

# CLUSTER OPERATIONS

## HIGH-LEVEL OPERATIONS

High-level cluster operations consist primarily of starting, stopping, and restarting a cluster with the ceph service; checking the cluster's health; and, monitoring an operating cluster.

- [Operating a Cluster](#)
- [Monitoring a Cluster](#)
- [Monitoring OSDs and PGs](#)
- [Authentication Overview](#)
- [Cephx Authentication](#)

## LOW-LEVEL OPERATIONS

Low-level cluster operations consist of starting, stopping, and restarting a particular daemon within a cluster; changing the settings of a particular daemon or subsystem; and, adding a daemon to the cluster or removing a daemon from the cluster. The most common use cases for low-level operations include growing or shrinking the Ceph cluster and replacing legacy or failed hardware with new hardware.

- [Adding/Removing OSDs](#)
- [Adding/Removing Monitors](#)
- [Command Reference](#)

## DATA PLACEMENT

Once you have your cluster up and running, you may begin working with data placement. Ceph supports petabyte-scale data storage clusters, with storage pools and placement groups that distribute data across the cluster using Ceph's CRUSH algorithm.

- [Data Placement Overview](#)
- [Pools](#)
- [Placement Groups](#)
- [CRUSH Maps](#)

## TROUBLESHOOTING

Ceph is still on the leading edge, so you may encounter situations that require you to evaluate your Ceph configuration and modify your logging and debugging settings to identify and remedy issues you are encountering with your cluster.

- [The Ceph Community](#)
- [Recovering from Monitor Failures](#)
- [Troubleshooting OSDs](#)
- [Troubleshooting PGs](#)
- [Logging and Debugging](#)
- [CPU Profiling](#)
- [Memory Profiling](#)