Red Hat OpenShift Container Storage 4.6

Monitoring OpenShift Container Storage

Monitoring OpenShift Container Storage using storage dashboards

Last Updated: 2022-06-06

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Legal Notice

Abstract

Read this document for instructions on monitoring Red Hat OpenShift Container Storage using the persistent and object service dashboards.

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CHAPTER 1. CLUSTER HEALTH

1.1. VERIFYING OPENSHIFT CONTAINER STORAGE IS HEALTHY

Storage health is visible on the Persistent Storage and Object Service dashboards.

Procedure

1. Log in to OpenShift Web Console.

2. Check the Status card in the following locations.

   - **Home → Overview → Persistent Storage**

   - **Home → Overview → Object Service**
     If **Green Tick** appears on the Status card, the cluster is healthy.

     If the state is not **Healthy**, see Section 1.2, "Storage health levels and cluster state" for more information about the current state and any alerts that appear.

1.2. STORAGE HEALTH LEVELS AND CLUSTER STATE

Status information and alerts related to OpenShift Container Storage are displayed in the storage dashboards.

1.2.1. Persistent storage dashboard indicators

The **Persistent Storage** dashboard shows the state of OpenShift Container Storage as a whole, as well as the state of persistent volumes.

The states that are possible for each resource type are listed in the following table.

Table 1.1. OpenShift Container Storage health levels

State	Icon	Description
UNKNOWN		OpenShift Container Storage is not deployed or unavailable.
Green Tick		Cluster health is good.
Warning		When OpenShift Container Storage cluster is in a warning state. In internal mode, an alert will be displayed along with the issue details. Alerts are not displayed for external mode.

State	Icon	Description
Error		When the OpenShift Container Storage cluster has encountered an error and some component is nonfunctional. In internal mode, an alert will be displayed along with the issue details. Alerts are not displayed for external mode.

1.2.2. Object Service dashboard indicators

The **Object Service** dashboard shows the state of the Multicloud Object Gateway and any object claims in the cluster.

The states that are possible for each resource type are listed in the following table.

Table 1.2. Object Service health levels

State	Description
 Green Tick	Object Storage is healthy.
Multicloud Object Gateway is not running	Shown when NooBaa system is not found.
All resources are unhealthy	Shown when all NooBaa pools are unhealthy.
Many buckets have issues	Shown when >= 50% of buckets encounter error(s).
Some buckets have issues	Shown when >= 30% of buckets encounter error(s).
Unavailable	Shown when network issues and/or errors exist.

1.2.3. Alert panel

The Alert panel appears below the Status card in both the Persistent Storage dashboard and the Object Service dashboard when the cluster state is not healthy.

Information about specific alerts and how to respond to them is available in Troubleshooting OpenShift Container Storage.

CHAPTER 2. METRICS

2.1. METRICS IN THE PERSISTENT STORAGE DASHBOARD

To view the persistent storage dashboard, click **Home → Overview → Persistent Storage** in OpenShift Web Console.

Figure 2.1. Example of Persistent Storage Overview Dashboard for internal mode
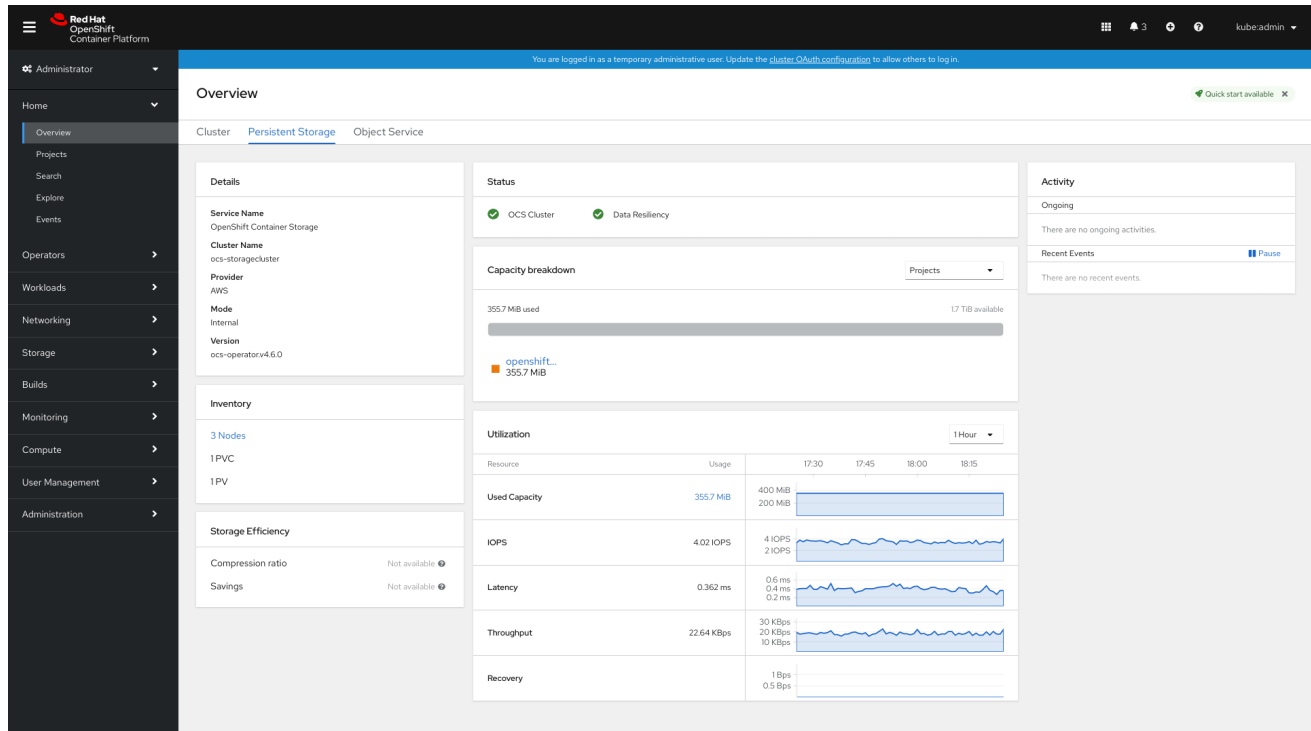
The following cards on Persistent Storage dashboard provides the metrics based on deployment mode (internal or external):

Details card

The Details card shows the following:

- Service Name

- Cluster name

- The name of the Provider on which the system runs (example: AWS, VSphere, 'None' for Bare metal)

- Mode (deployment mode as either Internal or External)

- OpenShift Container Storage operator version.

Inventory card

The Inventory card shows the number of active nodes, PVCs and PVs backed by OpenShift Container Storage provisioner. On the left hand side of the card, total number of storage nodes, PVCs and PVs are displayed. While on the corresponding right hand side of the card, number of storage nodes in Not Ready state, count of PVCs in Pending state and PVs in Released state are shown.

> **NOTE**
>
> For external mode, the number of nodes will be 0 by default, since there are no dedicated nodes for OpenShift Container Storage.

Status card

This card shows whether the cluster is up and running without any errors or is experiencing some issues.
For internal mode, Data Resiliency indicates the status of data re-balancing in Ceph across the replicas. When the internal mode cluster is in a warning or error state, the Alerts section is shown along with the relevant alerts.

For external mode, Data Resiliency and alerts will not be displayed

Capacity breakdown card

In this card, you can view graphic breakdown of capacity per project, storage classes and pods. You can choose between Projects, Storage Classes and Pods from the drop down menu on the top of the card. These options are for filtering the data shown in the graph.

Option	Display
Projects	The aggregated capacity of each project which is using the OpenShift Container storage and how much is being used.
Storage Classes	Will show aggregate capacity based on OpenShift Container Storage based storage classes.
Pods	All the pods trying to use the PVC backed by OpenShift Container Storage provisioner.
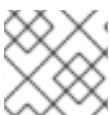
> **NOTE**
>
> For external mode, this graph shows only the used capacity details.

Utilization card

The card shows Used Capacity, input/output operations per second, latency, throughput, and recovery information for the internal mode cluster.
For external mode, this card shows only the used and requested capacity details for that cluster.

Storage Efficiency card

This card shows the system-wide compression ratio and the amount of space saved for persistent volume claims using the storage classes with compression.

2.2. METRICS IN THE OBJECT SERVICE DASHBOARD

To view the object service dashboard, click **Home → Overview → Object Service** in OpenShift Web Console.
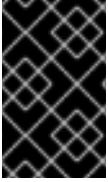
> **IMPORTANT**
>
> In order to view the Object Gateway (RGW) metrics in the Object Service dashboard in OpenShift Container Storage 4.6 post upgrade, monitoring must be enabled. To enable monitoring for RGW, see Enabling monitoring for the Object Service dashboard.
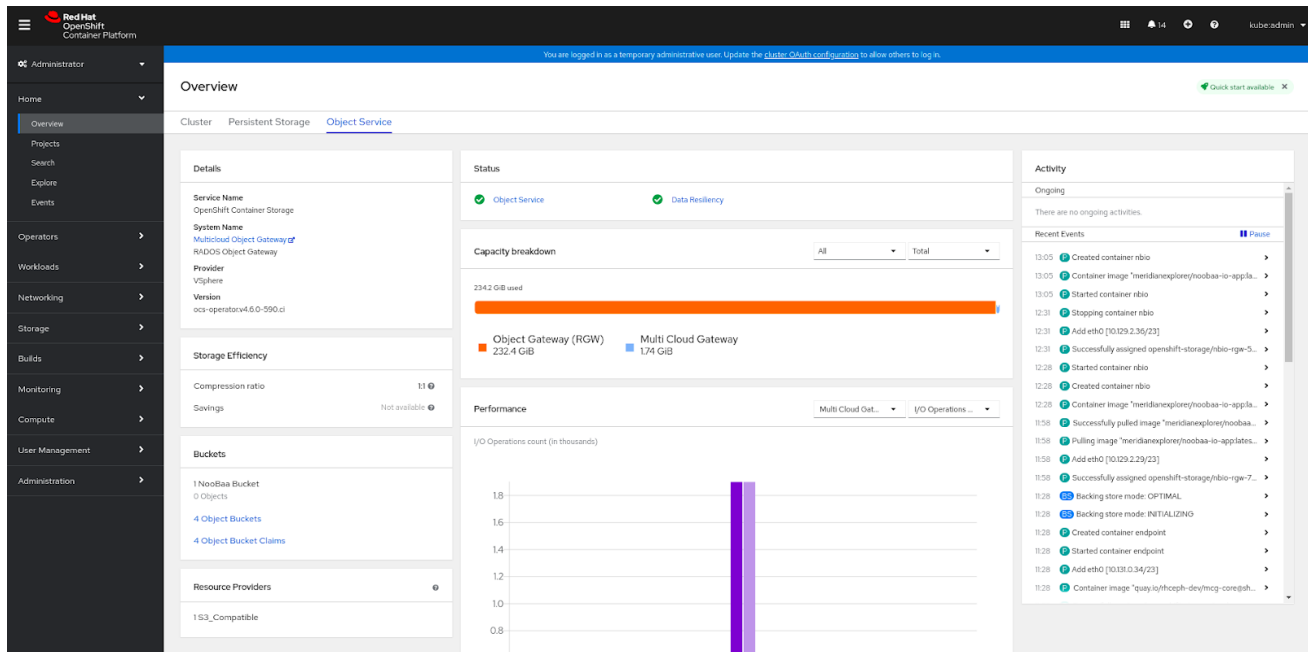
Figure 2.2. Example of Object Service Overview Dashboard

The following metrics are available in Object Service dashboard:

Details card

This card shows the following information:

- **Service Name**: The Multicloud Object Gateway (MCG) service name.

- **System Name**: The Multicloud Object Gateway and RADOS Object Gateway system names. The Multicloud Object Gateway system name is also a hyperlink to the MCG management user interface.

- **Provider**: The name of the provider on which the system runs (example: AWS, VSphere, 'None' for Baremetal)

- **Version**: OpenShift Container Storage operator version.

Storage Efficiency card

In this card you can view how the MCG optimizes the consumption of the storage backend resources through deduplication and compression and provides you with a calculated efficiency ratio (application data vs logical data) and an estimated savings figure (how many bytes the MCG did not send to the storage provider) based on capacity of bare metal and cloud based storage and egress of cloud based storage.

Buckets card

Buckets are containers maintained by the MCG and RADOS Object Gateway to store data on behalf of the applications. These buckets are created and accessed through object bucket claims (OBCs). A specific policy can be applied to bucket to customize data placement, data spill-over, data resiliency, capacity quotas, and so on.
In this card, information about object buckets (OB) and object bucket claims (OBCs) is shown

separately. OB includes all the buckets that are created using S3 or the user interface(UI) and OBC includes all the buckets created using YAMLs or the command line interface (CLI). The number displayed on the left of the bucket type is the total count of OBs or OBCs. The number displayed on the right shows the error count and is visible only when the error count is greater than zero. You can click on the number to see the list of buckets that has the warning or error status.

Resource Providers card

This card displays a list of all Multicloud Object Gateway and RADOS Object Gateway resources that are currently in use. Those resources are used to store data according to the buckets policies and can be a cloud-based resource or a bare metal resource.

Status card

This card shows whether the system and its services are running without any issues. When the system is in a warning or error state, the alerts section is shown and the relevant alerts are displayed there. Click the alert links beside each alert for more information about the issue. For information about health checks, see Cluster health .
If multiple object storage services are available in the cluster, click the service type (such as **Object Service** or **Data Resiliency**) to see the state of the individual services.

Data resiliency in the status card indicates if there is any resiliency issue regarding the data stored through the Multicloud Object Gateway and RADOS Object Gateway.

Capacity breakdown card

In this card you can visualize how applications consume the object storage through the Multicloud Object Gateway and RADOS Object Gateway. You can use the **Service Type** drop-down to view the capacity breakdown for the Multicloud Gateway and Object Gateway separately. When viewing the Multicloud Object Gateway, you can use the **Break By** drop-down to filter the results in the graph by either **Projects** or **Bucket Class**.

Performance card

In this card, you can view the performance of the Multicloud Object Gateway or RADOS Object Gateway. Use the **Service Type** drop-down to choose which you would like to view.
For Multicloud Object Gateway accounts, you can view the I/O operations and logical used capacity. For providers, you can view I/O operation, physical and logical usage, and egress.

The following tables explain the different metrics that you can view based on your selection from the drop down menus on the top of the card:

Table 2.1. Indicators for Multicloud Object Gateway

Consumer types	Metrics	Chart display
Accounts	I/O operations	Displays read and write I/O operations for the top five consumers. The total reads and writes of all the consumers is displayed at the bottom. This information helps you monitor the throughput demand (IOPS) per application or account.

Consumer types	Metrics	Chart display
Accounts	Logical Used Capacity	Displays total logical usage of each account for the top five consumers. This helps you monitor the throughput demand per application or account.
Providers	I/O operations	Displays the count of I/O operations generated by the MCG when accessing the storage backend hosted by the provider. This helps you understand the traffic in the cloud so that you can improve resource allocation according to the I/O pattern, thereby optimizing the cost.
Providers	Physical vs Logical usage	Displays the data consumption in the system by comparing the physical usage with the logical usage per provider. This helps you control the storage resources and devise a placement strategy in line with your usage characteristics and your performance requirements while potentially optimizing your costs.
Providers	Egress	The amount of data the MCG retrieves from each provider (read bandwidth originated with the applications). This helps you understand the traffic in the cloud to improve resource allocation according to the egress pattern, thereby optimizing the cost.
Accounts	I/O operations	Displays read and write I/O operations for the top five consumers. The total reads and writes of all the consumers is displayed at the bottom. This information helps you monitor the throughput demand (IOPS) per application or account.

Consumer types	Metrics	Chart display
Accounts	Logical Used Capacity	Displays total logical usage of each account for the top five consumers. This helps you monitor the throughput demand per application or account.

For the RADOS Object Gateway, you can use the **Metric** drop-down to view the **Latency** or **Bandwidth**.

- **Latency**: Provides a visual indication of the average GET/PUT latency imbalance across RADOS Object Gateway instances.

- **Bandwidth**: Provides a visual indication of the sum of GET/PUT bandwidth across RADOS Object Gateway instances.

Activity card

This card displays what activities are happening or have recently happened in the OpenShift Container Storage cluster. The card is separated into two sections:

- **Ongoing**: Displays the progress of ongoing activities related to rebuilding of data resiliency and upgrading of OpenShift Container Storage operator.

- **Recent Events**: Displays the list of events that happened in the **openshift-storage** namespace.

CHAPTER 3. ALERTS

3.1. SETTING UP ALERTS

For internal Mode clusters, various alerts related to the storage metrics services, storage cluster, disk devices, cluster health, cluster capacity, and so on are displayed in the persistent storage and the object service dashboards. These alerts are not available for external Mode.

> **NOTE**
>
> It might take a few minutes for alerts to be shown in the alert panel, because only firing alerts are visible in this panel.

You can also view alerts with additional details and customize the display of Alerts in the OpenShift Container Platform.

For more information, see Managing alerts.

CHAPTER 4. REMOTE HEALTH MONITORING

OpenShift Container Storage collects anonymized aggregated information about the health, usage, and size of clusters and reports it to Red Hat via an integrated component called Telemetry. This information allows Red Hat to improve OpenShift Container Storage and to react to issues that impact customers more quickly.

A cluster that reports data to Red Hat via Telemetry is considered a *connected cluster*.

4.1. ABOUT TELEMETRY

Telemetry sends a carefully chosen subset of the cluster monitoring metrics to Red Hat. These metrics are sent continuously and describe:

- The size of an OpenShift Container Storage cluster

- The health and status of OpenShift Container Storage components

- The health and status of any upgrade being performed

- Limited usage information about OpenShift Container Storage components and features

- Summary info about alerts reported by the cluster monitoring component

This continuous stream of data is used by Red Hat to monitor the health of clusters in real time and to react as necessary to problems that impact our customers. It also allows Red Hat to roll out OpenShift Container Storage upgrades to customers so as to minimize service impact and continuously improve the upgrade experience.

This debugging information is available to Red Hat Support and engineering teams with the same restrictions as accessing data reported via support cases. All connected cluster information is used by Red Hat to help make OpenShift Container Storage better and more intuitive to use. None of the information is shared with third parties.

4.2. INFORMATION COLLECTED BY TELEMETRY

Primary information collected by Telemetry includes:

- The size of ceph cluster in bytes : **"ceph_cluster_total_bytes"**,

- The amount of ceph cluster storage used in bytes : **"ceph_cluster_total_used_raw_bytes"**,

- Ceph cluster health status : **"ceph_health_status"**,

- The total count of osds : **"job:ceph_osd_metadata:count"**,

- The total number of Persistent Volumes present in RHOCP cluster : **"job:kube_pv:count"**,

- The total iops (reads+writes) value for all the pools in ceph cluster : **"job:ceph_pools_iops:total"**,

- The total iops (reads+writes) value in bytes for all the pools in ceph cluster : **"job:ceph_pools_iops_bytes:total"**,

- The total count of ceph cluster versions running : **"job:ceph_versions_running:count"**

- The total number of unhealthy noobaa buckets : **"job:noobaa_total_unhealthy_buckets:sum"**,

- The total number of noobaa buckets : **"job:noobaa_bucket_count:sum"**,

- The total number of noobaa objects : **"job:noobaa_total_object_count:sum"**,

- The count of noobaa's accounts : **"noobaa_accounts_num"**,

- The total usage of noobaa's storage in bytes : **"noobaa_total_usage"**,

- The total amount of storage requested by PVCs from a particular storage provisioner in bytes: **"cluster:kube_persistentvolumeclaim_resource_requests_storage_bytes:provisioner:sum"**,

- The total amount of storage used by PVCs from a particular storage provisioner in bytes: **"cluster:kubelet_volume_stats_used_bytes:provisioner:sum"**.

Telemetry does not collect identifying information such as user names, passwords, or the names or addresses of user resources. In addition to the telemetry information stated above, NooBaa sends statistical information about accounts, buckets, objects, capacity, nodes, and connectivity health to phonehome.noobaa.com.