Alibaba Cloud ApsaraDB for MySQL

Product Introduction

Issue: 20190906

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Generic conventions

Table -1: Style conventions

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

Style	Description	Example
{} or {a|b}	It indicates that it is a required value, and only one item can be selected.	`swich {stand | slave}`

Contents

1 What is ApsaraDB for RDS?

ApsaraDB for RDS (Relational Database Service) is a stable, reliable, and scalable online database service. Based on a distributed file system designed by Alibaba Cloud and incorporated with high-performance SSDs, RDS supports MySQL, SQL Server, PostgreSQL, Postgre Plus Advanced Server (PPAS), and MariaDB engines. It provides a complete solution that includes backup, recovery, monitoring, migration, and more, and allows you to focus more on services rather than database O&M.

Learning path

Use RDS Learning Path to learn about concepts and operations of RDS.

Related concepts

To better familiarize yourself with RDS, the following describes common terms used in RDS:

- Instance: Avirtualized database server. You can create one or more databases in an RDS instance.
- Region: A physical data center. Generally, we recommend that your RDS and ECS instances are located in the same region so that ECS can access RDS at fasternetw ork speeds.
- Zone: A physical area that has an independent power supply and networks. A region consists of one or more zones.
- Database engine: Database engines supported by RDS are MySQL, SQL Server, PostgreSQL, PPAS (Postgre Plus Advanced Server, highly compatible with Oracle) and MariaDB. For more information, see Database engines.
- Network type: Alibaba Cloud supports two network types: classic network and virtual private cloud (VPC).
- Product series: ApsaraDB for RDS includes Basic Edition, High-Availability Edition, and Cluster (AlwaysOn) Edition. For more information, see #unique_5.
- Instance type family: ApsaraDB for RDS supports common instance, dedicated instance, or dedicated-host instance types. For more information, see #unique_6.
- Storage type: ApsaraDB for RDS supports local SSDs or cloud SSDs. For more information, see #unique_7.

Related services

- ECS: Elastic Compute Service (ECS) is a cloud-based server. An ECS instance can access an RDS instance at the fastest speed if the ECS instance accesses the RDS instance through the intranet. Using both ECS and RDS is a typical service model.
- Redis: Redis is a persistent in-memory database service. If the service volume is large, using ECS, RDS, and Redis can handle more read requests and reduce the response time.
- MongoDB: MongoDB is a stable, reliable, and scalable database service that is compatible with the MongoDB protocol. If your business involves different types of data structure, you can store structured data in RDS and unstructured data in MongoDB.
- MaxCompute: MaxCompute (previously known as ODPS) is a general-purpose, fully managed, multi-tenant data processing platform for large-scale data warehousing. MaxCompute supports various data importing solutions and distributed computing models, allowing you to effectively query massive datasets, reduce production costs, and ensure data security. You can use the Data Integration service to import RDS data to MaxCompute for large-scale data processing.
- DTS: You can use Data Transmission Service (DTS) to migrate on-premises database to RDS or implement remote disaster recovery of RDS.
- OSS: Object Storage Service (OSS) is an encrypted, secure, cost-effective, and easy-to-use object storage service that enables you to store, back up, and archive large amounts of data in the cloud.

How to use RDS

You can create RDS instances, configure the network, create databases, create accounts, and more by using the web console, CLI, SDK, or API, depending on your actual scenario.

- Web console: RDS provides a graphical web console where you can perform operations easily.
- CLI: All operations available on the web console can be performed through the CLI.
- SDK: All operations available on the web console can be performed through the SDK.
- API: All operations available on the web console can be performed through APIs.

After you create an RDS instance, you can access it through any common client, such as MySQL-Front, SSMS (SQL Server Management Studio), or pgAdmin.

RDS pricing

See #unique_14.

2 Benefits

2.1 Low costs and easy-to-use

Flexible billing methods

RDS provides flexible billing methods to help you save costs.

- For short-term requirements, create Pay-As-You-Go instances (billed by hour), which can be released at any time to save costs.
- For long-term requirements, create Subscription instances, which are more cost-effective. Furthermore, the longer the subscription, the higher the discount.

For more information, see #unique_17/unique_17_Connect_42_section_25l_g7t_kzx.

Easy deployment

- You do not need to purchase database server hardware or software.
- To use RDS, simply create RDS instances through the RDS console or API. Instances are created within minutes.

On-demand upgrades and downgrades

If you are starting a new business, you can buy an RDS instance of low specifications. As the database pressure and data volume increase, upgrade the instance specifications. During off-peak hours, you can downgrade the instance specifications to save costs. For more information, see #unique_19 and #unique_20.

High compatibility

- You can operate RDS databases in the way you operate your own database engines.
- RDS is compatible with your existing programs and tools. Commonly used data import and export tools can be used to import data to RDS. Furthermore, Alibaba Cloud provides DTS to simplify the migration.

Simple O&M

- Alibaba Cloud ensures the normal operation of RDS through routine maintenance and management, such as hardware/software fault processing and database patch upgrades.

- You can also manage databases through the RDS console or API. Supported operations include instance management, database management, backup, recovery, and more.

Get started

- #unique_21
- Learning path

Related topics

- #unique_22
- #unique_23
- #unique_24
- #unique_25

2.2 High performance

Parameter optimization

Alibaba Cloud has top database experts who have optimized RDS parameters based on many years of experience in production. DBAs continuously optimize RDS throughout its life cycle to ensure that RDS is running with the optimal performance.

SQL optimization

Based on your application scenario, RDS locates low-efficiency SQL statements and offers recommendations for optimization.

High-end backend hardware

All servers used by RDS have been evaluated by multiple parties to ensure exceptiona l performance and stability.

High-speed access

With RDS is used with ECS, ECS can access RDS through the intranet. This shortens response time and saves your Internet traffic costs.

Performance white papers

- RDS for MySQL
- RDS for SQL Server

Get started

- #unique_21
- Learning path

Related topics

- #unique_25
- Precautions on comparing ECS user-created databases and ApsaraDB for RDS instances in terms of performance
- #unique_27
- #unique_23
- #unique_24

2.3 Disaster tolerance

Backup and recovery

- RDS supports automatic and manual backups. You can set the automatic backup frequency or manually create backups at any time. For more information, see Backup and recovery.
- RDS supports data recovery by time or backup set. You can restore data of any point in time within the log retention period to a new instance, verify the data, and then transfer the data to the original instance. For more information, see Backup and recovery.

Disaster tolerance

Series	Disaster tolerance
Basic Edition	· Data backups are stored as multiple copies on OSS or distributed cloud disks to prevent data loss. (This applies to all RDS series.) · The Basic Edition consists of a single node without a slave node as hot backup. Therefore, if fault occurs, the restoration time is long. Choose Basic Edition if you do not require high availability.

Series	Disaster tolerance
High-availability Edition	The High-availability Edition adopts the high-availability architecture with one master node and one slave node. It is applicable to over 80% of scenarios. If the master node fails, a switchover occurs within seconds without affecting your applications. If the slave node fails, a new slave node is automatically generated to ensure high availability. · Single-zone instance: The master and slave nodes are in the same zone but on different physical servers. All cabinets, air conditioners, electricity, and networks in the zone are redundant to ensure high availability. · Multi-zone instance Note: You can switch between single-zone instances and multi-zone instances. For details, see #unique_29.
Cluster (AlwaysOn) Edition	Based on the AlwaysOn technology, it provides one master node, one slave node, and up to seven read-only nodes that horizontally scale read capabilities. The slave and read-only nodes synchronize data from the master node. The Cluster Edition provides the same availability as the High-availability Edition. Besides, the read-only nodes can be deployed in zones different from those of the master and slave nodes. Note: · Only RDS for SQL Server 2017 provides the Cluster Edition. For more information, see #unique_30. · For information about RDS for MySQL read-only instances, see #unique_31. · For information about RDS for PostgreSQL read-only instances, see #unique_32. · For information about RDS for PPAS read-only nodes, see #unique_33.

Get started

- #unique_21
- Learning path

Related topics

- #unique_27
- #unique_22

- #unique_23
- #unique_25

2.4 High security

DDoS protection

If DDoS attacks are detected, the security system of RDS enables traffic cleaning first. If traffic cleaning fails or the attacks reach the blackhole threshold, blackhole filtering is triggered.

> Note:
> We recommend accessing RDS instances through the intranet to prevent DDoS attacks.

Access control

- IP addresses can access RDS only after you add them to the whitelist. IP addresses that are not in the whitelist cannot access RDS.
- Each account can only view and operate its own databases.

For more information, see access control.

System security

- RDS is protected by multiple firewall layers that block various network attacks and ensure data security.
- Direct logon to the RDS server is not allowed. Only the ports required by certain database services are open.
- RDS servers cannot initiate an external connection. It can only accept access requests.

For more information, see Network isolation.

Professional security team

Aliabab Cloud security team is responsible for ensuring the security of RDS.

Get started

- #unique_21
- Learning path

Related topics

- #unique_27
- #unique_22
- #unique_24
- #unique_25

2.5 Comparisons between ApsaraDB for RDS and self-hosted databases

Performance comparison

Item	ApsaraDB for RDS	Self-hosted databases
Service availability	99.95%	You need to manually build master-slave replication and RAID arrays.
Data reliability	99.9999%	You need to manually build master-slave replication and RAID arrays.
System security	DDoS protection , traffic cleaning , timely repair of various database security vulnerabilities	Self-hosted database deployment incurs high costs and database security vulnerabilities must be repaired manually.
Database backup	Automatic backup	Independent backups are possible, but you have to find storage space for backup and regularly validate whether the backup data can be recovered.
Software and hardware investment	Pay only for the resources you use, with no upfront software and hardware investment required	Database servers are costly and the licensing fees for SQL Server must be paid.
System hosting	No hosting fee	The running of asingle 2U server costs more than RMB 5,000 RMB/year (more than 10,000 RMB/year for master and slave servers, if needed).
Maintenance cost	No user maintenance is required	Professional DBAs are required, resulting in high labor cost.

Item	ApsaraDB for RDS	Self-hosted databases
Deployment and resizing	Instant activation , fast deployment, automatic resizing	Hardware procurement, data center hosting, and host deployment, and other tasks are time-consuming.
Resource utilization rate	Charged based on actual usage, resulting in 100% utilization.	Resource utilization is unpredictable because there are peak and off-peak hours.

Price comparison

Item	ApsaraDB for RDS	Local databases
Costs of hardware, spare parts, and accessories	Take the following instance type as an example: An instance with 1,200 MB of memory and 50 GB storage (IOPS is up to 600) costs 2,040 RMB/year.	· A minimum of 2 servers are required for a database cluster, and a single server of which the IOPS is up to 600 costs approximately 6,000 RMB. · An intranet switch is used to connect the front-end Web server (an inexpensive 1U non -NMS switch costs approximat ely 1,000 RMB). Furthermore, repairs to damaged hardware incurs an estimated 30% increase to costs. · Hardware cost: (6,000 x 2 + 1, 000) x 130% = 16,900 RMB Annual hardware cost: 16,900 RMB/3= 5,633 RMB (the cost of hardware is calculated over a 3-year depreciation period)
Data center hosting fee	No hosting fee is required from the user because it is the responsibility of the service provider.	The hosting fee for a 1U cabinet is 3,000 RMB/year, and hosting fees for two 1U servers and a 1U intranet switch are charged. Data center hosting fees: 3,000 x 3 = 9,000 RMB

Item	ApsaraDB for RDS	Local databases
Bandwidth fee	Communication between ECS and ApsaraDB for RDS in the same region is available through the intranet with no cost. However, communication between ECS and ApsaraDB for RDS across different regions is available over the Internet with a certain cost for Internet traffic. For more information, see Pricing.	Available only in the intranet with no cost for Internet traffic.
Cost of database maintenance engineers	There is no labor cost because database maintenance is taken care of by a service provider.	The monthly salary for an entry -level DBA engineer is at least 5, 000 RMB. If 30% workload for a full-time engineer is needed for the current project: Labor cost: 5 ,000 x 12 x 30% = 18,000 RMB
Total annual cost	2,040 RMB/year	32,633 RMB/year

3 Product series

3.1 Product series overview

RDS instances are divided into three series: Basic Edition, High-availability Edition, and Cluster Edition. Different instance types support different series. For more information, see #unique_6.

Comparison between different series

Series	Description	Applicable scenarios
Basic Edition	It provides a single node and separates computing from storage, and is extremely cost-effective. For more information, see #unique_38.	· Personal learning · Small websites · Development and test environments for small- and medium-sized enterprises
High-availability Edition	It adopts the high-availability architecture with one master node and one slave node. It is applicable to over 80% of scenarios.	· Production databases of large-and medium-sized enterprises · Databases for the Internet, Internet of things (IoT), online retail, logistics, gaming, and other industries
Cluster Edition	Only RDS for SQL Server 2017 Enterprise provides this series. Based on the AlwaysOn technology, it provides one master node, one slave node, and up to seven read-only nodes that horizontally scale read capabilities. For more information, see #unique_39.	Production databases of large- and medium-sized enterprises, such as online retail and automobile companies

RDS for MySQL

Function	Basic Edition	High-availability Edition
	MySQL 5.7	MySQL 5.5/5.6/5.7
Monitoring and alarms	Supported	Supported

Function	Basic Edition	High-availability Edition
	MySQL 5.7	MySQL 5.5/5.6/5.7
IP whitelist	Supported	Supported
Backup and recovery	Supported	Supported
Parameter settings	Supported	Supported
Log management	Not supported	Supported
Master/Slave switchover	Not supported	Supported
SSL	Not supported	Supported
TDE	Not supported	Supported
Migrate to another zone	Not supported	Supported
Read/Write splitting	Not supported	Supported
Read-only instance	Not supported	Supported (not free)
SQL audit	Not supported	Supported (not free)

Note:

- MySQL 5.5 High-availability Edition does not support SSL.
- MySQL 5.7 High-availability Edition based on local SSDs does not support TDE.
- MySQL 5.7 High-availability Edition based on cloud SSDs does not support SSL, TDE, performance tuning, read-only instances, read/write splitting, SQL audit, or migrations to another zone.

RDS for SQL Server

Please see Function differences between SQL Server versions.

RDS for PostgreSQL/PPAS

Function	Basic Edition	High-availability Edition
	PostgreSQL 10	PostgreSQL 9.4 or 10
Monitoring and alarms	Supported	Supported
IP whitelist	Supported	Supported
Backup and recovery	Supported	Supported
Parameter settings	Supported	Supported
Log management	Not supported	Supported

Function	Basic Edition	High-availability Edition
	PostgreSQL 10	PostgreSQL 9.4 or 10
SQL audit	Not supported	Supported
Migrate to another zone	Not supported	Supported
Master/Slave switchover	Not supported	Supported

RDS for MariaDB

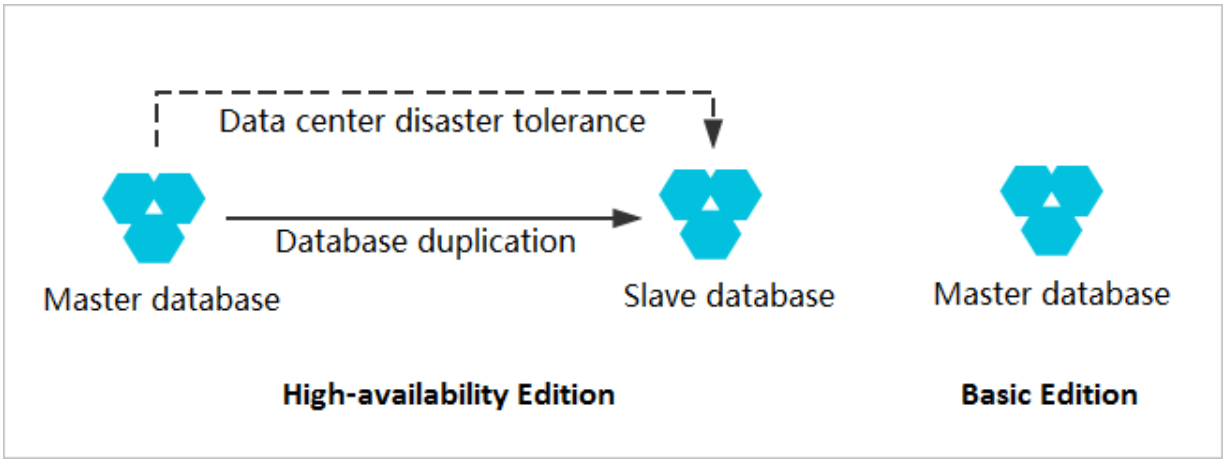
Function	High-availability Edition
Monitoring and alarms	Supported
IP whitelist	Supported
Backup and recovery	Supported
Parameter settings	Supported
Log management	Supported
Master/Slave switchover	Supported
SSL	Supported

3.2 Basic Edition

The Basic Edition is based on the single-node architecture and separates computing from storage, providing a cost-effective database service.

Note:
The Basic Edition consists of a single node without a salve node as hot backup, so the database service becomes unavailable for some time when the node fails unexpectedly or is performing configuration changes. If you require high availability, choose High-availability or Cluster Edition.

The following picture shows the architecture of the Basic Edition and High-availability Edition.



Advantages

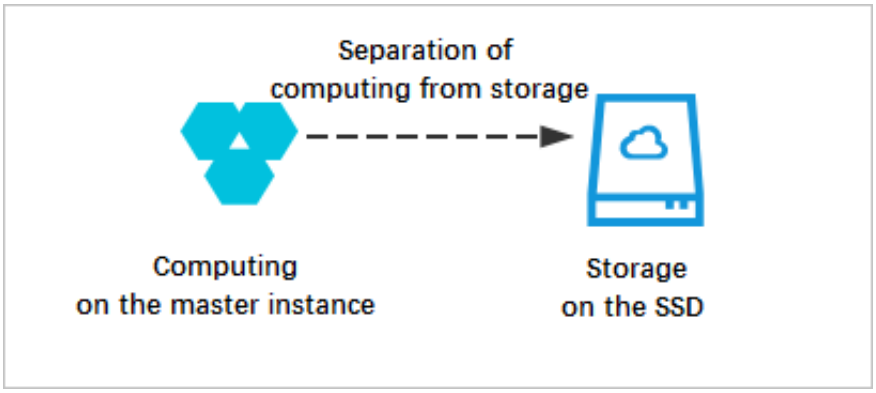
Performance

The Basic Edition does not provide a slave node, so it has no performance decrease caused by real-time replication. In this aspect, the Basic Edition is superior to the High-availability Edition of the same specifications.

Reliability

- Computing is separated from storage, so the failure of the compute node does not cause data loss.

  Note:
  When the log backup interval is set to 30 minutes for an SQL Server Basic Edition instance, the instance can be restored to the nearest time point with 30 minutes in the event of underlying SSD damage or force majeure. For more information, see #unique_54.



- The large-scale underlying Apsara distributed storage provides multiple replicas to ensure data reliability.

Costs

With the number of database nodes reduced, the price is only half that of the High-availability Edition.

Functions

The Basic Edition provides basic functions such as IP whitelists, monitoring, alarms, backup, and recovery, but does not provide the following functions:

- Switch between master and slave instances
- Migrate instance across zones
- Log management
- Introduction to MySQL read-only instances

For functions supported by different database engines, see #unique_55.

Scenarios

- Small websites or applications

  You can buy cost-effective RDS instances and focus on your business without worrying about database O&M.
- Personal learning

  You can use the Basic Edition to test and learn about databases.
- Development and test

  RDS instances can be created within minutes. If they are Pay-As-You-Go instances , they can also be released at any time. Therefore, your development effeciency is greatly improved.

Get started

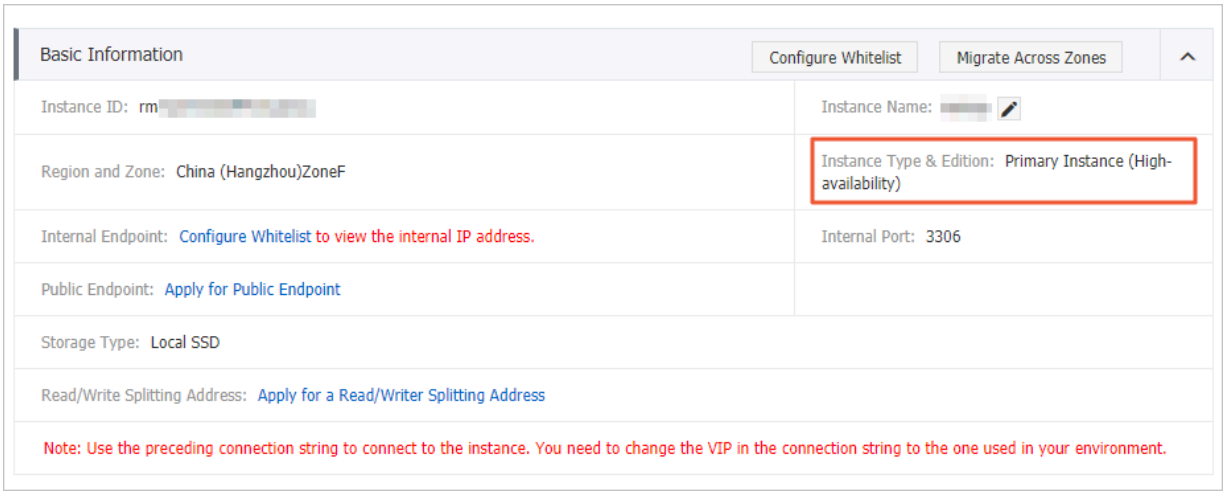
Currently, RDS for MySQL, SQL Server, and PostgreSQL provide the Basic Edition. Use Quick Start to quickly create and connect to an RDS instance.

- Quick Start for MySQL
- Quick Start for SQL Server
- Quick Start for PostgreSQL

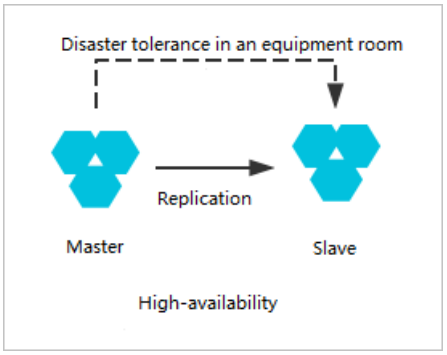
3.3 High-availability Edition

RDS instances are divided into Basic Edition, High-availability Edition, Cluster Edition, and Three-node Enterprise Edition. This topic describes High-availability Edition.

High-availability Edition is a widely used database edition that uses a primary/secondary architecture to implement high availability. High-availability Edition is suitable for over 80% of user scenarios such as the Internet, IoT, retail e-commerce, logistics, and gaming.



Topology



Benefits

High availability

High-availability Edition instances each have a secondary instance. Data between the primary and secondary instances is synchronized in real time. If the primary instance cannot be accessed, your business is automatically switched to the secondary instance.

Comprehensive features

High-availability Edition instances provide comprehensive features such as auto scaling, backup and restoration, performance optimization, and read/write splitting. The instances also provide the SQL explorer feature to query SQL execution records. This feature makes database access traceable and ensures the security of core data.

Upgrade to High-availability Edition

Basic Edition instances do not have secondary instances for hot backup. Therefore, when a Basic Edition instance fails, changes specifications, or upgrades the version , it may remain unavailable for a long period of time. We recommend that you use High-availability Edition instances if your business has high database availability requirements.

In addition to creating new High-availability Edition instances, you can also upgrade existing Basic Edition instances to High-availability Edition instances to avoid having to migrate data and release instances.

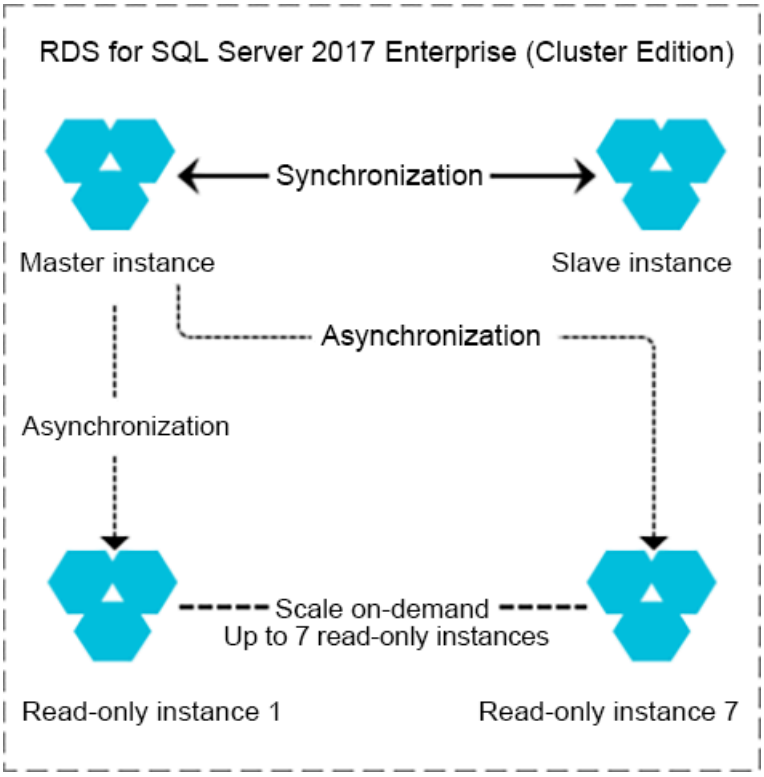
Note:

- RDS for MySQL 5.7 Basic Edition instances can be upgraded to High-availability Edition instances. For more information, see #unique_19.
- RDS for SQL Server Basic Edition instances can be upgraded to High-availability Edition instances in the console. For more information, see Upgrade from Basic Edition to High-availability Edition.

3.4 Cluster Edition (AlwaysOn Edition)

Currently, only RDS for SQL Server 2017 Enterprise Edition supports the Cluster Edition (AlwaysOn Edition), which is based on the native AlwaysOn technology of SQL Server. The Cluster Edition separates computing from storage, and supports read /write splitting. By default, each read-only instance in the cluster also provides an independent intranet connection string.

The following figure shows the architecture of the Cluster Edition.



Advantages

- Horizontally scalable read capability

  You can add read-only instances to linearly increase the cluster's read capability. Additionally, the specifications of read-only instances can be different from those of the master instance. Therefore, you can add read-only instances with high specifications to achieve even better read capability.

  > Note:
  > By default, read-only instances do not support high availability. To implement high availability of read-only instances, at least two read-only instances are required.

- Flexibly controllable costs

  In the Cluster Edition, you can create read-only instances of common specificat ions, which are cost-effective options. Additional read-only instances can process more read requests so that the overall system configuration is optimized.

  In addition, specifications of read-only instances can be lower than those of the master instance. Therefore, you can choose cost-effective read-only instance with

lower specifications for background applications, such as intelligent analysis applications.

In the near future, the Cluster Edition will also support the maximum performance mode, which can be used during peak hours to implement asynchronous replication between the master and slave nodes, so that the cluster performance is maximized.

Scenarios

- Use read-only instances to handle read requests during peak traffic hours

  For example, to prepare for peak trading events like Double 11 Festival, online retail enterprises can buy additional read-only instances with high specifications to process the majority of read requests while implementing read/write splitting and traffic control on the service level. In this way, the enterprises can handle several times the amount of usual traffic.
- Assign analysis tasks to read-only instances

  Enterprises generally have demand for intelligent data analysis. An independent read-only instance dedicated for data analysis can reduce the probability of the master instance becoming unresponsive, improve concurrency, and reduce the impact on core service queries, thereby ensuring service stability.

4 Instance types

4.1 Instance type overview

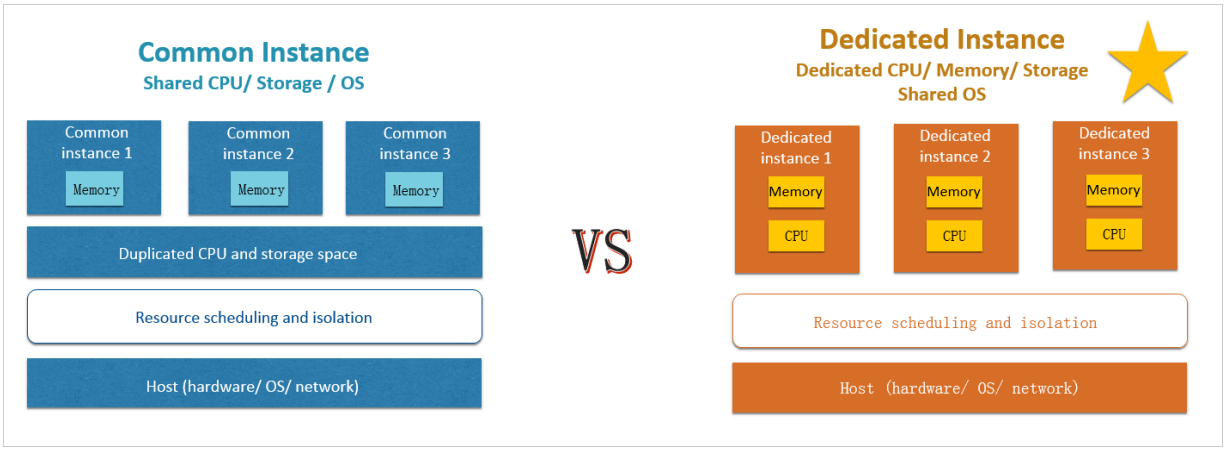
Different types of ApsaraDB for RDS instances are provided: common instances, dedicated instances, and dedicated-host instances. To distinguish from the instance type provided before January 2017, which we defined as common instances, the new instance types are defined as dedicated instances, among which dedicated-host instances have top-level configurations. A dedicated-host instance can be upgrade to the top level so that it can use a full physical machine.

The following list shows the features and applicable scenarios of various instance types:

Types	Description	Applicable scenarios
Common instances	· It is a highly cost-effective instance type which maximizes utilization by reusing resources and allows you to enjoy the benefits of scale. · Its storage capacity is not subject to CPU /memory, allowing flexible configurations.	· Price-sensitive customers · Scenarios where high-performance stability is not required

Types	Description	Applicable scenarios
Dedicated instances/ dedicated-host instances	· The two types are new RDS instance types which feature fixed computing capabilities , storage space, and IO performance. · A number of fully dedicated CPU cores and threads are assigned to each instance to ensure long-term stability in computing performanc e. · The fixed storage space is reserved for higher stability. · Dedicated-host instances are dedicated instances with top-level configurations.	It is applicable for business scenarios where a database-centric system is used, such as finance, e-commerce, government , medium and large -size Internet businesses.

The differences between common and dedicated instances are shown in the following figure.



4.2 Instance types

ApsaraDB RDS for MySQL

Edition	Version	Instance family	Instance type	CPU and memory	Maximum connections	Maximum IOPS	Storage capacity
Basic Edition	5.7 or 8.0	General-purpose	mysql.n1.micro.1	1 core, 1 GB	2,000	min{30 × Storage capacity, 20,000}	20 GB to 6,000 GB
			mysql.n2.small.1	1 core, 2 GB	2,000		
			mysql.n2.medium.1	2 cores, 4 GB	4,000		
			mysql.n4.medium.1	2 cores, 8 GB	6,000		
			mysql.n4.large.1	4 cores, 16 GB	8,000		
			mysql.n4.xlarge.1	8 cores, 32 GB	10,000		
			mysql.n4.2xlarge.1	16 cores, 64 GB	15,000		
			mysql.n4.4xlarge.1	32 cores, 128 GB	20,000		
			mysql.n8.4xlarge.1	32 cores, 256 GB	64,000		
			mysql.n4.8xlarge.1	56 cores, 224 GB	64,000		
			mysql.n8.8xlarge.1	56 cores, 480 GB	64,000		

Edition	Version	Instance family	Instance type	CPU and memory	Maximum connections	Maximum IOPS	Storage capacity
High-availability Edition	5.5, 5.6, 5.7, or 8.0	General-purpose	rds.mysql.t1.small	1 core, 1 GB	300	600	5 GB to 2,000 GB
			rds.mysql.s1.small	1 core, 2 GB	600	1,000	
			rds.mysql.s2.large	2 cores, 4 GB	1,200	2,000	
			rds.mysql.s2.xlarge	2 cores, 8 GB	2,000	4,000	
			rds.mysql.s3.large	4 cores, 8 GB	2,000	5,000	
			rds.mysql.m1.medium	4 cores, 16 GB	4,000	7,000	
			rds.mysql.c1.large	8 cores, 16 GB	4,000	8,000	
			rds.mysql.c1.xlarge	8 cores, 32 GB	8,000	12,000	
			rds.mysql.c2.xlarge	16 cores, 64 GB	16,000	14,000	5 GB to 3,000 GB
			rds.mysql.c2.xlp2	16 cores, 96 GB	24,000	16,000	

Edition	Version	Instance family	Instance type	CPU and memory	Maximum connections	Maximum IOPS	Storage capacity
		Dedicated instance (with high memory)	mysql.x8.medium.2	2 cores, 16 GB	2,500	4,500	250 GB
			mysql.x8.large.2	4 cores, 32 GB	5,000	9,000	500 GB
			mysql.x8.xlarge.2	8 cores, 64 GB	10,000	18,000	1,000 GB or 2,000 GB
			mysql.x8.2xlarge.2	16 cores, 128 GB	20,000	36,000	2,000 GB or 3,000 GB
		Dedicated instance (with high CPU)	mysql.x4.large.2	4 cores, 16 GB	2,500	4,500	250 GB or 500 GB
			mysql.x4.xlarge.2	8 cores, 32 GB	5,000	9,000	500 GB, 1,000 GB, or 2,000 GB
			mysql.x4.2xlarge.2	16 cores, 64 GB	10,000	18,000	1,000 GB, 2,000 GB, or 3,000 GB
			mysql.x4.4xlarge.2	32 cores, 128 GB	20,000	36,000	2,000 GB or 3,000 GB
		Dedicated host	rds.mysql.st.h43	60 cores, 470 GB	100,000	50,000	3,000 GB, 4,000 GB, 5,000 GB, or 6,000 GB
Read-only instance	5.6, 5.7, or 8.0	General-purpose	rds.mysql.t1.small	1 core, 1 GB	300	600	5 GB to 2,000 GB

Edition	Version	Instance family	Instance type	CPU and memory	Maximum connections	Maximum IOPS	Storage capacity
			rds.mysql.s1.small	1 core, 2 GB	600	1,000	
			rds.mysql.s2.large	2 cores, 4 GB	1,200	2,000	
			rds.mysql.s2.xlarge	2 cores, 8 GB	2,000	4,000	
			rds.mysql.s3.large	4 cores, 8 GB	2,000	5,000	
			rds.mysql.m1.medium	4 cores, 16 GB	4,000	7,000	
			rds.mysql.c1.large	8 cores, 16 GB	4,000	8,000	
			rds.mysql.c1.xlarge	8 cores, 32 GB	8,000	12,000	
			rds.mysql.c2.xlarge	16 cores, 64 GB	16,000	14,000	5 GB to 3,000 GB
			rds.mysql.c2.xlp2	16 cores, 96 GB	24,000	16,000	
		Dedicated instance (with high memory)	mysqlro.x8.medium.1	2 cores, 16 GB	2,500	4,500	250 GB
			mysqlro.x8.large.1	4 cores, 32 GB	5,000	9,000	500 GB

Edition	Version	Instance family	Instance type	CPU and memory	Maximum connections	Maximum IOPS	Storage capacity
			mysqlro.x8.xlarge.1	8 cores, 64 GB	10,000	18,000	1,000 GB or 2,000 GB
			mysqlro.x8.2xlarge.1	16 cores, 128 GB	20,000	36,000	2,000 GB or 3,000 GB
		Dedicated instance (with high CPU)	mysqlro.x4.large.1	4 cores, 16 GB	2,500	4,500	250 GB or 500 GB
			mysqlro.x4.xlarge.1	8 cores, 32 GB	5,000	9,000	500 GB, 1,000 GB, or 2,000 GB
			mysqlro.x4.2xlarge.1	16 cores, 64 GB	10,000	18,000	1,000 GB, 2,000 GB, or 3,000 GB
			mysqlro.x4.4xlarge.1	32 cores, 128 GB	20,000	36,000	2,000 GB or 3,000 GB

ApsaraDB RDS for SQL Server primary instance

Edition	Version	Instance family	Instance type	CPU and memory	Maximum connections	Maximum IOPS	Storage capacity
Basic Edition	2012 Enterprise Edition	General purpose	rds.mssql.s2.large	2 cores, 4 GB	Not limited	min{30 × Storage capacity, 20,000}	20 GB to 3,000 GB
			rds.mssql.s2.xlarge	2 cores, 8 GB			
			rds.mssql.s3.large	4 cores, 8 GB			

Edition	Version	Instanc family	Instance type	CPU and memory	Maximu connect s	Maximum IOPS	Storage capacity
			rds.mssql.m1. medium	4 cores, 16 GB			
			rds.mssql.c1. large	8 cores, 16 GB			
			rds.mssql.c1. xlarge	8 cores, 32 GB			
			rds.mssql.c2. xlarge	16 cores, 64 GB			
	2012 Web Edition and 2016 Web Edition	Dedicated instance	mssql.x2. medium.w1	2 cores, 4 GB	Not limited	min{ 30 × Storage capacity, 20,000}	20 GB to 3,000 GB
			mssql.x4. medium.w1	2 cores, 8 GB			
			mssql.x2.large. w1	4 cores, 8 GB			
			mssql.x4.large. w1	4 cores, 16 GB			
			mssql.x2.xlarge. w1	8 cores, 16 GB			
			mssql.x4.xlarge. w1	8 cores, 32 GB			
			mssql.x2.2xlarge .w1	16 cores, 32 GB			
			mssql.x4.2xlarge .w1	16 cores, 64 GB			
High-availabilty Edition	2008 R2	General - purpose	rds.mssql.s2. large	2 cores, 4 GB	1,200	2,000	10 GB to 2,000 GB
			rds.mssql.s2. xlarge	2 cores, 8 GB	2,000	4,000	
			rds.mssql.s3. large	4 cores, 8 GB	2,000	5,000	
			rds.mssql.m1. medium	4 cores, 16 GB	4,000	7,000	

Edition	Version	Instance family	Instance type	CPU and memory	Maximum connections	Maximum IOPS	Storage capacity
			rds.mssql.c1.large	8 cores, 16 GB	4,000	8,000	
			rds.mssql.c1.xlarge	8 cores, 32 GB	8,000	12,000	
			rds.mssql.c2.xlarge	16 cores, 64 GB	16,000	14,000	
			rds.mssql.c2.xlp2	16 cores, 96 GB	24,000	16,000	
		Dedicated instance	mssql.x8.medium.2	2 cores, 16 GB	2,500	4,500	250 GB
			mssql.x8.large.2	4 cores, 32 GB	5,000	9,000	500 GB
			mssql.x8.xlarge.2	8 cores, 64 GB	10,000	18,000	1,000 GB
			mssql.x8.2xlarge.2	16 cores, 128 GB	20,000	36,000	2,000 GB
		Dedicated host	rds.mssql.st.d13	30 cores, 220 GB	64,000	20,000	2,000 GB
			rds.mssql.st.h43	60 cores, 470 GB	100,000	50,000	2,000 GB
	2012 Enterprise Edition and 2016 Enterprise Edition	Dedicated instance	mssql.x4.medium.e2	2 cores, 8 GB	Not limited	Dependent on the performance of cloud disks	20 GB to 4,000 GB
			mssql.x8.medium.e2	2 cores, 16 GB			
			mssql.x4.large.e2	4 cores, 16 GB			
			mssql.x8.large.e2	4 cores, 32 GB			
			mssql.x4.xlarge.e2	8 cores, 32 GB			
			mssql.x8.xlarge.e2	8 cores, 64 GB			

Edition	Version	Instanc family	Instance type	CPU and memory	Maximu connect s	Maximum IOPS	Storage capacity
			mssql.x4.2xlarge .e2	16 cores, 64 GB			
			mssql.x8.2xlarge .e2	16 cores, 128 GB			
			mssql.x4.3xlarge .e2	24 cores, 96 GB			
			mssql.x4.4xlarge .e2	32 cores, 128 GB			
			mssql.x8.4xlarge .e2	32 cores, 256 GB			
			mssql.x8.7xlarge .e2	56 cores, 480 GB			
			mssql.x4.8xlarge .e2	64 cores, 256 GB			
			mssql.x8.8xlarge .e2	64 cores, 512 GB			
	2012 Standard Edition and 2016 Standard Edition	General-purpose	mssql.s2. medium.s2	2 cores, 4 GB			
			mssql.s2.large.s2	4 cores, 8 GB			
			mssql.s2.xlarge. s2	8 cores, 16 GB			
			mssql.s2.2xlarge .s2	16 cores, 32 GB			
		Dedicated instance	mssql.x4. medium.s2	2 cores, 8 GB			
			mssql.x8. medium.s2	2 cores, 16 GB			
			mssql.x4.large.s2	4 cores, 16 GB			
			mssql.x8.large.s2	4 cores, 32 GB			

Edition	Version	Instanc family	Instance type	CPU and memory	Maximu connect s	Maximum IOPS	Storage capacity
			mssql.x4.xlarge. s2	8 cores, 32 GB			
			mssql.x8.xlarge. s2	8 cores, 64 GB			
			mssql.x4.2xlarge .s2	16 cores, 64 GB			
			mssql.x8.2xlarge .s2	16 cores, 128 GB			
			mssql.x4.3xlarge .s2	24 cores, 96 GB			
Cluster Edition	2017 Enterprise Edition	Dedicated instance	mssql.x4. medium.e2	2 cores, 8 GB	Not limited	Dependent on the performance of cloud disks	20 GB to 4,000 GB
			mssql.x4.large.e2	4 cores, 16 GB			
			mssql.x4.xlarge. e2	8 cores, 32 GB			
			mssql.x4.2xlarge .e2	16 cores, 64 GB			
			mssql.x4.4xlarge .e2	32 cores, 128 GB			
			mssql.x4.8xlarge .e2	64 cores, 256 GB			
			mssql.x8. medium.e2	2 cores, 16 GB			
			mssql.x8.large.e2	4 cores, 32 GB			
			mssql.x8.xlarge. e2	8 cores, 64 GB			
			mssql.x8.2xlarge .e2	16 cores, 128 GB			
			mssql.x8.4xlarge .e2	32 cores, 256 GB			

Edition	Version	Instanc family	Instance type	CPU and memory	Maximu connect s	Maximum IOPS	Storage capacity
			mssql.x8.8xlarge .e2	64 cores, 512 GB			

ApsaraDB RDS for SQL Server read-only instance

Edition	Version	Instanc family	Instance type	CPU and memory	Maximu connect s	Maximum IOPS	Storage capacity
Cluster Edition	2017 Enterprise Edition	General purpose	rds.mssql.s2. large	2 cores, 4 GB	Not limited	Dependent on the performanc e of cloud disks	20 GB to 4,000 GB
			rds.mssql.s3. large	4 cores, 8 GB			
			rds.mssql.c1. large	8 cores, 16 GB			
			rds.mssql.s2. xlarge	2 cores, 8 GB			
			rds.mssql.m1. medium	4 cores, 16 GB			
			rds.mssql.c1. xlarge	8 cores, 32 GB			
			rds.mssql.c2. xlarge	16 cores, 64 GB			
		Dedicated instance	mssql.x4. medium.ro	2 cores, 8 GB			
			mssql.x4.large.ro	4 cores, 16 GB			
			mssql.x4.xlarge. ro	8 cores, 32 GB			
			mssql.x4.2xlarge .ro	16 cores, 64 GB			
			mssql.x4.4xlarge .ro	32 cores, 128 GB			

Edition	Version	Instanc family	Instance type	CPU and memory	Maximu connect s	Maximum IOPS	Storage capacity
			mssql.x4.8xlarge .ro	64 cores, 256 GB			
			mssql.x8. medium.ro	2 cores, 16 GB			
			mssql.x8.large.ro	4 cores, 32 GB			
			mssql.x8.xlarge. ro	8 cores, 64 GB			
			mssql.x8.2xlarge .ro	16 cores, 128 GB			
			mssql.x8.4xlarge .ro	32 cores, 256 GB			
			mssql.x8.7xlarge .ro	56 cores, 480 GB			
			mssql.x8.8xlarge .ro	64 cores, 512 GB			

ApsaraDB RDS for PostgreSQL primary instance or read-only instance (based on local disks)

Edition	Version	Instance family	Instance type	CPU and memory	Maximu connecti s	Maximu IOPS	Storage capacity
High-availabili ty Edition	9.4	General - purpose	rds.pg.t1.small	1 core, 1 GB	100	600	5 GB to 2,000 GB
			rds.pg.s1.small	1 core, 2 GB	200	1,000	
			rds.pg.s2.large	2 cores, 4 GB	400	2,000	
			rds.pg.s3.large	4 cores, 8 GB	800	5,000	
			rds.pg.c1.xlarge	8 cores, 32 GB	2,000	12,000	

Edition	Version	Instance family	Instance type	CPU and memory	Maximu connecti s	Maximu IOPS	Storage capacity
			rds.pg.c2.xlarge	16 cores, 64 GB	2,000	14,000	
		Dedicated instance (with high memory)	pg.x8.medium.2	2 cores, 16 GB	2,500	4,500	250 GB
			pg.x8.large.2	4 cores, 32 GB	5,000	9,000	500 GB
			pg.x8.xlarge.2	8 cores, 64 GB	10,000	18,000	1,000 GB
			pg.x8.2xlarge.2	16 cores, 128 GB	12,000	36,000	2,000 GB
		Dedicated instance (with high CPU)	pg.x4.large.2	4 cores, 16 GB	2,500	4,500	250 GB or 500 GB
			pg.x4.xlarge.2	8 cores, 32 GB	5,000	9,000	500 GB or 1, 000 GB
			pg.x4.2xlarge.2	16 cores, 64 GB	10,000	18,000	1,000 GB or 2 ,000 GB
			pg.x4.4xlarge.2	32 cores, 128 GB	12,000	36,000	2,000 GB or 3 ,000 GB
		Dedicated host	rds.pg.st.d13	30 cores, 220 GB	4,000	20,000	3,000 GB
			rds.pg.st.h43	60 cores, 470 GB	4,000	50,000	3,000 GB, 4, 000 GB , 5,000 GB, or 6,000 GB

ApsaraDB RDS for PostgreSQL primary instance (based on cloud disks)

Edition	Version	Instance family	Instance type	CPU and memory	Maximu connecti s	Maximu IOPS	Storage capacity
Basic Edition	10	General-purpose	pg.n1.micro.1	1 core, 1 GB	100	min{1 ,200 + 30 × Storage capacity , 20,000 }	20 GB to 6, 000 GB
			pg.n2.small.1	1 core, 2 GB	200		
			pg.n2.medium.1	2 cores, 4 GB	400		
			pg.n4.medium.1	2 cores, 8 GB	800		
			pg.n2.large.1	4 cores, 8 GB	800		
			pg.n4.large.1	4 cores, 16 GB	1,600		
			pg.n2.xlarge.1	8 cores, 16 GB	1,600		
			pg.n4.xlarge.1	8 cores, 32 GB	3,200		
			pg.n2.2xlarge.1	16 cores, 32 GB	3,200		
			pg.n4.2xlarge.1	16 cores, 64 GB	6,400		
			pg.n8.2xlarge.1	16 cores, 128 GB	10,000		
			pg.n4.4xlarge.1	32 cores, 128 GB	12,800		
			pg.n8.4xlarge.1	32 cores, 256 GB	20,000		
			pg.n4.8xlarge.1	56 cores, 224 GB	22,000		
			pg.n8.8xlarge.1	56 cores, 480 GB	48,000		
pg.n2. medium .2c	2 cores , 4 GB	100					

Edition	Version	Instance family	Instance type	CPU and memory	Maximu connecti s	Maximu IOPS	Storage capacity
Dedicated instance	pg.x2.large.2c	4 cores, 8 GB	200				
	pg.x4.large.2c	4 cores, 16 GB	400				
	pg.x2.xlarge.2c	8 cores, 16 GB	400				
	pg.x4.xlarge.2c	8 cores, 32 GB	800				
	pg.x2.2xlarge.2c	16 cores, 32 GB	800				
	pg.x4.2xlarge.2c	16 cores, 64 GB	1,600				
	pg.x8.2xlarge.2c	16 cores, 128 GB	3,200				
	pg.x4.4xlarge.2c	32 cores, 128 GB	3,200				
	pg.x8.4xlarge.2c	32 cores, 256 GB	6,400				
	pg.x4.8xlarge.2c	56 cores, 224 GB	5,600				
	pg.x8.8xlarge.2c	56 cores, 480 GB	12,000				

ApsaraDB RDS for PPAS

Edition	Version	Instance family	Instance type	CPU and memory	Maximum connections	Maximum IOPS	Storage capacity
High-availability Edition	10	General-purpose	rds.ppas.t1.small	1 core, 1 GB (for compatibility test)	100	1,200	150 GB
		Dedicated instance	ppas.x4.small.2	1 core, 4 GB	200	5,000	250 GB
			ppas.x4.medium.2	2 cores, 8 GB	400	10,000	
			ppas.x8.medium.2	2 cores, 16 GB	2,500	15,000	
			ppas.x4.large.2	4 cores, 16 GB	2,500	20,000	250 GB or 500 GB
			ppas.x8.large.2	4 cores, 32 GB	5,000	30,000	
			ppas.x4.xlarge.2	8 cores, 32 GB	5,000	40,000	500 GB or 1,000 GB
			ppas.x8.xlarge.2	8 cores, 64 GB	10,000	60,000	
			ppas.x4.2xlarge.2	16 cores, 64 GB	10,000	80,000	1,000 GB or 2,000 GB
			ppas.x8.2xlarge.2	16 cores, 128 GB	12,000	120,000	
			ppas.x4.4xlarge.2	32 cores, 128 GB	12,000	160,000	2,000 GB or 3,000 GB
			ppas.x8.4xlarge.2	32 cores, 256 GB	12,000	240,000	
		Dedicated host	rds.ppas.st.h43	60 cores, 470 GB	12,000	450,000	3,000 GB, 4,000 GB, 5,000 GB, or 6,000 GB

ApsaraDB RDS for MariaDB

Edition	Instance family	Instance type	CPU and memory	Maximum connections	Storage	
					Maximum IOPS	Storage capacity
High-availability Edition	General-purpose	mariadb.n2.small.2c	1 core, 2 GB	2,000	min{1,200 + 30 × Storage capacity, 20,000}	20 GB to 1,000 GB
		mariadb.n2.medium.2c	2 cores, 4 GB	4,000		
	Dedicated instance	mariadb.x2.large.2c	4 cores, 8 GB	6,000		20 GB to 6,000 GB
		mariadb.x4.large.2c	4 cores, 16 GB	8,000		
		mariadb.x2.xlarge.2c	8 cores, 16 GB	8,000		
		mariadb.x4.xlarge.2c	8 cores, 32 GB	10,000		
		mariadb.x2.2xlarge.2c	16 cores, 32 GB	10,000		
		mariadb.x4.2xlarge.2c	16 cores, 64 GB	15,000		
		mariadb.x8.2xlarge.2c	16 cores, 128 GB	20,000		
		mariadb.x4.4xlarge.2c	32 cores, 128 GB	20,000		
		mariadb.x8.4xlarge.2c	32 cores, 256 GB	64,000		
		mariadb.x4.8xlarge.2c	56 cores, 224 GB	64,000		
		mariadb.x8.8xlarge.2c	56 cores, 480 GB	100,000		

Phased-out instance types of ApsaraDB RDS for MySQL

The following table describes the phased-out instance types of ApsaraDB RDS for MySQL. They will not be available when you create instances. We recommend that you use the latest instance types.

Instance type	CPU cores	Memory	Maximum connections	Maximum IOPS
rds.mys2.small	2	240 MB	60	150
rds.mys2.mid	4	600 MB	150	300
rds.mys2.standard	6	1,200 MB	300	600
rds.mys2.large	8	2,400 MB	600	1,200
rds.mys2.xlarge	9	6,000 MB	1,500	3,000
rds.mys2.2xlarge	10	12,000 MB	2,000	6,000
rds.mys2.4xlarge	11	24,000 MB	2,000	12,000
rds.mys2.8xlarge	13	48,000 MB	2,000	14,000
rds.mysql.st.d13	30	220 GB	64,000	20,000

Phased-out instance types of ApsaraDB RDS for SQL Server

The following table describes the phased-out instance types of ApsaraDB RDS for SQL Server. They will not be available when you create instances. We recommend that you use the latest instance types.

Instance type	CPU cores	Memory	Maximum connections	Maximum IOPS
rds.mssql.s1.small	1	2 GB	600	1,000
rds.mss1.small	6	1,000 MB	100	500
rds.mss1.mid	8	2,000 MB	200	1,000
rds.mss1.standard	9	4,000 MB	400	2,000
rds.mss1.large	10	6,000 MB	600	3,000
rds.mss1.xlarge	11	8,000 MB	800	4,000

Instance type	CPU cores	Memory	Maximum connections	Maximum IOPS
rds.mss1.2xlarge	12	12,000 MB	1,200	6,000
rds.mss1.4xlarge	13	24,000 MB	2,000	12,000
rds.mss1.8xlarge	13	48,000 MB	2,000	14,000

Phased-out instance types of ApsaraDB RDS for PostgreSQL

The following table describes the phased-out instance types of ApsaraDB RDS for PostgreSQL. They will not be available when you create instances. We recommend that you use the latest instance types.

Instance type	CPU cores	Memory	Maximum connections	Maximum IOPS
rds.pg.c1.large	8	16 GB	1,500	8,000

Phased-out instance types of ApsaraDB RDS for PPAS

The following table describes the phased-out instance types of ApsaraDB RDS for PPAS. They will not be available when you create instances. We recommend that you use the latest instance types.

Instance type	CPU cores	Memory	Maximum connections	Maximum IOPS
rds.ppas.s1.small	1	2 GB	200	1,000
rds.ppas.s2.large	2	4 GB	400	2,000
rds.ppas.s3.large	4	8 GB	800	5,000
rds.ppas.m1.medium	4	16 GB	1,500	8,000
rds.ppas.c1.xlarge	8	32 GB	2,000	12,000
rds.ppas.c2.xlarge	16	64 GB	2,000	14,000

5 Storage types

ApsaraDB RDS provides two types of storage: local SSDs and cloud SSDs.

- Local SSD (recommended)

  A local SSD is in the server node where database engine resides. With local SSDs, computing is close to data so that I/O latency is reduced.
- Cloud SSD

  A cloud SSD is an elastic block storage device based on the distributed storage architecture. With cloud SSDs, computing is separated from storage.

> Note:
> The reliability and availability of local SSDs and cloud SSDs are as follows:
>
> - Local SSDs: used for RDS instances that work in master/slave mode. If the master node becomes faulty, the slave node takes over services in seconds. For more information, see Product series overview.
> - Cloud SSDs: work in a distributed architecture to ensure data reliability through multiple replicas. If the RDS instance to which cloud SSDs belong is in Basic Edition, recovering services takes a long time in the event of a fault. If the RDS instance to which cloud SSDs belong is in High-availability Edition or Cluster Edition, services can be taken over in seconds in the event of a fault.

No matter which type of storage you choose, Alibaba Cloud ensures that RDS provides reliability, availability, and read/write performance that meet SLA requirements.

Comparison

Table 5-1: Feature comparison

Item	Local SSD	Cloud SSD
I/O performance	★★★★★ Low I/O latency and good performance.	★★★★ Performance is slightly lower due to additional network I/O.

Item	Local SSD	Cloud SSD
Functionality	★★★★★ Supports all features of RDS.	★★★ Currently certain database engines do not support read/write splitting and SQL audit.
Configuration flexibility	★★★ The storage capacity of an dedicated instance depends on the instance specification and therefore cannot be adjusted without changing the instance specification.	★★★★★ There are more optional configurations, and the storage capacity can be adjusted separately.
Scalability	★★★ Scaling requires data replication and may take a few hours.	★★★★★ Scaling can be completed in minutes.

Table 5-2: Function comparison

Item	Local SSD	Cloud SSD
Maximum storage capacity	6 TB	6 TB
Network type	Classic network and VPC	Classic network and VPC
Elastic upgrade and downgrade	Supported (An elastic upgrade or downgrade can be completed in hours, depending on the data volume.)	Supported (An elastic upgrade or downgrade can be completed in 10 minutes.)
Zone migration	Supported	In development
Introduction to MySQL read-only instances	Supported	Supported by some database engines
Introduction to read/write splitting	Supported	Supported by some database engines
SQL audit	Supported	In development

Item	Local SSD	Cloud SSD
Set SSL encryption and TDE	Supported	Supported by some database engines
Back up RDS data	Physical backup and logical backup	Snapshot backup
Restore MySQL data	Supported	Supported
Restore MySQL data	Supported	Supported

Product support

The supported storage types depend on the database engine, version, and series.

Database engine	Version	Series	Storage type
MySQL	8.0	High-availability Edition	Cloud SSD
			Local SSD
	5.7	Basic Edition	Cloud SSD
		High-availability Edition	Cloud SSD
			Local SSD
	5.6	High-availability Edition	Local SSD
	5.5	High-availability Edition	Local SSD
SQL Server	2017	Cluster Edition	Cloud SSD
	2016	Basic Edition/High-availability Edition	Cloud SSD
	2012	Basic Edition/High-availability Edition	Cloud SSD
	2008 R2	High-availability Edition	Local SSD
PostgreSQL	10、9.4	High-availability Edition	Local SSD
	10	Basic Edition	Cloud SSD
PPAS	10	High-availability Edition	Local SSD
MariaDB	10.3	High-availability Edition	Cloud SSD

6 Typical applications

6.1 Remote disaster recovery

Remote disaster recovery from a user-created database to an RDS instance

You can use DTS to synchronize the data of a database in any user-created data center or an ECS-hosted database in one region to an RDS instance in another region in real time. In such case, you can always retrieve a backup of your data on Alibaba Cloud even if your data center is damaged.

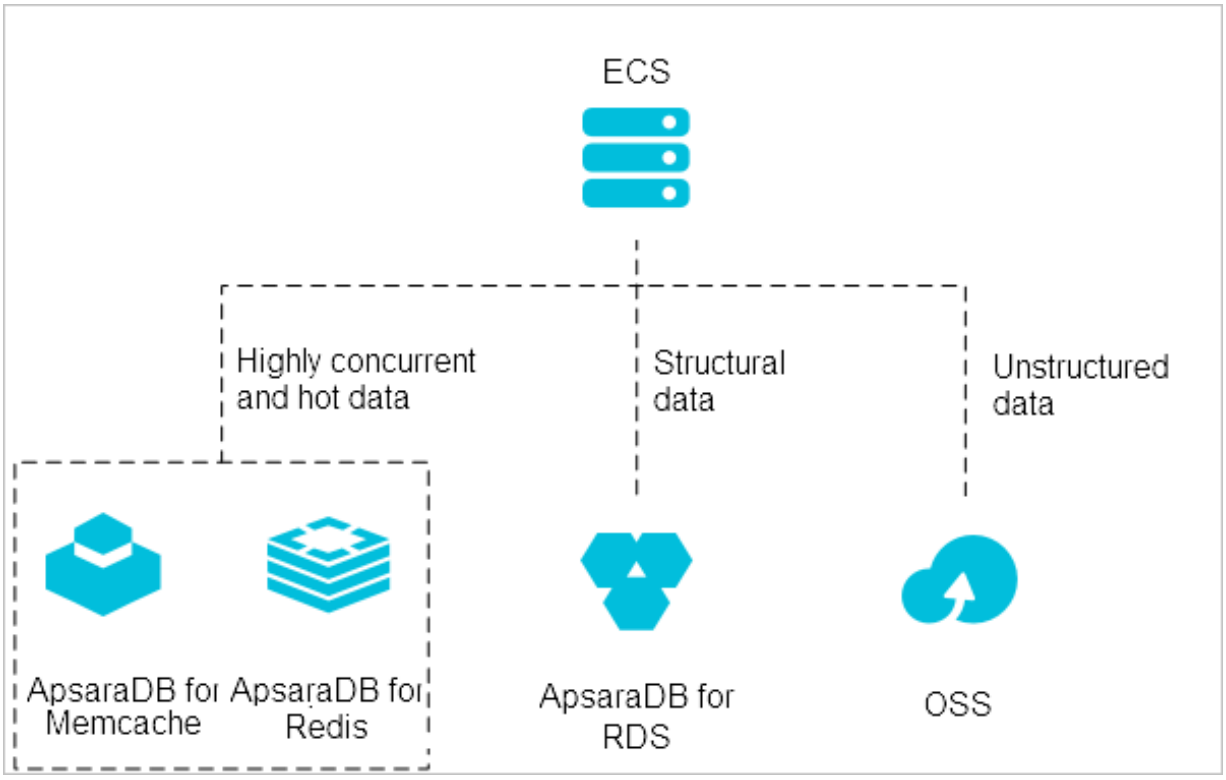
For more information about how to synchronize data, see Create a data synchronization task.

Cross-region backup and restoration

RDS for MySQL can automatically replicate backup files from your computer to an OSS bucket that is located in a region different from your computer. The backup file replicates are used to manage and restore your RDS instance. For more information, see #unique_73.

6.2 Diversified data storage

RDS supports diversified storage extension through storage products, such as Memcache, Redis, and OSS.



Cache data persistence

ApsaraDB for Memcache and ApsaraDB for Redis can be used together to form a high-throughput and low-latency storage solution.

These cache products have two characteristics:

- Fast response with a request delay of only a few milliseconds
- Higher QPS (queries per second) than RDS

For more information, see #unique_75.

Multi-structure data storage

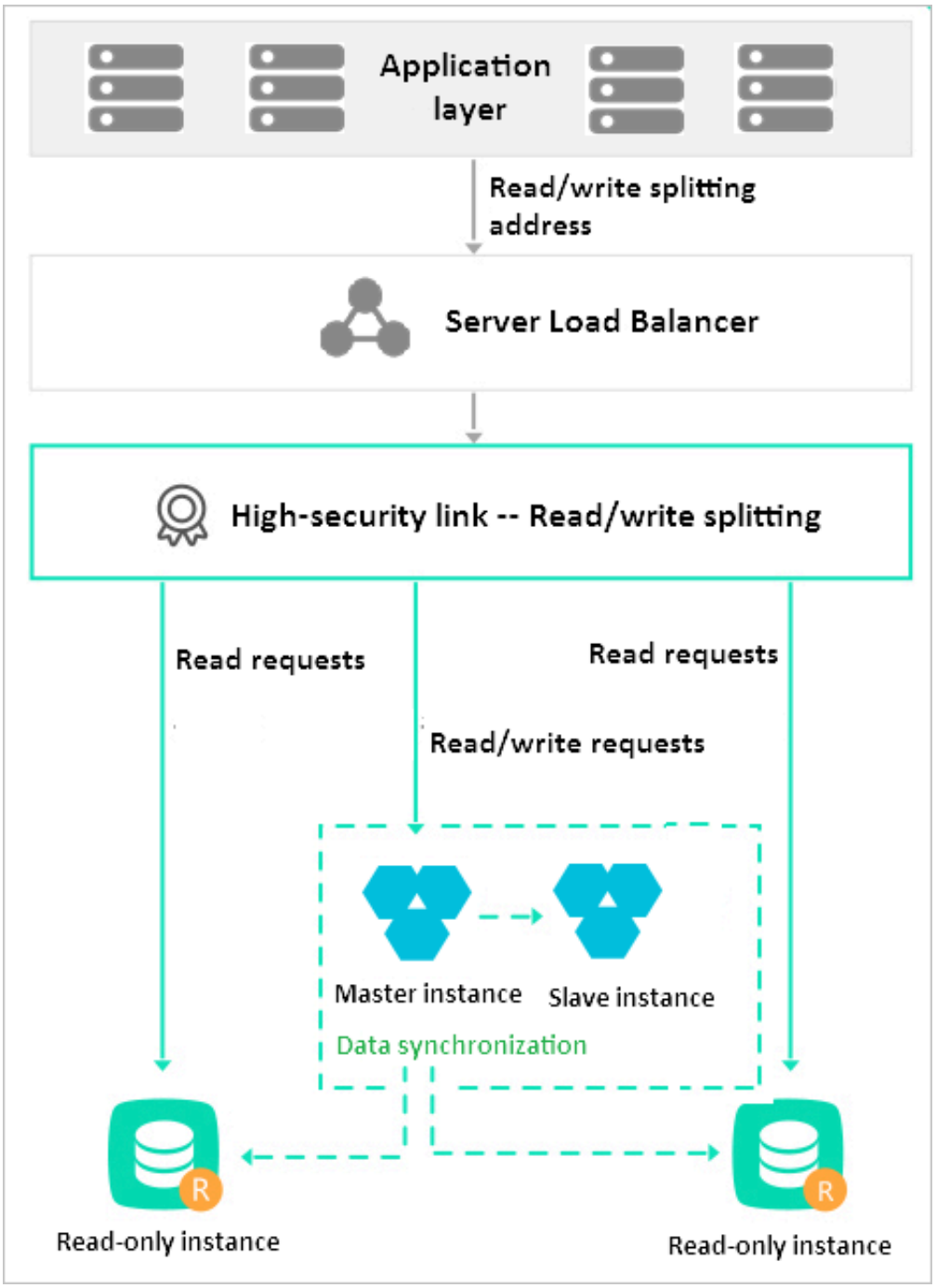
OSS is an Alibaba Cloud storage service that features massive capacity, robust security, low cost, and high reliability. RDS and OSS can work together to form multiple data storage solutions.

For example, when RDS and OSS are used in a forum, resources such as the images of registered users or those posted on the forum can be stored in OSS to reduce the storage pressure on RDS.

For more information, see #unique_76.

6.3 Read/Write splitting function

ApsaraDB for MySQL allows read-only instances to be directly attached to RDS in order to distribute the read pressure on the master instance. Each read-only instance has an independent connection string, and the read pressure can be automatically distributed on the application side.



For more information on creating read-only instances on ApsaraDB for MySQL, see #unique_78. To enable read/write splitting, see #unique_79.

6.4 Big data analysis

The Open Data Processing Service (MaxCompute) is formerly known as the Big Data Computing Service (ODPS). It stores and computes structured data in batches, providing solutions for massive data warehouses as well as big data analysis and modeling.

With the data integration service, RDS data can be imported into MaxCompute to achieve large-scale data computing.

7 RDS usage instructions

- Instructions for RDS instance upgrade

  There is a transient disconnection of up to 30 seconds during RDS instance upgrade. To avoid service unavailability caused by interruptions, you must make preparations in advance and set auto-reconnection for the program and to RDS.

- Risks of intranet/Internet switchover

  During the switchover between the intranet and Internet, RDS may be disconnect ed with the server and the RDS IP address may change. After the switchover, update the connection address in the program in a timely manner.

- Rollback risks

  Currently, RDS only supports data rollback for the entire instance but not for a single table or database. It is important to make backups of crucial data before rollback to prevent data loss. If you need to roll back only partial tables or partial data, we recommend that you recover the data by creating a temporary instance or a clone instance. After a temporary instance or a clone instance is created successfully, the required data is directed returned to the production database. For more information, see Recover data to the master instance through a temporary instance.

- Instructions on RDS locking policies

  Currently, RDS only supports data rollback for the entire instance, not for a single table or database. It is important to make backups of crucial data before rollback to prevent data loss. We recommend that you create a temporary instance for data recovery if you only want to roll back part of the tables or part of the data. You must import the required data back to the production databases from the temporary instance. For more information, see Recover data to the master instance through a temporary instance.

- Instructions on RDS failover

  RDS adopts a master-slave mode to guarantee high availability. When the master node fails, RDS fails services over to the slave node within 30 seconds. During the failover, there may be an inaccessible period of (less than or equal to) 30 seconds. You must set auto-reconnection for your program to RDS to avoid service unavailability.

- Instructions on data synchronization mode for MySQL instances
  - For MySQL 5.1, data synchronization between the master and slave nodes is in asynchronous mode. This mode guarantees high performance of instances, but it may lead to probabilistic data inconsistency between the master and slave nodes.
  - For MySQL 5.5, data synchronization between the master and slave nodes is in semi-synchronous mode. This mode compromises write performance to some extent, but it can greatly reduce the probability of data inconsistency between the master and slave databases. If you have a high requirement on data reliability (for example, financial systems), we recommend that you purchase instances of MySQL 5.5 or later versions.
  - For MySQL 5.6, data synchronization between the master and slave nodes uses GTID (a new feature in MySQL 5.6). This feature guarantees both the performance and data consistency.
- Notes of attentions for using RDS

  After purchasing an RDS instance, you do not need to conduct basic O&M (such as high availability guarantee, backup, and security patches) for databases. Pay attention to the following matters:

  - Check whether the CPU, IOPS, space, and the number of connections of your RDS instance are adequate. If not, you must optimize or upgrade your instance.
  - Check whether your RDS instance has performance problems, for example, whether there is a large number of slow SQL queries, whether the SQL statements need optimization, and whether there are extra or missing indexes.
  - Check whether your RDS instance has any web SQL injection warnings. If so, your databases may be vulnerable to web SQL injections. In this case, modify the application to prevent web SQL injection attacks.

8 [Notice] Supplementary service agreement for RDS for SQL Server 2008 R2

Alibaba Cloud will stop providing security updates for RDS for SQL Server 2008 R2 instances purchased on and after July 9, 2019.

Causes

Microsoft will end its support for SQL Server 2008 and 2008 R2 on July 9, 2019. This means that regular security updates will no longer be provided. However, you will be able to purchase up to three years of Extended Security Updates from Microsoft. Microsoft will offer Extended Security Updates for purchase on July 9, 2019, which includes Security Updates and Bulletins rated "critical."

Effective time

July 9, 2019

Existing RDS for SQL Server 2008 R2 instances

We recommend that you upgrade your instances to SQL Server 2012 or 2016. For more information, see Upgrade SQL Server 2008 R2.

New RDS for SQL Server 2008 R2 instances

Microsoft will offer up to three years of Extended Security Updates for purchase. We recommend that you use other RDS for SQL Server versions. If you still choose to purchase RDS for SQL Server 2008 R2 instances, you hereby acknowledge that Alibaba Cloud will not provide security updates for the related instances.

 Note:
You can purchase Extended Security Updates (for three years from July 9, 2019) offered by Microsoft, and submit a ticket to Alibaba Cloud to install the updates.

9 [Important] RDS network link upgrade

To ensure better stability and performance, we recommend that you upgrade the network connection mode of your RDS instances from the safe mode (database proxy mode) to the high-performance mode (standard mode).

Potential risks of not performing the upgrade

The safe mode may encounter temporary instability in certain scenarios. To ensure stability of your services, we recommend that you perform the upgrade as soon as possible.

Benefits

After the upgrade, the network link is shorter so that:

- The network becomes more stable.
- The average response time is reduced by 20% and performance is significantly improved.

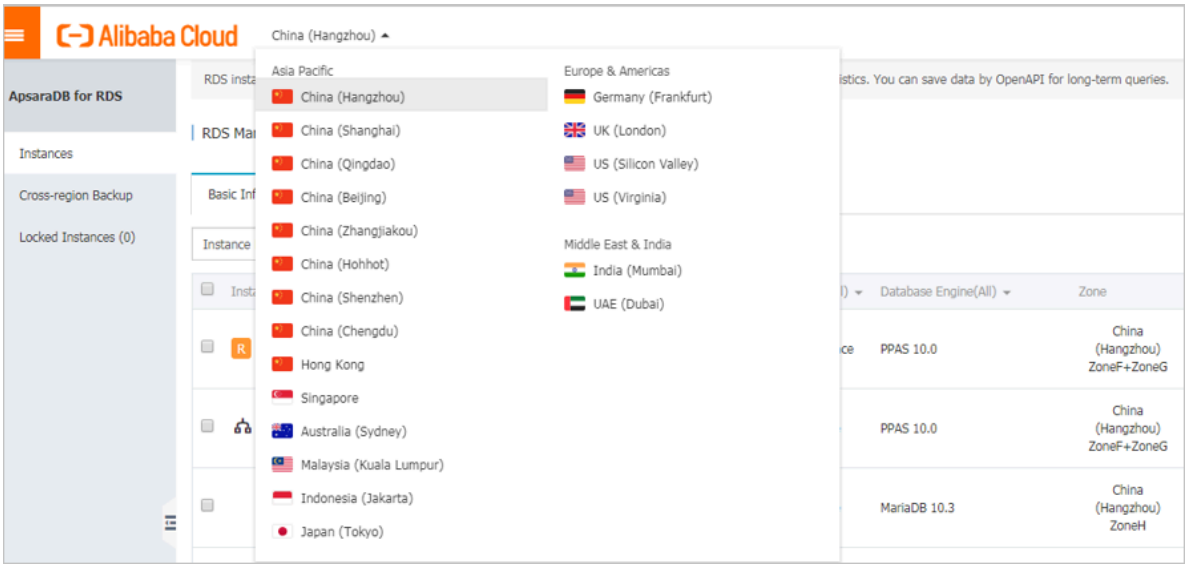
Instances that need to be upgraded

You need to upgrade the network connection modes of all RDS for MySQL, RDS for PostgreSQL, RDS for PPAS, and HybridDB for PostgreSQL instances that are in safe mode (database proxy mode).

To check whether an instance is in safe mode (database proxy mode), follow these steps:

1. Log on to the RDS console.

2. In the upper-left corner, select the region where the target instance is located.



3. Find the target instance and click its ID.
4. In the left-side navigation pane, click Database Connection. Then, check the Database Proxy (Safe Mode) field.
   - If the status is Disabled, the instance does not need to be upgraded.
   - If the status is Enabled, the instance needs to be upgraded.

> Note:
>
> - If an MySQL instance has enabled read/write splitting, the instance does not need to be upgraded. Alibaba Cloud will provide another upgrade plan for such instances.
> - If an instance has read-only instances attached to it, you only need to upgrade the master instance and then the read-only instances will be automatically upgraded

Impact of the upgrade

- During the upgrade, the RDS instance being upgraded will be disconnected for about 30 seconds. Make sure that your services can automatically reconnect to the RDS instance.
- In database proxy mode, the multi-statement function is enabled at the protocol layer by default. Therefore, if the multi-statement function is disabled but multiple SQL statements are run after the switchover, the system reports errors while running the SQL statements. We recommend that you check and add connection

parameters before the upgrade. For example, you can add the `allowMultiQueries` parameter in the JDBC API as follows:

```
dbc : mysql :/// test ? allowMulti  Queries = true
```

Upgrade method 1

1. On the Database Connection page, click Switch Access Mode.

   Note:
   This button is displayed only when the access mode of the instance is safe mode (database proxy mode).
2. In the displayed dialog box, click Confirm.
3. Check that services are running properly.

   Note:
   This step is important.

Upgrade method 2

1. On the Database Proxy page, click the slider next to Database Proxy (Safe Mode).

   Note:
   This slider is available only when the access mode of the instance is safe mode (database proxy mode).
2. In the displayed dialog box, click Confirm.
3. Check that services are running properly.

   Note:
   This step is important.

FAQ

1. How do I know whether an instance needs to be upgraded?

   See Instances that need to be upgraded.
2. I cannot upgrade my instance. Why?

   If a MySQL instance has enabled read/write splitting, the instance currently cannot be upgraded. Alibaba Cloud will provide another upgrade plan for such instances.

3. What do I need to do for my services after an upgrade?
   - During an upgrade, the instance being upgraded may be disconnected. Make sure that your services have an automatic reconnection mechanism; otherwise, you may need to manually restart your services.
   - After an upgrade, the connection address, IP address, and other settings of the RDS instance remain unchanged, so you do not need to make any changes to your applications.
4. Can I switch back to the safe mode (database proxy mode)?

   You do not need to switch back to the safe mode. The safe mode was designed to support the coexistence of different network types (Internet and intranet), but now the high-performance mode (standard mode) also serves that purpose.
5. If a master instance has read-only instances, do I need to upgrade each read-only instance?

   No. You only need to upgrade the master instance. The attached read-only instances are then automatically upgraded.