

TencentDB for MySQL

Product Introduction

Product Documentation



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Product Introduction

Overview

Last updated : 2022-01-19 15:04:22

Overview

TencentDB for MySQL is a high-performance distributed data storage service developed by Tencent Cloud based on the open-source MySQL database. It enables you to set up, manipulate, and scale relational databases in the cloud more easily.

TencentDB for MySQL has the following features:

- It provides cloud-based data storage service for internet applications.
- It is fully compatible with MySQL protocols and suitable for table-oriented application scenarios. TencentDB for MySQL can be used wherever MySQL is used.
- It offers MySQL cluster service that features high performance, data reliability up to 99.9996%, ease of use, and convenience.
- It integrates various database features such as backup, scaling, and migration. In addition, it is equipped with the new-generation database tool DMC for even more convenient management of databases.

Concepts

Instance: a TencentDB for MySQL resource in Tencent Cloud.

Instance type: a combination of node count, read/write capability, and deployment region for a TencentDB for MySQL instance.

Read-Only instance: a TencentDB for MySQL instance that can only be read from.

RO group: a logical tool used to manage one or more read-only instances. It can meet load balancing requirements in read/write separation scenarios and significantly enhance a database's read load capacity.

Disaster recovery instance: a TencentDB for MySQL instance that supports disaster recovery across AZs and regions.

VPC: a custom virtual network space that is logically isolated from other resources.

Security group: security access control to TencentDB for MySQL instances by specifying IP, protocol, and port rules for instance access.

[Region and AZ](#): physical location of a TencentDB for MySQL instance and other resources.

[Tencent Cloud console](#): web-based UIs.

Additional Services

For more information on how to calculate actual expenses precisely with relevant billing tools, see [Billing Overview](#) and [Price Calculator](#).

For more information on how to set up in-cloud data services by purchasing TencentDB for MySQL instances, see [Purchase Methods](#) and [Getting Started](#).

For more information on how to migrate data in/off the cloud with the TencentDB for MySQL data migration tool, see [Data Migration](#).

For more information on how to cleanse and analyze data with the TencentDB for MySQL data subscription tool, see [Creating Data Subscription Task](#).

For more information on how to streamline the post-transaction auditing and tracking mechanism with the TencentDB for MySQL audit feature, see [Enabling TencentDB for MySQL Audit](#).

For more information on how to deploy your computing services by purchasing CVM instances, see [CVM](#).

For more information on how to monitor the running status of your TencentDB for MySQL instances with Cloud Monitor, see [Cloud Monitor](#).

For more information on how to call TencentCloud APIs to access Tencent Cloud products and services by writing code, see [TencentCloud API](#).

Strengths

Last updated : 2022-04-26 11:33:31

Note :

The strengths described in this document are exclusive to dual-node and three-node TencentDB for MySQL instances.

Cost Effectiveness and Ease of Use

- **Read/write separation is supported**

Read-only replicas can be mounted to TencentDB for MySQL. One-source-multiple-replica architecture allows you to respond to massive requests. RO group with load balancing feature is supported to greatly optimize the pressure distribution among read-only replicas.

- **Powerful hardware ensures high performance**

NVMe SSD features high IO performance, ensuring smooth reads and writes.

A maximum of 240,000 QPS and a maximum storage space of 6 TB are supported for an instance.

High Security

- **Protection against DDoS attacks**

When your business suffers a DDoS attack, this feature can help you resist various attack traffic to ensure normal operation.

- **Protection against database attacks**

Effectively defend against database attacks like SQL injection and brute force attacks.

High Reliability

Data is stored online in a source-replica architecture to ensure security. Moreover, it can be backed up and stored for an extended period of time, allowing for data recovery in the event of a database disaster.

- **Data encryption**

Transparent data encryption (TDE) feature guarantees the security of real-time data and backup data.

- **Database audit**

Financial-grade data audit feature helps prevent core data theft, trace non-compliant operations, and locate malicious pulls.

High Availability

- **Real-time hot backup**

The dual-server hot backup mechanism supports lossless restoration of data from the last 7–1830 days based on data backup and log backup (binlog). Such backups can be retained for 7–1830 days.

- **Automatic disaster recovery**

Automatic failure detection and failover are supported. Users are not aware of source-replica switchover or failover.

Advantages over Self-built Databases

- **Easy management of massive databases**

Databases can be managed via command line or console. Batch database management, permission setting, and SQL import are supported.

- **Data import and backup rollback**

Multiple data import methods are provided for initialization. Data is backed up automatically on a daily basis. TencentDB allows data to be rolled back to any point in time within the retention period based on backup files.

- **Professional monitoring and alarm**

You can monitor resources from multiple dimensions and customize alarming thresholds for them. You can also download reports about slow query analysis and SQL running.

- **A variety of access methods**

Access to the public network and VPC is supported. You can connect TencentDB instances to your IDC, a private cloud, or other computing resources for deployment in a hybrid cloud conveniently.

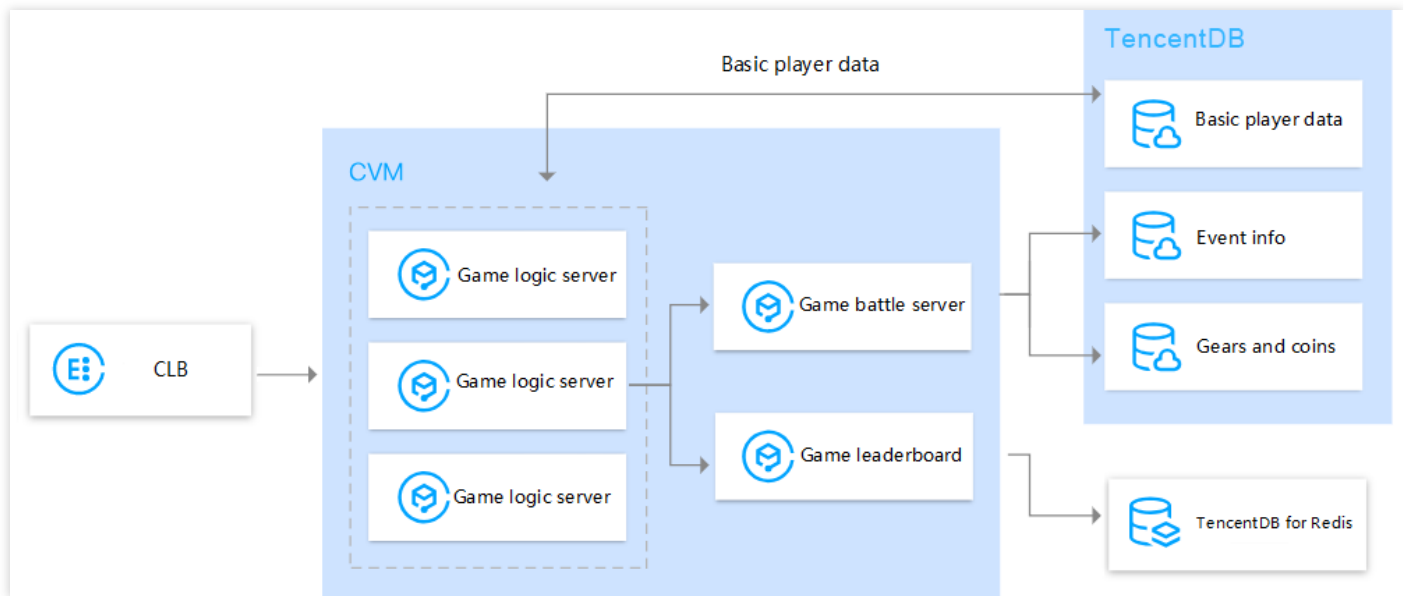
Use Cases

Last updated : 2022-03-31 18:08:54

Games

Gaming scenarios generally require elastic scaling and fast rollback.

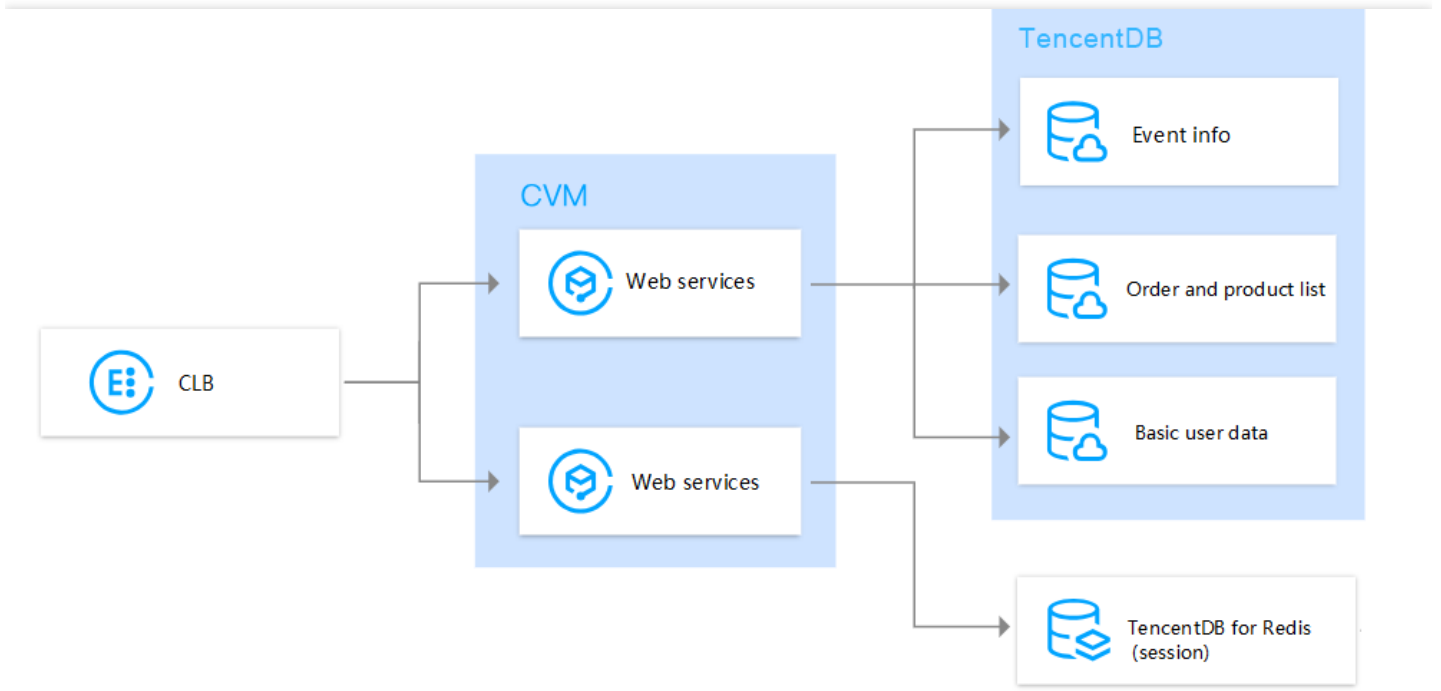
- TencentDB for MySQL supports elastic scaling of compute resources, enabling you to deploy game servers in multiple regions in minutes.
- It also supports rollback and batch operation, allowing you to restore to any point in time for gaming rollback.



Web/Mobile Apps

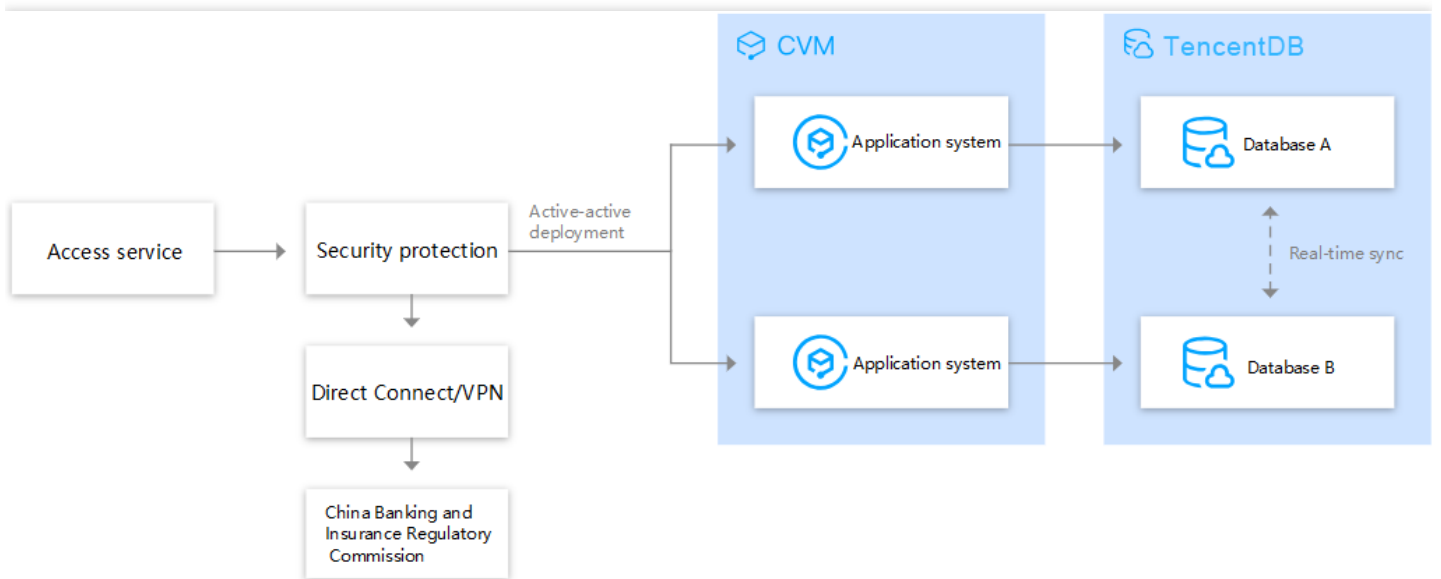
TencentDB for MySQL can serve as the storage medium of server data in web and mobile apps. For scenarios where there are more reads than writes, read-only instances can be created for frequently read databases, which greatly

improves the read performance.



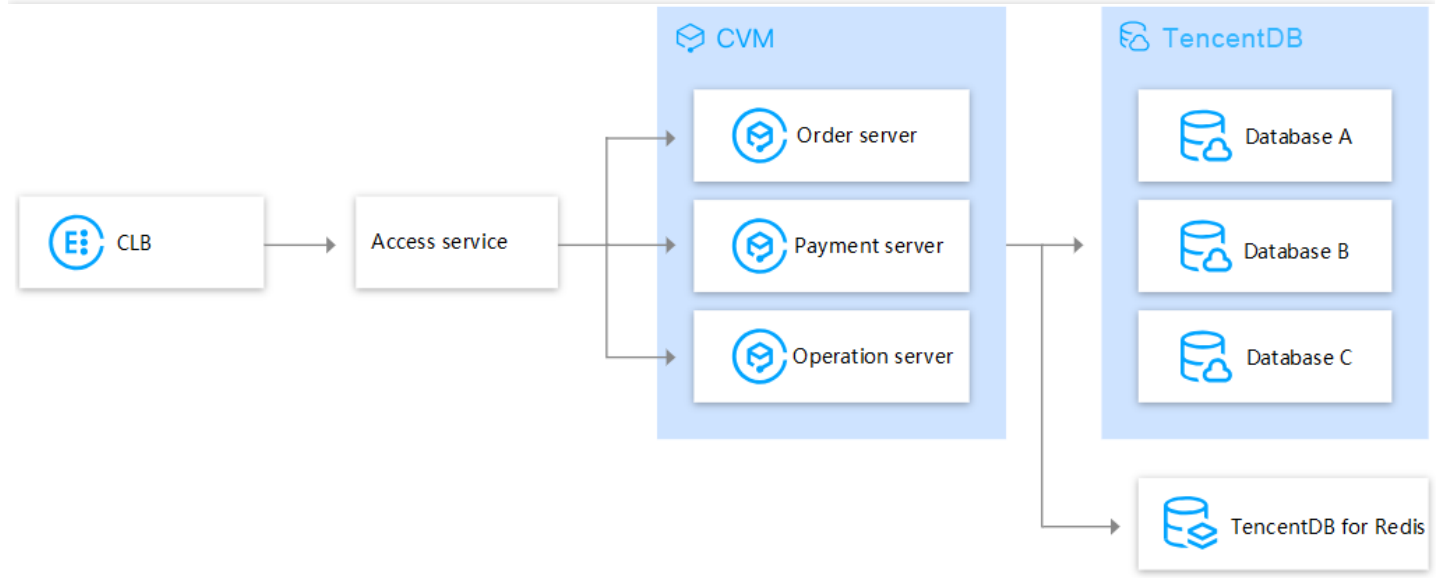
Finance

TencentDB for MySQL offers a variety of services to ensure high security and reliability for financial transaction and account data, including security audit, cross-region disaster recovery, and strong data consistency.



Ecommerce

TencentDB for MySQL offers high performance and fast Redis reads and writes, allowing you to handle high-concurrency access traffic and business peaks during sales and marketing campaigns with ease.



Database Architecture

Overview

Last updated : 2022-11-16 15:34:12

TencentDB for MySQL supports three types of architectures: single-node (Cloud Disk Edition), two-node (formerly High-Availability Edition), and three-node (formerly Finance Edition).

Note :

The single-node architecture of the cloud disk edition is currently supported in Shanghai region and will be available in more regions in the future.

Viewing the instance architecture

- For instances to be purchased, enter the [TencentDB for MySQL purchase page](#) and select the architecture in the **Architecture** section.
- For purchased instances, log in to the [TencentDB for MySQL console](#), find the target instance in the instance list, and view its architecture in **Configuration Info**.

Architecture comparison

Architecture	Two-Node	Three-Node	Single-Node	
Resource Isolation Policy	General	General	General	Basic
Supported version	MySQL 5.5, 5.6, 5.7, 8.0	MySQL 5.6, 5.7, 8.0	MySQL 5.6, 5.7, 8.0	MySQL 5.7, 8.0
Node	One source, one replica	One source, two replicas	Single node	Single node
Source-replica replication mode	Async (default), semi-sync	Async (default), strong sync, and semi-sync	-	-

Architecture	Two-Node	Three-Node	Single-Node	
Instance availability	99.95%	99.99%	-	-
Underlying storage	Local NVMe SSD	Local NVMe SSD	Local NVMe SSD	SSD cloud disk Enhanced SSD
Performance	Up to 240,000 IOPS	Up to 240,000 IOPS	Up to 240,000 IOPS	<ul style="list-style-type: none"> Random IOPS calculation of SSD cloud disk: $\min\{1800 + 30 * \text{capacity (GB)}, 26000\}$ Throughput calculation of SSD cloud disk (MB/s): $\min\{120 + 0.2 * \text{capacity (GB)}, 260\}$ Random IOPS calculation of Enhanced SSD: $\min\{1800 + 50 * \text{capacity (GB)}, 50000\}$ Throughput calculation of Enhanced SSD (MB/s): $\min\{120 + 0.5 * \text{capacity (GB)}, 350\}$
Use case	Gaming, internet, IoT, retail, ecommerce, logistics, insurance, securities, etc.	Gaming, internet, IoT, retail, ecommerce, logistics, insurance, securities, etc.	Applications with read/write separation requirements	Personal learning, small websites, non-core small enterprise systems, and medium-to-large enterprise development and testing

References

- TencentDB for MySQL supports MySQL 8.0, 5.7, 5.6, and 5.5. For more information, see [Database Versions](#).
- TencentDB for MySQL supports the following instance types: source instance, read-only instance, and disaster recovery instance. For more information, see [Database Instance Types](#).
- TencentDB for MySQL supports different features in different architectures. For more information, see [List of Feature Differences](#).

Two-Node Instances (Formerly High-Availability Edition)

Last updated : 2022-04-01 15:45:21

TencentDB for MySQL supports three types of architectures: single-node, two-node, and three-node. This document describes the two-node architecture.

- Two-node instances are built on a highly available one-source-one-replica architecture that supports real-time hot backup, automatic failure detection, and automatic failover.
- Two-node instances support two resource isolation policies: general and dedicated. For more information, see [Resource Isolation Policy](#).

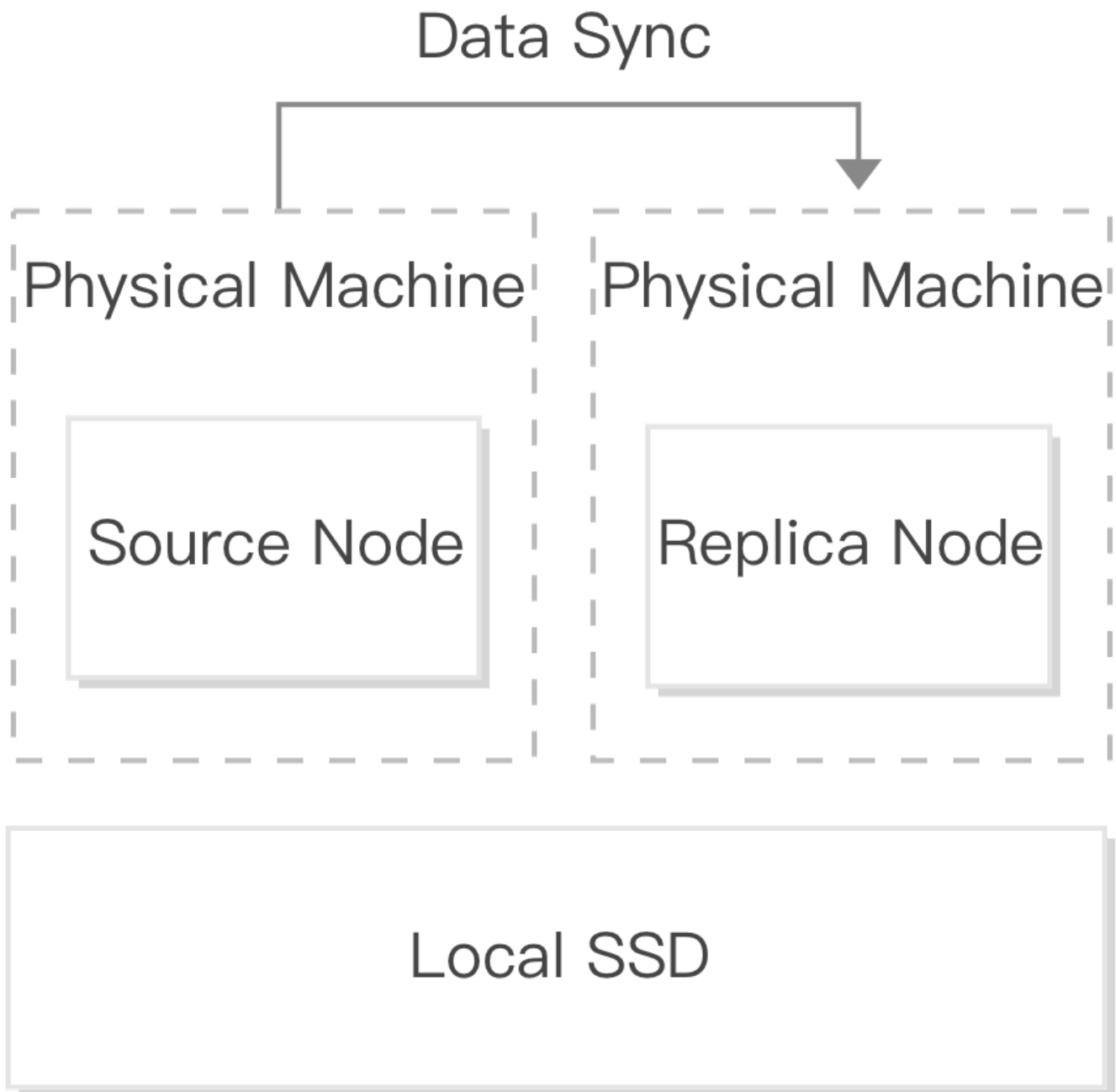
Use Cases

They are widely used in a variety of industries, including gaming, the internet, IoT, retail, e-commerce, logistics, insurance, and securities.

Features

- The two-node architecture offers two source/replica replication modes: async (default) and semi-sync. You can modify the replication mode or [upgrade to the three-node architecture](#) (with the one-source-two-replica strong sync mode) on the instance details page in the [console](#).
- The two-node architecture supports a complete set of features including read-only instances, disaster recovery instance, security groups, data migration, and multi-AZ deployment. For more information, see [Strengths](#).
- The two-node architecture achieves a high availability of up to 99.95%. For more information, see [TencentDB Service Level Agreement \(New Version\)](#).
- The two-node instance provides multiple replicas to guarantee data persistence. The source node data can be synced to the replica node; the source instance data can be synced to the read-only instances (if any). This architecture ensures data security and achieves a data persistence of up to 99.99999%.
- The two-node architecture deploys data nodes on powerful hardware devices and uses local NVMe SSD disks as underlying storage with an IOPS of up to 240,000 (this value is the test result with MySQL's default page size of 16 KB and for your reference only. The actual value is subject to the specific configuration, page size, and business load).

Basic Framework Diagram



Upgrading

- The engine versions of TencentDB for MySQL can be upgraded. For more information, see [Upgrading Database Engine](#).

- TencentDB for MySQL can be upgraded from the two-node architecture to the three-node architecture. For more information, see [Upgrading Two-Node Instances to Three-Node Instances](#).
- The kernel minor versions of TencentDB for MySQL can be upgraded automatically or manually. For more information, see [Upgrading Kernel Minor Version](#).

Three-Node Instances (Formerly Finance Edition)

Last updated : 2022-04-01 15:41:11

TencentDB for MySQL supports three types of architectures: single-node, two-node, and three-node. This document describes the three-node architecture.

- Three-node instances are built on a one-source-two-replica architecture that supports strong sync replication. They deliver finance-grade reliability and high availability by ensuring strong data consistency with real-time hot backup.
- Three-node instances support two resource isolation policies: general and dedicated. For more information, see [Resource Isolation Policy](#).

Use Cases

They are widely used in a variety of industries, including gaming, the internet, IoT, retail, e-commerce, logistics, insurance, and securities.

Features

- The three-node architecture supports such source/replica replication modes as async (default), strong sync, and semi-sync.
- The three-node architecture supports a complete set of features including read-only instances, disaster recovery instance, security groups, data migration, and multi-AZ deployment. For more information, see [Strengths](#).
- The three-node architecture achieves a high availability of up to 99.99%. For more information, see [TencentDB Service Level Agreement \(New Version\)](#).
- The three-node instance provides multiple replicas to guarantee data persistence. The source node data can be synced to the replica nodes; the source instance data can be synced to the read-only instances (if any). This architecture ensures data security and achieves a data persistence of up to 99.99999%.
- The three-node architecture deploys data nodes on powerful hardware devices and uses local NVMe SSD disks as underlying storage with an IOPS of up to 240,000 (this value is the test result with MySQL's default page size of 16 KB and for your reference only. The actual value is subject to the specific configuration, page size, and business load).
- You can deploy the two replica nodes of a three-node instance in the same availability zone (e.g., Beijing Zone 5), but the TencentDB's default node distribution strategy ensures that they are deployed on different physical servers.

You can also deploy the two replica nodes in different availability zones (e.g., one replica node in Beijing Zone 5 and the other in Beijing Zone 7).

Upgrading

- The engine versions of TencentDB for MySQL can be upgraded. For more information, see [Upgrading Database Engine](#).
- The kernel minor versions of TencentDB for MySQL can be upgraded automatically or manually. For more information, see [Upgrading Kernel Minor Version](#).

Resource Isolation Policy

Last updated : 2022-04-01 15:10:07

This document describes three resource isolation policies of TencentDB for MySQL: basic, general, and dedicated.

Note :

- The former "Basic Edition" has been renamed "basic single-node", and the former "Single-node High IO Edition" has been renamed "general single-node".
- Two-node and three-node instances support the general and dedicated policies. The dedicated policy is currently in beta; therefore, to purchase dedicated instances, please [submit a ticket](#).

Resource Isolation Policy	Description
Basic	Only single-node instances support this policy. A basic single-node instance (formerly Basic Edition) supports computation-storage separation and stores data on cloud disks.
General	<ul style="list-style-type: none">• A general instance exclusively uses the allocated memory and disk resources and shares the CPU resources with other general instances on the same physical machine.• A general instance benefits from higher specifications at a lower cost by sharing CPU resources.• A general instance's disk capacity is unaffected by its CPU and memory specs.
Dedicated	<ul style="list-style-type: none">• A dedicated instance has exclusive access to the CPU, memory, and disk resources (if CPU pinning is enabled). It has long-term stability and is unaffected by the activities of other instances on the physical machine.• A dedicated instance with the highest configurations can monopolize a physical machine and all of its resources.

List of Feature Differences

Last updated : 2022-04-01 14:34:02

This document compares the features supported by different types of TencentDB for MySQL instances, allowing you to learn more about the capabilities of each type and purchase instances that best suit your needs.

Feature	Two-Node Instance	Three-Node Instance	Single-Node Instance	
			General	Basic
Resource isolation policy	General	General	General	Basic
Database engine version	<ul style="list-style-type: none"> MySQL 5.5 MySQL 5.6 MySQL 5.7 MySQL 8.0 	<ul style="list-style-type: none"> MySQL 5.6 MySQL 5.7 MySQL 8.0 	<ul style="list-style-type: none"> MySQL 5.6 MySQL 5.7 MySQL 8.0 	MySQL 5.7
Node quantity	2	3	1	1
Memory/Disk	Up to 690 GB/6 TB	Up to 690 GB/6 TB	Up to 690 GB/6 TB	Up to 8 GB/1 TB
Upgrading database engine version	Supported (MySQL 5.5 and 5.6 only)	Supported	Supported	Supported
Upgrading to three-node instances	Supported	-	-	-
Read-only replicas	Supported (only in MySQL 5.6, 5.7, and 8.0)	Supported	Supported	-
Managing accounts	Supported	Supported	-	Supported
Setting parameters	Supported	Supported	-	Supported
Backup	Supported	Supported	-	-
Rollback	Supported	Supported	-	-
Data migration	Supported	Supported	Supported	-
Importing SQL files	Supported	Supported	-	-
Security groups	Supported	Supported	Supported	-

Feature	Two-Node Instance	Three-Node Instance	Single-Node Instance	
Monitoring and alarms	Supported	Supported	Supported	Supported
Operation logs	Supported	Supported	Supported	Supported

Note :

"-" in the table above means "unsupported".

Database Instance

Database Versions

Last updated : 2022-04-01 15:00:10

Supported Versions

Currently, TencentDB for MySQL supports MySQL v8.0, v5.7, v5.6, and v5.5. For more information on the features of each version, please see the [official documentation](#). MySQL's official lifecycle support policies are as shown below:

Release	GA Date	Premier Support End	Extended Support End	Sustaining Support End
MySQL Database 5.0	Oct-05	Dec-11	Not Available	Indefinite
MySQL Database 5.1	Dec-08	Dec-13	Not Available	Indefinite
MySQL Database 5.5	Dec-10	Dec-15	Dec-18	Indefinite
MySQL Database 5.6	Feb-13	Feb-18	Feb-21	Indefinite
MySQL Database 5.7	Oct-15	Oct-20	Oct-23	Indefinite
MySQL Database 8.0	Apr-18	Apr-23	Apr-26	Indefinite

Note :

- The extended official support for MySQL v5.5 ended in December 2018. There has been no explicit statement on further support extension, which is possibly because fixing issues takes more time. We strongly recommend that you use a higher version of MySQL.
- MySQL v5.6 and higher no longer support the MyISAM storage engine, so we recommend that you use the InnoDB engine, which features better and more stable performance.
- Currently, MySQL v5.6 and higher support three replication modes: async, semi-sync, and strong sync. Only async mode is available in MySQL v5.5.

TencentDB for MySQL v8.0 Strengths

- Combined with a complete set of management services and the TXSQL kernel, TencentDB for MySQL provides an enterprise-level database service that is more stable and quicker to deploy. It applies to various use cases and helps you upgrade your business.
- TXSQL is 100% compatible with MySQL and the widely-used MySQL forks.
- TencentDB for MySQL supports three disaster recovery systems including hot standby, cold standby, and multi-AZ switchover. It can achieve up to 99.95% service availability and up to 99.9996% data reliability.
- TencentDB for MySQL offers a series of easy-to-use database management services, including monitoring, backup, rollback, encryption, auto scaling, auditing, and intelligent diagnosis and optimization. With these services, you can focus more on your business development.
- A TencentDB for MySQL instance can handle 500,000+ QPS. TencentDB for MySQL greatly simplifies business development, database Ops, and business architecture, making it easy for you to manage databases.
- It offers three architecture options: single-node, two-node, and three-node.
- It supports CStore, a high-performance columnar storage engine that allows for millions of real-time writes per second and millisecond-level queries on tens of billions of data points in any dimension. To apply for CStore, please [submit a ticket](#).

Feature Comparison between TencentDB for MySQL v8.0 and Oracle MySQL v8.0

Feature	TencentDB for MySQL v8.0	Oracle MySQL v8.0
Cost performance	<ol style="list-style-type: none"> 1. Elastic resources. 2. Tencent's kernel TXSQL. 3. Integrated backup and restoration features. 4. A complete set of SaaS tools and services. 	<ol style="list-style-type: none"> 1. Huge one-time investment cost. 2. The open source version has no performance optimization. 3. Additional backup resources and costs. 4. Public network fees and high domain name fees.
Availability	<ol style="list-style-type: none"> 1. A complete high-availability switchover system is provided. 2. Read-only replicas automatically balance load and traffic. 3. Disaster recovery instances are provided for remote disaster recovery, ensuring high availability. 	<ol style="list-style-type: none"> 1. You need to buy servers and wait for the delivery. 2. You need to deploy the high availability and load balancing systems by yourself. 3. It costs a lot to build data centers in multiple regions.

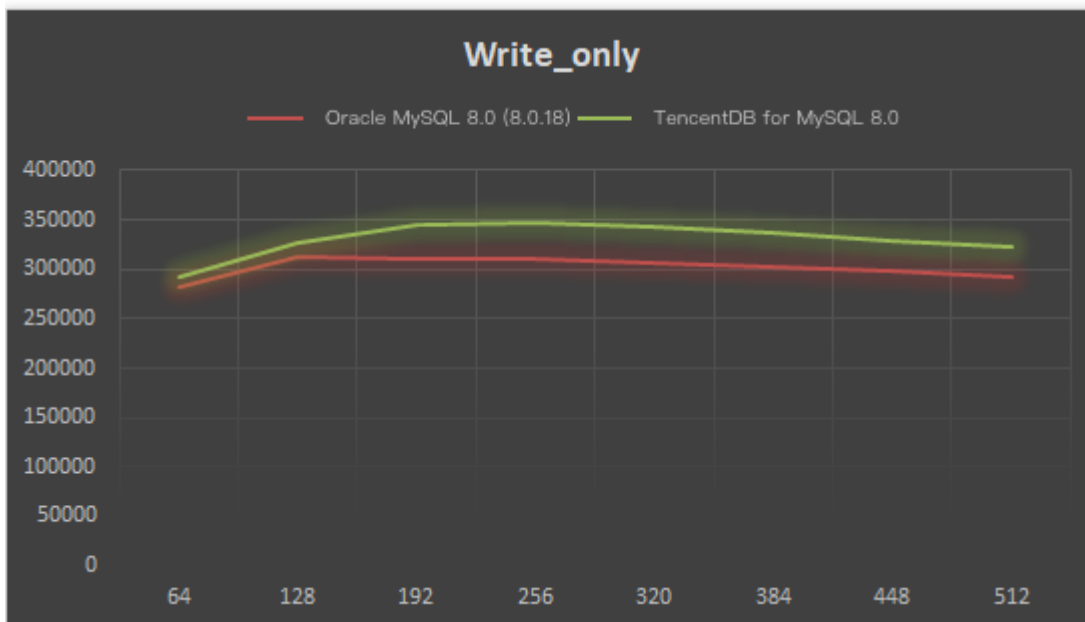
Feature	TencentDB for MySQL v8.0	Oracle MySQL v8.0
Reliability	<ol style="list-style-type: none"> 1. Data reliability of up to 99.9996%. 2. Low RPO/RTO. 3. Stable source-replica data replication. 	<ol style="list-style-type: none"> 1. Data reliability of 99%, which depends on the probability of damage to a single disk. 2. You need extra R&D investment to achieve a low RPO. 3. Data replication delays or interruptions may occur.
Ease of use	<ol style="list-style-type: none"> 1. A complete set of database management services are provided and databases can be easily operated in the console. 2. Second-level monitoring and intelligent alarms. 3. An automatic multi-AZ high availability system. 4. One-click version upgrade. 	<ol style="list-style-type: none"> 1. You need to deploy high availability and backup and restoration systems by yourself, which requires time and money. 2. You need extra investment to purchase a monitoring system. 3. It costs a lot to set up data centers in different regions with labor costs in OPS. 4. The version upgrade cost is high and the maintenance needs a long downtime.
Performance	<ol style="list-style-type: none"> 1. Local SSD disks have excellent performance and the custom hardware supports fast iterations. 2. The optimized TXSQL ensures high performance. 3. DBbrain supports the intelligent diagnosis and optimization of MySQL. 	<ol style="list-style-type: none"> 1. Oracle MySQL has a slower hardware iteration speed than that of cloud computing, usually resulting in lower performance. 2. It can be costly as databases rely on senior DBAs. 3. Oracle MySQL does not have native performance tools, so you have to purchase or deploy them by yourself.
Security	<ol style="list-style-type: none"> 1. Prevention in advance: allowlist, security group, VPC-based isolation. 2. Protection during the database operations: TDE + KMS data encryption. 3. Auditing after the database operations: SQL auditing. 4. TencentDB for MySQL is updated right after the Oracle MySQL has security updates. 	<ol style="list-style-type: none"> 1. The cost of the allowlist configuration is high and the private network needs to be implemented by yourself. 2. You need to implement encryption by yourself during the database operations. 3. It is difficult to audit SQLs after the database operations as the open source MySQL does not support SQL auditing. 4. Once MySQL updates, Ops will be required to install updates or databases will have to be shut down for maintenance.

Performance Comparison between TencentDB for MySQL v8.0 and Oracle MySQL v8.0

Read performance



Write performance



Database Instance Types

Last updated : 2022-04-12 09:30:13

A TencentDB for MySQL instance is a database environment that runs independently in Tencent Cloud. It is the basic unit for you to purchase the TencentDB for MySQL service. You can create, modify, and delete instances in the console.

Each instance is independent of each other with isolated resources. There are no CPU, memory, and IO preemption issues between instances. Each instance has its own characteristics such as database type and version, and the system has corresponding parameters to control instance behaviors.

There are three types of instances available in TencentDB for MySQL:

Instance Type	Definition	Architecture	Available in Instance List	Feature
Source instance	An instance that can be read from and written to	<ul style="list-style-type: none"> Single-Node Two-Node Three-Node 	Yes	A source instance can mount read-only instances and disaster recovery instances to achieve read/write separation and remote disaster recovery.
Read-only instance	An instance that can only be read from	Single-Node	Yes	A read-only instance cannot exist on its own. It must instead be associated with a source instance, with its data only being synced from the source instance. It must also reside in the same region as the source instance.
Disaster recovery instance	An instance that supports disaster recovery across AZs and regions	Two-Node	Yes	A disaster recovery instance is read-only when it syncs with a source instance. It can actively stop the sync and be promoted to a source instance for read/write access. The disaster recovery instance should reside in a different region than the source instance does.

Reference

- For more information on the creation of and notes on the read-only instance, see [Creating Read-Only Instance](#).
- For more information on how to create and configure RO groups for read-only instances, see [Managing the RO Group of Read-Only Instance](#).

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- For more information on the creation of and notes on the disaster recovery instance, see [Disaster Recovery Instance](#).

Database Instance Replication

Last updated : 2022-04-01 16:08:53

Database instance replication means to sync data by configuring one or more backup databases for the server in order to distribute the data in MySQL to multiple systems. TencentDB for MySQL supports three data replication modes:

Note :

- "Source" refers to the source node in an instance, while "replica" the replica node in the instance.
- Currently, MySQL v5.6, v5.7, and v8.0 support three replication modes: async, semi-sync, and strong sync. Only async mode is available in MySQL v5.5.

Async Replication

After receiving a data update (including INSERT, UPDATE and DELETE operations) request from an application, the source performs the update operation. When the update is completed, the source immediately sends a response to the application and replicates the data to the replica.

During data update, the source does not need to wait for a response from the replica, so the database instance replicated asynchronously often has a higher performance, and replica unavailability will not affect the provision of services by the source. However, as the data is not synced to the replica in real time, if the source fails when a delay occurs on the replica, there is a slight chance of data inconsistency.

Async replication is implemented on one-source-one-replica TencentDB for MySQL.

Semi-Sync Replication

After receiving a data update (including INSERT, UPDATE, and DELETE operations) request from an application, the source performs the update operation. When the update is completed, the source replicates the data to a replica immediately. After **receiving and writing the data into relay log (bypassed)**, the replica returns a success message to the source. Only after receiving the message from the replica, the source can return a response to the application.

Only when an exception occurs with the data replication (a replica node becomes unavailable or an exception occurs with the network used for data replication), the source will suspend the response to the application (for about 10 seconds by default in MySQL), and the replication will be downgraded to async replication. When the data replication returns to a normal state, semi-sync replication will be restored.

Semi-sync replication is implemented on one-source-one-replica TencentDB for MySQL.

Strong Sync Replication

After receiving a data update (including INSERT, UPDATE, and DELETE operations) request from an application, the source performs the update operation. When the update is completed, the source replicates the data to a replica immediately. After **receiving and writing the data into relay log (bypassed)**, the replica returns a success message to the source. Only after receiving the message from the replica, the source can return a response to the application.

When an exception occurs with the data replication (a replica node becomes unavailable or an exception occurs with the network used for data replication), **the replication won't be downgraded** and the source will suspend the response to the application until the exception is handled so as to ensure data consistency.

Strong sync replication is implemented on one-source-two-replica TencentDB for MySQL. The source can receive the success message as long as either of the two replicas updates the data successfully, preventing the unavailability of a single replica from affecting the operations on the source, and improving the availability of strong sync replication cluster.

Database Storage Engines

Last updated : 2022-02-25 14:21:27

Storage engine of a database refers to the type of tables and determines how tables are stored in computers.

Although MySQL supports different types of storage engines, not all of them have been optimized for data restoration and persistence. TencentDB for MySQL features such as point-in-time restoration and snapshot restoration require a restoration-enabled storage engine and are available in the InnoDB storage engine only.

TencentDB for MySQL supports InnoDB by default. It no longer supports the MyISAM and Memory engines in MySQL 5.6 and higher mainly for the following reasons:

- TencentDB for MySQL greatly optimizes the kernels for InnoDB and achieves higher performance.
- MyISAM adopts a table-level locking mechanism, while InnoDB uses a row-level one. Usually, InnoDB has higher write efficiency.

Note :

- With the widest lock scope, table-level locking is to lock the entire table that is being manipulated in MySQL.
- With the narrowest lock scope, row-level locking is to lock only the row that is being manipulated in MySQL.

- MyISAM has defects in protecting data integrity, which may lead to data corruption or even loss. Moreover, many of these defects are design issues and cannot be fixed without breaking compatibility.
- Migration from MyISAM and Memory to InnoDB can be achieved at low cost by simply changing the code to create the tables for most applications.
- MyISAM is giving ground to InnoDB. In the latest MySQL 8.0, all system tables come in the InnoDB type.
- Memory cannot guarantee data integrity. If the instance restarts or experiences source/replica switch, all data in the table will be lost. It's recommended to migrate to InnoDB as soon as possible.

For more information, please see [InnoDB Overview](#) and [MyISAM Overview](#).

High Availability (Multi-AZ)

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Multi-AZ deployment protects your database against database instance failures and AZ outages. For more information, see [Regions and AZs](#).

In TencentDB for MySQL, multiple AZs are combined to enable multi-AZ deployment to ensure high availability and failover capability of database instances.

Note :

- No matter whether the TencentDB for MySQL instances in a database cluster are running across multiple AZs or not, each instance has a replica for real-time hot backup to ensure high database availability.
- With multi-AZ deployment, TencentDB for MySQL automatically presets and maintains a sync replica in a different AZ.
- The source database instance is synchronously replicated to the replica across AZs to provide data redundancy, eliminate I/O freezes, and minimize latency during system backups.

Supported Regions

The multi-AZ deployment scheme of TencentDB for MySQL is currently available in Guangzhou, Shanghai, Beijing, Chengdu, and Virginia regions.

Multi-AZ Deployment

1. Log in to the [TencentDB for MySQL Console](#) and click **Create** in the Instance List to enter the purchase page.
2. On the TencentDB for MySQL purchase page, select a supported region, and select a desired replica AZ in the **Replica AZ** option.

Note :

Only certain AZs can be selected as a replica AZ. For more information, see the purchase page.

The screenshot shows a configuration interface for availability zones. It is divided into two sections: 'Source AZ' and 'Replica AZ'. In the 'Source AZ' section, there are seven buttons representing availability zones: 'Shanghai Zone 1', 'Shanghai Zone 2', 'Shanghai Zone 3' (highlighted in dark blue), 'Shanghai Zone 4', 'Shanghai Zone 5' (with a 'NEW' tag), and 'Shanghai Zone 7' (with an 'OUT' tag). Below these buttons, a red text note states: 'Products in the same VPC but different availability zones can communicate with each other via private network. For example, in the same VPC, the CVM in Guangzhou Zone 2 can access the MySQL instance in Guangzhou Zone 3 via private network.' In the 'Replica AZ' section, there are two buttons: 'Shanghai Zone 3' (highlighted in dark blue) and 'Shanghai Zone 4'.

3. After confirming that everything is correct, click **Buy Now**. After making the payment, you can return to the instance list to view the newly purchased multi-AZ instance.

Failover

TencentDB for MySQL processes failover automatically, so database operations can be resumed as quickly as possible with no administrative intervention required. The source database instance will automatically switch to the replica in the replica AZ in the following conditions:

- AZ outage
- Source database instance failure

Regions and AZs

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TencentDB data centers are hosted in multiple locations worldwide. These locations are known as regions. Each region contains multiple availability zones (AZs).

Each region is an independent geographic area with multiple isolated AZs. Separate AZs in the same region are connected via low-latency private networks. Tencent Cloud allows you to distribute Tencent Cloud resources across different locations. We recommend you place resources in different AZs to eliminate single points of failure which may lead to service unavailability.

Region name and AZ name can most directly embody the coverage of a data center. The following naming convention is used for your convenience:

- A region name is composed of **region + city**. The `region` indicates the geographic area that the data center covers, while the `city` represents the city in or near which the data center is located.
- AZ names utilize the format of **city + number**.

Region

Tencent Cloud regions are completely isolated. This guarantees the maximum cross-region stability and fault tolerance. When you purchase Tencent Cloud services, we recommend you select the region closest to your end users to minimize access latency and improve download speed. Operations such as launching or viewing instances are performed at the region level.

Private network communication:

- Tencent Cloud resources in the same VPC within the same region under the same account can communicate with each other over private network. They can also be accessed via [private IPs](#).
- The networks of different regions are fully isolated from each other, and Tencent Cloud services in different regions cannot communicate using private networks by default.
- Tencent Cloud services across regions can communicate with each other through [public IPs](#) over the Internet, while those in different VPCs can communicate with each other through [CCN](#) that is faster and steadier.
- [Cloud Load Balancer](#) currently supports intra-region traffic forwarding by default. If [cross-region binding](#) is enabled, cross-region binding of CLB and CVM instances is supported.

AZs

An availability zone (AZ) is a physical IDC of Tencent Cloud with independent power supply and network in the same region. It can ensure business stability, as failures (except for major disasters or power failures) in one AZ are isolated without affecting other AZs in the same region. By starting an instance in an independent AZ, users can protect their applications from being affected by a single point of failure.

When launching an instance, you can select any AZ in the specified region. For high reliability, you can adopt a cross-AZ deployment solution to ensure that the service remains available when an instance in a single location fails.

Examples of such solutions include [CLB](#) and [EIP](#).

List of Regions and AZs

The supported regions and AZs are as follows:

Note :

Currently, public network access is supported only in the following regions:

Guangzhou, Shanghai, Nanjing, Beijing, Chengdu, Chongqing, Hong Kong (China), Singapore, Seoul, Tokyo, Silicon Valley, and Frankfurt.

China

Region	AZ
South China (Guangzhou) ap-guangzhou	Guangzhou Zone 1 (sold out) ap-guangzhou-1
	Guangzhou Zone 2 ap-guangzhou-2
	Guangzhou Zone 3 ap-guangzhou-3
	Guangzhou Zone 4 ap-guangzhou-4
	Guangzhou Zone 6 ap-guangzhou-6
	Guangzhou Zone 7 ap-guangzhou-7
East China (Shanghai) ap-shanghai	Shanghai Zone 1 ap-shanghai-1

	Shanghai Zone 2 ap-shanghai-2
	Shanghai Zone 3 ap-shanghai-3
	Shanghai Zone 4 ap-shanghai-4
	Shanghai Zone 5 ap-shanghai-5
East China (Nanjing) ap-nanjing	Nanjing Zone 1 ap-nanjing-1
	Nanjing Zone 2 ap-nanjing-2
	Nanjing Zone 3 ap-nanjing-3
North China (Beijing) ap-beijing	Beijing Zone 1 ap-beijing-1
	Beijing Zone 2 ap-beijing-2
	Beijing Zone 3 ap-beijing-3
	Beijing Zone 4 ap-beijing-4
	Beijing Zone 5 ap-beijing-5
	Beijing Zone 6 ap-beijing-6
	Beijing Zone 7 ap-beijing-7
Southwest China (Chengdu) ap-chengdu	Chengdu Zone 1 ap-chengdu-1
	Chengdu Zone 2 ap-chengdu-2

Southwest China (Chongqing) ap-chongqing	Chongqing Zone 1 ap-chongqing-1
Hong Kong/Macao/Taiwan (Hong Kong, China) ap-hongkong	Hong Kong Zone 1 (Hong Kong nodes cover services in the China regions of Hong Kong, Macao, and Taiwan) ap-hongkong-1
	Hong Kong Zone 2 (Hong Kong nodes cover services in the China regions of Hong Kong, Macao, and Taiwan) ap-hongkong-2
	Hong Kong Zone 3 (Hong Kong nodes cover services in the China regions of Hong Kong, Macao, and Taiwan) ap-hongkong-3

Other countries and regions

Region	AZ
Southeast Asia (Singapore) ap-singapore	Singapore Zone 1 (Singapore nodes cover services in Southeast Asia) ap-singapore-1
	Singapore Zone 2 (Singapore nodes cover services in Southeast Asia) ap-singapore-2
	Singapore Zone 3 (Singapore nodes cover services in Southeast Asia) ap-singapore-3
	Singapore Zone 4 (Singapore nodes cover services in Southeast Asia) ap-singapore-4
Southeast Asia (Jakarta) ap-jakarta	Jakarta Zone 1 ap-jakarta-1
	Jakarta Zone 2 ap-jakarta-2
Southeast Asia (Bangkok) ap-bangkok	Bangkok Zone 1 (Bangkok nodes cover services in Southeast Asia) ap-bangkok-1
	Bangkok Zone 2 (Bangkok nodes cover services in Southeast Asia) ap-bangkok-2
South Asia (Mumbai) ap-mumbai	Mumbai Zone 1 (Mumbai nodes cover services in South Asia) ap-mumbai-1
	Mumbai Zone 2 (Mumbai nodes cover services in South Asia)

	ap-mumbai-2
Northeast Asia (Seoul) ap-seoul	Seoul Zone 1 (Seoul nodes cover services in Northeast Asia) ap-seoul-1
	Seoul Zone 2 (Seoul nodes cover services in Northeast Asia) ap-seoul-2
Northeast Asia (Tokyo) ap-tokyo	Tokyo Zone 1 (Tokyo nodes cover services in Northeast Asia) ap-tokyo-1
	Tokyo Zone 2 (Tokyo nodes cover services in Northeast Asia) ap-tokyo-2
West US (Silicon Valley) na-siliconvalley	Silicon Valley Zone 1 (sold out) na-siliconvalley-1
	Silicon Valley Zone 2 (Silicon Valley nodes cover services in West US) na-siliconvalley-2
East US (Virginia) na-ashburn	Virginia Zone 1 (Virginia nodes cover services in East US) na-ashburn-1
	Virginia Zone 2 (Virginia nodes cover services in East US) na-ashburn-2
North America (Toronto) na-toronto	Toronto Zone 1 (Toronto nodes cover services in North America) na-toronto-1
South America (Sao Paulo) sa-saopaulo	Sao Paulo Zone 1 (Sao Paulo nodes cover services in South America) sa-saopaulo-1
Europe (Frankfurt) eu-frankfurt	Frankfurt Zone 1 (Frankfurt nodes cover services in Europe) eu-frankfurt-1
	Frankfurt Zone 2 (Frankfurt nodes cover services in Europe) eu-frankfurt-2
Europe (Moscow) eu-moscow	Moscow Zone 1 (Moscow nodes cover services in Europe) eu-moscow-1

Selection of Regions and AZs

When you purchase Tencent Cloud services, we recommend you select the region closest to your end users to minimize access latency and improve download speed.