Managing disks

ONTAP 9

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When you need to update the Disk Qualification Package

The Disk Qualification Package (DQP) adds full support for newly qualified drives. Before you update drive firmware or add new drive types or sizes to a cluster, you must update the DQP. A best practice is to also update the DQP regularly; for example, every quarter or semi-annually.

You need to download and install the DQP in the following situations:

- Whenever you add a new drive type or size to the node

  For example, if you already have 1-TB drives and add 2-TB drives, you need to check for the latest DQP update.

- Whenever you update the disk firmware
- Whenever newer disk firmware or DQP files are available
- Whenever you upgrade to a new version of ONTAP.

  The DQP is not updated as part of an ONTAP upgrade.

Related information

NetApp Downloads: Disk Qualification Package

NetApp Downloads: Disk Drive Firmware

How hot spare disks work

A hot spare disk is a disk that is assigned to a storage system and is ready for use, but is not in use by a RAID group and does not hold any data.

If a disk failure occurs within a RAID group, the hot spare disk is automatically assigned to the RAID group to replace the failed disks. The data of the failed disk is reconstructed on the hot spare replacement disk in the background from the RAID parity disk. The reconstruction activity is logged in the `/etc/message` file and an AutoSupport message is sent.

If the available hot spare disk is not the same size as the failed disk, a disk of the next larger size is chosen and then downsized to match the size of the disk that it is replacing.

How low spare warnings can help you manage your spare disks

By default, warnings are issued to the console and logs if you have fewer than one hot spare drive that matches the attributes of each drive in your storage system. You can change the threshold value for these warning messages to ensure that your system adheres to best practices.

You should set the `min_spare_count` RAID option to `2` to ensure that you always have the minimum recommended number of spare disks. You can use the `storage raid-options modify -node nodename -name option_name -value 2` to set the option.

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 using the `storage disk show -ownership` command:

```
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, display the partition ownership using the `storage disk show -partition-ownership` command:

```
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
...
```

Manually assign ownership of partitioned disks

Manually assign ownership of partitioned disks overview

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.

> If a container disk fails in a half-populated shelf and is replaced, ONTAP will not auto-assign ownership. In this case, any assignment of new disks will need to be done manually. To make auto-assign work on half-populated shelves, place disks equally on lower half and 6 on far right bays to begin with. That is, 6 disks from bays 0-5 and 6 disks from bays 18-23. After the container disk is assigned in an ADP-configured system, ONTAP's software will handle any partitioning and partition assignments that are required, without user intervention.

Manually assign disks with root-data 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 an aggregate, it must be owned by the same node that owns the aggregate.

Steps

1. 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 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`

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

Manually assign disks with root-data-data partitioning

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

About this task

Root-data-data partitioning creates one small partition as the root partition and two larger, equally sized partitions for data.

Parameters must be used in 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.

Steps

1. 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 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`

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

Additional root-data partitioning management options

Beginning with ONTAP 9.2, a new root-data partitioning option is available from the Boot Menu that provides additional management features for disks that are configured for root-data partitioning.

The following management features are available under the Boot Menu Option 9.

- Unpartition all disks and remove their ownership information

  This option is useful if your system is configured for root-data partitioning and you need to reinitialize it with a different configuration.

- Clean configuration and initialize node with partitioned disks

  This option is useful for the following:

  - Your system is not configured for root-data partitioning and you would like to configure it for root-data partitioning
  - Your system is incorrectly configured for root-data partitioning and you need to correct it
  - You have an AFF platform or a FAS platform with only SSDs attached that is configured for the previous version of root-data partitioning and you want to upgrade it to the newer version of root-data partitioning to gain increased storage efficiency

- Clean configuration and initialize node with whole disks

  This option is useful if you need to:

  - Unpartition existing partitions
  - Remove local disk ownership
  - Reinitialize your system with whole disks using RAID-DP

Configure automatic assignment of disk ownership

You can configure ONTAP to automatically assign disk ownership according to a disk's stack, shelf, or bay. If configured, automatic disk ownership assignments occur 10 minutes after system initialization and every five minutes during normal system operation.

What you'll need

- Your system must adhere to the requirements for automatic disk ownership.
- If 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.
- Use the `bay autoassign-policy` only for entry level platforms. If you try to use the `bay autoassign-policy` for a non-entry level platform, it will fail.

About this task

The behavior of the `default` automatic assignment policy depends on the system model. For entry level models, the `default` policy is equivalent to the `bay` policy. For all other systems, it is equivalent to the `stack` policy.

Steps

1. Configure automatic disk assignment:

   `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.

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
```

Which disk autoassignment policy to use

You can typically use the default autoassignment policy, which is equivalent to the `stack` policy for most systems, and to the `bay` policy for entry-level systems (AFF A2xx, FAS2xxx). However, for some configurations, you might need to change the

autoassignment policy.

You must select the appropriate autoassignment based on your configuration:

If you are using…	Then use this autoassignment policy…
Stand-alone entry-level system	`stack`
Entry-level systems in an HA configuration with a single, shared shelf	`bay`
Entry-level systems in an HA configuration with one stack of two or more shelves	`shelf`
MetroCluster configurations with one stack per node, two or more shelves	`shelf`
All other configurations	`stack`

Remove a failed disk

A disk that is completely failed is no longer counted by ONTAP as a usable disk, and you can immediately disconnect the disk from the disk shelf. However, you should leave a partially failed disk connected long enough for the Rapid RAID Recovery process to complete.

About this task

If you are removing a disk because it has failed or because it is producing excessive error messages, you should not use the disk again in this or any other storage system.

Steps

1. Find the disk ID of the failed disk:

   `storage disk show -broken`

   If the disk does not appear in the list of failed disks, it might be partially failed, with a Rapid RAID Recovery in process. In this case, you should wait until the disk is present in the list of failed disks (which means that the Rapid RAID Recovery process is complete) before removing the disk.

2. Determine the physical location of the disk you want to remove:

   `storage disk set-led -action on -disk` *`disk_name`* `2`

   The fault LED on the face of the disk is lit.

3. Remove the disk from the disk shelf, following the instructions in the hardware guide for your disk shelf model.

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 aggregate.

- It cannot be in the maintenance center.
- It cannot be undergoing sanitization.
- It cannot be 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 automatic ownership assignment until the disk is removed, and then reenable it.

Steps

1. If disk ownership automatic assignment is on, 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:

   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 by entering both of the following 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 turned off disk ownership automatic assignment previously, 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.

Sanitize a disk

Sanitizing a disk allows you to remove data from a disk or a set of disks on decommissioned or inoperable systems so that the data can never be recovered.

ONTAP 9.6 and later

Beginning with ONTAP 9.6, you can perform disk sanitization in maintenance mode.

What you'll need

- The disk cannot be a self-encrypting disk (SED).

  You must use the `storage encryption disk sanitize` command to sanitize an SED.

  Encryption of data at rest

Steps

1. Boot into maintenance mode.
2. If the disks you want to sanitize are partitioned, unpartition each disk:

   ```
   disk unpartition disk_name
   ```

3. Sanitize the specified disks:

   ```
   disk sanitize start [-p pattern1|-r [-p pattern2|-r [-p pattern3|-r]]] [-c
   cycle_count] disk_list
   ```

   > Do not turn off power to the node, disrupt the storage connectivity, or remove target disks while sanitizing. If sanitizing is interrupted during the formatting phase, the formatting phase must be restarted and allowed to finish before the disks are sanitized and ready to be returned to the spare pool. If you need to abort the sanitization process, you can do so by using the `disk sanitize abort` command. If the specified disks are undergoing the formatting phase of sanitization, the abort does not occur until the phase is complete.

   `-p` *`pattern1`* `-p` *`pattern2`* `-p` *`pattern3`* specifies a cycle of one to three user-defined hex byte overwrite patterns that can be applied in succession to the disks being sanitized. The default pattern is three passes, using 0x55 for the first pass, 0xaa for the second pass, and 0x3c for the third pass.

   `-r` replaces a patterned overwrite with a random overwrite for any or all of the passes.

   `-c` *`cycle_count`* specifies the number of times that the specified overwrite patterns are applied. The default value is one cycle. The maximum value is seven cycles.

   `disk_list` specifies a space-separated list of the IDs of the spare disks to be sanitized.

4. If desired, check the status of the disk sanitization process:

   ```
   disk sanitize status [disk_list]
   ```

5. After the sanitization process is complete, return the disks to spare status for each disk:

   `disk sanitize release disk_name`

6. Exit maintenance mode.

ONTAP 9.5 and earlier

When disk sanitization is enabled, it disables some Data ONTAP commands. After disk sanitization is enabled on a node, it cannot be disabled.

What you'll need

- The disks must be spare disks; they must be owned by a node, but not used in an aggregate. + If the disk is partitioned, neither partition can be in use in an aggregate.
- The disks cannot be part of a storage pool.

Steps

1. Enter the nodeshell for the node that owns the disks you want to sanitize:

   `system node run -node node_name`

2. Enable disk sanitization:

   `options licensed_feature.disk_sanitization.enable on`

   You are asked to confirm the command because it is irreversible.

3. If the disks you want to sanitize are partitioned, unpartition each disk:

   `disk unpartition disk_name`

4. Sanitize the specified disks:

   `disk sanitize start [-p pattern1|-r [-p pattern2|-r [-p pattern3|-r]]] [-c cycle_count] disk_list`

   > Do not turn off power to the node, disrupt the storage connectivity, or remove target disks while sanitizing. If sanitizing is interrupted during the formatting phase, the formatting phase must be restarted and allowed to finish before the disks are sanitized and ready to be returned to the spare pool.
   >
   > If you need to abort the sanitization process, you can do so by using the disk sanitize abort command. If the specified disks are undergoing the formatting phase of sanitization, the abort does not occur until the phase is complete.

   `-p pattern1 -p pattern2 -p pattern3` specifies a cycle of one to three user-defined hex byte overwrite patterns that can be applied in succession to the disks being sanitized. The default pattern is three passes, using 0x55 for the first pass, 0xaa for the second pass, and 0x3c for the third pass.

   `-r` replaces a patterned overwrite with a random overwrite for any or all of the passes.

   `-c cycle_count` specifies the number of times that the specified overwrite patterns are applied.

The default value is one cycle. The maximum value is seven cycles.

`disk_list` specifies a space-separated list of the IDs of the spare disks to be sanitized.

5. If you want to check the status of the disk sanitization process:

   ```
   disk sanitize status [disk_list]
   ```

6. After the sanitization process is complete, return the disks to spare status:

   ```
   disk sanitize release disk_name
   ```

7. Return to the clustered Data ONTAP CLI:

   ```
   exit
   ```

8. Determine whether all of the disks were returned to spare status:

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

If…	Then…
All of the sanitized disks are listed as spares	You are done. The disks are sanitized and in spare status.

Some of the sanitized disks are not listed as spares	Complete the following steps:
	a. Enter advanced privilege mode:
	`set -privilege advanced`
	b. Assign the unassigned sanitized disks to the appropriate node for each disk:
	`storage disk assign -disk disk_name -owner node_name`
	c. Return the disks to spare status for each disk:
	`storage disk unfail -disk disk_name -s -q`
	d. Return to administrative mode: `+set -privilege admin`

Result

The specified disks are sanitized and designated as hot spares. The serial numbers of the sanitized disks are written to `/etc/log/sanitized_disks`.

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 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.

All commands are input at the clustershell.

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

Steps

1. View the current ownership of the data partitions:

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

   You can see 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 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.

All commands are input at the clustershell.

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

Steps

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`

   You should see 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
   ```

Commands for managing disks

You can use the `storage disk` and `storage aggregate` commands to manage your disks.

If you want to…	Use this command…

Display a list of spare disks, including partitioned disks, by owner	`storage aggregate show-spare-disks`
Display the disk RAID type, current usage, and RAID group by aggregate	`storage aggregate show-status`
Display the RAID type, current usage, aggregate, and RAID group, including spares, for physical disks	`storage disk show -raid`
Display a list of failed disks	`storage disk show -broken`
Display the pre-cluster (nodescope) drive name for a disk	`storage disk show -primary-paths` (advanced)
Illuminate the LED for a particular disk or shelf	`storage disk set-led`
Display the checksum type for a specific disk	`storage disk show -fields checksum-compatibility`
Display the checksum type for all spare disks	`storage disk show -fields checksum-compatibility -container-type spare`
Display disk connectivity and placement information	`storage disk show -fields disk,primary-port,secondary-name,secondary-port,shelf,bay`
Display the pre-cluster disk names for specific disks	`storage disk show -disk diskname -fields diskpathnames`
Display the list of disks in the maintenance center	`storage disk show -maintenance`
Display SSD wear life	`storage disk show -ssd-wear`
Unpartition a shared disk	`storage disk unpartition` (available at diagnostic level)
Zero all non-zeroed disks	`storage disk zerospares`
Stop an ongoing sanitization process on one or more specified disks	`system node run -node nodename -command disk sanitize`
Display storage encryption disk information	`storage encryption disk show`

Retrieve authentication keys from all linked key management servers	`security key-manager restore`

Related information

ONTAP 9 commands

Commands for displaying space usage information

You use the `storage aggregate` and `volume` commands to see how space is being used in your aggregates and volumes and their Snapshot copies.

To display information about…	Use this command…
Aggregates, including details about used and available space percentages, Snapshot reserve size, and other space usage information	`storage aggregate show storage aggregate show-space -fields snap-size-total,used-including-snapshot-reserve`
How disks and RAID groups are used in an aggregate, and RAID status	`storage aggregate show-status`
The amount of disk space that would be reclaimed if you deleted a specific Snapshot copy	`volume snapshot compute-reclaimable`
The amount of space used by a volume	`volume show -fields size,used,available,percent-used volume show-space`
The amount of space used by a volume in the containing aggregate	`volume show-footprint`

Related information

ONTAP 9 commands

Commands for displaying information about storage shelves

You use the `storage shelf show` command to display configuration and error information for your disk shelves.

If you want to display…	Use this command…
General information about shelf configuration and hardware status	`storage shelf show`

If you want to display…	Use this command…
Detailed information for a specific shelf, including stack ID	`storage shelf show -shelf`
Unresolved, customer actionable, errors by shelf	`storage shelf show -errors`
Bay information	`storage shelf show -bay`
Connectivity information	`storage shelf show -connectivity`
Cooling information, including temperature sensors and cooling fans	`storage shelf show -cooling`
Information about I/O modules	`storage shelf show -module`
Port information	`storage shelf show -port`
Power information, including PSUs (power supply units), current sensors, and voltage sensors	`storage shelf show -power`

Related information

ONTAP 9 commands

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