



Cluster management (cluster administrators only)

ONTAP 9

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Cluster management (cluster administrators only)

View node-level details in an ONTAP cluster

You can view node names, whether the nodes are healthy, and whether they are eligible to participate in the cluster. At the advanced privilege level, you can also display whether a node holds epsilon.

Steps

1. To view information about the nodes in a cluster, use the `cluster show` command.

If you want the output to show whether a node holds epsilon, run the command at the advanced privilege level.

Learn more about `cluster show` in the [ONTAP command reference](#).

Examples of displaying the nodes in a cluster

The following example displays information about all nodes in a four-node cluster:

```
cluster1::> cluster show
Node          Health  Eligibility
-----
node1         true    true
node2         true    true
node3         true    true
node4         true    true
```

The following example displays detailed information about the node named “node1” at the advanced privilege level:

```
cluster1::> set -privilege advanced
Warning: These advanced commands are potentially dangerous; use them only
when directed to do so by support personnel.
Do you want to continue? {y|n}: y

cluster1::*> cluster show -node node1

  Node: node1
  Node UUID: a67f9f34-9d8f-11da-b484-000423b6f094
  Epsilon: false
  Eligibility: true
  Health: true
```

View ONTAP cluster-level details

You can display a cluster's unique identifier (UUID), name, serial number, location, and contact information.

Steps

1. To display a cluster's attributes, use the `cluster identity show` command.

Example of displaying cluster attributes

The following example displays the name, serial number, location, and contact information of a cluster.

```
cluster1::> cluster identity show

    Cluster UUID: 1cd8a442-86d1-11e0-ae1c-123478563412
    Cluster Name: cluster1
    Cluster Serial Number: 1-80-123456
    Cluster Location: Sunnyvale
    Cluster Contact: jsmith@example.com
```

Learn more about `cluster identity show` in the [ONTAP command reference](#).

Modify ONTAP cluster attributes

You can modify a cluster's attributes, such as the cluster name, location, and contact information as needed.

About this task

You cannot change a cluster's UUID, which is set when the cluster is created.

Steps

1. To modify cluster attributes, use the `cluster identity modify` command.

The `-name` parameter specifies the name of the cluster. Learn more about `cluster identity modify` and the rules for specifying the cluster's name in the [ONTAP command reference](#).

The `-location` parameter specifies the location for the cluster.

The `-contact` parameter specifies the contact information such as a name or e-mail address.

Example of renaming a cluster

The following command renames the current cluster ("cluster1") to "cluster2":

```
cluster1::> cluster identity modify -name cluster2
```

View the replication status of the ONTAP cluster rings

You can view the status of cluster replication rings to help you diagnose cluster-wide problems. If your cluster is experiencing problems, support personnel might ask you to perform this task to assist with troubleshooting efforts.

Steps

1. To display the status of cluster replication rings, use the `cluster ring show` command at the advanced privilege level.

Example of displaying cluster ring-replication status

The following example displays the status of the VLDB replication ring on a node named node0:

```
cluster1::> set -privilege advanced
Warning: These advanced commands are potentially dangerous; use them only
when directed to do so by support personnel.
Do you wish to continue? (y or n): y

cluster1::*> cluster ring show -node node0 -unitname vldb
      Node: node0
      Unit Name: vldb
      Status: master
      Epoch: 5
      Master Node: node0
      Local Node: node0
      DB Epoch: 5
      DB Transaction: 56
      Number Online: 4
      RDB UUID: e492d2c1-fc50-11e1-bae3-123478563412
```

Learn more about `cluster ring show` in the [ONTAP command reference](#).

ONTAP cluster health assessments using quorum and epsilon

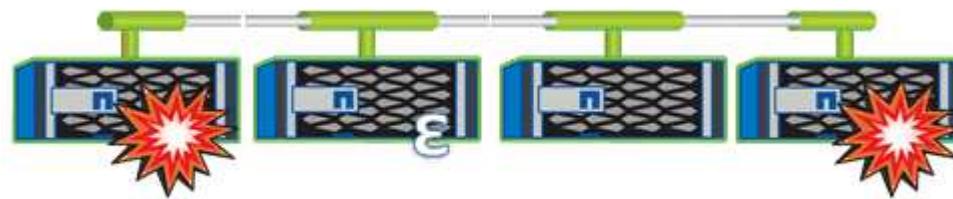
Quorum and epsilon are important measures of cluster health and function that together indicate how clusters address potential communications and connectivity challenges.

Quorum is a precondition for a fully functioning cluster. When a cluster is in quorum, a simple majority of nodes are healthy and can communicate with each other. When quorum is lost, the cluster loses the ability to accomplish normal cluster operations. Only one collection of nodes can have quorum at any one time because all of the nodes collectively share a single view of the data. Therefore, if two non-communicating nodes are permitted to modify the data in divergent ways, it is no longer possible to reconcile the data into a single data view.

Each node in the cluster participates in a voting protocol that elects one node *master*; each remaining node is a *secondary*. The master node is responsible for synchronizing information across the cluster. When quorum is

formed, it is maintained by continual voting. If the master node goes offline and the cluster is still in quorum, a new master is elected by the nodes that remain online.

Because there is the possibility of a tie in a cluster that has an even number of nodes, one node has an extra fractional voting weight called *epsilon*. If the connectivity between two equal portions of a large cluster fails, the group of nodes containing epsilon maintains quorum, assuming that all of the nodes are healthy. For example, the following illustration shows a four-node cluster in which two of the nodes have failed. However, because one of the surviving nodes holds epsilon, the cluster remains in quorum even though there is not a simple majority of healthy nodes.



Epsilon is automatically assigned to the first node when the cluster is created. If the node that holds epsilon becomes unhealthy, takes over its high-availability partner, or is taken over by its high-availability partner, then epsilon is automatically reassigned to a healthy node in a different HA pair.

Taking a node offline can affect the ability of the cluster to remain in quorum. Therefore, ONTAP issues a warning message if you attempt an operation that will either take the cluster out of quorum or else put it one outage away from a loss of quorum. You can disable the quorum warning messages by using the `cluster quorum-service options modify` command at the advanced privilege level. Learn more about `cluster quorum-service options modify` in the [ONTAP command reference](#).

In general, assuming reliable connectivity among the nodes of the cluster, a larger cluster is more stable than a smaller cluster. The quorum requirement of a simple majority of half the nodes plus epsilon is easier to maintain in a cluster of 24 nodes than in a cluster of two nodes.

A two-node cluster presents some unique challenges for maintaining quorum. Two-node clusters use *cluster HA*, in which neither node holds epsilon; instead, both nodes are continuously polled to ensure that if one node fails, the other has full read-write access to data, as well as access to logical interfaces and management functions.

View storage capacity utilization of system volumes in an ONTAP cluster

System volumes are FlexVol volumes that contain special metadata, such as metadata for file services audit logs. These volumes are visible in the cluster so that you can fully account for storage use in your cluster.

System volumes are owned by the cluster management server (also called the admin SVM), and they are created automatically when file services auditing is enabled.

You can view system volumes by using the `volume show` command, but most other volume operations are not permitted. For example, you cannot modify a system volume by using the `volume modify` command.

This example shows four system volumes on the admin SVM, which were automatically created when file services auditing was enabled for a data SVM in the cluster:

```
cluster1::> volume show -vserver cluster1
Vserver      Volume      Aggregate      State      Type      Size  Available
Used%
-----
-----
cluster1  MDV_aud_1d0131843d4811e296fc123478563412
          aggr0      online      RW      2GB  1.90GB
5%
cluster1  MDV_aud_8be27f813d7311e296fc123478563412
          root_vs0    online      RW      2GB  1.90GB
5%
cluster1  MDV_aud_9dc4ad503d7311e296fc123478563412
          aggr1      online      RW      2GB  1.90GB
5%
cluster1  MDV_aud_a4b887ac3d7311e296fc123478563412
          aggr2      online      RW      2GB  1.90GB
5%
4 entries were displayed.
```

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