Storage limits for Cloud Volumes ONTAP 9.4

Cloud Volumes ONTAP

Ben Cammett
August 02, 2020

Table of Contents

Storage limits for Cloud Volumes ONTAP 9.4

Cloud Volumes ONTAP has storage configuration limits to provide reliable operations. For best performance, do not configure your system at the maximum values.

Maximum system capacity by license

The maximum system capacity for a Cloud Volumes ONTAP system is determined by its license. The maximum system capacity includes disk-based storage plus object storage used for data tiering. NetApp doesn't support exceeding this limit.

In Azure, disk limits prevent you from reaching the 368 TB capacity limit by using disks alone. In those cases, you can reach the 368 TB capacity limit by tiering inactive data to object storage. Refer to capacity and disk limits by Azure VM size for more details.

License	Maximum system capacity (disks + object storage)
Explore	2 TB (data tiering is not supported with Explore)
Standard	10 TB
Premium	368 TB
BYOL	368 TB per license

For HA, is the license capacity limit per node or for the entire HA pair?

The capacity limit is for the entire HA pair. It is not per node. For example, if you use the Premium license, you can have up to 368 TB of capacity between both nodes.

For an HA system in AWS, does mirrored data count against the capacity limit?

No, it doesn't. Data in an AWS HA pair is synchronously mirrored between the nodes so that the data is available in the event of failure. For example, if you purchase an 8 TB disk on node A, Cloud Manager also allocates an 8 TB disk on node B that is used for mirrored data. While 16 TB of capacity was provisioned, only 8 TB counts against the license limit.

Aggregate and disk limits for Cloud Volumes ONTAP in AWS

In Cloud Volumes ONTAP 9.4, all EC2 instance types can reach the 368 TB capacity limit using EBS storage alone, or by using EBS storage and tiering to S3 (both single node and HA).

Physical storage	Parameter	Limit
Aggregates and disks	Maximum number of aggregates	34 for single-node configurations 18 per node in an HA configuration [1]
	Maximum aggregate size	96 TB of raw capacity [2]
	Disks per aggregate	1-6 [3]
	Maximum disk size	16 TB
	Maximum number of data disks across all aggregates [4]	34 for single-node configurations 31 per node in an HA configuration
RAID groups	Maximum per aggregate	1

Notes:

1. It is not possible to create 18 aggregates on both nodes in an HA pair because doing so would exceed the data disk limit.
2. The aggregate capacity limit is based on the disks that comprise the aggregate. The limit does not include object storage used for data tiering.
3. All disks in an aggregate must be the same size.
4. The data disk limit is specific to disks that contain user data. The boot disk and root disk for each node are not included in this limit.

Aggregate and disk limits for Cloud Volumes ONTAP in Azure

Physical storage	Parameter	Limit
Aggregates and disks	Maximum number of aggregates	Same as the disk limit
	Maximum aggregate size	200 TB of raw capacity [1]
	Disks per aggregate	1-12 [2]
	Maximum disk size	32 TB
	Maximum number of data disks across all aggregates [3]	Depends on VM size. See below.
RAID groups	Maximum per aggregate	1

Notes:

1. The aggregate capacity limit is based on the disks that comprise the aggregate. The limit does not include object storage used for data tiering.
2. All disks in an aggregate must be the same size.
3. The data disk limit is specific to disks that contain user data. The boot disk and root disk for each node are not included in this limit.

Capacity and disk limits by Azure VM size

In Azure, single node systems can use Standard HDD Managed Disks, Standard SSD Managed Disks, and Premium SSD Managed Disks, with up to 32 TB per disk. The number of supported disks varies by VM size.

The tables below show the maximum system capacity by VM size with disks alone, and with disks and cold data tiering to object storage.

Disk limits are shown by VM size for Premium and BYOL licenses only because disk limits can't be reached with Explore or Standard licenses due to system capacity limits.

Single node with a Premium license

VM size	Max disks per node	Max system capacity with disks alone	Max system capacity with disks and data tiering
DS3_v2	15	368 TB	Tiering not supported
DS4_v2	31	368 TB	368 TB
DS5_v2	63	368 TB	368 TB
DS13_v2	31	368 TB	368 TB
DS14_v2	63	368 TB	368 TB

Single node with one or more BYOL licenses

For some VM types, you'll need several BYOL licenses to reach the max system capacity listed below. For example, you'd need 6 BYOL licenses to reach 2 PB with DS5_v2.

VM size	Max disks per node	Max system capacity with one license		Max system capacity with multiple licenses	
		Disks alone	Disks + data tiering	Disks alone	Disks + data tiering
DS3_v2	15	368 TB	Tiering not supported	480 TB	Tiering not supported
DS4_v2	31	368 TB	368 TB	992 TB	368 TB x each license
DS5_v2	63	368 TB	368 TB	2 PB	368 TB x each license
DS13_v2	31	368 TB	368 TB	992 TB	368 TB x each license
DS14_v2	63	368 TB	368 TB	2 PB	368 TB x each license

Logical storage limits

Logical storage	Parameter	Limit
Storage virtual machines (SVMs)	Maximum number for Cloud Volumes ONTAP (HA pair or single node)	One data-serving SVM and one destination SVM used for disaster recovery. You can activate the destination SVM for data access if there's an outage on the source SVM. [1] The one data-serving SVM spans the entire Cloud Volumes ONTAP system (HA pair or single node).
Files	Maximum size	16 TB
	Maximum per volume	Volume size dependent, up to 2 billion
FlexClone volumes	Hierarchical clone depth [2]	499
FlexVol volumes	Maximum per node	500
	Minimum size	20 MB
	Maximum size	AWS: Dependent on the size of the aggregate [3] Azure: 100 TB
Qtrees	Maximum per FlexVol volume	4,995
Snapshot copies	Maximum per FlexVol volume	1,023

Notes:

1. Cloud Manager does not provide any setup or orchestration support for SVM disaster recovery. It also does not support storage-related tasks on an additional SVM. You must use System Manager or the CLI for SVM disaster recovery.
   - SVM Disaster Recovery Preparation Express Guide
   - SVM Disaster Recovery Express Guide
2. Hierarchical clone depth is the maximum depth of a nested hierarchy of FlexClone volumes that can be created from a single FlexVol volume.
3. Less than 100 TB is supported because aggregates for this configuration are limited to 96 TB of *raw* capacity.

iSCSI storage limits

iSCSI storage	Parameter	Limit
LUNs	Maximum per node	1,024
	Maximum number of LUN maps	1,024
	Maximum size	16 TB
	Maximum per volume	512
igroups	Maximum per node	256

iSCSI storage	Parameter	Limit
Initiators	Maximum per node	512
	Maximum per igroup	128
iSCSI sessions	Maximum per node	1,024
LIFs	Maximum per port	32
	Maximum per portset	32
Portsets	Maximum per node	256