

# **TencentDB for MySQL**

## **MySQL Cluster Edition**

### **Product Documentation**



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# MySQL Cluster Edition

## Introduction to TencentDB for MySQL Cluster Edition

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TencentDB for MySQL supports the Cluster Edition product architecture, offering high elasticity, high performance, flexibility, and reliability. It combines the simplicity and openness of open-source cloud databases with efficient iteration advantages. The Cluster Edition provides unique features such as automatic failover, the ability to switch any replica node (read-only node) to a primary node (read-write node), read-only replica nodes, on-demand scaling of nodes by adding or deleting them, multi-availability zone disaster recovery, granular node monitoring, and cluster node topology management. It helps users tackle complex business scenarios, enabling a single database deployment to meet a variety of business requirements.

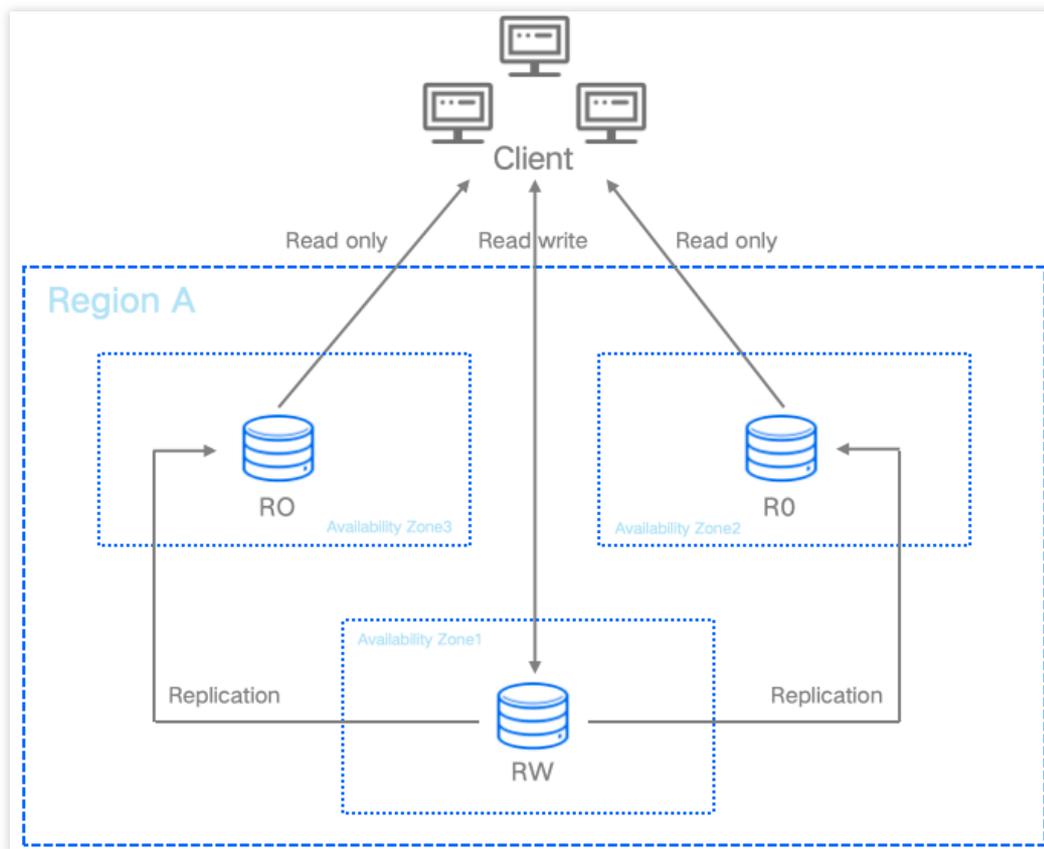
### What is the Cluster Edition?

The database Cluster Edition is based on a cloud-native high availability deployment model, featuring multiple read replica database nodes. It provides both read-write and read-only access addresses. Replica databases in two-node/three-node instances serve only for high availability purposes and do not provide direct access. Considering performance and cost factors, the Cluster Edition's architecture is suitable for more complex business scenarios where there are substantial business fluctuations, large data volumes, high read performance requirements, and frequent scaling or addition/deletion of read-only instances.

In the TencentDB for MySQL Cluster Edition, async and semi-sync replication are supported. You can choose the replication mode on the purchase page, and modify it later in the console's instance details page. For more details on replication modes, see [Database Instance Replication](#).

The storage type for the TencentDB for MySQL Cluster Edition is cloud disk, supporting Tremendous SSD, Enhanced SSD, and SSD. The cloud disk type can only be selected on the purchase page. For more details on the performance of each cloud disk, see [Cloud Disk Types](#).

### Architecture Diagram



## Architecture Applications

Users can freely deploy the number of primary and replica nodes according to actual business needs to meet the most suitable database deployment method required for business operation, achieving the best balance between cost and performance.

For example, the following are some common deployment methods (representing only some scenarios).

1 Primary, 1 Replica: The read-write node is used for online business and the read-only node is used for failover preparation and lightweight read queries. It is suitable for scenarios with high availability requirements for the production environment.

1 Primary, 2 Replicas: The read-write node is used for online business, and read-only node 1 is used for online analytical reads and read-only node 2 is used for failover preparation. It is suitable for scenarios needing high availability and better flexibility.

1 Primary, Multiple Replicas: The read-write node is used for online business and multiple read-only nodes are used for distributing the load of read requests, significantly enhancing the capability to handle a high volume of read requests. It is suitable for businesses with particularly high read request demands.

## Advantages

**Performance Enhancement:** Significant improvements from various kernel optimizations such as atomic writes, code segment optimization, and Buffer Pool pre-warming.

**Read-Only Replica Nodes:** Replica databases support for the configuration of read-only addresses, eliminating the need for creating inaccessible replica instances.

**High Elasticity:** Can quickly adjust configurations up or down based on business needs, rapidly complete scaling out, and achieve cost optimization for compute resources.

**Flexibility:** Can quickly add or delete read-only nodes based on business needs. A Cluster Edition instance can quickly accommodate the addition or deletion of 1 to 5 read-only nodes.

**Security and Reliability:** Offering both async and semi-sync replication as options, combined with multiple replica nodes, ensures business continuity by maintaining proper primary-replica sync under normal circumstances.

## Billing

To understand the billing methods and items for the TencentDB for MySQL Cluster Edition, see [Billing Overview](#).

To know the prices for the TencentDB for MySQL Cluster Edition, see [Price Calculator](#).

For information on the TencentDB for MySQL Cluster Edition storage free space and the billing for backup beyond the free space, see [Backup Space Billing](#).

## Supported Features

The features supported by the TencentDB for MySQL Cluster Edition instances are basically the same as those of the MySQL two-node/three-node instances. For a specific feature comparison, see [Feature List](#).

For features and operations that differentiate the TencentDB for MySQL Cluster Edition instances from the MySQL two-node/three-node instances, see [Subsequent Articles in This Section](#).

# Creating TencentDB for MySQL Cluster Edition Instance

Last updated : 2024-05-14 09:38:21

You can create a TencentDB for MySQL Cluster Edition instance via the console and API. For operation methods, see [Creating MySQL Instance](#).

# Maintenance Management Instance

## Adding a Node for an Instance

Last updated : 2024-05-14 12:52:58

Instances in the TencentDB for MySQL Cluster Edition architecture support attaching from 1 up to 5 read-only nodes. This document guides you through the process of adding read-only nodes for a cluster instance via the console once the instance has been created.

## Prerequisites

For instances of the TencentDB for MySQL Cluster Edition, see [Purchase Methods](#) for creation. The instance is running.

## Billing

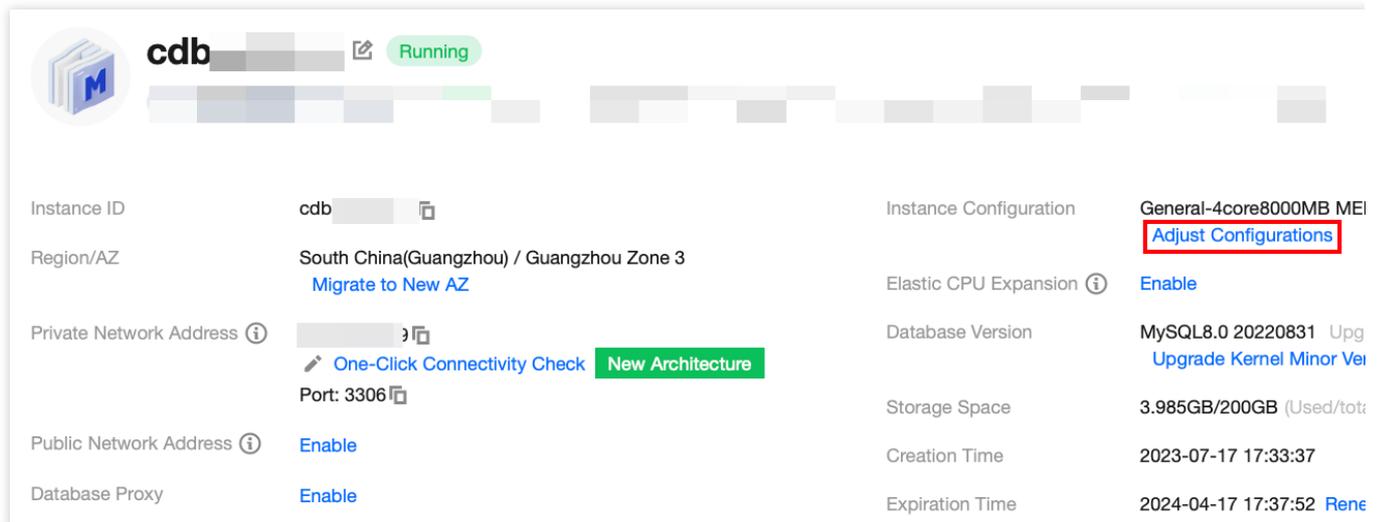
For billing description of adding read-only nodes, see [Instance Adjustment Fee](#).

## Directions

### Note:

The current cluster edition instance supports up to one primary and five replicas, totaling six nodes.

1. Log in to the [MySQL Console](#). In the instance list, click **Instance ID** or **Manage** in the **Operation** column to enter the **Instance Details** page.
2. After going to **Instance Details > Instance Configuration**, select **Adjust Configurations**.



Instance ID	cdb	Instance Configuration	General-4core8000MB MEI <a href="#">Adjust Configurations</a>
Region/AZ	South China(Guangzhou) / Guangzhou Zone 3 <a href="#">Migrate to New AZ</a>	Elastic CPU Expansion	Enable
Private Network Address	<a href="#">One-Click Connectivity Check</a> <a href="#">New Architecture</a> Port: 3306	Database Version	MySQL8.0 20220831 <a href="#">Upg</a> <a href="#">Upgrade Kernel Minor Ver</a>
Public Network Address	Enable	Storage Space	3.985GB/200GB (Used/tot)
Database Proxy	Enable	Creation Time	2023-07-17 17:33:37
		Expiration Time	2024-04-17 17:37:52 <a href="#">Renew</a>

3. On the adjust configurations page, under **Node Availability Zone**, click **Add Read-Only Node**, and then set the availability zone for this read-only node.

4. After selecting the switch time, click **Submit**.

**During Maintenance Time:** The configuration switch will occur within the maintenance time. To modify the instance maintenance time, see [Setting Instance Maintenance Time](#).

**Upon Upgrade Completion:** A configuration switch will be immediately performed after the configuration change is completed.

5. After the switch is completed, the newly added read-only node will be found under **Instance Architecture Diagram** on the **Instance Details** page.

# Deleting a Node for an Instance

Last updated : 2024-05-14 12:50:44

Instances in the TencentDB for MySQL Cluster Edition architecture support attaching from 1 up to 5 read-only nodes. This document guides you through the process of deleting read-only nodes for a cluster instance via the console once the instance has been created.

## Prerequisites

For instances of the TencentDB for MySQL Cluster Edition, see [Purchase Methods](#) for creation.

The instance is running.

There are at least 2 read-only nodes under the instance.

## Billing

For the billing description of deleting read-only nodes, see [Instance Adjustment Fee](#).

## Directions

1. Log in to the [MySQL Console](#). In the instance list, click **Instance ID** or **Manage** in the **Operation** column to enter the **Instance Details** page.
2. After going to **Instance Details** > **Instance Configuration**, select **Adjust Configurations**.

The screenshot shows the 'Instance Details' page for a TencentDB for MySQL instance. The instance is named 'cdb' and is in a 'Running' state. The page is divided into two main sections: Instance Information and Instance Configuration.

Instance Information	Instance Configuration
Instance ID: cdb	Instance Configuration: General-4core8000MB MEI
Region/AZ: South China(Guangzhou) / Guangzhou Zone 3	<a href="#">Adjust Configurations</a>
Private Network Address: [Redacted]	Elastic CPU Expansion: Enable
Public Network Address: Enable	Database Version: MySQL8.0 20220831
Database Proxy: Enable	Storage Space: 3.985GB/200GB (Used/total)
	Creation Time: 2023-07-17 17:33:37
	Expiration Time: 2024-04-17 17:37:52

Additional features visible in the Instance Information section include: 'One-Click Connectivity Check' and 'New Architecture' buttons.

3. On the adjust configurations page, under **Node Availability Zone**, find the read-only node you want to delete and click **Delete**.

**Note:**

If a read-only node is accidentally deleted, it can be restored before completing the configuration adjustment by clicking **Recover** after the corresponding read-only node.

4. After selecting the switch time, click **Submit**.

During Maintenance Time: The configuration switch will occur within the maintenance time. To modify the instance maintenance time, see [Setting Instance Maintenance Time](#).

Upon Upgrade Completion: A configuration switch will be immediately performed after the configuration change is completed.

5. After the switch is completed, the deleted read-only node will be synchronously removed under **Instance Architecture Diagram** on the **Instance Details** page.

# Read-Write Address Management

Last updated : 2024-07-05 21:35:57

After creating a TencentDB for MySQL Cluster Edition instance, you can change its read-write node's network and modify private network address. This document describes how to change the network and modify private network address or port number of a Cluster Edition instance's read-write node through the console.

## Prerequisites

For instances of the TencentDB for MySQL Cluster Edition, see [Purchase Methods](#) for creation.

The instance is running.

## Notes

When the network is changed, the IP of the instance will be replaced with a new one. The old one will become invalid 24 hours following the change by default. Please modify the client program accordingly in time.

If the Valid Hours of Old IP is set to 0 hour, the old IP is reclaimed immediately after the network is changed.

You can only select a VPC and subnet in the same region as the instance.

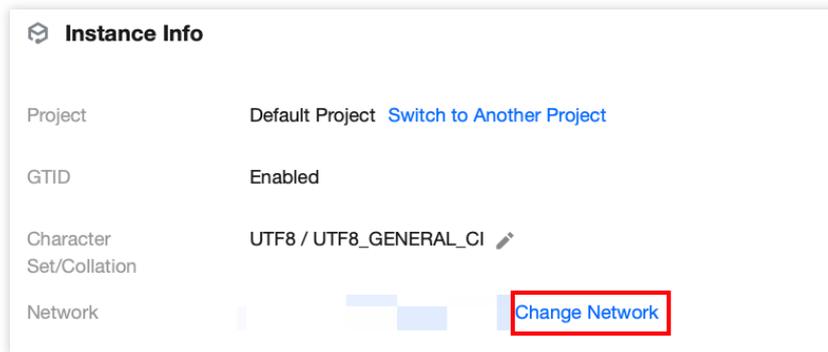
Modifying the private network address will affect the database service being accessed. Please modify the client program accordingly in time.

## Changing Network of Read-Write Node

To change the network of a Cluster Edition instance's read-write nodes, you can select a network in other regions.

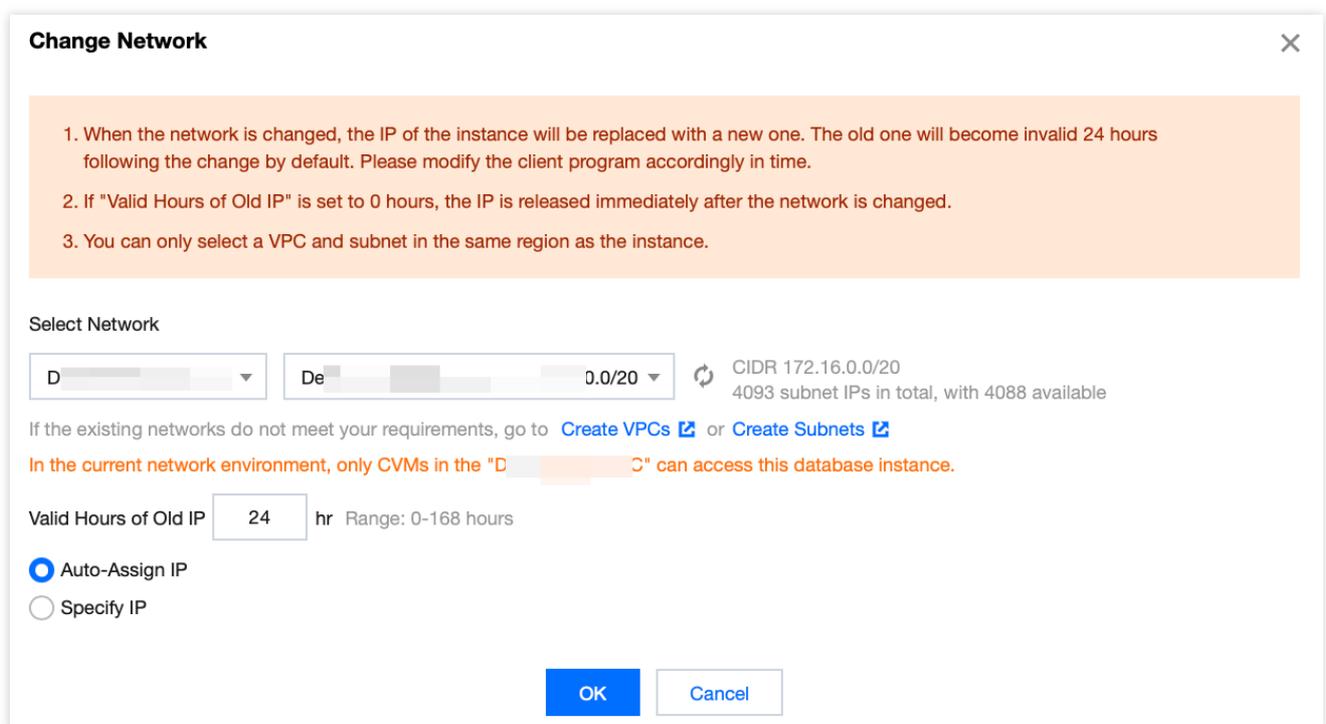
After the network is changed, the old IP will become invalid. The application systems/clients need to bind to the new network IP.

1. Log in to the [MySQL Console](#). In the instance list, click **Instance ID** or **Manage** in the **Operation** column to enter the **Instance Details** page.
2. After going to **Instance Details** > **Instance Info** > **Network**, select **Change Network**.

**Note:**

You can also select **Change Network** on the right side of **Instance Details > Instance Architecture Diagram > Read-Write Address**.

3. In the **Change Network** pop-up, change the network, set Valid Hours of Old IP (24 hours by default), select the new IP assignment method, and click **OK**.



Select the new IP assignment method:

**Auto-Assign IP:** The system automatically assigns an IP from the selected network.

**Specify IP:** Custom the IP.

4. When it is returned to the instance details page, you can view the new network of the read-write node.

**Note:**

If the Valid Hours of Old IP is set to 0 hour, the old IP address will be immediately reclaimed after the network is changed.

If the Valid Hours of Old IP is set to non-0 hour, the old IP address will be reclaimed after the set time when the network is changed. To release the old IP address earlier, you can go to the **Instance Details** page > **Private Network Address**, click the **Retained Address**, and then **Release Now** the target address operation.

IP Address	Retention P...	Expiration Time	Operation
[Redacted]	24	2024-04-10 10:42:15	Release Now

## Modifying Private Network Address or Port Number of Read-Write Node

Modifying only the private network address of the read-write node means only changing the IP of the read-write node's private network under the current region and network. Modifying the private network address will affect the database service being accessed.

1. Log in to the [MySQL Console](#). In the instance list, click **Instance ID** or **Manage** in the **Operation** column to enter the **Instance Details** page.
2. After going to **Instance Details > Private Network Address**, click the Edit Icon.

### Note:

You can also click the Edit Icon after going to **Private Network Address** below **Instance Details > Instance Architecture Diagram > Read-Write Address**.

3. In the pop-up, modify the private network address or port number according to actual needs, then click **OK**.

### Modify Private Network Address ✕

Private IP\*

Available Private IP Range: 172.16.16.0/20

Private Port\*

Port value range: 1024-65535

**Note: modifying the private network address will affect the database service being accessed.**

# Read-Only Address Management

Last updated : 2024-05-14 12:59:40

After creating a TencentDB for MySQL Cluster Edition instance, you can change its read-only node's network and modify private network address. This document describes how to change the network and modify private network address or port number of a Cluster Edition instance's read-only node through the console.

## Prerequisites

For instances of the TencentDB for MySQL Cluster Edition, see [Purchase Methods](#) for creation.

The instance is running.

## Notes

When the network is changed, the IP of the instance will be replaced with a new one. The old one will become invalid 24 hours following the change by default. Please modify the client program accordingly in time.

If Valid Hours of Old IP is set to 0 hour, the IP is released immediately after the network is changed.

You can only select a VPC and subnet in the same region as the instance.

Modifying the private network address will affect the database service being accessed. Please modify the client program accordingly in time.

## Changing Network of Read-Only Node

To change the network of a Cluster Edition instance's read-only nodes, you can select a network in other regions. After the network is changed, the old IP will become invalid. The application systems/clients need to bind to the new network IP.

1. Log in to the [MySQL Console](#). In the instance list, click **Instance ID** or **Manage** in the **Operation** column to enter the **Instance Details** page.
2. You can also select **Change Network** on the right side of **Instance Details** > **Instance Architecture Diagram** > **Read-Only Address**.
3. In the **Change Network** pop-up, change the network, set Valid Hours of Old IP (24 hours by default), select the new IP assignment method, and click **OK**.

**Change Network**
✕

1. When the network is changed, the IP of the instance will be replaced with a new one. The old one will become invalid 24 hours following the change by default. Please modify the client program accordingly in time.
2. If "Valid Hours of Old IP" is set to 0 hours, the IP is released immediately after the network is changed.
3. You can only select a VPC and subnet in the same region as the instance.

**Select Network**

D

De

0.0/20

↻

CIDR 172.16.0.0/20  
 4093 subnet IPs in total, with 4088 available

If the existing networks do not meet your requirements, go to [Create VPCs](#) or [Create Subnets](#)

In the current network environment, only CVMs in the "D" can access this database instance.

Valid Hours of Old IP

24

hr
Range: 0-168 hours

Auto-Assign IP  
 Specify IP

OK

Cancel

Select the new IP assignment method:

**Auto-Assign IP:** The system automatically assigns an IP from the selected network.

**Specify IP:** Custom the IP.

4. When it is returned to the instance details page, you can view the new network of the read-only node.

#### Note:

If the old IP address valid hours setting is 0 hour, the old IP address will be immediately released after the network is changed.

If the old IP address valid hours setting is not 0 hour, the old IP address will be released after the set time when the network is changed. To release the old IP address earlier, you can go to the **Instance Details** page > **Instance Architecture Diagram** > **Read-Only Address** > **Private Network Address**, click the Reserved Address, and then operate to release the target address immediately.

## Modifying Private Network Address or Port Number of Read-Only Node

Modifying only the private network address of the read-only node means only changing the IP of the read-only node's private network under the current region and network. Modifying the private network address will affect the database service being accessed.

1. Log in to the [MySQL Console](#). In the instance list, click **Instance ID** or **Manage** in the **Operation** column to enter the **Instance Details** page.
2. After going to **Instance Details** > **Instance Architecture Diagram** > **Read-Only Address** > **Private Network Address**, click the Edit Icon.
3. In the pop-up, modify the private network address or port number according to actual needs, then click **OK**.

### Modify Private Network Address ✕

Private IP\*

Available Private IP Range: 172.16.16.0/20

Private Port\*

Port value range: 1024-65535

**Note: modifying the private network address will affect the database service being accessed.**

# Switch Between Read-Write Nodes and Read-Only Nodes

Last updated : 2024-05-14 14:12:42

TencentDB for MySQL Cluster Edition instances support switching between read-write nodes and read-only nodes, i.e., primary/replica switch. In the event of an instance failure, the system will automatically switch a read-only node to a read-write node to ensure system availability and data integrity. This automatic switching is triggered under special circumstances such as failures. In addition to automatic switching, you can also perform manual switching through the console. This document introduces the read-write node switching for the Cluster Edition. For information on primary/replica switch for two-node and three-node instances, see [Primary/Replica Switch](#).

## Background

In enterprise-level applications, the database is usually a critical part of the business system. Any database failure or downtime can have a severe impact on business operations. Therefore, to ensure system availability and data integrity, it is necessary to adopt a high availability solution like primary/replica switch. This solution allows for a quick switch from a read-write node to a read-only node within the cluster in the event of a failure, preventing business interruptions and data loss.

## Prerequisites

For instances of the TencentDB for MySQL Cluster Edition, see [Purchase Methods](#) for creation.  
The instance is running, with no other tasks in progress.

## Notes

During the read-write node switching process, there will be brief disconnections lasting a few seconds. It is recommended to perform the switching operation during off-peak business hours and ensure that your application has a reconnection mechanism.

Once the read-write node has been switched, the instance connection address remains unchanged. The original read-write node will serve as a read-only node, and applications will automatically connect to the new read-write node (which was previously a read-only node).

## Directions

1. Log in to the [MySQL Console](#). In the instance list, click **Instance ID** or **Manage** in the **Operation** column to enter the **Instance Details** page.

2. After going to **Instance Details > Availability Information > Read-Write Node Availability Zone**, click **Read-Write Node Switch**.

**Note:**

You can also directly find the target read-only instance under **Instance Details > Instance Architecture Diagram**, and click the Switch Icon on the topology chart to enter the Read-Write Node Switch popup.

3. In the pop-up, select the switch time, specify the node, check the notes, and then click **OK**.

**During Maintenance Time:** The read-write node switch will be carried out during the maintenance time. To modify the instance maintenance time, see [Setting Instance Maintenance Time](#).

**Upon Upgrade Completion:** After the settings are completed, you can immediately perform read-write node switching.

4. After the instance status changes from Primary/Replica Switching to Running, the switch is completed.

# Adjusting Data Protection Space

Last updated : 2024-05-14 14:16:02

TencentDB for MySQL Cluster Edition instances require allocating dedicated space for data protection to ensure the recoverability of the database instance. You can do this during the creation of the Cluster Edition instance, and modifications are supported on the instance details page after creation. This document guides you on how to modify the database protection space after creating a Cluster Edition instance.

## Note:

To ensure the recoverability of the database instances, TencentDB for MySQL Cluster Edition instances must allocate a designated amount of space specifically for data protection within the instances. This reserved space is not used for data storage and is categorized as system protection space, designed to prevent potential instance malfunctions resulting from data overflow.

## Prerequisites

For instances of the TencentDB for MySQL Cluster Edition, see [Purchase Methods](#) for creation.

The instance is running.

## Directions

1. Log in to the [MySQL Console](#). In the instance list, click **Instance ID** or **Manage** in the **Operation** column to enter the **Instance Details** page.
2. After going to **Configuration Info > Storage Space**, click **Adjust Data Protection Space**.
3. In the pop-up, configure the required data protection space size. The selectable range is 1 GB - 10 GB, and then click **OK**.

# Viewing Instance Monitoring

Last updated : 2024-05-14 14:14:36

TencentDB for MySQL supports monitoring of primary instances, read-only instances, disaster recovery instances, database proxy nodes, and both read-write and read-only nodes of Cluster Edition instances. It provides an independent monitoring view for each instance to facilitate querying. This document introduces the operation of switching to view the monitoring of each node under the Cluster Edition instance through the console. For detailed information regarding specific monitoring metrics, monitoring granularity, and other aspects of the monitoring feature, see [Monitoring](#).

## Note:

You can access the monitoring metrics of the instance through [Tencent Cloud Observability Platform](#).

You can also [Create Dashboard](#) for monitoring metrics to dynamically analyze the monitoring data.

If the number of tables in a single instance exceeds one million, database monitoring may be affected. Reasonably manage the number of tables and make sure that the number of tables in a single instance is below one million.

## Prerequisites

For instances of the TencentDB for MySQL Cluster Edition, see [Purchase Methods](#) for creation.

The instance is running.

## Directions

1. Log in to the [MySQL Console](#). In the instance list, click **Instance ID** or **Manage** in the **Operation** column to enter the **Instance Details** page.
2. Select the **Instance Monitoring** page, and then you can view the monitoring status of the read-write node (default).
3. To view the monitoring status of other read-only nodes in the Cluster Edition instance, you can switch by using the drop-down key after **Node Selection**.

# Adjusting Instance Configuration

Last updated : 2024-05-14 14:17:28

TencentDB for MySQL supports convenient adjustments through the console, enabling users to modify instance specifications, add or remove nodes, and carry out flexible scaling operations. According to the varying stages of your business (whether in its early phase, a period of rapid growth, peak usage times, or troughs), you can adaptively fine-tune the specifications of MySQL instances to optimally use resources and realize real-time cost optimization more effectively.

For changes in adjustment fee, see [Instance Adjustment Fee](#).

For operations on adjusting the configurations of single-node, two-node and three-node instances, see [Adjusting Database Instance Specifications](#).

## Prerequisites

For instances of the TencentDB for MySQL Cluster Edition, see [Purchase Methods](#) for creation.

The instance is running.

## Directions

1. Log in to the [MySQL Console](#). In the instance list, click **Instance ID** or **Manage** in the **Operation** column to enter the **Instance Details** page.
2. After going to **Instance Configuration**, click **Adjust Configurations**.



3. After completing the following configurations on the redirected page, click **Submit**.

Parameter	Description
Instance Type	Instance type modification (isolation policy) is supported. The instance types supported by the Cluster Edition are: Standard, Enhanced.
Specification	Select the instance specifications you wish to modify. For specifications specifically supported

	by the Cluster Edition, see <a href="#">Database Instance Specification</a> .
Disk	Supports for increasing disk storage space.
Data Replication Mode	Supports for modifying the data replication mode of instances. The Cluster Edition supports asynchronous replication, semi-synchronous replication. For a detailed understanding of the differences between each replication mode, see <a href="#">Database Instance Replication</a> .
Node Availability Zone	This option can be used to add, and delete read-only nodes, and change node availability zones (subject to actual resource availability).
Rapid Configuration Adjustment	Indicates that the configuration adjustment will be completed directly on the current host server without involving data migration. Whether this option can be enabled should be based on the actual configuration adjustment operation page.
Switch Time	During Maintenance Time: Configuration adjustment occurs during the maintenance period. For modifying the instance maintenance time, see <a href="#">Setting Instance Maintenance Time</a> . Upon Upgrade Completion: The switch will be performed immediately after the configuration adjustment is completed.
Restart	Whether the adjusted configuration will restart the instance should be based on the actual configuration adjustment operation page. Some operations, such as modifying the replication mode and adding a read-only node, do not involve a restart.

# Operations for Other Features

Last updated : 2024-05-14 12:41:47

The feature operations for TencentDB for MySQL Cluster Edition instances in the console are consistent with those of single-node, two-node, and three-node instances. You can see [Operation Overview](#) for the directions of the corresponding feature items.

# Migrating to TencentDB for MySQL Cluster Edition

Last updated : 2024-05-14 12:43:39

[Data Transfer Service](#) supports migrating self-built MySQL in local IDCs, third-party cloud vendor MySQL, and TencentDB for MySQL to TencentDB for MySQL. For detailed preparations and directions, see [Migration from MySQL to TencentDB for MySQL](#).