Cautions and considerations for changing file or directory capacity

ONTAP 9

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The default and maximum number of files allowed for FlexVol volumes in ONTAP

FlexVol volumes have a default and maximum number of files they can contain. If your data requires a large number of files, you can increase the number of user visible files allowed on a volume up to a maximum value. You should understand the limitations and caveats before proceeding.

The number of user visible files a volume can contain is determined by the available inode capacity for the volume. An inode is a data structure that contains information about files.

ONTAP automatically sets the default and maximum number of available inodes for a newly created volume as follows based on the size of the volume.

Default number of inodes	Maximum number of inodes
1 per 32 KB of volume size	1 per 4 KB of volume size

When the size of a volume is increased, either manually by an administrator or automatically by ONTAP's autosize feature, ONTAP also increases (if necessary) the number of available inodes so that there is at least 1 inode per 32 KB of volume size, until the volume reaches approximately 680 GB in size.

In ONTAP 9.12.1 and earlier, creating a new volume or resizing an existing volume greater than 680 GB in size does not automatically result in additional inode capacity. If you need more files than the default number for any size volume, you can use the `volume modify` command to increase the available number of inodes for the volume up to the maximum.

Beginning with ONTAP 9.13.1, creating a new volume or resizing an existing volume sets the default number of available inodes to 1 inode per 32 KB of volume space even if the volume is larger than 680 GB. This ratio persists until the volume reaches the absolute inode maximum of 2,040,109,451.

You can also decrease the available number of inodes. This does not change the amount of space allocated to inodes, but it does lower the maximum amount of space the public inode file can consume. After space has been allocated for inodes, it is never returned to the volume. Therefore, it is not possible to lower the maximum number of inodes below the number of inodes currently allocated.

More information

- Determine file and inode usage for a volume
- NetApp Knowledge Base: FAQ - ONTAP default and maximum number of files (inodes)

Maximum directory size for FlexVol volumes

You can increase the default maximum directory size for a specific FlexVol volume by using the `-maxdir-size` option of the `volume modify` command, but doing so could impact system performance. See the NetApp Knowledge Base: What is maxdirsize?.

To learn more about the model-dependent maximum directory sizes for FlexVol volumes, visit the NetApp Hardware Universe.

Learn more about `volume modify` in the ONTAP command reference.

Restrictions on node root volumes and root aggregates

You should be aware of the restrictions governing a node's root volume and root aggregate.

A node's root volume contains special directories and files for the node. The root volume is contained in the root aggregate.

A node's root volume is a FlexVol volume that is installed at the factory or by setup software. It is reserved for system files, log files, and core files. The directory name is `/mroot`, which is accessible only through the systemshell by technical support. The minimum size for a node's root volume depends on the platform model.

- The following rules govern the node's root volume:
  - Unless technical support instructs you to do so, do not modify the configuration or content of the root volume.
  - Do not store user data in the root volume.

    Storing user data in the root volume increases the storage giveback time between nodes in an HA pair.
  - You can move the root volume to another aggregate.

    Relocating root volumes to new aggregates
- The root aggregate is dedicated to the node's root volume only.

  ONTAP prevents you from creating other volumes in the root aggregate.

NetApp Hardware Universe

Relocate a root volume to new aggregates

The root replacement procedure migrates the current root aggregate to another set of disks without disruption. You might need to perform this as part of a disk replacement or preventative maintenance process.

About this task

You can change the location of the root volume to a new aggregate in the following scenarios:

- When the root aggregates are not on the disk you prefer
- When you want to rearrange the disks connected to the node
- When you are performing a shelf replacement of the EOS disk shelves

Steps

1. Relocate the root aggregate:

```
system node migrate-root -node node_name -disklist disk_list -raid-type
raid_type
```

- **-node**

  Specifies the node that owns the root aggregate that you want to migrate.

- **-disklist**

  Specifies the list of disks on which the new root aggregate will be created. All disks must be spares and owned by the same node. The minimum number of disks required is dependent on the RAID type.

- **-raid-type**

  Specifies the RAID type of the root aggregate. The default value is `raid-dp`. This is the only type supported in advanced mode.

2. Monitor the progress of the job:

```
job show -id jobid -instance
```

Results

If all of the pre-checks are successful, the command starts a root volume replacement job and exits.

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