Relational Database Service

Service Overview

Issue 01

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Contents

1 What Is RDS?

Relational Database Service (RDS) is a reliable and scalable cloud database service that is easy to manage. RDS supports the following DB engines:

- **MySQL**
- **PostgreSQL**
- **Microsoft SQL Server**
- **MariaDB**

RDS includes a comprehensive performance monitoring system, multi-level security measures, and a professional database management platform, allowing you to easily set up and scale up a relational database. On the RDS console, you can perform almost all necessary tasks and no programming is required. The console simplifies operations and reduces routine O&M workloads, so you can stay focused on application and service development.

RDS for MySQL

MySQL is one of the world's most popular open-source relational databases. It works with the Linux, Apache, and Perl/PHP/Python to establish a LAMP model for efficient web solutions. RDS for MySQL is reliable, secure, scalable, inexpensive, and easy to manage.

- It supports various web applications and is cost-effective, preferred by small- and medium-sized enterprises.
- A web-based console provides comprehensive visualized monitoring for easier operations.
- You can flexibly scale resources based on your service requirements and pay for only what you use.

For details about the versions supported by RDS for MySQL, see **DB Engines and Versions**.

For more information, see the official documentation at **https://dev.mysql.com/doc/**.

RDS for PostgreSQL

PostgreSQL is an open-source object-relational database management system that focuses on extensibility and standards compliance. It is known as the most advanced open-source database available. RDS for PostgreSQL excels in processing complex online transaction processing (OLTP) transactions and supports NoSQL (JSON, XML, or hstore) and geographic information system (GIS) data types. It has earned a reputation for reliability and data integrity, and is widely used for websites, location-based applications, and complex data object processing.

- RDS for PostgreSQL supports the PostGIS extension and provides excellent spatial performance.
- RDS for PostgreSQL is a good cost-effective solution for many different scenarios. You can flexibly scale resources based on your service requirements and pay for only what you use.

For details about the versions supported by RDS for PostgreSQL, see **DB Engines and Versions**.

For more information, see the official documentation at **https://www.postgresql.org/docs/**.

RDS for SQL Server

Microsoft SQL Server is a commercial database with a mature enterprise-class architecture. One-stop deployment simplifies key O&M services and greatly reduces labor costs. With RDS for SQL Server, you can build a safe and stable database operation environment that meets Huawei international security standards. It is widely used in government, finance, medical care, education, and gaming.

RDS for SQL Server is reliable, scalable, inexpensive, and easy to manage. It uses a high availability (HA) architecture, guarantees data security, and recovers from faults within seconds.

For details about the versions supported by RDS for SQL Server, see **DB Engines and Versions**.

NOTICE

To purchase RDS for SQL Server DB instances, choose **Service Tickets > Create Service Ticket** in the upper right corner of the console to submit a service ticket.

For more information, see the official documentation at **https://learn.microsoft.com/en-us/sql/?view=sql-server-ver16**.

RDS for MariaDB

MariaDB was founded by Monty, the founder of MySQL, and is one of the most popular open-source databases.

RDS for MariaDB is highly compatible with MySQL. As a powerful, high-performance, secure, and reliable database management system, it is suitable for various applications. RDS for MariaDB has the following advantages:

- It allows you to easily migrate your databases to the cloud without refactoring existing applications.
- A web-based console provides comprehensive visualized monitoring for easier operations.
- You can flexibly scale resources to meet business needs and pay for only what you use.

For details about the versions supported by RDS for MariaDB, see **DB Engines and Versions**.

For more information, see the official documentation at **https://mariadb.org/**.

2 Advantages

2.1 Easy Management

Quick Setup

You can create a DB instance on the management console within minutes and access RDS from an ECS to reduce the application response time and avoid paying for the traffic that would be generated by regular public access.

Elastic Scaling

Cloud Eye monitors changes in the load on your database and storage capacity. You can flexibly scale resources accordingly and pay for only what you use.

High Compatibility

You use RDS database engines (DB engines) the same way as you would use a native engine. RDS is compatible with existing programs and tools.

Easy O&M

Routine RDS maintenance and management operations, including hardware and software fault handling and database patching, are easy to perform. With a web-based console, you can reboot DB instances, reset passwords, modify parameters, view error or slow query logs, and restore data. Additionally, the system helps you monitor DB instances in real time and generates alarms if errors occur. You can check DB instance information at any time, including CPU usage, IOPS, database connections, and storage space usage.

2.2 High Performance

Optimized Performance

Combining years of experience in database R&D, setup, and maintenance with cloud-based technology, Huawei Cloud has built a database service that is highly available, reliable, secure, scalable, and easy to maintain.

Optimized Hardware

RDS offers stable and high-performance database services using servers that have been proven robust by customer success in a wide range of applications.

Optimized SQL Solutions

RDS can detect slowly-executed SQL statements, so you can optimize the code accordingly.

High-Speed Access

You can access RDS DB instances directly from ECSs deployed in the same region. This means applications can respond faster, and saves money as it is an intranet connection so there are no traffic charges generated.

Performance White Paper

- **RDS for MySQL Performance White Paper**
- **RDS for PostgreSQL Performance White Paper**
- **RDS for SQL Server Performance White Paper**

2.3 High Security

Network Isolation

RDS uses Virtual Private Cloud (VPC) and network security groups to isolate and secure your DB instances. VPCs allow you to define what IP address range can access RDS. You can configure subnets and security groups to control access to DB instances.

Access Control

RDS controls access through the account/IAM user and security groups. When you create an RDS DB instance, an account is automatically created. To separate out specific permissions, you can create IAM users and assign permissions to them as needed. VPC security groups have rules that govern both inbound and outbound traffic for DB instances.

Transmission Encryption

RDS uses Transport Layer Security (TLS) and Secure Sockets Layer (SSL) to encrypt transmission. You can download a Certificate Agency (CA) certificate from the RDS console and upload it when connecting to a database for authentication.

Storage Encryption

RDS encrypts data before storing it.

Data Deletion

When you delete an RDS DB instance, its attached disks, storage space its automated backups occupy, and all data it stores will be deleted. You can restore a deleted DB instance using a manual backup or rebuild the DB instance from the recycle bin within the retention period.

Security Protection

RDS is protected by multiple layers of firewalls to defend against various malicious attacks, such as DDoS attacks and SQL injections. For security reasons, you are advised to access RDS through a private network.

2.4 High Reliability

Dual-Host Hot Standby

RDS uses the hot standby architecture, in which failover upon fault occurrence takes only some seconds.

Data Backup

RDS automatically backs up data every day and stores backup files as packages in Object Storage Service (OBS). The backup files can be stored for 732 days and can be restored with just a few clicks. You can set a custom backup policy and create manual backups at any time.

Data Restoration

You can restore data from backups to any point in time during the backup retention period. In most scenarios, you can use backup files to restore data to an existing or a new DB instance at any time point within 732 days. After the data is verified, data can be migrated back to the primary DB instance.

Deleted DB instances can be moved to the recycle bin. You can rebuild the DB instance that was deleted up to 7 days ago from the recycle bin.

Data Durability

RDS provides a data durability of 99.9999999%, ensuring data security and reliability and protecting your workloads from faults.

2.5 Comparison Between RDS and On-Premises Databases

Table 2-1 lists the advantages of RDS over on-premises databases.

Table 2-1 Comparison

Item	RDS	On-Premises Database
Service availability	For details, see **ECS Advantages**.	Requires device procurement, primary/standby relationship setup, and RAID setup.
Data reliability	For details, see **What Is EVS?**	Requires device procurement, primary/standby relationship setup, and RAID setup.
Database backup	Supports automated backups, manual backups, and custom backup retention periods.	Requires device procurement, setup, and maintenance.
Hardware and software investment	Supports on-demand pricing and scaling without requiring hardware and software investment.	Requires large investment in database servers. The RDS for SQL Server license must be paid for separately.
System hosting	Not required.	Requires two servers for primary/standby DB instances.
Maintenance cost	Not required.	Requires large labor investment and professional database administrator (DBA) for maintenance.
Deployment and scaling	Supports elastic scaling, fast upgrade, and on-demand enabling.	Requires procurement, deployment, and coordination of hardware that matches original devices.

3 Typical Use Cases

3.1 Reducing Read Pressure with RDS Read/Write Splitting

RDS for MySQL, RDS for PostgreSQL, and RDS for SQL Server 2017 Enterprise Edition DB instances support read replicas to offload read traffic from primary DB instances.

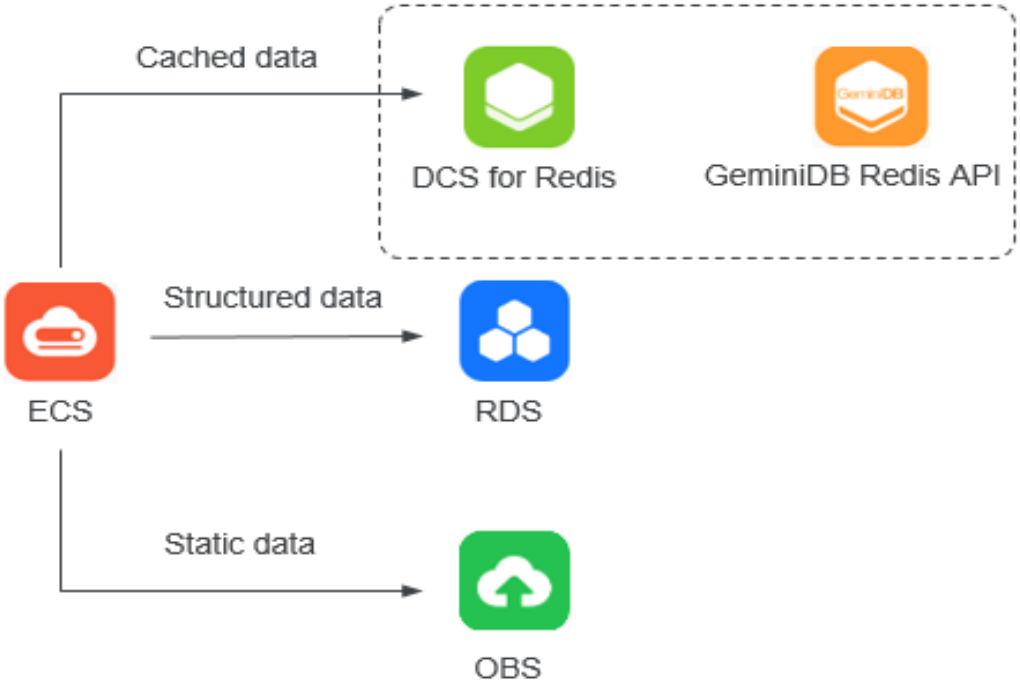
RDS for MySQL primary instances and read replicas have independent connection addresses. A maximum of 10 read replicas can be created for each RDS for MySQL instance. For details about how to create a read replica, see **Creating a Read Replica**.

To offload read pressure on the primary DB instance, you can create one or more read replicas in the same region as the primary instance. These read replicas can process a large number of read requests and increase application throughput.

3.2 Storing Diverse Data Types with RDS and Other Services

RDS can work with Distributed Cache Service (DCS) for Redis, GeminiDB Redis API, and OBS to store different types of data.

Figure 3-1 Storing diverse data types



4 Product Series

4.1 RDS for MySQL Product Series

Table 4-1 and Table 4-2 list different DB instance types and their function comparisons of RDS for MySQL.

Table 4-1 DB instance types

DB Instance Type	Description	Notes	Advantages	Scenarios
Single	A single-node architecture is more cost-effective than a primary/standby DB pair.	If a fault occurs on a single instance, the instance cannot recover in a timely manner.	This instance type supports the creation of read replicas and supports the queries of error logs and slow query logs. Different from primary/standby DB instances that have two database nodes, a single DB instance has only one node, reducing the price to half of primary/standby DB instances. If the node fails, the restoration will take a long time. Therefore, single DB instances are not recommended for sensitive services that have high requirements on database availability.	• Personal learning • Microsites • Development and testing environment of small- and medium-sized enterprises

DB Instance Type	Description	Notes	Advantages	Scenarios
Primary/Standby	An HA architecture. A pair of primary and standby DB instances shares the same IP address and can be deployed in different AZs.	• When a primary instance is being created, a standby instance is provisioned synchronously to provide data redundancy. The standby instance is invisible to you after being created. • If the primary instance fails, a failover occurs, during which database connection is interrupted. If there is a replication delay between the primary and standby instances, the failover takes an extended period of time. The client needs to be able to reconnect to the instance.	The standby node of a primary/standby DB instance is only used for failover and restoration. It does not provide services. The performance of single DB instances is similar to or even higher than primary/standby DB instances because standby nodes cause extra performance overhead.	• Production databases of large and medium enterprises • Applications for the Internet, Internet of Things (IoT), retail e-commerce sales, logistics, gaming, and other industries

Table 4-2 Function comparisons

Function	Single	Primary/Standby
Number of nodes	1	2

Function	Single	Primary/Standby
Specifications	vCPUs: a maximum of 128 Memory: a maximum of 1,024 GB Storage: a maximum of 4,000 GB Final specifications on the console may differ slightly.	vCPUs: a maximum of 128 Memory: a maximum of 1,024 GB Storage: a maximum of 4,000 GB Final specifications on the console may differ slightly.
Monitoring and alarms	Supported	Supported
Security group	Supported	Supported
Backup and restoration	Supported	Supported
Parameter settings	Supported	Supported
SSL	Supported	Supported
Log management	Supported	Supported
Read replicas (which need to be created)	Supported	Supported
Read/write splitting	Supported	Supported
SQL audit	Supported	Supported
DBA Assistant	Supported	Supported
Monitoring by Seconds	Supported	Supported
Failover	Not supported	Supported
Standby DB instance migration	Not supported	Supported
Manual primary/standby switchover	Not supported	Supported
Instance class change	Supported	Supported
Storage scale-up	Supported	Supported
Recycle bin	Supported	Supported

4.2 RDS for MariaDB Product Series

Table 4-3 and Table 4-4 list different DB instance types and their function comparisons of RDS for MariaDB.

Table 4-3 DB instance types

DB Instance Type	Description	Notes	Advantages	Scenarios
Single	A single-node architecture is more cost-effective than a primary/standby DB pair.	If a fault occurs on a single instance, the instance cannot recover in a timely manner.	This instance type supports the creation of read replicas and supports the queries of error logs and slow query logs. Different from primary/standby DB instances that have two database nodes, a single DB instance has only one node, greatly reducing costs. If the node fails, the restoration will take a long time. Therefore, single DB instances are not recommended for sensitive services that have high requirements on database availability.	• Personal learning • Microsites • Development and testing environment of small- and medium-sized enterprises

DB Instance Type	Description	Notes	Advantages	Scenarios
Primary/Standby	An HA architecture. A pair of primary and standby DB instances shares the same IP address and can be deployed in different AZs.	• When a primary instance is being created, a standby instance is provisioned synchronously to provide data redundancy. The standby instance is invisible to you after being created. • If the primary instance fails, a failover occurs, during which database connection is interrupted. If there is a replication delay between the primary and standby instances, the failover takes an extended period of time. The client needs to be able to reconnect to the instance.	The standby node of a primary/standby DB instance is only used for failover and restoration. It does not provide services. The performance of single DB instances is similar to or even higher than primary/standby DB instances because standby nodes cause extra performance overhead.	• Production databases of large and medium enterprises • Applications for the Internet, Internet of Things (IoT), retail e-commerce sales, logistics, gaming, and other industries

Table 4-4 Function comparisons

Function	Single	Primary/Standby
Number of nodes	1	2

Function	Single	Primary/Standby
Specifications	vCPUs: a maximum of 64 Memory: a maximum of 512 GB Storage: a maximum of 4,000 GB Final specifications on the console may differ slightly.	vCPUs: a maximum of 64 Memory: a maximum of 512 GB Storage: a maximum of 4,000 GB Final specifications on the console may differ slightly.
Monitoring and alarms	Supported	Supported
Security group	Supported	Supported
Backup and restoration	Supported	Supported
Parameter settings	Supported	Supported
SSL	Supported	Supported
Log management	Supported	Supported
Read replicas (which need to be created)	Supported	Supported
SQL audit	Supported	Supported
DBA Assistant	Supported	Supported
Standby DB instance migration	Not supported	Supported
Manual primary/standby switchover	Not supported	Supported
Instance class change	Supported	Supported
Storage scale-up	Supported	Supported
Recycle bin	Supported	Supported

4.3 RDS for PostgreSQL Product Series

RDS for PostgreSQL DB instances are classified into the following types:

- Single

- Primary/Standby

Table 4-5 DB instance types

DB Instance Type	Description	Notes	Scenarios
Single	A single-node architecture is more cost-effective than a primary/standby DB pair.	If a fault occurs on a single instance, the instance cannot recover in a timely manner.	• Personal learning • Microsites • Development and testing environment of small- and medium-sized enterprises
Primary/Standby	An HA architecture. A pair of primary and standby DB instances shares the same IP address and can be deployed in different AZs.	• When a primary instance is being created, a standby instance is provisioned synchronously to provide data redundancy. The standby instance is invisible to you after being created. • If the primary instance fails, a failover occurs, during which database connection is interrupted. If there is a replication delay between the primary and standby instances, the failover takes an extended period of time. The client needs to be able to reconnect to the instance.	• Production databases of large and medium enterprises • Applications for the Internet, Internet of Things (IoT), retail e-commerce sales, logistics, gaming, and other industries

Advantage Comparison

- Single DB instances: support the creation of read replicas and support the queries of error logs and slow query logs. Different from primary/standby DB

instances that have two database nodes, a single DB instance has only one node, reducing the price to half of primary/standby DB instances. If the node fails, the restoration will take a long time. Therefore, single DB instances are not recommended for sensitive services that have high requirements on database availability.

- Primary/Standby DB instances: use the standby database node only for failover and restoration. The standby database node does not provide services. The performance of single DB instances is similar to or even higher than primary/standby DB instances because standby nodes cause extra performance overhead.

Table 4-6 Function comparisons

Function	Single	Primary/Standby
Number of nodes	1	2
Specifications	vCPUs: a maximum of 64 Memory: a maximum of 512 GB Storage: a maximum of 4,000 GB	vCPUs: a maximum of 64 Memory: a maximum of 512 GB Storage: a maximum of 4,000 GB
Monitoring and alarms	Supported	Supported
Security group	Supported	Supported
Backup and restoration	Supported	Supported
Recycle bin	Supported	Supported
Parameter settings	Supported	Supported
SSL	Supported	Supported
Log management	Supported	Supported
Read replicas (which need to be created)	Supported	Supported
High-frequency monitoring	Supported	Supported
Failover	Not supported	Supported
Standby DB instance migration	Not supported	Supported

Function	Single	Primary/Standby
Manual primary/standby switchover	Not supported	Supported
Instance class change	Supported	Supported

4.4 RDS for SQL Server Product Series

RDS for SQL Server DB instances are classified into the following types:

- Single
- Primary/Standby
- Cluster

Table 4-7 DB instance types

DB Instance Type	Description	Notes	Scenarios
Single	A single-node architecture is more cost-effective than a primary/standby DB pair.	If a fault occurs on a single instance, the instance cannot recover in a timely manner.	• Personal learning • Microsites • Development and testing environment of small- and medium-sized enterprises

DB Instance Type	Description	Notes	Scenarios
Primary/Standby	An HA architecture. A pair of primary and standby DB instances shares the same IP address and can be deployed in different AZs.	• When a primary instance is being created, a standby instance is provisioned synchronously to provide data redundancy. The standby instance is invisible to you after being created. • If the primary instance fails, a failover occurs, during which database connection is interrupted. If there is a replication delay between the primary and standby instances, the failover takes an extended period of time. The client needs to be able to reconnect to the instance.	• Production databases of large and medium enterprises • Applications for the Internet, Internet of Things (IoT), retail e-commerce sales, logistics, gaming, and other industries
Cluster	The Microsoft Always On architecture. There is one primary node, one standby node, and up to five read-only nodes. It features higher availability, reliability, and scalability.	Only for RDS for SQL Server.	• Finance industry • Internet industry • Hotel industry • Online education

Advantage Comparison

- Single DB instances: support the creation of read replicas and support the queries of error logs and slow query logs. Different from primary/standby DB instances that have two database nodes, a single DB instance has only one node, reducing the price to half of primary/standby DB instances. If the node fails, the restoration will take a long time. Therefore, single DB instances are

not recommended for sensitive services that have high requirements on database availability.

- Primary/Standby DB instances: use the standby database node only for failover and restoration. The standby database node does not provide services. The performance of single DB instances is similar to or even higher than primary/standby DB instances because standby nodes cause extra performance overhead.
- Cluster instances: use the Microsoft Always On architecture with one primary node, one standby node, and up to five read-only nodes. It features higher availability, reliability, and scalability.

Table 4-8 Function comparisons

Function	Single	Primary/Standby	Cluster
Number of nodes	1	2	2
Specifications	vCPUs: a maximum of 64 Memory: a maximum of 512 GB Storage: a maximum of 4,000 GB	vCPUs: a maximum of 64 Memory: a maximum of 512 GB Storage: a maximum of 4,000 GB	vCPUs: a maximum of 64 Memory: a maximum of 512 GB Storage: a maximum of 4 TB
Monitoring and alarms	Supported	Supported	Supported
Security group	Supported	Supported	Supported
Backup and restoration	Supported	Supported	Supported
Recycle bin	Supported	Supported	Supported
Parameter settings	Supported	Supported	Supported
SSL	Supported	Supported	Supported
Log management	Supported	Supported	Supported
Read replicas (which need to be created)	Not supported	Not supported	Supported

Function	Single	Primary/Standby	Cluster
High-frequency monitoring	Supported	Supported	Supported
Failover	Not supported	Supported	Supported
Standby DB instance migration	Not supported	Supported	Supported
Manual primary/standby switchover	Not supported	Supported	Supported
Instance class change	Supported	Supported	Supported

5 Functions of RDS for SQL Server Versions

5.1 RDS for SQL Server 2012

Category	Function Item	Version				
		Web Edition	Standard Edition		Enterprise Edition	
		Single	Single	Primary/ Standby	Single	Primary/ Standby
Instance management	Reboot an instance	√	√	√	√	√
	Change the instance class	√	√	√	√	√
	Reset a password	√	√	√	√	√
	Change instance type from single to primary/ standby	×	×	×	×	×
	Scale up storage space	√	√	√	√	√
	Manually switch between primary and standby instances	×	×	√	×	√

	Delete a pay-per-use instance	√	√	√	√	√
	Upgrade the DB engine version	×	×	×	×	×
	Change the instance name	√	√	√	√	√
	Change the instance description	√	√	√	√	√
	Change the maintenance window	√	√	√	√	√
Tags	**Manage tags**	√	√	√	√	√
Task center	**View a task**	√	√	√	√	√
Data migration	**Migrate backups using DRS**	√	√	√	√	√
Database connection	**Intra-VPC access**	√	√	√	√	√
	Public access	√	√	√	√	√
	Change a floating IP address	√	√	√	√	√
	Change a database port	√	√	√	√	√
Backup and restoration	**Full backup (automated backup)**	√	√	√	√	√
	Incremental backup	√	√	√	√	√
	Download a backup	√	√	√	√	√
	Replicate a backup	√	√	√	√	√
	Configure an automated backup policy	√	√	√	√	√

	Restore data to RDS for SQL Server from backups	√	√	√	√	√
	Restore an instance to a point in time	√	√	√	√	√
	Manual backup	√	√	√	√	√
	Restore data to a new instance	√	√	√	√	√
	Restore data to an existing instance	√	√	√	√	√
Monitoring and alarms	**Resource monitoring**	√	√	√	√	√
	DB engine monitoring	√	√	√	√	√
	Set alarm rules	√	√	√	√	√
Parameter management	**Create a parameter template**	√	√	√	√	√
	Compare parameter templates	√	√	√	√	√
	Apply a parameter template	√	√	√	√	√
	View application records of a parameter template	√	√	√	√	√
	Modify parameters	√	√	√	√	√
	Export a parameter template	√	√	√	√	√
	View parameter change history	√	√	√	√	√
Log management	**View and download system logs**	√	√	√	√	√

	View and download slow query logs	√	√	√	√	√
Security management	Cloud Trace Service (CTS)	√	√	√	√	√
	Database Security Service (DBSS)	√	√	√	√	√
	Server-side encryption	√	√	√	√	√
	Change a security group	√	√	√	√	√
	Configure the TDE function	×	×	×	√	√
Recycle bin	Modify the recycling policy	√	√	√	√	√
	Rebuild an instance	√	√	√	√	√
DB engine functions	Account management	√	√	√	√	√
	Database management	√	√	√	√	√
		√	√	√	√	√
	Microsoft Distributed Transaction Coordinator (MSDTC)	√	√	√	√	√
	SQL Server Integration Services (SSIS)	×	×	×	×	×
	FileStream	√	√	×	√	×
	CLR integration	√	√	√	√	√
	Create and configure Agent jobs and DBLinks	√	√	√	√	√

Stored procedures	Change a custom database name	√	√	√	√	√
	Capture change data	×	√	√	√	√
	Shrink a database	√	√	√	√	√
	Replicate a database	√	√	√	√	√
	Update database statistics	√	√	√	√	√
	Trace flags	√	√	√	√	√
Best practices	Create a linked server	√	√	√	√	√

5.2 RDS for SQL Server 2014

Category	Function Item	Version				
		Web Edition	Standard Edition		Enterprise Edition	
		Single	Single	Primary/ Standby	Single	Primary/ Standby
Instance management	Reboot an instance	√	√	√	√	√
	Change the instance class	√	√	√	√	√
	Reset a password	√	√	√	√	√
	Change instance type from single to primary/ standby	×	×	×	×	×
	Scale up storage space	√	√	√	√	√

	Manually switch between primary and standby instances	×	×	√	×	√
	Delete a pay-per-use instance	√	√	√	√	√
	Upgrade the DB engine version	×	×	×	×	×
	Change the instance name	√	√	√	√	√
	Change the instance description	√	√	√	√	√
	Change the maintenance window	√	√	√	√	√
Tags	**Manage tags**	√	√	√	√	√
Task center	**View a task**	√	√	√	√	√
Data migration	**Migrate backups using DRS**	√	√	√	√	√
Database connection	**Intra-VPC access**	√	√	√	√	√
	Public access	√	√	√	√	√
	Change a floating IP address	√	√	√	√	√
	Change a database port	√	√	√	√	√
Backup and restoration	**Full backup (automated backup)**	√	√	√	√	√
	Incremental backup	√	√	√	√	√
	Download a backup	√	√	√	√	√
	Replicate a backup	√	√	√	√	√

	Configure an automated backup policy	√	√	√	√	√
	Restore data to RDS for SQL Server from backups	√	√	√	√	√
	Restore an instance to a point in time	√	√	√	√	√
	Manual backup	√	√	√	√	√
	Restore data to a new instance	√	√	√	√	√
	Restore data to an existing instance	√	√	√	√	√
Monitoring and alarms	Resource monitoring	√	√	√	√	√
	DB engine monitoring	√	√	√	√	√
	Set alarm rules	√	√	√	√	√
Parameter management	Create a parameter template	√	√	√	√	√
	Compare parameter templates	√	√	√	√	√
	Apply a parameter template	√	√	√	√	√
	View application records of a parameter template	√	√	√	√	√
	Modify parameters	√	√	√	√	√
	Export a parameter template	√	√	√	√	√
	View parameter change history	√	√	√	√	√

Log management	View and download system logs	√	√	√	√	√
	View and download slow query logs	√	√	√	√	√
Security management	Cloud Trace Service (CTS)	√	√	√	√	√
	Database Security Service (DBSS)	√	√	√	√	√
	Server-side encryption	√	√	√	√	√
	Change a security group	√	√	√	√	√
	Configure the TDE function	×	×	×	√	√
Recycle bin	Modify the recycling policy	√	√	√	√	√
	Rebuild an instance	√	√	√	√	√
DB engine functions	Account management	√	√	√	√	√
	Database management	√	√	√	√	√
		√	√	√	√	√
	Microsoft Distributed Transaction Coordinator (MSDTC)	√	√	√	√	√
	SQL Server Integration Services (SSIS)	×	√	√	√	√
	FileStream	√	√	×	√	×
	CLR integration	√	√	√	√	√
	Create and configure Agent jobs and DBLinks	√	√	√	√	√

Stored procedures	Change a custom database name	√	√	√	√	√
	Capture change data	×	√	√	√	√
	Shrink a database	√	√	√	√	√
	Replicate a database	√	√	√	√	√
	Update database statistics	√	√	√	√	√
	Trace flags	√	√	√	√	√
Best practices	Create a linked server	√	√	√	√	√

5.3 RDS for SQL Server 2016

Category	Function Item	Version				
		Web Edition	Standard Edition		Enterprise Edition	
		Single	Single	Primary/ Standby	Single	Primary/ Standby
Instance management	Reboot an instance	√	√	√	√	√
	Change the instance class	√	√	√	√	√
	Reset a password	√	√	√	√	√
	Change instance type from single to primary/ standby	×	×	×	×	×
	Scale up storage space	√	√	√	√	√

	Manually switch between primary and standby instances	×	×	√	×	√
	Delete a pay-per-use instance	√	√	√	√	√
	Upgrade the DB engine version	×	×	×	×	×
	Change the instance name	√	√	√	√	√
	Change the instance description	√	√	√	√	√
	Change the maintenance window	√	√	√	√	√
Tags	**Manage tags**	√	√	√	√	√
Task center	**View a task**	√	√	√	√	√
Data migration	**Migrate backups using DRS**	√	√	√	√	√
Database connection	**Intra-VPC access**	√	√	√	√	√
	Public access	√	√	√	√	√
	Change a floating IP address	√	√	√	√	√
	Change a database port	√	√	√	√	√
Backup and restoration	**Full backup (automated backup)**	√	√	√	√	√
	Incremental backup	√	√	√	√	√
	Download a backup	√	√	√	√	√
	Replicate a backup	√	√	√	√	√

	Configure an automated backup policy	√	√	√	√	√
	Restore data to RDS for SQL Server from backups	√	√	√	√	√
	Restore an instance to a point in time	√	√	√	√	√
	Manual backup	√	√	√	√	√
	Restore data to a new instance	√	√	√	√	√
	Restore data to an existing instance	√	√	√	√	√
Monitoring and alarms	Resource monitoring	√	√	√	√	√
	DB engine monitoring	√	√	√	√	√
	Set alarm rules	√	√	√	√	√
Parameter management	Create a parameter template	√	√	√	√	√
	Compare parameter templates	√	√	√	√	√
	Apply a parameter template	√	√	√	√	√
	View application records of a parameter template	√	√	√	√	√
	Modify parameters	√	√	√	√	√
	Export a parameter template	√	√	√	√	√
	View parameter change history	√	√	√	√	√

Log management	View and download system logs	√	√	√	√	√
	View and download slow query logs	√	√	√	√	√
Security management	Cloud Trace Service (CTS)	√	√	√	√	√
	Database Security Service (DBSS)	√	√	√	√	√
	Server-side encryption	√	√	√	√	√
	Change a security group	√	√	√	√	√
	Configure the TDE function	×	×	×	√	√
Recycle bin	Modify the recycling policy	√	√	√	√	√
	Rebuild an instance	√	√	√	√	√
DB engine functions	Account management	√	√	√	√	√
	Database management	√	√	√	√	√
		√	√	√	√	√
	Microsoft Distributed Transaction Coordinator (MSDTC)	√	√	√	√	√
	SQL Server Integration Services (SSIS)	×	√	√	√	√
	FileStream	√	√	×	√	×
	CLR integration	√	√	√	√	√
	Create and configure Agent jobs and DBLinks	√	√	√	√	√

Stored procedures	Change a custom database name	√	√	√	√	√
	Capture change data	×	√	√	√	√
	Shrink a database	√	√	√	√	√
	Replicate a database	√	√	√	√	√
	Update database statistics	√	√	√	√	√
	Trace flags	√	√	√	√	√
Best practices	Create a linked server	√	√	√	√	√

5.4 RDS for SQL Server 2017

Category	Function Item	Version			
		Web Edition	Standard Edition		Enterprise Edition
		Single	Single	Primary/ Standby	Cluster
Instance management	Reboot an instance	√	√	√	√
	Change the instance class	√	√	√	√
	Reset a password	√	√	√	√
	Change instance type from single to primary/standby	×	×	×	×
	Scale up storage space	√	√	√	√

	Manually switch between primary and standby instances	×	×	√	√
	Delete a pay-per-use instance	√	√	√	√
	Upgrade the DB engine version	×	×	×	×
	Change the instance name	√	√	√	√
	Change the instance description	√	√	√	√
	Change the maintenance window	√	√	√	√
Tags	**Manage tags**	√	√	√	√
Task center	**View a task**	√	√	√	√
Data migration	**Migrate backups using DRS**	√	√	√	√
Database connection	**Intra-VPC access**	√	√	√	√
	Public access	√	√	√	√
	Change a floating IP address	√	√	√	√
	Change a database port	√	√	√	√
Backup and restoration	**Full backup (automated backup)**	√	√	√	√
	Incremental backup	√	√	√	√
	Download a backup	√	√	√	√
	Replicate a backup	√	√	√	√
	Configure an automated backup policy	√	√	√	√

	Restore data to RDS for SQL Server from backups	√	√	√	√
	Restore an instance to a point in time	√	√	√	√
	Manual backup	√	√	√	√
	Restore data to a new instance	√	√	√	√
	Restore data to an existing instance	√	√	√	√
Monitoring and alarms	**Resource monitoring**	√	√	√	√
	DB engine monitoring	√	√	√	√
	Set alarm rules	√	√	√	√
Parameter management	**Create a parameter template**	√	√	√	√
	Compare parameter templates	√	√	√	√
	Apply a parameter template	√	√	√	√
	View application records of a parameter template	√	√	√	√
	Modify parameters	√	√	√	√
	Export a parameter template	√	√	√	√
	View parameter change history	√	√	√	√
Log management	**View and download system logs**	√	√	√	√

	View and download slow query logs	√	√	√	√
Security management	Cloud Trace Service (CTS)	√	√	√	√
	Database Security Service (DBSS)	√	√	√	√
	Server-side encryption	√	√	√	√
	Change a security group	√	√	√	√
	Configure the TDE function	×	×	×	√
Recycle bin	Modify the recycling policy	√	√	√	√
	Rebuild an instance	√	√	√	√
DB engine functions	Account management	√	√	√	√
	Database management	√	√	√	√
		√	√	√	√
	Microsoft Distributed Transaction Coordinator (MSDTC)	√	√	√	√
	SQL Server Integration Services (SSIS)	×	√	√	√
	FileStream	√	√	×	√
	CLR integration	√	√	√	√
	Create and configure Agent jobs and DBLinks	√	√	√	√
Stored procedures	Change a custom database name	√	√	√	√
	Capture change data	×	√	√	√
	Shrink a database	√	√	√	√

	Replicate a database	√	√	√	√
	Update database statistics	√	√	√	√
	Trace flags	√	√	√	√
Best practices	Create a linked server	√	√	√	√

5.5 RDS for SQL Server 2019

Category	Function Item	Version			
		Web Edition	Standard Edition		Enterprise Edition
		Single	Single	Primary/ Standby	Cluster
Instance management	Reboot an instance	√	√	√	√
	Change the instance class	√	√	√	√
	Reset a password	√	√	√	√
	Change instance type from single to primary/standby	×	×	×	×
	Scale up storage space	√	√	√	√
	Manually switch between primary and standby instances	×	×	√	√
	Delete a pay-per-use instance	√	√	√	√
	Upgrade the DB engine version	×	×	×	×
	Change the instance name	√	√	√	√
	Change the instance description	√	√	√	√

	Change the maintenance window	√	√	√	√
Tags	**Manage tags**	√	√	√	√
Task center	**View a task**	√	√	√	√
Data migration	**Migrate backups using DRS**	√	√	√	√
Database connection	**Intra-VPC access**	√	√	√	√
	Public access	√	√	√	√
	Change a floating IP address	√	√	√	√
	Change a database port	√	√	√	√
Backup and restoration	**Full backup (automated backup)**	√	√	√	√
	Incremental backup	√	√	√	√
	Download a backup	√	√	√	√
	Replicate a backup	√	√	√	√
	Configure an automated backup policy	√	√	√	√
	Restore data to RDS for SQL Server from backups	√	√	√	√
	Restore an instance to a point in time	√	√	√	√
	Manual backup	√	√	√	√
	Restore data to a new instance	√	√	√	√
	Restore data to an existing instance	√	√	√	√

Monitoring and alarms	**Resource monitoring**	√	√	√	√
	DB engine monitoring	√	√	√	√
	Set alarm rules	√	√	√	√
Parameter management	**Create a parameter template**	√	√	√	√
	Compare parameter templates	√	√	√	√
	Apply a parameter template	√	√	√	√
	View application records of a parameter template	√	√	√	√
	Modify parameters	√	√	√	√
	Export a parameter template	√	√	√	√
	View parameter change history	√	√	√	√
Log management	**View and download system logs**	√	√	√	√
	View and download slow query logs	√	√	√	√
Security management	**Cloud Trace Service (CTS)**	√	√	√	√
	Database Security Service (DBSS)	√	√	√	√
	Server-side encryption	√	√	√	√
	Change a security group	√	√	√	√
	Configure the TDE function	×	√	√	√

Recycle bin	**Modify the recycling policy**	√	√	√	√
	Rebuild an instance	√	√	√	√
DB engine functions	**Account management**	√	√	√	√
	Database management	√	√	√	√
		√	√	√	√
	Microsoft Distributed Transaction Coordinator (MSDTC)	√	√	√	√
	SQL Server Integration Services (SSIS)	×	×	×	√
	FileStream	√	×	×	√
	CLR integration	√	√	√	√
	Create and configure Agent jobs and DBLinks	√	√	√	√
Stored procedures	**Change a custom database name**	√	√	√	√
	Capture change data	×	√	√	√
	Shrink a database	√	√	√	√
	Replicate a database	√	√	√	√
	Update database statistics	√	√	√	√
	Trace flags	√	√	√	√
Best practices	**Create a linked server**	√	√	√	√

5.6 RDS for SQL Server 2022

Category	Function Item	Version			
		Web Edition	Standard Edition		Enterprise Edition
		Single	Single	Primary/ Standby	Cluster
Instance management	Reboot an instance	√	√	√	√
	Change the instance class	√	√	√	√
	Reset a password	√	√	√	√
	Change instance type from single to primary/standby	×	×	×	×
	Scale up storage space	√	√	√	√
	Manually switch between primary and standby instances	×	×	√	√
	Delete a pay-per-use instance	√	√	√	√
	Upgrade the DB engine version	×	×	×	×
	Change the instance name	√	√	√	√
	Change the instance description	√	√	√	√
	Change the maintenance window	√	√	√	√
Tags	Manage tags	√	√	√	√
Task center	View a task	√	√	√	√

Data migration	**Migrate backups using DRS**	√	√	√	√
Database connection	**Intra-VPC access**	√	√	√	√
	Public access	√	√	√	√
	Change a floating IP address	√	√	√	√
	Change a database port	√	√	√	√
Backup and restoration	**Full backup (automated backup)**	√	√	√	√
	Incremental backup	√	√	√	√
	Download a backup	√	√	√	√
	Replicate a backup	√	√	√	√
	Configure an automated backup policy	√	√	√	√
	Restore data to RDS for SQL Server from backups	√	√	√	√
	Restore an instance to a point in time	√	√	√	√
	Manual backup	√	√	√	√
	Restore data to a new instance	√	√	√	√
	Restore data to an existing instance	√	√	√	√
Monitoring and alarms	**Resource monitoring**	√	√	√	√
	DB engine monitoring	√	√	√	√
	Set alarm rules	√	√	√	√

Parameter management	**Create a parameter template**	√	√	√	√
	Compare parameter templates	√	√	√	√
	Apply a parameter template	√	√	√	√
	View application records of a parameter template	√	√	√	√
	Modify parameters	√	√	√	√
	Export a parameter template	√	√	√	√
	View parameter change history	√	√	√	√
Log management	**View and download system logs**	√	√	√	√
	View and download slow query logs	√	√	√	√
Security management	**Cloud Trace Service (CTS)**	√	√	√	√
	Database Security Service (DBSS)	√	√	√	√
	Server-side encryption	√	√	√	√
	Change a security group	√	√	√	√
	Configure the TDE function	×	√	√	√
Recycle bin	**Modify the recycling policy**	√	√	√	√
	Rebuild an instance	√	√	√	√

DB engine functions	Account management	√	√	√	√
	Database management	√	√	√	√
		√	√	√	√
	Microsoft Distributed Transaction Coordinator (MSDTC)	√	√	√	√
	SQL Server Integration Services (SSIS)	×	×	×	√
	FileStream	√	×	×	√
	CLR integration	√	√	√	√
	Create and configure Agent jobs and DBLinks	√	√	√	√
Stored procedures	Change a custom database name	√	√	√	√
	Capture change data	×	√	√	√
	Shrink a database	√	√	√	√
	Replicate a database	√	√	√	√
	Update database statistics	√	√	√	√
	Trace flags	√	√	√	√
Best practices	Create a linked server	√	√	√	√

5.7 Function Differences Among Standard, Web, and Enterprise Editions

Table 5-1 lists the major differences among the official Microsoft SQL Server editions.

Table 5-1 Differences among Microsoft SQL Server editions

Function Item	Web Edition	Standard Edition	Enterprise Edition
High availability	Not supported	Mirror HA	• Microsoft SQL Server 2012 (Mirror) • Microsoft SQL Server 2014 (Mirror) • Microsoft SQL Server 2016 (Mirror) • Microsoft SQL Server 2017 (Always On)
Data compression	Supported	Supported	Supported
SQL Profiler	Supported	Supported	Supported
Column index	Not supported	Supported	Supported
Table/index partitioning	Supported	Supported	Supported
Change Data Capture (CDC)	Not supported	Supported	Supported
Parallel searches	Not supported	Not supported	Supported
Adjustment of partitioned table parallelism	Supported	Supported	Supported
Transparent Data Encryption (TDE)	Not supported	Not supported	Supported
Advanced R integration	Not supported	Not supported	Supported

6 DB Instance Description

6.1 DB Instance Types

The smallest management unit of RDS is the DB instance. A DB instance is an isolated database environment on the cloud. Each DB instance can contain multiple user-created databases, and you can access a DB instance using the same tools and applications that you use with a stand-alone DB instance. You can easily create or modify DB instances using the management console or HTTPS-compliant application programming interfaces (APIs). RDS does not have limits on the number of running DB instances. Each DB instance has a DB instance identifier.

DB instances are classified into the following types.

Table 6-1 DB instance types

DB Instance Type	Description	Notes
Single	A single-node architecture is more cost-effective than a primary/standby DB pair.	If a fault occurs on a single instance, the instance cannot recover in a timely manner.

DB Instance Type	Description	Notes
Primary/ Standby	An HA architecture. In a primary/standby pair, each instance has the same instance class. The primary and standby instances can be deployed in different AZs.	• When a primary instance is being created, a standby instance is provisioned synchronously to provide data redundancy. The standby instance is invisible to you after being created. • If a failover occurs due to a primary instance failure, your database client will be disconnected briefly. You need to reconnect the client to the instance. • The default replication mode between the primary and standby instances is as follows: – RDS for MySQL and RDS for MariaDB: semi-synchronous – RDS for PostgreSQL: asynchronous – RDS for SQL Server: synchronous. SQL Server 2017 Enterprise Edition and 2019 Enterprise Edition use AlwaysOn availability groups (AGs). Other editions use database mirroring. – RDS for SQL Server uses asynchronous replication between the primary instance and read replicas.

DB Instance Type	Description	Notes
Read replica	A single-node or HA architecture	• Read replicas include single read replicas and HA read replicas. – Single read replicas: If you choose single read replicas, you are advised to buy more than one single read replica and enable database proxy. That way, if one read replica fails, the database proxy can route traffic to other read replicas. – HA read replicas: If the physical server where a primary read replica is deployed fails, the standby read replica automatically takes over the workloads. When you purchase a read replica, select the same value for **Table Name** as the DB instance. • If the replication between a read replica (single or HA) and the DB instance is abnormal, it can take a long time to rebuild and restore the read replica (depending on the data volume).
Cluster	The Microsoft Always On architecture. There is one primary node, one standby node, and up to five read-only nodes. It features higher availability, reliability, and scalability.	Only for RDS for SQL Server.

You can use RDS to create and manage DB instances running various DB engines.

For details about differences and function comparison between different instance types, see **RDS for MySQL Product Series**, **RDS for MariaDB Product Series**, **RDS for PostgreSQL Product Series**, and **RDS for SQL Server Product Series**.

6.2 DB Instance Storage Types

The database system is generally an important part of an IT system and has high requirements on storage I/O performance. You can select a storage type based on

service demands. You cannot change the storage type after the DB instance is created.

Description

RDS supports **Cloud SSD** (also called **Ultra-high I/O**) and **Extreme SSD** to suit different performance requirements of your workloads.

- Cloud SSD or Ultra-high I/O

  Stores data in cloud disks for decoupled storage and compute. The maximum throughput is 350 MB/s.

  - For RDS for MySQL instances, this storage type is normally displayed as **Cloud SSD**, but for existing instances in certain regions it is displayed as **Ultra-high I/O**.
  - For RDS for MariaDB, RDS for PostgreSQL and RDS for SQL Server instances, this storage type is displayed as **Cloud SSD**.
  - The supported IOPS depends on the I/O performance of the Elastic Volume Service (EVS) disk. For details, see "Ultra-high I/O" in **Disk Types and Performance** of the *Elastic Volume Service Service Overview*.

- Extreme SSD

  Uses 25GE network and RDMA technologies to provide you with up to 1,000 MB/s throughput per disk and sub-millisecond latency.

  - Only RDS for MySQL, RDS for SQL Server, and RDS for PostgreSQL support extreme SSDs.
  - The supported IOPS depends on the I/O performance of the EVS disk. For details, see "Extreme SSD" in **Disk Types and Performance** of the *Elastic Volume Service Service Overview*.

- Extreme SSD V2

  Extreme SSD V2: supports super-high IOPS and throughput as well as super-low latency for the most performance-demanding workloads.

  With the Extreme SSD V2 type, you can buy disks with the IOPS tailored to your workloads. The disk performance no longer changes with the disk capacity.

  NOTE

  Extreme SSD V2 is now available only in CN South-Guangzhou. To use this storage type, contact customer service.

  Extreme SSD V2 disks with a preconfigured IOPS higher than 128,000 can only reach the maximum performance on AC7 compute resources. To use such disks, contact customer service.

  - Only RDS for SQL Server supports extreme SSD V2 disks.
  - The supported IOPS depends on the I/O performance of the EVS disk. For details, see "Extreme SSD" in **Disk Types and Performance** of the *Elastic Volume Service Service Overview*.

Performance Comparison

Table 6-2 Performance comparison

Item	Cloud SSD	Extreme SSD	Extreme SSD V2
I/O performance	Sub-par I/O performance due to additional network I/O overheads	Higher I/O performance than cloud SSDs	Higher I/O performance than cloud SSDs
Elastic scalability	Scaling in seconds	Scaling in seconds	Scaling in minutes
Maximum IOPS	50,000	128,000	Smaller value: min(256000, Storage space x 1000) You can buy disks with the IOPS tailored to your workloads. IOPS is separately billed on a pay-per-use basis.
Maximum throughput	350 MB/s	1,000 MB/s	4,000 MB/s
Read/write latency	1 ms	Sub-millisecond	Sub-millisecond

6.3 DB Engines and Versions

Table 6-3 lists the DB engines and versions supported by RDS.

NOTICE

To purchase RDS for SQL Server DB instances, choose **Service Tickets > Create Service Ticket** in the upper right corner of the console to submit a service ticket.

For new applications, you are advised to use the latest major version of the DB engine, for example, MySQL 8.0. When you create a DB instance, you can select a major DB engine version only (such as MySQL 8.0). The system will automatically select an appropriate minor version (such as 8.0.17) for you. After the DB instance is created, you can view the minor version in the **DB Engine Version** column on the **Instances** page. The DB engine and version vary according to site requirements.

Figure 6-1 DB engine version

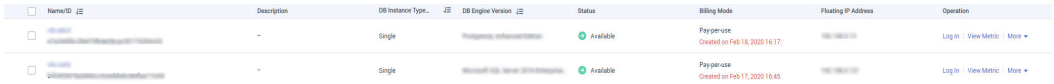


Table 6-3 DB engines and versions

DB Engine	Single	Primary/Standby	Cluster
MySQL	• 8.0 • 5.7 • 5.6 • 5.6 (Only for installed base operations)	• 8.0 • 5.7 • 5.6 • 5.6 (Only for installed base operations)	Not supported
PostgreSQL	• 16 • 15 • 14 • 13 • 12 • 11 (Only for installed base operations) • 10 (Only for installed base operations) • 9.6 (Only for installed base operations) • 9.5 (Only for installed base operations)	• 16 • 15 • 14 • 13 • 12 • 11 (Only for installed base operations) • 10 (Only for installed base operations) • 9.6 (Only for installed base operations)	Not supported
MariaDB	10.5 Minor version: 10.5.16	10.5 Minor version: 10.5.16	Not supported

DB Engine	Single	Primary/Standby	Cluster
Microsoft SQL Server	• 2017 Enterprise Edition • 2017 Standard Edition • 2017 Web Edition • 2016 Enterprise Edition • 2016 Standard Edition • 2016 Web Edition • 2014 Enterprise Edition • 2014 Standard Edition • 2014 Web Edition • 2012 Enterprise Edition • 2012 Standard Edition • 2012 Web Edition • 2008 R2 Web Edition (Only for installed base operations)	• 2017 Standard Edition • 2016 Enterprise Edition • 2016 Standard Edition • 2014 Enterprise Edition • 2014 Standard Edition • 2012 Enterprise Edition • 2012 Standard Edition • 2008 R2 Enterprise Edition (Only for installed base operations)	• 2017 Enterprise Edition

6.4 DB Instance Statuses

DB Instance Statuses

The status of a DB instance indicates the health of the DB instance. You can use the management console or API to view the status of a DB instance.

Table 6-4 DB instance statuses

Status	Description
Available	A DB instance is available.
Abnormal	A DB instance is abnormal.
Creating	A DB instance is being created.
Cloning	A DB instance is being cloned.
Creation failed	A DB instance has failed to be created.

Status	Description
Available (synchronizing data)	A DB instance that is in the process of being restored. The status is only for RDS for SQL Server read replicas and is displayed only on the console.
Switchover in progress	A standby DB instance is being switched over to the primary DB instance.
Changing type to primary/ standby	A single DB instance is being changed to primary/standby DB instances.
Rebooting	A DB instance is being rebooted.
Changing port	A DB instance port is being changed.
Changing instance class	The CPU or memory of a DB instance is being modified.
Changing proxy instance class	The CPU or memory of a DB proxy instance is being modified.
Scaling up	Storage space of a DB instance is being scaled up.
Backing up	A DB instance is being backed up.
Restoring	A DB instance is in the process of being restored from a backup.
Restore failed	A DB instance fails to be restored.
Frozen	A DB instance is frozen when your account balance is less than or equal to $0 USD. Retained frozen DB instances are unfrozen only after your account is recharged and the overdue payments are cleared.
Storage full	Storage space of a DB instance is full. Data cannot be written to databases.
Deleted	A DB instance has been deleted and will not be displayed in the instance list.
Upgrading minor version	A DB instance minor version is being upgraded.
Upgrading	A DB engine version is being upgraded.
Migrating standby DB instance	A standby RDS for MySQL instance is being migrated to another AZ in the same region.
Promoting to primary	A read replica is being promoted to a primary DB instance.
Parameter change. Pending reboot	A modification to a database parameter is waiting for an instance reboot before it can take effect.

Status	Description
Stopping	A DB instance is being stopped.
Stopped	A DB instance has been stopped. It can be stopped for up to seven days. You can manually restart it or it will be automatically restarted after seven days.
Starting	A stopped DB instance is being started.
Changing read/write permissions of the instance	The read/write permissions of a DB instance are being changed.
Forced to read-only	A DB instance is set to read-only and operations that cause data changes, such as data writes and updates, are not allowed for the instance.

7 DB Instance Classes

7.1 RDS for MySQL Instance Classes

To learn about the DB engine versions supported by RDS for MySQL, see **DB Engines and Versions**.

Table 7-1 lists the instance classes based on the x86 CPU architecture available to RDS for MySQL. For detailed specifications of each instance class, see **Table 7-3** and **Table 7-4**.

- x86: general-purpose (recommended), dedicated (recommended), general-enhanced (installed base operations), and general-enhanced II (installed base operations)

NOTE

For information about transactions per second (TPS) and queries per second (QPS), see ***Performance White Paper***.

Table 7-1 Instance classes for cloud SSD and extreme SSD

Instance Class	Description	Scenario	Constraints
General-purpose (recommended)	CPU resources are shared with other general-purpose DB instances on the same physical machine. CPU usage is maximized through resource overcommitment. This instance class is a cost-effective option and suitable for scenarios where performance stability is not critical. If traffic loads are light, the computing performance is high. However, if traffic loads are heavy, vCPUs of different instances compete for physical CPU resources, resulting in unstable computing performance.	Suitable for scenarios that have high requirements on cost-effectiveness.	**Table 7-2** lists the regions where this instance class is available.
Dedicated (recommended)	The instance has dedicated CPU and memory resources to ensure stable performance. There is no CPU resource contention between instances. This instance class is good when performance stability is important.	Suitable for core database scenarios such as e-commerce, gaming, finance, government, and enterprise applications.	**Table 7-2** lists the regions where this instance class is available.
General-enhanced and general-enhanced II	With a leading network acceleration engine and Data Plane Development Kit (DPDK) fast packet processing, this instance class provides higher network performance and computing power.	Suitable for websites and web applications that require high database computing and network performance.	These two instance classes are for installed base operations.

Table 7-2 Regions where general-purpose and dedicated instance classes are available

Instance Class	Region
General-purpose and dedicated	CN North-Beijing4 and CN North-Ulanqab1
	CN East-Shanghai1
	CN South-Guangzhou and CN South-Guangzhou-InvitationOnly
	CN Southwest-Guiyang1
	AP-Bangkok and AP-Singapore
	CN-Hong Kong
	LA-Sao Paulo1, LA-Santiago, LA-Mexico City1, and LA-Mexico City2
	AF-Johannesburg

Table 7-3 Detailed specifications of general-purpose and dedicated instance classes

Instance Class	Specification Code for Primary/ Standby Instances	Specification Code for Read Replicas	Specification Code for Single Instances	vCPUs	Memory (GB)
General-purpose	rds.mysql.n1.large.2.ha	rds.mysql.n1.large.2.rr (Read replicas) rds.mysql.n1.large.2.rha.rr (HA read replicas)	rds.mysql.n1.large.2	2	4
	rds.mysql.n1.large.4.ha	rds.mysql.n1.large.4.rr (Read replicas) rds.mysql.n1.large.4.rha.rr (HA read replicas)	rds.mysql.n1.large.4	2	8

Instance Class	Specification Code for Primary/ Standby Instances	Specification Code for Read Replicas	Specification Code for Single Instances	vCPUs	Memory (GB)
	rds.mysql.n1.xlarge.2.ha	rds.mysql.n1.xlarge.2.rr (Read replicas) rds.mysql.n1.xlarge.2.rha.rr (HA read replicas)	rds.mysql.n1.xlarge.2	4	8
	rds.mysql.n1.xlarge.4.ha	rds.mysql.n1.xlarge.4.rr (Read replicas) rds.mysql.n1.xlarge.4.rha.rr (HA read replicas)	rds.mysql.n1.xlarge.4	4	16
	rds.mysql.n1.2xlarge.2.ha	rds.mysql.n1.2xlarge.2.rr (Read replicas) rds.mysql.n1.2xlarge.2.rha.rr (HA read replicas)	rds.mysql.n1.2xlarge.2	8	16
	rds.mysql.n1.2xlarge.4.ha	rds.mysql.n1.2xlarge.4.rr (Read replicas) rds.mysql.n1.2xlarge.4.rha.rr (HA read replicas)	rds.mysql.n1.2xlarge.4	8	32

Instance Class	Specification Code for Primary/ Standby Instances	Specification Code for Read Replicas	Specification Code for Single Instances	vCPUs	Memory (GB)
Dedicated **NOTE** • The specifications supported for cloud SSDs and extreme SSDs are different. • The 2 vCPUs | 4 GB, 2 vCPUs | 8 GB, 2 vCPUs | 16 GB, 4 vCPUs | 8 GB, 4 vCPUs | 16 GB, and 4 vCPUs | 32 GB specifications are available only in certain regions. • The 32 vCPUs | 256 GB, 96 vCPUs | 192 GB, 96 vCPUs | 384 GB, 96 vCPUs | 768 GB, 128 vCPUs | 256 GB, 128 vCPUs | 512 GB, and 128 vCPUs | 1024 GB specifications are available only in certain regions.	rds.mysql.x1.large.2.ha	rds.mysql.x1.large.2.rr (Read replicas) rds.mysql.x1.large.2.rha.rr (HA read replicas)	rds.mysql.x1.large.2	2	4
	rds.mysql.x1.large.4.ha	rds.mysql.x1.large.4.rr (Read replicas) rds.mysql.x1.large.4.rha.rr (HA read replicas)	rds.mysql.x1.large.4	2	8
	rds.mysql.x1.large.8.ha	rds.mysql.x1.large.8.rr (Read replicas) rds.mysql.x1.large.8.rha.rr (HA read replicas)	rds.mysql.x1.large.8	2	16
	rds.mysql.x1.xlarge.2.ha	rds.mysql.x1.xlarge.2.rr (Read replicas) rds.mysql.x1.xlarge.2.rha.rr (HA read replicas)	rds.mysql.x1.xlarge.2	4	8
	rds.mysql.x1.xlarge.4.ha	rds.mysql.x1.xlarge.4.rr (Read replicas) rds.mysql.x1.xlarge.4.rha.rr (HA read replicas)	rds.mysql.x1.xlarge.4	4	16
	rds.mysql.x1.xlarge.8.ha	rds.mysql.x1.xlarge.8.rr (Read replicas) rds.mysql.x1.xlarge.8.rha.rr (HA read replicas)	rds.mysql.x1.xlarge.8	4	32

Instance Class	Specification Code for Primary/ Standby Instances	Specification Code for Read Replicas	Specification n Code for Single Instances	vCPUs	Memory (GB)
	rds.mysql.x1.2xlarge.2.ha	rds.mysql.x1.2xlarge.2.rr (Read replicas) rds.mysql.x1.2xlarge.2.rha.rr (HA read replicas)	rds.mysql.x1.2xlarge.2	8	16
	rds.mysql.x1.2xlarge.4.ha	rds.mysql.x1.2xlarge.4.rr (Read replicas) rds.mysql.x1.2xlarge.4.rha.rr (HA read replicas)	rds.mysql.x1.2xlarge.4	8	32
	rds.mysql.x1.2xlarge.8.ha	rds.mysql.x1.2xlarge.8.rr (Read replicas) rds.mysql.x1.2xlarge.8.rha.rr (HA read replicas)	rds.mysql.x1.2xlarge.8	8	64
	rds.mysql.x1.4xlarge.2.ha	rds.mysql.x1.4xlarge.2.rr (Read replicas) rds.mysql.x1.4xlarge.2.rha.rr (HA read replicas)	rds.mysql.x1.4xlarge.2	16	32
	rds.mysql.x1.4xlarge.4.ha	rds.mysql.x1.4xlarge.4.rr (Read replicas) rds.mysql.x1.4xlarge.8.rha.rr (HA read replicas)	rds.mysql.x1.4xlarge.4	16	64

Instance Class	Specification Code for Primary/ Standby Instances	Specification Code for Read Replicas	Specification Code for Single Instances	vCPUs	Memory (GB)
	rds.mysql.x1.4xlarge.8.ha	rds.mysql.x1.4xlarge.8.rr (Read replicas) rds.mysql.x1.4xlarge.8.rha.rr (HA read replicas)	rds.mysql.x1.4xlarge.8	16	128
	rds.mysql.x1.8xlarge.2.ha	rds.mysql.x1.8xlarge.2.rr (Read replicas) rds.mysql.x1.8xlarge.2.rha.rr (HA read replicas)	rds.mysql.x1.8xlarge.2	32	64
	rds.mysql.x1.8xlarge.4.ha	rds.mysql.x1.8xlarge.4.rr (Read replicas) rds.mysql.x1.8xlarge.4.rha.rr (HA read replicas)	rds.mysql.x1.8xlarge.4	32	128
	rds.mysql.x1.8xlarge.8.ha	rds.mysql.x1.8xlarge.8.rr (Read replicas) rds.mysql.x1.8xlarge.8.rha.rr (HA read replicas)	rds.mysql.x1.8xlarge.8	32	256
	rds.mysql.x1.16xlarge.2.ha	rds.mysql.x1.16xlarge.2.rr (Read replicas) rds.mysql.x1.16xlarge.2.rha.rr (HA read replicas)	rds.mysql.x1.16xlarge.2	64	128

Instance Class	Specification Code for Primary/ Standby Instances	Specification Code for Read Replicas	Specification Code for Single Instances	vCPUs	Memory (GB)
	rds.mysql.x1.16xlarge.4.ha	rds.mysql.x1.16xlarge.4.rr (Read replicas) rds.mysql.x1.16xlarge.4.rha.rr (HA read replicas)	rds.mysql.x1.16xlarge.4	64	256
	rds.mysql.x1.16xlarge.8.ha	rds.mysql.x1.16xlarge.8.rr (Read replicas) rds.mysql.x1.16xlarge.8.rha.rr (HA read replicas)	rds.mysql.x1.16xlarge.8	64	512
	rds.mysql.x1.24xlarge.2.ha	rds.mysql.x1.24xlarge.2.rr (Read replicas) rds.mysql.x1.24xlarge.2.rha.rr (HA read replicas)	rds.mysql.x1.24xlarge.2	96	192
	rds.mysql.x1.24xlarge.4.ha	rds.mysql.x1.24xlarge.4.rr (Read replicas) rds.mysql.x1.24xlarge.4.rha.rr (HA read replicas)	rds.mysql.x1.24xlarge.4	96	384
	rds.mysql.x1.24xlarge.8.ha	rds.mysql.x1.24xlarge.8.rr (Read replicas) rds.mysql.x1.24xlarge.8.rha.rr (HA read replicas)	rds.mysql.x1.24xlarge.8	96	768

Instance Class	Specification Code for Primary/ Standby Instances	Specification Code for Read Replicas	Specification n Code for Single Instances	vCPUs	Memory (GB)
	rds.mysql.x1.32xlarge.2.ha	rds.mysql.x1.32xlarge.2.rr (Read replicas) rds.mysql.x1.32xlarge.2.rha.rr (HA read replicas)	rds.mysql.x1.32xlarge.2	128	256
	rds.mysql.x1.32xlarge.4.ha	rds.mysql.x1.32xlarge.4.rr (Read replicas) rds.mysql.x1.32xlarge.4.rha.rr (HA read replicas)	rds.mysql.x1.32xlarge.4	128	512
	rds.mysql.x1.32xlarge.8.ha	rds.mysql.x1.32xlarge.8.rr (Read replicas) rds.mysql.x1.32xlarge.8.rha.rr (HA read replicas)	rds.mysql.x1.32xlarge.8	128	1024

Table 7-4 Instance classes for ultra-high I/O (installed base operations)

Instance Class	vCPUs	Memory (GB)
General-enhanced	1	2
	1	4
	1	8
	2	4
	2	8
	2	16
	4	8
	4	16
	4	32
	8	16

Instance Class	vCPUs	Memory (GB)
	8	32
	8	64
	16	32
	16	64
	16	128
	32	64
	32	128
	32	256
	60	128
	60	256
	60	512
General-enhanced II	2	4
	2	8
	2	16
	4	8
	4	16
	4	32
	8	16
	8	32
	8	64
	16	32
	16	64
	16	128
	32	64
	32	128
	64	128
	64	256
	64	512

The DB instance specifications vary according to site requirements.

7.2 RDS for MariaDB Instance Classes

To learn about the DB engine versions supported by RDS for MariaDB, see **DB Engines and Versions**.

Table 1 lists the instance classes based on the x86 CPU architecture available to RDS for MariaDB instances using cloud SSDs.

Table 7-5 Instance classes

Instance Class	Description	Scenario	Constraints
General-purpose (recommended)	CPU resources are shared with other general-purpose DB instances on the same physical machine. CPU usage is maximized through resource overcommitment. This instance class is a cost-effective option and suitable for scenarios where performance stability is not critical.	Suitable for scenarios that have high requirements on cost-effectiveness.	**Table 2** lists the regions where this instance class is available.
Dedicated (recommended)	The instance has dedicated CPU and memory resources to ensure stable performance. The performance of a dedicated instance is never affected by other instances on the same physical machine. This instance class is good when performance stability is important.	Suitable for core database scenarios such as e-commerce, gaming, finance, government, and enterprise applications.	**Table 2** lists the regions where this instance class is available.

Table 7-6 Regions where general-purpose and dedicated instance classes are available

Instance Class	Region
General-purpose and dedicated	CN North-Beijing4 and CN North-Ulanqab1
	CN East-Shanghai1

Instance Class	Region
	CN South-Guangzhou and CN South-Guangzhou-InvitationOnly
	CN Southwest-Guiyang1
	AP-Bangkok and AP-Singapore
	CN-Hong Kong
	LA-Sao Paulo1, LA-Santiago, LA-Mexico City1, and LA-Mexico City2
	AF-Johannesburg

Table 7-7 Detailed specifications of general-purpose and dedicated instance classes

Instance Class	Specification Code for Primary/ Standby Instances	Specification Code for Read Replicas	Specification Code for Single Instances	vCPUs	Memory (GB)
General-purpose	rds.mariadb.n1.large.2.ha	rds.mariadb.n1.large.2.rr	rds.mariadb.n1.large.2	2	4
	rds.mariadb.n1.large.4.ha	rds.mariadb.n1.large.4.rr	rds.mariadb.n1.large.4	2	8
	rds.mariadb.n1.xlarge.2.ha	rds.mariadb.n1.xlarge.2.rr	rds.mariadb.n1.xlarge.2	4	8
	rds.mariadb.n1.xlarge.4.ha	rds.mariadb.n1.xlarge.4.rr	rds.mariadb.n1.xlarge.4	4	16
	rds.mariadb.n1.2xlarge.2.ha	rds.mariadb.n1.2xlarge.2.rr	rds.mariadb.n1.2xlarge.2	8	16
	rds.mariadb.n1.2xlarge.4.ha	rds.mariadb.n1.2xlarge.4.rr	rds.mariadb.n1.2xlarge.4	8	32

Instance Class	Specification Code for Primary/ Standby Instances	Specification Code for Read Replicas	Specification Code for Single Instances	vCPUs	Memory (GB)
Dedicated **NOTE** • To use the dedicated instance class (vCPU:Memory=1:2) supported for cloud SSDs, you need to contact customer service to apply for the required permission. • The DB instance specifications vary according to site requirements.	rds.mariadb.x1.large.2.ha	rds.mariadb.x1.large.2.rr	rds.mariadb.x1.large.2	2	4
	rds.mariadb.x1.large.4.ha	rds.mariadb.x1.large.4.rr	rds.mariadb.x1.large.4	2	8
	rds.mariadb.x1.large.8.ha	rds.mariadb.x1.large.8.rr	rds.mariadb.x1.large.8	2	16
	rds.mariadb.x1.xlarge.2.ha	rds.mariadb.x1.xlarge.2.rr	rds.mariadb.x1.xlarge.2	4	8
	rds.mariadb.x1.xlarge.4.ha	rds.mariadb.x1.xlarge.4.rr	rds.mariadb.x1.xlarge.4	4	16
	rds.mariadb.x1.xlarge.8.ha	rds.mariadb.x1.xlarge.8.rr	rds.mariadb.x1.xlarge.8	4	32
	rds.mariadb.x1.2xlarge.2.ha	rds.mariadb.x1.2xlarge.2.rr	rds.mariadb.x1.2xlarge.2	8	16
	rds.mariadb.x1.2xlarge.4.ha	rds.mariadb.x1.2xlarge.4.rr	rds.mariadb.x1.2xlarge.4	8	32
	rds.mariadb.x1.2xlarge.8.ha	rds.mariadb.x1.2xlarge.8.rr	rds.mariadb.x1.2xlarge.8	8	64
	rds.mariadb.x1.4xlarge.2.ha	rds.mariadb.x1.4xlarge.2.rr	rds.mariadb.x1.4xlarge.2	16	32
	rds.mariadb.x1.4xlarge.4.ha	rds.mariadb.x1.4xlarge.4.rr	rds.mariadb.x1.4xlarge.4	16	64
	rds.mariadb.x1.4xlarge.8.ha	rds.mariadb.x1.4xlarge.8.rr	rds.mariadb.x1.4xlarge.8	16	128
	rds.mariadb.x1.8xlarge.2.ha	rds.mariadb.x1.8xlarge.2.rr	rds.mariadb.x1.8xlarge.2	32	64
	rds.mysql.x1.8xlarge.4.ha	rds.mariadb.x1.8xlarge.4.rr	rds.mariadb.x1.8xlarge.4	32	128
	rds.mariadb.x1.8xlarge.8.ha	rds.mariadb.x1.8xlarge.8.rr	rds.mariadb.x1.8xlarge.8	32	256
	rds.mariadb.x1.16xlarge.2.ha	rds.mariadb.x1.16xlarge.2.rr	rds.mariadb.x1.16xlarge.2	64	128
	rds.mariadb.x1.16xlarge.4.ha	rds.mariadb.x1.16xlarge.4.rr	rds.mariadb.x1.16xlarge.4	64	256

Instance Class	Specification Code for Primary/ Standby Instances	Specification Code for Read Replicas	Specification Code for Single Instances	vCPUs	Memory (GB)
	rds.mariadb.x1.16xlarge.8.ha	rds.mariadb.x1.16xlarge.8.rr	rds.mariadb.x1.16xlarge.8	64	512

7.3 RDS for PostgreSQL Instance Classes

To learn about the DB engine versions supported by RDS for PostgreSQL, see **DB Engines and Versions**.

Table 7-8 lists the instance classes based on the x86 CPU architecture available to RDS for PostgreSQL. For detailed specifications of each instance class, see **Table 7-10** and **Table 7-11**.

- x86: general-purpose (recommended), dedicated (recommended), general-enhanced (installed base operations), and general-enhanced II (installed base operations)

Table 7-8 Instance classes

Instance Class	Description	Scenario	Constraints
General-purpose (recommended)	CPU resources are shared with other general-purpose DB instances on the same physical machine. CPU usage is maximized through resource overcommitment. This instance class is a cost-effective option and suitable for scenarios where performance stability is not critical.	Suitable for scenarios that have high requirements on cost-effectiveness.	**Table 7-9** lists the regions where this instance class is available.

Instance Class	Description	Scenario	Constraints
Dedicated (recommended)	The instance has dedicated CPU and memory resources to ensure stable performance. The performance of a dedicated instance is never affected by other instances on the same physical machine. This instance class is good when performance stability is important.	Suitable for core database scenarios such as e-commerce, gaming, finance, government, and enterprise applications.	Table 7-9 lists the regions where this instance class is available.
General-enhanced and general-enhanced II	With a leading network acceleration engine and Data Plane Development Kit (DPDK) fast packet processing, this instance class provides higher network performance and computing power.	Suitable for websites and web applications that require high database computing and network performance.	These two instance classes are for installed base operations.

Table 7-9 Regions where general-purpose and dedicated instance classes are available

Instance Class	Region
General-purpose and dedicated	CN North-Beijing4 and CN North-Ulanqab1
	CN East-Shanghai1
	CN South-Guangzhou and CN South-Guangzhou-InvitationOnly
	CN Southwest-Guiyang1
	AP-Bangkok and AP-Singapore
	CN-Hong Kong
	LA-Sao Paulo1, LA-Santiago, LA-Mexico City1, and LA-Mexico City2
	AF-Johannesburg

Table 7-10 Detailed specifications of general-purpose and dedicated instance classes

Instance Class	Specification Code for Primary/ Standby Instances	Specification Code for Read Replicas	Specification Code for Single Instances	vCPUs	Memory (GB)
General-purpose	rds.pg.n1.medium.2.ha	rds.pg.n1.medium.2.rr	rds.pg.n1.medium.2	1	2
	rds.pg.n1.large.2.ha	rds.pg.n1.large.2.rr	rds.pg.n1.large.2	2	4
	rds.pg.n1.large.4.ha	rds.pg.n1.large.4.rr	rds.pg.n1.large.4	2	8
	rds.pg.n1.xlarge.2.ha	rds.pg.n1.xlarge.2.rr	rds.pg.n1.xlarge.2	4	8
	rds.pg.n1.xlarge.4.ha	rds.pg.n1.xlarge.4.rr	rds.pg.n1.xlarge.4	4	16
	rds.pg.n1.2xlarge.2.ha	rds.pg.n1.2xlarge.2.rr	rds.pg.n1.2xlarge.2	8	16
	rds.pg.n1.2xlarge.4.ha	rds.pg.n1.2xlarge.4.rr	rds.pg.n1.2xlarge.4	8	32
Dedicated **NOTE** The specifications supported for cloud SSDs and extreme SSDs are different.	rds.pg.x1.large.2.ha	rds.pg.x1.large.2.rr	-	2	4
	rds.pg.x1.large.4.ha	rds.pg.x1.large.4.rr	-	2	8
	rds.pg.x1.large.8.ha	rds.pg.x1.large.8.rr	-	2	16
	rds.pg.x1.xlarge.2.ha	rds.pg.x1.xlarge.2.rr	-	4	8
	rds.pg.x1.xlarge.4.ha	rds.pg.x1.xlarge.4.rr	-	4	16
	rds.pg.x1.xlarge.8.ha	rds.pg.x1.xlarge.8.rr	-	4	32
	rds.pg.x1.2xlarge.2.ha	rds.pg.x1.2xlarge.2.rr	-	8	16
	rds.pg.x1.2xlarge.4.ha	rds.pg.x1.2xlarge.4.rr	-	8	32
	rds.pg.x1.2xlarge.8.ha	rds.pg.x1.2xlarge.8.rr	-	8	64

Instance Class	Specification Code for Primary/ Standby Instances	Specification Code for Read Replicas	Specification Code for Single Instances	vCPUs	Memory (GB)
	rds.pg.x1.4xlarge.2.ha	rds.pg.x1.4xlarge.2.rr	-	16	32
	rds.pg.x1.4xlarge.4.ha	rds.pg.x1.4xlarge.4.rr	-	16	64
	rds.pg.x1.4xlarge.8.ha	rds.pg.x1.4xlarge.8.rr	-	16	128
	rds.pg.x1.8xlarge.2.ha	rds.pg.x1.8xlarge.2.rr	-	32	64
	rds.pg.x1.8xlarge.4.ha	rds.pg.x1.8xlarge.4.rr	-	32	128
	rds.pg.x1.16xlarge.2.ha	rds.pg.x1.16xlarge.2.rr	-	64	128
	rds.pg.x1.16xlarge.4.ha	rds.pg.x1.16xlarge.4.rr	-	64	256
	rds.pg.x1.16xlarge.8.ha	rds.pg.x1.16xlarge.8.rr	-	64	512

Table 7-11 Detailed specifications of general-enhanced and general-enhanced II instance classes

Instance Class	vCPUs	Memory (GB)
General-enhanced	1	2
	1	4
	2	4
	2	8
	2	16
	4	8
	4	16
	4	32
	8	32
	8	64
	16	64

Instance Class	vCPUs	Memory (GB)
	32	128
	60	128
	60	256
General-enhanced II	2	4
	2	8
	2	16
	4	8
	4	16
	4	32
	8	16
	8	32
	8	64
	16	32
	16	64
	16	128
	32	64
	32	128
	64	128
	64	256
	64	512

The DB instance specifications vary according to site requirements.

7.4 RDS for SQL Server Instance Classes

To learn about the DB engine versions supported by RDS for SQL Server, see **DB Engines and Versions**.

Table 7-12 lists the instance classes based on the x86 CPU architecture available to RDS for SQL Server. For detailed specifications of each instance class, see **Table 7-13**.

Table 7-12 Instance classes

Instance Class	Description	Scenario
General-purpose	CPU resources are shared with other general-purpose DB instances on the same physical machine. CPU usage is maximized through resource overcommitment. This instance class is a cost-effective option and suitable for scenarios where performance stability is not critical.	Suitable for scenarios that have high requirements on cost-effectiveness.
Dedicated	The instance has dedicated CPU and memory resources to ensure stable performance. The performance of a dedicated instance is never affected by other instances on the same physical machine. This instance class is good when performance stability is important.	Suitable for core database scenarios such as e-commerce, gaming, finance, government, and enterprise applications.
General-purpose (Extended-use)	CPU resources are shared with other general-purpose DB instances on the same physical machine. CPU usage is maximized through resource overcommitment. This instance class is a cost-effective option and suitable for scenarios where performance stability is not critical.	To purchase this instance class, contact customer service. Less expensive than general-purpose instances For details, see **Product Price Details**.
Dedicated (Extended-use)	The instance has dedicated CPU and memory resources to ensure stable performance. The performance of a dedicated instance is never affected by other instances on the same physical machine. This instance class is good when performance stability is important.	To purchase this instance class, contact customer service. Less expensive than dedicated instances For details, see **Product Pricing Details**.

Table 7-13 Detailed specifications of general-purpose, dedicated, general-purpose (extended-use), and dedicated (extended-use) instance classes

Instance Class	Specification Code for Cluster Instances	Specification Code for Single Instances	Specification Code for Primary/ Standby Instances	Specification Code for Read Replicas	vCPUs	Memory (GB) [a]
General-purpose	-	rds.mssql.spec.n1.web.large.2	-	-	2	4
	-	rds.mssql.spec.n1.web.large.4	-	-	2	8
	-	rds.mssql.spec.n1.web.xlarge.2	-	-	4	8
	-	rds.mssql.spec.n1.web.xlarge.4	-	-	4	16
	-	rds.mssql.spec.n1.web.2xlarge.2	-	-	8	16
	-	rds.mssql.spec.n1.web.2xlarge.4	-	-	8	32
	-	rds.mssql.spec.n1.se.large.2	rds.mssql.spec.n1.se.large.2.ha	-	2	4
	-	rds.mssql.spec.n1.se.xlarge.2	rds.mssql.spec.n1.se.xlarge.2.ha	-	4	8
	-	rds.mssql.spec.n1.se.2xlarge.2	rds.mssql.spec.n1.se.2xlarge.2.ha	-	8	16
	-	rds.mssql.spec.n1.se.4xlarge.2	rds.mssql.spec.n1.se.4xlarge.2.ha	-	16	32
	rds.mssql.spec.n1.ee.large.2.ha	rds.mssql.spec.n1.ee.large.2	-	rds.mssql.spec.n1.ee.large.2.rr	2	4
	rds.mssql.spec.n1.ee.xlarge.2.ha	rds.mssql.spec.n1.ee.xlarge.2	-	rds.mssql.spec.n1.ee.xlarge.2.rr	4	8

Instance Class	Specification Code for Cluster Instances	Specification Code for Single Instances	Specification Code for Primary/ Standby Instances	Specification Code for Read Replicas	vCPUs	Memory (GB) [a]
	rds.mssql.spec.n1.ee.2xlarge.2.ha	rds.mssql.spec.n1.ee.2xlarge.2	-	rds.mssql.spec.n1.ee.2xlarge.2.rr	8	16
	rds.mssql.spec.n1.ee.4xlarge.2.ha	rds.mssql.spec.n1.ee.4xlarge.2	-	rds.mssql.spec.n1.ee.4xlarge.2.rr	16	32
Dedicated **NOTE** The specifications vary depending on the DB engine version.	-	rds.mssql.spec.x1.web.large.4	-	-	2	8
	-	rds.mssql.spec.x1.web.large.8	-	-	2	16
	-	rds.mssql.spec.x1.web.xlarge.4	-	-	4	16
	-	rds.mssql.spec.x1.web.xlarge.8	-	-	4	32
	-	rds.mssql.spec.x1.web.2xlarge.4	-	-	8	32
	-	rds.mssql.spec.x1.web.2xlarge.8	-	-	8	64
	-	rds.mssql.spec.x1.web.4xlarge.4	-	-	16	64
	-	rds.mssql.spec.x1.se.large.4	rds.mssql.spec.x1.se.large.4.ha	-	2	8
	-	rds.mssql.spec.x1.se.large.8	rds.mssql.spec.x1.se.large.8.ha	-	2	16
	-	rds.mssql.spec.x1.se.xlarge.2	rds.mssql.spec.x1.se.xlarge.2.ha	-	4	8

Instance Class	Specification Code for Cluster Instances	Specification Code for Single Instances	Specification Code for Primary/ Standby Instances	Specification Code for Read Replicas	vCPUs	Memory (GB) [a]
	-	rds.mssql.spec.x1.se.xlarge.4	rds.mssql.spec.x1.se.xlarge.4.ha	-	4	16
	-	rds.mssql.spec.x1.se.xlarge.8	rds.mssql.spec.x1.se.xlarge.8.ha	-	4	32
	-	rds.mssql.spec.x1.se.2xlarge.4	rds.mssql.spec.x1.se.2xlarge.4.ha	-	8	32
	-	rds.mssql.spec.x1.se.2xlarge.8	rds.mssql.spec.x1.se.2xlarge.8.ha	-	8	64
	-	rds.mssql.spec.x1.se.4xlarge.4	rds.mssql.spec.x1.se.4xlarge.4.ha	-	16	64
	-	rds.mssql.spec.x1.se.4xlarge.8	rds.mssql.spec.x1.se.4xlarge.8.ha	-	16	128
	-	-	rds.mssql.spec.x1.se.6xlarge.4.ha	-	24	96
	rds.mssql.spec.x1.ee.large.4.ha	rds.mssql.spec.x1.ee.large.4	rds.mssql.spec.x1.ee.large.4.ha	rds.mssql.spec.x1.ee.large.4.rr	2	8
	rds.mssql.spec.x1.ee.large.8.ha	rds.mssql.spec.x1.ee.large.8	rds.mssql.spec.x1.ee.large.8.ha	rds.mssql.spec.x1.ee.large.8.rr	2	16
	rds.mssql.spec.x1.ee.xlarge.2.ha	rds.mssql.spec.x1.ee.xlarge.2	rds.mssql.spec.x1.ee.xlarge.2.ha	rds.mssql.spec.x1.ee.xlarge.2.rr	4	8
	rds.mssql.spec.x1.ee.xlarge.4.ha	rds.mssql.spec.x1.ee.xlarge.4	rds.mssql.spec.x1.ee.xlarge.4.ha	rds.mssql.spec.x1.ee.xlarge.4.rr	4	16
	rds.mssql.spec.x1.ee.xlarge.8.ha	rds.mssql.spec.x1.ee.xlarge.8	rds.mssql.spec.x1.ee.xlarge.8.ha	rds.mssql.spec.x1.ee.xlarge.8.rr	4	32

Instance Class	Specification Code for Cluster Instances	Specification Code for Single Instances	Specification Code for Primary/ Standby Instances	Specification Code for Read Replicas	vCPUs	Memory (GB) [a]
	rds.mssql.spec.x1.ee.2xlarge.4.ha	rds.mssql.spec.x1.ee.2xlarge.4	rds.mssql.spec.x1.ee.2xlarge.4.ha	rds.mssql.spec.x1.ee.2xlarge.4.rr	8	32
	rds.mssql.spec.x1.ee.2xlarge.8.ha	rds.mssql.spec.x1.ee.2xlarge.8	rds.mssql.spec.x1.ee.2xlarge.8.ha	rds.mssql.spec.x1.ee.2xlarge.8.rr	8	64
	rds.mssql.spec.x1.ee.4xlarge.4.ha	rds.mssql.spec.x1.ee.4xlarge.4	rds.mssql.spec.x1.ee.4xlarge.4.ha	rds.mssql.spec.x1.ee.4xlarge.4.rr	16	64
	rds.mssql.spec.x1.ee.4xlarge.8.ha	rds.mssql.spec.x1.ee.4xlarge.8	rds.mssql.spec.x1.ee.4xlarge.8.ha	rds.mssql.spec.x1.ee.4xlarge.8.rr	16	128
	-	-	rds.mssql.spec.x1.ee.6xlarge.4.ha	-	24	96
	rds.mssql.spec.x1.ee.6xlarge.8.ha	rds.mssql.spec.x1.ee.6xlarge.8	rds.mssql.spec.x1.ee.6xlarge.8.ha	rds.mssql.spec.x1.ee.6xlarge.8.rr	24	192
	rds.mssql.spec.x1.ee.8xlarge.4.ha	rds.mssql.spec.x1.ee.8xlarge.4	rds.mssql.spec.x1.ee.8xlarge.4.ha	rds.mssql.spec.x1.ee.8xlarge.4.rr	32	128
	rds.mssql.spec.x1.ee.8xlarge.8.ha	rds.mssql.spec.x1.ee.8xlarge.8	rds.mssql.spec.x1.ee.8xlarge.8.ha	rds.mssql.spec.x1.ee.8xlarge.8.rr	32	256
	rds.mssql.spec.x1.ee.16xlarge.4.ha	rds.mssql.spec.x1.ee.16xlarge.4	rds.mssql.spec.x1.ee.16xlarge.4.ha	rds.mssql.spec.x1.ee.16xlarge.4.rr	64	256
	-	rds.mssql.spec.x1.ee.16xlarge.8	rds.mssql.spec.x1.ee.16xlarge.8.ha	-	64	512

Instance Class	Specification Code for Cluster Instances	Specification Code for Single Instances	Specification Code for Primary/ Standby Instances	Specification Code for Read Replicas	vCPUs	Memory (GB) [a]
General-purpose (Extended-use) **NOTE** To purchase this instance class, contact customer service.	-	rds.mssql.spec.n1-ext.se.large.2	rds.mssql.spec.n1-ext.se.large.2.ha	-	2	4
	-	rds.mssql.spec.n1-ext.se.xlarge.2	rds.mssql.spec.n1-ext.se.xlarge.2.ha	-	4	8
	-	rds.mssql.spec.n1-ext.se.2xlarge.2	rds.mssql.spec.n1-ext.se.2xlarge.2.ha	-	8	16
	-	rds.mssql.spec.n1-ext.se.4xlarge.2	rds.mssql.spec.n1-ext.se.4xlarge.2.ha	-	16	32
	rds.mssql.spec.n1-ext.ee.large.2.ha	rds.mssql.spec.n1-ext.ee.large.2	-	rds.mssql.spec.n1-ext.ee.large.2.rr	2	4
	rds.mssql.spec.n1-ext.ee.xlarge.2.ha	rds.mssql.spec.n1-ext.ee.xlarge.2	-	rds.mssql.spec.n1-ext.ee.xlarge.2.rr	4	8
	rds.mssql.spec.n1-ext.ee.2xlarge.2.ha	rds.mssql.spec.n1-ext.ee.2xlarge.2	-	rds.mssql.spec.n1-ext.ee.2xlarge.2.rr	8	16
	rds.mssql.spec.n1-ext.ee.4xlarge.2.ha	rds.mssql.spec.n1-ext.ee.4xlarge.2	-	rds.mssql.spec.n1-ext.ee.4xlarge.2.rr	16	32

Instance Class	Specification Code for Cluster Instances	Specification Code for Single Instances	Specification Code for Primary/ Standby Instances	Specification Code for Read Replicas	vCPUs	Memory (GB) [a]
Dedicated (Extended-use) **NOTE** To purchase this instance class, contact customer service.	-	rds.mssql.spec.x1-ext.se.large.4	rds.mssql.spec.x1-ext.se.large.4.ha	-	2	8
	-	rds.mssql.spec.x1-ext.se.large.8	rds.mssql.spec.x1-ext.se.large.8.ha	-	2	16
	-	rds.mssql.spec.x1-ext.se.xlarge.4	rds.mssql.spec.x1-ext.se.xlarge.4.ha	-	4	16
	-	rds.mssql.spec.x1-ext.se.xlarge.8	rds.mssql.spec.x1-ext.se.xlarge.8.ha	-	4	32
	-	rds.mssql.spec.x1-ext.se.2xlarge.4	rds.mssql.spec.x1-ext.se.2xlarge.4.ha	-	8	32
	-	rds.mssql.spec.x1-ext.se.2xlarge.8	rds.mssql.spec.x1-ext.se.2xlarge.8.ha	-	8	64
	-	rds.mssql.spec.x1-ext.se.4xlarge.4	rds.mssql.spec.x1-ext.se.4xlarge.4.ha	-	16	64
	-	rds.mssql.spec.x1-ext.se.4xlarge.8	rds.mssql.spec.x1-ext.se.4xlarge.8.ha	-	16	128
	-	rds.mssql.spec.x1-ext.se.6xlarge.4.ha	-	-	24	96
	rds.mssql.spec.x1-ext.ee.large.4.ha	rds.mssql.spec.x1-ext.ee.large.4	rds.mssql.spec.x1-ext.ee.large.4.ha	rds.mssql.spec.x1-ext.ee.large.4.rr	2	8

Instance Class	Specification Code for Cluster Instances	Specification Code for Single Instances	Specification Code for Primary/ Standby Instances	Specification Code for Read Replicas	vCPUs	Memory (GB) [a]
	rds.mssql.spec.x1-ext.ee.large.8.ha	rds.mssql.spec.x1-ext.ee.large.8	rds.mssql.spec.x1-ext.ee.large.8.ha	rds.mssql.spec.x1-ext.ee.large.8.rr	2	16
	-	-	rds.mssql.spec.x1-ext.ee.xlarge.2.ha	-	4	8
	rds.mssql.spec.x1-ext.ee.xlarge.4.ha	rds.mssql.spec.x1-ext.ee.xlarge.4	rds.mssql.spec.x1-ext.ee.xlarge.4.ha	rds.mssql.spec.x1-ext.ee.xlarge.4.rr	4	16
	rds.mssql.spec.x1-ext.ee.xlarge.8.ha	rds.mssql.spec.x1-ext.ee.xlarge.8	rds.mssql.spec.x1-ext.ee.xlarge.8.ha	rds.mssql.spec.x1-ext.ee.xlarge.8.rr	4	32
	rds.mssql.spec.x1-ext.ee.2xlarge.4.ha	rds.mssql.spec.x1-ext.ee.2xlarge.4	rds.mssql.spec.x1-ext.ee.2xlarge.4.ha	rds.mssql.spec.x1-ext.ee.2xlarge.4.rr	8	32
	rds.mssql.spec.x1-ext.ee.2xlarge.8.ha	rds.mssql.spec.x1-ext.ee.2xlarge.8	rds.mssql.spec.x1-ext.ee.2xlarge.8.ha	rds.mssql.spec.x1-ext.ee.2xlarge.8.rr	8	64
	rds.mssql.spec.x1-ext.ee.4xlarge.4.ha	rds.mssql.spec.x1-ext.ee.4xlarge.4	rds.mssql.spec.x1-ext.ee.4xlarge.4.ha	rds.mssql.spec.x1-ext.ee.4xlarge.4.rr	16	64
	rds.mssql.spec.x1-ext.ee.4xlarge.8.ha	rds.mssql.spec.x1-ext.ee.4xlarge.8	rds.mssql.spec.x1-ext.ee.4xlarge.8.ha	rds.mssql.spec.x1-ext.ee.4xlarge.8.rr	16	128
	-	rds.mssql.spec.x1-ext.ee.6xlarge.8	rds.mssql.spec.x1-ext.ee.6xlarge.8.ha	-	24	192
	rds.mssql.spec.x1-ext.ee.8xlarge.4.ha	rds.mssql.spec.x1-ext.ee.8xlarge.4	rds.mssql.spec.x1-ext.ee.8xlarge.4.ha	rds.mssql.spec.x1-ext.ee.8xlarge.4.rr	32	128

Instance Class	Specification Code for Cluster Instances	Specification Code for Single Instances	Specification Code for Primary/ Standby Instances	Specification Code for Read Replicas	vCPUs	Memory (GB) [a]
	rds.mssql.spec.x1-ext.ee.8xlarge.8.ha	rds.mssql.spec.x1-ext.ee.8xlarge.8	rds.mssql.spec.x1-ext.ee.8xlarge.8.ha	rds.mssql.spec.x1-ext.ee.8xlarge.8.rr	32	256
	rds.mssql.spec.x1-ext.ee.16xlarge.4.ha	rds.mssql.spec.x1-ext.ee.16xlarge.4	rds.mssql.spec.x1-ext.ee.16xlarge.4.ha	rds.mssql.spec.x1-ext.ee.16xlarge.4.rr	64	256
	rds.mssql.spec.x1-ext.ee.16xlarge.8.ha	rds.mssql.spec.x1-ext.ee.16xlarge.8	rds.mssql.spec.x1-ext.ee.16xlarge.8.ha	rds.mssql.spec.x1-ext.ee.16xlarge.8.rr	64	512
	-	-	rds.mssql.spec.x1-ext.ee.26xlarge.14.ha	-	104	1466
	-	-	rds.mssql.spec.x1-ext.ee.52xlarge.14.ha	-	208	2932

NOTE

a: The memory defined by an RDS for SQL Server instance class includes the memory occupied by instance management, database workloads, and the underlying OS (including the memory reserved for BIOS, kernel memory, and hypervisor memory). Therefore, the available memory of a DB instance is less than the memory defined in the instance class. RDS for SQL Server instances using cloud SSDs are built on ECSs. The ECS specifications used by each DB instance may be different, so the performance of each DB instance varies.

The DB instance specifications vary according to site requirements.

8 Security

8.1 Shared Responsibilities

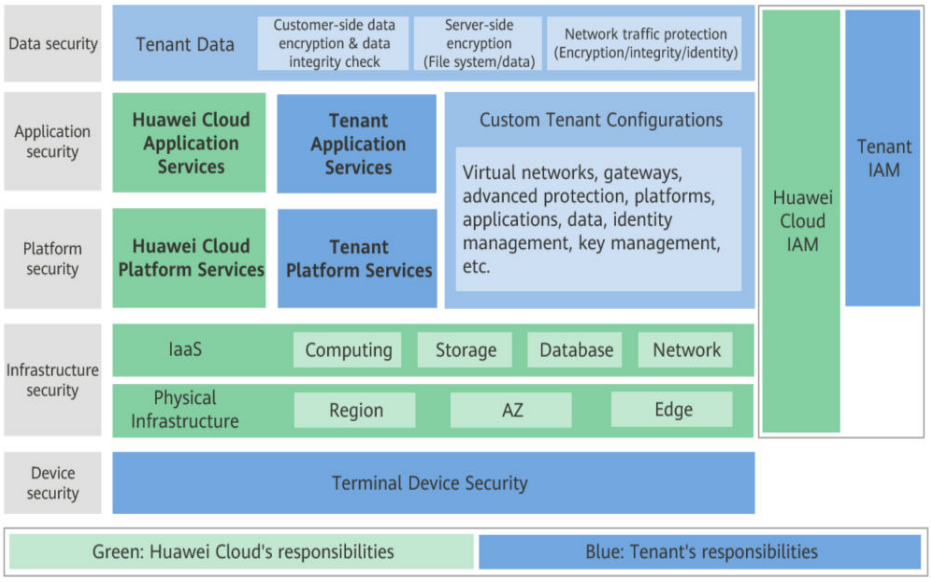
Huawei guarantees that its commitment to cyber security will never be outweighed by consideration of commercial interests. To address emerging cloud security challenges and pervasive cloud security threats and attacks, Huawei Cloud has built a comprehensive cloud service security assurance system for different regions and industries. This system is based on Huawei's unique software and hardware advantages, and on relevant laws, regulations, industry standards, and on the security ecosystem as a whole.

The shared responsibility model for Huawei Cloud and the tenants who use Huawei Cloud services is illustrated in **Figure 8-1**. Responsibilities are as follows:

- **Huawei Cloud**: Ensure the security of cloud services and provide secure clouds. Huawei Cloud's security responsibilities include ensuring the security of our IaaS, PaaS, and SaaS services, as well as the physical environments of the Huawei Cloud data centers where our IaaS, PaaS, and SaaS services operate. Huawei Cloud is responsible for not only the security functions and performance of our infrastructure, cloud services, and technologies, but also for the overall cloud O&M security and, in more widely speaking, the security compliance of our infrastructure and services.
- **Tenant**: Use the cloud securely. Tenants of Huawei Cloud are responsible for the secure and effective management of the tenant-customized configurations of cloud services including IaaS, PaaS, and SaaS. This includes but is not limited to virtual networks, the OSs of virtual machine hosts and guests, virtual firewalls, API Gateway, advanced security services, all types of cloud services, tenant data, identity accounts, and key management.

Huawei Cloud Security White Paper elaborates on the ideas behind and measures used to ensure Huawei Cloud security, including cloud security strategies, the shared responsibility model, compliance and privacy, security organizations and personnel, infrastructure security, tenant service and security, engineering security, O&M security, and ecosystem security.

Figure 8-1 Huawei Cloud shared security responsibility model



8.2 Identity Authentication and Access Control

Identity Authentication

When you access RDS, the system authenticates your identity using a password or IAM.

- **Password verification**

  To manage your instance, you need to use Data Admin Service (DAS) to log in to your instance. The login is successful only after your account and password are verified.

- **IAM verification**

  You can use **Identity and Access Management (IAM)** to provide fine-grained control over RDS permissions. IAM provides identity authentication, permissions management, and access control, helping you efficiently manage access to your Huawei Cloud resources. IAM users can use RDS resources only after their accounts and passwords are verified. For details, see **Step 2: Create IAM Users and Log In**.

Access Control

- **Permissions control**

  If you need to assign different permissions to different employees in your enterprise to access your instance resources, IAM is a good choice. For details, see **Permissions**.

- **VPCs and subnets**

  A VPC is a logically isolated, configurable, and manageable virtual network. It helps improve the security of cloud resources and simplifies network deployment. You can define security groups, virtual private networks (VPNs), IP address segments, and bandwidth for a VPC. This facilitates internal

network configuration and management and allows you to change your network in a secure and convenient manner.

A subnet provides dedicated network resources that are logically isolated from other networks for security.

For details, see **Creating a VPC**.

- **Security groups**

  A security group is a logical group that provides access control policies for the ECSs and RDS instances that have the same security protection requirements and are mutually trusted within a VPC. To ensure database security and reliability, you need to configure security group rules to allow only specific IP addresses and ports to access your RDS instances.

  For details, see **Configuring a Security Group Rule**.

8.3 Data Protection

RDS provides a series of methods and features to ensure data security and reliability.

Table 8-1 Methods for data security

Method	Description	Reference
Secure Sockets Layer (SSL)	RDS for MySQL and RDS for MariaDB instances support both non-SSL and SSL connections. SSL is recommended for enhanced security. RDS for PostgreSQL and RDS for SQL Server instances support only SSL connections to ensure data transmission security.	• RDS for MySQL: **Configuring an SSL Connection** • RDS for MariaDB: **Connecting to a DB Instance Through a Private Network** • RDS for PostgreSQL: **Using psql CLI to Connect to an Instance Through a Private Network** • RDS for SQL Server: **Connecting to an Instance Through a Private Network**
Cross-AZ deployment	To ensure high availability, RDS allows you to deploy primary and standby DB instances across AZs. AZs are physically isolated but interconnected through an internal network.	• RDS for MySQL: **Buying an RDS for MySQL DB Instance** • RDS for MariaDB: **Step 1: Buy a DB Instance** • RDS for PostgreSQL: **Step 1: Buy a DB Instance**

Method	Description	Reference
Deletion protection	RDS allows you to move unsubscribed yearly/monthly DB instances and deleted pay-per-use DB instances to the recycle bin. You can rebuild a DB instance that was deleted up to 7 days ago from the recycle bin.	• RDS for MySQL: **Recycling a DB Instance** • RDS for PostgreSQL: **Recycling a DB Instance** • RDS for SQL Server: **Recycling a DB Instance**
Cross-region backup	RDS can store backups in a different region from the DB instance for disaster recovery. If the DB instance ever fails, you can use backups in the other region to restore data to a new DB instance.	• RDS for MySQL: **Setting a Cross-Region Backup Policy**

8.4 Audit and Logs

Audit

- Cloud Trace Service (CTS)

  CTS is a log audit service intended for cloud security. It records operations on the cloud resources in your account. You can use the logs generated by CTS to perform security analysis, track resource changes, audit compliance, and locate faults.

  After you enable CTS and configure a tracker, CTS can record management and data traces of RDS for auditing.

  For details about how to enable and configure CTS, see **Enabling CTS**.

  - For details about RDS for MySQL management and data traces that can be tracked by CTS, see **Key Operations Supported by CTS**.
  - For details about RDS for PostgreSQL management and data traces that can be tracked by CTS, see **Key Operations Supported by CTS**.
  - For details about RDS for SQL Server management and data traces that can be tracked by CTS, see **Key Operations Supported by CTS**.
  - For details about RDS for MariaDB management and data traces that can be tracked by CTS, see **Key Operations Supported by CTS**.

- Database Security Service (DBSS)

  DBSS is based on machine learning and big data analytics technologies. It provides functions such as database audit, SQL injection attack detection, and risky operation identification to ensure the security of databases on the cloud.

  You are advised to use DBSS to provide extended data security capabilities. For details, see **Database Security Service**.

  Advantages:

  - DBSS can help you meet security compliance requirements.
    - DBSS can help you comply with DJCP (graded protection) standards for database audit.
    - DBSS can help you comply with security laws and regulations, and provide compliance reports that meet data security standards (such as Sarbanes-Oxley).
  - DBSS can back up and restore database audit logs and meet the audit data retention requirements.
  - DBSS can monitor risks, sessions, session distribution, and SQL distribution in real time.
  - DBSS can report alarms for risky behavior and attacks and respond to database attacks in real time.
  - DBSS can locate internal violations and improper operations and keep data assets secure.

  Deployed in bypass pattern, database audit can perform flexible audits on the database without affecting user services.

  - Database audit monitors database logins, operation types (data definition, operation, and control), and operation objects based on risky operations to effectively audit the database.
  - Database audit analyzes risks and sessions, and detects SQL injection attempts so you can stay apprised of your database status.
  - Database audit provides a report template library to generate daily, weekly, or monthly audit reports according to your configurations. It sends real-time alarm notifications to help you obtain audit reports in a timely manner.

Logs

RDS for MySQL

- You can view database-level logs, including error logs and slow SQL query logs.

  For details about error logs, see **Viewing and Downloading Error Logs**.
- Slow query logs record statements that exceed **long_query_time** (1s by default). You can view log details and statistics to identify statements that are executing slowly and optimize the statements.

  For details, see **Viewing and Downloading Slow Query Logs**.
- You can view failover or switchover logs to evaluate the impact on your workloads.

  For details, see **Viewing Failover/Switchover Logs**.
- If you enable SQL Audit, the system records all SQL operations in audit logs to audit operations such as adding, deleting, modifying, and querying data.

  For details, see **Enabling the SQL Audit Function**.

RDS for PostgreSQL

- Error logs contain logs generated while the database is running. They can help you analyze database problems.

For details, see **Viewing and Downloading Error Logs**.

- Slow query logs record statements that exceed **log_min_duration_statement**. You can view log details and statistics to identify statements that are executing slowly and optimize the statements.

  For details, see **Viewing and Downloading Slow Query Logs**.

RDS for SQL Server

- System logs contain logs generated while the database is running. They can help you analyze database problems.

  For details, see **Viewing and Downloading System Logs**.
- Slow query logs record statements that exceed **long_query_time** (1s by default). You can view log details to identify statements that are executing slowly and optimize the statements.

  For details, see **Viewing and Downloading Slow Query Logs**.
- SQL Audit is enabled for RDS for SQL Server instances by default. The system records major change operations on services, databases, and tables in audit logs to audit operations such as adding, deleting, modifying, and querying data.

  For details, see **Viewing and Downloading Audit Logs**.

RDS for MariaDB

- You can view database-level logs, including error logs and slow SQL query logs.

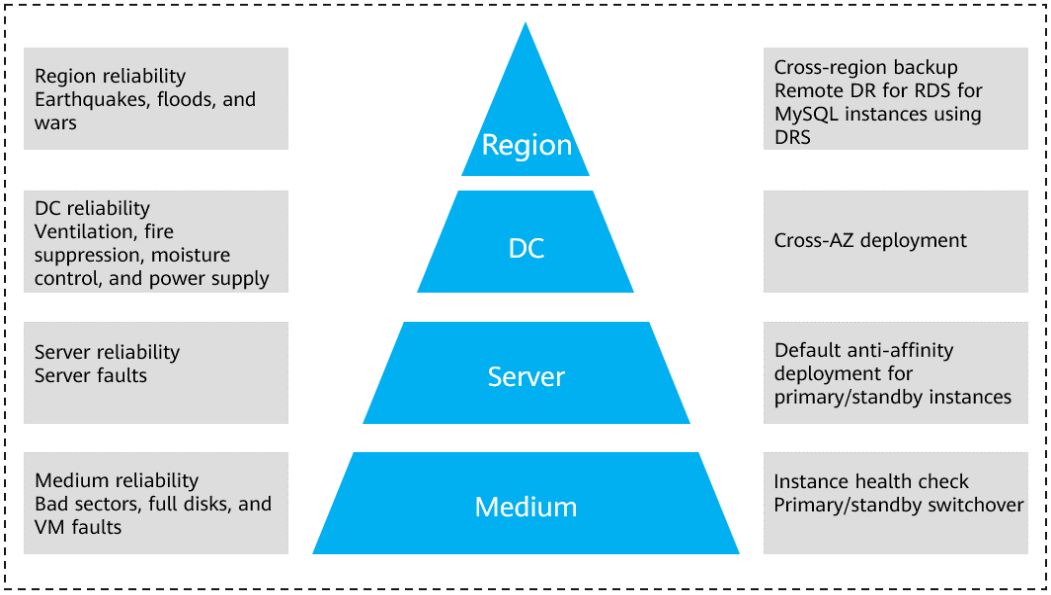
  For details about error logs, see **Viewing and Downloading Error Logs**.
- Slow query logs record statements that exceed **long_query_time** (1s by default). You can view log details and statistics to identify statements that are executing slowly and optimize the statements.

  For details, see **Viewing and Downloading Slow Query Logs**.

8.5 Resilience

- RDS for MySQL uses EVS disks to store data, providing three-copy storage and 99.9999999% data durability. RDS for MySQL also provides features like cross-region replication, multi-AZ data redundancy, and intra-AZ anti-affinity, to guarantee reliability and availability of your instances.
- RDS for PostgreSQL uses EVS disks to store data, providing three copies and 99.9999999% data durability. RDS for PostgreSQL also provides features like cross-region replication and intra-AZ anti-affinity, to guarantee reliability and availability of your instances.
- RDS for SQL Server uses EVS disks to store data, providing three copies and 99.9999999% data durability. RDS for PostgreSQL also provides features like cross-region replication and intra-AZ anti-affinity, to guarantee reliability and availability of your instances.
- RDS for MariaDB uses EVS disks to store data, providing three-copy storage and 99.9999999% data durability. RDS for MariaDB also provides features like cross-region replication, multi-AZ data redundancy, and intra-AZ anti-affinity, to guarantee reliability and availability of your instances.

Figure 8-2 Reliability architecture



8.6 Risk Monitoring

Monitoring Metrics

RDS works with Cloud Eye to monitor instances in your account in real time, reporting alarms and sending notifications based on your settings. You can get details about running metrics and storage usage of your instances in real time.

- For details about RDS for MySQL metrics and how to create alarm rules, see **Configuring Displayed Metrics**.
- For details about RDS for PostgreSQL metrics and how to create alarm rules, see **Configuring Displayed Metrics**.
- For details about RDS for SQL Server metrics and how to create alarm rules, see **Configuring Displayed Metrics**.
- For details about RDS for MariaDB metrics and how to create alarm rules, see **Configuring Displayed Metrics**.

Protection for Critical Operations

With critical operation protection enabled, to enhance the security of your data and configurations, the system requires your identity to be authenticated before critical operations like deleting an instance can be performed. For more information, see **Critical Operation Protection**.

8.7 Fault Recovery

RDS automatically creates backups for your DB instance during a backup window you specify. The backups are stored based on a preset retention period (1 to 732 days).

To restore instance data, you can choose one of the following methods:

RDS for MySQL

- **Restoring a DB instance from backups**
- **Restoring a DB instance to a point in time**
- **Restoring a table to a point in time**

RDS for PostgreSQL

- **Restoring a DB instance from backups**
- **Restoring a DB instance to a point in time**

RDS for SQL Server

- **Restoring a DB instance from backups**
- **Restoring a DB instance to a point in time**

RDS for MariaDB

- **Restoring a DB instance from backups**
- **Restoring a DB instance to a point in time**

Cross-Region Backup

RDS can store backups in a different region from the DB instance for disaster recovery. If the DB instance ever fails, you can use backups in the other region to restore data to a new DB instance.

If you enable cross-region backup, backups are automatically stored in the region you specify.

Multiple-AZ Deployment

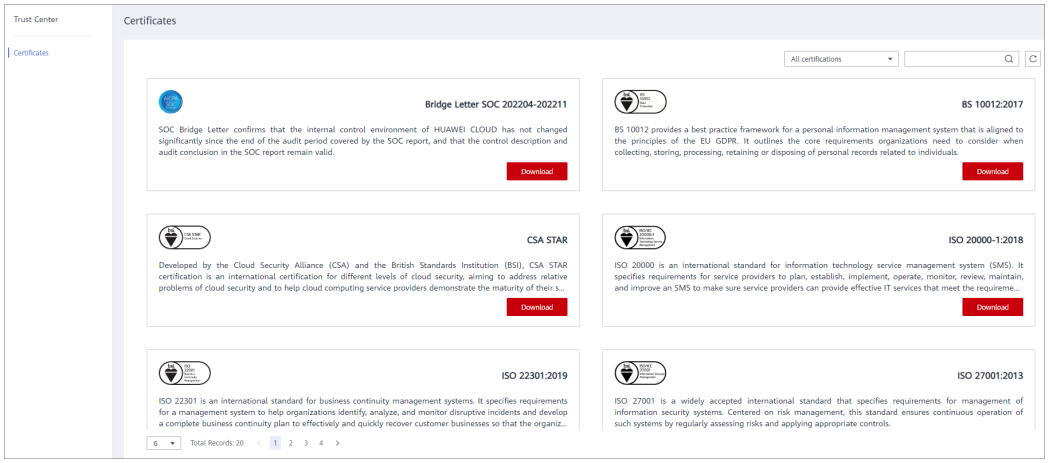
An AZ is a physical region where resources have their own independent power supply and networks. AZs are physically isolated but interconnected through a private network. You can deploy primary and standby DB instances in a single AZ or across AZs to achieve failover and high availability.

8.8 Certificates

Compliance Certificates

Huawei Cloud services and platforms have obtained various security and compliance certifications from authoritative organizations, such as International Organization for Standardization (ISO), system and organization controls (SOC), and Payment card industry (PCI) compliance standards. These certifications are available for **download**.

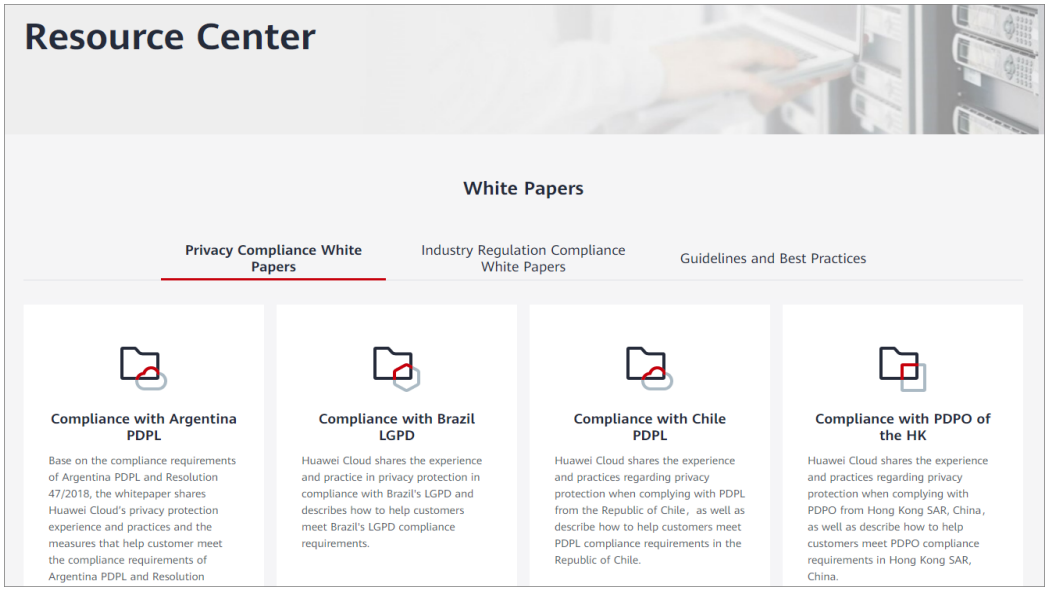
Figure 8-3 Downloading compliance certificates



Resource Center

Huawei Cloud also provides the following resources to help users meet compliance requirements. For details, see **Resource Center**.

Figure 8-4 Resource center



9 Permissions

If you need to assign different permissions to personnel in your enterprise to access your RDS resources, Identity and Access Management (IAM) is a good choice for fine-grained permissions management. IAM provides identity authentication, permissions management, and access control, helping you to securely access your cloud resources.

With IAM, you can create IAM users and assign permissions to control their access to specific resources. For example, if you want some software developers in your enterprise to use RDS resources but do not want them to delete RDS instances or perform any other high-risk operations, you can create IAM users and grant permission to use RDS instances but not permission to delete them.

If your Huawei account does not require individual IAM users for permissions management, you can skip this section.

IAM is a free service. You only pay for the resources in your account. For more information about IAM, see **IAM Service Overview**.

RDS Permissions

New IAM users do not have any permissions assigned by default. You need to first add them to one or more groups and attach policies or roles to these groups. The users then inherit permissions from the groups and can perform specified operations on cloud services based on the permissions they have been assigned.

RDS is a project-level service deployed for specific regions. When you set **Scope** to **Region-specific projects** and select the specified projects in the specified regions, the users only have permissions for RDS instances in the selected projects. If you set **Scope** to **All resources**, the users have permissions for RDS instances in all region-specific projects. When accessing RDS instances, the users need to switch to the authorized region.

You can grant permissions by using roles and policies.

- Roles: A coarse-grained authorization strategy provided by IAM to assign permissions based on users' job responsibilities. Only a limited number of service-level roles are available for authorization. Cloud services depend on each other. When you grant permissions using roles, you also need to attach any existing role dependencies. Roles are not ideal for fine-grained authorization and least privilege access.

- Policies: A fine-grained authorization strategy that defines permissions required to perform operations on specific cloud resources under certain conditions. This type of authorization is more flexible and is ideal for least privilege access. For example, you can grant users only permission to manage database resources of a certain type. A majority of fine-grained policies contain permissions for specific APIs, and permissions are defined using API actions. For the API actions supported by RDS, see **Permissions and Supported Actions**.

Table 9-1 lists all the system-defined permissions for RDS.

Table 9-1 System-defined permissions for RDS

Role/Policy Name	Description	Type	Dependencies
RDS FullAccess	Full permissions for Relational Database Service	System-defined policy	To purchase a yearly/monthly DB instance, configure the following actions: bss:order:update bss:order:pay To use storage autoscaling, configure the following actions for IAM users: • Creating a custom policy: – iam:agencies:listAgencies – iam:agencies:createAgency – iam:permissions:listRolesForAgencyOnProject – iam:permissions:grantRoleToGroupOnProject – iam:roles:listRoles – iam:roles:createRole • Adding system role **Security Administrator**:

Role/Policy Name	Description	Type	Dependencies
			1. Select a user group to which the user belongs. 2. Click **Authorize** in the **Operation** column. 3. Add the **Security Administrator** role. To create a yearly/monthly instance using a RAM-based shared KMS key, configure the following actions: • iam:agencies:listAgencies • iam:roles:listRoles • iam:agencies:pass • iam:agencies:createAgency • iam:permissions:grantRoleToAgency RDS FullAccess already contains the **iam:agencies:listAgencies**, **iam:roles:listRoles**, and **iam:agencies:pass** actions.

Role/Policy Name	Description	Type	Dependencies
			RDS is a region-level service, and IAM is a global service. If you grant **RDS FullAccess** to a project, grant **BSS ServiceAgency ReadPolicy** (global service) to the project as well. Granting **RDS FullAccess** to all projects eliminates the need for additional configuration when using IAM actions. **BSS ServiceAgency CreatePolicy** contains the following actions: **iam:agencies:createAgency** and **iam:permissions:grantRoleToAgency**.
RDS ReadOnlyAccess	Read-only permissions for Relational Database Service	System-defined policy	N/A
RDS ManageAccess	Database administrator permissions for all operations except deleting RDS resources	System-defined policy	N/A

Role/Policy Name	Description	Type	Dependencies
RDS Administrator	Administrator permissions for RDS	System-defined role	**Tenant Guest** and **Server Administrator** roles, which must be attached in the same project as the **RDS Administrator** role If only the RDS Administrator role is attached and you want to use storage autoscaling, configure the actions on storage autoscaling listed in **Table 9-3** for IAM users:

Table 9-2 lists the common operations supported by system-defined permissions for RDS.

Table 9-2 Common operations supported by system-defined permissions

Operation	RDS FullAccess	RDS ReadOnlyAccess	RDS ManageAccess	RDS Administrator
Creating an RDS DB instance	√	x	√	√
Deleting an RDS DB instance	√	x	x	√
Querying an RDS DB instance list	√	√	√	√

Table 9-3 Common operations and supported actions

Operation	Actions	Remarks
Creating a DB instance	rds:instance:create rds:param:list	To select a VPC, subnet, and security group, configure the following actions: vpc:vpcs:list vpc:vpcs:get vpc:subnets:get vpc:securityGroups:get vpc:securityGroupRules:get To create an encrypted instance, configure the KMS Administrator permission for the project. To purchase a yearly/monthly DB instance, configure the following actions: bss:order:update bss:order:pay
Changing DB instance specifications	rds:instance:modifySpec	N/A
Scaling up storage space	rds:instance:extendSpace	N/A
Changing a DB instance type from single to primary/standby	rds:instance:singleToHa	If the original single DB instance is encrypted, you need to configure the KMS Administrator permission in the project.
Rebooting a DB instance	rds:instance:restart	N/A
Deleting a DB instance	rds:instance:delete	N/A
Querying a DB instance list	rds:instance:list	N/A

Operation	Actions	Remarks
Querying DB instance details	rds:instance:list	If the VPC, subnet, and security group are displayed in the DB instance list, you need to configure vpc:*:get and vpc:*:list.
Changing a DB instance password	rds:password:update	N/A
Changing a database port	rds:instance:modifyPort	N/A
Changing a floating IP address	rds:instance:modifyIp	To query the list of unused IP addresses, configure the following actions: vpc:subnets:get vpc:ports:get
Changing a DB instance name	rds:instance:modify	N/A
Changing a maintenance window	rds:instance:modify	N/A
Performing a manual switchover	rds:instance:switchover	N/A
Changing the replication mode	rds:instance:modifySynchroni-zeModel	N/A
Changing the failover priority	rds:instance:modifyStrategy	N/A
Changing a security group	rds:instance:modifySecurityGro up	N/A
Binding or unbinding an EIP	rds:instance:modifyPublicAcces s	To query public IP addresses, configure the following actions: vpc:publicIps:get vpc:publicIps:list
Modifying the recycling policy	rds:instance:setRecycleBin	N/A
Querying the recycling policy	rds:instance:list	N/A
Enabling or disabling SSL	rds:instance:modifySSL	N/A

Operation	Actions	Remarks
Enabling or disabling event scheduler	rds:instance:modifyEvent	N/A
Configuring read/write splitting	rds:instance:modifyProxy	N/A
Applying for a private domain name	rds:instance:createDns	N/A
Migrating a standby DB instance to another AZ	rds:instance:create	Standby DB instance migration involves operations on the IP address in the subnet. For encrypted DB instances, you need to configure the KMS Administrator permission in the project.
Restoring tables to a specified point in time	rds:instance:tableRestore	N/A
Configuring TDE permission	rds:instance:tde	Only used for RDS for SQL Server DB instances.
Changing host permission	rds:instance:modifyHost	N/A
Querying hosts of the corresponding database account	rds:instance:list	N/A
Obtaining a parameter template list	rds:param:list	N/A
Creating a parameter template	rds:param:create	N/A
Modifying parameters in a parameter template	rds:param:modify	N/A
Applying a parameter template	rds:param:apply	N/A
Modifying parameters of a specified DB instance	rds:param:modify	N/A

Operation	Actions	Remarks
Obtaining the parameter template of a specified DB instance	rds:param:list	N/A
Obtaining parameters of a specified parameter template	rds:param:list	N/A
Deleting a parameter template	rds:param:delete	N/A
Resetting a parameter template	rds:param:reset	N/A
Comparing parameter templates	rds:param:list	N/A
Saving parameters in a parameter template	rds:param:save	N/A
Querying a parameter template type	rds:param:list	N/A
Setting an automated backup policy	rds:instance:modifyBackupPolicy	N/A
Querying an automated backup policy	rds:instance:list	N/A
Creating a manual backup	rds:backup:create	N/A
Obtaining a backup list	rds:backup:list	N/A
Obtaining the link for downloading a backup file	rds:backup:download	N/A
Deleting a manual backup	rds:backup:delete	N/A
Replicating a backup	rds:backup:create	N/A
Querying the restoration time range	rds:instance:list	N/A

Operation	Actions	Remarks
Restoring data to a new DB instance	rds:instance:create	To select a VPC, subnet, and security group, configure the following actions: vpc:vpcs:list vpc:vpcs:get vpc:subnets:get vpc:securityGroups:get vpc:securityGroupRules:get
Restoring data to an existing or original DB instance	rds:instance:restoreInPlace	N/A
Obtaining the binlog clearing policy	rds:binlog:get	N/A
Merging binlog files	rds:binlog:merge	N/A
Downloading a binlog file	rds:binlog:download	N/A
Deleting a binlog file	rds:binlog:delete	N/A
Configuring a binlog clearing policy	rds:binlog:setPolicy	N/A
Obtaining a database backup file list	rds:backup:list	N/A
Obtaining a backup database list at a specified time point	rds:backup:list	N/A
Querying a database error log	rds:log:list	N/A
Querying a database slow log	rds:log:list	N/A
Downloading a database error log	rds:log:download	N/A
Downloading a database slow log	rds:log:download	N/A
Enabling or disabling the audit log function	rds:auditlog:operate	N/A

Operation	Actions	Remarks
Obtaining an audit log list	rds:auditlog:list	N/A
Querying the audit log policy	rds:auditlog:list	N/A
Obtaining the link for downloading an audit log	rds:auditlog:download	N/A
Obtaining a switchover log	rds:log:list	N/A
Creating a database	rds:database:create	N/A
Querying details about databases	rds:database:list	N/A
Querying authorized databases of a specified user	rds:database:list	N/A
Dropping a database	rds:database:drop	N/A
Creating a database account	rds:databaseUser:create	N/A
Querying details about database accounts	rds:databaseUser:list	N/A
Querying authorized accounts of a specified database	rds:databaseUser:list	N/A
Deleting a database account	rds:databaseUser:drop	N/A
Authorizing a database account	rds:databasePrivilege:grant	N/A
Revoking permissions of a database account	rds:databasePrivilege:revoke	N/A
Viewing a task center list	rds:task:list	N/A
Deleting a task from the task center	rds:task:delete	N/A

Operation	Actions	Remarks
Submitting an order for a yearly/monthly DB instance	bss:order:update	To purchase a yearly/monthly DB instance, configure the following actions: bss:order:pay
Managing a tag	rds:instance:modify	Tag-related operations depend on the tms:resourceTags:* permission.
Configuring autoscaling	rds:instance:extendSpace	To enable autoscaling, configure the following actions for the IAM users instead of your Huawei account: • Creating a custom policy – iam:agencies:listAgencies – iam:agencies:createAgency – iam:permissions:listRolesForAgencyOnProject – iam:permissions:grantRoleToGroupOnProject – iam:roles:listRoles – iam:roles:createRole • Adding system role **Security Administrator**: 1. Select a user group to which the user belongs. 2. Click **Authorize** in the **Operation** column. 3. Add the **Security Administrator** role.
Stopping or starting a DB instance	rds:instance:operateServer	N/A

Operation	Actions	Remarks
Stopping an instance	rds:instance:stop	N/A
Starting an instance	rds:instance:start	N/A
Modifying the remarks of a database account	rds:databaseUser:update	N/A

10 Constraints

10.1 RDS for MySQL Constraints

The following tables list the constraints designed to ensure the stability and security of RDS for MySQL.

Specifications and Performance

Table 10-1 Specifications

Item	Constraints	Description
Storage space	• Cloud SSD: 40 GB to 4,000 GB • Extreme SSD: 40 GB to 4,000 GB	To increase the upper limit of the storage space to 10 TB, contact customer service.
Connections	A maximum of 100,000	The default maximum number of connections varies depending on the memory. For details, see **What Is the Maximum Number of Connections to an RDS DB Instance?**
IOPS	• Cloud SSD: a maximum of 50,000 • Extreme SSD: a maximum of 128,000	The input/output operations per second (IOPS) supported depends on the I/O performance of Elastic Volume Service (EVS) disks. For details, see the description about ultra-high I/O and extreme SSDs in **Disk Types and Performance** of *Elastic Volume Service Service Overview*.

Quotas

Table 10-2 Quotas

Item	Constraints	Description
Total number of instances (including read replicas)	50	To increase the quotas, see **Managing Quotas**.
Read replica	A maximum of 10 read replicas can be created for a DB instance.	For more information, see **Introducing Read Replicas**.
Tags	A maximum of 20 tags can be added for a DB instance.	For more information, see **Managing Tags**.
Free backup space	RDS provides free backup space of the same size as your purchased storage space.	After you pay for the storage space of your DB instance, you will get a backup space of the same size for free. For more information, see **How Is RDS Backup Data Billed?**
Retention period of automated backups	The default value is 7 days. The value ranges from 1 to 732 days.	For more information, see **Configuring an Intra-Region Backup Policy**.
Log retention period	• Error log details: 30 days • Slow query log details: 30 days • Original slow query logs: 30 days • Slow query log statistics: 30 days • Failover/switchover logs: 30 days • SQL audit logs: The default value is 7 days. The value ranges from 1 to 732 days.	For more information, see **Log Management**.

Naming

Table 10-3 Naming

Item	Constraints
Instance name	• 4 to 64 characters long • Must start with a letter. Only letters (case sensitive), digits, hyphens (-), and underscores (_) are allowed.
Database name	• 1 to 64 characters long • Only letters, digits, hyphens (-), underscores (_), and dollar signs ($) are allowed. The total number of hyphens (-) and dollar signs ($) cannot exceed 10. (RDS for MySQL 8.0 does not support dollar signs ($).)
Account name	• RDS for MySQL 5.6: The account name must be 1 to 16 characters long. Only letters, digits, hyphens (-), and underscores (_) are allowed. • RDS for MySQL 5.7 and 8.0: The account name must be 1 to 32 characters long. Only letters, digits, hyphens (-), and underscores (_) are allowed.
Backup name	• 4 to 64 characters long • Must start with a letter. Only letters (case sensitive), digits, hyphens (-), and underscores (_) are allowed.
Parameter template name	• 1 to 64 characters long • Only letters (case sensitive), digits, hyphens (-), underscores (_), and periods (.) are allowed.

Security

Table 10-4 Security

Item	Constraints
root permissions	Only the administrator account **root** is provided on the instance creation page. For details about the supported permissions, see **root Permissions**. **NOTE** Running **revoke**, **drop user**, or **rename user** on **root** may cause service interruption. Exercise caution when running any of these statements.

Item	Constraints
root password	• 8 to 32 characters long • Must contain at least three types of the following characters: uppercase letters, lowercase letters, digits, and special characters (~!@$#%^*-_=+?,()&.|). For more information, see **Resetting the Administrator Password to Restore root Access**.
Database port	1024 to 65535 (excluding 12017, 33071, and 33062, which are occupied by the RDS system) For more information, see **Changing a Database Port**.
Disk encryption	If you enable disk encryption during instance creation, the disk encryption status and the key cannot be changed later. For more information, see **Performing a Server-Side Encryption**.
VPC	The VPC where a DB instance is located cannot be changed after the instance is created.
Security group	• By default, you can create a maximum of 100 security groups in your cloud account. • By default, you can add up to 50 security group rules to a security group. For more information, see **Configuring a Security Group Rule**. • One RDS DB instance can be associated with multiple security groups, and one security group can be associated with multiple RDS DB instances. • When creating a DB instance, you can select multiple security groups. For better network performance, you are advised to select no more than five security groups. For more information, see **Changing a Security Group**.

Item	Constraints
System account	To provide O&M services, the system automatically creates system accounts when you create RDS for MySQL DB instances. These system accounts are unavailable to you. • **rdsAdmin**: a management account with the highest permission. It is used to query and modify instance information, rectify faults, migrate data, and restore data. • **rdsRepl**: a replication account, used to synchronize data from the primary instance to the standby instance or read replicas. • **rdsBackup**: a backup account, used for backend backup. • **rdsMetric**: a metric monitoring account used by watchdog to collect database status data. • **rdsProxy**: a database proxy account, used for authentication when the database is connected through the read/write splitting address. This account is automatically created when you enable read/write splitting.
Instance parameter	To ensure optimal performance of RDS, you can modify parameters in the parameter template you created as needed. For more information, see **Suggestions on RDS for MySQL Parameter Tuning**.

Instance Operations

Table 10-5 Instance operations

Item	Constraints
RDS for MySQL storage engine	Only the InnoDB storage engine is supported. MyISAM, FEDERATED, and MEMORY are not supported. For more information, see **What Storage Engines Does RDS for MySQL Support?**
Instance deployment	ECSs where DB instances are deployed are not directly visible to you. You can only access the DB instances through IP addresses and database ports.

Item	Constraints
Data migration	You can migrate data from DDM, GaussDB, TaurusDB, self-managed MySQL databases, self-managed Oracle databases, or MySQL databases built on other clouds to RDS for MySQL, or from one RDS for MySQL instance to another RDS for MySQL instance. Data migration tools include Data Replication Service (DRS), mysqldump, and Data Admin Service (DAS). You are advised to use DRS because it is easy to use and can complete a migration task in minutes. DRS facilitates data transfer between databases, helping you reduce DBA labor costs and hardware costs. **NOTE** We have arranged preferential pricing for DRS in the following scenarios: • Real-time migration tasks are free of configuration and data transmission fees in the first seven days, lowering your costs for migrating data to the cloud. • Real-time migration and synchronization will provide long-term discounts, lowering your costs for data transfers. You can use the **price calculator** provided by DRS to quickly calculate the reference price based on the required specifications. For more information, see **Migration Solutions**.
Primary/Standby replication	RDS for MySQL uses a primary/standby dual-node replication cluster. You do not need to set up replication additionally. The standby DB instance is not visible to you and therefore you cannot access it directly.
High CPU usage	If the CPU usage is high or close to 100%, data read/write and database access will become slow, and an error will be reported during data deletion. For details, see **Identifying Why CPU Usage of RDS for MySQL DB Instances Is High and Providing Solutions**.
Full storage	There is not enough storage available for a DB instance and the instance becomes read-only, so applications cannot write any data to the instance. For details, see **What Should I Do If an RDS DB Instance Is Abnormal Due to Full Storage Space?**

Item	Constraints
Number of tables	RDS for MySQL supports a maximum of 500,000 tables. If there are more than 500,000 tables, database backup or a minor version upgrade may fail. If there are more than 100,000 tables, DDL statements executed for the tables cause high CPU utilization. To remain database performance, temporarily increase the value of **innodb_open_files** on the console to the total number of tables in the instance. After the DDL execution is complete, set the parameter to its default value. **NOTICE** The **innodb_open_files** value actually applied is the smaller one of **innodb_open_files** and **table_open_cache**.
Rebooting a DB instance	DB instances cannot be rebooted through commands. They must be rebooted through the RDS console.
Stopping or starting a DB instance	• You can temporarily stop pay-per-use instances to save money. For more information, see **Stopping an Instance**. • After stopping your instance, you can restart it to begin using it again.
Viewing backups	You can download automated and manual backups for local storage. To download a backup, you can use OBS Browser+, the current browser, or the download URL. For more information, see **Downloading a Full Backup File**.
Log management	• RDS for MySQL logging is enabled by default and cannot be disabled. • Binary logging is enabled for RDS for MySQL by default and uses row-based logging. • Read replicas do not provide binlogs.
Recycle bin	RDS allows you to move unsubscribed yearly/monthly DB instances and deleted pay-per-use DB instances to the recycle bin. You can rebuild a DB instance that was deleted up to 7 days ago from the recycle bin.
SQL standard	The ZEROFILL attribute has been deprecated and will be deleted in later versions.

root Permissions

Table 10-6 root permissions

Permission	Level	Description	Supported
Select	Table	Query permissions	Yes
Insert	Table	Insert permissions	

Permission	Level	Description	Supported
Update	Table	Update permissions	
Delete	Table	Delete permissions	
Create	Database, table, or index	Permissions of creating databases, tables, or indexes	
Drop	Database or table	Permissions of deleting databases or tables	
Reload	Server management	Permissions of running the following commands: flush-hosts, flush-logs, flush-privileges, flush-status, flush-tables, flush-threads, refresh, and reload	
Process	Server management	Permissions of viewing processes	
Grant	Database, table, or stored program	Permissions of granting access control	
References	Database or table	Foreign key operation permissions	
Index	Table	Index permissions	
Alter	Table	Permissions of altering tables, such as adding fields or indexes	
Show_db	Server management	Permissions of viewing database connections	
Create_tmp_table	Server management	Permissions of creating temporary tables	
Lock_tables	Server management	Permissions of locking tables	
Execute	Stored procedure	Permissions of executing storage procedures	
Repl_slave	Server management	Replication permissions	

Permission	Level	Description	Supported
Repl_client	Server management	Replication permissions	
Create_view	View	Permissions of creating views	
Show_view	View	Permissions of viewing views	
Create_routine	Stored procedure	Permissions of creating storage procedures	
Alter_routine	Stored procedure	Permissions of altering storage procedures	
Create_user	Server management	Permissions of creating users	
Event	Database	Event triggers	
Trigger	Database	Triggers	
Super	Server management	Permissions of killing threads	No **NOTE** For details, see **Why Does the Root User Not Have the Super Permission?**
File	File on the server	Permissions of accessing files on database server nodes	No
Shutdown	Server management	Permissions of shutting down databases	
Create_tablespace	Server management	Permissions of creating tablespaces	

10.2 RDS for MariaDB Constraints

The following shows the constraints designed to ensure the stability and security of RDS for MariaDB.

Constraints on Usage

- Only the InnoDB storage engine is supported. Transparent Data Encryption (TDE) is not supported.

- DDL statements cannot be executed during full backup.
- DML operations cannot be performed on tables in system databases such as **mysql**, **information_schema**, and **performance_schema**.
- Operations that require the **SUPER** or ***_ADMIN** permissions are not supported.

Specifications

Table 10-7 Specifications

Item	Constraints	Description
Storage space	Cloud SSD: 40 GB to 4,000 GB	-
Connections	A maximum of 100,000 for 512 GB of memory	The default maximum number of connections varies depending on the memory. For details, see **What Is the Maximum Number of Connections to an RDS DB Instance?**
IOPS	Cloud SSD: a maximum of 50,000	The input/output operations per second (IOPS) supported depends on the I/O performance of Elastic Volume Service (EVS) disks. For details, see the description about ultra-high I/O in **Disk Types and Performance** of *Elastic Volume Service Service Overview*.

Quotas

Table 10-8 Quotas

Item	Constraints	Description
Read replica	A maximum of five read replicas can be created for a DB instance.	For more information, see **Introducing Read Replicas**.
Tags	A maximum of 20 tags can be added for a DB instance.	For more information, see **Managing Tags**.
Free backup space	RDS for MariaDB provides free backup space of the same size as your purchased storage space.	After you pay for the storage space of your DB instance, you will get a backup space of the same size for free. For more information, see **How Is RDS Backup Data Billed?**

Item	Constraints	Description
Retention period of automated backups	The default value is 7 days. The value ranges from 1 to 732 days.	For more information, see **Configuring an Intra-Region Backup Policy**.
Log retention period	• Error log details: 30 days • Slow query log details: 30 days	For more information, see **Log Management**.

Naming

Table 10-9 Naming

Item	Constraints
Instance name	• 4 to 64 characters long • Must start with a letter. Only letters (case sensitive), digits, hyphens (-), and underscores (_) are allowed.
Database name	• 1 to 64 characters long • Only letters, digits, hyphens (-), and underscores (_) are allowed. The total number of hyphens (-) cannot exceed 10.
Account name	• 1 to 32 characters long • Only letters, digits, hyphens (-), and underscores (_) are allowed.
Backup name	• 4 to 64 characters long • Must start with a letter. Only letters (case sensitive), digits, hyphens (-), and underscores (_) are allowed.
Parameter template name	• 1 to 64 characters long • Only letters (case sensitive), digits, hyphens (-), underscores (_), and periods (.) are allowed.

Security

Table 10-10 Security

Item	Constraints
root permissions	Only the administrator account **root** is provided on the instance creation page. For details about the supported permissions, see **Table 10-12**. **NOTE** Running **revoke**, **drop user**, or **rename user** on **root** may cause service interruption. Exercise caution when running any of these statements.
root password	• 8 to 32 characters long • Must contain at least three types of the following characters: uppercase letters, lowercase letters, digits, and special characters (~!@$#%^*-_=+?,()&). For more information, see **Resetting the Administrator Password to Restore Root Access**.
Database port	1024 to 65535 (excluding 12017 and 33071, which are occupied by the RDS system) For more information, see **Changing a Database Port**.
VPC	The VPC where a DB instance is located cannot be changed after the instance is created.
Security group	• By default, you can create a maximum of 100 security groups in your cloud account. • By default, you can add up to 50 security group rules to a security group. For more information, see **Configuring a Security Group Rule**. • One RDS DB instance can be associated with multiple security groups, and one security group can be associated with multiple RDS DB instances.

Item	Constraints
System account	To provide O&M services, the system automatically creates system accounts when you create RDS for MariaDB DB instances. These system accounts are unavailable to you. • **mariadb.sys**: used to create views. • **rdsAdmin**: a management account, used to query and modify instance information, rectify faults, migrate data, and restore data. • **rdsRepl**: a replication account, used to synchronize data from the primary instance to the standby instance or read replicas. • **rdsBackup**: a backup account, used for backend backup. • **rdsMetric**: a metric monitoring account used by watchdog to collect database status data. • **rdsProxy**: a database proxy account, used for authentication when the database is connected through the read/write splitting address. This account is automatically created when you enable read/write splitting.
Instance parameter	To ensure the optimal performance of RDS, you can modify parameters in the parameter template you created as needed.

Instance Operations

Table 10-11 Instance operations

Item	Description
Instance deployment	ECSs where DB instances are deployed are not directly visible to you. You can only access the DB instances through IP addresses and database ports.
Data synchronization	You can synchronize data from self-managed MariaDB databases or MariaDB databases built on other clouds to RDS for MariaDB, or from one RDS for MariaDB instance to another RDS for MariaDB instance. The common data synchronization tool is Data Replication Service (DRS). For details, see **From MariaDB to RDS for MariaDB**. DRS is easy to use and can complete a synchronization task in minutes. DRS facilitates data transfer between databases, helping you reduce DBA labor costs and hardware costs.

Item	Description
High CPU usage	If the CPU usage is high or close to 100%, data read/write and database access will become slow, and an error will be reported during data deletion.
Full storage	There is not enough storage available for a DB instance and the instance becomes read-only, so applications cannot write any data to the instance. For details, see **What Should I Do If an RDS DB Instance Is Abnormal Due to Full Storage Space?**
Number of tables	RDS for MariaDB supports a maximum of 500,000 tables. If there are more than 500,000 tables, database backup or a minor version upgrade may fail.
Rebooting a DB instance	DB instances cannot be rebooted through commands. They must be rebooted through the RDS console. For details, see **Rebooting DB Instances or Read Replicas**.
Viewing backups	You can download automated and manual backups for local storage. To download a backup, you can use OBS Browser+, the current browser, or the download URL. For more information, see **Downloading a Full Backup File**.
Log management	• RDS for MariaDB logging is enabled by default and cannot be disabled. • Binary logging is enabled for RDS for MariaDB by default and uses row-based logging. • Read replicas do not provide binlogs.
Recycle bin	RDS allows you to move deleted pay-per-use DB instances to the recycle bin. You can rebuild a DB instance that was deleted up to 7 days ago from the recycle bin.

root Permissions

Table 10-12 root permissions

Permission	Level	Description	Supported
Select	Table	Query permissions	Yes
Insert	Table	Insert permissions	
Update	Table	Update permissions	
Delete	Table	Delete permissions	
Create	Database, table, or index	Permissions of creating databases, tables, or indexes	

Permission	Level	Description	Supported
Drop	Database or table	Permissions of deleting databases or tables	
Reload	Server management	Permissions of running the following commands: flush-hosts, flush-logs, flush-privileges, flush-status, flush-tables, flush-threads, refresh, and reload	
Process	Server management	Permissions of viewing processes	
Grant	Database, table, or stored program	Permissions of granting access control	
References	Database or table	Foreign key operation permissions	
Index	Table	Index permissions	
Alter	Table	Permissions of altering tables, such as adding fields or indexes	
Show_db	Server management	Permissions of viewing database connections	
Create_tmp_table	Server management	Permissions of creating temporary tables	
Lock_tables	Server management	Permissions of locking tables	
Execute	Stored procedure	Permissions of executing storage procedures	
Repl_slave	Server management	Replication permissions	
Repl_client	Server management	Replication permissions	

Permission	Level	Description	Supported
Create_view	View	Permissions of creating views	
Show_view	View	Permissions of viewing views	
Create_routine	Stored procedure	Permissions of creating storage procedures	
Alter_routine	Stored procedure	Permissions of altering storage procedures	
Create_user	Server management	Permissions of creating users	
Event	Database	Event triggers	
Trigger	Database	Triggers	
Super	Server management	Permissions of killing threads	No **NOTE** For details, see **Why Does the Root User Not Have the Super Permissions?**
File	File on the server	Permissions of accessing files on database server nodes	No
Shutdown	Server management	Permissions of shutting down databases	
Create_tablespace	Server management	Permissions of creating tablespaces	

10.3 RDS for PostgreSQL Constraints

The following tables list the constraints designed to ensure the stability and security of RDS for PostgreSQL.

Specifications and Performance

Table 10-13 Specifications

Item	Constraints	Description
Storage space	• Cloud SSD: 40 GB to 4,000 GB • Extreme SSD: 40 GB to 4,000 GB	-
Maximum connections	It depends on the value of **max_connections**.	For more information, see **What Is the Maximum Number of Connections to an RDS DB Instance?**
IOPS	• Cloud SSD: a maximum of 50,000 • Extreme SSD: a maximum of 128,000	The input/output operations per second (IOPS) supported depends on the I/O performance of Elastic Volume Service (EVS) disks. For details, see the description about ultra-high I/O and extreme SSDs in **Disk Types and Performance** of *Elastic Volume Service Service Overview*.

Quotas

Table 10-14 Quotas

Item	Constraints	Description
Read replica	A maximum of five read replicas can be created for a DB instance.	For more information, see **Introducing Read Replicas**.
Tags	A maximum of 20 tags can be added for a DB instance.	For more information, see **Managing Tags**.
Free backup space	RDS provides free backup space of the same size as your purchased storage space.	After you pay for the storage space of your DB instance, you will get a backup space of the same size for free. For more information, see **How Is RDS Backup Data Billed?**
Retention period of automated backups	The default value is 7 days. The value ranges from 1 to 732 days.	For more information, see **Configuring an Intra-Region Backup Policy**.

Item	Constraints	Description
Log query	• Error log records: 2,000 • Slow query log records: 2,000	For more information, see **Log Management**.

Naming

Table 10-15 Naming

Item	Constraints
Instance name	• 4 to 64 characters long • Must start with a letter. Only letters (case sensitive), digits, hyphens (-), and underscores (_) are allowed.
Database name	• 1 to 63 characters long • Only letters, digits, and underscores (_) are allowed. It cannot start with **pg** or a digit, and must be different from RDS for PostgreSQL template database names. RDS for PostgreSQL template databases include **postgres**, **template0**, and **template1**.
Account name	• 1 to 128 characters long • Only letters, digits, hyphens (-), and underscores (_) are allowed. It must be different from system accounts. System accounts include **rdsadmin**, **rdsuser**, **rdsbackup**, and **rdsmirror**.
Backup name	• 4 to 64 characters long • Must start with a letter. Only letters (case sensitive), digits, hyphens (-), and underscores (_) are allowed.
Parameter template name	• 1 to 64 characters long • Only letters (case sensitive), digits, hyphens (-), underscores (_), and periods (.) are allowed.

Security

Table 10-16 Security

Item	Constraints
root permissions	Only the **root** user is available on the instance creation page. RDS for PostgreSQL supports **root** privilege escalation in specific scenarios. For details, see **Privileges of the root User**.

Item	Constraints
root password	• 8 to 32 characters long • Must contain at least three types of the following characters: uppercase letters, lowercase letters, digits, and special characters (~!@#%^*-_=+?,). For more information, see **Resetting the Administrator Password to Restore Root Access**.
Database port	2100 to 9500 For more information, see **Changing a Database Port**.
Disk encryption	If you enable disk encryption during instance creation, the disk encryption status and the key cannot be changed later. For more information, see **Performing a Server-Side Encryption**.
VPC	The VPC where a DB instance is located cannot be changed after the instance is created.
Security group	• By default, you can create a maximum of 100 security groups in your cloud account. • By default, you can add up to 50 security group rules to a security group. For more information, see **Configuring Security Group Rules**. • One RDS DB instance can be associated with multiple security groups, and one security group can be associated with multiple RDS DB instances. • When creating a DB instance, you can select multiple security groups. For better network performance, you are advised to select no more than five security groups. For more information, see **Changing a Security Group**.

Item	Constraints
System account	To provide O&M services, the system automatically creates system accounts when you create RDS for PostgreSQL DB instances. These system accounts are unavailable to you. • **rdsAdmin**: a management account with the highest permission. It is used to query and modify instance information, rectify faults, migrate data, and restore data. • **pg_execute_server_program**: an account that allows executing programs on the database server as the user the database runs as with COPY and other functions which allow executing a server-side program. • **pg_read_all_settings**: an account that reads all configuration variables. • **pg_read_all_stats**: an account that reads all **pg_stat_*** views and uses various extension-related statistics. • **pg_stat_scan_tables**: an account that executes monitoring functions that may take **ACCESS SHARE** locks on tables, potentially for a long time. • **pg_signal_backend**: an account that signals another backend to cancel a query or terminate its session. • **pg_read_server_files**: an account that allows reading files from any location the database can access on the server with COPY and other file-access functions. • **pg_write_server_files**: an account that allows writing to files in any location the database can access on the server with COPY and other file-access functions. • **pg_monitor**: an account that reads and executes various monitoring views and functions. This role is a member of **pg_read_all_settings**, **pg_read_all_stats**, and **pg_stat_scan_tables**. • **rdsRepl**: a replication account, used to synchronize data from the primary instance to the standby instance or read replicas. • **rdsBackup**: a backup account, used for backend backup. • **rdsMetric**: a metric monitoring account used by watchdog to collect database status data.
Instance parameter	To ensure the optimal performance of RDS, you can modify parameters in the parameter template you created as needed. For more information, see **Suggestions on RDS for PostgreSQL Parameter Tuning**.

Instance Operations

Table 10-17 Instance operations

Item	Constraints
Instance deployment	ECSs where DB instances are deployed are not directly visible to you. You can only access the DB instances through IP addresses and database ports.
Data migration	You can migrate data from self-managed PostgreSQL databases, PostgreSQL databases built on other clouds, self-managed Oracle databases, RDS for MySQL, self-managed MySQL databases, or MySQL databases built on other clouds to RDS for PostgreSQL, or from one RDS for PostgreSQL instance to another RDS for PostgreSQL instance. Data migration tools include Data Replication Service (DRS), pg_dump, and Data Admin Service (DAS). You are advised to use DRS because it is easy to use and can complete a migration task in minutes. DRS facilitates data transfer between databases, helping you reduce DBA labor costs and hardware costs. For more information, see **Migration Solutions**.
Primary/Standby replication	RDS for PostgreSQL uses a primary/standby dual-node replication cluster. You do not need to set up replication additionally. The standby DB instance is not visible to you and therefore you cannot access it directly.
High CPU usage	If the CPU usage is high or close to 100%, data read/write and database access will become slow, and an error will be reported during data deletion. For details, see **High CPU Usage of RDS for PostgreSQL DB Instances**.
Rebooting a DB instance	DB instances cannot be rebooted through commands. They must be rebooted through the RDS console.
Stopping or starting a DB instance	• You can temporarily stop pay-per-use instances to save money. For more information, see **Stopping an Instance**. • After stopping your instance, you can restart it to begin using it again.
Viewing backups	You can download automated and manual backups for local storage. To download a backup, you can use OBS Browser+, the current browser, or the download URL. For more information, see **Downloading a Full Backup File**.
Log management	RDS for PostgreSQL logging is enabled by default and cannot be disabled.

Item	Constraints
Recycle bin	RDS allows you to move unsubscribed yearly/monthly DB instances and deleted pay-per-use DB instances to the recycle bin. You can rebuild a DB instance that was deleted up to 7 days ago from the recycle bin.

Privileges of the root User

RDS for PostgreSQL provides permissions for the **root** user. To create objects on an RDS for PostgreSQL database without operation risks, escalate your account to root privileges when necessary.

The following table describes root privilege escalation in different versions.

Table 10-18 Privileges of the **root** user

Version	Whether to Escalate Privileges	Initial Version for Privilege Escalation
pgcore9	No	N/A
pgcore10	No	N/A
pgcore11	Yes	11.11
pgcore12	Yes	12.6
pgcore13	Yes	13.2
pgcore14	Yes	14.4
pgcore15	Yes	15.4
pgcore16	Yes	16.2

Escalate to root privileges when you need to:

- Create an event trigger.
- Create a wrapper.
- Create a logical replication publication.
- Create a logical replication subscription.
- Query and maintain replication sources.
- Create a replication user.
- Create a full-text index template and parser.
- Run the **vacuum** command on a system table.
- Run the **analyze** command on a system table.
- Create an extension.

- Grant an object permission to a user.

10.4 RDS for SQL Server Constraints

To ensure data security, there are certain constraints on using RDS for SQL Server.

RDS for SQL Server DB instances are classified into three types: single, primary/standby, and cluster. Different types support different functions. For details, see **Function Comparison**.

Specifications and Performance

Table 10-19 Specifications

Item	Constraints	Description
vCPUs and memory	RDS for SQL Server supports Web, Standard, and Enterprise editions. • Standard Edition supports only instance classes with vCPUs less than 24 or memory less than 128 GB. • Web Edition supports only instance classes with vCPUs less than 16 or memory less than 64 GB.	For details about other function differences among different editions, see **official documentation**.
Storage space	• Cloud SSD: 40 GB to 4,000 GB • Extreme SSD: 40 GB to 4,000 GB	If you need a larger storage space, **submit a service ticket** to apply for it.
IOPS	• Cloud SSD: a maximum of 50,000 • Extreme SSD: a maximum of 128,000	The input/output operations per second (IOPS) supported depends on the I/O performance of Elastic Volume Service (EVS) disks. For details, see the description about ultra-high I/O and extreme SSDs in **Disk Types and Performance** of *Elastic Volume Service Service Overview*.

Quotas

Table 10-20 Quotas

Item	Constraints	Description
Number of databases	A maximum of 100 (can be increased)	-
Number of database accounts	Unlimited	-
Read replica	A maximum of five read replicas can be created for a DB instance.	For more information, see **Managing a Read Replica**.
Tags	A maximum of 20 tags can be added for a DB instance.	For more information, see **Managing Tags**.
Free backup space	RDS provides free backup space of the same size as your purchased storage space.	After you pay for the storage space of your DB instance, you will get a backup space of the same size for free. For more information, see **How Is RDS Backup Data Billed?**
Retention period of automated backups	The default value is 7 days. The value ranges from 1 to 732 days.	For more information, see **Configuring an Intra-Region Backup Policy**.
Audit logs	The maximum size of an audit log file is 50 MB. Up to 50 audit log files can be displayed.	For more information, see **Log Management**.

Naming

Table 10-21 Naming

Item	Constraints
Instance name	• 4 to 64 characters long • Must start with a letter. Only letters (case sensitive), digits, hyphens (-), and underscores (_) are allowed.

Item	Constraints
Database name	• 1 to 64 characters long • Only letters, digits, hyphens (-), underscores (_), and periods (.) are allowed. It cannot start or end with an RDS for SQL Server system database name. RDS for SQL Server system databases include **master**, **msdb**, **model**, **tempdb**, **resource**, **rdsdistribution**, and **rdsadmin**. • Databases cannot be created for a DB instance that is being restored or whose instance class is being changed. • Databases with HA relationships can be renamed only after the replication relationships are removed.
Account name	• 1 to 128 characters long • Only letters, digits, hyphens (-), and underscores (_) are allowed. It must be different from system accounts. System accounts include **rdsadmin**, **rdsuser**, **rdsbackup**, and **rdsmirror**.
Backup name	• 4 to 64 characters long • Must start with a letter. Only letters (case sensitive), digits, hyphens (-), and underscores (_) are allowed.
Parameter template name	• 1 to 64 characters long • Only letters (case sensitive), digits, hyphens (-), underscores (_), and periods (.) are allowed.

Security

Table 10-22 Security

Item	Constraints
rdsuser roles	The administrator account of RDS for SQL Server is **rdsuser**, which has roles **processadmin**, **public**, and **dbcreator** but does not have the following roles: • bulkadmin • diskadmin • securityadmin • serveradmin • sysadmin

Item	Constraints
rdsuser password	• 8 to 32 characters long • Must contain at least three types of the following characters: uppercase letters, lowercase letters, digits, and special characters (~!@#$%^*-_+?,). For more information, see **Resetting the Administrator Password**.
Database port	RDS for SQL Server instances can use port 1433 (default) or ports 2100 to 9500 (excluding 5355 and 5985). For RDS for SQL Server 2017 and 2019 Enterprise, Standard, and Web editions, ports 5050, 5353, and 5986 cannot be used, either. For more information, see **Changing a Database Port**.
Disk encryption	If you enable disk encryption during instance creation, the disk encryption status and the key cannot be changed later. For more information, see **Performing a Server-Side Encryption**.
VPC	The VPC where a DB instance is located cannot be changed after the instance is created.
Security group	• By default, you can create a maximum of 100 security groups in your cloud account. • By default, you can add up to 50 security group rules to a security group. For more information, see **Configuring Security Group Rules**. • One RDS DB instance can be associated with multiple security groups, and one security group can be associated with multiple RDS DB instances. • When creating a DB instance, you can select multiple security groups. For better network performance, you are advised to select no more than five security groups. For more information, see **Changing a Security Group**.

Item	Constraints
System account	To provide O&M services, the system automatically creates system accounts when you create RDS for SQL Server DB instances. These system accounts are unavailable to you. • **rdsadmin**: an account that has the **sysadmin** role and is used to query DB instance information, monitor instance status, rectify faults, migrate data, and restore data. • **rdsmirror**: a primary/standby replication account, used to create mirroring endpoints. • **rdsbackup**: a backup account, used for backend backup. • **Mike**: a Windows system account of RDS for SQL Server. It is used to initialize SQL statements during the DB instance initialization, including creating the **rdsadmin** database and related accounts.
Instance parameter	To ensure the optimal performance of RDS, you can modify parameters in the parameter template you created as needed. For more information, see **Modifying RDS for SQL Server Instance Parameters**.

Instance Operations

Table 10-23 Instance operations

Item	Constraints
Instance deployment	ECSs where DB instances are deployed are not directly visible to you. You can only access the DB instances through IP addresses and database ports.
Data migration	You can migrate data from on-premises SQL Server databases or SQL Server databases built on other clouds to RDS for SQL Server, or from an RDS for SQL Server instance to another RDS for SQL Server instance. Data migration tools include Data Replication Service (DRS) and Data Admin Service (DAS). You are advised to use DRS because it is easy to use and can complete a migration task in minutes. DRS facilitates data transfer between databases, helping you reduce DBA labor costs and hardware costs. RDS for SQL Server does not support database import to system databases **master** or **msdb**. For more information, see **Migration Solutions**.

Item	Constraints
High CPU usage	If the CPU usage is high or close to 100%, data read/write and database access will become slow, and an error will be reported during data deletion. For details, see **High CPU Usage of RDS for SQL Server Instances**.
Rebooting a DB instance	DB instances cannot be rebooted through commands. They must be rebooted through the RDS console.
Stopping or starting a DB instance	• You can temporarily stop pay-per-use instances to save money. For more information, see **Stopping an Instance**. • After stopping your instance, you can restart it to begin using it again.
Viewing backups	You can download backups for local storage. To download a backup, you can use OBS Browser+ or the download URL. For more information, see **Downloading a Backup File**.
Log management	RDS for SQL Server logging is enabled by default and cannot be disabled.
Recycle bin	RDS allows you to move unsubscribed yearly/monthly DB instances and deleted pay-per-use DB instances to the recycle bin. You can rebuild a DB instance that was deleted up to 7 days ago from the recycle bin.

Functions

Table 10-24 Functions

Item	Single	Primary/Standby	Cluster
Maximum number of databases	100 (can be increased)	100 (can be increased)	100 (can be increased)
Number of database accounts	Unlimited	Unlimited	Unlimited
Creation of user, LOGIN, or database	Supported	Supported	Supported
Database-level DDL trigger	Supported	Supported	Supported
Database permission authorization	Supported	Supported	Supported
KILL permission	Supported	Supported	Supported
LinkServer	Supported	Supported	Supported

Item	Single	Primary/Standby	Cluster
Distributed transaction	Supported	Supported	Supported
SQL Profiler	Supported	Supported	Supported
Tuning Adviser	Supported	Supported	Supported
Change Data Capture (CDC)	Supported	Supported	Supported
Change tracking	Supported	Supported	Supported
Windows domain account login	Supported	Supported	Supported
Email	Supported	Supported	Supported
SQL Server Integration Services (SSIS)	Supported	Supported	Supported
SQL Server Analysis Services (SSAS)	Not supported	Not supported	Not supported
SQL Server Reporting Services (SSRS)	Supported	Supported	Supported
R Services	Not supported	Not supported	Not supported
Common Language Runtime (CLR)	SAFE supported	SAFE supported	SAFE supported
Asynchronous communication	Not supported	Not supported	Not supported
Publications & Subscriptions	Supported	Supported	Supported
Policy management	Not supported	Not supported	Not supported
Private domain name	Supported	Supported	Supported
SQL Agent job	Supported	Supported	Supported

Other Constraints

RDS for SQL Server does not support synchronization of service-level objects such as jobs and dblinks between the primary and standby DB instances. You need to create service-level objects on the standby instance. For details, see **Using DAS to Create and Configure Agent Jobs and Dblinks on the Primary and Standby DB Instances**.

11 Related Services

The following figure shows the relationship between RDS and other services.

Figure 11-1 Relationship between RDS and other services

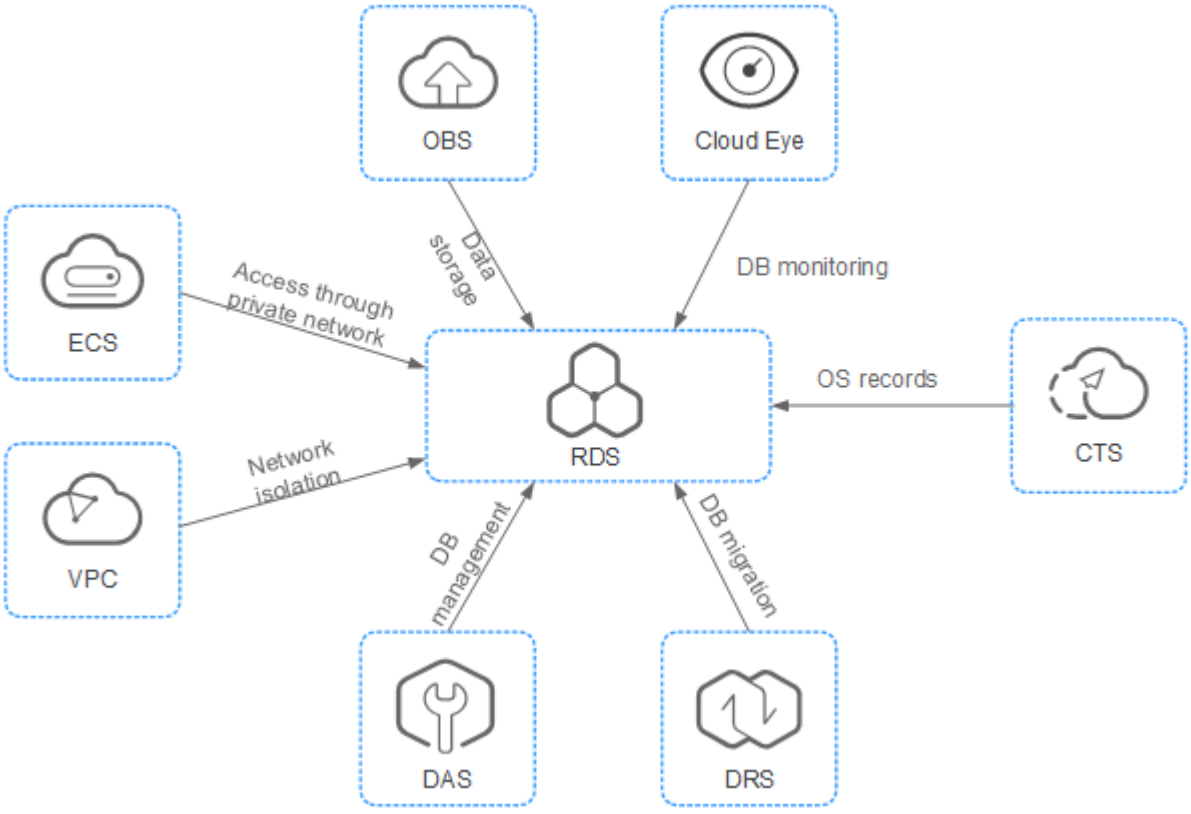


Table 11-1 Related services

Service Name	Description
Elastic Cloud Server (ECS)	Enables you to access RDS DB instances through an internal network. You can then access applications faster and you do not need to pay for public network traffic.

Service Name	Description
Virtual Private Cloud (VPC)	Isolates your networks and controls access to your RDS DB instances.
Object Storage Service (OBS)	Stores automated and manual backups of your RDS DB instances.
Cloud Eye	Monitors RDS resources in real time and reports alarms and warnings promptly.
Cloud Trace Service (CTS)	Records operations on cloud service resources for query, audit, and backtrack.
Distributed Database Middleware (DDM)	Connects to multiple RDS for MySQL DB instances and allows you to access distributed databases.
Data Replication Service (DRS)	Smoothly migrates databases to the cloud.
Data Admin Service (DAS)	Provides a visualized GUI interface for you to connect to and manage cloud databases.

12 Basic Concepts

DB Instances

The smallest management unit of RDS is a DB instance. A DB instance is an isolated database environment on the cloud. An instance ID uniquely identifies a DB instance. A DB instance can contain multiple user-created databases and can be accessed using tools and applications. Each database name is unique.

A default administrator account is provided when you purchase a DB instance. You can use this account to create databases and database users and assign permissions to them. For details about the permissions of user **root**, see **Table 10-6**. You can set the administrator password when or after purchasing a DB instance. If you forget the administrator password, you can reset it.

Each DB instance runs a DB engine. For details about DB instance types, specifications, engines, versions, and statuses, see **DB Instance Description**.

DB Engines

RDS supports the following DB engines:

- MySQL
- PostgreSQL
- Microsoft SQL Server
- MariaDB

For details about the supported versions, see **DB Engines and Versions**.

DB Instance Types

There are two types of RDS DB instances: single and primary/standby. Different series support different DB engines and instance specifications.

For details about DB instance types, see **RDS for MySQL Product Series**, **RDS for MariaDB Product Series**, **RDS for PostgreSQL Product Series**, and **RDS for SQL Server Product Series**.

DB Instance Classes

The DB instance class determines the compute (vCPUs) and memory capacity (memory size) of a DB instance. For details, see **DB Instance Classes**.

Automated Backups

When you create a DB instance, an automated backup policy is enabled by default, but after the DB instance is created, you can modify the policy if needed. RDS will automatically create full backups for DB instances based on your settings.

Manual Backups

Manual backups are user-initiated full backups of DB instances. They are retained until you delete them manually.

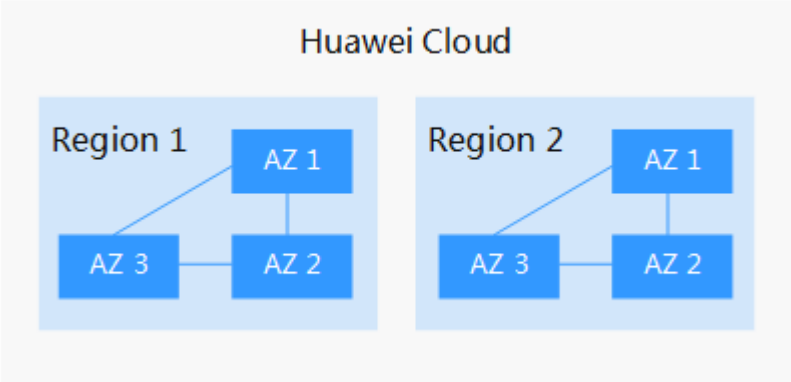
Regions and AZs

A region and availability zone (AZ) identify the location of a data center. You can create resources in a specific region and AZ.

- Regions are defined by their geographical location and network latency. Public services, such as Elastic Cloud Server (ECS), Elastic Volume Service (EVS), Object Storage Service (OBS), Virtual Private Cloud (VPC), Elastic IP (EIP), and Image Management Service (IMS), can all be shared within a given region. Regions are classified as universal regions and dedicated regions. A universal region provides cloud services for all users. A dedicated region provides services of only a specific type or only for specific users.
- An AZ contains one or multiple physical data centers. Each AZ has its own independent cooling, fire extinguishing, moisture-proofing, and electrical facilities. Within an AZ, compute, network, storage, and other resources are logically divided into multiple clusters. AZs within a region are interconnected using high-speed optical fibers so you can build cross-AZ high-availability systems.

Figure 12-1 shows the relationship between regions and AZs.

Figure 12-1 Regions and AZs



Huawei Cloud provides services in many regions around the world. You can select a region and AZ as needed. For more information, see **Global Products and Services**.

Projects

Projects are used to group and isolate OpenStack resources (compute, storage, and network resources). A project can be a department or a project team. Multiple projects can be created for a single account.

