NetApp

Aggregate expansion

ONTAP 9

NetApp
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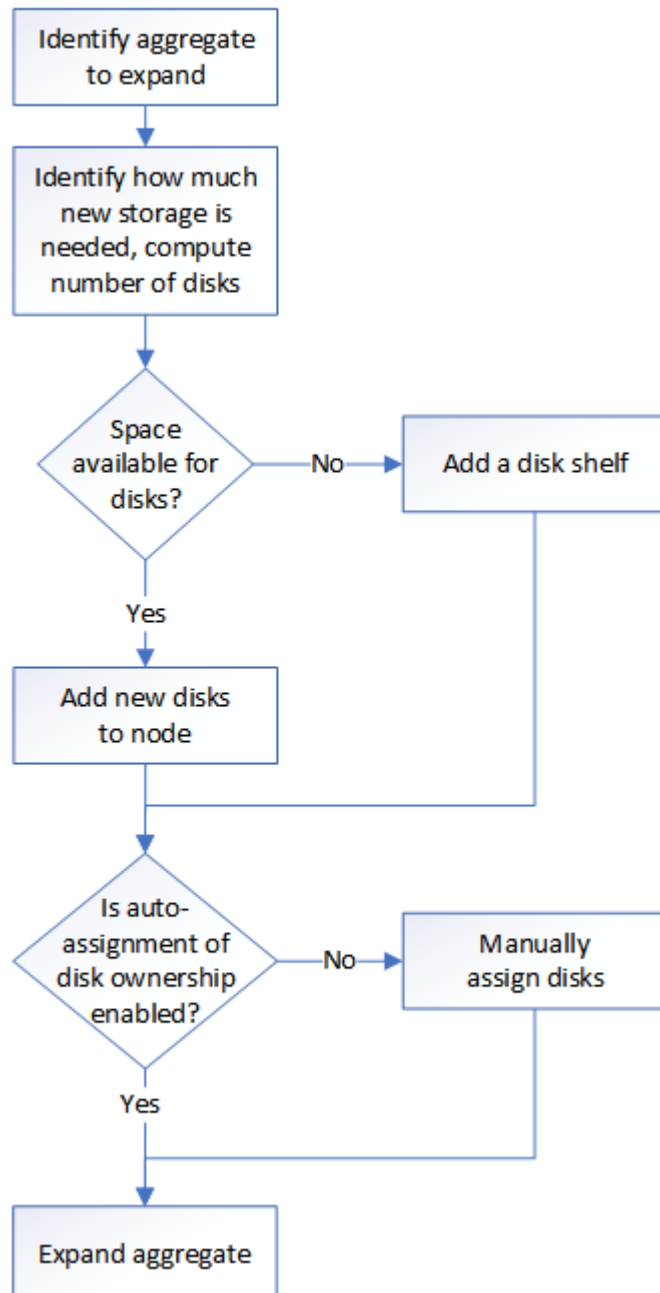
Table of Contents

Aggregate expansion

Aggregate expansion workflow

Expanding an aggregate involves identifying the aggregate to expand, determining how much new storage is needed, installing new disks, assigning disk ownership, and creating new a RAID group if needed.

Add drives to a node or shelf

You add drives to a node or shelf to increase the number of hot spares or to add space to an aggregate.

About this task

The drive you want to add must be supported by your platform.

NetApp Hardware Universe

The minimum number of drives you should add in a single procedure is six. Adding a single drive might reduce performance.

Steps

1. Check the NetApp Support Site for newer drive and shelf firmware and Disk Qualification Package files.

   If your node or shelf does not have the latest versions, update them before installing the new drive.

   Drive firmware is automatically updated (nondisruptively) on new drives that do not have current firmware versions.

2. Properly ground yourself.

3. Gently remove the bezel from the front of the platform.

4. Identify the correct slot for the new drive.

   > (i) The correct slots for adding drives vary depending on the platform model and ONTAP version. In some cases you need to add drives to specific slots in sequence. For example, in an AFF A800 you add the drives at specific intervals leaving clusters of empty slots. Whereas, in an AFF A220 you add new drives to the next empty slots running from the outside towards the middle of the shelf.

   See the NetApp Hardware Universe to identify the correct slots for your configuration.

5. Insert the new drive:

   a. With the cam handle in the open position, use both hands to insert the new drive.

   b. Push until the drive stops.

   c. Close the cam handle so that the drive is fully seated into the mid plane and the handle clicks into place. Be sure to close the cam handle slowly so that it aligns correctly with the face of the drive.

6. Verify that the drive's activity LED (green) is illuminated.

   When the drive's activity LED is solid, it means that the drive has power. When the drive's activity LED is blinking, it means that the drive has power and I/O is in progress. If the drive firmware is automatically updating, the LED blinks.

7. To add another drive, repeat Steps 4 through 6.

   The new drives are not recognized until they are assigned to a node. You can assign the new drives manually, or you can wait for ONTAP to automatically assign the new drives if your node follows the rules for drive autoassignment.

8. After the new drives have all been recognized, verify their addition and their ownership information:

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

   You should see the new drives, owned by the correct node.

9. Zero the newly added drives:

```
storage disk zerospares
```

Drives that have been used previously in an ONTAP aggregate must be zeroed before they can be added to another aggregate. Zeroing the drives now can prevent delays in case you need to quickly increase the size of an aggregate. The drive zeroing command runs in the background and can take hours to complete, depending on the size of the non-zeroed drives in the node.

Results

The new drives are ready to be added to an aggregate, placed onto the list of hot spares, or you can create a new aggregate.

Manually assigning disk ownership

Disks must be owned by a node before they can be used in an aggregate. If your cluster is not configured to use automatic disk ownership assignment, you must assign ownership manually. You cannot reassign ownership of a disk that is in use in an aggregate.

Steps

1. 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

Fast zeroing of drives

Beginning with ONTAP 9.4, you can automatically and quickly zeros drives (both SSDs and HDDs) before provisioning without experiencing long wait times..

For systems that are freshly installed with ONTAP 9.4 or later or systems that are reinitialized with ONTAP 9.4 or later, drive zeroing takes place automatically and is complete in seconds.

If you need to manually zero a drive, you can use one of the following methods:

- Use the `storage disk zerospares` command.

  Admin privileges are required to use this command.

- From the boot menu select one of the following options:

  ◦ `(4) Clean configuration and initialize all disks`

  ◦ `(9a) Unpartition all disks and remove their ownership information`

◦ (9b) Clean configuration and initialize node with whole disks

The fast zeroing enhancement does not support systems upgraded from a release earlier than ONTAP 9.4.

If any node on the cluster contains an aggregate with fast-zeroed drives, then you cannot revert the cluster to ONTAP 9.2 or earlier.

Expand aggregates

You can add disks to an aggregate so that it can provide more storage to its associated volumes. The procedure for adding partitioned disks to an aggregate is similar to the procedure for adding unpartitioned disks.

What you'll need
You must know what the RAID group size is for the aggregate you are adding the storage to.

About this task
When you expand an aggregate, you should be aware of whether you are adding partition or unpartitioned disks to the aggregate. When you add unpartitioned drives to an existing aggregate, the size of the existing RAID groups is inherited by the new RAID group, which can affect the number of parity disks required. If an unpartitioned disk is added to a RAID group composed of partitioned disks, the new disk is partitioned, leaving an unused spare partition.

When you provision partitions, you must ensure that you do not leave the node without a drive with both partitions as spare. If you do, and the node experiences a controller disruption, valuable information about the problem (the core file) might not be available to provide to the technical support.

> (i) Do not use the `disklist` command to expand your aggregates. This could cause partition misalignment.

Steps

1. Show the available spare storage on the system that owns the aggregate:

   `storage aggregate show-spare-disks -original-owner` *node_name*

   You can use the `-is-disk-shared` parameter to show only partitioned drives or only unpartitioned drives.

```
cl1-s2::> storage aggregate show-spare-disks -original-owner cl1-s2 -is
-disk-shared true

Original Owner: cl1-s2
 Pool0
  Shared HDD Spares
                                                              Local
Local
                                                              Data
Root Physical
 Disk                        Type    RPM Checksum           Usable
Usable    Size Status
 --------------------------- ----- ------ -------------- ---------
-------- -------- --------
 1.0.1                        BSAS   7200 block              753.8GB
73.89GB  828.0GB zeroed
 1.0.2                        BSAS   7200 block              753.8GB
0B  828.0GB zeroed
 1.0.3                        BSAS   7200 block              753.8GB
0B  828.0GB zeroed
 1.0.4                        BSAS   7200 block              753.8GB
0B  828.0GB zeroed
 1.0.8                        BSAS   7200 block              753.8GB
0B  828.0GB zeroed
 1.0.9                        BSAS   7200 block              753.8GB
0B  828.0GB zeroed
 1.0.10                       BSAS   7200 block                   0B
73.89GB  828.0GB zeroed
2 entries were displayed.
```

2. Show the current RAID groups for the aggregate:

```
storage aggregate show-status aggr_name
```

```
cl1-s2::> storage aggregate show-status -aggregate data_1

Owner Node: cl1-s2
 Aggregate: data_1 (online, raid_dp) (block checksums)
   Plex: /data_1/plex0 (online, normal, active, pool0)
    RAID Group /data_1/plex0/rg0 (normal, block checksums)
                                                          Usable
Physical
      Position Disk                         Pool Type     RPM     Size
Size Status
      -------- -------------------------- ---- ----- ------ --------
-------- ----------
      shared   1.0.10                        0   BSAS    7200  753.8GB
828.0GB (normal)
      shared   1.0.5                         0   BSAS    7200  753.8GB
828.0GB (normal)
      shared   1.0.6                         0   BSAS    7200  753.8GB
828.0GB (normal)
      shared   1.0.11                        0   BSAS    7200  753.8GB
828.0GB (normal)
      shared   1.0.0                         0   BSAS    7200  753.8GB
828.0GB (normal)
5 entries were displayed.
```

3. Simulate adding the storage to the aggregate:

   storage aggregate add-disks -aggregate *aggr_name* -diskcount
   number_of_disks_or_partitions -simulate true

   You can see the result of the storage addition without actually provisioning any storage. If any warnings are displayed from the simulated command, you can adjust the command and repeat the simulation.

```
cl1-s2::> storage aggregate add-disks data_1 -diskcount 5 -simulate true

Addition of disks would succeed for aggregate "data_1" on node "cl1-s2".
The
following disks would be used to add to the aggregate: 1.0.2, 1.0.3,
1.0.4, 1.0.8, 1.0.9.
```

4. Add the storage to the aggregate:

   storage aggregate add-disks -aggregate *aggr_name* -raidgroup new -diskcount
   number_of_disks_or_partitions

   When creating a Flash Pool aggregate, if you are adding disks with a different checksum than the aggregate, or if you are adding disks to a mixed checksum aggregate, you must use the

`-checksumstyle` parameter.

If you are adding disks to a Flash Pool aggregate, you must use the `-disktype` parameter to specify the disk type.

You can use the `-disksize` parameter to specify a size of the disks to add. Only disks with approximately the specified size are selected for addition to the aggregate.

```
cl1-s2::> storage aggregate add-disks -aggregate data_1 -raidgroup new
-diskcount 5
```

5. Verify that the storage was added successfully:

```
storage aggregate show-status -aggregate aggr_name
```

```
cl1-s2::> storage aggregate show-status -aggregate data_1

Owner Node: cl1-s2
 Aggregate: data_1 (online, raid_dp) (block checksums)
   Plex: /data_1/plex0 (online, normal, active, pool0)
    RAID Group /data_1/plex0/rg0 (normal, block checksums)
                                                       Usable
Physical
     Position Disk                         Pool Type     RPM     Size
Size Status
     -------- -------------------------- ---- ----- ------ --------
-------- ----------
     shared   1.0.10                        0   BSAS   7200  753.8GB
828.0GB (normal)
     shared   1.0.5                         0   BSAS   7200  753.8GB
828.0GB (normal)
     shared   1.0.6                         0   BSAS   7200  753.8GB
828.0GB (normal)
     shared   1.0.11                        0   BSAS   7200  753.8GB
828.0GB (normal)
     shared   1.0.0                         0   BSAS   7200  753.8GB
828.0GB (normal)
     shared   1.0.2                         0   BSAS   7200  753.8GB
828.0GB (normal)
     shared   1.0.3                         0   BSAS   7200  753.8GB
828.0GB (normal)
     shared   1.0.4                         0   BSAS   7200  753.8GB
828.0GB (normal)
     shared   1.0.8                         0   BSAS   7200  753.8GB
828.0GB (normal)
     shared   1.0.9                         0   BSAS   7200  753.8GB
828.0GB (normal)
10 entries were displayed.
```

6. Verify that the node still has at least one drive with both the root partition and the data partition as spare:

```
storage aggregate show-spare-disks -original-owner node_name
```

```
cl1-s2::> storage aggregate show-spare-disks -original-owner cl1-s2 -is
-disk-shared true

Original Owner: cl1-s2
 Pool0
  Shared HDD Spares
                                                                   Local
Local
                                                                   Data
Root Physical
 Disk                           Type    RPM Checksum          Usable
Usable    Size Status
 -------------------------- ----- ------ -------------- --------
-------- -------- --------
 1.0.1                          BSAS    7200 block           753.8GB
73.89GB  828.0GB zeroed
 1.0.10                         BSAS    7200 block              0B
73.89GB  828.0GB zeroed
2 entries were displayed.
```