure the source database information and click **Test Connection**. If a successful test message is returned, the database is connected.

| Source Database | | | | |
|---|-----------------------------------|--|--|--|
| System databases, users, parameters, and jobs will not be migrated. You need to manually import users and jobs to the destination database and configure parameters in parameter templates of the destination database. | | | | |
| IP Address or Domain Name | | | | |
| Port | 3306 | | | |
| Database Username | root | | | |
| Database Password | Q | | | |
| SSL Connection | | | | |
| | Test Connection 🥑 Test successful | | | |

2. Configure destination database information and click **Test Connection**. If a successful test message is returned, the database is connected.
Destination Database

| DB Instance Name | ddm-drs-tar () | |
|-------------------|-----------------------------------|---|
| Database Username | ddm_user | |
| Database Password | ····· | 2 |
| | Test Connection 🥑 Test successful | |

- Step 8 Click Next.
- Step 9 On the Set Task page, configure migration objects.
 - Migrate Object: Select Tables.
- **Step 10** Click **Next**. On the **Check Task** page, check the migration task.
 - If any check fails, review the cause and rectify the fault. After the fault is rectified, click **Check Again**.
 - If all check items are successful, click **Next**.

Step 11 Click Submit.

Return to the **Online Migration Management** page and check the migration task status.

It takes several minutes to complete.

| Task Name/ID ↓Ξ | Status | Delay 🕐 | Charging | Data Flow | DB Engine ↓Ξ | Migration Type | Created 🐙 | Network | Descript | Operation |
|-----------------|----------|---------|----------|--------------|--------------|------------------|---------------------------|---------|----------|-----------|
| DRS-MySQLToDDM | Starting | - | 6 No | To the cloud | MySQL-DDM | Full+Incremental | Apr 12, 2022 16:17:51 GMT | VPN or | | Stop |

If the status changes to **Full migration**, the migration task has been started.

NOTE

- For migration from MySQL to DDM, full migration and full+incremental migration modes are supported.
- If you create a full migration task, the task automatically stops after the full data is migrated to the destination.
- If you create a full+incremental migration task, a full migration is executed first. After the full migration is complete, an incremental migration starts.
- During the incremental migration, data is continuously migrated so the task will not automatically stop.

----End

2.9.8 Confirming Migration Results

You can use either of the following methods to check the migration results:

1. DRS compares migration objects and data and provides comparison results. For details, see **Viewing Migration Results**. 2. Log in to the destination side to check whether the databases, tables, and data are migrated. Confirm the data migration status. For details, see **Viewing Migration Results**.

Viewing Migration Results

- **Step 1** Log in to the management console.
- **Step 2** Click Sin the upper left corner of the management console and select CN-Hong Kong.
- **Step 3** Under the service list, choose **Databases** > **Data Replication Service**.
- **Step 4** Click the DRS instance name.
- **Step 5** In the navigation pane on the left, choose **Migration Comparison**.
- **Step 6** Click the **Object-Level Comparison** tab and check whether some objects are missing.

Click **Compare**. After the comparison is complete, view the comparison results.

| C DRS-MySQLToDDN | 1 | | | | | G Feedback | View Metric |
|----------------------|---|---|----------------------|--------------------------------|--------------|----------------|-------------|
| Basic Information | Before You Start 🔿 | | | | | | |
| Migration Comparison | To minimize the impact on services, you are advised to perform | orm a migration comparison in accordance to the following g | uidelines. | | | | |
| Migration Progress | | | | | | | |
| Migration Logs | Object Comparison / Account- | Compare Data - Validate All | Compare Data - Doub | · • • | | | |
| Tags | Level Comparison | Rows/Values | During Cutove | | Stop Isok | | |
| | Object-Level Comparison Data-Level Compa | ison | | | | | |
| | Only the migration objects that you have selected for compo Comparison Time: Apr 13, 2022 14:36:55 GMT+08:00 | rison are displayed here. | | | Compare | cel Comparison | C C |
| | Item | Source Database | Destination Database | Result | Operation | | |
| | Database | 1 | 1 | Consistent | View Details | | |
| | Table | 1 | 1 | Consistent | View Details | | |

- **Step 7** Choose **Data-Level Comparison** and check whether the number of rows of migrated objects is consistent.
 - 1. Click Create Comparison Task.
 - 2. In the displayed dialog box, select the comparison type, time, and object.

| Create Compa | rison Task | | | | | | × |
|--|--|--|-----------------|-------------------|--|--------------------------------|--------------|
| Some comparison resu comparison during off- | ilts may be inconsistent because da peak hours so that you can get an a | ita changes during the comparison c iccurate comparison result. | cannot be synct | nronized to the d | lestination in real time. You are advi | sed to select a scheduled time | to start the |
| * Comparison Type | Row | | | | | | |
| * Comparison Time | Start upon task creation | Start at a specified time | | | | | |
| * Object | If any data in the source database | e changes, click the refresh button be | elow. | | | | |
| | 0 | Select All | C | | | Select All | |
| | For tables, only expanded dat | tabases are searched. | Q | | For tables, only expanded data | bases are searched. | Q |
| | | | | | + db_test | databa | ise |
| | | | | | | | |
| | | | | >> | | | |
| | | | | « | | | |
| | | | | | | | |
| | | | | | | | Ŧ |
| | | | ОК | Cancel | | | |

3. After the comparison task is complete, view the data comparison results.

| C DRS-MySQLToDD | м | | | | | G Fee | back View Metric |
|----------------------|--|--|------------------------------------|-------------------------------|----------------------------|----------------------------|------------------|
| Basic Information | Before You Start | | | | | | |
| Migration Comparison | To minimize the impact on services, you are ad | vised to perform a migration comparison in accor | dance to the following guidelines. | | | | |
| Migration Progress | | | | | | | |
| Migration Logs | | | Inner Data Malakata Ali | | (📥 | | |
| Tags | Level Comparison | | Rous/Values | During Cutover | Lo su | ap Tasik | |
| | Object-Level Comparison Data-Le | vel Comparison | | | | | |
| | If the destination database is modified separate | ly, the data inspection may be inaccurate. | | | | | _ |
| | Create Comparison Task | | | | | | C |
| | Comparison Type | Start Time | End Time | Status | Exported Comparison Report | Operation | |
| | Row Companison | Apr 13, 2022 14:38:33 GMT+08:00 | Apr 13, 2022 14:38:37 GMT+08:00 | Completed | none | View Results Export Report | |

4. To view the comparison details, click **View Results** next to the comparison task.

| C DRS-MySQLToDDM View | Results | | | | | |
|---------------------------------|---|---|---------------------------------|------------|---|---------|
| Comparison type: Row Comparison | Comparison start time: Apr 13, 2022 14:38:33 GMT+08:00 Comparis | son end time: Apr 13, 2022 14:38:37 GMT+08:00 | | | | |
| Results | | | | | | С |
| Source Database | Destination Database | | Result | Operation | • | |
| db_test | db_test | | Consistent | View Deta | 15 | |
| | | | | | | |
| Details db_test - db_test | | | | | Enter keywords to search the table name | Q |
| Source Database Table Name | Destination Database Table Name | Source Database Table Rows | Destination Database Table Rows | Row | diff | erences |
| table3_ | table3_ | 3 | 3 | Consistent | | 0 |

----End

Viewing Migration Results

- **Step 1** Log in to the **management console**.
- **Step 2** Click O in the upper left corner of the management console and select CN-Hong Kong.
- Step 3 Click Service List on the left and choose Databases > Distributed Database Middleware.
- **Step 4** Locate the DDM instance and click **Log In** in the **Operation** column.

| | | | | | | Instance name | ÷ | C Search by Tag S C L |
|---|-----------|-------------------------------|-----------------|---------|--------------------|---------------|-------------------------------|-----------------------------|
| Instance Name ↓Ξ | Status ↓Ξ | Billing Mode | Instance Class | Version | Connection Address | | Created ↓F | Operation |
| ddm-drs-tar 3aa11cfeb2464cba88307a27b159bb5fin09 | Running | Pay-per-Use Created on Apr | 8 vCPUs 16 GB | 3.0.8.2 | 172.16.0.104:5066 | | Apr 12, 2022 15:06:24 GMT+08: | Create Schema Log In More 🗸 |

- **Step 5** In the dialog box that is displayed, enter the password and click **Test Connection**.
- **Step 6** After the connection is successful, click **Log In**.
- **Step 7** Check whether the databases and tables of the source instance have been migrated.

----End

2.10 From MySQL Schema and Logic Table to DDM

2.10.1 Overview

Scenarios

Traditional databases are expensive and difficult to maintain. These deficiencies are some of the driving forces behind cloud migration. This section describes how

to use DRS to migrate MySQL shards and tables to a DDM instance on Huawei Cloud.

Solution Architecture

In this example, DDS shards and tables are associated with two MySQL instances at the source side, and a DDM instance is associated with two RDS MySQL instances at the destination side. Source data is migrated to the destination through a DRS instance, and source data is continuously synchronized before the incremental synchronization task is manually stopped. Figure 2-57 shows the overall deployment architecture.

Figure 2-57 Solution architecture



Advantages

- The full+incremental migration mode is used to ensure that services are not interrupted and data is not lost during data migration.
- DRS saves traditional database administrator (DBA) costs and hardware costs, and supports on-demand pricing.
- A migration task can be set up within minutes.

2.10.2 Resource Planning

| Tabl | e 2- | 36 | Resour | ce pl | anning |
|------|------|----|-----------|-------|--------|
| | ~ ~ | | 1 CDC all | ce pi | anning |

| Resource | Name | Description | Quant ity |
|-----------------------------------|------------------------------|--|--------------|
| Virtual Private Cloud (VPC) | vpc-src-172 | CIDR: 172.16.0.0/16 | 1 |
| Source DDM instance | Autotest- DDM- SRC-001 | Specifications: 4 vCPUs 8 GB Nodes: 2 Schema: db_test_info Database user: test_info | 1 |

| Resource | Name | Description | Quant ity |
|--|---------------------------------|---|--------------|
| RDS DB instance associated with the source DDM instance | Auto-ddm- Single- SRC-001 | DB instance type: single Database version: MySQL 5.7 Specifications: General-enhanced 2 vCPUs 4 GB Storage type: ultra-high I/O | 1 |
| | Auto-ddm- Single- SRC-002 | DB instance type: single Database version: MySQL 5.7 Specifications: General-enhanced 1 vCPU 2 GB Storage type: ultra-high I/O | 1 |
| Destination DDM instance | Autotest- DDM- SRC-001 | Specifications: 2 vCPUs 8 GB Nodes: 2 Schema: db_test_info Database user: test_info_tar | 1 |
| RDS DB instance associated with the destination DDM | Auto-tar- ddm-0001 | DB instance type: single Database version: MySQL 5.7 Specifications: General-enhanced 1 vCPU 2 GB Storage type: ultra-high I/O | 1 |
| instance | Auto-tar- ddm-0002 | DB instance type: single Database version: MySQL 5.7 Specifications: General-enhanced 1 vCPU 2 GB Storage type: ultra-high I/O | 1 |
| DRS replication instance | DRS-test- info | Source DB engine: MySQL shards and tables Destination DB engine: DDM Network type: public network | 1 |

2.10.3 Process

Figure 2-58 shows how to implement the entire task.

Figure 2-58 Flowchart



Table 2-37 Migration process

| No. | Procedur e | Description |
|-----|---|---|
| 1 | Construct ing Data Before the Migratio n | Before the migration, construct data in the source database so that you can check whether the migration is successful after the migration. |
| 2 | Preparing for the Destinati on DDM Instance | Creating a VPC and Security Group: Prepare network resources for creating an instance. Creating a DDM Instance: Create a destination DDM instance. Creating an RDS for MySQL Instance: Create an RDS MySQL instance associated with the DDM instance. Creating a DDM Account: Create an account for connecting to the DDM schema. Creating a Schema and Associating It with the RDS for MySQL Instance: Associate DDM with an RDS MySQL |
| | | instance. 6. Creating Table Structures in the Destination Database: Create a table structure in the destination database for data migration. |

| No. | Procedur e | Description |
|-----|---|--|
| 3 | Migratin g Database s | Describe how to create a DRS migration task and the overall migration process. |
| 4 | Verifying Data After the Migratio n | Verify the data migration results by comparing data. |

2.10.4 Procedure

2.10.4.1 Constructing Data Before the Migration

Before the migration, you need to construct some data types in the source database for data verification after the migration.

Prerequisites

You have obtained the IP address, port, username, and password of the source instance.

Procedure

- **Step 1** Use the database connection tool to connect to the IP address of the source database.
- **Step 2** Construct data in the source database based on the supported data types.
 - 1. Log in to the source database.
 - 2. Open a schema to be migrated.
 - The schema used in this practice is **db_test_info**.
 - 3. Clear the previous table information in the **db_test_info** schema to ensure that data can be created successfully.

drop table if exists db_test_info_001;

db_test_info_001 is the name of the table created in this practice. Replace it as required.

4. Create a data table.

create table *db_test_info_001*(column19 TIMESTAMP , column18 VARCHAR(256) , column11 DATETIME , column10 ENUM('a','b','c') ,

5.

```
column13 FLOAT(2,1),
 column12 YEAR,
 column15 VARCHAR(64) not null,
 column14 DOUBLE(2,1),
 column17 INT,
 column16 LONGTEXT,
 column20 TIME,
 column21 BIT(8),
 column22 LONGBLOB,
 column23 MEDIUMINT,
 column24 VARCHAR(20),
 column9 DECIMAL(2,1),
 column8 VARCHAR(1024),
 column5 SMALLINT,
 column4 DATE,
 column7 VARCHAR(32),
 column6 SET('hehe','xixi','haha'),
 column1 char(1),
 column0 MEDIUMINT,
 column3 BIGINT,
 column2 TINYINT,
 primary key(column19,column11,column17)
 );
Insert records into the table.
 insert into
 db test info 001(column19,column11,column10,column1,column24,colu
 mn15,column23,column0,column8) values('2019-07-24
 14:08:58',now(),'A',(RAND()*1000000),
 (RAND()*1000000),'db_test_info_001',(RAND()*10000000),
 (RAND()*1000000),'a');
 insert into
 db test info 001(column19,column11,column17,column10,column1,colu
 mn24,column15,column23,column0,column8) values(now(),now(),
 (RAND()*1000000),'A',(RAND()*1000000),
 (RAND()*1000000),'db_test_info_001',(RAND()*10000000),
 (RAND()*1000000),'a');
 insert into
 db test info 001(column19,column11,column17,column10,column1,colu
 mn24,column15,column23,column0,column8) values(now(),now(),
 (RAND()*1000000),'A',(RAND()*1000000),
 (RAND()*1000000),'db_test_info_001',(RAND()*1000000),
 (RAND()*1000000),'a');
 insert into
 db test info 001(column19,column11,column17,column10,column1,colu
 mn24,column15,column23,column0,column8) values(now(),now(),
```

```
(RAND()*1000000),'A',(RAND()*1000000),
(RAND()*1000000),'db_test_info_001',(RAND()*1000000),
(RAND()*1000000),'a');
```

6. Query the results.

select * FROM db_test_info_001;

----End

2.10.4.2 Preparing for the Destination DDM Instance

2.10.4.2.1 Creating a VPC and Security Group

This section describes how to create a VPC and security group for the instance you will create.

Prerequisites

- You have registered with Huawei Cloud and completed authentication.
- Your account balance is greater than or equal to \$0 USD.

Creating a VPC

Step 1 Log in to the **Huawei Cloud console**.

- **Step 2** Click ¹ in the upper left corner and select a region and a project.
- **Step 3** Click the service list icon on the left and choose **Networking** > **Virtual Private Cloud**.

The VPC console is displayed.



Step 4 Click Create VPC.

| Basic Information | |
|--------------------------|--|
| Region | ♥ CN North-Beijing1 ▼ |
| | Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
| Name | vpc-01 |
| CIDR Block | 192 · 168 · 0 · 0 / 16 · |
| | Recommended: 10.0.0/8-24 (Select) 172.16.0.0/12-24 (Select) 192.168.0.0/16-24 (Select) |
| | A the CLOR block 192, 165,00/16 Overlaps with a CLOR block of another VPC in the current region. In you interio to enable communication between VPCs or between a VPC and an on-premises data center, change the CIDR block. View VPC CIDR blocks in current region. |
| Enterprise Project | -Select C Create Enterprise Project |
| Default Sub AZ | AZ3 v ? |
| Name | subnet-1d4e |
| CIDR Block | 192 • 168 • 0 / 24 • ? Available IP Addresses: 25 The CIDR block cannot be modified after the subnet has been created. |
| Associated Ro | oute Table Default 🕜 |
| Advanced Set | tings 🐱 Gateway DNS Server Address DHCP Lease Time Tag Description |
| | |

🕂 Add Subnet

Step 5 Configure parameters as needed and click **Create Now**.

Step 6 Return to the VPC list and check whether the VPC is created.If the VPC status becomes available, the VPC has been created.----End

Creating a Security Group

- **Step 1** Log in to the **Huawei Cloud console**.
- **Step 2** Click ^(Q) in the upper left corner and select a region and a project.
- Step 3 Under the service list, choose Networking > Virtual Private Cloud. The VPC console is displayed.

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×

| ≡ | Service List > | Enter a service or functi | on name. | | | Q | |
|-------------|-----------------------------|----------------------------|-----------------------|---------------------------------------|---------|---------------------------|-----------------|
| | Elastic Cloud Server | Recently Visited Services: | Virtual Private Cloud | Distributed Database Middleware | GaussDB | Document Database Service | Relational Data |
| ஃ | Relational Database Service | Compute | | Storage | | Networking | |
| 000 | Auto Scaling | Elastic Cloud Server | * | Elastic Volume Service | | Virtual Private Cloud | |
| 10000 | | Bare Metal Server | | Dedicated Distributed Storage Service | | Elastic Load Balance | |
| | Bare Metal Server | Cloud Phone | | Storage Disaster Recovery Service | | Direct Connect | |
| 0 | Elastic Volume Service | Image Management Servi | ce | Cloud Server Backup Service | | Virtual Private Network | |
| 6 | Volume Backup Service | FunctionGraph | | Cloud Backup and Recovery | | Domain Name Service | |
| | Forante boentap bertree | Auto Scaling | | Volume Backup Service | | NAT Gateway | |
| Ó | Virtual Private Cloud | Dedicated Cloud | | Object Storage Service | | Elastic IP | |
| \triangle | Elastic Load Balance | Dedicated Host | | Data Express Service | | Cloud Connect | |
| æ | Domain Registration | | | Scalable File Service | | VPC Endpoint | |

- **Step 4** Choose **Access Control** > **Security Groups**.
- Step 5 Click Create Security Group.
- **Step 6** Configure parameters as needed.

| Create | Security | Group |
|--------|----------|-------|
|--------|----------|-------|

| * Name | sg-01 |] |
|----------------------|---|---|
| ★ Enterprise Project | default 👻 | C Create Enterprise Project 🧿 |
| * Template | General-purpose web server 🔹 |] |
| Description | The security group is for general-p servers and includes default rules all inbound ICMP traffic and inbou ports 22, 80, 443, and 3389. The se is used for remote login, ping, and website on ECSs. | purpose web that allow und traffic on ecurity group I hosting a |
| | | 0/255 |
| Show Default Rule 💌 | | |
| | OK Cancel | |

Step 7 Click OK.

- **Step 8** Return to the security group list and click security group name **sg-01**.
- **Step 9** Click the **Inbound Rules** tab, and then click **Add Rule**.

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Step 10 Configure an inbound rule and add the IP address of the source database.

| dd Inbound Rule Learn more about security group configuration. | | | | | | |
|---|---|---------------------------------------|-------------|--|--|--|
| 1 Inbound rules allow incoming traffi | c to instances associated with the security o | jroup. | | | | |
| Security Group cse-engine-7f93 You can import multiple rules in a batch. | | | | | | |
| Protocol & Port ⑦ | Source ⑦ | Description | Operation | | | |
| TCP Example: 22 or 22-30 | IP address 0.0.0.0/0 | • • • • • • • • • • • • • • • • • • • | Operation 👻 | | | |
| | (+) Add Rule | | | | | |
| | ОК | Cancel | | | | |

----End

2.10.4.2.2 Creating a DDM Instance

This section describes how to create a DDM instance as the destination database for the migration task.

- Step 1 Log in to the Huawei Cloud console.
- **Step 2** Click ^(Q) in the upper left corner and select a region and a project.
- **Step 3** Click the service list icon on the left and choose **Databases > Distributed Database Middleware**.

| Ξ | Service List | Enter a service or function name. | | | Q | | | Х |
|----|-----------------------------|---|--|---------|-----------------------------------|-----|---------------------------------|-----|
| ٢ | Elastic Cloud Server | Recently Visited Services: GaussDB Data A | dmin Service Identity and Access Managem | ent | | | | |
| ΔA | Auto Scaling | Compute | Storage | | Networking | | Databases | * |
| | Rare Metal Server | Elastic Cloud Server | Elastic Volume Service | | Virtual Private Cloud | ¥., | UGO | |
| | but mean cerver | Auto Scaling | Dedicated Distributed Storage Service | | Elastic Load Balance | | GaussDB | |
| 0 | Elastic Volume Service | Image Management Service | Storage Disaster Recovery Service | | Virtual Private Network | | Relational Database Service | |
| 0 | Cloud Backup and Recovery | Dedicated Host | Cloud Server Backup Service | | Direct Connect | | Document Database Service | - 1 |
| ~ | Ohiert Storage Service | Cloud Container Engine | Cloud Backup and Recovery | ÷. | Domain Name Service | | GaussDB(for Cassandra) | - 1 |
| 60 | object of the ge derived | Bare Metal Server | Volume Backup Service | | NAT Gateway | | GaussDB(for Mongo) | |
| Ø | Virtual Private Cloud | FunctionGraph | Object Storage Service | | Elastic IP | | GaussDB(for Influx) | - 1 |
| 4 | Elastic Load Balance | Dedicated Cloud | Data Express Service | | Cloud Connect | | GaussDB(for Redis) | - 1 |
| 0 | Elastic IP | | Scalable File Service | | VPC Endpoint | | Distributed Database Middleware | - 1 |
| 0 | Liasue II | Security & Compliance | CDN | | | | Data Replication Service | |
| ക | Relational Database Service | Anti-DDoS | Dedicated OBS | | Application | | Data Admin Service | - 1 |
| | | DDoS Mitigation | | | ServiceStage | | | - 1 |
| | | Advanced Anti-DDoS | Management & Governance | | Application Orchestration Service | | Migration | - 1 |

Step 4 On the displayed page, in the upper right corner, click **Buy DDM Instance**.

Step 5 Specify a node class and other information.

| Billing Mode | Yearly/Monthly Pay-per-use ? |
|---------------|---|
| Region | • ⑦ |
| AZ | ☑ az1 🗌 az2 🔲 az3 🗌 az4 ⊘ |
| | |
| Instance Name | Autotest-DDM-TAR-001 |
| Time Zone | UTC+08:00 Beijing, Chong 💌 |
| Node Class | General-enhanced Kunpeng general computing-plus |

Step 6 Select a VPC and security group for the DB instance and configure the database port.

The VPC and security group have been created in **Creating a VPC and Security Group**.

- **Step 7** After the configuration is complete, click **Next** at the bottom of the page.
- **Step 8** Go to the **Instances** page to view and manage the instance.

The default database port is **5066** and cab be changed after the instance is created. If the status of the instance is **Running**, the instance is created.

----End

2.10.4.2.3 Creating an RDS for MySQL Instance

Create an RDS for MySQL instance and associate it with the DDM instance.

Procedure

- **Step 1** Log in to the **management console**.
- **Step 2** Click ^(Q) in the upper left corner and select a region and a project.
- **Step 3** Under the service list, choose **Databases** > **Relational Database Service**.
- Step 4 Click Buy DB Instance.
- **Step 5** Configure the instance name and basic information.



Step 6 Configure instance specifications.

| Instance Class | General-purpose Learn more | | | |
|--------------------|--|--|--|---|
| | vCPU Memory | Maximum Connections | TPS/QPS (?) | IPv6 |
| | O 2 vCPUs 4 GB | 1,500 | 334 6,673 | Not supported |
| | 2 vCPUs 8 GB | 2,500 | 552 11,039 | Not supported |
| | ○ 4 vCPUs 8 GB | 2,500 | 756 15,122 | Not supported |
| | O 4 vCPUs 16 GB | 5,000 | 1,062 21,249 | Not supported |
| | O 8 vCPUs 16 GB | 5,000 | 1,338 26,756 | Not supported |
| | 0 8 vCPUs 32 GB | 10,000 | 2,117 42,335 | Not supported |
| | DB Instance Specifications General-purpos | e 2 vCPUs 8 GB, Maximum Connections: 250 | 0, TPS/QPS: 552 11039 | |
| 1 | 40 GB | | | |
| Storage Space (GB) | 40 800 | 1,550 2,300 | 4,000 | |
| | DDC provides free backup storage space of th | | free the free he down more to used up when | and the local sector and the sector sectors and the |

Step 7 Select a VPC and security group for the DB instance and configure the database port.

The VPC and security group have been created in **Creating a VPC and Security Group**.

The RDS for MySQL instance must be in the same VPC and subnet as the DDM instance.

Step 8 Configure the instance password.

| Password | Configure | Skip | |
|------------------------|-----------|------|---|
| Administrator | root | | |
| Administrator Password | •••••• | | Keep your password secure. The system cannot retrieve y |
| Confirm Password | •••••• | |] |

Step 9 Click Next.

Step 10 Return to the instance list.

If the instance status becomes **Available**, the instance is created.

Create another RDS DB instance based on the destination RDS DB instance information in **Resource Planning**.

----End

2.10.4.2.4 Creating a DDM Account

- **Step 1** Log in to the management console.
- **Step 2** Click ^(Q) in the upper left corner and select a region and a project.
- Step 3 Click Service List on the left and choose Databases > Distributed Database Middleware.
- **Step 4** On the **Instances** page, locate the required DDM instance and click its name.
- **Step 5** In the navigation pane, choose **Accounts**.
- **Step 6** On the displayed page, click **Create Account** and configure parameters as needed.

For details about the permissions required by the DDM account, see **Precautions** In this practice, select all permissions.

| ~ | 1 |
|---|----|
| 2 | ς. |
| | |

| ★ Username | test_info | ? |
|--------------------|---------------------------------|-------------------|
| ★ Password | ••••• | |
| ★ Confirm Password | •••••• | |
| Schema | Select | |
| ★ Permissions | V All | |
| | 🔽 CREATE 🔽 DROP 🔽 ALTER 🔽 INDEX | 🗸 INSERT 🔽 DELETE |
| | VPDATE V SELECT | |
| Description | Enter a description. | |
| | | |
| | // | |
| | 0/230 | |
| | OK Cancel | |
| | | |

Step 7 Click OK.

----End

2.10.4.2.5 Creating a Schema and Associating It with the RDS for MySQL Instance

Step 1 Log in to the management console.

- **Step 2** Click ¹ in the upper left corner and select a region and a project.
- Step 3 Click Service List on the left and choose Databases > Distributed Database Middleware.
- **Step 4** On the **Instances** page, locate the required DDM instance and click **Create Schema** in the **Operation** column.
- **Step 5** On the displayed page, specify a sharding method, enter a schema name, set the number of shards, select the required DDM accounts, and click **Next**.

In this example, the schema is unsharded, and the schema name is **db_test_info**.

Currently, only data can be migrated from the RDS for MySQL to DDM. To migrate table structures and other objects, you need to create schemas in the destination DDM instance based on table structures of the source RDS for MySQL instance.

| * Sharding | Sharded Unsharded | | | |
|---|--|---|---|---|
| | Each schema corresponds to multiple data nodes. | | | |
| * Shards | - 2 + | | | |
| * Schema Nan | db_test_info | 0 | | |
| Account | test_info_tar 🕲 ddm_user 🕲 🗸 C | | | |
| | No accounts available. Create Account | | | |
| | | | | |
| Data Nodes | Image: SOL 5.7 RDS for MvSOL 8.0 GaussDB/for MvSOL 8.0 | OL) | | |
| Data Nodes <u>RDS for My</u> Select only the existing database | O SQL 5.7 RDS for MySQL 8.0 GaussDB(for MyS data nodes that are in the same VPC as your DDM instance and not ses and tables. Name | QL) in use by other DDM Instan | ces. DDM will create databases on the sele | acted data nodes without affecting the DB Engine |
| Data Nodes RDS for My Select only the existing database | Image: SQL 5.7 RDS for MySQL 8.0 GaussDB(for MySQL 8.0 data nodes that are in the same VPC as your DDM instance and not tes and tables. Name Auto-Single-src-57-migration-group1 | QL) In use by other DDM instan Status The Running | Connection Address 92.168.152.224.3306 | ected data nodes without affecting the DB Engine MySQL 5.7 |
| Data Nodes RDS for My Select only the existing database | RDS for MySQL 8.0 GaussDB(for MySQL 8.1 GaussDB(for MySQL 8.1 GaussDB) GaussDB(for MySQL 8.2 GaussDB) State are in the same VPC as your DDM instance and not res and tables. Name Auto-Single-src-57-migration-group1 Auto-Single-src-57-migration-low-0 | QL) In use by other DDM instan Status Parameters Running Running | ces. DDM will create databases on the sel Connection Address 192.168.152.224:3306 192.168.11.91:3306 | ected data nodes without affecting the DB Engine MySQL 5.7 MySQL 5.7 |
| Data Nodes RDS for My Select only the existing databas | Image: SQL 5.7 RDS for MySQL 8.0 GaussDB(for MySQL 8.0 data nodes that are in the same VPC as your DDM instance and not see and tables. Name Name Auto-Single-src-57-migration-group1 Auto-Single-src-57-migration-low-0 Auto-Single-src-57-migration-low-0 Auto-Single-src-57-migration-low-0 | QL) Status Running Running | Connection Address 192.168.152.224:3306 192.168.1.1.91:3306 192.168.223:3306 | ected data nodes without affecting the DB Engine MySQL 5.7 MySQL 5.7 MySQL 5.7 |
| Data Nodes RDS for My Select only the existing database | Image: SQL 5.7 RDS for MySQL 8.0 GaussDB(for MySQL 8.0 data nodes that are in the same VPC as your DDM instance and not tess and tables. Name Auto-Single-src-57-migration-group1 Auto-Single-src-57-migration-low-0 Auto-Ha-tar-57-readonly-migration Auto-Single-tar-57-dr-multiwrite | QL) Status Status Running Running Running Running Running Running Running | Connection Address 192.168.152.224:3306 192.168.152.3306 192.168.11.115:3306 | ected data nodes without affecting the DB Engine MySQL 5.7 MySQL 5.7 MySQL 5.7 MySQL 5.7 |
| Data Nodes RDS for My Select only the existing databas | Image: SQL 5.7 RDS for MySQL 8.0 GaussDB(for MySQL 8.0 SQL 5.7 RDS for MySQL 8.0 GaussDB(for MySQL 8.0 data nodes that are in the same VPC as your DDM instance and not rese and tables. Name Name Auto-Single-src-57-migration-group1 Auto-Single-src-57-migration-low-0 Auto-Single-src-57-readonly-migration Auto-Single-tar-57-readonly-migration Auto-Single-tar-57-readonly-migration Auto-tar-ddm-0001 | QL) Status Status Running Running Running Running Running Running Running | Connection Address 192.168.152.224:3306 192.168.152.3306 192.168.8.223:3306 192.168.8.181.115:3306 192.168.181.33306 | ected data nodes without affecting the DB Engine MySQL 5.7 MySQL 5.7 MySQL 5.7 MySQL 5.7 MySQL 5.7 |
| Data Nodes RDS for My Select only the existing databat | Image: SQL 5.7 RDS for MySQL 8.0 GaussDB(for MySQL 8.0 GaussDB(for MySQL 8.0 GaussDB(for MySQL 8.0 GaussDB(for MySQL 8.0 data nodes that are in the same VPC as your DDM instance and not see and tables. Name Name Auto-Single-src-57-migration-group1 Auto-Single-src-57-migration-low-0 Auto-Single-src-57-migration-low-0 Auto-Single-tar-57-readonly-migration Auto-Single-tar-57-dr-multiwrite Auto-tar-ddm-0001 Auto-tar-ddm-0002 | QL) In use by other DDM Instan Status Running Running Running Running Running Running Running Running | Connection Address 192.168.152.224:3306 192.168.11.91:3306 192.168.11.91:3306 192.168.11.115:3306 192.168.13.3306 192.168.3.80:3306 | ected data nodes without affecting th DB Engine MySQL 5.7 MySQL 5.7 MySQL 5.7 MySQL 5.7 MySQL 5.7 MySQL 5.7 MySQL 5.7 |

----End

2.10.4.2.6 Creating Table Structures in the Destination Database

Currently, DRS can only migrate data from the source instance to the destination DDM instance. It cannot migrate table structures or other objects in the source database. To migrate table structures and other objects, you need to create table structures and indexes in the destination database based on table structures of the source schema. Any source objects that have no corresponding objects created in the destination cannot be migrated. For more constraints, see **Before You Start**.

Procedure

- **Step 1** Log in to the **management console**.
- **Step 2** Click ¹ in the upper left corner and select a region and a project.
- Step 3 Click Service List on the left and choose Databases > Distributed Database Middleware.
- **Step 4** On the **Instances** page, locate the required instance and click **Log In** in the **Operation** column.
- **Step 5** On the displayed page, enter the username and password created in **Creating a DDM Account**, and click **Test Connection**.
- **Step 6** After the connection is successful, click **Log In** to log in to the DDM instance.
- Step 7 Click the db_test_info schema created in Creating a Schema and Associating It with the RDS for MySQL Instance.
- Step 8 Run the following SQL statements in database db_test_info to create table db_test_info_001 with the same structure as the source:

create table db_test_info_001(

column19 TIMESTAMP,

column18 VARCHAR(256),

column11 DATETIME ,

column10 ENUM('a','b','c') ,

column13 FLOAT(2,1),

column12 YEAR ,

column15 VARCHAR(64) not null,

column14 DOUBLE(2,1) ,

column17 INT ,

column16 LONGTEXT ,

column20 TIME ,

column21 BIT(8),

column22 LONGBLOB,

column23 MEDIUMINT,

column24 VARCHAR(20),

column9 DECIMAL(2,1) ,

column8 VARCHAR(1024),

column5 SMALLINT ,

column4 DATE ,

column7 VARCHAR(32),

column6 SET('hehe','xixi','haha') ,

column1 char(1) ,

column0 MEDIUMINT,

column3 BIGINT ,

column2 TINYINT ,

primary key(column19,column11,column17)

);

----End

2.10.4.3 Migrating Databases

Create a DRS instance and migrate table data from the source RDS MySQL database to the **db_test_info** schema of the DDM instance.

Pre-Check

Before creating a migration task, you need to manually check the migration conditions for smooth migration.

Creating a Migration Task

Step 1 Log in to the **Huawei Cloud console**.

Step 2 Click ¹ in the upper left corner and select a region and a project.

Select the region in which the destination instance is located.

- Step 3 Click the service list icon on the left and choose Databases > Data Replication Service.
- **Step 4** In the navigation pane on the left, choose **Online Migration Management** and click **Create Migration Task**.

| DRS | Online Migration Management ⑦ | Feedback Create Migration Task |
|------------------------------------|---|--|
| Online Migration Management | Batch Operations View Abnormal Tasks All DB engines | ▼ All statuses ▼ |
| Management | Task Name/ID JΞ Status Delay ⑦ Char | jing Data FL. DB Eng ↓ ⊟ Migration T Created ↓ F Netw Descri Operation |
| Data Synchronization Management | | |
| Data Subscription Management | | 3 |
| Disaster Recovery Management | | |

- **Step 5** Configure the replication instance information.
 - 1. Select a region and project, and enter a task name.

| Region | | | | | | |
|--|--|---|-----------------|-------------------|-----------------------|---------------------------------------|
| | Regions are geogra access, select the n | phic areas isolated from each o earest region. | ther. Resources | are region-speci | fic and cannot be use | d across regions through internal net |
| ★ Task Name | DRS-test_info | | ? | | | |
| Description | | | ? | | | |
| | | | | | | |
| | | 0. | /256 | | | |
| | | | | | | |
| Replication Instance Deta | ails 💿 | | | | | |
| The following information cannot be more | lified after you go to | the next page. | | | | |
| * Data Flow | To the cloud | Out of the cloud | Self-built | to self-built | | |
| | The destination dat | tabase must be a database in th | e current cloud | l. If you want to | migrate data betweer | n databases, select To the cloud. |
| * Source DB Engine | MySQL | MySQL schema and logic t | able | MongoDB | PostgreSQL | Microsoft SQL Server |
| * Destination DB Engine | DDM | | | | | |

2. Configure the migration task type and select the destination instance and subnet.

| | | | | 10 0 00 0 |
|-------------------------------|--|-------------------------|---------------------------|------------------------------------|
| * Source DB Engine | MySQL MySQL schema and logic table | MongoDB | PostgreSQL | Microsoft SQL Server |
| * Destination DB Engine | DDM | | | |
| | | | | |
| * Network Type | Public network |) | | |
| | I understand that an EIP will be automatically bound to | o the replication insta | nce and released after | the replication task is complete. |
| * Destination DB Instance | Autotest-DDM-TAR-001 | View DB Instance | View Unselectable DB | Instance |
| | | | | |
| Replication Instance Subnet | subnet-target-192(192.168.0.0/16) |) View Subnets | | |
| * Migration Type | Full+Incremental Full | | | |
| | This migration type allows you to migrate data with minim | al downtime. After a f | full migration initialize | es the destination database, an in |
| | the source and destination databases. | | | |
| * Source DB Instance Quantity | - 2 + | | | |
| | The number of source DB instances must be the same as the | ne number of instance | s associated with DDM | И. |
| | | | | |
| | | | | |
| Tags | It is recommended that you use TMS's predefined tag function | n to add the same tag | to different cloud rese | ources.View predefined tags C |
| | To add a tag, enter a tag key and a tag value below. | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | Enter a tag key Enter a tag value | Add | | |

3. Click Create Now.

Step 6 Configure the source and destination instance information.

1. Enter the IP address, port number, username, and password of the source instance.

Click Test Connection.

| Replication instance created successfully. View IP. To ensure network connectivity, add the IP to the whitelist of the source database middleware and each sharded database. | | | | | | | |
|--|--|---|---|--|--|--|--|
| | | | | | | | |
| 192.168.170.164 | | | | | | | |
| 5066 | | | | | | | |
| test_info | | | | | | | |
| | Q | | | | | | |
| | | | | | | | |
| IP Address or Domain Name | Port | Username | Password | SSL Connection | | | |
| 192.168.23.97 | 3306 | root | ····· 🗞 | | | | |
| 192.168.81.18 | 3306 | root | ····· @ | | | | |
| | essfully. View IP. To ensure net/ 192.168.170.164 5066 test_info IP Address or Domain Name 192.168.23.97 192.168.81.18 | essfully. View IP. To ensure network connectivity 192.168.170.164 5066 test_info IP. Address or Domain Name Port 192.168.23.97 3306 192.168.81.18 | essfully. View IP. To ensure network connectivity, add the IP to the whit 192.168.170.164 5066 test_info | essfully. View IP. To ensure network connectivity, add the IP to the whitelist of the source data 192.168.170.164 5066 test_info IP Address or Domain Name Port Username Password 192.168.23.97 3306 root Image: Content of the source of t | | | |

2. Enter the username and password of the destination database. Click **Test Connection**.

Destination Database

| DB Instance Name | Autotest-DDM-TAR-001 (192.168.240.55) | | | | |
|-------------------|---------------------------------------|---|--|--|--|
| Database Username | test_info_tar | | | | |
| Database Password | ••••• | Ø | | | |
| | Test Connection 🕑 Test successful | | | | |

3. Click Next. In the displayed box, read the message carefully and click Agree.



 \times

I acknowledge that the IP addresses, domain names, ports, usernames, and passwords of involved databases will be temporarily collected and used in this task. These items will be deleted after the task is deleted.



Step 7 Configure the synchronization task.

Select the databases and tables of the source database to be migrated. In this practice, select the **db_test_info_001** table in database **db_test_info**.

| Migrate Object | Tables | | | | |
|----------------|---|---|---|---|---|
| | If any data in the source databas Move objects to be migrated from | e changes, click the refresh button I n list of unselected objects on left s | elow. Ide to the list of selected o | objects on right side. | |
| | 0 | Select All | С | Select All | |
| | For tables, only expanded da | tabases are searched. | Q | For tables, only expanded databases are searched. | Q |
| | 😑 🗹 db_test_info | database | | | |
| | db_test_info_00 | 1 table | | | |
| | | | » | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Step 8 Perform a pre-check.

1. After all settings are complete, perform a pre-check to ensure that the migration is successful.

| () a | reate Replication Instance | Configure Source and Destination Databases | (3) Set Task | | 4 Check Task | – (5) Confirm Tas |
|------|----------------------------|--|---|--------------------------------------|---------------------------------------|-------------------|
| | Basic Information | | | | | |
| | Task ID | b3bc54fe-284b-43db-a61b-f0e1068jb107 | Task Name | DRS-test_info | | |
| | Created | Jun 01, 2022 15:06:34 GMT+08:00 | Source Database Middleware IP | 192.168.170.164 | | |
| | Destination Database Name | Autotest-DDM-TAR-001 | Destination Database IP | 192.168.240.55 | | |
| | | | | | | |
| | Check Again | | | | | |
| | Check success rate | 8% All checks must pass before j | you can continue. If any check requires confi | mation, check and confirm the result | s before proceeding to the next step. | |

2. If any check fails, review the cause and rectify the fault. Then, click **Check Again**.

| Check success rate 100% All checks must pass before you can continue. | If any check requires confirmation, check and confirm the results before proceeding to the next step. |
|--|---|
| Check Item | Check Result |
| Destination database storage space | |
| Whether the destination database has sufficient storage space | Confirm Confirm Details |
| Database parameters | |
| Whether the AUTO_INCREMENT values of the destination database tables are too small | Passed |
| Whether primary keys and shard keys are consistent | Passed |
| Whether the schema in the source database middleware can be connected | Passed |
| Whether the source database middleware contains tables without primary keys | Passed |
| Whether the table structures (including columns and indexes) in the source and destination database middleware are consistent | Passed |
| Whether the source end contains empty databases | Passed |
| Whether the number of source DB instances is the same as that of destination DB instances | Passed |
| Whether the destination database middleware account has sufficient permissions | 🤣 Passed |
| Whether the source and destination database character sets are consistent | Passed |
| | |
| Whether the SSL connection is correctly configured | Passed |
| Whether the source database binlog is row-based | Passed |
| Whether the binlog row image value of the source database is FULL | Passed |

3. If all check items are successful, click **Next**.

Step 9 Confirm the task.

1. Check whether all configured information is correct.

| Start Time | Start upon task creation Start | at a specified time |
|-----------------------------|--------------------------------|--|
| | Jun 02, 2022 03:00:00 | 0800 It is strongly recommended that you set the task start time to service off-peak hours and reserve 2 to 3 days to verify the data. |
| | | |
| Send Notifications | If disabled, DRS alarms, such | as task failure, high latency, and frozen, cannot be received. |
| * Stop Abnormal Tasks After | 14 ⑦ Abnormal task | s run longer than the period you set (unit: day) will automatically stop. |
| Details | | |
| Product Name | Configuration | |
| | Task Information | |
| | Name | DRS-test_info |
| | Description | Source Database IP Address or Domain Name: 192.168.170.164 Destination DB Instance Name: Autotest-DDM-TAR-001 |
| | Migration Type | Full+Incremental migration |
| | Data Flow | To the cloud |
| | Replication Instance Details | |
| | Specifications | Large |
| | Source DB Engine | MySQL schema and logic table |
| | | |

- 2. Specify **Start Time** and select the check box before the agreement.
- 3. Click **Submit**.

Notice

When DRS migration tasks are in progress, certain operations may cause issues. To ensure migration success, we strongly recommend that you read the migration precautions carefully before starting migration tasks and follow the instructions to ensure migration stability.

Any task that is active will be billed, even if its status becomes abnormal. If a task is no longer needed, stop the task to avoid unnecessary fees.

If the task status is abnormal for more than 14 days, the task automatically stops. Pay attention to the alarms you received and handle the task in time to resume the download and avoid task retry failure.

✓ I have read the precautions.

Start at a specified time

Step 10 After the task is submitted, view and manage it.

After the task is created, return to the task list to view the status of the created task.

| | Task Name/ID ↓Ξ | Status | Delay 🕐 | Charging | Data Fl | DB Eng ↓Ξ | Migration T | Created JF | Netw | Operation |
|-----|------------------------------------|------------------|---------|----------|----------|-----------|-------------|---------------------|--------|-----------|
| ~ 🗆 | DRS-test_info b3bc54fe-284b-43d | • Full migration | | l No | To the c | MySQL sch | Full+Increm | Jun 01, 2022 15:06: | Public | Stop |

----End

2.10.4.4 Verifying Data After the Migration

When the task status changes to **Incremental migration**, the full migration is complete. Then, you can log in to the DDM instance to view the migration results.

Step 1 Wait until the migration task status becomes **Incremental migration**.

| | Task Name/ID ↓Ξ | Status | Delay 🕐 | Charging | Data Fl | DB Eng ↓Ξ | Migration T | Created JF | Netw | Operation |
|---|-----------------------------|-------------------------|---------|----------|----------|-----------|-------------|---------------------|--------|----------------------------|
| ~ | DRS-test_info b3bc54fe-2 |) Incremental migration | Os | 🙆 No | To the c | MySQL sch | Full+Increm | Jun 01, 2022 15:06: | Public | Stop View Compare Data |

- **Step 2** Click the task name to go to the **Basic Information** page.
- Step 3 Verify data consistency.
 - Choose Migration Comparison > Object-Level Comparison to view the database and table migration results.

 \times

| < DRS-test_info | | | | | Feedball | |
|--|---|---|----------------------|------------|---|--|
| Basic Information | To view the subtasks, click:DRS-test_info- | child-01 DRS-test_info-child-02 | | | × | |
| Nigration <u>comparison</u> Migration Progress Tags | Attent Progress Before You Start To minimize the impact on services, you are advised to perform a migration comparison in accordance to the following guidelines. Object-Comparison Deta-Level Comparison Deta-Level Comparison Deta-Level Comparison | | | | | |
| | Only the migration objects that you have Comparison Time: Jun 01, 2022 16:01:26 (Item | selected for comparison are displayed here. iMT+08:00 Source Database | Destination Database | Result | Compare Cancel Comparison [] C Operation | |
| | Database Table | tasks, clickDRS-test_Info-child-01 DRS-test_Info-child-02 tasks, clickDRS-test_Info-child-02 tasks, | | | | |
| | Index | 1 | 1 | Consistent | View Details | |

2. Choose **Migration Comparison** > **Data-Level Comparison**, click **Create Comparison Task**, and view the migration results of the rows in the table.

| Some comparison resu comparison during off | Its may be inconsistent because data changes during the peak hours so that you can get an accurate compariso | ne comparison cannot be sy n result. | nchronized to th | e destination in real time. You are advised to select a scheduled time to start th |
|---|--|---|------------------|--|
| * Comparison Type | Row | | | |
| * Comparison Time | Start upon task creation Start at a spe | ecified time | | |
| * Object | If any data in the source database changes, click the | refresh button below. | | |
| | ③ Select All | C | | Select All |
| | For tables, only expanded databases are searched | Q | | For tables, only expanded databases are searched. |
| | 😑 🗹 db_test_info | database | | |
| | db_test_info_001 | table | | |
| | | | >> | |
| | | | « | |
| | | | | |
| | | ок | Cancel | |

Step 4 Stop the migration task.

Create Comparison Task

After data is completely migrated to the destination database, stop the migration task.

1. Locate the task and click **Stop** in the **Operation** column.



2. In the display box, click **Yes**.



Step 5 After the migration is complete, test the performance.

For details, see **DDM Performance White Paper**.

----End



3.1 Migrating Microsoft SQL Server Backup Data to RDS SQL Server DB Instance

3.1.1 Overview

It often becomes necessary to hide a real IP address of your database for the sake of security. Migrating data through direct connections is an option, but costly. DRS supports backup migration, which allows you to export data from your source database for backup and upload the backup files to OBS. Then, you can restore the backup files to the destination database to complete the migration. Using this method, data migration can be realized without exposing your source databases.

DRS supports full migration and full+incremental migration.

Scenario 1: Full Backup Migration

In this scenario, you need to stop services, upload the exported full backup file of the Microsoft SQL Server database to OBS, and then restore the backup data to the destination database.





Scenario 2: Full+Incremental Backup Migration

In this scenario, data is migrated continuously. After a full backup and restoration is complete, you can perform incremental migrations for several times to minimize service interruption. A complete restoration process involves restoring several incremental backup files. The destination DB instance will not be available until the last backup file is restored. You can determine whether the selected backup file is the last one.



Figure 3-2 Full+incremental migration

3.1.2 Migration Preparations

This section describes how to prepare for backup and migration. Before using DRS, ensure that you have completed the required preparations.

Preparing for Backup Files

For details, see Migration Overview in Backup Migration.

Configuring Database Restoration Mode

- No configuration is required during a full backup restoration.
- During full and incremental backup migration, the recovery mode must be set to **Full**. The procedure is as follows:

Method 1: Log in to the local database center using Microsoft SQL Server Management Studio. Right-click the database to be migrated and choose **Properties** from the shortcut menu. In the dialog box that is displayed, click **Options**, and select **Full** for **Recovery mode**.

Figure 3-3 Recovery mode

| J Database Properties - drs_test_1 − □ × | | | | | |
|--|---|---------------------------|--|--|--------|
| Select a page P General | 🔄 Script 🔻 🚺 Help | | | | |
| Files Pilegroups Options | <u>C</u> ollation: Recovery <u>m</u> odel: | Chinese_PRC_CI_AS Full | | | ~ |
| Permissions | Compatibility <u>l</u> evel: | SQL Server 2014 (120) | | | \sim |
| 🚰 Extended Properties 🚰 Mirroring | Containment <u>t</u> ype: | None | | | ~ |

Method 2: Run the following SQL commands to set the restoration mode: USE master; ALTER DATABASE database_name SET RECOVERY FULL;

Destination Database Storage Space

The available storage space of the destination database should be at least 1.5 times larger than the total storage space of the database to be restored.

Migration Duration Reference

A complete backup and migration process consists of the following phases:

Figure 3-4 Migration diagram



Table 3-1 Backup migration

| Phase | Name | Description |
|-------------------|--|--|
| 1 | Export the backup files. | The time required for generating database backup files depends on the configuration of the source database. You need to estimate the time based on the configuration of the source database. |
| 2 | Upload the backup file to an OBS bucket. | OBS does not limit the upload and download speed. If you access OBS through a public network, the upload and download speed is restricted by the public network bandwidth. For example, if the bandwidth of the public network is 10 MB/s and the network is not affected by other factors, the upload rate is 10 MB/s. |
| 3 | Download the backup file to the destination RDS for SQL Server through DRS. | Generally, the download speed is 100 MB/s or 300 GB/h. |
| 4 | Restore the backup files to the destination database. | Generally, the recovery speed is about 5 GB/min or 300 GB/h. |
| Total Duration | Total time consumption time consumption + ph consumption | $\mathfrak{I} = \mathfrak{phase} \ (1)$ time consumption + $\mathfrak{phase} \ (2)$ ase (3) time consumption + $\mathfrak{phase} \ (4)$ time |
| | Service downtime = Ser > Uploading to OBS -> | vice suspension -> Last incremental backup - Creating a DRS task for restoration |

The following uses an example to describe the time required for backing up and migrating data. You can estimate the migration time in advance. The actual time required depends on the network and database configurations on the client. The time listed in the following table is for reference only.

Example

| Phase | Name | Backup File Size (GB) | Time Required (h) |
|------------|---|--------------------------|-------------------|
| 1 | Export the backup files. | 283 | 5.5 |
| 2 | Upload the backup file to an OBS bucket. | 283 | 8.95 |
| 3 | Download the backup file by through DRS. | 283 | 0.61 |
| 4 | Restore the backup files to the destination database. | 283 | 2.24 |
| Total Dura | ation | | 17.3 |

Table 3-2 Backup migration example

3.1.3 Exporting Backup Files

This section describes how to export the full backup files and incremental backup files of a database.

Step 1 Check the parameter settings of the local database.

NOTE

This operation is mandatory for full and incremental migration. If you only perform the full migration, skip this step.

The database has log truncation and shrinking configurations. Therefore, before exporting full backup files, you must set the database recovery model to **Full** until the entire database and services are migrated to the DB instance on the current cloud.

- 1. Log in to the local database center through Microsoft SQL Server Management Studio.
- 2. Right-click the database to be migrated and choose **Properties** from the shortcut menu. In the displayed dialog box, select **Options** from the left list.
- 3. Select Full for Recovery model. Then, click OK.

| Connect - 🛃 🛃 = 🍸 🛃 🍒 | | DifferentialBaseLSN NUMERIC (| 25, 0), | |
|---|---|----------------------------------|-------------------|--------|
| DESKTOP-DHNDL3I (SQL Server 12.0.2000 - CHINA\w0051 | | DifferentialBaseGOID UNIQUEID | SNTIFIER, | |
| 🖃 🚞 Databases | Database Properties - dr | rs_test_1 | | × |
| 🗉 🚞 System Databases | Select a page | Script - BHelp | | |
| 🛅 Database Snapshots | 🚰 General | | | |
| 🖃 🚺 drs_test_1 🛛 🚺 | Files | Collection: Chi | DATA PRC CT AS | |
| 표 🚞 Database Diagrams | 2 Options | 2011011011 | | |
| 🗉 🚞 Tables | Change Tracking | Recovery model: | | ~ |
| 🗉 🚞 Views | Permissions 🖉 | Compatibility <u>l</u> evel: SQL | Server 2014 (120) | \sim |
| 🗉 🚞 Synonyms | Extended Properties | Containment type: Non | e | \sim |
| 🗉 🚞 Programmability | Transaction Log Shinning | Other options: | | |
| 🗷 🧰 Service Broker | i i and i i i i i i i i i i i i i i i i i i i | | | |
| 🗄 🧰 Storage | | 0: Z* | | |
| 🗉 🚞 Security | | Auto Update Statistics | Irue R-l | - ^ |
| 🗉 🧻 drs_test_10 | | × Containment | nous Fairse | |
| 🗉 间 drs_test_11 | | Default Fulltext Language LCID | 1033 | 4 |
| ⊞ 间 drs_test_12 | | Default Language | English | |
| 🗉 间 drs_test_13 | | Nested Triggers Enabled | Irue | |
| 🗉 间 drs_test_14 | | Transform Noise Words | False | - |
| 🗉 间 drs_test_15 | | Iwo Digit Tear Lutoff | 2049 | |
| 🗷 间 drs_test_16 | Lonnegrion | Close Cursor on Commit Enabled | False | · |
| 🗉 间 drs_test_17 | Server: DESETOP-DEEDIST | Default Cursor | GLOBAL. | |
| 🗉 间 drs_test_18 | DESILOT DIADLEST | V FILESTREAM | | |
| 🗉 间 drs_test_19 | CHINA\w00510300 | FILESTREAM Directory Name | | |
| 🗉 间 drs_test_2 | View connection | FILESTREAM Non-Transacted Acces | s Off | |
| 🗉 🧻 drs_test_20 | properties | Allow Spanshot Isolation | Volco | 4 |
| ⊞ 🥫 drs_test_21 | Parameter | ANSI NULL Default | False | |
| ⊞ 🥫 drs_test_22 | Trogress | Allow Snapshot Isolation | | |
| ⊞ 间 drs_test_23 | Ready | | | |
| 🗉 间 drs_test_24 | *a.s* | | | |
| 🗉 间 drs_test_25 | | | | _ |
| 🗉 间 drs_test_26 | | | OK Cancel | |
| 🗉 📔 drs_test_27 | | | | |

Figure 3-5 Configuring the recovery model

Step 2 (Optional) Set backup file compression parameter.

If the bandwidth of your local data center is low and uploading data to OBS Browser takes a long time, you are advised to configure the backup file compression parameters.

- 1. Log in to the database center through Microsoft SQL Server Management Studio as the database administrator.
- 2. In Object Explorer, right-click the server and choose **Properties**.
- 3. Click Database Settings.
- 4. In the **Backup and restore** area, select **Compress backup**.

This setting determines the server-level default setting for compression backup, as detailed below:

- If **Compress backup** is not selected, the new backup will not be compressed by default.
- If **Compress backup** is selected, the new backup file is compressed by default.

| 3 3 3 | • • | |
|--|---|---|
| Object Explorer 🔹 👎 🗙 | Server Properties - DESK | TOP-DHNDI3I - 🗆 X |
| Connect - 🛃 🛃 🔲 🍸 🛃 🍒 | Select a page | |
| Connect 24 24 11 2 3 Connect 24 24 12 12 3 Connect 24 24 24 12 12 3 Connect 24 24 24 12 12 12 12 12 12 12 12 12 12 12 12 12 | Select a page Meary Meany Security Connections Maraced Permissions 2 2 2 3 3 4 4 4 4 4 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 | Script - The Halp Default jador fill factor: 0 0 Bachy and restore Specify how long SQL Server will with for a new tape. 9 gait indefinitely 0 Try for 0 Try for 0 0 0 animate(r) Default bachy media retention (in days): 0 0 2 Compress backup 3 |
| | Concention. | Recovery |
| <pre>0 drs_test_13 0 drs_test_14 0 drs_test_14 0 drs_test_15 0 drs_test_16 0 drs_test_17 0 drs_test_17 0 drs_test_19 0 drs_test_2 0 drs</pre> | Connection Server: DESKTOF-DHORL3I Connection: CHIRAN-0050000 Programs Recoverliss Ready | Recevery interval (minntes): Database default locations Database default locations Database default locations D:\Frogram Files\Microsoft SQL Server\MSSQL12_MSSQLSERVER\MSS Loc: D:\Frogram Files\Microsoft SQL Server\MSSQL12_MSSQLSERVER\MSS Backup: D:\Frogram Files\Microsoft SQL Server\MSSQL12_MSSQLSERVER\MSS @ Configured values |
| Image: Book of the state of th | | OK Cancel |

Figure 3-6 Configuring compression parameter

- **Step 3** Export the full backup file.
 - 1. Log in to the local database center through Microsoft SQL Server Management Studio.
 - 2. Right-click the database whose data needs to be exported and choose **Tasks** > **Back Up**.



Figure 3-7 Back Up

3. Set **Backup type** to **Full**, click **Add**, and enter the path to which the backup file is exported. The file name extension must be **.bak**.

| 间 Back Up Database - | drs_test_1 | | - | | × |
|---|--------------------------------|--|----|-------------------------------|--------|
| Select a page | Script - R Help | | | | |
| General Media Options Backup Options | Source | drs_test_1 FULL Full 1 Disk | | | × × |
| Connection | D:\Program Files\Microsoft SQL | Server/MSSQL12_MSSQLSERVER/MSSQL\Backup\text.bak | | A <u>d</u> d <u>R</u> emov | e |
| Server: DESKTOP-DHNDL3I Connection: CHINA\w00510300 View connection properties | | | | Conten | ts |
| Progress Ready | | | | | |
| | | | OK | Cance | 1 |

Figure 3-8 Setting the full backup file

NOTE

- It is recommended that the backup file name be the same as the database name (case sensitive), and the suffix **.bak** be added to the backup file name.
- You are advised to back up all the databases in a .bak file or a few .bak files. This reduces the frequency of uploading and restoring the database.
- **Step 4** Export the incremental backup file.
 - 1. Log in to the local database center through Microsoft SQL Server Management Studio.
 - 2. Right-click the database whose data needs to be exported and choose **Tasks** > **Back Up**.

| B drs_tes C drs_tes C drs_tes C drs_tes C drs_tes New Query C drs_tes Script Database as | • | |
|---|---|---|
| | | |
| H drs_tes lasks | • | Detach |
| Ors_tes Policies | • | Take Offline |
| | | Bring Online |
| H drs_tes | _ | |
| | | Shrink 🕨 |
| | | Back Up 2 |
| H U drs_tes | | Restore |
| Heports | · | |
| 🗄 📙 drs_tes 🔋 Rename | | Mirror |
| 🗄 📙 drs_tes 🛛 Delete | | Launch Database Mirroring Monitor |
| ⊞ | _ | Ship Transaction Logs |
| Heresh | | Generate Scrints |
| | _ | |
| 🗉 间 drs_test_25 | | Extract Data-tier Application |
| 🗄 间 drs_test_26 | | Deploy Database to Windows Azure SQL Database |
| 🗉 间 drs_test_27 | | Deploy Database to a Windows Azure VM |
| 🗄 间 drs_test_28 | | Export Data-tier Application |
| 🗄 间 drs_test_29 | | Register as Data-tier Application |
| 🗄 间 drs_test_3 | | Upgrade Data-tier Application |
| 🗄 间 drs_test_30 | | Delate Data tion Application |
| 🗄 间 drs_test_31 | | |
| 🗉 间 drs_test_32 | | Import Data |
| 🗄 间 drs_test_33 | | Export Data |
| 🗄 间 drs_test_34 | | Copy Database |
| 🗄 间 drs_test_35 | | Managa Databasa Enspirition |
| 🗄 间 drs_test_36 | | Manage Database Entryption |

Figure 3-9 Back Up

3. Select **Transaction Log** for **Backup type**, click **Add**, and enter the path to which the backup file is exported. The suffix is **.bak**.

| 间 Back Up Database - | lrs_test_1 | - | |
|---|--|--|----------|
| Select a page | 🔄 Soript 🔻 🌇 Help | | |
| Media Options | Source Database: Recovery model: Backup type: Copy-only backup Backup component: () Database | drs_test_1 FULL Transaction Log 1 | |
| | O Files and filegroups: Destination Back up to: | Disk | |
| Connection | D:\Program Files\Microsoft SQL : | Server MSSQL12.MSSQLSERVER/MSSQL\Backup\test_ingr_20191919.bak | Add |
| Server: DESKTOP-DHNDL31 Connection: | | | Contents |
| CHINA\w00510300 | | | |
| rogress C | | | |
| | | ОК | Cancel |

Figure 3-10 Setting the incremental backup file

NOTE

- It is recommended that the backup file name be the same as the database name (case sensitive), with the time stamp and .bak suffix. For example: [*Database name*] _Incr_ [*Timestamp*] .bak.
- You are advised to back up all the databases in a .bak file or a few .bak files. This reduces the frequency of uploading and restoring the database. For example, you can back up the A, B, and C databases to a .bak file, and then compress, upload, and restore the three databases in a batch. This helps to improve the success rate of data restoration.

----End

3.1.4 Uploading Backup Files

This section describes how to upload backup files.

Step 1 Create an OBS bucket and upload the backup file to the OBS bucket.

D NOTE

- If the size of the file uploaded at a time does not exceed 5 GB, select **Standard** for **Storage Class** and **Public Read** for **Bucket Policy** on the OBS console.
- If you want to upload multiple files in batches (up to 100 files can be uploaded at a time and the total size of the files cannot exceed 5 GB) or upload files greater than 5 GB at a time, download and install the OBS Browser+ client. For details, see Object Storage Service Client Guide.

You are advised to store backup files in independent OBS buckets in the same region to distinguish the backup files from other public files.

Before uploading the backup file, create access keys (AK and SK) in the OBS console. For details, see **Creating Access Keys (AK and SK)**.

When uploading backup files, select Standard for Storage Class.

- Microsoft SQL Server supports only .bak files and does not support restoration from a newer version to an older version.
- You are advised to store backup files in independent OBS buckets in the same region to distinguish the backup files from other public files.
- 1. Log in to OBS Console. For details, see Logging In to OBS Console.
- 2. For details about how to add an OBS bucket, see Creating a Bucket.
- 3. For details about how to upload files to an OBS bucket, see Uploading a File.

----End

3.1.5 Scenario 1: Full Backup Migration

In this scenario, you need to stop services, upload the exported full backup file of the Microsoft SQL Server database to OBS, and then restore the backup data to the destination database.

This section describes how to migrate a full backup.

Migration Diagram



Figure 3-11 Full migration
Migration Process



Figure 3-12 Migration process

Procedure

- **Step 1** Export the full backup file of the database. For details, see **Exporting Backup Files**.
- Step 2 Upload files to an OBS bucket. For details, see Uploading Backup Files.
- **Step 3** Log in to the DRS console.
- **Step 4** Click ¹ in the upper left corner and select a region and a project.
- **Step 5** Choose **Service List > Databases > Data Replication Service**.
- **Step 6** In the navigation pane on the left, choose **Backup Migration Management**. Then, click **Create Migration Task**.
- **Step 7** Enter the information about the migration task and backup file, and click **Next**.



| Backup File Info | mation | | | |
|----------------------|--|---|---|---|
| * Database Type | Microsoft SQL Server | | | |
| * Backup File Source | OBS Bucket RDS full backup | 0 | | |
| * Bucket Name | fine eth | • C (?) | | |
| Tags | It is recommended that you use TMS's prede | fined tag function to add the same tag to diffe | ent cloud resources. View predefined tags | |
| | Tag key Tag value | | | |
| | You can add 10 more tags. | | | |
| Enter a backup name. | Q | | | C |
| Backup Name | | Size | Last Modified Time | |
| eldbgwry201 | 90630 hak | 139.20 MB | Jul 02, 2019 11:56:51 GMT+08:00 | |

| Parameter | Description | |
|--------------------|---|--|
| Task Name | The task name consists of 4 to 64 characters, starts with a letter, and can contain only letters (case-insensitive), digits, hyphens (-), and underscores (_). | |
| Description | The description consists of a maximum of 256 characters and cannot contain the following special characters: !=<>'&" | |
| Database Type | Select Microsoft SQL Server. | |
| Backup File Source | Select OBS bucket. | |
| Bucket Name | Select the bucket where the backup file is stored and the full backup file. | |
| | NOTE | |
| | The backup file of the Microsoft SQL Server must be in the .bak format. Multiple backup files can be selected at the same time. | |
| | • A database cannot be split into different files for upload. | |
| | The bucket name, backup file name, or path cannot contain Chinese characters. | |
| | If the number of data records in a bucket exceeds 500, data overflow may occur. As a result, some data cannot be displayed. You can use an independent standard bucket with the public-read permission. | |

| Table 3-3 Migr | ation task | information |
|----------------|------------|-------------|
|----------------|------------|-------------|

Step 8 On the **Select Destination** page, specify database information and click **Next**.

Figure 3-14 Full migration database information



Table 3-4 Microsoft SQL Server database information

| Parameter | Description |
|--|---|
| Destination RDS DB Instance Name | Select a destination RDS DB instance. |
| Backup File Format | Select Full. Full: indicates full backup files. NOTE To migrate databases at a time, you need to stop services first and upload full backups for restoration. |
| Last Backup | Select Yes if you perform a one-time full migration. |
| Overwrite Data | You can determine whether to overwrite data in the destination database during the restoration if the destination DB instance contains a database with the same name as the backup database. NOTE If you select this option, the destination databases with the same names as the backup databases will be overwritten. Exercise caution when performing this operation. |
| Perform Pre- verification | Specifies whether to perform pre-verification on the backup migration task. The default value is Yes. Yes: To ensure successful migration and identify potential problems in advance, verify the validity, integrity, continuity, and version compatibility of backup files before restoration. No: If pre-verification is not performed, the migration speed is faster, but you need to check the validity, integrity, continuity, and version compatibility of backup files preserve is faster. |

| Parameter | Description |
|-------------------------|--|
| Restore Database | You can restore all or some of databases. |
| | • All: Restores all databases in the backup file. You do not need to enter the names of the databases to be restored. By default, all databases in the backup file are restored. |
| | • Custom : Restore specified databases from the backup file. You need to enter the names of the databases to be restored. |
| | The databases to be restored must be consistent with those for which the full or incremental backups are created. |
| Reset Database Name | If Restore Database is set to All , you can reset database names. If you enable Reset Database Name , the original database names in the backup file will be reset to new database names. Prerequisites: |
| | The backup file contains only one database. |
| | • The backup file is a full backup file and is the last backup file. Select Full for Backup File and Yes for Last Backup Type . |
| | NOTE The database name can be reset only when Backup Type is set to Full and Restore Database is set to All . |
| Backup Database Name | If Restore Database is set to Custom , specify Backup Database Name . |
| | The backup database name is case sensitive and must be the same as that in the backup file. The backup database name can contain a maximum of 256 bytes, and the new database name can contain a maximum of 128 bytes. Only letters, digits, hyphens (-), and underscores (_) are allowed. DRS also allows you to set an alias for the database to be restored |

- **Step 9** On the **Confirm Task** page, check the configuration details, read and agree to the agreement, and click **Next**.
- **Step 10** In the task list on the **Backup Migration Management** page, check whether the task is in the **Restoring** status. If the migration is successful, the task status becomes **Successful**.

----End

3.1.6 Scenario 2: Full+Incremental Backup Migration

In this scenario, data is migrated continuously. After a full backup and restoration is complete, you can perform incremental migrations for several times to minimize service interruption. A complete restoration process involves restoring several incremental backup files. The destination DB instance will not be available until the last backup file is restored. You can determine whether the selected backup file is the last one.

This section uses a full+incremental migration as an example to describe how to perform a migration while minimizing service interruption.

Migration Diagram



Figure 3-15 Full+incremental migration

Migration Process





First Full Migration

- **Step 1** Export the full backup file of the database. For details, see **Exporting Backup** Files.
- Step 2 Upload files to an OBS bucket. For details, see Uploading Backup Files.
- **Step 3** Log in to the DRS console.
- **Step 4** Click ^(Q) in the upper left corner and select a region and a project.
- **Step 5** Choose **Service List > Databases > Data Replication Service**.
- **Step 6** In the navigation pane on the left, choose **Backup Migration Management**. Then, click **Create Migration Task**.
- **Step 7** Enter the information about the migration task and backup file, and click **Next**.

Figure 3-17 Migration task information

| Backup File Info | rmation | | |
|----------------------|--|--|---------------------------------|
| * Database Type | Microsoft SQL Server | | |
| * Backup File Source | OBS Bucket RDS full backup | 0 | |
| * Bucket Name | dowell | • C (2) | |
| Tags | It is recommended that you use TMS's prede | fined tag function to add the same tag to different cloud resources. | View predefined tags |
| | Tag key Tag value | | |
| | You can add 10 more tags. | | |
| Enter a backup name. | Q | | C |
| Backup Name | | Size | Last Modified Time |
| eldbpwry201 | 90630 bak | 139.20 MB | Jul 02, 2019 11:56:51 GMT+08:00 |

 Table 3-5 Migration task information

| Parameter | Description |
|--------------------|--|
| Task Name | The task name consists of 4 to 64 characters, starts with a letter, and can contain only letters (case-insensitive), digits, hyphens (-), and underscores (_). |
| Description | The description consists of a maximum of 256 characters and cannot contain the following special characters: !=<>'&" |
| Database Type | Select Microsoft SQL Server. |
| Backup File Source | Select OBS bucket . |

| Parameter | Description | |
|-------------|---|--|
| Bucket Name | Select the bucket where the backup file is stored and the full backup file. NOTE | |
| | The backup file of the Microsoft SQL Server must be in the .bak format. Multiple backup files can be selected at the same time. | |
| | • A database cannot be split into different files for upload. | |
| | The bucket name, backup file name, or path cannot contain Chinese characters. | |
| | • If the number of data records in a bucket exceeds 500, data overflow may occur. As a result, some data cannot be displayed. You can use an independent standard bucket with the public-read permission. | |

Step 8 On the **Select Destination** page, specify database information and click **Next**.

Figure 3-18 Full migration database information

| Database Information | |
|----------------------------------|--|
| Destination RDS DB Instance Name | Select Destination R05 10 Instance |
| Backup File Format | Full Incremental |
| | full: Indicates full backup files. |
| Last Backup | Yes No O |
| | The destination distabases involved will be unavailable, and incremental backups can still be restored. |
| Overwrite Data | Yes No You can determine whether to overwrite data in the destination database during the restoration if the destination DB instance contains a database with the same name as the badoup database |
| | Denniting data will clear the existing data of the destination database. Exercise caution when performing this operation. |
| Perform Pre-verification | Yes No |
| Restore Database | AL Custom (2) |
| Reset Database Name | |

Table 3-6 Microsoft SQL Server database information

| Parameter | Description |
|--|--|
| Destination RDS DB Instance Name | Select a destination RDS DB instance. |
| Backup Type | Select Full . Full : indicates full backup files. |

| Parameter | Description |
|------------------------------|---|
| Last Backup File | A complete restoration process involves restoring several incremental backup files. The destination DB instance will not be available until the last backup file is restored. You can determine whether the selected backup file is the last one. Select Yes in either of the following scenarios: Perform a one-time full migration. The selected backup file is the last one to be restored. |
| | Select No in the scenario where you continue to restore databases using incremental backup files after a full backup restoration is performed. In this case, the destination database is in the restoring state and cannot be read or written. |
| Overwrite Data | You can determine whether to overwrite data in the destination database during the restoration if the destination DB instance contains a database with the same name as the backup database. NOTE If you select this option, the destination databases with the same names as the backup databases will be overwritten. Exercise caution |
| | when performing this operation. |
| Perform Pre- verification | Specifies whether to perform pre-verification on the backup migration task. The default value is Yes . |
| | • Yes : To ensure successful migration and identify potential problems in advance, verify the validity, integrity, continuity, and version compatibility of backup files before restoration. |
| | • No: If pre-verification is not performed, the migration speed is faster, but you need to check the validity, integrity, continuity, and version compatibility of backup files on your own. |
| Restore Database | You can restore all or some of databases. |
| | • All: Restores all databases in the backup file. You do not need to enter the names of the databases to be restored. By default, all databases in the backup file are restored. |
| | Custom: Restore specified databases from the backup file. You need to enter the names of the databases to be restored. The databases to be restored must be consistent with those for which the full or incremental backups are created |

| Parameter | Description |
|-------------------------|--|
| Reset Database Name | If Restore Database is set to All , you can reset database names. If you enable Reset Database Name , the original database names in the backup file will be reset to new database names. |
| | Prerequisites: |
| | • The backup file contains only one database. |
| | • The backup file is a full backup file and is the last backup file. Select Full for Backup File and Yes for Last Backup Type . |
| | NOTE The database name can be reset only when Backup Type is set to Full and Restore Database is set to All . |
| Backup Database Name | If Restore Database is set to Custom , specify Backup Database Name . |
| | The backup database name is case sensitive and must be the same as that in the backup file. The backup database name can contain a maximum of 256 bytes, and the new database name can contain a maximum of 128 bytes. Only letters, digits, hyphens (-), and underscores (_) are allowed. |
| | DRS also allows you to set an alias for the database to be restored. |

- **Step 9** On the **Confirm Task** page, check the configuration details, read and agree to the agreement, and click **Next**.
- **Step 10** In the task list on the **Backup Migration Management** page, check whether the task is in the **Restoring** status. If the migration is successful, the task status becomes **Successful**.

----End

First Incremental Migration

- **Step 1** Export the first incremental backup file of the database. For details, see **Exporting Backup Files**.
- Step 2 Upload files to an OBS bucket. For details, see Uploading Backup Files.
- **Step 3** Log in to the DRS console.
- **Step 4** In the navigation pane on the left, choose **Backup Migration Management**. Then, click **Create Migration Task**.
- **Step 5** Enter the information about the migration task and backup file, and click **Next**.

Figure 3-19 Incremental backup

| Backup File Information | | | | |
|-------------------------|--------------------------------|--|---|---|
| * Database Type | Microsoft SQL Server | I | | |
| * Backup File Sourc | e OBS Bucket RD | OS full backup | | |
| * Bucket Name | drs- | • C (?) | | |
| Tags | It is recommended that you use | TMS's predefined tag function to add the sar | ne tag to different cloud resources. View predefined tags | |
| | Tag key | Tag value | | |
| | You can add 10 more tags. | | | |
| Enter a backup nar | me. Q | | | С |
| Backup Name | | Size | Last Modified Time | |
| | transfer_test1.bak | 2.77 MB | Jul 25, 2019 11:15:21 GMT+08:00 | |
| 1040.00 | _transfer_test2.bak | 2.77 MB | Jul 25, 2019 11:15:21 GMT+08:00 | |
| - | transfer_test3.bak | 2.77 MB | Jul 25, 2019 11:15:22 GMT+08:00 | |
| - | transfer_test1.bak | 149.50 KB | Jul 25, 2019 11:17:00 GMT+08:00 | |

| Table 3-7 | Migration | task | information |
|-----------|-----------|------|-------------|
|-----------|-----------|------|-------------|

| Parameter | Description | |
|--------------------|--|--|
| Task Name | The task name consists of 4 to 64 characters, starts with a letter, and can contain only letters (case-insensitive), digits, hyphens (-), and underscores (_). | |
| Description | The description consists of a maximum of 256 characters and cannot contain the following special characters: !=<>'&" | |
| Database Type | Select Microsoft SQL Server. | |
| Backup File Source | Select OBS bucket . | |
| Bucket Name | Select the bucket where the backup file is stored and the first incremental backup file. NOTE | |
| | • The backup file of the Microsoft SQL Server must be in the .bak format. Multiple backup files can be selected at the same time. | |
| | • A database cannot be split into different files for upload. | |
| | The bucket name, backup file name, or path cannot contain Chinese characters. | |

Step 6 On the **Select Destination** page, specify database information and click **Next**.

Figure 3-20 Incremental migration database information

| Database Information | | | |
|------------------------------------|----------------------------|--|--|
| * Destination RDS DB Instance Name | 1001_010_017 | | Select Destination RDS DB Instance |
| * Backup Type | Full | Incremental | |
| | Incremental: indicates tr | ansaction log backup files | i. |
| * Last Backup File (?) | Yes | No | |
| | If you select No, the dest | ination databases <mark>involve</mark> | d in this migration will be unavailable and incremental backups can still be restored. |
| * Perform Pre-verification | Yes | No | |
| * Restore Database | All | Custom | 0 |

| Table 3-8 | Microsoft SOL | Server | database | information |
|-----------|---------------|--------|----------|-------------|
| Table J-0 | MICIOSOIL SQL | JUIVU | uatabase | mormation |

| Parameter | Description |
|--|--|
| Destination RDS DB Instance Name | Select a destination RDS DB instance. The destination RDS DB instance must be the same as the DB instance selected during full backup and restoration. |
| Backup Type | Select Incremental. |
| Last Backup File | A complete restoration process involves restoring several incremental backup files. The destination DB instance will not be available until the last backup file is restored. You can determine whether the selected backup file is the last one. Select Yes in either of the following scenarios: Perform a one-time full migration. The selected backup file is the last one to be restored. Select No if the incremental backup is performed for the first time. In this case, the destination database is in the |
| Daufauna Dua | restoring state and cannot be read or written. |
| verification | Specifies whether to perform pre-verification on the backup migration task. The default value is Yes. Yes: To ensure successful migration and identify potential problems in advance, verify the validity, integrity, continuity, and version compatibility of backup files before restoration. No: If pre-verification is not performed, the migration speed is faster, but you need to check the validity, integrity, continuity, and version compatibility of backup files on your own. |

| Parameter | Description | |
|------------------|--|--|
| Restore Database | You can restore all or some of databases. | |
| | • All: Restores all databases in the backup file. You do not need to enter the names of the databases to be restored. By default, all databases in the backup file are restored. | |
| | • Custom : Restore specified databases from the backup file. You need to enter the names of the databases to be restored. | |

- **Step 7** On the **Confirm Task** page, check the configuration details, read and agree to the agreement, and click **Next**.
- **Step 8** In the task list on the **Backup Migration Management** page, check whether the task is in the **Restoring** status. If the migration is successful, the task status becomes **Successful**.

----End

Second Incremental Migration

To minimize the service interruption caused by migration, you need to back up, upload, and restore transaction logs before service migration. These operations will restore historical data to the destination database, which greatly reduces the time for uploading and restoring the last transaction log backup during the migration.

- **Step 1** Before service migration, export new incremental backup files. For details, see **Exporting Backup Files**.
- Step 2 Perform Step 2 to Step 4.
- **Step 3** Enter the information about the migration task and backup file, and click **Next**.

Figure 3-21 Incremental backup



| Parameter | Description | |
|--------------------|--|--|
| Task Name | The task name consists of 4 to 64 characters, starts with a letter, and can contain only letters (case-insensitive), digits, hyphens (-), and underscores (_). | |
| Description | The description consists of a maximum of 256 characters and cannot contain the following special characters: !<>&'\" | |
| Database Type | Select Microsoft SQL Server. | |
| Backup File Source | Select OBS bucket . | |
| Bucket Name | Select the bucket where the backup file is stored and the new incremental backup file. NOTE | |
| | The backup file of the Microsoft SQL Server must be in the .bak format. Multiple backup files can be selected at the same time. | |
| | • A database cannot be split into different files for upload. | |
| | The bucket name, backup file name, or path cannot contain Chinese characters. | |

| Table 3-9 Migration | task information |
|---------------------|------------------|
|---------------------|------------------|

Step 4 On the **Select Destination** page, specify database information and click **Next**.

| Database Information | | | |
|------------------------------------|------------------------------|---|---|
| * Destination RDS DB Instance Name | teol_olk_32 | | Select Destination RDS DB Instance |
| * Backup Type | Full | Incremental | |
| | Incremental: indicates tra | nsaction log backup files. | |
| * Last Backup File (| Yes | No | |
| | If you select No, the destin | ation databases <mark>involved</mark> i | n this migration will be unavailable and incremental backups can still be restored. |
| * Perform Pre-verification | Yes | No | |
| * Restore Database | All | Custom (| 0 |

Figure 3-22 Incremental migration database information

| Table 3-10 Microsoft SQI | Server database | information |
|--------------------------|-----------------|-------------|
|--------------------------|-----------------|-------------|

| Parameter | Description |
|--|--|
| Destination RDS DB Instance Name | Select a destination RDS DB instance. The destination RDS DB instance must be the same as the DB instance selected during full backup and restoration. |

| Parameter | Description |
|------------------------------|---|
| Backup Type | Select Incremental. |
| | Incremental: indicates log backup files. |
| Last Backup File | A complete restoration process involves restoring several incremental backup files. The destination DB instance will not be available until the last backup file is restored. You can determine whether the selected backup file is the last one. Select Yes in either of the following scenarios: |
| | Perform a one-time full migration. |
| | • The selected backup file is the last one to be restored. |
| | Select No if the incremental backup is performed before migration. In this case, the destination database is in the restoring state and cannot be read or written. |
| Perform Pre- verification | Specifies whether to perform pre-verification on the backup migration task. The default value is Yes . |
| | • Yes : To ensure successful migration and identify potential problems in advance, verify the validity, integrity, continuity, and version compatibility of backup files before restoration. |
| | • No: If pre-verification is not performed, the migration speed is faster, but you need to check the validity, integrity, continuity, and version compatibility of backup files on your own. |
| Restore Database | You can restore all or some of databases. |
| | • All: Restores all databases in the backup file. You do not need to enter the names of the databases to be restored. By default, all databases in the backup file are restored. |
| | • Custom : Restore specified databases from the backup file. You need to enter the names of the databases to be restored. |

- **Step 5** On the **Confirm Task** page, check the configuration details, read and agree to the agreement, and click **Next**.
- **Step 6** In the task list on the **Backup Migration Management** page, check whether the task is in the **Restoring** status. If the migration is successful, the task status becomes **Successful**.

----End

Checking Database Transactions

Before service migration, stop services and ensure that no unfinished transaction exists in the database. Otherwise, data may be lost during migration.

Step 1 Run the following statement to check whether the IP addresses of the service system are disconnected:

select * from sys.dm_exec_connections;

- If yes, all service system IP addresses are disconnected and the last incremental backup can be migrated.
- If no, go to **Step 2**.
- Step 2 If an IP address is not disconnected, run the following statement to query the sessions that are not closed: select * from sys.dm exec sessions;

Run the following statement to view the transactions that are being executed:

select * from sys.dm_tran_session_transactions;

If the query result contains unclosed sessions and transactions that are being executed, go to **Step 3**.

Step 3 The last incremental backup can be migrated only after the transaction is complete, the session is closed, and the service system is disconnected.

----End

Last Incremental Migration

After several incremental migrations, the two databases are almost consistent. During the transaction checks, services are stopped and no data will be generated. Then, you need to perform the last incremental migration to ensure the data consistency.

- Step 1 Export the new incremental backup file of the database. For details, see Exporting Backup Files.
- Step 2 Perform Step 2 to Step 4.
- **Step 3** Enter the information about the migration task and backup file, and click **Next**.

| Backup File Inf | formation | | | |
|---------------------|--|--|---------------------------------------|---|
| * Database Type | Microsoft SQL Server | | | |
| * Backup File Sourc | e OBS Bucket RDS full bac | kup (?) | | |
| * Bucket Name | drs | • C (?) | | |
| Tags | It is recommended that you use TMS's pre | edefined tag function to add the same tag to different | cloud resources. View predefined tags | |
| | Tag key Tag value | 2 | | |
| | You can add 10 more tags. | | | |
| Enter a backup nan | ne. Q | | | С |
| Backup Name | | Size | Last Modified Time | |
| 19400 | _transfer_test1.bak | 2.77 MB | Jul 25, 2019 11:15:21 GMT+08:00 | |
| 104000 | _transfer_test2.bak | 2.77 MB | Jul 25, 2019 11:15:21 GMT+08:00 | |
| | transfer_test3.bak | 2.77 MB | Jul 25, 2019 11:15:22 GMT+08:00 | |
| | .transfer_test1.bak | 149.50 KB | Jul 25, 2019 11:17:00 GMT+08:00 | |

Figure 3-23 Incremental backup

| Parameter | Description | | | | | |
|--------------------|--|--|--|--|--|--|
| Task Name | The task name consists of 4 to 64 characters, starts with a letter, and can contain only letters (case-insensitive), digits, hyphens (-), and underscores (_). | | | | | |
| Description | The description consists of a maximum of 256 characters and cannot contain the following special characters: !=<>'&" | | | | | |
| Database Type | Select Microsoft SQL Server. | | | | | |
| Backup File Source | Select OBS bucket . | | | | | |
| Bucket Name | Select the bucket where the backup file is stored and the new incremental backup file. | | | | | |
| | The backup file of the Microsoft SQL Server must be in the .bak format. Multiple backup files can be selected at the same time. | | | | | |
| | • A database cannot be split into different files for upload. | | | | | |
| | The bucket name, backup file name, or path cannot contain Chinese characters. | | | | | |

 Table 3-11 Migration task information

Step 4 On the **Select Destination** page, specify database information and click **Next**.

| Database Information | | | |
|------------------------------------|-------------------------------|--------------------------|--|
| * Destination RDS DB Instance Name | shjadjil | | Select Destination RDS DB Instance |
| * Backup Type | Full | Incremental | |
| | Incremental: indicates trans | saction log backup files | L. |
| * Last Backup File | Yes | No | |
| | If you select Yes, the destin | ation databases involv | ed in this migration remain available and incremental backups can no longer be restored. |
| * Perform Pre-verification | Yes | No | |
| * Restore Database | All | Custom | 0 |

Figure 3-24 Incremental migration database information

Table 3-12 Microsoft SQL Server database information

| Parameter | Description |
|--|--|
| Destination RDS DB Instance Name | Select a destination RDS DB instance. The destination RDS DB instance must be the same as the DB instance selected during full backup and restoration. |

| Parameter | Description |
|------------------------------|---|
| Backup Type | Select Incremental. Incremental: indicates log backup files. |
| Last Backup File | Select Yes because it is the last incremental migration after services are stopped. |
| Perform Pre- verification | Specifies whether to perform pre-verification on the backup migration task. The default value is Yes . |
| | • Yes : To ensure successful migration and identify potential problems in advance, verify the validity, integrity, continuity, and version compatibility of backup files before restoration. |
| | • No: If pre-verification is not performed, the migration speed is faster, but you need to check the validity, integrity, continuity, and version compatibility of backup files on your own. |
| Restore Database | You can restore all or some of databases. |
| | • All: Restores all databases in the backup file. You do not need to enter the names of the databases to be restored. By default, all databases in the backup file are restored. |
| | • Custom : Restore specified databases from the backup file. You need to enter the names of the databases to be restored. |

- **Step 5** On the **Confirm Task** page, check the configuration details, read and agree to the agreement, and click **Next**.
- **Step 6** In the task list on the **Backup Migration Management** page, check whether the task is in the **Restoring** status. If the migration is successful, the task status becomes **Successful**.

----End

3.1.7 Manual Configuration

Scenarios

After data is migrated from the local host or VMs to the RDS for SQL Server DB instance on the current cloud through DRS, the Login accounts, database links, Agent Jobs, and key configurations of the source database also need to be synchronized to the destination database.

Login Account

Login account is an instance-level account of Microsoft SQL Server and is used to manage user server and database permissions. Generally, a user has multiple such accounts. After the user is migrated to the RDS for SQL Server DB instance, you need to manually create corresponding Login accounts on the DB instance. The following describes how to create a Login account with the same name and password as those of your local Login account on the RDS for SQL Server DB instance and grant permissions to the account.

Step 1 Execute the following script to obtain the script for creating a Local account on vour local instance. The obtained script can be directly executed on the destination DB instance to create a Login account with the same name and password. SELECT 'IF (SUSER ID('+QUOTENAME(SP.name,'"')+') IS NULL) BEGIN CREATE LOGIN ' +QUOTENAME(SP.name)+ CASE WHEN SP.type_desc = 'SQL_LOGIN' THEN ' WITH PASSWORD = ' +CONVERT(NVARCHAR(MAX),SL.password hash,1)+ ' HASHED,SID=' +CONVERT(NVARCHAR(MAX), SP.SID, 1)+', CHECK_EXPIRATION = ' + CASE WHEN SL.is_expiration_checked = 1 THEN 'ON' ELSE 'OFF' END +', CHECK_POLICY = ' +CASE WHEN SL.is_policy_checked = 1 THEN 'ON,' ELSE 'OFF,' END ELSE ' FROM WINDOWS WITH' END +' DEFAULT DATABASE=[' +SP.default database name+ '], DEFAULT LANGUAGE=[' +SP.default language name+ '] END;' as CreateLogin FROM sys.server principals AS SP LEFT JOIN sys.sql logins AS SL ON SP.principal_id = SL.principal_id WHERE SP.type ='S' AND SP.name NOT LIKE '##%##' AND SP.name NOT LIKE 'NT AUTHORITY%' AND SP.name NOT LIKE 'NT SERVICE%' AND SP.name NOT IN ('rdsadmin', 'rdsbackup', 'rdsuser', 'rdsmirror', 'public') **Step 2** Execute the script in **Step 1**:

Figure 3-25 Obtaining the script

| CreateLogin |
|--|
| IF (SUSER_ID('sa') IS NULL) EECIN CREATE LOGIN [sa] WITH PASSWORD = 0x010039EF2EFAD6A3DE4E2AEE941E8ED32E5189A4EE757 |
| IF (SUSER_ID("rdsuser2") IS NULL) EBGIN CREATE LOGIN [rdsuser2] WITH PASSWORD = 0x0100EE8BCBC25FC67008D4EE75AD660D1 |
| IF (SUSER_ID('csidbo') IS NULL) BEGIN CREATE LOGIN [csidbo] WITH PASSWORD = 0x0100A508789C15CE6888648162A5EDF4F4D2E |
| IF (SUSER_ID('TestLogin7') IS NULL) BEGIN CREATE LOGIN [TestLogin7] WITH PASSWORD = 0x010073DA9A79E6677E8AF7077EF67 |
| IF (SUSER_ID("rdsuser3") IS NULL) EBGIN CREATE LOGIN [rdsuser3] WITH PASSWORD = 0x01009448FEDECE8D5E5E2529384028CA0 |
| IF (SUSER_ID('Test2') IS NULL) BEGIN CREATE LOGIN [Test2] WITH PASSWORD = 0x0100130953CEEAEC997D08B6BAF65F84EBCAA44 |
| IF (SUSER_ID('Test3') IS NULL) BEGIN CREATE LOGIN [Test3] WITH PASSWORD = 0x0100EE98873940E02595EDCD9538426637281E7 |
| IF (SUSER_ID('Test4') IS NULL) BECIN CREATE LOGIN [Test4] WITH PASSWORD = 0x01000EE91B9EF087741F16A44E70AA813D0EA88 |
| IF (SUSER ID('Test5') IS NULL) BEGIN CREATE LOGIN [Test5] WITH PASSWORD = 0x0100568EF845DF098D2DF9395AF7E7618A20735. |

- **Step 3** Copy and execute the script obtain in **Step 2** on the destination instance. The created Login account is the same as the original one.
- **Step 4** Map the newly created Login account to the database user permissions that have been migrated to the RDS for SQL Server DB instance to ensure permission consistency.

declare @DBName nvarchar(200)
declare @Login_name nvarchar(200)
declare @SQL nvarchar(MAX)
set @Login_name = 'TestLogin7' //Enter the login name one by one.
declare DBName_Cursor cursor for
select quotename(name)from sys.databases where database_id > 4 and state = 0
and name not like '%\$%'
and name <> 'rdsadmin'
open DBName_Cursor
fetch next from DBName_Cursor into @DBName
WHILE @@FETCH_STATUS= 0
begin
SET @SQL=' USE '+ (@DBName)+ '
if exists(select top 1 1 from sys.sysusers where name = '''+ @Login_name +''')
begin

```
ALTER USER '+@Login_name+' with login = '+@Login_name+';
end
'
print @SQL
EXEC (@SQL)
fetch next from DBName_Cursor into @DBName
end
close DBName_Cursor
deallocate DBName_Cursor
```

NOTE

After the preceding script is executed, you can view the Login account with the same name on the new instance, and the password and permission are the same as those on your local host.

----End

Database Link

SQL Server allows you to create database links to interact with databases on external DB instances. Therefore you can query, synchronize, and compare databases of different types or on different DB instances. However, these links cannot be automatically synchronized to the DB instance on cloud so you need to synchronize them manually.

Step 1 Connect the local DB instance and cloud DB instance through Microsoft SQL Server Management Studio. Choose Server Objects > Linked Servers and locate the DBLink of the current DB instance.

Figure 3-26 Viewing database links



Step 2 Select the linked server and press **F7**. The **Object Explore** page is displayed. On this page, you can quickly create a script.

Figure 3-27 Creating the script



Step 3 In the displayed window, view all the scripts for creating DBLinks of the current DB instance. You only need to copy the scripts to the destination DB instance and change the password on @rmtpassword.

USE [master] GO

/****** Object: LinkedServer [DRS_TEST_REMOTE] Script Date: 2019/5/25 17:51:50 ******/ EXEC master.dbo.sp_addlinkedserver @server = N'DRS_TEST_REMOTE', @srvproduct=N'', @provider=N'SQLNCLI', @datasrc=N'DESKTOP-B18JH5T\SQLSERVER2016EE' /* For security reasons the linked server remote logins password is changed with ######## */ EXEC master.dbo.sp_addlinkedsrvlogin @rmtsrvname=N'DRS_TEST_REMOTE',@useself=N'False',@locallogin=NULL,@rmtuser=N'sa',@r

@rmtsrvname=N'DRS_TEST_REMOTE',@useself=N'False',@locallogin=NULL,@rmtuser=N'sa',@r
mtpassword='#########'

GO

NOTE

The preceding script is an example. The created script may contain a large number of default system configuration items. You need to retain only the following two key scripts for each DBLink. In addition, you need to enter the account and password again.

```
----End
```

Agent JOB

Agent Job is the agent service of Microsoft SQL Server. It helps you quickly create scheduled tasks on DB instances, perform routine O&M, and process data. You need to manually migrate local Job scripts.

Step 1 Connect the local DB instance and cloud DB instance through Microsoft SQL Server Management Studio. Choose SQL Server Agent > Jobs and locate all the jobs of the current DB instance.





Step 2 Select a job and press **F7**. All jobs are displayed on the **Object Explore** page. Select all jobs and create a script in the new window.

Figure 3-29 Creating a script

| 😓 Object Explorer Details - Microsoft SQL Server Management Stud | io | | | | |
|--|------------------------|------------------------------------|----------------------------------|--|-------------------------|
| File Edit View Project Debug ApexSQL Tools Window H | elp | | | | |
| 🗄 🐨 🗉 📲 😹 🎉 🔔 New Query 🕠 😘 😘 👗 🕹 🖄 | (i) + (i + J + J) | A | - 🧭 Containr | ment | - 🔍 🕾 🛠 🖬 - 🗉 |
| : 말 값 master · · · · · · · · · · · · Debug ■ | ✓ \$\$ 0 0 10 % | 值值值[日日]建建[站。 | | | |
| 7 Format SQL 💷 Qualify object names 🔹 Wildcard expansion | 🎎 Unused variables an | nd parameters 🖕 | | | |
| Object Explorer 🛛 👻 🖣 🗙 | Object Explorer Detail | s X | | | |
| Connect • 🛃 🛃 = 🍸 👩 🍒 | 001277 | 🔏 Search | | | |
| 🗄 🐻 DESKTOP-DHNOLII (SQL Server 12.0.2000 - CHINAY,ADD5100 | DEUXTOP-DHNDLE (S | QL Server 12.0.2000 - CHINALABOSTO | (ill0)\Server Objects\Linked Ser | vers | |
| 🗉 🧰 Databases | | | | | |
| B Security | Name | Policy Health State | | | |
| E Server Objects | Providers | | | | |
| Endpoints | TEST | Script Linked Server ar | CREATE T- | (Internal Internal In | N. O. S.K. MAL |
| Linked Servers | TEST | Script Dirked Server us | | 13 | New Query Editor Window |
| 🗉 🦢 Providers | | Delete | DROP To | R | File |
| 🗉 📲 TEST | | | DROP And CREATE To | 3 | Clipboard |
| I TEST1 | 1 | | | - 🖸 | Agent Job |
| I Triggers | | | SELECT TO | | |
| E Replication Keplication | 1 | | INSERT TO | | |
| Awayson nigh Avalability Management | | | UPDATE TO | | |
| ⊞ ☐ Integration Services Catalogs | | | | - | |
| 🗉 📸 SQL Server Agent | | | EXECUTE To | | |
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| | I | | | | |

Step 3 Copy the T-SQL script in the new window to the new DB instance, and then modify the following key items to ensure that the creation is successful.

- Modify the owner account of each job. Example:
 - @owner_login_name=N'rdsuser'
- Modify the DB instance name of each job.
 - Example:

@server=N' DB instance IP address'

@server_name = N'DB instance IP address'

NOTE

The owner account of the new job is very important. On the RDS for SQL Server DB instance, only the owner of the job can view the job of the DB instance. Therefore, it is recommended that all job owners use the same account to facilitate job management.

----End

Key Configuration

After the database is restored to the RDS for SQL Server DB instance, some local important configuration items need to be synchronized to keep service running properly.

1. tempdb: The file configuration of the temporary database needs to be synchronized.

It is recommended that you set 8 temporary files and ensure that the files are stored in **D:\RDSDBDATA\Temp**.

Run the following script on the destination database to add the temporary database file configuration:

```
USE [master]
GO
ALTER DATABASE [tempdb] ADD FILE ( NAME = N'tempdb1', FILENAME =
N'D:\RDSDBDATA\Temp\tempdb1.ndf', SIZE = 65536KB, FILEGROWTH = 65536KB)
GO
ALTER DATABASE [tempdb] ADD FILE ( NAME = N'tempdb2', FILENAME =
N'D:\RDSDBDATA\Temp\tempdb2.ndf', SIZE = 65536KB, FILEGROWTH = 65536KB)
GO
ALTER DATABASE [tempdb] ADD FILE ( NAME = N'tempdb3', FILENAME =
N'D:\RDSDBDATA\Temp\tempdb3.ndf', SIZE = 65536KB, FILEGROWTH = 65536KB)
GO
ALTER DATABASE [tempdb] ADD FILE ( NAME = N'tempdb4', FILENAME =
N'D:\RDSDBDATA\Temp\tempdb4.ndf', SIZE = 65536KB, FILEGROWTH = 65536KB)
GO
ALTER DATABASE [tempdb] ADD FILE ( NAME = N'tempdb5', FILENAME =
N'D:\RDSDBDATA\Temp\tempdb5.ndf', SIZE = 65536KB, FILEGROWTH = 65536KB)
GO
ALTER DATABASE [tempdb] ADD FILE ( NAME = N'tempdb6', FILENAME =
N'D:\RDSDBDATA\Temp\tempdb6.ndf', SIZE = 65536KB, FILEGROWTH = 65536KB)
GO
ALTER DATABASE [tempdb] ADD FILE ( NAME = N'tempdb7', FILENAME =
N'D:\RDSDBDATA\Temp\tempdb7.ndf', SIZE = 65536KB, FILEGROWTH = 65536KB)
GO
```

| 间 Database Properties - dr | s_test_1 | | | | - | | \times | | |
|--|---------------------------|-------------|----------------|------------------|--------|-----------|----------|--|--|
| Select a page | 🔄 Script 🔻 📑 Help | | | | | | | | |
| Files | Databaze name: drs_test_1 | | | | | | | | |
| P Options | Owner: | Owner: | | CHINA\w00510300 | | | | | |
| Permissions | ☑ ∐se full-te | xt indexing | | | | | | | |
| 🖀 Mirroring 🚰 Transaction Log Shipping | Database <u>f</u> iles | Ele Tune | Flooreup | lotial Size (MP) | Autoor | outh / Mo | voizo | | |
| | drs test 1 | ROWS Data | PRIMARY | 5 | By 1 M | MB. Unli | mite | | |
| | drs test | LOG | Not Applicable | 2 | By 10 | percent | . Li | | |
| | | | | | | | | | |
| Connection | | | | | | | | | |
| Zennestion Server: | | | | | | | | | |
| Connection Server: DESKTOP-DHRDL31 | | | | | | | | | |
| Connection Server: DESKTOF-DHNDL3I Connection: CHNA\v05010300 | | | | | | | | | |
| Connection Server: DESKTOP-DHNDL31 Connection: CHINA:w00510300 CHINA:w00510300 | | | | | | | | | |
| Connection Servar: DESKTOF-DANDL3I Connection: CHURA\w0510300 Properties trogress | | | | | | | | | |
| Connection Server: DESKTOF-DHNDL31 Connection: CHNNAvOST10300 Properties Frogress Ready | × | | | | | | > | | |

Figure 3-30 Checking temporary files

- 2. Database isolation level: Check whether the database isolation level is enabled on the source DB instance and synchronize the isolation level to the RDS for SQL Server DB instance. There are two snapshot isolation parameters:
 - Is Read Committed Snapshot On
 - Allow Snapshot Isolation

If the database isolation level of the source DB instance is enabled, you can run the following script on the destination database to enable the database isolation level:

```
USE [DBName]
GO
ALTER DATABASE [DBName] SET READ_COMMITTED_SNAPSHOT ON WITH NO_WAIT
GO
ALTER DATABASE [DBName] SET ALLOW_SNAPSHOT_ISOLATION ON
GO
```

3. Max Degree of Parallelism: The maximum degree of parallelism is set to **0** by default on the RDS for SQL Server instance. You can also set the value based on the local settings to avoid exceptions in different service scenarios.

In **Object Explorer**, right-click a local server and select **Properties**. Click the **Advanced** node. In the **Max Degree of Parallelism** box, view the value of the local instance and change the **max degree of parallelism** value in the parameter group of the destination RDS for SQL Server instance to the same.



Figure 3-31 Max Degree of Parallelism

Log in to the RDS console. On the **Instance Management** page, click the target DB instance name. Choose **Parameters**, search for the **max degree of parallelism** parameter, and change its value.

Figure 3-32 max degree of parallelism

| Instance Management + rds-sqlse | rver-hjm 👻 🧿 Available | | | | Log In View Metric Reboot Migrate Database C |
|---|---------------------------|--------------------------|-------|----------------|---|
| Basic Information Backups & Restorations | Parameters Change History | | | | |
| EIPs | Save Cancel Preview E | xport Compare | | | max degree of para × Q C |
| Distributed Transactions | Parameter Name 💠 | Effective upon Reboot \$ | Value | Allowed Values | Description |
| Logs | max degree of parallelism | No | 0 | 0-32,767 | Max degree of parallelism option. When SQL Server runs on a computer with more than |
| Parameters | | | | | |

4. Check whether the database recovery model on the cloud is set to **Full**. If not, change the mode.

Right-click the database and choose **Properties** from the shortcut menu. In the displayed page, select **Options**. Then, verify that **Recovery Model** is set to **Full**. Ensure that the database is highly available and the backup policy is executable.

| Figure 3-33 | Checking | the | database | recovery | / model |
|-------------|----------|-----|----------|----------|---------|
|-------------|----------|-----|----------|----------|---------|

| 间 Database Properties - d | - | × | | |
|----------------------------|------------------------------|-----------------------|--|--------|
| Select a page | 🔄 Script 🔻 🚺 Help | | | |
| General | | | | |
| Files Filegroups | <u>C</u> ollation: | Chinese_PRC_CI_AS | | \sim |
| Options University Options | Recovery model: | Full | | \sim |
| Permissions | Compatibility <u>l</u> evel: | SQL Server 2014 (120) | | \sim |
| 🚰 Extended Properties | Containment <u>t</u> ype: | None | | \sim |

4 Real-Time Synchronization

4.1 From Other Cloud PostgreSQL to RDS for PostgreSQL

DRS helps you synchronize PostgreSQL instances from other cloud platforms to the current cloud. DRS supports real-time synchronization to ensure real-time flow of key service data.

This section describes how to use DRS to synchronize data from a PostgreSQL instance on another cloud to the current cloud. Synchronization scenarios include:

- Synchronizing PostgreSQL databases from another cloud to the current cloud.
- Synchronizing PostgreSQL databases from other cloud servers to the current cloud in real time.

Diagram



Figure 4-1 Real-time synchronization of other cloud PostgreSQL databases



Figure 4-2 PostgreSQL databases on other cloud servers

Synchronization Process





Synchronization Suggestions (Important)

 Database synchronization is closely impacted by a wide range of environmental and operational factors. To ensure the synchronization goes smoothly, you are advised to perform a test run before the actual synchronization to help you detect and resolve any potential issues in advance. Recommendations on how to minimize any potential impacts on your data base are provided in this section. • It is strongly recommended that you start a task during off-peak hours. A less active database is easier to synchronize successfully. If the data is fairly static, there is less likely to be any severe performance impacts during the synchronization.

Notes on Synchronization (Important)

NOTICE

Before creating a real-time synchronization task, read this section carefully.

For details, see **Precautions** in *Real-Time Synchronization*.

Synchronization Preparations

1. Permissions

Table 4-1 lists the permissions required for the source and destination databases when you synchronize a PostgreSQL database from another cloud to the current cloud.

| Synchronization Type | Full | Full+Incremental |
|----------------------|---|--|
| Source | The CONNECT permission for databases, the USAGE permission for schemas, the SELECT permission for tables, the SELECT permission for system table catalog pg_catalog.pg_authid (used for synchronizing user passwords) | The CONNECT permission for databases, the USAGE permission for schemas, the SELECT permission for tables, the SELECT permission for sequences, the SELECT permission for system table catalog pg_catalog.pg_authid (used for synchronizing user passwords), the UPDATE, DELETE, and TRUNCATE permissions for tables that do not have primary keys, and the permission to create replication connections NOTE • The UPDATE, DELETE, and TRUNCATE permissions for tables that do not have primary keys are only used to temporarily lock tables to ensure data consistency after the migration. • To add the permission to create replication connections, perform the following steps: 1. Add host replication < src_user_name> < drs_instance_ip> / 32 md5 before all configurations in the pg_hba.conf file of the source database. 2. Run select pg_reload_conf(); in the source database as user SUPERUSER, or restart the DB instance to apply the changes. |

Table 4-1 Account permissions

| Synchronization Type | Full | Full+Incremental | | |
|----------------------|---|---|--|--|
| Destination | Database-level: The CREATEDB permission is required. Table-level: | | | |
| | To synchronize data permission is requi | abases, the CREATEDB red. | | |
| | To synchronize a so and CREATE permi- that contains the so | hema, the CONNECT ssions for the database chema are required. | | |
| | To synchronize objective CONNECT permissing contains the schemective CREATE permission contain the objects | ects in a schema, the on for the database that a, and the USAGE and is for the schema that are required. | | |
| | Synchronization user: permission is required | The CREATEROLE | | |
| | Synchronization user privilege cannot be m object permissions of may be inconsistent w database. | permissions: The default odified. Otherwise, the the destination database <i>i</i> th those of the source | | |
| | NOTE To synchronize event trigge text search templates, the must be RDS for PostgreSC destination database user member of user root. | ers, text search parsers, and destination database version QL 11.11 or later, and the must be user root or a | | |

- Source database permissions:

The source PostgreSQL database account must have all the required permissions listed in **Table 4-1**. If the permissions are insufficient, create a user that has all of the permissions on the source database.

- Destination database permissions:

If the destination database is a PostgreSQL database on the current cloud, the initial account can be used.

2. Network settings

Enable public accessibility for the source database.

- Source database network settings:

Enable public accessibility for the source PostgreSQL database.

Destination database network settings:

By default, the destination database and the DRS replication instance are in the same VPC and can communicate with each other. No further configuration is required.

3. Security rules

- Source database security group settings:

The synchronization instance needs to be able to access the source database, which means that the EIP of the replication instance must be on the whitelist of the source PostgreSQL instance.

Before configuring the network whitelist, you need to obtain the EIP of the synchronization instance.

After creating a synchronization instance on the DRS console, you can find the EIP on the **Configure Source and Destination Databases** page, as shown in **Figure 4-4**.

Figure 4-4 Synchronization Instance EIP

Create Bynchronication
 Configure Baunce and
 Configure Baun

You can also add 0.0.0.0/0 to the source database whitelist to allow any IP address to access the source database but this action may result in security risks.

After the synchronization is complete, you can delete the rules.

- Destination database security group settings:

By default, the destination database and the DRS synchronization instance are in the same VPC and can communicate with each other. No further configuration is required.

4. Other

DRS can synchronize only some types of DDL statements of PostgreSQL. For details, see **related guides**. Properly plan the source database services. Do not perform DDL operations that are not supported during synchronization.

Procedure

- **Step 1** Create a synchronization task.
 - 1. Log in to the management console and choose **Databases** > **Data Replication Service** to go to the DRS console.
 - 2. On the **Data Synchronization Management** page, click **Create Synchronization Task**.
 - 3. On the displayed page, specify the task name, description, and synchronization instance details.

Figure 4-5 Synchronization instance information

| Synchronization Instan | Synchronization Instance Details 💿 | | |
|---------------------------------------|--|--|--|
| The following information cannot be r | modified after you go to the next page. | | |
| * Data Flow | In the doud Out of the doud Self-built to se | | |
| * Source DB Engine | MgGQL Oxide DB2 for LWW DDM MonopuBB PetergerGQL Microsoft SQL Server TDB | | |
| * Destination DB Engine | GaussD8(DVS) GaussD8 Distributed GaussD8 Primary/Standby PolypetQL | | |
| * Network Type | Public retwork | | |
| | DRS will automatically bind an EP to the DRS instance and release the EP after the task is complete. | | |
| * Destination DB Instance | No D8 instance available. C View D8 Instance View Unrelectable D8 Instance | | |
| Synchronization Instance Subnet | Select the subset | | |
| * Synchronization Mode | Full-Incemental Full Incremental | | |
| | This synchronization type synchronizes data in real time. After a full synchronization initializes the destination database, an incremental synchronization parses logs to ensure data consistency between the source and destination databases. | | |

| Table 4-2 | Task | settings |
|-----------|------|----------|
|-----------|------|----------|

| Parameter | Description |
|-------------|--|
| Region | The region where the replication instance is deployed. You can change the region. To reduce latency and improve access speed, select the region closest to your workloads. |
| Project | The project corresponds to the current region and can be changed. |
| Task Name | The task name consists of 4 to 50 characters, starts with a letter, and can contain only letters (case-insensitive), digits, hyphens (-), and underscores (_). |
| Description | The description consists of a maximum of 256 characters and cannot contain the following special characters: =<>&'\" |

Table 4-3 Synchronization instance settings

| Parameter | Description |
|----------------------------|--|
| Data Flow | To the cloud |
| Source DB Engine | Select PostgreSQL. |
| Destination DB Engine | Select PostgreSQL . |
| Network Type | Select Public network . Enabling SSL is recommended. It may slow down the synchronization by 20% to 30% but it ensures data security. |
| Destination DB Instance | The RDS for PostgreSQL instance you created. |
| Synchronization Mode | Full+Incremental This synchronization mode allows you to synchronize data in real time. After a full synchronization initializes the destination database, an incremental synchronization parses logs to ensure data consistency between the source and destination databases. Full All objects and data in non-system databases are synchronized to the destination database at a time. This mode is applicable to scenarios where service |
| | – Incremental |
| | NOTE If you select the Full+Incremental synchronization mode, ongoing changes made to the data will be synchronized to the destination database in real time, ensuring that the source database remain accessible. |

4. On the **Configure Source and Destination Databases** page, wait until the synchronization instance is created. Then, specify source and destination database information and click **Test Connection** for both the source and destination databases to check whether they have been connected to the synchronization instance. After the connection tests are successful, select the check box before the agreement and click **Next**.

| Source Database | |
|---|--|
| System databases, users, parameters, and ju | vis will not be migrated. You need to manually import users and jobs to the destination database and configure parameters in parameter templates of the destination database |
| IP Address or Domain Name | |
| Port | |
| Database Username | |
| Database Password | <i><i>iQ</i></i> |
| SSL Connection | |
| | If you want to enable SSL connection, ensure that SSL has been enabled on the source database, and related parameters have been correctly configured. |
| | Test Connection This botton is available only after the replication instance is created successfully. |
| | |
| Destination Database | |
| DB Instance Name | pg-12-for-autotest () |
| Database Username | |
| Database Password | Q |
| | Test Connection This buffon is available only after the replication instance is created successfully |

Figure 4-6 Source and destination database details

Table 4-4 Source database settings

| Parameter | Description |
|------------------------------|--|
| IP Address or Domain Name | The IP address or domain name of the source database. |
| Port | The port of the source database. Range: 1 - 65535 |
| Database Username | A username for the source database. |
| Database Password | The password for the database username. |
| SSL Connection | To improve data security during synchronization over a public network, you are advised to enable SSL to encrypt synchronization links and upload a CA certificate. |

Table 4-5 Destination database settings

| Parameter | Description |
|---------------------|---|
| DB Instance Name | The RDS for PostgreSQL instance you have selected during the synchronization instance creation is displayed by default and cannot be changed. |

| Parameter | Description |
|----------------------|---|
| Database Username | The username for accessing the destination RDS for PostgreSQL instance. |
| Database Password | The password for the database username. |

5. On the **Set Synchronization Task** page, select the synchronization object and user.

Figure 4-7 Synchronization mode

| Flow Control | Yes No 🕥 | | | | | | | | |
|-----------------------------|--|--|------------------------|------------------------|---|---|-------------------------------|--------------|---|
| Incremental Conflict Policy | Igname Report error | Overwrite () | atabases containing | the same primary or | arique keys) is the destination databas | oe, the existing data will be overwritter | | | |
| Dynchronize | 🔽 Normal index 🛛 Incremental DOLs | Populate materialized views during | ng the full synchronia | zation phase 🕥 | | | | | |
| Synchronization Object | Tobles Catabases If any data in the source database changes, of Nove objects to be migrated from list of unsel | lick the refresh button below. ected objects on left side to the list of se | lected abjects on rig | pitt side. | | | | | |
| | ۲ | C | | | | | | | |
| | Fartables, only expanded databases are | searched. Q | | Far tables, only expan | ded databases are searched. | Q | | | |
| | + postgres | database | ÷ |] 🗌 gibest Edit | database | | | | |
| | | | | | | | | | |
| | | | 20 | | | | | | |
| | | | ~ | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| Synchranize Account | Ves No | | | | | | | | |
| | Common Parallel | | | | | | | | С |
| | Account | Whether to Support Synchroni | Parent Account | | Parent Account That Cannot 8 | AccountAttribute | Account Attribute That Cannot | Remarks | |
| | NON . | No | pg_monitor.pg_re | ead_al_statupg . | | REPLICATION, OREATEROLE, C. | | View Confirm | |
| | 🔽 Synchronize object permissions | | | | | | | | |

 Table 4-6 Synchronization object

| Parameter | Description |
|--------------|---|
| Flow Control | You can choose whether to control the flow. |

| Parameter | Description | | | |
|-----------------------------------|--|--|--|--|
| Incremental Conflict Policy | The real-time synchronization function provides conflict policies for you to choose from if the synchronized data conflicts with existing data (such as the source and destination databases containing the same primary or unique keys) in the destination database. | | | |
| | Select any of the following conflict policies: | | | |
| | Ignore The system will skip the conflicting data and continue the subsequent synchronization process. | | | |
| | Report error The synchronization task will be stopped and fail. | | | |
| | Overwrite Conflicting data will be overwritten. | | | |
| | In the following scenarios, you can select Ignore or Overwrite . In other scenarios, you are advised to select Report error . | | | |
| | Data already exists in the destination database. | | | |
| | Multiple source databases are synchronized to one destination database. | | | |
| | Data in the destination database is updated manually. | | | |
| Synchronize | Available options: Index, Incremental DDLs, and Populate materialized views during the full synchronization phase | | | |
| | Populate materialized views during the full synchronization phase : This option takes effect only for materialized views that was populated in the source database. This operation affects the full synchronization performance. You perform this operation after the full synchronization is complete. | | | |
| Synchronizati on Object | DRS supports database- and table-level synchronization. You can select databases or tables for synchronization based on your service requirements. A single task can synchronize objects from only one database. Database name mapping is supported. | | | |
| | Database-level synchronization synchronizes all objects in the source database to the destination database. | | | |
| | Table-level synchronization synchronizes the selected table objects to the destination database. | | | |
| | NOTE If you select table-level synchronization, the selected table may have dependencies on other objects in the database. If the referenced objects are not selected and do not exist in the destination database, the task will fail. Ensure that all referenced objects are selected before synchronization or select database- level synchronization. | | | |

| Parameter | Description |
|------------------------|---|
| Synchronize Account | During the synchronization, you can synchronize accounts based on your service requirements. |
| | There are two types of accounts: accounts that can be synchronized and accounts that cannot be synchronized. For accounts that cannot be synchronized, you can view details in the Remarks column and determine whether to synchronize accounts and permissions based on your service requirements. |

- 6. On the **Check Task** page, check the synchronization task.
 - If any check fails, review the cause and rectify the fault. After the fault is rectified, click **Check Again**.

For details about how to handle check failures, see **Checking Whether the Source Database Is Connected** in *Data Replication Service User Guide*.

- If all check items are successful, click **Next**.

Figure 4-8 Task Check

| Check Again | |
|---|---|
| Check success rate 100% All checks must pass before you can continue. If any check requires confirmation, | check and confirm the results before proceeding to the next step. |
| Check Item | Check Result |
| Destination database storage space | |
| Whether the destination database has sufficient storage space | Passed |
| Database parameters | |
| Whether the objects required for DDL synchronization are created in the source database | Passed |
| Whether the source database contains tables whose replication attribute is full and that do not have primary keys | Passed |
| Whether session_replication_role is set to replica in the destination database | Passed |
| Whether the specified object exists in the target database | Passed |
| Whether the PASSWORD_ENCRYPTION values of the source and destination databases are consistent | Passed |
| Whether the associated objects are selected | Passed |
| Whether the source database contains unlogged tables | Passed |
| Whether the source database name is valid | Passed |
| Whether the test_decoding plugin is installed in the source database | Passed |
| Whether the MAX_REPLICATION_SLOTS value of the source database is correctly configured | Passed |
| Whether the MAX_WAL_SENDERS value of the source database is correctly configured | Passed |
| Whether the source database schema name is valid | Passed |

D NOTE

You can proceed to the next step only when all checks are successful. If there are any items that require confirmation, view and confirm the details first before proceeding to the next step.

7. On the **Confirm Task** page, specify **Start Time** and click **Next**.

D NOTE

- Set **Start Time** to **Start upon task creation** or **Start at a specified time** based on site requirements.
- After a synchronization task is started, the performance of the source and destination databases may be affected. You are advised to start a synchronization task during off-peak hours.
- 8. After the task is submitted, go back to the **Data Synchronization Management** page to view the task status.

Step 2 Manage the migration task.

The migration task contains two phases: full migration and incremental migration. You can manage them in different phases.

• Full synchronization

Viewing the synchronization progress: Click the target full synchronization task, and on the **Migration Progress** tab, you can see the synchronization progress of the structure, data, indexes, and synchronization objects. When the progress reaches 100%, the synchronization is complete.

- Incremental synchronization
 - Viewing the synchronization delay: After the full synchronization is complete, an incremental synchronization starts. On the **Data Synchronization Management** page, click the target synchronization task. On the displayed page, click **Synchronization Progress** to view the synchronization delay of the incremental synchronization. If the synchronization delay is 0s, the destination database is being synchronized with the source database in real time. You can also view the data consistency on the **Synchronization Comparison** tab.

| Figure 4-9 | Viewing | the | synchronization | delay |
|------------|---------|-----|-----------------|-------|
|------------|---------|-----|-----------------|-------|



 Viewing the synchronization comparison results: To minimize service downtime, click the name of an incremental synchronization task. On the Synchronization Comparison page, create a comparison task.

For details, see **Comparing Migration Items** in *Data Replication Service User Guide*.

Step 3 Cut over services.

You are advised to start the cutover process during off-peak hours. At least one complete data comparison is performed during off-peak hours. To obtain accurate comparison results, start data comparison at a specified time point during off-peak hours. If it is needed, select **Start at a specified time** for **Comparison Time**. Due to slight time difference and continuous operations on data, inconsistent comparison results may be generated, reducing the reliability and validity of the results.

1. Interrupt services first. If the workload is not heavy, you may not need to interrupt the services.
Run the following statement on the source database and check whether any new sessions execute SQL statements within the next 1 to 5 minutes. If there are no new statements executed, the service has been stopped. select * from pg_stat_activity;

D NOTE

The process list queried by the preceding statement includes the connection of the DRS synchronization instance. If no additional session executes SQL statements, the service has been stopped.

- 3. On the **Synchronization Progress** page, view the synchronization delay. When the delay is displayed as 0s and remains stable for a period, then you can perform a data-level comparison between the source and destination databases. For details about the time required, refer to the results of the previous comparison.
 - If there is enough time, compare all objects.
 - If there is not enough time, use the data-level comparison to compare the tables that are frequently used and that contain key business data or inconsistent data.
- 4. Determine an appropriate time to cut the services over to the destination database. After services are restored and available, the synchronization is complete.
- **Step 4** Complete the synchronization.
 - 1. Stop the synchronization task. After databases and services are synchronized to the destination database, to prevent operations on the source database from being synchronized to the destination database to overwrite data, you can stop the synchronization task. This operation only deletes the synchronization instance, and the synchronization task is still displayed in the task list. You can view or delete the task. You will not be charged for the synchronization task after the task is stopped.
 - 2. Delete the synchronization task. After the synchronization task is complete, you can delete it. After the synchronization task is deleted, it will not be displayed in the task list.

----End

4.2 From ECS-hosted PostgreSQL to RDS for PostgreSQL

DRS helps you synchronize data from PostgreSQL databases on ECSs to PostgreSQL instances on the current cloud. With DRS, you can synchronize databases online with zero downtime and your services and databases can remain operational during migration.

This section describes how to use DRS to synchronize data from a PostgreSQL database on an ECS to a PostgreSQL instance on the current cloud. The following network scenarios are supported:

- Source and destination databases are in the same VPC.
- Source and destination databases are in different VPCs.

Diagram



Figure 4-10 Source and destination databases in the same VPC





Synchronization Process





Synchronization Suggestions (Important)

- Database synchronization is closely impacted by a wide range of environmental and operational factors. To ensure the synchronization goes smoothly, you are advised to perform a test run before the actual synchronization to help you detect and resolve any potential issues in advance. Recommendations on how to minimize any potential impacts on your data base are provided in this section.
- It is strongly recommended that you start a task during off-peak hours. A less active database is easier to synchronize successfully. If the data is fairly static, there is less likely to be any severe performance impacts during the synchronization.

Notes on Synchronization (Important)

NOTICE

Before creating a real-time synchronization task, read this section carefully.

For details, see **Precautions** in *Real-Time Synchronization*.

Synchronization Preparations

1. Permissions

Table 4-7 lists the source and destination database user permissions required in full and incremental synchronization from PostgreSQL databases on ECS to the PostgreSQL DB instances on the current cloud.

| Synchronization Type | Full | Full+Incremental |
|----------------------|---|--|
| Source | The CONNECT permission for databases, the USAGE permission for schemas, the SELECT permission for tables, the SELECT permission for system table catalog pg_catalog.pg_authid (used for synchronizing user passwords) | The CONNECT permission for databases, the USAGE permission for schemas, the SELECT permission for tables, the SELECT permission for sequences, the SELECT permission for system table catalog pg_catalog.pg_authid (used for synchronizing user passwords), the UPDATE, DELETE, and TRUNCATE permissions for tables that do not have primary keys, and the permission to create replication connections NOTE • The UPDATE, DELETE, and TRUNCATE permissions for tables that do not have primary keys are only used to temporarily lock tables to ensure data consistency after the migration. • To add the permission to create replication connections, perform the following steps: 1. Add host replication < src_user_name> < drs_instance_ip> / 32 md5 before all configurations in the pg_hba.conf file of the source database. 2. Run select pg_reload_conf() ; in the source database. 2. Run select pg_reload_conf() ; in the source database as user SUPERUSER, or restart the DB instance to apply the changes. |

Table 4-7 Account permissions

| Synchronization Type | Full | Full+Incremental |
|----------------------|---|--|
| Destination | Database-level: The Grequired. Table-level: | CREATEDB permission is |
| | To synchronize data permission is require | abases, the CREATEDB red. |
| | To synchronize a so and CREATE permis that contains the so | hema, the CONNECT ssions for the database chema are required. |
| | To synchronize objection CONNECT permissing contains the schemection CREATE permission contain the objects | ects in a schema, the on for the database that a, and the USAGE and s for the schema that are required. |
| | Synchronization user: permission is required | The CREATEROLE |
| | Synchronization user privilege cannot be m object permissions of may be inconsistent w database. | permissions: The default odified. Otherwise, the the destination database vith those of the source |
| | NOTE To synchronize event trigge text search templates, the must be RDS for PostgreSC destination database user i member of user root. | ers, text search parsers, and destination database version L 11.11 or later, and the must be user root or a |

- Source database permissions:

The source database user must have all the required permissions listed in **Table 4-7**. If the permissions are insufficient, create a user that has all of the permissions on the source database.

– Destination database permissions:

If the destination database is a PostgreSQL database on the current cloud, the initial account can be used.

- 2. Network settings
 - The source and destination databases must be in the same region.
 - The source and destination databases can be either in the same VPC or different VPCs.
 - If the source and destination databases are in different VPCs, the subnets of the source and destination databases are required to be in different CIDR blocks. You need to create a VPC peering connection between the two VPCs. For details, see VPC Peering Connection Creation Procedure.

- If the source and destination databases are in the same VPC, the networks are interconnected by default.
- 3. Security rules
 - In the same VPC, the network is connected by default. You do not need to set a security group.
 - In different VPCs, establish a VPC peering connection between the two VPCs. You do not need to set a security group.
- 4. Other

DRS can synchronize only some types of DDL statements of PostgreSQL. For details, see **related guides**. Properly plan the source database services. Do not perform DDL operations that are not supported during synchronization.

Procedure

Step 1 Create a synchronization task.

- 1. Log in to the management console and choose **Databases** > **Data Replication Service** to go to the DRS console.
- 2. On the **Data Synchronization Management** page, click **Create Synchronization Task**.
- 3. On the displayed page, specify the task name, description, and synchronization instance details.

Figure 4-13 Synchronization instance information



Table 4-8 Task settings

| Parameter | Description |
|-------------|--|
| Region | The region where the replication instance is deployed. You can change the region. To reduce latency and improve access speed, select the region closest to your workloads. |
| Project | The project corresponds to the current region and can be changed. |
| Task Name | The task name consists of 4 to 50 characters, starts with a letter, and can contain only letters (case-insensitive), digits, hyphens (-), and underscores (_). |
| Description | The description consists of a maximum of 256 characters and cannot contain the following special characters: =<>&'\" |

| Parameter | Description |
|----------------------------|--|
| Data Flow | To the cloud |
| Source DB Engine | Select PostgreSQL . |
| Destination DB Engine | Select PostgreSQL . |
| Network Type | Select a VPC network. Enabling SSL is recommended. It may slow down the synchronization by 20% to 30% but it ensures data security. |
| Destination DB Instance | The PostgreSQL instance you purchased. |
| Synchronization Type | Full+Incremental This synchronization mode allows you to synchronize data in real time. After a full synchronization initializes the destination database, an incremental synchronization parses logs to ensure data consistency between the source and destination databases. |
| | Full All objects and data in non-system databases are synchronized to the destination database at a time. This mode is applicable to scenarios where service interruption is acceptable. |
| | – Incremental |
| | NOTE If you select the Full+Incremental synchronization type, data generated during the full synchronization will be synchronized to the destination database with zero downtime, ensuring that both the source and destination databases remain accessible. |

Table 4-9 Synchronization instance settings

4. On the **Configure Source and Destination Databases** page, wait until the synchronization instance is created. Then, specify source and destination database information. You are advised to click **Test Connection** for both the source and destination databases to check whether they have been connected to the synchronization instance. After the connection tests are successful, select the check box before the agreement and click **Next**.

Source databases are classified into two types: self-built databases on ECSs and RDS DB instances. Configure parameters based on different scenarios.

– Scenario 1: Self-built databases on ECS - source database configuration

| Source Database | |
|---------------------------|--|
| Source Database Type | Self-built on ECS RDS DB instance |
| VPC | C View VPC |
| Subnet | • 0 |
| IP Address or Domain Name | 102 102 00 100 |
| Port | |
| Database Username | root |
| | DRS migrates only some key parameters to the destination database. For the other parameters that cannot be migrated, you need to use parameter templates to configure them on the destination database. |
| Database Password | |
| SSL Connection | |
| | If you want to enable SSL connection, ensure that SSL has been enabled on the source database, related parameters have been correctly configured, and an SSL certificate |
| | has been uploaded. |
| Encryption Certificate | Select |
| | Test Connection 📀 Test successful |

Figure 4-14 Self-build on ECS - source database information

| Table 4-10 Self-build on ECS - source | database | information |
|---------------------------------------|----------|-------------|
|---------------------------------------|----------|-------------|

| Parameter | Description | |
|------------------------------|---|--|
| Source Database Type | Select Self-built on ECS. | |
| VPC | A dedicated virtual network in which the source database is located. It isolates networks for different services. You can select an existing VPC or create a VPC. | |
| Subnet | A subnet provides dedicated network resources that are logically isolated from other networks, improving network security. The subnet must be in the AZ where the source database resides. You need to enable DHCP for creating the source database subnet. | |
| IP Address or Domain Name | The IP address or domain name of the source database. | |
| Port | Enter an integer ranging from 1 to 65535, which indicates the port number of the source database. | |
| Database Username | A username for the source database. | |
| Database Password | The password for the database username. | |
| SSL Connection | To improve data security during synchronization over a public network, you are advised to enable SSL to encrypt synchronization links and upload a CA certificate. | |

- Scenario 2: RDS DB instance - source database configuration

Figure 4-15 RDS DB instance - source database information

| Source Database | | |
|---|-----------------------------------|--|
| System databases, users, parameters, and jobs will not be migrated. You need to manually import users and jobs to the destination database and configure parameters in parameter templates of the destination database. | | |
| Source Database Type | Self-built on ECS RDS DB Instance | |
| DB Instance Name | rds- | C View DB Instance View Unselectable DB Instance |
| Database Username | | |
| Database Password | ····· 89 | |
| | Test Connection | |

Table 4-11 RDS DB instance - source database information

| Parameter | Description |
|-------------------------|--|
| Source Database Type | Select an RDS DB instance. |
| DB Instance Name | Select the PostgreSQL instance to be synchronized as the source DB instance. |
| Database Username | A username for the source database. |
| Database Password | The password for the database username. |

Figure 4-16 Destination database settings

Destination Database

| DB Instance Name | rds | |
|-------------------|-----------------|----------|
| Database Username | | |
| Database Password | | Q |
| | Test Connection | |

Table 4-12 Destination database settings

| Parameter | Description |
|----------------------|---|
| DB Instance Name | The RDS for PostgreSQL instance you have selected during the synchronization instance creation is displayed by default and cannot be changed. |
| Database Username | The username for accessing the destination PostgreSQL DB instance. |
| Database Password | The password for the database username. |

5. On the **Set Synchronization Task** page, select the synchronization object and user.

Figure 4-17 Synchronization mode

Table 4-13 Synchronization object

| Parameter | Description |
|-----------------------------------|--|
| Incremental Conflict Policy | The real-time synchronization function provides conflict policies for you to choose from if the synchronized data conflicts with existing data (such as the source and destination databases containing the same primary or unique keys) in the destination database. |
| | Select any of the following conflict policies: |
| | Ignore The system will skip the conflicting data and continue the subsequent synchronization process. |
| | Report error The synchronization task will be stopped and fail. |
| | Overwrite Conflicting data will be overwritten. |
| | In the following scenarios, you can select Ignore or Overwrite . In other scenarios, you are advised to select Report error . |
| | - Data already exists in the destination database. |
| | Multiple source databases are synchronized to one destination database. |
| | - Data in the destination database is updated manually. |
| Synchronize | Available options: Index, Incremental DDLs, and Populate materialized views during the full synchronization phase |
| | Populate materialized views during the full synchronization phase : This option takes effect only for materialized views that was populated in the source database. This operation affects the full synchronization performance. You perform this operation after the full synchronization is complete. |

| Parameter | Description |
|----------------------------|--|
| Synchronizati on Object | Objects can be synchronized at the database or table level. You can synchronize the entire database or some tables based on service requirements. For a single task, you can synchronize objects in only one database of an instance. Database name mapping is supported. |
| | Database-level synchronization synchronizes all objects in the source database to the destination database. |
| | Table-level synchronization synchronizes the selected table objects to the destination database. |
| | NOTE If you select table-level synchronization, the selected table may have dependencies on other objects in the database. If the referenced objects are not selected and do not exist in the destination database, the task will fail. Ensure that all referenced objects are selected before synchronization or select database- level synchronization. |
| Synchronize Account | During the synchronization, you can synchronize accounts based on your service requirements. |
| | There are two types of accounts: accounts that can be synchronized and accounts that cannot be synchronized. For accounts that cannot be synchronized, you can view details in the Remarks column and determine whether to synchronize accounts and permissions based on your service requirements. |

- 6. On the **Check Task** page, check the synchronization task.
 - If any check fails, review the cause and rectify the fault. After the fault is rectified, click **Check Again**.
 - For details about how to handle check failures, see **Checking Whether the Source Database Is Connected** in *Data Replication Service User Guide*.
 - If all check items are successful, click **Next**.

Figure 4-18 Task Check

| Check Again | |
|---|---|
| Check success rate 100% All checks must pass before you can continue. If any check requires confirmation | on, check and confirm the results before proceeding to the next step. |
| Check Item | Check Result |
| Destination database storage space | |
| Whether the destination database has sufficient storage space | Passed |
| Database parameters | |
| Whether the objects required for DDL synchronization are created in the source database | Passed |
| Whether the source database contains tables whose replication attribute is full and that do not have primary keys | Passed |
| Whether session_replication_role is set to replica in the destination database | Passed |
| Whether the specified object exists in the target database | Passed |
| Whether the PASSWORD_ENCRYPTION values of the source and destination databases are consistent | Passed |
| Whether the associated objects are selected | Passed |
| Whether the source database contains unlogged tables | Passed |
| Whether the source database name is valid | Passed |
| Whether the test_decoding plugin is installed in the source database | Passed |
| Whether the MAX_REPLICATION_SLOTS value of the source database is correctly configured | Passed |
| Whether the MAX_WAL_SENDERS value of the source database is correctly configured | Passed |
| Whether the source database schema name is valid | Passed |

D NOTE

You can proceed to the next step only when all checks are successful. If there are any items that require confirmation, view and confirm the details first before proceeding to the next step.

7. On the **Confirm Task** page, specify **Start Time** and click **Next**.

NOTE

- Set **Start Time** to **Start upon task creation** or **Start at a specified time** based on site requirements.
- After a synchronization task is started, the performance of the source and destination databases may be affected. You are advised to start a synchronization task during off-peak hours.
- 8. After the task is submitted, go back to the **Data Synchronization Management** page to view the task status.

Step 2 Manage the migration task.

The migration task contains two phases: full migration and incremental migration. You can manage them in different phases.

• Full synchronization

Viewing the synchronization progress: Click the target full synchronization task, and on the **Migration Progress** tab, you can see the synchronization progress of the structure, data, indexes, and synchronization objects. When the progress reaches 100%, the synchronization is complete.

- Incremental synchronization
 - Viewing the synchronization delay: After the full synchronization is complete, an incremental synchronization starts. On the Data Synchronization Management page, click the target synchronization task. On the displayed page, click Synchronization Progress to view the synchronization delay of the incremental synchronization. If the synchronization delay is 0s, the destination database is being

synchronized with the source database in real time. You can also view the data consistency on the **Synchronization Comparison** tab.

Figure 4-19 Viewing the synchronization delay

| - | - | - | | - | |
|-------------------------------|--|--|-----------------------------------|----------------------|---|
| Basic Information | | | | | |
| Synchronization Comparison | Note: Do not change the usernames, passwords, and permissions of source and destinat Last Updated Dec 20, 2821 10:41:03 GMT+08:00 | tion database users before the task has completed. | | | 4 |
| Synchronization Progress | Progress - | | | | |
| Process Data | | | | | |
| Synchronization | _ | Full Synchronization Completed | Incremental synchronization delay | | |
| Mapping | | 100% | 00 | | |
| Synchronization Logs | | 10070 | 03 0 | • | |
| Abromal Records | Source Database | | | Destination Database | |
| Tags | | | | | |

- Viewing the synchronization comparison results: To minimize service downtime, click the name of an incremental synchronization task. On the **Synchronization Comparison** page, create a comparison task.

For details, see **Comparing Migration Items** in *Data Replication Service User Guide*.

Step 3 Cut over services.

You are advised to start the cutover process during off-peak hours. At least one complete data comparison is performed during off-peak hours. To obtain accurate comparison results, start data comparison at a specified time point during off-peak hours. If it is needed, select **Start at a specified time** for **Comparison Time**. Due to slight time difference and continuous operations on data, inconsistent comparison results may be generated, reducing the reliability and validity of the results.

- 1. Interrupt services first. If the workload is not heavy, you may not need to interrupt the services.
- 2. Run the following statement on the source database and check whether any new sessions execute SQL statements within the next 1 to 5 minutes. If there are no new statements executed, the service has been stopped. select * from pg_stat_activity;

NOTE

The process list queried by the preceding statement includes the connection of the DRS synchronization instance. If no additional session executes SQL statements, the service has been stopped.

- 3. On the **Synchronization Progress** page, view the synchronization delay. When the delay is displayed as 0s and remains stable for a period, then you can perform a data-level comparison between the source and destination databases. For details about the time required, refer to the results of the previous comparison.
 - If there is enough time, compare all objects.
 - If there is not enough time, use the data-level comparison to compare the tables that are frequently used and that contain key business data or inconsistent data.
- 4. Determine an appropriate time to cut the services over to the destination database. After services are restored and available, the synchronization is complete.
- **Step 4** Complete the synchronization.
 - 1. Stop the synchronization task. After databases and services are synchronized to the destination database, to prevent operations on the source database

from being synchronized to the destination database to overwrite data, you can stop the synchronization task. This operation only deletes the synchronization instance, and the synchronization task is still displayed in the task list. You can view or delete the task. You will not be charged for the synchronization task after the task is stopped.

2. Delete the synchronization task. After the synchronization task is complete, you can delete it. After the synchronization task is deleted, it will not be displayed in the task list.

----End

4.3 From On-Premises PostgreSQL to RDS for PostgreSQL

DRS supports data synchronization from on-premises MySQL databases to RDS for PostgreSQL instances. With DRS, you can synchronize databases online with zero downtime and your services and databases can remain operational during migration.

This section describes how to configure DRS to migrate data from an on-premises PostgreSQL database to a RDS for PostgreSQL instance. The following network types are supported:

- VPN
- Public network

Diagram



Figure 4-20 VPN network



Figure 4-21 Public network+SSL connection

Synchronization Process



Figure 4-22 Flowchart

Synchronization Suggestions (Important)

- Database synchronization is closely impacted by a wide range of environmental and operational factors. To ensure the synchronization goes smoothly, you are advised to perform a test run before the actual synchronization to help you detect and resolve any potential issues in advance. Recommendations on how to minimize any potential impacts on your data base are provided in this section.
- It is strongly recommended that you start a task during off-peak hours. A less active database is easier to synchronize successfully. If the data is fairly static,

there is less likely to be any severe performance impacts during the synchronization.

Notes on Synchronization (Important)

NOTICE

Before creating a real-time synchronization task, read this section carefully.

For details, see **Precautions** in *Real-Time Synchronization*.

Synchronization Preparations

1. Permissions

Table 4-14 lists the source and destination database user permissions required in full and incremental synchronizations from on-premises PostgreSQL databases to PostgreSQL DB instances on the current cloud.

| Synchronization Type | Full | Full+Incremental |
|----------------------|---|--|
| Source | The CONNECT permission for databases, the USAGE permission for schemas, the SELECT permission for tables, the SELECT permission for system table catalog pg_catalog.pg_authid (used for synchronizing user passwords) | The CONNECT permission for databases, the USAGE permission for schemas, the SELECT permission for tables, the SELECT permission for sequences, the SELECT permission for system table catalog pg_catalog.pg_authid (used for synchronizing user passwords), the UPDATE, DELETE, and TRUNCATE permissions for tables that do not have primary keys, and the permission to create replication connections NOTE • The UPDATE, DELETE, and TRUNCATE permissions for tables that do not have primary keys are only used to temporarily lock tables to ensure data consistency after the migration. • To add the permission to create replication connections, perform the following steps: 1. Add host replication < src_user_name> < drs_instance_ip> / 32 md5 before all configurations in the pg_hba.conf file of the source database. 2. Run select pg_reload_conf(); in the source database. 2. Run select pg_reload_conf(); in the source database. 2. Run select pg_reload_conf(); in the source database. 3. Run select pg_reload_conf(); in the changes. |

Table 4-14 Account permissions

| Synchronization Type | Full | Full+Incremental |
|----------------------|---|--|
| Destination | Database-level: The C required. Table-level: | CREATEDB permission is |
| | permission is requi | red. |
| | To synchronize a so and CREATE permis that contains the so | hema, the CONNECT ssions for the database chema are required. |
| | To synchronize objection CONNECT permissing contains the schemection CREATE permission contain the objects | ects in a schema, the on for the database that a, and the USAGE and s for the schema that are required. |
| | Synchronization user: permission is required | The CREATEROLE |
| | Synchronization user privilege cannot be module object permissions of may be inconsistent we database. | permissions: The default odified. Otherwise, the the destination database rith those of the source |
| | NOTE To synchronize event trigge text search templates, the must be RDS for PostgreSC destination database user r member of user root. | ers, text search parsers, and destination database version L 11.11 or later, and the must be user root or a |

- Source database permissions:

The source database user must have all the required permissions listed in **Table 4-14**. If the permissions are insufficient, create a user that has all of the permissions on the source database.

- Destination database permissions:

If the destination database is a RDS for PostgreSQL instance, the initial account can be used.

- 2. Network settings
 - Source database network settings:

You can synchronize data from on-premises PostgreSQL databases to RDS for PostgreSQL databases on the current cloud through a VPN or public network. Enable public accessibility or establish a VPN for the on-premises PostgreSQL databases based on your service requirements. You are advised to synchronize data through a public network, which is more convenient and cost-effective.

- Destination database network settings:

- If you want to access the destination databases through a VPN, enable the VPN service first so that the source database can communicate with the destination database.
- If the source database attempts to access the destination database through a public network, no further configuration is required.
- 3. Security rules
 - a. Source database security group settings:
 - If the synchronization is performed over a public network, add the EIP of the DRS synchronization instance to the network whitelist of the source PostgreSQL database to enable the source database to communicate with the current cloud. Before configuring the network whitelist, you need to obtain the EIP of the synchronization instance.

The IP address on the **Configure Source and Destination Databases** page is the EIP of the synchronization instance.

Figure 4-23 Synchronization instance EIP

Synchronization instance created successfully. Its EIP is 10. Add this EIP to the destination database whitelist so that it can access the destination database. IP of the synchronization instance is 192. Add this IP to the source database whitelist so that it can access the source database.

If the synchronization is performed over a VPN network, add the private IP address of the DRS synchronization instance to the network whitelist of the source database to enable the source database to communicate with the destination database.

The IP address on the **Configure Source and Destination Databases** page is the private IP address of the synchronization instance.

If you do take this step, then once the synchronization is complete, you should delete this item from the whitelist or your system will insecure.

b. Destination database security group settings:

By default, the destination database and the DRS synchronization instance are in the same VPC and can communicate with each other. No further configuration is required.

4. Other

DRS can synchronize only some types of DDL statements of PostgreSQL. For details, see **related guides**. Properly plan the source database services. Do not perform DDL operations that are not supported during synchronization.

Procedure

Step 1 Create a synchronization task.

- 1. Log in to the management console and choose **Databases** > **Data Replication Service** to go to the DRS console.
- 2. On the **Data Synchronization Management** page, click **Create Synchronization Task**.
- 3. On the displayed page, specify the task name, description, and synchronization instance details.

Figure 4-24 Synchronization instance information



Table 4-15 Task settings

| Parameter | Description |
|-------------|--|
| Region | The region where the replication instance is deployed. You can change the region. To reduce latency and improve access speed, select the region closest to your workloads. |
| Project | The project corresponds to the current region and can be changed. |
| Task Name | The task name consists of 4 to 50 characters, starts with a letter, and can contain only letters (case-insensitive), digits, hyphens (-), and underscores (_). |
| Description | The description consists of a maximum of 256 characters and cannot contain the following special characters: =<>&'\" |

Table 4-16 Synchronization instance settings

| Parameter | Description |
|----------------------------|--|
| Data Flow | To the cloud |
| Source DB Engine | Select PostgreSQL . |
| Destination DB Engine | Select PostgreSQL . |
| Network Type | Select Public network . Enabling SSL is recommended. It may slow down the synchronization by 20% to 30% but it ensures data security. |
| Destination DB Instance | The RDS for PostgreSQL instance you created. |

| Parameter | Description |
|-------------------------|--|
| Synchronization Mode | Full+Incremental This synchronization mode allows you to synchronize data in real time. After a full synchronization initializes the destination database, an incremental synchronization parses logs to ensure data consistency between the source and destination databases. |
| | Full All objects and data in non-system databases are synchronized to the destination database at a time. This mode is applicable to scenarios where service interruption is acceptable. |
| | – Incremental |
| | NOTE If you select the Full+Incremental synchronization mode, ongoing changes made to the data will be synchronized to the destination database in real time, ensuring that the source database remain accessible. |

4. On the **Configure Source and Destination Databases** page, wait until the synchronization instance is created. Then, specify source and destination database information and click **Test Connection** for both the source and destination databases to check whether they have been connected to the synchronization instance. After the connection tests are successful, select the check box before the agreement and click **Next**.

Figure 4-25 Source and destination database details

| Source Database System databases, users, parameters, and j | ots will not be migrated. You need to manually import users and jobs to the destination database and configure parameters in parameter templates of the destination database. |
|---|---|
| IP Address or Domain Name | |
| Port | |
| Database Username | |
| Database Password | ଭ |
| SSL Connection | |
| | If you want to enable SSL connection, ensure that SSL has been enabled on the source database, and related parameters have been correctly configured. |
| | Test Connection This button is available only after the replication instance is created successfully. |
| Destination Database | |
| DD Instance Name | |
| Dis instance Name | pg-12-for-autotest () |
| Database Username | |
| Database Password | a |
| | Test Connection |

Table 4-17 Source database settings

| Parameter | Description |
|------------------------------|---|
| IP Address or Domain Name | The IP address or domain name of the source database. |
| Port | The port of the source database. Range: 1 - 65535 |

| Parameter | Description |
|----------------------|--|
| Database Username | A username for the source database. |
| Database Password | The password for the database username. |
| SSL Connection | To improve data security during synchronization over a public network, you are advised to enable SSL to encrypt synchronization links and upload a CA certificate. |

Table 4-18 Destination database settings

| Parameter | Description |
|----------------------|---|
| DB Instance Name | The RDS for PostgreSQL instance you have selected during the synchronization instance creation is displayed by default and cannot be changed. |
| Database Username | The username for accessing the destination RDS for PostgreSQL instance. |
| Database Password | The password for the database username. |

5. On the **Set Synchronization Task** page, select the synchronization object and user.

Figure 4-26 Synchronization mode



 Table 4-19
 Synchronization object

| Parameter | Description |
|--------------|---|
| Flow Control | You can choose whether to control the flow. |

| Parameter | Description |
|-----------------------------------|--|
| Incremental Conflict Policy | The real-time synchronization function provides conflict policies for you to choose from if the synchronized data conflicts with existing data (such as the source and destination databases containing the same primary or unique keys) in the destination database. |
| | Select any of the following conflict policies: |
| | Ignore The system will skip the conflicting data and continue the subsequent synchronization process. |
| | Report error The synchronization task will be stopped and fail. |
| | Overwrite Conflicting data will be overwritten. |
| | In the following scenarios, you can select Ignore or Overwrite . In other scenarios, you are advised to select Report error . |
| | Data already exists in the destination database. |
| | Multiple source databases are synchronized to one destination database. |
| | Data in the destination database is updated manually. |
| Synchronize | Available options: Index, Incremental DDLs, and Populate materialized views during the full synchronization phase |
| | Populate materialized views during the full synchronization phase : This option takes effect only for materialized views that was populated in the source database. This operation affects the full synchronization performance. You perform this operation after the full synchronization is complete. |
| Synchronizati on Object | DRS supports database- and table-level synchronization. You can select databases or tables for synchronization based on your service requirements. A single task can synchronize objects from only one database. Database name mapping is supported. |
| | Database-level synchronization synchronizes all objects in the source database to the destination database. |
| | Table-level synchronization synchronizes the selected table objects to the destination database. |
| | NOTE If you select table-level synchronization, the selected table may have dependencies on other objects in the database. If the referenced objects are not selected and do not exist in the destination database, the task will fail. Ensure that all referenced objects are selected before synchronization or select database- level synchronization. |

| Parameter | Description |
|------------------------|---|
| Synchronize Account | During the synchronization, you can synchronize accounts based on your service requirements. |
| | There are two types of accounts: accounts that can be synchronized and accounts that cannot be synchronized. For accounts that cannot be synchronized, you can view details in the Remarks column and determine whether to synchronize accounts and permissions based on your service requirements. |

- 6. On the **Check Task** page, check the synchronization task.
 - If any check fails, review the cause and rectify the fault. After the fault is rectified, click **Check Again**.

For details about how to handle check failures, see **Checking Whether the Source Database Is Connected** in *Data Replication Service User Guide*.

- If all check items are successful, click **Next**.

Figure 4-27 Task Check

| Check Again | |
|---|---|
| Check success rate 100% All checks must pass before you can continue. If any check requires confirmation, | check and confirm the results before proceeding to the next step. |
| Check Item | Check Result |
| Destination database storage space | |
| Whether the destination database has sufficient storage space | Passed |
| Database parameters | |
| Whether the objects required for DDL synchronization are created in the source database | Passed |
| Whether the source database contains tables whose replication attribute is full and that do not have primary keys | Passed |
| Whether session_replication_role is set to replica in the destination database | Passed |
| Whether the specified object exists in the target database | Passed |
| Whether the PASSWORD_ENCRYPTION values of the source and destination databases are consistent | Passed |
| Whether the associated objects are selected | Passed |
| Whether the source database contains unlogged tables | Passed |
| Whether the source database name is valid | Passed |
| Whether the test_decoding plugin is installed in the source database | Passed |
| Whether the MAX_REPLICATION_SLOTS value of the source database is correctly configured | Passed |
| Whether the MAX_WAL_SENDERS value of the source database is correctly configured | Passed |
| Whether the source database schema name is valid | Passed |

You can proceed to the next step only when all checks are successful. If there are any items that require confirmation, view and confirm the details first before proceeding to the next step.

7. On the **Confirm Task** page, specify **Start Time** and click **Next**.

D NOTE

- Set **Start Time** to **Start upon task creation** or **Start at a specified time** based on site requirements.
- After a synchronization task is started, the performance of the source and destination databases may be affected. You are advised to start a synchronization task during off-peak hours.
- 8. After the task is submitted, go back to the **Data Synchronization Management** page to view the task status.

Step 2 Manage the migration task.

The migration task contains two phases: full migration and incremental migration. You can manage them in different phases.

• Full synchronization

Viewing the synchronization progress: Click the target full synchronization task, and on the **Migration Progress** tab, you can see the synchronization progress of the structure, data, indexes, and synchronization objects. When the progress reaches 100%, the synchronization is complete.

- Incremental synchronization
 - Viewing the synchronization delay: After the full synchronization is complete, an incremental synchronization starts. On the **Data** Synchronization Management page, click the target synchronization task. On the displayed page, click Synchronization Progress to view the synchronization delay of the incremental synchronization. If the synchronization delay is 0s, the destination database is being synchronized with the source database in real time. You can also view the data consistency on the Synchronization Comparison tab.

| Figure 4-28 | Viewing | the | synchronization | delay |
|-------------|---------|-----|-----------------|-------|
|-------------|---------|-----|-----------------|-------|



 Viewing the synchronization comparison results: To minimize service downtime, click the name of an incremental synchronization task. On the Synchronization Comparison page, create a comparison task.

For details, see **Comparing Migration Items** in *Data Replication Service User Guide*.

Step 3 Cut over services.

You are advised to start the cutover process during off-peak hours. At least one complete data comparison is performed during off-peak hours. To obtain accurate comparison results, start data comparison at a specified time point during off-peak hours. If it is needed, select **Start at a specified time** for **Comparison Time**. Due to slight time difference and continuous operations on data, inconsistent comparison results may be generated, reducing the reliability and validity of the results.

1. Interrupt services first. If the workload is not heavy, you may not need to interrupt the services.

 Run the following statement on the source database and check whether any new sessions execute SQL statements within the next 1 to 5 minutes. If there are no new statements executed, the service has been stopped. select * from pg_stat_activity;

D NOTE

The process list queried by the preceding statement includes the connection of the DRS synchronization instance. If no additional session executes SQL statements, the service has been stopped.

- 3. On the **Synchronization Progress** page, view the synchronization delay. When the delay is displayed as 0s and remains stable for a period, then you can perform a data-level comparison between the source and destination databases. For details about the time required, refer to the results of the previous comparison.
 - If there is enough time, compare all objects.
 - If there is not enough time, use the data-level comparison to compare the tables that are frequently used and that contain key business data or inconsistent data.
- 4. Determine an appropriate time to cut the services over to the destination database. After services are restored and available, the synchronization is complete.
- **Step 4** Complete the synchronization.
 - 1. Stop the synchronization task. After databases and services are synchronized to the destination database, to prevent operations on the source database from being synchronized to the destination database to overwrite data, you can stop the synchronization task. This operation only deletes the synchronization instance, and the synchronization task is still displayed in the task list. You can view or delete the task. You will not be charged for the synchronization task after the task is stopped.
 - 2. Delete the synchronization task. After the synchronization task is complete, you can delete it. After the synchronization task is deleted, it will not be displayed in the task list.

----End

4.4 From On-premises MySQL to GaussDB Distributed

Description

You can use real-time synchronization of DRS to synchronize on-premises MySQL to Huawei Cloud GaussDB. Full+incremental synchronization can ensure that data is always in sync between the source MySQL and the destination GaussDB.

Problems

- Enterprise workloads have been growing and evolving fast, and traditional databases lack the scalability needed to keep up. Enterprises need distributed databases.
- Building a traditional database means purchasing and installing servers, systems, databases, and other software. The O&M is expensive and difficult.

- Traditional databases are poor in complex queries.
- It is hard for traditional databases to smoothly synchronize data with no downtime.

Service architecture



Synchronization Principles

A full+incremental synchronization task includes the following operations:

- 1. In the full synchronization phase, tables, primary keys, and unique keys are synchronized.
- 2. Incremental data extraction is started to ensure that the incremental data generated during full data synchronization is completely extracted to the DRS instance.
- 3. A full synchronization is started.
- 4. An incremental synchronization is automatically started after the full synchronization is complete. The replay starts from the position where the full synchronization starts.
- 5. A comparison task is started after the incremental replay is complete to check the data consistency. Real-time comparison is supported.
- 6. Workloads synchronization is started if the data is consistent between the source and destination databases.



Service List

- Virtual Private Cloud (VPC)
- GaussDB
- Data Replication Service (DRS)
- Data Admin Service (DAS)

Notes on Usage

- The resource planning in this best practice is for demonstration only. Adjust it as needed.
- The end-to-end test data in this document is for reference only.
- Full synchronization is used to synchronize data. Incremental synchronization is used to synchronize data between the source and destination databases in real time.

Prerequisites

- You have registered with Huawei Cloud and completed account authentication.
- Your account balance is greater than or equal to \$0 USD.
- You have set up an on-premises MySQL database for testing.
- You have obtained the IP address, port number, account, and password of the MySQL database to be synchronized.

Resource Planning

| Categor y | Subcat egory | Planned Value | Remarks | | | |
|--------------------------|------------------------------------|---|---|--|--|--|
| VPC | VPC name | vpc-src-172 | Specify a name that is easy to identify. | | | |
| | Region | Test region | For low network latency and quick resource access, select the region nearest to you. | | | |
| | AZ | AZ 3 | - | | | |
| | Subnet CIDR block | 172.16.0.0/16 | Select a subnet with sufficient network resources. | | | |
| | Subnet name | subnet-src-172 | Specify a name that is easy to identify. | | | |
| On- premises MySQL | Databa se version | 5.7.38 | - | | | |
| (source databas e) | Databa se user | test_info | Specify a database user. The following minimum permissions are required: SELECT, LOCK TABLES, REPLICATION SLAVE and REPLICATION CLIENT. | | | |
| GaussDB | Instanc e name | Auto-drs-gaussdbv5- tar-1 | Specify a name that is easy to identify. | | | |
| | Databa se version | GaussDB 1.3 Enterprise Edition | - | | | |
| | lnstanc e type | Distributed (1 CN, 3 DN shards, and 3 replicas) | Select a distributed instance for the test. | | | |
| | Deploy ment model | Independent | - | | | |
| | Transa ction consist ency | Strong consistency | - | | | |
| | Shards | 3 | - | | | |

| Categor y | Subcat egory | Planned Value | Remarks |
|--------------------------------|------------------------------------|--|---|
| | Coordi nator nodes | 3 | - |
| | Storag e type | Ultra-high I/O | - |
| | AZ | AZ 2 | In this example, a single AZ is select. You are advised to select multiple AZs to improve instance availability in actual use. |
| | Instanc e specific ations | General-enhanced II 8 vCPUs 64 GB | Small specifications are selected for this test instance. You are advised to configure specifications based on service requirements in actual use. |
| | Storag e space | 480 GB | A small storage space is selected for this test instance. You are advised to configure the storage space based on service requirements in actual use. |
| | Disk encryp tion | Disable | In this example, disk encryption is disabled. Enabling disk encryption improves the security of data, but may slightly affect the database read/write performance. |
| Logging in to the | DB engine | GaussDB | - |
| databas e through DAS | Databa se source | GaussDB | Select the GaussDB instance created in this example. |
| | Databa se name | postgres | - |
| | Userna me | root | - |
| | Passwo rd | - | Password of the root user of the GaussDB instance created in this example |

| Categor y | Subcat egory | Planned Value | Remarks |
|-----------------|---|--------------------|---|
| DRS synchron | Task name | DRS-test-info | Specify a name that is easy to identify. |
| ization task | Destin ation databa se name | test_database_info | Specify a name that is easy to identify. The name must be compatible with the MySQL database name. |
| | Source DB engine | MySQL | - |
| | Destin ation DB engine | GaussDB | - |
| | Netwo rk type | Public network | Public network is used in this example. |

Flowchart

Figure 4-29 shows the main operation flowchart.

Figure 4-29 Flowchart



Creating a VPC

Create a VPC to prepare network resources for creating a GaussDB instance.

- **Step 1** Log in to the management console.
- **Step 2** Click ¹ in the upper left corner and select a region.
- **Step 3** Click in the upper left corner of the page and choose **Networking** > **Virtual Private Cloud**.

The VPC console is displayed.

| = | Service List > | Enter a service or function name. | | | | Q | |
|---|-----------------------------|--|---------|---------------------------------------|---------|---------------------------|-----------------|
| • | Elastic Cloud Server | Recently Visited Services: Virtual Private | e Cloud | Distributed Database Middleware | GaussDB | Document Database Service | Relational Data |
| 3 | Relational Database Service | Compute | | Storage | | Networking | |
|) | Auto Scaling | Elastic Cloud Server | | Elastic Volume Service | | Virtual Private Cloud | * |
| | - | Bare Metal Server | | Dedicated Distributed Storage Service | | Elastic Load Balance | * |
| 5 | Bare Metal Server | Cloud Phone | | Storage Disaster Recovery Service | | Direct Connect | |
| | Elastic Volume Service | Image Management Service | | Cloud Server Backup Service | | Virtual Private Network | |
| A | Volume Backup Service | FunctionGraph | | Cloud Backup and Recovery | | Domain Name Service | |
| | Votarrie boertap service | Auto Scaling | | Volume Backup Service | | NAT Gateway | |
| | Virtual Private Cloud | Dedicated Cloud | | Object Storage Service | | Elastic IP | |
| 2 | Elastic Load Balance | Dedicated Host | | Data Express Service | | Cloud Connect | |
| þ | Domain Registration | | | Scalable File Service | | VPC Endpoint | |

Step 4 Click Create VPC.

| Basic Information | | |
|-------------------------------|---|---|
| Region | CN North-Beijing1 | × |
| | Regions are geographic area latency and quick resource a | s isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network ccess, select the nearest region. |
| lame | vpc-01 | |
| CIDR Block | 192 · 168 · | 0 · 0 / 16 • |
| | Recommended: 10.0.0/8-24 | 4 (Select) 172.16.0.0/12-24 (Select) 192.168.0.0/16-24 (Select) |
| | A The CIDR block 192.1 VPC and an on-prem | 68.0.0/16 overlaps with a CIDR block of another VPC in the current region. If you intend to enable communication between VPCs or between a ises data center, change the CIDR block. View VPC CIDR blocks in current region |
| nterprise Project | Select | ▼ C Create Enterprise Project ⑦ |
| Default Sub AZ | net | 73 • ⑦ |
| Name | su | bnet-1d4e |
| CIDR Block | | |
| | 1 The | 92 · 168 · 0 · 0 / 24 · ⑦ Available IP Addresses: 251 CIDR block cannot be modified after the subnet has been created. |
| Associated Ro | 1 The ute Table Defa | 92 · 168 · 0 · 0 / 24 · ⑦ Available IP Addresses: 251 CIDR block cannot be modified after the subnet has been created. |
| Associated Ro Advanced Set | 1 The ute Table Defa ings v Gate | 92 · 168 · 0 · 0 / 24 · ⑦ Available IP Addresses: 251 CIDR block cannot be modified after the subnet has been created. ault ⑦ way DNS Server Address DHCP Lease Time Tag Description |

🕂 Add Subnet

Step 5 Configure parameters as needed and click **Create Now**.

Step 6 Return to the VPC list and check whether the VPC is created.

If the VPC status becomes available, the VPC has been created.

----End

Creating a Security Group

Create a security group for creating a GaussDB instance.

Step 1 Log in to the **management console**.

Step 2 Click O in the upper left corner and select a region.

 \times

Step Step Step

Add Rule

Step 3 Click in the upper left corner of the page and choose Networking > Virtual Private Cloud.

The VPC console is displayed.

| ≡ | Service List | Enter a service or function name. | | | | | |
|------------------|-----------------------------|--|-------|---------------------------------------|---------|---------------------------|------------------|
| | Elastic Cloud Server | Recently Visited Services: Virtual Private | Cloud | Distributed Database Middleware | GaussDB | Document Database Service | Relational Datał |
| ക | Relational Database Service | Compute | | Storage | | Networking | |
| 000 | Auto Scaling | Elastic Cloud Server | * | Elastic Volume Service | | Virtual Private Cloud | * |
| | | Bare Metal Server | | Dedicated Distributed Storage Service | | Elastic Load Balance | * |
| | Bare Metal Server | Cloud Phone | | Storage Disaster Recovery Service | | Direct Connect | |
| | Elastic Volume Service | Image Management Service | | Cloud Server Backup Service | | Virtual Private Network | |
| 61 | Volume Backup Service | FunctionGraph | | Cloud Backup and Recovery | | Domain Name Service | |
| - | | Auto Scaling | | Volume Backup Service | | NAT Gateway | |
| Ó | Virtual Private Cloud | Dedicated Cloud | | Object Storage Service | | Elastic IP | |
| \bigtriangleup | Elastic Load Balance | Dedicated Host | | Data Express Service | | Cloud Connect | |
| \oplus | Domain Registration | | | Scalable File Service | | VPC Endpoint | |

- **Step 4** Choose **Access Control** > **Security Groups**.
- Step 5 Click Create Security Group.
- **Step 6** Configure parameters as needed.

Create Security Group

| | * Name | sg-01 | | | | | | |
|---|--|--|--|--|--|--|--|--|
| | * Enterprise Project | default C Create Enterprise Project | | | | | | |
| | * Template | General-purpose web server 💌 | | | | | | |
| | Description The security group is for general-purpose web servers and includes default rules that allow all inbound ICMP traffic and inbound traffic on ports 22, 80, 443, and 3389. The security group is used for remote login, ping, and hosting a website on ECSs. | | | | | | | |
| | Show Default Rule 🔻 | Show Default Rule OK Cancel | | | | | | |
| 7 | Click OK . | | | | | | | |
| 8 | Return to the security group list and click the security group name. | | | | | | | |
| 9 | Click the Inbound Rules tab, and then click Add Rule. | | | | | | | |
| | Summary Inbound Rules Associated Instances | | | | | | | |

 Fast-Add Rule
 Delete
 Allow Common Ports
 Inbound Rules: 3 Learn more about security group configuration.

Step 10 Configure an inbound rule, add the IP address of the source database, and click **OK**.

| Add Inbound Rule | | | | | | | |
|---|----------------------|--|-------------|------------------|--|--|--|
| f you select IP address for Source, you can enter multiple IP addresses in the same IP address box. Each IP address represents a different security group rule. | | | | | | | |
| Security Group defined_security_group You can import multiple rules in a batch. | | | | | | | |
| Туре | Protocol & Port (?) | Source 🕐 | Description | Operation | | | |
| IPv4 • | Protocols/TCP (Custo | IP address ▼ 0.0.0.0/0 ⊗ | | Replicate Delete | | | |
| Add Rule Cancel | | | | | | | |
| | | | | | | | |

----End

Creating a Distributed GaussDB Instance

This section describes how to create a distributed GaussDB instance as the destination database.

- **Step 1** Log in to the management console.
- **Step 2** Click O in the upper left corner and select a region.
- **Step 3** Under the service list, choose **Databases** > **GaussDB**.
- Step 4 Click Buy DB Instance.
- **Step 5** Configure the instance name and basic information.
| Rejon Rejon De lacare lane pass-Sale © Edtor lyae Edtor lyae Edtor lyae Edtor lyae 0 Bickee lane 0 Bi | Billing Mode | Yearly/Monthly Pay-per-use |
|---|---------------------------|--|
| Researce sees soluted from each other. Resources are regions properties and cannot be used across regions through internal network cannet does and across regions through internal network cannet does across regions through internal network cannet d | Region | Y |
| D8 Instance Name status D8 Instance Name status Edition Type Exterprise edition B8 Instance Type B Intrary Standby D8 Instance Type Deschulad D8 Instance Type Independent Instance Type Independent Instance Type Storig unsidency Extended © Storig unsidency Instance Type Independent Instance Type Storig unsidency Extended © Independent Instance Type Instance an only le used for testing AZ Instance Type Instance Type Instance an only le used for testing Instance Type Instance an only le used for testing Instance Type Instance an only le used for testing Instance Type Instance an only le used for testing Instance Type Instance an only le used for testing | | Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
| DB Indarce Name gass-Sea8 Editor Type Editopice edition DB Indarce Type 8.102 DB Indarce Type Distributed Pelogment Model ① Indigendent Transaction Consistery ② Stords Indigendent Stords Indigendent Notes ② Image: Starte Type Image: Starte Type </td <td></td> <td></td> | | |
| Editon Type Exiterprice edition DE Engine Vesion 8 to2 2.2.5 2.8 De Issance Type Dictributed Perloyment Modil ① Independent Transaction Consistery Storg consistery Storg consistery Exertual consistery Feplais ② Image: Constraint on the section of the instance can only be used for testing: A2 Image: Constraint on the section of the section of testing: | DB Instance Name | gauss-3688 |
| DB Ergine Version 8.102 3.226 2.8 De Instance Type De Instance Type Independent Fanoschin Consistency Bentual consistency Transaction Consistency O Storg consistency Bentual consistency Fanoschin Consistency O Stands - 3 + + Condinator Nodes Ose to to, the Instance can only be used for testing: AZ Cancett-4 Cancett-44 Cancett-44 AZ | Edition Type | Enterprise edition Basic edition |
| B Istance Type Detributed Peployment Model ② Independent Transaction Consisteng ③ Storog consistengy Bentual Consistengy Bentual Consistengy Feploxe ③ - 3 + Shards - 3 + Coordinator Nodes ③ - 3 + If Coordinator Nodes is set to 1, the instance can only be used for testing. | DB Engine Version | 8.102 3.226 2.8 |
| Deployment Model (a) Independent Transaction Consistency (b) Storng consistency (b) Replicas (b) - 3 + Shards - 3 + Coordinator Nodes (b) - 3 + If coo | DB Instance Type | Distributed Primary/Standby |
| Tansaction Consistency Stong consistency Replicas O - 3 + Shards - 3 + Coordinator Nodes O - 3 + If Coordinator Nodes is set to 1, the instance can only be used for testing. | Deployment Model | Independent |
| Replicas O Image: Construction of the state sta | Transaction Consistency 🕥 | Strong consistency Eventual consistency |
| Shards - 3 + Coordinator Nodes () - 3 + If Coordinator Nodes is set to 1, the Instance can only be used for testing. AZ CH-north-4a CH-north-4b CH-north-4c AZ7 Only one or three AZs can be selected. | Replicas | - 3 + |
| Coordinator Nodes If Coordinator Nodes is set to 1, the instance can only be used for testing. AZ Cri-north-4a Cri-north-4b Cri-north-4b Cri-north-4c AZ7 Only one or three AZs can be selected. | Shards | - 3 + |
| If Coordinator Nodes is set to 1, the Instance can only be used for testing. AZ Cn+north-4a Cn+north-4b Cn+north-4c AZ7 Only one or three AZs can be selected. | Coordinator Nodes | - 3 + |
| AZ cn-north-4a cn-north-4b cn-north-4c AZ7 Only one or three AZs can be selected. | | If Coordinator Nodes is set to 1, the instance can only be used for testing. |
| Only one or three AZs can be selected. | AZ | cn-north-4a cn-north-4c AZ7 |
| | | Only one or three AZs can be selected. |
| Time Zone | Time Zone | |

Step 6 Configure instance specifications.

| Instance Specifications | General-enhanced II |
|-------------------------|--|
| | Flavor Name |
| | 8 vCPUs 64 GB Unavailable for production environment |
| | O 16 vCPUs 128 GB |
| | 32 vCPUs 256 GB (Sold Out) |
| | 図 64 vCPUs 512 GB (Sold Out) |
| | DB Instance Specifications General-enhanced II 8 vCPUs 64 GB |
| Storage Type | Ultra-high I/O Learn more about storage types. |
| | 480 GB |
| Storage Space (GB) | |
| | 480 9,950 19,450 28,950 48,000 |
| Disk Encryption | Disable Enable ? |

Select small specifications for this test instance. You are advised to configure specifications based on service requirements in actual use.

Step 7 Select a VPC and security group (created in **Creating a VPC** and **Creating a Security Group**) for the instance and configure the database port.



Step 8 Configure password and other information.

| Administrator | root | |
|------------------------|--|--|
| Administrator Password | | Keep your password secure. The system cannot retrieve your password. |
| Confirm Password | | |
| | | |
| Parameter Template | | C View Parameter Template |
| Enterprise Project | Select | C Create Enterprise Project |
| | | |
| Tag | It is recommended that you use TMS's predefined ta | ig function to add the same tag to different cloud resources. C View predefined tags |
| | Tag key Tag value | |
| | You can add 20 more tags. | |

- Step 9 Click Next, confirm the information, and click Submit.
- Step 10 Go to the instance list.

If the instance status becomes available, the instance has been created.

----End

Constructing Test Data

Before the synchronization, prepare some data types in the source database for verification after the synchronization is complete.

For details about the data types supported by DRS, see MySQL->GaussDB.

Perform the following steps to construct data in the source database:

- **Step 1** Use a database connection tool to connect to the source MySQL database based on its IP address.
- Step 2 Construct data in the source database based on data types supported by DRS.
 - 1. Create a test user.

create user *test_info* identified by *xxx*;

test_info indicates the user created for the test, and *xxx* indicates the password of the user.

- Create a database named test_info under the user.
 CREATE DATABASE test_info;
- 3. Create a table in the **test_info** database.

CREATE TABLE `test_info`.`test_table` (

`id` int NOT NULL,

- `c1` char(10) DEFAULT NULL,
- `c2` varchar(10) DEFAULT NULL,

- **`c3` binary(10) DEFAULT NULL**,
- `c4` varbinary(10) DEFAULT NULL,
- `c5` tinyblob,
- `c6` mediumblob,
- `c7` longblob,
- `c8` tinytext,
- `c9` text,
- `c10` mediumtext,
- `c11` longtext,
- `c12` enum('1','2','3') DEFAULT NULL,
- `c13` set('1','2','3') DEFAULT NULL,
- `c14` tinyint DEFAULT NULL,
- `c15` smallint DEFAULT NULL,
- `c16` mediumint DEFAULT NULL,
- `c17` bigint DEFAULT NULL,
- `c18` float DEFAULT NULL,
- `c19` double DEFAULT NULL,
- `c20` date DEFAULT NULL,
- `c21` datetime DEFAULT NULL,
- `c22` timestamp,
- `c23` time DEFAULT NULL,
- `c24` year DEFAULT NULL,
- `c25` bit(10) DEFAULT NULL,
- `c26` json DEFAULT NULL,
- `c27` decimal(10,0) DEFAULT NULL,
- `c28` decimal(10,0) DEFAULT NULL,

```
PRIMARY KEY (`id`)
```

);

4. Assign permissions to the user.

GRANT SELECT, LOCK TABLES ON <database>. to test_info; GRANT REPLICATION SLAVE, REPLICATION CLIENT ON *.* to test_info;

In the preceding command, *test_info* indicates the user created for this test, *<database>* indicates the name of the database to be synchronized, and indicates the name of the table to be synchronized. Replace them based on the site requirements.

5. Insert two rows of data into the table.

```
insert into test_info.test_table values
(1,'a','b','111','111','tinyblob','mediumblob','longblob','tinytext','text','med
iumtext','longtext','1','3',1,2,3,4,1.123,1.1234,'2024-03-08','2024-03-08
08:00:00','2024-03-08
08:00:00','08:00:00','2024','1010','{"a":"b"}',1.23,1.234);
```

insert into test_info.test_table values (2,'a','b','111','111','tinyblob','mediumblob','longblob','tinytext','text','med iumtext','longtext','1','3',1,2,3,4,1.123,1.1234,'2024-03-08','2024-03-08 08:00:00','2024-03-08 08:00:00','08:00:00','2024','1010','{"a":"b"}',1.23,1.234);

Step 3 Create a database in the destination GaussDB instance.

- 1. Log in to the management console.
- 2. Click 💟 in the upper left corner and select a region.
- 3. Click **Click** in the upper left corner of the page and choose **Databases** > **Data Admin Service**.
- 4. In the navigation pane on the left, click **Development Tool** to go to the login list page.
- 5. Click Add Login.
- On the displayed page, select the DB engine, source database, and target DB instance, enter the login username, password, and description (optional), and enable Collect Metadata Periodically and Show Executed SQL Statements. If Collect Metadata Periodically is enabled, select Remember Password.
- 7. Click **Test Connection** to check whether the connection is successful.

If a message is displayed indicating connection successful, continue with the operation. If a message is displayed indicating connection failed and the failure cause is provided, make modifications according to the error message.

- 8. Click **OK**.
- 9. Locate the added instance, click **Log In** in the **Operation** column.

| Add Login | | All DB Insta | nces 🔻 | | Enter an instance |
|----------------|--|-----------------|----------------|----------|--|
| DB Instance ↓Ξ | DB Engine Version JΞ | Source Database | Login Username | Remember | Description ↓Ξ |
| | Auto-drs-gaussdbv5-tar-1(172.16.24.234:8000/test_database_info) | GaussDB | root | Yes | @ |
| | Auto-drs-gaussdbv5HA-src-1(192.168.100.73,192.168.100.8,192.168.100.192.8000/postgres) | GaussDB | root | Yes | 🖉 |
| | Auto-drs-gaussdbv5-src-2(192.168.100.241:8000/postgres) | GaussDB | root | Yes | 🖉 |
| | Auto-drs-gaussdbv5HA-star-1(192.168.100.57,192.168.100.157,192.168.100.194.8000/postgr | GaussDB | root | Yes | created by sync rds instance $\underline{\mathscr{Q}}$ |
| | Auto-drs-gaussdbv5HA-src-2(192.168.100.89,192.168.100.55,192.168.100.10.8000/postgres) | GaussDB | root | Yes | created by sync rds instance $ ot\!\!\!\!/$ |
| | Auto-drs-gaussdbv5-src-1 (192.168.0.97.8000/postgres) | GaussDB | root | Yes | created by sync rds instance $\underline{\mathscr{Q}}$ |
| | Auto-drs-gaussdbv5-tar-1(172.16.24.234.8000/postores) | GaussDB | root | Yes | created by sync rds instance |

10. Choose SQL Operations > SQL Window on the top menu bar.



 Run the following statement to create a database compatible with MySQL: test_database_info indicates the database name. Replace it based on the site requirements. CREATE DATABASE test database info DBCOMPATIBILITY 'mysgl';

----End

Performing a Pre-Check

Before creating a task, check whether synchronization conditions are met.

Before synchronization, refer to **Precautions**.

Creating a DRS Synchronization Task

This section describes how to create a DRS instance and synchronize data from the **test_info** database in the on-premises MySQL database to the **test_database_info** database in the GaussDB instance.

- **Step 1** Log in to the management console.
- **Step 2** Click ¹ in the upper left corner and select a region.

Select the region where the destination instance is deployed.

- Step 3 Click the service list icon on the left and choose Databases > Data Replication Service.
- **Step 4** In the navigation pane on the left, choose **Data Synchronization Management**. On the displayed page, click **Create Synchronization Task**.
- **Step 5** Configure synchronization instance information.
 - 1. Select a region, and project, and enter a task name.

| < Create Synchronization Task | 0 | | | | | |
|-------------------------------|---|--|---|---|--------------------------------|----------------|
| Create Synchronization | Onfigure Source and Destination Databases | (3) Set Synchronization Task | (4) Advanced Settings | (5) Process Data | (6) Check Task | ⑦ Confirm Task |
| Region | × | | | | | |
| | Regions are geographic areas isolated from each oth | er. Resources are region-specific and cannot be used acros | s regions through internal network connections. For | low network latency and quick resource acce | ss, select the nearest region. | |
| Project | × | | | | | |
| * Task Name | DRS-3627 | ۲ | | | | |
| Description | | 0 | | | | |
| | | | | | | |
| | 0/2 | 56 | | | | |

2. Specify Data Flow, Source DB Engine, Destination DB Engine, Network Type, DRS Task Type, , Destination DB Instance, Synchronization Instance Subnet (optional), Synchronization Mode, Specifications, AZ, and Tags (optional).

| Synchronization Instance | ce Details 💿 |
|---|--|
| The following information cannot be modifi- | ed after you go to the next page. |
| * Data Flow | thushine entrushead before thushead before and the second terms of terms |
| | The destination distabase must be a distabase in the current cloud, if you want to systemate data between databases, select To the cloud. |
| · Source DB Engine | Mycox, Oncie D62/br1U/// DCM Mers/CB MorgoD8 PattyreGX, Microsett SCX, Server GaussCB/br1/b;SCI,) TDB |
| * Destination DB Engine | MySOL GaustOG(DVIS) CaustOG Extended GaustOG PrivaryStandby MaraOS PredgedOL GaustOG(or MySOL) |
| * Network Type | Pude network v 0 |
| | CRS will automatically bind the specified EIP to the DRS Instance and release the EIP after the tack is complete For default about the data transmission fee when an EIP is specified, see the pricing details of the EIP service. |
| * Destination DB Instance | No DB indunca available. V View DB indunce. View Unset-citable DB indunce. |
| * Synchronization Instance Subnet | Beloct the saturet v 🔍 🕲 Were Buterets Ware Occupied IP Address |
| * Synchronization Mode | Full Incremental Full Incremental |
| | This spectronization type spectronizes data in real time. After a full spectronization initializes the destination database, an incremental spectronization parses logs to ensure data consistency between the source and destination databases. |
| * Specify EIP | ✓ C Deate an EP |
| | |

3. Click **Create Now**.

Step 6 Configure the source and destination database information.

1. Enter the IP address, port number, username, and password of the source database.

Click Test Connection.

| Source Database | | |
|--|--|---|
| System databases, users, parameters, and j | obs will not be migrated. You need to manually import us | ers and jobs to the destination database and configure parameters in parameter templates of the destination database. |
| P Address or Domain Name | | |
| Port | | |
| Database Username | | |
| Database Password | | |
| SSL Connection | | |
| | (Test Connection) | |

2. Enter the username and password of the destination database. Click **Test Connection**.

| Destination Database | | | |
|----------------------|---------------------|-----------------------------|---|
| DB Instance Name | Auto-drs-gaussdbv5- | tar-1 (172.16.24.234:8000) | |
| Database Username | root | | |
| Database Password | | Ŕ | |
| | Test Connection | This button is available or | nly after the replication instance is created successfully. |

3. Click Next. In the displayed box, read the message carefully and click Agree.



I acknowledge that the IP addresses, domain names, ports, usernames, and passwords of involved databases will be temporarily collected and used in this task. These items will be deleted after the task is deleted.

|--|

Step 7 Configure the synchronization task.

 Select the object type for full synchronization. If the table structure to be synchronized has not been created in the destination database, select **Table** structure (the table structure contains primary keys and unique keys) for Synchronization Object Type. Otherwise, deselect **Table structure**. Select Index for Synchronization Object Type based on the site requirements.

Synchronization Object Type Table structure Data Index
Table structure a table structure in the destination database, for details about the data type, see Mapping Data Types.

- 2. Specify Incremental Conflict Policy.
 - Ignore: The system will ignore the conflicting data and continue the subsequent synchronization process. If you select Ignore, data in the source database may be inconsistent with that in the destination database.
 - Report error: The synchronization task will be stopped and fail. You can view the details in synchronization logs.
 - **Overwrite**: Conflicting data will be overwritten.

 \times

Incremental Conflict Policy Ignore Report error Overwrite 🕖

3. Select the databases and tables of the source database to be synchronized. In this test, select the **test_table** table from the **test_info** database.

| Synchronization Object | Tables Import object file | | | | |
|------------------------|---|---------------------------------|-------------------|---|--|
| | If any data in the source database changes, click the refre | sh button below. | alactad objacts (| n rinht cide | |
| | more objects to be migrated nom list of diselected object | s on reit side to the list of s | siected objects (| un nyin awa. | |
| | | C | | | |
| | Search the expanded database using regular express | ions. Q | | Search the expanded database using regular expressions. Q | |
| | + 🗆 TEST1 | database | | | |
| | + test_info | database | | | |
| | + db1_sync_newfull_pause_001 | database | | | |
| | + db1_sync_new_lincr_pause_002 | database | >>> | | |
| | + db_test1 | database | « | | |
| | + db_test12 | database | - | | |
| | + sbtest | database | | | |
| | + sbtest123 | database | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

4. Locate the database and table, respectively, and click **Edit** to change the database name and table name.

| ⑦ Select All | C | | Select All |
|---|----------|----------|---|
| For tables, only expanded databases are searched. | Q | | For tables, only expanded databases are searched. Q |
| + jrh003 | database | | E test_database_info X (2) database |
| + jrh004 | database | | E test_info Edit 1 |
| + jrh005 | database | _ | test_table Edit |
| + jrh006 | database | » | |
| +jrh007 | database | « | |
| +jrh009 | database | | |
| +jrh1 | database | | |
| + jrh10 | database | | |
| + _ jrh2 | database | | |
| + jrh3 | database | | |
| + Izy | database | | |
| | | | 4 |

5. On the displayed box, enter a new name, for example, **DATATYPELIST_After**. The name cannot include special characters. Otherwise, an error will be reported during SQL statement execution after the synchronization.

New Table Name

| The new table will be used in the destination database. | | | | | |
|---|--------------------|---|--|--|--|
| Edit Table Name | DATATYPELIST_After | ? | | | |
| | OK Cancel | | | | |

 \times

6. Confirm the settings and click **Next**.

| Select All | | C | Select All |
|--|---|---|---|
| Select All For tables, only expanded databases are searched. * | Q database database database database database database database database database database | × | Select All For tables, only expanded databases are searched. test_database_info x (2) database test_info Edit 1 test_table New name: DATATYPELIST_After) Edit |

Step 8 Confirm advanced settings.

The information on the **Advanced Settings** page is for confirmation only and cannot be modified. After confirming the information, click **Next**.

| Create Synchronization | O Configure Source and Destination Databases | (3) Set Synchronization Task | Advanced Settings | ⑤ Process Data | 6 Check Task | ⑦ Confirm Task | | |
|--------------------------------|--|------------------------------|-------------------|----------------|--------------|----------------|--|--|
| Basic Information | | | | | | | | |
| Task ID | 5b99e983-f78a-42c9-aa73-ba921d1jb20r | Task Name | DRS-test-info | | | | | |
| Created | Dec 30, 2021 16:50:36 GMT+08:00 | Source Database IP | | | | | | |
| Destination Database Name | Auto-drs-gaussdbv5-tar-1 | Destination Database IP Port | :8000 | | | | | |
| Full Synchronization S | Settings | | | | | | | |
| * Synchronization Object Type | 💌 Table structure 💌 Data 💌 Constraint(excluding foreig | n keys) | | | | | | |
| * Stream Mode | 0 | | | | | | | |
| * Concurrent Export Tasks | - 8 + Ø | | | | | | | |
| * Concurrent Import Tasks | - a + 0 | | | | | | | |
| * Import Mode | COPY INCERT | | | | | | | |
| * Rows per Shard | 520000 | | | | | | | |
| Incremental Data Cap | oture Settings | | | | | | | |
| * Concurrent Log Capture Tasks | - 1 + O | | | | | | | |
| Incremental Replay Se | ettings | | | | | | | |
| * Concurrent Replay Tasks | - 64 + 🕐 | | | | | | | |
| rice: | | | | | | Previous Next | | |

Step 9 Process data.

On the **Processing Columns** tab, select the column to be synchronized and change its name, for example, change **c1** to **new-line**.

1. Click **Edit** next to the table to be processed.



2. Edit the **c1** column.

| Database | Name: test_info Table Nar | ne: test_table | | Enter a column name | Q | С |
|----------|---------------------------|----------------|-------------------|---------------------|---|---|
| | Column Name | Column Name | Туре | Constraint Type | | |
| | d | ₫ | int(11) | Primary Key | | Î |
| | at | | char(10) | | | |
| | :10 | | mediumtext | | | |
| | :11 | | longtext | | | |
| | :12 | | enum('1','2','3') | | | |
| | :13 | | set('1','2','3') | | | |
| | :14 | | tinyint(4) | | | |
| - | | | 10 - CAN. | | | |
| | | Confirm | Cancel | | | |

- 3. Enter the new name **new-line** and click **Confirm**.
- 4. Click **Next**.

Step 10 Perform a pre-check.

- 1. After all settings are complete, perform a pre-check to ensure that the synchronization is successful.
- 2. If any check item fails, review the cause and rectify the fault. Then, click **Check Again**.

| Check Again | |
|---|--|
| Check success rate 100% All checks must pass before you can continue. If a | any check requires confirmation, check and confirm the results before proceeding to the next step. |
| Check Item | Check Result |
| Database parameters | |
| Whether the source database contains unsupported table field types | Passed |
| Whether the destination database is compatible with the source database | Passed |
| Whether the character set of the source database matches that of the destination database | Passed |
| Whether the destination database has sufficient available connections | Passed |
| Whether the selected objects exist in the destination database | Passed |
| Whether the destination database contains the configured databases | Passed |
| Whether there are source database foreign keys | Passed |
| Whether tables to be migrated contain primary keys | Passed |
| Whether existing data meets the constraints | Passed |
| Whether the source database character set is supported | Passed |
| Whether the source database has sufficient available connections | Passed |
| Whether the source database container type is correct | Passed |
| Whether archive logs are enabled on the source database | Passed |
| Whether the source database name is valid | Passed |
| Whether the supplementary log is enabled for the source database. | Passed |
| Whether OGG log reading is enabled on the source database | Passed |
| Whether the source database table name is valid | Passed |

3. If all check items pass the pre-check, click **Next**.

Step 11 Confirm the task.

1. Check that all configured information is correct.

| Start Time | Start upon task creation Sta | t at a specified time 🛛 💿 | | | | | |
|---|------------------------------|--|--|--|--|--|--|
| Seed hothstates Image: The district DRS skerns, such as san Marke high Danny, and Please, sand the restead. + Strap Maximum Data Adar Image: The district DRS skerns, such as san Marke high Danny, and Please, sand the restead. | | | | | | | |
| Details | | | | | | | |
| Product Name | Configuration | | | | | | |
| | Task Information | | | | | | |
| | Name | DBS-test-info | | | | | |
| | Description | Source Database IP Address or Domain Name: 10.154.219.69 Destination DB Instance Name: Auto-drs-gaussibly5-tar-1 | | | | | |
| | Synchronization Mode | Full-incremental synchronization | | | | | |
| | Data Flow | To the cloud | | | | | |

- 2. Click **Submit**. In the display box, select **I have read the precautions**.
- 3. Click **Submit**.



Step 12 After the task is submitted, view and manage it.

After the task is created, return to the task list to view the status of the created task.

----End

Verifying Data After Synchronization

When the task status changes to **Incremental**, the full synchronization is complete. You can log in GaussDB and view the data synchronization result.

Step 1 Wait until the synchronization task status becomes Incremental.

| 4287c148-9e66-4e6b-bf94-8285e4 | C Incremental | 5.14s | Yes | To the cl |
|--------------------------------|---------------|-------|-----|-----------|
| | | | | |

- **Step 2** Click the task name to go to the **Basic Information** page.
- **Step 3** Verify data consistency.
 - 1. Choose **Synchronization Comparison** > **Object-Level Comparison** to view the database and table synchronization results.

| Basic Information | You ca | an edit this task. | | | | | |
|----------------------|--------|----------------------------|--------------------------|---------------------------------|-----------------------------|-------------------------------------|-------------------|
| Synchronization | | | | | | | |
| Comparison | | | | | | | |
| companion | Objec | t-Level Comparison | Data-Level Compar | ison | | | |
| Synchronization | | | | | | | |
| Progress | In the | many to one synchronizatio | n sconario, the numbers | of objects in the source and de | stination databases and con | anarison result displayed are based | on the actual c |
| | in the | many-to-one synchronizatio | in scenario, che numbers | or objects in the source and de | schacion databases and con | iparison result displayed are based | i on the actual t |
| Brocoss Data | | | | | | | |
| FIOLESS Data | Item | | | Source Database | | Destination Database | |
| | | | | | | | |
| Synchronization | | | | | | | |
| Mapping | | | | | | | |
| | | | | | | 6.1 | |
| Synchronization Logs | | | | | | | |
| | | | | | | ×2 | |
| Abnormal Records | | | | | | | |
| Abitorinal Records | | | | | | | |
| - | | | | | | No data avail | able |
| Tags | | | | | | | |

 Choose Synchronization Comparison > Data-Level Comparison, click Create Comparison Task, and view the synchronization results of the rows in the table. Create Comparison Task

| ereute compa | born rusic | | | |
|--|---|--|--------------------------|--|
| Some comparison resu comparison during off- | ilts may be inconsistent because d -peak hours so that you can get a | ata changes during the comparison can n accurate comparison result. | not be synchronized to t | he destination in real time. You are advised to select a scheduled time to start the |
| * Comparison Type | Row | | | |
| * Comparison Time | Start upon task creation | Start at a specified time | | |
| * Object | If any data in the source databa | se changes, click the refresh button belo | w. | |
| | 0 | Select All | С | Select All |
| | For tables, only expanded da | atabases are searched. Q | | For tables, only expanded databases are searched. |
| | 😑 🗹 TEST_INFO | database | | |
| | DATATYPELIST | (New name: DATATY table | | |
| | | | » | |
| | | | * | |
| | | | | |
| | | | Cancel | |

Step 4 Connect to test_database_info in GaussDB using DAS.

For details about how to connect to an instance through DAS, see **Adding Login Information**.

Step 5 Run the following statement to query the full synchronization result: SELECT * FROM test_info.datatypelist_after;

After the schema in MySQL is synchronized, it will be used as the schema in GaussDB. Therefore, it is required to add the schema in the query statement for exact query.

All data types in the table were successfully synchronized and the data is correct.

Step 6 Verify incremental synchronization.

In full+incremental synchronization, after the full synchronization is complete, the data that is written to the source database after the task is created can still be synchronized to the destination database until the task is stopped. The following describes how to synchronize incremental data from the source database to the destination database.

- 1. Use a database connection tool to connect to the source MySQL database based on its IP address.
- 2. Run the following statement to insert a data record into the source database:

Insert a data record whose ID is 3.

```
insert into test_info.test_table values
(3,'a','b','111','111','tinyblob','mediumblob','longblob','tinytext','text','mediumtext','longtext','1','3',1,2,3,4,
1.123,1.1234,'2024-03-08','2024-03-08 08:00:00','2024-03-08
08:00:00','08:00:00','2024','1010','{"a":"b"}',1.23,1.234);
```

3. Run the following statement in the destination database to query the result: SELECT * FROM test_info.datatypelist_after;

The new data in the source database has been synchronized to the destination database in real time.

Step 7 Stop the synchronization task.

After data is completely synchronized to the destination database, stop the synchronization task.

1. Locate the task and click **Stop** in the **Operation** column.

2. In the display box, click **Yes**.

----End

4.5 From On-premises Oracle to GaussDB Distributed

4.5.1 Purpose

Description

You can use real-time synchronization of DRS to synchronize on-premises Oracle to Huawei Cloud GaussDB. Full+incremental synchronization can ensure that data is always in sync between the source Oracle and the destination GaussDB.

Problems

- With the rapid increase of enterprise workloads, traditional databases have poor scalability and distributed databases are required.
- Building traditional databases require purchasing and install servers, systems, databases, and other software. Its O&M is expensive and difficult.
- The performance of complex queries for traditional databases is poor.
- It is hard for traditional databases to smoothly migrate data without interrupting services.

Migration Architecture



Migration Principles

Perform the following operations to complete full and incremental synchronization:

1. In the full synchronization phase, migrate tables, primary keys, and unique keys.

- 2. Start incremental data extraction to ensure that the incremental data generated during full data synchronization is completely extracted to the DRS instance.
- 3. Start the full migration task.
- 4. Automatically perform incremental synchronization after the full migration is complete. The playback starts from the location where the full migration starts.
- 5. Start the comparison task after the incremental replay is complete to check the data consistency. Real-time comparison is supported.
- 6. Start migration if the data is consistent.



Service List

- Virtual Private Cloud (VPC)
- GaussDB
- Data Replication Service (DRS)
- Data Admin Service (DAS)

Notes on Usage

- The resource planning in this document is for demonstration only. Adjust it as needed.
- The end-to-end test data in this document is for reference only.
- Full synchronization is used to migrate data. Incremental synchronization is used to synchronize data between the source and destination databases in real time.

Prerequisites

- You have registered with Huawei Cloud and completed account authentication.
- Your account balance is greater than or equal to \$0 USD.
- You have set up an on-premises Oracle database for testing.
- You have obtained the IP address, port number, account, and password of the Oracle database to be migrated.

4.5.2 Resource Planning

| | Resource | ptanning | | | |
|--------------|-------------------------|---|---|--|--|
| Categor y | Subcat egory | Planned Value | Remarks | | |
| VPC | VPC name | vpc-src-172 | Customize a name for easy identification. | | |
| | Region | Test region | For low network latency and quick resource access, select the region nearest to you. | | |
| | AZ | AZ3 | - | | |
| | Subnet | 172.16.0.0/16 | Select a subnet with sufficient network resources. | | |
| | Subnet name | subnet-src-172 | Customize a name for easy identification. | | |
| Oracle | Name | orcl | Customize a name for easy identification. | | |
| | Specifi cations | 16 vCPUs 32 GB | - | | |
| | Databa se version | 11.2.0.1 | - | | |
| | Databa se user | test_info | Customize a user. However, the user must have the following permissions during migration: CREATE SESSION, SELECT ANY TRANSACTION, SELECT ANY TABLE, SELECT ANY DICTIONARY, and EXECUTE_CATALOG_ROLE. | | |
| GaussDB | Instanc e name | Auto-drs-gaussdbv5- tar-1 | Customize a name for easy identification. | | |
| | Databa se version | GaussDB 1.3 Enterprise Edition | - | | |
| | lnstanc e type | Distributed (1 CN, 3 DN shards, and 3 replicas) | Select a distributed instance for the test. | | |
| | Deploy ment model | Independent | - | | |

Table 4-21 Resource planning

| Categor y | Subcat egory | Planned Value | Remarks |
|--------------------------------|------------------------------------|--|--|
| | Transa ction consist ency | Strong consistency | - |
| | Shards | 3 | - |
| | Coordi nator nodes | 3 | - |
| | Storag e type | Ultra-high I/O | - |
| | AZ | AZ2 | Select a single AZ for the test. You are advised to select multiple AZs to improve instance availability in actual use. |
| | Instanc e specific ations | General-enhanced II 8 vCPUs 64 GB | Select small specifications for the test. You are advised to configure specifications based on service requirements in actual use. |
| | Storag e space | 480G | Select a small storage space for the test. You are advised to configure storage space based on service requirements in actual use. |
| | Disk encryp tion | Disable | In this example, disk encryption is disabled. Enabling disk encryption improves data security, but slightly affects the read and write performance of the database. |
| Logging in to the | DB engine | GaussDB | - |
| databas e through DAS | Databa se source | GaussDB | Select the GaussDB instance created in this example. |
| | Databa se name | postgres | - |
| | Userna me | root | - |

| Categor y | Subcat egory | Planned Value | Remarks |
|---------------------------|---|--------------------|---|
| | Passwo rd | - | Password of the root user of the GaussDB instance created in this example |
| DRS migratio n task | Migrati on task name | DRS-test-info | Customize a name for easy identification. |
| | Destin ation databa se name | test_database_info | Customize a name for easy identification, but the name must be compatible with the Oracle database name. |
| | Source DB engine | Oracle | - |
| | Destin ation DB engine | GaussDB | - |
| | Netwo rk type | Public | Select the public network for the test. |

4.5.3 Operation Process

Figure 4-30 shows the main operation flowchart.



4.5.4 Creating a VPC and Security Group

Create a VPC and security group for a GaussDB instance.

Creating a VPC

- **Step 1** Log in to the management console.
- **Step 2** Click ¹ in the upper left corner and select a region.
- **Step 3** Click in the upper left corner of the page and choose **Networking** > **Virtual Private Cloud**.

The VPC console is displayed.

4 Real-Time Synchronization

| ≡ | Service List | Enter a service or function name. | | | | Q | |
|-------------|-----------------------------|--|----------|---------------------------------------|---------|---------------------------|-----------------|
| | Elastic Cloud Server | Recently Visited Services: Virtual Private C | loud | Distributed Database Middleware | GaussDB | Document Database Service | Relational Data |
| & | Relational Database Service | Compute | | Storage | | Networking | |
| 000 | Auto Scaling | Elastic Cloud Server | # | Elastic Volume Service | | Virtual Private Cloud | |
| 1.000 | | Bare Metal Server | | Dedicated Distributed Storage Service | | Elastic Load Balance | |
| | Bare Metal Server | Cloud Phone | | Storage Disaster Recovery Service | | Direct Connect | |
| | Elastic Volume Service | Image Management Service | | Cloud Server Backup Service | | Virtual Private Network | |
| 5 | Volume Backup Service | FunctionGraph | | Cloud Backup and Recovery | | Domain Name Service | |
| | Votarne backup Service | Auto Scaling | | Volume Backup Service | | NAT Gateway | |
| Ó | Virtual Private Cloud | Dedicated Cloud | | Object Storage Service | | Elastic IP | |
| \triangle | Elastic Load Balance | Dedicated Host | | Data Express Service | | Cloud Connect | |
| æ | Domain Registration | | | Scalable File Service | | VPC Endpoint | |

Step 4 Click Create VPC.

| Basic Information | |
|--------------------------|--|
| Region | ♦ CN North-Beijing1 ▼ |
| | Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
| Name | vpc-01 |
| CIDR Block | 192 · 168 · 0 · 0 / 16 • |
| | Recommended: 10.0.0.0/8-24 (Select) 172.16.0.0/12-24 (Select) 192.168.0.0/16-24 (Select) |
| | A The CIDR block 192.168.0.0/16 overlaps with a CIDR block of another VPC in the current region. If you intend to enable communication between VPCs or between a VPC and an on-premises data center, change the CIDR block. View VPC CIDR blocks in current region |
| Enterprise Project | Select C Create Enterprise Project |
| Default Sub AZ | AZ3 |
| Name | subnet-1d4e |
| CIDR Block | 192 ⋅ 168 ⋅ 0 / 24 マ ? Available IP Addresses: 251 The CIDR block cannot be modified after the subnet has been created. |
| Associated Ro | ute Table Default 🕐 |
| Advanced Sett | tings 👻 Gateway DNS Server Address DHCP Lease Time Tag Description |
| | |

🕂 Add Subnet

Step 5 Configure parameters as needed and click **Create Now**.

Step 6 Return to the VPC list and check whether the VPC is created.

If the VPC status becomes available, the VPC has been created.

----End

×

Creating a Security Group

Step 1 Log in to the management console.

- **Step 2** Click O in the upper left corner and select a region.
- **Step 3** Click in the upper left corner of the page and choose **Networking** > **Virtual Private Cloud**.

The VPC console is displayed.

| \equiv | Service List | Enter a service or function name. | | | | Q | |
|------------|-----------------------------|--|-------|---------------------------------------|---------|---------------------------|-----------------|
| | Elastic Cloud Server | Recently Visited Services: Virtual Private | Cloud | Distributed Database Middleware | GaussDB | Document Database Service | Relational Data |
| ക | Relational Database Service | Compute | | Storage | | Networking | |
| 00 | Auto Scaling | Elastic Cloud Server | | Elastic Volume Service | | Virtual Private Cloud | * |
| , | 5 | Bare Metal Server | | Dedicated Distributed Storage Service | | Elastic Load Balance | |
| | Bare Metal Server | Cloud Phone | | Storage Disaster Recovery Service | | Direct Connect | |
| | Elastic Volume Service | Image Management Service | | Cloud Server Backup Service | | Virtual Private Network | |
| 5 | Volume Backup Seprice | FunctionGraph | | Cloud Backup and Recovery | | Domain Name Service | |
| | Votume backup service | Auto Scaling | | Volume Backup Service | | NAT Gateway | |
| Ó | Virtual Private Cloud | Dedicated Cloud | | Object Storage Service | | Elastic IP | |
| Δ | Elastic Load Balance | Dedicated Host | | Data Express Service | | Cloud Connect | |
| \bigcirc | Domain Registration | | | Scalable File Service | | VPC Endpoint | |

- **Step 4** Choose **Access Control** > **Security Groups**.
- Step 5 Click Create Security Group.
- **Step 6** Configure parameters as needed.

| Create | Security | Group |
|--------|----------|-------|
|--------|----------|-------|

| * Name | sg-01 |
|----------------------|---|
| ★ Enterprise Project | default C Create Enterprise Project (?) |
| * Template | General-purpose web server 🔹 |
| Description | The security group is for general-purpose web servers and includes default rules that allow all inbound ICMP traffic and inbound traffic on ports 22, 80, 443, and 3389. The security group is used for remote login, ping, and hosting a website on ECSs. |
| | 0/255 |
| Show Default Rule | * |
| | OK Cancel |



Step 8 Return to the security group list and click the security group name.

Step 9 Click the **Inbound Rules** tab, and then click **Add Rule**.

| Summary Inbound Ru | les Outbound Rules Associate | d Instances |
|--------------------|------------------------------|---|
| Add Rule Fast-Add | Rule Delete Allow Common Por | 5 Inbound Rules: 3 Learn more about security group configuration. |

Step 10 Configure an inbound rule, add the IP address of the source database, and click **OK**.

| Add Inbound Rule | | | | × | | | | | | |
|--|---|-----------------------------|-------------|--------------------|--|--|--|--|--|--|
| 1 If you select IP address for Source, you can enter multiple IP addresses in the same IP address box. Each IP address represents a different security group rule. | | | | | | | | | | |
| Security Group defined_securit You can import multiple rules in a b | Security Group defined_security_group You can import multiple rules in a batch. | | | | | | | | | |
| Туре | Protocol & Port (?) | Source | Description | Operation | | | | | | |
| IPv4 · | Protocols/TCP (Custo Example: 22 or 22,24 or 22-3 | IP address ▼ 0.0.0.0/0 ◎ | | Replicate Delete | | | | | | |
| | | Add Rule Cancel | | | | | | | | |
| | | | | | | | | | | |

----End

4.5.5 Creating a GaussDB Instance

This section describes how to create a GaussDB instance as the destination database.

- **Step 1** Log in to the **management console**.
- **Step 2** Click ^I in the upper left corner and select a region.
- **Step 3** Under the service list, choose **Databases** > **GaussDB**.
- Step 4 Click Buy DB Instance.
- **Step 5** Configure the instance name and basic information.

| Billing Mode | Yearly/Monthly Pay-per-use |
|---------------------------|--|
| Region | Y |
| | Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
| | |
| DB Instance Name | gaussea63 |
| DB Engine | GaussO8 |
| DB Engine Version | 1.4 Enterprise Edition 2.7 Enterprise Edition |
| DB Instance Type | Distributed Primary/Standby |
| Deployment Model 🕥 | Independent |
| Transaction Consistency 🕥 | Strong consistency Eventual consistency |
| Replicas 🕜 | - 3 + |
| Shards | - 3 + |
| Coordinator Nodes | - 3 + |
| | If Coordinator Nodes is set to 1, the instance can only be used for testing. |
| AZ | AZ3 AZ1 AZ2 |
| | Only one or three AZs can be selected. |
| Time Zone | (UTC+06:00) Beijing, Chongging, Hong Kon 🔻 |

Step 6 Configure instance specifications.

| Instance Specifications ⑦ | General-enhanced II |
|---------------------------|--|
| | Flavor Name |
| | 8 vCPUs 64 GB Unavailable for production environment |
| | O 16 vCPUs 128 GB |
| | 32 vCPUs 256 GB (Sold Out) |
| | 64 vCPUs 512 GB (Sold Out) |
| | DB Instance Specifications General-enhanced II 8 vCPUs 64 GB |
| Storage Type | Ultra-high I/O Learn more about storage types. |
| | 480 GB |
| Storage Space (GB) | |
| | 480 9,950 19,450 28,950 48,000 |
| Disk Encryption | Disable Enable ? |

Select small specifications for the test. You are advised to configure specifications based on service requirements in actual use.

Step 7 Select a VPC and security group (created in **Creating a VPC and Security Group**) for the instance and configure the database port.



Step 8 Configure password and other information.

| Administrator | root | |
|------------------------|---|---|
| Administrator Password | | Keep your password secure. The system cannot retrieve your password. |
| Confirm Password | | |
| | | - |
| Parameter Template | | C View Parameter Template |
| Enterprise Project ⑦ | Select 🔻 | C Create Enterprise Project |
| | | |
| Tag | It is recommended that you use TMS's predefined tag | function to add the same tag to different cloud resources. ${f C}$ View predefined tags |
| | Tag key Tag value | |
| | You can add 20 more tags. | |

- Step 9 Click Next, confirm the information, and click Submit.
- **Step 10** Go to the instance list.

If the instance status becomes available, the instance has been created.

----End

4.5.6 Generating Test Data

Before the synchronization, prepare some data types in the source database for verification after the synchronization is complete.

The following table lists data types supported by DRS.

| Source Data Type | Destinati on Data Type | Sync (Sourc e Data Type as Primar y Key) | Sync (Source Data Type as Non- Primary Key) | Comparis on (Source Data Type as Primary Key) | Comparis on (Source Data Type as Non- Primary Key) | Remarks |
|------------------------|------------------------------|--|---|--|--|---------|
| CHAR | character | Suppor ted | Supporte d | Supported . The spaces before and after the character are ignored. | Supported. The spaces before and after the character are ignored. | - |

Table 4-22 Data type mapping

| Source Data Type | Destinati on Data Type | Sync (Sourc e Data Type as Primar y Key) | Sync (Source Data Type as Non- Primary Key) | Comparis on (Source Data Type as Primary Key) | Comparis on (Source Data Type as Non- Primary Key) | Remarks |
|------------------------|------------------------------|--|---|--|--|--|
| VARCH AR | character varying | Suppor ted | Supporte d | Supported | Supported | The precision ranges of the source and destination databases are different, causing precision loss. |
| VARCH AR2 | character varying | Suppor ted | Supporte d | Supported | Supported | - |
| NCHAR | character | Suppor ted | Supporte d | Supported . The spaces before and after the character are ignored. | Supported. The spaces before and after the character are ignored. | - |
| NVARC HAR2 | nvarchar2 | Suppor ted | Supporte d | Supported | Supported | - |
| NUMBE R | numeric | Suppor ted | Supporte d | Supported | Supported | - |
| NUMBE R (6,3) | numeric(6,3) | Suppor ted | Supporte d | Supported | Supported | - |
| NUMBE R (6,0) | Integer | Suppor ted | Supporte d | Supported | Supported | - |
| NUMBE R (3) | smallint | Suppor ted | Supporte d | Supported | Supported | - |
| NUMBE R (6,-2) | integer | Suppor ted | Supporte d | Supported | Supported | - |

| Source Data Type | Destinati on Data Type | Sync (Sourc e Data Type as Primar y Key) | Sync (Source Data Type as Non- Primary Key) | Comparis on (Source Data Type as Primary Key) | Comparis on (Source Data Type as Non- Primary Key) | Remarks |
|------------------------|------------------------------|---|---|---|--|--|
| BINARY _FLOAT | real | Unsup ported (The destin ation databa se does not suppor t creatin g tables using the primar y key.) | Supporte d | Unsupport ed | Supported | The precision ranges of the source and destination databases are different, causing precision loss. |
| BINARY _DOUB LE | double precision | Unsup ported (The destin ation databa se does not suppor t creatin g tables using the primar y key.) | Supporte d | Unsupport ed | Supported | - |

| Source Data Type | Destinati on Data Type | Sync (Sourc e Data Type as Primar y Key) | Sync (Source Data Type as Non- Primary Key) | Comparis on (Source Data Type as Primary Key) | Comparis on (Source Data Type as Non- Primary Key) | Remarks |
|------------------------|------------------------------|---|---|---|--|--|
| FLOAT | real | Unsup ported (The destin ation databa se does not suppor t creatin g tables using the primar y key.) | Supporte d | Unsupport ed | Supported | The precision ranges of the source and destination databases are different, causing precision loss. |
| INT | numeric | Suppor ted | Supporte d | Supported | Supported | - |
| INTEGE R | numeric | Suppor ted | Supporte d | Supported | Supported | - |

| Source Data Type | Destinati on Data Type | Sync (Sourc e Data Type as Primar y Key) | Sync (Source Data Type as Non- Primary Key) | Comparis on (Source Data Type as Primary Key) | Comparis on (Source Data Type as Non- Primary Key) | Remarks |
|------------------------|--|--|---|---|--|---|
| DATE | date | Suppor ted | Supporte d | Unsupport ed | Supported | If a table with date type is created in the destination database, the data type precision range in the source database is different from that in the destination database, causing precision loss. Therefore, compariso n is not supported. |
| TIMEST AMP | timestam p(6) without time zone | Suppor ted | Supporte d | Unsupport ed | The value is accurate to six decimal places. | The maximum precision supported by the source database is 6. |

| Source Data Type | Destinati on Data Type | Sync (Sourc e Data Type as Primar y Key) | Sync (Source Data Type as Non- Primary Key) | Comparis on (Source Data Type as Primary Key) | Comparis on (Source Data Type as Non- Primary Key) | Remarks |
|------------------------|------------------------------------|---|---|---|--|---|
| TIMEST AMP_T Z | timestam p(6) with time zone | Unsup ported (The source databa se does not suppor t creatin g tables using the primar y key.) | Supporte d | Unsupport ed | Filter this column. | - |
| TIMEST AMP_LT Z | timestam p(6) with time zone | Unsup ported (The destin ation databa se does not suppor t creatin g tables using the primar y key.) | Supporte d | Unsupport ed | Filter this column. | - |
| INTERV AL_YM | interval year to month | Suppor ted | Supporte d | Unsupport ed | Unsupport ed | Incrementa l synchroniz ation does not support this type. |

| Source Data Type | Destinati on Data Type | Sync (Sourc e Data Type as Primar y Key) | Sync (Source Data Type as Non- Primary Key) | Comparis on (Source Data Type as Primary Key) | Comparis on (Source Data Type as Non- Primary Key) | Remarks |
|------------------------|------------------------------|--|---|---|--|--|
| INTERV AL_DS | interval day to second | Suppor ted | Supporte d | Unsupport ed | Unsupport ed | Incrementa l synchroniz ation does not support this type. The maximum precision supported by the source database is 6. |
| BLOB | bytea | Unsup ported (The source databa se does not suppor t creatin g tables using the primar y key.) | Supporte d | Unsupport ed | Filter this column. | - |

| Source Data Type | Destinati on Data Type | Sync (Sourc e Data Type as Primar y Key) | Sync (Source Data Type as Non- Primary Key) | Comparis on (Source Data Type as Primary Key) | Comparis on (Source Data Type as Non- Primary Key) | Remarks |
|------------------------|------------------------------|--|---|---|--|---------|
| CLOB | text | Unsup ported (The source databa se does not suppor t creatin g tables using the primar y key.) | Supporte d | Unsupport ed | Filter this column. | - |
| NCLOB | text | Unsup ported (The source databa se does not suppor t creatin g tables using the primar y key.) | Supporte d | Unsupport ed | Filter this column. | - |

| Source Data Type | Destinati on Data Type | Sync (Sourc e Data Type as Primar y Key) | Sync (Source Data Type as Non- Primary Key) | Comparis on (Source Data Type as Primary Key) | Comparis on (Source Data Type as Non- Primary Key) | Remarks |
|------------------------|------------------------------|--|---|---|--|---------|
| LONG | text | Unsup ported (The source databa se does not suppor t creatin g tables using the primar y key.) | Supporte d | Unsupport ed | Filter this column. | - |
| LONG_ RAW | bytea | Unsup ported (The source databa se does not suppor t creatin g tables using the primar y key.) | Supporte d | Unsupport ed | Filter this column. | - |

| Source Data Type | Destinati on Data Type | Sync (Sourc e Data Type as Primar y Key) | Sync (Source Data Type as Non- Primary Key) | Comparis on (Source Data Type as Primary Key) | Comparis on (Source Data Type as Non- Primary Key) | Remarks |
|------------------------|------------------------------|---|---|---|--|---|
| RAW | bytea | Unsup ported (The destin ation databa se does not suppor t creatin g tables using the primar y key.) | Supporte d | Unsupport ed | Supported | - |
| RowID | character varying(1 8) | Suppor ted | Supporte d | Supported | Supported | - |
| BFILE | - | Unsup ported | Unsuppo rted | Unsupport ed | Unsupport ed | Restriction s on the source database: The bfile type is not supported. |
| XMLTYP E | - | Unsup ported | Unsuppo rted | Unsupport ed | Unsupport ed | Restriction s on the source database: The xmltype type is not supported. |

| Source Data Type | Destinati on Data Type | Sync (Sourc e Data Type as Primar y Key) | Sync (Source Data Type as Non- Primary Key) | Comparis on (Source Data Type as Primary Key) | Comparis on (Source Data Type as Non- Primary Key) | Remarks |
|------------------------|------------------------------|--|---|---|--|--|
| UROWI D | - | Unsup ported | Unsuppo rted | Unsupport ed | Unsupport ed | Full and incrementa l synchroniz ations are not supported. |
| sdo_ge ometry | - | Unsup ported | Unsuppo rted | Unsupport ed | Unsupport ed | Restriction s on the source database: The sdo_geome try type is not supported. |
| NUMBE R(*, 0) | numeric | Suppor ted | Supporte d | Supported | Supported | - |

Perform the following steps to generate data in the source database:

- **Step 1** Use a database connection tool to connect to the source Oracle database based on its IP address.
- Step 2 Construct data in the source database based on data types supported by DRS.
 - 1. Create a test user.

create user *test_info* identified by *xxx*;

test_info indicates the user created for the test, and *xxx* indicates the password of the user.

- Assign permissions to the user.
 grant dba to test_info;
- 3. Create a data table under the user.

CREATE TABLE *test_info.DATATYPELIST*(ID INT, COL_01_CHAR____E CHAR(100), COL_02_NCHAR___E NCHAR(100), COL_03_VARCHAR__E VARCHAR(1000), COL_04_VARCHAR2_E VARCHAR2(1000), COL_05_NVARCHAR2_E NVARCHAR2(1000),

COL_06_NUMBER____E NUMBER(38,0),

COL_07_FLOAT____E FLOAT(126),

COL_08_BFLOAT____E BINARY_FLOAT,

COL_09_BDOUBLE___E BINARY_DOUBLE,

COL_10_DATE____E DATE DEFAULT SYSTIMESTAMP,

COL_11_TS____E TIMESTAMP(6),

COL_12_TSTZ____E TIMESTAMP(6) WITH TIME ZONE,

COL_13_TSLTZ____E TIMESTAMP(6) WITH LOCAL TIME ZONE,

COL_14_CLOB _____E CLOB DEFAULT EMPTY_CLOB(),

COL_15_BLOB____E BLOB DEFAULT EMPTY_BLOB(),

COL_16_NCLOB____E NCLOB DEFAULT EMPTY_CLOB(),

COL_17_RAW____E RAW(1000),

COL_19_LONGRAW___E LONG RAW,

COL_24_ROWID____E ROWID,

PRIMARY KEY(ID)

);

4. Insert two rows of data.

insert into test_info.DATATYPELIST values(4,'huawei','xian','shanxi','zhongguo','shijie', 666,12.321,1.123,2.123,sysdate,sysdate,sysdate,sysdate,'hw','cb','df','FF','FF ','AAAYEVAAJAAAACrAAA');

insert into test_info.DATATYPELIST values(2,'Migratetest','test1','test2','test3','test4', 666,12.321,1.123,2.123,sysdate,sysdate,sysdate,sysdate,'hw','cb','df','FF','FF ','AAAYEVAAJAAAACrAAA');

5. Make the above statements take effect. **commit:**

Step 3 Create a database at the destination server.

- 1. Log in to the management console.
- 2. Click 🖤 in the upper left corner and select a region.
- 3. Click in the upper left corner of the page and choose **Databases** > **Data Admin Service**.
- 4. In the navigation pane on the left, click **Development Tool** to go to the login list page.
- 5. Click Add Login.
- On the displayed page, select the DB engine, source database, and target DB instance, enter the login username, password, and description (optional), and enable Collect Metadata Periodically and Show Executed SQL Statements.
 If Collect Metadata Periodically is enabled, select Remember Password.
- 7. Click **Test Connection** to check whether the connection is successful.

If a message is displayed indicating connection successful, continue with the operation. If a message is displayed indicating connection failed and the failure cause is provided, make modifications according to the error message.

- 8. Click **OK**.
- 9. Locate the added instance, click **Log In** in the **Operation** column.

| Add Login | | All DB Insta | nces 🔻 | | Enter an Instan |
|----------------|--|-----------------|----------------|----------|--|
| 08 Instance JΞ | DB Engine Version JΞ | Source Database | Login Username | Remember | Description ↓Ξ |
| | Auto-drs-gaussdbv5-tar-1(172.16.24.234:8000/test_database_info) | GaussDB | root | Yes | @ |
| | Auto-drs-gaussdbv5HA-src-1(192.168.100.73,192.168.100.8,192.168.100.192.8000/postgres) | GaussDB | root | Yes | 🖉 |
| | Auto-drs-gaussdbv5-src-2(192.168.100.241:8000/postgres) | GaussDB | root | Yes | 🖉 |
| | Auto-drs-gaussdbv5HA-star-1(192.168.100.57,192.168.100.157,192.168.100.194.8000/postgr | GaussDB | root | Yes | created by sync rds instance $\underline{\mathscr{Q}}$ |
| | Auto-drs-gaussdbv5HA-src-2(192.168.100.89,192.168.100.55,192.168.100.10.8000/postgres) | GaussDB | root | Yes | created by sync rds instance $ ot\!\!\!\!/$ |
| | Auto-drs-gaussdbv5-src-1 (192.168.0.97.8000/postgres) | GaussDB | root | Yes | created by sync rds instance $\underline{\mathscr{Q}}$ |
| | Auto-drs-gaussdbv5-tar-1(172.16.24.234/8000/postgres) | GaussDB | root | Yes | created by sync rds instance 🖉 |

10. Choose SQL Operations > SQL Window on the top menu bar.

| Da Ad | ta min Service | | SQL Operations | Database Management | Import and Export | Account Management | |
|----------|------------------------------|------------------|----------------|------------------------|----------------------|------------------------|-------------|
| Home | SQL History χ | SQL Window X | SQL Window | int-t X SQL I | Nindow X | | |
| G Cur | rrent Database t auto | o_db () ∣ instan | SQL History | i-tar-1 172.16.24.23 | 4.8000 Character S | iet: UTF8 Time Zone: | Elo'GMT-8 V |

 Run the following statement to create a database compatible with Oracle: test_database_info indicates the database name. Replace it based on the site requirements.

CREATE DATABASE test_database_info DBCOMPATIBILITY 'ORA';

----End

4.5.7 Synchronizing Databases

This section describes how to create a DRS instance and synchronize data from the **test_info** database on the local Oracle to the **test_database_info** database on GaussDB instance.

Pre-Check

Before creating a task, check the synchronization conditions.

Before synchronization, refer to **Precautions**.

Creating a Synchronization Task

- **Step 1** Log in to the **management console**.
- **Step 2** Click **O** in the upper left corner and select a region.

Select the region where the destination instance is deployed.

Step 3 Click the service list icon on the left and choose Databases > Data Replication Service.

- **Step 4** In the navigation pane on the left, choose **Data Synchronization Management**. On the displayed page, click **Create Synchronization Task**.
- **Step 5** Configure synchronization instance information.
 - 1. Select a region, and project, and enter a task name.

| Create Synchronization Task | Ø | | | | | |
|-----------------------------|--|--|---|---|--------------------------------|----------------|
| O Create Synchronization | ② Configure Source and Destination Databases | (3) Set Synchronization Task | (d) Advanced Settings | (§) Process Data | (6) Check Task | ⑦ Confirm Task |
| Billing Mode | Yearly/Monthly Pay-per-use | | | | | |
| Region | × | | | | | |
| | Regions are geographic areas isolated from each other. | Resources are region-specific and cannot be used across re | gions through internal network connections. For | low network latency and quick resource acce | ss, select the nearest region. | |
| Project | • | | | | | |
| * Task Name | DR5-3627 | 0 | | | | |
| Description | | 0 | | | | |
| | | | | | | |
| | 0/256 | | | | | |

2. Specify Data Flow, Source DB Engine, Destination DB Engine, Network Type, DRS Task Type, , Destination DB Instance, Synchronization Instance Subnet (optional), Synchronization Mode, Specifications, AZ, and Tags (optional).

| Synchronization Instanc | Synchronization Instance Details 💿 | | | | |
|---------------------------------------|--|--|--|--|--|
| The following information cannot be m | udified after you go to the next page. | | | | |
| * Data Flow | To the cloud Out of the cloud Self-built to self-built | | | | |
| | The destination database must be a database in the current cloud. If you want to synchronize data between databases, select To the cloud. | | | | |
| * Source D8 Engine | MySQL Oracle DR2 for LUW DDM MongoDB ProstgreSQL Microsoft SQL Server TIDB | | | | |
| * Destination DB Engine | MySQL DDM Gaundel Division Gaundel Divisionated Gaundel International Gaundel Internationa Gaundel Internationa Gaundel Internationa | | | | |
| * Network Type | Public returnik 🔹 💿 | | | | |
| | DES will automotically bind an EP to the DRS instance and release the EP after the task is complete. | | | | |
| * Destination DB Instance | Select an instance C Wew DB Instance View Uselectable DB Instance | | | | |
| Synchronization Instance Subnet | Select the subset | | | | |
| * Synchronization Mode | Full-Incremental Full Incremental | | | | |
| | This gradronization type synchronizes data in mal time. After a full synchronization initializes the destination database, an incremental synchronization panes logs to ensure data consistency between the source and destination databases. | | | | |

3. Click **Create Now**.

Step 6 Configure the source and destination database information.

1. Enter the IP address, port number, username, and password of the source database.

Click Test Connection.

| G The synchronization instance is being created. This operation takes about 5 to 10 minutes to complete. | | | |
|--|----------------------------------|----------------------------|---|
| Source Database | | | |
| System databases, users, parameters, and | l jobs will not be migrated. You | I need to manually impo | t users and jobs to the destination database and configure parameters in parameter templates of the destination database. |
| IP Address or Domain Name | 10.154.219.69 | | |
| | For a RAC cluster, use a Sca | n IP address and specify ! | Service Name to improve access performance. |
| Port | 1521 | | |
| Database Service Name | orcl | Service Name | |
| PDB Name | • | | |
| Database Username | zhangliang | | |
| Database Password | | <i>k</i> a | |
| SSL Connection | | | |
| | | This button is available | only after the replication instance is created successfully |

2. Enter the username and password of the destination database. Click **Test Connection**.
\times

| Destination Database | | | |
|----------------------|-----------------------|-----------------------------|---|
| DB Instance Name | Auto-drs-gaussdbv5-ta | ar-1 (172.16.24.234:8000) | |
| Database Username | root | | |
| Database Password | | <i>Q</i> | |
| | Test Connection | This button is available or | nly after the replication instance is created successfully. |

3. Click Next. In the displayed box, read the message carefully and click Agree.



I acknowledge that the IP addresses, domain names, ports, usernames, and passwords of involved databases will be temporarily collected and used in this task. These items will be deleted after the task is deleted.

| Agree Cancel |
|--------------|
|--------------|

Step 7 Set the synchronization task.

1. Select the databases and tables of the source database to be migrated. For example, select the **DATATYPELIST** table from the **test_info** database.

| Basic Information | | | |
|---------------------------|---|--|--|
| Task ID | 5b99e983-f78a-42c9-aa73-ba921d1jb20r | Task Name | DRS-test-info |
| Created | Dec 30, 2021 16:50:36 GMT+08:00 | Source Database IP | 10.154.219.69 |
| Destination Database Name | Auto-drs-gaussdbv5-tar-1 | Destination Database IP Port | 172.16.24.234:8000 |
| | | | |
| Flow Control | Yes No 🕥 | | |
| | | | |
| Synchronization Object | Tables Import object file | | |
| | Only some DDL statements can be synchronized. For deta After objects are synchronized, they will be saved in the d | ils, see precautions of the current scena estination database with their names in | ario in Real-Time Synchronization > Before You Start. in all lowercase. |
| | If any data in the source database changes, click the refre Move objects to be migrated from list of unselected object | ish button below. its on left side to the list of selected obj | jects on right side. |
| | ② Select All | C | Select All |
| | test | XQ | For tables, only expanded databases are searched. |
| | + | database | |
| | | database | |
| | + | database | |
| | + | database >>> | |
| | + | database « | |
| | + | database | |
| | + | database | |
| | ÷ | database | |
| | | database | |

2. Locate the database and table, respectively, and click **Edit** to change the database name and table name.

| 0 | Select All | C | | Select All |
|-----------|------------|-----|---|---|
| test_info | | X Q | | For tables, only expanded databases are searched. Q |
| | | | | database |
| | | | | TEST_INFO Edit |
| | | | > | DATATYPELIST Edit |
| | | | _ | |
| | | | ~ | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

×

3. On the displayed box, enter the new name, for example, enter **DATATYPELIST_After** as the new table name.

The name cannot include special characters. Otherwise, an error will be reported during SQL statement execution after the migration.

| New Table Name | | | | | | | |
|-----------------|--|---|---|--|--|--|--|
| 1 The new tab | le will be used in the destination database. | | × | | | | |
| Edit Table Name | DATATYPELIST_After | 0 | | | | | |

4. Confirm the settings and click **Next**.

| 0 | Select All | С | Select All |
|-----------|------------|----|---|
| test_info | × | | For tables, only expanded databases are searched. Q |
| | | | - Ø database |
| | | | TEST_INFO Edit |
| | | >> | DATATYPELIST (New name: DATATYPELIST_After) Edit |
| | | * | |
| | | | |
| | | | |
| | | | |
| | | | 4 |

Step 8 Confirm advanced settings.

The information on the **Advanced Settings** page is for confirmation only and cannot be modified. After confirming the information, click **Next**.

| ① Create Synchronization | (2) Configure Source and Destination Databases | (3) Set Synchronization Task | Advanced Settings | (5) Process Data | (6) Check Task | ⑦ Confirm Task | |
|--------------------------------|---|------------------------------|--------------------|------------------|----------------|----------------|--|
| | | | | | | | |
| Basic Information | | | | | | | |
| Task ID | 5b99e983-f78a-42c9-aa73-ba921d1jb20r | Task Name | DRS-test-info | | | | |
| Created | Dec 30, 2021 16:50:36 GMT+08:00 | Source Database IP | 10.154.219.69 | | | | |
| Destination Database Name | Auto-drs-gaussdbv5-tar-1 | Destination Database IP Port | 172.16.24.234:8000 | | | | |
| | | | | | | | |
| Full Synchronization | Settings | | | | | | |
| * Synchronization Object Type | Table structure V Data V Constraint(excluding forei | gn keys) | | | | | |
| * Stream Mode | 0 | | | | | | |
| * Concurrent Export Tasks | - 8 + 🕲 | | | | | | |
| * Concurrent Import Tasks | - 8 + 🗇 | | | | | | |
| * Import Mode | COPY INSERT | COW IRELAT | | | | | |
| * Rows per Shard | 52000 | | | | | | |
| | | | | | | | |
| Incremental Data Ca | pture Settings | | | | | | |
| * Concurrent Log Capture Tasks | - 1 + 🗇 | | | | | | |
| have been a second second | | | | | | | |
| incremental Replay S | ettings | | | | | | |
| * Concurrent Replay Tasks | - 64 + W | | | | | | |
| Price: | | | | | | Previous Next | |

Step 9 Process data.

On this page, you can process the table to be migrated. Select the column to be migrated and change its name, for example, change **COL_01_CHAR____E** to **new-line**.

1. Select the table to be processed.



2. Edit the COL_01_CHAR____E column.

| Database Nar | me: SYNC_FULL_INCR_VPC | _001 Table Name: COMMON | | Enter a column name | Q |
|--------------|------------------------|-------------------------|--------|---------------------|---|
| 🔽 Colu | umn Name | New Column Name | Туре | Constraint Type | |
| V ID | | | NUMBER | Primary Key | |
| COL | 03 | new_line | NUMBER | | |
| COL | 04 | Edit Column Name | | | |
| COL | 06 | Confirm Cancel | | | |
| COL | 07 | | NUMBER | | |

3. Enter the new name **new-line** and click **Confirm**.

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| Databas | e Name: SYNC_FULL_INCR_VPC | _001 Table Name: COMMON | | Enter a co | olumn name | Q | С |
|---------|----------------------------|-------------------------|--------|------------|-----------------|---|---|
| | Column Name | New Column Name | Туре | | Constraint Type | | |
| ~ | ID | | NUMBER | | Primary Key | | |
| ~ | COL_03 | new_line | NUMBER | | | | |
| ~ | COL_04 | | NUMBER | | | | |
| ~ | COL_06 | | NUMBER | | | | |
| ~ | COL_07 | | NUMBER | | | | |
| ~ | COL_09 | | FLOAT | | | | l |
| ~ | COL_10 | | NUMBER | | | | |
| 10 | ▼ Total Records: 20 < | 1 2 > | | | | | |
| | | Confirm | Cancel | | | | |

4. Click **Next**.

Step 10 Perform a pre-check.

1. After all settings are complete, perform a pre-check to ensure that the migration is successful.

| Basic Information | | | | |
|---|---|---|--|--|
| Task ID | 5b99e983-f78a-42c9-aa73-ba921d1jb20r | Task Name | DRS-test-info | |
| Created | Dec 30, 2021 16:50:36 GMT+08:00 | Source Database IP | 10.154.219.69 | |
| Destination Database Name | Auto-drs-gaussdbv5-tar-1 | Destination Database IP Port | 172.16.24.234:8000 | |
| | | | | |
| Check Again | | | | |
| Check success rate | 4% All checks must pass before | you can continue. If any check requires cor | firmation, check and confirm the results before proceeding to the next step. | |
| We do have | | | | |
| Check Item | | | Check Result | |
| Database parameters | | | Check Result | |
| Database parameters Whether the source database contains in | unsupported table field types | | Check Result | |
| Unex item Database parameters Whether the source database contains i Whether the destination database is con | unsupported table field types mpatible with the source database | | Checking C Checking | |
| Unex item Database parameters Whether the source database contains it Whether the destination database is cor Whether the character set of the source | unsupported table field types mpatible with the source database -database matches that of the destination database | | Checking C Checking C Checking C Checking | |
| Unex item Database parameters Whether the source database contains if Whether the destination database is coi Whether the character set of the source Whether the destination database has a | unsupported table field types mpatible with the source database -database matches that of the destination database unficient available connections | | Checking C Checking C Checking C Checking C Checking | |
| Unick term Database parameters Whether the source database contains of Whether the destination database is con Whether the database at of the source Whether the destination database has s Whether the selected objects exist in th | unsupported table field types mpatble with the source database database matches that of the destination database utificient available connections e destination database | | Checking C Checking C Checking C Checking C Checking C Checking | |
| Unick term Database parameters Whether the source database contains of Whether the destination database is con Whether the database as so Whether the destination database has so Whether the selected objects exist in th Whether the destination database conta | unsupported table field types mpatble with the source database database matches that of the destination database utificient available connections e destination database ains the configured databases | | Checking C Checking C Checking C Checking C Checking C Checking C Checking | |
| Unick term Database parameters Whether the source database contains of Whether the destination database is con Whether the destination database has s Whether the destination database has s Whether the selected objects exist in th Whether the destination database conta Whether there are source database form | unsupported table field types mputble with the source database database matches that of the destination database database matches that of the destination database distination database e destination database ains the configured databases sign keys | | Checking C Checking C Checking C Checking C Checking C Checking C Checking C Checking | |

2. If any check fails, review the cause and rectify the fault. Then, click **Check Again**.

| Check Again | |
|---|---|
| Check success rate 100% All checks must pass before you can continue. If any check rec | uires confirmation, check and confirm the results before proceeding to the next step. |
| Check Item | Check Result |
| Database parameters | |
| Whether the source database contains unsupported table field types | Passed |
| Whether the destination database is compatible with the source database | Passed |
| Whether the character set of the source database matches that of the destination database | Passed |
| Whether the destination database has sufficient available connections | Passed |
| Whether the selected objects exist in the destination database | Passed |
| Whether the destination database contains the configured databases | Passed |
| Whether there are source database foreign keys | Passed |
| Whether tables to be migrated contain primary keys | Passed |
| Whether existing data meets the constraints | Passed |
| Whether the source database character set is supported | Passed |
| Whether the source database has sufficient available connections | Passed |
| Whether the source database container type is correct | Passed |
| Whether archive logs are enabled on the source database | Passed |
| Whether the source database name is valid | Passed |
| Whether the supplementary log is enabled for the source database. | Passed |
| Whether OGG log reading is enabled on the source database | Passed |
| Whether the source database table name is valid | Passed |

3. If all check items are successful, click **Next**.

Step 11 Confirm the task.

1. Check whether all configured information is correct.

| Start Time | Start upon task creation | Start at a specified time (1) |
|--|---|---|
| Send Notifications * Stop Abnormal Tasks After | If disabled, DRS alarr I4 Abnor | is, such as task failure, high latency, and frozen, cannot be received. That tasks run longer than the period you set (unit; day) will automatically stop. |
| Details | | |
| Product Name | Configuration | |
| | Task Informa | ation |
| | Name | DIS-test-info |
| | Description | Source Database IP Address or Domain Name: 10.154.219.69 Destination DB Instance Name: Auto-drs-gaussidovS-tar-1 |
| | Synchronization | Mode Full-Incremental synchronization |
| | Data Flow | To the cloud |

- 2. Click Start Task. In the display box, select I have read the precautions.
- 3. Click **Submit**.



Step 12 After the task is submitted, view and manage it.

After the task is created, return to the task list to view the status of the created task.

----End

4.5.8 Verifying Data

When the task status changes to **Incremental**, the full synchronization is complete. You can log in GaussDB and view the data migration result.

Step 1 Wait until the migration task status becomes Incremental.

OfSetime & Charmental - On Tofectual Occidence. Rel-Incremental Dec 20, 2007 HS331. Mailor. Canadio Date. Same Bit Stary Speed
 Section Date. Same Bit Stary Speed

- **Step 2** Click the task name to go to the **Basic Information** page.
- Step 3 On the Synchronization Progress page, view the full synchronization result.

As shown in the following figure, the **DATATYPELIST** table in the **TEST_INFO** database has been migrated to **shard_0**. Two rows were migrated successfully.

| Basic Information | You can edit this task. | | | | | | | | |
|--|--|---------------------------------|--------------------------------------|----------------------------|------------------|--|--------------------------|--|-----------------|
| Synchronization Comparison Synchronization Progress | Note: Do not change the usemannes, passwords, and permissions of source and destination database users before the task has completed. Last Updated Der. 30, 2021 17:25:56 CMT-46:00 | | | | | | | | |
| Process Data Synchronization Mapping Synchronization Logs Abnormal Records Taos | | | Progress Fu | II Synchronization Compl | eted Incremen | tal synchronization in prog | ress Destination Data | abase | |
| | Full Incremental Synchronization Inform | Parameters | | | | | | | |
| | Total Tables Total Shards | 1 | Completed Tables Completed Shards | 1 | Uncompleted | Tables 0(Falled: 0) Shards 0(Falled: 0) | Export Import | Rate 0.01 rows/se Rate 0.01 rows/se | cond |
| | Time Required Synchronized | 0h 6min 15s Not synchronized | Start Time | Dec 30, 2021 17:18:45 GMT+ | 08:00 | | Database Name | Table Name | Se |
| | Database Name | Table Name | Shard/Partition Name | Exported Rows JE | Imported Rows ↓Ξ | Synchronized | Last Updated | Shard Start Value | Shard End Value |
| | TEST_INFO | DATATYPELIST | shard_ID_0 | 2 | 2 | Dec 30, 2021 17:24:39 GM | Dec 30, 2021 17:24:43 GM | - | - |

Step 4 Verify data consistency.

1. Choose **Synchronization Comparison** > **Object-Level Comparison** to view the database and table migration results.

| Basic Information | You can edit this task. | | |
|-------------------------------|------------------------------------|---|---|
| Synchronization Comparison | Object-Level Comparison | Data-Level Comparison | |
| Synchronization Progress | In the many-to-one synchronization | on scenario, the numbers of objects in the source and desti | ination databases and comparison result displayed are based on the actual c |
| Process Data | Item | Source Database | Destination Database |
| Synchronization Mapping | | | 6 |
| Synchronization Logs | | | |
| Abnormal Records | | | |
| Tags | | | No data available |

2. Choose Synchronization Comparison > Data-Level Comparison, click Create Comparison Task, and view the migration results of the rows in the table.

| Create Compar | ison Task | | | | | | | | × |
|---|--|--|--|-----------|------------------|-------------------------------------|-------------------------|----------------------------|---|
| Some comparison resu comparison during off | lts may be inconsistent because di -peak hours so that you can get ar | ata changes during 1 accurate compari | g the comparison canno ison result. | ot be syn | chronized to the | e destination in real time. You are | e advised to select a s | cheduled time to start the | |
| * Comparison Type | Row | | | | | | | | |
| * Comparison Time | Start upon task creation | Start at a | specified time | | | | | | |
| * Object | If any data in the source databa | e changes, click th | ne refresh button below | | | | | | |
| | 0 | Select All | | C | | | Select All | | |
| | For tables, only expanded da | tabases are search | ned. Q | | | For tables, only expanded da | tabases are searched. | Q | |
| | E V TEST_INFO | | database | | | | | | |
| | DATATYPELIST (| New name: DAT | ATY table | | | | | | |
| | | | | | » | | | | |
| | | | | | ~ | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | ОК | | Cancel | | | | |

Step 5 Connect to the destination database **test_database_info** through DAS.

For details about how to connect to an instance through DAS, see **Adding Login Information**.

Step 6 Run the following statement to query the full synchronization result: SELECT * FROM test_info.datatypelist_after;

After the schema in Oracle is migrated, it will be used as the schema in GaussDB. Therefore, it is required to add the schema in the query statement for exact query.

As shown in the following figure, all data types in the table were successfully migrated and the data is correct.

| Home SQL History $	imes$ SQL W | /indow × I | Database Management-t | × SQL Window × SQL | Window × | | | | | |
|--|---|---------------------------------------|--------------------------------------|------------------------------|-------------------------------|-------------------|--------------------|------------------------|------------------|
| Current Database: test_database | e_info | Instance Name: Auto-drs-gaussdb | w5-tar-1 172.16.24.234.8000 | Character Set: UTF8 Time Z | one: Etc/GMT-8 V | | | Save Executed S | QL Statements 🗇 |
| Database: test_database_info ∨ | O Execute 502, (FB) () Format 502, (FB) () () Format 502, (FB) () () Format 502, (FB) Format 502, (FB) () Format 502, (FB) () Format 502, (FB) Format 502, (FB) | | | | | | | Full Screen | |
| Schema: public V Tablez Wees Please search by k Q. C | 1 SELECT V | -HUM TEST_INTO.GREAT/PEILST_A | | | | | | | |
| | Executed SQL | Statements Messages Result | Set1 × | | | | | | Overwrite Mode |
| | The following | is the execution result set of SELECT | * FROM test_info.datatypelist_after; | () The | table below cannot be edited. | | | Copy Row Copy Column V | olumn Settings 🗸 |
| | | id | col_01_chare | col_02_nchare | col_03_varchare | col_04_varchar2_e | col_05_nvarchar2_e | col_06_numbere | col_07_flo: |
| | 1 | 4 | huavei | xian | shanxi | zhongguo | shijie | 666 | 12.3209999 |
| | 2 | 2 | Migrate-test | test1 | test2 | test3 | test4 | 666 | 12.3209999 |
| | | | | | | | | | |

Step 7 Verify incremental synchronization.

In the migration type of full and incremental synchronization, after the full synchronization is complete, the data that is written to the source database after the task is created can still be synchronized to the destination database until the task is complete. The following describes how to synchronize incremental data from the source database to the destination database.

- 1. Use a database connection tool to connect to the source Oracle database based on its IP address.
- 2. Run the following statement to insert a data record into the source database:

Insert a data record whose ID is 1. insert into test_info.DATATYPELIST values(1,'Migrate-test','test1','test2','test3','test4', 666,12.321,1.123,2.123,sysdate,sysdate,sysdate,sysdate,'hw','cb','df','FF','AAAYEVAAJAAAACrAAA'); commit;

3. Run the following statement in the destination database to query the result: SELECT * FROM test_info.datatypelist_after;

As shown in the following figure, the new data inserted in the source database has been synchronized to the destination database in real time.

| | (1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1 | C | | | | - |
|--|---|------------|------------------------|-----------------|-------------------|-------------------|
| | The last loss second | | | | | |
| | | | | | | the second second |
| | | | | | | |
| | | vet.et.ens | vol.00.000.0000.00 | ***.**.******** | 100.00.000.000000 | 101.07.000 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Step 8 Stop the migration task.

After data is completely migrated to the destination database, stop the migration task.

1. Locate the task and click **Stop** in the **Operation** column.

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Fi

2. In the display box, click **Yes**.



----End

4.6 From On-premises Oracle to GaussDB Primary/ Standby

4.6.1 Purpose

Description

This practice uses UGO syntax migration and DRS real-time synchronization to synchronize on-premises Oracle to Huawei Cloud GaussDB. You can create a full +incremental synchronization task to synchronize data from the source Oracle to the destination GaussDB.

Problems

- With the rapid increase of enterprise workloads, traditional databases have poor scalability and distributed databases are required.
- Building traditional databases require purchasing and install servers, systems, databases, and other software. Its O&M is expensive and difficult.

- The performance of complex queries for traditional databases is poor.
- It is hard for traditional databases to smoothly synchronize data with no downtime.

Migration Principles

In this practice, UGO is used to migrate heterogeneous database schemas, and DRS is used to only synchronize data. The principles are as follows:

- 1. UGO is used to synchronize basic objects.
- 2. DRS is used to perform full synchronization and suspend the task after the task enters the incremental phase.
- 3. UGO is used to synchronize common indexes.
- 4. DRS is used to resume incremental synchronization. After data is synchronized, stop services on the source end for data comparison to ensure data consistency. Then, you need to stop the DRS task.
- 5. Finally, UGO is used to migrate triggers, events, jobs, foreign keys, and sequences, and services are migrated to GaussDB.



Service List

- Virtual Private Cloud (VPC)
- GaussDB
- Database and Application Migration UGO (UGO)
- Data Replication Service (DRS)
- Data Admin Service (DAS)

Notes on Usage

- The resource planning in this document is for demonstration only. Adjust it as needed.
- The end-to-end test data in this document is for reference only.
- Full synchronization is used to migrate data. Incremental synchronization is used to synchronize data between the source and destination databases in real time.

Prerequisites

- You have registered with Huawei Cloud and completed account authentication.
- Your account balance is greater than or equal to \$0 USD.
- You have set up an on-premises Oracle database for testing.
- You have obtained the IP address, port number, account, and password of the Oracle database to be migrated.

4.6.2 Resource Planning

| Table 4-23 Resourc | e planning |
|--------------------|------------|
|--------------------|------------|

| Categor y | Subcat egory | Planned Value | Remarks | |
|--------------|-----------------------------|------------------|---|--|
| VPC | VPC name | vpc-src-172 | Customize a name for easy identification. | |
| | Region | Test region | For low network latency and quick resource access, select the region nearest to you. | |
| | AZ | AZ3 | - | |
| | Subnet | 172.16.0.0/16 | Select a subnet with sufficient network resources. | |
| | Subnet name | subnet-src-172 | Customize a name for easy identification. | |
| Oracle | Name | orcl | Customize a name for easy identification. | |
| | Specifi cations | 16 vCPUs 32 GB | - | |
| | Databa se version | 11.2.0.1 | - | |
| | Databa test_info se user | | Customize a user. However, the user must have the following permissions during migration: CREATE SESSION, SELECT ANY TRANSACTION, SELECT ANY TABLE, SELECT ANY DICTIONARY, and EXECUTE_CATALOG_ROLE. | |
| GaussDB | Instanc e name | gauss-b193-cent | Customize a name for easy identification. | |

| Categor y | Subcat egory | Planned Value | Remarks |
|--------------------------------|------------------------------------|--|--|
| | Databa se version | GaussDB 2.7 Enterprise Edition | - |
| | lnstanc e type | Primary/Standby | In this example, a primary/ standby instance is used. |
| | Deploy ment model | Independent | - |
| | Transa ction consist ency | Strong consistency | - |
| | Storag e type | Ultra-high I/O | - |
| | AZ | AZ2 | Select a single AZ for the test. You are advised to select multiple AZs to improve instance availability in actual use. |
| | Instanc e specific ations | General-enhanced II 8 vCPUs 64 GB | Select small specifications for the test. You are advised to configure specifications based on service requirements in actual use. |
| | Storag e space | 480G | Select a small storage space for the test. You are advised to configure storage space based on service requirements in actual use. |
| | Disk encryp tion | Disable | In this example, disk encryption is disabled. Enabling disk encryption improves data security, but slightly affects the read and write performance of the database. |
| Logging in to the | DB engine | GaussDB | - |
| databas e through DAS | Databa se source | GaussDB | Select the GaussDB instance created in this example. |

| Categor y | Subcat egory | Planned Value | Remarks | |
|---------------------------|---|-----------------------------------|---|--|
| | Databa se name | postgres | - | |
| | Userna me | root | - | |
| | Passwo rd | - | Password of the root user of the GaussDB instance created in this example | |
| UGO migratio n task | Databa se evaluat ion project | Oracle-Centralized | Customize a name for easy identification. | |
| | Object migrati on project | Oracle-GaussDB- Centralized | Customize a name for easy identification. | |
| | Source DB engine | Oracle 11g | - | |
| | Target DB engine | GaussDB Primary/ Standby - 2.8 | - | |
| | Netwo rk type | Public Network | Select the public network for the test. | |
| DRS migratio n task | Migrati on task name | DRS-test-info | Customize a name for easy identification. | |
| | Destin ation databa se name | test_database_info | Customize a name for easy identification, but the name must be compatible with the Oracle database name. | |
| | Source DB engine | Oracle | - | |
| | Destin ation DB engine | GaussDB Primary/ Standby | - | |

| Categor y | Subcat egory | Planned Value | Remarks |
|--------------|------------------|---------------|---|
| | Netwo rk type | Public | Select the public network for the test. |

4.6.3 Operation Process

Figure 4-31 shows the main operation flowchart.





4.6.4 Preparations

Permissions Required for UGO

• The permission check for the source database must be passed. **Table 4-24** lists the permissions that need to be checked when the source database type is Oracle.

| Checked Item | Description | Mandatory |
|----------------|---|--|
| DBMS_METADATA | Permission to retrieve metadata from the Oracle database dictionary. This permission is used to obtain the DDL of schema objects. | Yes |
| Dynamic View | Permission to access various dynamic performance views. This permission is used to obtain basic database information. | Yes |
| Schema Objects | Permission to check schema objects to be evaluated. At least one object needs to be evaluated. | Yes |
| DBA | DBA permission required for subsequent operations. | No If Check Result is Alarm , some objects could not be collected because of permissions, but the evaluation project can still be created successfully. |

| Table | 4-74 | Rea | uired | chec | kc |
|-------|------|-----|-------|------|----|
| Iavic | 4-74 | neu | uneu | LIEU | ΛD |

- When connecting to the target database, you must have the permissions needed to create, delete, and modify databases objects, such as schemas, tables, programs, indexes, users, functions, and views. For details, see Viewing the Permission Check Report.
- You have the permissions needed to create an evaluation project. For details, see **Permission Management**.

For more information about permissions required for UGO, see Here.

Permissions Required for DRS

- The permissions required by DRS for connecting to the Oracle database must meet the following requirements to ensure smooth data synchronization:
 - Full synchronization requires the following permissions: CREATE SESSION, SELECT ANY DICTIONARY, and SELECT for a single table (GRANT SELECT ON <userName.tbName> to drsUser).
 - Full+incremental synchronization and incremental synchronization:
 - Oracle 12c or later in tenant mode:

To synchronize a container database (CDB) of Oracle 12c or later, you must have the following permissions: CREATE SESSION, SELECT ANY DICTIONARY, SELECT for a single table (GRANT SELECT ON <userName.tbName> to drsUser), EXECUTE_CATALOG_ROLE, SELECT ANY TRANSACTION, and LOGMINING.

To synchronize a pluggable database (PDB) of Oracle 12c or later, you must have the following permissions: CREATE SESSION, SELECT ANY DICTIONARY, SELECT for a single table (GRANT SELECT ON <userName.tbName> to drsUser), EXECUTE_CATALOG_ROLE, SELECT ANY TRANSACTION, LOGMINING, and CREATE SESSION, SELECT ANY DICTIONARY, EXECUTE_CATALOG_ROLE, SELECT ANY TRANSACTION, LOGMINING and SET CONTAINER (GRANT SET CONTAINER TO <userName> CONTAINER=ALL) permissions for a CDB.

• Oracle 12c or later in non-tenant mode:

You must have the following permissions: CREATE SESSION, SELECT ANY DICTIONARY, SELECT for a single table (GRANT SELECT ON <userName.tbName> to drsUser), EXECUTE_CATALOG_ROLE, SELECT ANY TRANSACTION, and LOGMINING.

- To synchronize a database of Oracle 11g or earlier, you must have the following permissions: CREATE SESSION, SELECT ANY DICTIONARY, SELECT for a single table (GRANT SELECT ON <userName.tbName> to drsUser), EXECUTE_CATALOG_ROLE, and SELECT ANY TRANSACTION.
- During incremental synchronization, enable PK, UI, or ALL supplemental logging for the source Oracle database at the database level or table level. If supplemental logging is enabled at table level, enable supplemental logging again after you rebuild or rename tables. During the synchronization, ensure that the preceding settings are always enabled.
- Oracle 12c or later does not support incremental synchronization using accounts whose ORACLE_MAINTAINED is Y (except system/sys), because accounts with this attribute do not have the permission to parse logs.
- The permissions required by DRS for connecting to the GaussDB database must meet the following requirements to ensure smooth data synchronization:
 - Database-level permissions: Log in to the postgres base database as user root or user DATABASE with the Sysadmin role, and grant the CREATE and CONNECT permissions to user DATABASE.

Statement: GRANT CREATE, CONNECT ON DATABASE <database> TO <user>

Schema-level permissions: Log in to the database as user root or user
 DATABASE with the Sysadmin role, or the owner of the database, and
 grant the CREATE and USAGE permissions of the schema to the user.

Statement: GRANT CREATE, USAGE ON SCHEMA <schema> TO <user>

 Table-level permissions: Log in to the database as user **root** or user DATABASE with the Sysadmin role, or the owner of the database, and grant the DML permission for tables in the schema to the user. (The SELECT permission is required only for tables without primary keys.)
 Statement for granting the DML permission on all tables in the schema: GRANT SELECT, UPDATE, INSERT, DELETE, INDEX, ALTER ON ALL TABLES IN SCHEMA <schema> TO <user>

Statement for granting the DML permission on a specified table in the schema: GRANT SELECT, UPDATE, INSERT, DELETE, INDEX, ALTER ON TABLE <schema.table> TO <user>

For more information about permissions required for DRS, see Here.

Network Settings

Plan the network properly to ensure that the source Oracle database can be accessed by UGO and DRS.

4.6.5 Creating a VPC and Security Group

Create a VPC and security group for a GaussDB instance.

Creating a VPC

Step 1 Log in to the management console.

- **Step 2** Click ¹ in the upper left corner and select a region.
- **Step 3** Click the service list icon on the left and choose **Networking** > **Virtual Private Cloud**.

The VPC console is displayed.

Step 4 Click Create VPC.

| Basic Information | |
|---------------------|---|
| Region | • n • |
| | Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
| Name | vpc-168a |
| IPv4 CIDR Block | 192 · 168 · 0 · 0 / 16 • |
| | Recommended:10.0.0.0/8-24 (Select) 172.16.0.0/12-24 (Select) 192.168.0.0/16-24 (Select) |
| | The CIDR block 192.168.0.0/16 overlaps with a CIDR block of another VPC in the current region. If you intend to enable communication between VPCs or between a VPC and an on-premises data center, change the CIDR block. <u>View VPC CIDR blocks in current region</u> |
| Enterprise Project | -Select- C Create Enterprise Project |
| Advanced Settings 🔻 | Tag Description |

| Default Subnet | |
|------------------------|---|
| AZ | AZ3 • ? |
| Name | subnet-1d4e |
| CIDR Block | 192 • 168 • 0 / 24 • ⑦ Available IP Addresses: 251 The CIDR block cannot be modified after the subnet has been created. |
| Associated Route Table | Default ⑦ |
| Advanced Settings 🔹 | Gateway DNS Server Address DHCP Lease Time Tag Description |

- **Step 5** Configure parameters as needed and click **Create Now**.
- **Step 6** Return to the VPC list and check whether the VPC is created.

When its status becomes available, the VPC is created.

----End

Creating a Security Group

- **Step 1** Log in to the management console.
- **Step 2** Click **O** in the upper left corner and select a region.
- **Step 3** Click the service list icon on the left and choose **Networking** > **Virtual Private Cloud**.

The VPC console is displayed.

- **Step 4** In the navigation pane, choose **Access Control** > **Security Groups**.
- Step 5 Click Create Security Group.
- **Step 6** Configure parameters as needed.

×

| Create | Security | Group |
|--------|----------|-------|
| create | Security | Group |

| * Name | sg-DRS01 | | |
|----------------------|---|-------------------|---|
| * Enterprise Project | default 💌 C Create Er | nterprise Project | ? |
| * Template | General-purpose web server 💌 | | |
| Description | The security group is for general-purpose web servers and includes default rules that allow all inbound ICMP traffic and inbound traffic on ports 22, 80, 443, and 3389. The security group is used for remote login, ping, and hosting a website on ECSs. | | |
| | 0/255 | | |
| Show Default Rule | * | | |
| | | | |
| | OK Cancel | | |

- Step 7 Click OK.
- **Step 8** Return to the security group list and click the security group name (**sg-01** in this example).
- **Step 9** Click the **Inbound Rules** tab, and then click **Add Rule**.

| Summary | Inbound Rules | Outbound Rules | Associated Instances |
|----------|---------------|----------------|---|
| Add Rule | Fast-Add Rule | Delete Allo | ow Common Ports Inbound Rules: 9 Learn more about security group configuration. |

Step 10 Configure an inbound rule, add the IP address of the source database, and click **OK**.

| Add Inbound R | ule | | | |
|----------------------------------|--|--------------------------------------|---------------------------|----------------------------------|
| () If you select IP a | ddress for Source, you can enter multiple IP add | resses in the same IP address box. E | ach IP address represents | a different security group rule. |
| ecurity Group define | ed_security_group | | | |
| ou can import multiple r Type | Protocol & Port ⑦ | Source ⑦ | Description | Operation |
| IPv4 | Protocols/TCP (Custo Example: 22 or 22,24 or 22-3 | IP address • | | Replicate Delete |
| | | Add Rule | | |
| | | OK Cancel | | |
| _ | | | | |
| End | | | | |

4.6.6 Creating a GaussDB Instance

This section describes how to create a GaussDB instance as the destination database.

- **Step 1** Log in to the **management console**.
- **Step 2** Click O in the upper left corner and select a region.
- Step 3 Under the service list, choose Databases > GaussDB.
- **Step 4** In the navigation pane on the left, choose **GaussDB** > **Instances**.
- Step 5 Click Buy DB Instance.
- **Step 6** Configure the instance name and basic information.

| Billing Mode | Yearly/Monthly Ray per use |
|-----------------------------|--|
| Region | • |
| | Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
| | |
| DB Instance Name | gauss-ea63 |
| DB Engine | Gamt08 |
| DB Engine Version | 1.4 Enterprise Edition 2.7 Enterprise Edition |
| DB Instance Type | Distributed Primary/Standby |
| Deployment Model | Independent |
| Transaction Consistency (?) | Strong consistency Eventual consistency |
| Replicas 🕥 | - 3 + |
| Shards | - 3 + |
| Coordinator Nodes 🕥 | If Coordinator Nodes is set to 1, the Instance can only be used for testing. |
| AZ | AZ3 AZ1 AZ2 |
| | Only one or three AZs can be selected. |
| Time Zone | (UTC+08:00) Beijing, Chongqing, Hong Kon • |

Step 7 Configure instance specifications.

| Instance Specifications | General-enhanced II |
|-------------------------|--|
| | Flavor Name |
| | 8 vCPUs 64 GB Unavailable for production environment |
| | O 16 vCPUs 128 G8 |
| | 32 vCPUs [256 GB (Sold Out) |
| | 64 vCPUs 512 GB (Sold Out) |
| | DB Instance Specifications General-enhanced II 8 vCPUs 64 GB |
| Storage Type | Ultra-High I/O Learn more about storage types. |
| 1 | 480 GB |
| Storage Space (GB) | - 490 + Ø |
| 5 1 1 7 | 480 9,950 19,450 28,950 48,000 |
| Disk Encryption | Disable Frable (7) |

Select small specifications for the test. You are advised to configure specifications based on service requirements in actual use.

Step 8 Select a VPC and security group (created in **Creating a VPC and Security Group**) for the instance and configure the database port.

| | Relationship among VPCs, subnets, security groups, and DB instances |
|----------------|---|
| VPC 🕥 | • • • C • • C |
| | If you want to create a VPC, go to the VPC console. |
| | Make sure there are enough private IP addresses available for future scale-ups. After the DB instance is created, the subnet carnot be changed. Available private IP addresses in the selected subnet: 240 |
| Security Group | C View Security Group |
| | Inbound: ICMP/; TCP/20-21, 443, 10250, 10250, 10250, 3000-32767, 3389, 22; UDP/30000-32767, 4789 Outbound: In a security group, rules that authorize connections to DB instances apply to all OB instances associated with the security group. |
| Database Port | Default port: 8000 |

Step 9 Configure password and other information.

| Administrator | root | |
|------------------------|---|---|
| Administrator Password | | Keep your password secure. The system cannot retrieve your password. |
| Confirm Password | | |
| Parameter Template | | C View Parameter Template |
| Enterprise Project (2) | Select | Create Enterprise Project |
| Tag | It is recommended that you use TMS's predefined t | ag function to add the same tag to different cloud resources. ${f C}$ View predefined tag |
| | Tag key Tag value | |

- **Step 10** Click **Next**, confirm the information, and click **Submit**.
- **Step 11** Go to the instance list.

If the instance status becomes available, the instance has been created.

- **Step 12** Create a database in the destination GaussDB instance.
 - 1. In the GaussDB instance list, locate the DB instance and click **Log In** in the **Operation** column.

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- 2. In the displayed dialog box, enter the password and click **Test Connection**.
- 3. After the connection test is successful, click Log In.

| Instance Login Information | 1 | Х |
|---------------------------------|---|---|
| DB Instance Name gauss-c1b3 | DB Engine Version GaussDB | |
| ★ Login Username | - | |
| * Database Name | | |
| * Password | Reference Connection | |
| | Remember Password Your password will be encrypted and stored securely. | |
| Description | created by sync gaussdb instance | |
| Collect Metadata Periodically ③ | If not enabled, DAS can query the real-time structure information only from databases, which may affect the real-time performance of databases. | |
| Show Executed SQL Statements ⑦ | If not enabled, the executed SQL statements cannot be viewed, and you need to input each SQL statement manually. | |
| | Log In Cancel | |

4. After the login is successful, click **Create Database**, enter required information as needed, and click **OK**.

| Home | | | |
|--------------------|------------------------|----------------------------|------------------|
| DB Instance N | ame: gauss-c1b3 | DB Engine Version: GaussDB | - |
| Database List | | | |
| + Create Databa | ase | | |
| Database Name | | \$ | Table Quantity 🌲 |
| | | | |
| Create Data | hase | | \times |
| | 0450 | | |
| * Name | Database Name | | |
| | Only user databases of | an be created | |
| Character Set | UTF8 | | \vee |
| Template 💿 | template0 | | \vee |
| Collation ③ | | | |
| Ctype ③ | | | |
| DBCOMPATIBILITY () | Oracle | | ~ |
| | | | |
| | ОК | Cancel | |

5. Prepare permissions for logging in to GaussDB by referring to Preparations.

----End

4.6.7 Creating a UGO Task

4.6.7.1 Creating a Database Evaluation Project

Step 1 Log in to the UGO console.

- **Step 2** In the navigation pane on the left, choose **Schema Migration** > **DB Evaluation**.
- **Step 3** Click **Create Project** in the upper right corner.
- **Step 4** Read **Source Database Preparation and Authorization Tips** and click **Create**.
- **Step 5** Configure the basic information.

After the basic information is configured, the **Test** button next to **Test Connection** is available.

| * Project Name | Oracle-Centralized | | | | | | | | | |
|-----------------------------|---|--|---|------------------------------|---------------------------------|-----------------------------|---------------------------------|---------------------------------|------------------------------------|---------------------|
| Exception Notification Mode | SMN Topic | | | | | | | | | |
| | Please select Specify the start time and end tim | C Create e for the collection of | e SMN Topic source DB schema. Conr | ection to the source DB will | be established at the start tim | e you specify and will be c | losed at the end time you spe | cilv. | | |
| |) | | | | | - , | , , , | | | |
| Target DB Analysis | Select this option if you already have one for migration. Database analysis | a confirmed target da takes some time afte | atabase. UGO will only co r data collection. | lect data and not analyze th | e target database to produce | summary and evaluation n | eports. Deselect this option fo | r heip selecting a target datat | ase. UGO will analyze different da | labases and recomme |
| Source DB Type | Oracle-10g | Oracle-11g | Oracle-12c | Oracle-18c | Oracle-19c | MySQL-5.6 | MySQL-5.7 | MySQL-8.0 | | |
| Network Type | Public Network If the source DB network is restricted | I by the IP address tru | istlist, add the IP address | (10.83.11.241) to the source | e DB network trustlist to ensur | e that the UGO can conner | t to the source DB. | | | |
| Connection Method | Service Name Co Connect to the Source DB with Servi | nnection string ice Name, IP and Port | | | | | | | | |
| * Source DB Name | | | | | | | | | | |
| Host Type | Hostname H | ost IP Address | | | | | | | | |
| * Host IP Address | | | | | | | | | | |
| * Host Port | | | | | | | | | | |
| * User Name | | | | | | | | | | |
| * Password | | Ŕ | | | | | | | | |
| SSL Type | No SSL C | One Way SSL | | | | | | | | |
| | Enter the SSL truststore passw | ord 🗞 | | | | | | | | |
| | Add File | | | | | | | | | |
| | Only upload JKS type certificate. | | | | | | | | | |
| Data Collected From | DBA views UGO collects data from objects in th | All views e entire source DB in: | stance. | | | | | | | |
| Tags | It is recommended that you use TMS different cloud resources. View pred To add a tag, enter a tag key and a t | i's predefined tag fun efined tags ag value below. | ction to add the same tag | 10 | | | | | | |
| | | | | | | | | | | |
| | Enter a tag key | Enter a tag value | | bb | | | | | | |
| | 20 tags available for addition. | | | | | | | | | |

Step 6 Click Test next to the Test Connection field.

If the connection test succeeds, the **Next** button will be available.

If the connection test fails, the message "Unable to connect to DB" is displayed.

- Step 7 (Optional) Click Test next to Network Stability. A successful network stability test only means that there is little network latency or packet loss, or no packet loss at the current time. It takes 10s to 15s to complete.
- **Step 8** Click **Next** to go to the **Precheck** page.

The check result of each check item is displayed. You can also click **Recheck** to check the permissions again.

| • | Go to the next step to create an evaluat | Restauk Pre-stauk deadline: 2033/12/20 10 30 45 04/1+08 50 | |
|--------|---|--|--------------|
| S item | s were checked. The following 5 items passed the check. | | |
| No. | Check Item | Description | Check Result |
| | DBMS_METADATA Permission | Provides mechanism to retrieve metadate from the statutese distancey as creation DDL to recreate the object | Success |
| | Dynamis Vasv Permission | Checks setell access to various Dynamic views | S Guerana |
| | DDL Object Count Check | Checks for at least one tichema Object which have DDL objects to fetch can be accessed | 😒 Busseta |
| 4 | DBA Privilige | Check whether the user has the DBA permission. If the DBA permission check result is Alarm, the evaluation project can be created successfully, but some objects m | C Tuccete |
| 6 | Setting DBM9_METADATA SQL Formatting Parameters | Oneck whether the user can run the SQL formatting command of OBM6_METADATA. If the check result is warning, the evaluation project can be created successful | Success |

- **Step 9** After all check items are passed, click **Next** to go to the **Evaluation Scope Selection** page.
- **Step 10** Select the object types to be collected, target database versions, and source database schemas.

| Object Types to be Collected Search III TABLE © INDEX © SEQUENCE © SYNONYM © TYPE © Schedule © Job_Class © Job © Db_LINK | RELOOM IN MEN INTERNALIZELINEN IN ROCCOURE IN FUNCTION IN MONAE IN MONAE LOOM IN TRODER IN ROLE IN USER IN DRAFT IN DRECTORY IN CREDENTIAL IN PRODUM |
|--|--|
| Target Database Selection 0/ Available Target Database 0/ CaucidD PrimaryDatabase 2 Enterprise Edition CaucidD Database 2 Enterprise Edition | Selected Target Databases 0/1 GaustOB Prinary/standy - 11 Edeprise Editor |
| Dynamic SQL Evaluation Enable Disable Enable: The dynamic SQL statements in objects | analyzest. Disable: The gynamic SOL statements are not analyzest. |
| 1. If there are multiple schemas with the same name (case-insensitive), 2. Oracle Lightweight Jobs are collected as part of PROGRAM object typ | d one of Rem. |
| Schemas to be Contented | Selected Schema List 0 / 1 |
| Image: Street (10) Image: Street (10) Image: Street (10) Image: Stree (10) Image: Street (10) <td>Cifer a Rayourd. C.</td> | Cifer a Rayourd. C. |
| U004 | |

Step 11 Click **Next** to go to the **Confirmation** page.

| Basic Information | | | | | |
|---------------------------|--------------------------|---------------------------|-----------|------------------------|----------------|
| Project Name | Oracle-Centralized | Connection to Source | Online | Connection Method | Service name |
| Skip Target DB Evaluation | Yes | SSL Type | No SSL | Source DB Name | Oracle |
| Source DB Version | 19.0.0.0 | Collection Time | All Time | Host IP Address | |
| Host Port | 1521 | Data Collected From | All views | | |
| Precheck | | | | | |
| DBMS_METADATA Permission | Success | Dynamic View Permission | Success | DDL Object Count Check | Success |
| DBA Privilege | Success | Setting DBMS_METADATA SQL | 🥑 Success | | |
| Selected Target Databases | 5 | | | | |
| GaussDB Primary/Standby | - 3.1 Enterprise Edition | | | | |
| | | | | | |
| Selected Schemas | | | | | |
| TEST12 | | | | | |
| | | | | | |
| | | | | | |
| | | | | | Devices Device |

- **Step 12** Confirm the settings and click **Create**. A message is displayed, indicating that the project is created successfully.
- Step 13 Click OK to go to the DB Evaluation page. View the evaluation project you created in the list.

In progress
 Oracle
 Oracle

Step 14 When Project Status is In progress. Confirm Target DB Pending, click Confirm Target DB Pending.

Status Source DB Type Created Differential ggrass Oracle Dec 20, 2023 10:36 07 G... --

- Step 15 On the Target DB Analysis page, select GaussDB Primary/Standby-2.7 (select target database as needed) as the target database, and click Confirm DB Selection.
- **Step 16** In the displayed dialog box, click **Confirm**.
- **Step 17** After the target database is confirmed, a dialog box is displayed. Click:

Create Now to go to the page for migration project creation.

Create Later to stay on the current page.

----End

4.6.7.2 Creating an Object Migration Project

- Step 1 Log in to the UGO console.
- **Step 2** In the navigation pane on the left, choose **Schema Migration** > **Object Migration**.
- **Step 3** Click **Create Project** in the upper right corner.
- **Step 4** Configure required information.

| (| | | | |
|--|---|---|-------------|--|
| Project Name | Oracle-GaussDB-Centralized | | | |
| Evaluation Project | Oracle-Centralized | • | | |
| Target DB | GaussDB Primary/Standby | | | |
| Target DB Version | 8.0 Enterprise Edition | | | |
| + Host IP Address | | 0 | | |
| ★ Host Port | 4000 | | | |
| ★ DB Name | ugo | (?) | | |
| | | | | |
| Username | root | 0 | | |
| k Username k Password | root | <u>ت</u> | | |
| k Username k Password Schemas to Migrate | root Select all Select schemas to be collected by | UGO from the source database. | | |
| * Username * Password Schemas to Migrate SSL Type | root ✓ Select all Select schemas to be collected by No SSL If you do not select SSL, there may | UGO from the source database. SSL without authentication y be potential security risks. | One-way SSL | |
| V Sername Password Schemas to Migrate SSL Type Test Connection | root ✓ Select all Select schemas to be collected by No SSL If you do not select SSL, there ma Test Connection Test the connection between USC | UGO from the source database. SSL without authentication y be potential security risks. | One-way SSL | |

Step 5 Click Test Connection.

If the connection test is successful, the **Create** button is available.

If the connection test fails, an error message is displayed.

Step 6 Click **Next** to go to the **Precheck** page.

| | Start the migration. | | | Pré-dheik deadine: 2023/12/20 11:20:03 OMT-08:00 |
|-----------|--------------------------------------|--|--------------|--|
| 🌝 3 item: | a were checked. The following 3 item | is passed the check. | | |
| No. | Check Rem | Description | Check Result | Operation |
| 1 | Check the compatibility mode | Check whether the compatibility modes of the source and destination databases are the same | C Success | |
| 2 | Character set check | Check whether the character sets of the source and destination databases are compatible | Success | View Details |
| 2 | Syzadmin privilege check | Check whether the database user has the sysadmin privilege | Success | |

Step 7 After the pre-check items are passed, click **Next** in the lower right corner to confirm the settings.

| ** | Migration Project Details | Overthe Charlotts Company | | |
|------------------------------|---------------------------|---------------------------|-----------------------------|-------------------------|
| Nigration Scope | Evaluation Project Name | Oracle-Centralized | Target Database Information | |
| Migrated Scheman All scheman | | | | ugo |
| Not Migrated Scheman 0 | | | Target DD | GaussDB Primary/Standby |
| | | | Target DB Version | |
| | | | | |
| | | | | |

Step 8 Confirm the settings and click **Create**. On the object migration list page, view that the **Project Status** of the project is **Ready**.

| 51 No. | Project Name | Evaluation Project | Project Status | Target DB Type | Created | Created By | Operation |
|--------|--------------|--------------------|----------------|--|---------------------------------|------------|--|
| 1 | Oracle-Gauss | Oracle-Centralized | Ready | GaussDB Primary/Standby Enterprise Edition | Dec 20, 2023 11:21:00 GMT+05:00 | admin | Migrate Change Target DB Connection Delete |

----End

4.6.8 Creating a DRS Task

This section describes how to create a DRS task. Before creating a DRS task, you need to understand the prerequisites, suggestions, and precautions. For details, see **Precautions**.

Procedure

- **Step 1** Log in to the management console.
- **Step 2** Click O in the upper left corner and select a region.

Select the region where the destination instance is deployed.

- **Step 3** Under the service list, choose **Databases** > **Data Replication Service**.
- **Step 4** In the navigation pane on the left, choose **Data Synchronization Management**. On the displayed page, click **Create Synchronization Task**.
- **Step 5** Configure synchronization instance information.
 - 1. Select a region, and project, and enter a task name.

| Billing Mode | Yearly/Monthly Pay-per-use | |
|--------------|--|---|
| Region | . • | |
| | Regions are geographic areas isolated from each other. | Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
| Project | ¥ | |
| * Task Name | DRS-8315 | 0 |
| Description | | 0 |
| | | |

2. Specify Data Flow, Source DB Engine, Destination DB Engine, Network Type, Destination DB Instance, Synchronization Instance Subnet (optional), Synchronization Mode, Specifications, AZ, and Tags (optional).



3. Click **Create Now** and wait until the task status changes to **Configuring**.

----End

4.6.9 Starting Synchronization

4.6.9.1 UGO Schema Migration Phase 1: Tables, Primary Keys, Unique Keys/ Indexes

Step 1 On the Object Migration page, locate the project that you created in Creating an Object Migration Project and click Migrate in the Operation column.

| SI No. | Project Name | Evaluation Project | Project Status | Target DB Type | Created | Created By | Operation |
|--------|--------------|--------------------|----------------|--|---------------------------------|------------|--|
| 1 | Oracle-Gauss | Oracle-Centralized | Ready | GaussDB Primary/Standby Enterprise Edition | Dec 20, 2023 11:21:00 GMT+08:00 | admin | Migrate Change Target DB Connection Delete |

Step 2 On the **Conversion Plan** page, the collection objects and types for the project are displayed.

| DE Objects (3) | Select Migration Object Types | Skip Conversion Convert E | Export SQL | | | | |
|-------------------------|-------------------------------|---------------------------|-----------------------------|---------------------------|-----------------------|---------------------------------|---|
| - 😑 🖹 Storage (2) | | All sche | mas • All object statuses • | All conversion statuses + | Start Date - End Date | Enter an object name. | Q |
| B SEQUENCE (0) | Schema | Object Name | Object Type | Object Status (2) | Conversion Status | Update Time | |
| TABLE (1) | TEOT 12 | PPPOP | TARI E | Normal | Convert | Dec 20, 2022 11-21-01 OMT+08-00 | |
| INDEX (1) | | | | | - comen | | |
| SYNONYM (0) | TEST12 | IDX_88888 | INDEX | Ormal | Convert | Dec 20, 2023 11:21:01 GMT+08:00 | |
| TYPE (0) | TEST12 | TEST12 | LISER | - Normal | Convert | Dec 20, 2023 11:21 01 GMT+08 00 | |
| - 😑 🖹 Code (0) | | | | • | • | | |
| VIEW (0) | | | | | | | |
| MATERIALIZED_VIEW (0) | | | | | | | |
| TRIGGER (0) | | | | | | | |
| TYPE_BODY (0) | | | | | | | |
| PROCEDURE (0) | | | | | | | |
| FUNCTION (0) | | | | | | | |
| PACKAGE (0) | | | | | | | |
| PACKAGE_BODY (0) | | | | | | | |
| DIRECTORY (0) | | | | | | | |
| DB_LINK (0) | | | | | | | |
| | | | | | | | |
| - 😑 🖹 Job Objects (0) 🕐 | | | | | | | |

Step 3 Click **Next** to go to the **Conversion Config** page. Locate a feature and click **Edit** in the **Operation** column.

| Conversion Plan —— 🕗 Conversion Config —— | - (3) Syntax Conversion - (4) Object Correction - | (5) Migration & Verification | | | |
|---|--|---|---|-----------|-----|
| Configuration Tablespace Mapping | | | | | |
| Feature Configuration | | | | | |
| Parameter Configuration Default value | * Import SQL | | | | |
| 1. After importing configuration parameters, you can adj 2. After you import new parameter settings, the existing 3. After your import, the configuration status of features in | ust the feature configuration based on the current project requirements. Settings will be overwritten. Is Defauitt. If you edit the configuration of a feature, the configuration stat | The adjusted configuration does not affect the original template. us will become Modified. | | | × |
| Q Search by Features by default | | | | | C 🛛 |
| Features | Affected Object Types | Configuration Status | Current Configuration | Operation | |
| Support for special character objectnames case format. | Table, Index, Package, Materialized View, Function, Procedure, Tr | Ø Default value | If the object name contains special character, the object $na_{\cdots} \oslash$ | Edt | |
| Support for reserved keyword objectnames case format. | Table Index, Package Materialized View, Function, Procedure, Tr | Ø Default value | The object names which are reserved keywords in the targ $$ | Edit | |
| Support for object names case format | ALL | Ø Default value | Convert all object names to lowercase. | Edit | |
| Support for object level privileges | System | Ø Default value | This config will raise the error. | Edit | |
| Support for system privilege | System | Ø Default value | This config will throw the error for the system privileges wh $$ | Edit | |
| Support for grant Any privileges | System | Ø Default value | throws an error. | Edit | |
| Support for system role | System | Ø Default value | This config will retain the script as it is without logging any $$ | Edit | |
| Support for target character set | All Objects | Ø Default value | This config will select UTF8 as characterset for target db. | Edit | |
| Support for mismatch character set | All Objects | Ø Default value | This config will retain the script without conversion.(?) | Edit | |
| | | | | | |

Step 4 Click Next to go to the Syntax Conversion page. Click Start to convert the syntax.

| Conversion F | Plan Conversion | Config 🕄 8 | yntax Conversion | Object Correction | (6) Migration 8 | Verification | | | | | | |
|--------------|---|-------------------------------|------------------------------|----------------------|-------------------|--------------|--------|-----------|--------------------------|-----------------|-----------------------------|------------------------------|
| Syntax Cor | Conversion His | itory | | | | | | | | | | |
| A The | iyntax will be converted again and | all converted data, including | g manually modified objects. | will be overwritten. | | | | | | | | |
| • | Syntax conversions Syntax of 3 object types con | ersion compl | eted | | | | | | 100 _% | Start Time: Dec | 20. 2023 11.25:30 GW Ent | use 17+08:00 d Time: - |
| Downloa | d Reports | | | | | | | | | | | C |
| | Object Type | Total Count | Skip | Conversion Succes | Conversion Failed | Ignored | Manual | Remaining | Success (%) | | Operation | |
| | Total | 3 | 0 | 3 | 0 | 0 | 0 | 0 | | 100.00% | | |
| | INDEX | 1 | 0 | 1 | 0 | 0 | 0 | 0 | | 100.00% | Details | |
| | TABLE | 4 | 0 | 4 | 0 | 0 | 0 | 0 | | 100.00% | Details | |
| | USER | 1 | 0 | 1 | 0 | 0 | 0 | 0 | | 100.00% | Details | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | Previous | Next |

Step 5 Click Next to go to the Object Correction page. Select the objects to be skipped. In this phase, users, roles, permissions, tables, primary keys, unique keys, unique indexes, types, type bodies, functions, procedures, package bodies, and views can be migrated. You need to select objects that are not migrated and click Skip Migration.

| Conversion Plan Conversion Config | Syntax Convers | ion ——— 🚯 Object O | orrection —— (5) M | pration & Verification | | | | | |
|-----------------------------------|----------------|--------------------|--------------------|------------------------|-------------------|------------------|---------------|------------------|------|
| Bulk Statement Update | Skip Migrat | Skip Migration | | | | | × | | |
| B DB Objects (3) | O Search b | Schema | Object Name | Object Type | Conversion Status | Migration Status | | | |
| E Storage (2) | Q search b | TEST12 | IDX BBBBB | INDEX | Success | Pending | | | |
| SEQUENCE (0) | □ ~ So | | | | | | ration Status | Operation | |
| CREATE TABLE (1) | E | 10 🔻 Total Reco | ds:1 < 1 > | | | | Pending | View Details (?) | |
| FOREIGN KEY (0) | | | | OK Cance | 4 | | Pending | View Details | |
| INDEX (1) | | | | | | | Dender | View Dataile | |
| SYNONYM (0) | | | - | | • | | Pending | New Delate (F) | |
| TYPE (0) | | TEST12 1 | EST12 | USER | 🕑 Suci | 00655 | () Pending | View Details | |
| Code (0) | | | | | | | | | |
| - NEW (0) | | | | | | | | | |
| MATERIALIZED_VIEW (0) | | | | | | | | | |
| TRIGGER (0) | | | | | | | | | |
| TYPE_BODY (0) | | | | | | | | | |
| PROCEDURE (0) | | | | | | | | | |
| FUNCTION (0) | | | | | | | | | |
| PACKAGE (0) | | | | | | | | | |
| PACKAGE_BODY (0) | | | | | | | | | |
| DIRECTORY (0) | | | | | | | | | |
| B DB_LINK (0) | | | | | | | | | |
| E Job Objects (0) @ | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | Previous | Next |

For example, if the target database supports foreign keys, you can skip migrating them. In the object tree on the left, click **FOREIGN KEY**, select the FOREIGN KEY objects on the right, and click **Skip Migration**.

| de Statement Freiste | | | | | | | |
|---|--|-------------------------------------|--|--|------------------|---|---|
| our official official | | | | | | | |
| P. co. community | Skip Migration Undo Skip | Rerun Conversion | Export SQL | | | | |
| Dis Objects (3) Storage (2) | Q. Search by Object Name by defa | the | | | | | C |
| SEQUENCE (0) | Schema | Object Name | Object Type | Conversion Status | Migration Status | Operation | |
| | TEST12 | IDX_B8888 | FOREIGN KEY | Success | Pending | View Details 🕥 | |
| នkip Migration | ı | | | | | | |
| Schema | Object Name | | Object Type | Conversion Status | 5 | Migration Status | |
| TEST12 | IDX_BBBBB | | FOREIGN KEY | Success | | Pending | |
| 10 v Total Records: 1 V OK Cancel | | | | | | | |
| 10 🔻 Total Re | cords: 1 < 1 > | | OK Cancel | | | | |
| 10 Total Rev | Cords: 1 < 1 > | | OK Cancel | | | | |
| 10 Total Rev Maration Unde Stage each by Object Name by default Scheme | Cords: 1 < 1 > Rerun Conversion Export SQL Object Name | Object Type | OK Cancel | Mgration Status | | Operation | |
| 10 Total Res | Cords: 1 < 1 > Rerun Conversion Export SQL Object Name BBBBB | Object Type TABLE | OK Cancel | Migration Status | | Operation View Details ② | |
| 10 Total Rev Magnitum Undo Step earch by Object Name by default Schema TEST12 TEST12 | Cords: 1 < 1 > Rerun Conversion Export SQL Object Name BBBBB IDX_BBBBB | Object Type TABLE FOREION KEY | OK Cancel Conversion Status Conversion Status Succes Succes Succes | Migration Status S Pending Tignore | | Operation View Details ⑦ View Details ⑦ | |

Step 6 Click **Next** to go to the **Migration & Verification** page. Click **Start** on the right to start the migration. Ensure that all objects except ignored objects are successfully migrated.

Do not click **Finish** in the lower right corner because other objects need to be migrated later.

| Oracle-GaussDB-Centralized | | | | | | | | | |
|---|--|-------------------------|---|-----------|---------|-------------|---------------|--|--|
|) Conversion Plan ——— ⊘ Conversion Config ———— 💮 Syntax Conversion ———— 🛞 Udgration & Vertication | | | | | | | | | |
| Migration Migration Hist | Migration History | | | | | | | | |
| Sotyect types | Migration Succeeded 100% Surface Dec 20, 2021 It 45 6 GMT-48.00 S reject types mystel. Ender Dec 20, 2021 It 45 6 GMT-48.00 Ender Dec 20, 2021 It 45 6 GMT-48.00 Ender Dec 20, 2021 It 45 6 GMT-48.00 | | | | | | | | |
| 17 Total SQL Lines | 0 Total Stored Procedure Lines | 3 Migrated SQL Lines | 0 Migrated Stored Procedure Lines | | | | | | |
| Download Reports | | | | | | | C | | |
| Object Type | Total Count | Migration Succeeded | Migration Failed | Remaining | Ignored | Success (%) | Operation | | |
| TOTAL | 3 | 1 | 2 | 0 | 0 | 33 | .33% | | |
| INDEX | 1 | 0 | 1 | 0 | 0 | 0. | 00% Details | | |
| ✓ TABLE | 1 | 0 | 1 | 0 | 0 | 0. | 00% Details | | |
| USER | 1 | 1 | 0 | 0 | 0 | 10 | 0.00% Details | | |

----End

4.6.9.2 DRS Synchronization Phase 1: Full Synchronization

- **Step 1** Select the full+incremental task created in section **Creating a DRS Task** and configure source and destination database information.
 - 1. Enter the IP address, port number, username, and password of the source database.

Click Test Connection.

| Source Database | |
|---|---|
| System databases, users, parameters, and jo | obs will not be migrated. You need to manually import users and jobs to the destination database and configure parameters in parameter templates of the destination database. |
| Database Type | Self-built on ECS |
| VPC | vpc-stc- |
| Subnet | subnet- |
| IP Address or Domain Name | |
| | For a RAC cluster, use a Scan IP address and specify Service Name to improve access performance. |
| Port | |
| Database Service Name | orci Service Name * |
| PDB Name | 0 |
| Database Username | |
| Database Password | ····· & |
| SSL Connection | |
| | Test Connection |

2. Enter the username and password of the destination database. Click **Test Connection**.

| Destination Database | | |
|----------------------|-----------------------------------|---|
| DB Instance Name | | |
| Database Username | | |
| Database Password | | Ø |
| | Test Connection 📀 Test successful | |

3. Click Next. In the displayed box, read the message carefully and click Agree.

| ▲ Notice | × | | | | | |
|--|---|--|--|--|--|--|
| I acknowledge that the IP addresses, domain names, ports, usernames, and passwords of involved databases will be temporarily collected and used in this task. These items will be deleted after the task is deleted. | | | | | | |
| Agree Cancel | | | | | | |

Step 2 Set the synchronization task.

1. Select the databases and tables of the source database to be synchronized. In this practice, all tables in **test** are selected.

| Flow Control | Yes No (?) | | |
|------------------------|---|--|--|
| | | | |
| Synchronize DDLs | Default Custom (7) You can select the types of DDL statements to be sync caution when filtering out high-risk DDL statements in Please select | hronized. The selected DDL statements will n one-to-many scenarios, such as DROP_TA | I be synchronized, and the unselected DDL statements will be filtered out. Exercise R.E., ALTER, TABLE, and DRDP, COLUMN. |
| Synchronization Object | Tables Import object file Only some DDL statements can be synchronized. For of After objects are synchronized, they will be saved in th if any data in the source database change, click the n Move objects to be migrated from list of unselected of | Setalls, see precautions of the current scene e destination database with their names in afresh button below. bjects on left side to the list of selected obj | vio in Real-Time Synchronization > Before You Start. all lowercase. ect on right side. |
| | ③ Select All | С | Select All |
| | + AUTO_DDM2ORACLE_RETRY | database | Search the expanded database using regular expressions. Q |
| | + _ AUTO_DRS_MULTITABLES01000 | database | C database |
| | + AUTO_DRS_MULTITABLES05000 | database | |
| | + AUTO_DRS_MULTITABLES10000 | database | + AUTO_DRS_STRESS Edit |
| | + AUTO_DRS_MULTITABLES50000 | database | |
| | AUTO_DRS_NCBLOB | database | |
| | AUTO_DRS_ORA | database | |
| | + AUTO_ORACLE2DDM_DB_1 | database | |
| | AUTO_ORACLE2DDM_NORMAL | database | |
| | AUTO_RESTART_BUG2023011203312 | database | |
| | A SYNC FULL RESET 001 | database | |
| | A SYNC FULL RETRY 001 | database | |
| | | database | |
| | | | |

2. Locate the database and table, respectively, and click **Edit** to change the database name and table name.

| ⑦ Set | ect All | С | Select All |
|------------------------------------|--------------------------|----|---|
| Search the expanded database using | g regular expressions. Q | | Search the expanded database using regular expressions. Q |
| + C##AAA + C##TESTCF | database database | | ☐ dbtset x ⑦ database ☐ C##ZL Edit 1 |
| | | >> | TB1 Edit |
| | | ~ | |
| | | | |
| | | | |
| | | | |

- 3. Click Next.
- **Step 3** On the **Advanced Settings** page, in the **Full Synchronization Settings** area, only select **Data** for **Synchronization Object Type**.

Full Synchronization Settings

| * Synchronization Object Type | 🔽 Table structure 🛛 Data 🔽 Index(Normal index, cannot contain primary keys, unique keys or foreign keys) |
|---|--|
| | Check this if you need to migrate the table structure. |
| * Stream Mode | • • |
| * Concurrent Task Configuration | • • |
| * Concurrent Export Tasks | |
| * Concurrent Import Tasks | |
| * Import Mode | COPY INSERT |
| * Rows per Shard | 520000 |
| * Character Adapt for Structure Migration | Auto adapt the character length Keep the character length in the original database |
| | |
| Incremental Data Captur | e Settings |
| * Concurrent Log Capture Tasks | |
| | |
| Incremental Replay Setti | nac |
| | ngs |
| * Concurrent Replay Tasks | - 64 + ⑦ |
| * Concurrent Replay Tasks - | Automated Manual |

Step 4 (Optional) Process data based on the site requirements.

| Processing Columns Data Filtering | | | | |
|---|---|----|---|--|
| You can query or filter columns or create new column names. | | | | |
| | C | | | |
| Search the expanded database using regular expressions. | Q | | Search the expanded database using regular expressions. Q | |
| + C##ZL database | | | | |
| | | | | |
| | | >> | | |
| | | ~ | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Step 5 After all settings are complete, perform a pre-check to ensure that the synchronization is successful. If any check fails, review the cause and rectify the fault. Then, click **Check Again**.

| Check Again | |
|---|--|
| Check success rate 100% All checks must pass before you can continue. If any check requires con | firmation, check and confirm the results before proceeding to the next step. |
| Check Item | Check Result |
| Database parameters | |
| Whether the source database contains unsupported table field types | Passed |
| Whether the destination database is compatible with the source database | Passed |
| Whether the character set of the source database matches that of the destination database | Passed |
| Whether the destination database has sufficient available connections | Passed |
| Whether the selected objects exist in the destination database | Passed |
| Whether the destination database contains the configured databases | Passed |
| Whether there are source database foreign keys | Passed |
| Whether tables to be migrated contain primary keys | Passed |
| Whether existing data meets the constraints | Passed |
| Whether the source database character set is supported | Passed |
| Whether the source database has sufficient available connections | Passed |
| Whether the source database container type is correct | Passed |
| Whether archive logs are enabled on the source database | Passed |
| Whether the source database name is valid | Passed |
| Whether the supplementary log is enabled for the source database. | Passed |
| Whether OGG log reading is enabled on the source database | Passed |
| Whether the source database table name is valid | Passed |

If all check items are successful, click **Next**.

Step 6 Confirm the task.

1. Check whether all configured information is correct.

| Start Time | Start upon task creation | Start at a specified time | 0 | | | | |
|-----------------------------|---|--|--|--|--|--|--|
| Send Notifications | () († disabled, | DRS alarms, such as task fallure, high lat | ency, and frozen, cannot be received. | | | | |
| * Stop Abnormal Tasks After | Atnormal Tasis After 14 (a) Atnormal tasks run larger than the period you set (unit: day) will automatically stop. | | | | | | |
| Details | | | | | | | |
| Product Name | Configu | ration | | | | | |
| | Task | nformation | | | | | |
| | Name | DRS | test info | | | | |
| | Descrip | tion Sou | re Database IP Address or Domain Name 10.154.219.69 Destination DBI Instance Name Auto-drs-gausschof-tar-1 | | | | |
| | Synchro | nization Mode Full | Incenental geoderonization | | | | |
| | Data Fi | ow To t | e cloud | | | | |

- 2. Click **Submit**. In the display box, select **I have read the precautions**.
- 3. Click Submit.

| Not | ice | × |
|------------|---|---|
| | During the synchronization, do not perform any operations on the destination DB instance through the management console. To ensur- migration success, we strongly recommend that you read the migration precautions carefully before starting migration tasks and follow the instructions to ensure migration stability. | 2 |
| | If the task status is abnormal for more than 14 days, the task automatically stops. Pay attention to the alarms you received and handle the task in time to resume the download and avoid task retry failure. | / |
| ~ 1 | have read the precautions. Submit | |

Step 7 After the task is submitted, view and manage it.

1. After the task is created, return to the task list to view the task status. After the status changes to **Incremental**, click **Pause**.

| | □ 4287c140-9e66-4e6b-b994-6235e4 ≥ Incremental | 3.81s 🛞 Yes To the r | cl Oracle-Gau Full+Increm Dec 25, 2023 14.5 | VPN Pay-per-use | Edit Stop More + |
|----|--|----------------------|---|-----------------|---------------------|
| | 10 v Total Records: 5 < 1 > | | | | Pause |
| 2. | In the displayed dial | og box, de | eselect Pause | log captu | ring and click Yes. |

| Are you sur | e you want to pause this task? |
|--|---|
| Name | Status |
| | O Incremental |
| A Pausing a task will st destination database longer communicate | op connections between the DRS instance and the . If you select Pause log capturing, the DRS instance will no with the source database. |
| A If the task is paused logs required by the task be paused no m | for too long, it may not be able to be resumed because the source database can expire. It is recommended that the ore than 24 hours. |
| Pause log capturing | |
| | Yes No |
| The DRS task er | nters the Paused state |

----End

4.6.9.3 UGO Schema Migration Phase 2: Common Indexes

Step 1 Select the task in UGO Schema Migration Phase 1: Tables, Primary Keys, Unique Keys/Indexes. On the Object Correction page, select the indexes to be migrated (or click INDEX in the object tree on the left and select displayed indexes on the right), and click Undo Skip. Migration Status of the selected indexes changes to Manual.

| Image: TEST12 BBBBB TABLE @ Manual @ Manual View Details () Image: TEST12 IDX_BBBBB INDEX @ Manual @ Manual View Details () | v | Schema | Object Name | Object Type | Conversion Status | Migration Status | Operation |
|---|---|----------|-------------|-------------|-------------------|------------------|--------------|
| TEST12 IDX_BBBBB INDEX @ Manual @ Manual View Details () | | + TEST12 | 88888 | TABLE | 🙆 Manual | 🙆 Manual | View Details |
| | | TEST12 | IDX_BBBBB | INDEX | 🙆 Manual | 🙆 Manual | View Details |
| TESTIZ TESTIZ USER 🗸 Success View Details | | TEST12 | TEST12 | USER | Success | Success | View Details |

Step 2 Click **Next** to go to the **Migration & Verification** page. Click **Start** to migrate indexes.

Ensure that all indexes are successfully migrated.

D NOTE

Do not click **Finish** in the lower right corner because other objects need to be migrated later.

| 01 | bject Type | Total Count | | Migration Suc | ceeded | Migration Faile | d | Remaining | | ignored | | Success (%) | | Operation |
|-----|--------------|-------------|-------------|---------------|---------------------|-----------------|------------------|-----------|-----------|---------|---------|-------------|---------|-----------|
| т | DTAL | 11 | | 10 | | 0 | | 0 | | 1 | | | 90.91% | |
| R | UNCTION | 1 | | 1 | | 0 | | 0 | | 0 | | | 100.00% | Details |
| в | IDEX | 2 | | 2 | | 0 | | 0 | | 0 | | | 100.00% | Details |
| P | ROCEDURE | 1 | | 1 | | 0 | | 0 | | 0 | | | 100.00% | Details |
| ^ T | ABLE | 5 | | 5 | | 0 | | 0 | | 0 | | | 100.00% | Details |
| | Object Type | | Total Count | | Migration Succeeded | | Migration Failed | | Remaining | | Ignored | Success (%) | | |
| | CREATE TABLE | | 5 | | 5 | | 0 | | 0 | | 0 | | | 100.00% |
| | FOREIGN KEY | | 1 | | 0 | | 0 | | 0 | | 1 | | | 0.00% |
| Т | 0.0070 | | | | | 0 | | 0 | | 1 | | | 0.00% | Datale |
| | RIGGER | 1 | | v | | | | | | | | | | |

----End

4.6.9.4 DRS Synchronization Phase 2: Incremental Synchronization

Step 1 Locate the task paused in **DRS Synchronization Phase 1: Full Synchronization** and click **Resume** in the **Operation** column.

Paused - @ Yes To the cl... Oracle-Gau... Full-Increm... Dec 25, 2023 14.5... VPN ... Pay-ger-use Resume Reset Stop

Step 2 The task enters the incremental synchronization phase. If the incremental synchronization delay is less than 30s, all data is about to be synchronized. Disconnect the service system of the source Oracle database to ensure that no data is written to the source Oracle database. Wait for about 1 minute after the disconnection.

| | 4287c148-9e66-4e6b-bl94-8285e4 | C Incremental | 5.14s | 🗑 Yes | To the cl | Oracle-Gau | Full+Increm | Dec 25, 2023 14:5 | VPN | Pay-per-use | | Edit Stop More 🔻 |
|--|--------------------------------|---------------|-------|-------|-----------|------------|-------------|-------------------|-----|-------------|--|----------------------|
|--|--------------------------------|---------------|-------|-------|-----------|------------|-------------|-------------------|-----|-------------|--|----------------------|

- Step 3 Compare data. Click the task name and choose Synchronization Comparison.
 - 1. On the **Object-Level Comparison** tab, click **Compare** to compare synchronization objects in the source Oracle database and destination GaussDB database.

| Basic Information | | | | | | | | | | |
|-------------------------------|--|--|---|--------------------------------|---------------------------|---|--|--|--|--|
| Synchronization Comparison | Object-Level Comparison Data-Level Comp | Jack-Level Comparison Data-Level Comparison | | | | | | | | |
| Synchronization Progress | In the many-to-one synchronization scenario, the number Comparison Time:Dec 27, 2023 09:13:33 GMT+08:00 | s of objects in the source and destination databases and con | reparison result displayed are based on the actual condition. | | Compare Cancel Comparison | C | | | | |
| Process Data | item | Source Database | Destination Database | Result | Operation | | | | | |
| Synchronization Mapping | Database | 4 | 1 | Consistent | View Details | | | | | |
| Synchronization Logs | Table | 1 | 1 | Consistent | View Details | | | | | |
| Abnormal Records | | | | | | | | | | |

2. On the **Data-Level Comparison** tab, click **Create Comparison Task**, select the tables whose rows to be compared, and click **OK**.

| Create Compar | ison Task | | | | | |
|---|--|--|------------------------------|-------------------------------------|------------------------|-------------------------|
| Some comparison result comparison during off-p | s may be inconsistent because da eak hours so that you can get an a | ta changes during the comparison cann occurate comparison result. | not be synchronized to the d | estination in real time. You are ad | vised to select a sche | duled time to start the |
| * Comparison Type | Row | | | | | |
| * Comparison Time | Start upon task creation | Start at a specified time | | | | |
| * Object | If any data in the source database | e changes, click the refresh button below | ν. | | | |
| | 0 | Select All | C | | Select All | |
| | Search the expanded databas | se using regular expressions. | 2 | Search the expanded databas | e using regular expre | essions. Q |
| | + C##ZL | database | | | | |
| | | | | | | |
| | | | >> | | | |
| | | | * | | | |
| | | | OK Cancel | | | |

3. After the comparison task is complete, click **View Results** to view the row comparison details.

| Object-Level Comparison | Data-Level Comparison | | | | |
|--|---|---------------------------------|--|-----------------------------|---|
| If the destination database is modifie | ed separately, the data inspection may be inacc | irate. | | | |
| Create Comparison Task | | | | | |
| Comparison Type | Start Time | End Time | Status | Exported Comparison Report | Operation |
| Row Comparison | Dec 27, 2023 09:13:44 GMT+00 | 00 Dec 27, 2023 09:13:51 GMT+08 | :00 O Completed | None | View Results Export Report |
| Results | | | | | C |
| Source Delabase | Destination D | labase | Result | Operation | |
| C##ZL | "do003"."0#kz | | Consistent | Vew Details | |
| | | | | | |
| Details C##ZL - "db003"."c##2/" | | | | | inter keywords to search the lable name Q |
| Source Delabase Table Nome | Destination Database Table Name 118 | ering Criteria Source | Delabase Table Rows 0 Destination Database | se Table Rows 0 Row Results | Now Differences |
| 78.1 | | | | 3 Committeet | |

Step 4 After confirming that the data is consistent in the source and destination databases, locate the task and click **Stop** in the **Operation** column to stop the DRS task.

----End

4.6.9.5 UGO Schema Migration Phase 3: Triggers, Events, Tasks, Foreign Keys, and Sequences

Step 1 Select the task in UGO Schema Migration Phase 2: Common Indexes. On the Object Correction page, select TRIGGER, EVENT, TASK, and FOREIGN KEY objects and click Undo Skip. Migration Status of the selected objects changes to Manual.

| Bulk Statement Update | | | | | | |
|--|------------------------------------|-----------------------------|-------------|-------------------|------------------|------------------|
| - E DB Objects (1459) | Skip Migration Undo Skip | Rerun Conversion Export SQL | | | | |
| - 😑 Storage (1014) | Q Search by Object Name by default | | | | | C |
| SEQUENCE (14) | ↓ Schema | Object Name | Object Type | Conversion Status | Migration Status | Operation |
| E TABLE (745) ⑦ | zmy_offine | FE0929_KEEP_US2022110401061 | PROCEDURE | Manual | Ø Manual | View Details (?) |
| FOREIGN KEY (26) | zmy_offine | FE0929_KEEP_US2022112900982 | PROCEDURE | Success | Success | View Details 💮 |
| - E INDEX (213) - SYNONYM (1) | zmy_offine | FE0929_KEEP_US2022112900992 | PROCEDURE | Success | Success | View Details (?) |
| TYPE (40) | zmy_offine | FE0929_KEEP_US2022112901001 | PROCEDURE | Success | Success | View Details (?) |
| - B VIEW (37) | XUELEI | PERSON_TYPE | TYPE | Success | Success | View Details (?) |
| MATERIALIZED_VIEW (6) B TRIGGER (82) | XUELEI | SF_ORG_PACK | PACKAGE | Success | Success | View Details (?) |

For FOREIGN KEY objects, select **FOREIGN KEY** in the object tree on the left and select displayed foreign keys on the right.
| DB Objects (1459) DB Storage (1014) | Skip Mig | undo Ski | Rerun Conversion | Export 9QL | | | | | | C |
|--|-------------|--------------|-----------------------|--------------|--------------|-------------------|------------------|-------|--------------|--------------|
| B SEQUENCE (14) | • • | Schema | | | | | | | Operation | |
| - TABLE (746) (?) | • | 090 | Undo Skip | | | | | × | View Details | |
| E FOREION KEY (26) | | 000 | Schema | Object Name | Object Type | Conversion Status | Migration Status | | View Details | |
| - INDEX (212) | | 000 | 000 | Алалалалалал | FOREIGN KEY | Manual | Ignore | | View Details | |
| B SYNONYM (1) TYPE (40) | | UGO_CHINESE_ | 10 - Total Records: 1 | < 1 > | | | | - 1 | View Details | |
| Code (385) | | U90_1 | | | | | | | View Details | |
| VIEW (37) | | UG0_AUT0_1 | | | Candel | | | | View Details | |
| ■ ∨ Schema | Object Name | | Object Type | | Conversion S | tatus | Migration S | tatus | | Operation |
| | | | | | | | - | | | |
| | | | FOREIGN KEY | 1 | A Manual | | 🙆 Manual | | | View Details |

Step 2 Click **Next** to go to the **Migration & Verification** page. Click **Start** to migrate the selected objects.

| Ob | ject Type | Total Count | Migration S | lucceeded | Migration Failed | | Remaining | | Ignored | | Success (%) | | Operation |
|------|---|-----------------------|-------------|-------------------------------|------------------|-----------------------|-----------|----------------|---------|--------------|-------------|---------|--------------------|
| TO | TAL | 11 | 10 | | 0 | | 0 | | 1 | | | 90.91% | |
| R. | INCTION | 1 | 1 | | 0 | | 0 | | 0 | | | 100.00% | Details |
| IN | DEX | 2 | 2 | | 0 | | 0 | | 0 | | | 100.00% | Details |
| PF | ROCEDURE | 1 | 1 | | 0 | | 0 | | 0 | | | 100.00% | Details |
| ^ TA | BLE | 5 | 5 | | 0 | | 0 | | 0 | | | 100.00% | Details |
| | | | | | | | | | | | | | |
| | Object Type | Total Count | | Migration Succeeded | | Nigration Failed | | Remaining | | Ignored | Success (%) | | |
| | Object Type CREATE TABLE | Total Count | | Migration Succeeded | | Migration Failed | | Remaining 0 | | lgnored D | Success (%) | | 100.00% |
| | Object Type CREATE TABLE FOREIGN KEY | Total Count 5 1 | | Migration Succeeded 5 1 | | Migration Failed 0 | | Remaining 0 | | lgnored D | Success (%) | | 100.00% |
| | Object Type CREATE TABLE FOREIGN KEY | Total Count 5 | | Migration Succeeded 5 | | Nigration Failed 0 0 | | Remaining 0 | | lgnored O | Success (%) | | 100.00% |
| AT | Object Type CREATE TABLE FOREIGN KEY NGGER | Total Count 5 1 | 1 | Migration Succeeded 5 | 0 | Nigration Failed 0 | 0 | Remaining 0 | 0 | lgnored D | Success (%) | 100.00% | 100.00% 100.00% |

Step 3 After the migration is successful, connect the service system to the target database GaussDB for data writing.

----End

4.7 From On-Premises Oracle to DDM

4.7.1 Overview

Description

You can use real-time synchronization of DRS to synchronize data from onpremises Oracle databases to Huawei Cloud DDM. Full+incremental synchronization can ensure that data is always in sync between the source Oracle database and the destination DDM instance.

Prerequisites

- You have registered with Huawei Cloud.
- Your account balance is greater than or equal to \$0 USD.

Service List

• Virtual Private Cloud (VPC)

- Distributed Database Middleware (DDM)
- Data Replication Service (DRS)
- Data Admin Service (DAS)

Deployment Architecture

In this example, the source database is an on-premises Oracle database, and the destination database is a Distributed Database Middleware (DDM) instance on Huawei Cloud. DRS synchronizes data from the source database to the destination database through the public network. For details about the deployment architecture, see Figure 4-32.

Figure 4-32 Synchronizing data through the public network



Before You Start

- The resource planning in this best practice is for demonstration only. Adjust it as needed.
- The test data is for reference only. For more information about DRS, click **here**.

4.7.2 Resource Planning

| Categor y | Subcategor y | Plan | Description |
|--------------|-----------------|-------------|---|
| VPC | VPC name | vpc-DRStar | Specify a name that is easy to identify. |
| | Region | Test region | To achieve lower network latency, select the region nearest to you. |
| | AZ | AZ 3 | - |

| Table 4-25 | Resource | planning |
|------------|----------|----------|
|------------|----------|----------|

| Categor y | Subcategor y | Plan | Description | | |
|-----------------------------------|----------------------------|-----------------------------------|--|--|--|
| | Subnet | 192.168.0.0/24 | Select a subnet with sufficient network resources. | | |
| | Subnet name | subnet-drs01 | Specify a name that is easy to identify. | | |
| Oracle (source databas | Name | orcl | Specify a name that is easy to identify. | | |
| e) | Specificatio ns | 16vCPUs 32GB | - | | |
| | Database version | 11.2.0.1 | - | | |
| | Database user | test_info | You can customize a user with the minimum permissions. For details, see here . | | |
| DDM (destinat ion | DDM instance name | ddm-DRS- AUTOTEST-001 | Specify a name that is easy to identify. | | |
| databas e) | Region | Test region | To achieve lower network latency, select the region nearest to you. | | |
| | AZ | AZ 3 | You can select one or more AZs. You are advised to create the instance across different AZs to improve service reliability. | | |
| | Node specification s | General-enhanced 4 vCPU 8 GB | - | | |
| | Nodes 1 | | A single node has high availability risks. In practice, you are advised to create at least two nodes. | | |
| RDS instance associat | RDS instance name | rds_ddm01 | Specify a name that is easy to identify. | | |
| ed with the DDM instance | Region | Test region | To achieve lower network latency, select the region nearest to you. | | |
| | Database version | MySQL 5.7 | - | | |

| Categor y | Subcategor y | Plan | Description |
|----------------------------|----------------------------------|-----------------------------------|---|
| | Instance type | Single | A single instance is used in this example. |
| | | | To improve service reliability, select a primary/standby instance. |
| | Storage type | SSD | - |
| | AZ | AZ 3 | A single instance is used in this example. |
| | | | To improve service reliability, create a primary/standby RDS instance and then deploy them in different AZs. |
| | Specificatio ns | General-purpose 4 vCPUs 8 GB | - |
| DRS synchron ization | Synchroniza tion task name | DRS-OracleToDDM | Specify a name that is easy to identify. |
| task | Source DB engine | Oracle | In this example, the source database is an Oracle database. |
| | Destination DB engine | DDM | In this example, the destination database is a DDM instance. |
| | Network type | Public network | Public network is used in this example. |

4.7.3 Operation Process

Figure 4-33 shows the process of creating a DDM instance and synchronizing data from an Oracle database to DDM.

Figure 4-33 Flowchart



4.7.4 Preparing for the Source Oracle Database

Before the synchronization, prepare some data types in the source database for verification after the synchronization is complete.

The following table lists data types supported by DRS.

Table 4-26 Data type mapping

| Data Type (Oracle) | Condition | Data Type (DDM) | Whether to Support Mapping |
|--------------------------------------|------------------------------|------------------------------------|----------------------------------|
| CHAR(n) | n ≤ 255 | CHAR(n) | Yes |
| CHAR(n) | n > 255 | VARCHAR(n) | Yes |
| VARCHAR(Size) | Length (row size) ≤ 65535 | VARCHAR(n) | Yes |
| VARCHAR(Size) | Length (row size) > 65535 | TEXT | Yes |
| VARCHAR2(n) | - | VARCHAR(n) | Yes |
| NCHAR(n) | n ≤ 255 | NCHAR(n) | Yes |
| NCHAR(n) | n > 255 | NVARCHAR(n) | Yes |
| NVARCHAR2(n) | - | NVARCHAR(n) | Yes |
| NUMBER(p,s) | s > 0 | NUMBER(p,s) | Yes |
| NUMBER(p,s) | s ≤ 0 | NUMBER(p-s,0) | Yes |
| BINARY_FLOAT | - | FLOAT | Yes |
| BINARY_DOUBL E | - | DOUBLE | Yes |
| FLOAT(b) | b ≤ 99 | DECIMAL(b*0.30103*2, b*0.30103) | Yes |
| FLOAT(b) | b > 99 | DOUBLE | Yes |
| DATE | - | DATETIME | Yes |
| TIMESTAMP | - | TIMESTAMP | Yes |
| TIMESTAMP WITH LOCAL TIME ZONE | - | TIMESTAMP | Yes |
| TIMESTAMP WITH TIME ZONE | - | TIMESTAMP | Yes |
| INTERVAL | Incremental | VARCHAR(30) | No |
| INTERVAL | Full; 6 digit precision | VARCHAR(30) | Yes |
| BLOB | - | LONGBLOB | Yes |
| CLOB | - | LONGTEXT | Yes |
| NCLOB | - | LONGTEXT | Yes |

| Data Type (Oracle) | Condition | Data Type (DDM) | Whether to Support Mapping |
|-----------------------|-----------|-----------------|----------------------------------|
| LONG | - | LONGTEXT | Yes |
| LONG_RAW | - | LONGBLOB | Yes |
| RAW | - | VARBINARY | Yes |
| ROWID | - | VARCHAR(18) | Yes |

Perform the following steps to generate data in the source database:

- **Step 1** Use a database connection tool to connect to the source Oracle database based on its IP address.
- **Step 2** Construct data in the source database based on its supported data types.
 - Create a test user.
 create user test_info identified by xxx;
 test_info indicates the user created for the test, and xxx indicates the password of the user.
 - Assign permissions to the user. grant dba to test_info;
 - Create a data table under the user. CREATE TABLE test_info.table3(ID INT, COL01 CHAR(100), COL02 NCHAR(100), PRIMARY KEY(ID)):
 - 4. Insert two rows of data.

insert into test_info.table3 values(4,'huawei','xian'); insert into test_info.table3 values(2,'DRS-test','test1'); insert into test_info.table3 values(1,'huawei','xian');

 Make the above statements take effect. commit;

----End

4.7.5 Preparing for the Destination DDM Instance

4.7.5.1 Creating a VPC and Security Group

Create a VPC and security group to prepare for the destination DDM instance.

Creating a VPC

Step 1 Log in to the management console.

- **Step 2** Click ^(Q) in the upper left corner and select a region and project.
- **Step 3** Click the service list icon on the left and choose **Networking** > **Virtual Private Cloud**.

The VPC console is displayed.

Step 4 Click Create VPC.

| Basic Information | - |
|------------------------|--|
| Region | Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
| Name | vpc-DRStar |
| IPv4 CIDR Block | 192 + 168 + 0 + 0 / 24 - Recommended: 10.0.0.076-24 (Select) 172:16.0.0/12-24 (Select) 192:168.0.0/16-24 (Select) |
| Enterprise Project | default C Create Enterprise Project |
| Advanced Settings 👻 | Tag Description |
| | |
| Default Subnet | |
| AZ | AZ3 • 0 |
| Name | subnel-drs01 |
| IPv4 CIDR Block (?) | 192 · 168 · 0 · 0 / 24 · |
| | Available IP Addresses: 251 The CIDR block cannot be modified after the subnet has been created. |
| IPv6 CIDR Block | Enable 💿 |
| Associated Route Table | Default ⑦ |
| Advanced Settings 💌 | Gateway DNS Server Address DHCP Lease Time Tag Description |

- **Step 5** Configure parameters as needed and click **Create Now**.
- **Step 6** Return to the VPC list and check whether the VPC is created.

When its status becomes available, the VPC is created.

----End

Creating a Security Group

- **Step 1** Log in to the **management console**.
- **Step 2** Click ^Q in the upper left corner and select a region and project.
- Step 3 Click the service list icon on the left and choose Networking > Virtual Private Cloud.

The VPC console is displayed.

- **Step 4** In the navigation pane, choose **Access Control** > **Security Groups**.
- Step 5 Click Create Security Group.
- **Step 6** Specify the security group name and other information, and click **OK**.

×

| Name | sg-DRS02 |
|---------------------|---|
| Enterprise Project | default C Create Enterprise Project @ |
| Template | General-purpose web ser • |
| Description | The security group is for general-purpose web servers and includes default rules that allow all inbound ICMP traffic and inbound traffic on ports 22, 80, 443, and 3389. The security group is used for remote login, ping, and hosting a website on ECSs. |
| | d 0/255 |
| Show Default Rule 🔻 | |

----End

4.7.5.2 Creating a DDM Instance

- **Step 1** Log in to the management console.
- **Step 2** Click ⁽²⁾ in the upper left corner and select a region and project.
- **Step 3** Click the service list icon on the left and choose **Databases > Distributed Database Middleware**.
- **Step 4** On the displayed page, in the upper right corner, click **Buy DDM Instance**.
- **Step 5** Specify the instance information and specifications as required.

| Billing Mode | Yearly/Monthly Pay-per-use ⑦ |
|----------------|---|
| Region | CN North-Ulanqab1 • ? |
| AZ | 🗌 AZ1 🗌 AZ2 💟 AZ3 💿 |
| | |
| Instance Name | ddm-DRS-AUTOTEST-001 |
| Time Zone | UTC+08:00 Beijing, Chong 🔻 |
| Node Class | General-enhanced Kunpeng general computing-plus (?) |
| | CPU/Memory |
| | 8 vCPUs 16 GB |
| | ○ 16 vCPUs 32 GB |
| | 32 vCPUs 64 GB |
| | |
| Instance Nodes | - <u>1</u> + |
| | Selecting at least 2 nodes is recommended because a single node cannot provide the same level of availability |

Step 6 Select a VPC and security group for the instance and configure the database port.The VPC and security group have been created in Creating a VPC and Security Group.

```
VPC vpc.0153ar · C submet-dep01(192168.0.0,24) · C Vew VPC (*)

To cannot change its VPC after a DDM Instance is created. Exercise calcular where selecting a VPC. The DDM Instance, the ESS where the application is deployed, and the underlying DB Instances must be in the same VP

Security Group c C

To exercise methods connectivity, select the same security group at the associated DB Instances, and the ESS where your application is deployed. Learn more (*)
```

- **Step 7** After the configuration is complete, click **Next** at the bottom of the page.
- **Step 8** Confirm your settings.
 - To modify your settings, click **Previous**.
 - If you do not need to modify your settings, click **Submit**.
- **Step 9** Go to the **Instances** page to view and manage the instance.

The default database port is **5066** and can be changed after a DDM instance is created. If the status of the instance is **Running**, the instance has been created.

----End

4.7.5.3 Creating an RDS for MySQL Instance

Create an RDS for MySQL instance associated with the DDM instance.

Procedure

- **Step 1** Log in to the management console.
- **Step 2** Click ¹ in the upper left corner and select a region and project.
- Step 3 Click the service list icon on the left and choose Databases > Relational Database Service.
- Step 4 Click Buy DB Instance.
- **Step 5** Configure the instance name and basic information.



Step 6 Configure instance specifications.

| Instance Class | General-purpose | Dedicated | Kunpeng general- | enhanced | | | | | |
|--------------------|-------------------------------|------------------------|------------------------|---------------------|-------------------------|------------------------------|--|---------------|--|
| | vCPU Memory | | | | Recommended Connec | tions | TPS/QPS (?) | IPv6 | |
| | 2 vCPUs 4 GB | | | | | 1,500 | 334 6,673 | Not supported | |
| | 2 vCPUs 8 GB | | | | | 2,500 | 552 11,039 | Not supported | |
| | 4 vCPUs 8 GB | | | | | 2,500 | 756 15,122 | Not supported | |
| | 4 vCPUs 16 GB | | | | | 5,000 | 1,062 21,249 | Not supported | |
| | O 8 vCPUs 16 GB | | | | | 5,000 | 1,338 26,756 | Not supported | |
| | DB Instance Specifications | General-purpose 4 | vCPUs 8 GB, Recom | mended Connection | ns: 2500, TPS/QPS: 756 | 15122 | | | |
| Storage Space (GB) | 40 GB | | | | - | 40 + 📀 | | | |
| | 40 | 830 | 1,620 | 2,410 | 4,000 | | | | |
| | RDS provides free backup str | orage space of the sar | me size as your purch | ased storage space. | After the free backup | space is used up, charges a | are applied based on the OBS pricing | details. | |
| | Enable autoscaling 🕥 | Trigger If Avail | lable Storage Drops T | b 10% | | Autoscaling Limit | 4000 | GB | |
| | If available storage drops to | 10% or less, your stor | rage will autoscale by | 15% (in increment | s of 10 GB) of your all | ocated storage. If your acco | ount balance is insufficient, autoscal | ng will fail. | |
| Disk Encryption | Disable | Recommended Enable | 0 | | | | | | |

Step 7 Select a VPC and security group for the instance and configure the database port.

The VPC and security group have been created in **Creating a VPC and Security Group**.



The RDS for MySQL instance must be in the same VPC and subnet as your DDM instance.

| | ⑦ Relationship among VPCs, subnets, second secon | irity group | x, and DB instances |
|------------------|---|---------------------------|---|
| VPC ⑦ | vpc-DRStar | • c | subnet-drsot (192.168.0.0/24) C Automatically-assigned IP address View In-use IP Address |
| | After the RDS instance is created, the VPC of An EIP is required if you want to access DB | annot be c instances t | Danged, ECSs in different VPCs cannot communicate with each other by default. If you want to create a VPC, go to the VPC console. Available Private IP Addresses: 251 brough a public network. View EP |
| Database Port | Default port: 3306 | | |
| Security Group 👩 | sg-DR502 | • C | View Security Group |
| | Ensure that port 3306 of the security group | allows tra | ffic from your server IP address to the DB instance. |

Step 8 Configure the instance password.

| Password | Configure | Skip | |
|------------------------|-----------|------|--|
| Administrator | root | | |
| Administrator Password | •••••• | | Keep your password secure. The system cannot retrieve your password. |
| Confirm Password | ••••• | | |

Step 9 Click Next.

- Step 10 Confirm your settings.
 - To modify your settings, click **Previous**.
 - If you do not need to modify your settings, click **Submit**.
- **Step 11** Return to the instance list.

If the instance status becomes available, the instance has been created.

----End

4.7.5.4 Creating a Schema and Associating It with the RDS for MySQL Instance

- **Step 1** Log in to the management console.
- **Step 2** Click ⁽²⁾ in the upper left corner and select a region and project.
- **Step 3** Click the service list icon on the left and choose **Databases > Distributed Database Middleware**.
- **Step 4** On the **Instances** page, locate the required DDM instance and click **Create Schema** in the **Operation** column.
- **Step 5** On the displayed page, specify a sharding method, enter a schema name, set the number of shards, select the required DDM accounts, and click **Next**.

In this example, the schema is unsharded, and the schema name is **db_test**.

 \times

Currently, only data can be synchronized from Oracle to DDM. To synchronize table structures and other objects, you need to create schemas in the destination DDM instance based on table structures of the source Oracle database.

| Createsterms corresponde to only one data node, and only one shard is created on the data node. * Sthema Cestest | * Sharding | Sharded Unsharded | | | |
|---|---|--|--|--|---|
| | | One schema corresponds to only one data node, | and only one shard is created on the data node. | | |
| AccountC | * Schema | db_test | 0 | | |
| No accounts available. Create Account | Account | Select | • C | | |
| Data Nodes RDS for MySQL 5.7 RDS for MySQL 5.0 GaussDB(for MySQL) Select only the data nodes that are in the same VPC as your DDM instances and not in use by other DDM instances. DDM will create databases on the selected data nodes without affecting their existing databases and tables. Select only the data nodes: 1 DB linstance name • Q C Image: Instance Name Status Connection Address Image: Instance Name B lingine Image: Instance Name B lingine Image: Instance Name B lingine Image: Instance Name B lingine | | No accounts available. Create Account | | | |
| Instance Name Status Connection Address DB Engine ths_dem01 • Running 192.166.8.863306 MyGQL 5.7 | | | | | |
| rds_ddm01 | Data Node RDS for MyS ielect only the | S RDS for MySQL 8.0 Gaus data nodes that are in the same VPC as your DDI | sDB(for MySQL) I instance and not in use by other DDM instances. DD | M will create databases on the selected data no Selected nodes: 1 DB instance nam | des without affecting their existing databases and tables. e • Q (C) |
| | Data Node RDS for MyS ielect only the | S GQL 5.7 RDS for MySQL 8.0 Gauss data nodes that are in the same VPC as your DDI nce Name | sDB(for MySQL) I instance and not in use by other DOM instances. DO Status | M will create databases on the selected data no Selected nodes: 1 DB instance nam Connection Address | des without affecting their existing databases and tables. e Q C DB Engine |

----End

4.7.5.5 Creating a DDM Account

- **Step 1** Log in to the **management console**.
- **Step 2** Click ⁽²⁾ in the upper left corner and select a region and project.
- **Step 3** Click the service list icon on the left and choose **Databases > Distributed Database Middleware**.
- **Step 4** On the **Instances** page, locate the required DDM instance and click its name.
- **Step 5** In the navigation pane, choose **Accounts**.

Create Account

Step 6 On the displayed page, click Create Account and configure parameters as needed.For details about the permissions required by the DDM account, see Precautions

| cleate Account | |
|--------------------|---|
| * Username | ddm_user ⑦ |
| * Password | |
| * Confirm Password | |
| Schema | db_test 💿 💌 |
| * Permissions | ✓ All ✓ CREATE ✓ DROP ✓ ALTER ✓ INDEX ✓ INSERT ✓ DELETE ✓ UPDATE ✓ SELECT |
| Description | Enter a description. |
| | OK Cancel |

Step 7 Click OK.

----End

4.7.5.6 Creating Table Structures in the Destination Database

Currently, only data can be synchronized from the source Oracle database to the destination DDM instance. Source table structures and other objects cannot be synchronized, so you need to create table structures and indexes in the destination database based on the table structures of the source schema. For more details, see**Precautions**.

Procedure

Step 1 Log in to the management console.

- **Step 2** Click ^(Q) in the upper left corner and select a region and project.
- **Step 3** Click the service list icon on the left and choose **Databases > Distributed Database Middleware**.
- **Step 4** On the displayed page, enter the username and password created in **Creating a DDM Account**, and click **Test Connection**.
- **Step 5** After the connection is successful, click **Log In** to log in to the DDM instance.
- Step 6 Click the db_test schema created in Creating a Schema and Associating It with the RDS for MySQL Instance.
- Step 7 Run the following SQL statements in database db_test to create table table3 with the same structure as the source:

 CREATE TABLE `db_test`.`table3`(

 ID INT,

 COL01 CHAR(100),

 COL02 NCHAR(100),

 PRIMARY KEY(ID));

----End

4.7.6 Creating a DRS Synchronization Task

This section describes how to create a DRS task and synchronize data from an onpremises Oracle database to Huawei Cloud DDM.

Pre-Check

Before creating a task, check whether synchronization conditions are met.

In this example, data is synchronized to DDM. For more details, see Precautions.

Procedure

Step 1 Log in to the management console.

Step 2 Click ¹ in the upper left corner and select a region and project.

- Step 3 Click the service list icon on the left and choose Databases > Data Replication Service.
- **Step 4** In the upper right corner, click **Create Synchronization Task**.
- **Step 5** Configure synchronization task parameters.
 - 1. Specify a synchronization task name.

| Billing Mode | Yearly.Monthy Payseruse |
|--------------|---|
| Region | ۹ |
| | Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For four network latency and quick resource access, select the nearest region. |
| Project | × |
| * Task Name | DRS-drawshotDM () |
| Description | 0 |
| | |
| | 0/256 |

2. Enter the synchronization task information and select the destination database.

Select the DDM instance created in **Creating a DDM Instance** as the destination database.

| Synchronization Instance | e Details 💿 | | | | |
|---------------------------------------|--|---|--|---------------------------------------|----------------------------------|
| The following information cannot be m | odified after you go to the next page. | | | | |
| * Data Flow | To the cloud Out o | of the cloud Self-built to self-I | built | | |
| | The destination database must be | a database in the current cloud. If you | want to synchronize data between data | bases, select To the cloud. | |
| * Source DB Engine | MySQL Oracle | DB2 for LUW DDM | MongoDB PostgreSQ | Microsoft SQL Server | TICE |
| * Destination DB Engine | MySQL DOM | GaussDB(DWS) GaussD | DB Distributed GaussDB Prima | nyiStandby PostgreSQL | GaussD8(for MySQL) |
| * Network Type | Public network | • (1) | | | |
| | DRS will automatically bind a | n EIP to the DRS instance and release th | he EIP after the task is complete. | | |
| * Destination DB Instance | No DB Instance available. | C View DB Inst | stance Wew Unselectable DB Instance | | |
| Synchronization Instance Subnet | Select the subnet | • (?) View Subret | ts | | |
| * Synchronization Mode | Full-incremental | Full | | | |
| | This synchronization type synchro | nizes data in real time. After a full synch | hronization initializes the destination da | tabase, an incremental synchronizatio | n parses logs to ensure data con |

Step 6 Click Create Now.

The synchronization instance is being created. It takes about 5 to 10 minutes.

- **Step 7** Configure source and destination database information.
 - 1. Configure the source database information and click **Test Connection**. If a successful test message is returned, the database is connected.

| Source Database | | | |
|-------------------------------------|------------------------------------|-----------------------|---------|
| System databases, users, parameters | and jobs will not be migrated. You | need to manually impo | ort use |
| IP Address or Domain Name | | | |
| | For a RAC cluster, use a Sca | an IP address and spe | cify Se |
| Port | 1521 | | |
| Database Service Name | ORA11G | Service Name | • |
| | _ | | |
| PDB Name | 0 | | |
| Database Username | | | |
| Database Password | | | Q |
| 001.0 | | | |
| SSL Connection | | | |
| | Test Connection | Test successful | |

2. Configure the destination database information and click **Test Connection**. If a successful test message is returned, the database is connected.

Destination Database

| DB Instance Name | ddm-DRS-AUTOTEST-001 (|) |
|-------------------|------------------------|---|
| Database Username | | |
| Database Password | | Ø |
| | Test Connection | |

Step 8 Click Next.

- Step 9 On the Set Synchronization Task page, select the synchronization objects.
 - Set Flow Control to No.
 - Set Synchronization Object to Tables.

Select the databases and tables of the source database to be synchronized. In this bset practice, **table3** in **test_info** is selected and synchronized to **table3** in **db_test**.

| Flow Control | Yes No | 0 | | | | | |
|------------------------|--|---|---|--|---|---|--------------------|
| Synchronization Object | Tables This take does not support DDL - only selected tables are synchronized in the s | ynchronization nized. To synchron e changes, click ti list of unselected Select All tabases are sear | nite new tables added to the soo in the destandon distance with referesh button bolow. I objects on left side to the list of the distance of the source of the source of the child | rce database du teir names in all selected objects | tog the incurrential synchronization, you need to edit beneficial: Select Al For Lation, only organized databases are search Tog Tables, only organized databases are search Tog Tables, only organized databases. | This synchronization task to selv ed. Q Edit database | act the new tables |
| | | | | * « | TARES EST table | | |

Step 10 Click Next. On the Check Task page, check the synchronization task.

- If any check fails, review the cause and rectify the fault. After the fault is rectified, click **Check Again**.
- If all check items are successful, click **Next**.

Step 11 Click Submit.

Return to the **Data Synchronization Management** page and check the synchronization task status.

It takes several minutes to complete.

| Task Name/ID ↓Ξ | Status | Delay 🕐 | Charging | Data Flow | DB Engine 👌 | Synchronizat | Created JF | Networ | Billing Mode | Description | Enterp | Operation |
|---|----------------|---------|----------|--------------|-------------|------------------|----------------------|--------|------------------------------|--------------|---------|-----------|
| DRS-OracleToDDM ba8b9bfa-c533-4136-945 |) Starting (?) | | 🗑 Yes | To the cloud | Oracle-DDM | Full+Incremental | Nov 08, 2022 15:49:4 | Public | Pay-per-Use Created on No | Source Datab | default | Stop |

If the status changes to **Full synchronization**, the synchronization task has been started.

- For synchronization from Oracle to DDM, full synchronization and full+incremental synchronization modes are supported.
- If you create a full synchronization task, the task automatically stops after the full data is synchronized to the destination.
- If you create a full+incremental synchronization task, a full synchronization is executed first. After the full synchronization is complete, an incremental synchronization starts.
- During the incremental synchronization, data is continuously synchronized, so the task will not automatically stop.

----End

4.7.7 Confirming Synchronization Results

You can use either of the following methods to check the synchronization results:

- 1. DRS compares synchronization objects and data and provides comparison results. For details, see Viewing Synchronization Results on the DRS Console.
- 2. Log in to the destination side to check whether the databases, tables, and data are synchronized. Confirm the data synchronization status. For details, see **Viewing Synchronization Results on the DDM Console**.

Viewing Synchronization Results on the DRS Console

Step 1 Log in to the management console.

- **Step 2** Click ¹ in the upper left corner and select a region and project.
- **Step 3** Click the service list icon on the left and choose **Databases** > **Data Replication Service**.
- **Step 4** Locate the required DRS instance and click its name.
- **Step 5** In the navigation pane on the left, choose **Synchronization Comparison**.
- **Step 6** Click the **Object-Level Comparison** tab and check whether some objects are missing.

Click **Compare**. After the comparison is complete, view the comparison results.

| < DRS-OracleToDDN | 1 | | | | Feedback | View Metric |
|-------------------------------|---|---|--|--------------------------------|---------------------------|-------------|
| Basic Information | Object-Level Comparison Data-Level Con | parison | | | | |
| Comparison Synchronization | In the many-to-one synchronization scenario, the numb Comparison Time: Nov 08, 2022 18:13:59 GMT+08:00 | ers of objects in the source and destination databases and co | mparison result displayed are based on the actual condition. | | Compare Cancel Comparison | C C |
| 1109035 | Item | Source Database | Destination Database | Result | Operation | |
| Synchronization Mapping | Database | 1 | 1 | Consistent | View Details | |
| Synchronization Logs | Table | 1 | 1 | Consistent | View Details | |
| Tags | | | | | | |

- **Step 7** Click the **Data-Level Comparison** tab and check whether the number of rows of synchronized objects is consistent.
 - 1. Click Create Comparison Task.
 - 2. In the displayed dialog box, select the comparison type, time, and object.

×

Create Comparison Task

| erouto eompu | | | | | | | |
|--|--|---|---------------|-------------------|---|-------------------------|---|
| Some comparison resu comparison during off- | ilts may be inconsistent because da beak hours so that you can get an a | ta changes during the comparison ca ccurate comparison result. | nnot be synct | nronized to the c | destination in real time. You are advised to select a scher | Juled time to start the | * |
| * Comparison Type | Row | | | | | | |
| * Comparison Time | Start upon task creation | Start at a specified time | | | | | |
| * Object | If any data in the source database | changes, click the refresh button bel | ow. | | | | |
| | 0 | Select All | С | | Select All | | |
| | For tables, only expanded dat | abases are searched. | Q | | For tables, only expanded databases are searched. | Q | |
| | | | | | TEST_INFO (New name: db_test) | database | |
| | | | | | TABLE3 | table | |
| | | | | >> | | | |
| | | | | « | | | |
| | | | | | | | |
| | | | | | | | |
| | | | ок | Cancel | | | |

3. After the comparison task is complete, view the data comparison results.

| < DRS-OracleToDDN | 1 | | | | | Feedback | View Metric | |
|-------------------------------|---|---------------------------------|---------------------------------|-----------|----------------------------|------------------------------|-------------|--|
| Basic Information | Déject-Level Comparison Data-Level Comparison | | | | | | | |
| Synchronization Comparison | If the definition distance is modified separately, the data resection may be harccurate | | | | | | | |
| Synchronization | Greete Comparison Task | | | | | | | |
| Progress | Comparison Type | Start Time | End Time | Status | Exported Comparison Report | Operation | | |
| Synchronization Mapping | Row Comparison | Nov 08, 2022 18:16:29 GMT+08:00 | Nov 08, 2022 18:16:34 GMT+08:00 | Completed | O none | View Results Export Report | | |
| Synchronization Logs | | | | | | | | |
| Tags | | | | | | | | |

4. To view the comparison details, click **View Results** next to the comparison task.

| C DR3-Oracle toDDM view Results | | | | | | | | |
|---|---------------------------------|----------------------------|---------------------------------|--------------------------------|--------------|---|---------|--|
| Companion type fine Companion Companion Ret File R0, 2022 112 23 (10)7-101.00 Companion end Time Nov 80, 2022 11.23 24 (10)7-101.00 | | | | | | | | |
| Results | | | | | | | С | |
| Source Database | Destination Database | | Result | | Operation | | | |
| TEST_INFO | text01 | | Consistent | | View Details | | | |
| | | | | | | | | |
| Details TEST_INFO - db_test | | | | | | Enter logwords to search the table name | Q | |
| Source Database Table Name | Destination Database Table Name | Source Database Table Rows | Destination Database Table Rows | Row | | diff | erences | |
| TABLE3 | table3 | 3 | 3 | Consistent | | | | |

----End

Viewing Synchronization Results on the DDM Console

- **Step 1** Log in to the management console.
- **Step 2** Click \bigcirc in the upper left corner and select a region and project.
- **Step 3** Click the service list icon on the left and choose **Databases > Distributed Database Middleware**.
- Step 4 Locate the target DDM instance and click Log In in the Operation column.
- **Step 5** In the displayed dialog box, enter the password and click **Test Connection**.
- **Step 6** After the connection is successful, click **Log In**.
- **Step 7** View destination database and table names and check whether all data is synchronized.

----End

4.8 From RDS for MySQL to Kafka

4.8.1 Overview

Description

In this section, we will create a DRS synchronization task to synchronize the incremental data from the source RDS for MySQL database to the destination Kafka database. This section also describes:

- How to create an RDS for MySQL instance.
- How to create DMS for Kafka.
- How to create a DRS synchronization task.

Prerequisites

- You have registered with Huawei Cloud.
- Your account balance is greater than or equal to \$0 USD.

Service List

- Virtual Private Cloud (VPC)
- Relational Database Service (RDS)
- DMS for Kafka
- Data Replication Service (DRS)
- Data Admin Service (DAS)

Deployment Architecture

In this example, the source is an RDS for MySQL instance, and the destination is a DMS for Kafka in the same region. Incremental data of the source database is synchronized to the destination database in a VPC. For details about the deployment architecture, see Figure 4-34.

Figure 4-34 VPC network



Before You Start

- The resource planning in this best practice is for demonstration only. Adjust it as needed.
- The test data is for reference only. For more information about DRS, click **here**.

4.8.2 Resource and Cost Planning

| Categ ory | Subcatego ry | Plan | Description | | |
|--------------------|-----------------------------|--------------|---|--|--|
| VPC | VPC name | vpc-DRStest | Specify a name that is easy to identify. | | |
| | Region | AP-Singapore | To achieve lower network latency, select the region nearest to you. | | |
| | AZ | AZ 1 | - | | |
| | Subnet | 10.0.0/24 | Select a subnet with sufficient network resources. | | |
| | Subnet subnet-drs01 name | | Specify a name that is easy to identify. | | |
| RDS (sourc e | RDS instance name | rds-mysql | Specify a name that is easy to identify. | | |
| datab ase) | DB engine version | MySQL 5.7 | - | | |

| Table 4-27 Resou | urce planning |
|------------------|---------------|
|------------------|---------------|

| Categ ory | Subcatego ry | Plan | Description | | |
|---------------------------|----------------------------------|-----------------------------------|--|--|--|
| | Instance type | Single | A single instance is used in this example. To improve service reliability, select a | | |
| | | | primary/standby instance. | | |
| | Storage type | SSD | - | | |
| | AZ | AZ 3 | A single instance is used in this example. | | |
| | | | To improve service reliability, create a primary and standby instance and then locate them in two different AZs. | | |
| | Specificati ons | General-purpose 4 vCPUs 8 GB | - | | |
| Kafka (desti nation | Kafka instance name | kafka-drs | Specify a name that is easy to identify. | | |
| datab ase) | Version | 2.3.0 | - | | |
| use) | AZ | AZ 3 | You can select one, three, or more AZs. You are advised to create the instance across different AZs to improve service reliability. | | |
| | Specificati ons | c6.2u4g.cluster | - | | |
| | Brokers | 3 | - | | |
| | Storage space | High I/O, 200 GB | The storage space is used to store messages (including replicas). Kafka uses three replicas by default. In addition to storing messages, some space needs to be reserved for storing logs and metadata. | | |
| DRS synchr onizati | Synchroniz ation task name | DRS- MySQLToKafka | Custom | | |
| on task | Source DB engine | MySQL | In this example, the source is an RDS for MySQL instance. | | |
| | Destinatio n DB engine | Kafka | In this example, the destination database is Kafka. | | |
| | Network Type | VPC | In the practice, select the VPC network. | | |

NOTE

For details about the prices of the preceding resources, see **Pricing Details**. You can use the **price calculator** provided by Huawei Cloud to quickly calculate the reference price based on your desired specifications.

4.8.3 Operation Process

Figure 4-35 shows the process of creating an RDS for MySQL instance and synchronizing the incremental data from an RDS for MySQL instance to Kafka.



Figure 4-35 Flowchart

4.8.4 Creating a VPC and Security Group

Create a VPC and security group for an RDS for MySQL and Kafka instances.

Creating a VPC

Step 1 Log in to the **management console**.

- **Step 2** Click Singapore. **Step 2** Click Represent the state of the management console and select AP-Singapore.
- Step 3 Under the service list, choose Networking > Virtual Private Cloud. The VPC console is displayed.

Step 4 Click Create VPC.

| Basic Information | |
|------------------------|---|
| Region | Comparing a set of the set o |
| | latency and quick resource access, select the nearest region. |
| Name | vpc DRStest |
| IPv4 CIDR Block | 10 . 0 . 0 / 24 * |
| | Recommended: 10.0.0.0/8-24 (Select) 172.16.0.0/12-24 (Select) 192.168.0.0/16-24 (Select) |
| | The CIDR block 10.0.0.0/24 overlaps with a CIDR block of another VPC in the current region. If you intend to enable communication between VPCs or between a VPC and an on-premises data center, change the CIDR block. View VPC CIDR blocks in current region |
| Enterprise Project | default C Create Enterprise Project |
| Advanced Settings v | Tag Description |
| Default Subnet | |
| AZ | AZ1 • ⑦ |
| Name | submet-drs01 |
| IPv4 CIDR Block | 10 · 0 · 0 / 24 · ⑦ Available IP Addresses: 251 |
| | The CIDR block cannot be modified after the subnet has been created. |
| IPv6 CIDR Block | 🗌 Enable 💿 |
| Associated Route Table | Default 🕥 |
| Advanced Settings 🔻 | Gateway DNS Server Address NTP Server Address DHCP Lease Time Tag Description |

- **Step 5** Configure parameters as needed and click **Create Now**.
- **Step 6** Return to the VPC list and check whether the VPC is created.

If the VPC status becomes available, the VPC has been created.

----End

Creating a Security Group

- **Step 1** Log in to the **management console**.
- **Step 2** Click I in the upper left corner of the management console and select AP-Singapore.
- **Step 3** Under the service list, choose **Networking** > **Virtual Private Cloud**.

The VPC console is displayed.

- **Step 4** In the navigation pane, choose **Access Control** > **Security Groups**.
- Step 5 Click Create Security Group.
- **Step 6** Configure parameters as needed.

| Create Security | Group | × |
|----------------------|--|---|
| * Name | sg-DRS01 | |
| ★ Enterprise Project | default C Create Enterprise Project | |
| * Template | General-purpose web server 🔻 | |
| Description | The security group is for general-purpose web servers and includes default rules that allow all inbound ICMP traffic and inbound traffic on ports 22, 80, 443, and 3389. The security group is used for remote login, ping, and hosting a website on ECSs. | |
| Show Default Rule | | |
| | OK Cancel | |

- Step 7 Click OK.
- **Step 8** Return to the security group list and click the security group name (**sg-DRS01** in this example).
- **Step 9** Click the **Inbound Rules** tab, and then click **Add Rule**.

| Summary | Inbound Rules | Outbound R | Associated Instance | es |
|----------|---------------|------------|---------------------|----|
| | | | | |
| Add Rule | Fast-Add Rule | Delete | Allow Common Ports | |

Step 10 Configure an inbound rule to allow access from database port **3306**.

| Add Inbound Rule Learn more about security group configuration. | | | | | | | | |
|---|---------|---------------------|------------|--------------|-------------|-------------|--|--|
| Inbound rules allow incoming traffic to instances associated with the security group. | | | | | | | | |
| Security Group sg-DRS01 You can import multiple rules in a batch. | | | | | | | | |
| Priority (?) | Action | Protocol & Port (?) | Туре | Source (?) | Description | Operation | | |
| 1-100 | Allow 🔻 | TCP - | IPv4 💌 | IP address • | | Operation - | | |
| | | | 🕀 Add Rule | | | | | |
| OK Cancel | | | | | | | | |

~

4.8.5 Preparing for Source RDS for MySQL

4.8.5.1 Creating an RDS for MySQL Instance

Create an RDS for MySQL instance, and select the VPC and security group you configured for the instance.

- **Step 1** Log in to the management console.
- **Step 2** Click O in the upper left corner of the management console and select AP-Singapore.
- **Step 3** Under the service list, choose **Databases** > **Relational Database Service**.
- Step 4 Click Buy DB Instance.
- **Step 5** Configure the instance name and basic information.

| Billing Mode | Yearly/Monthly Pay-per-use (?) |
|-------------------|---|
| Region | Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and guid resource access, select the nearest region. |
| DB Instance Name | res-mysq Image: The second as a time, they will be named with four digits appended in the format "DB instance name-SN". For example, if the DB instance name is instance, the first instance will be named as instance-0002, and so on. |
| DB Engine | MySQL PostgreSQL Microsoft SQL Server Learn more about D8 engines and versions. |
| DB Engine Version | 8.0 57 5.6 |
| DB Instance Type | the committee way you are wanted over wanted over a more companies moning-activity and protects for a training more of more or one or one of one of the one of t |
| Storage Type | Cloud SSD Learn more about storage types. |
| AZ | aző az az az |
| Time Zone | UTC+08:00 Beijing, Chongqing, Hong K 💌 |

Step 6 Configure instance specifications.

| | vCPU Memory | Maximum Connections | TPS/QPS 🥎 | IPv6 | |
|--------------------|---|--|---------------------------|---------------|--|
| | 🔿 2 vCPUs 4 GB | 1,500 | 334 6,673 | Not supported | |
| | 2 vCPUs 8 GB | 2,500 | 552 11,039 | Not supported | |
| | 🔿 4 vCPUs 8 GB | 2,500 | 756 15,122 | Not supported | |
| | ○ 4 vCPUs 16 GB | 5,000 | 1,062 21,249 | Not supported | |
| | 8 vCPUs 16 GB | 5,000 | 1,338 26,756 | Not supported | |
| | O 8 vCPUs 32 GB | 10,000 | 2,117 42,335 | Not supported | |
| | DB Instance Specifications General-purpos | e 2 vCPUs 8 GB, Maximum Connections: : | 2500, TPS/QPS: 552 1103 |) | |
| | 40 GB | | | | |
| | Ŵ | | - 4 | 0 + 🤊 | |
| Storage Space (GR) | | | | | |

Step 7 Select a VPC and security group for the instance and configure the database port.The VPC and security group have been created in Creating a VPC and Security Group.

| | ⑦ Relationship among VPCs, subnets, security groups, and DB instances | | | | | | | |
|----------------|--|----------|---|--------|---------------------------------------|--------------------------------------|--|--|
| VPC (?) | vpc-DRStest 💌 | С | subnet-drs01(10.0.0/24) 🔹 | С | Automatically-assigned IP address | View In-use IP Address | | |
| | After the RDS instance is created, the VPC cannot Available Private IP Addresses: 251 | be chi | anged. ECSs in different VPCs cannot communicat | e with | each other by default. If you want to | create a VPC, go to the VPC console. | | |
| Database Port | 3306 | | | | | | | |
| | The database port of read replicas (if any) is the | ame a | is that of the primary DB instance. | | | | | |
| Security Group | sg-DRS01 💌 | С | View Security Group | | | | | |
| | Ensure that port 3306 of the security group allow | s traffi | c from your server IP address to the DB instance. | | | | | |
| | Security Group Rules 🐱 Add Inbound Rule | | | | | | | |

Step 8 Configure information such as the instance password and parameter template.

| Password | Configure | Skip | |
|------------------------|-----------|------|--|
| Administrator | root | | |
| Administrator Password | | | Keep your password secure. The system cannot retrieve your password. |
| Confirm Password | •••••• | |] |

- **Step 9** Click **Next**, confirm the information, and click **Submit**.
- **Step 10** Return to the instance list.

If the instance status becomes available, the instance has been created.

----End

4.8.5.2 Generating Test Data

Step 1 Log in to the management console.

- **Step 2** Click Singapore. **Step 2** Click singapore.
- **Step 3** Under the service list, choose **Databases** > **Relational Database Service**.
- Step 4 Select an RDS instance and choose More > Log In.
- **Step 5** In the displayed dialog box, enter the password and click **Test Connection**.
- Step 6 After the connection is successful, click Log In.

Step 7 Click **Create Database** to create the **db_test** database.

| Create Database | | × |
|-----------------|------------------------------------|--------|
| Name | db_test | |
| | Only user databases can be created | |
| Character Set | utf8mb4 | \sim |
| | | |
| | OK Cancel | |

Step 8 Run the following statement in the db_test database to create the corresponding table **table3**_:



----End

4.8.6 Preparing for Destination Kafka

4.8.6.1 Creating a Kafka Instance

This section describes how to create a Kafka instance.

- **Step 1** Log in to the **management console**.
- **Step 2** Click Singapore. Singapore.
- **Step 3** In the Service List, choose **Application** > **Distributed Message Service for Kafka** to open the Kafka console.
- Step 4 Click Buy Kafka Instance.
- **Step 5** Select the instance region and AZ.

| Billing Mode | Yearly/Monthly Pay-per-use |
|--------------|---|
| Region | • C |
| | For low network latency and quick resource access, select the region nearest to your target users. Note that resources cannot be shared across regions without Cloud Connect (CC) or Virtual. Private Network (VPN). |
| Project | (debait) |
| AZ | AZ1 AZ3 AZ5 AZ6 |
| | Select one AZ or at least three AZs. Do not select two AZs. Learn more |
| | The more AZs selected, the better the reliability and SLA coverage. |



| Instance Name | kafka-drs X | | | | |
|--------------------|--|--------------------------------------|-----------------------------------|--------------------------------|----------------------------|
| Enterprise Project | default • | C (?) View Enterprise Proj | ect | | |
| Version | 2.3.0 1.1.0 | | | | |
| CPU Architecture | x85 | | | | |
| Specifications | Flavor Name | ECS Flavor | TPS Limit per Broker | Maximum Partitions per Brok | Recommended Consumer Gr |
| | c6.2u4g.cluster | c6.large.2 | 30,000 | 250 | 4,000 |
| | C c6.4u8g.cluster | c6.xlarge.2 | 100,000 | 500 | 4,000 |
| | C c6.8u16g.cluster | c6.2xlarge.2 | 150,000 | 1,000 | 4,000 |
| | C c6.12u24g.cluster | c6.3xlarge.2 | 200,000 | 1,500 | 4,000 |
| | C c6.16u32g.cluster | c6.4xlarge.2 | 250,000 | 2,000 | 4,000 |
| | To ensure stable services, choose a bandwidth 30% | higher than what is required unde | r normal conditions. | | |
| | common_current_spec c6.2u4g.cluster ECS Flav | or c6.large.2 TPS Limit per Broker | 30,000 Maximum Partitions per B | roker 250 Recommended Consum | er Groups per Broker 4,000 |
| | Instances created with the selected specifications d | o not support dynamic enabling/di | sabling of dumping. | | |
| Brokers | - 3 + | | | | |

Step 7 Select the storage space and capacity threshold policy.

| Storage Space | High I/O | • | 200 + | GB (?) | |
|---------------------------|--|----------------------------|-------------------|------------------|------------------------------|
| | Total storage space 600 GB After the instance is created, you | a cannot change the disk t | ype or reduce the | e storage space. | Learn more about disk types. |
| Capacity Threshold Policy | Automatically delete | Stop production | 0 | | |

Step 8 Select the VPC and security group.

The VPC and security group have been created in **Creating a VPC and Security Group**.

| VPC | vpc-DRStest | • | C | subnet-drs01 | • | С | ? |
|----------------|--------------------------------|------------------------|--------|---------------------------------|-----------------|----|---|
| | You cannot change the selected | VPC and subnet after t | the in | stance is created. You can also | create a new VP | C. | |
| Security Group | sg-DRS01 | • | C۱ | Nanage Security Group 🧿 | | | |

Step 9 Configure the instance password.

| Manager Username | root | Username for logging in to Kafka Manager. You cannot modify the username after the instance is created. |
|------------------|----------|---|
| Password | | |
| Confirm Password | ······ @ | |

- **Step 10** Click **Create Now**, confirm the information, and click **Submit**.
- **Step 11** Return to the instance list.

If the status of the Kafka instance is **Running**, the instance has been created.

----End

4.8.6.2 Creating a Topic

- **Step 1** Click a Kafka instance.
- **Step 2** Click the **Topics** tab, and click **Create Topic**.
- **Step 3** In the dialog box that is displayed, enter a topic name, specify other parameters, and click **OK**.

| Topic Name | testTopic |
|----------------------------|--|
| Partitions | - 3 + Value range: 1 to 100 |
| | Number of partitions in the topic. Messages in the topic will be distributed to these partitions to achieve scalability and fault tolerance. |
| Replicas | - 3 + Value range: 1 to 3 |
| | Number of message copies. This number is fixed once the topic is created. |
| Aging Time (h) | - 72 + Value range: 1 to 168 |
| | Time after which data in the topic expires. |
| Synchronous Replication (? | |
| Synchronous Flushing | |

----End

4.8.7 Creating a DRS Synchronization Task

This section describes how to create a DRS instance and synchronize incremental data from RDS for MySQL to Kafka.

Pre-Check

Before creating a task, check the synchronization conditions.

In this example, data is synchronized from RDS for MySQL to Kafka. For details, see **Precautions**.

Procedure

- **Step 1** Log in to the management console.
- **Step 2** Click O in the upper left corner of the management console and select AP-Singapore.
- **Step 3** Under the service list, choose **Databases** > **Data Replication Service**.
- Step 4 Choose Data Synchronization Management and click Create Synchronization Task.
- **Step 5** Configure synchronization task parameters.
 - 1. Task name

| Region | • |
|-------------|--|
| | Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
| * Task Name | DRS:MySOLToKalka |
| Description | 0 |
| | |
| | 0/256 |

Select the source database, destination database, and network information.
 Select the RDS instance created in Preparing for Source RDS for MySQL as the destination database.



3. Set Enterprise Project to default.

| ★ Enterprise Project | default | C View Project Management |
|----------------------|-------------------------------------|--|
| Tags | It is recommended that you use TMS' | s predefined tag function to add the same tag to different cloud resources View predefined tags C Tag value |
| | You can add 10 more tags. | |

Step 6 Click Create Now.

The synchronization instance is being created. It takes about 5 to 10 minutes.

- **Step 7** Configure source and destination database information.
 - 1. Configure source database information.

2. Click Test Connection.

If a successful test message is returned, login to the destination is successful.

Source Database

| DB Instance Name | rds-mysql () | |
|-------------------|-----------------------------------|---|
| Database Username | root | |
| Database Password | | Ø |
| | Test Connection 🥑 Test successful | |

3. Select the VPC and subnet where the destination database is located, and enter the Kafka IP address and port number.

4. Click **Test Connection**.

If a successful test message is returned, login to the destination is successful.

Destination Database

| VPC | vpc-DRStest(10.0.0/24) | C View VPC |
|---------------------------|---------------------------|----------------|
| Subnet | subnet-drs01(10.0.0.0/24) | O View Subnets |
| IP Address or Domain Name | | 0 |
| | Test Connection | e DB instance. |

Step 8 Click Next.

Step 9 Select the synchronization information, policy, message format, and object, and the format of the message sent to the Kafka.

The following table lists the settings.

| Туре | Setting |
|------------------------------|--|
| Topic Synchronization Policy | Deliver the content to a topic named testTopic . |
| Synchronize Topic To | Partitions are differentiated by the hash values of the database and table names |
| Data Format in Kafka | You can select the JSON format. For details, see Kafka Message Format. |
| Synchronization Object | Select table3_ under db_test . |

| Topic Synchronization Policy | A specified topic | • | | | |
|------------------------------|--|---|--|----------------|--|
| Торіс | testTopic | • | C | | |
| Synchronize Topic To | Partitions are differentiated by th | e hash valu 🔻 | | | |
| Data Format in Kafka | Avro JSON | | | | |
| Synchronization Object | Tables Databases | Import obje | ect file | | |
| | Only selected tables are synchroni select the new tables. If any data in the source database Move objects to be migrated from I | zed. To synchronize n changes, click the refi list of unselected obje | rew tables added to the source resh button below. cts on left side to the list of so | e database dur | ing the incremental synchronization, you need to edit this synchronization task to or right side. |
| | 0 | Select All | C | | Select All |
| | For tables, only expanded data | abases are searched. | Q | | For tables, only expanded databases are searched. |
| | e db_test | | database | | - db_test Edit database |
| | table1_ | | table | | table3_ Edit table |
| | | | | >>> | |
| | | | | « | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Step 10 Click Next.

Step 11 Select a data processing mode. Data synchronization from RDS for MySQL to Kafka supports only column-based processing, which provides column-level query and filtering capabilities.

| Edit (| Column | | | | | × | | | |
|--|----------------------------|-----------------|----------------|--------------|-----------------|---|--|--|--|
| The new column name will be used in the destination database. Note: Only the selected columns will be synchronized. | | | | | | | | | |
| Databas | se Name: db_test Table Nar | ne: table3_ | [| Enter a colu | mn name C | C | | | |
| | Column Name | New Column Name | Туре | | Constraint Type | | | | |
| \checkmark | Column1 | | int(11) unsigr | ned | Primary Key | | | | |
| ~ | Column2 | | time | | | | | | |
| ~ | Column3 | | char(1) | | | | | | |
| 10 | ▼ Total Records: 5 < | 1 > | | | | | | | |
| | | Confirm | ancel | | | | | | |

Step 12 Click **Next** and wait for the check results.

Step 13 If the check is complete and the check success rate is 100%, click **Next**.

| Check Again | | |
|--|--------|------------------------------|
| Check success rate 100% All checks must pass before you can continue. If any check requires confirmation, check and confirm the results b | pefore | proceeding to the next step. |
| Check Item | Che | eck Result |
| Database parameters | | |
| Whether tables structures are consistent | 0 | Passed |
| Whether the source database binlog is row-based | 0 | Passed |
| Whether the binlog_row_image value of the source database is FULL | 0 | Passed |
| Checking the expire_logs_days parameter setting in the source database | 0 | Passed |
| Whether the source database binlog is enabled | 0 | Passed |
| Whether the source database tables use storage engines not supported by the destination database | 0 | Passed |
| Whether the log_slave_updates value is ON on the source database | 0 | Passed |

Step 14 After confirming that the synchronization task information is correct, click **Next**.

Return to the **Data Synchronization Management** page and check the synchronization task status.

It takes several minutes to complete.

| Task Name/ID ↓Ξ | Status | Charging | Data Flow | DB Engine ↓Ξ | Synchroniza | Netwo | Description | Enterp | Operation |
|---------------------------------------|-------------|----------|------------|--------------|-------------|-------|--------------|---------|-----------------|
| DRS-MySQLToKafka 1f1c1e78-fcda-430 | Incremental | Yes | Out of the | MySQL-Kafka | Incremental | VPC | Source Datab | default | Edit Stop Pause |

If the status changes to **Incremental synchronization**, the synchronization task has been started.

NOTE

- In this example, **Synchronization Mode** is set to **Incremental** for the task from RDS for MySQL to Kafka. After the task is started, the status is **Incremental**.
- If the created task is a full+incremental synchronization task, the task enters the full synchronization state after being started. After the full synchronization is complete, the task enters the incremental synchronization state.
- Incremental synchronization continuously synchronizes incremental data and does not stop automatically.

----End

4.8.8 Confirming the Results

In this practice, DRS continuously synchronizes the incremental data generated in the source database to the destination database until you stop the task. The following describes how to verify the synchronization results by inserting data to the source RDS for MySQL database and viewing the data received by Kafka.

Procedure

Step 1 Log in to the **management console**.

Step 2 Click which in the upper left corner of the management console and select AP-Singapore.

- **Step 3** Under the service list, choose **Databases** > **Relational Database Service**.
- **Step 4** Locate the required RDS instance and choose **More** > **Log In**.
- **Step 5** In the displayed dialog box, enter the password and click **Test Connection**.
- **Step 6** After the connection is successful, click **Log In**.
- **Step 7** Run the following statement to insert data to the **db_test.table3_** table. INSERT INTO `db_test`.`table3_` (`Column1`,`Column2`,`Column3`) VALUES(4,'00:00:44','ddd');



- **Step 8** In the Service List, choose **Application** > **Distributed Message Service for Kafka** to open the Kafka console.
- Step 9 Click a Kafka instance.
- **Step 10** Click the **Message Query** tab, select the Kafka topic, view the received data in JSON format.

 \times

View Message Body

| Topic Name | testTop | ic | | | | | | | |
|--------------|-------------------------------|--|--|--|--|--|--|--|--|
| Partition | 0 | | | | | | | | |
| Offset | 0 | | | | | | | | |
| Created | 2021/11/08 17:57:55 GMT+08:00 | | | | | | | | |
| Message Body | Messag Key | e Size (Bytes): 352 db_test.itable3_` | 🗖 Copy | | | | | | |
| | Value | {"mysqlType": {"Column2":"time","Column3":"char","Column1":"int"},"i :1636365475000,"ts":1636365475874,"database":"db_tes "table3_","type":"INSERT","isDdl":false,"sql":"","sqlType": {"Column2":92,"Column3":1,"Column1":4},"data": [{"Column2":"00:00:44","Column3":"ddd","Column1":"4" ull,"pkNames":["Column1"]} | id":22,"es" ;t","table": ; }],"old":n | | | | | | |

Step 11 Stop the synchronization task.

If all data has been synchronized to the destination database, you can stop the current task.

1. Locate the task and click **Stop** in the **Operation** column.

| All projects | - AI | II DB engines | → All net | work types | * All | statuses | - | Enter a task name | or ID | Q Search by Tag 💝 |
|--------------|---------------------------------------|---------------|-----------|------------|--------------|-------------|-------|-------------------|---------|---------------------|
| 5 | С | | | | | | | | | |
| | Task Name/ID ↓Ξ | Status | Charging | Data Flow | DB Engine ↓Ξ | Synchroniza | Netwo | Description | Enterp | Operation |
| | DRS-MySQLToKafka 1f1c1e78-fcda-430 | Incremental | @ Yes | Out of the | MySQL-Kafka | Incremental | VPC | Source Datab | default | Edit Stop Pause |

2. In the display box, click **Yes**.

 \times

| Stop Task | | |
|---|---------------------------------|---|
| Are you sure you wan | t to stop this task? | |
| Name | Status | |
| DRS-MySQLToKafka | O Incremental | |
| A If you forcibly stop a task, the migrati | ion task will be stopped first. | × |
| Force stop task Display breakpoint information when the Description: Once this task is stopped, it cannot be | e task is stopped | |
| Yes | No | |

----End

5 Real-Time Disaster Recovery

5.1 Configuring Remote Single-Active DR for an RDS for MySQL Instance Using DRS

5.1.1 Overview

Scenarios

This best practice involves two tasks:

- Create an RDS for MySQL instance.
- Use DRS to establish a remote single-active DR relationship for the RDS for MySQL instance.

Prerequisites

- You have registered with Huawei Cloud.
- Your account balance is at least \$0 USD.

How Cross-Region DR Works

RDS for MySQL instances are deployed in the production and DR data centers. DRS replicates data from the production center to the DR center, keeping data synchronous between your primary instance and the DR instance.

Service List

- Virtual Private Cloud (VPC)
- Elastic IP (EIP)
- Relational Database Service (RDS)
- Data Replication Service (DRS)
Notes on Usage

- The resource planning in this best practice is for demonstration only. Adjust it as needed.
- All settings in this best practice are for reference only. For more information about RDS for MySQL instance DR, see From MySQL to MySQL (Single-Active DR).

5.1.2 Resource Planning

| Table 5- | Resource | planning |
|----------|----------|----------|
|----------|----------|----------|

| Categor y | Categor Subcategor Planned Valu y y | | Description | | |
|--------------------------------------|--|-----------------|---|--|--|
| VPC in the | VPC name | vрс-01 | Specify a name that is easy to identify. | | |
| producti on center | Region | CN-Hong Kong | To achieve lower network latency, select the region nearest to you. | | |
| | AZ | AZ2 | - | | |
| | Subnet | 192.168.0.0/24 | Select a subnet with sufficient network resources. | | |
| | Subnet name | subnet-3c29 | Specify a name that is easy to identify. | | |
| VPC in the DR | VPC name | vpc-DR | Specify a name that is easy to identify. | | |
| center | Region | AP-Singapore | To achieve lower network latency, select the region nearest to you. | | |
| | AZ | AZ1 | - | | |
| | Subnet | 192.168.0.0/24 | Select a subnet with sufficient network resources. | | |
| | Subnet name | subnet-ac27 | Specify a name that is easy to identify. | | |
| RDS for MySQL | Instance name | rds-database-01 | Specify a name that is easy to identify. | | |
| instance in the producti on | Region | CN-Hong Kong | To achieve lower network latency, select the region nearest to you. | | |
| center | DB engine version | MySQL 8.0 | - | | |

| Categor y | Subcategor y | Planned Value | Description | | |
|------------------------------------|--------------------------------|------------------------------------|---|--|--|
| | Instance type | Single | A single instance is used in this example. To improve service reliability, select a primary/standby instance. | | |
| | Storage type | Ultra-high I/O | - | | |
| | AZ | AZ2 | AZ2 is selected in this example. To improve service reliability, select the primary/standby instance type and deploy the primary and standby instances in different AZs. | | |
| | Instance specification s | General-enhanced 2 vCPUs 4 GB | - | | |
| RDS for MySQL | Instance name | rds-DR | Specify a name that is easy to identify. | | |
| instance in the DR center | Region | AP-Singapore | To achieve lower network latency, select the region nearest to you. | | |
| | DB engine version | MySQL 8.0 | - | | |
| | Instance type | Single | A single instance is used in this example. To improve service reliability, select a primary/standby instance. | | |
| | Storage type | Cloud SSD | - | | |
| | AZ | AZ1 | AZ1 is selected in this example. To improve service reliability, select the primary/standby instance type and deploy the primary and standby instances in different AZs. | | |
| | Instance specification s | General-purpose 2 vCPUs 8 GB | - | | |
| DRS DR task | DR task name | DRS-DR-Task | Specify a name that is easy to identify. | | |

| Categor y | Subcategor y | Planned Value | Description |
|--------------|--------------------------|----------------|--|
| | Source DB engine | MySQL | In this example, the primary instance created in CN-Hong Kong is used as the source database. |
| | Destination DB engine | MySQL | In this example, the DR instance created in AP-Singapore is used as the destination database. |
| | Network type | Public network | Public network is used in this example. |

5.1.3 Operation Process

You can create a single RDS instance and a DR instance and migrate data from the single instance to the DR instance.





5.1.4 Configuring an RDS for MySQL Instance in the Production Center

5.1.4.1 Creating a VPC and Security Group

Create a VPC and security group for a DB instance in the production center.

Creating a VPC

- **Step 1** Go to the **Create VPC** page.
- **Step 2** Configure the basic information, subnet, and IP address. Select **CN-Hong Kong** for **Region**.

Figure 5-2 Creating a VPC

| Basic Information | |
|---|---|
| Region | CN-Hong Kong ▼ |
| | Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
| Name | vpc-6cc7 |
| IPv4 CIDR Block | 192 · 168 · 0 · 16 • |
| | Recommended: 10.0.0/8-24 (Select) 172.16.0.0/12-24 (Select) 192.168.0.0/16-24 (Select) |
| | The CIDR block 192.168.00/16 overlaps with a CIDR block of another VPC in the current region. If you intend to enable communication between VPCs or between a VPC and an on-premises data center, change the CIDR block. View VPC CIDR blocks in current region |
| Enterprise Project | default C Create Enterprise Project |
| | |
| Advanced Settings 👻 | Tag Description |
| Advanced Settings 👻 | Tag Description |
| Advanced Settings | Tag Description |
| Advanced Settings | Tag Description subnet-3c29 192 · 168 · 0 / 24 ⑦ Available IP Addresses: 251 |
| Advanced Settings | Tag Description subnet-3c29 |
| Advanced Settings Default Subnet Name IPv4 CIDR Black IPv6 CIDR Black | Tag Description subnet-3c29 192 108 0 1 24 ① Available IP Addresses: 251 The CIDR block cannot be modified after the subnet has been created. ① ● ● ● |

Step 3 Click Create Now.

----End

Creating a Security Group

- **Step 1** Log in to the management console.
- **Step 2** Click O in the upper left corner of the management console and select **CN-Hong Kong**.
- **Step 3** Under the service list, choose **Networking** > **Virtual Private Cloud**.
- **Step 4** In the navigation pane on the left, choose **Access Control** > **Security Groups**.
- Step 5 Click Create Security Group.

Х

Figure 5-3 Creating a security group

Create Security Group

| * Name | sg-database | |
|----------------------|---|---|
| * Enterprise Project | default 💌 | C Create Enterprise Project 🧿 |
| * Template | General-purpose web server 🔹 | |
| Description | The security group is for general-p servers and includes default rules all inbound ICMP traffic and inbou ports 22, 80, 443, and 3389. The se is used for remote login, ping, and website on ECSs. | urpose web that allow ind traffic on ecurity group hosting a 0/255 |
| Show Default Rule 💌 | | |
| | | |
| | OK Cancel | |
| Click OK . | | |

----End

5.1.4.2 Creating an EIP

Step 6

Create an EIP for your source DB instance. Using the EIP, external systems can access your application and DRS can connect to the source DB instance.

Procedure

Step 1 Go to the **Buy EIP** page.

Step 2 Configure required parameters. Select **CN-Hong Kong** for **Region**.

Figure 5-4 Buying an EIP

| < 🗌 Buy EIP 🕐 | Assured Purchase 🔗 Flexible Billing |
|--------------------------------------|---|
| Billing Mode Region | Yearly/Monthly Pay-per-use |
| EIP Type | Dynamic BGP Premium BGP Image: Comparison of the state of the sta |
| Billed By | Bandwidth 🖒 Traffic Sor heavy/stable traffic Sor Itagit/sharply fluctuating traffic |
| Bandwidth | Billed based on usage duration and bandwidth size. If a pay-per-use EIP (billed by bandwidth or traffic) is unbound from an instance, it remains allocated to your account and will be billed. Pricing details 1 2 5 10 200 Custom 5 + The value ranges from 1 to 500 Mbit/s. Series Anti-ODoS protection Free Anti-ODoS protection 5 + The value ranges from 1 to 500 Mbit/s. |
| Bandwidth Name Enterprise Project | rds-drs default C Create Enterprise Project |
| Advanced Settings 👻 | Tag |
| Monitoring | Enabled by default Free You can monitor network traffic at one-minute granularity, for free. You can monitor bandwidth fluctuations, and inbound/outbound bandwidth rates. |
| EIP Price: /hour | + Bandwidth Price: /hour ① Next |

- Step 3 Click Next.
- **Step 4** Confirm the information and click **Submit**.

----End

5.1.4.3 Creating an RDS for MySQL Instance

Create an RDS for MySQL instance (source database), and select the VPC and EIP you configured for the instance.

Procedure

- Step 1 Go to the Buy DB Instance page.
- **Step 2** Select **CN-Hong Kong** for **Region**. Configure instance information and click **Next**.

| Billing Mode | Yearly/Monthly Rayspersize |
|-------------------|--|
| Region | CN-Hong Kong 🔹 |
| | Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
| DB Instance Name | rds-database-dis (i) |
| | If you buy multiple DB instances at a time, they will be named with four digits appended in the format "DB instance name-SW". For example, if the DB instance name is instance, the first instance will be named as instance.0001, the second as instance.0002, and so on. |
| DB Engine | MySQL PostgreSQL Learn more about D8 engines and versions. |
| DB Engine Version | 80 57 56 |
| DB Instance Type | Primary/Standby Single |
| | Single-node architecture is cost-effective and suitable for developing and testing of microsites, and small- and medium-sized entreprises, or for learning about ROS. |
| Storage Type | Cloud SSD Learn more about storage types. |
| AZ | all all |
| Time Zone | (UTC+06:00) Beijing, Chongqing, Hong * |

Figure 5-5 Selecting a DB engine

Figure 5-6 Selecting specifications

| Instance Class | General-enhanced | | | |
|--------------------|---|--|--|----------|
| | vCPU Memory | Maximum Connections | TPS/QPS ⑦ | |
| | 2 vCPUs 4 GB | 1,500 | 482 9,452 | |
| | O 2 vCPUs 8 GB | 2,500 | 563 13,231 | |
| | O 2 vCPUs 16 GB | 5,000 | 686 12,632 | |
| | O 4 vCPUs 8 GB | 2,500 | 975 19,463 | |
| | ○ 4 vCPUs 16 GB | 5,000 | 1,241 23,852 | |
| | ○ 4 vCPUs 32 GB | 10,000 | 1,362 28,652 | |
| | DB Instance Specifications General-enhanced 2 vCPUs | 4 GB, Maximum Connections: 1500, TPS/QPS: 482 9 | 452 | |
| | 40 GB | | | |
| Storage Space (GB) | 40 800 1 | 550 2 300 4 000 | 40 + ⑦ | |
| | RDS provides free backup storage space of the same size a | is your purchased storage space. After the free backup | space is used up, charges are applied based on the OBS pricing | details. |
| Disk Encryption | Disable Recommended Enable ⑦ | | | |

Figure 5-7 Configuring network information as planned

| | ⑦ Relationship among VPCs, subnets, security groups, and DB instances |
|----------------|---|
| VPC 🕐 | vpc vpc subnet-3/29(192.168.0.0/24) v C Automatically-assigned IP address View In-use IP Address |
| | After the RDS instance is created, the VPC cannot be changed. ECSs in different VPCs cannot communicate with each other by default. If you want to create a VPC, go to the VPC console. Available Private IP Addresses: 249 |
| Database Port | Default port: 3306 |
| | The database port of read replicas (if any) is the same as that of the primary DB instance. |
| Security Group | sg-database C View Security Group |
| | Ensure that port 3306 of the security group allows traffic from your server IP address to the DB instance. |
| | Security Group Rules 🗸 Add Inbound Rule |

| Password | Configure Skip | |
|--------------------------|---|------|
| Administrator | root | |
| Administrator Password | Keep your password secure. The system cannot retrieve your password. | |
| Confirm Password | | |
| | | |
| Parameter Template | Default-MySQL-80 View Parameter Template | |
| Table Name | Case sensitive Case insensitive | |
| Enterprise Project 🕜 | default View Project Management | |
| Tag | It is recommended that you use TMS's predefined tag function to add the same tag to different cloud resources. C View predefined tags Tag key Tag value You can add 10 more tags. Tag value | |
| Quantity Read Replica | 1 + (i) The total number of primary DB instances and read replicas cannot exceed 49. Increase quota Skip Create | |
| Price | | Next |

Figure 5-8 Setting an administrator password

Step 3 Confirm the settings.

- To modify your settings, click **Previous**.
- If there is no need to modify your settings, click **Submit**.

Step 4 Bind an EIP to the created instance.

1. On the **Instances** page, click the instance name to go to the **Basic Information** page.

Figure 5-9 Locating your instance in the list

| Renew | Unsubscribe Change to Yearly/N | Ionthly R | eboot | | | | | | |
|-------|--|-------------|--------------------------------|------------------|-----------------|---------------------------|-------------|--------------|----------------------|
| | All project | 8 | ▪ All DB er | gines 💌 Di | B Instance Name | 💌 Enter a ke | yword. | Q | Search by Tag 😸 🖸 |
| | Name/ID ↓Ξ | Description | DB Inst ↓Ξ | DB Engine Ver ↓Ξ | Status | Billing Mode | Floating IP | Enterprise P | Operation |
| | rds- 1ef8b412b7654342810f335d4bb6ad 🗇 | | Single 2 vCPUs 4 GB | MySQL 8.0.21 | 🕤 Availab | Pay-per-use Created on | 192 🗇 | default | View Metric More 👻 |
| | đ | - | Primary/Stan 2 vCPUs 4 GB | MySQL 8.0.21 | 🕤 Availab | Pay-per-use Created on | 192 🗇 | default | View Metric More 👻 |

- 2. In the navigation pane on the left, choose **Connectivity & Security**. In the **Connection Information** area, click **Bind** next to the **EIP** field.
- 3. In the displayed dialog box, all unbound EIPs are listed. Select the EIP you have created for the instance and click **Yes**.

Figure 5-10 Binding an EIP

| < rds- | 🔻 🕤 Available | | | | C Feedback Log In | n View Metric | Reboot |
|--------------------------|-------------------------------|--|--|--|--------------------------------|-----------------------------|---------------|
| Basic Information | | | | | | | |
| Backups & Restorations | We would much appreci | ate if you could complete our question | | | × | | × |
| EIPs | Connection Information | | Bind EIP | | | | |
| Connection Management | Floating IP Address | 192.168.0.193 🗍 Change | For security purpos outbound rules in t | es, after the EIP is bound, use SSL to connect to the the security group. | e database and add inbound and | 01.internal.cn-n 🗇 | |
| Accounts | EIP | No EIP bound Bind | Calart DD, Only DD; that i | inne not been bound to any cloud measures see dire | load C | | |
| Databases | SSL | Certificate 🛓 | Junct Dr Only Cr S Once | name mot been booms to any close resource are only | usjeu. | | |
| Logs | | | EIP | Status | Bandwidth | _ | |
| SQL Audits | Connection Topology | Private Connection Public C | ۲ | Outpound | 5 Mbit/s | | |
| Parameters | VPC vpc-lwx33195 | | View EIP | | | | |
| Advanced O&M | Security Group Sys-default | | | OK Cancel | | wect to a DB Instance Three | ough a Public |
| Tags | | | | | 1100.01000 | Do If I Can't to Connect t | o a DB Insta |



5.1.5 Configuring an RDS for MySQL Instance in the DR Center

5.1.5.1 Creating a VPC and Security Group

Create a VPC and security group for the DR instance to be configured, ensuring that it is in a different region from the instance created for production center.

Creating a VPC

- **Step 1** Go to the **Create VPC** page.
- **Step 2** Configure the basic information, subnet, and IP address. Select **AP-Singapore** for **Region**.

| Basic Information | |
|---------------------|--|
| Region | ♥ AP-Singapore ▼ |
| | Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
| Name | vpc-DR |
| IPv4 CIDR Block | 192 · 168 · 0 · 0 / 16 · |
| | Recommended: 10.0.0.0/8-24 (Select) 172.16.0.0/12-24 (Select) 192.168.0.0/16-24 (Select) |
| | The CIDR block 192.168.0.0/16 overlaps with a CIDR block of another VPC in the current region. If you intend to enable communication between VPCs or between a VPC and an on-premises data center, change the CIDR block. View VPC CIDR blocks in current region |
| Enterprise Project | default C Create Enterprise Project |
| Advanced Settings 👻 | Tag Description |
| Default Subnet | |
| Name | subnet-ac27 |
| IPv4 CIDR Block | 192 · 168 · 0 · 0 / 24 · ⑦ Available IP Addresses: 251 |
| | The CIDR block cannot be modified after the subnet has been created. |
| | Enable |
| IPv6 CIDR Block | |

Figure 5-11 Creating a VPC

Step 3 Click Create Now.

----End

Creating a Security Group

Step 1 Log in to the management console.

- **Step 2** Click Singapore. Singapore.
- **Step 3** Under the service list, choose **Networking** > **Virtual Private Cloud**.
- **Step 4** In the navigation pane on the left, choose **Access Control** > **Security Groups**.

Х

Step 5 Click Create Security Group.

Figure 5-12 Creating a security group

| Create Security G | Froup |
|-------------------|-------|
| | |
| | [|

| * Name | sg-DR | |
|----------------------|---|--|
| ſ | | |
| * Enterprise Project | default 🔻 | C Create Enterprise Project |
| di Tamalata | Control and the second second | |
| * Template | General-purpose web server | |
| Description | The security group is for general-p servers and includes default rules all inbound ICMP traffic and inbou ports 22, 80, 443, and 3389. The se is used for remote login, ping, and website on ECSs. | urpose web that allow ind traffic on ecurity group hosting a |
| | | 0/255 |
| Show Default Rule 🔻 | | |
| | | |
| | OK Cancel | |

Step 6 Click OK.

----End

5.1.5.2 Creating an RDS for MySQL Instance

Create an RDS for MySQL instance as a DR instance and select the VPC you configured for the instance.

Procedure

Step 1 Go to the **Buy DB Instance** page.

Step 2 Select **AP-Singapore** for **Region**. Configure instance information and click **Next**.

| Billing Mode | Yearly/Monthly Ray-per-size |
|----------------------|---|
| Region | AP-Singapore |
| | Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region. |
| DB Instance Name | rds-DR (0) |
| DD Fooine | If you buy multiple DB instances at a time, they will be named with four digits appended in the format "DB instance name SN". For example, if the DB instance, the first instance, will be named as instance.0001, the second as instance.0002, and so on. |
| DB Engine | PO C C |
| DB Instance Type (?) | Primary/Sandby Single |
| | Single-node architecture is cost-effective and suitable for developing and testing of microsites, and small- and medium-sized enterprises, or for learning about RDS. |
| Storage Type | Cloud SSD Learn more about storage types. |
| AZ | AZ1 AZ2 AZ3 AZ5 |
| Time Zone | (UTC-08:00) Beijing. Chongqing. Hong * |

Figure 5-13 Selecting a DB engine

Figure 5-14 Selecting specifications

| Instance Class 🕐 | General-purpose | | | |
|--------------------|---|---|--|----|
| | vCPU Memory | Maximum Connections | TPS/QPS (?) | |
| | O 2 vCPUs 4 GB | 1,500 | | |
| | 2 vCPUs 8 GB | 2,500 | | |
| | O 4 vCPUs 8 GB | 2,500 | | |
| | O 4 vCPUs 16 GB | 5,000 | | |
| | O 8 vCPUs 16 GB | 5,000 | | |
| | O 8 vCPUs 32 GB | 10,000 | | |
| | DB Instance Specifications General-purp | ose 2 vCPUs 8 GB, Maximum Connections: 2500, TPS/ | QP5: - - | |
| | 40 GB | | | |
| Storage Space (GB) | (II) 40 800 | 1,550 2,300 4,00 | - 40 + ⑦ | |
| | RDS provides free backup storage space of | the same size as your purchased storage space. After th | e free backup space is used up, charges are applied based on the OBS pricing details | i. |
| Disk Encryption | Disable Enable | ended | | |

Figure 5-15 Configuring network information as planned

| | ⑦ Relationship among VPCs, subnets, security | proups | s, and DB Instances |
|------------------|---|----------|---|
| VPC 🕐 | vpc-DR 💌 | С | subnet-ac27(192.168.0.0/24) C Automatically-assigned IP address View In-use IP Address |
| | After the RDS instance is created, the VPC canno | be ch | hanged. ECSs in different VPCs cannot communicate with each other by default. If you want to create a VPC, go to the VPC console. Available Private IP Addresses: 249 |
| Database Port | Default port: 3306 | | |
| Security Group 🕐 | sg-DR 💌 | С | View Security Group |
| | Ensure that port 3306 of the security group allow | is traff | fic from your server IP address to the DB instance. |
| | Security Group Rules 🗸 Add Inbound Rule | | |

| Password | | |
|-------------------------|---|--|
| | Configure Skip | |
| Administrator | root | |
| Administrator Password | | Keep your password secure. The system cannot retrieve your password. |
| onfirm Password | | |
| | | |
| arameter Template | Default-MySQL-8.0 | C View Parameter Template |
| able Name | Case sensitive Case insensitive | 0 |
| nterprise Project (?) | default | C View Project Management |
| | | |
| Tag | It is recommended that you use TMS's predefined ta Tag key Tag value | ig function to add the same tag to different cloud resources. ${f C}$. View predefined tags |
| Tag | It is recommended that you use TMS's predefined ta Tag key Tag value You can add 10 more tags. | g function to add the same tag to different cloud resources. ${f C}$. View predefined tags |
| Tag Quantity | It is recommended that you use TMS's predefined ta Tag key Tag value You can add 10 more tags. Tag value The total number of predefined tags. | Ig function to add the same tag to different cloud resources. C View predefined tags |

Figure 5-16 Setting an administrator password

Step 3 Confirm the settings.

- To modify your settings, click **Previous**.
- If there is no need to modify your settings, click Submit.
- ----End

5.1.6 Configuring Remote Disaster Recovery

5.1.6.1 Creating a DRS Disaster Recovery Task

Create a DRS disaster recovery task in the same region as the RDS for MySQL instance configured for the DR center.

Procedure

- **Step 1** Go to the **Create Disaster Recovery Task** page.
- **Step 2** Select **AP-Singapore** for **Region**. Set **DR Type** to **Single-active**, **Disaster Recovery Relationship** to **Current cloud as standby**, and **DR DB Instance** to the RDS for MySQL DR instance created in the AP-Singapore region, and click **Create Now**.

| Region | • AP-Singapore • | |
|--|--|--|
| F | Regions are geographic areas isolated from each nearest region. | other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the |
| * Task Name | DRS-DR-Task | 0 |
| Description | | 0 |
| | | |
| | | 0/256 |
| Send Notifications | 0 | |
| * SMN Topic | DRS-DR-Task | • C (1) |
| Synchronization Delay Threshold(s) | () (10) The val | ue ranges from 1 to 3600. |
| RTO Synchronization Delay Threshold(s) | () (10 The val | ue ranges from 1 to 3600. |
| RPO Synchronization Delay Threshold(s) | () (10 The val | Lie ranges from 1 to 3600. |
| | | |

Figure 5-17 Configuring basic information

Figure 5-18 Setting DR instance information

| Disaster Recovery Insta | ance Details |
|--|--|
| The following information cannot be modi | ied after you go to the next page. |
| * DR Type | Single active 💿 |
| * Disaster Recovery Relationship | Current doud as standby Current cloud as active |
| * Service DB Engine | MySOL Cassandra DDM GaussD8(for MySOL) |
| * DR DB Engine | MySol. GaussBe(tor MySol.) |
| * Network Type | Public retwork • 0 |
| | IDRS will automatically bind an EP to the DRS instance and release the EIP after the task is complete. |
| * DR DB Instance | rds-DR (192/168.0.94) C View DB Instance View Linselectable DB Instance |
| Disaster Recovery Instance Subnet | subnet-ac27(192168.D.0,24) v ② Weiv Subnets Veiv occupied IP address |
| * Destination DB Instance Access | Read-only |
| | During disaster recovery, the destination DB instance becomes read-only/or ensure the integrity and success of data disaster recovery. When the task is complete, the DB instance becomes readable and writable. This process takes a few minutes. |
| | |

Step 3 Return to the **Disaster Recovery Management** page and check the status of the task.

Figure 5-19 Disaster recovery task created

| All projects All DB engines All network types All statuses Enter a task name or ID Casch by Tag C | Batch Operati | ions 👻 View Abnormal | Tasks | | | | | | | | | | |
|---|---------------|---------------------------------|-----------------|---------|-----------|------------------------|----------|--------------|--------------|----------------|----------------|--------------------|-----------------------|
| Task Name/ID [#] Status Delay (*) Charging Disaster Recovery Relationship DB Engine [#] Created [#] Network Type Description Enterprise Project Operation DR5-0R-Task bd821686-3686-45 © Configuration @) No Current cloud as standby My/SQL Oct 28, 2021 Public network default Edit Stop ! Speed | | | All projects | • | All DB en | gines 💌 | All netv | work types | ▼ All statu | ses | Enter a task n | ame or ID Q | Search by Tag 🗧 🚺 🙆 C |
| DRS-DR-Task DRS-DR-Task O Configuration O No Current cloud as standby MySQL Oct 28, 2021 Public network default Edit Stop I Speed bd821686-4866-45 | | Task Name/ID ↓Ξ | Status | Delay 🕐 | Charging | Disaster Recovery Rela | tionship | DB Engine ↓Ξ | Created 1 | Network Type | Description | Enterprise Project | Operation |
| | | DRS-DR-Task bd8216f8-b8e8-45 | • Configuration | | No No | Current cloud as stand | by | MySQL | Oct 28, 2021 | Public network | | default | Edit Stop Speed |

5.1.6.2 Configuring the Disaster Recovery Task

Configure the disaster recovery task, including setting the source and destination databases.

Procedure

- **Step 1** On the **Disaster Recovery Management** page, locate the created disaster recovery task and click **Edit** in the **Operation** column.
- **Step 2** Add the EIP of the DRS instance to the inbound rule of the security group associated with the RDS for MySQL instance in the production center, select TCP, and set the port number to that of the RDS for MySQL instance of the production center.

| Figure | 5-20 | Adding | a secu | rity | group | rule |
|--------|------|--------|--------|------|-------|------|
|--------|------|--------|--------|------|-------|------|

| < sg-database | sg-database ◎ Feedback 2 Import Rule | | | | | | | | |
|--|--------------------------------------|----------------------------|-------------|------------------|--------|--|--|--|--|
| Summary hourd Rules Outbound Rules Associated Instances | | | | | | | | | |
| Add Rule Fast-Add Rule Delete Allow Common Ports Inbound | Rules: 7 Learn more about se | unity group configuration. | | | С | | | | |
| Protocol & Port 🖓 🕜 | Туре | Source ⑦ | Description | Operation | | | | | |
| All | IPv4 | sg-database 💿 | | Modify Replicate | Delete | | | | |
| CMP : All | IPv4 | 0.0.0.0/0 ② | | Modify Replicate | Delete | | | | |
| TCP: 22 | IPv4 | 0.0.0.0/0 ③ | | Modify Replicate | Delete | | | | |
| TCP:80 | IPv4 | 0.0.0.0/0 ② | | Modify Replicate | Delete | | | | |
| TCP: 443 | IPv4 | 0.0.0.0/0 ③ | | Modify Replicate | Delete | | | | |
| C TCP : 3306 | IPv4 | /32 | DR-Task | Modify Replicate | Delete | | | | |
| CP: 3389 | IPv4 | 0.0.0.0/0 ⑦ | | Modify Replicate | Delete | | | | |

In the **Source Database** area, set **IP Address or Domain Name** and **Port** to the EIP and port of the RDS for MySQL instance in the production center. When the connection test is successful, click **Next**.

| Source Database | | |
|---------------------------|-----------------------------------|----------|
| Source Database Type | self-built database | |
| IP Address or Domain Name | | |
| Port | 3306 | |
| Database Username | root | |
| Database Password | | Q |
| SSL Connection | | |
| | Test Connection 📀 Test successful | |
| Destination Database | | |
| DB Instance Name | rds-DR (192.168.0.94) | |
| Database Username | root | |
| Database Password | | Q |
| | | |

Figure 5-21 Editing a disaster recovery task

Step 3 Configure the flow control and click **Next**.

Figure 5-22 Configuring flow control

| < Ed | lit Disaster Recovery Task | | | | | |
|-------------|----------------------------|--|-------------------------|----------------|------------------------|----------------|
| 1) Cr In | eate Disaster Recovery | Configure Source and Destination Databases | - 3 Configure DR | (4) Check Task | (5) Compare Parameters | 6 Confirm Task |
| | | | | | | |
| | Basic Information | | | | | |
| | Task ID | bd8216f8-b8e8-4577-8234-a4cadfejb502 | Task Name | DRS-DR-Task | | |
| | Created | Oct 28, 2021 15:49:03 GMT+08:00 | Source Database IP | | | |
| | Destination Database Name | rds-DR | Destination Database IP | 192.168.0.94 | | |
| | | | | | | |
| | Flow Control | Yes No ⑦ | | | | |
| | Migrate Definer to User | ● Yes ⑦ ○ No ⑦ | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| Price: | 0 | | | | Previo | us Next |

Step 4 Check the disaster recovery task. When the check success rate reaches 100%, click Next.

Figure 5-23 Checking the task

| ate Disaster Recovery | Configure Source and Destination Databases | 3) Configure DR | Check Task (5) Compare Parameters | 6 Ca |
|---|--|--|---|------|
| Basic Information | | | | |
| Task ID | bd8216f8-b8e8-4577-8234-a4cadfejb502 | Task Name | DRS-DR-Task | |
| Created | Oct 28, 2021 15:49:03 GMT+08:00 | Source Database IP | | |
| | | | 102 168 0 04 | |
| Destination Database Name Check Again eck success rate | rds-DR 100% All checks must pass before | Destination Database IP | confirmation, check and confirm the results before proceeding to the next step. | |
| Destination Database Name Check Again eck success rate | rds-DR 100% All checks must pass before | bestination Database IP e you can continue. If any check requires Check Result | confirmation, check and confirm the results before proceeding to the next step. | |
| Destination Database Name Check Again eeck success rate Check Item Destination database stor | rds-DR 100% All checks must pass before rage space | e you can continue. If any check requires Check Result | confirmation, check and confirm the results before proceeding to the next step. | |
| Destination Database Name Check Again heck success rate Destination database stor Whether the destination database has | rds-DR 100% All checks must pass before rage space sufficient storage space | e you can continue. If any check requires Check Result | confirmation, check and confirm the results before proceeding to the next step. | |
| Destination Database Name Check Again eck success rate Check Item Destination database stor Whether the destination database has Database parameters | rds-DR 100% All checks must pass before rage space s sufficient storage space | e you can continue. If any check requires Check Result Passed | confirmation, check and confirm the results before proceeding to the next step. | |
| Destination Database Name Check Again check success rate Destination database stor Whether the destination database has Database parameters Whether the destination database is e | rds-DR 100% All checks must pass before rage space sufficient storage space | e you can continue. If any check requires e you can continue. If any check requires Check Result Passed Passed | confirmation, check and confirm the results before proceeding to the next step. | |
| Destination Database Name Check Again Reck success rate Check Item Destination database stor Whether the destination database is e Whether the source and destination database is e | rds-DR 100% All checks must pass before rage space sufficient storage space empty stabase character sets are consistent | e you can continue. If any check requires Check Result Passed Passed Passed | confirmation, check and confirm the results before proceeding to the next step. | |

Step 5 Configure parameters and click **Next**.

| Create Disaster Recovery | Onfigure Source and Destination Databases | 3 Configure DR | ④ Check Task | 5 Compare Parameters | (6) Confirm 1 |
|--|---|--|---------------------------------------|--|----------------|
| Parameter Type Common parameter Select the destination database parameters destination database before or after the mig Save Change | Performance parameters whose values you want to change to be the sam gration. | ie as those in the source database. Some | changes take effect only after you re | istart the destination database. You are advised | to restart the |
| Parameter Name | Source Database Value | Destina | tion Database Value | Result | |
| Ocharacter_set_server | utf8mb4 | utf8mb | 4 | Consistent | |
| ⑦ collation_server | utf8mb4_0900_ai_ci | utf8mb | 4_0900_ai_ci | Consistent | |
| ⑦ connect_timeout | 10 | 10 | | Consistent | |
| <pre>② explicit_defaults_for_timest</pre> | amp OFF | OFF | | Consistent | |
| Innodb_flush_log_at_trx_com | mmit 1 | 1 | | Consistent | |
| Innodb_lock_wait_timeout | 50 | 50 | | Consistent | |
| max_connections | 1500 | 2500 | | Inconsistent | |
| ⑦ net_read_timeout | 30 | 30 | | Consistent | |
| ⑦ net_write_timeout | 60 | 60 | | Consistent | |
| | | | | | |
| | | | | P | revious Nex |

Figure 5-24 Configuring parameters

Step 6 Configure **Start Time** and click **Submit**.

Figure 5-25 Starting the task

| reate Disaster Recovery | Configure Source and Destination Databases | 3 Configure DR | — ④ Check Task ——— | (5) Compare Parameters | ——— 6 Confirm Ta |
|-------------------------------------|--|---|--------------------|------------------------|------------------|
| Start Time Start upon task creation | n Start at a specified time ⑦ | | | | |
| Details | | | | | |
| Product Name | Configuration | | | | |
| | Task Information | | | | |
| | Name | DRS-DR-Task | | | |
| | Description | Source Database IP Address or Domain Na | me: Destination DE | Instance Name: rds-DR | |
| | Disaster Recovery Relationship | Current cloud as standby | | | |
| | Enterprise Project | default | | | |
| | Disaster Recovery Instance De | etails | | | |
| | Specifications | Large | | | |
| | Disk Space(GB) | 500 | | | |
| | Service DB Engine | MySQL | | | |
| | DR DB Engine | MySQL | | | |
| | Network Type | Public network | | | |
| Data Replication Service | Elastic IP Address | | | | |
| | Diractor Recovery Instance Subnet | subpet-ac27/192 168 0 0/24) | | | |

Step 7 On the Disaster Recovery Management page, check the task status. The status is Disaster recovery in progress.

Figure 5-26 Checking the task status

| Batch | Operations 👻 View | / Abnormal Tasks | | | | | | | | | |
|-------|---------------------------|---------------------------------|----------------------|----------------|--------------|--------------|-------------------------|------------|-------------------|------------|-----------------------|
| | | All projects | •) | All DB engines | ▼ All ne | etwork types | ✓ All statuses | ٠ | Enter a task name | or ID Q | Search by Tag 🗧 📫 🛞 C |
| | Task Name/ID ↓Ξ | Status | Delay 🕐 | Charging | Disaster Rec | DB Engine ↓Ξ | Created ↓ | Network | Description | Enterprise | Operation |
| | DRS-DR-Task bd8216f8-b | O Disaster recovery in progress | RTO : Os RPO : Os | 🕲 Yes | Current clou | MySQL | Oct 28, 2021 15:49:03 G | Public net | | default | Stop Speed |

Step 8 Click the task name to go to the **Basic Information** page and confirm the disaster recovery comparison, disaster recovery progress, and disaster recovery data.

| < DRS-DR-Task | | | | | | G Feedback | View Metric | | | |
|---------------------------------|---|---|---------------------------------|-------------------------------|----------------------------|------------------------------|-------------|--|--|--|
| Basic Information | Object-Level Comparison Da | Diget-Level Comparison Data-Level Comparison | | | | | | | | |
| Comparison | If the destination database is modified | If the destination database is modified separately, the data impection may be inaccurate. | | | | | | | | |
| Disaster Recovery | Create Comparison Task | | | | | | | | | |
| riogress | Comparison Type | Start Time | End Time | Status | Exported Comparison Report | Operation | | | | |
| Disaster Recovery Monitoring | Row Comparison | Oct 28, 2021 20:52:42 GMT+08:00 | Oct 28, 2021 20:52:51 GMT+08:00 | Completed | none | View Results Export Report | | | | |
| Disaster Recovery Data | | | | | | | | | | |
| Disaster Recovery Logs | | | | | | | | | | |
| Tags | | | | | | | | | | |

Figure 5-27 Disaster recovery comparison

Figure 5-28 Disaster recovery progress

| < DRS-DR-Task | | Feedback | View Metric |
|---------------------------------|---|----------|-------------|
| Basic Information | Refore the disaster recruises task is remoleted do not perform constitions on the DR instance such as restartion or modifision parameters arounds and databases for the DR instance | | С |
| Disaster Recovery Comparison | Last Updated Oct 28, 2021 19:35:51: GMT+08:00 | | _ |
| Disaster Recovery Progress | Progress | | |
| Disaster Recovery Monitoring | Initialization completed Disaster recovery synchronization delay | | |
| Disaster Recovery Data | | | |
| Disaster Recovery Logs | Source Database Destination Database | | |
| Tags | | | |

Figure 5-29 Disaster recovery data

| < DRS-DR-Task | | | | | | | G Feedback | View Metric | | |
|---|--|-------------|-------------------------------|----------------|---------------------------------|---------------------------------|--------------|-------------|--|--|
| Basic Information Disaster Recovery Comparison Disaster Recovery | Initialization progress Duta Health Reports Initialization Progress shows the Natory data. Import progress during the disater recovery environment creation. After the Initiary data has been imported, the Initialization is complete, and data on this tab will not be updated any more. | | | | | | | | | |
| Progress | Migration Object | Total Items | Status | Migrated Items | Start Time | Finish Time | Operation | | | |
| Disaster Recovery Monitoring | table | 0 | Completed | 0 | Oct 28, 2021 18:22:20 GMT+08:00 | Oct 28, 2021 18:22:22 GMT+08:00 | View Details | | | |
| Disaster Recovery | account | 1 | Completed | 1 | Oct 28, 2021 18:22:20 GMT+08:00 | Oct 28, 2021 18:22:22 GMT+08:00 | View Details | | | |
| Disaster Recovery | table_rename_or_copy | 0 | Completed | 0 | Oct 28, 2021 18:22:20 GMT+08:00 | Oct 28, 2021 18:22:22 GMT+08:00 | View Details | | | |
| Logs | function | 0 | Completed | 0 | Oct 28, 2021 18:22:20 GMT+08:00 | Oct 28, 2021 18:22:22 GMT+08:00 | View Details | | | |
| lags | procedure | 0 | Completed | 0 | Oct 28, 2021 18:22:20 GMT+08:00 | Oct 28, 2021 18:22:22 GMT+08:00 | View Details | | | |
| | view | 0 | Completed | 0 | Oct 28, 2021 18:22:20 GMT+08:00 | Oct 28, 2021 18:22:22 GMT+08:00 | View Details | | | |
| | table_structure | 0 | Completed | 0 | Oct 28, 2021 18:22:20 GMT+08:00 | Oct 28, 2021 18:22:22 GMT+08:00 | View Details | | | |
| | table_indexs | 0 | Completed | 0 | Oct 28, 2021 18:22:20 GMT+08:00 | Oct 28, 2021 18:22:22 GMT+08:00 | View Details | | | |
| | database | 0 | Completed | 0 | Oct 28, 2021 18:22:20 GMT+08:00 | Oct 28, 2021 18:22:22 GMT+08:00 | View Details | | | |
| | | | | | | | | | | |

----End

5.1.6.3 Performing a Primary/Standby Switchover

If the source database in the production center is faulty, manually switch the DR instance to the read/write state. Then, data is written to the DR instance and synchronized to the source database.

Procedure

- **Step 1** Find that the source database in the production center is faulty. For example, the source database cannot be connected, the source database execution is slow, or the CPU usage is high.
- Step 2 Receive an SMN email notification
- **Step 3** Check the delay of the DR task.

Figure 5-30 Delay exception

| 6 w | e would | much appreciate if you could o | complete our questionn | aire on Data Replication Service | . Your feedback wil | l help us provide a | better user experience | | | | | | × |
|------------|----------|---------------------------------|------------------------|--|---------------------|---------------------|------------------------|-------------------------|------------|------------------|------------|---------------------|-----|
| Ba | itch Ope | rations 👻 View Abnor | mal Tasks All proje | its 👻 🖌 | l DB engines | • 7 | All network types | ✓ All statuses | | Enter a task nar | ne or ID | Q Search by Tag 😸 🖪 | © C |
| | | Task Name/ID ↓Ξ | Status | Delay ③ | Charging | Disaster Rec | DB Engine ↓Ξ | Created 4F | Network | Description | Enterprise | Operation | |
| | | DRS-DR-Task 6252c9b2-054f-4e | C Disaster r | Incremental delay : 105.05s RTO : 0s RPO : 135.64s | Yes | Current clou | MySQL | Nov 05, 2021 15:36:35 G | Public net | | default | Stop Speed | |

 \times

- **Step 4** Check that the services of the source database have been stopped. For details, see How Do I Ensure that All Services on the Database Are Stopped?
- **Step 5** Select the task, click the **Batch Operation** drop-down box in the upper left corner and select Primary/Standby Switchover.

Figure 5-31 Primary/standby switchover

Primary/Standby Switchover



Are you sure you want to perform the primary/standby switchover for the following 1 tasks? Disaster recovery does not support the active/active mode. Ensure no data changes on the original active database and then initiate a switchover. Learn how to ensure that all services on the service database are stopped.

| Name | | Status |
|-------------|-----|---|
| DRS-DR-Task | | Disaster recovery in progress |
| | Yes | No |

Figure 5-32 Switchover completed

| Batch Ope | rations 👻 View Abnormal Tasks | | | | | | | | | |
|-----------|---|--------------|--|-----------|-------------------------|--------------|-------------------------|--------------------|------------|-------------------------|
| | | All projects | ▼ All D | B engines | ✓ All network ty | 9es 👻 | All statuses | ▼ Enter a task nam | e or ID C |) Search by Tag 🗧 🖾 🛞 C |
| | Task Name/ID ↓Ξ | Status | Delay 🕐 | Charging | Disaster Recovery Relat | DB Engine ↓Ξ | Created JF | Network Desc | Enterprise | Operation |
| | DRS-DR-Task 6252c9b2-054f-4e7b-b847-89 | C Disaster r | Incremental dela RTO : 0s RPO : 0s | 🙆 Yes | Current cloud as active | MySQL | Nov 05, 2021 15:36:35 G | Public net | default | Stop Speed |

Step 6 Change the database IP address on your application and use it to connect to the database. Then data is properly read from and written to the database.

----End

6 Security Best Practices

Security is a shared responsibility between Huawei Cloud and you. Huawei Cloud is responsible for the security of cloud services to provide a secure cloud. As a tenant, you should properly use the security capabilities provided by cloud services to protect data, and securely use the cloud. For details, see **Shared Responsibilities**.

This section provides actionable guidance for enhancing the overall security of using DRS for data migration. You can continuously evaluate the security status of your DRS tasks for secure data migration and enhance their overall security defense. By doing this, only the minimum permissions required for business can be assigned, and data can be protected from leakage and tampering both in transmission.

Make security configurations from the following dimensions to meet your business needs.

- Using Fine-Grained Authorization to Control the Usage Scope of DRS Resources
- Using Secure and Reliable Networks and Encrypted Transmission Potocols
- Using Network Access Control to Isolate the Network for Data Synchronization
- Configuring Independent Database Migration Users and Assigning the Minimum Permissions
- Creating HA Tasks to Improve Service Availability
- Properly Using Authentication Credentials to Prevent Data Leaks

Using Fine-Grained Authorization to Control the Usage Scope of DRS Resources

1. Set only the minimum permissions for IAM users with different roles to prevent data leakage or misoperations caused by excessive permissions.

To better isolate and manage permissions, you are advised to configure an independent IAM administrator and grant them the permission to manage IAM policies. The IAM administrator can create different user groups based on your service requirements. User groups correspond to different data access scenarios. By adding users to user groups and binding IAM policies to user

groups, the IAM administrator can grant different data access permissions to employees in different departments based on the principle of least privilege.

2. Fine-grained authorization is recommended to enable fine-grained control on user permissions.

Fine-grained policies define permissions by APIs. You are advised to **create a custom policy** based on your DRS operation permissions.

Using Secure and Reliable Networks and Encrypted Transmission Potocols

1. You are advised to use a secure network, such as a VPN, for data synchronization.

Do not use an EIP network if possible. Instead, use a secure network, such as a VPN, for data transmission. Configure firewalls, security groups, and ACL rules to reduce the attack surface and improve the network security for data synchronization.

2. The certificate+SSL connection mode is recommended.

The certificate+SSL mode is a secure connection mode. It protects the integrity and confidentiality of data during transmission, but slightly affects the read and write performance of the database. In certain scenarios that are sensitive to synchronization performance, you need to balance performance and security.

Using Network Access Control to Isolate the Network for Data Synchronization

Firewalls, Access Control List (ACL) rules, and security groups are used for network access control to effectively control the network range for DRS to access databases and isolate the network for data synchronization from other networks, ensuring DRS task security.

Configuring Independent Database Migration Users and Assigning the Minimum Permissions

If you migrate data as user **root** or other service users, permission control may be disordered and permission leakage may occur. When creating a DRS task, you are advised to create independent migration accounts for the source and destination databases and grant the minimum permissions to the migration accounts by referring to the user guide to reduce the risk of account and permission leaks.

Creating HA Tasks to Improve Service Availability

DRS provides the cross-AZ HA. If the instance in the primary AZ becomes faulty, services can be switched over to the instance in the standby AZ to continue data replication.

Properly Using Authentication Credentials to Prevent Data Leaks

When you use code or API Explorer to call APIs, you need to obtain a token using the account password or AK/SK information. You need to comply with the secure

encoding rules, properly manage authentication credentials, and do not hardcode authentication information in plaintext.

A Change History

| Date | Description |
|------------|--|
| 2024-04-30 | This issue is the sixteenth official release, which incorporates the following change: |
| | • Added From On-premises MySQL to GaussDB Distributed. |
| 2023-11-30 | This issue is the fifteenth official release, which incorporates the following change: Added From On-premises Oracle to GaussDB Primary/ Standby. |
| 2023-07-30 | This issue is the fourteenth official release, which incorporates the following change:Added Security Best Practices. |
| 2022-11-10 | This issue is the thirteenth official release, which incorporates the following changes: Added From On-Premises Oracle to DDM. |
| 2022-06-15 | This issue is the twelfth official release, which incorporates the following change:Added From MySQL Schema and Logic Table to DDM. |
| 2022-04-30 | This is the eleventh official release, which incorporates the following change:Added From RDS for MySQL to DDM. |
| 2021-11-30 | This issue is the tenth official release, which incorporates the following change: Added Configuring Remote Single-Active DR for an RDS for MySQL Instance Using DRS. |
| 2021-11-20 | This issue is the ninth official release, which incorporates the following changes: Added From RDS for MySQL to Kafka. Added From Other Cloud MySQL to GaussDB(for MySQL). |

| Date | Description |
|------------|---|
| 2021-10-30 | This issue is the eighth official release, which incorporates the following change: Added From ECS-hosted MySQL to RDS for MySQL. Added From On-premises Oracle to GaussDB Distributed. |
| 2021-08-30 | This issue is the eighth official release, which incorporates the following change: Added From Other Cloud PostgreSQL to RDS for PostgreSQL. |
| 2020-11-30 | This issue is the seventh official release, which incorporates the following changes: Added the example for migrating data from a MySQL database to GaussDB(for MySQL). |
| 2019-10-30 | This issue is the sixth official release, which incorporates the following changes: Supported the migration of specified MySQL users. Supported checking backup files during backup migration. |
| 2019-07-30 | This issue is the fifth official release, which incorporates the following changes: Added backup migration in Migrating Microsoft SQL Server Backup Data to RDS SQL Server DB Instance. Supported unbinding EIP from destination databases during real-time migration. |
| 2018-09-30 | This issue is the fourth official release, which incorporates the following changes: Added practices of PostgreSQL database migrations. Supported setting a synchronization delay threshold. Supported setting the source database type. |
| 2018-08-31 | This issue is the third official release, which incorporates the following changes: Displayed the remaining time of a migration task. Supported object-level and data-level comparisons. Supported full migration of MongoDB clusters. |
| 2018-07-14 | This issue is the second official release, which incorporates the following changes: Added the practice of MongoDB database migration. Added practices of starting a migration task as scheduled. Added practices of sending notifications to a specified recipient. Organized information of migration preparations based on permissions, network, and security rules. |

| Date | Description |
|------------|---|
| 2018-05-31 | This issue is the first official release. |