Deploying Cloud Volumes ONTAP

Cloud Manager 3.6

NetApp
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Table of Contents

Deploying Cloud Volumes ONTAP

Before you create Cloud Volumes ONTAP systems

Before you use Cloud Manager to create and manage Cloud Volumes ONTAP systems, your Cloud Manager administrator should have prepared networking and installed and set up Cloud Manager.

Your administrator should have followed instructions to get up and running in AWS or in Azure, and optionally set up Cloud Manager.

The following conditions should exist before you start deploying Cloud Volumes ONTAP:

- AWS and Azure networking requirements were met for Cloud Manager and Cloud Volumes ONTAP.
- Cloud Manager has permissions to perform operations in AWS and Azure on your behalf.
- Each Cloud Volumes ONTAP product that users will deploy was subscribed to from the AWS Marketplace.
- Cloud Manager was installed.
- (Optional) Additional tenants were defined.
- (Optional) Additional user accounts were created, which can include Tenant Admins and Working Environment Admins.

Logging in to Cloud Manager

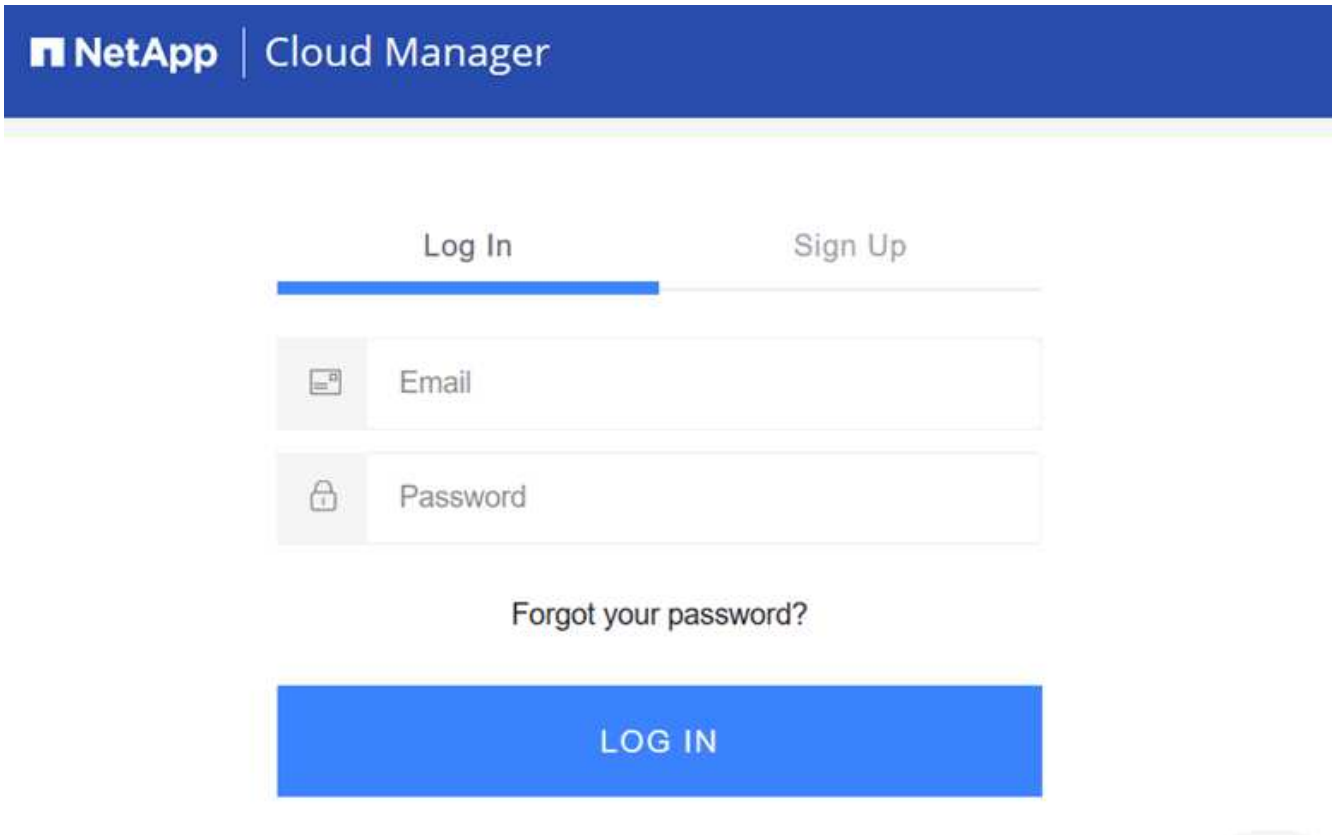
You can log in to Cloud Manager from any web browser that has a connection to the Cloud Manager system. You should log in using a NetApp Cloud Central user account.

Steps

1. Open a web browser and log in to NetApp Cloud Central.
2. Click **Go to Cloud Data Services** and select **Cloud Volumes ONTAP**.
3. Click **Go to Cloud Manager** for the Cloud Manager system that you want to access.

   If you do not see any systems listed, make sure that the Cloud Manager administrator added your NetApp Cloud Central account to the system.

4. Log in to Cloud Manager using your NetApp Cloud Central account.



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.

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 9.5
- Supported configurations for Cloud Volumes ONTAP 9.4
- Supported configurations for ONTAP Cloud 9.3

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 9.5
- Storage limits for Cloud Volumes ONTAP 9.4
- Storage limits for ONTAP Cloud 9.3

Sizing your system in AWS

Sizing your Cloud Volumes ONTAP system can help you meet requirements for performance and capacity. You should be aware of a few key points when choosing an instance type, disk type, and disk size:

Instance type

- Match your workload requirements to the maximum throughput and IOPS for each EC2 instance type.
- If several users write to the system at the same time, choose an instance type that has enough CPUs to manage the requests.
- If you have an application that is mostly reads, then choose a system with enough RAM.

  AWS Documentation: Amazon EC2 Instance Types
  AWS Documentation: Amazon EBS–Optimized Instances

EBS disk type

General Purpose SSDs are the most common disk type for Cloud Volumes ONTAP. To view the use cases for EBS disks, refer to AWS Documentation: EBS Volume Types.

EBS disk size

You need to choose an initial disk size when you launch a Cloud Volumes ONTAP system. After that, you can let Cloud Manager manage a system's capacity for you, but if you want to build aggregates yourself, be aware of the following:

- All disks in an aggregate must be the same size.
- 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.
- Ultimately, you should choose the disk size that gives you the *sustained performance* that you need.
- 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 EBS disk performance, refer to AWS Documentation: EBS Volume Types.

Watch the following video for more details about sizing your Cloud Volumes ONTAP system in AWS:

Sizing your system in Azure

Sizing your Cloud Volumes ONTAP system can help you meet requirements for performance and capacity. You should be aware of a few key points when choosing a VM type, disk type, and disk size:

Virtual machine type

Look at the supported virtual machine types in the Cloud Volumes ONTAP Release Notes and then review details about each supported VM type. Be aware that each VM type supports a specific number of data disks.

- Azure documentation: General purpose virtual machine sizes
- Azure documentation: Memory optimized virtual machine sizes

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.

HA systems use Premium page blobs. Meanwhile, single node systems can use two types of Azure Managed Disks:

- *Premium SSD Managed Disks* provide high performance for I/O-intensive workloads at a higher cost.
- *Standard SSD Managed Disks* provide consistent performance for workloads that require low IOPS.
- *Standard HDD Managed Disks* are a good choice if you don't need high IOPS and want to reduce your costs.

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

Azure disk size

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.

All disks in an aggregate must be the same size.

When choosing a 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.

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.

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

Refer to Azure for IOPS and throughput by disk size:

- Microsoft Azure: Managed Disks pricing
- Microsoft Azure: Page Blobs pricing

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.

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.

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.

Recommendations when using high write speed

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

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.

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.

Network information for Cloud Volumes ONTAP

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

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	

AWS information	Your value
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	

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)	

Enabling Flash Cache on Cloud Volumes ONTAP in AWS

Some EC2 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 is effective for random read-intensive workloads, including databases, email, and file services.

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

Steps

1. Select one of the following EC2 instance types, which are available with the Premium and BYOL licenses:
   - c5d.4xlarge
   - c5d.9xlarge
   - r5d.2xlarge
2. Disable compression on all volumes.

Compression must be disabled on all volumes to take advantage of the Flash Cache performance improvements. You can choose no storage efficiency when creating a volume from Cloud Manager, or you can create a volume and then disable data compression by using the CLI.

Launching Cloud Volumes ONTAP in AWS

You can launch Cloud Volumes ONTAP in a single-system configuration or as an HA pair in AWS.

Launching a single Cloud Volumes ONTAP system in AWS

If you want to launch Cloud Volumes ONTAP in AWS, you need to create a new working environment in Cloud Manager.

Before you begin

- You should have prepared by choosing a configuration and by obtaining AWS networking information from your administrator. For details, see Planning your Cloud Volumes ONTAP configuration.
- If you want to launch a BYOL system, you must have the 20-digit serial number (license key).
- If you want to use CIFS, you must have set up DNS and Active Directory. For details, see Networking requirements for Cloud Volumes ONTAP in AWS.

About this task

Immediately after you create the working environment, Cloud Manager launches a test instance in the specified VPC to verify connectivity. If successful, Cloud Manager immediately terminates the instance and then starts deploying the Cloud Volumes ONTAP system. If Cloud Manager cannot verify connectivity, creation of the working environment fails. The test instance is either a t2.nano (for default VPC tenancy) or m3.medium (for dedicated VPC tenancy).

Steps

1. On the Working Environments page, click **Add Working Environment**.
2. Under Create, select **Cloud Volumes ONTAP**.
3. On the Details and Credentials page, optionally change the AWS account, enter a working environment name, add tags if needed, and then enter a password.

   Some of the fields in this page are self-explanatory. The following table describes fields for which you might need guidance:

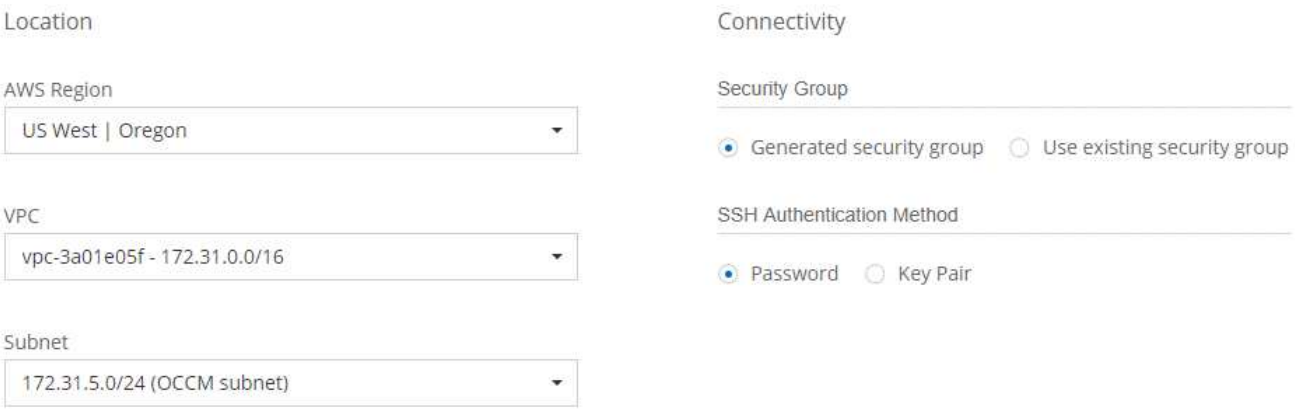
Field	Description
Switch Account	You can choose a different account if you added additional Cloud Provider Accounts. For details, see Adding Cloud Provider Accounts to Cloud Manager.
Working Environment Name	Cloud Manager uses the working environment name to name both the Cloud Volumes ONTAP system and the Amazon EC2 instance. It also uses the name as the prefix for the predefined security group, if you select that option.

Field	Description
Add tags	AWS tags are metadata for your AWS resources. Cloud Manager adds the tags to the Cloud Volumes ONTAP instance and each AWS resource associated with the instance. You can add up to four tags from the user interface when creating a working environment, and then you can add more after its created. Note that the API does not limit you to four tags when creating a working environment. For information about tags, refer to AWS Documentation: Tagging your Amazon EC2 Resources.
Credentials	These are the credentials for the Cloud Volumes ONTAP cluster admin account. You can use these credentials to connect to Cloud Volumes ONTAP through OnCommand System Manager or its CLI.

If AWS keys were not specified for your Cloud Manager account, you are prompted to enter them after you click Continue. You need to enter them before you can proceed.

4. On the Location & Connectivity page, enter the network information that you recorded in the AWS worksheet and then click **Continue**.

   The following image shows the Location & Connectivity page filled out:



5. On the Data Encryption page, choose no data encryption or AWS-managed encryption.

   For AWS-managed encryption, you can choose a different Customer Master Key (CMK) from your account or another AWS account.

   Learn how to set up the AWS KMS for Cloud Volumes ONTAP.

   Learn more about supported encryption technologies.

6. On the License and Support Site Account page, specify whether you want to use pay-as-you-go or BYOL, and then specify a NetApp Support Site account.

   To understand how licenses work, see Licensing.

   A NetApp Support Site Account is optional for pay-as-you-go, but required for BYOL systems. Learn how to add NetApp Support Site accounts.

7. On the Preconfigured Packages page, select one of the packages to quickly launch Cloud Volumes ONTAP, or click **Create my own configuration**.

   If you choose one of the packages, you only need to specify a volume and then review and approve the configuration.

8. On the IAM Role page, you should keep the default option to let Cloud Manager create the role for you.

   If you prefer to use your own policy, it must meet policy requirements for Cloud Volumes ONTAP nodes.

9. On the Licensing page, change the Cloud Volumes ONTAP version as needed, select a license, an instance type, the instance tenancy, and then click **Continue**.

   If your needs change after you launch the instance, you can modify the license or instance type later.

   If a newer Release Candidate, General Availability, or patch release is available for the selected version, then Cloud Manager updates the system to that version when creating the working environment. For example, the update occurs if you select Cloud Volumes ONTAP 9.4 RC1 and 9.4 GA is available. The update does not occur from one release to another—for example, from 9.3 to 9.4.

10. On the Underlying Storage Resources page, choose settings for the initial aggregate: a disk type, a size for each disk, and whether S3 tiering should be enabled.

    The disk type is for the initial volume. You can choose a different disk type for subsequent volumes.

    The disk size is for all disks in the initial aggregate and for any additional aggregates that Cloud Manager creates when you use the simple provisioning option. You can create aggregates that use a different disk size by using the advanced allocation option.

    For help choosing a disk type and size, see Sizing your system in AWS.

11. On the Write Speed & WORM page, choose **Normal** or **High** write speed, and activate write once, read many (WORM) storage, if desired.

    Learn more about write speed.

    Learn more about WORM storage.

12. On the Create Volume page, enter details for the new volume, and then click **Continue**.

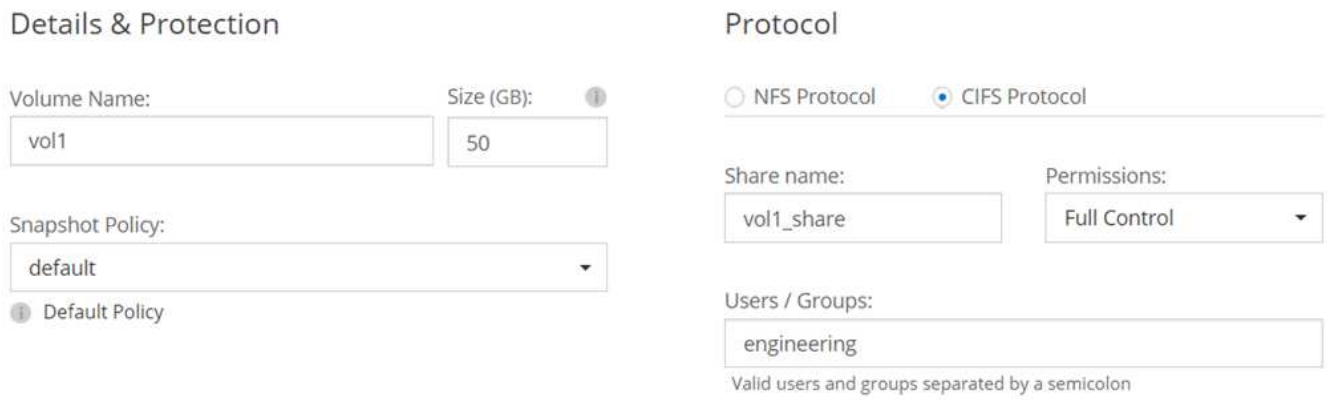
    You might skip this step if you want to create a volume for iSCSI. Cloud Manager sets up volumes for NFS and CIFS only.

    Some of the fields in this page are self-explanatory. The following table describes fields for which you might need guidance:

Field	Description
Size	The maximum size that you can enter largely depends on whether you enable thin provisioning, which enables you to create a volume that is bigger than the physical storage currently available to it.

Field	Description
Access control (for NFS only)	An export policy defines the clients in the subnet that can access the volume. By default, Cloud Manager enters a value that provides access to all instances in the subnet.
Permissions and Users / Groups (for CIFS only)	These fields enable you to control the level of access to a share for users and groups (also called access control lists or ACLs). You can specify local or domain Windows users or groups, or UNIX users or groups. If you specify a domain Windows user name, you must include the user's domain using the format domain\username.
Snapshot Policy	A Snapshot copy policy specifies the frequency and number of automatically created NetApp Snapshot copies. A NetApp Snapshot copy is a point-in-time file system image that has no performance impact and requires minimal storage. You can choose the default policy or none. You might choose none for transient data: for example, tempdb for Microsoft SQL Server.

The following image shows the Volume page filled out for the CIFS protocol:



13. If you chose the CIFS protocol, set up a CIFS server on the CIFS Setup page:

Field	Description
DNS Primary and Secondary IP Address	The IP addresses of the DNS servers that provide name resolution for the CIFS server. The listed DNS servers must contain the service location records (SRV) needed to locate the Active Directory LDAP servers and domain controllers for the domain that the CIFS server will join.
Active Directory Domain to join	The FQDN of the Active Directory (AD) domain that you want the CIFS server to join.
Credentials authorized to join the domain	The name and password of a Windows account with sufficient privileges to add computers to the specified Organizational Unit (OU) within the AD domain.
CIFS server NetBIOS name	A CIFS server name that is unique in the AD domain.
Organizational Unit	The organizational unit within the AD domain to associate with the CIFS server. The default is CN=Computers.

Field	Description
DNS Domain	The DNS domain for the Cloud Volumes ONTAP storage virtual machine (SVM). In most cases, the domain is the same as the AD domain.
NTP Server	Select **Use Active Directory Domain** to configure an NTP server using the Active Directory DNS. If you need to configure an NTP server using a different address, then you should use the API. See the Cloud Manager API Developer Guide for details.

14. On the Usage Profile, Disk Type, and Tiering Policy page, choose whether you want to enable storage efficiency features and edit the S3 tiering policy, if needed.

    For more information, see Understanding volume usage profiles and Data tiering overview.

15. On the Review & Approve page, review and confirm your selections:
    a. Review details about the configuration.
    b. Click **More information** to review details about support and the AWS resources that Cloud Manager will purchase.
    c. Select the **I understand…** check boxes.
    d. Click **Go**.

Result

Cloud Manager launches the Cloud Volumes ONTAP instance. You can track the progress in the timeline.

If you experience any issues launching the Cloud Volumes ONTAP instance, review the failure message. You can also select the working environment and click Re-create environment.

For additional help, go to NetApp Cloud Volumes ONTAP Support.

After you finish

- If you provisioned a CIFS share, give users or groups permissions to the files and folders and verify that those users can access the share and create a file.
- If you want to apply quotas to volumes, use System Manager or the CLI.

  Quotas enable you to restrict or track the disk space and number of files used by a user, group, or qtree.

Launching a Cloud Volumes ONTAP HA pair in AWS

If you want to launch a Cloud Volumes ONTAP HA pair in AWS, you need to create an HA working environment in Cloud Manager.

Before you begin

- You should have prepared by choosing a configuration and by obtaining AWS networking information from your administrator. For details, see Planning your Cloud Volumes ONTAP configuration.
- If you purchased BYOL licenses, you must have a 20-digit serial number (license key) for each node.
- If you want to use CIFS, you must have set up DNS and Active Directory. For details, see Networking requirements for Cloud Volumes ONTAP in AWS.

About this task

Immediately after you create the working environment, Cloud Manager launches a test instance in the specified VPC to verify connectivity. If successful, Cloud Manager immediately terminates the instance and then starts deploying the Cloud Volumes ONTAP system. If Cloud Manager cannot verify connectivity, creation of the working environment fails. The test instance is either a t2.nano (for default VPC tenancy) or m3.medium (for dedicated VPC tenancy).

Steps

1. On the Working Environments page, click **Add Working Environment**.
2. Under Create, select **Cloud Volumes ONTAP HA**.
3. On the Details and Credentials page, optionally change the AWS account, enter a working environment name, add tags if needed, and then enter a password.

   Some of the fields in this page are self-explanatory. The following table describes fields for which you might need guidance:

Field	Description
Switch Account	You can choose a different account if you added additional Cloud Provider Accounts. For details, see Adding Cloud Provider Accounts to Cloud Manager.
Working Environment Name	Cloud Manager uses the working environment name to name both the Cloud Volumes ONTAP system and the Amazon EC2 instance. It also uses the name as the prefix for the predefined security group, if you select that option.
Add tags	AWS tags are metadata for your AWS resources. Cloud Manager adds the tags to the Cloud Volumes ONTAP instance and each AWS resource associated with the instance. For information about tags, refer to AWS Documentation: Tagging your Amazon EC2 Resources.
Credentials	These are the credentials for the Cloud Volumes ONTAP cluster admin account. You can use these credentials to connect to Cloud Volumes ONTAP through OnCommand System Manager or its CLI.

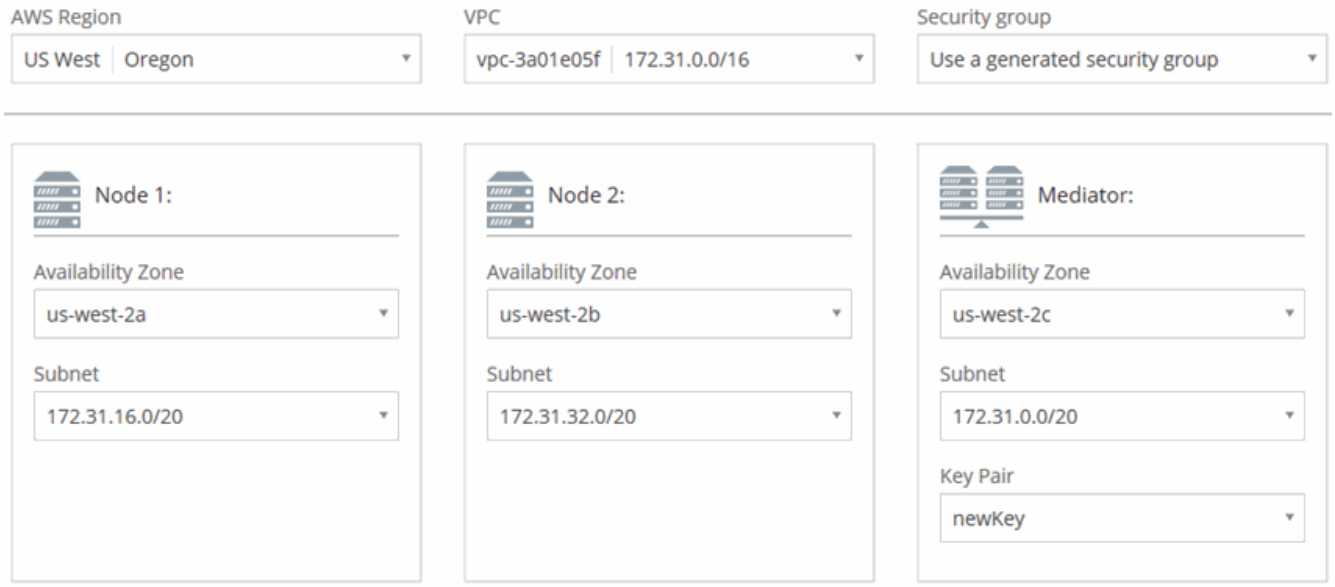
   If AWS keys were not specified for your Cloud Manager account, you are prompted to enter them after you click Continue. You must enter the AWS keys before you proceed.

4. On the HA Deployment Models page, choose an HA configuration.

   For an overview of the deployment models, see Cloud Volumes ONTAP HA for AWS.

5. On the Region & VPC page, enter the network information that you recorded in the AWS worksheet and then click **Continue**.

   The following image shows the Location page filled out for a multiple AZ configuration:



6. On the Connectivity and SSH Authentication page, choose connection methods for the HA pair and the mediator.
7. If you chose multiple AZs, specify the floating IP addresses and then click **Continue**.

   The IP addresses must be outside of the CIDR block for all VPCs in the region. For additional details, see AWS networking requirements for Cloud Volumes ONTAP HA in multiple AZs.

8. If you chose multiple AZs, select the route tables that should include routes to the floating IP addresses and then click **Continue**.

   If you have more than one route table, it is very important to select the correct route tables. Otherwise, some clients might not have access to the Cloud Volumes ONTAP HA pair. For more information about route tables, refer to AWS Documentation: Route Tables.

9. On the Data Encryption page, choose no data encryption or AWS-managed encryption.

   For AWS-managed encryption, you can choose a different Customer Master Key (CMK) from your account or another AWS account.

   Learn how to set up the AWS KMS for Cloud Volumes ONTAP.

   Learn more about supported encryption technologies.

10. On the License and Support Site Account page, specify whether you want to use pay-as-you-go or BYOL, and then specify a NetApp Support Site account.

    To understand how licenses work, see Licensing.

    A NetApp Support Site Account is optional for pay-as-you-go, but required for BYOL systems. Learn how to add NetApp Support Site accounts.

11. On the Preconfigured Packages page, select one of the packages to quickly launch a Cloud Volumes ONTAP system, or click **Create my own configuration**.

    If you choose one of the packages, you only need to specify a volume and then review and approve the configuration.

12. On the IAM Role page, you should keep the default option to let Cloud Manager create the roles for you.

    If you prefer to use your own policy, it must meet policy requirements for Cloud Volumes ONTAP nodes and the HA mediator.

13. On the Licensing page, change the Cloud Volumes ONTAP version as needed, select a license, an instance type, the instance tenancy, and then click **Continue**.

    If your needs change after you launch the instances, you can modify the license or instance type later.

    > If a newer Release Candidate, General Availability, or patch release is available for the selected version, then Cloud Manager updates the system to that version when creating the working environment. For example, the update occurs if you select Cloud Volumes ONTAP 9.4 RC1 and 9.4 GA is available. The update does not occur from one release to another—for example, from 9.3 to 9.4.

14. On the Underlying Storage Resources page, choose settings for the initial aggregate: a disk type, a size for each disk, and whether S3 tiering should be enabled.

    The disk type is for the initial volume. You can choose a different disk type for subsequent volumes.

    The disk size is for all disks in the initial aggregate and for any additional aggregates that Cloud Manager creates when you use the simple provisioning option. You can create aggregates that use a different disk size by using the advanced allocation option.

    For help choosing a disk type and size, see Sizing your system in AWS.

15. On the WORM page, activate write once, read many (WORM) storage, if desired.

    Learn more about WORM storage.

16. On the Create Volume page, enter details for the new volume, and then click **Continue**.

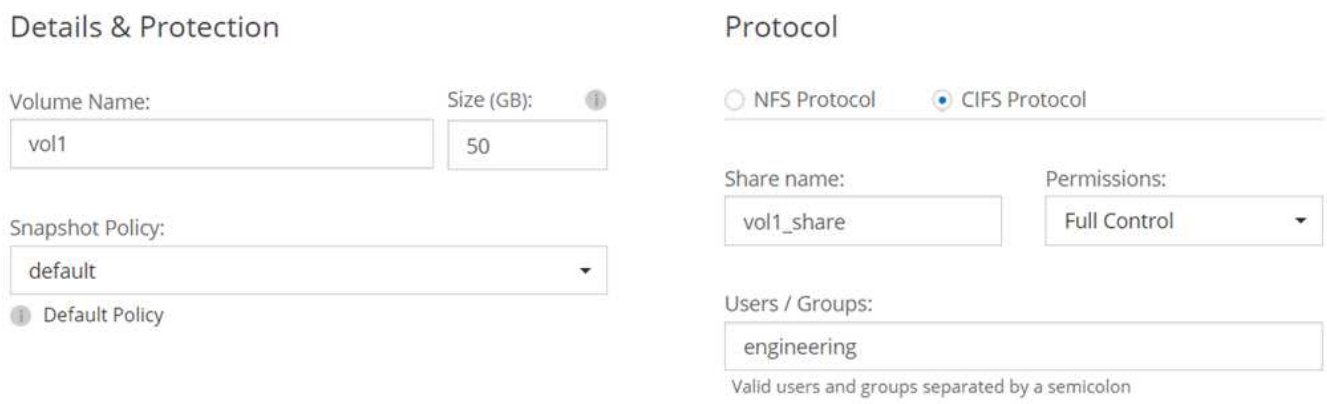
    You might skip this step if you want to create a volume for iSCSI. Cloud Manager sets up volumes for NFS and CIFS only.

    Some of the fields in this page are self-explanatory. The following table describes fields for which you might need guidance:

Field	Description
Size	The maximum size that you can enter largely depends on whether you enable thin provisioning, which enables you to create a volume that is bigger than the physical storage currently available to it.
Access control (for NFS only)	An export policy defines the clients in the subnet that can access the volume. By default, Cloud Manager enters a value that provides access to all instances in the subnet.
Permissions and Users / Groups (for CIFS only)	These fields enable you to control the level of access to a share for users and groups (also called access control lists or ACLs). You can specify local or domain Windows users or groups, or UNIX users or groups. If you specify a domain Windows user name, you must include the user's domain using the format domain\username.

Field	Description
Snapshot Policy	A Snapshot copy policy specifies the frequency and number of automatically created NetApp Snapshot copies. A NetApp Snapshot copy is a point-in-time file system image that has no performance impact and requires minimal storage. You can choose the default policy or none. You might choose none for transient data: for example, tempdb for Microsoft SQL Server.

The following image shows the Volume page filled out for the CIFS protocol:



17. If you selected the CIFS protocol, set up a CIFS server on the CIFS Setup page:

Field	Description
DNS Primary and Secondary IP Address	The IP addresses of the DNS servers that provide name resolution for the CIFS server. The listed DNS servers must contain the service location records (SRV) needed to locate the Active Directory LDAP servers and domain controllers for the domain that the CIFS server will join.
Active Directory Domain to join	The FQDN of the Active Directory (AD) domain that you want the CIFS server to join.
Credentials authorized to join the domain	The name and password of a Windows account with sufficient privileges to add computers to the specified Organizational Unit (OU) within the AD domain.
CIFS server NetBIOS name	A CIFS server name that is unique in the AD domain.
Organizational Unit	The organizational unit within the AD domain to associate with the CIFS server. The default is CN=Computers.
DNS Domain	The DNS domain for the Cloud Volumes ONTAP storage virtual machine (SVM). In most cases, the domain is the same as the AD domain.
NTP Server	Select **Use Active Directory Domain** to configure an NTP server using the Active Directory DNS. If you need to configure an NTP server using a different address, then you should use the API. See the Cloud Manager API Developer Guide for details.

18. On the Usage Profile, Disk Type, and Tiering Policy page, choose whether you want to enable storage efficiency features and edit the S3 tiering policy, if needed.

For more information, see Understanding volume usage profiles and Data tiering overview.

19. On the Review & Approve page, review and confirm your selections:
    a. Review details about the configuration.
    b. Click **More information** to review details about support and the AWS resources that Cloud Manager will purchase.
    c. Select the **I understand…** check boxes.
    d. Click **Go**.

Result

Cloud Manager launches the Cloud Volumes ONTAP HA pair. You can track the progress in the timeline.

If you experience any issues launching the HA pair, review the failure message. You can also select the working environment and click Re-create environment.

For additional help, go to NetApp Cloud Volumes ONTAP Support.

After you finish

- If you provisioned a CIFS share, give users or groups permissions to the files and folders and verify that those users can access the share and create a file.
- If you want to apply quotas to volumes, use System Manager or the CLI.

  Quotas enable you to restrict or track the disk space and number of files used by a user, group, or qtree.

Launching Cloud Volumes ONTAP in Azure

You can launch a single node system or an HA pair in Azure by creating a Cloud Volumes ONTAP working environment in Cloud Manager.

Before you begin

- Make sure that your Azure account has the required permissions, especially if you upgraded from a previous release and are deploying an HA system for the first time.

  See the new permissions required to deploy HA systems.

- You should have chose a configuration and obtained Azure networking information from your administrator. For details, see Planning your Cloud Volumes ONTAP configuration.
- To deploy a BYOL system, you need the 20-digit serial number (license key) for each node.

About this task

When Cloud Manager creates a Cloud Volumes ONTAP system in Azure, it creates several Azure objects, such as a resource group, network interfaces, and storage accounts. You can review a summary of the resources at the end of the wizard.

Steps

1. On the Working Environments page, click **Add Working Environment**
2. Under Create, select a single node system in Azure or an HA pair in Azure.
3. On the Details and Credentials page, optionally change the Azure account or subscription, specify a cluster name and resource group name, add tags if needed, and then specify credentials.

The following table describes fields for which you might need guidance:

Field	Description
Switch Account	You can choose a different account or subscription if you added additional Cloud Provider Accounts.
Working Environment Name	Cloud Manager uses the working environment name to name both the Cloud Volumes ONTAP system and the Azure virtual machine. It also uses the name as the prefix for the predefined security group, if you select that option.
Resource Group Name	If you uncheck **Use Default**, you can enter the name of a new resource group. If you want to use an existing resource group, then you must use the API.
Tags	Tags are metadata for your Azure resources. Cloud Manager adds the tags to the Cloud Volumes ONTAP system and each Azure resource associated with the system. You can add up to four tags from the user interface when creating a working environment, and then you can add more after its created. Note that the API does not limit you to four tags when creating a working environment. For information about tags, refer to Microsoft Azure Documentation: Using tags to organize your Azure resources.
Credentials	These are the credentials for the Cloud Volumes ONTAP cluster admin account. You can use these credentials to connect to Cloud Volumes ONTAP through OnCommand System Manager or its CLI.

4. On the Location page, select a location and security group, select the checkbox to confirm network connectivity, and then click **Continue**.
5. On the License and Support Site Account page, specify whether you want to use pay-as-you-go or BYOL, and then specify a NetApp Support Site account.

   To understand how licenses work, see Licensing.

   A NetApp Support Site Account is optional for pay-as-you-go, but required for BYOL systems. Learn how to add NetApp Support Site accounts.

6. On the Preconfigured Packages page, select one of the packages to quickly deploy a Cloud Volumes ONTAP system, or click **Create my own configuration**.

   If you choose one of the packages, you only need to specify a volume and then review and approve the configuration.

7. On the Licensing page, change the Cloud Volumes ONTAP version as needed, select a license and a virtual machine type, and then click **Continue**.

   If your needs change after you launch the system, you can modify the license or virtual machine type later.

   If a newer Release Candidate, General Availability, or patch release is available for the selected version, then Cloud Manager updates the system to that version when creating the working environment. For example, the update occurs if you select Cloud Volumes ONTAP 9.5 RC1 and 9.5 GA is available. The update does not occur from one release to another—for example, from 9.4 to 9.5.

8. On the Azure Marketplace page, follow the steps if Cloud Manager could not enable programmatic deployments of Cloud Volumes ONTAP.
9. On the Underlying Storage Resources page, choose settings for the initial aggregate: a disk type, a size for each disk, and whether data tiering should be enabled.

   The disk type is for the initial volume. You can choose a different disk type for subsequent volumes.

   The disk size is for all disks in the initial aggregate and for any additional aggregates that Cloud Manager creates when you use the simple provisioning option. You can create aggregates that use a different disk size by using the advanced allocation option.

   For help choosing a disk type and size, see Sizing your system in Azure.
10. On the Write Speed & WORM page, choose **Normal** or **High** write speed, and activate write once, read many (WORM) storage, if desired.

    Choosing a write speed is supported with single node systems only.

    Learn more about write speed.

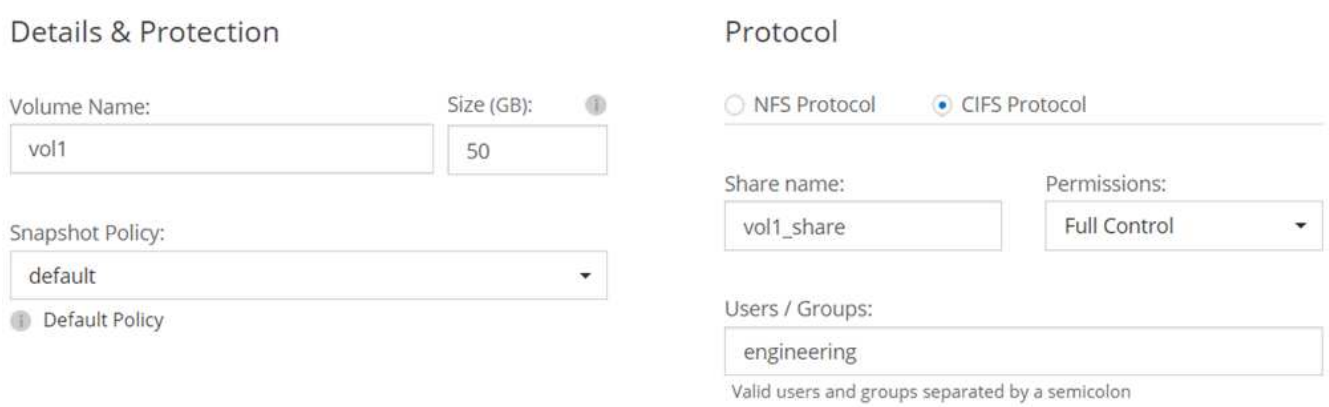
    Learn more about WORM storage.
11. On the Create Volume page, enter details for the new volume, and then click **Continue**.

    You should skip this step if you want to use iSCSI. Cloud Manager enables you to create volumes for NFS and CIFS only.

    Some of the fields in this page are self-explanatory. The following table describes fields for which you might need guidance:

Field	Description
Size	The maximum size that you can enter largely depends on whether you enable thin provisioning, which enables you to create a volume that is bigger than the physical storage currently available to it.
Access control (for NFS only)	An export policy defines the clients in the subnet that can access the volume. By default, Cloud Manager enters a value that provides access to all instances in the subnet.
Permissions and Users / Groups (for CIFS only)	These fields enable you to control the level of access to a share for users and groups (also called access control lists or ACLs). You can specify local or domain Windows users or groups, or UNIX users or groups. If you specify a domain Windows user name, you must include the user's domain using the format domain\username.
Snapshot Policy	A Snapshot copy policy specifies the frequency and number of automatically created NetApp Snapshot copies. A NetApp Snapshot copy is a point-in-time file system image that has no performance impact and requires minimal storage. You can choose the default policy or none. You might choose none for transient data: for example, tempdb for Microsoft SQL Server.

    The following image shows the Volume page filled out for the CIFS protocol:



12. If you chose the CIFS protocol, set up a CIFS server on the CIFS Setup page:

Field	Description
DNS Primary and Secondary IP Address	The IP addresses of the DNS servers that provide name resolution for the CIFS server. The listed DNS servers must contain the service location records (SRV) needed to locate the Active Directory LDAP servers and domain controllers for the domain that the CIFS server will join.
Active Directory Domain to join	The FQDN of the Active Directory (AD) domain that you want the CIFS server to join.
Credentials authorized to join the domain	The name and password of a Windows account with sufficient privileges to add computers to the specified Organizational Unit (OU) within the AD domain.
CIFS server NetBIOS name	A CIFS server name that is unique in the AD domain.
Organizational Unit	The organizational unit within the AD domain to associate with the CIFS server. The default is CN=Computers.
DNS Domain	The DNS domain for the Cloud Volumes ONTAP storage virtual machine (SVM). In most cases, the domain is the same as the AD domain.
NTP Server	Select **Use Active Directory Domain** to configure an NTP server using the Active Directory DNS. If you need to configure an NTP server using a different address, then you should use the API. See the Cloud Manager API Developer Guide for details.

13. On the Usage Profile, Disk Type, and Tiering Policy page, choose whether you want to enable storage efficiency features and change the tiering policy, if needed.

    Storage tiering is supported with single node systems only.

    For more information, see Understanding volume usage profiles and Data tiering overview.

14. On the Review & Approve page, review and confirm your selections:
    a. Review details about the configuration.
    b. Click **More information** to review details about support and the Azure resources that Cloud Manager will purchase.

c. Select the **I understand…** check boxes.

d. Click **Go**.

Result

Cloud Manager deploys the Cloud Volumes ONTAP system. You can track the progress in the timeline.

If you experience any issues deploying the Cloud Volumes ONTAP system, review the failure message. You can also select the working environment and click **Re-create environment**.

For additional help, go to NetApp Cloud Volumes ONTAP Support.

After you finish

- If you provisioned a CIFS share, give users or groups permissions to the files and folders and verify that those users can access the share and create a file.
- If you want to apply quotas to volumes, use System Manager or the CLI.

  Quotas enable you to restrict or track the disk space and number of files used by a user, group, or qtree.

Registering pay-as-you-go systems

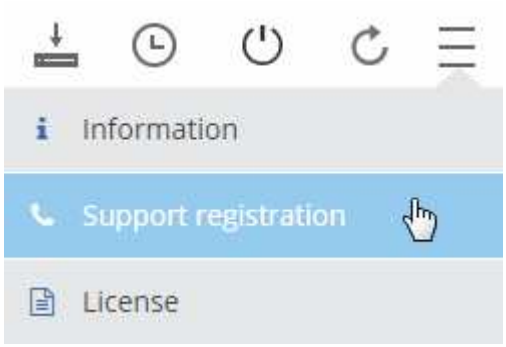
Support from NetApp is included with Cloud Volumes ONTAP Explore, Standard, and Premium systems, but you must first activate support by registering the systems with NetApp.

Steps

1. If you have not yet added your NetApp Support Site account to Cloud Manager, go to **Account Settings** and add it now.

   Learn how to add NetApp Support Site accounts.

2. On the Working Environments page, double-click the name of the system that you want to register.
3. Click the menu icon and then click **Support registration**:



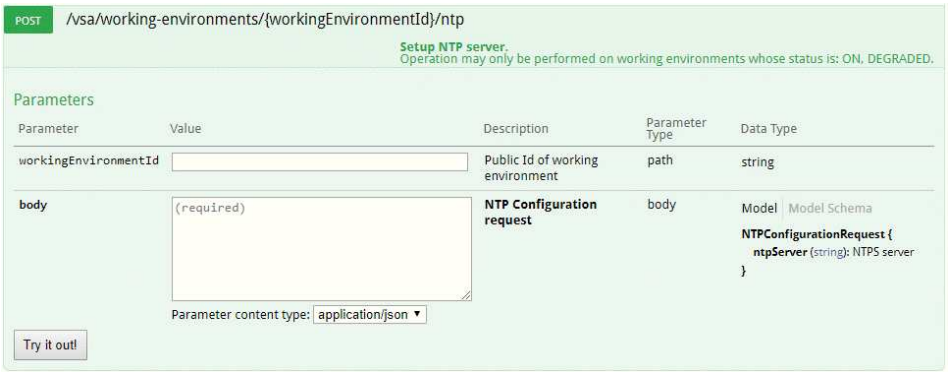
4. Select a NetApp Support Site account and click **Register**.

Result

Cloud Manager registers the system with NetApp.

Setting up Cloud Volumes ONTAP

After you deploy Cloud Volumes ONTAP, you can set it up by synchronizing the system time using NTP and by performing a few optional tasks from either System Manager or the CLI.

Task	Description
Synchronize the system time using NTP	Specifying an NTP server synchronizes the time between the systems in your network, which can help prevent issues due to time differences. Specify an NTP server using the Cloud Manager API or from the user interface when you set up a CIFS server. • Modifying the CIFS server • Cloud Manager API Developer Guide For example, here's the API for a single-node system in AWS: 
Optional: Configure AutoSupport	AutoSupport proactively monitors the health of your system and automatically sends messages to NetApp technical support by default. If the Cloud Manager Admin added a proxy server to Cloud Manager before you launched your instance, Cloud Volumes ONTAP is configured to use that proxy server for AutoSupport messages. You should test AutoSupport to ensure that it can send messages. For instructions, see the System Manager Help or the ONTAP 9 System Administration Reference.
Optional: Configure EMS	The Event Management System (EMS) collects and displays information about events that occur on Cloud Volumes ONTAP systems. To receive event notifications, you can set event destinations (email addresses, SNMP trap hosts, or syslog servers) and event routes for a particular event severity. You can configure EMS using the CLI. For instructions, see the ONTAP 9 EMS Configuration Express Guide.

Task	Description
Optional: Create an SVM management network interface (LIF) for HA systems in multiple AWS Availability Zones	A storage virtual machine (SVM) management network interface (LIF) is required if you want to use SnapCenter or SnapDrive for Windows with an HA pair. The SVM management LIF must use a *floating* IP address when using an HA pair across multiple AWS Availability Zones. Cloud Manager prompts you to specify the floating IP address when you launch the HA pair. If you did not specify the IP address, you can create the SVM Management LIF yourself from System Manager or the CLI. The following example shows how to create the LIF from the CLI: `network interface create -vserver svm_cloud -lif svm_mgmt -role data -data-protocol none -home-node cloud-01 -home-port e0a -address 10.0.2.126 -netmask 255.255.255.0 -status-admin up -firewall -policy mgmt`
Optional: Change the backup location of configuration files	Cloud Volumes ONTAP automatically creates configuration backup files that contain information about the configurable options that it needs to operate properly. By default, Cloud Volumes ONTAP backs up the files to the Cloud Manager host every eight hours. If you want to send the backups to an alternate location, you can change the location to an FTP or HTTP server in your data center or in AWS. For example, you might already have a backup location for your FAS storage systems. You can change the backup location using the CLI. See the ONTAP 9 System Administration Reference.

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