Disk and partition ownership

ONTAP 9

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You can manage the ownership of disks and partitions.

You can perform the following tasks:

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  You can view disk ownership to determine which node controls the storage. You can also view the partition ownership on systems that use shared disks.

- **Change settings for automatic assignment of disk ownership**

  You can select a non-default policy for automatically assigning disk ownership or disable automatic assignment of disk ownership.

- **Manually assign ownership of unpartitioned disks**

  If your cluster is not configured to use automatic disk ownership assignment, you must assign ownership manually.

- **Manually assign ownership of partitioned disks**

  You can set the ownership of the container disk or the partitions manually or by using auto-assignment—just as you do for unpartitioned disks.

- **Remove a failed disk**

  A disk that has failed completely is no longer considered by ONTAP to be a usable disk, and you can immediately disconnect the disk from the shelf.

- **Remove ownership from a disk**

  ONTAP writes disk ownership information to the disk. Before you remove a spare disk or its shelf from a node, you should remove its ownership information so that it can be properly integrated into another node.

About automatic assignment of disk ownership

The automatic assignment of unowned disks is enabled by default. Automatic disk ownership assignments occur 10 minutes after HA pair initialization and every five minutes during normal system operation.

When you add a new disk to an HA pair, for example, when replacing a failed disk, responding to a "low spares" message, or adding capacity, the default auto-assignment policy assigns ownership of the disk to a node as a spare.

The default auto-assignment policy is based on platform-specific characteristics, or the DS460C shelf if your HA pair has only these shelves, and it uses one of the following methods (policies) to assign disk ownership:

Assignment method	Effect on node assignments	Platform configurations that default to the assignment method
bay	Even-numbered bays are assigned to node A and odd-numbered bays to node B.	Entry-level systems in an HA pair configuration with a single, shared shelf.
shelf	All disks in the shelf are assigned to node A.	Entry-level systems in an HA pair configuration with one stack of two or more shelves, and MetroCluster configurations with one stack per node, two or more shelves.
split shelf This policy falls under the "default" value for the `-autoassign -policy` parameter of the `storage disk option` command for applicable platform and shelf configurations.	Disks on the left side of the shelf are assigned to node A and on the right side to Node B. Partial shelves on HA pairs are shipped from the factory with disks populated from the shelf edge toward the center.	Most AFF platforms and some MetroCluster configurations.
stack	All disks in the stack are assigned to node A.	Stand-alone entry-level systems and all other configurations.
half-drawer This policy falls under the "default" value for the `-autoassign -policy` parameter of the `storage disk option` command for applicable platform and shelf configurations.	All drives in the left half of a DS460C drawer (drive bays 0 to 5) are assigned to node A; all drives in the right half of a drawer (drive bays 6 to 11) are assigned to node B. When initializing an HA pair with only DS460C shelves, automatic assignment of disk ownership is not supported. You must manually assign ownership for drives containing root/container drives that have the root partition by conforming to the half-drawer policy.	HA pairs with only DS460C shelves, after HA pair initialization (boot up). After an HA pair boots up, automatic assignment of disk ownership is automatically enabled and uses the half-drawer policy to assign ownership to the remaining drives (other than the root drives/container drives that have the root partition) and any drives added in the future. If your HA pair has DS460C shelves in addition to other shelf models, the half-drawer policy is not used. The default policy used is dictated by platform-specific characteristics.

Auto-assignment settings and modifications:

- You can display the current auto-assignment settings (on/off) with the `storage disk option show` command.

- You can disable automatic assignment by using the `storage disk option modify` command.

- If the default auto-assignment policy is not desirable in your environment, you can specify (change) the bay, shelf, or stack assignment method using the `-autoassign-policy` parameter in the `storage disk option modify` command.

  Learn how to Change settings for automatic assignment of disk ownership.

  > ⓘ The half-drawer and split-shelf default auto-assignment policies are unique because they cannot be set by users like the bay, shelf, and stack policies can.

In Advanced Drive Partitioning (ADP) systems, to make auto-assign work on half-populated shelves, drives must be installed in the correct shelf bays based on what type of shelf you have:

- If your shelf is not a DS460C shelf, install drives equally on the far left side and far right side moving toward the middle. For example, six drives in bays 0-5 and six drives in bays 18-23 of a DS224C shelf.

- If your shelf is a DS460C shelf, install drives in the front row (drive bays 0, 3, 6, and 9) of each drawer. For the remaining drives, evenly distribute them across each drawer by filling drawer rows from front to back. If you don't have enough drives to fill rows, then install them in pairs so that drives occupy the left and right side of a drawer evenly.

  Installing drives in the front row of each drawer allows for proper air flow and prevents overheating.

  > ⓘ If drives are not installed in the correct shelf bays on half-populated shelves, when a container drive fails and is replaced, ONTAP does not auto-assign ownership. In this case, assignment of the new container drive needs to be done manually. After you have assigned ownership for the container drive, ONTAP automatically handles any drive partitioning and partitioning assignments that are required.

In some situations where auto-assignment will not work, you need to manually assign disk ownership using the `storage disk assign` command:

- If you disable auto-assignment, new disks are not available as spares until they are manually assigned to a node.

- If you want disks to be auto-assigned and you have multiple stacks or shelves that must have different ownership, one disk must have been manually assigned on each stack or shelf so that automatic ownership assignment works on each stack or shelf.

- If auto-assignment is enabled and you manually assign a single drive to a node that isn't specified in the active policy, auto-assignment stops working and an EMS message is displayed.

Learn how to Manually assign disk ownership of unpartitioned disks.

Learn how to Manually assign disk ownership of partitioned disks.

Display disk and partition ownership

You can view disk ownership to determine which node controls the storage. You can also view the partition ownership on systems that use shared disks.

Steps

1. Display the ownership of physical disks:

```
storage disk show -ownership
```

```
cluster::> storage disk show -ownership
Disk      Aggregate Home     Owner    DR Home  Home ID     Owner ID   DR
Home ID  Reserver    Pool
-------- --------- -------- -------- -------- ---------- -----------
----------- ----------- ------
1.0.0    aggr0_2   node2    node2    -        2014941509 2014941509 -
2014941509  Pool0
1.0.1    aggr0_2   node2    node2    -        2014941509 2014941509 -
2014941509  Pool0
1.0.2    aggr0_1   node1    node1    -        2014941219 2014941219 -
2014941219  Pool0
1.0.3    -         node1    node1    -        2014941219 2014941219 -
2014941219  Pool0
```

2. If you have a system that uses shared disks, you can display the partition ownership:

```
storage disk show -partition-ownership
```

```
cluster::> storage disk show -partition-ownership
                          Root                     Data
Container  Container
Disk      Aggregate Root Owner  Owner ID   Data Owner  Owner ID     Owner
Owner ID
-------- --------- ----------- ----------- ----------- -----------
---------- -----------
1.0.0    -         node1       1886742616  node1       1886742616  node1
1886742616
1.0.1    -         node1       1886742616  node1       1886742616  node1
1886742616
1.0.2    -         node2       1886742657  node2       1886742657  node2
1886742657
1.0.3    -         node2       1886742657  node2       1886742657  node2
1886742657
```

Change settings for automatic assignment of disk ownership

You can use the `storage disk option modify` command to select a non-default policy for automatically assigning disk ownership or to disable automatic assignment of disk ownership.

Learn about automatic assignment of disk ownership.

About this task

If you have an HA pair with only DS460C shelves, the default auto-assignment policy is half-drawer. You cannot change to a non-default policy (bay, shelf, stack).

Steps

1. Modify automatic disk assignment:

    a. If you want to select a non-default policy, enter:

        storage disk option modify -autoassign-policy *autoassign_policy* -node *node_name*

        - Use `stack` as the *autoassign_policy* to configure automatic ownership at the stack or loop level.

        - Use `shelf` as the *autoassign_policy* to configure automatic ownership at the shelf level.

        - Use `bay` as the *autoassign_policy* to configure automatic ownership at the bay level.

    b. If you want to disable automatic disk ownership assignment, enter:

        storage disk option modify -autoassign off -node *node_name*

2. Verify the automatic assignment settings for the disks:

    storage disk option show

```
cluster1::> storage disk option show

Node            BKg. FW. Upd.  Auto Copy     Auto Assign   Auto
                                                           Assign Policy
-------------   -------------  ------------  -------------  --------
cluster1-1      on             on            on             default
cluster1-2      on             on            on             default
```

Manually assign disk ownership of unpartitioned disks

If your HA pair is not configured to use automatic disk ownership assignment, you must manually assign ownership. If you are initializing an HA pair that has only DS460C shelves, you must manually assign ownership for the root drives.

About this task

- If you are manually assigning ownership in an HA pair that is not being initialized and does not have only DS460C shelves, use option 1.

- If you are initializing an HA pair that has only DS460C shelves, use option 2 to manually assign ownership for the root drives.

Option 1: Most HA pairs

For an HA pair that is not being initialized and does not have only DS460C shelves, use this procedure to manually assigning ownership.

About this task

- The disks you are assigning ownership for must be in a shelf that is physically cabled to the node you are assigning ownership to.

- If you are using disks in a local tier (aggregate):

  ◦ Disks must be owned by a node before they can be used in a local tier (aggregate).

  ◦ You cannot reassign ownership of a disk that is in use in a local tier (aggregate).

Steps

1. Use the CLI to display all unowned disks:

   ```
   storage disk show -container-type unassigned
   ```

2. Assign each disk:

   ```
   storage disk assign -disk disk_name -owner owner_name
   ```

   You can use the wildcard character to assign more than one disk at once. If you are reassigning a spare disk that is already owned by a different node, you must use the "-force" option.

Option 2: An HA pair with only DS460C shelves

For an HA pair that you are initializing and that only has DS460C shelves, use this procedure to manually assign ownership for the root drives.

About this task

- When you initialize an HA pair that has only DS460C shelves, you must manually assign the root drives to conform to the half-drawer policy.

  After HA pair initialization (boot up), automatic assignment of disk ownership is automatically enabled and uses the half-drawer policy to assign ownership to the remaining drives (other than the root drives) and any drives added in the future, such as replacing failed disks, responding to a "low spares" message, or adding capacity.

  Learn about the half-drawer policy in the topic About automatic assignment of disk ownership.

- RAID needs a minimum of 10 drives for each HA pair (5 for each node) for any greater than 8TB NL-SAS drives in a DS460C shelf.
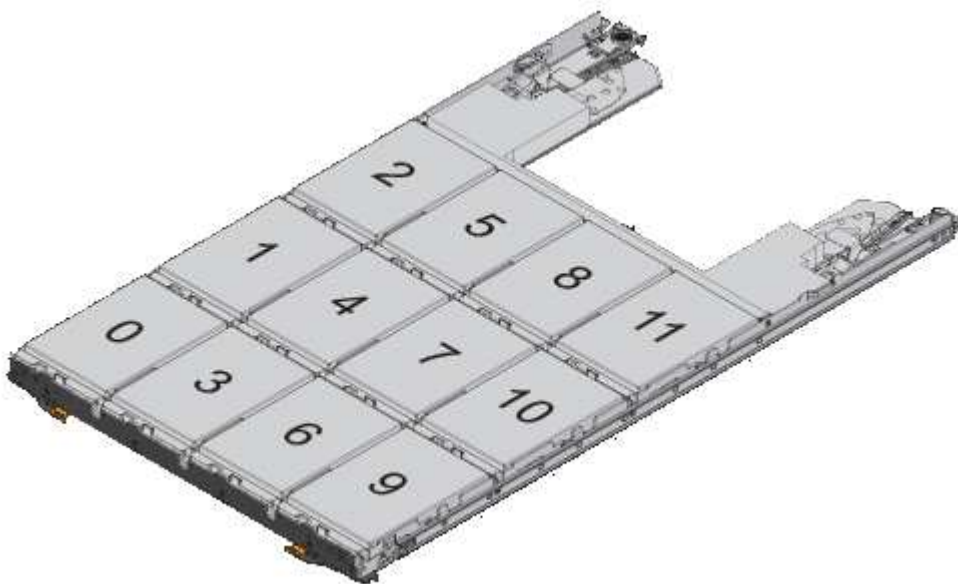
Steps

1. If your DS460C shelves are not fully populated, complete the following substeps; otherwise, go to the next step.

   a. First, install drives in the front row (drive bays 0, 3, 6, and 9) of each drawer.

      Installing drives in the front row of each drawer allows for proper air flow and prevents overheating.

   b. For the remaining drives, evenly distribute them across each drawer.

      Fill drawer rows from front to back. If you don't have enough drives to fill rows, then install them in pairs so that drives occupy the left and right side of a drawer evenly.

      The following illustration shows the drive bay numbering and locations in a DS460C drawer.

2. Log into the clustershell using the node-management LIF or cluster-management LIF.

3. Manually assign the root drives in each drawer to conform to the half-drawer policy using the following substeps:

   The half-drawer policy has you assign the left half of a drawer's drives (bays 0 to 5) to node A, and the right half of a drawer's drives (bays 6 to 11) to node B.

   a. Display all unowned disks: `storage disk show -container-type unassigned`

   b. Assign the root disks: `storage disk assign -disk disk_name -owner owner_name`

      You can use the wildcard character to assign more than one disk at a time.

Manually assign ownership of partitioned disks

You can manually assign the ownership of the container disk or the partitions on Advanced Drive Partitioning (ADP) systems. If you are initializing an HA pair that only has DS460C shelves, you must manually assign ownership for the container drives that will include root partitions.

About this task

- The type of storage system you have determines which method of ADP is supported, root-data (RD) or root-data-data (RD2).

  FAS storage systems use RD and AFF storage systems use RD2.

- If you are manually assigning ownership in an HA pair that is not being initialized and does not have only DS460C shelves, use option 1 to manually assign disks with root-data (RD) partitioning or use option 2 to manually assign disks with root-data-data (RD2) partitioning.

- If you are initializing an HA pair that has only DS460C shelves, use option 3 to manually assign ownership for the container drives that have the root partition.

Option 1: Manually assign disks with root-data (RD) partitioning

For root-data partitioning, there are three owned entities (the container disk and the two partitions) collectively owned by the HA pair.

About this task

- The container disk and the two partitions do not all need to be owned by the same node in the HA pair as long as they are all owned by one of the nodes in the HA pair. However, when you use a partition in a local tier (aggregate), it must be owned by the same node that owns the local tier.

- If a container disk fails in a half-populated shelf and is replaced, you might need to manually assign disk ownership because ONTAP does not always auto-assign ownership in this case.

- After the container disk is assigned, ONTAP's software automatically handles any partitioning and partition assignments that are required.

Steps

1. Use the CLI to display the current ownership for the partitioned disk:

   ```
   storage disk show -disk disk_name -partition-ownership
   ```

2. Set the CLI privilege level to advanced:

   ```
   set -privilege advanced
   ```

3. Enter the appropriate command, depending on which ownership entity you want to assign ownership for:

   If any of the ownership entities are already owned, then you must include the "-force" option.

If you want to assign ownership for the…	Use this command…
Container disk	`storage disk assign -disk disk_name -owner owner_name`
Data partition	`storage disk assign -disk disk_name -owner owner_name -data true`
Root partition	`storage disk assign -disk disk_name -owner owner_name -root true`

Option 2: Manually assign disks with root-data-data (RD2) partitioning

For root-data-data partitioning, there are four owned entities (the container disk and the three partitions) collectively owned by the HA pair. Root-data-data partitioning creates one small partition as the root partition and two larger, equally sized partitions for data.

About this task

- Parameters must be used with the `disk assign` command to assign the proper partition of a root-data-data partitioned disk. You cannot use these parameters with disks that are part of a storage pool. The default value is "false".

  ◦ The `-data1 true` parameter assigns the "data1" partition of a root-data1-data2 partitioned disk.

  ◦ The `-data2 true` parameter assigns the "data2" partition of a root-data1-data2 partitioned disk.

- If a container disk fails in a half-populated shelf and is replaced, you might need to manually assign disk ownership because ONTAP does not always auto-assign ownership in this case.

- After the container disk is assigned, ONTAP's software automatically handles any partitioning and partition assignments that are required.

Steps

1. Use the CLI to display the current ownership for the partitioned disk:

   ```
   storage disk show -disk disk_name -partition-ownership
   ```

2. Set the CLI privilege level to advanced:

   ```
   set -privilege advanced
   ```

3. Enter the appropriate command, depending on which ownership entity you want to assign ownership for:

   If any of the ownership entities are already owned, then you must include the "-force" option.

If you want to assign ownership for the…	Use this command…
Container disk	`storage disk assign -disk disk_name -owner owner_name`
Data1 partition	`storage disk assign -disk disk_name -owner owner_name -data1 true`
Data2 partition	`storage disk assign -disk disk_name -owner owner_name -data2 true`
Root partition	`storage disk assign -disk disk_name -owner owner_name -root true`

Option 3: Manually assign DS460C container drives that have the root partition

If you are initializing an HA pair that has only DS460C shelves, you must manually assign ownership for the container drives that have the root partition by conforming to the half-drawer policy.

About this task

- When you initialize an HA pair that has only DS460C shelves, the ADP boot menu (available with ONTAP 9.2 and later) options 9a and 9b do not support automatic drive ownership assignment. You must manually assign the container drives that have the root partition by conforming to the half-drawer policy.

  After HA pair initialization (boot up), automatic assignment of disk ownership is automatically enabled and uses the half-drawer policy to assign ownership to the remaining drives (other than the container drives that have the root partition) and any drives added in the future, such as replacing failed drives, responding to a "low spares" message, or adding capacity.

- Learn about the half-drawer policy in the topic About automatic assignment of disk ownership.

Steps

1. If your DS460C shelves are not fully populated, complete the following substeps; otherwise, go to the next step.

   a. First, install drives in the front row (drive bays 0, 3, 6, and 9) of each drawer.

      Installing drives in the front row of each drawer allows for proper air flow and prevents overheating.

   b. For the remaining drives, evenly distribute them across each drawer.

      Fill drawer rows from front to back. If you don't have enough drives to fill rows, then install them in pairs so that drives occupy the left and right side of a drawer evenly.

      The following illustration shows the drive bay numbering and locations in a DS460C drawer.
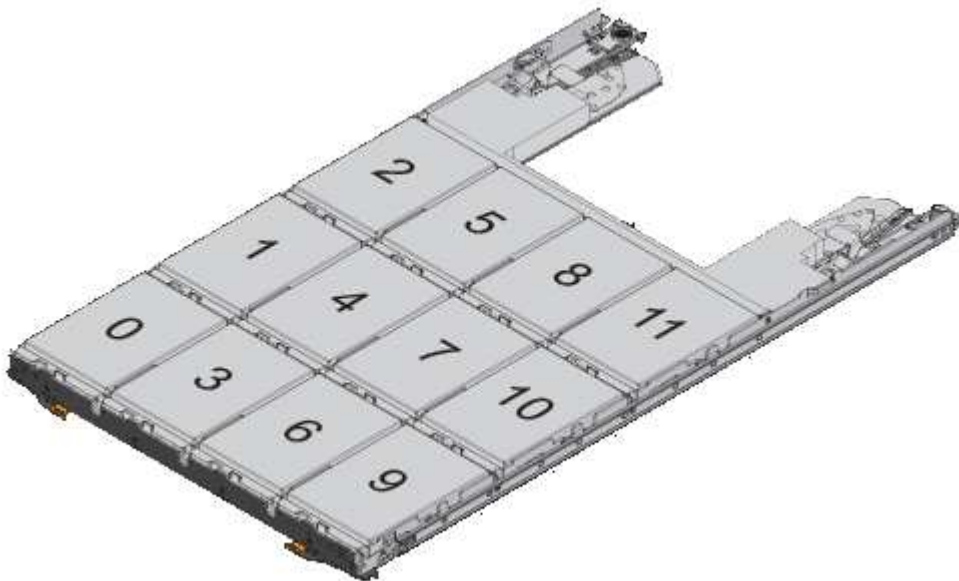
2. Log into the clustershell using the node-management LIF or cluster-management LIF.

3. For each drawer, manually assign the container drives that have the root partition by conforming to

the half-drawer policy using the following substeps:

The half-drawer policy has you assign the left half of a drawer's drives (bays 0 to 5) to node A, and the right half of a drawer's drives (bays 6 to 11) to node B.

    a. Display all unowned disks: `storage disk show -container-type unassigned`

    b. Assign the container drives that have the root partition: `storage disk assign -disk disk_name -owner owner_name`

       You can use the wildcard character to assign more than one drive at a time.

Set up an active-passive configuration on nodes using root-data partitioning

When an HA pair is configured to use root-data partitioning by the factory, ownership of the data partitions is split between both nodes in the pair for use in an active-active configuration. If you want to use the HA pair in an active-passive configuration, you must update partition ownership before creating your data local tier (aggregate).

What you'll need

- You should have decided which node will be the active node and which node will be the passive node.
- Storage failover must be configured on the HA pair.

About this task

This task is performed on two nodes: Node A and Node B.

This procedure is designed for nodes for which no data local tier (aggregate) has been created from the partitioned disks.

Learn about advanced disk partitioning.

Steps

All commands are inputted at the cluster shell.

1. View the current ownership of the data partitions:

   `storage aggregate show-spare-disks`

   The output shows that half of the data partitions are owned by one node and half are owned by the other node. All of the data partitions should be spare.

   ```
   cluster1::> storage aggregate show-spare-disks

   Original Owner: cluster1-01
    Pool0
     Partitioned Spares
                                                         Local
   Local
   ```

```
                                                       Data
Root Physical
 Disk                         Type     RPM Checksum        Usable
Usable    Size
 -------------------------- ----- ------ -------------- --------
-------- --------
 1.0.0                        BSAS    7200 block           753.8GB
0B  828.0GB
 1.0.1                        BSAS    7200 block           753.8GB
73.89GB  828.0GB
 1.0.5                        BSAS    7200 block           753.8GB
0B  828.0GB
 1.0.6                        BSAS    7200 block           753.8GB
0B  828.0GB
 1.0.10                       BSAS    7200 block           753.8GB
0B  828.0GB
 1.0.11                       BSAS    7200 block           753.8GB
0B  828.0GB

Original Owner: cluster1-02
 Pool0
  Partitioned Spares
                                                       Local
Local
                                                       Data
Root Physical
 Disk                         Type     RPM Checksum        Usable
Usable    Size
 -------------------------- ----- ------ -------------- --------
-------- --------
 1.0.2                        BSAS    7200 block           753.8GB
0B  828.0GB
 1.0.3                        BSAS    7200 block           753.8GB
0B  828.0GB
 1.0.4                        BSAS    7200 block           753.8GB
0B  828.0GB
 1.0.7                        BSAS    7200 block           753.8GB
0B  828.0GB
 1.0.8                        BSAS    7200 block           753.8GB
73.89GB  828.0GB
 1.0.9                        BSAS    7200 block           753.8GB
0B  828.0GB
12 entries were displayed.
```

2. Enter the advanced privilege level:

```
set advanced
```

3. For each data partition owned by the node that will be the passive node, assign it to the active node:

```
storage disk assign -force -data true -owner active_node_name -disk disk_name
```

You do not need to include the partition as part of the disk name.

You would enter a command similar to the following example for each data partition you need to reassign:

```
storage disk assign -force -data true -owner cluster1-01 -disk 1.0.3
```

4. Confirm that all of the partitions are assigned to the active node.

```
cluster1::*> storage aggregate show-spare-disks

Original Owner: cluster1-01
 Pool0
  Partitioned Spares
                                                             Local
Local
                                                              Data
Root Physical
 Disk                           Type     RPM Checksum         Usable
Usable     Size
 -------------------------- ----- ------ -------------- --------
-------- --------
 1.0.0                          BSAS    7200 block           753.8GB
0B   828.0GB
 1.0.1                          BSAS    7200 block           753.8GB
73.89GB   828.0GB
 1.0.2                          BSAS    7200 block           753.8GB
0B   828.0GB
 1.0.3                          BSAS    7200 block           753.8GB
0B   828.0GB
 1.0.4                          BSAS    7200 block           753.8GB
0B   828.0GB
 1.0.5                          BSAS    7200 block           753.8GB
0B   828.0GB
 1.0.6                          BSAS    7200 block           753.8GB
0B   828.0GB
 1.0.7                          BSAS    7200 block           753.8GB
0B   828.0GB
 1.0.8                          BSAS    7200 block           753.8GB
0B   828.0GB
 1.0.9                          BSAS    7200 block           753.8GB
0B   828.0GB
 1.0.10                         BSAS    7200 block           753.8GB
```

```
 0B   828.0GB
  1.0.11                          BSAS     7200 block            753.8GB
 0B   828.0GB


 Original Owner: cluster1-02
  Pool0
   Partitioned Spares
                                                                  Local
 Local
                                                                  Data
 Root Physical
  Disk                           Type     RPM Checksum           Usable
 Usable     Size
  -------------------------- ----- ------ -------------- --------
 -------- --------
  1.0.8                           BSAS     7200 block              0B
 73.89GB   828.0GB
 13 entries were displayed.
```

Note that cluster1-02 still owns a spare root partition.

5. Return to administrative privilege:

```
set admin
```

6. Create your data aggregate, leaving at least one data partition as spare:

```
storage aggregate create new_aggr_name -diskcount number_of_partitions -node
active_node_name
```

The data aggregate is created and is owned by the active node.

Set up an active-passive configuration on nodes using root-data-data partitioning

When an HA pair is configured to use root-data-data partitioning by the factory, ownership of the data partitions is split between both nodes in the pair for use in an active-active configuration. If you want to use the HA pair in an active-passive configuration, you must update partition ownership before creating your data local tier (aggregate).

What you'll need

- You should have decided which node will be the active node and which node will be the passive node.

- Storage failover must be configured on the HA pair.

About this task

This task is performed on two nodes: Node A and Node B.

This procedure is designed for nodes for which no data local tier (aggregate) has been created from the partitioned disks.

Learn about advanced disk partitioning.

Steps

All commands are input at the cluster shell.

1. View the current ownership of the data partitions:

   ```
   storage aggregate show-spare-disks -original-owner passive_node_name -fields
   local-usable-data1-size, local-usable-data2-size
   ```

   The output shows that half of the data partitions are owned by one node and half are owned by the other node. All of the data partitions should be spare.

2. Enter the advanced privilege level:

   ```
   set advanced
   ```

3. For each data1 partition owned by the node that will be the passive node, assign it to the active node:

   ```
   storage disk assign -force -data1 -owner active_node_name -disk disk_name
   ```

   You do not need to include the partition as part of the disk name

4. For each data2 partition owned by the node that will be the passive node, assign it to the active node:

   ```
   storage disk assign -force -data2 -owner active_node_name -disk disk_name
   ```

   You do not need to include the partition as part of the disk name

5. Confirm that all of the partitions are assigned to the active node:

   ```
   storage aggregate show-spare-disks
   ```

   ```
   cluster1::*> storage aggregate show-spare-disks

   Original Owner: cluster1-01
     Pool0
      Partitioned Spares
                                                                    Local
    Local
                                                                     Data
    Root Physical
     Disk                            Type     RPM Checksum          Usable
    Usable     Size
     -------------------------- ----- ------ -------------- --------
    -------- --------
     1.0.0                           BSAS    7200 block            753.8GB
    0B   828.0GB
   ```

```
   1.0.1                              BSAS    7200 block           753.8GB
73.89GB  828.0GB
   1.0.2                              BSAS    7200 block           753.8GB
0B   828.0GB
   1.0.3                              BSAS    7200 block           753.8GB
0B   828.0GB
   1.0.4                              BSAS    7200 block           753.8GB
0B   828.0GB
   1.0.5                              BSAS    7200 block           753.8GB
0B   828.0GB
   1.0.6                              BSAS    7200 block           753.8GB
0B   828.0GB
   1.0.7                              BSAS    7200 block           753.8GB
0B   828.0GB
   1.0.8                              BSAS    7200 block           753.8GB
0B   828.0GB
   1.0.9                              BSAS    7200 block           753.8GB
0B   828.0GB
   1.0.10                             BSAS    7200 block           753.8GB
0B   828.0GB
   1.0.11                             BSAS    7200 block           753.8GB
0B   828.0GB

Original Owner: cluster1-02
 Pool0
  Partitioned Spares
                                                                    Local
Local
                                                                     Data
Root Physical
 Disk                              Type    RPM Checksum          Usable
Usable    Size
  -------------------------- ----- ------ -------------- --------
-------- --------
   1.0.8                              BSAS    7200 block              0B
73.89GB  828.0GB
13 entries were displayed.
```

Note that cluster1-02 still owns a spare root partition.

6. Return to administrative privilege:

```
set admin
```

7. Create your data aggregate, leaving at least one data partition as spare:

```
storage aggregate create new_aggr_name -diskcount number_of_partitions -node
```

```
active_node_name
```

The data aggregate is created and is owned by the active node.

8. Alternatively, you can use ONTAP's recommend aggregate layout which includes best practices for RAID group layout and spare counts:

```
storage aggregate auto-provision
```

Remove ownership from a disk

ONTAP writes disk ownership information to the disk. Before you remove a spare disk or its shelf from a node, you should remove its ownership information so that it can be properly integrated into another node.

What you'll need
The disk you want to remove ownership from must meet the following requirements:

- It must be a spare disk.

  You cannot remove ownership from a disk that is being used in an local tier (aggregate).

- It cannot be in the maintenance center.
- It cannot be undergoing sanitization.
- It cannot have failed.

  It is not necessary to remove ownership from a failed disk.

About this task
If you have automatic disk assignment enabled, ONTAP could automatically reassign ownership before you remove the disk from the node. For this reason, you disable the automatic ownership assignment until the disk is removed, and then you re-enable it.

Steps
1. If disk ownership automatic assignment is on, use the CLI to turn it off:

```
storage disk option modify -node node_name -autoassign off
```

2. If needed, repeat the previous step for the node's HA partner.
3. Remove the software ownership information from the disk:

```
storage disk removeowner disk_name
```

To remove ownership information from multiple disks, use a comma-separated list.

Example:

```
storage disk removeowner sys1:0a.23,sys1:0a.24,sys1:0a.25
```

4. If the disk is partitioned for root-data partitioning, remove ownership from the partitions:

   a. For ONTAP 9.10.1 and later, enter:

   ```
   storage disk removeowner -disk disk_name
   ```

   b. For ONTAP 9.9.1 and earlier, enter both commands:

   ```
   storage disk removeowner -disk disk_name -root true
   ```

   ```
   storage disk removeowner -disk disk_name -data true
   ```

   Both partitions are no longer owned by any node.

5. If you previously turned off automatic assignment of disk ownership, turn it on after the disk has been removed or reassigned:

   ```
   storage disk option modify -node node_name -autoassign on
   ```

6. If needed, repeat the previous step for the node's HA partner.