Rack-zone awareness in Redis Enterprise Software

Rack-zone awareness is a Redis Enterprise feature that helps to ensure high-availability in the event of a rack or zone failure.

When you enable rack-zone awareness in a Redis Enterprise Software cluster, you assign a rack-zone ID to each node. This ID is used to map the node to a physical rack or logical zone. The cluster can then ensure that master shards, corresponding replica shards, and associated endpoints are placed on nodes in different racks/zones.

In the event of a rack or zone failure, the replicas and endpoints in the remaining racks/zones are promoted. This ensures high availability when a rack or zone fails.

There is no limitation on the number of rack-zones per cluster; each node can belong to a different rack, or multiple nodes can belong to the same rack.

Rack-zone awareness affects various cluster, node and database-related actions, such as node rebalancing, node removal, node replacement, shard and endpoint migration, and database failover.

Cluster and node configuration

To enable rack-zone awareness, you need to configure it at the cluster, node, and database levels.

First, enable rack-zone awareness when you initially create the cluster.

Now, every time you add a new node to the cluster, define a rack-zone ID for the node.

The rack-zone ID must comply with the following rules:

- Maximum length of 63 characters.
- Characters consist of letters, digits, or hyphens ('-').
- ID starts with a letter and ends with a letter or a digit.

⚠️ Note: Rack-zone IDs are case-insensitive (uppercase and lowercase letter are treated as the same).

Node layout

Recall that the recommended minimum number of nodes in a RS deployment is three. For high availability, these three nodes must be distributed across three distinct racks or zones.

When using availability zones, note that all three zones should exist within the same region to avoid potential latency issues.

Keep in mind that one of the nodes in your cluster can be a quorum-only node, assuming compute resources are limited. What this means is that the minimum rack-zone aware RS deployment will consist of two data nodes and one quorum-only node, where each of these nodes is situated in a distinct rack or zone.

Database configuration

Once the cluster has been configured to support rack-zone awareness, you can create a rack-zone aware database.

Rack-zone awareness is relevant only for databases that have replication enabled (i.e., databases with replica shards). Once you enable replication for a database, you may also enable rack-zone awareness.
Shard placement without rack-zone awareness

Note that even in the case of a database with rack-zone awareness disabled, the cluster will still ensure that master and replica shards are placed on distinct nodes.

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