Data Replication Service

Workload Replay

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Contents

1 Replay Overview

A workload replay task simulates the service load of the source database on the destination database so you can evaluate the effectiveness and performance of the destination database.

A task consists of SQL recording and replay. All of the SQL statements (create, delete, update, and query operations) executed in the required period on the source database will be downloaded by a recording tool from the binlog, and then cached and injected into the destination database where you can trigger a replay and review performance.

Typical Scenarios

- By creating a workload replay task, you can evaluate how the service load of the source database runs on the destination database.
- By specifying the replay thread and speed, you can simulate the peak service load of the source database and analyze the stability of the destination database when workloads increase sharply.

Figure 1-1 Workload replay

Supported Database Types

The following table lists the database types supported by DRS in workload replay.

Table 1-1 Replay scheme

Source DB Type and Version	Destination DB Type and Version	Related Documents
RDS for MySQL	RDS for MySQL	**From MySQL to MySQL** (Current cloud)
	GaussDB(for MySQL)	**From MySQL to GaussDB(for MySQL)** (Current cloud)
GaussDB(for MySQL)	GaussDB(for MySQL)	**From GaussDB(for MySQL) to GaussDB(for MySQL)** (Current cloud)
● ECS-hosted MySQL ● On-premises MySQL ● MySQL on other clouds	RDS for MySQL	**From MySQL to MySQL** (To the cloud)
	GaussDB(for MySQL)	**From MySQL to GaussDB(for MySQL)** (To the cloud)

2 Current Cloud

2.1 From MySQL to MySQL

Supported Source and Destination Databases

Table 2-1 Supported databases

Source DB	Destination DB
RDS for MySQL	RDS for MySQL

Database Account Permission Requirements

When using DRS to create a workload replay task, you are advised to ensure that permissions of the source database account are the same as those of the destination database account before starting the task.

Precautions

To ensure smooth workload replay, read the following notes before creating a task.

Table 2-2 Precautions

Type	Restrictions
Starting a task	**Source database requirements:** - The source database must be RDS for MySQL. - SQL workload files have been recorded on the source database. For details, see **Enabling SQL Audit**. **Destination database requirements:** - The destination database must be RDS for MySQL. - The destination database version must be the same as or later than the source database version. - Baseline data has been developed in the destination database. The closer the time for collecting baseline data is to the start time for workload capturing on the source database, the more accurate simulation will be for the replay. **Workload file requirements:** - If a workload file contains SQL delimiters, a parsing exception may occur. As a result, the replay task fails. - The full SQL structure of a workload file must be complete. If any SQL statement in audit logs provided by the user is truncated, a parsing exception may occur. - The size of a single SQL statement in a workload file cannot exceed 1 MB. - If other statements are inserted into a transaction, a deadlock may occur. **Other notes:** - If configuration parameters (such as **innodb_buffer_pool_size** and **sqlmode**) of the source database are inconsistent with those of the destination database, the replay progress may be slow or the replay may fail. - If a workload file is deleted or added during a task editing, you need to select **Parse and Reset** when resetting the task and then replay the workload file again. For details, see **Resetting a Replay Task**. - The workload replay process is executed concurrently. DDL statements and DML statements are executed in the same batch (10s), and all the statements may be executed in disorder.
Parsing a workload file	After a parsing file is selected, the file cannot be renamed.
Replaying a database workload	Only SELECT, INSERT, DELETE, UPDATE, and DDLs are supported.

Type	Restrictions
Stopping a task	A finished task cannot be restarted.

Prerequisites

- **You have logged in to the DRS console.**

- Your account balance is greater than or equal to $0 USD.

- For details about the DB types and versions supported by workload replay, see **Supported Databases**.

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

- You have read **Precautions**.

Procedure

Step 1 On the **Workload Replay Management** page, click **Create Workload Replay Task**.

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

- Task information description

Figure 2-1 Workload replay task information
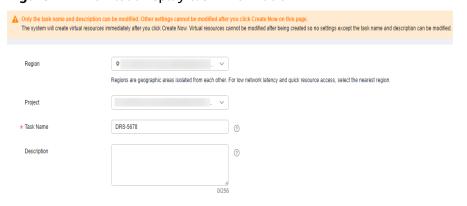
Table 2-3 Task information

Parameter	Description
Region	The region where the replay instance is deployed. You can change the region.
Project	The project corresponds to the current region and can be changed.

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

● Replay instance information

Figure 2-2 Replay instance information

Table 2-4 Replay instance settings

Parameter	Description
Data Flow	Select **Current cloud**. – **Current cloud** refers to the workload replay scenario where both source and destination databases are Huawei Cloud DB instances. – **To the cloud** refers to the workload replay scenario where the destination database is a Huawei Cloud DB instance and data needs to be transferred.
Source DB Engine	Select **MySQL**.
Workload File Source	Specifies where the workload file in the source database is from. – **Download from Huawei Cloud APIs**: Obtain audit log files through the API corresponding to Huawei Cloud services. – **Download from Huawei Cloud OBS**: Obtain workload files from Huawei Cloud OBS buckets.
Destination DB Engine	Select **MySQL**.
Network Type	**Public network** is used as an example. Available options: **Public network**, **VPC**, **VPN or Direct Connect**

Parameter	Description
Destination DB Instance	The RDS for MySQL DB instance you created. Ensure that baseline data has been developed in the destination database.
Replay Instance Subnet	Select the subnet where the replay instance is located. You can also click **View Subnets** to go to the network console to view the subnet where the instance resides. By default, the DRS instance and the 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 replay instance can be successfully created, only subnets with DHCP enabled are displayed.
Specify EIP	This parameter is available when you select **Public network** for **Network Type**. Select an EIP to be bound to the DRS instance. DRS will automatically bind the specified EIP to the DRS instance and unbind the EIP after the task is complete. For details about the data transfer fee generated using a public network, see **EIP Price Calculator**.

● AZ

Figure 2-3 AZ

Table 2-5 Task AZ

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

● Enterprise Project and Tags

Figure 2-4 Enterprise Project and Tags

Table 2-6 Enterprise Project and Tags

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

◘ **NOTE**

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

Step 3 After the replay instance is created, on the **Configure Source and Destination Databases** page, specify parameters in **Source Database**, **Destination Database**, and **Task Settings**. Then, click **Test Connection** for the destination database to check whether the destination database has been connected to the replay instance. After the connection test is successful, click **Next**.

● Source database information when **Download from Huawei Cloud APIs** is selected for **Workload File Source**

Figure 2-5 Source database information

Table 2-7 Source database settings

Parameter	Description
Workload File Source	Specifies where the workload file in the source database is from.
DB Instance Name	Select an RDS for MySQL DB instance for which SQL workload files have been recorded. For details about how to record SQL workload files, see **Enabling SQL Audit**.
Workload Type	Only **Audit log** is supported.
Time Range	Select the time range for audit logs.

- Source database information when **Download from Huawei Cloud OBS** is selected for **Workload File Source**
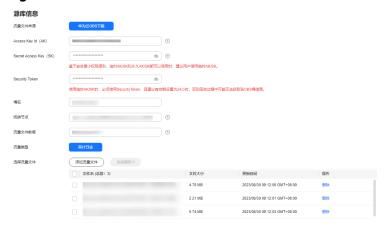
Figure 2-6 Source database information

Table 2-8 Source database settings

Parameter	Description
Workload File Source	Specifies where the workload file in the source database is from.
Access Key ID (AK)	Access key ID, which is a unique identifier used in conjunction with a secret access key to sign requests cryptographically.

Parameter	Description
Secret Access Key (SK)	Used together with the access key ID to sign requests cryptographically. It identifies a request sender and prevents the request from being modified. – Based on the principle of least permission, the AK/SK permissions must be minimized. If you can use both temporary and permanent AKs/SKs, you are advised to use a **temporary AK/SK**. Permanent AKs/SKs are used only in scenarios where temporary AKs/SKs cannot meet requirements. For example, if a large number of logs need to be downloaded for a long time, temporary AKs/SKs may become invalid due to timeout. – AK/SK information of the user is encrypted and temporarily stored in the system until the task is deleted.
Security Token	When a temporary AK/SK is used, **Security Token** must be used, and the recommended validity period is 24 hours. Otherwise, OBS bucket information may fail to be obtained during workload replay.
Bucket Name	Name of the OBS bucket for storing workload files.
Endpoint	OBS provides an endpoint for each region. An endpoint can be considered as the domain name of OBS in a region, and is used to process access requests from the region.
Workload File Prefix	Prefix of a file name in the OBS bucket. Only files whose names start with this prefix will be displayed.
Workload Type	Only **Audit log** is supported.
Workload File	Select the required workload file.

- Destination database information

  Figure 2-7 Destination database information

Table 2-9 Destination database settings

Parameter	Description
DB Instance Name	The RDS DB instance you selected when creating the task. This parameter cannot be changed.
Database Username	The username for accessing the destination database.
Database Password	The password for the database username.
SSL Connection	If SSL connection is required, enable SSL on the destination database, ensure that related parameters have been correctly configured, and upload an SSL certificate. **NOTE** – The maximum size of a single certificate file that can be uploaded is 500 KB. – If SSL is disabled, your data may be at risk.

📖 **NOTE**

The username and password of the destination database are encrypted and temporarily stored on the DRS instance host during the workload replay. After the task is deleted, the username and password are permanently deleted.

- Task Settings

Figure 2-8 Task settings

Table 2-10 Task settings

Parameter	Description
SQL Type	Select the SQL type to be replayed to the destination database. The default value is **SELECT**. The available options are **SELECT**, **INSERT**, **UPDATE**, **DELETE**, and **DDL**.
Replay Mode	You can select **Performance** or **Transaction**. – In performance mode, you can set how many concurrent connections are allowed. SQL statements are replayed to the destination database based on a set number of connections. The SQL execution sequence in the source database may be different from that in the destination database. The replay performance is better. – In transaction mode, you cannot set how many concurrent connections are allowed. The number of connections is dynamically adjusted based on the connections in the source database logs to ensure that transaction SQL statements in the same connection of the source database are executed in sequence.
Filter out SQLs	The system fuzzily matches SQL statements based on the entered conditions, ignores case sensitivity, and filters SQL logs to be replayed to the destination database. The SQL logs that meet the conditions will be filtered out. You can configure up to 10 filtering rules.
Filter out SQLs Without Conditions	This option is used to filter out SQL statements of the SELECT, UPDATE, and DELETE types that do not contain conditions (that is, filter out SQL statements without a where condition).
Maximum Concurrent Connections	The number of replay threads configured for a workload replay task. The default value is **8**. The value ranges from **1** to **100**.
Acceleration Configuration	The percentage of the replayed SQLs to the SQLs executed on the source database within the same period. The percentage cannot exceed the maximum performance of the workload replay task. The value can be **Unlimited**, **100%**, or **200%**.

Step 4 On the **Check Task** page, check the replay 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 5 On the displayed page, specify **Start Time**, **Send Notification**, **SMN Topic**, and **Stop Abnormal Tasks After** and confirm that the configured information is correct and click **Submit** to submit the task.

Figure 2-9 Task startup settings

Table 2-11 Task startup settings

Parameter	Description
Start Time	Set **Start Time** to **Start upon task creation** or **Start at a specified time** based on site requirements. **NOTE** After a replay task is started, the performance of the source and destination databases may be affected. You are advised to start a replay task during off-peak hours.
Send Notifications	SMN topic. This parameter is optional. If an exception occurs during workload replay, the system will send a notification to the specified recipients.
SMN Topic	This parameter is available only after you enable **Send Notifications** and create a topic on the SMN console and add a subscriber. For details, see *Simple Message Notification User Guide*.
Stop Abnormal Tasks After	Number of days after which an abnormal task automatically stops. The value must range from 14 to 100. The default value is **14**. **NOTE** 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 running longer than the period you set (unit: day) will automatically stop to avoid unnecessary fees.

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

- You can view the task status. For more information about task status, see **Task Statuses**.

- You can click ↻ in the upper right corner to view the latest task status.

- By default, DRS retains a task in the **Configuration** state for three days. After three days, DRS automatically deletes background resources, but the task status remains unchanged. When you reconfigure the task, DRS applies for resources for the task again.

- For a public network task, DRS needs to delete background resources after you stop the task. The EIP bound to the task cannot be restored to the **Unbound** state until background resources are deleted.

----End

2.2 From MySQL to GaussDB(for MySQL)

Supported Source and Destination Databases

Table 2-12 Supported databases

Source DB	Destination DB
RDS for MySQL	GaussDB(for MySQL) Primary/Standby

Database Account Permission Requirements

When using DRS to create a workload replay task, you are advised to ensure that permissions of the source database account are the same as those of the destination database account before starting the task.

Precautions

To ensure smooth workload replay, read the following notes before creating a task.

Table 2-13 Precautions

Type	Restrictions
Starting a task	• **Source database requirements:** – The source database must be RDS for MySQL. – SQL workload files have been recorded on the source database. For details, see **Enabling SQL Audit**. • **Destination database requirements:** – The destination database must be GaussDB(for MySQL). – The destination database version must be the same as or later than the source database version. – Baseline data has been developed in the destination database. The closer the time for collecting baseline data is to the start time for workload capturing on the source database, the more accurate simulation will be for the replay. • **Workload file requirements:** – If a workload file contains SQL delimiters, a parsing exception may occur. As a result, the replay task fails. – The full SQL structure of a workload file must be complete. If any SQL statement in audit logs provided by the user is truncated, a parsing exception may occur. – The size of a single SQL statement in a workload file cannot exceed 1 MB. – If other statements are inserted into a transaction, a deadlock may occur. • **Other notes:** – If configuration parameters (such as **innodb_buffer_pool_size** and **sqlmode**) of the source database are inconsistent with those of the destination database, the replay progress may be slow or the replay may fail. – If a workload file is deleted or added during a task editing, you need to select **Parse and Reset** when resetting the task and then replay the workload file again. For details, see **Resetting a Replay Task**. – The workload replay process is executed concurrently. DDL statements and DML statements are executed in the same batch (10s), and all the statements may be executed in disorder.
Parsing a workload file	After a parsing file is selected, the file cannot be renamed.
Replaying a database workload	Only SELECT, INSERT, DELETE, UPDATE, and DDLs are supported.

Type	Restrictions
Stopping a task	A finished task cannot be restarted.

Prerequisites

- **You have logged in to the DRS console.**

- Your account balance is greater than or equal to $0 USD.

- For details about the DB types and versions supported by workload replay, see **Supported Databases**.

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

- You have read **Precautions**.

Procedure

Step 1 On the **Workload Replay Management** page, click **Create Workload Replay Task**.

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

- Task information description

Figure 2-10 Workload replay task information

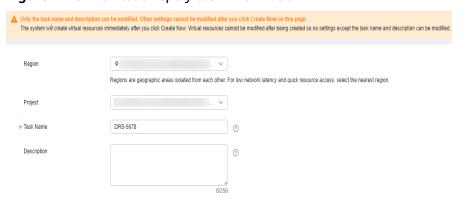**Table 2-14** Task information

Parameter	Description
Region	The region where the replay instance is deployed. You can change the region.
Project	The project corresponds to the current region and can be changed.

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

● Replay instance information

Figure 2-11 Replay instance information

Table 2-15 Replay instance settings

Parameter	Description
Data Flow	Select **Current cloud**. – **Current cloud** refers to the workload replay scenario where both source and destination databases are Huawei Cloud DB instances. – **To the cloud** refers to the workload replay scenario where the destination database is a Huawei Cloud DB instance and data needs to be transferred.
Source DB Engine	Select **MySQL**.
Workload File Source	Specifies where the workload file in the source database is from. – **Download from Huawei Cloud APIs**: Obtain audit log files through the API corresponding to Huawei Cloud services. – **Download from Huawei Cloud OBS**: Obtain workload files from Huawei Cloud OBS buckets.
Destination DB Engine	Select **GaussDB(for MySQL)**.
Network Type	**Public network** is used as an example. Available options: **Public network**, **VPC**, **VPN or Direct Connect**

Parameter	Description
Destination DB Instance	The GaussDB(for MySQL) DB instance you created. Ensure that baseline data has been developed in the destination database.
Replay Instance Subnet	Select the subnet where the replay instance is located. You can also click **View Subnets** to go to the network console to view the subnet where the instance resides. By default, the DRS instance and the 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 replay instance can be successfully created, only subnets with DHCP enabled are displayed.
Specify EIP	This parameter is available when you select **Public network** for **Network Type**. Select an EIP to be bound to the DRS instance. DRS will automatically bind the specified EIP to the DRS instance and unbind the EIP after the task is complete. For details about the data transfer fee generated using a public network, see **EIP Price Calculator**.

- AZ

Figure 2-12 AZ

Table 2-16 Task AZ

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

- Enterprise Project and Tags

Figure 2-13 Enterprise Project and Tags

Table 2-17 Enterprise Project and Tags

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

☐ **NOTE**

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

Step 3 After the replay instance is created, on the **Configure Source and Destination Databases** page, specify parameters in **Source Database**, **Destination Database**, and **Task Settings**. Then, click **Test Connection** for the destination database to check whether the destination database has been connected to the replay instance. After the connection test is successful, click **Next**.

● Source database information when **Download from Huawei Cloud APIs** is selected for **Workload File Source**

Figure 2-14 Source database information

Table 2-18 Source database settings

Parameter	Description
Workload File Source	Specifies where the workload file in the source database is from.
DB Instance Name	Select an RDS for MySQL DB instance for which SQL workload files have been recorded. For details about how to record SQL workload files, see **Enabling SQL Audit**.
Workload Type	Only **Audit log** is supported.
Time Range	Select the time range for audit logs.

- Source database information when **Download from Huawei Cloud OBS** is selected for **Workload File Source**

Figure 2-15 Source database information

Table 2-19 Source database settings

Parameter	Description
Workload File Source	Specifies where the workload file in the source database is from.
Access Key ID (AK)	Access key ID, which is a unique identifier used in conjunction with a secret access key to sign requests cryptographically.

Parameter	Description
Secret Access Key (SK)	Used together with the access key ID to sign requests cryptographically. It identifies a request sender and prevents the request from being modified. – Based on the principle of least permission, the AK/SK permissions must be minimized. If you can use both temporary and permanent AKs/SKs, you are advised to use a **temporary AK/SK**. Permanent AKs/SKs are used only in scenarios where temporary AKs/SKs cannot meet requirements. For example, if a large number of logs need to be downloaded for a long time, temporary AKs/SKs may become invalid due to timeout. – AK/SK information of the user is encrypted and temporarily stored in the system until the task is deleted.
Security Token	When a temporary AK/SK is used, **Security Token** must be used, and the recommended validity period is 24 hours. Otherwise, OBS bucket information may fail to be obtained during workload replay.
Bucket Name	Name of the OBS bucket for storing workload files.
Endpoint	OBS provides an endpoint for each region. An endpoint can be considered as the domain name of OBS in a region, and is used to process access requests from the region.
Workload File Prefix	Prefix of a file name in the OBS bucket. Only files whose names start with this prefix will be displayed.
Workload Type	Only **Audit log** is supported.
Workload File	Select the required workload file.

- Destination database information

Figure 2-16 Destination database information

Table 2-20 Destination database settings

Parameter	Description
DB Instance Name	The GaussDB(for MySQL) instance you selected when creating the task. This parameter cannot be changed.
Replay Connection IP Address	The primary node IP address of a DB instance is selected by default, but if the instance has a proxy IP address, you can also select that address if needed.
Database Username	The username for accessing the destination database.
Database Password	The password for the database username.

☐ **NOTE**

The username and password of the destination database are encrypted and temporarily stored on the DRS instance host during the workload replay. After the task is deleted, the username and password are permanently deleted.

- Task Settings

Figure 2-17 Task settings

Table 2-21 Task settings

Parameter	Description
SQL Type	Select the SQL type to be replayed to the destination database. The default value is **SELECT**. The available options are **SELECT**, **INSERT**, **UPDATE**, **DELETE**, and **DDL**.

Parameter	Description
Replay Mode	You can select **Performance** or **Transaction**. – In performance mode, you can set how many concurrent connections are allowed. SQL statements are replayed to the destination database based on a set number of connections. The SQL execution sequence in the source database may be different from that in the destination database. The replay performance is better. – In transaction mode, you cannot set how many concurrent connections are allowed. The number of connections is dynamically adjusted based on the connections in the source database logs to ensure that transaction SQL statements in the same connection of the source database are executed in sequence.
Filter out SQLs	The system fuzzily matches SQL statements based on the entered conditions, ignores case sensitivity, and filters SQL logs to be replayed to the destination database. The SQL logs that meet the conditions will be filtered out. You can configure up to 10 filtering rules.
Filter out SQLs Without Conditions	This option is used to filter out SQL statements of the SELECT, UPDATE, and DELETE types that do not contain conditions (that is, filter out SQL statements without a where condition).
Maximum Concurrent Connections	The number of replay threads configured for a workload replay task. The default value is **8**. The value ranges from **1** to **100**.
Acceleration Configuration	The percentage of the replayed SQLs to the SQLs executed on the source database within the same period. The percentage cannot exceed the maximum performance of the workload replay task. The value can be **Unlimited**, **100%**, or **200%**.

Step 4 On the **Check Task** page, check the replay 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 5 On the displayed page, specify **Start Time**, **Send Notification**, **SMN Topic**, and **Stop Abnormal Tasks After** and confirm that the configured information is correct and click **Submit** to submit the task.
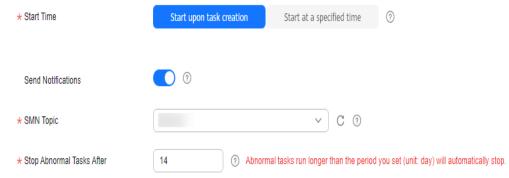
Figure 2-18 Task startup settings

Table 2-22 Task startup settings

Parameter	Description
Start Time	Set **Start Time** to **Start upon task creation** or **Start at a specified time** based on site requirements. **NOTE** After a replay task is started, the performance of the source and destination databases may be affected. You are advised to start a replay task during off-peak hours.
Send Notifications	SMN topic. This parameter is optional. If an exception occurs during workload replay, the system will send a notification to the specified recipients.
SMN Topic	This parameter is available only after you enable **Send Notifications** and create a topic on the SMN console and add a subscriber. For details, see *Simple Message Notification User Guide*.
Stop Abnormal Tasks After	Number of days after which an abnormal task automatically stops. The value must range from 14 to 100. The default value is **14**. **NOTE** 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 running longer than the period you set (unit: day) will automatically stop to avoid unnecessary fees.

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

- You can view the task status. For more information about task status, see **Task Statuses**.

- You can click ↻ in the upper right corner to view the latest task status.

- By default, DRS retains a task in the **Configuration** state for three days. After three days, DRS automatically deletes background resources, but the task status remains unchanged. When you reconfigure the task, DRS applies for resources for the task again.

- For a public network task, DRS needs to delete background resources after you stop the task. The EIP bound to the task cannot be restored to the **Unbound** state until background resources are deleted.

----End

2.3 From GaussDB(for MySQL) to GaussDB(for MySQL)

Supported Source and Destination Databases

Table 2-23 Supported databases

Source DB	Destination DB
GaussDB(for MySQL)	GaussDB(for MySQL) Primary/Standby

Database Account Permission Requirements

When using DRS to create a workload replay task, you are advised to ensure that permissions of the source database account are the same as those of the destination database account before starting the task.

Precautions

To ensure smooth workload replay, read the following notes before creating a task.

Table 2-24 Precautions

Type	Restrictions
Starting a task	**• Source database requirements:** – The source database must be GaussDB(for MySQL). – SQL Explorer has been enabled on the source database. For details, see **Enabling or Disabling SQL Explorer**. Enabling SQL Explorer will affect the performance of the source database. Evaluate the impact before enabling SQL Explorer. **• Destination database requirements:** – The destination database must be GaussDB(for MySQL). – Baseline data has been developed in the destination database. The closer the time for collecting baseline data is to the start time for workload capturing on the source database, the more accurate simulation will be for the replay. **• Workload file requirements:** – In earlier versions, the formats of files generated using GaussDB(for MySQL) SQL Explorer are different. Currently, all SQL statements of GaussDB(for MySQL) 2.0.8.3 to 2.0.28.15 and later patch versions 2.0.28.*xx* can be parsed. – By default, the maximum size of a SQL statement for GaussDB(for MySQL) is 4 KB. If the size of a SQL statement exceeds the default value, you need to change the value of the **rds_sql_tracer_max_record_size** parameter by referring to **Modifying a Parameter Template**. Otherwise, the statement whose size exceeds the default value will not be recorded and cannot be replayed. – If a workload file contains SQL delimiters (such as **^^**), a parsing exception may occur. As a result, the replay task fails. – The full SQL structure of a workload file must be complete. If any SQL statement in audit logs provided by the user is truncated, a parsing exception may occur. – The size of a single SQL statement in a workload file cannot exceed 1 MB. – If other statements are inserted into a transaction, a deadlock may occur. **• Other notes:** – If configuration parameters (such as **innodb_buffer_pool_size** and **sqlmode**) of the source database are inconsistent with those of the destination database, the replay progress may be slow or the replay may fail.

Type	Restrictions
	– If a workload file is deleted or added during a task editing, you need to select **Parse and Reset** when resetting the task and then replay the workload file again. For details, see **Resetting a Replay Task**. – The workload replay process is executed concurrently. DDL statements and DML statements are executed in the same batch (10s), and all the statements may be executed in disorder.
Parsing a workload file	After a parsing file is selected, the file cannot be renamed.
Replaying a database workload	Only SELECT, INSERT, DELETE, UPDATE, and DDLs are supported.
Stopping a task	A finished task cannot be restarted.

Prerequisites

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

Procedure

Step 1 On the **Workload Replay Management** page, click **Create Workload Replay Task**.

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

- Task information description

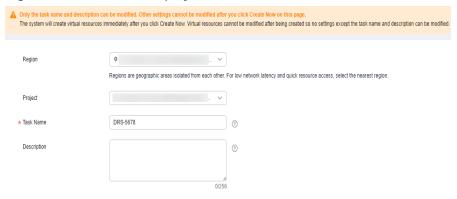**Figure 2-19** Workload replay task information

Table 2-25 Task information

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

● Replay instance information

Figure 2-20 Replay instance information

Table 2-26 Replay instance settings

Parameter	Description
Data Flow	Select **Current cloud**. – **Current cloud** refers to the workload replay scenario where both source and destination databases are Huawei Cloud DB instances. – **To the cloud** refers to the workload replay scenario where the destination database is a Huawei Cloud DB instance and data needs to be transferred.
Source DB Engine	Select **GaussDB(for MySQL)**.
Workload File Source	Specifies where the workload file in the source database is from. – **Download from Huawei Cloud APIs**: Obtain audit log files through the API corresponding to Huawei Cloud services. – **Download from Huawei Cloud OBS**: Obtain workload files from Huawei Cloud OBS buckets.

Parameter	Description
Destination DB Engine	Select **GaussDB(for MySQL)**.
Network Type	**Public network** is used as an example. Available options: **Public network**, **VPC**, **VPN or Direct Connect**
Destination DB Instance	The GaussDB(for MySQL) DB instance you created. Ensure that baseline data has been developed in the destination database.
Replay Instance Subnet	Select the subnet where the replay instance is located. You can also click **View Subnets** to go to the network console to view the subnet where the instance resides. By default, the DRS instance and the 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 replay instance can be successfully created, only subnets with DHCP enabled are displayed.
Specify EIP	This parameter is available when you select **Public network** for **Network Type**. Select an EIP to be bound to the DRS instance. DRS will automatically bind the specified EIP to the DRS instance and unbind the EIP after the task is complete. For details about the data transfer fee generated using a public network, see **EIP Price Calculator**.

- AZ

Figure 2-21 AZ

Table 2-27 Task AZ

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

- Enterprise Project and Tags

Figure 2-22 Enterprise Project and Tags

Table 2-28 Enterprise Project and Tags

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

☐ NOTE

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

Step 3 After the replay instance is created, on the **Configure Source and Destination Databases** page, specify parameters in **Source Database**, **Destination Database**, and **Task Settings**. Then, click **Test Connection** for the destination database to check whether the destination database has been connected to the replay instance. After the connection test is successful, click **Next**.

- Source database information when **Download from Huawei Cloud APIs** is selected for **Workload File Source**

Figure 2-23 Source database information
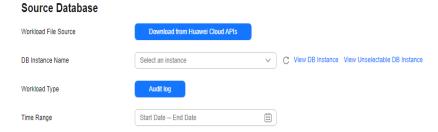
Table 2-29 Source database settings

Parameter	Description
Workload File Source	Specifies where the workload file in the source database is from.
DB Instance Name	Select a GaussDB(for MySQL) DB instance for which SQL Explorer has been enabled. For details about how to enable SQL Explorer, see **Enabling or Disabling SQL Explorer**.
Workload Type	Only **SQL Explorer** is supported.
Time Range	Select the time range for audit logs.

- Source database information when **Download from Huawei Cloud OBS** is selected for **Workload File Source**

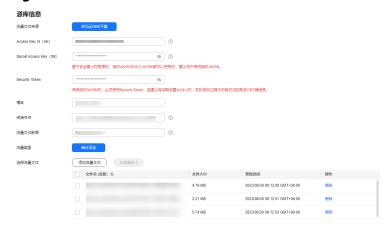**Figure 2-24** Source database information

Table 2-30 Source database settings

Parameter	Description
Workload File Source	Specifies where the workload file in the source database is from.

Parameter	Description
Access Key ID (AK)	Access key ID, which is a unique identifier used in conjunction with a secret access key to sign requests cryptographically.
Secret Access Key (SK)	Used together with the access key ID to sign requests cryptographically. It identifies a request sender and prevents the request from being modified. – Based on the principle of least permission, the AK/SK permissions must be minimized. If you can use both temporary and permanent AKs/SKs, you are advised to use a **temporary AK/SK**. Permanent AKs/SKs are used only in scenarios where temporary AKs/SKs cannot meet requirements. For example, if a large number of logs need to be downloaded for a long time, temporary AKs/SKs may become invalid due to timeout. – AK/SK information of the user is encrypted and temporarily stored in the system until the task is deleted.
Security Token	When a temporary AK/SK is used, **Security Token** must be used, and the recommended validity period is 24 hours. Otherwise, OBS bucket information may fail to be obtained during workload replay.
Bucket Name	Name of the OBS bucket for storing workload files.
Endpoint	OBS provides an endpoint for each region. An endpoint can be considered as the domain name of OBS in a region, and is used to process access requests from the region.
Workload File Prefix	Prefix of a file name in the OBS bucket. Only files whose names start with this prefix will be displayed.
Workload Type	Only **Audit log** is supported.
Workload File	Select the required workload file.

- Destination database information

Figure 2-25 Destination database information

Table 2-31 Destination database settings

Parameter	Description
DB Instance Name	The GaussDB(for MySQL) instance you selected when creating the task. This parameter cannot be changed.
Replay Connection IP Address	The primary node IP address of a DB instance is selected by default, but if the instance has a proxy IP address, you can also select that address if needed.
Database Username	The username for accessing the destination database.
Database Password	The password for the database username.

📖 **NOTE**

The username and password of the destination database are encrypted and temporarily stored on the DRS instance host during the workload replay. After the task is deleted, the username and password are permanently deleted.

- Task Settings

Figure 2-26 Task settings

Table 2-32 Task settings
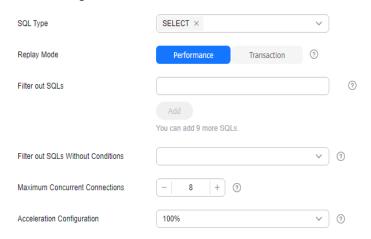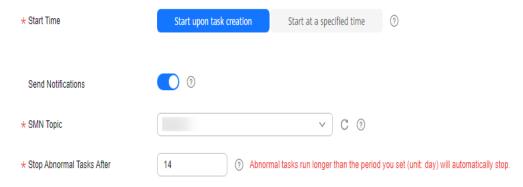
Parameter	Description
SQL Type	Select the SQL type to be replayed to the destination database. The default value is **SELECT**. The available options are **SELECT**, **INSERT**, **UPDATE**, **DELETE**, and **DDL**.
Replay Mode	You can select **Performance** or **Transaction**. – In performance mode, you can set how many concurrent connections are allowed. SQL statements are replayed to the destination database based on a set number of connections. The SQL execution sequence in the source database may be different from that in the destination database. The replay performance is better. – In transaction mode, you cannot set how many concurrent connections are allowed. The number of connections is dynamically adjusted based on the connections in the source database logs to ensure that transaction SQL statements in the same connection of the source database are executed in sequence.
Filter out SQLs	The system fuzzily matches SQL statements based on the entered conditions, ignores case sensitivity, and filters SQL logs to be replayed to the destination database. The SQL logs that meet the conditions will be filtered out. You can configure up to 10 filtering rules.
Filter out SQLs Without Conditions	This option is used to filter out SQL statements of the SELECT, UPDATE, and DELETE types that do not contain conditions (that is, filter out SQL statements without a where condition).

Parameter	Description
Maximum Concurrent Connections	The number of replay threads configured for a workload replay task. The default value is **8**. The value ranges from **1** to **100**.
Acceleration Configuration	The percentage of the replayed SQLs to the SQLs executed on the source database within the same period. The percentage cannot exceed the maximum performance of the workload replay task. The value can be **Unlimited**, **100%**, or **200%**.

Step 4 On the **Check Task** page, check the replay 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 5 On the displayed page, specify **Start Time**, **Send Notification**, **SMN Topic**, and **Stop Abnormal Tasks After** and confirm that the configured information is correct and click **Submit** to submit the task.

Figure 2-27 Task startup settings

Table 2-33 Task startup settings

Parameter	Description
Start Time	Set **Start Time** to **Start upon task creation** or **Start at a specified time** based on site requirements. **NOTE** After a replay task is started, the performance of the source and destination databases may be affected. You are advised to start a replay task during off-peak hours.
Send Notifications	SMN topic. This parameter is optional. If an exception occurs during workload replay, the system will send a notification to the specified recipients.

Parameter	Description
SMN Topic	This parameter is available only after you enable **Send Notifications** and create a topic on the SMN console and add a subscriber. For details, see *Simple Message Notification User Guide*.
Stop Abnormal Tasks After	Number of days after which an abnormal task automatically stops. The value must range from 14 to 100. The default value is **14**. **NOTE** 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 running longer than the period you set (unit: day) will automatically stop to avoid unnecessary fees.

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

- You can view the task status. For more information about task status, see **Task Statuses**.

- You can click ⟳ in the upper right corner to view the latest task status.

- By default, DRS retains a task in the **Configuration** state for three days. After three days, DRS automatically deletes background resources, but the task status remains unchanged. When you reconfigure the task, DRS applies for resources for the task again.

- For a public network task, DRS needs to delete background resources after you stop the task. The EIP bound to the task cannot be restored to the **Unbound** state until background resources are deleted.

----End

3 To the cloud

3.1 From MySQL to MySQL

Supported Source and Destination Databases

Table 3-1 Supported databases

Source DB	Destination DB
• ECS-hosted MySQL 5.6, 5.7, and 8.0 • On-premises MySQL 5.6, 5.7, and 8.0 • MySQL 5.6, 5.7, and 8.0 on other clouds	RDS for MySQL

Database Account Permission Requirements

When using DRS to create a workload replay task, you are advised to ensure that permissions of the source database account are the same as those of the destination database account before starting the task.

Precautions

To ensure smooth workload replay, read the following notes before creating a task.

Table 3-2 Precautions

Type	Restrictions
Starting a task	• **Source database requirements:** – The source database can be a self-managed MySQL database or a MySQL database on other clouds (such as ApsaraDB RDS for MySQL and PolarDB for MySQL). You can enable and export audit logs or insight logs. – SQL workload files have been recorded on the source database and uploaded to an OBS bucket on Huawei Cloud. DRS obtains the workload files from the OBS bucket. • **Destination database requirements:** – The destination database must be RDS for MySQL. – The destination database version must be the same as or later than the source database version. – Baseline data has been developed in the destination database. The closer the time for collecting baseline data is to the start time for workload capturing on the source database, the more accurate simulation will be for the replay. • **Workload file requirements:** – If a workload file contains SQL delimiters, a parsing exception may occur. As a result, the replay task fails. – The full SQL structure of a workload file must be complete. If any SQL statement in audit logs provided by the user is truncated, a parsing exception may occur. – The size of a single SQL statement in a workload file cannot exceed 1 MB. – If other statements are inserted into a transaction, a deadlock may occur. – Only .gz and .zip files can be uploaded. • **Other notes:** – If configuration parameters (such as **innodb_buffer_pool_size** and **sqlmode**) of the source database are inconsistent with those of the destination database, the replay progress may be slow or the replay may fail. – If a workload file is deleted or added during a task editing, you need to select **Parse and Reset** when resetting the task and then replay the workload file again. For details, see **Resetting a Replay Task**. – The workload replay process is executed concurrently. DDL statements and DML statements are executed in the same batch (10s), and all the statements may be executed in disorder.

Type	Restrictions
Parsing a workload file	After a parsing file is selected, the file cannot be renamed.
Replaying a database workload	Only SELECT, INSERT, DELETE, UPDATE, and DDLs are supported.
Stopping a task	A finished task cannot be restarted.

Prerequisites

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

Procedure

Step 1 On the **Workload Replay Management** page, click **Create Workload Replay Task**.

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

- Task information description

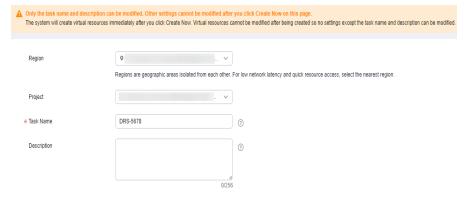**Figure 3-1** Workload replay task information

Table 3-3 Task information

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

● Replay instance information

Figure 3-2 Replay instance information

Table 3-4 Replay instance settings

Parameter	Description
Data Flow	Select **To the cloud**. – **Current cloud** refers to the workload replay scenario where both source and destination databases are Huawei Cloud DB instances. – **To the cloud** refers to the workload replay scenario where the destination database is a Huawei Cloud DB instance and data needs to be transferred.
Source DB Engine	Select **MySQL**.
Source DB From	Platform where the source database is from. The audit log format varies depending on the source database. For details, see **Audit Log Format**.
Destination DB Engine	Select **MySQL**.

Parameter	Description
Network Type	**Public network** is used as an example. Available options: **Public network**, **VPC**, **VPN or Direct Connect**
Destination DB Instance	The RDS for MySQL DB instance you created. Ensure that baseline data has been developed in the destination database.
Replay Instance Subnet	Select the subnet where the replay instance is located. You can also click **View Subnets** to go to the network console to view the subnet where the instance resides. By default, the DRS instance and the 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 replay instance can be successfully created, only subnets with DHCP enabled are displayed.
Specify EIP	This parameter is available when you select **Public network** for **Network Type**. Select an EIP to be bound to the DRS instance. DRS will automatically bind the specified EIP to the DRS instance and unbind the EIP after the task is complete. For details about the data transfer fee generated using a public network, see **EIP Price Calculator**.

- AZ

Figure 3-3 AZ

Table 3-5 Task AZ

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

- Enterprise Project and Tags

Figure 3-4 Enterprise Project and Tags

Table 3-6 Enterprise Project and Tags

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

⬚ NOTE

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

Step 3 After the replay instance is created, on the **Configure Source and Destination Databases** page, specify parameters in **Source Database**, **Destination Database**, and **Task Settings**. Then, click **Test Connection** for the destination database to check whether the destination database has been connected to the replay instance. After the connection test is successful, click **Next**.

● Source database information

Figure 3-5 Source database information

Table 3-7 Source database settings

Parameter	Description
Workload File Source	Specifies where the workload file in the source database is from.
Access Key ID (AK)	Access key ID, which is a unique identifier used in conjunction with a secret access key to sign requests cryptographically.
Secret Access Key (SK)	Used together with the access key ID to sign requests cryptographically. It identifies a request sender and prevents the request from being modified. – Based on the principle of least permission, the AK/SK permissions must be minimized. If you can use both temporary and permanent AKs/SKs, you are advised to use a **temporary AK/SK**. Permanent AKs/SKs are used only in scenarios where temporary AKs/SKs cannot meet requirements. For example, if a large number of logs need to be downloaded for a long time, temporary AKs/SKs may become invalid due to timeout. – AK/SK information of the user is encrypted and temporarily stored in the system until the task is deleted.
Security Token	When a temporary AK/SK is used, **Security Token** must be used, and the recommended validity period is 24 hours. Otherwise, OBS bucket information may fail to be obtained during workload replay.
Bucket Name	Name of the OBS bucket for storing workload files.
Endpoint	OBS provides an endpoint for each region. An endpoint can be considered as the domain name of OBS in a region, and is used to process access requests from the region.
Workload File Prefix	Prefix of a file name in the OBS bucket. Only files whose names start with this prefix will be displayed.

Parameter	Description
Workload Type	Only **Audit log** is supported.
Workload File	Select the required workload file.

- Destination database information

Figure 3-6 Destination database information

Table 3-8 Destination database settings

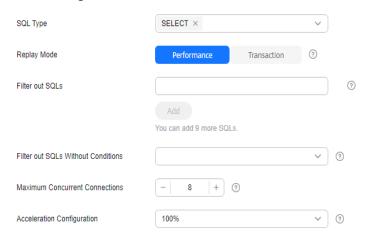| Parameter	Description
DB Instance Name	The RDS DB instance you selected when creating the task. This parameter cannot be changed.
Database Username	The username for accessing the destination database.
Database Password	The password for the database username.
SSL Connection	If SSL connection is required, enable SSL on the destination database, ensure that related parameters have been correctly configured, and upload an SSL certificate. **NOTE** – The maximum size of a single certificate file that can be uploaded is 500 KB. – If SSL is disabled, your data may be at risk.

NOTE

The username and password of the destination database are encrypted and temporarily stored on the DRS instance host during the workload replay. After the task is deleted, the username and password are permanently deleted.
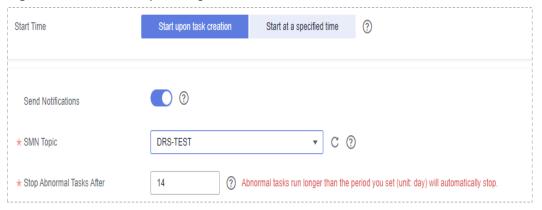
- Task Settings

Figure 3-7 Task settings

Table 3-9 Task settings

Parameter	Description
SQL Type	Select the SQL type to be replayed to the destination database. The default value is **SELECT**. The available options are **SELECT**, **INSERT**, **UPDATE**, **DELETE**, and **DDL**.
Replay Mode	You can select **Performance** or **Transaction**. – In performance mode, you can set how many concurrent connections are allowed. SQL statements are replayed to the destination database based on a set number of connections. The SQL execution sequence in the source database may be different from that in the destination database. The replay performance is better. – In transaction mode, you cannot set how many concurrent connections are allowed. The number of connections is dynamically adjusted based on the connections in the source database logs to ensure that transaction SQL statements in the same connection of the source database are executed in sequence.
Filter out SQLs	The system fuzzily matches SQL statements based on the entered conditions, ignores case sensitivity, and filters SQL logs to be replayed to the destination database. The SQL logs that meet the conditions will be filtered out. You can configure up to 10 filtering rules.
Filter out SQLs Without Conditions	This option is used to filter out SQL statements of the SELECT, UPDATE, and DELETE types that do not contain conditions (that is, filter out SQL statements without a where condition).

Parameter	Description
Maximum Concurrent Connections	The number of replay threads configured for a workload replay task. The default value is **8**. The value ranges from **1** to **100**.
Acceleration Configuration	The percentage of the replayed SQLs to the SQLs executed on the source database within the same period. The percentage cannot exceed the maximum performance of the workload replay task. The value can be **Unlimited**, **100%**, or **200%**.

Step 4 On the **Check Task** page, check the replay 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 5 On the displayed page, specify **Start Time**, **Send Notification**, **SMN Topic**, and **Stop Abnormal Tasks After** and confirm that the configured information is correct and click **Submit** to submit the task.

Figure 3-8 Task startup settings

Table 3-10 Task startup settings

Parameter	Description
Start Time	Set **Start Time** to **Start upon task creation** or **Start at a specified time** based on site requirements. **NOTE** After a replay task is started, the performance of the source and destination databases may be affected. You are advised to start a replay task during off-peak hours.
Send Notifications	SMN topic. This parameter is optional. If an exception occurs during workload replay, the system will send a notification to the specified recipients.

Parameter	Description
SMN Topic	This parameter is available only after you enable **Send Notifications** and create a topic on the SMN console and add a subscriber. For details, see ***Simple Message Notification User Guide***.
Stop Abnormal Tasks After	Number of days after which an abnormal task automatically stops. The value must range from 14 to 100. The default value is **14**. **NOTE** 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 running longer than the period you set (unit: day) will automatically stop to avoid unnecessary fees.

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

- You can view the task status. For more information about task status, see **Task Statuses**.

- You can click ↻ in the upper right corner to view the latest task status.

- By default, DRS retains a task in the **Configuration** state for three days. After three days, DRS automatically deletes background resources, but the task status remains unchanged. When you reconfigure the task, DRS applies for resources for the task again.

- For a public network task, DRS needs to delete background resources after you stop the task. The EIP bound to the task cannot be restored to the **Unbound** state until background resources are deleted.

----End

3.2 From MySQL to GaussDB(for MySQL)

Supported Source and Destination Databases

Table 3-11 Supported databases

Source DB	Destination DB
- ECS-hosted MySQL 5.6, 5.7, and 8.0 - On-premises MySQL 5.6, 5.7, and 8.0 - MySQL 5.6, 5.7, and 8.0 on other clouds	GaussDB(for MySQL) Primary/Standby

Database Account Permission Requirements

When using DRS to create a workload replay task, you are advised to ensure that permissions of the source database account are the same as those of the destination database account before starting the task.

Precautions

To ensure smooth workload replay, read the following notes before creating a task.

Table 3-12 Precautions

Type	Restrictions
Starting a task	**Source database requirements:** - The source database can be a self-managed MySQL database or a MySQL database on other clouds (such as ApsaraDB RDS for MySQL and PolarDB for MySQL). You can enable and export audit logs or insight logs. - SQL workload files have been recorded on the source database and uploaded to an OBS bucket on Huawei Cloud. DRS obtains the workload files from the OBS bucket. **Destination database requirements:** - The destination database must be GaussDB(for MySQL). - Baseline data has been developed in the destination database. The closer the time for collecting baseline data is to the start time for workload capturing on the source database, the more accurate simulation will be for the replay. **Workload file requirements:** - If a workload file contains SQL delimiters (such as ^^), a parsing exception may occur. As a result, the replay task fails. - The full SQL structure of a workload file must be complete. If any SQL statement in audit logs provided by the user is truncated, a parsing exception may occur. - The size of a single SQL statement in a workload file cannot exceed 1 MB. - If other statements are inserted into a transaction, a deadlock may occur. - Only .gz and .zip files can be uploaded. **Other notes:** - If configuration parameters (such as **innodb_buffer_pool_size** and **sqlmode**) of the source database are inconsistent with those of the destination database, the replay progress may be slow or the replay may fail. - If a workload file is deleted or added during a task editing, you need to select **Parse and Reset** when resetting the task and then replay the workload file again. For details, see **Resetting a Replay Task**. - The workload replay process is executed concurrently. DDL statements and DML statements are executed in the same batch (10s), and all the statements may be executed in disorder.
Parsing a workload file	After a parsing file is selected, the file cannot be renamed.

Type	Restrictions
Replaying a database workload	Only SELECT, INSERT, DELETE, UPDATE, and DDLs are supported.
Stopping a task	A finished task cannot be restarted.

Prerequisites

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

Procedure

Step 1 On the **Workload Replay Management** page, click **Create Workload Replay Task**.

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

- Task information description

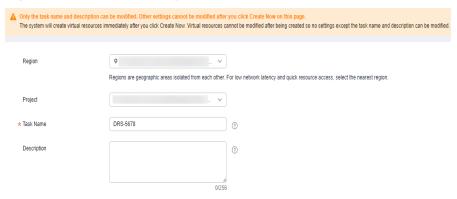**Figure 3-9** Workload replay task information

Table 3-13 Task information

Parameter	Description
Region	The region where the replay instance is deployed. You can change the region.

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

- Replay instance information

Figure 3-10 Replay instance information

Table 3-14 Replay instance settings

Parameter	Description
Data Flow	Select **To the cloud**. – **Current cloud** refers to the workload replay scenario where both source and destination databases are Huawei Cloud DB instances. – **To the cloud** refers to the workload replay scenario where the destination database is a Huawei Cloud DB instance and data needs to be transferred.
Source DB Engine	Select **MySQL**.
Source DB From	Platform where the source database is from. The audit log format varies depending on the source database. For details, see **Audit Log Format**.
Destination DB Engine	Select **GaussDB(for MySQL)**.
Network Type	**Public network** is used as an example. Available options: **Public network**, **VPC**, **VPN or Direct Connect**
Destination DB Instance	The GaussDB(for MySQL) DB instance you created. Ensure that baseline data has been developed in the destination database.

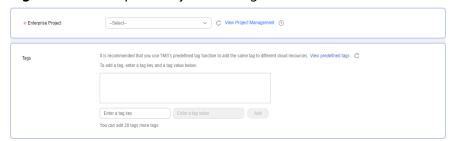| Parameter	Description
Replay Instance Subnet	Select the subnet where the replay instance is located. You can also click **View Subnets** to go to the network console to view the subnet where the instance resides. By default, the DRS instance and the destination DB instance are in the same subnet. You need to select the subnet where the DRS instance resides, and there are available IP addresses for the subnet. To ensure that the replay instance can be successfully created, only subnets with DHCP enabled are displayed.
Specify EIP	This parameter is available when you select **Public network** for **Network Type**. Select an EIP to be bound to the DRS instance. DRS will automatically bind the specified EIP to the DRS instance and unbind the EIP after the task is complete. For details about the data transfer fee generated using a public network, see **EIP Price Calculator**.

● AZ

Figure 3-11 AZ

Table 3-15 Task AZ

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

● Enterprise Project and Tags

Figure 3-12 Enterprise Project and Tags
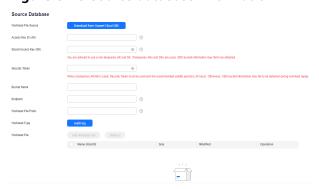
Table 3-16 Enterprise Project and Tags

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

□ NOTE

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

Step 3 After the replay instance is created, on the **Configure Source and Destination Databases** page, specify parameters in **Source Database**, **Destination Database**, and **Task Settings**. Then, click **Test Connection** for the destination database to check whether the destination database has been connected to the replay instance. After the connection test is successful, click **Next**.

● Source database information

Figure 3-13 Source database information

Table 3-17 Source database settings

Parameter	Description
Workload File Source	Specifies where the workload file in the source database is from.
Access Key ID (AK)	Access key ID, which is a unique identifier used in conjunction with a secret access key to sign requests cryptographically.
Secret Access Key (SK)	Used together with the access key ID to sign requests cryptographically. It identifies a request sender and prevents the request from being modified. – Based on the principle of least permission, the AK/SK permissions must be minimized. If you can use both temporary and permanent AKs/SKs, you are advised to use a **temporary AK/SK**. Permanent AKs/SKs are used only in scenarios where temporary AKs/SKs cannot meet requirements. For example, if a large number of logs need to be downloaded for a long time, temporary AKs/SKs may become invalid due to timeout. – AK/SK information of the user is encrypted and temporarily stored in the system until the task is deleted.
Security Token	When a temporary AK/SK is used, **Security Token** must be used, and the recommended validity period is 24 hours. Otherwise, OBS bucket information may fail to be obtained during workload replay.
Bucket Name	Name of the OBS bucket for storing workload files.
Endpoint	OBS provides an endpoint for each region. An endpoint can be considered as the domain name of OBS in a region, and is used to process access requests from the region.
Workload File Prefix	Prefix of a file name in the OBS bucket. Only files whose names start with this prefix will be displayed.
Workload Type	Only **Audit log** is supported.
Workload File	Select the required workload file.

● Destination database information

Figure 3-14 Destination database information

Table 3-18 Destination database settings

Parameter	Description
DB Instance Name	The GaussDB(for MySQL) instance you selected when creating the task. This parameter cannot be changed.
Replay Connection IP Address	The primary node IP address of a DB instance is selected by default, but if the instance has a proxy IP address, you can also select that address if needed.
Database Username	The username for accessing the destination database.
Database Password	The password for the database username.

📖 **NOTE**

The username and password of the destination database are encrypted and temporarily stored on the DRS instance host during the workload replay. After the task is deleted, the username and password are permanently deleted.

- Task Settings

Figure 3-15 Task settings

Table 3-19 Task settings
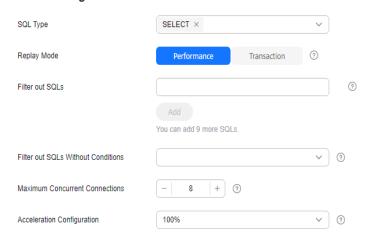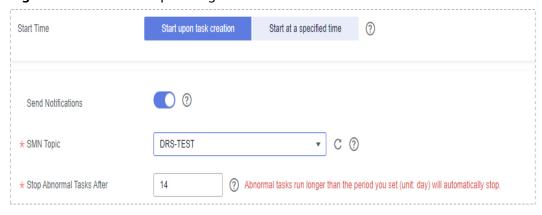
Parameter	Description
SQL Type	Select the SQL type to be replayed to the destination database. The default value is **SELECT**. The available options are **SELECT**, **INSERT**, **UPDATE**, **DELETE**, and **DDL**.
Replay Mode	You can select **Performance** or **Transaction**. – In performance mode, you can set how many concurrent connections are allowed. SQL statements are replayed to the destination database based on a set number of connections. The SQL execution sequence in the source database may be different from that in the destination database. The replay performance is better. – In transaction mode, you cannot set how many concurrent connections are allowed. The number of connections is dynamically adjusted based on the connections in the source database logs to ensure that transaction SQL statements in the same connection of the source database are executed in sequence.
Filter out SQLs	The system fuzzily matches SQL statements based on the entered conditions, ignores case sensitivity, and filters SQL logs to be replayed to the destination database. The SQL logs that meet the conditions will be filtered out. You can configure up to 10 filtering rules.
Filter out SQLs Without Conditions	This option is used to filter out SQL statements of the SELECT, UPDATE, and DELETE types that do not contain conditions (that is, filter out SQL statements without a where condition).

Parameter	Description
Maximum Concurrent Connections	The number of replay threads configured for a workload replay task. The default value is **8**. The value ranges from **1** to **100**.
Acceleration Configuration	The percentage of the replayed SQLs to the SQLs executed on the source database within the same period. The percentage cannot exceed the maximum performance of the workload replay task. The value can be **Unlimited**, **100%**, or **200%**.

Step 4 On the **Check Task** page, check the replay 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 5 On the displayed page, specify **Start Time**, **Send Notification**, **SMN Topic**, and **Stop Abnormal Tasks After** and confirm that the configured information is correct and click **Submit** to submit the task.

Figure 3-16 Task startup settings

Table 3-20 Task startup settings

Parameter	Description
Start Time	Set **Start Time** to **Start upon task creation** or **Start at a specified time** based on site requirements. NOTE After a replay task is started, the performance of the source and destination databases may be affected. You are advised to start a replay task during off-peak hours.
Send Notifications	SMN topic. This parameter is optional. If an exception occurs during workload replay, the system will send a notification to the specified recipients.

Parameter	Description
SMN Topic	This parameter is available only after you enable **Send Notifications** and create a topic on the SMN console and add a subscriber. For details, see *Simple Message Notification User Guide*.
Stop Abnormal Tasks After	Number of days after which an abnormal task automatically stops. The value must range from 14 to 100. The default value is **14**. **NOTE** 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 running longer than the period you set (unit: day) will automatically stop to avoid unnecessary fees.

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

- You can view the task status. For more information about task status, see **Task Statuses**.

- You can click ↻ in the upper right corner to view the latest task status.

- By default, DRS retains a task in the **Configuration** state for three days. After three days, DRS automatically deletes background resources, but the task status remains unchanged. When you reconfigure the task, DRS applies for resources for the task again.

- For a public network task, DRS needs to delete background resources after you stop the task. The EIP bound to the task cannot be restored to the **Unbound** state until background resources are deleted.

----End
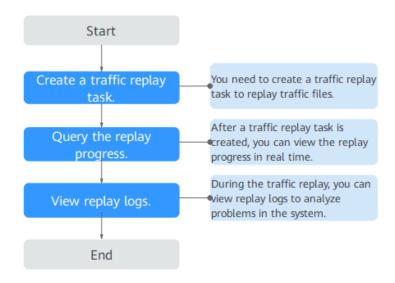
4 Task Management

4.1 Creating a Workload Replay Task

Scenarios

A workload replay task simulates the service load of the source database on the destination database so you can evaluate the effectiveness and performance of the destination database. This function applies to the following scenarios:

● Function testing: By creating a workload replay task, you can evaluate how the service load of the source database runs on the destination database.

● Peak load testing: By specifying the replay thread and speed, you can simulate the peak service load of the source database and analyze the stability of the destination database when workloads increase sharply.

Process

Figure 4-1 Workload replay process

- **Step 1: Create a workload replay task.** You can select the source database, workload file, and destination database as required to create a workload replay task.

- **Step 2: Query the replay progress.** During the workload replay, you can view the progress.

- **Step 3: View replay logs.** Workload replay logs contain alarms, errors, and prompt information. You can analyze replay problems based on such information.

This section describes how to create a workload replay task from RDS for MySQL to RDS for MySQL. To configure other storage engines, you can refer to the following procedures.

Procedure

Step 1 On the **Workload Replay Management** page, click **Create Workload Replay Task**.

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

- Task information description

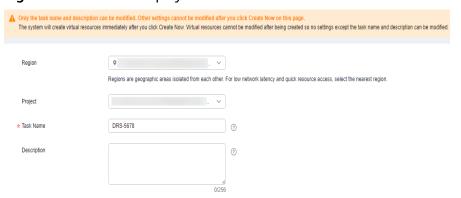**Figure 4-2** Workload replay task information

Table 4-1 Task information

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

- Replay instance information

Figure 4-3 Replay instance information

Table 4-2 Replay instance settings

Parameter	Description
Data Flow	Select **Current cloud**. – **Current cloud** refers to the workload replay scenario where both source and destination databases are Huawei Cloud DB instances. – **To the cloud** refers to the workload replay scenario where the destination database is a Huawei Cloud DB instance and data needs to be transferred.
Source DB Engine	Select **MySQL**.
Workload File Source	Specifies where the workload file in the source database is from. – **Download from Huawei Cloud APIs**: Obtain audit log files through the API corresponding to Huawei Cloud services. – **Download from Huawei Cloud OBS**: Obtain workload files from Huawei Cloud OBS buckets.
Destination DB Engine	Select **MySQL**.
Network Type	**Public network** is used as an example. Available options: **Public network**, **VPC**, **VPN or Direct Connect**
Destination DB Instance	The RDS for MySQL DB instance you created. Ensure that baseline data has been developed in the destination database.

Parameter	Description
Replay Instance Subnet	Select the subnet where the replay instance is located. You can also click **View Subnets** to go to the network console to view the subnet where the instance resides. By default, the DRS instance and the 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 replay instance can be successfully created, only subnets with DHCP enabled are displayed.
Specify EIP	This parameter is available when you select **Public network** for **Network Type**. Select an EIP to be bound to the DRS instance. DRS will automatically bind the specified EIP to the DRS instance and unbind the EIP after the task is complete. For details about the data transfer fee generated using a public network, see **EIP Price Calculator**.

- AZ

  Figure 4-4 AZ

  Table 4-3 Task AZ

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

- Enterprise Project and Tags

  Figure 4-5 Enterprise Project and Tags

Table 4-4 Enterprise Project and Tags

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

📖 **NOTE**

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

Step 3 After the replay instance is created, on the **Configure Source and Destination Databases** page, specify parameters in **Source Database**, **Destination Database**, and **Task Settings**. Then, click **Test Connection** for the destination database to check whether the destination database has been connected to the replay instance. After the connection test is successful, click **Next**.

- Source database information when **Download from Huawei Cloud APIs** is selected for **Workload File Source**

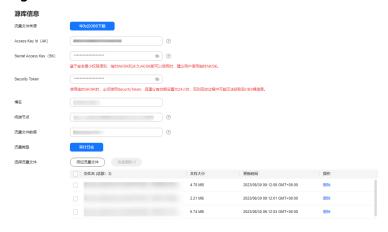**Figure 4-6** Source database information

Table 4-5 Source database settings

Parameter	Description
Workload File Source	Specifies where the workload file in the source database is from.
DB Instance Name	Select an RDS for MySQL DB instance for which SQL workload files have been recorded. For details about how to record SQL workload files, see **Enabling SQL Audit**.
Workload Type	Only **Audit log** is supported.
Time Range	Select the time range for audit logs.

- Source database information when **Download from Huawei Cloud OBS** is selected for **Workload File Source**

Figure 4-7 Source database information

Table 4-6 Source database settings

Parameter	Description
Workload File Source	Specifies where the workload file in the source database is from.
Access Key ID (AK)	Access key ID, which is a unique identifier used in conjunction with a secret access key to sign requests cryptographically.

Parameter	Description
Secret Access Key (SK)	Used together with the access key ID to sign requests cryptographically. It identifies a request sender and prevents the request from being modified. – Based on the principle of least permission, the AK/SK permissions must be minimized. If you can use both temporary and permanent AKs/SKs, you are advised to use a **temporary AK/SK**. Permanent AKs/SKs are used only in scenarios where temporary AKs/SKs cannot meet requirements. For example, if a large number of logs need to be downloaded for a long time, temporary AKs/SKs may become invalid due to timeout. – AK/SK information of the user is encrypted and temporarily stored in the system until the task is deleted.
Security Token	When a temporary AK/SK is used, **Security Token** must be used, and the recommended validity period is 24 hours. Otherwise, OBS bucket information may fail to be obtained during workload replay.
Bucket Name	Name of the OBS bucket for storing workload files.
Endpoint	OBS provides an endpoint for each region. An endpoint can be considered as the domain name of OBS in a region, and is used to process access requests from the region.
Workload File Prefix	Prefix of a file name in the OBS bucket. Only files whose names start with this prefix will be displayed.
Workload Type	Only **Audit log** is supported.
Workload File	Select the required workload file.

- Destination database information

Figure 4-8 Destination database information

Table 4-7 Destination database settings

Parameter	Description
DB Instance Name	The RDS DB instance you selected when creating the task. This parameter cannot be changed.
Database Username	The username for accessing the destination database.
Database Password	The password for the database username.
SSL Connection	If SSL connection is required, enable SSL on the destination database, ensure that related parameters have been correctly configured, and upload an SSL certificate. **NOTE** – The maximum size of a single certificate file that can be uploaded is 500 KB. – If SSL is disabled, your data may be at risk.

 NOTE

The username and password of the destination database are encrypted and temporarily stored on the DRS instance host during the workload replay. After the task is deleted, the username and password are permanently deleted.

● Task Settings

Figure 4-9 Task settings

Table 4-8 Task settings

Parameter	Description
SQL Type	Select the SQL type to be replayed to the destination database. The default value is **SELECT**. The available options are **SELECT**, **INSERT**, **UPDATE**, **DELETE**, and **DDL**.
Replay Mode	You can select **Performance** or **Transaction**. – In performance mode, you can set how many concurrent connections are allowed. SQL statements are replayed to the destination database based on a set number of connections. The SQL execution sequence in the source database may be different from that in the destination database. The replay performance is better. – In transaction mode, you cannot set how many concurrent connections are allowed. The number of connections is dynamically adjusted based on the connections in the source database logs to ensure that transaction SQL statements in the same connection of the source database are executed in sequence.
Filter out SQLs	The system fuzzily matches SQL statements based on the entered conditions, ignores case sensitivity, and filters SQL logs to be replayed to the destination database. The SQL logs that meet the conditions will be filtered out. You can configure up to 10 filtering rules.
Filter out SQLs Without Conditions	This option is used to filter out SQL statements of the SELECT, UPDATE, and DELETE types that do not contain conditions (that is, filter out SQL statements without a where condition).
Maximum Concurrent Connections	The number of replay threads configured for a workload replay task. The default value is **8**. The value ranges from **1** to **100**.
Acceleration Configuration	The percentage of the replayed SQLs to the SQLs executed on the source database within the same period. The percentage cannot exceed the maximum performance of the workload replay task. The value can be **Unlimited**, **100%**, or **200%**.

Step 4 On the **Check Task** page, check the replay 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 5 On the displayed page, specify **Start Time**, **Send Notification**, **SMN Topic**, and **Stop Abnormal Tasks After** and confirm that the configured information is correct and click **Submit** to submit the task.

Figure 4-10 Task startup settings

Table 4-9 Task startup settings

Parameter	Description
Start Time	Set **Start Time** to **Start upon task creation** or **Start at a specified time** based on site requirements. **NOTE** After a replay task is started, the performance of the source and destination databases may be affected. You are advised to start a replay task during off-peak hours.
Send Notifications	SMN topic. This parameter is optional. If an exception occurs during workload replay, the system will send a notification to the specified recipients.
SMN Topic	This parameter is available only after you enable **Send Notifications** and create a topic on the SMN console and add a subscriber. For details, see *Simple Message Notification User Guide*.
Stop Abnormal Tasks After	Number of days after which an abnormal task automatically stops. The value must range from 14 to 100. The default value is **14**. **NOTE** 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 running longer than the period you set (unit: day) will automatically stop to avoid unnecessary fees.

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

- You can view the task status. For more information about task status, see **Task Statuses**.

- You can click ⟳ in the upper right corner to view the latest task status.

- By default, DRS retains a task in the **Configuration** state for three days. After three days, DRS automatically deletes background resources, but the task status remains unchanged. When you reconfigure the task, DRS applies for resources for the task again.

- For a public network task, DRS needs to delete background resources after you stop the task. The EIP bound to the task cannot be restored to the **Unbound** state until background resources are deleted.

----End

4.2 Querying the Replay Progress

The replay progress displays the SQL execution status during workload replay, helping you learn about the task status.

Prerequisites

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

Querying the Replay Progress

Step 1 On the **Workload Replay Management** page, click the target replay task in the **Task Name/ID** column.

Step 2 On the displayed page, click **Workload Replay Progress** to view task progress.

- In the **Workload Replay Progress** area, you can view the task status, start time, total number of SQL statements, and number of replayed SQL statements.

- In the **Statistics Chart** area, you can view the total number of SQL statements, number of replayed SQL statements, number of abnormal SQL statements, and number of slow SQL statements in a specified period.

- In the **Abnormal SQLs in Workload Replay** area, you can view the category and number of SQL statements that fail to be replayed.

- In the **Slow SQLs** area, you can view the original time and replay time required for executing a SQL statement.

- In the **SQL Execution Progress** are, you can view the SQL statements that are executing in the destination database during replay.
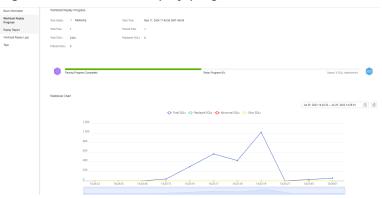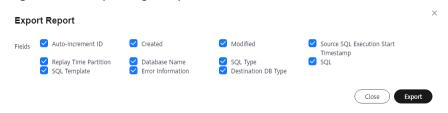
Figure 4-11 Workload replay progress

----End

Downloading an Exported Report

Abnormal and slow SQL statements can be exported and download during workload replay.

Step 1 On the **Workload Replay Management** page, click the target replay task in the **Task Name/ID** column.

Step 2 On the displayed page, click **Workload Replay Progress** to view task progress.

Step 3 In the **Abnormal SQLs in Workload Replay** and **Slow SQLs** areas on the **Workload Replay Progress** page, download reports for the task.

1. Click ⬈ on the right of the **Abnormal SQLs in Workload Replay** or **Slow SQLs** area to export the report.

2. In the displayed dialog box, select the fields to be exported and click **Export**.

Figure 4-12 Exporting a report

3. After the export is complete, click 🗁 to download the report.

Figure 4-13 Downloading a report

----**End**

4.3 Viewing the Replay Reporting

The replay reporting records the execution time curve of each SQL statement replayed in the destination database, number of replayed SQLs, and replay duration.

Prerequisites

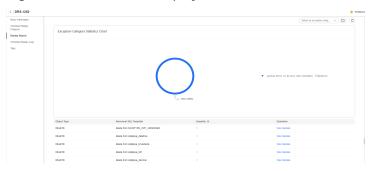You have logged in to the DRS console.

Viewing the Replay Reporting

Step 1 On the **Workload Replay Management** page, click the target replay task in the **Task Name/ID** column.

Step 2 On the **Replay Reporting** page, view the report information about the current task.

- In the **Statistics Chart** area, you can view the total number of SQL statements, number of replayed SQL statements, number of abnormal SQL statements, and number of slow SQL statements replayed in the destination database in a specified period.

Figure 4-14 Replay statistics chart

- In the **Slow SQLs** area, you can view the number of SQL statements of each type and the replay duration.
- In the **Abnormal SQLs in Workload Replay** area, you can view the category and number of SQL statements that fail to be replayed.

Figure 4-15 SQLs to be replayed

----End

Downloading a Replay Report

Step 1 On the **Workload Replay Management** page, click the target replay task in the **Task Name/ID** column.

Step 2 On the **Replay Reporting** page, download the replay report of the current task.

1. Click ⬀ on the right of the **Slow SQLs** or **Abnormal SQLs in Workload Replay** area to export the report.

2. After the export is complete, click 🗁 to download the report.

Figure 4-16 Downloading a report

----End

4.4 Viewing Replay Logs

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

Prerequisites

You have logged in to the DRS console.

Procedure

Step 1 On the **Workload Replay Management** page, click the target replay task in the **Task Name/ID** column.

Step 2 On the displayed page, click **Workload Replay Logs** to view the logs generated during the workload replay.

Figure 4-17 Viewing replay logs

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

----End

4.5 Task Life Cycle

4.5.1 Viewing Task Details

After a workload replay task is created and started, you can view the configuration information about the task on the **Basic Information** page. The configuration information includes the task information, connection information, object information, and replay control.

Prerequisites

You have logged in to the DRS console.

Procedure

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

Step 1 On the **Workload Replay Management** page, click the target replay task in the **Task Name/ID** column.

Step 2 On the displayed **Basic Information** tab, view details about the replay task.

You can view the task information, connection information, object information, replay control, and notification settings of the current replay task.

----End

4.5.2 Modifying Task Information

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

The following task information can be edited:

- Task name
- Description
- SMN topic
- Number of days when an abnormal task is stopped
- Task start time

Prerequisites

You have logged in to the DRS console.

Procedure

Step 1 On the **Workload Replay Management** page, click the target replay task in the **Task Name/ID** column.

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

- You can click ✎ to modify the task name, SMN topic, the time to stop abnormal tasks, and description.

- To submit the change, click ✔.
- To cancel the change, click ✖.

Table 4-10 Workload replay task information

Task Information	Description
Task Name	The task name must start with a letter and consist of 4 to 50 characters. It can contain only letters, digits, hyphens (-), and underscores (_).
Description	The description consists of a maximum of 256 characters and cannot contain special characters ! <>&'\"
SMN Topic	You can apply for a topic on the SMN console and add a subscription. For details, see **Simple Message Notification User Guide**.
Stop Abnormal Tasks After	The value must range from 14 to 100. The default value is 14.

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

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

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

----End

4.5.3 Editing a Replay Task

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

- Creating
- Configuration
- Paused
- Replay completed

  📖 **NOTE**

  For a paused or completed task, you can use the editing function to add a workload file and modify the task configuration.

Prerequisites

You have logged in to the DRS console.

Procedure

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

Step 2 On the **Configure Source and Destination Databases** page, enter information about the source and destination databases and task settings, and click **Next**.

Step 3 On the **Confirm Task** page, specify **Start Time**, confirm that the configured information is correct and click **Submit** to submit the task.

Step 4 After the task is submitted, view and manage it on the **Workload Replay Management** page.

----End

4.5.4 Pausing a Replay Task

DRS allows you to pause workload replay tasks.

Prerequisites

- You have logged in to the DRS console.

Pausing a Task

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

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

📖 **NOTE**

After the task is paused, the status of the task becomes **Paused**.

----End

4.5.5 Resuming a Replay Task

A fault may occur during the workload replay due to external factors. After the fault is rectified based on the replay log information, you can resume the replay.

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

- Failed
- Paused

📖 **NOTE**

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

Prerequisites

You have logged in to the DRS console.

Procedure

Step 1 In the task list on the **Workload Replay Management** page, locate the target task and click **Resume** in the **Operation** column.

Step 2 In the displayed **Resume Task** dialog box, confirm the task information and click **Yes** to submit the replay task again.

----End

4.5.6 Resetting a Replay Task

During workload replay, you can reset the replay tasks in one of the following statuses so that you do not need to configure the tasks again.

- Paused

- Replay completed

☐ **NOTE**

You can select **Parse and Reset** as required. Resetting a replay task will not clear the data in the destination database.

Prerequisites

You have logged in to the DRS console.

Procedure

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

Step 2 In the displayed **Reset Task** dialog box, select a reset method.

- If you deselect **Parse and Reset**, after the task is reset, the workload file will not be parsed again. The existing parsed workload is replayed on the destination database.

- If you select **Parse and Reset**, after the task is reset, all content obtained by parsing the workload file is cleared, the workload file is parsed again, and the new parsed workload is replayed on the destination database.

Step 3 After the pre-check is passed, click **Start** to reset the task.

----End

4.5.7 Stopping a Replay Task

After the workload replay is complete, you can stop the replay task. You can stop a task in any of the following statuses:

- Creating

- Configuration

- Pending start

- Starting

- Start failed

- Parsing
- Replaying
- Replay failed
- Replay completed

NOTICE

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

Procedure

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

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

----End

4.5.8 Deleting a Replay Task

This section describes how to delete a replay task that has been completed or has failed. Deleted tasks will no longer be displayed in the task list. Exercise caution when performing this operation.

Prerequisites

You have logged in to the DRS console.

Deleting a Task

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

Step 2 Click **Yes**.

----End

Deleting Tasks

Step 1 On the **Workload Replay Management** page, select the tasks to be deleted.

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

Figure 4-18 Batch Operations

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

----End

4.5.9 Task Statuses

Replay statuses indicate different replay phases.

Table 4-11 lists replay task statuses and descriptions.

Table 4-11 Task status description

Status	Description
Creating	The replay instance is being created for DRS.
Configuration	The replay instance is successfully created, but the synchronization task is not started. You can continue to configure the task.
Pending start	The scheduled replay task has been delivered to the replay instance, waiting for the replay instance to start the replay task.
Starting	The replay task is being started.
Start failed	The workload replay task fails to be started.
Parsing	The workload file is being parsed.
Replaying	Workload replay is in progress.
Replay failed	Workload data fails to be replayed to the destination database.
Replay completed	All SQL statements in the selected workload file have been replayed to the destination database.
Task stopping	The replay instance and resources are being released.
Stopping task failed	The replay instance and resources fail to be released.
Completed	The replay instance is released successfully.

NOTE

- If a task fails to be created, DRS retains the task for three days by default. After three days, the task automatically stops.
- By default, DRS retains a task in the **Configuration** state for three days. After three days, DRS automatically deletes background resources, but the task status remains unchanged. When you reconfigure the task, DRS applies for resources for the task again.
- Deleted replay tasks are not displayed in the status list.
- For a completed task, you can use the editing function to add a workload file, modify the task configuration, and replay the task again.
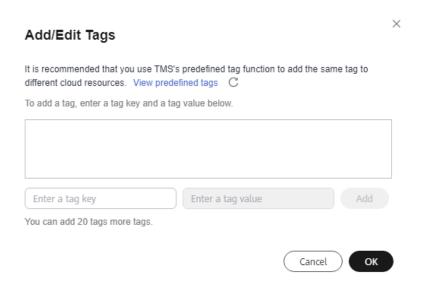
5 Tag Management

Scenarios

Tag Management Service (TMS) enables you to use tags on the management console to manage resources. TMS works with other cloud services to manage tags. TMS manages tags globally, and other cloud services manage their own tags. If you have to manage a large number of tasks, you can use different tags to identify and search for tasks.

- You are advised to set predefined tags on the TMS console.
- A tag consists of a key and value. You can add only one value for each key.
- Each DB instance can have up to 20 tags.

Adding a Tag

Step 1 On the **Workload Replay Management** page, click the target replay task in the **Task Name/ID** column.

Step 2 In the navigation pane on the left, choose **Tags**.

Step 3 On the **Tags** tab, click **Add/Edit Tags**. In the displayed dialog box, enter a tag key and value, click **Add**, and click **OK**.

- When you enter a tag key and value, the system automatically displays all tags (including predefined tags and resource tags) associated with all DB instances except the current one.
- The tag key must be unique. It must consist of 1 to 128 characters and can include letters, digits, spaces, and the following characters: **_.:=+-@**. It cannot start or end with a space, or start with **_sys_**.
- The tag value can be empty. It cannot start or end with a space and can contain 0 to 255 characters, including letters, digits, spaces, and special characters _.:/=+-@

Step 4 View and manage the tag on the **Tags** page.

----End

Editing a Tag

Step 1 On the **Workload Replay Management** page, click the target replay task in the **Task Name/ID** column.

Step 2 In the navigation pane on the left, choose **Tags**.

Step 3 On the **Tags** page, click **Add/Edit Tags**. In the displayed dialog box, modify the tag and click **OK**.

----End

Delete a Tag

Step 1 On the **Workload Replay Management** page, click the target replay task in the **Task Name/ID** column.

Step 2 In the navigation pane on the left, choose **Tags**.

Step 3 On the **Tags** page, locate the tag to be deleted and click **Delete** in the **Operation** column. In the displayed dialog box, click **Yes**.

Step 4 After the tag is deleted, it will no longer be displayed on the **Tags** page.

----End

6 Connection Diagnosis

If a DRS instance fails to be connected to the destination database during connection testing, DRS provides the quick diagnosis function and returns the diagnosis result.

- You can perform connection diagnosis only on the task node whose database information is obtained by entering an IP address or selecting a task node on the GUI.

Prerequisites

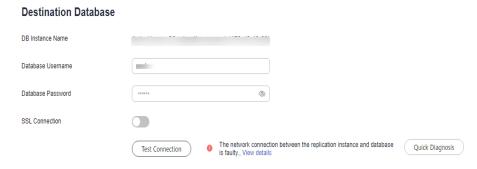- You have logged in to the DRS console.
- A task has been created.

Procedure

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

Step 2 On the **Configure Source and Destination Databases** page, specify the destination database information and click **Test Connection** for the destination database to check whether the destination database has been connected to the DRS instance.

If the connection testing fails, click **Quick Diagnosis** on the right of the failure information to diagnose the fault.

Figure 6-1 Quick Diagnosis

Step 3 View the diagnosis result on the displayed **Diagnosis Details** dialog box. The result includes the packet loss rate and port check result.

Figure 6-2 Diagnosis Details

----End

7 Interconnecting with LTS

7.1 Log Reporting

Scenarios

If you enable log reporting, all logs generated by DRS instances (including real-time migration, backup migration, real-time synchronization, real-time disaster recovery, and workload replay instances) are uploaded to Log Tank Service (LTS) for management.

Precautions

- After this function is enabled, all logs of the task are reported by default.
- This request does not take effect immediately. There is a delay of about 10 minutes.
- You will be billed for this function. For details, see **LTS Pricing Details**.
- Ensure that there are available LTS log groups and log streams in the same region as your instance.

  For more information about log groups and log streams, see **Log Management**.
- After this function is disabled, you will not be billed anymore.
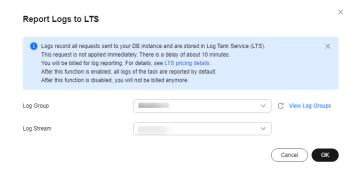
Enabling or Disabling Log Reporting

Step 1 Log in to the management console.

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

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

Step 4 Take real-time migration as an example. On the **Online Migration Management** page, click the target migration task name in the **Task Name/ID** column. The operations for real-time synchronization, real-time disaster recovery, and workload replay are similar to those for real-time migration.

Step 5   On the **Basic Information** page, click **Migration Logs** on the left.

Step 6   Click ⬭ next to **Report Logs to LTS** in the upper part of the page.

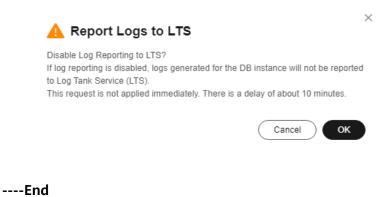**Step 7**   Select an LTS log group and log stream and click **OK**.

> 📖 **NOTE**
>
> This request does not take effect immediately. There is a delay of about 10 minutes.

Figure 7-1 Enabling audit log reporting to LTS

Step 8   To disable or modify log reporting, click the toggle switch next to **Report Logs to LTS** or click **Edit** next to the **Report Logs to LTS** toggle switch.

● Modifying log reporting: Click **Edit** next to the **Report Logs to LTS** toggle switch. In the displayed dialog box, select the LTS log group and log stream again and click **OK**.

● Disabling log reporting: Click the toggle switch next to **Report Logs to LTS**. In the displayed dialog box, click **OK**.

Figure 7-2 Disabling log reporting to LTS

----End

7.2 Viewing and Downloading Logs

Scenarios

If you have enabled log reporting to LTS for a DRS task in **Log Reporting**, you can analyze logs, search for logs, visualize logs, download logs, and view real-time logs on the LTS console.

Viewing Logs Reported to LTS

Step 1 Log in to the management console.

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

Step 3 Under **Management & Governance**, click **Log Tank Service**.

Step 4 In the **Log Groups** area, locate a target log group and click its name. For details about LTS, see *Log Tank Service (LTS) User Guide*.

Figure 7-3 Viewing log details
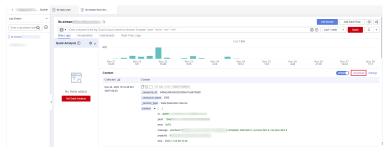

Table 7-1 Log field description

Name	Type	Description
_resource_id	String	Resource ID. The value is fixed to **projectId** for DRS.
_resource_name	String	Resource name. The value is fixed to **DRS**.
_service_type	String	Service type. The value is fixed to **Data Replication Service**.

----End

Downloading Logs Reported to LTS

Step 1 Log in to the management console.

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

Step 3 Under **Management & Governance**, click **Log Tank Service**.

Step 4 In the **Log Groups** area, locate a target log group and click its name.

Step 5 Click **Download** on the right to download logs. For details about LTS, see *Log Tank Service (LTS) User Guide*.

Figure 7-4 Downloading logs

----End

8 Audit Log Format

When creating a DRS workload replay task, you can select different sources for the source DB engine. The audit log format varies depending on the source database.

Table 8-1 Parameters of audit logs

Parameter	Description
quo	Enclosing character. Generally, SQL statements in audit logs are enclosed by this character.
column	Total number of columns in each row.
separator	Separator of audit logs.
format	Meaning of a key column. The value starts from 0.
timeFormat	Date format. If this parameter is left empty, it indicates the timestamp.

Huawei Cloud RDS for MySQL

```
quo ="
column = 12
separator = ,
format = threadId:1,protocolType:3,time:4,queryType:5,sql:6,client:10
timeFormat = yyyy-MM-dd'T'HH:mm:ss 'UTC'
```

Huawei Cloud GaussDB(for MySQL)

```
quo =^^
column = 19
separator = ,
format = threadId:4,latency:12,protocolType:0,time:2,queryType:3,sql:6,client:10,schemaName:11,client2:8
timeFormat =
```

Alibaba Cloud ApsaraDB RDS for MySQL

```
quo ="
column = 16
separator = ,
format = threadId:2,latency:8,time:10,queryType:5,sql:0,client:4,schemaName:1
timeFormat =
```

Alibaba Cloud PolarDB for MySQL

```
quo ="
separator=,
column = 12
format = threadId:2,latency:8,time:11,queryType:5,sql:0,client:4,schemaName:1
timeFormat =
```

Tencent Cloud TDSQL-C for MySQL

```
quo ="
separator=,
column = 20
format = threadId:15,latency:9,time:18,queryType:2,sql:6,client:7,schemaName:5
timeFormat = yyyy-MM-dd HH:mm:ss
```

Amazon Aurora MySQL

```
quo ='
column = 10
separator = ,
format = threadId:4,time:0,sql:8,client:3,schemaName:7
timeFormat = yyyy-MM-dd'T'HH:mm:ss.SSS'Z'
```

Self-Managed MySQL

```
quo =
separator =\t
column = 3
format = time:0,threadIdAndProtocolType:1,sql:2
//MySQL 5.7 or later
timeFormat = yyyy-MM-dd'T'HH:mm:ss.SSSSSS'Z'
//MySQL 5.5 and 5.6
timeFormat = yyMMdd HH:mm:ss
```

MariaDB

```
quo ='
separator=,
column = 10
format = threadId:4,time:0,protocolType:6,sql:8,client:3,schemaName:7
timeFormat = yyyyMMdd HH:mm:ss
```