zone group
A *zone group* is a set of one or more zones. Data stored in one zone in the zone group is replicated to all other zones in the zone group. One zone in every zone group is designated as the master zone for that group. The other zones in the zone group are secondary zones.

realm
A *realm* represents the global namespace for all objects and buckets in the multisite replication space. A realm contains one or more zone groups, each of which contains one or more zones. One zone group in the realm is designated as the master zone group, and the others are secondary zone groups. All RADOS Gateways in the environment pull their configuration from the RADOS Gateway in the master zone group and master zone.

Because the master zone in the master zone group handles all metadata updates, operations such as creating users must occur in the master zone.

Important
You can execute metadata operations in a secondary zone, but it is not recommended because the metadata will not be synchronized over the realm. This behavior can lead to metadata fragmentation and configuration inconsistency between zones.

This architecture can be structured in several ways:

- A `single zone` configuration has one zone group and one zone in the realm. One or more (possibly load-balanced) RADOS Gateways are backed by one Red Hat Ceph Storage cluster.
- A `multizone` configuration has one zone group but multiple zones. Each zone is backed by one or more RADOS Gateways and an independent Red Hat Ceph Storage cluster. Data stored in one zone is replicated to all zones in the zone group. This can be used for disaster recovery if one zone suffers a catastrophic failure.
- A `multizone group` configuration has multiple zone groups, each with one or more zones. You can use a multizone group to manage the geographic location of RADOS Gateways within one or more zones in a region.
- A `multiregion` configuration allows the same hardware to be used to support multiple object namespaces that are common across zone groups and zones.

A minimal RADOS Gateway multisite deployment requires two Red Hat Ceph Storage clusters, and a RADOS Gateway for each cluster. They exist in the same realm and are assigned to the same master zone group. One RADOS Gateway is associated with the master zone in that zone group. The other is associated with a separate secondary zone in that zone group. This is a basic multizone configuration.

Change Coordination with Periods and Epochs

Each realm has an associated period, and each period has an associated epoch. A period is used to track the configuration state of the realm, zone groups, and zones at a particular time. Epochs are version numbers to track configuration changes for a particular realm period. Each period has a unique ID, contains realm configuration, and knows the previous period ID.

When you update the configuration of the master zone, the RADOS Gateway service updates the period. This new period becomes the current period of the realm, and the epoch of this period increases its value by one. For other configuration changes, only the epoch is incremented; the period does not change.