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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)

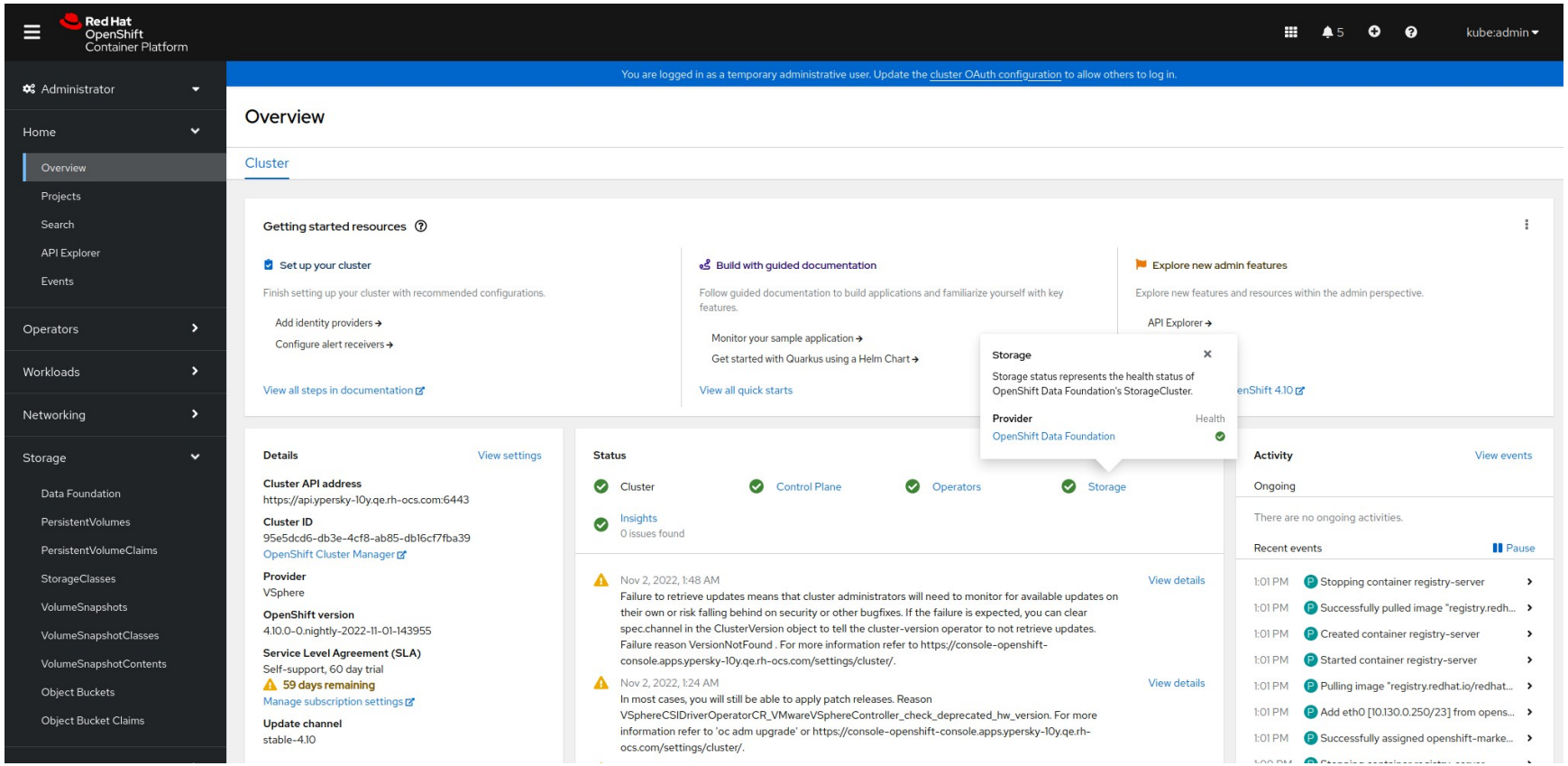
Red Hat OpenShift monitoring

What is available for users

- Dashboards
- Alerts
- Metrics

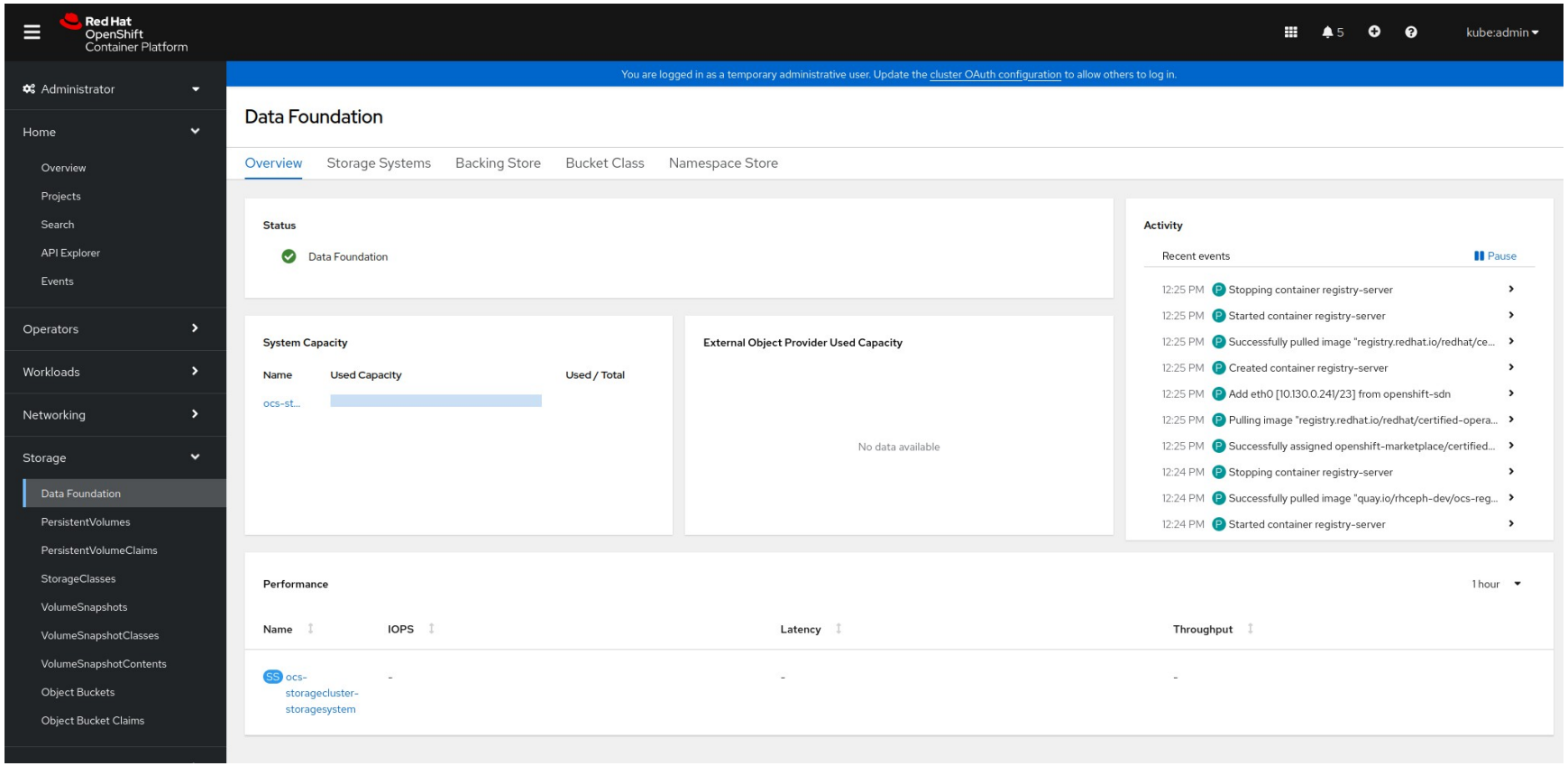
ODF Dashboards

Cluster Overview



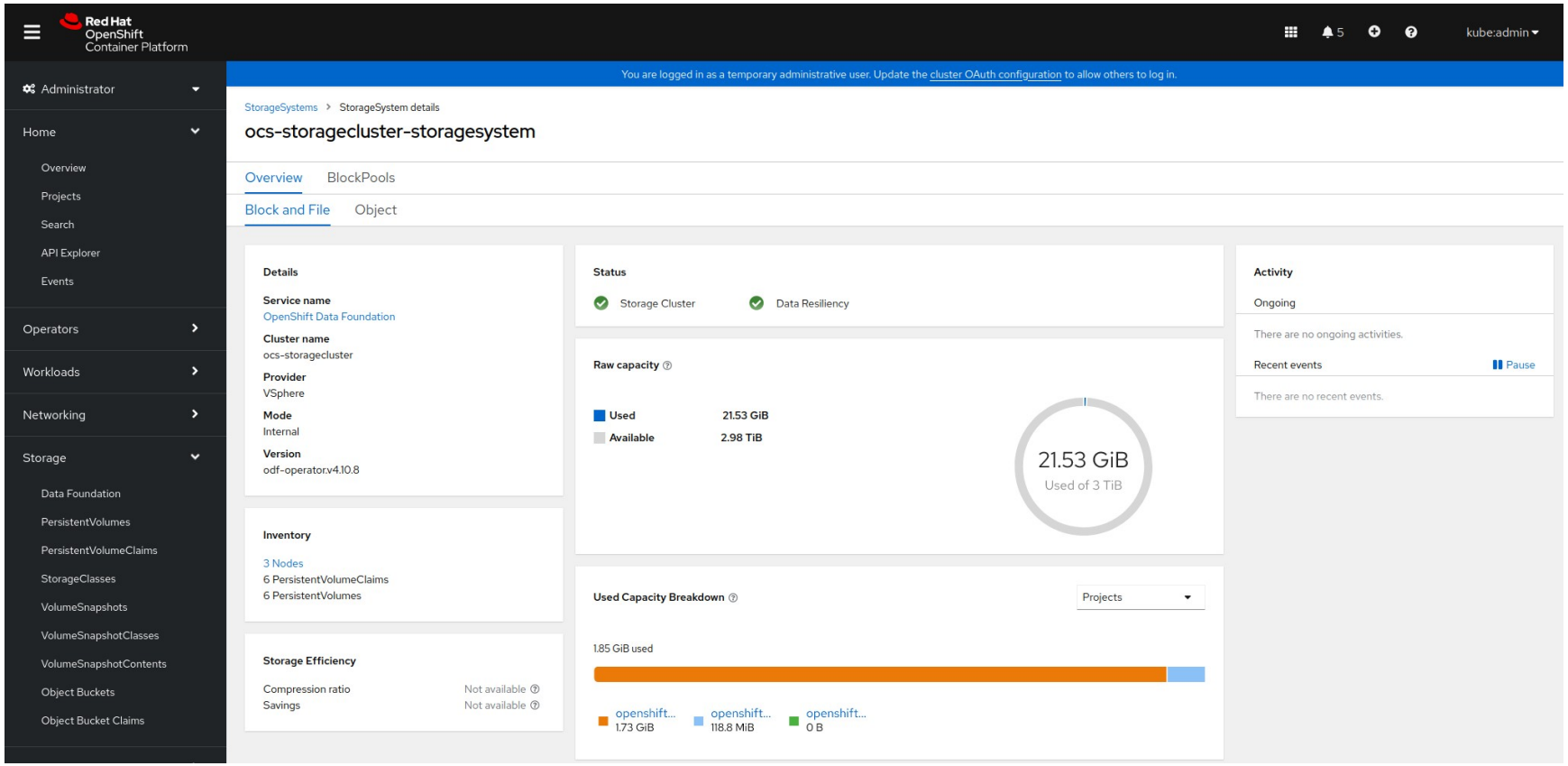
ODF Dashboards

Data Foundation Overview



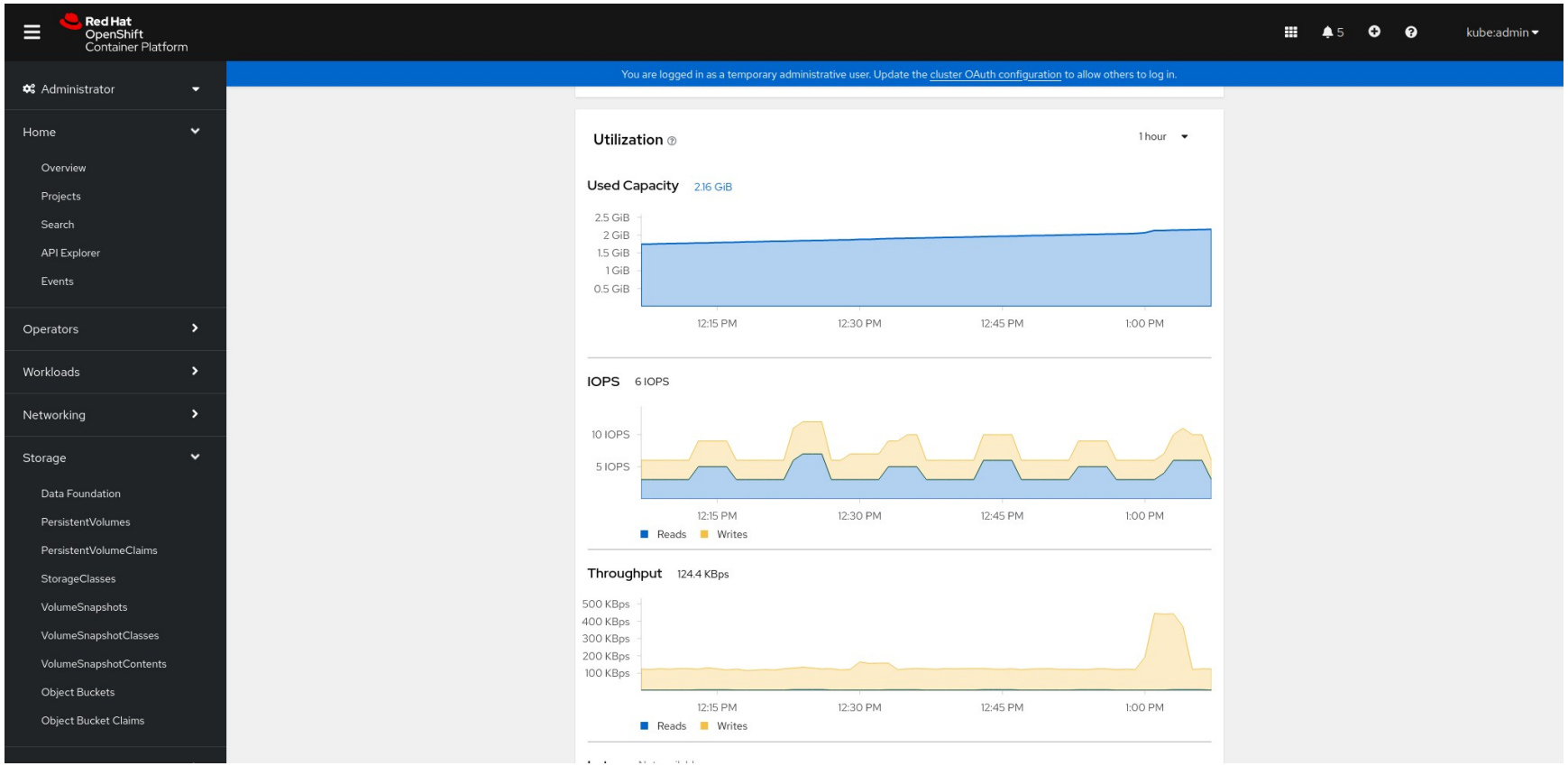
ODF Dashboards

Block and File dashboard 1/3



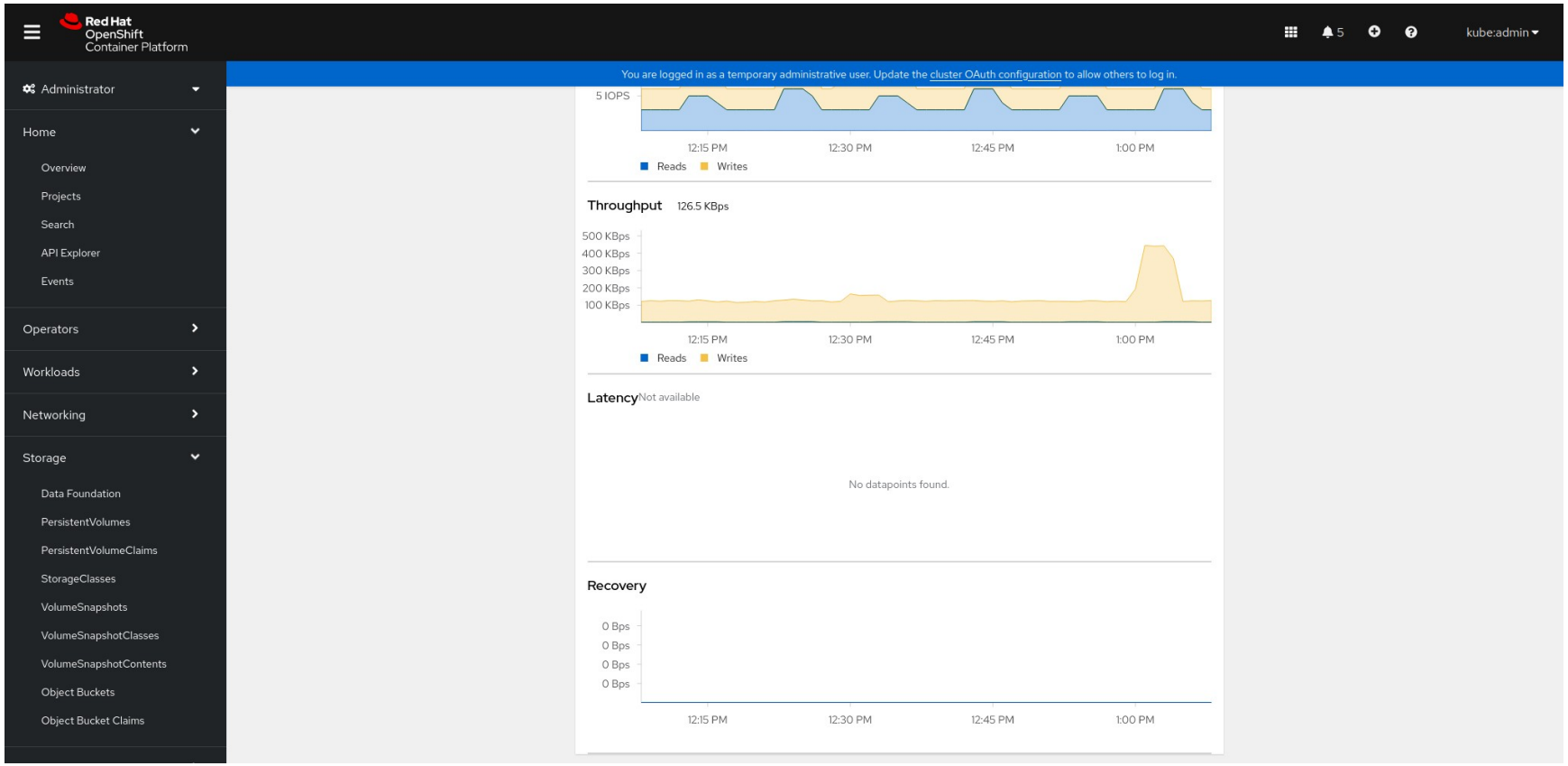
ODF Dashboards

Block and File dashboard 2/3



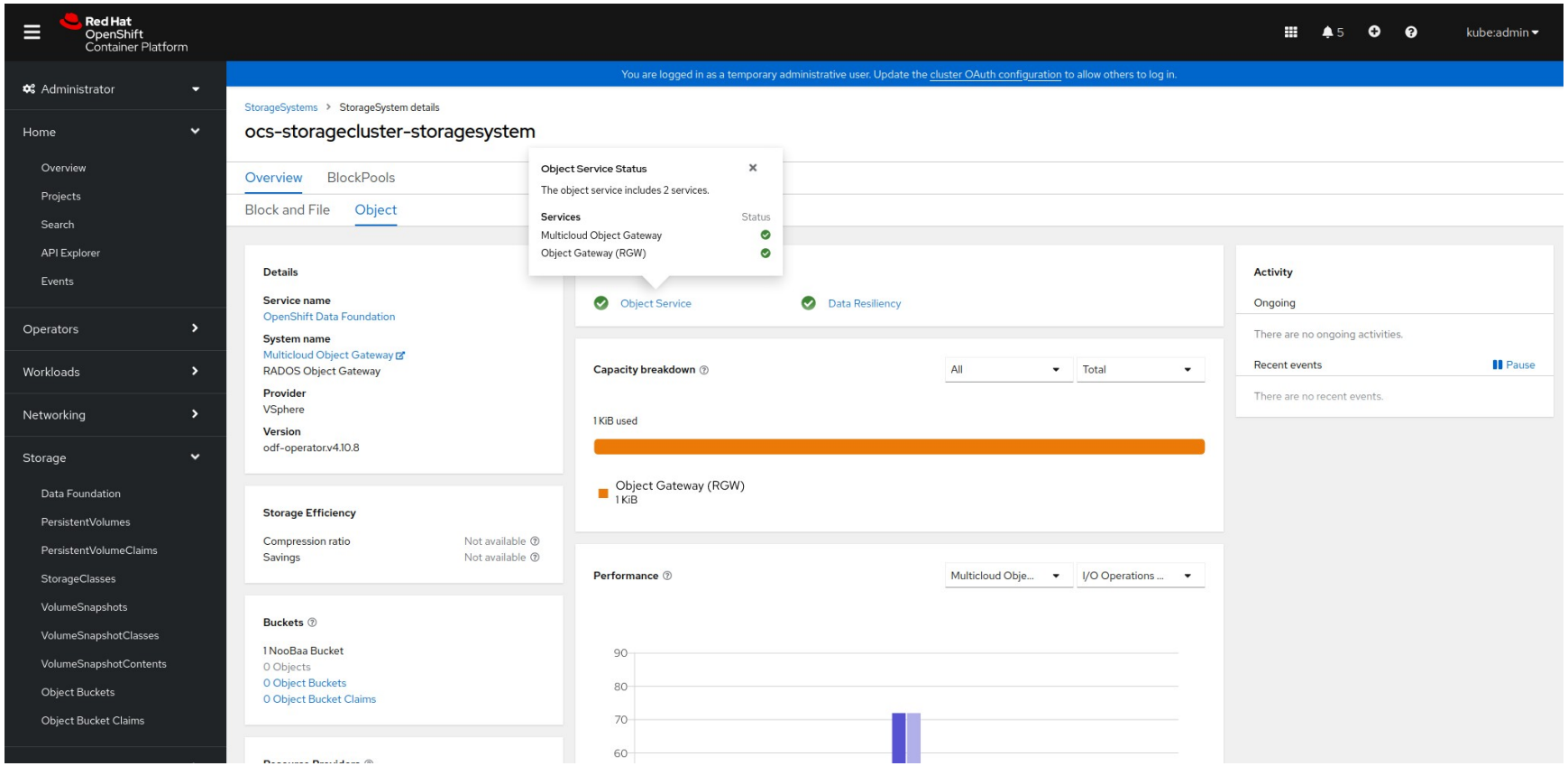
ODF Dashboards

Block and File dashboard 3/3



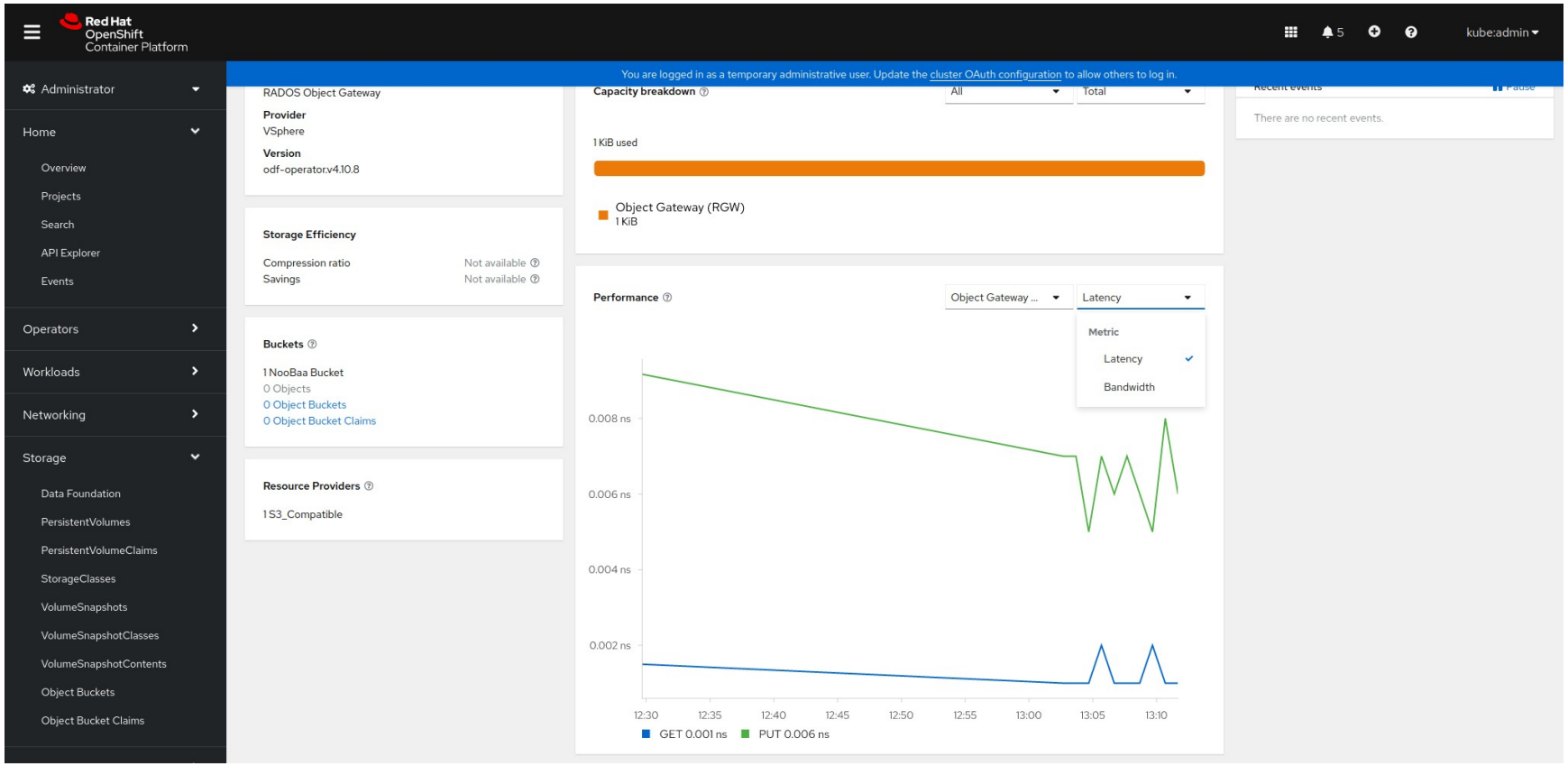
ODF Dashboards

Object dashboard 1/2



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

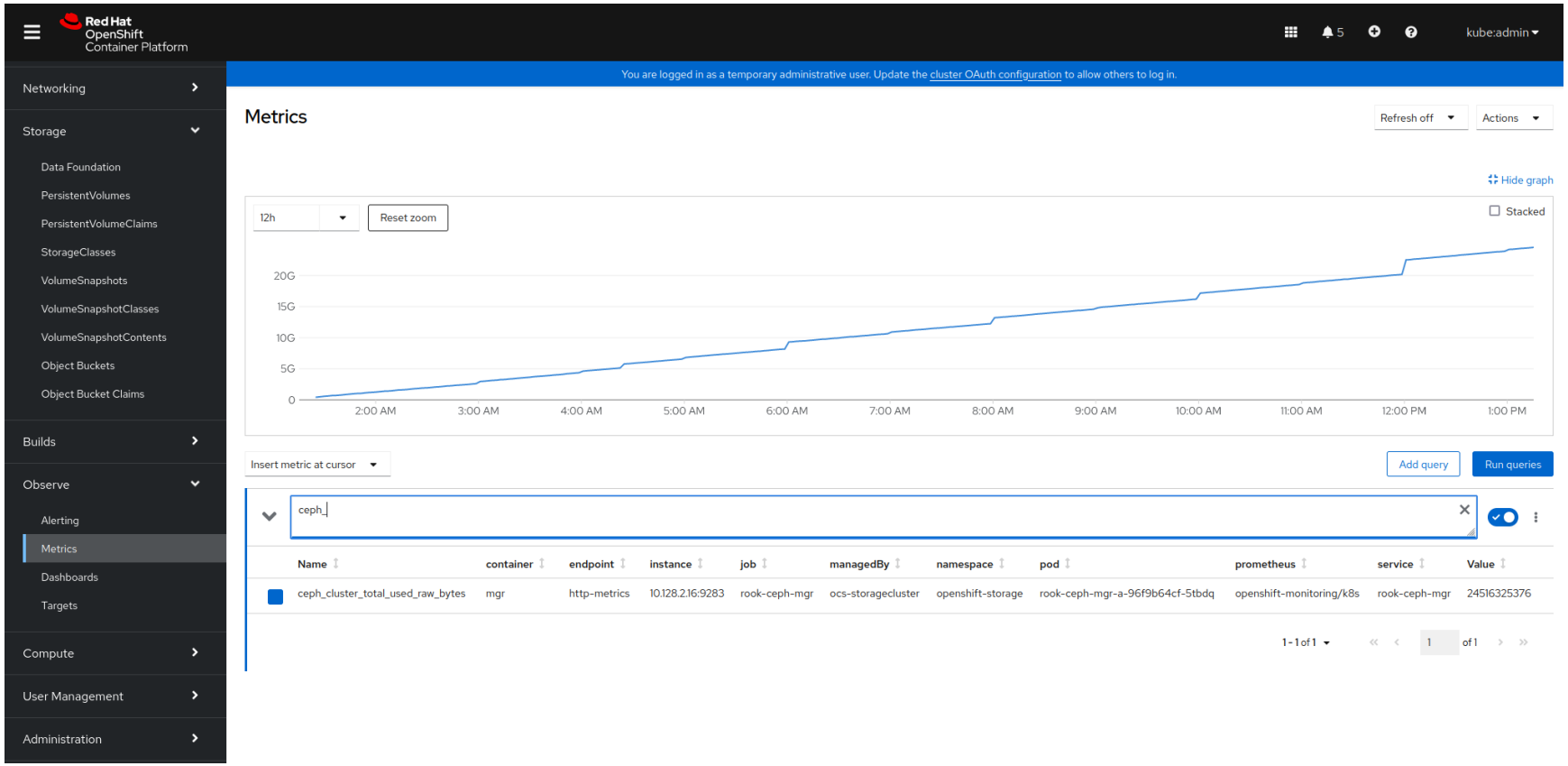
Monitoring Multicloud Object Gateway

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
- 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

Thank you