MONITORING A CLUSTER

Once you have a running cluster, you may use the ceph tool to monitor your cluster. Monitoring a cluster typically involves checking OSD status, monitor status, placement group status and metadata server status.

INTERACTIVE MODE

To run the ceph tool in interactive mode, type ceph at the command line with no arguments. For example:

```
ceph
ceph> health
ceph> status
ceph> quorum_status
ceph> mon_status
```

CHECKING CLUSTER HEALTH

After you start your cluster, and before you start reading and/or writing data, check your cluster's health first. You can check on the health of your Ceph cluster with the following:

```
ceph health
```

If you specified non-default locations for your configuration or keyring, you may specify their locations:

```
ceph -c /path/to/conf -k /path/to/keyring health
```

Upon starting the Ceph cluster, you will likely encounter a health warning such as `HEALTH_WARN XXX num placement groups stale`. Wait a few moments and check it again. When your cluster is ready, `ceph health` should return a message such as `HEALTH_OK`. At that point, it is okay to begin using the cluster.

WATCHING A CLUSTER

To watch the cluster's ongoing events, open a new terminal. Then, enter:

```
ceph -w
```

Ceph will print each version of the placement group map and their status. For example, a tiny Ceph cluster consisting of one monitor, one metadata server and two OSDs may print the following:

```
health HEALTH_OK
monmap e1: 1 mons at {a=192.168.0.1:6789/0}, election epoch 0, quorum 0 a
osdmap e13: 2 osds: 2 up, 2 in
 placement groupmap v9713: 384 placement groups: 384 active+clean; 8730 bytes data, 22948 MB
mdsmap e4: 1/1/1 up {0=a=up:active}

     2012-08-01 11:33:53.831268 mon.0 [INF] placement groupmap v9712: 384 placement groups: 3
     2012-08-01 11:35:31.904650 mon.0 [INF] placement groupmap v9713: 384 placement groups: 3
     2012-08-01 11:35:53.903189 mon.0 [INF] placement groupmap v9714: 384 placement groups: 3
     2012-08-01 11:37:31.865809 mon.0 [INF] placement groupmap v9715: 384 placement groups: 3
```

CHECKING A CLUSTER'S STATUS

To check a cluster's status, execute the following:

```
ceph status
```

Or:

```
ceph -s
```

In interactive mode, type `status` and press **Enter**.

```
ceph> status
```

Ceph will print the cluster status. For example, a tiny Ceph cluster consisting of one monitor, one metadata server and two OSDs may print the following:

```
health HEALTH_OK
monmap e1: 1 mons at {a=192.168.0.1:6789/0}, election epoch 0, quorum 0 a
osdmap e13: 2 osds: 2 up, 2 in
 placement groupmap v9754: 384 placement groups: 384 active+clean; 8730 bytes data, 22948 MB
mdsmap e4: 1/1/1 up {0=a=up:active}
```

CHECKING OSD STATUS

You can check OSDs to ensure they are up and in by executing:

```
ceph osd stat
```

Or:

```
ceph osd dump
```

You can also check view OSDs according to their position in the CRUSH map.

```
ceph osd tree
```

Ceph will print out a CRUSH tree with a host, its OSDs, whether they are up and their weight.

```
# id    weight  type name       up/down reweight
-1      3       pool default
-3      3               rack mainrack
-2      3                       host osd-host
0       1                               osd.0   up      1
1       1                               osd.1   up      1
2       1                               osd.2   up      1
```

For a detailed discussion, refer to Monitoring OSDs and Placement Groups.

CHECKING MONITOR STATUS

If your cluster has multiple monitors (likely), you should check the monitor quorum status after you start the cluster before reading and/or writing data. A quorum must be present when multiple monitors are running. You should also check monitor status periodically to ensure that they are running.

To see display the monitor map, execute the following:

```
ceph mon stat
```

Or:

```
ceph mon dump
```

To check the quorum status for the monitor cluster, execute the following:

```
ceph quorum_status
```

Ceph will return the quorum status. For example, a Ceph cluster consisting of three monitors may return the following:

```
{ "election_epoch": 10,
  "quorum": [
        0,
        1,
        2],
  "monmap": { "epoch": 1,
      "fsid": "444b489c-4f16-4b75-83f0-cb8097468898",
      "modified": "2011-12-12 13:28:27.505520",
      "created": "2011-12-12 13:28:27.505520",
      "mons": [
            { "rank": 0,
              "name": "a",
              "addr": "127.0.0.1:6789\/0"},
            { "rank": 1,
              "name": "b",
              "addr": "127.0.0.1:6790\/0"},
            { "rank": 2,
              "name": "c",
              "addr": "127.0.0.1:6791\/0"}
           ]
    }
}
```

CHECKING MDS STATUS

Metadata servers provide metadata services for Ceph FS. Metadata servers have two sets of states: `up | down` and `active | inactive`. To ensure your metadata servers are up and `active`, execute the following:

```
ceph mds stat
```

To display details of the metadata cluster, execute the following:

```
ceph mds dump
```

CHECKING PLACEMENT GROUP STATES

Placement groups map objects to OSDs. When you monitor your placement groups, you will want them to be `active` and `clean`. For a detailed discussion, refer to Monitoring OSDs and Placement Groups.

USING THE ADMIN SOCKET

The Ceph admin socket allows you to query a daemon via a socket interface. By default, Ceph sockets reside under `/var/run/ceph`. To access a daemon via the admin socket, login to the host running the daemon and use the following command:

```
ceph --admin-daemon /var/run/ceph/{socket-name}
```

To view the available admin socket commands, execute the following command:

```
ceph --admin-daemon /var/run/ceph/{socket-name} help
```

The admin socket command enables you to show and set your configuration at runtime. See Viewing a Configuration at Runtime for details.

Additionally, you can set configuration values at runtime directly (i.e., the admin socket bypasses the monitor, unlike ceph `{daemon-type} tell {id} injectargs`, which relies on the monitor but doesn't require you to login directly to the host in question).