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# Red Hat OpenShift Data Foundation monitoring

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# Red Hat OpenShift Data Foundation

## Introduction

- Provides higher level data services and persistent storage for Red Hat OpenShift
- Is composed of Red Hat Ceph Storage, Rook and Multicloud Object Gateway
  - Red Hat Ceph Storage and Multicloud Object Gateway provide their own monitoring
- The same storage cluster can function as an object store, a block store and a file system

# Red Hat OpenShift monitoring

## Default monitoring components

- Based on the Prometheus open source project
- Components:
  - Prometheus
    - Collects, stores and provides access to metrics as time series data
  - Alertmanager
    - Handles alerts received from Prometheus and is also responsible for sending the alerts to external notification systems
  - Grafana
    - Provides dashboards for analyzing and visualizing the metrics
    - Those dashboards are also available in Observe → Dashboards
  - Telemeter Client
  - Operators (Cluster Monitoring Operator, Prometheus Operator)
  - Other components (Thanos Querier, kube-state-metrics, openshift-state-metrics, node-exporter)

# Red Hat OpenShift monitoring

What is available for users

- Dashboards
- Alerts
- Metrics

# ODF Dashboards

## Cluster Overview

**Red Hat OpenShift Container Platform**

You are logged in as a temporary administrative user. Update the [cluster OAuth configuration](#) to allow others to log in.

### Overview

#### Cluster

**Getting started resources**

- Set up your cluster**  
Finish setting up your cluster with recommended configurations.  
Add identity providers →  
Configure alert receivers →  
[View all steps in documentation](#)
- Build with guided documentation**  
Follow guided documentation to build applications and familiarize yourself with key features.  
Monitor your sample application →  
Get started with Quarkus using a Helm Chart →  
[View all quick starts](#)
- Explore new admin features**  
Explore new features and resources within the admin perspective.  
[API Explorer](#)

**Details** [View settings](#)

**Cluster API address**  
<https://api.ypersky-10y.qe.rh-ocs.com:6443>

**Cluster ID**  
95e5dcd6-db3e-4cf8-ab85-dbl6cf7fba39  
[OpenShift Cluster Manager](#)

**Provider**  
VSphere

**OpenShift version**  
4.10.0-0.nightly-2022-11-01-143955

**Service Level Agreement (SLA)**  
Self-support, 60 day trial  
**59 days remaining**  
[Manage subscription settings](#)

**Update channel**  
stable-4.10

**Status**

- Cluster
- Control Plane
- Operators
- Storage
- Insights  
0 issues found

**Activity** [View events](#)

Ongoing

There are no ongoing activities.

**Recent events** [Pause](#)

- 1:01 PM Stopping container registry-server
- 1:01 PM Successfully pulled image "registry.redh..."
- 1:01 PM Created container registry-server
- 1:01 PM Started container registry-server
- 1:01 PM Pulling image "registry.redhat.io/redhat..."
- 1:01 PM Add eth0 [10.130.0.250/23] from opens...
- 1:01 PM Successfully assigned openshift-marke...

**Storage**  
Storage status represents the health status of OpenShift Data Foundation's StorageCluster.  
Provider: OpenShift Data Foundation  
Health: ✔

# ODF Dashboards

## Data Foundation Overview

The screenshot displays the Red Hat OpenShift Container Platform Data Foundation Overview dashboard. The interface includes a left-hand navigation menu with categories like Administrator, Home, Operators, Workloads, Networking, and Storage. The main content area is titled 'Data Foundation' and features several sections: 'Status' showing a green checkmark for 'Data Foundation', 'System Capacity' with a bar chart for 'Used Capacity', 'External Object Provider Used Capacity' with a 'No data available' message, and 'Performance' with a table of metrics. A right-hand sidebar shows 'Activity' with a list of recent events.

**Red Hat OpenShift Container Platform**

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### Data Foundation

[Overview](#) [Storage Systems](#) [Backing Store](#) [Bucket Class](#) [Namespace Store](#)

**Status**

✓ Data Foundation

**System Capacity**

Name	Used Capacity	Used / Total
ocs-st...	<div></div>	

**External Object Provider Used Capacity**

No data available

**Activity**

Recent events [Pause](#)

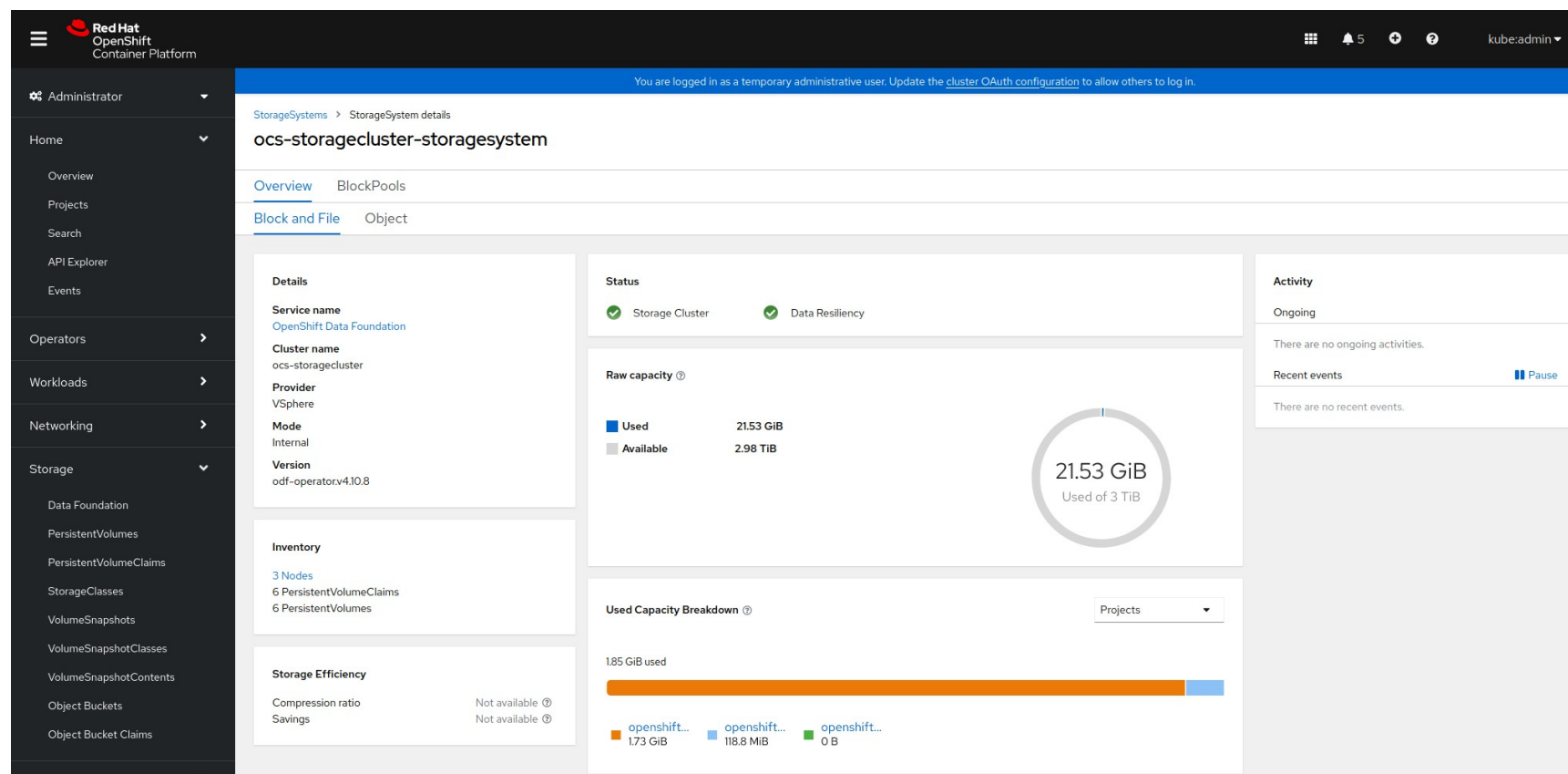
- 12:25 PM Stopping container registry-server
- 12:25 PM Started container registry-server
- 12:25 PM Successfully pulled image "registry.redhat.io/redhat/ce..."
- 12:25 PM Created container registry-server
- 12:25 PM Add eth0 [10.130.0.241/23] from openshift-sdn
- 12:25 PM Pulling image "registry.redhat.io/redhat/certified-opera..."
- 12:25 PM Successfully assigned openshift-marketplace/certified...
- 12:24 PM Stopping container registry-server
- 12:24 PM Successfully pulled image "quay.io/rhceph-dev/ocs-reg..."
- 12:24 PM Started container registry-server

**Performance** 1 hour

Name	IOPS	Latency	Throughput
ocs-storagecluster-storage-system	-	-	-

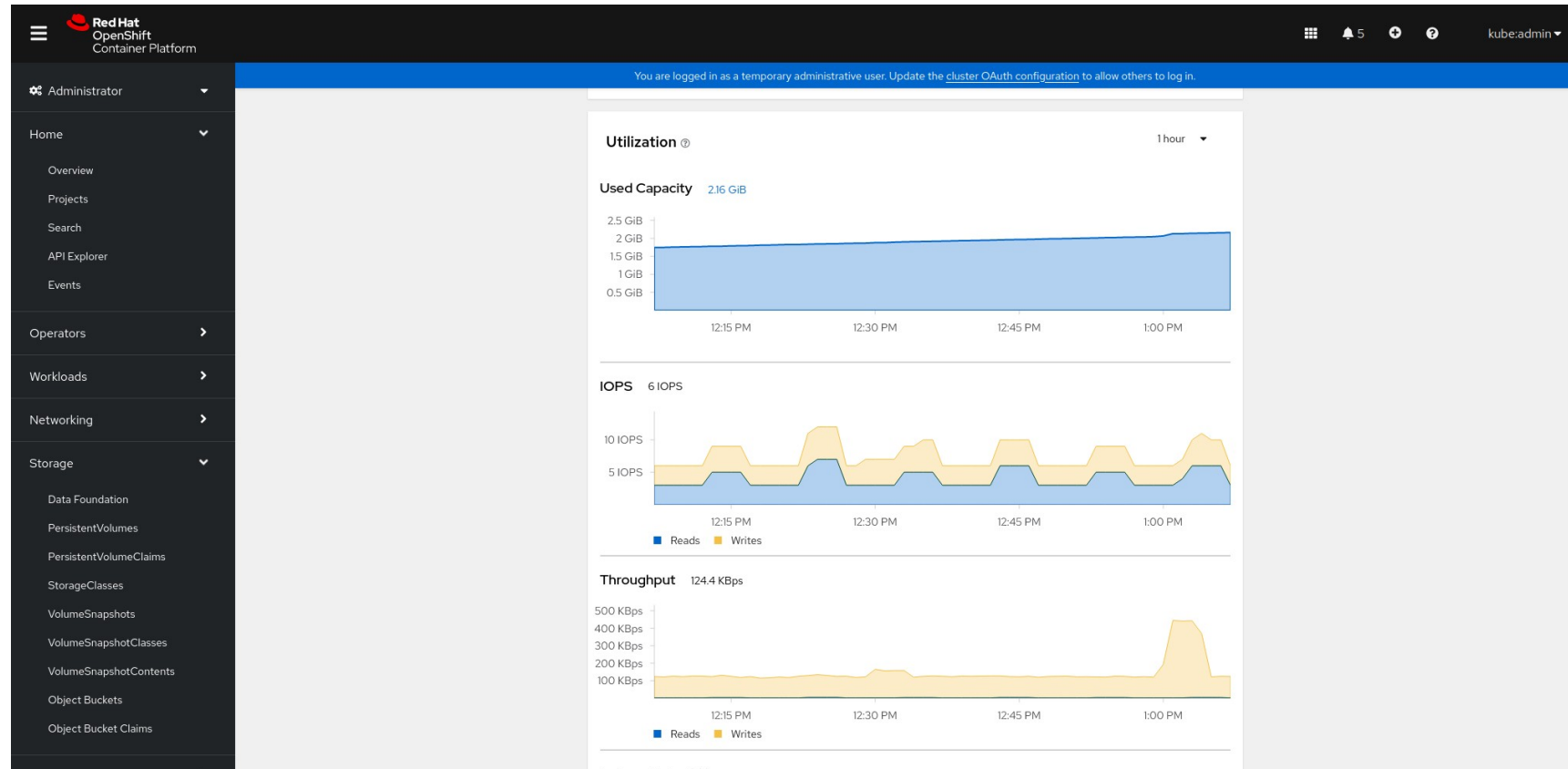
# ODF Dashboards

## Block and File dashboard 1/3



# ODF Dashboards

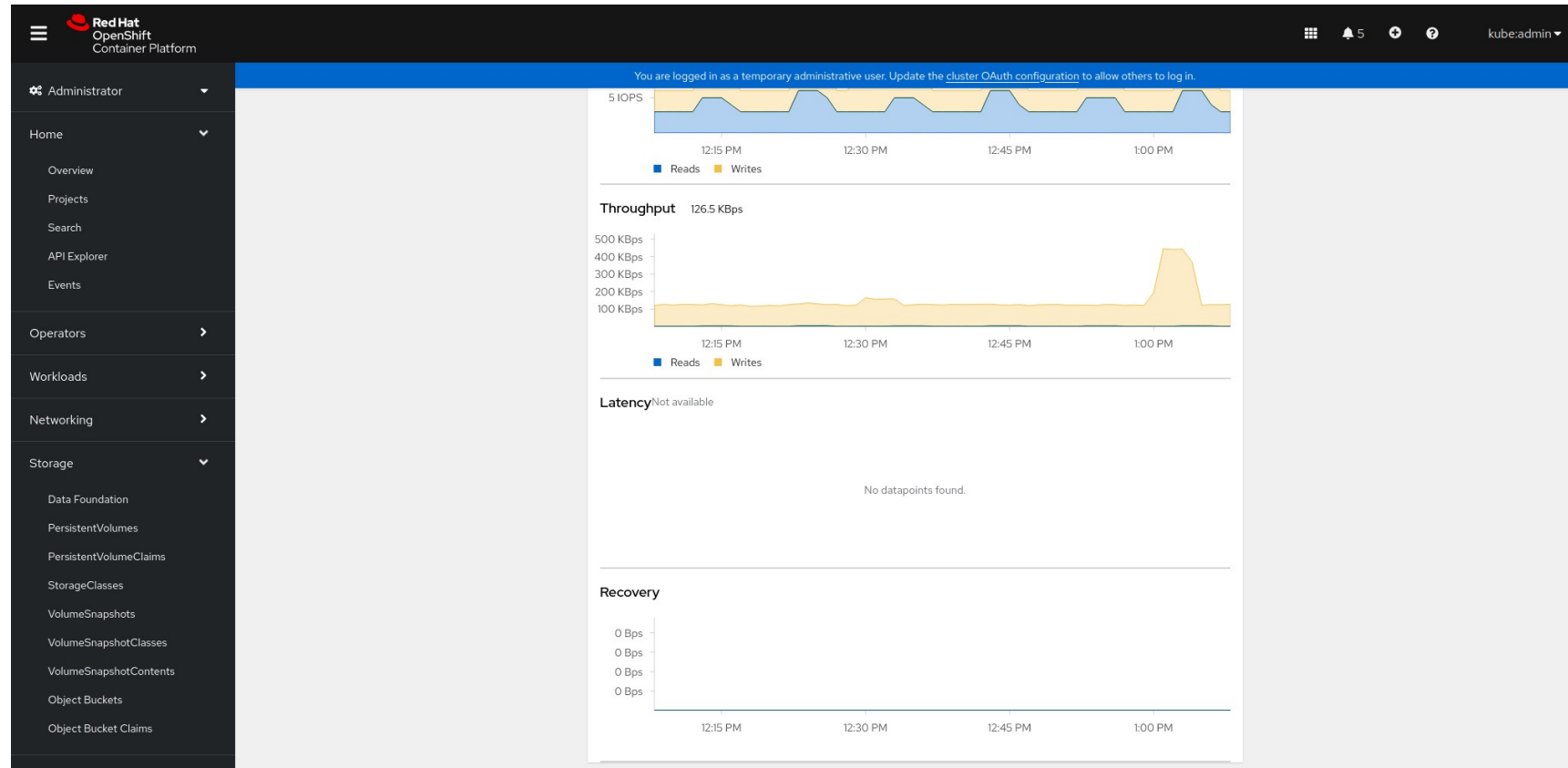
## Block and File dashboard 2/3





# ODF Dashboards

## Block and File dashboard 3/3



# ODF Dashboards

## Object dashboard 1/2

Red Hat OpenShift Container Platform

You are logged in as a temporary administrative user. Update the [cluster OAuth configuration](#) to allow others to log in.

StorageSystems > StorageSystem details

ocs-storagecluster-storagesystem

Overview BlockPools

Block and File Object

**Details**

Service name  
OpenShift Data Foundation

System name  
Multicloud Object Gateway [↗](#)  
RADOS Object Gateway

Provider  
VSphere

Version  
odf-operatorv4.10.8

**Storage Efficiency**

Compression ratio Not available ⓘ  
Savings Not available ⓘ

**Buckets ⓘ**

1 NooBaa Bucket  
0 Objects  
0 Object Buckets  
0 Object Bucket Claims

**Object Service Status**

The object service includes 2 services.

Services Status

Multicloud Object Gateway ✓  
Object Gateway (RGW) ✓

**Object Service** **Data Resiliency**

**Capacity breakdown ⓘ**

All Total

1 KiB used

Object Gateway (RGW) 1 KiB

**Performance ⓘ**

Multicloud Obj... I/O Operations ...

90  
80  
70  
60

**Activity**

Ongoing

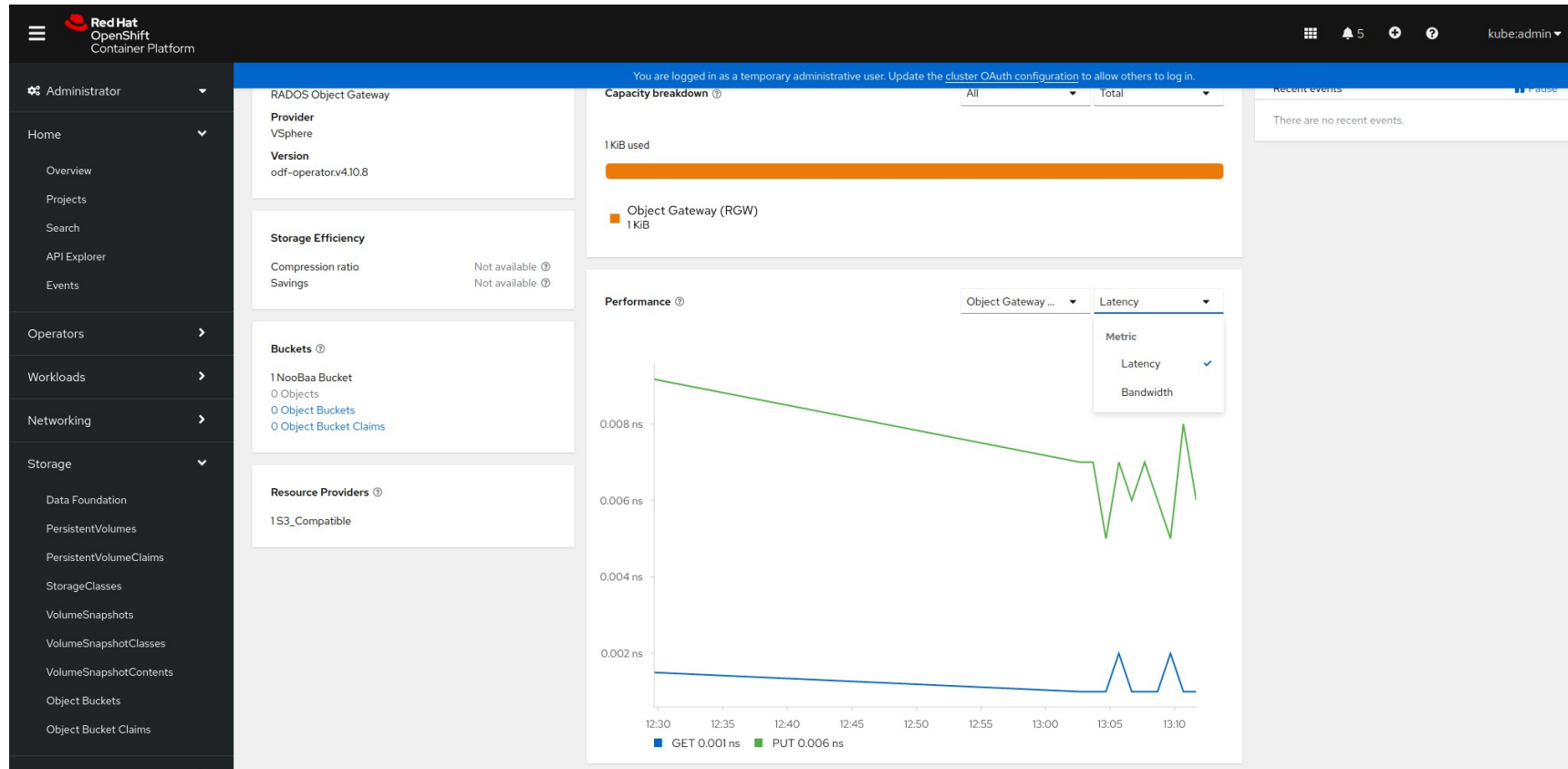
There are no ongoing activities.

Recent events [Pause](#)

There are no recent events.

# ODF Dashboards

## Object dashboard 2/2



# Monitoring cluster health

- Storage health is visible on the Overview dashboard
- Available alerts:
  - CephClusterWarningState
  - CephClusterErrorState

# Monitoring cluster capacity

- Storage cluster capacity is displayed on the Block and File and Object dashboards
- Available alerts:
  - CephClusterNearFull
  - CephClusterCriticallyFull
  - CephClusterReadOnly
- If ODF is used as Managed Service add-on then this is the only monitoring available
  - Site reliability engineers handle the rest

# Monitoring Ceph components

## Ceph components

- Ceph Manager
- Ceph Metadata Server
- Ceph Monitors
- Ceph Object Storage Daemons (OSDs)

# Monitoring Ceph components

## Ceph Manager

- Responsible for keeping track of runtime metrics and the current state of the Ceph cluster
- If the component is down then no storage cluster monitoring is working except for alerts specific to this component
- Monitored by alerts: CephMgrIsAbsent, CephMgrIsMissingReplicas

# Monitoring Ceph components

## Ceph Metadata Server

- Stores metadata on behalf of the Ceph File System
- Ceph Metadata Servers allow POSIX file system users to execute basic commands (like ls, find, etc.) without placing an enormous burden on the Ceph Storage Cluster.
- Ceph Block Devices and Ceph Object Storage do not use MDS
- Monitored by alert: CephMdsMissingReplicas



# Monitoring Ceph components

## Ceph Monitors

- Maintains maps of the cluster state, including the monitor map, manager map, the OSD map, the MDS map, and the CRUSH map
- There needs to be odd number of monitors to report actual state of cluster
- One monitor serves as leader
- Monitored by alerts:
  - CephMonQuorumAtRisk
  - CephMonQuorumLost
  - CephMonHighNumberOfLeaderChanges

# Monitoring Ceph components

## Ceph Object Storage Daemons (OSDs)

- Stores data, handles data replication, recovery, rebalancing
- Monitored by alerts:
  - Availability of OSDs: CephOSDDiskNotResponding, CephOSDDiskUnavailable
  - Capacity: CephOSDCriticallyFull, CephOSDNearFull
  - Data recovery and self healing: CephDataRecoveryTakingTooLong, CephPGRepairTakingTooLong

# Monitoring Multicloud Object Gateway

## Introduction

- Based on the NooBaa project, which was acquired by Red Hat in November 2018
- Object interface with an S3 compatible API
- Multiple backing stores can be added and mirroring policies to create hybrid data buckets and multi-cloud data buckets can be applied
- Cloud-native storage providers and/or on-prem storage providers
- Relevant data is available in Object dashboard

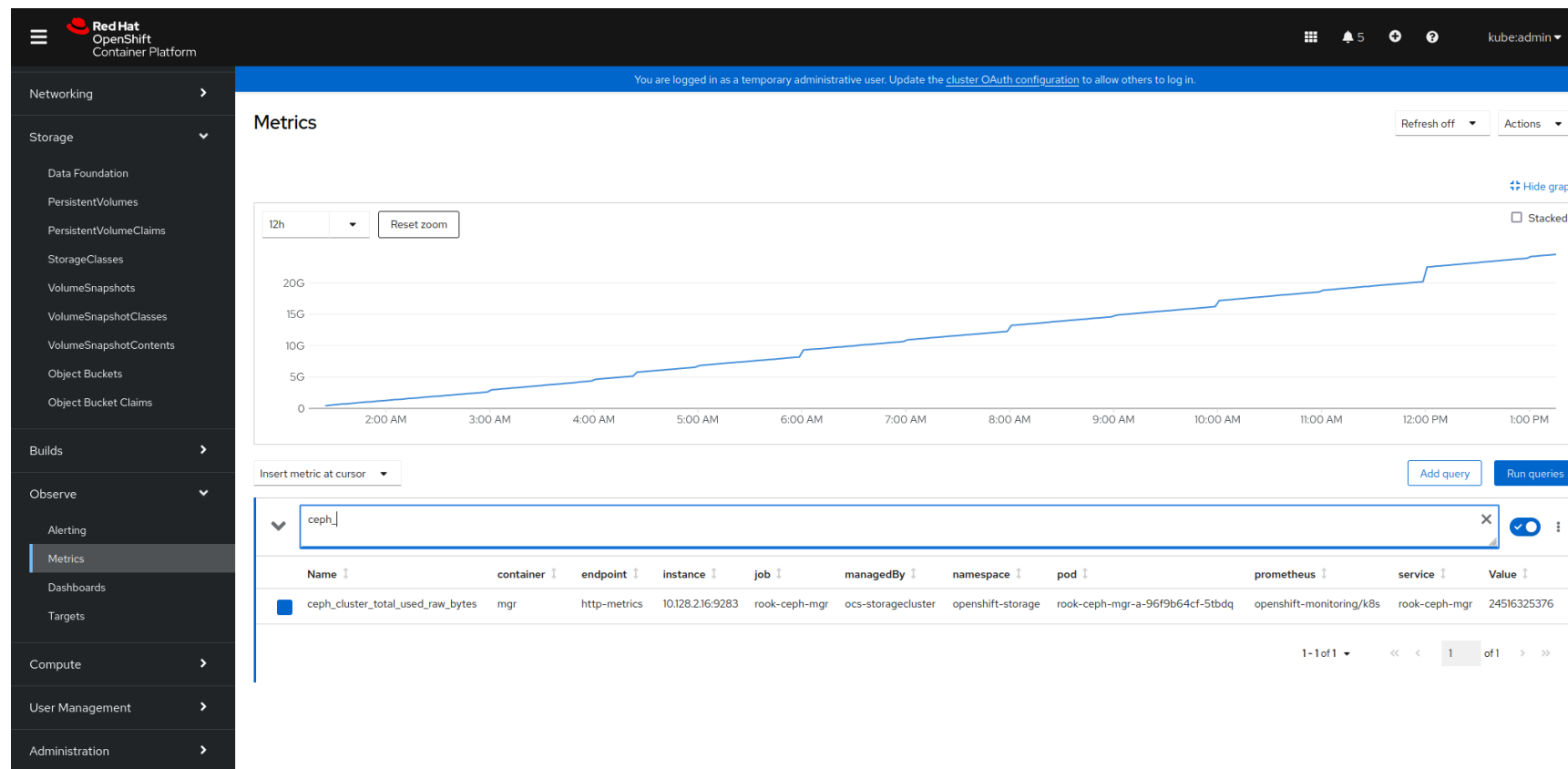
# Monitoring Multicloud Object Gateway

## NooBaa buckets

- Bucket state
  - NooBaaBucketErrorState
- Bucket quota
  - NooBaaBucketExceedingQuotaState
  - NooBaaBucketReachingQuotaState
- Bucket capacity
  - NooBaaBucketLowCapacityState
  - NooBaaBucketNoCapacityState,

# ODF Dashboards

## OpenShift Metrics



# Resources

- Configuring and using the monitoring stack in OpenShift Container Platform
  - [https://access.redhat.com/documentation/en-us/openshift\\_container\\_platform/4.11/html/monitoring/managing-alerts](https://access.redhat.com/documentation/en-us/openshift_container_platform/4.11/html/monitoring/managing-alerts)
- Monitoring OpenShift Data Foundation
  - [https://access.redhat.com/documentation/en-us/red\\_hat\\_openshift\\_data\\_foundation/4.11/html-single/monitoring\\_openshift\\_data\\_foundation](https://access.redhat.com/documentation/en-us/red_hat_openshift_data_foundation/4.11/html-single/monitoring_openshift_data_foundation)
- Troubleshooting alerts and errors in OpenShift Data Foundation
  - [https://access.redhat.com/documentation/en-us/red\\_hat\\_openshift\\_data\\_foundation/4.11/html-single/troubleshooting\\_openshift\\_data\\_foundation/index#troubleshooting-alerts-and-errors-in-openshift-data-foundation](https://access.redhat.com/documentation/en-us/red_hat_openshift_data_foundation/4.11/html-single/troubleshooting_openshift_data_foundation/index#troubleshooting-alerts-and-errors-in-openshift-data-foundation)

# Thank you

