Cloud Volumes ONTAP 9.18.1 Release Notes

Cloud Volumes ONTAP release notes

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Cloud Volumes ONTAP 9.18.1 Release Notes

What's new in Cloud Volumes ONTAP 9.18.1

You can now deploy and upgrade to Cloud Volumes ONTAP 9.18.1. You can see the base version of this release and the latest patch versions available for deployment and upgrade in the Console.

To know about the Cloud Volumes ONTAP features that are introduced in the latest versions of the NetApp Console, see what's new in Cloud Volumes ONTAP.

9.18.1 P3 (22 July 2026)

The Cloud Volumes ONTAP 9.18.1 P3 patch is now available for deployment and upgrade in AWS, Azure, and Google Cloud. The Console will prompt you to upgrade your existing systems to this patch release.

View the list of bugs fixed in the P3 patch (NetApp Support Site login required).

9.18.1 P2 (30 April 2026)

The Cloud Volumes ONTAP 9.18.1 P2 patch is now available for deployment and upgrade in AWS, Azure, and Google Cloud. The Console will prompt you to upgrade your existing systems to this patch release.

> For AWS, Cloud Volumes ONTAP 9.18.1 P2 is the standard version for deployment and upgrade. Any lower version or patch of 9.18.1 is not supported.

View the list of bugs fixed in the P2 patch (NetApp Support Site login required).

9.18.1 P1 (31 March 2026)

The Cloud Volumes ONTAP 9.18.1 P1 patch is now available for deployment and upgrade in Azure and Google Cloud. The Console will prompt you to upgrade your existing systems to this patch release.

> This version is not available for deployment and upgrade in AWS.

View the list of bugs fixed in the P1 patch (NetApp Support Site login required).

9.18.1 GA (10 February 2026)

The Cloud Volumes ONTAP 9.18.1 General Availability release is now available for deployment and upgrade in Microsoft Azure and Google Cloud.

> This version is not available for deployment and upgrade in Amazon Web Services (AWS).

Upgrade notes

Read through these notes to learn more about upgrading to this release.

How to upgrade

Upgrades of Cloud Volumes ONTAP must be completed from the Console. You should not upgrade Cloud Volumes ONTAP by using System Manager or the CLI. Doing so can impact system stability.

Learn how to upgrade when the Console notifies you.

Supported upgrade path

You can upgrade to Cloud Volumes ONTAP 9.18.1 from the 9.17.1 P1 and later patches in AWS, Azure, and Google Cloud. The Console will prompt you to upgrade eligible Cloud Volumes ONTAP systems to this release.

Downtime

- The upgrade of a single-node system takes the system offline for up to 25 minutes, during which I/O is interrupted.
- Upgrading an HA pair is non-disruptive and I/O is uninterrupted. During this non-disruptive upgrade process, each node is upgraded in tandem to continue serving I/O to clients.

Licensing overview for Cloud Volumes ONTAP

Several licensing options are available for Cloud Volumes ONTAP. Each option enables you to choose a consumption model that meets your needs.

The following licensing options are available for new customers.

Capacity-based licensing packages

Capacity-based licensing enables you to pay for Cloud Volumes ONTAP per TiB of capacity. The license is associated with your NetApp account and enables you to charge multiple systems against the license, as long as enough capacity is available through the license.

Capacity-based licensing is available in the form of a *package*. When you deploy a Cloud Volumes ONTAP system, you can choose from several licensing packages based on your business needs.

Packages
More about capacity-based licenses

Keystone Flex Subscription

A pay-as-you-grow subscription-based service that delivers a seamless hybrid cloud experience for those preferring OpEx consumption models to upfront CapEx or leasing.

Charging is based on the size of your committed capacity for one or more Cloud Volumes ONTAP HA pairs in your Keystone Flex Subscription.

The previous by-node licensing model remains available for existing customers who have already purchased a license or who have an active marketplace subscription.

Learn more about these licensing options

Supported configurations

Supported configurations for Cloud Volumes ONTAP in AWS

Several Cloud Volumes ONTAP configurations are supported in AWS.

Supported number of nodes

Cloud Volumes ONTAP is available in AWS as a single-node system and as a high-availability (HA) pair of nodes for fault tolerance and nondisruptive operations.

Upgrading a single-node system to an HA pair is not supported. If you want to switch between a single-node system and an HA pair, then you need to deploy a new system and replicate data from the existing system to the new system.

Supported storage

Cloud Volumes ONTAP supports several types of EBS disks, and S3 object storage for data tiering. The maximum storage capacity is determined by the license that you choose.

Storage support by license

Each license supports a different maximum system capacity. The maximum system capacity includes disk-based storage plus object storage used for data tiering. NetApp doesn't support exceeding this limit.

The following tables list the supported storage and EC2 machine type combinations for each license. For the latest EC2 instance specifications, including vCPU, memory, network bandwidth, and Amazon EBS bandwidth, refer to Amazon EC2 instance types.

Cloud Volumes ONTAP can run on either a Reserved or On-demand EC2 instance. Solutions that use other instance types aren't supported.

Capacity-based licenses

	Freemium	Capacity-based license (Essentials and Professional)
Maximum system capacity [1] (disks + object storage)	500 GiB	Flexible [2]

	Freemium	Capacity-based license (Essentials and Professional)
Supported machine types	**C5 series** • c5.9xlarge • c5.18xlarge [7] **C5a series** • c5a.12xlarge **C5d series** • c5d.4xlarge [8] • c5d.9xlarge • c5d.18xlarge [7] **C5n series** • c5n.9xlarge • c5n.18xlarge [7] **M5 series** • m5.xlarge [8] • m5.2xlarge [8] • m5.4xlarge [8] • m5.16xlarge **M5a series** • m5a.2xlarge • m5a.16xlarge **M5d series** • m5d.8xlarge • m5d.12xlarge **M5dn series** • m5dn.4xlarge m5dn.12xlarge m5dn.24xlarge [7]	

	Freemium	Capacity-based license (Essentials and Professional)
Supported disk types	• General Purpose SSD (gp3 and gp2) [3,5] • Provisioned IOPS SSD (io1) [3] • Throughput Optimized HDD (st1) [4]	
Cold data tiering to S3	Supported	

1. For an HA pair, the capacity limit is for the entire HA pair. It's not per node. For example, if you use the PAYGO Premium license, you can have up to 368 TiB of capacity between both nodes.
2. For some configurations, disk limits prevent you from reaching the capacity limit by using disks alone. In those cases, you can reach the capacity limit by tiering inactive data to object storage. For information about disk limits, refer to storage limits.

   With capacity-based licensing, each Cloud Volumes ONTAP system supports tiering to object storage. The total tiered capacity can scale up to the cloud provider's bucket limit. While the license does not impose capacity restrictions, you should follow the FabricPool Best Practices to ensure optimal performance, reliability, and cost efficiency when configuring and managing tiering.
3. Enhanced write performance is enabled when using SSDs with all Cloud Volumes ONTAP configurations, except for PAYGO Explore.
4. Tiering data to object storage isn't recommended when using Throughput Optimized HDDs (st1).
5. Cloud Volumes ONTAP configurations in AWS Local Zones support only the General Purpose SSD (gp2) disk type. No other disk types are supported in AWS Local Zones.
6. The r5.12xlarge instance type has a known limitation with supportability. If a node unexpectedly reboots due to a panic, the system might not collect core files used to troubleshoot and root cause the problem. The customer accepts the risks and limited support terms and bears all support responsibility if this condition occurs. This limitation affects newly deployed HA pairs and HA pairs upgraded from 9.8. The limitation does not affect newly deployed single-node systems.
7. While these EC2 instance types support more than 64 vCPUs, Cloud Volumes ONTAP supports up to 64 vCPUs.
8. AWS Local Zones are supported in the following EC2 instance type families with sizes xlarge to 4xlarge: M5, C5, C5d, R5, and R5d. You should refer to AWS for the latest and complete details about supported EC2 instance types in Local Zones.

   High write speed isn't supported with these instance types in AWS Local Zones.
9. These instance types require ONTAP 9.16.1 GA or later.

M6id series

- m6id.xlarge [9]
- m6id.2xlarge [9]
- m6id.4xlarge [9]
- m6id.8xlarge [9]
- m6id.16xlarge [7,9]
- m6id.32xlarge [7,9]

M6idn series

- m6idn.xlarge [9]
- m6idn.2xlarge [9]
- m6idn.4xlarge [9]
- m6idn.8xlarge [9]
- m6idn.16xlarge [7,9]
- m6idn.32xlarge [9]

R5 series

- r5.xlarge [8]
- r5.2xlarge [8]
- r5.8xlarge
- r5.12xlarge [6]

R5d series

- r5d.2xlarge

Other licenses

	PAYGO Explore	PAYGO Standard	PAYGO Premium	Node-based BYOL
Maximum system capacity (disks + object storage)	2 TiB	10 TiB	368 TiB [2]	368 TiB per license [2]

	PAYGO Explore	PAYGO Standard	PAYGO Premium	Node-based BYOL
Supported machine types	**M5 series** • m5.xlarge [8] **M6id series** • m6id.xlarge [9] **M6idn series** • m6idn.xlarge [9]	**M5 series** • m5.2xlarge [8] **M5a series** • m5a.2xlarge **M6id series** • m6id.2xlarge [9] **M6idn series** • m6idn.2xlarge [9] **R5 series** • r5.xlarge [8]	**C5 series** • c5.9xlarge • c5.18xlarge [7] **C5a series** • c5a.12xlarge **C5d series** • c5d.4xlarge [8] • c5d.9xlarge • c5d.18xlarge [7] **C5n series** • c5n.9xlarge • c5n.18xlarge [7] **M5 series** • m5.4xlarge [8] • m5.16xlarge **M5a series** • m5a.16xlarge	**C5 series** • c5.9xlarge • c5.18xlarge [7] **C5a series** • c5a.12xlarge **C5d series** • c5d.4xlarge [8] • c5d.9xlarge • c5d.18xlarge [7] **C5n series** • c5n.9xlarge • c5n.18xlarge [7] **M5 series** • m5.xlarge [8] • m5.2xlarge [8] • m5.4xlarge [8] • m5.16xlarge

	PAYGO Explore	PAYGO Standard	PAYGO Premium	Node-based BYOL
Supported disk types	• General Purpose SSD (gp3 and gp2) [3],[5] • Provisioned IOPS SSD (io1) [3] • Throughput Optimized HDD (st1) [4]			
Cold data tiering to S3	Not supported	Supported		

1. For an HA pair, the capacity limit is for the entire HA pair. It's not per node. For example, if you use the PAYGO Premium license, you can have up to 368 TiB of capacity between both nodes.
2. For some configurations, disk limits prevent you from reaching the capacity limit by using disks alone. In those cases, you can reach the capacity limit by tiering inactive data to object storage. For information about disk limits, refer to storage limits.

   With capacity-based licensing, each Cloud Volumes ONTAP system supports tiering to object storage. The total tiered capacity can scale up to the cloud provider's bucket limit. While the license does not impose capacity restrictions, you should follow the FabricPool Best Practices to ensure optimal performance, reliability, and cost efficiency when configuring and managing tiering.
3. Enhanced write performance is enabled when using SSDs with all Cloud Volumes ONTAP configurations, except for PAYGO Explore.
4. Tiering data to object storage isn't recommended when using Throughput Optimized HDDs (st1).
5. Cloud Volumes ONTAP configurations in AWS Local Zones support only the General Purpose SSD (gp2) disk type. No other disk types are supported in AWS Local Zones.
6. The r5.12xlarge instance type has a known limitation with supportability. If a node unexpectedly reboots due to a panic, the system might not collect core files used to troubleshoot and root cause the problem. The customer accepts the risks and limited support terms and bears all support responsibility if this condition occurs. This limitation affects newly deployed HA pairs and HA pairs upgraded from 9.8. The limitation does not affect newly deployed single-node systems.
7. While these EC2 instance types support more than 64 vCPUs, Cloud Volumes ONTAP supports up to 64 vCPUs.
8. AWS Local Zones are supported in the following EC2 instance type families with sizes xlarge to 4xlarge: M5, C5, C5d, R5, and R5d. You should refer to AWS for the latest and complete details about supported EC2 instance types in Local Zones.

   High write speed isn't supported with these instance types in AWS Local Zones.
9. These instance types require ONTAP 9.16.1 GA or later.

rge

rge

M5dn series

M5d series

- m5dn.4xlarge
- m5dn.12xlarge
- m5dn.24xlarge [7]
- m5d.8xlarge
- m5d.12xlarge

M5n series

M5dn series

- m5n.2xlarge
- m5dn.4xlarge
- m5dn.12xlarge
- m5dn.24xlarge [7]

M6id series

M5n series

- m6id.4xlarge [8]
- m6id.8xlarge [9]
- m6id.16xlarge [7,9]
- m6id.32xlarge [7,9]
- m5n.2xlarge

Support for Flash Cache and high write speed

The following table identifies which supported EC2 instance types support Flash Cache and high write speed.

Supported instance	Flash Cache	High write speed
c5.9xlarge	Not supported	Supported
c5.18xlarge	Not supported	Supported

Supported instance	Flash Cache	High write speed
c5a.12xlarge	Not supported	Supported
c5d.4xlarge	Supported	Supported
c5d.9xlarge	Supported	Supported
c5d.18xlarge	Supported	Supported
c5n.9xlarge	Not supported	Supported
c5n.18xlarge	Not supported	Supported
m5.xlarge	Not supported	Supported (single node only)
m5.2xlarge	Not supported	Supported
m5.4xlarge	Not supported	Supported
m5.16xlarge	Not supported	Supported
m5a.2xlarge	Not supported	Supported
m5a.16xlarge	Not supported	Supported
m5d.8xlarge	Supported	Supported
m5d.12xlarge	Supported	Supported
m5dn.4xlarge	Supported	Supported
m5dn.12xlarge	Supported	Supported
m5dn.24xlarge	Supported	Supported
m5n.2xlarge	Not supported	Supported
m6id.xlarge	Supported *	Supported (single node only)
m6id.2xlarge	Supported *	Supported
m6id.4xlarge	Supported	Supported
m6id.8xlarge	Supported	Supported
m6id.16xlarge	Supported	Supported
m6id.32xlarge	Supported	Supported
m6idn.xlarge	Supported *	Supported (single node only)
m6idn.2xlarge	Supported *	Supported
m6idn.4xlarge	Supported	Supported
m6idn.8xlarge	Supported	Supported
m6idn.16xlarge	Supported	Supported
m6idn.32xlarge	Supported	Supported
r5.xlarge	Not supported	Supported (single node only)
r5.2xlarge	Not supported	Supported
r5.8xlarge	Not supported	Supported

Supported instance	Flash Cache	High write speed
r5.12xlarge	Not supported	Supported
r5d.2xlarge	Supported	Supported

* Flash Cache is supported on m6id.xlarge, m6id.2xlarge, m6idn.xlarge, and m6idn.2xlarge. However, these instance types have fewer than 16 core processors and are not recommended for high-performance or memory-intensive workloads. Under heavy load, they may restart due to memory constraints. To avoid this, use an instance type with a higher core count and larger memory.

The following notes provide general guidance about supported instance behavior and deployment options.

- Some instance types include local NVMe storage, which Cloud Volumes ONTAP uses as Flash Cache. Flash Cache speeds access to data through real-time intelligent caching of recently read user data and NetApp metadata. It's effective for random read-intensive workloads, including databases, email, and file services. Compression must be disabled on all volumes to take advantage of the Flash Cache performance improvements. Learn more about Flash Cache.
- Cloud Volumes ONTAP supports high write speed with all supported instance types when using a single-node system. When using an HA pair, high write speed is supported only with supported instance types. Learn more about choosing a write speed.
- When you choose an EC2 instance type, you can specify whether it is a shared instance or a dedicated instance.

R5d series

- r5.2xlarge
- r5.8xlarge
- r5.12xlarge
- r5d.2xlarge

Supported disk sizes

In AWS, an aggregate can contain up to 6 disks that are all the same size. But if you have a configuration that supports the Amazon EBS Elastic Volumes feature, then an aggregate can contain up to 8 disks. Learn more about support for Elastic Volumes

General Purpose SSDs (gp3 and gp2)	Provisioned IOPS SSDs (io1)	Throughput Optimized HDDs (st1)
• 100 GiB • 500 GiB • 1 TiB • 2 TiB • 4 TiB • 6 TiB • 8 TiB • 16 TiB	• 100 GiB • 500 GiB • 1 TiB • 2 TiB • 4 TiB • 6 TiB • 8 TiB • 16 TiB	• 500 GiB • 1 TiB • 2 TiB • 4 TiB • 6 TiB • 8 TiB • 16 TiB

c4, m4, and r4 instances no longer supported

Cloud Volumes ONTAP no longer supports the c4, m4, and r4 EC2 instance types in AWS.

If your system runs on a c4, m4, or r4 instance, change it to a c5, m5, or r5 instance before you upgrade to this release.

Learn how to change the EC2 instance type for Cloud Volumes ONTAP.

For more information, refer to the following resources:

- Knowledge base (KB) article: Converting an AWS Xen CVO instance to Nitro KVM
- KB article: Unable to change the instance type from r4 to r5 with disk count error
- Learn more about the end of availability and support for these instance types

Supported regions

For AWS region support, see Cloud Volumes Global Regions.

Related information

- Amazon EC2 instance types
- Amazon EC2 M5 instances
- Amazon EC2 M6i instances
- Amazon EC2 C5 instances
- Amazon EC2 R5 instances

Supported configurations for Cloud Volumes ONTAP in Azure

Several Cloud Volumes ONTAP configurations are supported in Azure.

Supported configurations by license

Cloud Volumes ONTAP is available in Azure as a single-node system and as a high-availability (HA) pair of nodes for fault tolerance and nondisruptive operations.

Upgrading a single-node system to an HA pair is not supported. If you want to switch between a single-node system and an HA pair, then you need to deploy a new system and replicate data from the existing system to the new system.

Cloud Volumes ONTAP can run on either a Reserved or On-demand VM instance from your cloud provider. Solutions that use other VM instance types aren’t supported.

For supported instances specifications, refer to the Microsoft Azure documentation.

Single-node systems

You can choose from the following capacity-based or node-based licensing configurations when deploying Cloud Volumes ONTAP as a single-node system in Azure.

Cloud Volumes ONTAP can run on either a Reserved or On-demand VM instance from your cloud provider. Solutions that use other VM instance types aren’t supported.

Capacity-based licenses

	Freemium	Optimized [5]	Capacity-based license (Essentials and Professional)
Maximum system capacity (disks + object storage)	500 GiB	With capacity-based licensing, each Cloud Volumes ONTAP system supports tiering to object storage. The total tiered capacity can scale up to the cloud provider's bucket limit. While the license does not impose capacity restrictions, you should follow the FabricPool Best Practices to ensure optimal performance, reliability, and cost efficiency when configuring and managing tiering.	

	Freemium	Optimized [5]	Capacity-based license (Essentials and Professional)
Supported virtual machine types	**DSv2 series** • DS4_v2 [1] • DS5_v2 [1] • DS13_v2 [1] • DS14_v2 [1] • DS15_v2 [1] **Ebdsv5 series** • E4bds_v5 [7] • E8bds_v5 [7] • E16bds_v5 [7] • E32bds_v5 [7] • E48bds_v5 [7] • E64bds_v5 [7] **Edsv4 series** • E4ds_v4 • E8ds_v4 • E32ds_v4 [3] • E48ds_v4 [3] • E80ids_v4 [3] **Edsv5 series** • E4ds_v5 • E8ds_v5 • E20ds_v5 [3] • E32ds_v5 [3] • E48ds_v5 [3] • E64ds_v5 [3] • E104ids_v5 [7]	**DSv2 series** • DS4_v2 [1] • DS13_v2 [1] **Esv3 series** • E4s_v3 [1] • E8s_v3 [1] **Edsv4 series** • E4ds_v4 [3] • E8ds_v4 [3] • E4ds_v5 • E8ds_v5	**DSv2 series** • DS4_v2 [1] • DS5_v2 [1] • DS13_v2 [1] • DS14_v2 [1] • DS15_v2 [1] **Ebdsv5 series** • E4bds_v5 [7] • E8bds_v5 [7] • E16bds_v5 [7] • E32bds_v5 [7] • E48bds_v5 [7] • E64bds_v5 [7] **Edsv4 series** • E4ds_v4 [3] • E8ds_v4 [3] • E32ds_v4 [3] • E48ds_v4 [3] • E80ids_v4 [3] **Edsv5 Series** • E4ds_v5 • E8ds_v5 • E20ds_v5 [3] • E32ds_v5 [3] • E48ds_v5 [3] • E64ds_v5 [3] • E104ids_v5 [7]

	Freemium	Optimized [5]	Capacity-based license (Essentials and Professional)
Supported disk types [4]	Standard HDD Managed Disks, Standard SSD Managed Disks, Premium SSD Managed Disks, and Premium SSD v2 Managed Disks.		

Notes:

1. [1] The DSv2 and Esv3 machine families are no longer available for selection on the NetApp Console when deploying new instances of Cloud Volumes ONTAP in Azure. These families will be retained and supported only in older, existing systems. New deployments of Cloud Volumes ONTAP are supported in Azure only from the 9.12.1 release. We recommend that you switch to either Es_v4 or any other series compatible with Cloud Volumes ONTAP 9.12.1 and later. The DS_v2 and Es_v3 series machines, however, will be available for new deployments made through the API.
2. [2] This VM type includes local NVMe storage, which Cloud Volumes ONTAP uses as *Flash Cache*. Flash Cache speeds access to data through real-time intelligent caching of recently read user data and NetApp metadata. It is effective for random read-intensive workloads, including databases, email, and file services. Learn more.

   The minimum ONTAP version required for configuring Flash Cache on Azure is 9.13.1 GA.
3. [3] These VM types use an Ultra SSD for VNVRAM, which provides better write performance.

   If you choose any of these VM types when you deploy a new Cloud Volumes ONTAP system, you can't change to another VM type that *doesn't* use an Ultra SSD for VNVRAM. For example, you can't change from E8ds_v4 to E8s_v3, but you can change from E8ds_v4 to E32ds_v4 because both of those VM types use Ultra SSDs. Conversely, if you deployed Cloud Volumes ONTAP using any other VM type, you won't be able to change to another that uses an Ultra SSD for VNVRAM. For example, you can't change E8s_v3, which doesn't use Ultra SSD for VNVRAM, to E8ds_v4 that does.

   Similarly, if you choose Premium SSD Managed Disks for an environment that fulfils the criteria for Premium SSD v2 Managed Disks, the Console automatically deploys Premium SSD v2 Managed Disks. You cannot switch to Premium SSD v1 Managed Disks.
4. [4] For information about the supported disk types in single node deployments, refer to Azure (single node). High write speed is supported with all instance types when using a single-node system. You can enable high write speed from the Console during deployment or any time after. Learn more about choosing a write speed. Enhanced write performance is enabled when using SSDs.
5. [5] Beginning on August 11, 2025, the Cloud Volumes ONTAP Optimized license is deprecated and will no longer be available for purchase or renewal in the Azure marketplace for pay-as-you-go (PAYGO) subscriptions. For more information, refer to End of availability of Optimized licenses.
6. [6] Edsv6 VM types are supported for new deployments of Cloud Volumes ONTAP 9.17.1 and later. You cannot switch an existing deployment with any other VM type, for example, from Edsv5 to Edsv6; only size changes among Edsv6 variants (for example E20ds_v6 → E32ds_v6) are supported. For information about this VM type, refer to the Azure documentation: Edsv6 sizes series.
7. [7] The Ebdsv5 and E104ids_v5 VMs are available for new deployments and upgrade of Cloud Volumes ONTAP 9.18.1 and later. You can change or upgrade your existing Edsv4, Edsv5, or other Ebdsv5 VMs types to Ebdsv5. You can upgrade Ebdsv5 or Eidsv5 VMs to E104ids_v5.

Other licenses

	PAYGO Explore	PAYGO Standard	PAYGO Premium	Node-based BYOL
Maximum system capacity (disks + object storage)	2 TiB [5]	10 TiB	368 TiB	368 TiB per license

	PAYGO Explore	PAYGO Standard	PAYGO Premium	Node-based BYOL
Supported virtual machine types	**Ebdsv5 series** • E4bds_v5 [7] **Esv3 series** • E4s_v3 [1] **Edsv4 series** • E4ds_v4 [3] **Edsv5 series** • E4ds_v5 **Edsv6 series** • E4ds_v6 [6]	**Dsv2 series** • DS4_v2 [1] • DS13_v2 [1] **Ebdsv5 series** • E8bds_v5 [7] **Esv3 series** • E8s_v3 [1] **Edsv4 series** • E8ds_v4 [3] **Edsv5 series** • E8ds_v5 **Lsv3 series** • L8s_v3 [2]	**DSv2 series** • DS5_v2 [1] • DS14_v2 [1] • DS15_v2 [1] **Ebdsv5 series** • E16bds_v5 [7] • E32bds_v5 [7] • E48bds_v5 [7] • E64bds_v5 [7] **Esv3 series** • E32s_v3 [1,3] • E48s_v3 [1,3] • E64is_v3 [1,3] **Edsv4 series** • E32ds_v4 [3] • E48ds_v4 [3] • E80ids_v4 [3]	**DSv2 series** • DS4_v2 [1] • DS5_v2 [1] • DS13_v2 [1] • DS14_v2 [1] • DS15_v2 [1] **Ebdsv5 series** • E4bds_v5 [7] • E8bds_v5 [7] • E16bds_v5 [7] • E32bds_v5 [7] • E48bds_v5 [7] • E64bds_v5 [7] **Esv3 series** • E4s_v3 [1] • E8s_v3 [1] • E32s_v3 [1,3] • E48s_v3 [1,3] • E64is_v3 [1,3]

	PAYGO Explore	PAYGO Standard	PAYGO Premium	Node-based BYOL
Supported disk types [4]	Standard HDD Managed Disks, Standard SSD Managed Disks, and Premium SSD Managed Disks			

Notes:

1. [1] The DS_v2 and Es_v3 machine families are no longer available for selection on the Console when deploying new instances of Cloud Volumes ONTAP in Azure. These will be retained and supported only in older, existing systems. New deployments of Cloud Volumes ONTAP are supported in Azure only from the 9.12.1 release. We recommend that you switch to either Es_v4 or any other series compatible with Cloud Volumes ONTAP 9.12.1 and later. The DS_v2 and Es_v3 series machines, however, will be available for new deployments made through the API.
2. [2] This VM type includes local NVMe storage, which Cloud Volumes ONTAP uses as *Flash Cache*. Flash Cache speeds access to data through real-time intelligent caching of recently read user data and NetApp metadata. It is effective for random read-intensive workloads, including databases, email, and file services. Learn more.
3. [3] These VM types use an Ultra SSD for VNVRAM, which provides better write performance.

   If you choose any of these VM types when you deploy a new Cloud Volumes ONTAP system, you can't change to another VM type that *doesn't* use an Ultra SSD for VNVRAM. For example, you can't change from E8ds_v4 to E8s_v3, but you can change from E8ds_v4 to E32ds_v4 because both of those VM types use Ultra SSDs. Conversely, if you deployed Cloud Volumes ONTAP using any other VM type, you won't be able to change to another that uses an Ultra SSD for VNVRAM. For example, you can't change E8s_v3, which doesn't use Ultra SSD for VNVRAM, to E8ds_v4 that does.

   Similarly, if you choose Premium SSD Managed Disks for an environment that fulfils the criteria for Premium SSD v2 Managed Disks, the Console automatically deploys Premium SSD v2 Managed Disks. You cannot switch to Premium SSD v1 Managed Disks.
4. [4] High write speed is supported with all instance types when using a single-node system. You can enable high write speed from the Console during deployment or any time after. Learn more about choosing a write speed. Enhanced write performance is enabled when using SSDs.
5. [5]Data tiering to Azure Blob storage isn't supported with PAYGO Explore.
6. [6] Edsv6 VM types are supported for new deployments of Cloud Volumes ONTAP 9.17.1 and later. You cannot switch an existing deployment with any other VM type, for example, from Edsv5 to Edsv6, only size changes among Edsv6 variants (for example E20ds_v6 → E32ds_v6) are supported. For information about this VM type, refer to the Azure documentation: Edsv6 sizes series.
7. [7] The Ebdsv5 and E104ids_v5 VMs are available for new deployments and upgrade of Cloud Volumes ONTAP 9.18.1 and later. You can change or upgrade your existing Edsv4, Edsv5, or other Ebdsv5 VMs types to Ebdsv5. You can upgrade Ebdsv5 or Eidsv5 VMs to E104ids_v5.

Edsv5 series

- E4ds_v5
- E8ds_v5
- E20ds_v5 [3]
- E32ds_v5 [3]
- E48ds_v5 [3]
- E64ds_v5 [3]
- E80ids_v4 [3]
- E104ids_v5 [7]

Edsv6 series

- E4ds_v6 [6]
- E20ds_v6 [6]
- E32ds_v6 [6]
- E48ds_v6 [6]
- E64ds_v6 [6]

Lsv3 series

- L8s_v3 [2]
- L16s_v3 [2]
- L32s_v3 [2]
- L48s_v3 [2]
- L64s_v3 [2]

HA pairs

You can choose from the following configurations when deploying Cloud Volumes ONTAP as an HA pair in Azure.

HA pairs with shared managed disks

You can choose from the following configurations when deploying Cloud Volumes ONTAP as an HA pair in Azure.

Capacity-based licenses

	Freemium	Optimized [7]	Capacity-based license (Essentials and Professional)
Maximum system capacity (disks + object storage)	500 GiB	With capacity-based licensing, each Cloud Volumes ONTAP system supports tiering to object storage. The total tiered capacity can scale up to the cloud provider's bucket limit. While the license does not impose capacity restrictions, you should follow the FabricPool Best Practices to ensure optimal performance, reliability, and cost efficiency when configuring and managing tiering.	

	Freemium	Optimized [7]	Capacity-based license (Essentials and Professional)
Supported virtual machine types	**Ebdsv5 series** • E8bds_v5 [9] • E16bds_v5 [9] • E32bds_v5 [9] • E48bds_v5 [9] • E64bds_v5 [9] **Edsv4 series** • E8ds_v4 • E32ds_v4 [1] • E48ds_v4 [1] • E80ids_v4 [1,2] **Edsv5 series** • E8ds_v5 [4] • E20ds_v5 [1,4] • E32ds_v5 [1,4] • E48ds_v5 [1,4] • E64ds_v5 [1,4] • E104ids_v5 [9] **Edsv6 series** • E20ds_v6 [8] • E32ds_v6 [8] • E48ds_v6 [8] • E64ds_v6 [8] **Lsv3 series** • L8s_v3 [1,3,5] • L16s_v3 [1,3,5] • L32s_v3 [1,3,5] • L48s_v3 [1,3,5] L64s_v3 [1,3,5]	**Edsv4 series** • E8ds_v4 **Edsv5 series** • E8ds_v5 [4]	**Ebdsv5 series** • E8bds_v5 [9] • E16bds_v5 [9] • E32bds_v5 [9] • E48bds_v5 [9] • E64bds_v5 [9] **Edsv4 series** • E8ds_v4 • E32ds_v4 [1] • E48ds_v4 [1] • E80ids_v4 [1,2] **Edsv5 series** • E8ds_v5 [4] • E20ds_v5 [1,4] • E32ds_v5 [1,4] • E48ds_v5 [1,4] • E64ds_v5 [1,4] • E104ids_v5 [9] **Edsv6 series** • E20ds_v6 [8] • E32ds_v6 [8] • E48ds_v6 [8] • E64ds_v6 [8] **Lsv3 series** • L8s_v3 [1,3,5] • L16s_v3 [1,3,5] • L32s_v3 [1,3,5] • L48s_v3 [1,3,5] L64s_v3 [1,3,5]

	Freemium	Optimized [7]	Capacity-based license (Essentials and Professional)
Supported disk types [6]	Premium SSD Managed Disks or Premium SSD v2 Managed Disks.		

Notes:

1. [1] Cloud Volumes ONTAP supports high write speed with these VM types when using an HA pair. You can enable high write speed from the Console during deployment or any time after. Learn more about choosing a write speed.
2. [2] Use this VM only when Azure maintenance control is required. It is not recommended for other use cases due to higher pricing. When using Isolated instance types for Azure maintenance control, ensure that each VM in an HA pair has its own Maintenance Configuration in Azure with staggered schedules so that both VMs are not offline simultaneously.
3. [3] Multiple availability zone support starts from ONTAP version 9.13.1.
4. [4] Multiple availability zone support starts from ONTAP version 9.14.1 RC1.
5. [5] This VM type includes local NVMe storage, which Cloud Volumes ONTAP uses as *Flash Cache*. Flash Cache speeds access to data through real-time intelligent caching of recently read user data and NetApp metadata. It is effective for random read-intensive workloads, including databases, email, and file services. Learn more.
6. [6] If you choose Premium SSD Managed Disks for an environment that fulfils the criteria for Premium SSD v2 Managed Disks, the Console automatically deploys Premium SSD v2 Managed Disks. You cannot switch to Premium SSD v1 Managed Disks. For information about the internal disks for system data for HA deployments single and multiple availability zones, refer to Azure (HA pair).
7. [7] Beginning on August 11, 2025, the Cloud Volumes ONTAP Optimized license is deprecated and will no longer be available for purchase or renewal in the Azure marketplace for pay-as-you-go (PAYGO) subscriptions. End of availability of Optimized licenses.
8. [8] Edsv6 VM types are supported for new deployments of Cloud Volumes ONTAP 9.17.1 and later. You cannot switch an existing deployment with any other VM type, for example, from Edsv5 to Edsv6; only size changes among Edsv6 variants (for example E20ds_v6 → E32ds_v6) are supported. For information about this VM type, refer to the Azure documentation: Edsv6 sizes series.
9. [9] The Ebdsv5 and E104ids_v5 VMs are available for new deployments and upgrade of Cloud Volumes ONTAP 9.18.1 and later. You can change or upgrade your existing Edsv4, Edsv5, or other Ebdsv5 VMs types to Ebdsv5. You can upgrade Ebdsv5 or Eidsv5 VMs to E104ids_v5.

Other licenses

	PAYGO Standard	PAYGO Premium	Node-based BYOL
Maximum system capacity (disks + object storage)	10 TiB	368 TiB	368 TiB per license

	PAYGO Standard	PAYGO Premium	Node-based BYOL
Supported virtual machine types	**Ebdsv5 series** • E8bds_v5 [7] **Edsv4 series** • E8ds_v4 [4] **Lsv3 series** • L8s_v3 [4,5]	**Ebdsv5 series** • E16bds_v5 [7] • E32bds_v5 [7] • E48bds_v5 [7] • E64bds_v5 [7] **Edsv4 series** • E32ds_v4 [1,4] • E48ds_v4 [1,4] • E80ids_v4 [1,2,4] **Edsv5 series** • E20ds_v5 [1] • E32ds_v5 [1] • E48ds_v5 [1] • E64ds_v5 [1] • E104ids_v5 [7] **Edsv6 series** • E20ds_v6 [6] • E32ds_v6 [6] • E48ds_v6 [6] • E64ds_v6 [6] **Lsv3 series** • L16s_v3 [1,4,5] • L32s_v3 [1,4,5] • L48s_v3 [1,4,5] • L64s_v3 [1,4,5]	**Ebdsv5 series** • E4bds_v5 [7] • E8bds_v5 [7] • E16bds_v5 [7] • E32bds_v5 [7] • E48bds_v5 [7] • E64bds_v5 [7] **Edsv4 series** • E8ds_v4 [4] • E32ds_v4 [1,4] • E48ds_v4 [1,4] • E80ids_v4 [1,2,4] **Edsv5 series** • E4ds_v5 • E8ds_v5 • E20ds_v5 [1] • E32ds_v5 [1] • E48ds_v5 [1] • E64ds_v5 [1] • E104ids_v5 [7] **Edsv6 series** • E20ds_v6 [6] • E32ds_v6 [6] • E48ds_v6 [6] • E64ds_v6 [6] **Lsv3 series** • L16s_v3 [1,4,5] • L32s_v3 [1,4,5] • L48s_v3 [1,4,5] • L64s_v3 [1,4,5]

	PAYGO Standard	PAYGO Premium	Node-based BYOL
Supported disk types	Premium SSD Managed Disks or Premium SSD v2 Managed Disks.		

Notes:

1. [1] Cloud Volumes ONTAP supports high write speed with these VM types when using an HA pair. You can enable high write speed from the Console during deployment or any time after. Learn more about choosing a write speed.
2. [2] Use this VM only when Azure maintenance control is required. It is not recommended for other use cases due to higher pricing. When using Isolated instance types for Azure maintenance control, ensure that each VM in an HA pair has its own Maintenance Configuration in Azure with staggered schedules so that both VMs are not offline simultaneously.
3. [3] These VM types are only supported for HA pairs in a single availability zone configuration running on shared managed disks.
4. [4] These VM types are supported for HA pairs in single availability zone and multiple availability zone configurations running on shared managed disks. For Ls_v3 VM types, multiple availability zone support starts from ONTAP version 9.13.1. For Eds_v5 VM types, multiple availability zone support starts from ONTAP version 9.14.1 RC1.
5. [5] This VM type includes local NVMe storage, which Cloud Volumes ONTAP uses as *Flash Cache*. Flash Cache speeds access to data through real-time intelligent caching of recently read user data and NetApp metadata. It is effective for random read-intensive workloads, including databases, email, and file services. Learn more.
6. [6] Edsv6 VM types are supported for new deployments of Cloud Volumes ONTAP 9.17.1 and later. You cannot switch an existing deployment with any other VM type, for example, from Edsv5 to Edsv6; only size changes among Edsv6 variants (for example E20ds_v6 → E32ds_v6) are supported. For information about this VM type, refer to the Azure documentation: Edsv6 sizes series.
7. [7] The Ebdsv5 and E104ids_v5 VMs are available for new deployments and upgrade of Cloud Volumes ONTAP 9.18.1 and later. You can change or upgrade your existing Edsv4, Edsv5, or other Ebdsv5 VMs types to Ebdsv5. You can upgrade Ebdsv5 or Eidsv5 VMs to E104ids_v5.

HA pairs with page blob

You can use the following configurations with the existing Cloud Volumes ONTAP HA page blob deployments in Azure.

Azure page blobs are not supported for any new deployment.

Capacity-based licenses

	Freemium	Optimized [4]	Capacity-based license (Essentials and Professional)
Maximum system capacity (disks + object storage)	500 GiB	With capacity-based licensing, each Cloud Volumes ONTAP system supports tiering to object storage. The total tiered capacity can scale up to the cloud provider's bucket limit. While the license does not impose capacity restrictions, you should follow the FabricPool Best Practices to ensure optimal performance, reliability, and cost efficiency when configuring and managing tiering.	
Supported virtual machine types	**DSv2 series** • DS4_v2 • DS5_v2 [1] • DS13_v2 • DS14_v2 [1] • DS15_v2 [1] **Esv3 series** • E8s_v3 • E48s_v3 [1] **Edsv4 series** • E8ds_v4 [3] • E32ds_v4 [1,3] • E48ds_v4 [1,3] • E80ids_v4 [1,2,3] **Edsv5 series** • E8ds_v5 • E20ds_v5 [1] • E32ds_v5 [1] • E48ds_v5 [1] • E64ds_v5 [1]	**DSv2 series** • DS4_v2 • DS13_v2 **Esv3 series** • E8s_v3 **Edsv4 series** • E8ds_v4 [3] **Edsv5 series** • E8ds_v5	**DSv2 series** • DS4_v2 • DS5_v2 [1] • DS13_v2 • DS14_v2 [1] • DS15_v2 [1] **Esv3 series** • E8s_v3 • E48s_v3 [1] **Edsv4 series** • E8ds_v4 [3] • E32ds_v4 [1,3] • E48ds_v4 [1,3] • E80ids_v4 [1,2,3] **Edsv5 series** • E8ds_v5 • E20ds_v5 [1] • E32ds_v5 [1] • E48ds_v5 [1] • E64ds_v5 [1]

	Freemium	Optimized [4]	Capacity-based license (Essentials and Professional)
Supported disk types	Page blobs		

Notes:

1. [1] Cloud Volumes ONTAP supports high write speed with these VM types when using an HA pair. You can enable high write speed from the Console during deployment or any time after. Learn more about choosing a write speed.
2. [2] This VM is recommended only when Azure maintenance control is needed. It's not recommended for any other use case due to the higher pricing.
3. [3] These VMs are only supported in deployments of Cloud Volumes ONTAP 9.11.1 or earlier. With these VM types you can upgrade an existing page blob deployment from Cloud Volumes ONTAP 9.11.1 to 9.12.1. You cannot perform new page blob deployments with Cloud Volumes ONTAP 9.12.1 or above.
4. [4] Beginning on August 11, 2025, the Cloud Volumes ONTAP Optimized license is deprecated and will no longer be available for purchase or renewal in the Azure marketplace for pay-as-you-go (PAYGO) subscriptions. For more information, refer to End of availability of Optimized licenses.

Other licenses

	PAYGO Standard	PAYGO Premium	Node-based BYOL
Maximum system capacity (disks + object storage)	10 TiB	368 TiB	368 TiB per license

	PAYGO Standard	PAYGO Premium	Node-based BYOL
Supported virtual machine types	**DSv2 series** • DS4_v2 • DS13_v2 **Esv3 series** • E8s_v3 **Edsv4 series** • E8ds_v4 [3] **Edsv5 series** • E8ds_v5	**DSv2 series** • DS5_v2 [1] • DS14_v2 [1] • DS15_v2 [1] **Esv3 series** • E48s_v3 [1] **Edsv4 series** • E32ds_v4 [1,3] • E48ds_v4 [1,3] • E80ids_v4 [1,2,3] **Edsv5 series** • E20ds_v5 [1] • E32ds_v5 [1] • E48ds_v5 [1] • E64ds_v5 [1]	**DSv2 series** • DS4_v2 • DS5_v2 [1] • DS13_v2 • DS14_v2 [1] • DS15_v2 [1] **Esv3 series** • E8s_v3 • E48s_v3 [1] **Edsv4 series** • E8ds_v4 [3] • E32ds_v4 [1,3] • E48ds_v4 [1,3] • E80ids_v4 [1,2,3] **Edsv5 series** • E4ds_v5 • E8ds_v5 • E20ds_v5 [1] • E32ds_v5 [1] • E48ds_v5 [1] • E64ds_v5 [1]
Supported data disk types	Page blobs		

Notes:

1. [1] Cloud Volumes ONTAP supports high write speed with these VM types when using an HA pair. You can enable high write speed from the Console during deployment or any time after. Learn more about choosing a write speed.
2. [2] This VM is recommended only when Azure maintenance control is needed. It's not recommended for any other use case due to the higher pricing.
3. [3] These VMs are only supported in deployments of Cloud Volumes ONTAP 9.11.1 or earlier. With these VM types you can upgrade an existing page blob deployment from Cloud Volumes ONTAP

9.11.1 to 9.12.1. You cannot perform new page blob deployments with Cloud Volumes ONTAP 9.12.1 or above.

Supported disk sizes

In Azure, an aggregate can contain up to 12 disks that are all the same type and size.

Single-node systems

Single-node systems use Azure Managed Disks. The following disk sizes are supported:

Premium SSD	Standard SSD	Standard HDD
• 500 GiB • 1 TiB • 2 TiB • 4 TiB • 8 TiB • 16 TiB • 32 TiB	• 100 GiB • 500 GiB • 1 TiB • 2 TiB • 4 TiB • 8 TiB • 16 TiB • 32 TiB	• 100 GiB • 500 GiB • 1 TiB • 2 TiB • 4 TiB • 8 TiB • 16 TiB • 32 TiB

HA pairs

HA pairs use Azure Managed Disks. The following disk type and sizes are supported.

(Page blobs are supported with HA pairs deployed before the 9.12.1 release.)

Premium SSD

- 500 GiB
- 1 TiB
- 2 TiB
- 4 TiB
- 8 TiB
- 16 TiB (managed disks only)
- 32 TiB (managed disks only)

Supported regions

For Azure region support, see Cloud Volumes Global Regions.

Supported configurations for Cloud Volumes ONTAP in Google Cloud

Several Cloud Volumes ONTAP configurations are supported in Google Cloud.

Supported configurations by license

Cloud Volumes ONTAP is available in Google Cloud as a single-node system and as a high-availability (HA) pair of nodes for fault tolerance and nondisruptive operations.

Upgrading a single-node system to an HA pair isn't supported. If you want to switch between a single-node system and an HA pair, then you need to deploy a new system and replicate data from the existing system to the new system.

Cloud Volumes ONTAP can run on either a Reserved or On-demand VM instance from your cloud provider. Solutions that use other VM instance types aren't supported.

Single node systems

Capacity-based licenses

	Freemium	Optimized [4]	Capacity-based license (Essentials and Professional)
Maximum system capacity (disks + object storage)	500 GiB	With capacity-based licensing, each Cloud Volumes ONTAP system supports tiering to object storage. The total tiered capacity can scale up to the cloud provider's bucket limit. While the license does not impose capacity restrictions, you should follow the FabricPool Best Practices to ensure optimal performance, reliability, and cost efficiency when configuring and managing tiering.	
Supported machine types [1]	• c3-standard-4, c3-standard-4-lssd [5] • c3-standard-8, c3-standard-8-lssd [5] • c3-standard-22, c3-standard-22-lssd [5] • c3-standard-44, c3-standard-44-lssd [5] • c3-standard-88, c3-standard-88-lssd [5] • n1-standard-8 [1] • n1-standard-32 [1] • n2-standard-4 • n2-standard-8 • n2-standard-16 • n2-standard-32 • n2-standard-48 • n2-standard-64	• n2-standard-4 • n2-standard-8	• c3-standard-4, c3-standard-4-lssd [5] • c3-standard-8, c3-standard-8-lssd [5] • c3-standard-22, c3-standard-22-lssd [5] • c3-standard-44, c3-standard-44-lssd [5] • c3-standard-88, c3-standard-88-lssd [5] • n1-standard-8 [1] • n1-standard-32 [1] • n2-standard-4 • n2-standard-8 • n2-standard-16 • n2-standard-32 • n2-standard-48 • n2-standard-64
Supported disk types [2]	Balanced persistent disks [3], Performance (SSD) persistent disks [3], and Standard (HDD) persistent disks. C3 VMs support only Hyperdisk Balanced disks.		

Notes:

1. [1] The n1 series machines are no longer available for selection on the NetApp Console when deploying new instances of Cloud Volumes ONTAP in Google Cloud. The n1 series machines will be retained and supported only in older, existing systems. New deployments of Cloud Volumes ONTAP are supported in Google Cloud only from the 9.8 release. We recommend that you switch to the n2 series machines that are compatible with Cloud Volumes ONTAP 9.8 and later. The n1 series machines, however, will be available for new deployments made through the API.

   The custom-4-16384 machine type is no longer supported with new Cloud Volumes ONTAP systems.

If you have an existing system running on this machine type, you can keep using it, but we recommend switching to the n2-standard-4 machine type.

2. [2] Disk limits can prevent you from reaching the maximum system capacity limit by using disks alone. You can reach the capacity limit by tiering inactive data to object storage.

   Learn more about disk limits in Google Cloud.

3. [3] Enhanced write performance is enabled when using Balanced persistent disks and Performance (SSD) persistent disks.
4. [4] Beginning on August 11, 2025, the Cloud Volumes ONTAP Optimized license is deprecated and will no longer be available for purchase or renewal in the Google Cloud marketplace for pay-as-you-go (PAYGO) subscriptions. For information, refer to What's new in Cloud Volumes ONTAP.
5. [5] You can deploy the next-generation C3 family VMs on Cloud Volumes ONTAP 9.18.1 and later. The c3-standard-44 and c3-standard-88 machines and their LSSD variants support Tier-1 bandwidth in Google Cloud Console by default. Refer to Flash Cache support for more information on the LSSD variants.

Other licenses

	PAYGO Explore	PAYGO Standard	PAYGO Premium	Node-based BYOL
Maximum system capacity (disks + object storage)	2 TB [2]	10 TiB	368 TiB	368 TiB per license

	PAYGO Explore	PAYGO Standard	PAYGO Premium	Node-based BYOL
Supported machine types [3]	• c3-standard-4, c3-standard-4-lssd [5] • n2-standard-4	• c3-standard-8, c3-standard-8-lssd [5] • n1-standard-8 [3] • n2-standard-8	• c3-standard-22, c3-standard-22-lssd [5] • c3-standard-44, c3-standard-44-lssd [5] • c3-standard-88, c3-standard-88-lssd [5] • n1-standard-32 [3] • n2-standard-16 • n2-standard-32 • n2-standard-48 • n2-standard-64	• c3-standard-4, c3-standard-4-lssd [5] • c3-standard-8, c3-standard-8-lssd [5] • c3-standard-22, c3-standard-22-lssd [5] • c3-standard-44, c3-standard-44-lssd [5] • c3-standard-88, c3-standard-88-lssd [5] • n1-standard-8 [3] • n1-standard-32 [3] • n2-standard-4 • n2-standard-8 • n2-standard-16 • n2-standard-32 • n2-standard-48 • n2-standard-64
Supported disk types	Balanced persistent disks [4], Performance (SSD) persistent disks [4], and Standard (HDD) persistent disks. C3 VMs support only Hyperdisk Balanced disks.			

Notes:

1. [1] Disk limits can prevent you from reaching the maximum system capacity limit by using disks alone. You can reach the capacity limit by tiering inactive data to object storage.

   Learn more about disk limits in Google Cloud.

2. [2] Data tiering to Google Cloud Storage isn't supported with PAYGO Explore.
3. [3] The n1 series machines are no longer available for selection on the Console when deploying new instances of Cloud Volumes ONTAP in Google Cloud. The n1 series machines will be retained and supported only in older, existing systems. New deployments of Cloud Volumes ONTAP are supported in Google Cloud only from the 9.8 release. We recommend that you switch to the n2 series machines that are compatible with Cloud Volumes ONTAP 9.8 and later. The n1 series machines, however, will be available for new deployments performed through the API.

   The custom-4-16384 machine type is no longer supported with new Cloud Volumes ONTAP systems. If you have an existing system running on this machine type, you can keep using it, but we recommend switching to the n2-standard-4 machine type.

4. [4] Enhanced write performance is enabled when using Balanced persistent disks and Performance (SSD) persistent disks.
5. [5] You can deploy the next-generation C3 family VMs on Cloud Volumes ONTAP 9.18.1 and later. The c3-standard-44 and c3-standard-88 machines and their LSSD variants support Tier-1 bandwidth in Google Cloud Console by default. Refer to Flash Cache support for more information on the LSSD variants.

The Console shows an additional supported machine type for Standard and BYOL: n1-highmem-4. However, this machine type isn't meant for production environments. We've made it available for a specific lab environment only.

For more information about specific machine types, refer to the Google Cloud documentation:

- n1 series general-purpose machine types
- N2 series general-purpose machine types

High-availability (HA) pairs

Capacity-based licenses

	Freemium	Optimized [4]	Capacity-based license (Essentials and Professional)
Maximum system capacity based on license (disks + object storage)	500 GiB	With capacity-based licensing, each Cloud Volumes ONTAP system supports tiering to object storage. The total tiered capacity can scale up to the cloud provider's bucket limit. While the license does not impose capacity restrictions, you should follow the FabricPool Best Practices to ensure optimal performance, reliability, and cost efficiency when configuring and managing tiering.	
Supported machine types [1]	• n1-standard-8 [1] • n1-standard-32 [1] • n2-standard-4 • n2-standard-8 • n2-standard-16 • n2-standard-32 • n2-standard-48 • n2-standard-64	• n2-standard-4 • n2-standard-8	• n1-standard-8 [1] • n1-standard-32 [1] • n2-standard-4 • n2-standard-8 • n2-standard-16 • n2-standard-32 • n2-standard-48 • n2-standard-64
Supported disk types [2]	Balanced persistent disks [3], Performance (SSD) persistent disks [3], and Standard (HDD) persistent disks.		

Notes:

1. [1] The n1 series machines are no longer available for selection on the NetApp Console when deploying new instances of Cloud Volumes ONTAP in Google Cloud. The n1 series machines will be retained and supported only in older, existing systems. New deployments of Cloud Volumes ONTAP are supported in Google Cloud only from the 9.8 release. We recommend that you switch to the n2 series machines that are compatible with Cloud Volumes ONTAP 9.8 and later. The n1 series machines, however, will be available for new deployments made through the API.

   The custom-4-16384 machine type is no longer supported with new Cloud Volumes ONTAP systems. If you have an existing system running on this machine type, you can keep using it, but we recommend switching to the n2-standard-4 machine type.

2. [2] Disk limits can prevent you from reaching the maximum system capacity limit by using disks alone. You can reach the capacity limit by tiering inactive data to object storage.

   Learn more about disk limits in Google Cloud.

3. [3] Enhanced write performance is enabled when using Balanced persistent disks and Performance (SSD) persistent disks.
4. [4] Beginning on August 11, 2025, the Cloud Volumes ONTAP Optimized license is deprecated and will no longer be available for purchase or renewal in the Google Cloud marketplace for pay-as-you-go (PAYGO) subscriptions. For information, refer to What's new in Cloud Volumes ONTAP.

Other licenses

	PAYGO Explore	PAYGO Standard	PAYGO Premium	Node-based BYOL
Maximum system capacity based on license (disks + object storage)	2 TB [2]	10 TiB	368 TiB	368 TiB per license
Supported machine types [3]	• n2-standard-4	• n1-standard-8 [3] • n2-standard-8	• n1-standard-32 [3] • n2-standard-16 • n2-standard-32 • n2-standard-48 • n2-standard-64	• n1-standard-8 [3] • n1-standard-32 [3] • n2-standard-4 • n2-standard-8 • n2-standard-16 • n2-standard-32 • n2-standard-48 • n2-standard-64
Supported disk types	Balanced persistent disks [4], Performance (SSD) persistent disks [4], and Standard (HDD) persistent disks.			

Notes:

1. [1] Disk limits can prevent you from reaching the maximum system capacity limit by using disks alone. You can reach the capacity limit by tiering inactive data to object storage.

   Learn more about disk limits in Google Cloud.

2. [2] Data tiering to Google Cloud Storage isn't supported with PAYGO Explore.
3. [3] The n1 series machines are no longer available for selection on the Console when deploying new instances of Cloud Volumes ONTAP in Google Cloud. The n1 series machines will be retained and supported only in older, existing systems. New deployments of Cloud Volumes ONTAP are supported in Google Cloud only from the 9.8 release. We recommend that you switch to the n2 series machines that are compatible with Cloud Volumes ONTAP 9.8 and later. The n1 series machines, however, will be available for new deployments performed through the API.

   The custom-4-16384 machine type is no longer supported with new Cloud Volumes ONTAP systems. If you have an existing system running on this machine type, you can keep using it, but we recommend switching to the n2-standard-4 machine type.

4. [4] Enhanced write performance is enabled when using Balanced persistent disks and Performance (SSD) persistent disks.

The Console shows an additional supported machine type for Standard and BYOL: n1-highmem-4. However, this machine type isn't meant for production environments. We've made it available for a specific lab environment only.

For more information about specific machine types, refer to the Google Cloud documentation:

- n1 series general-purpose machine types
- N2 series general-purpose machine types

Flash Cache support

Beginning with Cloud Volumes ONTAP 9.13.0, *Flash Cache*, high write speed, and a higher maximum transmission unit (MTU) of 8,896 bytes, are available for the following HA pair deployment instances:

- n2-standard-16
- n2-standard-32
- n2-standard-48
- n2-standard-64

You can enable *Flash Cache*, and high write speed when deploying an eligible instance type. To enable the higher maximum transmission unit of 8,896 bytes, you must chose VPC-1, VPC-2, or VPC-3 for the deployment. The higher MTU enables higher network throughput. For more information on launching one of these deployments, see Launching Cloud Volumes ONTAP in Google Cloud.

Flash Cache, high write mode, and an MTU of 8,896 are feature-dependent and cannot be disabled individually within a configured instance.

In single node deployments, beginning with Cloud Volumes ONTAP 9.18.1, if you select the local SSD (LSSD) variants of the C3 VMs, Flash Cache gets enabled by default. You can't switch between C3 LSSD VM variants in your Cloud Volumes ONTAP deployment, even if the target variant supports Flash Cache.

Check this table to understand the VM variant and the number of LSSDs supported by them:

VM type	Number of LSSD disks attached
c3-standard-4-lssd	1
c3-standard-8-lssd	2
c3-standard-22-lssd	4
c3-standard-44-lssd	8
c3-standard-88-lssd	16

Maximum system capacity based on VM type

VM type	Maximum supported data disks	Maximum capacity (in TiB)
n2 (all variants)	124	257
c3-standard-4	12	256
c3-standard-8	12	256
c3-standard-22	28	256
c3-standard-44	28	512
c3-standard-88	28	512
c3-standard-4-lssd	12	256

VM type	Maximum supported data disks	Maximum capacity (in TiB)
c3-standard-8-lssd	12	256
c3-standard-22-lssd	28	256
c3-standard-44-lssd	28	512
c3-standard-88-lssd	28	512

Supported disk sizes

In Google Cloud, an aggregate can contain up to 6 disks that are all the same type and size. The following disk sizes are supported:

- 100 GB
- 500 GB
- 1 TB
- 2 TB
- 4 TB
- 8 TB
- 16 TB
- 64 TB

Supported regions

For Google Cloud region support, see Cloud Volumes Global Regions.

Storage limits

Storage limits for Cloud Volumes ONTAP in AWS

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 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, the NetApp Console displays an action required message and no longer allows you to add additional disks.

For some configurations, disk limits prevent you from reaching the capacity limit by using disks alone. In those cases, you can reach the capacity limit by tiering inactive data to object storage. Refer to capacity and disk limits below for more details.

Capacity limit for capacity-based licenses

With capacity-based licensing, each Cloud Volumes ONTAP system supports tiering to object storage. The total tiered capacity can scale up to the cloud provider's bucket limit. While the license does not impose capacity restrictions, you should follow the FabricPool Best Practices to ensure optimal performance, reliability, and cost efficiency when configuring and managing tiering.
Refer to the AWS documentation for more information.

Capacity limits for other license types

License	Maximum system capacity (disks + object storage)
Freemium	500 GiB
PAYGO Explore	2 TiB (data tiering is not supported with Explore)
PAYGO Standard	10 TiB
PAYGO Premium	368 TiB
Node-based license	2 PiB (requires multiple licenses)

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, the Premium license allows up to 368 TiB across 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 TiB disk on node A, the Console also allocates an 8 TiB disk on node B that is used for mirrored data. While 16 TiB of capacity was provisioned, only 8 TiB counts against the license limit.

Aggregate limits

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

Parameter	Limit
Maximum number of aggregates	Single node: Same as the disk limit HA pairs: 18 in a node [1]
Maximum aggregate size [2]	• 96 TiB of raw capacity • 128 TiB of raw capacity with Elastic Volumes [3]
Disks per aggregate [4]	• 1-6 • 4 or 8 with Elastic Volumes [3]
Maximum number of RAID groups per aggregate	2

Notes:

1. You cannot create 18 aggregates on both nodes in an HA pair because that would exceed the data disk limit.
2. The maximum aggregate size depends on its disks and does not include object storage you use for data tiering.
3. If you have a configuration that supports the Amazon EBS Elastic Volumes feature, then an aggregate can contain up to 8 disks, which provides up to 128 TiB of capacity. By default, Cloud Volumes ONTAP 9.11.0 and later systems have Amazon EBS Elastic Volumes enabled when you use gp3 or io1 disks. Learn more about support for Elastic Volumes
4. All disks in an aggregate must be the same size.

Disk and tiering limits by EC2 instance

Capacity limits are different depending on the EC2 instance type family that you use and whether you're using a single-node system or an HA pair.

The following notes provide details about the numbers that you'll see in the tables below:

- The disk limits are specific to disks that contain user data.

  The limits do not include the boot disk and root disk.

- A maximum system capacity is listed when using disks alone and when using disks and cold data tiering to object storage.
- Cloud Volumes ONTAP uses EBS volumes as disks, with a maximum disk size of 16 TiB.

Limits for different deployment modes of capacity-based licensing

The following disk limits apply to Cloud Volumes ONTAP systems that use a capacity-based licensing package. Learn about Cloud Volumes ONTAP licensing options

For maximum system capacity and data tiering capacity limits for single node and HA configurations, refer to Capacity limit for capacity-based licenses.

Single node

Instance	Max disks per node	Max system capacity with disks alone
c5, m5, and r5 instances	21	336 TiB
• m5dn.24xlarge • m6id.32xlarge	19 [1]	304 TiB

1. This instance type has more local NVMe disks than other instance types, which means a smaller number of data disks are supported.

HA pairs

Instance	Max disks per node	Max system capacity with disks alone
c5, m5, and r5 instances	18	288 TiB
• m5dn.24xlarge • m6id.32xlarge	16 [1]	256 TiB

1. This instance type has more local NVMe disks than other instance types, which means a smaller number of data disks are supported.

Limits for different deployment modes of node-based licensing

The following disk limits apply to Cloud Volumes ONTAP systems that use node-based licensing, which is the previous generation licensing model that enabled you to license Cloud Volumes ONTAP by node. Node-based licensing is still available for existing customers.

You can purchase multiple node-based licenses for a Cloud Volumes ONTAP BYOL single node or HA pair system to allocate more than 368 TiB of capacity, up to the maximum tested and supported system capacity limit of 2 PiB. 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. Though Cloud Volumes ONTAP supports up to the maximum tested and supported system capacity of 2 PiB, crossing the 2 PiB limit results in an unsupported system configuration.

AWS Secret Cloud and Top Secret Cloud regions support purchases of multiple node-based licenses starting with Cloud Volumes ONTAP 9.12.1.

Single node with PAYGO Premium

Instance	Max disks per node	Max system capacity with disks alone	Max system capacity with disks and data tiering
c5, m5, and r5 instances	21 [1]	336 TiB	368 TiB

Instance	Max disks per node	Max system capacity with disks alone	Max system capacity with disks and data tiering
• m5dn.24xlarge • m6id.32xlarge	19 [2]	304 TiB	368 TiB

1. 21 data disks is the limit for *new* deployments of Cloud Volumes ONTAP. If you upgrade a system that was created with version 9.7 or earlier, then the system continues to support 22 disks. One less data disk is supported on new systems that use these instance types because of the addition of a core disk starting with the 9.8 release.
2. This instance type has more local NVMe disks than other instance types, which means a smaller number of data disks are supported.

Single node with BYOL

Instance	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
c5, m5, and r5 instances	21 [1]	336 TiB	368 TiB	336 TiB	2 PiB
• m5dn.24xlarge • m6id.32xlarge	19 [2]	304 TiB	368 TiB	304 TiB	2 PiB

1. 21 data disks is the limit for *new* deployments of Cloud Volumes ONTAP. If you upgrade a system that was created with version 9.7 or earlier, then the system continues to support 22 disks. One less data disk is supported on new systems that use these instance types because of the addition of a core disk starting with the 9.8 release.
2. This instance type has more local NVMe disks than other instance types, which means a smaller number of data disks are supported.

HA pairs with PAYGO Premium

Instance	Max disks per node	Max system capacity with disks alone	Max system capacity with disks and data tiering
c5, m5, and r5 instances	18 [1]	288 TiB	368 TiB
• m5dn.24xlarge • m6id.32xlarge	16 [2]	256 TiB	368 TiB

1. 18 data disks is the limit for *new* deployments of Cloud Volumes ONTAP. If you upgrade a system that was created with version 9.7 or earlier, then the system continues to support 19 disks. One less data disk is supported on new systems that use these instance types because of the addition of a core disk starting with the 9.8 release.
2. This instance type has more local NVMe disks than other instance types, which means a smaller number of data disks are supported.

HA pairs with BYOL

Instance	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
c5, m5, and r5 instances	18 [1]	288 TiB	368 TiB	288 TiB	2 PiB
• m5dn.24xlarge • m6id.32xlarge	16 [2]	256 TiB	368 TiB	256 TiB	2 PiB

1. 18 data disks is the limit for *new* deployments of Cloud Volumes ONTAP. If you upgrade a system that was created with version 9.7 or earlier, then the system continues to support 19 disks. One less data disk is supported on new systems that use these instance types because of the addition of a core disk starting with the 9.8 release.
2. This instance type has more local NVMe disks than other instance types, which means a smaller number of data disks are supported.

Storage VM limits

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

Learn how to create additional storage VMs.

License type	Storage VM limit
Freemium	24 storage VMs total [1,2]
Capacity-based PAYGO or BYOL [3]	24 storage VMs total [1,2]
Node-based PAYGO	• 1 storage VM for serving data • 1 storage VM for disaster recovery
Node-based BYOL [4]	• 24 storage VMs total [1,2]

1. The limit can be lower, depending on the EC2 instance type that you use. The limits per instance are listed in the section below.
2. These 24 storage VMs can serve data or be configured for disaster recovery (DR).

3. For capacity-based licensing, there are no extra licensing costs for additional storage VMs, but there is a 4 TiB minimum capacity charge per storage VM. For example, if you create two storage VMs and each has 2 TiB of provisioned capacity, you'll be charged a total of 8 TiB.
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.

Storage VM limit by EC2 instance type

When you create an additional storage VM, you need to allocate private IP addresses to port e0a. The table below identifies the maximum number of private IPs per interface, as well as the number of IP addresses that are available on port e0a after Cloud Volumes ONTAP has been deployed. The number of available IP addresses directly affects the maximum number of storage VMs for that configuration.

The instances listed below are for the c5, m5, and r5 instance families.

Configuration	Instance type	Max private IPs per interface	IPs remaining after deployment [1]	Max storage VMs without a mgmt LIF [2,3]	Max storage VMs with a mgmt LIF [2,3]
Single node	*.xlarge	15	9	10	5
	*.2xlarge	15	9	10	5
	*.4xlarge	30	24	24	12
	*.8xlarge	30	24	24	12
	*.9xlarge	30	24	24	12
	*.12xlarge	30	24	24	12
	*.16xlarge	50	44	24	12
	*.18xlarge	50	44	24	12
	*.24xlarge	50	44	24	12
HA pair in single AZ	*.xlarge	15	10	11	5
	*.2xlarge	15	10	11	5
	*.4xlarge	30	25	24	12
	*.8xlarge	30	25	24	12
	*.9xlarge	30	25	24	12
	*.12xlarge	30	25	24	12
	*.16xlarge	50	45	24	12
	*.18xlarge	50	45	24	12
	*.24xlarge	50	44	24	12

Configuration	Instance type	Max private IPs per interface	IPs remaining after deployment [1]	Max storage VMs without a mgmt LIF [2,3]	Max storage VMs with a mgmt LIF [2,3]
HA pair in multi AZs	*.xlarge	15	12	13	13
	*.2xlarge	15	12	13	13
	*.4xlarge	30	27	24	24
	*.8xlarge	30	27	24	24
	*.9xlarge	30	27	24	24
	*.12xlarge	30	27	24	24
	*.16xlarge	50	47	24	24
	*.18xlarge	50	47	24	24
	*.24xlarge	50	44	24	12

1. This number indicates how many *remaining* private IP addresses are available on port e0a after Cloud Volumes ONTAP is deployed and set up. For example, a *.2xlarge system supports a maximum of 15 IP addresses per network interface. When an HA pair is deployed in a single AZ, 5 private IP addresses are allocated to port e0a. As a result, an HA pair that uses a *.2xlarge instance type has 10 private IP addresses remaining for additional storage VMs.
2. The number listed in these columns includes the initial storage VM that the Console creates by default. For example, if 24 is listed in this column, it means that you can create 23 additional storage VMs for a total of 24.
3. A management LIF for the storage VM is optional. A management LIF provides a connection to management tools like SnapCenter.

   Because it requires a private IP address, it will limit the number of additional storage VMs that you can create. The only exception is an HA pair in multiple AZs. In that case, the IP address for the management LIF is a *floating* IP address so it doesn't count against the *private* IP limit.

File and volume limits

Logical storage	Parameter	Limit
Files	Maximum size [2]	128 TB
	Maximum per volume	Volume size dependent, up to 2 billion
FlexClone volumes	Hierarchical clone depth [1]	499
FlexVol volumes	Maximum per node	500
	Minimum size	20 MB
	Maximum size [3]	300 TiB
Qtrees	Maximum per FlexVol volume	4,995
Snapshot copies	Maximum per FlexVol volume	1,023

1. Hierarchical clone depth is the maximum depth of a nested hierarchy of FlexClone volumes that can be created from a single FlexVol volume.
2. Beginning with ONTAP 9.12.1P2, the limit is 128 TB. In ONTAP 9.11.1 and earlier versions, the limit is 16 TB.
3. FlexVol volume creation up to maximum size of 300 TiB is supported using the following tools and minimum versions:
   - System Manager and the ONTAP CLI starting from Cloud Volumes ONTAP 9.12.1 P2 and 9.13.0 P2
   - Beginning with Cloud Volumes ONTAP 9.13.1

iSCSI storage limits

iSCSI storage	Parameter	Limit
LUNs	Maximum per node	1,024
	Maximum number of LUN maps	1,024
	Maximum size	16 TiB
	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

Storage limits for Cloud Volumes ONTAP 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, the NetApp Console displays an action required message and blocks you from adding more disks.

Capacity limit for capacity-based licenses

With capacity-based licensing, each Cloud Volumes ONTAP system supports tiering to object storage. The total tiered capacity can scale up to the cloud provider's bucket limit. While the license does not impose capacity restrictions, you should follow the FabricPool Best Practices to ensure optimal performance, reliability, and cost efficiency when configuring and managing tiering.
Refer to the Azure documentation for managed disks and Azure documentation for blob storage.

Capacity limits for other license types

License	Maximum system capacity (disks + object storage)
Freemium	500 GiB
PAYGO Explore	2 TiB (data tiering is not supported with Explore)
PAYGO Standard	10 TiB
PAYGO Premium	368 TiB
Node-based license	2 PiB (requires multiple licenses)

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 TiB of capacity between both nodes.

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 [1]	384 TiB of raw capacity for single node [2] 352 TiB of raw capacity for single node with PAYGO 96 TiB of raw capacity for HA pairs with page blob 384 TiB of raw capacity for HA pairs with managed disks
Disks per aggregate	1-12 [3]
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 TiB.
3. All disks in an aggregate must be the same size.

Disk and tiering limits by VM size

Capacity limits vary by VM size and system type (single node or HA pair).

The notes below explain the numbers in the tables:

- The disk limits are specific to disks that contain user data.

The limits do not include the root disk, core disk, and VNVRAM.

- You can see the maximum system capacity when you use disks alone and when you use disks and cold data tiering to object storage.
- Single node and HA systems which use managed disks have a maximum of 32 TiB per disk. The number of supported disks varies by VM size.
- HA systems which use page blobs have a maximum of 8 TiB per page blob. The number of supported disks varies by VM size.
- The 896 TiB disk-based limit that's listed for single-node systems with certain VM sizes is the *tested* limit.

Limits for different deployment modes of capacity-based licensing

The following disk limits apply to Cloud Volumes ONTAP systems using a capacity-based licensing package. Learn about Cloud Volumes ONTAP licensing options.

For maximum system capacity and data tiering capacity limits for single node, HA pairs in a single availability zone with page blobs, and HA pairs in a single and multiple availability zones with shared managed disks, refer to Capacity limit for capacity-based licenses.

Single node

VM size	Max data disks per node	Max system capacity with disks alone
DS4_v2	29	896 TiB
DS5_v2	61	896 TiB
DS13_v2	29	896 TiB
DS14_v2	61	896 TiB
DS15_v2	61	896 TiB
E4s_v3	5	160 TiB
E8s_v3	13	416 TiB
E32s_v3	29	896 TiB
E48s_v3	29	896 TiB
E64is_v3	29	896 TiB
E4ds_v4	5	160 TiB
E8ds_v4	13	416 TiB
E32ds_v4	29	896 TiB
E48ds_v4	29	896 TiB
E80ids_v4	61	896 TiB
E4ds_v5	5	160 TiB
E8ds_v5	13	416 TiB
E20ds_v5	29	896 TiB

VM size	Max data disks per node	Max system capacity with disks alone
E32ds_v5	29	896 TiB
E48ds_v5	29	896 TiB
E64ds_v5	29	896 TiB
L8s_v3	12	384 TiB
L16s_v3	28	896 TiB
L32s_v3	28	896 TiB
L48s_v3	28	896 TiB
L64s_v3	28	896 TiB

HA pairs in a single availability zone with page blobs

VM size	Max data disks for an HA pair	Max system capacity with disks alone
DS4_v2	29	232 TiB
DS5_v2	61	488 TiB
DS13_v2	29	232 TiB
DS14_v2	61	488 TiB
DS15_v2	61	488 TiB
E8s_v3	13	104 TiB
E48s_v3	29	232 TiB
E8ds_v4	13	104 TiB
E32ds_v4	29	232 TiB
E48ds_v4	29	232 TiB
E80ids_v4	61	488 TiB

HA pairs in a single availability zone with shared managed disks

VM size	Max data disks for an HA pair	Max system capacity with disks alone
E8ds_v4	12	384 TiB
E32ds_v4	28	896 TiB
E48ds_v4	28	896 TiB
E80ids_v4	28	896 TiB
E8ds_v5	12	384 TiB
E20ds_v5	28	896 TiB
E32ds_v5	28	896 TiB

VM size	Max data disks for an HA pair	Max system capacity with disks alone
E48ds_v5	28	896 TiB
E64ds_v5	28	896 TiB
L16s_v3	28	896 TiB
L32s_v3	28	896 TiB
L48s_v3	28	896 TiB
L64s_v3	28	896 TiB

HA pairs in multiple availability zones with shared managed disks

VM size	Max data disks for an HA pair	Max system capacity with disks alone
E8ds_v4	12	384 TiB
E32ds_v4	28	896 TiB
E48ds_v4	28	896 TiB
E80ids_v4	28	896 TiB
E8ds_v5	12	384 TiB
E20ds_v5	28	896 TiB
E32ds_v5	28	896 TiB
E48ds_v5	28	896 TiB
E64ds_v5	28	896 TiB
L16s_v3	28	896 TiB
L32s_v3	28	896 TiB
L48s_v3	28	896 TiB
L64s_v3	28	896 TiB

Limits for different deployment modes of node-based licensing

The following disk limits apply to Cloud Volumes ONTAP systems that use node-based licensing. Node-based licensing is the previous generation model that lets you license Cloud Volumes ONTAP by node. Node-based licensing is still available for existing customers.

You can purchase multiple node-based licenses for a Cloud Volumes ONTAP BYOL single node or HA pair system to allocate more than 368 TiB of capacity, up to the maximum tested and supported system capacity limit of 2 PiB. 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. Cloud Volumes ONTAP supports up to the maximum tested and supported system capacity of 2 PiB, and crossing the 2 PiB limit results in an unsupported system configuration.

Single node

Single node has two node-based licensing options: PAYGO Premium and BYOL.

Single node with PAYGO Premium

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 TiB	368 TiB
DS14_v2	61	368 TiB	368 TiB
DS15_v2	61	368 TiB	368 TiB
E32s_v3	29	368 TiB	368 TiB
E48s_v3	29	368 TiB	368 TiB
E64is_v3	29	368 TiB	368 TiB
E32ds_v4	29	368 TiB	368 TiB
E48ds_v4	29	368 TiB	368 TiB
E80ids_v4	61	368 TiB	368 TiB
E20ds_v5	29	896 TiB	2 PiB
E32ds_v5	29	896 TiB	2 PiB
E48ds_v5	29	896 TiB	2 PiB
E64ds_v5	29	896 TiB	2 PiB

Single node with BYOL

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 TiB	368 TiB	896 TiB	2 PiB
DS5_v2	61	368 TiB	368 TiB	896 TiB	2 PiB
DS13_v2	29	368 TiB	368 TiB	896 TiB	2 PiB
DS14_v2	61	368 TiB	368 TiB	896 TiB	2 PiB
DS15_v2	61	368 TiB	368 TiB	896 TiB	2 PiB
L8s_v2	13	368 TiB	368 TiB	416 TiB	2 PiB
E4s_v3	5	160 TiB	368 TiB	160 TiB	2 PiB
E8s_v3	13	368 TiB	368 TiB	416 TiB	2 PiB
E32s_v3	29	368 TiB	368 TiB	896 TiB	2 PiB
E48s_v3	29	368 TiB	368 TiB	896 TiB	2 PiB
E64is_v3	29	368 TiB	368 TiB	896 TiB	2 PiB
E4ds_v4	5	160 TiB	368 TiB	160 TiB	2 PiB
E8ds_v4	13	368 TiB	368 TiB	416 TiB	2 PiB
E32ds_v4	29	368 TiB	368 TiB	896 TiB	2 PiB
E48ds_v4	29	368 TiB	368 TiB	896 TiB	2 PiB
E80ids_v4	61	368 TiB	368 TiB	896 TiB	2 PiB
E4ds_v5	5	160 TiB	368 TiB	160 TiB	2 PiB
E8ds_v5	13	368 TiB	368 TiB	416 TiB	2 PiB
E20ds_v5	29	368 TiB	368 TiB	896 TiB	2 PiB
E32ds_v5	29	368 TiB	368 TiB	896 TiB	2 PiB
E48ds_v5	29	368 TiB	368 TiB	896 TiB	2 PiB
E64ds_v5	29	368 TiB	368 TiB	896 TiB	2 PiB

HA pairs

HA pairs have two configuration types: page blob and multiple availability zone. Each configuration has two

node-based licensing options: PAYGO Premium and BYOL.

PAYGO Premium: HA pairs in single availability zone with page blobs

VM size	Max data disks for an HA pair	Max system capacity with disks alone	Max system capacity with disks and data tiering
DS5_v2	61	368 TiB	368 TiB
DS14_v2	61	368 TiB	368 TiB
DS15_v2	61	368 TiB	368 TiB
E8s_v3	13	104 TiB	368 TiB
E48s_v3	29	232 TiB	368 TiB
E32ds_v4	29	232 TiB	368 TiB
E48ds_v4	29	232 TiB	368 TiB
E80ids_v4	61	368 TiB	368 TiB

PAYGO Premium: HA pairs in a multiple availability zone configuration with shared managed disks

VM size	Max data disks for an HA pair	Max system capacity with disks alone	Max system capacity with disks and data tiering
E32ds_v4	28	368 TiB	368 TiB
E48ds_v4	28	368 TiB	368 TiB
E80ids_v4	28	368 TiB	368 TiB
E20ds_v5	28	896 TiB	2 PiB
E32ds_v5	28	896 TiB	2 PiB
E48ds_v5	28	896 TiB	2 PiB
E64ds_v5	28	896 TiB	2 PiB

BYOL: HA pairs in single availability zone with page blobs

VM size	Max data disks for an HA pair	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	232 TiB	368 TiB	232 TiB	2 PiB
DS5_v2	61	368 TiB	368 TiB	488 TiB	2 PiB
DS13_v2	29	232 TiB	368 TiB	232 TiB	2 PiB
DS14_v2	61	368 TiB	368 TiB	488 TiB	2 PiB
DS15_v2	61	368 TiB	368 TiB	488 TiB	2 PiB
E8s_v3	13	104 TiB	368 TiB	104 TiB	2 PiB
E48s_v3	29	232 TiB	368 TiB	232 TiB	2 PiB
E8ds_v4	13	104 TiB	368 TiB	104 TiB	2 PiB
E32ds_v4	29	232 TiB	368 TiB	232 TiB	2 PiB
E48ds_v4	29	232 TiB	368 TiB	232 TiB	2 PiB
E80ids_v4	61	368 TiB	368 TiB	488 TiB	2 PiB

BYOL: HA pairs in a multiple availability zone configuration with shared managed disks

VM size	Max data disks for an HA pair	Max system capacity with one license		Max system capacity with multiple licenses	
		Disks alone	Disks + data tiering	Disks alone	Disks + data tiering
E8ds_v4	12	368 TiB	368 TiB	368 TiB	2 PiB
E32ds_v4	28	368 TiB	368 TiB	368 TiB	2 PiB
E48ds_v4	28	368 TiB	368 TiB	368 TiB	2 PiB
E80ids_v4	28	368 TiB	368 TiB	368 TiB	2 PiB
E8ds_v5	12	368 TiB	368 TiB	368 TiB	2 PiB
E20ds_v5	28	368 TiB	368 TiB	368 TiB	2 PiB
E32ds_v5	28	368 TiB	368 TiB	368 TiB	2 PiB
E48ds_v5	28	368 TiB	368 TiB	368 TiB	2 PiB
E64ds_v5	28	368 TiB	368 TiB	368 TiB	2 PiB

Storage VM limits

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

These are the tested limits. Setting up more storage VMs is not supported.

Learn how to create additional storage VMs.

License type	Storage VM limit
Freemium	24 storage VMs total [1,2]
Capacity-based PAYGO or BYOL [3]	24 storage VMs total [1,2]
Node-based BYOL [4]	24 storage VMs total [1,2]
Node-based PAYGO	• 1 storage VM for serving data • 1 storage VM for disaster recovery

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 TiB minimum capacity charge per storage VM. For example, if you create two storage VMs and each has 2 TiB of provisioned capacity, you'll be charged a total of 8 TiB.
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 for disaster recovery (DR) do not need an add-on license, but they count toward the storage VM limit. For example, if you have 12 data-serving and 12 DR storage VMs, you have reached the limit and cannot create more.

File and volume limits

Logical storage	Parameter	Limit
Files	Maximum size [2]	128 TB
	Maximum per volume	Volume size dependent, up to 2 billion
FlexClone volumes	Hierarchical clone depth [1]	499
FlexVol volumes	Maximum per node	500
	Minimum size	20 MB
	Maximum size [3]	300 TiB
Qtrees	Maximum per FlexVol volume	4,995
Snapshot copies	Maximum per FlexVol volume	1,023

1. Hierarchical clone depth is the maximum depth of a nested hierarchy of FlexClone volumes that can be created from a single FlexVol volume.
2. Beginning with ONTAP 9.12.1P2, the limit is 128 TB. In ONTAP 9.11.1 and earlier versions, the limit is 16 TB.
3. FlexVol volume creation up to maximum size of 300 TiB is supported using the following tools and minimum versions:
   - System Manager and the ONTAP CLI beginning with Cloud Volumes ONTAP 9.12.1 P2 and 9.13.0 P2
   - Beginning with Cloud Volumes ONTAP 9.13.1

iSCSI storage limits

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

iSCSI storage	Parameter	Limit
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

Storage limits for Cloud Volumes ONTAP in Google Cloud

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, the NetApp Console displays an action required message and no longer allows you to add additional disks.

For some configurations, disk limits prevent you from reaching the capacity limit by using disks alone. You can reach the capacity limit by tiering inactive data to object storage. Refer to the disk limits below for more details.

Capacity limit for capacity-based licenses

With capacity-based licensing, each Cloud Volumes ONTAP system supports tiering to object storage. The total tiered capacity can scale up to the cloud provider's bucket limit. While the license does not impose capacity restrictions, you should follow the FabricPool Best Practices to ensure optimal performance, reliability, and cost efficiency when configuring and managing tiering.
Refer to the Google Cloud documentation for more information.

Capacity limits for other license types

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	2 PiB (requires multiple licenses)

For an HA pair, is the licensed 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 pair, does mirrored data count against the licensed capacity limit?

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

Aggregate limits

Cloud Volumes ONTAP groups Google Cloud Platform disks into *aggregates*. Aggregates provide storage to volumes.

Parameter	Limit
Maximum number of data aggregates [1]	• 99 for single node • 64 for an entire HA pair
Maximum aggregate size	256 TB of raw capacity [2]
Disks per aggregate	1-6 [3]
Maximum number of RAID groups per aggregate	1

Notes:

1. The maximum number of data aggregates doesn't include the root aggregate.
2. The disks that comprise the aggregate determine the aggregate capacity limit. This limit does not include object storage used for data tiering.
3. All disks in an aggregate must be the same size.

Disk and tiering limits

The table below shows the maximum system capacity with disks alone, and with disks and cold data tiering to object storage. The disk limits are specific to disks that contain user data. The limits do not include the boot disk, root disk, or NVRAM.

Parameter	Limit
Maximum data disks	• 124 for single-node systems • 123 per node for HA pairs
Maximum disk size	64 TB
Maximum system capacity with disks alone	256 TB [1]

Parameter	Limit
Maximum system capacity with disks and cold data tiering to a Google Cloud Storage bucket	Depends on the license. Refer to the maximum system capacity limits above.

[1] This limit is defined by virtual machine limits in Google Cloud Platform.

Storage VM limits

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

These are the tested limits. Configuring more storage VMs is not supported.

Learn how to create additional storage VMs.

License type	Storage VM limit
Freemium	24 storage VMs total [1]
Capacity-based PAYGO or BYOL [2]	24 storage VMs total [1]
Node-based BYOL [3]	24 storage VMs total [1]
Node-based PAYGO	• 1 storage VM for serving data • 1 storage VM for disaster recovery

1. These 24 storage VMs can serve data or be configured for disaster recovery (DR).
2. For capacity-based licensing, there are no extra licensing costs for additional storage VMs, but there is a 4 TiB minimum capacity charge per storage VM. For example, if you create two storage VMs and each has 2 TiB of provisioned capacity, you'll be charged a total of 8 TiB.
3. 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 get 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.

Logical storage limits

Logical storage	Parameter	Limit
Files	Maximum size [2]	128 TB
	Maximum per volume	Volume size dependent, up to 2 billion
FlexClone volumes	Hierarchical clone depth [12]	499

Logical storage	Parameter	Limit
FlexVol volumes	Maximum per node	500
	Minimum size	20 MB
	Maximum size [3]	300 TiB
Qtrees	Maximum per FlexVol volume	4,995
Snapshot copies	Maximum per FlexVol volume	1,023

1. Hierarchical clone depth is the maximum depth of a nested hierarchy of FlexClone volumes that can be created from a single FlexVol volume.
2. Beginning with ONTAP 9.12.1P2, the limit is 128 TB. In ONTAP 9.11.1 and earlier versions, the limit is 16 TB.
3. FlexVol volume creation up to maximum size of 300 TiB is supported using the following tools and minimum versions:
   - System Manager and the ONTAP CLI beginning with Cloud Volumes ONTAP 9.12.1 P2 and 9.13.0 P2
   - Beginning with Cloud Volumes ONTAP 9.13.1

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	1
	Maximum per portset	32
Portsets	Maximum per node	256

Cloud Volumes ONTAP HA pairs do not support immediate storage giveback

After a node reboots, the partner must sync data before it can return the storage. The time that it takes to resync data depends on the amount of data written by clients while the node was down and the data write speed during the time of giveback.

Learn how storage works in a Cloud Volumes ONTAP HA pair running in Google Cloud.

Known issues for Cloud Volumes ONTAP

Known issues identify problems that might prevent you from using this release of the product successfully.

There are no known issues in this release specific to Cloud Volumes ONTAP.

You can find known issues for ONTAP software in the ONTAP Release Notes.

Known limitations

Known limitations for Cloud Volumes ONTAP in all cloud providers

Known limitations identify platforms, devices, or functions that are not supported by this release of the product, or that do not interoperate correctly with it. Review these limitations carefully.

The following limitations apply to Cloud Volumes ONTAP in all cloud providers: AWS, Azure, and Google Cloud.

Unsupported ONTAP features

Some ONTAP features are not supported with Cloud Volumes ONTAP, including but not limited to:

- Aggregate-level inline deduplication
- Aggregate-level background deduplication
- Disk maintenance center
- Disk sanitization
- FabricPool mirroring
- Fibre Channel (FC)
- Flash Pools
- Infinite Volumes
- Interface groups
- Intranode LIF failover
- MetroCluster
- Multi-admin verification

  Enabling multi-admin verification on Cloud Volumes ONTAP will result in an unsupported configuration.

- RAID4, RAID-DP, RAID-TEC (RAID0 is supported)
- Service Processor
- SnapLock Compliance and Enterprise modes (only Cloud WORM is supported)
- SnapMirror Synchronous
- VLANs
- Onboard Key Manager (OKM) for encryption
- SMB Continuous Availability (CA)

  Continuously available SMB shares for nondisruptive operations are not supported.

Maximum concurrent replication operations

The maximum number of concurrent SnapMirror or SnapVault transfers for Cloud Volumes ONTAP is 100 per node, regardless of the instance type or machine type.

Cloud provider snapshots must not be used for your backup and recovery plans

You shouldn't use your cloud provider's snapshots as part of your backup and recovery plan for Cloud Volumes ONTAP data. You should always use ONTAP Snapshot copies or third-party backup solutions to back up and restore data hosted on Cloud Volumes ONTAP.

Learn how to use NetApp Backup and Recovery to back up and restore ONTAP data.

ONTAP consistency points in the WAFL file system determine data consistency. Only ONTAP can quiesce the WAFL file system to make a crash-consistent backup.

Cloud Volumes ONTAP supports only Reserved and On-demand VM instances

Cloud Volumes ONTAP can run on either a Reserved or On-demand VM instance from your cloud provider. Other types of VM instances aren't supported.

Automatic application resource management solutions shouldn't be used

Automatic application resource management solutions should not manage Cloud Volumes ONTAP systems. Doing so can result in a change to an unsupported configuration. For example, the solution might change Cloud Volumes ONTAP to an unsupported VM instance type.

Software updates must be completed by NetApp Console

Upgrades of Cloud Volumes ONTAP must be completed from the NetApp Console. You should not upgrade Cloud Volumes ONTAP by using System Manager or the CLI. Doing so can impact system stability.

Cloud Volumes ONTAP deployment must not be modified from your cloud provider's console

Changes to a Cloud Volumes ONTAP configuration from your cloud provider's console results in an unsupported configuration. Any changes to the Cloud Volumes ONTAP resources that the Console creates and manages can impact system stability and the ability of the Console to manage the system.

After initial deployment, modification of the Azure Subscription name used for Cloud Volumes ONTAP resources is supported.

Disks and aggregates must be managed from the Console

All disks and aggregates must be created and deleted directly from the Console. You should not perform these actions from another management tool. Doing so can impact system stability, hamper the ability to add disks in the future, and potentially generate redundant cloud provider fees.

SnapManager licensing limitation

SnapManager per-server licenses are supported with Cloud Volumes ONTAP. Per-storage system (SnapManager suite) licenses are not supported.

Limitations with third-party agents and extensions

Third-party agents and VM extensions are not supported on Cloud Volumes ONTAP virtual machine instances.

Known limitations for Cloud Volumes ONTAP in AWS

The following known limitations are specific to Cloud Volumes ONTAP in Amazon Web Services. Be sure to also review Limitations for Cloud Volumes ONTAP in all cloud providers.

AWS Outpost limitations

If you have an AWS Outpost, you can deploy Cloud Volumes ONTAP in that Outpost by selecting the Outpost VPC during deployment. The experience is the same as any other VPC that resides in AWS. Note that you will need to first deploy a Console agent in your AWS Outpost.

There are a few limitations to point out:

- Only single node Cloud Volumes ONTAP systems are supported at this time
- The EC2 instances that you can use with Cloud Volumes ONTAP are limited to what's available in your Outpost
- Only General Purpose SSDs (gp2) are supported at this time

Flash Cache limitations

C5D and R5D instance types include local NVMe storage, which Cloud Volumes ONTAP uses as *Flash Cache*. Note the following limitations:

- Compression must be disabled on all volumes to take advantage of the Flash Cache performance improvements up to Cloud Volumes ONTAP 9.12.0. When you deploy or upgrade to Cloud Volumes ONTAP 9.12.1, you don't need to disable compression.

  You can choose no storage efficiency when creating a volume from the NetApp Console, or you can create a volume and then disable data compression by using the CLI.

- Cache rewarming after a reboot is not supported with Cloud Volumes ONTAP.

False alarms reported by Amazon CloudWatch

Cloud Volumes ONTAP does not release CPUs when idle, so Amazon CloudWatch can report a high CPU warning for the EC2 instance because it sees 100% usage. You can ignore this alarm. The ONTAP statistics command displays the true usage of the CPUs.

Cloud Volumes ONTAP HA pairs do not support immediate storage giveback

After a node reboots, the partner must sync data before it can return the storage. The time that it takes to resync data depends on the amount of data written by clients while the node was down and the data write speed during the time of giveback.

Learn how storage works in a Cloud Volumes ONTAP HA pair running in AWS.

Known limitations for Cloud Volumes ONTAP in Azure

The following known limitations are specific to Cloud Volumes ONTAP in Microsoft Azure. Be sure to also review Limitations for Cloud Volumes ONTAP in all cloud providers.

Limitations with using Azure VM extensions

Cloud Volumes ONTAP does not support Azure virtual machine (VM) extensions because they affect the management operations in the NetApp Console. During deployment, the Console prevents the installation of any extensions on your VMs. If extensions are already installed on your existing Cloud Volumes ONTAP VMs, contact Microsoft Azure Support to remove them. For guidance, refer to the knowledge base (KB) article Can Azure VM Management Extensions be installed into Cloud Volume ONTAP?

Starting July 14, 2025, NetApp will send emails and notify you in the Console if VM extensions are detected on your Cloud Volumes ONTAP VMs.

Premium SSD v2 disks limitations for HA configurations

Premium SSD v2 Managed Disks have the following limitations for high-availability (HA) deployments in Azure:

- Not supported in HA deployments in non-zonal regions.
- Not supported in HA deployments across multiple availability zones.
- Only supported in HA configurations deployed within single availability zones.

To use Premium SSD v2 Managed Disks with Cloud Volumes ONTAP HA configurations, ensure the following requirements are met:

- Cloud Volumes ONTAP version is 9.15.1 or later.
- The HA deployment is in an Azure single availability zone.
- The selected regions and zones support Premium SSD v2 Managed Disks. For information about the supported regions, refer to the Microsoft Azure website: Products available by region.

For more information, refer to Support for Premium SSD v2 Managed Disks in Azure.

Limitations with HA deployments in single availability zones

Beginning with Cloud Volumes ONTAP 9.15.1, you can deploy virtual machine (VM) instances in HA mode in single availability zones (AZs) in Azure. For information about the criteria supporting this feature, refer to Deploy HA pairs in single availability zones in Azure.

If the Cloud Volumes ONTAP version is earlier than 9.15.1 or if any of these conditions are not met, the previous deployment model utilizing availability sets becomes effective. This applies to only HA configurations.

Flash Cache limitations

Cloud Volumes ONTAP uses the local NVMe storage in some VM types as *Flash Cache*. Note this limitation:

- Cache rewarming after a reboot is not supported.

Limitations with HA deployments

HA pairs aren't supported in some regions.

View the list of supported Azure regions.

Known limitations for Cloud Volumes ONTAP in Google Cloud

The following known limitations are specific to Cloud Volumes ONTAP in Google Cloud Platform. Be sure to also review Limitations for Cloud Volumes ONTAP in all cloud providers.

Limitation with packet mirroring

Packet mirroring must be disabled in the Google Cloud VPC in which you deploy Cloud Volumes ONTAP.

Cloud Volumes ONTAP can't operate properly if packet mirroring is enabled.

Google Private Service Connect limitations

If you leverage Google Private Service Connect within the VPC that you are deploying Cloud Volumes ONTAP into, you will need to implement DNS records that forward traffic to the required API Endpoints.

Tiering data from Cloud Volumes ONTAP into a Google Cloud Storage bucket is not currently supported with Private Service Connect.

Collaboration with cloud providers for Cloud Volumes ONTAP

Learn how NetApp collaborates with cloud providers to address potential issues.

Collaborative support best practices

NetApp is committed to provide support to Licensee and will use commercially reasonable efforts to resolve technical support issues for Cloud Volumes ONTAP when reported by the Licensee. NetApp and the applicable cloud provider don't have any direct support obligations to each other's licensed software or infrastructure.

NetApp has implemented tools aimed to connect with applicable cloud providers on customer technical issues that may be a result of the applicable cloud provider services. However, the best way to maintain a seamless support flow is for customers to (i) maintain a current support contract with both NetApp and the applicable cloud provider and (ii) coordinate joint escalation meetings with both NetApp and the applicable cloud provider when technical issues arise and the customer needs clarity on which products or services are causing those technical issues.

Azure maintenance events

Microsoft schedules and programmatically announces maintenance events on its Azure virtual machine (VM) infrastructure that may affect Cloud Volumes ONTAP VMs. These events are announced 15 minutes prior to the maintenance window.

Special handling of the maintenance events is supported for Cloud Volumes ONTAP high-availability (HA) pairs. To maintain application health, we perform a preventive takeover to prioritize stability, as any loss of connectivity of more than 15 seconds will disable failover capabilities.

When the maintenance window is announced, the partner node of the targeted node will perform a takeover. When the maintenance is complete, a giveback will be initiated. After the giveback, the HA pair is expected to return to a healthy state. If this doesn't occur, contact NetApp Support for assistance. Note that maintenance events are targeted at one of the VMs in an HA pair at a time, and typically both nodes are targeted in a relatively short period of time.

CIFS/SMB clients that use Cloud Volumes ONTAP non-continuously available CIFS shares will experience a loss of session both when a takeover occurs, and when the aggregate that the session is using is given back to the aggregate's home node. This is a limitation imposed by the CIFS/SMB protocol itself. You can use approved third-party products to avoid issues resulting from takeover and giveback. For further assistance, contact NetApp Support.

Continuously available SMB shares for nondisruptive operations are not supported in Cloud Volumes ONTAP.

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- Notice for the Cloud Volumes ONTAP 9.18.1
- Notice for ONTAP

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