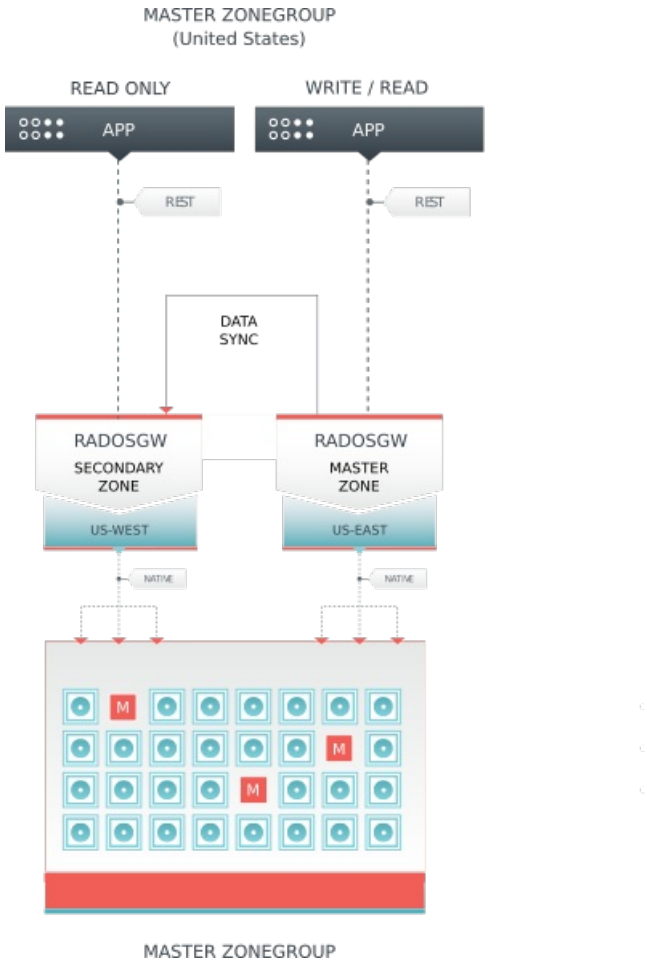
MULTI-SITE

New in version Jewel.

A single zone configuration typically consists of one zone group containing one zone and one or more *ceph-radosgw* instances where you may load-balance gateway client requests between the instances. In a single zone configuration, typically multiple gateway instances point to a single Ceph storage cluster. However, Kraken supports several multi-site configuration options for the Ceph Object Gateway:

- **Multi-zone:** A more advanced configuration consists of one zone group and multiple zones, each zone with one or more *ceph-radosgw* instances. Each zone is backed by its own Ceph Storage Cluster. Multiple zones in a zone group provides disaster recovery for the zone group should one of the zones experience a significant failure. In Kraken, each zone is active and may receive write operations. In addition to disaster recovery, multiple active zones may also serve as a foundation for content delivery networks.
- **Multi-zone-group:** Formerly called 'regions', Ceph Object Gateway can also support multiple zone groups, each zone group with one or more zones. Objects stored to zones in one zone group within the same realm as another zone group will share a global object namespace, ensuring unique object IDs across zone groups and zones.
- **Multiple Realms:** In Kraken, the Ceph Object Gateway supports the notion of realms, which can be a single zone group or multiple zone groups and a globally unique namespace for the realm. Multiple realms provide the ability to support numerous configurations and namespaces.

Replicating object data between zones within a zone group looks something like this:



For additional details on setting up a cluster, see Ceph Object Gateway for Production.

FUNCTIONAL CHANGES FROM INFERNALIS

In Kraken, you can configure each Ceph Object Gateway to work in an active-active zone configuration, allowing for writes to non-master zones.

The multi-site configuration is stored within a container called a "realm." The realm stores zone groups, zones, and a time "period" with multiple epochs for tracking changes to the configuration. In Kraken, the `ceph-radosgw` daemons handle the synchronization, eliminating the need for a separate synchronization agent. Additionally, the new approach to synchronization allows the Ceph Object Gateway to operate with an "active-active" configuration instead of "active-passive".

REQUIREMENTS AND ASSUMPTIONS

A multi-site configuration requires at least two Ceph storage clusters, preferably given a distinct cluster name. At least two Ceph object gateway instances, one for each Ceph storage cluster.

This guide assumes at least two Ceph storage clusters in geographically separate locations; however, the configuration can work on the same site. This guide also assumes two Ceph object gateway servers named `rgw1` and `rgw2`.

A multi-site configuration requires a master zone group and a master zone. Additionally, each zone group requires a master zone. Zone groups may have one or more secondary or non-master zones.

In this guide, the `rgw1` host will serve as the master zone of the master zone group; and, the `rgw2` host will serve as the secondary zone of the master zone group.

See Pools for instructions on creating and tuning pools for Ceph Object Storage.

CONFIGURING A MASTER ZONE

All gateways in a multi-site configuration will retrieve their configuration from a `ceph-radosgw` daemon on a host within the master zone group and master zone. To configure your gateways in a multi-site configuration, choose a `ceph-radosgw` instance to configure the master zone group and master zone.

CREATE A REALM

A realm contains the multi-site configuration of zone groups and zones and also serves to enforce a globally unique namespace within the realm.

Create a new realm for the multi-site configuration by opening a command line interface on a host identified to serve in the master zone group and zone. Then, execute the following:

```
# radosgw-admin realm create --rgw-realm={realm-name} [--default]
```

For example:

```
# radosgw-admin realm create --rgw-realm=movies --default
```

If the cluster will have a single realm, specify the `--default` flag. If `--default` is specified, `radosgw-admin` will use this realm by default. If `--default` is not specified, adding zone-groups and zones requires specifying either the `--rgw-realm` flag or the `--realm-id` flag to identify the realm when adding zone groups and zones.

After creating the realm, `radosgw-admin` will echo back the realm configuration. For example:

```
{
    "id": "0956b174-fe14-4f97-8b50-bb7ec5e1cf62",
    "name": "movies",
    "current_period": "1950b710-3e63-4c41-a19e-46a715000980",
    "epoch": 1
}
```

Note: Ceph generates a unique ID for the realm, which allows the renaming of a realm if the need arises.

CREATE A MASTER ZONE GROUP

A realm must have at least one zone group, which will serve as the master zone group for the realm.

Create a new master zone group for the multi-site configuration by opening a command line interface on a host identified to serve in the master zone group and zone. Then, execute the following:

```
# radosgw-admin zonegroup create --rgw-zonegroup={name} --endpoints={url} [--rgw-realm={realm
```

For example:

```
# radosgw-admin zonegroup create --rgw-zonegroup=us --endpoints=http://rgw1:80 --rgw-realm=mo
```

If the realm will only have a single zone group, specify the `--default` flag. If `--default` is specified, `radosgw-admin` will use this zone group by default when adding new zones. If `--default` is not specified, adding zones will require either the `--rgw-zonegroup` flag or the `--zonegroup-id` flag to identify the zone group when adding or modifying zones.

After creating the master zone group, `radosgw-admin` will echo back the zone group configuration. For example:

```
{
    "id": "f1a233f5-c354-4107-b36c-df66126475a6",
    "name": "us",
    "api_name": "us",
    "is_master": "true",
    "endpoints": [
        "http:\/\/rgw1:80"
    ],
    "hostnames": [],
    "hostnames_s3webzone": [],
    "master_zone": "",
    "zones": [],
    "placement_targets": [],
    "default_placement": "",
    "realm_id": "0956b174-fe14-4f97-8b50-bb7ec5e1cf62"
}
```

CREATE A MASTER ZONE

Important: Zones must be created on a Ceph Object Gateway node that will be within the zone.

Create a new master zone for the multi-site configuration by opening a command line interface on a host identified to serve in the master zone group and zone. Then, execute the following:

```
# radosgw-admin zone create --rgw-zonegroup={zone-group-name} \
                            --rgw-zone={zone-name} \
                            --master --default \
                            --endpoints={http://fqdn}[,{http://fqdn}]
```

For example:

```
# radosgw-admin zone create --rgw-zonegroup=us --rgw-zone=us-east \
                            --master --default \
                            --endpoints={http://fqdn}[,{http://fqdn}]
```

Note: The `--access-key` and `--secret` aren't specified. These settings will be added to the zone once the user is created in the next section.

Important: The following steps assume a multi-site configuration using newly installed systems that aren't storing data yet. DO NOT DELETE the `default` zone and its pools if you are already using it to store data, or the data will be deleted and unrecoverable.

DELETE DEFAULT ZONE GROUP AND ZONE

Delete the `default` zone if it exists. Make sure to remove it from the default zone group first.

```
# radosgw-admin zonegroup remove --rgw-zonegroup=default --rgw-zone=default
# radosgw-admin period update --commit
# radosgw-admin zone delete --rgw-zone=default
# radosgw-admin period update --commit
```

```
# radosgw-admin zonegroup delete --rgw-zonegroup=default
# radosgw-admin period update --commit
```

Finally, delete the `default` pools in your Ceph storage cluster if they exist.

Important: The following step assumes a multi-site configuration using newly installed systems that aren't currently storing data. DO NOT DELETE the `default` zone group if you are already using it to store data.

```
# rados rmpool default.rgw.control default.rgw.control --yes-i-really-really-mean-it
# rados rmpool default.rgw.data.root default.rgw.data.root --yes-i-really-really-mean-it
# rados rmpool default.rgw.gc default.rgw.gc --yes-i-really-really-mean-it
# rados rmpool default.rgw.log default.rgw.log --yes-i-really-really-mean-it
# rados rmpool default.rgw.users.uid default.rgw.users.uid --yes-i-really-really-mean-it
```

CREATE A SYSTEM USER

The `ceph-radosgw` daemons must authenticate before pulling realm and period information. In the master zone, create a system user to facilitate authentication between daemons.

```
# radosgw-admin user create --uid="{user-name}" --display-name="{Display Name}" --system
```

For example:

```
# radosgw-admin user create --uid="synchronization-user" --display-name="Synchronization User
```

Make a note of the `access_key` and `secret_key`, as the secondary zones will require them to authenticate with the master zone.

Finally, add the system user to the master zone.

```
# radosgw-admin zone modify --rgw-zone=us-east --access-key={access-key} --secret={secret}
# radosgw-admin period update --commit
```

UPDATE THE PERIOD

After updating the master zone configuration, update the period.

```
# radosgw-admin period update --commit
```

Note: Updating the period changes the epoch, and ensures that other zones will receive the updated configuration.

UPDATE THE CEPH CONFIGURATION FILE

Update the Ceph configuration file on master zone hosts by adding the `rgw_zone` configuration option and the name of the master zone to the instance entry.

```
[client.rgw.{instance-name}]
...
rgw_zone={zone-name}
```

For example:

```
[client.rgw.rgw1]
host = rgw1
rgw frontends = "civetweb port=80"
```

```
rgw_zone=us-east
```

START THE GATEWAY

On the object gateway host, start and enable the Ceph Object Gateway service:

```
# systemctl start ceph-radosgw@rgw.`hostname -s`
# systemctl enable ceph-radosgw@rgw.`hostname -s`
```

CONFIGURE SECONDARY ZONES

Zones within a zone group replicate all data to ensure that each zone has the same data. When creating the secondary zone, execute all of the following operations on a host identified to serve the secondary zone.

Note: To add a third zone, follow the same procedures as for adding the secondary zone. Use different zone name.

Important: You must execute metadata operations, such as user creation, on a host within the master zone. The master zone and the secondary zone can receive bucket operations, but the secondary zone redirects bucket operations to the master zone. If the master zone is down, bucket operations will fail.

PULL THE REALM

Using the URL path, access key and secret of the master zone in the master zone group, pull the realm to the host. To pull a non-default realm, specify the realm using the `--rgw-realm` or `--realm-id` configuration options.

```
# radosgw-admin realm pull --url={url-to-master-zone-gateway} --access-key={access-key} --sec
```

If this realm is the default realm or the only realm, make the realm the default realm.

```
# radosgw-admin realm default --rgw-realm={realm-name}
```

PULL THE PERIOD

Using the URL path, access key and secret of the master zone in the master zone group, pull the period to the host. To pull a period from a non-default realm, specify the realm using the `--rgw-realm` or `--realm-id` configuration options.

```
# radosgw-admin period pull --url={url-to-master-zone-gateway} --access-key={access-key} --se
```

Note: Pulling the period retrieves the latest version of the zone group and zone configurations for the realm.

CREATE A SECONDARY ZONE

Important: Zones must be created on a Ceph Object Gateway node that will be within the zone.

Create a secondary zone for the multi-site configuration by opening a command line interface on a host identified to serve the secondary zone. Specify the zone group ID, the new zone name and an endpoint for the zone. **DO NOT** use the `--master` or `--default` flags. In Kraken, all zones run in an active-active configuration by default; that is, a gateway client may write data to any zone and the zone will replicate the data to all other zones within the zone group. If the secondary zone should not accept write operations, specify the `--read-only` flag to create an active-passive configuration between the master zone and the secondary zone. Additionally, provide the `access_key` and `secret_key` of the generated system user stored in the master zone of the master zone group. Execute the following:

```
# radosgw-admin zone create --rgw-zonegroup={zone-group-name}\
```

```
                              --rgw-zone={zone-name} --endpoints={url} \
                              --access-key={system-key} --secret={secret}\
                              --endpoints=http://{fqdn}:80 \
                              [--read-only]
```

For example:

```
# radosgw-admin zone create --rgw-zonegroup=us --rgw-zone=us-west \
                              --access-key={system-key} --secret={secret} \
                              --endpoints=http://rgw2:80
```

Important: The following steps assume a multi-site configuration using newly installed systems that aren't storing data. **DO NOT DELETE** the `default` zone and its pools if you are already using it to store data, or the data will be lost and unrecoverable.

Delete the default zone if needed.

```
# radosgw-admin zone delete --rgw-zone=default
```

Finally, delete the default pools in your Ceph storage cluster if needed.

```
# rados rmpool default.rgw.control default.rgw.control --yes-i-really-really-mean-it
# rados rmpool default.rgw.data.root default.rgw.data.root --yes-i-really-really-mean-it
# rados rmpool default.rgw.gc default.rgw.gc --yes-i-really-really-mean-it
# rados rmpool default.rgw.log default.rgw.log --yes-i-really-really-mean-it
# rados rmpool default.rgw.users.uid default.rgw.users.uid --yes-i-really-really-mean-it
```

UPDATE THE CEPH CONFIGURATION FILE

Update the Ceph configuration file on the secondary zone hosts by adding the `rgw_zone` configuration option and the name of the secondary zone to the instance entry.

```
[client.rgw.{instance-name}]
...
rgw_zone={zone-name}
```

For example:

```
[client.rgw.rgw2]
host = rgw2
rgw frontends = "civetweb port=80"
rgw_zone=us-west
```

UPDATE THE PERIOD

After updating the master zone configuration, update the period.

```
# radosgw-admin period update --commit
```

Note: Updating the period changes the epoch, and ensures that other zones will receive the updated configuration.

START THE GATEWAY

On the object gateway host, start and enable the Ceph Object Gateway service:

```
# systemctl start ceph-radosgw@rgw.`hostname -s`
```

```
# systemctl enable ceph-radosgw@rgw.`hostname -s`
```

CHECK SYNCHRONIZATION STATUS

Once the secondary zone is up and running, check the synchronization status. Synchronization copies users and buckets created in the master zone to the secondary zone.

```
# radosgw-admin sync status
```

The output will provide the status of synchronization operations. For example:

```
realm f3239bc5-e1a8-4206-a81d-e1576480804d (earth)
    zonegroup c50dbb7e-d9ce-47cc-a8bb-97d9b399d388 (us)
         zone 4c453b70-4a16-4ce8-8185-1893b05d346e (us-west)
metadata sync syncing
              full sync: 0/64 shards
              metadata is caught up with master
              incremental sync: 64/64 shards
    data sync source: 1ee9da3e-114d-4ae3-a8a4-056e8a17f532 (us-east)
                      syncing
                      full sync: 0/128 shards
                      incremental sync: 128/128 shards
                      data is caught up with source
```

Note: Secondary zones accept bucket operations; however, secondary zones redirect bucket operations to the master zone and then synchronize with the master zone to receive the result of the bucket operations. If the master zone is down, bucket operations executed on the secondary zone will fail, but object operations should succeed.

MAINTENANCE

CHECKING THE SYNC STATUS

Information about the replication status of a zone can be queried with:

```
$ radosgw-admin sync status
        realm b3bc1c37-9c44-4b89-a03b-04c269bea5da (earth)
    zonegroup f54f9b22-b4b6-4a0e-9211-fa6ac1693f49 (us)
         zone adce11c9-b8ed-4a90-8bc5-3fc029ff0816 (us-2)
       metadata sync syncing
              full sync: 0/64 shards
              incremental sync: 64/64 shards
              metadata is behind on 1 shards
              oldest incremental change not applied: 2017-03-22 10:20:00.0.881361s
    data sync source: 341c2d81-4574-4d08-ab0f-5a2a7b168028 (us-1)
                      syncing
                      full sync: 0/128 shards
                      incremental sync: 128/128 shards
                      data is caught up with source
              source: 3b5d1a3f-3f27-4e4a-8f34-6072d4bb1275 (us-3)
                      syncing
                      full sync: 0/128 shards
                      incremental sync: 128/128 shards
                      data is caught up with source
```

CHANGING THE METADATA MASTER ZONE

Important: Care must be taken when changing which zone is the metadata master. If a zone has not finished syncing metadata from the current master zone, it will be unable to serve any remaining entries when promoted to master and those changes will be lost. For this reason, waiting for a zone's `radosgw-admin sync status` to catch up on metadata sync before promoting it to master is recommended.

Similarly, if changes to metadata are being processed by the current master zone while another zone is being promoted to master, those changes are likely to be lost. To avoid this, shutting down any `radosgw` instances on the previous master zone is recommended. After promoting another zone, its new period can be fetched with `radosgw-admin period pull` and the gateway(s) can be restarted.

To promote a zone (for example, zone `us-2` in zonegroup `us`) to metadata master, run the following commands on that zone:

```
$ radosgw-admin zone modify --rgw-zone=us-2 --master
$ radosgw-admin zonegroup modify --rgw-zonegroup=us --master
$ radosgw-admin period update --commit
```

This will generate a new period, and the radosgw instance(s) in zone `us-2` will send this period to other zones.

FAILOVER AND DISASTER RECOVERY

If the master zone should fail, failover to the secondary zone for disaster recovery.

1. Make the secondary zone the master and default zone. For example:

   ```
   # radosgw-admin zone modify --rgw-zone={zone-name} --master --default
   ```

   By default, Ceph Object Gateway will run in an active-active configuration. If the cluster was configured to run in an active-passive configuration, the secondary zone is a read-only zone. Remove the `--read-only` status to allow the zone to receive write operations. For example:

   ```
   # radosgw-admin zone modify --rgw-zone={zone-name} --master --default \
                               --read-only=False
   ```

2. Update the period to make the changes take effect.

   ```
   # radosgw-admin period update --commit
   ```

3. Finally, restart the Ceph Object Gateway.

   ```
   # systemctl restart ceph-radosgw@rgw.`hostname -s`
   ```

If the former master zone recovers, revert the operation.

1. From the recovered zone, pull the period from the current master zone.

   ```
   # radosgw-admin period pull --url={url-to-master-zone-gateway} \
                               --access-key={access-key} --secret={secret}
   ```

2. Make the recovered zone the master and default zone.

   ```
   # radosgw-admin zone modify --rgw-zone={zone-name} --master --default
   ```

3. Update the period to make the changes take effect.

   ```
   # radosgw-admin period update --commit
   ```

4. Then, restart the Ceph Object Gateway in the recovered zone.

   ```
   # systemctl restart ceph-radosgw@rgw.`hostname -s`
   ```

5. If the secondary zone needs to be a read-only configuration, update the secondary zone.

```
# radosgw-admin zone modify --rgw-zone={zone-name} --read-only
```

6. Update the period to make the changes take effect.

```
# radosgw-admin period update --commit
```

7. Finally, restart the Ceph Object Gateway in the secondary zone.

```
# systemctl restart ceph-radosgw@rgw.`hostname -s`
```

MIGRATING A SINGLE SITE SYSTEM TO MULTI-SITE

To migrate from a single site system with a `default` zone group and zone to a multi site system, use the following steps:

1. Create a realm. Replace <name> with the realm name.

```
# radosgw-admin realm create --rgw-realm=<name> --default
```

2. Rename the default zone and zonegroup. Replace <name> with the zonegroup or zone name.

```
# radosgw-admin zonegroup rename --rgw-zonegroup default --zonegroup-new-name=<name>
# radosgw-admin zone rename --rgw-zone default --zone-new-name us-east-1 --rgw-zonegroup=
```

3. Configure the master zonegroup. Replace <name> with the realm or zonegroup name. Replace <fqdn> with the fully qualified domain name(s) in the zonegroup.

```
# radosgw-admin zonegroup modify --rgw-realm=<name> --rgw-zonegroup=<name> --endpoints ht
```

4. Configure the master zone. Replace <name> with the realm, zonegroup or zone name. Replace <fqdn> with the fully qualified domain name(s) in the zonegroup.

```
# radosgw-admin zone modify --rgw-realm=<name> --rgw-zonegroup=<name> \
                            --rgw-zone=<name> --endpoints http://<fqdn>:80 \
                            --access-key=<access-key> --secret=<secret-key> \
                            --master --default
```

5. Create a system user. Replace <user-id> with the username. Replace <display-name> with a display name. It may contain spaces.

```
# radosgw-admin user create --uid=<user-id> --display-name="<display-name>"\
                            --access-key=<access-key> --secret=<secret-key> --system
```

6. Commit the updated configuration.

```
# radosgw-admin period update --commit
```

7. Finally, restart the Ceph Object Gateway.

```
# systemctl restart ceph-radosgw@rgw.`hostname -s`
```

After completing this procedure, proceed to Configure a Secondary Zone to create a secondary zone in the master zone group.

MULTI-SITE CONFIGURATION REFERENCE

The following sections provide additional details and command-line usage for realms, periods, zone groups and zones.

REALMS

A realm represents a globally unique namespace consisting of one or more zonegroups containing one or more zones, and zones containing buckets, which in turn contain objects. A realm enables the Ceph Object Gateway to support multiple namespaces and their configuration on the same hardware.

A realm contains the notion of periods. Each period represents the state of the zone group and zone configuration in time. Each time you make a change to a zonegroup or zone, update the period and commit it.

By default, the Ceph Object Gateway does not create a realm for backward compatibility with Infernalis and earlier releases. However, as a best practice, we recommend creating realms for new clusters.

CREATE A REALM

To create a realm, execute `realm create` and specify the realm name. If the realm is the default, specify `--default`.

```
# radosgw-admin realm create --rgw-realm={realm-name} [--default]
```

For example:

```
# radosgw-admin realm create --rgw-realm=movies --default
```

By specifying `--default`, the realm will be called implicitly with each `radosgw-admin` call unless `--rgw-realm` and the realm name are explicitly provided.

MAKE A REALM THE DEFAULT

One realm in the list of realms should be the default realm. There may be only one default realm. If there is only one realm and it wasn't specified as the default realm when it was created, make it the default realm. Alternatively, to change which realm is the default, execute:

```
# radosgw-admin realm default --rgw-realm=movies
```

Note: When the realm is default, the command line assumes `--rgw-realm=<realm-name>` as an argument.

DELETE A REALM

To delete a realm, execute `realm delete` and specify the realm name.

```
# radosgw-admin realm delete --rgw-realm={realm-name}
```

For example:

```
# radosgw-admin realm delete --rgw-realm=movies
```

GET A REALM

To get a realm, execute `realm get` and specify the realm name.

```
#radosgw-admin realm get --rgw-realm=<name>
```

For example:

```
# radosgw-admin realm get --rgw-realm=movies [> filename.json]
```

The CLI will echo a JSON object with the realm properties.

```
{
    "id": "0a68d52e-a19c-4e8e-b012-a8f831cb3ebc",
    "name": "movies",
    "current_period": "b0c5bbef-4337-4edd-8184-5aeab2ec413b",
    "epoch": 1
}
```

Use > and an output file name to output the JSON object to a file.

SET A REALM

To set a realm, execute `realm set`, specify the realm name, and `--infile=` with an input file name.

```
#radosgw-admin realm set --rgw-realm=<name> --infile=<infilename>
```

For example:

```
# radosgw-admin realm set --rgw-realm=movies --infile=filename.json
```

LIST REALMS

To list realms, execute `realm list`.

```
# radosgw-admin realm list
```

LIST REALM PERIODS

To list realm periods, execute `realm list-periods`.

```
# radosgw-admin realm list-periods
```

PULL A REALM

To pull a realm from the node containing the master zone group and master zone to a node containing a secondary zone group or zone, execute `realm pull` on the node that will receive the realm configuration.

```
# radosgw-admin realm pull --url={url-to-master-zone-gateway} --access-key={access-key} --sec
```

RENAME A REALM

A realm is not part of the period. Consequently, renaming the realm is only applied locally, and will not get pulled with `realm pull`. When renaming a realm with multiple zones, run the command on each zone. To rename a realm, execute the following:

```
# radosgw-admin realm rename --rgw-realm=<current-name> --realm-new-name=<new-realm-name>
```

Note: DO NOT use `realm set` to change the name parameter. That changes the internal name only. Specifying `--rgw-realm` would still use the old realm name.

ZONE GROUPS

The Ceph Object Gateway supports multi-site deployments and a global namespace by using the notion of zone groups. Formerly called a region in Infernalis, a zone group defines the geographic location of one or more Ceph Object Gateway instances within one or more zones.

Configuring zone groups differs from typical configuration procedures, because not all of the settings end up in a Ceph configuration file. You can list zone groups, get a zone group configuration, and set a zone group configuration.

CREATE A ZONE GROUP

Creating a zone group consists of specifying the zone group name. Creating a zone assumes it will live in the default realm unless `--rgw-realm=<realm-name>` is specified. If the zonegroup is the default zonegroup, specify the `--default` flag. If the zonegroup is the master zonegroup, specify the `--master` flag. For example:

```
# radosgw-admin zonegroup create --rgw-zonegroup=<name> [--rgw-realm=<name>][--master] [--def
```

Note: Use `zonegroup modify --rgw-zonegroup=<zonegroup-name>` to modify an existing zone group's settings.

MAKE A ZONE GROUP THE DEFAULT

One zonegroup in the list of zonegroups should be the default zonegroup. There may be only one default zonegroup. If there is only one zonegroup and it wasn't specified as the default zonegroup when it was created, make it the default zonegroup. Alternatively, to change which zonegroup is the default, execute:

```
# radosgw-admin zonegroup default --rgw-zonegroup=comedy
```

Note: When the zonegroup is default, the command line assumes `--rgw-zonegroup=<zonegroup-name>` as an argument.

Then, update the period:

```
# radosgw-admin period update --commit
```

ADD A ZONE TO A ZONE GROUP

To add a zone to a zonegroup, execute the following:

```
# radosgw-admin zonegroup add --rgw-zonegroup=<name> --rgw-zone=<name>
```

Then, update the period:

```
# radosgw-admin period update --commit
```

REMOVE A ZONE FROM A ZONE GROUP

To remove a zone from a zonegroup, execute the following:

```
# radosgw-admin zonegroup remove --rgw-zonegroup=<name> --rgw-zone=<name>
```

Then, update the period:

```
# radosgw-admin period update --commit
```

RENAME A ZONE GROUP

To rename a zonegroup, execute the following:

```
# radosgw-admin zonegroup rename --rgw-zonegroup=<name> --zonegroup-new-name=<name>
```

Then, update the period:

```
# radosgw-admin period update --commit
```

DELETE A ZONE GROUP

To delete a zonegroup, execute the following:

```
# radosgw-admin zonegroup delete --rgw-zonegroup=<name>
```

Then, update the period:

```
# radosgw-admin period update --commit
```

LIST ZONE GROUPS

A Ceph cluster contains a list of zone groups. To list the zone groups, execute:

```
# radosgw-admin zonegroup list
```

The `radosgw-admin` returns a JSON formatted list of zone groups.

```
{
    "default_info": "90b28698-e7c3-462c-a42d-4aa780d24eda",
    "zonegroups": [
        "us"
    ]
}
```

GET A ZONE GROUP MAP

To list the details of each zone group, execute:

```
# radosgw-admin zonegroup-map get
```

Note: If you receive a `failed to read zonegroup map` error, run `radosgw-admin zonegroup-map update` as `root` first.

GET A ZONE GROUP

To view the configuration of a zone group, execute:

```
radosgw-admin zonegroup get [--rgw-zonegroup=<zonegroup>]
```

The zone group configuration looks like this:

```
{
    "id": "90b28698-e7c3-462c-a42d-4aa780d24eda",
    "name": "us",
    "api_name": "us",
    "is_master": "true",
    "endpoints": [
        "http:\/\/rgw1:80"
    ],
    "hostnames": [],
    "hostnames_s3website": [],
    "master_zone": "9248cab2-afe7-43d8-a661-a40bf316665e",
    "zones": [
        {
            "id": "9248cab2-afe7-43d8-a661-a40bf316665e",
            "name": "us-east",
            "endpoints": [
                "http:\/\/rgw1"
            ],
            "log_meta": "true",
            "log_data": "true",
            "bucket_index_max_shards": 0,
            "read_only": "false"
        },
        {
            "id": "d1024e59-7d28-49d1-8222-af101965a939",
            "name": "us-west",
            "endpoints": [
                "http:\/\/rgw2:80"
            ],
            "log_meta": "false",
            "log_data": "true",
            "bucket_index_max_shards": 0,
            "read_only": "false"
        }
    ],
    "placement_targets": [
        {
            "name": "default-placement",
            "tags": []
        }
    ],
    "default_placement": "default-placement",
    "realm_id": "ae031368-8715-4e27-9a99-0c9468852cfe"
}
```


SET A ZONE GROUP

Defining a zone group consists of creating a JSON object, specifying at least the required settings:

1. `name`: The name of the zone group. Required.
2. `api_name`: The API name for the zone group. Optional.
3. `is_master`: Determines if the zone group is the master zone group. Required. **note:** You can only have one master zone group.
4. `endpoints`: A list of all the endpoints in the zone group. For example, you may use multiple domain names to refer to the same zone group. Remember to escape the forward slashes (`\/`). You may also specify a port (`fqdn:port`) for each endpoint. Optional.
5. `hostnames`: A list of all the hostnames in the zone group. For example, you may use multiple domain names to refer to the same zone group. Optional. The `rgw dns name` setting will automatically be included in this list. You should restart the gateway daemon(s) after changing this setting.
6. `master_zone`: The master zone for the zone group. Optional. Uses the default zone if not specified. **note:** You can only have one master zone per zone group.
7. `zones`: A list of all zones within the zone group. Each zone has a name (required), a list of endpoints (optional), and whether or not the gateway will log metadata and data operations (false by default).
8. `placement_targets`: A list of placement targets (optional). Each placement target contains a name (required) for the placement target and a list of tags (optional) so that only users with the tag can use the placement target (i.e., the user's `placement_tags` field in the user info).
9. `default_placement`: The default placement target for the object index and object data. Set to `default-placement` by default. You may also set a per-user default placement in the user info for each user.

To set a zone group, create a JSON object consisting of the required fields, save the object to a file (e.g., `zonegroup.json`);

then, execute the following command:

```
# radosgw-admin zonegroup set --infile zonegroup.json
```

Where `zonegroup.json` is the JSON file you created.

Important: The `default` zone group `is_master` setting is `true` by default. If you create a new zone group and want to make it the master zone group, you must either set the `default` zone group `is_master` setting to `false`, or delete the `default` zone group.

Finally, update the period:

```
# radosgw-admin period update --commit
```

SET A ZONE GROUP MAP

Setting a zone group map consists of creating a JSON object consisting of one or more zone groups, and setting the `master_zonegroup` for the cluster. Each zone group in the zone group map consists of a key/value pair, where the key setting is equivalent to the `name` setting for an individual zone group configuration, and the `val` is a JSON object consisting of an individual zone group configuration.

You may only have one zone group with `is_master` equal to `true`, and it must be specified as the `master_zonegroup` at the end of the zone group map. The following JSON object is an example of a default zone group map.

```
{
    "zonegroups": [
        {
            "key": "90b28698-e7c3-462c-a42d-4aa780d24eda",
            "val": {
                "id": "90b28698-e7c3-462c-a42d-4aa780d24eda",
                "name": "us",
                "api_name": "us",
                "is_master": "true",
                "endpoints": [
                    "http:\/\/rgw1:80"
                ],
                "hostnames": [],
                "hostnames_s3website": [],
                "master_zone": "9248cab2-afe7-43d8-a661-a40bf316665e",
                "zones": [
                    {
                        "id": "9248cab2-afe7-43d8-a661-a40bf316665e",
                        "name": "us-east",
                        "endpoints": [
                            "http:\/\/rgw1"
                        ],
                        "log_meta": "true",
                        "log_data": "true",
                        "bucket_index_max_shards": 0,
                        "read_only": "false"
                    },
                    {
                        "id": "d1024e59-7d28-49d1-8222-af101965a939",
                        "name": "us-west",
                        "endpoints": [
                            "http:\/\/rgw2:80"
                        ],
                        "log_meta": "false",
                        "log_data": "true",
                        "bucket_index_max_shards": 0,
                        "read_only": "false"
                    }
                ],
                "placement_targets": [
                    {
                        "name": "default-placement",
                        "tags": []
                    }
```

```
                ],
                "default_placement": "default-placement",
                "realm_id": "ae031368-8715-4e27-9a99-0c9468852cfe"
            }
        }
    ],
    "master_zonegroup": "90b28698-e7c3-462c-a42d-4aa780d24eda",
    "bucket_quota": {
        "enabled": false,
        "max_size_kb": -1,
        "max_objects": -1
    },
    "user_quota": {
        "enabled": false,
        "max_size_kb": -1,
        "max_objects": -1
    }
}
```

To set a zone group map, execute the following:

```
# radosgw-admin zonegroup-map set --infile zonegroupmap.json
```

Where `zonegroupmap.json` is the JSON file you created. Ensure that you have zones created for the ones specified in the zone group map. Finally, update the period.

```
# radosgw-admin period update --commit
```

ZONES

Ceph Object Gateway supports the notion of zones. A zone defines a logical group consisting of one or more Ceph Object Gateway instances.

Configuring zones differs from typical configuration procedures, because not all of the settings end up in a Ceph configuration file. You can list zones, get a zone configuration and set a zone configuration.

CREATE A ZONE

To create a zone, specify a zone name. If it is a master zone, specify the `--master` option. Only one zone in a zone group may be a master zone. To add the zone to a zonegroup, specify the `--rgw-zonegroup` option with the zonegroup name.

```
# radosgw-admin zone create --rgw-zone=<name> \
                [--zonegroup=<zonegroup-name]\
                [--endpoints=<endpoint>[,<endpoint>] \
                [--master] [--default] \
                --access-key $SYSTEM_ACCESS_KEY --secret $SYSTEM_SECRET_KEY
```

Then, update the period:

```
# radosgw-admin period update --commit
```

DELETE A ZONE

To delete zone, first remove it from the zonegroup.

```
# radosgw-admin zonegroup remove --zonegroup=<name>\
                                 --zone=<name>
```

Then, update the period:

```
# radosgw-admin period update --commit
```

Next, delete the zone. Execute the following:

```
# radosgw-admin zone delete --rgw-zone<name>
```

Finally, update the period:

```
# radosgw-admin period update --commit
```

Important: Do not delete a zone without removing it from a zone group first. Otherwise, updating the period will fail.

If the pools for the deleted zone will not be used anywhere else, consider deleting the pools. Replace `<del-zone>` in the example below with the deleted zone's name.

Important: Only delete the pools with prepended zone names. Deleting the root pool, such as, `.rgw.root` will remove all of the system's configuration.

Important: Once the pools are deleted, all of the data within them are deleted in an unrecoverable manner. Only delete the pools if the pool contents are no longer needed.

```
# rados rmpool <del-zone>.rgw.control <del-zone>.rgw.control --yes-i-really-really-mean-it
# rados rmpool <del-zone>.rgw.data.root <del-zone>.rgw.data.root --yes-i-really-really-mean-i
# rados rmpool <del-zone>.rgw.gc <del-zone>.rgw.gc --yes-i-really-really-mean-it
# rados rmpool <del-zone>.rgw.log <del-zone>.rgw.log --yes-i-really-really-mean-it
# rados rmpool <del-zone>.rgw.users.uid <del-zone>.rgw.users.uid --yes-i-really-really-mean-i
```

MODIFY A ZONE

To modify a zone, specify the zone name and the parameters you wish to modify.

```
# radosgw-admin zone modify [options]
```

Where `[options]`:

- `--access-key=<key>`
- `--secret/--secret-key=<key>`
- `--master`
- `--default`
- `--endpoints=<list>`

Then, update the period:

```
# radosgw-admin period update --commit
```

LIST ZONES

As `root`, to list the zones in a cluster, execute:

```
# radosgw-admin zone list
```

GET A ZONE

As `root`, to get the configuration of a zone, execute:

```
# radosgw-admin zone get [--rgw-zone=<zone>]
```

The `default` zone looks like this:

```
{ "domain_root": ".rgw",
  "control_pool": ".rgw.control",
  "gc_pool": ".rgw.gc",
  "log_pool": ".log",
  "intent_log_pool": ".intent-log",
  "usage_log_pool": ".usage",
  "user_keys_pool": ".users",
  "user_email_pool": ".users.email",
  "user_swift_pool": ".users.swift",
  "user_uid_pool": ".users.uid",
  "system_key": { "access_key": "", "secret_key": ""},
  "placement_pools": [
      {  "key": "default-placement",
         "val": { "index_pool": ".rgw.buckets.index",
                  "data_pool": ".rgw.buckets"}
      }
    ]
  }
```

SET A ZONE

Configuring a zone involves specifying a series of Ceph Object Gateway pools. For consistency, we recommend using a pool prefix that is the same as the zone name. See Pools for details of configuring pools.

To set a zone, create a JSON object consisting of the pools, save the object to a file (e.g., `zone.json`); then, execute the following command, replacing `{zone-name}` with the name of the zone:

```
# radosgw-admin zone set --rgw-zone={zone-name} --infile zone.json
```

Where `zone.json` is the JSON file you created.

Then, as `root`, update the period:

```
# radosgw-admin period update --commit
```

RENAME A ZONE

To rename a zone, specify the zone name and the new zone name.

```
# radosgw-admin zone rename --rgw-zone=<name> --zone-new-name=<name>
```

Then, update the period:

```
# radosgw-admin period update --commit
```

ZONE GROUP AND ZONE SETTINGS

When configuring a default zone group and zone, the pool name includes the zone name. For example:

- `default.rgw.control`

To change the defaults, include the following settings in your Ceph configuration file under each `[client.radosgw.{instance-name}]` instance.

Name	Description	Type	Default
`rgw_zone`	The name of the zone for the gateway instance.	String	None

rgw_zonegroup	The name of the zone group for the gateway instance.	String	None
rgw_zonegroup_root_pool	The root pool for the zone group.	String	.rgw.root
rgw_zone_root_pool	The root pool for the zone.	String	.rgw.root
rgw_default_zone_group_info_oid	The OID for storing the default zone group. We do not recommend changing this setting.	String	default.zonegroup
rgw_num_zone_opstate_shards	The maximum number of shards for keeping inter-zone group synchronization progress.	Integer	128