Aggregate creation

ONTAP 9

NetApp
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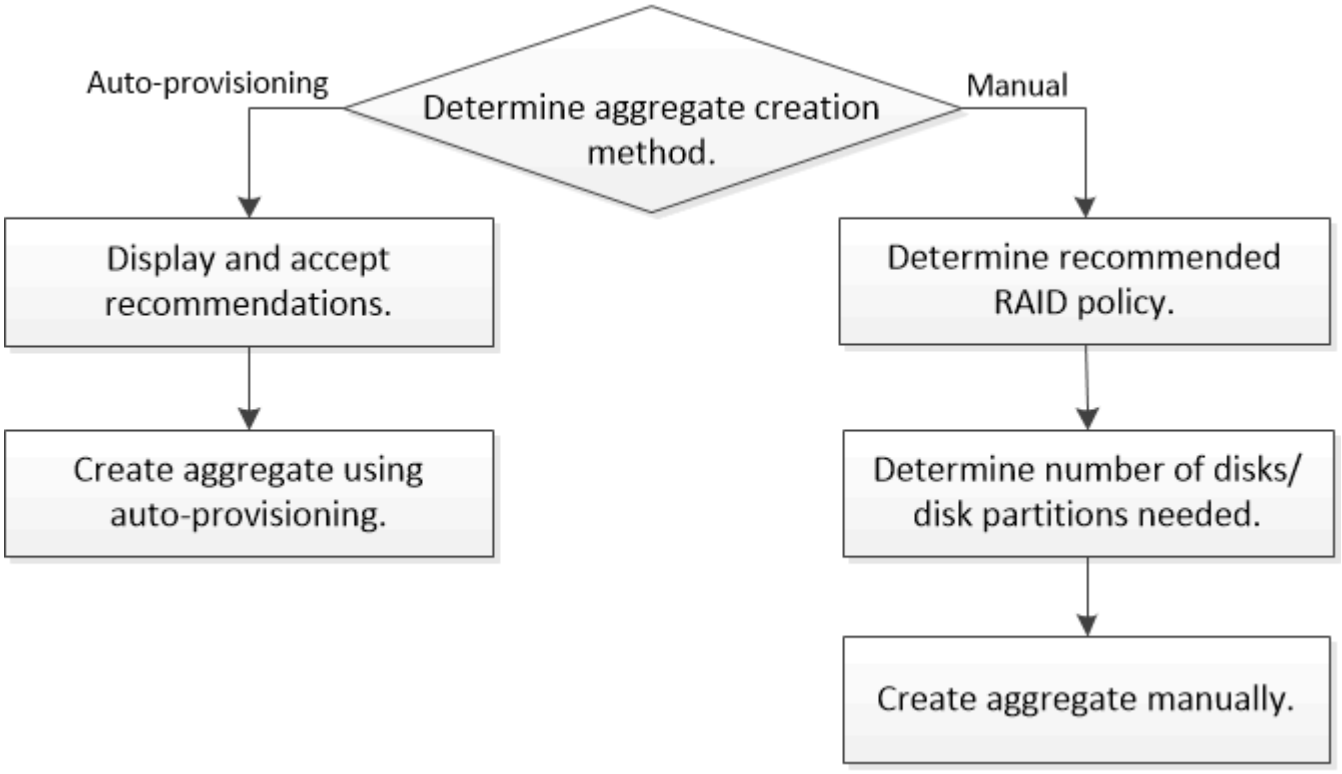
Aggregate creation workflow

Creating aggregates provides storage to volumes on your system. Beginning with ONTAP 9.2, you can let ONTAP recommend aggregate configurations for your system (auto-provision). If the auto-provision method is not available or appropriate in your environment, you can configure aggregates manually.



Decide which aggregate creation method to use

Although aggregate creation with auto-provision is a best practice in ONTAP 9.2 and later, you must determine whether it is supported in your environment. If it is not, you must make decisions about RAID policy and disk configuration, and then create the aggregates manually.

When you create an aggregate using the `storage aggregate auto-provision` command, ONTAP analyzes available spare disks in the cluster and generates a recommendation about how spare disks should be used to create aggregates according to best practices. ONTAP displays the summary of recommended aggregates including their names and usable size, and then prompts you to decide whether the aggregates should be created as recommended.

In many cases, the recommended aggregate layout in the auto-provision display will be optimal for your environment. However, if your cluster is running ONTAP 9.1 or earlier, or your environment includes the following configurations, you must use the manual aggregate configuration method.

- Aggregates using third-party array LUNs

- Virtual disks with Cloud Volumes ONTAP or ONTAP Select
- MetroCluster
- SyncMirror
- MSATA disks
- FlashPool aggregates
- Multiple disk types or sizes are connected to the node

In addition, if any of the following disk conditions are present, they must be addressed before using the auto-provision method:

- Missing disks
- Fluctuation in spare disk numbers
- Unassigned disks
- Non-zeroed spares
- Disks undergoing maintenance testing

The `storage aggregate auto-provision` man page contains more information about these requirements.

Related information

ONTAP 9 commands

Create aggregates with auto-provision

If the auto-provision method is appropriate in your environment, you run the `storage aggregate auto-provision` to generate aggregate layout recommendations. You can then create aggregates after reviewing and approving ONTAP recommendations.

What you'll need

ONTAP 9.2 or later must be running on your cluster.

About this task

The default summary generated with the `storage aggregate auto-provision` command lists the recommended aggregates to be created, including names and usable size. You can view the list and determine whether you want to create the recommended aggregates when prompted.

You can also display a detailed summary by using the `-verbose` option, which displays the following reports:

- Per node summary of new aggregates to create, discovered spares, and remaining spare disks and partitions after aggregate creation
- New data aggregates to create with counts of disks and partitions to be used
- RAID group layout showing how spare disks and partitions will be used in new data aggregates to be created
- Details about spare disks and partitions remaining after aggregate creation

If you are familiar with the auto-provision method and your environment is correctly prepared, you can use the `-skip-confirmation` option to create the recommended aggregate without display and confirmation. The

`storage aggregate auto-provision` command is not affected by the CLI session `-confirmations` setting.

The `storage aggregate auto-provision` man page contains more information about the aggregate layout recommendations.

Steps

1. Run the `storage aggregate auto-provision` command with the desired display options.
   - no options: Display standard summary
   - `-verbose` option: Display detailed summary
   - `-skip-confirmation` option: Create recommended aggregates without display or confirmation
2. After reviewing the display of recommended aggregates, respond to the prompt to create the recommended aggregates.

```
Do you want to create recommended aggregates? {y|n}:y

Info: Creating node1_SSD_1 ...
      Creating node2_SSD_1 ...
```

Related information

ONTAP 9 commands

Default RAID policies for aggregates

Either RAID-DP or RAID-TEC is the default RAID policy for all new aggregates. The RAID policy determines the parity protection you have in the event of a disk failure.

RAID-DP provides double-parity protection in the event of a single or double disk failure. RAID-DP is the default RAID policy for the following aggregate types:

- All flash aggregates
- Flash Pool aggregates
- Performance hard disk drive (HDD) aggregates

A new RAID policy called RAID-TEC is available. RAID-TEC is supported on all disk types and all platforms, including AFF. Aggregates that contain larger disks have a higher possibility of concurrent disk failures. RAID-TEC helps to mitigate this risk by providing triple-parity protection so that your data can survive up to three simultaneous disk failures. RAID-TEC is the default RAID policy for capacity HDD aggregates with disks that are 6 TB or larger.

Determine the number of disks or disk partitions required for an aggregate

You must have enough disks or disk partitions in your aggregate to meet system and business requirements. You should also have the recommended number of hot spare

disks or hot spare disk partitions to minimize the potential of data loss.

Root-data partitioning is enabled by default on certain configurations. Systems with root-data partitioning enabled use disk partitions to create aggregates. Systems that do not have root-data partitioning enabled use unpartitioned disks.

You must have enough disks or disk partitions to meet the minimum number required for your RAID policy and enough to meet your minimum capacity requirements.

> In ONTAP, the usable space of the drive is less than the physical capacity of the drive. You can find the usable space of a specific drive and the minimum number of disks or disk partitions required for each RAID policy in *Hardware Universe*. You can also use the `storage aggregate show-spare-disks` command to find the usable space of a specific disk.

In addition to the number of disks or disk partitions necessary to create your RAID group and meet your capacity requirements, you should also have the minimum number of hot spare disks or hot spare disk partitions recommended for your aggregate:

- For all flash aggregates, you should have a minimum of one hot spare disk or disk partition.

  > The AFF C190 defaults to no spare drive. This exception is fully supported.

- For non-flash homogenous aggregates, you should have a minimum of two hot spare disks or disk partitions.
- For SSD storage pools, you should have a minimum of one hot spare disk for each HA pair.
- For Flash Pool aggregates, you should have a minimum of two spare disks for each HA pair. You can find more information on the supported RAID policies for Flash Pool aggregates in the Hardware Universe.
- To support the use of the Maintenance Center and to avoid issues caused by multiple concurrent disk failures, you should have a minimum of four hot spares in multi-disk carriers.

Related information

NetApp Hardware Universe

NetApp Technical Report 3838: Storage Subsystem Configuration Guide

Create aggregates manually

Before you create aggregates manually, you should review disk configuration options and simulate creation. Then you can issue the `storage aggregate create` and verify the results.

What you'll need

You must have determined the number of disks and the number of hot spare disks you need in the aggregate.

About this task

If root-data-data partitioning is enabled and you have 24 solid state drives (SSDs) or fewer in your configuration, it is recommended that your data partitions be assigned to different nodes.

The procedure for creating aggregates on systems with root-data partitioning and root-data-data partitioning enabled is the same as the procedure for creating aggregates on systems using unpartitioned disks. If root-

data partitioning is enabled on your system, you should use the number of disk partitions for the `-diskcount` option. For root-data-data partitioning, the `-diskcount` option specifies the count of disks to use.

> When creating multiple aggregates for use with FlexGroups, aggregates should be as close in size as possible.

The `storage aggregate create` man page contains more information about aggregate creation options and requirements.

Steps

1. View the list of spare disk partitions to verify that you have enough to create your aggregate:

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

   Data partitions are displayed under `Local Data Usable`. A root partition cannot be used as a spare.

2. Simulate the creation of the aggregate:

   ```
   storage aggregate create -aggregate aggregate_name -node node_name -raidtype
   raid_dp -diskcount number_of_disks_or_partitions -simulate true
   ```

3. If any warnings are displayed from the simulated command, adjust the command and repeat the simulation.
4. Create the aggregate:

   ```
   storage aggregate create -aggregate aggr_name -node node_name -raidtype
   raid_dp -diskcount number_of_disks_or_partitions
   ```

5. Display the aggregate to verify that it was created:

   ```
   storage aggregate show-status aggregate_name
   ```

Related information

ONTAP 9 commands