**Data Replication Service** 

# **Best Practices**

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# **Contents**

1 Best Practices Summary	1
2 Real-Time Migration	3
2.1 From Other Cloud MySQL to GaussDB(for MySQL)	3
2.1.1 Overview	3
2.1.2 Resource Planning	4
2.1.3 Operation Process	6
2.1.4 Creating a VPC and Security Group	6
2.1.5 Creating a GaussDB(for MySQL) Instance	9
2.1.6 Configuring a MySQL Instance on Other Clouds	10
2.1.7 Creating a DRS Migration Task	11
2.1.8 Checking Migration Results	13
2.2 From Other Cloud MongoDB to DDS	14
2.3 From MongoDB on ECS to DDS	28
2.4 From On-Premises MySQL to RDS MySQL	
2.5 From On-Premises MongoDB to DDS	57
3 Backup Migration	72
3.1 Migrating Microsoft SQL Server Backup Data to RDS SQL Server DB Instance	72
3.1.1 Overview	72
3.1.2 Migration Preparations	73
3.1.3 Exporting Backup Files	75
3.1.4 Uploading Backup Files	
3.1.5 Scenario 1: Full Backup Migration	82
3.1.6 Scenario 2: Full+Incremental Backup Migration	86
3.1.7 Manual Configuration	99
4 Real-Time Synchronization	107
4.1 From Other Cloud PostgreSQL to RDS PostgreSQL	107
4.2 From PostgreSQL on ECS to RDS PostgreSQL	117
4.3 From On-Premises PostgreSQL to RDS PostgreSQL	
4.4 From RDS MySQL to Kafka	138
4.4.1 Overview	138
4.4.2 Resource and Cost Planning	139
4.4.3 Operation Process	141

4.4.4 Creating a VPC and Security Group	141
4.4.5 Preparing for Source RDS MySQL	144
4.4.5.1 Creating an RDS MySQL Instance	144
4.4.5.2 Generating Test Data	145
4.4.6 Preparing for Destination Kafka	146
4.4.6.1 Creating a Kafka Instance	146
4.4.6.2 Creating a Topic	148
4.4.7 Creating a DRS Synchronization Task	148
4.4.8 Confirming the Results	152
A Change History	155



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

Function	Source DB Type	Destination DB	Cases	
Real- Time Migratio	MySQL databases on other clouds	Huawei Cloud GaussDB(for MySQL) instances	From Other Cloud MySQL to GaussDB(for MySQL)	
n	MongoDB databases on other clouds	Huawei Cloud DDS	From Other Cloud MongoDB to DDS	
	MongoDB databases on ECSs	Huawei Cloud DDS	From MongoDB on ECS to DDS	
	On-premises MySQL databases	Huawei Cloud RDS MySQL instances	From On-Premises MySQL to RDS MySQL	
	On-premises MongoDB databases	Huawei Cloud DDS	From On-Premises MongoDB to DDS	
Backup Migratio n	On-premises Microsoft SQL Server databases	Huawei Cloud RDS SQL Server instances	Migrating Microsoft SQL Server Backup Data to RDS SQL Server DB Instance	
Real- Time Synchron ization	PostgreSQL databases on other clouds	Huawei Cloud RDS PostgreSQL instances	From Other Cloud PostgreSQL to RDS PostgreSQL	

Table 1-1 DRS best practices

Function	Source DB Type	Destination DB	Cases
PostgreSQL databases or ECSs			From PostgreSQL on ECS to RDS PostgreSQL
	On-premises PostgreSQL databases		From On-Premises PostgreSQL to RDS PostgreSQL
	RDS for MySQL instances	DMS for Kafka	From RDS MySQL to Kafka

# **2** Real-Time Migration

## 2.1 From Other Cloud MySQL to GaussDB(for MySQL)

## 2.1.1 Overview

#### Description

This section includes the following content:

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

#### Prerequisites

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

#### **Deployment Architecture**

In this example, the source is a MySQL database on other cloud platforms and the destination is a Huawei Cloud GaussDB(for MySQL) instance. Data is migrated from the source to the destination over a public network. For details about the deployment architecture, see Figure 2-1.

Figure 2-1 Deployment architecture



#### Service List

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

#### **Before You Start**

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

## 2.1.2 Resource Planning

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

Categor y	Subcatego ry	Plan	Description
VPC	VPC name	vpc-DRStest	Specify a name that is easy to identify.
	Region	EU-Dublin	To achieve lower network latency, select the region nearest to you.
	AZ	AZ 1	-
	Subnet	10.0.0/24	Select a subnet with sufficient network resources.
	Subnet name	subnet-drs01	Specify a name that is easy to identify.

Categor y	Subcatego ry	Plan	Description
Other cloud	DB engine version	MySQL 5.7	-
MySQL	IP address	10.154.217.42	Enter an IP address.
	Port	3306	-
GaussD B(for	Instance name	gauss-drstar	Specify a name that is easy to identify.
MySQL) instance	DB engine version	MySQL 8.0	-
	AZ type	Single AZ	In this example, a single AZ is used.
			To improve service reliability, select multiple AZs.
	AZ	AZ1	AZ1 is selected in this example.
			To improve service reliability, deploy the instance across multiple AZs.
	Instance class	Dedicated 4 vCPUs   16 GB	-
DRS migratio	Task name	DRS-test-migrate	Specify a name that is easy to identify.
n task	Source DB engine	MySQL	-
	Destinatio n DB engine	GaussDB(for MySQL) primary/ standby instance	-
	Network type	Public network	Public network is used in this example.

## 2.1.3 Operation Process

#### Figure 2-2 Flowchart



## 2.1.4 Creating a VPC and Security Group

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

#### **Creating a VPC**

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



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

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

----End

#### **Creating a Security Group**

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

NAND	HUAWEI CLOUD Console	e v				Search	Q	More <sup>e</sup> English
Ξ	Service List	Enter a service or function name.				Q		
۵	Elastic Cloud Server	No Recently Visited Services						
ക	Relational Database Service	Compute		Storage		Networking		Databases
<i>///</i>	Auto Scaling	Elastic Cloud Server	Ŧ.	Elastic Volume Service	Ŧ.	Virtual Private Cloud	ŧ.	GaussDB
MA	Auto Scalling	Bare Metal Server	+	Dedicated Distributed Storage Service		Elastic Load Balance	ŧ.	Relational Database Servic
	Bare Metal Server	Cloud Phone		Storage Disaster Recovery Service		Direct Connect		Document Database Servi
0	Elastic Volume Service	Image Management Service		Cloud Server Backup Service		Virtual Private Network		GaussDB(for Cassandra)
5	Volume Paskup Convice	FunctionGraph		Cloud Backup and Recovery		Domain Name Service		GaussDB(for Mongo)
2	Volume backup Service	Auto Scaling	÷.	Volume Backup Service	Ŧ.	NAT Gateway		GaussDB(for Influx)
$\bigcirc$	Virtual Private Cloud	Dedicated Cloud		Object Storage Service		Elastic IP	ŧ.	GaussDB(for Redis)
Φ	Elastic Load Balance	Dedicated Host		Data Express Service		Cloud Connect		Distributed Database Midd
0	Domain Registration			Scalable File Service		VPC Endpoint		Data Replication Service

**Step 4** In the navigation pane, choose **Access Control** > **Security Groups**.

 $\times$ 

- Step 5 Click Create Security Group.
- **Step 6** Configure parameters as needed.

Create Security	Group				
* Name	sg-DR501				
* Enterprise Project	default   C Create Enterprise Project  (?)				
* Template	General-purpose web server 💌				
Description	The security group is for general-purpose web servers and includes default rules that allow all inbound ICMP traffic and inbound traffic on ports 22, 80, 443, and 3389. The security group is used for remote login, ping, and hosting a website on ECSs.				
Show Default Rule	0/255				
Show Selaut Rule	OK Cancel				

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

Summary	Inbound Rules	Outbound R	ules Associated Instances
Add Rule	Fast-Add Rule	Delete	Allow Common Ports

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

Add Inbound Rule Learn more about security group configuration.							
<ul> <li>Inbound ru</li> </ul>	iles allow incoming	traffic to instances associated v	with the security gro	oup.			
Security Group s	g-DRS01						
You can import m	ultiple rules in a ba	rotocol & Port ⑦	Туре	Source ⑦	Description	Operation	
1-100	Allow 🔻	TCP -	IPv4 v	IP address		Operation -	
			Add Rule				
			ОК	Cancel			

----End

## 2.1.5 Creating a GaussDB(for MySQL) Instance

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

- **Step 1** Log in to the management console.
- **Step 2** Click <sup>(Q)</sup> in the upper left corner of the management console and select region EU-Dublin.
- Step 3 Under the service list, choose Databases > GaussDB.
- Step 4 Choose GaussDB(for MySQL) and click Buy DB Instance.
- **Step 5** Configure the instance name and basic information.



**Step 6** Configure instance specifications.

Instance Specifications	Dedicated Edition	
CPU Architecture	x86 ⑦	
	vCPU   Memory	Maximum Connections
	4 vCPUs   16 GB	5,000
	O 4 vCPUs   32 GB	10,000
	O 8 vCPUs   32 GB	10,000
	O 16 vCPUs   64 GB	18,000
	O 16 vCPUs   128 GB	18,000
	O 32 vCPUs   128 GB	30,000
	DB Instance Specifications Dedicated Edition   x86   4 vCPUs   16 GB	
Read Replicas		
Storage	You pay only for the storage resources that you use, and they are billed by the	hour.

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

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

	Relationship among VPCs, subnets, security group	s, and D	8 instances
VPC ③	vpc-DRStest	C	subnet-drs01(10.0.0.0/24)    C Automatically-assigned IP address View In-use IP Address
	After the DB instance is created, the VPC cannot automatically assigned. Available IP addresses: 20	e chang 1.	ed. If you want to create a VPC, go to the VPC console. If you want to create DB instances in batches, the IP addresses are
	Make sure that there are sufficient subnets and II	address	ses.
Security Group 🕜	sg-DRS01	- c	View Security Group
	Inbound: TCP/, 443, 3389, 22, 80; ICMP/   Out	ound:	
	In a security group, rules that authorize connection	ns to DE	3 instances apply to all DB instances associated with the security group.
	A The security group rule must allow access from the security group r	the 10	0.125.0.0/16 CIDR block.

#### **Step 8** Configure the instance password.

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

- Step 9 Click Next. If you do not need to modify your settings, click Submit.
- **Step 10** Return to the instance list. If the instance becomes **Available**, the instance has been created.

----End

## 2.1.6 Configuring a MySQL Instance on Other Clouds

#### **Prerequisites**

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

#### **Permission Requirements**

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

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

Table 2-2 Required permissions

For details about MySQL authorization operations, see **operation guide**.

#### **Network Configuration**

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

Take ApsaraDB RDS for MySQL as an example. You need to apply for an external IP address to allow interconnection with external applications. For details about the operations and precautions, see the official documents.

## 2.1.7 Creating a DRS Migration Task

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

#### **Pre-migration Check**

Before creating a migration task, check the migration conditions.

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

#### Creating a Migration Task

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

	Region	Q (	
		Regions are geographic areas isolated from each other. I latency and quick resource access, select the nearest re	Resources are region-specific and cannot be used across regions through internal network connections. For low network gion.
;	r Task Name	DRS-test-migrate	0
	Description		0
		0/256	

2. Configure replication instance details as needed.

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

Replication Instance D	etails (0)
The following information cannot be mod	dified after you go to the next page.
* Data Flow	To the cloud Out of the cloud
	The destination database must be a database in the current cloud. If you want to migrate data between databases, select To the cloud.
* Source DB Engine	MySQL MySQL schema and logic table MongoDB
* Destination DB Engine	MySQL DDM GaussDB(for MySQL) Primary/Standby Ed
* Network Type	Public network v ()
	I understand that an EIP will be automatically bound to the replication instance and released after the replication task is complete.
* Destination DB Instance	gauss-distar ( )   C View DB Instance View Unselectable DB Instance
* Replication Instance Subnet	subnet-drsö1( )
* Migration Type	Full+Incremental Full
	This migration type is suitable for scenarios where services can be interrupted. It migrates all database objects and data, in a non-system database, to a destination database a time.
* Destination DB Instance Access	Read-only Read/Wite
	Configuring the destination DB instance as read-only helps ensure the migration is successful. Once the migration is complete, the DB instance automatically changes to Read Write.
* Enterprise Project	-Solect- C View Project Management (2)
7	It is recommended that you use TMS's predefined tag function to add the same tag to different cloud resources. Wew predefined tags
1030	Tan key Tan value

#### Step 6 Click Next.

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

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

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

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

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

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

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

#### **Destination Database**

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

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

#### Step 12 Click Submit.

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

It takes several minutes to complete.

All projects	* AII	DB engines	* Al	network types	•	All statuses	• Enter	a task name o	ar ID Q
Search by Tag	* C @ C								
	Task Name/ID ↓Ξ	Status	Delay 🕐	Charging	Data Flow	DB Engine ↓Ξ	Migration Type	Netwo	Operation
	DRS-test-migrate 3634e419-9faf	O Star	-	(i) No	To the cloud	MySQL-GaussDB(	Full	Public	Stop

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

#### **NOTE**

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

----End

## 2.1.8 Checking Migration Results

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

1. DRS compares migration objects, users, and data and provide comparison results. For details, see **Checking the Migration Results on the DRS Console**.

2. Log in to the destination side to check whether the databases, tables, and data are migrated. Confirm the data migration status. For details, see **Checking the Migration Results on the GaussDB Console**.

#### Checking the Migration Results on the DRS Console

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

----End

#### Checking the Migration Results on the GaussDB Console

- **Step 1** Log in to the management console.
- **Step 2** Click Sin the upper left corner of the management console and select region EU-Dublin.
- **Step 3** Under the service list, choose **Databases** > **GaussDB**.
- **Step 4** Select **GaussDB(for MySQL)**, locate the destination instance, and click **Log In** in the **Operation** column.



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

----End

## 2.2 From Other Cloud MongoDB to DDS

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

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

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

#### Diagram



#### Figure 2-3 Migrating MongoDB databases from other clouds

#### Figure 2-4 Migrating MongoDB databases from other cloud servers



#### **Migration Process**





#### **Migration Suggestions (Important)**

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

#### Notes on Migration (Important)

#### NOTICE

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

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

#### Preparations

1. Permissions

**Table 2-3** lists the permissions required for the source and destination databases when migrating a MongoDB database from another cloud to DDS on the current cloud.

Database	Full Migration Permission	Full+Incremental Migration Permission
Source	<ul> <li>Replica set: The source database user must have the read permission for the database to be migrated.</li> <li>Single node: The source database user must have the read permission for the database to be migrated.</li> <li>Cluster: The source database user must have the read permission for the databases to be migrated and the config database.</li> <li>To migrate accounts and roles of the source database user must have the read permission for the database and roles of the source database user must have the read permission for the system.users and system.roles system tables of the admin database.</li> </ul>	<ul> <li>Replica set: The source database user must have the read permission for the databases to be migrated and the local database.</li> <li>Single node: The source database user must have the read permission for the databases to be migrated and the local database.</li> <li>Cluster: The source mongos node user must have the readAnyDatabase permission for the databases to be migrated and the config database. The source shard node user must have the readAnyDatabase permission for the admin database and the read permission for the source database.</li> <li>To migrate accounts and roles of the source database, the source database user must have the read permission for the local database.</li> </ul>

Database	Full Migration Permission	Full+Incremental Migration Permission
Destination	The destination database dbAdminAnyDatabase pe database and the readWin destination database. If t is a cluster instance, the in have the read permission	user must have the ermission for the admin rite permission for the he destination database migration account must for the config database.

- Source database permissions:

The source MongoDB database user must have all the required permissions listed in **Table 2-3**. If the permissions are insufficient, create a user that has all of the permissions on the source database.

Data of the following third-party cloud vendors can be migrated: Alibaba Cloud and Tencent Cloud (Tencent Cloud 3.2 is not supported).

For example, if you want to migrate an Alibaba Cloud MongoDB database to a DDS database, you can use the initial account of the source database.

– Destination database permissions:

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

2. Network settings

Enable public accessibility for the source database.

- Source database network settings:

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

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

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

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

After creating a replication instance on the DRS console, you can find the EIP on the Configure Source and Destination Databases page as shown in Figure 2-6.

**Figure 2-6** EIP of the replication instance

Contribution trobuse
 Configure Source and
 Destination Dublication
 Configure Source and
 Stat Task
 G Destination Dublications
 Configure Source and
 Stat Task
 G Destination
 Configure Source and
 Configure Source and
 State
 Configure Source and
 Configure S

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

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

– Destination database security group settings:

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

4. Other

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

#### **Migration Procedure**

**Step 1** Create a migration task.

Peolication Instance Details

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

Replication instance De	
The following information cannot be m	notified after you go to the next page.
* Data Flow	To the cloud Out of the cloud Self-built to self-built
	The destination database must be a database in the current cloud. If you want to migrate data between databases, select To the cloud.
* Source DB Engine	MySQL Oracle MySQL scheme and logic table Mongx08
* Destination DB Engine	GaussDR(for Mongo) DD5
* Network Type	Public network v 🕑
	V I understand that an EP will be automatically bound to the replication instance and released after the replication task is complete.
* Destination DB Instance	Select an instance View Unselectable DB Instance
Replication Instance Subnet	Select the subnet   Very Subnets
* Migration Type	Full-incremental Full
	This migration type allows you to migrate data with minimal downtime. After a full migration initializes the destination database, an incremental migration parses logs to ensure data consistency between the source and destination databases.
<b>*</b> Source DB Instance Type	Non-cluster Cluster
* Obtain Incremental Data	oplog changeStream
* Source Shard Quantity	

#### Figure 2-7 Replication instance information

#### Table 2-4 Task settings

Parameter	Description
Region	The region where your service is running. You can change the region.

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

Table 2-5 Replication instance settings

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

Parameter	Description
Source DB Instance Type	If you select <b>Full+Incremental</b> for <b>Migration Type</b> , set this parameter based on the source database.
	<ul> <li>If the source database is a cluster instance, set this parameter to Cluster.</li> </ul>
	<ul> <li>If the source database is a replica set or a single node instance, set this parameter to Non-cluster.</li> </ul>
Obtain Incremental Data	This parameter is available for configuration if <b>Source</b> <b>DB Instance Type</b> is set to <b>Cluster</b> . You can determine how to capture data changes during the incremental synchronization.
	<ul> <li>oplog: For MongoDB 3.2 or later, DRS directly connects to each shard of the source DB instance to extract data. If you select this mode, you must disable the balancer of the source instance. When testing the connection, you need to enter the connection information of each shard node of the source instance.</li> </ul>
	<ul> <li>changeStream: This method is recommended. For MongoDB 4.0 and later, DRS connects to mongos nodes of the source instance to extract data. If you select this method, you must enable the WiredTiger storage engine of the source instance.</li> </ul>
	NOTE Only whitelisted users can use <b>changeStream</b> . To use this function, submit a service ticket. In the upper right corner of the management console, choose <b>Service Tickets</b> > <b>Create Service</b> <b>Ticket</b> to submit a service ticket.
Source Shard Quantity	If <b>Source DB Instance Type</b> is set to <b>Cluster</b> and <b>Obtain</b> <b>Incremental Data</b> is set to <b>oplog</b> , enter the number of source shard nodes.
	The default minimum number of source DB instances is 2 and the maximum number is 32. You can set this parameter based on the number of source database shards.
Tags	This setting is optional. Adding tags helps you better identify and manage your tasks. Each task can have up to 10 tags.

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

Figure 2-8 Source database information

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

Table 2-6 Source database settings

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

- Destination database configuration

Figure 2-9 Destination database information

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

 Table 2-7 Destination database settings

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

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

Figure 2-10 Migration object

Note:	Before the migration task is complete, you cannot change the usernames, passwords, and rights of any source database users.							
*Migrate Account	Visi No Continn All Remarks ()				С			
	Recount	Account		Can Be Migrated	Can Be Migrated Role			Remarks
		fastunit.testuser4		Yes		fastunit.r	oletestő	
		fastunit.testuser3		Yes		fastunit.r	oletest3,fastunit.roletest2,f	
	$\checkmark$	fastunit.test8		Yes	Yes adm		isterAdmin	
	$\checkmark$	fastunit.test1		Yes	is fastunit.		ead	
	<u>~</u>	admin.testuser2		Yes		admin.clu	isterAdmin	-
	<b>×</b>	admin.test14	Yes			fastunit.read		
		fastunit.test_inc_fastunit		No		admin.ro	ot,fastunit.read,admin.read	View
		fastunit.test_full_fastunit		No		admin.ro	ot,fastunit.read,admin.read	View
	Role Infe	ormation						
		Role Name	Can Be	Migrated	Permission		Inherited Role	Remarks
	<b>~</b>	fastunit.roletest6	Yes		{"resource": {"db": "f	astu	fastunit.readWrite,fastuni	
		fastunit.roletest3	Yes		{"resource": {"db": "f	astu	fastunit.roletest2	
		fastunit.roletest2	Yes		("resource": {"db": "f	astu	fastunit.roletest1	
*Migrate Object	All	Tables D	atabases					

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

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

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

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

#### Figure 2-11 Task Check

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

#### **NOTE**

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

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

#### Figure 2-12 Task startup settings

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

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

#### Table 2-9 Task startup settings

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

#### **Step 2** Manage the migration task.

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

• Full migration

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

Figure 2-13 Viewi	ng the syn	chronization	delay
-------------------	------------	--------------	-------

Basic Information Migration Comparison Migration Progress Migration Logs	Note: Do not change the use synchronization or migration Last Updated Jan 05, 2022	ernames, passwords, and permissions of is complete, there may still be triggers o 17:08:49 GMT+08:00	source and destination data r events to be migrated befor	base users before the task has completed Start the task a e the entire task is finished.	nd get 7 days free. If the status indicates a
τημ	Source Databa	Full migration prog Structure migration Data migration	gress 100% 100% 100% 100%	Waiting for incremental migration	Destination Database

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

#### Figure 2-14 Database comparison process



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

**Step 3** Cut over services.

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

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

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

#### **NOTE**

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

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

----End

## 2.3 From MongoDB on ECS to DDS

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

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

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

#### Diagram

Figure 2-15 Source and destination databases in the same VPC



**Figure 2-16** Source and destination databases in the same region and different VPCs



#### **Migration Process**



#### **Migration Suggestions (Important)**

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

#### Notes on Migration (Important)

#### NOTICE

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

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

#### Preparations

1. Permissions:

**Table 2-10** lists the permissions required for the source and destination databases when migrating data from a MongoDB database on an ECS to DDS on the current cloud.

Table	2-10	Migration	permissions

Database	Full Migration Permission	Full+Incremental Migration Permission
Source	<ul> <li>Replica set: The source database user must have the read permission for the database to be migrated.</li> <li>Single node: The source database user must have the read permission for the database to be migrated.</li> <li>Cluster: The source database user must have the read permission for the databases to be migrated and the config database.</li> <li>To migrate accounts and roles of the source database user must have the read permission for the system.users and system.roles system tables of the admin database.</li> </ul>	<ul> <li>Replica set: The source database user must have the read permission for the databases to be migrated and the local database.</li> <li>Single node: The source database user must have the read permission for the databases to be migrated and the local database.</li> <li>Cluster: The source mongos node user must have the readAnyDatabase permission for the databases to be migrated and the config database. The source shard node user must have the readAnyDatabase permission for the admin database and the read permission for the admin database.</li> <li>To migrate accounts and roles of the source database, the source database, the source database user must have the read permission for the local database.</li> <li>To migrate accounts and roles of the source database user must have the read permission for the source database user must have the read permission for the system.users and system.roles system tables of the admin database.</li> </ul>

Database	Full Migration Permission	Full+Incremental Migration Permission
Destination	The destination database user must have the dbAdminAnyDatabase permission for the admin database and the readWrite permission for the destination database. If the destination database is a cluster instance, the migration account must have the read permission for the config database	

- Source database permissions:

The source MongoDB database user must have all the required permissions listed in **Table 2-10**. If the permissions are insufficient, create a user that has all of the permissions on the source database.

- Destination database permissions:

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

- 2. Network settings
  - The source database and destination DDS DB instance must be in the same region.
  - The source database and destination DDS DB instance can be either in the same VPC or different VPCs.
    - If the source and destination databases are in different VPCs, the subnets of the source and destination databases are required to be in different CIDR blocks. You need to create a VPC peering connection between the two VPCs. For details, see VPC Peering Connection Creation Procedure.
    - If the source and destination databases are in the same VPC, the networks are interconnected by default.
- 3. Security rules
  - In the same VPC, the network is connected by default. You do not need to set a security group.
  - In different VPCs, establish a VPC peering connection between the two VPCs. You do not need to set a security group.
- 4. Other

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

#### **Migration Procedure**

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

Replication Instance Details 💿						
The following information cannot be modifie	Latter you go to the next page.					
* Data Flow	To the cloud Out of the cloud					
	The destination database must be a database in the current cloud. If you want to migrate data between databases, select To the cloud.					
* Source DB Engine	MySQL Oracle MySQL scheme and logic table MongxQB					
* Destination DB Engine	GaussD8(for Mongo) D/DS					
* Network Type	VPC • Ø					
* Destination DB Instance	Select an instance   V View DB Instance View Unselectable DB Instance					
Replication Instance Subnet	Select the subnet					
* Migration Type	Full-troenental Ful					
	This migration type allows you to migrate data with minimal downtime. After a full migration mitializes the destination database, an incremential migration parses logs to ensure data consistency between the source and destination databases.					
* Source DB Instance Type	Non-duster Cluster					

#### Figure 2-18 Replication instance information

# Table 2-11 Task settings

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

 Table 2-12 Replication instance information

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

Parameter	Description				
Migration Type	Select Full+Incremental as an example:				
	<ul> <li>Full: This migration type is suitable for scenarios where a service interruption is acceptable. All objects and data in non-system databases are migrated to the destination database at one time. The objects include tables, views, and stored procedures.</li> </ul>				
	<b>NOTE</b> If you perform a full migration, you are advised to stop operations on the source database. Otherwise, data generated in the source database during the migration will not be synchronized to the destination database.				
	- <b>Full+Incremental</b> : 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.				
	<b>NOTE</b> If you select the <b>Full+Incremental</b> migration type, data generated during the full migration will be synchronized to the destination database with zero downtime, ensuring that both the source and destination databases remain accessible.				
Source DB Instance Type	If you select <b>Full+Incremental</b> for <b>Migration Type</b> , set this parameter based on the source database. <b>Non-</b> <b>cluster</b> is selected as an example.				
	<ul> <li>If the source database is a cluster instance, set this parameter to Cluster.</li> </ul>				
	<ul> <li>If the source database is a replica set or a single node instance, set this parameter to Non-cluster.</li> </ul>				

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

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

# Figure 2-19 Source and destination database details Source Database

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

## **Destination Database**

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

## Table 2-13 Source database information

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

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

Table 2-14 Destination database information

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

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

Figure 2-20 Migration object

Note:	Before the migration task is complete, you cannot change the usernames, passwords, and rights of any source database users.							
<ul> <li>Migrate Account</li> </ul>	Yes Confir	No m All Remarks						С
	Account	Account		Can Be Migrated		Role		Remarks
		fastunit.testuser4		Yes		fastunit.r	roletestő	
	~	fastunit.testuser3		Yes		fastunit.r	roletest3,fastunit.roletest2,f	
		fastunit.test8		Yes		admin.cli	usterAdmin	
	$\checkmark$	fastunit.test1		Yes		fastunit.r	read	
	~	admin.testuser2		Yes		admin.cli	usterAdmin	
	$\checkmark$	admin.test14		Yes		fastunit.r	read	
		fastunit.test_inc_fastunit		No		admin.ro	ot,fastunit.read,admin.read	View
		fastunit.test_full_fastunit		No		admin.ro	ot,fastunit.read,admin.read	View
	Role Inf	ormation						
		Role Name	Can Be	Migrated	Permission		Inherited Role	Remarks
	<b>~</b>	fastunit.roletest6	Yes		{"resource": {"db": '	"fastu	fastunit.readWrite,fastuni	
		fastunit.roletest3	Yes		{"resource": {"db": '	"fastu	fastunit.roletest2	
	<b>~</b>	fastunit.roletest2	Yes		{"resource": {"db": '	"fastu	fastunit.roletest1	
•Migrate Object	All	Tables Da	itabases					

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

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

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

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

## Figure 2-21 Task Check

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

#### **NOTE**

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

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

#### Figure 2-22 Task startup settings

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

Set Start Time to Start upon task creation or Start at a specified time based on site requirements. The Start at a specified time option is recommended. NOTE The migration task may affect the performance of the source and
destination databases. You are advised to start the task in off-peak hours and reserve two to three days for data verification
SMN topic. This parameter is optional. If an exception occurs during migration, the system will send a notification to the specified recipients.
This parameter is available only after you enable <b>Send</b> <b>Notification</b> and create a topic on the SMN console and add a subscriber.
For details, see <i>Simple Message Notification User Guide</i> .
During an incremental migration, a synchronization delay indicates a time difference (in seconds) of synchronization between the source and destination database.
If the synchronization delay exceeds the threshold you specify, DRS will send alarms to the specified recipients. The value ranges from 0 to 3,600. To avoid repeated alarms caused by the fluctuation of delay, an alarm is sent only after the delay has exceeded the threshold for six minutes.
NOTE
<ul> <li>In the early stages of an incremental migration, there is more delay because more data is waiting to be synchronized. In this situation, no notifications will be sent.</li> </ul>
<ul> <li>Before setting the delay threshold, enable Send Notification.</li> </ul>
<ul> <li>If the delay threshold is set to 0, no notifications will be sent to the recipient.</li> </ul>

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

automatically stop to avoid unnecessary fees.

Tasks in the abnormal state are still charged. If tasks remain in the abnormal state for a long time, they cannot be resumed. Abnormal

tasks run longer than the period you set (unit: day) will

The default value is **14**.

NOTE

#### **Step 2** Manage the migration task.

Tasks After

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

• Full migration

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

Fiaure	2-23	Viewina	the	synchronization	delav

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

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

#### Figure 2-24 Database comparison process



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

**Step 3** Cut over services.

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

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

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

#### **NOTE**

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

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

----End

# 2.4 From On-Premises MySQL to RDS MySQL

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

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

- Virtual Private Network (VPN)
- Public network

# Diagram

## Figure 2-25 VPN



# Figure 2-26 Public network+SSL connection



# **Migration Process**



# **Migration Suggestions (Important)**

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

# Notes on Migration (Important)

#### NOTICE

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

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

# Preparations

1. Permissions

**Table 2-17** lists the permissions required for the source and destination databases when migrating data from on-premises MySQL databases to the RDS MySQL instances on the current cloud.

Database	Full Migration	Full+Incremental Migration
Source	SELECT, SHOW VIEW, and EVENT	SELECT, SHOW VIEW, EVENT, LOCK TABLES, REPLICATION SLAVE, and REPLICATION CLIENT
Destination	SELECT, CREATE, ALTER, DROP, DELETE, INSERT, UPDATE, INDEX, EVENT, CREATE VIEW, CREATE ROUTINE, TRIGGER, and WITH GRANT OPTION.	SELECT, CREATE, ALTER, DROP, DELETE, INSERT, UPDATE, INDEX, EVENT, CREATE VIEW, CREATE ROUTINE, TRIGGER, and WITH GRANT OPTION.

– Source database permissions:

The source database user must have all the required permissions listed in **Table 2-17**. If the permissions are insufficient, create a user that has all of the permissions on the source database.

– Destination database permissions:

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

- 2. Network settings
  - Source database network settings:

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

- Destination database network settings:
  - If the source database attempts to access the destination database through a VPN, you need to enable the VPN service first so that the source database can communicate with the destination RDS MySQL.
  - If the source database attempts to access the destination database through a public network, you do not need to configure the destination database.

- 3. Security rules
  - a. Source database security group settings:
    - The replication instance needs to be able to access the source DB. That means that the EIP of the replication instance must be on the whitelist of the source MySQL DB instance. Before configuring the network whitelist, you need to obtain the EIP of the replication instance.

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

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

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

b. Destination database security group settings:

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

4. Other

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

# **Migration Procedure**

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

**Step 1** Create a migration task.

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

# Figure 2-28 Replication instance information

Replication Instance	Details ⑦
The following information cannot be mo	colfied after you go to the next page
* Data Flow	To the cloud Out of the cloud
	The destination database must be a database in the current cloud, If you want to migrate data between databases, select To the cloud.
* Source DB Engine	MySOL MySOL schema and logic table MongsOB
* Destination DB Engine	MySOL DDM GauceOB(fr MySOL) PinnaryStandby Ed
* Network Type	Public network • (7)
	Understand that an EIP will be automatically bound to the replication instance and released after the replication task is complete.
* Destination DB Instance	Stilled an instance    Vew UB Instance  Vew UB Instance Vew UB Instance
* Replication Instance Subnet	Select the subnet  Vew Subnets Vew occupied IP address
* Migration Type	Full-Incremental Full
	This migration type allows you to migrate data with minimal downtime. After a full migration initializes the destination database, an incremental migration parses legs to ensure data consistency between the source and destination database.
* Destination DB Instance Access	Read-only Read/White
	Configuring the destinution DB instance as read-only helps ensure the migration is successful. Once the migration is complete, the DB instance automatically changes to Read/Write.
* Enterprise Project	-Select- C View Project Management (2)
Tags	It is recommended that you use TMS's predefined tag function to add the same tag to different doud resources. Wew predefined tags C
	13g 189 1300
	You can add 10 more tags.

# Table 2-18 Task settings

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

 Table 2-19 Replication instance settings

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

Parameter	Description
Destination Database Access	<ul> <li>You can select Read-only or Read/Write.</li> <li>Read-only <ul> <li>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.</li> </ul> </li> <li>Read/Write <ul> <li>During migration, the destination database can be queried or modified. Data may be modified when operations are performed or applications are connected. It should be noted that background processes can often generate or modify data, which may result in data conflicts, task faults, and upload failures. Do not select this option if you do not fully understand the risks.</li> </ul> </li> </ul>
Migration Type	<ul> <li>Select Full+Incremental as an example.</li> <li>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.</li> <li>NOTE         <ul> <li>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.</li> <li>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.</li> </ul> </li> <li>NOTE         <ul> <li>If you select the Full+Incremental migration will pervices and parses logs to the destination database.</li> </ul> </li> </ul>

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

5	
Source Database	
IP Address or Domain Name	1982 148 182 110
Port	100
Database Username	root
	DRS migrates only some key parameters to the destination database. For the other parameters that cannot be migrated, you need to use parameter templates to o them on the destination database.
Database Password	
SSL Connection	
	If you want to enable SSL connection, ensure that SSL has been enabled on the source database, related parameters have been correctly configured, and an SSL co
	has been uploaded.
Encryption Certificate	Select Orac Select

#### Figure 2-29 Source and destination database details

	has been uploaded.				
Encryption Certificate	Select Select				
	Test Connection				
Destination Database					
DB Instance Name	rds-hjm-text2				
Database Username	root				
Database Password					
Migrate Definer to User	○ Yes ⑦ ● No ⑦				
	Test Connection 🖉 Test successful				

#### Table 2-20 Source database settings

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

# Table 2-21 Destination database settings

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

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

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

# Figure 2-30 Migration object

Note:	Before the migration task is complete, you cannot change the usernames, passwords, and rights of any source database users.								
◆Flow Control	Yes No ⑦								
*Filter DROP DATABASE	Yes No								
*Migrate Account	Yes         No           During a database migration, you need to database. Ensure that services are not affer         Confirm All Remarks	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.							
	Account	Can Be Migrated	Permission	Password	Remarks				
	<b>v</b> (@'	Yes	GRANT ALL PRIVILEGES ON *.*		View				
	✓ )'@' %	Yes	GRANT ALL PRIVILEGES ON *.*		View				
	✓ 1'@'	Yes	GRANT ALL PRIVILEGES ON *.*		View				
	I'@'%'	No	GRANT SELECT, INSERT, UPD		View				
	'@'%'	No	GRANT USAGE ON *.* GRAN		View				
	:'@'%'	No	GRANT ALL PRIVILEGES ON *.*		View				
	@'localhost'	No	GRANT USAGE ON *.* GRAN		View				
	Reset Password     Set Unified Password								
★Migrate Object	All Tables Data	bases ⑦							

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

 Table 2-22 Migration types and objects-public network

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

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

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

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

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

Figure 2-31	Modifying	common	parameters
-------------	-----------	--------	------------

Parameter	Type Common parameters Performance parameters			
Select the	destination database parameters whose values you want to change to be	the same as those in the source database. Some changes take effect only after	r you restart the destination database. You are advised to restart the destination	on database before or after the migration.
Save C	hange			С
- 💟 P	arameter Name	Source Database Value	Destination Database Value	Result
	() character_set_server	utf8	utf8	<ul> <li>Consistent</li> </ul>
	⑦ collation_server	utf8_general_cl	utf6,general,ci	<ul> <li>Consistent</li> </ul>
	(2) connect_timeout	10	10	<ul> <li>Consistent</li> </ul>
<b>M</b>	explicit_defaults_for_timestamp	OFF	ON	Inconsistent
	() innodb_flush_log_at_trx_commit	1	1	<ul> <li>Consistent</li> </ul>
	(innodb_look_wait_timeout)	50	50	<ul> <li>Consistent</li> </ul>
	() max_connections	800	800	<ul> <li>Consistent</li> </ul>
	() net_read_timeout	30	30	<ul> <li>Consistent</li> </ul>
	⑦ net_write_timeout	60	60	<ul> <li>Consistent</li> </ul>
	() tojsolation	REPEATABLE-READ	REPEATABLE-READ	<ul> <li>Consistent</li> </ul>

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

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

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

#### Figure 2-32 One-click modification

Parame	er Type Common parameters Performance parameters							
Select t	e dettination database parameters you want to change. Some changes take effect Source Database Value Save Change	only after you restart the destination d	atabase. You are advised to restart the	destination database before	or after the migration.			С
	Parameter Name	Source Database Value	Destination Database Value	Change To		Allowed Destination Database Va	Result	
	() binlog, cache, size	32768	32768	8	* 4096 = 32768	4096~16777216	<ul> <li>Consistent</li> </ul>	
	(b) binlog.stmt, cache_size	32768	32768	8	* 4096 = 32768	4096-16777216	<ul> <li>Consistent</li> </ul>	
	(bulk_inset_buffer_size)	8388608	8388608			0~18446744073709551615	O Consistent	
M	Innode_buffer_pool_size Enter a value smaller than or equal to 70% of memory size of the destina	536870012	805306368	4	* 134217728 = 536870912	536870012~1717986018	Inconsistent	
	() long_query_time	1.000000	1.000000			0.03-3600	<ul> <li>Consistent</li> </ul>	
	Tread_buffer_size	262144	262144	64	* 4096 = 262144	8192-2147479552	O Consistent	
	⑦ read_md_buffer_size	524288	524288	128	* 4096 = 524288	1-2147483647	<ul> <li>Consistent</li> </ul>	
	() sort_buffer_size	262144	262144			32768~18446744073709551615	<ul> <li>Consistent</li> </ul>	
	() sync, binlog	1	1			0-4294967295	Consistent	

#### D NOTE

You can also manually enter parameter values.

2) Click Save Change to save your changes.

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

Paramete	r Type Common parameters Performance parameters							
Select the	destination database parameters you want to change. Some changes take effect	only after you restart the destination of	database. You are advised to restart the	destination database before	or after the migration.			
Use S	ource Database Value Save Change							С
	Parameter Name	Source Database Value	Destination Database Value	Change To		Allowed Destination Database Va	Result	
	③ binlog_cache_size	32768	32768	8	* 4096 = 32768	4096~16777216	<ul> <li>Consistent</li> </ul>	
	③ binlog.stmt,cache_size	32708	32768	8	* 4096 = 32768	4096-16777216	<ul> <li>Consistent</li> </ul>	
	③ bulk_inset_buffer_size	8388608	8388608			0~18446744073709551615	<ul> <li>Consistent</li> </ul>	
×	Innodb_buffer.pool_size Enter a value smaller than or equal to 70% of memory size of the destina	536870912	805306368	4	* 134217728 = 536870912	536870912-1717986918	0 Inconsistent	
	③ long.query.time	1.000000	1.000000			0.03-3600	Consistent	
	⑦ read_buffer_size	262144	262144	64	* 4096 = 262144	8192-2147479552	<ul> <li>Consistent</li> </ul>	
	⑦ read_md_buffer_size	524288	524288	128	* 4096 = 524288	1-2147483547	<ul> <li>Consistent</li> </ul>	
	③ sort_buffer_size	262144	262144			32768-18446744073709551615	<ul> <li>Consistent</li> </ul>	
	() grechning	1	1			0-4294967295	<ul> <li>Consistent</li> </ul>	

Figure 2-33 Performance parameters

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

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

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

Figure 2-3	84 Task	startup	settings
------------	---------	---------	----------

Start Time	Start upon task creation         Start at a specified time         ?
Send Notifications	Please handle exceptions within 48 hours of receiving SMS messages or emails.
* SMN Topic	• C (2)
Synchronization Delay Threshold(s)	0
* Stop Abnormal Tasks After	14 (2) Abnormal tasks run longer than the period you set (unit: day) will automatically stop.

#### Table 2-23 Task startup settings

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

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

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

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

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

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

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

Figure 2-35 Viewing the synchronization delay

Basic Information Migration Comparison Migration Progress Migration Logs	Note: Do not change the usernam synchronization or migration is cor Last Updated Jan 05, 2022 17:08:	es, passwords, and permissions of source and dest mplete, there may still be triggers or events to be mi 49 GMT-08.00	nation data grated befo	base users before the task has completed Start the task and g e the entire task is finished.	et 7 days free. If the status indicates a	2
Tags	Progress Source Database	Full migration progress Structure migration Data migration Index migration	100%	Waiting for incremental migration	Destination Database	

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

#### Figure 2-36 Database comparison process



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

#### **Step 3** Cut over services.

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

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

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

#### **NOTE**

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

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

----End

# 2.5 From On-Premises MongoDB to DDS

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

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

- VPN
- Public network

# Diagram



## Figure 2-38 Public network+SSL connection



# **Migration Process**



Figure 2-39 Flowchart

# Migration Suggestions (Important)

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

# Notes on Migration (Important)

## NOTICE

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

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

# Preparations

1. Permissions

**Table 2-24** lists the permissions required for the source and destination databases when migrating data from on-premises MongoDB databases to DDS DB instances.

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

#### Table 2-24 Migration permissions

- Source database permissions:

The source database user must have all the required permissions listed in **Table 2-24**. If the permissions are insufficient, create a user that has all of the permissions on the source database.

– Destination database permissions:

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

- 2. Network settings
  - Source database network settings:

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

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

After creating a replication instance on the DRS console, you can find the EIP on the **Configure Source and Destination Databases** page as shown in **Figure 2-40**.

**Figure 2-40** EIP of the replication instance

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

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

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

b. Destination database security group settings:

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

4. Other

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

# **Migration Procedure**

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

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

Replication Instance Details 💿		
The following information cannot be modified after you go to the next page.		
* Data Flow	To the cloud Out of the cloud Self-built to self-built	
	The destination database must be a database in the current cloud. If you want to migrate data between databases, select. To the cloud.	
* Source DB Engine	MySQL Oracle MySQL scheme and logic table Mongo08	
* Destination DB Engine	Gauss08(for Mongo) D05	
* Network Type	Public network 💌 🕖	
	V Indestand that an EP will be automatically bound to the replication instance and released after the replication task is complete.	
* Destination DB Instance	Select an instance   Vew UR instance  Vew Unselectable DB Instance	
Replication Instance Subnet	Select the subnet   View Subnets	
* Migration Type	Full-Incremental Full	
	This migration type allows you to migrate data with minimal downtime. After a full migration initializes the destination database, an incremental migration parses logs to ensure data consistency between the source and destination databases.	
* Source DB Instance Type	Non-cluster Cluster	
* Obtain Incremental Data	oplog changeStream	
* Source Shard Quantity	- 2 +	

#### Figure 2-41 Replication instance information

#### Table 2-25 Task settings

Parameter	Description
Region	The region where your service is running. You can change the region.

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

Table 2-26 Replication instance settings

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

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

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

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

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

#### Table 2-27 Source database settings

# - Destination database configuration

#### Figure 2-43 Destination database information

Destination Data	ase
DB Instance Name	dds-shard-wyrn-ta
Database Username	rwuser
Database Password	
	Test Connection

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

Table 2-28 Destination database settings

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

# Figure 2-44 Migration object

Note:	Before the migration task is complete, you cannot change the usernames, passwords, and rights of any source database users.							
<ul> <li>Migrate Account</li> </ul>	Yes Confir	No m All Remarks						С
	Account	Account		Can Be Migrated		Role		Remarks
		fastunit.testuser4		Yes		fastunit	roletestő	
	<b>~</b>	fastunit.testuser3		Yes		fastunit	roletest3,fastunit.roletest2,f	
	$\checkmark$	fastunit.test8		Yes		admin.cl	usterAdmin	
	$\checkmark$	fastunit.test1		Yes		fastunit	read	
	$\checkmark$	admin.testuser2		Yes		admin.cl	usterAdmin	
	$\checkmark$	admin.test14		Yes		fastunit	read	
		fastunit.test_inc_fastunit		No		admin.ro	ot,fastunit.read,admin.read	View
		fastunit.test_full_fastunit		No		admin.ro	ot,fastunit.read,admin.read	View
	Role Information							
		Role Name	Can Be	Migrated	Permission		Inherited Role	Remarks
		fastunit.roletest6	Yes		{"resource": {"db": '	'fastu	fastunit.readWrite,fastuni	
	~	fastunit.roletest3	Yes		{"resource": {"db": '	'fastu	fastunit.roletest2	
	~	fastunit.roletest2	Yes		("resource": ("db": "	'fastu	fastunit.roletest1	
*Migrate Object	All	Tables D	atabases					

# Table 2-29 Migration object

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

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

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

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

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

## Figure 2-45 Task Check

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

#### **NOTE**

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

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

#### Figure 2-46 Task startup settings

Start Time	Start upon task creation	Start at a specified time	0
Sand Natifications	Please handle excer	ations within 48 hours of receiving	a SMS messages or emails
Send Notifications			,
* SMN Topic		• C	
Synchronization Delay Threshold(s)	0		
* Stop Abnormal Tasks After	14 (?) Abn	ormal tasks run longer than the p	period you set (unit: day) will automatically stop.
Parameter	Description		
--	--		
Start Time	Set <b>Start Time</b> to <b>Start upon task creation</b> or <b>Start at a</b> <b>specified time</b> based on site requirements. The <b>Start at a</b> <b>specified time</b> option is recommended.		
	The migration task may affect the performance of the source and destination databases. You are advised to start the task in off-peak hours and reserve two to three days for data verification.		
Send Notification s	SMN topic. This parameter is optional. If an exception occurs during migration, the system will send a notification to the specified recipients.		
SMN Topic	This parameter is available only after you enable <b>Send</b> <b>Notification</b> and create a topic on the SMN console and add a subscriber.		
	For details, see <i>Simple Message Notification User Guide</i> .		
Synchroniza tion Delay Threshold	During an incremental migration, a synchronization delay indicates a time difference (in seconds) of synchronization between the source and destination database.		
	If the synchronization delay exceeds the threshold you specify, DRS will send alarms to the specified recipients. The value ranges from 0 to 3,600. To avoid repeated alarms caused by the fluctuation of delay, an alarm is sent only after the delay has exceeded the threshold for six minutes.		
	NOTE		
	<ul> <li>In the early stages of an incremental migration, there is more delay because more data is waiting to be synchronized. In this situation, no notifications will be sent.</li> </ul>		
	<ul> <li>Before setting the delay threshold, enable Send Notification.</li> <li>If the delay threshold is set to 0, no notifications will be sent to the recipient.</li> </ul>		
Stop Abnormal Tasks After	Number of days after which an abnormal task is automatically stopped. The value must range from 14 to 100. The default value is <b>14</b> .		
	<b>NOTE</b> Tasks in the abnormal state are still charged. If tasks remain in the abnormal state for a long time, they cannot be resumed. Abnormal tasks run longer than the period you set (unit: day) will automatically stop to avoid unnecessary fees.		

## Table 2-30 Task startup settings

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

## **Step 2** Manage the migration task.

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

• Full migration

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

Fiaure	2-47	Viewina	the	synchron	ization	delav
igaic	~ .,	viewing	circ	Syncinion	Lacion	aciay

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

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

#### Figure 2-48 Database comparison process



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

**Step 3** Cut over services.

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

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

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

#### **NOTE**

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

- 3. On the **Migration Progress** page, view the synchronization delay. When the delay is displayed as 0s and remains stable for a period, then you can perform a data-level comparison between the source and destination databases. For details about the time required, refer to the results of the previous comparison.
  - If there is enough time, compare all objects.
  - If there is not enough time, use the data-level comparison to compare the tables that are frequently used and that contain key business data or inconsistent data.
- 4. Determine an appropriate time to cut the services over to the destination database. After services are restored and available, the migration is complete.

**Step 4** Stop or delete the migration task.

- 1. Stopping the migration task. After databases and services are migrated to the destination database, to prevent operations on the source database from being synchronized to the destination database to overwrite data, you can stop the migration task. This operation only deletes the replication instance, and the migration task is still displayed in the task list. You can view or delete the task. DRS will not charge for this task after you stop it.
- 2. Delete the migration task. After the migration task is complete, you can delete it. After the migration task is deleted, it will no longer be displayed in the task list.

----End



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

# 3.1.1 Overview

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

DRS supports full migration and full+incremental migration.

## Scenario 1: Full Backup Migration

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





## Scenario 2: Full+Incremental Backup Migration

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





# **3.1.2 Migration Preparations**

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

## **Preparing for Backup Files**

For details, see Migration Overview in Backup Migration.

## **Configuring Database Restoration Mode**

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

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

#### Figure 3-3 Recovery mode

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

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

## **Destination Database Storage Space**

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

## **Migration Duration Reference**

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

Figure 3-4 Migration diagram



Table 3-1 Backup migration

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

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

#### Example

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

Table 3-2 Backup migration example

# 3.1.3 Exporting Backup Files

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

**Step 1** Check the parameter settings of the local database.

## **NOTE**

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

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

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

onnect * 🐉 🛃 🗏 🖉 🛃		DifferentialBaseLSN NUMERIC	(25, 0), DENTIFIER.	
B DESKTOP-DHNDL3I (SQL Server 12.0.2000 - CHINA\w0051	^ Details and Descention of			 
🖃 🚞 Databases	Database Properties - dr	s_test_1		 
🗉 🚞 System Databases	Select a page	Soript - 🖪 Help		
Database Snapshots	General 🦉			
🗉 间 drs_test_1 🛛 🚺	Files #	Collation: Ch	vinese PRC CT AS	~
🕀 🚞 Database Diagrams	2 Options		11 13	
🗉 🚞 Tables	Change Tracking	Recovery model:		~
🗉 🛄 Views	Permissions 🖉	Compatibility <u>level</u> : S6	L Server 2014 (120)	~
🗉 🚞 Synonyms	Extended Properties	Containment type: No	ne	$\sim$
🗉 🚞 Programmability	Troprostion Log Shipping	Other options:		
🗉 🚞 Service Broker	in ansaction bog baipping			
🗉 🚞 Storage		2+		
🗉 🧰 Security		Auto Update Statistics	True	^
		Auto Update Statistics Asynchr	onous False	
🗉 间 drs test 11		Default Fulltext Language LCID	1033	-
🗉 📔 drs test 12		Default Language	English	
🗉 间 drs test 13		Nested Triggers Enabled	True	
🗉 间 drs test 14		Transform Noise Words	False	
I drs test 15		Two Digit Year Cutoff	2049	_
I drs test 16	Connection	✓ Cursor		
I drs test 17	Server:	Liose Lursor on Lommit Enabled	false CLOBAT	
drs_test_19	DESKTOP-DHNDL3I	V KILKSTRAN	GLOBKI.	- 1
B drs_test_19	Connection:	FILESTREAM Directory Name		-
	CHINA (WOOD10300	FILESTREAM Non-Transacted Acce	ss Off	
I distest 2	View connection	✓ ■iscellaneous		
drs_test_20	properties	Allow Snapshot Isolation	False	Ξ.,
	Progress	ANSI NILL Default	False	 -
H II drs_test_22	Ready	Allow Snapshot Isolation		
I U drs_test_23				
drs_test_24				
I drs test 25				

Figure 3-5 Configuring the recovery model

Step 2 (Optional) Set backup file compression parameter.

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

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

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

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

<b>3 3 3</b>	• •	
Object Explorer 🔹 후 부 🗙	Server Properties - DESK	TOP-DHNDI3I - T X
Connect - 🛃 🛃 = 🍸 😰 🍒	Select a page	
Connect 2f 2f 2 ( (SQL Server 12) Context 2f 2f (SQL Server 12) Context 2f (SQL Serv	Select a page Macry Macry Security Connections Maraneed Advanced Permissions	Script ~ [] Halp Defeult index fill factor:
<pre>a Security a drs_test_10 b drs_test_11 c drs_test_11 c drs_test_12 c drs_test_13 c drs_test_14 c drs_test_15 c drs_test_16 c drs_test_16 c drs_test_17 c drs_test_19 c drs_test_2 c dr</pre>	Connection Server: DESETOP-DUBULSI Connection: DECONSTICUS Progress Ready	Image: Starting of the Window of the Way?         Image: Starting of the Window of th
<ul> <li></li></ul>		OK Cancel

Figure 3-6 Configuring compression parameter

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



#### Figure 3-7 Back Up

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

间 Back Up Database -	drs_test_1		-		×
Select a page	Script - In Help				
General Media Options Backup Options	Source Database: Recovery model: Backup type: Copy-only backup Backup component:	drs_test_1 FULL Full			>
Connection	Destination Back up to: D:\frogram Files Wicrosoft SQL	Disk . Server/MSSQL12_MSSQLSERVER/MSSQL\Beakup\test.bak		Add	2)~
Server: DESKTOF-DHNDL3I Connection: CHLNA\w00510300 Properties		-		<u>K</u> emov Conten	ts
Fregress Ready					
			ОК	Canc	1

Figure 3-8 Setting the full backup file

## **NOTE**

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

<ul> <li>drs_tes</li> <li>drs_tes</li> <li>drs_tes</li> <li>New Database</li> <li>New Query</li> </ul>		
Gript Database as		
B drs_tes lasks		Detach
Officies     Policies		Take Offline
		Bring Online
	-	
	_	Shrink •
		Back Up 2
		Restore +
Iteports	_	
		Mirror
		Launch Database Mirroring Monitor
⊞ drs_tes     Befresh     Refresh     Sefresh     Sefresh	-	Ship Transaction Logs
		Generate Scripts
drs_tes	-	
		Extract Data-tier Application
		Deploy Database to Windows Azure SQL Database
		Deploy Database to a Windows Azure VM
		Export Data-tier Application
H U drs_test_29     Grade and a state of the sta		Register as Data-tier Application
		Upgrade Data-tier Application
🗄 📙 drs_test_30		Delete Data-tier Application
		Import Data
		Export Data
🗉 🔰 drs_test_34		Copy Database
표 🔰 drs_test_35		Manage Database Encryption
🗄 间 drs_test_36		manage stabase cherypronin

Figure 3-9 Back Up

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

间 Back Up Database -	drs_test_1	-	- 🗆	$\times$
Select a page	🔄 Soript 🔻 🚺 Help			
∰ Hedia Options ∰ Backup Options	Source Database: Recovery model: Backup type: Copy-only backup Backup component: © Batabase Files and filegroups: Destination Back up to: P.Vfrogrem Files/Microsoft SQU	drs_test_1 FULL Transaction Log 1 Disk 	2	~
onnection		3	A <u>d</u> d	_
Server: DESKTOP-DUNDL3I Connection: CHIMAW00510300 Vice connection properties Progress Ready			<u>C</u> ontents	
		ОК	Cancel	

Figure 3-10 Setting the incremental backup file

## **NOTE**

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

#### ----End

# 3.1.4 Uploading Backup Files

This section describes how to upload backup files.

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

## D NOTE

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

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

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

When uploading backup files, select **Standard** for **Storage Class**.

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

----End

## 3.1.5 Scenario 1: Full Backup Migration

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

This section describes how to migrate a full backup.

## **Migration Diagram**

Figure 3-11 Full migration



## **Migration Process**



#### Figure 3-12 Migration process

## Procedure

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



Backup File Info	mation			
* Database Type	Microsoft SQL Server			
* Backup File Source	OBS Bucket RDS full backup	0		
* Bucket Name	fine eth	• C ③		
Tags	It is recommended that you use TMS's prede	fined tag function to add the same tag to different clo	ud resources. View predefined tags	
	Tag key Tag value			
	You can add 10 more tags.			
Enter a backup name.	Q			С
Backup Name		Size	Last Modified Time	
eldbgwry201	90630 bak	139.20 MB	Jul 02, 2019 11:56:51 GMT+08:00	

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

Table 3-3 Migration	n task informatio	n
---------------------	-------------------	---

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





#### Table 3-4 Microsoft SQL Server database information

Parameter	Description	
Destination RDSSelect a destination RDS DB instance. If no RDS DB i is available, you can buy one by referring to the Name		
Backup File Format	Select Full. Full: indicates full backup files. NOTE To migrate databases at a time, you need to stop services first and upload full backups for restoration.	
Last Backup	Select <b>Yes</b> if you perform a one-time full migration.	
Overwrite Data	You can determine whether to overwrite data in the destination database during the restoration if the destination DB instance contains a database with the same name as the backup database. <b>NOTE</b> If you select this option, the destination databases with the same names as the backup databases will be overwritten. Exercise caution when performing this operation.	
Perform Pre- verification	<ul> <li>Specifies whether to perform pre-verification on the backup migration task. The default value is Yes.</li> <li>Yes: To ensure successful migration and identify potential problems in advance, verify the validity, integrity, continuity, and version compatibility of backup files before restoration.</li> <li>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.</li> </ul>	

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

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

----End

# 3.1.6 Scenario 2: Full+Incremental Backup Migration

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

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

## **Migration Diagram**



## Figure 3-15 Full+incremental migration

## **Migration Process**





## **First Full Migration**

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

Figure 3-17 Migration task information

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

 Table 3-5 Migration task information

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

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

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

## Figure 3-18 Full migration database information

Database Info	rmation		
Destination RDS DB Ins	tance Name		Select Destruction RDS DB Instance
Backup File Format	Full	Incremental	
	Full: indicates fu	ll backup files.	
Last Backup	Yes	No	0
	The destination	databases involved will be unav	silable, and incremental backups can still be restored.
Overwrite Data	Yes	No	You can determine whether to overwrite data in the destination database during the restoration if the destination DB instance contains a database with the same name as the backup database.
	Overwriting dat	will clear the existing data of	the destination database. Exercise caution when performing this operation.
Perform Pre-verification	i Yes	No	
Restore Database	AL	Custom	0
Reset Database Name	0		

## Table 3-6 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 buy one by referring to the
Backup Type	Select <b>Full</b> . <b>Full</b> : indicates full backup files.

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

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

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

----End

## First Incremental Migration

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

## Figure 3-19 Incremental backup

Backup File Ir	nformation			
* Database Type	Microsoft SQL Server			
* Backup File Sour	Ce OBS Bucket RDS fu	III backup		
* Bucket Name	drs-	• C (?)		
Tags	It is recommended that you use TM	S's predefined tag function to add the same tag 1	o different cloud resources. View predefined tags	
	Tag key Tag	j value		
	You can add 10 more tags.			
Enter a backup na	ame. Q			С
Backup Nam	e	Size	Last Modified Time	
	transfer_test1.bak	2.77 MB	Jul 25, 2019 11:15:21 GMT+08:00	
	_transfer_test2.bak	2.77 MB	Jul 25, 2019 11:15:21 GMT+08:00	
	transfer_test3.bak	2.77 MB	Jul 25, 2019 11:15:22 GMT+08:00	

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

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

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

Figure 3-20 Incremental migration database information

Database Information			
* Destination RDS DB Instance Name	test, etc., ill		Select Destination RDS DB Instance
* Backup Type	Full	Incremental	
	Incremental: indicates tra	nsaction log backup file	ì.
* Last Backup File   ?	Yes	No	
	If you select No, the desti	nation databases involve	d in this migration will be unavailable and incremental backups can still be restored.
* Perform Pre-verification	Yes	No	
* Restore Database	All	Custom	0

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

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

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

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

----End

## **Second Incremental Migration**

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

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

Figure 3-21 Incremental backup



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

 Table 3-9 Migration task information

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

Database Information			
* Destination RDS DB Instance Name	tent_rdb_32		Select Destination RDS DB Instance
* Backup Type	Full	Incremental	
	Incremental: indicates tra	nsaction log backup files.	
* Last Backup File	Yes	No	
	If you select No, the destin	nation databases <mark>involved</mark> in	n this migration will be unavailable and incremental backups can still be restored
* Perform Pre-verification	Yes	No	
* Restore Database	All	Custom	D

Figure 3-22 Incremental migration database information

Table 3-10 Microso	ft SQL	Server	database	information
--------------------	--------	--------	----------	-------------

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

Parameter	Description	
Backup Type	Select Incremental.	
	Incremental: indicates log backup files.	
Last Backup File	A complete restoration process involves restoring several incremental backup files. The destination DB instance will not be available until the last backup file is restored. You can determine whether the selected backup file is the last one. Select <b>Yes</b> in either of the following scenarios:	
	Perform a one-time full migration.	
	• The selected backup file is the last one to be restored.	
	Select <b>No</b> if the incremental backup is performed before migration. In this case, the destination database is in the restoring state and cannot be read or written.	
Perform Pre- verification	Specifies whether to perform pre-verification on the backup migration task. The default value is <b>Yes</b> .	
	• <b>Yes</b> : To ensure successful migration and identify potential problems in advance, verify the validity, integrity, continuity, and version compatibility of backup files before restoration.	
	• No: If pre-verification is not performed, the migration speed is faster, but you need to check the validity, integrity, continuity, and version compatibility of backup files on your own.	
Restore Database	You can restore all or some of databases.	
	• All: Restores all databases in the backup file. You do not need to enter the names of the databases to be restored. By default, all databases in the backup file are restored.	
	• <b>Custom</b> : Restore specified databases from the backup file. You need to enter the names of the databases to be restored.	

- **Step 5** On the **Confirm Task** page, check the configuration details, read and agree to the agreement, and click **Next**.
- **Step 6** In the task list on the **Backup Migration Management** page, check whether the task is in the **Restoring** status. If the migration is successful, the task status becomes **Successful**.

----End

## **Checking Database Transactions**

Before service migration, stop services and ensure that no unfinished transaction exists in the database. Otherwise, data may be lost during migration.

**Step 1** Run the following statement to check whether the IP addresses of the service system are disconnected:

select \* from sys.dm\_exec\_connections;

- If yes, all service system IP addresses are disconnected and the last incremental backup can be migrated.
- If no, go to **Step 2**.
- Step 2 If an IP address is not disconnected, run the following statement to query the sessions that are not closed: select \* from sys.dm exec sessions;

Run the following statement to view the transactions that are being executed:

select \* from sys.dm\_tran\_session\_transactions;

If the query result contains unclosed sessions and transactions that are being executed, go to **Step 3**.

**Step 3** The last incremental backup can be migrated only after the transaction is complete, the session is closed, and the service system is disconnected.

----End

## Last Incremental Migration

After several incremental migrations, the two databases are almost consistent. During the transaction checks, services are stopped and no data will be generated. Then, you need to perform the last incremental migration to ensure the data consistency.

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

Backup	Backup File Information				
* Databas	se Type	Microsoft SQL Server			
* Backup	File Source	OBS Bucket RDS full backup	0		
* Bucket	Name	drs · · ·	• C Ø		
Tags		t is recommended that you use TMS's predefi	ned tag function to add the same tag to different cloud resources. V	iew predefined tags	
		Tag key Tag value			
Enter a b	backup name.	You can add 10 more tags.		C	
Ba	ackup Name		Size	Last Modified Time	
	10.00	transfer_test1.bak	2.77 MB	Jul 25, 2019 11:15:21 GMT+08:00	
	104030	transfer_test2.bak	2.77 MB	Jul 25, 2019 11:15:21 GMT+08:00	
	104030	_transfer_test3.bak	2.77 MB	Jul 25, 2019 11:15:22 GMT+08:00	
	140,000	_transfer_test1.bak	149.50 KB	Jul 25, 2019 11:17:00 GMT+08:00	

Figure 3-23 Incremental backup

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

 Table 3-11 Migration task information

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

Database Information			
* Destination RDS DB Instance Name	oh just 10		Select Destination RDS DB Instance
* Backup Type	Full	Incremental	
	Incremental: indicates tran	saction log backup files	
* Last Backup File ( 🤉	Yes	No	
	If you select Yes, the destin	nation databases <mark>involv</mark>	ed in this migration remain available and incremental backups can no longer be restored.
* Perform Pre-verification	Yes	No	
* Restore Database	All	Custom	0

Figure 3-24 Incremental migration database information

## Table 3-12 Microsoft SQL Server database information

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

Parameter	Description
Backup Type	Select Incremental. Incremental: indicates log backup files.
Last Backup File	Select <b>Yes</b> because it is the last incremental migration after services are stopped.
Perform Pre- verification	Specifies whether to perform pre-verification on the backup migration task. The default value is <b>Yes</b> .
	• <b>Yes</b> : To ensure successful migration and identify potential problems in advance, verify the validity, integrity, continuity, and version compatibility of backup files before restoration.
	• No: If pre-verification is not performed, the migration speed is faster, but you need to check the validity, integrity, continuity, and version compatibility of backup files on your own.
Restore Database	You can restore all or some of databases.
	• All: Restores all databases in the backup file. You do not need to enter the names of the databases to be restored. By default, all databases in the backup file are restored.
	• <b>Custom</b> : Restore specified databases from the backup file. You need to enter the names of the databases to be restored.

- **Step 5** On the **Confirm Task** page, check the configuration details, read and agree to the agreement, and click **Next**.
- **Step 6** In the task list on the **Backup Migration Management** page, check whether the task is in the **Restoring** status. If the migration is successful, the task status becomes **Successful**.

----End

# **3.1.7 Manual Configuration**

## **Scenarios**

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

## Login Account

Login account is an instance-level account of Microsoft SQL Server and is used to manage user server and database permissions. Generally, a user has multiple such accounts. After the user is migrated to the RDS 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 3-25 Obtaining the script

	CreateLogin
2	IF (SUSER_ID('sa') IS NULL) EECIN CREATE LOGIN [sa] WITH PASSWORD = 0x010039EF2EFAD6A3DE4E2AEE941E8ED32E5189A4EE757
	IF (SUSER_ID('rdsuser2') IS NULL) EECIN CREATE LOGIN [rdsuser2] WITH PASSWORD = 0x0100EE8DCEC25FC67008D4EE75AD660D1
	IF (SUSER_ID('csidbo') IS NULL) BEGIN CREATE LOGIN [csidbo] WITH PASSWORD = 0x0100A508789C15CE6888648162A5EDF4F4D2E.
	IF (SUSER_ID('TestLogin7') IS NULL) BECIN CREATE LOGIN [TestLogin7] WITH PASSWORD = 0x010073DA9A79E6677E8AF7077EF67.
	IF (SUSER_ID("rdsuser3") IS NULL) EECIN CREATE LOCIN [rdsuser3] WITH PASSWORD = 0x01009448FEDECE8D5E5E2529384028CA0
	IF (SUSER_ID('Test2') IS NULL) BEGIN CREATE LOGIN [Test2] WITH PASSWORD = 0x0100130953CEEAEC997D08B6BAF65F84EBCAA44
	IF (SUSER_ID('Test3') IS NULL) BEGIN CREATE LOGIN [Test3] WITH PASSWORD = 0x0100EE98873948E02595EDCD953842663728187
	IF (SUSER_ID('Test4') IS NULL) BECIN CREATE LOGIN [Test4] WITH PASSWORD = 0x01000EE91B9EF087741F16A44E70AA813D0EA88
	IF (SUSER ID('Test5') IS NULL) REGIN CREATE LOGIN [Test5] WITH PASSWORD = 0x0100568EF845DF098D2DF9395AF7E7618A20735

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

declare @DBName nvarchar(200)
declare @Login\_name nvarchar(200)
declare @SQL nvarchar(MAX)
set @Login\_name = 'TestLogin7' //Enter the login name one by one.
declare DBName\_Cursor cursor for
select quotename(name)from sys.databases where database\_id > 4 and state = 0
and name not like '%\$%'
and name <> 'rdsadmin'
open DBName\_Cursor
fetch next from DBName\_Cursor into @DBName
WHILE @@FETCH\_STATUS= 0
begin
SET @SQL=' USE '+ (@DBName)+ '
if exists(select top 1 1 from sys.sysusers where name = '''+ @Login\_name +''')
begin

```
ALTER USER '+@Login_name+' with login = '+@Login_name+';
end
'
print @SQL
EXEC (@SQL)
fetch next from DBName_Cursor into @DBName
end
close DBName_Cursor
deallocate DBName_Cursor
```

#### **NOTE**

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

----End

## **Database Link**

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

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

Figure 3-26 Viewing database links



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





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

USE [master] GO

/\*\*\*\*\*\* Object: LinkedServer [DRS\_TEST\_REMOTE] Script Date: 2019/5/25 17:51:50 \*\*\*\*\*\*/ EXEC master.dbo.sp\_addlinkedserver @server = N'DRS\_TEST\_REMOTE', @srvproduct=N'', @provider=N'SQLNCLI', @datasrc=N'DESKTOP-B18JH5T\SQLSERVER2016EE' /\* For security reasons the linked server remote logins password is changed with ######## \*/ EXEC master.dbo.sp\_addlinkedsrvlogin @rmtsrvname=N'DRS\_TEST\_REMOTE',@useself=N'False',@locallogin=NULL,@rmtuser=N'sa',@r 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 3-28 Viewing Jobs

Co	nnect • 🛃 🛃 💷 🍸 😰	3
•	👩 DEUCTOP-DHNDLE (SC	L Server 12.0.2000 - CHINIK #005100
	🗉 🚞 Databases	
	🗉 🚞 Security	
	🗉 🚞 Server Objects	
Replication		
🗉 🛅 AlwaysOn High Availability		
🗄 🚞 Management		
Integration Services Catalogs		
	SQL Server Agent	
	😑 🚞 Jobs	
	CDW_DESKTO	P-DHNDL3I_DESKTOP-DHNDL3I_0
	📑 HugeDbs.Sub	plan_1
	📑 HugeDbs.Sub	plan_2
	syspolicy_pur	ge_history
	🖓 Job Activity Mon	itor
	🗉 🚞 Alerts	
Derators		
🗉 🤖 Proxies		
Error Logs		

**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.





- **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'

## D 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: \RDSDBDATA\Temp\tempdb1.ndf' , SIZE = 65536KB , FILEGROWTH = 65536KB ) GO

ALTER DATABASE [tempdb] ADD FILE ( NAME = N'tempdb2', FILENAME = N'D: \RDSDBDATA\Temp\tempdb2.ndf' , SIZE = 65536KB , FILEGROWTH = 65536KB ) GO

ALTER DATABASE [tempdb] ADD FILE ( NAME = N'tempdb3', FILENAME = N'D: \RDSDBDATA\Temp\tempdb3.ndf' , SIZE = 65536KB , FILEGROWTH = 65536KB ) GO

ALTER DATABASE [tempdb] ADD FILE ( NAME = N'tempdb4', FILENAME = N'D: \RDSDBDATA\Temp\tempdb4.ndf' , SIZE = 65536KB , FILEGROWTH = 65536KB ) GO

ALTER DATABASE [tempdb] ADD FILE ( NAME = N'tempdb5', FILENAME = N'D: \RDSDBDATA\Temp\tempdb5.ndf' , SIZE = 65536KB , FILEGROWTH = 65536KB ) GO

ALTER DATABASE [tempdb] ADD FILE ( NAME = N'tempdb6', FILENAME = N'D: \RDSDBDATA\Temp\tempdb6.ndf' , SIZE = 65536KB , FILEGROWTH = 65536KB ) GO

ALTER DATABASE [tempdb] ADD FILE ( NAME = N'tempdb7', FILENAME = N'D: \RDSDBDATA\Temp\tempdb7.ndf' , SIZE = 65536KB , FILEGROWTH = 65536KB ) GO
间 Database Properties - drs	s_test_1						$\times$
elect a page	🖾 Script 👻 🛐	Help					
Filegroups Options Change Tracking Extended Properties Wirvering	Database <u>n</u> ame: <u>O</u> wner:		drs_test_1 CHINA\w00510300				•
	⊻ ⊻se full-tes	ct indexing					
Transaction Log Shipping	Logical Name	File Type	Filegroup	Initial Size (MB)	Autogr	owth / Max	xsize
	drs_test_i	LOG	Not April 1	0	Dy 1 1		T
-							
onnection							
Server: DESKTOP-DHNDL3I							
Connection: CHINA\w00510300							
View connection properties							
rogress							
Ready	<						>
				Add	Ē	<u>k</u> emove	
				OB		Cancel	

Figure 3-30 Checking temporary files

- 2. Database isolation level: Check whether the database isolation level is enabled on the source DB instance and synchronize the isolation level to the RDS 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.

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Programmability     P	E Synonyms	📑 🚰 Extended Properties	Containment type: None		~
<ul> <li>Service Brocker</li> <li>Storage</li> <li>Storage</li> <li>Storage</li> <li>Grstest 10</li> <li>Grstest 11</li> <li>Grstest 12</li> <li>Grstest 13</li> <li>Grstest 15</li> <li>Grstest 16</li> <li>Grstest 16</li> <li>Grstest 17</li> <li>Grstest 18</li> <li>Grstest 18</li> <li>Grstest 18</li> <li>Grstest 2</li> <li>Grstest 2</li> <li>Jimcompatible</li> <li>Grstest 21</li> <li>Grstest 21</li> <li>Freges</li> <li>Kady Water Statistics</li> <li>Freges</li> <li>Kady Statistics</li> <li>Kady Statistics</li> <li>Statistics</li> <li>Statist</li></ul>	Programmability	Mirroring			
<ul> <li>Storage</li> &lt;</ul>	III i Senice Broker	📲 🚰 Transaction Log Shipping	Uther options:		
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B drs test 26	H i drs test 26			OK	Concol
B drs test 27	I drs test 27			20	- and -

Figure 3-31 Max Degree of Parallelism

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

Figure 3-32 max degree of parallelism

notance Management > rds-aqberver-tijm 👻 🔕 Anailable 🛛 🖉 Grand Database 🖸					
Basic Information Backups & Restorations	Parameters Change History				
EIPs	Save Cancel Preview E	xport Compare			max degree of para ×   Q   C
Distributed Transactions	Parameter Name 💠	Effective upon Reboot \$	Value	Allowed Values	Description
Logs	max degree of parallelism	No	0	0-32,767	Max degree of parallelism option. When SQL Server runs on a computer with more than
Parameters					

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

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

🧻 Database Properties -	drs_test_1		-	×
Select a page	🔄 Script 🔻 📑 Help			
🚰 General	a			
Files Filegroups	<u>C</u> ollation:	Chinese_PRC_CI_AS		$\sim$
Options Change Tracking	Recovery <u>m</u> odel:	Full		$\sim$
🚰 Permissions	Compatibility <u>l</u> evel:	SQL Server 2014 (120)		$\sim$
🚰 Extended Properties 🚰 Mirroring	Containment <u>t</u> ype:	None		$\sim$

# **4** Real-Time Synchronization

## 4.1 From Other Cloud PostgreSQL to RDS PostgreSQL

DRS helps you synchronize PostgreSQL instances from other cloud platforms to the current cloud. DRS supports real-time synchronization to ensure real-time flow of key service data.

This section describes how to use DRS to synchronize data from a PostgreSQL instance on another cloud to the current cloud. Synchronization scenarios include:

- Synchronizing PostgreSQL databases from another cloud to the current cloud.
- Synchronizing PostgreSQL databases from other cloud servers to the current cloud in real time.

## Diagram



Figure 4-1 Real-time synchronization of other cloud RDS PostgreSQL databases



Figure 4-2 PostgreSQL databases on other cloud servers

## **Synchronization Process**



## \_

## Synchronization Suggestions (Important)

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

## Notes on Synchronization (Important)

### NOTICE

Before creating a real-time synchronization task, read this section carefully.

For details, see **Precautions** in *Real-Time Synchronization*.

## **Synchronization Preparations**

1. Permissions

**Table 4-1** lists the permissions required for the source and destination databases when you synchronize a PostgreSQL database from another cloud to the current cloud.

Table 4-1 Account	permissions
-------------------	-------------

Synchronization Type	Full	Full+Incremental
Source	<ul> <li>Database: CONNENT</li> <li>Schema: USAGE</li> <li>Table with a primary key: SELECT</li> <li>Tables without primary keys: SELECT, UPDATE, DELETE, and TRUNCATE</li> <li>Sequence: SELECT</li> </ul>	<ul> <li>Account: REPLICATION</li> <li>Database: CONNENT</li> <li>Schema: USAGE</li> <li>Table with a primary key: SELECT</li> <li>Tables without primary keys: SELECT, UPDATE, DELETE, and TRUNCATE</li> <li>Sequence: SELECT</li> </ul>
Destination	CREATEDB	CREATEDB, CREATEROLE

- Source database permissions:

The source PostgreSQL database account must have all the required permissions listed in **Table 4-1**. If the permissions are insufficient, create a user that has all of the permissions on the source database.

Currently, you can use DRS to migrate databases on Alibaba Cloud and Tencent Cloud.

– Destination database permissions:

If the destination database is a PostgreSQL database on the current cloud, the initial account can be used.

2. Network settings

Enable public accessibility for the source database.

- Source database network settings:
  - Enable public accessibility for the source PostgreSQL database.
- Destination database network settings:

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

- 3. Security rules
  - Source database security group settings:

The synchronization instance needs to be able to access the source database, which means that the EIP of the replication instance must be on the whitelist of the source PostgreSQL instance.

For example, if you want to synchronize a PostgreSQL database from Alibaba Cloud to the current cloud, you need to set the source database whitelist based on the instructions provided by **Alibaba Cloud documentation**. Before configuring the network whitelist, you need to obtain the EIP of the synchronization instance.

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

#### Figure 4-4 Synchronization Instance EIP

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

After the synchronization is complete, you can delete the rules.

– Destination database security group settings:

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

4. Other

DRS can synchronize only some types of DDL statements of PostgreSQL. For details, see **related guides**. Properly plan the source database services. Do not perform DDL operations that are not supported during synchronization.

## Procedure

**Step 1** Create a synchronization task.

1. Log in to the management console and choose **Databases** > **Data Replication Service** to go to the DRS console.

## 2. On the **Data Synchronization Management** page, click **Create Synchronization Task**.

3. On the displayed page, specify the task name, description, and synchronization instance details.

### Figure 4-5 Synchronization instance information

Synchronization Instar	nce Details 💿
The following information cannot be mod	Ified after you go to the next page.
* Data Flow	To the cloud Out of the cloud Self-built to self-built
	The destination database must be a database in the current cloud. If you want to synchronize data between databases, select To the cloud.
* Source DB Engine	MySQL Oracle DDM GaussDB(for MySQL) Distributed Edition PostgreSQL
* Destination DB Engine	GaussDB(DVVS) GaussDB(tor openGauss) Distributed Edition GaussDB(tor openGauss) Primary/Stando ProstgreGOL
* Network Type	Public network • 🛞
	V I understand that an EIP will be automatically bound to the replication instance and released after the synchronization task is complete.
* Destination DB Instance	Select an instance
* Synchronization Instance Subnet	Select the subnet   View Subnets View occupied IP address
* Synchronization Mode	Full-Incremental Full
	This synchronization type synchronizes data in real time. After a full synchronization initializes the destination database, an incremental synchronization parses logs to ensure data consistency between the source and destination database
* Enterprise Project	-Select- C View Project Management (2)
Tags	It is recommended that you use TMS's predefined tag function to add the same tag to different cloud resources. View predefined tags C
	Tag key Tag value

## Table 4-2 Task settings

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

#### Table 4-3 Synchronization instance settings

Parameter	Description
Data Flow	To the cloud
Source DB Engine	Select <b>PostgreSQL</b> .
Destination DB Engine	Select <b>PostgreSQL</b> .
Network Type	Select <b>Public network</b> . Enabling SSL is recommended. It may slow down the synchronization by 20% to 30% but it ensures data security.
Destination DB Instance	The PostgreSQL instance you purchased.

Parameter	Description
Synchronization	Full+Incremental
Туре	This synchronization mode allows you to synchronize data in real time. After a full synchronization initializes the destination database, an incremental synchronization parses logs to ensure data consistency between the source and destination databases.
	<b>NOTE</b> If you select the <b>Full+Incremental</b> synchronization mode, ongoing changes made to the data will be synchronized to the destination database in real time, ensuring that the source database remain accessible.

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

Figure 4-6 Source and	destination	database	details
-----------------------	-------------	----------	---------

Source Database	
System databases, users, parameters, and j	obs will not be migrated. You need to manually import users and jobs to the destination database and configure parameters in parameter templates of the destination database.
IP Address or Domain Name	
Port	
Database Username	
Database Password	100 E
SSL Connection	
	If you want to enable SSL connection, ensure that SSL has been enabled on the source database, and related parameters have been correctly configured.
	Test Connection This button is available only after the replication instance is created successfully.
Destination Database	
DB Instance Name	pg-12-for-autotest ( )
Database Username	
Database Password	8

#### Table 4-4 Source database settings

Parameter	Description
IP Address or Domain Name	The IP address or domain name of the source database.
Port	The port of the source database. Range: 1 - 65535
Database Username	A username for the source database.
Database Password	The password for the database username.

Parameter	Description
SSL Connection	To improve data security during synchronization over a public network, you are advised to enable SSL to encrypt synchronization links and upload a CA certificate.

Table 4-5 Destination database settings

Parameter	Description
DB Instance Name	The RDS PostgreSQL instance you have selected during the synchronization instance creation is displayed by default and cannot be changed.
Database Username	The username for accessing the destination PostgreSQL DB instance.
Database Password	The password for the database username.

5. On the **Set Synchronization Task** page, select the synchronization object and user.

### Figure 4-7 Synchronization mode



Table 4-6	Synchronization	object
-----------	-----------------	--------

Parameter	Description			
Flow Control	You can choose whether to control the flow.			

Parameter	Description				
Incremental Conflict Policy	The real-time synchronization function provides conflict policies for you to choose from if the synchronized data conflicts with existing data (such as the source and destination databases containing the same primary or unique keys) in the destination database.				
	Select any of the following conflict policies:				
	<ul> <li>Ignore</li> <li>The system will skip the conflicting data and continue the subsequent synchronization process.</li> </ul>				
	<ul> <li>Report error</li> <li>The synchronization task will be stopped and fail.</li> </ul>				
	<ul> <li>Overwrite</li> <li>Conflicting data will be overwritten.</li> </ul>				
	In the following scenarios, you can select <b>Ignore</b> or <b>Overwrite</b> . In other scenarios, you are advised to select <b>Report error</b> .				
	<ul> <li>Data already exists in the destination database.</li> </ul>				
	<ul> <li>Multiple source databases are synchronized to one destination database.</li> </ul>				
	- Data in the destination database is updated manually.				
Synchronize	Available options: Index, Incremental DDLs, and Populate materialized views during the full synchronization phase				
	<b>Populate materialized views during the full</b> <b>synchronization phase</b> : This option takes effect only for materialized views that was populated in the source database. This operation affects the full synchronization performance. You perform this operation after the full synchronization is complete.				
Synchronizati on Object	DRS supports database- and table-level synchronization. You can select databases or tables for synchronization based on your service requirements. A single task can synchronize objects from only one database. Database name mapping is supported.				
	<ul> <li>Database-level synchronization synchronizes all objects in the source database to the destination database.</li> </ul>				
	<ul> <li>Table-level synchronization synchronizes the selected table objects to the destination database.</li> </ul>				
	<b>NOTE</b> If you select table-level synchronization, the selected table may have dependencies on other objects in the database. If the referenced objects are not selected and do not exist in the destination database, the task will fail. Ensure that all referenced objected are selected before synchronization or select database- level synchronization.				

Parameter	Description
Synchronize Account	During the synchronization, you can synchronize accounts based on your service requirements.
	There are two types of accounts: accounts that can be synchronized and accounts that cannot be synchronized. For accounts that cannot be synchronized, you can view details in the <b>Remarks</b> column and determine whether to synchronize accounts and permissions based on your service requirements.

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

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

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

D NOTE

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

7. On the **Confirm Task** page, specify **Start Time** and click **Next**.

### **NOTE**

- Set **Start Time** to **Start upon task creation** or **Start at a specified time** based on site requirements.
- After a synchronization task is started, the performance of the source and destination databases may be affected. You are advised to start a synchronization task during off-peak hours.
- 8. After the task is submitted, go back to the **Data Synchronization Management** page to view the task status.

### **Step 2** Manage the migration task.

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

• Full synchronization

Viewing the synchronization progress: Click the target full synchronization task, and on the **Migration Progress** tab, you can see the synchronization progress of the structure, data, indexes, and synchronization objects. When the progress reaches 100%, the synchronization is complete.

- Incremental synchronization
  - Viewing the synchronization delay: After the full synchronization is complete, an incremental synchronization starts. On the Data Synchronization Management page, click the target synchronization task. On the displayed page, click Synchronization Progress to view the synchronization delay of the incremental synchronization. If the synchronization delay is 0s, the destination database is being

synchronized with the source database in real time. You can also view the data consistency on the **Synchronization Comparison** tab.

Figure 4-8 Viewing the synchronization delay

Basic Information					
Synchronization Comparison	Nate: Do not change the usernames, passwords, and permissions of source and destinat Last Updated Dec 20, 2821 10:41:03 GMT+08:00	tion database users before the task has completed.			
Synchronization Progress	Progress -				
Process Data					
Synchronization		Full Synchronization Completed	Incremental synchronization delay		
Mapping		100%	05 0		
Synchronization Logs	Duran Dantari	10070	00 0	Destruction Destruction	
Abnormal Records	Source Database			Destination Database	
Tags				)	

 Viewing the synchronization comparison results: To minimize service downtime, click the name of an incremental synchronization task. On the Synchronization Comparison page, create a comparison task.

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

#### **Step 3** Cut over services.

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

- 1. Interrupt services first. If the workload is not heavy, you may not need to interrupt the services.
- 2. Run the following statement on the source database and check whether any new sessions execute SQL statements within the next 1 to 5 minutes. If there are no new statements executed, the service has been stopped. select \* from pg\_stat\_activity;

### **NOTE**

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

- 3. On the **Synchronization Progress** page, view the synchronization delay. When the delay is displayed as 0s and remains stable for a period, then you can perform a data-level comparison between the source and destination databases. For details about the time required, refer to the results of the previous comparison.
  - If there is enough time, compare all objects.
  - If there is not enough time, use the data-level comparison to compare the tables that are frequently used and that contain key business data or inconsistent data.
- 4. Determine an appropriate time to cut the services over to the destination database. After services are restored and available, the synchronization is complete.
- **Step 4** Complete the synchronization.
  - 1. Stop the synchronization task. After databases and services are synchronized to the destination database, to prevent operations on the source database

from being synchronized to the destination database to overwrite data, you can stop the synchronization task. This operation only deletes the synchronization instance, and the synchronization task is still displayed in the task list. You can view or delete the task. You will not be charged for the synchronization task after the task is stopped.

2. Delete the synchronization task. After the synchronization task is complete, you can delete it. After the synchronization task is deleted, it will not be displayed in the task list.

----End

## 4.2 From PostgreSQL on ECS to RDS PostgreSQL

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

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

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

## Diagram



### Figure 4-9 Source and destination databases in the same VPC



**Figure 4-10** Source and destination databases in the same region and different VPCs

## **Synchronization Process**



## Figure 4-11 Flowchart

## Synchronization Suggestions (Important)

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

## Notes on Synchronization (Important)

### NOTICE

Before creating a real-time synchronization task, read this section carefully.

For details, see **Precautions** in *Real-Time Synchronization*.

## **Synchronization Preparations**

1. Permissions

**Table 4-7** lists the source and destination database user permissions required in full and incremental synchronization from PostgreSQL databases on ECS to the PostgreSQL DB instances on the current cloud.

Synchronization Type	Full	Full+Incremental		
Source	<ul> <li>Database: CONNENT</li> <li>Schema: USAGE</li> <li>Table with a primary key: SELECT</li> <li>Tables without primary keys: SELECT, UPDATE, DELETE, and TRUNCATE</li> <li>Sequence: SELECT</li> </ul>	<ul> <li>Account: REPLICATION</li> <li>Database: CONNENT</li> <li>Schema: USAGE</li> <li>Table with a primary key: SELECT</li> <li>Tables without primary keys: SELECT, UPDATE, DELETE, and TRUNCATE</li> </ul>		
		Sequence: SELECT		
Destination	CREATEDB	CREATEDB, CREATEROLE		

 Table 4-7 Account permissions

Source database permissions:

The source database user must have all the required permissions listed in **Table 4-7**. If the permissions are insufficient, create a user that has all of the permissions on the source database.

Destination database permissions:
 If the destination database is a PostgreSQL database on the current cloud, the initial account can be used.

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

DRS can synchronize only some types of DDL statements of PostgreSQL. For details, see **related guides**. Properly plan the source database services. Do not perform DDL operations that are not supported during synchronization.

### Procedure

**Step 1** Create a synchronization task.

- 1. Log in to the management console and choose **Databases** > **Data Replication Service** to go to the DRS console.
- 2. On the **Data Synchronization Management** page, click **Create Synchronization Task**.
- 3. On the displayed page, specify the task name, exception notification, task description, and synchronization instance details.

Synchronization Instance Details 💿							
The following information cannot be modified after you go to the next page.							
* Data Flow	To the cloud Qu	t of the cloud	Self-built to self-built				
	The destination database must t	e a database in the	current cloud. If you want to sy	inchronize data betwee	en databases, select To the cloud		
* Source DB Engine	MySQL Oracle	DDM	GaussDB(for MySQL) D	listributed Edition	PostgreSQI,		
* Destination DB Engine	GaussDB(DWS)	GaussDB(for open	Gauss) Distributed Edition	GaussDB(for op	enGauss) Primary/Standb	PostgreSQL	
* Network Type	VPC		• 0				
* Destination DB Instance	Select an instance		C View DB Instance	View Unselectable DB	Instance		
* Synchronization Instance Subnet	default_subnet(192.168.0.0/24	default_submet(192.168.0.024)    The IP address is automatically allocated but it can t					
* Synchronization Mode	Full+Incremental	Full					
	This synchronization type synch	ronizes data in real t	ime. After a full synchronization	n initializes the destina	ion database, an incremental sy	chronization parses logs to ensure data o	onsistency between the source and destination databa
* Enterprise Project	-Select-		C View Project Manage	gement (?)			
Tags	It is recommended that you use TM	S's predefined tag fo	unction to add the same tag to	different cloud resourc	es. View predefined tags C		
	Tag key	Tag value					
	You can add 10 more tags.						

#### Figure 4-12 Synchronization instance settings

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

 Table 4-9 Synchronization instance settings

Parameter	Description
Data Flow	To the cloud
Source DB Engine	Select <b>PostgreSQL</b> .
Destination DB Engine	Select <b>PostgreSQL</b> .
Network Type	Select a VPC network. Enabling SSL is recommended. It may slow down the synchronization by 20% to 30% but it ensures data security.
Destination DB Instance	The PostgreSQL instance you purchased.
Synchronization	Full+Incremental
Туре	This synchronization mode allows you to synchronize data in real time. After a full synchronization initializes the destination database, an incremental synchronization parses logs to ensure data consistency between the source and destination databases.
	<b>NOTE</b> If you select the <b>Full+Incremental</b> synchronization type, data generated during the full synchronization will be synchronized to the destination database with zero downtime, ensuring that both the source and destination databases remain accessible.

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

## **NOTE**

Source databases are classified into two types: self-built databases on ECSs and RDS DB instances. Configure parameters based on different scenarios.

- Scenario 1: Self-built databases on ECS - source database configuration

Figure 4-13 Self-build on ECS - source database information

Source Database	
Source Database Type	Self-built on ECS RDS DB instance
VPC	C View VPC
Subnet	• ③
IP Address or Domain Name	
Port	
Database Username	root ORS migrates only some key parameters to the destination database. For the other parameters that cannot be migrated, you need to use parameter templates to configure them on the destination database.
Database Password	
SSL Connection	
	If you want to enable SSL connection, ensure that SSL has been enabled on the source database, related parameters have been correctly configured, and an SSL confificate has been uploaded.
Encryption Certificate	Select
	Test Connection Set Successful

#### Table 4-10 Self-build on ECS - source database information

Parameter	Description
Source Database Type	Select Self-built on ECS.
VPC	A dedicated virtual network in which the source database is located. It isolates networks for different services. You can select an existing VPC or create a VPC.
Subnet	A subnet provides dedicated network resources that are logically isolated from other networks, improving network security. The subnet must be in the AZ where the source database resides. You need to enable DHCP for creating the source database subnet.
IP Address or Domain Name	The IP address or domain name of the source database.
Port	Enter an integer ranging from 1 to 65535, which indicates the port number of the source database.
Database Username	A username for the source database.
Database Password	The password for the database username.

Parameter	Description
SSL Connection	To improve data security during synchronization over a public network, you are advised to enable SSL to encrypt synchronization links and upload a CA certificate.

- Scenario 2: RDS DB instance - source database configuration

Figure 4-14 RDS DB instance - source database information

Source Database			
System databases, users, parameters, and jobs will not be migrated. You need to manually import users and jobs to the destination database and configure parameters in parameter templates of the destination database			
Source Database Type	Self-built on ECS	RDS DB Instance	
DB Instance Name	rds-	*	C View DB Instance View Unselectable DB Instance
Database Username			
Database Password		69	
	Test Connection		



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

### Figure 4-15 Destination database settings

#### Destination Database

DB Instance Name	rds	
Database Username		
Database Password	····· Ka	
	Test Connection	

Table 4-12 Destination	database settings
------------------------	-------------------

Parameter	Description
DB Instance Name	The RDS PostgreSQL instance you have selected during the synchronization instance creation is displayed by default and cannot be changed.
Database Username	The username for accessing the destination PostgreSQL DB instance.
Database Password	The password for the database username.

5. On the **Set Synchronization Task** page, select the synchronization object and user.

## Figure 4-16 Synchronization mode



Table 4-13	Synchronization	object

Parameter	Description
Incremental Conflict Policy	The real-time synchronization function provides conflict policies for you to choose from if the synchronized data conflicts with existing data (such as the source and destination databases containing the same primary or unique keys) in the destination database.
	Select any of the following conflict policies:
	<ul> <li>Ignore</li> <li>The system will skip the conflicting data and continue the subsequent synchronization process.</li> </ul>
	<ul> <li>Report error</li> <li>The synchronization task will be stopped and fail.</li> </ul>
	<ul> <li>Overwrite</li> <li>Conflicting data will be overwritten.</li> </ul>
	In the following scenarios, you can select <b>Ignore</b> or <b>Overwrite</b> . In other scenarios, you are advised to select <b>Report error</b> .
	<ul> <li>Data already exists in the destination database.</li> </ul>
	<ul> <li>Multiple source databases are synchronized to one destination database.</li> </ul>
	- Data in the destination database is updated manually.
Synchronize	Available options: Index, Incremental DDLs, and Populate materialized views during the full synchronization phase
	<b>Populate materialized views during the full</b> <b>synchronization phase</b> : This option takes effect only for materialized views that was populated in the source database. This operation affects the full synchronization performance. You perform this operation after the full synchronization is complete.
Synchronizati on Object	Objects can be synchronized at the database or table level. You can synchronize the entire database or some tables based on service requirements. For a single task, you can synchronize objects in only one database of an instance. Database name mapping is supported.
	<ul> <li>Database-level synchronization synchronizes all objects in the source database to the destination database.</li> </ul>
	<ul> <li>Table-level synchronization synchronizes the selected table objects to the destination database.</li> </ul>
	<b>NOTE</b> If you select table-level synchronization, the selected table may have dependencies on other objects in the database. If the referenced objects are not selected and do not exist in the destination database, the task will fail. Ensure that all referenced objected are selected before synchronization or select database- level synchronization.

Parameter	Description
Synchronize Account	During the synchronization, you can synchronize accounts based on your service requirements.
	There are two types of accounts: accounts that can be synchronized and accounts that cannot be synchronized. For accounts that cannot be synchronized, you can view details in the <b>Remarks</b> column and determine whether to synchronize accounts and permissions based on your service requirements.

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

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

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

D NOTE

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

7. On the **Confirm Task** page, specify **Start Time** and click **Next**.

#### **NOTE**

- Set **Start Time** to **Start upon task creation** or **Start at a specified time** based on site requirements.
- After a synchronization task is started, the performance of the source and destination databases may be affected. You are advised to start a synchronization task during off-peak hours.
- 8. After the task is submitted, go back to the **Data Synchronization Management** page to view the task status.

#### **Step 2** Manage the migration task.

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

• Full synchronization

Viewing the synchronization progress: Click the target full synchronization task, and on the **Migration Progress** tab, you can see the synchronization progress of the structure, data, indexes, and synchronization objects. When the progress reaches 100%, the synchronization is complete.

- Incremental synchronization
  - Viewing the synchronization delay: After the full synchronization is complete, an incremental synchronization starts. On the Data Synchronization Management page, click the target synchronization task. On the displayed page, click Synchronization Progress to view the synchronization delay of the incremental synchronization. If the synchronization delay is 0s, the destination database is being

synchronized with the source database in real time. You can also view the data consistency on the **Synchronization Comparison** tab.

Figure 4-17 Viewing the synchronization delay

-	-	-		-	
Basic Information					
Synchronization Comparison	Note: Do not change the usernames, passwords, and permissions of source and destination Last Updated Dec 20, 2821 10:41:03 GMT+08:00	in database users before the task has completed.			
Synchronization Progress	Progress -				
Process Data					
Sunchronization		Full Synchronization Completed	Incremental synchronization delay		
Mapping		1002			
Synchronization Logs		100%	US (J	•	
Abnormal Records	Source Database			Destination Database	
Tags				)	

 Viewing the synchronization comparison results: To minimize service downtime, click the name of an incremental synchronization task. On the Synchronization Comparison page, create a comparison task.

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

### **Step 3** Cut over services.

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

- 1. Interrupt services first. If the workload is not heavy, you may not need to interrupt the services.
- 2. Run the following statement on the source database and check whether any new sessions execute SQL statements within the next 1 to 5 minutes. If there are no new statements executed, the service has been stopped. select \* from pg\_stat\_activity;

### **NOTE**

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

- 3. On the **Synchronization Progress** page, view the synchronization delay. When the delay is displayed as 0s and remains stable for a period, then you can perform a data-level comparison between the source and destination databases. For details about the time required, refer to the results of the previous comparison.
  - If there is enough time, compare all objects.
  - If there is not enough time, use the data-level comparison to compare the tables that are frequently used and that contain key business data or inconsistent data.
- 4. Determine an appropriate time to cut the services over to the destination database. After services are restored and available, the synchronization is complete.
- **Step 4** Complete the synchronization.
  - 1. Stop the synchronization task. After databases and services are synchronized to the destination database, to prevent operations on the source database

from being synchronized to the destination database to overwrite data, you can stop the synchronization task. This operation only deletes the synchronization instance, and the synchronization task is still displayed in the task list. You can view or delete the task. You will not be charged for the synchronization task after the task is stopped.

2. Delete the synchronization task. After the synchronization task is complete, you can delete it. After the synchronization task is deleted, it will not be displayed in the task list.

----End

## 4.3 From On-Premises PostgreSQL to RDS PostgreSQL

DRS supports data synchronization from on-premises MySQL databases to PostgreSQL instances on the current cloud. With DRS, you can synchronize databases online with zero downtime and your services and databases can remain operational during migration.

This section describes how to configure DRS to migrate data from an on-premises PostgreSQL database to a PostgreSQL instance on the current cloud. The following network types are supported:

- VPN
- Public network

## Diagram



#### Figure 4-19 Public network+SSL connection



## Synchronization Process





## Synchronization Suggestions (Important)

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

## Notes on Synchronization (Important)

### NOTICE

Before creating a real-time synchronization task, read this section carefully.

For details, see **Precautions** in *Real-Time Synchronization*.

## Synchronization Preparations

1. Permissions

**Table 4-14** lists the source and destination database user permissions required in full and incremental synchronizations from on-premises PostgreSQL databases to PostgreSQL DB instances on the current cloud.

Table 4-14 Account permissions	Table	4-14	Account	permission
--------------------------------	-------	------	---------	------------

Synchronization Type	Full	Full+Incremental
Source	<ul> <li>Database: CONNENT</li> <li>Schema: USAGE</li> <li>Table with a primary key: SELECT</li> <li>Tables without primary keys: SELECT, UPDATE, DELETE, and TRUNCATE</li> <li>Sequence: SELECT</li> </ul>	<ul> <li>Account: REPLICATION</li> <li>Database: CONNENT</li> <li>Schema: USAGE</li> <li>Table with a primary key: SELECT</li> <li>Tables without primary keys: SELECT, UPDATE, DELETE, and TRUNCATE</li> <li>Sequence: SELECT</li> </ul>
Destination	CREATEDB	CREATEDB, CREATEROLE

– Source database permissions:

The source database user must have all the required permissions listed in **Table 4-14**. If the permissions are insufficient, create a user that has all of the permissions on the source database.

Destination database permissions:

If the destination database is a PostgreSQL database on the current cloud, the initial account can be used.

- 2. Network settings
  - Source database network settings:

You can synchronize data from on-premises PostgreSQL databases to RDS PostgreSQL databases on the current cloud through a VPN or public network. Enable public accessibility or establish a VPN for the onpremises PostgreSQL databases based on your service requirements. You are advised to synchronize data through a public network, which is more convenient and cost-effective.

- Destination database network settings:
  - If you want to access the destination databases through a VPN, enable the VPN service first so that the source database can communicate with the destination database.

- If the source database attempts to access the destination database through a public network, no further configuration is required.
- 3. Security rules
  - a. Source database security group settings:
    - If the synchronization is performed over a public network, add the EIP of the DRS synchronization instance to the network whitelist of the source PostgreSQL database to enable the source database to communicate with the current cloud. Before configuring the network whitelist, you need to obtain the EIP of the synchronization instance.

The IP address on the **Configure Source and Destination Databases** page is the EIP of the synchronization instance.

Figure 4-21 Synchronization instance EIP

Synchronization instance created successfully. Its EIP is 10. Add this EIP to the destination database whitelist so that it can access the destination database. IP of the synchronization instance is 192. Add this IP to the source database whitelist so that it can access the source database.

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

The IP address on the **Configure Source and Destination Databases** page is the private IP address of the synchronization instance.

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

b. Destination database security group settings:

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

4. Other

DRS can synchronize only some types of DDL statements of PostgreSQL. For details, see **related guides**. Properly plan the source database services. Do not perform DDL operations that are not supported during synchronization.

## Procedure

**Step 1** Create a synchronization task.

- 1. Log in to the management console and choose **Databases** > **Data Replication Service** to go to the DRS console.
- 2. On the **Data Synchronization Management** page, click **Create Synchronization Task**.
- 3. On the displayed page, specify the task name, description, and synchronization instance details.

### Figure 4-22 Synchronization instance information



### Table 4-15 Task settings

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

Table 4-16 Synchronization instance settings

Parameter	Description
Data Flow	To the cloud
Source DB Engine	Select <b>PostgreSQL</b> .
Destination DB Engine	Select <b>PostgreSQL</b> .
Network Type	Select <b>Public network</b> . Enabling SSL is recommended. It may slow down the synchronization by 20% to 30% but it ensures data security.
Destination DB Instance	The PostgreSQL instance you purchased.

Parameter	Description
Synchronization	Full+Incremental
Туре	This synchronization mode allows you to synchronize data in real time. After a full synchronization initializes the destination database, an incremental synchronization parses logs to ensure data consistency between the source and destination databases.
	<b>NOTE</b> If you select the <b>Full+Incremental</b> synchronization mode, ongoing changes made to the data will be synchronized to the destination database in real time, ensuring that the source database remain accessible.

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

Figure 4-23 Source and of	destination	database	details
---------------------------	-------------	----------	---------

Source Database	
System databases, users, parameters, and j	obs will not be migrated. You need to manually import users and jobs to the destination database and configure parameters in parameter templates of the destination database.
IP Address or Domain Name	
Port	
Database Username	
Database Password	<i><i><i>Q</i></i></i>
SSL Connection	
	If you want to enable SSL connection, ensure that SSL has been enabled on the source database, and related parameters have been correctly configured.
	Test Connection This button is available only after the replication instance is created successfully.
Destination Database	
DB Instance Name	pg-12-for-autotest ( )
Database Username	
Database Password	<b>Q</b>
	Test Connection This button is available only after the replication instance is created successfully.

Table 4-17	' Source	database	settings
------------	----------	----------	----------

Parameter	Description
IP Address or Domain Name	The IP address or domain name of the source database.
Port	The port of the source database. Range: 1 - 65535
Database Username	A username for the source database.
Database Password	The password for the database username.

Parameter	Description
SSL Connection	To improve data security during synchronization over a public network, you are advised to enable SSL to encrypt synchronization links and upload a CA certificate.

## Table 4-18 Destination database settings

Parameter	Description	
DB Instance Name	The RDS PostgreSQL instance you have selected during the synchronization instance creation is displayed by default and cannot be changed.	
Database Username	The username for accessing the destination PostgreSQL DB instance.	
Database Password	The password for the database username.	

5. On the **Set Synchronization Task** page, select the synchronization object and user.

## Figure 4-24 Synchronization mode



 Table 4-19
 Synchronization object

Parameter	Description	
Flow Control	You can choose whether to control the flow.	

Parameter	Description		
Incremental Conflict Policy	The real-time synchronization function provides conflict policies for you to choose from if the synchronized data conflicts with existing data (such as the source and destination databases containing the same primary or unique keys) in the destination database.		
	Select any of the following conflict policies:		
	<ul> <li>Ignore</li> <li>The system will skip the conflicting data and continue the subsequent synchronization process.</li> </ul>		
	<ul> <li>Report error</li> <li>The synchronization task will be stopped and fail.</li> </ul>		
	<ul> <li>Overwrite</li> <li>Conflicting data will be overwritten.</li> </ul>		
	In the following scenarios, you can select <b>Ignore</b> or <b>Overwrite</b> . In other scenarios, you are advised to select <b>Report error</b> .		
	<ul> <li>Data already exists in the destination database.</li> </ul>		
	<ul> <li>Multiple source databases are synchronized to one destination database.</li> </ul>		
	- Data in the destination database is updated manually.		
Synchronize	Available options: Index, Incremental DDLs, and Popula materialized views during the full synchronization ph		
	<b>Populate materialized views during the full</b> <b>synchronization phase</b> : This option takes effect only for materialized views that was populated in the source database. This operation affects the full synchronization performance. You perform this operation after the full synchronization is complete.		
Synchronizati on Object	DRS supports database- and table-level synchronization. You can select databases or tables for synchronization based on your service requirements. A single task can synchronize objects from only one database. Database name mapping is supported.		
	<ul> <li>Database-level synchronization synchronizes all objects in the source database to the destination database.</li> </ul>		
	<ul> <li>Table-level synchronization synchronizes the selected table objects to the destination database.</li> </ul>		
	<b>NOTE</b> If you select table-level synchronization, the selected table may have dependencies on other objects in the database. If the referenced objects are not selected and do not exist in the destination database, the task will fail. Ensure that all referenced objected are selected before synchronization or select database- level synchronization.		

Parameter	Description
Synchronize Account	During the synchronization, you can synchronize accounts based on your service requirements.
	There are two types of accounts: accounts that can be synchronized and accounts that cannot be synchronized. For accounts that cannot be synchronized, you can view details in the <b>Remarks</b> column and determine whether to synchronize accounts and permissions based on your service requirements.

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

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

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

D NOTE

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

7. On the **Confirm Task** page, specify **Start Time** and click **Next**.

#### **NOTE**

- Set **Start Time** to **Start upon task creation** or **Start at a specified time** based on site requirements.
- After a synchronization task is started, the performance of the source and destination databases may be affected. You are advised to start a synchronization task during off-peak hours.
- 8. After the task is submitted, go back to the **Data Synchronization Management** page to view the task status.

### **Step 2** Manage the migration task.

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

• Full synchronization

Viewing the synchronization progress: Click the target full synchronization task, and on the **Migration Progress** tab, you can see the synchronization progress of the structure, data, indexes, and synchronization objects. When the progress reaches 100%, the synchronization is complete.

- Incremental synchronization
  - Viewing the synchronization delay: After the full synchronization is complete, an incremental synchronization starts. On the Data Synchronization Management page, click the target synchronization task. On the displayed page, click Synchronization Progress to view the synchronization delay of the incremental synchronization. If the synchronization delay is 0s, the destination database is being

synchronized with the source database in real time. You can also view the data consistency on the **Synchronization Comparison** tab.

Figure 4-25 Viewing the synchronization delay

-	-	-		-	
Basic Information					
Synchronization Comparison	Note: Do not change the usernames, parsonals, and permosions of source and destination stabilizes users before the task has completed Last Updated Div: 20, 2021 19 41 53 DBT-98 00				
Synchronization Progress	Progress -				
Process Data					
Synchronization		Full Synchronization Completed	Incremental synchronization delay		
Mapping		100%	05 0		
Synchronization Logs		10070	08 0		
Abnormal Records	Source Database			Destnation Database	
Tags					

 Viewing the synchronization comparison results: To minimize service downtime, click the name of an incremental synchronization task. On the Synchronization Comparison page, create a comparison task.

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

### **Step 3** Cut over services.

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

- 1. Interrupt services first. If the workload is not heavy, you may not need to interrupt the services.
- 2. Run the following statement on the source database and check whether any new sessions execute SQL statements within the next 1 to 5 minutes. If there are no new statements executed, the service has been stopped. select \* from pg\_stat\_activity;

### **NOTE**

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

- 3. On the **Synchronization Progress** page, view the synchronization delay. When the delay is displayed as 0s and remains stable for a period, then you can perform a data-level comparison between the source and destination databases. For details about the time required, refer to the results of the previous comparison.
  - If there is enough time, compare all objects.
  - If there is not enough time, use the data-level comparison to compare the tables that are frequently used and that contain key business data or inconsistent data.
- 4. Determine an appropriate time to cut the services over to the destination database. After services are restored and available, the synchronization is complete.
- **Step 4** Complete the synchronization.
  - 1. Stop the synchronization task. After databases and services are synchronized to the destination database, to prevent operations on the source database

from being synchronized to the destination database to overwrite data, you can stop the synchronization task. This operation only deletes the synchronization instance, and the synchronization task is still displayed in the task list. You can view or delete the task. You will not be charged for the synchronization task after the task is stopped.

2. Delete the synchronization task. After the synchronization task is complete, you can delete it. After the synchronization task is deleted, it will not be displayed in the task list.

----End

## 4.4 From RDS MySQL to Kafka

## 4.4.1 Overview

## Description

In this section, we will create a DRS synchronization task to synchronize the incremental data from the source RDS MySQL database to the destination Kafka database. This section also describes:

- How to create an RDS MySQL instance on Huawei Cloud.
- How to create DMS for Kafka on Huawei Cloud.
- How to create a DRS synchronization task.

## Prerequisites

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

## Service List

- Virtual Private Cloud (VPC)
- Relational Database Service (RDS)
- DMS for Kafka
- Data Replication Service (DRS)
- Data Admin Service (DAS)

## **Deployment Architecture**

In this example, the source is an RDS MySQL instance, and the destination is a DMS for Kafka in the same region. Incremental data of the source database is synchronized to the destination database in a VPC. For details about the deployment architecture, see **Figure 4-26**.

Figure 4-26 VPC network



## **Before You Start**

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

## 4.4.2 Resource and Cost Planning

Categ ory	Subcatego ry	Plan	Description
VPC	VPC name	vpc-DRStest	Specify a name that is easy to identify.
	Region	EU-Dublin	To achieve lower network latency, select the region nearest to you.
	AZ	AZ 1	-
	Subnet	10.0.0/24	Select a subnet with sufficient network resources.
	Subnet name	subnet-drs01	Specify a name that is easy to identify.
RDS (sourc e datab ase)	RDS instance name	rds-mysql	Specify a name that is easy to identify.
	DB engine version	MySQL 5.7	-

Categ ory	Subcatego ry	Plan	Description
	Instance type	Single	A single instance is used in this example.
			To improve service reliability, select a primary/standby instance.
	Storage type	SSD	-
	AZ	AZ 3	A single instance is used in this example.
			To improve service reliability, create a primary and standby instance and then locate them in two different AZs.
	Specificati ons	General-purpose 4 vCPUs   8 GB	-
Kafka (desti nation	Kafka instance name	kafka-drs	Specify a name that is easy to identify.
datab ase)	Version	2.3.0	-
	AZ	AZ 3	You can select one, three, or more AZs. You are advised to create the instance across different AZs to improve service reliability.
	Specificati ons	c6.2u4g.cluster	-
	Brokers	3	-
	Storage space	High I/O, 200 GB	The storage space is used to store messages (including replicas). Kafka uses three replicas by default. In addition to storing messages, some space needs to be reserved for storing logs and metadata.
DRS synchr onizati on task	Synchroniz ation task name	DRS- MySQLToKafka	Custom
	Source DB engine	MySQL	In this example, the source is an RDS MySQL instance on Huawei Cloud.
	Destinatio n DB engine	Kafka	In this example, the destination database is Kafka.
	Network Type	VPC	In the practice, select the VPC network.
#### **NOTE**

For details about the prices of the preceding resources, see **Pricing Details**. You can use the **price calculator** provided by Huawei Cloud to quickly calculate the reference price based on your desired specifications.

# 4.4.3 Operation Process

**Figure 4-27** shows the process of creating an RDS MySQL instance and synchronizing the incremental data from an RDS MySQL instance to Kafka.



#### Figure 4-27 Flowchart

# 4.4.4 Creating a VPC and Security Group

Create a VPC and security group for an RDS for MySQL and Kafka instances.

# Creating a VPC

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

- **Step 2** Click <sup>(2)</sup> in the upper left corner of the management console and select EU-Dublin.
- Step 3 Under the service list, choose Networking > Virtual Private Cloud. The VPC console is displayed.

NAME:	HUAWEI CLOUD Consol	le 🗸 🗸			Search	Q	More <sup>®</sup> English
≡	Service List	Enter a service or function name.			Q		
6	Elastic Cloud Server	No Recently Visited Services					
ക	Relational Database Service	Compute		Storage	Networking		Databases
00	Auto Scaling	Elastic Cloud Server	+	Elastic Volume Service	Virtual Private Cloud	+	GaussDB
		Bare Metal Server		Dedicated Distributed Storage Service	Elastic Load Balance	¥	Relational Database Servic
	Bare Metal Server	Cloud Phone		Storage Disaster Recovery Service	Direct Connect		Document Database Servi
0	Elastic Volume Service	Image Management Service		Cloud Server Backup Service	Virtual Private Network		GaussDB(for Cassandra)
5	Volume Packup Service	FunctionGraph		Cloud Backup and Recovery	Domain Name Service		GaussDB(for Mongo)
	Volume Dackup Service	Auto Scaling		Volume Backup Service	NAT Galeway		GaussDB(for Influx)
Ô	Virtual Private Cloud	Dedicated Cloud		Object Storage Service	Elastic IP		GaussDB(for Redis)
Φ	Elastic Load Balance	Dedicated Host		Data Express Service	Cloud Connect		Distributed Database Midd
$\oplus$	Domain Registration			Scalable File Service	VPC Endpoint		Data Replication Service

### Step 4 Click Create VPC.

Basic Information	
Region	Q (
	Regions are geographic areas loolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region.
Name	vpc-DRStest
IPv4 CIDR Block	10 . 0 . 0 / 24 -
	Recommended: 10.0.0.0/8-24 (Select) 172.16.0.0/12-24 (Select) 192.168.0.0/16-24 (Select)
	A The CDR block 10.0.0,24 overlaps with a CIDR block of another VPC in the current region. If you intend to enable communication between VPCs or between a VPC and an on-premises data center, change the CDR block. View VPC CDR blocks in current region
Enterprise Project	default   C Greate Enterprise Project
Advanced Settings 💌	Tag   Description
Default Subnet	
AZ	A21 • • ①
Name	subnet-dis01
IPv4 CIDR Block	10     ·     0     /     24     ·<
IPv6 CIDR Block	🗌 Enable 🔞
Associated Route Table	Default 🕥

Advanced Settings 👻 🛛 Gateway | DNS Server Address | NTP Server Address | DHCP Lease Time | Tag | Description

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

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

----End

# **Creating a Security Group**

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

**Step 2** Click O in the upper left corner of the management console and select EU-Dublin.

 $\times$ 

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

The VPC console is displayed.

нама	HUAWEI CLOUD Console	8 ▼		Search	Q	More <sup>®</sup> English
≡	Service List	Enter a service or function name.		Q		
6	Elastic Cloud Server	No Recently Visited Services				
ക	Relational Database Service	Compute	Storage	Networking		Databases
00	Auto Scaling	Elastic Cloud Server	Elastic Volume Service	Virtual Private Cloud	¥.,	GaussDB
	. Inter of the second sec	Bare Metal Server	Dedicated Distributed Storage Service	Elastic Load Balance	¥	Relational Database Servic
٢	Bare Metal Server	Cloud Phone	Storage Disaster Recovery Service	Direct Connect		Document Database Servix
0	Elastic Volume Service	Image Management Service	Cloud Server Backup Service	Virtual Private Network		GaussDB(for Cassandra)
5	Volume Packup Service	FunctionGraph	Cloud Backup and Recovery	Domain Name Service		GaussDB(for Mongo)
0	Volume Dackup Service	Auto Scaling	Volume Backup Service	NAT Gateway		GaussDB(for Influx)
Ô	Virtual Private Cloud	Dedicated Cloud	Object Storage Service	Elastic IP	¥.,	GaussDB(for Redis)
Φ	Elastic Load Balance	Dedicated Host	Data Express Service	Cloud Connect		Distributed Database Midd
Θ	Domain Registration		Scalable File Service	VPC Endpoint		Data Replication Service

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

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

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

Summary	Inbound Rules	Outbound R	ules Associated Instances
Add Rule	Fast-Add Rule	Delete	Allow Common Ports

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



----End

# 4.4.5 Preparing for Source RDS MySQL

## 4.4.5.1 Creating an RDS MySQL Instance

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

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



#### **Step 6** Configure instance specifications.

Instance Class	General-purpose				
	vCPU   Memory	Maximum Connections	TPS/QPS (?)	IPv6	
	2 vCPUs   4 GB	1,500	334   6,673	Not supported	
	2 vCPUs   8 GB	2,500	552   11,039	Not supported	
	O 4 vCPUs   8 GB	2,500	756   15,122	Not supported	
	O 4 vCPUs   16 GB	5,000	1,052   21,249	Not supported	
	8 vCPUs   16 GB	5,000	1,338   26,756	Not supported	
	O 8 VCPUs   32 GB	10,000	2,117   42,335	Not supported	
	DB Instance Specifications General-	ourpose   2 vCPUs   8 GB, Maximum Connecti	ons: 2500, TPS/QPS: 552   11039	2	
	40 G8				
Storage Space (GB)	(11) 40 8	000 1,550 2,300	4,000	10 + (2)	
	RDS provides free backup storage space	of the same size as your purchased storage	space. After the free backup spa	ace is used up, charges are applied ba	sed on the OBS pricing details
Disk Encryption	Dtable Enabl	mmended ©			

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

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

	<ul> <li>Relationship among VPCs, subnets, security</li> </ul>	groups	and D8 instances			
VPC ③	vpc-DRStest *	с	subnet-drs01(10.0.0/24) *	c	Automatically-assigned IP address	View In-use IP Address
	After the RDS Instance is created, the VPC can Available Private IP Addresses: 251	ot be d	anged. ECSs in different VPCs cannot communicat	te with	each other by default. If you want to	create a VPC, go to the VPC console.
Database Port	3306					
	The database port of read replicas (if any) is th	e same	as that of the primary DB instance.			
Security Group 🧑	sg-DRS01	c	View Security Group			
	Ensure that port 3306 of the security group allo Security Group Rules	ws traf	ic from your server IP address to the DB instance.			

**Step 8** Configure the instance password.

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

#### Step 9 Click Next.

**Step 10** Return to the instance list.

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

----End

## 4.4.5.2 Generating Test Data

- **Step 1** Log in to the management console.
- **Step 2** Click <sup>(Q)</sup> in the upper left corner of the management console and select EU-Dublin.
- **Step 3** Under the service list, choose **Databases** > **Relational Database Service**.
- **Step 4** Select an RDS instance and choose **More** > **Log In**.
- **Step 5** In the displayed dialog box, enter the password and click **Test Connection**.
- **Step 6** After the connection is successful, click **Log In**.
- **Step 7** Enter the instance password for logging in to the RDS instance.
- **Step 8** Click **Create Database** to create the **db\_test** database.

Create Database						
Name	db_test					
Character Set	Only user databases can be created utf8mb4	$\vee$				
	OK Cancel					

**Step 9** Run the following statement in the db\_test database to create the corresponding table **table3**\_:

CF	REATE TABLE `db_test`.`table3_` (
	Column1` INT(11) UNSIGNED NOT NULL,
	`Column2` TIME NULL,
	`Column3` CHAR NULL,
	PRIMARY KEY (`Column1`)
)	ENGINE = InnoDB
	DEFAULT CHARACTER SET = utf8mb4
	COLLATE = utf8mb4 general ci:

1 (8	REATE TABLE 'db test' 'table3 ' (	
2	Column1' INT(11) UNSIGNED NOT NULL.	
3	Column2' TIME NULL,	
4	'Column3' CHAR NULL,	
5	PRIMARY KEY ('Column1')	
6)	ENGINE = InnoDB	
7	DEFAULT CHARACTER SET = utf8mb4	
8	COLLATE = utf8mb4_general_ci;	

----End

# 4.4.6 Preparing for Destination Kafka

## 4.4.6.1 Creating a Kafka Instance

This section describes how to create a Kafka instance.

- **Step 1** Log in to the **management console**.
- **Step 2** Click O in the upper left corner of the management console and select EU-Dublin.
- **Step 3** In the Service List, choose **Application** > **Distributed Message Service for Kafka** to open the Kafka console.

#### Step 4 Click Buy Kafka Instance.

#### **Step 5** Select the instance region and AZ.



#### **Step 6** Configure the instance name and specifications.

案例名称	kafka-drs X				
Instance Name	kafka-drs >	×			
Enterprise Project	default	O View Enterprise Project	tt		
Version	2.3.0 1.1.0				
CPU Architecture	x86				
Specifications	Flavor Name	ECS Flavor	TPS Limit per Broker	Maximum Partitions per Brok	Recommended Consumer Gr
	c6.2u4g.cluster	c6.large.2	30,000	250	4,000
	C6.4u8g.cluster	c6.xlarge.2	100,000	500	4,000
	C c6.8u16g.cluster	c6.2xlarge.2	150,000	1,000	4,000
	C c6.12u24g.cluster	c6.3xlarge.2	200,000	1,500	4,000
	C c6.16u32g.cluster	c6.4xlarge.2	250,000	2,000	4,000
	To ensure stable services, choose a bandwidth 309	6 higher than what is required under	normal conditions.		
	common_current_spec c6.2u4g.cluster   ECS Flam	vor c6.large.2   TPS Limit per Broker 3	30,000   Maximum Partitions per B	roker 250   Recommended Consum	er Groups per Broker 4,000
	Instances created with the selected specifications of	do not support dynamic enabling/disa	abling of dumping.		
Brokers	- 3 +				

#### Step 7 Select the storage space and capacity threshold policy.

Storage Space	High I/O	• -	200 +	GB (?)	
	Total storage space 600 GB				
	After the instance is created, yo	u cannot change the disk t	ype or reduce the	storage space.	Learn more about disk types.
Capacity Threshold Policy	Automatically delete	Stop production	?		

#### **Step 8** Select the VPC and security group.

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

VPC	vpc-DRStest 👻	C	subnet-drs01	•	С	?
	You cannot change the selected VPC and subnet aft	er the in	nstance is created. You can also create a new	ı VP	C.	
Security Group	sg-DRS01 🔻	C	Manage Security Group			

#### **Step 9** Configure the instance password.

Manager Username	root	Username for logging in to Kafka Manager. You cannot modify the username after the instance is created
Password	····· 🗞	
Confirm Password	······ 🗞	

- Step 10 Click Next.
- **Step 11** Return to the instance list.

If the status of the Kafka instance is **Running**, the instance has been created.

----End

# 4.4.6.2 Creating a Topic

- **Step 1** Click a Kafka instance.
- **Step 2** Click the **Topics** tab, and click **Create Topic**.
- **Step 3** In the dialog box that is displayed, enter a topic name, specify other parameters, and click **OK**.

Topic Name	testTopic
Partitions	- 3 + Value range: 1 to 100
	Number of partitions in the topic. Messages in the topic will be distributed to these partitions to achieve scalability and fault tolerance.
Replicas	- 3 + Value range: 1 to 3
	Number of message copies. This number is fixed once the topic is created.
Aging Time (h)	- 72 + Value range: 1 to 168
	Time after which data in the topic expires.
Synchronous Replication	
Synchronous Flushing	

#### ----End

# 4.4.7 Creating a DRS Synchronization Task

This section describes how to create a DRS instance and synchronize incremental data from RDS MySQL to Kafka.

# **Pre-Check**

Before creating a task, check the synchronization conditions.

In this example, data is synchronized from RDS MySQL to Kafka. For details, see **Precautions**.

## Procedure

This section describes how to perform incremental synchronization from RDS MySQL to Kafka.

- **Step 1** Log in to the management console.
- **Step 2** Click **O** in the upper left corner of the management console and select EU-Dublin.
- **Step 3** Under the service list, choose **Databases** > **Data Replication Service**.

# Step 4 Choose Data Synchronization Management and click Create Synchronization Task.

- **Step 5** Configure synchronization task parameters.
  - 1. Task name

Region	CN South-Guangzhou
	Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region.
* Task Name	DRS-MySQLToKafka
Description	0
	0/255

Select the source database, destination database, and network information.
 Select the RDS instance created in Preparing for Source RDS MySQL as the destination database.

Synchronization Instance Details 💿						
The following information cannot be modi	ified after you go to the next page.					
* Data Flow	To the cloud Out of th	e cloud Self-built to self-built				
	Out of the cloud: The source database	e must be a database in the current cloud.				
* Source DB Engine	MySQL DDM	GaussDB(for openGauss) Distributed Edition	GaussDB(for openGauss) Primary/Standb	DDS		
	GaussDB(for MySQL) Primary/S	itandby Ed				
* Destination DB Engine	MySQL Kafka					
* Network Type	VPC	• ⑦				
* Source DB Instance	rds-mysql (10.0.0.19)	C View DB Instance View 0	Unselectable DB Instance			
* Synchronization Instance Subnet	subnet-drs01(10.0.0/24)	View Subnets				

#### 3. Set Enterprise Project to default.

* Enterprise Project	default   C View Project Management ③
Tags	It is recommended that you use TMS's predefined tag function to add the same tag to different cloud resources. View predefined tags C
	Tag key Tag value
	You can add 10 more tags.

#### Step 6 Click Next.

The synchronization instance is being created. It takes about 5 to 10 minutes.

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

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

#### Source Database

DB Instance Name	rds-mysql ( )				
Database Username	root				
Database Password		Ø			
	Test Connection 🤡 Test successful				

3. Select the VPC and subnet where the destination database is located, and enter the Kafka IP address and port number.

#### 4. Click Test Connection.

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

Destination Database			
VPC	vpc-DRStest(10.0.0.0/24)	•	C View VPC
Subnet	subnet-drs01(10.0.0/24)	•	View Subnets
IP Address or Domain Name			0
	Ensure that the entered addresses belong to the sa	me D	B instance.
	Test Connection 🥏 Test successful		

#### Step 8 Click Next.

**Step 9** Select the synchronization information, policy, message format, and object, and the format of the message sent to the Kafka.

The following table lists the settings.

#### Table 4-21 Sync Settings

Туре	Setting
Topic Synchronization Policy	Deliver the content to a topic named <b>testTopic</b> .
Synchronize Topic To	Partitions are differentiated by the hash values of the database and table names
Data Format in Kafka	You can select the JSON format. For details, see Kafka Message Format.
Synchronization Object	Select <b>table3_</b> under <b>db_test</b> .

Topic Synchronization Policy	A specified topic	•					
Topic	testTopic	•	c				
Synchronize Topic To	Partitions are differentiated by t	ne hash valu 👻					
Data Format in Kafka	Avro JSON						
Synchronization Object	Tables Database: Only selected tables are synchror select the new tables. If any data in the source database Move objects to be migrated from	ized. To synchronize n changes, click the ref list of unselected obje	ect file rew tables added to the resh button below. cts on left side to the	ne source database dur	ing the incremental synchronizatio on right side.	n, you need to edit this sync	hronization task
	0	Select All		С		Select All	
	For tables, only expanded da	abases are searched.	Q		For tables, only expanded dat	abases are searched.	Q
	db_test		database		🖃 🗌 db_test Edit data	ibase	
	table1_		table		table3_ Edit t	able	
				>>			
				~			

Step 10 Click Next.

**Step 11** Select a data processing mode. Data synchronization from RDS MySQL to Kafka supports only column-based processing, which provides column-level query and filtering capabilities.

Edit Column			×
The new column name will Note: Only the selected col	be used in the destination database. umns will be synchronized.		×
Database Name: db_test Table N	ame: table3_	Enter a	column name Q C
Column Name	New Column Name	Туре	Constraint Type
Column1		int(11) unsigned	Primary Key
Column2		time	
Column3		char(1)	
10 🔻 Total Records: 5	< 1 >		
	Confirm	Cancel	

- Step 12 Click Next and wait for the check results.
- Step 13 If the check is complete and the check success rate is 100%, click Next.

Check Again	
Check success rate 100% All checks must pass before you can continue. If any check requires confirmation, check and confirm the result	Its before proceeding to the next step.
Check Item	Check Result
Database parameters	
Whether tables structures are consistent	Passed
Whether the source database binlog is row-based	Passed
Whether the binlog_row_image value of the source database is FULL	Passed
Checking the expire_logs_days parameter setting in the source database	Passed
Whether the source database binlog is enabled	Passed
Whether the source database tables use storage engines not supported by the destination database	Passed
Whether the log_slave_updates value is ON on the source database	Passed

**Step 14** After confirming that the synchronization task information is correct, click **Next**.

Return to the **Data Synchronization Management** page and check the synchronization task status.

It takes several minutes to complete.



If the status changes to **Incremental synchronization**, the synchronization task has been started.

#### 

- RDS for MySQL supports only incremental synchronization to Kafka. After the task is started, it is in the incremental synchronization state.
- If the created task is a full synchronization task, full synchronization is performed after the task is started. After the synchronization is complete, the task automatically stops.
- If the created task is a full+incremental synchronization task, the task enters the full synchronization state after being started. After the full synchronization is complete, the task enters the incremental synchronization state.
- Incremental synchronization continuously synchronizes incremental data and does not stop automatically.

----End

# 4.4.8 Confirming the Results

In this practice, DRS continuously synchronizes the incremental data generated in the source database to the destination database until you stop the task. The following describes how to verify the synchronization results by inserting data to the source RDS MySQL database and viewing the data received by Kafka.

## Procedure

- **Step 1** Log in to the management console.
- **Step 2** Click Sin the upper left corner of the management console and select EU-Dublin.
- **Step 3** Under the service list, choose **Databases** > **Relational Database Service**.
- Step 4 Locate the required RDS instance and choose More > Log In.
- **Step 5** In the displayed dialog box, enter the password and click **Test Connection**.
- Step 6 After the connection is successful, click Log In.
- Step 7 Enter the instance password for logging in to the RDS instance.
- **Step 8** Run the following statement to insert data to the **db\_test.table3\_** table. INSERT INTO `db\_test`.`table3\_` (`Column1`,`Column2`,`Column3`) VALUES(4,'00:00:44','ddd');

SQL Preview



Х

- **Step 9** In the Service List, choose **Application** > **Distributed Message Service for Kafka** to open the Kafka console.
- **Step 10** Click a Kafka instance.
- **Step 11** Click the **Message Query** tab, select the Kafka topic, view the received data in JSON format.

View Message Body								
Topic Name	testTop	testTopic						
Partition	0	0						
Offset	0							
Created	2021/1	2021/11/08 17:57:55 GMT+08:00						
Message Body	Messag Key	Message Size (Bytes): 352						
	Value	{"mysqlType": {"Column2":"time","Column3":"char","Column1":"int"},"id :1636365475000,"ts":1636365475874,"database":"db_test" "table3_", "type":"INSERT","isDdl":false,"sql":"","sqlType": {"Column2":92,"Column3":1,"Column1":4},"data": [{"Column2":00:00:44","Column3":"ddd","Column1":"4"}] ull,"pkNames":["Column1"]}	":22,"es" ',"table": ,"old":n					

#### **Step 12** Stop the synchronization task.

If all data has been synchronized to the destination database, you can stop the current task.

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

All projects	•	All DB engines	* All net	work types	▼ All	statuses	٣	Enter a task nam	e or ID	Q Search by Tag ⊗
6	С									
	Task Name/ID ↓Ξ	Status	Charging	Data Flow	DB Engine ↓Ξ	Synchroniza	Netwo	Description	Enterp	Operation
	DRS-MySQLToKafka 1f1c1e78-fcda-430	Incremental	Yes	Out of the	MySQL-Kafka	Incremental	VPC	Source Datab	default	Edir Stop Pause

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

 $\times$ 

Are you sure you want	t to stop this task?
Name	Status
DRS-MySQLToKafka	O Incremental
A If you forcibly stop a task, the migrati	on tack will be stonned first
Force stop task Display breakpoint information when the	task is stopped
Description: · Once this task is stopped, it cannot b	e recovered.
Yes	No

----End



Date	Description	
2022-09-30	This issue is the first official release.	