Alibaba Cloud ApsaraDB for MySQL

Quick Start for MySQL

Issue: 20181125

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Generic conventions

Table -1: Style conventions

Style	Description	Example
	This warning information indicates a situation that will cause major system changes, faults, physical injuries, and other adverse results.	 **Danger:** Resetting will result in the loss of user configuration data.
	This warning information indicates a situation that may cause major system changes, faults, physical injuries, and other adverse results.	 **Warning:** Restarting will cause business interruption. About 10 minutes are required to restore business.
	This indicates warning information, supplementary instructions, and other content that the user must understand.	 **Note:** Take the necessary precautions to save exported data containing sensitive information.
	This indicates supplemental instructio ns, best practices, tips, and other content that is good to know for the user.	 **Note:** You can use **Ctrl** + **A** to select all files.
>	Multi-level menu cascade.	**Settings** > **Network** > **Set network type**
Bold	It is used for buttons, menus, page names, and other UI elements.	Click **OK**.
`Courier font`	It is used for commands.	Run the `cd /d C:/windows` command to enter the Windows system folder.
Italics	It is used for parameters and variables.	`bae log list --instanceid` *Instance_ID*
[] or [a|b]	It indicates that it is a optional value, and only one item can be selected.	`ipconfig` *[-all|-t]*
{} or {a|b}	It indicates that it is a required value, and only one item can be selected.	`swich` *{stand | slave}*

Contents

1 Limits

To guarantee the stability and security of ApsaraDB for MySQL, certain limits are propose.

Items	Restrictions
Parameter modification	The *RDS console* or APIs must be used to modify database parameters. But some parameters cannot be modified. For more information, see *Set parameters through the RDS console*.
Root permission	The root or sa permission is not provided.
Backup	• Command lines or graphical interfaces can be used for logical backup. • For physical backup, the *RDS console* or APIs must be used.
Restoration	• Command lines or graphical interfaces can be used for logical restoration. • For physical restoration, the *RDS console* or APIs must be used.
Migration	• Command lines or graphical interfaces can be used for logical import. • You can use the MySQL command line tool or Data Transmission Service (DTS) to migrate data.
MySQL storage engine	• Currently only InnoDB and TokuDB are supported. The MyISAM engine has defects and may cause data loss. If you create MyISAM engine tables, they are automatically converted to InnoDB engine tables. For more information, see *Why does RDS for MySQL not support the MyISAM engine?* • The InnoDB storage engine is recommended for performance and security requirements. • The Memory engine is not supported. If you create Memory engine tables , they are automatically converted to InnoDB engine tables.
Replication	MySQL provides a dual-node cluster based on the master/slave replication architecture, so you manual deployment is not required. The slave instance in the architecture is invisible to you, and your application cannot access to the slave instance directly.
Restarting RDS instances	Instances must be restarted through the *RDS console* or APIs.
User, password , and database management	By default, *RDS console* is used to manage users, passwords, and databases, including operations such as instance creation, instance deletion, permission modification, and password modification. MySQL also allows you to create a master account for finer-grained management.
Common account	• Does not support customized authorization.

Items	Restrictions
	• The account management and database management interfaces are provided on the RDS console. • Instances that support common accounts also support master accounts.
Master account	• Support customized authorization. • SQL statements can be used for management.
Network settings	If a MySQL 5.5/5.6 instance is in a classic network and its *access mode* is safe connection mode, do not enable net.ipv4.tcp_timestamps in SNAT mode.

2 General process to use RDS

Purpose of the Quick Start

This document describes the procedure right from purchasing an RDS instance to using it. This document also elaborates on how to create an ApsaraDB for RDS instance, perform basic settings , and connect to the instance database.

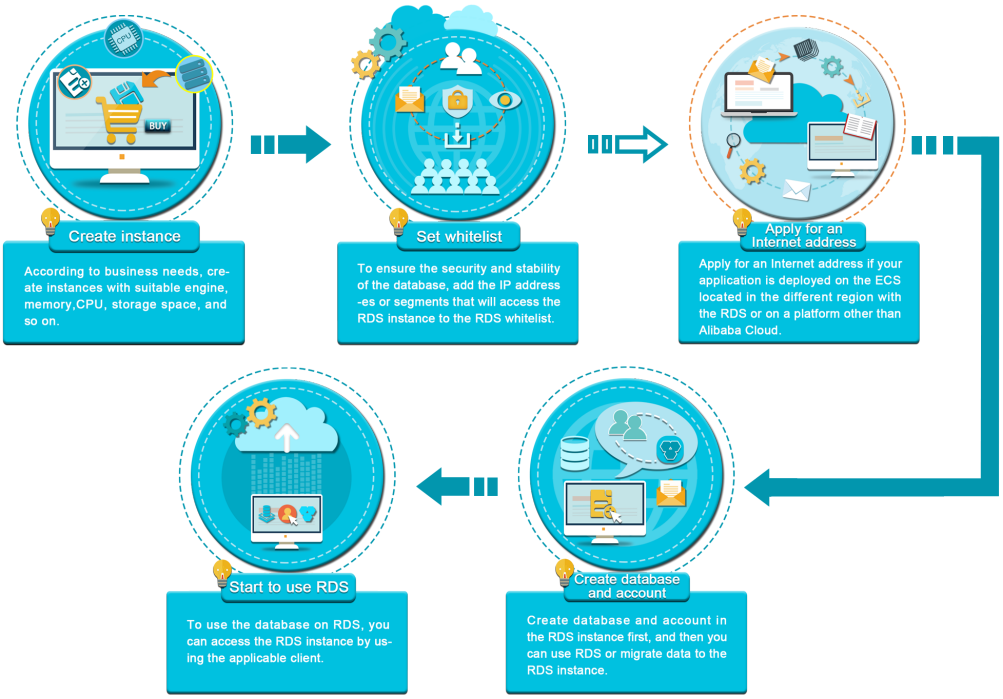
Target reader

- Users who buy an ApsaraDB for RDS instance for the first time.
- Users who need to perform basic settings for the instance they created.
- Users who want to know how to connect to an ApsaraDB for RDS instance.

Quick Start flowchart

If you use Alibaba Cloud ApsaraDB for RDS for the first time, see *Limits* and *Instance management interface for MySQL*.

The following diagram explains the steps you must follow right from creating an instance to using it.



3 Create an instance

You can use the RDS console or APIs to create an RDS instance. For more information about instance pricing, see *Pricing of ApsaraDB for RDS*. This document describes how to use the RDS console to create an instance. For more information about how to use APIs to create an instance, see *CreateDBInstance*.

Prerequisites

- You must have registered to an Alibaba Cloud account.
- If you are creating a Pay-As-You-Go instance, make sure that your account balance is sufficient.

Procedure

1. Log on to the *RDS console*.
2. On the **Instances** page, click **Create Instance**.
3. Select **Subscription** or **Pay-As-You-Go**. For more information about billing methods, see *Billing items and billing methods*.
4. Select the instance configuration. The parameters are described as follows:
   - Basic configuration
     - Region and zone: Select the region and zone in which the instance is located. Some regions support both single-zone and multi-zone instances, while some regions support only single-zone instances.

       Note:
       Products in different regions cannot intercommunicate through the intranet, and you cannot change the instance region after creating an instance. Therefore, special attention is required when you select the region.
     - Database engine: RDS supports MySQL, SQL Server, PostgreSQL, and PPAS. Different database types are supported in different regions. Choose the database type according to the instructions on the RDS console.
     - Version: indicates the database version. RDS for MySQL supports MySQL 5.5, 5.6, and 5.7. Different database versions are supported in different regions. Choose the database version according to the instructions on the RDS console.

- Series: RDS for MySQL instances support the Basic Edition and High-availability Edition . Different database versions support different series. Choose the instance series according to the instructions on the RDS console.

- Network type: RDS supports the classic network and virtual private cloud (VPC). A VPC needs to be created beforehand. Alternatively, you can change the network type after creating an instance. For more information, see *Set network type*.
- Specifications: indicate the CPU and memory occupied by the instance, the number of connections, and the maximum IOPS. For more information about instance specifications, see *Instance type list*.
- Storage: indicates space used by data, system files, binlog files, and transaction files.
- Subscription time: indicates the duration of a Subscription instance.
- Quantity: indicates the number of instances with the same configurations to be purchased.

5. Click **Buy Now** to go to the **Confirm Order** page.

> **Note:**
> To buy multiple instances with different configurations, click **Add To List** for each instance type and click **Batch Purchase**.

6. Select **Product Terms of Service and Service Level Notice and Terms of Use**, and then:

- Click **Pay** if the billing method of the instance is Subscription.
- Click **Activate** if the billing method of the instance is Pay-As-You-Go.

4 Connect to an instance

You can connect to an RDS instance through the MySQL client.

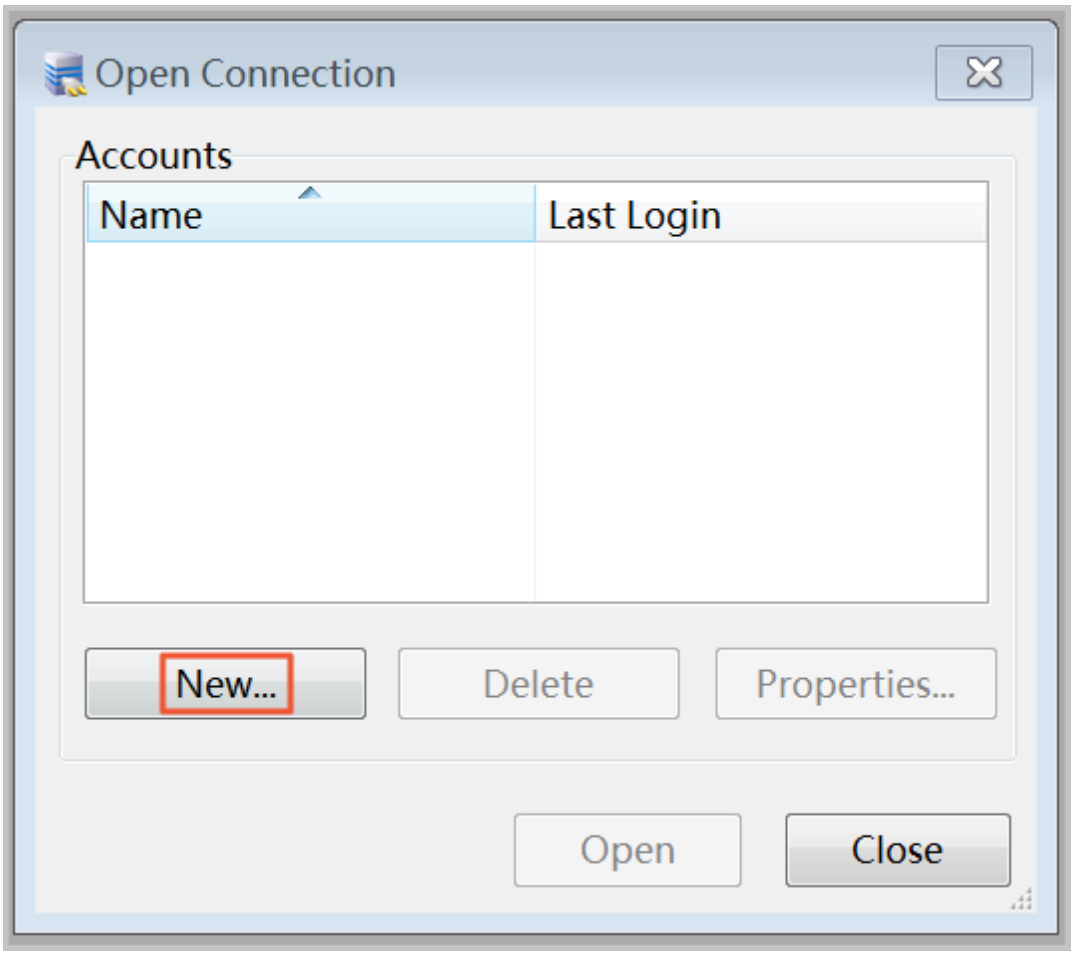
Background information

RDS for MySQL is fully compatible with MySQL, so you can connect to your RDS instance in the way you connect to an on-premises MySQL server. This document introduces the connection procedure by taking the MySQL-Front client as an example. When connecting to an RDS instance, use an *intranet or Internet address* as follows:

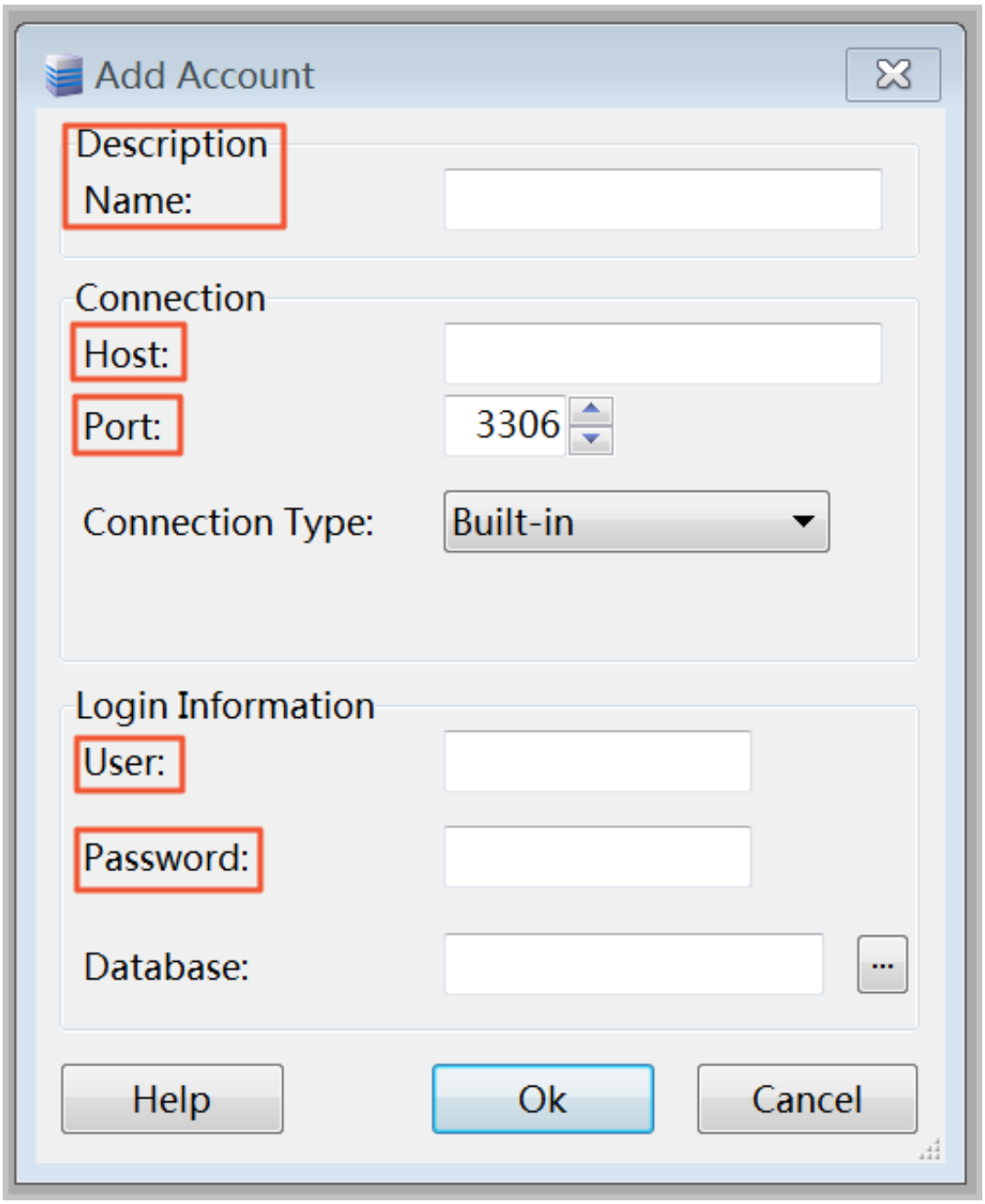
- If your client is deployed on an ECS instance that is in the same region and has the same network type as your RDS instance, use the intranet IP address.
- In other cases, use the Internet IP address.

Log on with a client

1. In the RDS whitelist, add the IP address of the computer that runs the client. For information about how to set the whitelist, see *Set a whitelist*.
2. Start the MySQL-Front client.
3. In the **Open Connection** window, click **New**, as shown in the following figure.



4. Enter the RDS connection information.



Parameter description:

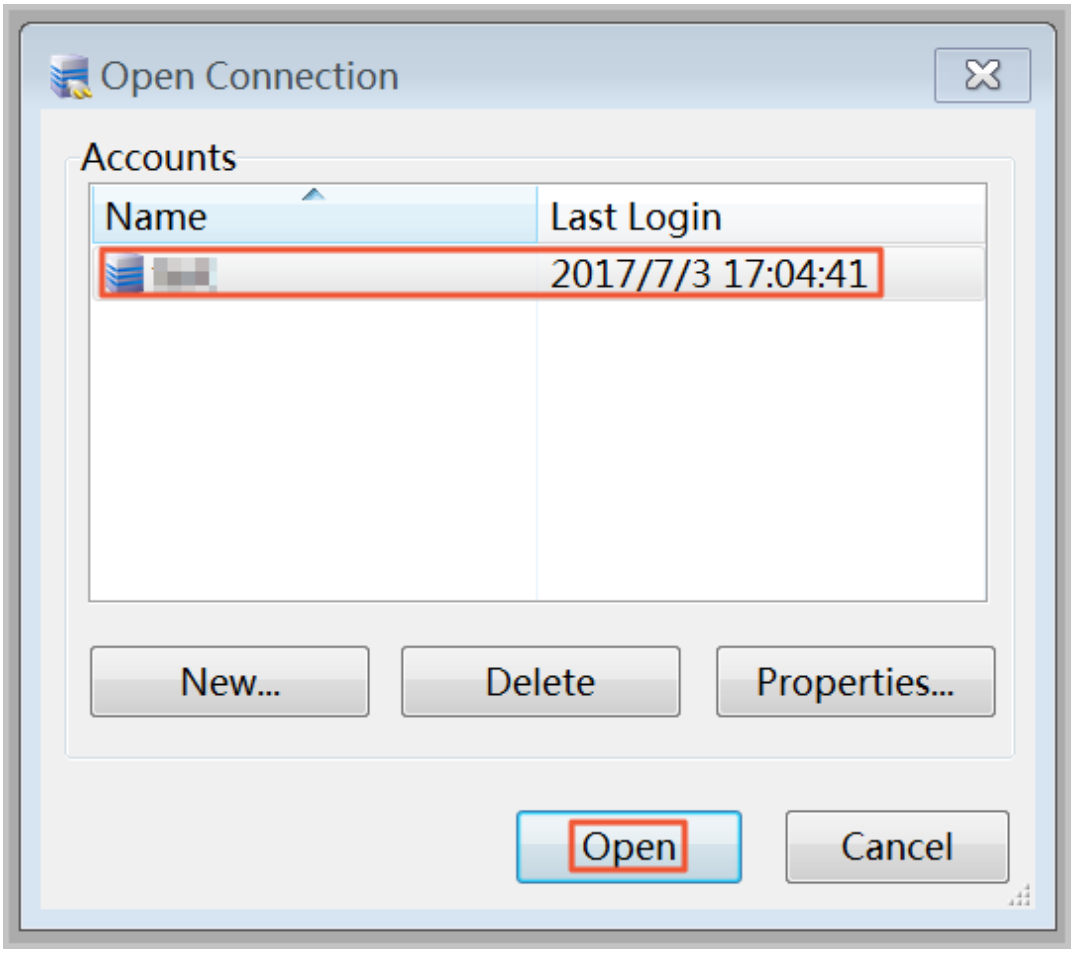
- **`Description Name`**: Enter the connection task name. It is the same as the **`Host`** field by default.
- **`Host`**: Enter the intranet or Internet IP address allowed to access the RDS instance by referring to **Background information** of this document. You can view the address and port information as follows:

  1. Log on to the *RDS console*.
  2. Select the region where the target instance is located.

3. Click the ID of the instance to visit the **Basic Information** page.
4. In the **Basic Information** area, you can find the Internet and intranet IP addresses and port numbers.

- **`Port`**: Enter the intranet port number if you use an intranet connection. Enter the Internet port number if you use an Internet connection.
- **`User`**: Enter an account name of the RDS instance.
- **`Password`**: Enter the account password of the RDS instance.

5. Click **OK**.
6. In the **Open Connection** window, select the connection task that you created and click **Open**. If the connection information is correct, the RDS instance gets connected successfully.



5 Scale instances

5.1 Read-only instance

5.1.1 Introduction to read-only instances

Scenario

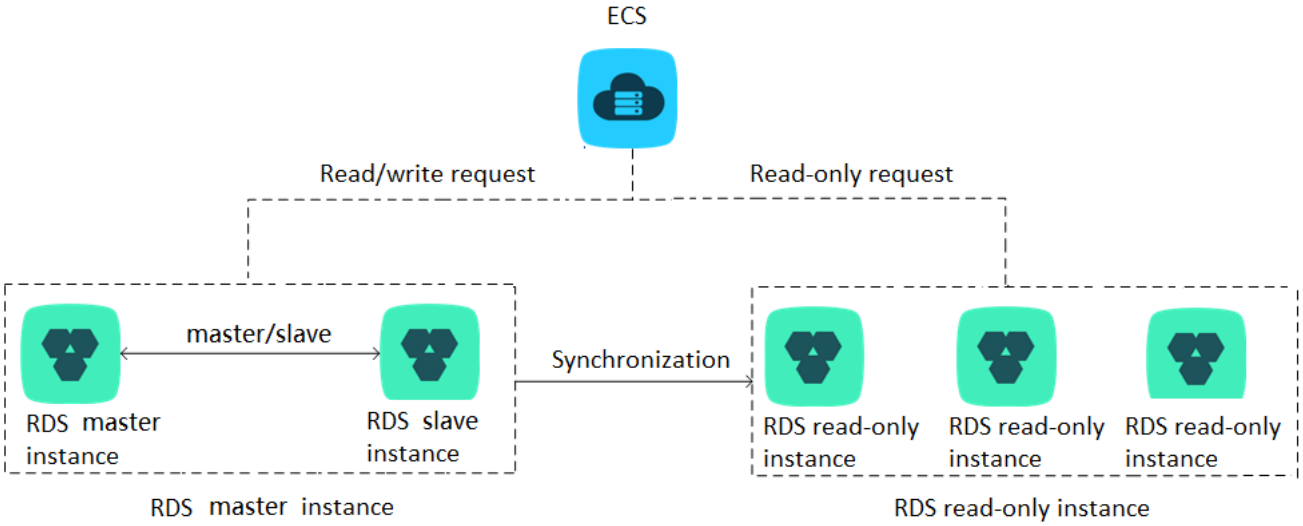
For services that involve a small number of write requests but a great number of read requests, a single instance may not be able to resist the read pressure. As a result, services may be affected. To achieve the elastic expansion of the read ability and share the pressure of the database, you can create one or more read-only instances in a region. The read-only instances can handle massive read requests and increase the application throughput.

Overview

A read-only instance is a read-only copy of the master instance. Changes to the master instance are also automatically synchronized to all relevant read-only instances. The synchronization works even if the master and read-only instances have different network types. Read-only instances and the master instance must be in the same region, but they can be in different zones. The following topology shows the positioning of the read-only instance.

Note:

- Currently the following instances support read-only instances:
  - MySQL 5.7 High-Availability Edition (based on local SSDs)
  - MySQL 5.6
  - SQL Server 2017
- Each read-only instance adopts a single-node architecture (without slave nodes).



Pricing

The billing method of read-only instances is Pay-As-You-Go. For more information, see *Pricing*.

Note:
For information about data retention policies for read-only instances, see *Expiration and overdue payment*.

Features

Read-only instances offer the following features:

- The specifications of a read-only instance differ from those of the master instance, and can be changed at any time, to facilitate easy elastic upgrade and downgrade.
- Read-only instances support billing measured per hour, which is user-friendly and cost-efficient .
- No account or database maintenance is required for a read-only instance. Both the account and database are synchronized through the master instance.
- Read-only instances support independent whitelist configuration.
- Read-only instances support system performance monitoring.

  Up to 20 system performance monitoring views can be used, which includes disk capacity, IOPS, connections, CPU utilization, and network traffic. Users can view the load of instances at ease.
- Read-only instances provide optimization suggestions.

Optimization tools support storage engine check, primary key check, large table check, and excessive indexing and missing indexing checks.

Restrictions

- Quantity of read-only instances

Database type	Memory	Max number of read-only instances
MySQL	≥ 64 GB	10
	< 64 GB	5
SQL Server	Any	7

- Read-only instances do not support backup settings or temporary backup.
- Instance recovery:
  - Read-only instances do not support the creation of temporary instances through backup files or backups at any point in time. Read-only instances do not support the overwriting of instances using backup sets.
  - After creating a read-only instance, the master instance does not support data recovery through the direct overwriting of instances using backup sets.
- You cannot migrate data to read-only instances.
- You cannot create or delete databases for read-only instances.
- You cannot create or delete accounts for read-only instances.
- You cannot authorize accounts or modify account passwords for read-only instances.

5.1.2 Create a read-only instance

You can create read-only instances to process massive read requests sent to the database and increase the application throughput. A read-only instance is a read-only copy of the master instance. Changes to the master instance are also automatically synchronized to all relevant read-only instances through the native replication capability of MySQL.

Attention

- Currently the following instances support read-only instances:
  - MySQL 5.7 High-Availability Edition (based on local SSDs)
  - MySQL 5.6
  - SQL Server 2017

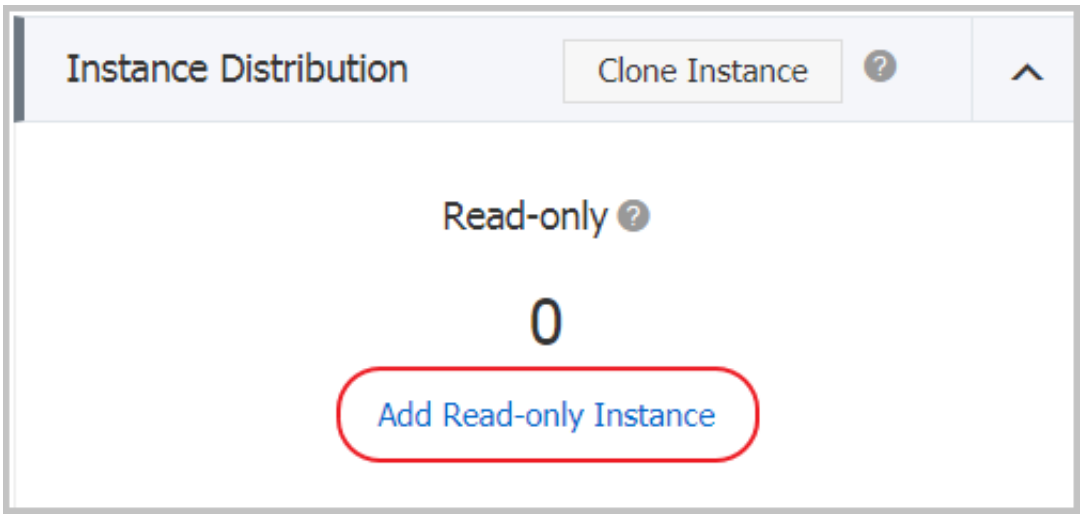
- Quantity of read-only instances

Database type	Memory	Max number of read-only instances
MySQL	≥ 64 GB	10
	< 64 GB	5
SQL Server	Any	7

- Read-only instance is subject to an additional charge and its billing method is Pay-As-You-Go. For more information, see *Pricing* for read-only instances.
- The read-only instance automatically copies the whitelist its master instance, but the whitelist of the read-only instance and that of the master instance are independent. To modify the whitelist of the read-only instance, see *Set a whitelist*.

Procedure

1. Log on to the *RDS console*.
2. Select the region where the target instance is located.
3. Click the ID of the target instance to visit the **Basic Information** page.
4. In the **Instance Distribution** area, click **Add Read-only Instance**, as shown in the following figure.



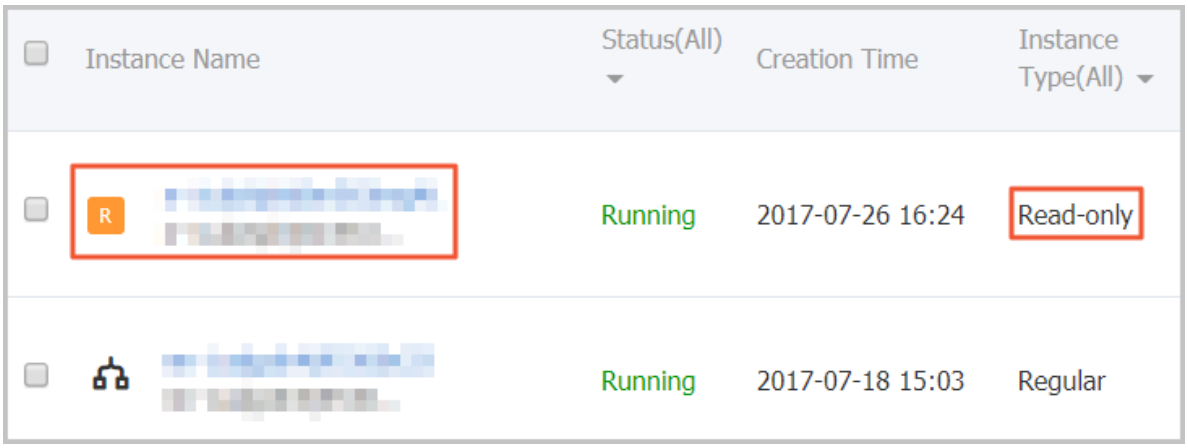
5. On the purchasing page, choose the configuration of the read-only instance, and then click **Buy Now**.

Note:

- We recommend that the read-only instance and the master instance be in the same VPC.

- To guarantee sufficient I/O for data synchronization, we recommend that the configuration of the read-only instance (the memory) is not less than that of the master instance.
- We recommend that you purchase multiple read-only instances to improve availability.

6. Select **Product Terms of Service and Service Level Notice and Terms of Use**, and then click **Pay Now**.
7. After creating the read-only instance, you can view it on the **Instances** page, as shown in the following figure.



5.2 Disaster recovery instances

For services that require high data reliability or financial services that require regulation, the RDS provides remote disaster recovery instances to improve data reliability.

Background introduction

RDS achieves real-time synchronization between the master instance and the remote disaster recovery instance through Data Transmission Service (DTS). Both instances are deployed in the master/slave high-availability architecture. If the master node and slave node cannot be connected due to any abrupt event such as natural disasters in the region of the master instance, you can switch over the remote disaster recovery instance to the master instance. After the database link address is modified on the application, service access to the application can be quickly recovered.

Through the DTS console, disaster recovery instances can enable synchronization links to support original features such as synchronization object changing, synchronization rate setting, and delay alarming. For details, see DTS product documentation.

Disaster recovery instances have the following features:

- Provide independent database connection addresses so that the connections can be independently controlled by user applications.

- Use the master/slave high-availability architecture.
- Support hourly billing and can be enabled and disabled out-of-the-box.
- Support independent whitelist configuration and account management.

Billing

The configuration of an RDS disaster recovery instance is exactly the same as its master instance configuration, data transmission realizes real-time synchronization between the master instance and the remote disaster recovery instance. As a result, creating disaster recovery instances will result in fees of both RDS and DTS. For price details, refer to RDS pricing information and data transmission pricing information.

Prerequisites

- Currently, disaster recovery instances support RDS for MySQL instances only.
- When a disaster recovery instance is to be created, the master instance version must be MySQL 5.6 or later. Make a compatibility test before upgrading the master instance version. Alternatively, create a new MySQL 5.6 to copy the data from the master instance to the new instance, then create a disaster recovery instance on the new instance.
- The master instance that creates the disaster recovery instance must have an internal network address.

Functional restrictions

Disaster recovery instances have the following functional limitations:

- Support creating accounts with the read-only permission, to ensure stability of synchronization links.
- Backup settings, backup recovery, data migration, database management, Internet IP address application, and connection address modification are not supported.

Operation steps

1. Log on to the *RDS Management Console*.
2. Select the target instance.
3. On the **Basic Information** page, click **Add Disaster Recovery Instance**.
4. On the **Create Synchronization Task** page, click **Purchase Instance Right Now** to purchase a disaster recovery instance.

   Parameter description:

- **`Synchronization Task Name`**: indicates the name of a synchronization task. The default name can be retained.
- **`Instance ID`** (local instance information): indicates the ID of the local instance. The system automatically associates the current instance ID, or you can click an RDS instance under a different Alibaba Cloud account. Fill in an RDS instance ID, database, account number, and the corresponding password.
- **`Instance ID`** (target instance information): indicates the ID of the target instance. Click **Buy Now** to purchase the disaster recovery instance.

5. In the target RDS instance purchase window, select the region where the instance is located, and click **Buy Now**.

   During the purchase of a disaster recovery instance, you can only select a region, and other configuration information is consistent with that of the master instance by default. If there are any disaster recovery instance upgrade requirements, you can create them successfully in *RDS Management Console* to change configuration of the disaster recovery instance.

    **Note:**
   It takes minutes to create a disaster recovery instance. Do not close the dialog box during creation. Otherwise, the disaster recovery instance may fail to be created.

6. After the disaster recovery instance is purchased, the instance ID is automatically added to the target instance ID. Then, click **Authorize White List and Next**.
7. The system automatically creates a migration account. After the creation is complete, click **Next**.

    **Note:**
   The name is automatically generated for the disaster recovery instance. For DTS synchronization, do not modify or delete the account. Otherwise, a synchronization exception may occur.

8. Select the objects to be migrated from the source database objects , click **>** to add the selected objects, and then click **Next**.
9. Select the synchronization initialization type and set the synchronization rate, and click **Pre-check** to start the synchronization.

   Parameter description:

- **`Synchronization Initialization`**: Migrate the structure and data of the synchronization objects from the local instance to the disaster recovery instance, which will be used as the basis for subsequent incremental data synchronization. This parameter has two options: **`Structure Initialization`** and **`Full Data Initialization`**. Both options must be selected for your first data synchronization.
- **`Synchronization Rate`**: Set the rate of synchronization between the master instance and the disaster recovery instance to protect services on the master instance. The unit is TPS. If this default value of the parameter is retained, the synchronization rate is the upper limit of the DTS performance.

> **Note:**
> Pre-check failure is described below. If pre-check is passed, go to Step 12.

10. The system displays the pre-check results.
11. Click the detection item after the test results is failed. View the failure details to complete the error troubleshooting.
12. After troubleshooting, select the current synchronization task from **Synchronization Task List** and click **Start**.
13. After the pre-check is passed, click **OK**. The synchronization task is automatically started.
14. On the data synchronization list page of DTS, you can query created synchronization tasks and operate such tasks by changing the synchronization object, setting the monitoring alarm, and modifying the synchronization rate. For details, see DTS product documentation.

> **Note:**
> In order to ensure the real-time performance of disaster backup instance data, do not pause the synchronization task of the disaster recovery instance.