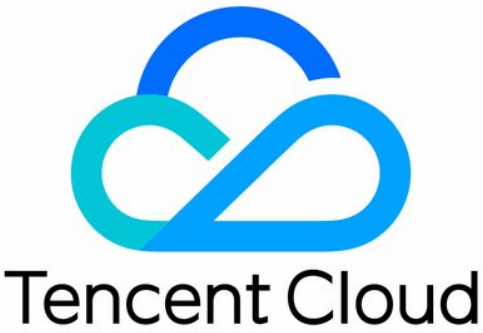
# TencentDB for MySQL

# Product Introduction

# Product Documentation



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# Product Introduction

# Overview

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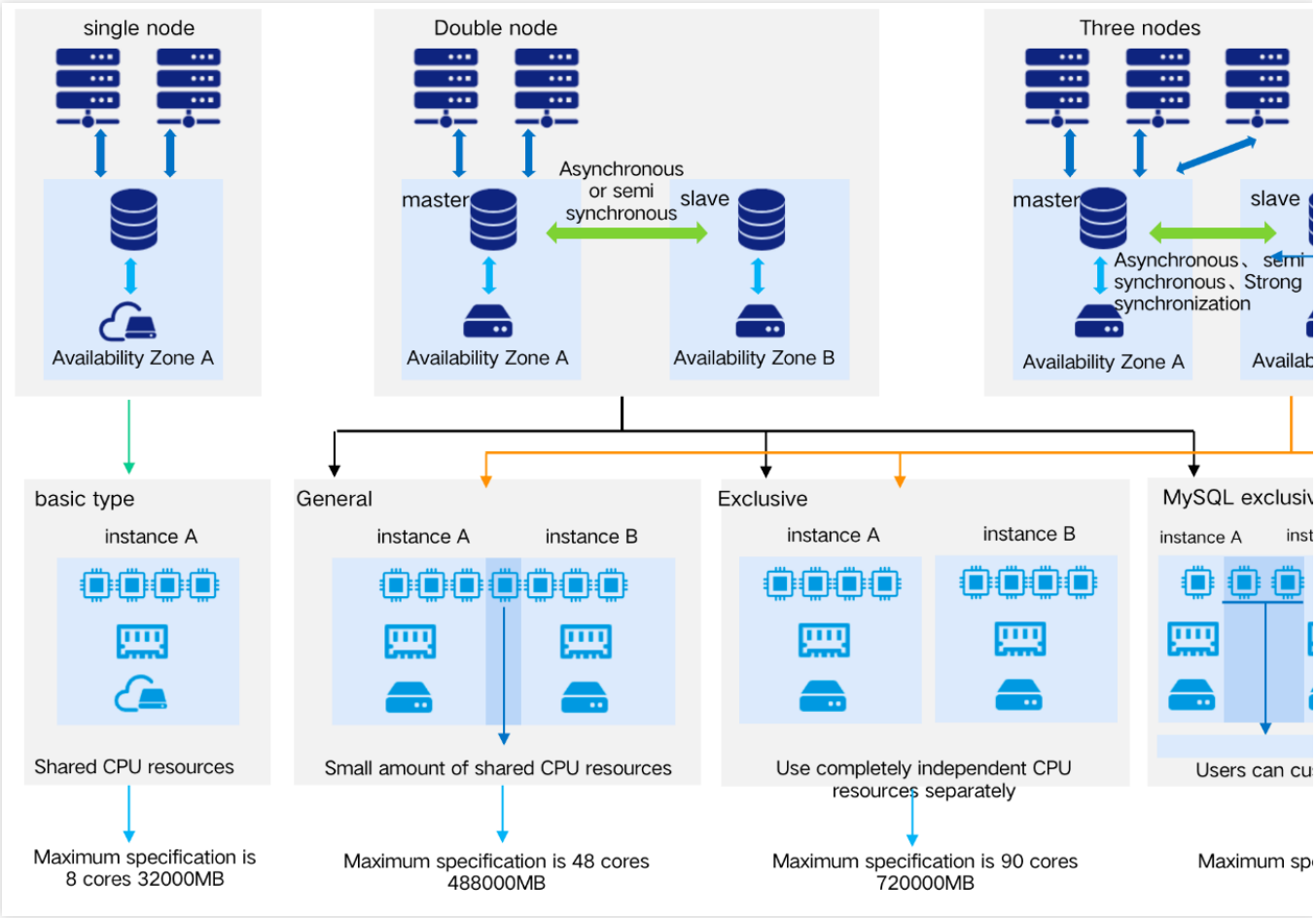
## Overview

TencentDB for MySQL is a high-performance enterprise-grade database 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.

## Product Architecture




# Relevant Concepts

Instance: A TencentDB for MySQL resource in Tencent Cloud.

Database Instance Types: 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.

Regions and AZs: Physical location of a TencentDB for MySQL instance and other resources.

Tencent Cloud console: Web-based UIs.

Database Proxy: A network proxy service between the TencentDB service and the application service. It is used to proxy all requests when the application service accesses the database.

# Additional Services

For more information on how to calculate actual expenses precisely with relevant billing tools, see Fees 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 Transfer Service.

You can cleanse and analyze data with the TencentDB for MySQL data subscription tool.

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

For more information on how to deploy your computing services by purchasing CVM instances, see Cloud Virtual Machine.

For more information on how to monitor the running status of your TencentDB for MySQL instances with Tencent Cloud Observability Platform, see Tencent Cloud Observability Platform (TCOP).

For more information on how to call TencentCloud APIs to access Tencent Cloud products and services by writing code, see APIs.

# Strengths

Last updated：2024-07-22 10:59:17

## Strengths of Single-Node Instances

### High cost effectiveness

Computing resources start at as low as 3.685 USD/month, greatly reducing the deployment costs.

### Large disks

Up to 30 TB storage space is available, with no limits on disk specification.

### High security

**Anti-DDoS protection**

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 defense against such database attacks as SQL injection and brute force attacks.

### High reliability

The system adopts a distributed three-copy storage mechanism and guarantees that data is written in all three copies before returning a response of successful write. If any copy fails, the backend data replication mechanism can quickly create a new copy by using methods such as data migration, ensuring the availability of three data copies at all times and increasing the data reliability.

### Strengths 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.

# Strengths of Two-Node/Three-Node Instances

## High cost performance

**Flexible billing modes**

Pay-as-you-go and monthly subscription billing modes are available, so you don't have to invest a lump sum of money in infrastructure construction.

**Read/Write separation**

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

**Powerful hardware for high performance**

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

A single instance can sustain up to 240,000 QPS and 6 TB storage space.

## High security

**Anti-DDoS protection**

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 defense against such database attacks as 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.

## Strengths 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**

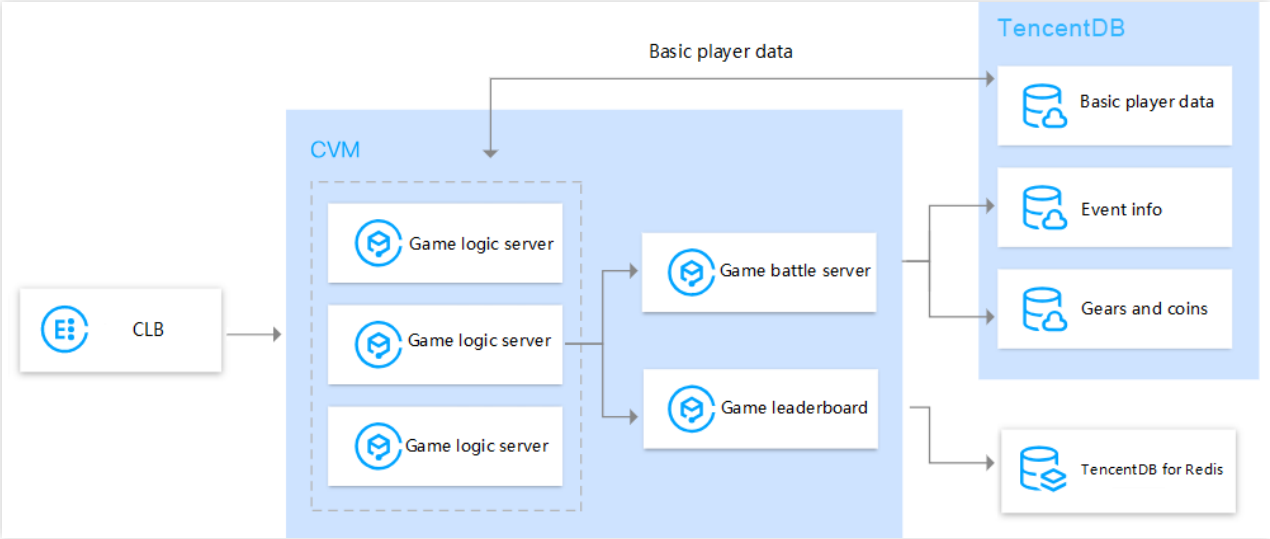
Access to the public network and VPC is supported. You can connect TencentDB instances to your IDC, a private cloud, or other computing resources for deployment in a hybrid cloud conveniently.

# Use Cases

Last updated：2024-07-22 10:59:46

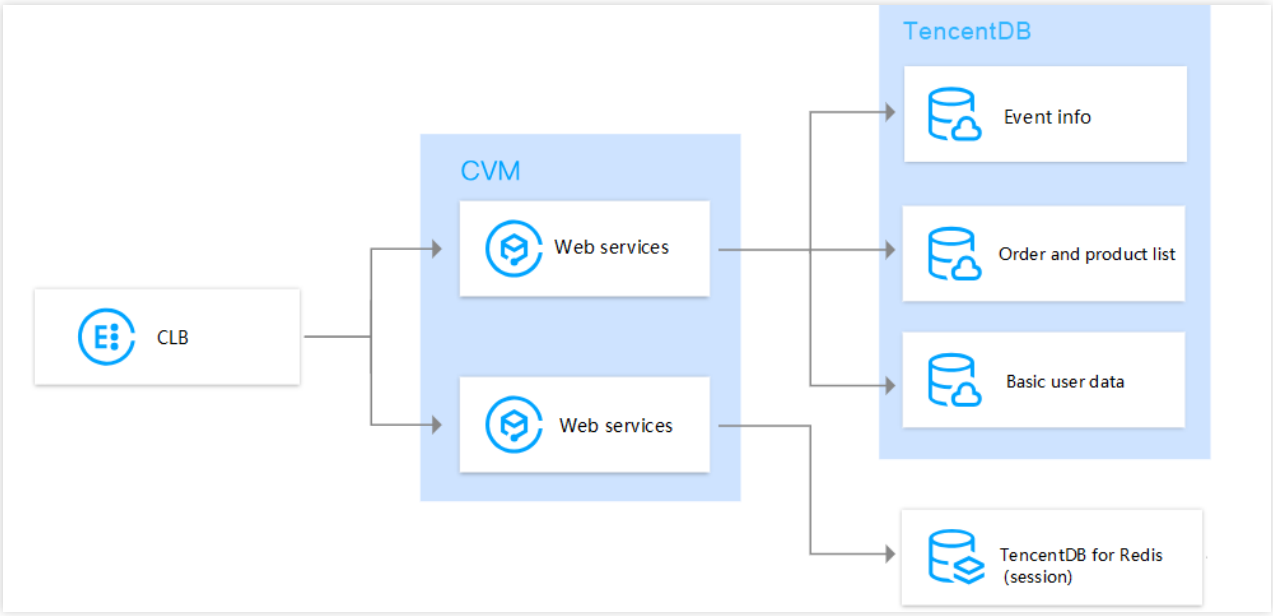
## Games

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.



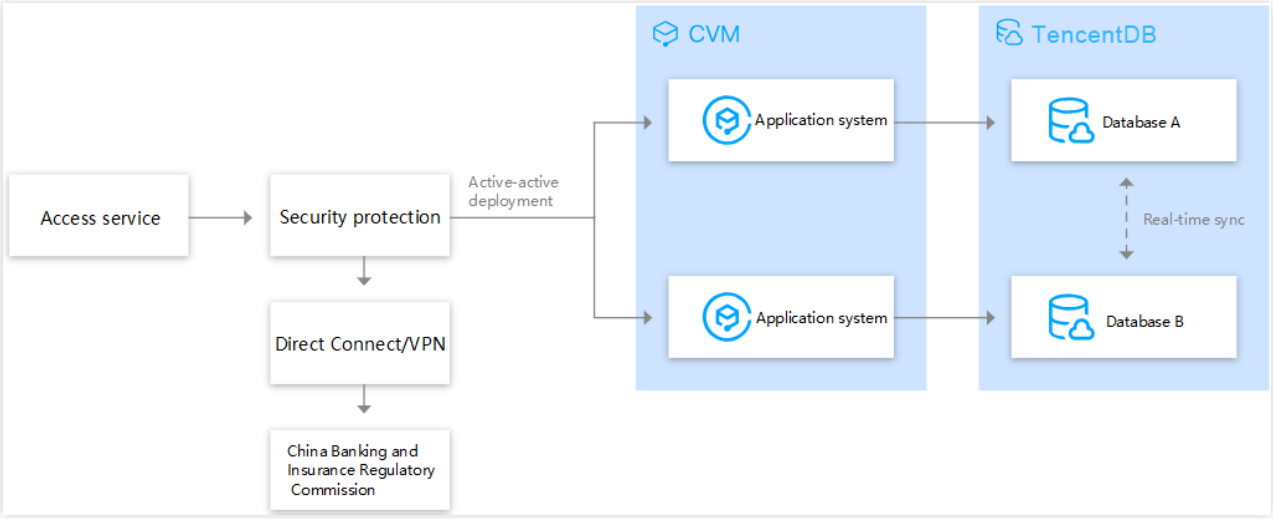

## Web/Mobile Apps

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.



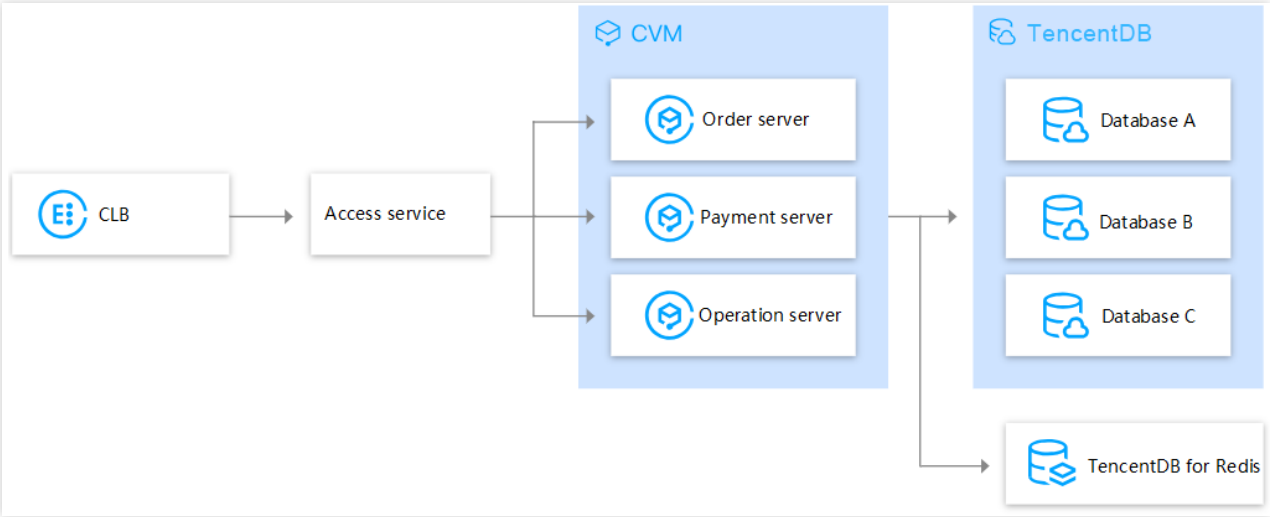

# Finance

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：2024-05-14 16:11:10

TencentDB for MySQL supports four types of architectures: single-node (cloud disk edition), two-node (formerly high availability edition), and three-node (formerly finance edition),Cluster Edition (cloud disk edition).

**Note:**

The single-node (cloud disk edition) architecture is currently available in the regions of Shanghai, Beijing, Guangzhou, Chengdu, Hong Kong of China, Singapore, and Frankfurt. Other regions will be available gradually in the future.

The two-node (formerly high availability edition) employs a one-primary-one-replica mode. Only the primary database provides access services, and the replica database is dedicated for disaster recovery without providing access.

The three-node (formerly finance edition) employs a one-primary-two-replica mode. Only the primary database provides access services, and the two replica databases are dedicated for disaster recovery without providing access.

The Cluster Edition (cloud disk edition) employs a one-primary-multiple-replica mode. The primary node (read-write node) provides read-write services, and the replica nodes (read-only nodes) provide read-only access services.

## 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 from the instance list, and view its architecture in the **Configuration Info** section.

## Architecture comparison

| Architecture | Cluster Edition | Two-Node | Three-Node | Single-Node | |
|---|---|---|---|---|---|
| Isolation Policy | Standard, Enhanced | General | General | General (Read-Only Instance) | Basic |
| Supported Versions | MySQL 5.7, 8.0 | MySQL 5.5, 5.6, 5.7, 8.0 | MySQL 5.6, 5.7, 8.0 | MySQL 5.6, 5.7, 8.0 | MySQ |
| Node | One-Primary-Multiple-Replica (Up to 5 Read-Only Nodes) | One-Primary-One-Replica | One-Primary-Two-Replica | Single Node | Single |

| | | | | | |
|---|---|---|---|---|---|
| Primary-Replica Replication Mode | Asynchronous/Semi-Synchronous (Default) | Asynchronous (Default), Semi-Synchronous | Asynchronous (Default), Fully Synchronous, Semi-Synchronous | - | - |
| Instance Availability | 99.95% | 99.95% | 99.99% | - | - |
| Underlying Storage | Tremendous SSD Cloud Disk<br>Enhanced SSD Cloud Disk<br>SSD Cloud Disk | Local NVMe SSD Disk | Local NVMe SSD Disk | Local NVMe SSD Disk | Enhan<br>SSD C |
| IOPS Performance | **Tremendous SSD Cloud Disk**<br>**Benchmark Performance** :<br>Random IOPS = min{4000+Capacity(GiB)×100, 50000}<br>**Additional Performance** :<br>Maximum IOPS = min{Additional Performance Value×128, 950000}<br>**Enhanced SSD Cloud Diske**<br>**Benchmark Performance** :<br>Random IOPS = min{1800+Capacity(GiB)×50, 50000}<br>**Additional Performance** :<br>Maximum IOPS = min{Additional Performance Value×128, 50000}<br>**SSD Cloud Disk**<br>Random IOPS = min{1800+Capacity(GiB)×30, 26000} | Up to 240,000 IOPS | Up to 240,000 IOPS | Up to 240,000 IOPS | **Enha**<br>**Disk**<br>**Benc**<br>Rando<br>min{18<br>50000<br>**Perfo**<br>Maxim<br>min{A<br>Value×<br>**SSD**<br>Rando<br>min{18<br>26000 |
| Throughput Performance (MB/s) | **Tremendous SSD Cloud Disk**<br>**Benchmark Performance** :<br>Throughput = min{120+Capacity(GiB)×0.5, 350}<br>**Additional Performance** : | - | - | - | **Enha**<br>**Disk**<br>**Benc**<br>Throu<br>min{12<br>350} /<br>**Perfo** |

| | | | | | |
|---|---|---|---|---|---|
| | Throughput = min{Additional Performance Value×1, 3650}<br>**Enhanced SSD Cloud Disk Benchmark Performance** :<br>Throughput = min{120+Capacity(GiB)×0.5, 350}<br>**Additional Performance** :<br>Throughput = min{Additional Performance Value×1, 650}<br>**SSD Cloud Disk**<br>Throughput = min{120+Capacity(GiB)×0.2, 260} | | | | Throu<br>Perfor<br>**SSD**<br>Throu<br>min{12<br>260} |
| Applicable Scenarios | Applications in various industries such as gaming, the internet, Internet of Things, retail and e-commerce, logistics, insurance, and securities. | Applications in various industries such as gaming, the internet, Internet of Things, retail and e-commerce, logistics, insurance, and securities. | Applications in various industries such as gaming, the internet, Internet of Things, retail and e-commerce, logistics, insurance, and securities. | Applications with Read/Write Separation Requirements | Perso<br>websit<br>enterp<br>mediu<br>develc<br>enviro |

# References

TencentDB for MySQL supports MySQL 5.5, 5.6, 5.7, and 8.0. For more information, see Database Versions.
TencentDB for MySQL supports the following instance types: the source instance, the read-only instance, and the 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.

# TencentDB for MySQL Cluster Edition

Last updated：2024-05-14 12:45:06

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

**Note:**

The TencentDB for MySQL Cluster Edition (cloud disk edition) employs a one-primary-multiple-replica mode. The primary node (read-write node) provides access services, and 1 to 5 replica nodes (read-only nodes) offer read-only access.

The Cluster Edition employs a decoupled architecture of computing and storage, featuring a one-primary-multiple-replica setup. It supports automatic failover, the ability to switch any replica node (read-only node) into a primary node (read-write node), read capability on replica nodes, on-demand addition or deletion of nodes, multi-availability zone disaster recovery, granular monitoring at the node level, and cluster node topology management. Compared to self-built databases, this design offers increased cost-effectiveness, flexibility, and reliability.

The Cluster Edition architecture, based on different isolation policies, can be classified into the Standard and Enhanced types. For more information, see Isolation Policy.

## Applicable Scenarios

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

## Architecture Features

The computing resource is not bound to the disk specification, allowing for high flexibility and fuller resource utilization.

Supports all performance-level disk types, including Tremendous SSD, Enhanced SSD, and SSD cloud disks.

Backup uses the form of cloud disk snapshots. The speed of backup and recovery is extremely fast, satisfying the needs for instant rollback.

Supports rapid node addition and deletion. Based on business needs, read-only nodes can be quickly added or deleted, with each read-only node capable of being deployed in its own availability zone. This adapts to business requirements and ensures high availability and disaster recovery capability.

Supports replica node read-only functionality. Traditional backup databases only provide disaster recovery without access. All replica nodes (read-only nodes) in Cluster Edition instances have their own read-only addresses. There is no need to create inaccessible replica servers.

There are two primary-replica replication modes: asynchronous and semi-synchronous (default). The replication mode can be modified on the instance details page of the Console.
Features are comprehensive, including replica database read-only, rapid addition/deletion of read-only nodes, node-level monitoring, and multi-availability zone disaster recovery.
Cluster Edition instances can achieve an availability of 99.95%.
Cluster Edition instances use multiple replicas to ensure data storage durability. Data produced by read/write nodes will be synchronized to other read-only nodes, effectively ensuring data security and achieving a data storage durability of no less than 99.9999999%.

# Two-Node Instances (Formerly High-Availability Edition)

Last updated：2024-05-14 16:13:41

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

**Note**

TencentDB for MySQL two-node instances are built on a one-source-one-replica architecture, with the source only providing access and the replica serving as disaster recovery system alone.

Two-node instances are built on a highly available one-source-one-replica architecture that implements 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 on the instance details page in the console. Or you can do so when upgrading to the three-node architecture as instructed in Upgrading Two-Node Instances to Three-Node Instances.

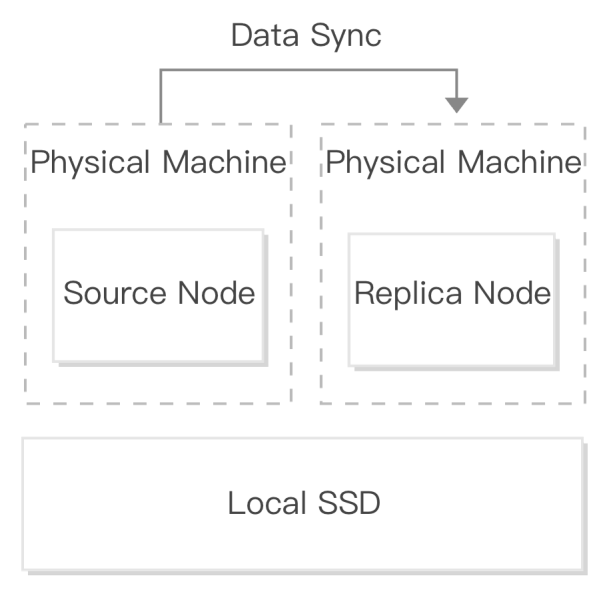
The three-node architecture supports a complete set of features including read-only instances, disaster recovery instances, security groups, data migration, and multi-AZ deployment. For more information, see Strengths.

Achieves a high availability of up to 99.95%. For more information, see Service Level Agreement.

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% (seven nines).

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：2024-05-14 16:20:20

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

**Note**

TencentDB for MySQL three-node instances are built on a one-source-two-replica architecture, with the source only providing access and the two replicas serving as disaster recovery systems alone.

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 such as async (default), strong sync, and semi-sync.

The three-node architecture supports a complete set of features including read-only instances, disaster recovery instances, 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 Service Level Agreement.

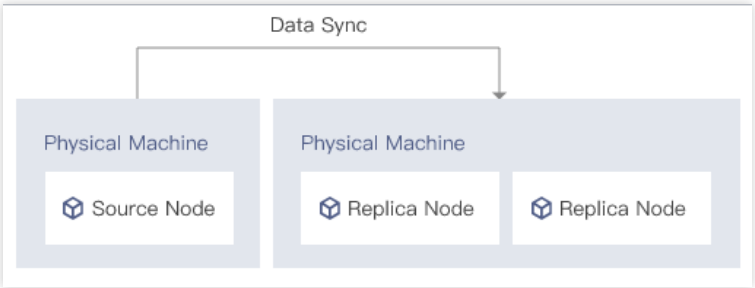
The three-node instance provides multiple replicas to guarantee data persistence. The source node data can be synced to the replica node; the source instance data can be synced to the read-only instances (if any). This architecture ensures data security and achieves a data persistence of up to 99.99999% (seven nines).

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 AZ (e.g., Beijing Zone 5), but TencentDB's default node distribution policy ensures that they are deployed on different physical servers. You can also deploy the

two replica nodes in different AZs (e.g., one replica node in Beijing Zone 5 and the other in Beijing Zone 7).

## Basic Framework Diagram




## 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.

# Single-Node Instances (Formerly Basic Edition and Cloud Disk Edition)

Last updated：2024-05-14 16:22:21

TencentDB for MySQL supports four types of architectures: single-node, two-node, three-node,and Cluster Edition. This document describes the single-node architecture.
Single-node instances support different resource isolation policies: basic (formerly basic edition), basic (cloud disk edition), and general (for read-only instances). For more information, see Resource Isolation Policy.

## Single-Node - Basic (Cloud Disk Edition)

### Use cases

The single-node architecture has only one database node, so it is very cost-effective and suitable for business scenarios that don't require a high availability, such as testing, development, and learning.

### Features

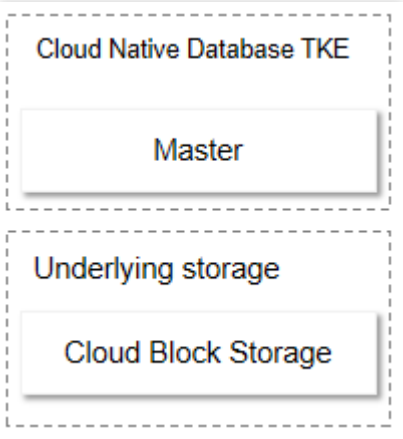
The underlying storage adopts SSD or Enhanced SSD cloud disks.
SSD cloud disk: It is an all-flash cloud disk storage type with NVMe SSD as the storage media. It provides low-latency and high-throughput I/O capabilities with a high random IOPS and 99.9999999% (nine nines) data security. It is suitable for scenarios that require a high I/O performance.
Enhanced SSD cloud disk: It is based on Tencent Cloud's latest storage engine, NVMe SSD storage media and the latest network infrastructure. It provides high-performance storage with low latency, high random IOPS, high throughput I/O, and data security up to 99.9999999% (nine nines), making it suitable for I/O-intensive applications with high requirements for latency. Uniquely, the performance and capacity of Enhanced SSD cloud disks can be independently adjusted to meet your requirements.
Random IOPS formula for SSD cloud disk: Random IOPS = min{1800 + capacity (GiB) * 30, 26000}.
Throughput formula for SSD cloud disk (MB/s): Throughput = min{120 + capacity (GiB) * 0.2, 260}.
Random IOPS formula for Enhanced SSD cloud disk: Random IOPS = min{1800 + capacity (GiB) * 50, 50000}.
Throughput formula for Enhanced SSD cloud disk (MB/s): Throughput = min{120 + capacity (GiB) * 0.5, 350}.

**Note:**

As basic instances of cloud disk edition take a long time to recover and don't provide an SLA, we recommend that you use the two-node or three-node version for production environments, which ensures up to 99.99% availability.
In order to ensure the data availability and recoverability of the database instance, a small part (5%) of the disk space is used as the system protection space, which protects the data in the instance but cannot store data.

Enhanced SSD cloud disk is supported only in certain regions as displayed on the purchase page for single-node instances of cloud disk edition.

### Basic framework diagram




## Single-Node - Basic (Formerly Basic Edition - Disused)

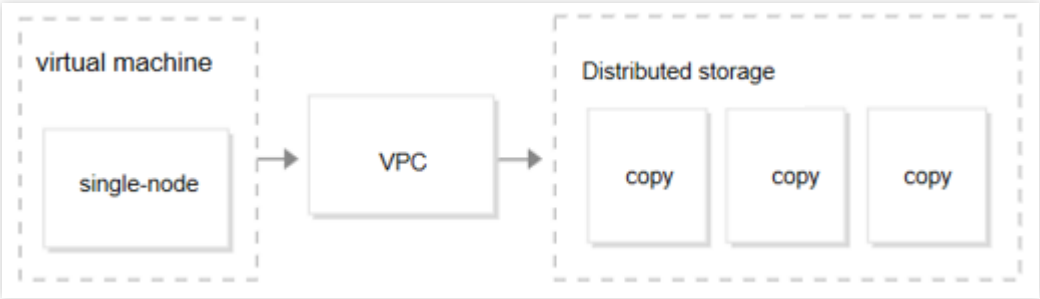
### Use cases

We do not recommend basic single-node instances for the business production environment. It is more suitable for personal learning, small websites, non-core small enterprise systems, and medium-to-large enterprise development and testing.

### Features

Supports computation-storage separation. If a compute node fails, fast recovery can be achieved by switching to another node. Underlying data is stored in three copies on cloud disks, which ensures a certain level of data reliability and enables quick data restoration from disk snapshots in case of disk failures.
Offers over 20 monitoring metrics such as database connection, access, and resource and supports configuring alarm policies as needed. Compared with a self-created CVM-based database, a basic single-node instance is also deployed on a CVM instance but is more convenient and provides higher database performance at a 40% lower cost.
Uses cost-effective premium cloud disks with stable performance as its underlying storage media, which makes them suitable for 90% of I/O scenarios. The IOPS calculation formula is {min 1,500 + 8 * capacity, max 4,500}. For example, the IOPS value range of a 50 GB disk is {min 1,900, max 4,500}.

### Basic framework diagram




**Note:**

As it adopts a single-node architecture, when the node fails, it takes slightly longer to recover than CVM (due to instance startup and data restoration). If your business requires high availability, we recommend that you use two-node or three-node MySQL instances.

# General Single-Node Instances

### Use cases

Currently, it is ideal only for read-only instances in various industries with read/write separation requirements.

### Features

It uses local NVMe SSD disks for underlying storage with excellent IO performance and is ideal for read-only instances to share business read load.

### Basic framework diagram


**Note:**

Single-node deployment is susceptible to single points of failure. If only one read-only instance is purchased, it is impossible to ensure high availability for your business, because a failure of the single read-only instance will lead to business disruption.

As the time taken to recover a single read-only instance depends on the business data volume, the recovery time cannot be guaranteed. As a result, if your business requires high availability, we recommend that you purchase at least two read-only instances for the read-only group as instructed in Managing the RO Group of Read-Only Instance.

### Relevant operations

You can create one or more read-only instances, which can be applied to read/write separation and one-source-multiple-replica application scenarios. For more information, see Creating Read-Only Instance.
You can create one or more read-only instances and put them in an RO group to ensure availability. For more information, see Managing the RO Group of Read-Only Instance.

# Resource Isolation Policy

Last updated：2024-05-14 16:26:53

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 architectures support general and dedicated isolation policies.

The Cluster Edition architecture supports both standard and enhanced isolation policies.

| Resource Isolation Policy | Description |
| --- | --- |
| Basic | Single-node instances are the only ones that support this policy. A basic single-node instance (formerly Basic Edition) supports computation-storage separation and stores data on cloud disks. |
| General | 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.<br>A general instance benefits from higher specifications at a lower cost by sharing CPU resources. |
| Dedicated | 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.<br>A dedicated instance with the highest configurations can monopolize a physical machine and all of its resources. |
| Standard Type | Exclusive allocation of CPU and memory ensures long-term stable performance.<br>A decoupled architecture of computing and storage offers flexible configuration options. |
| Enhanced Type | Enhanced frequency CPU cores deliver optimal performance.<br>Exclusive allocation of CPU and memory ensures long-term stable performance.<br>A decoupled architecture of computing and storage offers flexible configuration options.<br>Supports Tremendous SSD cloud disk, providing stable and reliable performance. |

## Isolation policies for different architectures

For TencentDB for MySQL, both the single node (cloud disk edition) and the Cluster Edition (cloud disk edition), are deployed on the cloud-native TKE, with each instance enjoying dedicated CPU, memory, and disk resources, ensuring complete isolation between different instances.

TencentDB for MySQL two-node (local disk) and three-node (local disk) instances are deployed based on local physical machines. Each physical machine sustains multiple instances and adopts isolation policies to ensure the complete isolation between different instances with dedicated CPU, memory, and disk resources.
In addition, TencentDB for MySQL also implements corresponding data isolation policies in multiple dimensions such as account, region, AZ, and network.

# Feature List

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## Product features

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

**Note:**

"-" in the table means "unsupported".

You can click the table title to switch between the feature comparison and new feature list.

| Feature Attributes | Feature Name | Cluster Edition | Two-Node | Three-Node | Single-Node | |
|---|---|---|---|---|---|---|
| Lifecycle | Isolation Policy | Standard Type, Enhanced | General Type, Dedicated | General Type, Dedicated | General Type (Read-Only Instance) | Basic Type (Cloud Disk Edition) |
| | Supported Versions | MySQL 5.7<br>MySQL 8.0 | MySQL 5.5<br>MySQL 5.6<br>MySQL 5.7<br>MySQL 8.0 | MySQL 5.6<br>MySQL 5.7<br>MySQL 8.0 | MySQL 5.6<br>MySQL 5.7<br>MySQL 8.0 | MySQL 5.7, 8.0 |
| | Number of Nodes | 1 Read-Write Node<br>1 - 5 Read-Only Nodes<br>1-15 independent read-only instances | 2 | 3 | 1 | 1 |
| | Memory/Disk | Standard Type: Up to 216 GB/30 TB | Up to 720 GB/12 TB | Up to 720 GB/12 TB | Up to 720 GB/12 TB | Up to 16 GB/30 TB |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | Enhanced Type: Up to 1536 GB/30 TB | | | | |
| | Create Instance | Supported | Supported | Supported | Supported | Supported |
| | Create Read-Only Instance | Supported (Add a read-only node or an independent read-only instance) | Supported (for MySQL 5.6, 5.7, and 8.0 Only) | Supported | Supported | - |
| | Create Disaster Recovery Instance | - | Supported (for MySQL 5.6, 5.7, and 8.0 Only) | Supported | - | - |
| | Terminate Instance | Supported | Supported | Supported | Supported | Supported |
| | Convert Pay-As-You-Go to Monthly Subscription | Supported | Supported | Supported | Supported | Supported |
| | Auto-Renewal | Supported | Supported | Supported | Supported | Supported |
| Instance Management | Set Instance Maintenance Time | Supported | Supported | Supported | Supported | Supported |
| | Assign a Project to the Instance | Supported | Supported | Supported | Supported | Supported |
| | Adjust Configuration | Supported | Supported | Supported | Supported | Supported |
| | Migrate Availability Zone | Supported | Supported | Supported | - | - |

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|---|---|---|---|---|---|---|
| | Change the port number | Supported | Supported | Supported | Supported | Supported |
| | Primary-replica switch | Supported | Supported | Supported | - | - |
| Version Upgrade | Upgrade Database Engine Version | - | Supported (for MySQL 5.5 and 5.6 Only) | Supported | Supported | - |
| | Upgrade the kernel minor version | - | Supported | Supported | Supported | Supported |
| Architecture Upgrade | Two-node upgrade to three-node | Supported (enable rapidly adding or deleting 1-5 nodes, with enhanced flexibility) | Supported | - | - | - |
| | Two-node upgrade to Cluster Edition | - | Supported | - | - | - |
| | Three-node upgrade to Cluster Edition | - | - | Supported | - | - |
| Supported Engines | InnoDB | Supported | Supported | Supported | Supported | Supported |
| | RocksDB | Supported | Supported | Supported | - | - |
| Backup and Rollback | Automatic backup | Supported | Supported | Supported | - | Supported |
| | Manual Backup | Supported | Supported | Supported | - | Supported |
| | Cross-region backup | - | Supported | Supported | - | - |

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|---|---|---|---|---|---|---|
| | Backup downloading | - | Supported | Supported | - | - |
| | Backup deletion | Supported (Manual snapshot backups support deletion) | Supported | Supported | - | - |
| | Clone Instance | Supported | Supported | Supported | - | Supported |
| | Rollback | Supported | Supported | Supported | - | - |
| | Regular Backup Retention | - | Supported | Supported | - | - |
| | Backup Encryption | - | Supported | Supported | - | - |
| | Backup Cooling | - | Supported | Supported | - | - |
| Monitoring and Alarms | Resource Monitoring | Supported | Supported | Supported | Supported | Supported |
| | Engine Monitoring | Supported | Supported | Supported | Supported | Supported |
| | Deployment Monitoring | Supported | Supported | Supported | - | - |
| | Alarm | Supported | Supported | Supported | Supported | Supported |
| Account Management | Create Account | Supported | Supported | Supported | Supported | Supported |
| | Setting Password Complexity | Supported | Supported | Supported | - | - |
| | Reset Password | Supported | Supported | Supported | Supported | Supported |
| | Modify Account | Supported | Supported | Supported | Supported | Supported |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Permissions | | | | | |
| | Modify Authorized Host Address | Supported | Supported | Supported | Supported | Supported |
| | Delete Account | Supported | Supported | Supported | Supported | Supported |
| Database Management | DMC Console | Supported | Supported | Supported | Supported | Supported |
| Data Security | Security Group | Supported | Supported | Supported | Supported | Supported |
| | Database Auditing | Supported | Supported (for MySQL 5.6 and 5.7 Only) | Supported | - | - |
| | Enabling Transparent Data Encryption | Supported | Supported (for MySQL 5.7 and 8.0 Only) | Supported (for MySQL 5.7 and 8.0 Only) | - | - |
| | Setting SSL Encryption | Supported | Supported (for MySQL 5.6, 5.7, and 8.0 Only) | Supported (for MySQL 5.6, 5.7, and 8.0 Only) | - | - |
| Data Channel | Migrating with DTS Service | Supported | Supported | Supported | Supported | Supported |
| | Offline Migration | - | Supported | Supported | - | - |
| | Importing SQL Files | Supported | Supported | Supported | - | - |
| Parameter Management | Setting Instance Parameters | Supported | Supported | Supported | Supported | Supported |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Intelligent parameter tuning | - | Supported | Supported | - | - |
| Network | Switch network | Supported | Supported | Supported | Supported | Supported |
| Performance | Database proxy | Supported | Supported | Supported | - | - |
| | Parallel query | Supported | Supported (Kernel Version 20220831 of MySQL 8.0 and Above) | Supported (Kernel Version 20220831 of MySQL 8.0 and Above) | Supported (Kernel Version 20220831 of MySQL 8.0 and Above) | Supported (Kernel Version 20220831 of MySQL 8.0 and Above) |
| | CPU elasticity scaling | - | General Type Supported | General Type Supported | Supported | - |
| Operation Logs | Slow Logs | Supported | Supported | Supported | Supported | Supported |
| | Slow Log Download | - | Supported | Supported | Supported | - |
| | Error Logs | Supported | Supported | Supported | Supported | Supported |
| | Rollback Logs | Supported | Supported | Supported | - | - |
| | Log Delivery | Supported | Supported | Supported | Supported | - |

# Database Instance
# Database Versions

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## Supported Versions

Currently, TencentDB for MySQL supports MySQL 5.5, 5.6, 5.7, and 8.0. For more information on the features of each version, see Lifetime Support Policy: Coverage of Technology (Oracle MySQL Releases). MySQL's official lifecycle service support policies are as shown below:

| Release | GA Date | Premier Support End | Extended Support End | Sustaining Support End |
|---|---|---|---|---|
| MySQL Database5.6 | Feb-13 | Feb-18 | Feb-21 | Indefinite |
| MySQL Database5.7 | Oct-15 | Oct-20 | Oct-23 | Indefinite |
| MySQL Database8.0 | Apr-18 | Apr-25 | Apr-26 | Indefinite |

**Note:**
The extended official support for MySQL 5.5 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 5.6 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 5.6 and higher support three replication modes: async, semi-sync, and strong sync. Only async mode is available in MySQL 5.5.
TencentDB for MySQL will extend support for MySQL 5.7 until after October 2023. During the extension period, important patch updates, upgrade capabilities and service support will still be provided regularly. We will prioritize the availability, reliability and security of our database services.

## TencentDB for MySQL Version Support Policy

| Version | Tencent Cloud Support | Tencent Cloud Support | Community Deactivation |
|---|---|---|---|

| | Start Date | End Date | Date |
|---|---|---|---|
| MySQL 5.6 | March 2016 | March 2022 | February 2021 |
| MySQL 5.7 | June 2017 | September 2025 | October 2023 |
| MySQL 8.0 | August 2020 | - | April 2026 |

# List of Feature Differences between MySQL8.0 and MySQL5.7

**Note:**

The table below only lists some important differences between MySQL 8.0 and MySQL 5.7. For specific differences, see the official documentation.

| Feature | MySQL5.7 | MySQL8.0 |
|---|---|---|
| GRANT ... IDENTIFIED BY PASSWORD Syntax | Supported | Not Supported |
| PASSWORD() Function, such as SET PASSWORD ... = PASSWORD('auth_string') | Supported | Not Supported |
| Parameters of the SQL_MODE system variable: DB2, MAXDB, MSSQL, MYSQL323, MYSQL40, ORACLE, POSTGRESQL, NO_FIELD_OPTIONS, NO_KEY_OPTIONS, NO_TABLE_OPTIONS, PAD_CHAR_TO_FULL_LENGTH, NO_AUTO_CREATE_USER | Supported | Not Supported |
| GROUP BY syntax automatically sorts by default | Supported | Not Supported |
| Functions such as ENCODE(), DECODE(), ENCRYPT(), DES_ENCRYPT(), DES_DECRYPT() for encryption and decryption | Supported | Not Supported |
| For more information on space analysis related functions, see the official documentation. | Supported | Not Supported |
| | | |

| | | |
|---|---|---|
| Functions that previously accepted strings or geometric parameters as WKB values no longer permit geometric parameters. For more information, see the official documentation. | Supported | Not Supported |
| The parser interprets \\N as NULL. | Supported | Not Supported |
| PROCEDURE ANALYSE() Function | Supported | Not Supported |
| InnoDB Compressed Temporary Tables | Supported | Not Supported |
| JSON_APPEND(), JSON_MERGE() Features | Supported | Not Supported |
| Transaction scheduling first-in-first-out (FIFO) algorithm, see the official documentation. | Supported | Not Supported |
| Counters for undo_truncate_sweep_count, undo_truncate_sweep_usec, undo_truncate_flush_count, and undo_truncate_flush_usec. | Supported | Not Supported |
| Numeric data type ZEROFILL. | Supported | Not Supported |
| information_schema_stats_expiry | Supported | Not Supported |
| Query Cache | Supported | Not Supported |
| The GLOBAL_VARIABLES, SESSION_VARIABLES, GLOBAL_STATUS, SESSION_STATUS tables in the INFORMATION_SCHEMA library, see the official documentation. | Supported | Not Supported |
| The INNODB_LOCKS and INNODB_LOCK_WAITS tables in the INFORMATION_SCHEMA library | Supported | Not Supported |
| Parallel Query | Not Supported | Supported |
| sort merge join | Not | Supported |

| | | |
|---|---|---|
| | Supported | |
| statement outline | Not Supported | Supported |
| REVOKE supports the IF EXISTS and IGNORE UNKNOWN USER options | Not Supported | Supported |
| Supports atomic DDL, ensuring that DDL operations are either fully committed or rolled back. For more information, see the official documentation. | Not Supported | Supported |

## TencentDB for MySQL 8.0 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 99.99% service availability and up to 99.9999999% 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, remarkably simplifying both business development and database operations. It reduces the complexity of business architectures, allowing for effortless management through the Database Management Center (DMC).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, submit a ticket.

## Feature Comparison between TencentDB for MySQL 8.0 and Oracle MySQL 8.0.

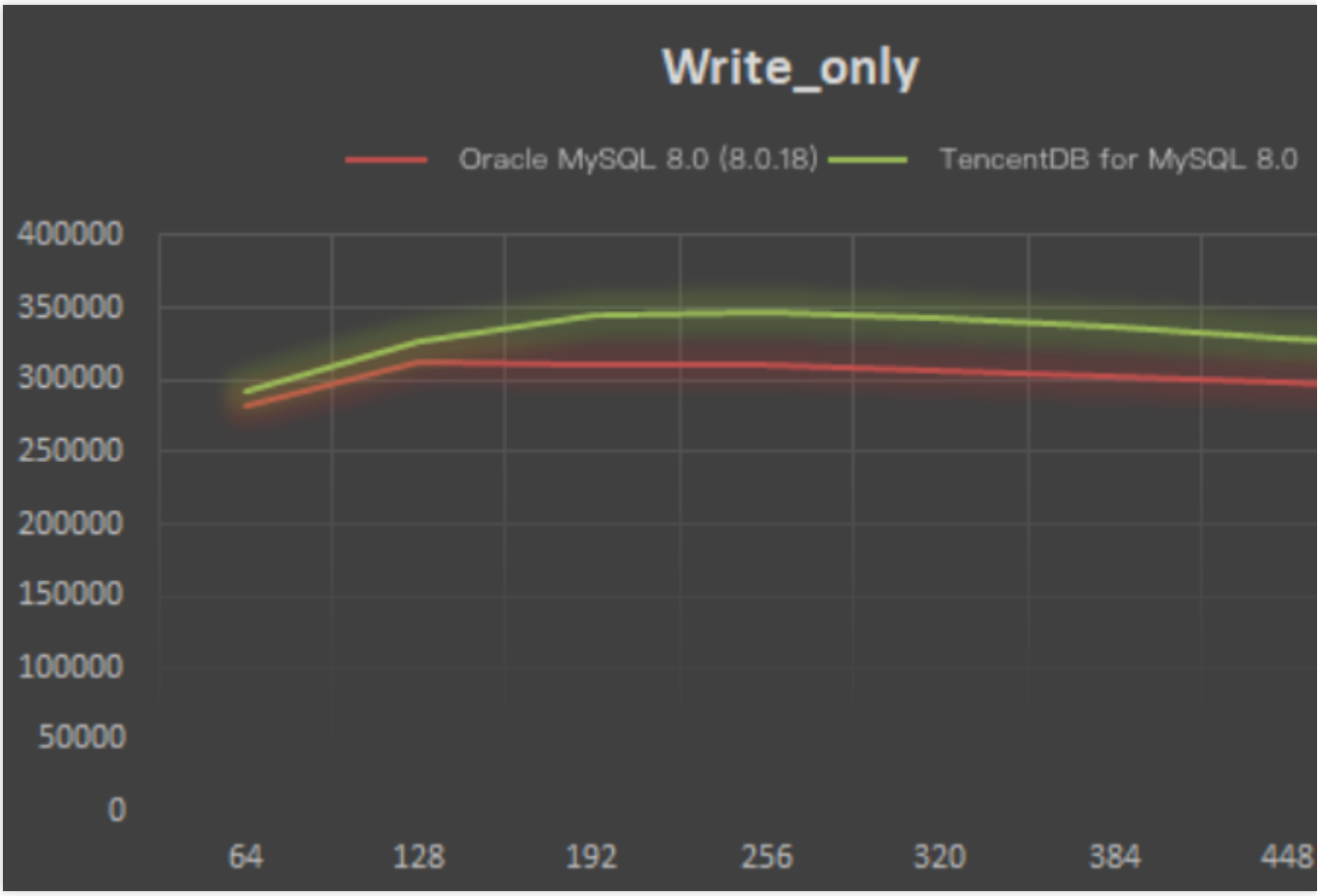
| Feature | TencentDB for MySQL 8.0 | Oracle MySQL 8.0 |
| --- | --- | --- |
| Cost Performance | 1. Elastic resources.<br>2. Tencent's kernel TXSQL.<br>3. Integrated backup and restoration features.<br>4. A complete set of SaaS tools and services. | 1. Huge one-time investment cost.<br>2. The open source version has no performance optimization.<br>3. Additional backup resources and costs.<br>4. Public network fees and high domain name fees. |
| Availability | 1. A complete high-availability switchover system is provided.<br>2. Read-only instances automatically balance load and traffic.<br>3. Disaster recovery instances are provided for remote disaster recovery, ensuring high availability. | 1. You need to buy servers and wait for the delivery.<br>2. You need to deploy the high availability and load balancing systems by yourself.<br>3. It costs a lot to build data centers in multiple regions. |
| Reliability | 1. Data reliability of up to 99.9999999%.<br>2. Low RPO/RTO.<br>3. Stable source-replica data replication. | 1. Data reliability of 99%, which depends on the probability of damage to a single disk.<br>2. You need extra R&D investment to achieve a low RPO.<br>3. Data replication delays or interruptions may occur. |
| Ease of Use | 1. A complete set of database management services are provided and databases can be easily operated in the console.<br>2. Second-level monitoring and intelligent alarms.<br>3. Automatic multi-AZ high-availability capability.<br>4. One-click version upgrade. | 1. You need to deploy high availability and backup and restoration systems by yourself, which requires time and money.<br>2. You need extra investment to purchase a monitoring system.<br>3. It costs a lot to set up data centers in different regions with labor costs in Ops.<br>4. The version upgrade cost is high and the maintenance needs a long downtime. |
| Performance | 1. Local SSD disks have excellent performance and the custom hardware supports fast iterations.<br>2. The optimized TXSQL ensures high performance.<br>3. DBbrain supports the intelligent diagnosis and optimization of MySQL. | 1. Oracle MySQL has a slower hardware iteration speed than that of cloud computing, usually resulting in lower performance.<br>2. It can be costly as database maintenance relies on senior DBAs.<br>3. Oracle MySQL does not have native performance tools, so you have to purchase or deploy them by yourself. |
| Security | 1. Prevention in advance: allowlist, security group, VPC-based isolation. | 1. The cost of the allowlist configuration is high and the private network needs to be implemented by yourself. |

| | | |
|---|---|---|
| | 2. Protection during the database operations: TDE + KMS data encryption.<br>3. Auditing after the database operations: SQL auditing.<br>4. TencentDB for MySQL is updated right after the Oracle MySQL has security updates. | 2. You need to implement encryption by yourself during the database operations.<br>3. It is difficult to audit SQLs after the database operations as the open-source MySQL does not support SQL auditing.<br>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 8.0 and Oracle MySQL 8.0

**Read Performance**


**Write Performance**




# FAQs

### What will happen to the TencentDB for MySQL service after the MySQL Community Edition is deactivated?

After the MySQL Community Edition is decommissioned, TencentDB for MySQL will continue to make security fixes for the database version during the extended service period, but will only fix major bugs and security issues. Also continue to perform regular maintenance on hosts, OS, containers, and other service-related components. However, if there are issues related to technical support for the MySQL database version, we may be unable to provide relevant technical support, and you will need to upgrade the database version to receive effective technical support services. Please note that the SLA only applies to issues related to TencentDB for MySQL services and does not cover any failure issues caused by bugs related to the database engine.

### How do I upgrade the TencentDB for MySQL version?

TencentDB for MySQL supports upgrading the database version through the console. For more information, see:

Upgrade from MySQL 5.5 to MySQL 5.6

Upgrade from MySQL 5.6 to MySQL 5.7

Upgrade from MySQL 5.7 to MySQL 8.0

# Database Instance Types

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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 | Visible in Instance List | Feature |
| --- | --- | --- | --- | --- |
| Source instance | An instance that can be read from and written to | Single-node<br>Two-node<br>Three-node<br>Cluster | Yes | A source instance can mount read-only instances and disaster recovery instances for read/write separation and remote disaster recovery.Single-node and Cluster Edition architectures do not support attaching read-only instances and disaster recovery instances. |
| Read-only instance | An instance that can only be read from | Single-node | Yes | A read-only instance cannot exist on its own. Instead, it must be affiliated to a source instance. Its data comes solely from syncing with the source instance, and it must reside in the same region as the source instance. |
| Disaster recovery instance | An instance that supports disaster recovery across AZs and regions | Two-node<br>Three-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 read-only instances, see Creating Read-Only Instance.

For operations of adding or removing read-only nodes in Cluster Edition, see Adding Instance Nodes and Removing Instance Nodes.

For more information on how to create and configure RO groups for read-only instances, see Managing the RO Group of Read-Only Instance.
For more information on the creation of and notes on the disaster recovery instance, see Managing Disaster Recovery Instance.

# Database Instance Specification

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This document introduces the instance specifications of TencentDB for MySQL, providing you with a comprehensive understanding of the supported specifications for MySQL instances. You may view this document for detailed configurations of each specification, or visit the purchase page to query the latest supported specifications.

## Cluster Edition (Cloud Disk Edition)

For specifications of the Cluster Edition (cloud disk edition) instances, see this table.

| Isolation Policy | CPU and Memory |
| --- | --- |
| Standard Type | 2-core 4,000 MB |
| | 2-core 8,000 MB |
| | 2-core 16,000 MB |
| | 4-core 8,000 MB |
| | 4-core 16,000 MB |
| | 4-core 32,000 MB |
| | 8-core 16,000 MB |
| | 8-core 32,000 MB |
| | 8-core 64,000 MB |
| | 16-core 32,000 MB |
| | 16-core 64,000 MB |
| | 16-core 128,000 MB |
| Enhanced Type | 2-core 4,000 MB |
| | 2-core 8,000 MB |
| | 2-core 16,000 MB |
| | 4-core 8,000 MB |
| | |

| |
|---|
| 4-core 16,000 MB |
| 4-core 32,000 MB |
| 8-core 16,000 MB |
| 8-core 32,000 MB |
| 8-core 64,000 MB |
| 16-core 32,000 MB |
| 16-core 64,000 MB |
| 16-core 128,000 MB |
| 32-core 64,000 MB |
| 32-core 128,000 MB |
| 32-core 256,000 MB |
| 48-core 128,000 MB |
| 48-core 192,000 MB |
| 64-core 128,000 MB |
| 64-core 256,000 MB |
| 80-core 160,000 MB |
| 80-core 320,000 MB |
| 96-core 192,000 MB |
| 96-core 384,000 MB |
| 112-core 224,000 MB |
| 112-core 448,000 MB |
| 128-core 256,000 MB |
| 128-core 512,000 MB |
| 144-core 288,000 MB |
| 144-core 576,000 MB |

| | |
|---|---|
| | 160-core 320,000 MB |
| | 160-core 640,000 MB |
| | 176-core 352,000 MB |
| | 176-core 704,000 MB |
| | 192-core 384,000 MB |
| | 192-core 768,000 MB |
| | 384-core 768,000 MB |
| | 384-core 1,536,000 MB |

## Two-node/Three-node (local SSD disk)

The following table lists the specifications of source instances (two-node/three-node), read-only instances, and disaster recovery instances.

| Isolation Policy | CPU and Memory | Maximum IOPS | Storage Space |
|---|---|---|---|
| General | 1-core 1000 MB | 1200 | 25GB - 3000GB |
| | 1-core 2000 MB | 2000 | |
| | 2-core 4000 MB | 4000 | |
| | 4-core 8000 MB | 8000 | |
| | 4-core 16000 MB | 14000 | 25GB - 4000GB |
| | 8-core 16000 MB | 20000 | |
| | 8-core 32000 MB | 28000 | |
| | 16-core 32000 MB | 32000 | |
| | 16-core 64000 MB | 40000 | |
| | 16-core 96000 MB | 40000 | |
| | 16-core 128000 MB | 40000 | 25GB - 6000GB |
| | 24-core 192000 MB | 60000 | 25GB - 6000GB |
| | | | |

| | | | |
|---|---|---|---|
| | 24-core 244000 MB | 60000 | 25GB - 8000GB |
| | 32-core 256000 MB | 80000 | |
| | 48-core 488000 MB | 120000 | 25GB - 12000GB |
| | 80-core 690000 MB | 140000 | |
| Dedicated | 2-core 16000 MB | 8000 | 25GB - 4000GB |
| | 4-core 16000 MB | 10000 | |
| | 4-core 24000 MB | 13000 | |
| | 4-core 32000 MB | 16000 | |
| | 8-core 32000 MB | 32000 | |
| | 8-core 48000 MB | 36000 | |
| | 8-core 64000 MB | 40000 | |
| | 12-core 48000 MB | 36000 | 25GB - 8000GB |
| | 12-core 72000 MB | 40000 | |
| | 12-core 96000 MB | 48000 | |
| | 16-core 64000 MB | 60000 | |
| | 16-core 96000 MB | 60000 | |
| | 16-core 128000 MB | 60000 | |
| | 24-core 96000 MB | 72000 | |
| | 24-core 144000 MB | 76000 | |
| | 24-core 192000 MB | 80000 | |
| | 32-core 128000 MB | 80000 | |
| | 32-core 192000 MB | 90000 | |
| | 32-core 256000 MB | 100000 | |
| | 48-core 192000 MB | 120000 | 25GB - 10000GB |
| | 48-core 288000 MB | 140000 | |
| | | | |

| | | | |
|---|---|---|---|
| | 48-core 384000 MB | 140000 | |
| | 64-core 256000 MB | 150000 | |
| | 64-core 384000 MB | 150000 | |
| | 64-core 512000 MB | 150000 | 25GB - 12000GB |
| | 90-core 720000 MB | 150000 | |

**Note:**

The storage space cap of an instance specification may vary by region as displayed on the purchase page.

## Single-node (SSD cloud disk)

| Isolation policy | CPU and Memory | IOPS performance | Throughput performance | Storage capacity |
|---|---|---|---|---|
| Basic | 1-core 1000 MB | Random IOPS = min{1800 + 30 × capacity (GB), 26000} Maximum IOPS: 26000 | Throughput = min{120 + 0.2 × capacity (GB), 260} Maximum Throughput (MB/s): 260 MB/s | 20GB - 32000GB |
| | 1-core 2000 MB | | | |
| | 2-core 4000 MB | | | |
| | 2-core 8000 MB | | | |
| | 4-core 8000 MB | | | |
| | 4-core 16000 MB | | | |
| | 8-core 16000 MB | | | |
| | 8-core 32000 MB | | | |

## Single-node (Enhanced SSD cloud disk)

| Isolation policy | CPU and Memory | IOPS performance | Throughput performance | Storage capacity |
| --- | --- | --- | --- | --- |
| Basic | 1-core 1000 MB | Random IOPS = min{1800 + 50 × capacity (GB), 50000} Maximum IOPS: 50000 | Throughput = min{120 + 0.5 × capacity (GB), 350} Maximum Throughput (MB/s): 350 MB/s | 20GB - 32000GB |
| | 1-core 2000 MB | | | |
| | 2-core 4000 MB | | | |
| | 2-core 8000 MB | | | |
| | 4-core 8000 MB | | | |
| | 4-core 16000 MB | | | |
| | 8-core 16000 MB | | | |
| | 8-core 32000 MB | | | |

# Database Instance Replication

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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.

**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 responds 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

An application initiates a data update (including INSERT, UPDATE, and DELETE operations) request. After completing the update operation, 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

An application initiates a data update (including INSERT, UPDATE, and DELETE operations) request. After completing the update operation, 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：2024-07-22 11:02:20

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)

Last updated：2024-05-14 16:57:35

Multi-AZ deployment protects your database against database instance failures and AZ outages. For more information on supported regions and AZs, see Regions and AZs.

In TencentDB for MySQL, multiple AZs are combined to form a single multi-AZ architecture to ensure high availability and failover capability of database instances.

**Note:**

Two-Node and Three-Node Instances:

No matter whether the cluster instances are deployed in multiple AZs, each TencentDB for MySQL instance has a replica server that supports real-time hot backup to ensure the high availability of the database.

In multi-AZ deployment, TencentDB for MySQL will automatically preset and maintain a synced replica in different AZs.

The source database instance will be synchronously replicated across AZs to the replica to provide data redundancy, eliminate I/O freezes, and minimize latency peak during the system backup.

Cluster Edition Instances:

Supports read-only replica nodes, with a Cluster Edition instance supporting only one primary node (read-write node) and up to five replica nodes (read-only nodes).

All read-only nodes within a Cluster Edition instance support the configuration of availability zones (in the same region as the read-write node).

## Supported regions

Currently, the multi-AZ deployment of TencentDB for MySQL is supported in Guangzhou, Shenzhen Finance, Shanghai, Shanghai Finance, Nanjing, Beijing, Chengdu, Hong Kong (China), Singapore, Jakarta, Bangkok, Mumbai, Seoul, Tokyo, Virginia, and Frankfurt regions.

## Multi-AZ Deployment

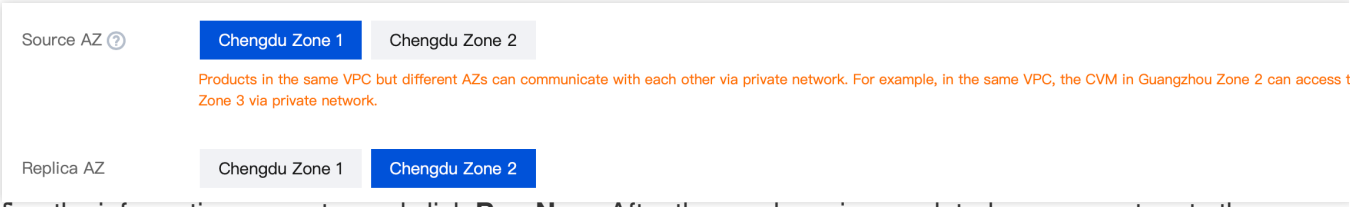
Dual-node and Triple-node Instance Operation Procedures

Cluster Edition Instance Operation Steps

1. Log in to the TencentDB for MySQL console and click **Create** in the **Instance List** to enter the purchase page.
2. On the MySQL purchase page, select the corresponding support region and choose either the two-node or three-node architecture. Then, under the  Replica AZ  option, select the corresponding replica availability zone.

**Note:**

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




3. Confirm the information you enter and click **Buy Now**. After the purchase is completed, you can return to the instance list to view the newly purchased multi-AZ instance.

1. Log in to the TencentDB for MySQL console and click **Create** in the instance list to enter the purchase page.
2. On the MySQL purchase page, select the corresponding support region and choose the Cluster Edition architecture. Then, you may choose the **Availability Zone for Read-Write Nodes** as well as the **Availability Zone for Read-Only Nodes** .
3. Confirm the information you enter and click **Buy Now** . After the purchase is completed, you can return to the instance list to view the newly purchased multi-AZ instance.

## Failover

TencentDB for MySQL will handle failover automatically, so you can quickly restore the database operations without administrative intervention. If any of the following conditions occurs, the source database instance will automatically switch to the replica in the replica AZ.

AZ outages.

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**.

## Regions

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 at the private network access.
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 as instructed in Internet Access, while those in different VPCs can communicate with each other through Cloud Connect Network that is faster and steadier.
Cloud Load Balancer (CLB) 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 Cloud Load Balancer and Elastic IP (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 (sold out) 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 |
| South China (Shenzhen Finance)ap-shenzhen-fsi | Shenzhen Finance Zone 1 (only financial institutions and enterprises can contact us to apply for activation)ap-shenzhen-fsi-1 |
| | Shenzhen Finance Zone 2(only financial institutions and enterprises can contact us to apply for activation)ap-shenzhen-fsi-2 |
| | Shenzhen Finance Zone 3(only financial institutions and enterprises can contact us to apply for activation)ap-shenzhen-fsi-3 |

| | |
|---|---|
| East China (Shanghai)ap-shanghai | Shanghai Zone 1ap-shanghai-1 |
| | Shanghai Zone 2ap-shanghai-2 |
| | Shanghai Zone 3ap-shanghai-3 |
| | Shanghai Zone 4ap-shanghai-4 |
| | Shanghai Zone 5ap-shanghai-5 |
| | Shanghai Zone 8ap-shanghai-8 |
| East China (Nanjing)ap-nanjing | Nanjing Zone 1ap-nanjing-1 |
| | Nanjing Zone 2ap-nanjing-2 |
| | Nanjing Zone 3ap-nanjing-3 |
| East China (Shanghai Finance)ap-shanghai-fsi | Shanghai Finance Zone 1 (only financial institutions and enterprises can contact us to apply for activation)ap-shanghai-fsi-1 |
| | Shanghai Finance Zone 2 (only financial institutions and enterprises can contact us to apply for activation)ap-shanghai-fsi-2 |
| | Shanghai Finance Zone 3 (only financial institutions and enterprises can contact us to apply for activation)ap-shanghai-fsi-3 |
| North China (Beijing)ap-beijing | Beijing Zone 1ap-beijing-1 |
| | Beijing Zone 2ap-beijing-2 |
| | Beijing Zone 3ap-beijing-3 |
| | Beijing Zone 4ap-beijing-4 |
| | Beijing Zone 5ap-beijing-5 |
| | Beijing Zone 6ap-beijing-6 |
| | Beijing Zone 7ap-beijing-7 |
| North China (Beijing Finance) ap-beijing-fsi | Beijing Finance Zone 1 (only financial institutions and enterprises can contact us to apply for activation)ap-beijing-fsi-1 |
| Southwest China (Chengdu)ap-chengdu | Chengdu Zone 1ap-chengdu-1 |
| | |

| | |
|---|---|
| | Chengdu Zone 2ap-chengdu-2 |
| Southwest China (Chongqing)ap-chongqing | Chongqing Zone 1ap-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 1ap-jakarta-1 |
| | Jakarta Zone 2ap-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 |
| US West (Silicon Valley)na-siliconvalley | Silicon Valley Zone 1 (sold out)na-siliconvalley-1 |
| | Silicon Valley Zone 2 (Silicon Valley nodes cover services in Western US)na-siliconvalley-2 |
| US East (Virginia)na-ashburn | Virginia Zone 1 (Virginia nodes cover services in Eastern US)na-ashburn-1 |
| | Virginia Zone 2 (Virginia nodes cover services in Eastern US)na-ashburn-2 |
| North America (Toronto)na-toronto | Toronto Zone 1 (Toronto nodes cover services in North America)na-toronto-1 |
| South America (São Paulo)sa-saopaulo | São Paulo Zone 1 (São 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 | Northeast Europe 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.