



# **Storage limits for Cloud Volumes ONTAP 9.9.1 in Azure**

## **Cloud Volumes ONTAP**

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# Storage limits for Cloud Volumes ONTAP 9.9.1 in Azure

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 the system capacity limit. If you reach the licensed capacity limit, Cloud Manager displays an action required message and no longer allows you to add additional disks.

License	Maximum system capacity (disks + object storage)
Freemium	500 GB
PAYGO Explore	2 TB (data tiering is not supported with Explore)
PAYGO Standard	10 TB
PAYGO Premium	368 TB
Node-based license	368 TB per license
Capacity-based license	2 PB

**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.

## Disk and tiering limits by VM size

The disk limits below are specific to disks that contain user data. The limits do not include the root disk, core disk, and VNV RAM.

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

- 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.
- HA systems use Premium page blobs as disks, with up to 8 TB per page blob. The number of supported disks varies by VM size.



You can purchase multiple node-based licenses for a Cloud Volumes ONTAP BYOL system to allocate more than 368 TB of capacity. The number of licenses that you can purchase for a single node system or HA pair is unlimited. Be aware that disk limits can prevent you from reaching the capacity limit by using disks alone. You can go beyond the disk limit by [tiering inactive data to object storage](#). [Learn how to add additional system licenses to Cloud Volumes ONTAP](#).

## Single node with a Premium license

VM size	Max data disks per node	Max system capacity with disks alone	Max system capacity with disks and data tiering
DS5_v2	61	368 TB	368 TB
DS14_v2	61	368 TB	368 TB
DS15_v2	61	368 TB	368 TB
E32s_v3	29	368 TB	368 TB
E48s_v3	29	368 TB	368 TB
E64is_v3	29	368 TB	368 TB
E80ids_v4	29	368 TB	368 TB

## Single node with node-based licensing



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 1.95 PB with DS5\_v2.

VM size	Max data 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	13	368 TB	368 TB	416 TB	368 TB x each license
DS4_v2	29	368 TB	368 TB	928 TB	368 TB x each license
DS5_v2	61	368 TB	368 TB	1.95 PB	368 TB x each license
DS13_v2	29	368 TB	368 TB	928 TB	368 TB x each license
DS14_v2	61	368 TB	368 TB	1.95 PB	368 TB x each license
DS15_v2	61	368 TB	368 TB	1.95 PB	368 TB x each license

VM size	Max data disks per node	Max system capacity with one license		Max system capacity with multiple licenses	
E4s_v3	5	160 TB	368 TB	160 TB	368 TB x each license
E8s_v3	13	368 TB	368 TB	416 TB	368 TB x each license
E32s_v3	29	368 TB	368 TB	928 TB	368 TB x each license
E48s_v3	29	368 TB	368 TB	928 TB	368 TB x each license
E64is_v3	29	368 TB	368 TB	928 TB	368 TB x each license
E80ids_v4	29	368 TB	368 TB	928 TB	368 TB x each license
L8s_v2	13	368 TB	368 TB	416 TB	368 TB x each license

### Single node with capacity-based licensing

VM size	Max data disks per node	Max system capacity with disks alone	Max system capacity with disks and data tiering
DS3_v2	13	416 TB	2 PB
DS4_v2	29	928 TB	2 PB
DS5_v2	61	1.95 TB	2 PB
DS13_v2	29	928 TB	2 PB
DS14_v2	61	1.95 TB	2 PB
DS15_v2	61	1.95 TB	2 PB
E4s_v3	5	160 TB	2 PB
E8s_v3	13	416 TB	2 PB
E32s_v3	29	928 TB	2 PB
E48s_v3	29	928 TB	2 PB
E64is_v3	29	928 TB	2 PB
E80ids_v4	29	928 TB	2 PB
L8s_v2	13	416 TB	2 PB

### HA pairs with a Premium license

VM size	Max data disks per node	Max system capacity with disks alone	Max system capacity with disks and data tiering
DS5_v2	61	368 TB	368 TB
DS14_v2	61	368 TB	368 TB
DS15_v2	61	368 TB	368 TB
E8s_v3	13	208 TB	368 TB
E48s_v3	29	368 TB	368 TB
E80ids_v4	29	368 TB	368 TB

## HA pairs with node-based licensing



For some VM types, you'll need several BYOL licenses to reach the max system capacity listed below. For example, you'd need 3 BYOL licenses to reach 976 TB with DS5\_v2.

VM size	Max data 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
DS4_v2	29	368 TB	368 TB	464 TB	368 TB x each license
DS5_v2	61	368 TB	368 TB	976 TB	368 TB x each license
DS13_v2	29	368 TB	368 TB	464 TB	368 TB x each license
DS14_v2	61	368 TB	368 TB	976 TB	368 TB x each license
DS15_v2	61	368 TB	368 TB	976 TB	368 TB x each license
E8s_v3	13	208 TB	368 TB	208 TB	368 TB x each license
E48s_v3	29	368 TB	368 TB	464 TB	368 TB x each license
E80ids_v4	29	368 TB	368 TB	464 TB	368 TB x each license

## HA pairs with capacity-based licensing

VM size	Max data disks per node	Max system capacity with disks alone	Max system capacity with disks and data tiering
DS4_v2	29	464 TB	2 PB
DS5_v2	61	976 TB	2 PB
DS13_v2	29	464 TB	2 PB
DS14_v2	61	976 TB	2 PB
DS15_v2	61	976 TB	2 PB
E8s_v3	13	208 TB	2 PB
E48s_v3	29	464 TB	2 PB
E80ids_v4	29	464 TB	2 PB

## Aggregate limits

Cloud Volumes ONTAP uses Azure storage as disks and groups them into *aggregates*. Aggregates provide storage to volumes.

Parameter	Limit
Maximum number of aggregates	Same as the disk limit
Maximum aggregate size <sup>1</sup>	384 TB of raw capacity for single node <sup>2</sup> 352 TB of raw capacity for single node with PAYGO 96 TB of raw capacity for HA pairs
Disks per aggregate	1-12 <sup>3</sup>
Maximum number of RAID groups 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. If using node-based licensing, two BYOL licenses are required to reach 384 TB.
3. All disks in an aggregate must be the same size.

## Storage VM limits

Some configurations enable you to create additional storage VMs (SVMs) for Cloud Volumes ONTAP.

These are the tested limits. While it is theoretically possible to configure additional storage VMs, it's not supported.

[Learn how to create additional storage VMs.](#)

License type	Storage VM limit
<b>PAYGO</b>	<ul style="list-style-type: none"> <li>• 1 storage VM for serving data</li> <li>• 1 storage VM for disaster recovery</li> </ul>
<b>Freemium</b>	24 storage VMs total <sup>1,2</sup>
<b>Capacity-based license</b> <sup>3</sup>	24 storage VMs total <sup>1,2</sup>
<b>Node-based BYOL</b> <sup>4</sup>	24 storage VMs total <sup>1,2</sup>

1. These 24 storage VMs can serve data or be configured for disaster recovery (DR).
2. Each storage VM can have up to three LIFs where two are data LIFs and one is an SVM management LIF.
3. For capacity-based licensing, there are no extra licensing costs for additional storage VMs, but there is a 4 TB minimum capacity charge per storage VM. For example, if you create two storage VMs and each has 2 TB of provisioned capacity, you'll be charged a total of 8 TB.
4. For node-based BYOL, an add-on license is required for each additional *data-serving* storage VM beyond the first storage VM that comes with Cloud Volumes ONTAP by default. Contact your account team to obtain a storage VM add-on license.

Storage VMs that you configure for disaster recovery (DR) don't require an add-on license (they are free of charge), but they do count against the storage VM limit. For example, if you have 12 data-serving storage VMs and 12 storage VMs configured for disaster recovery, then you've reached the limit and can't create any additional storage VMs.

## File and volume limits

Logical storage	Parameter	Limit
<b>Files</b>	Maximum size	16 TB
	Maximum per volume	Volume size dependent, up to 2 billion
<b>FlexClone volumes</b>	Hierarchical clone depth <sup>2</sup>	499
<b>FlexVol volumes</b>	Maximum per node	500
	Minimum size	20 MB
	Maximum size	Azure HA: Dependent on the size of the aggregate <sup>3</sup> Azure single node: 100 TB
<b>Qtrees</b>	Maximum per FlexVol volume	4,995
<b>Snapshot copies</b>	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 for this configuration because aggregates on HA pairs 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
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

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