

Data Replication Service

User Guide

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Huawei Technologies Co., Ltd.

Address: Huawei Industrial Base
Bantian, Longgang
Shenzhen 518129
People's Republic of China

Website: <https://www.huawei.com>

Email: support@huawei.com

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1 Service Overview

This chapter provides general information about Data Replication Service (DRS), including its application scenarios, functions, and constraints.

1.1 What Is DRS?

DRS is a stable, efficient, and easy-to-use cloud service for database migration and synchronization in real time.

It simplifies data migration processes and reduces migration costs.

You can use DRS to quickly transmit data between different DB engines.

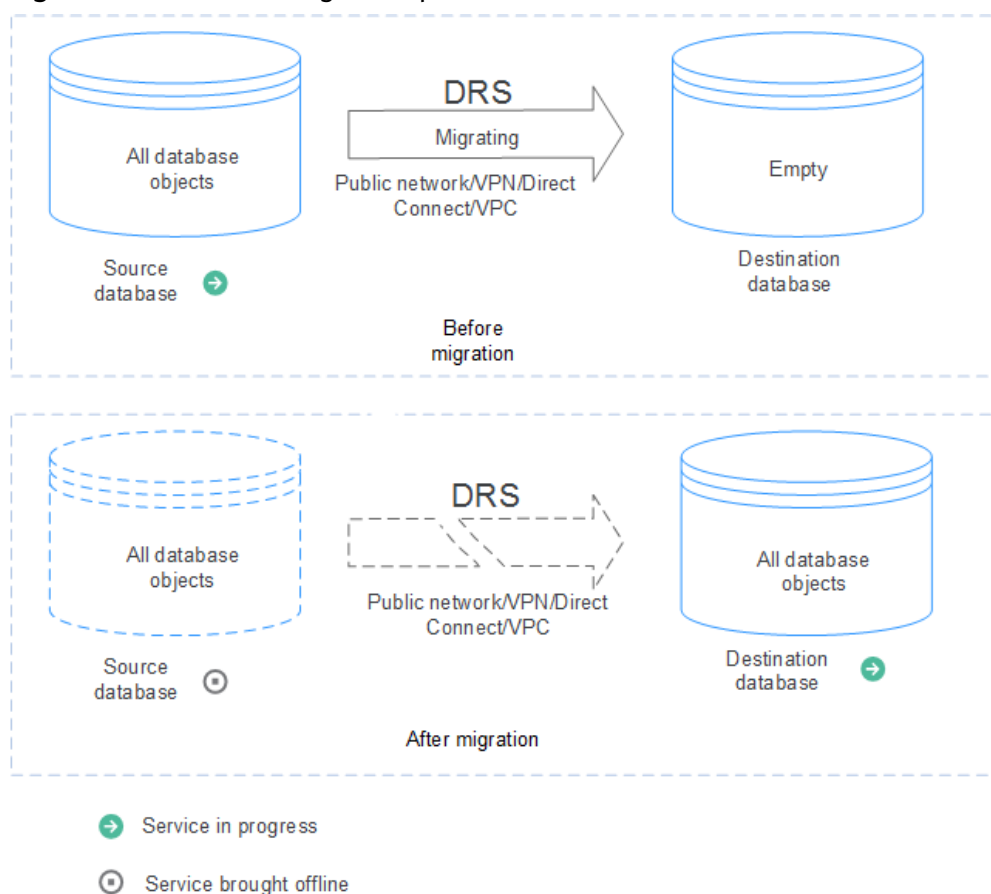
Real-Time Migration

With DRS, you can migrate data from sources to destinations in real time. You create a replication instance to connect to both the source and destination and configure objects to be migrated. DRS will help you compare metrics and data between source and destination, so you can determine the best time to switch to the destination database while minimizing service downtime.

You can perform a migration task over multiple types of networks, such as public networks, VPCs, VPNs, and direct connections. With these network connections, you can migrate between different cloud platforms, from on-premises databases to cloud databases, or between cloud databases across regions.

DRS supports incremental migration, so you can replicate ongoing changes to keep sources and destinations in sync while minimizing the impact of service downtime and migration.

Figure 1-1 Real-time migration process



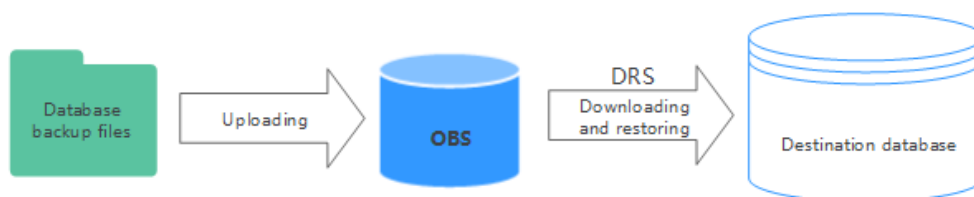
Backup Migration

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

You can use backup migration when you want to migrate on-premises databases to the cloud.

Without connecting to your sources, DRS can help you complete data migration.

Figure 1-2 Backup migration process



1.2 Advantages

Easy to Use

DRS simplifies migration procedures and does not require too much technical knowledge. Traditional migration requires professional technical personnel and migration procedures are complicated.

Fast Setup

DRS sets up a migration task within minutes. Traditional migration takes several days, weeks, or even months to set up.

Low Costs

DRS saves traditional database administrator (DBA) labor costs and hardware costs.

Secure

DRS allows you to query the migration progress, check migration logs, and compare migration items, so you can easily complete migration tasks.

1.3 Functions and Features

1.3.1 Real-Time Migration

In real-time migration, you only need to configure the source database, destination database, and migration objects. DRS will help you compare and analyze data so you can determine when to migrate with minimal service disruption.

Supported Database Types

DRS supports migration between different DB engines. The following table lists the supported data sources. Self-built databases include on-premises databases and ECS databases.

Table 1-1 Database types

Migration Direction	Data Flow	Source DB	Destination DB	Destination DB Type
To the cloud	MySQL->MySQL	<ul style="list-style-type: none"> On-premises databases ECS databases Databases on other clouds RDS MySQL DB instances 	RDS MySQL DB instances	<ul style="list-style-type: none"> Single DB instance Primary/Standby DB instance
From the cloud	MySQL->MySQL	RDS MySQL DB instances	<ul style="list-style-type: none"> On-premises databases ECS databases Databases on other clouds 	<ul style="list-style-type: none"> Single DB instance Primary/Standby DB instance

Table 1-2 Database versions

Migration Direction	Data Flow	Source DB Version	Destination DB Version
To the cloud	MySQL->MySQL	<ul style="list-style-type: none"> MySQL 5.5.x MySQL 5.6.x MySQL 5.7.x MySQL 8.0.x 	<ul style="list-style-type: none"> MySQL 5.6.x MySQL 5.7.x MySQL 8.0.x
From the cloud	MySQL->MySQL	<ul style="list-style-type: none"> MySQL 5.6.x MySQL 5.7.x MySQL 8.0.x 	<ul style="list-style-type: none"> MySQL 5.6.x MySQL 5.7.x MySQL 8.0.x

Supported Migration Types

DRS supports two migration types: full migration and full+incremental migration.

This full migration type is suitable for scenarios where service interruption is acceptable. All objects and data in non-system databases are migrated to the destination database at one time. The objects that can be migrated include tables, views, stored procedures, and triggers.

The full+incremental migration type allows you to migrate data without interrupting services. After a full migration initializes the destination database, an incremental migration parses logs to ensure data consistency between the source and destination databases.

Table 1-3 Migration types

Migration Direction	Data Flow	Full Migration	Full+Incremental Migration
To the cloud	MySQL->MySQL	Supported	Supported
From the cloud	MySQL->MySQL	Supported	Supported

Supported Network Types

DRS supports data migration through a Virtual Private Cloud (VPC), Virtual Private Network (VPN), Direct Connect, or public network. [Table 1-4](#) lists the application scenarios of each network type and required preparations, and [Table 1-5](#) lists the supported network types of each migration scenario.

Table 1-4 Network types

Network Type	Application Scenario	Preparations
VPC	Migrations between cloud databases in the same region	<ul style="list-style-type: none"> • The source and destination databases must be in the same region. • The source and destination databases can be in either the same VPC or in different VPCs. • If source and destination databases are in the same VPC, they can communicate with each other by default. Therefore, you do not need to configure a security group. • If the source and destination databases are not in the same VPC, the CIDR blocks of the source and destination databases cannot be duplicated or overlapped, and the source and destination databases are connected through a VPC peering connection. DRS automatically establishes a VPC peering connection through a single IP address when you test the network connectivity.
VPN	Migrations from on-premises databases to cloud databases or between cloud databases across regions	Establish a VPN connection between your local data center and the VPC that hosts the destination database. Before migration, ensure that the VPN network is accessible.
Direct Connect	Migrations from on-premises databases to cloud databases or between cloud databases across regions	Use a dedicated network connection to connect your data center to VPCs.

Network Type	Application Scenario	Preparations
Public network	Migrations from on-premises or other cloud databases to destination databases	<p>To ensure network connectivity between the source and destination databases, perform the following operations:</p> <ol style="list-style-type: none"> 1. Enable public accessibility. Enable public accessibility for the source database based on your service requirements. 2. Configure security group rules. <ul style="list-style-type: none"> • Add the EIPs of the replication instance to the whitelist of the source database for inbound traffic. • If destination databases and the replication instance are in the same VPC, they can communicate with each other by default. You do not need to configure a security group. <p>NOTE</p> <ul style="list-style-type: none"> • The IP address on the Configure Source and Destination Databases page is the EIP of the replication instance. • If SSL is not enabled, migrating confidential data is not recommended.

Table 1-5 Supported network types

Migration Direction	Data Flow	VPC	Public Network	VPN or Direct Connect
To the cloud	MySQL->MySQL	Supported	Supported	Supported
From the cloud	MySQL->MySQL	Supported	Supported	Supported

Migration Objects

DRS allows you to migrate objects at different levels. The following table lists the supported migration objects.

Table 1-6 Supported migration objects

Migration Direction	Data Flow	Full Migration	Table-Level Migration	Database-Level Migration
To the cloud	MySQL->MySQL	Supported	Supported	Supported
From the cloud	MySQL->MySQL	Supported	Supported	Supported

Advanced Features

DRS supports multiple features to ensure successful real-time migration.

Table 1-7 Advanced features

Feature	Description
Flow control	Allows you to limit the overall migration speed to make the impact of migration on bandwidth and database I/O controllable. Flow control mode takes effect only during a full migration.
Account migration	Allows you to migrate accounts, permissions, and passwords.
Parameter comparison	Checks the consistency of common parameters and performance parameters between source and destination databases to ensure that the migrated service is running properly.

1.3.2 Backup Migration

DRS supports backup migrations of various database types.

Supported Database Types

Table 1-8 Database types

Data Flow	Backup File Source	Destination DB Type
Microsoft SQL Server -> RDS Microsoft SQL Server	<ul style="list-style-type: none">On-premises Microsoft SQL Server backup filesRDS Microsoft SQL Server full backup filesMicrosoft SQL Server backup files on other clouds	RDS Microsoft SQL Server DB instances

Migration Methods

Table 1-9 Migration methods

Data Flow	Full Migration	Incremental Migration
Microsoft SQL Server -> RDS Microsoft SQL Server	Supported	Supported

Supported Database Versions

Table 1-10 Database versions

Data Flow	Backup File Version	Destination DB Version
Microsoft SQL Server -> RDS Microsoft SQL Server	On-premises and other cloud's Microsoft SQL Server backup file versions: <ul style="list-style-type: none"> • Microsoft SQL Server 2000 • Microsoft SQL Server 2005 • Microsoft SQL Server 2008 • Microsoft SQL Server 2012 • Microsoft SQL Server 2014 • Microsoft SQL Server 2016 • Microsoft SQL Server 2017 • Microsoft SQL Server 2019 	<ul style="list-style-type: none"> • Microsoft SQL Server 2008 • Microsoft SQL Server 2012 • Microsoft SQL Server 2014 • Microsoft SQL Server 2016 • Microsoft SQL Server 2017 • Microsoft SQL Server 2019
	RDS Microsoft SQL Server full backup file versions: <ul style="list-style-type: none"> • Microsoft SQL Server 2008 • Microsoft SQL Server 2012 • Microsoft SQL Server 2014 • Microsoft SQL Server 2016 • Microsoft SQL Server 2017 • Microsoft SQL Server 2019 	<ul style="list-style-type: none"> • Microsoft SQL Server 2008 • Microsoft SQL Server 2012 • Microsoft SQL Server 2014 • Microsoft SQL Server 2016 • Microsoft SQL Server 2017 • Microsoft SQL Server 2019

Backup Migration Scenarios

Table 1-11 Migration scenarios

Scenario	Description
OBS bucket	If you copy the database backup files to an Object Storage Service (OBS) bucket, ensure that the OBS bucket is located in the same region as the destination instance.
RDS full backup	If you select an RDS full backup as the backup file source, ensure that the RDS instance has a full backup.

1.4 Basic Concepts

VPC

VPC-based migration refers to a real-time migration that the source and destination databases are in the same VPC or two VPCs that can communicate with each other. No additional network services are required.

VPN

VPN-based migration refers to a real-time migration where the source and destination databases are in the same VPN network. The VPN establishes a secure, encrypted communication tunnel that complies with industry standards between your data centers and the cloud platform. Through this tunnel, DRS seamlessly migrates data from the data center to the cloud.

Direct Connect

Direct Connect enables you to establish a dedicated network connection from your data center to the cloud platform. With Direct Connect, you can use a dedicated network connection to connect your data center to VPCs to enjoy a high-performance, low-latency, and secure network.

Replication Instance

A replication instance refers to an instance that performs the migration task. It exists in the whole lifecycle of a migration task. DRS uses the replication instance to connect to the source database, read source data, and replicate the data to the destination database.

Migration Log

A migration log refers to the log generated during database migration. Migration logs are classified into the following levels: warning, error, and info.

Task Check

Before starting a migration task, you need to check whether the source and destination databases have met all migration requirements. If any check item fails, rectify the fault and check the task again. Only when all check items are successful the task can start.

To the Cloud

DRS requires that either the source or destination database is on the current cloud. **To the cloud** means that the destination database must be on the current cloud.

Out of the Cloud

DRS requires that either the source or destination database is on the current cloud. **Out of the cloud** means that the source database must be on the current cloud.

Account Entrustment

DRS will entrust your account to the administrator to implement some functions. For example, if you enable scheduled startup tasks, DRS will automatically entrust your account to DRS administrator **op_svc_rds** during the task creation to implement automated management on the scheduled tasks.

Account entrustment can be implemented in the same region only.

Temporary Accounts

To ensure that your database can be successfully migrated to RDS MySQL DB instances, DRS automatically creates temporary accounts **drsFull** and **drsIncremental** in the destination database during full migration and incremental migration, respectively. After the migration task is complete, DRS automatically deletes the temporary account.

NOTICE

Attempting to delete, rename, or change the passwords or permissions for these accounts will cause task errors.

High Availability

If the primary host of a replication instance fails, it automatically fails over to the standby host, preventing service interruption and improving the success rate of migration.

If a replication instance fails, the system will automatically restart the instance and retry the task. In this case, the task status changes to **Fault rectification**. If the replication instance is still faulty after being restarted, the system automatically creates an instance. After the instance is created, the system retries the task again. The high availability management applies to the following tasks:

- Full migration
- Incremental migration

1.5 Billing

Billing Standards

DRS charges you for your configurations and data transfer:

Table 1-12 Billing standards

Item	Description
Configuration fee	Configuration fees are generated when you use computing and storage resources and process data. You are charged for the actual usage duration on an hourly basis.
Data transfer fee	Data transfer fees are generated when you process or transfer data through a public network (excluding VPN, VPC, Direct Connect, and CC networks). No matter what billing mode is used, DRS charges you for the actual public network traffic you use in GB.

For details about DRS pricing, see "Product Pricing Details".

Billing Example

The following uses full plus incremental migration of a MySQL database in a region as an example. Assume that the configuration fee is \$0.35 USD/hour and the data transfer fee over a public network is \$0.21 USD/GB.

- Scenario 1: Migrating data to the cloud
If you started the migration to the cloud at 8:00 on July 1, 2021 and ended the task at 12:00 on July 16, 2021, you will be charged \$0.35 USD per hour for configuration and \$0.21 USD/GB for data transfer.
- Scenario 2: Migrating data out of the cloud
If you started migrating 100 GB of data out of the cloud at 8:00 on July 1, 2021 and ended the migration task at 8:00 on July 3, 2021 over a public network, you will be charged \$0.35 USD per hour for configuration and \$0.21 USD/GB for data transfer. The configuration fee is calculated as follows: 2 days x 24 hours x \$0.35 USD/hour = \$16.8 USD. The data transfer fee is \$21 (100 GB x \$0.21 USD/GB). The total amount is \$37.8 USD (16.8+21).
- Scenario 3: Non-public network migration
If you started migrating 100 GB of data to the cloud at 08:00 on July 1, 2021 and ended the task at 08:00 on July 3, 2021 in a VPC, you will not be charged for data transfer which is free in a private network. You only need to pay for the configuration which is \$25.2 USD (3 days x 24 hours x \$0.35 USD/hour).

The following uses real-time synchronization of a MySQL database in a region as an example. Assume that the configuration fee is \$0.35 USD/hour and the public network data transfer fee is \$0.21 USD/GB.

- Scenario 1: Synchronizing data to the cloud
If you started synchronizing 100 GB of data out of the cloud at 8:00 on July 1, 2021 and ended the synchronization task at 12:00 on July 5, 2021 over a public network, you will be charged for configuration at \$0.35 per hour and for data transfer at \$0.21 per GB for the duration of the task from start to finish. Total fees = Configuration fee + Data transfer fee = 5 days x 24 hours x \$0.35 USD/hour + 100 GB x \$0.21 USD/GB = \$63 USD.
- Scenario 1: Synchronizing data out of the cloud
If you started synchronizing 100 GB of data out of the cloud at 8:00 on July 1, 2021 and ended the synchronization task at 8:00 on July 5, 2021 over a public network, you will be charged for configuration at \$0.35 per hour and for data transfer at \$0.21 per GB for the duration of the task from start to finish. Total fees = Configuration fee + Data transfer fee = 5 days x 24 hours x \$0.35 USD/hour + 100 GB x \$0.21 USD/GB = \$63 USD.

Charging in Failure Scenarios

DRS charges the tasks you created from the time when the tasks are started to the time when the tasks are complete. During this period, billing will not be stopped even if the tasks fail. To avoid unnecessary charges, you can set **Stop Abnormal Tasks After** to a value between 14 to 100 days to automatically stop abnormal tasks. Abnormal tasks run longer than the period you set (unit: day) will automatically stop to avoid unnecessary fees.

1.6 Security Suggestions

You can encrypt data and database connections and increase database account security.

Data Encryption

Before saving sensitive information and private data in a database, encrypt data to reduce the risk of information leakage.

Connection Encryption

Use the Secure Sockets Layer (SSL) to encrypt connections between applications and DB instances to enhance data transmission security.

Database Account Security

To ensure data security, improve the security of database accounts.


1.7 Accessing DRS

Prerequisites

To begin using DRS, register an account on the official website. When the registration is successful, you can access all cloud services, including DRS and RDS.

If you have registered an account, you can log in to the management console and access your DRS.

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** Log in to the management console, click **Data Replication Service** under **Databases** to go to the DRS console.
- End

1.8 Permissions Management

If you need to assign different permissions to employees in your enterprise to access your DRS resources, IAM is a good choice for fine-grained permissions management. IAM provides identity authentication, permissions management, and access control, helping you secure access to cloud resources.

With IAM, you can use your cloud account to create IAM users for your employees, and assign permissions to the users to control their access to specific resources. For example, some software developers in your enterprise need to use DRS resources but must not delete DRS or perform any high-risk operations. To achieve this result, you can create IAM users for the software developers and grant them only the permissions required for using DRS resources.

If your account does not need individual IAM users for permissions management, you may skip over this topic.

IAM can be used free of charge. You pay only for the resources in your cloud account. For more information about IAM, see .

DRS Permissions

By default, new IAM users do not have permissions assigned. You need to add a user to one or more groups, and attach permissions policies or roles to these groups. Users inherit permissions from the groups to which they are added and can perform specified operations on cloud services based on the permissions.

DRS is a project-level service deployed and accessed in specific physical regions. To assign DRS permissions to a user group, specify the scope as region-specific projects and select projects for the permissions to take effect. If **All projects** is selected, the permissions will take effect for the user group in all region-specific

projects. When accessing DRS, users need to switch to a region where they have been authorized to use DRS.

You can grant users permissions by using roles and policies.

- **Roles:** A type of coarse-grained authorization mechanism that defines permissions related to user responsibilities. This mechanism provides only a limited number of service-level roles for authorization. When using roles to grant permissions, you need to also assign other roles on which the permissions depend to take effect. However, roles are not an ideal choice for fine-grained authorization and secure access control.
- **Policies:** A type of fine-grained authorization mechanism that defines permissions required to perform operations on specific cloud resources under certain conditions. This mechanism allows for more flexible policy-based authorization, meeting requirements for secure access control. For example, you can grant ECS users only the permissions for managing a certain type of ECSs. Most fine-grained policies are API-based.

Table 1-13 lists all the system policies supported by DRS.

Table 1-13 System-defined roles and policies supported by DRS

Policy Name/ System Role	Description	Type	Dependency
Security Administrator	Security administrator To improve your experience with DRS, add the Security Administrator permission using IAM in case some functions become unavailable, such as scheduled task startup, automatic ending of full-migration tasks, and automatic retry of failed tasks.	System-defined role	None

Policy Name/ System Role	Description	Type	Dependency
DRS Administrator	DRS administrator Basic permission, which must be added when DRS is used.	System role	Dependent on the Tenant Guest, Server Administrator, and RDS Administrator roles. <ul style="list-style-type: none"> • Tenant Guest: A project-level role, which must be assigned in the same project. • Server Administrator: A project-level role, which must be assigned in the same project. • RDS Administrator: A project-level role, which must be assigned in the same project.
DRS FullAccess	Full permissions for DRS	System policy	Dependent on the VPC FullAccess, RDS ReadOnlyAccess, and SMN Administrator, and OBS Administrator policies. <p>VPC FullAccess: This parameter needs to be configured when the VPC and subnet are selected.</p> <p>RDS ReadOnlyAccess: This parameter needs to be configured when RDS is selected.</p> <p>SMN Administrator: This parameter needs to be configured when SMN is selected.</p> <p>OBS Administrator: This parameter needs to be configured when bucket information is selected for a backup task.</p>

Policy Name/ System Role	Description	Type	Dependency
DRS ReadOnlyAccess	Read-only permissions for DRS resources.	System policy	None
DRS FullWithoutDeletePermission	All permissions on DRS except the deletion permission	System Policy	<p>Dependent on the VPC FullAccess, RDS ReadOnlyAccess, and SMN Administrator, and OBS Administrator policies.</p> <p>VPC FullAccess: This parameter needs to be configured when the VPC and subnet are selected.</p> <p>RDS ReadOnlyAccess: This parameter needs to be configured when RDS is selected.</p> <p>SMN Administrator: This parameter needs to be configured when SMN is selected.</p> <p>OBS Administrator: This parameter needs to be configured when bucket information is selected for a backup task.</p>

Table 1-14 lists the common operations supported by the DRS system policy.

Table 1-14 Common operations supported by the DRS system policy

Procedure	DRS FullAccess	DRS ReadOnlyAccess	DRS Administrator	DRS FullWithoutDeletePermission
Creating a task	√	x	√	√
Editing a task	√	x	√	√
Deleting a task	√	x	√	x

Procedure	DRS FullAccess	DRS ReadOnlyAccess	DRS Administrator	DRS FullWithOutDeletePermission
Starting a task	√	x	√	√
Retrying a task	√	x	√	√
Stopping a task	√	x	√	√

Table 1-15 lists common DRS operations and corresponding actions. You can refer to this table to customize permission policies.

Table 1-15 Common operations and supported actions

Permission	Actions	Remarks
Performing operations on tasks.	drs:migrationJob:action	The VPC FullAccess permission for the project is required. If the RDS database is used, you need to configure the RDS ReadOnlyAccess permission for the project.
Stopping a task	drs:migrationJob:terminate	Permissions required for the project: VPC FullAccess RDS ReadOnlyAccess
Modifying a migration task	drs:migrationJob:modify	Permission required for selecting VPCs and subnets on the GUI: VPC FullAccess Permission required for selecting RDS on the GUI: RDS ReadOnlyAccess
Creating a migration task	drs:migrationJob:create	Permission required for selecting VPCs and subnets on the GUI: VPC FullAccess Permission required for selecting RDS on the GUI: RDS ReadOnlyAccess

Permission	Actions	Remarks
Deleting a migration task	drs:migrationJob:delete	None
Updating the database user information.	drs:migrationJob:modifyUserInfo	The read permission for the corresponding instance is required. For example, if the RDS database is used, you need to configure the following permission for the project: RDS ReadOnlyAccess
Controlling the migration speed	drs:migrationJob:setMigrationTransSpeed	None
Modify database parameters	drs:dataBaseParams:modify	The read permission for the corresponding instance is required. For example, if the RDS database is used, you need to configure the RDS ReadOnlyAccess permission for the project.
Updating the data processing information	drs:dataTransformation:update	The read permission for the corresponding instance is required. For example, if the RDS database is used, you need to configure the RDS ReadOnlyAccess permission for the project.
Adding the data processing information	drs:dataTransformation:add	The read permission for the corresponding instance is required. For example, if the RDS database is used, you need to configure the RDS ReadOnlyAccess permission for the project.
Deleting the data processing data	drs:dataTransformation:delete	None
Updating the database object selection information	drs:migrationJob:update	The read permission for the corresponding instance is required. For example, if the RDS database is used, you need to configure the RDS ReadOnlyAccess permission for the project.
Updating the task configuration	drs:migrationJob:updateJobConfig	None

Permission	Actions	Remarks
Updating the DDL filtering policy.	drs:migrationJob:updateDDLPolicy	None
Modifying the comparison policy	drs:healthCompare:modify	None
Stopping a comparison task	drs:healthCompare:stop	None
Creating an object-level table comparison task	drs:migrationCompare-Job:create	None
Canceling a data-level table comparison task	drs:migrationCompare-Job:delete	None
Immediately starting a data-level table comparison task	drs:migrationCompare-Job:start	None
Cleaning up resources	drs:cleanJob:clean	The VPC FULLAccess permission is required.
Verifying the backup task name.	drs:backupMigration-Job:check	None
Verifying data processing	drs:dataTransformation:check	None
Verifying online task names	drs:migrationJob:check	None
Obtaining database parameters	drs:databaseParameters:get	None
Querying operation results	drs:job:getResult	None
Querying the data processing information	drs:migrationTransformationJob:get	None
Obtaining the task pre-check results	drs:precheckJob:get	None
Obtaining the object-level migration comparison overview	drs:compareJob:getOverview	None
Querying data-level table comparison tasks	drs:compareJob:list	None

Permission	Actions	Remarks
Querying data-level table comparison results	drs:compareJob:getResult	None
Obtaining object-level migration comparison details	drs:compareJob:getDetails	None
Querying details about a data-level table comparison task	drs:compareJob:getContentsInfo	None
Querying the estimated time of a comparison task	drs:compareJob:getEstimateTime	None
Querying the value comparison overview.	drs:compareJob:getContentOverview	None
Querying the row comparison overview	drs:compareJob:getLineOverview	None
Querying row comparison details	drs:compareJob:getLineDetail	None
Querying value comparison details	drs:compareJob:getContentDetail	None
Querying value comparison differences	drs:compareJob:getContentDiff	None
Obtaining the online migration task list	drs:migrationJob:list	None
Obtaining the online migration task details	drs:migrationJob:get	The read permission for the corresponding instance is required. For example, if the RDS database is used, you need to configure the RDS ReadOnlyAccess permission for the project.
Obtaining the object-level migration comparison overview	drs:migrationJob:getCompareStruct	None

Permission	Actions	Remarks
Obtaining the data-level stream comparison	drs:migrationJob:getStreamComparison	None
Obtaining the source database user list	drs:migrationJob:getSrcUsers	The read permission for the corresponding instance is required. For example, if the RDS database is used, you need to configure the RDS ReadOnlyAccess permission for the project.
Obtaining the migration progress of a specified migration task	drs:migrationJob:getSpecifiedProgress	None
Obtaining the database affected time of a specified task.	drs:migrationJob:getEffectTime	None
Querying the migration progress	drs:migrationJobs:getProgress	None
Processing data	drs:migrationJob:action	The read permission for the corresponding instance is required. For example, if the RDS database is used, you need to configure the RDS ReadOnlyAccess permission for the project.
Starting a task	drs:migrationJob:action	The VPC FULLAccess permission is required.
Querying task details	drs:migrationJob:get	The read permission for the corresponding instance is required. For example, if the RDS database is used, you need to configure the RDS ReadOnlyAccess permission for the project.
Querying task statuses	drs:migrationJob:get	None
Querying resource tags	drs:tag:get	None
Deleting resource tags	drs:tags:delete	None

Permission	Actions	Remarks
Adding a resource tag	drs:tag:add	None
Modifying resource tags	drs:tag:modify	None
Obtaining migration logs	drs:migrationJob:getLog	None

1.9 Compliance Description

You understand and agree that your use of this service complies with laws and regulations, including but not limited to legal compliance requirements on data content, data transfer, and cross-border data transfer. DRS only provides a standard service upon your request and is not responsible for the legal compliance of your use. If you use the services illegally or engage in illegal actions using the services, you shall bear all consequences arising therefrom.

1.10 Related Services

RDS

DRS can migrate data from your databases to the RDS databases in the cloud. For more information about RDS, see Relational Database Service User Guide.

Supported network types during migration to RDS:

- VPC
- VPN
- Direct Connect
- Public network

2 Preparations

2.1 Overview

Before creating a DRS task, make preparations given in the following table to meet the environment requirements.

Table 2-1 Preparations

Item	Description	Reference
Account	Prepare an account, create a user, and grant permissions to the user to use DRS.	If you do not have an account, register an account on the official website. Then, create a user and grant permissions to the user by referring to Permissions Management .
Databases	Prepare the source and destination databases with required user permissions.	Different data flow types require different databases and permissions. Select a specific data flow type and view the related notes in this document.

Item	Description	Reference
Network	Before the migration, learn about the application scenarios and the supported network types.	DRS supports migration through the public network, VPC, VPN, and Direct Connect. <ul style="list-style-type: none">• VPC is suitable for migrations of cloud databases in the same region.• VPN and Direct Connect are suitable for migrations from on-premises databases to cloud databases or between cloud databases across regions.• Public network is suitable for migrations from on-premises databases or external cloud databases to destination databases. You need to configure network settings based on your service requirements.

2.2 Permissions Management

2.2.1 Creating a User and Granting Permissions

This chapter describes IAM's fine-grained permissions management for DRS.

- With IAM, you can:
 - Create IAM users for employees based on the organizational structure of your enterprise. Each IAM user has their own security credentials, providing access to DRS resources.
 - Grant only the permissions required for users to perform a task.
 - Entrust an account or cloud service to perform professional and efficient O&M on your DRS resources.

If your account does not require individual IAM users, skip this chapter.

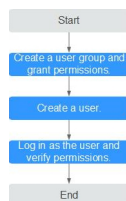
This section describes the procedure for granting permissions (see [Figure 2-1](#)).

Prerequisites

Learn about the permissions (see [Permissions Management](#)) supported by DRS and choose policies or roles according to your requirements. For the system policies of other services, see [Permission Description](#).

Process Flow

Figure 2-1 Process for granting DRS permissions



1. Create a user group and assign permissions to it.
Create a user group on the IAM console, and assign the **DRS Administrator** policy to the group.
2. Create a user.
Create a user on the IAM console and add the user to the group created in **1**.
3. Log in and verify permissions.
Log in to the management console by using the newly created user, and verify that the user only has read permissions for DRS.
Go to the DRS console, click **Create Migration Task** in the upper right corner to create a migration task. If a migration task (assume that there is only the **DRS Administrator** permission) is created, the **DRS Administrator** policy has taken effect.

2.2.2 Creating a Custom Policy

Custom policies can be created to supplement the system-defined policies of DRS.

You can create custom policies in either of the following ways:

- Visual editor: Select cloud services, actions, resources, and request conditions. This does not require knowledge of policy syntax.
- JSON: Edit JSON policies from scratch or based on an existing policy.

For details about how to create a custom policy, see Identity and Access Management User Guide. The following describes examples of common DRS custom policies.

Example Custom Policies

- Example 1: Allowing users to create DRS instances

```
{
  "Version": "1.1",
  "Statement": [{
    "Action": ["drs:instance:create"],
    "Effect": "Allow"
  }]
}
```

- Example 2: Denying DRS instance deletion

A policy with only "Deny" permissions must be used in conjunction with other policies to take effect. If the permissions assigned to a user contain both "Allow" and "Deny", the "Deny" permissions take precedence over the "Allow" permissions.

The following method can be used if you need to assign permissions of the **DRS FullAccess** policy to a user but you want to prevent the user from deleting DRS instances. Create a custom policy for denying DRS instance deletion, and attach both policies to the group to which the user belongs. Then, the user can perform all operations on DRS instances except deleting DRS instances. The following is an example of the deny policy:

```
{
  "Version": "1.1",
  "Statement": [{
    "Action": ["drs:instance:delete"],
    "Effect": "Deny"
  }]
}
```

3 Real-Time Migration

3.1 To the Cloud

3.1.1 From MySQL to MySQL

Supported Source and Destination Databases

Table 3-1 Supported databases

Source DB	Destination DB
<ul style="list-style-type: none">On-premises databases (MySQL 5.5, 5.6, 5.7, and 8.0)ECS databases (MySQL 5.5, 5.6, 5.7, and 8.0)Other cloud databases (MySQL 5.5, 5.6, 5.7, and 8.0)RDS for MySQL (5.5, 5.6, 5.7, 8.0)	<ul style="list-style-type: none">RDS for MySQL (5.5, 5.6, 5.7, 8.0) <p>NOTE The destination database version must be the same as or later than the source database version.</p>

Supported Migration Objects

Different types of migration tasks support different migration objects. For details, see [Table 3-2](#). DRS will automatically check the objects you selected before the migration.

Table 3-2 Migration objects

Type	Precautions
Migration objects	<ul style="list-style-type: none">• Object level: table level, database level, or instance level (full migration).• Supported migration objects:<ul style="list-style-type: none">– Databases, tables, users, views, indexes, constraints, functions, stored procedures, triggers, and events– The system database and event statuses cannot be migrated.– Tables with storage engine different to MyISAM and InnoDB tables cannot be migrated.– Associated objects must be migrated at the same time to avoid migration failure caused by missing associated objects. Common dependencies: tables referenced by views, views referenced by views, views and tables referenced by stored procedures/functions/triggers, and tables referenced by primary and foreign keys– 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. <p>NOTE The objects that can be migrated have the following constraints:</p> <ul style="list-style-type: none">• The source database name, table name, and view name cannot contain non-ASCII characters or special characters '<>`\'\"'• The source database name cannot start with ib_logfile and cannot be ib_buffer_pool, ib_doublewrite, ibdata1 or ibtmp1.

Database Account Permission Requirements

To start a migration task, the source and destination database users must have permissions listed in the following table. Different types of migration tasks require different permissions. For details, see [Table 3-3](#). DRS automatically checks the database account permissions in the pre-check phase and provides handling suggestions.

Table 3-3 Database account permission

Type	Full Migration	Full+Incremental Migration
Source database user	The user must have the following minimum permissions: SELECT, SHOW VIEW, and EVENT The user must have the SELECT permission for mysql.user.	The user must have the following minimum permissions: SELECT, SHOW VIEW, EVENT, LOCK TABLES, REPLICATION SLAVE, and REPLICATION CLIENT The user must have the SELECT permission for mysql.user.
Destination database user	The user must have the following minimum permissions: SELECT, CREATE, ALTER, DROP, DELETE, INSERT, UPDATE, INDEX, EVENT, CREATE VIEW, CREATE ROUTINE, TRIGGER, REFERENCES, and WITH GRANT OPTION. If the destination database version is in the range 8.0.14 to 8.0.18, the SESSION_VARIABLES_ADMIN permission is required. To migrate data, you must have the SELECT, INSERT, UPDATE, and DELETE permissions for the MySQL database.	

Suggestions

⚠ CAUTION

- When a task is being started or in the full migration phase, do not perform DDL operations on the source database. Otherwise, the task may be abnormal.
 - To maintain data consistency before and after the migration, do not write data to the source and destination databases in the full migration mode. In the full +incremental migration mode, you can continue the migration while data is still being written to the source database.
-
- The success of migration depends on environment and manual operations. You can run a migration test before you start the full-scale migration to help you detect and resolve problems in advance.
 - Start your migration task during off-peak hours. A less active database is easier to migrate successfully. If the data is fairly static, there is less likely to be any severe performance impacts during the migration.
 - If network bandwidth is not limited, the query rate of the source database increases by about 50 MB/s during full migration, and two to four CPUs are occupied.
 - To ensure data consistency, tables to be migrated without a primary key may be locked for 3s.
 - The data being migrated may be locked by other transactions for a long period of time, resulting in read timeout.
 - Due to the inherent characteristics of MySQL, in some scenarios the performance may be negatively affected. For example, if the CPU

resources are insufficient and the storage engine is TokuDB, the read speed on tables may be decreased by 10%.

- 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 the full migration, the exclusive lock on that table may be blocked.
- Data-level comparison

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

Precautions

The full+incremental migration process consists of four phases: task startup, full synchronization, incremental synchronization, and task completion. A single full migration task contains three phases. To ensure smooth migration, read the following precautions before creating a migration task.

Table 3-4 Precautions

Type	Restrictions
Starting a task	<ul style="list-style-type: none">● Source database requirements:<ul style="list-style-type: none">- The binlog of the source database must be enabled and use the row-based format during incremental migration.- If the storage space is sufficient, store the source database binlogs for as long as possible. The recommended retention period is three days.- If the expire_logs_days value of the source database is set to 0, the migration may fail. Set expire_logs_day to a proper value to ensure that the binlog does not expire before data transfer resumes. This ensures that services can be recovered after interruption.- During an incremental migration, the server_id value of the MySQL source database must be set. If the source database version is MySQL 5.6 or earlier, the server_id value ranges from 2 to 4294967296. If the source database is MySQL 5.7 or later, the server_id value ranges from 1 to 4294967296.- Enable skip-name-resolve for the source database to reduce the possibility of connection timeout.- Enable GTID for the source database. If GTID is not enabled for the source database, primary/standby switchover is not supported. DRS tasks will be interrupted and cannot be restored during a switchover.- The log_slave_updates parameter of the source database must be enabled. Otherwise, the migration fails.- The binlog_row_image parameter value of the source database must be FULL. Otherwise, the migration fails.● Source database object requirements:<ul style="list-style-type: none">- If the source database is an on-premises database and has Percona Server for MySQL 5.6.x or Percona Server for MySQL 5.7.x installed, the memory manager must use Jemalloc to prevent Out of Memory errors caused by frequent queries on system tables.- The source database does not support the mysql binlog dump command.- The source database does not support the reset master or reset master to command, which may cause DRS task failures or data inconsistency.- Associated objects must be migrated at the same time to avoid migration failure caused by missing associated objects.- 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.

Type	Restrictions
	<ul style="list-style-type: none">- Due to the MySQL constraints, if the one-time event triggering time of the source database is earlier than the migration start time, the event will not be migrated to the destination database.● Destination database parameter requirements:<ul style="list-style-type: none">- The destination DB instance is running properly.- The destination DB instance must have sufficient storage space.- You are advised to use the row-based binlog in the destination database. Otherwise, an error may occur during an incremental migration.- The destination database isolation level must be set to at least read committed.- During migration, a large amount of data is written to the destination database. If the value of the max_allowed_packet parameter of the destination database is too small, data cannot be written. You are advised to set the max_allowed_packet parameter to a value greater than 100 MB.- Enable GTID of the destination database.- The character sets of the source and destination databases must be the same. Otherwise, the migration fails.- The log_bin_trust_function_creators parameter value of the destination database must be set to on. Otherwise, the migration fails.- The value of server_uuid of the destination database must be the same as that of the source database. Otherwise, the incremental migration fails.- The collation_server values of the destination database and source database must be the same. Otherwise, the migration may fail.- The value of time_zone of the destination database must be the same as that of the source database. Otherwise, the migration may fail.- The sql_mode values of the destination database and source database must be the same. Otherwise, the migration may fail.- The innodb_strict_mode values of the destination database and source database must be the same. Otherwise, the migration may fail.- The lower_case_table_names values of the source and destination databases must be the same. Otherwise, the migration fails.- If the MyISAM tables are included in the migration objects, the sql_mode parameter in the destination database

Type	Restrictions
	<p>cannot contain the no_engine_substitution parameter. Otherwise, the migration fails.</p> <ul style="list-style-type: none">● Destination database object requirements:<ul style="list-style-type: none">- The destination DB instance cannot contain databases with the same name as the source databases (except the MySQL system database).● Other notes:<ul style="list-style-type: none">- When creating multiple migration tasks in the many-to-one scenario, ensure that the read and write settings of the destination database are consistent in these tasks.- The table without a primary key lacks a unique identifier for rows. When the network is unstable, you may need to retry the task several times, or data inconsistency may occur.- The destination database cannot be restored to a point in time when a full migration was being performed.- If the source and destination sides are RDS MySQL instances, transparent data encryption (TDE) is not supported, and tables with the encryption function cannot be created.- If the source MySQL database does not support TLS 1.2 or is a self-built database of an earlier version (earlier than 5.6.46 or between 5.7 and 5.7.28), you need to submit an O&M application for testing the SSL connection.- The destination database of a migration task can be set to Read-only or Read/Write. Read-only: During the migration, the destination database is read-only. After the migration is complete, it restores to the read/write status. This option ensures the integrity and success rate of data migration. Read/Write: During the migration, the destination instance can be queried or modified. Data being migrated may be modified when operations are performed or applications are connected. It should be noted that background processes can often generate or modify data, which may result in data conflicts, task faults, and upload failures. Do not select this option if you do not fully understand the risks.

Type	Restrictions
Full migration	<ul style="list-style-type: none">• During task startup and full migration, do not perform DDL operations on the source database. Otherwise, the task may be abnormal.• During migration, do not modify or delete the usernames, passwords, permissions, or ports of the source and destination databases.• During migration, do not modify the destination database (including but not limited to DDL and DML operations) that is being migrated.• During migration, do not write the statement-based binlog into the source database.• During migration, do not clear the binlog in the source database.• During migration, do not create a database named ib_logfile in the source database.
Incremental migration	<ul style="list-style-type: none">• During migration, do not modify or delete the usernames, passwords, permissions, or ports of the source and destination databases.• During migration, do not modify the destination database (including but not limited to DDL and DML operations) that is being migrated.• During migration, do not write the statement-based binlog into the source database.• During migration, do not clear the binlog in the source database.• During migration, do not create a database named ib_logfile on the source side.• During an incremental migration of table-level objects, renaming tables is not supported.• During an incremental migration, do not perform the point-in-time recovery (PITR) operation on the source database.• During an incremental migration, resumable upload is supported. However, data may be repeatedly inserted into a non-transactional table that does not have a primary key when the server system breaks down.• DDL statements are supported in the incremental migration phase.• If the source and destination databases are of the same major version and the entire instance is migrated, DCL statements can be migrated in incremental mode, but users cannot be changed by updating the mysql.user table. For details about DCL statements, see the MySQL official document.

Type	Restrictions
Stopping a task	<ul style="list-style-type: none"> ● Stop a task normally. <ul style="list-style-type: none"> – The selected events and triggers are migrated while the migration task proceeds to the final stage. Before a task is completed, ensure that the source and destination databases are connected and pay attention to the migration status reported by the migration log. ● Forcibly stop a task. <ul style="list-style-type: none"> – If you forcibly stop a task, DRS resources will be released and triggers and events will not be migrated. You need to manually migrate triggers, events, and events. If you want DRS to migrate triggers and events, restore the DRS task first. After the task status becomes normal, stop the task.

Prerequisites

- You have logged in to the DRS console.
- For details about the DB types and versions supported by real-time migration, see [Real-Time Migration](#).
- You have read [Suggestions](#) and [Precautions](#).

Procedure

This section uses the migration from MySQL to RDS MySQL in a VPC as an example to describe how to configure a migration task on the DRS console.

Step 1 On the **Online Migration Management** page, click **Create Migration Task**.

Step 2 On the **Create Replication Instance** page, configure task details, description, and the replication instance, and click **Next**.

- Task information description

Figure 3-1 Migration task information



The screenshot shows a form with three fields:

- Region:** A dropdown menu with a location pin icon.
- * Task Name:** A text input field containing "DRS-7117" and a help icon (?).
- Description:** A text area with a help icon (?) and a character count "0/256" at the bottom right.

Table 3-5 Task information

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 !=<>'&"\

- Replication instance information

Table 3-6 Replication instance settings

Parameter	Description
Data Flow	Select To the cloud . The destination DB is on the current cloud.
Source DB Engine	Select MySQL .
Destination DB Engine	Select MySQL .
Network Type	Select VPC Network. Available options: VPC , VPN or Direct Connect , and Public network . By default, the value is Public network . <ul style="list-style-type: none">- VPC is suitable for migrations of cloud databases in the same region.- Public network is suitable for migrations from on-premises or external cloud databases to the destination databases bound with an EIP.- VPN and Direct Connect are suitable for migrations from on-premises databases to cloud databases or between cloud databases across regions.
Destination DB Instance	The RDS DB instance you created.
Replication Instance Subnet	The subnet where the replication instance resides. You can also click View Subnet to go to the network console to view the subnet where the instance resides. By default, the DRS instance and the destination DB instance are in the same subnet. You need to select the subnet where the DRS instance resides, and there are available IP addresses for the subnet. To ensure that the replication instance is successfully created, only subnets with DHCP enabled are displayed.

Parameter	Description
Destination Database Access	<ul style="list-style-type: none">- Read-only During migration, the destination database is read-only. After the migration is complete, it restores to the read/write status. This option ensures the integrity and success rate of data migration.- Read/Write During the migration, the destination database can be queried or modified. Data being migrated may be modified when operations are performed or applications are connected. It should be noted that background processes can often generate or modify data, which may result in data conflicts, task faults, and upload failures. Do not select this option if you do not fully understand the risks. Set the destination database to Read/Write only when you need to modify other data in the database during the migration. The task cannot be modified after being created.
Migration Type	<ul style="list-style-type: none">- Full: This migration type is suitable for scenarios where service interruption is acceptable. All objects and data in non-system databases are migrated to the destination database at one time. The objects include tables, views, and stored procedures. NOTE If you are performing a full migration, do not perform operations on the source database. Otherwise, data generated in the source database during the migration will not be synchronized to the destination database.- Full+Incremental: This migration type allows you to migrate data without interrupting services. After a full migration initializes the destination database, an incremental migration initiates and parses logs to ensure data consistency between the source and destination databases. NOTE If you select Full+Incremental, data generated during the full migration will be continuously synchronized to the destination database, and the source remains accessible.

 **NOTE**

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

Step 3 On the **Configure Source and Destination Databases** page, wait until the replication instance is created. Then, specify source and destination database information and click **Test Connection** for both the source and destination databases to check whether they have been connected to the replication instance. After the connection tests are successful, select the check box before the agreement and click **Next**.

 **NOTE**

The source database can be an ECS database or an RDS instance. Configure parameters based on different scenarios.

- Scenario 1: Databases on an ECS - source database configuration

Table 3-7 Self-build on ECS - source database information

Parameter	Description
Source Database Type	Select Self-built on ECS .
VPC	A dedicated virtual network in which the source database is located. It isolates networks for different services. You can select an existing VPC or create a VPC.
Subnet	A subnet provides dedicated network resources that are isolated from other networks, improving network security. The subnet must be in the AZ where the source database resides. You need to enable DHCP for creating the source database subnet.
IP Address or Domain Name	The IP address or domain name of the source database.
Port	The port of the source database. Range: 1 – 65535
Database Username	The username for accessing the source database.
Database Password	The password for the database username.
SSL Connection	SSL encrypts the connections between the source and destination databases. If SSL is enabled, upload the SSL CA root certificate. NOTE <ul style="list-style-type: none">- 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 source database are encrypted and stored in DRS, and will be cleared after the task is deleted.

- Scenario 2: RDS DB instance - source database configuration

Table 3-8 RDS DB instance - source database information

Parameter	Description
Source Database Type	Select RDS DB Instance .
DB Instance Name	Select the RDS DB instance to be migrated as the source DB instance.
Database Username	The username for accessing the source database.
Database Password	The password for the database username.

- Destination database configuration

Table 3-9 Destination database settings

Parameter	Description
DB Instance Name	The RDS DB instance selected during migration task creation. This parameter cannot be changed.
Database Username	The username for accessing the destination database.
Database Password	The password for the database username.
Migrate Definer to User	<ul style="list-style-type: none">- Yes- 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

The database username and password are encrypted and stored in the system and will be cleared after the task is deleted.

- Step 4** On the **Set Task** page, select the accounts and objects to be migrated, and click **Next**.

Figure 3-2 Migration type

Note: Before the migration task is complete, you cannot change the usernames, passwords, and rights of any source database users.

*Flow Control Yes No ⓘ

*Filter DROP DATABASE Yes No

*Migrate Account Yes No
During a database migration, you need to separately migrate accounts and permissions. Certain accounts cannot be migrated to the destination database. Ensure that services are not affected.

Confirm All Remarks ⓘ

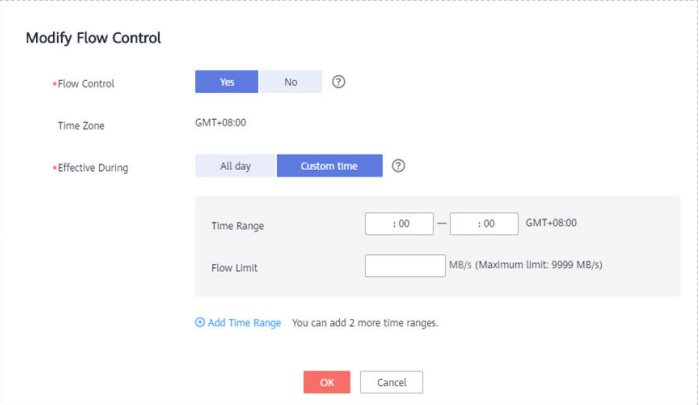
<input checked="" type="checkbox"/>	Account	Can Be Migrated	Permission	Password	Remarks
<input checked="" type="checkbox"/>	'@' ...	Yes	GRANT ALL PRIVILEGES ON *.*	<input type="text"/>	View
<input checked="" type="checkbox"/>	'@' %	Yes	GRANT ALL PRIVILEGES ON *.*	<input type="text"/>	View
<input checked="" type="checkbox"/>	'@' ...	Yes	GRANT ALL PRIVILEGES ON *.*	<input type="text"/>	View
<input type="checkbox"/>	'@' %	No	GRANT SELECT, INSERT, UPD...	--	View
<input type="checkbox"/>	'@' %	No	GRANT USAGE ON *.* GRAN...	--	View
<input type="checkbox"/>	'@' %	No	GRANT ALL PRIVILEGES ON *.*	--	View
<input type="checkbox"/>	@'localhost'	No	GRANT USAGE ON *.* GRAN...	--	View

Reset Password


Set Unified Password

*Migrate Object All Tables Databases ⓘ

Table 3-10 Migration types and objects

Parameter	Description
Flow Control	<p>You can choose whether to control the flow.</p> <ul style="list-style-type: none"> Yes You can customize the maximum migration speed. In addition, you can set the time range based on your service requirements. The traffic rate setting usually includes setting of a rate limiting time period and a traffic rate value. Flow can be controlled all day or during specific time ranges. The default value is All day. A maximum of three time ranges can be set, and they cannot overlap. The flow rate must be set based on the service scenario and cannot exceed 9,999 MB/s. <p>Figure 3-3 Flow control</p>  <ul style="list-style-type: none"> No The migration speed is not limited and the outbound bandwidth of the source database is maximally used, which will increase the read burden on the source database. For example, if the outbound bandwidth of the source database is 100 MB/s and 80% bandwidth is used, the I/O consumption on the source database is 80 MB/s. <p>NOTE</p> <ul style="list-style-type: none"> - Flow control mode takes effect only during a full migration. - You can also change the flow control mode after creating a task. For details, see Modifying the Flow Control Mode.

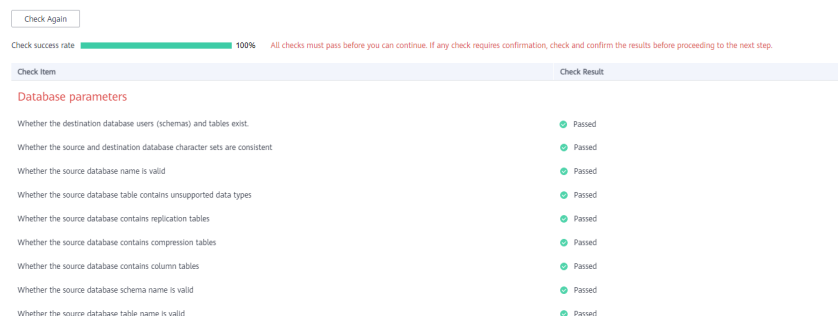
Parameter	Description
Migrate Account	<p>During a database migration, accounts need to be migrated separately.</p> <p>There are accounts that can be migrated completely, accounts whose permissions need to be reduced, and accounts that cannot be migrated. You can choose whether to migrate the accounts based on service requirements. If you select Yes, you can select the accounts to be migrated as required.</p> <ul style="list-style-type: none">• Yes If you need to migrate accounts, see Migrating Accounts.• No During migration, accounts, permissions, and passwords are not migrated.
Filter DROP DATABASE	<p>To reduce the risks involved in data migration, DDL operations can be filtered out. You can choose not to synchronize certain DDL operations.</p> <ul style="list-style-type: none">• If you select Yes, any database deletion operations performed on the source database are not migrated during data migration.• If you select No, related operations are migrated to the destination database during data migration.

Parameter	Description
Migrate Object	<p>You can choose to migrate all objects, tables, or databases based on your service requirements.</p> <ul style="list-style-type: none"> ● All: All objects in the source database are migrated to the destination database. After the migration, the object names will remain the same as those in the source database and cannot be modified. ● Tables: The selected table-level objects will be migrated. ● Databases: The selected database-level objects will be migrated. <p>If the source database is changed, click  in the upper right corner before selecting migration objects to ensure that the objects to be selected are from the changed source database.</p> <p>NOTE</p> <ul style="list-style-type: none"> ● If you choose not to migrate all of the databases, the migration may fail because the objects, such as stored procedures and views, in the databases to be migrated may have dependencies on other objects that are not migrated. To prevent migration failure, migrate all of the databases. ● If the object name contains spaces, the spaces before and after the object name are not displayed. If there are multiple spaces between the object name and the object name, only one space is displayed. ● The name of the selected migration object cannot contain spaces. ● To quickly select the desired database objects, you can use the search function.

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

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

Figure 3-4 Pre-check



- 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 Compare source and destination parameters.

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

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

If the common parameter values in the comparison results are inconsistent, click **Save Change** to change the destination database values to be the same as those of the source database.

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

- If you need to change the performance parameter values that are consistent in the comparison results to different values, locate the target parameter, enter values in the **Change To** column, and click **Save Change** in the upper left corner.
- If you want to make the performance parameter values of the source and destination database be the same:
 - i. Click **Use Source Database Value**.

DRS automatically makes the destination database values the same as those of the source database.

 **NOTE**

You can also manually enter parameter values.

- ii. Click **Save Change** to save your changes.

The system changes the parameter values based on your settings for the destination database values. After the modification, the list is updated automatically.

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

For details about how to set parameters during a comparison, see [Parameters for Comparison](#).


- iii. Click **Next**.

Step 7 On the displayed page, specify **Start Time** and confirm that the configured information is correct and click **Submit** to submit the task.

Table 3-11 Task startup settings

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

Step 8 After the task is submitted, view and manage it on the **Online Migration 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.

----End

3.2 Out of the Cloud

3.2.1 From MySQL to MySQL

Supported Source and Destination Databases

Table 3-12 Supported databases

Source DB	Destination DB
<ul style="list-style-type: none">• RDS for MySQL (5.5, 5.6, 5.7, 8.0)	<ul style="list-style-type: none">• On-premises databases (MySQL 5.5, 5.6, 5.7, and 8.0)• ECS databases (MySQL 5.5, 5.6, 5.7, and 8.0)• Other cloud databases (MySQL 5.5, 5.6, 5.7, and 8.0)• RDS for MySQL (5.5, 5.6, 5.7, 8.0) <p>NOTE The destination database version must be the same as or later than the source database version.</p>

Database Account Permission Requirements

To start a migration task, the source and destination database users must have permissions listed in the following table. Different types of migration tasks require different permissions. For details, see [Table 3-13](#). DRS automatically checks the

database account permissions in the pre-check phase and provides handling suggestions.

Table 3-13 Database account permission

Type	Full Migration	Full+Incremental Migration
Source database user	<p>The user must have the following minimum permissions: SELECT, SHOW VIEW, and EVENT</p> <p>During user migration, the user must have the SELECT permission for mysql.user.</p>	<p>The user must have the following minimum permissions: SELECT, SHOW VIEW, EVENT, LOCK TABLES, REPLICATION SLAVE, and REPLICATION CLIENT</p> <p>During user migration, the user must have the SELECT permission for mysql.user.</p>
Destination database user	<p>The user must have the following minimum permissions: SELECT, CREATE, ALTER, DROP, DELETE, INSERT, UPDATE, INDEX, EVENT, CREATE VIEW, CREATE ROUTINE, TRIGGER, REFERENCES, and WITH GRANT OPTION. If the destination database version is in the range 8.0.14 to 8.0.18, the SESSION_VARIABLES_ADMIN permission is required.</p> <p>To migrate data, you must have the SELECT, INSERT, UPDATE, and DELETE permissions for the MySQL database.</p>	

Suggestions

⚠ CAUTION

- When a task is being started or in the full migration phase, do not perform DDL operations on the source database. Otherwise, the task may be abnormal.
 - To maintain data consistency before and after the migration, do not write data to the source and destination databases in the full migration mode. In the full +incremental migration mode, you can continue the migration while data is still being written to the source database.
-
- The success of migration depends on environment and manual operations. You can run a migration test before you start the full-scale migration to help you detect and resolve problems in advance.
 - Start your migration task during off-peak hours. A less active database is easier to migrate successfully. If the data is fairly static, there is less likely to be any severe performance impacts during the migration.
 - If network bandwidth is not limited, the query rate of the source database increases by about 50 MB/s during full migration, and two to four CPUs are occupied.
 - To ensure data consistency, tables to be migrated without a primary key may be locked for 3s.

- The data being migrated may be locked by other transactions for a long period of time, resulting in read timeout.
- Due to the inherent characteristics of MySQL, in some scenarios the performance may be negatively affected. For example, if the CPU resources are insufficient and the storage engine is TokuDB, the read speed on tables may be decreased by 10%.
- 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 the full migration, the exclusive lock on that table may be blocked.
- Data-level comparison
 - To obtain accurate comparison results, compare data at a specified time point during off-peak hours. If it is needed, select **Start at a specified time** for **Comparison Time**. Due to slight time difference and continuous operations on data, inconsistent comparison results may be generated, reducing the reliability and validity of the results.

Precautions

The full+incremental migration process consists of four phases: task startup, full synchronization, incremental synchronization, and task completion. A single full migration task contains three phases. To ensure smooth migration, read the following precautions before creating a migration task.

Table 3-14 Precautions

Type	Restrictions
Starting a task	<ul style="list-style-type: none">● Source database requirements:<ul style="list-style-type: none">- The binlog of the source database must be enabled and use the row-based format during incremental migration.- If the storage space is sufficient, store the source database binlogs for as long as possible. The recommended retention period is three days.- If the expire_logs_days value of the source database is set to 0, the migration may fail. Set expire_logs_day to a proper value to ensure that the binlog does not expire before data transfer resumes. This ensures that services can be recovered after interruption.- During an incremental migration, the server_id value of the MySQL source database must be set. If the source database version is MySQL 5.6 or earlier, the server_id value ranges from 2 to 4294967296. If the source database is MySQL 5.7 or later, the server_id value ranges from 1 to 4294967296.- Enable skip-name-resolve for the source database to reduce the possibility of connection timeout.- Enable GTID for the source database. If GTID is not enabled for the source database, primary/standby switchover is not supported. DRS tasks will be interrupted and cannot be restored during a switchover.- The log_slave_updates parameter of the source database must be enabled. Otherwise, the migration fails.- The binlog_row_image parameter value of the source database must be FULL. Otherwise, the migration fails.● Source database object requirements:<ul style="list-style-type: none">- The source database does not support the mysql binlog dump command.- The source database does not support the reset master or reset master to command, which may cause DRS task failures or data inconsistency.- Associated objects must be migrated at the same time to avoid migration failure caused by missing associated objects.- 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.- Due to the MySQL constraints, if the one-time event triggering time of the source database is earlier than the migration start time, the event will not be migrated to the destination database.● Destination database parameter requirements:

Type	Restrictions
	<ul style="list-style-type: none"> - The destination DB instance is running properly. - The destination DB instance must have sufficient storage space. - You are advised to use the row-based binlog in the destination database. Otherwise, an error may occur during an incremental migration. - The destination database isolation level must be set to at least read committed. - During migration, a large amount of data is written to the destination database. If the value of the max_allowed_packet parameter of the destination database is too small, data cannot be written. You are advised to set the max_allowed_packet parameter to a value greater than 100 MB. - Enable GTID of the destination database. - The character sets of the source and destination databases must be the same. Otherwise, the migration fails. - The log_bin_trust_function_creators parameter value of the destination database must be set to on. Otherwise, the migration fails. - The value of server_uuid of the destination database must be the same as that of the source database. Otherwise, the incremental migration fails. - The collation_server values of the destination database and source database must be the same. Otherwise, the migration may fail. - The value of time_zone of the destination database must be the same as that of the source database. Otherwise, the migration may fail. - The sql_mode values of the destination database and source database must be the same. Otherwise, the migration may fail. - The innodb_strict_mode values of the destination database and source database must be the same. Otherwise, the migration may fail. - The lower_case_table_names values of the source and destination databases must be the same. Otherwise, the migration fails. <ul style="list-style-type: none"> ● Destination database object requirements: <ul style="list-style-type: none"> - The destination DB instance cannot contain databases with the same name as the source databases (except the MySQL system database). ● Other notes: <ul style="list-style-type: none"> - The table without a primary key lacks a unique identifier for rows. When the network is unstable, you may need to

Type	Restrictions
	<p>retry the task several times, or data inconsistency may occur.</p> <ul style="list-style-type: none"> - The destination database cannot be restored to a point in time when a full migration was being performed. - If the source DB instance is an RDS for MySQL instance, tables encrypted using Transparent Data Encryption (TDE) cannot be synchronized. - If the destination MySQL database does not support TLS 1.2 or is a self-built database of an earlier version (earlier than 5.6.46 or between 5.7 and 5.7.28), you need to submit an O&M application for testing the SSL connection.
Full migration	<ul style="list-style-type: none"> • During task startup and full migration, do not perform DDL operations on the source database. Otherwise, the task may be abnormal. • During migration, do not modify or delete the usernames, passwords, permissions, or ports of the source and destination databases. • During migration, do not modify the destination database (including but not limited to DDL and DML operations) that is being migrated. • During migration, do not write the statement-based binlog into the source database. • During migration, do not clear the binlog in the source database. • During migration, do not create a database named ib_logfile in the source database.

Type	Restrictions
Incremental migration	<ul style="list-style-type: none">• During migration, do not modify or delete the usernames, passwords, permissions, or ports of the source and destination databases.• During migration, do not modify the destination database (including but not limited to DDL and DML operations) that is being migrated.• During migration, do not write the statement-based binlog into the source database.• During migration, do not clear the binlog in the source database.• During migration, do not create a database named ib_logfile on the source side.• During an incremental migration of table-level objects, renaming tables is not supported.• During an incremental migration, do not perform the point-in-time recovery (PITR) operation on the source database.• During an incremental migration, resumable upload is supported. However, data may be repeatedly inserted into a non-transactional table that does not have a primary key when the server system breaks down.• DDL statements are supported in the incremental migration phase.
Stopping a task	<ul style="list-style-type: none">• Stop a task normally.<ul style="list-style-type: none">- The selected events and triggers are migrated while the migration task proceeds to the final stage. Before a task is completed, ensure that the source and destination databases are connected and pay attention to the migration status reported by the migration log.• Forcibly stop a task.<ul style="list-style-type: none">- If you forcibly stop a task, DRS resources will be released and triggers and events will not be migrated. You need to manually migrate triggers, events, and events. If you want DRS to migrate triggers and events, restore the DRS task first. After the task status becomes normal, stop the task.

Prerequisites

- You have logged in to the DRS console.
- For details about the DB types and versions supported by real-time migration, see [Real-Time Migration](#).
- You have read [Suggestions](#) and [Precautions](#).

Procedure

This section uses the migration from an RDS MySQL database to a MySQL database on an ECS as an example to describe how to configure a migration task in a VPC network on the DRS management console.

Step 1 On the **Online Migration Management** page, click **Create Migration Task**.

Step 2 On the **Create Replication Instance** page, configure task details, description, and the replication instance, and click **Next**.

- Task information description

Figure 3-5 Migration task information

Table 3-15 Task information

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 !=<>'&"\

- Replication instance information

Figure 3-6 Replication instance information

Table 3-16 Replication instance settings

Parameter	Description
Data Flow	Select Out of the cloud . The source database is a database on the current cloud.
Source DB Engine	Select MySQL .
Destination DB Engine	Select MySQL .
Network Type	Available options: Public network, VPC, VPN or Direct Connect <ul style="list-style-type: none"> - VPC is suitable for migrations of cloud databases in the same region. - VPN and Direct Connect are suitable for migrations from on-premises databases to cloud databases or between cloud databases across regions. - Public network is suitable for migrations from on-premises databases or external cloud databases to destination databases.
Source DB Instance	Select the DB instance whose data is to be migrated out of the cloud.
Replication Instance Subnet	The subnet where the replication instance resides. You can also click View Subnet to go to the network console to view the subnet where the instance resides. By default, the DRS instance and the destination DB instance are in the same subnet. You need to select the subnet where the DRS instance resides, and there are available IP addresses for the subnet. To ensure that the replication instance is successfully created, only subnets with DHCP enabled are displayed.

Parameter	Description
Migration Type	<ul style="list-style-type: none"> - Full: This migration type is suitable for scenarios where service interruption is acceptable. All objects and data in non-system databases are migrated to the destination database at one time. The objects include tables, views, and stored procedures. NOTE If you are performing a full migration, do not perform operations on the source database. Otherwise, data generated in the source database during the migration will not be synchronized to the destination database. - Full+Incremental: This migration type allows you to migrate data without interrupting services. After a full migration initializes the destination database, an incremental migration initiates and parses logs to ensure data consistency between the source and destination databases. NOTE If you select Full+Incremental, data generated during the full migration will be continuously synchronized to the destination database, and the source remains accessible.

 **NOTE**

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

Step 3 On the **Configure Source and Destination Databases** page, wait until the replication instance is created. Then, specify source and destination database information and click **Test Connection** for both the source and destination databases to check whether they have been connected to the replication instance. After the connection tests are successful, select the check box before the agreement and click **Next**.

Figure 3-7 Source database information

Source Database

DB Instance Name ids-01w-source

Database Username

Database Password

 Test successful

Table 3-17 Source database settings

Parameter	Description
DB Instance Name	The RDS DB instance selected during migration task creation. This parameter cannot be changed.
Database Username	Enter the username of the source database.
Database Password	The password for the database username. If the task is in the Starting , Full migration , Incremental migration , or Incremental migration failed status, in the Migration Information area on the Basic Information page, click Update Password next to the Source Database Password field. In the displayed dialog box, change the password. This action only updates DRS with the changed password.

NOTE

The username and password of the source database are encrypted and stored in the database and the replication instance during the migration. After the task is deleted, the username and password are permanently deleted.

Figure 3-8 Destination database information

Destination Database

VPC: [View VPC](#)

Subnet: [View Subnets](#)

IP Address or Domain Name:

Port:

Database Username:

Database Password:

SSL Connection:

If you want to enable SSL connection, ensure that SSL has been enabled on the destination database, related parameters have been correctly configured, and an SSL certificate has been uploaded.

Encryption Certificate: [Select](#)

Migrate Definer to User: Yes No

[Test Connection](#) This button is available only after the replication instance is created successfully.

Table 3-18 Destination database settings

Parameter	Description
VPC	A dedicated virtual network in which the destination database is located. It isolates networks for different services.
Subnet	A subnet provides dedicated network resources that are isolated from other networks, improving network security. The subnet must be in the AZ where the source database resides. You need to enable DHCP for creating the source database subnet.
IP Address or Domain Name	Enter the IP address or domain name of the destination database.

Parameter	Description
Port	The port of the destination database. Range: 1 - 65535
Database Username	The username for accessing the destination 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, Full migration, Incremental migration, or Incremental migration failed status, in the Migration Information area on the Basic Information page, click Update Password next to the Destination Database Password field. In the displayed dialog box, change the password. This action only updates DRS with the changed password.
SSL Connection	SSL encrypts the connections between the source and destination databases. If SSL is enabled, upload the SSL CA root certificate. NOTE <ul style="list-style-type: none">• 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.
Migrate Definer to User	<ul style="list-style-type: none">• Yes• 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**

The IP address, port, username, and password of the destination database are encrypted and stored in the database and the replication instance, and will be cleared after the task is deleted.

Step 4 On the **Set Task** page, set migration accounts and objects, and click **Next**.

Figure 3-9 Migration Type

Note: Before the migration task is complete, you cannot change the usernames, passwords, and rights of any source database users.

*Flow Control Yes No ⓘ

*Filter DROP DATABASE Yes No

*Migrate Account Yes No
 During a database migration, you need to separately migrate accounts and permissions. **Certain accounts cannot be migrated to the destination database. Ensure that services are not affected.**

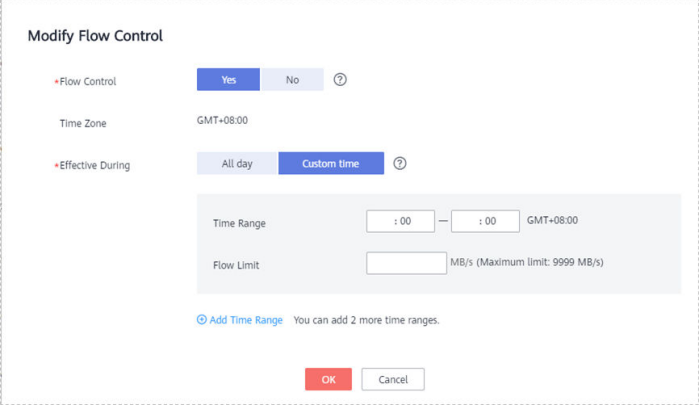
Confirm All Remarks ⓘ

<input checked="" type="checkbox"/>	Account	Can Be Migrated	Permission	Password	Remarks
<input checked="" type="checkbox"/>	██████████	Yes	GRANT ALL PRIVILEGES ON *.*	██████████	View
<input checked="" type="checkbox"/>	██████████	Yes	GRANT ALL PRIVILEGES ON *.*	██████████	View
<input checked="" type="checkbox"/>	██████████	Yes	GRANT ALL PRIVILEGES ON *.*	██████████	View
<input type="checkbox"/>	██████████	No	GRANT SELECT, INSERT, UPD...	--	View
<input type="checkbox"/>	██████████	No	GRANT USAGE ON *.* GRAN...	--	View
<input type="checkbox"/>	██████████	No	GRANT ALL PRIVILEGES ON *.*	--	View
<input type="checkbox"/>	██████████	No	GRANT USAGE ON *.* GRAN...	--	View


Reset Password
 Set Unified Password ██████████

*Migrate Object All Tables Databases ⓘ

Table 3-19 Migration types and objects

Parameter	Description
Flow Control	<p>You can choose whether to control the flow.</p> <ul style="list-style-type: none"> Yes You can customize the maximum migration speed. In addition, you can set the time range based on your service requirements. The traffic rate setting usually includes setting of a rate limiting time period and a traffic rate value. Flow can be controlled all day or during specific time ranges. The default value is All day. A maximum of three time ranges can be set, and they cannot overlap. The flow rate must be set based on the service scenario and cannot exceed 9,999 MB/s. <p>Figure 3-10 Flow control</p>  <ul style="list-style-type: none"> No The migration speed is not limited and the outbound bandwidth of the source database is maximally used, which will increase the read burden on the source database. For example, if the outbound bandwidth of the source database is 100 MB/s and 80% bandwidth is used, the I/O consumption on the source database is 80 MB/s. <p>NOTE</p> <ul style="list-style-type: none"> - Flow control mode takes effect only during a full migration. - You can also change the flow control mode after creating a task. For details, see Modifying the Flow Control Mode.

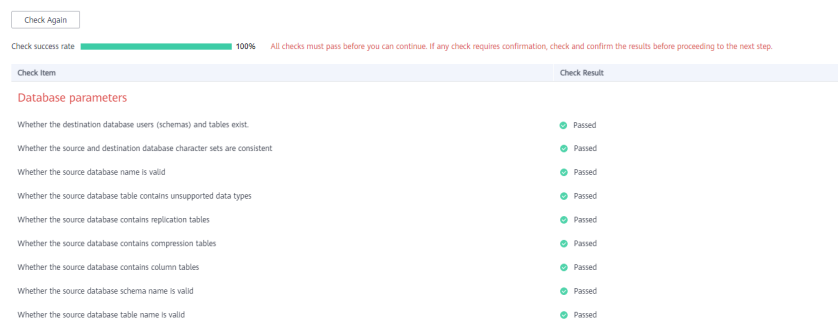
Parameter	Description
Filter DROP DATABASE	<p>During an incremental migration, executing DDL operations on the source database may affect the data migration performance to some extent. To reduce data migration risks, DRS allows you to filter out DDL operations.</p> <p>The database deletion operation can be filtered out by default.</p> <ul style="list-style-type: none">• If you select Yes, any database deletion operations performed on the source database are not synchronized during data migration.• If you select No, related operations are synchronized to the destination database during data migration. <p>NOTE Currently, only the full plus incremental migrations from RDS MySQL to MySQL are supported.</p>
Migrate Account	<p>During a database migration, accounts need to be migrated separately.</p> <p>There are accounts that can be migrated completely, accounts whose permissions need to be reduced, and accounts that cannot be migrated. You can choose whether to migrate the accounts based on service requirements.</p> <ul style="list-style-type: none">• Yes If you need to migrate accounts, see Migrating Accounts.• No During the migration, accounts, permissions, and passwords are not migrated.

Parameter	Description
Migrate Object	<p>You can choose to migrate all objects, tables, or databases based on your service requirements.</p> <ul style="list-style-type: none"> ● All: All objects in the source database are migrated to the destination database. After the migration, the object names will remain the same as those in the source database and cannot be modified. ● Tables: The selected table-level objects will be migrated. ● Databases: The selected database-level objects will be migrated. <p>If the source database is changed, click  in the upper right corner before selecting migration objects to ensure that the objects to be selected are from the changed source database.</p> <p>NOTE</p> <ul style="list-style-type: none"> ● If you choose not to migrate all of the databases, the migration may fail because the objects, such as stored procedures and views, in the databases to be migrated may have dependencies on other objects that are not migrated. To prevent migration failure, migrate all of the databases. ● If the object name contains spaces, the spaces before and after the object name are not displayed. If there are multiple spaces between the object name and the object name, only one space is displayed. ● The name of the selected migration object cannot contain spaces. ● To quickly select the desired database objects, you can use the search function.

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

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

Figure 3-11 Pre-check



- 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 displayed page, specify **Start Time** and confirm that the configured information is correct and click **Submit** to submit the task.

Table 3-20 Task startup settings

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

Step 7 After the task is submitted, view and manage it on the **Online Migration 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.

----End

3.3 Task Management

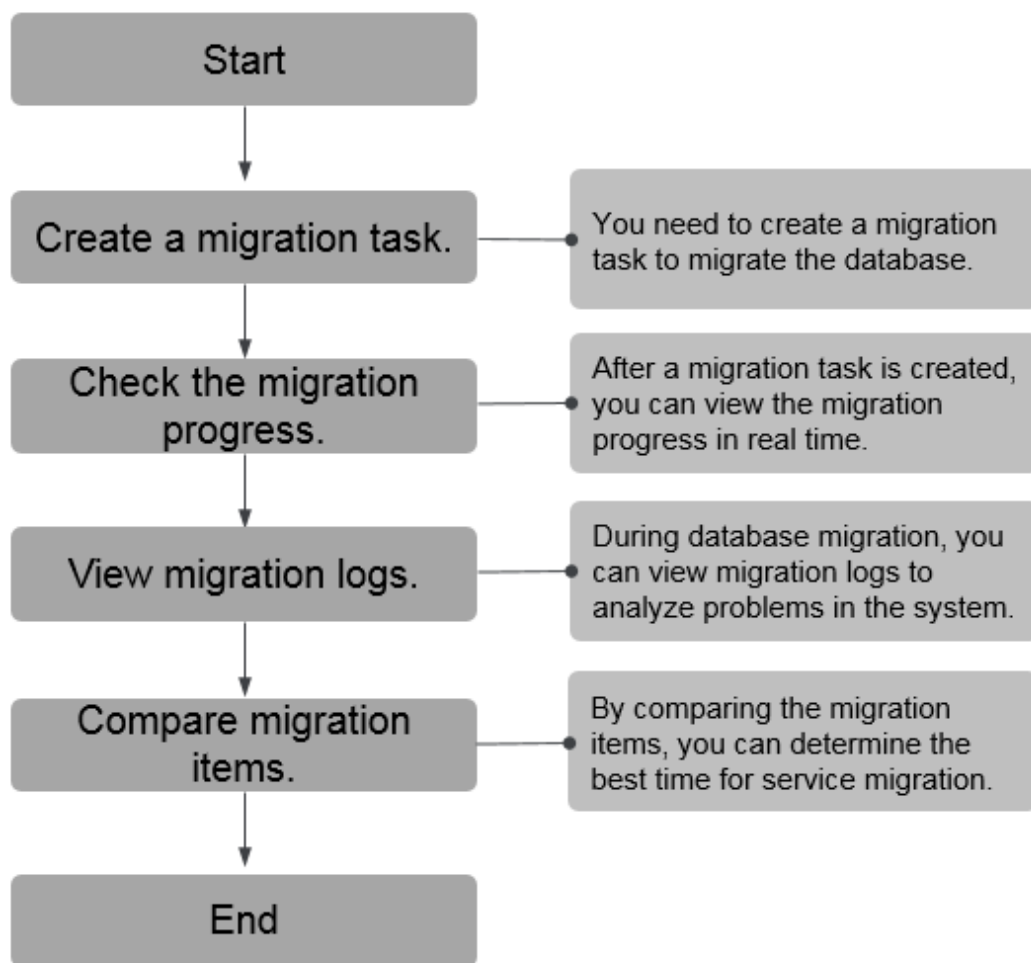
3.3.1 Creating a Migration Task

Process

A complete real-time migration consists of creating a migration task, tracking task progress, analyzing migration logs, and comparing data consistency. By comparing multiple items and data, you can determine the proper time for service migration to minimize the service downtime.

A complete migration involves the following procedures.

Figure 3-12 Migration process



- **Step 1: Create a migration task.** Select the source and destination databases as required and create a migration task.
- **Step 2: Check the migration progress.** During migration, you can view the migration progress.
- **Step 3: View migration logs.** Migration logs contain alarms, errors, and prompt information. You can analyze system problems based on such information.
- **Step 4: Compare migration items.** You can compare objects and data to be migrated to ensure data consistency.

This section uses the migration from MySQL to RDS MySQL as an example to describe how to configure a migration task over a VPC network on the DRS console.

VPC is suitable for migrations of cloud databases in the same region.

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

Prerequisites

- You have logged in to the DRS console.
- For details about the DB types and versions supported by real-time migration, see [Real-Time Migration](#).

Procedure

Step 1 On the **Online Migration Management** page, click **Create Migration Task**.

Step 2 On the **Create Replication Instance** page, configure task details, description, and the replication instance, and click **Next**.

- Task information description

Figure 3-13 Migration task information

Table 3-21 Task information

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 !=<>'&"\

- Replication instance information

Table 3-22 Replication instance settings

Parameter	Description
Data Flow	Select To the cloud . The destination DB is on the current cloud.
Source DB Engine	Select MySQL .
Destination DB Engine	Select MySQL .

Parameter	Description
Network Type	Select VPC Network. Available options: VPC , VPN or Direct Connect , and Public network . By default, the value is Public network . <ul style="list-style-type: none">- VPC is suitable for migrations of cloud databases in the same region.- Public network is suitable for migrations from on-premises or external cloud databases to the destination databases bound with an EIP.- VPN and Direct Connect are suitable for migrations from on-premises databases to cloud databases or between cloud databases across regions.
Destination DB Instance	The RDS DB instance you created.
Replication Instance Subnet	The subnet where the replication instance resides. You can also click View Subnet to go to the network console to view the subnet where the instance resides. By default, the DRS instance and the destination DB instance are in the same subnet. You need to select the subnet where the DRS instance resides, and there are available IP addresses for the subnet. To ensure that the replication instance is successfully created, only subnets with DHCP enabled are displayed.
Destination Database Access	<ul style="list-style-type: none">- Read-only During migration, the destination database is read-only. After the migration is complete, it restores to the read/write status. This option ensures the integrity and success rate of data migration.- Read/Write During the migration, the destination database can be queried or modified. Data being migrated may be modified when operations are performed or applications are connected. It should be noted that background processes can often generate or modify data, which may result in data conflicts, task faults, and upload failures. Do not select this option if you do not fully understand the risks. Set the destination database to Read/Write only when you need to modify other data in the database during the migration. The task cannot be modified after being created.

Parameter	Description
Migration Type	<ul style="list-style-type: none">- Full: This migration type is suitable for scenarios where service interruption is acceptable. All objects and data in non-system databases are migrated to the destination database at one time. The objects include tables, views, and stored procedures. NOTE If you are performing a full migration, do not perform operations on the source database. Otherwise, data generated in the source database during the migration will not be synchronized to the destination database.- Full+Incremental: This migration type allows you to migrate data without interrupting services. After a full migration initializes the destination database, an incremental migration initiates and parses logs to ensure data consistency between the source and destination databases. NOTE If you select Full+Incremental, data generated during the full migration will be continuously synchronized to the destination database, and the source remains accessible.

 **NOTE**

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

Step 3 On the **Configure Source and Destination Databases** page, wait until the replication instance is created. Then, specify source and destination database information and click **Test Connection** for both the source and destination databases to check whether they have been connected to the replication instance. After the connection tests are successful, select the check box before the agreement and click **Next**.

 **NOTE**

The source database can be an ECS database or an RDS instance. Configure parameters based on different scenarios.

- Scenario 1: Databases on an ECS - source database configuration

Table 3-23 Self-built on ECS - source database information

Parameter	Description
Source Database Type	Select Self-built on ECS .
VPC	A dedicated virtual network in which the source database is located. It isolates networks for different services. You can select an existing VPC or create a VPC.

Parameter	Description
Subnet	A subnet provides dedicated network resources that are isolated from other networks, improving network security. The subnet must be in the AZ where the source database resides. You need to enable DHCP for creating the source database subnet.
IP Address or Domain Name	The IP address or domain name of the source database.
Port	The port of the source database. Range: 1 - 65535
Database Username	The username for accessing the source database.
Database Password	The password for the database username.
SSL Connection	SSL encrypts the connections between the source and destination databases. If SSL is enabled, upload the SSL CA root certificate. NOTE <ul style="list-style-type: none">- 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 source database are encrypted and stored in DRS, and will be cleared after the task is deleted.

- Scenario 2: RDS DB instance - source database configuration

Table 3-24 RDS DB instance - source database information

Parameter	Description
Source Database Type	Select RDS DB Instance .
DB Instance Name	Select the RDS DB instance to be migrated as the source DB instance.
Database Username	The username for accessing the source database.
Database Password	The password for the database username.

- Destination database configuration

Table 3-25 Destination database settings

Parameter	Description
DB Instance Name	The RDS DB instance selected during migration task creation. This parameter cannot be changed.
Database Username	The username for accessing the destination database.
Database Password	The password for the database username.
Migrate Definer to User	<ul style="list-style-type: none"> - Yes - 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**

The database username and password are encrypted and stored in the system and will be cleared after the task is deleted.

Step 4 On the **Set Task** page, select the accounts and objects to be migrated, and click **Next**.


Figure 3-14 Migration type

Note: Before the migration task is complete, you cannot change the usernames, passwords, and rights of any source database users.

*Flow Control Yes No 

*Filter DROP DATABASE Yes No

*Migrate Account Yes No
 During a database migration, you need to separately migrate accounts and permissions. *Certain accounts cannot be migrated to the destination database. Ensure that services are not affected.*



<input checked="" type="checkbox"/>	Account	Can Be Migrated	Permission	Password	Remarks
<input checked="" type="checkbox"/>	...@% ...	Yes	GRANT ALL PRIVILEGES ON *.*	<input type="text"/>	View
<input checked="" type="checkbox"/>	...@% %	Yes	GRANT ALL PRIVILEGES ON *.*	<input type="text"/>	View
<input checked="" type="checkbox"/>	...@% ...	Yes	GRANT ALL PRIVILEGES ON *.*	<input type="text"/>	View
<input type="checkbox"/>	...@%'	No	GRANT SELECT, INSERT, UPD...	--	View
<input type="checkbox"/>	...@%'	No	GRANT USAGE ON *.* GRAN...	--	View
<input type="checkbox"/>	...@%'	No	GRANT ALL PRIVILEGES ON *.*	--	View
<input type="checkbox"/>	...@localhost	No	GRANT USAGE ON *.* GRAN...	--	View

Reset Password
 Set Unified Password


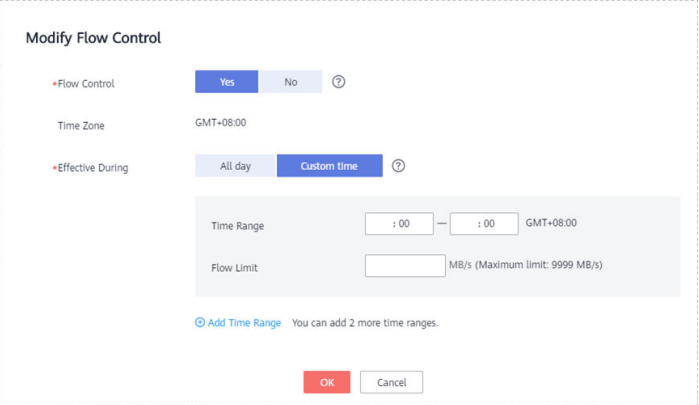

*Migrate Object All Tables Databases 

Table 3-26 Migration types and objects

Parameter	Description
Flow Control	<p>You can choose whether to control the flow.</p> <ul style="list-style-type: none"> Yes You can customize the maximum migration speed. In addition, you can set the time range based on your service requirements. The traffic rate setting usually includes setting of a rate limiting time period and a traffic rate value. Flow can be controlled all day or during specific time ranges. The default value is All day. A maximum of three time ranges can be set, and they cannot overlap. The flow rate must be set based on the service scenario and cannot exceed 9,999 MB/s. <p>Figure 3-15 Flow control</p>  <ul style="list-style-type: none"> No The migration speed is not limited and the outbound bandwidth of the source database is maximally used, which will increase the read burden on the source database. For example, if the outbound bandwidth of the source database is 100 MB/s and 80% bandwidth is used, the I/O consumption on the source database is 80 MB/s. <p>NOTE</p> <ul style="list-style-type: none"> - Flow control mode takes effect only during a full migration. - You can also change the flow control mode after creating a task. For details, see Modifying the Flow Control Mode.

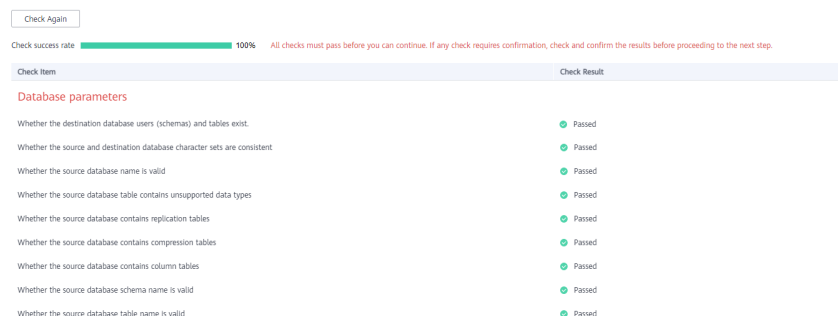
Parameter	Description
Migrate Account	<p>During a database migration, accounts need to be migrated separately.</p> <p>There are accounts that can be migrated completely, accounts whose permissions need to be reduced, and accounts that cannot be migrated. You can choose whether to migrate the accounts based on service requirements. If you select Yes, you can select the accounts to be migrated as required.</p> <ul style="list-style-type: none"> • Yes If you need to migrate accounts, see Migrating Accounts. • No During migration, accounts, permissions, and passwords are not migrated.
Filter DROP DATABASE	<p>To reduce the risks involved in data migration, DDL operations can be filtered out. You can choose not to synchronize certain DDL operations.</p> <ul style="list-style-type: none"> • If you select Yes, any database deletion operations performed on the source database are not migrated during data migration. • If you select No, related operations are migrated to the destination database during data migration.

Parameter	Description
Migrate Object	<p>You can choose to migrate all objects, tables, or databases based on your service requirements.</p> <ul style="list-style-type: none"> ● All: All objects in the source database are migrated to the destination database. After the migration, the object names will remain the same as those in the source database and cannot be modified. ● Tables: The selected table-level objects will be migrated. ● Databases: The selected database-level objects will be migrated. <p>If the source database is changed, click  in the upper right corner before selecting migration objects to ensure that the objects to be selected are from the changed source database.</p> <p>NOTE</p> <ul style="list-style-type: none"> ● If you choose not to migrate all of the databases, the migration may fail because the objects, such as stored procedures and views, in the databases to be migrated may have dependencies on other objects that are not migrated. To prevent migration failure, migrate all of the databases. ● If the object name contains spaces, the spaces before and after the object name are not displayed. If there are multiple spaces between the object name and the object name, only one space is displayed. ● The name of the selected migration object cannot contain spaces. ● To quickly select the desired database objects, you can use the search function.

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

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

Figure 3-16 Pre-check



- 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 Compare source and destination parameters.

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

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

If the common parameter values in the comparison results are inconsistent, click **Save Change** to change the destination database values to be the same as those of the source database.

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

- If you need to change the performance parameter values that are consistent in the comparison results to different values, locate the target parameter, enter values in the **Change To** column, and click **Save Change** in the upper left corner.
- If you want to make the performance parameter values of the source and destination database be the same:
 - i. Click **Use Source Database Value**.

DRS automatically makes the destination database values the same as those of the source database.

 **NOTE**

You can also manually enter parameter values.

- ii. Click **Save Change** to save your changes.

The system changes the parameter values based on your settings for the destination database values. After the modification, the list is updated automatically.

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

For details about how to set parameters during a comparison, see [Parameters for Comparison](#).


- iii. Click **Next**.

Step 7 On the displayed page, specify **Start Time** and confirm that the configured information is correct and click **Submit** to submit the task.

Table 3-27 Task startup settings

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

Step 8 After the task is submitted, view and manage it on the **Online Migration 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.

----End

3.3.2 Querying the Migration Progress

The migration progress of a real-time migration task helps you keep track of the status of the migration task.

DRS shows the migration progress using a progress bar, helping you learn the migration progress in real time. During full migration, you can check migration details.

- With the progress bar, you can view the migration progress of structures, data, and indexes. When the progress reaches 100%, the migration is complete. The migration of data and indexes is relatively slow.
- In the migration details, you can view the migration progress of a specific object. If the number of objects is the same as that of migrated objects, the migration is complete. You can view the migration progress of each object in detail. During incremental migration, the progress details are not displayed. You can view the consistency status on the **Migration Comparison** tab.

Prerequisites

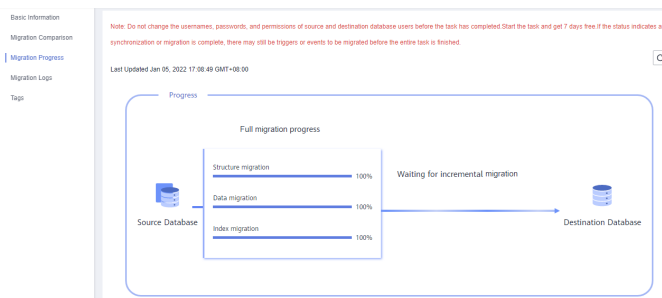
- You have logged in to the DRS console.
- A migration task has been started.

Procedure

Step 1 On the **Online Migration Management** page, click the target migration task name in the **Task Name/ID** column.

Step 2 On the displayed page, click **Migration Progress**.

- View the migration progress of structures, data, and indexes.
When a full migration is complete, the progress of each item reaches 100%.
For a full plus incremental migration, you can view the delay of the incremental migration on the **Migration Progress** page.

Figure 3-17 Migration progress overview

You can also view the incremental migration delay on the **Online Migration Management** page. When the incremental migration delay exceeds the preset or default threshold, the value of the incremental migration delay is displayed in red in the task list.

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.

- View the migration task progress. In the **Migration Details** area, locate the target migration object and click **View Details** in the **Operation** column to view the migration progress. After the incremental migration starts, the progress is not displayed. You can click the **Migration Comparison** tab to compare the data consistency.

----End

3.3.3 Viewing Migration Logs

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

Prerequisites

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

Procedure

Step 1 On the **Online Migration Management** page, click the target migration task name in the **Task Name/ID** column.

Step 2 On the **Migration Logs** tab, view logs of the migration task by level.

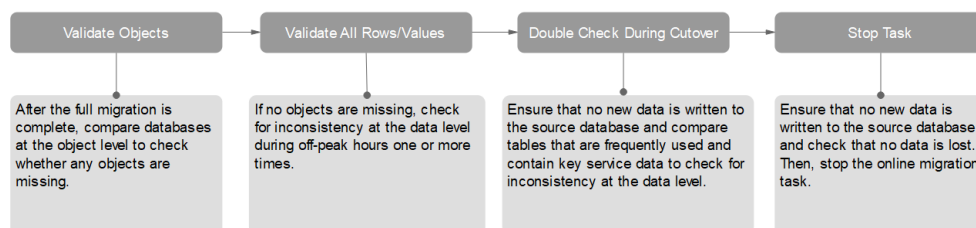
You can view time, levels, and descriptions of the logs.

----End

3.3.4 Comparing Migration Items

This section describes how to compare migration items to check if there are any differences between source and destination databases. By comparing migration objects, you can determine the proper time for service migration to minimize the service downtime.

Figure 3-18 Comparison process



Comparison Scenarios

You can compare migration objects with different dimensions:

- **Object-level comparison:** It helps you compare databases, indexes, tables, views, stored procedures and functions, and sorting rules of tables. You are advised to perform the comparison after a full migration is complete.
- **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 migrated. This comparison method is recommended because it is fast.
 - **Value comparison:** It helps you check whether data in the migrated table is consistent. The comparison process is relatively slow.

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.

Comparison Restrictions

- A comparison task can be created only when the task is in the incremental phase. When a full task is complete, DRS automatically creates object-level and row comparison tasks.
- If DDL operations were performed on the source database, you need to compare the objects again to ensure the accuracy of the comparison results.

- If data in the destination database is modified separately, the comparison results 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.
- 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 source database is a relational database, the row comparison duration is 60 minutes. If the source database is a non-relational database, the row comparison duration is 30 minutes.

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.

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.

Prerequisites

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

Creating a comparison task

You can follow the comparison process or select a comparison method based on your service scenario. The following operations describe how to compare migration items by following the recommended migration process.

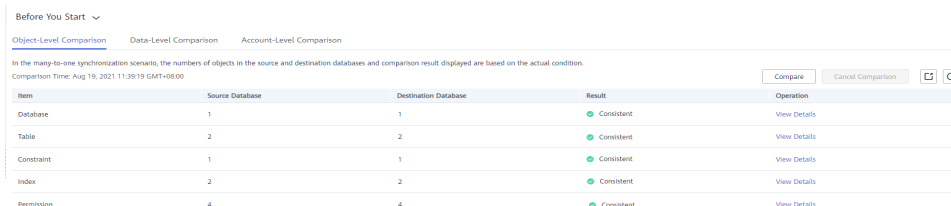
- Step 1** On the **Online Migration Management** page, click the target migration task name in the **Task Name/ID** column.

Step 2 On the **Migration Comparison** tab, compare objects of the source and destination databases.

1. Check the integrity of the database object.

Click **Validate Objects**. On the **Object-Level Comparison** tab, view the comparison result of each comparison item.

Figure 3-19 Comparing objects




The screenshot shows the 'Object-Level Comparison' tab in the Migration Comparison interface. It displays a table with the following columns: Item, Source Database, Destination Database, Result, and Operation. The table lists several database objects, all of which are marked as 'Consistent'.

Item	Source Database	Destination Database	Result	Operation
Database	1	1	Consistent	View Details
Table	2	2	Consistent	View Details
Constraint	1	1	Consistent	View Details
Index	2	2	Consistent	View Details
Permission	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.
 - a. In the **Before You Start** pane, click **Validate All Rows/Values**.
 - b. In the displayed **Create Comparison Task** dialog box, specify **Comparison Type**, **Comparison Time**, and **Object**. Then, click **OK**.
 - **Comparison Type**: compares rows and values.
 - **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.
 - **Object**: You can select objects to be compared based on the scenarios.

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.

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 source and destination databases, and click **View Details** in the **Operation** column to view detailed comparison results.

NOTE

You can cancel a running task at any time and view the comparison report of a canceled comparison task.

3. Perform a double check before the cutover.

Click **Double Check During Cutover**. In the displayed **Create Comparison Task** dialog box, specify **Comparison Type**, **Comparison Time**, and **Object**. Then, click **OK**.

For details about how to view comparison details, see [Step 2.2](#).
4. Stop the migration task.

After the service system is successfully migrated to the destination database, stop the migration task to prevent operations in the source database from being synchronized to the destination database to overwrite the data. This operation only deletes the replication instance, and the migration task is still in the task list. You can view or delete the task.

Generally, stopping a task can ensure the integrity of special objects because triggers and events are migrated when a task is being stopped. Only in some cases, such as network disconnections, a task may fail to be stopped. If a task fails to be stopped multiple times, you can select **Forcibly stop task** to reduce the waiting time. If you forcibly stop a task, triggers and events may not be completely migrated and you need to manually migrate them.

----End

Quick Comparison

To accelerate and simplify the migration process, DRS provides the quick comparison function. You can directly perform a comparison on the migration task list. This function can be used to compare all migration objects only when incremental migration tasks are in progress.

Step 1 On the **Online Migration Management** page, locate the target migration task and click **Compare** in the **Operation** column.

Step 2 On the **Create Comparison Task** page, select **Start upon task creation** or **Start at a specified time** and click **Yes** to start the comparison task.

----End

Viewing a Comparison Task

Step 1 On the **Online Migration Management** page, locate the target migration task and click **View** in the **Operation** column.

Step 2 On the **Migration Comparison** tab, view the data comparison result.

----End

3.3.5 Managing Objects

3.3.5.1 Migrating Accounts

Scenarios

During a database migration, accounts need to be migrated separately.

MySQL Databases Operations

During the migration of MySQL databases, there are accounts that can be migrated completely, accounts whose permissions need to be reduced, and accounts that cannot be migrated.

- Accounts that can be completely migrated refer to the accounts that meet the permission requirements of the destination database. By default, the system

automatically migrates the permission of the database account to the destination database.

- Accounts whose permissions need to be reduced refer to high-level accounts that fail to meet the permission requirements of the destination database, such as super, file, and shutdown. To migrate these accounts, reduce the permissions of the account. Otherwise, the migration fails.

You can click **View** in the **Remarks** column to view detailed information about the permission to be reduced. You can then determine whether the permission reduction will have an impact on your services.

- Accounts that cannot be migrated indicate that database users cannot meet the migration requirements for certain reasons. These accounts will not be migrated to the destination database. Ensure that services are not affected by these accounts. After the migration is started, any operation of changing the password or permission for these accounts will result in an incremental migration failure.

You can choose whether to migrate the accounts. Perform the following operations to set the database username, permission, and password. The following procedure uses all database users that can be migrated as an example.

The account information consists of account name, permission, and password.

Step 1 The account name is in the '**Account name**'+'@+'**host**' format. **host** indicates the IP address of the destination database, which is allowed to access the source database. You can change the IP address as required.

Step 2 By default, account permissions cannot be modified. For accounts that can be migrated (including accounts that can be completely migrated and accounts whose permissions need to be reduced), the system also migrates the permissions of these accounts.

After the migration is successful, accounts in the destination database are those whose permissions need to be reduced.

Step 3 Migrate account passwords.

You can enter new passwords in the **Passwords** column for specified accounts that can be migrated, or select all accounts that can be migrated and select **Set Unified Password** to set a unified new password for them. After the migration is successful, you can run DDL statements on the destination database to reset the password.

Step 4 For accounts whose permissions need to be reduced and accounts that cannot be migrated, you can click **View** to confirm the remarks before performing the next step. If there are multiple accounts, you can click **Confirm All Remarks**.

If an account already exists in the destination database, it cannot be migrated. You can delete it from the destination database. After the deletion, you can continue the migration.

 **NOTE**

----End

3.3.5.2 Parameters for Comparison

Parameter comparison helps you check consistency between the source and destination database data to ensure your services will not be affected after being migrated.

This section lists the common parameters and performance parameters of different DB engine versions for your reference during parameter comparison.

MySQL 5.6

Table 3-28 MySQL 5.6 parameters to be compared

Parameter	Type	Restart Required
connect_timeout	Common parameter	No
event_scheduler	Common parameter	No
innodb_lock_wait_timeout	Common parameter	No
max_connections	Common parameter	No
net_read_timeout	Common parameter	No
net_write_timeout	Common parameter	No
explicit_defaults_for_timestamp	Common parameter	Yes
innodb_flush_log_at_trx_commit	Common parameter	No
max_allowed_packet	Common parameter	No
tx_isolation	Common parameter	No
character_set_client	Common parameter	No
character_set_connection	Common parameter	No
collation_connection	Common parameter	No
character_set_results	Common parameter	No
collation_server	Common parameter	No
binlog_cache_size	Performance parameter	No
binlog_stmt_cache_size	Performance parameter	No
bulk_insert_buffer_size	Performance parameter	No
innodb_buffer_pool_size	Performance parameter	Yes
key_buffer_size	Performance parameter	No
long_query_time	Performance parameter	No

Parameter	Type	Restart Required
query_cache_type	Performance parameter	Yes
read_buffer_size	Performance parameter	No
read_rnd_buffer_size	Performance parameter	No
sort_buffer_size	Performance parameter	No
sync_binlog	Performance parameter	No

MySQL 5.7

Table 3-29 MySQL 5.7 parameters to be compared

Parameter	Type	Restart Required
connect_timeout	Common parameter	No
event_scheduler	Common parameter	No
innodb_lock_wait_timeout	Common parameter	No
max_connections	Common parameter	No
net_read_timeout	Common parameter	No
net_write_timeout	Common parameter	No
explicit_defaults_for_timestamp	Common parameter	No
innodb_flush_log_at_trx_commit	Common parameter	No
max_allowed_packet	Common parameter	No
tx_isolation	Common parameter	No
character_set_client	Common parameter	No
character_set_connection	Common parameter	No
collation_connection	Common parameter	No
character_set_results	Common parameter	No
collation_server	Common parameter	No
binlog_cache_size	Performance parameter	No
binlog_stmt_cache_size	Performance parameter	No
bulk_insert_buffer_size	Performance parameter	No

Parameter	Type	Restart Required
innodb_buffer_pool_size	Performance parameter	No
key_buffer_size	Performance parameter	No
long_query_time	Performance parameter	No
query_cache_type	Performance parameter	No
read_buffer_size	Performance parameter	No
read_rnd_buffer_size	Performance parameter	No
sort_buffer_size	Performance parameter	No
sync_binlog	Performance parameter	No

 NOTE

3.3.6 Task Life Cycle

3.3.6.1 Viewing Task Details

This section describes how to view details about a migration task, including information about the task, replication instance, and migration.

Prerequisites

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

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 **Online Migration Management** page, click the target migration task name in the **Task Name/ID** column.

Step 2 On the displayed **Basic Information** tab, view details about the migration task. You can view information about the task, replication instance, and migration.

----End

3.3.6.2 Editing Migration Task Information

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

The following task information can be edited:

- Task name
- Description
- Task start time

Prerequisites

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

Procedure

Step 1 On the **Online Migration Management** page, click the target migration task name 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 and description.
 - To submit the change, click .

Table 3-30 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 the following special characters: !<>&"\

- 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

3.3.6.3 Modifying Connection Information

During the migration, you may change the password of the source or destination database. As a result, the migration task fails. In this case, you need to change the password on the DRS console and resume the task.

You can modify the following information:

- Source database password
- Destination database password

 **NOTE**

After the preceding information is changed, the change takes effect immediately, and the data in the destination database is not cleared.

Prerequisites

You have logged in to the DRS console.

Procedure

- Step 1** On the **Online Migration Management** page, click the target migration task name in the **Task Name/ID** column.
- Step 2** On the **Basic Information** tab, click **Modify Connection Details** in the **Migration Information** area.
- Step 3** In the displayed dialog box, change the passwords of the source and destination databases and click **OK**.

----End

3.3.6.4 Modifying the Flow Control Mode

You can choose whether to control the flow. DRS allows you to change the flow control mode after a task is created. Currently, only the following real-time migration types support this function:

- To the cloud
 - MySQL->MySQL
- From of the cloud
 - MySQL->MySQL

 **NOTE**

- Flow control mode takes effect only during a full migration.
- After the traffic rate is modified in the incremental migration phase, the modification takes effect when the task enters the full migration phase again.

Prerequisites

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

Method 1

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

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

----End

Method 2

Step 1 In the task list on the **Online Migration 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

3.3.6.5 Editing a Migration Task

For a migration task that has been created but not started, DRS allows you to edit the configuration information of the task, including the task information, replication instance information, and migration information. For migration tasks in the following statuses, you can edit the tasks again after the replication instances are created:

- Creating
- Configuration

 **NOTE**

For a started migration task, modifying the migration objects is not supported.

Prerequisites

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

Method 1

Step 1 In the task list on the **Online Migration 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 source and destination databases and click **Next**.

Step 3 On the **Set Task** page, select the accounts and objects to be migrated, and click **Next**.

Figure 3-20 Migration type

Note: Before the migration task is complete, you cannot change the usernames, passwords, and rights of any source database users.

*Flow Control Yes No ⓘ

*Filter DROP DATABASE Yes No

*Migrate Account Yes No

During a database migration, you need to separately migrate accounts and permissions. **Certain accounts cannot be migrated to the destination database. Ensure that services are not affected.**

Confirm All Remarks ⓘ

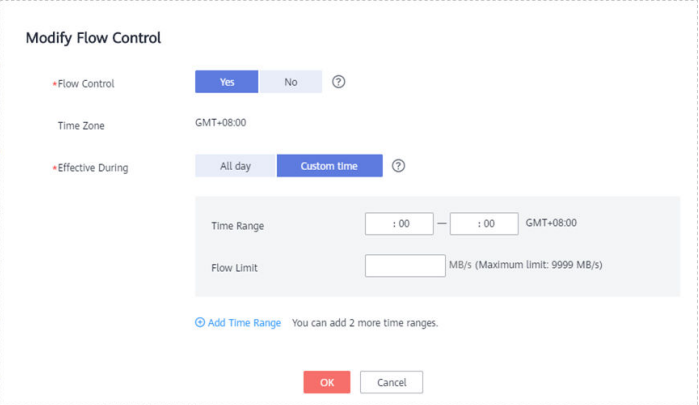
<input checked="" type="checkbox"/>	Account	Can Be Migrated	Permission	Password	Remarks
<input checked="" type="checkbox"/>	'@' ...	Yes	GRANT ALL PRIVILEGES ON *.*	<input type="text"/>	View
<input checked="" type="checkbox"/>	'@' %	Yes	GRANT ALL PRIVILEGES ON *.*	<input type="text"/>	View
<input checked="" type="checkbox"/>	'@' ...	Yes	GRANT ALL PRIVILEGES ON *.*	<input type="text"/>	View
<input type="checkbox"/>	'@' %	No	GRANT SELECT, INSERT, UPD...	--	View
<input type="checkbox"/>	'@' %	No	GRANT USAGE ON *.* GRAN...	--	View
<input type="checkbox"/>	'@' %	No	GRANT ALL PRIVILEGES ON *.*	--	View
<input type="checkbox"/>	@'localhost'	No	GRANT USAGE ON *.* GRAN...	--	View

Reset Password


Set Unified Password

*Migrate Object All Tables Databases ⓘ

Table 3-31 Migration types and objects

Parameter	Description
Flow Control	<p>You can choose whether to control the flow.</p> <ul style="list-style-type: none"> Yes You can customize the maximum migration speed. In addition, you can set the time range based on your service requirements. The traffic rate setting usually includes setting of a rate limiting time period and a traffic rate value. Flow can be controlled all day or during specific time ranges. The default value is All day. A maximum of three time ranges can be set, and they cannot overlap. The flow rate must be set based on the service scenario and cannot exceed 9,999 MB/s. <p>Figure 3-21 Flow control</p>  <ul style="list-style-type: none"> No The migration speed is not limited and the outbound bandwidth of the source database is maximally used, which will increase the read burden on the source database. For example, if the outbound bandwidth of the source database is 100 MB/s and 80% bandwidth is used, the I/O consumption on the source database is 80 MB/s. <p>NOTE</p> <ul style="list-style-type: none"> - Flow control mode takes effect only during a full migration. - You can also change the flow control mode after creating a task. For details, see Modifying the Flow Control Mode.

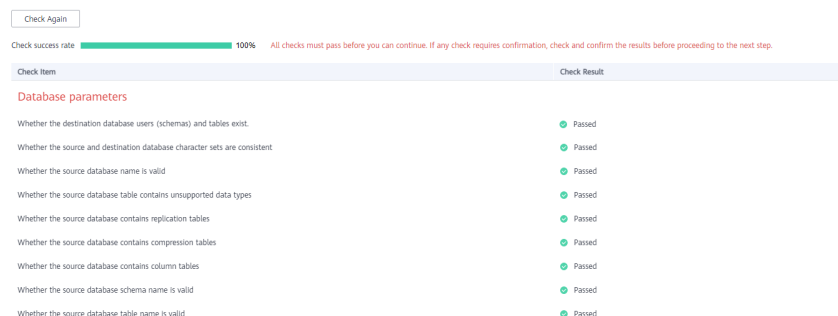
Parameter	Description
Migrate Account	<p>During a database migration, accounts need to be migrated separately.</p> <p>There are accounts that can be migrated completely, accounts whose permissions need to be reduced, and accounts that cannot be migrated. You can choose whether to migrate the accounts based on service requirements. If you select Yes, you can select the accounts to be migrated as required.</p> <ul style="list-style-type: none"> ● Yes If you need to migrate accounts, see Migrating Accounts. ● No During migration, accounts, permissions, and passwords are not migrated.
Filter DROP DATABASE	<p>To reduce the risks involved in data migration, DDL operations can be filtered out. You can choose not to synchronize certain DDL operations.</p> <ul style="list-style-type: none"> ● If you select Yes, any database deletion operations performed on the source database are not migrated during data migration. ● If you select No, related operations are migrated to the destination database during data migration.

Parameter	Description
Migrate Object	<p>You can choose to migrate all objects, tables, or databases based on your service requirements.</p> <ul style="list-style-type: none"> ● All: All objects in the source database are migrated to the destination database. After the migration, the object names will remain the same as those in the source database and cannot be modified. ● Tables: The selected table-level objects will be migrated. ● Databases: The selected database-level objects will be migrated. <p>If the source database is changed, click  in the upper right corner before selecting migration objects to ensure that the objects to be selected are from the changed source database.</p> <p>NOTE</p> <ul style="list-style-type: none"> ● If you choose not to migrate all of the databases, the migration may fail because the objects, such as stored procedures and views, in the databases to be migrated may have dependencies on other objects that are not migrated. To prevent migration failure, migrate all of the databases. ● If the object name contains spaces, the spaces before and after the object name are not displayed. If there are multiple spaces between the object name and the object name, only one space is displayed. ● The name of the selected migration object cannot contain spaces. ● To quickly select the desired database objects, you can use the search function.

Step 4 On the **Check Task** page, check the migration task.

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

Figure 3-22 Pre-check



- 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 5 On the **Confirm Task** page, specify **Start Time**, confirm that the configured information is correct, and click **Submit** to submit the task.

 **NOTE**

- Set **Start Time** to **Start upon task creation** or **Start at a specified time** based on site requirements.
- After a migration task is started, the performance of the source and destination databases may be affected. You are advised to start a migration task during off-peak hours.
- Under specific conditions, the destination database needs to be restarted once during the task startup, which may interrupt database services.

Step 6 After the task is submitted, view and manage it on the **Online Migration 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.

----End

Method 2

Step 1 On the **Online Migration Management** page, click the target migration task name 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 steps [Step 2](#) to [Step 6](#).

----End

3.3.6.6 Resuming a Migration Task

A fault may occur during the migration due to external factors, such as insufficient storage space. After the fault is rectified based on the migration log information, you can resume the migration.

You can resume migration tasks in any of the following statuses:

- Migration failed
- Paused

 **NOTE**

- If a migration 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.

Prerequisites

- You have logged in to the DRS console.
- A failed migration task exists.

Method 1

On the **Online Migration Management** page, locate the target task and click **Resume** in the **Operation** column.

Method 2

Step 1 In the task list on the **Online Migration Management** page, locate and click the task.

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

----End

3.3.6.7 Resetting a Migration Task

During the migration, if a migration task fails due to uncertain causes, the background will resume the task several times. However, the task may fail to be recovered in some scenarios. To continue the migration, DRS allows you to reset the task.

You can reset failed migration tasks in any of the following statuses:

- Migration failure status

Prerequisites

- You have logged in to the DRS console.
- A migration task has failed.

Method 1

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

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

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

----End

Method 2

Step 1 On the **Data Migration Management** page, click the target task name in the **Task Name/ID** column.

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

Step 3 Perform **Step 2** to **Step 3** from method 1.

----End

3.3.6.8 Pausing a Migration Task

During migration, if the flow control mode cannot meet the requirements during peak hours, you can pause the migration task.

You can pause the following migration tasks:

- To the cloud
 - MySQL->MySQL
- From the cloud
 - MySQL->MySQL

Prerequisites

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

Pausing a Task

Step 1 In the task list on the **Online Migration 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

- After the task is paused, the status of the task becomes **Paused**.
- 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. It is recommended that the pause duration be less than or equal to 24 hours.
- You can use the resumable transfer function to continue the migration.

----End

3.3.6.9 Stopping a Migration Task

After the source database and services are migrated to the destination database, you can stop the migration task. To prevent data from being overwritten after the source database and services are migrated to the destination database, operations on the source database should not be synchronized to the destination database. This section describes how to stop a migration task to achieve this goal.

You can stop a task in any of the following statuses:

- Creating
- Configuration
- Pending start
- Full migration

- Full migration failed
- Incremental migration
- Incremental migration failed
- Paused
- Fault rectification

NOTICE

- You are advised to stop the task before performing other operations, such as disconnecting the network between the source database and the replication instance. Otherwise, an alarm indicating that the source database cannot be connected will be generated.
 - For a task in the **Configuration** state, it cannot be stopped if it fails to be configured.
 - For a task in the **Fault rectification** state, it cannot be stopped if the fault is being rectified.
 - After a task is stopped, it cannot be resumed.
-

Prerequisites

- You have logged in to the DRS console.
- A migration task is in progress.

Stopping a Task

Step 1 On the **Online Migration Management** page, locate the task and click **Stop** in the **Operation** column.

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

 **NOTE**

- Generally, triggers and events will be synchronized when you stop the task.
- 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 and will not migrate triggers and events. You have to manually migrate triggers and events.
- If you need to migrate triggers and events, restore the DRS task first. After the task status becomes normal, you can stop the task.

----End

3.3.6.10 Deleting a Migration Task

This section describes how to delete a migration task that has been completed or has failed. 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.
- A migration task that has been completed or fails to be configured exists.

Deleting a Task

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

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

----End

3.3.6.11 Task Statuses

Migration statuses indicate different migration phases.

[Table 3-32](#) lists statuses and descriptions of online migration tasks.

Table 3-32 Task status and description

Status	Description
Creating	A replication instance is being created for DRS.
Task creation failed.	Failed to create a replication instance for real-time migration.
Configuring	A replication instance is created, but the migration task is not started. You can continue to configure the task.
Pending start	The scheduled migration task has been delivered to the replication instance, waiting for the replication instance to start the migration task.
Starting	A migration task is being started.
Start failed	Failed to start a real-time migration task.
Full migration	A full migration task is being performed.
Full migration failed	Failed to perform a full migration task.
Incremental migration	An incremental migration task is being performed.
Incremental migration failed	Failed to perform an incremental migration task.
Fault rectification	A replication instance is faulty and the system automatically restores the migration task.
Paused	A real-time migration task is paused.

Status	Description
Stopping	The replication instance and resources used for executing the migration task are being released.
Completing	A replication instance and resources are being released.
Stopping task failed	Failed to release the replication instance and resources used by the migration task.
Completed	The task is completed and the replication instance is released.

 **NOTE**

- If a task fails to be created, DRS retains the task for three days by default. After three days, the task automatically ends.
- Deleted migration tasks are not displayed in the status list.

4 Backup Migration

4.1 Migration Overview

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

You can use backup migration when you want to migrate on-premises databases to the cloud.

Without connecting to your sources, DRS can help you complete data migration.

Figure 4-1 Backup migration process



Supported Database Types

Table 4-1 lists the source database and destination database types supported by DRS in backup migration.

Table 4-1 Migration schemes

Backup File	Destination DB	Documentation
Full backup file of RDS Microsoft SQL Server	RDS for Microsoft SQL Server	Creating an RDS Backup Migration Task

Backup File	Destination DB	Documentation
Backup files of on-premises and other cloud Microsoft SQL Server		Creating a Backup Using OBS Buckets

4.2 Creating an RDS Backup Migration Task

Supported Source and Destination Databases

Table 4-2 Supported databases

Backup File	Destination DB
RDS Microsoft SQL Server full backup file versions: <ul style="list-style-type: none">• Microsoft SQL Server 2008• Microsoft SQL Server 2012• Microsoft SQL Server 2014• Microsoft SQL Server 2016• Microsoft SQL Server 2017• Microsoft SQL Server 2019	RDS for Microsoft SQL Server <ul style="list-style-type: none">• Microsoft SQL Server 2008• Microsoft SQL Server 2012• Microsoft SQL Server 2014• Microsoft SQL Server 2016• Microsoft SQL Server 2017• Microsoft SQL Server 2019

Prerequisites

- You have logged in to the DRS console.

Precautions

This section describes constraints on backup migrations of Microsoft SQL Server databases.

Table 4-3 Precautions

Type	Restrictions
Database permissions	Before creating a backup migration task, ensure that the account has the permission to operate the RDS service.

Type	Restrictions
Backup database names	<ul style="list-style-type: none">• Backup database names are case-insensitive, must be unique, and cannot be any of the following:<ul style="list-style-type: none">- msdb- master- model- tempdb- rdsadmin- resource
New database name	<ul style="list-style-type: none">• The new database name must be unique and cannot be any of the following (case-insensitive):<ul style="list-style-type: none">- msdb- master- model- tempdb- rdsadmin- resource• The new database name contains 1 to 128 characters, including letters, digits, underscores (_), and hyphens (-).
Backup file sources	<ul style="list-style-type: none">• RDS full backups: Backup files are manually or automatically created for RDS DB instances.
Precautions	<ul style="list-style-type: none">• The available disk space of the destination database is at least 1.5 times the total data size of the backup database.• Backup database name is case-sensitive and must be the same as the database name in the backup file.• The database backup file from a database of later version cannot be restored on the instance database of an earlier version (for example, restored from version 2017 to 2016).• The restoration from Enterprise Edition to Standard Edition to Web Edition may fail. That depends on whether the features of the later version are enabled.• During a migration, if Overwrite Data is set to Yes, high availability of the destination database is disabled by default. After the migration is complete, high availability is restored automatically.• During a migration, stop writing transactions to the destination database.• If a primary/standby switchover of the destination database is performed, the backup migration fails. In this case, the migration task cannot be restored.

Procedure

This section describes how to create an RDS full backup migration task. You can use the full backups of Microsoft SQL Server DB instances in the cloud to migrate data.

Step 1 On the **Backup Migration Management** page, click **Create Migration Task**.

Step 2 On the **Select Backup** page, specify information about the task and backup files. Then, click **Next**.

Figure 4-2 Task information

Table 4-4 Task information

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 !=<>'&"\

Figure 4-3 Backup file information

Backup Name	DB Instance Name/ID	DB Engine	Backup Start Time	Status	Size
<input checked="" type="radio"/> backup-098	rds-098-fengjianbo 23664723286647268893backu1a0f2	SQL SERVER2008_R2_EE	Jul 04, 2019 05:07:07 GMT+08:...	Comple...	3.58MB
<input type="radio"/> backup-094	rds-094 3f5eeeb0f2347e2bafceec796a072a	SQL SERVER2012_SE	Jun 29, 2019 17:42:30 GMT+08:...	Comple...	3.43MB

Table 4-5 Backup file information

Parameter	Description
Database Type	Select Microsoft SQL Server .
Backup File Source	Select RDS full backup . NOTE Select a backup file whose status is Completed .

Step 3 On the **Select Destination** page, specify database information and click **Next**.

Figure 4-4 Database information

Database Information

Destination RDS DB Instance Name

I understand restoring databases to the destination instance will overwrite the instance data or create new databases, and the databases in the destination database are unavailable during the restoration. I also understand that only an existing instance that has the same or a later version, and whose storage space is greater than or equal to that of the source instance can be selected.

Backup Database Name

<input type="checkbox"/> Backup Database Name	New Database Name
<input type="checkbox"/> sbtest5	<input type="text" value="sbtest5"/>
<input type="checkbox"/> db1-new	<input type="text" value="db1-new"/>
<input type="checkbox"/> db2	<input type="text" value="db2"/>
<input type="checkbox"/> db1	<input type="text" value="db1"/>
<input type="checkbox"/> sbtest123	<input type="text" value="sbtest123"/>
<input type="checkbox"/> sbtest	<input type="text" value="sbtest"/>

Table 4-6 Database information

Parameter	Description
Destination RDS DB Instance Name	Select a destination RDS DB instance. If no RDS DB instance is available, you can create one.

Parameter	Description
Backup Database Name	<p>After you select the destination RDS DB instance, all databases to be restored are automatically displayed. You can select databases to be restored as required and rename them.</p> <ul style="list-style-type: none">• Backup Database Name: Name of the database to be restored.• New Database Name: The backup database name must consist of 1 to 64 characters. It can contain only uppercase letters, lowercase letters, digits, hyphens (-), and underscores (_). If the name is not specified, the original database name is used. <p>NOTE</p> <ul style="list-style-type: none">• The backup database can be renamed. A maximum of 100 backup databases can be created.• The new database name cannot be the same as the name of any other database in the source.

Step 4 On the **Confirm Task** page, check configuration details, read and agree to the agreement, and click **Next**.

 **NOTE**

If the SQL Server source contains non-clustered index tables, the index information of non-clustered index tables will become invalid after the SQL Server backups are restored to a new database. For the best performance, rebuild the indexes after the backup migration. In addition, the backup files store only database-level information. If the SQL Server source contains some instance-level configurations, such as login, permission, DBlink, and job, migrate these configurations by referring to [Manual Configuration](#)

Step 5 In the task list on the **Backup Migration Management** page, check whether the task is in the **Restoring** status. If the migration is successful, the task status becomes **Successful**.

----End

4.3 Creating a Backup Using OBS Buckets

Supported Source and Destination Databases

Table 4-7 Supported databases

Backup File	Destination DB
On-premises and other cloud's Microsoft SQL Server backup file versions: <ul style="list-style-type: none">• Microsoft SQL Server 2000• Microsoft SQL Server 2005• Microsoft SQL Server 2008• Microsoft SQL Server 2012• Microsoft SQL Server 2014• Microsoft SQL Server 2016• Microsoft SQL Server 2017	RDS for Microsoft SQL Server <ul style="list-style-type: none">• Microsoft SQL Server 2008• Microsoft SQL Server 2012• Microsoft SQL Server 2014• Microsoft SQL Server 2016• Microsoft SQL Server 2017

Prerequisites

- You have logged in to the DRS console.

Precautions

This section describes constraints on backup migrations of Microsoft SQL Server databases.

Table 4-8 Precautions

Type	Restrictions
Database permissions	Before creating a backup migration task, ensure that the current account has the OBS and bucket permissions.

Type	Restrictions
Backup database names	<ul style="list-style-type: none"> ● Backup database names are case-insensitive, must be unique, and cannot be any of the following: <ul style="list-style-type: none"> - msdb - master - model - tempdb - rdsadmin - resource ● The name of the OBS bucket contains 1 to 256 characters, including letters, digits, underscores (_), and hyphens (-).
New database name	<ul style="list-style-type: none"> ● The new database name must be unique and cannot be any of the following (case-insensitive): <ul style="list-style-type: none"> - msdb - master - model - tempdb - rdsadmin - resource ● The new database name contains 1 to 128 characters, including letters, digits, underscores (_), and hyphens (-).
Local backup files	<ul style="list-style-type: none"> ● The suffix of the backup file to be uploaded to an OBS bucket must be .bak. Only .bak files can be selected in the OBS backup file list. ● The backup file name contains 1 to 200 characters. ● The backup file name can contain only letters, digits, hyphens (-), and underscores (_). ● Backup files are classified into full backup files and log backup files.
Backup file sources	<ul style="list-style-type: none"> ● OBS buckets: store local backup files in its root directory.

Type	Restrictions
Precautions	<ul style="list-style-type: none"> • The OBS bucket and DB instance must be in the same region. • The available disk space of the destination database is at least 1.5 times the total data size of the backup database. • Backup database name is case-sensitive and must be the same as the database name in the backup file. • The database backup file from a database of later version cannot be restored on the instance database of an earlier version (for example, restored from version 2017 to 2016). • The restoration from Enterprise Edition to Standard Edition to Web Edition may fail. That depends on whether the features of the later version are enabled. • During a migration, if Overwrite Data is set to Yes, high availability of the destination database is disabled by default. After the migration is complete, high availability is restored automatically. • During a migration, stop writing transactions to the destination database. • If a primary/standby switchover of the destination database is performed, the backup migration fails. In this case, the migration task cannot be restored.

Procedure

This section describes how to create a backup migration task using the backup stored in the OBS bucket on the DRS console.

Step 1 On the **Backup Migration Management** page, click **Create Migration Task**.

Step 2 On the **Select Backup** page, specify information about the task and backup files. Then, click **Next**.

Figure 4-5 Task information

The screenshot shows a form with two main input fields:

- Task Name:** A text input field containing the value "DRS-2477". To the right of the field is a question mark icon.
- Description:** A larger text area for entering details. To the right of the text area is a question mark icon. At the bottom right corner of the text area, the character count "0/256" is displayed.

Table 4-9 Task information

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 !=<>'&"\

Figure 4-6 Backup file information

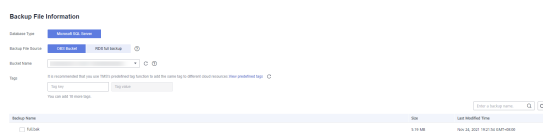


Table 4-10 Backup file information

Parameter	Description
Database Type	Database type of the backup file. Select Microsoft SQL Server.
Backup File Source	Select OBS Bucket .
Bucket Name	Select a bucket and a backup file stored in the directory of the bucket. NOTE <ul style="list-style-type: none"> The backup file of the Microsoft SQL Server must be named in the .bak format in the OBS bucket directory. Multiple backup files can be selected at the same time. A database cannot be split into different files for upload.

Step 3 On the **Select Destination** page, specify database information and click **Next**.

Figure 4-7 Microsoft SQL Server database information

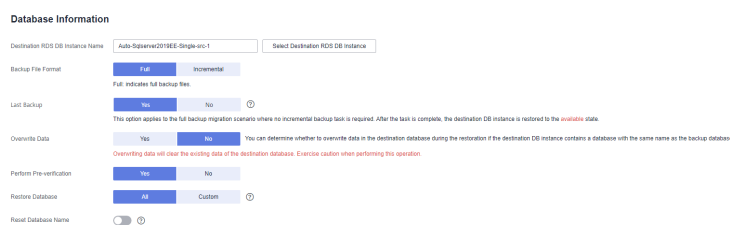


Table 4-11 Microsoft SQL Server database information

Parameter	Description
Destination RDS DB Instance Name	Select a destination RDS DB instance. If no RDS DB instance is available, you can create one.
Backup File Format	Select Full or Incremental . <ul style="list-style-type: none">● Full: indicates full backup files.● Incremental: indicates log backup files. NOTE <ul style="list-style-type: none">- Before performing an incremental restoration, you need to perform a full restoration.- To migrate databases at a time, you need to stop services first and upload full backups for restoration.- To ensure service continuity during a migration, perform a full backup and multiple incremental backups, and then upload the backup data to OBS for restoration.
Last Backup	A complete restoration involves restoring several incremental backup files. The destination DB instance cannot be modified while it is being restored. It will not be available until the last backup file is restored. If you select Yes and restore the instance, any incremental restoration will not be performed. You can select the last backup in the following scenarios: <ul style="list-style-type: none">● Perform a one-time full migration.● The selected backup file is the last one to be restored.● Select No for the full+incremental backup migration scenario where you continue to restore databases using incremental backup files after a full backup restoration is performed. During this period, the destination DB instance is being restored and in the unavailable state.
Overwrite Data	You can determine whether to overwrite data in the destination database during the restoration if the destination DB instance contains a database with the same name as the backup database. Exercise caution when performing this operation. NOTE If you select this option, the destination databases with the same names as the backup databases will be overwritten. Exercise caution when performing this operation.

Parameter	Description
Perform Pre-verification	<p>Specifies whether to perform pre-verification on the backup migration task. The default value is Yes.</p> <ul style="list-style-type: none">• Yes: To ensure successful migration and identify potential problems in advance, verify the validity, integrity, continuity, and version compatibility of backup files before restoration.• No: If pre-verification is not performed, the migration speed is faster, but you need to check the validity, integrity, continuity, and version compatibility of backup files on your own.
Restore Database	<p>You can restore all or part of databases. All of databases are restored by default.</p> <ul style="list-style-type: none">• All: Restore all databases from the backup file. You do not need to enter the name of the database to be restored.• Custom: Restore specified databases from the backup file. You need to enter the names of the databases to be restored. The databases to be restored must be consistent with those for which the full or incremental backups are created.
Reset Database Name	<p>If Restore Database is set to All, you can reset database names. If you enable Reset Database Name, the original database names in the backup file will be reset to new database names.</p> <p>Constraint:</p> <ul style="list-style-type: none">• The backup file contains only one database.• The backup file is a full backup file and is the last backup file. Select Full for Backup File and Yes for Last Backup Type. <p>NOTE The database name can be reset only when Backup Type is set to Full and Restore Database is set to All.</p>

Parameter	Description
Backup Database Name	<p>If Restore Database is set to Custom, you need to specify Backup Database Name.</p> <p>The backup database name must be the same as that in the backup file and consist of 1 to 256 characters. It can contain only letters (case-sensitive), digits, hyphens (-), and underscores (_).</p> <p>DRS also allows you to create an alias for the database to be restored.</p> <ul style="list-style-type: none">• If you choose to restore databases in full backup mode, you can set the alias of the database based on the site requirements. The alias is also stored in the destination database.• If databases are restored in incremental backup mode, alias is not supported. <p>NOTE The backup database can be renamed. Up to 100 backup databases can be created.</p>

Step 4 On the **Confirm Task** page, check configuration details, read and agree to the agreement, and click **Next**.

 **NOTE**

If the SQL Server source contains non-clustered index tables, the index information of non-clustered index tables will become invalid after the SQL Server backups are restored to a new database. For the best performance, rebuild the indexes after the backup migration. In addition, the backup files store only database-level information. If the SQL Server source contains some instance-level configurations, such as login, permission, DBlink, and job, migrate these configurations by referring to [Manual Configuration](#)

Step 5 In the task list on the **Backup Migration Management** page, check whether the task is in the **Restoring** status. If the migration is successful, the task status becomes **Successful**.

----End

4.4 Task Management

4.4.1 Viewing Task Details

The **Basic Information** page of a backup migration task displays information about the task, backup files, and databases. This section describes how to view details about current migration task.

Prerequisites

You have logged in to the DRS console.

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 **Backup Migration Management** page, click the target migration task name in the **Task Name/ID** column.

Step 2 On the displayed **Basic Information** tab, view details about the migration task. You can view information about the task, backup files, and databases.

----End

4.4.2 Editing Migration Task Information

After a backup migration task is created, you can modify basic information about the task to identify different tasks.

The following task information can be edited:


- Task name
- Description

Prerequisites

You have logged in to the DRS console.

Procedure

Step 1 On the **Backup Migration Management** page, click the target migration task name in the **Task Name/ID** column.

Step 2 On the **Basic Information** page, click  next to the information to modify.


- To submit the change, click .

Table 4-12 Task information description

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 the following special characters: ! =<>'&"

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

----End

4.4.3 Viewing Migration Logs

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

Prerequisites

You have logged in to the DRS console.

Procedure

- Step 1** On the **Backup Migration Management** page, click the target migration task name in the **Task Name/ID** column.
- Step 2** On the displayed page, click **Migration Logs** to view the logs generated during the migration.

You can view time, levels, and descriptions of the logs.

----End

4.4.4 Deleting a Migration Task

This section describes how to delete a migration task. 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 **Backup Migration Management** page, locate the target task and click **Delete** in the **Operation** column.
- Step 2** Click **Yes** to submit the deletion task.

----End

4.4.5 Task Statuses

Migration statuses indicate different migration phases.

Table 4-13 lists statuses and descriptions of backup migration tasks.

Table 4-13 Backup migration task statuses

Status	Description
Restoring	A backup file is being restored to the destination database.
Successful	A backup file has been restored to the destination database.
Failed	A backup file fails to be restored to the destination database.

Status	Description
Check failed	A backup file is unavailable.

 NOTE

Deleted migration tasks are not displayed in the status list.

4.5 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.

Adding a Tag

- Step 1** On the **Backup Migration Management** page, click the target migration task name in the **Task Name/ID** column.
- Step 2** On the **Basic Information** tab, click the **Tags** tab.
- Step 3** On the **Tags** tab, click **Add Tag**. In the displayed dialog box, enter a tag key and value, and click **OK**.
- Step 4** After a tag has been added, you can view and manage it on the **Tags** page.

----End

Editing a Tag

- Step 1** On the **Backup Migration Management** page, click the target migration task name in the **Task Name/ID** column.
- Step 2** On the **Basic Information** tab, click the **Tags** tab.
- 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 **Backup Migration Management** page, click the target migration task name in the **Task Name/ID** column.

Step 2 On the **Basic Information** tab, click the **Tags** tab.

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

5 FAQs

5.1 Product Consulting

5.1.1 What Is DRS?

DRS is a stable, efficient, and easy-to-use cloud service for database migration and synchronization in real time.

It simplifies data migration processes and reduces migration costs.

You can use DRS to quickly transmit data between different DB engines.

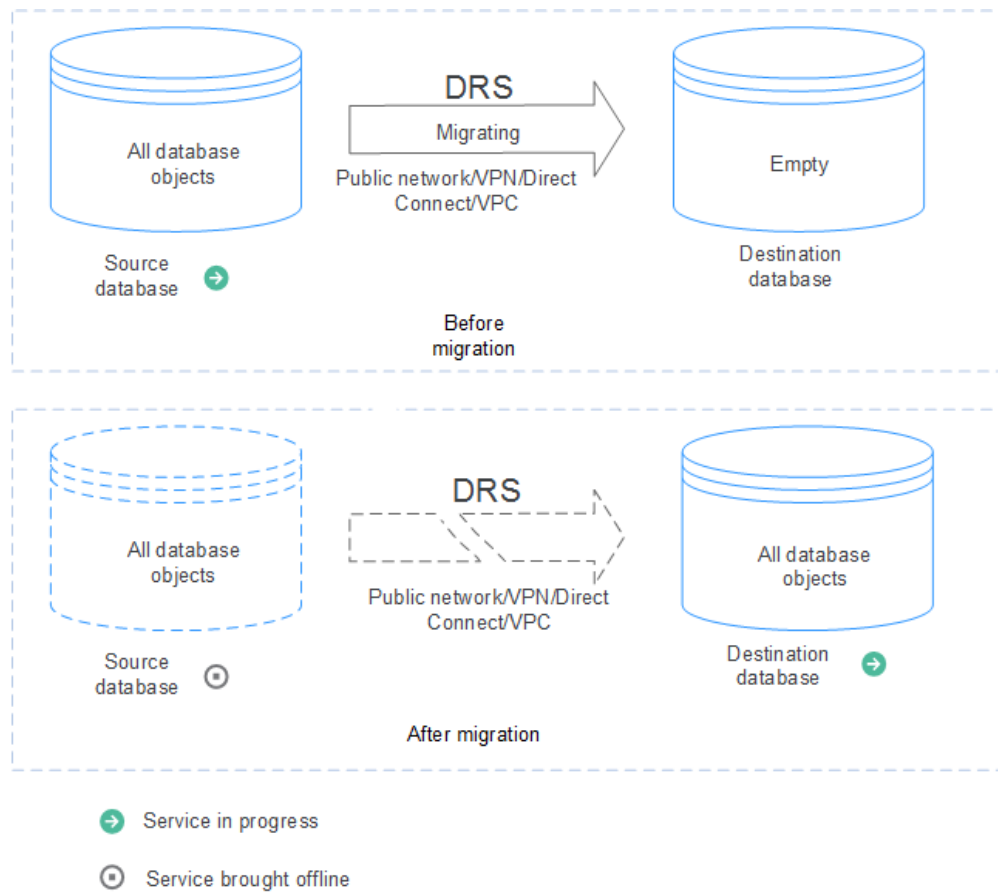
Real-Time Migration

With DRS, you can migrate data from sources to destinations in real time. You create a replication instance to connect to both the source and destination and configure objects to be migrated. DRS will help you compare metrics and data between source and destination, so you can determine the best time to switch to the destination database while minimizing service downtime.

You can perform a migration in multiple types of networks, such as public networks, VPCs, VPNs, and direct connections. With these network connections, you can migrate between different cloud platforms, from on-premises databases to cloud databases, or between cloud databases across regions.

DRS supports incremental migration, so you can replicate ongoing changes to keep sources and destinations in sync while minimizing the impact of service downtime and migration.

Figure 5-1 Real-time migration process



Backup Migration

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

You can use backup migration when you want to migrate on-premises databases to the cloud.

Without connecting to your sources, DRS can help you complete data migration.

Figure 5-2 Backup migration process



5.1.2 Can DRS Migrate RDS Primary/Standby Instances?

Yes. DRS provides high availability and can migrate a single RDS instance or RDS primary/standby instances. DRS can automatically rebuild the databases connection after a short interruption and resumes data transfer from the point when the connection was lost to ensure the continuity and consistency of data synchronization.

If the HA design of the source database meets the requirements of floating IP address connections and RPO is 0 during a switchover, DRS supports migration of primary/standby instances without manual intervention.

If the HA design does not meet the requirements of floating IP address connections and RPO is 0 during a switchover, the following situations may occur:

- The floating IP address is used and RPO may be 0 during a switchover. In this situation, the database can be connected, but DRS will identify data interruption (if data loss occurs during the switchover) and display a message indicating that the task fails. You can only reset the migration task.
- A fixed IP address is used and RPO is 0 during the switchover. In this situation, the migration is supported only when the instance is running properly.
- The floating IP address is used and zero RPO cannot be ensured during a switchover. In this situation, the database can be connected, but DRS will identify data interruption (if data loss occurs during the switchover) and display a message indicating that the task fails. You can only reset the migration task.

If the destination is primary/standby instances, DRS can ensure that the source data is completely migrated to the destination database. However, the switchover of the destination database cannot ensure zero RPO. As a result, data in the destination database may be incomplete.

5.1.3 Does DRS Support Resumable Uploads?

In database migration scenarios, if a migration task fails due to unavoidable problems (such as network fluctuation), DRS records the current parsing and replay point (which is the basis of database internal consistency) and then resumes data transfer from the point to ensure data integrity.

For incremental migration, DRS automatically retries for multiple times. For full migration of MySQL databases, the system automatically resumes the migration for three times by default. After the number of automatic retry failures reaches a specified value, the task becomes abnormal. You need to analyze the cause based on logs and try to rectify the blocking point (for example, the database password is changed). If the environment cannot be restored and the required logs have been eliminated, you can use the reset the task.

5.1.4 How Do I Solve the Table Bloat Issue?

In the full migration phase, DRS uses the row-level parallel migration mode to ensure migration performance and transmission stability. If the source database data is compact, table bloat may occur after data is migrated to the RDS MySQL database. As a result, the disk space required is much greater than that of the source database. In this case, you can run the following command in the destination database to free up the space:

```
optimize table table_name
```

NOTE

The OPTIMIZE TABLE command locks tables. Do not run this command when you operate table data. Otherwise, services may be affected.

5.1.5 Why Cannot I Select RDS Read Replicas on the DRS Console?

RDS read replicas cannot be selected on the DRS console. You can select **Self-built on ECS** and enter the read replica IP address and port number to connect to the instance.

5.1.6 How Does DRS Affect the Source and Destination Databases?

Impact on the Source

- During the initialization of a full migration or synchronization task, DRS needs to query all inventory data in the source database. DRS uses simple SQL statements to query data, and the query speed is limited by the I/O performance and network bandwidth of the source database. Generally, if the bandwidth is not limited, the query workload of the source database will be increased by 50 MB/s and 2 to 4 vCPUs will be occupied. If the source database is read concurrently, about 6 to 10 sessions are occupied.
 - Fewer than eight sessions are used to query some system tables, such as tables, views, and columns in the information_schema database, in the source database.
 - Fewer than four sessions are used to query shards in the source database. For example, in the following statement, the conditions following **select** and **where** contain only the primary key or unique key.

```
select id from xxx where id>12345544 and limit 10000,1;
```
 - Fewer than four sessions are used to query SQL statements. For example, in the following statement, the information after **select** is all column names in the table, and the condition after **where** contains only the primary key or unique key.

```
select id,name,msg from xxx where id>12345544 and id<=12445544;
```
 - The SQL statement for locking a table without a primary key is similar to the following statement. The table is locked to obtain the consistency point of the table without a primary key. After the table is locked, a connection is obtained to unlock the table.

```
flush table xxx with read lock  
lock table xxx read
```
- In the incremental phase, there is no pressure on the source database. Only one dump connection is available to listen to binlog incremental data in real time.

Impact on the Destination Database

- During the initialization of a full migration or synchronization task, DRS needs to write structures, inventory data, and indexes of the source database to the

destination database in sequence. Generally, the total number of sessions is less than 16.

- Fewer than eight sessions are used to create structures.
- Fewer than eight sessions are writing data. Example:
`insert into xxx (id,name,msg) values (xxx);`
- Fewer than eight sessions are used to create indexes. Example:
`alter table xxx add index xxx;`
- In the incremental phase, DRS parses the incremental data in the binlog file of the source database into SQL statements and executes the SQL statements in the destination database. Generally, the total number of sessions is less than 64.
 - DDL statements are executed in serial mode. When a DDL statement is executed, no other DML statement is executed.
 - There are a maximum of 64 DML connections (short connections with a timeout interval of 30 seconds). The DML statements include insert, update, delete, and replace.

NOTE

To evaluate the impact on the source database, you can create a test task and adjust the migration policy by using rate limiting or run the test during off-peak hours.

5.2 Network and Security

5.2.1 What Security Protection Policies Does DRS Have?

Network

- Uses security groups to ensure that the sources of access are trusted.
- Uses SSL channels to encrypt data during transmission.

5.2.2 What Can I Do If the Network Is Disconnected During the Migration?

If the network is disconnected during the migration, you can view the task status first. If a full or incremental task fails, click **Resume** in the **Operation** column.

Full migration

Incremental migration

5.2.3 How Can I Configure a VPC Security Group to Allow Traffic from an EIP?

By default, a VPC on the current cloud is isolated from external networks for security reasons. You cannot use an EIP outside a VPC (for example, an EIP of another cloud database or an on-premise database) to access DB instances inside the VPC. However, the replication instance or destination database in a VPC needs to connect to an external EIP to migrate data.

Therefore, you need to add an outbound rule to a security group to allow access from specific external EIPs and ports outside the VPC. The outbound rule allows the replication instance EIP to access the destination database EIP.

5.2.4 What Can I Do If the Network Connection Between the Replication Instance and Database Is Abnormal?

Before data migration, ensure that network preparations and security rule settings are complete. If the connection is abnormal, check whether the network configuration is correct.

This section uses the migration from MySQL to RDS MySQL as an example to describe three migration scenarios: cross-cloud real-time migration, on-premises database migration, and real-time migration of self-built ECS databases.

Cross-Cloud Real-Time Migration

1. Network settings

Enable public accessibility for the source database.

- Source database network settings:

Enable public accessibility for the source database.

- Destination database network settings:

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

2. Security rules

- Source database security group settings:

Add the EIP of the replication instance to the whitelist of the source MySQL DB instance to allow the access from the EIP.

Before configuring the whitelist for the source database, obtain the EIP of the DRS replication instance. You can find the EIP on the **Configure Source and Destination Databases** page after creating the replication instance on the DRS console.

You can also add 0.0.0.0/0 to the source database whitelist to allow any IP address to access the source database but you must ensure that the above does not pose a risk to your services.

After the migration is complete, you can delete the configuration from the whitelist.

- Destination database security group settings:

- By default, the destination database and the DRS replication instance are in the same VPC and can communicate with each other. DRS can directly write data to the destination database.

- Configure the security group of the VPC where the destination database is located to ensure that the IP addresses and listening ports of the DRS instance are allowed to access the on-premises database.

Real-Time Migration of On-Premises Databases

1. Network settings
 - Source database network settings:

You can migrate on-premises MySQL databases to the RDS MySQL databases on the current cloud through a VPN or public network. Enable public accessibility or establish a VPN for the on-premises MySQL databases based on the site requirements. You are advised to migrate data through a public network, which is more convenient and cost-effective.
 - Destination database network settings:
 - If the source database attempts to access the destination database through a VPN, ensure that the source database can communicate with the destination RDS MySQL database.
 - If the source database attempts to access the destination database through a public network, you do not need to configure the destination RDS MySQL database.
2. Security rules
 - a. Source database security group settings:
 - If the migration is performed over a public network, add the EIP of the DRS replication instance to the network whitelist of the source MySQL database to enable the source MySQL database to communicate with the current cloud. Before setting the network whitelist, obtain the EIP of the replication instance.

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

After the migration is complete, you can delete the rules.
 - b. Destination database security group settings:
 - By default, the destination database and the DRS replication instance are in the same VPC and can communicate with each other. DRS can directly write data to the destination database.
 - Configure the security group of the VPC where the destination database is located to ensure that the IP addresses and listening ports of the DRS instance are allowed to access the on-premises database.

Real-Time Migration of Self-Built Databases on the ECS

1. Network settings
 - The source and destination databases must be in the same region.

- The source and destination databases can be either in the same VPC or different VPCs.
 - If the source and destination databases are in the same VPC, the networks are interconnected by default.
 - If the source and destination databases are in different VPCs, the subnets of the source and destination databases are required to be in different CIDR blocks. You need to create a VPC peering connection between the two VPCs.
- 2. Security rules
 - In the same VPC, the network is connected by default. You do not need to set a security group.
 - In different VPCs, establish a VPC peering connection between the two VPCs. You do not need to set a security group.

Checking iptables Settings

If the source database is a self-built database on an ECS and cannot be connected after the preceding operations are performed, check the iptables settings. If the DRS frequently initiates connection requests and fails, the HOSTGUARD service adds the requested IP address to the blacklist.

1. Log in to the ECS.
2. Run the following command to check whether any DENY-related project contains the IP address of the DRS instance. The project name is **IN_HIDS_MYSQLD_DENY_DROP**.
iptables --list
3. If yes, run the following command to query the iptables inbound rule list and obtain the rule ID (line-numbers):
iptables -L INPUT --line-numbers
4. Run the following command to delete the inbound rules that deny the IP address of the DRS instance: (Note: Delete the rules from the end to the beginning. Otherwise, line-numbers will be updated and you need to query again.)
iptables -D Project_name Rule_ID
5. Delete the iptables rules and test the connection again.

5.3 Permissions Management

5.3.1 Which MySQL Permissions Are Required for DRS?

DRS has certain permission requirements on accounts during migration. This section describes the permission requirements on the MySQL engine.

Permission

- You must have the login permission of the source and destination database connection accounts. If you do not have the account, perform the following operations to create one. user1 is used as an example.

- Reference statement: **CREATE USER** 'user1'@'host' **IDENTIFIED BY** 'password'
- **Table 5-1** lists the required permissions for real-time migration.

Table 5-1 Permission requirements and reference statements

Function Modules	Source/Service Database	Destination/DR Database
Real-time migration	<p>Full migration: SELECT, SHOW VIEW, and EVENT</p> <p>Reference statement: GRANT SELECT, SHOW VIEW, EVENT ON *.* TO 'user1';</p> <p>Full+incremental migration: SELECT, SHOW VIEW, EVENT, LOCK TABLES, REPLICATION SLAVE, and REPLICATION CLIENT</p> <ul style="list-style-type: none"> • REPLICATION SLAVE and REPLICATION CLIENT are global permissions and must be enabled separately. The reference statement is as follows: GRANT REPLICATION SLAVE, REPLICATION CLIENT ON *.* TO 'user1'; • SELECT, SHOW VIEW, EVENT, and LOCK TABLES are non-global permissions. The reference statement is as follows: GRANT SELECT, SHOW VIEW, EVENT, LOCK TABLES ON [Database to be migrated].* TO 'user1'; 	<p>Full migration: SELECT, CREATE, ALTER, DROP, DELETE, INSERT, UPDATE, INDEX, EVENT, CREATE VIEW, CREATE ROUTINE, TRIGGER, REFERENCES, and WITH GRANT OPTION. If the destination database version is in the range 8.0.14 to 8.0.18, the SESSION_VARIABLES_ADMIN permission is required.</p> <p>Reference statement: GRANT SELECT, CREATE, ALTER, DROP, DELETE, INSERT, UPDATE, INDEX, EVENT, CREATE VIEW, CREATE ROUTINE, TRIGGER ON *.* TO 'user1' WITH GRANT OPTION;</p> <p>Full+incremental migration: SELECT, CREATE, ALTER, DROP, DELETE, INSERT, UPDATE, INDEX, EVENT, CREATE VIEW, CREATE ROUTINE, TRIGGER, REFERENCES, and WITH GRANT OPTION. If the destination database version is in the range 8.0.14 to 8.0.18, the SESSION_VARIABLES_ADMIN permission is required.</p> <p>Reference statement: GRANT SELECT, CREATE, ALTER, DROP, DELETE, INSERT, UPDATE, INDEX, EVENT, CREATE VIEW, CREATE ROUTINE, TRIGGER, REFERENCES ON [Databases to be migrated].* TO 'user1' WITH GRANT OPTION;</p>

 **NOTE**

Run **flush privileges**; after executing the preceding reference statements. Make the authorization take effect.

- Account migration:
The user must have the SELECT permission of mysql.user.
Reference statement:
GRANT SELECT ON mysql.user TO 'user1'@'host' ;
GRANT SELECT ON mysql.user_view TO 'user1';
The destination database users must have the SELECT, INSERT, UPDATE, DELETE, and WITH GRANT OPTION permissions on all databases.
Reference statement: **GRANT SELECT, INSERT, UPDATE, DELETE ON *.* TO 'user1' WITH GRANT OPTION**

Actions

- Create a user.
Operation:
CREATE USER 'username'@'host' IDENTIFIED BY 'password';
 - **username**: indicates the account to be created.
 - **host**: indicates the host that allows the account to log in. If the account is allowed to log in to the database from any host, use %.
 - **password**: indicates the password of the account.
- Grant corresponding permissions.
Operation:
GRANT privileges ON databasename.tablename TO 'username'@'host' WITH GRANT OPTION;
flush privileges;
 - **privileges**: indicates the operation permissions granted to the account, such as SELECT, INSERT, and UPDATE. To grant all permissions to the account, use ALL.
 - **databasename**: indicates the database name. To grant the account with all database operation permissions, use *.
 - **tablename**: indicates table name. To grant the account with all table operation permissions, use *.
 - **username**: indicates the account to be authorized.
 - **host**: indicates the host that allows the account to log in. If the account is allowed to log in from any host, use %.
 - **WITH GRANT OPTION**: indicates that the permission to use the GRANT command is granted to the account. This parameter is optional.

5.3.2 How Can I Import Users and Permissions from the Source to the Destination Database?

Step 1 Log in to an ECS that can access the source database.

Step 2 Run the following command, enter the password as prompted, and press **Enter** to export the source database users to the **users.sql** temporary file:

```
mysql -h 'host' -u 'user' -p -N $@ -e "SELECT CONCAT('SHOW GRANTS FOR '", user, "'@'", host, "';") AS query FROM mysql.user" > /tmp/users.sql
```

host indicates the IP address of the source database and *user* indicates the username of the source database.

Step 3 Run the following command to export the authorization information of the users from the source database to the **grants.sql** file:

```
mysql -h 'host' -u 'user' -p -N $@ -e "source /tmp/users.sql" > /tmp/grants.sql  
sed -i 's/$/;/g' /tmp/grants.sql
```

host indicates the IP address of the source database and *user* indicates the username of the source database.

Step 4 After the preceding command has been executed successfully, open the **grants.sql** file. Information similar to the following is displayed:

```
-- Grants for root@%  
GRANT ALL PRIVILEGES ON *.* TO 'root'@'%';  
  
-- Grants for testt@%  
GRANT SELECT, INSERT, UPDATE, DELETE ON *.* TO 'testt'@'%';  
  
-- Grants for debian-sys-maint@localhost  
GRANT ALL PRIVILEGES ON *.* TO 'debian-sys-maint'@'localhost' WITH GRANT OPTION;  
  
-- Grants for mysql.session@localhost  
GRANT SUPER ON *.* TO 'mysql.session'@'localhost';  
GRANT SELECT ON `performance_schema`.* TO 'mysql.session'@'localhost';  
GRANT SELECT ON `mysql`.`user` TO 'mysql.session'@'localhost';  
  
-- Grants for mysql.sys@localhost  
GRANT USAGE ON *.* TO 'mysql.sys'@'localhost';  
GRANT TRIGGER ON `sys`.* TO 'mysql.sys'@'localhost';  
GRANT SELECT ON `sys`.`sys_config` TO 'mysql.sys'@'localhost';  
  
-- Grants for root@localhost  
GRANT ALL PRIVILEGES ON *.* TO 'root'@'localhost' WITH GRANT OPTION;  
GRANT PROXY ON "" TO 'root'@'localhost' WITH GRANT OPTION;
```

----End

5.4 Real-Time Migration

5.4.1 When Can I Stop a Migration Task?

You can refer to the following methods to check whether the task can be stopped. Before stopping the task, ensure that:

1. At least one complete data comparison is performed during off-peak hours.
2. Service cutover is completed.
 - a. Interrupt services first. If the workload is not heavy, you may do not need to interrupt the services.
 - b. Run the following statement on the source database (MySQL is used as an example) and check whether there are statements executed by new sessions within 1 to 5 minutes. If not, the service is stopped.

```
show processlist;
```

 NOTE

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

- c. When the real-time synchronization delay is 0s and remains stable for a period, you can perform a data-level comparison between the source and destination databases. For details about the time required, refer to the comparison results of the previous comparison.
 - If there is enough time, compare all objects.
 - If there is not enough time, use the data-level comparison to compare the tables that are frequently used and that contain key business data or inconsistent data.
 - d. Determine a proper time to cut the services over to the destination database. Then, services can be used externally again.
3. Stopping a task only deletes the replication instance, and the migration task is still in the task list. You can choose whether to delete the task.

5.4.2 How Do I Maintain the Original Service User Permission System After Definer Is Forcibly Converted During MySQL Migration?

Definer is used in views, stored procedures, triggers, and events. Definer does not restrict the permission to invoke objects, instead the permission to access the database. If you select **Yes** for **Migrate Definer to User** during MySQL migration, the Definers of all source database objects will be migrated to the user. The user continues to use the original services without authorization. (Users, permissions, and passwords are migrated). Other users do not have permissions on database objects unless these users are authorized.

The following procedures describe how to use database commands to authorize users.

- Step 1** Ensure that the new user (Definer uses the specified account) has sufficient permission to execute view- and stored procedure-related SQL statements.
- Step 2** Log in to the destination database using the MySQL official client or other tools.
- Step 3** Run the following command to view details about permissions of the user to be authorized:
- ```
show grants for 'user'@'host';
```
- Step 4** To ensure that the original service does not report an error, run the following command to grant the user the operation permissions the involved database objects do not have:
- ```
grant select,insert,update,delete on db_name.* to 'user'@'host';
```

Generally, the permissions to access the database are as follows: SELECT, CREATE, DROP, DELETE, INSERT, UPDATE, INDEX, EVENT, CREATE VIEW, CREATE ROUTINE, TRIGGER, and EXECUTE. You need to check the permissions that are missing based on the database object, and then perform the authorization operation.

For stored procedures and functions, ensure that the user has the EXECUTE permission. The authorization command is as follows:

```
grant execute on db_name.function_name to 'user'@'host';
```

- Step 5** Use the authorized account to access the destination database. If the access is successful, the authorization is successful. Note: If the following information is displayed when a stored procedure or function is invoked in a Java project, the **mysql.proc** database must be authorized: `Java.sql.SQLException: User does not have access to metadata required to determine stored procedure parameter types.` If rights can not be granted, configure connection with `"noAccessToProcedureBodies=true"` to have driver generate parameters that represent INOUT strings irregardless of actual parametertypes
- ```
grant select on mysql.proc to 'user'@'host';
```

----End

### 5.4.3 What Can I Do If the Invoking Permission Problem Occurs After the MySQL Stored Procedure Is Migrated to the Cloud?

After the MySQL stored procedure is migrated to the cloud, an error may occur when the stored procedure or function is invoked due to permission problems.

The method varies with Definer policies. This section uses user1 as an example to describe how to solve this problem in two Definer policies.

#### Policy 1

On the **Destination Database** page, enter the database username **user1**, and select **OK** for **Migrate Definer to User**.

In this policy, after the Definers of all stored procedures and methods in the source database are migrated to the destination database, the account is automatically changed to user1, and the value of host is automatically changed to %. If a stored procedure fails to be invoked in the destination database, perform the following operations:

- Step 1** Log in to the RDS MySQL DB instance of the destination database as the user1.
- Step 2** Grant the execute permission to the account that you want to use to invoke a stored procedure.
- Step 3** Run the following statement to use user1 to grant other accounts the permission to execute stored procedures:

**user** indicates other accounts that need to invoke the stored procedure.

```
GRANT EXECUTE ON db.* TO user;
```

- Step 4** To invoke a stored procedure using Java, run the following statement to use user1 to grant other accounts the permission to query the **mysql.proc** table:

The following is the authorization statement, in which **user** indicates the account that needs to invoke the stored procedure:

```
GRANT SELECT ON mysql.proc TO 'user'@'%';
```

----End

## Policy 2

On the **Destination Database** page, enter the database username **user1**, and select **Cancel** for **Migrate Definer to User**.

In this policy, the account and host in the source database remain unchanged after the Definers of all stored procedures and methods are migrated to the destination database. You need to migrate all users in the source database by referring to . In this way, the permission system of the source database remains unchanged.

If you do not migrate account permissions or some accounts cannot be migrated, you are advised to use [Policy 1](#).

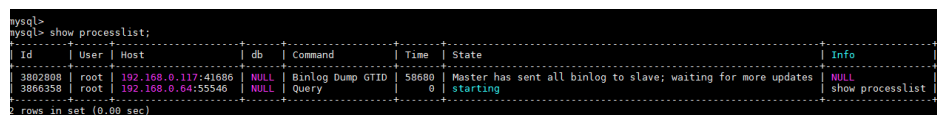
### 5.4.4 How Do I Ensure that All Services on the Database Are Stopped?

To ensure that all services on the database are stopped, perform the following steps:

- Step 1** Run the following statement on the source database to check whether active connections exist:

```
show processlist;
```

Figure 5-3 Checking active connections

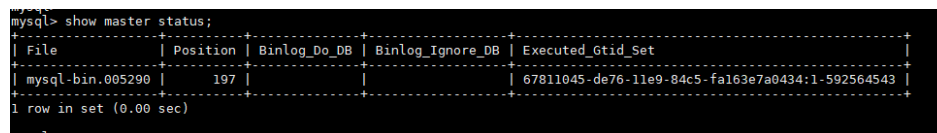


```
mysql> show processlist;
+----+-----+-----+-----+-----+-----+-----+-----+
| Id | User | Host | db | Command | Time | State | Info |
+----+-----+-----+-----+-----+-----+-----+-----+
| 3802808 | root | 192.168.0.117:41686 | NULL | Binlog Dump GTID | 58680 | Master has sent all binlog to slave; waiting for more updates | NULL |
| 3866358 | root | 192.168.0.64:55546 | NULL | Query | 0 | starting | show processlist |
+----+-----+-----+-----+-----+-----+-----+-----+
rows in set (0.00 sec)
```

- Step 2 Optional:** If there are active connections, locate the service processes based on the values in the **Host** column in the command output and stop the service processes.
- Step 3** Run the following statement in the source database to check the binlog position. Then, record the two values in the **file** and **position** columns as **ckpt1**:

```
show master status;
```

Figure 5-4 Viewing the binlog position



```
mysql> show master status;
+-----+-----+-----+-----+-----+
| File | Position | Binlog_Do_DB | Binlog_Ignore_DB | Executed_Gtid_Set |
+-----+-----+-----+-----+-----+
| mysql-bin.005290 | 197 | | | 67811045-de76-11e9-84c5-fa163e7a0434:1-592564543 |
+-----+-----+-----+-----+-----+
1 row in set (0.00 sec)
```

- Step 4** Wait for more than 30s. Run the following statement in the source database to check the binlog position again. Then, record the two values in the **file** and **position** columns as **ckpt2**. If **ckpt1** and **ckpt2** are equal, no data is written to the source database.

```
show master status;
```

----End

## 5.4.5 What Can I Do If MyISAM Tables Are Not Supported by RDS for MySQL?

Currently, RDS for MySQL does not support the MyISAM engine due to the following reasons.

- MyISAM engine tables do not support transactions and support only table-level locks. As a result, read and write operations conflict with each other.
- MyISAM has a defect in protecting data integrity, which may cause database data damage or even data loss.
- If data is damaged, MyISAM does not support data restoration provided by RDS for MySQL and requires manual restoration.
- Data can be transparently migrated from MyISAM to InnoDB, which does not require code modification for tables.

During migration, DRS automatically converts MyISAM to InnoDB. The MyISAM engine table does not support transactions. To ensure data consistency of the MyISAM table, DRS uses primary keys to ensure final data consistency. If you need to migrate MyISAM tables without primary keys, you are advised to start the migration task when no service is running to ensure data consistency.

## 5.4.6 What Are the Precautions for Migrating Data from an Earlier Version MySQL to MySQL 8.0?

Based on MySQL 5.7, some new features have been added to MySQL 8.0. There are performance differences between the two versions. Before migration, you need to analyze compatibility and provide a corresponding solution. The following shows the analysis:

- Compatibility analysis  
MySQL 8.0 and MySQL 5.7 Community Edition are analyzed as follows:
  - a. Compatibility does not affect migration, but the solutions are different.

| Compatibility           | Check Item    | Function   | Status  | Solution                  |
|-------------------------|---------------|------------|---------|---------------------------|
| Data types or functions | ENCODE()      | Encryption | Deleted | Replaced by AES_ENCRYPT() |
|                         | DECODE()      | Decryption | Deleted | Replaced by AES_DECRYPT() |
|                         | ENCRYPT()     | Encryption | Deleted | Replaced by SHA2()        |
|                         | DES_ENCRYPT() | Encryption | Deleted | Replaced by AES_ENCRYPT() |

|                               |                                                                                                                                   |                          |           |                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                               | DES_DECRYPT()                                                                                                                     | Decryption               | Deleted   | Replaced by AES_DECRYPT()                                                                                                                                                                                                                                                                                                                  |
|                               | JSON_APPEND()                                                                                                                     | Adds JSON elements.      | Deleted   | Replaced by JSON_ARRAY_APPEND()                                                                                                                                                                                                                                                                                                            |
|                               | PASSWORD()                                                                                                                        | Changes a user password. | Deleted   | ALTER USER user IDENTIFIED BY 'auth_string';                                                                                                                                                                                                                                                                                               |
|                               | JSON_MERGE()                                                                                                                      | Merges multiple JSONs.   | Discarded | Replaced by JSON_MERGE_PRESERVE()                                                                                                                                                                                                                                                                                                          |
| SQL MODE                      | NO_AUTO_CREATE_USER, DB2, MAXDB, MSSQL, MYSQL323, MYSQL40, ORACLE, POSTGRESQL, NO_FIELD_OPTIONS, NO_KEY_OPTIONS, NO_TABLE_OPTIONS | -                        | Deleted   | -                                                                                                                                                                                                                                                                                                                                          |
| Foreign key constraint length | The constraint name cannot be greater than 64 characters.                                                                         | -                        | -         | <p>SELECT TABLE_SCHEMA, TABLE_NAME FROM INFORMATION_SCHEMA.TABLES WHERE TABLE_NAME IN (SELECT LEFT(SUBSTR(ID,INSTR(ID, '/')+1), INSTR(SUBSTR(ID,INSTR(ID, '/')+1),'_ibfk_')-1) FROM INFORMATION_SCHEMA.INNODB_SYS_FOREIGN WHERE LENGTH(SUBSTR(ID,INSTR(ID, '/')+1))&gt;64);</p> <p>Use the ALTER TABLE statement to adjust the length.</p> |



|          |                                                     |                                                                                           |         |                                              |
|----------|-----------------------------------------------------|-------------------------------------------------------------------------------------------|---------|----------------------------------------------|
| Features | Use the GRANT statement to create users.            | -                                                                                         | Deleted | CREATE USER                                  |
|          | Use the GRANT statement to modify user information. | -                                                                                         | Deleted | ALTER USER                                   |
|          | IDENTIFIED BY PASSWORD 'auth_string'                | Sets new passwords                                                                        | Deleted | IDENTIFIED WITH auth_plugin AS 'auth_string' |
|          | \N in a SQL statement                               | NULL                                                                                      | Deleted | Replaced by NULL                             |
|          | PROCEDURE ANALYSE() syntax                          | Specifies the recommended field type is provided after the MySQL field value is analyzed. | Deleted | -                                            |
|          | Spatial functions                                   | -                                                                                         | -       | -                                            |
|          | mysql_install_db                                    | Initialization                                                                            | Deleted | mysqld --initialize or --initialize-insecure |

b. The following items affect the migration. You need to check in advance.

| Compatibility | Check Item | Function | Status | Solution | Original Usage |
|---------------|------------|----------|--------|----------|----------------|
|---------------|------------|----------|--------|----------|----------------|

|                      |                                                                                                                                                                                                       |                      |           |                                                                                                                                                                                                                                                                                                                         |                                                                                                |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Reserving keywords   | cume_dist, dense_rank, empty, except, first_value, grouping, groups, json_table, lag, last_value, lateral, lead, nth_value, ntile, of, over, percent_rank, rank, recursive,row_number, system, window | -                    | Added     | SET sql_mode = 'ANSI_QUOTES'                                                                                                                                                                                                                                                                                            | Name: database, table, index, column, alias, view, stored procedure, partition, and tablespace |
| Character set        | UTF8MB3                                                                                                                                                                                               | -                    | Discarded | Replaced by UTF8MB4.                                                                                                                                                                                                                                                                                                    | -                                                                                              |
| Partition table name | Partition tables of storage engines that do not support local partitions are not allowed.                                                                                                             | -                    | Deleted   | <p>SELECT TABLE_SCHEMA, TABLE_NAME FROM INFORMATION_SCHEMA.TABLES WHERE ENGINE NOT IN ('innodb', 'ndbcluster') AND CREATE_OPTIONS LIKE '%partitioned%';</p> <p>You can use either of the following methods:</p> <p>(1) ALTER TABLE table_name ENGINE=INNODB;</p> <p>(2) ALTER TABLE table_name REMOVE PARTITIONING;</p> | MyISAM is not supported.                                                                       |
| Syntax               | group by... asc/desc                                                                                                                                                                                  | Ascending/Descending | Deleted   | Replaced by the ORDER By clause.                                                                                                                                                                                                                                                                                        | View and function                                                                              |

|                              |                                                                         |                                                               |   |                                                                                                                                                                                                                                                                                                                                                                   |                                                    |
|------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| Name length                  | The view name cannot be greater than 64 characters.                     | -                                                             | - | ALTER                                                                                                                                                                                                                                                                                                                                                             | The value can contain a maximum of 255 characters. |
|                              | The enum or set element contains a maximum of 255 characters.           | -                                                             | - | Handled by users.                                                                                                                                                                                                                                                                                                                                                 | The value can contain a maximum of 64 KB.          |
| Upper and lower case letters | lower_case_table_names                                                  | Specifies whether to set the MySQL table name case sensitive. | - | <p>If this parameter is set to <b>1</b> during the upgrade, ensure that the schema and table names are in lowercase.</p> <pre>SELECT TABLE_NAME FROM INFORMATION_SCHEMA.TABLES WHERE TABLE_NAME != LOWER(TABLE_NAME) AND TABLE_TYPE = 'BASE TABLE';</pre> <pre>SELECT SCHEMA_NAME FROM INFORMATION_SCHEMA.SCHEMATA WHERE SCHEMA_NAME != LOWER(SCHEMA_NAME);</pre> | -                                                  |
| Triggers                     | Check whether there is an empty definition or invalid creation context. | -                                                             | - | Use the SHOW TRIGGERS statement to check the character_set_client, collation_connection, and Database Collation attributes.                                                                                                                                                                                                                                       | -                                                  |

- Change the default value of the system variable.  
The analysis of default values of MySQL 5.7 and MySQL 8.0 Community Edition shows that default values do not affect the migration but affect services after the migration.

| No.    | Parameter/Option                 | Community              |                    | Function                                                                | Remarks                                      |
|--------|----------------------------------|------------------------|--------------------|-------------------------------------------------------------------------|----------------------------------------------|
|        |                                  | Original Default Value | New Default Value  |                                                                         |                                              |
| Server |                                  |                        |                    |                                                                         |                                              |
| 1      | character_set_server             | latin1                 | utf8mb4            | -                                                                       | Be consistent with the origin default value. |
| 2      | collation_server                 | latin1_swedish_ci      | utf8mb4_0900_ai_ci | -                                                                       | Be consistent with the origin default value. |
| 3      | explicit_defaults_for_timestamp  | OFF                    | ON                 | Specifies whether to update the timestamp column when a row is updated. | Be consistent with the origin default value. |
| 4      | optimizer_trace_max_mem_size     | 16KB                   | 1MB                | -                                                                       | Be consistent with the origin default value. |
| 5      | validate_password_check_username | OFF                    | ON                 | -                                                                       | Be consistent with the origin default value. |

|        |                         |                                                                                             |                                                                          |                                                                                                                                                                                                 |                                                             |
|--------|-------------------------|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| 6      | back_log                | -1<br>(autosize)<br>changed<br>from :<br>back_log =<br>50 +<br>(max_con<br>nections /<br>5) | -1<br>(autosize)<br>changed<br>to :<br>back_log =<br>max_conn<br>ections | Specifies<br>the<br>number of<br>requests<br>that can<br>be stored<br>in the<br>stack in a<br>short<br>period<br>before the<br>MySQL<br>database<br>stops<br>respon<br>ding to new<br>requests. | Be<br>consistent<br>with the<br>origin<br>default<br>value. |
| 7      | max_allow<br>ed_packet  | 4194304<br>(4MB)                                                                            | 67108864<br>(64MB)                                                       | Limits the<br>size of<br>data<br>packets<br>received<br>by the<br>server                                                                                                                        | Use the<br>default<br>value.                                |
| 8      | max_error<br>_count     | 64                                                                                          | 1024                                                                     | Controls<br>the<br>number of<br>alarms to<br>be<br>displayed.                                                                                                                                   | Be<br>consistent<br>with the<br>origin<br>default<br>value. |
| 9      | event_sch<br>eduler     | OFF                                                                                         | ON                                                                       | -                                                                                                                                                                                               | Be<br>consistent<br>with the<br>origin<br>default<br>value. |
| 10     | table_ope<br>n_cache    | 2000                                                                                        | 4000                                                                     | -                                                                                                                                                                                               | Be<br>consistent<br>with the<br>origin<br>default<br>value. |
| 11     | log_error_<br>verbosity | 3 (Notes)                                                                                   | 2<br>(Warning)                                                           | -                                                                                                                                                                                               | Use the<br>default<br>value.                                |
| INNODB |                         |                                                                                             |                                                                          |                                                                                                                                                                                                 |                                                             |

|   |                                |                 |                                    |                                                                                                                  |                                                   |
|---|--------------------------------|-----------------|------------------------------------|------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| 1 | innodb_undo_tablespaces        | 0               | 2                                  | -                                                                                                                | Use the default value.                            |
| 2 | innodb_undo_log_truncate       | OFF             | ON                                 | -                                                                                                                | Use the default value.                            |
| 3 | innodb_flush_method            | NULL            | fsync (Unix), unbuffered (Windows) | Controls the enabling and writing modes of InnoDB data files and redo logs.                                      | Use the default value<br><b>O_DIRECT</b> for SQL. |
| 4 | innodb_autoinc_lock_mode       | 1 (consecutive) | 2 (interleaved)                    | Controls the behavior of related locks when data is inserted into a table with the <b>auto_increment</b> column. | Be consistent with the origin default value.      |
| 5 | innodb_flush_neighbors         | 1 (enable)      | 0 (disable)                        | Checks whether other dirty pages in the same range are refreshed when refreshing the page from the buffer pool.  | Be consistent with the origin default value.      |
| 6 | innodb_max_dirty_pages_pct_lwm | 0 (%)           | 10 (%)                             | Affects the InnoDB dirty page refreshing operation.                                                              | Use the default value.                            |

|                    |                                  |                           |                          |                                                     |                                                    |
|--------------------|----------------------------------|---------------------------|--------------------------|-----------------------------------------------------|----------------------------------------------------|
| 7                  | innodb_max_dirty_pages_pct       | 75 (%)                    | 90 (%)                   | Affects the InnoDB dirty page refreshing operation. | Use the default value.                             |
| PERFORMANCE SCHEMA | Enabled globally.                | -                         | -                        | -                                                   | Be consistent with the origin default value.       |
| REPLICATION        |                                  |                           |                          |                                                     |                                                    |
| 1                  | log_bin                          | OFF                       | ON                       | -                                                   | Enabled by default                                 |
| 2                  | server_id                        | 0                         | 1                        | -                                                   | If the value is <b>0</b> , change it to <b>1</b> . |
| 3                  | log-slave-updates                | OFF                       | ON                       | -                                                   | Enabled by default.                                |
| 4                  | expire_log_days                  | 0                         | 30                       | -                                                   | Use the default value.                             |
| 5                  | master-info-repository           | FILE                      | TABLE                    | -                                                   | Use the default value <b>TABLE</b> .               |
| 6                  | relay-log-info-repository        | FILE                      | TABLE                    | -                                                   | Use the default value <b>TABLE</b> .               |
| 7                  | transaction-write-set-extraction | OFF                       | XXHASH64                 | -                                                   | Use the default value.                             |
| 8                  | slave_rows_search_algorithms     | INDEX_SCAN,<br>TABLE_SCAN | INDEX_SCAN,<br>HASH_SCAN | -                                                   | Use the default value.                             |

- Remove system variables.

The analysis of MySQL 5.7 and 8.0 Community Edition shows that removing system variables does not affect migration.

|                                       |
|---------------------------------------|
| System variables                      |
| innodb_locks_unsafe_for_binlog        |
| log_builitn_as_identified_by_password |
| old_passwords                         |
| query_cache_limit                     |
| query_cache_min_res_unit              |
| query_cache_size                      |
| query_cache_type                      |
| query_cache_wlock_invalidate          |
| ndb_cache_check_time                  |
| ignore_db_dirs                        |
| tx_isolation                          |
| tx_read_only                          |
| sync_frm                              |
| secure_auth                           |
| multi_range_count                     |
| log_error_verbosity                   |
| sql_log_bin                           |
| metadata_locks_cache_size             |
| metadata_locks_hash_instances         |
| date_format                           |
| datetime_format                       |
| time_format                           |
| max_tmp_tables                        |
| ignore_builitn_innodb                 |
| innodb_support_xa                     |
| innodb_undo_logs                      |
| innodb_undo_tablespaces               |
| internal_tmp_disk_storage_engine      |



## 5.4.7 How Do I Export and Import Events and Triggers in Batches?

During the MySQL to MySQL migration, if the migration log indicates that the migration of events and triggers fails after the migration task is complete, you can manually migrate the events and triggers.

This section describes how to export and import events and triggers in batches.

**Step 1** Export triggers from the source database in batches.

1. Run the following statement in the source database to obtain values of **TRIGGER\_SCHEMA** and **TRIGGER\_NAME**:

```
SELECT TRIGGER_SCHEMA,TRIGGER_NAME FROM INFORMATION_SCHEMA.TRIGGERS
WHERE TRIGGER_SCHEMA in ('DB1','DB2','DB3') order by TRIGGER_NAME;
```

In the preceding statements, **DB1**, **DB2**, and **DB3** indicate the databases to be migrated to the destination database.

2. Run the following statement in the source database to obtain the statement for creating a trigger from the source database from the **SQL Original Statement** field:

```
SHOW CREATE TRIGGER TRIGGER_SCHEMA.TRIGGER_NAME \G;
```

In the preceding statement, replace **TRIGGER\_SCHEMA** and **TRIGGER\_NAME** with the values obtained in [Step 1.1](#).

**Step 2** Export events from the source database in batches.

1. Run the following statement in the source database to obtain values of **EVENT\_SCHEMA** and **EVENT\_NAME**:

```
SELECT EVENT_SCHEMA,EVENT_NAME FROM INFORMATION_SCHEMA.EVENTS WHERE
EVENT_SCHEMA in ('DB1','DB2','DB3') order by EVENT_NAME;
```

In the preceding statements, **DB1**, **DB2**, and **DB3** indicate the databases to be migrated to the destination database.

2. Run the following statement in the source database to obtain the statement for creating an event from the source database from the **SQL Original Statement** field:

```
SHOW CREATE EVENT EVENT_SCHEMA.EVENT_NAME \G;
```

In the preceding statement, replace **EVENT\_SCHEMA** and **EVENT\_NAME** with the values obtained in [Step 2.1](#).

**Step 3** Import triggers and events.

Execute the statements for creating triggers and events exported from the source database in the destination database.

----End

## 5.4.8 How Can I Migrate Databases or Tables Whose Names Contain Uppercase Letters?

### Scenarios

When the value of source database parameter **lower\_case\_table\_names** is set to **1**, the databases or tables whose names contain uppercase letters cannot be migrated.

## Possible Cause

When the value of **lower\_case\_table\_names** in the source database is **1**, the MySQL engine converts the database name or table name into lowercase letters. In this case, the database or table may not be found, resulting in query failure. Simply, if the value of **lower\_case\_table\_names** is **1**, the database or table containing uppercase letters may be inaccessible.

## Solutions

Two solutions are provided as follows:

### Solution 1

Change the value of **lower\_case\_table\_names** in the source database to **0** (case-sensitive) and ensure that the value of this parameter in the source database is the same as that in the destination database.

### Solution 2

If the value of **lower\_case\_table\_names** cannot be changed permanently, change the value to **0**, and then perform the following operations:

- For a table, you can use the following statement to convert the table name to lowercase:  

```
alter table `BigTab` rename to `bigtab`
```
- For a database, you need to export the database data, change the database name from uppercase to lowercase, and then import the data.

---

#### CAUTION

After changing the database name or table name, you need to maintain the permission consistency without affecting application access.

---

## Method 3

Do not migrate the databases or tables that contain uppercase letters.

## 5.5 Backup Migration

### 5.5.1 What Should I Do If the Last Backup File Is Incorrectly Selected in the Backup Migration Scenario?

During the backup migration, if **Last Backup File** is selected by mistake, perform either of the following operations:

- If you select **Yes** by mistake, the database receives a signal that the restore is complete, and then sets the database to available, making incremental backup migration impossible. In this case, you can only delete the backup database and perform full and incremental backup restoration again.

- SQL Server does not have the last backup file in a strict sense. If you select **No** by mistake, you can perform an incremental backup (even if no data is changed). During the incremental backup, select **Yes** to complete the migration. The related database becomes available.

## 5.5.2 Manual Configuration

### Scenarios

After data is migrated from the local host or VMs to the RDS SQL Server DB instance on the current cloud through DRS, the Login accounts, DBLink, AgentJobs, and key configurations of the source database also need to be synchronized to the destination database.

### Login Account

Login account is an instance-level account of Microsoft SQL Server and is used to manage user server and database permissions. Generally, a user has multiple such accounts. After the user is migrated to the RDS SQL Server DB instance, you need to manually create corresponding Login accounts on the DB instance. The following describes how to create a Login account with the same name and password as those of your local Login account on the RDS SQL Server DB instance and grant permissions to the account.

- Step 1** Execute the following script to obtain the script for creating a Local account on your local instance. The obtained script can be directly executed on the destination DB instance to create a Login account with the same name and password.

```
SELECT 'IF (SUSER_ID('+QUOTENAME(SP.name,'"')+') IS NULL) BEGIN CREATE LOGIN '+
+QUOTENAME(SP.name)+
CASE
WHEN SP.type_desc = 'SQL_LOGIN' THEN ' WITH PASSWORD = '
+CONVERT(NVARCHAR(MAX),SL.password_hash,1)+ ' HASHED,SID='
+CONVERT(NVARCHAR(MAX),SP.SID,1)+' ,CHECK_EXPIRATION = '
+ CASE WHEN SL.is_expiration_checked = 1 THEN 'ON' ELSE 'OFF' END +', CHECK_POLICY = '
+CASE WHEN SL.is_policy_checked = 1 THEN 'ON,' ELSE 'OFF,' END
ELSE ' FROM WINDOWS WITH'
END
+' DEFAULT_DATABASE=[' +SP.default_database_name+ '], DEFAULT_LANGUAGE=['
+SP.default_language_name+ '] END;' as CreateLogin
FROM sys.server_principals AS SP LEFT JOIN sys.sql_logins AS SL
ON SP.principal_id = SL.principal_id
WHERE SP.type = 'S'
AND SP.name NOT LIKE '###%'
AND SP.name NOT LIKE 'NT AUTHORITY%'
AND SP.name NOT LIKE 'NT SERVICE%'
AND SP.name NOT IN ('rdsadmin','rdsbackup','rdsuser','rdsmirror','public')
```

- Step 2** Execute the script in [Step 1](#):

Figure 5-5 Obtaining the script

```
CreateLogin
1 IF (SUSER_ID('sa') IS NULL) BEGIN CREATE LOGIN [sa] WITH PASSWORD = 0x010039BF2EFAD6A3DB4E2ABB941F8BD32E5189A4BE757...
2 IF (SUSER_ID('rdsuser2') IS NULL) BEGIN CREATE LOGIN [rdsuser2] WITH PASSWORD = 0x0100BE8BCBC2DFC67008D4EE75AD660D1...
3 IF (SUSER_ID('csidbe') IS NULL) BEGIN CREATE LOGIN [csidbe] WITH PASSWORD = 0x0100A508789C15CF088664B162A5EDF4F4D2E...
4 IF (SUSER_ID('TestLogin7') IS NULL) BEGIN CREATE LOGIN [TestLogin7] WITH PASSWORD = 0x010073DA9A79E6677E8AF7077EF67...
5 IF (SUSER_ID('rdsuser3') IS NULL) BEGIN CREATE LOGIN [rdsuser3] WITH PASSWORD = 0x01009448FEDBC8D5E5E2529384029CA0...
6 IF (SUSER_ID('Test2') IS NULL) BEGIN CREATE LOGIN [Test2] WITH PASSWORD = 0x0100130953CEEAC997D08B66AF65F8489CAA44...
7 IF (SUSER_ID('Test3') IS NULL) BEGIN CREATE LOGIN [Test3] WITH PASSWORD = 0x0100EE98873948E02595EDCD953B426637281B7...
8 IF (SUSER_ID('Test4') IS NULL) BEGIN CREATE LOGIN [Test4] WITH PASSWORD = 0x01000EE91B99F087741F16A44E70AA813D08A8B...
9 IF (SUSER_ID('Test5') IS NULL) BEGIN CREATE LOGIN [Test5] WITH PASSWORD = 0x010056EEF845DF098D2DF9395AF7B7618A20735...
```

- Step 3** Copy and execute the script obtain in [Step 2](#) on the destination instance. The created Login account is the same as the original one.
- Step 4** Map the newly created Login account to the database user permissions that have been migrated to the RDS SQL Server DB instance to ensure permission consistency.

```
declare @DBName nvarchar(200)
declare @Login_name nvarchar(200)
declare @SQL nvarchar(MAX)
set @Login_name = 'TestLogin7' //Enter the login name one by one.
declare DBName_Cursor cursor for
select quotename(name)from sys.databases where database_id > 4 and state = 0
and name not like '%$%'
and name <> 'rdsadmin'
open DBName_Cursor
fetch next from DBName_Cursor into @DBName
WHILE @@FETCH_STATUS= 0
begin
SET @SQL=' USE '+ (@DBName)+ '
if exists(select top 1 1 from sys.sysusers where name = '''+ @Login_Name +''')
begin
ALTER USER '+@Login_name+' with login = '+@Login_name+';
end
'
print @SQL
EXEC (@SQL)
fetch next from DBName_Cursor into @DBName
end
close DBName_Cursor
deallocate DBName_Cursor
```

#### NOTE

After the preceding script is executed, you can view the Login account with the same name on the new instance, and the password and permission are the same as those on your local host.

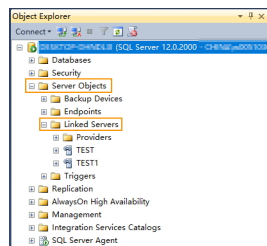
----End

## Database Link

SQL Server allows you to create database links to interact with databases on external DB instances. Therefore you can query, synchronize, and compare databases of different types or on different DB instances. However, these links cannot be automatically synchronized to the DB instance on cloud so you need to synchronize them manually.

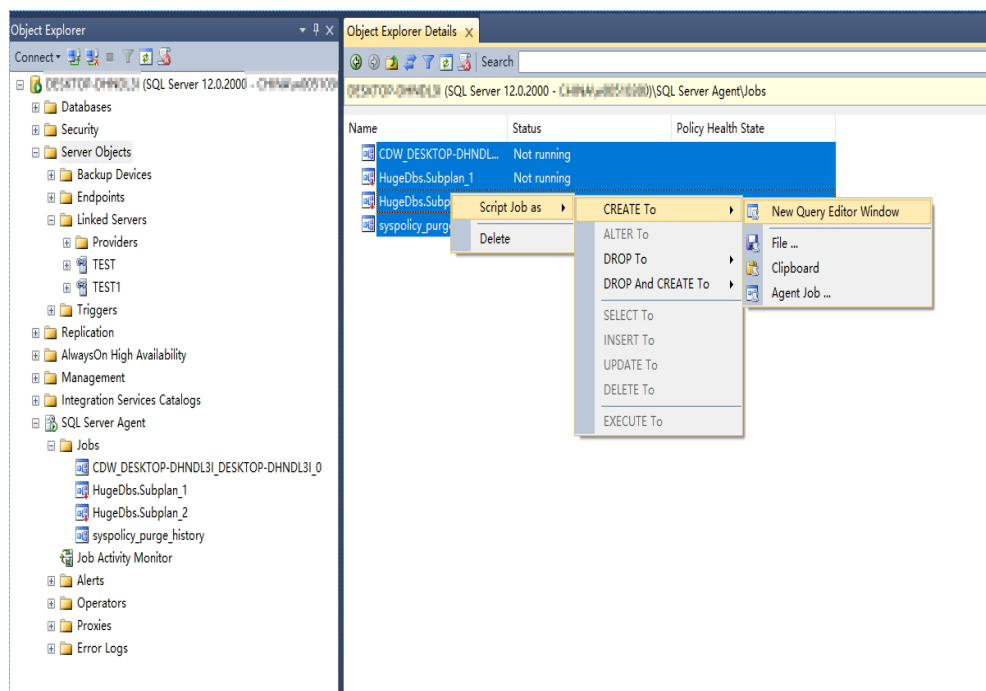
- Step 1** Connect the local DB instance and cloud DB instance through Microsoft SQL Server Management Studio. Choose **Server Objects** > **Linked Servers** and locate the Dblink of the current DB instance.

**Figure 5-6** Viewing database links



- Step 2** Select the linked server and press **F7**. The **Object Explore** page is displayed. On this page, you can quickly create a script.

**Figure 5-7** Creating the script



- Step 3** In the displayed window, view all the scripts for creating Dblinks of the current DB instance. You only need to copy the scripts to the destination DB instance and change the password on @rmtpassword.

```
USE [master]
GO

/***** Object: LinkedServer [DRS_TEST_REMOTE] Script Date: 2019/5/25 17:51:50 *****/
EXEC master.dbo.sp_addlinkedserver @server = N'DRS_TEST_REMOTE', @srvproduct=N'',
@provider=N'SQLNCLI', @datasrc=N'DESKTOP-B18JH5T\SQLSERVER2016EE'
/* For security reasons the linked server remote logins password is changed with ##### */
EXEC master.dbo.sp_addlinkedsrvlogin
@rmtsrname=N'DRS_TEST_REMOTE',@useself=N'False',@locallogin=NULL,@rmtuser=N'sa',@r
mtpassword='#####'
GO
```

 **NOTE**

The preceding script is an example. The created script may contain a large number of default system configuration items. You need to retain only the following two key scripts for each DBLink. In addition, you need to enter the account and password again.

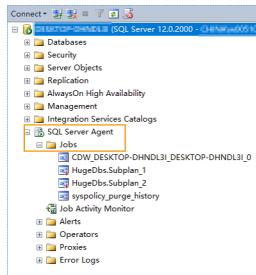
----End

## Agent JOB

Agent Job is the agent service of Microsoft SQL Server. It helps you quickly create scheduled tasks on DB instances, perform routine O&M, and process data. You need to manually migrate local Job scripts.

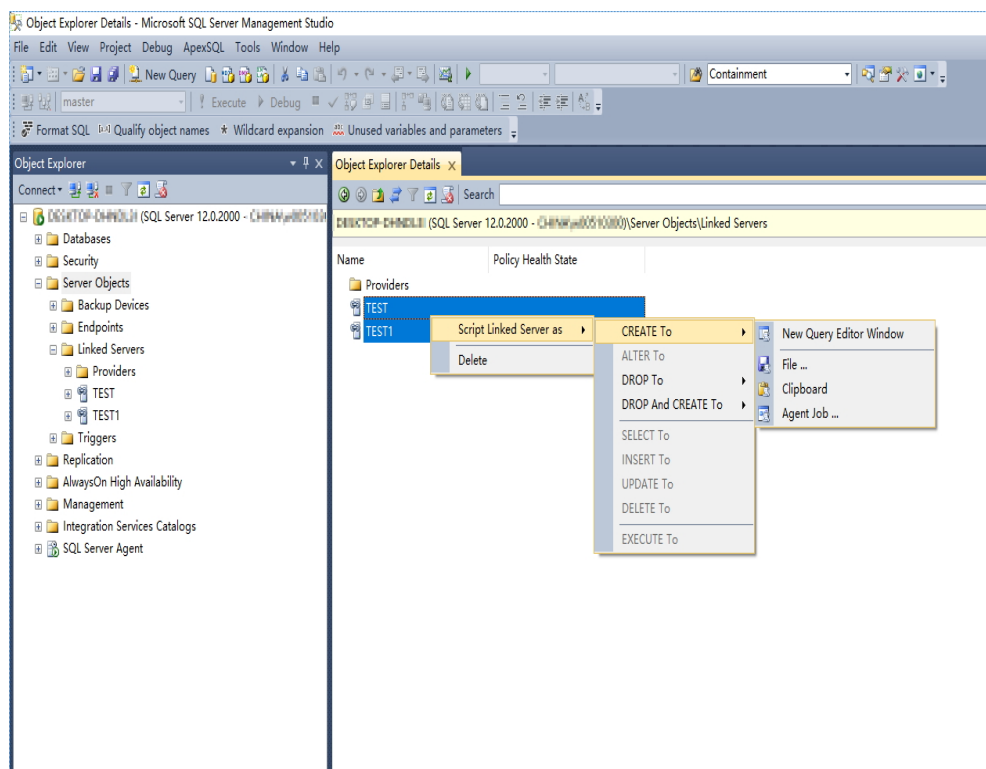
- Step 1** Connect the local DB instance and cloud DB instance through Microsoft SQL Server Management Studio. Choose **SQL Server Agent > Jobs** and locate all the jobs of the current DB instance.

**Figure 5-8** Viewing Jobs



- Step 2** Select a job and press **F7**. All jobs are displayed on the **Object Explore** page. Select all jobs and create a script in the new window.

Figure 5-9 Creating a script



**Step 3** Copy the T-SQL script in the new window to the new DB instance, and then modify the following key items to ensure that the creation is successful.

- Modify the owner account of each job.  
Example:  
`@owner_login_name=N'rdsuser'`
- Modify the DB instance name of each job.  
Example:  
`@server=N' DB instance IP address'`  
`@server_name = N'DB instance IP address'`

#### NOTE

The owner account of the new job is very important. On the RDS SQL Server DB instance, only the owner of the job can view the job of the DB instance. Therefore, it is recommended that all job owners use the same account to facilitate job management.

----End

## Key Configuration

After the database is restored to the RDS SQL Server DB instance, some local important configuration items need to be synchronized to keep service running properly.

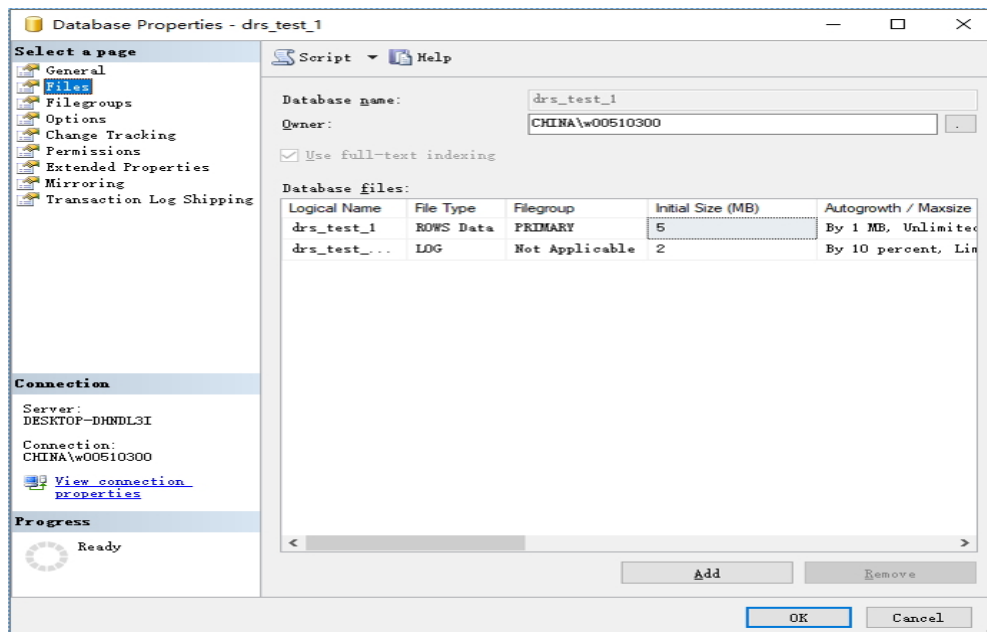
1. tempdb: The file configuration of the temporary database needs to be synchronized.

It is recommended that you set 8 temporary files and ensure that the files are stored in **D:\RDSDBDATA\Temp\**.

Run the following script on the destination database to add the temporary database file configuration:

```
USE [master]
GO
ALTER DATABASE [tempdb] ADD FILE (NAME = N'tempdb1', FILENAME = N'D:\RDSBDDATA\Temp\tempdb1.ndf', SIZE = 65536KB, FILEGROWTH = 65536KB)
GO
ALTER DATABASE [tempdb] ADD FILE (NAME = N'tempdb2', FILENAME = N'D:\RDSBDDATA\Temp\tempdb2.ndf', SIZE = 65536KB, FILEGROWTH = 65536KB)
GO
ALTER DATABASE [tempdb] ADD FILE (NAME = N'tempdb3', FILENAME = N'D:\RDSBDDATA\Temp\tempdb3.ndf', SIZE = 65536KB, FILEGROWTH = 65536KB)
GO
ALTER DATABASE [tempdb] ADD FILE (NAME = N'tempdb4', FILENAME = N'D:\RDSBDDATA\Temp\tempdb4.ndf', SIZE = 65536KB, FILEGROWTH = 65536KB)
GO
ALTER DATABASE [tempdb] ADD FILE (NAME = N'tempdb5', FILENAME = N'D:\RDSBDDATA\Temp\tempdb5.ndf', SIZE = 65536KB, FILEGROWTH = 65536KB)
GO
ALTER DATABASE [tempdb] ADD FILE (NAME = N'tempdb6', FILENAME = N'D:\RDSBDDATA\Temp\tempdb6.ndf', SIZE = 65536KB, FILEGROWTH = 65536KB)
GO
ALTER DATABASE [tempdb] ADD FILE (NAME = N'tempdb7', FILENAME = N'D:\RDSBDDATA\Temp\tempdb7.ndf', SIZE = 65536KB, FILEGROWTH = 65536KB)
GO
```

Figure 5-10 Checking temporary files



2. Database isolation level: Check whether the database isolation level is enabled on the source DB instance and synchronize the isolation level to the RDS SQL Server DB instance. There are two snapshot isolation parameters:
  - Is Read Committed Snapshot On
  - Allow Snapshot Isolation

If the database isolation level of the source DB instance is enabled, you can run the following script on the destination database to enable the database isolation level:

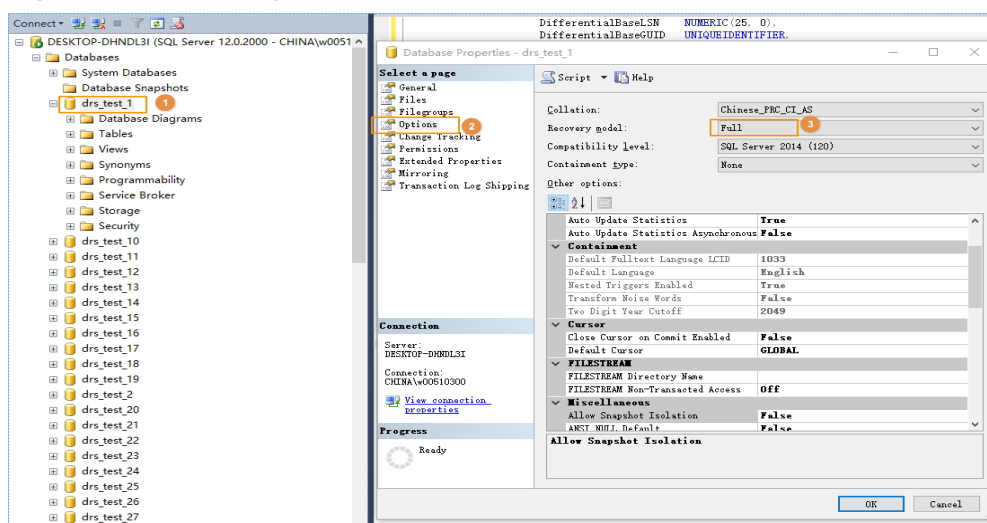


```
USE [DBName]
GO
ALTER DATABASE [DBName] SET READ_COMMITTED_SNAPSHOT ON WITH NO_WAIT
GO
ALTER DATABASE [DBName] SET ALLOW_SNAPSHOT_ISOLATION ON
GO
```

3. Max Degree of Parallelism: The maximum degree of parallelism is set to **0** by default on the RDS SQL Server instance. You can also set the value based on the local settings to avoid exceptions in different service scenarios.

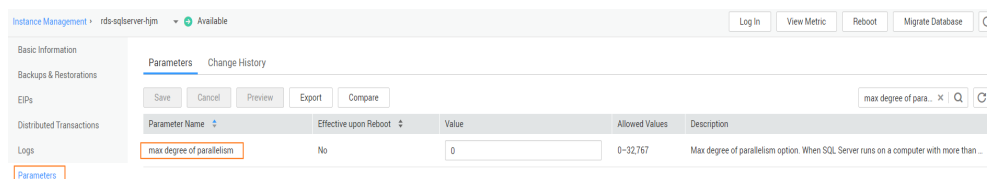
In **Object Explorer**, right-click a local server and select **Properties**. Click the **Advanced** node. In the **Max Degree of Parallelism** box, view the value of the local instance and change the **max degree of parallelism** value in the parameter group of the destination RDS SQL Server instance to the same.

Figure 5-11 Max Degree of Parallelism



Log in to the RDS console. On the **Instance Management** page, click the target DB instance name. Choose **Parameters**, search for the **max degree of parallelism** parameter, and change its value.

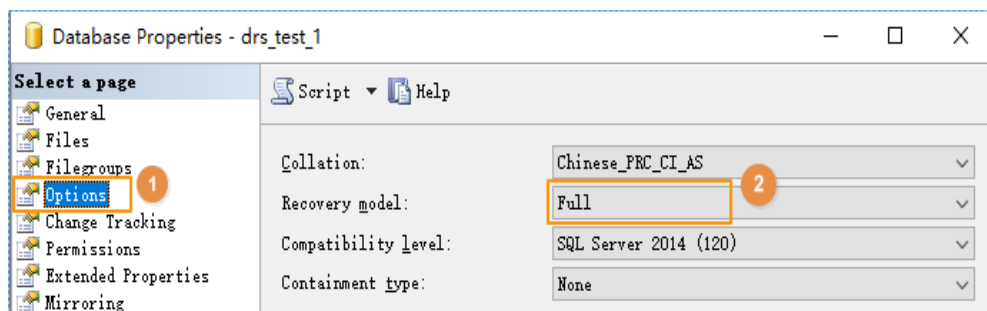
Figure 5-12 max degree of parallelism



4. Check whether the database recovery model on the cloud is set to **Full**. If not, change the mode.

Right-click the database and choose **Properties** from the shortcut menu. In the displayed page, select **Options**. Then, verify that **Recovery Model** is set to **Full**. Ensure that the database is highly available and the backup policy is executable.

**Figure 5-13** Checking the database recovery model



## 5.6 Data-Level Comparison

### 5.6.1 Which of the Following Data Types Are Not Supported By Value Comparison?

DRS's data comparison allows you to check whether the data in the source database is the same as that in the destination database.

DRS does not support value comparison for the data types shown here. During value comparison, these data types are automatically ignored.

**Table 5-2** Data types that do not support value comparison

| Source DB Type         | Data Type                                                                  |
|------------------------|----------------------------------------------------------------------------|
| MySQL                  | TINYBLOB, BLOB, MEDIUMBLOB, LONGBLOB, TINYTEXT, TEXT, MEDIUMTEXT, LONGTEXT |
| GaussDB(for openGauss) | TEXT, CLOB, BLOB, BYTEA, INTERVAL DAY TO SECOND, INTERVAL                  |
| MongoDB                | _id is of the bindata type.                                                |

DRS does not support value comparison for the following primary key types. During value comparison, the following primary key types are grouped into a specified table that does not support comparison.

**Table 5-3** Primary key type that does not support value comparison.

| Source DB Type         | Data Type                                                                                                                           |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| MySQL                  | TINYBLOB, BLOB, MEDIUMBLOB, LONGBLOB, TINYTEXT, TEXT, MEDIUMTEXT, LONGTEXT, FLOAT                                                   |
| GaussDB(for openGauss) | TEXT, CLOB, BLOB, BYTEA, INTERVAL DAY TO SECOND, INTERVAL, REAL, DOUBLE PRECISION, BOOL, TIME, TIMETZ, TIMESTAMP, TIMESTAMPTZ, DATE |

| Source DB Type | Data Type                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PostgreSQL     | REAL, DOUBLE PRECISION, MONEY, TEXT, BYTEA, TIMESTAMP WITHOUT TIME ZONE, TIMESTAMP WITH TIME ZONE, DATE, TIME WITHOUT TIME ZONE, TIME WITH TIME ZONE, INTERVAL, BOOLEAN, ENUMERATED TYPES, POINT, LINE, LSEG, BOX, PATH, POLYGON, CIRCLE, CIDR, INET, MACADDR, MACADDR8, BIT, BIT VARYING, TSVECTOR, TSQUERY, XML, JSON, ARRAY, COMPOSITE TYPES, INT4RANGE, INT8RANGE, NUMRANGE, TSRANGE, TSTZRANGE, DATERANGE |

## 5.6.2 What Impact Does a DRS Comparison Task Have 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.

## 5.6.3 How Long Does a DRS Comparison Task Take?

- 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.

## 5.7 General Operations

## 5.7.1 What Can I Do When Information Overlaps on the DRS Console?

Information often overlaps when you decrease the size of the page. You are advised to set the page scale at 100%.

## 5.7.2 Is the Destination Instance Set to Read-only or Read/Write?

During the migration, the destination instance can be set to read-only or read/write.

- **Read-only:** During the migration, the destination instance is read-only. After the migration is complete, it restores to the read/write status. This option ensures the integrity and success rate of data migration.
- **Read/Write:** During the migration, the destination instance can be queried or modified. Data being migrated may be modified when operations are performed or applications are connected. It should be noted that background processes can often generate or modify data, which may result in data conflicts, task faults, and upload failures. Do not select this option if you do not fully understand the risks.

Setting the destination instance to read-only can prevent DDL or DML misoperations from being performed on the databases or tables that are being migrated, improving migration integrity and data consistency.

After a migration task is started, the status of the destination database cannot be changed. After all migration tasks in which the destination database status is set to read-only are complete, the destination database can be read and written.

## 5.7.3 How Do I Set Global `binlog_format=ROW` to Take Effect Immediately?

During migration for MySQL databases, the source database binlog must be in the ROW format. Otherwise, the task fails. After **`binlog_format=ROW`** at the global level is set in the source database, all the previous service threads need to be stopped because these threads still connect the binlog in the non-ROW format.

### Procedure

**Step 1** Log in to the source database using the MySQL official client or other tools.

**Step 2** Run the following command for setting global parameters in the source database.  
`set global binlog_format = ROW;`

**Step 3** Run the following command on the source database and check whether the preceding operation is successful:  
`select @@global.binlog_format;`

**Step 4** You can use either of the following methods to ensure that the modified binlog format of the source database takes effect immediately:

#### Method 1

1. Select a non-service period to disconnect all service connections on the current database.
  - a. Run the following command to query all service threads (excluding all binlog dump threads and current threads) in the current database:

```
show processlist;
```
  - b. Stop all the service threads queried in the previous step.

**NOTE**

Do not create or start a migration task before the preceding operations are complete. Otherwise, data may be inconsistent.

2. To prevent the binlog format of the source database from becoming invalid due to database restart, add or modify the **binlog\_format** parameter in the startup configuration file (**my.ini** or **my.cnf**) of the source database and save the modification.

```
binlog_format=ROW
```

**Method 2**

1. To prevent the binlog format of the source database from becoming invalid due to database restart, add or modify the **binlog\_format** parameter in the startup configuration file (**my.ini** or **my.cnf**) of the source database and save the modification.

```
binlog_format=ROW
```
2. Ensure that the **binlog\_format** parameter is successfully added or modified. Then, restart the source database at a non-service period.

----End

## 5.7.4 How Do I Set **binlog\_row\_image=FULL** to Take Effect Immediately?

When migrating MySQL databases, ensure that the **binlog\_row\_image** parameter of the source database is set to **FULL**. Otherwise, the migration task will fail. After **binlog\_row\_image** is set to **FULL** in the source database, the setting takes effect only for new sessions. To close old sessions, restart the source database and reset the task during a non-service period.

### Setting **binlog\_row\_image** to **FULL**

- If the source is an RDS instance on the cloud, change **binlog\_row\_image** to **FULL** on the RDS console, and then restart the source database and reset the task.
- If the source database is an on-premises database, perform the following steps:
  - a. Log in to the server where the MySQL source database is located.
  - b. Manually change the value of **binlog\_row\_image** in the **my.cnf** configuration file to **FULL** and save the file.

```
binlog_row_image=full
```
  - c. To close old sessions, restart the source database and reset the task during a non-service period.

## 5.7.5 How Do I Change the Destination Database Password to Meet the Password Policy?

### Scenarios

When you set the password for the migration account in the destination database, you need to set the password based on the password strength requirements of the destination database.

### Procedure

The following operations apply to the scenario where the target database is an RDS instance.

- Step 1** Log in to the RDS console.
- Step 2** Locate the target DB instance.
- Step 3** Click the DB instance name.
- Step 4** On the **Basic Information** page, click the **Parameters** tab.
- Step 5** Enter the keyword **password** in the search box in the upper right corner of the page and press **Enter** to view the search result.
- Step 6** In the search result in **Step 5**, change the values of the parameters listed in **Table 5-4** based on the password strength requirements. Ensure that the parameter values are within the password complexity range.

**Table 5-4** Password description

| Parameter                            | Allowed Value       | Description                                                                                                                              |
|--------------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| validate_password_length             | 0-2,147,483,647     | Specifies the minimum password length verified by the validate_password plugin.                                                          |
| validate_password_mixed_case_count   | 0-2,147,483,647     | Specifies the minimum number of lowercase and uppercase letters in a password when the password policy level is <b>MEDIUM</b> or higher. |
| validate_password_number_count       | 0-2,147,483,647     | Specifies the minimum number of digits in a password when the password policy level is <b>MEDIUM</b> or higher.                          |
| validate_password_policy             | LOW, MEDIUM, STRONG | Specifies the password policy executed by the validate_password plugin.                                                                  |
| validate_password_special_char_count | 0-2,147,483,647     | Specifies the minimum number of non-alphanumeric characters in a password when the password policy level is <b>MEDIUM</b> or higher.     |

**Step 7** After the parameter values are modified, save the modification.

**Step 8** Back to the **Select Migration Type** page and perform the next step.

----End

## 5.7.6 Does Bandwidth Expansion Affect the Running DRS Tasks?

When the cloud connection bandwidth is expanded, the bandwidth link needs to be re-established and the network is disconnected. Whether the network disconnection affects DRS tasks depends on the network disconnection duration and whether the source database IP address changes. For example, for the MySQL DB engine, if the network is disconnected for one day and the binlog of the source database is cleared within this day (the binlog clearing policy of MySQL is configured by the user), the task cannot be resumed. In this scenario, you need to reset the task. If the network is interrupted for a short period of time and the IP address of the source database in the VPN remains unchanged after the bandwidth link is changed, the system can continue to resume the task.

## 5.7.7 Why Data in MariaDB and SysDB Cannot Be Migrated?

In some MariaDB versions, the SysDB database is used as a system database (similar to the sys database of MySQL 5.7). Therefore, DRS considers the SysDB database as the system database of all MariaDB databases by default (similar to the MySQL, information\_schema, and performance\_schema databases).

## 5.7.8 Constraints and Operation Suggestions on Many-to-One Scenario

DRS supports many-to-one scenarios during migration of different types of instances and tables to suit your service requirements.

### Operation Suggestions

- To ensure that there is sufficient space during task creation, you are advised to calculate the total data volume of the source database and plan how to allocate the disk space of the destination instance. The remaining disk space must be greater than the total data volume of the source database. For example, if the data volume of source system1 is 1 GB, the data volume of source system2 is 3 GB, and the data volume of source system3 is 6 GB, the remaining disk space of the destination instance must be greater than 10 GB.
- To improve the performance of the destination MySQL database, you are advised to use the **Save Change** function to configure common parameters (except **max\_connections**). For performance parameters, you need to manually change the parameter values based on the specifications of the destination database.
- When you create a many-to-one synchronization task, the task created later may block the task created earlier. This is because each synchronization task involves index creation. When an index is created, a schema lock may occur on the destination database, which blocks the synchronization of other tables

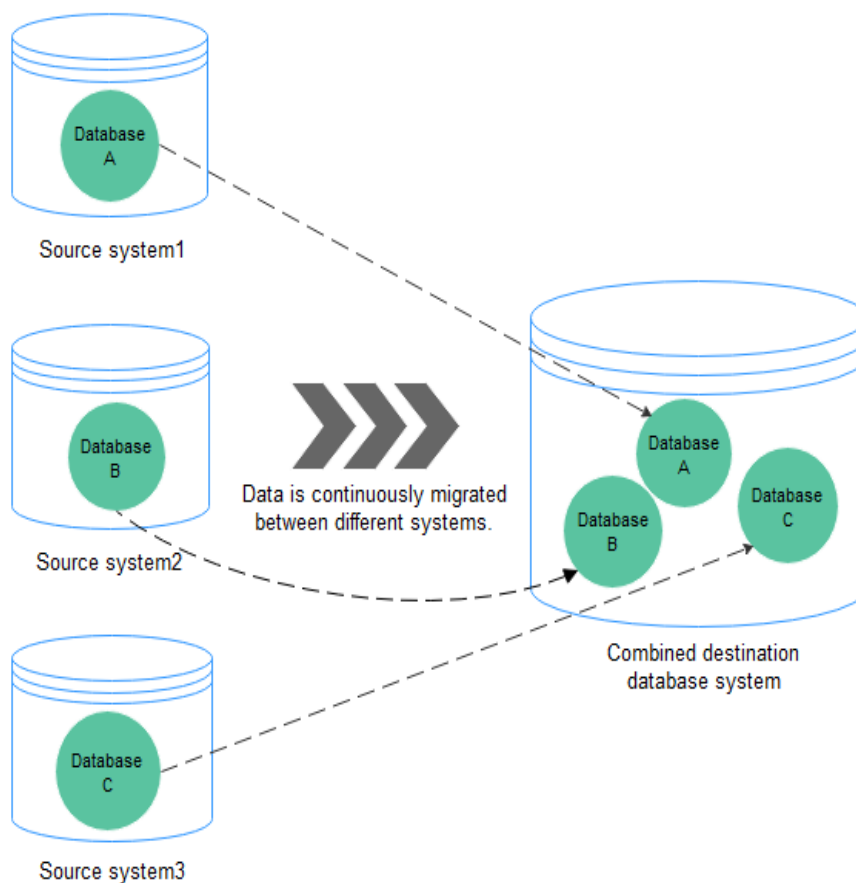
in the schema. As a result, the previously created tasks cannot be synchronized. To avoid this problem, you are advised to set **Start Time** to **Start at a specified time** to start a task during off-peak hours.

- For many-to-one synchronization tasks that involve the synchronization of the same table, DDL operations cannot be performed on source databases. Otherwise, all synchronization tasks fail.

## Many-to-One Data Migration

Data migration aims to migrate the entire database. Multiple databases can be migrated at the instance level. Databases with the same name in the source system cannot be migrated and database name mapping is not supported.

**Figure 5-14** Many-to-one data migration

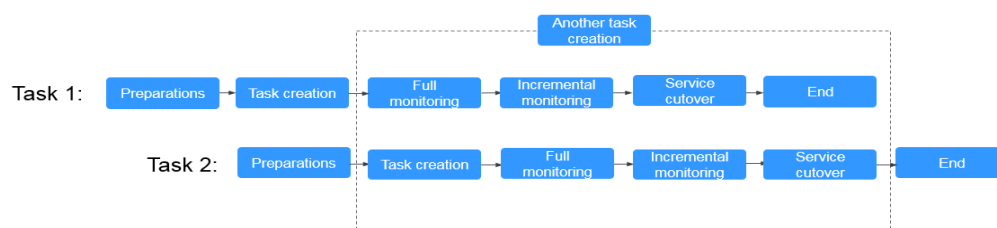


## Flow Chart

When creating a task, ensure that the second task is created after the first task has entered the full migration state.



Figure 5-15 Flow chart



## 5.7.9 Where Can I View DRS Operation Logs?

Click the username in the upper right corner and select **Operation Log** from the drop-down list.

## 5.7.10 Can a Completed Task Be Restarted?

No. DRS cannot restart a completed task.

## 5.7.11 What Are the Differences Between Resetting a Task and Recreating a Task?

You can reset a task when the task is suspended or fails. Resetting a task does not clear the destination database. You can determine whether to clear the destination database based on your requirements. After the task is reset, a full synchronization is performed again. You do not need to configure the task again.

# 6 Troubleshooting

## 6.1 Solutions to Failed Check Items

### 6.1.1 Disk Space

#### 6.1.1.1 Checking Whether the Destination Database Has Sufficient Storage Space

##### MySQL Migration

**Table 6-1** Checking whether the destination database has sufficient storage space

|                                              |                                                                                                                                                                       |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the destination database has sufficient storage space                                                                                                         |
| <b>Description</b>                           | Check whether the destination database has sufficient storage space. If storage space is insufficient, the migration will fail.                                       |
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: This item cannot be checked because the source database fails to be connected.<br>Handling suggestion: Check whether the source database is connected. |
|                                              | Failure cause: Insufficient user permissions<br>Handling suggestion: Check whether the database user permissions meet the migration requirements.                     |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Handling suggestion: Scale up or clean up the destination database storage space. If you clean up the storage space, you will obtain more space within 2 to 3 minutes.<br><b>NOTE</b><br>It is recommended that the size of the destination database disk be set to the smaller value of the following two values:<br><ol style="list-style-type: none"><li>1. 2.5 times the size of the data to be migrated in the source database.</li><li>2. The size of the data to be migrated in the source database plus 200 GB.</li></ol> |
|  | Failure cause: An internal error occurs.<br>Handling suggestion: Contact technical support.                                                                                                                                                                                                                                                                                                                                                                                                                                       |

### 6.1.1.2 Checking Whether the Destination Server Has Sufficient Storage Space

**Table 6-2** Checking whether the destination server has sufficient storage space

|                                              |                                                                                                                                                                                            |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the destination server has sufficient storage space                                                                                                                                |
| <b>Description</b>                           | If the destination server's storage space is insufficient, the migration will fail.                                                                                                        |
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: The amount of data in the source database is greater than the remaining storage space of the destination server.<br>Handling suggestion: Modify the synchronization object. |

## 6.1.2 Database Parameters

### 6.1.2.1 Checking Whether the Source Database Binlog Is Enabled

#### MySQL Migration

**Table 6-3** Checking whether the source database binlog is enabled

|                    |                                                          |
|--------------------|----------------------------------------------------------|
| <b>Check Item</b>  | Whether the source database binlog is enabled            |
| <b>Description</b> | Check whether binlog is enabled for the source database. |

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Failure Cause and Handling Suggestion</b> | <p>Failure cause: This item cannot be checked because the source database fails to be connected.</p> <p>Handling suggestion: Check whether the source database is connected.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                                              | <p>Failure cause: Insufficient user permissions</p> <p>Handling suggestion: Check whether the database user permissions meet the migration requirements.</p> <p><b>NOTE</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                              | <p>Failure cause: An internal error occurs.</p> <p>Handling suggestion: Contact technical support.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                              | <p>Failure cause: The binlog function is disabled on the source database.</p> <p>Handling suggestion:</p> <ul style="list-style-type: none"> <li>• If the source is an on-premises database, perform the following operations to enable binlog.             <ol style="list-style-type: none"> <li>1. Run the following command to check whether binlog is enabled:<br/><b>show variables like "log_bin"\G;</b></li> </ol> <pre style="background-color: #333; color: #fff; padding: 5px;">mysql&gt; show variables like "log_bin"\G; ***** 1. row ***** Variable_name: log_bin Value: OFF 1 row in set (0.01 sec)</pre> <ol style="list-style-type: none"> <li>2. If binlog is disabled, add <b>log-bin = mysql-bin</b> followed by <b>[mysqld]</b> in the MySQL configuration file <b>my.cnf</b> or <b>my.ini</b>.                     <pre style="background-color: #333; color: #fff; padding: 5px;">[mysqld] log-bin = mysql-bin</pre> </li> <li>3. Restart the database.                     <pre style="background-color: #333; color: #fff; padding: 5px;">mysql&gt; show variables like "log_bin"\G; ***** 1. row ***** Variable_name: log_bin Value: ON 1 row in set (0.00 sec)</pre> </li> </ol> </li> </ul> |

### 6.1.2.2 Checking Whether the Source Database Binlog Is Row-Based

#### MySQL Migration

**Table 6-4** Checking whether the source database binlog is row-based

|                    |                                                        |
|--------------------|--------------------------------------------------------|
| <b>Check Item</b>  | Whether the source database binlog is row-based        |
| <b>Description</b> | Check whether the source database binlog is row-based. |

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: This item cannot be checked because the source database fails to be connected.<br>Handling suggestion: Check whether the source database is connected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                              | Failure cause: Insufficient user permissions<br>Handling suggestion: Check whether the database user permissions meet the migration requirements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                              | Failure cause: The source database binlog is not row-based.<br>Handling suggestion: <ul style="list-style-type: none"> <li>If the source database is an on-premises database, perform the following operations to change the binlog format of the source database:<br/>Method 1: You can modify the <b>my.cnf</b> or <b>my.ini</b> configuration file and restart the database.<br/><code>binlog_format=row</code></li> <li>Method 2: Stop all service connections.<br/><code>set global binlog_format='ROW'</code></li> </ul> Modify the <b>my.cnf</b> or <b>my.ini</b> configuration file.<br><code>binlog_format=row</code><br>In the <b>ROW</b> format, the log growth rate increases, which may occupy more disk space.<br><b>NOTE</b> <ul style="list-style-type: none"> <li>If the source database is an RDS DB instance on the cloud, change the <b>binlog_format</b> value of the source database to <b>ROW</b>. After the change, restart the database for the change to take effect.</li> </ul> <b>NOTE</b> |
|                                              | Failure cause: An internal error occurs.<br>Handling suggestion: Contact technical support.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

### 6.1.2.3 Checking Whether the Binlog Retention Period Is Set on the Source Database

#### MySQL Migration

**Table 6-5** Checking whether the binlog retention period is set on the source database

|                    |                                                                                                                                                                                        |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>  | Whether the binlog retention period is set on the source database                                                                                                                      |
| <b>Description</b> | Checking whether the binlog retention period is set on the source database. You are advised to store the source database binlog for a longer time, if the storage space is sufficient. |

|                                              |                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Failure Cause and Handling Suggestion</b> | <p>Failure cause: The binlog retention period is not set on the source database.</p> <p>Handling suggestion:</p> <p>Log in to the source database and run the following SQL statement to set the retention period of binlog:<br/>call mysql.rds_set_configuration('binlog retention hours', n);</p> <p>The value <b>n</b> indicates an integer from 1 to 168.</p> |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 6.1.2.4 Checking Whether the Source and Destination Database Character Sets Are Consistent

#### MySQL Migration

**Table 6-6** Checking whether the source and destination database character sets are consistent

|                                              |                                                                                                                                                                                            |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the source and destination database character sets are consistent                                                                                                                  |
| <b>Description</b>                           | Check whether the character sets of the servers hosting the source and destination databases are consistent.                                                                               |
| <b>Failure Cause and Handling Suggestion</b> | <p>Failure cause: This item cannot be checked because the source database fails to be connected.</p> <p>Handling suggestion: Check whether the source database is connected.</p>           |
|                                              | <p>Failure cause: This item cannot be checked because the destination database fails to be connected.</p> <p>Handling suggestion: Check whether the destination database is connected.</p> |
|                                              | <p>Failure cause: Insufficient user permissions</p> <p>Handling suggestion: Check whether the database user permissions meet the migration requirements.</p>                               |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>Failure cause: The character set of the source database is inconsistent with that of the destination database.</p> <p>Handling suggestion: Modify the character sets.</p> <p>Run commands to modify the self-created source database.</p> <ol style="list-style-type: none"> <li>1. Check whether source and destination database character sets are consistent.<br/> <code>show variables like "character_set_server"\G;</code><br/> <pre>mysql&gt; show variables like "character_set_server"\G; ***** 1. row ***** Variable_name: character_set_server Value: utf8 1 row in set (0.00 sec)</pre> </li> <li>2. Modify the character set of the source database server.<br/> <code>set character_set_server='utf8';</code><br/> <pre>mysql&gt; set character_set_server='utf8'; Query OK, 0 rows affected (0.00 sec)</pre> </li> </ol> |
|  | <p>Failure cause: An internal error occurs.</p> <p>Handling suggestion: Contact technical support.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

### 6.1.2.5 Checking Whether the Source Database server\_id Meets the Incremental Migration Requirements

#### MySQL

**Table 6-7** Checking whether the source database server\_id meets the incremental migration requirements

|                                              |                                                                                                                                                                        |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the source database <b>server_id</b> meets the incremental migration requirements                                                                              |
| <b>Description</b>                           | Check whether the source database <b>server_id</b> meets the incremental migration requirements.                                                                       |
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: This item cannot be checked because the source database failed to be connected.<br>Handling suggestion: Check whether the source database is connected. |
|                                              | Failure cause: Insufficient user permissions<br>Handling suggestion: Check whether the database user permissions meet the migration requirements.                      |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>Failure cause: The source database <b>server_id</b> does not meet the incremental migration requirements.</p> <p>Handling suggestion:</p> <p>Run the following command to modify the <b>server_id</b> value:</p> <p><b>set global server_id=n</b></p> <p>The value <b>n</b> indicates the source database server_id. If the source database version is MySQL 5.6, the value <b>n</b> ranges from 2 to 4294967296. Otherwise, the value <b>n</b> ranges from 1 to 4294967296.</p> |
|  | <p>Failure cause: An internal error occurs.</p> <p>Handling suggestion: Contact technical support.</p>                                                                                                                                                                                                                                                                                                                                                                              |

### 6.1.2.6 Checking Whether the Source and Destination Database Table Names Are Consistent in Case Sensitivity

#### MySQL Migration

**Table 6-8** Checking whether the source and destination database table names are consistent in case sensitivity

|                                              |                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the source and destination database table names are consistent in case sensitivity                                                                                                                                                                                                                                                    |
| <b>Description</b>                           | Check whether the source and destination database names and table names are consistent in case sensitivity.                                                                                                                                                                                                                                   |
| <b>Failure Cause and Handling Suggestion</b> | <p>Failure cause: This item cannot be checked because the source database fails to be connected.</p> <p>Handling suggestion: Check whether the source database is connected.</p> <p>Failure cause: Insufficient user permissions</p> <p>Handling suggestion: Check whether the database user permissions meet the migration requirements.</p> |



|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>Failure cause: The <b>lower_case_table_names</b> values in the source and destination databases must be the same.</p> <p>Handling suggestion:</p> <ul style="list-style-type: none"> <li>If you are migrating data out of the cloud, change the values of <b>lower_case_table_names</b> in the source and destination databases to the same.<br/>You are advised to change the parameter value in an empty database. For example, if the destination RDS DB instance is empty, run the following example command to change the <b>lower_case_table_names</b> value to the same as that in the source database: Sample command:<br/> <pre>set global lower_case_table_names=n;</pre> In the preceding command, <b>n</b> indicates the parameter value of the source database. After the modification, restart the database for the modification to take effect.</li> <li>If you are migrating data out of the cloud, perform the following operations:<br/>If the destination database is a self-built database, modify the <b>lower_case_table_names</b> parameter of the destination database. Add <b>lower_case_table_names=n</b> under the <b>[mysqld]</b> tag in the MySQL configuration file <b>my.cnf</b>. <b>n</b> indicates the value of parameter <b>same lower_case_table_names</b> of the source database. The database must be restarted to make the change take effect.<br/>If the destination database is a cloud database, check whether the <b>lower_case_table_names</b> parameter can be modified. If not, contact technical support.</li> </ul> |
|  | <p>Failure cause: The <b>lower_case_table_names</b> parameter value of the destination database is different from that of the source database, and the source database contains uppercase database and table names.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|  | <p>Failure cause: The database is unavailable.</p> <p>Handling suggestion: Contact technical support.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|  | <p>Failure cause: An internal error occurs.</p> <p>Handling suggestion: Contact technical support.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

### 6.1.2.7 Checking Whether the Source Database Contains Object Names with Non-ASCII Characters

#### MySQL

**Table 6-9** Checking whether the source database contains object names with non-ASCII characters

|                   |                                                                             |
|-------------------|-----------------------------------------------------------------------------|
| <b>Check Item</b> | Whether the source database contains object names with non-ASCII characters |
|-------------------|-----------------------------------------------------------------------------|

|                                              |                                                                                                                                                                                                    |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description</b>                           | If the source database contains object names with non-ASCII characters, the migration will fail.                                                                                                   |
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: The source database cannot contain object names with non-ASCII characters.<br>Handling suggestion: In the source database, change the object names containing non-ASCII characters. |

### 6.1.2.8 Checking Whether the TIME\_ZONE Values of the Source and Destination Databases Are the Same

#### MySQL

**Table 6-10** Checking whether the TIME\_ZONE values of the source and destination databases are the same

|                                              |                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the <b>TIME_ZONE</b> values of the source and destination databases are the same                                                                                                                                                                                                                                                                                       |
| <b>Description</b>                           | The migration fails because the <b>TIME_ZONE</b> values of the source and destination databases are different.                                                                                                                                                                                                                                                                 |
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: The <b>TIME_ZONE</b> or <b>SYSTEM_TIME_ZONE</b> values of the source and destination databases must be the same.<br>Handling suggestion: Change the <b>TIME_ZONE</b> value of the destination database to the same as that of the source database, or change the <b>TIME_ZONE</b> value of the source database to the same as that of the destination database. |

### 6.1.2.9 Checking Whether the COLLATION\_SERVER Values of the Source and Destination Databases Are the Same

#### MySQL

**Table 6-11** Checking whether the COLLATION\_SERVER values of the source and destination databases are the same

|                    |                                                                                                                       |
|--------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>  | Whether the <b>COLLATION_SERVER</b> values of the source and destination databases are the same                       |
| <b>Description</b> | The migration fails because the <b>COLLATION_SERVER</b> values of the source and destination databases are different. |

|                                              |                                                                                                                                                                                                                               |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: The <b>COLLATION_SERVER</b> values of the source and destination databases must be the same.<br>Handling suggestion: Change <b>COLLATION_SERVER</b> of the source and destination databases to the same value. |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 6.1.2.10 Checking Whether the **SERVER\_UUID** Values of the Source and Destination Databases Are the Same

#### MySQL Migration

**Table 6-12** Checking whether the **SERVER\_UUID** values of the source and destination databases are the same

|                                              |                                                                                                                                                                                                                  |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the <b>SERVER_UUID</b> values of the source and destination databases are the same                                                                                                                       |
| <b>Description</b>                           | If the <b>SERVER_UUID</b> values of the source and destination databases are the same, the migration fails.                                                                                                      |
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: The <b>SERVER_UUID</b> values of the source and destination databases must be different.<br>Handling suggestion: Check that the source and destination databases are not the same MySQL database. |

### 6.1.2.11 Checking Whether the **SERVER\_ID** Values of the Source and Destination Databases Are Different

#### MySQL

**Table 6-13** Checking whether the **SERVER\_ID** values of the source and destination databases are different

|                                              |                                                                                                                                                                                                                    |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the <b>SERVER_ID</b> values of the source and destination databases are different                                                                                                                          |
| <b>Description</b>                           | Check whether the <b>SERVER_ID</b> values of the source and destination databases are different. If they are the same, the migration fails.                                                                        |
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: The <b>SERVER_ID</b> values of the source and destination databases must be different.<br>Handling suggestion: Change <b>SERVER_ID</b> of the source and destination databases to different values. |

### 6.1.2.12 Checking Whether the Source Database Contains Invalid `sql_mode` Values

#### MySQL

**Table 6-14** Checking whether the source database contains invalid `sql_mode` values

|                                              |                                                                                                                                                                                                                      |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the source database contains invalid <code>sql_mode</code> values                                                                                                                                            |
| <b>Description</b>                           | If the source database contains invalid <code>sql_mode</code> values, the migration will fail.                                                                                                                       |
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: The <code>sql_mode</code> value of the source database cannot be <code>no_engine_substitution</code> .<br>Handling suggestion: Change <code>sql_mode</code> of the source database to a proper value. |

### 6.1.2.13 Checking Whether the `SQL_MODE` Values of the Source and Destination Databases Are the Same

#### MySQL

**Table 6-15** Checking whether the `SQL_MODE` values of the source and destination databases are the same

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the <code>SQL_MODE</code> values of the source and destination databases are the same                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>                           | Check whether the <code>SQL_MODE</code> values of source and destination databases are the same. If they are inconsistent, the migration may fail.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Failure Cause and Handling Suggestion</b> | <ul style="list-style-type: none"><li>If you are migrating data to the cloud, perform the following operations:<br/>Failure cause: The <code>SQL_MODE</code> values of the source and destination databases must be the same.</li><li>If you are migrating data out of the cloud, perform the following operations:<br/>Item to be confirmed: The <code>SQL_MODE</code> values of the source and destination databases must be the same.<br/>Handling suggestions: Change the <code>SQL_MODE</code> values of the destination database to the same as those of the source database. Ensure that both the source and destination databases do not have the forbidden <code>SQL_MODE</code> values.</li></ul> |

### 6.1.2.14 Checking Whether the `sql_mode` Value in the Destination Database Is Not `NO_ENGINE_SUBSTITUTION`

#### MySQL Migration and Synchronization

**Table 6-16** Checking whether the `sql_mode` value in the destination database is not `NO_ENGINE_SUBSTITUTION`

|                                              |                                                                                                                                                                  |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the <code>sql_mode</code> value in the destination database is not <code>NO_ENGINE_SUBSTITUTION</code>                                                   |
| <b>Description</b>                           | MyISAM tables are included in the migration objects. The <code>sql_mode</code> value in the destination database cannot be <code>NO_ENGINE_SUBSTITUTION</code> . |
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: The <b><code>sql_mode</code></b> value in the destination database is <b><code>NO_ENGINE_SUBSTITUTION</code></b> .                                |

### 6.1.2.15 Checking Whether the `innodb_strict_mode` Values of the Source and Destination Databases Are the Same

#### MySQL Migration

**Table 6-17** Checking whether the `innodb_strict_mode` values of the source and destination databases are the same

|                    |                                                                                                                                                                     |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>  | Whether the <b><code>innodb_strict_mode</code></b> values of the source and destination databases are the same                                                      |
| <b>Description</b> | Check whether the <b><code>innodb_strict_mode</code></b> values of source and destination databases are the same. If they are inconsistent, the migration may fail. |

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Failure Cause and Handling Suggestion</b> | <ul style="list-style-type: none"> <li>• If you are migrating data to the cloud, perform the following operations:<br/>Failure cause: The <b>innodb_strict_mode</b> values of the source and destination databases must be the same.</li> <li>• If you are migrating data out of the cloud, perform the following operations:<br/>Failure cause: The <b>innodb_strict_mode</b> values of the source and destination databases must be the same.<br/><br/>Handling suggestion: Change <b>innodb_strict_mode</b> of the destination database to the same value as that of the source database.</li> </ul> |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 6.1.2.16 Checking Whether the log\_slave\_updates Value of the Source Database Is Correctly Configured

#### MySQL Migration

**Table 6-18** Checking whether the log\_slave\_updates value of the source database is correctly configured

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                                   | Whether the <b>log_slave_updates</b> value of the source database is correctly configured                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>                                  | The migration will fail if the <b>log_slave_updates</b> parameter of the source database is disabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Failure Cause and Handling Suggestion</b>        | <p>Failure cause: The <b>slave_updates_check</b> parameter of the source database must be enabled.</p> <p>Handling suggestion: In the MySQL configuration file <b>my.cnf</b>, add the "log_slave_updates=1" line under [mysqld] and restart the database for the modification to take effect.</p> <p>Failure cause: The source database is a standby database and the <b>log_slave_updates</b> value is <b>OFF</b>.</p> <p>Handling suggestion: On the source database, set <b>log_slave_updates</b> to <b>ON</b>. Then, restart the database for the modification to take effect.</p> |
| <b>Item to Be Confirmed and Handling Suggestion</b> | <p>Item to be confirmed: The source database is a standby database and the <b>log_slave_updates</b> value is <b>OFF</b>.</p> <p>Handling suggestion: On the source database, set <b>log_slave_updates</b> to <b>ON</b>. Then, restart the database for the modification to take effect. If no switchover or failover will occur, no operation is required.</p>                                                                                                                                                                                                                         |

### 6.1.2.17 Checking Whether the binlog\_row\_image Value is FULL

#### MySQL

**Table 6-19** Checking whether the binlog\_row\_image value is FULL

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the <b>binlog_row_image</b> value is <b>FULL</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>                           | If the <b>binlog_row_image</b> value of the source database is not <b>FULL</b> , the migration will fail.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Failure Cause and Handling Suggestion</b> | <p>Failure cause: The <b>binlog_row_image</b> value of the source database is not <b>FULL</b>.</p> <p>Handling suggestion:</p> <ul style="list-style-type: none"><li>• If the source database is an RDS DB instance on the cloud, change <b>binlog_row_image</b> to <b>FULL</b> on the RDS console, and then restart the source database.</li><li>• If the source database is an on-premises database, perform the following steps:<ol style="list-style-type: none"><li>1. Log in to the server where the MySQL source database is located.</li><li>2. Manually change the value of <b>binlog_row_image</b> in the <b>my.cnf</b> configuration file to <b>FULL</b> and save the file.<pre>binlog_row_image=full</pre></li><li>3. To ensure a successful task, restart the source database during off-peak hours.</li></ol></li></ul> |

### 6.1.2.18 Checking Whether the Transaction Isolation Levels are Consistent

#### MySQL

**Table 6-20** Checking whether the transaction isolation levels are consistent

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the transaction isolation levels are consistent                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>                           | Check whether the transaction isolation levels of the source and destination databases are the same.                                                                                                                                                                                                                                                                                                 |
| <b>Failure Cause and Handling Suggestion</b> | <p>If you are migrating data to the cloud, perform the following operations:</p> <p><b>Failure cause:</b> The transaction isolation levels of the source and destination databases are different.</p> <p><b>Handling suggestion:</b> Change the isolation level (<b>tx_isolation</b> or <b>transaction_isolation</b>) of the destination database to be the same as that of the source database.</p> |

### 6.1.2.19 Checking Whether the Source Database Contains Trigger Names with Non-ASCII Characters

#### MySQL

**Table 6-21** Checking whether the source database contains trigger names with non-ASCII characters

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                                   | Whether the source database contains trigger names with non-ASCII characters                                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>                                  | If the source database contains non-ASCII characters, the migration will fail.                                                                                                                                                                                                                                                                                                                                                      |
| <b>Item to Be Confirmed and Handling Suggestion</b> | <p>Item to be confirmed: The source database cannot contain view names with non-ASCII characters.</p> <p>Handling suggestion: To solve this problem, perform the following steps:</p> <p>Method 1:</p> <p>Click <b>Previous</b> to return to the <b>Select Migration Type</b> page. Select a customized object and do not select the trigger name that contains non-ASCII characters.</p> <p>Method 2: Change the trigger name.</p> |

### 6.1.2.20 Checking Whether log\_bin\_trust\_function\_creators Is Set to On in Both the Source and Destination Databases

#### MySQL

**Table 6-22** Checking whether log\_bin\_trust\_function\_creators is set to on in both the source and destination databases

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>  | Whether log_bin_trust_function_creators is set to on in both the source and destination databases                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b> | During the out-of-cloud migration from MySQL to MySQL, the <b>log_bin_trust_function_creators</b> value of the source database must be the same as that of the destination database. If the source database supports user-defined functions (UDFs) but the destination database does not, change the <b>log_bin_trust_function_creators=off</b> parameter of the destination database to <b>log_bin_trust_function_creators=on</b> . If the parameters of the source and destination are different, the migration may fail. |



|                                                     |                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Item to Be Confirmed and Handling Suggestion</b> | <p>Item to be confirmed: The destination database does not support custom functions.</p> <p>Handling suggestions: In the <b>my.cnf</b> file of the destination database, check whether <b>log_bin_trust_function_creators=on</b> exists. If it does not exist, add <b>log_bin_trust_function_creators=on</b> and restart the database for the modification to take effect.</p> |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 6.1.2.21 Checking Whether log\_bin\_trust\_function\_creators Is Set to On in the Destination Database

#### MySQL

**Table 6-23** Checking whether log\_bin\_trust\_function\_creators is set to on in the destination database

|                                              |                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether <b>log_bin_trust_function_creators</b> is set to <b>on</b> in the destination database                                                                                                                                                                                                                                                                          |
| <b>Description</b>                           | During the migration from RDS for MySQL to MySQL out of the cloud, the destination database does not support custom functions.                                                                                                                                                                                                                                          |
| <b>Failure Cause and Handling Suggestion</b> | <p>Failure cause: The destination database does not support custom functions.</p> <p>Handling suggestions: In the <b>my.cnf</b> file of the destination database, check whether <b>log_bin_trust_function_creators=on</b> exists. If it does not exist, add <b>log_bin_trust_function_creators=on</b> and restart the database for the modification to take effect.</p> |

### 6.1.2.22 Checking Whether the max\_allowed\_packet Value of the Destination Database Is too Small

#### MySQL

**Table 6-24** Checking whether the max\_allowed\_packet value of the destination database is too small

|                   |                                                                               |
|-------------------|-------------------------------------------------------------------------------|
| <b>Check Item</b> | Whether the max_allowed_packet value of the destination database is too small |
|-------------------|-------------------------------------------------------------------------------|

|                                              |                                                                                                                                                                                                                                                              |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description</b>                           | A large amount of data cannot be written to the destination database during the migration because the <code>max_allowed_packet</code> value is smaller than 100 MB. As a result, the full migration failed.                                                  |
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: The <code>max_allowed_packet</code> value of the destination database is too small, which may cause data fails to be written during the migration.<br>Handling suggestions: Set the <code>max_allowed_packet</code> value greater than 100 MB |

### 6.1.2.23 Checking Whether the Databases and Tables Exist

#### All Scenarios

**Table 6-25** Checking whether the databases and tables exist

|                                              |                                                                                                                                                                           |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the databases and tables exist                                                                                                                                    |
| <b>Description</b>                           | There are databases and tables in the uploaded file that do not exist in the source database. The synchronization fails.                                                  |
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: Objects imported from files do not exist in the source database.<br>Handling suggestion: Remove these objects that do not exist and import the file again. |

### 6.1.2.24 Checking Whether the Values of `group_concat_max_len` Are Consistent

#### MySQL Migration, Synchronization, and Disaster Recovery

**Table 6-26** `group_concat_max_len` consistency check

|                    |                                                                                                                                                                                         |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>  | The <code>group_concat_max_len</code> value in the destination database is inconsistent with that in the source database.                                                               |
| <b>Description</b> | If the values of <code>group_concat_max_len</code> in the source and destination databases are different, the queried fields may be truncated. Change the parameter values to the same. |

|                                                     |                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Item to Be Confirmed and Handling Suggestion</b> | <p>Item to be confirmed: If the values of <code>group_concat_max_len</code> in the source and destination databases are different, the queried fields may be truncated. Change the parameter values to the same.</p> <p>Handling suggestion: Change the parameter values to the same.</p> |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 6.1.3 Destination DB Instance Statuses

### 6.1.3.1 Checking Whether the Destination Database Is Involved in Another Migration Task

#### MySQL

**Table 6-27** Checking whether the destination database is involved in another migration task

|                                              |                                                                                                                                                                                                                           |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the destination database is involved in another migration task                                                                                                                                                    |
| <b>Description</b>                           | Check whether the destination database is being used in another migration task. If more than one migration task uses the same destination database, the migration may fail.                                               |
| <b>Failure Cause and Handling Suggestion</b> | <p>Failure cause: The destination RDS DB instance is being used in another migration task.</p> <p>Handling suggestion: Wait for the migration task to complete. You can also stop or delete an unused migration task.</p> |

### 6.1.3.2 Checking Whether the Destination Database Has a Read Replica

#### MySQL

**Table 6-28** Checking whether the destination database has a read replica

|                   |                                                     |
|-------------------|-----------------------------------------------------|
| <b>Check Item</b> | Whether the destination database has a read replica |
|-------------------|-----------------------------------------------------|

|                                              |                                                                                                                                                                                                                                        |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description</b>                           | Check whether the destination database has read replicas. If the destination database has read replicas, the incremental migration may fail.                                                                                           |
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: In an incremental migration, the destination database cannot have read replicas.<br>Handling suggestion: Delete the read replicas from the destination database. After the migration is complete, create read replicas. |

### 6.1.3.3 Checking Whether the Destination DB Instance Is Available

**Table 6-29** Checking whether the destination DB instance is available

|                                              |                                                                                                                                                               |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the destination DB instance is available                                                                                                              |
| <b>Description</b>                           | Check whether the primary instance and read replicas are available in the destination database. If not, the migration fails.                                  |
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: The destination DB instance is not available.<br>Handling suggestion: Repair the destination DB instance.                                      |
|                                              | Failure cause: Read replicas in the destination database are abnormal.<br>Handling suggestion: Repair the abnormal read replicas in the destination database. |
|                                              | Failure cause: The RDS service is abnormal. Try again later.<br>Handling suggestion: Try again later.                                                         |

## 6.1.4 Database User Permissions

### 6.1.4.1 Checking Whether the Source Database User Has Sufficient Permissions

#### MySQL Migration

**Table 6-30** Checking whether the source database user has sufficient permissions

|                   |                                                             |
|-------------------|-------------------------------------------------------------|
| <b>Check Item</b> | Whether the source database user has sufficient permissions |
|-------------------|-------------------------------------------------------------|

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Description</b>                           | <p>The source database user must have the required permissions.</p> <ul style="list-style-type: none"> <li>• In a full migration, the source database user must have the SELECT, SHOW VIEW, and EVENT permissions.</li> <li>• In an incremental migration, the source database user must have the following permissions: SELECT, SHOW VIEW, EVENT, LOCK TABLES, REPLICATION SLAVE, and REPLICATION CLIENT.</li> </ul> <p>If the permissions are insufficient, the migration will fail.</p> |
| <b>Failure Cause and Handling Suggestion</b> | <p>Failure cause: In a full migration, the source database user must have the SELECT, SHOW VIEW, and EVENT permissions.</p> <p>Handling suggestions: Grant the source database user the corresponding permissions.</p>                                                                                                                                                                                                                                                                     |
|                                              | <p>Failure cause: In an incremental migration, the source database user must have the following permissions: SELECT, SHOW VIEW, EVENT, LOCK TABLES, REPLICATION SLAVE, REPLICATION CLIENT, In the DR scenario, the following permissions are required: CREATE, ALTER, DROP, DELETE, INSERT, UPDATE, and INDEX.</p> <p>Handling suggestions: Grant the source database user the corresponding permissions.</p>                                                                              |
|                                              | <p>Failure cause: Insufficient user permissions</p> <p>Handling suggestion: Check whether the database user permissions meet the migration requirements.</p> <p><b>NOTE</b></p>                                                                                                                                                                                                                                                                                                            |
|                                              | <p>Failure cause: An internal error occurs.</p> <p>Handling suggestion: Contact technical support.</p>                                                                                                                                                                                                                                                                                                                                                                                     |

### 6.1.4.2 Checking Whether the Destination Database User Has Sufficient Permissions

#### MySQL Migration

**Table 6-31** Checking whether the destination database user has sufficient permissions

|                    |                                                                                                                                                        |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>  | Whether the destination database user has sufficient permissions                                                                                       |
| <b>Description</b> | Check whether the destination database user permissions meet the migration requirements. If the permissions are insufficient, the migration will fail. |

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: The destination database user must have the following permissions: SELECT, CREATE, DROP, DELETE, INSERT, UPDATE, INDEX, EVENT, CREATE VIEW, CREATE ROUTINE, TRIGGER, and WITH GRANT OPTION. If the destination database version is in the range from 8.0.14 to 8.0.18, the SESSION_VARIABLES_ADMIN permission is required.<br>Handling suggestion: Check whether the destination database user permissions meet the migration requirements. |
|                                              | Failure cause: Insufficient user permissions<br>Handling suggestion: Check whether the database user permissions meet the migration requirements.                                                                                                                                                                                                                                                                                                          |
|                                              | Failure cause: An internal error occurs.<br>Handling suggestion: Contact technical support.                                                                                                                                                                                                                                                                                                                                                                |

## 6.1.5 Database Versions

### 6.1.5.1 Checking Whether the Source Database Version Is Supported

#### MySQL Migration

**Table 6-32** Checking whether the source database version is supported

|                                              |                                                                                                                                                                       |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the source database version is supported                                                                                                                      |
| <b>Description</b>                           | Check whether the source database version is MySQL 5.5.x, MySQL 5.6.x, and MySQL 5.7.x.                                                                               |
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: The source database version is not supported.                                                                                                          |
|                                              | Failure cause: Insufficient user permissions<br>Handling suggestion: Check whether the database user permissions meet the migration requirements.                     |
|                                              | Failure cause: An internal error occurs.<br>Handling suggestion: Contact technical support.                                                                           |
|                                              | Failure cause: This item cannot be checked because the source database fails to be connected.<br>Handling suggestion: Check whether the source database is connected. |

## 6.1.5.2 Checking Whether the Destination Database Version Is Supported

### MySQL Migration

**Table 6-33** Checking whether the destination database version is supported

|                                              |                                                                                                                                                                                 |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the destination database version is supported                                                                                                                           |
| <b>Description</b>                           | Check whether the destination database version is MySQL 5.6.x, or MySQL 5.7.x.                                                                                                  |
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: The destination database version is not supported.                                                                                                               |
|                                              | Failure cause: Insufficient user permissions<br>Handling suggestion: Check whether the database user permissions meet the migration requirements.                               |
|                                              | Failure cause: An internal error occurs.<br>Handling suggestion: Contact technical support.                                                                                     |
|                                              | Failure cause: This item cannot be checked because the destination database fails to be connected.<br>Handling suggestion: Check whether the destination database is connected. |

## 6.1.5.3 Checking Whether the Migration Is from an Earlier Database Version to the Same or a Later Version

### MySQL Migration

**Table 6-34** Checking whether the migration is from an earlier database version to the same or a later version

|                                              |                                                                                                                                                                                 |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the migration is from an earlier database version to the same or a later version                                                                                        |
| <b>Description</b>                           | Check whether the source database version is earlier than or the same as the destination database version.                                                                      |
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: This item cannot be checked because the source database fails to be connected.<br>Handling suggestion: Check whether the source database is connected.           |
|                                              | Failure cause: This item cannot be checked because the destination database fails to be connected.<br>Handling suggestion: Check whether the destination database is connected. |

|  |                                                                                                                                                                                                                                                    |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>Failure cause: The source database version is not supported.<br/>Handling suggestion: Check whether the source database version is supported. Currently, only MySQL 5.5.x, MySQL 5.6.x, and MySQL 5.7.x are supported.</p>                      |
|  | <p>Failure cause: The destination database version is not supported.<br/>Handling suggestion: Check whether the destination database version is supported. Currently, only MySQL 5.6.x, and MySQL 5.7.x are supported.</p>                         |
|  | <p>Failure cause: An internal error occurs.<br/>Handling suggestion: Contact technical support.</p>                                                                                                                                                |
|  | <p>Failure cause: Insufficient user permissions<br/>Handling suggestion: Check whether the database user permissions meet the migration requirements.</p>                                                                                          |
|  | <p>Failure cause: The destination database version must be the same as or later than the source database version.<br/>Handling suggestion: Ensure the source database version is earlier than or the same as the destination database version.</p> |

## 6.1.6 Networks

### 6.1.6.1 Checking Whether the Source Database Is Connected

#### MySQL Migration

**Table 6-35** Checking whether the source database is connected

|                                              |                                                                                                                                                                                                                                                                                              |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the source database is connected                                                                                                                                                                                                                                                     |
| <b>Description</b>                           | Check the connectivity and accuracy of the IP address, port number, username, and password of the source database.                                                                                                                                                                           |
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: The connection fails.                                                                                                                                                                                                                                                         |
|                                              | <p>Failure cause: Incorrect username or password<br/>Handling suggestion: Check whether the input username and password for the connection test are correct.</p>                                                                                                                             |
|                                              | <p>Failure cause: The database account does not allow remote connections.<br/>Handling suggestion:<br/>Run the following command to create a user that allows remote connections. After the migration, delete this user.<br/><b>CREATE USER 'Account' @ '%' IDENTIFIED BY 'Password'</b></p> |



|  |                                                                                                                   |
|--|-------------------------------------------------------------------------------------------------------------------|
|  | Failure cause: The SSL CA root certificate is invalid.<br>Handling suggestion: Upload a valid SSL CA certificate. |
|  | Failure cause: No SSL CA root certificate exists.<br>Handling suggestion: Contact technical support.              |
|  | Failure cause: The database is unavailable.<br>Handling suggestion: Contact technical support.                    |

## 6.1.6.2 Checking Whether the Destination Database Is Connected

### MySQL Migration

**Table 6-36** Checking whether the destination database is connected

|                                              |                                                                                                                                                                                                                                                                                    |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the destination database is connected                                                                                                                                                                                                                                      |
| <b>Description</b>                           | Check the connectivity and accuracy of the IP address, port number, username, and password of the destination database.                                                                                                                                                            |
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: The connection fails.                                                                                                                                                                                                                                               |
|                                              | Failure cause: Incorrect username or password<br>Handling suggestion: Check whether the input username and password for the connection test are correct.                                                                                                                           |
|                                              | Failure cause: The database account does not allow remote connections.<br>Handling suggestion:<br>Run the following command to create a user that allows remote connections. After the migration, delete this user.<br><b>CREATE USER 'Account' @ '%' IDENTIFIED BY 'Password'</b> |
|                                              | Failure cause: The database is unavailable.<br>Handling suggestion: Contact technical support.                                                                                                                                                                                     |

### 6.1.6.3 Checking Whether the Destination Database Can Connect to the Source Database

#### MySQL Migration and Synchronization

**Table 6-37** Checking whether the destination database can connect to the source database

|                                              |                                                                                  |
|----------------------------------------------|----------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the destination database can connect to the source database              |
| <b>Description</b>                           | Check whether the destination database can connect to the source database.       |
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: The destination database fails to connect to the source database. |

### 6.1.7 Database Objects

#### 6.1.7.1 Checking Whether the Source Database Contains a MyISAM Table

##### MySQL

**Table 6-38** Checking whether the source database contains a MyISAM table

|                                                     |                                                                                                                                                                                                                                                               |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                                   | Whether the source database contains a MyISAM table                                                                                                                                                                                                           |
| <b>Description</b>                                  | If the source database contains a MyISAM table, the migration will fail.                                                                                                                                                                                      |
| <b>Item to Be Confirmed and Handling Suggestion</b> | Item to be confirmed: The source database contains MyISAM tables that are not supported by the destination database, which may cause the migration to fail.<br>Handling suggestion: Convert the tables in the source database to InnoDB tables and try again. |

### 6.1.7.2 Checking Whether the Source Database Contains the Functions or Stored Procedures that the Source Database User Is Not Authorized to Migrate

#### MySQL

**Table 6-39** Checking whether the source database contains the functions or stored procedures that the source database user is not authorized to migrate

|                                              |                                                                                                                                                                                                            |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the source database contains the functions or stored procedures that the source database user is not authorized to migrate.                                                                        |
| <b>Description</b>                           | The source database contains the functions or stored procedures that the source database user is not authorized to migrate.                                                                                |
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: The source database user does not have the permission to migrate functions and stored procedures.<br>Handling suggestion: Ensure that the source database user has the highest-level right. |

### 6.1.7.3 Checking Whether the Source Database Tables Use Storage Engines Not Supported by the Destination Database

#### MySQL Migration

**Table 6-40** Checking whether the source database tables use storage engines not supported by the destination database

|                                                     |                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                                   | Whether the source database tables use storage engines not supported by the destination database                                                                                                                                                                           |
| <b>Description</b>                                  | Check whether the source database tables use storage engines not supported by the destination database. If yes, the migration fails.                                                                                                                                       |
| <b>Item to Be Confirmed and Handling Suggestion</b> | Failure cause: The source database tables use the storage engines that are not supported by the destination database.<br>Handling suggestion: Go back to the previous page and deselect the tables that use the storage engines not supported by the destination database. |

## 6.1.7.4 Checking Whether the Source Database Tables Contain Primary Keys

### MySQL Migration

**Table 6-41** Checking whether the source database tables contain primary keys

|                                                     |                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                                   | Whether the source database tables contain primary keys                                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>                                  | If tables to be migrated in the source database do not contain primary keys, the migration may fail.                                                                                                                                                                                                                                                                       |
| <b>Item to Be Confirmed and Handling Suggestion</b> | Item to be confirmed: The tables to be migrated in the source database do not contain primary keys.<br>Handling suggestion: Create a primary key for the table. If the table does not have a primary key to uniquely identify every row and the network connection is unstable, the data in the destination database may be inconsistent with that in the source database. |

## 6.1.7.5 Checking Whether the Source Database Contains Triggers or Events

### MySQL Migration

**Table 6-42** Checking whether the source database contains triggers or events

|                                                     |                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                                   | Whether the source database contains triggers or events                                                                                                                                                                                                                                                           |
| <b>Description</b>                                  | To prevent unexpected operations on the destination database automatically triggered by triggers or events, this task starts the trigger or event migration only after you stop the task. If you close or disconnect the source database connection during the task running, triggers or events are not migrated. |
| <b>Item to Be Confirmed and Handling Suggestion</b> | Item to be confirmed: The source database contains triggers or events.<br>Handling suggestion: Stop the task first and then disconnect the network to ensure the completeness of the migration.                                                                                                                   |

## 6.1.8 Database Configuration Items

### 6.1.8.1 Checking Whether the Source Database Name Is Valid

#### MySQL Migration

**Table 6-43** Checking whether the source database name is valid

|                                              |                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the source database name is valid                                                                                                                                                                                                                                                                                                                                                    |
| <b>Description</b>                           | The source database name cannot contain invalid characters. It must contain 1 to 64 characters, including only lowercase letters, digits, hyphens (-), and underscores (_).<br>If the source database name contains any invalid character, the migration fails.                                                                                                                              |
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: This item cannot be checked because the source database fails to be connected.<br>Handling suggestion: Check whether the source database is connected.                                                                                                                                                                                                                        |
|                                              | Failure cause: The source database name cannot contain invalid characters. It must contain 1 to 64 characters, including only lowercase letters, digits, hyphens (-), and underscores (_).<br>Handling suggestion: Change the source database names that contain unsupported characters or go back to the previous page and select the databases that do not contain unsupported characters. |

### 6.1.8.2 Checking Whether the Source Database Table Name Is Valid

#### MySQL Migration

**Table 6-44** Checking whether the source database table name is valid

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the source database table name is valid                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>                           | If the source database table name contains invalid character, the synchronization task fails.                                                                                                                                                                                                                                                                                                                                    |
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: The source database table names contain unsupported characters, non-ASCII characters, or the following characters: ></\<br>Handling suggestion: To solve this problem, perform the following steps:<br>Click <b>Previous</b> to return to the <b>Select Migration Type</b> page. Select a customized object and do not select the table that contains unsupported characters.<br>Method 2: Change the table name. |

### 6.1.8.3 Checking Whether the Source Database View Name Is Valid

#### MySQL

**Table 6-45** Checking whether the source database contains view names with non-ASCII characters

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                                   | Whether the source database contains view names with non-ASCII characters                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Description</b>                                  | If the source database contains non-ASCII characters, the migration will fail.                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Item to Be Confirmed and Handling Suggestion</b> | Failure cause: The source database view names contain unsupported characters, non-ASCII characters, or the following characters: ></\<br>Handling suggestion: To solve this problem, perform the following steps:<br>Method 1:<br>Click <b>Previous</b> to return to the <b>Select Migration Type</b> page. Select a customized object and do not select the view name that contains unsupported characters.<br>Method 2: Change the view name. |

## 6.1.9 Conflicts

### 6.1.9.1 Checking Whether the Names of the Source and Destination Databases Are the Same

#### MySQL Migration

**Table 6-46** Checking whether the names of the source and destination databases are the same

|                                   |                                                                                                                                                                       |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                 | Whether the names of the source and destination databases are the same                                                                                                |
| <b>Description</b>                | Check whether the names of the source and destination databases are the same.                                                                                         |
| <b>Failure Cause and Handling</b> | Failure cause: This item cannot be checked because the source database fails to be connected.<br>Handling suggestion: Check whether the source database is connected. |

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Suggestion</b> | <p>Failure cause: This item cannot be checked because the destination database fails to be connected.</p> <p>Handling suggestion: Check whether the destination database is connected.</p>                                                                                                                                                                                                                                                                                |
|                   | <p>Failure cause: Insufficient user permissions</p> <p>Handling suggestion: Check whether the database user permissions meet the migration requirements.</p>                                                                                                                                                                                                                                                                                                              |
|                   | <p>Handling suggestion:</p> <ul style="list-style-type: none"> <li>• If you are migrating data to the cloud, determine whether to delete the databases with the same names as the source databases or specify a new destination DB instance based on site requirements.</li> <li>• If you are migrating data out of the cloud, determine whether to use the original destination database or specify a new destination DB instance based on site requirements.</li> </ul> |
|                   | <p>Failure cause: During an incremental migration, the source and destination databases cannot have the same names.</p> <p>Handling suggestion: Determine whether to retain these databases in the destination RDS DB instance or specify another destination RDS DB instance.</p>                                                                                                                                                                                        |
|                   | <p>Failure cause: An internal error occurs.</p> <p>Handling suggestion: Contact technical support.</p>                                                                                                                                                                                                                                                                                                                                                                    |

## 6.1.10 SSL Connections

### 6.1.10.1 Checking Whether the SSL Connection Is Correctly Configured

#### MySQL

**Table 6-47** Checking whether the SSL connection is correctly configured

|                                              |                                                                                                                                                                                  |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the SSL connection is correctly configured                                                                                                                               |
| <b>Description</b>                           | Check whether the SSL connection is correctly configured for the source database.                                                                                                |
| <b>Failure Cause and Handling Suggestion</b> | <p>Failure cause: This item cannot be checked because the source database fails to be connected.</p> <p>Handling suggestion: Check whether the source database is connected.</p> |
|                                              | <p>Failure cause: Insufficient user permissions</p> <p>Handling suggestion: Check whether the database user permissions meet the migration requirements.</p>                     |

|  |                                                                                                                                                                                                                                                                                                                                                                                             |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>Failure cause: The database is unavailable.<br/>Handling suggestion: Contact technical support.</p>                                                                                                                                                                                                                                                                                      |
|  | <p>Item to be confirmed: The source database user must have the REQUIRE SSL permission when using the SSL connection.<br/>Handling suggestion: This alarm does not affect the migration process. If you require the SSL connection, you are advised to grant the REQUIRE SSL permission to the source database user.</p>                                                                    |
|  | <p>Item to be confirmed: The destination database user must have the REQUIRE SSL permission when using the SSL connection.<br/>Handling suggestion: This alarm does not affect the migration process. If you require the SSL connection, you are advised to grant the REQUIRE SSL permission to the destination database user.</p>                                                          |
|  | <p>Failure cause: The source database user has the REQUIRE SSL permission but did not upload the encryption certificate. The SSL connection cannot be used.<br/>Handling suggestion: On the <b>Configure Source and Destination Databases</b> page, enable the SSL connection and upload the certificate, or change the source database user.</p>                                           |
|  | <p>Failure cause: The destination database user has the REQUIRE SSL permission but did not upload the encryption certificate. The SSL connection cannot be used.<br/>Handling suggestion: On the <b>Configure Source and Destination Databases</b> page, enable the SSL connection and upload the certificate, or change the destination database user.</p>                                 |
|  | <p>Item to be confirmed: Currently, the SSL connection is not enabled. DRS must ensure that the source database account allows non-SSL connections to the source database.<br/>Handling suggestion: Manually check whether the source database account allows non-SSL connections, or try to perform a migration. (By default, the source database account allows non-SSL connections.)</p> |
|  | <p>Failure cause: An internal error occurs.<br/>Handling suggestion: Contact technical support.</p>                                                                                                                                                                                                                                                                                         |
|  | <p>Failure cause: The SSL connection is enabled for the source database but no certificate has been uploaded.<br/>Handling suggestion: On the <b>Configure Source and Destination Databases</b> page, upload a certificate or disable the SSL connection for the source database.</p>                                                                                                       |



## 6.1.10.2 Checking Whether the SSL Certificate of the Destination Database Exists

### MySQL

**Table 6-48** Checking whether the SSL certificate of the destination database exists

|                                              |                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>                            | Whether the SSL certificate of the destination database exists                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>                           | Check whether the SSL certificate type of the destination database is correct during migration. Otherwise, the migration fails.                                                                                                                                                                                                                                             |
| <b>Failure Cause and Handling Suggestion</b> | Failure cause: The SSL certificate of the destination database does not exist.<br>Handling suggestion: On the <b>Configure Source and Destination Databases</b> page, enable SSL connection for the destination database and upload an encryption certificate that contains only one beginning tag <b>BEGIN CERTIFICATE</b> and one end tag <b>END CERTIFICATE</b> .        |
|                                              | Failure cause: The SSL certificate type of the destination database is not supported.<br>Handling suggestion: On the <b>Configure Source and Destination Databases</b> page, enable SSL connection for the destination database and upload an encryption certificate that contains only one beginning tag <b>BEGIN CERTIFICATE</b> and one end tag <b>END CERTIFICATE</b> . |

## 6.1.11 Object Dependencies

### 6.1.11.1 Checking Whether Referenced Tables Are Selected for Migration

#### MySQL Migration

**Table 6-49** Checking whether the tables referenced by the foreign key in the table to be migrated are selected for migration.

|                    |                                                                                                          |
|--------------------|----------------------------------------------------------------------------------------------------------|
| <b>Check Item</b>  | Whether the tables referenced by the foreign key in the table to be migrated are selected for migration. |
| <b>Description</b> | The tables referenced by the foreign key in the table to be migrated are not selected for migration.     |

|                                                     |                                                                                                                                                                       |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Item to Be Confirmed and Handling Suggestion</b> | Failure cause: Tables referenced by the foreign key in the table to be migrated are not selected for migration.<br>Handling suggestion: Select the referenced tables. |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 6.2 Failure Cases

### 6.2.1 Backup Migration Failed Because Backup Files Cannot Be Found

#### Scenarios

When you migrate full backups from self-built OBS buckets to clouds, the following error message is displayed: restore:null.

#### Possible Causes

The possible causes are as follows:

- Backup files are deleted after you submit a backup migration task.
- When you upload backup files to a self-built OBS bucket, you select **Archive** for **Storage Class**. OBS archive storage offers cloud storage for rarely accessed data. An archive file uploaded for the first time is in the **Not restored** status. As a result, a Microsoft SQL Server DB instance cannot download the file.

#### Solutions

Based on the previous analysis, solutions are provided as follows:

##### Solution 1

If the migration fails because you delete the backup files, you can upload the deleted backup files again to a self-built OBS bucket and select **Standard** for **Storage Class**. For details, see **Uploading a File** in *Object Storage Service Console Operation Guide*.

##### Solution 2

- If the migration failed because the storage class of your backup files is **Archive**, perform the following steps. If the size of backup files is small, upload the backup files again to an OBS bucket and select **Standard** for **Storage Class**.
- If the backup files are large in size, log in to the OBS console and click the bucket to which the backup files are uploaded. On the displayed page, choose **Objects** in the navigation pane on the left. On the **Objects** page, select the object to be restored and click **Restore** above the file list. After the status of the backup files becomes **Restored**, submit an offline migration task again.

## 6.2.2 Backup Migration Failed Because a Backup Database Cannot Be Found in the Backup Files

### Scenarios

When you migrate full backups from self-built OBS buckets to clouds, the system displays an error message indicating that the migration failed because the source database cannot be found in the backup files.

### Possible Cause

The name of a .bak backup file uploaded to a self-built OBS bucket is too long.

### Solution

Based on the previous analysis, a solution is provided as follows:

- Step 1** Change the name of the backup file in the local database and upload the file to a self-built OBS bucket again.

----End

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# A Change History

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| Released On | Description                                                                                                                                |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| 2022-12-30  | This issue is the third official release, which incorporates the following changes:<br>Changed the sequence of sections.                   |
| 2021-07-14  | This issue is the second official release, which incorporates the following change:<br>Supported backup migration of Microsoft SQL Server. |
| 2020-08-10  | This issue is the first official release.                                                                                                  |