

FROM INTRODUCTION TO PRACTICE

Lesson 5: Operation and Maintenance of OceanBase Database

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Agenda



- **Using OCP for Operation and Maintenance**
- **Using The Command Line for Operation and Maintenance**
- **Using OBD for Operation and Maintenance**
- **Using Ob-operator for Operation and Maintenance**

Using OCP for Operation and Maintenance

Why OCP is recommended for operation and maintenance?

1. GUI operation, easy to use
2. Designed specifically for OceanBase, with high focus
3. Open API, custom monitoring alarm, high flexibility
4. Supports user and role management with high-security

Precondition for using OCP?

1. OBD and OCP do not jointly manage a cluster
2. MetaDB and business clusters are not shared

1. Taking over a cluster

1. Taking over OB
2. Take over OBProxy

2. Migrate out of the cluster

1. Migrate from OB
2. Migrate from OBProxy

3. Backup and Recovery

1. Backup media
2. Data backup
3. Backup recovery

4. Upgrading a Cluster

1. Upgrade OCP
2. Upgrade OB
3. Upgrade OBProxy

5. Cluster expansion and reduction

1. Scale-out clusters and tenants
2. Shrink clusters and tenants

6. Node Replacement

1. Alternative server resources are available
2. No alternative server resources

Using OCP for Operation and Maintenance

What are the log files of OCP?

When deploying:

Installation Path: /{home_path}/ocp-server/log
Initialize the MetaDB log: bootstrap.log
OCP log during deployment: ocp.log

When using:

Service Path: /{home_path}/ocp/logs
OCP service log: ocp-server.log

OCP-agent service log Path: /home/admin/ocp_agent/log
OCP-agent log: mgragent.log

Using OCP for Operation and Maintenance

Taking Over a Cluster

1 Connect to Cluster

2 Precheck

Note that if the cluster has been managed by another OCP, you must migrate the cluster from the corresponding OCP to prevent the cluster from being managed by multiple OCPs, thus causing abnormal cluster behavior.

Connection Method

Direct Connection OBProxy

Access Address

Enter access address

Port

2881

Root@sys Password

Enter a password

Enter the password of the proxyo user.

The proxyo account is used by OBProxy to access the OceanBase cluster. If you forget the password, you can reset the password. For more information, see [proxyo Account Management](#)

Next

1. Choose a direct connection or an OBProxy connection?

Answer: There is no difference. OCP connects to the cluster to obtain takeover information. Proxy connection requires more configuration information.

2. An error occurs during the takeover pre-check?

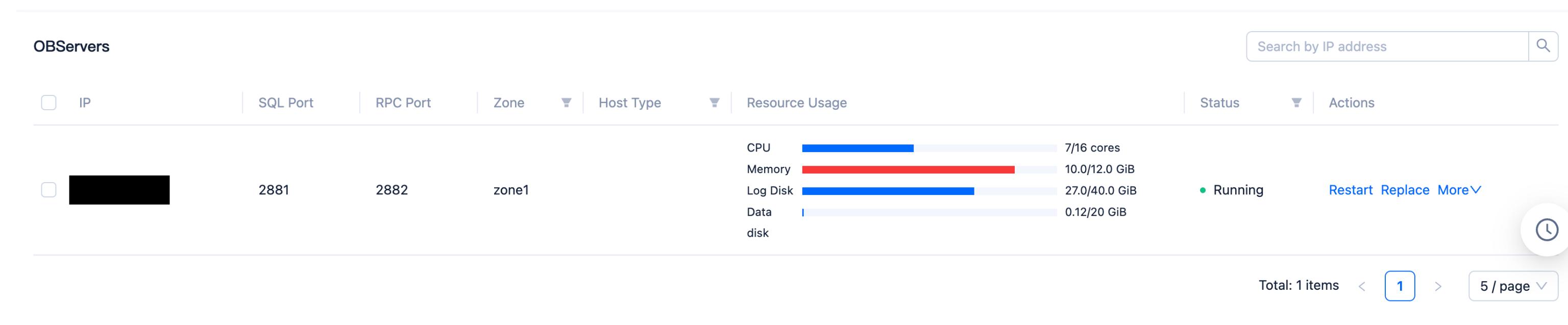
A: This is a common error. The reason is that the default IDC or region information of OCP needs to be consistent with the actual configuration of the cluster. You can modify the OCP metadata or the cluster zone information.

```
select * from DBA_OB_ZONES;
alter system alter zone 'zone1' set idc = '';
alter system alter zone 'zone1' set region = 'sys_region';
```

Or modify ocp_meta tenant metadata related table: compute_region、compute_idc

3. An error occurs when executing a takeover task?

Answer: Most of them are due to **pre-check failures**, such as the “clockdiff” command not having permission



Using OCP for Operation and Maintenance

Taking Over a Cluster

The screenshot shows the OCP Overview page with the following sections:

- Basic Information:** Deployment Mode: ConfigUrl, Created By: admin, Access URL: http://[REDACTED]:3080/services?User..., ConfigUrl: http://[REDACTED]:3080/services?User..., Label: [REDACTED]
- OBProxies:** A table with columns: IP, SQL Port Number, Version, Parameter Version, Future Available Periods, Status, Actions. One item is listed: IP: [REDACTED], SQL Port Number: 2883, Version: 4.3.2.0-26, Parameter Version: 1, Future Available Periods: Nov 20, 2024, 10:51:40, Status: Running, Actions: Upgrade, More.
- Connectable OceanBase Clusters:** A table with columns: Cluster Name, Connected User, Connections, Status, Actions. One item is listed: Cluster Name: hongbo, Connected User: proxyro, Connections: 1, Status: Running, Actions: Delete.

1. Cannot find the takeover OBProxy entry?
A: You need to deploy an OBProxy cluster first and initialize OBProxy related meta info.
2. An error occurs when taking over an OBProxy?
A: There are a few things you must pay attention to before taking over
 - Only supports OBProxy cluster takeover deployed by OCP, not OBD deployment
 - The newly deployed OBProxy needs to be associated with (contains or is equal to) the connectable OceanBase cluster of the OBProxy to be taken over
 - It would be best if you took over the corresponding OceanBase cluster first
 - The version of the taken-over OBProxy service cannot be too different from the current OBProxy cluster version
 - The OBProxy cluster service to be taken over is in normal status

Using OCP for Operation and Maintenance

Migrate Out of The Cluster

X Migrate OceanBase Cluster

! Migrating the cluster will unbind the cluster from the current OCP instance. Proceed with caution.

OceanBase Cluster Name: test_2:1732085792	Number of Servers: 1
Number of Tenants: 3	Current Number of Sessions: 1
Current QPS: 69.2	Current TPS: 21.73

Select Host to Be Deleted

We recommend that you delete the host where the cluster service is deployed from OCP. If other services are also deployed on the host, you cannot delete the host.

<input checked="" type="checkbox"/> IP Address	Cluster	Service	Status
<input checked="" type="checkbox"/> [REDACTED]	Object: test_2:1732085792 Type:OceanBase Cluster	OceanBase	● Online

Credential File Encryption Key [?](#)

Please enter the password

[Export Credentials](#)

Enter **move out** Confirm

[Migrate](#) [Cancel](#)

1. Can MetaDB also be migrated?
A: Yes. Migration means that you will no longer use OCP to manage it. It will not affect the normal use of OceanBase. You can still use the takeover function to take it back, or it can be taken over by other OCPs.
2. What are the restrictions on moving out?
A: When using migration, you need to ensure the following points:
 - Whether the OCP version supports it, this feature is only available from OCP4.2.2
 - Clusters that are in operation or upgrading status do not support migration. That is, the cluster must be in STOPPED, RUNNING, or UNAVAILABLE status
3. What to do after moving out?
A: If the cluster host involved has no other services, it is recommended to delete the corresponding host. Migration will delete the **OceanBase** attributes on the corresponding host. If there are no other services, the host status will be idle. Subsequent use of this idle host will fail to detect the existence of the OBServer, or other OCPs will add this host, which will affect the status of the original OCP host

Using OCP for Operation and Maintenance

Migrate Out of The Cluster

X Migrate OBProxy Cluster

! Migrating the cluster will unbind the cluster from the current OCP instance. Proceed with caution.

OBProxy Cluster Name: [REDACTED] Current Number of Client Connections: 2

Select Host to Be Deleted

We recommend that you delete the host where the cluster service is deployed from OCP. If other services are also deployed on the host, you cannot delete the host.

<input type="checkbox"/> IP Address	Cluster	Service	Status
<input type="checkbox"/> [REDACTED]	Object: [REDACTED] [REDACTED] 628999 Type:OBProxy Cluster、OceanBase Cluster	OBProxy, OceanBase	● Online

Enter move out Confirm

move out

Migrate **Cancel**

1. Will the migration of OBProxy affect the services of existing connections?

A: No, migration means no longer using OCP to continue management, which will not affect the normal use of OBProxy. You can still use the takeover function to take it back, or it can be taken over by other OCPs.

2. What are the restrictions on moving out?

A: When using migration, you need to ensure the following points:

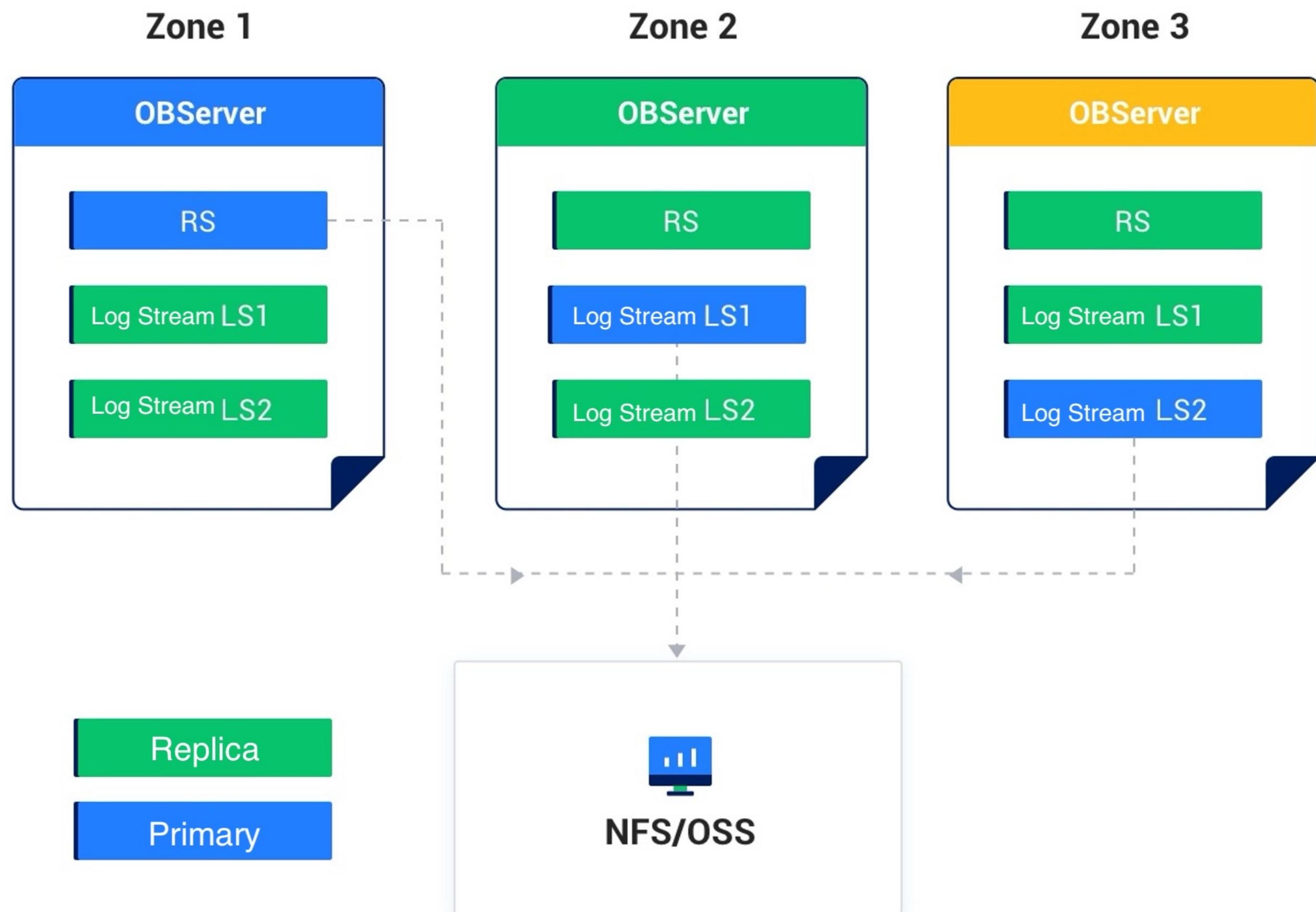
- Whether the OCP version supports it, this feature is only available from OCP4.2.2
- Clusters that are in operation or upgrading status do not support migration. That is, the cluster must be in STOPPED, RUNNING, or UNAVAILABLE status

3. What to do after moving out?

A: If the cluster host involved has no other services, it is recommended to delete the corresponding host. Migration will delete the OBProxy attributes on the corresponding host. If there are no other services, the host status is idle. If you use this idle host later, it will fail to check the existence of the OBProxy, or other OCPs will add this host, which will affect the status of the original OCP host

Using OCP for Operation and Maintenance

Backup and Recovery



The premise of data backup is backup media. OCP supports backup media NFS/OSS/COS. NFS is often used as a backup medium. Please refer to the official website for steps to [Deploy NFS](#).

1. What should you pay attention to when using backup media?
 - A: Different media have different version requirements, so you need to pay attention when using them:
 - NFS media requires NFS4.1 and above, OSS media requires OceanBase 4.1.0, and COS backup media requires OceanBase 4.2.1 and above
 - Multi-node clusters must use backup media. Single-node and test environments can be backed up locally, but there are security risks
2. Common Issues with NFS Storage Media

Answer:

 - Improper deployment leads to access rights issues. The nfsnobody user, backup directory, and OceanBase process user, that is, the process user and the nfsnobody user, all need to have access rights to the backup directory.
 - The NFS client needs to be deployed and configured on each node in the OceanBase cluster.

Using OCP for Operation and Maintenance

Backup and Recovery

Backup

Storage Configuration Select Existing Configuration ▾

Storage Configuration Name
Enter a value

Storage Type
 File oss cos

Storage Directory file:/// /obbackup/ Test Alert Threshold for Storage Capacity 80 %

Scheduling Settings

Scheduling Cycle Weeks Months

Mo Tu We Th Fr Sa Su All

Scheduling Duration 04:00:00

Data Backup Method
We recommend that you create at least a full backup task.

Tuesday: Full Backup Incremental Backup

Thursday: Full Backup Incremental Backup

Saturday: Full Backup Incremental Backup

Automatic Major Compaction If automatic major compaction is enabled, a major compaction will be automatically triggered during backup scheduling when the backup depends on a major compaction. If automatic major compaction is disabled, automatic major compaction will not be triggered during backup scheduling, and this may cause a backup scheduling failure.

Initiate Log Backup If you need to perform physical backups, log backup must be enabled.

Scheduling Configuration Cleanup for Expiring Backups

Retention Period of Backup Files 7 Days

Data backup includes log archive backup and data backup. Data backup can be performed only when the log archive backup status is "doing".

What are the limitations of data backup and what should be paid attention to?

1. The sys tenant and Meta tenant do not support data backup. Only **business tenants** can be backed up
2. Data backup is not supported for clusters in the Upgrading state
3. The cleanup of data backups must follow the principle of **full + incremental = complete** data. If there is only one full backup, the cleanup of the full backup will not be triggered even if the expired backup cleanup retention period is reached
4. It is recommended to perform a compaction before backing up. The first backup must be a full data backup
5. It is **forbidden** to directly delete the files being backed up manually using the rm method. This operation may cause archive log backup to fail, data backup to fail, etc
6. Deleting a backup policy on OCP will not delete the backed-up data files. If you are sure that the backup data can be discarded, you can manually delete the backup directory using **rm**.
7. If the Recoverable Time field is blank or the Source Tenant information cannot be selected in the backup interface, it might indicate that the **ob_admin** file is missing from the bin directory of the OceanBase installation deployed via OBD. You can resolve this by extracting the ob_admin file from the OceanBase Utils package and placing it in the bin directory

Using OCP for Operation and Maintenance

Backup and Recovery

Recovery / Initiate Recovery

← Initiate Recovery

Storage Configuration Select Existing Configuration ▾

The storage URL is parsed.

Storage Type

- File
- OSS
- COS

Storage Directory

Host for Parsing ⓘ

Select a host for parsing. If you need to parse logical backups, select a host on which the Backup & Recovery service is installed. If you need to parse physical backups, select a host on which an OceanBase cluster V2.2.70 or later is installed.

Restore Source Information

Source Cluster Select a value

Source Tenant Select a value

Recovery Date Select date

Hours, minutes and seconds Select time

Microseconds 0 Specified Recovery Period: -

Restore Destination Information

Destination Cluster Select a value

Destination Tenant Enter a value

You can add a recovery tenant only for a cluster that is running or in O&M.

Data recovery includes: log archive backup and data backup. Data backup can only be performed after the log archive backup status is "doing".

What are the limitations and points to note when recovering data?

1. It is recommended that the database version of the target cluster and the source cluster be consistent
2. OceanBase currently only supports restoring backup data of lower versions to the same or higher versions but does not support restoring backup data of OceanBase V3.X to OceanBase V4.X
3. **Special version:** The backup data of OceanBase V4.0.X version does not support restoration to OceanBase V4.1.X and above versions
4. If the Recoverable Time field is blank or the Source Tenant information cannot be selected in the backup interface, it might indicate that the `ob_admin` file is missing from the bin directory of the OceanBase installation deployed via OBD. You can resolve this by extracting the `ob_admin` file from the OceanBase Utils package and placing it in the bin directory
5. By default, the target tenant of the backup and recovery will form a primary-standby tenant relationship with the source tenant, and data synchronization will be performed at the same time. If the synchronization status needs to be released, the primary-standby tenant can be [decoupled](#).

Using OCP for Operation and Maintenance

Upgrading a Cluster

Welcome to the OCP Upgrade Wizard

OceanBase Cloud Platfrom upgrade wizard

Start upgrade

Deployment configuration Connectivity Test Environment pre-check OCP upgrade

Connection information

Access address: [REDACTED]

Access Port: 2883

Database name: meta_database

Access account: root@ocp_meta

Access password: U@9G/a4g

Verification

The verification is successful. Please enter the following parameters.

Component name	Node IP
ocp-server-ce	[REDACTED]

Operating system users

Username: [REDACTED]

Exit Previous step Next Step

Before upgrading the OceanBase service with OCP, you need to confirm whether to upgrade OCP. OCP has container deployment and OBD deployment methods. Upgrading OCP also requires upgrading according to the deployment method.

It is recommended to use the “**OBD web update**” GUI mode to upgrade. You only need to fill in the **root@ocp_meta** password. If it is the container-based version of OCP, this method will reinstall it as a non-containerized version. If you still need to use the container-based version, you can obtain the [new version image](#) for a [container-based upgrade](#).

NOTE:

OCP nodes need to install the JAVA environment. Currently, only JDK 1.8 is supported, and the build version number must be at least 161. When upgrading the OCP deployed in the container, the container will be closed and the new OCP service will be deployed again using the RPM package. Container management will no longer be used.

Using OCP for Operation and Maintenance

Upgrading a Cluster

Upgrade Version

Cluster: [test_2:1732085792](#)

OceanBase version: 4.2.1.2

CPU Architecture: x86_64

Perform a Minor Compaction

Rolling Upgrade: Database access will not be interrupted.

Upgrade Method ⓘ

Downtime Upgrade: Database access will be interrupted and the services will become unavailable.

The downtime upgrade will interrupt database access and cause the services to become unavailable.

Upgrade Version ⓘ

Select a value

Only packages that use the x86_64 can be selected.

Upgrade **Cancel**

What should I pay attention to when upgrading the OceanBase cluster using OCP?

1. Before upgrading the cluster, you need to upload three OceanBase software packages: database package (`oceanbase-ce-*.rpm`), database dependency package (`oceanbase-ce-libs-*.rpm`), and database tool integration package (`oceanbase-ce-utils-*.rpm`)
2. Before upgrading the cluster, it is recommended to confirm the corresponding version [upgrade instructions](#). For example, the current OB4.2.1.3 version does not support upgrading to OB4.2.x, but will support it later
3. Before upgrading a cluster, the cluster status must be guaranteed to be healthy and normal. It is not recommended to upgrade a cluster that is in operation and maintenance
4. When upgrading a cluster, if the cluster environment is greater than or equal to 3 zones, a rolling upgrade is recommended, which can be upgraded online. Single zone does not support rolling upgrades, and the database will be stopped during the upgrade process, affecting business use. You need to apply for the upgrade time window in advance
5. When upgrading a cluster, if a cluster with more than 3 zones uses a rolling upgrade, you must ensure that all tenants have more than 3 replicas before upgrading. Otherwise, the upgrade pre-check will fail because tenants cannot guarantee a majority during the upgrade process
6. When upgrading a cluster, pay attention to the fact that you cannot roll back the cluster upgrade task after completing the “**Pre-check for upgrade**” phase. If a task fails, do not manually skip or roll back it or set it to success. This may cause irreversible damage to the cluster and endanger business production. You need to contact OceanBase technical support personnel for assistance in troubleshooting.

Using OCP for Operation and Maintenance

Upgrading a Cluster



What should I pay attention to when upgrading the OBProxy cluster using OCP?

1. When upgrading an OBProxy cluster, all OBProxy servers in the cluster will be upgraded at the same time, so the OBProxy cluster will stop providing external services. If the current OBProxy cluster is already carrying services, it is recommended to upgrade the OBProxy services in the cluster in batches according to the currently configured load balancing.
2. When upgrading an OBProxy cluster with multiple CPU architectures, if the selected installation package version is missing in a certain CPU architecture, the upgrade will fail. In other words, you need to upload the software package of the corresponding architecture.
3. The package version cannot be lower than the current version.

Using OCP for Operation and Maintenance

OCP Scaling out OceanBase Clusters and Tenants



OceanBase has two scenarios for adding/reducing nodes:

- Adding/reducing nodes **horizontally** will increase/decrease the number of zones, thereby controlling the number of tenant replicas.
- Adding/reducing nodes **vertically** will increase/decrease the number of OBServers, thus controlling the upper limit of tenant resources.

What should I pay attention to when using OCP to scale out the number of OceanBase cluster zones?

1. Before scaling out the zone, you must include three OceanBase installation packages in the software package management: `oceanbase-ce-* .rpm`, `oceanbase-ce-langs-* .rpm`, `oceanbase-ce-utils-* .rpm`
2. Before scaling out the Zone, you must add a host first. It is recommended that the server be initialized first.
3. Before scaling out the zone, the cluster needs to be in a healthy state.
4. When scaling out a zone, if the expansion task fails, rollback is supported. If the rollback fails, it is not recommended to skip the task or set it to success. You need to contact OceanBase technical support personnel for assistance in troubleshooting.
5. After the expansion of the Zone is completed, a copy will not be automatically added for the tenant. You need to go to Tenant Management and click the required tenant to add a copy.
6. After the expansion of the zone is completed, if the primary zone is a sequential priority strategy, the cluster computing performance cannot be increased. If the primary zone is a random strategy, it generally has some impact on the performance of the partition table, which depends on the business usage scenario. For example: for a partition table, after the expansion, the partitions will be scattered to more nodes, the number of partitions per node will be reduced, and the computing speed will be improved, but the more nodes are crossed, the more network IO may increase.

Using OCP for Operation and Maintenance

OCP Scaling out OceanBase Clusters and Tenants

The screenshot shows the OceanBase Control Panel (OCP) interface. At the top, there's a modal window titled "Create Replica" for creating a replica for the tenant "obtest". The modal includes fields for "Target Zone" (set to "Select a value"), "Replica Type" (set to "Full-featured Replica"), "Unit Specifications" (set to "S1"), and "Units" (set to "1"). Below these fields is a button "+ Create Zone". A note at the bottom of the modal says: "We recommend that you specify consistent specifications for resource units of each zone in the tenant." At the bottom right of the modal are "Cancel" and "OK" buttons.

Below the modal, there's a table titled "Replica Details" showing existing replicas. The table has columns: "Zone Name", "Replica Type", "Unit Specification", "Units", and "Actions". One row is visible, showing "zone1" as the zone name, "Full-featured Replica" as the type, "CPU (Core): 1 Cores, Memory (GiB): 5, Log Disk : 5 GiB, IOPS: Unlimited" as the unit specification, "1" as the number of units, and "Edit" and "Delete" actions.

After the zone is scaled out, tenants can be scaled out. There are two scenarios for scaling out tenants. You can scale out tenant replicas or adjust tenant [unit specifications](#) to increase the upper limit of tenant resource usage.

What should I pay attention to when using OCP to scale out tenant replicas and unit specifications?

1. New replicas: OceanBase V4.0 ~ V4.2 only supports **full-featured replicas**, i.e. F replicas.
2. New replicas: OceanBase V4.2 and above support **full-featured replicas** and **read-only replicas**, namely F replicas and R replicas.
3. When increasing the unit specification, it is recommended to keep the tenant's log disk 3~4 times the size of the **tenant's memory**.

Using OCP for Operation and Maintenance

OCP Scaling out Oceanbase Clusters and Tenants

Add OBServer

Basic Information

Cluster: [test_cluster:1732085794](#)

OBServer Information

Zone Name	IDC	Model(Optional)	CPU Architecture	Host
zone1	default_...	Select a... ▾	x86_64 ▾	Select a value ▾
zone2	default_...	Select a... ▾	x86_64 ▾	Select a value ▾
zone3	default_...	Select a... ▾	x86_64 ▾	Select a value ▾
Zone5	default_...	Select a... ▾	x86_64 ▾	Select a value ▾

[Custom Settings >](#)

[Parameter Settings >](#)

Batch Modify

Object: [sysall zones in the tenant](#)

Unit Specifications

If this field is empty, the unit spe... ▾

We recommend that you specify consistent specifications for resource units of each zone in the tenant.

Units

Enter a value ▾

An empty value indicates that the number of units is not modified.

Cancel **OK**

Vertical expansion is to add OBServer nodes to an existing zone, which can increase the upper limit of the zone's resource usage (CPU, memory, disk capacity). For example, a 1-1-1 architecture cluster is vertically scaled out to a 2-2-2 architecture. Precautions for vertical expansion and tenant unit adjustment:

1. Before scaling out the OBServer, you need to add a host first. It is recommended that the server be [initialized first](#).
2. Before scaling out the OBServer, you must include three OceanBase installation packages in the software package management, `oceanbase-ce-* .rpm`, `oceanbase-ce-libs-* .rpm`, `oceanbase-ce-utils-* .rpm`, and add nodes with the same version.
3. Before scaling out the capacity of OBServer, it is recommended to keep the resource configuration consistent with that of the source cluster server to ensure the rational use of resources and reduce the resource waste caused by the barrel effect.
4. Before scaling out the OBServer, the host of the expanded node needs to be consistent with the host of the cluster architecture, for example: CPU architecture
5. Before scaling out the OBServer, the cluster status needs to be running
6. When scaling out the OBServer, if the expansion task fails, rollback is supported. If the rollback fails, it is not recommended to skip the task or set it to success. You need to contact OceanBase technical support personnel for assistance in troubleshooting.
7. After scaling out the OBServer, the tenant's data will not be automatically balanced to the new node. You need to go to Tenant Management, click the required tenant, and [modify the Unit](#) to generate the same Unit resource pool on the newly scaled-out node and balance the tenant data partitions under the same Zone to the new node.

Using OCP for Operation and Maintenance

OCP Scaling in OceanBase Clusters and Tenants

The screenshot shows the OCP interface with two main sections:

- Replica Details:** A table listing tenant replicas across three zones (zone1, zone2, zone3). Each row shows the Zone Name, Replica Type (Full-featured Replica), Unit Specification (CPU: 1 Core, Memory: 5 GiB, Log Disk: 5 GiB, IOPS: Unlimited), number of units (1), and actions (Edit, Delete).
- OB Servers:** A table listing four servers across three zones (zone1, zone2, zone3). Each row shows the IP, SQL Port, RPC Port, Zone, Host Type, Resource Usage (CPU, Memory, Log Disk, Data disk), Status (Running), and Actions (Restart, Replace, More).

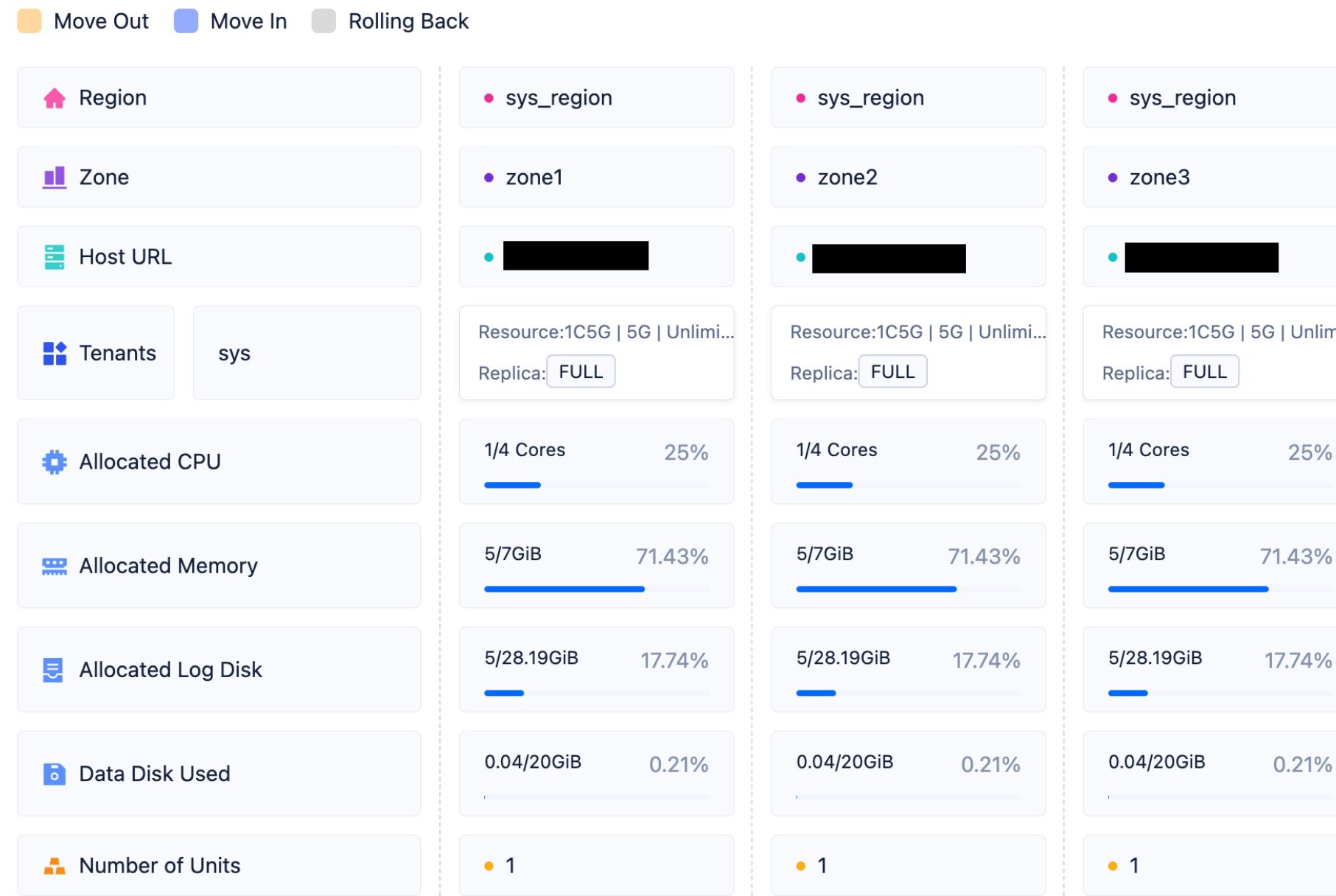
The steps for scaling in a cluster are essentially the reverse of scaling out. Before scaling in the cluster, you need to scale in the tenants first. During the horizontal scaling in of a Zone, the tenant replicas must be removed first.

Considerations for scaling in tenant replicas and horizontally scaling in zones:

1. Before deleting a replica, the OceanBase cluster and tenant must be running. Operations are not allowed in other states.
2. Before deleting a replica, you need to ensure that the tenant's replicas can satisfy the majority after deleting the replica. That is, a tenant with 3 replicas can only delete 1 replica at most.
3. Before deleting replicas, it is recommended to proactively switch the primary replica by modifying the tenant's [Primary Zone priority](#) to ensure that the replica deletion does not affect the business.
4. Before scaling in a Zone, ensure that there are no tenant replicas on the Zone. This requires [scaling in the tenant replicas](#) first, and tenant replicas can be deleted in batches.
5. When scaling in a zone, if the scaling task fails, rollback is supported. If the rollback fails, it is not recommended to skip the task or set it to success. You need to contact OceanBase technical support personnel for assistance in troubleshooting.

Using OCP for Operation and Maintenance

OCP Scaling in OceanBase Clusters and Tenants



Migrate Units

Unit ID: 1

Tenant Name: sys

Resource Specifications: 1C5G | 5GiB | Unlimited

Source URL: [REDACTED]

Destination URL: Select a value

Targets that have no insufficient tenants are removed.

Cancel OK

Vertical scaling involves reducing the **unit_num** of tenants to free up resources before scaling in OBServer nodes within a Zone.

Considerations for scaling in tenant replicas and vertically scaling in zones:

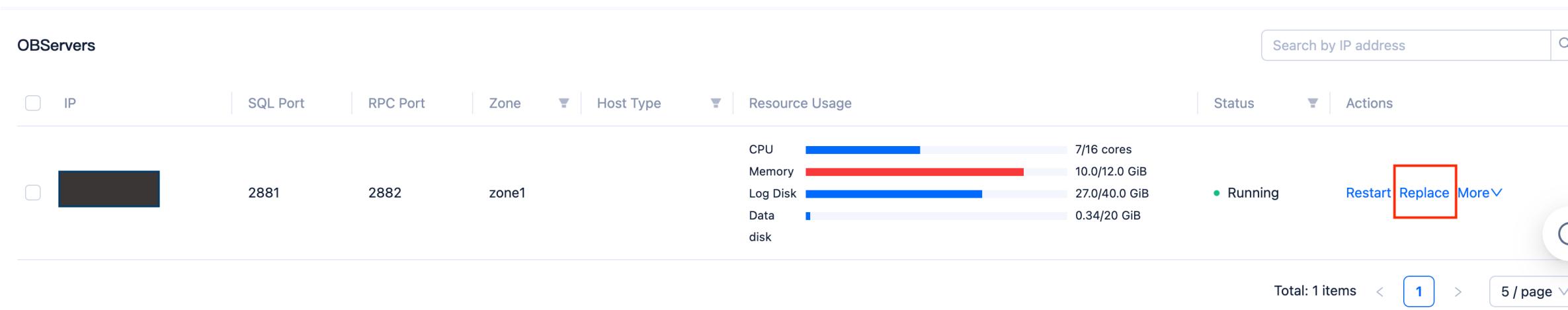
- Before scaling in tenant units, it is recommended to merge tenants to release the memory being used by tenants and improve scaling efficiency.
- Before scaling in the tenant unit, you need to ensure that the remaining disk resources of the remaining OBServer nodes are sufficient to support the data of the scaled-in tenant.
- If you need to scale in to a specific OBServer node, you need to [manually migrate the Unit](#). **Note:** You need to first turn off the tenant's enable_rebalance resource automatic load parameter.
- When the OceanBase cluster is V4.2.0 or above, and the tenant parameter enable_rebalance (default true) is false, the number of units cannot be modified.
- In multi-zone cluster scenarios, OceanBase V4.0.0 and above do not support reducing the number of units in a single zone, and the replica type only supports the **full-featured replica type**. That is, for a 2-2-2 architecture cluster or tenant, a tenant can only be scaled in to a 1-1-1 architecture, not a 2-1-1 or 2-2-1 architecture.
- Before scaling in the OBServer, you need to confirm that the tenants of the scaled-in OBServer node have been migrated.
- When scaling in OBServer, if the scaling in task fails, it is not recommended to skip the task or set it to success. You need to contact OceanBase technical support personnel for assistance in troubleshooting.

OBServers

IP	SQL Port	RPC Port	Zone	Host Type	Resource Usage	Status	Actions
[REDACTED]	2881	2882	zone1		CPU: 1/4 cores Memory: 5.0/7.0 GiB Log Disk: 5.0/28.2 GiB Data disk: 0.03/20 GiB	● Running	Restart Replace More
[REDACTED]	2881	2882	zone2		CPU: 1/4 cores Memory: 5.0/7.0 GiB Log Disk: 5.0/28.2 GiB Data disk: 0.03/20 GiB	● Running	Restart Replace Delete Download Logs
[REDACTED]	2881	2882	zone3		CPU: 1/4 cores Memory: 5.0/7.0 GiB Log Disk: 5.0/28.2 GiB Data disk: 0.03/20 GiB	● Running	Restart Replace More

Using OCP for Operation and Maintenance

OCP Replaces OceanBase Nodes



When there is no replacement server, please pay attention:

1. If the server failure can be repaired in a short time, you can adjust the permanent offline time parameter `server_permanent_offline_time` first, and then stop the OBserver process. The permanent offline time needs to be evaluated according to the time it takes for the server to be repaired and put back online.
2. If a server failure cannot be repaired promptly in a multi-zone, multi-OBServer cluster (e.g., a 2-2-2 architecture), you can consider manually migrating the Unit to other nodes within the same zone, provided the remaining OBServer nodes have sufficient resources to accommodate the migrated Unit. Once the migration is complete, you can proceed to delete the faulty OBServer node.
3. If the server failure cannot be repaired in a short time, and the cluster is a multi-zone single-OBServer cluster, you can consider the cluster scaling in solution.

Node replacement scenarios are generally used when a node fails or when the computer room is relocated.

When replacement is needed and there are idle server resources, the replacement needs to be paid attention to:

1. The cluster must be available, that is, tenants can be accessed normally through the cluster.
2. The idle server needs to match the current cluster hardware architecture, and the host needs to be in the same computer room as the original host.
3. The idle server's hardware and software resources (CPU, memory, disk, etc.) need to be greater than or equal to the failed node, especially the disk capacity.
4. Before replacing the server, you need to add a host first. It is recommended that the [server be initialized first](#).
5. Before replacing the server, the OceanBase and OCP-agent software packages must be available in the software package management, and the versions must be consistent with the source cluster.
6. When replacing a server, if the faulty node OBServer is offline, you need to follow the prompt to skip the host operation during the replacement process.
7. When replacing a server, if the replacement task fails, it is not recommended to skip the task or set it to success. You need to contact OceanBase technical support personnel for assistance in troubleshooting.
8. After replacing the server, if the node has OBProxy service deployed, you need to deploy or [add OBProxy](#) for the node separately.

Agenda

- **Using OCP for Operation and Maintenance**
- **Using The Command Line for Operation and Maintenance**
- **Using OBD for Operation and Maintenance**
- **Using Ob-operator for Operation and Maintenance**

Using the Command Line for Operation and Maintenance

50+ Common SQL

Type	Description
Cluster related SQL	Query cluster basic information
Cluster resource related SQL	Control over resource allocation
Table partitioning and distribution related SQL	Get the information about tables on a node
Dump and merge related SQL	Initiation, progress, delay, history and other information
Execution plan cache related SQL	View and clear the plan cache
Collecting statistics related SQL	Manual collection and review
Other SQL	

Using the Command Line for Operation and Maintenance

Common Operation and Maintenance

1. How to obtain database log information corresponding to SQL statements
 - { Get trace_id when an error occurs
 - Get trace_id without error
2. How to collect information about slow SQL performance
 - { SQL timeout, slow
 - DDL stuck
3. How to troubleshoot database initialization failures
 - { observer.log
 - Keywords
4. How to troubleshoot logs when database upgrades fail
 - { 4 upgrade logs
 - Precautions when upgrading with different tools
5. How to collect stack trace after the OBServer node core dump
 - { Collection Stack
 - Emergency treatment

Using the Command Line for Operation and Maintenance

How to obtain database log information corresponding to SQL statements?

When SQL cannot be executed repeatedly:

1. View the `gv$ob_sql_audit` view, find the exception info through the SQL statement, and obtain the `TRACE_ID` and `svr_ip` information.

```
select
query_sql,svr_ip,TRACE_ID,client_ip,TENANT_NAME,user_name,DB_NAME,ELAPSED_TIME,RET_CODE,FROM_UNIXTIME(ROUND(REQUEST_
TIME/1000/1000),'%Y-%m-%d %H:%i:%S') from `GV$OB_SQL_AUDIT` WHERE query_sql like '%Keyword%' and REQUEST_TIME>='2024-
04-05 14:34:00' limit 10;
```

2. Log in to the machine corresponding to `svr_ip` and filter the log information by `TRACE_ID`. The issues in different exception scenarios may not always be found in the `observer.log`. For example, if the backup command fails, the cause of the error can be analyzed in the `rootservice.log` log.

```
[root@x.x.x.x ~]$ grep "YB420BA1CC68-000615A09D4CBDA0-0-0" observer.log*
[root@x.x.x.x ~]$ grep "YB420BA1CC68-000615A09D4CBDA0-0-0" rootservice.log*
```

3. If the `gv$ob_sql_audit` information is purged, the database system logs are flushed, or the system log level is too low, you can configure it as follows and wait for SQL to be executable to reproduce the problem, and then obtain the log according to the above process.

```
# Set the log level. The default is WDIAG, which is enough
alter system set syslog_level='WDIAG';
```

```
# When setting the number of logs to be retained, you need to pay attention to whether the disk space can support the number of logs
alter system set max_syslog_file_count='10';
```

Using the Command Line for Operation and Maintenance

How to obtain database log information corresponding to SQL statements?

When SQL can be executed repeatedly:

You can first check `gv$ob_sql_audit` in the above way to troubleshoot

1. If the SQL execution reports an error immediately, using the system tenant to obtain the `trace_id` is recommended.

Log in to the system tenant and turn on the `enable_rich_error_msg` parameter

```
alter system set enable_rich_error_msg=true;
```

Log in to the business tenant and execute the error-reporting SQL statement

```
select count(*) from t2;
```

```
ERROR 1146 (42S02): Table 'test.t2' doesn't exist [xx.xx.xx.1:2882] [2024-04-13 20:10:20.292087] [YB420BA1CC68-000615A0A8EA5E38-0-0]
```

Go to the `xx.xx.xx.1` node to filter logs. You can filter multiple logs by regular matching if the latest log cannot be filtered.

```
grep "YB420BA1CC68-000615A0A8EA5E38-0-0" rootservice.log
```

```
grep "YB420BA1CC68-000615A0A8EA5E38-0-0" observer.log
```

After obtaining the log information, turn off the `enable_rich_error_msg` parameter

```
alter system set enable_rich_error_msg=false;
```

Using the Command Line for Operation and Maintenance

How to obtain database log information corresponding to SQL statements?

When SQL can be executed repeatedly:

2. If the executed SQL statement returns success, but the SQL task has not been completed, it is recommended to use the business tenant to obtain the trace_id. For example: When log archiving is enabled, the archiving status is not doing.

Log in to the business tenant and set the `ob_enable_show_trace` variable

```
SET ob_enable_show_trace='ON';
```

Execute SQL statements to obtain trace_id. This method can only return trace_id. You need to use the `gv$ob_sql_audit` view to find out which SVR_IP address to filter the logs.

#Note: This SQL needs to be executed in the same session.

```
select count(*) from test2;  
select last_trace_id();  
select * from oceanbase.gv$ob_sql_audit where trace_id='YBxxxxx';
```

Filter the logs by the SVR_IP and trace_id obtained above. You can filter multiple logs by regular matching if the latest log cannot be filtered.

```
grep "YBxxxxx" rootservice.log  
grep "YBxxxxx" observer.log
```

Using the Command Line for Operation and Maintenance

How to collect information about slow SQL?

Through [One-Click Diagnosis Analysis](#) and the [Show Trace](#) function in the full-link diagnosis, or check the `gv$ob_sql_audit` audit view to confirm the events that affect the execution time.

Get SQL execution plan `EXPLAIN EXTENDED`, [view execution plan and analyze](#), get SQL plan monitor information

1. Log in to the sys tenant and set the `sql_plan_monitor` parameter

```
# Verify that sql_plan_monitor is turned on
show parameters like 'enable_sql_audit';
# If enable_sql_audit = False then turn it on
alter system enable_sql_audit = true;
```

2. Log in to the business tenant and obtain the SQL execution plan

```
EXPLAIN EXTENDED SQL statement;
```

3. Set up temporary trace acquisition

```
SET ob_enable_show_trace='ON';
```

4. Execute the SQL statement that needs to be collected again

5. Get the `trace_id` information of the SQL executed in the previous step

```
select last_trace_id();
```

6. Temporarily disable plan monitor data to prevent information from being overwritten

```
alter system enable_sql_audit = false;
```

7. Get the SQL of the plan monitor and replace `xxxxx` with the `trace_id` returned in step 5 to obtain the output line information of each operator.

```
select plan_line_id, plan_operation, sum(output_rows), sum(STARTS) rescan, min(first_refresh_time) open_time, max(last_refresh_time) close_time,
min(first_change_time) first_row_time, max(last_change_time) last_eof_time, count(1) from oceanbase.gv$sql_plan_monitor where trace_id =
'xxxxx' group by plan_line_id, plan_operation order by plan_line_id;
```

8. Restore `sql_audit` parameters

```
alter system enable_sql_audit = true;
```

Using the Command Line for Operation and Maintenance

How to collect information about slow SQL performance?

How to troubleshoot when DDL execution does not return?
Is it being executed or stuck?

Many modules are involved, such as RS scheduling exceptions, lock conflicts, RPC, high business pressure, etc.

Get the information about the DDL currently being executed:

```
select tenant_id, gmt_create, ddl_type, status, task_id, parent_task_id, object_id,  
target_object_id, execution_id, trace_id, unhex(ddl_stmt_str) from __all_virtual_ddl_task_status;
```

View the rootservice.log log by filtering by trace_id:

```
select * from gv$ob_sql_audit where query_sql like '% DDL statement keywords %';
```

Using the Command Line for Operation and Maintenance

How to troubleshoot database initialization failures?

Whether OBD or OCP deploys the database, if the initialization phase fails, you need to use the observer.log log to determine the cause of the problem.

Note: Initialization can only be performed once.

View the difficulties encountered in the initialization phase log:

1. The logs were overwritten during the initialization phase.
2. There were too many logs and the failed log information could not be found.
3. The log level was not set correctly and the key information was not printed.

Solution:

1. Set the number of system logs to retain

Set max_syslog_file_count a little higher. **Note:** System log space occupancy issue

2. Find keywords

In addition to checking the ERROR log **error level**, you can also look for the **ERROR keyword** "Unexpected internal error happen, please checkout the internal errcode" in the initialization phase or the log print information "begin server limit report" when the database is started.

3. Set the system log level

syslog_level is set to WDIAG level (default)

Using the Command Line for Operation and Maintenance

How to check logs when database upgrade fails?

Whether OBD or OCP is used to upgrade the database, the upgrade is performed by calling the database upgrade script. If some upgrades fail, the cause of the problem cannot be confirmed through the logs of these two tools alone. You need to pay attention to the following four database upgrade logs:

- upgrade_checker.py ---> upgrade_checker.log
- upgrade_pre.py ---> upgrade_pre.log
- upgrade_health_checker.py ---> upgrade_cluster_health_checker.log
- upgrade_post.py ---> upgrade_post.log

Note:

- When OBD executes the upgrade database command, the upgrade log is located in the current directory.
- The upgrade log is located in /tmp when OCP performs a database upgrade. The file format is: version information}/upgrade_*_{time}.log, for example: /tmp/4.2.1.2-102000042023120514_upgrade_post_20240411101214.log.
- After the OBD database upgrade command fails, you can execute the upgrade command again.
- You Can Not skip the task directly after the OCP fails in the database upgrade operation step.

Tip:

- The log format will be standardized in future versions.
- In subsequent versions, users will not be allowed to skip critical steps in the OCP upgrade process if they fail.

Using the Command Line for Operation and Maintenance

How to collect the stack trace info after the OBServer node Core Dump?

The OBServer may crash and generate Core files when encountering serious abnormal failures. Usually, OceanBase R&D needs to locate and confirm such problems and provide some log and stack trace info.

Core file configuration:

```
grep "kernel.core_pattern" /etc/sysctl.conf
kernel.core_pattern = /obdata/data/core-%e-%p-%t
```

If not configured, the core.\${ob_pid} file will be generated in the home_path of the OceanBase database by default.

You can view the current resource limits through ulimit -a or ulimit -c. If it is set to 0 or very small, core files cannot be generated when a node core occurs.

Log keywords:

```
grep "CRASH ERROR" observer.log
CRASH ERROR!!! sig=6, sig_code=-6, sig_addr=3eb00000dbb, timestamp=1712828099270879, tid=4466, tname=ReplayEngine12, trace_id=0-0,
extra_info=((null)), lbt=0x9af40d8 0x9ae4978 0x7f74fdbdd62f 0x7f74fd42a377 0x7f74fd42ba67 0x9a28638 0x873cffa 0x8dd491f 0x8dd309b 0x8e6f22e
0x8b4e29c 0x8b4ac4b 0x8b48b04 0x9a69028 0x3426f0e 0x2cc7671 0x985e884 0x985d271 0x9859d2e
```

Print Stacktrace:

```
addr2line -pCfe ./bin/observer 0x9af40d8 0x9ae4978 0x7f74fdbdd62f 0x7f74fd42a377 0x7f74fd42ba67 0x9a28638 0x873cffa 0x8dd491f 0x8dd309b
0x8e6f22e 0x8b4e29c 0x8b4ac4b 0x8b48b04 0x9a69028 0x3426f0e 0x2cc7671 0x985e884 0x985d271 0x9859d2e
```

Emergency treatment:

After collecting or backing up the required troubleshooting and analysis information, you can try to manually restart the observer service process to see if it returns to normal. If the core frequently fails to recover through restart, consider [replacing the node](#) if the cluster is available, or increase the [permanent offline time](#) to prevent the node from being kicked out of the cluster. If the cluster is unavailable, consider restoring data through data backup files or switching to a physical standby database to restore business.

Agenda



- **Using OCP for Operation and Maintenance**
- **Using The Command Line for Operation and Maintenance**
- **Using OBD for Operation and Maintenance**
- **Using Ob-operator for Operation and Maintenance**

Using OBD for Maintenance

Use OBD to Adjust Oceanbase Cluster Parameters - Part I

```
[admin@test001 ~] $ cd /home/admin/.obd/cluster
[admin@test001 .obd/cluster] $ ./obd cluster edit-config metadb
$obd cluster edit-config metadb
Search param plugin and load ok
Search param plugin and load ok
Parameter check ok
Save deploy "metadb" configuration
Use `obd cluster reload metadb` to make changes take effect.
Trace ID: 8559d8e8-07b7-11ef-94fe-00163e046d79
If you want to view detailed obd logs, please run: obd display-trace 8559d8e8-07b7-11ef-94fe-00163e046d79

[admin@test001 ~] $ ./obd cluster reload metadb
```

[admin@test001 /home/admin/]\$tree -L 1 ~/obd
/home/admin/.obd
└── cluster
 # Stores the configuration file corresponding to the deployment name. Editing the configuration file directly is not recommended. It would help if you used the obd cluster edit-config operation.

There is a **.data** hidden file that records the deployment name, component-related information, and deployment status information. Editing this configuration file directly is not recommended.

- ├── config_parser
- ├── lock
- ├── log # Stores OBD command operation logs
- ├── mirror # Store the installation package of the local warehouse and the repo file of the remote warehouse
- ├── optimize
- ├── plugins # Store the component-related plugins
- ├── repository
- └── version # Record OBD version

Using OBD for Maintenance

Use OBD to Adjust Oceanbase Cluster Parameters - Part II

OBD Steps to Adjust OceanBase Cluster Parameters

View the deployment name	obd cluster list
Editing Cluster Parameters	obd cluster edit-config Deployment_Name
Make the parameters effective	obd cluster reload/restart/redeploy Deployment_Name

Things to note when adjusting cluster parameters	<p>If you are not sure whether the parameters adjusted by edit-config take effect after reinstallation, restart, or reload, you can refer to the files searched by command <code>find ~/.obd/plugin/\${component} "parameter.yaml"</code>.</p> <p>Principles to follow: Parameters in the deployment configuration file should be modified using OBD cluster edit-config. Parameters not in the deployment configuration file can be modified using the SQL command in the database. If you are not sure how to modify the parameters in the deployment configuration file, check the <code>parameter.yaml</code> file and modify it as appropriate.</p> <p>When editing resource parameters under the oceanbase-ce module, please note that the <code>datafile_size</code> parameter does not support reduction</p>
When adjusting cluster resources, you need to follow the principles	<p>When increasing the parameter value: do not exceed the remaining resources of the server;</p> <p>When decreasing the parameter value, do not be lower than the value range of the tenant's allocated occupancy.</p> <p>When adjusting tenant resource parameters, you need to follow the principles.</p> <p>When increasing the parameter value: do not exceed the remaining resources of the cluster;</p> <p>When decreasing the parameter value, the minimum tenant memory cannot be lower than the <code>__min_full_resource_pool_memory</code> limit.</p> <p>When decreasing the parameter value, the minimum tenant CPU cannot be lower than <code>1</code> core, and <code>MAX_CPU</code> cannot be lower than <code>MIN_CPU</code>;</p> <p>When decreasing the parameter value, the tenant <code>LOG_DISK_SIZE</code> parameter is recommended to be 3~4 times the size of the tenant memory</p>

Using OBD for Maintenance

Restart Management Services Using OBD - Part I

```
[admin@test001 /home/admin]$ obd cluster restart test2
```

Get local repositories **and** plugins ok

Load cluster param plugin ok

Open ssh connection ok

Cluster status check ok

Check before restart observer ok

-

```
[admin@test001 /home/admin]$obd cluster restart test2 -c obproxy-ce
```

Get local repositories **and** plugins ok

Load cluster param plugin ok

Open ssh connection ok

```
[admin@test001 /home/admin]$obd cluster start test2 -c oceanbase-ce -s xx.xx.xx.2
```

Get local repositories ok

Search plugins ok

Open ssh connection ok

Load cluster param plugin ok

Cluster status check ok

Check before start observer ok

Start observer ok

observer program health check ok

Connect to observer xx.xx.xx.2:2881 ok

succeed

Trace ID: bb2082a0-f3db-11ee-8a93-00163e046d79

If you want to view detailed obd logs, please run: obd display-trace bb2082a0-f3db-

1. Restart all services under the deployment name: **obd cluster restart deployment name**
2. Restart the specified service under the deployment name: **obd cluster restart deployment_name -c component_name**
3. Restart the specified service and the specified node under the deployment: **obd cluster restart deployment_name -c component_name -s IP1,IP2**

Using OBD for Maintenance

Restart Management Services Using OBD - Part II

Note when restarting components:

1. The prerequisite for restarting a component is that the nodes involved in all components need to be connected via SSH. Otherwise, the restart operation cannot be performed even if the IP node is specified.
2. When all components are restarted, the status of the corresponding deployment name in the `obd cluster list` will be running. If an element fails to restart, the subsequent components will not be restarted.
3. The status of the deployment name in the `obd cluster list` is not obtained in real-time and will only be updated after the management operation is completed. Therefore, the component's service may be abnormal, while the deployment status is running, for example, after the server is restarted. Using the command "display" is recommended to confirm whether all components are normal.
4. If the deployment name status is not running, it will affect subsequent management operations, such as upgrades and expansions
5. The component name refers to the module name specified in the deployment configuration file, not the name displayed by the "`obd cluster display`" command.
6. When specifying multiple component names, use commas to separate them.
7. When restarting a specific service component separately, the deployment status will not be updated. For example, when all services are stopped, the deployment status is shown as "stopped." Even if each component is started separately, the overall deployment status will remain "stopped."
8. If multiple IPs are specified and there is an incorrect IP, OBD will skip the incorrect IP information and only restart the correct IP.
9. If multiple component services are specified and there is an incorrect component name, OBD will terminate the entire restart operation.

Using OBD for Maintenance

Using OBD Update Management Services - Part I

```
[admin@oceanbase ~] /home/admin]
$obd update

MySQL [(none)]>
MySQL [(none)]> ALTER TENANT test primary_zone='zone1;zone2;zone3';

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MySQL [(none)]> ALTER SYSTEM MAJOR FREEZE;
```

```
[admin@oceanbase ~] /home/admin]
$obd mirror list local|grep oceanbase-ce
| oceanbase-ce | 4.2.1.2 | 102000042023120514.el7 | x86_64 | b2ccb524f200a9ef0fad2cddf59d309ddaa2e3e4 |
| oceanbase-ce-libs | 4.2.1.2 | 102000042023120514.el7 | x86_64 | b4ae0ee729404557fa858d4cdd87250bc1aa63 |
| oceanbase-ce-utils | 4.2.1.2 | 102000042023120514.el7 | x86_64 | acaa97166f3772111958be10473052a1f36c63f0 |
| oceanbase-ce | 4.2.1.2 | 102010022023121415.el7 | x86_64 | 1873bbe80cbbe5d00d5f276a4f7302cfca677fb6 |
| oceanbase-ce-libs | 4.2.1.2 | 102010022023121415.el7 | x86_64 | 3d3eeee6694be9b8debb0c3f8b5b6583c06e3b62 |
| oceanbase-ce-utils | 4.2.1.2 | 102010022023121415.el7 | x86_64 | 8d9490944c0cf35efe36fee39d5b56c622a2c82f |
| oceanbase-ce | 4.2.1.4 | 104000052024022918.el7 | x86_64 | 736ac0f3379032dd41436c1b5a229f8d42b44e21 |
| oceanbase-ce-libs | 4.2.1.4 | 104000052024022918.el7 | x86_64 | ed5c776874a7b6f6ef9c67e39be86d3a6d304441 |
| oceanbase-ce-utils | 4.2.1.4 | 104000052024022918.el7 | x86_64 | 39023ce085a4703b97eab59da4fbc039f4061c04 |

[admin@oceanbase ~] /home/admin]
$obd cluster upgrade obtest -c oceanbase-ce -V 4.2.1.4 --usable=736ac0f3379032dd41436c1b5a229f8d42b44e21
```

1. Check and update OBD: obd update
2. Upgrading OceanBase:
obd cluster upgrade Deployment_Name -c oceanbase-ce -V 4.2.1.4 --usable=xxxx

Using OBD for Maintenance

Using OBD Update Management Services - Part II

Notes on upgrading OceanBase via OBD:

1. Before using OBD to upgrade, if the cluster has primary and backup tenants, it is recommended that both the primary and backup clusters be upgraded to the same version.
2. Before using OBD to upgrade, confirm the upgrade instructions in the Release Notes of the target version.
3. Before using OBD to upgrade, if the upgrade target version is V4.0.x, V4.1.x, and V4.2.0 BETA, you need to adjust the primary zone of the business tenant to the sequential priority and restore it after the upgrade is complete.
4. Before using OBD to upgrade, you need to check that the deployment name status is running and that the OceanBase cluster status is normal.
5. When using OBD to upgrade, if the upgrade fails, you can repeat the OBD upgrade command, but it is forbidden to modify the cluster system parameters, such as enable_ddl and enable_upgrade_mode, when the reason for the upgrade failure is unknown.
6. When using OBD to upgrade, if the upgrade fails, you can check it through the command `obd display-trace` to print the information on the interface or check the upgrade log `upgrade_post.log`.
7. After the OBD upgrade is completed, in addition to checking the cluster status, it is recommended to upgrade other component services to matching versions.

Using OBD for Maintenance

Using OBD Scale-out Management Services - Part I

```
[admin@test001 /home/admin]$cat Expansion1_3.yaml
oceanbase-ce:
  servers:
    - name: server2
      ip: xx.xx.xx.2
    - name: server3
      ip: xx.xx.xx.3
  server2:
    mysql_port: 2881
    rpc_port: 2882
    home_path: /home/admin/oceanbase
    zone: zone2
  server3:
    mysql_port: 2881
    rpc_port: 2882
    home_path: /home/admin/oceanbase
    zone: zone3
```

```
[admin@test001 /home/admin]
$obd cluster scale_out Expansion -c Expansion1_3.yaml
```

The `obd cluster scale_out` command will update the new node expansion configuration to the source cluster deployment configuration file, and perform an environmental pre-check on the expansion node. If it passes, OceanBase will be installed on the expansion node and the service will be started, and added to the source cluster.

1. Write OceanBase expansion configuration file
2. Scaling out OceanBase Services

Using OBD for Maintenance

Using OBD Scale-out Management Services - Part II

Things to note when using OBD to scale out OceanBase:

1. Before scaling out, you need to check whether the OBD version needs to be updated. It is recommended to use the latest version.
2. Before scaling out, it is recommended to [initialize the server](#) of the expanded node first. The deployment user and SSH connection information must be consistent.
3. Before scaling out the capacity, you need to ensure that the OceanBase cluster is in a normal state.
4. Before scaling out, you need to ensure that the OBClient has been installed.
5. Before scaling out, the configuration file of the expanded node is not allowed to modify the depends, global, or other server configurations in the original cluster configuration. You only need to configure the basic information of the new node. Therefore, it is necessary to ensure that the resource configuration and directory mounting of the expanded node server are consistent with the original cluster server.
6. After scaling out, you need to [add copies](#) to the tenant, otherwise it will still be a single copy tenant
7. After capacity scaling out, it is recommended to adjust the tenant's primary zone priority as needed.
8. After scaling out, cluster reduction using OBD is not supported yet.
9. After scaling out, vertical scaling of OBServer nodes is also supported. To achieve this, specify the source cluster zone name in the expansion configuration file. Once the expansion is complete, tenant resources can be [scaled out horizontally](#).

Agenda

- Using OCP for Operation and Maintenance
- Using The Command Line for Operation and Maintenance
- Using OBD for Operation and Maintenance
- Using Ob-operator for Operation and Maintenance

Using OB-Operator for Operation and Maintenance

The current OB-Operator already supports providing users with an interface for managing OceanBase clusters in K8s through the Dashboard, calling K8S APIs to implement OceanBase resource management, including a basic overview, cluster creation, tenant creation, monitoring indicators, backup and recovery, cluster upgrades, cluster expansion and reduction, etc. Currently, only the community version of OceanBase database images are supported. For complete operation and maintenance documentation, please refer to the [OB-Operator documentation](#).

[Create a New Business Tenant Using Ob-operator](#)

[Data Backup Using OB-Operator](#)

[Data Recovery Using Ob-operator](#)

[Scale Out a Cluster Using Ob-operator](#)

[Scale Up a Cluster Using Ob-operator](#)

[Scale in a Cluster Using Ob-operator](#)

[Scale Down a Cluster vertically Using OB-Operator](#)

[Upgrading a Cluster Using Ob-operator](#)

Thank You!

 OceanBase Official website:
<https://oceanbase.github.io/>

 GitHub Discussions:
<https://github.com/oceanbase/oceanbase/discussions>

