



Reference

Cloud Manager 3.4

NetApp
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Reference

What's new in Cloud Manager 3.4

OnCommand Cloud Manager typically introduces a new release every month to bring you new features, enhancements, and bug fixes.

You can find information about known issues and limitations in the [Cloud Manager 3.4 Release Notes](#).

Cloud Manager 3.4.5

Cloud Manager 3.4.5 includes new support and enhancements.

- [Support for RHEL 7.4 and CentOS 7.4](#)
- [Cloud Manager can now enable programmatic deployments](#)
- [Data disk limit for ONTAP Cloud for AWS](#)
- [Changes coming soon](#)

Support for RHEL 7.4 and CentOS 7.4

Cloud Manager is now supported on Red Hat Enterprise Linux 7.4 and CentOS 7.4.

Cloud Manager can now enable programmatic deployments

In previous releases, you had to manually enable programmatic deployments of ONTAP Cloud from the Azure Marketplace for each Azure subscription. Cloud Manager can now do this for you.

To enable programmatic deployments for an Azure subscription, Cloud Manager requires the following permissions:

"Microsoft.MarketplaceOrdering/offertypes/publishers/offers/plans/agreements/read"

"Microsoft.MarketplaceOrdering/offertypes/publishers/offers/plans/agreements/write"

You should update the role definition for the Cloud Manager Operator role to include these permissions.

You can find the entire list of required permissions in [the policies provided by NetApp](#).

Data disk limit for ONTAP Cloud for AWS

Due to AWS infrastructure changes, the number of data disks supported in AWS has been reduced. Cloud Manager enforces the following data disk limits:

- A single-node ONTAP Cloud system can have up to 35 data disks.
- An ONTAP Cloud HA node can have up to 32 data disks.



The data disk limit does not include the boot disk and root disk.

To ensure that you can utilize the system's maximum capacity before it reaches the maximum number of data disks, Cloud Manager chooses larger disks as ONTAP Cloud systems grow in AWS. For additional details, see [Disk size selection for aggregates in AWS](#).

Changes coming soon

NetApp occasionally announces changes that will be made in upcoming releases of Cloud Manager and ONTAP Cloud so that you are provided advance notice.

- [Deprecation of EC2 instance types](#)
- [New permissions required for ONTAP Cloud 9.4](#)

Deprecation of EC2 instance types

In June 2018, all versions of ONTAP Cloud will no longer support several EC2 instance types. Existing ONTAP Cloud systems running these instance types will continue to operate normally; however, NetApp strongly recommends changing to a different instance type.

To review pricing differences between instance types and NetApp licenses, go to the AWS Marketplace for [single-node ONTAP Cloud systems](#) and for [ONTAP Cloud HA pairs](#).

Instance type no longer supported	Recommended instance type
c3.2xlarge	m4.xlarge
c4.2xlarge	m4.2xlarge
m3.xlarge	m4.xlarge
m3.2xlarge	m4.2xlarge
r3.xlarge	m4.2xlarge
r3.2xlarge	r4.2xlarge



M3 and R3 instance types are not supported with ONTAP Cloud data tiering and enhanced performance, so moving to the M4 and R4 instance types allows you to take advantage of those features.

New permissions required for ONTAP Cloud 9.4

Cloud Manager will require new permissions for key features in the upcoming ONTAP Cloud 9.4 release. To ensure that your Cloud Manager systems are ready to deploy and manage ONTAP Cloud 9.4 systems, we recommend that you update your Cloud Manager policy now by adding the following permissions:

- For AWS: "ec2:DescribeInstanceAttribute",
- For Azure: "Microsoft.Network/virtualNetworks/subnets/write",

You can find the entire list of required permissions in [the latest policies provided by NetApp](#).

Cloud Manager 3.4.4

Cloud Manager now chooses larger disks as ONTAP Cloud systems grow in AWS.

When Cloud Manager creates new aggregates for ONTAP Cloud systems in AWS, it steadily increases the disk size in an aggregate, as the number of aggregates in the system increases. Cloud Manager does this to ensure that you can utilize the system's maximum capacity before it reaches the maximum number of data disks allowed by AWS.

For example, Cloud Manager might choose the following disk sizes for aggregates in an ONTAP Cloud Premium or BYOL system:

Aggregate number	Disk size	Max aggregate capacity
1	500 MB	3 TB
4	1 TB	6 TB
6	2 TB	12 TB

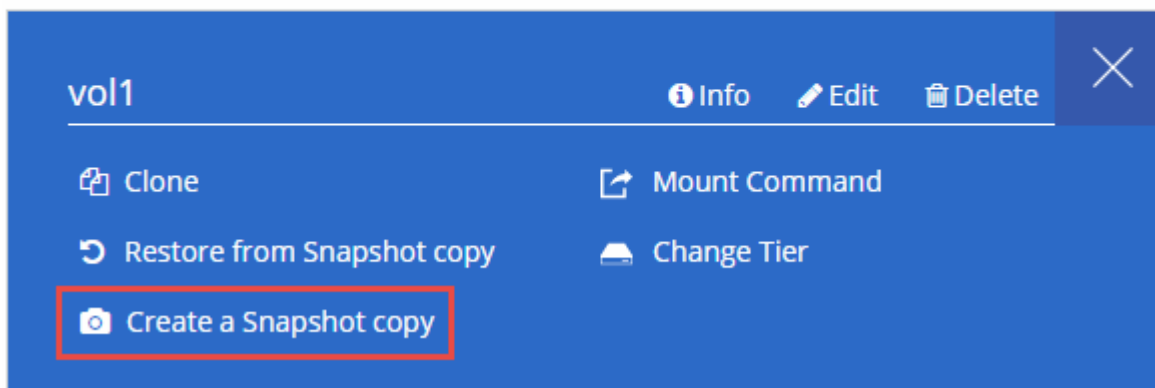
You can choose the disk size yourself by using the advanced allocation option.

Cloud Manager 3.4.3

You can now create ONTAP Snapshot copies on demand.

Volumes

1 Volume | 0.10 TB Allocated | < 0.01 TB Used (0 TB in S3)



Cloud Manager 3.4.2

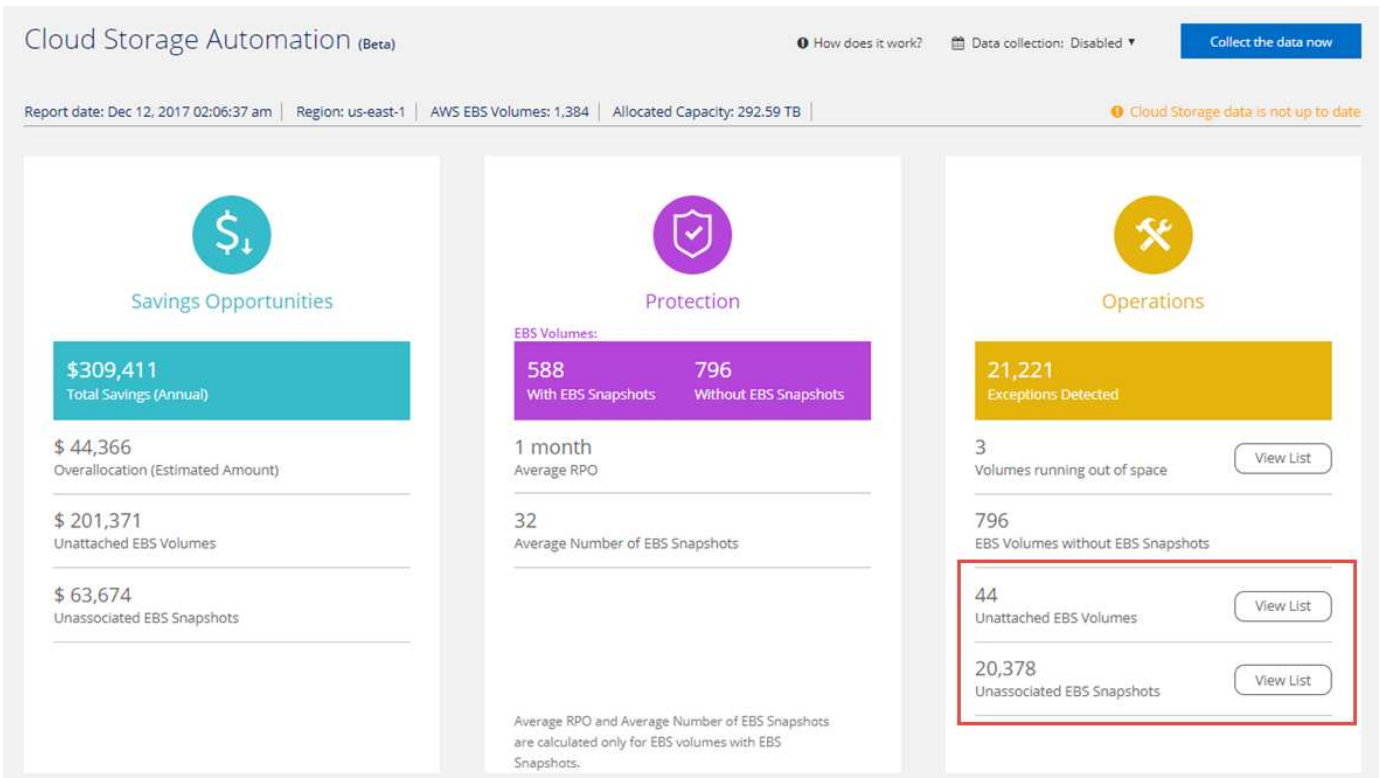
Cloud Manager 3.4.2 includes several new features and enhancements.

- [Enhancements to the Cloud Storage Automation Report](#)
- [Support for multiple AWS accounts when using an IAM role](#)
- [Support for multiple Azure accounts](#)
- [Security group selection for the HA mediator](#)

Enhancements to the Cloud Storage Automation Report

The Cloud Storage Automation Report identifies several savings opportunities, including savings for unattached EBS volumes and unassociated snapshots. Starting in version 3.4.2, Cloud Manager now shows you the list of those volumes and snapshots and enables you to delete them.

The following image shows how you can access the list of unattached volumes and unassociated snapshots:



The following image shows an example of how you can delete unattached EBS volumes:

Unattached EBS Volumes [Delete all selected](#)

44 EBS Volumes 4 selected

<input type="checkbox"/>	EBS Volume ID	Type	Allocated Capacity	Tags	Creation Time	Deleting Status
<input checked="" type="checkbox"/>	vol-0f569b8cbb8f3728c	gp2	16 TB	None	Nov 20, 2017 07:30:27 pm	
<input checked="" type="checkbox"/>	vol-044641bbcf5c0595	gp2	9.77 TB	None	Oct 27, 2017 09:16:26 am	
<input checked="" type="checkbox"/>	vol-0ba66d87777af9a39	gp2	9.77 TB	8 Tags ⓘ	Oct 28, 2017 04:12:54 pm	
<input checked="" type="checkbox"/>	vol-0d4b3a3a4b77e91a8	gp2	9.77 TB	None	Nov 6, 2017 06:34:48 pm	
<input type="checkbox"/>	vol-00acf6e082030125	gp2	7.81 TB	None	Dec 1, 2017 02:36:25 am	
<input type="checkbox"/>	vol-0276f5ac55a477e67	gp2	7.81 TB	None	Oct 11, 2017 07:25:22 pm	
<input type="checkbox"/>	vol-0343fd60e5e62b29c	gp2	7.81 TB	None	Jul 21, 2017 07:32:42 pm	
<input type="checkbox"/>	vol-03f34df0e7c5c125e	gp2	7.81 TB	4 Tags ⓘ	Aug 24, 2017 04:22:02 pm	
<input type="checkbox"/>	vol-0476b62ea98a6743b	gp2	7.81 TB	None	Oct 10, 2017 05:54:46 pm	
<input type="checkbox"/>	vol-06d0f6c2164f21090	gp2	7.81 TB	None	Nov 16, 2017 06:56:51 pm	
<input type="checkbox"/>	vol-086e06fb6540c3386	gp2	7.81 TB	None	Oct 11, 2017 07:28:24 pm	

For more details, see [Cloud Storage Automation](#).

Support for multiple AWS accounts when using an IAM role

Cloud Manager now enables you to choose the AWS account to use when launching an ONTAP Cloud system:

Details & Credentials

This working environment will be created in your default [AWS Account](#)



Details

Working Environment Name (Cluster Name)

Up to 40 characters

Credentials

User Name

admin

This feature is supported if you associated the Cloud Manager instance with an IAM role.

Before you can choose from multiple AWS accounts, you must first delegate access across those accounts.

[Adding additional AWS accounts to Cloud Manager](#)

Support for multiple Azure accounts

Cloud Manager now enables you to choose the Azure subscription to use when deploying an ONTAP Cloud system:

Details & Credentials

This working environment will be created in Azure Subscription: [OCCM Dev](#)



Details

Working Environment Name (Cluster Name)

Up to 40 characters

Credentials

User Name

admin

Before you can choose from multiple Azure subscriptions, you must first bind the Active Directory service principal to multiple Azure subscriptions.

[Granting Azure permissions to Cloud Manager](#)



This change is possible because Cloud Manager no longer associates user accounts with specific Azure subscriptions. Instead, Cloud Manager obtains the list of Azure subscriptions that are bound to the Active Directory service principal.

Security group selection for the HA mediator

You can now choose an existing security group for the HA mediator when you deploy a new ONTAP Cloud HA system. Cloud Manager always created this security group in previous releases.

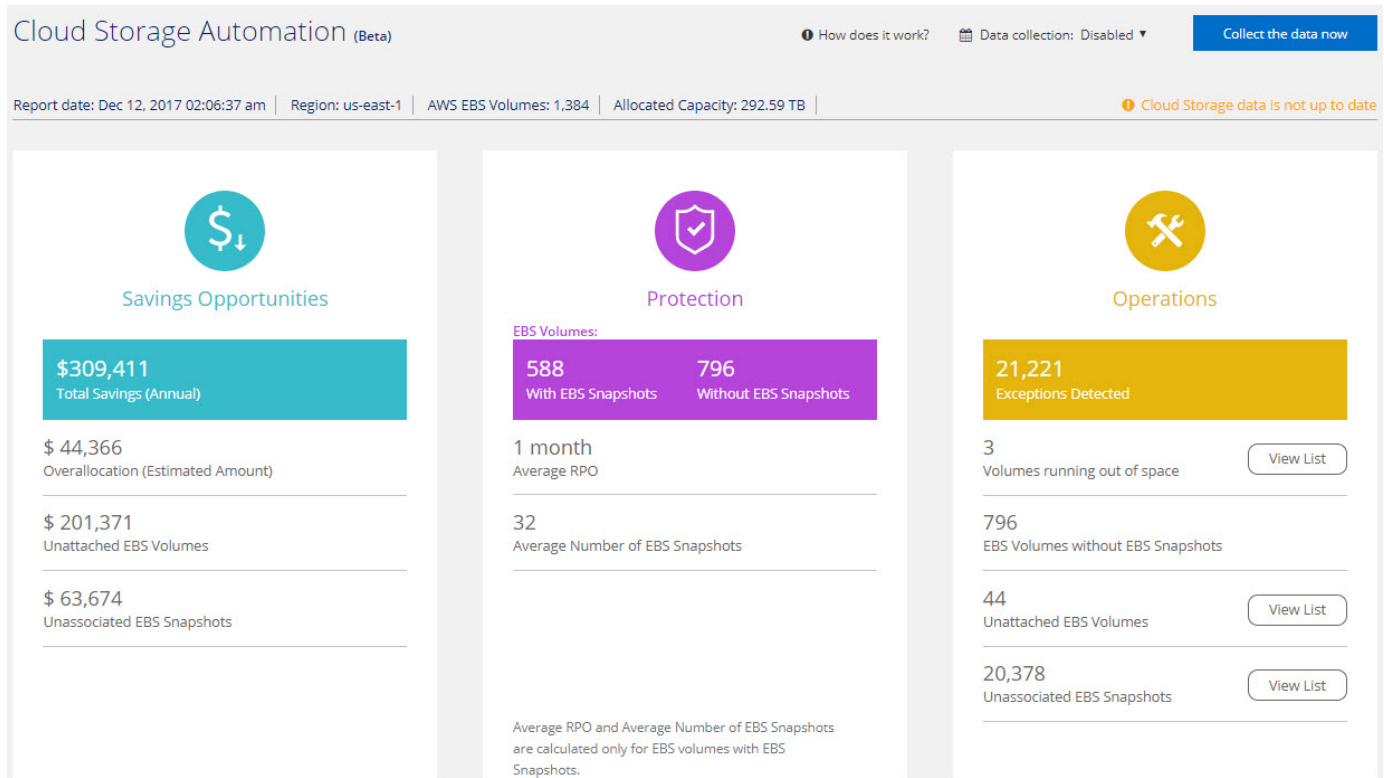
Cloud Manager 3.4.1

Cloud Manager 3.4.1 includes several new features and enhancements.

- [Cloud Storage Automation \(Beta\)](#)
- [Improved reliability when upgrading ONTAP Cloud systems](#)
- [Resource group naming in Azure](#)
- [Support for Azure US Gov regions](#)
- [Improvement when replicating data from on-premises ONTAP systems](#)

Cloud Storage Automation (Beta)

Cloud Manager can now analyze your cloud storage to show you savings opportunities, data protection enhancements, and operations that can optimize the cloud storage associated with your AWS account. For example, Cloud Manager identifies savings opportunities for unassociated EBS volumes and snapshots, the EBS volumes that impact your recovery point objective, and EBS volumes that are running out of space.



For more details, see [Cloud Storage Automation](#).

Improved reliability when upgrading ONTAP Cloud systems

Cloud Manager now leverages Amazon S3 Transfer Acceleration when upgrading ONTAP Cloud software. This enhancement improves the reliability of downloading the software image, which reduces the chances of timeouts and proxy failures.

Resource group naming in Azure

You can now specify the name of the Azure resource group that Cloud Manager creates for an ONTAP Cloud system when you create a new working environment.

Support for Azure US Gov regions

You can now deploy Cloud Manager and ONTAP Cloud BYOL in the following Azure regions:

- US Gov Arizona
- US Gov Texas
- US Gov Virginia

To deploy Cloud Manager in these regions, you must create a CentOS 7.3 virtual machine from the Azure Marketplace, download the Cloud Manager installer from the NetApp Support Site, and then install the software. After Cloud Manager is running, you can deploy ONTAP Cloud BYOL systems in these regions just like any other region.

Improvement when replicating data from on-premises ONTAP systems

When you replicate data from an on-premises ONTAP system, Cloud Manager now associates the LIF to the default IPspace.

Cloud Manager 3.4

Cloud Manager is now integrated with NetApp Cloud Central.

NetApp Cloud Central is a suite of data-driven services that allows you to run critical applications in the cloud, create automated DR sites, back up your SaaS data, and effectively migrate and control data across multiple clouds leveraging NetApp's prominent data management expertise and technologies.

Cloud Manager's integration with NetApp Cloud Central provides several benefits, including a simplified deployment experience, a single location to view and manage multiple Cloud Manager systems, and centralized user authentication.

With centralized user authentication, you can use the same set of credentials across Cloud Manager systems and between Cloud Manager and other data services, such as Cloud Sync. It's also easy to reset your password if you forgot it.

You can keep using your existing Cloud Manager systems as is, but if you would like to use this new experience, you can deploy a new Cloud Manager 3.4 system from NetApp Cloud Central and then discover any existing ONTAP Cloud systems from the new Cloud Manager system.

What's new in ONTAP Cloud

New releases of ONTAP Cloud introduce new features, enhancements, and bug fixes.

You can find information about known issues and limitations in the [ONTAP Cloud 9.3 for AWS Release Notes](#) and [ONTAP Cloud 9.3 for Azure Release Notes](#).

ONTAP Cloud 9.3

ONTAP Cloud 9.3 includes several new features and enhancements.

ONTAP Cloud HA enhancements in AWS

The 9.3 release addresses the resiliency of ONTAP Cloud HA pairs to tolerate network glitches or transient higher latencies within the AWS ecosystem, and to ensure the availability of customer data during such events.

Support for the EU (Paris) region in AWS

ONTAP Cloud is now supported in the EU (Paris) region in AWS. Based on the supported instance types in this region, the following ONTAP Cloud configurations are available in the EU (Paris) region:

- ONTAP Cloud Standard (r4.xlarge)
- ONTAP Cloud Premium (r4.2xlarge)
- ONTAP Cloud BYOL (r4.xlarge and r4.2xlarge)

Enhanced write performance with Azure Premium disks

Write performance for ONTAP Cloud has been improved in Azure when using Premium Storage disks. The enhancement is supported with ONTAP Cloud Standard, Premium, and BYOL.



Write performance enhancements are not supported when using the DS3_v2 virtual machine type.

Increased capacity limit for ONTAP Cloud Premium and BYOL in Azure

The capacity limit for ONTAP Cloud Premium and ONTAP Cloud BYOL has doubled to 252 TB when using the DS5_v2 or DS14_v2 virtual machine types.



This change is possible due to an increase in the number of disks available per Azure virtual machine. It does not change the maximum capacity per aggregate.

Support for Azure US Gov regions

You can now deploy Cloud Manager and ONTAP Cloud BYOL in the following Azure regions:

- US Gov Arizona
- US Gov Texas
- US Gov Virginia

To deploy Cloud Manager in these regions, you must create a CentOS 7.3 virtual machine from the Azure Marketplace, download the Cloud Manager installer from the NetApp Support Site, and then install the software. After Cloud Manager is running, you can deploy ONTAP Cloud BYOL systems in the these regions just like any other region.

Support for SVM disaster recovery

ONTAP Cloud supports one data-serving Storage Virtual Machine (SVM) and one or more SVMs used for disaster recovery.

SVM disaster recovery is the asynchronous mirroring of SVM data and configuration from a source SVM to a destination SVM. You can quickly activate a destination SVM for data access if the source SVM is no longer available.



Cloud Manager does not provide any setup or orchestration support for SVM disaster recovery. It also does not support storage-related tasks on any additional SVMs. You must use System Manager or the CLI for SVM disaster recovery.

[ONTAP Cloud 9.3 SVM Disaster Recovery Preparation Express Guide](#)

[ONTAP Cloud 9.3 SVM Disaster Recovery Express Guide](#)

Upgrade notes

- You can upgrade to ONTAP Cloud 9.3 from ONTAP Cloud 9.1 or ONTAP Cloud 9.2. You can perform the upgrade directly from Cloud Manager.
- When you use Cloud Manager to upgrade a single ONTAP Cloud system, the upgrade process takes the ONTAP Cloud system offline for up to 25 minutes, during which I/O is interrupted.
- Upgrades of ONTAP Cloud HA pairs in AWS are nondisruptive. A nondisruptive upgrade upgrades both nodes in an HA pair concurrently while maintaining service to clients.

Supported regions

Cloud Manager and ONTAP Cloud are supported in a number of AWS regions and Microsoft Azure regions.

Supported AWS regions

You can deploy Cloud Manager and ONTAP Cloud in the following AWS regions.

Asia Pacific

- Mumbai
- Seoul
- Singapore
- Sydney
- Tokyo

EU

- Frankfurt
- Ireland
- London
- Paris

North America

- Canada (Central)

- GovCloud (US)
- US East (N. Virginia)
- US East (Ohio)
- US West (N. California)
- US West (Oregon)

South America

- Sao Paulo

Supported Azure regions

You can deploy Cloud Manager and ONTAP Cloud in the following Azure regions.

Asia Pacific

- Australia East
- Australia Southeast
- Central India
- East Asia
- Japan East
- Japan West
- Korea Central
- Korea South
- South India
- Southeast Asia
- West India

EU

- Germany Central
- Germany Northeast
- North Europe
- UK South
- UK West
- West Europe

North America

- Canada Central
- Canada East
- Central US
- East US

- East US 2
- North Central US
- South Central US
- US Gov Arizona
- US Gov Texas
- US Gov Virginia
- West US
- West US 2
- West Central US

South America

- Brazil South

Security group rules for AWS

Cloud Manager creates AWS security groups that include the inbound and outbound rules that Cloud Manager and ONTAP Cloud need to operate successfully. You might want to refer to the ports for testing purposes or if you prefer your to use own security groups.

Security group rules for Cloud Manager

Inbound rules

The source for inbound rules is 0.0.0.0/0.

Type	Port range	Purpose
SSH	22	SSH connections to Cloud Manager
HTTP	80	Accessing the Cloud Manager console
HTTPS	443	Accessing the Cloud Manager console

Outbound rules

Type	Port range	Purpose
All TCP	All	All outbound traffic
All UDP	All	All outbound traffic

Security group rules for ONTAP Cloud

Inbound rules

The source for inbound rules is 0.0.0.0/0.

Type	Port range	Purpose
All ICMP	All	Pinging the instance
Custom TCP Rule	111	Portmapper
Custom TCP Rule	139	NetBIOS
Custom TCP Rule	161-162	SNMP
Custom TCP Rule	445	Microsoft SMB
Custom TCP Rule	635	NFS mount
Custom TCP Rule	749	Kerberos
Custom TCP Rule	2049	NFS
Custom TCP Rule	3260	iSCSI
Custom TCP Rule	4045-4046	NFS mountd
Custom TCP Rule	10000	NDMP
Custom TCP Rule	11104-11105	Intercluster management and data
Custom UDP Rule	111	Portmapper
Custom UDP Rule	161-162	SNMP
Custom UDP Rule	635	NFS mount
Custom UDP Rule	2049	NFS
Custom UDP Rule	4045-4046	NFS mountd
HTTP	80	System Manager access
HTTPS	443	System Manager access
SSH	22	SSH to the CLI

Outbound rules

Type	Port range	Purpose
All ICMP	All	All outbound traffic (SnapMirror and SnapVault)
All TCP	All	All outbound traffic
All UDP	All	All outbound traffic

External security group rules for the HA mediator

Inbound rules

The source for inbound rules is 0.0.0.0/0.

Type	Port range	Purpose
SSH	22	SSH connections to the HA mediator

Type	Port range	Purpose
TCP	3000	RESTful API access from Cloud Manager

Outbound rules

Type	Port range	Purpose
All TCP	All	All outbound traffic
All UDP	All	All outbound traffic

Internal security group rules for the HA mediator

Cloud Manager always creates this security group. You do not have the option to use your own security group.

Inbound rules

Type	Port range	Purpose
All traffic	All	Communication between the HA mediator and ONTAP Cloud HA nodes only

Outbound rules

Type	Port range	Purpose
All traffic	All	Communication between the HA mediator and ONTAP Cloud HA nodes only

Security group rules for Azure

Cloud Manager creates Azure security groups that include the inbound and outbound rules that Cloud Manager and ONTAP Cloud need to operate successfully. You might want to refer to the ports for testing purposes or if you prefer your to use own security groups.

Security group rules for Cloud Manager

Inbound rules

The source for inbound rules is 0.0.0.0/0.

Type	Port range	Purpose
SSH	22	SSH connections to Cloud Manager
HTTP	80	Accessing the Cloud Manager console
HTTPS	443	Accessing the Cloud Manager console

Outbound rules

Type	Port range	Purpose
All TCP	All	All outbound traffic
All UDP	All	All outbound traffic

Security group rules for ONTAP Cloud

Inbound rules

The source for inbound rules is 0.0.0.0/0.

Type	Port range	Purpose
All ICMP	All	Pinging the instance
Custom TCP Rule	111	Portmapper
Custom TCP Rule	139	NetBIOS
Custom TCP Rule	161-162	SNMP
Custom TCP Rule	445	Microsoft SMB
Custom TCP Rule	635	NFS mount
Custom TCP Rule	749	Kerberos
Custom TCP Rule	2049	NFS
Custom TCP Rule	3260	iSCSI
Custom TCP Rule	4045-4046	NFS mountd
Custom TCP Rule	10000	NDMP
Custom TCP Rule	11104-11105	Intercluster management and data
Custom UDP Rule	111	Portmapper
Custom UDP Rule	161-162	SNMP
Custom UDP Rule	635	NFS mount
Custom UDP Rule	2049	NFS
Custom UDP Rule	4045-4046	NFS mountd
HTTP	80	System Manager access
HTTPS	443	System Manager access
SSH	22	SSH to the CLI

Outbound rules

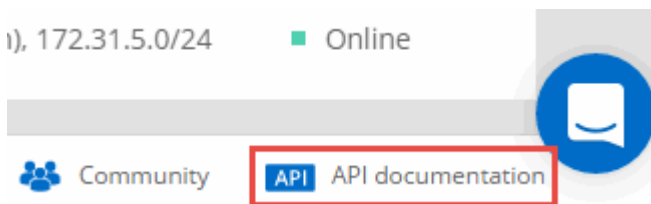
Type	Port range	Purpose
All ICMP	All	All outbound traffic (SnapMirror and SnapVault)
All TCP	All	All outbound traffic

Type	Port range	Purpose
All UDP	All	All outbound traffic

Cloud Manager REST APIs

Cloud Manager includes REST APIs that enable software developers to automate the management of NetApp storage in the cloud. There is an API for every action that is available from the user interface.

Cloud Manager provides interactive API documentation using the Swagger interface. A link to the API documentation is available in the lower-right corner of the console:



You can also find an overview, examples, and an API reference in the [OnCommand Cloud Manager API Developer Guide](#).

AWS and Azure permissions for Cloud Manager

Cloud Manager requires permissions to perform actions in AWS and Azure on your behalf. These permissions are included in [the policies provided by NetApp](#). You might want to understand what Cloud Manager does with these permissions.

What Cloud Manager does with AWS permissions

Cloud Manager uses an AWS account to make API calls to several AWS services, including EC2, S3, CloudFormation, IAM, the Security Token Service (STS), and the Key Management Service (KMS).

Actions	Purpose
"ec2:StartInstances", "ec2:StopInstances", "ec2:DescribeInstances", "ec2:DescribeInstanceStatus", "ec2:RunInstances", "ec2:TerminateInstances", "ec2:ModifyInstanceAttribute",	Launches an ONTAP Cloud instance and stops, starts, and monitors the instance.
"ec2:DescribeRouteTables", "ec2:DescribeImages",	Launches an ONTAP Cloud HA configuration.
"ec2:CreateTags",	Tags every resource that Cloud Manager creates with the "WorkingEnvironment" and "WorkingEnvironmentId" tags. Cloud Manager uses these tags for maintenance and cost allocation.

Actions	Purpose
"ec2:CreateVolume", "ec2:DescribeVolumes", "ec2:ModifyVolumeAttribute", "ec2:AttachVolume", "ec2>DeleteVolume", "ec2:DetachVolume",	Manages the EBS volumes that ONTAP Cloud uses as back-end storage.
"ec2:CreateSecurityGroup", "ec2>DeleteSecurityGroup", "ec2:DescribeSecurityGroups", "ec2:RevokeSecurityGroupEgress", "ec2:AuthorizeSecurityGroupEgress", "ec2:AuthorizeSecurityGroupIngress", "ec2:RevokeSecurityGroupIngress",	Creates predefined security groups for ONTAP Cloud.
"ec2:CreateNetworkInterface", "ec2:DescribeNetworkInterfaces", "ec2>DeleteNetworkInterface", "ec2:ModifyNetworkInterfaceAttribute",	Creates and manages network interfaces for ONTAP Cloud in the target subnet.
"ec2:DescribeSubnets", "ec2:DescribeVpcs",	Gets the list of destination subnets and security groups, which is needed when creating a new working environment for ONTAP Cloud.
"ec2:DescribeDhcpOptions",	Determines DNS servers and the default domain name when launching ONTAP Cloud instances.
"ec2:CreateSnapshot", "ec2>DeleteSnapshot", "ec2:DescribeSnapshots",	Takes snapshots of EBS volumes during initial setup and whenever an ONTAP Cloud instance is stopped.
"ec2:GetConsoleOutput",	Captures the ONTAP Cloud console, which is attached to AutoSupport messages.
"ec2:DescribeKeyPairs",	Obtains the list of available key pairs when launching instances.
"ec2:DescribeRegions",	Gets a list of available AWS regions.
"ec2>DeleteTags", "ec2:DescribeTags",	Manages tags for resources associated with ONTAP Cloud instances.
"cloudformation:CreateStack", "cloudformation>DeleteStack", "cloudformation:DescribeStacks", "cloudformation:DescribeStackEvents", "cloudformation:ValidateTemplate",	Launches ONTAP Cloud instances.

Actions	Purpose
"iam:PassRole", "iam:CreateRole", "iam>DeleteRole", "iam:PutRolePolicy", "iam:CreateInstanceProfile", "iam>DeleteRolePolicy", "iam:AddRoleToInstanceProfile", "iam:RemoveRoleFromInstanceProfile", "iam:DeleteInstanceProfile",	Launches an ONTAP Cloud HA configuration.
"iam:ListInstanceProfiles", "sts:DecodeAuthorizationMessage", "ec2:AssociateIamInstanceProfile", "ec2:DescribeIamInstanceProfileAssociations", "ec2:DisassociateIamInstanceProfile",	Manages instance profiles for ONTAP Cloud instances.
"s3:GetObject", "s3:ListBucket"	Obtains AWS cost data for ONTAP Cloud.
"s3:GetBucketTagging", "s3:GetBucketLocation", "s3:ListAllMyBuckets",	Obtains information about AWS S3 buckets so Cloud Manager can integrate with the NetApp Data Fabric Cloud Sync service.
"s3:CreateBucket", "s3>DeleteBucket", "s3:GetLifecycleConfiguration", "s3:PutLifecycleConfiguration", "s3:PutBucketTagging", "s3:ListBucketVersions",	Manages the S3 bucket that an ONTAP Cloud system uses as a capacity tier.
"kms:List*", "kms:Describe*"	Obtains information about keys from the AWS Key Management Service.

What Cloud Manager does with Azure permissions

The Cloud Manager Azure policy includes the permissions that Cloud Manager needs to deploy and manage ONTAP Cloud systems in Azure.

Actions	Purpose
"Microsoft.Compute/locations/operations/read", "Microsoft.Compute/locations/vmSizes/read", "Microsoft.Compute/operations/read", "Microsoft.Compute/virtualMachines/instanceView/read", "Microsoft.Compute/virtualMachines/powerOff/action", "Microsoft.Compute/virtualMachines/read", "Microsoft.Compute/virtualMachines/restart/action", "Microsoft.Compute/virtualMachines/start/action", "Microsoft.Compute/virtualMachines/deallocate/action", "Microsoft.Compute/virtualMachines/vmSizes/read", "Microsoft.Compute/virtualMachines/write",	Creates ONTAP Cloud systems and stops, starts, deletes, and obtains the status of the system.

Actions	Purpose
"Microsoft.Compute/images/write", "Microsoft.Compute/images/read",	Enables ONTAP Cloud deployment from a VHD.
"Microsoft.Compute/disks/delete", "Microsoft.Compute/disks/read", "Microsoft.Compute/disks/write", "Microsoft.Storage/checknameavailability/read", "Microsoft.Storage/operations/read", "Microsoft.Storage/storageAccounts/listkeys/action", "Microsoft.Storage/storageAccounts/read", "Microsoft.Storage/storageAccounts/regeneratekey/action", "Microsoft.Storage/storageAccounts/write"	Manages Azure storage accounts and disks, and attaches the disks to ONTAP Cloud systems.
"Microsoft.Network/networkInterfaces/read", "Microsoft.Network/networkInterfaces/write", "Microsoft.Network/networkInterfaces/join/action",	Creates and manages network interfaces for ONTAP Cloud systems in the target subnet.
"Microsoft.Network/networkSecurityGroups/read", "Microsoft.Network/networkSecurityGroups/write", "Microsoft.Network/networkSecurityGroups/join/action",	Creates predefined network security groups for ONTAP Cloud systems.
"Microsoft.Resources/subscriptions/locations/read", "Microsoft.Network/locations/operationResults/read", "Microsoft.Network/locations/operations/read", "Microsoft.Network/virtualNetworks/read", "Microsoft.Network/virtualNetworks/checkIpAddressAvailability/read", "Microsoft.Network/virtualNetworks/subnets/read", "Microsoft.Network/virtualNetworks/subnets/virtualMachines/read", "Microsoft.Network/virtualNetworks/virtualMachines/read", "Microsoft.Network/virtualNetworks/subnets/join/action",	Gets network information about regions, the target VNet and subnet, and adds ONTAP Cloud systems to VNets.
"Microsoft.Resources/deployments/operations/read", "Microsoft.Resources/deployments/read", "Microsoft.Resources/deployments/write",	Deploys ONTAP Cloud systems from a template.

Actions	Purpose
"Microsoft.Resources/deployments/operations/read", "Microsoft.Resources/deployments/read", "Microsoft.Resources/deployments/write", "Microsoft.Resources/resources/read", "Microsoft.Resources/subscriptions/operationresults/read", "Microsoft.Resources/subscriptions/resourceGroups/delete", "Microsoft.Resources/subscriptions/resourceGroups/read", "Microsoft.Resources/subscriptions/resourcegroups/resources/read", "Microsoft.Resources/subscriptions/resourceGroups/write",	Creates and manages resource groups for ONTAP Cloud systems.
"Microsoft.Compute/snapshots/write", "Microsoft.Compute/snapshots/read", "Microsoft.Compute/disks/beginGetAccess/action"	Creates and manages Azure managed snapshots.
"Microsoft.Compute/availabilitySets/write", "Microsoft.Compute/availabilitySets/read",	Creates and manages availability sets for ONTAP Cloud systems.
"Microsoft.MarketplaceOrdering/offertypes/publishers/offers/plans/agreements/read", "Microsoft.MarketplaceOrdering/offertypes/publishers/offers/plans/agreements/write"	Enables programmatic deployments from the Azure Marketplace.

Default configurations

Details about how Cloud Manager and ONTAP Cloud are configured by default can help you administer the systems.

Default configuration for Cloud Manager on Linux

If you need to troubleshoot Cloud Manager or your Linux host, it might help to understand how Cloud Manager is configured.

- If you deployed Cloud Manager from NetApp Cloud Central (or directly from the AWS Marketplace or Azure Marketplace), note the following:
 - In AWS, the user name for the EC2 Linux instance is ec2-user.
 - For both AWS and Azure, the operating system for the Cloud Manager image is Red Hat Enterprise Linux 7.3 (HVM).

The operating system does not include a GUI. You must use a terminal to access the system.

- The Cloud Manager installation folder resides in the following location:

```
/opt/application/netapp/cloudmanager
```

- Log files are contained in the following folder:

/opt/application/netapp/cloudmanager/log

- The Cloud Manager service is named occm.
- The occm service is dependent on the MySQL service.

If the MySQL service is down, then the occm service is down too.

- Cloud Manager installs the following packages on the Linux host, if they are not already installed:
 - 7Zip
 - AWSCLI
 - Java
 - MySQL
 - Wget

Default configuration for ONTAP Cloud

Understanding how ONTAP Cloud is configured by default can help you set up and administer your systems, especially if you are familiar with ONTAP because the default setup for ONTAP Cloud is different than ONTAP.

- ONTAP Cloud is available as a single system in AWS and Microsoft Azure, and as an HA pair in AWS.
- Cloud Manager creates one data-serving SVM when it deploys an ONTAP Cloud system. While you can create another data-serving SVM from System Manager or the CLI, using multiple data-serving SVMs is not supported.
- Several network interfaces are created by default:
 - A cluster management LIF
 - An intercluster LIF
 - A node management LIF
 - An iSCSI data LIF
 - A CIFS and NFS data LIF




LIF failover is disabled by default for ONTAP Cloud due to EC2 requirements. Migrating a LIF to a different port breaks the external mapping between IP addresses and network interfaces on the instance, making the LIF inaccessible.

- ONTAP Cloud sends configuration backups to Cloud Manager using HTTPS.
- When logged in to Cloud Manager, the backups are accessible from <https://ipaddress/occm/offboxconfig/>
- Cloud Manager sets a few volume attributes differently than other management tools (System Manager or the CLI, for example).

The following table lists the volume attributes that Cloud Manager sets differently from the defaults:

Attribute	Value set by Cloud Manager
Autosize mode	grow

Attribute	Value set by Cloud Manager
Maximum autosize	1,000 percent  The Cloud Manager Admin can modify this value from the Settings page.
Security style	NTFS for CIFS volumes UNIX for NFS volumes
Space guarantee style	none
UNIX permissions (NFS only)	777

See the *volume create* man page for information about these attributes.

Boot and root data for ONTAP cloud

In addition to the storage for user data, Cloud Manager also purchases cloud storage for boot and root data on each ONTAP Cloud system.

AWS

- One Provisioned IOPS SSD disk for ONTAP Cloud boot data, which is approximately 45 GB and 1,250 PIOPS
- One General Purpose SSD disk for ONTAP Cloud root data, which is approximately 140 GB
- One EBS snapshot for each boot disk and root disk

In an HA pair, both ONTAP Cloud nodes replicate its root disk to the partner node.

Azure

- One Premium Storage SSD disk for ONTAP Cloud boot data, which is approximately 73 GB
- One Premium Storage SSD disk for ONTAP Cloud root data, which is approximately 140 GB
- One Azure snapshot for each boot disk and root disk

Where the disks reside

Cloud Manager lays out the storage from AWS and Azure as follows:

- Boot data resides on a disk attached to the EC2 instance or Azure virtual machine.

This disk, which contains the boot image, is not available to ONTAP Cloud.

- Root data, which contains the system configuration and logs, resides in aggr0.
- The storage virtual machine (SVM) root volume resides in aggr1.
- Data volumes also reside in aggr1.

User roles

Each Cloud Manager user account is assigned a role that defines permissions.

Task	Cloud Manager Admin	Tenant Admin	Working Environment Admin
Manage tenants	Yes	No	No
Manage working environments	Yes	Yes, for the assigned tenant	Yes, for assigned working environments
Integrate a working environment with Cloud Sync	Yes	Yes	No
View data replication status	Yes	Yes, for the assigned tenant	Yes, for assigned working environments
View the timeline	Yes	Yes	Yes
Create and delete user accounts	Yes	Yes, for the assigned tenant	No
Modify user accounts	Yes	Yes, for the assigned tenant	Yes, for their own account
Switch between the Storage System View and the Volume View	Yes	No	No
Modify settings	Yes	No	No
View and manage the Support Dashboard	Yes	No	No
Back up and restore Cloud Manager	Yes	No	No
Remove a working environment	Yes	No	No
Update Cloud Manager	Yes	No	No
Set up encryption	Yes	No	No
Install an HTTPS certificate	Yes	No	No
Set up Active Directory	Yes	No	No
Enable the Cloud Storage Automation Report	Yes	No	No

Where to get help and find more information

You can get help and find more information about Cloud Manager and ONTAP Cloud through various resources, including videos, forums, and support.

- [Videos for Cloud Manager and ONTAP Cloud](#)

Watch videos that show you how to deploy and manage ONTAP Cloud in AWS and Azure and how to replicate data across your hybrid cloud.

- [Policies for Cloud Manager](#)

Download JSON files that include the permissions that Cloud Manager needs to perform actions in AWS and Azure.

- [Cloud Manager API Developer Guide](#)

Read an overview of the APIs, examples of how to use them, and an API reference.

- [Release Notes](#)

- [Cloud Manager 3.4 Release Notes](#)
- [ONTAP Cloud 9.3 for AWS Release Notes](#)
- [ONTAP Cloud 9.3 for Azure Release Notes](#)

Read about known issues and limitations that affect Cloud Manager and ONTAP Cloud.

- [ONTAP 9 Documentation Center](#)

Access product documentation for ONTAP, which can help you as you use ONTAP Cloud.

- [NetApp ONTAP Cloud Support](#)

Access support resources to get help and troubleshoot issues with ONTAP Cloud.

- [NetApp Community: Hybrid Cloud](#)

Connect with peers, ask questions, exchange ideas, find resources, and share best practices.

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