Describing Red Hat Ceph Storage Architecture

Objectives

After completing this section, you should be able to describe the Red Hat Ceph Storage architecture, introduce the Object Storage Cluster, and describe the choices in data access methods.

Introducing the Ceph Cluster Architecture

Red Hat Ceph Storage is a distributed data object store. It is an enterprise-ready, software-defined storage solution that scales to thousands of clients who access exabytes of data and beyond. Ceph is designed to provide excellent performance, reliability, and scalability.

Ceph has a modular and distributed architecture that contains the following elements:

- An object storage back end that is known as RADOS (Reliable Autonomic Distributed Object Store)
- Various access methods to interact with RADOS

RADOS is a self-healing and self-managing software-based object store.

Ceph Storage Back-end Components

The Red Hat Ceph Storage cluster has the following daemons:

- *Monitors (MONs)* maintain maps of the cluster state. They help the other daemons to coordinate with each other.
- *Object Storage Devices (OSDs)* store data and handle data replication, recovery, and rebalancing.
- *Managers (MGRs)* track runtime metrics and expose cluster information through a browser-based dashboard and REST API.
- *Metadata Servers (MDSes)* store metadata that CephFS uses (but not object storage or block storage) so that clients can run POSIX commands efficiently.

These daemons can scale to meet the requirements of a deployed storage cluster.

Ceph Monitors

Ceph Monitors (MONs) are the daemons that maintain the cluster map. The cluster map is a collection of five maps that contain information about the state of the cluster and its configuration. Ceph must handle each cluster event, update the appropriate map, and replicate the updated map to each MON daemon.

To apply updates, the MONs must establish a consensus on the state of the cluster. A majority of the configured monitors must be available and agree on the map update. Configure your Ceph clusters with an odd number of monitors to ensure that the monitors can establish a quorum when they vote on the state of the cluster. More than half of the configured monitors must be functional for the Ceph storage cluster to be operational and accessible.