



Red Hat Gluster Storage 3.3

Monitoring Guide

Monitoring Gluster Cluster

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Abstract

This guide provides essential information on how to import a Gluster cluster using Red Hat Gluster Storage Web Administration and how to monitor your Gluster cluster health, performance, and status. The monitoring and metrics visualization is provided by the Grafana monitoring platform which is integrated into the Web Administration interface.

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CHAPTER 1. OVERVIEW

Red Hat Gluster Storage Web Administration provides visual monitoring and metrics infrastructure for Red Hat Gluster Storage 3.3.1 and is the primary method to monitor your Red Hat Gluster Storage environment. The Red Hat Gluster Storage Web Administration is based on the Tendrl upstream project and utilizes Ansible automation for installation. The key goal of Red Hat Gluster Storage Web Administration is to provide deep metrics and visualization of Red Hat Storage Gluster clusters and the associated physical storage elements such as storage nodes, volumes, and bricks.

Key Features

1. Monitoring dashboards for Clusters, Hosts, Volumes, and Bricks
2. Top-level list views of Clusters, Hosts, and Volumes
3. SNMPv3 Configuration and alerting
4. User Management
5. Importing Gluster cluster

CHAPTER 2. IMPORT CLUSTER

2.1. IMPORTING CLUSTER

The following procedure outlines the steps to import a Gluster cluster.

Procedure. Importing Cluster

1. Log in the Web Administration interface.

Figure 2.1. Login Page

2. In the default landing interface of the Web Administration, click **Import Cluster**.

Figure 2.2. Import Cluster

1 Cluster

	Cluster Version	Managed	Volume Profiling	
> ? 2a2158e5-8b96-415e-84df-e4ee9caa30b9	gluster 3.8.4	No	Disabled	Import
	Ready to Import			


3. The available hosts are listed. By default, Volume profiling is enabled. Click **Import** to continue.

Figure 2.3. Available Hosts

Host	Cluster Version	Role
ci-usb4-gl1.usmqe.lab.eng.blr.redhat...	gluster 3.8.4	Gluster Peer
ci-usb4-gl2.usmqe.lab.eng.blr.redhat...	gluster 3.8.4	Gluster Peer
ci-usb4-gl3.usmqe.lab.eng.blr.redhat...	gluster 3.8.4	Gluster Peer
ci-usb4-gl4.usmqe.lab.eng.blr.redhat...	gluster 3.8.4	Gluster Peer
ci-usb4-gl5.usmqe.lab.eng.blr.redhat...	gluster 3.8.4	Gluster Peer
ci-usb4-gl6.usmqe.lab.eng.blr.redhat...	gluster 3.8.4	Gluster Peer

Import Cancel

- The cluster import request is submitted. To view the task progress, click **View Task Progress**.

Figure 2.4. Import Cluster Submitted



Import Cluster Task Submitted

An import cluster task has been submitted. You will be notified when processing is complete and the cluster is ready for use.

Close
View Task Progress

- The import cluster task is completed.

Figure 2.5. Task Detail

	ImportCluster <small>Task ID: a4f79a9b-6de5-4a02-9702-29d3bafb192f</small>	Submitted	Completed	Details
		22 Nov 2017 16:36:00	22 Nov 2017 16:36:04	


- Navigate to the Clusters tab. The Cluster is successfully imported and ready for use.

Figure 2.6. Cluster Ready

Name ▾

Name ▾ ↓↑

1 Cluster

		Cluster Version	Managed	Volume Profiling	
> 	2a2158e5-8b96-415e-84df-e4ee9caa30b9	gluster 3.8.4	Yes	Enabled	Details Dashboard Disable Profiling
	<small>Ready to Use</small>				

**IMPORTANT**

Before initiating Web Administration installation using tendrl-ansible, it is highly recommended to create the Gluster Cluster to be imported first in the absence of an existing one. If the Gluster cluster is created after installation of Web Administration, the cluster import operation may fail. In case of Web Administration manual installation, create the Gluster cluster first and then subsequently install the tendrl-node-agent to avoid cluster import failure.

2.1.1. Volume Profiling

Volume profiling enables additional telemetry information to be collected on a per volume basis for a given cluster, which helps in troubleshooting, capacity planning, and performance tuning.

Volume profiling can be enabled or disabled on a per cluster basis when a cluster is actively managed and monitored using the Web Administration interface.

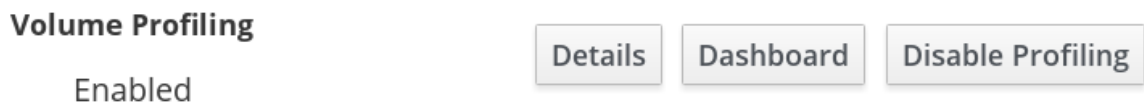
Note: Enabling volume profiling results in richer set of metrics being collected which may cause performance degradation to occur as system resources, for example, CPU and memory, may get used for volume profiling data collection.

Volume profiling is enabled by default and is seen on the Discovered Hosts interface after clicking the Import Cluster button.

To disable Volume Profiling after the cluster is imported, following these instructions:

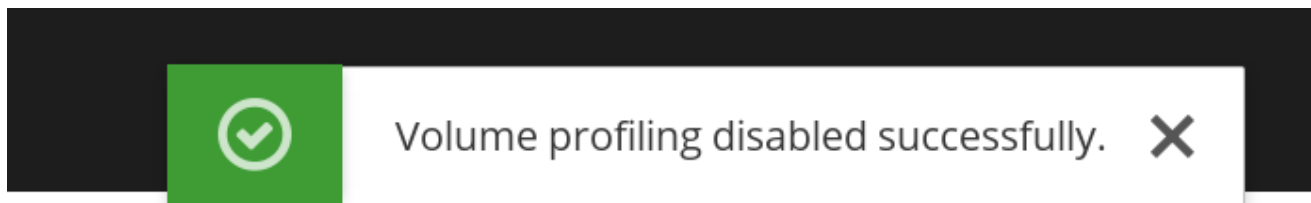
1. Navigate to the Clusters menu from the navigation pane and locate the Cluster. At the right-hand side, click **Disable Profiling**.

Figure 2.7. Disable Volume Profiling



2. A notification appears confirming Volume Profiling is successfully disabled.

Figure 2.8. Volume Profiling Disabled



CHAPTER 3. CLUSTER EXPANSION

To expand an existing Gluster cluster already imported and managed by the Web Administration environment, perform the following sequence of actions:

1. Unmanage the existing cluster from Web Administration.
2. Expand the Gluster storage nodes.
3. Install the Web Administration components via `tendr1-ansible`.
4. Reimport the cluster in the Web Administration environment.

3.1. UNMANAGING CLUSTER



WARNING

For all the clusters that are currently managed by Web Administration, un-managing one cluster will result in all the clusters being un-managed. You will have to re-import any cluster that is required.

Unmanage a cluster from Web Administration

1. Stop and uninstall all `tendr1-*` services and `collectd` on the storage nodes monitored by Web Administration. See [Commands for Stopping Tendr1 Services](#) section for the commands required to stop the services.
2. Stop all `tendr1-*` and related services like Grafana or Graphite on Tendr1 server. See [Commands for Stopping Tendr1 Services](#) section for the commands required to stop the services.
3. Backup and delete data directories from the Web Administration server for Graphite and Carbon services to ensure stale metrics do not persist. See [Commands for Deleting Database Files](#) section for the commands required to remove database files.
4. Backup and uninstall Etcd from Web Administration server and delete all data from etcd. See [Commands for Deleting Database Files](#) section for the commands required to remove database files.



NOTE

Delete the `etcd %data_dir` from all members of the etcd cluster. For more details, see [Data Directory Lifecycle](#) documentation.

3.1.1. Commands for Stopping Tendr1 Services

Stopping Services on Storage Nodes

Run the following commands to stop individual services on the Storage Nodes:

To stop the `tendr1-node-agent` service:

```
# service tendrl-node-agent stop
```

To stop the collectd service:

```
# service collectd stop
```

To stop the tendrl-gluster-integration service:

```
# service tendrl-gluster-integration stop
```

Stopping services on Tendrl server

Run the following commands to stop individual services on the Tendrl server.

To stop the etcd service:

```
# service etcd stop
```

To stop the tendrl-monitoring-integration service:

```
# service tendrl-monitoring-integration stop
```

To stop the tendrl-api service:

```
# service tendrl-api stop
```

To stop the tendrl-notifier service:

```
# service tendrl-notifier stop
```

To stop the carbon-cache service:

```
# service carbon-cache stop
```

To stop the grafana-server service:

```
# service grafana-server stop
```

To stop the tendrl-node-agent service:

```
# service tendrl-node-agent stop
```

3.1.2. Commands for Deleting Database Files

The default paths mentioned here are for Etcd, Carbon and Grafana and are not for Tendrl services. The **data_dir** can be set to any directory as part of their configuration. Please ensure to remove the **data_dir** from the correct path.

Commands for Removing the database files from Server Node:

To remove Etcd files:

■

```
# rm -rf /var/lib/etcd/*
```

To remove Carbon files which will remove the monitoring data:

```
# rm -rf /var/lib/carbon/whisper/*
```

To remove Grafana files:

```
# rm -rf /var/lib/grafana/grafana.db
```

3.2. EXPANDING STORAGE NODES

To expand the cluster, see the [Expanding Volumes](#) section in the *Red Hat Gluster Storage Administration Guide*.

1. After the cluster is expanded, install Web Administration. For detailed installation instructions, see the [Installing Web Administration](#) chapter in the *Red Hat Gluster Storage Web Administration Quick Start Guide*.
2. Start the following services on the Storage nodes:
To start the tendrl-node-agent service:

```
# service tendrl-node-agent start
```

To start the collectd service:

```
# service collectd start
```

3.3. REIMPORTING CLUSTER

Once the services are started, import the cluster in Web Administration. For instructions on importing cluster, see the [Import Cluster](#) chapter of this Guide.

CHAPTER 4. MONITORING AND METRICS

Gluster Web Administration provides deep metrics and visualization of Gluster clusters, the physical server nodes and the storage elements (disks) through the Grafana open-source monitoring platform.

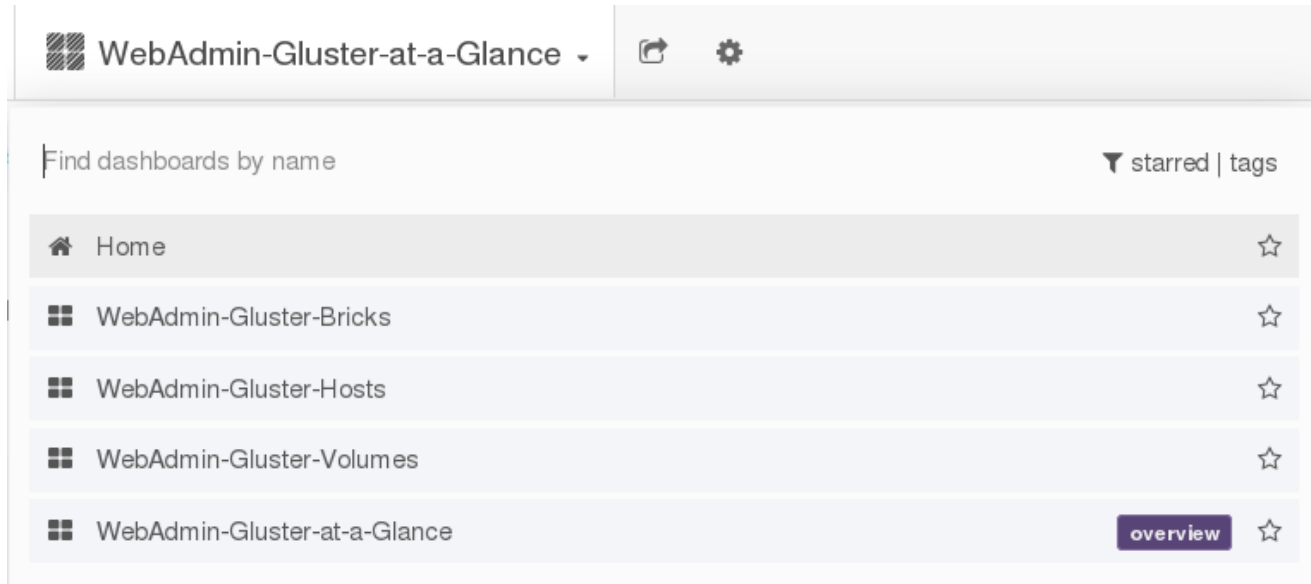
CHAPTER 5. MONITORING DASHBOARD AND CONCEPTS

The Monitoring Dashboard provides high level visual information on health, performance and utilization of cluster wide resources.

5.1. DASHBOARD SELECTOR

The Dashboard Selector is the primary navigation tool to move between different dashboards.

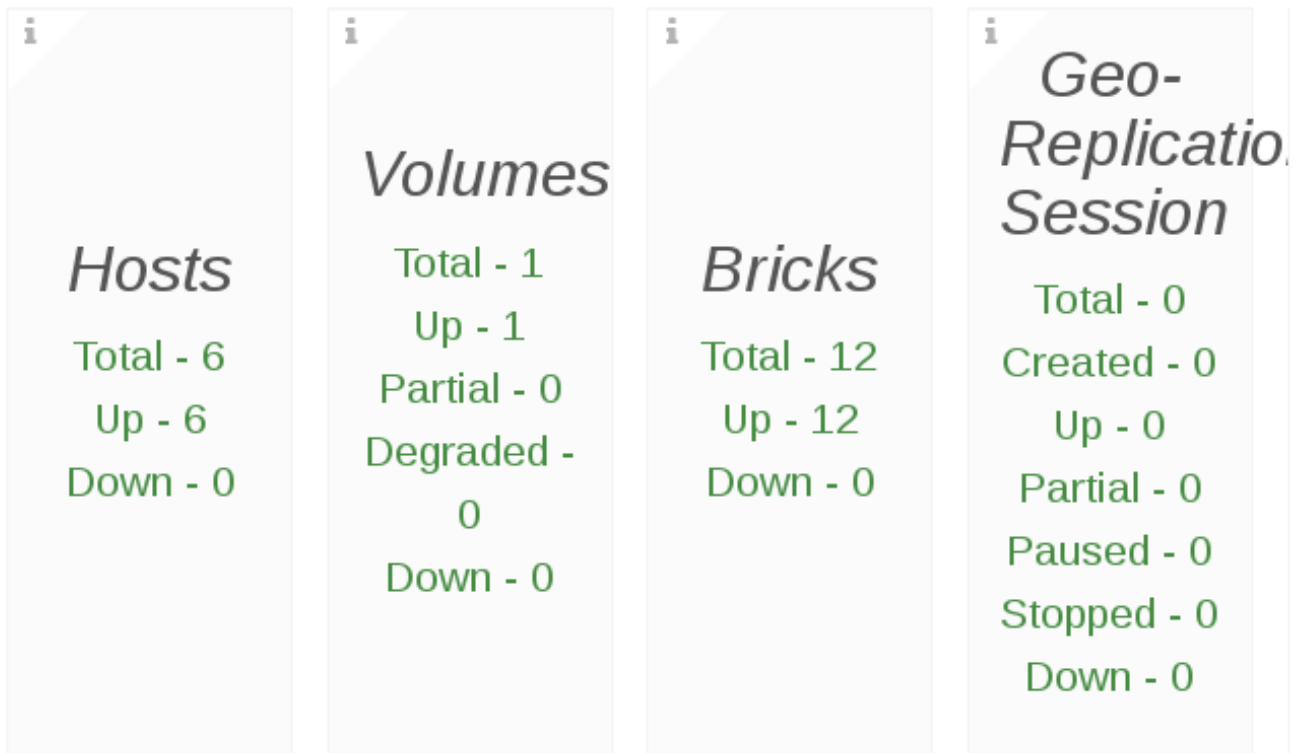
Figure 5.1. Dashboard Selector



5.2. DASHBOARD PANELS

The Dashboard is composed of individual visualization blocks displaying different metrics and statistics termed as Panels. The panels exhibit different colors based on the current status of the metrics. Panels can be dragged and dropped and rearranged on the Dashboard.

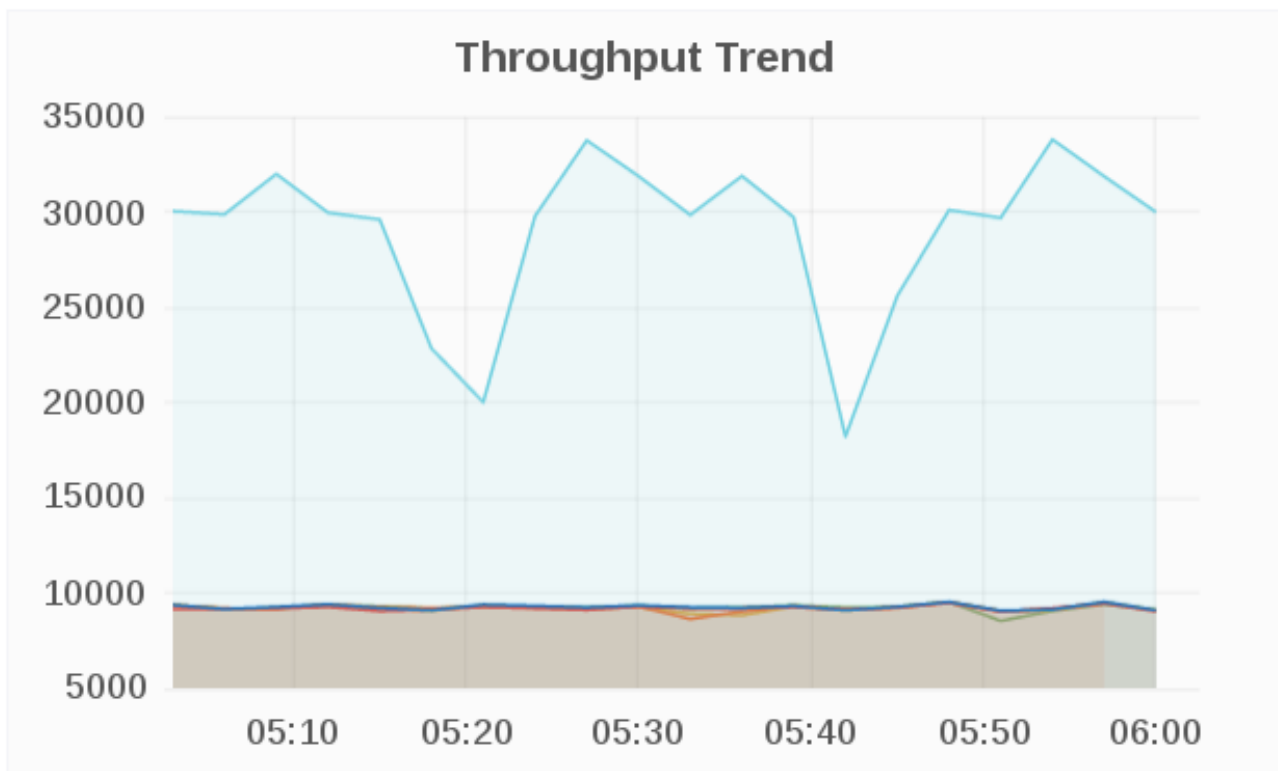
Figure 5.2. Dashboard Panels



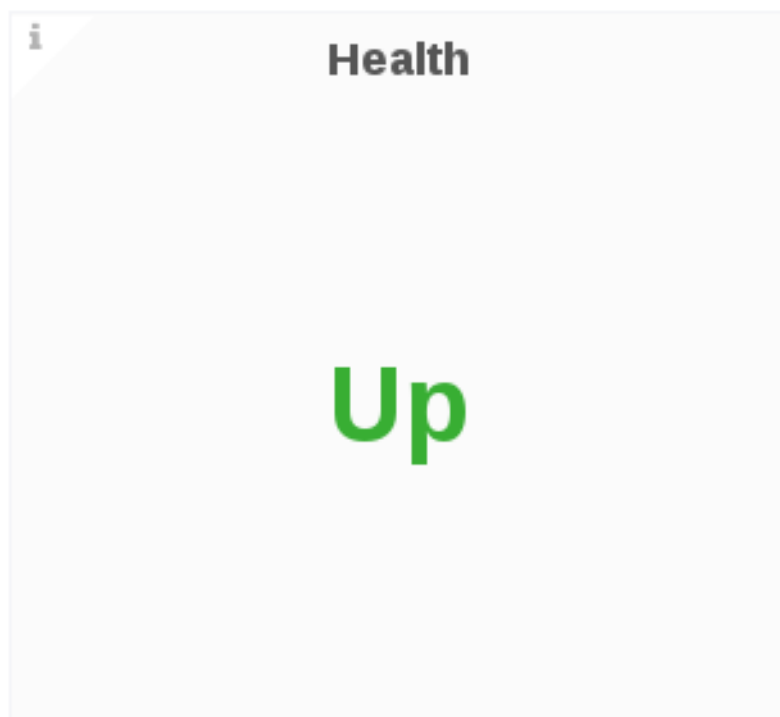
There are following types of panels available to visualize monitoring data:

- **Graph:** The Graph panel allows to visualize unrestrained amounts of metrics. The Connection Trend and the Throughput Trend are examples of Graph panel.

Figure 5.3. Graph Panel Example



- **Singlestat:** The Singlestat panel displays the aggregated value of a series in a single number data. For example, the Health, volume, snapshots are Singlestat panels.

Figure 5.4. Singestat Panel Example

5.3. DASHBOARD ROWS

A row is a logical divider in a given Dashboard. The panels of the dashboard are arranged and organized in rows to give a streamlined look and visual.

5.4. DASHBOARD COLOR CODES

The Dashboard panels text displays the following color codes to represent health status information:

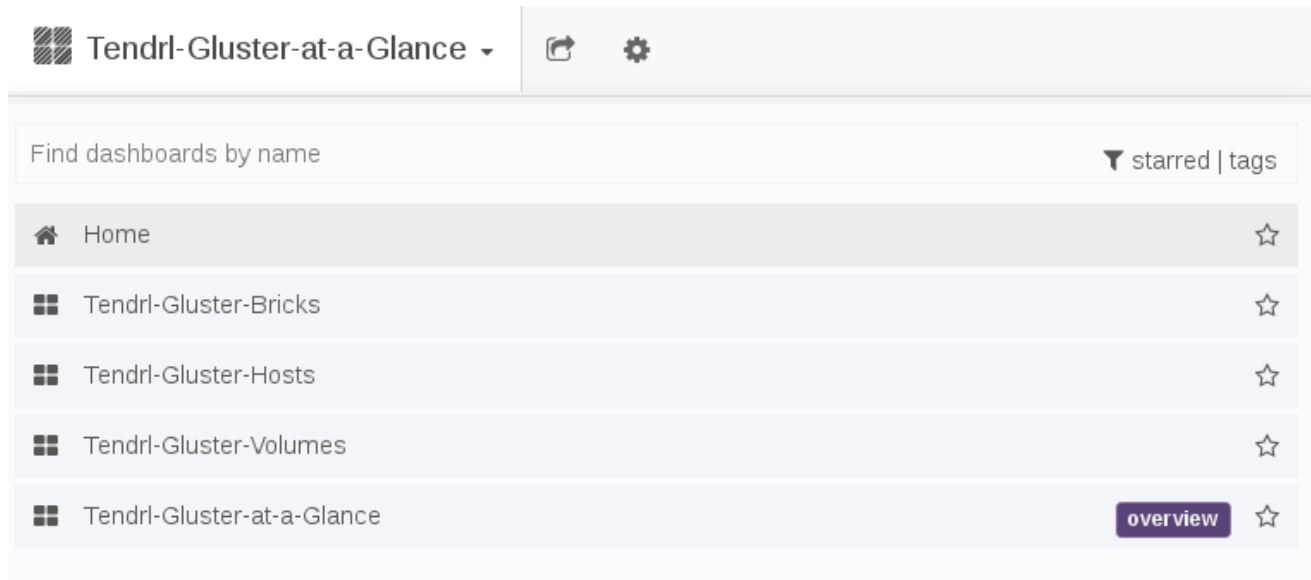
- **Green:** Healthy
- **Orange:** Degraded
- **Red:** Unhealthy, Down, or Unavailable

CHAPTER 6. MONITORING DASHBOARD FEATURES

6.1. DASHBOARD SEARCH

You can search the available dashboards by the dashboard name. The available filters to search a particular dashboard are starred and tags. The dashboard search functionality is accessed through the dashboard selector, located at the top of the Grafana interface.

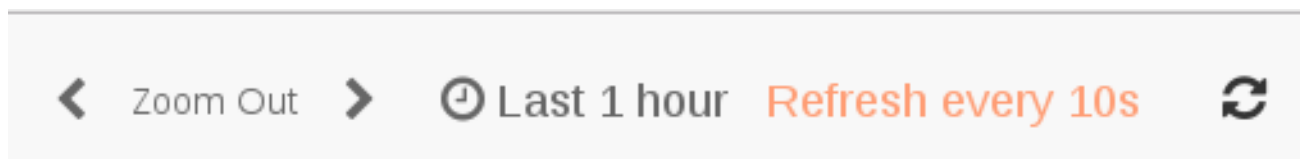
Figure 6.1. Dashboard Search



6.2. DASHBOARD TIME RANGE

The Grafana interface provides time range management of the the data being visualized. You can change the time range for a graph to view the data at different points in time

At the top right, you can access the master Dashboard time picker. It shows the current selected time range and the refresh interval.



Clicking the master Dashboard time picker, toggles a menu for time range controls.



Time range

The time range filter allows to mix both explicit and relative time ranges. The explicit time range format is **YYYY-MM-DD HH:MM:SS**.

Quick Range

Quick ranges are preset values to choose a relative time.

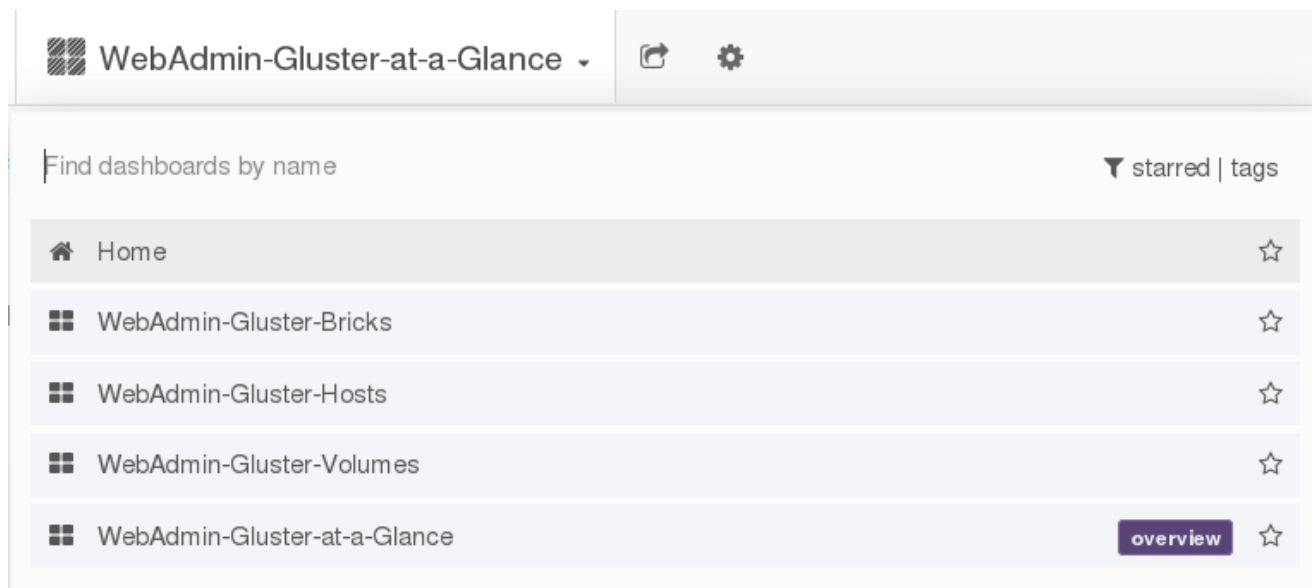
Refreshing every

When enabled, auto-refresh will reload the dashboard at the specified time range.

6.3. DASHBOARD SHARING

The Dashboard Selector is the primary navigation tool to move between different dashboards.

Figure 6.2. Dashboard Selector



CHAPTER 7. MONITORING DASHBOARD NAVIGATION

To access the Monitoring Dashboard, follow these steps:

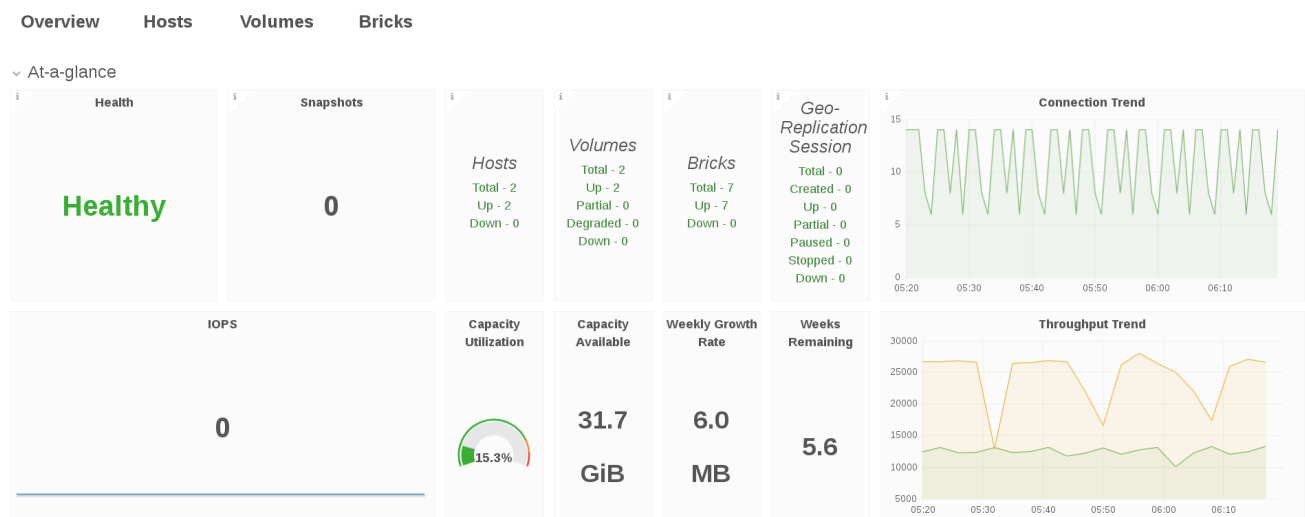
1. Log in to the Web Administration interface at <http://web-admin-server.example.com>.
2. In the default Cluster view, locate the cluster and click **Launch Dashboard**.
3. The Cluster dashboard showing the aggregated metrics view is opened in a new window.

7.1. CLUSTER VIEW DASHBOARD

The Cluster view dashboard allows the Gluster Administrator to:

- View at-a-glance information about the Gluster cluster that includes health and status information, key performance indicators such as IOPS, throughput, etc, and alerts that can highlight attention to potential issues in the cluster, host, volume, and brick.
- Compare a metric such as IOPS, CPU, Memory, Network Load across hosts within the cluster.
- Compare utilization across bricks within a volume, for example, IOPS, capacity, etc.

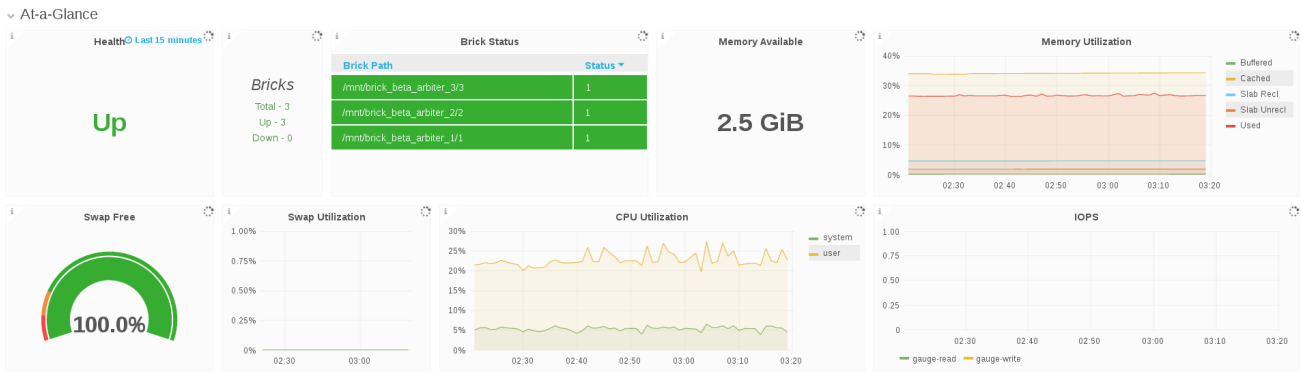
Figure 7.1. Cluster View Dashboard



7.2. HOSTS VIEW DASHBOARD

The Host view Dashboard allows the Gluster Administrator to:

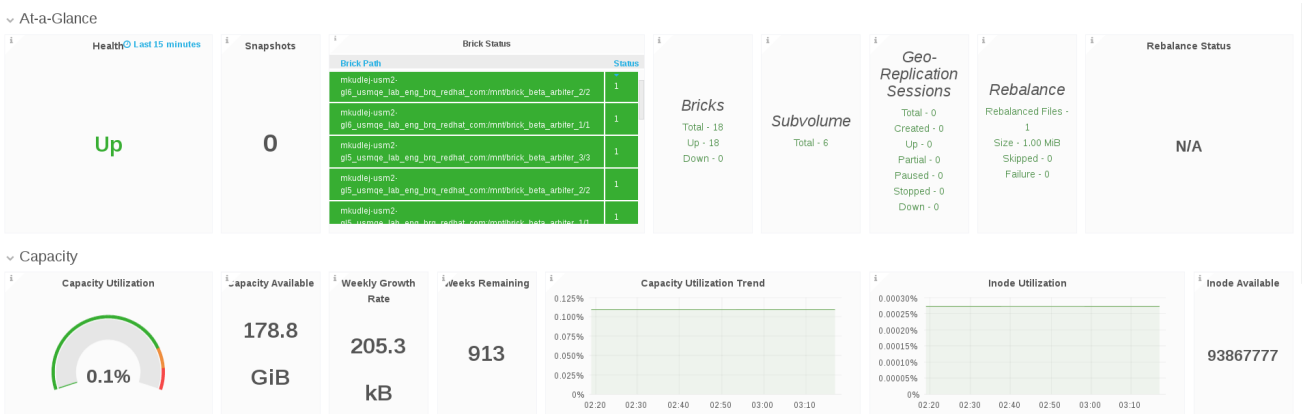
- View at-a-glance information about the Gluster host that includes health and status information, key performance indicators such as IOPS, throughput, etc and alerts that highlights attention to potential issues in the host, volume, brick, and disk.
- Compare one or more metrics such as IOPS, CPU, Memory, Network Load across bricks within the host.
- Compare utilization such as IOPS, capacity, etc across bricks within a host.



7.3. VOLUME VIEW DASHBOARD

The Volume view Dashboard allows the Gluster Administrator to:

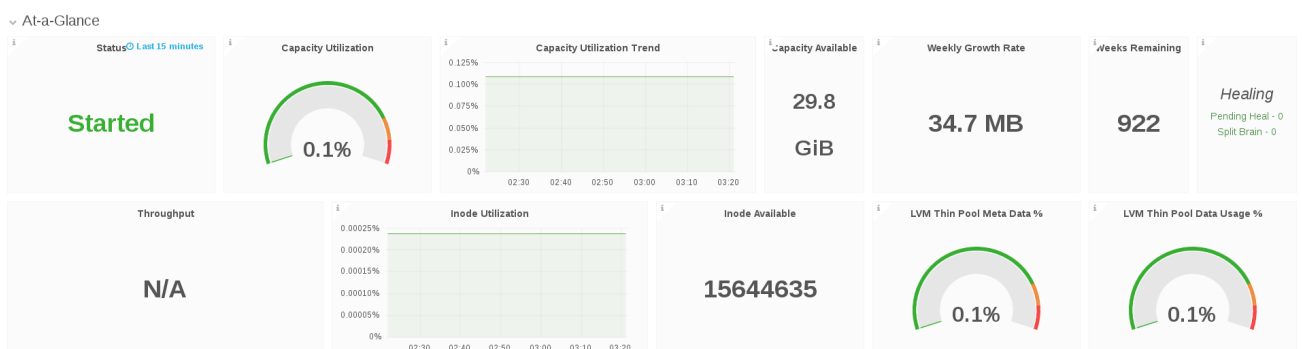
- View at-a-glance information about the Gluster Volume that includes health and status information, key performance indicators that highlights attention to potential issues in the volume, brick, and disk.



7.4. BRICK VIEW DASHBOARD

The Brick view dashboard allows the Gluster Administrator to:

- View at-a-glance information about the Gluster brick that includes health and status information, key performance indicators such as IOPS, throughput, latency, etc and alerts that can highlight attention to potential issues in the brick and underlying disks.
- Look at performance by brick to address diagnosing of RAID 6 disk failure/rebuild/degradation poor performance on one brick.



CHAPTER 8. MONITORING CLUSTER METRICS

8.1. CLUSTER LEVEL DASHBOARD

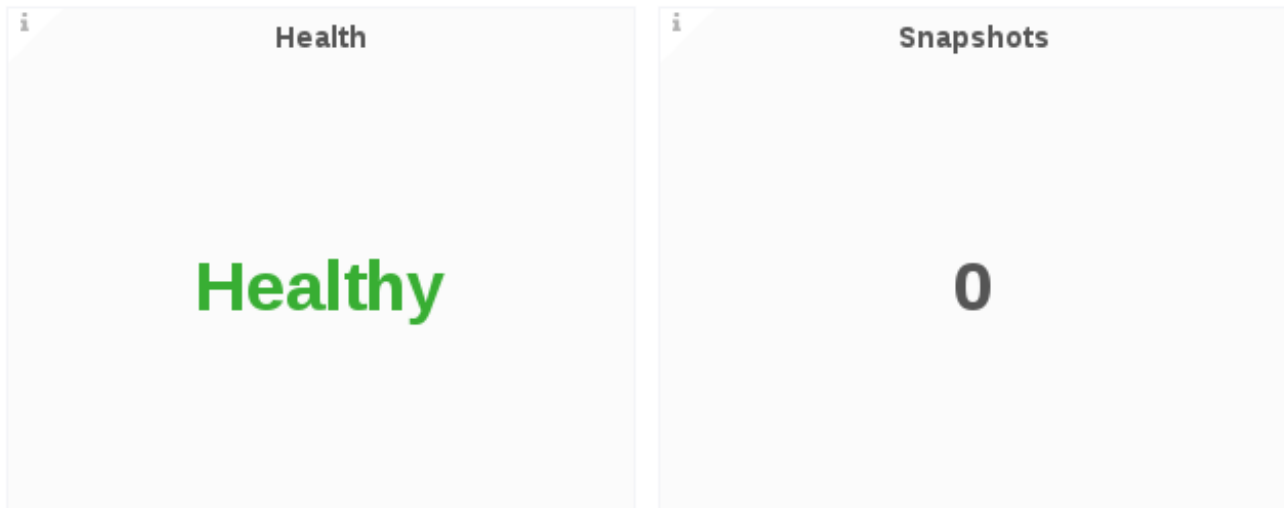
This is the default dashboard of the Monitoring interface that shows the overview of the selected cluster.

8.1.1. Monitoring and Viewing Cluster Health

To monitor the Cluster health status and the metrics associated with it, view the panels in the Cluster Dashboard. For detailed panel descriptions and health indicators, see **Table 7.1. Cluster Health Panel Descriptions**.

8.1.1.1. Health and Snapshots

The **Health** panel displays the overall health of the selected cluster and the **Snapshots** panel shows the active number of snapshots.



8.1.1.2. Hosts, Volumes and Bricks

The Hosts, Volumes, and Bricks panels displays status information. The following is an example screen displaying the respective status information.



- **Hosts:** In total, there are 6 Hosts, out of which 1 is offline.
- **Volumes:** In total, there are zero Volumes
- **Bricks:** In total, there are 12 Bricks, out of which, 2 are offline.

8.1.1.3. Geo-Replication Session

The Geo-Replication Session panel displays geo-replication session information from a given cluster, including the total number of geo-replication session and a count of geo-replication sessions by status.



8.1.1.4. Health Panel Descriptions

The following table lists the Panels and the descriptions.

Table 8.1. Cluster Health Panel Descriptions

Panel	Description	Health Indicator
Health	The Health panel displays the overall health of the selected cluster, which is either Healthy or Unhealthy	Green: Healthy Red: Unhealthy Orange: Degraded
Snapshots	The Snapshots panel displays the count of the active snapshots	
Hosts	The Hosts panel displays host status information including the total number of hosts and a count of hosts by status	
Volume	The Volumes panel displays volume status information for the selected cluster, including the total number of volumes and a count of volumes by status	

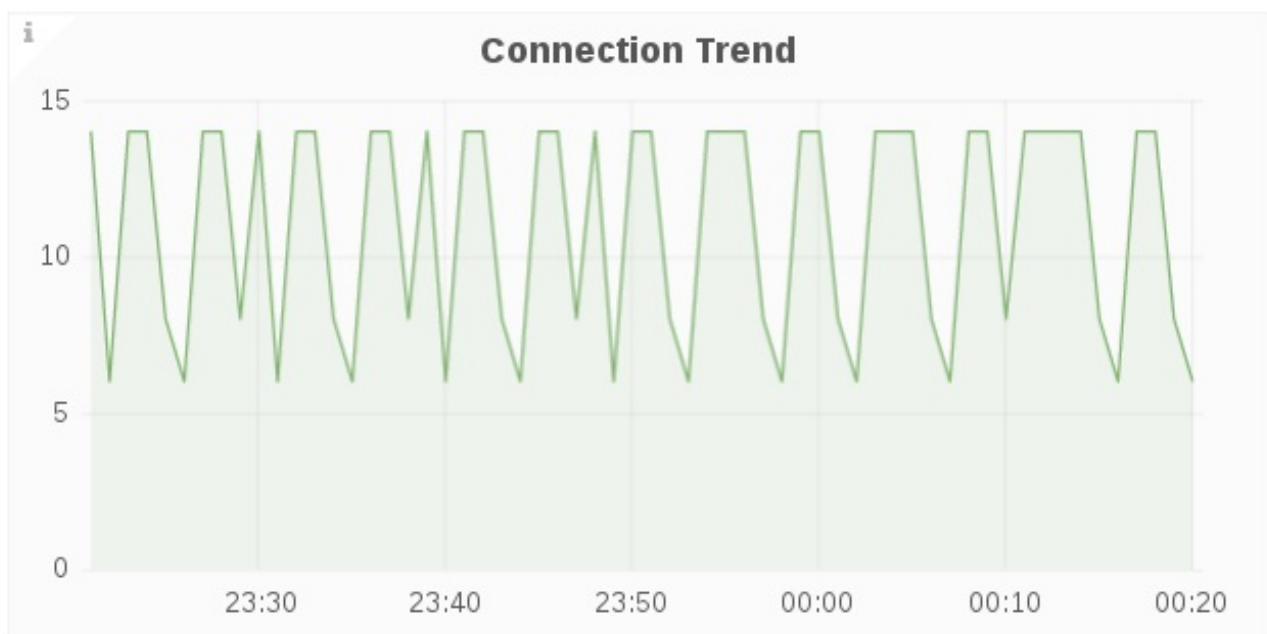
Panel	Description	Health Indicator
Bricks	The Bricks panel displays brick status information for the selected cluster, including the total number of bricks in the cluster, and a count of bricks by status	
Geo-Replication Session	The Geo-Replication Session panel displays geo-replication session information from a given cluster, including the total number of geo-replication session and a count of geo-replication sessions by status	

8.1.2. Monitoring and Viewing Cluster Performance

Cluster performance metrics can be monitored by the data displayed in the following panels.

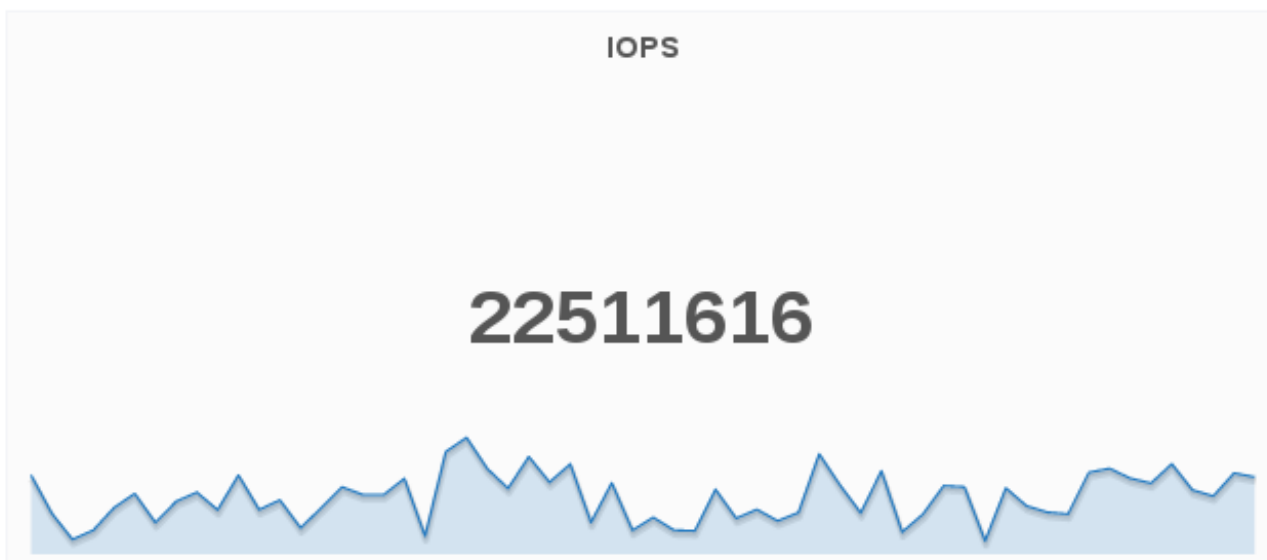
Connection Trend

The Connection Trend panel displays the total number of client connections to bricks in the volumes for the selected cluster over a period of time. Typical statistics may look like this:



IOPS

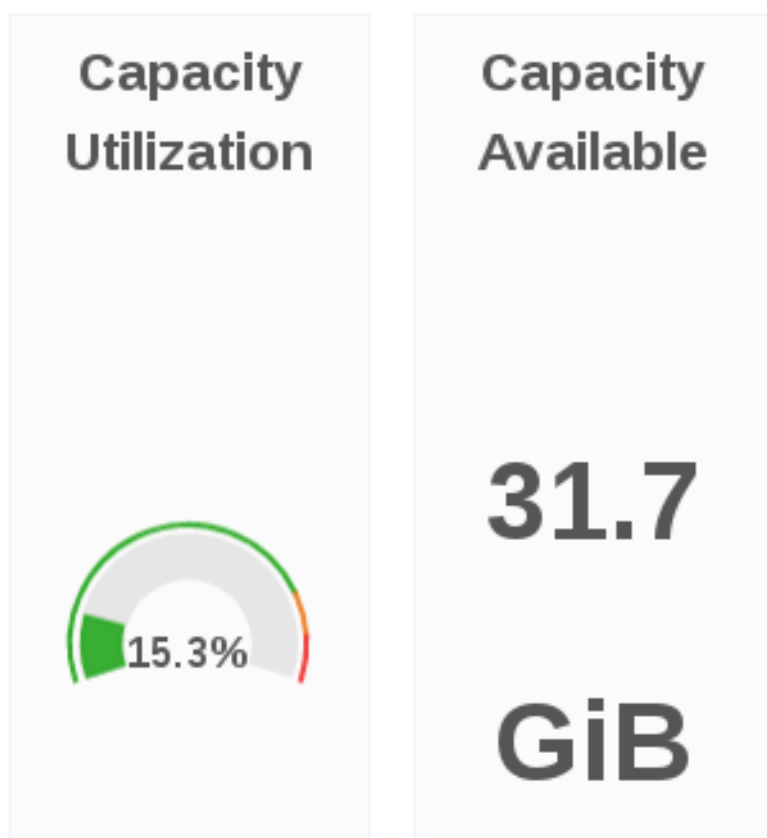
The IOPS panel displays IOPS for the selected cluster over a period of time. IOPS is based on the aggregated brick level read and write operations collected using *gluster volume profile* info.



Capacity Utilization and Capacity Available

The **Capacity Utilization** panel displays the capacity utilized across all volumes for the selected cluster.

The **Capacity Available** panel displays the available capacity across all volumes for the selected cluster.



Weekly Growth Rate

The Weekly Growth Rate panel displays the forecasted weekly growth rate for capacity utilization computed based on daily capacity utilization.

**Weekly
Growth Rate**

6.0

MB

Weeks Remaining

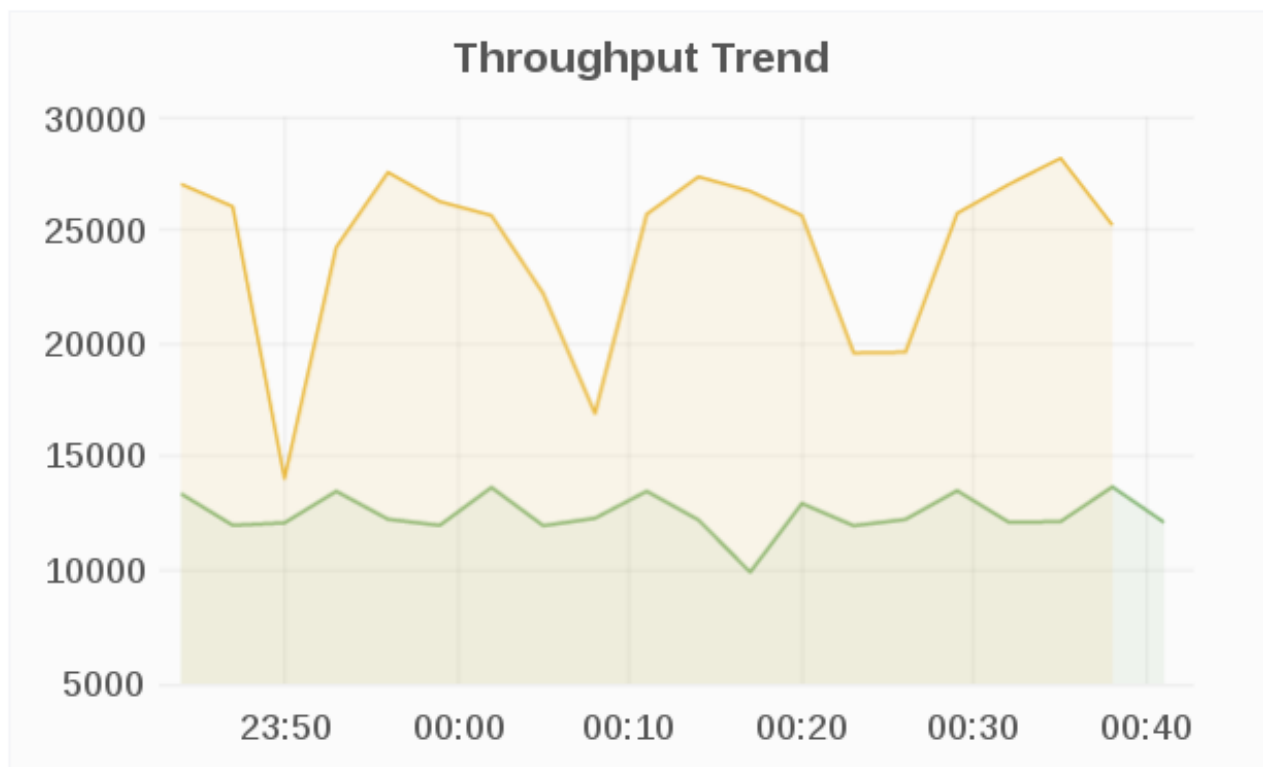
The Weeks Remaining panel displays the estimated time remaining in weeks till volumes reach full capacity based on the forecasted Weekly Growth Rate.

**Weeks 
Remaining**

5.6

Throughput Trend

The Throughput Trend panel displays the network throughput for the selected cluster over a period of time.



8.1.3. Top Consumers

The Top Consumers panels displays the highest capacity utilization by the cluster resources.

To view the top consumers of the cluster:

1. In the Cluster level dashboard, at the bottom, click **Top Consumers** to expand the menu.

> Top Consumers

> Status

Top 5 Utilization By Bricks

The Top 5 Utilization By Bricks panel displays the bricks with the highest capacity utilization.

Top 5 Utilization by Bricks	
Bricks	
_blr_redhat_com:/root/bricks/v2	16.8%
g_blr_redhat_com:/root/bricks/v3	12.4%
g_blr_redhat_com:/root/bricks/v22	12.4%
g_blr_redhat_com:/root/bricks/v2	12.4%

Top 5 Utilization by Volume

The Top 5 Utilization By Volumes panel displays the volumes with the highest capacity utilization.

Top 5 Utilization by Volume	
Volume Name	Utilization ▼
test-v3	16.8%
test-v2	14.6%

CPU Utilization by Host

The CPU Utilization by Host panel displays the CPU utilization of each node in the cluster.

CPU Utilization by Host

Host Name	Utilization
dhcp41-255_lab_eng_blr_redhat_com	4.8%
dhcp42-11_lab_eng_blr_redhat_com	4.6%

Memory Utilization By Host

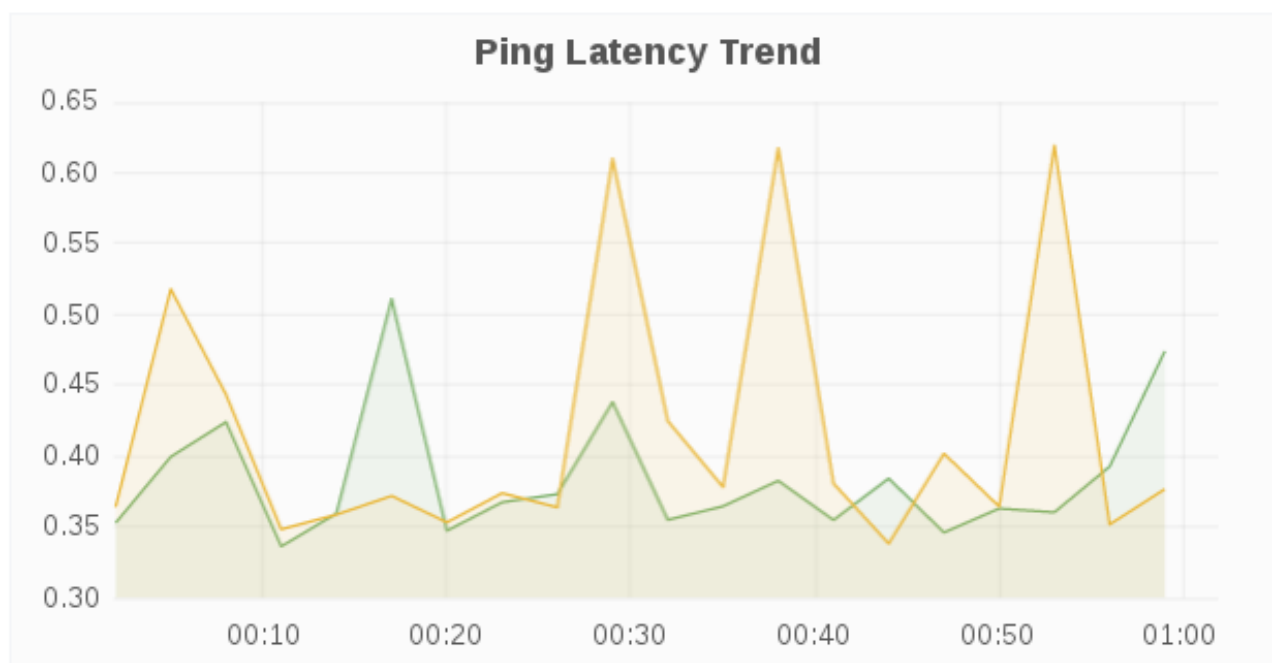
The Memory Utilization by Hosts panel displays memory utilization of each node in the cluster.

Memory Utilization by Host

Host Name	Utilization
dhcp42-11_lab_eng_blr_redhat_com	54.1%
dhcp41-255_lab_eng_blr_redhat_com	44.0%

Ping Latency Trend

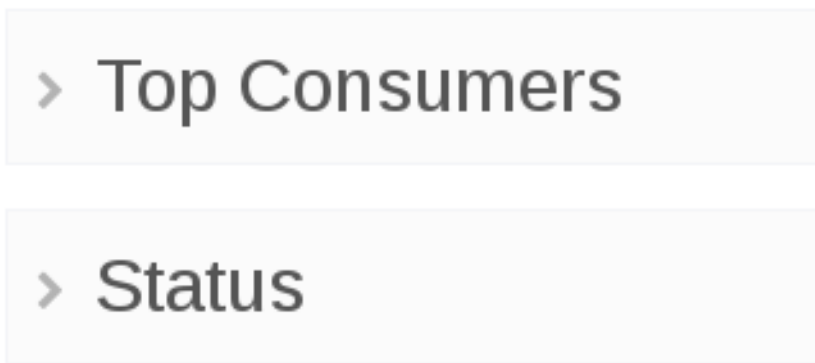
The Ping Latency Trend panel displays the ping latency for each host in a given cluster.



8.1.4. Monitoring and Viewing Cluster Status

To view the status of the overall cluster:

1. In the Cluster level dashboard, at the bottom, click **Status** to expand the menu.



2. The Volume, Host, and Brick status are displayed in the panels.

▼ Status

Volume Status		Host Status		Brick Status	
Volume Name	Status	Host Name	Status	Brick Name	Status
volume_gama_disperse_4_plus_2x2	0	ci-usb4-gl6_usmqe_lab_eng_blr_redhat_com	0	ci-usb4-gl6_usmqe_lab_eng_blr_redhat_com/mnt/brick_gama_disperse_4_plus_2x2	0
		ci-usb4-gl5_usmqe_lab_eng_blr_redhat_com	0	ci-usb4-gl6_usmqe_lab_eng_blr_redhat_com/mnt/brick_gama_disperse_4_plus_2x2	0
		ci-usb4-gl4_usmqe_lab_eng_blr_redhat_com	0	ci-usb4-gl5_usmqe_lab_eng_blr_redhat_com/mnt/brick_gama_disperse_4_plus_2x2	0
		ci-usb4-gl3_usmqe_lab_eng_blr_redhat_com	0	ci-usb4-gl6_usmqe_lab_eng_blr_redhat_com/mnt/brick_gama_disperse_4_plus_2x2	0
		ci-usb4-gl2_usmqe_lab_eng_blr_redhat_com	0	ci-usb4-gl5_usmqe_lab_eng_blr_redhat_com/mnt/brick_gama_disperse_4_plus_2x2	0

Volume Status

The Volume Status panel displays the status code of each volume for the selected cluster.

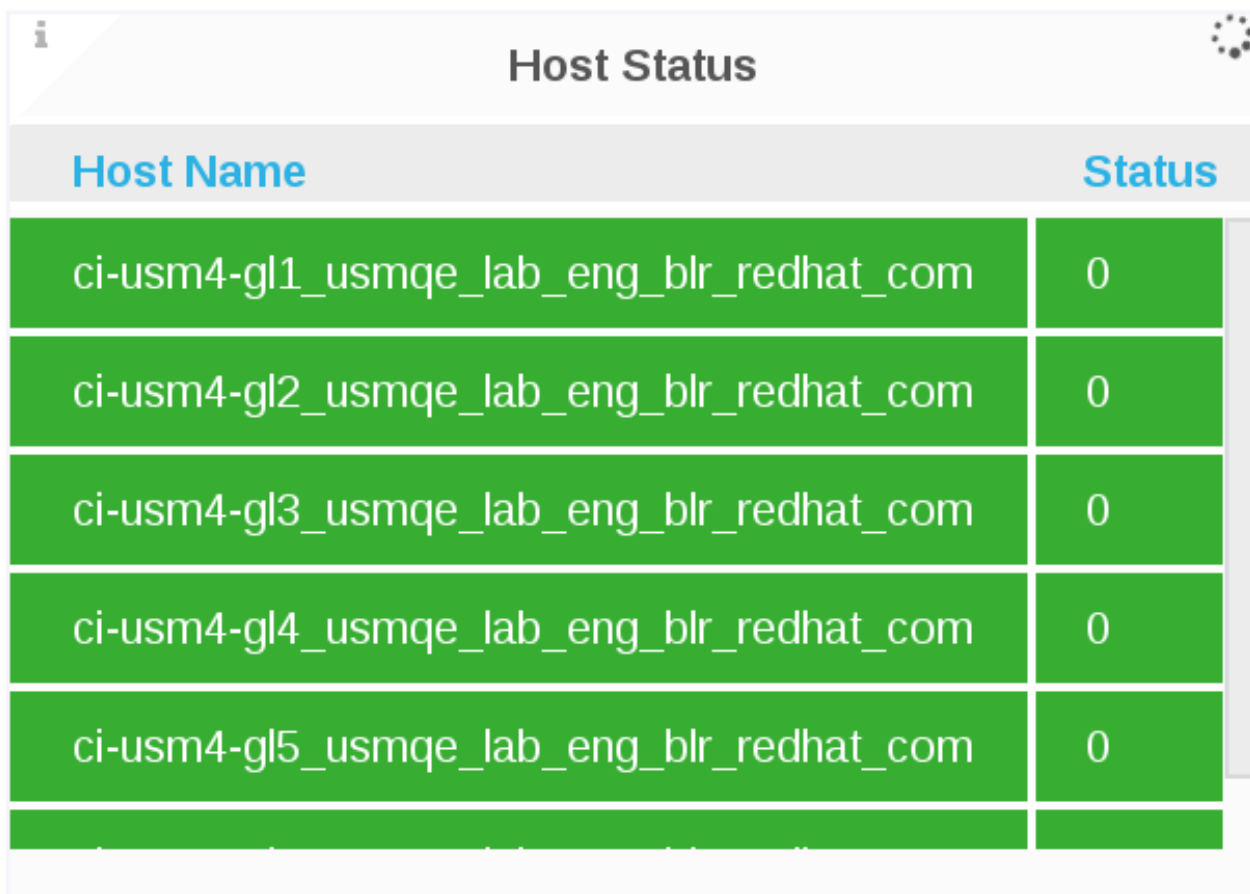
Volume Status	
Volume Name	Status
volume_gama_disperse_4_plus_2x2	0

The volume status is displayed in numerals and colors. The following are the corresponding status of the numerals.

- 0 = Up
- 3 = Up (Degraded)
- 4 = Up (Partial)
- 5 = Unknown
- 8 = Down

Host Status

The Host Status panel displays the status code of each host for the selected cluster.



The screenshot shows a panel titled "Host Status" with an information icon on the left and a refresh icon on the right. Below the title is a table with two columns: "Host Name" and "Status". The table contains five rows, each with a host name and a status code of 0. The rows are highlighted in green.

Host Name	Status
ci-usm4-gl1_usmqe_lab_eng_blr_redhat_com	0
ci-usm4-gl2_usmqe_lab_eng_blr_redhat_com	0
ci-usm4-gl3_usmqe_lab_eng_blr_redhat_com	0
ci-usm4-gl4_usmqe_lab_eng_blr_redhat_com	0
ci-usm4-gl5_usmqe_lab_eng_blr_redhat_com	0

The Host status is displayed in numeric codes:

- 0 = Up
- 8 = Down

Brick Status

The Brick Status panel displays the status code of each brick for the selected cluster.

Brick Status	
Brick Name	Status
ci-usm4- gl6_usmqe_lab_eng_blr_redhat_com:/mnt/brick_gama_disperse_2/2	1
ci-usm4- gl6_usmqe_lab_eng_blr_redhat_com:/mnt/brick_gama_disperse_1/1	1
ci-usm4- gl5_usmqe_lab_eng_blr_redhat_com:/mnt/brick_gama_disperse_2/2	1
ci-usm4-	1

The Brick status is displayed in numeric codes:

- 1 = Started
- 10 = Stopped

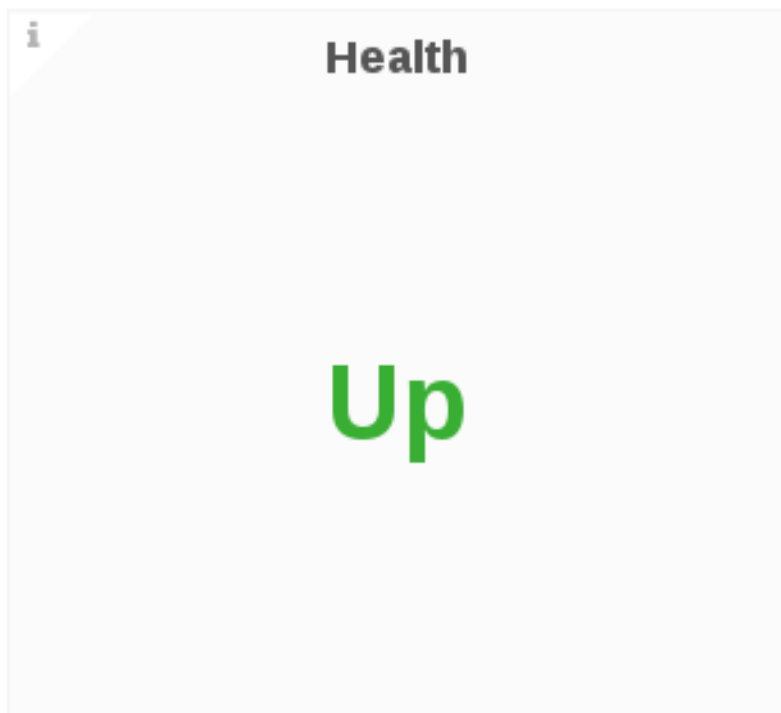
8.2. HOST LEVEL DASHBOARD

8.2.1. Monitoring and Viewing Health and Status

To monitor the Cluster Hosts status and the metrics associated with it, navigate to the Hosts Level Dashboard and view the panels.

Health

The Health panel displays the overall health for a given host.



Bricks and Bricks Status

The Bricks panel displays brick status information for a given host, including the total number of bricks in the host, and a count of bricks by status.



The Brick Status panel displays the status code of each brick for a given host.

Brick Status	
Brick Path	Status ▾
/root/bricks/v3	1
/root/bricks/v22	1
/root/bricks/v2	1

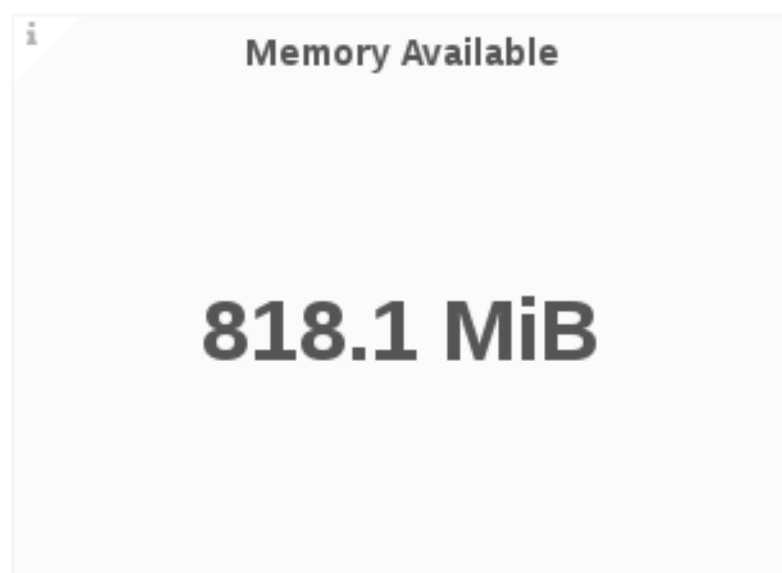
- 1 = Started
- 10 = Stopped

8.2.2. Monitoring and Viewing Performance

8.2.2.1. Memory and CPU Utilization

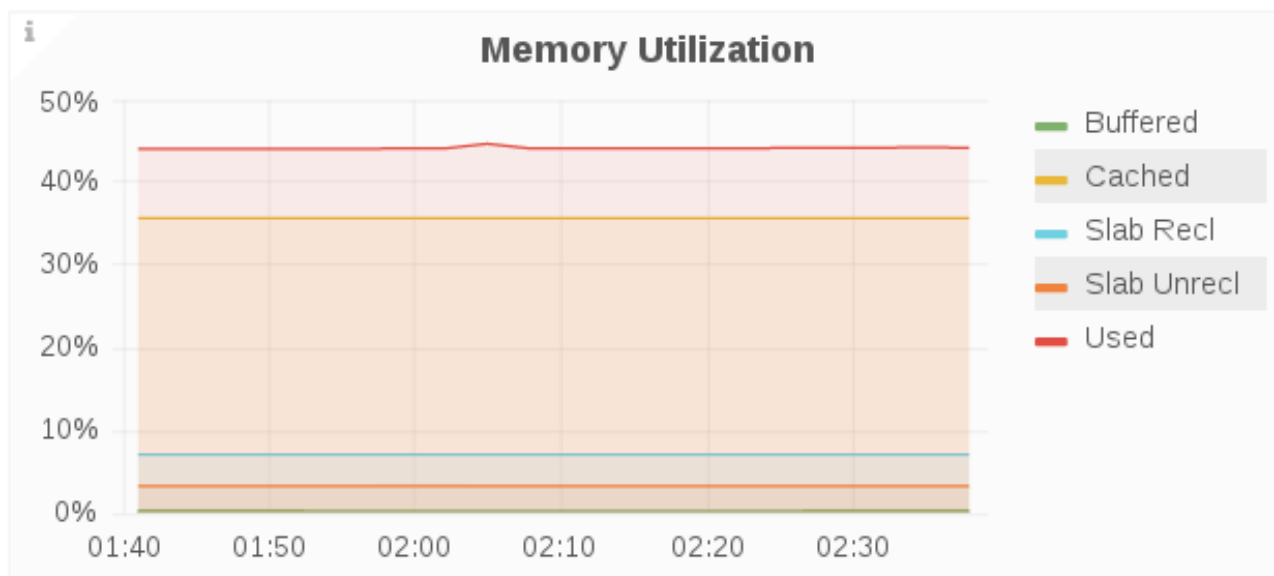
Memory Available

The Memory Available panel displays the sum of memory free and memory cached.



Memory Utilization

The Memory Utilization panel displays memory utilization percentage for a given host that includes buffers and caches used by the kernel over a period of time.



- **Buffered:** Amount of memory used for buffering, mostly for I/O operations
- **Cached:** Memory used for caching disk data for reads, memory-mapped files or tmpfs data
- **Slab Rec:** Amount of reclaimable memory used for slab kernel allocations
- **Slab Unrecl:** Amount of unreclaimable memory used for slab kernel allocations
- **Used:** Amount of memory used, calculated as Total - Free (Unused Memory) - Buffered - Cache
- **Total:** Total memory used

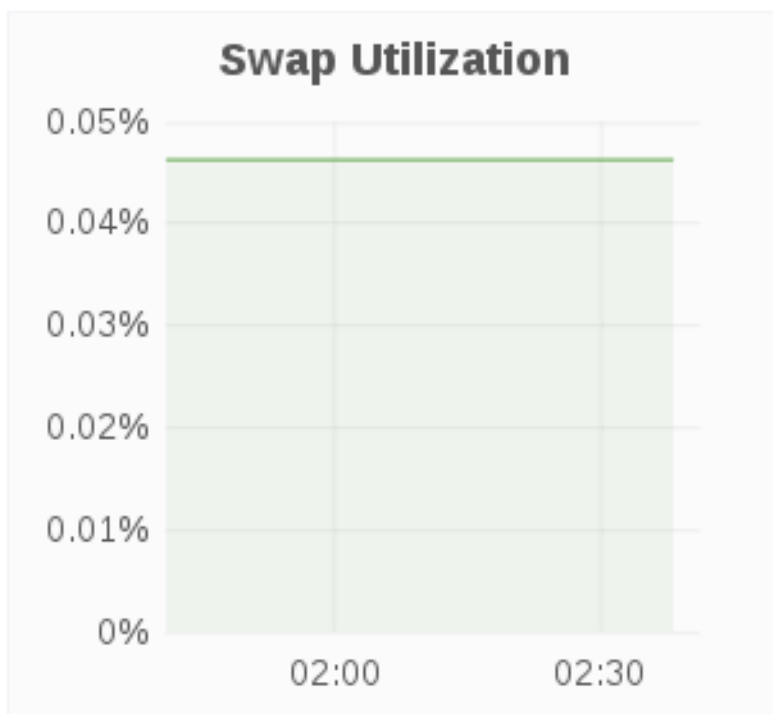
Swap Free

The Swap Free panel displays the available swap space in percent for a given host.



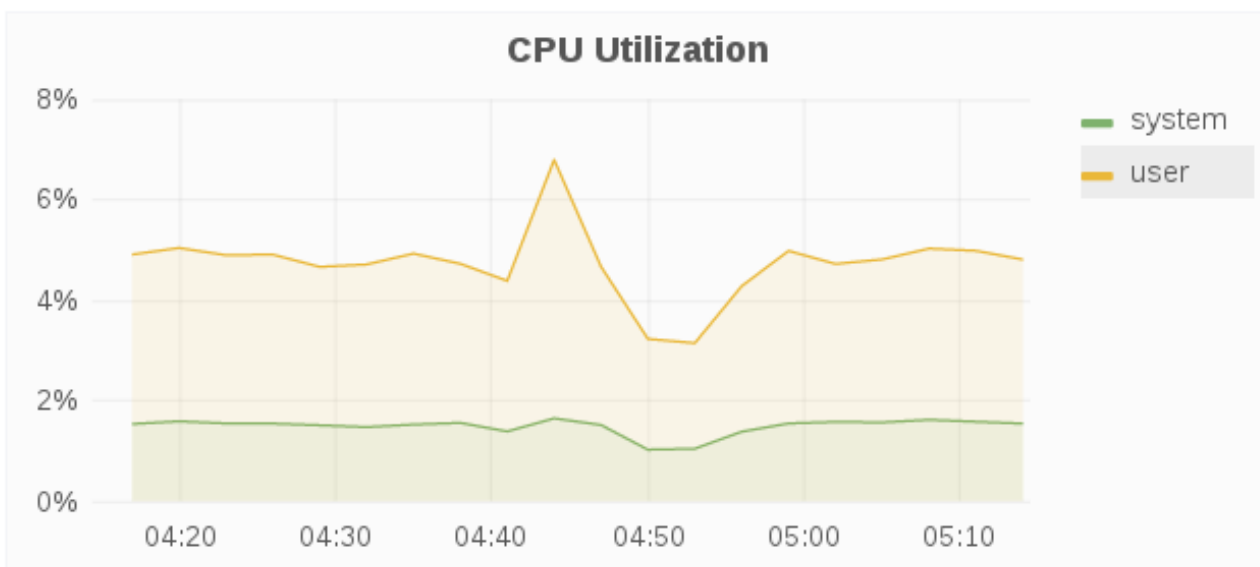
Swap Utilization

The Swap Utilization panel displays the used swap space in percent for a given host.



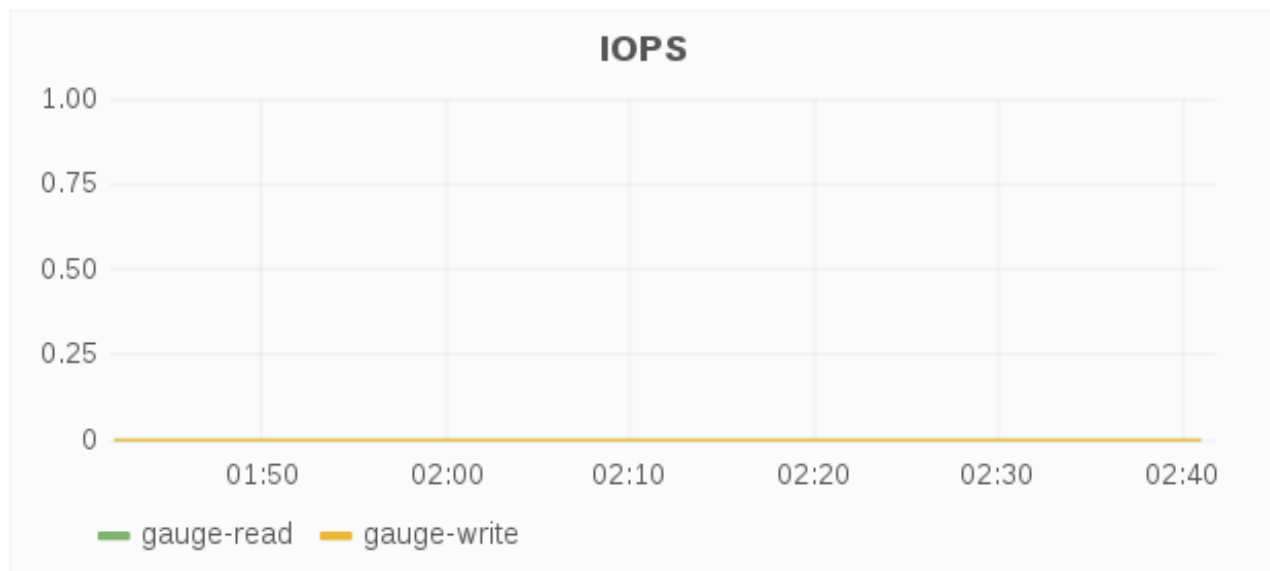
CPU Utilization

The CPU utilization panel displays the CPU utilization for a given host over a period of time.



IOPS

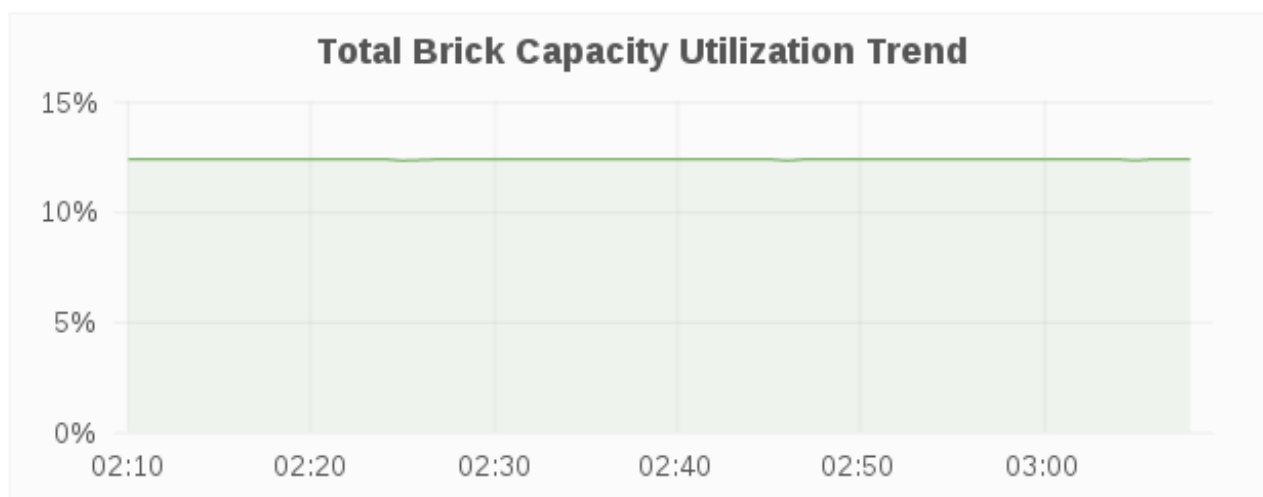
The IOPS panel displays IOPS for a given host over a period of time. IOPS is based on the aggregated brick level read and write operations.



8.2.2.2. Capacity and Disk Load

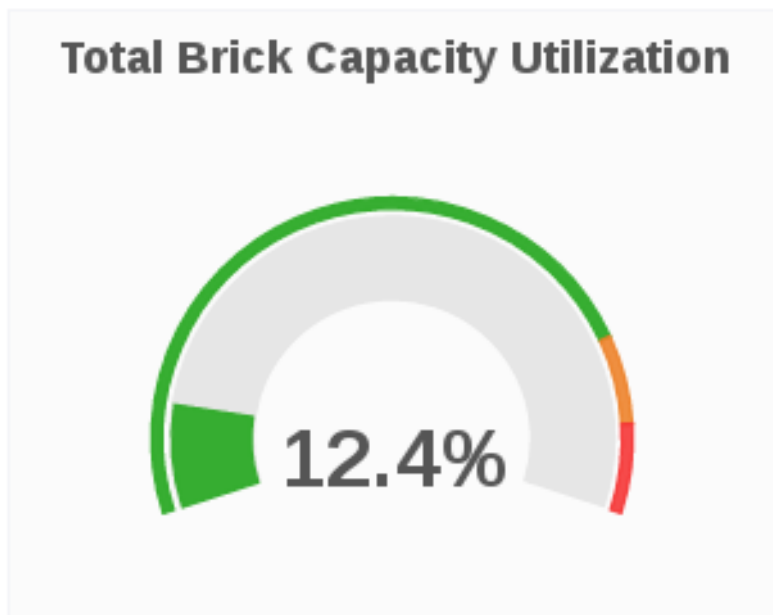
Total Brick Capacity Utilization Trend

The Total Brick Capacity Utilization Trend panel displays the capacity utilization for all bricks on a given for a period of time.



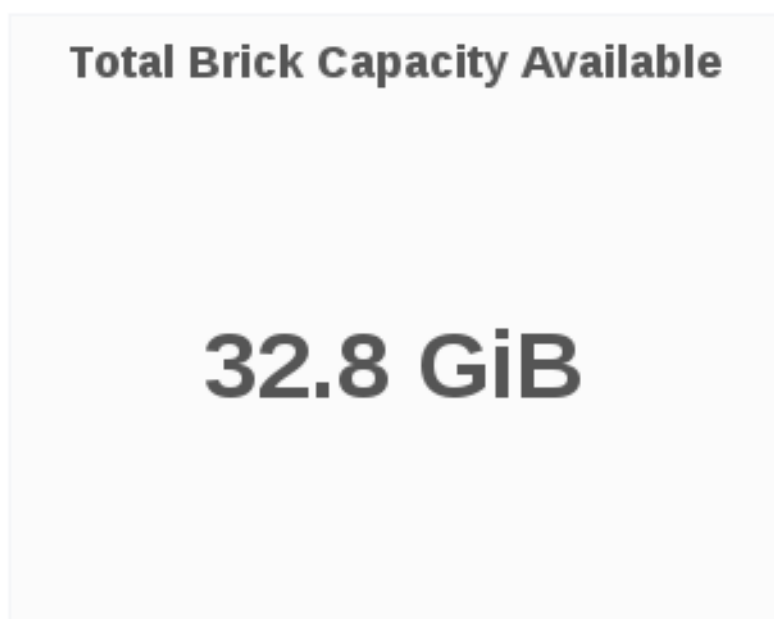
Total Brick Capacity Utilization

The Total Brick Capacity Utilization panel displays the current percent capacity utilization for a given host.



Total Brick Capacity Available

The Total Brick Capacity Available panel displays the current available capacity for a given host.



Weekly Growth Rate

The Weekly Growth Rate panel displays the forecasted weekly growth rate for capacity utilization computed based on daily capacity utilization.

Weekly Growth Rate

4.9 GB

Weeks Remaining

The Weeks Remaining panel displays the estimated time remaining in weeks till host capacity reaches full capacity based on the forecasted Weekly Growth Rate.

Weeks Remaining

7

Brick Utilization

The Brick Utilization panel displays the utilization of each brick for a given host.

Brick Utilization	
Brick Path	Utilization ▼
/mnt/brick_gama_disperse_2/2	0.2%
/mnt/brick_gama_disperse_1/1	0.2%

Brick Capacity

The Brick Capacity panel displays the total capacity of each brick for a given host.

Brick Capacity	
Brick Path	Capacity ▾
/mnt/brick_gama_disperse_2/2	19.9 GiB
/mnt/brick_gama_disperse_1/1	19.9 GiB

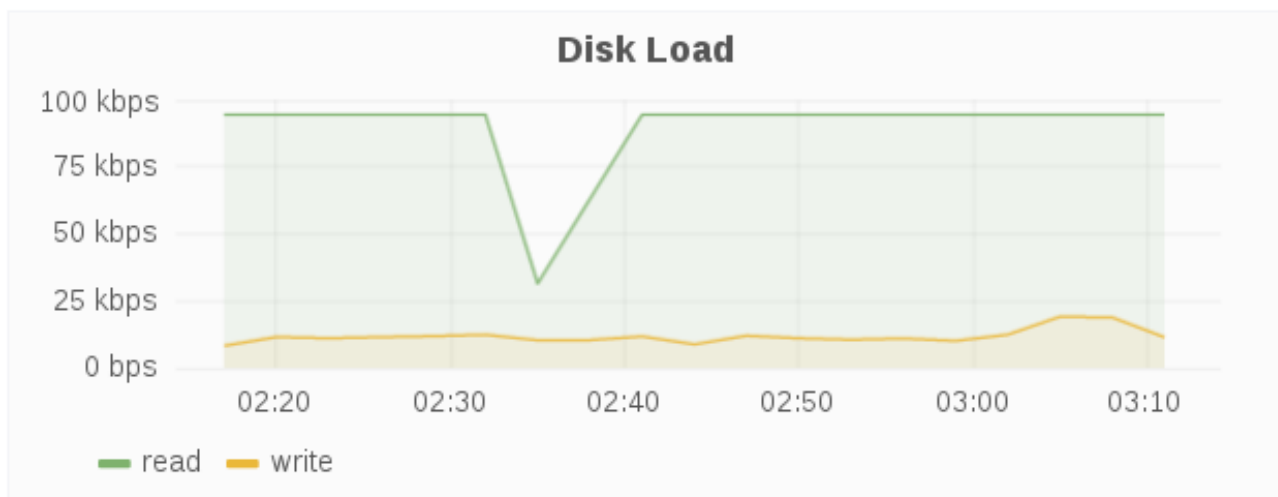
Brick Capacity Used

The Brick Capacity Used panel displays the used capacity of each brick for a given host.

Brick Capacity Used	
Brick Path	Capacity ▾
/mnt/brick_gama_disperse_2/2	33.0 MiB
/mnt/brick_gama_disperse_1/1	33.0 MiB

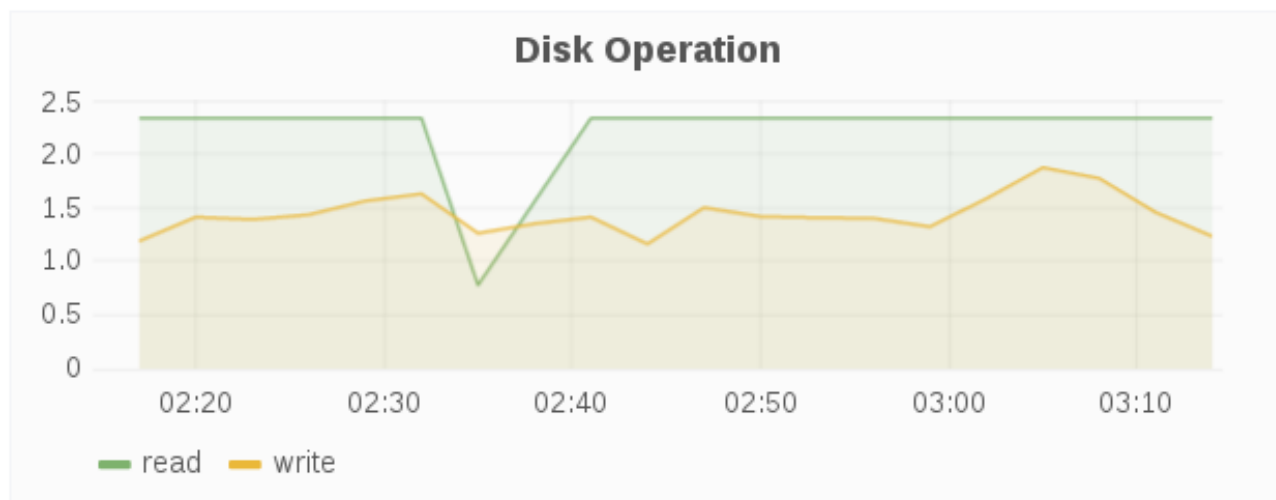
Disk Load

The Disk Load panel shows the host's aggregated read and writes from/to disks over a period of time.



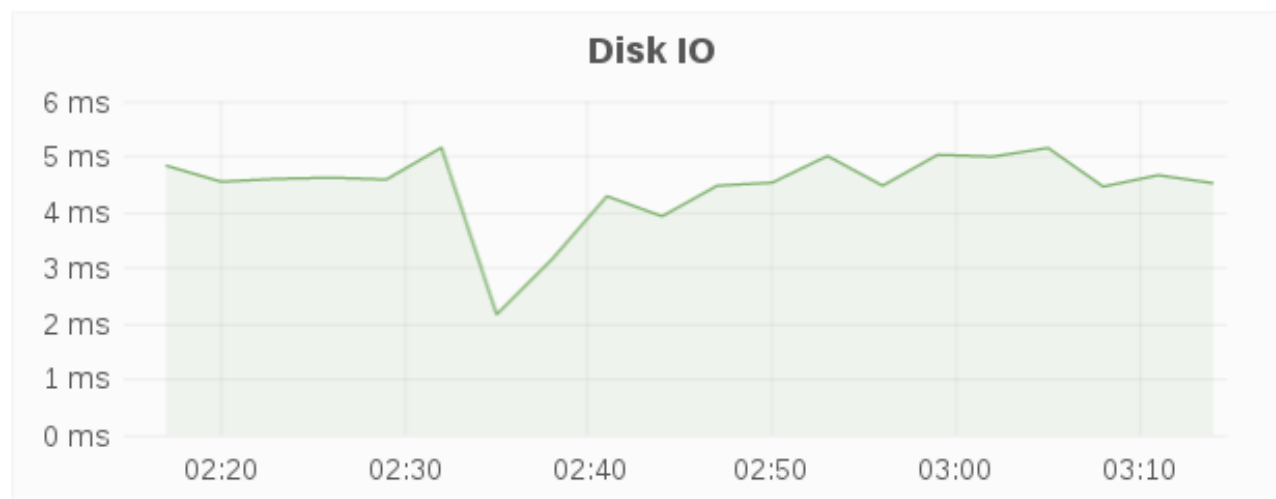
Disk Operation

The Disk Operations panel shows the host's aggregated read and writes disk operations over a period of time.



Disk IO

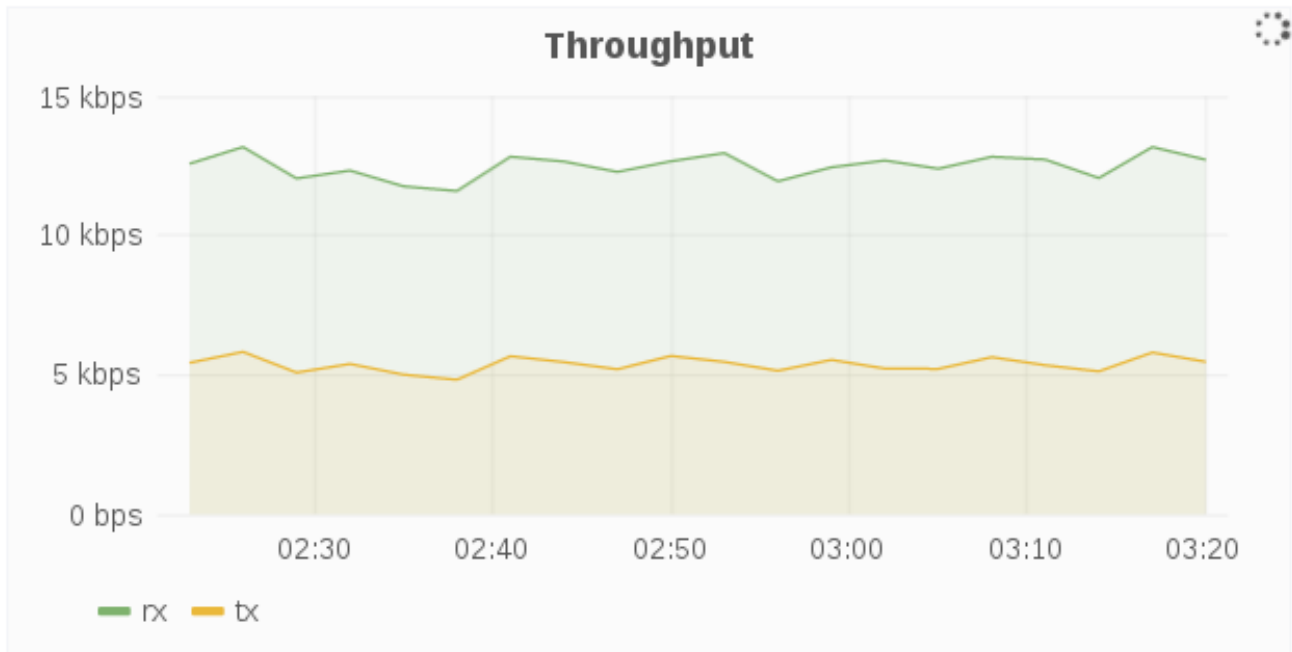
The Disk IO panel shows the host's aggregated I/O time over a period of time.



8.2.2.3. Network

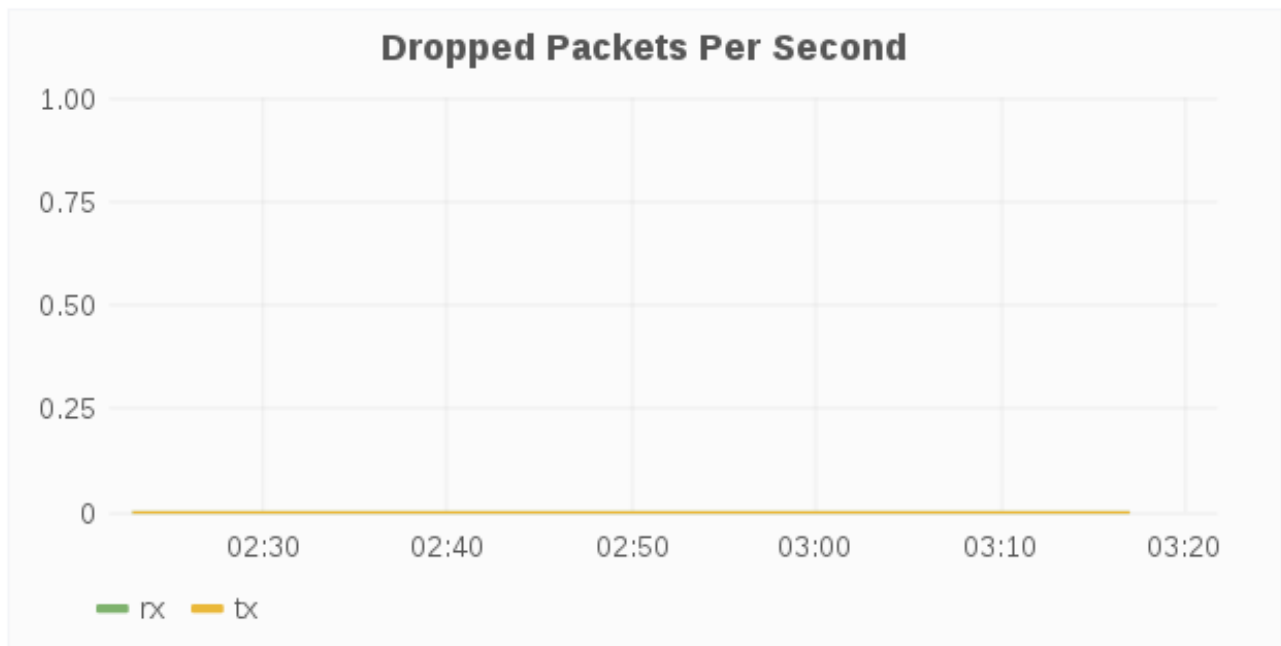
Throughput

The Throughput panel displays the network throughput for a given host over a period of time.



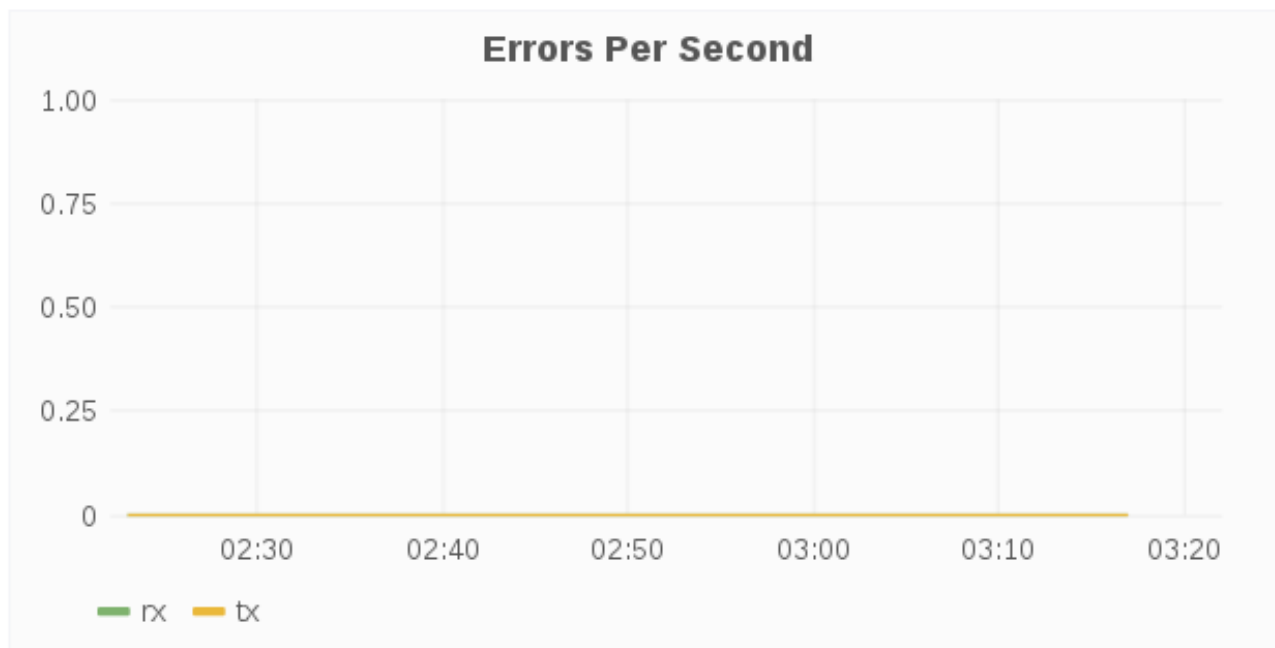
Dropped Packets Per Second

The Dropped Packets Per Second panel displays dropped network packets for the host over a period of time. Typically, dropped packets indicates network congestion, for example, the queue on the switch port your host is connected to is full and packets are dropped because it cannot transmit data fast enough.



Errors Per Second

The Errors Per Second panel displays network errors for a given host over a period of time. Typically, the errors indicate issues that occurred while transmitting packets due to carrier errors (duplex mismatch, faulty cable), fifo errors, heartbeat errors, and window errors, CRC errors too short frames, and/or too long frames. In short, errors typically result from faulty hardware, and/or speed mismatch.



8.2.3. Host Dashboard Metric Units

The following table shows the metrics and their corresponding measurement units.

Table 8.2. Host Dashboard Metric Units

Metrics	Units
Memory Available	Megabyte/Gigabyte/Terabyte
Memory Utilization	Percentage %
Swap free	Percentage %
Swap Utilization	Percentage %
CPU Utilization	Percentage %
Total Brick Capacity Utilization	Percentage %
Total Brick Capacity	MB/GB/TB
Weekly Growth Rate	MB/GB/TB
Disk Load	kbps
Disk IO	millisecond ms
Network Throughput	kbps

8.3. VOLUME LEVEL DASHBOARD

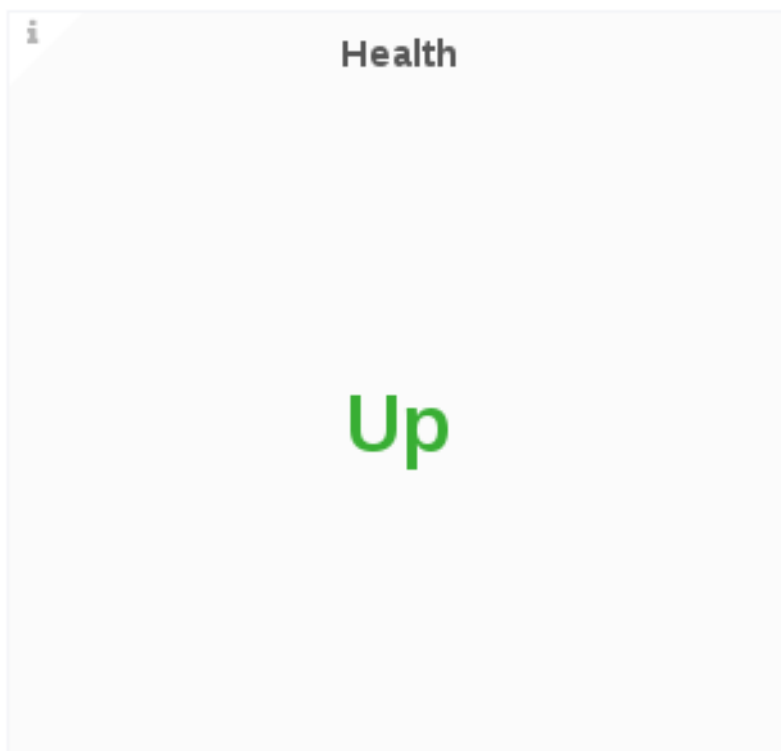
The Volume view dashboard allows the Gluster Administrator to:

- View at-a-glance information about the Gluster volume that includes health and status information, key performance indicators such as IOPS, throughput, etc, and alerts that can highlight attention to potential issues in the volume, brick, and disk.
- Compare 1 or more metrics such as IOPS, CPU, Memory, Network Load across bricks within the volume.
- Compare utilization such as IOPS, capacity, etc, across bricks within a volume.
- View performance metrics by brick (within a volume) to address diagnosing of failure, rebuild, degradation, and poor performance on one brick.

8.3.1. Monitoring and Viewing Health

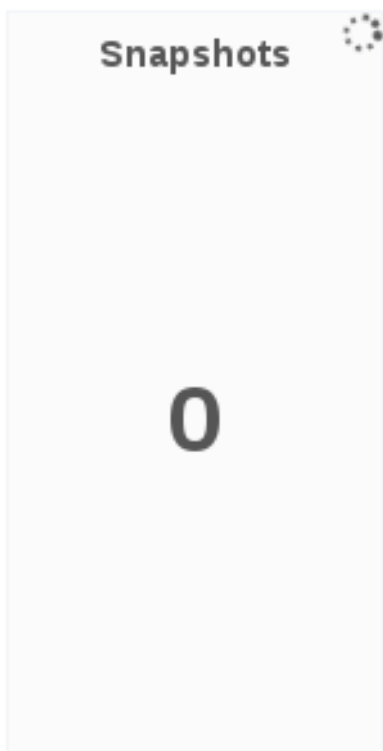
Health

The Health panel displays the overall health for a given volume.



Snapshots

The Snapshots panel displays the count of active snapshots for the selected cluster.



Brick Status

The Brick Status panel displays the status code of each brick for a given volume.

Brick Status	
Brick Path	Status
dhcp42-11_lab_eng_blr_redhat_com:/root/bricks/v22	1
dhcp42-11_lab_eng_blr_redhat_com:/root/bricks/v2	1
dhcp41-255_lab_eng_blr_redhat_com:/root/bricks/v22	1
dhcp41-255_lab_eng_blr_redhat_com:/root/bricks/v2	1

- 1 = Started
- 10 = Stopped

Bricks

The Bricks panel displays brick status information for a given volume, including the total number of bricks in the volume, and a count of bricks by status.

Bricks

Total - 4

Up - 4

Down - 0

Subvolumes

The Subvolumes panel displays subvolume status information for a given volume.

Subvolume

Total - 2

Geo-Replication Sessions

The Geo-Replication Session panel displays geo-replication session information from a given volumes, including the total number of geo-replication session and a count of geo-replication sessions by status.

Geo-Replication Sessions

Total - 0

Created - 0

Up - 0

Partial - 0

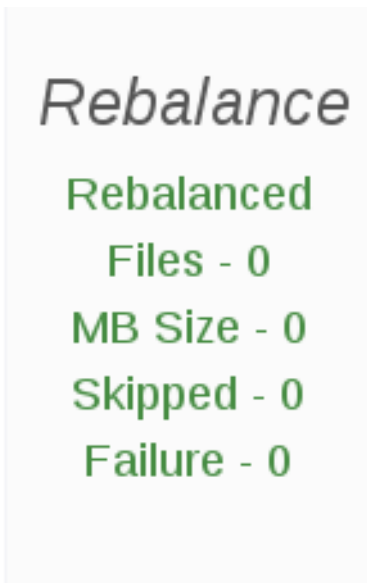
Paused - 0

Stopped - 0

Down - 0

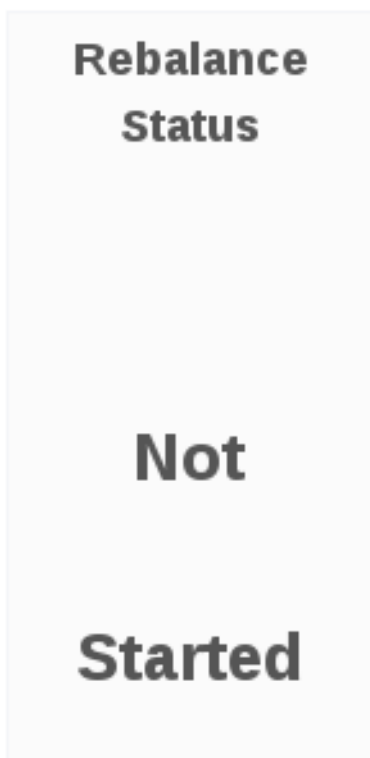
Rebalance

The Rebalance panel displays rebalance progress information for a given volume, which is applicable when rebalancing is underway.



Rebalance Status:

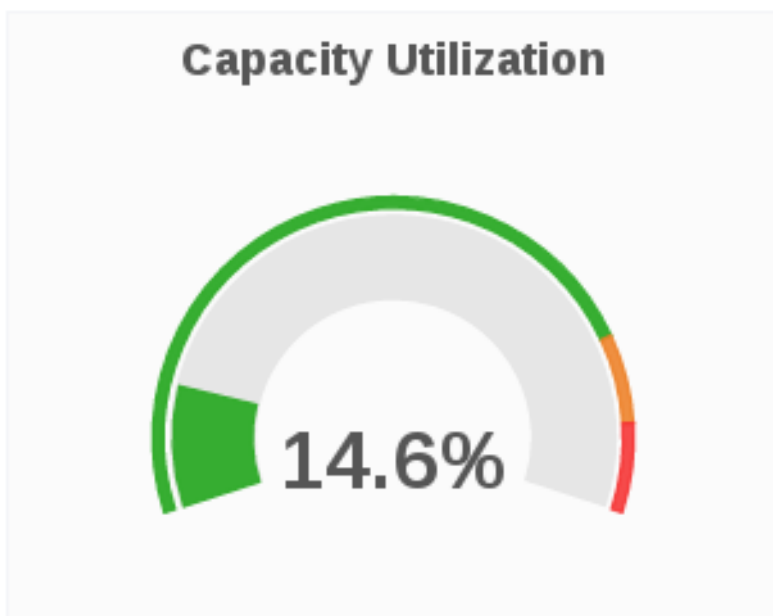
The Rebalance Status panel displays the status of rebalancing for a given volume, which is applicable when rebalancing is underway.



8.3.2. Monitoring and Viewing Performance

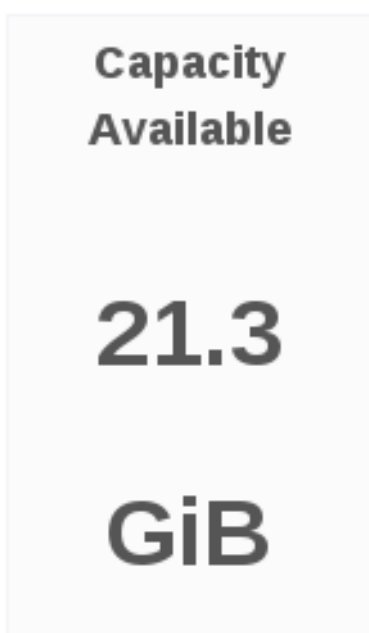
Capacity Utilization

The Capacity Utilization panel displays the used capacity for a given volume.



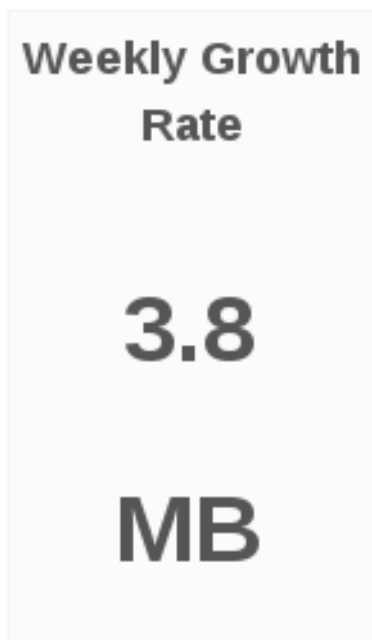
Capacity Available

The Capacity Available panel displays the available capacity for a given volume.



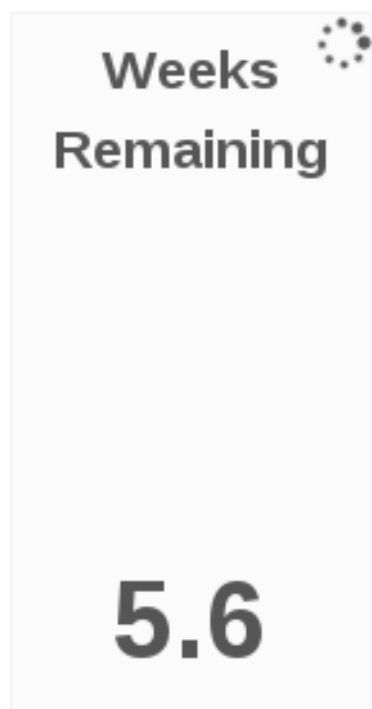
Weekly Growth Rate

The Weekly Growth Rate panel displays the forecasted weekly growth rate for capacity utilization computed based on daily capacity utilization.



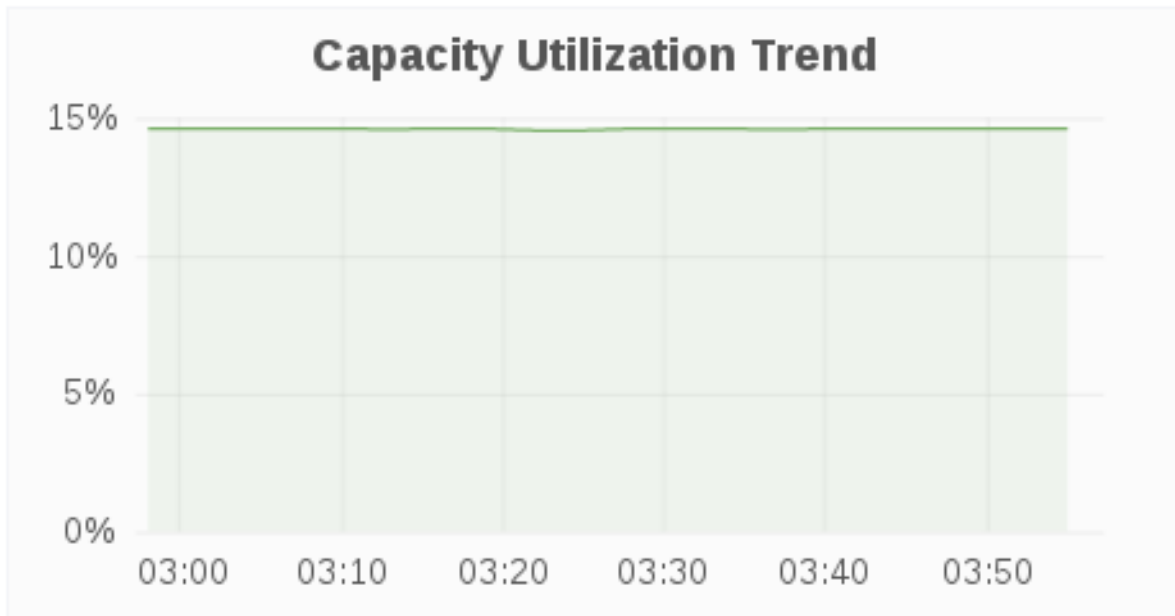
Weeks Remaining

The Weeks Remaining panel displays the estimated time remaining in weeks till volume reaches full capacity based on the forecasted Weekly Growth Rate.



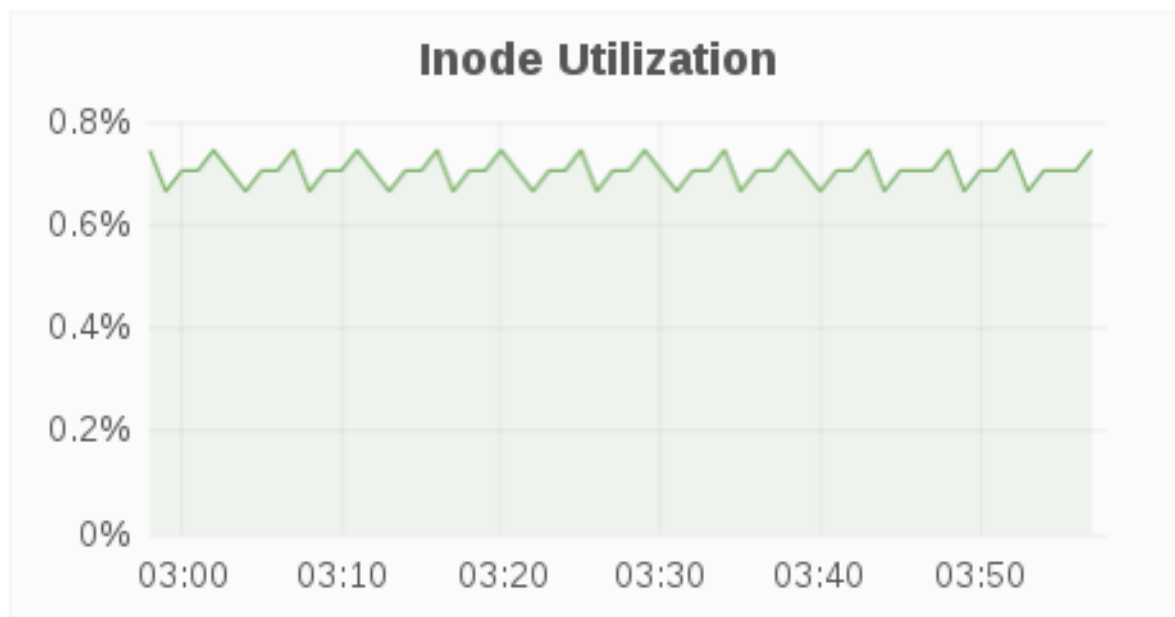
Capacity Utilization Trend

The Capacity Utilization Trend panel displays the volume capacity utilization over a period of time.



Inode Utilization

The Inode Utilization panel displays inodes used for bricks in the volume over a period of time.



Inode Available

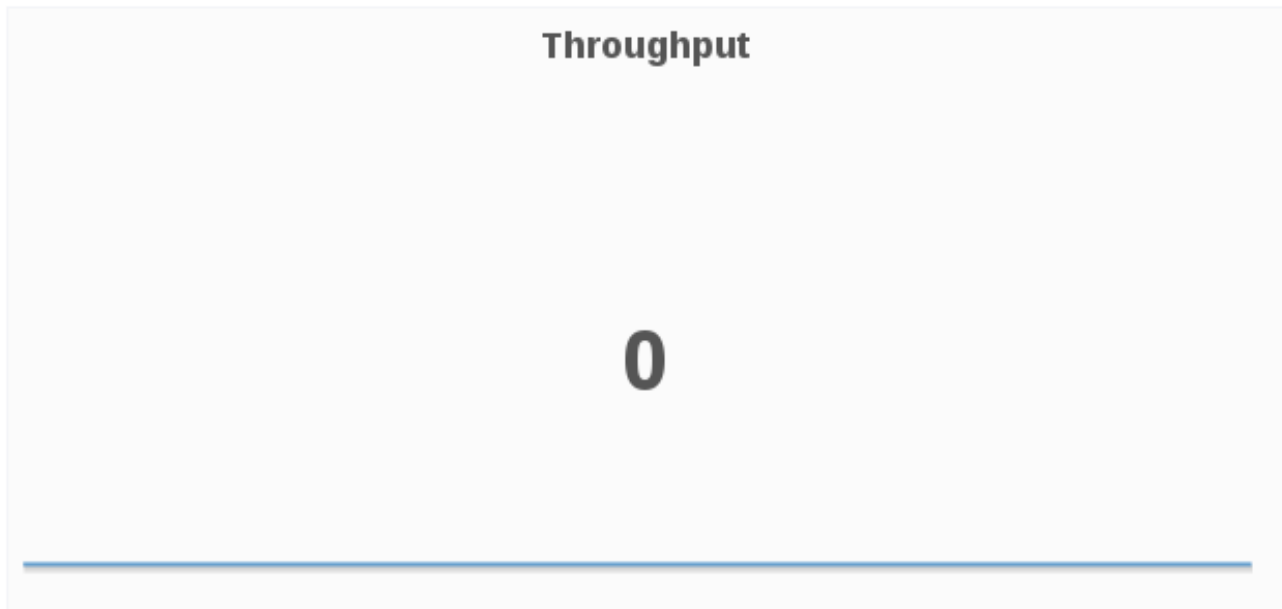
The Inode Available panel displays inodes free for bricks in the volume.

Inode Available

20287947

Throughput

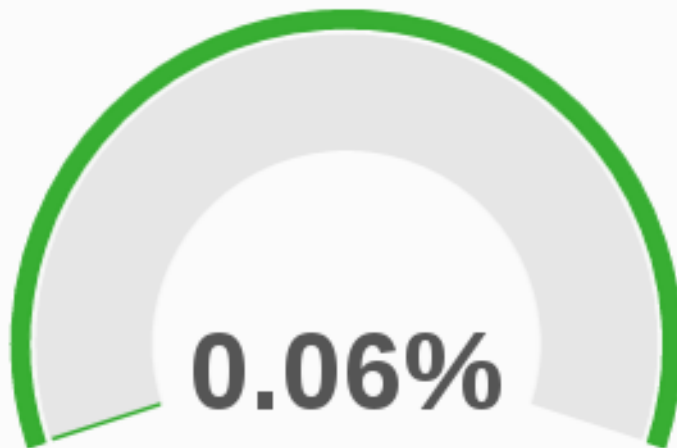
The Throughput panel displays volume throughput based on brick-level read and write operations fetched using *gluster volume profile*.



LVM Thin Pool Metadata %

The LVM Thin Pool Metadata % panel displays the utilization of LVM thin pool metadata for a given volume. Monitoring the utilization of LVM thin pool metadata and data usage is important to ensure they do not run out of space. If the data space is exhausted, I/O operations are either queued or failing based on the configuration. If metadata space is exhausted, you will observe error I/O's until the LVM pool is taken offline and repair is performed to fix potential inconsistencies. Moreover, due to the metadata transaction being aborted and the pool doing caching there might be uncommitted (to disk) I/O operations that were acknowledged to the upper storage layers (file system) so those layers will need to have checks/repairs performed as well.

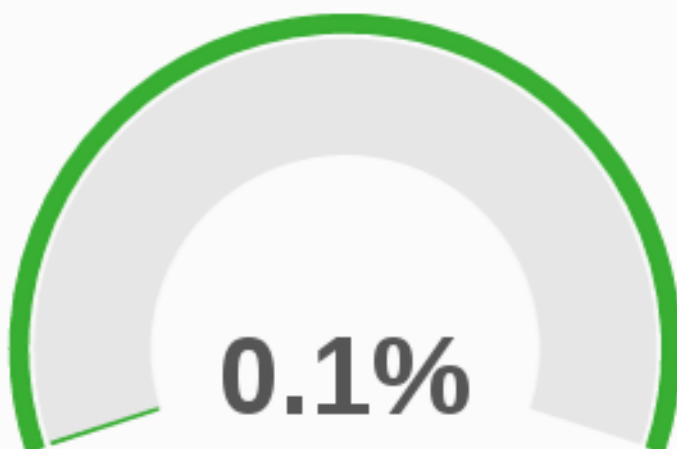
LVM Thin Pool Metadata %



LVM Thin Pool Data Usage %

The LVM Thin Pool Data Usage % panel displays the LVM thin pool data usage for a given volume. Monitoring the utilization of LVM thin pool metadata and data usage is important to ensure they do not run out of space. If the data space is exhausted, I/O operations are either queued or failing based on the configuration. If metadata space is exhausted, you will observe error I/O's until the LVM pool is taken offline and repair is performed to fix potential inconsistencies. Moreover, due to the metadata transaction being aborted and the pool doing caching there might be uncommitted (to disk) I/O operations that were acknowledged to the upper storage layers (file system) so those layers will need to have checks/repairs performed as well.

LVM Thin Pool Data Usage %



8.3.3. Monitoring File Operations

Top File Operations

The Top File Operations panel displays the top 5 FOP (file operations) with the highest % latency, wherein the % latency is the fraction of the FOP response time that is consumed by the FOP.

Top File Operations	
File Operations ▼	Used
STATFS	2.00
READDIR	6.00
OPENDIR	3.00
LOOKUP	4.00
GETXATTR	1.00

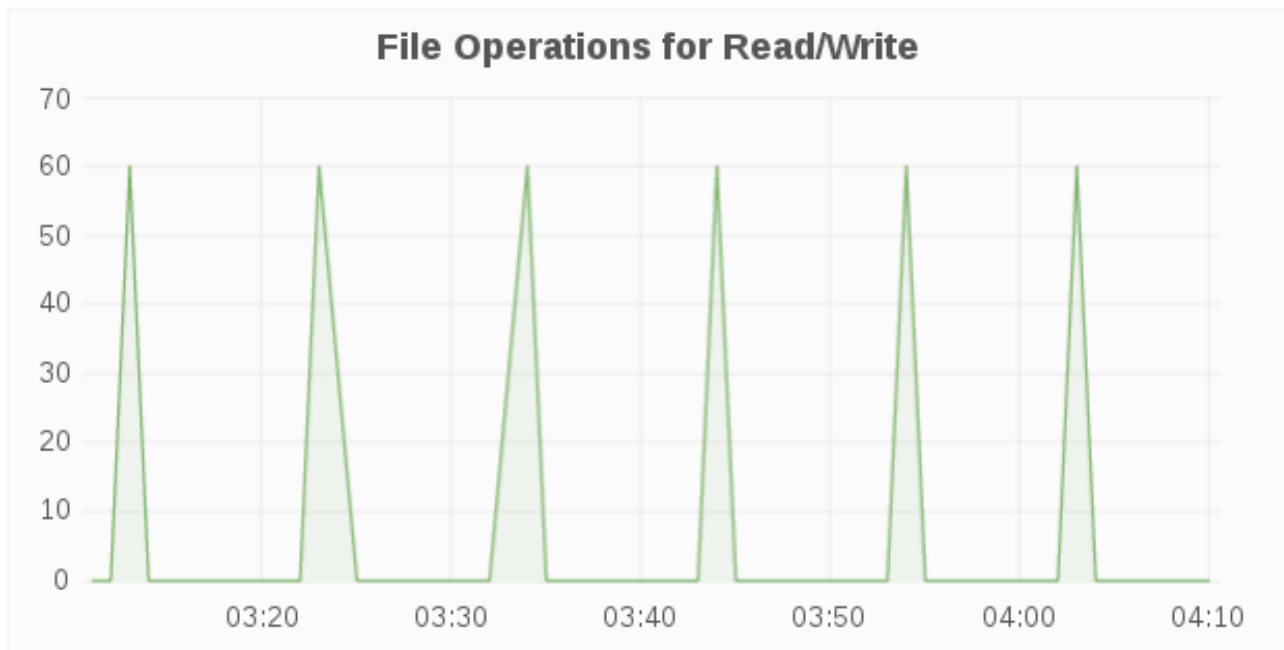
File Operations for Locks Trend

The File Operations for Locks Trend panel displays the average latency, maximum latency, call rate for each FOP for Locks over a period of time.



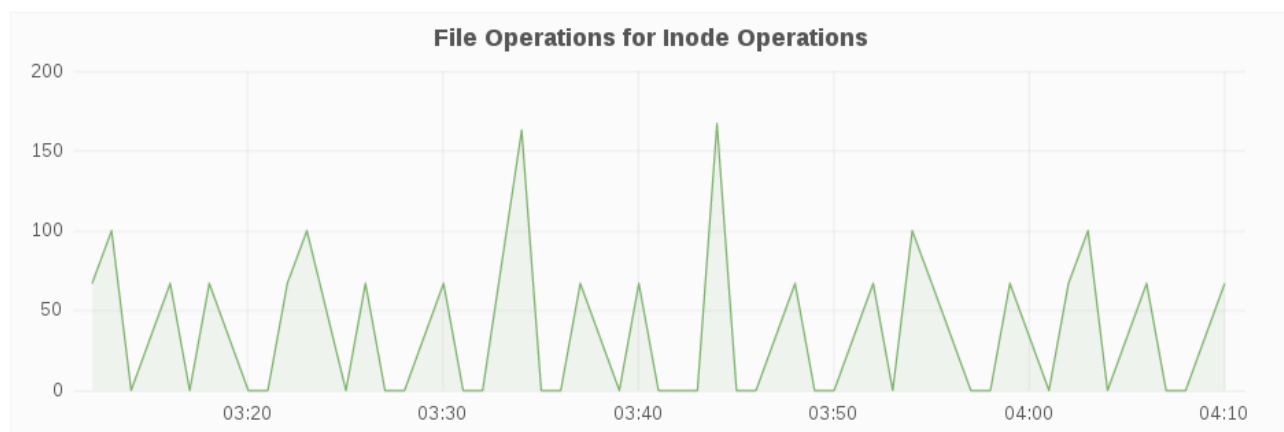
File Operations for Read/Write

The File Operations for Read/Write panel displays the average latency, maximum latency, call rate for each FOP for Read/Write Operations over a period of time.



File Operations for Inode Operations

The File Operations for Inode Operations panel displays the average latency, maximum latency, call rate for each FOP for Inode Operations over a period of time.



File Operations for Entry Operations

The File Operations for Entry Operations panel displays the average latency, maximum latency, call rate for each FOP for Entry Operations over a period of time.



8.3.4. Volume Dashboard Metric Units

The following table shows the metrics and their corresponding measurement units.

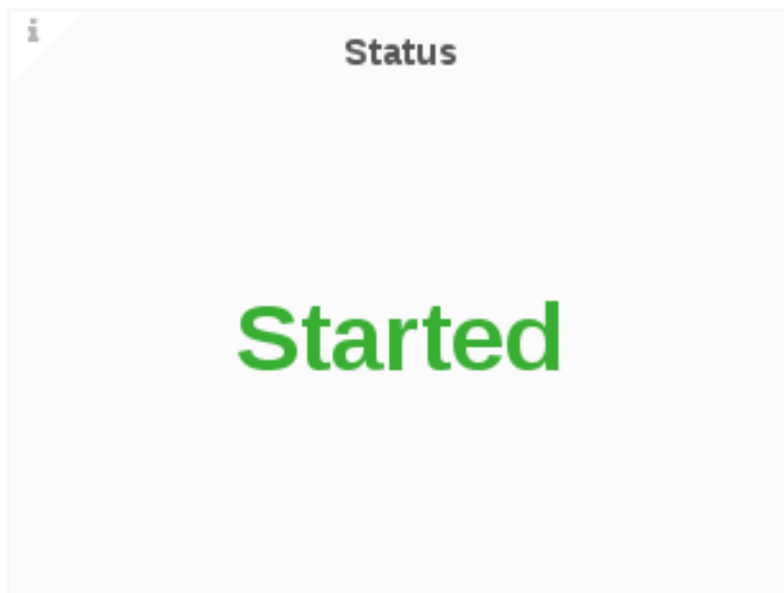
Table 8.3. Volume Dashboard Metric Units

Metrics	Units
Capacity Utilization	Percentage %
Capacity Available	Megabyte/Gigabyte/Terabyte
Weekly Growth Rate	Megabyte/Gigabyte/Terabyte
Capacity Utilization Trend	Percentage %
Inode Utilization	Percentage %
Lvm Thin Pool Metadata	Percentage %
Lvm Thin Pool Data Usage	Percentage %
File Operations for Locks Trend	MB/GB/TB
File Operations for Read/Write	K
File Operations for Inode Operation Trend	K
File Operations for Entry Operations	K

8.4. BRICK LEVEL DASHBOARD

8.4.1. Monitoring and Viewing Brick Status

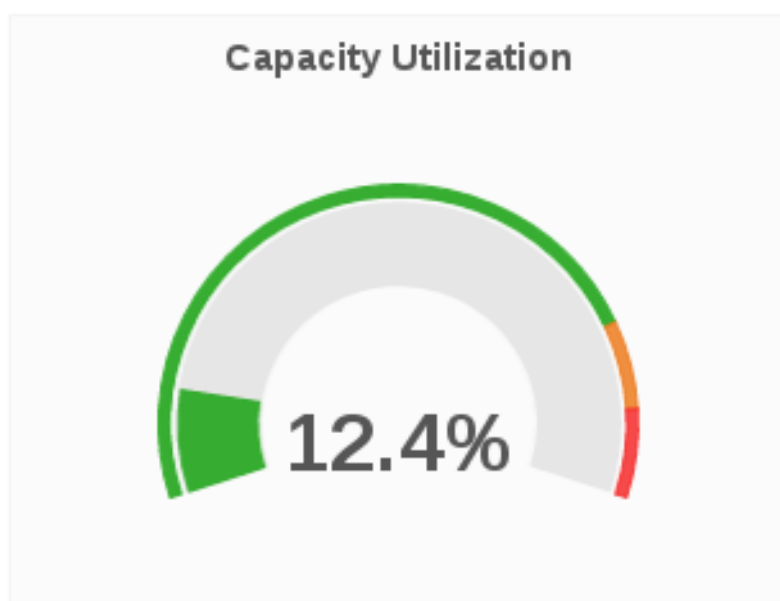
The Status panel displays the status for a given brick.



8.4.2. Monitoring and Viewing Brick Performance

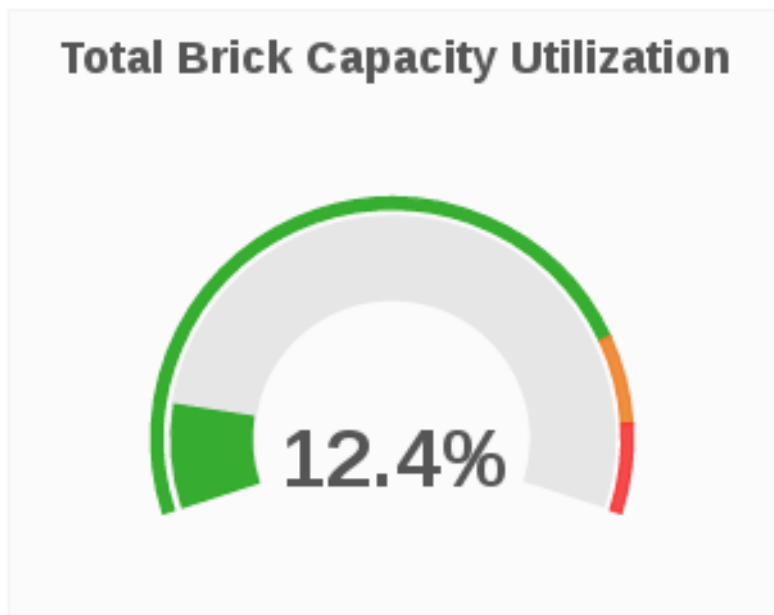
Capacity Utilization

The Capacity Utilization panel displays the percentage of capacity utilization for a given brick.



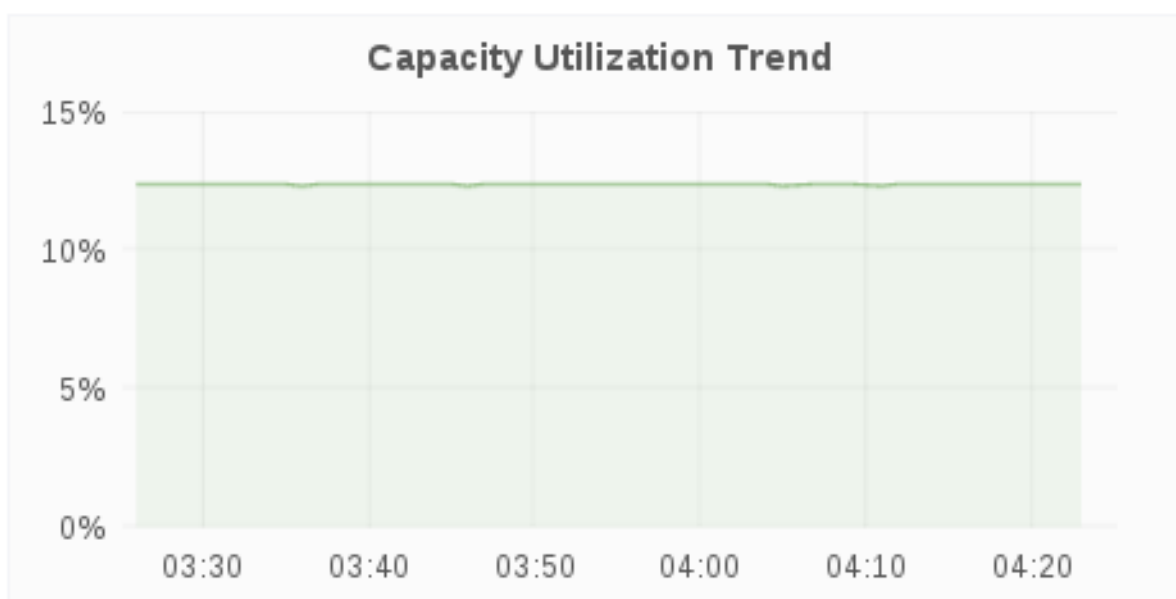
Capacity Available

The Capacity Available panel displays the available capacity for a given volume.



Capacity Utilization Trend

The Capacity Utilization Trend panel displays the brick capacity utilization over a period of time.



Weekly Growth Rate

The Weekly Growth Rate panel displays the forecasted weekly growth rate for capacity utilization computed based on daily capacity utilization.

Weekly Growth Rate

1.6 GB

Weeks Remaining

The Weeks Remaining panel displays the estimated time remaining in weeks till brick reaches full capacity based on the forecasted Weekly Growth Rate.

Weeks Remaining

7

Healing

The Healing panel displays healing information for a given volume based on healinfo.

Healing

Pending Heal - 0

Split Brain - 0

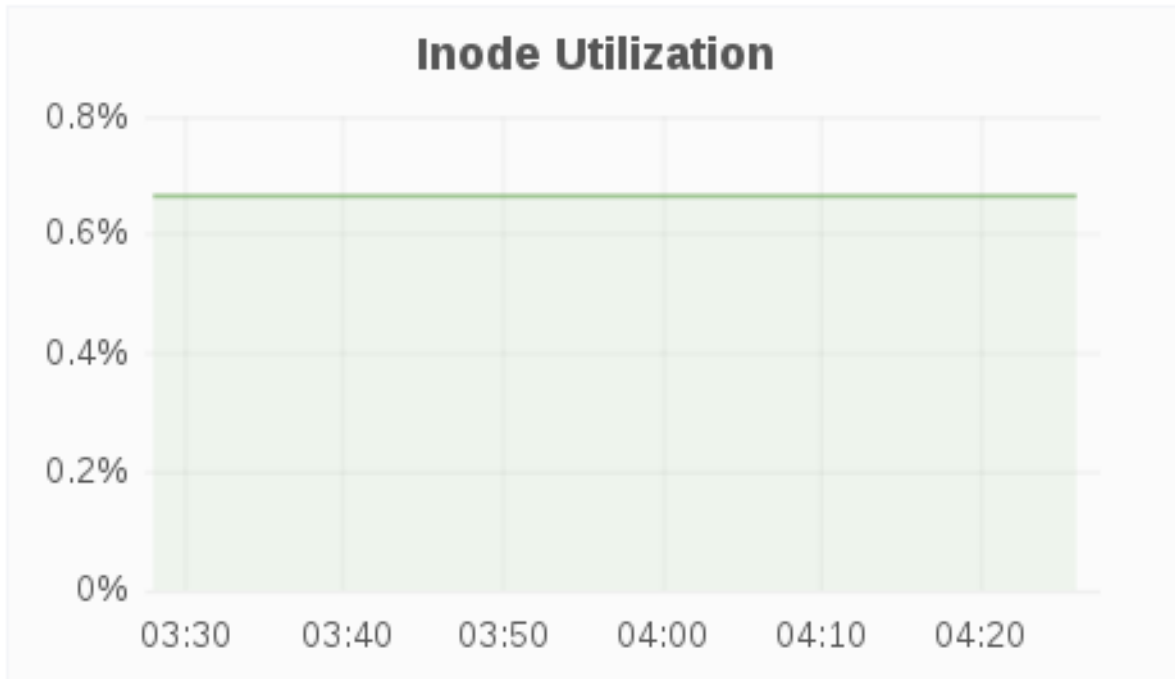


NOTE

The Healing panel will not show any data for volumes without replica.

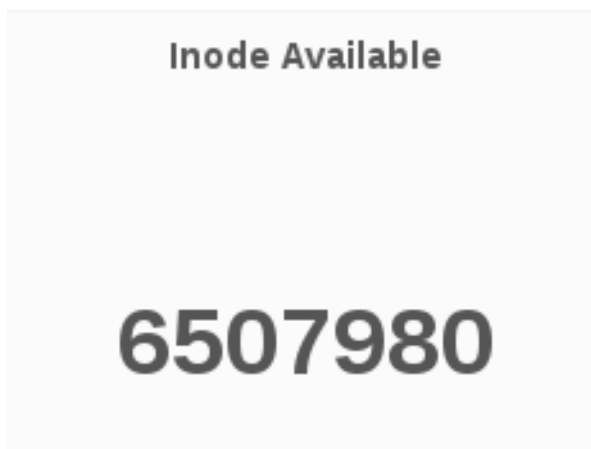
Inode Utilization

The Inode Utilization panel displays inodes used for a given brick over a period of time.



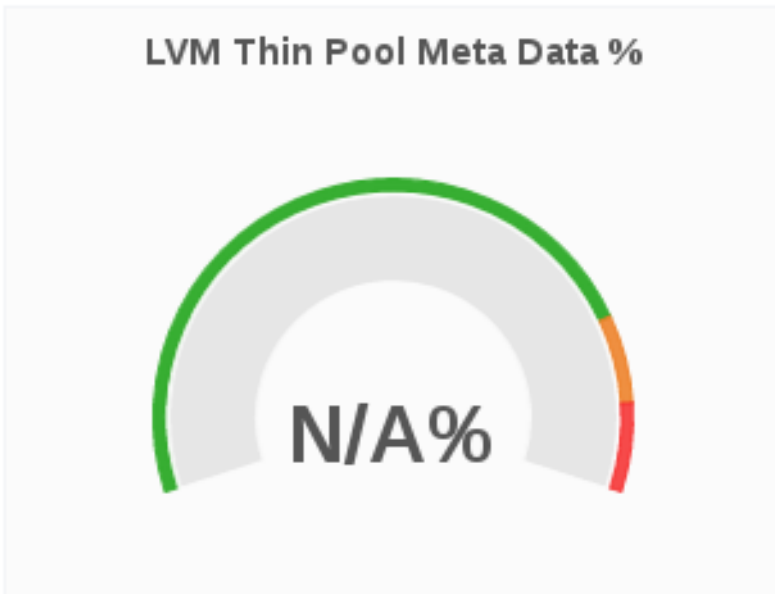
Inode Available

The Inode Available panel displays inodes free for a given brick.



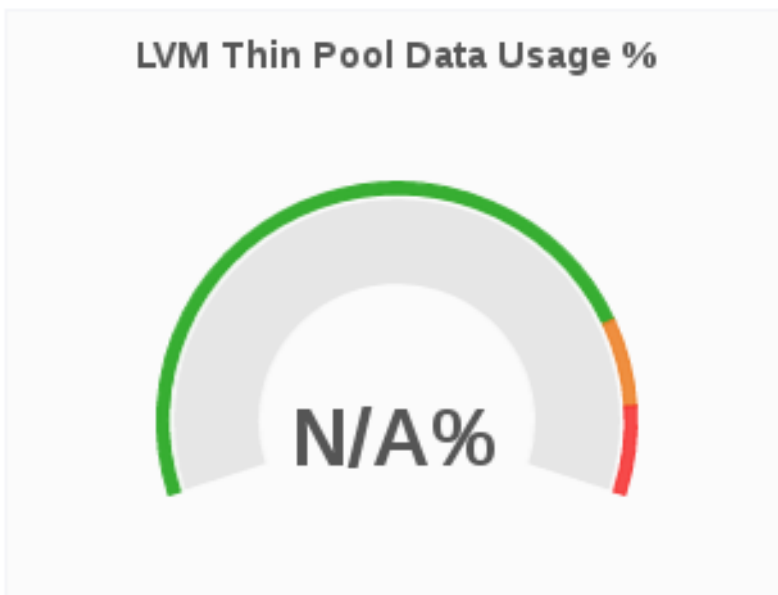
LVM Thin Pool Metadata %

The LVM Thin Pool Metadata % panel displays the utilization of LVM thin pool metadata for a given brick. Monitoring the utilization of LVM thin pool metadata and data usage is important to ensure they don't run out of space. If the data space is exhausted, I/O operations are either queued or failing based on the configuration. If metadata space is exhausted, you will observe error I/O's until the LVM pool is taken offline and repair is performed to fix potential inconsistencies. Moreover, due to the metadata transaction being aborted and the pool doing caching there might be uncommitted (to disk) I/O operations that were acknowledged to the upper storage layers (file system) so those layers will need to have checks/repairs performed as well.



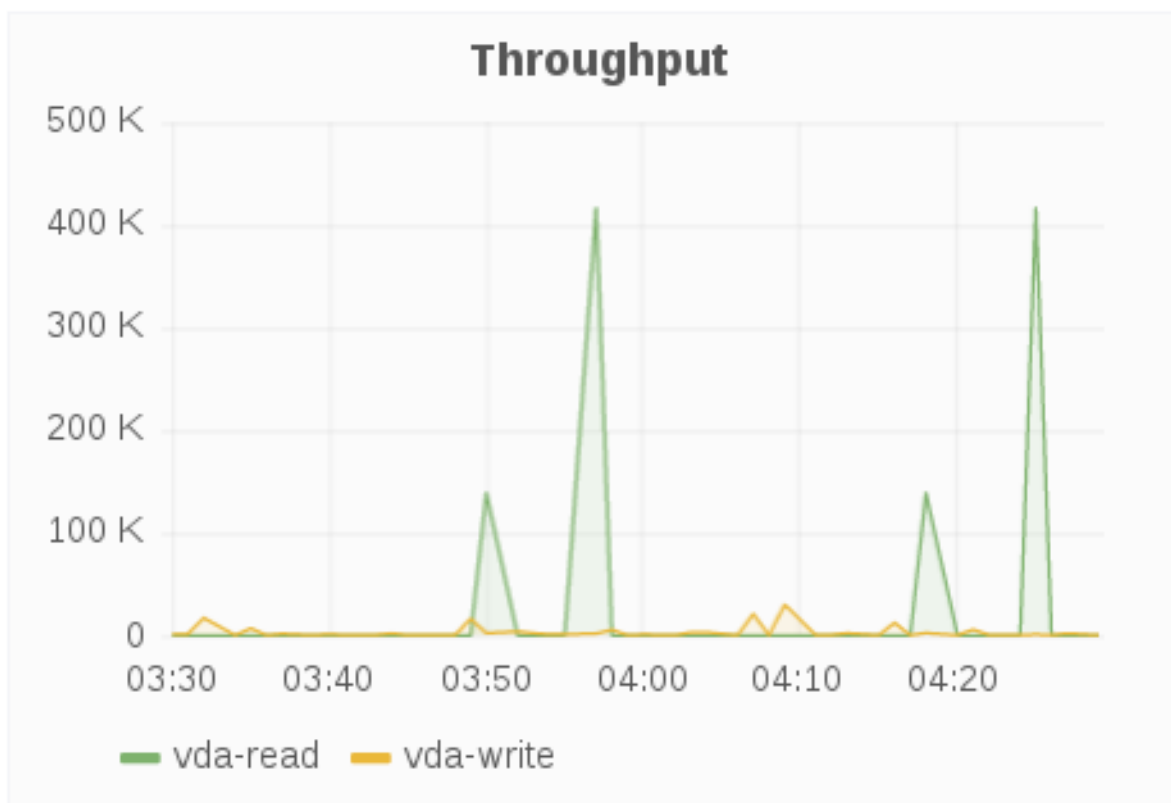
LVM Thin Pool Data Usage %

The LVM Thin Pool Data Usage % panel displays the LVM thin pool data usage for a given brick. Monitoring the utilization of LVM thin pool metadata and data usage is important to ensure they don't run out of space. If the data space is exhausted, I/O operations are either queued or failing based on the configuration. If metadata space is exhausted, you will observe error I/O's until the LVM pool is taken offline and repair is performed to fix potential inconsistencies. Moreover, due to the metadata transaction being aborted and the pool doing caching there might be uncommitted (to disk) I/O operations that were acknowledged to the upper storage layers (file system) so those layers will need to have repairs performed as well.



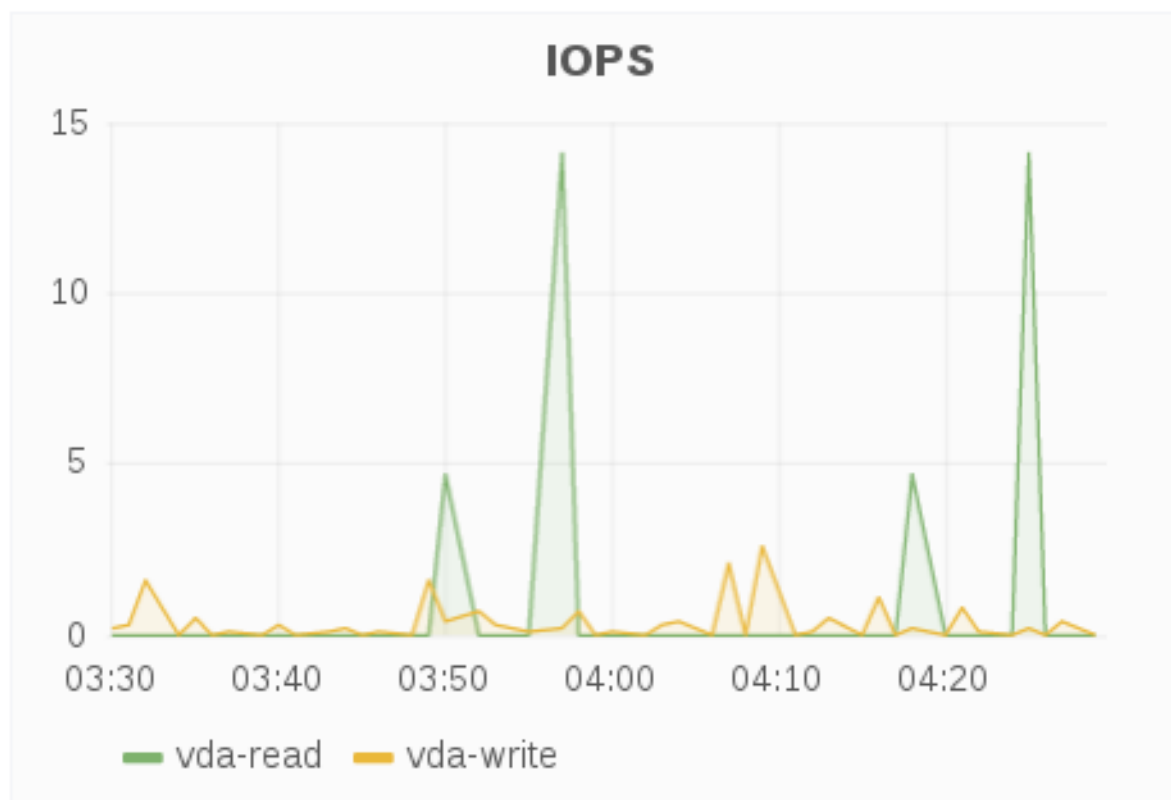
Throughput

The Throughput panel displays brick-level read and write operations fetched using "gluster volume profile."



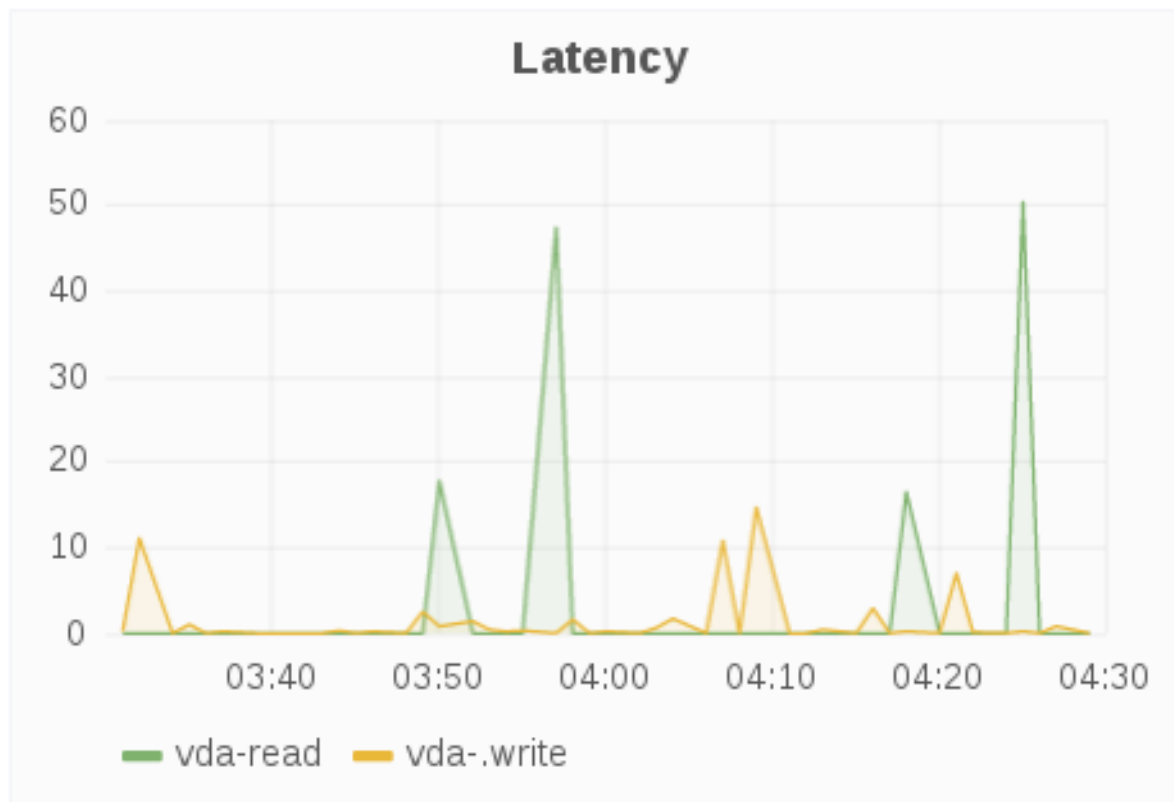
IOPS

The IOPS panel displays IOPS for a brick over a period of time. IOPS is based on brick level read and write operations.



Latency

The Latency panel displays latency for a brick over a period of time. Latency is based on the average amount of time a brick spends doing a read or write operation.



8.4.3. Brick Dashboard Metric Units

The following table shows the metrics and their corresponding measurement units.

Table 8.4. Brick Dashboard Metric Units

Metrics	Units
Capacity Utilization	Percentage %
Capacity Available	Megabyte/Gigabyte/Terabyte
Weekly Growth Rate	Megabyte/Gigabyte/Terabyte
Capacity Utilization Trend	Percentage %
Inode Utilization	Percentage %
Lvm Thin Pool Metadata	Percentage %
Lvm Thin Pool Data Usage	Percentage %
Disk Throughput	Percentage %

CHAPTER 9. USERS AND ROLES ADMINISTRATION

9.1. USER ROLES

There are three user roles available for Web Administration.

1. **Admin:** The Admin role gives complete rights to the user to manage all Web Administration operations.
2. **Normal User:** The Normal User role authorizes the user to perform operations such as importing cluster and enabling or disabling volume profiling but restricts managing users and other administrative operations.
3. **Read-only User:** Read-only: The Read-only User role authorizes the user to only view and monitor cluster-wide metrics and readable data. The user can launch Grafana dashboards from the Web Administration interface but is restricted to perform any storage operations. This role is suited for users performing monitoring tasks.

9.2. CONFIGURING ROLES

To add and configure a new user, follow these steps:

1. Log In the Web Administration interface and in navigation pane, click **Admin > Users**.
2. The users list is displayed. To add a new user, click **Add** at the right-hand side.

User ID ▾ *Filter by Use*
Add

User ID	Name	Role	Notification	Email	Actions
admin	Admin	Admin	✘ Disabled	admin@tendrl.org	Edit ⋮

3. Enter the user information in the given fields. To enable or disable email notifications, toggle the **ON-OFF** button.





Add a new local user. All user information will be stored internally in Tendrl.

User ID	<input style="width: 95%;" type="text" value="Normal"/>
Name	<input style="width: 95%;" type="text" value="John Smith"/>
Email	<input style="width: 60%;" type="text" value="jsmith@org.com"/> Email Notifications <input checked="" type="checkbox"/> ON
Password	<input style="width: 95%;" type="password" value="....."/> 👁
Confirm Password	<input style="width: 95%;" type="password" value="....."/> 👁

4. Select a **Role** from the available three roles and click **Save**.

- Select a Role
- Admin**
The Admin role permits the user to manage Tendrl and all storage operations.
 - Normal User**
The Normal user role permits the user to provision storage but cannot manage the Tendrl applications.
 - Read-only User**
The Read-only user role permits the user to access Tendrl in read-only mode, which means the user cannot actively manage storage. This role is ideal for users interested in monitoring the storage.





5. The new user is successfully created.

User ID	Name	Role	Notification	Email	Actions
admin	Admin	Admin	 Disabled	admin@tendrl.org	<input type="button" value="Edit"/> 
administrator	John Smith	Normal	 Enabled	jsmith@org.com	<input type="button" value="Edit"/> 

9.2.1. Editing Users

To edit an existing user:

1. Navigate to the user view by clicking **Admin > Users** from the interface navigation.
2. Locate the user to be edited and click **Edit** at the right-hand side.

User ID	Name	Role	Notification	Email	Actions
admin	Admin	Admin	 Disabled	admin@tendrl.org	<input type="button" value="Edit"/> 
administrator	John Smith	Normal	 Enabled	jsmith@org.com	<input type="button" value="Edit"/> 

3. Edit the required information and click **Save**.

User ID Normal

Name

Email Email Notifications ON

New Password

Confirm Password

9.2.2. Disabling Notifications and Deleting User

Enabling and Disabling Notifications

To enable notifications:

1. Navigate to the user view by clicking **Admin > Users** from the interface navigation.

User ID	Name	Role	Notification	Email	Actions
admin	Admin	Admin	Disabled	admin@tendrl.org	<input type="button" value="Edit"/>
administrator	John Smith	Normal	Enabled	jsmith@org.com	<input type="button" value="Edit"/>

2. Click the vertical elipsis next to the Edit button and click **Disable Email Notification** from the callout menu.

Email	Actions
admin@tendrl.org	<input type="button" value="Edit"/>
jsmith@org.com	<input type="button" value="Edit"/>

Disable Email Notification
Delete User

3. Email notification is successfully disabled for the user.

Email notification is now disabled for Normal. ✕

Users

User ID Filter by User ID[Add](#)

User ID	Name	Role	Notification	Email	Actions
admin	Admin	Admin	Disabled	admin@tendr1.org	Edit
Normal	John Smith	Normal	Disabled	jsmith@org.com	Edit

Deleting User

To delete an existing user:

1. Navigate to the user view by clicking **Admin > Users** from the interface navigation.
2. Locate the user to be deleted and click the vertical elipsis next to the Edit button.

Email	Actions
admin@tendr1.org	Edit
jsmith@org.com	Edit

Disable Email Notification
Delete User

3. From the callout menu, click **Delete User**.
4. A confirmation box appears. Click **Delete**.

Delete User ✕

This action will permanently remove user **Normal**. Click Delete to continue.

[Cancel](#)[Delete](#)

CHAPTER 10. ALERTS AND NOTIFICATIONS

Alerts are current problems and critical conditions that occur in the system and notified to the user. The Grafana monitoring platform generates alerts based on severity levels.

You can configure alerts via SMTP and SNMP protocols. SMTP configuration will send email alerts to users that have email notifications enabled. SNMPv3 configuration will send SNMP trap alerts to the Alerts notifications drawer of the Web Administration environment.

10.1. TYPES OF ALERTS

The alerts triggered by the dashboard are classified in the following categories:

- **Status alerts** : Alerts arising when a cluster resource undergoes a change of state. For example, Healthy to Unhealthy.
- **Utilization alerts**: Alerts arising after a cluster resource exceed the set threshold and after it reverts to the normal state. For example, when the Host CPU utilization is breached, an alert is triggered notifying the user about the event.

10.2. LIST OF ALERTS

The list of Web Administration alerts are given in the tables below.

Status Alerts

Table 10.1. Status Alerts

Alert	System Resource
volume status	Volume and Cluster
volume state	Volume and Cluster
brick status	Volume, Host, and Cluster
peer status	Cluster
rebalance status	Volume and Cluster
Geo-Replication status	Cluster
quorum of volume lost	Volume and Cluster
quorum of volume regained	Volume and Cluster
svc connected	Cluster
svc disconnected	Cluster

Alert	System Resource
minimum number of bricks not up in EC subvolume	Volume and Cluster
minimum number of bricks up in EC subvolume	Volume and Cluster
afr quorum met for subvolume	Volume and Cluster
afr quorum fail for subvolume	Volume and Cluster
afr subvolume up	Volume and Cluster
afr subvolume down	Volume and Cluster

Utilization Alerts

Table 10.2. Utilization Alerts

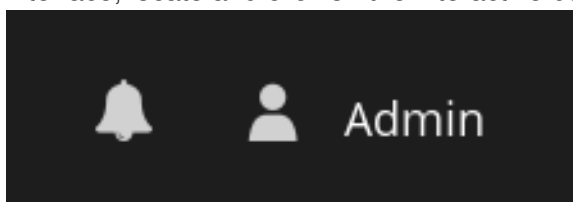
Alert	System Resource
cpu utilization	Host
memory utilization	host
swap utilization	host
volume utilization	Volume and Cluster
brick utilization	Volume and Cluster

10.3. ALERTS NOTIFICATIONS DRAWER

Alerts drawer is a notification delivery utility embedded in the Web Administration interface to display the system wide alerts.

Accessing Alerts Drawer

1. To access the Alerts drawer, log in the Web Administration interface. In the default landing interface, locate and click on the interactive bell icon on the header bar at the top right-hand side.



2. The drawer is opened displaying the number of alerts generated.

🔔
👤 Admin

Alerts
✕

6 Alerts

i 2
 ! 4

i

Memory utilization of node dhcp42-8.lab.eng.blr...

30 Nov 2017 09:34:40

i

Memory utilization of node dhcp42-11.lab.eng.b...

30 Nov 2017 09:33:01

!

Cpu utilization of node dhcp42-8.lab.eng.blr.red...

30 Nov 2017 09:12:19

!

Swap utilization of node dhcp42-8.lab.eng.blr.re...

28 Nov 2017 18:36:24

!

Status of brick: dhcp42-15.lab.eng.blr.redhat.co...

16 Nov 2017 20:34:02

!

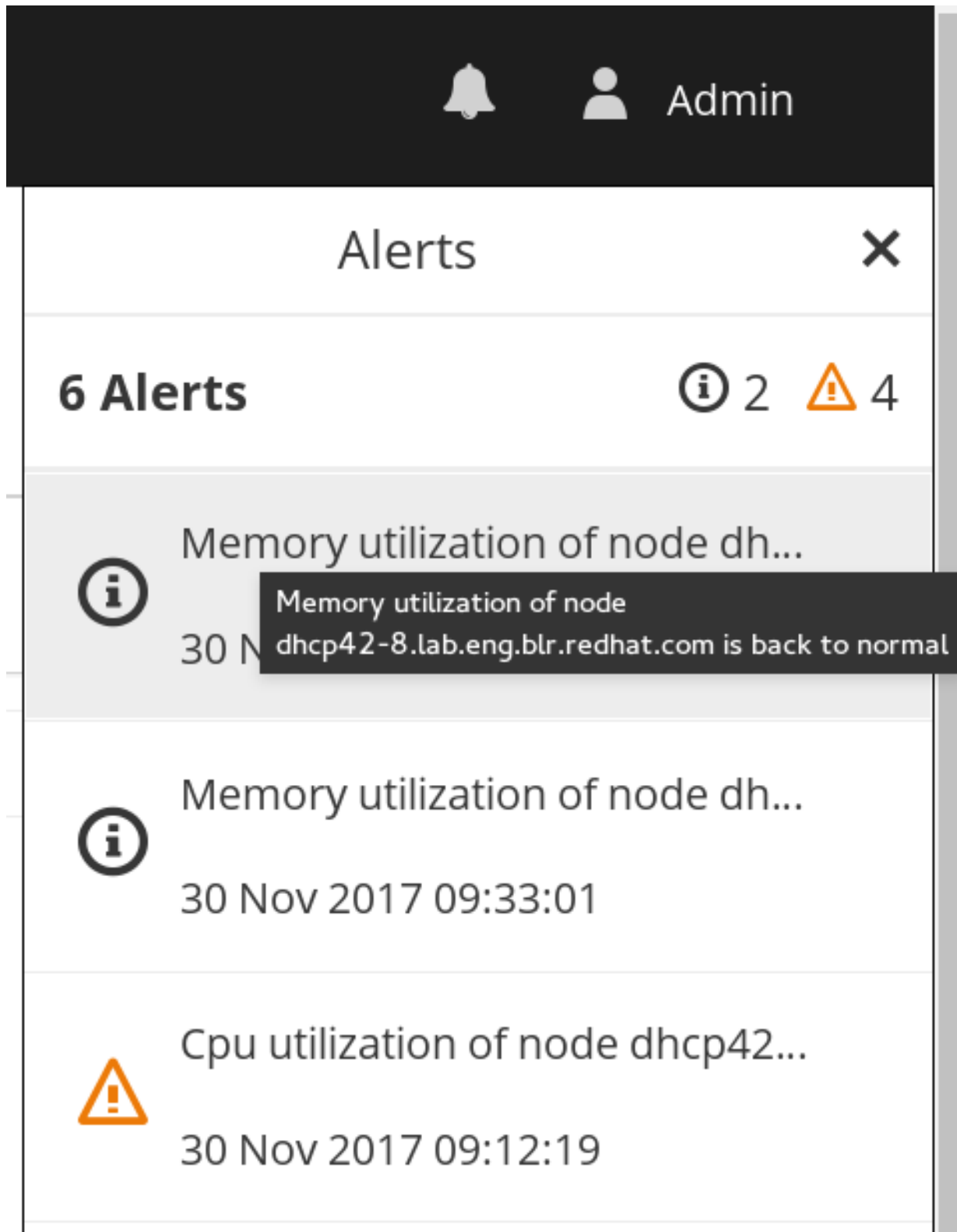
Status of brick: dhcp42-15.lab.eng.blr.redhat.co...

16 Nov 2017 20:33:54



To filter alerts, click on the status icons at the right.


 2  4


If the alert message is truncated and not viewable, hover over the alert message and a dialogue box will open displaying the complete alert message.




Alerts

6 Alerts  2  4

 Memory utilization of node dh...
30 N Memory utilization of node dhcp42-8.lab.eng.blr.redhat.com is back to normal

 Memory utilization of node dh...
30 Nov 2017 09:33:01

 Cpu utilization of node dhcp42...
30 Nov 2017 09:12:19

10.4. SMTP NOTIFICATIONS CONFIGURATION

To configure SMTP email notifications, install and configure tendrl-notifier first.

1. Install tendrl-notifier:

```
yum install tendrl-notifier
```

2. Open the `/etc/tendrl/notifier/notifier.conf.yaml` file and update:

```
etcd_connection: <FQDN of etcd server>
```



NOTE

Ensure to use FQDNs for volumes creation as Web Administration does not support short hostnames. Volumes already created in the Gluster clusters using short names or IP addresses will display inconsistent data in the Web Administration interface.

After the tendrl-notifier file is configured, configure SMTP email notifications:

1. Open the `/etc/tendrl/notifier/email.conf.yaml` file

2. Update the parameters:

```
email_id = <The sender email id>
email_smtp_server = <The smtp server>
email_smtp_port = <The smtp port>
```

3. If the SMTP server supports only authenticated email, follow the template in the `/etc/tendrl/notifier/email_auth.conf.yaml.sample` file and accordingly enable the following:

```
auth = <ssl/tls>
email_pass = <password corresponding to email_id for authenticating to
smtp server>
```

10.5. SNMPV3 NOTIFICATION CONFIGURATION

Configure SNMP

To configure SNMPv3 trap notifications, install and configure tendrl-notifier first.

1. Install tendrl-notifier:

```
yum install tendrl-notifier
```

2. Open the `/etc/tendrl/notifier/notifier.conf.yaml` file and update:

```
etcd_connection: <FQDN of etcd server>
```

**NOTE**

Ensure to use FQDNs for volumes creation as Web Administration does not support short hostnames. Volumes already created in the Gluster clusters using short names or IP addresses will display inconsistent data in the Web Administration interface.

After the `tendr1-notifier` file is configured, configure SNMPv3 trap notifications:

1. Open the **tendr1-notifier** configuration file:

```
# cat /etc/tendr1/notifier/snmp.conf.yaml
```

2. Update the parameters in the file for v3 trap alerts:

```
For v3_endpoint:
# For more hosts you can add more entry with endpoint2, endpoint3,
etc
endpoint1:

# Name or IP address of the remote SNMP host.
  host_ip: <Receiving machine ip>
# Name of the user on the host that connects to the agent.
  username: <Username of receiver>
# Enables the agent to receive packets from the host.
  auth_key: <md5 password>
# The private user password
  priv_key: <des password>

# For v2_endpoint:

# For more hosts you can add more entry with endpoint2, endpoint3,
etc

endpoint1:
# Name or IP address of the remote SNMP host.
  host_ip: <Receiving machine ip>
  community: <community name>
```

CHAPTER 11. TROUBLESHOOTING

Importing Cluster

Scenario 1: Successive attempts to import the same cluster on the same Web Administration server fails

In this scenario, when you attempt reimporting the previously failed cluster, It will continue to fail.

Resolution

To resolve this issue, clean up the Tendrl central store (etcd) by following the Unmanage Cluster procedure. For details, navigate to the [Unmanaging Cluster](#) section of this Guide.

Scenario 2: The Import cluster UI button is disabled after a failed cluster import operation.

In this scenario, when cluster import fails, the Import button is disabled.

Resolution

To resolve this issue, uninstall Web Administration and install it again. For uninstall instructions, navigate to the [Unmanaging Cluster](#) section of this Guide. For installation instructions, see the [Installing Web Administration](#) chapter in the *Red Hat Gluster Storage Web Administration Quick Start Guide*.

Common Scenario

For any cluster import fail scenario, the current troubleshooting method is to uninstall Web Administration, unmanage the cluster and reinstall Web Administration using tendrl-asnible. For details, navigate to the [Unmanaging Cluster](#) section of this Guide.