Planning your Cloud Volumes ONTAP configuration

Cloud Manager 3.5

NetApp

11/01/2018

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1. Planning your Cloud Volumes ONTAP configuration

When you deploy Cloud Volumes ONTAP, you can choose a preconfigured system that matches your workload requirements, or you can create your own configuration. If you choose your own configuration, you should understand the options available to you.

1.1. Choosing a license type

Cloud Volumes ONTAP is available in AWS and Azure in two pricing options: pay-as-you-go and Bring Your Own License (BYOL). For pay-as-you-go, you can choose from three licenses: Explore, Standard, or Premium. Each license provides different capacity and compute options.

- Supported configurations for Cloud Volumes ONTAP 9.4
- Supported configurations for ONTAP Cloud 9.3

1.2. Understanding storage limits

The raw capacity limit for a Cloud Volumes ONTAP system is tied to the license. Additional limits impact the size of aggregates and volumes. You should be aware of these limits as you plan your configuration.

- Storage limits for Cloud Volumes ONTAP 9.4
- Storage limits for ONTAP Cloud 9.3

1.3. Choosing an AWS disk type

When you create volumes for Cloud Volumes ONTAP, you need to choose the underlying cloud storage that Cloud Volumes ONTAP uses as a disk. In AWS, you can choose a single EBS disk type or a tiered storage configuration that uses EBS storage as a performance tier and S3 as a capacity tier. You should choose the configuration that meets your requirements for performance and cost.

For an overview of data tiering, see Storage. For requirements, see Tiering data in AWS.

1.3.1. Supported EBS disk types

At a high level, the differences between EBS disk types are as follows:

- *General Purpose SSD* disks balance cost and performance for a broad range of workloads. Performance is defined in terms of IOPS.
- *Provisioned IOPS SSD* disks are for critical applications that require the highest performance at a higher cost.
- *Throughput Optimized HDD* disks are for frequently accessed workloads that require fast and

consistent throughput at a lower price.

- *Cold HDD* disks are meant for backups, or infrequently accessed data, because the performance is very low. Like Throughput Optimized HDD disks, performance is defined in terms of throughput.

Cold HDD disks are not supported with HA configurations.

For additional details about the use cases for these disks, refer to AWS Documentation: EBS Volume Types.

1.4. Choosing an Azure disk type

When you create volumes for Cloud Volumes ONTAP, you need to choose the underlying cloud storage that Cloud Volumes ONTAP uses as a disk. In Azure, you can choose a managed disk or a tiered storage configuration that uses managed disks as a performance tier and Azure Blob storage as a capacity tier. You should choose the configuration that meets your requirements for performance and cost.

For an overview of data tiering, see Storage. For requirements, see Tiering cold data to low-cost object storage.

1.4.1. Supported Azure managed disks

The underlying managed disk type for Azure can be Premium Storage or Standard Storage:

- *Premium Storage* disks store data on solid state drives (SSDs). The SSD disks provide high performance for I/O-intensive workloads at a higher cost.
- If you do not need high IOPS, you can reduce your costs by using *Standard Storage* disks which are backed by hard disk drives (HDD).

For additional details about the use cases for these disks, see Microsoft Azure Documentation: Introduction to Microsoft Azure Storage.

1.5. Choosing a disk size

You can choose from several disk sizes when you launch Cloud Volumes ONTAP and when you use the advanced allocation option. You should consider the disk size carefully because it impacts cost, performance, and total volume and system capacity.

When you launch Cloud Volumes ONTAP instances, you must choose the default disk size for aggregates. Cloud Manager uses this disk size for the initial aggregate, and for any additional aggregates that it creates when you use the simple provisioning option. You can create aggregates that use a disk size different from the default by using the advanced allocation option.

In AWS, Cloud Manager gradually increases the size of disks as a system grows. For details, see Disk size selection for aggregates in AWS.

When choosing disk size, you should take several factors into consideration. The disk size impacts how much you pay for storage, the size of volumes that you can create in an aggregate, the total capacity available to Cloud Volumes ONTAP, and storage performance.

Different disk sizes are available for each disk type. Note that all disks in an aggregate must be the same size.

1.5.1. How disk size relates to performance in AWS

The performance of EBS disks is tied to disk size. The size determines the baseline IOPS and maximum burst duration for SSD disks and the baseline and burst throughput for HDD disks.

Larger disks have a higher baseline and burst performance, so you should always consider performance along with cost. Ultimately, you should choose the disk size that gives you the *sustained performance* that you need.

For example, when using General Purpose SSD disks, you might choose the following disk sizes:

- 100 GB because you want to start out with something small or because you have low performance requirements
- 500 GB because you want to get the best price to performance ratio
- 4 TB because you need very high sustained IOPS performance

Even if you do choose larger disks (for example, six 4 TB disks), you might not get all of the IOPS because the EC2 instance can reach its bandwidth limit.

For more details about the relationship between disk size and performance, refer to AWS Documentation: EBS Volume Types.

1.5.2. How disk size relates to performance in Azure

The performance of Azure Premium Storage is tied to the disk size. Larger disks provide higher IOPS and throughput. For example, choosing 1 TB disks can provide better performance than 500 GB disks, at a higher cost.

When sizing for performance, you should also be aware of performance limits tied to Azure virtual machine types. For details, refer to the following:

- Microsoft Azure Documentation: High-performance Premium Storage and managed disks for VMs
- Microsoft Azure Documentation: Sizes for Linux virtual machines in Azure

There are no performance differences between disk sizes for Standard Storage. You should choose disk size based on the capacity that you need.

1.6. Choosing a write speed

Cloud Manager enables you to choose a write speed setting for single node Cloud Volumes ONTAP systems. Before you choose a write speed, you should understand the differences between the

normal and high settings and risks and recommendations when using high write speed.

1.6.1. Difference between normal write speed and high write speed

When you choose normal write speed, data is written directly to disk, thereby reducing the likelihood of data loss in the event of an unplanned system outage.

When you choose high write speed, data is buffered in memory before it is written to disk, which provides faster write performance. Due to this caching, there is the potential for data loss if an unplanned system outage occurs.

The amount of data that can be lost in the event of an unplanned system outage is the span of the last two consistency points. A consistency point is the act of writing buffered data to disk. A consistency point occurs when the write log is full or after 10 seconds (whichever comes first). However, AWS EBS volume performance can affect consistency point processing time.

1.6.2. When to use high write speed

High write speed is a good choice if fast write performance is required for your workload and you can withstand the risk of data loss in the event of an unplanned system outage.

1.6.3. Recommendations when using high write speed

If you enable high write speed, you should ensure write protection at the application layer.

1.7. Choosing a volume usage profile

ONTAP includes several storage efficiency features that can reduce the total amount of storage that you need. When you create a volume in Cloud Manager, you can choose a profile that enables these features or a profile that disables them. You should learn more about these features to help you decide which profile to use.

NetApp storage efficiency features provide the following benefits:

Thin provisioning

Presents more logical storage to hosts or users than you actually have in your physical storage pool. Instead of preallocating storage space, storage space is allocated dynamically to each volume as data is written.

Deduplication

Improves efficiency by locating identical blocks of data and replacing them with references to a single shared block. This technique reduces storage capacity requirements by eliminating redundant blocks of data that reside in the same volume.

Compression

Reduces the physical capacity required to store data by compressing data within a volume on primary, secondary, and archive storage.

1.8. AWS network information worksheet

When you launch Cloud Volumes ONTAP in AWS, you need to specify details about your VPC network. You can use a worksheet to collect the information from your administrator.

1.8.1. Network information for Cloud Volumes ONTAP

AWS information	Your value
Region	
VPC	
Subnet	
Security group (if using your own)	

1.8.2. Network information for an HA pair in multiple AZs

AWS information	Your value
Region	
VPC	
Security group (if using your own)	
Node 1 availability zone	
Node 1 subnet	
Node 2 availability zone	
Node 2 subnet	
Mediator availability zone	
Mediator subnet	
Key pair for the mediator	
Floating IP address for cluster management port	
Floating IP address for data on node 1	
Floating IP address for data on node 2	
Route tables for floating IP addresses	

1.9. Azure network information worksheet

When you deploy Cloud Volumes ONTAP in Azure, you need to specify details about your virtual network. You can use a worksheet to collect the information from your administrator.

Azure information	Your value
Region	
Virtual network (VNet)	
Subnet	
Network security group (if using your own)	