

SphereEx-Console User Manual

V1.0

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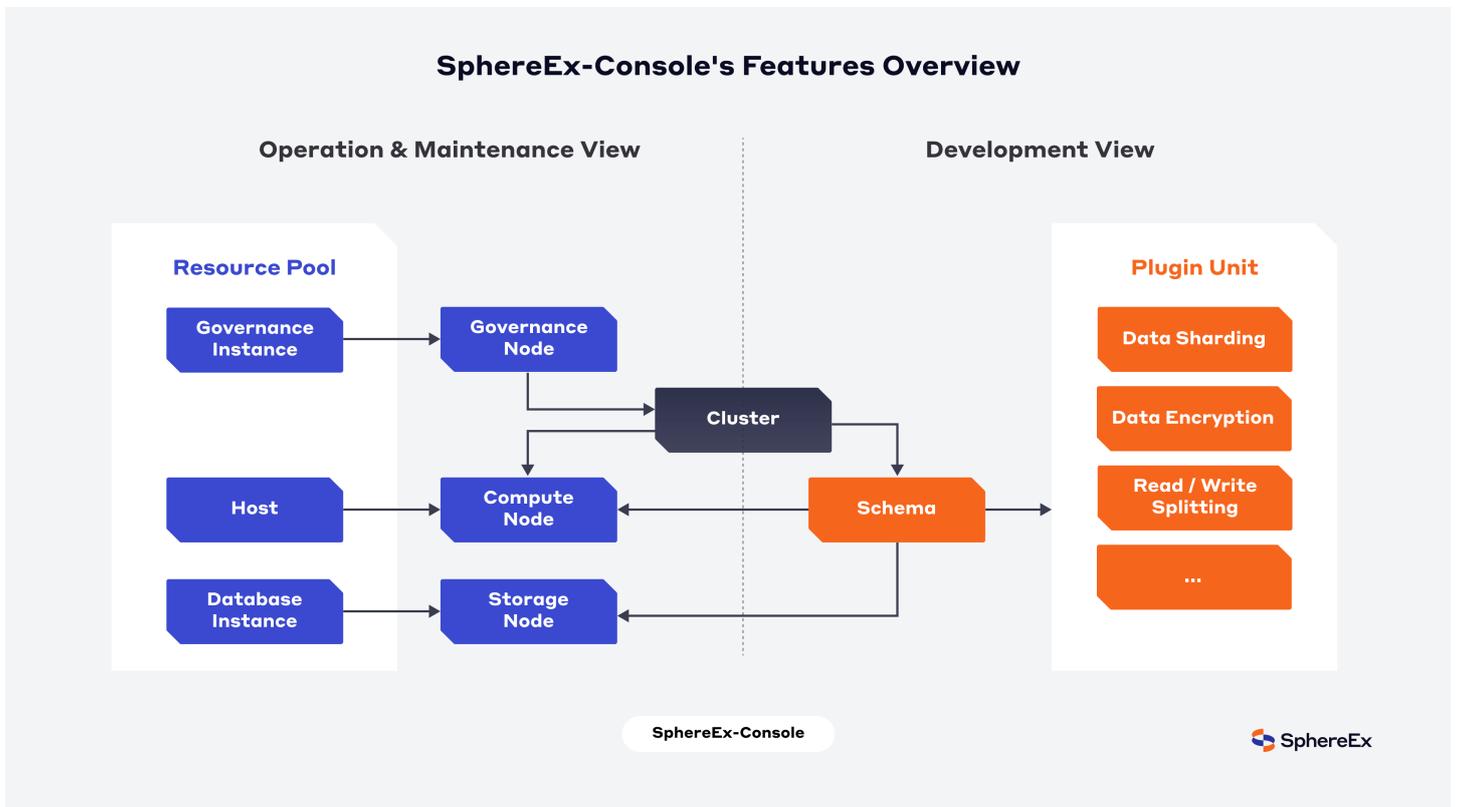
Product Instructions

1.1 What is SphereEx-Console?

The SphereEx Enterprise Data Service Platform was created by leveraging ShardingSphere's open source kernel and enhancing it with enterprise level features. It can provide enterprises with enhanced data service capabilities, including but not limited to data sharding, data security, etc.

SphereEx-Console is a visual operation platform applied to the management and control of the SphereEx Enterprise Data Service Platform, providing a more user-friendly experience. At the same time, a comprehensive solution with ShardingSphere as the core is built, packaging of multiple functions such as resource layer, instance layer and application layer, to provide users with a one-stop solution.

The functions overview of SphereEx-Console is as follows:



1.2 Keywords

- Host

Deploys and installs actual physical resources such as physical machine, virtual machine, container, etc.

- Database instance

Physically corresponding to the database instance, there may be multiple database instances on one host.

- DB Plus Engine

It consists of two products, DB Plus Engine-Driver and DB Plus Engine-Proxy, which can be deployed independently and support mixed deployment. They both provide standardized horizontal scaling of data, distributed transaction, distributed governance and other functions. They can be applied to various application scenarios such as Java isomorphism, heterogeneous language, cloud native and so on.

- Compute node

A computing node, corresponding to the DB Plus Engine deployment unit, is a group of resources determined by IP and port.

A single computing node is responsible for SQL routing, data consolidation, data aggregation and other functions.

One DB Plus Engine instance corresponds to multiple computing nodes.

- Storage node

Corresponding to a database under a database instance, DB Plus Engine is responsible for data storage.

Physically corresponds to a schema under a database instance, that is, a set of object resource collections under IP, port, username, password and schema conventions.

- Cluster

A distributed cluster composed of multiple compute nodes and storage nodes, which is the unit of user management.

- Governance Center

Store the configuration information of the computing node, and the namespace corresponds to the cluster one by one.

- Logical database

A logical database corresponds to a schema in DB Plus Engine, and is managed at the cluster level. A cluster can have multiple logical databases with different names.

- Plugin

DB Plus Engine is designed with a plugin oriented architecture. Functions are provided in the form of plugins, including but not limited to data sharding, read/write splitting, etc.

1.3 Architecture Overview

SphereEx-Console is based on B/S architecture, and accessed through a web browser. Its logical structure diagram is as follows:

Users log into the system through the browser, and manage the cluster of the SphereEx Enterprise Data Service Platform in SphereEx-Console. The monitoring data queried by SphereEx console comes from the data exported from the host and compute node in the cluster to the Prometheus server.

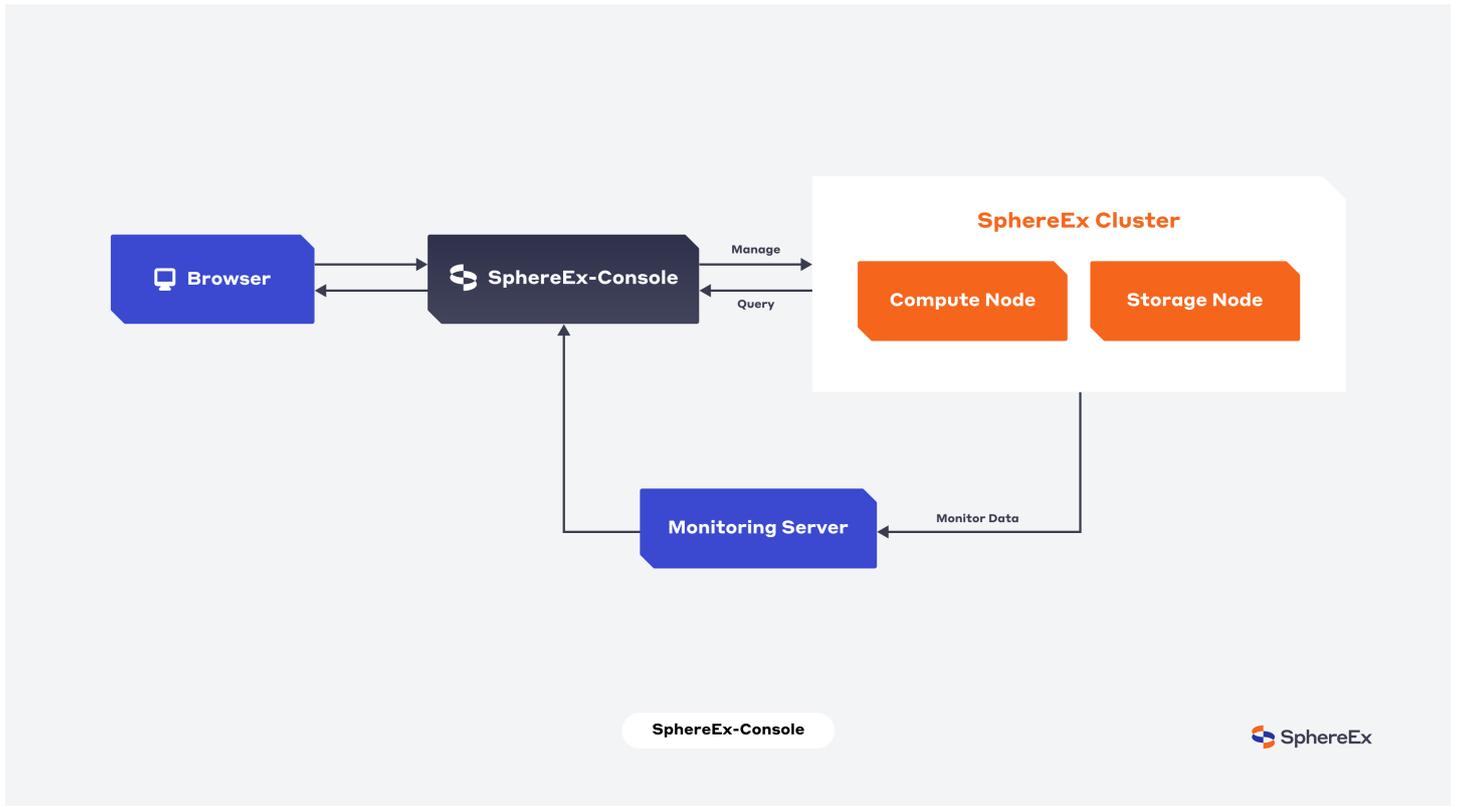


Fig. 1: Architecture

1.4 Advantages

Easy to use

It improves the user experience and avoids configuration errors. Users do not need to operate the SphereEx Enterprise Data Service Platform through configuration and commands, which greatly improves ease of use and achieves platform “zero” bottlenecks.

Comprehensive

Evolving the management capabilities of the open source version, it provides a unified solution for the management and control of the SphereEx Enterprise Data Service Platform from basic resources to plugin capabilities.

Visual monitoring

With its data visualization & management dashboard, SphereEx Enterprise Data Service Platform’s clusters, instances and hosts monitoring data are visible online and in real time.

1.5 Functions

Level 1 Module	Level 2 Module	Description
Resource	Host	Manage physical hosts.
	Database Instance	Manage database instances.
	Governance Center Instance	Manage governance center.
Cluster	Cluster	Manage clusters, governance centers and parameters.
	Compute Node	Create and manage compute nodes.
	Storage Node	Create and manage storage nodes.
	Schema	Create and manage logical databases.
Plugin	Data Sharding	Manage data sharding and table group.
Monitoring	Host	Display host monitoring information.
	Compute Node	Display the monitoring information of the compute node.

1.6 Scenarios

SphereEx-Console is mainly used for the operation, maintenance and control of the SphereEx Enterprise Data Service Platform. It can support common operation scenarios for maintainers and developers in the Internet, finance and government fields.

2.1 Operating Environment

SphereEx-Console is based on Java, and needs to run in an environment that supports Java. Generally, operating systems can run SphereEx-Console as long as they supports Java. Additionally, the monitoring of SphereEx-Console is based on the Prometheus system, so if you need to use the monitoring function, you need to run Prometheus.

Version
JDK 1.8 +
Prometheus 2.8.1 +

2.2 Obtain and Install

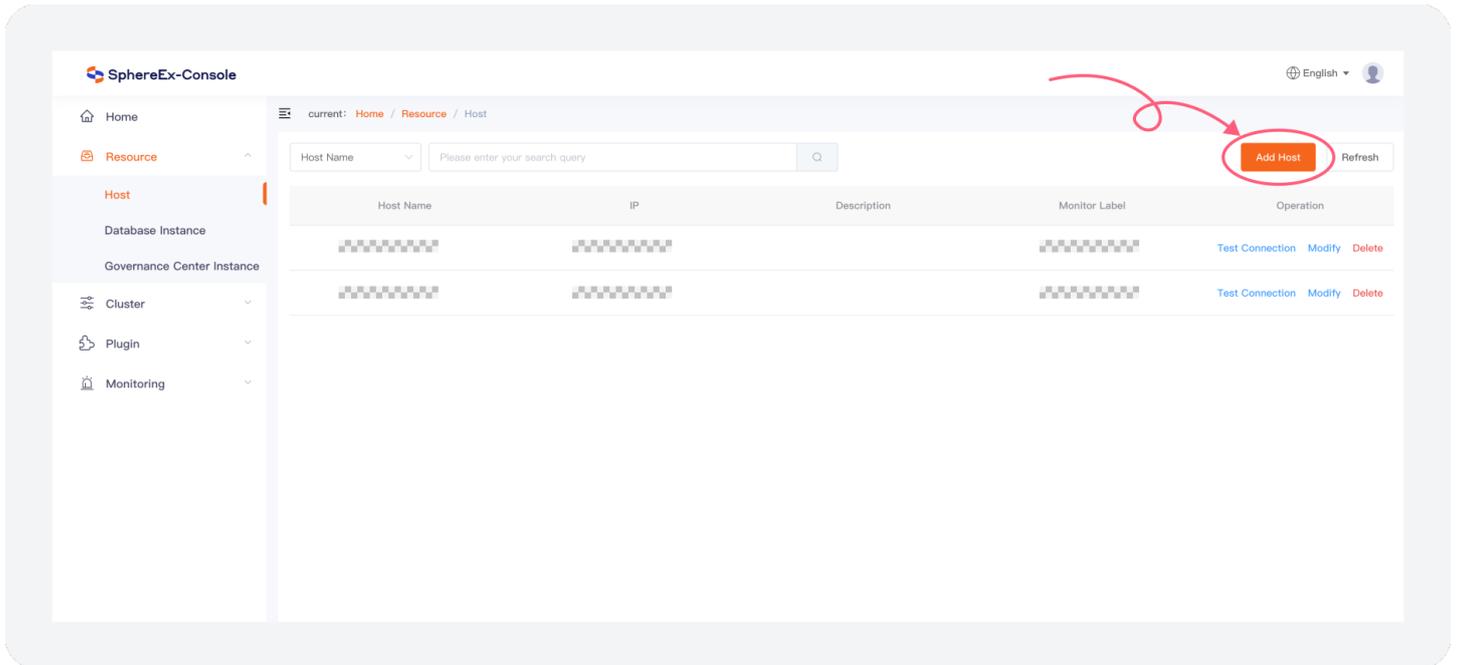
[Contact Us](#) to get the SphereEx-Console software package SphereEx-Console-{x.x.x}.tar.gz to local. After decompression, enter the directory of SphereEx-Console and run the start script under bin to start SphereEx-Console.

```
bin/start.sh
```

Open the browser to access the address <http://localhost:8807>. The default login user is admin/admin.

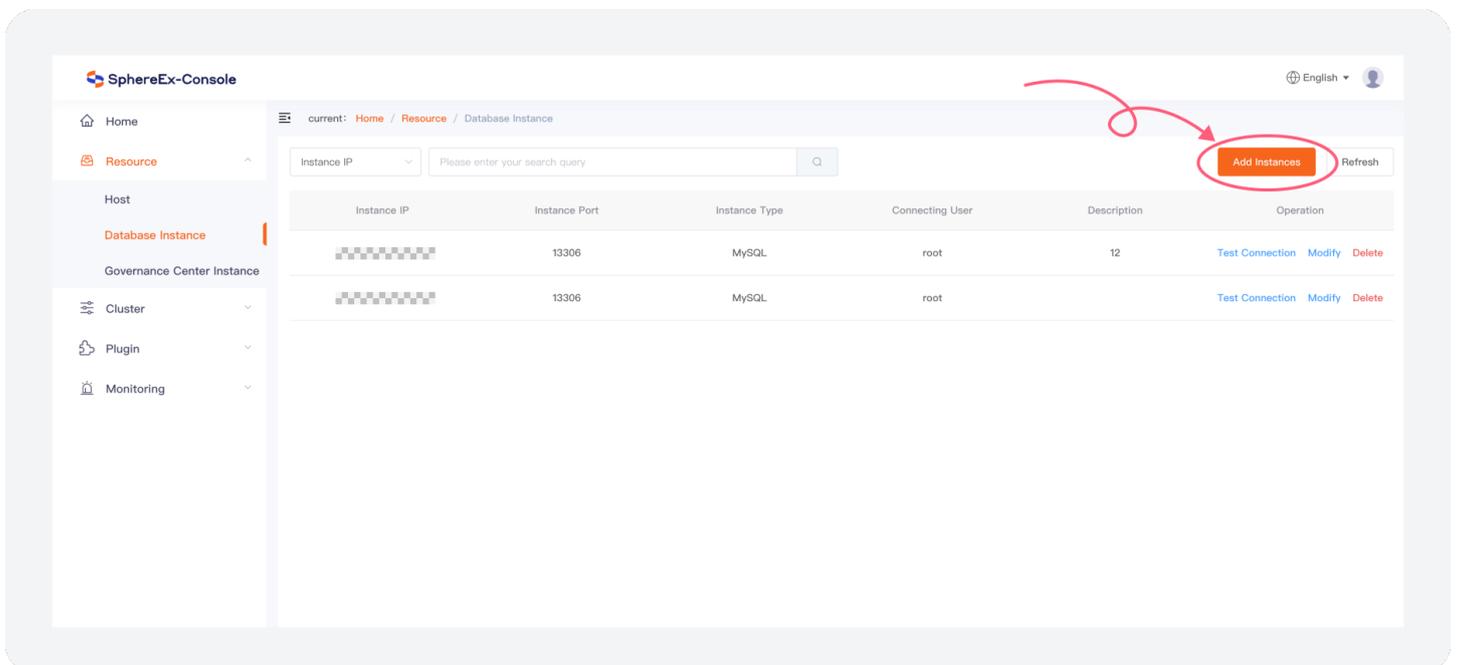
2.3 Sample Scenario

1. Add host.
 - a. Choose **Resource > Host** and click **Add Host**.
 - b. Enter host data in the pop-up interface.
 - c. Click **OK** to add new host information.



2. Add database instances.

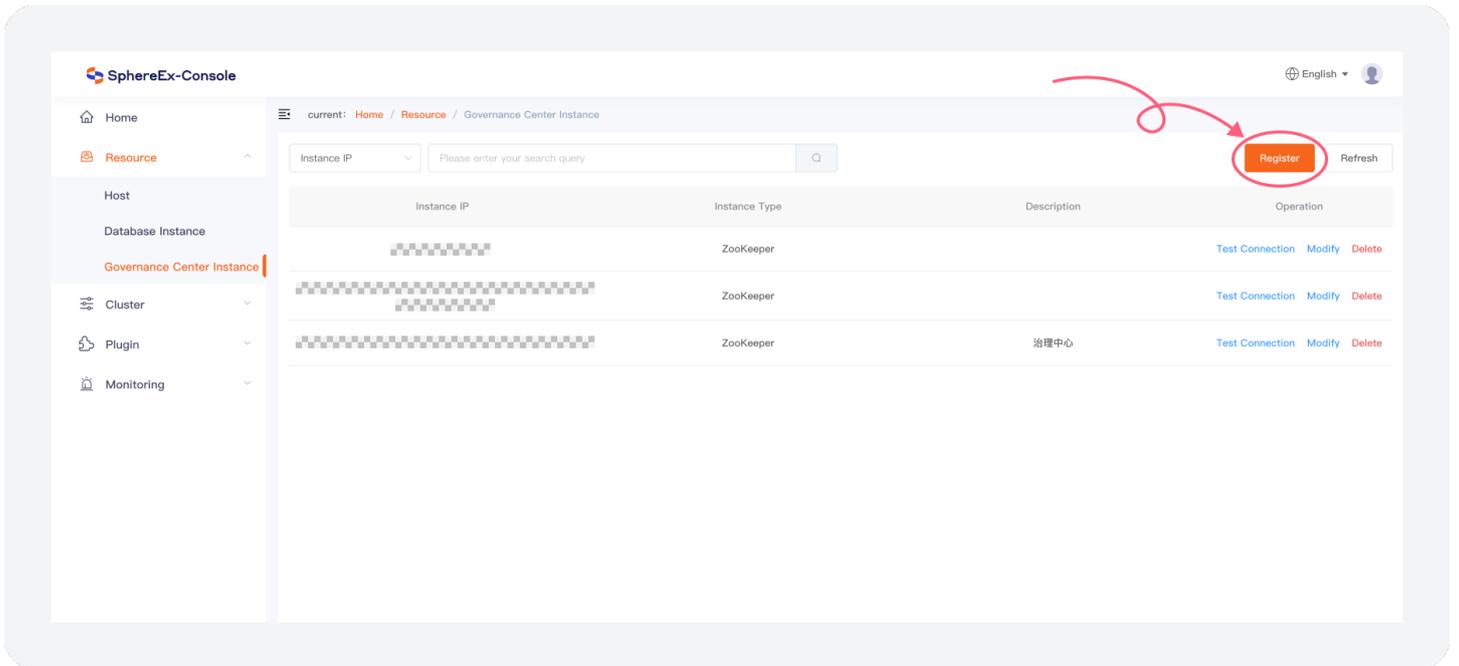
- Choose **Resource > Database Instance** and click **Add Instances**.
- Enter the corresponding data in the pop-up interface, such as IP: 127.0.0.1, port: 3306, type: MySQL, connected user: root, password: 123456.
- After clicking **OK**, the corresponding registration data will be added to the database instance list.
- Click **Test Connection** to test whether the database instance can be successfully connected.



3. Register governance instance.

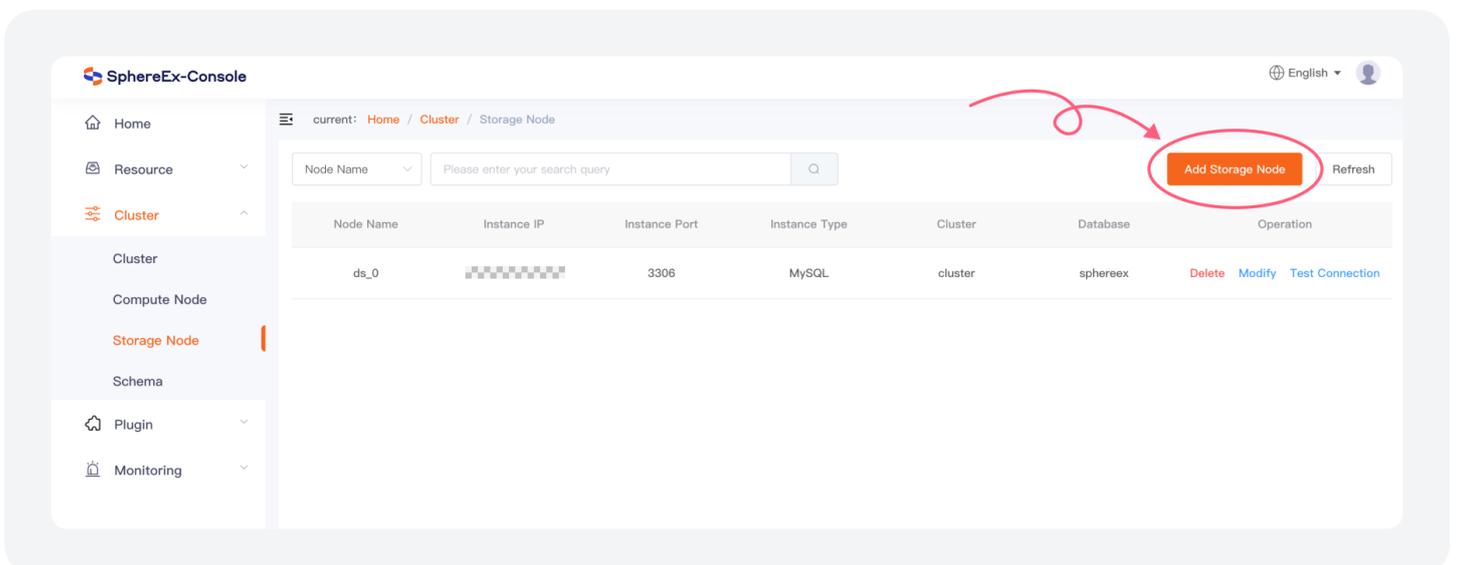
- Choose **Resource > Governance Center Instance** and click **Register**.
- Enter the corresponding data in the pop-up interface, such as IP: 127.0.0.1:2181, 127.0.0.1:2182, 127.0.0.1:2183; Instance description: the governance center of xxx business.
- After clicking **OK**, the corresponding registration data will be added to the governance instance list.

d. Click **Test Connection** to test whether the governance instance can be successfully connected.



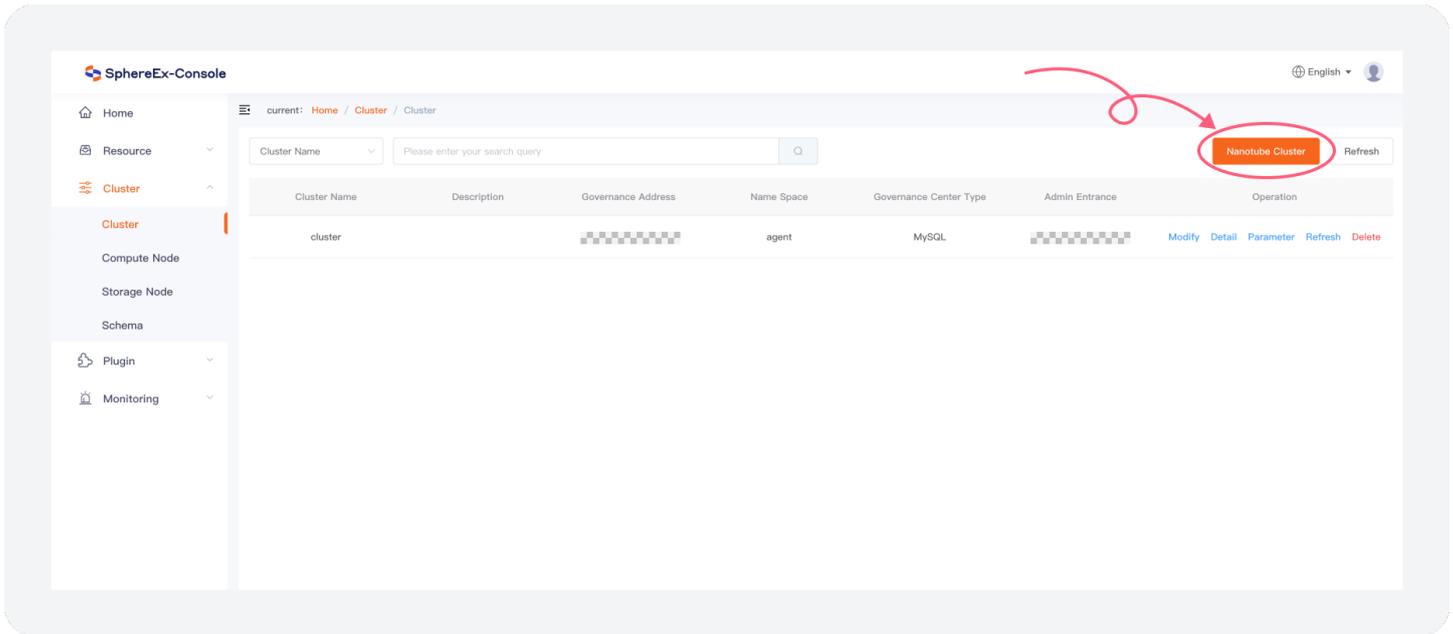
4. Add storage node.

- Choose **Cluster > Storage Node**, and click **Add Storage Node**.
- In the pop-up interface, enter the relevant information of the corresponding storage node.
- Click **OK** to add storage node data.
- Click **Test Connection** to test whether the storage node can be successfully connected.



5. Nanotube cluster.

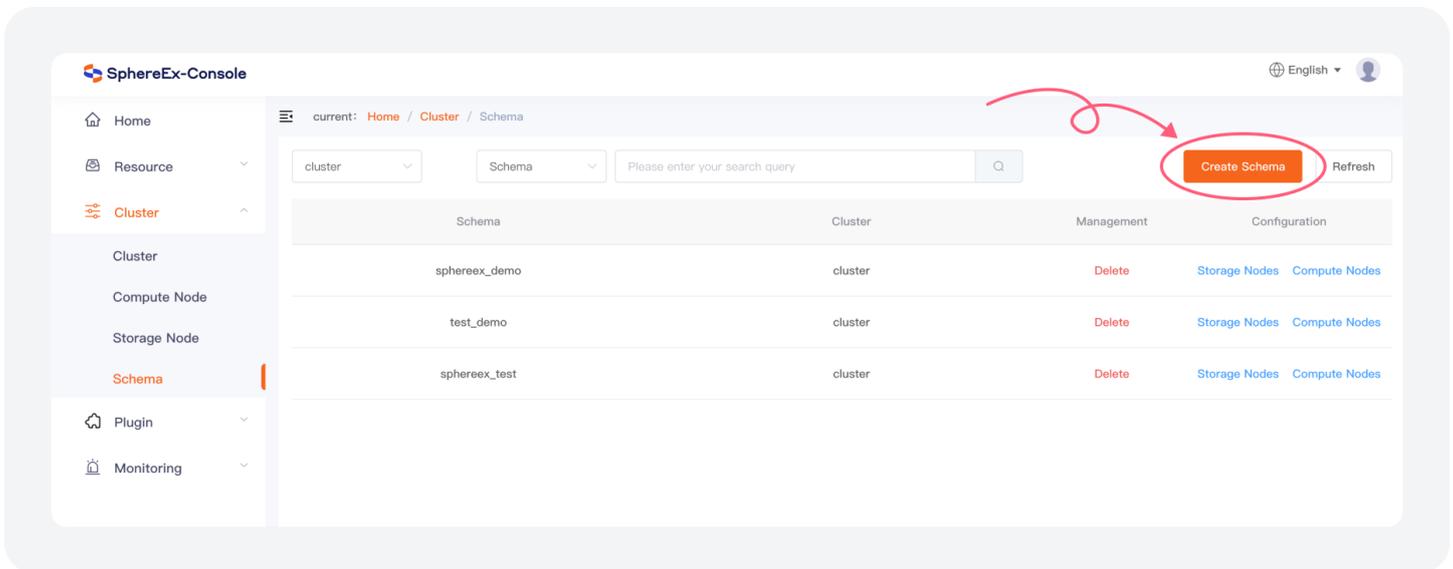
- Choose **Cluster > Cluster**, and click **Nanotube Cluster**.
- In the pop-up interface, enter the relevant information of the corresponding cluster.
- Click **OK** to add a cluster. The information of compute node, schema and storage node will be refreshed to the corresponding place.



d. After configuration, you can click the **Detail** button to view the relevant information of compute nodes, storage nodes and logical databases in the cluster.

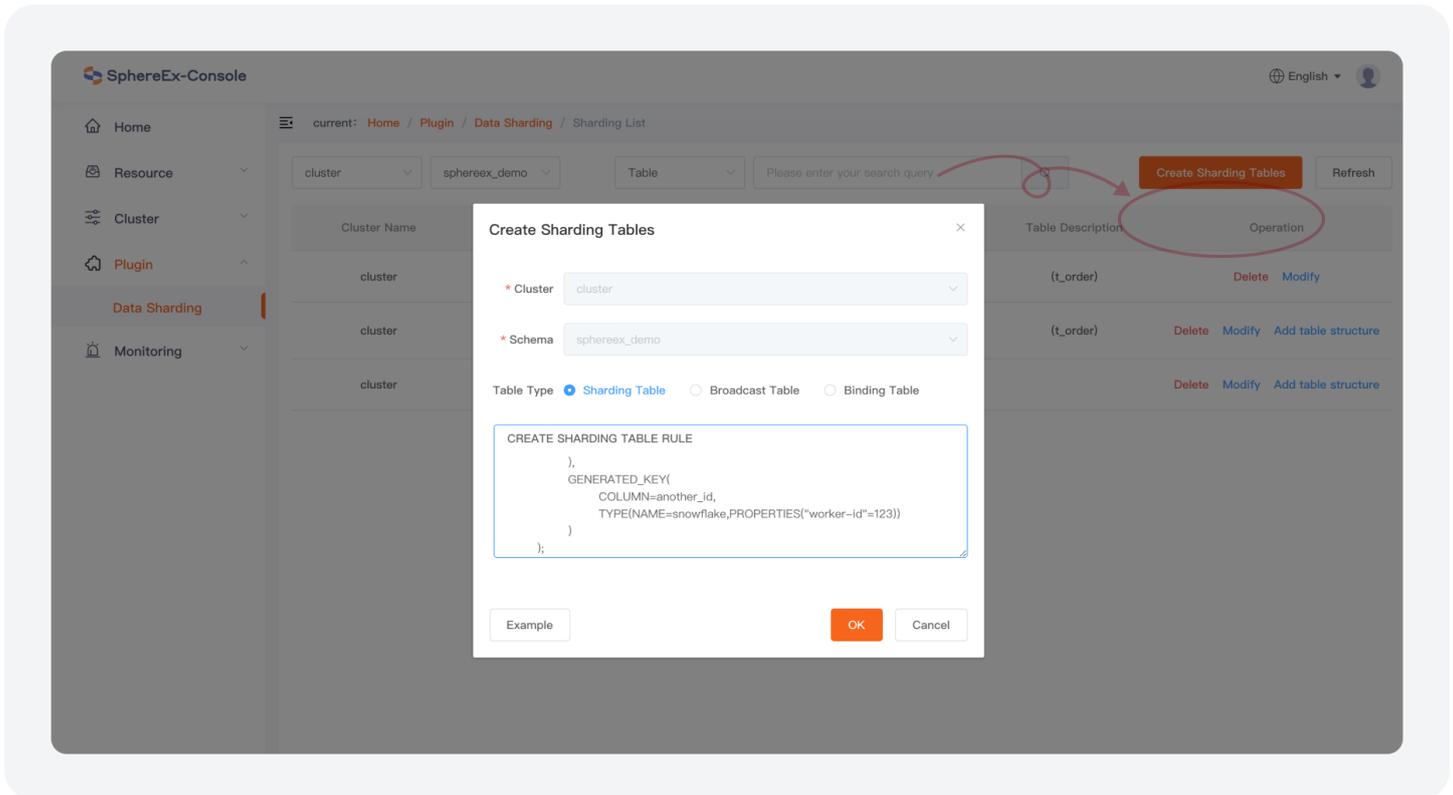
6. Create a logical database.

- a. Choose **Cluster > Schema**, and click **Create Schema**.
- b. In the pop-up interface, enter the name of the logical database and select the storage node required by the logical database. Note: All compute nodes are selected and cannot be modified.
- c. Click storage node and compute node to view the storage node and compute node information applied to the logical database respectively.

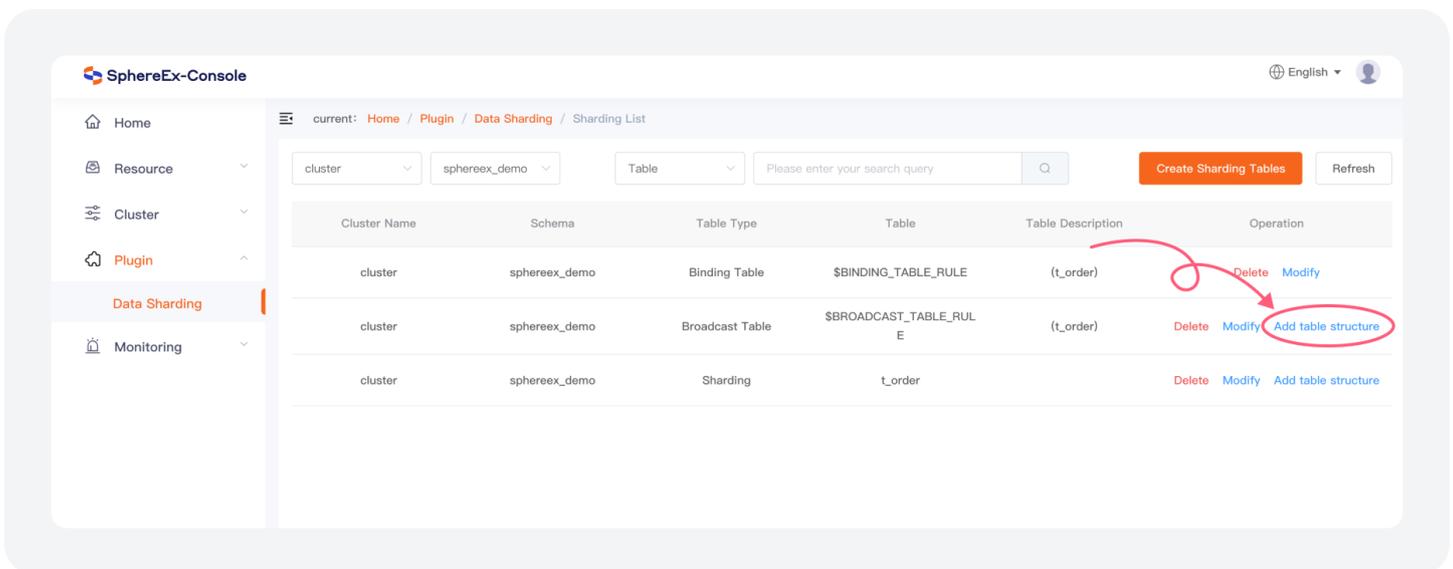


7. Plugin - Data Sharding

- a. In the **Plugin > Data Sharding** menu, data sharding is currently available, and more plugin features will be added and supported in the future.
- b. After selecting the corresponding cluster and the corresponding logical database under the cluster, click **Create Sharding Tables** to create sharding table, broadcast table and single table using DistSQL under the corresponding logical database.
- c. After creation, you can also use DistSQL to modify table rules.



d. After creating the sharding rule, you can click **Add table structure** to create the actual database table using the normal table creation statement.



3.1 Home

3.1.1 Resource Overview

You can view the used and unused status of the following resources: - Number of hosts - Number of database instances
- Number of governance center instances

3.1.2 Component Overview

You can view the used and unused status of the following components:

- Number of clusters
- Number of compute nodes
- Number of storage nodes
- Number of schemas

3.1.3 Plugin Overview

You can view the following data sharding:

- Data sharding statistics
- Number of table group

3.2 Resource

3.2.1 Host

3.2.1.1 Add Host

Scenarios

When users need to monitor the host where the application service is located, they can monitor and manage single or multiple hosts in a unified manner by registering the host, and learn about indicators related to the service host.

Note

Ensure that the host address is true and valid, which can be determined by Test Connection activity.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Resource > Host**.
3. In the upper-right corner, click the **Add Host** button.
4. Fill in the host information. Refer to the table below for specific parameters.

Parameters	Description
IP	Required field, normal IP address, such as 127.0.0.1.
Description	Optional, cannot exceed 500 characters.
Username	Optional, no more than 50 characters.
Password	Optional, no more than 50 characters.
Host Name	Required field, cannot exceed 50 characters. The unique identification of different hosts on console, and not the hostname.
Monitor Lable	Required field, the instance name corresponding to the host in Prometheus.
Test Connection	Use Ping mechanism to detect whether the host is available online.

5. Click **OK** to complete the host registration.

Post-processing

1. After adding data successfully, close the pop-up window and refresh the list data.
2. If you receive a prompt stating that the user data already exists, please add it again.

3.2.1.2 Delete Host**Scenarios**

When the user no longer carries out unified monitoring and management on single or multiple hosts, you can delete them in host. After deletion, you won't be able to view the relevant hosts in monitoring.

Note

Before deleting, please confirm that the host no longer needs unified monitoring and management. Deleting a host has no impact on the cluster, schema, compute node and storage node.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Resource > Host**.
3. Select the targeted host and click the **Delete** button on the right.
4. A prompt dialog box **Tips** will pop up, to confirm whether to delete the host.
5. Click **OK**, to permanently delete the Host.

3.2.1.3 Modify Host

Scenarios

When the relevant information of the service host changes, such as host name and IP address, users can modify the relevant information of the host in host.

Note

Ensure that the modified IP address is consistent with the service host, otherwise the monitoring will be affected.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Resource > Host**.
3. Select the targeted host and click the **Modify** button on the right.
4. The **Modify Host** dialog box will pop up; fill in the required and optional contents according to the dialog box prompts.

Parameters	Description
IP	Required field, normal IP address, such as 127.0.0.1.
Description	Optional, cannot exceed 500 characters.
Host Name	Required field, cannot exceed 50 characters.
Monitor Lable	Required field, the instance name corresponding to the host in Prometheus.

5. Click **OK** to complete the modification of the host.

3.2.1.4 Test Connection

Scenarios

The test connection function allows users to check whether the service host is alive or not.

Note

Ensure that the IP address of the service host is true and valid.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Resource > Host**.
3. Select the targeted host and click the **Test Connection** button on the right.
4. If the **Connection successful** message appears, it indicates that the host is online.

Post-processing

If a **Connection failed** message appears, please check whether the configured IP address is correct.

3.2.2 Database Instance

3.2.2.1 Add Instances

Scenarios

Users needing to manage multiple database instances can uniformly maintain and manage multiple database instances by registering instances.

Note

Ensure that the registered instance IP, port, user name and password are correct, otherwise the test connection fails.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Resource > Database Instance**.
3. In the upper-right corner of the console, click **Add Instances**.
4. Fill in the instance information. See the table below for specific parameters.

Parameters	Description
Instance IP	Required field, normal IP address, such as 127.0.0.1.
Instance Port	Required field, normal port address 1-65535, such as 3306.
Description	Optional, cannot exceed 500 characters.
Instance Type	Required field. You need to select MySQL.
Connecting User	Required field, cannot exceed 50 characters.
Password	Required field, cannot exceed 50 characters.
Test Connection	Use the database connection mechanism to check whether the data can be connected normally.

5. Click **OK** to complete the host registration.

Post-processing

1. After adding data successfully, close the pop-up window and refresh the list data automatically.
2. If you receive a prompt stating that the user data already exists, please add it again.

3.2.2.2 Delete Instances

Scenarios

When single or multiple instances are not under management, you can delete them.

Note

Before deleting, please confirm whether the deleted instance has registered storage nodes.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Resource > Database Instance**.
3. Select the targeted database and click the **Delete** button on the right.
4. A prompt dialog box **Tips** will pop up, to confirm whether to delete the instance.
5. Click **OK** to permanently delete the instance.

3.2.2.3 Modify Instances

Scenarios

When the database instance information changes, such as IP, port, type, user name, etc., users can update the instance through the modification function.

Note

Ensure that the modified content is consistent with the actual changed information.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Resource > Database Instance**.
3. Select the targeted database, and click the **Modify** button on the right.

4. A **Modify Instances** dialog box will pop up, fill in the required and optional contents according to the prompted dialog box.

Parameters	Description
Instance IP	Required field, normal IP address, such as 127.0.0.1.
Instance Port	Required field, normal port address 1 ~ 65535, such as 3306.
Description	Optional, cannot exceed 500 characters.
Instance Type	Required field. You need to select MySQL.
Connecting User	Required field, cannot exceed 50 characters.
Password	Required field. Used to check whether the data can be connected normally.

5. Click **OK** to finish modifying the instance.

3.2.2.4 Test Connection

Scenarios

The test connection function allows users to check whether the database is alive or not.

Note

Ensure that the registered instance IP, port, type, user name and password are correct.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Resource > Database Instance**.
3. Select the targeted database and click the **Test Connection** button on the right.
4. If the message **Detection successful** appears, it indicates that the database instance is online.

Post-processing

If the message **Connection failed** appears, it means that the database instance connection is abnormal. Please check that the registered instance IP, port, type, user name and password are correct.

3.2.3 Governance Center Instance

3.2.3.1 Register Governance Center Instance

Scenarios

Users needing to manage multiple governance center instances can uniformly maintain and manage multiple governance center instances by registering instances.

Note

Ensure that the registered instance IP and port are correct, otherwise the test connection will fail.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Resource > Governance Center Instance**.
3. In the upper-right corner of the console, click **Register**.
4. Fill in the instance information. See the table below for specific parameters.

Parameters	Description
Instance Type	Required field. You need to select ZooKeeper.
Instance IP	Required field, normal IP address, such as 127.0.0.1:2181、127.0.0.1:2182、127.0.0.1:2183
Description	Optional, cannot exceed 500 characters.
Test Connection	To test whether the governance center instance is available.

5. Click OK to complete the governance center instance registration. Verify the uniqueness of instance IP.

Post-processing

1. After adding data successfully, close the pop-up window and refresh the list data automatically.
2. If you receive a prompt stating that the user data already exists, please add it again.

3.2.3.2 Delete Instances

Scenarios

When single or multiple instances are not under management, you can delete them.

Note

Deleting only the configuration in SphereEx-Console does not really delete the backend resources.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Resource > Governance Center Instance**.
3. Select the targeted database and click the **Delete** button on the right.
4. A prompt dialog box **Tips** will pop up, to confirm whether to delete the instance.
5. Click **OK** to permanently delete the instance.

3.2.3.3 Modify Instances

Scenarios

When the governance center instance information changes, such as IP and description, users can update the instance through the modification function.

Note

Ensure that the modified content is consistent with the actual changed information.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Resource > Governance Center Instance**.
3. Select the targeted database, and click the **Modify** button on the right.
4. A **Modify Governance Center Instance** dialog box will pop up, fill in the required and optional contents according to the prompted dialog box.

Parameters	Description
Instance Type	Cannot modify
Instance IP	Required field, normal IP address, such as 127.0.0.1:2181, 127.0.0.1:2182, 127.0.0.1:2183.
Description	Optional, cannot exceed 500 characters.

5. Click **OK** to finish modifying the instance.

3.2.3.4 Test Connection

Scenarios

The test connection function allows users to check whether the governance center instance is alive or not.

Note

Ensure that the registered instance IP, port, type, user name and password are correct.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Resource > Governance Center Instance**.
3. Select the targeted instance and click the **Test Connection** button on the right.
4. If the message **Detection successful** appears, it indicates that the governance center instance is online.

Post-processing

If the message **Connection failed** appears, it means that the governance center instance connection is abnormal.

Please check that the registered instance IP, port, type, user name and password are correct.

3.3 Cluster

3.3.1 Cluster

3.3.1.1 Nanotube Cluster

Scenarios

When the user deploys a compute node or configures a schema in the actual application scenario, the cluster management can be used to manage and maintain the compute node and storage node.

Requirements

- The DB Plus Engine-Proxy has been deployed.

Procedure

1. Login to the SphereEx-Console.
2. In the upper-left corner of the console, select **Cluster > Cluster**.
3. In the upper-right corner of the console, and click **Nanotube Cluster**.
4. Fill in the cluster information. See the table below for specific parameters.

Parameters	Description
Cluster Name	Required field, cannot exceed 50 characters.
Description	Optional, cannot exceed 500 characters.
Management Type	Required field, the drop-down list is used to identify the type of DB that can be accessed by the compute node corresponding to this entry. Currently, only MySQL is supported.
Management Portal	Required field, can be IP, host name, domain name
Management Port	Required field, conform to port length and specification
Management Username	Required field, user name to access the compute node
Management Password	Required field, password to access the user name of the compute node

5. Click **OK** to finish creating the cluster.

3.3.1.2 Delete Cluster

Scenarios

When the user no longer manages and maintains the cluster, the cluster can be deleted.

Note

In the current version, deleting a cluster only deletes the cluster management information (cluster list, compute node list, storage node list and schema list) of the console, and does not actually operate the configuration of the backend.

Procedure

1. Login to the SphereEx-Console.
2. In the upper-left corner of the console, select **Cluster > Cluster**.
3. Select the targeted cluster and click the **Delete** button on the right.
4. A prompt dialog box **Tips** will pop up, to confirm whether to delete the cluster.
5. Click **OK** to permanently delete the cluster.

3.3.1.3 Modify Cluster

Scenarios

When users modify the cluster description or change the management entry, they can make corresponding changes through modification.

Note

Modify according to the actual changes.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Cluster > Cluster**.
3. Select the targeted cluster and click the **Modify** button on the right.
4. A **Modify Cluster** dialog box will appear. Fill in the required and optional content according to the dialog box prompts.

Parameters	Description
Cluster Name	Cannot be modified.
Description	Optional, cannot exceed 500 characters.
Governance Center Type	Cannot be modified.
Governance Center Instance	Cannot be modified.
Governance Center User-name	Cannot be modified.
Governance Center Name-spce	Cannot be modified.
Management Type	Required field, the drop-down list is used to identify the type of DB that can be accessed by the compute node corresponding to this entry. Currently, only MySQL is supported.
Management Portal	Required field, can be IP, host name, domain name
Management Port	Required field, conform to port length and specification
Management Username	Required field, user name to access the compute node
Management Password	Required field, password to access the user name of the compute node

5. Click **OK** to finish modifying the cluster.

3.3.1.4 Refresh Cluster

Scenarios

When the compute node of the governance center changes, the changed information can be updated to the cluster list by refreshing.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Cluster > Cluster**.
3. In the upper-right corner of the console, and click **Refresh** to refresh globally.
4. Select a cluster and click **refresh** on the right to refresh the specified cluster information.

3.3.1.5 View Cluster & Component Info

Scenarios

Users can use the view information function to confirm which node information is associated with the cluster.

Note

You need to complete the cluster configuration before you can see the relevant contents.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Cluster > Cluster**.
3. Select the targeted cluster and click the **Detail** button on the right.
4. The **Cluster & Component Info** dialog box will pop up, providing the compute node, storage node and schema information.

3.3.1.6 Parameter Management

Scenarios

Manage the parameters of compute nodes in the cluster.

Notes

- If modification and reset in parameter operation are grayed out, it indicates that the parameters cannot be modified.
- Parameter adjustment is available for all compute nodes.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Cluster > Cluster**.
3. Select the targeted cluster and click the **Parameter** button on the right.
4. Hover over the question mark in the upper right corner of the parameter to view the detailed explanation of the parameter.
5. Parameter list field description:

Field Name	Description
Parameter Name	English only
Default Value	Parameter default value (for subsequent reset actions)
Current Value	The current value of the parameter is the same as the default value if it is not modified. It is the latest value after modification.
Restart Effective	Whether the parameter needs to restart DB Plus Engine-Proxy to take effect (currently, it is limited that the modifiable parameters do not need to be restarted)
Parameter Range	Range parameter
Operation	Modify parameters and reset parameters. When [Modify] and [Reset] are gray, it means that parameters cannot be modified.

6. Modify parameters.
 - a. Select a parameter and select **Modify** in parameter operation to enter the parameter modification dialog box.
 - b. Fill the parameter modification value into the corresponding position. The lower left corner will remind you whether the parameter needs to restart the compute node to take effect. The restart action currently shall be completed by the customer.
 - c. Click **OK** to finish the modification, and click **Cancel** to return to the parameter list without any operation.
7. Reset parameters.
 - a. Select a parameter and select **Reset** in parameter operation to enter the parameter reset dialog box.
 - b. The lower left corner will remind you whether the parameter needs to restart the compute node to take effect. The restart action currently shall be completed by the customer.
 - c. Click **OK** to complete the reset, and click **Cancel** to return to the parameter list without any operation.

3.3.2 Compute Node

3.3.2.1 Refresh Compute Node

Scenarios

The user modifies the monitoring label information of the compute node from the page, or the user operates in the back-end host.

Requirements

The premise is that the cluster is successfully managed.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Cluster > Compute Node**.
3. In the upper-right corner of the console, click **Refresh**. Refresh all compute node information of the current page.

3.3.2.2 Modify Compute Node

Scenarios

When the monitoring label information of the compute node needs to be changed, the user can change the monitoring label through the modification function in the compute node.

Note

Ensure that the changed content is consistent with the actual node information.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Cluster > Compute Node**.
3. Select the targeted compute node and click the **Modify** button on the right.
4. The **Modify Compute Node** dialog box will pop up, fill in the required and optional contents according to the dialog box prompts.

Parameters	Description
IP	Cannot be modified.
Port	Cannot be modified.
Username	Cannot be modified.
Password	Cannot be modified.
Node Name	Cannot be modified.
Monitor Label	The name of the instance of the compute node in Prometheus (the default is [IP]: 9000 of the computing node without configuration).

5. Click **OK** to finish modifying the compute node.

3.3.2.3 Test Connection

Scenarios

The test connection function in compute node can be used to check whether a compute node is alive or not.

Note

Ensure that the IP, port, username and password of the node are correct.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Cluster > Compute Node**.
3. Select the targeted compute node and click the **Test Connection** button on the right.
4. If the **Connection successful** appears, it indicates that the compute node is online.

Post-processing

If the **Connection failed** message appears, it indicates that the connection of the compute node is abnormal. Please check whether the added IP and port are correct when registering the compute node.

3.3.3 Storage Node

3.3.3.1 Add Storage Node

Scenarios

When a compute node needs to be associated with a data source, you can register a storage node through storage node for associating compute nodes.

Prerequisites

First, you need to register an instance in database instance.

Note

Chinese names are not recommended. Creating a schema does not support Chinese storage node names.

Procedure

1. Login to the SphereEx-Console.
2. In the upper-left corner of the console, select **Cluster > Storage Node**.
3. In the upper-right corner of the console, click **Add Storage Node**.
4. Fill in the storage node information. Refer to the the following table for specific parameters.

Parameters	Description
Instance	Required field, pulls data from the database instance list. After selection, the instance IP, instance port and instance type will be automatically filled.
Instance IP	Required field, it is obtained from the database instance and cannot be edited, normal IP address, such as 127.0.0.1.
Instance Port	Required field, it is obtained from the database instance and cannot be edited, normal port address 1-65535, such as 3306.
Instance Type	Required field, it is obtained from the database instance and cannot be edited, you need to select MySQL.
Username	Required field, it is obtained from the database instance and cannot be edited, cannot exceed 50 characters.
Password	Optional, it is obtained from the database instance and cannot be edited, cannot exceed 50 characters.
Database	Required field.
Node Name	Required field, automatically generated and can be edited, and cannot exceed 50 characters.
Parameter Extensions (&-sparated)	Optional, cannot exceed 500 characters.
URL Connection String	Automatic splicing generation and cannot edit.
Test Connection	Check node availability.

5. Click **OK** to complete the registration of the storage node.

Post-processing

1. After adding data successfully, close the **Add Storage Node** window and refresh the list data.
2. When verify with node name, if you receive a prompt stating that the user data already exists, please add it again.

3.3.3.2 Delete Storage Node

Scenarios

When the compute node no longer needs to specify a single or multiple storage nodes, users can delete the storage node through the delete function in storage node.

Notes

- You cannot delete a node that has been associated with a cluster. If you want to delete it, you need to disassociate the cluster first.
- Deleting a storage node has no impact on the actual database.

Procedure

1. Login to the SphereEx-Console.
2. In the upper-left corner of the console, select **Cluster > Storage Node**.
3. Select the targeted storage node and click the **Delete** button on the right.
4. A prompt dialog box **Tips** will pop up, confirm whether to delete the storage node.
5. Click **OK** to permanently delete the storage node.

3.3.3.3 Refresh Storage Node

Scenarios

When the storage node information changes, the user can obtain the latest storage node configuration information through the refresh action.

Procedure

1. Login to the SphereEx-Console.
2. In the upper-left corner of the console, select **Cluster > Storage Node**.
3. Click the **Refresh** button in the upper right corner to refresh all storage nodes information on the current page.

3.3.3.4 Modify Storage Node

Scenarios

There is no user name and password information in the storage node information automatically refreshed by the management cluster. If the detection fails, the corresponding information needs to be returned to remind the user to add the user name and password information through the modification page. When it is found that the user field in the list is empty, the user name and password information can also be added through the modification page.

Note

Ensure that the information to be changed is correct.

Procedure

1. Login to the SphereEx-Console.
2. In the upper-left corner of the console, select **Cluster > Storage Node**.
3. Select the targeted storage node and click the **Modify** button on the right.
4. The **Modify Storage Node** dialog box will pop up, fill in the required and optional contents according to the dialog box prompts.

Parameters	Description
Instance	Cannot be modified.
Instance IP	Cannot be modified.
Instance Port	Cannot be modified.
Instance Type	Cannot be modified.
Username	Required field, cannot exceed 50 characters.
Password	Optional, cannot exceed 50 characters.
Database	Cannot be modified.
Node Name	Cannot be modified.
Parameter Extensions (&-sparated)	Cannot be modified.
URL Connection String	Cannot be modified.

5. Click **OK** to finish modifying the storage node.

3.3.3.5 Test Connection

Scenarios

Users can confirm whether a storage node is alive or not, through the test connection function in storage node.

Note

Ensure that the configured IP, port, type, user name, password and database information are correct.

Procedure

1. Login to the SphereEx-Console.
2. In the upper-left corner of the console, select **Cluster > Storage Node**.
3. Select the targeted storage node and click the **Test Connection** button on the right.
4. If the **Connection successful** appears, it indicates that the storage node is online.

Post-processing

If the **Connection failed** prompt appears, it indicates that the connection of the storage node is abnormal. Please check whether the IP, port, type, user name, password and database information filled in when registering the storage node are correct.

3.3.4 Schema

3.3.4.1 Create Schema

Scenarios

When operations on schemas are made, it allows operations on real data sources. Users can create schemas and associate them with real data sources in schema.

Requirements

- Finish creating the cluster and complete the configuration.
- Make sure the selection cluster has compute nodes.

Notes

- Chinese names of schemas are not supported.
- Chinese storage node names are not supported.
- The storage node is a storage node that is not associated with a cluster.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Cluster > Schema**.
3. Click the **Create Schema** button on the top right conner.
4. Fill in the schema information, see the table below for specific parameters.

Parameters	Description
Schema	Required field, cannot exceed 50 characters
Cluster	Automatic filling of list cluster items
Compute Nodes	Not operable, only for display
Storage Nodes	Can be added from optional node selections

5. Click **OK** to complete the creation of Schema.

Post-processing

If the Schema creation failed, please check whether you are using Chinese names of schemas or Chinese storage node names, and make sure the selected storage node is available.

3.3.4.2 Delete Schema

Scenarios

When the schema is no longer in use by the user, it can be deleted via the delete function in the schema, which will not delete the data source.

Note

When a schema is deleted, it cannot be recovered, but has to be recreated.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Cluster > Schema**.
3. Select the targeted schema, and click the **Delete** button on the right.
4. A **Tips** dialog box will pop up, to confirm the deletion of the schema.
5. Click **OK** to delete the schema permanently.

3.3.4.3 Refresh Schema

Scenarios

When the schema information changes, the user can obtain the latest schema configuration information through the refresh action.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Cluster > Schema**.
3. Click the **refresh** button in the upper right corner to refresh all schema information on the current page.

3.3.4.4 Manage Storage Nodes

Scenarios

When the storage node associated with a schema changes, the user can update the storage node through the storage node function in schema.

Note

Ensure that the data source to be changed is consistent.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Cluster > Schema**.
3. Select the targeted schema, and click the **Storage Nodes** button on the right.
4. A **Storage Node** dialog box will pop up. Please confirm and select related storage nodes.

Note: Optional nodes are storage nodes that have not been associated with a cluster. For improved experience, the node suffix + is used to indicate that the node will be added to the schema after confirmation. The node suffix - indicates that the node will be removed from the schema and deleted from the storage node list.

- Click **OK** to complete the update of the storage node.

3.4 Plugin

3.4.1 Data Sharding

3.4.1.1 Create Sharding Tables

Scenarios

When users' usage scenarios require database sharding, they can create sharding rules in data sharding to enable the sharding of the real data source.

Notes

- Chinese names of sharding tables are not supported.
- Creating more than one sharding table at a time is not supported.

Requirements

- Require existing clusters.
- Require existing schema.

Procedure

- Login to SphereEx-Console.
- In the upper-left corner of the console, select **Plugin > Data Sharding**.
- Click on the **Create Sharding Tables** on the top right corner.
- Fill in the sharding information, see the table below for specific parameters.

Parameters	Description
Cluster	Filling by the filter
Schema	Filling by the filter
Table Type	Required field, select one from the table types: Sharding Table, Broadcast Table, Single Table.
Table State-ments	Required field, fill in the table statements
Example	Examples of sharding table statements

- Click **OK** to complete the creation of sharding tables.

3.4.1.2 Delete Sharding Tables

Scenarios

When a sharding table is no longer required in the schema, it can be deleted via the deletion function in schema.

Notes

- Deleting a sharding table in the schema does not delete it in the actual database.
- Repeated creations of sharding tables will not affect the actual database.

Procedure

- Login to SphereEx-Console.
- In the upper-left corner of the console, select **Plugin > Data Sharding**.

3. Select the targeted sharding table, and click **Delete** on the right.
4. A **Tips** dialog box will pop up to confirm whether you'd like to delete the sharding table.
5. Click **OK** to delete the sharding table permanently.

3.4.1.3 Modify Sharding Tables

Scenarios

When users' usage scenarios require changes to the sharding tables database, they can change sharding rules of a specific table through the modify function in data sharding.

Note

Ensure that the table to be changed is consistent with the actual table before the modification.

Procedure

1. Login to the SphereEx-Console.
2. In the upper-left corner of the console, select **Plugin > Data Sharding**.
3. Select the targeted sharding table, and click **Modify** on the right.
4. A **Modify Sharding Tables** dialog box will pop up, and users will be prompted to fill in the mandatory and fillable fields.

Parameters	Description
Cluster	Cannot be modified, filling by the filter list
Schema	Cannot be modified, filling by the filter list
Table Type	Cannot be modified
	Required field, complete the amendment of table statements
Example	Examples of table statements

5. Click **OK** to complete change to the sharding table.

3.4.1.4 Add Table Structure

Scenarios

When users complete the creation of sharding table rules, they can create table structures accordingly.

Note

- The table structure to be created is aligned with the association rules.
- Adding sharding table structure to a broadcast table type is not supported, the table structure must be added according to the corresponding table type.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Plugin > Data Sharding**.
3. Select the targeted sharding table, and click **Add Table Structure** on the right.
4. An **Add Table Structure** dialog box will pop up, and users will be prompted to fill in the mandatory and fillable fields.

Parameters	Description
Cluster	Cannot be modified, filling by the filter list
Schema	Cannot be modified, filling by the filter list
Table Type	Cannot be modified
Table Statements	Required field, fill in the table structure statement
Examples	Examples of table structure statements

5. Click **OK** to complete the adding of a table structure.

3.4.1.5 Table Group Management

3.4.1.5.1 Create Table Group

Scenarios

When the user's scenario needs require binding the sharding table.

Notes

- The sharding table has been created.
- The table that needs to be bound cannot join any of the current table groups.

Prerequisites

- The cluster has been created.
- The schema has been created.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select Plugin > Data Sharding.
3. Click on the **Table Groups** on the top right corner.
4. Click the **Create Table Group** button in the upper right corner of the new page.
5. Fill in the table group information. See the following table for specific parameters.

Parameters	Description
First Member	Required field. Select the sharding table in the current schema from the drop-down list, and select any one of the tables of expected binding rules. There is no primary or secondary distinction.
Other Members	Required field, select from the drop-down list. The sharding table in the current schema and other tables that comply with the table binding rules with the first member can be selected.

6. Click **OK** to complete the creation of the table group.

3.4.1.5.2 Member Management

Scenarios

When the user's scenario needs to manage the existing table group.

Notes

- Table groups have been created.
- When the table group member is 1, the table group will be deleted.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Plugin > Data Sharding**.
3. Click on the **Table Group** on the top right corner.
4. Select a table group and click **Member Management** on the right.
5. Select group members in the pop-up dialog box.

Parameters	Description
Optional Member	Drop down the text box, the existing table in the table group. Select and click to remove out of the table group.
Group Member	Drop down the text box, The sharding table in the current schema and the table that meets the binding table rules with the members of the current table group. Select Add to join the table group.

6. Click **OK** to complete the selection of members.

3.5 Monitoring

3.5.1 Instructions for Use

3.5.1.1 Configuration Description

The configuration file of SphereEx-Console is in the conf directory. The Application.properties file is the system configuration file, users.yaml is the user profile, logback.xml is the log configuration file.

application.properties

General Configuration: - server.port: Run port - jwt.secret: JWT authentication key - jwt.expiration: JWT authentication timeout - prometheus.server.address: Prometheus address

users.yaml

Modify the users.yaml file to add, delete and disable users.

3.5.1.2 How to Enable Monitoring?

The host monitoring function needs to pass through Prometheus' node_exporter, and the agent module of SphereEx Enterprise Data Service Platform achieves compute node monitoring.

Requirements

Before enabling the monitoring function:

- Please confirm that node_exporter is running on the monitoring host.
 - a. Download the corresponding node_exporter component according to the operating system, download address: <https://prometheus.io/download/>.
 - b. Unzip the node_exporter installation package, and execute command ./node_exporter to start.
- Please ensure that the agent function is enabled on the compute node. Refer to <https://shardingsphere.apache.org/document/current/en/features/observability/use-norms> for relevant operations.

Procedure

1. Install and start Prometheus. Assume that the operation address is 192.168.1.100 and port 9090.
2. Configure monitoring objectives.

Caution: Modify the Prometheus configuration file `prometheus.yml`, add the host, compute node IP and port in the `static_configs.targets` under `scrape_configs` node. You need to use the actual IP address of the host and compute node, not `127.0.0.1`, `localhost` and other local addresses.

Suppose the access address of `node_exporter` of the monitoring host is `192.168.1.100:9100`, and the running address of the Prometheus plugin in the agent module of the compute node is `192.168.1.100:9000`.

```
static_configs:  
- targets: ["192.168.1.100:9100", "192.168.1.100:9000"]
```

3. Configure the Prometheus address in `application.properties`. `prometheus.server.address=http://192.168.1.100:9090`

3.5.2 Host

Scenarios

When users monitor the host on which application service resides, they can learn information about various metrics related to the service host.

Requirements

- The monitored host has `node_exporter` installed to collect host monitoring data, and the Prometheus service needs to be configured to collect the host monitoring data.
- The `node_exporter` monitoring port is required for host management.
- The `application.properties` file of SphereEx-Console has configured the Prometheus server address.
- Prometheus service has started.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Monitoring > Host**.
3. Click on the **Monitor** button of the targeted server to enter the monitoring interface.
4. The first drop down option in the top right corner of the monitoring screen allows you to limit the monitored data to a specified time range. The second drop down option allows you to specify the interval length for calculating the oscillograms' variation.

3.5.3 Compute Node

Scenarios

Allows users to monitor the compute node service, and obtain metrics information related to the compute node.

Requirements

- The agent of the monitored compute node has Prometheus monitoring enabled, and the monitoring data of the compute node needs to be collected in the configuration file of the Prometheus service using the IP value of the compute node and the Prometheus monitoring port enabled in the agent.
- The compute node information is configured and the compute node is available.
- The Prometheus server address is configured in SphereEx-Console' s configuration file `application.properties`.
- Prometheus service has started.

Procedure

1. Login to SphereEx-Console.
2. In the upper-left corner of the console, select **Monitoring > Compute Node**.
3. Click on the **Monitor** button in the list of compute nodes.

4. The first drop down option in the top right corner of the monitoring screen allows you to limit the monitored data to a specified time range, and the second drop down option allows you to specify the interval length for calculating the rate of graph changes.

Monitoring data can be viewed in Prometheus. What to do in case SphereEx-Console does not have monitoring data?

1. Please confirm that the Prometheus address in the configuration file `conf/application.properties` is correct and can be accessed normally.
2. Ensure that the correct monitoring port is filled in when registering the host.
3. Ensure that Prometheus monitoring is enabled on the compute node agent.

What to do when multiple duplicate data occurs in SphereEx-Console monitoring?

Please check whether there are multiple jobs collecting the same monitoring address data configuration in Prometheus service.

If you delete the schema on the Proxy terminal, the information of the corresponding storage node can still be viewed on the Console and cannot be deleted. What should you do?

Login to the SphereEx-Console, choose **Cluster > Cluster**, and click **Refresh** to refresh the data of the storage node. The reason is that the storage node information is stored locally in the Console, and the Proxy terminal operation cannot be refreshed in real time.