POOLS

When you first deploy a cluster without creating a pool, Ceph uses the default pools for storing data. A pool differs from CRUSH's location-based buckets in that a pool doesn't have a single physical location, and a pool provides you with some additional functionality, including:

- **Replicas**: You can set the desired number of copies/replicas of an object. A typical configuration stores an object and one additional copy (i.e., `size = 2`), but you can determine the number of copies/replicas.
- **Placement Groups**: You can set the number of placement groups for the pool. A typical configuration uses approximately 100 placement groups per OSD to provide optimal balancing without using up too many computing resources. When setting up multiple pools, be careful to ensure you set a reasonable number of placement groups for both the pool and the cluster as a whole.
- **CRUSH Rules**: When you store data in a pool, a CRUSH ruleset mapped to the pool enables CRUSH to identify a rule for the placement of the primary object and object replicas in your cluster. You can create a custom CRUSH rule for your pool.
- **Snapshots**: When you create snapshots with `ceph osd pool mksnap`, you effectively take a snapshot of a particular pool.
- **Set Ownership**: You can set a user ID as the owner of a pool.

To organize data into pools, you can list, create, and remove pools. You can also view the utilization statistics for each pool.

LIST POOLS

To list your cluster's pools, execute:

```
ceph osd lspools
```

The default pools include:

- `data`
- `metadata`
- `rbd`

CREATE A POOL

To create a pool, execute:

```
ceph osd pool create {pool-name} {pg-num} [{pgp-num}]
```

Where:

`{pool-name}`

Description: The name of the pool. It must be unique.
Type: String
Required: Yes

`{pg-num}`

Description: The total number of placement groups for the pool. See Placement Groups for details on calculating a suitable number. The default value 8 is NOT suitable for most systems.
Type: Integer
Required: Yes
Default: 8

`{pgp-num}`

Description: The total number of placement groups for placement purposes. This **should be equal to the total number of placement groups**, except for placement group splitting scenarios.
Type: Integer

Required: Yes
Default: 8

When you create a pool, set the number of placement groups to a reasonable value (e.g., 100). Consider the total number of placement groups per OSD too. Placement groups are computationally expensive, so performance will degrade when you have many pools with many placement groups (e.g., 50 pools with 100 placement groups each). The point of diminishing returns depends upon the power of the OSD host.

Important: Increasing the number of placement groups in a pool after you create the pool is still an experimental feature in Bobtail (v 0.56). We recommend defining a reasonable number of placement groups and maintaining that number until Ceph's placement group splitting and merging functionality matures.

See Placement Groups for details on calculating an appropriate number of placement groups for your pool.

DELETE A POOL

To delete a pool, execute:

```
ceph osd pool delete {pool-name} [{pool-name} --yes-i-really-really-mean-it]
```

If you created your own rulesets and rules for a pool you created, you should consider removing them when you no longer need your pool. If you created users with permissions strictly for a pool that no longer exists, you should consider deleting those users too.

RENAME A POOL

To rename a pool, execute:

```
ceph osd pool rename {current-pool-name} {new-pool-name}
```

If you rename a pool and you have per-pool capabilities for an authenticated user, you must update the user's capabilities (i.e., caps) with the new pool name.

Note: Version 0.48 Argonaut and above.

SHOW POOL STATISTICS

To show a pool's utilization statistics, execute:

```
rados df
```

MAKE A SNAPSHOT OF A POOL

To make a snapshot of a pool, execute:

```
ceph osd pool mksnap {pool-name} {snap-name}
```

Note: Version 0.48 Argonaut and above.

REMOVE A SNAPSHOT OF A POOL

To remove a snapshot of a pool, execute:

```
ceph osd pool rmsnap {pool-name} {snap-name}
```

Note: Version 0.48 Argonaut and above.

SET POOL VALUES

To set a value to a pool, execute the following:

```
ceph osd pool set {pool-name} {key} {value}
```

You may set values for the following keys:

`size`

Description: Sets the number of replicas for objects in the pool. See Set the Number of Object Replicas for further details.
Type: Integer

`min_size`

Description: Sets the minimum number of replicas required for io. See Set the Number of Object Replicas for further details
Type: Integer

Note: Version 0.54 and above

`crash_replay_interval`

Description: The number of seconds to allow clients to replay acknowledged, but uncommitted requests.
Type: Integer

`pgp_num`

Description: The effective number of placement groups to use when calculating data placement.
Type: Integer
Valid Range: Equal to or less than `pg_num`.

`crush_ruleset`

Description: The ruleset to use for mapping object placement in the cluster.
Type: Integer

Note: Version 0.48 Argonaut and above.

GET POOL VALUES

To set a value to a pool, execute the following:

```
ceph osd pool get {pool-name} {key}
```

`pg_num`

Description: The number of placement groups for the pool.
Type: Integer

`pgp_num`

Description: The effective number of placement groups to use when calculating data placement.

Type: Integer
Valid Range: Equal to or less than pg_num.

SET THE NUMBER OF OBJECT REPLICAS

To set the number of object replicas, execute the following:

```
ceph osd pool set {poolname} size {num-replicas}
```

Important: The {num-replicas} includes the object itself. If you want the object and two copies of the object for a total of three instances of the object, specify 3.

For example:

```
ceph osd pool set data size 3
```

You may execute this command for each pool.

Note, however, that pool size is more of a best-effort setting: an object might accept ios in degraded mode with fewer than size replicas. To set a minimum number of required replicas for io, you should use the min_size setting.

For example:

```
ceph osd pool set data min_size 2
```

This ensures that no object in the data pool will receive io with fewer than min_size replicas.

GET THE NUMBER OF OBJECT REPLICAS

To get the number of object replicas, execute the following:

```
ceph osd dump | grep 'rep size'
```

Ceph will list the pools, with the rep size attribute highlighted. By default, Ceph creates two replicas of an object (two copies).