CRUSH Map Management

The cluster keeps a compiled binary representation of the CRUSH map. You can modify it by:

- Using the `ceph osd crush` command.
- Extracting and decompiling the binary CRUSH map to plain text, editing the text file, recompiling it to binary format, and importing it back into the cluster.

It is usually easier to update the CRUSH map with the `ceph osd crush` command. However, there are less common scenarios which can only be implemented by using the second method.

Customizing the CRUSH Map Using Ceph Commands

This example creates a new bucket:

```
[ceph: root@node /]# ceph osd crush add-bucket name type
```

For example, these commands create three new buckets, one of the `datacenter` type and two of the `rack` type:

```
[ceph: root@node /]# ceph osd crush add-bucket DC1 datacenter
added bucket DC1 type datacenter to crush map
[ceph: root@node /]# ceph osd crush add-bucket rackA1 rack
added bucket rackA1 type rack to crush map
[ceph: root@node /]# ceph osd crush add-bucket rackB1 rack
added bucket rackB1 type rack to crush map
```

You can then organize the new buckets in a hierarchy with the following command:

```
[ceph: root@node /]# ceph osd crush move name type=parent
```

You also use this command to reorganize the tree. For example, the following commands attach the two rack buckets from the previous example to the data center bucket, and attaches the data center bucket to the default root bucket:

```
[ceph: root@node /]# ceph osd crush move rackA1 datacenter=DC1
moved item id -10 name 'rackA1' to location {datacenter=DC1} in crush map
[ceph: root@node /]# ceph osd crush move rackB1 datacenter=DC1
moved item id -11 name 'rackB1' to location {datacenter=DC1} in crush map
[ceph: root@node /]# ceph osd crush move DC1 root=default
moved item id -9 name 'DC1' to location {root=default} in crush map
```

Setting the Location of OSDs

After you have created your custom bucket hierarchy, place the OSDs as leaves on this tree. Each OSD has a location, which is a string defining the full path to the OSD from the root of the tree. For example, the location of an OSD attached to the `rackA1` bucket is:

```
root=default datacenter=DC1 rack=rackA1
```