Data Replication Service

Real-Time Disaster Recovery

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Contents

1 DR Overview

To prevent service unavailability caused by regional faults, DRS provides disaster recovery to ensure service continuity. You can easily implement disaster recovery between on-premises and cloud, without the need to invest a lot in infrastructure in advance.

The disaster recovery architectures, such as two-site three-data-center and two-site four-data center, are supported. A primary/standby switchover can be implemented by promoting a standby node or demoting a primary node in the disaster recovery scenario.

Figure 1-1 Real-time DR switchover

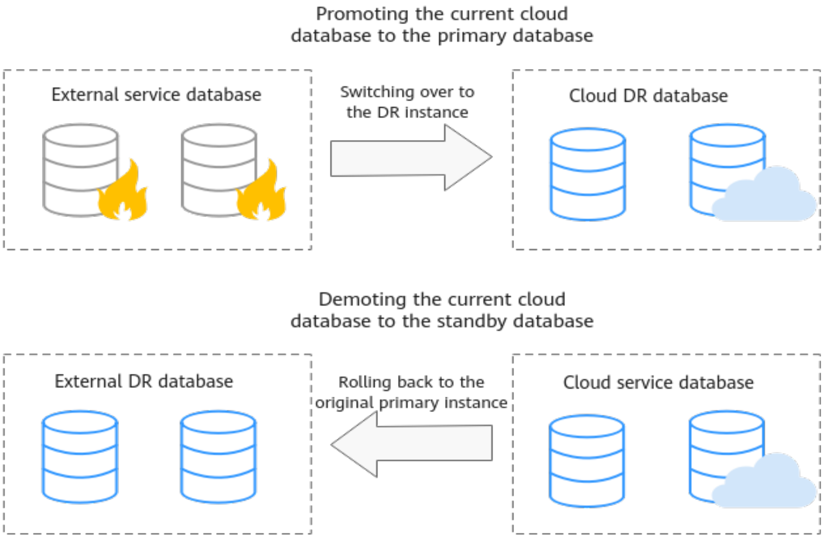
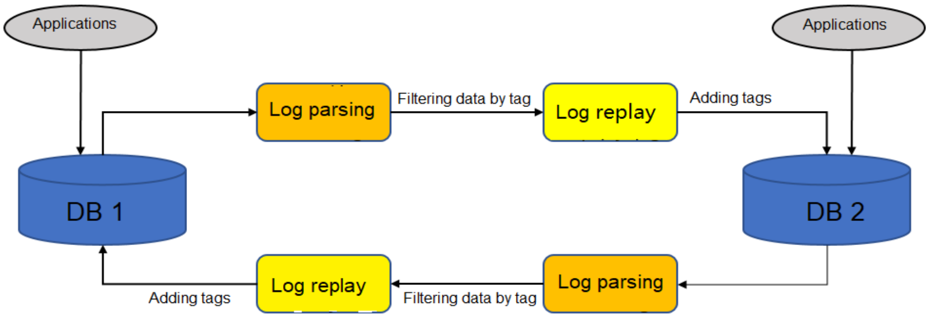

Promoting the current cloud database to the primary database
External service database
Switching over to the DR instance
Cloud DR database
Demoting the current cloud database to the standby database
External DR database
Rolling back to the original primary instance
Cloud service database

Figure 1-2 Dual-active DR principles



Loopback Prevention (DML)

- When logs are parsed from the source database, the parsed data may contain a certain tag. The data containing the tag is written to the source database through DRS. The data written by applications is not tagged. After the parsing, the data without the tag is filtered out.
- When data is replayed to the destination database, the data to be replayed is marked with a special tag, which is recorded in database logs.
- DRS ensures eventual consistency. The concurrency sequence of DRS is at the row level. That is, operations on the same row are executed based on the source database sequence, not based on the transactions of the source database.

Supported Database Types

The following table lists the database types supported by DRS.

Table 1-1 DR schemes

Service Database	DR Database	Documentation
• On-premises MySQL databases • MySQL databases on an ECS • MySQL databases on other clouds • RDS for MySQL	RDS for MySQL	• **From MySQL to MySQL (Single-Active DR)** • **From MySQL to MySQL (Dual-Active DR)**
	GaussDB(for MySQL)	**From MySQL to GaussDB(for MySQL) (Single-Active DR)**
DDM	DDM	**From DDM to DDM (Single-Active DR)**

Service Database	DR Database	Documentation
GaussDB(for MySQL)	GaussDB(for MySQL)	• **From GaussDB(for MySQL) to GaussDB(for MySQL) (Single-Active DR)** • **From GaussDB(for MySQL) to GaussDB(for MySQL) (Dual-Active DR)**

Basic Principles of Real-Time Disaster Recovery

DRS uses the real-time replication technology to implement disaster recovery for two databases. The underlying technical principles are the same as those of real-time migration. The difference is that real-time DR supports forward synchronization and backward synchronization. In addition, disaster recovery is performed on the instance-level, which means that databases and tables cannot be selected.

2 DR Scenarios

2.1 From MySQL to MySQL (Single-Active DR)

Supported Source and Destination Databases

Table 2-1 Supported databases

Disaster Recovery Relationship	Service Database	DR Database
Current cloud as standby	● On-premises MySQL databases ● MySQL databases on an ECS ● MySQL databases on other clouds ● RDS for MySQL	● RDS for MySQL
Current cloud as active	● RDS for MySQL	● On-premises MySQL databases ● MySQL databases on an ECS ● MySQL databases on other clouds ● RDS for MySQL

Database Account Permission Requirements

To start a DR task, the service and DR database users must meet the requirements in the following table. Different types of DR tasks require different permissions. For details, see **Table 2-2**. DRS automatically checks the database account permissions in the pre-check phase and provides handling suggestions.

Table 2-2 Database account permission

Type	Permission Required
Service database user	The user must have the following permissions: SELECT, CREATE, ALTER, DROP, DELETE, INSERT, UPDATE, TRIGGER, REFERENCES, SHOW VIEW, EVENT, INDEX, LOCK TABLES, CREATE VIEW, CREATE ROUTINE, ALTER ROUTINE, CREATE USER, RELOAD, REPLICATION SLAVE, REPLICATION CLIENT, and WITH GRANT OPTION. The user **root** of the RDS for MySQL instance has the preceding permissions by default. If the service database version is 8.0.14 to 8.0.18, the SESSION_VARIABLES_ADMIN permission is required. If the service database version is 8.0.2 or later, the XA_RECOVER_ADMIN permission is required to prevent data loss caused by uncommitted XA transactions during startup. The **root** account of the RDS for MySQL DB instance has the preceding permissions by default.
DR database user	The user must have the following permissions: SELECT, CREATE, ALTER, DROP, DELETE, INSERT, UPDATE, TRIGGER, REFERENCES, SHOW VIEW, EVENT, INDEX, LOCK TABLES, CREATE VIEW, CREATE ROUTINE, ALTER ROUTINE, CREATE USER, RELOAD, REPLICATION SLAVE, REPLICATION CLIENT, and WITH GRANT OPTION. The user **root** of the RDS for MySQL instance has the preceding permissions by default. If the DR database version is 8.0.14 to 8.0.18, the SESSION_VARIABLES_ADMIN permission is required.

NOTE

- You are advised to create an independent database account for DRS task connection to prevent task failures caused by database account password modification.
- After changing the account passwords for the service and DR databases, modify the connection information of the DRS task by referring to **Modifying Connection Information** to prevent automatic retry after a task failure. Automatic retry will lock the database accounts.
- **Table 2-2** lists the minimum permissions required by a DRS task. If you need to migrate the grant permission through a DRS task, ensure that the connection account of the DRS task has the corresponding permission. Otherwise, the destination database user may not be authorized due to grant execution failure. For example, if the connection account of the DRS task does not require the process permission, but you need to migrate the process permission through a DRS task, ensure that the connection account of the DRS task has the process permission.

Prerequisites

- **You have logged in to the DRS console.**
- Your account balance is greater than or equal to $0 USD.
- For details about the supported DB types and versions, see **Supported Databases**.
- If a subaccount is used to create a DRS task, ensure that an agency has been added. For details about how to create an agency, see **Agency Management**.

Suggestions

CAUTION

- During the DR initialization, do not perform DDL operations on the service database. Otherwise, the task may be abnormal.
- During DR initialization, ensure that no data is written to the DR database to ensure data consistency before and after DR.

- The success of DR depends on environment and manual operations. To ensure a smooth DR, perform a DR trial before you start the DR task to help you detect and resolve problems in advance.
- It is recommended that you start your DR task during off-peak hours to minimize the impact on your services.
  - If the bandwidth is not limited, initialization of DR will increase query workload of the source database by 50 MB/s and occupy 2 to 4 vCPUs.
  - To ensure data consistency, tables without a primary key may be locked for 3s during disaster recovery.
  - The data in the DR process may be locked by other transactions for a long period of time, resulting in read timeout.
  - If DRS concurrently reads data from a database, it will use about 6 to 10 sessions. The impact of the connections on services must be considered.
  - If you read a table, especially a large table, during DR, the exclusive lock on that table may be blocked.

  - For more information about the impact of DRS on databases, see **How Does DRS Affect the Source and Destination Databases?**

- Data-Level Comparison

  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, data inconsistency may occur, reducing the reliability and validity of the comparison results.

Precautions

Before creating a DR task, read the following precautions:

Table 2-3 Precautions

Type	Constraint
Disaster recovery objects	● Only MyISAM and InnoDB tables support disaster recovery. ● System tables are not supported. ● Triggers and events do not support disaster recovery. ● Accounts that have operation permissions on customized objects in the system database cannot be used for disaster recovery. ● Disaster recovery cannot be configured for a specific service database. ● Disaster recovery for non-standard floating-point data that can be written in loose mode but cannot be written in strict mode is not supported. Such non-standard floating-point data may fail to be hit, causing data disaster recovery failures.

Type	Constraint
Service database configuration	● During data disaster recovery, do not upgrade the MySQL instance across major versions. Otherwise, data may become inconsistent or the synchronization task may fail (data, table structures, and keywords may cause compatibility changes after the cross-version upgrade). You are advised to create a DR task again if the MySQL instance is upgraded across major versions. ● The binlog of the MySQL service database must be enabled and use the row-based format. ● If the storage space is sufficient, store the service database binlog for as long as possible. The recommended retention period is seven days. – For self-built MySQL databases, you can set the **expire_logs_days** parameter to specify the binlog retention period. – If the source database is an RDS for MySQL instance, set the binlog retention period by following the instructions provided in **RDS User Guide**. ● The service database username or password cannot be empty. ● **server_id** in the MySQL service database must be set. If the service database version is MySQL 5.6 or earlier, the **server_id** value ranges from **2** to **4294967296**. If the service database is MySQL 5.7 or later, the **server_id** value ranges from **1** to **4294967296**. ● During disaster recovery, if the session variable **character_set_client** is set to **binary**, some data may include garbled characters. ● GTID must be enabled for the database. ● During the disaster recovery, 0 cannot be written to the auto-increment primary key column in the service database. Otherwise, the data of the auto-increment column in the service database is inconsistent with that in the DR database. ● The service database name must contain 1 to 64 characters, including only lowercase letters, digits, hyphens (-), and underscores (_). ● The table name and view name in the service database cannot contain non-ASCII characters, or the following characters: .'<>/\" ● The column names in the service database tables cannot end with a backslash (\). ● If the **expire_logs_days** value of the service database is set to **0**, the disaster recovery may fail. ● If tables that have no primary key contain hidden primary keys in the service database, the DR task may fail or data may be inconsistent.

Type	Constraint
DR database configuration	● During data disaster recovery, do not upgrade the MySQL instance across major versions. Otherwise, data may become inconsistent or the synchronization task may fail (data, table structures, and keywords may cause compatibility changes after the cross-version upgrade). You are advised to create a DR task again if the MySQL instance is upgraded across major versions. ● The DR DB instance is running properly. If the DR DB instance is a primary/standby instance, the replication status must also be normal. ● The DR DB instance must have sufficient storage space. ● The major version of the DR database must be the same as that of the service database. ● The binlog of the DR database must be enabled and use the row-based format. ● GTID must be enabled for the DR database. ● The DR DB instance cannot contain any service databases except the MySQL system database. If you select an RDS DB instance on the console as the DR database, the DR instance will be set to read-only after the DR task starts.

Type	Constraint
Precautions	● If the DCC does not support instances with 4 vCPUs and 8 GB memory or higher instance specifications, the DR task cannot be created. ● If a physically generated column in a table is generated based on a time type, the data in the column may be inconsistent. ● Cascade operations cannot be performed on tables with foreign keys. If the foreign key index of a table is a common index, the table structure may fail to be created. You are advised to use a unique index. ● The service database does not support point-in-time recovery (PITR). ● Binlogs cannot be forcibly deleted. Otherwise, the DR task fails. ● The service database does not support the **reset master** or **reset master to** command, which may cause DRS task failures or data inconsistency. ● If the network is reconnected within 30 seconds, disaster recovery will not be affected. If the network is interrupted for more than 30 seconds, the DR task will fail. ● Resumable upload is supported, but data may be repeatedly inserted into a table that does not have a primary key. ● If there is a DR task in a database, you are not allowed to create a migration or synchronization task (The database cannot be used as the source or destination database of the migration or synchronization task). ● The parameter modification of the service database is not recorded in logs and is not synchronized to the DR database. Therefore, you need to modify the parameters after the DR database is promoted to the primary. ● If the service database and DR database are RDS for MySQL instances, tables with TDE enabled cannot be created. ● If the DR database version is 5.7, the last digit 0 after the decimal point is lost in the floating point number of the JSON type due to version restrictions. The value comparison result will be inconsistent due to precision loss. ● Before creating a DRS task, if concurrency control rules of SQL statements are configured for the service or DR database, the DRS task may fail. ● DB instances that you need to enter their IP addresses are external databases. ● If a high-privilege user created in an external database is not supported by RDS for MySQL, the user will not be synchronized to the DR database, for example, the super user. ● The DR relationship involves only one primary database. If the external database does not provide the superuser permission, it cannot be set to read-only when it acts as a standby

Type	Constraint
	database. Ensure that the data of the standby node is synchronized only from the primary node. Any other write operations will pollute the data in the standby database, data conflicts may occur in the DR center and cannot be resolved. ● If the external database is a standby and read-only database, only the account with the superuser permission can write data to that database. But you still need to ensure that data is written only by this account. Otherwise, the standby database may be polluted, and data conflicts occur in the DR center and cannot be resolved. ● During disaster recovery, if the password of the service database is changed, the DR task will fail. To rectify the fault, you can correct the service database information on the DRS console and retry the task to continue disaster recovery. Generally, you are advised not to modify the preceding information during disaster recovery. ● If the service database port is changed during disaster recovery, the DR task fails. Generally, you are advised not to modify the service database port during disaster recovery. ● During disaster recovery, if the service database is on an RDS DB instance that does not belong the current cloud platform, the IP address cannot be changed. If the service database is an RDS instance on the current cloud and the DR task fails due to changes on the IP address, DRS automatically changes the IP address to the correct one. Then, you can retry the task to continue disaster recovery. Therefore, changing the IP address is not recommended. ● During disaster recovery, you can create accounts for the service database. ● During the DR initialization, do not perform DDL operations on the source database. Otherwise, the DR task may be abnormal. ● During disaster recovery initialization, a lot of binlogs are generated in the DR database, occupying too much storage space. Therefore, during disaster recovery initialization, only the latest five binlogs are retained in the DR database by default. After the disaster recovery initialization is complete, the retention period of binlogs in the DR database is restored to the value you configure. If you want to keep the binlog retention period of the DR database to be the value you specify due to service requirements, you need to submit a service ticket. In the upper right corner of the management console, choose **Service Tickets** > **Create Service Ticket** to submit a service ticket. ● Do not write data to the source database during the primary/standby switchover. Otherwise, data pollution or table structure inconsistency may occur, resulting in data inconsistency between the service database and DR database.

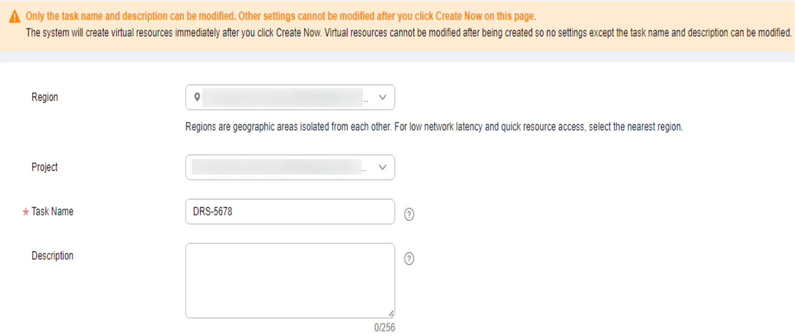
Procedure

Step 1 On the **Disaster Recovery Management** page, click **Create Disaster Recovery Task**.

Step 2 On the **Create Disaster Recovery Instance** page, select a region and project, specify the task name, description, and the DR instance details, and click **Create Now**.

- Task information description

Figure 2-1 DR task information



⚠ Only the task name and description can be modified. Other settings cannot be modified after you click Create Now on this page.
The system will create virtual resources immediately after you click Create Now. Virtual resources cannot be modified after being created so no settings except the task name and description can be modified.

Region: [redacted]
Regions are geographic areas isolated from each other. For low network latency and quick resource access, select the nearest region.

Project: [redacted]

* Task Name: DRS-5678

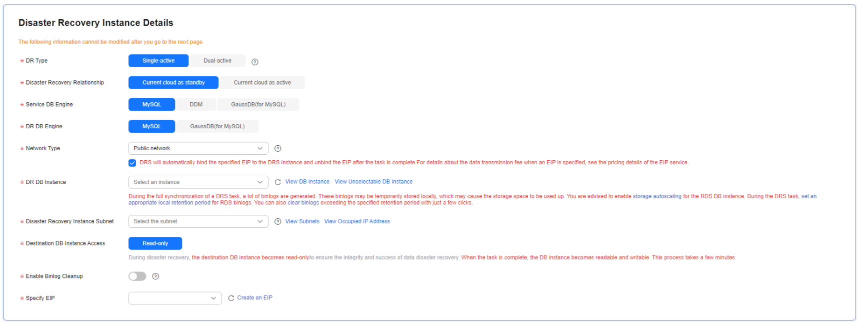
Description:
0/256

Table 2-4 Task and recipient description

Parameter	Description
Region	The region where your service is running. You can change the region.
Project	The project corresponds to the current region and can be changed.
Task Name	The task name must start with a letter and consist of 4 to 50 characters. It can contain only letters, digits, hyphens (-), and underscores (_).
Description	The description consists of a maximum of 256 characters and cannot contain special characters !=<>'&"\

- DR instance information

Figure 2-2 DR instance information



Disaster Recovery Instance Details

The following information cannot be modified after you go to the next page.

* DR Type: Single-active
* Disaster Recovery Relationship: Current cloud as standby
* Service DB Engine: MySQL
* DR DB Engine: MySQL
* Network Type: Public network

☑ DRS will automatically bind the specified EIP to the DRS instance and unbind the EIP after the task is complete.For details about the data transmission fee when an EIP is specified, see the pricing details of the EIP service.

* DR DB Instance: Select an instance

During the full synchronization of a DRS task, a lot of binlogs are generated. These binlogs may be temporarily stored locally, which may cause the storage space to be used up. You are advised to enable storage autoscaling for the RDS DB instance. During the DRS task, set an appropriate local retention period for RDS binlogs. You can also clear binlogs exceeding the specified retention period with just a few clicks.

* Disaster Recovery Instance Subnet: Select the subnet
* Destination DB Instance Access: Read-only

During disaster recovery, the destination DB instance becomes read-onlyto 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.

* Enable Binlog Cleanup
* Specify EIP

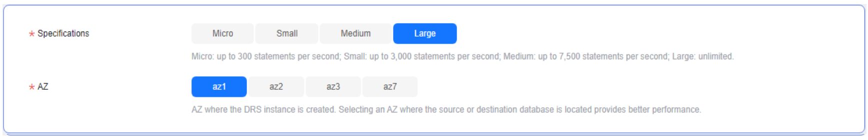
Table 2-5 DR instance settings

Parameter	Description
DR Type	Select **Single-active**. The DR type can be single-active or dual-active. If **Dual-active** is selected, two subtasks are created by default, a forward DR task and a backward DR task. **NOTE** Only whitelisted users can use dual-active DR. 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.
Disaster Recovery Relationship	Select **Current cloud as standby**. This parameter is available only when you select **Single-active**. By default, **Current cloud as standby** is selected. You can also select **Current cloud as active**. – **Current cloud as standby**: The DR database is on the current cloud. – **Current cloud as active**: The service database is on the current cloud.
Service DB Engine	Select **MySQL**.
DR DB Engine	Select **MySQL**.
Network Type	The public network is used as an example. Available options: **VPN or Direct Connect** and **Public network**. By default, the value is **Public network**.
DR DB Instance	RDS DB instance you have created as the destination database of the DR task.
Disaster Recovery Instance Subnet	Select the subnet where the disaster recovery instance is located. You can also click **View Subnets** to go to the network console to view the subnet where the instance resides. By default, the DRS instance and the DR DB instance are in the same subnet. You need to select the subnet where the DRS instance resides and ensure that there are available IP addresses. To ensure that the disaster recovery instance is successfully created, only subnets with DHCP enabled are displayed.

Parameter	Description
Destination DB Instance Access	Select **Read-only**. This parameter is available when you select **Single-active** for **DR Type** and **Current cloud as standby** for **Disaster Recovery Relationship**. – During disaster recovery, the entire DR database instance becomes read-only. To change the DR database to **Read/Write**, you can change the DR database (or destination database) to a service database by clicking **Promote Current Cloud** on the **Disaster Recovery Monitoring** tab. – If a DR task fails, the DR database does not automatically change to the read/write state. – If a DR task is paused, you can disable read-only for the DR database. For details, see **Disabling or Enabling Read-Only**. – After read-only is disabled and the DR task is resumed, the DR database automatically changes to read-only. The read-only settings of the DR DB instance are also affected by the access settings of the DB instance itself. Therefore, you are advised not to set the access settings of the DB instance on the RDS console. – After the DR task is complete, the DR database changes to **Read/Write**. – When the external database functions as the DR database, the user with the superuser permission can set the database to read-only. – If a DRS instance node is rebuilt due to a fault, to ensure data consistency during the DRS task restoration, the current cloud standby database is set to read-only before the task is restored. After the task is restored, the synchronization relationship recovers.
Enable Binlog Cleanup	This parameter is available when you set **Disaster Recovery Relationship** to **Current cloud as standby**. It indicates whether to enable the function of quickly clearing binlogs of the destination database. After this function is enabled, binlog clearing is enabled for the DR database during the full synchronization and disabled during the incremental synchronization.
Specify EIP	This parameter is available when you select **Public network** for **Network Type**. Select an EIP to be bound to the DRS instance. DRS will automatically bind the specified EIP to the DRS instance and unbind the EIP after the task is complete. The number of specified EIPs must be the consistent with that of DB instances. For details about the data transfer fee generated using a public network, see **EIP Price Calculator**.

- Specifications

Figure 2-3 Specifications



* Specifications

Micro: up to 300 statements per second; Small: up to 3,000 statements per second; Medium: up to 7,500 statements per second; Large: unlimited.

* AZ

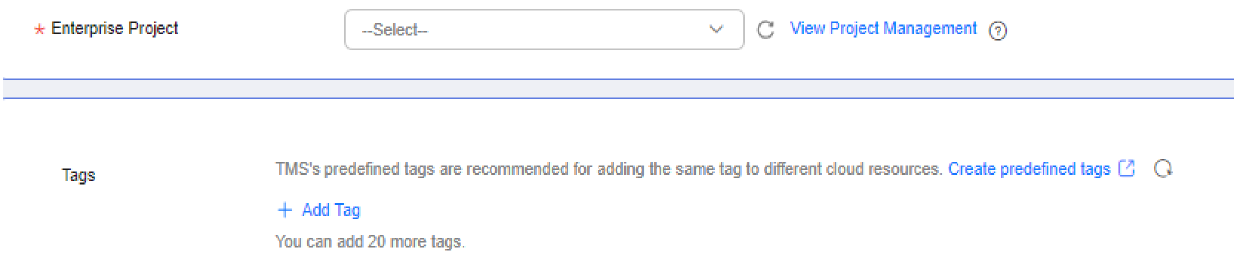
AZ where the DRS instance is created. Selecting an AZ where the source or destination database is located provides better performance.

Table 2-6 Specifications

Parameter	Description
Specifications	DRS instance specifications. Different specifications have different performance upper limits. For details, see **Real-Time DR**. **NOTE** DRS allows you to upgrade specifications only for real-time DR tasks from MySQL to MySQL, from MySQL to GaussDB(for MySQL), and from GaussDB(for MySQL) to GaussDB(for MySQL). Task specifications cannot be downgraded. For details, see **Changing Specifications**.
AZ	Select the AZ where you want to create the DRS task. Selecting the one housing the source or destination database can provide better performance.

- Enterprise Project and Tags

Figure 2-4 Enterprise projects and tags



* Enterprise Project --Select--

Tags

TMS's predefined tags are recommended for adding the same tag to different cloud resources. Create predefined tags

You can add 20 more tags.

Table 2-7 Enterprise Project and Tags

Parameter	Description
Enterprise Project	An enterprise project you would like to use to centrally manage your cloud resources and members. Select an enterprise project from the drop-down list. The default project is **default**. For more information about enterprise projects, see ***Enterprise Management User Guide***. To customize an enterprise project, click **Enterprise** in the upper right corner of the console. The **Enterprise Project Management Service** page is displayed. For details, see **Creating an Enterprise Project** in *Enterprise Management User Guide*.
Tags	– Tags a task. This configuration is optional. Adding tags helps you better identify and manage your tasks. Each task can have up to 20 tags. – If your organization has configured tag policies for DRS, add tags to tasks based on the policies. If a tag does not comply with the policies, task creation may fail. Contact your organization administrator to learn more about tag policies. – After a task is created, you can view its tag details on the **Tags** tab. For details, see **Tag Management**.

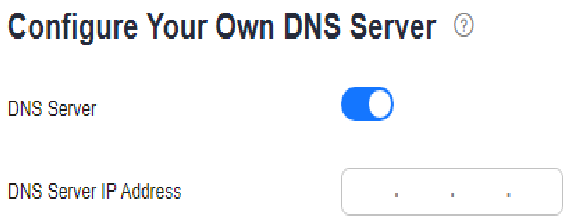
NOTE

If a task fails to be created, DRS retains the task for three days by default. After three days, the task automatically stops.

Step 3 On the **Configure Source and Destination Databases** page, wait until the DR 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 DR instance. After the connection tests are successful, select the check box before the agreement and click **Next**.

- (Optional) Configuring your own DNS server

Figure 2-5 DNS Server



Configure Your Own DNS Server

DNS Server

DNS Server IP Address

Table 2-8 DNS server information

Parameter	Description
DNS Server	Enable this option if you need to use the IP address of your own DNS server as the source or destination database IP address.
DNS Server IP Address	Add the IP address of your own DNS server to **DNS Server IP Address**. Then, you can also enter this IP address in **IP Address or Domain Name** in the **Source Database** or **Destination Database** area for data migration.

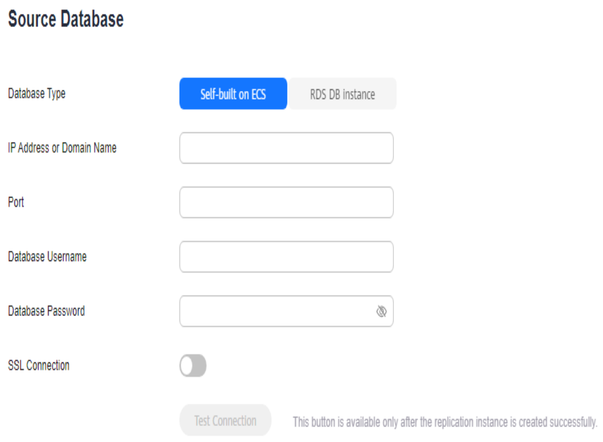
NOTE

This function is available when you need to use the IP address of your own DNS server as the source or destination database IP address.

Only whitelisted users can use this function. You need to submit a service ticket to apply for this function. In the upper right corner of the management console, choose **Service Tickets** > **Create Service Ticket** to submit a service ticket.

- Select **Current cloud as standby** for **Disaster Recovery Relationship** in **Step 2**.

Figure 2-6 Service database information



Source Database

Database Type: Self-built on ECS

This button is available only after the replication instance is created successfully.

Table 2-9 Service database settings

Parameter	Description
Database Type	By default, **Self-built on ECS** is selected. The source database can be a **Self-built on ECS** or an **RDS DB instance**. After selecting **RDS DB instance**, select the region where the source database resides and the region cannot be the same as the region where the destination database resides. The region where the destination database is located is the region where you log in to the management console. To use the **RDS DB instance** option, submit a service ticket.
IP Address or Domain Name	The IP address or domain name of the service database.
Port	The port of the service database. Range: 1 – 65535
Database Username	The username for accessing the service database.
Database Password	The password for the service database username. You can change the password if necessary. To change the password, perform the following operation after the task is created: If the task is in the **Starting**, **Initializing**, **Disaster recovery in progress**, or **Disaster recovery failed** status, in the **Connection Information** area on the **Basic Information** tab, click **Modify Connection Details**. In the displayed dialog box, change the password.
SSL Connection	SSL encrypts the connections between the source and destination databases. If SSL is enabled, upload the SSL CA root certificate. **NOTE** – The maximum size of a single certificate file that can be uploaded is 500 KB. – If SSL is disabled, your data may be at risk.
Region	The region where the source database is located. This parameter is available only when **Database Type** for the source database is set to **RDS DB instance**. The region cannot be the region where the destination database is located.
DB Instance Name	The name of the service DB instance. This parameter is available only when the source database is an **RDS DB instance**.
Database Username	The username for accessing the service database.
Database Password	The password for the service database username.

NOTE

The IP address, domain name, username, and password of the service database are encrypted and stored in DRS and will be cleared after the task is deleted.

Figure 2-7 DR database information

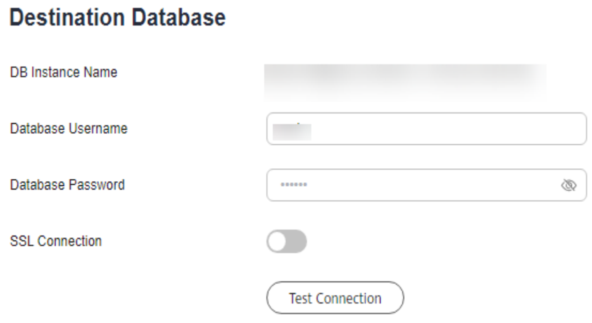
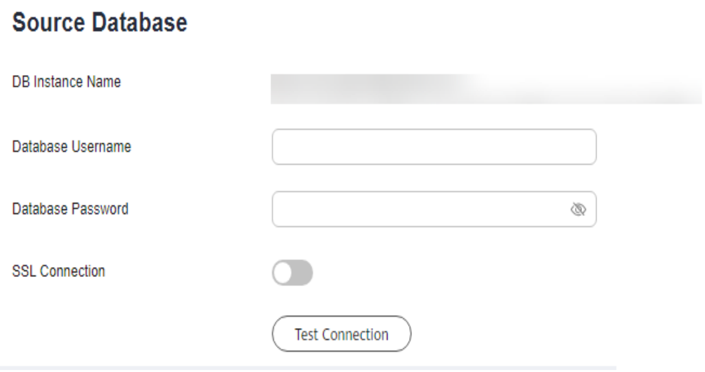


Table 2-10 DR database settings

Parameter	Description
DB Instance Name	The DB instance you selected when creating the DR task and cannot be changed.
Database Username	The username for accessing the DR database.
Database Password	The password for the database username. The password can be changed after a task is created. If the task is in the **Starting**, **Initializing**, **Disaster recovery in progress**, or **Disaster recovery failed** status, in the **DR Information** area on the **Basic Information** tab, click **Modify Connection Details**. In the displayed dialog box, change the password. The database username and password are encrypted and stored in DRS, and will be cleared after the task is deleted.
SSL Connection	If SSL connection is required, enable SSL on the DR database, ensure that related parameters have been correctly configured, and upload an SSL certificate. **NOTE** – The maximum size of a single certificate file that can be uploaded is 500 KB. – If SSL is disabled, your data may be at risk.

- Select **Current cloud as active** for **Disaster Recovery Relationship** in **Step 2**.

Figure 2-8 Service database information



Source Database

DB Instance Name

Database Username

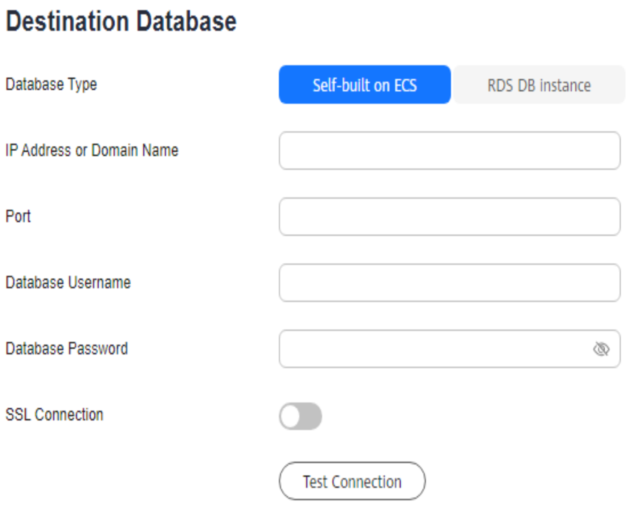
Database Password

SSL Connection

Table 2-11 Service database settings

Parameter	Description
DB Instance Name	The RDS instance selected when you created the DR task. This parameter cannot be changed.
Database Username	The username for accessing the service database.
Database Password	The password for the database username. You can change the password if necessary. To change the password, perform the following operation after the task is created: If the task is in the **Starting**, **Initializing**, **Disaster recovery in progress**, or **Disaster recovery failed** status, in the **DR Information** area on the **Basic Information** tab, click **Modify Connection Details**. In the displayed dialog box, change the password. The database username and password are encrypted and stored in the system and will be cleared after the task is deleted.
SSL Connection	If SSL connection is required, enable SSL on the service database, ensure that related parameters have been correctly configured, and upload an SSL certificate. **NOTE** – The maximum size of a single certificate file that can be uploaded is 500 KB. – If SSL is disabled, your data may be at risk.

Figure 2-9 DR database information



Destination Database

Database Type: Self-built on ECS | RDS DB instance

IP Address or Domain Name

Port

Database Username

Database Password

SSL Connection

Test Connection

Table 2-12 DR database settings

Parameter	Description
Database Type	By default, **Self-built on ECS** is selected. The destination database can be a **Self-built on ECS** or an **RDS DB instance**. If you select **RDS DB instance**, you need to select the region where the destination database is located. To use the **RDS DB instance** option, submit a service ticket.
IP Address or Domain Name	The IP address or domain name of the DR database.
Port	The port of the DR database. Range: 1 – 65535
Region	The region where the RDS DB instance is located. This parameter is available only when the destination database is an RDS DB instance.
DB Instance Name	DR instance name. This parameter is available only when the destination database is an RDS DB instance. **NOTE** When the DB instance is used as the DR database, it is set to read-only. After the task is complete, the DB instance can be readable and writable.
Database Username	Username for logging in to the DR database.
Database Password	Password for the database username.

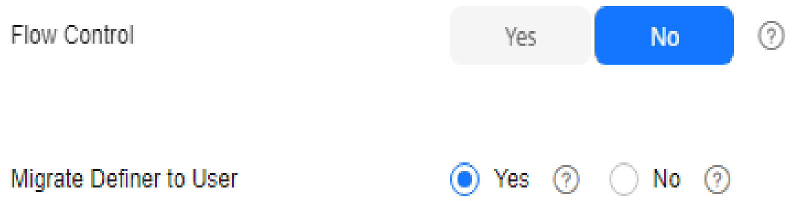
Parameter	Description
SSL Connection	If SSL connection is required, enable SSL on the DR database, ensure that related parameters have been correctly configured, and upload an SSL certificate. **NOTE** – The maximum size of a single certificate file that can be uploaded is 500 KB. – If SSL is disabled, your data may be at risk.

NOTE

The IP address, domain name, username, and password of the DR database are encrypted and stored in DRS and will be cleared after the task is deleted.

Step 4 On the **Configure DR** page, specify flow control and click **Next**.

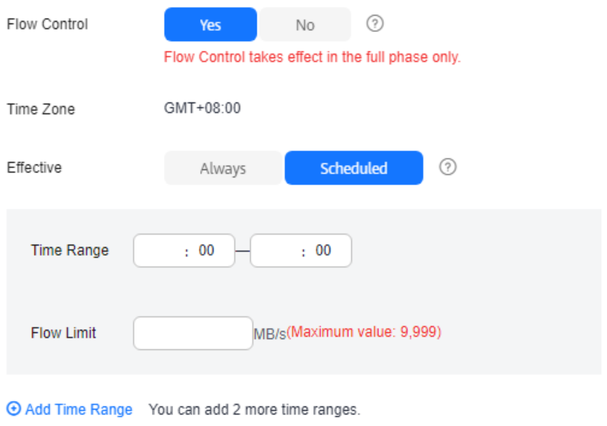
Figure 2-10 DR settings



Flow Control: Yes [✓ No]

Migrate Definer to User: ● Yes ○ No

Table 2-13 DR settings

Parameter	Description
Flow Control	You can choose whether to control the flow. ● **Yes** You can customize the maximum disaster recovery speed. During the disaster recovery, the speed of each task (or each subtask in multi-task mode) does not exceed the value of this parameter. 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 **Always**. A maximum of 10 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. **Figure 2-11** Flow control Flow Control: Yes / No Flow Control takes effect in the full phase only. Time Zone: GMT+08:00 Effective: Always / Scheduled Time Range: : 00 — : 00 Flow Limit: MB/s(Maximum value: 9,999) Add Time Range You can add 2 more time ranges. ● **No** The DR speed is not limited and the outbound bandwidth of the source database is maximally used, which causes read consumption on the source database accordingly. 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 in the DR initialization phase. – You can also change the flow control mode when the task is in the **Configuration** state. For details, see **Modifying the Flow Control Mode**.

Parameter	Description
Migrate Definer to User	Indicates whether to migrate the Definers of all source database objects to the destination database user entered during the connection test. ● 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 about authorization, see **How Do I Maintain the Original Service User Permission System After Definer Is Forcibly Converted During MySQL Migration?** For example, if the view is CREATE ALGORITHM=UNDEFINED DEFINER=`username`@`%` SQL SECURITY DEFINER VIEW `test_db`.`view5` AS select 1 AS `1` before migration, it is converted to CREATE ALGORITHM=UNDEFINED DEFINER=`drsUser`@`%` SQL SECURITY DEFINER VIEW `test_db`.`view5` AS select 1 AS `1` after the migration. **drsUser** indicates the destination database user used for testing the connection. ● **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. Note that if the Definer account is not found in the destination database, unavailable objects will be created. For details about Definer, see the **MySQL official document**.

Step 5 On the **Check Task** page, check the DR task.

- If any check fails, review the failure cause and rectify the fault. After the fault is rectified, click **Check Again**.

  For details about how to handle check failures, see **Solutions to Failed Check Items** in *Data Replication Service User Guide*.

- If the check is complete and the check success rate is 100%, go to the **Compare Parameter** page.

  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.

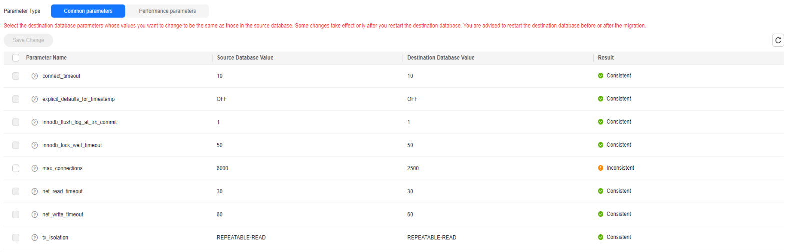
Step 6 Compare the parameters.

The parameter comparison function helps you check the consistency of common parameters and performance parameters between service and DR databases and show inconsistent values. You can determine whether to use this function based on service requirements. It mainly ensures that services are not affected after the DR task is completed.

- This process is optional, so you can click **Next** to skip the comparison.

- Compare common parameters:
  - For common parameters, if the parameters in the service database are different from those in the DR database, click **Save Change** to make the parameters of the DR database be the same as those in the service database.

Figure 2-12 Modifying common parameters



Select the destination database parameters whose values you want to change to be the same as those in the source database. Some changes take effect only after you restart the destination database. You are advised to restart the destination database before or after the migration.

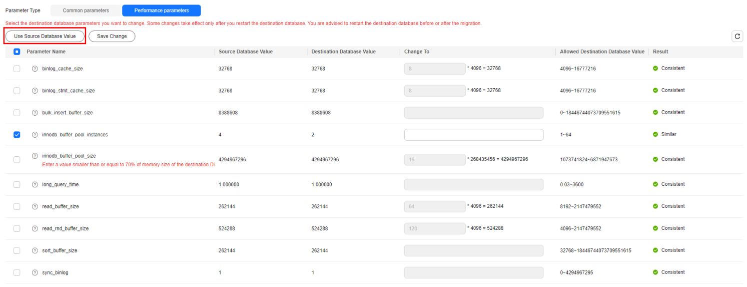
Parameter Name	Source Database Value	Destination Database Value	Result
connect_timeout	10	10	Consistent
explicit_defaults_for_timestamp	OFF	OFF	Consistent
innodb_flush_log_at_trx_commit	1	1	Consistent
innodb_lock_wait_timeout	50	50	Consistent
max_connections	6000	2500	Inconsistent
net_read_timeout	30	30	Consistent
net_write_timeout	60	60	Consistent
tx_isolation	REPEATABLE-READ	REPEATABLE-READ	Consistent

  - Performance parameter values in both the service and DR databases can be the same or different.
    - If you need to adjust the performance parameters, enter the value in the **Change to** column and click **Save Change**.
    - If you want to make the performance parameter values of the source and destination database be the same:

1) Click **Use Source Database Value**.

DRS automatically makes the DR database values the same as those of the service database.

Figure 2-13 One-click modification



Select the destination database parameters you want to change. Some changes take effect only after you restart the destination database. You are advised to restart the destination database before or after the migration.

Parameter Name	Source Database Value	Destination Database Value	Change To	Allowed Destination Database Value	Result
binlog_cache_size	32768	32768	8 * 4096 = 32768	4096~16777216	Consistent
binlog_stmt_cache_size	32768	32768	8 * 4096 = 32768	4096~16777216	Consistent
bulk_insert_buffer_size	8388608	8388608		0~18446744073709551615	Consistent
innodb_buffer_pool_instances	4	2		1~64	Similar
innodb_buffer_pool_size Enter a value smaller than or equal to 70% of memory size of the destination DI	4294967296	4294967296	16 * 268435456 = 4294967296	1073741824~6871947673	Consistent
long_query_time	1.000000	1.000000		0.03~3600	Consistent
read_buffer_size	262144	262144	64 * 4096 = 262144	8192~2147479552	Consistent
read_rnd_buffer_size	524288	524288	128 * 4096 = 524288	4096~2147479552	Consistent
sort_buffer_size	262144	262144		32768~18446744073709551615	Consistent
sync_binlog	1	1		0~4294967295	Consistent

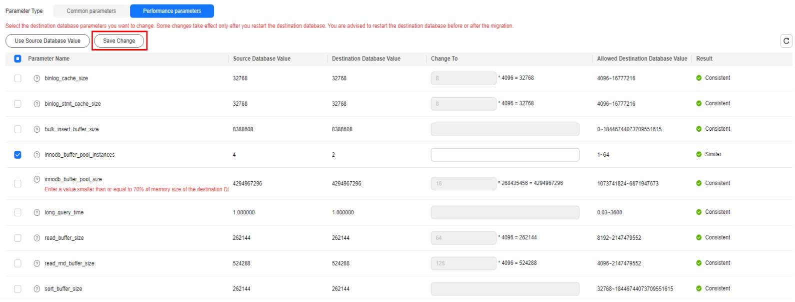
NOTE

You can also manually enter the value as required.

2) Click **Save Change**.

DRS changes the DR database parameter values based on your settings. After the modification, the comparison results are automatically updated.

Figure 2-14 One-click modification



Parameter Type: Common parameters | **Performance parameters**

Select the destination database parameters you want to change. Some changes take effect only after you restart the destination database. You are advised to restart the destination database before or after the migration.

Use Source Database Value | Save Change

■	Parameter Name	Source Database Value	Destination Database Value	Change To	Allowed Destination Database Value	Result
□	binlog_cache_size	32768	32768	8 * 4096 = 32768	4096~16777216	✓ Consistent
□	binlog_stmt_cache_size	32768	32768	8 * 4096 = 32768	4096~16777216	✓ Consistent
□	bulk_insert_buffer_size	8388608	8388608		0~18446744073709551615	✓ Consistent
☑	innodb_buffer_pool_instances	4	2		1~64	✓ Similar
□	innodb_buffer_pool_size Enter a value smaller than or equal to 70% of memory size of the destination DI	4294967296	4294967296	16 * 268435456 = 4294967296	1073741824~6871947673	✓ Consistent
□	long_query_time	1.000000	1.000000		0.03~3600	✓ Consistent
□	read_buffer_size	262144	262144	64 * 4096 = 262144	8192~2147479552	✓ Consistent
□	read_rnd_buffer_size	524288	524288	128 * 4096 = 524288	4096~2147479552	✓ Consistent
□	sort_buffer_size	262144	262144		32768~18446744073709551615	✓ Consistent

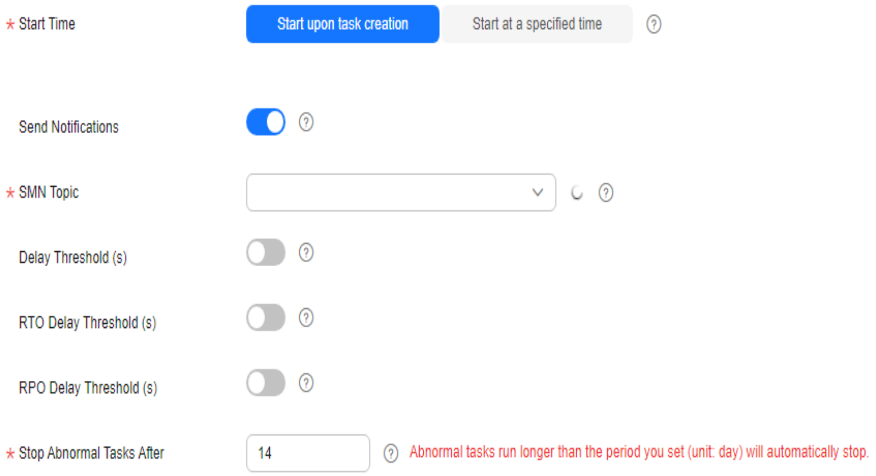
Some parameters in the DR database cannot take effect immediately, so the comparison result is temporarily inconsistent. Restart the DR database before the DR task is started or after the DR task is completed for the modification to take effect. To minimize the impact of database restart on your services, restart the DR database at the scheduled time after the disaster recovery is complete.

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

3) Click **Next**.

Step 7 On the **Confirm Task** page, specify **Start Time**, **Send Notifications**, **SMN Topic**, **Delay Threshold**, **RPO Delay Threshold**, **RTO Delay Threshold**, **Stop Abnormal Tasks After**. After confirming that the configured information about the DR task is correct, click **Submit**.

Figure 2-15 Task startup settings



* Start Time: **Start upon task creation** | Start at a specified time

Send Notifications: ●

* SMN Topic:

Delay Threshold (s): ○

RTO Delay Threshold (s): ○

RPO Delay Threshold (s): ○

* Stop Abnormal Tasks After: 14 — Abnormal tasks run longer than the period you set (unit: day) will automatically stop.

Table 2-14 Task settings

Parameter	Description
Start Time	Set **Start Time** to **Start upon task creation** or **Start at a specified time** based on site requirements. **NOTE** Starting a DR task may slightly affect the performance of the service and DR databases. You are advised to start a DR task during off-peak hours.
Send Notifications	This parameter is optional. After enabled, select a SMN topic. If the status or latency metric of the DR task is abnormal, DRS will send you a notification.
SMN Topic	This parameter is available only after you enable **Send Notifications** and create a topic on the SMN console and add a subscriber. For details, see ***Simple Message Notification User Guide***.
Delay Threshold (s)	During disaster recovery, a synchronization delay indicates a time difference (in seconds) of synchronization between the service and DR 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** ● Before setting the delay threshold, enable **Send Notifications**. ● If the delay threshold is set to 0, no notifications will be sent to the recipient.
RTO Delay Threshold (s)	If the synchronization delay from the DRS instance to the DR database exceeds the threshold you specify, DRS will notify 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** ● Before setting the RTO delay threshold, enable **Send Notifications**. ● If the delay threshold is set to 0, no notifications will be sent to the recipient.

Parameter	Description
RPO Delay Threshold (s)	If the synchronization delay from the DRS instance to the service database exceeds the threshold you specify, DRS will notify 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** ● Before setting the delay threshold, enable **Send Notifications**. ● If the delay threshold is set to 0, no notifications will be sent to the recipient. ● In the early stages of an incremental DR, more delay is normal because more data is waiting to be synchronized. In this situation, no notifications will be sent.
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** ● You can set this parameter only for pay-per-use tasks. ● Tasks in the abnormal state are still charged. If tasks remain in the abnormal state for a long time, they cannot be resumed. Any task in the abnormal state that has run for longer than the period you set here (in days) will automatically stop to avoid unnecessary fees.

Step 8 After the task is submitted, view and **manage it** on the **Disaster Recovery Management** page.

- You can view the task status. For more information about task status, see **Task Statuses**.
- You can click ↻ in the upper-right corner to view the latest task status.
- By default, DRS retains a task in the **Configuration** state for three days. After three days, DRS automatically deletes background resources, but the task status remains unchanged. When you reconfigure the task, DRS applies for resources again.
- For a public network task, DRS needs to delete background resources after you stop the task. The EIP bound to the task cannot be restored to the **Unbound** state until background resources are deleted.
- For a task that is in the **Disaster recovery in progress** state, you can use **data comparison** to check whether data is consistent before and after the disaster recovery.

----End

2.2 From MySQL to GaussDB(for MySQL) (Single-Active DR)

Supported Source and Destination Databases

Table 2-15 Supported databases

Disaster Recovery Relationship	Service Database	DR Database
Current cloud as standby	- On-premises MySQL databases - MySQL databases on an ECS - MySQL databases on other clouds - RDS for MySQL	- GaussDB(for MySQL) Primary/Standby

Database Account Permission Requirements

To start a DR task, the service and DR database users must meet the requirements in the following table. Different types of DR tasks require different permissions. For details, see **Table 2-16**. DRS automatically checks the database account permissions in the pre-check phase and provides handling suggestions.

Table 2-16 Database account permission

Type	Permission Required
Service database user	The user must have the following permissions: SELECT, CREATE, ALTER, DROP, DELETE, INSERT, UPDATE, TRIGGER, REFERENCES, SHOW VIEW, EVENT, INDEX, LOCK TABLES, CREATE VIEW, CREATE ROUTINE, ALTER ROUTINE, CREATE USER, RELOAD, REPLICATION SLAVE, REPLICATION CLIENT, and WITH GRANT OPTION If the service database version is 8.0.14 to 8.0.18, the SESSION_VARIABLES_ADMIN permission is required. If the service database version is 8.0.2 or later, the XA_RECOVER_ADMIN permission is required to prevent data loss caused by uncommitted XA transactions during startup. The **root** account of the RDS for MySQL DB instance has the preceding permissions by default.
DR database user	The user must have the following permissions: SELECT, CREATE, ALTER, DROP, DELETE, INSERT, UPDATE, TRIGGER, REFERENCES, SHOW VIEW, EVENT, INDEX, LOCK TABLES, CREATE VIEW, CREATE ROUTINE, ALTER ROUTINE, CREATE USER, RELOAD, REPLICATION SLAVE, REPLICATION CLIENT, and WITH GRANT OPTION The **root** account of the GaussDB(for MySQL) instance has the preceding permissions by default.

NOTE

- You are advised to create an independent database account for DRS task connection to prevent task failures caused by database account password modification.
- After changing the account passwords for the service and DR databases, modify the connection information of the DRS task by referring to **Modifying Connection Information** to prevent automatic retry after a task failure. Automatic retry will lock the database accounts.
- **Table 2-16** lists the minimum permissions required by a DRS task. If you need to migrate the grant permission through a DRS task, ensure that the connection account of the DRS task has the corresponding permission. Otherwise, the destination database user may not be authorized due to grant execution failure. For example, if the connection account of the DRS task does not require the process permission, but you need to migrate the process permission through a DRS task, ensure that the connection account of the DRS task has the process permission.

Prerequisites

- **You have logged in to the DRS console.**
- Your account balance is greater than or equal to $0 USD.
- For details about the supported DB types and versions, see **Supported Databases**.
- If a subaccount is used to create a DRS task, ensure that an agency has been added. For details about how to create an agency, see **Agency Management**.

Suggestions

⚠ CAUTION

- During the DR initialization, do not perform DDL operations on the service database. Otherwise, the task may be abnormal.
- During DR initialization, ensure that no data is written to the DR database to ensure data consistency before and after DR.

- The success of DR depends on environment and manual operations. To ensure a smooth DR, perform a DR trial before you start the DR task to help you detect and resolve problems in advance.
- It is recommended that you start your DR task during off-peak hours to minimize the impact on your services.
  - If the bandwidth is not limited, initialization of DR will increase query workload of the source database by 50 MB/s and occupy 2 to 4 vCPUs.
  - To ensure data consistency, tables without a primary key may be locked for 3s during disaster recovery.
  - The data in the DR process may be locked by other transactions for a long period of time, resulting in read timeout.
  - If DRS concurrently reads data from a database, it will use about 6 to 10 sessions. The impact of the connections on services must be considered.
  - If you read a table, especially a large table, during DR, the exclusive lock on that table may be blocked.
  - For more information about the impact of DRS on databases, see **How Does DRS Affect the Source and Destination Databases?**
- Data-Level Comparison

  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, data inconsistency may occur, reducing the reliability and validity of the comparison results.

Precautions

Before creating a DR task, read the following precautions:

Table 2-17 Precautions

Type	Restrictions
Disaster recovery objects	● Only MyISAM and InnoDB tables support disaster recovery. ● System tables are not supported. ● Triggers and events do not support disaster recovery. ● Accounts that have operation permissions on customized objects in the system database cannot be used for disaster recovery. ● Disaster recovery cannot be configured for a specific service database. ● Disaster recovery for non-standard floating-point data that can be written in loose mode but cannot be written in strict mode is not supported. Such non-standard floating-point data may fail to be hit, causing data disaster recovery failures.

Type	Restrictions
Service database configuration	● During data disaster recovery, do not upgrade the MySQL instance across major versions. Otherwise, data may become inconsistent or the synchronization task may fail (data, table structures, and keywords may cause compatibility changes after the cross-version upgrade). You are advised to create a DR task again if the MySQL instance is upgraded across major versions. ● The binlog of the MySQL service database must be enabled and use the row-based format. ● If the storage space is sufficient, store the service database binlog for as long as possible. The recommended retention period is seven days. – For self-built MySQL databases, you can set the **expire_logs_days** parameter to specify the binlog retention period. – If the source database is an RDS for MySQL instance, set the binlog retention period by following the instructions provided in **RDS User Guide**. ● The service database username or password cannot be empty. ● **server-id** in the MySQL service database must be set. If the service database version is MySQL 5.6 or earlier, the **server-id** value ranges from **2** to **4294967296**. If the service database is MySQL 5.7 or later, the **server-id** value ranges from **1** to **4294967296**. ● During disaster recovery, if the session variable **character_set_client** is set to **binary**, some data may include garbled characters. ● GTID must be enabled for the database. ● The service database name must contain 1 to 64 characters, including only lowercase letters, digits, hyphens (-), and underscores (_). ● During the disaster recovery, 0 cannot be written to the auto-increment primary key column in the service database. Otherwise, the data of the auto-increment column in the service database is inconsistent with that in the DR database. ● The table name and view name in the service database cannot contain non-ASCII characters, or the following characters: .'<>/\" ● The column names in the service database tables cannot end with a backslash (\). ● If the **expire_logs_days** value of the service database is set to **0**, the disaster recovery may fail. ● If tables that have no primary key contain hidden primary keys in the service database, the DR task may fail or data may be inconsistent.

Type	Restrictions
DR database configuration	● The DR DB instance is running properly. If the DR DB instance is a primary/standby instance, the replication status must also be normal. ● The DR DB instance must have sufficient storage space. ● The binlog of the DR database must be enabled and use the row-based format. ● GTID must be enabled for the DR database. ● The DR DB instance cannot contain any service databases except the system database.

Type	Restrictions
Precautions	● The parameter modification of the service database is not recorded in logs and is not synchronized to the DR database. Therefore, you need to modify the parameters after the DR database is promoted to the primary. ● If a high-privilege user created in an external database is not supported by RDS for MySQL, the user will not be synchronized to the DR database, for example, the super user. ● If a physically generated column in a table is generated based on a time type, the data in the column may be inconsistent. ● Cascade operations cannot be performed on tables with foreign keys. If the foreign key index of a table is a common index, the table structure may fail to be created. You are advised to use a unique index. ● The service database does not support point-in-time recovery (PITR). ● Binlogs cannot be forcibly deleted. Otherwise, the DR task fails. ● The service database does not support the **reset master** or **reset master to** command, which may cause DRS task failures or data inconsistency. ● If the network is reconnected within 30 seconds, disaster recovery will not be affected. If the network is interrupted for more than 30 seconds, the DR task will fail. ● If the DCC does not support instances with 4 vCPUs and 8 GB memory or higher instance specifications, the DR task cannot be created. ● Resumable upload is supported, but data may be repeatedly inserted into a table that does not have a primary key. ● If there is a DR task in a database, you are not allowed to create a migration or synchronization task (The database cannot be used as the source or destination database of the migration or synchronization task). ● The DR relationship involves only one primary database. If the external database does not provide the superuser permission, it cannot be set to read-only when it acts as a standby database. Ensure that the data of the standby node is synchronized only from the primary node. Any other write operations will pollute the data in the standby database, data conflicts occur in the DR center and cannot be resolved. ● If the external database is a standby and read-only database, only the account with the superuser permission can write data to that database. But you still need to ensure that data is written only by this account. Otherwise, the standby database may be polluted, and data conflicts occur in the DR center and cannot be resolved. ● When DR occurs between an earlier version database and a later version database, service activities must be compatible

Type	Restrictions
	with both the earlier version and the later version. Otherwise, the DR may fail. ● If the service database is an RDS for MySQL instance, tables encrypted using Transparent Data Encryption (TDE) cannot be synchronized. ● Before creating a DRS task, if concurrency control rules of SQL statements are configured for the service or DR database, the DRS task may fail. ● During disaster recovery, if the password of the service database is changed, the DR task will fail. To rectify the fault, you can correct the service database information on the DRS console and retry the task to continue disaster recovery. Generally, you are advised not to modify the preceding information during disaster recovery. ● If the service database port is changed during disaster recovery, the DR task fails. Generally, you are advised not to modify the service database port during disaster recovery. ● During disaster recovery, if the service database is on an RDS DB instance that does not belong the current cloud platform, the IP address cannot be changed. If the service database is an RDS DB instance on the current cloud and the DR task fails due to changes on the IP address, DRS automatically changes the IP address to the correct one. Then, you can retry the task to continue disaster recovery. Therefore, changing the IP address is not recommended. ● During disaster recovery, you can create accounts for the service database. ● During the DR initialization, do not perform DDL operations on the source database. Otherwise, the DR task may be abnormal. ● Do not write data to the source database during the primary/standby switchover. Otherwise, data pollution or table structure inconsistency may occur, resulting in data inconsistency between the service database and DR database.

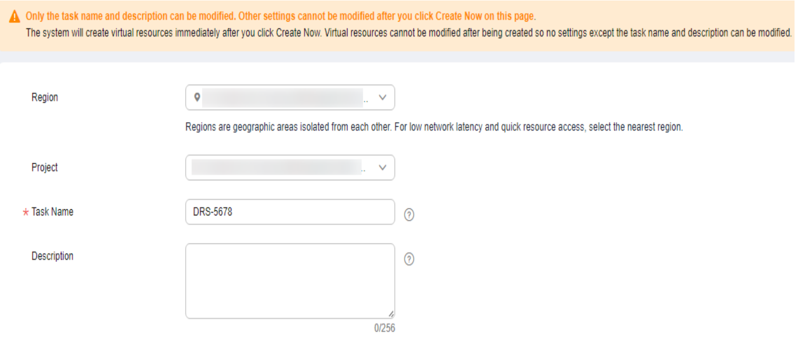
Procedure

Step 1 On the **Disaster Recovery Management** page, click **Create Disaster Recovery Task**.

Step 2 On the **Create Disaster Recovery Instance** page, select a region and project, specify the task name, description, and the DR instance details, and click **Create Now**.

- Task information description

Figure 2-16 DR task information



⚠ Only the task name and description can be modified. Other settings cannot be modified after you click Create Now on this page.
The system will create virtual resources immediately after you click Create Now. Virtual resources cannot be modified after being created so no settings except the task name and description can be modified.

Region

Regions are geographic areas isolated from each other. For low network latency and quick resource access, select the nearest region.

Project

* Task Name: DRS-5678

Description

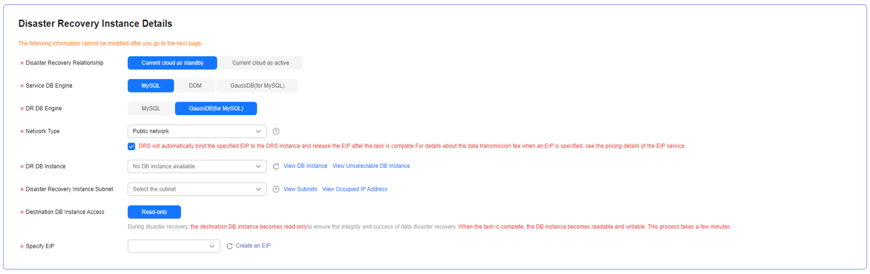
0/256

Table 2-18 Task and recipient description

Parameter	Description
Region	The region where your service is running. You can change the region.
Project	The project corresponds to the current region and can be changed.
Task Name	The task name must start with a letter and consist of 4 to 50 characters. It can contain only letters, digits, hyphens (-), and underscores (_).
Description	The description consists of a maximum of 256 characters and cannot contain special characters !=<>'&"\

- DR instance information

Figure 2-17 DR instance information



Disaster Recovery Instance Details

The following information cannot be modified after you go to the next page.

* Disaster Recovery Relationship: Current cloud as standby | Current cloud as active

* Service DB Engine: MySQL | DDM | GaussDB(for MySQL)

* DR DB Engine: MySQL | GaussDB(for MySQL)

* Network Type: Public network

☑ DRS will automatically bind the specified EIP to the DRS instance and release the EIP after the task is complete.For details about the data transmission fee when an EIP is specified, see the pricing details of the EIP service.

* DR DB Instance: No DB instance available. View DB Instance View Unselectable DB Instance

* Disaster Recovery Instance Subnet: Select the subnet View Subnets View Occupied IP Address

* Destination DB Instance Access: Read-only

During disaster recovery, the destination DB instance becomes read-onlyto 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.

* Specify EIP: Create an EIP

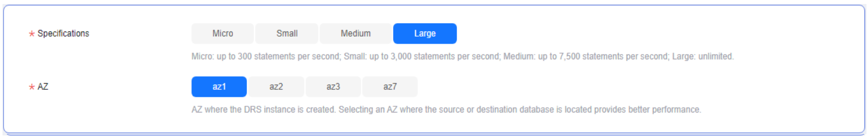
Table 2-19 DR instance settings

Parameter	Description
DR Type	Select **Single-active**. The DR type can be single-active or dual-active. If **Dual-active** is selected, two subtasks are created by default, a forward DR task and a backward DR task. **NOTE** Only whitelisted users can use dual-active DR. 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.
Disaster Recovery Relationship	Select **Current cloud as standby**. This parameter is available only when you select **Single-active**. By default, **Current cloud as standby** is selected. You can also select **Current cloud as active**. – **Current cloud as standby**: The DR database is on the current cloud. – **Current cloud as active**: The service database is on the current cloud.
Service DB Engine	Select **MySQL**.
DR DB Engine	Select **GaussDB(for MySQL)**.
Network Type	The public network is used as an example. Available options: **VPN or Direct Connect** and **Public network**. By default, the value is **Public network**.
DR DB Instance	GaussDB(for MySQL) instance you have created as the destination database of the DR task.
Disaster Recovery Instance Subnet	Select the subnet where the disaster recovery instance is located. You can also click **View Subnets** to go to the network console to view the subnet where the instance resides. By default, the DRS instance and the DR DB instance are in the same subnet. You need to select the subnet where the DRS instance resides and ensure that there are available IP addresses. To ensure that the disaster recovery instance is successfully created, only subnets with DHCP enabled are displayed.

Parameter	Description
Destination DB Instance Access	Select **Read-only**. This parameter is available only when you select **Single-active**. – During disaster recovery, the entire DR database instance becomes read-only. To change the DR database to **Read/Write**, you can change the DR database (or destination database) to a service database by clicking **Promote Current Cloud** on the **Disaster Recovery Monitoring** tab. – If a DR task fails, the DR database does not automatically change to the read/write state. – If a DR task is paused, you can disable read-only for the DR database. For details, see **Disabling or Enabling Read-Only**. – After read-only is disabled and the DR task is resumed, the DR database automatically changes to read-only. The read-only settings of the DR DB instance are also affected by the access settings of the DB instance itself. Therefore, you are advised not to set the access settings of the DB instance on the RDS console. – After the DR task is complete, the DR database changes to **Read/Write**. – When the external database functions as the DR database, the user with the superuser permission can set the database to read-only. – If a DRS instance node is rebuilt due to a fault, to ensure data consistency during the DRS task restoration, the current cloud standby database is set to read-only before the task is restored. After the task is restored, the synchronization relationship recovers.
Specify EIP	This parameter is available when you select **Public network** for **Network Type**. Select an EIP to be bound to the DRS instance. DRS will automatically bind the specified EIP to the DRS instance and unbind the EIP after the task is complete. The number of specified EIPs must be the consistent with that of DB instances. For details about the data transfer fee generated using a public network, see **EIP Price Calculator**.

- Specifications

Figure 2-18 Specifications



* Specifications: Micro | Small | Medium | **Large**

Micro: up to 300 statements per second; Small: up to 3,000 statements per second; Medium: up to 7,500 statements per second; Large: unlimited.

* AZ: **az1** | az2 | az3 | az7

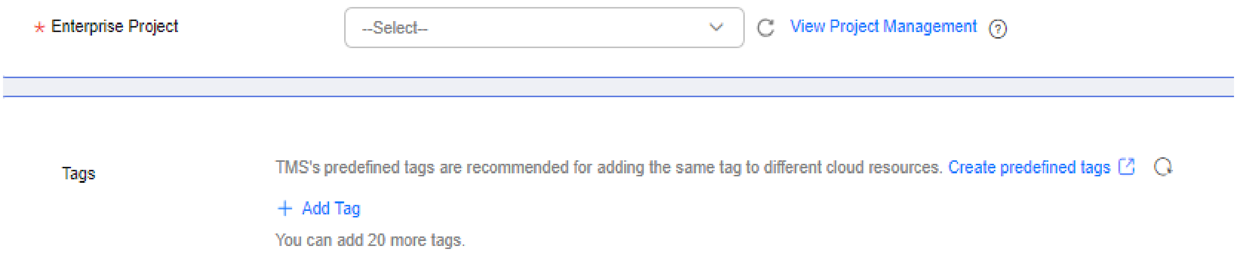
AZ where the DRS instance is created. Selecting an AZ where the source or destination database is located provides better performance.

Table 2-20 Specifications

Parameter	Description
Specifications	DRS instance specifications. Different specifications have different performance upper limits. For details, see **Real-Time DR**. **NOTE** DRS allows you to upgrade specifications only for real-time DR tasks from MySQL to MySQL, from MySQL to GaussDB(for MySQL), and from GaussDB(for MySQL) to GaussDB(for MySQL). Task specifications cannot be downgraded. For details, see **Changing Specifications**.
AZ	Select the AZ where you want to create the DRS task. Selecting the one housing the source or destination database can provide better performance.

- Enterprise Project and Tags

Figure 2-19 Enterprise projects and tags



* Enterprise Project --Select-- View Project Management

Tags TMS's predefined tags are recommended for adding the same tag to different cloud resources. Create predefined tags

+ Add Tag

You can add 20 more tags.

Table 2-21 Enterprise Project and Tags

Parameter	Description
Enterprise Project	An enterprise project you would like to use to centrally manage your cloud resources and members. Select an enterprise project from the drop-down list. The default project is **default**. For more information about enterprise projects, see ***Enterprise Management User Guide***. To customize an enterprise project, click **Enterprise** in the upper right corner of the console. The **Enterprise Project Management Service** page is displayed. For details, see **Creating an Enterprise Project** in *Enterprise Management User Guide*.

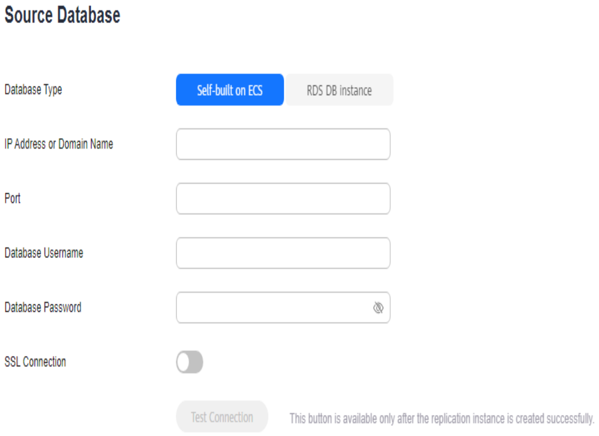
Parameter	Description
Tags	– Tags a task. This configuration is optional. Adding tags helps you better identify and manage your tasks. Each task can have up to 20 tags. – If your organization has configured tag policies for DRS, add tags to tasks based on the policies. If a tag does not comply with the policies, task creation may fail. Contact your organization administrator to learn more about tag policies. – After a task is created, you can view its tag details on the **Tags** tab. For details, see **Tag Management**.

NOTE

If a task fails to be created, DRS retains the task for three days by default. After three days, the task automatically stops.

Step 3 On the **Configure Source and Destination Databases** page, wait until the DR 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 DR instance. After the connection tests are successful, select the check box before the agreement and click **Next**.

Figure 2-20 Service database information



Source Database

Database Type: Self-built on ECS

This button is available only after the replication instance is created successfully.

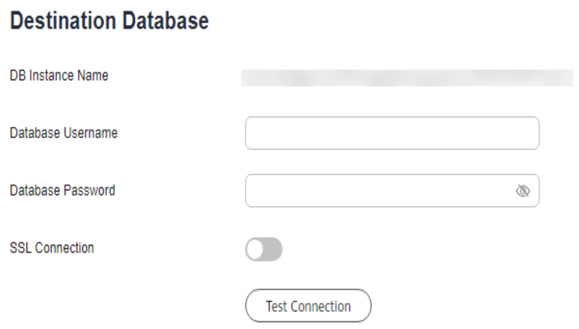
Table 2-22 Service database settings

Parameter	Description
Database Type	By default, **Self-built on ECS** is selected. The source database can be a **Self-built on ECS** or an **RDS DB instance**. After selecting **RDS DB instance**, select the region where the source database resides and the region cannot be the same as the region where the destination database resides. The region where the destination database is located is the region where you log in to the management console. To use the **RDS DB instance** option, submit a service ticket.
IP Address or Domain Name	The IP address or domain name of the service database.
Port	The port of the service database. Range: 1 – 65535
Database Username	The username for accessing the service database.
Database Password	The password for the service database username. You can change the password if necessary. To change the password, perform the following operation after the task is created: If the task is in the **Starting**, **Initializing**, **Disaster recovery in progress**, or **Disaster recovery failed** status, in the **Connection Information** area on the **Basic Information** tab, click **Modify Connection Details**. In the displayed dialog box, change the password.
SSL Connection	SSL encrypts the connections between the source and destination databases. If SSL is enabled, upload the SSL CA root certificate. **NOTE** ● The maximum size of a single certificate file that can be uploaded is 500 KB. ● If SSL is disabled, your data may be at risk.
Region	The region where the source database is located. This parameter is available only when **Database Type** for the source database is set to **RDS DB instance**. The region cannot be the region where the destination database is located.
DB Instance Name	The name of the service DB instance. This parameter is available only when the source database is an **RDS DB instance**.
Database Username	The username for accessing the service database.
Database Password	The password for the service database username.

NOTE

The IP address, domain name, username, and password of the service database are encrypted and stored in DRS and will be cleared after the task is deleted.

Figure 2-21 DR database information



Destination Database

DB Instance Name

Database Username

Database Password

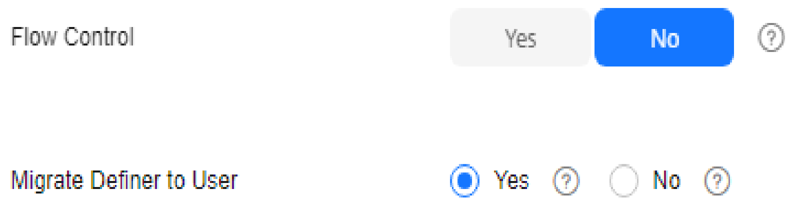
SSL Connection

Table 2-23 DR database settings

Parameter	Description
DB Instance Name	The GaussDB(for MySQL) instance you selected when creating the DR task. This parameter cannot be changed.
Database Username	The username for accessing the DR database.
Database Password	The password for the database username. The password can be changed after a task is created. If the task is in the **Starting**, **Initializing**, **Disaster recovery in progress**, or **Disaster recovery failed** status, in the **Connection Information** area on the **Basic Information** tab, click **Modify Connection Details**. In the displayed dialog box, change the password. The database username and password are encrypted and stored in DRS, and will be cleared after the task is deleted.

Step 4 On the **Configure DR** page, specify flow control and click **Next**.

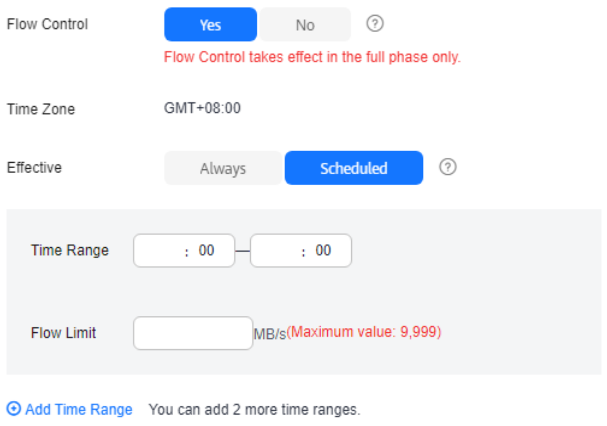
Figure 2-22 DR settings



Flow Control Yes [✓ No]

Migrate Definer to User ● Yes ○ No

Table 2-24 DR settings

Parameter	Description
Flow Control	You can choose whether to control the flow. ● **Yes** You can customize the maximum disaster recovery speed. During the disaster recovery, the speed of each task (or each subtask in multi-task mode) does not exceed the value of this parameter. 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 **Always**. A maximum of 10 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. **Figure 2-23** Flow control  Flow Control: Yes | No Flow Control takes effect in the full phase only. Time Zone: GMT+08:00 Effective: Always | Scheduled Time Range : 00 — : 00 Flow Limit MB/s(Maximum value: 9,999) Add Time Range You can add 2 more time ranges. ● **No** The DR speed is not limited and the outbound bandwidth of the source database is maximally used, which causes read consumption on the source database accordingly. 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 in the DR initialization phase. – You can also change the flow control mode when the task is in the **Configuration** state. For details, see **Modifying the Flow Control Mode**.

Parameter	Description
Migrate Definer to User	Indicates whether to migrate the Definers of all source database objects to the destination database user entered during the connection test. ● 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 about authorization, see **How Do I Maintain the Original Service User Permission System After Definer Is Forcibly Converted During MySQL Migration?** For example, if the view is CREATE ALGORITHM=UNDEFINED DEFINER=`username`@`%` SQL SECURITY DEFINER VIEW `test_db`.`view5` AS select 1 AS `1` before migration, it is converted to CREATE ALGORITHM=UNDEFINED DEFINER=`drsUser`@`%` SQL SECURITY DEFINER VIEW `test_db`.`view5` AS select 1 AS `1` after the migration. **drsUser** indicates the destination database user used for testing the connection. ● **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. Note that if the Definer account is not found in the destination database, unavailable objects will be created. For details about Definer, see the **MySQL official document**.

Step 5 On the **Check Task** page, check the DR task.

- If any check fails, review the failure cause and rectify the fault. After the fault is rectified, click **Check Again**.

  For details about how to handle check failures, see **Solutions to Failed Check Items** in *Data Replication Service User Guide*.

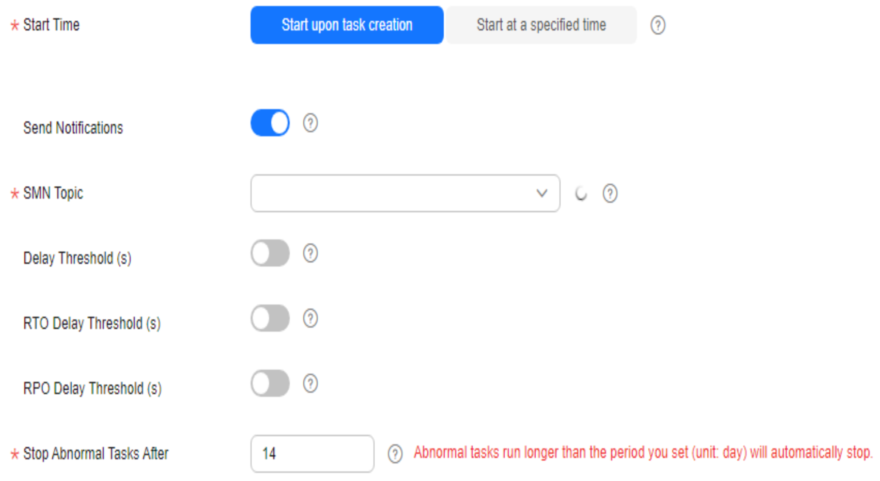
- If the check is complete and the check success rate is 100%, click **Next**.

  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.

Step 6 On the **Confirm Task** page, specify **Start Time**, **Send Notifications**, **SMN Topic**, **Delay Threshold**, **RPO Delay Threshold**, **RTO Delay Threshold**, **Stop Abnormal Tasks After**. After confirming that the configured information about the DR task is correct, click **Submit**.

Figure 2-24 Task startup settings



* Start Time: Start upon task creation | Start at a specified time

Send Notifications: ●

* SMN Topic:

Delay Threshold (s): ○

RTO Delay Threshold (s): ○

RPO Delay Threshold (s): ○

* Stop Abnormal Tasks After: 14 Abnormal tasks run longer than the period you set (unit: day) will automatically stop.

Table 2-25 Task settings

Parameter	Description
Start Time	Set **Start Time** to **Start upon task creation** or **Start at a specified time** based on site requirements. **NOTE** Starting a DR task may slightly affect the performance of the service and DR databases. You are advised to start a DR task during off-peak hours.
Send Notifications	This parameter is optional. After enabled, select a SMN topic. If the status or latency metric of the DR task is abnormal, DRS will send you a notification.
SMN Topic	This parameter is available only after you enable **Send Notifications** and create a topic on the SMN console and add a subscriber. For details, see ***Simple Message Notification User Guide***.
Delay Threshold (s)	During disaster recovery, a synchronization delay indicates a time difference (in seconds) of synchronization between the service and DR 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** ● Before setting the delay threshold, enable **Send Notifications**. ● If the delay threshold is set to 0, no notifications will be sent to the recipient.

Parameter	Description
RTO Delay Threshold (s)	If the synchronization delay from the DRS instance to the DR database exceeds the threshold you specify, DRS will notify 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** ● Before setting the RTO delay threshold, enable **Send Notifications**. ● If the delay threshold is set to 0, no notifications will be sent to the recipient.
RPO Delay Threshold (s)	If the synchronization delay from the DRS instance to the service database exceeds the threshold you specify, DRS will notify 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** ● Before setting the delay threshold, enable **Send Notifications**. ● If the delay threshold is set to 0, no notifications will be sent to the recipient. ● In the early stages of an incremental DR, more delay is normal because more data is waiting to be synchronized. In this situation, no notifications will be sent.
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** ● You can set this parameter only for pay-per-use tasks. ● Tasks in the abnormal state are still charged. If tasks remain in the abnormal state for a long time, they cannot be resumed. Any task in the abnormal state that has run for longer than the period you set here (in days) will automatically stop to avoid unnecessary fees.

Step 7 After the task is submitted, view and **manage it** on the **Disaster Recovery Management** page.

- You can view the task status. For more information about task status, see **Task Statuses**.
- You can click ↻ in the upper-right corner to view the latest task status.
- By default, DRS retains a task in the **Configuration** state for three days. After three days, DRS automatically deletes background resources, but the task status remains unchanged. When you reconfigure the task, DRS applies for resources again.
- For a public network task, DRS needs to delete background resources after you stop the task. The EIP bound to the task cannot be restored to the **Unbound** state until background resources are deleted.

- For a task that is in the **Disaster recovery in progress** state, you can use **data comparison** to check whether data is consistent before and after the disaster recovery.

----End

2.3 From DDM to DDM (Single-Active DR)

Supported Source and Destination Databases

Table 2-26 Supported databases

Service database	DR Database
DDM instances	DDM instances

Database Account Permission Requirements

To start a DR task, the service and DR database users must meet the requirements in the following table. Different types of DR tasks require different permissions. For details, see **Table 2-27**. DRS automatically checks the database account permissions in the pre-check phase and provides handling suggestions.

Table 2-27 Database account permission

Type	Permission Required
Service database user	The user of the service database must have at least one permission, for example, SELECT.
DR database user	The user of the DR database must have at least one permission, for example, SELECT.

NOTE

- You are advised to create an independent database account for DRS task connection to prevent task failures caused by database account password modification.
- After changing the account passwords for the service and DR databases, modify the connection information of the DRS task by referring to **Modifying Connection Information** to prevent automatic retry after a task failure. Automatic retry will lock the database accounts.

Prerequisites

- **You have logged in to the DRS console.**
- Your account balance is greater than or equal to $0 USD.
- For details about the supported DB types and versions, see **Supported Databases**.

- If a subaccount is used to create a DRS task, ensure that an agency has been added. For details about how to create an agency, see **Agency Management**.

Suggestions

⚠ CAUTION

- During the DR initialization, do not perform DDL operations on the service database. Otherwise, the task may be abnormal.
- During DR initialization, ensure that no data is written to the DR database to ensure data consistency before and after DR.

- The success of DR depends on environment and manual operations. To ensure a smooth DR, perform a DR trial before you start the DR task to help you detect and resolve problems in advance.
- It is recommended that you start your DR task during off-peak hours to minimize the impact on your services.
  - If the bandwidth is not limited, initialization of DR will increase query workload of the source database by 50 MB/s and occupy 2 to 4 vCPUs.
  - To ensure data consistency, tables without a primary key may be locked for 3s during disaster recovery.
  - The data in the DR process may be locked by other transactions for a long period of time, resulting in read timeout.
  - If DRS concurrently reads data from a database, it will use about 6 to 10 sessions. The impact of the connections on services must be considered.
  - If you read a table, especially a large table, during DR, the exclusive lock on that table may be blocked.
  - For more information about the impact of DRS on databases, see **How Does DRS Affect the Source and Destination Databases?**
- Data-Level Comparison

  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, data inconsistency may occur, reducing the reliability and validity of the comparison results.

Precautions

Before creating a DR task, read the following precautions:

Table 2-28 Environment Constraints

Type	Restrictions
Disaster recovery objects	● Only MyISAM and InnoDB tables support disaster recovery. ● Accounts that have operation permissions on customized objects in the system database cannot be used for disaster recovery. ● System tables are not supported. ● Triggers and events do not support disaster recovery. ● Disaster recovery cannot be configured for a specific service database. ● Disaster recovery of DDM account permissions is not supported. ● Disaster recovery for non-standard floating-point data that can be written in loose mode but cannot be written in strict mode is not supported. Such non-standard floating-point data may fail to be hit, causing data disaster recovery failures.
Service database configuration	● In the public network, EIPs must be bound to each DDM instance and the associated RDS for MySQL instance. ● The binlog of the RDS for MySQL instance associated with the DDM instance must be enabled and uses the ROW format and GTID. ● If the storage space is sufficient, store the service database binlog for as long as possible. The recommended retention period is seven days. ● The service database name must contain 1 to 64 characters, including only lowercase letters, digits, hyphens (-), and underscores (_). ● The table name in the service database cannot contain non-ASCII characters, or the following characters: .'<>/\
DR database configuration	● The DR DB instance is running properly. If the DR DB instance is a primary/standby instance, the replication status must also be normal. ● The DR DB instance must have sufficient storage space. ● The binlog and GTID of the RDS instance associated with the DDM instance must be enabled. ● The minor version of the DR DDM instance must be the same as that of the service DDM instance. ● The number of DDM DR instances must be the same as that of the RDS instances associated with the DDM service instance. ● The sharding rules of the DDM DR instance must be the same as those of the DDMservice instance. You are advised to use the schema import and export functions to ensure sharding rule consistency.

Type	Restrictions
Precautions	● The parameter modification of the service database is not recorded in logs and is not synchronized to the DR database. Therefore, you need to modify the parameters after the DR database is promoted to the primary. ● If a physically generated column in a table is generated based on a time type, the data in the column may be inconsistent. ● The service database does not support point-in-time recovery (PITR). ● Binlogs cannot be forcibly deleted. Otherwise, the DR task fails. ● Resumable upload is supported, but data may be repeatedly inserted into a table that does not have a primary key. ● If there is a DR task in a database, you are not allowed to create a migration or synchronization task (The database cannot be used as the source or destination database of the migration or synchronization task). ● The DR relationship involves only one primary database. If the external database does not provide the superuser permission, it cannot be set to read-only when it acts as a standby database. Ensure that the data of the standby node is synchronized only from the primary node. Any other write operations will pollute the data in the standby database, data conflicts occur in the DR center and cannot be resolved. ● The DDM DR database cannot create schemas automatically. You need to set the schema rules before disaster recovery. ● After a task is created, you cannot add schemas to the service database or modify the old schema to associate with the new RDS DB instance. Otherwise, data cannot be backed up and restored or the task fails. ● During DR, rebalance and reshard operations cannot be performed on DDM schemas. ● During disaster recovery, if the password of the service database is changed, the DR task will fail. To rectify the fault, you can correct the service database information on the DRS console and retry the task to continue disaster recovery. Generally, you are advised not to modify the preceding information during disaster recovery. ● If the service database port is changed during disaster recovery, the DR task fails. Generally, you are advised not to modify the service database port during disaster recovery. ● During the DR initialization, do not perform DDL operations on the source database. Otherwise, the DR task may be abnormal. ● Do not write data to the source database during the primary/ standby switchover. Otherwise, data pollution or table

Type	Restrictions
	structure inconsistency may occur, resulting in data inconsistency between the service database and DR database.

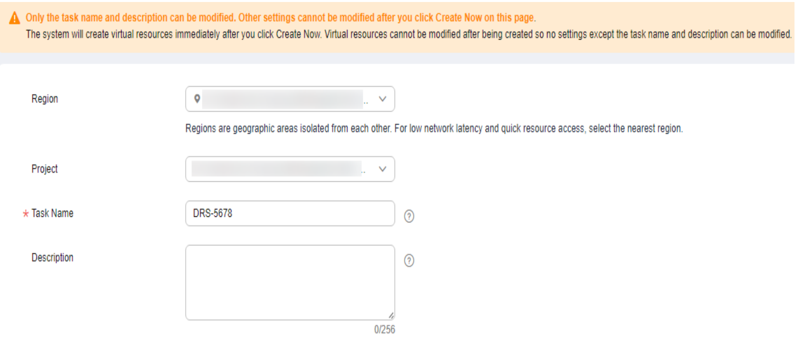
Procedure

Step 1 On the **Disaster Recovery Management** page, click **Create Disaster Recovery Task**.

Step 2 On the **Create Disaster Recovery Instance** page, select a region and project, specify the task name, description, and the DR instance details, and click **Create Now**.

- Task information description

Figure 2-25 DR task information



Only the task name and description can be modified. Other settings cannot be modified after you click Create Now on this page.
The system will create virtual resources immediately after you click Create Now. Virtual resources cannot be modified after being created so no settings except the task name and description can be modified.

Region: [redacted]
Regions are geographic areas isolated from each other. For low network latency and quick resource access, select the nearest region.

Project: [redacted]

* Task Name: DRS-5678

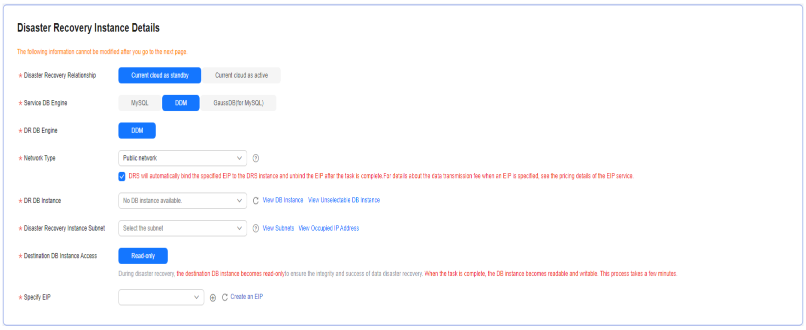
Description:
0/256

Table 2-29 Task and recipient description

Parameter	Description
Region	The region where your service is running. You can change the region.
Project	The project corresponds to the current region and can be changed.
Task Name	The task name must start with a letter and consist of 4 to 50 characters. It can contain only letters, digits, hyphens (-), and underscores (_).
Description	The description consists of a maximum of 256 characters and cannot contain special characters !=<>'&"\

- DR instance information

Figure 2-26 DR instance information



Disaster Recovery Instance Details

The following information cannot be modified after you go to the next page.

* Disaster Recovery Relationship: Current cloud as standby | Current cloud as active
* Service DB Engine: MySQL | DDM | GaussDB(for MySQL)
* DR DB Engine: DDM
* Network Type: Public network

☑ DRS will automatically bind the specified EIP to the DRS instance and unbind the EIP after the task is complete.For details about the data transmission fee when an EIP is specified, see the pricing details of the EIP service.

* DR DB Instance: No DB instance available.
* Disaster Recovery Instance Subnet: Select the subnet
* Destination DB Instance Access: Read-only

During disaster recovery, the destination DB instance becomes read-onlyto 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.

* Specify EIP:

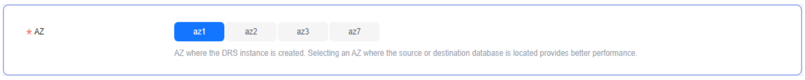
Table 2-30 DR instance settings

Parameter	Description
DR Type	Select **Single-active**. The DR type can be single-active or dual-active. If **Dual-active** is selected, two subtasks are created by default, a forward DR task and a backward DR task. **NOTE** Only whitelisted users can use dual-active DR. 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.
Disaster Recovery Relationship	Select **Current cloud as standby**. This parameter is available only when you select **Single-active**. By default, **Current cloud as standby** is selected. You can also select **Current cloud as active**. – **Current cloud as standby**: The DR database is on the current cloud. – **Current cloud as active**: The service database is on the current cloud.
Service DB Engine	Select **DDM**.
DR DB Engine	Select **DDM**.
Network Type	The public network is used as an example. Available options: **VPN or Direct Connect** and **Public network**. By default, the value is **Public network**.
DR DB Instance	The DDM instance you created.

Parameter	Description
Disaster Recovery Instance Subnet	Select the subnet where the disaster recovery instance is located. You can also click **View Subnets** to go to the network console to view the subnet where the instance resides. By default, the DRS instance and the DR DB instance are in the same subnet. You need to select the subnet where the DRS instance resides and ensure that there are available IP addresses. To ensure that the disaster recovery instance is successfully created, only subnets with DHCP enabled are displayed.
Destination DB Instance Access	Select **Read-only**. This parameter is available only when you select **Single-active**. – During disaster recovery, the entire DR database instance becomes read-only. To change the DR database to Read/Write, you can change the DR database (or destination database) to a service database by clicking **Batch Operation > Primary/ Standby Switchover** on the **Disaster Recovery Management** page. – If a DR task fails, the DR database automatically changes to the read/write state. – After the DR task is complete, the DR database changes to **Read/Write**. – When the external database functions as the DR database, the user with the superuser permission can set the database to read-only. – If a DRS instance node is rebuilt due to a fault, to ensure data consistency during the DRS task restoration, the current cloud standby database is set to read-only before the task is restored. After the task is restored, the synchronization relationship recovers.
Specify EIP	This parameter is available when you select **Public network** for **Network Type**. Select an EIP to be bound to the DRS instance. DRS will automatically bind the specified EIP to the DRS instance and unbind the EIP after the task is complete. The number of specified EIPs must be the consistent with that of DB instances. For details about the data transfer fee generated using a public network, see **EIP Price Calculator**.

- AZ

Figure 2-27 AZ



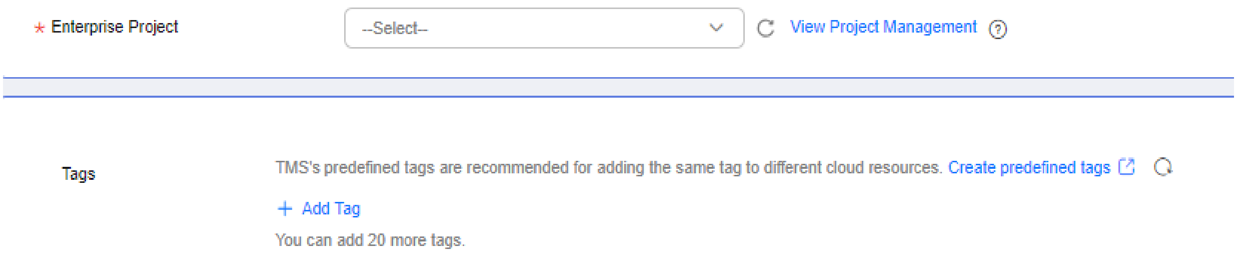
AZ where the DRS instance is created. Selecting an AZ where the source or destination database is located provides better performance.

Table 2-31 Task AZ

Parameter	Description
AZ	Select the AZ where you want to create the DRS task. Selecting the one housing the source or destination database can provide better performance.

- Enterprise Project and Tags

Figure 2-28 Enterprise projects and tags



* Enterprise Project
--Select--
View Project Management

Tags
TMS's predefined tags are recommended for adding the same tag to different cloud resources. Create predefined tags
+ Add Tag
You can add 20 more tags.

Table 2-32 Enterprise Project and Tags

Parameter	Description
Enterprise Project	An enterprise project you would like to use to centrally manage your cloud resources and members. Select an enterprise project from the drop-down list. The default project is **default**. For more information about enterprise projects, see ***Enterprise Management User Guide***. To customize an enterprise project, click **Enterprise** in the upper right corner of the console. The **Enterprise Project Management Service** page is displayed. For details, see **Creating an Enterprise Project** in *Enterprise Management User Guide*.
Tags	– Tags a task. This configuration is optional. Adding tags helps you better identify and manage your tasks. Each task can have up to 20 tags. – If your organization has configured tag policies for DRS, add tags to tasks based on the policies. If a tag does not comply with the policies, task creation may fail. Contact your organization administrator to learn more about tag policies. – After a task is created, you can view its tag details on the **Tags** tab. For details, see **Tag Management**.

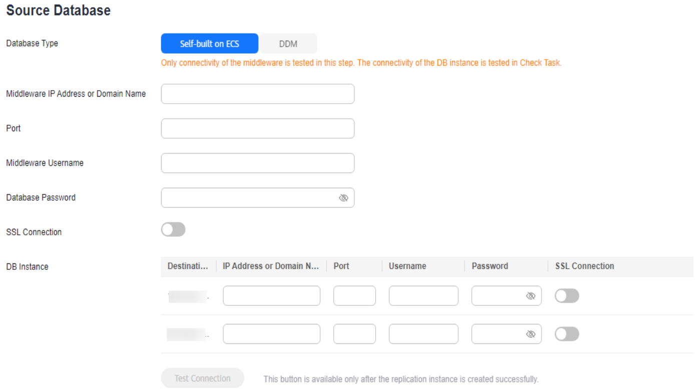
NOTE

If a task fails to be created, DRS retains the task for three days by default. After three days, the task automatically stops.

Step 3 On the **Configure Source and Destination Databases** page, wait until the DR 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 DR instance. After the connection tests are successful, select the check box before the agreement and click **Next**.

- Select **Current cloud as the standby** for **Disaster Recovery Relationship** in **Step 2**.

Figure 2-29 Service database information



Source Database

Database Type: Self-built on ECS | DDM

Only connectivity of the middleware is tested in this step. The connectivity of the DB instance is tested in Check Task.

Middleware IP Address or Domain Name

Port

Middleware Username

Database Password

SSL Connection

DB Instance

Destinati...	IP Address or Domain N...	Port	Username	Password	SSL Connection

Test Connection   This button is available only after the replication instance is created successfully.

Table 2-33 Service database settings

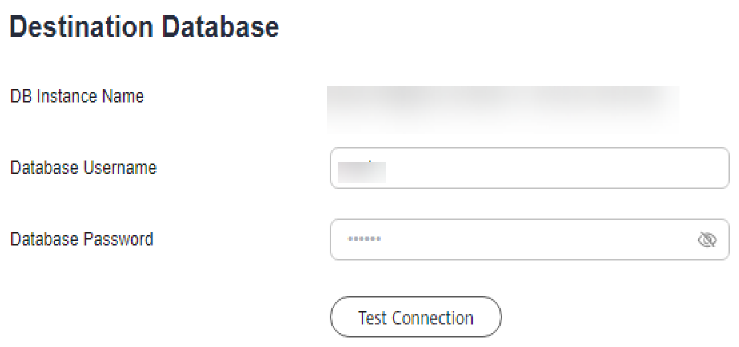
Parameter	Description
Database Type	Select a service database type.
Middleware IP Address or Domain Name	The IP address or domain name of the source DDM middleware.
Port	The port of the source DDM middleware. Value range: 1 to 65535
Middleware Username	The username of the source DDM instance.
Middleware Password	The password for the source DDM instance username.

Parameter	Description
SSL Connection	SSL encrypts the connections between the source and destination databases. If SSL is enabled, upload the SSL CA root certificate. **NOTE** – The maximum size of a single certificate file that can be uploaded is 500 KB. – If SSL is disabled, your data may be at risk.
DB Instance	Enter the database information based on the actual DN sharded database and data DR relationship of DDM. For details, see **How Do I Configure Source Database Information for a DDM DR Task?**
Region	The region where the source database is located. This parameter is available only when **Database Type** for the source database is set to **DDM**. The region cannot be the region where the destination database is located.
DB Instance Name	The name of the service DB instance. This parameter is available only when the source database is a **DDM** database.
Database Username	The username for accessing the service database. This parameter is available only when the source database is a **DDM** database.
Database Password	The password for the service database username. This parameter is available only when the source database is a **DDM** database.

NOTE

The IP address, domain name, username, and password of the service database are encrypted and stored in DRS and will be cleared after the task is deleted.

Figure 2-30 DR database information



Destination Database

DB Instance Name [redacted]

Database Username [redacted]

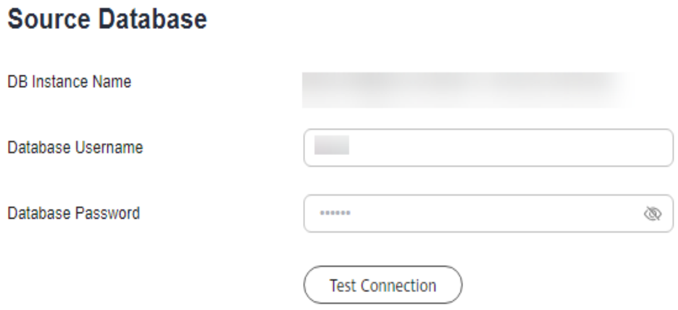
Database Password ••••••

Table 2-34 DR database settings

Parameter	Description
DB Instance Name	The DDM instance you selected when you create the DR task. The instance name cannot be changed.
Database Username	The username for accessing the DR database.
Database Password	The password for the database username. You can change the password if necessary. To change the password, perform the following operation after the task is created: If the task is in the **Starting**, **Initializing**, **Disaster recovery in progress**, or **Disaster recovery failed** status, in the **DR Information** area on the **Basic Information** tab, click **Modify Connection Details**. In the displayed dialog box, change the password. The database username and password are encrypted and stored in the system, and will be cleared after the task is deleted.

– Select **Current cloud as active** for **Disaster Recovery Relationship** in **Step 2**.

Figure 2-31 Service database information



Source Database

DB Instance Name

Database Username

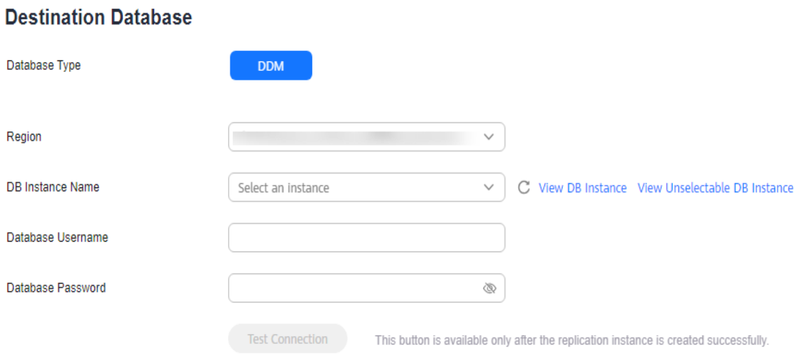
Database Password ••••••

Table 2-35 Service database settings

Parameter	Description
DB Instance Name	The DDM instance you selected when you create the DR task. The instance name cannot be changed.
Database Username	The username for accessing the service database.

Parameter	Description
Database Password	The password for the database username. You can change the password if necessary. To change the password, perform the following operation after the task is created: If the task is in the **Starting**, **Initializing**, **Disaster recovery in progress**, or **Disaster recovery failed** status, in the **DR Information** area on the **Basic Information** tab, click **Modify Connection Details**. In the displayed dialog box, change the password. The database username and password are encrypted and stored in the system, and will be cleared after the task is deleted.

Figure 2-32 DR database information



Destination Database

Database Type: DDM

Region

DB Instance Name: Select an instance

Database Username

Database Password

View DB Instance
View Unselectable DB Instance
Test Connection
This button is available only after the replication instance is created successfully.

Table 2-36 DR database settings

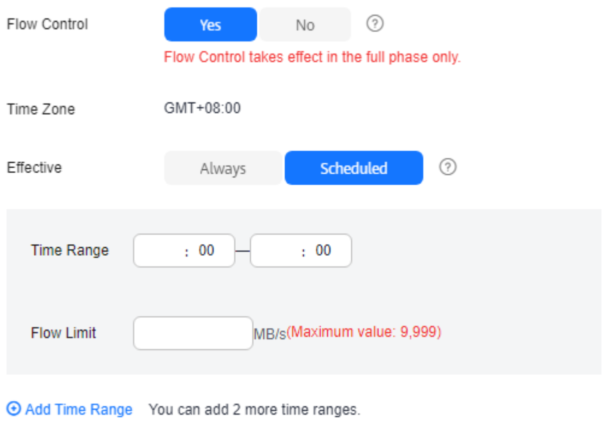
Parameter	Description
Database Type	Type of the DR database.
Region	The region where the DDM instance is located.
DB Instance Name	Name of the DR instance. **NOTE** When the DB instance is used as the DR database, it is set to read-only. After the task is complete, the DB instance can be readable and writable.
Database Username	Username for logging in to the DR database.
Database Password	Password for the database username.

NOTE

The username and password of the DR databases are encrypted and stored in DRS, and will be cleared after the task is deleted.

Step 4 On the **Configure DR** page, specify flow control and click **Next**.

Table 2-37 DR settings

Parameter	Description
Flow Control	You can choose whether to control the flow. ● **Yes** You can customize the maximum disaster recovery speed. During the disaster recovery, the speed of each task (or each subtask in multi-task mode) does not exceed the value of this parameter. 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 **Always**. A maximum of 10 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. **Figure 2-33** Flow control  Flow Control: Yes / No Flow Control takes effect in the full phase only. Time Zone: GMT+08:00 Effective: Always / Scheduled Time Range: : 00 — : 00 Flow Limit: MB/s(Maximum value: 9,999) Add Time Range You can add 2 more time ranges. ● **No** The DR speed is not limited and the outbound bandwidth of the source database is maximally used, which causes read consumption on the source database accordingly. 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 in the DR initialization phase. – You can also change the flow control mode when the task is in the **Configuration** state. For details, see **Modifying the Flow Control Mode**.

Step 5 On the **Check Task** page, check the DR task.

- If any check fails, review the failure cause and rectify the fault. After the fault is rectified, click **Check Again**.

For details about how to handle check failures, see **Solutions to Failed Check Items** in *Data Replication Service User Guide*.

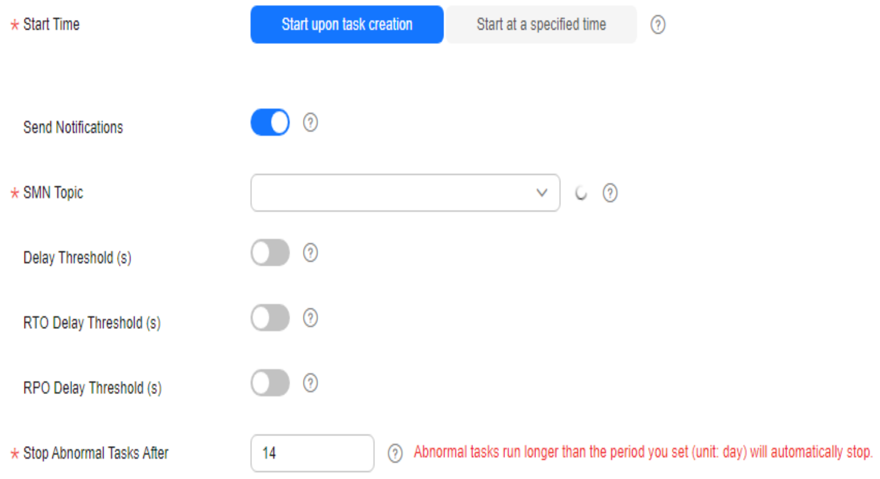
- If the check is complete and the check success rate is 100%, click **Next**.

  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.

Step 6 On the **Confirm Task** page, specify **Start Time**, **Send Notifications**, **SMN Topic**, **Delay Threshold**, **RPO Delay Threshold**, **RTO Delay Threshold**, **Stop Abnormal Tasks After**. After confirming that the configured information about the DR task is correct, click **Submit**.

Figure 2-34 Task startup settings



* Start Time: Start upon task creation | Start at a specified time

Send Notifications: on

* SMN Topic:

Delay Threshold (s): off

RTO Delay Threshold (s): off

RPO Delay Threshold (s): off

* Stop Abnormal Tasks After: 14

Abnormal tasks run longer than the period you set (unit: day) will automatically stop.

Table 2-38 Task settings

Parameter	Description
Start Time	Set **Start Time** to **Start upon task creation** or **Start at a specified time** based on site requirements. **NOTE** Starting a DR task may slightly affect the performance of the service and DR databases. You are advised to start a DR task during off-peak hours.
Send Notifications	This parameter is optional. After enabled, select a SMN topic. If the status or latency metric of the DR task is abnormal, DRS will send you a notification.
SMN Topic	This parameter is available only after you enable **Send Notifications** and create a topic on the SMN console and add a subscriber. For details, see ***Simple Message Notification User Guide***.

Parameter	Description
Delay Threshold (s)	During disaster recovery, a synchronization delay indicates a time difference (in seconds) of synchronization between the service and DR 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** ● Before setting the delay threshold, enable **Send Notifications**. ● If the delay threshold is set to 0, no notifications will be sent to the recipient.
RTO Delay Threshold (s)	If the synchronization delay from the DRS instance to the DR database exceeds the threshold you specify, DRS will notify 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** ● Before setting the RTO delay threshold, enable **Send Notifications**. ● If the delay threshold is set to 0, no notifications will be sent to the recipient.
RPO Delay Threshold (s)	If the synchronization delay from the DRS instance to the service database exceeds the threshold you specify, DRS will notify 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** ● Before setting the delay threshold, enable **Send Notifications**. ● If the delay threshold is set to 0, no notifications will be sent to the recipient. ● In the early stages of an incremental DR, more delay is normal because more data is waiting to be synchronized. In this situation, no notifications will be sent.
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** ● You can set this parameter only for pay-per-use tasks. ● Tasks in the abnormal state are still charged. If tasks remain in the abnormal state for a long time, they cannot be resumed. Any task in the abnormal state that has run for longer than the period you set here (in days) will automatically stop to avoid unnecessary fees.

Step 7 After the task is submitted, view and **manage it** on the **Disaster Recovery Management** page.

- You can view the task status. For more information about task status, see **Task Statuses**.
- You can click ⟳ in the upper-right corner to view the latest task status.
- By default, DRS retains a task in the **Configuration** state for three days. After three days, DRS automatically deletes background resources, but the task status remains unchanged. When you reconfigure the task, DRS applies for resources again.
- For a public network task, DRS needs to delete background resources after you stop the task. The EIP bound to the task cannot be restored to the **Unbound** state until background resources are deleted.
- For a task that is in the **Disaster recovery in progress** state, you can use **data comparison** to check whether data is consistent before and after the disaster recovery.

----End

2.4 From GaussDB(for MySQL) to GaussDB(for MySQL) (Single-Active DR)

Supported Source and Destination Databases

Table 2-39 Supported databases

Service database	DR Database
GaussDB(for MySQL) Primary/Standby	GaussDB(for MySQL) Primary/Standby

Database Account Permission Requirements

To start a DR task, the service and DR database users must meet the requirements in the following table. Different types of DR tasks require different permissions. For details, see **Table 2-40**. DRS automatically checks the database account permissions in the pre-check phase and provides handling suggestions.

Table 2-40 Database account permission

Type	Permission Required
Service database user	The user must have the following permissions: SELECT, CREATE, ALTER, DROP, DELETE, INSERT, UPDATE, TRIGGER, REFERENCES, SHOW VIEW, EVENT, INDEX, LOCK TABLES, CREATE VIEW, CREATE ROUTINE, ALTER ROUTINE, CREATE USER, RELOAD, REPLICATION SLAVE, REPLICATION CLIENT, and WITH GRANT OPTION The **root** account of the GaussDB(for MySQL) instance has the preceding permissions by default.
DR database user	The user must have the following permissions: SELECT, CREATE, ALTER, DROP, DELETE, INSERT, UPDATE, TRIGGER, REFERENCES, SHOW VIEW, EVENT, INDEX, LOCK TABLES, CREATE VIEW, CREATE ROUTINE, ALTER ROUTINE, CREATE USER, RELOAD, REPLICATION SLAVE, REPLICATION CLIENT, and WITH GRANT OPTION The **root** account of the GaussDB(for MySQL) instance has the preceding permissions by default.

NOTE

- You are advised to create an independent database account for DRS task connection to prevent task failures caused by database account password modification.
- After changing the account passwords for the service and DR databases, modify the connection information of the DRS task by referring to **Modifying Connection Information** to prevent automatic retry after a task failure. Automatic retry will lock the database accounts.
- **Table 2-40** lists the minimum permissions required by a DRS task. If you need to migrate the grant permission through a DRS task, ensure that the connection account of the DRS task has the corresponding permission. Otherwise, the destination database user may not be authorized due to grant execution failure. For example, if the connection account of the DRS task does not require the process permission, but you need to migrate the process permission through a DRS task, ensure that the connection account of the DRS task has the process permission.

Prerequisites

- **You have logged in to the DRS console.**
- Your account balance is greater than or equal to $0 USD.
- For details about the supported DB types and versions, see **Supported Databases**.
- If a subaccount is used to create a DRS task, ensure that an agency has been added. For details about how to create an agency, see **Agency Management**.

Suggestions

⚠ CAUTION

- During the DR initialization, do not perform DDL operations on the service database. Otherwise, the task may be abnormal.
- During DR initialization, ensure that no data is written to the DR database to ensure data consistency before and after DR.

- The success of DR depends on environment and manual operations. To ensure a smooth DR, perform a DR trial before you start the DR task to help you detect and resolve problems in advance.
- It is recommended that you start your DR task during off-peak hours to minimize the impact on your services.
  - If the bandwidth is not limited, initialization of DR will increase query workload of the source database by 50 MB/s and occupy 2 to 4 vCPUs.
  - To ensure data consistency, tables without a primary key may be locked for 3s during disaster recovery.
  - The data in the DR process may be locked by other transactions for a long period of time, resulting in read timeout.
  - If DRS concurrently reads data from a database, it will use about 6 to 10 sessions. The impact of the connections on services must be considered.
  - If you read a table, especially a large table, during DR, the exclusive lock on that table may be blocked.
  - For more information about the impact of DRS on databases, see **How Does DRS Affect the Source and Destination Databases?**
- Data-Level Comparison

  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, data inconsistency may occur, reducing the reliability and validity of the comparison results.

Precautions

Before creating a DR task, read the following precautions:

Table 2-41 Precautions

Type	Restrictions
Disaster recovery objects	● Only MyISAM and InnoDB tables support disaster recovery. ● System tables are not supported. ● Triggers and events do not support disaster recovery. ● Accounts that have operation permissions on customized objects in the system database cannot be used for disaster recovery. ● Disaster recovery cannot be configured for a specific service database. ● Disaster recovery for non-standard floating-point data that can be written in loose mode but cannot be written in strict mode is not supported. Such non-standard floating-point data may fail to be hit, causing data disaster recovery failures.
Service database configuration	● The service database must be the primary node of the GaussDB(for MySQL) instance. ● The binlog of the service database must be enabled and use the row-based format. ● If the storage space is sufficient, store the service database binlog for as long as possible. The recommended retention period is seven days. ● GTID must be enabled for the database. ● The service database name must contain 1 to 64 characters, including only lowercase letters, digits, hyphens (-), and underscores (_). ● During the disaster recovery, 0 cannot be written to the auto-increment primary key column in the service database. Otherwise, the data of the auto-increment column in the service database is inconsistent with that in the DR database. ● The table name and view name in the service database cannot contain non-ASCII characters, or the following characters: '<>/\ ● The column names in the service database tables cannot end with a backslash (\).
DR database configuration	● The DR DB instance is running properly. If the DR DB instance is a primary/standby instance, the replication status must also be normal. ● The DR DB instance must have sufficient storage space. ● The major version of the DR database must be the same as that of the service database. ● The DR database must be an empty instance. After the DR task starts, the DR database is set to read-only. ● The binlog of the DR database must be enabled and use the row-based format. ● GTID must be enabled for the DR database.

Type	Restrictions
Precautions	● The parameter modification of the service database is not recorded in logs and is not synchronized to the DR database. Therefore, you need to modify the parameters after the DR database is promoted to the primary. ● Before creating a DRS task, if concurrency control rules of SQL statements are configured for the service or DR database, the DRS task may fail. ● If a physically generated column in a table is generated based on a time type, the data in the column may be inconsistent. ● Cascade operations cannot be performed on tables with foreign keys. If the foreign key index of a table is a common index, the table structure may fail to be created. You are advised to use a unique index. ● The service database does not support point-in-time recovery (PITR). ● Binlogs cannot be forcibly deleted. Otherwise, the DR task fails. ● The service database does not support the **reset master** or **reset master to** command, which may cause DRS task failures or data inconsistency. ● If the network is reconnected within 30 seconds, disaster recovery will not be affected. If the network is interrupted for more than 30 seconds, the DR task will fail. ● If the DCC does not support instances with 4 vCPUs and 8 GB memory or higher instance specifications, the DR task cannot be created. ● Resumable upload is supported, but data may be repeatedly inserted into a table that does not have a primary key. ● If there is a DR task in a database, you are not allowed to create a migration or synchronization task (The database cannot be used as the source or destination database of the migration or synchronization task). ● The DR relationship involves only one primary database. Ensure that the data of the standby node is synchronized only from the primary node. Any other write operations will pollute the data in the standby database, data conflicts occur in the DR center and cannot be resolved. ● If the external database is a standby and read-only database, only the account with the superuser permission can write data to that database. But you still need to ensure that data is written only by this account. Otherwise, the standby database may be polluted, and data conflicts occur in the DR center and cannot be resolved. ● During disaster recovery, if the password of the service database is changed, the DR task will fail. To rectify the fault, you can correct the service database information on the DRS

Type	Restrictions
	console and retry the task to continue disaster recovery. Generally, you are advised not to modify the preceding information during disaster recovery. ● If the service database port is changed during disaster recovery, the DR task fails. Generally, you are advised not to modify the service database port during disaster recovery. ● During disaster recovery, if the service database is an RDS DB instance on the current cloud and the DR task fails due to changes on the IP address, DRS automatically changes the IP address to the correct one. Then, you can retry the task to continue disaster recovery. Therefore, changing the IP address is not recommended. ● During disaster recovery, you can create accounts for the service database. ● During the DR initialization, do not perform DDL operations on the source database. Otherwise, the DR task may be abnormal. ● Do not write data to the source database during the primary/standby switchover. Otherwise, data pollution or table structure inconsistency may occur, resulting in data inconsistency between the service database and DR database.

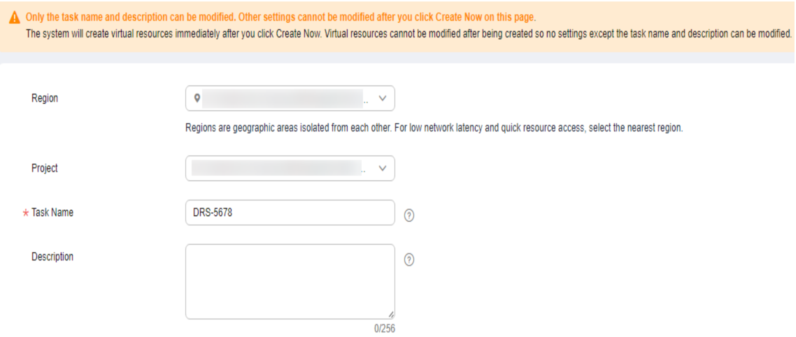
Procedure

Step 1 On the **Disaster Recovery Management** page, click **Create Disaster Recovery Task**.

Step 2 On the **Create Disaster Recovery Instance** page, select a region and project, specify the task name, description, and the DR instance details, and click **Create Now**.

- Task information description

Figure 2-35 DR task information



Only the task name and description can be modified. Other settings cannot be modified after you click Create Now on this page.
The system will create virtual resources immediately after you click Create Now. Virtual resources cannot be modified after being created so no settings except the task name and description can be modified.

Region

Regions are geographic areas isolated from each other. For low network latency and quick resource access, select the nearest region.

Project

* Task Name: DRS-5678

Description

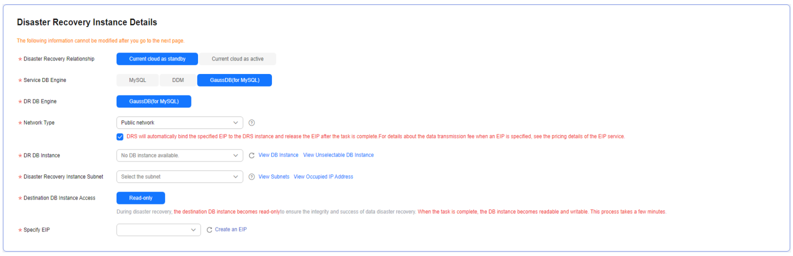
0/256

Table 2-42 Task and recipient description

Parameter	Description
Region	The region where your service is running. You can change the region.
Project	The project corresponds to the current region and can be changed.
Task Name	The task name must start with a letter and consist of 4 to 50 characters. It can contain only letters, digits, hyphens (-), and underscores (_).
Description	The description consists of a maximum of 256 characters and cannot contain special characters !=<>'&"\

- DR instance information

Figure 2-36 DR instance information



Disaster Recovery Instance Details

The following information cannot be modified after you go to the next page.

* Disaster Recovery Relationship: Current cloud as standby

* Service DB Engine: GaussDB(for MySQL)

* DR DB Engine: GaussDB(for MySQL)

* Network Type: Public network

☑ DRS will automatically bind the specified EIP to the DRS instance and release the EIP after the task is complete.For details about the data transmission fee when an EIP is specified, see the pricing details of the EIP service.

* DR DB Instance: No DB instance available.

* Disaster Recovery Instance Subnet: Select the subnet

* Destination DB Instance Access: Read-only

During disaster recovery, the destination DB instance becomes read-onlyto 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.

* Specify EIP:

Table 2-43 DR instance settings

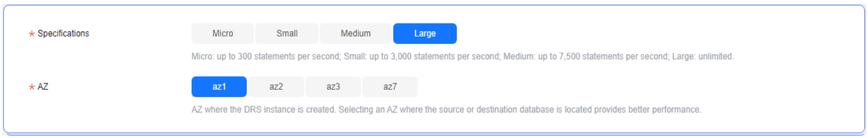
Parameter	Description
DR Type	Select **Single-active**. The DR type can be single-active or dual-active. If **Dual-active** is selected, two subtasks are created by default, a forward DR task and a backward DR task. **NOTE** Only whitelisted users can use dual-active DR. To use this function, submit a service ticket. In the upper right corner of the management console, choose **Service Tickets** > **Create Service Ticket** to submit a service ticket.
Disaster Recovery Relationship	Select **Current cloud as standby**. This parameter is available only when you select **Single-active**. By default, **Current cloud as standby** is selected. You can also select **Current cloud as active**. – **Current cloud as standby**: The DR database is on the current cloud. – **Current cloud as active**: The service database is on the current cloud.

Parameter	Description
Service DB Engine	Select **GaussDB(for MySQL)**.
DR DB Engine	Select **GaussDB(for MySQL)**.
Network Type	The public network is used as an example. Available options: **VPN or Direct Connect** and **Public network**. By default, the value is **Public network**.
DR DB Instance	The GaussDB(for MySQL) instance you created.
Disaster Recovery Instance Subnet	Select the subnet where the disaster recovery instance is located. You can also click **View Subnets** to go to the network console to view the subnet where the instance resides. By default, the DRS instance and the DR DB instance are in the same subnet. You need to select the subnet where the DRS instance resides and ensure that there are available IP addresses. To ensure that the disaster recovery instance is successfully created, only subnets with DHCP enabled are displayed.

Parameter	Description
Destination DB Instance Access	Select **Read-only**. This parameter is available only when you select **Single-active**. – During disaster recovery, the entire DR database instance becomes read-only. To change the DR database to **Read/Write**, you can change the DR database (or destination database) to a service database by clicking **Promote Current Cloud** on the **Disaster Recovery Monitoring** tab. – If a DR task fails, the DR database does not automatically change to the read/write state. – If a DR task is paused, you can disable read-only for the DR database. For details, see **Disabling or Enabling Read-Only**. – After read-only is disabled and the DR task is resumed, the DR database automatically changes to read-only. The read-only settings of the DR DB instance are also affected by the access settings of the DB instance itself. Therefore, you are advised not to set the access settings of the DB instance on the RDS console. – After the DR task is complete, the DR database changes to **Read/Write**. – When the external database functions as the DR database, the user with the superuser permission can set the database to read-only. – If a DRS instance node is rebuilt due to a fault, to ensure data consistency during the DRS task restoration, the current cloud standby database is set to read-only before the task is restored. After the task is restored, the synchronization relationship recovers.
Specify EIP	This parameter is available when you select **Public network** for **Network Type**. Select an EIP to be bound to the DRS instance. DRS will automatically bind the specified EIP to the DRS instance and unbind the EIP after the task is complete. The number of specified EIPs must be the consistent with that of DB instances. For details about the data transfer fee generated using a public network, see **EIP Price Calculator**.

- Specifications

Figure 2-37 Specifications



* Specifications: Micro / Small / Medium / Large (selected)

Micro: up to 300 statements per second; Small: up to 3,000 statements per second; Medium: up to 7,500 statements per second; Large: unlimited.

* AZ: az1 (selected) / az2 / az3 / az7

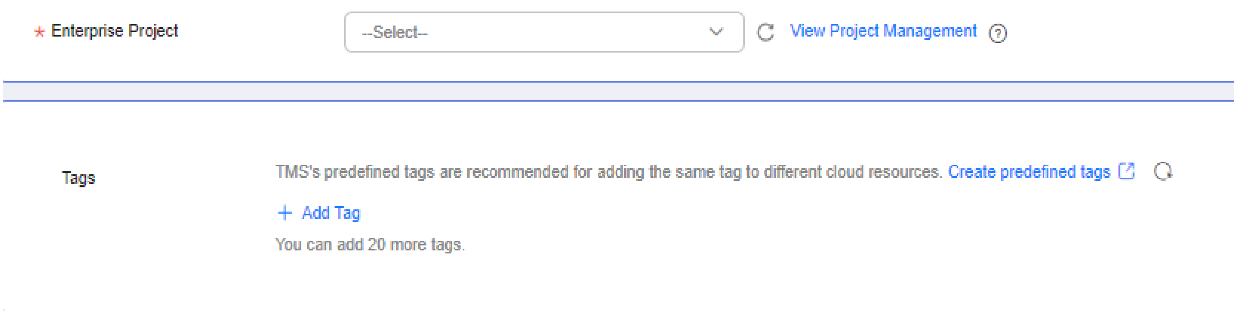
AZ where the DRS instance is created. Selecting an AZ where the source or destination database is located provides better performance.

Table 2-44 Specifications

Parameter	Description
Specifications	DRS instance specifications. Different specifications have different performance upper limits. For details, see **Real-Time DR**. **NOTE** DRS allows you to upgrade specifications only for real-time DR tasks from MySQL to MySQL, from MySQL to GaussDB(for MySQL), and from GaussDB(for MySQL) to GaussDB(for MySQL). Task specifications cannot be downgraded. For details, see **Changing Specifications**.
AZ	Select the AZ where you want to create the DRS task. Selecting the one housing the source or destination database can provide better performance.

- Enterprise Project and Tags

Figure 2-38 Enterprise projects and tags



TMS's predefined tags are recommended for adding the same tag to different cloud resources.

You can add 20 more tags.

Table 2-45 Enterprise Project and Tags

Parameter	Description
Enterprise Project	An enterprise project you would like to use to centrally manage your cloud resources and members. Select an enterprise project from the drop-down list. The default project is **default**. For more information about enterprise projects, see ***Enterprise Management User Guide***. To customize an enterprise project, click **Enterprise** in the upper right corner of the console. The **Enterprise Project Management Service** page is displayed. For details, see **Creating an Enterprise Project** in *Enterprise Management User Guide*.

Parameter	Description
Tags	– Tags a task. This configuration is optional. Adding tags helps you better identify and manage your tasks. Each task can have up to 20 tags. – If your organization has configured tag policies for DRS, add tags to tasks based on the policies. If a tag does not comply with the policies, task creation may fail. Contact your organization administrator to learn more about tag policies. – After a task is created, you can view its tag details on the **Tags** tab. For details, see **Tag Management**.

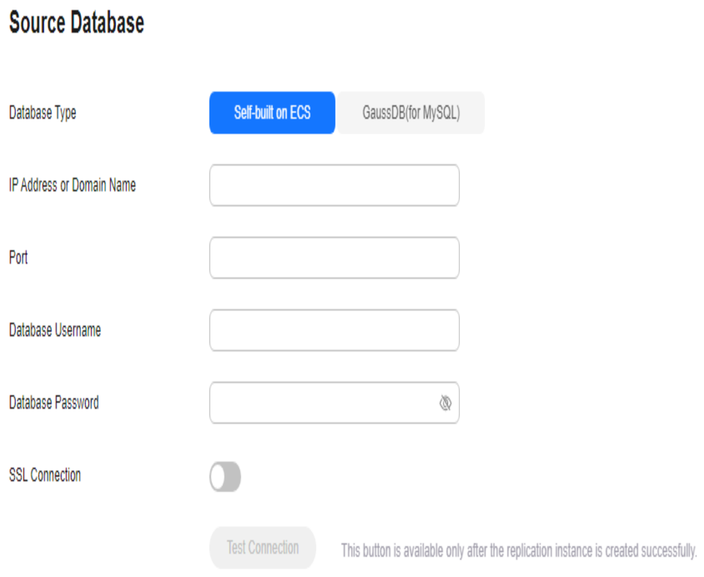
NOTE

If a task fails to be created, DRS retains the task for three days by default. After three days, the task automatically stops.

Step 3 On the **Configure Source and Destination Databases** page, wait until the DR 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 DR instance. After the connection tests are successful, select the check box before the agreement and click **Next**.

- Select **Current cloud as the standby** for **Disaster Recovery Relationship** in **Step 2**.

Figure 2-39 Service database information



Source Database

Database Type: Self-built on ECS | GaussDB(for MySQL)

IP Address or Domain Name

Port

Database Username

Database Password

SSL Connection

Test Connection

This button is available only after the replication instance is created successfully.

Table 2-46 Service database settings

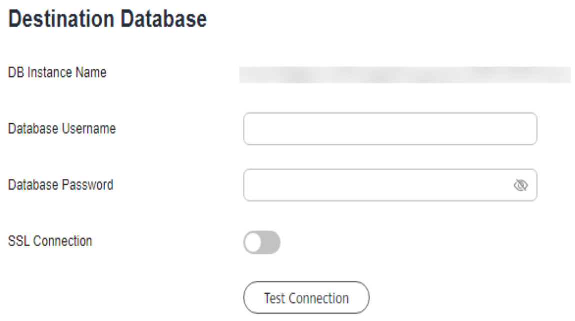
Parameter	Description
Database Type	By default, **Self-built on ECS** is selected. The source database can be a **Self-built on ECS** or **GaussDB(for MySQL)** database. After selecting **GaussDB(for MySQL)**, select the region where the source database resides and the region cannot be the same as the region where the destination database resides. The region where the destination database is located is the region where you log in to the management console. To use the **GaussDB(for MySQL)** option, submit a service ticket.
IP Address or Domain Name	The IP address or domain name of the service database.
Port	The port of the service database. Range: 1 – 65535
Database Username	The username for accessing the service database.
Database Password	The password for the service database username. You can change the password if necessary. To change the password, perform the following operation after the task is created: If the task is in the **Starting**, **Initializing**, **Disaster recovery in progress**, or **Disaster recovery failed** status, in the **DR Information** area on the **Basic Information** tab, click **Modify Connection Details**. In the displayed dialog box, change the password.
SSL Connection	SSL encrypts the connections between the source and destination databases. If SSL is enabled, upload the SSL CA root certificate. **NOTE** – The maximum size of a single certificate file that can be uploaded is 500 KB. – If SSL is disabled, your data may be at risk.
Region	The region where the source database is located. This parameter is available only when **Database Type** for the source database is set to **GaussDB(for MySQL)**. The region cannot be the region where the destination database is located.
DB Instance Name	The name of the service DB instance. This parameter is available only when the source database is a **GaussDB(for MySQL)** database.
Database Username	The username for accessing the service database.

Parameter	Description
Database Password	The password for the service database username.

NOTE

The IP address, domain name, username, and password of the service database are encrypted and stored in DRS and will be cleared after the task is deleted.

Figure 2-40 DR database information



Destination Database

DB Instance Name:

Database Username:

Database Password:

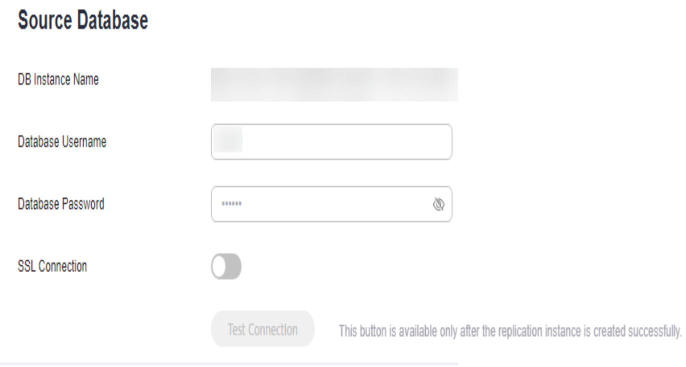
SSL Connection: off

Table 2-47 DR database settings

Parameter	Description
DB Instance Name	The GaussDB(for MySQL) instance you selected when creating the DR task. This parameter cannot be changed.
Database Username	The username for accessing the DR database.
Database Password	The password for the database username. You can change the password if necessary. To change the password, perform the following operation after the task is created: If the task is in the **Starting**, **Initializing**, **Disaster recovery in progress**, or **Disaster recovery failed** status, in the **DR Information** area on the **Basic Information** tab, click **Modify Connection Details**. In the displayed dialog box, change the password. The database username and password are encrypted and stored in the system, and will be cleared after the task is deleted.

- Select **Current cloud as active** for **Disaster Recovery Relationship** in **Step 2**.

Figure 2-41 Service database information



Source Database

DB Instance Name

Database Username

Database Password ••••••

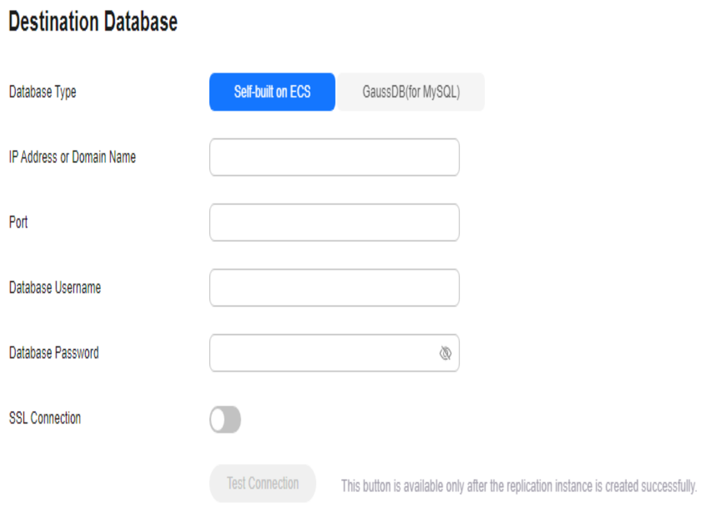
SSL Connection

Test Connection
This button is available only after the replication instance is created successfully.

Table 2-48 Service database settings

Parameter	Description
DB Instance Name	The GaussDB(for MySQL) instance you selected when creating the DR task. This parameter cannot be changed.
Database Username	The username for accessing the service database.
Database Password	The password for the database username. You can change the password if necessary. To change the password, perform the following operation after the task is created: If the task is in the **Starting**, **Initializing**, **Disaster recovery in progress**, or **Disaster recovery failed** status, in the **DR Information** area on the **Basic Information** tab, click **Modify Connection Details**. In the displayed dialog box, change the password. The database username and password are encrypted and stored in the system, and will be cleared after the task is deleted.

Figure 2-42 DR database information



This button is available only after the replication instance is created successfully.

Table 2-49 DR database settings

Parameter	Description
Database Type	By default, **Self-built on ECS** is selected. The destination database can be a **Self-built on ECS** or **GaussDB(for MySQL)** database. If you select **GaussDB(for MySQL)**, you need to select the region where the destination database is located. To use the **GaussDB(for MySQL)** option, submit a service ticket.
IP Address or Domain Name	The IP address or domain name of the DR database.
Port	The port of the DR database. Range: 1 – 65535
Database Username	The username for accessing the DR database.
Database Password	The password for the DR database username. You can change the password if necessary. To change the password, perform the following operation after the task is created: If the task is in the **Starting**, **Initializing**, **Disaster recovery in progress**, or **Disaster recovery failed** status, in the **DR Information** area on the **Basic Information** tab, click **Modify Connection Details**. In the displayed dialog box, change the password.
SSL Connection	SSL encrypts the connections between the source and destination databases. If SSL is enabled, upload the SSL CA root certificate. **NOTE** The maximum size of a single certificate file that can be uploaded is 500 KB.

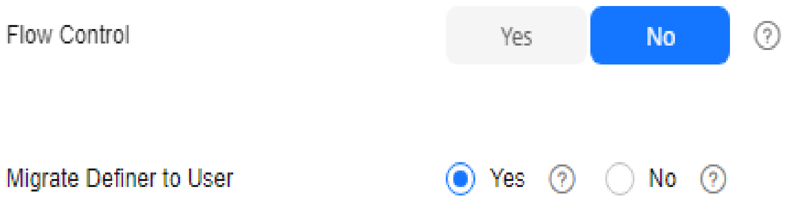
Parameter	Description
Region	Region where the GaussDB(for MySQL) instance is located. This parameter is available only when the destination database is a GaussDB(for MySQL) instance.
DB Instance Name	DR instance name. This parameter is available only when the destination database is a GaussDB(for MySQL) instance. **NOTE** When the DB instance is used as the DR database, it is set to read-only. After the task is complete, the DB instance can be readable and writable.
Database Username	Username for logging in to the DR database.
Database Password	Password for the database username.

NOTE

The IP address, domain name, username, and password of the DR database are encrypted and stored in DRS and will be cleared after the task is deleted.

Step 4 On the **Configure DR** page, specify flow control and click **Next**.

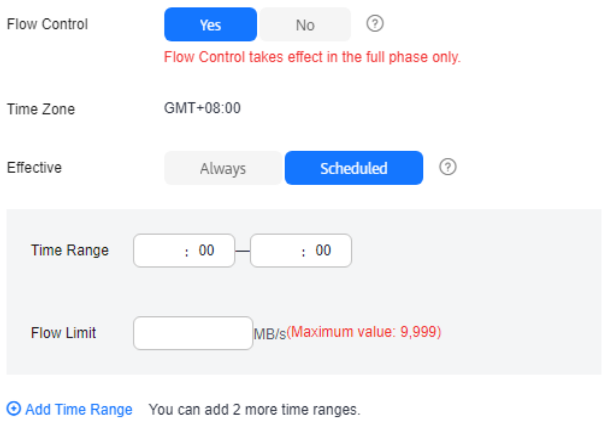
Figure 2-43 DR settings



Flow Control: Yes [✓ No]

Migrate Definer to User: ● Yes ○ No

Table 2-50 DR settings

Parameter	Description
Flow Control	You can choose whether to control the flow. ● **Yes** You can customize the maximum disaster recovery speed. During the disaster recovery, the speed of each task (or each subtask in multi-task mode) does not exceed the value of this parameter. 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 **Always**. A maximum of 10 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. **Figure 2-44** Flow control  Flow Control: Yes / No Flow Control takes effect in the full phase only. Time Zone: GMT+08:00 Effective: Always / Scheduled Time Range: : 00 – : 00 Flow Limit: MB/s(Maximum value: 9,999) Add Time Range You can add 2 more time ranges. ● **No** The DR speed is not limited and the outbound bandwidth of the source database is maximally used, which causes read consumption on the source database accordingly. 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 in the DR initialization phase. – You can also change the flow control mode when the task is in the **Configuration** state. For details, see **Modifying the Flow Control Mode**.

Parameter	Description
Migrate Definer to User	Indicates whether to migrate the Definers of all source database objects to the destination database user entered during the connection test. ● 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 about authorization, see **How Do I Maintain the Original Service User Permission System After Definer Is Forcibly Converted During MySQL Migration?** For example, if the view is CREATE ALGORITHM=UNDEFINED DEFINER=`username`@`%` SQL SECURITY DEFINER VIEW `test_db`.`view5` AS select 1 AS `1` before migration, it is converted to CREATE ALGORITHM=UNDEFINED DEFINER=`drsUser`@`%` SQL SECURITY DEFINER VIEW `test_db`.`view5` AS select 1 AS `1` after the migration. **drsUser** indicates the destination database user used for testing the connection. ● **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. Note that if the Definer account is not found in the destination database, unavailable objects will be created. For details about Definer, see the **MySQL official document**.

Step 5 On the **Check Task** page, check the DR task.

- If any check fails, review the failure cause and rectify the fault. After the fault is rectified, click **Check Again**.

  For details about how to handle check failures, see **Solutions to Failed Check Items** in *Data Replication Service User Guide*.

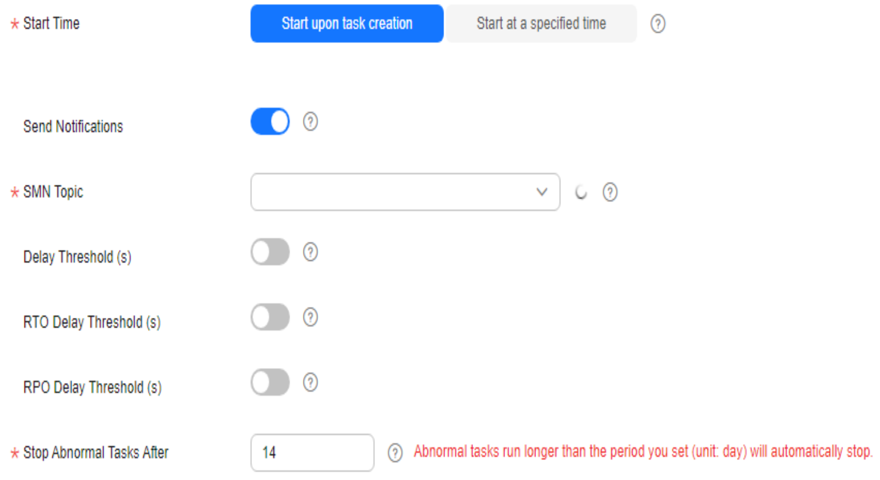
- If the check is complete and the check success rate is 100%, click **Next**.

  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.

Step 6 On the **Confirm Task** page, specify **Start Time**, **Send Notifications**, **SMN Topic**, **Delay Threshold**, **RPO Delay Threshold**, **RTO Delay Threshold**, **Stop Abnormal Tasks After**. After confirming that the configured information about the DR task is correct, click **Submit**.

Figure 2-45 Task startup settings



* Start Time: Start upon task creation | Start at a specified time

Send Notifications: ●

* SMN Topic:

Delay Threshold (s): ○

RTO Delay Threshold (s): ○

RPO Delay Threshold (s): ○

* Stop Abnormal Tasks After: 14 — Abnormal tasks run longer than the period you set (unit: day) will automatically stop.

Table 2-51 Task settings

Parameter	Description
Start Time	Set **Start Time** to **Start upon task creation** or **Start at a specified time** based on site requirements. **NOTE** Starting a DR task may slightly affect the performance of the service and DR databases. You are advised to start a DR task during off-peak hours.
Send Notifications	This parameter is optional. After enabled, select a SMN topic. If the status or latency metric of the DR task is abnormal, DRS will send you a notification.
SMN Topic	This parameter is available only after you enable **Send Notifications** and create a topic on the SMN console and add a subscriber. For details, see ***Simple Message Notification User Guide***.
Delay Threshold (s)	During disaster recovery, a synchronization delay indicates a time difference (in seconds) of synchronization between the service and DR 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** ● Before setting the delay threshold, enable **Send Notifications**. ● If the delay threshold is set to 0, no notifications will be sent to the recipient.

Parameter	Description
RTO Delay Threshold (s)	If the synchronization delay from the DRS instance to the DR database exceeds the threshold you specify, DRS will notify 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** ● Before setting the RTO delay threshold, enable **Send Notifications**. ● If the delay threshold is set to 0, no notifications will be sent to the recipient.
RPO Delay Threshold (s)	If the synchronization delay from the DRS instance to the service database exceeds the threshold you specify, DRS will notify 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** ● Before setting the delay threshold, enable **Send Notifications**. ● If the delay threshold is set to 0, no notifications will be sent to the recipient. ● In the early stages of an incremental DR, more delay is normal because more data is waiting to be synchronized. In this situation, no notifications will be sent.
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** ● You can set this parameter only for pay-per-use tasks. ● Tasks in the abnormal state are still charged. If tasks remain in the abnormal state for a long time, they cannot be resumed. Any task in the abnormal state that has run for longer than the period you set here (in days) will automatically stop to avoid unnecessary fees.

Step 7 After the task is submitted, view and **manage it** on the **Disaster Recovery Management** page.

- You can view the task status. For more information about task status, see **Task Statuses**.
- You can click ⟳ in the upper-right corner to view the latest task status.
- By default, DRS retains a task in the **Configuration** state for three days. After three days, DRS automatically deletes background resources, but the task status remains unchanged. When you reconfigure the task, DRS applies for resources again.
- For a public network task, DRS needs to delete background resources after you stop the task. The EIP bound to the task cannot be restored to the **Unbound** state until background resources are deleted.

- For a task that is in the **Disaster recovery in progress** state, you can use **data comparison** to check whether data is consistent before and after the disaster recovery.

----End

2.5 From MySQL to MySQL (Dual-Active DR)

Supported Source and Destination Databases

Table 2-52 Supported databases

Service database	DR Database
● On-premises MySQL databases ● MySQL databases on an ECS ● MySQL databases on other clouds ● RDS for MySQL	● RDS for MySQL

NOTE

Only whitelisted users can use this function.

Database Account Permission Requirements

To start a DR task, the service and DR database users must meet the requirements in the following table. Different types of DR tasks require different permissions. For details, see **Table 2-53**. DRS automatically checks the database account permissions in the pre-check phase and provides handling suggestions.

Table 2-53 Database account permission

Type	Permission Required
Service database user	The user must have the following permissions: SELECT, CREATE, ALTER, DROP, DELETE, INSERT, UPDATE, TRIGGER, REFERENCES, SHOW VIEW, EVENT, INDEX, LOCK TABLES, CREATE VIEW, CREATE ROUTINE, ALTER ROUTINE, CREATE USER, RELOAD, REPLICATION SLAVE, REPLICATION CLIENT, and WITH GRANT OPTION. The user **root** of the RDS for MySQL instance has the preceding permissions by default. If the service database version is 8.0.14 to 8.0.18, the SESSION_VARIABLES_ADMIN permission is required. If the service database version is 8.0.2 or later, the XA_RECOVER_ADMIN permission is required to prevent data loss caused by uncommitted XA transactions during startup. The **root** account of the RDS for MySQL DB instance has the preceding permissions by default.

Type	Permission Required
DR database user	The user must have the following permissions: SELECT, CREATE, ALTER, DROP, DELETE, INSERT, UPDATE, TRIGGER, REFERENCES, SHOW VIEW, EVENT, INDEX, LOCK TABLES, CREATE VIEW, CREATE ROUTINE, ALTER ROUTINE, CREATE USER, RELOAD, REPLICATION SLAVE, REPLICATION CLIENT, and WITH GRANT OPTION. The user **root** of the RDS for MySQL instance has the preceding permissions by default. If the DR database version is 8.0.14 to 8.0.18, the SESSION_VARIABLES_ADMIN permission is required.

NOTE

- You are advised to create an independent database account for DRS task connection to prevent task failures caused by database account password modification.
- After changing the account passwords for the service and DR databases, modify the connection information of the DRS task by referring to **Modifying Connection Information** to prevent automatic retry after a task failure. Automatic retry will lock the database accounts.
- **Table 2-53** lists the minimum permissions required by a DRS task. If you need to migrate the grant permission through a DRS task, ensure that the connection account of the DRS task has the corresponding permission. Otherwise, the destination database user may not be authorized due to grant execution failure. For example, if the connection account of the DRS task does not require the process permission, but you need to migrate the process permission through a DRS task, ensure that the connection account of the DRS task has the process permission.

Prerequisites

- **You have logged in to the DRS console.**
- Your account balance is greater than or equal to $0 USD.
- For details about the supported DB types and versions, see **Supported Databases**.
- If a subaccount is used to create a DRS task, ensure that an agency has been added. For details about how to create an agency, see **Agency Management**.

Suggestions

⚠ CAUTION

- During the DR initialization, do not perform DDL operations on the service database. Otherwise, the task may be abnormal.
- During DR initialization, ensure that no data is written to the DR database to ensure data consistency before and after DR.

- The success of DR depends on environment and manual operations. To ensure a smooth DR, perform a DR trial before you start the DR task to help you detect and resolve problems in advance.

- It is recommended that you start your DR task during off-peak hours to minimize the impact on your services.
  - If the bandwidth is not limited, initialization of DR will increase query workload of the source database by 50 MB/s and occupy 2 to 4 vCPUs.
  - To ensure data consistency, tables without a primary key may be locked for 3s during disaster recovery.
  - The data in the DR process may be locked by other transactions for a long period of time, resulting in read timeout.
  - If DRS concurrently reads data from a database, it will use about 6 to 10 sessions. The impact of the connections on services must be considered.
  - If you read a table, especially a large table, during DR, the exclusive lock on that table may be blocked.
  - For more information about the impact of DRS on databases, see **How Does DRS Affect the Source and Destination Databases?**
- Data-Level Comparison

  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, data inconsistency may occur, reducing the reliability and validity of the comparison results.

Precautions

Before creating a DR task, read the following precautions:

Table 2-54 Precautions

Type	Restrictions
Disaster recovery objects	● Only MyISAM and InnoDB tables support disaster recovery. ● System tables are not supported. ● Triggers and events do not support disaster recovery. ● Accounts that have operation permissions on customized objects in the system database cannot be used for disaster recovery. ● DDL operations cannot be executed on the active database 2. ● Disaster recovery for non-standard floating-point data that can be written in loose mode but cannot be written in strict mode is not supported. Such non-standard floating-point data may fail to be hit, causing data disaster recovery failures.

Type	Restrictions
Service database configuration	● During data disaster recovery, do not upgrade the MySQL instance across major versions. Otherwise, data may become inconsistent or the synchronization task may fail (data, table structures, and keywords may cause compatibility changes after the cross-version upgrade). You are advised to create a DR task again if the MySQL instance is upgraded across major versions. ● The binlog of the MySQL service database must be enabled and use the row-based format. ● If the storage space is sufficient, store the service database binlog for as long as possible. The recommended retention period is seven days. – For self-built MySQL databases, you can set the **expire_logs_days** parameter to specify the binlog retention period. – If the source database is an RDS for MySQL instance, set the binlog retention period by following the instructions provided in **RDS User Guide**. ● The service database username or password cannot be empty. ● **server_id** in the MySQL service database must be set. If the service database version is MySQL 5.6 or earlier, the **server_id** value ranges from **2** to **4294967296**. If the service database is MySQL 5.7 or later, the **server_id** value ranges from **1** to **4294967296**. ● During disaster recovery, if the session variable **character_set_client** is set to **binary**, some data may include garbled characters. ● GTID must be enabled for the database. ● The service database name must contain 1 to 64 characters, including only lowercase letters, digits, hyphens (-), and underscores (_). ● The table name and view name in the service database cannot contain non-ASCII characters, or the following characters: '<>/\ ● The column names in the service database tables cannot end with a backslash (\). ● If the **expire_logs_days** value of the service database is set to **0**, the disaster recovery may fail. ● If tables that have no primary key contain hidden primary keys in the service database, the DR task may fail or data may be inconsistent.

Type	Restrictions
DR database configuration	● During data disaster recovery, do not upgrade the MySQL instance across major versions. Otherwise, data may become inconsistent or the synchronization task may fail (data, table structures, and keywords may cause compatibility changes after the cross-version upgrade). You are advised to create a DR task again if the MySQL instance is upgraded across major versions. ● The DR DB instance is running properly. If the DR DB instance is a primary/standby instance, the replication status must also be normal. ● The DR DB instance must have sufficient storage space. ● The major version of the active database 1 must be the same as that of the active database 2. ● The binlog of the DR database must be enabled and use the row-based format. ● GTID must be enabled for the DR database. ● In addition to the MySQL system database, the active database 2 must be an empty instance. After the forward task is started, active database 2 is set to read-only. After the backward task is started and DR is performed, the active database 2 is restored to read-write.

Type	Restrictions
Precautions	● Only whitelisted users can use this function. To use this function, submit a service ticket. ● Dual-active DR supports backup in backward and forward directions. Due to certain uncontrollable factors, data may be inconsistent between the two sides. For example, if the load of active database 1 is too heavy and the load of active database 2 is light, data updates on the active database 1 synchronized to the active database 2 will be delayed due to the heave load, as a result, the operation sequence is changed and data becomes inconsistency. Therefore, divide data by unit (database, table, or row) and ensure the unit on one database is responsible for data read and write while on the other is read-only. In essence, in dual-active DR, both the databases play the active role but work differently. For details about common scenarios, see **Common Exceptions in Real-Time Disaster Recovery**. ● If the DR database version is 5.7, the last digit 0 after the decimal point is lost in the floating point number of the JSON type due to version restrictions. The value comparison result will be inconsistent due to precision loss. ● Before creating a DRS task, if concurrency control rules of SQL statements are configured for the service or DR database, the DRS task may fail. ● During the DR initialization, do not perform DDL operations on the source database. Otherwise, the DR task may be abnormal. ● During disaster recovery initialization, a lot of binlogs are generated in the DR database, occupying too much storage space. Therefore, during disaster recovery initialization, only the latest five binlogs are retained in the DR database by default. After the disaster recovery initialization is complete, the retention period of binlogs in the DR database is restored to the value you configure. If you want to keep the binlog retention period of the DR database to be the value you specify due to service requirements, you need to submit a service ticket. In the upper right corner of the management console, choose **Service Tickets** > **Create Service Ticket** to submit a service ticket. ● During disaster recovery, you can create accounts for the service database. ● If the same data on both databases is updated simultaneously, data conflicts may occur. DRS resolves the conflict by overwriting the previous settings with the last settings. – When the deletion operation is performed, data is deleted and DRS does not perform any operation. – When the insert operation is performed, DRS updates data with the latest inserted data.

Type	Restrictions
	– When the update operation is performed, the original data has been updated and DRS directly insert the new data. ● Primary key conflicts between the two sides need to be avoided. For example, you can use a UUID or the primary key rule of region+auto-increment ID to avoid conflicts. ● If the synchronization delay takes a long time due to connection interruption or network issues, you need to determine whether your services can tolerant the long-term delay. ● Cascade operations cannot be performed on tables with foreign keys. If the foreign key index of a table is a common index, the table structure may fail to be created. You are advised to use a unique index. ● If a physically generated column in a table is generated based on a time type, the data in the column may be inconsistent. ● The dual-active DR is different from the single-active DR. Therefore, no active/standby switchover is required. ● The DR latency is uncontrollable. Therefore, DDL operations must be performed when no service is running, and both RPO and RTO are zero and latency is kept within 30 seconds on active database 1. Do not perform DDL operations on active database 2. (DRS synchronizes only the DDL operations on active database 1 to active database 2.) ● Ensure that the tables, columns, and rows are consistent in both the databases. (The table structures of both the active databases are consistent.) ● A backward task can be started only when the forward task is in the DR process and both RPO and RTO are less than 60s. ● After the dual-active DR task is in the DR process, perform tests on the active database 2 first. If the test results meet the requirements, switch certain service traffic to the active database 2.

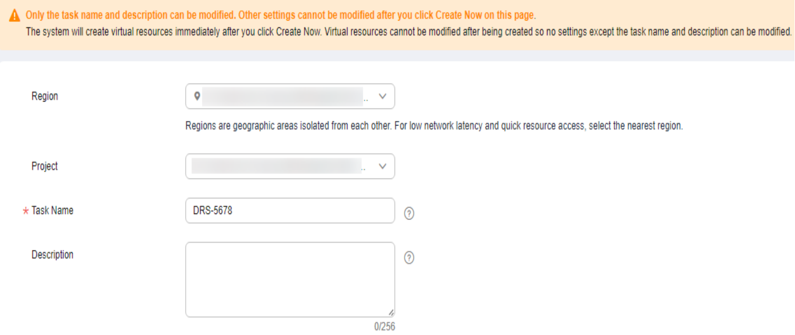
Procedure

Step 1 On the **Disaster Recovery Management** page, click **Create Disaster Recovery Task**.

Step 2 On the **Create Disaster Recovery Instance** page, select a region and project, specify the task name, description, and the DR instance details, and click **Create Now**.

- Task information description

Figure 2-46 DR task information



⚠ Only the task name and description can be modified. Other settings cannot be modified after you click Create Now on this page.
The system will create virtual resources immediately after you click Create Now. Virtual resources cannot be modified after being created so no settings except the task name and description can be modified.

Region: [redacted]

Regions are geographic areas isolated from each other. For low network latency and quick resource access, select the nearest region.

Project: [redacted]

* Task Name: DRS-5678

Description:

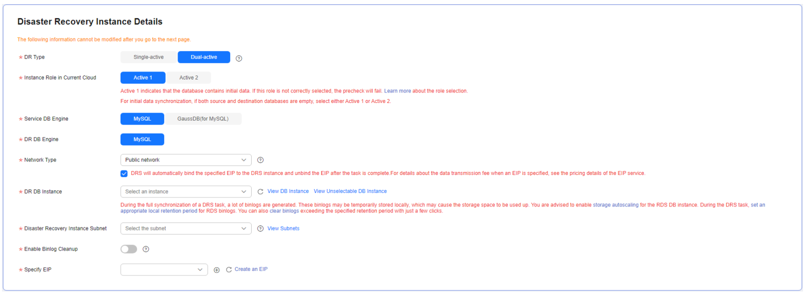
0/256

Table 2-55 Task and recipient description

Parameter	Description
Region	The region where your service is running. You can change the region.
Project	The project corresponds to the current region and can be changed.
Task Name	The task name must start with a letter and consist of 4 to 50 characters. It can contain only letters, digits, hyphens (-), and underscores (_).
Description	The description consists of a maximum of 256 characters and cannot contain special characters !=<>'&"\

- DR instance information

Figure 2-47 DR instance information



Disaster Recovery Instance Details

The following information cannot be modified after you go to the next page.

* DR Type: Single-active / Dual-active (selected)

* Instance Role in Current Cloud: Active 1 (selected) / Active 2

Active 1 indicates that the database contains initial data. If this role is not correctly selected, the precheck will fail. Learn more about the role selection.

For initial data synchronization, if both source and destination databases are empty, select either Active 1 or Active 2.

* Service DB Engine: MySQL (selected) / GaussDB(for MySQL)

* DR DB Engine: MySQL (selected)

* Network Type: Public network

☑ DRS will automatically bind the specified EIP to the DRS instance and unbind the EIP after the task is complete.For details about the data transmission fee when an EIP is specified, see the pricing details of the EIP service.

* DR DB Instance: Select an instance

During the full synchronization of a DRS task, a lot of binlogs are generated. These binlogs may be temporarily stored locally, which may cause the storage space to be used up. You are advised to enable storage autoscaling for the RDS DB instance. During the DRS task, set an appropriate local retention period for RDS binlogs. You can also clear binlogs exceeding the specified retention period with just a few clicks.

* Disaster Recovery Instance Subnet: Select the subnet

* Enable Binlog Cleanup

* Specify EIP

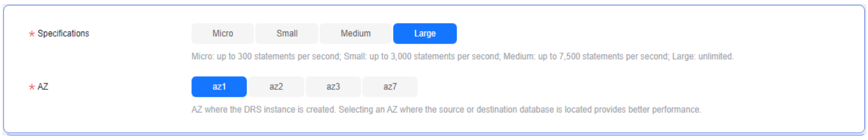
Table 2-56 DR instance settings

Parameter	Description
DR Type	Select **Dual-active**. The DR type can be single-active or dual-active. If **Dual-active** is selected, two subtasks are created by default, a forward DR task and a backward DR task. **NOTE** Only whitelisted users can use dual-active DR. 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.
Current Cloud RDS Instance Role	Select **Active 1** or **Active 2**. This parameter specifies the role of the current RDS DB instance in the DR relationship and is available when **DR Type** is set to **Dual-active**. For details, see **How Do I Select Active Database 1 and 2 for Dual-Active DR?** – Active 1: Initial data is available on the current cloud RDS when a task is created. – Active 2: The RDS DB instance on the current cloud is empty when a task is created. Active 2 is used as an example.
Service DB Engine	Select **MySQL**.
DR DB Engine	Select **MySQL**.
Network Type	The public network is used as an example. Available options: **VPN or Direct Connect** and **Public network**. By default, the value is **Public network**.
DR DB Instance	The RDS for MySQL instance you created.
Disaster Recovery Instance Subnet	Select the subnet where the disaster recovery instance is located. You can also click **View Subnets** to go to the network console to view the subnet where the instance resides. By default, the DRS instance and the DR DB instance are in the same subnet. You need to select the subnet where the DRS instance resides and ensure that there are available IP addresses. To ensure that the DR instance can be successfully created, only subnets with DHCP enabled are displayed.
Enable Binlog Cleanup	Indicates whether to enable the function of quickly clearing binlogs of the DR database. After this function is enabled, binlog clearing is enabled for the DR database during the full synchronization and disabled during the incremental synchronization.

Parameter	Description
Specify EIP	This parameter is available when you select **Public network** for **Network Type**. Select an EIP to be bound to the DRS instance. DRS will automatically bind the specified EIP to the DRS instance and unbind the EIP after the task is complete. The number of specified EIPs must be the consistent with that of DB instances. For details about the data transfer fee generated using a public network, see **EIP Price Calculator**.

- Specifications

Figure 2-48 Specifications



Micro: up to 300 statements per second; Small: up to 3,000 statements per second; Medium: up to 7,500 statements per second; Large: unlimited.

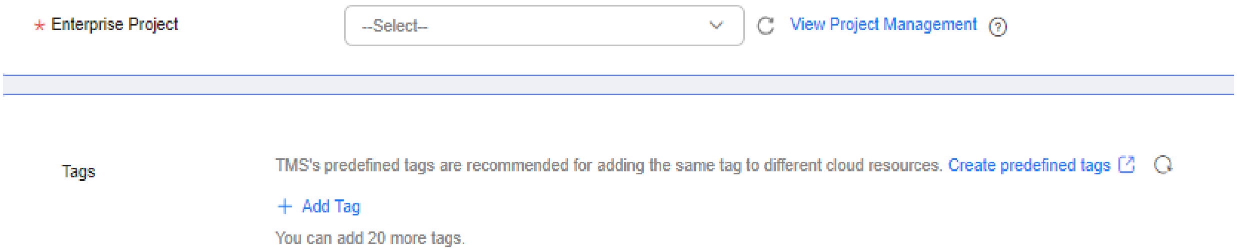
AZ where the DRS instance is created. Selecting an AZ where the source or destination database is located provides better performance.

Table 2-57 Specifications

Parameter	Description
Specifications	DRS instance specifications. Different specifications have different performance upper limits. For details, see **Real-Time DR**. **NOTE** DRS allows you to upgrade specifications only for real-time DR tasks from MySQL to MySQL, from MySQL to GaussDB(for MySQL), and from GaussDB(for MySQL) to GaussDB(for MySQL). Task specifications cannot be downgraded. For details, see **Changing Specifications**.
AZ	Select the AZ where you want to create the DRS task. Selecting the one housing the source or destination database can provide better performance.

- Enterprise Project and Tags

Figure 2-49 Enterprise projects and tags



TMS's predefined tags are recommended for adding the same tag to different cloud resources.

You can add 20 more tags.

Table 2-58 Enterprise Project and Tags

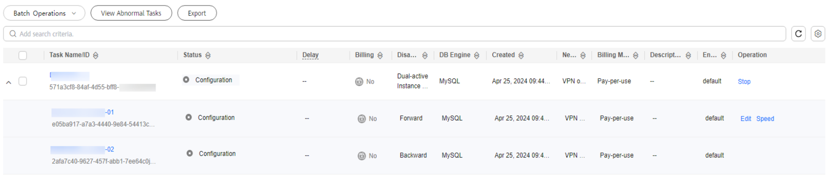
Parameter	Description
Enterprise Project	An enterprise project you would like to use to centrally manage your cloud resources and members. Select an enterprise project from the drop-down list. The default project is **default**. For more information about enterprise projects, see ***Enterprise Management User Guide***. To customize an enterprise project, click **Enterprise** in the upper right corner of the console. The **Enterprise Project Management Service** page is displayed. For details, see **Creating an Enterprise Project** in *Enterprise Management User Guide*.
Tags	– Tags a task. This configuration is optional. Adding tags helps you better identify and manage your tasks. Each task can have up to 20 tags. – If your organization has configured tag policies for DRS, add tags to tasks based on the policies. If a tag does not comply with the policies, task creation may fail. Contact your organization administrator to learn more about tag policies. – After a task is created, you can view its tag details on the **Tags** tab. For details, see **Tag Management**.

NOTE

If a task fails to be created, DRS retains the task for three days by default. After three days, the task automatically stops.

Step 3 On the **Disaster Recovery Management** page, after the task is created, locate the forward subtask and click **Edit** in the **Operation** column. The **Configure Source and Destination Databases** page is displayed.

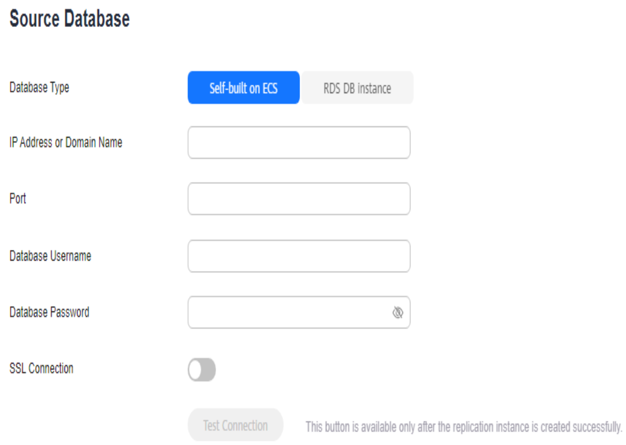
Figure 2-50 DR task list



	Task Name/ID	Status	Delay	Billing	Disa...	DB Engine	Created	Ne...	Billing M...	Descript...	En...	Operation
☐	[redacted] 571a3cf8-84af-4d55-bff8-[redacted]	Configuration	--	No	Dual-active Instance ...	MySQL	Apr 25, 2024 09:44...	VPN o...	Pay-per-use	--	default	Stop
	[redacted]-01 e05ba917-a7a3-4440-9e84-54413c...	Configuration	--	No	Forward	MySQL	Apr 25, 2024 09:4...	VPN ...	Pay-per-use	--	default	Edit Speed
	[redacted]-02 2afa7c40-9627-457f-abb1-7ee64c0j...	Configuration	--	No	Backward	MySQL	Apr 25, 2024 09:4...	VPN ...	Pay-per-use	--	default	

Step 4 On the **Configure Source and Destination Databases** page, wait until the DR 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 DR instance. After the connection tests are successful, select the check box before the agreement and click **Next**.

Figure 2-51 Service database information



Source Database

Database Type: Self-built on ECS | RDS DB instance

IP Address or Domain Name

Port

Database Username

Database Password

SSL Connection

Test Connection — This button is available only after the replication instance is created successfully.

Table 2-59 Service database settings

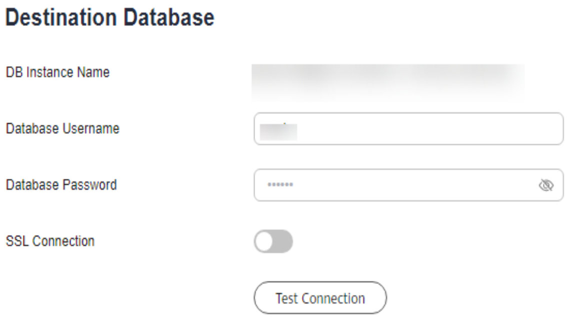
Parameter	Description
Database Type	By default, **Self-built on ECS** is selected. The source database can be a **Self-built on ECS** or an **RDS DB instance**. After selecting **RDS DB instance**, select the region where the source database resides and the region cannot be the same as the region where the destination database resides. The region where the destination database is located is the region where you log in to the management console. To use the **RDS DB instance** option, submit a service ticket.
IP Address or Domain Name	The IP address or domain name of the service database.
Port	The port of the service database. Range: 1 – 65535
Database Username	The username for accessing the service database.
Database Password	The password for the service database username. You can change the password if necessary. To change the password, perform the following operation after the task is created: If the task is in the **Starting**, **Initializing**, **Disaster recovery in progress**, or **Disaster recovery failed** status, in the **Connection Information** area on the **Basic Information** tab, click **Modify Connection Details**. In the displayed dialog box, change the password.

Parameter	Description
SSL Connection	SSL encrypts the connections between the source and destination databases. If SSL is enabled, upload the SSL CA root certificate. **NOTE** ● The maximum size of a single certificate file that can be uploaded is 500 KB. ● If SSL is disabled, your data may be at risk.
Region	The region where the source database is located. This parameter is available only when **Database Type** for the source database is set to **RDS DB instance**. The region cannot be the region where the destination database is located.
DB Instance Name	The name of the service DB instance. This parameter is available only when the source database is an **RDS DB instance**.
Database Username	The username for accessing the service database.
Database Password	The password for the service database username.

NOTE

The IP address, domain name, username, and password of the service database are encrypted and stored in DRS and will be cleared after the task is deleted.

Figure 2-52 DR database information



Destination Database

DB Instance Name

Database Username

Database Password ••••••

SSL Connection

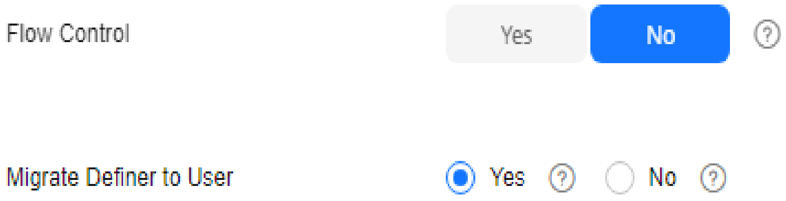
Table 2-60 DR database settings

Parameter	Description
DB Instance Name	The RDS for MySQL instance you selected when you create the DR instance. The instance name cannot be changed.

Parameter	Description
Database Username	The username for accessing the DR database.
Database Password	The password for the database username. The password can be changed after a task is created. If the task is in the **Starting**, **Initializing**, **Disaster recovery in progress**, or **Disaster recovery failed** status, in the **Connection Information** area on the **Basic Information** tab, click **Modify Connection Details**. In the displayed dialog box, change the password. The database username and password are encrypted and stored in DRS, and will be cleared after the task is deleted.
SSL Connection	If SSL connection is required, enable SSL on the DR database, ensure that related parameters have been correctly configured, and upload an SSL certificate. **NOTE** ● The maximum size of a single certificate file that can be uploaded is 500 KB. ● If SSL is disabled, your data may be at risk.

Step 5 On the **Configure DR** page, specify flow control and click **Next**.

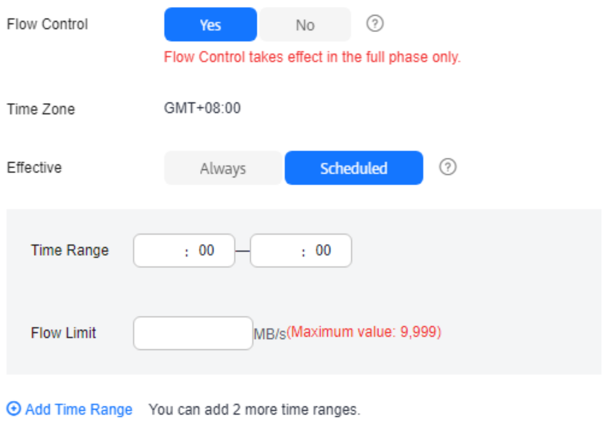
Figure 2-53 DR settings



Flow Control: Yes [✓ No]

Migrate Definer to User: ● Yes ○ No

Table 2-61 DR settings

Parameter	Description
Flow Control	You can choose whether to control the flow. - **Yes** You can customize the maximum disaster recovery speed. During the disaster recovery, the speed of each task (or each subtask in multi-task mode) does not exceed the value of this parameter. 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 **Always**. A maximum of 10 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. **Figure 2-54** Flow control  Flow Control: Yes / No Flow Control takes effect in the full phase only. Time Zone: GMT+08:00 Effective: Always / Scheduled Time Range: : 00 — : 00 Flow Limit: MB/s(Maximum value: 9,999) Add Time Range You can add 2 more time ranges. - **No** The DR speed is not limited and the outbound bandwidth of the source database is maximally used, which causes read consumption on the source database accordingly. 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 in the DR initialization phase. – You can also change the flow control mode when the task is in the **Configuration** state. For details, see **Modifying the Flow Control Mode**.

Parameter	Description
Migrate Definer to User	Indicates whether to migrate the Definers of all source database objects to the destination database user entered during the connection test. ● 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 about authorization, see **How Do I Maintain the Original Service User Permission System After Definer Is Forcibly Converted During MySQL Migration?** For example, if the view is CREATE ALGORITHM=UNDEFINED DEFINER=\`username\`@\`%\` SQL SECURITY DEFINER VIEW \`test_db\`.\`view5\` AS select 1 AS \`1\` before migration, it is converted to CREATE ALGORITHM=UNDEFINED DEFINER=\`drsUser\`@\`%\` SQL SECURITY DEFINER VIEW \`test_db\`.\`view5\` AS select 1 AS \`1\` after the migration. **drsUser** indicates the destination database user used for testing the connection. ● **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. Note that if the Definer account is not found in the destination database, unavailable objects will be created. For details about Definer, see the **MySQL official document**.

Step 6 On the **Check Task** page, check the DR task.

- If any check fails, review the failure cause and rectify the fault. After the fault is rectified, click **Check Again**.

  For details about how to handle check failures, see **Solutions to Failed Check Items** in *Data Replication Service User Guide*.

- If the check is complete and the check success rate is 100%, click **Next**.

  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.

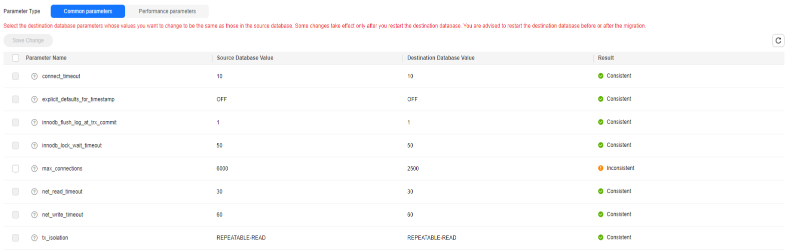
Step 7 Compare the parameters.

The parameter comparison function helps you check the consistency of common parameters and performance parameters between service and DR databases and show inconsistent values. You can determine whether to use this function based on service requirements. It mainly ensures that services are not affected after the DR task is completed.

- This process is optional, so you can click **Next** to skip the comparison.
- Compare common parameters:

– For common parameters, if the parameters in the service database are different from those in the DR database, click **Save Change** to make the parameters of the DR database be the same as those in the service database.

Figure 2-55 Modifying common parameters



Select the destination database parameters whose values you want to change to be the same as those in the source database. Some changes take effect only after you restart the destination database. You are advised to restart the destination database before or after the migration.

□ Parameter Name	Source Database Value	Destination Database Value	Result
□ connect_timeout	10	10	Consistent
□ explicit_defaults_for_timestamp	OFF	OFF	Consistent
□ innodb_flush_log_at_trx_commit	1	1	Consistent
□ innodb_lock_wait_timeout	50	50	Consistent
□ max_connections	6000	2500	Inconsistent
□ net_read_timeout	30	30	Consistent
□ net_write_timeout	60	60	Consistent
□ tx_isolation	REPEATABLE-READ	REPEATABLE-READ	Consistent

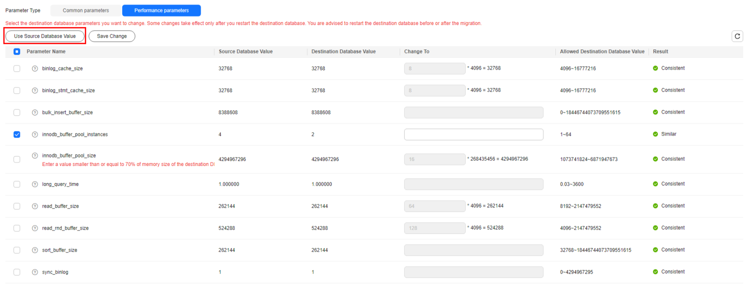
– Performance parameter values in both the service and DR databases can be the same or different.

- If you need to adjust the performance parameters, enter the value in the **Change to** column and click **Save Change**.
- If you want to make the performance parameter values of the source and destination database be the same:

1) Click **Use Source Database Value**.

DRS automatically makes the DR database values the same as those of the service database.

Figure 2-56 One-click modification



Select the destination database parameters you want to change. Some changes take effect only after you restart the destination database. You are advised to restart the destination database before or after the migration.

☑ Parameter Name	Source Database Value	Destination Database Value	Change To	Allowed Destination Database Value	Result
□ binlog_cache_size	32768	32768	8 * 4096 = 32768	4096~16777216	Consistent
□ binlog_stmt_cache_size	32768	32768	8 * 4096 = 32768	4096~16777216	Consistent
□ bulk_insert_buffer_size	8388608	8388608		0~18446744073709551615	Consistent
☑ innodb_buffer_pool_instances	4	2		1~64	Similar
□ innodb_buffer_pool_size Enter a value smaller than or equal to 70% of memory size of the destination DI	4294967296	4294967296	16 * 268435456 = 4294967296	1073741824~6871947673	Consistent
□ long_query_time	1.000000	1.000000		0.03~3600	Consistent
□ read_buffer_size	262144	262144	64 * 4096 = 262144	8192~2147479552	Consistent
□ read_rnd_buffer_size	524288	524288	128 * 4096 = 524288	4096~2147479552	Consistent
□ sort_buffer_size	262144	262144		32768~18446744073709551615	Consistent
□ sync_binlog	1	1		0~4294967295	Consistent

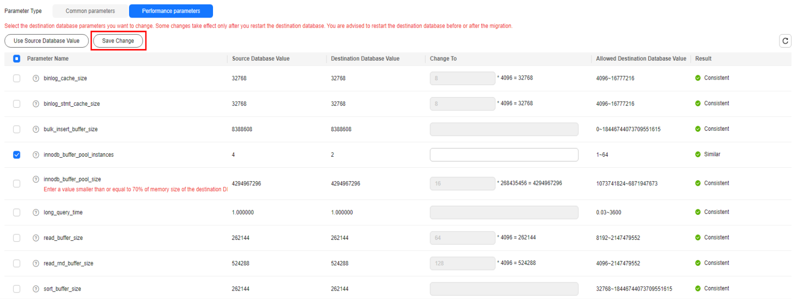
NOTE

You can also manually enter the value as required.

2) Click **Save Change**.

DRS changes the DR database parameter values based on your settings. After the modification, the comparison results are automatically updated.

Figure 2-57 One-click modification



Parameter Type: Common parameters | Performance parameters

Select the destination database parameters you want to change. Some changes take effect only after you restart the destination database. You are advised to restart the destination database before or after the migration.

☐	Parameter Name	Source Database Value	Destination Database Value	Change To	Allowed Destination Database Value	Result
☐	binlog_cache_size	32768	32768	8 * 4096 = 32768	4096~16777216	Consistent
☐	binlog_stmt_cache_size	32768	32768	8 * 4096 = 32768	4096~16777216	Consistent
☐	bulk_insert_buffer_size	8388608	8388608		0~18446744073709551615	Consistent
☑	innodb_buffer_pool_instances	4	2		1~64	Similar
☐	innodb_buffer_pool_size Enter a value smaller than or equal to 70% of memory size of the destination DI	4294967296	4294967296	16 * 268435456 = 4294967296	1073741824~6871947673	Consistent
☐	long_query_time	1.000000	1.000000		0.03~3600	Consistent
☐	read_buffer_size	262144	262144	64 * 4096 = 262144	8192~2147479552	Consistent
☐	read_rnd_buffer_size	524288	524288	128 * 4096 = 524288	4096~2147479552	Consistent
☐	sort_buffer_size	262144	262144		32768~18446744073709551615	Consistent

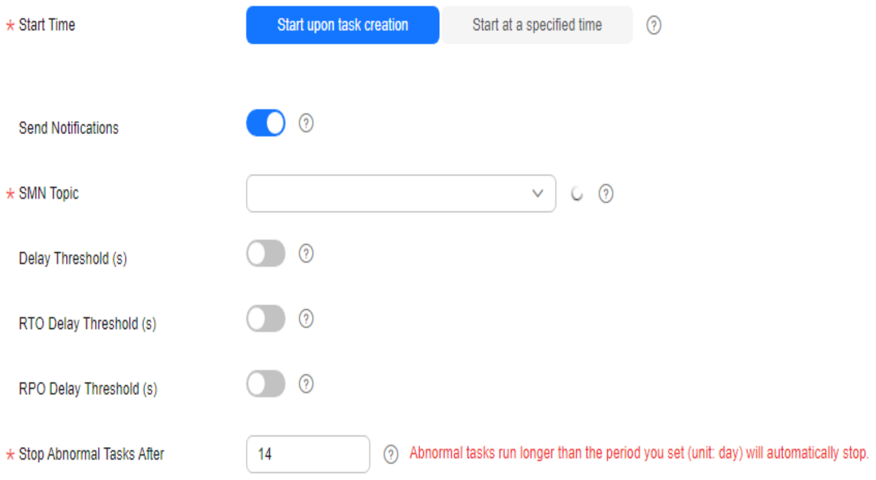
Some parameters in the DR database cannot take effect immediately, so the comparison result is temporarily inconsistent. Restart the DR database before the DR task is started or after the DR task is completed for the modification to take effect. To minimize the impact of database restart on your services, restart the DR database at the scheduled time after the disaster recovery is complete.

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

3) Click **Next**.

Step 8 On the **Confirm Task** page, specify **Start Time**, **Send Notifications**, **SMN Topic**, **Delay Threshold**, **RPO Delay Threshold**, **RTO Delay Threshold**, and **Stop Abnormal Tasks After** for the forward subtask. After confirming that the configured information is correct, click **Submit** to submit the forward DR task.

Figure 2-58 Task startup settings



* Start Time: Start upon task creation | Start at a specified time

Send Notifications: ●

* SMN Topic:

Delay Threshold (s): ○

RTO Delay Threshold (s): ○

RPO Delay Threshold (s): ○

* Stop Abnormal Tasks After: 14 — Abnormal tasks run longer than the period you set (unit: day) will automatically stop.

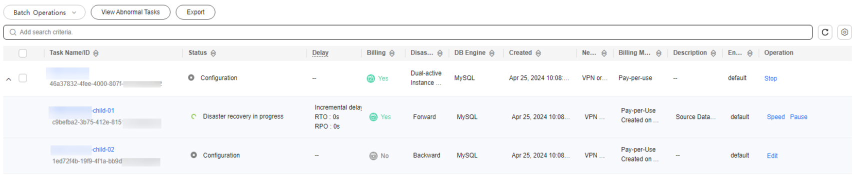
Table 2-62 Task settings

Parameter	Description
Start Time	Set **Start Time** to **Start upon task creation** or **Start at a specified time** based on site requirements. **NOTE** After a DR task is started, the performance of the service and DR databases may be affected. You are advised to start a DR task during off-peak hours.
Send Notifications	SMN topic. This parameter is optional. If the status or latency metric of the disaster recovery task is abnormal, DRS will send a notification.
SMN Topic	This parameter is available only after you enable **Send Notifications** and create a topic on the SMN console and add a subscriber. For details, see ***Simple Message Notification User Guide***.
Delay Threshold (s)	During disaster recovery, a synchronization delay indicates a time difference (in seconds) of synchronization between the service and DR 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** ● Before setting the delay threshold, enable **Send Notifications**. ● If the delay threshold is set to 0, no notifications will be sent to the recipient.
RTO Delay Threshold (s)	If the synchronization delay from the DRS instance to the DR database exceeds the threshold you specify, DRS will notify 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** ● Before setting the RTO delay threshold, enable **Send Notifications**. ● If the delay threshold is set to 0, no notifications will be sent to the recipient.

Parameter	Description
RPO Delay Threshold (s)	If the synchronization delay from the DRS instance to the service database exceeds the threshold you specify, DRS will notify 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** ● Before setting the delay threshold, enable **Send Notifications**. ● If the delay threshold is set to 0, no notifications will be sent to the recipient. ● In the early stages of an incremental DR, more delay is normal because more data is waiting to be synchronized. In this situation, no notifications will be sent.
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** ● You can set this parameter only for pay-per-use tasks. ● Tasks in the abnormal state are still charged. If tasks remain in the abnormal state for a long time, they cannot be resumed. Any task in the abnormal state that has run for longer than the period you set here (in days) will automatically stop to avoid unnecessary fees.

Step 9 Return to the **Disaster Recovery Management** page. After the forward subtask enters the **Disaster recovery in progress** state, locate the backward subtask and click **Edit** in the **Operation** column. The **Configure Source and Destination Databases** page of the backward subtask is displayed.

Figure 2-59 DR task list



	Task Name/ID	Status	Delay	Billing	Disas...	DB Engine	Created	Ne...	Billing M...	Description	En...	Operation
^ □	[redacted] 46a37832-4fee-4000-807f-[redacted]	Configuration	--	Yes	Dual-active Instance ...	MySQL	Apr 25, 2024 10:08:...	VPN or...	Pay-per-use	--	default	Stop
	[redacted]-child-01 c9befba2-3b75-412e-815[redacted]	Disaster recovery in progress	Incremental delay RTO : 0s RPO : 0s	Yes	Forward	MySQL	Apr 25, 2024 10:08...	VPN ...	Pay-per-Use Created on ...	Source Data...	default	Speed Pause
	[redacted]-child-02 1ed72f4b-19f9-4f1a-bb9d[redacted]	Configuration	--	No	Backward	MySQL	Apr 25, 2024 10:08...	VPN ...	Pay-per-Use Created on ...	--	default	Edit

Step 10 On the **Configure Source and Destination Databases** page, click **Test Connection** for both the source and destination databases to check whether they have been connected to the DR instance. After the connection tests are successful, click **Next**.

Step 11 On the **Confirm Task** page, specify **Start Time**, **Send Notifications**, **SMN Topic**, **Delay Threshold**, **RPO Delay Threshold**, **RTO Delay Threshold**, and **Stop Abnormal Tasks After** for the backward subtask. After confirming that the configured information is correct, click **Submit** to submit the backward DR task.

Step 12 After the task is submitted, view and manage it on the **Disaster Recovery Management** page.

- You can view the task status. For more information about task status, see **Task Statuses**.
- You can click ↻ in the upper-right corner to view the latest task status.
- By default, DRS retains a task in the **Configuration** state for three days. After three days, DRS automatically deletes background resources, but the task status remains unchanged. When you reconfigure the task, DRS applies for resources again.
- For a public network task, DRS needs to delete background resources after you stop the task. The EIP bound to the task cannot be restored to the **Unbound** state until background resources are deleted.
- For a task that is in the **Disaster recovery in progress** state, you can use **data comparison** to check whether data is consistent before and after the disaster recovery.

----End

2.6 From GaussDB(for MySQL) to GaussDB(for MySQL) (Dual-Active DR)

Supported Source and Destination Databases

Table 2-63 Supported databases

Service database	DR Database
GaussDB(for MySQL) Primary/Standby	GaussDB(for MySQL) Primary/Standby

NOTE

Only whitelisted users can use this function.

Database Account Permission Requirements

To start a DR task, the service and DR database users must meet the requirements in the following table. Different types of DR tasks require different permissions. For details, see **Table 2-64**. DRS automatically checks the database account permissions in the pre-check phase and provides handling suggestions.

Table 2-64 Database account permission

Type	Permission Required
Service database user	The user must have the following permissions: SELECT, CREATE, ALTER, DROP, DELETE, INSERT, UPDATE, TRIGGER, REFERENCES, SHOW VIEW, EVENT, INDEX, LOCK TABLES, CREATE VIEW, CREATE ROUTINE, ALTER ROUTINE, CREATE USER, RELOAD, REPLICATION SLAVE, REPLICATION CLIENT, and WITH GRANT OPTION The **root** account of the GaussDB(for MySQL) instance has the preceding permissions by default.
DR database user	The user must have the following permissions: SELECT, CREATE, ALTER, DROP, DELETE, INSERT, UPDATE, TRIGGER, REFERENCES, SHOW VIEW, EVENT, INDEX, LOCK TABLES, CREATE VIEW, CREATE ROUTINE, ALTER ROUTINE, CREATE USER, RELOAD, REPLICATION SLAVE, REPLICATION CLIENT, and WITH GRANT OPTION The **root** account of the GaussDB(for MySQL) instance has the preceding permissions by default.

NOTE

- You are advised to create an independent database account for DRS task connection to prevent task failures caused by database account password modification.
- After changing the account passwords for the service and DR databases, modify the connection information of the DRS task by referring to **Modifying Connection Information** to prevent automatic retry after a task failure. Automatic retry will lock the database accounts.
- **Table 2-64** lists the minimum permissions required by a DRS task. If you need to migrate the grant permission through a DRS task, ensure that the connection account of the DRS task has the corresponding permission. Otherwise, the destination database user may not be authorized due to grant execution failure. For example, if the connection account of the DRS task does not require the process permission, but you need to migrate the process permission through a DRS task, ensure that the connection account of the DRS task has the process permission.

Prerequisites

- **You have logged in to the DRS console.**
- Your account balance is greater than or equal to $0 USD.
- For details about the supported DB types and versions, see **Supported Databases**.
- If a subaccount is used to create a DRS task, ensure that an agency has been added. For details about how to create an agency, see **Agency Management**.

Suggestions

⚠ CAUTION

- During the DR initialization, do not perform DDL operations on the service database. Otherwise, the task may be abnormal.
- During DR initialization, ensure that no data is written to the DR database to ensure data consistency before and after DR.

- The success of DR depends on environment and manual operations. To ensure a smooth DR, perform a DR trial before you start the DR task to help you detect and resolve problems in advance.
- It is recommended that you start your DR task during off-peak hours to minimize the impact on your services.
  - If the bandwidth is not limited, initialization of DR will increase query workload of the source database by 50 MB/s and occupy 2 to 4 vCPUs.
  - To ensure data consistency, tables without a primary key may be locked for 3s during disaster recovery.
  - The data in the DR process may be locked by other transactions for a long period of time, resulting in read timeout.
  - If DRS concurrently reads data from a database, it will use about 6 to 10 sessions. The impact of the connections on services must be considered.
  - If you read a table, especially a large table, during DR, the exclusive lock on that table may be blocked.
  - For more information about the impact of DRS on databases, see **How Does DRS Affect the Source and Destination Databases?**
- Data-Level Comparison

  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, data inconsistency may occur, reducing the reliability and validity of the comparison results.

Precautions

Before creating a DR task, read the following precautions:

Table 2-65 Precautions

Type	Restrictions
Disaster recovery objects	- Only MyISAM and InnoDB tables support disaster recovery. - System tables are not supported. - Triggers and events do not support disaster recovery. - Accounts that have operation permissions on customized objects in the system database cannot be used for disaster recovery. - DDL operations cannot be executed on the active database 2. - Disaster recovery for non-standard floating-point data that can be written in loose mode but cannot be written in strict mode is not supported. Such non-standard floating-point data may fail to be hit, causing data disaster recovery failures.
Service database configuration	- The service database must be the primary node of the GaussDB(for MySQL) instance. - The binlog of the service database must be enabled and use the row-based format. - If the storage space is sufficient, store the service database binlog for as long as possible. The recommended retention period is seven days. - The service database username or password cannot be empty. - GTID must be enabled for the database. - The service database name must contain 1 to 64 characters, including only lowercase letters, digits, hyphens (-), and underscores (_). - The table name and view name in the service database cannot contain non-ASCII characters, or the following characters: '<>/\ - The column names in the service database tables cannot end with a backslash (\). - If the **expire_logs_days** value of the database is set to **0**, the disaster recovery may fail.
DR database configuration	- The DR DB instance is running properly. If the DR DB instance is a primary/standby instance, the replication status must also be normal. - The DR DB instance must have sufficient storage space. - The binlog of the DR database must be enabled and use the row-based format. - GTID must be enabled for the DR database. - The major version of the active database 1 must be the same as that of the active database 2. - Active database 2 must be an empty instance. After the forward task is started, active database 2 is set to read-only. After the backward task is started and DR is performed, active database 2 is restored to read/write.

Type	Restrictions
Precautions	● Dual-active DR supports backup in backward and forward directions. Due to certain uncontrollable factors, data may be inconsistent between the two sides. For example, if the load of active database 1 is too heavy and the load of active database 2 is light, data updates on the active database 1 synchronized to the active database 2 will be delayed due to the heave load, as a result, the operation sequence is changed and data becomes inconsistency. Therefore, divide data by unit (database, table, or row) and ensure the unit on one database is responsible for data read and write while on the other is read-only. In essence, in dual-active DR, both the databases play the active role but work differently. For details about common scenarios, see **Common Exceptions in Real-Time Disaster Recovery**. ● Before creating a DRS task, if concurrency control rules of SQL statements are configured for the service or DR database, the DRS task may fail. ● During the DR initialization, do not perform DDL operations on the source database. Otherwise, the DR task may be abnormal. ● During disaster recovery, you can create accounts for the service database. ● If the same data on both databases is updated simultaneously, data conflicts may occur. DRS resolves the conflict by overwriting the previous settings with the last settings. – When the deletion operation is performed, data is deleted and DRS does not perform any operation. – When the insert operation is performed, DRS updates data with the latest inserted data. – When the update operation is performed, the original data has been updated and DRS directly insert the new data. ● Primary key conflicts between the two sides need to be avoided. For example, you can use a UUID or the primary key rule of region+auto-increment ID to avoid conflicts. ● If the synchronization delay takes a long time due to connection interruption or network issues, you need to determine whether your services can tolerant the long-term delay. ● Cascade operations cannot be performed on tables with foreign keys. If the foreign key index of a table is a common index, the table structure may fail to be created. You are advised to use a unique index. ● If a physically generated column in a table is generated based on a time type, the data in the column may be inconsistent. ● The dual-active DR is different from the single-active DR. Therefore, no active/standby switchover is required.

Type	Restrictions
	● The DR latency is uncontrollable. Therefore, DDL operations must be performed when no service is running, and both RPO and RTO are zero and latency is kept within 30 seconds on active database 1. Do not perform DDL operations on active database 2. (DRS synchronizes only the DDL operations on active database 1 to active database 2.) ● Ensure that the tables, columns, and rows are consistent in both the databases. (The table structures of both the active databases are consistent.) ● A backward task can be started only when the forward task is in the DR process and both RPO and RTO are less than 60s. ● After the dual-active DR task is in the DR process, perform tests on the active database 2 first. If the test results meet the requirements, switch certain service traffic to the active database 2.

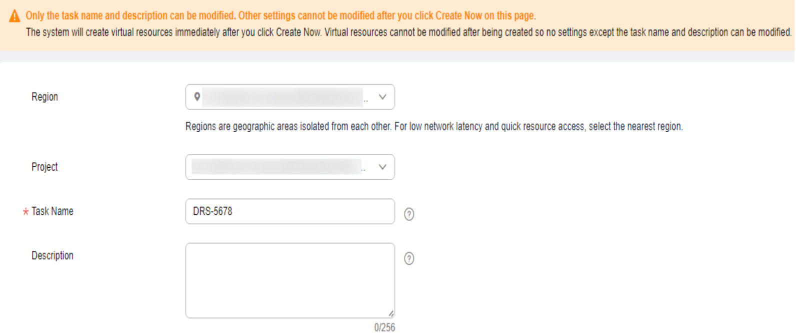
Procedure

Step 1 On the **Disaster Recovery Management** page, click **Create Disaster Recovery Task**.

Step 2 On the **Create Disaster Recovery Instance** page, select a region and project, specify the task name, description, and the DR instance details, and click **Create Now**.

- Task information description

Figure 2-60 DR task information



Only the task name and description can be modified. Other settings cannot be modified after you click Create Now on this page.
The system will create virtual resources immediately after you click Create Now. Virtual resources cannot be modified after being created so no settings except the task name and description can be modified.

Region: [redacted]

Regions are geographic areas isolated from each other. For low network latency and quick resource access, select the nearest region.

Project: [redacted]

* Task Name: DRS-5678

Description:

0/256

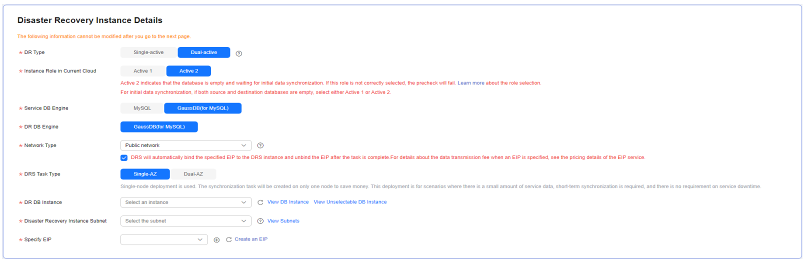
Table 2-66 Task and recipient description

Parameter	Description
Region	The region where your service is running. You can change the region.
Project	The project corresponds to the current region and can be changed.

Parameter	Description
Task Name	The task name must start with a letter and consist of 4 to 50 characters. It can contain only letters, digits, hyphens (-), and underscores (_).
Description	The description consists of a maximum of 256 characters and cannot contain special characters !=<>'&"\

- DR instance information

Figure 2-61 DR instance information



Disaster Recovery Instance Details

The following information cannot be modified after you go to the next page.

* DR Type: Dual-active

* Instance Role in Current Cloud: Active 2

Active 2 indicates that the database is empty and waiting for initial data synchronization. If this role is not correctly selected, the precheck will fail. Learn more about the role selection.

For initial data synchronization, if both source and destination databases are empty, select either Active 1 or Active 2.

* Service DB Engine: GaussDB(for MySQL)

* DR DB Engine: GaussDB(for MySQL)

* Network Type: Public network

☑ DRS will automatically bind the specified EIP to the DRS instance and unbind the EIP after the task is complete.For details about the data transmission fee when an EIP is specified, see the pricing details of the EIP service.

* DRS Task Type: Single-AZ

Single-node deployment is used. The synchronization task will be created on only one node to save money. This deployment is for scenarios where there is a small amount of service data, short-term synchronization is required, and there is no requirement on service downtime.

* DR DB Instance: Select an instance

* Disaster Recovery Instance Subnet: Select the subnet

* Specify EIP

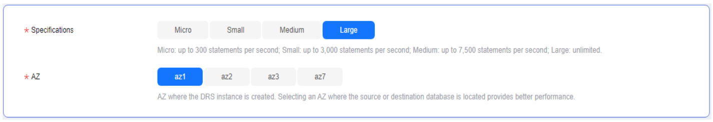
Table 2-67 DR instance settings

Parameter	Description
DR Type	Select **Dual-active**. The DR type can be single-active or dual-active. If **Dual-active** is selected, two subtasks are created by default, a forward DR task and a backward DR task. **NOTE** Only whitelisted users can use dual-active DR. 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.
Current Cloud RDS Instance Role	Select **Active 1** or **Active 2**. This parameter specifies the role of the current RDS DB instance in the DR relationship and is available when **DR Type** is set to **Dual-active**. For details about how to choose active 1 and 2, see **How Do I Select Active Database 1 and 2 for Dual-Active DR?** – Active 1: Initial data is available on the current cloud database when a task is created. – Active 2: The instance on the current cloud is empty when a task is created. Active 2 is used as an example.
Service DB Engine	Select **GaussDB(for MySQL)**.
DR DB Engine	Select **GaussDB(for MySQL)**.

Parameter	Description
Network Type	The public network is used as an example. Available options: **VPN or Direct Connect** and **Public network**. By default, the value is **Public network**.
DR DB Instance	The GaussDB(for MySQL) instance you created.
Disaster Recovery Instance Subnet	Select the subnet where the disaster recovery instance is located. You can also click **View Subnets** to go to the network console to view the subnet where the instance resides. By default, the DRS instance and the DR DB instance are in the same subnet. You need to select the subnet where the DRS instance resides and ensure that there are available IP addresses. To ensure that the disaster recovery instance is successfully created, only subnets with DHCP enabled are displayed.
Specify EIP	This parameter is available when you select **Public network** for **Network Type**. Select an EIP to be bound to the DRS instance. DRS will automatically bind the specified EIP to the DRS instance and unbind the EIP after the task is complete. The number of specified EIPs must be the consistent with that of DB instances. For details about the data transfer fee generated using a public network, see **EIP Price Calculator**.

- Specifications

Figure 2-62 Specifications



* Specifications: Micro Small Medium [✓ Large]

Micro: up to 300 statements per second; Small: up to 3,000 statements per second; Medium: up to 7,500 statements per second; Large: unlimited.

* AZ: [✓ az1] az2 az3 az7

AZ where the DRS instance is created. Selecting an AZ where the source or destination database is located provides better performance.

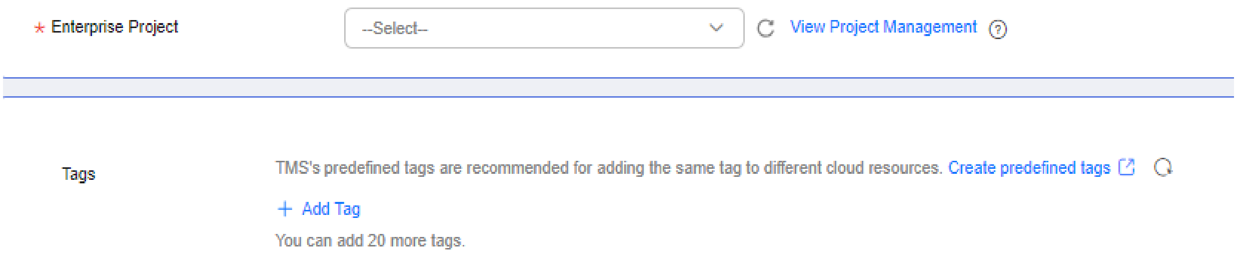
Table 2-68 Specifications

Parameter	Description
Specifications	DRS instance specifications. Different specifications have different performance upper limits. For details, see **Real-Time DR**. **NOTE** DRS allows you to upgrade specifications only for real-time DR tasks from MySQL to MySQL, from MySQL to GaussDB(for MySQL), and from GaussDB(for MySQL) to GaussDB(for MySQL). Task specifications cannot be downgraded. For details, see **Changing Specifications**.

Parameter	Description
AZ	Select the AZ where you want to create the DRS task. Selecting the one housing the source or destination database can provide better performance.

- Enterprise Project and Tags

Figure 2-63 Enterprise projects and tags



* Enterprise Project

--Select--

View Project Management

Tags

TMS's predefined tags are recommended for adding the same tag to different cloud resources. Create predefined tags

+ Add Tag

You can add 20 more tags.

Table 2-69 Enterprise Project and Tags

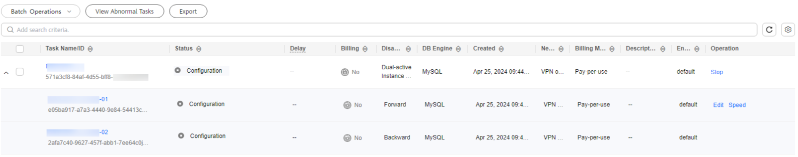
Parameter	Description
Enterprise Project	An enterprise project you would like to use to centrally manage your cloud resources and members. Select an enterprise project from the drop-down list. The default project is **default**. For more information about enterprise projects, see ***Enterprise Management User Guide***. To customize an enterprise project, click **Enterprise** in the upper right corner of the console. The **Enterprise Project Management Service** page is displayed. For details, see **Creating an Enterprise Project** in *Enterprise Management User Guide*.
Tags	– Tags a task. This configuration is optional. Adding tags helps you better identify and manage your tasks. Each task can have up to 20 tags. – If your organization has configured tag policies for DRS, add tags to tasks based on the policies. If a tag does not comply with the policies, task creation may fail. Contact your organization administrator to learn more about tag policies. – After a task is created, you can view its tag details on the **Tags** tab. For details, see **Tag Management**.

NOTE

If a task fails to be created, DRS retains the task for three days by default. After three days, the task automatically stops.

Step 3 On the **Disaster Recovery Management** page, after the task is created, locate the forward subtask and click **Edit** in the **Operation** column. The **Configure Source and Destination Databases** page is displayed.

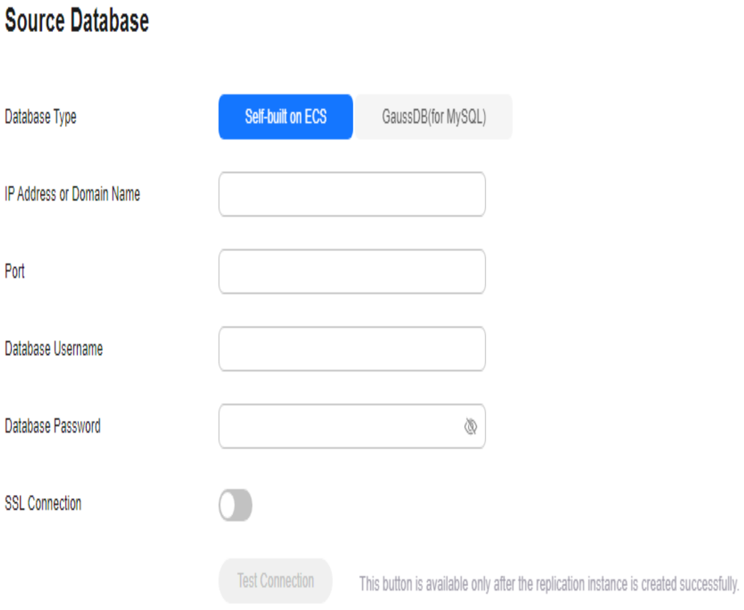
Figure 2-64 DR task list



	Task Name/ID	Status	Delay	Billing	Disa...	DB Engine	Created	Ne...	Billing M...	Descript...	En...	Operation
□	[redacted] 571a3cf8-84af-4d55-bff8-[redacted]	Configuration	--	No	Dual-active Instance ...	MySQL	Apr 25, 2024 09:44...	VPN o...	Pay-per-use	--	default	Stop
	[redacted]-01 e05ba917-a7a3-4440-9e84-54413c...	Configuration	--	No	Forward	MySQL	Apr 25, 2024 09:4...	VPN ...	Pay-per-use	--	default	Edit Speed
	[redacted]-02 2afa7c40-9627-457f-abb1-7ee64c0j...	Configuration	--	No	Backward	MySQL	Apr 25, 2024 09:4...	VPN ...	Pay-per-use	--	default	

Step 4 On the **Configure Source and Destination Databases** page, wait until the DR 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 DR instance. After the connection tests are successful, select the check box before the agreement and click **Next**.

Figure 2-65 Service database information



Source Database

Database Type: [✓ Self-built on ECS] GaussDB(for MySQL)

IP Address or Domain Name

Port

Database Username

Database Password

SSL Connection

This button is available only after the replication instance is created successfully.

Table 2-70 Service database settings

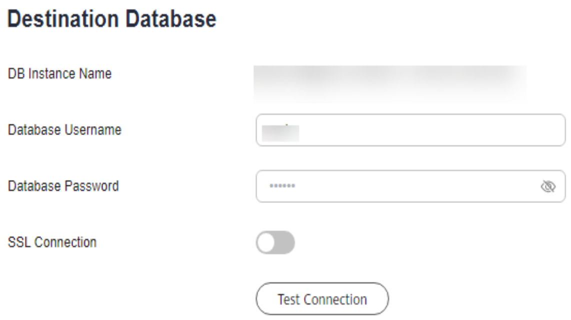
Parameter	Description
Database Type	By default, **Self-built on ECS** is selected. The source database can be a **Self-built on ECS** or **GaussDB(for MySQL)** database. After selecting **GaussDB(for MySQL)**, select the region where the source database resides and the region cannot be the same as the region where the destination database resides. The region where the destination database is located is the region where you log in to the management console. To use the **GaussDB(for MySQL)** option, submit a service ticket.

Parameter	Description
IP Address or Domain Name	The IP address or domain name of the service database.
Port	The port of the service database. Range: 1 – 65535
Database Username	The username for accessing the service database.
Database Password	The password for the service database username. You can change the password if necessary. To change the password, perform the following operation after the task is created: If the task is in the **Starting**, **Initializing**, **Disaster recovery in progress**, or **Disaster recovery failed** status, in the **Connection Information** area on the **Basic Information** tab, click **Modify Connection Details**. In the displayed dialog box, change the password.
SSL Connection	SSL encrypts the connections between the source and destination databases. If SSL is enabled, upload the SSL CA root certificate. **NOTE** ● The maximum size of a single certificate file that can be uploaded is 500 KB. ● If SSL is disabled, your data may be at risk.
Region	The region where the source database is located. This parameter is available only when **Database Type** for the source database is set to **GaussDB(for MySQL)**. The region cannot be the region where the destination database is located.
DB Instance Name	The name of the service DB instance. This parameter is available only when the source database is a **GaussDB(for MySQL)** database.
Database Username	The username for accessing the service database.
Database Password	The password for the service database username.

NOTE

The IP address, domain name, username, and password of the service database are encrypted and stored in DRS and will be cleared after the task is deleted.

Figure 2-66 DR database information



Destination Database

DB Instance Name

Database Username

Database Password ••••••

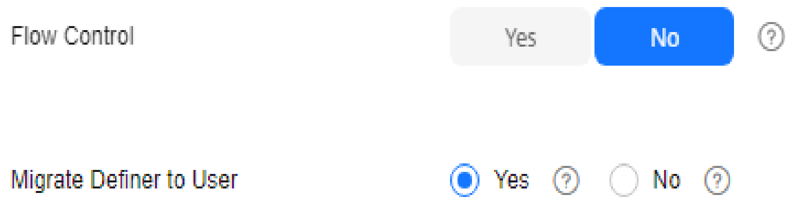
SSL Connection

Table 2-71 DR database settings

Parameter	Description
DB Instance Name	The GaussDB(for MySQL) instance you selected when creating the DR task. This parameter cannot be changed.
Database Username	The username for accessing the DR database.
Database Password	The password for the database username. The password can be changed after a task is created. If the task is in the **Starting**, **Initializing**, **Disaster recovery in progress**, or **Disaster recovery failed** status, in the **Connection Information** area on the **Basic Information** tab, click **Modify Connection Details**. In the displayed dialog box, change the password. The database username and password are encrypted and stored in DRS, and will be cleared after the task is deleted.

Step 5 On the **Configure DR** page, specify flow control and click **Next**.

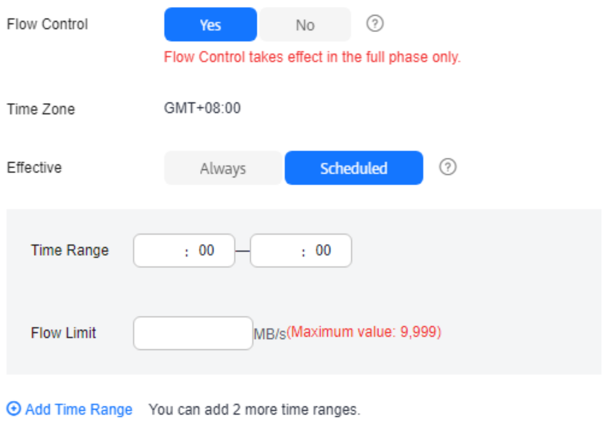
Figure 2-67 DR settings



Flow Control: Yes [✓ No]

Migrate Definer to User: ● Yes ○ No

Table 2-72 DR settings

Parameter	Description
Flow Control	You can choose whether to control the flow. ● **Yes** You can customize the maximum disaster recovery speed. During the disaster recovery, the speed of each task (or each subtask in multi-task mode) does not exceed the value of this parameter. 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 **Always**. A maximum of 10 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. **Figure 2-68** Flow control  Flow Control: Yes | No Flow Control takes effect in the full phase only. Time Zone: GMT+08:00 Effective: Always | Scheduled Time Range: : 00 — : 00 Flow Limit: MB/s(Maximum value: 9,999) Add Time Range You can add 2 more time ranges. ● **No** The DR speed is not limited and the outbound bandwidth of the source database is maximally used, which causes read consumption on the source database accordingly. 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 in the DR initialization phase. – You can also change the flow control mode when the task is in the **Configuration** state. For details, see **Modifying the Flow Control Mode**.

Parameter	Description
Migrate Definer to User	Indicates whether to migrate the Definers of all source database objects to the destination database user entered during the connection test. ● 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 about authorization, see **How Do I Maintain the Original Service User Permission System After Definer Is Forcibly Converted During MySQL Migration?** For example, if the view is CREATE ALGORITHM=UNDEFINED DEFINER=\`username\`@\`%\` SQL SECURITY DEFINER VIEW \`test_db\`.\`view5\` AS select 1 AS \`1\` before migration, it is converted to CREATE ALGORITHM=UNDEFINED DEFINER=\`drsUser\`@\`%\` SQL SECURITY DEFINER VIEW \`test_db\`.\`view5\` AS select 1 AS \`1\` after the migration. **drsUser** indicates the destination database user used for testing the connection. ● **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. Note that if the Definer account is not found in the destination database, unavailable objects will be created. For details about Definer, see the **MySQL official document**.

Step 6 On the **Check Task** page, check the DR task.

- If any check fails, review the failure cause and rectify the fault. After the fault is rectified, click **Check Again**.

  For details about how to handle check failures, see **Solutions to Failed Check Items** in *Data Replication Service User Guide*.

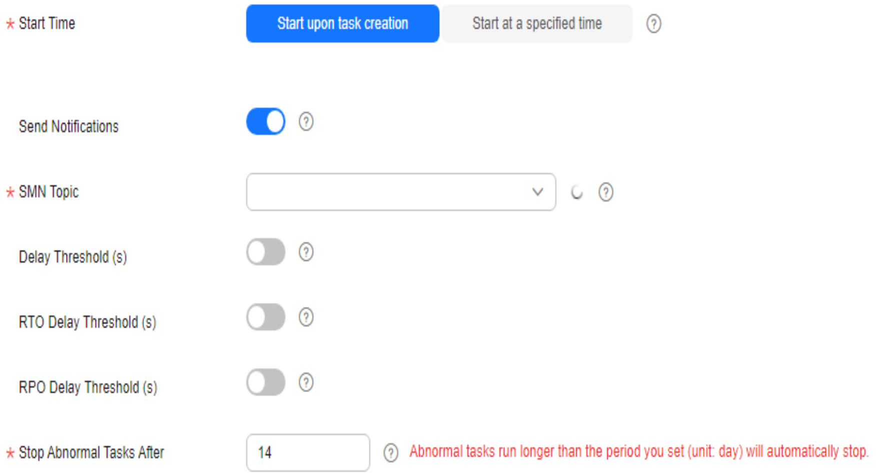
- If the check is complete and the check success rate is 100%, click **Next**.

  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.

Step 7 On the **Confirm Task** page, specify **Start Time**, **Send Notifications**, **SMN Topic**, **Delay Threshold**, **RPO Delay Threshold**, **RTO Delay Threshold**, and **Stop Abnormal Tasks After** for the forward subtask. After confirming that the configured information is correct, click **Submit** to submit the forward DR task.

Figure 2-69 Task startup settings



* Start Time: Start upon task creation | Start at a specified time

Send Notifications

* SMN Topic

Delay Threshold (s)

RTO Delay Threshold (s)

RPO Delay Threshold (s)

* Stop Abnormal Tasks After: 14

Abnormal tasks run longer than the period you set (unit: day) will automatically stop.

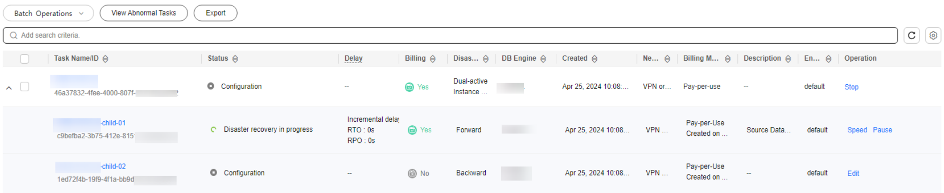
Table 2-73 Task settings

Parameter	Description
Start Time	Set **Start Time** to **Start upon task creation** or **Start at a specified time** based on site requirements. **NOTE** After a DR task is started, the performance of the service and DR databases may be affected. You are advised to start a DR task during off-peak hours.
Send Notifications	SMN topic. This parameter is optional. If the status or latency metric of the DR task is abnormal, DRS will send a notification.
SMN Topic	This parameter is available only after you enable **Send Notifications** and create a topic on the SMN console and add a subscriber. For details, see ***Simple Message Notification User Guide***.
Delay Threshold (s)	During disaster recovery, a synchronization delay indicates a time difference (in seconds) of synchronization between the service and DR databases. 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** ● Before setting the delay threshold, enable **Send Notifications**. ● If the delay threshold is set to 0, no notifications will be sent to the recipient.

Parameter	Description
RTO Delay Threshold (s)	If the synchronization delay from the DRS instance to the DR database exceeds the threshold you specify, DRS will notify 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** - Before setting the RTO delay threshold, enable **Send Notifications**. - If the delay threshold is set to 0, no notifications will be sent to the recipient.
RPO Delay Threshold (s)	If the synchronization delay from the DRS instance to the service database exceeds the threshold you specify, DRS will notify 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** - Before setting the delay threshold, enable **Send Notifications**. - If the delay threshold is set to 0, no notifications will be sent to the recipient. - In the early stages of an incremental DR, more delay is normal because more data is waiting to be synchronized. In this situation, no notifications will be sent.
Stop Abnormal Tasks After	Number of days after which an abnormal task automatically stops. The value must range from 14 to 100. The default value is **14**. **NOTE** - You can set this parameter only for pay-per-use tasks. - Tasks in the abnormal state are still charged. If tasks remain in the abnormal state for a long time, they cannot be resumed. Any task in the abnormal state that has run for longer than the period you set here (in days) will automatically stop to avoid unnecessary fees.

Step 8 Return to the **Disaster Recovery Management** page. After the forward subtask enters the **Disaster recovery in progress** state, locate the backward subtask and click **Edit** in the **Operation** column. The **Configure Source and Destination Databases** page of the backward subtask is displayed.

Figure 2-70 DR task list



Task Name/ID	Status	Delay	Billing	Disas...	DB Engine	Created	Ne...	Billing M...	Description	En...	Operation
[redacted] 46a37832-4fee-4000-807f-[redacted]	Configuration	--	Yes	Dual-active Instance ...	[redacted]	Apr 25, 2024 10:08:...	VPN or...	Pay-per-use	--	default	Stop
[redacted]-child-01 c9befba2-3b75-412e-815[redacted]	Disaster recovery in progress	Incremental delay RTO : 0s RPO : 0s	Yes	Forward	[redacted]	Apr 25, 2024 10:08...	VPN ...	Pay-per-Use Created on ...	Source Data...	default	Speed Pause
[redacted]-child-02 1ed72f4b-19f9-4f1a-bb9d[redacted]	Configuration	--	No	Backward	[redacted]	Apr 25, 2024 10:08...	VPN ...	Pay-per-Use Created on ...	--	default	Edit

Step 9 On the **Configure Source and Destination Databases** page, click **Test Connection** for both the source and destination databases to check whether they have been connected to the disaster recovery instance. After the connection tests are successful, click **Next**.

Step 10 On the **Confirm Task** page, specify **Start Time**, **Send Notifications**, **SMN Topic**, **Delay Threshold**, **RPO Delay Threshold**, **RTO Delay Threshold**, and **Stop Abnormal Tasks After** for the backward subtask. After confirming that the configured information is correct, click **Submit** to submit the backward DR task.

Step 11 After the task is submitted, view and **manage it** on the **Disaster Recovery Management** page.

- You can view the task status. For more information about task status, see **Task Statuses**.
- You can click ↻ in the upper-right corner to view the latest task status.
- By default, DRS retains a task in the **Configuration** state for three days. After three days, DRS automatically deletes background resources, but the task status remains unchanged. When you reconfigure the task, DRS applies for resources again.
- For a public network task, DRS needs to delete background resources after you stop the task. The EIP bound to the task cannot be restored to the **Unbound** state until background resources are deleted.
- For a task that is in the **Disaster recovery in progress** state, you can use **data comparison** to check whether data is consistent before and after the disaster recovery.

----End

3 Task Management

3.1 Creating a DR Task

Scenario

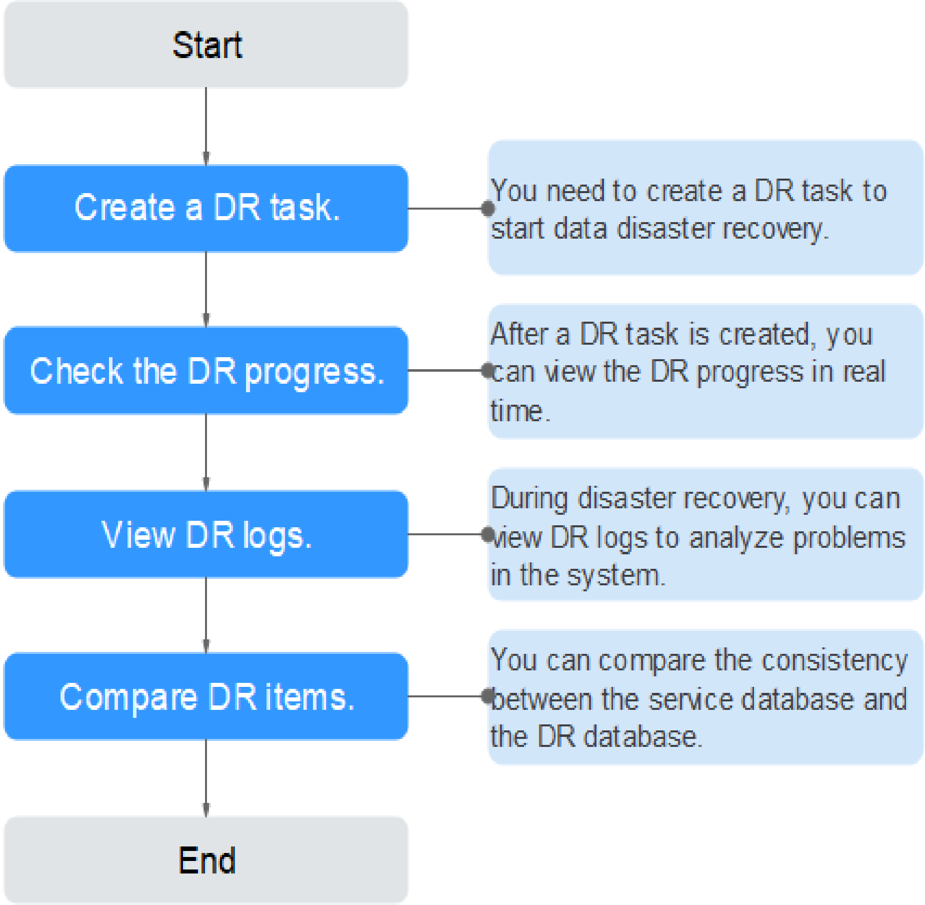
To prevent service unavailability caused by regional faults, DRS provides disaster recovery to ensure service continuity. If the region where the primary instance is located encounters a natural disaster and cannot be connected, you can switch the remote instance to the primary instance. To reconnect to the primary instance, you only need to change the connection address on the application side. DRS allows you to perform cross-region real-time synchronization between a primary instance and a DR instance during disaster recovery

A complete online disaster recovery consists of creating a DR task, tracking task progress, analyzing DR logs, and comparing data consistency. By comparing multiple items and data, you can synchronize data between different service systems.

Process

The following flowchart shows the basic processes for disaster recovery.

Figure 3-1 Disaster recovery process


Start
Create a DR task.
You need to create a DR task to start data disaster recovery.
Check the DR progress.
After a DR task is created, you can view the DR progress in real time.
View DR logs.
During disaster recovery, you can view DR logs to analyze problems in the system.
Compare DR items.
You can compare the consistency between the service database and the DR database.
End

- **Step 1: Create a DR task.** Select the service and DR databases as required and create a DR task.
- **Step 2: Query the DR progress.** During the disaster recovery, you can view the DR progress.
- **Step 3: View DR logs.** Disaster recovery logs contain alarms, errors, and prompt information. You can analyze system problems based on such information.
- **Step 4: Compare DR items.** The DR system supports object-level, data-level comparison to ensure data consistency.

This section uses disaster recovery from a MySQL instance to an RDS for MySQL instance as an example describes how to configure a DR task on the DRS console over a public network.

You can create a DR task that will walk you through each step of the process. After a DR task is created, you can manage it on the DRS console.

Prerequisites

- **You have logged in to the DRS console.**
- Your account balance is greater than or equal to $0 USD.
- For details about the supported DB types and versions, see **Supported Databases**.

- If a subaccount is used to create a DRS task, ensure that an agency has been added. For details about how to create an agency, see **Agency Management**.

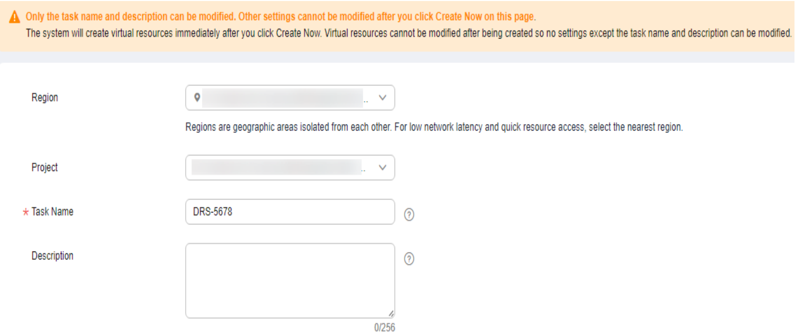
Procedure

Step 1 On the **Disaster Recovery Management** page, click **Create Disaster Recovery Task**.

Step 2 On the **Create Disaster Recovery Instance** page, select a region and project, specify the task name, description, and the DR instance details, and click **Create Now**.

- Task information description

Figure 3-2 DR task information



Only the task name and description can be modified. Other settings cannot be modified after you click Create Now on this page.
The system will create virtual resources immediately after you click Create Now. Virtual resources cannot be modified after being created so no settings except the task name and description can be modified.

Region

Regions are geographic areas isolated from each other. For low network latency and quick resource access, select the nearest region.

Project

* Task Name: DRS-5678

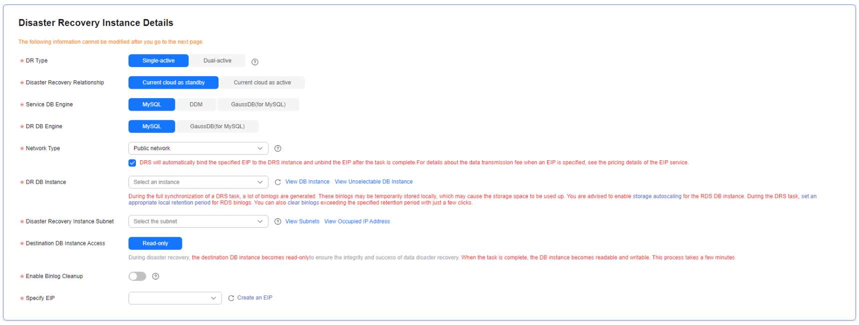
Description: 0/256

Table 3-1 Task and recipient description

Parameter	Description
Region	The region where your service is running. You can change the region.
Project	The project corresponds to the current region and can be changed.
Task Name	The task name must start with a letter and consist of 4 to 50 characters. It can contain only letters, digits, hyphens (-), and underscores (_).
Description	The description consists of a maximum of 256 characters and cannot contain special characters !=<>'&"\

- DR instance information

Figure 3-3 DR instance information



Disaster Recovery Instance Details

The following information cannot be modified after you go to the next page.

* DR Type: Single-active | Dual-active

* Disaster Recovery Relationship: Current cloud as standby | Current cloud as active

* Service DB Engine: MySQL | DDM | GaussDB(for MySQL)

* DR DB Engine: MySQL | GaussDB(for MySQL)

* Network Type: Public network

☑ DRS will automatically bind the specified EIP to the DRS instance and unbind the EIP after the task is complete.For details about the data transmission fee when an EIP is specified, see the pricing details of the EIP service.

* DR DB Instance: Select an instance

View DB Instance View Unselectable DB Instance

During the full synchronization of a DRS task, a lot of binlogs are generated. These binlogs may be temporarily stored locally, which may cause the storage space to be used up. You are advised to enable storage autoscaling for the RDS DB instance. During the DRS task, set an appropriate local retention period for RDS binlogs. You can also clear binlogs exceeding the specified retention period with just a few clicks.

* Disaster Recovery Instance Subnet: Select the subnet

View Subnets View Occupied IP Address

* Destination DB Instance Access: Read-only

During disaster recovery, the destination DB instance becomes read-onlyto 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.

* Enable Binlog Cleanup

* Specify EIP

Create an EIP

Table 3-2 DR instance settings

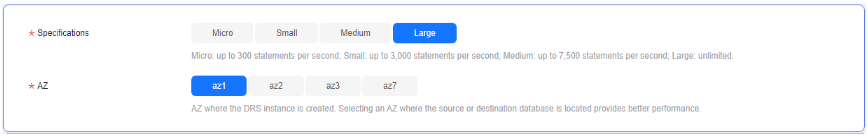
Parameter	Description
DR Type	Select **Single-active**. The DR type can be single-active or dual-active. If **Dual-active** is selected, two subtasks are created by default, a forward DR task and a backward DR task. **NOTE** Only whitelisted users can use dual-active DR. To use this function, submit a service ticket. In the upper right corner of the management console, choose **Service Tickets** > **Create Service Ticket** to submit a service ticket.
Disaster Recovery Relationship	Select **Current cloud as standby**. This parameter is available only when you select **Single-active**. By default, **Current cloud as standby** is selected. You can also select **Current cloud as active**. – **Current cloud as standby**: The DR database is on the current cloud. – **Current cloud as active**: The service database is on the current cloud.
Service DB Engine	Select **MySQL**.
DR DB Engine	Select **MySQL**.
Network Type	The public network is used as an example. Available options: **VPN or Direct Connect** and **Public network**. By default, the value is **Public network**.
DR DB Instance	RDS DB instance you have created as the destination database of the DR task.

Parameter	Description
Disaster Recovery Instance Subnet	Select the subnet where the disaster recovery instance is located. You can also click **View Subnets** to go to the network console to view the subnet where the instance resides. By default, the DRS instance and the DR DB instance are in the same subnet. You need to select the subnet where the DRS instance resides and ensure that there are available IP addresses. To ensure that the disaster recovery instance is successfully created, only subnets with DHCP enabled are displayed.
Destination DB Instance Access	Select **Read-only**. This parameter is available when you select **Single-active** for **DR Type** and **Current cloud as standby** for **Disaster Recovery Relationship**. – During disaster recovery, the entire DR database instance becomes read-only. To change the DR database to **Read/Write**, you can change the DR database (or destination database) to a service database by clicking **Promote Current Cloud** on the **Disaster Recovery Monitoring** tab. – If a DR task fails, the DR database does not automatically change to the read/write state. – If a DR task is paused, you can disable read-only for the DR database. For details, see **Disabling or Enabling Read-Only**. – After read-only is disabled and the DR task is resumed, the DR database automatically changes to read-only. The read-only settings of the DR DB instance are also affected by the access settings of the DB instance itself. Therefore, you are advised not to set the access settings of the DB instance on the RDS console. – After the DR task is complete, the DR database changes to **Read/Write**. – When the external database functions as the DR database, the user with the superuser permission can set the database to read-only. – If a DRS instance node is rebuilt due to a fault, to ensure data consistency during the DRS task restoration, the current cloud standby database is set to read-only before the task is restored. After the task is restored, the synchronization relationship recovers.

Parameter	Description
Enable Binlog Cleanup	This parameter is available when you set **Disaster Recovery Relationship** to **Current cloud as standby**. It indicates whether to enable the function of quickly clearing binlogs of the destination database. After this function is enabled, binlog clearing is enabled for the DR database during the full synchronization and disabled during the incremental synchronization.
Specify EIP	This parameter is available when you select **Public network** for **Network Type**. Select an EIP to be bound to the DRS instance. DRS will automatically bind the specified EIP to the DRS instance and unbind the EIP after the task is complete. The number of specified EIPs must be the consistent with that of DB instances. For details about the data transfer fee generated using a public network, see **EIP Price Calculator**.

- Specifications

Figure 3-4 Specifications


* Specifications: Micro / Small / Medium / [✓ Large]

Micro: up to 300 statements per second; Small: up to 3,000 statements per second; Medium: up to 7,500 statements per second; Large: unlimited.

* AZ: [✓ az1] / az2 / az3 / az7

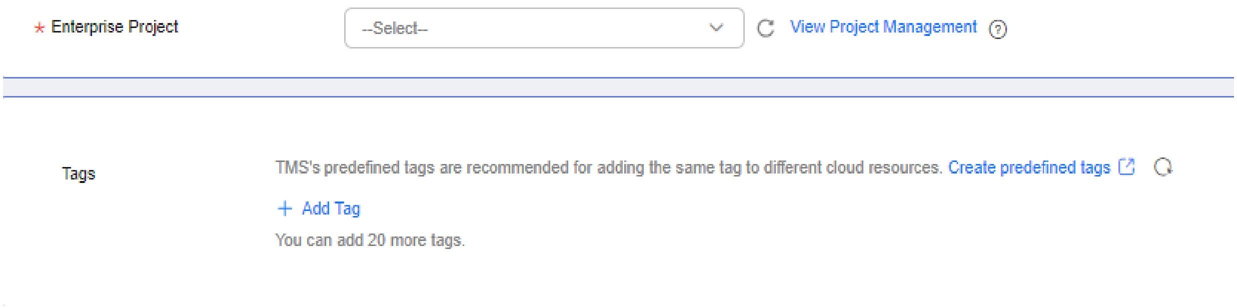
AZ where the DRS instance is created. Selecting an AZ where the source or destination database is located provides better performance.

Table 3-3 Specifications

Parameter	Description
Specifications	DRS instance specifications. Different specifications have different performance upper limits. For details, see **Real-Time DR**. **NOTE** DRS allows you to upgrade specifications only for real-time DR tasks from MySQL to MySQL, from MySQL to GaussDB(for MySQL), and from GaussDB(for MySQL) to GaussDB(for MySQL). Task specifications cannot be downgraded. For details, see **Changing Specifications**.
AZ	Select the AZ where you want to create the DRS task. Selecting the one housing the source or destination database can provide better performance.

- Enterprise Project and Tags

Figure 3-5 Enterprise projects and tags



* Enterprise Project

--Select--

Tags

TMS's predefined tags are recommended for adding the same tag to different cloud resources. Create predefined tags

You can add 20 more tags.

Table 3-4 Enterprise Project and Tags

Parameter	Description
Enterprise Project	An enterprise project you would like to use to centrally manage your cloud resources and members. Select an enterprise project from the drop-down list. The default project is **default**. For more information about enterprise projects, see ***Enterprise Management User Guide***. To customize an enterprise project, click **Enterprise** in the upper right corner of the console. The **Enterprise Project Management Service** page is displayed. For details, see **Creating an Enterprise Project** in *Enterprise Management User Guide*.
Tags	– Tags a task. This configuration is optional. Adding tags helps you better identify and manage your tasks. Each task can have up to 20 tags. – If your organization has configured tag policies for DRS, add tags to tasks based on the policies. If a tag does not comply with the policies, task creation may fail. Contact your organization administrator to learn more about tag policies. – After a task is created, you can view its tag details on the **Tags** tab. For details, see **Tag Management**.

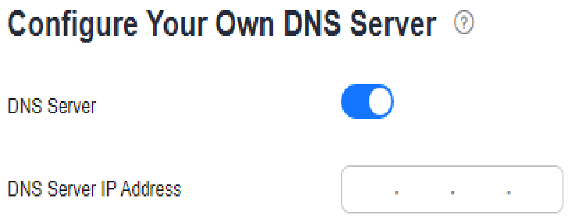
NOTE

If a task fails to be created, DRS retains the task for three days by default. After three days, the task automatically stops.

Step 3 On the **Configure Source and Destination Databases** page, wait until the DR 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 DR instance. After the connection tests are successful, select the check box before the agreement and click **Next**.

- (Optional) Configuring your own DNS server

Figure 3-6 DNS Server



Configure Your Own DNS Server

DNS Server

DNS Server IP Address

Table 3-5 DNS server information

Parameter	Description
DNS Server	Enable this option if you need to use the IP address of your own DNS server as the source or destination database IP address.
DNS Server IP Address	Add the IP address of your own DNS server to **DNS Server IP Address**. Then, you can also enter this IP address in **IP Address or Domain Name** in the **Source Database** or **Destination Database** area for data migration.

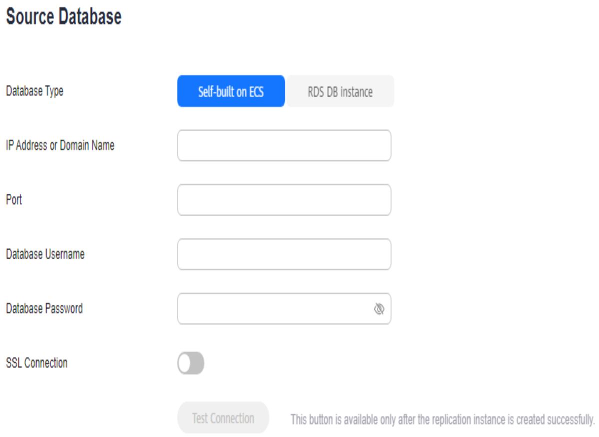
NOTE

This function is available when you need to use the IP address of your own DNS server as the source or destination database IP address.

Only whitelisted users can use this function. You need to submit a service ticket to apply for this function. In the upper right corner of the management console, choose **Service Tickets** > **Create Service Ticket** to submit a service ticket.

- Select **Current cloud as standby** for **Disaster Recovery Relationship** in **Step 2**.

Figure 3-7 Service database information



Source Database

Database Type Self-built on ECS RDS DB instance

IP Address or Domain Name

Port

Database Username

Database Password

SSL Connection

Test Connection This button is available only after the replication instance is created successfully.

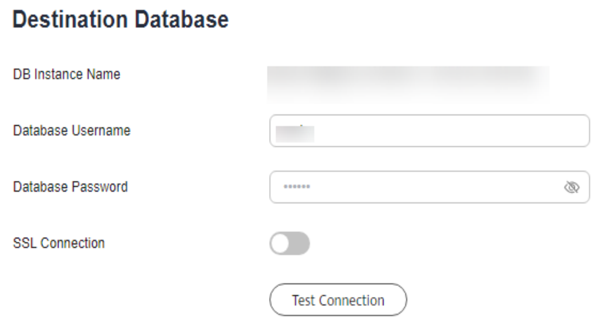
Table 3-6 Service database settings

Parameter	Description
Database Type	By default, **Self-built on ECS** is selected. The source database can be a **Self-built on ECS** or an **RDS DB instance**. After selecting **RDS DB instance**, select the region where the source database resides and the region cannot be the same as the region where the destination database resides. The region where the destination database is located is the region where you log in to the management console. To use the **RDS DB instance** option, submit a service ticket.
IP Address or Domain Name	The IP address or domain name of the service database.
Port	The port of the service database. Range: 1 – 65535
Database Username	The username for accessing the service database.
Database Password	The password for the service database username. You can change the password if necessary. To change the password, perform the following operation after the task is created: If the task is in the **Starting**, **Initializing**, **Disaster recovery in progress**, or **Disaster recovery failed** status, in the **Connection Information** area on the **Basic Information** tab, click **Modify Connection Details**. In the displayed dialog box, change the password.
SSL Connection	SSL encrypts the connections between the source and destination databases. If SSL is enabled, upload the SSL CA root certificate. **NOTE** – The maximum size of a single certificate file that can be uploaded is 500 KB. – If SSL is disabled, your data may be at risk.
Region	The region where the source database is located. This parameter is available only when **Database Type** for the source database is set to **RDS DB instance**. The region cannot be the region where the destination database is located.
DB Instance Name	The name of the service DB instance. This parameter is available only when the source database is an **RDS DB instance**.
Database Username	The username for accessing the service database.
Database Password	The password for the service database username.

NOTE

The IP address, domain name, username, and password of the service database are encrypted and stored in DRS and will be cleared after the task is deleted.

Figure 3-8 DR database information


Destination Database

DB Instance Name

Database Username

Database Password ••••••

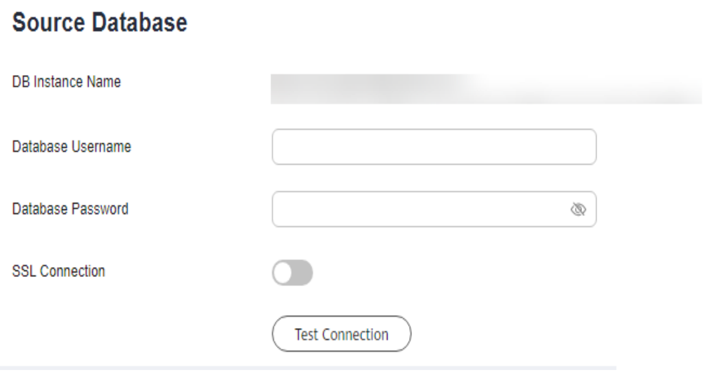
SSL Connection

Table 3-7 DR database settings

Parameter	Description
DB Instance Name	The DB instance you selected when creating the DR task and cannot be changed.
Database Username	The username for accessing the DR database.
Database Password	The password for the database username. The password can be changed after a task is created. If the task is in the **Starting**, **Initializing**, **Disaster recovery in progress**, or **Disaster recovery failed** status, in the **DR Information** area on the **Basic Information** tab, click **Modify Connection Details**. In the displayed dialog box, change the password. The database username and password are encrypted and stored in DRS, and will be cleared after the task is deleted.
SSL Connection	If SSL connection is required, enable SSL on the DR database, ensure that related parameters have been correctly configured, and upload an SSL certificate. **NOTE** – The maximum size of a single certificate file that can be uploaded is 500 KB. – If SSL is disabled, your data may be at risk.

- Select **Current cloud as active** for **Disaster Recovery Relationship** in **Step 2**.

Figure 3-9 Service database information



Source Database

DB Instance Name

Database Username

Database Password

SSL Connection

Table 3-8 Service database settings

Parameter	Description
DB Instance Name	The RDS instance selected when you created the DR task. This parameter cannot be changed.
Database Username	The username for accessing the service database.
Database Password	The password for the database username. You can change the password if necessary. To change the password, perform the following operation after the task is created: If the task is in the **Starting**, **Initializing**, **Disaster recovery in progress**, or **Disaster recovery failed** status, in the **DR Information** area on the **Basic Information** tab, click **Modify Connection Details**. In the displayed dialog box, change the password. The database username and password are encrypted and stored in the system and will be cleared after the task is deleted.
SSL Connection	If SSL connection is required, enable SSL on the service database, ensure that related parameters have been correctly configured, and upload an SSL certificate. **NOTE** – The maximum size of a single certificate file that can be uploaded is 500 KB. – If SSL is disabled, your data may be at risk.

Figure 3-10 DR database information

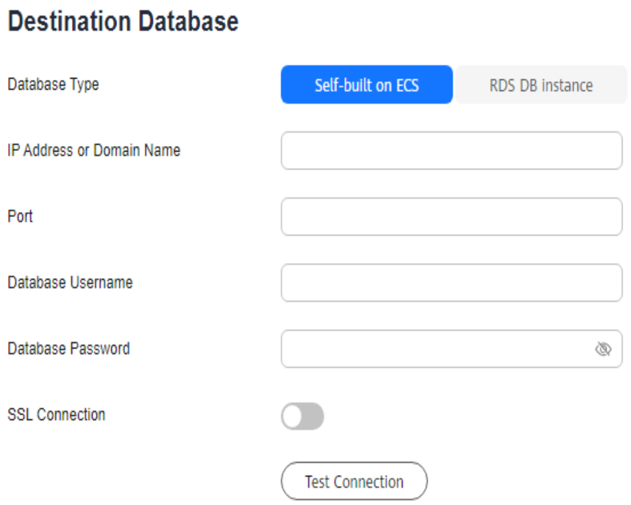


Table 3-9 DR database settings

Parameter	Description
Database Type	By default, **Self-built on ECS** is selected. The destination database can be a **Self-built on ECS** or an **RDS DB instance**. If you select **RDS DB instance**, you need to select the region where the destination database is located. To use the **RDS DB instance** option, submit a service ticket.
IP Address or Domain Name	The IP address or domain name of the DR database.
Port	The port of the DR database. Range: 1 – 65535
Region	The region where the RDS DB instance is located. This parameter is available only when the destination database is an RDS DB instance.
DB Instance Name	DR instance name. This parameter is available only when the destination database is an RDS DB instance. **NOTE** When the DB instance is used as the DR database, it is set to read-only. After the task is complete, the DB instance can be readable and writable.
Database Username	Username for logging in to the DR database.
Database Password	Password for the database username.

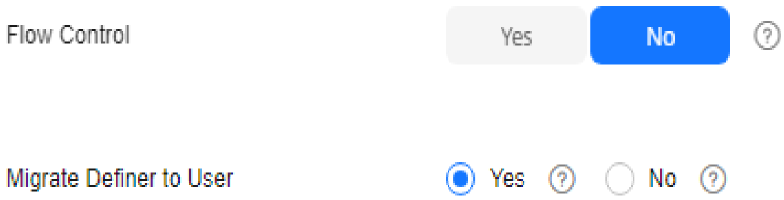
Parameter	Description
SSL Connection	If SSL connection is required, enable SSL on the DR database, ensure that related parameters have been correctly configured, and upload an SSL certificate. **NOTE** – The maximum size of a single certificate file that can be uploaded is 500 KB. – If SSL is disabled, your data may be at risk.

NOTE

The IP address, domain name, username, and password of the DR database are encrypted and stored in DRS and will be cleared after the task is deleted.

Step 4 On the **Configure DR** page, specify flow control and click **Next**.

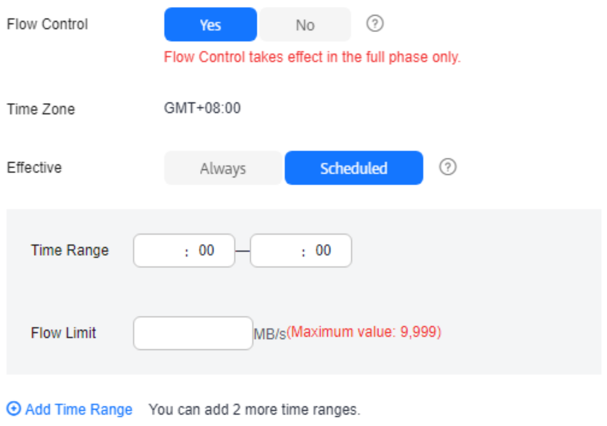
Figure 3-11 DR settings



Flow Control: Yes [✓ No]

Migrate Definer to User: ● Yes ○ No

Table 3-10 DR settings

Parameter	Description
Flow Control	You can choose whether to control the flow. - **Yes** You can customize the maximum disaster recovery speed. During the disaster recovery, the speed of each task (or each subtask in multi-task mode) does not exceed the value of this parameter. 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 **Always**. A maximum of 10 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. **Figure 3-12** Flow control Flow Control: Yes / No Flow Control takes effect in the full phase only. Time Zone: GMT+08:00 Effective: Always / Scheduled Time Range: : 00 – : 00 Flow Limit: MB/s(Maximum value: 9,999) Add Time Range You can add 2 more time ranges. - **No** The DR speed is not limited and the outbound bandwidth of the source database is maximally used, which causes read consumption on the source database accordingly. 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 in the DR initialization phase. – You can also change the flow control mode when the task is in the **Configuration** state. For details, see **Modifying the Flow Control Mode**.

Parameter	Description
Migrate Definer to User	Indicates whether to migrate the Definers of all source database objects to the destination database user entered during the connection test. ● 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 about authorization, see **How Do I Maintain the Original Service User Permission System After Definer Is Forcibly Converted During MySQL Migration?** For example, if the view is CREATE ALGORITHM=UNDEFINED DEFINER=\`username\`@\`%\` SQL SECURITY DEFINER VIEW \`test_db\`.\`view5\` AS select 1 AS \`1\` before migration, it is converted to CREATE ALGORITHM=UNDEFINED DEFINER=\`drsUser\`@\`%\` SQL SECURITY DEFINER VIEW \`test_db\`.\`view5\` AS select 1 AS \`1\` after the migration. **drsUser** indicates the destination database user used for testing the connection. ● **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. Note that if the Definer account is not found in the destination database, unavailable objects will be created. For details about Definer, see the **MySQL official document**.

Step 5 On the **Check Task** page, check the DR task.

- If any check fails, review the failure cause and rectify the fault. After the fault is rectified, click **Check Again**.

  For details about how to handle check failures, see **Solutions to Failed Check Items** in *Data Replication Service User Guide*.

- If the check is complete and the check success rate is 100%, go to the **Compare Parameter** page.

  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.

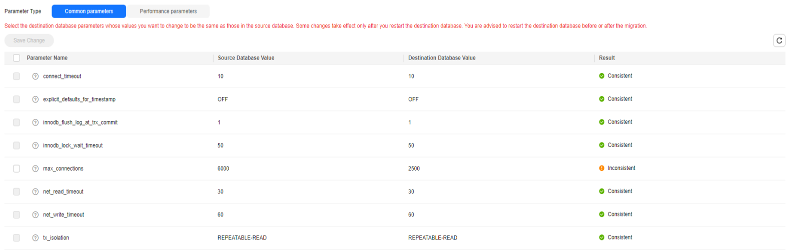
Step 6 Compare the parameters.

The parameter comparison function helps you check the consistency of common parameters and performance parameters between service and DR databases and show inconsistent values. You can determine whether to use this function based on service requirements. It mainly ensures that services are not affected after the DR task is completed.

- This process is optional, so you can click **Next** to skip the comparison.

- Compare common parameters:
  - For common parameters, if the parameters in the service database are different from those in the DR database, click **Save Change** to make the parameters of the DR database be the same as those in the service database.

    Figure 3-13 Modifying common parameters

    Parameter Type | Common parameters | Performance parameters

    Select the destination database parameters whose values you want to change to be the same as those in the source database. Some changes take effect only after you restart the destination database. You are advised to restart the destination database before or after the migration.

    Save Change

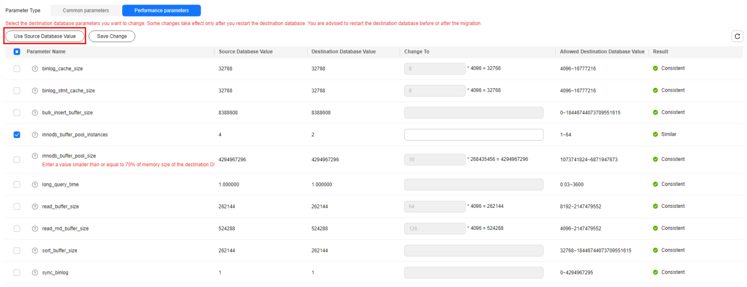
□ Parameter Name	Source Database Value	Destination Database Value	Result
□ connect_timeout	10	10	Consistent
□ explicit_defaults_for_timestamp	OFF	OFF	Consistent
□ innodb_flush_log_at_trx_commit	1	1	Consistent
□ innodb_lock_wait_timeout	50	50	Consistent
□ max_connections	6000	2500	Inconsistent
□ net_read_timeout	30	30	Consistent
□ net_write_timeout	60	60	Consistent
□ tx_isolation	REPEATABLE-READ	REPEATABLE-READ	Consistent

  - Performance parameter values in both the service and DR databases can be the same or different.
    - If you need to adjust the performance parameters, enter the value in the **Change to** column and click **Save Change**.
    - If you want to make the performance parameter values of the source and destination database be the same:

      1) Click **Use Source Database Value**.

         DRS automatically makes the DR database values the same as those of the service database.

         Figure 3-14 One-click modification

         Parameter Type | Common parameters | Performance parameters

         Select the destination database parameters you want to change. Some changes take effect only after you restart the destination database. You are advised to restart the destination database before or after the migration.

         Use Source Database Value | Save Change

■ Parameter Name	Source Database Value	Destination Database Value	Change To	Allowed Destination Database Value	Result
□ binlog_cache_size	32768	32768	8 * 4096 = 32768	4096~16777216	Consistent
□ binlog_stmt_cache_size	32768	32768	8 * 4096 = 32768	4096~16777216	Consistent
□ bulk_insert_buffer_size	8388608	8388608		0~18446744073709551615	Consistent
☑ innodb_buffer_pool_instances	4	2		1~64	Similar
□ innodb_buffer_pool_size Enter a value smaller than or equal to 70% of memory size of the destination DI	4294967296	4294967296	16 * 268435456 = 4294967296	1073741824~6871947673	Consistent
□ long_query_time	1.000000	1.000000		0.03~3600	Consistent
□ read_buffer_size	262144	262144	64 * 4096 = 262144	8192~2147479552	Consistent
□ read_rnd_buffer_size	524288	524288	128 * 4096 = 524288	4096~2147479552	Consistent
□ sort_buffer_size	262144	262144		32768~18446744073709551615	Consistent
□ sync_binlog	1	1		0~4294967295	Consistent

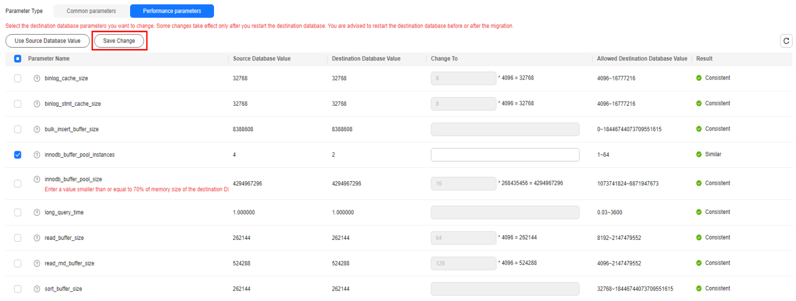
         NOTE

         You can also manually enter the value as required.

      2) Click **Save Change**.

         DRS changes the DR database parameter values based on your settings. After the modification, the comparison results are automatically updated.

Figure 3-15 One-click modification



Parameter Type: Common parameters | Performance parameters

Select the destination database parameters you want to change. Some changes take effect only after you restart the destination database. You are advised to restart the destination database before or after the migration.

Use Source Database Value | Save Change

☐	Parameter Name	Source Database Value	Destination Database Value	Change To	Allowed Destination Database Value	Result
☐	binlog_cache_size	32768	32768	8 * 4096 = 32768	4096~16777216	Consistent
☐	binlog_stmt_cache_size	32768	32768	8 * 4096 = 32768	4096~16777216	Consistent
☐	bulk_insert_buffer_size	8388608	8388608		0~18446744073709551615	Consistent
☑	innodb_buffer_pool_instances	4	2		1~64	Similar
☐	innodb_buffer_pool_size Enter a value smaller than or equal to 70% of memory size of the destination DI	4294967296	4294967296	16 * 268435456 = 4294967296	1073741824~6871947673	Consistent
☐	long_query_time	1.000000	1.000000		0.03~3600	Consistent
☐	read_buffer_size	262144	262144	64 * 4096 = 262144	8192~2147479552	Consistent
☐	read_rnd_buffer_size	524288	524288	128 * 4096 = 524288	4096~2147479552	Consistent
☐	sort_buffer_size	262144	262144		32768~18446744073709551615	Consistent

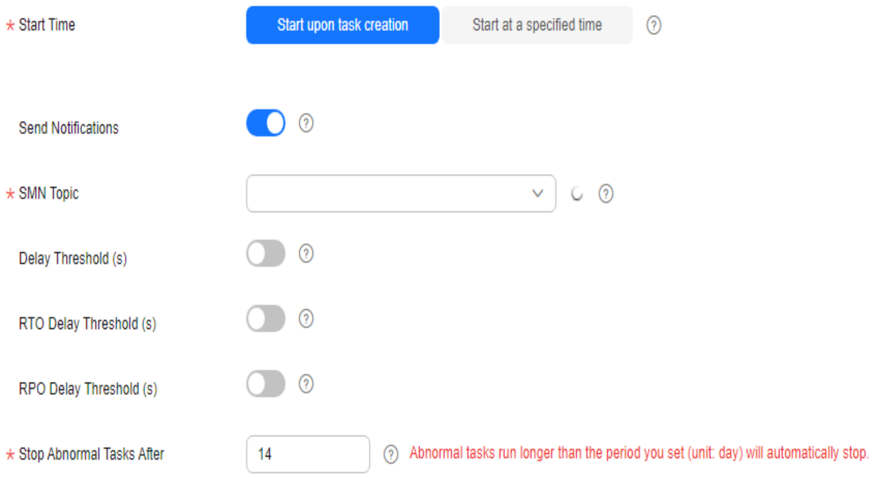
Some parameters in the DR database cannot take effect immediately, so the comparison result is temporarily inconsistent. Restart the DR database before the DR task is started or after the DR task is completed for the modification to take effect. To minimize the impact of database restart on your services, restart the DR database at the scheduled time after the disaster recovery is complete.

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

3) Click **Next**.

Step 7 On the **Confirm Task** page, specify **Start Time**, **Send Notifications**, **SMN Topic**, **Delay Threshold**, **RPO Delay Threshold**, **RTO Delay Threshold**, **Stop Abnormal Tasks After**. After confirming that the configured information about the DR task is correct, click **Submit**.

Figure 3-16 Task startup settings



* Start Time: Start upon task creation | Start at a specified time

Send Notifications: on

* SMN Topic:

Delay Threshold (s): off

RTO Delay Threshold (s): off

RPO Delay Threshold (s): off

* Stop Abnormal Tasks After: 14 — Abnormal tasks run longer than the period you set (unit: day) will automatically stop.

Table 3-11 Task settings

Parameter	Description
Start Time	Set **Start Time** to **Start upon task creation** or **Start at a specified time** based on site requirements. **NOTE** Starting a DR task may slightly affect the performance of the service and DR databases. You are advised to start a DR task during off-peak hours.
Send Notifications	This parameter is optional. After enabled, select a SMN topic. If the status or latency metric of the DR task is abnormal, DRS will send you a notification.
SMN Topic	This parameter is available only after you enable **Send Notifications** and create a topic on the SMN console and add a subscriber. For details, see ***Simple Message Notification User Guide***.
Delay Threshold (s)	During disaster recovery, a synchronization delay indicates a time difference (in seconds) of synchronization between the service and DR 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** ● Before setting the delay threshold, enable **Send Notifications**. ● If the delay threshold is set to 0, no notifications will be sent to the recipient.
RTO Delay Threshold (s)	If the synchronization delay from the DRS instance to the DR database exceeds the threshold you specify, DRS will notify 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** ● Before setting the RTO delay threshold, enable **Send Notifications**. ● If the delay threshold is set to 0, no notifications will be sent to the recipient.

Parameter	Description
RPO Delay Threshold (s)	If the synchronization delay from the DRS instance to the service database exceeds the threshold you specify, DRS will notify 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** ● Before setting the delay threshold, enable **Send Notifications**. ● If the delay threshold is set to 0, no notifications will be sent to the recipient. ● In the early stages of an incremental DR, more delay is normal because more data is waiting to be synchronized. In this situation, no notifications will be sent.
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** ● You can set this parameter only for pay-per-use tasks. ● Tasks in the abnormal state are still charged. If tasks remain in the abnormal state for a long time, they cannot be resumed. Any task in the abnormal state that has run for longer than the period you set here (in days) will automatically stop to avoid unnecessary fees.

Step 8 After the task is submitted, view and **manage it** on the **Disaster Recovery Management** page.

- You can view the task status. For more information about task status, see **Task Statuses**.
- You can click ↻ in the upper-right corner to view the latest task status.
- By default, DRS retains a task in the **Configuration** state for three days. After three days, DRS automatically deletes background resources, but the task status remains unchanged. When you reconfigure the task, DRS applies for resources again.
- For a public network task, DRS needs to delete background resources after you stop the task. The EIP bound to the task cannot be restored to the **Unbound** state until background resources are deleted.
- For a task that is in the **Disaster recovery in progress** state, you can use **data comparison** to check whether data is consistent before and after the disaster recovery.

----End

Helpful Links

- **Supported Databases**
- **Preparations**
- **DR Overview**

3.2 Querying the DR Progress

After a DR task starts, you can check the DR progress.

Prerequisites

- You have logged in to the DRS console.
- A DR task has been created and started.

Procedure

Step 1 On the **Disaster Recovery Management** page, click the target DR task in the **Task Name/ID** column.

Step 2 On the displayed page, click the **Disaster Recovery Progress** tab to view the DR progress. When the data initialization is complete, the initialization progress is displayed as 100%.

- On the **Disaster Recovery Progress** tab, you can view the DR synchronization delay.
- You can also view the DR synchronization delay on the **Disaster Recovery Management** page. When the synchronization delay exceeds the preset or default threshold, the value of the synchronization delay is displayed in red in the task list.
- When the delay is 0, data is synchronized from the service database to the DR database in real-time. You can view more metrics, such as RPO and RTO, on the **Disaster Recovery Monitoring** tab.

NOTE

"Delay" refers to the delay from when the transaction was submitted to the source database to when it is synchronized to the destination database and executed.

Transactions are synchronized as follows:

1. Data is extracted from the source database.
2. The data is transmitted over the network.
3. DRS parses the source logs.
4. The transaction is executed on the destination database.

If the delay is 0, the source database is consistent with the destination database, and no new transactions need to be synchronized.

CAUTION

Frequent DDL operations, ultra-large transactions, and network problems may result in excessive synchronization delay.

----End

3.3 Viewing DR Logs

DR logs refer to the warning-, error-, and info-level logs generated during the DR process. This section describes how to view DR logs to locate and analyze database problems.

Prerequisites

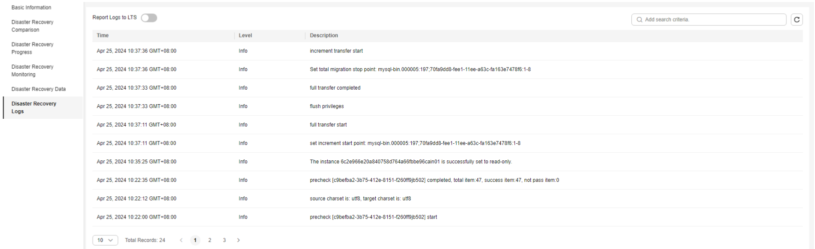
You have logged in to the DRS console.

Procedure

Step 1 On the **Disaster Recovery Management** page, click the target DR task in the **Task Name/ID** column.

Step 2 On the displayed page, click **Disaster Recovery Logs** to view the logs generated during DR.

Figure 3-17 Viewing DR Logs



Time	Level	Description
Apr 25, 2024 10:37:36 GMT+08:00	Info	increment transfer start
Apr 25, 2024 10:37:36 GMT+08:00	Info	Set total migration stop point: mysql-bin.000005:197;70fa9dd8-fee1-11ee-a63c-fa163e7478f6:1-8
Apr 25, 2024 10:37:33 GMT+08:00	Info	full transfer completed
Apr 25, 2024 10:37:33 GMT+08:00	Info	flush privileges
Apr 25, 2024 10:37:11 GMT+08:00	Info	full transfer start
Apr 25, 2024 10:37:11 GMT+08:00	Info	set increment start point: mysql-bin.000005:197;70fa9dd8-fee1-11ee-a63c-fa163e7478f6:1-8
Apr 25, 2024 10:35:25 GMT+08:00	Info	The instance 6c2e966e20a840758d764a66fbbe96cain01 is successfully set to read-only.
Apr 25, 2024 10:22:35 GMT+08:00	Info	precheck [c9befba2-3b75-412e-8151-f260ff9jb502] completed, total item:47, success item:47, not pass item:0
Apr 25, 2024 10:22:12 GMT+08:00	Info	source charset is: utf8, target charset is: utf8
Apr 25, 2024 10:22:00 GMT+08:00	Info	precheck [c9befba2-3b75-412e-8151-f260ff9jb502] start

10 Total Records: 24 ‹ 1 2 3 ›

In addition, DRS can interconnect with Log Tank Service (LTS). After you enable log reporting to LTS, all logs generated by DRS instances will be uploaded to LTS for management. For details, see **Log Reporting**.

----End

3.4 Data Comparison (Comparing DR Items)

Comparison Scenarios

DR item comparison: You can compare DR items to check data consistency between the service database and DR database. Currently, you can compare the following items during DR:

- Object-level comparison: compares databases, events, indexes, tables, views, stored procedures, functions, and triggers.
- Data-level comparison is classified into row comparison and value comparison.
  - Row comparison: It helps you compare the number of rows in the tables to be synchronized. This comparison method is recommended because it is fast.

- Value comparison: It helps you check whether data in the synchronized table is consistent. The comparison process is relatively slow.

To ensure that the comparison results are valid, compare data during off-peak hours by select **Start at a specified time** or compare cold data that is infrequently modified.

- Account comparison: It compares usernames and permissions of the source and destination databases.

When you check data consistency, compare the number of rows first. If the number of rows are inconsistent, you can then compare the data in the table to determine the inconsistent data.

Table 3-12 Supported comparison methods

DR Direction	Data Flow	Object-level Comparison	Row Comparison	Value Comparison	Dynamic Comparison	Account-level Comparison
Current cloud as standby	MySQL->MySQL	Supported	Supported	Supported	Supported	Supported
Current cloud as active	MySQL->MySQL	Supported	Supported	Supported	Supported	Supported
Current cloud as standby	MySQL->GaussDB(for MySQL)	Supported	Supported	Supported	Supported	Supported
Current cloud as standby	DDM -> DDM	Supported	Supported	Not supported	Not supported	Not supported
Current cloud as active	DDM -> DDM	Supported	Supported	Not supported	Not supported	Not supported

DR Direction	Data Flow	Object-level Comparison	Row Comparison	Value Comparison	Dynamic Comparison	Account-level Comparison
Current cloud as standby	GaussDB(for MySQL)->GaussDB(for MySQL)	Supported	Supported	Supported	Supported	Supported
Current cloud as active	GaussDB(for MySQL)->GaussDB(for MySQL)	Supported	Supported	Supported	Supported	Supported
Dual-Active DR	MySQL->MySQL	Supported	Supported	Supported	Not supported	Supported
Dual-Active DR	GaussDB(for MySQL)->GaussDB(for MySQL)	Supported	Supported	Supported	Not supported	Supported

Constraints

- During a comparison, the comparison items are case sensitive. If one of the service or DR database is case insensitive and the other one is case sensitive, the comparison result may be inconsistent.
- If DDL operations were performed on the service database, you need to compare the objects again to ensure the accuracy of the comparison results.
- If data in the DR database is modified separately, the comparison results may be inconsistent.
- If the encoding of the service database character type is abnormal, the database driver will convert the character type to an abnormal code point during DRS disaster recovery or comparison. As a result, the values may be consistent but the bytes may be inconsistent.
- Currently, only tables with primary keys support value comparison. For tables that do not support value comparison, you can compare rows. Therefore, you can compare data by row or value based on scenarios.
- The DRS task cannot be suspended during value comparison. Otherwise, the comparison task may fail.
- Some data types do not support value comparison. For details, see **Which of the Following Data Types Are Not Supported By Value Comparison?**
- To prevent resources from being occupied for a long time, DRS limits the row comparison duration. If the row comparison duration exceeds the threshold,

the row comparison task stops automatically. If the service database is a relational database, the row comparison duration is limited within 60 minutes. If the service database is a non-relational database, the row comparison duration is limited within 30 minutes.

- To avoid occupying resources, the comparison results of DRS tasks can be retained for a maximum of 60 days. After 60 days, the comparison results are automatically cleared.
- If you want to compare values and the DRS task you create supports value comparison, select a large specification for your DRS instance when creating the DRS task.
- For a DR task from MySQL or GaussDB(for MySQL), virtual columns in the source database do not support value comparison. During the comparison, virtual columns are filtered out.

Impact on Databases

- Object comparison: System tables of the source and destination databases are queried, occupying about 10 sessions. The database is not affected. However, if there are a large number of objects (for example, hundreds of thousands of tables), the database may be overloaded.
- Row comparison: The number of rows in the source and destination databases is queried, which occupies about 10 sessions. The SELECT COUNT statement does not affect the database. However, if a table contains a large amount of data (hundreds of millions of records), the database will be overloaded and the query results will be returned slowly.
- Value comparison: All data in the source and destination databases is queried, and each field is compared. The query pressure on the database leads to high I/O. The query speed is limited by the I/O and network bandwidth of the source and destination databases. Value comparison occupies one or two CPUs, and about 10 sessions.
- Account comparison: The accounts and permissions of the source and destination databases are queried, which does not affect the database.

Estimated Comparison Duration

- Object comparison: Generally, the comparison results are returned within several minutes based on the query performance of the source database. If the amount of data is large, the comparison may take dozens of minutes.
- Row comparison: The SELECT COUNT method is used. The query speed depends on the database performance.
- Value comparison: If the database workload is not heavy and the network is normal, the comparison speed is about 5 MB/s.
- Account comparison: The results are returned with the object-level comparison results. If the number of objects is small, the results are returned in several minutes.

Prerequisites

- You have logged in to the DRS console.
- A DR task has been started.

Procedure

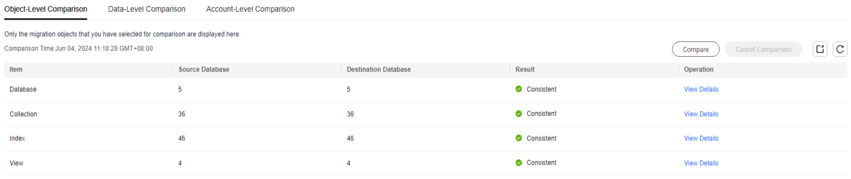
Step 1 On the **Disaster Recovery Management** page, click the target DR task in the **Task Name/ID** column.

Step 2 On the **Disaster Recovery Comparison** tab, compare the service and DR databases.

1. Check the integrity of the database object.

   Click **Validate Objects**. On the **Object-Level Comparison** tab, click **Compare**. Wait for a while and click ↻, and view the comparison result of each comparison item.

   Figure 3-18 Comparing objects

   Only the migration objects that you have selected for comparison are displayed here.

   Comparison Time:Jun 04, 2024 11:18:28 GMT+08:00

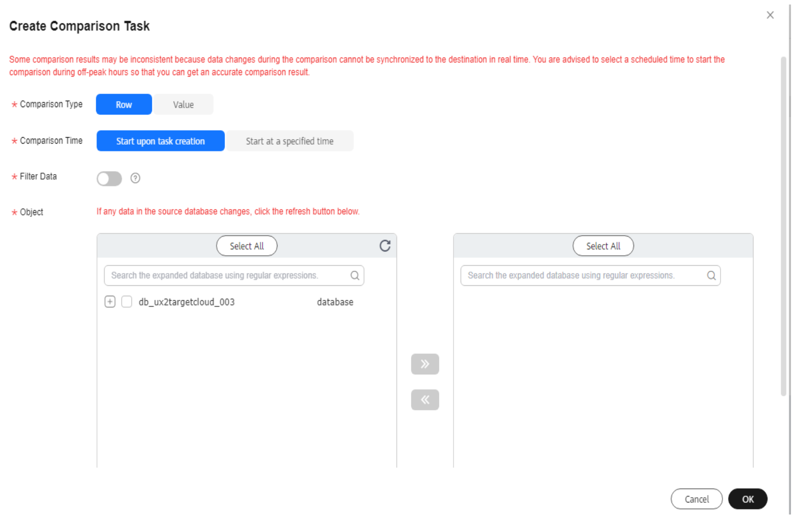
Item	Source Database	Destination Database	Result	Operation
Database	5	5	✓ Consistent	View Details
Collection	36	36	✓ Consistent	View Details
Index	46	46	✓ Consistent	View Details
View	4	4	✓ Consistent	View Details

   Locate a comparison item you want to view and click **View Details** in the **Operation** column.

2. After the check is complete, compare the number of rows and values.

   On the **Data-Level Comparison** tab, click **Create Comparison Task**. In the displayed dialog box, specify **Comparison Method**, **Comparison Type**, **Comparison Time**, and **Object**. Then, click **OK**.

   Figure 3-19 Creating a comparison task

   Some comparison results may be inconsistent because data changes during the comparison cannot be synchronized to the destination in real time. You are advised to select a scheduled time to start the comparison during off-peak hours so that you can get an accurate comparison result.

   * Comparison Type: Row | Value

   * Comparison Time: Start upon task creation | Start at a specified time

   * Filter Data

   * Object: If any data in the source database changes, click the refresh button below.

   Search the expanded database using regular expressions.

   db_ux2targetcloud_003 database

   Search the expanded database using regular expressions.

   - **Comparison Type**: compares rows and values.
   - **Comparison Method**: DRS provides static and dynamic comparison methods.
     - **Static**: All data in the source and destination databases is compared. The comparison task ends as the comparison is completed. Static

comparison can only be performed when there are no ongoing services.

- **Dynamic**: All data in the source database is compared with that in the destination database. After the comparison task is complete, incremental data in the source and destination databases is compared in real time. A dynamic comparison can be performed when data is changing.

NOTE

- Currently, only MySQL and GaussDB(for MySQL) support the comparison mode.
- New tables cannot be created in the service database during dynamic comparison. If you want to create a table in the service database, cancel the dynamic comparison first. After the new table is created and real-time DR is performed, restart the dynamic comparison.

- **Comparison Time**: You can select **Start upon task creation** or **Start at a specified time**. There is a slight difference in time between the source and destination databases during synchronization. Data inconsistency may occur. You are advised to compare migration items during off-peak hours for more accurate results.
- **Filter Data**: After this function is enabled, objects can be compared based on the configured filtering criteria.

NOTE

Only MySQL-to-MySQL DR tasks support data filtering and comparison.

After enabling **Filter Data**, add filtering criteria for the table objects to be compared.

In the **Filtering Criteria** area, enter the filtering criteria, and click **Verify**.

NOTE

- Standard SQL statements can be used to filter records. Each expression cannot contain packages, functions, variables, or constants specific to a database engine.
- Enter the part following WHERE in the SQL statement (excluding WHERE and semicolons), for example, sid > 3 and sname like "G %".
- Implicit conversion rules are not supported. Enter filtering criteria of a valid data type. For example, if column c of an Oracle database uses characters of the varchar2 type, the filtering criteria must be set to c > '10' instead of c > 10.
- Filter criteria cannot be configured for large objects, such as CLOB, BLOB, and BYTEA.
- You are not advised to set filter criteria for fields of approximate numeric types, such as FLOAT, DECIMAL, and DOUBLE.
- Do not use fields containing special characters as a filter condition.
- Objects whose database names, schema names, or table names are case insensitive cannot be filtered and compared.
- Currently, condition-based filtering is not supported when there are more than 50,000 tables in a database.

After the verification is successful, click **Generate Processing Rule**. The rule is displayed.

Click **OK**.

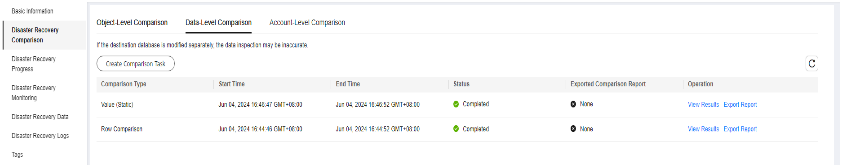
- **Object**: You can select objects to be compared based on the scenarios.

NOTE

- Data-level comparison cannot be performed for tasks in initialization.

3. After the comparison creation task is submitted, the **Data-Level Comparison** tab is displayed. Click ↻ to refresh the list and view the comparison result of the specified comparison type.

Figure 3-20 Viewing the data-level comparison result

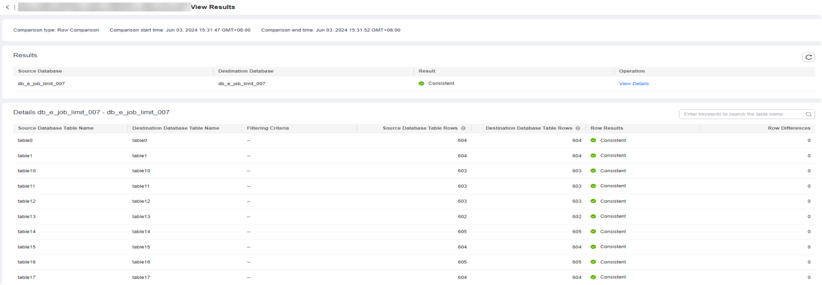


If the destination database is modified separately, the data inspection may be inaccurate.

Comparison Type	Start Time	End Time	Status	Exported Comparison Report	Operation
Value (Static)	Jun 04, 2024 16:46:47 GMT+08:00	Jun 04, 2024 16:46:52 GMT+08:00	Completed	None	View Results Export Report
Row Comparison	Jun 04, 2024 16:44:46 GMT+08:00	Jun 04, 2024 16:44:52 GMT+08:00	Completed	None	View Results Export Report

4. To view the comparison details, locate the target comparison type and click **View Results** in the **Operation** column. On the displayed page, locate a pair of service and DR databases, and click **View Details** in the **Operation** column to view detailed comparison results.

Figure 3-21 Row comparison details



< | [redacted] View Results

Comparison type: Row Comparison   Comparison start time: Jun 03, 2024 15:31:47 GMT+08:00   Comparison end time: Jun 03, 2024 15:31:52 GMT+08:00

Results

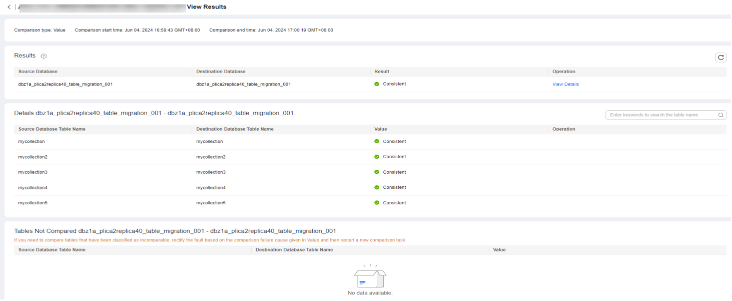
Source Database	Destination Database	Result	Operation
db_e_job_limit_007	db_e_job_limit_007	● Consistent	View Details

Details db_e_job_limit_007 - db_e_job_limit_007

Enter keywords to search the table name

Source Database Table Name	Destination Database Table Name	Filtering Criteria	Source Database Table Rows	Destination Database Table Rows	Row Results	Row Differences
table0	table0	--	604	604	● Consistent	0
table1	table1	--	604	604	● Consistent	0
table10	table10	--	603	603	● Consistent	0
table11	table11	--	603	603	● Consistent	0
table12	table12	--	603	603	● Consistent	0
table13	table13	--	602	602	● Consistent	0
table14	table14	--	605	605	● Consistent	0
table15	table15	--	604	604	● Consistent	0
table16	table16	--	605	605	● Consistent	0
table17	table17	--	604	604	● Consistent	0

Figure 3-22 Value comparison details



< | [redacted] View Results

Comparison type: Value   Comparison start time: Jun 04, 2024 16:59:43 GMT+08:00   Comparison end time: Jun 04, 2024 17:00:19 GMT+08:00

Results

Source Database	Destination Database	Result	Operation
dbz1a_plica2replica40_table_migration_001	dbz1a_plica2replica40_table_migration_001	● Consistent	View Details

Details dbz1a_plica2replica40_table_migration_001 - dbz1a_plica2replica40_table_migration_001

Enter keywords to search the table name

Source Database Table Name	Destination Database Table Name	Value	Operation
mycollection	mycollection	● Consistent	
mycollection2	mycollection2	● Consistent	
mycollection3	mycollection3	● Consistent	
mycollection4	mycollection4	● Consistent	
mycollection5	mycollection5	● Consistent	

Tables Not Compared dbz1a_plica2replica40_table_migration_001 - dbz1a_plica2replica40_table_migration_001

If you need to compare tables that have been classified as incomparable, rectify the fault based on the comparison failure cause given in Value and then restart a new comparison task.

Source Database Table Name	Destination Database Table Name	Value

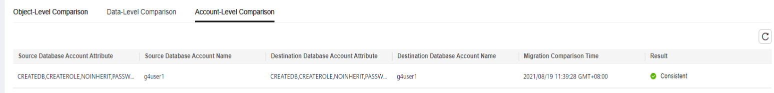
No data available.

NOTE

- You can also view comparison details of canceled comparison tasks.
- You can sort the row comparison results displayed on the current page in ascending or descending order based on the number of rows in the source database table or the destination database table.
- If a negative number is displayed in the **differences** column, the number of rows in the destination database table is greater than that in the source database table. If a positive number is displayed in the **differences** column, the number of rows in the source database table is greater than that in the destination database table.

5. Check the database accounts and permissions. Click the **Account-Level Comparison** tab to view the comparison results of database accounts and permissions.

Figure 3-23 Account-level comparison



Object-Level Comparison   Data-Level Comparison   Account-Level Comparison

Source Database Account Attribute	Source Database Account Name	Destination Database Account Attribute	Destination Database Account Name	Migration Comparison Time	Result
CREATEDB,CREATEROLE,NOINHERIT,PASSW...	g4user1	CREATEDB,CREATEROLE,NOINHERIT,PASSW...	g4user1	2021/08/19 11:39:28 GMT+08:00	● Consistent

NOTE

- Account comparison cannot be performed for tasks in the initialization phase.

----End

3.5 Task Life Cycle

3.5.1 Viewing DR Data

The data synchronization information is recorded during a disaster recovery. You can check the integrity of DR data after synchronization.

DRS allows you to view the initialization progress and of DR data health report on the management console.

Prerequisites

- You have logged in to the DRS console.
- You have created a DR task.

Procedure

NOTE

In the task list, only tasks created by the current login user are displayed. Tasks created by different users of the same tenant are not displayed.

Step 1 On the **Disaster Recovery Management** page, click the target DR task in the **Task Name/ID** column.

Step 2 On the **Basic Information** tab, click the **Disaster Recovery Data** tab.

- Initialization Progress

  Initialization Progress shows the historical data import progress during the disaster recovery environment creation. After the historical data is imported, the initialization is complete, and data on this tab will not be updated anymore.

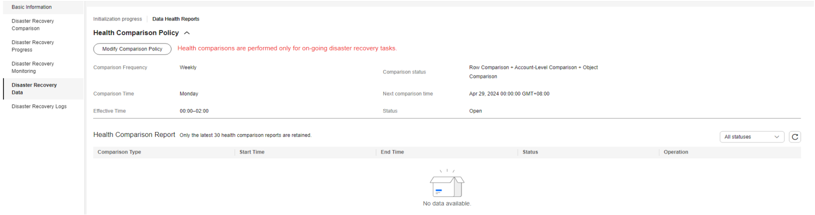
- Data Health Reports

  Data Health Reports periodically shows the data comparison result between the primary and disaster recovery instances, helping you review the data health status in the disaster recovery environment.

  NOTE

  – Data comparison is performed only for disaster recovery tasks.
  – Only MySQL-to-MySQL, MySQL-to-GaussDB(for MySQL), GaussDB(for MySQL)-to-GaussDB(for MySQL), and DDM-to-DDM DR tasks support health comparison.
  – Only the latest 30 health comparison reports are retained.
  – The periodical health report helps you learn the data consistency between the primary and standby instances. To avoid performance loss caused by long-term comparison of the primary instance, you can use **DR comparison** to compare large tables (for example, tables with more than 100 million rows).

Figure 3-24 Data Health Reports



Health Comparison Policy

Health comparisons are performed only for on-going disaster recovery tasks.

Comparison Frequency	Weekly	Comparison status	Row Comparison + Account-Level Comparison + Object Comparison
Comparison Time	Monday	Next comparison time	Apr 29, 2024 00:00:00 GMT+08:00
Effective Time	00:00–02:00	Status	Open

Health Comparison Report Only the latest 30 health comparison reports are retained.

Comparison Type	Start Time	End Time	Status	Operation

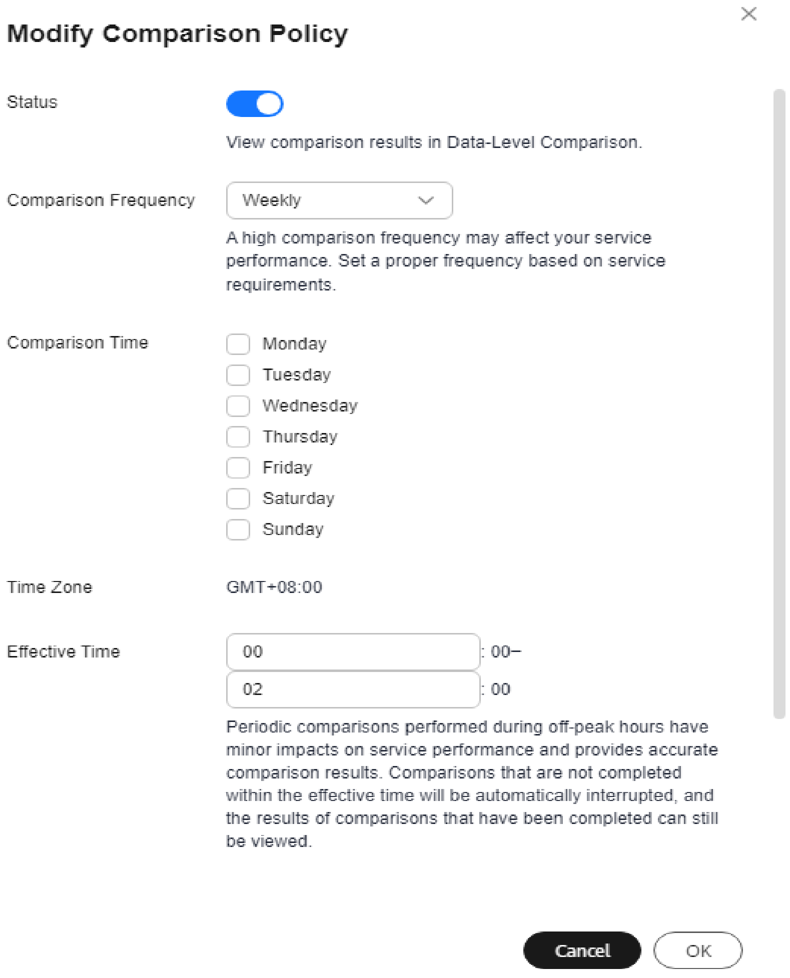
No data available.

– Modify the comparison policy.

  Modifying the comparison policy does not affect the current health comparison task. The modification takes effect upon the next comparison.

  - In the **Health Comparison Policy** area on the **Data Health Reports** tab, click **Modify Comparison Policy**.

    Figure 3-25 Modify Comparison Policy



Modify Comparison Policy

Status ●

View comparison results in Data-Level Comparison.

Comparison Frequency: Weekly

A high comparison frequency may affect your service performance. Set a proper frequency based on service requirements.

Comparison Time

□ Monday
□ Tuesday
□ Wednesday
□ Thursday
□ Friday
□ Saturday
□ Sunday

Time Zone GMT+08:00

Effective Time 00 : 00–
02 : 00

Periodic comparisons performed during off-peak hours have minor impacts on service performance and provides accurate comparison results. Comparisons that are not completed within the effective time will be automatically interrupted, and the results of comparisons that have been completed can still be viewed.

  - On the **Modify Comparison Policy** page, set the required parameters.
    - ○ **Status**: After the health comparison policy is disabled, the health comparison will not be performed, and historical health reports can still be viewed.
    - ○ **Comparison Frequency**: The comparison can be performed weekly or daily.
    - ○ **Comparison Time**: When **Comparison Frequency** is set to **Weekly**, you can set one or more days from Monday to Sunday as the comparison time.

        - **Time Zone**: The default value is the local time zone.
        - **Effective Time**: Specifies the time period during which the comparison policy takes effect. You are advised to perform the comparison in off-peak hours. If the health comparison is not complete within the validity period, the health comparison is automatically interrupted. You can still view the health comparison results of the completed task.
        - **Comparison Type**: Rows, accounts, and objects are compared by default.

    - Click **OK**.

      After the modification is successful, the new policy applies to the following comparison tasks. You can cancel the ongoing tasks but the health reports of the comparison tasks that have been completed can still be viewed.

----End

3.5.2 Modifying Task Information

After a DR task is created, you can modify task information to identify different tasks.

The following task information can be edited:

- Task name
- Description
- SMN Topic
- Synchronization delay threshold
- Number of days when an abnormal task is stopped
- Task start time

Prerequisites

You have logged in to the DRS console.

Procedure

Step 1 On the **Disaster Recovery Management** page, click the target DR task in the **Task Name/ID** column.

Step 2 On the **Basic Information** tab, locate the information to be modified in the **Task Information** area.

- You can click ✎ to modify the task name, SMN topic, delay threshold, the time to stop abnormal tasks, and description.
  - To submit the change, click ✓.
  - To cancel the change, click ✗.

Table 3-13 Real-time DR task information

Task Information	Description
Task Name	The task name must start with a letter and consist of 4 to 50 characters. It can contain only letters, digits, hyphens (-), and underscores (_).
Description	The description consists of a maximum of 256 characters and cannot contain special characters !<>&'\"
SMN Topic	You can apply for a topic on the SMN console and add a subscription. For details, see ***Simple Message Notification User Guide***.
Synchronization delay threshold	The delay ranges from 0s to 3600s. **NOTE** If the delay threshold is set to 0, no notifications will be sent to the recipient.
Stop Abnormal Tasks After	The value must range from 14 to 100. The default value is 14. **NOTE** You can set this parameter only for pay-per-use tasks.

- You can modify the task start time only when the task is in the **Pending start** status.

  In the **Task Information** area, click **Modify** in the **Scheduled Start Time** field. On the displayed page, specify the scheduled start time and click **OK**.

Step 3 View the change result on the **Basic Information** tab.

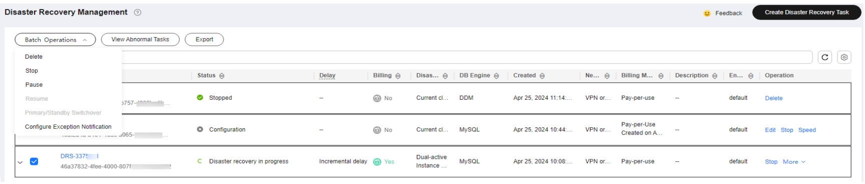
----End

Configuring Exception Notifications

Step 1 On the **Disaster Recovery Management** page, select the task for which you want to modify the exception notification.

Step 2 Click **Batch Operations** in the upper left corner and choose **Configure Exception Notification**.

Figure 3-26 Batch Operations


Disaster Recovery Management
Feedback
Create Disaster Recovery Task
Batch Operations
View Abnormal Tasks
Export
Delete
Stop
Pause
Resume
Primary/Standby Switchover
Configure Exception Notification

	Status	Delay	Billing	Disas...	DB Engine	Created	Ne...	Billing M...	Description	En...	Operation
...757-[redacted]...	Stopped	--	No	Current cl...	DDM	Apr 25, 2024 11:14:...	VPN or...	Pay-per-use	--	default	Delete
...065-[redacted]...	Configuration	--	No	Current cl...	MySQL	Apr 25, 2024 10:44:...	VPN or...	Pay-per-Use Created on A...	--	default	Edit Stop Speed
☑ DRS-3375[redacted] 46a37832-4fee-4000-807f[redacted]	Disaster recovery in progress	Incremental delay	Yes	Dual-active Instance ...	MySQL	Apr 25, 2024 10:08:...	VPN or...	Pay-per-use	--	default	Stop More

Step 3 In the displayed dialog box, modify the required parameter and click **Confirm**.

----End

3.5.3 Modifying Connection Information

During the disaster recovery, you may change the password of the service or DR database. As a result, the data DR, data comparison, task pause, resume, primary/standby switchover, and stopping may fail. In this case, you need to change the password on the DRS console and resume the task.

You can modify the following information:

- Database password
- Database IP address
- Database port
- Database username

Constraints

- The database connection password can be changed for all DRS tasks.
- You can change the IP address, port, and username during the disaster recovery phase only for a single-active DR task with MySQL or GaussDB(for MySQL) serving as the source and IP address entered for the connection test. If the IP address, port number, or username changes due to some operations on the service database, you can use this function to update the information.
- The function of changing an IP address applies to the scenario where the IP address of the service database changes. The IP addresses before and after the change must belong to the same data instance. Otherwise, the task may fail or data may be inconsistent.
- After the connection information is changed, the change takes effect immediately, and the data in the DR database is not cleared.

Procedure

Step 1 On the **Disaster Recovery Management** page, click the target DR task in the **Task Name/ID** column.

Step 2 On the **Basic Information** tab, click **Modify Connection Details** in the **DR Information** area.

Step 3 In the displayed dialog box, change the passwords of the source and destination databases and click **OK**.

Step 4 If a task is in the **Failed** state, return to the task list page after the change is complete and click **Resume** in the **Operation** column to continue the DR task.

----End

3.5.4 Modifying the Flow Control Mode

DRS allows you to change the flow control mode for a task. Currently, only the following DR tasks support this function.

- MySQL->MySQL
- MySQL->GaussDB(for MySQL)
- DDM->DDM

- GaussDB(for MySQL)->GaussDB(for MySQL)

Constraints

- The flow control mode limits the maximum traffic speed in seconds. The actual statistical value may be lower than the flow rate because the statistical value may decrease due to network fluctuation.
- The flow control mode takes effect only in the DR initialization phase.

Prerequisites

- You have logged in to the DRS console.
- A disaster recovery task has been created and not started.

Method 1

Step 1 In the **Flow Control Information** area on the **Basic Information** tab, click **Modify**.

Step 2 In the displayed dialog box, modify the settings.

----End

Method 2

Step 1 In the task list on the **Disaster Recover Management** page, locate the target task and choose **More** > **Speed** or **Speed** in the **Operation** column.

Step 2 In the displayed dialog box, modify the settings.

----End

3.5.5 Disabling or Enabling Read-Only

For a paused DR task, DRS allows you to disable read-only of the destination database.

Constraints

- You can disable or enable read-only of the destination database only for paused single-active DR tasks from MySQL to MySQL, MySQL to GaussDB(for MySQL), and GaussDB(for MySQL) to GaussDB(for MySQL).
- After read-only of the destination database is disabled, the destination database can be set to read-only again.
- Disabling read-only on the destination database may cause data inconsistencies. Exercise caution when performing this operation.
- After read-only is disabled and the DR task is resumed, the DR database automatically changes to read-only. The read-only settings of the DR DB instance are also affected by the access settings of the DB instance itself. Therefore, you are advised not to set the access settings of the DB instance on the RDS console.

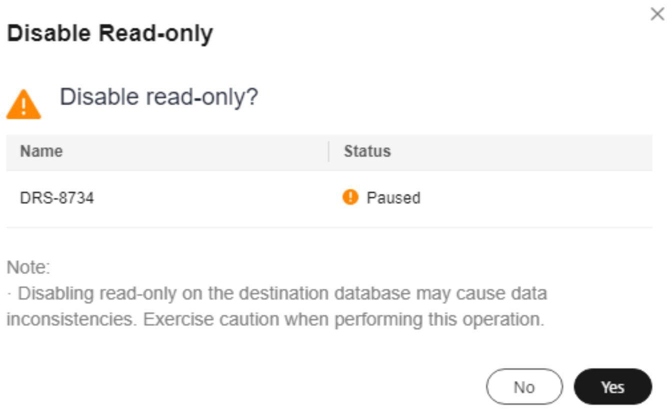
Disabling Read-Only

Step 1 In the task list on the **Disaster Recovery Management** page, locate the target task and click its name.

Step 2 In the **Task Information** area on the **Basic Information** page, click **Disable Read-only** next to **Destination DB Instance Access**.

Step 3 In the displayed dialog box, click **Yes**.

Figure 3-27 Disabling read-only



Disable Read-only

Disable read-only?

Name	Status
DRS-8734	Paused

Note:
· Disabling read-only on the destination database may cause data inconsistencies. Exercise caution when performing this operation.

----End

Enabling Read-Only

Step 1 In the task list on the **Disaster Recovery Management** page, locate the target task and click its name.

Step 2 In the **Task Information** area on the **Basic Information** page, click **Enable Read-only** next to **Destination DB Instance Access**.

Step 3 In the displayed dialog box, click **Yes**.

----End

3.5.6 Editing a DR Task

For a DR task that has been created but not started, DRS allows you to edit the configuration information of the task, including the source and destination database details. For DR tasks in the following statuses, you can edit and submit the tasks again.

- Creating
- Configuration

Prerequisites

You have logged in to the DRS console.

Method 1

Step 1 In the task list on the **Disaster Recovery Management** page, locate the target task and click **Edit** in the **Operation** column.

Step 2 On the **Configure Source and Destination Databases** page, enter information about the service and DR databases and click **Next**.

Step 3 On the **Check Task** page, check the DR task.

- If any check fails, review the failure cause and rectify the fault. After the fault is rectified, click **Check Again**.

  For details about how to handle check failures, see **Solutions to Failed Check Items** in *Data Replication Service User Guide*.

- If the check is complete and the check success rate is 100%, go to the **Compare Parameter** page.

  NOTE

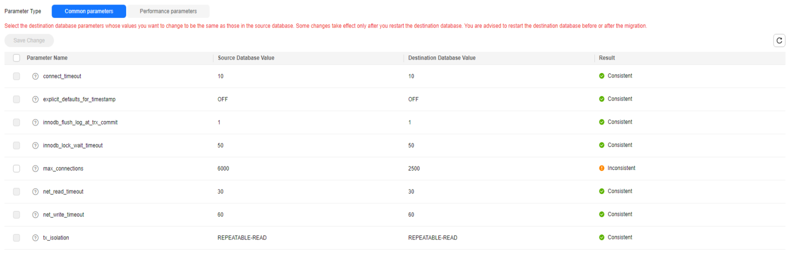
  You can proceed to the next step only when all checks are successful. If there are any items that require confirmation, view and confirm the details first before proceeding to the next step.

Step 4 Compare the parameters.

The parameter comparison function helps you check the consistency of common parameters and performance parameters between service and DR databases and show inconsistent values. You can determine whether to use this function based on service requirements. It mainly ensures that services are not affected after the DR task is completed.

- This process is optional, so you can click **Next** to skip the comparison.
- Compare common parameters:
  - For common parameters, if the parameters in the service database are different from those in the DR database, click **Save Change** to make the parameters of the DR database be the same as those in the service database.

    Figure 3-28 Modifying common parameters

    Select the destination database parameters whose values you want to change to be the same as those in the source database. Some changes take effect only after you restart the destination database. You are advised to restart the destination database before or after the migration.

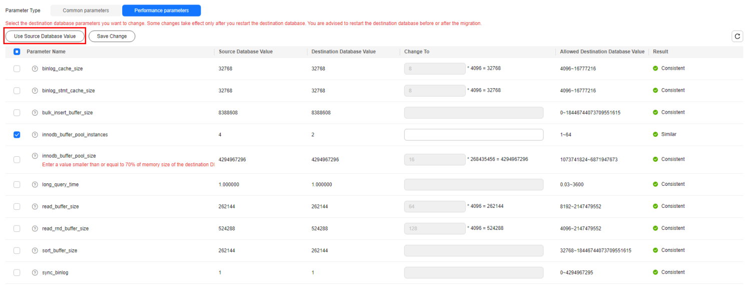
□ Parameter Name	Source Database Value	Destination Database Value	Result
□ connect_timeout	10	10	Consistent
□ explicit_defaults_for_timestamp	OFF	OFF	Consistent
□ innodb_flush_log_at_trx_commit	1	1	Consistent
□ innodb_lock_wait_timeout	50	50	Consistent
□ max_connections	6000	2500	Inconsistent
□ net_read_timeout	30	30	Consistent
□ net_write_timeout	60	60	Consistent
□ tx_isolation	REPEATABLE-READ	REPEATABLE-READ	Consistent

  - Performance parameter values in both the service and DR databases can be the same or different.
    - If you need to adjust the performance parameters, enter the value in the **Change to** column and click **Save Change**.
    - If you want to make the performance parameter values of the source and destination database be the same:

1) Click **Use Source Database Value**.

DRS automatically makes the DR database values the same as those of the service database.

Figure 3-29 One-click modification



Select the destination database parameters you want to change. Some changes take effect only after you restart the destination database. You are advised to restart the destination database before or after the migration.

☐	Parameter Name	Source Database Value	Destination Database Value	Change To	Allowed Destination Database Value	Result
☐	binlog_cache_size	32768	32768	8 * 4096 = 32768	4096~16777216	✓ Consistent
☐	binlog_stmt_cache_size	32768	32768	8 * 4096 = 32768	4096~16777216	✓ Consistent
☐	bulk_insert_buffer_size	8388608	8388608		0~18446744073709551615	✓ Consistent
☑	innodb_buffer_pool_instances	4	2		1~64	✓ Similar
☐	innodb_buffer_pool_size Enter a value smaller than or equal to 70% of memory size of the destination DI	4294967296	4294967296	16 * 268435456 = 4294967296	1073741824~6871947673	✓ Consistent
☐	long_query_time	1.000000	1.000000		0.03~3600	✓ Consistent
☐	read_buffer_size	262144	262144	64 * 4096 = 262144	8192~2147479552	✓ Consistent
☐	read_rnd_buffer_size	524288	524288	128 * 4096 = 524288	4096~2147479552	✓ Consistent
☐	sort_buffer_size	262144	262144		32768~18446744073709551615	✓ Consistent
☐	sync_binlog	1	1		0~4294967295	✓ Consistent

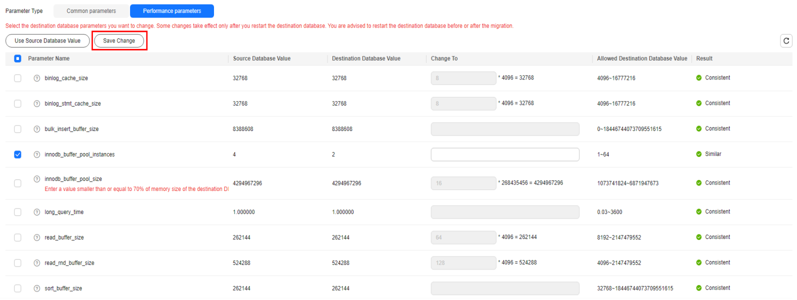
NOTE

You can also manually enter the value as required.

2) Click **Save Change**.

DRS changes the DR database parameter values based on your settings. After the modification, the comparison results are automatically updated.

Figure 3-30 One-click modification



Select the destination database parameters you want to change. Some changes take effect only after you restart the destination database. You are advised to restart the destination database before or after the migration.

☐	Parameter Name	Source Database Value	Destination Database Value	Change To	Allowed Destination Database Value	Result
☐	binlog_cache_size	32768	32768	8 * 4096 = 32768	4096~16777216	✓ Consistent
☐	binlog_stmt_cache_size	32768	32768	8 * 4096 = 32768	4096~16777216	✓ Consistent
☐	bulk_insert_buffer_size	8388608	8388608		0~18446744073709551615	✓ Consistent
☑	innodb_buffer_pool_instances	4	2		1~64	✓ Similar
☐	innodb_buffer_pool_size Enter a value smaller than or equal to 70% of memory size of the destination DI	4294967296	4294967296	16 * 268435456 = 4294967296	1073741824~6871947673	✓ Consistent
☐	long_query_time	1.000000	1.000000		0.03~3600	✓ Consistent
☐	read_buffer_size	262144	262144	64 * 4096 = 262144	8192~2147479552	✓ Consistent
☐	read_rnd_buffer_size	524288	524288	128 * 4096 = 524288	4096~2147479552	✓ Consistent
☐	sort_buffer_size	262144	262144		32768~18446744073709551615	✓ Consistent

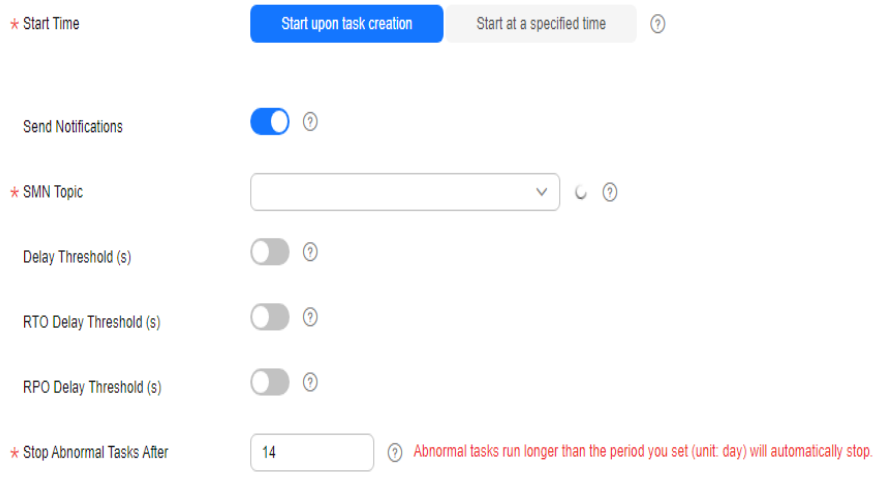
Some parameters in the DR database cannot take effect immediately, so the comparison result is temporarily inconsistent. Restart the DR database before the DR task is started or after the DR task is completed for the modification to take effect. To minimize the impact of database restart on your services, restart the DR database at the scheduled time after the disaster recovery is complete.

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

3) Click **Next**.

Step 5 On the **Confirm Task** page, specify **Start Time**, **Send Notifications**, **SMN Topic**, **Delay Threshold**, **RPO Delay Threshold**, **RTO Delay Threshold**, **Stop Abnormal Tasks After**. After confirming that the configured information about the DR task is correct, click **Submit**.

Figure 3-31 Task startup settings



* Start Time: Start upon task creation | Start at a specified time

Send Notifications

* SMN Topic

Delay Threshold (s)

RTO Delay Threshold (s)

RPO Delay Threshold (s)

* Stop Abnormal Tasks After: 14

Abnormal tasks run longer than the period you set (unit: day) will automatically stop.

Table 3-14 Task settings

Parameter	Description
Start Time	Set **Start Time** to **Start upon task creation** or **Start at a specified time** based on site requirements. **NOTE** Starting a DR task may slightly affect the performance of the service and DR databases. You are advised to start a DR task during off-peak hours.
Send Notifications	This parameter is optional. After enabled, select a SMN topic. If the status or latency metric of the DR task is abnormal, DRS will send you a notification.
SMN Topic	This parameter is available only after you enable **Send Notifications** and create a topic on the SMN console and add a subscriber. For details, see ***Simple Message Notification User Guide***.
Delay Threshold (s)	During disaster recovery, a synchronization delay indicates a time difference (in seconds) of synchronization between the service and DR 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** ● Before setting the delay threshold, enable **Send Notifications**. ● If the delay threshold is set to 0, no notifications will be sent to the recipient.

Parameter	Description
RTO Delay Threshold (s)	If the synchronization delay from the DRS instance to the DR database exceeds the threshold you specify, DRS will notify 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** ● Before setting the RTO delay threshold, enable **Send Notifications**. ● If the delay threshold is set to 0, no notifications will be sent to the recipient.
RPO Delay Threshold (s)	If the synchronization delay from the DRS instance to the service database exceeds the threshold you specify, DRS will notify 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** ● Before setting the delay threshold, enable **Send Notifications**. ● If the delay threshold is set to 0, no notifications will be sent to the recipient. ● In the early stages of an incremental DR, more delay is normal because more data is waiting to be synchronized. In this situation, no notifications will be sent.
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** ● You can set this parameter only for pay-per-use tasks. ● Tasks in the abnormal state are still charged. If tasks remain in the abnormal state for a long time, they cannot be resumed. Any task in the abnormal state that has run for longer than the period you set here (in days) will automatically stop to avoid unnecessary fees.

Step 6 After the task is submitted, view and **manage it** on the **Disaster Recovery Management** page.

- You can view the task status. For more information about task status, see **Task Statuses**.
- You can click ↻ in the upper-right corner to view the latest task status.
- By default, DRS retains a task in the **Configuration** state for three days. After three days, DRS automatically deletes background resources, but the task status remains unchanged. When you reconfigure the task, DRS applies for resources again.
- For a public network task, DRS needs to delete background resources after you stop the task. The EIP bound to the task cannot be restored to the **Unbound** state until background resources are deleted.

- For a task that is in the **Disaster recovery in progress** state, you can use **data comparison** to check whether data is consistent before and after the disaster recovery.

----End

Method 2

Step 1 On the **Disaster Recovery Management** page, click the target DR task in the **Task Name/ID** column.

Step 2 On the displayed page, click **edit this task** to go to the **Configure Source and Destination Databases** page.

Step 3 Perform **Step 2** through **Step 6** in method 1.

----End

3.5.7 Resuming a DR Task

A fault may occur during DR due to external factors, such as insufficient storage space.

NOTE

- If a DR task fails due to non-network problems, the system will automatically resume the task three times by default. If the failure persists, you can resume the task manually.
- If the DR task fails due to network problems, the system will automatically resume the task until the task is restored.

Prerequisites

- You have logged in to the DRS console.
- A DR task has been created.

Method 1

In the task list on the **Disaster Recovery Management** page, locate the target task and click **Resume** in the **Operation** column.

Method 2

Step 1 On the **Disaster Recovery Management** page, click the target DR task in the **Task Name/ID** column.

Step 2 On the displayed page, click the **Migration Progress** tab, and click **Resume** in the upper right corner.

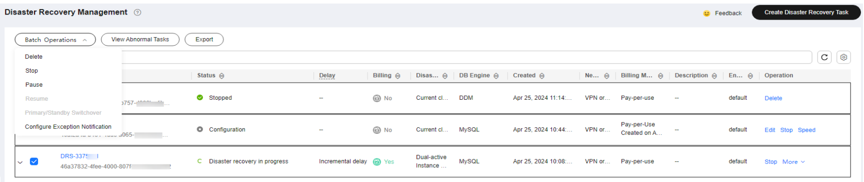
----End

Resume Tasks

Step 1 On the **Disaster Recovery Management** page, select the tasks to be resumed.

Step 2 Click **Batch Operations** in the upper left corner and choose **Resume**.

Figure 3-32 Batch Operations


Disaster Recovery Management
Feedback
Create Disaster Recovery Task
Batch Operations
View Abnormal Tasks
Export
Delete
Stop
Pause
Resume
Primary/Standby Switchover
Configure Exception Notification

	Status	Delay	Billing	Disas...	DB Engine	Created	Ne...	Billing M...	Description	En...	Operation
...b757-[redacted]...	Stopped	--	No	Current cl...	DDM	Apr 25, 2024 11:14:...	VPN or...	Pay-per-use	--	default	Delete
...d065-[redacted]...	Configuration	--	No	Current cl...	MySQL	Apr 25, 2024 10:44:...	VPN or...	Pay-per-Use Created on A...	--	default	Edit Stop Speed
☑ DRS-3375[redacted] 46a37832-4fee-4000-807f[redacted]	Disaster recovery in progress	Incremental delay	Yes	Dual-active Instance ...	MySQL	Apr 25, 2024 10:08:...	VPN or...	Pay-per-use	--	default	Stop More

Step 3 In the displayed dialog box, confirm the task information and click **Yes**.

----End

3.5.8 Pausing a DR Task

You can pause the DR tasks if they may cause buffer overflow or network congestion during peak hours.

You can pause the following DR tasks:

- MySQL->MySQL
- MySQL->GaussDB(for MySQL)
- GaussDB(for MySQL)>GaussDB(for MySQL)
- DDM->DDM

Prerequisites

- You have logged in to the DRS console.
- The DR task is running properly.

Pausing a Task

Step 1 In the task list on the **Disaster Recovery Management** page, locate the target task and click **Pause** in the **Operation** column.

Step 2 In the displayed **Pause Task** dialog box, select **Pause log capturing** and click **Yes**.

NOTE

- When a task is paused, only the replay or capture and replay of incremental data is paused. Before database cutover, stop the task.
- After you select **Pause log capturing**, the DRS instance will no longer communicate with the source and destination databases. If the pause duration is too long, the task may fail to be resumed because the logs required by the source database expire. You are not advised pausing a task for more than 24 hours. For details, check the corresponding log configuration.
- After the task is paused, its status becomes **Paused**.
- You can use the resumable transfer function to continue the DR task.

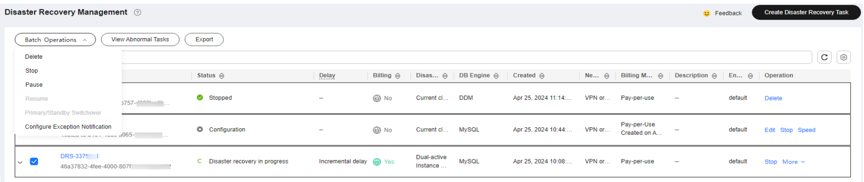
----End

Pausing Tasks

Step 1 On the **Disaster Recovery Management** page, select the tasks to be paused.

Step 2 Click **Batch Operations** in the upper left corner and choose **Pause**.

Figure 3-33 Batch Operations


Disaster Recovery Management
Feedback
Create Disaster Recovery Task
Batch Operations
View Abnormal Tasks
Export
Delete
Stop
Pause
Resume
Primary/Standby Switchover
Configure Exception Notification

	Status	Delay	Billing	Disas...	DB Engine	Created	Ne...	Billing M...	Description	En...	Operation
b757-[redacted]...	Stopped	--	No	Current cl...	DDM	Apr 25, 2024 11:14:...	VPN or...	Pay-per-use	--	default	Delete
d065-[redacted]...	Configuration	--	No	Current cl...	MySQL	Apr 25, 2024 10:44:...	VPN or...	Pay-per-Use Created on A...	--	default	Edit Stop Speed
☑ DRS-3375[redacted] 46a37832-4fee-4000-807f[redacted]	Disaster recovery in progress	Incremental delay	Yes	Dual-active Instance ...	MySQL	Apr 25, 2024 10:08:...	VPN or...	Pay-per-use	--	default	Stop More

Step 3 In the displayed dialog box, confirm the task information and click **Yes**.

----End

3.5.9 Retrying a DR Task

During the disaster recovery, the DR task may fail due to various causes. This section describes how to retry the failed DR task.

Prerequisites

You have logged in to the DRS console.

Method 1

On the **Disaster Recovery Management** page, locate the target task and click **Retry** in the **Operation** column.

Method 2

Step 1 On the **Disaster Recovery Management** page, click the target task in the **Task Name/ID** column.

Step 2 On the displayed page, click the **Disaster Recovery Progress** tab, and click **Retry** in the upper right corner.

----End

3.5.10 Resetting a DR Task

During the disaster recovery, the DR task may fail due to uncertain causes. This section describes how to reset the failed DR task.

You can reset the failed DR tasks in the following status:

- DR failure

Prerequisites

You have logged in to the DRS console.

Method 1

Step 1 In the task list on the **Disaster Recovery Management** page, locate the target task and click **Reset** in the **Operation** column.

Step 2 In the displayed dialog box, check the DR task again.

Step 3 After the check is complete and the check success rate is 100%, click **Start** to submit the DR task again.

----End

Method 2

Step 1 On the **Disaster Recovery Management** page, click the target task in the **Task Name/ID** column.

Step 2 On the displayed page, click the **Disaster Recovery Progress** tab, and click **Reset** in the upper right corner.

Step 3 Perform **Step 2** to **Step 3**.

----End

3.5.11 Viewing DR Metrics

DRS monitors the DB instance performance and the migration progress. With the monitoring information, you can determine the data flow health status, data integrity, and data consistency. If both RPO and RTO are 0, data has been completely migrated to the DR database. Then, you can determine whether to perform a switchover.

Prerequisites

- You have logged in to the DRS console.
- You have created a DR task.

Procedure

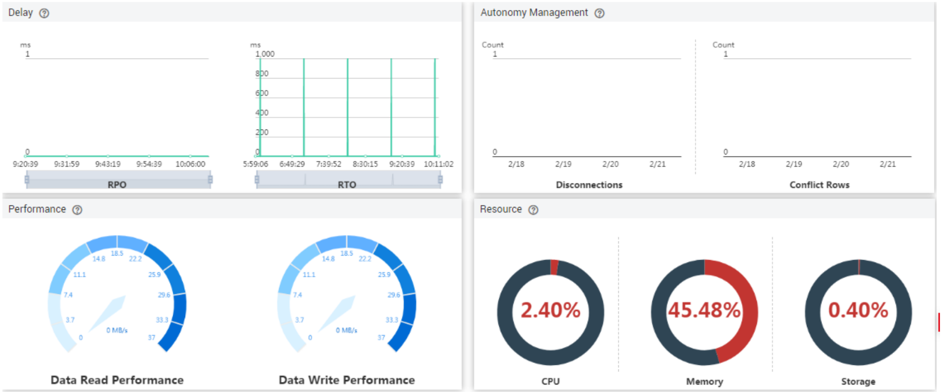
Step 1 On the **Disaster Recovery Management** page, click the target DR task in the **Task Name/ID** column.

Step 2 On the **Basic Information** tab, click the **Disaster Recovery Monitoring** tab.

- Recovery Point Objective (RPO) measures the consistency between the data in the service database and the data in the DRS instance. When RPO is 0, all the data in the service database has been migrated to the DRS instance.
- Recovery Time Objective (RTO) measures the amount of data being transmitted. When RTO is 0, all transactions on the DRS instance have been completed on the DR database.
- Delay: Monitors the historical RPO and RTO, which helps predict the amount of lost data if a disaster occurs. You can pay attention to the following time ranges during which:
  - The RPO or RTO is high for a long time.
  - The RPO or RTO is consistently high or spiking high on a regular basis.
- Autonomy Management: Monitors the following DRS intelligent autonomy capabilities:
  - Number of times that DRS automatically resumes data transfer after a network is disconnected

  - Number of times that DRS automatically overwrites old data with the latest data when a data conflict occurs
- Performance: You can use performance monitoring to help diagnose the network quality.
- Resource: You can use resource monitoring to help determine whether to scale up the DRS instance specifications.

Figure 3-34 DR monitoring



----End

3.5.12 Performing a Switchover for a Dual-AZ Task

You can set **DRS Task Type** to **Single-AZ** or **Dual-AZ** when creating a DRS real-time DR task. The dual-AZ deployment provides HA, improving the reliability of DRS tasks. After a dual-AZ task is created, DRS creates two subtasks, each running in the primary and standby AZs. If the subtask in the primary AZ fails, DRS automatically starts the subtask in the standby AZ to continue the disaster recovery.

You can select the DRS task type in the following scenarios:

- Active 1
  - MySQL -> MySQL (Dual-Active DR)
- Active 2
  - MySQL -> MySQL (Dual-Active DR)

Prerequisites

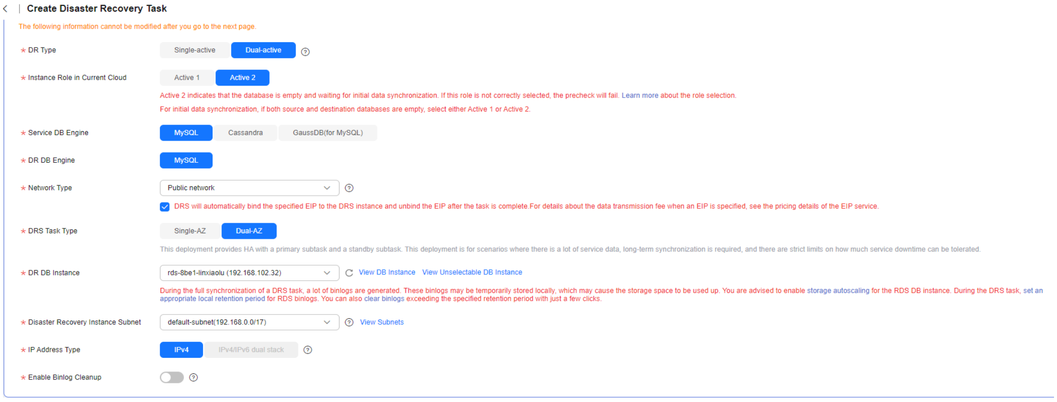
- You have logged in to the DRS console.

Scenarios

Step 1 On the **Disaster Recovery Management** page, click **Create Disaster Recovery Task**.

Step 2 On the **Create Disaster Recovery Instance** page, configure the task name, description, and the DR instance details, set **DRS Task Type** to **Dual-AZ**, and click **Next**.

Figure 3-35 Primary/Standby

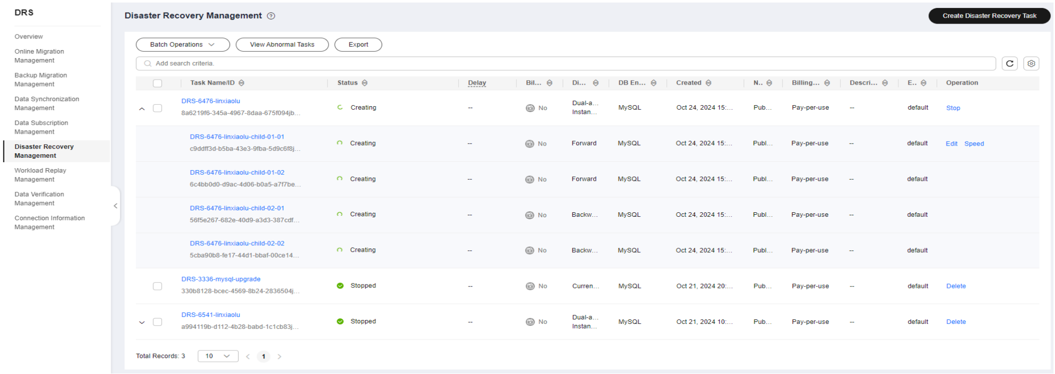


The following information cannot be modified after you go to the next page.

* DR Type	Single-active [✓ Dual-active]
* Instance Role in Current Cloud	Active 1 [✓ Active 2] Active 2 indicates that the database is empty and waiting for initial data synchronization. If this role is not correctly selected, the precheck will fail. Learn more about the role selection. For initial data synchronization, if both source and destination databases are empty, select either Active 1 or Active 2.
* Service DB Engine	[✓ MySQL] Cassandra GaussDB(for MySQL)
* DR DB Engine	[✓ MySQL]
* Network Type	Public network ☑ DRS will automatically bind the specified EIP to the DRS instance and unbind the EIP after the task is complete.For details about the data transmission fee when an EIP is specified, see the pricing details of the EIP service.
* DRS Task Type	Single-AZ [✓ Dual-AZ] This deployment provides HA with a primary subtask and a standby subtask. This deployment is for scenarios where there is a lot of service data, long-term synchronization is required, and there are strict limits on how much service downtime can be tolerated.
* DR DB Instance	rds-8be1-linxiaolu (192.168.102.32) View DB Instance View Unselectable DB Instance During the full synchronization of a DRS task, a lot of binlogs are generated. These binlogs may be temporarily stored locally, which may cause the storage space to be used up. You are advised to enable storage autoscaling for the RDS DB instance. During the DRS task, set an appropriate local retention period for RDS binlogs. You can also clear binlogs exceeding the specified retention period with just a few clicks.
* Disaster Recovery Instance Subnet	default-subnet(192.168.0.0/17) View Subnets
* IP Address Type	[✓ IPv4] IPv4/IPv6 dual stack
* Enable Binlog Cleanup	○

Step 3 Return to the **Disaster Recovery Management** page, you can find that DRS creates a standby task for each subtask.

Figure 3-36 Primary/Standby tasks



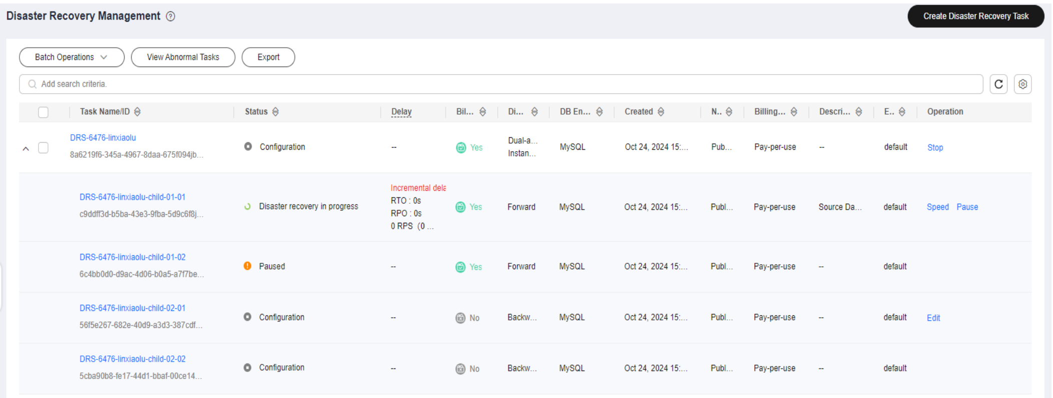
DRS
Overview
Online Migration Management
Backup Migration Management
Data Synchronization Management
Data Subscription Management
Disaster Recovery Management
Workload Replay Management
Data Verification Management
Connection Information Management
Disaster Recovery Management
Create Disaster Recovery Task
Batch Operations
View Abnormal Tasks
Export
Add search criteria.

Task Name/ID	Status	Delay	Bil...	Di...	DB En...	Created	N..	Billing...	Descri...	E..	Operation
DRS-6476-linxiaolu 8a6219f6-345a-4967-8daa-675f094jb...	Creating	--	No	Dual-a... Instan...	MySQL	Oct 24, 2024 15:...	Pub...	Pay-per-use	--	default	Stop
DRS-6476-linxiaolu-child-01-01 c9ddff3d-b5ba-43e3-9fba-5d9c6f8j...	Creating	--	No	Forward	MySQL	Oct 24, 2024 15:...	Publ...	Pay-per-use	--	default	Edit Speed
DRS-6476-linxiaolu-child-01-02 6c4bb0d0-d9ac-4d06-b0a5-a7f7be...	Creating	--	No	Forward	MySQL	Oct 24, 2024 15:...	Publ...	Pay-per-use	--	default	
DRS-6476-linxiaolu-child-02-01 56f5e267-682e-40d9-a3d3-387cdf...	Creating	--	No	Backw...	MySQL	Oct 24, 2024 15:...	Publ...	Pay-per-use	--	default	
DRS-6476-linxiaolu-child-02-02 5cba90b8-fe17-44d1-bbaf-00ce14...	Creating	--	No	Backw...	MySQL	Oct 24, 2024 15:...	Publ...	Pay-per-use	--	default	
DRS-3336-mysql-upgrade 330b8128-bcec-4569-8b24-2836504j...	Stopped	--	No	Curren...	MySQL	Oct 21, 2024 20:...	Pub...	Pay-per-use	--	default	Delete
DRS-6541-linxiaolu a994119b-d112-4b28-babd-1c1cb83j...	Stopped	--	No	Dual-a... Instan...	MySQL	Oct 21, 2024 10:...	Pub...	Pay-per-use	--	default	Delete

Total Records: 3 10 < 1 >

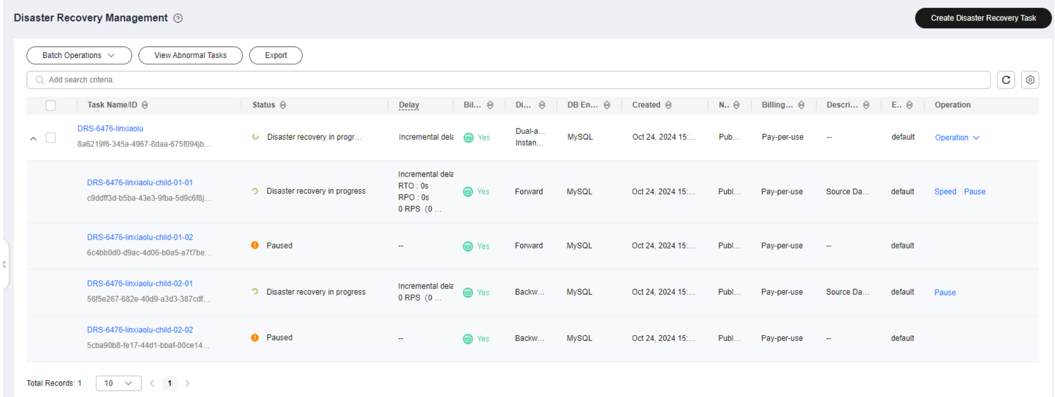
Step 4 After the forward DR task is configured and started, DRS will start the forward task in the primary AZ, and the forward task in the standby AZ is suspended.

Figure 3-37 Before the primary/standby switchover



Task Name/ID	Status	Delay	Bil...	Di...	DB En...	Created	N..	Billing...	Descri...	E..	Operation
DRS-6476-linxiaolu 8a6219f6-345a-4967-8daa-675f094jb...	Configuration	--	Yes	Dual-a... Instan...	MySQL	Oct 24, 2024 15:...	Pub...	Pay-per-use	--	default	Stop
DRS-6476-linxiaolu-child-01-01 c9ddff3d-b5ba-43e3-9fba-5d9c6f8j...	Disaster recovery in progress	Incremental dela RTO : 0s RPO : 0s 0 RPS (0 ...	Yes	Forward	MySQL	Oct 24, 2024 15:...	Publ...	Pay-per-use	Source Da...	default	Speed Pause
DRS-6476-linxiaolu-child-01-02 6c4bb0d0-d9ac-4d06-b0a5-a7f7be...	Paused	--	Yes	Forward	MySQL	Oct 24, 2024 15:...	Publ...	Pay-per-use	--	default	
DRS-6476-linxiaolu-child-02-01 56f5e267-682e-40d9-a3d3-387cdf...	Configuration	--	No	Backw...	MySQL	Oct 24, 2024 15:...	Publ...	Pay-per-use	--	default	Edit
DRS-6476-linxiaolu-child-02-02 5cba90b8-fe17-44d1-bbaf-00ce14...	Configuration	--	No	Backw...	MySQL	Oct 24, 2024 15:...	Publ...	Pay-per-use	--	default	

Step 5 When the forward task is in the DR state, DRS will start the backward task in the primary AZ, and the backward task in the standby AZ is suspended.

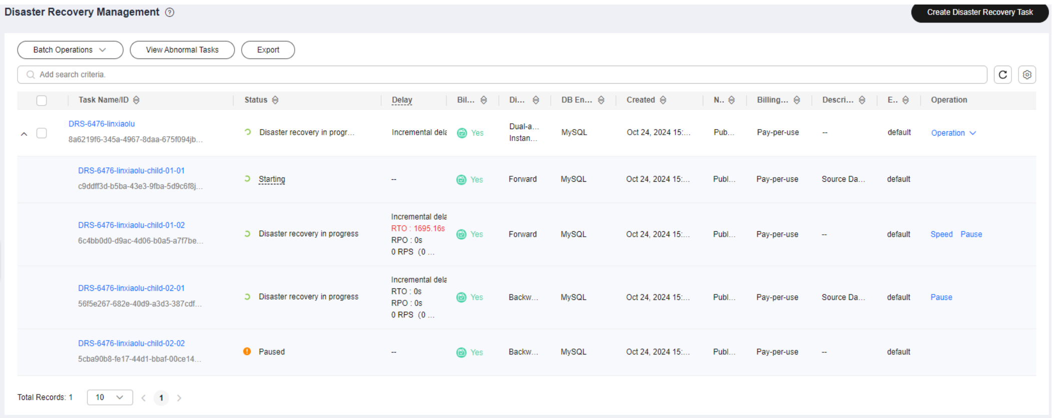


Task Name/ID	Status	Delay	Bil...	Di...	DB En...	Created	N..	Billing...	Descri...	E..	Operation
DRS-6476-linxiaolu 8a6219f6-345a-4967-8daa-675f094jb...	Disaster recovery in progr...	Incremental dela	Yes	Dual-a... Instan...	MySQL	Oct 24, 2024 15:...	Pub...	Pay-per-use	--	default	Operation
DRS-6476-linxiaolu-child-01-01 c9ddff3d-b5ba-43e3-9fba-5d9c6f8j...	Disaster recovery in progress	Incremental dela RTO : 0s RPO : 0s 0 RPS (0 ...	Yes	Forward	MySQL	Oct 24, 2024 15:...	Publ...	Pay-per-use	Source Da...	default	Speed Pause
DRS-6476-linxiaolu-child-01-02 6c4bb0d0-d9ac-4d06-b0a5-a7f7be...	Paused	--	Yes	Forward	MySQL	Oct 24, 2024 15:...	Publ...	Pay-per-use	--	default	
DRS-6476-linxiaolu-child-02-01 56f5e267-682e-40d9-a3d3-387cdf...	Disaster recovery in progress	Incremental dela 0 RPS (0 ...	Yes	Backw...	MySQL	Oct 24, 2024 15:...	Publ...	Pay-per-use	Source Da...	default	Pause
DRS-6476-linxiaolu-child-02-02 5cba90b8-fe17-44d1-bbaf-00ce14...	Paused	--	Yes	Backw...	MySQL	Oct 24, 2024 15:...	Publ...	Pay-per-use	--	default	

Total Records: 1 10 1

Step 6 If the forward task in the primary AZ is abnormal, DRS automatically starts the forward task in the standby AZ to continue the synchronization.

Figure 3-38 After the primary/standby switchover

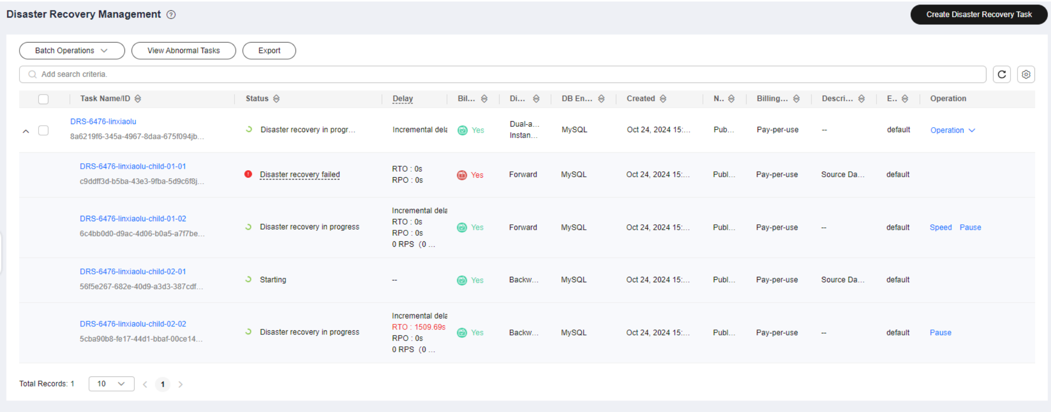


Task Name/ID	Status	Delay	Bil...	Di...	DB En...	Created	N..	Billing...	Descri...	E..	Operation
DRS-6476-linxiaolu 8a6219f6-345a-4967-8daa-675f094jb...	Disaster recovery in progr...	Incremental dela	Yes	Dual-a... Instan...	MySQL	Oct 24, 2024 15:...	Pub...	Pay-per-use	--	default	Operation
DRS-6476-linxiaolu-child-01-01 c9ddff3d-b5ba-43e3-9fba-5d9c6f8j...	Starting	--	Yes	Forward	MySQL	Oct 24, 2024 15:...	Publ...	Pay-per-use	Source Da...	default	
DRS-6476-linxiaolu-child-01-02 6c4bb0d0-d9ac-4d06-b0a5-a7f7be...	Disaster recovery in progress	Incremental dela RTO : 1695.16s RPO : 0s 0 RPS (0 ...	Yes	Forward	MySQL	Oct 24, 2024 15:...	Publ...	Pay-per-use	--	default	Speed Pause
DRS-6476-linxiaolu-child-02-01 56f5e267-682e-40d9-a3d3-387cdf...	Disaster recovery in progress	Incremental dela RTO : 0s RPO : 0s 0 RPS (0 ...	Yes	Backw...	MySQL	Oct 24, 2024 15:...	Publ...	Pay-per-use	Source Da...	default	Pause
DRS-6476-linxiaolu-child-02-02 5cba90b8-fe17-44d1-bbaf-00ce14...	Paused	--	Yes	Backw...	MySQL	Oct 24, 2024 15:...	Publ...	Pay-per-use	--	default	

Total Records: 1 10 1

Step 7 If the backward task in the primary AZ is abnormal, DRS automatically starts the backward task in the standby AZ to continue the synchronization.

Figure 3-39 Primary/Standby tasks



Task Name/ID	Status	Delay	Bil...	Di...	DB En...	Created	N..	Billing...	Descri...	E..	Operation
DRS-6476-linxiaolu 8a6219f6-345a-4967-8daa-675f094jb...	Disaster recovery in progr...	Incremental dela	Yes	Dual-a... Instan...	MySQL	Oct 24, 2024 15:...	Pub...	Pay-per-use	--	default	Operation
DRS-6476-linxiaolu-child-01-01 c9ddff3d-b5ba-43e3-9fba-5d9c6f8j...	Disaster recovery failed	RTO : 0s RPO : 0s	Yes	Forward	MySQL	Oct 24, 2024 15:...	Publ...	Pay-per-use	Source Da...	default	
DRS-6476-linxiaolu-child-01-02 6c4bb0d0-d9ac-4d06-b0a5-a7f7be...	Disaster recovery in progress	Incremental dela RTO : 0s RPO : 0s 0 RPS (0 ...	Yes	Forward	MySQL	Oct 24, 2024 15:...	Publ...	Pay-per-use	--	default	Speed Pause
DRS-6476-linxiaolu-child-02-01 56f5e267-682e-40d9-a3d3-387cdf...	Starting	--	Yes	Backw...	MySQL	Oct 24, 2024 15:...	Publ...	Pay-per-use	Source Da...	default	
DRS-6476-linxiaolu-child-02-02 5cba90b8-fe17-44d1-bbaf-00ce14...	Disaster recovery in progress	Incremental dela RTO : 1509.69s RPO : 0s 0 RPS (0 ...	Yes	Backw...	MySQL	Oct 24, 2024 15:...	Publ...	Pay-per-use	--	default	Pause

Total Records: 1 10 1

----End

3.5.13 Performing a Primary/Standby Switchover for DR Tasks

DRS supports primary/standby switchover for DR tasks. If both RPO and RTO are 0, data has been completely migrated to the DR database. Then, you can determine whether to perform a switchover.

- RPO measures the difference between the data in the service database and the data in the DRS instance. When RPO is 0, all the data in the service database has been migrated to the DRS instance.
- RTO measures the amount of data being transmitted. When RTO is 0, all transactions on the DRS instance have been completed on the DR database.

Prerequisites

- You have logged in to the DRS console.
- You have created a DR task.

Primary/Standby Switchover

Step 1 On the **Disaster Recovery Management** page, click the target DR task in the **Task Name/ID** column.

Step 2 On the **Basic Information** tab, click the **Disaster Recovery Monitoring** tab.

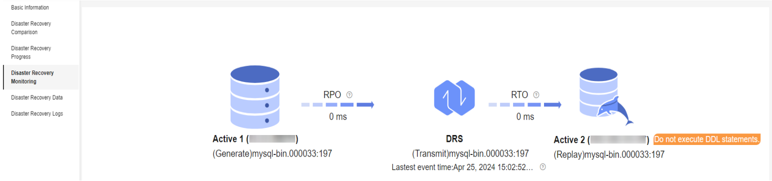
Step 3 A primary/secondary switchover can be performed only when the task status is disaster recovery in progress. Click **Promote Current Cloud** to promote the current instance to the service database. Click **Demote Current Cloud** to demote the current instance to the disaster recovery database.

The DR relationship involves only one primary database. During a primary/standby switchover, ensure that there is no data written to the database that will be the standby node, and no data will be written to the standby node in the future. The data of the standby node is synchronized only from the primary node. Any other write operations will pollute the data in the standby database, data conflicts occur in the DR center and cannot be resolved.

NOTE

Data DR from DDM to DDM involves multiple tasks and does not support primary/standby switchover on the **Disaster Recovery Monitoring** tab. You can perform a switchover by referring to **Performing Primary/Standby Switchovers in Batches**.

Figure 3-40 DR monitoring


Basic Information
Disaster Recovery Comparison
Disaster Recovery Progress
Disaster Recovery Monitoring
Disaster Recovery Data
Disaster Recovery Logs
RPO
0 ms
RTO
0 ms
DRS

Active 1 ([redacted])
(Generate)mysql-bin.000033:197

DRS
(Transmit)mysql-bin.000033:197
Lastest event time:Apr 25, 2024 15:02:52...

Active 2 ([redacted]) Do not execute DDL statements.
(Replay)mysql-bin.000033:197

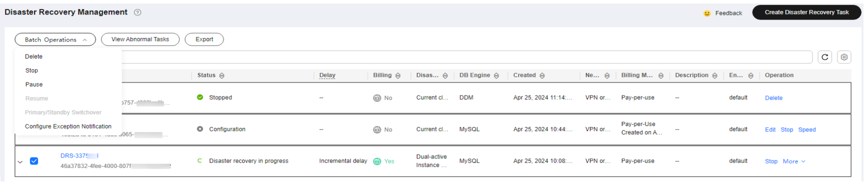
----End

Performing Primary/Standby Switchovers in Batches

Step 1 On the **Disaster Recovery Management** page, select the tasks.

Step 2 Click **Batch Operations** in the upper left corner and choose **Primary/Standby Switchover**.

Figure 3-41 Batch Operations


Disaster Recovery Management
Feedback
Create Disaster Recovery Task
Batch Operations
View Abnormal Tasks
Export
Delete
Stop
Pause
Resume
Primary/Standby Switchover
Configure Exception Notification

		Status	Delay	Billing	Disas...	DB Engine	Created	Ne...	Billing M...	Description	En...	Operation
	...5757-[redacted]...	Stopped	--	No	Current cl...	DDM	Apr 25, 2024 11:14:...	VPN or...	Pay-per-use	--	default	Delete
	...065-[redacted]...	Configuration	--	No	Current cl...	MySQL	Apr 25, 2024 10:44:...	VPN or...	Pay-per-Use Created on A...	--	default	Edit Stop Speed
☑	DRS-3375[redacted] 46a37832-4fee-4000-807f[redacted]	Disaster recovery in progress	Incremental delay	Yes	Dual-active Instance ...	MySQL	Apr 25, 2024 10:08:...	VPN or...	Pay-per-use	--	default	Stop More

Step 3 In the displayed dialog box, confirm the task information and click **Yes**.

----End

3.5.14 Exchanging the DR Direction

In dual-active DR, only forward tasks support DDL execution to prevent DDL loopback. DRS allows you to exchange the direction of a DR task. You can use this function to change the task role to enable DDL execution on backward tasks.

Constraints

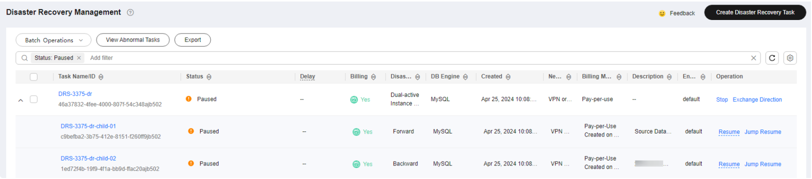
- This function is available only for dual-active DR tasks.
- The direction can be exchanged only when both the forward and backward tasks are paused.
- You need to resume the task to apply the change.

Procedure

Step 1 On the **Disaster Recovery Management** page, locate the paused dual-active DR task.

Subtask 1 is a forward task.

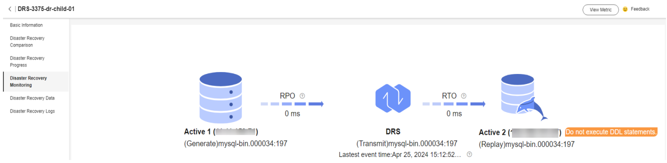
Figure 3-42 Before direction exchange



□	Task Name/ID	Status	Delay	Billing	Disas...	DB Engine	Created	Ne...	Billing M...	Description	En...	Operation
□	DRS-3375-dr 46a37832-4fee-4000-807f-54c348ajb502	Paused	--	Yes	Dual-active Instance ...	MySQL	Apr 25, 2024 10:08:...	VPN or...	Pay-per-use	--	default	Stop Exchange Direction
	DRS-3375-dr-child-01 c9befba2-3b75-412e-8151-f260ff9jb502	Paused	--	Yes	Forward	MySQL	Apr 25, 2024 10:08...	VPN ...	Pay-per-Use Created on ...	Source Data...	default	Resume Jump Resume
	DRS-3375-dr-child-02 1ed72f4b-19f9-4f1a-bb9d-ffac20ajb502	Paused	--	Yes	Backward	MySQL	Apr 25, 2024 10:08...	VPN ...	Pay-per-Use Created on ...	[redacted]...	default	Resume Jump Resume

View the DR monitoring of subtask 1. The DDL execution is disabled on active node 2.

Figure 3-43 DR monitoring before direction exchange



RPO 0 ms

RTO 0 ms

Active 1 ([redacted])
(Generate)mysql-bin.000034:197

DRS
(Transmit)mysql-bin.000034:197
Lastest event time:Apr 25, 2024 15:12:52...

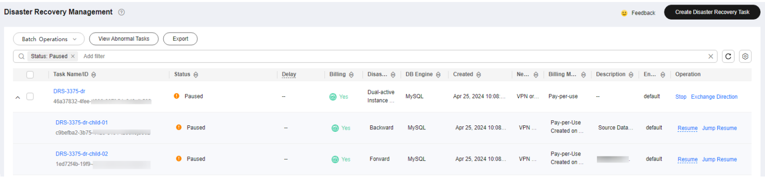
Active 2 ([redacted]) Do not execute DDL statements.
(Replay)mysql-bin.000034:197

Step 2 Click **Exchange Direction** in the **Operation** column of the task.

Step 3 In the displayed dialog box, click **Yes**.

Step 4 After the direction exchange, view that the DR relationship of subtask 1 changes and subtask 1 becomes a backward task.

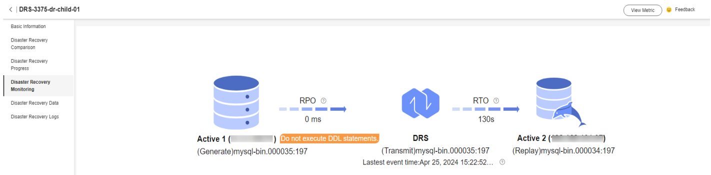
Figure 3-44 After direction exchange



Task Name/ID	Status	Delay	Billing	Disas...	DB Engine	Created	Ne...	Billing M...	Description	En...	Operation
DRS-3375-dr 46a37832-4fee-[redacted]	Paused	--	Yes	Dual-active Instance ...	MySQL	Apr 25, 2024 10:08:...	VPN or...	Pay-per-use	--	default	Stop Exchange Direction
DRS-3375-dr-child-01 c9befba2-3b75-[redacted]	Paused	--	Yes	Backward	MySQL	Apr 25, 2024 10:08...	VPN ...	Pay-per-Use Created on ...	Source Data...	default	Resume Jump Resume
DRS-3375-dr-child-02 1ed72f4b-19f9-[redacted]	Paused	--	Yes	Forward	MySQL	Apr 25, 2024 10:08...	VPN ...	Pay-per-Use Created on ...	[redacted]	default	Resume Jump Resume

View the DR monitoring of subtask 1. The DDL execution is disabled on active node 1.

Figure 3-45 DR monitoring after direction exchange



RPO 0 ms

RTO 130s

Active 1 ([redacted]) Do not execute DDL statements.
(Generate)mysql-bin.000035:197

DRS
(Transmit)mysql-bin.000035:197
Lastest event time:Apr 25, 2024 15:22:52...

Active 2 ([redacted])
(Replay)mysql-bin.000034:197

Step 5 Click **Resume** in the **Operation** column of the subtask.

----End

3.5.15 Changing Specifications

You can change the DRS task specifications based on your service requirements. After the specification change starts, the task enters the **Changing specifications** state and data disaster recovery is suspended. After the specification change is complete, the task is automatically resumed.

Constraints

- You can change the task specifications only when your account balance is more than $0 USD.
- DRS allows you to upgrade specifications only for real-time DR tasks from MySQL to MySQL, from MySQL to GaussDB(for MySQL), and from GaussDB(for MySQL) to GaussDB(for MySQL). Task specifications cannot be downgraded.

- DRS allows you to change the specifications of only tasks in the **Initializing** or **Disaster recovery in progress** state.
- Before changing the task specifications, ensure that the current AZ supports the target specifications.
- You are advised to change the task specifications during off-peak hours.
- After the specification change starts, the task is suspended. The task is automatically resumed after the change is complete.
- It takes about 5 to 10 minutes to change the task specifications.

Procedure

Step 1 Log in to the management console.

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

Step 3 Choose **Databases** > **Data Replication Service**. The **Data Replication Service** page is displayed.

Step 4 On the **Disaster Recovery Management** page, select the target task and choose **More** > **Change Specifications** in the **Operation** column.

Step 5 On the displayed page, select the desired specifications, perform a pre-check, and click **Next**.

Step 6 Confirm specifications.

- If you need to modify your settings, click **Previous**.
- For pay-per-use instances, click **Change**.

  To view the cost incurred by the specifications change, choose **Billing Center** > **Cost Bills** in the upper right corner.
- For yearly/monthly DB instances, click **Change**. On the displayed page, click **Pay**. You can change the specifications only after the payment is successful.

Step 7 View the task specification change result.

After the application is submitted, click **Back to Task List**. On the **Disaster Recovery Management** page, the instance status is **Changing specifications**.

After the task status changes from **Changing specifications** to another status, you can view the instance specifications on the **Basic Information** page to check whether the change is successful. Alternatively, you can view the change logs on the **Synchronization Logs** page to whether the change is successful.

- **change specification start**: indicates that the specification change starts.
- **change specification success**: indicates that the specifications are changed.
- **change specification failed**: indicates that the specifications fail to be changed.

----End

3.5.16 Unsubscribing from a Yearly/Monthly Task

To delete a DRS task billed on the yearly/monthly basis, you need to unsubscribe the order.

Prerequisites

- You have logged in to the DRS console.
- The billing mode of the current DRS instance is yearly/monthly.

Method 1

Unsubscribe from a yearly/monthly task on the **Disaster Recovery Management** page.

Step 1 Log in to the management console.

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

Choose **Databases** > **Data Replication Service**. The **Data Replication Service** page is displayed.

Step 3 On the **Disaster Recovery Management** page, select the target task and choose **More** > **Unsubscribe** in the **Operation** column.

Step 4 In the displayed dialog box, click **Yes**. The **Unsubscribe from Resource** page is displayed.

Step 5 On the **Unsubscribe from Resource** page, verify the information about the instance to be unsubscribed, specify a reason, select the ckeck box, and click **Confirm**.

NOTE

After a DRS instance is unsubscribed, the DRS task ends immediately. Ensure that data DR is complete or the DRS instance is no longer used.

Step 6 In the displayed dialog box, click **Yes**.

----End

Method 2

Unsubscribe from a yearly/monthly task on the **Billing Center** page.

Step 1 Log in to the management console.

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

Step 3 Choose **Databases** > **Data Replication Service**. The **Data Replication Service** page is displayed.

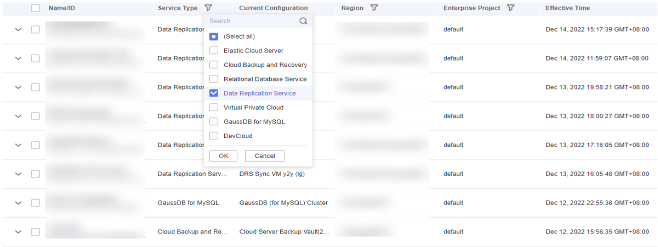
Step 4 Click **Billing & Costs** from the top menu bar. The **Billing Center** page is displayed.

Step 5 In the navigation pane, choose **Orders** > **Unsubscriptions**.

Step 6 On the displayed page, select the order to be unsubscribed and click **Unsubscribe** in the **Operation** column.

- You can select DRS in the **Service Type** to filter all DRS orders.

Figure 3-46 Filtering all orders



	□	Name/ID	Service Type	Current Configuration	Region	Enterprise Project	Effective Time
⌄	□	[redacted]	Data Replicatio		[redacted]	default	Dec 14, 2022 15:17:39 GMT+08:00
⌄	□	[redacted]	Data Replicatio		[redacted]	default	Dec 14, 2022 11:59:07 GMT+08:00
⌄	□	[redacted]	Data Replicatio		[redacted]	default	Dec 13, 2022 19:58:21 GMT+08:00
⌄	□	[redacted]	Data Replicatio		[redacted]	default	Dec 13, 2022 18:00:27 GMT+08:00
⌄	□	[redacted]	Data Replicatio		[redacted]	default	Dec 13, 2022 17:16:05 GMT+08:00
⌄	□	[redacted]	Data Replication Serv...	DRS Sync VM y2y (lg)	[redacted]	default	Dec 13, 2022 16:05:48 GMT+08:00
⌄	□	[redacted]	GaussDB for MySQL	GaussDB (for MySQL) Cluster	[redacted]	default	Dec 12, 2022 22:55:38 GMT+08:00
⌄	□	[redacted]	Cloud Backup and Re...	Cloud Server Backup Vault|2...	[redacted]	default	Dec 12, 2022 15:56:35 GMT+08:00

- Alternatively, search for target orders by name, order No., or ID in the search box.

Step 7 On the displayed page, confirm the order to be unsubscribed from and select a reason. Then, click **Confirm**.

For unsubscription details, see **Unsubscription Rules**.

Step 8 In the displayed dialog box, click **Yes**.

NOTE

After a DRS instance is unsubscribed, the DRS task ends immediately. Ensure that data synchronization is complete or the DRS instance is no longer used.

----End

3.5.17 Stopping a DR Task

When the DR task is complete or no longer needed, you can stop the DR task. You can stop a task in any of the following statuses:

- Creating
- Configuration
- Initializing
- Disaster recovery in progress
- Paused
- Disaster recovery failed

NOTICE

- For a task in the **Configuration** state, it cannot be stopped if it fails to be configured.
- After a task is stopped, it cannot be resumed.

Procedure

Step 1 In the task list on the **Disaster Recovery Management** page, locate the target task and click **Stop** in the **Operation** column.

Step 2 In the displayed dialog box, click **Yes**.

NOTE

- If the task status is abnormal (for example, the task fails or the network is abnormal), DRS will select **Forcibly stop task** to preferentially stop the task to reduce the waiting time.
- Forcibly stopping a task will release DRS resources. Check whether the synchronization is affected.
- To stop the task properly, restore the DRS task first. After the task status becomes normal, click **Stop**.
- For a DRS task that is in the DR state and with MySQL serving as the source database, after you select **Display breakpoint information when the task is stopped** when you stop the task, the GTID and binlog position information of the source database will be displayed on the disaster recovery progress page after the task is stopped.

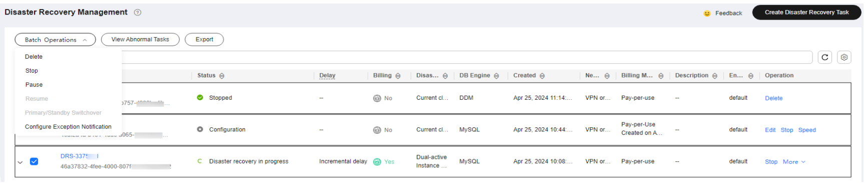
----End

Stopping Tasks

Step 1 On the **Disaster Recovery Management** page, select tasks you wan to stop.

Step 2 Click **Batch Operations** in the upper left corner and choose **Stop**.

Figure 3-47 Batch Operations



Disaster Recovery Management
Feedback
Create Disaster Recovery Task
Batch Operations
View Abnormal Tasks
Export
Delete
Stop
Pause
Resume
Primary/Standby Switchover
Configure Exception Notification

	Status	Delay	Billing	Disas...	DB Engine	Created	Ne...	Billing M...	Description	En...	Operation
...5757-[redacted]...	Stopped	--	No	Current cl...	DDM	Apr 25, 2024 11:14:...	VPN or...	Pay-per-use	--	default	Delete
...d065-[redacted]...	Configuration	--	No	Current cl...	MySQL	Apr 25, 2024 10:44:...	VPN or...	Pay-per-Use Created on A...	--	default	Edit Stop Speed
☑ DRS-3375[redacted] 46a37832-4fee-4000-807f[redacted]	Disaster recovery in progress	Incremental delay	Yes	Dual-active Instance ...	MySQL	Apr 25, 2024 10:08:...	VPN or...	Pay-per-use	--	default	Stop More

Step 3 In the displayed dialog box, confirm the task information and click **Yes**.

----End

3.5.18 Deleting a DR Task

You can delete a DR task, when it is no longer needed Deleted tasks will no longer be displayed in the task list. Exercise caution when performing this operation.

Prerequisites

You have logged in to the DRS console.

Deleting a Task

Step 1 In the task list on the **Disaster Recovery Management** page, locate the target task and click **Delete** in the **Operation** column.

Step 2 Click **Yes** to submit the deletion task.

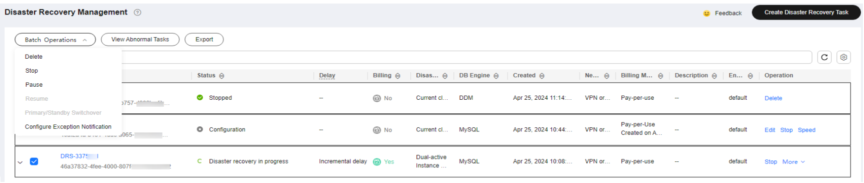
----End

Deleting Tasks

Step 1 On the **Disaster Recovery Management** page, select the tasks to be deleted.

Step 2 Click **Batch Operations** in the upper left corner and choose **Delete**.

Figure 3-48 Batch Operations


Disaster Recovery Management
Feedback
Create Disaster Recovery Task
Batch Operations
View Abnormal Tasks
Export
Delete
Stop
Pause
Resume
Primary/Standby Switchover
Configure Exception Notification

		Status	Delay	Billing	Disas...	DB Engine	Created	Ne...	Billing M...	Description	En...	Operation
	…b757-[redacted]…	Stopped	--	No	Current cl...	DDM	Apr 25, 2024 11:14:...	VPN or...	Pay-per-use	--	default	Delete
	…a065-[redacted]…	Configuration	--	No	Current cl...	MySQL	Apr 25, 2024 10:44:...	VPN or...	Pay-per-Use Created on A...	--	default	Edit Stop Speed
☑	DRS-3375[redacted] 46a37832-4fee-4000-807f[redacted]	Disaster recovery in progress	Incremental delay	Yes	Dual-active Instance ...	MySQL	Apr 25, 2024 10:08:...	VPN or...	Pay-per-use	--	default	Stop More

Step 3 In the displayed dialog box, confirm the task information and click **Yes**.

----End

3.5.19 Upgrading the Version of a DRS Task

In 24.10.0 and later versions, you can upgrade the version of a DRS task on the console immediately or as scheduled. You can set an upgrade time window. During the time window, the system checks whether a task meets the upgrade conditions every 10 minutes. If the task meets the upgrade conditions, the system delivers the request to the kernel for version upgrade.

Constraints

- The upgrade conditions displayed on the console are as follows:
  - The task is in the incremental state.
  - The kernel version must be 24.10.0 or later. To upgrade the DRS kernel, submit a service ticket by choosing **Service Tickets > Create Service Ticket** in the upper right corner of the management console.
  - The task has a version that can be upgraded.
  - The version upgrade function is available only for synchronization, migration, and DR tasks.
- The upgrade conditions on which the management system depends for delivering an upgrade command are as follows:
  - The task is in the incremental state.
  - The task latency is no more than 30s.
  - The task has a version that can be upgraded, and the upgrade time is within a specified time range.
  - In the multi-task scenario, an upgrade can be performed only when all subtasks meet the preceding conditions.
- After receiving the upgrade request from the management system, the kernel downloads the new version and monitors and checks whether the upgrade is successful based on the following conditions:
  - The log download, parsing, and incremental migration processes are normal.
  - The incremental position is updated properly.
- The maximum monitoring duration is 10 minutes. (If the system detects that the incremental position is updated properly within 3 minutes and the

preceding processes are normal within 3 minutes, the monitoring terminates within 3 minutes.)

- If the task upgrade fails, the system rolls back the version. The entire upgrade process is displayed in the **Migration Logs** page on the console.
- The task cannot be paused during version upgrade.

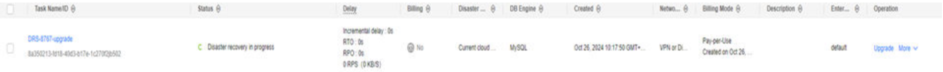
Prerequisites

- The task is in the incremental state. The task has been upgraded to the baseline version. The **Upgrade** button is available in the task list.

Procedure

Step 1 On the **Disaster Recovery Management** page, locate the target task and click **Upgrade** in the **Operation** column.

Figure 3-49 Task management

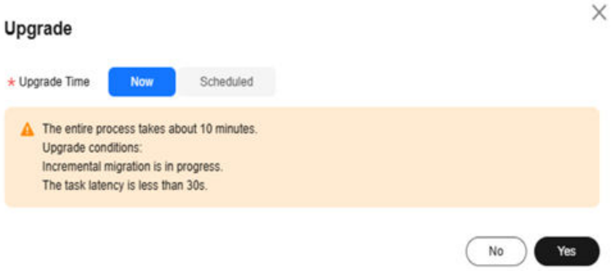


□	Task Name/ID	Status	Delay	Billing	Disaster ...	DB Engine	Created	Netwo...	Billing Mode	Description	Enter...	Operation
□	DRS-8767-upgrade 8a350213-fd18-40d3-b17e-1c270f2b502	Disaster recovery in progress	Incremental delay : 0s RTO : 0s RPO : 0s 0 RPS (0 KB/S)	No	Current cloud ...	MySQL	Oct 26, 2024 10:17:50 GMT+...	VPN or Di...	Pay-per-Use Created on Oct 26, ...		default	Upgrade More

Step 2 In the **Upgrade** dialog box, select **Now** or **Scheduled** for **Upgrade Time**.

1. After you click **Now**, the task upgrade starts.

Figure 3-50 Upgrading a task



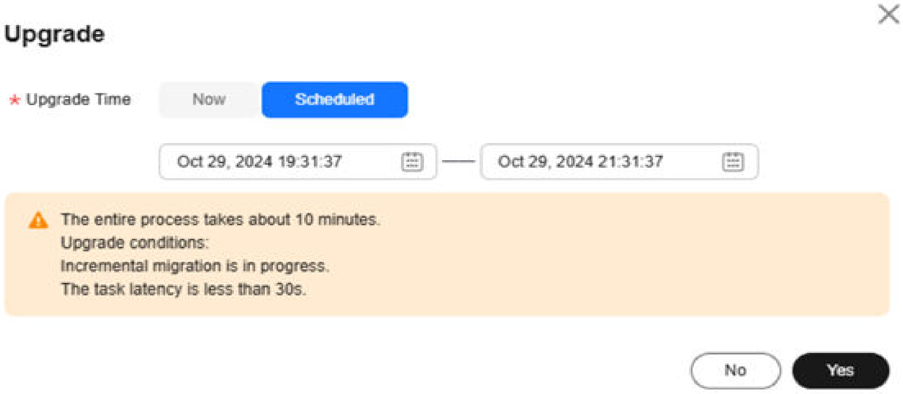
Upgrade

* Upgrade Time [✓ Now] Scheduled

The entire process takes about 10 minutes.
Upgrade conditions:
Incremental migration is in progress.
The task latency is less than 30s.

2. If you select **Scheduled** for **Upgrade Time**, specify a time range for task upgrade.

Figure 3-51 Upgrading a task as scheduled



Upgrade

* Upgrade Time Now [✓ Scheduled]

Oct 29, 2024 19:31:37 — Oct 29, 2024 21:31:37

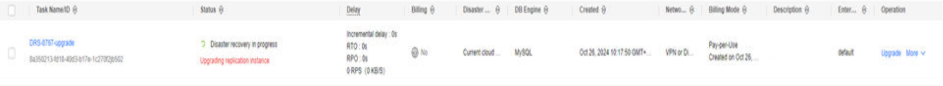
The entire process takes about 10 minutes.
Upgrade conditions:
Incremental migration is in progress.
The task latency is less than 30s.

----End

Viewing the Upgrade Status

- During the upgrade, the task status is **Upgrading replication instance** in the task list.

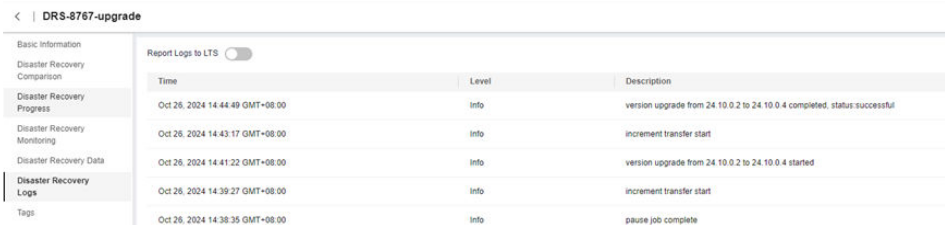
Figure 3-52 Upgrading



Task Name/ID	Status	Delay	Billing	Disaster ...	DB Engine	Created	Netwo...	Billing Mode	Description	Enter...	Operation
DRS-8767-upgrade 8a350213-f818-40d3-b17e-1c270f2jb502	Disaster recovery in progress Upgrading replication instance	Incremental delay : 0s RTO : 0s RPO : 0s 0 RPS（0 KB/S）	No	Current cloud ...	MySQL	Oct 26, 2024 10:17:50 GMT+...	VPN or Di...	Pay-per-Use Created on Oct 26, ...		default	Upgrade More

- Click the task name to go to the task details page. In the navigation pane, choose **Disaster Recovery Logs** to view upgrade logs.
  - Upgrade success logs

Figure 3-53 Logs



DRS-8767-upgrade

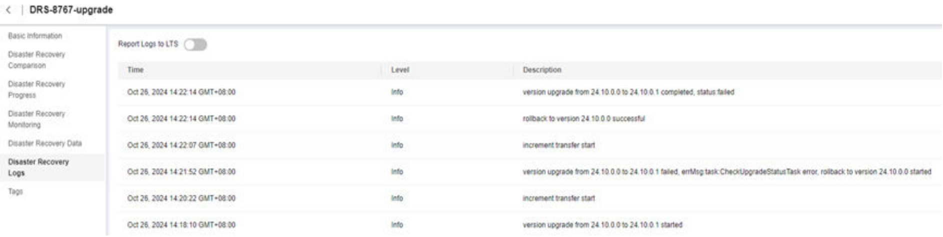
Basic Information
Disaster Recovery Comparison
Disaster Recovery Progress
Disaster Recovery Monitoring
Disaster Recovery Data
Disaster Recovery Logs
Tags

Report Logs to LTS

Time	Level	Description
Oct 26, 2024 14:44:49 GMT+08:00	Info	version upgrade from 24.10.0.2 to 24.10.0.4 completed, status:successful
Oct 26, 2024 14:43:17 GMT+08:00	Info	increment transfer start
Oct 26, 2024 14:41:22 GMT+08:00	Info	version upgrade from 24.10.0.2 to 24.10.0.4 started
Oct 26, 2024 14:39:27 GMT+08:00	Info	increment transfer start
Oct 26, 2024 14:38:35 GMT+08:00	Info	pause job complete

  - Upgrade failure logs

Figure 3-54 Logs



DRS-8767-upgrade

Basic Information
Disaster Recovery Comparison
Disaster Recovery Progress
Disaster Recovery Monitoring
Disaster Recovery Data
Disaster Recovery Logs
Tags

Report Logs to LTS

Time	Level	Description
Oct 26, 2024 14:22:14 GMT+08:00	Info	version upgrade from 24.10.0.0 to 24.10.0.1 completed, status failed
Oct 26, 2024 14:22:14 GMT+08:00	Info	rollback to version 24.10.0.0 successful
Oct 26, 2024 14:22:07 GMT+08:00	Info	increment transfer start
Oct 26, 2024 14:21:52 GMT+08:00	Info	version upgrade from 24.10.0.0 to 24.10.0.1 failed, errMsg:task:CheckUpgradeStatusTask error, rollback to version 24.10.0.0 started
Oct 26, 2024 14:20:22 GMT+08:00	Info	increment transfer start
Oct 26, 2024 14:18:10 GMT+08:00	Info	version upgrade from 24.10.0.0 to 24.10.0.1 started

3.5.20 Task Statuses

DR statuses indicate different DR phases.

Table 3-15 lists DR task statuses and descriptions.

Table 3-15 Task status and description

Status	Description
Creating	A DR instance is being created for DRS.

Status	Description
Configuration	A DR instance is created, but the DR task is not started. You can continue to configure the task.
Frozen	Instances are frozen when the account balance is less than or equal to $0.
Pending start	A scheduled DR task is created for the DR instance, waiting to be started.
Starting	A DR task is starting.
Start failed	A real-time DR task fails to be started.
Initialization	Full data from the service database to the DR database is being initialized.
Initialization completed	The DR task has been initialized.
Disaster recovery in progress	Incremental data from the service database is being synchronized to the DR database.
Switching over	The primary/standby switchover of a DR task is being performed.
Paused	The real-time DR synchronization task is paused.
Disaster recovery failed	A DR task fails during the disaster recovery.
Task stopping	A DR instance and resources are being released.
Completing	A DR instance and resources are being released.
Stopping task failed	Instances and resources used by the DR task fail to be released.
Completed	The DR instance used by a DR task is released successfully.

NOTE

- If a task fails to be created, DRS retains the task for three days by default. After three days, the task automatically stops.
- By default, DRS retains a task in the **Configuration** state for three days. After three days, DRS automatically deletes background resources, but the task status remains unchanged. When you reconfigure the task, DRS applies for resources again.
- Deleted DR tasks are not displayed in the status list.

4 Connection Information Management

4.1 Creating a Database Connection

To facilitate task creation, DRS allows you to create and save source or destination database information on the **Connection Information Management** page. After a task is created, you can select the corresponding database information to test the connection.

Constraints

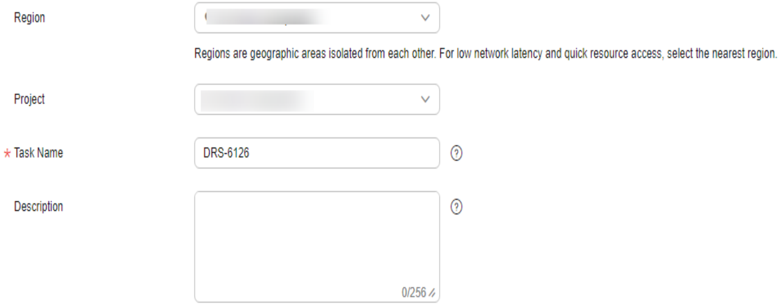
- You can create connection information only for MySQL, PostgreSQL, MongoDB, and Oracle databases.
- You can select connection information in the connection test step only for real-time migration, real-time synchronization, and real-time DR tasks.
- If **Data Flow** of a task is set to **To the cloud** (or **Current cloud as standby**), you can select the connection information for the source database. If **Data Flow** of a task is set to **Out of the cloud** (or **Current cloud as active**), you can select the connection information for the destination database. If **Data Flow** of a task is set to **Self-built to self-built**, you can select the connection information for both the source and destination databases.
- When creating a database connection, you need to select a network type that is the same as that of the DRS task. If the network type of a connection is inconsistent with that of the DRS task, the connection cannot be selected in the connection test step.

Procedure

Step 1 On the **Connection Information Management** page, click **Create Connection Information**.

Step 2 On the **Create Connection Information** page, specify **Region**, **Project**, **Task Name**, and **Description**.

Figure 4-1 Migration task information



Region [redacted]

Regions are geographic areas isolated from each other. For low network latency and quick resource access, select the nearest region.

Project [redacted]

* Task Name DRS-6126

Description 0/256

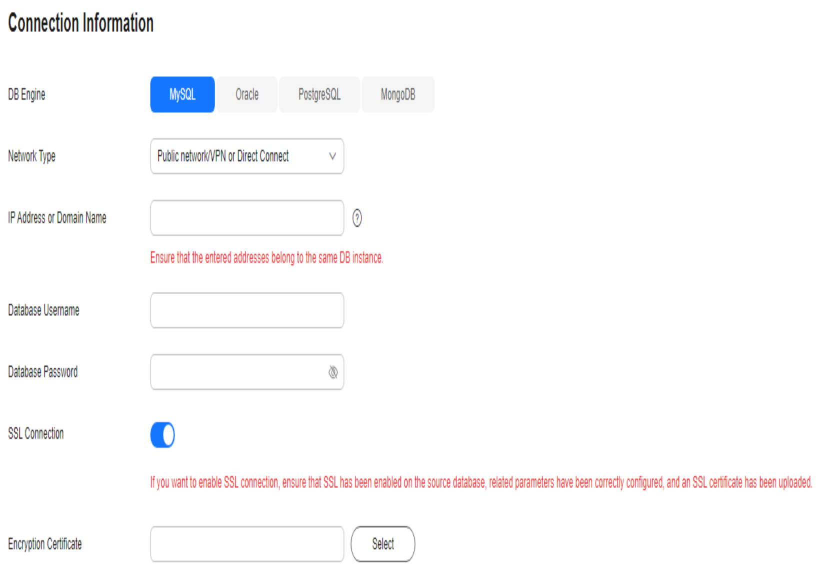
Table 4-1 Task information

Parameter	Description
Region	The region where the task is deployed. You can change the region. To reduce latency and improve access speed, select the region closest to your services.
Project	The project corresponds to the current region and can be changed.
Task Name	The task name must start with a letter and consist of 4 to 50 characters. It can contain only letters, digits, hyphens (-), and underscores (_).
Description	The description can contain up to 256 characters and cannot contain special characters !=<>&'\"

Step 3 In the **Connection Information** area on the **Create Connection Information** page, select a DB engine and network type, enter connection information, and click **Create**.

- MySQL connection information

Figure 4-2 MySQL connection information



Connection Information

DB Engine: MySQL | Oracle | PostgreSQL | MongoDB

Network Type: Public network/VPN or Direct Connect

IP Address or Domain Name:

Ensure that the entered addresses belong to the same DB instance.

Database Username:

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:

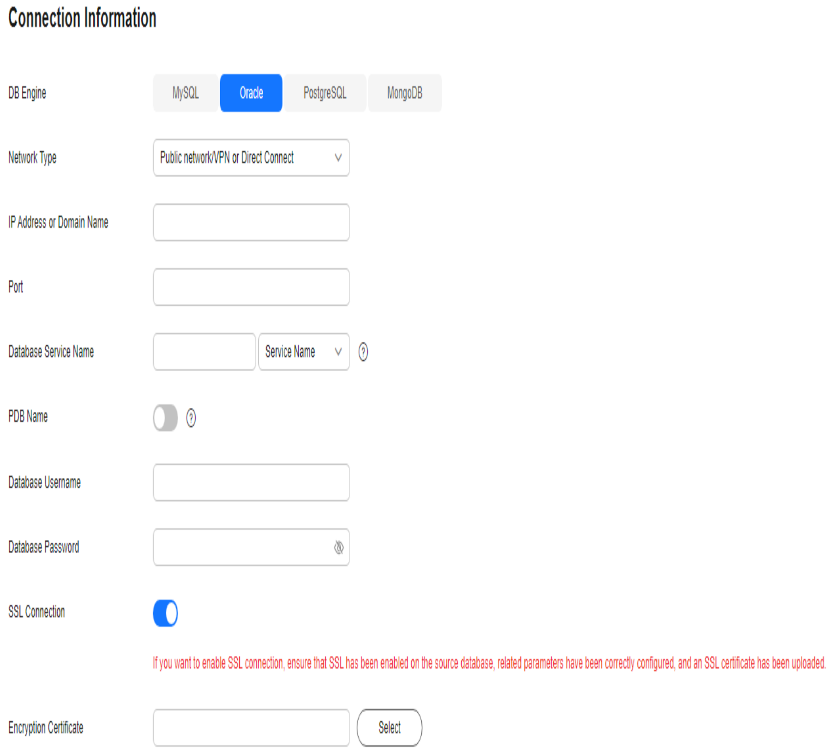
Table 4-2 MySQL connection settings

Parameter	Description
DB Engine	Select **MySQL**.
Network Type	The default value is **Public network/VPN or Direct Connect**. The value can be**Public network/VPN or Direct Connect** or **VPC**. **Public network/VPN or Direct Connect** is used as an example. Note that the selected network type must be the same as the network type of the task to be created. If the network types are different, you cannot select the database connection in the connection test step.
Database Type	This parameter is available when you select **VPC** for **Network Type**. The value can be **Self-built on ECS** or **RDS DB instance**.
VPC	This parameter is available when you select **Self-built on ECS** for **Database Type**. Select the VPC where the ECS-hosted DB instance is located to isolate networks for different services.
Subnet	This parameter is available when you select **Self-built on ECS** for **Database Type**. Select the subnet where the ECS-hosted DB instance is located.
DB Instance Name	This parameter is available when you select **RDS DB instance** for **Database Type**. Select an RDS instance from the drop-down list.
IP Address or Domain Name	The IP address or domain name of the MySQL database.

Parameter	Description
Database Username	Username of the MySQL database.
Database Password	The password for the MySQL database username.
SSL Connection	If SSL connection is required, enable SSL on the database, ensure that related parameters have been correctly configured, and upload an SSL certificate. **NOTE** – The maximum size of a single certificate file that can be uploaded is 500 KB. – If SSL is disabled, your data may be at risk.

- Oracle connection information

Figure 4-3 Oracle connection information



Connection Information

DB Engine: MySQL | **Oracle** | PostgreSQL | MongoDB

Network Type: Public network/VPN or Direct Connect

IP Address or Domain Name

Port

Database Service Name: Service Name

PDB Name

Database Username

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

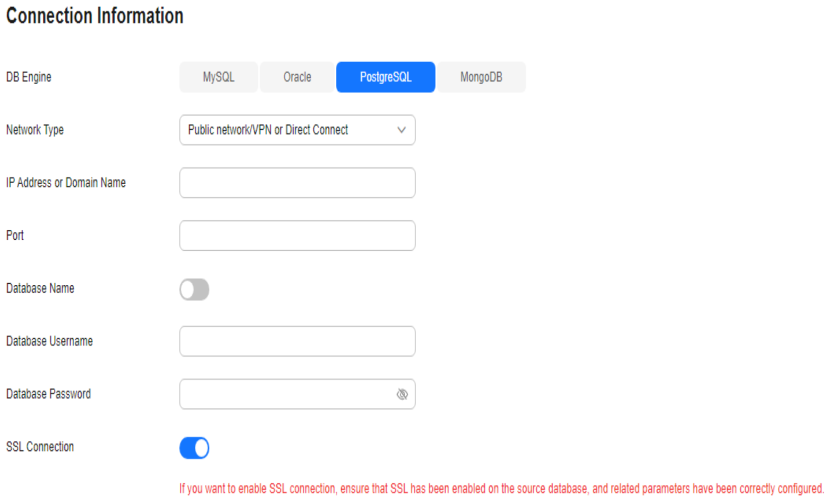
Table 4-3 Oracle connection settings

Parameter	Description
DB Engine	Select **Oralce**.

Parameter	Description
Network Type	The default value is **Public network/VPN or Direct Connect**. The value can be**Public network/VPN or Direct Connect** or **VPC**. **Public network/VPN or Direct Connect** is used as an example. Note that the selected network type must be the same as the network type of the task to be created. If the network types are different, you cannot select the database connection in the connection test step.
Database Type	This parameter is available when you select **VPC** for **Network Type**. The value can be **Self-built on ECS**.
VPC	This parameter is available when you select **Self-built on ECS** for **Database Type**. Select the VPC where the ECS-hosted DB instance is located to isolate networks for different services.
Subnet	This parameter is available when you select **Self-built on ECS** for **Database Type**. Select the subnet where the ECS-hosted DB instance is located.
IP Address or Domain Name	The IP address or domain name of the Oracle database. **NOTE** For a RAC cluster, use a SCAN IP address to improve access performance.
Port	The port of the Oracle database. Range: 1 – 65535
Database Service Name	Enter a database service name (Service Name/SID). The client can connect to the Oracle database through the database service name. For details about how to query the database service name, see the prompt on the GUI.
PDB Name	Container database (CDB) and pluggable database (PDB) are new features in Oracle 12c and later versions. This function is optional, but it must be enabled if you want to migrate only PDB tables. Enter the service name, SID, username, and password of the CDB that contains the PDB tables to be migrated.
Database Username	Username of the Oracle database.
Database Password	The password for the Oracle database username.
SSL Connection	If SSL connection is required, enable SSL on the database, ensure that related parameters have been correctly configured, and upload an SSL certificate. **NOTE** – The maximum size of a single certificate file that can be uploaded is 500 KB. – If SSL is disabled, your data may be at risk.

- PostgreSQL connection information

Figure 4-4 PostgreSQL connection information



Connection Information

DB Engine: MySQL | Oracle | PostgreSQL | MongoDB

Network Type: Public network/VPN or Direct Connect

IP Address or Domain Name

Port

Database Name

Database Username

Database Password

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.

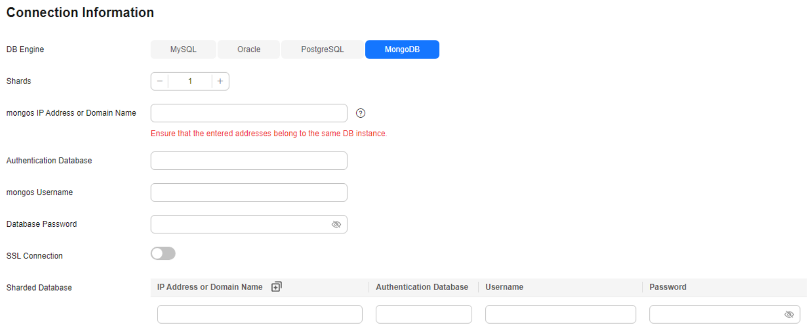
Table 4-4 PostgreSQL connection settings

Parameter	Description
DB Engine	Select **PostgreSQL**.
Network Type	The default value is **Public network/VPN or Direct Connect**. The value can be**Public network/VPN or Direct Connect** or **VPC**. **Public network/VPN or Direct Connect** is used as an example. Note that the selected network type must be the same as the network type of the task to be created. If the network types are different, you cannot select the database connection in the connection test step.
Database Type	This parameter is available when you select **VPC** for **Network Type**. The value can be **Self-built on ECS** or **RDS DB instance**.
VPC	This parameter is available when you select **Self-built on ECS** for **Database Type**. Select the VPC where the ECS-hosted DB instance is located to isolate networks for different services.
Subnet	This parameter is available when you select **Self-built on ECS** for **Database Type**. Select the subnet where the ECS-hosted DB instance is located.
DB Instance Name	This parameter is available when you select **RDS DB instance** for **Database Type**. Select an RDS instance from the drop-down list.

Parameter	Description
IP Address or Domain Name	The IP address or domain name of the PostgreSQL database.
Port	The port of the PostgreSQL database. Range: 1 – 65535
Database Name	Indicates whether to specify a database. If this option is enabled, enter the database name.
Database Username	Username of the PostgreSQL database.
Database Password	The password for the PostgreSQL database username.
SSL Connection	If SSL connection is required, enable SSL on the database, ensure that related parameters have been correctly configured, and upload an SSL certificate. **NOTE** – The maximum size of a single certificate file that can be uploaded is 500 KB. – If SSL is disabled, your data may be at risk.

- MongoDB connection information

Figure 4-5 MongoDB connection information



Connection Information

DB Engine: MySQL | Oracle | PostgreSQL | **MongoDB**

Shards: − 1 +

mongos IP Address or Domain Name: ⓘ

Ensure that the entered addresses belong to the same DB instance.

Authentication Database:

mongos Username:

Database Password:

SSL Connection: ○

Sharded Database:

IP Address or Domain Name	Authentication Database	Username	Password

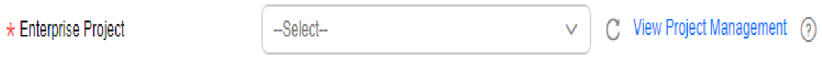
Table 4-5 MongoDB connection settings

Parameter	Description
Shards	Set this parameter based on the number of shards in the MongoDB cluster.
mongos IP Address or Domain Name	IP address or domain name of the MongoDB database in the **IP address/Domain name:Port** format. The port number is an integer ranging from 1 to 65535.
Authentication Database	The name of the authentication database.

Parameter	Description
mongos Username	Username of the MongoDB database.
Database Password	The password for the MongoDB database username.
Sharded Database	Enter the information about the sharded databases in the MongoDB database.

- Enterprise project

Figure 4-6 Enterprise project



* Enterprise Project

--Select--

Table 4-6 Enterprise project

Parameter	Description
Enterprise Project	An enterprise project you would like to use to centrally manage your cloud resources and members. You can select an enterprise project from the drop-down list. The default project is **default**. For more information about enterprise project, see ***Enterprise Management User Guide***. To create an enterprise project, click **Enterprise** in the upper right corner of the console. The **Enterprise Project Management Service** page is displayed. For details, see **Creating an Enterprise Project** in *Enterprise Management User Guide*.

Step 4 After the connection is created, you can select the connection on the **Test Connection** page for a migration, synchronization, or DR task. If the database connection information needs to be modified, you can locate the connection on the **Connection Information Management** page and edit the connection by referring to **Editing a Database Connection**.

----End

4.2 Editing a Database Connection

After a database connection is created, you can edit the following connection information:

- Task name
- Description
- Database IP address

- Database port
- Database username
- Database password

Procedure

Step 1 On the **Connection Information Management** page, locate the target task and click **Edit** in the **Operation** column.

Step 2 On the **Edit Connection Information** page, modify the database connection information and click **Save and Back**.

----End

4.3 Deleting a Database Connection

You can delete database connections that are no longer used. Deleted connections will no longer be displayed in the task list. Exercise caution when performing this operation.

Deleting a Task

Step 1 On the **Connection Information Management** page, locate the target task and click **Delete** in the **Operation** column.

Step 2 In the displayed dialog box, confirm the information and click **Yes**.

----End

Deleting Tasks

Step 1 On the **Connection Information Management** page, select the tasks to be deleted.

Step 2 Click **Batch Operations** in the upper left corner and choose **Delete**.

Step 3 In the displayed dialog box, confirm the information and click **Yes**.

----End

5 Tag Management

Scenarios

Tag Management Service (TMS) enables you to use tags on the management console to manage resources. TMS works with other cloud services to manage tags. TMS manages tags globally, and other cloud services manage their own tags. If you have to manage a large number of tasks, you can use different tags to identify and search for tasks.

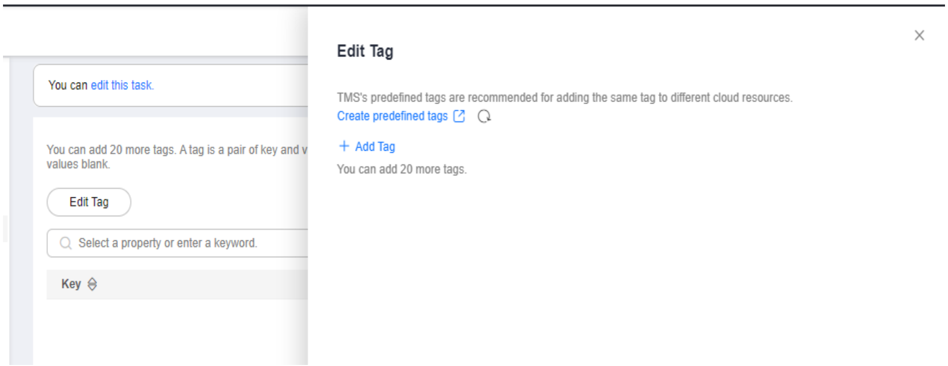
- You are advised to set predefined tags on the TMS console.
- A tag consists of a key and value. You can add only one value for each key.
- Each DB instance can have up to 20 tags.

Adding a Tag

Step 1 On the **Disaster Recovery Management** page, click the target DR task in the **Task Name/ID** column.

Step 2 In the navigation pane on the left, choose **Tags**.

Step 3 On the **Tags** page, click **Edit Tag**. In the displayed dialog box, click **Add Tag**, enter a tag key and value, and click **OK**.



You can edit this task.

You can add 20 more tags. A tag is a pair of key and v
values blank.

Edit Tag

TMS's predefined tags are recommended for adding the same tag to different cloud resources.

You can add 20 more tags.

- When you enter a tag key and value, the system automatically displays all tags (including predefined tags and resource tags) associated with all DB instances except the current one.

- The tag key cannot be empty and must be unique. It cannot start or end with a space or start with **_sys_**. It can contain 1 to 128 characters, including letters, digits, spaces, and special characters _.:=+-@
- The tag value can be empty. It cannot start or end with a space and can contain 0 to 255 characters, including letters, digits, spaces, and special characters _.:=+-@

Step 4 View and manage the tag on the **Tags** page.

----End

Editing a Tag

Step 1 On the **Disaster Recovery Management** page, click the target DR task in the **Task Name/ID** column.

Step 2 In the navigation pane on the left, choose **Tags**.

Step 3 On the **Tags** page, click **Add/Edit Tags**. In the displayed dialog box, modify the tag and click **OK**.

----End

Delete a Tag

Step 1 On the **Disaster Recovery Management** page, click the target DR task in the **Task Name/ID** column.

Step 2 In the navigation pane on the left, choose **Tags**.

Step 3 On the **Tags** page, locate the tag to be deleted and click **Delete** in the **Operation** column. In the displayed dialog box, click **Yes**.

Step 4 After the tag is deleted, it will no longer be displayed on the **Tags** page.

----End

6 Connection Diagnosis

If a DRS instance fails to be connected to the source or destination database during connection testing, DRS provides the quick diagnosis function and returns the diagnosis result.

- You can perform connection diagnosis only on the task node whose database information is obtained by entering an IP address or selecting a task node on the GUI. DN diagnosis of GaussDB is not supported.
- In cluster or multi-AZ task scenarios, diagnosis can be performed only on the node of the primary task.

Prerequisites

- You have logged in to the DRS console.
- A task has been created.

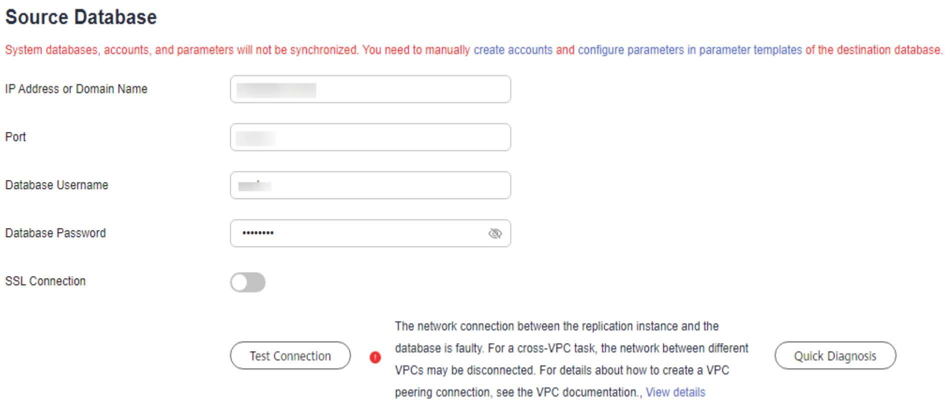
Procedure

Step 1 On the task management page, click the target task name in the **Task Name/ID** column.

Step 2 On the **Configure Source and Destination Databases** page, 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 DRS instance.

If the connection testing fails, click **Quick Diagnosis** on the right of the failure information to diagnose the fault.

Figure 6-1 Quick Diagnosis



Source Database

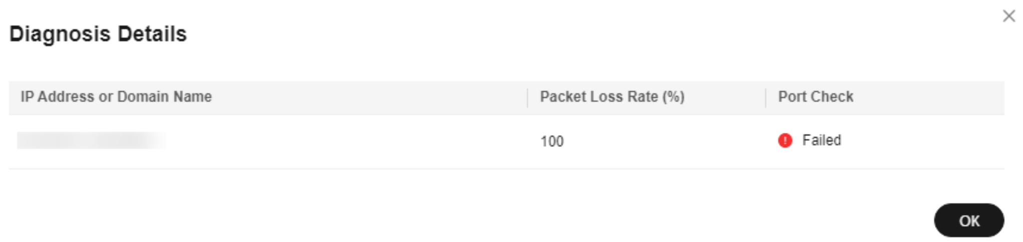
System databases, accounts, and parameters will not be synchronized. You need to manually create accounts and configure parameters in parameter templates of the destination database.

IP Address or Domain Name	[redacted]
Port	[redacted]
Database Username	[redacted]
Database Password	••••••••
SSL Connection	○

The network connection between the replication instance and the database is faulty. For a cross-VPC task, the network between different VPCs may be disconnected. For details about how to create a VPC peering connection, see the VPC documentation., View details

Step 3 View the diagnosis result on the displayed **Diagnosis Details** dialog box. The result includes the packet loss rate and port check result.

Figure 6-2 Diagnosis Details



Diagnosis Details

IP Address or Domain Name	Packet Loss Rate (%)	Port Check
[redacted]	100	● Failed

----End

7 Interconnecting with CTS

7.1 Key Operations Recorded by CTS

Cloud Trace Service (CTS) provides records of operations on cloud service resources, enabling you to query, audit, and backtrack operations.

Table 7-1 DRS operations recorded by CTS

Operation	Resource Type	Trace Name
Creating a task	job	createJob
Editing a task	job	modifyJob
Deleting a task	job	deleteJob
Starting a task	job	startJob
Resuming a task	job	retryJob

7.2 Viewing Traces

After CTS is enabled, CTS starts recording operations on cloud resources. The CTS management console stores the last seven days of operation records.

This section describes how to query the operation records of the last seven days on the CTS console.

Prerequisites

The CTS service has been enabled.

Procedure

Step 1 Log in to the management console.

Step 2 Click 📍 in the upper left corner of the page and select a region and project.

Step 3 Click **Service List**. Under **Management & Governance**, choose **Cloud Trace Service**.

Step 4 Choose **Trace List** in the navigation pane on the left.

Step 5 Specify the search criteria as needed.

- Search time range: In the upper right corner, choose **Last 1 hour**, **Last 1 day**, or **Last 1 week**, or specify a custom time range.
- **Trace Type**, **Trace Source**, **Resource Type**, and **Search By**: Select a filter from the drop-down list.

  If you select **Resource ID** for **Search By**, specify a resource ID.

  If you select **Data** for **Trace Type**, you can only filter traces by tracker.
- **Operator**: Select a specific operator (a user rather than a tenant).
- **Trace Status**: Available options include **All trace statuses**, **normal**, **warning**, and **incident**. You can only select one of them.

Step 6 Click **Query**.

Step 7 Click ⌄ to the left of the target record to extend its details.

Step 8 Click **View Trace** in the **Operation** column. A dialog box is displayed, on which the trace structure details are displayed.

----End

8 Interconnecting with Cloud Eye

8.1 Supported Metrics

Description

This section describes metrics reported by the Data Replication Service (DRS) to Cloud Eye as well as their namespaces and dimensions. You can use APIs provided by Cloud Eye to query the metrics of the monitored object and alarms generated for DRS.

Namespace

SYS.DRS

DB Instance Monitoring Metrics

Table 8-1 lists the DRS performance metrics.

Table 8-1 DRS metrics

Metric ID	Metrics Name	Description	Value Range	Monitored Object	Monitoring Interval (Raw Data)
cpu_util	CPU Usage	CPU usage of the monitored object	0-100 %	Monitored object: ECS Monitored instance type: replication, synchronization, and DR instances	1 minute
mem_util	Memory Usage	Memory usage of the monitored object	0-100 %	Monitored object: ECS Monitored instance type: replication, synchronization, and DR instances	1 minute
network_incoming_bytes_rate	Network Input Throughput	Incoming traffic in bytes per second	≥ 0 byte/s	Monitored object: ECS Monitored instance type: replication, synchronization, and DR instances	1 minute
network_outgoing_bytes_rate	Network Output Throughput	Outgoing traffic in bytes per second	≥ 0 byte/s	Monitored object: ECS Monitored instance type: replication, synchronization, and DR instances	1 minute
disk_read_bytes_rate	Disk Read Throughput	Number of bytes read from the disk per second (bytes/second).	≥ 0 byte/s	Monitored object: ECS Monitored instance type: replication, synchronization, and DR instances	1 minute

Metric ID	Metrics Name	Description	Value Range	Monitored Object	Monitoring Interval (Raw Data)
disk_write_bytes_rate	Disk Write Throughput	Number of bytes written to the disk per second (bytes/second).	≥ 0 byte/s	Monitored object: ECS Monitored instance type: replication, synchronization, and DR instances	1 minute
disk_util	Storage Space Usage	Storage space usage of the monitored object	0-100 %	Monitored object: ECS Monitored instance type: replication, synchronization, and DR instances	1 minute
extract_bytes_rate	Source Database Read Throughput	Table data or WAL bytes read from the source database per second	≥ 0 byte/s	Monitored object: ECS Monitored instance type: replication, synchronization, and DR instances	1 minute
extract_rows_rate	Rows Read from Source Database per Second	Number of table data rows or WAL rows read from the source database per second Unit: rows/s.	≥ 0 row/s	Monitored object: ECS Monitored instance type: replication, synchronization, and DR instances	1 minute
extract_latency	Source Database WAL Extract Lag	Latency of extracting WAL from the source database Unit: ms.	≥ms	Monitored object: ECS Monitored instance type: replication, synchronization, and DR instances	1 minute

Metric ID	Metrics Name	Description	Value Range	Monitored Object	Monitoring Interval (Raw Data)
apply_bytes_rate	Destination Database Write Throughput	Number of bytes written to the destination database per second.	≥ 0 byte/s	Monitored object: ECS Monitored instance type: replication, synchronization, and DR instances	1 minute
apply_rows_rate	Rows Written into Destination Database per Second	Number of rows that are written to the destination database per second Unit: rows/s.	≥ 0 row/s	Monitored object: ECS Monitored instance type: replication, synchronization, and DR instances	1 minute
apply_transactions_rate	DML TPS	Number of DML transactions written to the destination database per second.	≥ 0 transaction/s	Monitored object: ECS Monitored instance type: replication, synchronization, and DR instances	1 minute
apply_ddls_numberor apply_ddls_rate **NOTE** apply_ddls_rate is replaced by apply_ddls_number after December 2022.	DDL TPS	Total number of DDL transactions written into the destination database.	≥ 0 transaction	Monitored object: ECS Monitored instance type: replication, synchronization, and DR instances	1 minute

Metric ID	Metrics Name	Description	Value Range	Monitored Object	Monitoring Interval (Raw Data)
apply_latency	Replication Delay	Delay (in milliseconds) of data replay.	≥ 0 ms	Monitored object: ECS Monitored instance type: replication, synchronization, and DR instances	1 minute
apply_average_execute_time	Average Transaction Execution Time	Average execution time (RT = Execution time + Commit time) of a transaction in the destination database. The unit is millisecond.	≥ 0 ms	Monitored object: ECS Monitored instance type: replication, synchronization, and DR instances	1 minute
apply_average_commit_time	Average Transaction Commit Time	Average commit time (RT = Execution time + Commit time) of a transaction in the destination database. The unit is ms.	≥ 0 ms	Monitored object: ECS Monitored instance type: replication, synchronization, and DR instances	1 minute
apply_current_state	Synchronization Status	This metric is the synchronization status of the current kernel data (10: abnormal; 1: idle; 2: DML; 3: DDL), instead of the task status.	10: abnormal 1: idle 2: DML is executed. 3: DDL is executed.	Monitored object: ECS Monitored instance type: replication, synchronization, and DR instances	1 minute

Metric ID	Metrics Name	Description	Value Range	Monitored Object	Monitoring Interval (Raw Data)
apply_thread_workers	Synchronization Threads	Number of working threads for data synchronization	≥ 0	Monitored object: ECS Monitored instance type: replication, synchronization, and DR instances	1 minute
apply_job_status	Task Status	Status of the current task. (**0**: normal; **1**: abnormal; **2**: paused)	**0**: normal **1**: abnormal **2**: paused	Monitored object: ECS Monitored instance type: replication, synchronization, and DR instances	1 minute

Dimensions

Key	Value
instance_id	DRS instance ID

8.2 Configuring Alarm Rules

Scenarios

You can configure DRS alarm rules to customize the monitored objects and notification policies and learn the DRS running status in a timely manner.

This section describes how to set DRS alarm rules, including the alarm rule name, service, dimension, monitoring scope, template, and whether to send a notification.

Procedure

Step 1 Log in to the management console.

Step 2 Under **Management & Governance**, click **Cloud Eye**.

Step 3 In the navigation pane on the left, choose **Cloud Eye** > **Data Replication Service**.

Step 4 Select the DB instance which you want to create an alarm rule for and click **Create Alarm Rule** in the **Operation** column.

Step 5 On the displayed page, set parameters as required.

- Specify **Name** and **Description**.
- Select **Use template** for **Method**. The template contains the following common metrics: CPU usage, memory usage, and storage space usage.
- Click to enable alarm notification. The validity period is 24 hours by default. If the topics you required are not displayed in the drop-down list, click **Create an SMN topic**. Then, select **Generated alarm** and **Cleared alarm** for **Trigger Condition**.

> **NOTE**
>
> Cloud Eye sends notifications only within the validity period specified in the alarm rule.

Step 6 Click **Create**. The alarm rule is created.

For details about how to create alarm rules, see **Creating an Alarm Rule** in the *Cloud Eye User Guide*.

----End

8.3 Viewing Monitoring Metrics

Scenarios

Cloud Eye monitors the running statuses of replication, synchronization, and DR instances. You can obtain the monitoring metrics on the management console. Monitored data requires a period of time for transmission and display. The status of the monitored object displayed on the Cloud Eye page is the status obtained 5 to 10 minutes before. You can view the monitored data of a newly created DB instance 5 to 10 minutes later.

Prerequisites

An instance is running properly when in the following statuses:

- Real-time migration: Full migration and Incremental migration
- Real-time synchronization: Full synchronization and Incremental synchronization
- Real-time disaster recovery: Disaster recovery in progress

Viewing Metrics

Step 1 Log in to the management console.

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

Step 3 Choose **Database** > **Data Replication Service**. The **Data Replication Service** page is displayed.

Step 4 Take real-time migration as an example. On the **Online Migration Management** page, click the target migration task name in the **Task Name/ID** column.

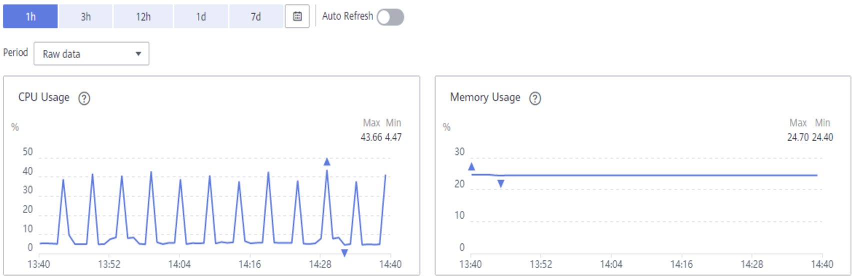
Step 5 On the displayed page, click **View Metric** in the upper right corner of the page to go to the Cloud Eye console.

By default, the monitoring information about the DRS instance is displayed on this page.

Step 6 View monitoring metrics of the instance.

- On the Cloud Eye console, click the target DB instance name and click **Select Metric** in the upper right corner. In the displayed dialog box, you can select the metrics to be displayed and sort them by dragging them at desired locations.
- You can sort graphs by dragging them based on service requirements.
- Cloud Eye can monitor performance metrics from the last 1 hour, 3 hours, 12 hours, 1 day, 7 days, and 6 months.

Figure 8-1 Viewing monitoring metrics



Period Raw data

----End

9 Interconnecting with LTS

9.1 Log Reporting

Scenarios

If you enable log reporting, all logs generated by DRS instances (including real-time migration, backup migration, real-time synchronization, real-time disaster recovery, and workload replay instances) are uploaded to Log Tank Service (LTS) for management.

Precautions

- After this function is enabled, all logs of the task are reported by default.
- This request does not take effect immediately. There is a delay of about 10 minutes.
- You will be billed for this function. For details, see **LTS Pricing Details**.
- Ensure that there are available LTS log groups and log streams in the same region as your instance.

  For more information about log groups and log streams, see **Log Management**.
- After this function is disabled, you will not be billed anymore.

Enabling or Disabling Log Reporting

Step 1 Log in to the management console.

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

Step 3 Choose **Database** > **Data Replication Service**. The **Data Replication Service** page is displayed.

Step 4 Take real-time migration as an example. On the **Online Migration Management** page, click the target migration task name in the **Task Name/ID** column. The operations for real-time synchronization, real-time disaster recovery, and workload replay are similar to those for real-time migration.

Step 5 On the **Basic Information** page, click **Migration Logs** on the left.

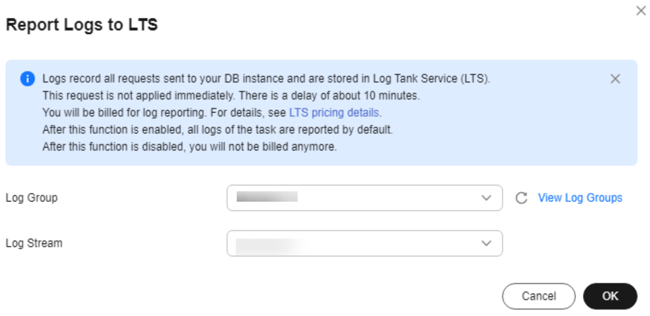
Step 6 Click ○ next to **Report Logs to LTS** in the upper part of the page.

Step 7 Select an LTS log group and log stream and click **OK**.

NOTE

This request does not take effect immediately. There is a delay of about 10 minutes.

Figure 9-1 Enabling audit log reporting to LTS



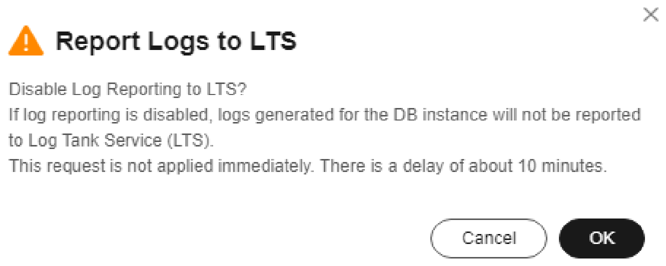
Report Logs to LTS

Logs record all requests sent to your DB instance and are stored in Log Tank Service (LTS).
This request is not applied immediately. There is a delay of about 10 minutes.
You will be billed for log reporting. For details, see LTS pricing details.
After this function is enabled, all logs of the task are reported by default.
After this function is disabled, you will not be billed anymore.

Step 8 To disable or modify log reporting, click the toggle switch next to **Report Logs to LTS** or click **Edit** next to the **Report Logs to LTS** toggle switch.

- Modifying log reporting: Click **Edit** next to the **Report Logs to LTS** toggle switch. In the displayed dialog box, select the LTS log group and log stream again and click **OK**.
- Disabling log reporting: Click the toggle switch next to **Report Logs to LTS**. In the displayed dialog box, click **OK**.

Figure 9-2 Disabling log reporting to LTS



Report Logs to LTS

Disable Log Reporting to LTS?
If log reporting is disabled, logs generated for the DB instance will not be reported to Log Tank Service (LTS).
This request is not applied immediately. There is a delay of about 10 minutes.

----End

9.2 Viewing and Downloading Logs

Scenarios

If you have enabled log reporting to LTS for a DRS task in **Log Reporting**, you can analyze logs, search for logs, visualize logs, download logs, and view real-time logs on the LTS console.

Viewing Logs Reported to LTS

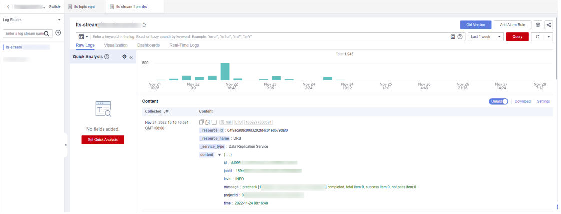
Step 1 Log in to the management console.

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

Step 3 Under **Management & Governance**, click **Log Tank Service**.

Step 4 In the **Log Groups** area, locate a target log group and click its name. For details about LTS, see ***Log Tank Service (LTS) User Guide***.

Figure 9-3 Viewing log details



```
Nov 24, 2022 16:16:40.591
GMT+08:00
null LTS 1669277800591
_resource_id : 04f9aca88c00d3202fd4c01ed679daf0
_resource_name : DRS
_service_type : Data Replication Service
content : {...}
    id : dd095[redacted]
    jobId : 159e[redacted]
    level : INFO
    message : precheck [1[redacted]] completed, total item:0, success item:0, not pass item:0
    projectId : 0[redacted]
    time : 2022-11-24 08:16:40
```

Table 9-1 Log field description

Name	Type	Description
_resource_id	String	Resource ID. The value is fixed to **projectId** for DRS.
_resource_name	String	Resource name. The value is fixed to **DRS**.
_service_type	String	Service type. The value is fixed to **Data Replication Service**.

----End

Downloading Logs Reported to LTS

Step 1 Log in to the management console.

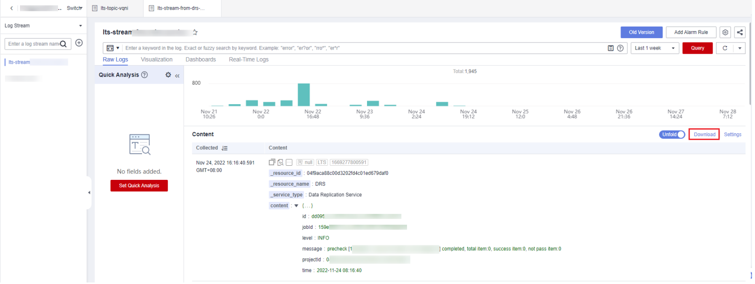
Step 2 Click in the upper left corner and select a region and project.

Step 3 Under **Management & Governance**, click **Log Tank Service**.

Step 4 In the **Log Groups** area, locate a target log group and click its name.

Step 5 Click **Download** on the right to download logs. For details about LTS, see ***Log Tank Service (LTS) User Guide***.

Figure 9-4 Downloading logs



```
Nov 24, 2022 16:16:40.591   null  LTS  1669277800591
GMT+08:00
                            _resource_id : 04f9aca88c00d3202fd4c01ed679daf0
                            _resource_name : DRS
                            _service_type : Data Replication Service
                            content : ▼ {...}
                                 id : dd095[redacted]
                                 jobId : 159e[redacted]
                                 level : INFO
                                 message : precheck [1[redacted]] completed, total item:0, success item:0, not pass item:0
                                 projectId : 0[redacted]
                                 time : 2022-11-24 08:16:40
```

----End