NetApp Console setup and administration documentation

NetApp Console setup and administration

NetApp
January 27, 2026

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NetApp Console setup and administration documentation

Release notes

What's new

Learn what's new with NetApp Console administration features: identity and access management (IAM), Console agents, cloud provider credentials, and more.

13 January 2026

Console agent 4.3.0

The 4.3.0 release supports both standard mode and restricted mode.

This release of the Console agent includes security improvements, bug fixes, and the following features:

Ability to validate network connections of Console agents

You can now validate network connections of connected Console agents directly from the NetApp Console. This feature helps verify connectivity and troubleshoot issues with Console agents. This is in addition to the existing ability to run network diagnostics from the Console agent maintenance console command line interface (CLI).

Learn how to run configuration from NetApp Console.

NetApp Console administration

This release includes the following:

Role-Based Access for Federated Groups in NetApp Console

NetApp Console supports assigning roles to federated groups (for example, Active Directory groups), allowing administrators to automate user onboarding and offboarding based on group membership in the organization's identity provider (IdP). This feature reduces administrative overhead, and ensures secure, consistent access by instantly updating Console access as group memberships change.

Learn how to provide access to a federated group to your organization.

Support for federation when NetApp Console is in restricted mode

You can now enable federation for a NetApp Console organization that is in restricted mode. This allows users to log in to the Console using their corporate credentials while maintaining the security benefits of restricted mode.

Read-only mode

You can set a NetApp Console organization to read-only mode. In read-only mode, users can view resources and settings but cannot make any changes. An Org admin or Super admin can enable read-only mode for an organization. When read-only mode is enabled, users with administrative roles must manually elevate their permissions to make changes as needed.

Learn how to enable read-only mode for a Console organization.

Learn how to elevate your role when your organization is in read-only mode.

10 December 2025

Console agent 4.2.0

The 4.2.0 release supports both standard mode and restricted mode.

This release of the Console agent includes security improvements, bug fixes, and the following features:

Support for Google Cloud Infrastructure Manager

NetApp now uses Google Cloud Infrastructure Manager (IM) instead of Google Cloud Deployment Manager to deploy agents and manage agents in Google Cloud. This change was made because Google will be deprecating Cloud Deployment Manager.

- Any new agents 4.2.0 and higher use Infrastructure Manager and you should update both the user account and service account permissions used for deployment. View the permissions change log.
- When you deploy an agent, the system also creates a Google Cloud bucket to store deployment files.

Improved configuration checks for Console agents

- The Console agent now checks for deprecated endpoints when performing a configuration check. If you have not updated to the new endpoint list for 4.0.0 or higher, installations succeed if the system can reach the previous endpoint list. Learn more about the required endpoints for Console agents.
- Run configuration checks on installed Console agents from the Console or Agent maintenance console to verify connectivity and troubleshoot issues. Learn how to run configuration checks on Console agents.

Directly download agent software from NetApp Console

When you need to manually install an agent, you can access agent software directly from the NetApp Console in addition to the NetApp Support site. Learn how to download the Console agent software directly from the NetApp Console.

NetApp Console administration

This release includes the following:

Ability to set notifications for expiring credentials

Set notifications for expiring credentials on service accounts and federations. Choose between seven or 30 days. The Console displays notifications and emails users with the appropriate role. Org admins receive service account notifications. Org admins, Federation admins, and Federation viewers receive federation notifications.

Local logins are not available after enabling federation

After you turn on federation for a Console organization, users cannot use local logins and are sent to federation logins.

Usability enhancements for the Storage management pages

Detailed information about your ONTAP on-premises systems (and FSx for ONTAP) is now easier to view and manage from the Storage management pages.

- The **Discoverable systems** page separates the summary information from the tabbed display of available systems, making it easier to view comprehensive information about discoverable systems.

10 November 2025

Console agent 4.1.0

This release of the Console agent includes security improvements, bug fixes, and the following features:

The 4.1.0 release is available for standard mode and restricted mode.

Renamed Agent status indicators

Renamed the status indicators for the Console agent from **Active** and **Inactive** to **Connected** and **Disconnected** to make their purpose more clear.

Support for Red Hat Enterprise Linux (RHEL) 9.6 and Podman 5.4.0

When manually installing a Console agent, the agent now supports RHEL 9.6 with Podman 5.4.0. In addition, when using RHEL 9 and higher, NetApp supports podman-compose 1.5.0. View operating system requirements.

NetApp Console administration

This release includes the following:

New email address for NetApp Console notifications

The email address that sends NetApp Console notifications has changed to **service@console.netapp.com** from **service@console.bluexp.netapp.com**. NetApp recommends updating any email rules to allow **service@console.netapp.com** to ensure you continue to receive NetApp Console email notifications.

06 October 2025

BlueXP is now NetApp Console

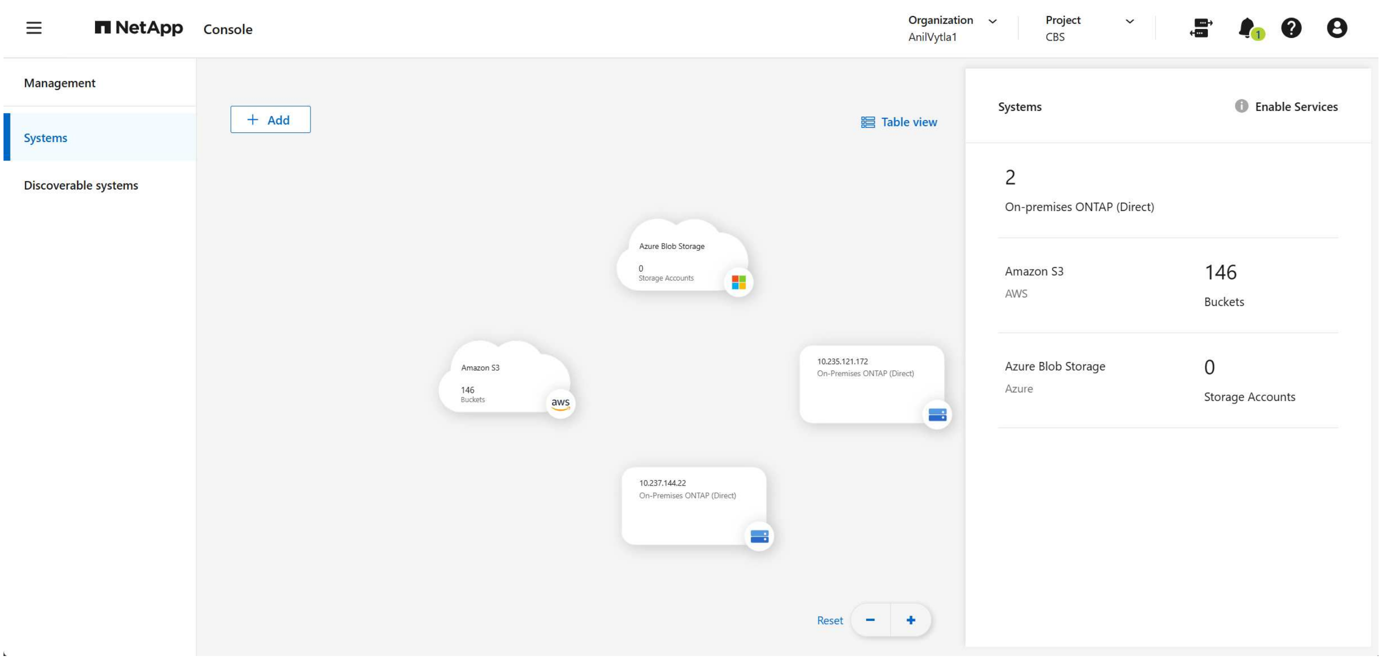
The NetApp Console, built on the enhanced and restructured BlueXP foundation, provides centralized management of NetApp storage and NetApp Data Services across on-premises and cloud environments at enterprise grade—delivering real-time insights, faster workflows, and simplified administration that is highly secure and compliant.

Navigation menus and pages

NetApp moved most menu options to the left-navigation pane and reorganized menus for easier navigation in the NetApp Console.

Canvas is replaced by the Systems page

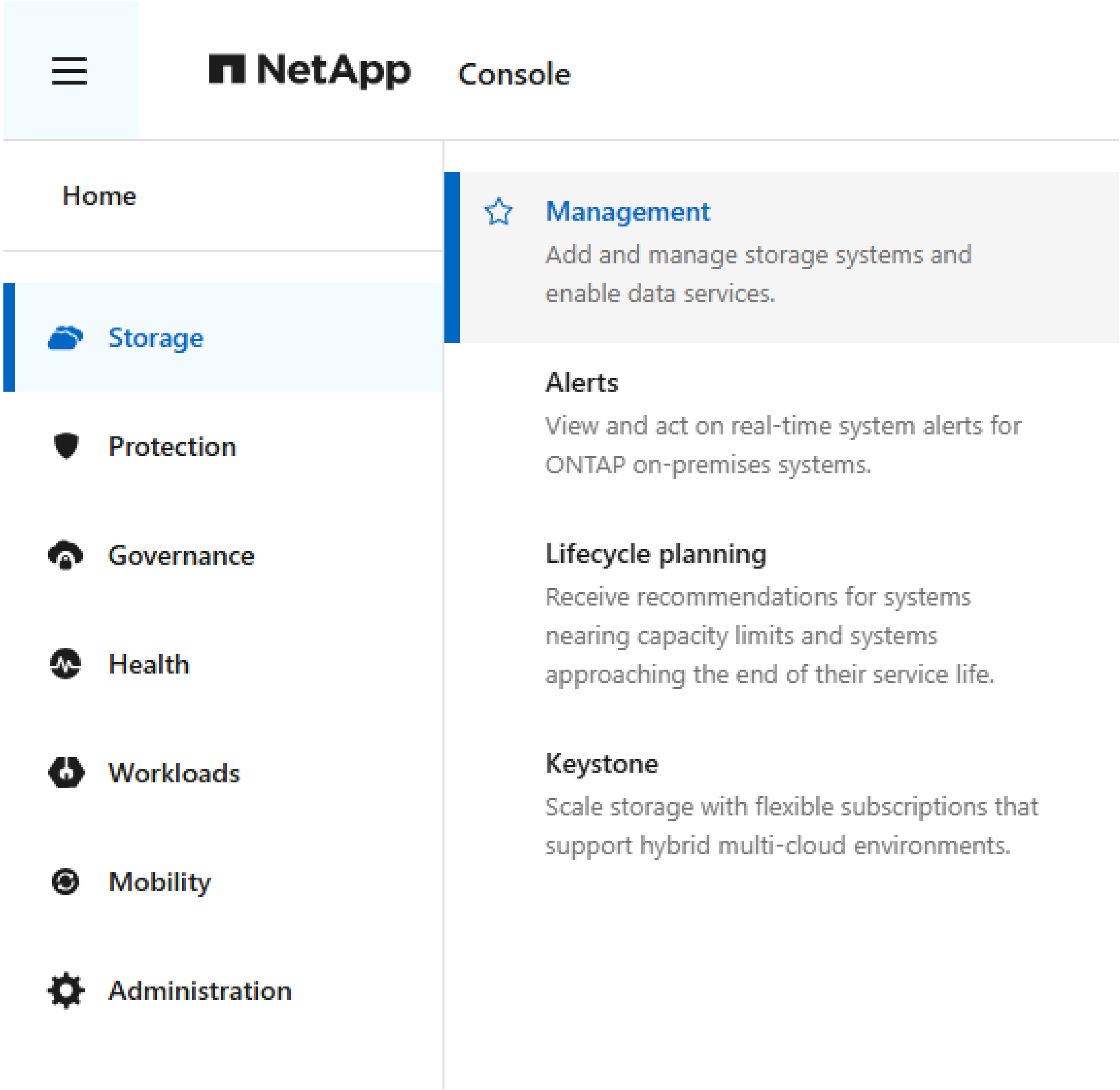
NetApp renamed the Canvas to the **Systems** page. Navigate to the **Systems** page from the **Storage > Management** menu.



Expanded Storage menu

The **Storage** menu includes **Alerts** to view ONTAP system alerts and **Lifecycle planning** (formerly **Economic efficiency**) to identify unused or underutilized resources.

NetApp has moved Keystone to the **Storage** menu, where you can manage your NetApp Keystone subscriptions and view your usage.



Management
Add and manage storage systems and enable data services.

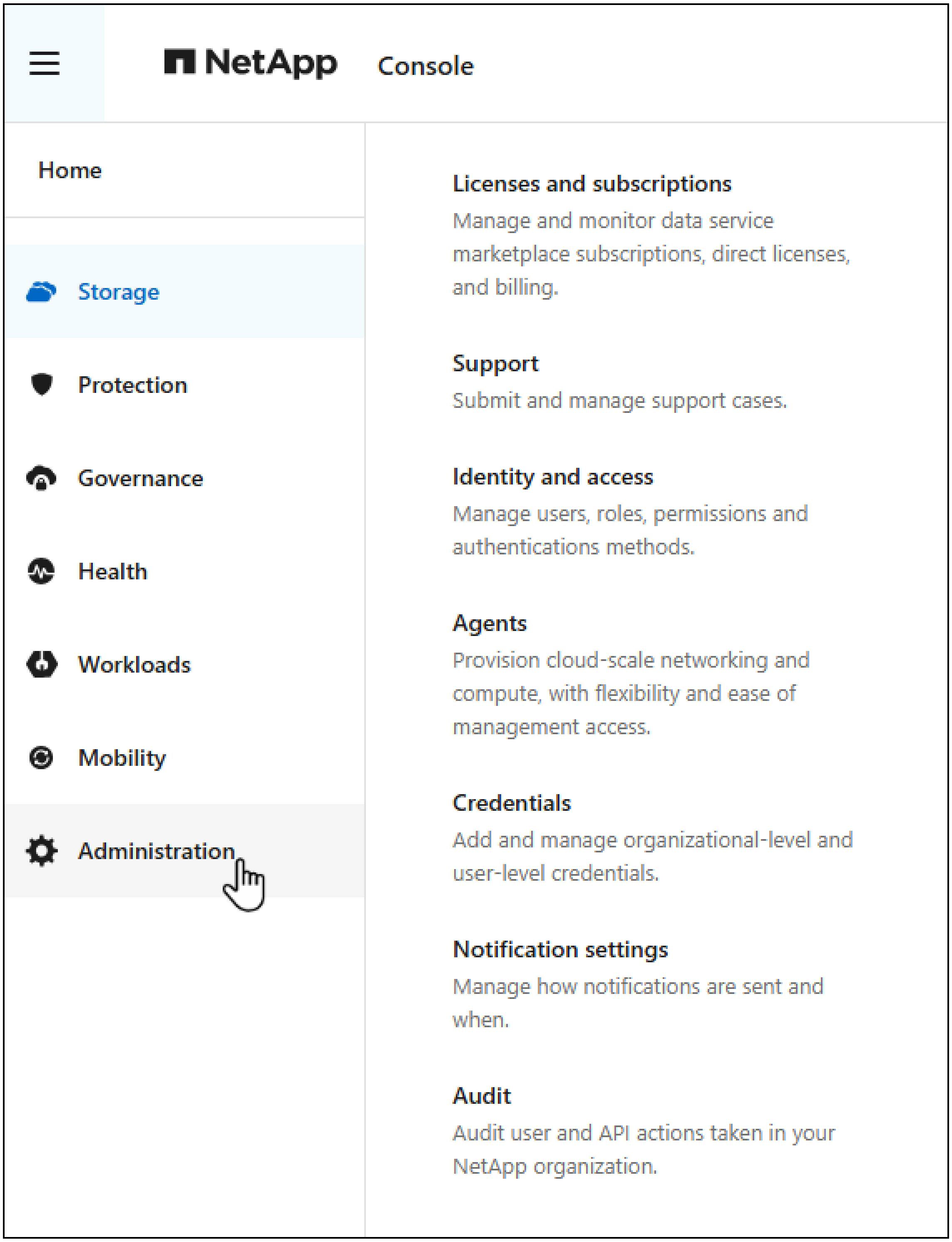
Alerts
View and act on real-time system alerts for ONTAP on-premises systems.

Lifecycle planning
Receive recommendations for systems nearing capacity limits and systems approaching the end of their service life.

Keystone
Scale storage with flexible subscriptions that support hybrid multi-cloud environments.

Administration menu

Use the centralized **Administration** menu to manage the NetApp Console, support cases, licenses, and subscriptions (previously called digital wallet).



Licenses and subscriptions
Manage and monitor data service marketplace subscriptions, direct licenses, and billing.

Support
Submit and manage support cases.

Identity and access
Manage users, roles, permissions and authentications methods.

Agents
Provision cloud-scale networking and compute, with flexibility and ease of management access.

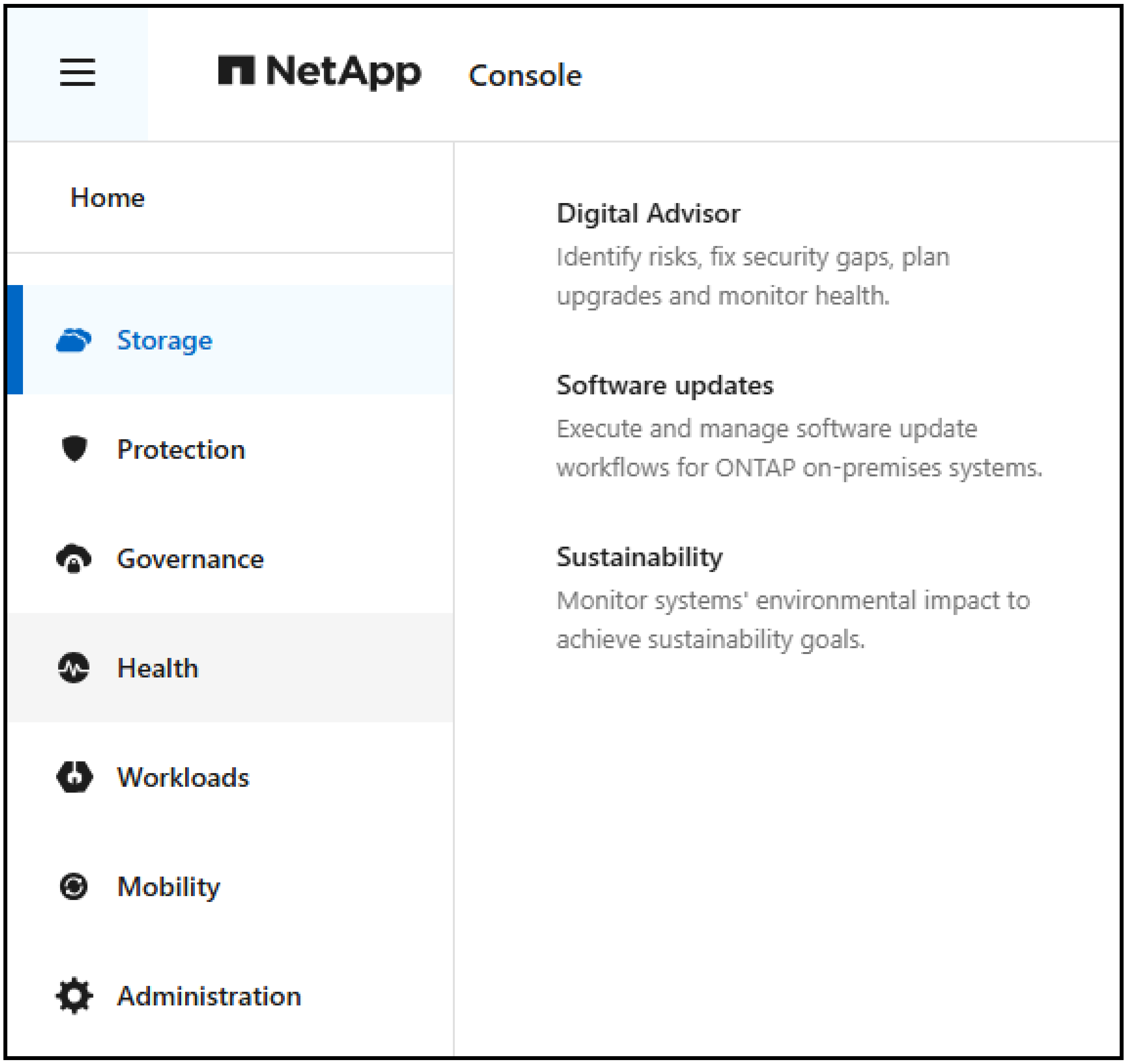
Credentials
Add and manage organizational-level and user-level credentials.

Notification settings
Manage how notifications are sent and when.

Audit
Audit user and API actions taken in your NetApp organization.

Health menu

An efficient **Health** menu includes **Software updates** where you can manage ONTAP software updates, **Sustainability** where you can monitor your environmental impact, and **Digital Advisor** where you can get proactive recommendations to optimize your storage environment.



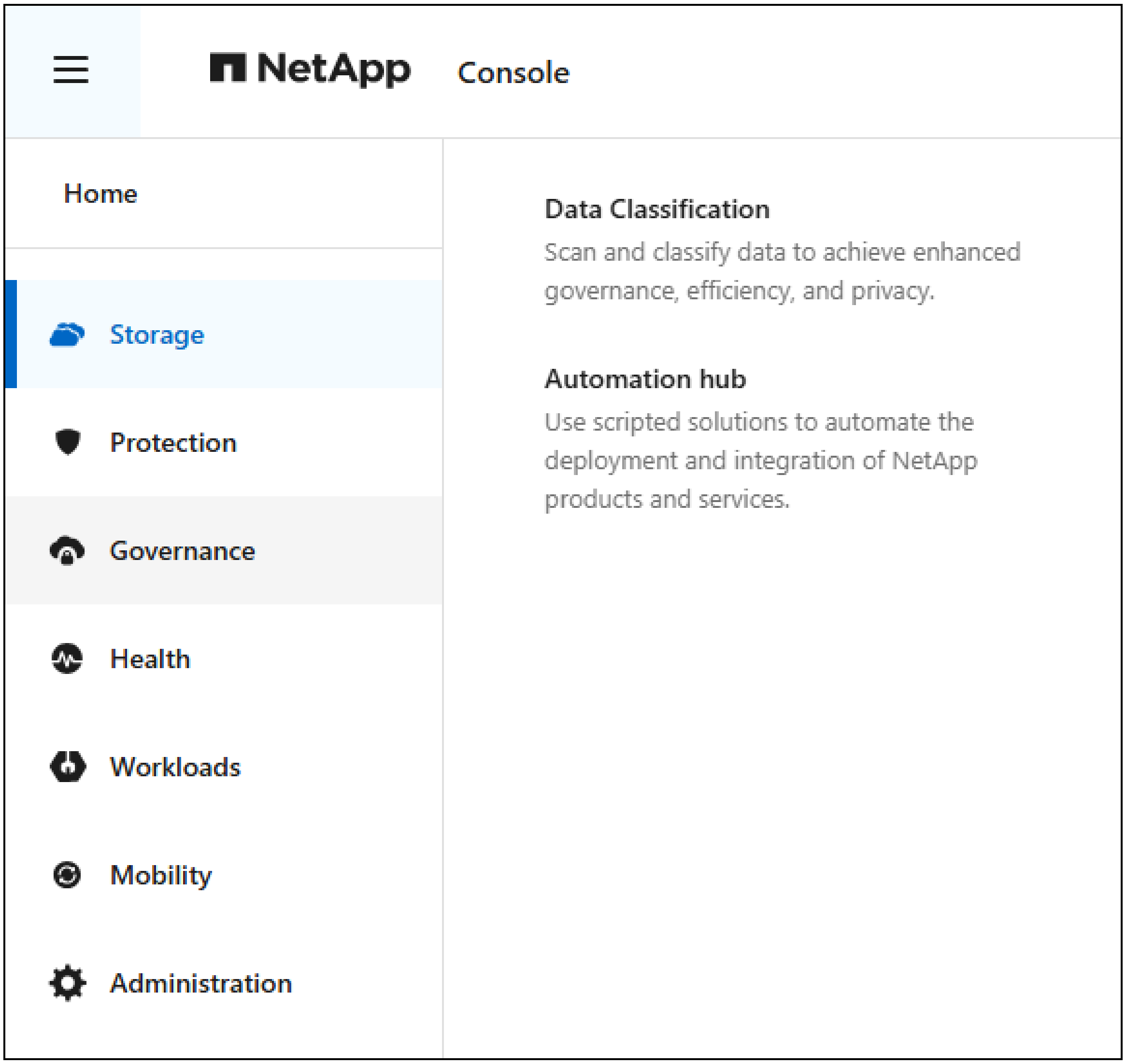
Digital Advisor
Identify risks, fix security gaps, plan upgrades and monitor health.

Software updates
Execute and manage software update workflows for ONTAP on-premises systems.

Sustainability
Monitor systems' environmental impact to achieve sustainability goals.

Governance menu

The **Governance** menu includes **Data Classification** where you can manage data classification and compliance and the **Automation hub** where you can create and manage automation workflows.


NetApp Console

Home

Storage

Protection

Governance

Health

Workloads

Mobility

Administration

Data Classification

Scan and classify data to achieve enhanced governance, efficiency, and privacy.

Automation hub

Use scripted solutions to automate the deployment and integration of NetApp products and services.

More intuitive naming of elements, data services, and features

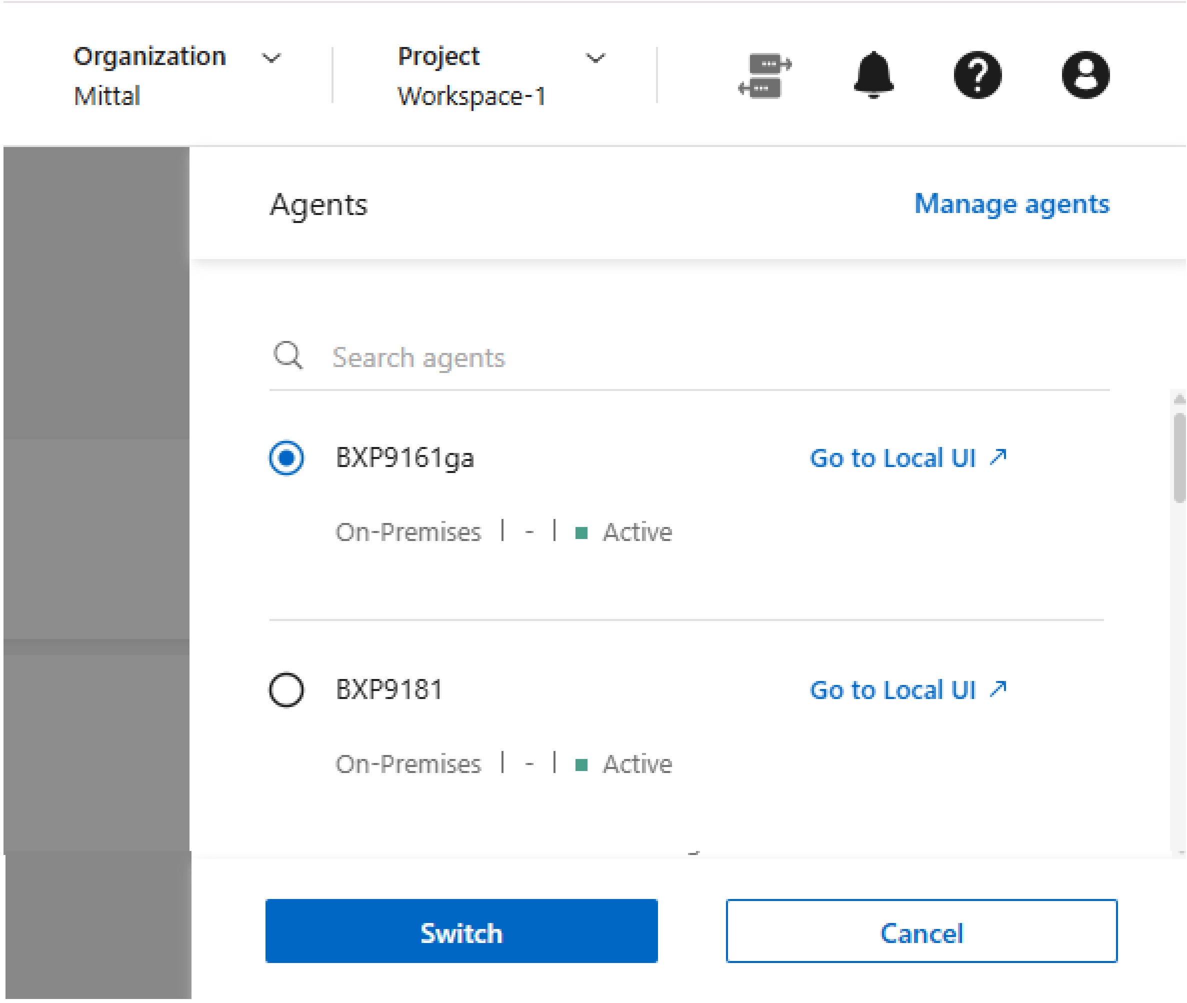
NetApp renamed several elements, data services, and features to clarify their purpose. Key changes include:

Previous name	NetApp Console name
Connectors	Console agents. View, add, and manage your agents from the **Administration > Agents** menu.
Timeline page	Audit page View audit Console activity from the **Administration > Audit** menu.
Working environments	Systems View, add, and manage your systems from the **Storage > Management** menu.

Previous name	NetApp Console name
BlueXP Ransomware protection	NetApp Ransomware Resilience. Ransomware Resilience helps you protect your data and recover quickly from a ransomware attack.
BlueXP Economic Efficiency	Lifecycle planning. Lifecycle planning helps you optimize your storage costs by identifying unused and underutilized resources. Access Lifecycle planning from the **Storage > Lifecycle planning** menu.
BlueXP digital wallet	Licenses and subscriptions Access your licenses and subscriptions from the **Administration > Licenses and subscriptions** menu.

Console agents

Access and manage your Console agents from the **Administration > Agents** menu. NetApp has changed how to select a Console agent for the **Systems** page (formerly the Canvas). NetApp has replaced the Connector menu name with an icon ⇄, allowing you to select the Console agent that you want to view systems for.



You can also manage your agents from the **Administration > Agents** menu.

Console agent 4.0.0

This release of the Console agent includes security improvements, bug fixes and the following new features.

The 4.0.0 release is available for standard mode and restricted mode.

Consolidation and reduction of required network endpoints

NetApp has reduced the required network endpoints for the Console and Console agents, enhancing security and simplifying deployment. Importantly, all deployments prior to version 4.0.0 continue to be fully supported. While previous endpoints remain available for existing agents, NetApp strongly recommends updating firewall rules to the current endpoints after confirming successful agent upgrades.

- Learn how to update your endpoint list and view a comparison.
- Learn more about required endpoints.

Support for VCenter deployment of Console agents

You can deploy Console agents in VMware environments using an OVA file. The OVA file includes a pre-configured VM image with Console agent software and settings to connect to the NetApp Console. A file download or URL deployment is available directly from the NetApp Console. Learn how to deploy a Console agent in VMware environments.

The Console agent OVA for VMware offers a pre-configured VM image for quick deployment.

Validation reports for failed agent deployments

When you deploy a Console agent from the NetApp Console, you now have the option to validate the agent configuration. If the Console fails to deploy the agent, it provides a downloadable report to help you troubleshoot.

Improved troubleshooting for Console agents

The Console agent has improved error messages that help you better understand issues. Learn how to troubleshoot Console agents.

NetApp Console

NetApp Console administration includes the following new features:

Home page dashboard

The NetApp Console's Home page dashboard provides real-time visibility into storage infrastructure with metrics for health, capacity, license status, and data services. Learn more about the Home page.

NetApp assistant

New users with the Organization admin role can use the NetApp assistant to configure the Console, including adding an agent, linking a NetApp Support account, and adding a storage system.
Learn about the NetApp assistant.

Service account authentication

The NetApp Console supports service account authentication using either a system-generated client ID and secret or customer-managed JWTs, allowing organizations to select the approach that best fits their security requirements and integration workflows. Private Key JWT Client Authentication uses asymmetric cryptography, providing stronger security than traditional client ID and secret methods. Private Key JWT Client Authentication uses asymmetric cryptography, keeping the private key secure in the customer's environment, reducing credential theft risks, and improving the security of your automation stack and client applications. Learn how to add a service account.

Session timeouts

The system logs out users after 24 hours or when they close their web browser.

Support for partnerships between organizations

You can create partnerships in the NetApp Console that let partners securely manage NetApp resources across organizational boundaries, making collaboration easier and security stronger. Learn how to manage partnerships.

Super admin and Super viewer roles

Added the **Super admin** and **Super viewer** roles. **Super admin** grants full management access to Console features, storage, and data services. **Super viewer** provides read-only visibility for auditors and stakeholders. These roles are useful for smaller teams of senior members where broad access is common. For improved security and auditability, organizations are encouraged to use **Super admin** access sparingly and assign fine-grained roles where possible. Learn more about access roles.

Additional role for Ransomware Resilience

Added the **Ransomware Resilience user behavior admin** role and the **Ransomware Resilience user behavior viewer** role. These roles allow users to configure and view user behavior and analytics data, respectively. Learn more about access roles.

Removed support chat

NetApp has removed the support chat feature from the NetApp Console. Use the **Administration > Support** page to create and manage support cases.

11 August 2025

Connector 3.9.55

This release of the BlueXP Connector includes security improvements, and bug fixes.

The 3.9.55 release is available for standard mode and restricted mode.

Japanese language support

The BlueXP UI is now available in the Japanese language. If your browser language is Japanese, BlueXP displays in Japanese. To access documentation in Japanese, use the language menu on the documentation website.

Operational resiliency feature

The Operational resiliency feature has been removed from BlueXP. Contact NetApp support if you encounter issues.

BlueXP Identity and Access Management (IAM)

Identity and Access Management in BlueXP now provides the following feature.

New access role for operational support

BlueXP now supports an Operational support analyst role. This role grants a user permissions to monitor storage alerts, view the BlueXP audit timeline, and enter and track NetApp Support cases.

Learn more about using access roles.

31 July 2025

Private mode release (3.9.54)

A new private mode release is now available to download from the NetApp Support Site

The 3.9.54 release includes updates to the following BlueXP components and services.

Component or service	Version included in this release	Changes since the previous private mode release
Connector	3.9.54, 3.9.53	Go to the what’s new in BlueXP page and refer to the changes included for versions 3.9.54 and 3.9.53.
Backup and recovery	28 July 2025	Go to the what’s new in BlueXP backup and recovery page and refer to the changes included in the July 2025 release.
Classification	14 July 2025 (version 1.45)	Go to the what’s new in BlueXP classification page.

For more details about private mode, including how to upgrade, refer to the following:

- Learn about private mode
- Learn how to get started with BlueXP in private mode
- Learn how to upgrade the Connector when using private mode

21 July 2025

Support for Google Cloud NetApp Volumes

You can now view Google Cloud NetApp Volumes in BlueXP. Learn more about Google Cloud NetApp Volumes.

BlueXP Identity and Access Management (IAM)

New access role for Google Cloud NetApp Volumes

BlueXP now supports using an access role for the following storage system:

- Google Cloud NetApp Volumes

Learn more about using access roles.

14 July 2025

Connector 3.9.54

This release of the BlueXP Connector includes security improvements, bug fixes, and the following new features:

- Support for transparent proxies for Connectors dedicated to supporting Cloud Volumes ONTAP services. Learn more about configuring a transparent proxy.
- Ability to use network tags to help route Connector traffic when the Connector is deployed in a Google Cloud environment.
- Additional in-product notifications for Connector health monitoring, including CPU and RAM usage.

At this time, the 3.9.54 release is available for standard mode and restricted mode.

BlueXP Identity and Access Management (IAM)

Identity and Access Management in BlueXP now provides the following features:

- Support for IAM in private mode, allowing you to manage user access and permissions for BlueXP services and applications.
- Streamlined management of identity federations, including easier navigation, clearer options for configuring federated connections, and improved visibility into existing federations.
- Access roles for BlueXP backup and recovery, BlueXP disaster recovery, and federation management.

Support for IAM in private mode

BlueXP now supports IAM in private mode, allowing you to manage user access and permissions for BlueXP services and applications. This enhancement enables private mode customers to leverage role-based access control (RBAC) for better security and compliance.

Learn more about IAM in BlueXP.

Streamlined management of identity federations

BlueXP now offers a more intuitive interface for managing identity federation. This includes easier navigation, clearer options for configuring federated connections, and improved visibility into existing federations.

Enabling single sign-on (SSO) through identity federation lets users log in to BlueXP with their corporate credentials. This improves security, reduces password use, and simplifies onboarding.

You’ll be prompted to import any existing federated connections to the new interface to gain access to the new management features. This allows you to take advantage of the latest enhancements without having to recreate your federated connections. Learn more about importing your existing federated connection to BlueXP.

Improved federation management allows you to:

- Add more than one verified domain to a federated connection, allowing you to use multiple domains with the same identity provider (IdP).
- Disable or delete federated connections when needed, giving you control over user access and security.
- Control access to federation management with IAM roles.

Learn more about identity federation in BlueXP.

New access roles for BlueXP backup and recovery, BlueXP disaster recovery, and federation management

BlueXP now supports using IAM roles for the following features and data services:

- BlueXP backup and recovery
- BlueXP disaster recovery
- Federation

Learn more about using access roles.

09 June 2025

Connector 3.9.53

This release of the BlueXP Connector includes security improvements and bug fixes.

The 3.9.53 release is available for standard mode and restricted mode.

Disk space usage alerts

The Notifications Center now includes alerts for disk space usage on the Connector. Learn more.

Audit improvements

The Timeline now includes login and logout events for users. You can see when login activity, which can help with auditing and security monitoring. API users who have the Organization administrator role can view the email address of the user who logged in by including the `includeUserData=true`` parameter as in the following: `/audit/<account_id>?includeUserData=true`.

Keystone subscription management available in BlueXP

You can manage your NetApp Keystone subscription from BlueXP.

Learn about Keystone subscription management in BlueXP.

BlueXP Identity and Access Management (IAM)

Multi-factor authentication (MFA)

Unfederated users can enable MFA for their BlueXP accounts to improve security. Administrators can manage MFA settings, including resetting or disabling MFA for users as needed. This is supported in standard mode only.

Learn about setting up multi-factor authentication for yourself.
Learn about administering multi-factor authentication for users.

Workloads

You can now view and delete Amazon FSx for NetApp ONTAP credentials from the Credentials page in BlueXP.

29 May 2025

Private mode release (3.9.52)

A new private mode release is now available to download from the NetApp Support Site

The 3.9.52 release includes updates to the following BlueXP components and services.

Component or service	Version included in this release	Changes since the previous private mode release
Connector	3.9.52, 3.9.51	Go to the what's new in BlueXP connector page and refer to the changes included for versions 3.9.52 and 3.9.50.

Component or service	Version included in this release	Changes since the previous private mode release
Backup and recovery	12 May 2025	Go to the what's new in BlueXP backup and recovery page and refer to the changes included in the May 2025 release.
Classification	12 May 2025 (version 1.43)	Go to the what's new in BlueXP classification page and refer to the changes included in the 1.38 to 1.371.41 releases.

For more details about private mode, including how to upgrade, refer to the following:

- Learn about private mode
- Learn how to get started with BlueXP in private mode
- Learn how to upgrade the Connector when using private mode

12 May 2025

Connector 3.9.52

This release of the BlueXP Connector includes minor security improvements and bug fixes, as well as some additional updates.

At this time, the 3.9.52 release is available for standard mode and restricted mode.

Support for Docker 27 and Docker 28

Docker 27 and Docker 28 are now supported with the Connector.

Cloud Volumes ONTAP

Cloud Volumes ONTAP nodes no longer shutdown when the Connector is out of compliance or down for more than 14 days. Cloud Volumes ONTAP still sends Event Management messages when it loses access to the Connector. This change is to ensure that Cloud Volumes ONTAP can continue to operate even if the Connector is down for an extended period of time. It does not change compliance requirements for the Connector.

Keystone administration available in BlueXP

The beta for NetApp Keystone in BlueXP has added access to Keystone administration. You can access the sign-up page for the NetApp Keystone beta from the left navigation bar of BlueXP.

BlueXP Identity and Access Management (IAM)

New storage management roles

The Storage admin, System health specialist, and Storage viewer roles are available and can be assigned to users.

These roles enable you to manage who in your organization can discover and manage storage resources, as well as view storage health information and perform software updates.

These roles are supported for controlling access to the following storage resources:

- E-Series systems

- StorageGRID systems
- On-premises ONTAP systems

You can also use these roles to control access to the following BlueXP services:

- Software updates
- Digital advisor
- Operational resiliency
- Economic efficiency
- Sustainability

The following roles have been added:

- **Storage admin**

  Administer storage health, governance, and discovery for the storage resources in the organization. This role can also perform software updates on storage resources.

- **System health specialist**

  Administer storage health and governance for the storage resources in the organization. This role can also perform software updates on storage resources. This role cannot modify or delete working environments.

- **Storage viewer**

  View storage health information and governance data.

  Learn about access roles.

14 April 2025

Connector 3.9.51

This release of the BlueXP Connector includes minor security improvements and bug fixes.

At this time, the 3.9.51 release is available for standard mode and restricted mode.

Secure endpoints for Connector downloads now supported for Backup and recovery and Ransomware protection

If you are using Backup and recovery or Ransomware protection, you can now use secure endpoints for Connector downloads. Learn about secure endpoints for Connector downloads.

BlueXP Identity and Access Management (IAM)

- Users without the Org admin or Folder or project admin must be assigned a Ransomware protection role to have access to Ransomware protection. You can assign a user one of two roles: Ransomware protection admin or Ransomware protection viewer.
- Users without the Org admin or Folder or project admin must be assigned a Keystone role to have access to Keystone. You can assign a user one of two roles: Keystone admin or Keystone viewer.

  Learn about access roles.

- If you have the Org admin or Folder or project admin role, you can now associate a Keystone subscription with an IAM project. Associating a Keystone subscription with an IAM project allows you to control access to Keystone within BlueXP.

28 March 2025

Private mode release (3.9.50)

A new private mode release is now available to download from the NetApp Support Site

The 3.9.50 release includes updates to the following BlueXP components and services.

Component or service	Version included in this release	Changes since the previous private mode release
Connector	3.9.50, 3.9.49	Go to the what's new in BlueXP connector page and refer to the changes included for versions 3.9.50 and 3.9.49.
Backup and recovery	17 March 2025	Go to the what's new in BlueXP backup and recovery page and refer to the changes included in the March 2024 release.
Classification	10 March 2025 (version 1.41)	Go to the what's new in BlueXP classification page and refer to the changes included in the 1.38 to 1.371.41 releases.

For more details about private mode, including how to upgrade, refer to the following:

- Learn about private mode
- Learn how to get started with BlueXP in private mode
- Learn how to upgrade the Connector when using private mode

10 March 2025

Connector 3.9.50

This release of the BlueXP Connector includes minor security improvements and bug fixes.

- Management of Cloud Volumes ONTAP systems is now supported by Connectors that have SELinux enabled on the operating system.

  Learn more about SELinux

At this time, the 3.9.50 release is available for standard mode and restricted mode.

NetApp Keystone beta available in BlueXP

NetApp Keystone will soon be available from BlueXP and is now in beta. You can access the sign-up page for the NetApp Keystone beta from the left navigation bar of BlueXP.

06 March 2025

Connector 3.9.49 update

ONTAP System Manager access when BlueXP uses a Connector

A BlueXP administrator (users with the Organization admin role) can configure BlueXP to prompt users to enter their ONTAP credentials in order to access ONTAP system manager. When this setting is enabled, users need enter their ONTAP credentials each time as they are not stored in BlueXP.

This feature is available in Connector version 3.9.49 and higher. Learn how to configure credentials settings..

18 February 2025

Private mode release (3.9.48)

A new private mode release is now available to download from the NetApp Support Site

The 3.9.48 release includes updates to the following BlueXP components and services.

Component or service	Version included in this release	Changes since the previous private mode release
Connector	3.9.48	Go to the what’s new in BlueXP connector page and refer to the changes included for versions 3.9.48.
Backup and recovery	21 February 2025	Go to the what’s new in BlueXP backup and recovery page and refer to the changes included in the February 2025 release.
Classification	22 January 2025 (version 1.39)	Go to the what’s new in BlueXP classification page and refer to the changes included in the 1.39 release.

10 February 2025

Connector 3.9.49

This release of the BlueXP Connector includes minor security improvements and bug fixes.

At this time, the 3.9.49 release is available for standard mode and restricted mode.

BlueXP identity and access management (IAM)

- Support for assigning multiple roles to a BlueXP user.
- Support for assigning a role on multiple resources of the BlueXP organization (Org/folder/project)
- Roles are now associated with one of two categories: platform and data service.

Restricted mode now uses BlueXP IAM

BlueXP identity and access management (IAM) is now used in restricted mode.

BlueXP identity and access management (IAM) is a resource and access management model that replaces and enhances the previous functionality provided by BlueXP accounts when using BlueXP in standard and restricted mode.

Related information

- Learn about BlueXP IAM
- Get started with BlueXP IAM

BlueXP IAM provides more granular management of resources and permissions:

- A top-level *organization* enables you to manage access across your various *projects*.
- *Folders* enable you to group related projects together.
- Enhanced resource management enables you to associate a resource with one or more folders or projects.

  For example, you can associate a Cloud Volumes ONTAP system with multiple projects.

- Enhanced access management enables you to assign a role to members at different levels of the organization hierarchy.

These enhancements provide better control over the actions that users can perform and the resources that they can access.

How BlueXP IAM affects your existing account in restricted mode

When you log in to BlueXP, you'll notice these changes:

- Your *account* is now called an *organization*
- Your *workspaces* are now called *projects*
- The names of user roles have changed:
  - *Account admin* is now *Organization admin*
  - *Workspace admin* is now *Folder or project admin*
  - *Compliance viewer* is now *Classification viewer*
- Under Settings, you can access BlueXP identity and access management to take advantage of these enhancements

Note the following:

- There are no changes to your existing users or working environments.
- While the names of the roles have changed, there are no differences from a permissions perspective. Users will continue to have access to the same working environments as before.
- There are no changes to how you log in to BlueXP. BlueXP IAM works with NetApp cloud logins, NetApp Support Site credentials, and federated connections just like BlueXP accounts did.
- If you had multiple BlueXP accounts, you now have multiple BlueXP organizations.

API for BlueXP IAM

This change introduces a new API for BlueXP IAM, but it is backwards compatible with the previous tenancy API. Learn about the API for BlueXP IAM

Supported deployment modes

BlueXP IAM is supported when using BlueXP in standard and restricted mode. If you're using BlueXP in private mode, then you'll continue using a BlueXP *account* to manage workspaces, users, and resources.

Private mode release (3.9.48)

A new private mode release is now available to download from the NetApp Support Site

The 3.9.48 release includes updates to the following BlueXP components and services.

Component or service	Version included in this release	Changes since the previous private mode release
Connector	3.9.48	Go to the what's new in BlueXP connector page and refer to the changes included for versions 3.9.48.
Backup and recovery	21 February 2025	Go to the what's new in BlueXP backup and recovery page and refer to the changes included in the February 2025 release.
Classification	22 January 2025 (version 1.39)	Go to the what's new in BlueXP classification page and refer to the changes included in the 1.39 release.

13 January 2025

Connector 3.9.48

This release of the BlueXP Connector includes minor security improvements and bug fixes.

At this time, the 3.9.48 release is available for standard mode and restricted mode.

BlueXP identity and access management

- The Resources page now displays undiscovered resources. Undiscovered resources are storage resources that BlueXP knows about but you have not created working environments for. For example, resources that display in digital advisor that do not yet have working environments display on the Resources page as undiscovered resources.
- Amazon FSx for NetApp ONTAP resources aren't displayed on the IAM resources page as you cannot associate them with an IAM role. You can view these resources on their respective canvas or from workloads.

Create a support case for additional BlueXP services

After you register BlueXP for support, you can create a support case directly from the BlueXP web-based console. When you create the case, you need to select the service that the issue is associated with.

Starting with this release, you can now create a support case and associate it with additional BlueXP services:

- BlueXP disaster recovery
- BlueXP ransomware protection

Learn more about creating a support case.

16 December 2024

New secure endpoints to obtain Connector images

When you install the Connector, or when an automatic upgrade occurs, the Connector contacts repositories to download images for the installation or upgrade. By default, the Connector has always contacted the following endpoints:

- https://*.blob.core.windows.net
- https://cloudmanagerinfraprod.azurecr.io

The first endpoint includes a wild card because we can’t provide a definitive location. The load balancing of the repository is managed by the service provider, which means the downloads can happen from different endpoints.

For increased security, the Connector can now download installation and upgrades images from dedicated endpoints:

- https://bluexpinfraprod.eastus2.data.azurecr.io
- https://bluexpinfraprod.azurecr.io

We recommend that you start using these new endpoints by removing the existing endpoints from your firewall rules and allowing the new endpoints.

These new endpoints are supported starting with the 3.9.47 release of the Connector. There is no backwards compatibility with previous releases of the Connector.

Note the following:

- The existing endpoints are still supported. If you don’t want to use the new endpoints, no changes are required.
- The Connector contacts the existing endpoints first. If those endpoints aren’t accessible, the Connector automatically contacts the new endpoints.
- The new endpoints are not supported in the following scenarios:
    - If the Connector is installed in a Government region.
    - If you use the Connector with BlueXP backup and recovery or BlueXP ransomware protection.

  For both of these scenarios, you can continue to use the existing endpoints.

09 December 2024

Connector 3.9.47

This release of the BlueXP Connector includes bug fixes and a change to the endpoints contacted during Connector installation.

At this time, the 3.9.47 release is available for standard mode and restricted mode.

Endpoint to contact NetApp support during installation

When you manually install the Connector, the installer no longer contacts https://support.netapp.com.

The installer still contacts https://mysupport.netapp.com.

BlueXP identity and access management

The Connectors page lists only currently available Connectors. It no longer displays Connectors that you have removed.

26 November 2024

Private mode release (3.9.46)

A new private mode release is now available to download from the NetApp Support Site

The 3.9.46 release includes updates to the following BlueXP components and services.

Component or service	Version included in this release	Changes since the previous private mode release
Connector	3.9.46	Minor security improvements and bug fixes
Backup and recovery	22 November 2024	Go to the what's new in BlueXP backup and recovery page and refer to the changes included in the November 2024 release
Classification	4 November 2024 (version 1.37)	Go to the what's new in BlueXP classification page and refer to the changes included in the 1.32 to 1.37 releases
Cloud Volumes ONTAP management	11 November 2024	Go to the what's new with Cloud Volumes ONTAP management page and refer to the changes included in the October 2024 and November 2024 releases
On-premises ONTAP cluster management	26 November 2024	Go to the what's new with on-premises ONTAP cluster management page and refer to the changes included in the November 2024 release

While the BlueXP digital wallet and BlueXP replication are also included with private mode, there are no changes from the previous private mode release.

For more details about private mode, including how to upgrade, refer to the following:

- Learn about private mode
- Learn how to get started with BlueXP in private mode
- Learn how to upgrade the Connector when using private mode

11 November 2024

Connector 3.9.46

This release of the BlueXP Connector includes minor security improvements and bug fixes.

At this time, the 3.9.46 release is available for standard mode and restricted mode.

ID for IAM projects

You can now view the ID for a project from BlueXP identity and access management. You might need to use the ID when making an API call.

Learn how to obtain the ID for a project.

10 October 2024

Connector 3.9.45 patch

This patch includes bug fixes.

07 October 2024

BlueXP identity and access management

BlueXP identity and access management (IAM) is a new resource and access management model that replaces and enhances the previous functionality provided by BlueXP accounts when using BlueXP in standard mode.

BlueXP IAM provides more granular management of resources and permissions:

- A top-level *organization* enables you to manage access across your various *projects*.
- *Folders* enable you to group related projects together.
- Enhanced resource management enables you to associate a resource with one or more folders or projects.

  For example, you can associate a Cloud Volumes ONTAP system with multiple projects.
- Enhanced access management enables you to assign a role to members at different levels of the organization hierarchy.

These enhancements provide better control over the actions that users can perform and the resources that they can access.

How BlueXP IAM affects your existing account

When you log in to BlueXP, you'll notice these changes:

- Your *account* is now called an *organization*
- Your *workspaces* are now called *projects*
- The names of user roles have changed:
  - *Account admin* is now *Organization admin*
  - *Workspace admin* is now *Folder or project admin*
  - *Compliance viewer* is now *Classification viewer*
- Under Settings, you can access BlueXP identity and access management to take advantage of these enhancements

Note the following:

- There are no changes to your existing users or working environments.
- While the names of the roles have changed, there are no differences from a permissions perspective. Users will continue to have access to the same working environments as before.
- There are no changes to how you log in to BlueXP. BlueXP IAM works with NetApp cloud logins, NetApp Support Site credentials, and federated connections just like BlueXP accounts did.
- If you had multiple BlueXP accounts, you now have multiple BlueXP organizations.

API for BlueXP IAM

This change introduces a new API for BlueXP IAM, but it is backwards compatible with the previous tenancy API. Learn about the API for BlueXP IAM

Supported deployment modes

BlueXP IAM is supported when using BlueXP in standard mode. If you're using BlueXP in restricted mode or private mode, then you'll continue using a BlueXP *account* to manage workspaces, users, and resources.

Where to go next

- Learn about BlueXP IAM
- Get started with BlueXP IAM

Connector 3.9.45

This release includes expanded operating system support and bug fixes.

The 3.9.45 release is available for standard mode and restricted mode.

Support for Ubuntu 24.04 LTS

Starting with the 3.9.45 release, BlueXP now supports new installations of the Connector on Ubuntu 24.04 LTS hosts when using BlueXP in standard mode or restricted mode.

View Connector host requirements.

Support for SELinux with RHEL hosts

BlueXP now supports the Connector with Red Hat Enterprise Linux hosts that have SELinux enabled in either enforcing mode or permissive mode.

Support for SELinux starts with the 3.9.40 release for standard mode and restricted mode and with the 3.9.42 release for private mode.

Note the following limitations:

- BlueXP does not support SELinux with Ubuntu hosts.
- Management of Cloud Volumes ONTAP systems it not supported by Connectors that have SELinux enabled on the operating system.

Learn more about SELinux

30 September 2024

Private mode release (3.9.44)

A new private mode release is now available to download from the NetApp Support Site.

This release includes the following versions of the BlueXP components and services that are supported with private mode.

Service	Version included
Connector	3.9.44
Backup and recovery	27 September 2024
Classification	15 May 2024 (version 1.31)
Cloud Volumes ONTAP management	9 September 2024
Digital wallet	30 July 2023

Service	Version included
On-premises ONTAP cluster management	22 April 2024
Replication	18 Sept 2022

For the Connector, the 3.9.44 private mode release includes the updates introduced in the August 2024 and September 2024 releases. Most notably, support for Red Hat Enterprise Linux 9.4.

To learn more about what's included in the versions of these BlueXP components and services, refer to the release notes for each BlueXP service:

- What's new in the September 2024 release of the Connector
- What's new in the August 2024 release of the Connector
- What's new with BlueXP backup and recovery
- What's new with BlueXP classification
- What's new with Cloud Volumes ONTAP management in BlueXP

For more details about private mode, including how to upgrade, refer to the following:

- Learn about private mode
- Learn how to get started with BlueXP in private mode
- Learn how to upgrade the Connector when using private mode

09 September 2024

Connector 3.9.44

This release includes support for Docker Engine 26, an enhancement to SSL certificates, and bug fixes.

The 3.9.44 release is available for standard mode and restricted mode.

Support for Docker Engine 26 with new installations

Starting with the 3.9.44 release of the Connector, Docker Engine 26 is now supported with *new* Connector installations on Ubuntu hosts.

If you have an existing Connector created prior to the 3.9.44 release, then Docker Engine 25.0.5 is still the maximum supported version on Ubuntu hosts.

Learn more about Docker Engine requirements.

Updated SSL certificate for local UI access

When you use BlueXP in restricted mode or private mode, the user interface is accessible from the Connector virtual machine that's deployed in your cloud region or on-premises. By default, BlueXP uses a self-signed SSL certificate to provide secure HTTPS access to the web-based console running on the Connector.

In this release, we made changes to the SSL certificate for new and existing Connectors:

- The Common Name for the certificate now matches the short host name
- The Certificate Subject Alternative Name is the Fully Qualified Domain Name (FQDN) of the host machine

Support for RHEL 9.4

BlueXP now supports installing the Connector on a Red Hat Enterprise Linux 9.4 host when using BlueXP in standard mode or restricted mode.

Support for RHEL 9.4 starts with the 3.9.40 release of the Connector.

The updated list of supported RHEL versions for standard mode and restricted mode now includes the following:

- 8.6 to 8.10
- 9.1 to 9.4

Learn about support for RHEL 8 and 9 with the Connector.

Support for Podman 4.9.4 with all RHEL versions

Podman 4.9.4 is now supported with all supported versions of Red Hat Enterprise Linux. Version 4.9.4 was previously supported with only RHEL 8.10.

The updated list of supported Podman versions includes 4.6.1 and 4.9.4 with Red Hat Enterprise Linux hosts.

Podman is required for RHEL hosts starting with the 3.9.40 release of the Connector.

Learn about support for RHEL 8 and 9 with the Connector.

Updated AWS and Azure permissions

We updated the AWS and Azure policies for the Connector to remove permissions that are no longer required. The permissions were related to BlueXP edge caching and discovery and management of Kubernetes clusters, which are no longer supported as of August, 2024.

- Learn what changed in the AWS policy.
- Learn what changed in the Azure policy.

22 August 2024

Connector 3.9.43 patch

We updated the Connector to support the Cloud Volumes ONTAP 9.15.1 release.

Support for this release includes an update to the Connector policy for Azure. The policy now includes the following permissions:

```
"Microsoft.Compute/virtualMachineScaleSets/write",
"Microsoft.Compute/virtualMachineScaleSets/read",
"Microsoft.Compute/virtualMachineScaleSets/delete"
```

These permissions are required for Cloud Volumes ONTAP support of Virtual Machine Scale Sets. If you have existing Connectors and you want to use this new feature, you’ll need to add these permissions to the custom roles that are associated with your Azure credentials.

- Learn about the Cloud Volumes ONTAP 9.15.1 release
- View Azure permissions for the Connector.

8 August 2024

Connector 3.9.43

This release includes minor improvements and bug fixes.

The 3.9.43 release is available for standard mode and restricted mode.

Updated CPU and RAM requirements

To provide higher reliability and to improve the performance of BlueXP and the Connector, we now require additional CPU and RAM for the Connector virtual machine:

- CPU: 8 cores or 8 vCPUs (the previous requirement was 4)
- RAM: 32 GB (the previous requirement was 14 GB)

As a result of this change, the default VM instance type when deploying the Connector from BlueXP or from the cloud provider's marketplace is as follows:

- AWS: t3.2xlarge
- Azure: Standard_D8s_v3
- Google Cloud: n2-standard-8

The updated CPU and RAM requirements apply to all new Connectors. For existing Connectors, increasing the CPU and RAM is recommended to provide improved performance and reliability.

Support for Podman 4.9.4 with RHEL 8.10

Podman version 4.9.4 is now supported when installing the Connector on a Red Hat Enterprise Linux 8.10 host.

User validation for identity federation

If you use identity federation with BlueXP, each user who logs in to BlueXP for the first time will need to complete a quick form to validate their identity.

31 July 2024

Private mode release (3.9.42)

A new private mode release is now available to download from the NetApp Support Site.

Support for RHEL 8 and 9

This release includes support for installing the Connector on a Red Hat Enterprise Linux 8 or 9 host when using BlueXP in private mode. The following versions of RHEL are supported:

- 8.6 to 8.10
- 9.1 to 9.3

Podman is required as the container orchestration tool for these operating systems.

You should be aware of Podman requirements, known limitations, a summary of operating system support, what to do if you have a RHEL 7 host, how to get started, and more.

Learn about support for RHEL 8 and 9 with the Connector.

Versions included in this release

This release includes the following versions of the BlueXP services that are supported with private mode.

Service	Version included
Connector	3.9.42
Backup and recovery	18 July 2024
Classification	1 July 2024 (version 1.33)
Cloud Volumes ONTAP management	10 June 2024
Digital wallet	30 July 2023
On-premises ONTAP cluster management	30 July 2023
Replication	18 Sept 2022

To learn more about what's included in the versions of these BlueXP services, refer to the release notes for each BlueXP service.

- Learn about private mode
- Learn how to get started with BlueXP in private mode
- Learn how to upgrade the Connector when using private mode
- Learn what's new with BlueXP backup and recovery
- Learn what's new with BlueXP classification
- Learn what's new with Cloud Volumes ONTAP management in BlueXP

15 July 2024

Support for RHEL 8.10

BlueXP now supports installing the Connector on a Red Hat Enterprise Linux 8.10 host when using standard mode or restricted mode.

Support for RHEL 8.10 starts with the 3.9.40 release of the Connector.

Learn about support for RHEL 8 and 9 with the Connector.

8 July 2024

Connector 3.9.42

This release includes minor improvements, bug fixes, and support for the Connector in the AWS Canada West (Calgary) region.

The 3.9.42 release is available for standard mode and restricted mode.

Updated Docker Engine requirements

When the Connector is installed on an Ubuntu host, the minimum supported version of Docker Engine is now 23.0.6. It was previously 19.3.1.

The maximum supported version is still 25.0.5.

View Connector host requirements.

Email verification now required

New users who sign up to BlueXP are now required to verify their email address before they can log in.

12 June 2024

Connector 3.9.41

This release of the BlueXP Connector includes minor security improvements and bug fixes.

The 3.9.41 release is available for standard mode and restricted mode.

End of support for RHEL 7 and CentOS 7

On June 30, 2024, RHEL 7 reached end of maintenance (EOM), while CentOS 7 reached end of life (EOL). NetApp discontinued support for agents on these Linux distributions on June 30, 2024.

Red Hat: What to know about Red Hat Enterprise Linux 7 End of Maintenance

If you have an existing agent running on RHEL 7 or CentOS 7, NetApp does not support upgrading or converting the operating system to RHEL 8 or 9. You need to create a new agent on a supported operating system.

1. Set up a RHEL 8 or 9 host.
2. Install Podman.
3. Install a *new* agent.
4. Configure the agent to discover the systems that the previous agent was managing.
5. Rediscover the systems.

   Refer to the following pages to rediscover your systems after you deploy a new Console agent.

   - Add existing Cloud Volumes ONTAP systems
   - Discover on-premises ONTAP clusters
   - Create or discover an FSx for ONTAP system
   - Create an Azure NetApp Files systems
   - Discover E-Series systems
   - Discover StorageGRID systems

4 June 2024

Private mode release (3.9.40)

A new private mode release is now available to download from the NetApp Support Site. This release includes the following versions of the BlueXP services that are supported with private mode.

Note that this private mode release does *not* include support for the Connector with Red Hat Enterprise Linux 8 and 9.

Service	Version included
Connector	3.9.40
Backup and recovery	17 May 2024
Classification	15 May 2024 (version 1.31)
Cloud Volumes ONTAP management	17 May 2024
Digital wallet	30 July 2023
On-premises ONTAP cluster management	30 July 2023
Replication	18 Sept 2022

To learn more about what's included in the versions of these BlueXP services, refer to the release notes for each BlueXP service.

- Learn about private mode
- Learn how to get started with BlueXP in private mode
- Learn how to upgrade the Connector when using private mode
- Learn what's new with BlueXP backup and recovery
- Learn what's new with BlueXP classification
- Learn what's new with Cloud Volumes ONTAP management in BlueXP

17 May 2024

Connector 3.9.40

This release of the BlueXP Connector includes support for additional operating systems, minor security improvements, and bug fixes.

At this time, the 3.9.40 release is available for standard mode and restricted mode.

Support for RHEL 8 and 9

The Connector is now supported on hosts running the following versions of Red Hat Enterprise Linux with *new* Connector installations when using BlueXP in standard mode or restricted mode:

- 8.6 to 8.9
- 9.1 to 9.3

Podman is required as the container orchestration tool for these operating systems.

You should be aware of Podman requirements, known limitations, a summary of operating system support, what to do if you have a RHEL 7 host, how to get started, and more.

Learn about support for RHEL 8 and 9 with the Connector.

End of support for RHEL 7 and CentOS 7

On June 30, 2024, RHEL 7 will reach end of maintenance (EOM), while CentOS 7 will reach end of life (EOL). NetApp will continue to support the Connector on these Linux distributions until June 30, 2024.

Learn what to do if you have an existing Connector running on RHEL 7 or CentOS 7.

AWS permissions update

In the 3.9.38 release, we updated the Connector policy for AWS to include the "ec2:DescribeAvailabilityZones" permission. This permission is now required to support AWS Local Zones with Cloud Volumes ONTAP.

- View AWS permissions for the Connector.
- Learn more about support for AWS Local Zones

Known limitations of NetApp Console

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

These limitations are specific to the set up for the NetApp Console and administration: the agent, the software as a service (SaaS) platform, and more.

Console agent limitations

Possible conflict with IP addresses in the 172 range

The NetApp Console deploys an agent with two interfaces that have IP addresses in the 172.17.0.0/16 and 172.18.0.0/16 ranges.

If your network has a subnet configured with either of these ranges, then you might experience connectivity failures from the Console. For example, discovering on-premises ONTAP clusters in the Console might fail.

See Knowledge Base article Agent IP conflict with existing network for instructions on how to change the IP address of the agent’s interfaces.

SSL decryption supported only for Cloud Volumes ONTAP

Transparent proxy servers are supported for agents associated with Cloud Volumes ONTAP only. You cannot use a transparent proxy for an agent if it is used with other NetApp data services. If you use NetApp data services with Cloud Volumes ONTAP, create a dedicated agent for Cloud Volumes ONTAP where you can use a transparent proxy server.

For enhanced security, you have the option to install an HTTPS certificate signed by a certificate authority (CA).

Blank page when loading the local UI

If you load the web-based console that’s running on an agent, the interface might fail to display sometimes, and you just get a blank page.

This issue is related to a caching problem. The workaround is to use an incognito or private web browser session.

Shared Linux hosts are not supported

The agent isn’t supported on a VM that is shared with other applications. The VM must be dedicated to the agent software.

Third-party agents and extensions

Third-party agents or VM extensions are not supported on the agent VM.

Get started

Learn the basics

Learn about NetApp Console

The Console unifies storage management and protection across hybrid multi-cloud with integrated data services to protect and optimize data.

It is available as a service (SaaS) platform or a self-hosted option that you can install in your sovereign cloud. It provides storage management, data mobility, data protection, and data analysis and control. Management capabilities are provided through a web-based console and APIs.

Centralized storage management

Discover, deploy, and manage cloud and on-premises storage with the Console.

Supported cloud and on-premises storage

You can manage the following types of storage from the Console:

Cloud storage solutions

- Amazon FSx for NetApp ONTAP
- Azure NetApp Files
- Cloud Volumes ONTAP
- Google Cloud NetApp Volumes

On-premises flash and object storage

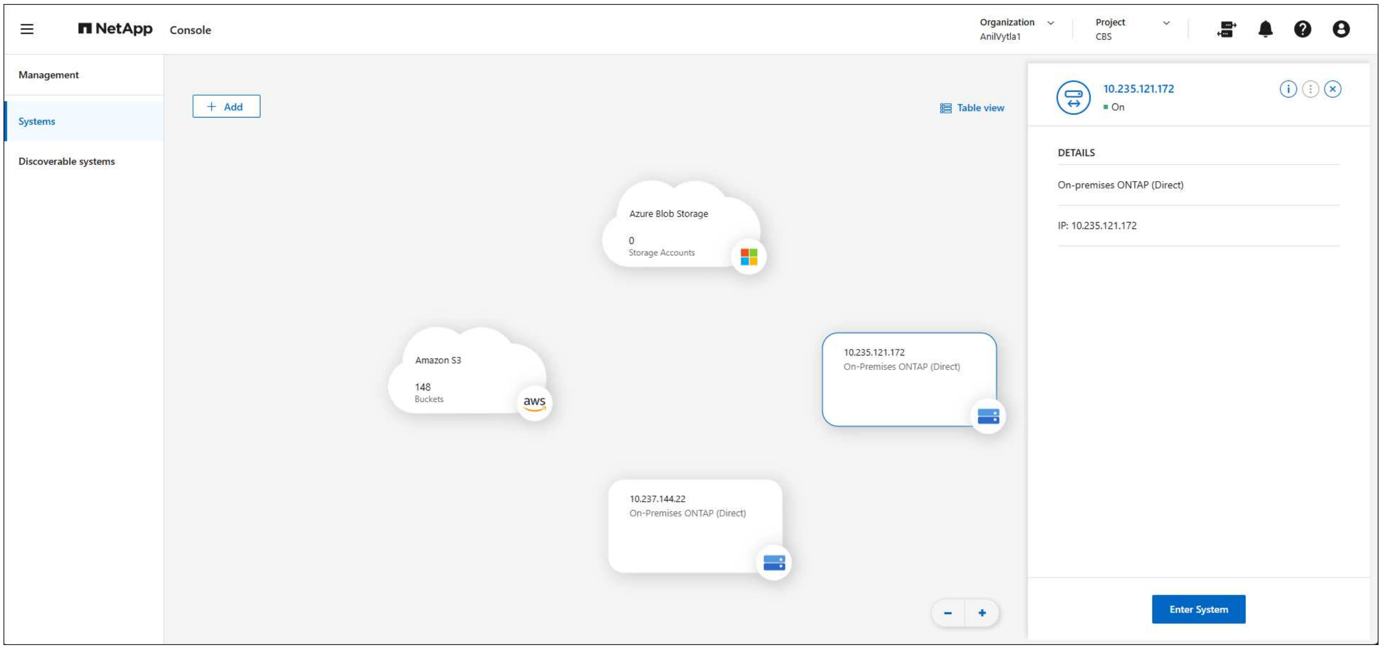
- E-Series systems
- ONTAP clusters
- StorageGRID systems

Cloud object storage

- Amazon S3 storage
- Azure Blob storage
- Google Cloud Storage

Storage management

Within the Console, *systems* represent discovered or deployed storage. You can select a *system* to integrate it with NetApp data services or manage storage, such as adding volumes.



Integrated data services and storage management to protect, secure, and optimize data

The Console provides data services to secure and maintain storage availability.

Storage alerts

View issues related to capacity, availability, performance, protection, and security in your ONTAP environment.

Automation hub

Use scripted solutions to automate the deployment and integration of NetApp products and services.

NetApp Backup and Recovery

Back up and restore cloud and on-premises data.

NetApp Data Classification

Get your application data and cloud environments privacy ready.

NetApp Copy and Sync

Sync data between on-premisesand cloud data stores.

NetApp digital advisor (Active IQ)

Use predictive analytics and proactive support to optimize your data infrastructure.

Licenses and subscriptions

Manage and monitor your licenses and subscriptions.

NetApp Disaster Recovery

Protect on-premises VMware workloads using VMware Cloud on Amazon FSx for ONTAP as a disaster recovery site.

Lifecycle planning

Identify clusters with current or forecasted low capacity and implement data tiering or additional capacity recommendations.

NetApp Ransomware Resilience

Detect anomalies that might result in ransomware attacks. Protect and recover workloads.

NetApp Replication

Replicate data between storage systems to support backup and disaster recovery.

Software updates

Automate the assessment, planning, and execution of ONTAP upgrades.

Sustainability dashboard

Analyze the sustainability of your storage systems.

NetApp Cloud Tiering

Extend your on-premises ONTAP storage to the cloud.

NetApp Volume Caching

Create a writable cache volume to speed up access to data or offload traffic from heavily accessed volumes.

NetApp Workloads

Design, set up, and operate key workloads using Amazon FSx for NetApp ONTAP.

Learn more about the NetApp Console and the available data services

Supported cloud providers

The Console enables you to manage cloud storage and use cloud services in Amazon Web Services, Microsoft Azure, and Google Cloud.

Cost

There is no charge for the NetApp Console. You incur costs if you deploy Console agents in the cloud or use Restricted mode deployed in the cloud. There are costs associated with some NetApp data services. Learn about NetApp data services pricing

How NetApp Console works

The NetApp Console is web-based console that’s provided through the SaaS layer, a resource and access management system, Console agents that manage storage systems and enable NetApp data services, and different deployment modes to meet your business requirements.

Software-as-a-service

You access the Console through a web-based interface and APIs. This SaaS experience enables you to automatically access the latest features as they’re released.

Identity and access management (IAM)

The Console provides identity and access management (IAM) for resource and access management. This IAM model provides granular management of resources and permissions:

- A top-level *organization* enables you to manage access across your various *projects*
- *Folders* enable you to group related projects together

- Resource management enables you to associate a resource with one or more folders or projects
- Access management enables you to assign a role to members at different levels of the organization hierarchy
- Learn more about IAM in NetApp Console

Console agents

A Console agent is needed for some additional features and data services. It enables you to manage resources and processes across your on-premises and cloud environments. You need it to manage some systems (for example, Cloud Volumes ONTAP) and to use some NetApp data services.

Learn more about Console agents.

SaaS versus sovereign cloud deployment

You can start using NetApp Console by signing up for the SaaS offering or deploying it in your sovereign cloud. When you deploy NetApp Console in a sovereign cloud, NetApp limits outbound connectivity to meet your organization’s security and compliance requirements. Not all features and services are available when the Console is deployed in a sovereign cloud.

NetApp continues to offer BlueXP for sites that want no outbound connectivity. BlueXP can be installed on your network with no outbound connectivity. Learn about BlueXP (private mode) for sites with no internet connectivity.

Learn more about deployment modes.

SOC 2 Type 2 certification

An independent certified public accountant firm and services auditor examined the Console and affirmed that it achieved SOC 2 Type 2 reports based on the applicable Trust Services criteria.

View NetApp’s SOC 2 reports

Learn about NetApp Console deployment modes

The NetApp Console offers multiple *deployment modes* that enable you to meet your business and security requirements.

- *Standard mode* leverages a software as a service (SaaS) layer to provide full functionality. Users access the Console through a web-based hosted interface
- *Restricted mode* is available for organizations that have connectivity restrictions who want to install the NetApp Console in their own public cloud. Users access the Console through a web-based interface that’s hosted on a Console agent in their cloud environment.

  NetApp Console restricts traffic, communication, and data in restricted mode, and you must ensure your environment (on-premises and in the cloud) complies with required regulations.

Overview

Each deployment mode differs in outbound connectivity, location, installation, authentication, data services, and charging methods.

Standard mode

You use a SaaS service from the web-based console. Depending on the data services and features that you plan to use, a Console organization admin creates one or more Console agents to manage data within your hybrid cloud environment.

This mode uses encrypted data transmission over the public internet.

Restricted mode

You install a Console agent in the cloud (in a government, sovereign, or commercial region), and it has limited outbound connectivity to the NetApp Console SaaS layer.

This mode is typically used by state and local governments and regulated companies.

Learn more about outbound connectivity to the SaaS layer.

BlueXP private mode (legacy BlueXP interface only)

BlueXP private mode (legacy BlueXP interface) is typically used with on-premises environments that have no internet connection and with secure cloud regions, which includes AWS Secret Cloud, AWS Top Secret Cloud, and Azure IL6. NetApp continues to support these environments with the legacy BlueXP interface. PDF documentation for BlueXP private mode

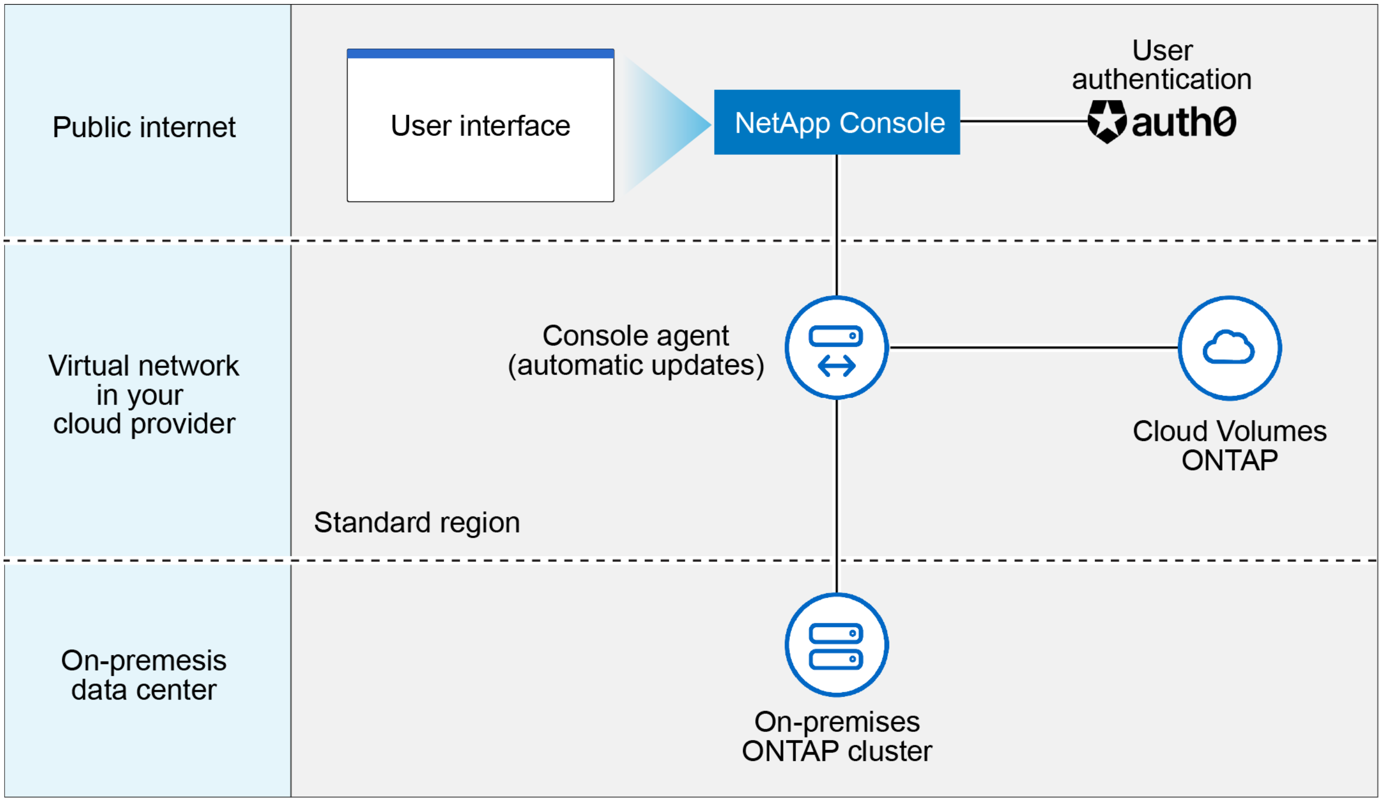
The following table provides a comparison of the NetApp console.

	Standard mode	Restricted mode
Connection required to NetApp Console SaaS layer?	Yes	Outbound only
Connection required to your cloud provider?	Yes	Yes, within the region
Console agent installation	From the Console, cloud marketplace, or manual install	Cloud marketplace or manual install
Console agent upgrades	Automatic upgrades	Automatic upgrades
UI access	From the Console SaaS layer	Locally from an agent VM
API endpoint	The Console SaaS layer	A Console agent
Authentication	Through SaaS using auth0, NSS login, or identity federation	Through SaaS using auth0 or identity federation
Multi-factor authentication	Available for local users	Not available
Storage and data services	All are supported	Many are supported
Data service licensing options	Marketplace subscriptions and BYOL	Marketplace subscriptions and BYOL

Read through the following sections to learn more about these modes, including which NetApp Console features and services are supported.

Standard mode

The following image is an example of a standard mode deployment.



The Console works as follows in standard mode:

Outbound communication

Connectivity is required from a Console agent to the Console SaaS layer, to your cloud provider's publicly available resources, and to other essential components for day-to-day operations.

- Endpoints that an agent contacts in AWS
- Endpoints that an agent contacts in Azure
- Endpoints that an agent contacts in Google Cloud

Supported location for an agent

In standard mode, an agent is supported in the cloud or on your premises.

Console agent installation

You can install an agent using one of the following methods:

- From the Console
- From the AWS or Azure Marketplace
- From the Google Cloud SDK
- Manually using an installer on a Linux host in your data center or cloud
- Use the provided OVA in your VCenter environment.

Console agent upgrades

NetApp automatically upgrades your agent monthly.p.

User interface access

The user interface is accessible from the web-based console that’s provided through the SaaS layer.

API endpoint

API calls are made to the following endpoint:
https://api.bluexp.netapp.com

Authentication

Authentication with auth0 or NetApp Support Site (NSS) logins. Identity federation is available.

Supported data services

All NetApp data services are supported. Learn more about NetApp data services.

Supported licensing options

Marketplace subscriptions and BYOL are supported with standard mode; however, the supported licensing options depends on which NetApp data service you are using. Review the documentation for each service to learn more about the available licensing options.

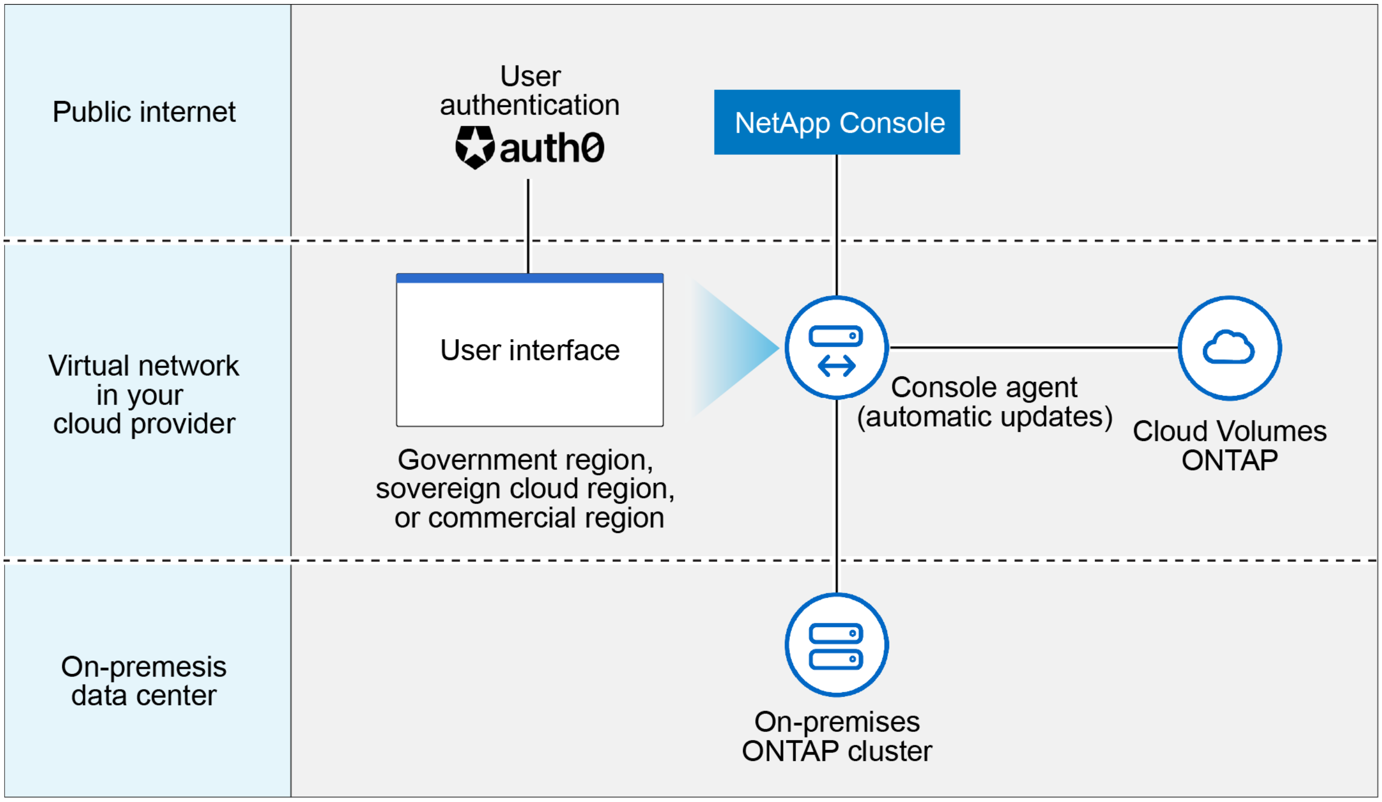
How to get started with standard mode

Go to the NetApp Console and sign up.

Learn how to get started with standard mode.

Restricted mode

The following image is an example of a restricted mode deployment.


Public internet
User authentication
auth0
NetApp Console
Virtual network in your cloud provider
User interface
Government region, sovereign cloud region, or commercial region
Console agent (automatic updates)
Cloud Volumes ONTAP
On-premesis data center
On-premises ONTAP cluster

The Console works as follows in restricted mode:

Outbound communication

An agent requires outbound connectivity to the Console SaaS layer for data services, software upgrades, authentication, and metadata transmission.

The Console SaaS layer does not initiate communication to an agent. Agents initiate all communication with the Console SaaS layer, pulling or pushing data as needed.

A connection is also required to cloud provider resources from within the region.

Supported location for an agent

In restricted mode, an agent is supported in the cloud: in a government region, sovereign region, or commercial region.

Console agent installation

You can install from the AWS or Azure Marketplace or a manual installation on your own Linux host or us a downloadable OVA in your VCenter environment.

Console agent upgrades

NetApp automatically upgrades your agent software with monthly updates.

User interface access

The user interface is accessible from an agent virtual machine that's deployed in your cloud region.

API endpoint

API calls are made to the agent virtual machine.

Authentication

Authentication is provided through auth0. Identity federation is also available.

Supported storage management and data services

The following storage and data services with restricted mode:

Supported services	Notes
Azure NetApp Files	Full support
Backup and recovery	Supported in Government regions and commercial regions with restricted mode. Not supported in sovereign regions with restricted mode. In restricted mode, NetApp Backup and Recovery supports back up and restore of ONTAP volume data only. View the list of supported backup destinations for ONTAP data Back up and restore of application data and virtual machine data is not supported.
NetApp Data Classification	Supported in Government regions with restricted mode. Not supported in commercial regions or in sovereign regions with restricted mode.
Cloud Volumes ONTAP	Full support

Supported services	Notes
Licenses and subscriptions	You can access license and subscription information with the supported licensing options listed below for restricted mode.
On-premises ONTAP clusters	Discovery with a Console agent and discovery without a Console agent (direct discovery) are both supported. When you discover an on-premises cluster without a Console agent, the Advanced view (System Manager) is not supported.
Replication	Supported in Government regions with restricted mode. Not supported in commercial regions or in sovereign regions with restricted mode.

Supported licensing options

The following licensing options are supported with restricted mode:

- Marketplace subscriptions (hourly and annual contracts)

  Note the following:

  - For Cloud Volumes ONTAP, only capacity-based licensing is supported.
  - In Azure, annual contracts are not supported with government regions.
- BYOL

  For Cloud Volumes ONTAP, both capacity-based licensing and node-based licensing are supported with BYOL.

How to get started with restricted mode

You need to enable restricted mode when you create your NetApp Console organization.

If you don’t have an organization yet, you are prompted to create your organization and enable restricted mode when you log in to the Console for the first time from a Console agent that you manually installed or that you created from your cloud provider’s marketplace.

ⓘ You cannot change the restricted mode setting after creating the organization.

Learn how to get started with restricted mode.

Service and feature comparison

The following table can help you quickly identify which services and features are supported with restricted mode.

Note that some services might be supported with limitations. For more details about how these services are supported with restricted mode, refer to the sections above.

Product area	NetApp data service or feature	Restricted mode
Storage This portion of the table lists support for storage systems management from the Console. It does not indicate the supported backup destinations for NetApp Backup and Recovery.	Amazon FSx for ONTAP	No
	Amazon S3	No
	Azure Blob	No
	Azure NetApp Files	Yes
	Cloud Volumes ONTAP	Yes
	Google Cloud NetApp Volumes	No
	Google Cloud Storage	No
	On-premises ONTAP clusters	Yes
	E-Series	No
	StorageGRID	No
Data Services	NetApp Backup and recovery	Yes View the list of supported backup destinations for ONTAP volume data
	NetApp Data Classification	Yes
	NetApp Copy and Sync	No
	NetApp Disaster Recovery	No
	NetApp Ransomware Resilience	No
	NetApp Replication	Yes
	NetApp Cloud Tiering	No
	NetApp Volume caching	No
	NetApp Workload factory	No

Product area	NetApp data service or feature	Restricted mode
Features	Alerts	No
	Digital Advisor	No
	License and subscription management	Yes
	Identity and access management	Yes
	Credentials	Yes
	Federation	Yes
	Lifecycle planning	No
	Multi-factor authentication	Yes
	NSS accounts	Yes
	Notifications	Yes
	Search	Yes
	Software updates	No
	Sustainability	No
	Audit	Yes

Manage NSS credentials associated with NetApp Console

Associate a NetApp Support Site account with your Console organization to enable key workflows for storage management. These NSS credentials are associated with the entire organization.

The Console also supports associating one NSS account per user account. Learn how to manage user-level credentials.

Overview

Associating NetApp Support Site credentials with your specific Console account serial number is required to enable the following tasks:

- Deploying Cloud Volumes ONTAP when you bring your own license (BYOL)

  Providing your NSS account is required so that the Console can upload your license key and to enable the subscription for the term that you purchased. This includes automatic updates for term renewals.

- Registering pay-as-you-go Cloud Volumes ONTAP systems

  Providing your NSS account is required to activate support for your system and to gain access to NetApp technical support resources.

- Upgrading Cloud Volumes ONTAP software to the latest release

These credentials are associated with your specific Console account serial number. Users can access these credentials from **Support > NSS Management**.

Add an NSS account

You can add and manage your NetApp Support Site accounts for use with the Console from the Support Dashboard within the Console.

When you have added your NSS account, the Console uses this information for things like license downloads, software upgrade verification, and future support registrations.

You can associate multiple NSS accounts with your organization; however, you cannot have customer accounts and partner accounts within the same organization.

> ⓘ NetApp uses Microsoft Entra ID as the identity provider for authentication services specific to support and licensing.

Steps

1. In **Administration > Support**.
2. Select **NSS Management**.
3. Select **Add NSS Account**.
4. Select **Continue** to be redirected to a Microsoft login page.
5. At the login page, provide your NetApp Support Site registered email address and password.

   Upon successful login, NetApp will store the NSS user name.

   This is a system-generated ID that maps to your email. On the **NSS Management** page, you can display your email from the ••• menu.

   - If you ever need to refresh your login credential tokens, there is also an **Update Credentials** option in the ••• menu.

     Using this option prompts you to log in again. Note that the token for these accounts expire after 90 days. A notification will be posted to alert you of this.

What's next?

Users can now select the account when creating new Cloud Volumes ONTAP systems and when registering existing Cloud Volumes ONTAP systems.

- Launching Cloud Volumes ONTAP in AWS
- Launching Cloud Volumes ONTAP in Azure
- Launching Cloud Volumes ONTAP in Google Cloud
- Registering pay-as-you-go systems

Update NSS credentials

For security reasons, you must update your NSS credentials every 90 days. You'll be notified in the Console notification center if your NSS credential has expired. Learn about the Notification Center.

Expired credentials can disrupt the following, but are not limited to:

- License updates, which mean you won't be able to take advantage of newly purchased capacity.
- Ability to submit and track support cases.

Additionally, you can update the NSS credentials associated with your organization if you want to change the NSS account associated with your organization. For example, if the person associated with your NSS account has left your company.

Steps

1. In **Administration > Support**.
2. Select **NSS Management**.
3. For the NSS account that you want to update, select ••• and then select **Update Credentials**.
4. When you're prompted, select **Continue** to be redirected to a Microsoft login page.

   NetApp uses Microsoft Entra ID as the identity provider for authentication services related to support and licensing.

5. At the login page, provide your NetApp Support Site registered email address and password.

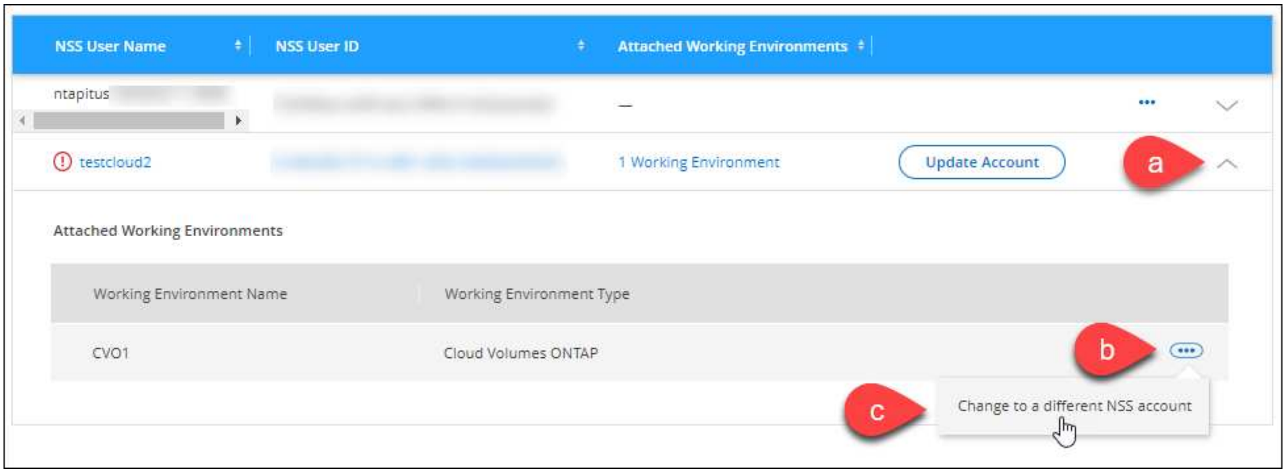
Attach a system to a different NSS account

If your organization has multiple NetApp Support Site accounts, you can change which account is associated with a Cloud Volumes ONTAP system.

You must first have associated the account with the Console.

Steps

1. In **Administration > Support**.
2. Select **NSS Management**.
3. Complete the following steps to change the NSS account:
   a. Expand the row for the NetApp Support Site account that the system is currently associated with.
   b. For the system that you want to change the association for, select •••
   c. Select **Change to a different NSS account**.



NSS User Name	NSS User ID	Attached Working Environments		
ntapitus[redacted]	[redacted]	–		•••
ⓘ testcloud2	[redacted]	1 Working Environment	Update Account	

Attached Working Environments

Working Environment Name	Working Environment Type
CVO1	Cloud Volumes ONTAP

   d. Select the account and then select **Save**.

Display the email address for an NSS account

For security, the email address associated with an NSS account is not displayed by default. You can view the email address and associated user name for an NSS account.

When you go to the NSS Management page, the Console generates a token for each account in the table. That token includes information about the associated email address. The token is removed when you leave the page. The information is never cached, which helps protect your privacy.

Steps

1. In **Administration > Support**.
2. Select **NSS Management**.
3. For the NSS account that you want to update, select ••• and then select **Display Email Address**. You can use the copy button to copy the email address.

Remove an NSS account

Delete any of the NSS accounts that you no longer want to use with the Console.

You can’t delete an account that is currently associated with a Cloud Volumes ONTAP system. You first need to attach those systems to a different NSS account.

Steps

1. In **Administration > Support**.
2. Select **NSS Management**.
3. For the NSS account that you want to delete, select ••• and then select **Delete**.
4. Select **Delete** to confirm.

Learn about NetApp Console agents

You use a Console agent to connect NetApp Console to your infrastructure and securely orchestrate storage solutions across AWS, Azure, Google Cloud, or on-premises environments, as well as use data protection services.

A Console agent enables you to:

- Orchestrate storage management tasks from the NetApp Console such as provisioning Cloud Volumes ONTAP, setting up storage volumes, using data classification, and more.
- Authenticate using your cloud provider’s IAM roles for subscription billing integration
- Use advanced data services (NetApp Backup and Recovery, NetApp Disaster Recovery, NetApp Ransomware Resilience, and NetApp Cloud Tiering)
- Use the Console in restricted mode.

If you don’t need advanced orchestration or data protection, you can centrally manage on-premises ONTAP clusters and cloud-native storage services without deploying an agent. Monitoring and data mobility tools are also available.

The following table shows which features and services you can use with and without a Console agent.

	Available with agent	**Available without agent**
Supported Storage systems:		

	Available with agent	**Available without agent**
Amazon FSx for ONTAP	Yes (discovery and management features)	Yes (discovery only)
Amazon S3 storage	Yes	No
Azure Blob storage	Yes	Yes
Azure NetApp Files	Yes	Yes
Cloud Volumes ONTAP	Yes	No
E-Series systems	Yes	No
Google Cloud NetApp Volumes	Yes	Yes
Google Cloud storage buckets	Yes	No
StorageGRID systems	Yes	No
On-premises ONTAP cluster (advanced management and discovery)	Yes (advanced management and discovery)	No (basic discovery only)
Available storage management services:		
Alerts	Yes	No
Automation hub	Yes	Yes
Digital Advisor (Active IQ)	Yes	No
License and subscription management	Yes	No
Economic efficiency	Yes	No
Home page dashboard metrics	Yes[2]	No
Lifecycle planning	Yes	No[1]
Sustainability	Yes	No
Software updates	Yes	Yes
NetApp Workloads	Yes	Yes

	Available with agent	Available without agent
Available data services:		
NetApp Backup and Recovery	Yes	No
Data Classification	Yes	No
NetApp Cloud Tiering	Yes	No
NetApp Copy and Sync	Yes	No
NetApp Disaster Recovery	Yes	No
NetApp Ransomware Resilience	Yes	No
NetApp Volume Caching	Yes	No

[1] You can view Lifecycle planning without a Console agent, but a Console agent is required to initiate actions.

[2] Accurate metrics on the Home page require appropriately sized and configured Console agents.

Console agents must be operational at all times

Console agents are a fundamental part of the NetApp Console. It's your responsibility (the customer) to ensure that relevant agents are up, operational, and accessible at all times. The Console can handle short agent outages, but you must fix infrastructure failures quickly.

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Supported locations

You can install agents in the following locations:

- Amazon Web Services
- Microsoft Azure

  Deploy a Console agent in Azure in the same region as the Cloud Volumes ONTAP systems it manages. Alternatively, deploy it in the Azure region pair. This ensures that an Azure Private Link connection is used between Cloud Volumes ONTAP and its associated storage accounts. Learn how Cloud Volumes ONTAP uses an Azure Private Link

- Google Cloud

  To use the Console and data services with Google Cloud, deploy your agent in Google Cloud.

- On your premises

Communication with cloud providers

The agent uses TLS 1.3 for all communication to AWS, Azure, and Google Cloud.

Restricted mode

To use the Console in restricted mode, you install a Console agent and access the Console interface that's running locally on the Console agent.

Learn about NetApp Console deployment modes.

How to install a Console agent

You can install a Console agent directly from the Console, from your cloud provider's marketplace, or by manually installing the software on your own Linux host or in your VCenter environment.

- Learn about NetApp Console deployment modes
- Get started with NetApp Console in standard mode
- Get started with NetApp Console in restricted mode

Cloud provider permissions

You need specific permissions to create the Console agent directly from the NetApp Console and another set of permissions for the Console agent itself. If you create the Console agent in AWS or Azure directly from the Console, then the Console creates the Console agent with the permissions that it needs.

When using the Console in standard mode, how you provide permissions depends on how you plan to create the Console agent.

To learn how to set up permissions, refer to the following:

- Standard mode
  - Agent installation options in AWS
  - Agent installation options in Azure
  - Agent installation options in Google Cloud
  - Set up cloud permissions for on-premises deployments
- Set up permissions for restricted mode

To view the exact permissions that the Console agent needs for day-to-day operations, refer to the following pages:

- Learn how the Console agent uses AWS permissions
- Learn how the Console agent uses Azure permissions
- Learn how the Console agent uses Google Cloud permissions

It's your responsibility to update the Console agent policies as new permissions are added in subsequent releases. The release notes list new permissions.

Agent upgrades

NetApp updates agent software monthly to add features and improve stability. Some Console features, like Cloud Volumes ONTAP and on-premises ONTAP cluster management, rely on the Console agent version and settings.

When you install your agent in the cloud, the Console agent updates automatically if it has internet access.

Operating system and VM maintenance

Maintaining the operating system on the Console agent host is your (customer's) responsibility. For example, you (customer) should apply security updates to the operating system on the Console agent host by following your company's standard procedures for operating system distribution.

Note that you (customer) don't need to stop any services on the Console gent host when applying minor security updates.

If you (customer) need to stop and then start the Console agent VM, you should do so from your cloud provider's console or by using the standard procedures for on-premises management.

The Console agent must be operational at all times.

Multiple systems and agents

An agent can manage multiple systems and support data services in the Console. You can use a single agent to manage multiple systems based on deployment size and the data services you use.

For large-scale deployments, work with your NetApp representative to size your environment. Contact NetApp Support if you experience issues.

Here are a few examples of agent deployments:

- You have a multicloud environment (for example, AWS and Azure) and you prefer to have one agent in AWS and another in Azure. Each manages the Cloud Volumes ONTAP systems running in those environments.
- A service provider might use one Console organization to provide services for their customers, while using another organization to provide disaster recovery for one of their business units. Each organization needs its own agent.

Learn about NetApp Console identity and access management

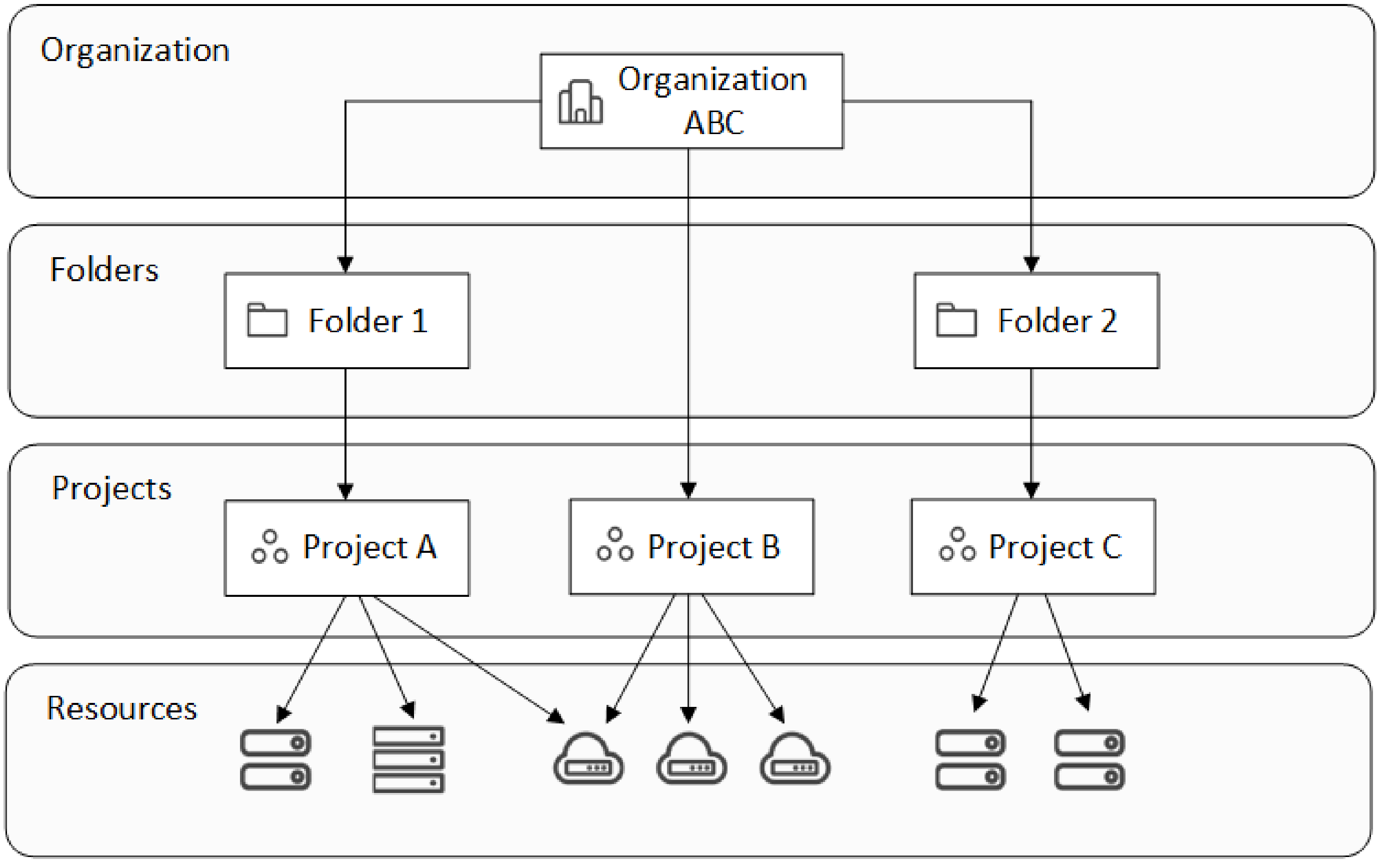
Use NetApp Console's Identity and Access Management (IAM) to organize your NetApp resources and control access according to your business structure—by location, department, or project.

Resources are arranged hierarchically: the organization is at the top, followed by folders (which can contain other folders or projects), and then projects, which contain storage systems, workloads, and agents.

Assign role-based access control (RBAC) permissions to members at the organization, folder, or project level to ensure users have the appropriate access to resources.

> ⓘ You must have the *Super admin*, *Organization admin* , or *Folder or project admin* roles to manage IAM in NetApp Console.

The following image illustrates this hierarchy at a basic level.



]

Identity and access management components

Within NetApp Console, you organize your storage resources using three main components: organizational components, resource components, and user access components.

Projects and folders within your organization

Within your IAM structure, you work with three organizational components are organizations, projects, and folders. You can grant users access by assigning them roles at any of these levels.

Organization

An *organization* is the top level of the Console IAM system and typically represents your company. Your organization consists of folders, projects, members, roles, and resources. Agents are associated with specific projects in the organization.

Projects

A *project* is used to provide access to a storage resource. You must assign a resources to project before anyone can access them. You can assign multiple resources to a single project and you can also have multiple projects. You then assign users permissions to the project to give them access to the resources within it.

For example, you can associate an on-premises ONTAP system with a single project or with all projects in your organization, depending on your needs.

Learn how to add projects to your organization.

Folders

Group related projects in *folders* to organize them by location, site, or business unit. You can’t associate resources directly with folders, but assigning a user a role at the folder level gives them access to all projects in that folder.

Learn how to add folders to your organization.

Resources

Resources include storage systems, Keystone subscriptions, as well as Console agents.

+
You must associate a resource with a project before anyone can access it.

+

For example, you might associate a Cloud Volumes ONTAP system with one project or with all projects in your organization. How you associate a resource depends on your organization’s needs.

+

Learn how to associate resources to projects.

Storage systems and Keystone subscriptions

Storage systems are the primary resources that you manage in NetApp Console. NetApp Console supports management of both on-premises and cloud storage systems. You must add a storage system to a project before anyone can access it.

Storage systems are automatically associated with the project where they are added, but you can also associate them with other projects or folders from the **Resources** page.

Keystone subscriptions are also resources that you can associate with projects in order to grant users access to the subscription in NetApp Console.

Console agents

Organization admins create Console agents to manage storage systems and enable NetApp data services. Agents are initially tied to the project where they are created, but admins can add them to other projects or folders from the Agents page.

Associating an agent with a project enables management of resources in that project, while associating an agent with a folder lets folder or project admins decide which projects should use the agent. Agents must be linked to specific projects to provide management capabilities.

Learn how to associate agents with projects.

Members and roles

Members

Members of your organization are user accounts or service accounts. A service account is typically used by an application to complete specified tasks without human intervention.

You need to add members to your organization after they sign up for NetApp Console. Once added, you can assign them roles to provide access to resources. You can manually add service accounts from within the Console or automate their creation and management through the NetApp Console IAM API.

Learn how to add members to your organization.

Access roles

The Console provides access roles that you can assign to the members of your organization.

When you associate a member with a role, you can grant that role for the entire organization, a specific folder, or a specific project. The role that you select gives a member permissions to the resources in the selected part of the hierarchy.

NetApp Console provides granular roles that adhere to the principles of "least privilege" which means access roles are designed to give users access to only that that they need

This means users may have multiple roles assigned to them as their duties expand.

Learn about access roles.

IAM strategy examples

Small organization strategy

For organizations with fewer than 50 users and centralized storage management, consider a simplified approach using Super admin and Super viewer roles.

Example: ABC Corporation (5-person team)

- **Structure:** Single organization with 3 projects (Production, Development, Backup)
- **Roles:**
  - 2 senior members: **Super admin** role for full administrative access
  - 3 team members: **Super viewer** role for monitoring without modification rights
- **Agent strategy:** Single agent associated with all projects for shared resource access
- **Benefits:** Simplified administration, reduced role complexity, suitable for teams requiring broad access

Multi-regional enterprise strategy

For large organizations with regional operations and specialized teams, implement a hierarchical approach with folders representing geographical or business unit boundaries.

Example: XYZ Corporation (multinational company)

- **Structure:** Organization > Regional folders (North America, Europe, Asia-Pacific) > Project folders per region
- **Platform roles:**
  - 1 **Organization admin**: Global oversight and policy management
  - 3 **Folder or project admins**: Regional control (one per region)
  - 1 **Federation admin**: Corporate identity provider integration
- **Storage roles by region:**
  - 9 **Storage admin**: Discover and manage storage systems in assigned regions
  - 2 **Storage viewer**: Monitor storage resources across regions
  - 1 **System health specialist**: Manage storage health without system modifications

- **Data service roles:**
  - **Backup and Recovery admin**: Per-project based on backup responsibilities
  - **Ransomware Resilience admin**: Security team monitoring across projects
- **Agent strategy:** Regional agents associated with appropriate geographical projects
- **Benefits:** Enhanced security through role segregation, regional autonomy, and compliance with local regulations

Departmental specialization strategy

For organizations with specialized teams requiring specific data service access, use targeted role assignments based on functional responsibilities.

Example: TechCorp (mid-size technology company)

- **Structure:** Organization > Department folders (IT, Security, Development) > Project-specific resources
- **Specialized roles:**
  - Security team: **Ransomware Resilience admin** and **Classification viewer** roles
  - Backup team: **Backup and Recovery super admin** for comprehensive backup operations
  - Development team: **Storage admin** for test environment management
  - Compliance team: **Operation support analyst** for monitoring and support case management
- **Agent strategy:** Agents linked to departmental projects based on resource ownership
- **Benefits:** Tailored access control, improved operational efficiency, and clear accountability for specialized tasks

Next steps with IAM in NetApp Console

- Get started with IAM in NetApp Console
- Monitor or audit IAM activity
- Learn about the API for NetApp Console IAM

Get started with NetApp Console (Saas)

Getting started workflow (SaaS)

Get started with the NetApp Console (SaaS) by preparing networking for the Console, signing up and creating an account, and using the Console assistant to set up initial functionality.

You access a web-based console that is hosted as a Software-as-a-service (SaaS) product from NetApp. You can use the Console to manage your hybrid cloud storage environment and use NetApp data services.

1

Prepare networking for using the NetApp console

Ensure computers accessing the NetApp console have network access to the required endpoints.

Learn how to prepare networking for the NetApp console.

2 **Sign up and create an organization**

Go to the NetApp console and sign up. If prompted to create an organization and you think an organization already exists for your company, close the dialog box and tell your organization administrator. If there isn't currently an Organization administrator for your company, you can claim this role. Learn how to contact an organization administrator.

At this point, you're logged in and can use the NetApp assistant to start configuring the Console. To begin, associate your NetApp Support account and a Console agent to enable full functionality.

If you choose not to use the NetApp assistant or install a Console agent, you can start managing storage and using services like Digital Advisor, Amazon FSx for ONTAP, Azure NetApp Files, and more. Learn what you can do without a Console agent.

3 **Associate your NetApp Support Site (NSS) account**

Associating your NetApp Support Site (NSS) account with the Console enables you to manage your licenses and subscriptions more easily as well as access support resources directly from the Console.

4 **Create a Console agent**

Advanced storage management features and some NetApp data services require that you install a Console agent. The Console agent enables the Console to manage resources and processes within your hybrid cloud environment.

You can create a Console agent in your cloud or on-premises network.

- Learn more about when Console agents are required and how they work
- Learn how to create a Console agent in AWS
- Learn how to create a Console agent in Azure
- Learn how to create a Console agent in Google Cloud
- Learn how to create a Console agent on-premises

5 **Add a storage system to the Console**

Within the NetApp Console, you can add or discover storage systems to manage your hybrid cloud storage environment. Use the NetApp assistant to add your first storage system.

> If you install a Console agent in AWS, Microsoft Azure, or Google Cloud, then the Console automatically discovers information about the Amazon S3 buckets, Azure Blob storage, or Google Cloud Storage buckets in the location where the agent is installed. These systems are automatically added to the **Systems** page.

- Learn how to discover an ONTAP system
- Learn how to discover a StorageGRID system
- Learn how to discover an E-Series system

6 Subscribe to NetApp Intelligent Services (optional)

Sign up for NetApp Intelligent Services through your cloud provider for hourly (PAYGO) or annual billing. A subscription includes NetApp Backup and Recovery, Cloud Volumes ONTAP, NetApp Cloud Tiering, NetApp Ransomware Resilience, NetApp Disaster Recovery, and NetApp Data Classification.

Prepare network access for NetApp Console

NetApp Console, the NetApp Console agent, and NetApp data services require outbound internet access and the ability to contact the necessary endpoints.

You'll need to set up network access for the following:

- Computers that access the NetApp Console as software as a service (SaaS)
- Console agents you install on-premises or in the cloud. Console agents.

> ⓘ With 4.0.0, NetApp has reduced the required network endpoints for the Console and Console agents, enhancing security and simplifying deployment. Importantly, all deployments prior to version 4.0.0 continue to be fully supported. While previous endpoints remain available for existing agents, NetApp strongly recommends updating firewall rules to the current endpoints after confirming successful agent upgrades.Learn how to update your endpoint list.

Endpoints contacted by NetApp Console and Console agents

Each agent you deploy and each computer that accesses the NetApp Console must have connections to the endpoints listed below.

Console agents that are deployed in your cloud provider need access to endpoints respective to that cloud provider.

Endpoints	Purpose
https://mysupport.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support.
https://signin.b2c.netapp.com	To update NetApp Support Site (NSS) credentials or to add new NSS credentials to the NetApp Console.
https://support.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support as well as to receive software updates for Cloud Volumes ONTAP.
https://api.bluexp.netapp.com https://netapp-cloud-account.auth0.com https://netapp-cloud-account.us.auth0.com https://console.netapp.com https://components.console.bluexp.netapp.com https://cdn.auth0.com	To provide features and services within the NetApp Console.

Endpoints	Purpose
https://bluexpinfraprod.eastus2.data.azurecr.io https://bluexpinfraprod.azurecr.io	To obtain images for Console agent upgrades. • When you deploy a new agent, the validation check tests connectivity to current endpoints. If you use previous endpoints, the validation check fails. To avoid this failure, skip the validation check. Although the previous endpoints are still supported, NetApp recommends updating your firewall rules to the current endpoints as soon as possible. Learn how to update your endpoint list. • When you update to the current endpoints in your firewall, your existing agents will continue to work.

Cloud provider endpoints contacted the Console agent

Console agents must have access to additional endpoints if they are deployed in your cloud provider.

Set up cloud provider network endpoint access before installing the Console agent.

- Set up AWS network access for a Console agent
- Set up Azure network access for a Console agent
- Set up Google Cloud network access for a Console agent

Data services endpoints contacted by the Console agent

Some NetApp data services as well as Cloud Volumes ONTAP require the agent to have additional outbound internet access.

Endpoints for Cloud Volumes ONTAP

- Endpoints for Cloud Volumes ONTAP in AWS
- Endpoints for Cloud Volumes ONTAP in Azure
- Endpoints for Cloud Volumes ONTAP in Google Cloud

Endpoints for Workloads

The Console agent must be able to access the following endpoint for NetApp Workloads.

Endpoints	Purpose
https://api.workloads.netapp.com	The web-based console contacts this endpoint to interact with the Workload Factory APIs to manage and operate FSx for ONTAP-based workloads.

Sign up or log in to NetApp Console

To use the Console, sign up or log in with your NetApp Support Site credentials, or create a NetApp Console login. If you are the first from your company to sign up, you create a new organization as the administrator. If your company already has an organization, sign up or log in with your existing NetApp Support Site credentials or company single-sign-on (SSO).

Sign up for NetApp Console as the initial organization administrator

If your company doesn't have a NetApp Console organization, sign up to create one. The first user becomes the organization administrator and manages user accounts and permissions. You can update roles and add more administrators later.

Steps

1. Open a web browser and go to the NetApp Console
2. If you have a NetApp Support Site account, enter the email address associated with your account directly on the **Log in** page.

   The Console signs you up as part of this initial login with your NetApp Support Site credentials.

3. If you want to sign up by creating a Console login, select **Sign up**.
   a. On the **Sign up** page, enter the required information and select **Next**.

      ⓘ Only English characters are allowed in the sign up form.

   b. Check your inbox for an email from NetApp that includes instructions to verify your email address.

      Verify your email address to complete sign up.

4. After you log in, review and accept the End User License Agreement.
5. On the **Welcome** page, create an organization.
6. Select **Let's Start**.

+ As a first-time user and organization administrator, you follow a guided process to add storage resources, create a Console agent, and more. Learn about using the Console Assistant.

Next steps

As an administrator, after you complete the steps included in the Console Assistant, you should plan your identity and access strategy, add users to your organization, and assign roles. Learn about identity and access management for NetApp Console

Sign up or login to NetApp Console when an organization already exists

If your company already has a NetApp Console organization, sign up or log in to access it. Your sign-up or log-in method depends on whether your company uses identity federation or has NetApp Support Site credentials. If not, create a NetApp Console log-in.

Steps

1. Open a web browser and go to the NetApp Console

2. If you have a NetApp Support Site account or if your company has set up single sign-on (SSO), enter your associated email address or SSO credentials on the **Log in** page. Follow the prompts to complete login.

   In both of these cases, you are signed up for the Console as part of this initial login.

3. If you want to sign up by creating a Console login, select **Sign up**.

   a. On the **Sign up** page, enter the required information and select **Next**.

      ⓘ Only English characters are allowed in the sign up form.

   b. Check your inbox for an email from NetApp that includes instructions to verify your email address.

      Verify your email address to complete sign up.

4. After you log in, review and accept the End User License Agreement.
5. If the system prompts you to create an organization, close the dialog box and tell a Console admin so they can add you to your Console organization and give you access. Learn how to contact an organization administrator.

Next steps

After you are given access to your organization, you can start managing storage and using the data services that you are assigned.

Get started using the NetApp Console assistant

If you are a first-time user of the NetApp Console (SaaS) with the Organization admin role, you can use the Console assistant to guide you through the initial setup process. The assistant helps you add a NetApp Support Site (NSS) account, add a Console agent, add a cluster, and add a license or subscription, making it easier to get started with managing your data.

Required roles to access the Console assistant

The Console assistant is only available to users with the Organization admin role.

By default, the NetApp Console displays the Console assistant on the Home page for first-time users who have the Organization admin role. It remains available until you complete the mandatory tasks of creating a Console agent and adding a system.

Use the assistant to complete these tasks, which provide the minimal set up for your NetApp Console environment:

- Add a NetApp Support Site (NSS) account.

  Learn how to add an NSS account.

- Connect to your storage estate by deploying a Console agent.

  Learn how to install a Console agent on-premises.

- Manage a storage system by adding or discovering a cluster

- Add a marketplace subscription or PAYGO license.

  Learn how to add licenses and subscriptions.

- Review data services information.

Get started with NetApp Console (restricted mode)

Getting started workflow (restricted mode)

Get started with the NetApp Console in restricted mode by preparing your environment and deploying the Console agent.

Restricted mode is typically used by state and local governments and regulated companies, including deployments in AWS GovCloud and Azure Government regions. Before getting started, ensure you have an understanding of Console agents and deployment modes.

1 **Prepare for deployment**

a. Prepare a dedicated Linux host that meets requirements for CPU, RAM, disk space, container orchestration tool, and more.

b. Set up networking that provides access to the target networks, outbound internet access for manual installations, and outbound internet for day-to-day access.

c. Set up permissions in your cloud provider so that you can associate those permissions with the Console agent instance after you deploy it.

2 **Deploy the Console agent**

a. Install the Console agent from your cloud provider’s marketplace or by manually installing the software on your own Linux host.

b. Set up the NetApp Console by opening a web browser and entering the Linux host’s IP address.

c. Provide the Console agent with the permissions that you previously set up.

3 **Subscribe to NetApp Intelligent Services (optional)**

Optional: Subscribe to NetApp Intelligent Services from your cloud provider’s marketplace to pay for data services at an hourly rate (PAYGO) or through an annual contract. NetApp Intelligent Services include NetApp Backup and Recovery, Cloud Volumes ONTAP, NetApp Cloud Tiering, NetApp Ransomware Resilience and NetApp Disaster Recovery. NetApp Data Classification is included with your subscription at no additional cost.

Prepare for deployment in restricted mode

Prepare your environment before you deploy NetApp Console in restricted mode. You need to review host requirements, prepare networking, set up permissions, and more.

Step 1: Understand how restricted mode works

Understand how the NetApp Console works in restricted mode before starting.

Use the browser-based interface available locally from the installed NetApp Console agent. You can't access the NetApp Console from the web-based console that's provided through the SaaS layer.

In addition, not all Console features and NetApp data services are available.

Learn how restricted mode works.

Step 2: Review installation options

In restricted mode, you can only install the Console agent in the cloud. The following installation options are available:

- From the AWS Marketplace
- From the Azure Marketplace
- Manually installing the Console agent on your own Linux host running in AWS, Azure, or Google Cloud

Step 3: Review host requirements

A host must meet specific OS, RAM, and port requirements to run the Console agent.

When you deploy the Console agent from the AWS or Azure Marketplace, the image includes the required OS and software components. You simply need to choose an instance type that meets CPU and RAM requirements.

Dedicated host

The Console agent requires a dedicated host. Any architecture is supported if it meets these size requirements:

- CPU: 8 cores or 8 vCPUs
- RAM: 32 GB
- Disk space: 165 GB is recommended for the host, with the following partition requirements:
  - `/opt`: 120 GiB of space must be available

    The agent uses `/opt` to install the `/opt/application/netapp` directory and its contents.
  - `/var`: 40 GiB of space must be available

    The Console agent requires this space in `/var` because Podman or Docker are architected to create the containers within this directory. Specifically, they will create containers in the `/var/lib/containers/storage` directory and `/var/lib/docker` for Docker. External mounts or symlinks do not work for this space.

AWS EC2 instance type

An instance type that meets CPU and RAM requirements. NetApp recommends t3.2xlarge.

Azure VM size

An instance type that meets CPU and RAM requirements. NetApp recommends Standard_D8s_v3.

Google Cloud machine type

An instance type that meets CPU and RAM requirements. NetApp recommends n2-standard-8.

The Console agent is supported in Google Cloud on a VM instance with an OS that supports Shielded VM features

Hypervisor

A bare metal or hosted hypervisor that is certified to run a supported operating system is required.

Operating system and container requirements

The Console agent is supported with the following operating systems when using the Console in standard mode or restricted mode. A container orchestration tool is required before you install the agent.

Operating system	Supported OS versions	Supported agent versions	Required container tool	SELinux
Red Hat Enterprise Linux				
	9.6 • English language versions only. • The host must be registered with Red Hat Subscription Management. If it’s not registered, the host can’t access repositories to update required 3rd-party software during agent installation.	4.0.0 or later with the Console in standard mode or restricted mode	Podman version 5.4.0 with podman-compose 1.5.0. View Podman configuration requirements.	Supported in enforcing mode or permissive mode

Operating system	Supported OS versions	Supported agent versions	Required container tool	SELinux
	9.1 to 9.4 - English language versions only. - The host must be registered with Red Hat Subscription Management. If it's not registered, the host can't access repositories to update required 3rd-party software during agent installation.	3.9.50 or later with the Console in standard mode or restricted mode	Podman version 4.9.4 with podman-compose 1.5.0. View Podman configuration requirements.	Supported in enforcing mode or permissive mode
	8.6 to 8.10 - English language versions only. - The host must be registered with Red Hat Subscription Management. If it's not registered, the host can't access repositories to update required 3rd-party software during agent installation.	3.9.50 or later with the Console in standard mode or restricted mode	Podman version 4.6.1 or 4.9.4 with podman-compose 1.0.6. View Podman configuration requirements.	Supported in enforcing mode or permissive mode
Ubuntu				
	24.04 LTS	3.9.45 or later with the NetApp Console in standard mode or restricted mode	Docker Engine 23.06 to 28.0.0.	Not supported

Operating system	Supported OS versions	Supported agent versions	Required container tool	SELinux
	22.04 LTS	3.9.50 or later	Docker Engine 23.0.6 to 28.0.0.	Not supported

Step 4: Install Podman or Docker Engine

To manually install the Console agent, prepare the host by installing Podman or Docker Engine.

Depending on your operating system, either Podman or Docker Engine is required before installing the agent.

- Podman is required for Red Hat Enterprise Linux 8 and 9.

  View the supported Podman versions.

- Docker Engine is required for Ubuntu.

  View the supported Docker Engine versions.

Example 1. Steps

Podman

Follow these steps to install and configure Podman:

- Enable and start the podman.socket service
- Install python3
- Install the podman-compose package version 1.0.6
- Add podman-compose to the PATH environment variable
- If using Red Hat Enterprise Linux, verify that your Podman version is using Netavark Aardvark DNS instead of CNI

> ⓘ Adjust the aardvark-dns port (default: 53) after installing the agent to avoid DNS port conflicts. Follow the instructions to configure the port.

Steps

1. Remove the podman-docker package if it's installed on the host.

   ```
   dnf remove podman-docker
   rm /var/run/docker.sock
   ```

2. Install Podman.

   You can obtain Podman from official Red Hat Enterprise Linux repositories.

   a. For Red Hat Enterprise Linux 9.6:

      ```
      sudo dnf install podman-5:<version>
      ```

      Where <version> is the supported version of Podman that you're installing. View the supported Podman versions.

   b. For Red Hat Enterprise Linux 9.1 to 9.4:

      ```
      sudo dnf install podman-4:<version>
      ```

      Where <version> is the supported version of Podman that you're installing. View the supported Podman versions.

   c. For Red Hat Enterprise Linux 8:

      ```
      sudo dnf install podman-4:<version>
      ```

      Where <version> is the supported version of Podman that you're installing. View the supported Podman versions.

3. Enable and start the podman.socket service.

   ```
   sudo systemctl enable --now podman.socket
   ```

4. Install python3.

   ```
   sudo dnf install python3
   ```

5. Install the EPEL repository package if it’s not already available on your system.

   This step is required because podman-compose is available from the Extra Packages for Enterprise Linux (EPEL) repository.

6. If using Red Hat Enterprise 9:

   a. Install the EPEL repository package.

   ```
   sudo dnf install https://dl.fedoraproject.org/pub/epel/epel-release-
   latest-9.noarch.rpm
   ```

   a. Install podman-compose package 1.5.0.

   ```
   sudo dnf install podman-compose-1.5.0
   ```

7. If using Red Hat Enterprise Linux 8:

   a. Install the EPEL repository package.

   ```
   sudo dnf install https://dl.fedoraproject.org/pub/epel/epel-
   release-latest-8.noarch.rpm
   ```

   b. Install podman-compose package 1.0.6.

   ```
   sudo dnf install podman-compose-1.0.6
   ```

   > Using the `dnf install` command meets the requirement for adding podman-compose to the PATH environment variable. The installation command adds podman-compose to /usr/bin, which is already included in the `secure_path` option on the host.

   c. If using Red Hat Enterprise Linux 8, verify that your Podman version is using NetAvark with Aardvark DNS instead of CNI.

      i. Check to see if your networkBackend is set to CNI by running the following command:

```
podman info | grep networkBackend
```

ii. If the networkBackend is set to `CNI`, you'll need to change it to `netavark`.

iii. Install `netavark` and `aardvark-dns` using the following command:

```
dnf install aardvark-dns netavark
```

iv. Open the `/etc/containers/containers.conf` file and modify the network_backend option to use "netavark" instead of "cni".

If `/etc/containers/containers.conf` doesn't exist, make the configuration changes to `/usr/share/containers/containers.conf`.

v. Restart podman.

```
systemctl restart podman
```

vi. Confirm networkBackend is now changed to "netavark" using the following command:

```
podman info | grep networkBackend
```

Docker Engine

Follow the documentation from Docker to install Docker Engine.

Steps

1. View installation instructions from Docker

   Follow the steps to install a supported Docker Engine version. Do not install the latest version, as it is unsupported by the Console.

2. Verify that Docker is enabled and running.

```
sudo systemctl enable docker && sudo systemctl start docker
```

Step 5: Prepare network access

Set up network access so the Console agent can manage resources in your public cloud. In addition to having a virtual network and subnet for the Console agent, you need to ensure that the following requirements are met.

Connections to target networks

Ensure the Console agent has a network connection to the storage locations. For example, the VPC or

VNet where you plan to deploy Cloud Volumes ONTAP, or the data center where your on-premises ONTAP clusters reside.

Prepare networking for user access to NetApp Console

In restricted mode, users access the Console from the Console agent VM. The Console agent contacts a few endpoints to complete data management tasks. These endpoints are contacted from a user's computer when completing specific actions from the Console.

ⓘ Console agents previous to version 4.0.0 need additional endpoints. If you upgraded to 4.0.0 or later, you can remove the old endpoints from your allow list. Learn more about the required network access for versions previous to 4.0.0.

+

Endpoints	Purpose
https://api.bluexp.netapp.com https://netapp-cloud-account.auth0.com https://netapp-cloud-account.us.auth0.com https://console.netapp.com https://components.console.bluexp.netapp.com https://cdn.auth0.com	To provide features and services within the NetApp Console.
https://cdn.auth0.com https://services.cloud.netapp.com	Your web browser connects to these endpoints for centralized user authentication through the NetApp Console.

Outbound internet access for day-to-day operations

The Console agent's network location must have outbound internet access. It needs to be able to reach the SaaS services of the NetApp Console as well as endpoints within your respective public cloud environment.

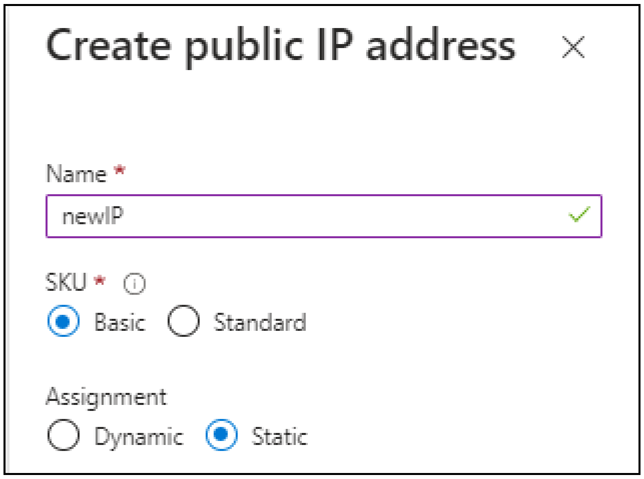
Endpoints	Purpose
AWS environments	
AWS services (amazonaws.com): • CloudFormation • Elastic Compute Cloud (EC2) • Identity and Access Management (IAM) • Key Management Service (KMS) • Security Token Service (STS) • Simple Storage Service (S3)	To manage AWS resources. The endpoint depends on your AWS region. Refer to AWS documentation for details
Amazon FsX for NetApp ONTAP: • api.workloads.netapp.com	The web-based console contacts this endpoint to interact with the Workload Factory APIs to manage and operate FSx for ONTAP based workloads.
Azure environments	

Endpoints	Purpose
https://management.azure.com https://login.microsoftonline.com https://blob.core.windows.net https://core.windows.net	To manage resources in Azure public regions.
https://management.usgovcloudapi.net https://login.microsoftonline.us https://blob.core.usgovcloudapi.net https://core.usgovcloudapi.net	To manage resources in Azure Government regions.
https://management.chinacloudapi.cn https://login.chinacloudapi.cn https://blob.core.chinacloudapi.cn https://core.chinacloudapi.cn	To manage resources in Azure China regions.
Google Cloud environments	
https://www.googleapis.com/compute/v1/ https://compute.googleapis.com/compute/v1 https://cloudresourcemanager.googleapis.com/v1/projects https://www.googleapis.com/compute/beta https://storage.googleapis.com/storage/v1 https://www.googleapis.com/storage/v1 https://iam.googleapis.com/v1 https://cloudkms.googleapis.com/v1 https://config.googleapis.com/v1/projects	To manage resources in Google Cloud.
NetApp Console endpoints	
https://mysupport.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support.
https://signin.b2c.netapp.com	To update NetApp Support Site (NSS) credentials or to add new NSS credentials to the NetApp Console.
https://support.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support as well as to receive software updates for Cloud Volumes ONTAP.
https://api.bluexp.netapp.com https://netapp-cloud-account.auth0.com https://netapp-cloud-account.us.auth0.com https://console.netapp.com https://components.console.bluexp.netapp.com https://cdn.auth0.com	To provide features and services within the NetApp Console.

Endpoints	Purpose
https://bluexpinfraprod.eastus2.data.azurecr.io https://bluexpinfraprod.azurecr.io	To obtain images for Console agent upgrades. • When you deploy a new agent, the validation check tests connectivity to current endpoints. If you use previous endpoints, the validation check fails. To avoid this failure, skip the validation check. Although the previous endpoints are still supported, NetApp recommends updating your firewall rules to the current endpoints as soon as possible. Learn how to update your endpoint list. • When you update to the current endpoints in your firewall, your existing agents will continue to work.

Public IP address in Azure

If you want to use a public IP address with the Console agent VM in Azure, the IP address must use a Basic SKU to ensure that the Console uses this public IP address.



Create public IP address

Name *

newIP

SKU *

● Basic ○ Standard

Assignment

○ Dynamic ● Static

If you use a Standard SKU IP address instead, then the Console uses the *private* IP address of the Console agent, instead of the public IP. If the machine that you’re using to access the Console doesn’t have access to that private IP address, then actions from the Console will fail.

Azure documentation: Public IP SKU

Proxy server

NetApp supports both explicit and transparent proxy configurations. If you are using a transparent proxy, you only need to provide the certificate for the proxy server. If you are using an explicit proxy, you’ll also need the IP address and credentials.

- IP address
- Credentials
- HTTPS certificate

Ports

There's no incoming traffic to the Console agent, unless you initiate it or if it is used as a proxy to send AutoSupport messages from Cloud Volumes ONTAP to NetApp Support.

- HTTP (80) and HTTPS (443) provide access to the local UI, which you'll use in rare circumstances.
- SSH (22) is only needed if you need to connect to the host for troubleshooting.
- Inbound connections over port 3128 are required if you deploy Cloud Volumes ONTAP systems in a subnet where an outbound internet connection isn't available.

  If Cloud Volumes ONTAP systems don't have an outbound internet connection to send AutoSupport messages, the Console automatically configures those systems to use a proxy server that's included with the Console agent. The only requirement is to ensure that the Console agent's security group allows inbound connections over port 3128. You'll need to open this port after you deploy the Console agent.

Enable NTP

If you're planning to use NetApp Data Classification to scan your corporate data sources, you should enable a Network Time Protocol (NTP) service on both the Console agent and the NetApp Data Classification system so that the time is synchronized between the systems. Learn more about NetApp Data classification

If you're planning to create a Console agent from your cloud provider's marketplace, implement this networking requirement after you create the Console agent.

Step 6: Prepare cloud permissions

The Console agent requires permissions from your cloud provider to deploy Cloud Volumes ONTAP in a virtual network and to use NetApp data services. You need to set up permissions in your cloud provider and then associate those permissions with the Console agent.

To view the required steps, choose the authentication option to use for your cloud provider.

AWS IAM role

Use an IAM role to provide the Console agent with permissions.

If you're creating the Console agent from the AWS Marketplace, you are prompted to select that IAM role when you launch the EC2 instance.

If you're manually installing the Console agent on your own Linux host, attach the role to the EC2 instance.

Steps

1. Log in to the AWS console and navigate to the IAM service.
2. Create a policy:
    a. Select **Policies > Create policy**.
    b. Select **JSON** and copy and paste the contents of the IAM policy for the Console agent.
    c. Finish the remaining steps to create the policy.
3. Create an IAM role:
    a. Select **Roles > Create role**.
    b. Select **AWS service > EC2**.
    c. Add permissions by attaching the policy that you just created.
    d. Finish the remaining steps to create the role.

Result

You now have an IAM role for the Console agent EC2 instance.

AWS access key

Set up permissions and an access key for an IAM user. You'll need to provide the Console with the AWS access key after you install the Console agent and set up the Console.

Steps

1. Log in to the AWS console and navigate to the IAM service.
2. Create a policy:
    a. Select **Policies > Create policy**.
    b. Select **JSON** and copy and paste the contents of the IAM policy for the Console agent.
    c. Finish the remaining steps to create the policy.

       Depending on the NetApp data services that you plan to use, you might need to create a second policy.

       For standard regions, the permissions are spread across two policies. Two policies are required due to a maximum character size limit for managed policies in AWS. Learn more about IAM policies for the Console agent.
3. Attach the policies to an IAM user.
    - AWS Documentation: Creating IAM Roles
    - AWS Documentation: Adding and Removing IAM Policies

4. Ensure that the user has an access key that you can add to the NetApp Console after you install the Console agent.

Azure role

Create an Azure custom role with the required permissions. You'll assign this role to the Console agent VM.

Note that you can create an Azure custom role using the Azure portal, Azure PowerShell, Azure CLI, or REST API. The following steps show how to create the role using the Azure CLI. If you would prefer to use a different method, refer to Azure documentation

Steps

1. If you're planning to manually install the software on your own host, enable a system-assigned managed identity on the VM so that you can provide the required Azure permissions through a custom role.

   Microsoft Azure documentation: Configure managed identities for Azure resources on a VM using the Azure portal

2. Copy the contents of the custom role permissions for the Connector and save them in a JSON file.
3. Modify the JSON file by adding Azure subscription IDs to the assignable scope.

   You should add the ID for each Azure subscription that you want to use with the NetApp Console.

   Example

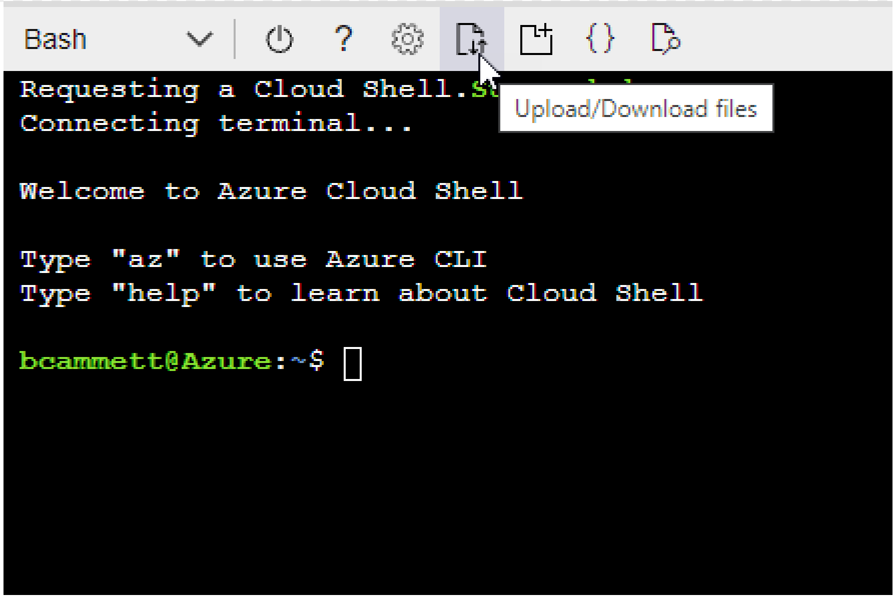
   ```
   "AssignableScopes": [
   "/subscriptions/d333af45-0d07-4154-943d-c25fbzzzzzzz",
   "/subscriptions/54b91999-b3e6-4599-908e-416e0zzzzzzz",
   "/subscriptions/398e471c-3b42-4ae7-9b59-ce5bbzzzzzzz"
   ]
   ```

4. Use the JSON file to create a custom role in Azure.

   The following steps describe how to create the role by using Bash in Azure Cloud Shell.

   a. Start Azure Cloud Shell and choose the Bash environment.

   b. Upload the JSON file.



```
Requesting a Cloud Shell.S
Connecting terminal...

Welcome to Azure Cloud Shell

Type "az" to use Azure CLI
Type "help" to learn about Cloud Shell

bcammett@Azure:~$
```

c. Use the Azure CLI to create the custom role:

```
az role definition create --role-definition agent_Policy.json
```

Azure service principal

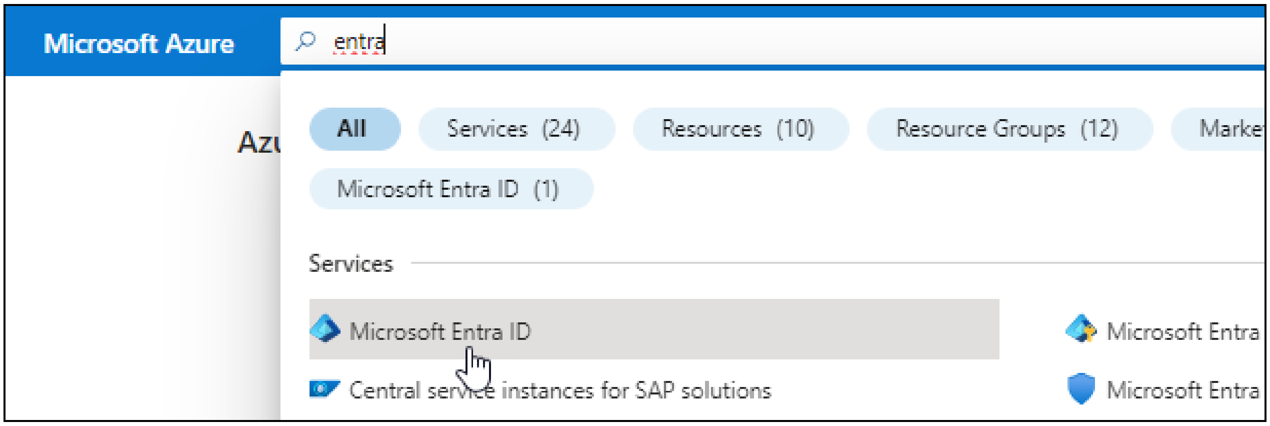
Create and set up a service principal in Microsoft Entra ID and obtain the Azure credentials that the Console needs. You need to provide the Console with these credentials after you install the Console agent.

Create a Microsoft Entra application for role-based access control

1. Ensure that you have permissions in Azure to create an Active Directory application and to assign the application to a role.

   For details, refer to Microsoft Azure Documentation: Required permissions

2. From the Azure portal, open the **Microsoft Entra ID** service.



3. In the menu, select **App registrations**.

4. Select **New registration**.

5. Specify details about the application:
   - **Name**: Enter a name for the application.
   - **Account type**: Select an account type (any will work with the NetApp Console).
   - **Redirect URI**: You can leave this field blank.
6. Select **Register**.

   You’ve created the AD application and service principal.

Assign the application to a role

1. Create a custom role:

   Note that you can create an Azure custom role using the Azure portal, Azure PowerShell, Azure CLI, or REST API. The following steps show how to create the role using the Azure CLI. If you would prefer to use a different method, refer to Azure documentation

   a. Copy the contents of the custom role permissions for the Console agent and save them in a JSON file.

   b. Modify the JSON file by adding Azure subscription IDs to the assignable scope.

      You should add the ID for each Azure subscription from which users will create Cloud Volumes ONTAP systems.

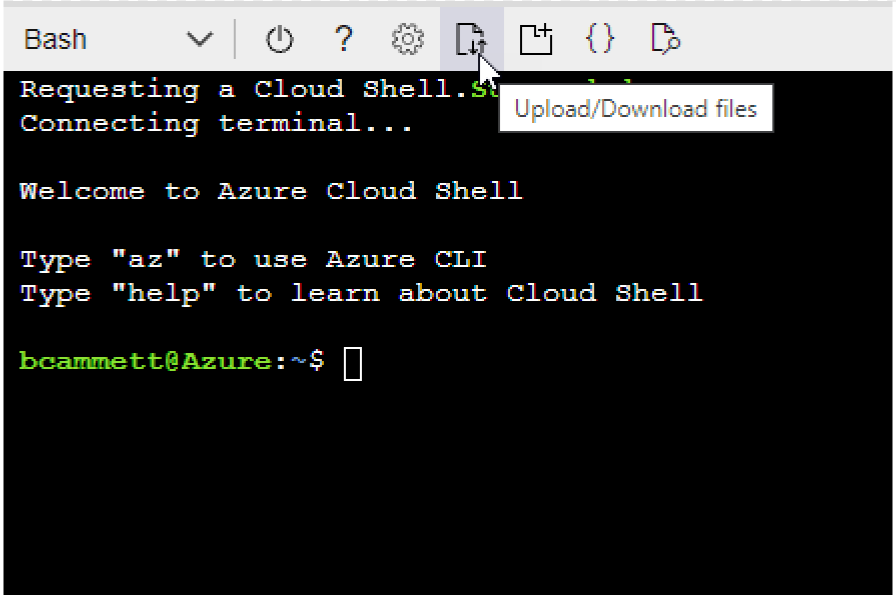
      Example

      ```
      "AssignableScopes": [
      "/subscriptions/d333af45-0d07-4154-943d-c25fbzzzzzzz",
      "/subscriptions/54b91999-b3e6-4599-908e-416e0zzzzzzz",
      "/subscriptions/398e471c-3b42-4ae7-9b59-ce5bbzzzzzzz"
      ]
      ```

   c. Use the JSON file to create a custom role in Azure.

      The following steps describe how to create the role by using Bash in Azure Cloud Shell.

      - Start Azure Cloud Shell and choose the Bash environment.
      - Upload the JSON file.



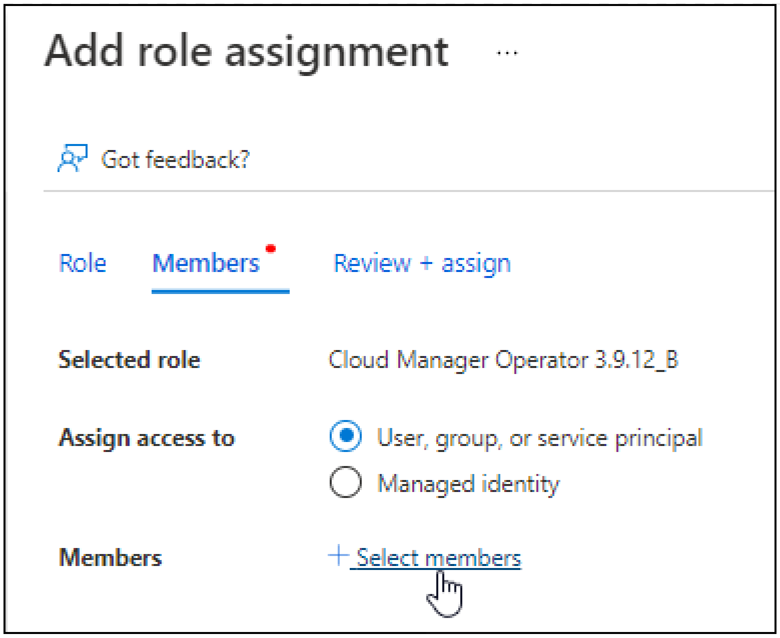
```
Requesting a Cloud Shell.Su
Connecting terminal...

Welcome to Azure Cloud Shell

Type "az" to use Azure CLI
Type "help" to learn about Cloud Shell

bcammett@Azure:~$
```

- Use the Azure CLI to create the custom role:

```
az role definition create --role-definition agent_Policy.json
```

You should now have a custom role called Console Operator that you can assign to the Console agent virtual machine.

2. Assign the application to the role:
   a. From the Azure portal, open the **Subscriptions** service.
   b. Select the subscription.
   c. Select **Access control (IAM) > Add > Add role assignment**.
   d. In the **Role** tab, select the **Console Operator** role and select **Next**.
   e. In the **Members** tab, complete the following steps:
      - Keep **User, group, or service principal** selected.
      - Select **Select members**.



Add role assignment ···

Got feedback?

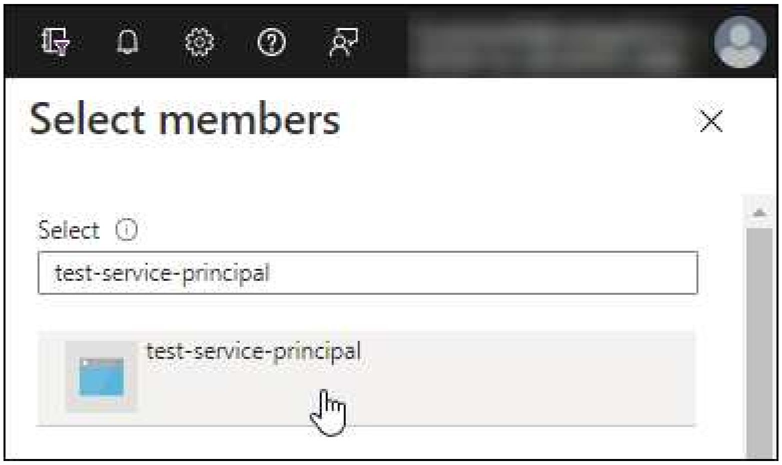
Selected role: Cloud Manager Operator 3.9.12_B

Assign access to: ● User, group, or service principal ○ Managed identity

Members: + Select members

- Search for the name of the application.

  Here's an example:



Select members

Select: test-service-principal

- Select the application and select **Select**.
- Select **Next**.

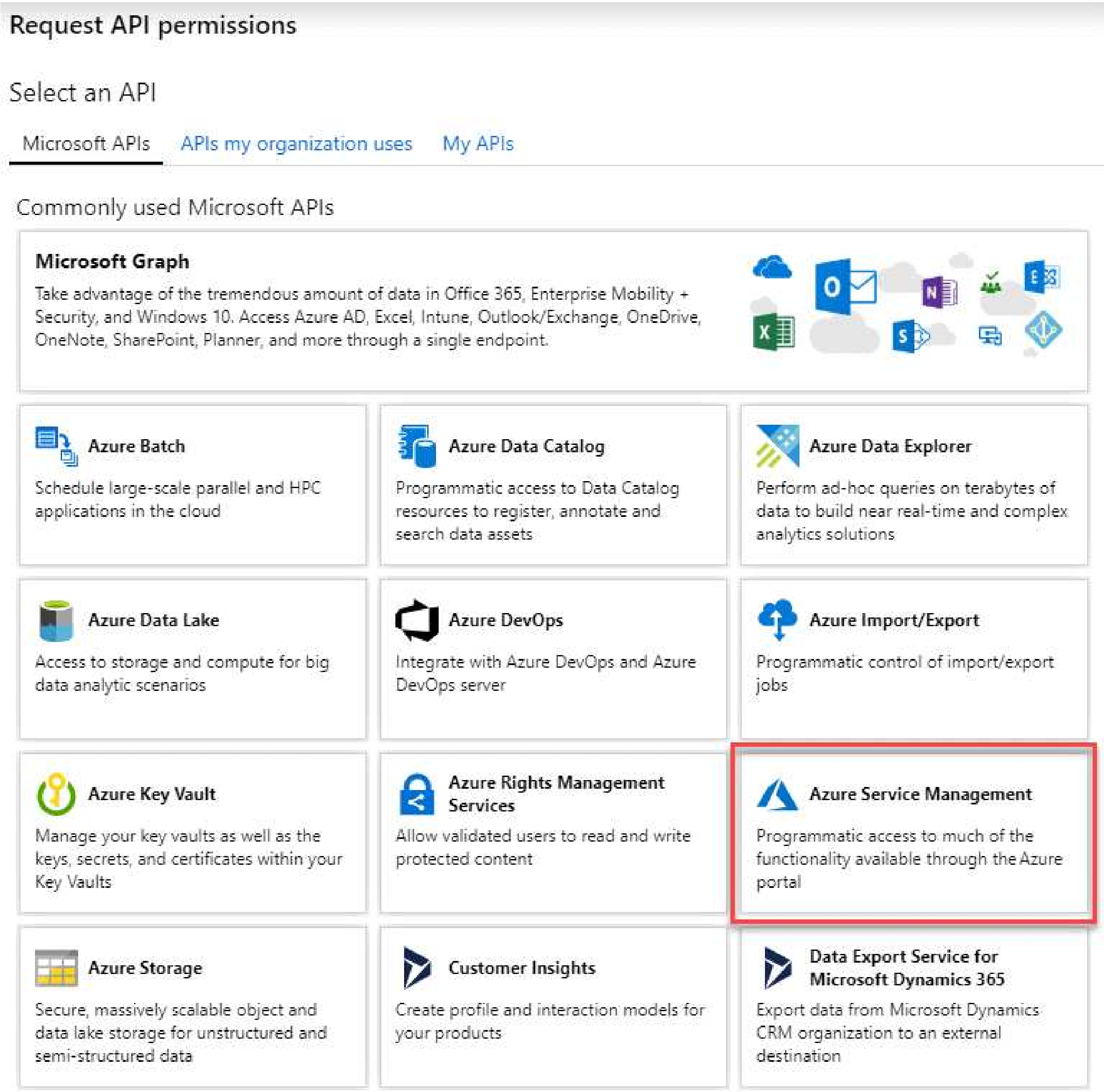
f. Select **Review + assign**.

   The service principal now has the required Azure permissions to deploy the Console agent.

   If you want to deploy Cloud Volumes ONTAP from multiple Azure subscriptions, then you must bind the service principal to each of those subscriptions. In the NetApp Console, you can select the subscription that you want to use when deploying Cloud Volumes ONTAP.

Add Windows Azure Service Management API permissions

1. In the **Microsoft Entra ID** service, select **App registrations** and select the application.
2. Select **API permissions > Add a permission**.
3. Under **Microsoft APIs**, select **Azure Service Management**.



Request API permissions

Select an API

Microsoft APIs | APIs my organization uses | My APIs

Commonly used Microsoft APIs

Microsoft Graph

Take advantage of the tremendous amount of data in Office 365, Enterprise Mobility + Security, and Windows 10. Access Azure AD, Excel, Intune, Outlook/Exchange, OneDrive, OneNote, SharePoint, Planner, and more through a single endpoint.

Azure Batch

Schedule large-scale parallel and HPC applications in the cloud

Azure Data Catalog

Programmatic access to Data Catalog resources to register, annotate and search data assets

Azure Data Explorer

Perform ad-hoc queries on terabytes of data to build near real-time and complex analytics solutions

Azure Data Lake

Access to storage and compute for big data analytic scenarios

Azure DevOps

Integrate with Azure DevOps and Azure DevOps server

Azure Import/Export

Programmatic control of import/export jobs

Azure Key Vault

Manage your key vaults as well as the keys, secrets, and certificates within your Key Vaults

Azure Rights Management Services

Allow validated users to read and write protected content

Azure Service Management

Programmatic access to much of the functionality available through the Azure portal

Azure Storage

Secure, massively scalable object and data lake storage for unstructured and semi-structured data

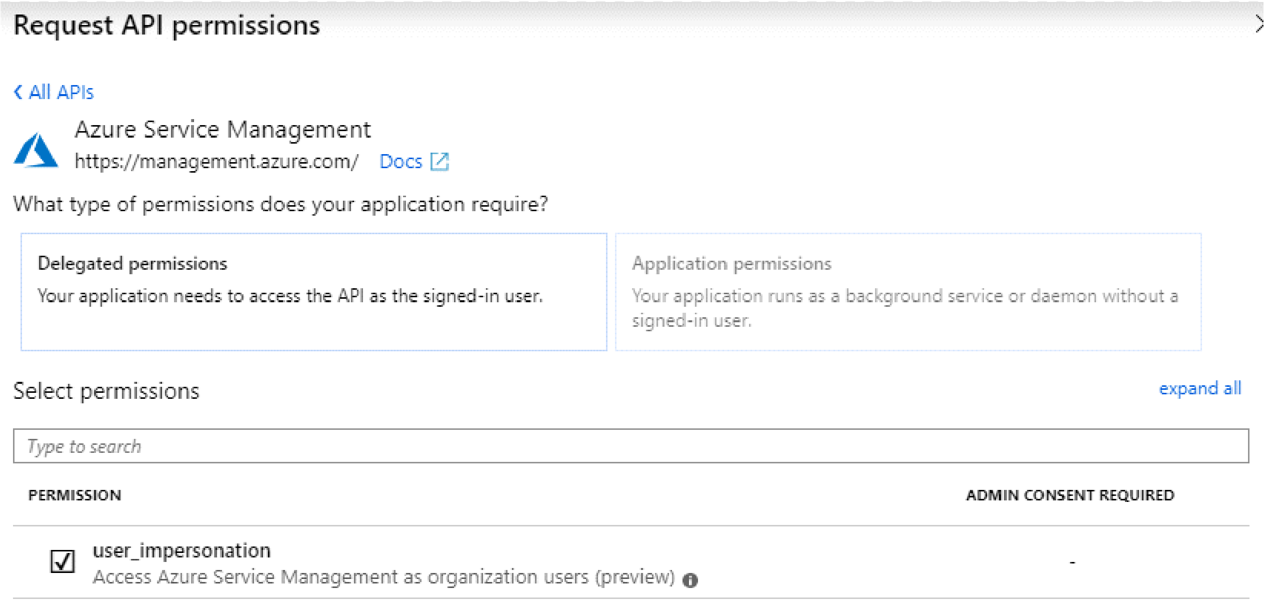
Customer Insights

Create profile and interaction models for your products

Data Export Service for Microsoft Dynamics 365

Export data from Microsoft Dynamics CRM organization to an external destination

4. Select **Access Azure Service Management as organization users** and then select **Add permissions**.



Request API permissions

‹ All APIs

Azure Service Management
https://management.azure.com/ Docs

What type of permissions does your application require?

Delegated permissions
Your application needs to access the API as the signed-in user.

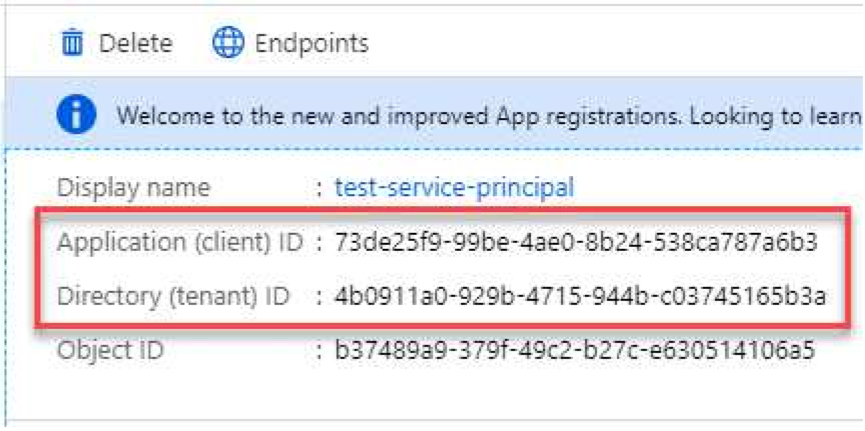
Application permissions
Your application runs as a background service or daemon without a signed-in user.

Select permissions

PERMISSION	ADMIN CONSENT REQUIRED
☑ user_impersonation Access Azure Service Management as organization users (preview)	-

Get the application ID and directory ID for the application

1. In the **Microsoft Entra ID** service, select **App registrations** and select the application.
2. Copy the **Application (client) ID** and the **Directory (tenant) ID**.



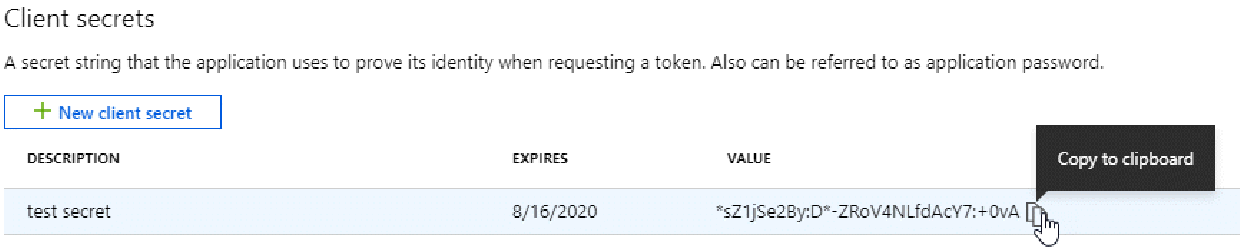
Welcome to the new and improved App registrations. Looking to learn

Display name : test-service-principal
Application (client) ID : 73de25f9-99be-4ae0-8b24-538ca787a6b3
Directory (tenant) ID : 4b0911a0-929b-4715-944b-c03745165b3a
Object ID : b37489a9-379f-49c2-b27c-e630514106a5

When you add the Azure account to the Console, you need to provide the application (client) ID and the directory (tenant) ID for the application. The Console uses the IDs to programmatically sign in.

Create a client secret

1. Open the **Microsoft Entra ID** service.
2. Select **App registrations** and select your application.
3. Select **Certificates & secrets > New client secret**.
4. Provide a description of the secret and a duration.
5. Select **Add**.
6. Copy the value of the client secret.



Client secrets

A secret string that the application uses to prove its identity when requesting a token. Also can be referred to as application password.

DESCRIPTION	EXPIRES	VALUE
test secret	8/16/2020	*sZ1jSe2By:D*-ZRoV4NLfdAcY7:+0vA

Result

Your service principal is now set up and you should have copied the application (client) ID, the directory (tenant) ID, and the value of the client secret. You need to enter this information in the Console when you add an Azure account.

Google Cloud service account

Create a role and apply it to a service account that you'll use for the Console agent VM instance.

Steps

1. Create a custom role in Google Cloud:
   a. Create a YAML file that includes the permissions defined in the Console agent policy for Google Cloud.
   b. From Google Cloud, activate cloud shell.
   c. Upload the YAML file that includes the required permissions for the Console agent.
   d. Create a custom role by using the `gcloud iam roles create` command.

      The following example creates a role named "agent" at the project level:

      ```
      gcloud iam roles create agent --project=myproject
      --file=agent.yaml
      ```

      Google Cloud docs: Creating and managing custom roles
2. Create a service account in Google Cloud:
   a. From the IAM & Admin service, select **Service Accounts > Create Service Account**.
   b. Enter service account details and select **Create and Continue**.
   c. Select the role that you just created.
   d. Finish the remaining steps to create the role.

      Google Cloud docs: Creating a service account

Step 7: Enable Google Cloud APIs

Several APIs are required to deploy Cloud Volumes ONTAP in Google Cloud.

Step

1. Enable the following Google Cloud APIs in your project

- Cloud Infrastructure Manager API
- Cloud Deployment Manager V2 API
- Cloud Logging API
- Cloud Resource Manager API
- Compute Engine API
- Identity and Access Management (IAM) API
- Cloud Key Management Service (KMS) API

  (Required only if you are planning to use NetApp Backup and Recovery with customer-managed encryption keys (CMEK))

Deploy the Console agent in restricted mode

Deploy the Console agent in restricted mode so that you can use the NetApp Console with limited outbound connectivity. To get started, install the Console agent, set up the Console by accessing the user interface that’s running on the Console agent, and then provide the cloud permissions that you previously set up.

Step 1: Install the Console agent

Install the Console agent from your cloud provider’s marketplace or manually on a Linux host.

You need to have prepared your environment before you install the Console agent. You can install from the AWS Marketplace, from the Azure Marketplace, or manually on your own Linux host running in AWS, Azure, or Google Cloud.

AWS Commercial Marketplace

Before you begin

Have the following:

- A VPC and subnet that meets networking requirements.

  Learn about networking requirements

- An IAM role with an attached policy that includes the required permissions for the Console agent.

  Learn how to set up AWS permissions

- Permissions to subscribe and unsubscribe from the AWS Marketplace for your IAM user.
- An understanding of CPU and RAM requirements for the agent.

  Review agent requirements.

- A key pair for the EC2 instance.

Steps

1. Go to the NetApp Console agent listing on the AWS Marketplace
2. On the Marketplace page, select **Continue to Subscribe**.
3. To subscribe to the software, select **Accept Terms**.

   The subscription process can take a few minutes.

4. After the subscription process is complete, select **Continue to Configuration**.
5. On the **Configure this software** page, ensure that you've selected the correct region and then select **Continue to Launch**.
6. On the **Launch this software** page, under **Choose Action**, select **Launch through EC2** and then select **Launch**.

   Use the EC2 Console to launch the instance and attach an IAM role. This is not possible with the **Launch from Website** action.

7. Follow the prompts to configure and deploy the instance:
   - **Name and tags**: Enter a name and tags for the instance.
   - **Application and OS Images**: Skip this section. The Console agent AMI is already selected.
   - **Instance type**: Depending on region availability, choose an instance type that meets RAM and CPU requirements (t3.2xlarge is preselected and recommended).
   - **Key pair (login)**: Select the key pair that you want to use to securely connect to the instance.
   - **Network settings**: Edit the network settings as needed:
     - Choose the desired VPC and subnet.
     - Specify whether the instance should have a public IP address.
     - Specify security group settings that enable the required connection methods for the Console agent instance: SSH, HTTP, and HTTPS.

       View security group rules for AWS.

    - **Configure storage**: Keep the default size and disk type for the root volume.

      If you want to enable Amazon EBS encryption on the root volume, select **Advanced**, expand **Volume 1**, select **Encrypted**, and then choose a KMS key.

    - **Advanced details**: Under **IAM instance profile**, choose the IAM role that includes the required permissions for the Console agent.
    - **Summary**: Review the summary and select **Launch instance**.

Result

AWS launches the software with the specified settings. The Console agent deploys in approximately five minutes.

What’s next?

Set up the NetApp Console.

AWS Gov Marketplace

Before you begin

Have the following:

- A VPC and subnet that meets networking requirements.

  Learn about networking requirements

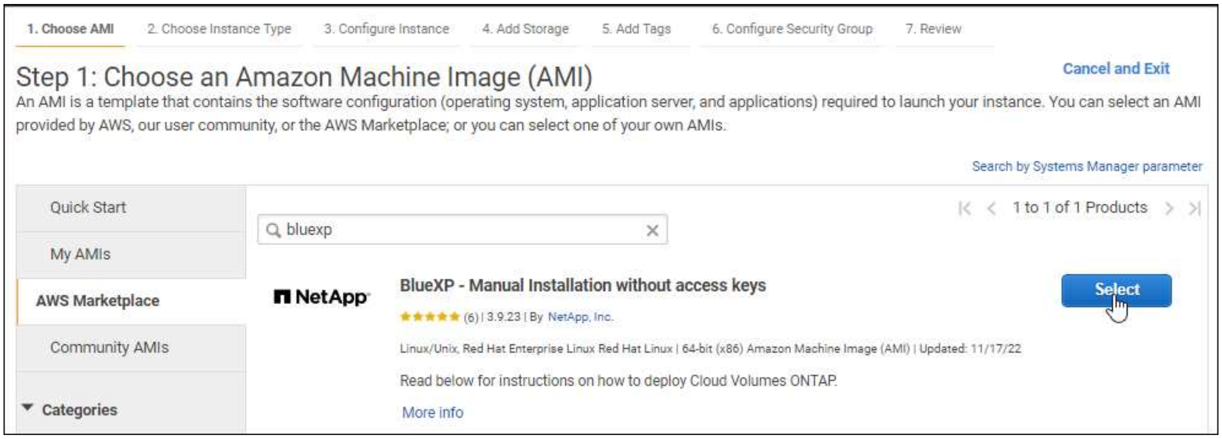
- An IAM role with an attached policy that includes the required permissions for the Console agent.

  Learn how to set up AWS permissions

- Permissions to subscribe and unsubscribe from the AWS Marketplace for your IAM user.
- A key pair for the EC2 instance.

Steps

1. Go to the NetApp Console agent offering in the AWS Marketplace.
    a. Open the EC2 service and select **Launch instance**.
    b. Select **AWS Marketplace**.
    c. Search for NetApp Console and select the offering.



Step 1: Choose an Amazon Machine Image (AMI)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. You can select an AMI provided by AWS, our user community, or the AWS Marketplace; or you can select one of your own AMIs.

bluexp

1 to 1 of 1 Products

BlueXP - Manual Installation without access keys

★★★★★ (6) | 3.9.23 | By NetApp, Inc.

Linux/Unix, Red Hat Enterprise Linux Red Hat Linux | 64-bit (x86) Amazon Machine Image (AMI) | Updated: 11/17/22

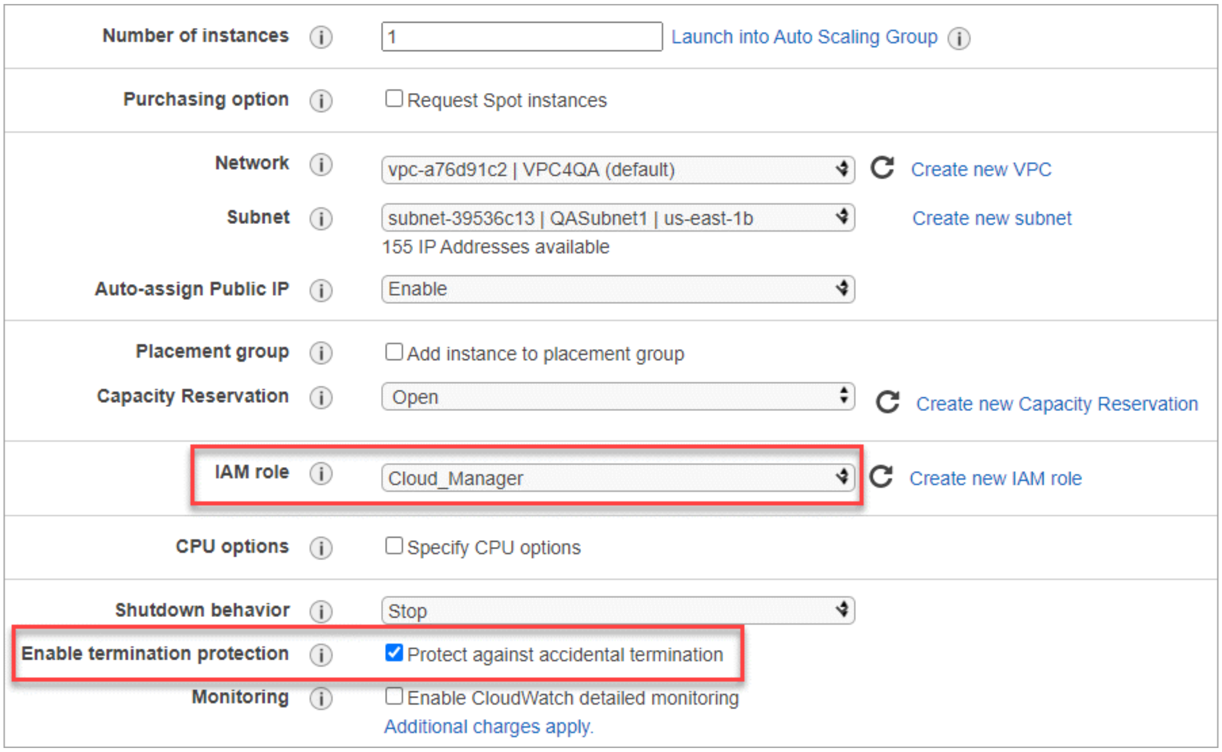
Read below for instructions on how to deploy Cloud Volumes ONTAP.

    d. Select **Continue**.

2. Follow the prompts to set up and start the instance:
   - **Choose an Instance Type**: Depending on region availability, choose one of the supported instance types (t3.2xlarge is recommended).

     Review the instance requirements.

   - **Configure Instance Details**: Select a VPC and subnet, choose the IAM role that you created in step 1, enable termination protection (recommended), and choose any other configuration options that meet your requirements.



Number of instances	1	Launch into Auto Scaling Group
Purchasing option	□ Request Spot instances	
Network	vpc-a76d91c2 | VPC4QA (default)	Create new VPC
Subnet	subnet-39536c13 | QASubnet1 | us-east-1b 155 IP Addresses available	Create new subnet
Auto-assign Public IP	Enable	
Placement group	□ Add instance to placement group	
Capacity Reservation	Open	Create new Capacity Reservation
IAM role	Cloud_Manager	Create new IAM role
CPU options	□ Specify CPU options	
Shutdown behavior	Stop	
Enable termination protection	☑ Protect against accidental termination	
Monitoring	□ Enable CloudWatch detailed monitoring Additional charges apply.	

   - **Add Storage**: Keep the default storage options.
   - **Add Tags**: Enter tags for the instance, if desired.
   - **Configure Security Group**: Specify the required connection methods for the Console agent instance: SSH, HTTP, and HTTPS.
   - **Review**: Review your selections and select **Launch**.

Result

AWS launches the software with the specified settings. The Console agent deploys in approximately five minutes.

What’s next?

Set up the Console.

Azure Gov Marketplace

Before you begin

You should have the following:

- A VNet and subnet that meets networking requirements.

Learn about networking requirements

- An Azure custom role that includes the required permissions for the Console agent.

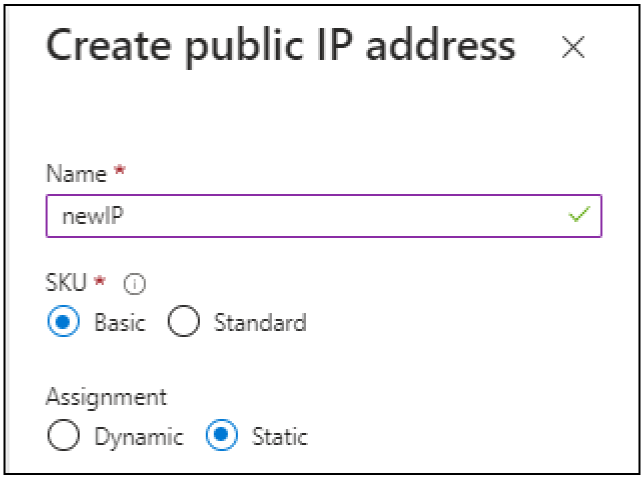
  Learn how to set up Azure permissions

Steps

1. Go to the NetApp Console agent VM page in the Azure Marketplace.
   - Azure Marketplace page for commercial regions
   - Azure Marketplace page for Azure Government regions
2. Select **Get it now** and then select **Continue**.
3. From the Azure portal, select **Create** and follow the steps to configure the virtual machine.

   Note the following as you configure the VM:

   - **VM size**: Choose a VM size that meets CPU and RAM requirements. We recommend Standard_D8s_v3.
   - **Disks**: The Console agent can perform optimally with either HDD or SSD disks.
   - **Public IP**: To use a public IP address with the Console agent VM, select a Basic SKU.

     Create public IP address

     Name *

     newIP

     SKU *

     ● Basic ○ Standard

     Assignment

     ○ Dynamic ● Static

     If you use a Standard SKU IP address instead, then the Console uses the *private* IP address of the Console agent, instead of the public IP. If the machine you use to access the Console cannot reach the private IP address, the Console does not work.

     Azure documentation: Public IP SKU

   - **Network security group**: The Console agent requires inbound connections using SSH, HTTP, and HTTPS.

     View security group rules for Azure.

   - **Identity**: Under **Management**, select **Enable system assigned managed identity**.

     A managed identity lets the Console agent VM identify itself to Microsoft Entra ID without credentials. Learn more about managed identities for Azure resources.

4. On the **Review + create** page, review your selections and select **Create** to start the deployment.

Result

Azure deploys the virtual machine with the specified settings. The virtual machine and Console agent software should be running in approximately five minutes.

What's next?

Set up the NetApp Console.

Manual install (must use for Google Cloud)

You can install the Console agent manually on your own Linux host running in AWS, Azure, or Google Cloud.

Before you begin

You should have the following:

- Root privileges to install the Console agent.
- Details about a proxy server, if a proxy is required for internet access from the Console agent.

  You have the option to configure a proxy server after installation but doing so requires restarting the Console agent.

- A CA-signed certificate, if the proxy server uses HTTPS or if the proxy is an intercepting proxy.

> ⓘ You cannot set a certificate for a transparent proxy server when manually installing the Console agent. If you need to set a certificate for a transparent proxy server, you must use the Maintenance Console after installation. Learn more about the Agent Maintenance Console.

- You need to disable the configuration check that verifies outbound connectivity during installation. The manual install fails if this check is not disabled. Learn how to disable configuration checks for manual installations.
- Depending on your operating system, either Podman or Docker Engine is required before you install the Console agent.

About this task

After installation, the Console agent automatically updates itself if a new version is available.

Steps

1. If the *http_proxy* or *https_proxy* system variables are set on the host, remove them:

   ```
   unset http_proxy
   unset https_proxy
   ```

   If you don't remove these system variables, the installation fails.

2. Download the Console agent software and then copy it to the Linux host. You can download it either from the NetApp Console or the NetApp Support site.

   - NetApp Console: Go to **Agents > Management> Deploy agent > On-prem > Manual install**.

     Choose download the agent installer files or a URL to the files.

    - NetApp Support Site (needed if you don’t already have access to the Console) NetApp Support Site,

3. Assign permissions to run the script.

   ```
   chmod +x NetApp_Console_Agent_Cloud_<version>
   ```

   Where <version> is the version of the Console agent that you downloaded.

4. If installing in a Government Cloud environment, disable the configuration checks. Learn how to disable configuration checks for manual installations.

5. Run the installation script.

   ```
   ./NetApp_Console_Agent_Cloud_<version> --proxy <HTTP or HTTPS proxy
   server> --cacert <path and file name of a CA-signed certificate>
   ```

   You’ll need to add proxy information if your network requires a proxy for internet access. You can add an explicit proxy during installation. The `--proxy` and `--cacert` parameters are optional and you won’t be prompted to add them. If you have an explicit proxy server, you will need to enter the parameters as shown.

ⓘ If you want to configure a transparent proxy, you can do so after you’ve installed. Learn about the agent maintenance console

+

Here is an example configuring an explicit proxy server with a CA-signed certificate:

+

```
./NetApp_Console_Agent_Cloud_v4.0.0--proxy
https://user:password@10.0.0.30:8080/ --cacert
/tmp/cacert/certificate.cer
```

+
`--proxy` configures the Console agent to use an HTTP or HTTPS proxy server using one of the following formats:

+
* http://address:port
* http://user-name:password@address:port
* http://domain-name%92user-name:password@address:port
* https://address:port
* https://user-name:password@address:port
* https://domain-name%92user-name:password@address:port

+
Note the following:

+
The user can be a local user or domain user.
For a domain user, you must use the ASCII code for a \ as shown above.
The Console agent doesn’t support user names or passwords that include the @ character.
If the password includes any of the following special characters, you must escape that special character by prepending it with a backslash: & or !

+
For example:

+
http://bxpproxyuser:netapp1\!@address:3128

1. If you used Podman, you’ll need to adjust the aardvark-dns port.

   a. SSH to the Console agent virtual machine.

   b. Open podman */usr/share/containers/containers.conf* file and modify the chosen port for Aardvark DNS service. For example, change it to 54.

   ```
   vi /usr/share/containers/containers.conf
   ```

   For example:

   ```
   # Port to use for dns forwarding daemon with netavark in rootful
   bridge
   # mode and dns enabled.
   # Using an alternate port might be useful if other DNS services
   should
   # run on the machine.
   #
   dns_bind_port = 54
   ```

   c. Reboot the Console agent virtual machine.

Result

The Console agent is now installed. At the end of the installation, the Console agent service (occm) restarts twice if you specified a proxy server.

What’s next?

Set up the NetApp Console.

Step 2: Set up NetApp Console

When you access the console for the first time, you are prompted to choose an organization for the Console agent and need to enable restricted mode.

Before you begin

The person who sets up the Console agent must log in to the Console using a login that doesn’t already belong to a Console organization.

If your login is associated with another organization, you need to sign up with a new login. Otherwise, you do not see the option to enable restricted mode on the setup screen.

Steps

1. Open a web browser from a host that has a connection to the Console agent instance and enter the following URL of the Console agent you installed.
2. Sign up or log in to the NetApp Console.
3. After you're logged in, set up the Console:
   a. Enter a name for the Console agent.
   b. Enter a name for a new Console organization.
   c. Select **Are you running in a secured environment?**
   d. Select **Enable restricted mode on this account**.

      Note that you can't change this setting after the account is created. You can't enable restricted mode later and you can't disable it later.

      If you deployed the Console agent in a Government region, the checkbox is already enabled and can't be changed. This is because restricted mode is the only mode supported in Government regions.

   e. Select **Let's start**.

Result

The Console agent is now installed and set up with your Console organization. All users need to access the Console using the IP address of the Console agent instance.

What's next?

Provide the Console with the permissions that you previously set up.

Step 3: Provide permissions to the Console agent

If you installed the Console agent from the Azure Marketplace or manually, you need to give the permissions you set up earlier.

These steps don't apply if you deployed the Console agent from the AWS Marketplace because you chose the required IAM role during deployment.

Learn how to prepare cloud permissions.

AWS IAM role

Attach the IAM role that you previously created to the EC2 instance where you installed the Console agent.

These steps apply only if you manually installed the Console agent in AWS. For AWS Marketplace deployments, you already associated the Console agent instance with an IAM role that includes the required permissions.

Steps

1. Go to the Amazon EC2 console.
2. Select **Instances**.
3. Select the Console agent instance.
4. Select **Actions > Security > Modify IAM role**.
5. Select the IAM role and select **Update IAM role**.

AWS access key

Provide the NetApp Console with the AWS access key for an IAM user that has the required permissions.

Steps

1. Select **Administration > Credentials**.
2. Select **Organization credentials**.
3. Select **Add Credentials** and follow the steps in the wizard.
   a. **Credentials Location**: Select *Amazon Web Services > Agent.
   b. **Define Credentials**: Enter an AWS access key and secret key.
   c. **Marketplace Subscription**: Associate a Marketplace subscription with these credentials by subscribing now or by selecting an existing subscription.
   d. **Review**: Confirm the details about the new credentials and select **Add**.

Azure role

Go to the Azure portal and assign the Azure custom role to the Console agent virtual machine for one or more subscriptions.

Steps

1. From the Azure Portal, open the **Subscriptions** service and select your subscription.

   It’s important to assign the role from the **Subscriptions** service because this specifies the scope of the role assignment at the subscription level. The *scope* defines the set of resources that the access applies to. If you specify a scope at a different level (for example, at the virtual machine level), your ability to complete actions from within the NetApp Console will be affected.

   Microsoft Azure documentation: Understand scope for Azure RBAC

2. Select **Access control (IAM)** > **Add** > **Add role assignment**.
3. In the **Role** tab, select the **Console Operator** role and select **Next**.

> ⓘ Console Operator is the default name provided in the policy. If you chose a different name for the role, then select that name instead.

4. In the **Members** tab, complete the following steps:
   a. Assign access to a **Managed identity**.
   b. Select **Select members**, select the subscription in which the Console agent virtual machine was created, under **Managed identity**, choose **Virtual machine**, and then select the Console agent virtual machine.
   c. Select **Select**.
   d. Select **Next**.
   e. Select **Review + assign**.
   f. If you want to manage resources in additional Azure subscriptions, switch to that subscription and then repeat these steps.

Azure service principal

Provide the NetApp Console with the credentials for the Azure service principal that you previously setup.

Steps

1. Select **Administration > Credentials**.
2. Select **Add Credentials** and follow the steps in the wizard.
   a. **Credentials Location**: Select **Microsoft Azure > Agent**.
   b. **Define Credentials**: Enter information about the Microsoft Entra service principal that grants the required permissions:
      - Application (client) ID
      - Directory (tenant) ID
      - Client Secret
   c. **Marketplace Subscription**: Associate a Marketplace subscription with these credentials by subscribing now or by selecting an existing subscription.
   d. **Review**: Confirm the details about the new credentials and select **Add**.

Result

the NetApp Console now has the permissions that it needs to perform actions in Azure on your behalf.

Google Cloud service account

Associate the service account with the Console agent VM.

Steps

1. Go to the Google Cloud portal and assign the service account to the Console agent VM instance.

   Google Cloud documentation: Changing the service account and access scopes for an instance

2. If you want to manage resources in other projects, grant access by adding the service account with the Console agent role to that project. You'll need to repeat this step for each project.

Subscribe to NetApp Intelligent Services (restricted mode)

Subscribe to NetApp Intelligent Services from your cloud provider's marketplace to pay for data services at an hourly rate (PAYGO) or through an annual contract. If you purchased a license from NetApp (BYOL), you also need to subscribe to the marketplace offering. Your license is always charged first, but you'll be charged at the hourly rate if you exceed your licensed capacity or if the license's term expires.

A marketplace subscription enables charging for the following data services with restricted mode:

- NetApp Backup and Recovery
- Cloud Volumes ONTAP
- NetApp Cloud Tiering
- NetApp Ransomware Resilience
- NetApp Disaster Recovery

NetApp Data Classification is enabled through your subscription, but there is no charge for using classification.

Before you begin

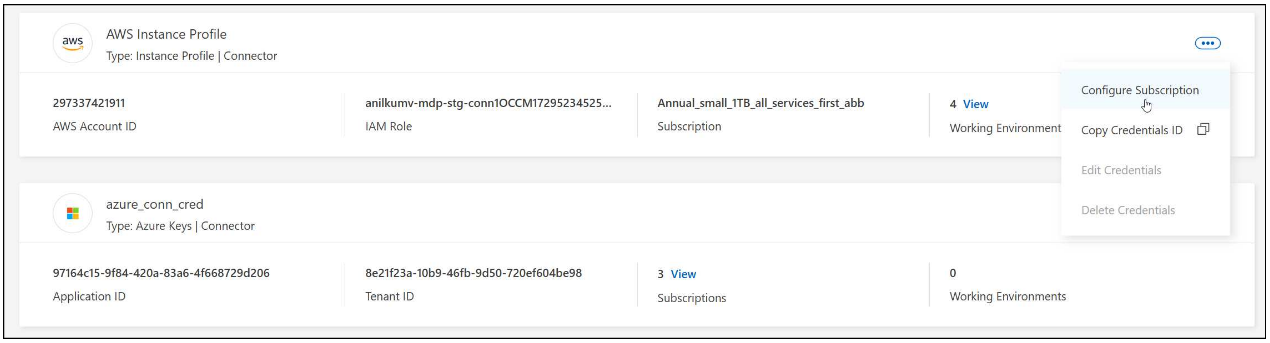
You must have already deployed a Console agent in order to subscribe to data services. You need to associate a marketplace subscription to the cloud credentials connected to a Console agent.

AWS

Steps

1. Select **Administration > Credentials**.
2. Select **Organization credentials**.
3. Select the action menu for a set of credentials that are associated with a Console agent and then select **Configure Subscription**.

   You must select credentials that are associated with a Console agent. You can't associate a marketplace subscription with credentials that are associated with the NetApp Console.

   AWS Instance Profile
   Type: Instance Profile | Connector

   297337421911
   AWS Account ID

   anilkumv-mdp-stg-conn1OCCM17295234525...
   IAM Role

   Annual_small_1TB_all_services_first_abb
   Subscription

   4 View
   Working Environment

   azure_conn_cred
   Type: Azure Keys | Connector

   97164c15-9f84-420a-83a6-4f668729d206
   Application ID

   8e21f23a-10b9-46fb-9d50-720ef604be98
   Tenant ID

   3 View
   Subscriptions

   0
   Working Environments

4. To associate the credentials with an existing subscription, select the subscription from the down-down list and select **Configure**.
5. To associate the credentials with a new subscription, select **Add Subscription > Continue** and follow the steps in the AWS Marketplace:

   a. Select **View purchase options**.

   b. Select **Subscribe**.

   c. Select **Set up your account**.

      You'll be redirected to the NetApp Console.

   d. From the **Subscription Assignment** page:

      - Select the Console organizations or accounts that you'd like to associate this subscription with.
      - In the **Replace existing subscription** field, choose whether you'd like to automatically replace the existing subscription for one organization or account with this new subscription.

        The Console replaces the existing subscription for all credentials in the organization or account with this new subscription. If a set of credentials wasn't ever associated with a subscription, then this new subscription won't be associated with those credentials.

        For all other organizations or accounts, you'll need to manually associate the subscription by repeating these steps.
      - Select **Save**.

Azure

Steps

1. Select **Administration > Credentials**.

2. Select **Organization credentials**.
3. Select the action menu for a set of credentials that are associated with a Console agent and then select **Configure Subscription**.

   You must select credentials that are associated with a Console agent. You can't associate a marketplace subscription with credentials that are associated with the NetApp Console.

4. To associate the credentials with an existing subscription, select the subscription from the down-down list and select **Configure**.
5. To associate the credentials with a new subscription, select **Add Subscription > Continue** and follow the steps in the Azure Marketplace:
   a. If prompted, log in to your Azure account.
   b. Select **Subscribe**.
   c. Fill out the form and select **Subscribe**.
   d. After the subscription process is complete, select **Configure account now**.

      You'll be redirected to the NetApp Console.

   e. From the **Subscription Assignment** page:
      - Select the Console organizations or accounts that you'd like to associate this subscription with.
      - In the **Replace existing subscription** field, choose whether you'd like to automatically replace the existing subscription for one organization or account with this new subscription.

        The Console replaces the existing subscription for all credentials in the organization or account with this new subscription. If a set of credentials wasn't ever associated with a subscription, then this new subscription won't be associated with those credentials.

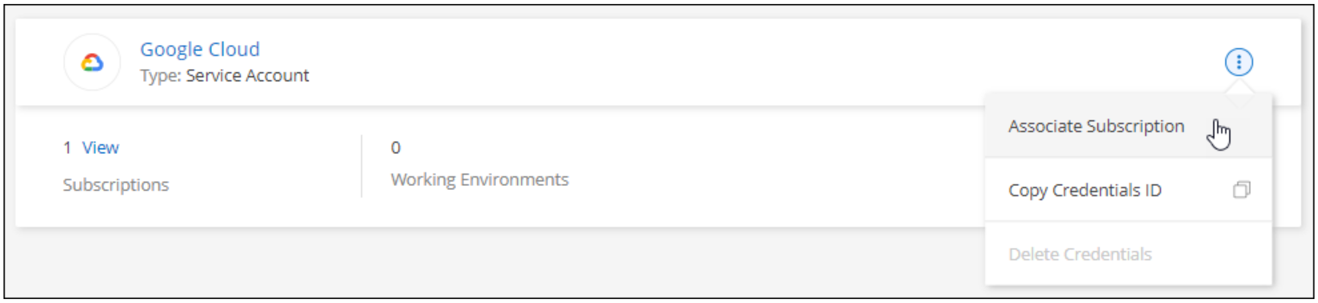
        For all other organizations or accounts, you'll need to manually associate the subscription by repeating these steps.

      - Select **Save**.

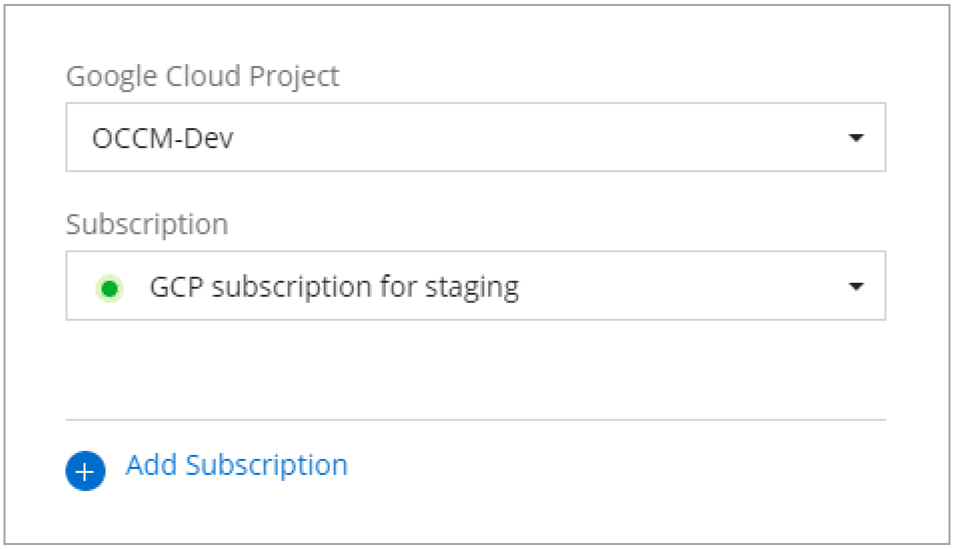
Google Cloud

Steps

1. Select **Administration > Credentials**.
2. Select **Organization credentials**.
3. Select the action menu for a set of credentials that are associated with a Console agent and then select **Configure Subscription**.



1. To configure an existing subscription with the selected credentials, select a Google Cloud project and subscription from the drop-down list, and then select **Configure**.



Google Cloud Project

OCCM-Dev

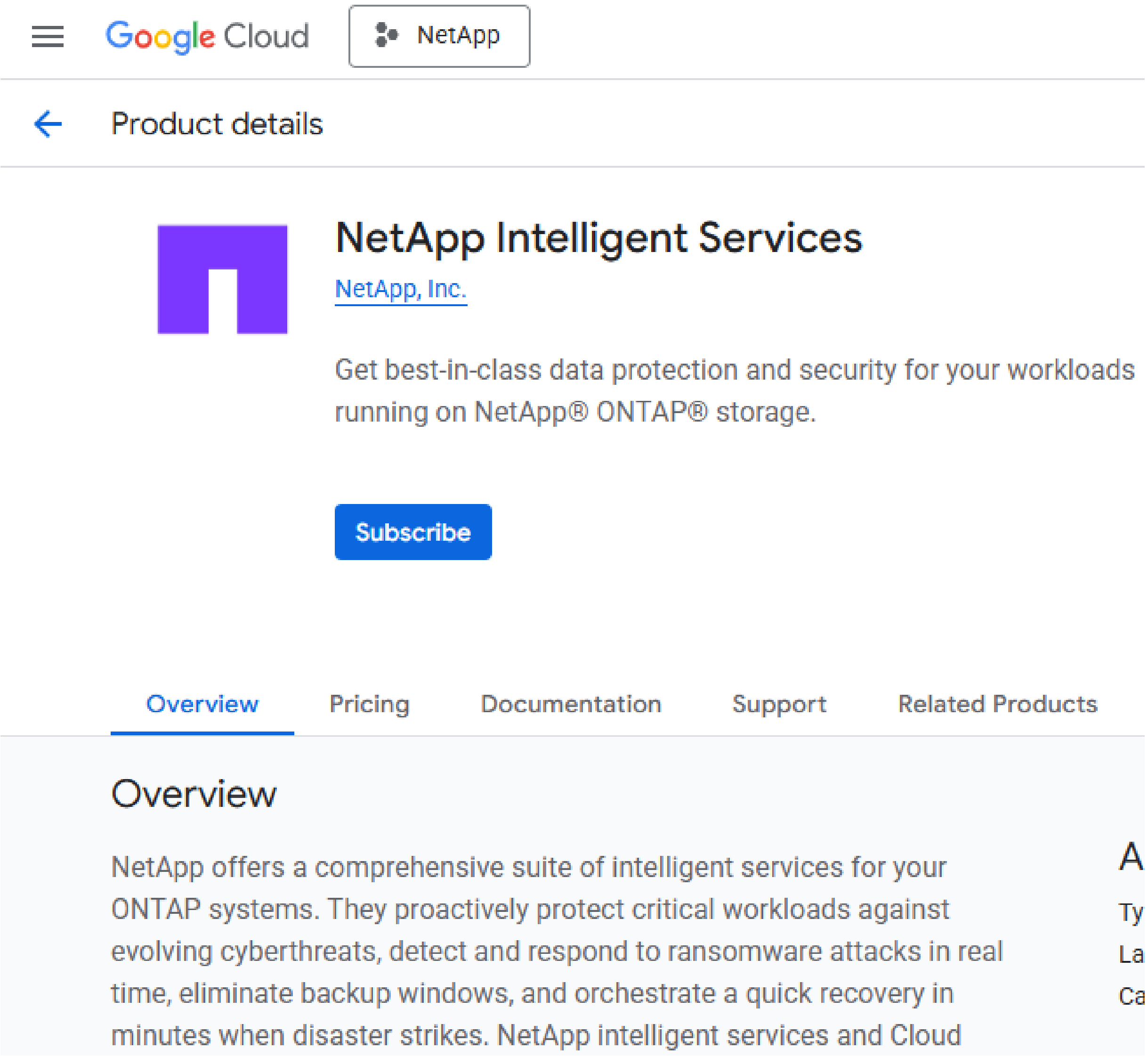
Subscription

● GCP subscription for staging

2. If you don’t already have a subscription, select **Add Subscription > Continue** and follow the steps in the Google Cloud Marketplace.

> Before you complete the following steps, ensure that you have both Billing Admin privileges in your Google Cloud account as well as a NetApp Console login.

   a. After you’re redirected to the NetApp Intelligent Services page on the Google Cloud Marketplace, ensure that the correct project is selected at the top navigation menu.



NetApp Intelligent Services

NetApp, Inc.

Get best-in-class data protection and security for your workloads running on NetApp® ONTAP® storage.

Overview

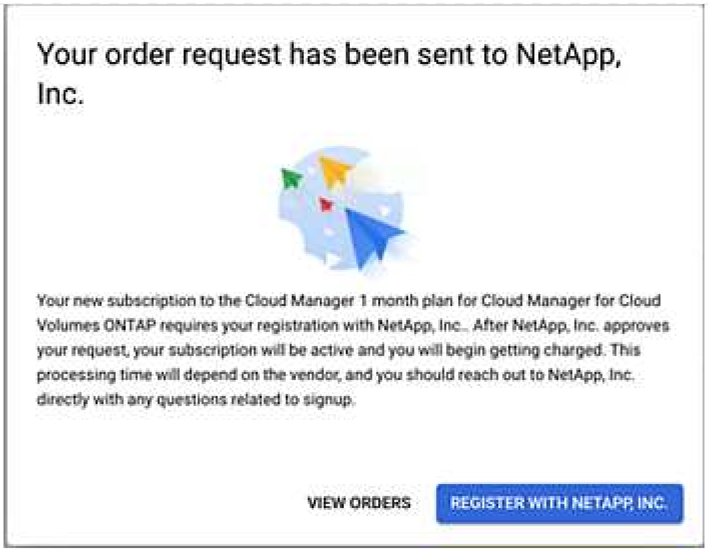
NetApp offers a comprehensive suite of intelligent services for your ONTAP systems. They proactively protect critical workloads against evolving cyberthreats, detect and respond to ransomware attacks in real time, eliminate backup windows, and orchestrate a quick recovery in minutes when disaster strikes. NetApp intelligent services and Cloud

b. Select **Subscribe**.
c. Select the appropriate billing account and agree to the terms and conditions.
d. Select **Subscribe**.

   This step sends your transfer request to NetApp.

e. On the pop-up dialog box, select **Register with NetApp, Inc.**

   This step must be completed to link the Google Cloud subscription with your Console organization or account. The process of linking a subscription isn't complete until you are redirected from this page and then sign in to the Console.



Your order request has been sent to NetApp, Inc.

Your new subscription to the Cloud Manager 1 month plan for Cloud Manager for Cloud Volumes ONTAP requires your registration with NetApp, Inc.. After NetApp, Inc. approves your request, your subscription will be active and you will begin getting charged. This processing time will depend on the vendor, and you should reach out to NetApp, Inc. directly with any questions related to signup.

f. Complete the steps on the **Subscription Assignment** page:

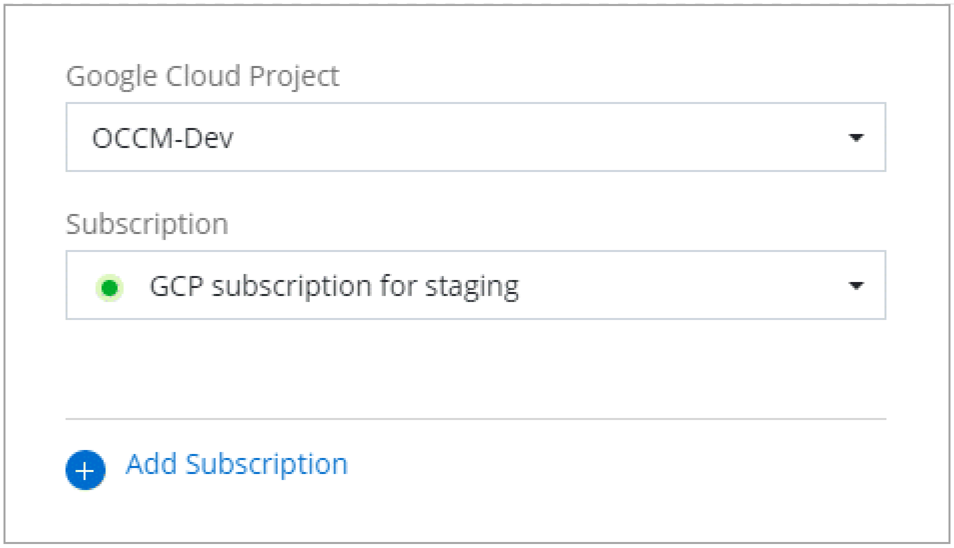
> ⓘ If someone from your organization has already has a marketplace subscription from your billing account, then you will be redirected to the Cloud Volumes ONTAP page within NetApp Console instead. If this is unexpected, contact your NetApp sales team. Google enables only one subscription per Google billing account.

- Select the Console organization that you'd like to associate this subscription with.
- In the **Replace existing subscription** field, choose whether you'd like to automatically replace the existing subscription for one organization with this new subscription.

  The Console replaces the existing subscription for all credentials in the organization with this new subscription. If a set of credentials wasn't ever associated with a subscription, then this new subscription won't be associated with those credentials.

  For all other organizations or accounts, you'll need to manually associate the subscription by repeating these steps.
- Select **Save**.

a. Once this process is complete, navigate back to the Credentials page in the Console and select this new subscription.


Google Cloud Project

OCCM-Dev

Subscription

● GCP subscription for staging

Related information

- Manage BYOL capacity-based licenses for Cloud Volumes ONTAP
- Manage BYOL licenses for data services
- Manage AWS credentials and subscriptions
- Manage Azure credentials and subscriptions
- Manage Google Cloud credentials and subscriptions

What you can do next (restricted mode)

After you get up and running with NetApp Console in restricted mode, you can start using the services that are supported with restricted mode.

For help, refer to the documentation for these services:

- Azure NetApp Files docs
- Backup and recovery docs
- Classification docs
- Cloud Volumes ONTAP docs
- Digital wallet docs
- On-premises ONTAP cluster docs
- Replication docs

Related information

NetApp Console deployment modes

Get started with private mode

Getting started workflow (BlueXP private mode)

BlueXP private mode (legacy BlueXP interface) is typically used with on-premises environments that have no internet connection and with secure cloud regions, which includes AWS Secret Cloud, AWS Top Secret Cloud, and Azure IL6. NetApp continues to support these environments with the legacy BlueXP interface.

PDF documentation for BlueXP private mode

Features and data services supported with private mode

The following table can help you quickly identify which BlueXP services and features are supported private mode.

Note that some services might be supported with limitations.

Product area	BlueXP service or feature	Private mode
Working environments This portion of the table lists support for working environment management from the BlueXP canvas. It does not indicate the supported backup destinations for BlueXP backup and recovery.	Amazon FSx for ONTAP	No
	Amazon S3	No
	Azure Blob	No
	Azure NetApp Files	No
	Cloud Volumes ONTAP	Yes
	Google Cloud NetApp Volumes	No
	Google Cloud Storage	No
	On-premises ONTAP clusters	Yes
	E-Series	No
	StorageGRID	No

Product area	BlueXP service or feature	Private mode
Services	Alerts	No
	Backup and recovery	Yes View the list of supported backup destinations for ONTAP volume data
	Classification	Yes
	Copy and sync	No
	Digital advisor	No
	Digital wallet	Yes
	Disaster recovery	No
	Economic efficiency	No
	Ransomware Resilience	No
	Replication	Yes
	Software updates	No
	Sustainability	No
	Tiering	No
	Volume caching	No
	Workload factory	No
Features	Identity and access management	Yes
	Credentials	Yes
	Federation	No
	Multi-factor authentication	No
	NSS accounts	No
	Notifications	No
	Search	No
	Timeline	Yes

Use NetApp Console

Log in to the NetApp Console

How you log in to the NetApp Console depends on which deployment mode that you're using.

You are automatically logged out after 24 hours or if you close your browser.

Learn about Console deployment modes.

Standard mode

After you sign up to the NetApp Console, you can log in from the web-based console to start managing your data and storage infrastructure.

About this task

You can log in to the NetApp Console using one of the following options:

- Your existing NetApp Support Site (NSS) credentials
- A NetApp Console account using your email address and a password
- A federated connection

  You can use single sign-on to log in using credentials from your corporate directory (federated identity). Learn how to set up identity federation.

Steps

1. Open a web browser and go to the NetApp Console
2. On the **Log in** page, enter the email address that's associated with your login.
3. Depending on the authentication method associated with your login, you'll be prompted to enter your credentials:
   - NetApp cloud credentials: Enter your password
   - Federated user: Enter your federated identity credentials
   - NetApp Support Site account: Enter your NetApp Support Site credentials

Result

You're now logged in and can start using to manage your hybrid multi-cloud infrastructure.

Restricted mode

When you use the Console in restricted mode, you need to log in to the the Console from the user interface that runs locally on the agent.

About this task

The Console supports logging in with one of the following options when in restricted mode:

- A NetApp Console login using your email address and a password
- A federated connection

  You can use single sign-on to log in using credentials from your corporate directory (federated identity). Learn how to use identity federation.

Steps

1. Open a web browser and enter the IP address where the agent is installed.
2. Enter your user name and password to log in.

Work with multiple Console agents

If you use multiple Console agents, you can switch between those Console agents directly from the Console to view the associated systems.

Switch between Console agents

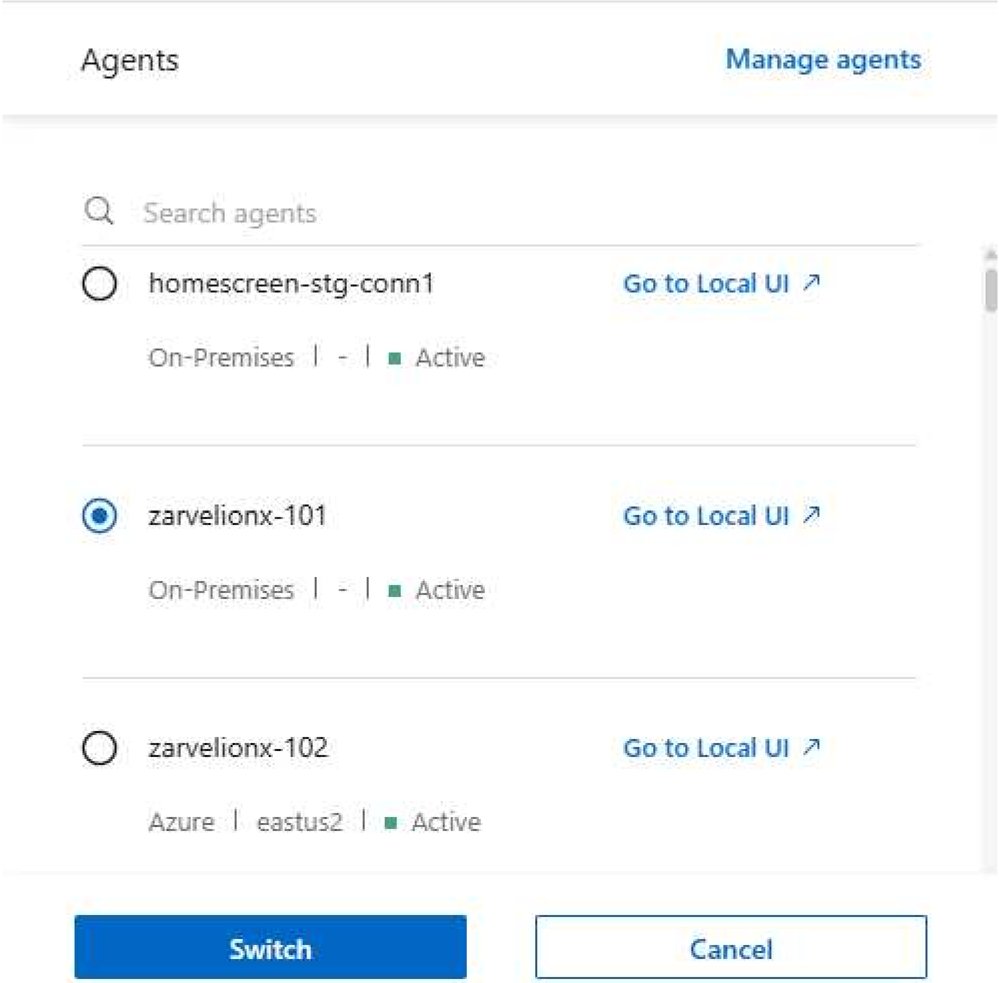
If you have multiple Console agents, you can switch between them to see the systems that are associated with a specific agent.

For example, in a multi-cloud environment, you might have one agent in AWS and another in Google Cloud. Switch between these agents to manage the Cloud Volumes ONTAP systems in the respective cloud environments.

> ⓘ This option is not available when viewing the NetApp Console from the agent’s local UI

Step

1. Select the Console agents icon ( ) in the top right to view the list of available agents.



Agents — Manage agents

Search agents

○ homescreen-stg-conn1 — Go to Local UI ↗
On-Premises | - | ■ Active

● zarvelionx-101 — Go to Local UI ↗
On-Premises | - | ■ Active

○ zarvelionx-102 — Go to Local UI ↗
Azure | eastus2 | ■ Active

Result

The Console refreshes and shows the systems associated with the selected agent.

View metrics on the NetApp Console Home page

Monitoring the health of your storage estate ensures that you are aware of issues with storage protection and can take steps to resolve them. Using the NetApp Console Home page, view a status of your backups and restores from NetApp Backup and Recovery and the number of workloads that are at risk for a ransomware attack or protected as indicated by NetApp Ransomware Resilience. You can review the storage capacity for individual clusters and Cloud Volumes ONTAP, ONTAP alerts, storage performance capacity per cluster or Cloud Volumes ONTAP system, the different types of licenses you have, and more.

All panes on the Home page show data at the organization level. The Storage capacity and Storage performance panes show systems associated with projects that the user can access based on IAM permissions.

The system refreshes the data on the Home page every five minutes. Caching may cause the data on this page to differ from real values for up to 15 minutes.

> ⓘ Accurate metrics on the Home page require appropriately sized and configured Console agents.

Required NetApp Console roles

Each pane in the Home page requires different user roles:

- **Storage capacity pane**: Ability to see the NetApp Console Systems page
- **ONTAP alerts pane**: Folder or project admin, Operations Support Analyst, Organization admin, Organization viewer, Super admin, Super viewer
- **Storage performance capacity pane**: Ability to see the NetApp Console Systems page
- **Licenses and subscriptions pane**: Folder or project admin, Organization admin, Organization viewer, Super admin, Super viewer
- **Ransomware Resilience pane**: Folder or project admin, Organization admin, Ransomware Resilience admin, Ransomware Resilience viewer, Super admin, Super viewer
- **Backup and Recovery pane**: Backup and recovery backup admin, Backup and recovery super admin, Backup and recovery backup viewer, Backup and recovery clone admin, Folder or project admin, Organization admin, Backup and recovery restore admin, Super admin, Super viewer

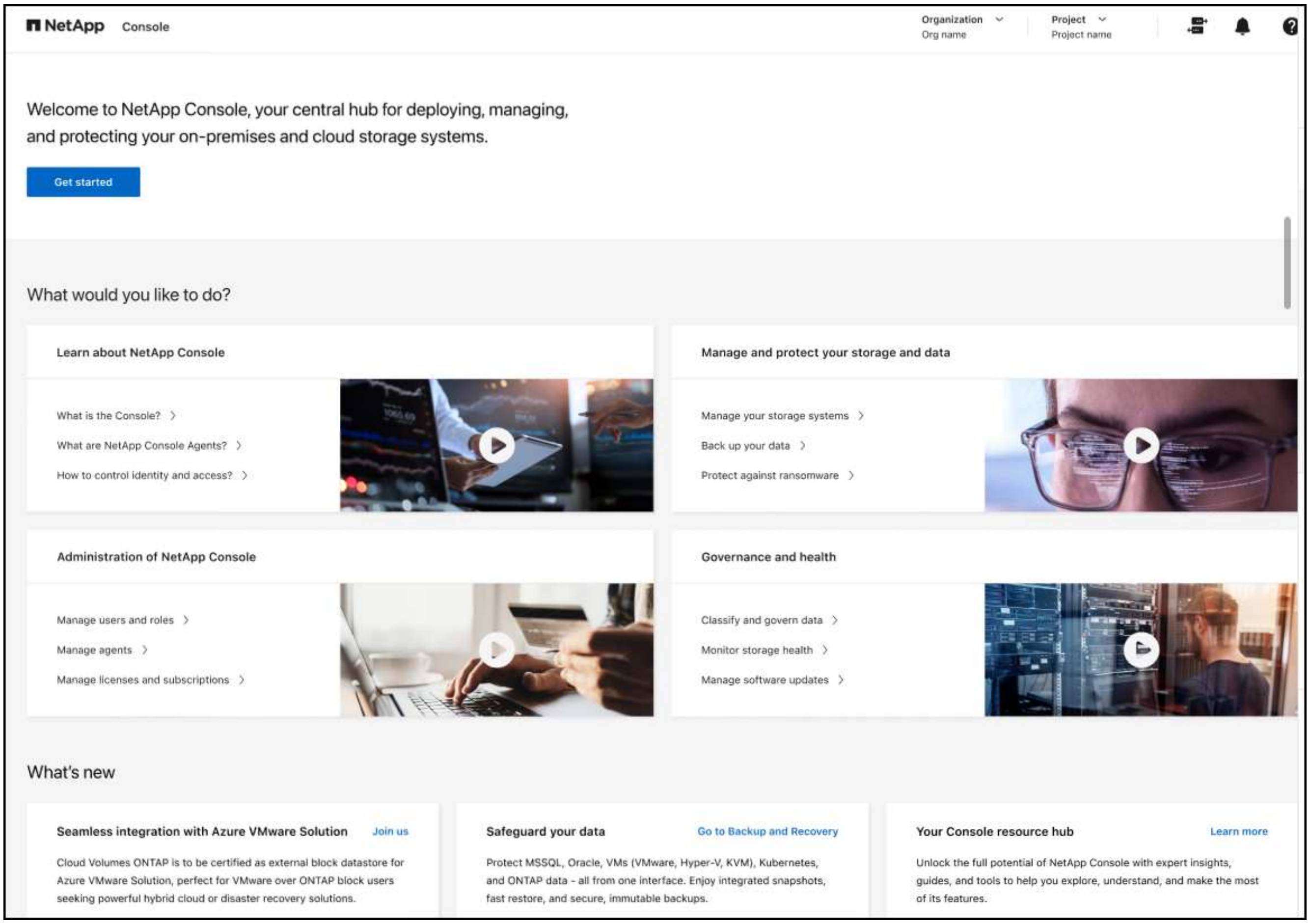
If you do not have permissions to access a pane, the pane displays a message indicating you lack permissions to use it.

Learn about NetApp Console access roles..

Steps

1. From the NetApp Console menu, select **Home**.

   If you have the Organization admin role and no agent or storage systems are set up, the Home page displays getting started information.



NetApp Console

Organization Org name | Project Project name

Welcome to NetApp Console, your central hub for deploying, managing, and protecting your on-premises and cloud storage systems.

Get started

What would you like to do?

Learn about NetApp Console

- What is the Console? >
- What are NetApp Console Agents? >
- How to control identity and access? >

Manage and protect your storage and data

- Manage your storage systems >
- Back up your data >
- Protect against ransomware >

Administration of NetApp Console

- Manage users and roles >
- Manage agents >
- Manage licenses and subscriptions >

Governance and health

- Classify and govern data >
- Monitor storage health >
- Manage software updates >

What's new

Seamless integration with Azure VMware Solution Join us

Cloud Volumes ONTAP is to be certified as external block datastore for Azure VMware Solution, perfect for VMware over ONTAP block users seeking powerful hybrid cloud or disaster recovery solutions.

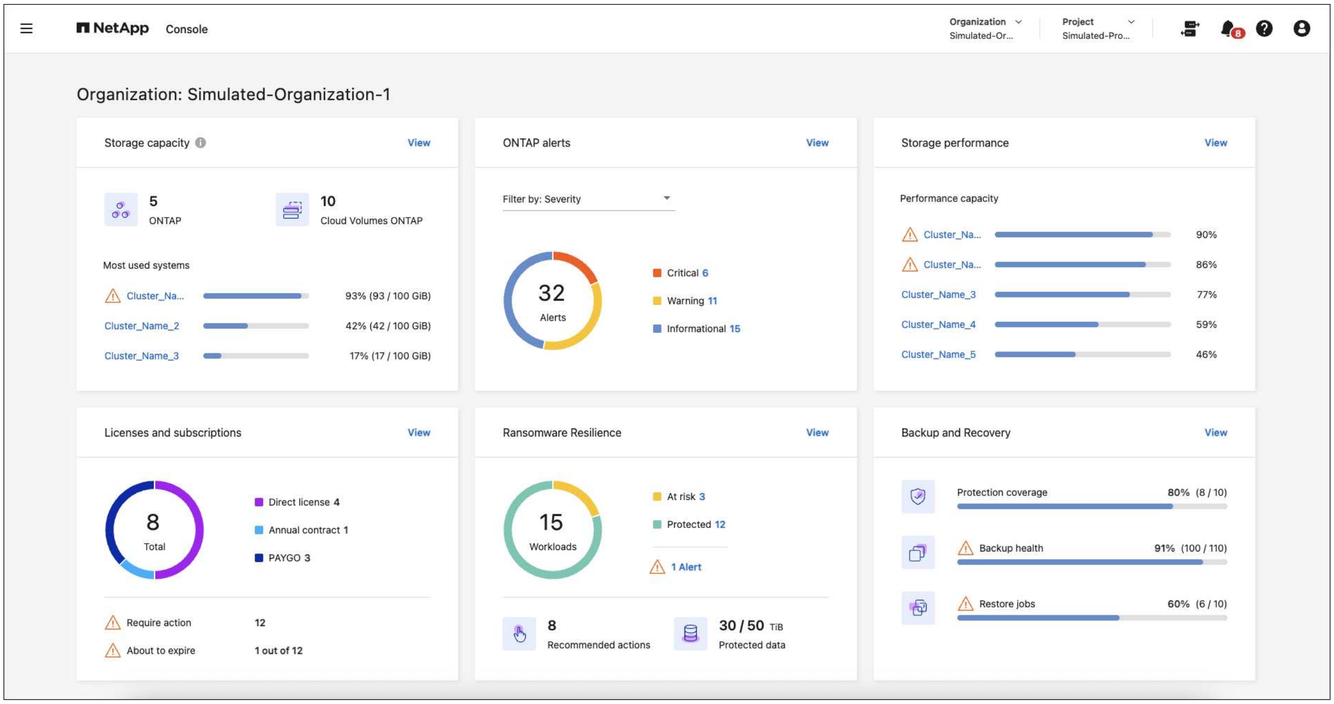
Safeguard your data Go to Backup and Recovery

Protect MSSQL, Oracle, VMs (VMware, Hyper-V, KVM), Kubernetes, and ONTAP data - all from one interface. Enjoy integrated snapshots, fast restore, and secure, immutable backups.

Your Console resource hub Learn more

Unlock the full potential of NetApp Console with expert insights, guides, and tools to help you explore, understand, and make the most of its features.

If you already set up the NetApp Console, at least one Console agent is enabled, and at least one cluster or Cloud Volumes ONTAP system has been added on that agent, the Home page shows metrics about your storage environment.



NetApp Console

Organization Simulated-Or... | Project Simulated-Pro...

Organization: Simulated-Organization-1

Storage capacity View

5 ONTAP | 10 Cloud Volumes ONTAP

Most used systems

⚠ Cluster_Na...	93% (93 / 100 GiB)
Cluster_Name_2	42% (42 / 100 GiB)
Cluster_Name_3	17% (17 / 100 GiB)

ONTAP alerts View

Filter by: Severity

32 Alerts

- Critical 6
- Warning 11
- Informational 15

Storage performance View

Performance capacity

⚠ Cluster_Na...	90%
⚠ Cluster_Na...	86%
Cluster_Name_3	77%
Cluster_Name_4	59%
Cluster_Name_5	46%

Licenses and subscriptions View

8 Total

- Direct license 4
- Annual contract 1
- PAYGO 3

⚠ Require action	12
⚠ About to expire	1 out of 12

Ransomware Resilience View

15 Workloads

- At risk 3
- Protected 12

⚠ 1 Alert

8 Recommended actions | 30 / 50 TiB Protected data

Backup and Recovery View

Protection coverage	80% (8 / 10)
⚠ Backup health	91% (100 / 110)
⚠ Restore jobs	60% (6 / 10)

Enable metrics to appear on the Home page

You can see metrics on the Home page when the following conditions are met:

- You are logged into a SaaS instance of the NetApp Console.
- You belong to an organization with existing storage resources (agent and cluster or Cloud Volumes ONTAP system).
- At least one Console agent is enabled.
- At least one cluster or Cloud Volumes ONTAP system has been added on that agent.

To enable metrics to appear on the Home page, complete the following tasks:

- Enable at least one Console agent.
- Add at least one cluster or one Cloud Volumes ONTAP using that agent.

View the overall storage capacity

The Storage capacity pane provides the following information across ONTAP clusters and Cloud Volumes ONTAP systems:

- Number of ONTAP systems discovered in the Console
- Number of Cloud Volumes ONTAP systems discovered in the Console
- Capacity usage per cluster

The order of the clusters or Cloud Volumes ONTAP systems is based on the amount of capacity used. The cluster or system with the highest capacity appears first for easy identification.

Warning indicators show for clusters at 80% capacity, with data updating every five minutes.

> If you have multiple projects, you might see different data in the Storage capacity pane compared to the Systems page. This is because the Systems page shows information based on the project level, whereas the Storage capacity pane shows information at the organization level. Also, the data on this pane might differ from real values for a maximum of 15 minutes because the data is cached for that duration to optimize performance.

Steps

1. From the NetApp Console menu, review the Storage capacity pane.
2. In the Storage capacity pane, select **View** to go to the Console Systems page.
3. On the Systems page, select the project containing the cluster you want to view.
4. On the Systems page, select a cluster to view more details about that cluster.

View ONTAP alerts

View issues or potential risks in your NetApp on-premises ONTAP environments. You can see some non-EMS alerts and some EMS alerts.

The data updates every 5 minutes.

You can see ONTAP alerts with these severities:

- Critical
- Warning
- Informational

You can see ONTAP alerts for these impact areas:

- Capacity
- Performance
- Protection
- Availability
- Security

> Caching optimizes performance, but may cause the data on this pane to differ from actual values for up to 15 minutes.

Systems supported

- An on-premises ONTAP NAS or SAN system is supported.
- Cloud Volumes ONTAP systems are not supported.

Data sources supported

View alerts regarding certain events that occur in ONTAP. They are a combination of EMS and metric-based alerts.

For details about ONTAP alerts, refer to About ONTAP alerts.

For a list of alerts that you might see, refer to View potential risks in ONTAP storage.

Steps

1. From the NetApp Console menu, review the ONTAP alerts pane.
2. Optionally, filter the alerts by selecting the severity level or change the filter to show alerts based on impact area.
3. In the ONTAP alerts pane, select **View** to go to the Console Alerts page.

View storage performance capacity

Review the storage performance capacity used per cluster or Cloud Volumes ONTAP system to determine how performance capacity, latency, and IOPS are impacting your workloads. For example, you might find that you need to shift workloads to minimize latency and maximize IOPS and throughput for your critical workloads.

The system arranges clusters and systems by performance capacity, listing the highest capacity first for easy identification.

> Caching optimizes performance, but may cause the data on this pane to differ from actual values for up to 15 minutes.

Steps

1. From the NetApp Console menu, review the Storage performance pane.

2. In the Storage performance pane, select **View** to go to a Performance page that lists all the clusters and Cloud Volumes ONTAP systems data for performance capacity, IOPS, and latency.
3. Select a cluster to view its details in System Manager.

View the licenses and subscriptions that you have

Review the following information on the Licenses and subscriptions pane:

- The total number of licenses and subscriptions that you have.
- The number of each type of license and subscription that you have (direct license, annual contract, or PAYGO).
- The number of licenses and subscriptions that are active, require action, or nearing expiration.
- The system displays indicators next to the license types that require action or are nearing expiration.

The data refreshes every 5 minutes.

> Caching optimizes performance, but may cause the data on this pane to differ from actual values for up to 15 minutes.

Steps

1. From the NetApp Console menu, review the Licenses and subscriptions pane.
2. In the Licenses and subscriptions pane, select **View** to go to the Console Licenses and subscriptions page.

View Ransomware Resilience status

Find out if workloads are at risk of ransomware attacks or protected with the NetApp Ransomware Resilience data service. You can review the total amount of data that is protected, view the number of recommended actions, and view the number of alerts related to ransomware protection.

The data refreshes every 5 minutes and matches the data shown in the NetApp Ransomware Resilience Dashboard.

Learn about NetApp Ransomware Resilience.

Steps

1. From the NetApp Console menu, review the Ransomware Resilience pane.
2. Do one of the following in the Ransomware Resilience pane:
   - Select **View** to go to the NetApp Ransomware Resilience Dashboard. For details, refer to Monitor workload health using the NetApp Ransomware Resilience Dashboard.
   - Review "Recommended actions" in the NetApp Ransomware Resilience Dashboard. For details, refer to Review protection recommendations on the NetApp Ransomware Resilience Dashboard.
   - Select the alerts link to review alerts in NetApp Ransomware Resilience Alerts page. For details, refer Handle detected ransomware alerts with NetApp Ransomware Resilience.

View Backup and Recovery status

Review the overall status of your backups and restores from NetApp Backup and Recovery. You can see the number of protected and unprotected resources. You can also see the percentage of backups and restore operations for protection of your workloads. A higher percentage indicates improved data protection.

The data refreshes every 5 minutes.

> Caching optimizes performance, but may cause the data on this pane to differ from actual values for up to 15 minutes.

Steps

1. From the NetApp Console menu, review the Backup and Recovery pane.
2. Select **View** to go to the NetApp Backup and Recovery Dashboard. For details, refer to NetApp Backup and Recovery documentation.

Manage your NetApp Console user settings

You can modify your Console profile including change your password, enable multi-factor authentication (MFA), and see who your Console administrator is.

Within the Console, each user has a profile that contains information about the user and their settings. You can view and edit your profile settings.

Change your display name

You can change your Console display name, which identifies you to other users. You cannot change your username or email address.

Steps

1. Select the profile icon in the upper right corner of the Console to view the User settings panel.
2. Select the **Edit** icon next to your name.
3. Enter your new display name in the **Name** field.

Elevate your role in read-only mode

In some cases, your Organization admin may put your organization into read-only mode. If you have an admin role, you must elevate permissions to make changes. This ensures changes are intentional and authorized.

After elevating your role, you can make changes in the Console until your current session expires.

When you’re finished, either log out of the Console or move the slider back to return to read-only mode. The system removes your elevated permissions when your session expires.

Steps

1. Select the profile icon in the upper right corner of the Console to view the User settings panel.
2. For **Read-only mode status**, move the slider to the **Elevated** position and confirm the changes.

Read-Only mode status ● Elevated

Configure multi-factor authentication

Configure multi-factor authentication (MFA) to improve security by requiring a second verification method.

Users who use single sign-on with an external identity provider or the NetApp Support Site cannot enable MFA. If either of these are true for you, you don't see the option to enable MFA in your profile settings.

Do not enable MFA if your user account is used for API access. Multi-factor authentication stops API access when enabled for a user account. Use service accounts for all API access.

Before you begin

- You must have already downloaded an authentication app, such as Google Authenticator or Microsoft Authenticator, to your device.
- You'll need your password to set up MFA.

> ⓘ If you do not have access to your authentication app or lose your recovery code, contact your Console administrator for help.

Steps

1. Select the profile icon in the upper right corner of the Console to view the User settings panel.
2. Select **Configure** next to the **Multi-Factor Authentication** header.
3. Follow the prompts to set up MFA for your account.
4. When you finish, you'll be prompted to save your recovery code. Choose to either copy the code or download a text file containing the code. Keep this code somewhere safe. You need the recovery code if you lose access to your authentication app.

   After you set up MFA, the Console prompts you to enter a one-time code from your authentication app each time you log in.

Regenerate your MFA recovery code

You can only use recovery codes once. If you use or lose yours, create a new one.

Steps

1. Select the profile icon in the upper right corner of the the Console to view the User settings panel.
2. Select ••• next to the **Multi-Factor Authentication** header.
3. Select **Regenerate recovery code**.
4. Copy the generated recovery code and save it in a secure location.

Delete your MFA configuration

When you're finished, either log out of the Console or move the slider back to return to read-only mode. The system removes your elevated permissions when your session expires.

> ⓘ If you are unable to access your authentication app or recovery code, you will need to contact your Organization administrator to reset your MFA configuration.

Steps

1. Select the profile icon in the upper right corner of the Console to view the User settings panel.
2. Select ••• next to the **Multi-Factor Authentication** header.
3. Select **Delete**.

Contact your Organization administrator

If you need to contact your organization administrator, you can send an email to them directly from the Console. The administrator manages user accounts and permissions within your organization.

> You must have a default email application configured for your browser to use the **Contact admins** feature.

Steps

1. Select the profile icon in the upper right corner of the Console to view the User settings panel.
2. Select **Contact admins** to send an email to your organization administrator.
3. Select the email application to use.
4. Finish the email and select **Send**.

Configure dark mode (dark theme)

You can set the Console to display in dark mode.

Steps

1. Select the profile icon in the upper right corner of the Console to view the User settings panel.
2. Move the **Dark theme** slider to enable it.

Administer and monitor

Associate NetApp Support accounts

Manage NSS credentials associated with NetApp Console

Associate a NetApp Support Site account with your Console organization to enable key workflows for storage management. These NSS credentials are associated with the entire organization.

The Console also supports associating one NSS account per user account. Learn how to manage user-level credentials.

Overview

Associating NetApp Support Site credentials with your specific Console account serial number is required to enable the following tasks:

- Deploying Cloud Volumes ONTAP when you bring your own license (BYOL)

  Providing your NSS account is required so that the Console can upload your license key and to enable the subscription for the term that you purchased. This includes automatic updates for term renewals.

- Registering pay-as-you-go Cloud Volumes ONTAP systems

  Providing your NSS account is required to activate support for your system and to gain access to NetApp technical support resources.

- Upgrading Cloud Volumes ONTAP software to the latest release

These credentials are associated with your specific Console account serial number. Users can access these credentials from **Support > NSS Management**.

Add an NSS account

You can add and manage your NetApp Support Site accounts for use with the Console from the Support Dashboard within the Console.

When you have added your NSS account, the Console uses this information for things like license downloads, software upgrade verification, and future support registrations.

You can associate multiple NSS accounts with your organization; however, you cannot have customer accounts and partner accounts within the same organization.

> ⓘ NetApp uses Microsoft Entra ID as the identity provider for authentication services specific to support and licensing.

Steps

1. In **Administration > Support**.
2. Select **NSS Management**.
3. Select **Add NSS Account**.

4. Select **Continue** to be redirected to a Microsoft login page.
5. At the login page, provide your NetApp Support Site registered email address and password.

   Upon successful login, NetApp will store the NSS user name.

   This is a system-generated ID that maps to your email. On the **NSS Management** page, you can display your email from the ••• menu.

   - If you ever need to refresh your login credential tokens, there is also an **Update Credentials** option in the ••• menu.

     Using this option prompts you to log in again. Note that the token for these accounts expire after 90 days. A notification will be posted to alert you of this.

What’s next?

Users can now select the account when creating new Cloud Volumes ONTAP systems and when registering existing Cloud Volumes ONTAP systems.

- Launching Cloud Volumes ONTAP in AWS
- Launching Cloud Volumes ONTAP in Azure
- Launching Cloud Volumes ONTAP in Google Cloud
- Registering pay-as-you-go systems

Update NSS credentials

For security reasons, you must update your NSS credentials every 90 days. You’ll be notified in the Console notification center if your NSS credential has expired. Learn about the Notification Center.

Expired credentials can disrupt the following, but are not limited to:

- License updates, which mean you won’t be able to take advantage of newly purchased capacity.
- Ability to submit and track support cases.

Additionally, you can update the NSS credentials associated with your organization if you want to change the NSS account associated with your organization. For example, if the person associated with your NSS account has left your company.

Steps

1. In **Administration > Support**.
2. Select **NSS Management**.
3. For the NSS account that you want to update, select ••• and then select **Update Credentials**.
4. When you’re prompted, select **Continue** to be redirected to a Microsoft login page.

   NetApp uses Microsoft Entra ID as the identity provider for authentication services related to support and licensing.

5. At the login page, provide your NetApp Support Site registered email address and password.

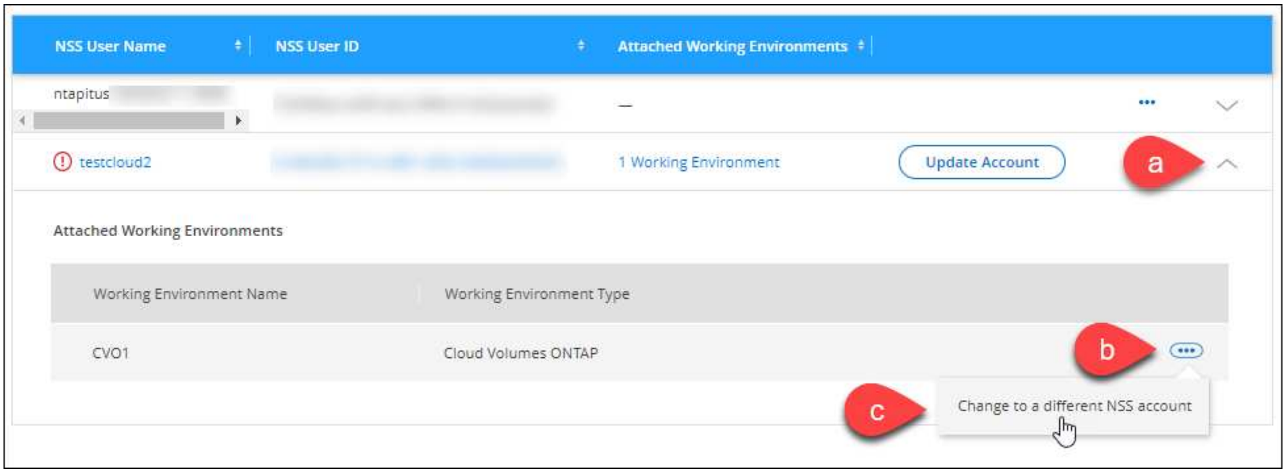
Attach a system to a different NSS account

If your organization has multiple NetApp Support Site accounts, you can change which account is associated with a Cloud Volumes ONTAP system.

You must first have associated the account with the Console.

Steps

1. In **Administration > Support**.
2. Select **NSS Management**.
3. Complete the following steps to change the NSS account:
   a. Expand the row for the NetApp Support Site account that the system is currently associated with.
   b. For the system that you want to change the association for, select •••
   c. Select **Change to a different NSS account**.



NSS User Name	NSS User ID	Attached Working Environments		
ntapitus [redacted]	[redacted]	–		•••
testcloud2	[redacted]	1 Working Environment	Update Account	

Attached Working Environments

Working Environment Name	Working Environment Type
CVO1	Cloud Volumes ONTAP

   d. Select the account and then select **Save**.

Display the email address for an NSS account

For security, the email address associated with an NSS account is not displayed by default. You can view the email address and associated user name for an NSS account.

> When you go to the NSS Management page, the Console generates a token for each account in the table. That token includes information about the associated email address. The token is removed when you leave the page. The information is never cached, which helps protect your privacy.

Steps

1. In **Administration > Support**.
2. Select **NSS Management**.
3. For the NSS account that you want to update, select ••• and then select **Display Email Address**. You can use the copy button to copy the email address.

Remove an NSS account

Delete any of the NSS accounts that you no longer want to use with the Console.

You can’t delete an account that is currently associated with a Cloud Volumes ONTAP system. You first need to attach those systems to a different NSS account.

Steps

1. In **Administration > Support**.
2. Select **NSS Management**.
3. For the NSS account that you want to delete, select ••• and then select **Delete**.
4. Select **Delete** to confirm.

Manage credentials associated with your NetApp Console login

Depending on the actions that you’ve taken in the Console, you might have associated ONTAP credentials and NetApp Support Site (NSS) credentials with your user login. You can view and manage those credentials after you’ve associated them. For example, if you change the password for these credentials, then you’ll need to update the password in the Console.

ONTAP credentials

Users need ONTAP admin credentials to discover ONTAP clusters in the Console. However, ONTAP System Manager access depends on whether or not you are using a Console agent.

Without a Console agent

Users are prompted to enter their ONTAP credentials to access ONTAP System Manager for the cluster. Users can choose to save these credentials in the Console which means they won’t be prompted to enter them each time. User credentials are only visible to the respective user and can be managed from the User credentials page.

With a Console agent

By default, users are not prompted to enter their ONTAP credentials to access ONTAP System Manager. However, a Console administrator (with the Organization admin role) can configure the Console to prompt users to enter their ONTAP credentials. When this setting is enabled, users need enter their ONTAP credentials each time.

Learn more.

NSS credentials

The NSS credentials associated with your NetApp Console login enable support registration, case management, and access to Digital Advisor.

- When you access **Support > Resources** and register for support, you’re prompted to associate NSS credentials with your login.

  This registers your organization or account for support and activates support entitlement. Only one user in your organization must associate a NetApp Support Site account with their login to register for support and activate support entitlement. After this is completed, the **Resources** page shows that your account is registered for support.

Learn how to register for support

- When you access **Administration > Support > Case Management**, you're prompted to enter your NSS credentials, if you haven't already done so. This page enables you to create and manage the support cases associated with your NSS account and with your company.
- When you access Digital Advisor in the Console, you're prompted to log in to Digital Advisor by entering your NSS credentials.

Note the following about the NSS account associated with your login:

- The account is managed at the user level, which means it isn't viewable by other users who log in.
- There can be only one NSS account associated with Digital Advisor and support case management, per user.
- If you're trying to associate a NetApp Support Site account with a Cloud Volumes ONTAP system, you can only choose from the NSS accounts that were added to the organization that you are a member of.

  NSS account-level credentials are different than the NSS account that's associated with your login. NSS account-level credentials enable you to deploy Cloud Volumes ONTAP with BYOL, register PAYGO systems, and upgrade its software.

  Learn more about using NSS credentials with your NetApp Console organization or account.

Manage your user credentials

Manage your user credentials by updating the user name and password or by deleting the credentials.

Steps

1. Select **Administration > Credentials**.
2. Select **User Credentials**.
3. If you don't have any user credentials yet, you can select **Add NSS credentials** to add your NetApp Support Site account.
4. Manage existing credentials by choosing the following options from the Actions menu:
   - **Update credentials**: Update the user name and password for the account.
   - **Delete credentials**: Remove the NSS account associated with your Console login.

Console agents

Learn about NetApp Console agents

You use a Console agent to connect NetApp Console to your infrastructure and securely orchestrate storage solutions across AWS, Azure, Google Cloud, or on-premises environments, as well as use data protection services.

A Console agent enables you to:

- Orchestrate storage management tasks from the NetApp Console such as provisioning Cloud Volumes ONTAP, setting up storage volumes, using data classification, and more.
- Authenticate using your cloud provider's IAM roles for subscription billing integration

- Use advanced data services (NetApp Backup and Recovery, NetApp Disaster Recovery, NetApp Ransomware Resilience, and NetApp Cloud Tiering)
- Use the Console in restricted mode.

If you don’t need advanced orchestration or data protection, you can centrally manage on-premises ONTAP clusters and cloud-native storage services without deploying an agent. Monitoring and data mobility tools are also available.

The following table shows which features and services you can use with and without a Console agent.

	Available with agent	**Available without agent**
Supported Storage systems:		
Amazon FSx for ONTAP	Yes (discovery and management features)	Yes (discovery only)
Amazon S3 storage	Yes	No
Azure Blob storage	Yes	Yes
Azure NetApp Files	Yes	Yes
Cloud Volumes ONTAP	Yes	No
E-Series systems	Yes	No
Google Cloud NetApp Volumes	Yes	Yes
Google Cloud storage buckets	Yes	No
StorageGRID systems	Yes	No
On-premises ONTAP cluster (advanced management and discovery)	Yes (advanced management and discovery)	No (basic discovery only)
Available storage management services:		
Alerts	Yes	No
Automation hub	Yes	Yes
Digital Advisor (Active IQ)	Yes	No
License and subscription management	Yes	No
Economic efficiency	Yes	No

	Available with agent	Available without agent
Home page dashboard metrics	Yes[2]	No
Lifecycle planning	Yes	No[1]
Sustainability	Yes	No
Software updates	Yes	Yes
NetApp Workloads	Yes	Yes
Available data services:		
NetApp Backup and Recovery	Yes	No
Data Classification	Yes	No
NetApp Cloud Tiering	Yes	No
NetApp Copy and Sync	Yes	No
NetApp Disaster Recovery	Yes	No
NetApp Ransomware Resilience	Yes	No
NetApp Volume Caching	Yes	No

[1] You can view Lifecycle planning without a Console agent, but a Console agent is required to initiate actions.

[2] Accurate metrics on the Home page require appropriately sized and configured Console agents.

Console agents must be operational at all times

Console agents are a fundamental part of the NetApp Console. It’s your responsibility (the customer) to ensure that relevant agents are up, operational, and accessible at all times. The Console can handle short agent outages, but you must fix infrastructure failures quickly.

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Supported locations

You can install agents in the following locations:

- Amazon Web Services
- Microsoft Azure

  Deploy a Console agent in Azure in the same region as the Cloud Volumes ONTAP systems it manages.

Alternatively, deploy it in the Azure region pair. This ensures that an Azure Private Link connection is used between Cloud Volumes ONTAP and its associated storage accounts. Learn how Cloud Volumes ONTAP uses an Azure Private Link

- Google Cloud

  To use the Console and data services with Google Cloud, deploy your agent in Google Cloud.

- On your premises

Communication with cloud providers

The agent uses TLS 1.3 for all communication to AWS, Azure, and Google Cloud.

Restricted mode

To use the Console in restricted mode, you install a Console agent and access the Console interface that's running locally on the Console agent.

Learn about NetApp Console deployment modes.

How to install a Console agent

You can install a Console agent directly from the Console, from your cloud provider's marketplace, or by manually installing the software on your own Linux host or in your VCenter environment.

- Learn about NetApp Console deployment modes
- Get started with NetApp Console in standard mode
- Get started with NetApp Console in restricted mode

Cloud provider permissions

You need specific permissions to create the Console agent directly from the NetApp Console and another set of permissions for the Console agent itself. If you create the Console agent in AWS or Azure directly from the Console, then the Console creates the Console agent with the permissions that it needs.

When using the Console in standard mode, how you provide permissions depends on how you plan to create the Console agent.

To learn how to set up permissions, refer to the following:

- Standard mode
  - Agent installation options in AWS
  - Agent installation options in Azure
  - Agent installation options in Google Cloud
  - Set up cloud permissions for on-premises deployments
- Set up permissions for restricted mode

To view the exact permissions that the Console agent needs for day-to-day operations, refer to the following pages:

- Learn how the Console agent uses AWS permissions

- Learn how the Console agent uses Azure permissions
- Learn how the Console agent uses Google Cloud permissions

It’s your responsibility to update the Console agent policies as new permissions are added in subsequent releases. The release notes list new permissions.

Agent upgrades

NetApp updates agent software monthly to add features and improve stability. Some Console features, like Cloud Volumes ONTAP and on-premises ONTAP cluster management, rely on the Console agent version and settings.

When you install your agent in the cloud, the Console agent updates automatically if it has internet access.

Operating system and VM maintenance

Maintaining the operating system on the Console agent host is your (customer’s) responsibility. For example, you (customer) should apply security updates to the operating system on the Console agent host by following your company’s standard procedures for operating system distribution.

Note that you (customer) don’t need to stop any services on the Console gent host when applying minor security updates.

If you (customer) need to stop and then start the Console agent VM, you should do so from your cloud provider’s console or by using the standard procedures for on-premises management.

The Console agent must be operational at all times.

Multiple systems and agents

An agent can manage multiple systems and support data services in the Console. You can use a single agent to manage multiple systems based on deployment size and the data services you use.

For large-scale deployments, work with your NetApp representative to size your environment. Contact NetApp Support if you experience issues.

Here are a few examples of agent deployments:

- You have a multicloud environment (for example, AWS and Azure) and you prefer to have one agent in AWS and another in Azure. Each manages the Cloud Volumes ONTAP systems running in those environments.
- A service provider might use one Console organization to provide services for their customers, while using another organization to provide disaster recovery for one of their business units. Each organization needs its own agent.

Deploy a Console agent

AWS

Console agent installation options in AWS

There are a few different ways to create a Console agent in AWS. Directly from the NetApp Console is the most common way.

The following installation options are available:

- Create the Console agent directly from the Console (this is the standard option)

  This action launches an EC2 instance running Linux and the Console agent software in a VPC of your choice.

- Create a Console agent from the AWS Marketplace

  This action also launches an EC2 instance running Linux and the Console agent software, but the deployment is initiated directly from the AWS Marketplace, rather than from the Console.

- Download and manually install the software on your own Linux host

The installation option that you choose impacts how you prepare for installation. This includes how you provide the Console with the required permissions that it needs to authenticate and manage resources in AWS.

Create a Console agent in AWS from NetApp Console

You can create a Console agent in AWS directly from the NetApp Console. Before creating a Console agent in AWS from the Console, you need to set up your networking and prepare AWS permissions.

Before you begin

- You should have an understanding of Console agents.
- You should review Console agent limitations.

Step 1: Set up networking for deploying a Console agent in AWS

Ensure that the network location where you plan to install the Console agent supports the following requirements. These requirements enable the Console agent to manage resources and processes in your hybrid cloud.

VPC and subnet

When you create the Console agent, you need to specify the VPC and subnet where it should reside.

Connections to target networks

The Console agent requires a network connection to the location where you're planning to create and manage systems. For example, the network where you plan to create Cloud Volumes ONTAP systems or a storage system in your on-premises environment.

Outbound internet access

The network location where you deploy the Console agent must have an outbound internet connection to contact specific endpoints.

Endpoints contacted from the Console agent

The Console agent requires outbound internet access to contact the following endpoints to manage resources and processes within your public cloud environment for day-to-day operations.

The endpoints listed below are all CNAME entries.

Endpoints	Purpose
AWS services (amazonaws.com): • CloudFormation • Elastic Compute Cloud (EC2) • Identity and Access Management (IAM) • Key Management Service (KMS) • Security Token Service (STS) • Simple Storage Service (S3)	To manage AWS resources. The endpoint depends on your AWS region. Refer to AWS documentation for details
Amazon FsX for NetApp ONTAP: • api.workloads.netapp.com	The web-based console contacts this endpoint to interact with the Workload Factory APIs to manage and operate FSx for ONTAP based workloads.
https://mysupport.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support.
https://signin.b2c.netapp.com	To update NetApp Support Site (NSS) credentials or to add new NSS credentials to the NetApp Console.
https://support.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support as well as to receive software updates for Cloud Volumes ONTAP.
https://api.bluexp.netapp.com https://netapp-cloud-account.auth0.com https://netapp-cloud-account.us.auth0.com https://console.netapp.com https://components.console.bluexp.netapp.com https://cdn.auth0.com	To provide features and services within the NetApp Console.
https://bluexpinfraprod.eastus2.data.azurecr.io https://bluexpinfraprod.azurecr.io	To obtain images for Console agent upgrades. • When you deploy a new agent, the validation check tests connectivity to current endpoints. If you use previous endpoints, the validation check fails. To avoid this failure, skip the validation check. Although the previous endpoints are still supported, NetApp recommends updating your firewall rules to the current endpoints as soon as possible. Learn how to update your endpoint list. • When you update to the current endpoints in your firewall, your existing agents will continue to work.

Endpoints contacted from the NetApp console

As you use the web-based NetApp Console that’s provided through the SaaS layer, it contacts several endpoints to complete data management tasks. This includes endpoints that are contacted to deploy the Console agent from the the Console.

View the list of endpoints contacted from the NetApp console.

Proxy server

NetApp supports both explicit and transparent proxy configurations. If you are using a transparent proxy, you only need to provide the certificate for the proxy server. If you are using an explicit proxy, you’ll also need the IP address and credentials.

- IP address
- Credentials
- HTTPS certificate

Ports

There’s no incoming traffic to the Console agent, unless you initiate it or if it is used as a proxy to send AutoSupport messages from Cloud Volumes ONTAP to NetApp Support.

- HTTP (80) and HTTPS (443) provide access to the local UI, which you’ll use in rare circumstances.
- SSH (22) is only needed if you need to connect to the host for troubleshooting.
- Inbound connections over port 3128 are required if you deploy Cloud Volumes ONTAP systems in a subnet where an outbound internet connection isn’t available.

  If Cloud Volumes ONTAP systems don’t have an outbound internet connection to send AutoSupport messages, the Console automatically configures those systems to use a proxy server that’s included with the Console agent. The only requirement is to ensure that the Console agent’s security group allows inbound connections over port 3128. You’ll need to open this port after you deploy the Console agent.

Enable NTP

If you’re planning to use NetApp Data Classification to scan your corporate data sources, you should enable a Network Time Protocol (NTP) service on both the Console agent and the NetApp Data Classification system so that the time is synchronized between the systems. Learn more about NetApp Data classification

You’ll need to implement this networking requirement after you create the Console agent.

Step 2: Set up AWS permissions for the Console agent

The Console needs to authenticate with AWS before it can deploy the Console agent in your VPC. You can choose one of these authentication methods:

- Let the Console assume an IAM role that has the required permissions
- Provide an AWS access key and secret key for an IAM user who has the required permissions

With either option, the first step is to create an IAM policy. This policy contains only the permissions needed to launch the Console agent in AWS from the Console.

If needed, you can restrict the IAM policy by using the IAM `Condition` element. AWS documentation: Condition element

Steps

1. Go to the AWS IAM console.
2. Select **Policies > Create policy**.
3. Select **JSON**.
4. Copy and paste the following policy:

   This policy contains only the permissions needed to launch the Console agent in AWS from the Console. When the Console creates the Console agent, it applies a new set of permissions to the Console agent that enables the Console agent to manage AWS resources. View permissions required for the Console agent itself.

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "iam:CreateRole",
        "iam:DeleteRole",
        "iam:PutRolePolicy",
        "iam:CreateInstanceProfile",
        "iam:DeleteRolePolicy",
        "iam:AddRoleToInstanceProfile",
        "iam:RemoveRoleFromInstanceProfile",
        "iam:DeleteInstanceProfile",
        "iam:PassRole",
        "iam:ListRoles",
        "ec2:DescribeInstanceStatus",
        "ec2:RunInstances",
        "ec2:ModifyInstanceAttribute",
        "ec2:CreateSecurityGroup",
        "ec2:DeleteSecurityGroup",
        "ec2:DescribeSecurityGroups",
        "ec2:RevokeSecurityGroupEgress",
        "ec2:AuthorizeSecurityGroupEgress",
        "ec2:AuthorizeSecurityGroupIngress",
        "ec2:RevokeSecurityGroupIngress",
        "ec2:CreateNetworkInterface",
        "ec2:DescribeNetworkInterfaces",
        "ec2:DeleteNetworkInterface",
        "ec2:ModifyNetworkInterfaceAttribute",
        "ec2:DescribeSubnets",
        "ec2:DescribeVpcs",
        "ec2:DescribeDhcpOptions",
        "ec2:DescribeKeyPairs",
        "ec2:DescribeRegions",
        "ec2:DescribeInstances",
        "ec2:CreateTags",
        "ec2:DescribeImages",
        "ec2:DescribeAvailabilityZones",
        "ec2:DescribeLaunchTemplates",
        "ec2:CreateLaunchTemplate",
        "cloudformation:CreateStack",
        "cloudformation:DeleteStack",
        "cloudformation:DescribeStacks",
        "cloudformation:DescribeStackEvents",
        "cloudformation:ValidateTemplate",
        "ec2:AssociateIamInstanceProfile",
        "ec2:DescribeIamInstanceProfileAssociations",
        "ec2:DisassociateIamInstanceProfile",
        "iam:GetRole",
        "iam:TagRole",
        "kms:ListAliases",
        "cloudformation:ListStacks"
      ],
      "Resource": "*"
    },
    {
      "Effect": "Allow",
      "Action": [
        "ec2:TerminateInstances"
      ],
      "Condition": {
        "StringLike": {
          "ec2:ResourceTag/OCCMInstance": "*"
        }
      },
      "Resource": [
        "arn:aws:ec2:*:*:instance/*"
      ]
    }
  ]
}
```

5. Select **Next** and add tags, if needed.
6. Select **Next** and enter a name and description.
7. Select **Create policy**.
8. Either attach the policy to an IAM role that the Console can assume or to an IAM user so that you can provide the Console with access keys:
   - (Option 1) Set up an IAM role that the Console can assume:
     a. Go to the AWS IAM console in the target account.

b. Under Access Management, select **Roles > Create Role** and follow the steps to create the role.

c. Under **Trusted entity type**, select **AWS account**.

d. Select **Another AWS account** and enter the ID of the Console SaaS account: 952013314444

e. Select the policy that you created in the previous section.

f. After you create the role, copy the Role ARN so that you can paste it in the Console when you create the Console agent.

- (Option 2) Set up permissions for an IAM user so that you can provide the Console with access keys:

  a. From the AWS IAM console, select **Users** and then select the user name.

  b. Select **Add permissions > Attach existing policies directly**.

  c. Select the policy that you created.

  d. Select **Next** and then select **Add permissions**.

  e. Ensure that you have the access key and secret key for the IAM user.

Result

You should now have an IAM role that has the required permissions or an IAM user that has the required permissions. When you create the Console agent from the Console, you can provide information about the role or access keys.

Step 3: Create the Console agent

Create the Console agent directly from the the Console web-based console.

About this task

- Creating the Console agent from the Console deploys an EC2 instance in AWS using a default configuration. Do not switch to a smaller EC2 instance with fewer CPUs or less RAM after creating the Console agent. Learn about the default configuration for the Console agent.
- When the Console creates the Console agent, it creates an IAM role and a profile for the agent. This role includes permissions that enables the Console agent to manage AWS resources. Ensure the role is updated as new permissions are added in future releases.
  Learn more about the IAM policy for the Console agent.

Before you begin

You should have the following:

- An AWS authentication method: either an IAM role or access keys for an IAM user with the required permissions.
- A VPC and subnet that meets networking requirements.
- A key pair for the EC2 instance.
- Details about a proxy server, if a proxy is required for internet access from the Console agent.
- Set up networking requirements.
- Set up AWS permissions.

Steps

1. Select **Administration > Agents**.
2. On the **Overview** page, select **Deploy agent > AWS**

3. Follow the steps in the wizard to create the Console agent:
4. On the **Introduction** page provides an overview of the process
5. On the **AWS Credentials** page, specify your AWS region and then choose an authentication method, which is either an IAM role that the Console can assume or an AWS access key and secret key.

   > If you choose **Assume Role**, you can create the first set of credentials from the Console agent deployment wizard. Any additional set of credentials must be created from the Credentials page. They will then be available from the wizard in a drop-down list. Learn how to add additional credentials.

6. On the **Details** page, provide details about the Console agent.
   - Enter a name.
   - Add custom tags (metadata).
   - Choose whether you want the Console to create a new role that has the required permissions, or if you want to select an existing role that you set up with the required permissions.
   - Choose whether you want to encrypt the Console agent's EBS disks. You have the option to use the default encryption key or to use a custom key.
7. On the **Network** page, Specify a VPC, subnet, and key pair for the agent, choose whether to enable a public IP address, and optionally specify a proxy configuration.

   Ensure you have the correct key pair to access the Console agent virtual machine. Without a key pair, you cannot access it.

8. On the **Security Group** page, choose whether to create a new security group or whether to select an existing security group that allows the required inbound and outbound rules.

   View security group rules for AWS.

9. Review your selections to verify that your set up is correct.

   a. The **Validate agent configuration** check box is marked by default to have the Console validate the network connectivity requirements when you deploy. If the Console fails to deploy the agent, it provides a report to help you troubleshoot. If the deployment succeeds, no report is provided.

   > If you are still using the previous endpoints used for agent upgrades, the validation fails with an error. To avoid this, unmark the check box to skip the validation check.

10. Select **Add**.

    The Console deploys the agent in about 10 minutes. Stay on the page until the process completes.

Result

After the process is complete, the Console agent is available for use from the Console.

> If the deployment fails, you can download a report and logs from the Console to help you fix the issues. Learn how to troubleshoot installation issues.

If you have Amazon S3 buckets in the same AWS account where you created the Console agent, you'll see an Amazon S3 working environment appear on the **Systems** page automatically. Learn how to manage S3 buckets from NetApp Console

Create a Console agent from the AWS Marketplace

You create a Console agent in AWS directly from the AWS Marketplace. To create a Console agent from the AWS Marketplace, you need to set up your networking, prepare AWS permissions, review instance requirements, and then create the Console agent.

Before you begin

- You should have an understanding of Console agents.
- You should review Console agent limitations.

Step 1: Set up networking

Ensure the network location for the Console agent meets the following requirements to manage hybrid cloud resources.

VPC and subnet

When you create the Console agent, you need to specify the VPC and subnet where it should reside.

Connections to target networks

The Console agent requires a network connection to the location where you're planning to create and manage systems. For example, the network where you plan to create Cloud Volumes ONTAP systems or a storage system in your on-premises environment.

Outbound internet access

The network location where you deploy the Console agent must have an outbound internet connection to contact specific endpoints.

Endpoints contacted from the Console agent

The Console agent requires outbound internet access to contact the following endpoints to manage resources and processes within your public cloud environment for day-to-day operations.

The endpoints listed below are all CNAME entries.

Endpoints	Purpose
AWS services (amazonaws.com): • CloudFormation • Elastic Compute Cloud (EC2) • Identity and Access Management (IAM) • Key Management Service (KMS) • Security Token Service (STS) • Simple Storage Service (S3)	To manage AWS resources. The endpoint depends on your AWS region. Refer to AWS documentation for details
Amazon FsX for NetApp ONTAP: • api.workloads.netapp.com	The web-based console contacts this endpoint to interact with the Workload Factory APIs to manage and operate FSx for ONTAP based workloads.

Endpoints	Purpose
https://mysupport.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support.
https://signin.b2c.netapp.com	To update NetApp Support Site (NSS) credentials or to add new NSS credentials to the NetApp Console.
https://support.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support as well as to receive software updates for Cloud Volumes ONTAP.
https://api.bluexp.netapp.com https://netapp-cloud-account.auth0.com https://netapp-cloud-account.us.auth0.com https://console.netapp.com https://components.console.bluexp.netapp.com https://cdn.auth0.com	To provide features and services within the NetApp Console.
https://bluexpinfraprod.eastus2.data.azurecr.io https://bluexpinfraprod.azurecr.io	To obtain images for Console agent upgrades. • When you deploy a new agent, the validation check tests connectivity to current endpoints. If you use previous endpoints, the validation check fails. To avoid this failure, skip the validation check. Although the previous endpoints are still supported, NetApp recommends updating your firewall rules to the current endpoints as soon as possible. Learn how to update your endpoint list. • When you update to the current endpoints in your firewall, your existing agents will continue to work.

Proxy server

NetApp supports both explicit and transparent proxy configurations. If you are using a transparent proxy, you only need to provide the certificate for the proxy server. If you are using an explicit proxy, you'll also need the IP address and credentials.

- IP address
- Credentials
- HTTPS certificate

Ports

There's no incoming traffic to the Console agent, unless you initiate it or if it is used as a proxy to send AutoSupport messages from Cloud Volumes ONTAP to NetApp Support.

- HTTP (80) and HTTPS (443) provide access to the local UI, which you'll use in rare circumstances.

- SSH (22) is only needed if you need to connect to the host for troubleshooting.
- Inbound connections over port 3128 are required if you deploy Cloud Volumes ONTAP systems in a subnet where an outbound internet connection isn't available.

  If Cloud Volumes ONTAP systems don't have an outbound internet connection to send AutoSupport messages, the Console automatically configures those systems to use a proxy server that's included with the Console agent. The only requirement is to ensure that the Console agent's security group allows inbound connections over port 3128. You'll need to open this port after you deploy the Console agent.

Enable NTP

If you're planning to use NetApp Data Classification to scan your corporate data sources, you should enable a Network Time Protocol (NTP) service on both the Console agent and the NetApp Data Classification system so that the time is synchronized between the systems. Learn more about NetApp Data classification

Implement this network access after you create the Console agent.

Step 2: Set up AWS permissions

To prepare for a marketplace deployment, create IAM policies in AWS and attach them to an IAM role. When you create the Console agent from the AWS Marketplace, you are prompted to select that IAM role.

Steps

1. Log in to the AWS console and navigate to the IAM service.
2. Create a policy:
   a. Select **Policies > Create policy**.
   b. Select **JSON** and copy and paste the contents of the IAM policy for the Console agent.
   c. Finish the remaining steps to create the policy.

      You may need to create a second policy based on the NetApp data services you plan to use. For standard regions, the permissions are spread across two policies. Two policies are required due to a maximum character size limit for managed policies in AWS. Learn more about IAM policies for the Console agent.
3. Create an IAM role:
   a. Select **Roles > Create role**.
   b. Select **AWS service > EC2**.
   c. Add permissions by attaching the policy that you just created.
   d. Finish the remaining steps to create the role.

Result

You now have an IAM role that you can associate with the EC2 instance during deployment from the AWS Marketplace.

Step 3: Review instance requirements

When you create the Console agent, you need to choose an EC2 instance type that meets the following requirements.

CPU

8 cores or 8 vCPUs

RAM

32 GB

AWS EC2 instance type

An instance type that meets CPU and RAM requirements. NetApp recommends t3.2xlarge.

Step 4: Create the Console agent

Create the Console agent directly from the AWS Marketplace.

About this task

Creating the Console agent from the AWS Marketplace deploys an EC2 instance in AWS using a default configuration. Learn about the default configuration for the Console agent.

Before you begin

You should have the following:

- A VPC and subnet that meets networking requirements.
- An IAM role with an attached policy that includes the required permissions for the Console agent.
- Permissions to subscribe and unsubscribe from the AWS Marketplace for your IAM user.
- An understanding of CPU and RAM requirements for the instance.
- A key pair for the EC2 instance.

Steps

1. Go to the NetApp Console agent listing on the AWS Marketplace
2. On the Marketplace page, select **Continue to Subscribe**.
3. To subscribe to the software, select **Accept Terms**.

   The subscription process can take a few minutes.

4. After the subscription process is complete, select **Continue to Configuration**.
5. On the **Configure this software** page, ensure that you've selected the correct region and then select **Continue to Launch**.
6. On the **Launch this software** page, under **Choose Action**, select **Launch through EC2** and then select **Launch**.

   Use the EC2 Console to launch the instance and attach an IAM role. This is not possible with the **Launch from Website** action.

7. Follow the prompts to configure and deploy the instance:

   - **Name and tags**: Enter a name and tags for the instance.
   - **Application and OS Images**: Skip this section. The Console agent AMI is already selected.
   - **Instance type**: Depending on region availability, choose an instance type that meets RAM and CPU requirements (t3.2xlarge is preselected and recommended).

- **Key pair (login)**: Select the key pair that you want to use to securely connect to the instance.
- **Network settings**: Edit the network settings as needed:
  - Choose the desired VPC and subnet.
  - Specify whether the instance should have a public IP address.
  - Specify security group settings that enable the required connection methods for the Console agent instance: SSH, HTTP, and HTTPS.

    View security group rules for AWS.
- **Configure storage**: Keep the default size and disk type for the root volume.

  If you want to enable Amazon EBS encryption on the root volume, select **Advanced**, expand **Volume 1**, select **Encrypted**, and then choose a KMS key.
- **Advanced details**: Under **IAM instance profile**, choose the IAM role that includes the required permissions for the Console agent.
- **Summary**: Review the summary and select **Launch instance**.

  AWS launches the Console agent with the specified settings, and the Console agent runs in about ten minutes.

> If the installation fails, you can view logs and a report to help you troubleshoot. Learn how to troubleshoot installation issues.

8. Open a web browser from a host that has a connection to the Console agent virtual machine and URL of the Console agent.
9. After you log in, set up the Console agent:
   a. Specify the Console organization to associate with the Console agent.
   b. Enter a name for the system.
   c. Under **Are you running in a secured environment?** keep restricted mode disabled.

      Keep restricted mode disabled to use the Console in standard mode. You should enable restricted mode only if you have a secure environment and want to disconnect this account from the Console backend services. If that's the case, follow steps to get started with NetApp Console in restricted mode.
   d. Select **Let's start**.

Result

The Console agent is now installed and set up with your Console organization.

Open a web browser and go to the NetApp Console to start using the Console agent with the Console.

If you have Amazon S3 buckets in the same AWS account where you created the Console agent, you'll see an Amazon S3 working environment appear on the **Systems** page automatically. Learn how to manage S3 buckets from NetApp Console

Manually install the Console agent in AWS

You can manually install a Console agent on a Linux host running in AWS. To manually install the Console agent on your own Linux host, you need to review host requirements, set up your networking, prepare AWS permissions, install the Console agent, and then provide the permissions that you prepared.

Before you begin

- You should have an understanding of Console agents.
- You should review Console agent limitations.

Step 1: Review host requirements

Ensure the host running the Console agent software meets operating system, RAM, and port requirements.

> ⓘ The Console agent reserves the UID and GID range of 19000 to 19200. This range is fixed and cannot be modified. If any third-party software on your host is using UIDs or GIDs within this range, the agent installation will fail. NetApp recommends using a host that is free of third-party software to avoid conflicts.

Dedicated host

The Console agent requires a dedicated host. Any architecture is supported if it meets these size requirements:

- CPU: 8 cores or 8 vCPUs
- RAM: 32 GB
- Disk space: 165 GB is recommended for the host, with the following partition requirements:
  - `/opt`: 120 GiB of space must be available

    The agent uses `/opt` to install the `/opt/application/netapp` directory and its contents.
  - `/var`: 40 GiB of space must be available

    The Console agent requires this space in `/var` because Podman or Docker are architected to create the containers within this directory. Specifically, they will create containers in the `/var/lib/containers/storage` directory and `/var/lib/docker` for Docker. External mounts or symlinks do not work for this space.

AWS EC2 instance type

An instance type that meets CPU and RAM requirements. NetApp recommends t3.2xlarge.

Hypervisor

A bare metal or hosted hypervisor that is certified to run a supported operating system is required.

Operating system and container requirements

The Console agent is supported with the following operating systems when using the Console in standard mode or restricted mode. A container orchestration tool is required before you install the agent.

Operating system	Supported OS versions	Supported agent versions	Required container tool	SELinux
Red Hat Enterprise Linux				

Operating system	Supported OS versions	Supported agent versions	Required container tool	SELinux
	9.6 • English language versions only. • The host must be registered with Red Hat Subscription Management. If it’s not registered, the host can’t access repositories to update required 3rd-party software during agent installation.	4.0.0 or later with the Console in standard mode or restricted mode	Podman version 5.4.0 with podman-compose 1.5.0. View Podman configuration requirements.	Supported in enforcing mode or permissive mode
	9.1 to 9.4 • English language versions only. • The host must be registered with Red Hat Subscription Management. If it’s not registered, the host can’t access repositories to update required 3rd-party software during agent installation.	3.9.50 or later with the Console in standard mode or restricted mode	Podman version 4.9.4 with podman-compose 1.5.0. View Podman configuration requirements.	Supported in enforcing mode or permissive mode

Operating system	Supported OS versions	Supported agent versions	Required container tool	SELinux
	8.6 to 8.10 • English language versions only. • The host must be registered with Red Hat Subscription Management. If it's not registered, the host can't access repositories to update required 3rd-party software during agent installation.	3.9.50 or later with the Console in standard mode or restricted mode	Podman version 4.6.1 or 4.9.4 with podman-compose 1.0.6. View Podman configuration requirements.	Supported in enforcing mode or permissive mode
Ubuntu				
	24.04 LTS	3.9.45 or later with the NetApp Console in standard mode or restricted mode	Docker Engine 23.06 to 28.0.0.	Not supported
	22.04 LTS	3.9.50 or later	Docker Engine 23.0.6 to 28.0.0.	Not supported

Key pair

When you create the Console agent, you'll need to select an EC2 key pair to use with the instance.

PUT response hop limit when using IMDSv2

If IMDSv2 is enabled (the default for new EC2 instances), set the PUT response hop limit to 3. If you do not, the system displays a UI initialization error during agent setup.

- Require the use of IMDSv2 on Amazon EC2 instances
- AWS documentation: Change the PUT response hop limit

Step 2: Install Podman or Docker Engine

Depending on your operating system, either Podman or Docker Engine is required before installing the agent.

- Podman is required for Red Hat Enterprise Linux 8 and 9.

  View the supported Podman versions.

- Docker Engine is required for Ubuntu.

  View the supported Docker Engine versions.

Example 2. Steps

Podman

Follow these steps to install and configure Podman:

- Enable and start the podman.socket service
- Install python3
- Install the podman-compose package version 1.0.6
- Add podman-compose to the PATH environment variable
- If using Red Hat Enterprise Linux, verify that your Podman version is using Netavark Aardvark DNS instead of CNI

> Adjust the aardvark-dns port (default: 53) after installing the agent to avoid DNS port conflicts. Follow the instructions to configure the port.

Steps

1. Remove the podman-docker package if it’s installed on the host.

   ```
   dnf remove podman-docker
   rm /var/run/docker.sock
   ```

2. Install Podman.

   You can obtain Podman from official Red Hat Enterprise Linux repositories.

   a. For Red Hat Enterprise Linux 9.6:

      ```
      sudo dnf install podman-5:<version>
      ```

      Where <version> is the supported version of Podman that you’re installing. View the supported Podman versions.

   b. For Red Hat Enterprise Linux 9.1 to 9.4:

      ```
      sudo dnf install podman-4:<version>
      ```

      Where <version> is the supported version of Podman that you’re installing. View the supported Podman versions.

   c. For Red Hat Enterprise Linux 8:

      ```
      sudo dnf install podman-4:<version>
      ```

      Where <version> is the supported version of Podman that you’re installing. View the supported Podman versions.

3. Enable and start the podman.socket service.

   ```
   sudo systemctl enable --now podman.socket
   ```

4. Install python3.

   ```
   sudo dnf install python3
   ```

5. Install the EPEL repository package if it's not already available on your system.

   This step is required because podman-compose is available from the Extra Packages for Enterprise Linux (EPEL) repository.

6. If using Red Hat Enterprise 9:

   a. Install the EPEL repository package.

   ```
   sudo dnf install https://dl.fedoraproject.org/pub/epel/epel-release-
   latest-9.noarch.rpm
   ```

   a. Install podman-compose package 1.5.0.

   ```
   sudo dnf install podman-compose-1.5.0
   ```

7. If using Red Hat Enterprise Linux 8:

   a. Install the EPEL repository package.

   ```
   sudo dnf install https://dl.fedoraproject.org/pub/epel/epel-
   release-latest-8.noarch.rpm
   ```

   b. Install podman-compose package 1.0.6.

   ```
   sudo dnf install podman-compose-1.0.6
   ```

   Using the `dnf install` command meets the requirement for adding podman-compose to the PATH environment variable. The installation command adds podman-compose to /usr/bin, which is already included in the `secure_path` option on the host.

   c. If using Red Hat Enterprise Linux 8, verify that your Podman version is using NetAvark with Aardvark DNS instead of CNI.

      i. Check to see if your networkBackend is set to CNI by running the following command:

```
podman info | grep networkBackend
```

ii. If the networkBackend is set to `CNI`, you'll need to change it to `netavark`.

iii. Install `netavark` and `aardvark-dns` using the following command:

```
dnf install aardvark-dns netavark
```

iv. Open the `/etc/containers/containers.conf` file and modify the network_backend option to use "netavark" instead of "cni".

If `/etc/containers/containers.conf` doesn't exist, make the configuration changes to `/usr/share/containers/containers.conf`.

v. Restart podman.

```
systemctl restart podman
```

vi. Confirm networkBackend is now changed to "netavark" using the following command:

```
podman info | grep networkBackend
```

Docker Engine

Follow the documentation from Docker to install Docker Engine.

Steps

1. View installation instructions from Docker

   Follow the steps to install a supported Docker Engine version. Do not install the latest version, as it is unsupported by the Console.

2. Verify that Docker is enabled and running.

```
sudo systemctl enable docker && sudo systemctl start docker
```

Step 3: Set up networking

Ensure the network location supports the following requirements so the Console agent can manage resources in your hybrid cloud.

Connections to target networks

The Console agent requires a network connection to the location where you're planning to create and manage systems. For example, the network where you plan to create Cloud Volumes ONTAP systems or a storage system in your on-premises environment.

Outbound internet access

The network location where you deploy the Console agent must have an outbound internet connection to contact specific endpoints.

Endpoints contacted from computers when using the web-based NetApp Console

Computers that access the Console from a web browser must have the ability to contact several endpoints. You'll need to use the Console to set up the Console agent and for day-to-day use of the Console.

Prepare networking for the NetApp console.

Endpoints contacted from the Console agent

The Console agent requires outbound internet access to contact the following endpoints to manage resources and processes within your public cloud environment for day-to-day operations.

The endpoints listed below are all CNAME entries.

Endpoints	Purpose
AWS services (amazonaws.com): • CloudFormation • Elastic Compute Cloud (EC2) • Identity and Access Management (IAM) • Key Management Service (KMS) • Security Token Service (STS) • Simple Storage Service (S3)	To manage AWS resources. The endpoint depends on your AWS region. Refer to AWS documentation for details
Amazon FsX for NetApp ONTAP: • api.workloads.netapp.com	The web-based console contacts this endpoint to interact with the Workload Factory APIs to manage and operate FSx for ONTAP based workloads.
https://mysupport.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support.
https://signin.b2c.netapp.com	To update NetApp Support Site (NSS) credentials or to add new NSS credentials to the NetApp Console.
https://support.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support as well as to receive software updates for Cloud Volumes ONTAP.

Endpoints	Purpose
https://api.bluexp.netapp.com https://netapp-cloud-account.auth0.com https://netapp-cloud-account.us.auth0.com https://console.netapp.com https://components.console.bluexp.netapp.com https://cdn.auth0.com	To provide features and services within the NetApp Console.
https://bluexpinfraprod.eastus2.data.azurecr.io https://bluexpinfraprod.azurecr.io	To obtain images for Console agent upgrades. • When you deploy a new agent, the validation check tests connectivity to current endpoints. If you use previous endpoints, the validation check fails. To avoid this failure, skip the validation check. Although the previous endpoints are still supported, NetApp recommends updating your firewall rules to the current endpoints as soon as possible. Learn how to update your endpoint list. • When you update to the current endpoints in your firewall, your existing agents will continue to work.

Proxy server

NetApp supports both explicit and transparent proxy configurations. If you are using a transparent proxy, you only need to provide the certificate for the proxy server. If you are using an explicit proxy, you'll also need the IP address and credentials.

- IP address
- Credentials
- HTTPS certificate

Ports

There's no incoming traffic to the Console agent, unless you initiate it or if it is used as a proxy to send AutoSupport messages from Cloud Volumes ONTAP to NetApp Support.

- HTTP (80) and HTTPS (443) provide access to the local UI, which you'll use in rare circumstances.
- SSH (22) is only needed if you need to connect to the host for troubleshooting.
- Inbound connections over port 3128 are required if you deploy Cloud Volumes ONTAP systems in a subnet where an outbound internet connection isn't available.

  If Cloud Volumes ONTAP systems don't have an outbound internet connection to send AutoSupport messages, the Console automatically configures those systems to use a proxy server that's included with the Console agent. The only requirement is to ensure that the Console agent's security group allows inbound connections over port 3128. You'll need to open this port after you deploy the Console agent.

Enable NTP

If you’re planning to use NetApp Data Classification to scan your corporate data sources, you should enable a Network Time Protocol (NTP) service on both the Console agent and the NetApp Data Classification system so that the time is synchronized between the systems. Learn more about NetApp Data classification

Step 4: Set up AWS permissions for the Console

Provide AWS permissions to the NetApp Console using one of these options:

- Option 1: Create IAM policies and attach the policies to an IAM role that you can associate with the EC2 instance.
- Option 2: Provide the Console with the AWS access key for an IAM user who has the required permissions.

Follow the steps to prepare permissions for the Console.

IAM role

Steps

1. Log in to the AWS console and navigate to the IAM service.
2. Create a policy:
   a. Select **Policies > Create policy**.
   b. Select **JSON** and copy and paste the contents of the IAM policy for the Console agent.
   c. Finish the remaining steps to create the policy.

      Depending on the NetApp data services you plann to use, you might need to create a second policy. For standard regions, the permissions are spread across two policies. Two policies are required due to a maximum character size limit for managed policies in AWS. Learn more about IAM policies for the Console agent.
3. Create an IAM role:
   a. Select **Roles > Create role**.
   b. Select **AWS service > EC2**.
   c. Add permissions by attaching the policy that you just created.
   d. Finish the remaining steps to create the role.

Result

You now have an IAM role that you can associate with the EC2 instance after you install the Console agent.

AWS access key

Steps

1. Log in to the AWS console and navigate to the IAM service.
2. Create a policy:
   a. Select **Policies > Create policy**.
   b. Select **JSON** and copy and paste the contents of the IAM policy for the Console agent.
   c. Finish the remaining steps to create the policy.

      Depending on the NetApp data services that you plan to use, you might need to create a second policy.

      For standard regions, the permissions are spread across two policies. Two policies are required due to a maximum character size limit for managed policies in AWS. Learn more about IAM policies for the Console agent.
3. Attach the policies to an IAM user.
   - AWS Documentation: Creating IAM Roles
   - AWS Documentation: Adding and Removing IAM Policies
4. Ensure that the user has an access key that you can add to the NetApp Console after you install the Console agent.

Result

You now have an IAM user that has the required permissions and an access key that you can provide to the Console.

Step 5: Install the Console agent

After you complete the prerequisites, manually install the software on your Linux host.

Before you begin

You should have the following:

- Root privileges to install the Console agent.
- Details about a proxy server, if a proxy is required for internet access from the Console agent.

  You have the option to configure a proxy server after installation but doing so requires restarting the Console agent.

- A CA-signed certificate, if the proxy server uses HTTPS or if the proxy is an intercepting proxy.

> You cannot set a certificate for a transparent proxy server when manually installing the Console agent. If you need to set a certificate for a transparent proxy server, you must use the Maintenance Console after installation. Learn more about the Agent Maintenance Console.

About this task

After installation, the Console agent automatically updates itself if a new version is available.

Steps

1. If the *http_proxy* or *https_proxy* system variables are set on the host, remove them:

   ```
   unset http_proxy
   unset https_proxy
   ```

   If you don’t remove these system variables, the installation fails.

2. Download the Console agent software and then copy it to the Linux host. You can download it either from the NetApp Console or the NetApp Support site.
   - NetApp Console: Go to **Agents > Management> Deploy agent > On-prem > Manual install**.

     Choose download the agent installer files or a URL to the files.

   - NetApp Support Site (needed if you don’t already have access to the Console) NetApp Support Site,

3. Assign permissions to run the script.

   ```
   chmod +x NetApp_Console_Agent_Cloud_<version>
   ```

   Where <version> is the version of the Console agent that you downloaded.

4. If installing in a Government Cloud environment, disable the configuration checks. Learn how to disable configuration checks for manual installations.

5. Run the installation script.

   ```
   ./NetApp_Console_Agent_Cloud_<version> --proxy <HTTP or HTTPS proxy
   server> --cacert <path and file name of a CA-signed certificate>
   ```

   You'll need to add proxy information if your network requires a proxy for internet access. You can add an explicit proxy during installation. The `--proxy` and `--cacert` parameters are optional and you won't be prompted to add them. If you have an explicit proxy server, you will need to enter the parameters as shown.

> If you want to configure a transparent proxy, you can do so after you've installed. Learn about the agent maintenance console

+

Here is an example configuring an explicit proxy server with a CA-signed certificate:

+

```
./NetApp_Console_Agent_Cloud_v4.0.0--proxy
https://user:password@10.0.0.30:8080/ --cacert /tmp/cacert/certificate.cer
```

+
`--proxy` configures the Console agent to use an HTTP or HTTPS proxy server using one of the following formats:

+
* http://address:port
* http://user-name:password@address:port
* http://domain-name%92user-name:password@address:port
* https://address:port
* https://user-name:password@address:port
* https://domain-name%92user-name:password@address:port

+
Note the following:

+
The user can be a local user or domain user.
For a domain user, you must use the ASCII code for a \ as shown above.
The Console agent doesn't support user names or passwords that include the @ character.
If the password includes any of the following special characters, you must escape that special character by prepending it with a backslash: & or !

+
For example:

+
http://bxpproxyuser:netapp1\!@address:3128

1. If you used Podman, you'll need to adjust the aardvark-dns port.
   a. SSH to the Console agent virtual machine.
   b. Open podman */usr/share/containers/containers.conf* file and modify the chosen port for Aardvark DNS service. For example, change it to 54.

   ```
   vi /usr/share/containers/containers.conf
   ```

   For example:

   ```
   # Port to use for dns forwarding daemon with netavark in rootful
   bridge
   # mode and dns enabled.
   # Using an alternate port might be useful if other DNS services
   should
   # run on the machine.
   #
   dns_bind_port = 54
   ```

   c. Reboot the Console agent virtual machine.
2. Wait for the installation to complete.

   At the end of the installation, the Console agent service (occm) restarts twice if you specified a proxy server.

> If the installation fails, you can view the installation report and logs to help you fix the issues. Learn how to troubleshoot installation issues.

1. Open a web browser from a host that has a connection to the Console agent virtual machine and enter the following URL:

   https://*ipaddress*

2. After you log in, set up the Console agent:
   a. Specify the organization to associate with the Console agent.
   b. Enter a name for the system.
   c. Under **Are you running in a secured environment?** keep restricted mode disabled.

      You should keep restricted mode disabled because these steps describe how to use the Console in standard mode. You should enable restricted mode only if you have a secure environment and want to disconnect this account from backend services. If that's the case, follow steps to get started with the NetApp Console in restricted mode.

   d. Select **Let's start**.

If you have Amazon S3 buckets in the same AWS account where you created the Console agent, you'll see an Amazon S3 storage system appear on the **Systems** page automatically. Learn how to manage S3 buckets from NetApp ConsoleP

Step 6: Provide permissions to NetApp Console

After you install the Console agent, provide the AWS permissions you set up so the Console agent can manage your data and storage infrastructure in AWS.

IAM role

Attach the IAM role you create to the Console agent EC2 instance.

Steps

1. Go to the Amazon EC2 console.
2. Select **Instances**.
3. Select the Console agent instance.
4. Select **Actions > Security > Modify IAM role**.
5. Select the IAM role and select **Update IAM role**.

Go to the NetApp Console to start using the Console agent.

AWS access key

Provide the Console with the AWS access key for an IAM user that has the required permissions.

Steps

1. Ensure that the correct Console agent is currently selected in the Console.
2. Select **Administration > Credentials**.
3. Select **Organization credentials**.
4. Select **Add Credentials** and follow the steps in the wizard.
   a. **Credentials Location**: Select *Amazon Web Services > Agent.
   b. **Define Credentials**: Enter an AWS access key and secret key.
   c. **Marketplace Subscription**: Associate a Marketplace subscription with these credentials by subscribing now or by selecting an existing subscription.
   d. **Review**: Confirm the details about the new credentials and select **Add**.

Go to the NetApp Console to start using the Console agent.

Azure

Console agent installation options in Azure

There are a few different ways to create a Console agent in Azure. Directly from the NetApp Console is the most common way.

The following installation options are available:

- Create a Console agent directly from the NetApp Console (this is the standard option)

  This action launches a VM running Linux and the Console agent software in a VNet of your choice.

- Create a Console agent from the Azure Marketplace

  This action also launches a VM running Linux and the Console agent software, but the deployment is initiated directly from the Azure Marketplace, rather than from the Console.

- Download and manually install the software on your own Linux host

The installation option that you choose impacts how you prepare for installation. This includes how you provide the Console agent with the required permissions that it needs to authenticate and manage resources in Azure.

Create a Console agent in Azure from NetApp Console

To create a Console agent in Azure from the NetApp Console, you need to set up your networking, prepare Azure permissions, and then create the Console agent.

Before you begin

- You should have an understanding of Console agents.
- You should review Console agent limitations.

Step 1: Set up networking

Ensure that the network location where you plan to install the Console agent supports the following requirements. These requirements allow the Console agent to manage hybrid cloud resources.

Azure region

If you use Cloud Volumes ONTAP, the Console agent should be deployed in the same Azure region as the Cloud Volumes ONTAP systems that it manages, or in the Azure region pair for the Cloud Volumes ONTAP systems. This requirement ensures that an Azure Private Link connection is used between Cloud Volumes ONTAP and its associated storage accounts.

Learn how Cloud Volumes ONTAP uses an Azure Private Link

VNet and subnet

When you create the Console agent, you need to specify the VNet and subnet where it should reside.

Connections to target networks

The Console agent requires a network connection to the location where you're planning to create and manage systems. For example, the network where you plan to create Cloud Volumes ONTAP systems or a storage system in your on-premises environment.

Outbound internet access

The network location where you deploy the Console agent must have an outbound internet connection to contact specific endpoints.

Endpoints contacted from the Console agent

The Console agent requires outbound internet access to contact the following endpoints to manage resources and processes within your public cloud environment for day-to-day operations.

The endpoints listed below are all CNAME entries.

Endpoints	Purpose
https://management.azure.com https://login.microsoftonline.com https://blob.core.windows.net https://core.windows.net	To manage resources in Azure public regions.
https://management.chinacloudapi.cn https://login.chinacloudapi.cn https://blob.core.chinacloudapi.cn https://core.chinacloudapi.cn	To manage resources in Azure China regions.
https://mysupport.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support.
https://signin.b2c.netapp.com	To update NetApp Support Site (NSS) credentials or to add new NSS credentials to the NetApp Console.
https://support.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support as well as to receive software updates for Cloud Volumes ONTAP.
https://api.bluexp.netapp.com https://netapp-cloud-account.auth0.com https://netapp-cloud-account.us.auth0.com https://console.netapp.com https://components.console.bluexp.netapp.com https://cdn.auth0.com	To provide features and services within the NetApp Console.
https://bluexpinfraprod.eastus2.data.azurecr.io https://bluexpinfraprod.azurecr.io	To obtain images for Console agent upgrades. • When you deploy a new agent, the validation check tests connectivity to current endpoints. If you use previous endpoints, the validation check fails. To avoid this failure, skip the validation check. Although the previous endpoints are still supported, NetApp recommends updating your firewall rules to the current endpoints as soon as possible. Learn how to update your endpoint list. • When you update to the current endpoints in your firewall, your existing agents will continue to work.

Endpoints contacted from the NetApp console

As you use the web-based NetApp Console that’s provided through the SaaS layer, it contacts several endpoints to complete data management tasks. This includes endpoints that are contacted to deploy the Console agent from the the Console.

View the list of endpoints contacted from the NetApp console.

Proxy server

NetApp supports both explicit and transparent proxy configurations. If you are using a transparent proxy, you only need to provide the certificate for the proxy server. If you are using an explicit proxy, you'll also need the IP address and credentials.

- IP address
- Credentials
- HTTPS certificate

Ports

There's no incoming traffic to the Console agent, unless you initiate it or if it is used as a proxy to send AutoSupport messages from Cloud Volumes ONTAP to NetApp Support.

- HTTP (80) and HTTPS (443) provide access to the local UI, which you'll use in rare circumstances.
- SSH (22) is only needed if you need to connect to the host for troubleshooting.
- Inbound connections over port 3128 are required if you deploy Cloud Volumes ONTAP systems in a subnet where an outbound internet connection isn't available.

  If Cloud Volumes ONTAP systems don't have an outbound internet connection to send AutoSupport messages, the Console automatically configures those systems to use a proxy server that's included with the Console agent. The only requirement is to ensure that the Console agent's security group allows inbound connections over port 3128. You'll need to open this port after you deploy the Console agent.

Enable NTP

If you're planning to use NetApp Data Classification to scan your corporate data sources, you should enable a Network Time Protocol (NTP) service on both the Console agent and the NetApp Data Classification system so that the time is synchronized between the systems. Learn more about NetApp Data classification

You need to implement this networking requirement after you create the Console agent.

Step 2: Create a Console agent deployment policy (custom role)

You need to create a custom role that has permissions to deploy the Console agent in Azure.

Create an Azure custom role that you can assign to your Azure account or to a Microsoft Entra service principal. The Console authenticates with Azure and uses these permissions to create the Console agent on your behalf.

The Console deploys the Console agent VM in Azure, enables a system-assigned managed identity, creates the required role, and assigns it to the VM. Review how the Console uses the permissions.

Note that you can create an Azure custom role using the Azure portal, Azure PowerShell, Azure CLI, or REST API. The following steps show how to create the role using the Azure CLI. If you would prefer to use a different method, refer to Azure documentation

Steps

1. Copy the required permissions for a new custom role in Azure and save them in a JSON file.

This custom role contains only the permissions needed to launch the Console agent VM in Azure from the Console. Don't use this policy for other situations. When the Console creates the Console agent, it applies a new set of permissions to the Console agent VM that enables the Console agent to manage Azure resources.

```
{
  "Name": "Azure SetupAsService",
  "Actions": [
    "Microsoft.Compute/disks/delete",
    "Microsoft.Compute/disks/read",
    "Microsoft.Compute/disks/write",
    "Microsoft.Compute/locations/operations/read",
    "Microsoft.Compute/operations/read",
    "Microsoft.Compute/virtualMachines/instanceView/read",
    "Microsoft.Compute/virtualMachines/read",
    "Microsoft.Compute/virtualMachines/write",
    "Microsoft.Compute/virtualMachines/delete",
    "Microsoft.Compute/virtualMachines/extensions/write",
    "Microsoft.Compute/virtualMachines/extensions/read",
    "Microsoft.Compute/availabilitySets/read",
    "Microsoft.Network/locations/operationResults/read",
    "Microsoft.Network/locations/operations/read",
    "Microsoft.Network/networkInterfaces/join/action",
    "Microsoft.Network/networkInterfaces/read",
    "Microsoft.Network/networkInterfaces/write",
    "Microsoft.Network/networkInterfaces/delete",
    "Microsoft.Network/networkSecurityGroups/join/action",
    "Microsoft.Network/networkSecurityGroups/read",
    "Microsoft.Network/networkSecurityGroups/write",
    "Microsoft.Network/virtualNetworks/checkIpAddressAvailability/read",
    "Microsoft.Network/virtualNetworks/read",
    "Microsoft.Network/virtualNetworks/subnets/join/action",
    "Microsoft.Network/virtualNetworks/subnets/read",
    "Microsoft.Network/virtualNetworks/subnets/virtualMachines/read",
    "Microsoft.Network/virtualNetworks/virtualMachines/read",
    "Microsoft.Network/publicIPAddresses/write",
    "Microsoft.Network/publicIPAddresses/read",
    "Microsoft.Network/publicIPAddresses/delete",
    "Microsoft.Network/networkSecurityGroups/securityRules/read",
    "Microsoft.Network/networkSecurityGroups/securityRules/write",
    "Microsoft.Network/networkSecurityGroups/securityRules/delete",
    "Microsoft.Network/publicIPAddresses/join/action",

"Microsoft.Network/locations/virtualNetworkAvailableEndpointServices/rea
d",
    "Microsoft.Network/networkInterfaces/ipConfigurations/read",
    "Microsoft.Resources/deployments/operations/read",
    "Microsoft.Resources/deployments/read",
    "Microsoft.Resources/deployments/delete",
    "Microsoft.Resources/deployments/cancel/action",
    "Microsoft.Resources/deployments/validate/action",
    "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",
    "Microsoft.Authorization/roleDefinitions/write",
    "Microsoft.Authorization/roleAssignments/write",

"Microsoft.MarketplaceOrdering/offertypes/publishers/offers/plans/agreem
ents/read",

"Microsoft.MarketplaceOrdering/offertypes/publishers/offers/plans/agreem
ents/write",
    "Microsoft.Network/networkSecurityGroups/delete",
    "Microsoft.Storage/storageAccounts/delete",
    "Microsoft.Storage/storageAccounts/write",
    "Microsoft.Resources/deployments/write",
    "Microsoft.Resources/deployments/operationStatuses/read",
    "Microsoft.Authorization/roleAssignments/read"
  ],
  "NotActions": [],
  "AssignableScopes": [],
  "Description": "Azure SetupAsService",
  "IsCustom": "true"
}
```

2. Modify the JSON by adding your Azure subscription ID to the assignable scope.

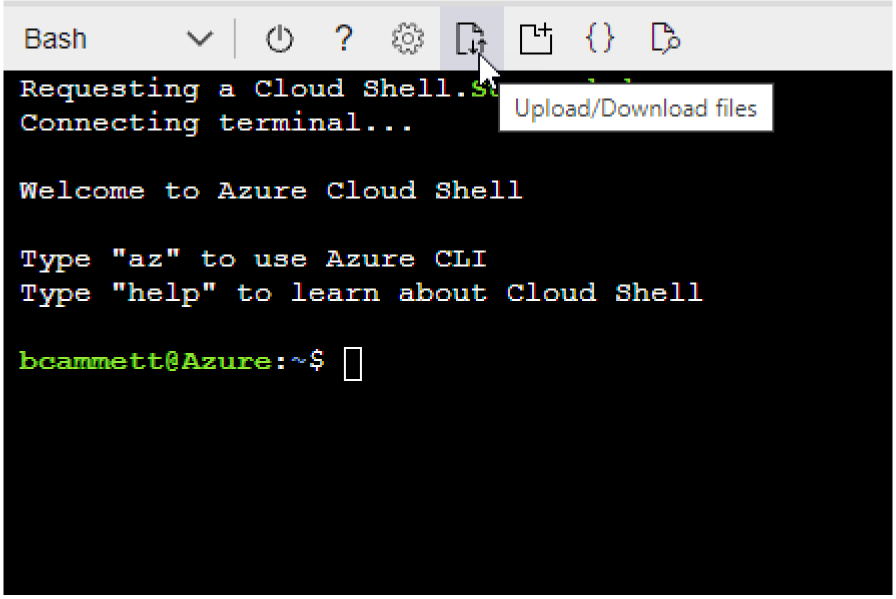
   Example

   ```
   "AssignableScopes": [
   "/subscriptions/d333af45-0d07-4154-943d-c25fbzzzzzzz"
   ]
   ```

3. Use the JSON file to create a custom role in Azure.

   The following steps describe how to create the role by using Bash in Azure Cloud Shell.

   a. Start Azure Cloud Shell and choose the Bash environment.
   b. Upload the JSON file.



```
Requesting a Cloud Shell.Su
Connecting terminal...

Welcome to Azure Cloud Shell

Type "az" to use Azure CLI
Type "help" to learn about Cloud Shell

bcammett@Azure:~$
```

c. Enter the following Azure CLI command:

```
az role definition create --role-definition
Policy_for_Setup_As_Service_Azure.json
```

You now have a custom role called *Azure SetupAsService*. You can apply this custom role to your user account or to a service principal.

Step 3: Set up authentication

When creating the Console agent from the Console, you need to provide a login that enables the Console to authenticate with Azure and deploy the VM. You have two options:

1. Sign in with your Azure account when prompted. This account must have specific Azure permissions. This is the default option.
2. Provide details about a Microsoft Entra service principal. This service principal also requires specific permissions.

Follow the steps to prepare one of these authentication methods for use with the Console.

Azure account

Assign the custom role to the user who will deploy the Console agent from the Console.

Steps

1. In the Azure portal, open the **Subscriptions** service and select the user's subscription.
2. Click **Access control (IAM)**.
3. Click **Add** > **Add role assignment** and then add the permissions:
   a. Select the **Azure SetupAsService** role and click **Next**.

      > Azure SetupAsService is the default name provided in the Console agent deployment policy for Azure. If you chose a different name for the role, then select that name instead.

   b. Keep **User, group, or service principal** selected.
   c. Click **Select members**, choose your user account, and click **Select**.
   d. Click **Next**.
   e. Click **Review + assign**.

Service principal

Rather than logging in with your Azure account, you can provide the Console with the credentials for an Azure service principal that has the required permissions.

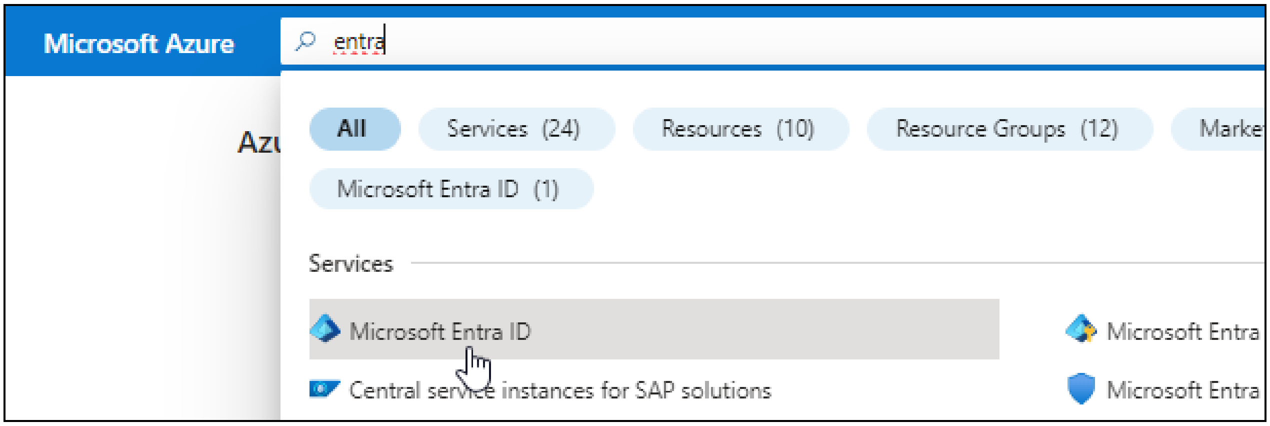
Create and set up a service principal in Microsoft Entra ID and obtain the Azure credentials that the Console needs.

Create a Microsoft Entra application for role-based access control

1. Ensure that you have permissions in Azure to create an Active Directory application and to assign the application to a role.

   For details, refer to Microsoft Azure Documentation: Required permissions

2. From the Azure portal, open the **Microsoft Entra ID** service.



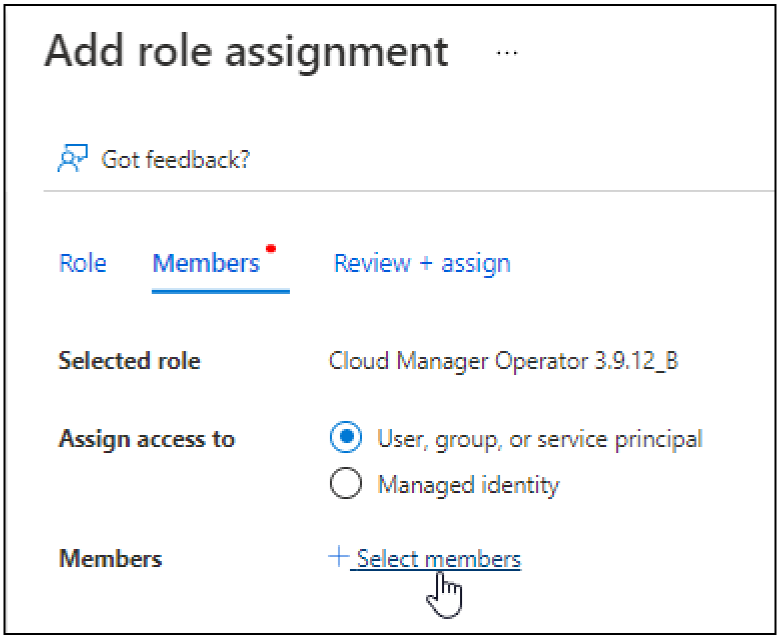
3. In the menu, select **App registrations**.
4. Select **New registration**.

5. Specify details about the application:
    - **Name**: Enter a name for the application.
    - **Account type**: Select an account type (any will work with the NetApp Console).
    - **Redirect URI**: You can leave this field blank.
6. Select **Register**.

    You've created the AD application and service principal.

Assign the custom role to the application

1. From the Azure portal, open the **Subscriptions** service.
2. Select the subscription.
3. Click **Access control (IAM) > Add > Add role assignment**.
4. In the **Role** tab, select the **Console Operator** role and click **Next**.
5. In the **Members** tab, complete the following steps:
    a. Keep **User, group, or service principal** selected.
    b. Click **Select members**.



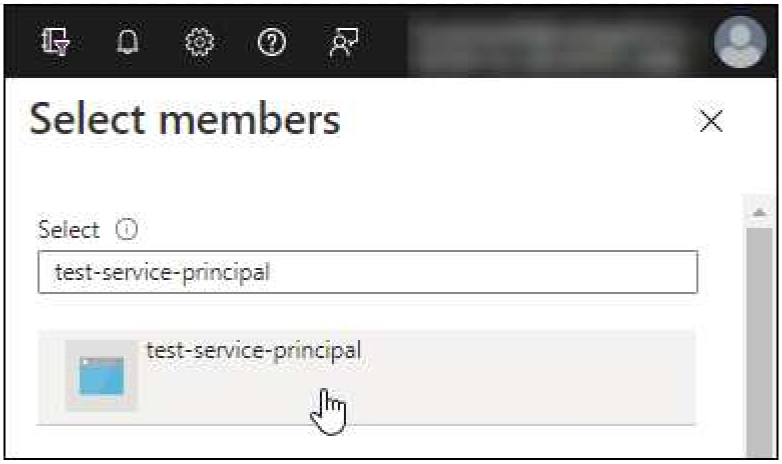
Selected role: Cloud Manager Operator 3.9.12_B

Assign access to: ● User, group, or service principal ○ Managed identity

Members: + Select members

    c. Search for the name of the application.

    Here's an example:


Select members

Select

test-service-principal

test-service-principal

<ol type="a" start="4"><li>Select the application and click <b>Select</b>.</li><li>Click <b>Next</b>.</li></ol>

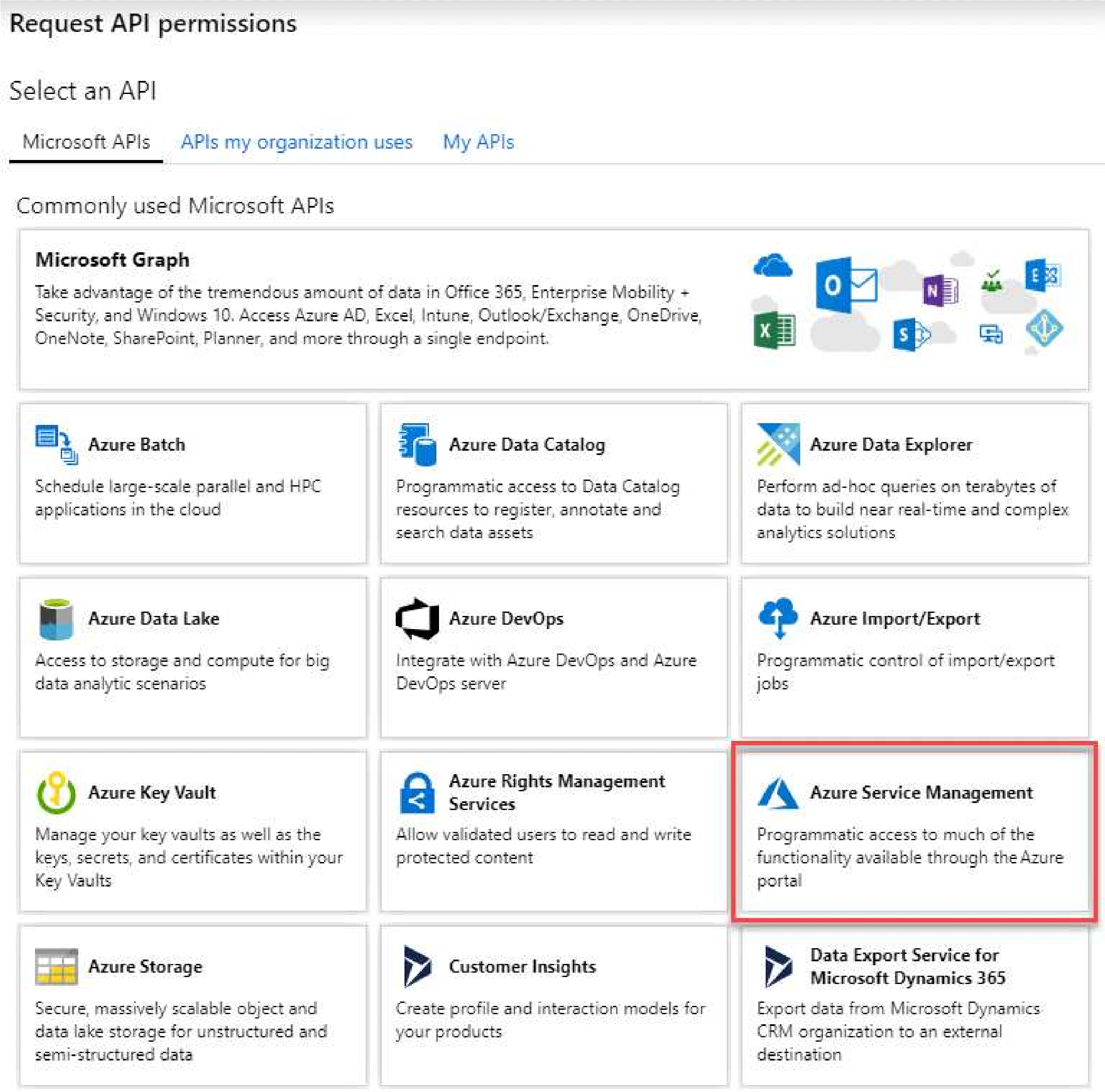
6. Click **Review + assign**.

   The service principal now has the required Azure permissions to deploy the Console agent.

   If you want to manage resources in multiple Azure subscriptions, then you must bind the service principal to each of those subscriptions. For example, the Console enables you to select the subscription that you want to use when deploying Cloud Volumes ONTAP.

Add Windows Azure Service Management API permissions

1. In the **Microsoft Entra ID** service, select **App registrations** and select the application.
2. Select **API permissions > Add a permission**.
3. Under **Microsoft APIs**, select **Azure Service Management**.



Request API permissions

Select an API

Microsoft APIs APIs my organization uses My APIs

Commonly used Microsoft APIs

Microsoft Graph
Take advantage of the tremendous amount of data in Office 365, Enterprise Mobility + Security, and Windows 10. Access Azure AD, Excel, Intune, Outlook/Exchange, OneDrive, OneNote, SharePoint, Planner, and more through a single endpoint.

Azure Batch
Schedule large-scale parallel and HPC applications in the cloud

Azure Data Catalog
Programmatic access to Data Catalog resources to register, annotate and search data assets

Azure Data Explorer
Perform ad-hoc queries on terabytes of data to build near real-time and complex analytics solutions

Azure Data Lake
Access to storage and compute for big data analytic scenarios

Azure DevOps
Integrate with Azure DevOps and Azure DevOps server

Azure Import/Export
Programmatic control of import/export jobs

Azure Key Vault
Manage your key vaults as well as the keys, secrets, and certificates within your Key Vaults

Azure Rights Management Services
Allow validated users to read and write protected content

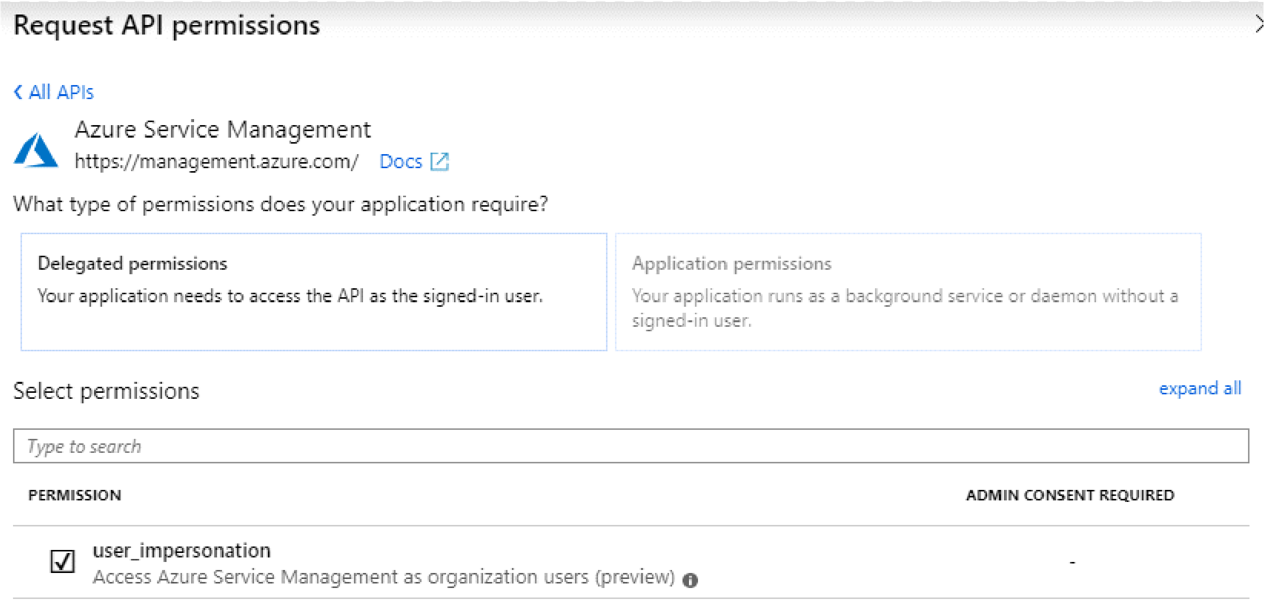
Azure Service Management
Programmatic access to much of the functionality available through the Azure portal

Azure Storage
Secure, massively scalable object and data lake storage for unstructured and semi-structured data

Customer Insights
Create profile and interaction models for your products

Data Export Service for Microsoft Dynamics 365
Export data from Microsoft Dynamics CRM organization to an external destination

4. Select **Access Azure Service Management as organization users** and then select **Add permissions**.



Request API permissions

< All APIs

Azure Service Management
https://management.azure.com/ Docs

What type of permissions does your application require?

Delegated permissions
Your application needs to access the API as the signed-in user.

Application permissions
Your application runs as a background service or daemon without a signed-in user.

Select permissions

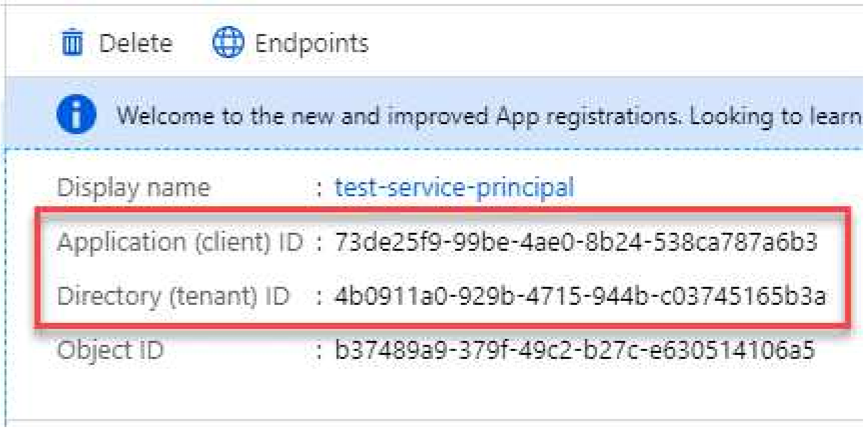
expand all

Type to search

PERMISSION	ADMIN CONSENT REQUIRED
☑ user_impersonation Access Azure Service Management as organization users (preview)	-

Get the application ID and directory ID for the application

1. In the **Microsoft Entra ID** service, select **App registrations** and select the application.
2. Copy the **Application (client) ID** and the **Directory (tenant) ID**.



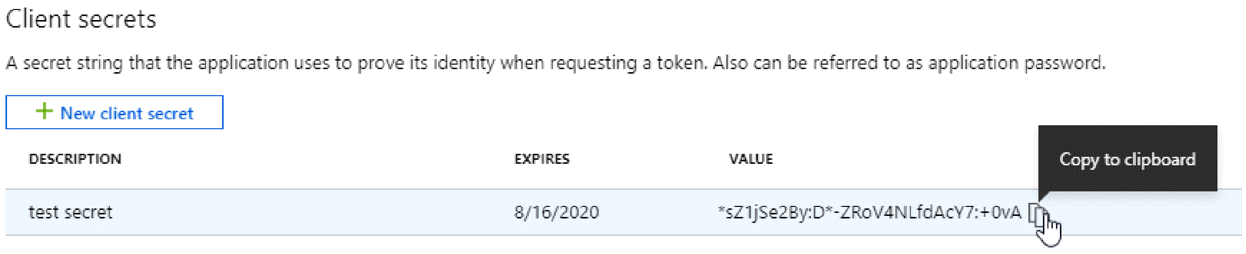
Welcome to the new and improved App registrations. Looking to learn

Display name : test-service-principal
Application (client) ID : 73de25f9-99be-4ae0-8b24-538ca787a6b3
Directory (tenant) ID : 4b0911a0-929b-4715-944b-c03745165b3a
Object ID : b37489a9-379f-49c2-b27c-e630514106a5

When you add the Azure account to the Console, you need to provide the application (client) ID and the directory (tenant) ID for the application. The Console uses the IDs to programmatically sign in.

Create a client secret

1. Open the **Microsoft Entra ID** service.
2. Select **App registrations** and select your application.
3. Select **Certificates & secrets > New client secret**.
4. Provide a description of the secret and a duration.
5. Select **Add**.
6. Copy the value of the client secret.



Client secrets

A secret string that the application uses to prove its identity when requesting a token. Also can be referred to as application password.

DESCRIPTION	EXPIRES	VALUE
test secret	8/16/2020	*sZ1jSe2By:D*-ZRoV4NLfdAcY7:+0vA

Result

Your service principal is now setup and you should have copied the application (client) ID, the directory (tenant) ID, and the value of the client secret. You need to enter this information in the Console when you create the Console agent.

Step 4: Create the Console agent

Create the Console agent directly from the NetApp Console.

About this task

- Creating the Console agent from the Console deploys a virtual machine in Azure using a default configuration. Do not switch to a smaller VM instance with fewer CPUs or less RAM after creating the Console agent. Learn about the default configuration for the Console agent.
- When the Console deploys the Console agent, it creates a custom role and assigns it to the Console agent VM. This role includes permissions that enables the Console agent to manage Azure resources. You need to ensure that the role is kept up to date as new permissions are added in subsequent releases. Learn more about the custom role for the Console agent.

Before you begin

You should have the following:

- An Azure subscription.
- A VNet and subnet in your Azure region of choice.
- Details about a proxy server, if your organization requires a proxy for all outgoing internet traffic:
  - IP address
  - Credentials
  - HTTPS certificate
- An SSH public key, if you want to use that authentication method for the Console agent virtual machine. The other option for the authentication method is to use a password.

  Learn about connecting to a Linux VM in Azure
- If you don't want the Console to automatically create an Azure role for the Console agent, then you'll need to create your own using the policy on this page.

  These permissions are for the Console agent itself. It's a different set of permissions than what you previously set up to deploy the Console agent VM.

Steps

1. Select **Administration > Agents**.
2. On the **Overview** page, select **Deploy agent > Azure**
3. On the **Review** page, review the requirements for deploying an agent. Those requirements are also detailed above on this page.
4. On the **Virtual Machine Authentication** page, select the authentication option that matches how you set up Azure permissions:

   - Select **Log in** to log in to your Microsoft account, which should have the required permissions.

     The form is owned and hosted by Microsoft. Your credentials are not provided to NetApp.

     > If you're already logged in to an Azure account, then the Console automatically uses that account. If you have multiple accounts, then you might need to log out first to ensure that you're using the right account.

   - Select **Active Directory service principal** to enter information about the Microsoft Entra service principal that grants the required permissions:
     - Application (client) ID
     - Directory (tenant) ID
     - Client Secret

   Learn how to obtain these values for a service principal.

5. On the **Virtual Machine Authentication** page, choose an Azure subscription, a location, a new resource group or an existing resource group, and then choose an authentication method for the Console agent virtual machine that you're creating.

   The authentication method for the virtual machine can be a password or an SSH public key.

   Learn about connecting to a Linux VM in Azure

6. On the **Details** page, enter a name for the agent, specify tags, and choose whether you want the Console to create a new role that has the required permissions, or if you want to select an existing role that you set up with the required permissions.

   Note that you can choose the Azure subscriptions associated with this role. Each subscription that you choose provides the Console agent permissions to manage resources in that subscription (for example, Cloud Volumes ONTAP).

7. On the **Network** page, choose a VNet and subnet, whether to enable a public IP address, and optionally specify a proxy configuration.
   - On the **Security Group** page, choose whether to create a new security group or whether to select an existing security group that allows the required inbound and outbound rules.

     View security group rules for Azure.

8. Review your selections to verify that your set up is correct.

   a. The **Validate agent configuration** check box is marked by default to have the Console validate the network connectivity requirements when you deploy. If the Console fails to deploy the agent, it provides a report to help you troubleshoot. If the deployment succeeds, no report is provided.

> If you are still using the previous endpoints used for agent upgrades, the validation fails with an error. To avoid this, unmark the check box to skip the validation check.

9. Select **Add**.

   The Console prepares the agent in about 10 minutes. Stay on the page until the process completes.

Result

After the process is complete, the Console agent is available for use from the Console.

> ⓘ If the deployment fails, you can download a report and logs from the Console to help you fix the issues. Learn how to troubleshoot installation issues.

If you have Azure Blob storage in the same Azure account where you created the Console agent, you'll see Azure Blob storage appear on the **Systems** page automatically. Learn how to manage Azure Blob storage from NetApp Console

Create a Console agent from the Azure Marketplace

You can create a Console agent in Azure directly from the Azure Marketplace. To create a Console agent from the Azure Marketplace, you need to set up your networking, prepare Azure permissions, review instance requirements, and then create the Console agent.

Before you begin

- You should have an understanding of Console agents.
- Review Console agent limitations.

Step 1: Set up networking

Ensure that the network location where you plan to install the Console agent supports the following requirements.These requirements enable the Console agent to manage resources in your hybrid cloud.

Azure region

If you use Cloud Volumes ONTAP, the Console agent should be deployed in the same Azure region as the Cloud Volumes ONTAP systems that it manages, or in the Azure region pair for the Cloud Volumes ONTAP systems. This requirement ensures that an Azure Private Link connection is used between Cloud Volumes ONTAP and its associated storage accounts.

Learn how Cloud Volumes ONTAP uses an Azure Private Link

VNet and subnet

When you create the Console agent, you need to specify the VNet and subnet where it should reside.

Connections to target networks

The Console agent requires a network connection to the location where you're planning to create and manage systems. For example, the network where you plan to create Cloud Volumes ONTAP systems or a storage system in your on-premises environment.

Outbound internet access

The network location where you deploy the Console agent must have an outbound internet connection to contact specific endpoints.

Endpoints contacted from the Console agent

The Console agent requires outbound internet access to contact the following endpoints to manage resources and processes within your public cloud environment for day-to-day operations.

The endpoints listed below are all CNAME entries.

Endpoints	Purpose
https://management.azure.com https://login.microsoftonline.com https://blob.core.windows.net https://core.windows.net	To manage resources in Azure public regions.
https://management.chinacloudapi.cn https://login.chinacloudapi.cn https://blob.core.chinacloudapi.cn https://core.chinacloudapi.cn	To manage resources in Azure China regions.
https://mysupport.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support.
https://signin.b2c.netapp.com	To update NetApp Support Site (NSS) credentials or to add new NSS credentials to the NetApp Console.
https://support.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support as well as to receive software updates for Cloud Volumes ONTAP.
https://api.bluexp.netapp.com https://netapp-cloud-account.auth0.com https://netapp-cloud-account.us.auth0.com https://console.netapp.com https://components.console.bluexp.netapp.com https://cdn.auth0.com	To provide features and services within the NetApp Console.

Endpoints	Purpose
https://bluexpinfraprod.eastus2.data.azurecr.io https://bluexpinfraprod.azurecr.io	To obtain images for Console agent upgrades. • When you deploy a new agent, the validation check tests connectivity to current endpoints. If you use previous endpoints, the validation check fails. To avoid this failure, skip the validation check. Although the previous endpoints are still supported, NetApp recommends updating your firewall rules to the current endpoints as soon as possible. Learn how to update your endpoint list. • When you update to the current endpoints in your firewall, your existing agents will continue to work.

Proxy server

NetApp supports both explicit and transparent proxy configurations. If you are using a transparent proxy, you only need to provide the certificate for the proxy server. If you are using an explicit proxy, you'll also need the IP address and credentials.

- IP address
- Credentials
- HTTPS certificate

Ports

There's no incoming traffic to the Console agent, unless you initiate it or if it is used as a proxy to send AutoSupport messages from Cloud Volumes ONTAP to NetApp Support.

- HTTP (80) and HTTPS (443) provide access to the local UI, which you'll use in rare circumstances.
- SSH (22) is only needed if you need to connect to the host for troubleshooting.
- Inbound connections over port 3128 are required if you deploy Cloud Volumes ONTAP systems in a subnet where an outbound internet connection isn't available.

  If Cloud Volumes ONTAP systems don't have an outbound internet connection to send AutoSupport messages, the Console automatically configures those systems to use a proxy server that's included with the Console agent. The only requirement is to ensure that the Console agent's security group allows inbound connections over port 3128. You'll need to open this port after you deploy the Console agent.

Enable NTP

If you're planning to use NetApp Data Classification to scan your corporate data sources, you should enable a Network Time Protocol (NTP) service on both the Console agent and the NetApp Data Classification system so that the time is synchronized between the systems. Learn more about NetApp Data classification

Implement the networking requirements after creating the Console agent.

Step 2: Review VM requirements

When you create the Console agent, choose a virtual machine type that meets the following requirements.

CPU
8 cores or 8 vCPUs

RAM
32 GB

Azure VM size
An instance type that meets CPU and RAM requirements. NetApp recommends Standard_D8s_v3.

Step 3: Set up permissions

You can provide permissions in the following ways:

- Option 1: Assign a custom role to the Azure VM using a system-assigned managed identity.
- Option 2: Provide the Console with the credentials for an Azure service principal that has the required permissions.

Follow these steps to set up permissions for the Console.

Custom role

Note that you can create an Azure custom role using the Azure portal, Azure PowerShell, Azure CLI, or REST API. The following steps show how to create the role using the Azure CLI. If you would prefer to use a different method, refer to Azure documentation

Steps

1. If you're planning to manually install the software on your own host, enable a system-assigned managed identity on the VM so that you can provide the required Azure permissions through a custom role.

   Microsoft Azure documentation: Configure managed identities for Azure resources on a VM using the Azure portal

2. Copy the contents of the custom role permissions for the Connector and save them in a JSON file.
3. Modify the JSON file by adding Azure subscription IDs to the assignable scope.

   You should add the ID for each Azure subscription that you want to use with the NetApp Console.

   Example

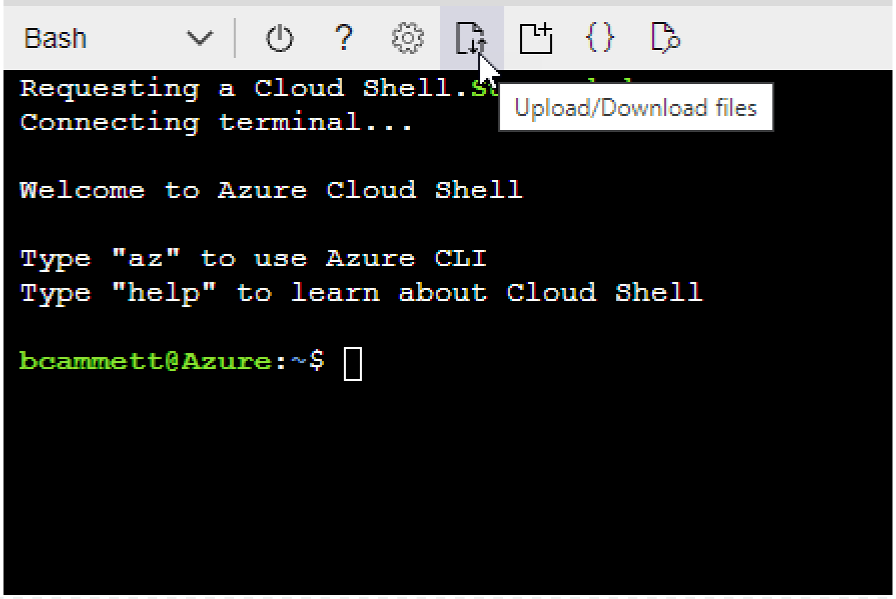
   ```
   "AssignableScopes": [
   "/subscriptions/d333af45-0d07-4154-943d-c25fbzzzzzzz",
   "/subscriptions/54b91999-b3e6-4599-908e-416e0zzzzzzz",
   "/subscriptions/398e471c-3b42-4ae7-9b59-ce5bbzzzzzzz"
   ]
   ```

4. Use the JSON file to create a custom role in Azure.

   The following steps describe how to create the role by using Bash in Azure Cloud Shell.

   a. Start Azure Cloud Shell and choose the Bash environment.

   b. Upload the JSON file.



```
Requesting a Cloud Shell.Su
Connecting terminal...

Welcome to Azure Cloud Shell

Type "az" to use Azure CLI
Type "help" to learn about Cloud Shell

bcammett@Azure:~$ 
```

c. Use the Azure CLI to create the custom role:

```
az role definition create --role-definition agent_Policy.json
```

Service principal

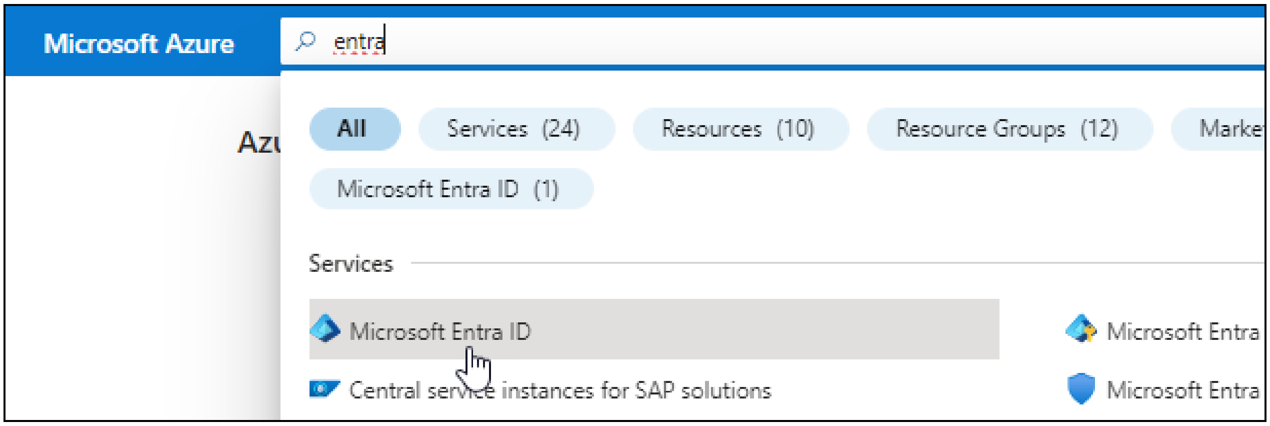
Create and set up a service principal in Microsoft Entra ID and obtain the Azure credentials that the Console needs.

Create a Microsoft Entra application for role-based access control

1. Ensure that you have permissions in Azure to create an Active Directory application and to assign the application to a role.

   For details, refer to Microsoft Azure Documentation: Required permissions

2. From the Azure portal, open the **Microsoft Entra ID** service.



3. In the menu, select **App registrations**.
4. Select **New registration**.
5. Specify details about the application:
   - **Name**: Enter a name for the application.
   - **Account type**: Select an account type (any will work with the NetApp Console).
   - **Redirect URI**: You can leave this field blank.
6. Select **Register**.

   You've created the AD application and service principal.

Assign the application to a role

1. Create a custom role:

   Note that you can create an Azure custom role using the Azure portal, Azure PowerShell, Azure CLI, or REST API. The following steps show how to create the role using the Azure CLI. If you would prefer to use a different method, refer to Azure documentation

   a. Copy the contents of the custom role permissions for the Console agent and save them in a JSON file.

b. Modify the JSON file by adding Azure subscription IDs to the assignable scope.

   You should add the ID for each Azure subscription from which users will create Cloud Volumes ONTAP systems.

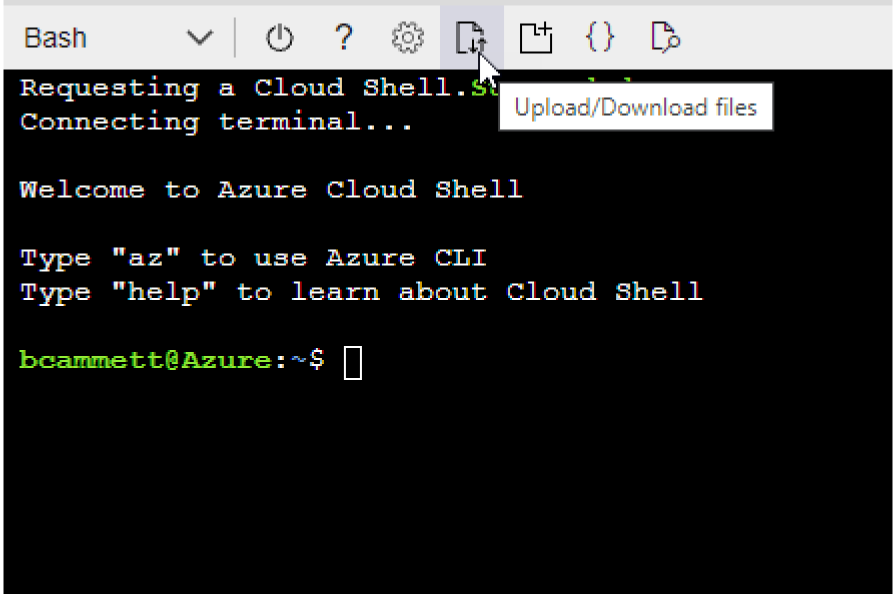
   Example

```
"AssignableScopes": [
"/subscriptions/d333af45-0d07-4154-943d-c25fbzzzzzzz",
"/subscriptions/54b91999-b3e6-4599-908e-416e0zzzzzzz",
"/subscriptions/398e471c-3b42-4ae7-9b59-ce5bbzzzzzzz"
]
```

c. Use the JSON file to create a custom role in Azure.

   The following steps describe how to create the role by using Bash in Azure Cloud Shell.

   - Start Azure Cloud Shell and choose the Bash environment.
   - Upload the JSON file.



```
Requesting a Cloud Shell.Su
Connecting terminal...

Welcome to Azure Cloud Shell

Type "az" to use Azure CLI
Type "help" to learn about Cloud Shell

bcammett@Azure:~$
```

   - Use the Azure CLI to create the custom role:

```
az role definition create --role-definition agent_Policy.json
```

     You should now have a custom role called Console Operator that you can assign to the Console agent virtual machine.

2. Assign the application to the role:

   a. From the Azure portal, open the **Subscriptions** service.

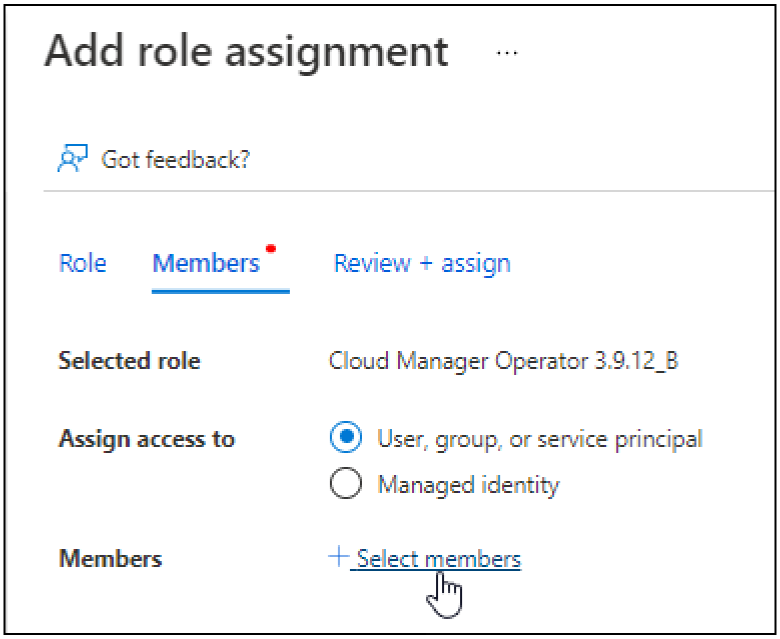
   b. Select the subscription.

c. Select **Access control (IAM) > Add > Add role assignment**.

d. In the **Role** tab, select the **Console Operator** role and select **Next**.

e. In the **Members** tab, complete the following steps:

   - Keep **User, group, or service principal** selected.
   - Select **Select members**.



Add role assignment ...

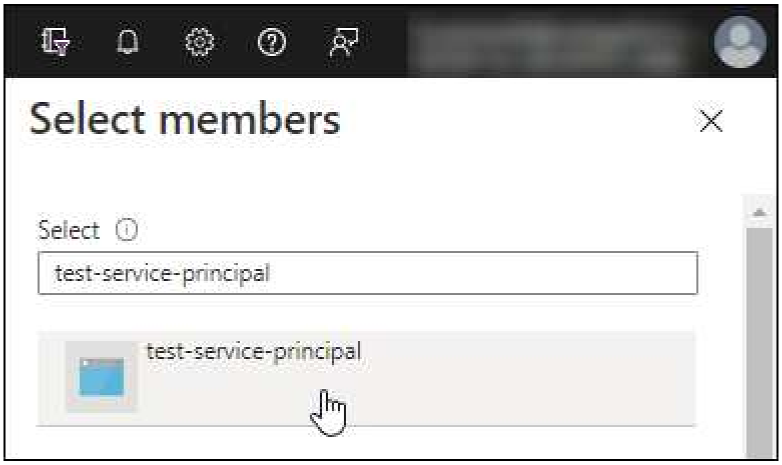
Selected role: Cloud Manager Operator 3.9.12_B

Assign access to: ● User, group, or service principal ○ Managed identity

Members: + Select members

   - Search for the name of the application.

     Here's an example:



Select members

Select: test-service-principal

   - Select the application and select **Select**.
   - Select **Next**.

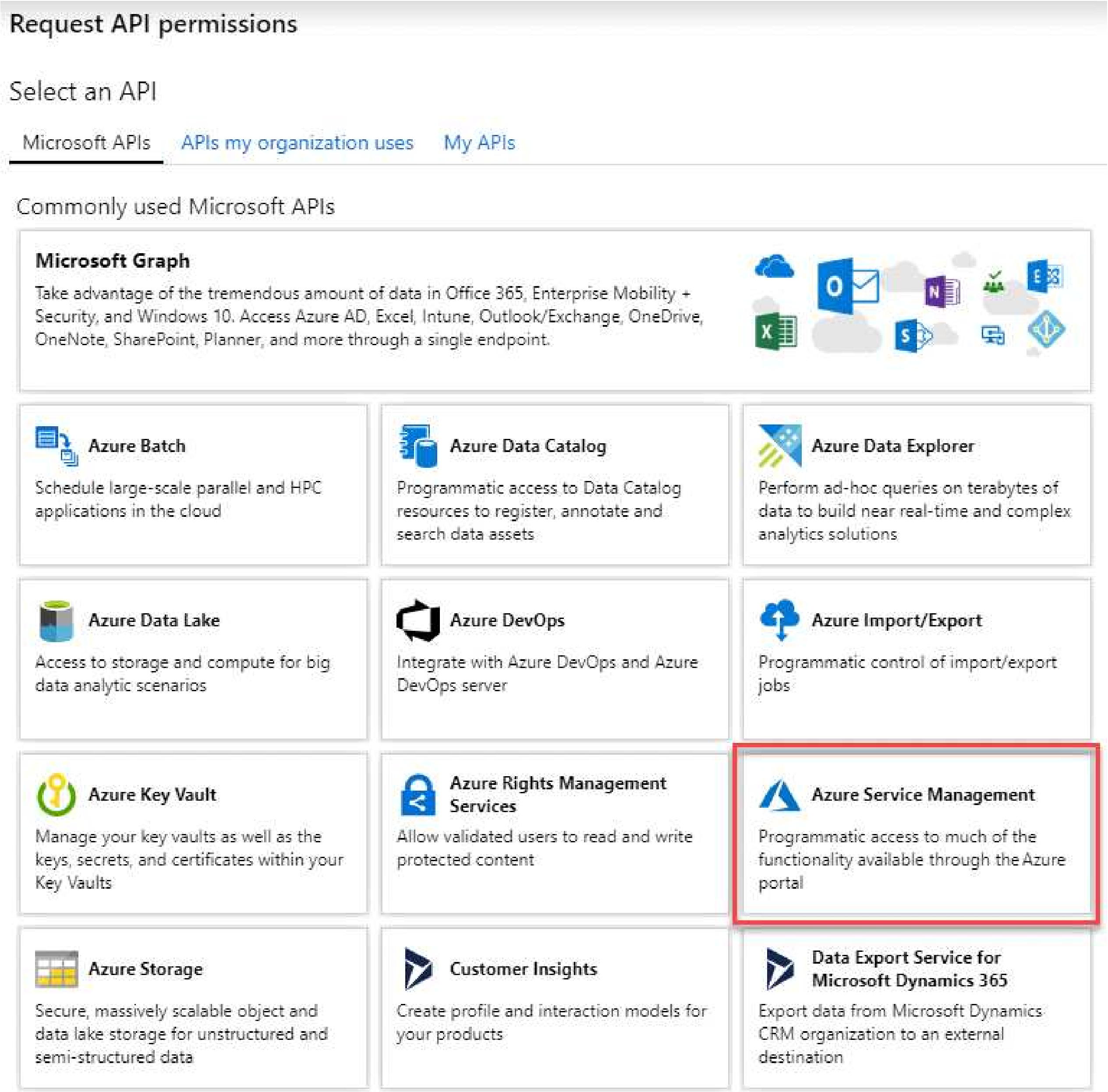
f. Select **Review + assign**.

   The service principal now has the required Azure permissions to deploy the Console agent.

   If you want to deploy Cloud Volumes ONTAP from multiple Azure subscriptions, then you must bind the service principal to each of those subscriptions. In the NetApp Console, you can select the subscription that you want to use when deploying Cloud Volumes ONTAP.

Add Windows Azure Service Management API permissions

1. In the **Microsoft Entra ID** service, select **App registrations** and select the application.
2. Select **API permissions > Add a permission**.
3. Under **Microsoft APIs**, select **Azure Service Management**.



Request API permissions

Select an API

Microsoft APIs | APIs my organization uses | My APIs

Commonly used Microsoft APIs

Microsoft Graph
Take advantage of the tremendous amount of data in Office 365, Enterprise Mobility + Security, and Windows 10. Access Azure AD, Excel, Intune, Outlook/Exchange, OneDrive, OneNote, SharePoint, Planner, and more through a single endpoint.

Azure Batch
Schedule large-scale parallel and HPC applications in the cloud

Azure Data Catalog
Programmatic access to Data Catalog resources to register, annotate and search data assets

Azure Data Explorer
Perform ad-hoc queries on terabytes of data to build near real-time and complex analytics solutions

Azure Data Lake
Access to storage and compute for big data analytic scenarios

Azure DevOps
Integrate with Azure DevOps and Azure DevOps server

Azure Import/Export
Programmatic control of import/export jobs

Azure Key Vault
Manage your key vaults as well as the keys, secrets, and certificates within your Key Vaults

Azure Rights Management Services
Allow validated users to read and write protected content

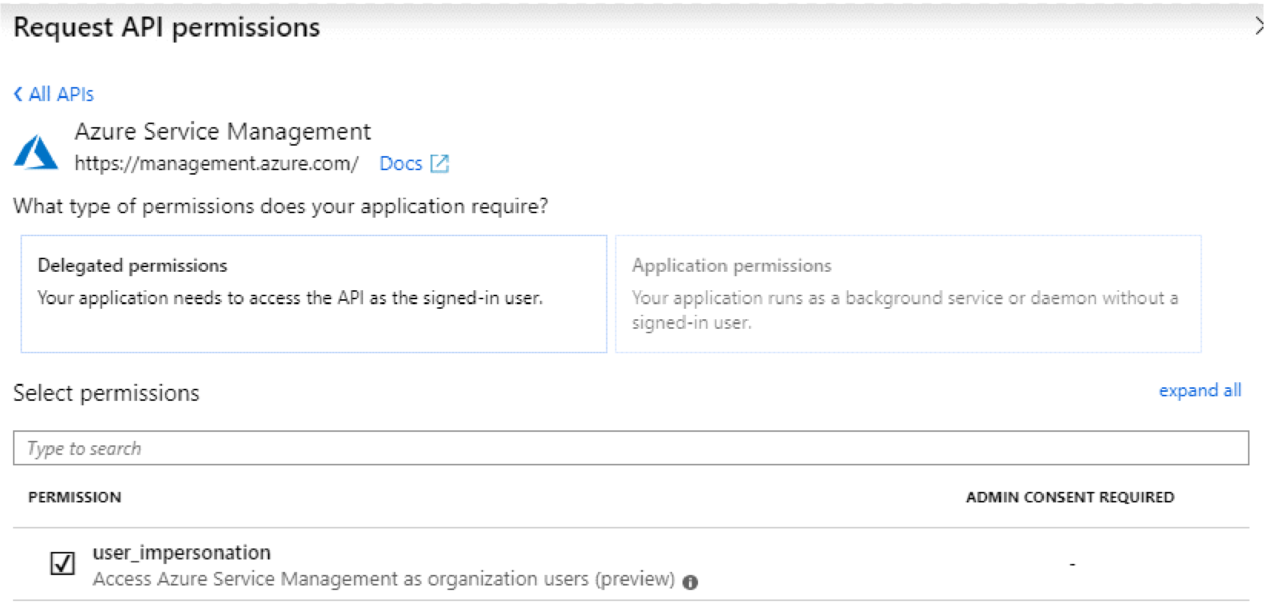
Azure Service Management
Programmatic access to much of the functionality available through the Azure portal

Azure Storage
Secure, massively scalable object and data lake storage for unstructured and semi-structured data

Customer Insights
Create profile and interaction models for your products

Data Export Service for Microsoft Dynamics 365
Export data from Microsoft Dynamics CRM organization to an external destination

4. Select **Access Azure Service Management as organization users** and then select **Add permissions**.



Request API permissions

< All APIs

Azure Service Management

https://management.azure.com/ Docs

What type of permissions does your application require?

Delegated permissions

Your application needs to access the API as the signed-in user.

Application permissions

Your application runs as a background service or daemon without a signed-in user.

Select permissions

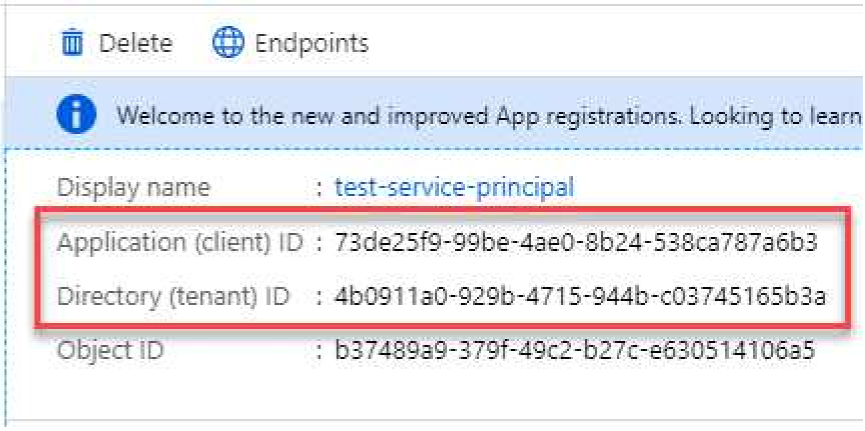
expand all

Type to search

PERMISSION	ADMIN CONSENT REQUIRED
☑ user_impersonation Access Azure Service Management as organization users (preview)	-

Get the application ID and directory ID for the application

1. In the **Microsoft Entra ID** service, select **App registrations** and select the application.
2. Copy the **Application (client) ID** and the **Directory (tenant) ID**.



Welcome to the new and improved App registrations. Looking to learn

Display name : test-service-principal

Application (client) ID : 73de25f9-99be-4ae0-8b24-538ca787a6b3

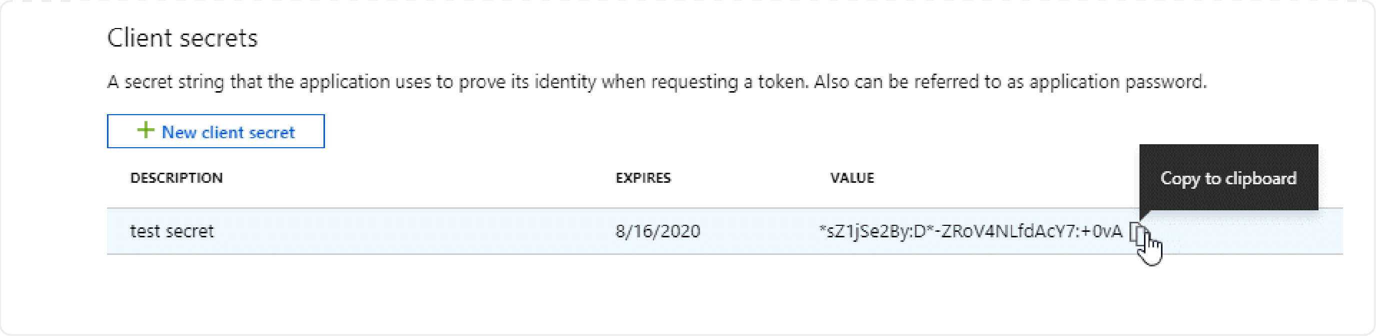
Directory (tenant) ID : 4b0911a0-929b-4715-944b-c03745165b3a

Object ID : b37489a9-379f-49c2-b27c-e630514106a5

When you add the Azure account to the Console, you need to provide the application (client) ID and the directory (tenant) ID for the application. The Console uses the IDs to programmatically sign in.

Create a client secret

1. Open the **Microsoft Entra ID** service.
2. Select **App registrations** and select your application.
3. Select **Certificates & secrets > New client secret**.
4. Provide a description of the secret and a duration.
5. Select **Add**.
6. Copy the value of the client secret.



Client secrets

A secret string that the application uses to prove its identity when requesting a token. Also can be referred to as application password.

DESCRIPTION	EXPIRES	VALUE
test secret	8/16/2020	*sZ1jSe2By:D*-ZRoV4NLfdAcY7:+0vA

Step 4: Create the Console agent

Launch the Console agent directly from the Azure Marketplace.

About this task

Creating the Console agent from the Azure Marketplace sets up a virtual machine with a default configuration. Learn about the default configuration for the Console agent.

Before you begin

You should have the following:

- An Azure subscription.
- A VNet and subnet in your Azure region of choice.
- Details about a proxy server, if your organization requires a proxy for all outgoing internet traffic:
  - IP address
  - Credentials
  - HTTPS certificate
- An SSH public key, if you want to use that authentication method for the Console agent virtual machine. The other option for the authentication method is to use a password.

  Learn about connecting to a Linux VM in Azure
- If you don't want the Console to automatically create an Azure role for the Console agent, then you'll need to create your own using the policy on this page.

  These permissions are for the Console agent instance itself. It's a different set of permissions than what you previously set up to deploy the Console agent VM.

Steps

1. Go to the NetApp Console agent VM page in the Azure Marketplace.

   Azure Marketplace page for commercial regions
2. Select **Get it now** and then select **Continue**.
3. From the Azure portal, select **Create** and follow the steps to configure the virtual machine.

   Note the following as you configure the VM:
   - **VM size**: Choose a VM size that meets CPU and RAM requirements. We recommend Standard_D8s_v3.

- **Disks**: The Console agent can perform optimally with either HDD or SSD disks.
- **Network security group**: The Console agent requires inbound connections using SSH, HTTP, and HTTPS.

  View security group rules for Azure.
- Identity*: Under **Management**, select **Enable system assigned managed identity**.

  This setting is important because a managed identity allows the Console agent virtual machine to identify itself to Microsoft Entra ID without providing any credentials. Learn more about managed identities for Azure resources.

4. On the **Review + create** page, review your selections and select **Create** to start the deployment.

   Azure deploys the virtual machine with the specified settings. You should see the virtual machine and Console agent software running in about ten minutes.

   > ⓘ If the installation fails, you can view logs and a report to help you troubleshoot. Learn how to troubleshoot installation issues.

5. Open a web browser from a host that has a connection to the Console agent virtual machine and enter the following URL:

   https://*ipaddress*

6. After you log in, set up the Console agent:
   a. Specify the the Console organization to associate with the Console agent.
   b. Enter a name for the system.
   c. Under **Are you running in a secured environment?** keep restricted mode disabled.

      Keep restricted mode disabled to use the Console in standard mode. You should enable restricted mode only if you have a secure environment and want to disconnect this account from the Console backend services. If that’s the case, follow steps to get started with the Console in restricted mode.
   d. Select **Let’s start**.

Result

You have now installed the Console agent and set it up with your the Console organization.

If you have Azure Blob storage in the same Azure subscription where you created the Console agent, you’ll see an Azure Blob storage system appear on the **Systems** page automatically. Learn how to manage Azure Blob storage from the Console

Step 5: Provide permissions to the Console agent

Now that you’ve created the Console agent, you need to provide it with the permissions that you previously set up. Providing the permissions enables the Console agent to manage your data and storage infrastructure in Azure.

Custom role

Go to the Azure portal and assign the Azure custom role to the Console agent virtual machine for one or more subscriptions.

Steps

1. From the Azure Portal, open the **Subscriptions** service and select your subscription.

   It’s important to assign the role from the **Subscriptions** service because this specifies the scope of the role assignment at the subscription level. The *scope* defines the set of resources that the access applies to. If you specify a scope at a different level (for example, at the virtual machine level), your ability to complete actions from within the NetApp Console will be affected.

   Microsoft Azure documentation: Understand scope for Azure RBAC

2. Select **Access control (IAM)** > **Add** > **Add role assignment**.
3. In the **Role** tab, select the **Console Operator** role and select **Next**.

   > Console Operator is the default name provided in the policy. If you chose a different name for the role, then select that name instead.

4. In the **Members** tab, complete the following steps:
   a. Assign access to a **Managed identity**.
   b. Select **Select members**, select the subscription in which the Console agent virtual machine was created, under **Managed identity**, choose **Virtual machine**, and then select the Console agent virtual machine.
   c. Select **Select**.
   d. Select **Next**.
   e. Select **Review + assign**.
   f. If you want to manage resources in additional Azure subscriptions, switch to that subscription and then repeat these steps.

What’s next?

Go to the NetApp Console to start using the Console agent.

Service principal

Steps

1. Select **Administration > Credentials**.
2. Select **Add Credentials** and follow the steps in the wizard.
   a. **Credentials Location**: Select **Microsoft Azure > Agent**.
   b. **Define Credentials**: Enter information about the Microsoft Entra service principal that grants the required permissions:
      - Application (client) ID
      - Directory (tenant) ID
      - Client Secret
   c. **Marketplace Subscription**: Associate a Marketplace subscription with these credentials by subscribing now or by selecting an existing subscription.

d. **Review**: Confirm the details about the new credentials and select **Add**.

Result

The Console now has the permissions that it needs to perform actions in Azure on your behalf.

Manually install the Console agent in Azure

To manually install the Console agent on your own Linux host, you need to review host requirements, set up your networking, prepare Azure permissions, install the Console agent, and then provide the permissions that you prepared.

Before you begin

- You should have an understanding of Console agents.
- You should review Console agent limitations.

Step 1: Review host requirements

The Console agent software must run on a host that meets specific operating system requirements, RAM requirements, port requirements, and so on.

> ⓘ The Console agent reserves the UID and GID range of 19000 to 19200. This range is fixed and cannot be modified. If any third-party software on your host is using UIDs or GIDs within this range, the agent installation will fail. NetApp recommends using a host that is free of third-party software to avoid conflicts.

Dedicated host

The Console agent requires a dedicated host. Any architecture is supported if it meets these size requirements:

- CPU: 8 cores or 8 vCPUs
- RAM: 32 GB
- Disk space: 165 GB is recommended for the host, with the following partition requirements:
  - `/opt`: 120 GiB of space must be available

    The agent uses `/opt` to install the `/opt/application/netapp` directory and its contents.
  - `/var`: 40 GiB of space must be available

    The Console agent requires this space in `/var` because Podman or Docker are architected to create the containers within this directory. Specifically, they will create containers in the `/var/lib/containers/storage` directory and `/var/lib/docker` for Docker. External mounts or symlinks do not work for this space.

Azure VM size

An instance type that meets CPU and RAM requirements. NetApp recommends Standard_D8s_v3.

Hypervisor

A bare metal or hosted hypervisor that is certified to run a supported operating system is required.

Operating system and container requirements

The Console agent is supported with the following operating systems when using the Console in standard mode or restricted mode. A container orchestration tool is required before you install the agent.

Operating system	Supported OS versions	Supported agent versions	Required container tool	SELinux
Red Hat Enterprise Linux				
	9.6 • English language versions only. • The host must be registered with Red Hat Subscription Management. If it's not registered, the host can't access repositories to update required 3rd-party software during agent installation.	4.0.0 or later with the Console in standard mode or restricted mode	Podman version 5.4.0 with podman-compose 1.5.0. View Podman configuration requirements.	Supported in enforcing mode or permissive mode
	9.1 to 9.4 • English language versions only. • The host must be registered with Red Hat Subscription Management. If it's not registered, the host can't access repositories to update required 3rd-party software during agent installation.	3.9.50 or later with the Console in standard mode or restricted mode	Podman version 4.9.4 with podman-compose 1.5.0. View Podman configuration requirements.	Supported in enforcing mode or permissive mode

Operating system	Supported OS versions	Supported agent versions	Required container tool	SELinux
	8.6 to 8.10 • English language versions only. • The host must be registered with Red Hat Subscription Management. If it’s not registered, the host can’t access repositories to update required 3rd-party software during agent installation.	3.9.50 or later with the Console in standard mode or restricted mode	Podman version 4.6.1 or 4.9.4 with podman-compose 1.0.6. View Podman configuration requirements.	Supported in enforcing mode or permissive mode
Ubuntu				
	24.04 LTS	3.9.45 or later with the NetApp Console in standard mode or restricted mode	Docker Engine 23.06 to 28.0.0.	Not supported
	22.04 LTS	3.9.50 or later	Docker Engine 23.0.6 to 28.0.0.	Not supported

Step 2: Install Podman or Docker Engine

Depending on your operating system, either Podman or Docker Engine is required before installing the agent.

- Podman is required for Red Hat Enterprise Linux 8 and 9.

  View the supported Podman versions.

- Docker Engine is required for Ubuntu.

  View the supported Docker Engine versions.

Example 3. Steps

Podman

Follow these steps to install and configure Podman:

- Enable and start the podman.socket service
- Install python3
- Install the podman-compose package version 1.0.6
- Add podman-compose to the PATH environment variable
- If using Red Hat Enterprise Linux, verify that your Podman version is using Netavark Aardvark DNS instead of CNI

ⓘ Adjust the aardvark-dns port (default: 53) after installing the agent to avoid DNS port conflicts. Follow the instructions to configure the port.

Steps

1. Remove the podman-docker package if it's installed on the host.

```
dnf remove podman-docker
rm /var/run/docker.sock
```

2. Install Podman.

   You can obtain Podman from official Red Hat Enterprise Linux repositories.

   a. For Red Hat Enterprise Linux 9.6:

   ```
   sudo dnf install podman-5:<version>
   ```

   Where <version> is the supported version of Podman that you're installing. View the supported Podman versions.

   b. For Red Hat Enterprise Linux 9.1 to 9.4:

   ```
   sudo dnf install podman-4:<version>
   ```

   Where <version> is the supported version of Podman that you're installing. View the supported Podman versions.

   c. For Red Hat Enterprise Linux 8:

   ```
   sudo dnf install podman-4:<version>
   ```

   Where <version> is the supported version of Podman that you're installing. View the supported Podman versions.

3. Enable and start the podman.socket service.

   ```
   sudo systemctl enable --now podman.socket
   ```

4. Install python3.

   ```
   sudo dnf install python3
   ```

5. Install the EPEL repository package if it’s not already available on your system.

   This step is required because podman-compose is available from the Extra Packages for Enterprise Linux (EPEL) repository.

6. If using Red Hat Enterprise 9:

   a. Install the EPEL repository package.

   ```
   sudo dnf install https://dl.fedoraproject.org/pub/epel/epel-release-latest-9.noarch.rpm
   ```

   a. Install podman-compose package 1.5.0.

   ```
   sudo dnf install podman-compose-1.5.0
   ```

7. If using Red Hat Enterprise Linux 8:

   a. Install the EPEL repository package.

   ```
   sudo dnf install https://dl.fedoraproject.org/pub/epel/epel-release-latest-8.noarch.rpm
   ```

   b. Install podman-compose package 1.0.6.

   ```
   sudo dnf install podman-compose-1.0.6
   ```

   > Using the `dnf install` command meets the requirement for adding podman-compose to the PATH environment variable. The installation command adds podman-compose to /usr/bin, which is already included in the `secure_path` option on the host.

   c. If using Red Hat Enterprise Linux 8, verify that your Podman version is using NetAvark with Aardvark DNS instead of CNI.

      i. Check to see if your networkBackend is set to CNI by running the following command:

```
podman info | grep networkBackend
```

ii. If the networkBackend is set to `CNI`, you'll need to change it to `netavark`.

iii. Install `netavark` and `aardvark-dns` using the following command:

```
dnf install aardvark-dns netavark
```

iv. Open the `/etc/containers/containers.conf` file and modify the network_backend option to use "netavark" instead of "cni".

If `/etc/containers/containers.conf` doesn't exist, make the configuration changes to `/usr/share/containers/containers.conf`.

v. Restart podman.

```
systemctl restart podman
```

vi. Confirm networkBackend is now changed to "netavark" using the following command:

```
podman info | grep networkBackend
```

Docker Engine

Follow the documentation from Docker to install Docker Engine.

Steps

1. View installation instructions from Docker

   Follow the steps to install a supported Docker Engine version. Do not install the latest version, as it is unsupported by the Console.

2. Verify that Docker is enabled and running.

```
sudo systemctl enable docker && sudo systemctl start docker
```

Step 3: Set up networking

Ensure that the network location where you plan to install the Console agent supports the following requirements. Meeting these requirements enables the Console agent to manage resources and processes within your hybrid cloud environment.

Azure region

If you use Cloud Volumes ONTAP, the Console agent should be deployed in the same Azure region as the

Cloud Volumes ONTAP systems that it manages, or in the Azure region pair for the Cloud Volumes ONTAP systems. This requirement ensures that an Azure Private Link connection is used between Cloud Volumes ONTAP and its associated storage accounts.

Learn how Cloud Volumes ONTAP uses an Azure Private Link

Connections to target networks

The Console agent requires a network connection to the location where you're planning to create and manage systems. For example, the network where you plan to create Cloud Volumes ONTAP systems or a storage system in your on-premises environment.

Outbound internet access

The network location where you deploy the Console agent must have an outbound internet connection to contact specific endpoints.

Endpoints contacted from computers when using the web-based NetApp Console

Computers that access the Console from a web browser must have the ability to contact several endpoints. You'll need to use the Console to set up the Console agent and for day-to-day use of the Console.

Prepare networking for the NetApp console.

Endpoints contacted from the Console agent

The Console agent requires outbound internet access to contact the following endpoints to manage resources and processes within your public cloud environment for day-to-day operations.

The endpoints listed below are all CNAME entries.

Endpoints	Purpose
https://management.azure.com https://login.microsoftonline.com https://blob.core.windows.net https://core.windows.net	To manage resources in Azure public regions.
https://management.chinacloudapi.cn https://login.chinacloudapi.cn https://blob.core.chinacloudapi.cn https://core.chinacloudapi.cn	To manage resources in Azure China regions.
https://mysupport.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support.
https://signin.b2c.netapp.com	To update NetApp Support Site (NSS) credentials or to add new NSS credentials to the NetApp Console.
https://support.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support as well as to receive software updates for Cloud Volumes ONTAP.

Endpoints	Purpose
https://api.bluexp.netapp.com https://netapp-cloud-account.auth0.com https://netapp-cloud-account.us.auth0.com https://console.netapp.com https://components.console.bluexp.netapp.com https://cdn.auth0.com	To provide features and services within the NetApp Console.
https://bluexpinfraprod.eastus2.data.azurecr.io https://bluexpinfraprod.azurecr.io	To obtain images for Console agent upgrades. • When you deploy a new agent, the validation check tests connectivity to current endpoints. If you use previous endpoints, the validation check fails. To avoid this failure, skip the validation check. Although the previous endpoints are still supported, NetApp recommends updating your firewall rules to the current endpoints as soon as possible. Learn how to update your endpoint list. • When you update to the current endpoints in your firewall, your existing agents will continue to work.

Proxy server

NetApp supports both explicit and transparent proxy configurations. If you are using a transparent proxy, you only need to provide the certificate for the proxy server. If you are using an explicit proxy, you'll also need the IP address and credentials.

- IP address
- Credentials
- HTTPS certificate

Ports

There's no incoming traffic to the Console agent, unless you initiate it or if it is used as a proxy to send AutoSupport messages from Cloud Volumes ONTAP to NetApp Support.

- HTTP (80) and HTTPS (443) provide access to the local UI, which you'll use in rare circumstances.
- SSH (22) is only needed if you need to connect to the host for troubleshooting.
- Inbound connections over port 3128 are required if you deploy Cloud Volumes ONTAP systems in a subnet where an outbound internet connection isn't available.

  If Cloud Volumes ONTAP systems don't have an outbound internet connection to send AutoSupport messages, the Console automatically configures those systems to use a proxy server that's included with the Console agent. The only requirement is to ensure that the Console agent's security group allows inbound connections over port 3128. You'll need to open this port after you deploy the Console agent.

Enable NTP

If you’re planning to use NetApp Data Classification to scan your corporate data sources, you should enable a Network Time Protocol (NTP) service on both the Console agent and the NetApp Data Classification system so that the time is synchronized between the systems. Learn more about NetApp Data classification

Step 4: Set up Console agent deployment permissions

You need to provide Azure permissions to the Console agent by using one of the following options:

- Option 1: Assign a custom role to the Azure VM using a system-assigned managed identity.
- Option 2: Provide the Console agent with the credentials for an Azure service principal that has the required permissions.

Follow the steps to prepare permissions for the Console agent.

Create a custom role for Console agent deployment

Note that you can create an Azure custom role using the Azure portal, Azure PowerShell, Azure CLI, or REST API. The following steps show how to create the role using the Azure CLI. If you would prefer to use a different method, refer to Azure documentation

Steps

1. If you're planning to manually install the software on your own host, enable a system-assigned managed identity on the VM so that you can provide the required Azure permissions through a custom role.

   Microsoft Azure documentation: Configure managed identities for Azure resources on a VM using the Azure portal

2. Copy the contents of the custom role permissions for the Connector and save them in a JSON file.
3. Modify the JSON file by adding Azure subscription IDs to the assignable scope.

   You should add the ID for each Azure subscription that you want to use with the NetApp Console.

   Example

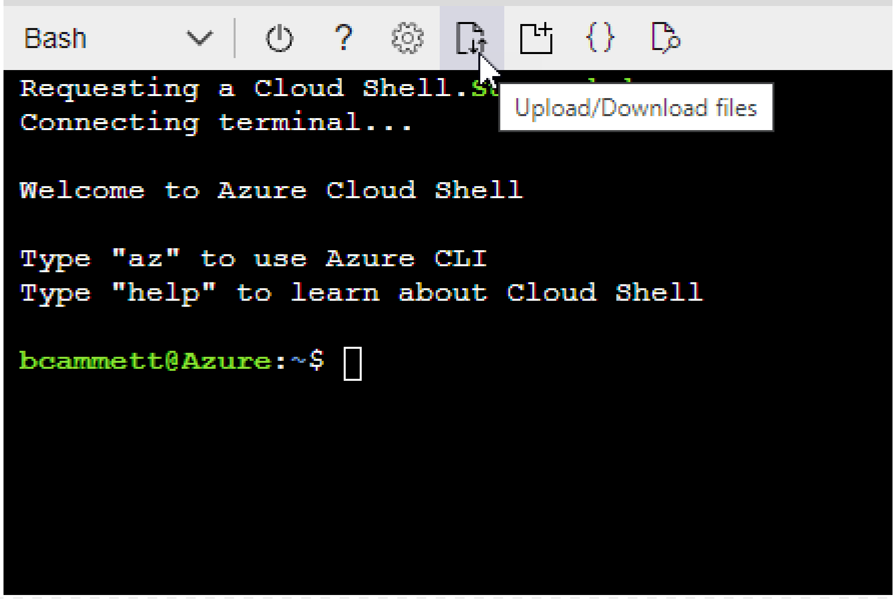
   ```
   "AssignableScopes": [
   "/subscriptions/d333af45-0d07-4154-943d-c25fbzzzzzzz",
   "/subscriptions/54b91999-b3e6-4599-908e-416e0zzzzzzz",
   "/subscriptions/398e471c-3b42-4ae7-9b59-ce5bbzzzzzzz"
   ]
   ```

4. Use the JSON file to create a custom role in Azure.

   The following steps describe how to create the role by using Bash in Azure Cloud Shell.

   a. Start Azure Cloud Shell and choose the Bash environment.

   b. Upload the JSON file.



```
Requesting a Cloud Shell.Su
Connecting terminal...

Welcome to Azure Cloud Shell

Type "az" to use Azure CLI
Type "help" to learn about Cloud Shell

bcammett@Azure:~$
```

c. Use the Azure CLI to create the custom role:

```
az role definition create --role-definition agent_Policy.json
```

Service principal

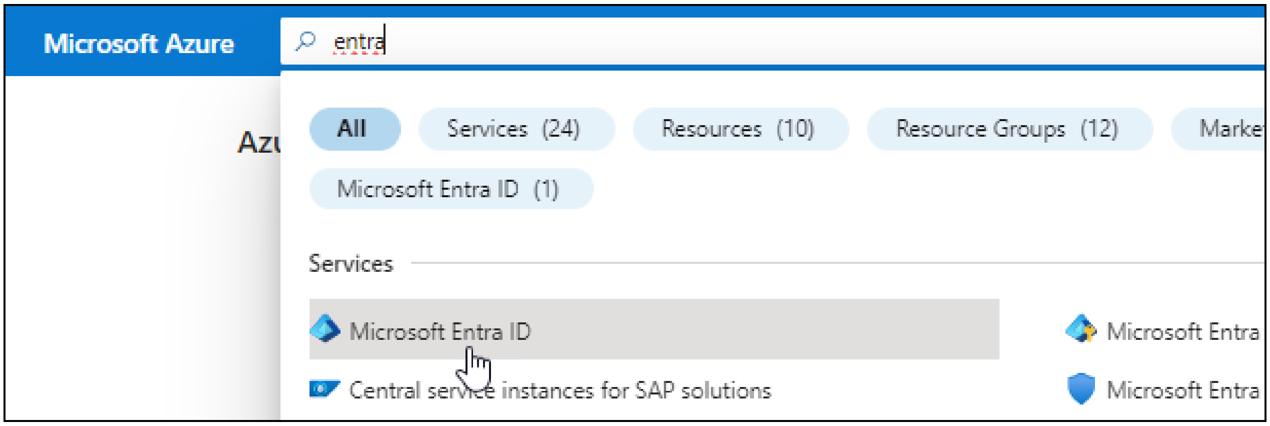
Create and set up a service principal in Microsoft Entra ID and obtain the Azure credentials that the Console agent needs.

Create a Microsoft Entra application for role-based access control

1. Ensure that you have permissions in Azure to create an Active Directory application and to assign the application to a role.

   For details, refer to Microsoft Azure Documentation: Required permissions

2. From the Azure portal, open the **Microsoft Entra ID** service.



3. In the menu, select **App registrations**.
4. Select **New registration**.
5. Specify details about the application:
   - **Name**: Enter a name for the application.
   - **Account type**: Select an account type (any will work with the NetApp Console).
   - **Redirect URI**: You can leave this field blank.
6. Select **Register**.

   You've created the AD application and service principal.

Assign the application to a role

1. Create a custom role:

   Note that you can create an Azure custom role using the Azure portal, Azure PowerShell, Azure CLI, or REST API. The following steps show how to create the role using the Azure CLI. If you would prefer to use a different method, refer to Azure documentation

   a. Copy the contents of the custom role permissions for the Console agent and save them in a JSON file.

b. Modify the JSON file by adding Azure subscription IDs to the assignable scope.

You should add the ID for each Azure subscription from which users will create Cloud Volumes ONTAP systems.

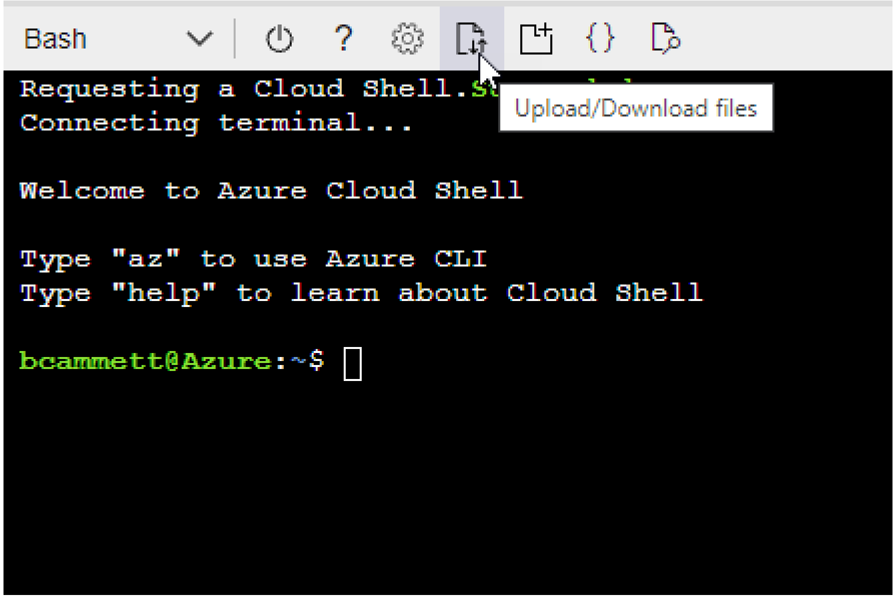
Example

```
"AssignableScopes": [
"/subscriptions/d333af45-0d07-4154-943d-c25fbzzzzzzz",
"/subscriptions/54b91999-b3e6-4599-908e-416e0zzzzzzz",
"/subscriptions/398e471c-3b42-4ae7-9b59-ce5bbzzzzzzz"
]
```

c. Use the JSON file to create a custom role in Azure.

The following steps describe how to create the role by using Bash in Azure Cloud Shell.

- Start Azure Cloud Shell and choose the Bash environment.
- Upload the JSON file.



```
Requesting a Cloud Shell.Su
Connecting terminal...

Welcome to Azure Cloud Shell

Type "az" to use Azure CLI
Type "help" to learn about Cloud Shell

bcammett@Azure:~$
```

- Use the Azure CLI to create the custom role:

```
az role definition create --role-definition agent_Policy.json
```

You should now have a custom role called Console Operator that you can assign to the Console agent virtual machine.

2. Assign the application to the role:

a. From the Azure portal, open the **Subscriptions** service.

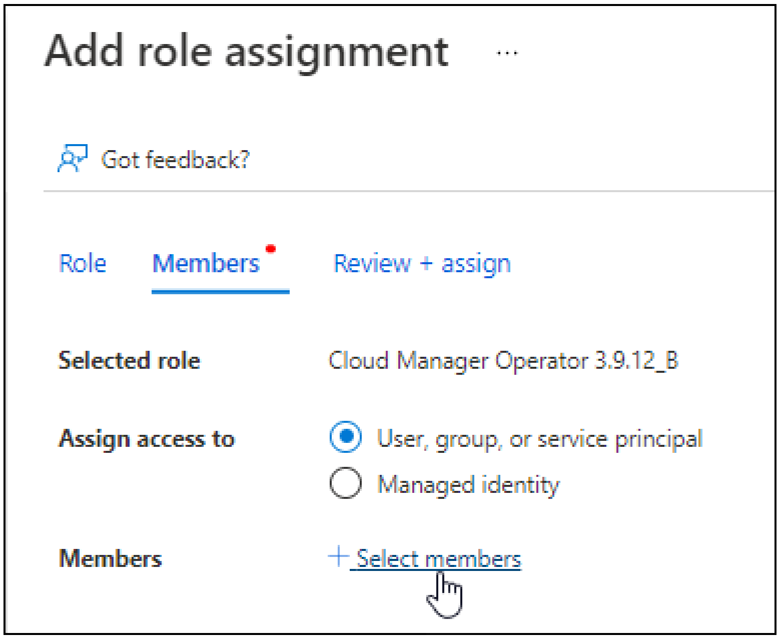
b. Select the subscription.

c. Select **Access control (IAM) > Add > Add role assignment**.

d. In the **Role** tab, select the **Console Operator** role and select **Next**.

e. In the **Members** tab, complete the following steps:

   - Keep **User, group, or service principal** selected.
   - Select **Select members**.



Add role assignment ...

Got feedback?

Role | Members | Review + assign

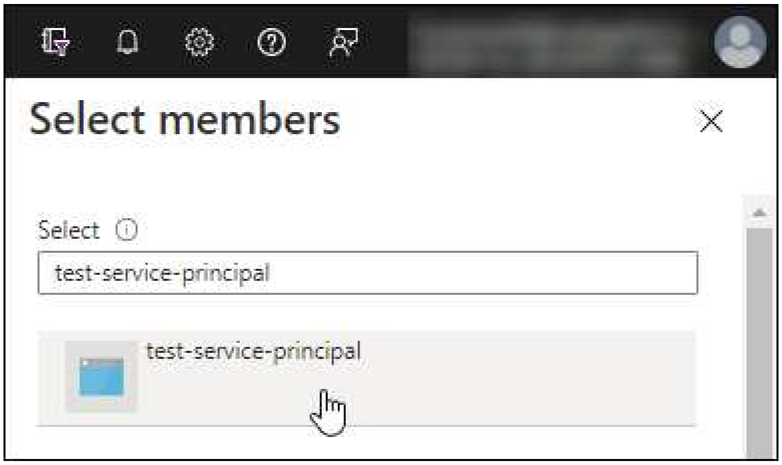
Selected role: Cloud Manager Operator 3.9.12_B

Assign access to: ● User, group, or service principal ○ Managed identity

Members: + Select members

   - Search for the name of the application.

   Here’s an example:



Select members

Select: test-service-principal

test-service-principal

   - Select the application and select **Select**.
   - Select **Next**.

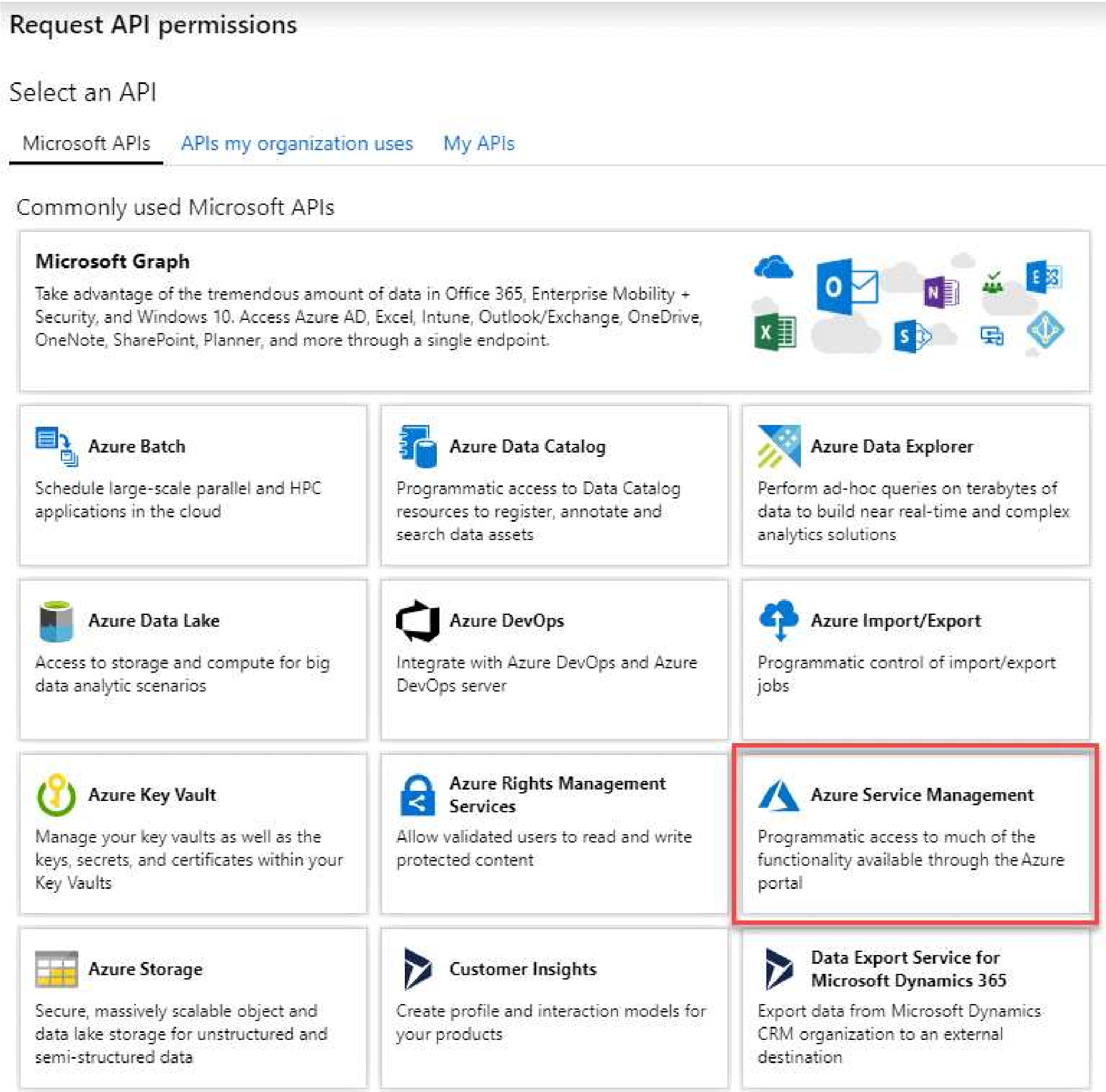
f. Select **Review + assign**.

   The service principal now has the required Azure permissions to deploy the Console agent.

   If you want to deploy Cloud Volumes ONTAP from multiple Azure subscriptions, then you must bind the service principal to each of those subscriptions. In the NetApp Console, you can select the subscription that you want to use when deploying Cloud Volumes ONTAP.

Add Windows Azure Service Management API permissions

1. In the **Microsoft Entra ID** service, select **App registrations** and select the application.
2. Select **API permissions > Add a permission**.
3. Under **Microsoft APIs**, select **Azure Service Management**.



Request API permissions

Select an API

Commonly used Microsoft APIs

Microsoft Graph
Take advantage of the tremendous amount of data in Office 365, Enterprise Mobility + Security, and Windows 10. Access Azure AD, Excel, Intune, Outlook/Exchange, OneDrive, OneNote, SharePoint, Planner, and more through a single endpoint.

Azure Batch
Schedule large-scale parallel and HPC applications in the cloud

Azure Data Catalog
Programmatic access to Data Catalog resources to register, annotate and search data assets

Azure Data Explorer
Perform ad-hoc queries on terabytes of data to build near real-time and complex analytics solutions

Azure Data Lake
Access to storage and compute for big data analytic scenarios

Azure DevOps
Integrate with Azure DevOps and Azure DevOps server

Azure Import/Export
Programmatic control of import/export jobs

Azure Key Vault
Manage your key vaults as well as the keys, secrets, and certificates within your Key Vaults

Azure Rights Management Services
Allow validated users to read and write protected content

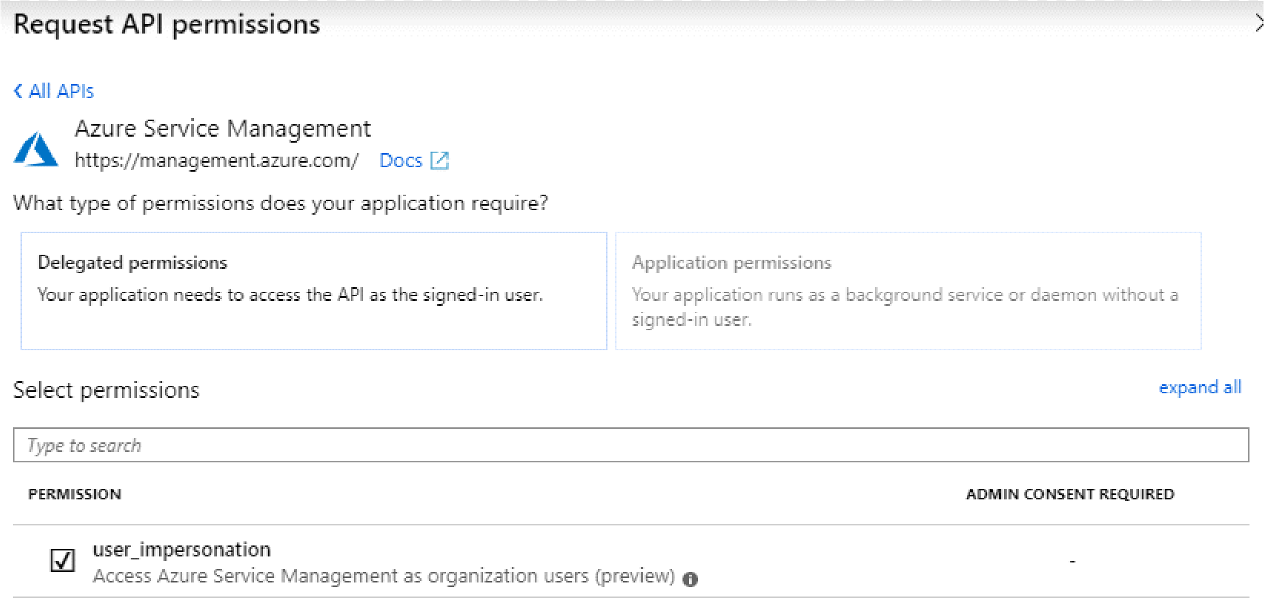
Azure Service Management
Programmatic access to much of the functionality available through the Azure portal

Azure Storage
Secure, massively scalable object and data lake storage for unstructured and semi-structured data

Customer Insights
Create profile and interaction models for your products

Data Export Service for Microsoft Dynamics 365
Export data from Microsoft Dynamics CRM organization to an external destination

4. Select **Access Azure Service Management as organization users** and then select **Add permissions**.



Request API permissions

‹ All APIs

Azure Service Management
https://management.azure.com/ Docs

What type of permissions does your application require?

Delegated permissions
Your application needs to access the API as the signed-in user.

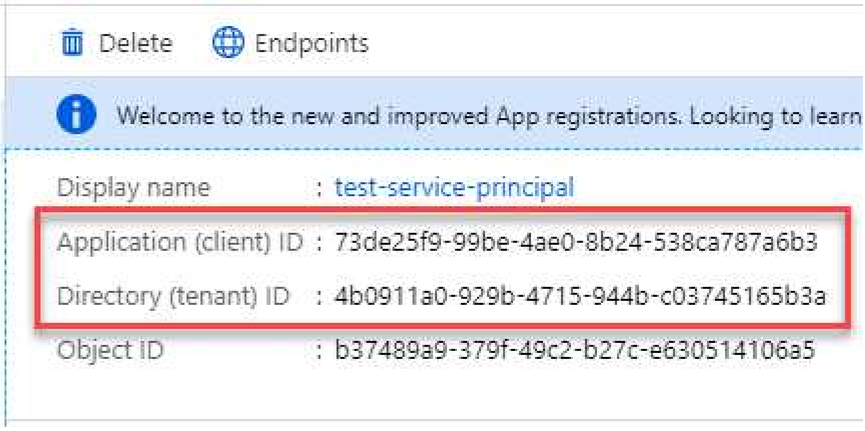
Application permissions
Your application runs as a background service or daemon without a signed-in user.

Select permissions

PERMISSION	ADMIN CONSENT REQUIRED
☑ user_impersonation Access Azure Service Management as organization users (preview)	-

Get the application ID and directory ID for the application

1. In the **Microsoft Entra ID** service, select **App registrations** and select the application.
2. Copy the **Application (client) ID** and the **Directory (tenant) ID**.



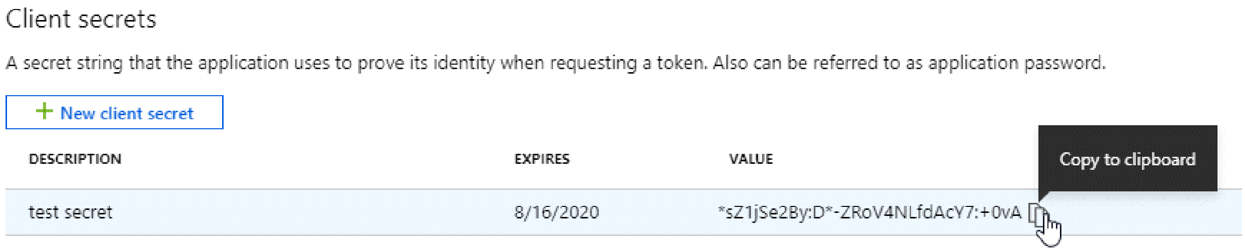
Welcome to the new and improved App registrations. Looking to learn

Display name : test-service-principal
Application (client) ID : 73de25f9-99be-4ae0-8b24-538ca787a6b3
Directory (tenant) ID : 4b0911a0-929b-4715-944b-c03745165b3a
Object ID : b37489a9-379f-49c2-b27c-e630514106a5

When you add the Azure account to the Console, you need to provide the application (client) ID and the directory (tenant) ID for the application. The Console uses the IDs to programmatically sign in.

Create a client secret

1. Open the **Microsoft Entra ID** service.
2. Select **App registrations** and select your application.
3. Select **Certificates & secrets > New client secret**.
4. Provide a description of the secret and a duration.
5. Select **Add**.
6. Copy the value of the client secret.



Client secrets

A secret string that the application uses to prove its identity when requesting a token. Also can be referred to as application password.

DESCRIPTION	EXPIRES	VALUE
test secret	8/16/2020	*sZ1jSe2By:D*-ZRoV4NLfdAcY7:+0vA

Result

Your service principal is now setup and you should have copied the application (client) ID, the directory (tenant) ID, and the value of the client secret. You need to enter this information in the Console when you add an Azure account.

Step 5: Install the Console agent

After the pre-requisites are complete, you can manually install the software on your own Linux host.

Before you begin

You should have the following:

- Root privileges to install the Console agent.
- Details about a proxy server, if a proxy is required for internet access from the Console agent.

  You have the option to configure a proxy server after installation but doing so requires restarting the Console agent.
- A CA-signed certificate, if the proxy server uses HTTPS or if the proxy is an intercepting proxy.

ⓘ You cannot set a certificate for a transparent proxy server when manually installing the Console agent. If you need to set a certificate for a transparent proxy server, you must use the Maintenance Console after installation. Learn more about the Agent Maintenance Console.

- A managed identity enabled on the VM in Azure so that you can provide the required Azure permissions through a custom role.

  Microsoft Azure documentation: Configure managed identities for Azure resources on a VM using the Azure portal

About this task

After installation, the Console agent automatically updates itself if a new version is available.

Steps

1. If the *http_proxy* or *https_proxy* system variables are set on the host, remove them:

   ```
   unset http_proxy
   unset https_proxy
   ```

   If you don't remove these system variables, the installation fails.

2. Download the Console agent software and then copy it to the Linux host. You can download it either from the NetApp Console or the NetApp Support site.
   - NetApp Console: Go to **Agents > Management> Deploy agent > On-prem > Manual install**.

     Choose download the agent installer files or a URL to the files.

   - NetApp Support Site (needed if you don't already have access to the Console) NetApp Support Site,
3. Assign permissions to run the script.

   ```
   chmod +x NetApp_Console_Agent_Cloud_<version>
   ```

   Where <version> is the version of the Console agent that you downloaded.

4. If installing in a Government Cloud environment, disable the configuration checks. Learn how to disable configuration checks for manual installations.
5. Run the installation script.

   ```
   ./NetApp_Console_Agent_Cloud_<version> --proxy <HTTP or HTTPS proxy
   server> --cacert <path and file name of a CA-signed certificate>
   ```

   You'll need to add proxy information if your network requires a proxy for internet access. You can add an explicit proxy during installation. The `--proxy` and `--cacert` parameters are optional and you won't be prompted to add them. If you have an explicit proxy server, you will need to enter the parameters as shown.

> ⓘ If you want to configure a transparent proxy, you can do so after you've installed. Learn about the agent maintenance console

+

Here is an example configuring an explicit proxy server with a CA-signed certificate:

+

```
./NetApp_Console_Agent_Cloud_v4.0.0--proxy
https://user:password@10.0.0.30:8080/ --cacert /tmp/cacert/certificate.cer
```

+
`--proxy` configures the Console agent to use an HTTP or HTTPS proxy server using one of the following formats:

+
* http://address:port
* http://user-name:password@address:port
* http://domain-name%92user-name:password@address:port
* https://address:port
* https://user-name:password@address:port

* https://domain-name%92user-name:password@address:port

+
Note the following:

+
The user can be a local user or domain user.
For a domain user, you must use the ASCII code for a \ as shown above.
The Console agent doesn’t support user names or passwords that include the @ character.
If the password includes any of the following special characters, you must escape that special character by prepending it with a backslash: & or !

+
For example:

+
http://bxpproxyuser:netapp1\!@address:3128

1. If you used Podman, you’ll need to adjust the aardvark-dns port.

    a. SSH to the Console agent virtual machine.

    b. Open podman */usr/share/containers/containers.conf* file and modify the chosen port for Aardvark DNS service. For example, change it to 54.

    ```
    vi /usr/share/containers/containers.conf
    ```

    For example:

    ```
    # Port to use for dns forwarding daemon with netavark in rootful
    bridge
    # mode and dns enabled.
    # Using an alternate port might be useful if other DNS services
    should
    # run on the machine.
    #
    dns_bind_port = 54
    ```

    c. Reboot the Console agent virtual machine.

2. Wait for the installation to complete.

    At the end of the installation, the Console agent service (occm) restarts twice if you specified a proxy server.

> If the installation fails, you can view the installation report and logs to help you fix the issues. Learn how to troubleshoot installation issues.

1. Open a web browser from a host that has a connection to the Console agent virtual machine and enter the following URL:

https://*ipaddress*

2. After you log in, set up the Console agent:
   a. Specify the organization to associate with the Console agent.
   b. Enter a name for the system.
   c. Under **Are you running in a secured environment?** keep restricted mode disabled.

      You should keep restricted mode disabled because these steps describe how to use the Console in standard mode. You should enable restricted mode only if you have a secure environment and want to disconnect this account from backend services. If that's the case, follow steps to get started with the NetApp Console in restricted mode.

   d. Select **Let's start**.

If you have Azure Blob storage in the same Azure subscription where you created the Console agent, you'll see an Azure Blob storage system appear on the **Systems** page automatically. Learn how to manage Azure Blob storage from NetApp Console

Step 6: Provide permissions to NetApp Console

Now that you've installed the Console agent, you need to provide the Console agent with the Azure permissions that you previously set up. Providing the permissions enables the Console to manage your data and storage infrastructure in Azure.

Custom role

Go to the Azure portal and assign the Azure custom role to the Console agent virtual machine for one or more subscriptions.

Steps

1. From the Azure Portal, open the **Subscriptions** service and select your subscription.

   It's important to assign the role from the **Subscriptions** service because this specifies the scope of the role assignment at the subscription level. The *scope* defines the set of resources that the access applies to. If you specify a scope at a different level (for example, at the virtual machine level), your ability to complete actions from within the NetApp Console will be affected.

   Microsoft Azure documentation: Understand scope for Azure RBAC

2. Select **Access control (IAM)** > **Add** > **Add role assignment**.
3. In the **Role** tab, select the **Console Operator** role and select **Next**.

   ⓘ Console Operator is the default name provided in the policy. If you chose a different name for the role, then select that name instead.

4. In the **Members** tab, complete the following steps:
   a. Assign access to a **Managed identity**.
   b. Select **Select members**, select the subscription in which the Console agent virtual machine was created, under **Managed identity**, choose **Virtual machine**, and then select the Console agent virtual machine.
   c. Select **Select**.
   d. Select **Next**.
   e. Select **Review + assign**.
   f. If you want to manage resources in additional Azure subscriptions, switch to that subscription and then repeat these steps.

What's next?

Go to the NetApp Console to start using the Console agent.

Service principal

Steps

1. Select **Administration > Credentials**.
2. Select **Add Credentials** and follow the steps in the wizard.
   a. **Credentials Location**: Select **Microsoft Azure > Agent**.
   b. **Define Credentials**: Enter information about the Microsoft Entra service principal that grants the required permissions:
      - Application (client) ID
      - Directory (tenant) ID
      - Client Secret
   c. **Marketplace Subscription**: Associate a Marketplace subscription with these credentials by subscribing now or by selecting an existing subscription.

d. **Review**: Confirm the details about the new credentials and select **Add**.

Result

The Console agent now has the permissions that it needs to perform actions in Azure on your behalf.

Google Cloud

Console agent installation options in Google Cloud

There are a few different ways to create a Console agent in Google Cloud. Directly from the NetApp Console is the most common way.

The following installation options are available:

- Create the Console agent directly from the Console (this is the standard option)

  This action launches a VM instance running Linux and the Console agent software in a VPC of your choice.

- Create the Console agent using Google Platform

  This action also launches a VM instance running Linux and the Console agent software, but the deployment is initiated directly from Google Cloud, rather than from the Console.

- Download and manually install the software on your own Linux host

The installation option that you choose impacts how you prepare for installation. This includes how you provide the Console with the required permissions that it needs to authenticate and manage resources in Google Cloud.

Create a Console agent in Google Cloud from NetApp Console

You can create a Console agent in Google Cloud from the Console. You need to set up your networking, prepare Google Cloud permissions, enable Google Cloud APIs, and then create the Console agent.

Before you begin

- You should have an understanding of Console agents.
- You should review Console agent limitations.

Step 1: Set up networking

Set up networking to ensure the Console agent can manage resources, with connections to target networks and outbound internet access.

VPC and subnet

When you create the Console agent, you need to specify the VPC and subnet where it should reside.

Connections to target networks

The Console agent requires a network connection to the location where you're planning to create and manage systems. For example, the network where you plan to create Cloud Volumes ONTAP systems or a storage system in your on-premises environment.

Outbound internet access

The network location where you deploy the Console agent must have an outbound internet connection to contact specific endpoints.

Endpoints contacted from the Console agent

The Console agent requires outbound internet access to contact the following endpoints to manage resources and processes within your public cloud environment for day-to-day operations.

The endpoints listed below are all CNAME entries.

Endpoints	Purpose
https://www.googleapis.com/compute/v1/ https://compute.googleapis.com/compute/v1 https://cloudresourcemanager.googleapis.com/v1/projects https://www.googleapis.com/compute/beta https://storage.googleapis.com/storage/v1 https://www.googleapis.com/storage/v1 https://iam.googleapis.com/v1 https://cloudkms.googleapis.com/v1 https://config.googleapis.com/v1/projects	To manage resources in Google Cloud.
https://mysupport.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support.
https://signin.b2c.netapp.com	To update NetApp Support Site (NSS) credentials or to add new NSS credentials to the NetApp Console.
https://support.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support as well as to receive software updates for Cloud Volumes ONTAP.
https://api.bluexp.netapp.com https://netapp-cloud-account.auth0.com https://netapp-cloud-account.us.auth0.com https://console.netapp.com https://components.console.bluexp.netapp.com https://cdn.auth0.com	To provide features and services within the NetApp Console.

Endpoints	Purpose
https://bluexpinfraprod.eastus2.data.azurecr.io https://bluexpinfraprod.azurecr.io	To obtain images for Console agent upgrades. • When you deploy a new agent, the validation check tests connectivity to current endpoints. If you use previous endpoints, the validation check fails. To avoid this failure, skip the validation check. Although the previous endpoints are still supported, NetApp recommends updating your firewall rules to the current endpoints as soon as possible. Learn how to update your endpoint list. • When you update to the current endpoints in your firewall, your existing agents will continue to work.

Endpoints contacted from the NetApp console

As you use the web-based NetApp Console that's provided through the SaaS layer, it contacts several endpoints to complete data management tasks. This includes endpoints that are contacted to deploy the Console agent from the the Console.

View the list of endpoints contacted from the NetApp console.

Proxy server

NetApp supports both explicit and transparent proxy configurations. If you are using a transparent proxy, you only need to provide the certificate for the proxy server. If you are using an explicit proxy, you'll also need the IP address and credentials.

- IP address
- Credentials
- HTTPS certificate

Ports

There's no incoming traffic to the Console agent, unless you initiate it or if it is used as a proxy to send AutoSupport messages from Cloud Volumes ONTAP to NetApp Support.

- HTTP (80) and HTTPS (443) provide access to the local UI, which you'll use in rare circumstances.
- SSH (22) is only needed if you need to connect to the host for troubleshooting.
- Inbound connections over port 3128 are required if you deploy Cloud Volumes ONTAP systems in a subnet where an outbound internet connection isn't available.

  If Cloud Volumes ONTAP systems don't have an outbound internet connection to send AutoSupport messages, the Console automatically configures those systems to use a proxy server that's included with the Console agent. The only requirement is to ensure that the Console agent's security group allows inbound connections over port 3128. You'll need to open this port after you deploy the Console agent.

Enable NTP

If you’re planning to use NetApp Data Classification to scan your corporate data sources, you should enable a Network Time Protocol (NTP) service on both the Console agent and the NetApp Data Classification system so that the time is synchronized between the systems. Learn more about NetApp Data classification

Implement this networking requirement after creating the Console agent.

Step 2: Set up permissions to create the Console agent

Before you can deploy a Console agent from the Console, you need to set up permissions for the Google Platform user who deploys the Console agent VM.

Steps

1. Create a custom role in Google Platform:
   a. Create a YAML file that includes the following permissions:

```
title: Console agent deployment policy
description: Permissions for the user who deploys the Console agent
stage: GA
includedPermissions:

- cloudbuild.builds.get
- compute.disks.create
- compute.disks.get
- compute.disks.list
- compute.disks.setLabels
- compute.disks.use
- compute.firewalls.create
- compute.firewalls.delete
- compute.firewalls.get
- compute.firewalls.list
- compute.globalOperations.get
- compute.images.get
- compute.images.getFromFamily
- compute.images.list
- compute.images.useReadOnly
- compute.instances.attachDisk
- compute.instances.create
- compute.instances.get
- compute.instances.list
- compute.instances.setDeletionProtection
- compute.instances.setLabels
- compute.instances.setMachineType
- compute.instances.setMetadata
- compute.instances.setTags
- compute.instances.start
- compute.instances.updateDisplayDevice
- compute.machineTypes.get
- compute.networks.get
- compute.networks.list
- compute.networks.updatePolicy
- compute.projects.get
- compute.regions.get
- compute.regions.list
- compute.subnetworks.get
- compute.subnetworks.list
- compute.zoneOperations.get
- compute.zones.get
- compute.zones.list
- config.deployments.create
- config.operations.get
- config.deployments.delete
- config.deployments.deleteState
- config.deployments.get
- config.deployments.getState
- config.deployments.list
- config.deployments.update
- config.deployments.updateState
- config.previews.get
- config.previews.list
- config.revisions.get
- config.resources.list
- deploymentmanager.compositeTypes.get
- deploymentmanager.compositeTypes.list
- deploymentmanager.deployments.create
- deploymentmanager.deployments.delete
- deploymentmanager.deployments.get
- deploymentmanager.deployments.list
- deploymentmanager.manifests.get
- deploymentmanager.manifests.list
- deploymentmanager.operations.get
- deploymentmanager.operations.list
- deploymentmanager.resources.get
- deploymentmanager.resources.list
- deploymentmanager.typeProviders.get
- deploymentmanager.typeProviders.list
- deploymentmanager.types.get
- deploymentmanager.types.list
- resourcemanager.projects.get
- compute.instances.setServiceAccount
- iam.serviceAccounts.actAs
- iam.serviceAccounts.create
- iam.serviceAccounts.list
- iam.serviceAccountKeys.create
- storage.buckets.create
- storage.buckets.get
- storage.objects.create
- storage.folders.create
- storage.objects.list
```

   b. From Google Cloud, activate cloud shell.
   c. Upload the YAML file that includes the required permissions.
   d. Create a custom role by using the `gcloud iam roles create` command.

      The following example creates a role named "agentDeployment" at the project level:

      gcloud iam roles create connectorDeployment --project=myproject --file=agent-deployment.yaml

      Google Cloud docs: Creating and managing custom roles

2. Assign this custom role to the user who will deploy the Console agent from the Console or by using gcloud.

   Google Cloud docs: Grant a single role

Step 3: Create a Google Cloud service account to use with the agent

A Google Cloud service account is required to provide the Console agent with the permissions that the Console needs to manage resources in Google Cloud. When you create the Console agent, you'll need to associate this service account with the Console agent VM.

It's your responsibility to update the custom role as new permissions are added in subsequent releases. If new permissions are required, they will be listed in the release notes.

Steps

1. Create a custom role in Google Cloud:
   a. Create a YAML file that includes the contents of the service account permissions for the Console agent.
   b. From Google Cloud, activate cloud shell.
   c. Upload the YAML file that includes the required permissions.
   d. Create a custom role by using the `gcloud iam roles create` command.

      The following example creates a role named "agent" at the project level:

      ```
      gcloud iam roles create connector --project=myproject --file=agent.yaml
      ```

      Google Cloud docs: Creating and managing custom roles

2. Create a service account in Google Cloud and assign the role to the service account:
   a. From the IAM & Admin service, select **Service Accounts > Create Service Account**.
   b. Enter service account details and select **Create and Continue**.
   c. Select the role that you just created.

d. Finish the remaining steps to create the role.

Google Cloud docs: Creating a service account

3. If you plan to deploy Cloud Volumes ONTAP systems in different projects than the project where the Console agent resides, then you'll need to provide the Console agent's service account with access to those projects.

   For example, let's say the Console agent is in project 1 and you want to create Cloud Volumes ONTAP systems in project 2. You'll need to grant access to the service account in project 2.

   a. From the IAM & Admin service, select the Google Cloud project where you want to create Cloud Volumes ONTAP systems.

   b. On the **IAM** page, select **Grant Access** and provide the required details.

      - Enter the email of the Console agent's service account.
      - Select the Console agent's custom role.
      - Select **Save**.

   For more details, refer to Google Cloud documentation

Step 4: Set up shared VPC permissions

If you are using a shared VPC to deploy resources into a service project, then you'll need to prepare your permissions.

This table is for reference and your environment should reflect the permissions table when IAM configuration is complete.

View shared VPC permissions

Identity	Creator	Hosted in	Service project permissions	Host project permissions	Purpose
Google account to deploy the agent	Custom	Service Project	Agent deployment policy	compute.network User	Deploying the agent in the service project
agent service account	Custom	Service project	Agent service account policy	compute.network User deploymentmanager.editor	Deploying and maintaining Cloud Volumes ONTAP and services in the service project
Cloud Volumes ONTAP service account	Custom	Service project	storage.admin member: NetApp Console service account as serviceAccount.user	N/A	(Optional) For NetApp Cloud Tiering and NetApp Backup and Recovery
Google APIs service agent	Google Cloud	Service project	(Default) Editor	compute.network User	Interacts with Google Cloud APIs on behalf of deployment. Allows the Console to use the shared network.
Google Compute Engine default service account	Google Cloud	Service project	(Default) Editor	compute.network User	Deploys Google Cloud instances and compute infrastructure on behalf of deployment. Allows the Console to use the shared network.

Notes:

1. deploymentmanager.editor is only required at the host project if you are not passing firewall rules to the deployment and are choosing to let the Console create them for you. The NetApp Console creates a deployment in the host project which contains the VPC0 firewall rule if no rule is specified.
2. firewall.create and firewall.delete are only required if you are not passing firewall rules to the deployment and are choosing to let the Console create them for you. These permissions reside in the Console account .yaml file. If you are deploying an HA pair using a shared VPC, these permissions will be used to create the firewall rules for VPC1, 2 and 3. For all other deployments, these permissions will also be used to create rules for VPC0.
3. For Cloud Tiering, the tiering service account must have the serviceAccount.user role on the service account, not just at the project level. Currently if you assign serviceAccount.user at the project level, the permissions don’t show when you query the service account with getIAMPolicy.

Step 5: Enable Google Cloud APIs

You must enable several Google Cloud APIs before deploying the Console agent and Cloud Volumes ONTAP.

Step

1. Enable the following Google Cloud APIs in your project:
   - Cloud Infrastructure Manager API
   - Cloud Deployment Manager V2 API
   - Cloud Logging API
   - Cloud Resource Manager API
   - Compute Engine API
   - Identity and Access Management (IAM) API
   - Cloud Key Management Service (KMS) API

     (Required only if you are planning to use NetApp Backup and Recovery with customer-managed encryption keys (CMEK))

Google Cloud documentation: Enabling APIs

Step 6: Create the Console agent

Create a Console agent directly from the Console.

Creating the Console agent deploys a virtual machine instance in Google Cloud using a default configuration. Do not switch to a smaller VM instance with fewer CPUs or less RAM after creating the Console agent. Learn about the default configuration for the Console agent.

> ⓘ When you deploy an agent in Google Cloud, the agent creates a bucket to store deployment files.

Before you begin

You should have the following:

- The required Google Cloud permissions to create the Console agent and a service account for the Console agent VM.
- A VPC and subnet that meets networking requirements.
- Details about a proxy server, if a proxy is required for internet access from the Console agent.

Steps

1. Select **Administration > Agents**.
2. On the **Overview** page, select **Deploy agent > Google Cloud**
3. On the **Deploying an agent** page, review the details about what you'll need. You have two options:
   a. Select **Continue** to prepare for deployment by using the in-product guide. Each step in the in-product guide includes the information that's contained on this page of the documentation.
   b. Select **Skip to Deployment** if you already prepared by following the steps on this page.
4. Follow the steps in the wizard to create the Console agent:
   - If you're prompted, log in to your Google account, which should have the required permissions to create the virtual machine instance.

     The form is owned and hosted by Google. Your credentials are not provided to NetApp.

- **Details**: Enter a name for the virtual machine instance, specify tags, select a project, and then select the service account that has the required permissions (refer to the section above for details).
- **Location**: Specify a region, zone, VPC, and subnet for the instance.
- **Network**: Choose whether to enable a public IP address and optionally specify a proxy configuration.
- **Network tags**: Add a network tag to the Console agent instance if using a transparent proxy. Network tags must start with a lowercase letter and can contain lowercase letters, numbers, and hyphens. Tags must end with a lowercase letter or number. For example, you might use the tag "console-agent-proxy".
- **Firewall Policy**: Choose whether to create a new firewall policy or whether to select an existing firewall policy that allows the required inbound and outbound rules.

  Firewall rules in Google Cloud

5. Review your selections to verify that your set up is correct.

   a. The **Validate agent configuration** check box is marked by default to have the Console validate the network connectivity requirements when you deploy. If the Console fails to deploy the agent, it provides a report to help you troubleshoot. If the deployment succeeds, no report is provided.

   > If you are still using the previous endpoints used for agent upgrades, the validation fails with an error. To avoid this, unmark the check box to skip the validation check.

6. Select **Add**.

   The agent is ready in approximately 10 minutes; stay on the page until the process completes.

Result

After the process completes, the Console agent is available for use.

> ⓘ If the deployment fails, you can download a report and logs from the Console to help you fix the issues. Learn how to troubleshoot installation issues.

If you have Google Cloud Storage buckets in the same Google Cloud account where you created the Console agent, you'll see a Google Cloud Storage system appear on the **Systems** page automatically. Learn how to manage Google Cloud Storage from the Console

Create a Console agent from Google Cloud

To create a Console agent in Google Cloud by using Google Cloud, you need to set up your networking, prepare Google Cloud permissions, enable Google Cloud APIs, and then create the Console agent.

Before you begin

- You should have a understanding of Console agents.
- You should review Console agent limitations.

Step 1: Set up networking

Set up networking to enable the Console agent to manage resources and connect to target networks and the internet.

VPC and subnet

When you create the Console agent, you need to specify the VPC and subnet where it should reside.

Connections to target networks

The Console agent requires a network connection to the location where you're planning to create and manage systems. For example, the network where you plan to create Cloud Volumes ONTAP systems or a storage system in your on-premises environment.

Outbound internet access

The network location where you deploy the Console agent must have an outbound internet connection to contact specific endpoints.

Endpoints contacted from the Console agent

The Console agent requires outbound internet access to contact the following endpoints to manage resources and processes within your public cloud environment for day-to-day operations.

The endpoints listed below are all CNAME entries.

Endpoints	Purpose
https://www.googleapis.com/compute/v1/ https://compute.googleapis.com/compute/v1 https://cloudresourcemanager.googleapis.com/v1/projects https://www.googleapis.com/compute/beta https://storage.googleapis.com/storage/v1 https://www.googleapis.com/storage/v1 https://iam.googleapis.com/v1 https://cloudkms.googleapis.com/v1 https://config.googleapis.com/v1/projects	To manage resources in Google Cloud.
https://mysupport.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support.
https://signin.b2c.netapp.com	To update NetApp Support Site (NSS) credentials or to add new NSS credentials to the NetApp Console.
https://support.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support as well as to receive software updates for Cloud Volumes ONTAP.
https://api.bluexp.netapp.com https://netapp-cloud-account.auth0.com https://netapp-cloud-account.us.auth0.com https://console.netapp.com https://components.console.bluexp.netapp.com https://cdn.auth0.com	To provide features and services within the NetApp Console.

Endpoints	Purpose
https://bluexpinfraprod.eastus2.data.azurecr.io https://bluexpinfraprod.azurecr.io	To obtain images for Console agent upgrades. • When you deploy a new agent, the validation check tests connectivity to current endpoints. If you use previous endpoints, the validation check fails. To avoid this failure, skip the validation check. Although the previous endpoints are still supported, NetApp recommends updating your firewall rules to the current endpoints as soon as possible. Learn how to update your endpoint list. • When you update to the current endpoints in your firewall, your existing agents will continue to work.

Endpoints contacted from the NetApp console

As you use the web-based NetApp Console that's provided through the SaaS layer, it contacts several endpoints to complete data management tasks. This includes endpoints that are contacted to deploy the Console agent from the the Console.

View the list of endpoints contacted from the NetApp console.

Proxy server

NetApp supports both explicit and transparent proxy configurations. If you are using a transparent proxy, you only need to provide the certificate for the proxy server. If you are using an explicit proxy, you'll also need the IP address and credentials.

- IP address
- Credentials
- HTTPS certificate

Ports

There's no incoming traffic to the Console agent, unless you initiate it or if it is used as a proxy to send AutoSupport messages from Cloud Volumes ONTAP to NetApp Support.

- HTTP (80) and HTTPS (443) provide access to the local UI, which you'll use in rare circumstances.
- SSH (22) is only needed if you need to connect to the host for troubleshooting.
- Inbound connections over port 3128 are required if you deploy Cloud Volumes ONTAP systems in a subnet where an outbound internet connection isn't available.

  If Cloud Volumes ONTAP systems don't have an outbound internet connection to send AutoSupport messages, the Console automatically configures those systems to use a proxy server that's included with the Console agent. The only requirement is to ensure that the Console agent's security group allows inbound connections over port 3128. You'll need to open this port after you deploy the Console agent.

Enable NTP

If you’re planning to use NetApp Data Classification to scan your corporate data sources, you should enable a Network Time Protocol (NTP) service on both the Console agent and the NetApp Data Classification system so that the time is synchronized between the systems. Learn more about NetApp Data classification

Implement this networking requirement after creating the Console agent.

Step 2: Set up permissions to create the Console agent

Set up permissions for the Google Cloud user to deploy the Console agent VM from Google Cloud.

Steps

1. Create a custom role in Google Platform:
    a. Create a YAML file that includes the following permissions:

```
title: Console agent deployment policy
description: Permissions for the user who deploys the Console
agent
stage: GA
includedPermissions:

- cloudbuild.builds.get
- compute.disks.create
- compute.disks.get
- compute.disks.list
- compute.disks.setLabels
- compute.disks.use
- compute.firewalls.create
- compute.firewalls.delete
- compute.firewalls.get
- compute.firewalls.list
- compute.globalOperations.get
- compute.images.get
- compute.images.getFromFamily
- compute.images.list
- compute.images.useReadOnly
- compute.instances.attachDisk
- compute.instances.create
- compute.instances.get
- compute.instances.list
- compute.instances.setDeletionProtection
- compute.instances.setLabels
- compute.instances.setMachineType
- compute.instances.setMetadata
- compute.instances.setTags
- compute.instances.start
- compute.instances.updateDisplayDevice
- compute.machineTypes.get
- compute.networks.get
- compute.networks.list
- compute.networks.updatePolicy
- compute.projects.get
- compute.regions.get
- compute.regions.list
- compute.subnetworks.get
- compute.subnetworks.list
- compute.zoneOperations.get
- compute.zones.get
- compute.zones.list
- config.deployments.create
- config.operations.get
- config.deployments.delete
- config.deployments.deleteState
- config.deployments.get
- config.deployments.getState
- config.deployments.list
- config.deployments.update
- config.deployments.updateState
- config.previews.get
- config.previews.list
- config.revisions.get
- config.resources.list
- deploymentmanager.compositeTypes.get
- deploymentmanager.compositeTypes.list
- deploymentmanager.deployments.create
- deploymentmanager.deployments.delete
- deploymentmanager.deployments.get
- deploymentmanager.deployments.list
- deploymentmanager.manifests.get
- deploymentmanager.manifests.list
- deploymentmanager.operations.get
- deploymentmanager.operations.list
- deploymentmanager.resources.get
- deploymentmanager.resources.list
- deploymentmanager.typeProviders.get
- deploymentmanager.typeProviders.list
- deploymentmanager.types.get
- deploymentmanager.types.list
- resourcemanager.projects.get
- compute.instances.setServiceAccount
- iam.serviceAccounts.actAs
- iam.serviceAccounts.create
- iam.serviceAccounts.list
- iam.serviceAccountKeys.create
- storage.buckets.create
- storage.buckets.get
- storage.objects.create
- storage.folders.create
- storage.objects.list
```

b. From Google Cloud, activate cloud shell.

c. Upload the YAML file that includes the required permissions.

d. Create a custom role by using the `gcloud iam roles create` command.

The following example creates a role named "connectorDeployment" at the project level:

```
gcloud iam roles create connectorDeployment --project=myproject --file=connector-deployment.yaml
```

Google Cloud docs: Creating and managing custom roles

2. Assign this custom role to the user who deploys the Console agent from Google Cloud.

   Google Cloud docs: Grant a single role

Step 3: Set up permissions for the Console agent operations

A Google Cloud service account is required to provide the Console agent with the permissions that the Console needs to manage resources in Google Cloud. When you create the Console agent, you'll need to associate this service account with the Console agent VM.

It's your responsibility to update the custom role as new permissions are added in subsequent releases. If new permissions are required, they will be listed in the release notes.

Steps

1. Create a custom role in Google Cloud:
   a. Create a YAML file that includes the contents of the service account permissions for the Console agent.
   b. From Google Cloud, activate cloud shell.
   c. Upload the YAML file that includes the required permissions.
   d. Create a custom role by using the `gcloud iam roles create` command.

      The following example creates a role named "agent" at the project level:

      ```
      gcloud iam roles create connector --project=myproject --file=agent.yaml
      ```

      Google Cloud docs: Creating and managing custom roles

2. Create a service account in Google Cloud and assign the role to the service account:
   a. From the IAM & Admin service, select **Service Accounts > Create Service Account**.
   b. Enter service account details and select **Create and Continue**.
   c. Select the role that you just created.
   d. Finish the remaining steps to create the role.

      Google Cloud docs: Creating a service account

3. If you plan to deploy Cloud Volumes ONTAP systems in different projects than the project where the Console agent resides, then you'll need to provide the Console agent's service account with access to those projects.

   For example, let's say the Console agent is in project 1 and you want to create Cloud Volumes ONTAP systems in project 2. You'll need to grant access to the service account in project 2.

   a. From the IAM & Admin service, select the Google Cloud project where you want to create Cloud Volumes ONTAP systems.
   b. On the **IAM** page, select **Grant Access** and provide the required details.
      - Enter the email of the Console agent's service account.

- Select the Console agent’s custom role.
- Select **Save**.

For more details, refer to Google Cloud documentation

Step 4: Set up shared VPC permissions

If you are using a shared VPC to deploy resources into a service project, then you’ll need to prepare your permissions.

This table is for reference and your environment should reflect the permissions table when IAM configuration is complete.

View shared VPC permissions

Identity	Creator	Hosted in	Service project permissions	Host project permissions	Purpose
Google account to deploy the agent	Custom	Service Project	Agent deployment policy	compute.network User	Deploying the agent in the service project
agent service account	Custom	Service project	Agent service account policy	compute.network User deploymentmanager.editor	Deploying and maintaining Cloud Volumes ONTAP and services in the service project
Cloud Volumes ONTAP service account	Custom	Service project	storage.admin member: NetApp Console service account as serviceAccount.user	N/A	(Optional) For NetApp Cloud Tiering and NetApp Backup and Recovery
Google APIs service agent	Google Cloud	Service project	(Default) Editor	compute.network User	Interacts with Google Cloud APIs on behalf of deployment. Allows the Console to use the shared network.
Google Compute Engine default service account	Google Cloud	Service project	(Default) Editor	compute.network User	Deploys Google Cloud instances and compute infrastructure on behalf of deployment. Allows the Console to use the shared network.

Notes:

1. deploymentmanager.editor is only required at the host project if you are not passing firewall rules to the deployment and are choosing to let the Console create them for you. The NetApp Console creates a deployment in the host project which contains the VPC0 firewall rule if no rule is specified.
2. firewall.create and firewall.delete are only required if you are not passing firewall rules to the deployment and are choosing to let the Console create them for you. These permissions reside in the Console account .yaml file. If you are deploying an HA pair using a shared VPC, these permissions will be used to create the firewall rules for VPC1, 2 and 3. For all other deployments, these permissions will also be used to create rules for VPC0.
3. For Cloud Tiering, the tiering service account must have the serviceAccount.user role on the service account, not just at the project level. Currently if you assign serviceAccount.user at the project level, the permissions don't show when you query the service account with getIAMPolicy.

Step 5: Enable Google Cloud APIs

Enable several Google Cloud APIs before deploying the Console agent and Cloud Volumes ONTAP.

Step

1. Enable the following Google Cloud APIs in your project:
   - Cloud Infrastructure Manager API
   - Cloud Deployment Manager V2 API
   - Cloud Logging API
   - Cloud Resource Manager API
   - Compute Engine API
   - Identity and Access Management (IAM) API
   - Cloud Key Management Service (KMS) API

     (Required only if you are planning to use NetApp Backup and Recovery with customer-managed encryption keys (CMEK))

Google Cloud documentation: Enabling APIs

Step 6: Create the Console agent

Create a Console agent by using Google Cloud.

Creating the Console agent deploys a VM instance in Google Cloud with the default configuration. Do not switch to a smaller VM instance with fewer CPUs or less RAM after you create the Console agent. Learn about the default configuration for the Console agent.

Before you begin

You should have the following:

- The required Google Cloud permissions to create the Console agent and a service account for the Console agent VM.
- A VPC and subnet that meets networking requirements.
- An understanding of VM instance requirements.
  - **CPU**: 8 cores or 8 vCPUs
  - **RAM**: 32 GB
  - **Machine type**: We recommend n2-standard-8.

    The Console agent is supported in Google Cloud on a VM instance with an OS that supports Shielded VM features.

Steps

1. Log in to the Google Cloud SDK using your preferred method.

   This example uses a local shell with the gcloud SDK installed, but you can also use the Google Cloud Shell.

   For more information about the Google Cloud SDK, visit the Google Cloud SDK documentation page.

2. Verify that you are logged in as a user who has the required permissions that are defined in the section above:

```
gcloud auth list
```

The output should show the following where the * user account is the desired user account to be logged in as:

```
Credentialed Accounts
ACTIVE  ACCOUNT
     some_user_account@domain.com
*    desired_user_account@domain.com
To set the active account, run:
 $ gcloud config set account `ACCOUNT`
Updates are available for some Cloud SDK components. To install them,
please run:
$ gcloud components update
```

3. Run the `gcloud compute instances create` command:

```
gcloud compute instances create <instance-name>
  --machine-type=n2-standard-8
  --image-project=netapp-cloudmanager
  --image-family=cloudmanager
  --scopes=cloud-platform
  --project=<project>
  --service-account=<service-account>
  --zone=<zone>
  --no-address
  --tags <network-tag>
  --network <network-path>
  --subnet <subnet-path>
  --boot-disk-kms-key <kms-key-path>
```

instance-name
The desired instance name for the VM instance.

project
(Optional) The project where you want to deploy the VM.

service-account
The service account specified in the output from step 2.

zone
The zone where you want to deploy the VM

no-address

(Optional) No external IP address is used (you need a cloud NAT or proxy to route traffic to the public internet)

network-tag

(Optional) Add network tagging to link a firewall rule using tags to the Console agent instance

network-path

(Optional) Add the name of the network to deploy the Console agent into (for a Shared VPC, you need the full path)

subnet-path

(Optional) Add the name of the subnet to deploy the Console agent into (for a Shared VPC, you need the full path)

kms-key-path

(Optional) Add a KMS key to encrypt the Console agent's disks (IAM permissions also need to be applied)

For more information about these flags, visit the Google Cloud compute SDK documentation.

Running the command deploys the Console agent. The Console agent instance and software should be running in approximately five minutes.

4. Open a web browser and enter the Console agent host URL:

   The Console host URL can be a localhost, a private IP address, or a public IP address, depending on the configuration of the host. For example, if the Console agent is in the public cloud without a public IP address, you must enter a private IP address from a host that has a connection to the Console agent host.

5. After you log in, set up the Console agent:
   a. Specify the Console organization to associate with the Console agent.

      Learn about identity and access management.

   b. Enter a name for the system.

Result

The Console agent is now installed and set up with your Console organization.

Open a web browser and go to the NetApp Console to start using the Console agent.

Manually install the Console agent in Google Cloud

To manually install the Console agent on your own Linux host, you need to review host requirements, set up your networking, prepare Google Cloud permissions, enable Google Cloud APIs, install the Console, and then provide the permissions that you prepared.

Before you begin

- You should have an understanding of Console agents.
- You should review Console agent limitations.

Step 1: Review host requirements

The Console agent software must run on a host that meets specific operating system requirements, RAM requirements, port requirements, and so on.

> ⓘ The Console agent reserves the UID and GID range of 19000 to 19200. This range is fixed and cannot be modified. If any third-party software on your host is using UIDs or GIDs within this range, the agent installation will fail. NetApp recommends using a host that is free of third-party software to avoid conflicts.

Dedicated host

The Console agent requires a dedicated host. Any architecture is supported if it meets these size requirements:

- CPU: 8 cores or 8 vCPUs
- RAM: 32 GB
- Disk space: 165 GB is recommended for the host, with the following partition requirements:
  - `/opt`: 120 GiB of space must be available

    The agent uses `/opt` to install the `/opt/application/netapp` directory and its contents.
  - `/var`: 40 GiB of space must be available

    The Console agent requires this space in `/var` because Podman or Docker are architected to create the containers within this directory. Specifically, they will create containers in the `/var/lib/containers/storage` directory and `/var/lib/docker` for Docker. External mounts or symlinks do not work for this space.

Google Cloud machine type

An instance type that meets CPU and RAM requirements. NetApp recommends n2-standard-8.

The Console agent is supported in Google Cloud on a VM instance with an OS that supports Shielded VM features

Hypervisor

A bare metal or hosted hypervisor that is certified to run a supported operating system is required.

Operating system and container requirements

The Console agent is supported with the following operating systems when using the Console in standard mode or restricted mode. A container orchestration tool is required before you install the agent.

Operating system	Supported OS versions	Supported agent versions	Required container tool	SELinux
Red Hat Enterprise Linux				

Operating system	Supported OS versions	Supported agent versions	Required container tool	SELinux
	9.6 • English language versions only. • The host must be registered with Red Hat Subscription Management. If it's not registered, the host can't access repositories to update required 3rd-party software during agent installation.	4.0.0 or later with the Console in standard mode or restricted mode	Podman version 5.4.0 with podman-compose 1.5.0. View Podman configuration requirements.	Supported in enforcing mode or permissive mode
	9.1 to 9.4 • English language versions only. • The host must be registered with Red Hat Subscription Management. If it's not registered, the host can't access repositories to update required 3rd-party software during agent installation.	3.9.50 or later with the Console in standard mode or restricted mode	Podman version 4.9.4 with podman-compose 1.5.0. View Podman configuration requirements.	Supported in enforcing mode or permissive mode

Operating system	Supported OS versions	Supported agent versions	Required container tool	SELinux
	8.6 to 8.10 • English language versions only. • The host must be registered with Red Hat Subscription Management. If it's not registered, the host can't access repositories to update required 3rd-party software during agent installation.	3.9.50 or later with the Console in standard mode or restricted mode	Podman version 4.6.1 or 4.9.4 with podman-compose 1.0.6. View Podman configuration requirements.	Supported in enforcing mode or permissive mode
Ubuntu				
	24.04 LTS	3.9.45 or later with the NetApp Console in standard mode or restricted mode	Docker Engine 23.06 to 28.0.0.	Not supported
	22.04 LTS	3.9.50 or later	Docker Engine 23.0.6 to 28.0.0.	Not supported

Google Cloud machine type

An instance type that meets CPU and RAM requirements. NetApp recommends n2-standard-8.

The Console agent is supported in Google Cloud on a VM instance with an OS that supports Shielded VM features

Step 2: Install Podman or Docker Engine

Depending on your operating system, either Podman or Docker Engine is required before installing the agent.

- Podman is required for Red Hat Enterprise Linux 8 and 9.

  View the supported Podman versions.

- Docker Engine is required for Ubuntu.

  View the supported Docker Engine versions.

Example 4. Steps

Podman

Follow these steps to install and configure Podman:

- Enable and start the podman.socket service
- Install python3
- Install the podman-compose package version 1.0.6
- Add podman-compose to the PATH environment variable
- If using Red Hat Enterprise Linux, verify that your Podman version is using Netavark Aardvark DNS instead of CNI

> Adjust the aardvark-dns port (default: 53) after installing the agent to avoid DNS port conflicts. Follow the instructions to configure the port.

Steps

1. Remove the podman-docker package if it’s installed on the host.

   ```
   dnf remove podman-docker
   rm /var/run/docker.sock
   ```

2. Install Podman.

   You can obtain Podman from official Red Hat Enterprise Linux repositories.

   a. For Red Hat Enterprise Linux 9.6:

      ```
      sudo dnf install podman-5:<version>
      ```

      Where <version> is the supported version of Podman that you’re installing. View the supported Podman versions.

   b. For Red Hat Enterprise Linux 9.1 to 9.4:

      ```
      sudo dnf install podman-4:<version>
      ```

      Where <version> is the supported version of Podman that you’re installing. View the supported Podman versions.

   c. For Red Hat Enterprise Linux 8:

      ```
      sudo dnf install podman-4:<version>
      ```

      Where <version> is the supported version of Podman that you’re installing. View the supported Podman versions.

3. Enable and start the podman.socket service.

   ```
   sudo systemctl enable --now podman.socket
   ```

4. Install python3.

   ```
   sudo dnf install python3
   ```

5. Install the EPEL repository package if it’s not already available on your system.

   This step is required because podman-compose is available from the Extra Packages for Enterprise Linux (EPEL) repository.

6. If using Red Hat Enterprise 9:

   a. Install the EPEL repository package.

   ```
   sudo dnf install https://dl.fedoraproject.org/pub/epel/epel-release-
   latest-9.noarch.rpm
   ```

   a. Install podman-compose package 1.5.0.

      ```
      sudo dnf install podman-compose-1.5.0
      ```

7. If using Red Hat Enterprise Linux 8:

   a. Install the EPEL repository package.

      ```
      sudo dnf install https://dl.fedoraproject.org/pub/epel/epel-
      release-latest-8.noarch.rpm
      ```

   b. Install podman-compose package 1.0.6.

      ```
      sudo dnf install podman-compose-1.0.6
      ```

      > Using the `dnf install` command meets the requirement for adding podman-compose to the PATH environment variable. The installation command adds podman-compose to /usr/bin, which is already included in the `secure_path` option on the host.

   c. If using Red Hat Enterprise Linux 8, verify that your Podman version is using NetAvark with Aardvark DNS instead of CNI.

      i. Check to see if your networkBackend is set to CNI by running the following command:

```
podman info | grep networkBackend
```

ii. If the networkBackend is set to `CNI`, you’ll need to change it to `netavark`.

iii. Install `netavark` and `aardvark-dns` using the following command:

```
dnf install aardvark-dns netavark
```

iv. Open the `/etc/containers/containers.conf` file and modify the network_backend option to use "netavark" instead of "cni".

If `/etc/containers/containers.conf` doesn’t exist, make the configuration changes to `/usr/share/containers/containers.conf`.

v. Restart podman.

```
systemctl restart podman
```

vi. Confirm networkBackend is now changed to "netavark" using the following command:

```
podman info | grep networkBackend
```

Docker Engine

Follow the documentation from Docker to install Docker Engine.

Steps

1. View installation instructions from Docker

   Follow the steps to install a supported Docker Engine version. Do not install the latest version, as it is unsupported by the Console.

2. Verify that Docker is enabled and running.

```
sudo systemctl enable docker && sudo systemctl start docker
```

Step 3: Set up networking

Set up your networking so the Console agent can manage resources and processes within your hybrid cloud environment. For example, you need to ensure that connections are available to target networks and that outbound internet access is available.

Connections to target networks

The Console agent requires a network connection to the location where you’re planning to create and manage systems. For example, the network where you plan to create Cloud Volumes ONTAP systems or a storage system in your on-premises environment.

Outbound internet access

The network location where you deploy the Console agent must have an outbound internet connection to contact specific endpoints.

Endpoints contacted from computers when using the web-based NetApp Console

Computers that access the Console from a web browser must have the ability to contact several endpoints. You'll need to use the Console to set up the Console agent and for day-to-day use of the Console.

Prepare networking for the NetApp console.

Endpoints contacted from the Console agent

The Console agent requires outbound internet access to contact the following endpoints to manage resources and processes within your public cloud environment for day-to-day operations.

The endpoints listed below are all CNAME entries.

Endpoints	Purpose
https://www.googleapis.com/compute/v1/ https://compute.googleapis.com/compute/v1 https://cloudresourcemanager.googleapis.com/v1/projects https://www.googleapis.com/compute/beta https://storage.googleapis.com/storage/v1 https://www.googleapis.com/storage/v1 https://iam.googleapis.com/v1 https://cloudkms.googleapis.com/v1 https://config.googleapis.com/v1/projects	To manage resources in Google Cloud.
https://mysupport.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support.
https://signin.b2c.netapp.com	To update NetApp Support Site (NSS) credentials or to add new NSS credentials to the NetApp Console.
https://support.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support as well as to receive software updates for Cloud Volumes ONTAP.
https://api.bluexp.netapp.com https://netapp-cloud-account.auth0.com https://netapp-cloud-account.us.auth0.com https://console.netapp.com https://components.console.bluexp.netapp.com https://cdn.auth0.com	To provide features and services within the NetApp Console.

Endpoints	Purpose
https://bluexpinfraprod.eastus2.data.azurecr.io https://bluexpinfraprod.azurecr.io	To obtain images for Console agent upgrades. • When you deploy a new agent, the validation check tests connectivity to current endpoints. If you use previous endpoints, the validation check fails. To avoid this failure, skip the validation check. Although the previous endpoints are still supported, NetApp recommends updating your firewall rules to the current endpoints as soon as possible. Learn how to update your endpoint list. • When you update to the current endpoints in your firewall, your existing agents will continue to work.

Proxy server

NetApp supports both explicit and transparent proxy configurations. If you are using a transparent proxy, you only need to provide the certificate for the proxy server. If you are using an explicit proxy, you'll also need the IP address and credentials.

- IP address
- Credentials
- HTTPS certificate

Ports

There's no incoming traffic to the Console agent, unless you initiate it or if it is used as a proxy to send AutoSupport messages from Cloud Volumes ONTAP to NetApp Support.

- HTTP (80) and HTTPS (443) provide access to the local UI, which you'll use in rare circumstances.
- SSH (22) is only needed if you need to connect to the host for troubleshooting.
- Inbound connections over port 3128 are required if you deploy Cloud Volumes ONTAP systems in a subnet where an outbound internet connection isn't available.

  If Cloud Volumes ONTAP systems don't have an outbound internet connection to send AutoSupport messages, the Console automatically configures those systems to use a proxy server that's included with the Console agent. The only requirement is to ensure that the Console agent's security group allows inbound connections over port 3128. You'll need to open this port after you deploy the Console agent.

Enable NTP

If you're planning to use NetApp Data Classification to scan your corporate data sources, you should enable a Network Time Protocol (NTP) service on both the Console agent and the NetApp Data Classification system so that the time is synchronized between the systems. Learn more about NetApp Data classification

Step 4: Set up permissions for the Console agent

A Google Cloud service account is required to provide the Console agent with the permissions that the

Console needs to manage resources in Google Cloud. When you create the Console agent, you'll need to associate this service account with the Console agent VM.

It's your responsibility to update the custom role as new permissions are added in subsequent releases. If new permissions are required, they will be listed in the release notes.

Steps

1. Create a custom role in Google Cloud:
   a. Create a YAML file that includes the contents of the service account permissions for the Console agent.
   b. From Google Cloud, activate cloud shell.
   c. Upload the YAML file that includes the required permissions.
   d. Create a custom role by using the `gcloud iam roles create` command.

      The following example creates a role named "agent" at the project level:

      ```
      gcloud iam roles create connector --project=myproject --file=agent.yaml
      ```

      Google Cloud docs: Creating and managing custom roles
2. Create a service account in Google Cloud and assign the role to the service account:
   a. From the IAM & Admin service, select **Service Accounts > Create Service Account**.
   b. Enter service account details and select **Create and Continue**.
   c. Select the role that you just created.
   d. Finish the remaining steps to create the role.

      Google Cloud docs: Creating a service account
3. If you plan to deploy Cloud Volumes ONTAP systems in different projects than the project where the Console agent resides, then you'll need to provide the Console agent's service account with access to those projects.

   For example, let's say the Console agent is in project 1 and you want to create Cloud Volumes ONTAP systems in project 2. You'll need to grant access to the service account in project 2.

   a. From the IAM & Admin service, select the Google Cloud project where you want to create Cloud Volumes ONTAP systems.
   b. On the **IAM** page, select **Grant Access** and provide the required details.
      - Enter the email of the Console agent's service account.
      - Select the Console agent's custom role.
      - Select **Save**.

   For more details, refer to Google Cloud documentation

Step 5: Set up shared VPC permissions

If you are using a shared VPC to deploy resources into a service project, then you'll need to prepare your permissions.

This table is for reference and your environment should reflect the permissions table when IAM configuration is complete.

View shared VPC permissions

Identity	Creator	Hosted in	Service project permissions	Host project permissions	Purpose
Google account to deploy the agent	Custom	Service Project	Agent deployment policy	compute.networkUser	Deploying the agent in the service project
agent service account	Custom	Service project	Agent service account policy	compute.networkUser deploymentmanager.editor	Deploying and maintaining Cloud Volumes ONTAP and services in the service project
Cloud Volumes ONTAP service account	Custom	Service project	storage.admin member: NetApp Console service account as serviceAccount.user	N/A	(Optional) For NetApp Cloud Tiering and NetApp Backup and Recovery
Google APIs service agent	Google Cloud	Service project	(Default) Editor	compute.networkUser	Interacts with Google Cloud APIs on behalf of deployment. Allows the Console to use the shared network.
Google Compute Engine default service account	Google Cloud	Service project	(Default) Editor	compute.networkUser	Deploys Google Cloud instances and compute infrastructure on behalf of deployment. Allows the Console to use the shared network.

Notes:

1. deploymentmanager.editor is only required at the host project if you are not passing firewall rules to the deployment and are choosing to let the Console create them for you. The NetApp Console creates a deployment in the host project which contains the VPC0 firewall rule if no rule is specified.
2. firewall.create and firewall.delete are only required if you are not passing firewall rules to the deployment and are choosing to let the Console create them for you. These permissions reside in the Console account .yaml file. If you are deploying an HA pair using a shared VPC, these permissions will be used to create the firewall rules for VPC1, 2 and 3. For all other deployments, these permissions will also be used to create rules for VPC0.
3. For Cloud Tiering, the tiering service account must have the serviceAccount.user role on the service account, not just at the project level. Currently if you assign serviceAccount.user at the project level, the permissions don’t show when you query the service account with getIAMPolicy.

Step 6: Enable Google Cloud APIs

Several Google Cloud APIs must be enabled before you can deploy a Console agent in Google Cloud.

Step

1. Enable the following Google Cloud APIs in your project:
   - Cloud Infrastructure Manager API
   - Cloud Deployment Manager V2 API
   - Cloud Logging API
   - Cloud Resource Manager API
   - Compute Engine API
   - Identity and Access Management (IAM) API
   - Cloud Key Management Service (KMS) API

     (Required only if you are planning to use NetApp Backup and Recovery with customer-managed encryption keys (CMEK))

Google Cloud documentation: Enabling APIs

Step 7: Install the Console agent

After the pre-requisites are complete, you can manually install the software on your own Linux host.

When you deploy an agent, the system also creates a Google Cloud bucket to store deployment files.

Before you begin

You should have the following:

- Root privileges to install the Console agent.
- Details about a proxy server, if a proxy is required for internet access from the Console agent.

  You have the option to configure a proxy server after installation but doing so requires restarting the Console agent.
- A CA-signed certificate, if the proxy server uses HTTPS or if the proxy is an intercepting proxy.

> You cannot set a certificate for a transparent proxy server when manually installing the Console agent. If you need to set a certificate for a transparent proxy server, you must use the Maintenance Console after installation. Learn more about the Agent Maintenance Console.

About this task

After installation, the Console agent automatically updates itself if a new version is available.

Steps

1. If the *http_proxy* or *https_proxy* system variables are set on the host, remove them:

```
unset http_proxy
unset https_proxy
```

If you don't remove these system variables, the installation fails.

2. Download the Console agent software and then copy it to the Linux host. You can download it either from the NetApp Console or the NetApp Support site.
   - NetApp Console: Go to **Agents > Management> Deploy agent > On-prem > Manual install**.

     Choose download the agent installer files or a URL to the files.
   - NetApp Support Site (needed if you don't already have access to the Console) NetApp Support Site,
3. Assign permissions to run the script.

   ```
   chmod +x NetApp_Console_Agent_Cloud_<version>
   ```

   Where <version> is the version of the Console agent that you downloaded.
4. If installing in a Government Cloud environment, disable the configuration checks. Learn how to disable configuration checks for manual installations.
5. Run the installation script.

   ```
   ./NetApp_Console_Agent_Cloud_<version> --proxy <HTTP or HTTPS proxy
   server> --cacert <path and file name of a CA-signed certificate>
   ```

   You'll need to add proxy information if your network requires a proxy for internet access. You can add an explicit proxy during installation. The `--proxy` and `--cacert` parameters are optional and you won't be prompted to add them. If you have an explicit proxy server, you will need to enter the parameters as shown.

> ⓘ If you want to configure a transparent proxy, you can do so after you've installed. Learn about the agent maintenance console

+

Here is an example configuring an explicit proxy server with a CA-signed certificate:

+

```
./NetApp_Console_Agent_Cloud_v4.0.0--proxy
https://user:password@10.0.0.30:8080/ --cacert /tmp/cacert/certificate.cer
```

+
`--proxy` configures the Console agent to use an HTTP or HTTPS proxy server using one of the following formats:

+
* http://address:port
* http://user-name:password@address:port
* http://domain-name%92user-name:password@address:port
* https://address:port
* https://user-name:password@address:port
* https://domain-name%92user-name:password@address:port

+
Note the following:

+
The user can be a local user or domain user.
For a domain user, you must use the ASCII code for a \ as shown above.
The Console agent doesn’t support user names or passwords that include the @ character.
If the password includes any of the following special characters, you must escape that special character by prepending it with a backslash: & or !

+
For example:

+
http://bxpproxyuser:netapp1\!@address:3128

1. If you used Podman, you’ll need to adjust the aardvark-dns port.
   a. SSH to the Console agent virtual machine.
   b. Open podman */usr/share/containers/containers.conf* file and modify the chosen port for Aardvark DNS service. For example, change it to 54.

   ```
   vi /usr/share/containers/containers.conf
   ```

   For example:

   ```
   # Port to use for dns forwarding daemon with netavark in rootful
   bridge
   # mode and dns enabled.
   # Using an alternate port might be useful if other DNS services
   should
   # run on the machine.
   #
   dns_bind_port = 54
   ```

   c. Reboot the Console agent virtual machine.
2. Wait for the installation to complete.

   At the end of the installation, the Console agent service (occm) restarts twice if you specified a proxy server.

ⓘ If the installation fails, you can view the installation report and logs to help you fix the issues. Learn how to troubleshoot installation issues.

1. Open a web browser from a host that has a connection to the Console agent virtual machine and enter the following URL:

   https://*ipaddress*

2. After you log in, set up the Console agent:

   a. Specify the organization to associate with the Console agent.

   b. Enter a name for the system.

   c. Under **Are you running in a secured environment?** keep restricted mode disabled.

      You should keep restricted mode disabled because these steps describe how to use the Console in standard mode. You should enable restricted mode only if you have a secure environment and want to disconnect this account from backend services. If that's the case, follow steps to get started with the NetApp Console in restricted mode.

   d. Select **Let's start**.

   ⓘ If the installation fails, you can view logs and a report to help you troubleshoot. Learn how to troubleshoot installation issues.

If you have Google Cloud Storage buckets in the same Google Cloud account where you created the Console agent, you'll see a Google Cloud Storage system appear on the **Systems** page automatically. Learn how to manage Google Cloud Storage from the NetApp Console

Step 8: Provide permissions to Console agent

You need to provide the Console agent with the Google Cloud permissions that you previously set up. Providing the permissions enables the Console agent to manage your data and storage infrastructure in Google Cloud.

Steps

1. Go to the Google Cloud portal and assign the service account to the Console agent VM instance.

   Google Cloud documentation: Changing the service account and access scopes for an instance

2. If you want to manage resources in other Google Cloud projects, grant access by adding the service account with the Console agent role to that project. You'll need to repeat this step for each project.

Install an agent on-premises

Manually install a Console agent on-premises

Install a Console agent on-premises and then log in and set it up to work with your Console organization.

ⓘ If you are a VMWare user, you can use an OVA to install a Console agent in your VCenter. Learn more about installing an agent in a VCenter.

Before you install, you'll need to ensure your host (VM or Linux host) meets requirements and ensure that the Console agent will have outbound access to the internet as well as targeted networks. If you plan to NetApp data services, or cloud storage options such as Cloud Volumes ONTAP, you'll need to create credentials in your cloud provider to add to the Console so that the Console agent can perform actions in the cloud on your behalf.

Prepare to install the Console agent

Before you install a Console agent, you should ensure you have a host machine that meets installation requirements. You'll also need to work with your network administrator to ensure that the Console agent has outbound access to required endpoints and connections to targeted networks.

Review Console agent host requirements

Run the Console agent on a x86 host that meets operating system, RAM, and port requirements. Ensure that your host meets these requirements before you install the Console agent.

> ⓘ The Console agent reserves the UID and GID range of 19000 to 19200. This range is fixed and cannot be modified. If any third-party software on your host is using UIDs or GIDs within this range, the agent installation will fail. NetApp recommends using a host that is free of third-party software to avoid conflicts.

Dedicated host

The Console agent requires a dedicated host. Any architecture is supported if it meets these size requirements:

- CPU: 8 cores or 8 vCPUs
- RAM: 32 GB
- Disk space: 165 GB is recommended for the host, with the following partition requirements:
  - `/opt`: 120 GiB of space must be available

    The agent uses `/opt` to install the `/opt/application/netapp` directory and its contents.
  - `/var`: 40 GiB of space must be available

    The Console agent requires this space in `/var` because Podman or Docker are architected to create the containers within this directory. Specifically, they will create containers in the `/var/lib/containers/storage` directory and `/var/lib/docker` for Docker. External mounts or symlinks do not work for this space.

Hypervisor

A bare metal or hosted hypervisor that is certified to run a supported operating system is required.

Operating system and container requirements

The Console agent is supported with the following operating systems when using the Console in standard mode or restricted mode. A container orchestration tool is required before you install the agent.

Operating system	Supported OS versions	Supported agent versions	Required container tool	SELinux
Red Hat Enterprise Linux				
	9.6 • English language versions only. • The host must be registered with Red Hat Subscription Management. If it's not registered, the host can't access repositories to update required 3rd-party software during agent installation.	4.0.0 or later with the Console in standard mode or restricted mode	Podman version 5.4.0 with podman-compose 1.5.0. View Podman configuration requirements.	Supported in enforcing mode or permissive mode
	9.1 to 9.4 • English language versions only. • The host must be registered with Red Hat Subscription Management. If it's not registered, the host can't access repositories to update required 3rd-party software during agent installation.	3.9.50 or later with the Console in standard mode or restricted mode	Podman version 4.9.4 with podman-compose 1.5.0. View Podman configuration requirements.	Supported in enforcing mode or permissive mode

Operating system	Supported OS versions	Supported agent versions	Required container tool	SELinux
	8.6 to 8.10 • English language versions only. • The host must be registered with Red Hat Subscription Management. If it’s not registered, the host can’t access repositories to update required 3rd-party software during agent installation.	3.9.50 or later with the Console in standard mode or restricted mode	Podman version 4.6.1 or 4.9.4 with podman-compose 1.0.6. View Podman configuration requirements.	Supported in enforcing mode or permissive mode
Ubuntu				
	24.04 LTS	3.9.45 or later with the NetApp Console in standard mode or restricted mode	Docker Engine 23.06 to 28.0.0.	Not supported
	22.04 LTS	3.9.50 or later	Docker Engine 23.0.6 to 28.0.0.	Not supported

Set up network access for the Console agent

Set up network access to ensure the Console agent can manage resources. It needs connections to target networks and outbound internet access to specific endpoints.

Connections to target networks

The Console agent requires a network connection to the location where you’re planning to create and manage systems. For example, the network where you plan to create Cloud Volumes ONTAP systems or a storage system in your on-premises environment.

Outbound internet access

The network location where you deploy the Console agent must have an outbound internet connection to contact specific endpoints.

Endpoints contacted from computers when using the web-based NetApp Console

Computers that access the Console from a web browser must have the ability to contact several endpoints. You’ll need to use the Console to set up the Console agent and for day-to-day use of the Console.

Prepare networking for the NetApp console.

Endpoints contacted from the Console agent

The Console agent requires outbound internet access to contact the following endpoints to manage resources and processes within your public cloud environment for day-to-day operations.

The endpoints listed below are all CNAME entries.

> ⓘ A Console agent installed on your premises cannot manage resources in Google Cloud. If you want to manage Google Cloud resources, you need to install an agent in Google Cloud.

AWS

When the Console agent is installed on-premises, it needs network access to the following AWS endpoints in order to manage NetApp systems (such as Cloud Volumes ONTAP) deployed in AWS.

Endpoints contacted from the Console agent

The Console agent requires outbound internet access to contact the following endpoints to manage resources and processes within your public cloud environment for day-to-day operations.

The endpoints listed below are all CNAME entries.

Endpoints	Purpose
AWS services (amazonaws.com): • CloudFormation • Elastic Compute Cloud (EC2) • Identity and Access Management (IAM) • Key Management Service (KMS) • Security Token Service (STS) • Simple Storage Service (S3)	To manage AWS resources. The endpoint depends on your AWS region. Refer to AWS documentation for details
Amazon FsX for NetApp ONTAP: • api.workloads.netapp.com	The web-based console contacts this endpoint to interact with the Workload Factory APIs to manage and operate FSx for ONTAP based workloads.
https://mysupport.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support.
https://signin.b2c.netapp.com	To update NetApp Support Site (NSS) credentials or to add new NSS credentials to the NetApp Console.
https://support.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support as well as to receive software updates for Cloud Volumes ONTAP.
https://api.bluexp.netapp.com https://netapp-cloud-account.auth0.com https://netapp-cloud-account.us.auth0.com https://console.netapp.com https://components.console.bluexp.netapp.com https://cdn.auth0.com	To provide features and services within the NetApp Console.

Endpoints	Purpose
https://bluexpinfraprod.eastus2.data.azurecr.io https://bluexpinfraprod.azurecr.io	To obtain images for Console agent upgrades. • When you deploy a new agent, the validation check tests connectivity to current endpoints. If you use previous endpoints, the validation check fails. To avoid this failure, skip the validation check. Although the previous endpoints are still supported, NetApp recommends updating your firewall rules to the current endpoints as soon as possible. Learn how to update your endpoint list. • When you update to the current endpoints in your firewall, your existing agents will continue to work.

Azure

When the Console agent is installed on-premises, it needs network access to the following Azure endpoints in order to manage NetApp systems (such as Cloud Volumes ONTAP) deployed in Azure.

Endpoints	Purpose
https://management.azure.com https://login.microsoftonline.com https://blob.core.windows.net https://core.windows.net	To manage resources in Azure public regions.
https://management.chinacloudapi.cn https://login.chinacloudapi.cn https://blob.core.chinacloudapi.cn https://core.chinacloudapi.cn	To manage resources in Azure China regions.
https://mysupport.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support.
https://signin.b2c.netapp.com	To update NetApp Support Site (NSS) credentials or to add new NSS credentials to the NetApp Console.
https://support.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support as well as to receive software updates for Cloud Volumes ONTAP.

Endpoints	Purpose
https://api.bluexp.netapp.com https://netapp-cloud-account.auth0.com https://netapp-cloud-account.us.auth0.com https://console.netapp.com https://components.console.bluexp.netapp.com https://cdn.auth0.com	To provide features and services within the NetApp Console.
https://bluexpinfraprod.eastus2.data.azurecr.io https://bluexpinfraprod.azurecr.io	To obtain images for Console agent upgrades. • When you deploy a new agent, the validation check tests connectivity to current endpoints. If you use previous endpoints, the validation check fails. To avoid this failure, skip the validation check. Although the previous endpoints are still supported, NetApp recommends updating your firewall rules to the current endpoints as soon as possible. Learn how to update your endpoint list. • When you update to the current endpoints in your firewall, your existing agents will continue to work.

Proxy server

NetApp supports both explicit and transparent proxy configurations. If you are using a transparent proxy, you only need to provide the certificate for the proxy server. If you are using an explicit proxy, you'll also need the IP address and credentials.

- IP address
- Credentials
- HTTPS certificate

Ports

There's no incoming traffic to the Console agent, unless you initiate it or if it is used as a proxy to send AutoSupport messages from Cloud Volumes ONTAP to NetApp Support.

- HTTP (80) and HTTPS (443) provide access to the local UI, which you'll use in rare circumstances.
- SSH (22) is only needed if you need to connect to the host for troubleshooting.
- Inbound connections over port 3128 are required if you deploy Cloud Volumes ONTAP systems in a subnet where an outbound internet connection isn't available.

  If Cloud Volumes ONTAP systems don't have an outbound internet connection to send AutoSupport messages, the Console automatically configures those systems to use a proxy server that's included with the Console agent. The only requirement is to ensure that the Console agent's security group allows inbound connections over port 3128. You'll need to open this port after you deploy the Console agent.

Enable NTP

If you're planning to use NetApp Data Classification to scan your corporate data sources, you should enable a Network Time Protocol (NTP) service on both the Console agent and the NetApp Data Classification system so that the time is synchronized between the systems. Learn more about NetApp Data classification

Create Console agent cloud permissions for AWS or Azure

If you want to use NetApp data services in AWS or Azure with an on-premises Console agent, then you need to set up permissions in your cloud provider and then you add the credentials to the Console agent after you install it.

> You must install the Console agent in Google Cloud to manage any resources that reside there.

AWS

When the Console agent is installed on-premises, you need to provide the Console with AWS permissions by adding access keys for an IAM user who has the required permissions.

You must use this authentication method if the Console agent is installed on-premises. You can't use an IAM role.

Steps

1. Log in to the AWS console and navigate to the IAM service.
2. Create a policy:
   a. Select **Policies > Create policy**.
   b. Select **JSON** and copy and paste the contents of the IAM policy for the Console agent.
   c. Finish the remaining steps to create the policy.

      Depending on the NetApp data services that you're planning to use, you might need to create a second policy.

      For standard regions, the permissions are spread across two policies. Two policies are required due to a maximum character size limit for managed policies in AWS. Learn more about IAM policies for the Console agent.
3. Attach the policies to an IAM user.
   - AWS Documentation: Creating IAM Roles
   - AWS Documentation: Adding and Removing IAM Policies
4. Ensure that the user has an access key that you can add to the NetApp Console after you install the Console agent.

Result

You should now have access keys for an IAM user who has the required permissions. After you install the Console agent, associate these credentials with the Console agent from the Console.

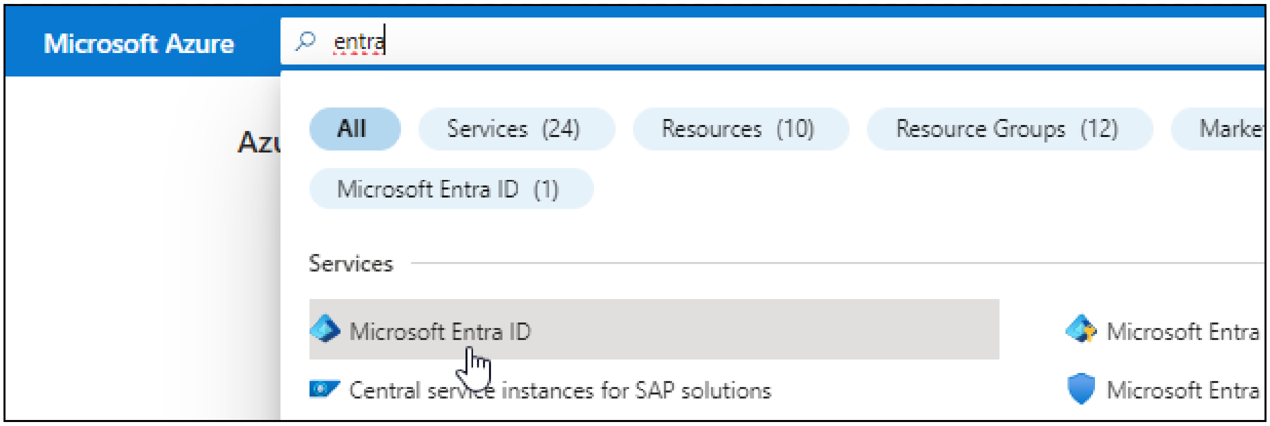
Azure

When the Console agent is installed on-premises, you need to provide the Console agent with Azure permissions by setting up a service principal in Microsoft Entra ID and obtaining the Azure credentials that the Console agent needs.

Create a Microsoft Entra application for role-based access control

1. Ensure that you have permissions in Azure to create an Active Directory application and to assign the application to a role.

   For details, refer to Microsoft Azure Documentation: Required permissions
2. From the Azure portal, open the **Microsoft Entra ID** service.



3. In the menu, select **App registrations**.
4. Select **New registration**.
5. Specify details about the application:
   - **Name**: Enter a name for the application.
   - **Account type**: Select an account type (any will work with the NetApp Console).
   - **Redirect URI**: You can leave this field blank.
6. Select **Register**.

   You've created the AD application and service principal.

Assign the application to a role

1. Create a custom role:

   Note that you can create an Azure custom role using the Azure portal, Azure PowerShell, Azure CLI, or REST API. The following steps show how to create the role using the Azure CLI. If you would prefer to use a different method, refer to Azure documentation

   a. Copy the contents of the custom role permissions for the Console agent and save them in a JSON file.

   b. Modify the JSON file by adding Azure subscription IDs to the assignable scope.

   You should add the ID for each Azure subscription from which users will create Cloud Volumes ONTAP systems.

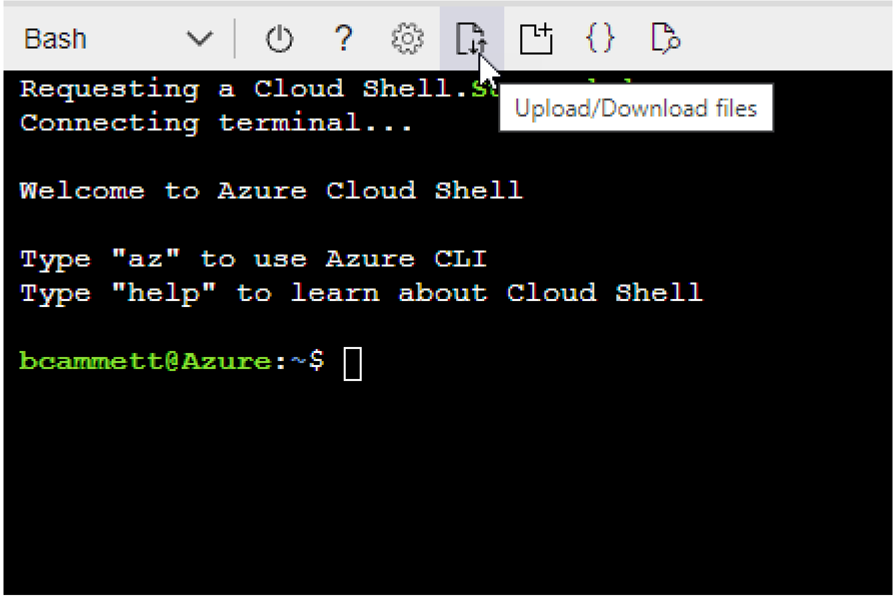
   Example

```
"AssignableScopes": [
"/subscriptions/d333af45-0d07-4154-943d-c25fbzzzzzzz",
"/subscriptions/54b91999-b3e6-4599-908e-416e0zzzzzzz",
"/subscriptions/398e471c-3b42-4ae7-9b59-ce5bbzzzzzzz"
]
```

   c. Use the JSON file to create a custom role in Azure.

   The following steps describe how to create the role by using Bash in Azure Cloud Shell.

- Start Azure Cloud Shell and choose the Bash environment.
- Upload the JSON file.



```
Requesting a Cloud Shell.Su
Connecting terminal...

Welcome to Azure Cloud Shell

Type "az" to use Azure CLI
Type "help" to learn about Cloud Shell

bcammett@Azure:~$
```

- Use the Azure CLI to create the custom role:

```
az role definition create --role-definition agent_Policy.json
```

You should now have a custom role called Console Operator that you can assign to the Console agent virtual machine.

2. Assign the application to the role:

   a. From the Azure portal, open the **Subscriptions** service.

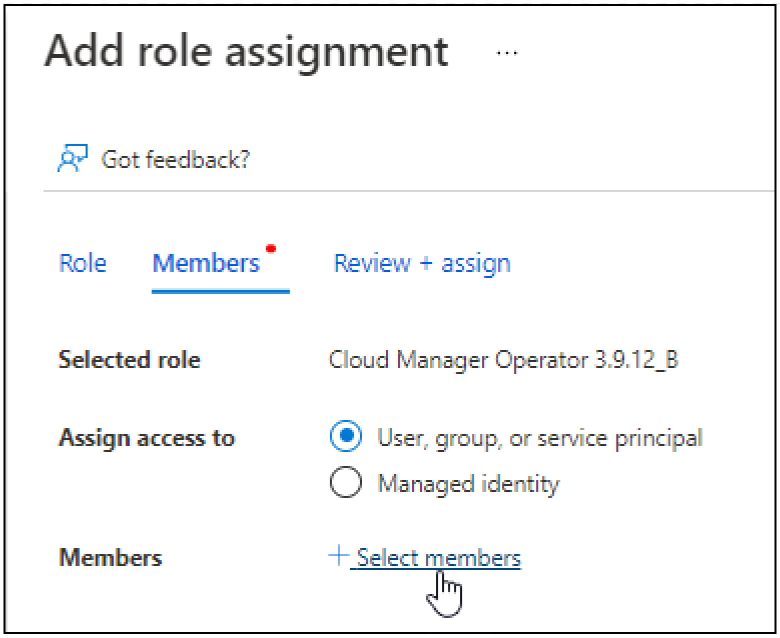
   b. Select the subscription.

   c. Select **Access control (IAM) > Add > Add role assignment**.

   d. In the **Role** tab, select the **Console Operator** role and select **Next**.

   e. In the **Members** tab, complete the following steps:

      - Keep **User, group, or service principal** selected.
      - Select **Select members**.



Add role assignment ...

Got feedback?

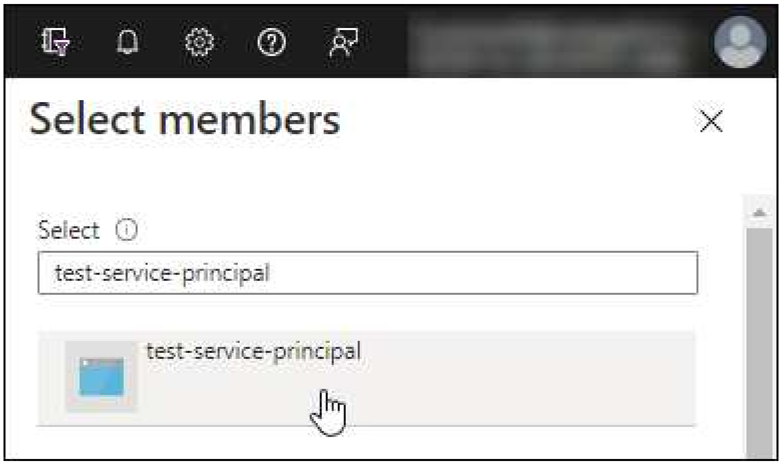
Selected role: Cloud Manager Operator 3.9.12_B

Assign access to: ● User, group, or service principal ○ Managed identity

Members: + Select members

- Search for the name of the application.

  Here’s an example:



Select members

Select ⓘ

test-service-principal

- Select the application and select **Select**.
- Select **Next**.

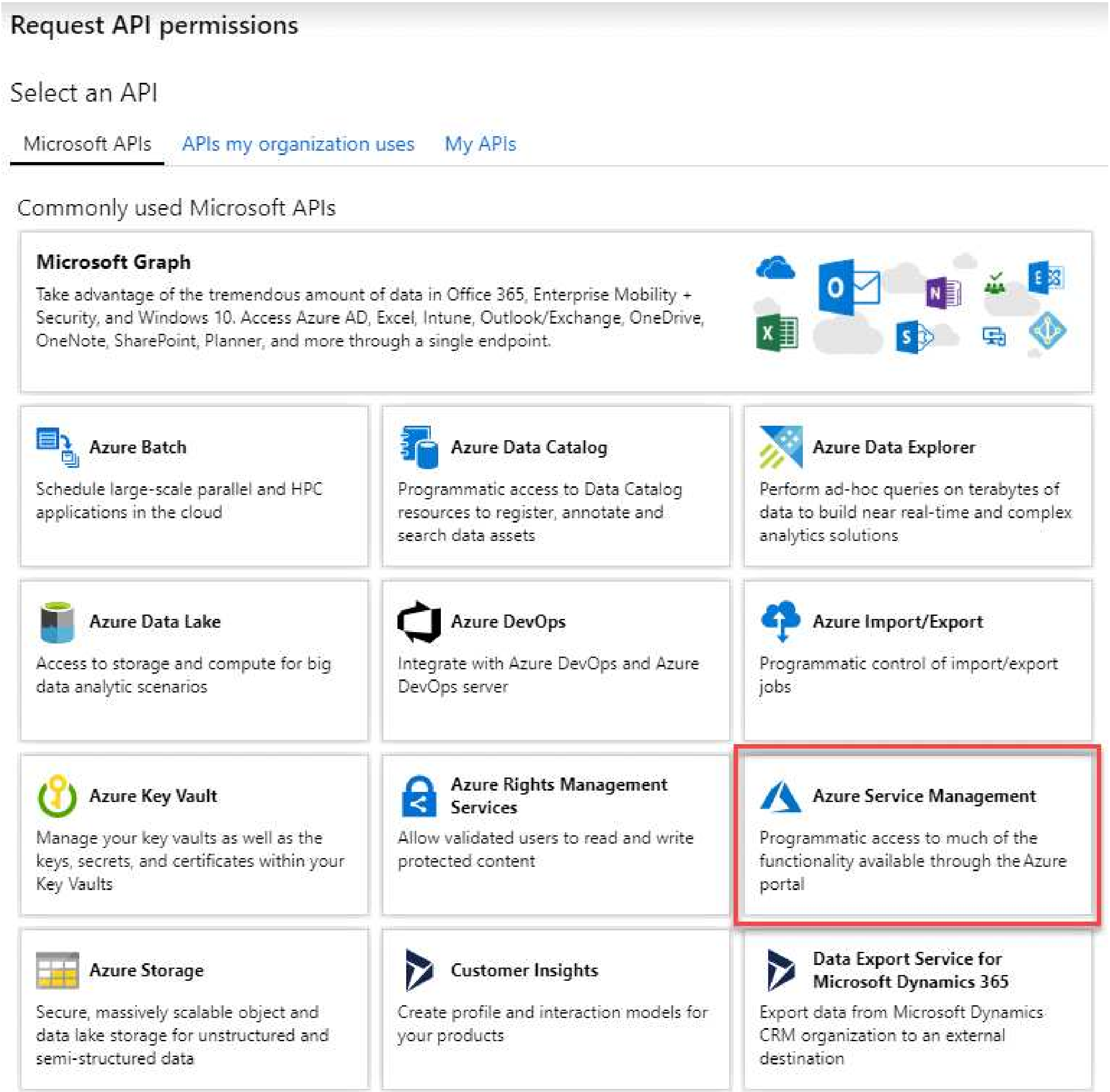
f. Select **Review + assign**.

   The service principal now has the required Azure permissions to deploy the Console agent.

   If you want to deploy Cloud Volumes ONTAP from multiple Azure subscriptions, then you must bind the service principal to each of those subscriptions. In the NetApp Console, you can select the subscription that you want to use when deploying Cloud Volumes ONTAP.

Add Windows Azure Service Management API permissions

1. In the **Microsoft Entra ID** service, select **App registrations** and select the application.
2. Select **API permissions > Add a permission**.
3. Under **Microsoft APIs**, select **Azure Service Management**.



Request API permissions

Select an API

Commonly used Microsoft APIs

Microsoft Graph
Take advantage of the tremendous amount of data in Office 365, Enterprise Mobility + Security, and Windows 10. Access Azure AD, Excel, Intune, Outlook/Exchange, OneDrive, OneNote, SharePoint, Planner, and more through a single endpoint.

Azure Batch
Schedule large-scale parallel and HPC applications in the cloud

Azure Data Catalog
Programmatic access to Data Catalog resources to register, annotate and search data assets

Azure Data Explorer
Perform ad-hoc queries on terabytes of data to build near real-time and complex analytics solutions

Azure Data Lake
Access to storage and compute for big data analytic scenarios

Azure DevOps
Integrate with Azure DevOps and Azure DevOps server

Azure Import/Export
Programmatic control of import/export jobs

Azure Key Vault
Manage your key vaults as well as the keys, secrets, and certificates within your Key Vaults

Azure Rights Management Services
Allow validated users to read and write protected content

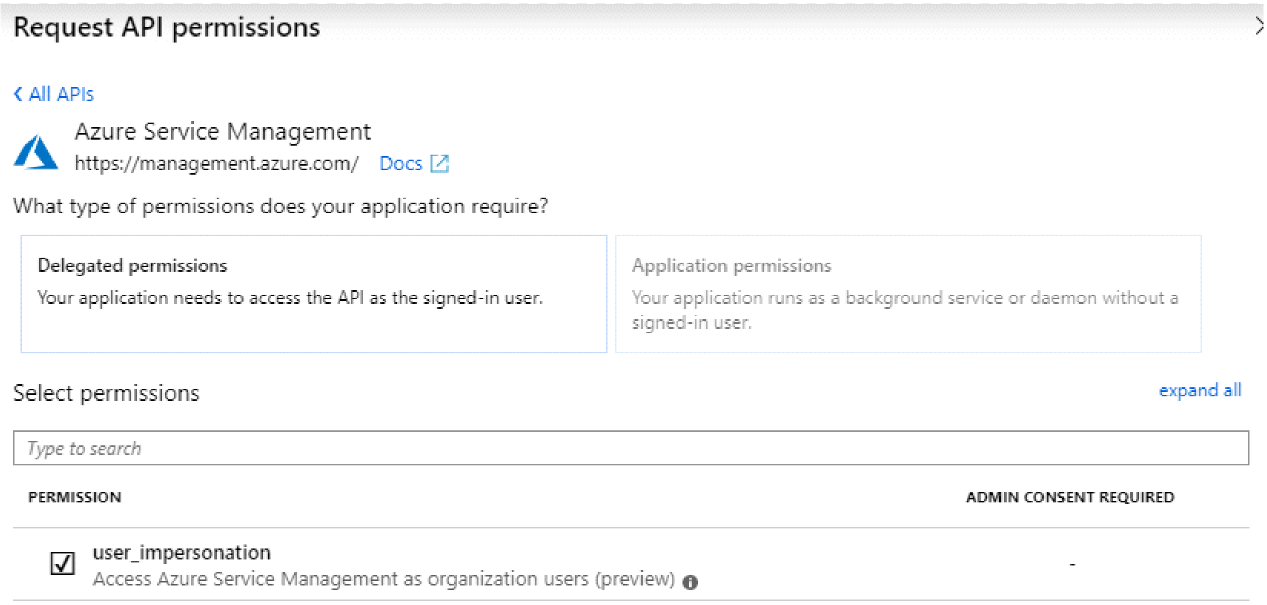
Azure Service Management
Programmatic access to much of the functionality available through the Azure portal

Azure Storage
Secure, massively scalable object and data lake storage for unstructured and semi-structured data

Customer Insights
Create profile and interaction models for your products

Data Export Service for Microsoft Dynamics 365
Export data from Microsoft Dynamics CRM organization to an external destination

4. Select **Access Azure Service Management as organization users** and then select **Add permissions**.



Request API permissions

‹ All APIs

Azure Service Management
https://management.azure.com/ Docs

What type of permissions does your application require?

Delegated permissions
Your application needs to access the API as the signed-in user.

Application permissions
Your application runs as a background service or daemon without a signed-in user.

Select permissions

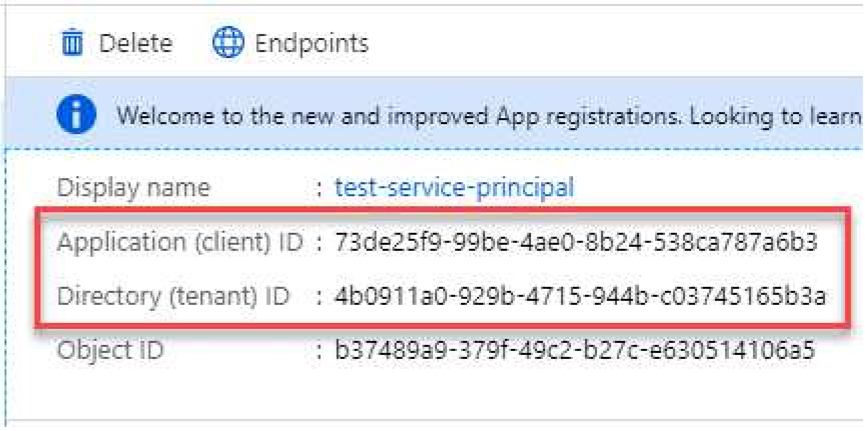
expand all

Type to search

PERMISSION	ADMIN CONSENT REQUIRED
☑ user_impersonation Access Azure Service Management as organization users (preview)	-

Get the application ID and directory ID for the application

1. In the **Microsoft Entra ID** service, select **App registrations** and select the application.
2. Copy the **Application (client) ID** and the **Directory (tenant) ID**.



Delete Endpoints

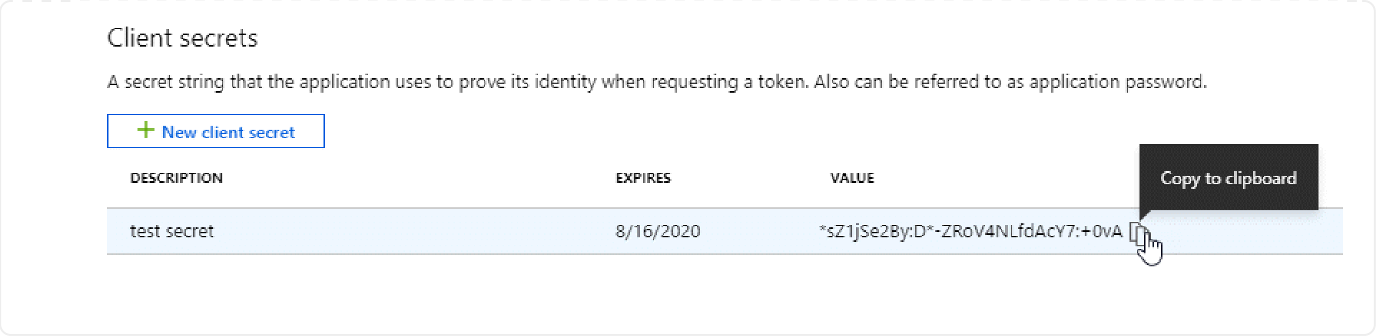
Welcome to the new and improved App registrations. Looking to learn

Display name	: test-service-principal
Application (client) ID	: 73de25f9-99be-4ae0-8b24-538ca787a6b3
Directory (tenant) ID	: 4b0911a0-929b-4715-944b-c03745165b3a
Object ID	: b37489a9-379f-49c2-b27c-e630514106a5

When you add the Azure account to the Console, you need to provide the application (client) ID and the directory (tenant) ID for the application. The Console uses the IDs to programmatically sign in.

Create a client secret

1. Open the **Microsoft Entra ID** service.
2. Select **App registrations** and select your application.
3. Select **Certificates & secrets > New client secret**.
4. Provide a description of the secret and a duration.
5. Select **Add**.
6. Copy the value of the client secret.



Client secrets

A secret string that the application uses to prove its identity when requesting a token. Also can be referred to as application password.

DESCRIPTION	EXPIRES	VALUE
test secret	8/16/2020	*sZ1jSe2By:D*-ZRoV4NLfdAcY7:+0vA

Manually install a Console agent

When you manually install a Console agent, you need to prepare your machine environment so that it meets requirements. You'll need an Linux machine and you'll need to install Podman or Docker, depending on your Linux operating system.

Install Podman or Docker Engine

Depending on your operating system, either Podman or Docker Engine is required before installing the agent.

- Podman is required for Red Hat Enterprise Linux 8 and 9.

  View the supported Podman versions.

- Docker Engine is required for Ubuntu.

  View the supported Docker Engine versions.

Example 5. Steps

Podman

Follow these steps to install and configure Podman:

- Enable and start the podman.socket service
- Install python3
- Install the podman-compose package version 1.0.6
- Add podman-compose to the PATH environment variable
- If using Red Hat Enterprise Linux, verify that your Podman version is using Netavark Aardvark DNS instead of CNI

> Adjust the aardvark-dns port (default: 53) after installing the agent to avoid DNS port conflicts. Follow the instructions to configure the port.

Steps

1. Remove the podman-docker package if it's installed on the host.

   ```
   dnf remove podman-docker
   rm /var/run/docker.sock
   ```

2. Install Podman.

   You can obtain Podman from official Red Hat Enterprise Linux repositories.

   a. For Red Hat Enterprise Linux 9.6:

      ```
      sudo dnf install podman-5:<version>
      ```

      Where <version> is the supported version of Podman that you're installing. View the supported Podman versions.

   b. For Red Hat Enterprise Linux 9.1 to 9.4:

      ```
      sudo dnf install podman-4:<version>
      ```

      Where <version> is the supported version of Podman that you're installing. View the supported Podman versions.

   c. For Red Hat Enterprise Linux 8:

      ```
      sudo dnf install podman-4:<version>
      ```

      Where <version> is the supported version of Podman that you're installing. View the supported Podman versions.

3. Enable and start the podman.socket service.

   ```
   sudo systemctl enable --now podman.socket
   ```

4. Install python3.

   ```
   sudo dnf install python3
   ```

5. Install the EPEL repository package if it’s not already available on your system.

   This step is required because podman-compose is available from the Extra Packages for Enterprise Linux (EPEL) repository.

6. If using Red Hat Enterprise 9:

   a. Install the EPEL repository package.

   ```
   sudo dnf install https://dl.fedoraproject.org/pub/epel/epel-release-
   latest-9.noarch.rpm
   ```

   a. Install podman-compose package 1.5.0.

      ```
      sudo dnf install podman-compose-1.5.0
      ```

7. If using Red Hat Enterprise Linux 8:

   a. Install the EPEL repository package.

      ```
      sudo dnf install https://dl.fedoraproject.org/pub/epel/epel-
      release-latest-8.noarch.rpm
      ```

   b. Install podman-compose package 1.0.6.

      ```
      sudo dnf install podman-compose-1.0.6
      ```

      > Using the `dnf install` command meets the requirement for adding podman-compose to the PATH environment variable. The installation command adds podman-compose to /usr/bin, which is already included in the `secure_path` option on the host.

   c. If using Red Hat Enterprise Linux 8, verify that your Podman version is using NetAvark with Aardvark DNS instead of CNI.

      i. Check to see if your networkBackend is set to CNI by running the following command:

```
podman info | grep networkBackend
```

ii. If the networkBackend is set to `CNI`, you'll need to change it to `netavark`.

iii. Install `netavark` and `aardvark-dns` using the following command:

```
dnf install aardvark-dns netavark
```

iv. Open the `/etc/containers/containers.conf` file and modify the network_backend option to use "netavark" instead of "cni".

If `/etc/containers/containers.conf` doesn't exist, make the configuration changes to `/usr/share/containers/containers.conf`.

v. Restart podman.

```
systemctl restart podman
```

vi. Confirm networkBackend is now changed to "netavark" using the following command:

```
podman info | grep networkBackend
```

Docker Engine

Follow the documentation from Docker to install Docker Engine.

Steps

1. View installation instructions from Docker

   Follow the steps to install a supported Docker Engine version. Do not install the latest version, as it is unsupported by the Console.

2. Verify that Docker is enabled and running.

```
sudo systemctl enable docker && sudo systemctl start docker
```

Install the Console agent manually

Download and install the Console agent software on an existing Linux host on-premises.

Before you begin

You should have the following:

- Root privileges to install the Console agent.

- Details about a proxy server, if a proxy is required for internet access from the Console agent.

  You have the option to configure a proxy server after installation but doing so requires restarting the Console agent.

- A CA-signed certificate, if the proxy server uses HTTPS or if the proxy is an intercepting proxy.

> ⓘ You cannot set a certificate for a transparent proxy server when manually installing the Console agent. If you need to set a certificate for a transparent proxy server, you must use the Maintenance Console after installation. Learn more about the Agent Maintenance Console.

About this task

After installation, the Console agent automatically updates itself if a new version is available.

Steps

1. If the *http_proxy* or *https_proxy* system variables are set on the host, remove them:

   ```
   unset http_proxy
   unset https_proxy
   ```

   If you don’t remove these system variables, the installation fails.

2. Download the Console agent software and then copy it to the Linux host. You can download it either from the NetApp Console or the NetApp Support site.

   - NetApp Console: Go to **Agents > Management> Deploy agent > On-prem > Manual install**.

     Choose download the agent installer files or a URL to the files.

   - NetApp Support Site (needed if you don’t already have access to the Console) NetApp Support Site,

3. Assign permissions to run the script.

   ```
   chmod +x NetApp_Console_Agent_Cloud_<version>
   ```

   Where <version> is the version of the Console agent that you downloaded.

4. If installing in a Government Cloud environment, disable the configuration checks. Learn how to disable configuration checks for manual installations.

5. Run the installation script.

   ```
   ./NetApp_Console_Agent_Cloud_<version> --proxy <HTTP or HTTPS proxy
   server> --cacert <path and file name of a CA-signed certificate>
   ```

   You’ll need to add proxy information if your network requires a proxy for internet access. You can add an explicit proxy during installation. The `--proxy` and `--cacert` parameters are optional and you won’t be prompted to add them. If you have an explicit proxy server, you will need to enter the parameters as shown.

> If you want to configure a transparent proxy, you can do so after you've installed. Learn about the agent maintenance console

+

Here is an example configuring an explicit proxy server with a CA-signed certificate:

+

```
./NetApp_Console_Agent_Cloud_v4.0.0--proxy
https://user:password@10.0.0.30:8080/ --cacert /tmp/cacert/certificate.cer
```

+
`--proxy` configures the Console agent to use an HTTP or HTTPS proxy server using one of the following formats:

+
* http://address:port
* http://user-name:password@address:port
* http://domain-name%92user-name:password@address:port
* https://address:port
* https://user-name:password@address:port
* https://domain-name%92user-name:password@address:port

+
Note the following:

+
The user can be a local user or domain user.
For a domain user, you must use the ASCII code for a \ as shown above.
The Console agent doesn't support user names or passwords that include the @ character.
If the password includes any of the following special characters, you must escape that special character by prepending it with a backslash: & or !

+
For example:

+
http://bxpproxyuser:netapp1\!@address:3128

1. If you used Podman, you'll need to adjust the aardvark-dns port.
   a. SSH to the Console agent virtual machine.
   b. Open podman */usr/share/containers/containers.conf* file and modify the chosen port for Aardvark DNS service. For example, change it to 54.

   ```
   vi /usr/share/containers/containers.conf
   ```

   For example:

```
# Port to use for dns forwarding daemon with netavark in rootful
bridge
# mode and dns enabled.
# Using an alternate port might be useful if other DNS services
should
# run on the machine.
#
dns_bind_port = 54
```

c. Reboot the Console agent virtual machine.

What's next?

You'll need to register the Console agent within the NetApp Console.

Register the Console agent with NetApp Console

Log into the Console and associate the Console agent with your organization. How you log in depends on the mode in which you are using Console. If you are using the Console in standard mode, you log in through the SaaS website. If you are using the Console in restricted mode, you log in locally from the Console agent host.

Steps

1. Open a web browser and enter the Console agent host URL:

   The Console host URL can be a localhost, a private IP address, or a public IP address, depending on the configuration of the host. For example, if the Console agent is in the public cloud without a public IP address, you must enter a private IP address from a host that has a connection to the Console agent host.

2. Sign up or log in.
3. After you log in, set up the Console:
   a. Specify the Console organization to associate with the Console agent.
   b. Enter a name for the system.
   c. Under **Are you running in a secured environment?** keep restricted mode disabled.

      Restricted mode isn't supported when the Console agent is installed on-premises.

   d. Select **Let's start**.

Provide cloud provider credentials to NetApp Console

After you install and set up the Console agent, add your cloud credentials so that the Console agent has the required permissions to perform actions in AWS or Azure.

AWS

Before you begin

If you just created these AWS credentials, they may take a few minutes to become available. Wait a few minutes before you add the credentials to the Console.

Steps

1. Select **Administration > Credentials**.
2. Select **Organization credentials**.
3. Select **Add Credentials** and follow the steps in the wizard.
   a. **Credentials Location**: Select *Amazon Web Services > Agent.
   b. **Define Credentials**: Enter an AWS access key and secret key.
   c. **Marketplace Subscription**: Associate a Marketplace subscription with these credentials by subscribing now or by selecting an existing subscription.
   d. **Review**: Confirm the details about the new credentials and select **Add**.

You can now go to the NetApp Console to start using the Console agent.

Azure

Before you begin

If you just created these Azure credentials, they may take a few minutes to become available. Wait a few minutes before you add the credentials the Console agent.

Steps

1. Select **Administration > Credentials**.
2. Select **Add Credentials** and follow the steps in the wizard.
   a. **Credentials Location**: Select **Microsoft Azure > Agent**.
   b. **Define Credentials**: Enter information about the Microsoft Entra service principal that grants the required permissions:
      - Application (client) ID
      - Directory (tenant) ID
      - Client Secret
   c. **Marketplace Subscription**: Associate a Marketplace subscription with these credentials by subscribing now or by selecting an existing subscription.
   d. **Review**: Confirm the details about the new credentials and select **Add**.

Result

The Console agent now has the permissions that it needs to perform actions in Azure on your behalf. You can now go to the NetApp Console to start using the Console agent.

Install a Console agent on-premises using VCenter

If you are a VMWare user, you can use an OVA to install a Console agent in your VCenter. THe OVA download or URL is available through the NetApp Console.

When you install a Console agent with your VCenter tools, you can use the VM web console to perform maintenance tasks. Learn more about the VM console for the agent.

Prepare to install the Console agent

Before installation, make sure your VM host meets the requirements and the Console agent can access the internet and targeted networks. To use NetApp data services or Cloud Volumes ONTAP, create cloud provider credentials for the Console agent to perform actions on your behalf.

Review Console agent host requirements

Make sure your host machine meets installation requirements before installing the Console agent.

- CPU: 8 cores or 8 vCPUs
- RAM: 32 GB
- Disk space: 165 GB (thick provisioned)
- vSphere 7.0 or higher
- ESXi host 7.03 or higher

Install the agent in a vCenter environment rather than directly on an ESXi host.

Set up network access for the Console agent

Work with your network administrator to ensure the Console agent has outbound access to the required endpoints and connections to targeted networks.

Connections to target networks

The Console agent requires a network connection to the location where you're planning to create and manage systems. For example, the network where you plan to create Cloud Volumes ONTAP systems or a storage system in your on-premises environment.

Outbound internet access

The network location where you deploy the Console agent must have an outbound internet connection to contact specific endpoints.

Endpoints contacted from computers when using the web-based NetApp Console

Computers that access the Console from a web browser must have the ability to contact several endpoints. You'll need to use the Console to set up the Console agent and for day-to-day use of the Console.

Prepare networking for the NetApp console.

Endpoints contacted from the Console agent

The Console agent requires outbound internet access to contact the following endpoints to manage resources and processes within your public cloud environment for day-to-day operations.

The endpoints listed below are all CNAME entries.

You can't manage resources in Google Cloud with an Console agent installed on your premises. To manage Google Cloud resources, install an agent in Google Cloud.

AWS

When the Console agent is installed on-premises, it needs network access to the following AWS endpoints in order to manage NetApp systems (such as Cloud Volumes ONTAP) deployed in AWS.

Endpoints contacted from the Console agent

The Console agent requires outbound internet access to contact the following endpoints to manage resources and processes within your public cloud environment for day-to-day operations.

The endpoints listed below are all CNAME entries.

Endpoints	Purpose
AWS services (amazonaws.com): • CloudFormation • Elastic Compute Cloud (EC2) • Identity and Access Management (IAM) • Key Management Service (KMS) • Security Token Service (STS) • Simple Storage Service (S3)	To manage AWS resources. The endpoint depends on your AWS region. Refer to AWS documentation for details
Amazon FsX for NetApp ONTAP: • api.workloads.netapp.com	The web-based console contacts this endpoint to interact with the Workload Factory APIs to manage and operate FSx for ONTAP based workloads.
https://mysupport.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support.
https://signin.b2c.netapp.com	To update NetApp Support Site (NSS) credentials or to add new NSS credentials to the NetApp Console.
https://support.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support as well as to receive software updates for Cloud Volumes ONTAP.
https://api.bluexp.netapp.com https://netapp-cloud-account.auth0.com https://netapp-cloud-account.us.auth0.com https://console.netapp.com https://components.console.bluexp.netapp.com https://cdn.auth0.com	To provide features and services within the NetApp Console.

Endpoints	Purpose
https://bluexpinfraprod.eastus2.data.azurecr.io https://bluexpinfraprod.azurecr.io	To obtain images for Console agent upgrades. • When you deploy a new agent, the validation check tests connectivity to current endpoints. If you use previous endpoints, the validation check fails. To avoid this failure, skip the validation check. Although the previous endpoints are still supported, NetApp recommends updating your firewall rules to the current endpoints as soon as possible. Learn how to update your endpoint list. • When you update to the current endpoints in your firewall, your existing agents will continue to work.

Azure

When the Console agent is installed on-premises, it needs network access to the following Azure endpoints in order to manage NetApp systems (such as Cloud Volumes ONTAP) deployed in Azure.

Endpoints	Purpose
https://management.azure.com https://login.microsoftonline.com https://blob.core.windows.net https://core.windows.net	To manage resources in Azure public regions.
https://management.chinacloudapi.cn https://login.chinacloudapi.cn https://blob.core.chinacloudapi.cn https://core.chinacloudapi.cn	To manage resources in Azure China regions.
https://mysupport.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support.
https://signin.b2c.netapp.com	To update NetApp Support Site (NSS) credentials or to add new NSS credentials to the NetApp Console.
https://support.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support as well as to receive software updates for Cloud Volumes ONTAP.

Endpoints	Purpose
https://api.bluexp.netapp.com https://netapp-cloud-account.auth0.com https://netapp-cloud-account.us.auth0.com https://console.netapp.com https://components.console.bluexp.netapp.com https://cdn.auth0.com	To provide features and services within the NetApp Console.
https://bluexpinfraprod.eastus2.data.azurecr.io https://bluexpinfraprod.azurecr.io	To obtain images for Console agent upgrades. • When you deploy a new agent, the validation check tests connectivity to current endpoints. If you use previous endpoints, the validation check fails. To avoid this failure, skip the validation check. Although the previous endpoints are still supported, NetApp recommends updating your firewall rules to the current endpoints as soon as possible. Learn how to update your endpoint list. • When you update to the current endpoints in your firewall, your existing agents will continue to work.

Proxy server

NetApp supports both explicit and transparent proxy configurations. If you are using a transparent proxy, you only need to provide the certificate for the proxy server. If you are using an explicit proxy, you'll also need the IP address and credentials.

- IP address
- Credentials
- HTTPS certificate

Ports

There's no incoming traffic to the Console agent, unless you initiate it or if it is used as a proxy to send AutoSupport messages from Cloud Volumes ONTAP to NetApp Support.

- HTTP (80) and HTTPS (443) provide access to the local UI, which you'll use in rare circumstances.
- SSH (22) is only needed if you need to connect to the host for troubleshooting.
- Inbound connections over port 3128 are required if you deploy Cloud Volumes ONTAP systems in a subnet where an outbound internet connection isn't available.

  If Cloud Volumes ONTAP systems don't have an outbound internet connection to send AutoSupport messages, the Console automatically configures those systems to use a proxy server that's included with the Console agent. The only requirement is to ensure that the Console agent's security group allows inbound connections over port 3128. You'll need to open this port after you deploy the Console agent.

Enable NTP

If you’re planning to use NetApp Data Classification to scan your corporate data sources, you should enable a Network Time Protocol (NTP) service on both the Console agent and the NetApp Data Classification system so that the time is synchronized between the systems. Learn more about NetApp Data classification

Create Console agent cloud permissions for AWS or Azure

If you want to use NetApp data services in AWS or Azure with an on-premises Console agent, then you need to set up permissions in your cloud provider so that you can add the credentials to the Console agent after you install it.

> ⓘ You can’t manage resources in Google Cloud with a Console agent installed on your premises. If you want to manage Google Cloud resources, you need to install an agent in Google Cloud.

AWS

For on-premises Console agents, provide AWS permissions by adding IAM user access keys.

Use IAM user access keys for on-premises Console agents; IAM roles are not supported for on-premises Console agents.

Steps

1. Log in to the AWS console and navigate to the IAM service.
2. Create a policy:
   a. Select **Policies > Create policy**.
   b. Select **JSON** and copy and paste the contents of the IAM policy for the Console agent.
   c. Finish the remaining steps to create the policy.

      Depending on the NetApp data services that you're planning to use, you might need to create a second policy.

      For standard regions, the permissions are spread across two policies. Two policies are required due to a maximum character size limit for managed policies in AWS. Learn more about IAM policies for the Console agent.
3. Attach the policies to an IAM user.
   - AWS Documentation: Creating IAM Roles
   - AWS Documentation: Adding and Removing IAM Policies
4. Ensure that the user has an access key that you can add to the NetApp Console after you install the Console agent.

Result

You should now have IAM user access keys with the required permissions.After you install the Console agent, associate these credentials with the Console agent from the Console.

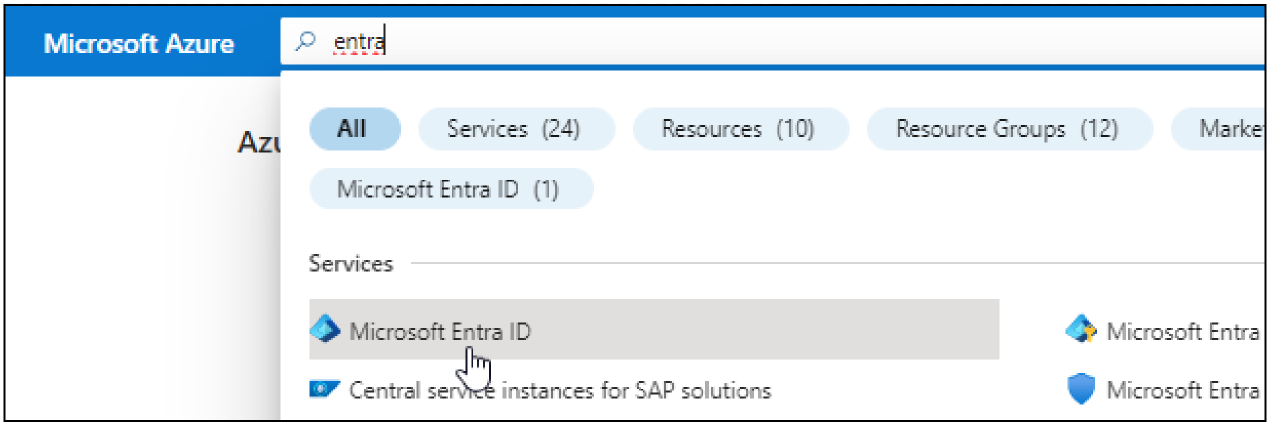
Azure

When the Console agent is installed on-premises, you need to give the Console agent Azure permissions by setting up a service principal in Microsoft Entra ID and getting the Azure credentials that the Console agent needs.

Create a Microsoft Entra application for role-based access control

1. Ensure that you have permissions in Azure to create an Active Directory application and to assign the application to a role.

   For details, refer to Microsoft Azure Documentation: Required permissions
2. From the Azure portal, open the **Microsoft Entra ID** service.



3. In the menu, select **App registrations**.
4. Select **New registration**.
5. Specify details about the application:
   - **Name**: Enter a name for the application.
   - **Account type**: Select an account type (any will work with the NetApp Console).
   - **Redirect URI**: You can leave this field blank.
6. Select **Register**.

   You've created the AD application and service principal.

Assign the application to a role

1. Create a custom role:

   Note that you can create an Azure custom role using the Azure portal, Azure PowerShell, Azure CLI, or REST API. The following steps show how to create the role using the Azure CLI. If you would prefer to use a different method, refer to Azure documentation

   a. Copy the contents of the custom role permissions for the Console agent and save them in a JSON file.

   b. Modify the JSON file by adding Azure subscription IDs to the assignable scope.

      You should add the ID for each Azure subscription from which users will create Cloud Volumes ONTAP systems.

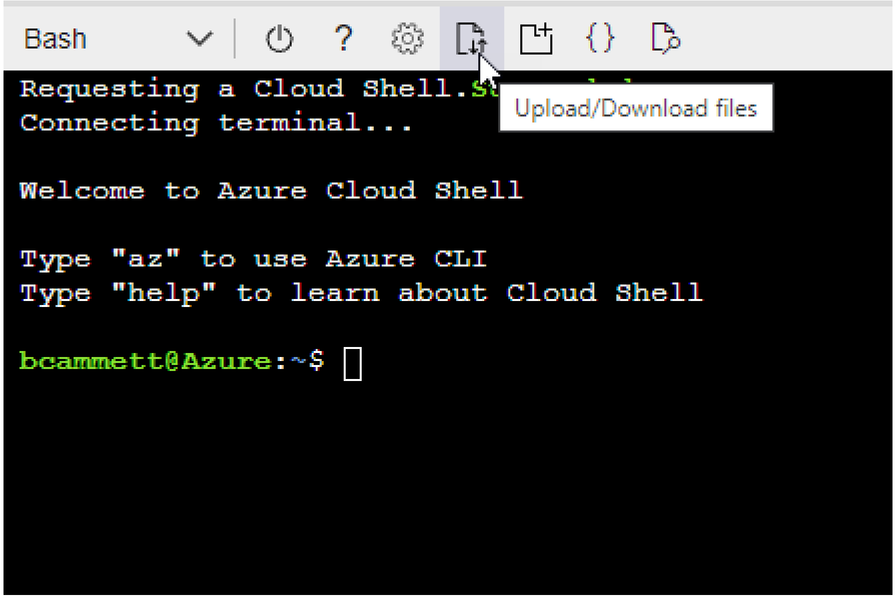
      Example

```
"AssignableScopes": [
"/subscriptions/d333af45-0d07-4154-943d-c25fbzzzzzzz",
"/subscriptions/54b91999-b3e6-4599-908e-416e0zzzzzzz",
"/subscriptions/398e471c-3b42-4ae7-9b59-ce5bbzzzzzzz"
]
```

   c. Use the JSON file to create a custom role in Azure.

      The following steps describe how to create the role by using Bash in Azure Cloud Shell.

- Start Azure Cloud Shell and choose the Bash environment.
- Upload the JSON file.



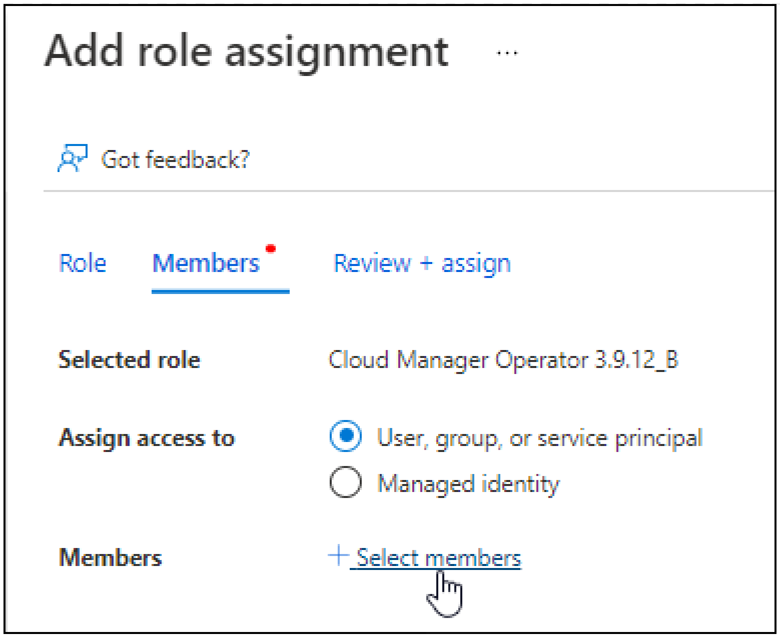
```
Requesting a Cloud Shell.Su
Connecting terminal...

Welcome to Azure Cloud Shell

Type "az" to use Azure CLI
Type "help" to learn about Cloud Shell

bcammett@Azure:~$
```

- Use the Azure CLI to create the custom role:

```
az role definition create --role-definition agent_Policy.json
```

You should now have a custom role called Console Operator that you can assign to the Console agent virtual machine.

2. Assign the application to the role:
   a. From the Azure portal, open the **Subscriptions** service.
   b. Select the subscription.
   c. Select **Access control (IAM) > Add > Add role assignment**.
   d. In the **Role** tab, select the **Console Operator** role and select **Next**.
   e. In the **Members** tab, complete the following steps:
      - Keep **User, group, or service principal** selected.
      - Select **Select members**.


Add role assignment

Got feedback?

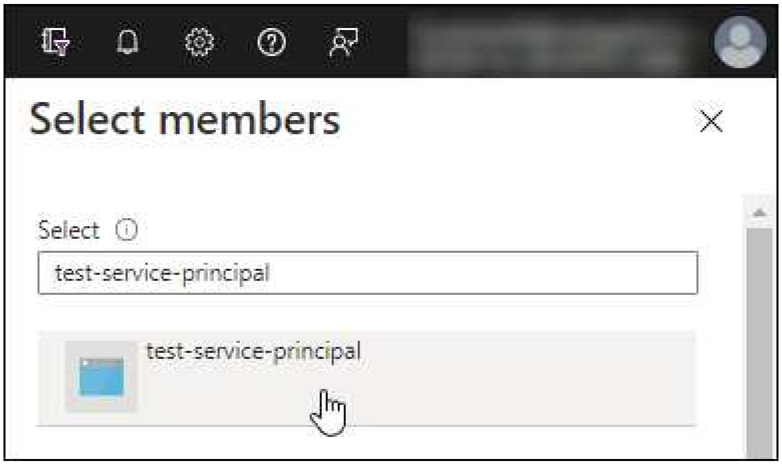
Selected role: Cloud Manager Operator 3.9.12_B

Assign access to: ● User, group, or service principal ○ Managed identity

Members: + Select members

- Search for the name of the application.

  Here's an example:


Select members

Select ⓘ

test-service-principal

test-service-principal

- Select the application and select **Select**.
- Select **Next**.

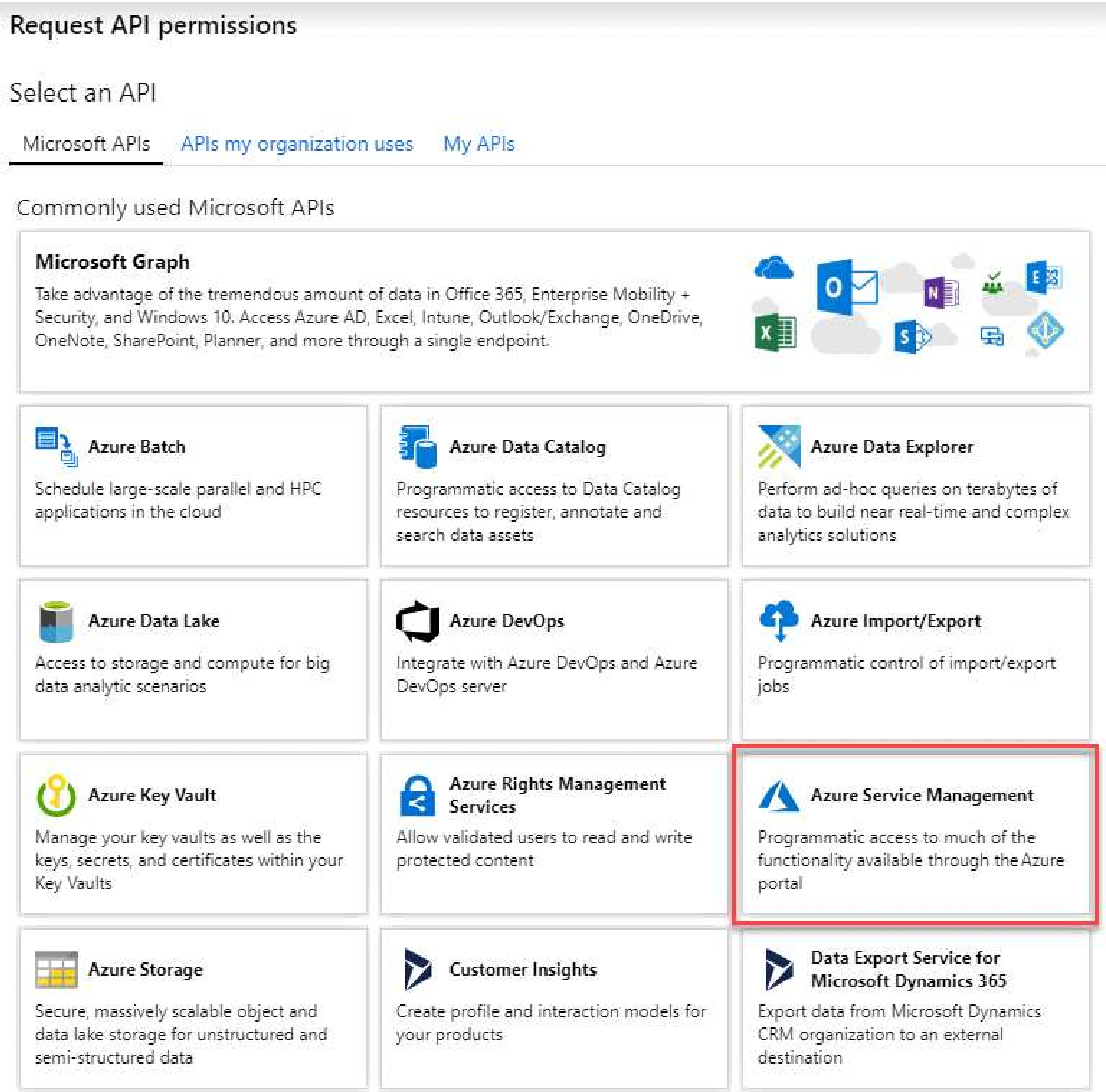
f. Select **Review + assign**.

The service principal now has the required Azure permissions to deploy the Console agent.

If you want to deploy Cloud Volumes ONTAP from multiple Azure subscriptions, then you must bind the service principal to each of those subscriptions. In the NetApp Console, you can select the subscription that you want to use when deploying Cloud Volumes ONTAP.

Add Windows Azure Service Management API permissions

1. In the **Microsoft Entra ID** service, select **App registrations** and select the application.
2. Select **API permissions > Add a permission**.
3. Under **Microsoft APIs**, select **Azure Service Management**.



Request API permissions

Select an API

Microsoft APIs | APIs my organization uses | My APIs

Commonly used Microsoft APIs

Microsoft Graph
Take advantage of the tremendous amount of data in Office 365, Enterprise Mobility + Security, and Windows 10. Access Azure AD, Excel, Intune, Outlook/Exchange, OneDrive, OneNote, SharePoint, Planner, and more through a single endpoint.

Azure Batch
Schedule large-scale parallel and HPC applications in the cloud

Azure Data Catalog
Programmatic access to Data Catalog resources to register, annotate and search data assets

Azure Data Explorer
Perform ad-hoc queries on terabytes of data to build near real-time and complex analytics solutions

Azure Data Lake
Access to storage and compute for big data analytic scenarios

Azure DevOps
Integrate with Azure DevOps and Azure DevOps server

Azure Import/Export
Programmatic control of import/export jobs

Azure Key Vault
Manage your key vaults as well as the keys, secrets, and certificates within your Key Vaults

Azure Rights Management Services
Allow validated users to read and write protected content

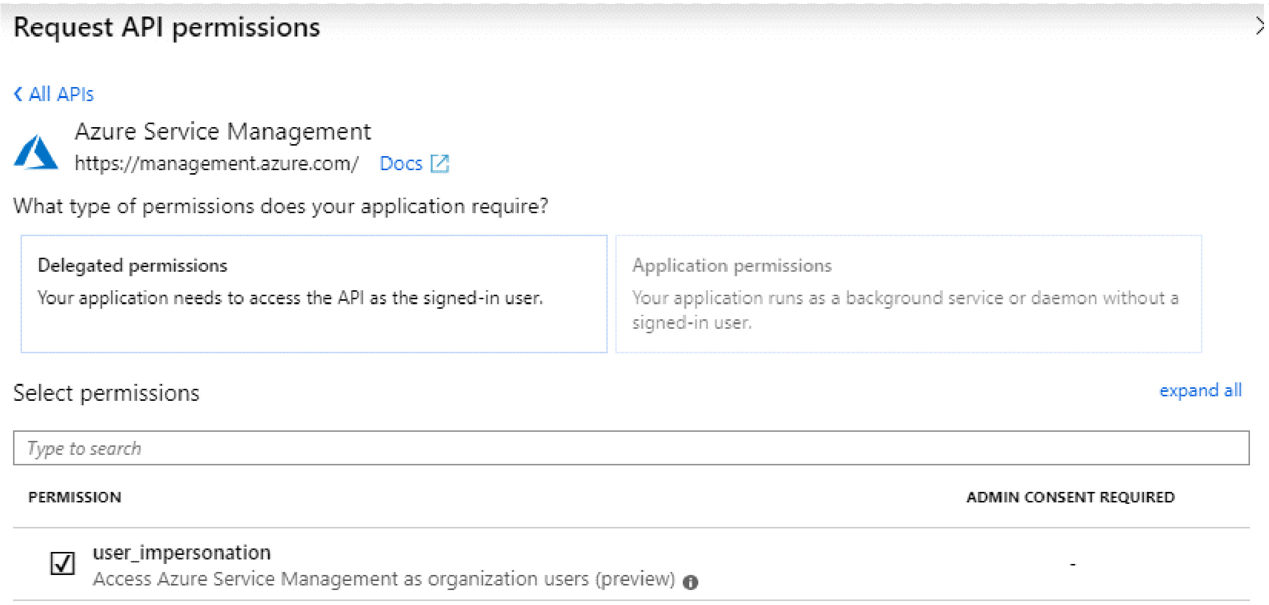
Azure Service Management
Programmatic access to much of the functionality available through the Azure portal

Azure Storage
Secure, massively scalable object and data lake storage for unstructured and semi-structured data

Customer Insights
Create profile and interaction models for your products

Data Export Service for Microsoft Dynamics 365
Export data from Microsoft Dynamics CRM organization to an external destination

4. Select **Access Azure Service Management as organization users** and then select **Add permissions**.



Request API permissions

< All APIs

Azure Service Management
https://management.azure.com/ Docs

What type of permissions does your application require?

Delegated permissions
Your application needs to access the API as the signed-in user.

Application permissions
Your application runs as a background service or daemon without a signed-in user.

Select permissions

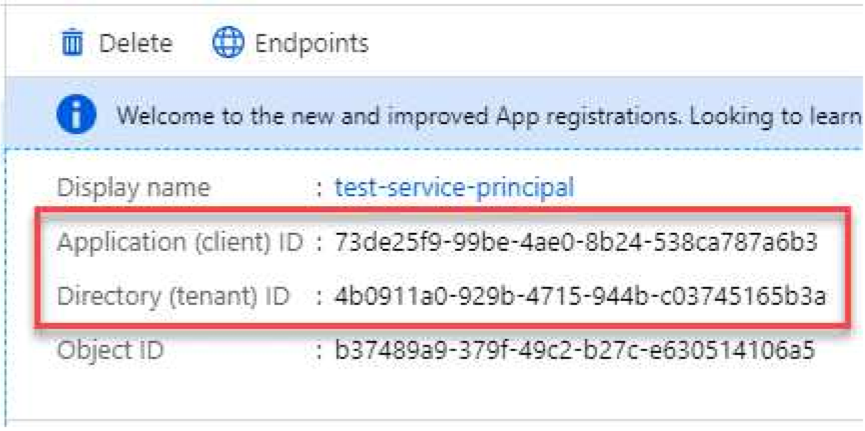
expand all

Type to search

PERMISSION	ADMIN CONSENT REQUIRED
☑ user_impersonation Access Azure Service Management as organization users (preview)	-

Get the application ID and directory ID for the application

1. In the **Microsoft Entra ID** service, select **App registrations** and select the application.
2. Copy the **Application (client) ID** and the **Directory (tenant) ID**.



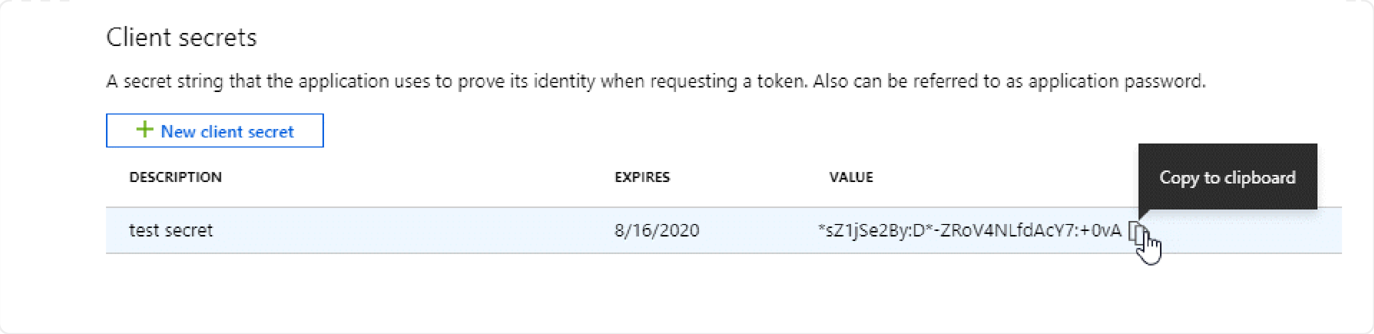
Welcome to the new and improved App registrations. Looking to learn

Display name : test-service-principal
Application (client) ID : 73de25f9-99be-4ae0-8b24-538ca787a6b3
Directory (tenant) ID : 4b0911a0-929b-4715-944b-c03745165b3a
Object ID : b37489a9-379f-49c2-b27c-e630514106a5

When you add the Azure account to the Console, you need to provide the application (client) ID and the directory (tenant) ID for the application. The Console uses the IDs to programmatically sign in.

Create a client secret

1. Open the **Microsoft Entra ID** service.
2. Select **App registrations** and select your application.
3. Select **Certificates & secrets > New client secret**.
4. Provide a description of the secret and a duration.
5. Select **Add**.
6. Copy the value of the client secret.



Client secrets

A secret string that the application uses to prove its identity when requesting a token. Also can be referred to as application password.

+ New client secret

DESCRIPTION	EXPIRES	VALUE
test secret	8/16/2020	*sZ1jSe2By:D*-ZRoV4NLfdAcY7:+0vA

Install a Console agent in your VCenter environment

NetApp supports installing the Console agent in your VCenter environment. The OVA file includes a pre-configured VM image that you can deploy in your VMware environment. A file download or URL deployment is available directly from the NetApp Console. It includes the Console agent software and a self-signed certificate.

Download the OVA or copy the URL

Download the OVA or copy the OVA URL directly from the NetApp Console.

1. Select **Administration > Agents**.
2. On the **Overview** page, select **Deploy agent > On-Premises**.
3. Select **With OVA**.
4. Choose to either download the OVA or copy the URL to use in VCenter.

Deploy the agent in your VCenter

Log into your VCenter environment to deploy the agent.

Steps

1. Upload the self-signed certificate to your trusted certificates if your environment requires it. You replace this certificate after installation.Learn how to replace the self-signed certificate.
2. Deploy the OVA from the content library or local system.

From the local system	From the content library
a. Right-click and select **Deploy OVF template…**. b. Choose the OVA file from the URL or browse to its location, then select **Next**.	a. Go to your content library and select the Console agent OVA. b. Select **Actions** > **New VM from this template**

3. Complete the Deploy OVF Template wizard to deploy the Console agent.
4. Select a name and folder for the VM, then select **Next**.
5. Select a compute resource, then select **Next**.
6. Review the details of the template, then select **Next**.
7. Accept the license agreement, then select **Next**.
8. Choose the type of proxy configuration you want to use: explicit proxy, transparent proxy, or no proxy.

9. Select the datastore where you want to deploy the VM, then select **Next**. Be sure it meets host requirements.
10. Select the network to which you want to connect the VM, then select **Next**. Ensure the network is IPv4 and has outbound internet access to the required endpoints.
11. in the **Customize template** window, complete the following fields:
    - **Proxy information**
        - If you selected explicit proxy, enter the proxy server hostname or IP address and port number, as well as the username, password.
        - If you selected transparent proxy, upload the respective certificate.
    - **Virtual Machine Configuration**
        - **Skip config check**: This check box is unchecked by default which means the agent runs a configuration check to validate network access.
            - NetApp recommends leaving this box unchecked so that the installation includes a configuration check of the agent. The Configuration check validates that the agent has network access to the required endpoints. If it deployment fails because of connectivity issues, you can access the validation report and logs from the agent host. In some cases, if you are confident that the agent has network access, you can choose to skip the check. For example, if you are still using the previous endpoints used for agent upgrades, the validation fails with an error. To avoid this, mark the check box to install without a validation check. Learn how to update your endpoint list.
        - **Maintenance password**: Set the password for the `maint` user that allows access to the agent maintenance console.
        - **NTP servers**: Specify one or more NTP servers for time synchronization.
        - **Hostname**: Set the hostname for this VM. It must not include the search domain. For example, an FQDN of console10.searchdomain.company.com should be entered as console10.
        - **Primary DNS**: Specify the primary DNS server to use for name resolution.
        - **Secondary DNS**: Specify the secondary DNS server to use for name resolution.
        - Search domains: Specify the search domain name to use when resolving the hostname. For example, if the FQDN is console10.searchdomain.company.com, then enter searchdomain.company.com.
        - **IPv4 address**: The IP address that is mapped to the hostname.
        - **IPv4 subnet mask**: The subnet mask for the IPv4 address.
        - **IPv4 gateway address**: The gateway address for the IPv4 address.
12. Select **Next**.
13. Review the details in the **Ready to complete** window, select **Finish**.

    The vSphere task bar shows the progress as the Console agent is deployed.
14. Power on the VM.

> ⓘ If the deployment fails, you can access the validation report and logs from the agent host. Learn how to troubleshoot installation issues.

Register the Console agent with NetApp Console

Log into the Console and associate the Console agent with your organization. How you log in depends on the mode in which you are using Console. If you are using the Console in standard mode, you log in through the SaaS website. If you are using the Console in restricted or private mode, you log in locally from the Console agent host.

Steps

1. Open a web browser and enter the Console agent host URL:

   The Console host URL can be a localhost, a private IP address, or a public IP address, depending on the configuration of the host. For example, if the Console agent is in the public cloud without a public IP address, you must enter a private IP address from a host that has a connection to the Console agent host.

2. Sign up or log in.
3. After you log in, set up the Console:
   a. Specify the Console organization to associate with the Console agent.
   b. Enter a name for the system.
   c. Under **Are you running in a secured environment?** keep restricted mode disabled.

      Restricted mode isn’t supported when the Console agent is installed on-premises.

   d. Select **Let’s start**.

Add cloud provider credentials to the Console

After you install and set up the Console agent, add your cloud credentials so that the Console agent has the required permissions to perform actions in AWS or Azure.

AWS

Before you begin

If you just created these AWS credentials, they may take a few minutes to become available. Wait a few minutes before you add the credentials to the Console.

Steps

1. Select **Administration > Credentials**.
2. Select **Organization credentials**.
3. Select **Add Credentials** and follow the steps in the wizard.
    a. **Credentials Location**: Select *Amazon Web Services > Agent.
    b. **Define Credentials**: Enter an AWS access key and secret key.
    c. **Marketplace Subscription**: Associate a Marketplace subscription with these credentials by subscribing now or by selecting an existing subscription.
    d. **Review**: Confirm the details about the new credentials and select **Add**.

You can now go to the NetApp Console to start using the Console agent.

Azure

Before you begin

If you just created these Azure credentials, they may take a few minutes to become available. Wait a few minutes before you add the credentials the Console agent.

Steps

1. Select **Administration > Credentials**.
2. Select **Add Credentials** and follow the steps in the wizard.
    a. **Credentials Location**: Select **Microsoft Azure > Agent**.
    b. **Define Credentials**: Enter information about the Microsoft Entra service principal that grants the required permissions:
        - Application (client) ID
        - Directory (tenant) ID
        - Client Secret
    c. **Marketplace Subscription**: Associate a Marketplace subscription with these credentials by subscribing now or by selecting an existing subscription.
    d. **Review**: Confirm the details about the new credentials and select **Add**.

Result

THe Console agent now has the permissions that it needs to perform actions in Azure on your behalf. You can now go to the NetApp Console to start using the Console agent.

Ports for the on-premises Console agent

The Console agent uses *inbound* ports when installed manually on an on-premises Linux host. Refer to these ports for planning purposes.

These inbound rules apply to all NetApp Console deployment modes.

Protocol	Port	Purpose
HTTP	80	• Provides HTTP access from client web browsers to the local user interface • Used during the Cloud Volumes ONTAP upgrade process
HTTPS	443	Provides HTTPS access from client web browsers to the local user interface

Maintain Console agents

Maintain a VCenter or ESXi host for the Console agent

You can make changes to your existing VCenter or ESXi host after you deploy the Console agent. For example, you can increase the CPU or RAM of the VM instance that hosts the Console agent.

Perform these maintenance tasks using the VM web console:

- Increase disk size
- Restart the agent
- Update static routes
- Update search domains

Limitations

Upgrading the agent through the console is not yet supported. In addition, you can only view information about the IP address, DNS, and gateways.

Access the VM maintenance console

You can access the maintenance Console from the VSphere client.

Steps

1. Open the VSphere client and log in to your VCenter.
2. Select the VM instance that hosts the Console agent.
3. Select **Launch Web Console**.
4. Log in to the VM instance using the user name and password that you specified when you created the VM instance. The username is `maint` and the password is the one that you specified when you created the VM instance.

Change the maint user password

You can change the password for the `maint` user.

Steps

1. Open the VSphere client and log in to your VCenter.
2. Select the VM instance that hosts the Console agent.
3. Select **Launch Web Console**.

4. Log in to the VM instance using the user name and password that you specified when you created the VM instance. The username is `maint` and the password is the one that you specified when you created the VM instance.
5. Enter `1` to view the `System Configuration` menu.
6. Enter `1` to change the maintenance user password and follow the on-screen prompts.

Increase the CPU or RAM of the VM instance

You can increase the CPU or RAM of the VM instance that hosts the Console agent.

Edit the VM instance settings in your VCenter or ESXi host, then use the maintenance Console to apply the changes.

Steps in the VSphere client

1. Open the VSphere client and log in to your VCenter.
2. Select the VM instance that hosts the Console agent.
3. Right-click the VM instance and select **Edit Settings**.
4. Increase the hard drive space used for /opt or the /var partition.
   a. Select **Hard Disk 2** to increase the hard drive space used for /opt.
   b. Select **Hard Disk 3** to increase the hard drive space used for /var.
5. Save your changes.

Steps in the maintenance console

1. Open the VSphere client and log in to your VCenter.
2. Select the VM instance that hosts the Console agent.
3. Select **Launch Web Console**.
4. Log in to the VM instance using the user name and password that you specified when you created the VM instance. The username is `maint` and the password is the one that you specified when you created the VM instance.
5. Enter `` 1 to view the `System Configuration `` menu.
6. Enter `2` and follow the on-screen prompts. The console scans for new settings and increases the size of the partitions.

View network settings for the agent VM

View the network settings for the agent VM in the VSphere client to confirm or troubleshoot network issues. You can only view (not update) the following network settings: IP address and DNS details.

Steps

1. Open the VSphere client and log in to your VCenter.
2. Select the VM instance that hosts the Console agent.
3. Select **Launch Web Console**.
4. Log in to the VM instance using the user name and password that you specified when you created the VM instance. The username is `maint` and the password is the one that you specified when you created the VM instance.

5. Enter `2` to view the `Network Configuration` menu.
6. Enter a number between 1 and 6 to view the corresponding network settings.

Update the static routes for the agent VM

Add, update, or remove static routes for the agent VM as needed.

Steps

1. Open the VSphere client and log in to your VCenter.
2. Select the VM instance that hosts the Console agent.
3. Select **Launch Web Console**.
4. Log in to the VM instance using the user name and password that you specified when you created the VM instance. The username is `maint` and the password is the one that you specified when you created the VM instance.
5. Enter `2` to view the `Network Configuration` menu.
6. Enter `7` to update static routes and follow the on-screen prompts.
7. Press Enter.
8. Optionally, make additional changes.
9. Enter `9` to commit your changes.

Update domain search settings for the agent VM

You can update the search domain settings for the agent VM.

Steps

1. Open the VSphere client and log in to your VCenter.
2. Select the VM instance that hosts the Console agent.
3. Select **Launch Web Console**.
4. Log in to the VM instance using the user name and password that you specified when you created the VM instance. The username is `maint` and the password is the one that you specified when you created the VM instance.
5. Enter ``2` `` to view the `Network Configuration` menu.
6. Enter `8` to update the domain search settings and follow the on-screen prompts.
7. Press Enter.
8. Optionally, make additional changes.
9. Enter `9` to commit your changes.

Access the agent diagnostic tools

Access diagnostic tools to troubleshoot issues with the Console agent. NetApp Support may ask you to do this when troubleshooting issues.

Steps

1. Open the VSphere client and log in to your VCenter.

2. Select the VM instance that hosts the Console agent.
3. Select **Launch Web Console**.
4. Log in to the VM instance using the user name and password that you specified when you created the VM instance. The username is `maint` and the password is the one that you specified when you created the VM instance.
5. Enter `3` to view the Support and Diagnostics menu.
6. Enter `1` to access the diagnostic tools and follow the on-screen prompts.
   + For example, you can verify that all agent services are running. Check the Console agent status.

Access the agent diagnostic tools remotely

You can access diagnostic tools remotely with a tool such as Putty. Enable SSH access to the agent VM by assigning a one-time password.

SSH access enables advanced terminal features like copy and paste.

Steps

1. Open the VSphere client and log in to your VCenter.
2. Select the VM instance that hosts the Console agent.
3. Select **Launch Web Console**.
4. Log in to the VM instance using the user name and password that you specified when you created the VM instance. The username is `maint` and the password is the one that you specified when you created the VM instance.
5. Enter `3` to view the `Support and Diagnostics` menu.
6. Enter `2` to access the diagnostic tools and follow the on-screen prompts to configure a one-time password that expires in 24 hours.
7. Use an SSH tool such as Putty to connect to the agent VM using the user name `diag` and the one-time password that you configured.

Install a CA-signed certificate for web-based console access

When you use the NetApp Console in restricted mode, the user interface is accessible from the Console agent virtual machine that's deployed in your cloud region or on-premises. By default, the Console uses a self-signed SSL certificate to provide secure HTTPS access to the web-based console running on the Console agent.

If required by your business, you can install a certificate signed by a certificate authority (CA), which provides better security protection than a self-signed certificate. After you install the certificate, the Console uses the CA-signed certificate when users access the web-based console.

Install an HTTPS certificate

Install a certificate signed by a CA for secure access to the web-based console running on the Console agent.

About this task

You can install the certificate using one of the following options:

- Generate a certificate signing request (CSR) from the Console, submit the certificate request to a CA, and then install the CA-signed certificate on the Console agent.

The key pair that the Console uses to generate the CSR is stored internally on the Console agent. The Console automatically retrieves the same key pair (private key) when you install the certificate on the Console agent.

- Install a CA-signed certificate that you already have.

  With this option, the CSR is not generated through the Console. You generate the CSR separately and store the private key externally. You provide the Console with the private key when you install the certificate.

Steps

1. Select **Administration > Agents**.
2. On the **Overview** page, select the action menu for a Console agent and select **HTTPS Setup**.

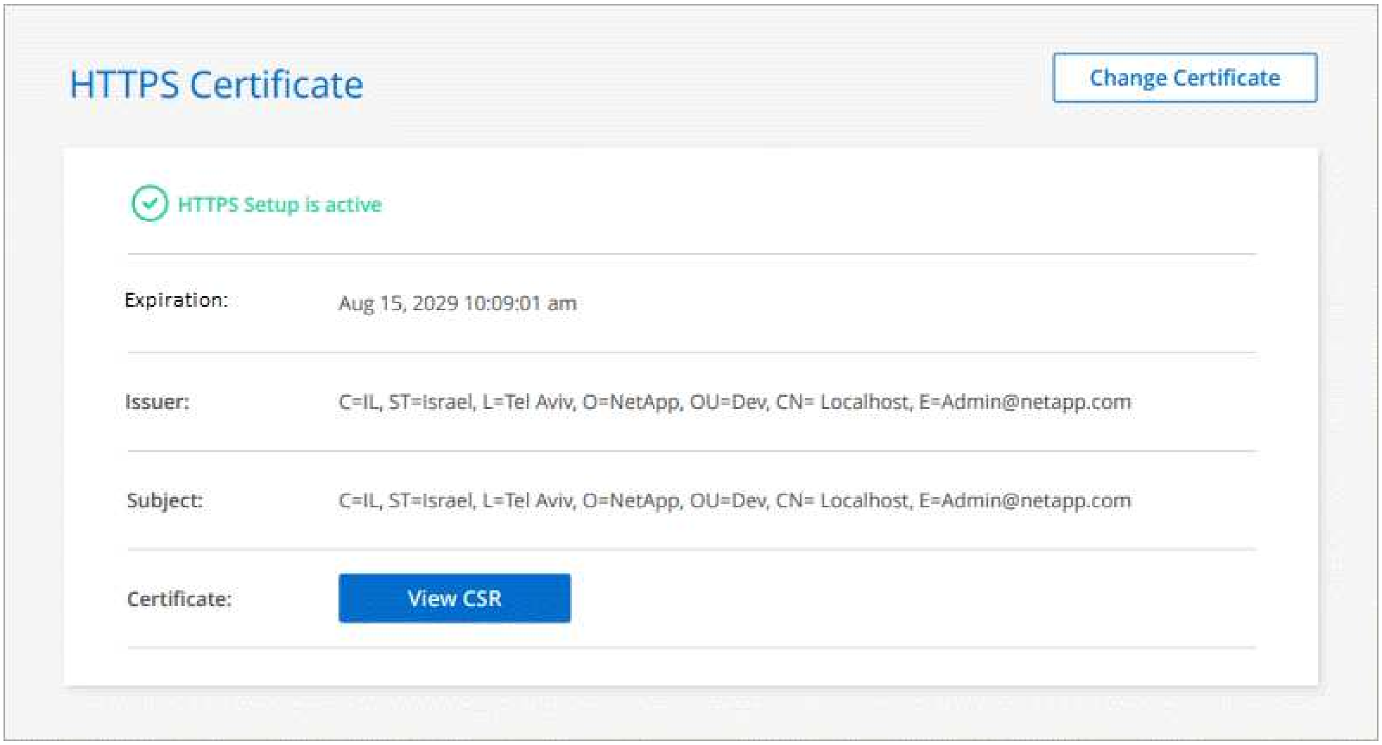
   The Console agent must be connected to edit it.

3. In the HTTPS Setup page, install a certificate by generating a certificate signing request (CSR) or by installing your own CA-signed certificate:

Option	Description
Generate a CSR	a. Enter the host name or DNS of the Console agent host (its Common Name), and then select **Generate CSR**. The Console displays a certificate signing request. b. Use the CSR to submit an SSL certificate request to a CA. The certificate must use the Privacy Enhanced Mail (PEM) Base-64 encoded X.509 format. c. Upload the certificate file and then select **Install**.
Install your own CA-signed certificate	a. Select **Install CA-signed certificate**. b. Load both the certificate file and the private key and then select **Install**. The certificate must use the Privacy Enhanced Mail (PEM) Base-64 encoded X.509 format.

Result

The Console agent now uses the CA-signed certificate to provide secure HTTPS access. The following image shows an agent that is configured for secure access:


HTTPS Certificate

HTTPS Setup is active

Expiration: Aug 15, 2029 10:09:01 am

Issuer: C=IL, ST=Israel, L=Tel Aviv, O=NetApp, OU=Dev, CN= Localhost, E=Admin@netapp.com

Subject: C=IL, ST=Israel, L=Tel Aviv, O=NetApp, OU=Dev, CN= Localhost, E=Admin@netapp.com

Certificate:

Renew the Console HTTPS certificate

You should renew the agent's HTTPS certificate before it expires to ensure secure access. If you don't renew the certificate before it expires, a warning appears when users access the web console using HTTPS.

Steps

1. Select **Administration > Agents**.
2. On the **Overview** page, select the action menu for a Console agent and select **HTTPS Setup**.

   Details about the certificate displays, including the expiration date.

3. Select **Change Certificate** and follow the steps to generate a CSR or install your own CA-signed certificate.

Configure a Console agent to use a proxy server

If your corporate policies require you to use a proxy server for all communication to the internet, then you need to configure your agents to use that proxy server. If you didn't configure a Console agent to use a proxy server during installation, then you can configure the Console agent to use that proxy server at any time.

The agent's proxy server enables outbound internet access without a public IP or NAT gateway. The proxy server provides outbound connectivity only for the Console agent, not for Cloud Volumes ONTAP systems.

If Cloud Volumes ONTAP systems lack outbound internet access, the Console configures them to use the Console agent's proxy server. You must ensure that the Console agent's security group allows inbound connections over port 3128. Open this port after deploying the Console agent.

If the Console agent itself doesn't have an outbound internet connection, Cloud Volumes ONTAP systems cannot use the configured proxy server.

Supported configurations

- Transparent proxy servers are supported for agents that serve Cloud Volumes ONTAP systems. If you use NetApp data services with Cloud Volumes ONTAP, create a dedicated agent for Cloud Volumes ONTAP where you can use a transparent proxy server.
- Explicit proxy servers are supported with all agents, including those that manage Cloud Volumes ONTAP systems and those that manage NetApp data services.
- HTTP and HTTPS.
- The proxy server can reside in the cloud or in your network.

ⓘ Once you have configured a proxy, you cannot change the proxy type. If you need to change the proxy type, you remove the Console agent and add a new agent with the new proxy type.

Enable an explicit proxy on a Console agent

When you configure a Console agent to use a proxy server, that agent and the Cloud Volumes ONTAP systems that it manages (including any HA mediators), all use the proxy server.

This operation restarts the Console agent. Verify the Console agent is idle before proceeding.

Steps

1. Select **Administration > Agents**.
2. On the **Overview** page, select the action menu for a Console agent and select **Edit agent**.

   The Console agent must be active to edit it.
3. Select **HTTP Proxy Configuration**.
4. Select **Explicit proxy** in the Configuration type field.
5. Select **Enable Proxy**.
6. Specify the server using the syntax http://*address:port* or https://*address:port*
7. Specify a user name and password if basic authentication is required for the server.

   Note the following:

   - The user can be a local user or domain user.
   - For a domain user, you must enter the ASCII code for the \ as follows: domain-name%92user-name

     For example: netapp%92proxy
   - The Console doesn’t support passwords that include the @ character.
8. Select **Save**.

Enable a transparent proxy for a Console agent

Only Cloud Volumes ONTAP supports using a transparent proxy on the Console agent. If you use NetApp data services in addition to Cloud Volumes ONTAP, you should create a separate agent to use for data services or to use for Cloud Volumes ONTAP.

Before enabling a transparent proxy, ensure that the following requirements are met:

- The agent is installed on the same network as the transparent proxy server.
- TLS inspection is enabled on the proxy server.
- You have a certificate in PEM format that matches the one used on the transparent proxy server.
- You do not use the Console agent for any NetApp data services other than Cloud Volumes ONTAP.

To configure an existing agent to use a transparent proxy server, you use the Console agent maintenance tool that is available through the command line on the Console agent host.

When you configure a proxy server, the Console agent restarts. Verify the Console agent is idle before proceeding.

Steps

Ensure that you have a certificate file in PEM format for the proxy server. If you do not have a certificate, contact your network administrator to obtain one.

1. Open a command-line interface on the Console agent host.
2. Navigate to the Console agent maintenance tool directory: `/opt/application/netapp/service-manager-2/agent-maint-console`
3. Run the following command to enable the transparent proxy, where `/home/ubuntu/<certificate-file>.pem` is the directory and name certificate file that you have for the proxy server:

   ```
   ./agent-maint-console proxy add -c /home/ubuntu/<certificate-file>.pem
   ```

   Ensure that the certificate file is in PEM format and resides in the same directory as the command or specify the full path to the certificate file.

   ```
   ./agent-maint-console proxy add -c /home/ubuntu/<certificate-file>.pem
   ```

Modify the transparent proxy for the Console agent

You can update a Console agent's existing transparent proxy server by using the `proxy update` command or remove the transparent proxy server by using the `proxy remove` command. For more information, review the documentation for Agent maintenance console.

Once you have configured a proxy, you cannot change the proxy type. If you need to change the proxy type, you remove the Console agent and add a new agent with the new proxy type.

Update the Console agent proxy if it loses access to the internet

If the proxy configuration for your network changes, your agent might lose access to the internet. For example, if someone changes the password for the proxy server or updates the certificate. In this case, you'll need to access the UI from the Console agent host directly and update the settings. Ensure you have network access to the Console agent host and that you can log into the Console.

Enable direct API traffic

If you configured a Console agent to use a proxy server, you can enable direct API traffic on the Console agent in order to send API calls directly to cloud provider services without going through the proxy. Agents running in AWS, Azure, or Google Cloud support this option.

If you disable Azure Private Links with Cloud Volumes ONTAP and use service endpoints, enable direct API traffic. Otherwise, the traffic won't be routed properly.

Learn more about using an Azure Private Link or service endpoints with Cloud Volumes ONTAP

Steps

1. Select **Administration > Agents**.
2. On the **Overview** page, select the action menu for a Console agent and select **Edit agent**.

   The Console agent must be active to edit it.

3. Select **Support Direct API Traffic**.
4. Select the checkbox to enable the option and then select **Save**.

Troubleshoot the Console agent

To troubleshoot issues with a Console agent, you can verify issues yourself or work with NetApp Support who might ask for your system ID, agent version, or the latest AutoSupport messages.

If you have a NetApp Support Site account, you can also view the NetApp Knowledge Base.

Common error messages and resolutions

This table lists common error messages and shows how to fix them:

Error message	Explanation	What to do
Unable to load the Console agent UI	Agent installation has failed	• Verify that the Service Manager service is active. • Verify that all containers are running. • Ensure your firewall allows access to the service at port 8888. • If you still have problems, contact support.
Cannot access the NetApp agent UI	This message appears when trying to access the IP address of an agent. The agent can fail to initialize if it doesn't have the correct network access or if it is unstable.	• Connect to the Console agent. • Verify that the Service Manager service • Verify that the agent has the network access it needs. Learn more about required network access endpoints.

Error message	Explanation	What to do
Unable to load agent settings	The Console displays this message when you try to access the Agent settings page..	- Check if the OCCM container is running and working. - If the issue persists, contact support.
Unable to load support information for the agent.	This message displays if the agent cannot access your support account.	- Verify that the agent has outbound access to the required endpoints. Learn more about required network access endpoints.

Check the Console agent status

Use one of the following commands to verify your Console agent. All services should have a status of *Running*. If this isn't the case, contact NetApp support.

> For more detailed information about accessing the Console agent diagnostics, see the following topics:
>
> - Check the Console agent status (for Linux host deployments)
> - Check the Console agent status (for VCenter deployments)

Docker (for Ubuntu and VCenter deployments)

```
docker ps -a
```

Podman (for RedHat Enterprise Linux deployments)

```
podman ps -a
```

View the Console agent version

View the Console agent version to confirm the upgrade or share it with your NetApp representative.

Steps

1. Select **Administration > Support > Agents**.

   The Console displays the version at the top of the page.

Verify network access

Ensure that the Console agent has the network access it needs. Learn more about required network access points.

Run configuration checks on the Console agent

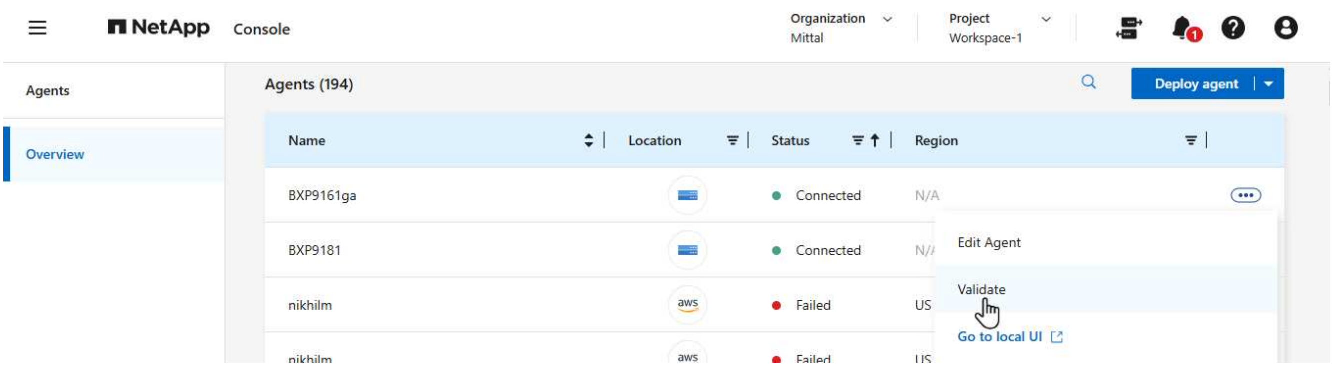
Run configuration checks on Console agents from the Console or or the Agent maintenance console to make sure they are connected.

You can also run configuration checks using the agent maintenance console. Learn more about using the config-checker validate command.

> You can only validate agents that have a status of **Connected**.

Steps from the Console

1. Select **Administration > Agents**.
2. Select the action menu for a Console agent that you want to check and choose **Validate**.



Name	Location	Status	Region
BXP9161ga		● Connected	N/A
BXP9181		● Connected	N/
nikhilm	aws	● Failed	US
nikhilm	aws	● Failed	US

Validation can take up to 15 minutes. Results show when it is done.

Console agent installation issues

If the installation fails, view the report and logs to resolve the issues.

You can also access the validation report in JSON format and the configuration logs directly from the Console agent host in the following directories:

```
/tmp/netapp-console-agents/logs

/tmp/netapp-console-agents/results.json
```

> - For new agent deployments, NetApp checks for the following endpoints: listed here. This configuration check fails with an error if you are using the previous endpoints used for upgrades, listed here. NetApp recommends updating your firewall rules to allow access to the current endpoints and block access to the previous endpoints at your earliest convenience Learn how to update your networking.
> - If you update the endpoints in your firewall, your existing agents will continue to work.

Disable configuration checks for manual installations

There may be times when you need to disable the configuration checks that verify outbound connectivity during installation. For example, when manually installing an agent in your Government Cloud environment, you need to disable the configuration checks or the installation will fail.

Steps

You disable the configuration check by setting the *skipConfigCheck* flag in the *com/opt/application/netapp/service-manager-2/config.json* file. By default, this flag is set to false and the configuration check verifies outbound access for the agent. Set this flag to true to disable the check. Be familiar with JSON syntax before completing this step.

To re-enable the configuration check, use these steps and set the *skipConfigCheck* flag to false.

Steps

1. Access the Console agent host as root or with sudo privileges.
2. Create a backup copy of the */opt/application/netapp/service-manager-2/config.json* file to ensure you can revert your changes.
3. Stop the service manager 2 service by running the following command:

```
systemctl stop netapp-service-manager.service
```

1. Edit the */opt/application/netapp/service-manager-2/config.json* file and change the value of the *skipConfigCheck* flag to true.

   ```
     "skipConfigCheck": true
   ```

2. Save your file.
3. Restart the service manager 2 service by running the following command:

   ```
   systemctl restart netapp-service-manager.service
   ```

Work with NetApp Support

If you haven't been able to resolve the issues with your Console agent, you may want to contact NetApp Support. NetApp support may ask for the Console agent ID or for you to send the Console agent logs to them if they don't have them already.

Find the Console agent ID

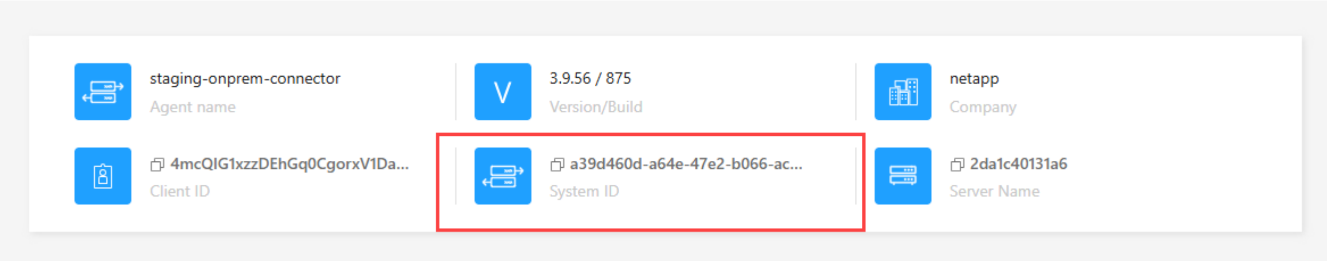
To help you get started, you may need the system ID of your Console agent. The ID is typically used for licensing and troubleshooting purposes.

Steps

1. Select **Administration > Support > Agents**.

   You can find the system ID at the top of the page.

   Example



staging-onprem-connector
Agent name

3.9.56 / 875
Version/Build

netapp
Company

4mcQIG1xzzDEhGq0CgorxV1Da...
Client ID

a39d460d-a64e-47e2-b066-ac...
System ID

2da1c40131a6
Server Name

2. Hover and click on the ID to copy it.

Download or send an AutoSupport message

If you're having problems, NetApp might ask you to send an AutoSupport message to NetApp support for troubleshooting purposes.

> The NetApp Console takes up to five hours to send AutoSupport messages due to load balancing. For urgent communication, download the file and send it manually.

Steps

1. Select **Administration > Support > Agents**.
2. Depending on how you need to send the information to NetApp support, choose one of the following options:
    a. Select the option to download the AutoSupport message to your local machine. You can then send it to NetApp Support using a preferred method.
    b. Select **Send AutoSupport** to directly send the message to NetApp Support.

Fix download failures when using a Google Cloud NAT gateway

The Console agent automatically downloads software updates for Cloud Volumes ONTAP. Your configuration can cause the download to fail if it uses a Google Cloud NAT gateway. You can correct this issue by limiting the number of parts that the software image is divided into. This step must be completed by using the API.

Step

1. Submit a PUT request to /occm/config with the following JSON as body:

```
{
  "maxDownloadSessions": 32
}
```

   The value for *maxDownloadSessions* can be 1 or any integer greater than 1. If the value is 1, then the downloaded image will not be divided.

   Note that 32 is an example value. The value depends on your NAT configuration and the number of simultaneous sessions.

Learn more about the /occm/config API call

Get help from the NetApp Knowledge Base

View troubleshooting information created by the NetApp Support team.

Uninstall and remove a Console agent

Uninstall the a Console agent to troubleshoot issues or to permanently remove it from the host. The steps that you need to use depends on the deployment mode that you're using. Once you have removed a Console agent from your environment, you can remove it from the Console.

Learn about NetApp Console deployment modes.

Uninstall the agent when using standard or restricted mode

If you're using standard mode or restricted mode (in other words, the agent host has outbound connectivity), then you should follow the steps below to uninstall the agent.

Steps

1. Connect to the Linux VM for the agent.
2. From the Linux host, run the uninstallation script:

   ```
   /opt/application/netapp/service-manager-2/uninstall.sh [silent]
   ```

   silent runs the script without prompting you for confirmation.

Remove Console agents from the Console

If you have deleted an agent VM or uninstalled the agent, you should remove it from the list of agents in the Console. After you delete an agent VM or uninstall the agent software, the agent shows a status of **Disconnected** in the Console.

Note the following about removing a Console agent:

- This action doesn't delete the virtual machine.
- This action can't be reverted—once you remove a Console agent, you can't add it back.

Steps

1. Select **Administration > Agents**.
2. On the **Overview** page , select the action menu for a disconnected agent and select **Remove agent**.
3. Enter the name of the agent to confirm and then select **Remove**.

Manage cloud provider credentials

AWS

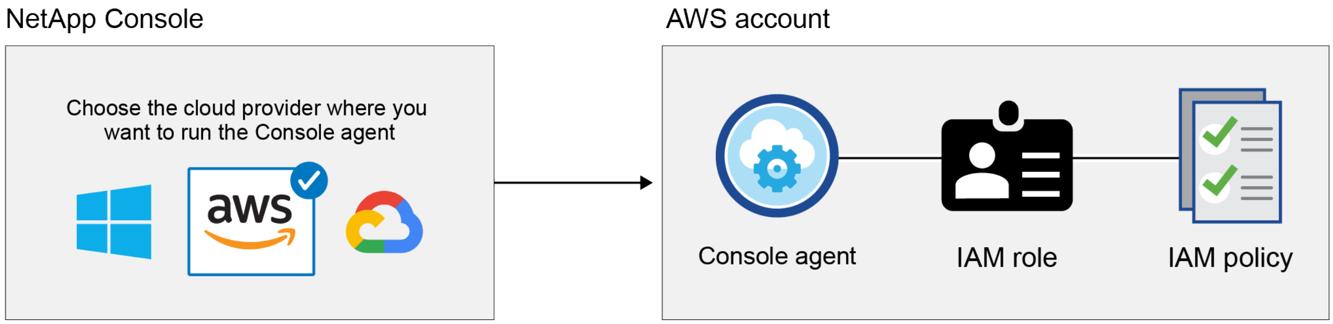
Learn about AWS credentials and permissions in NetApp Console

You manage AWS credentials and marketplace subscriptions directly from NetApp Console to ensure secure deployment of Cloud Volumes ONTAP and other data services by providing appropriate IAM credentials during Console agent deployment and associating them with AWS Marketplace subscriptions for billing.

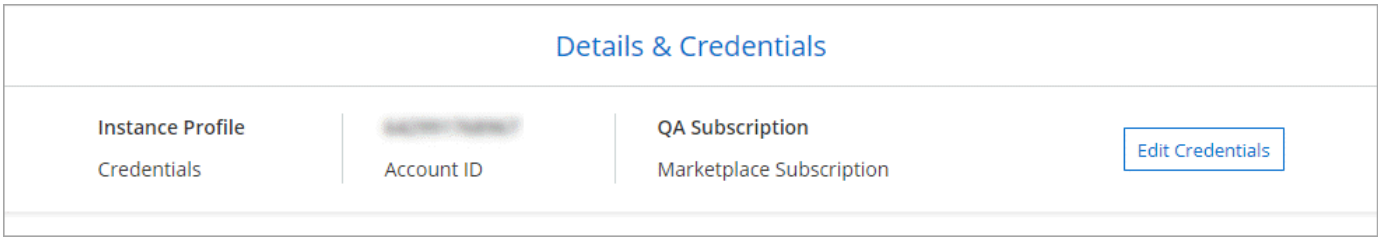
Initial AWS credentials

When you deploy an Console agent from the Console, you need to provide the ARN of an IAM role or access keys for an IAM user. The authentication method must have permissions to deploy the Console agent in AWS. The required permissions are listed in the Agent deployment policy for AWS.

When the Console launches the Console agent in AWS, it creates an IAM role and a profile for the agent. It also attaches a policy that provides the Console agent with permissions to manage resources and processes within that AWS account. Review how the Agent uses the permissions.


NetApp Console
Choose the cloud provider where you want to run the Console agent
aws
AWS account
Console agent
IAM role
IAM policy

If you add a new Cloud Volumes ONTAP system, the Console selects these AWS credentials by default:



Details & Credentials

Instance Profile	[redacted]	QA Subscription
Credentials	Account ID	Marketplace Subscription

Deploy all of your Cloud Volumes ONTAP systems using the initial AWS credentials, or you can add additional credentials.

Additional AWS credentials

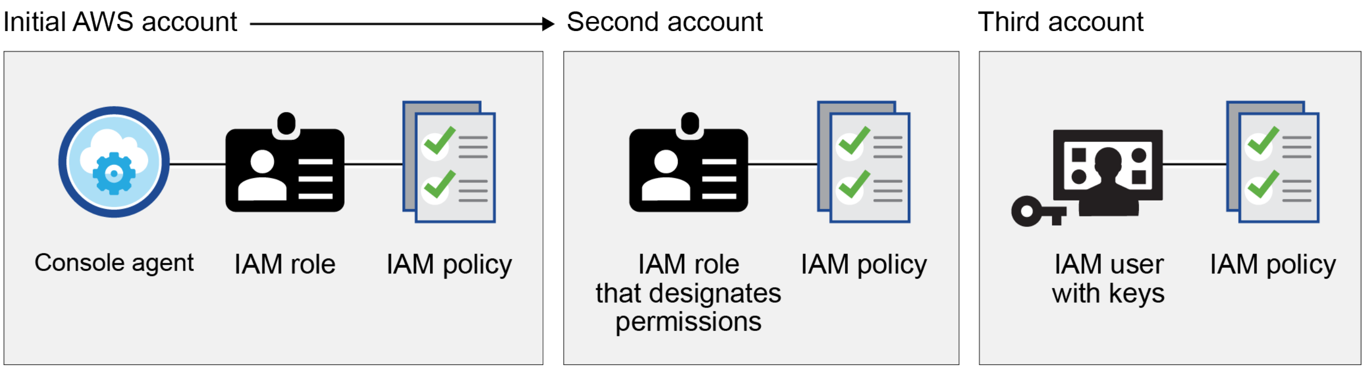
You might add additional AWS credentials to the Console in the following cases:

- To use your existing Console agent with an additional AWS account
- To create a new agent in a specific AWS account
- To create and manage FSx for ONTAP file systems

Review the sections below for more details.

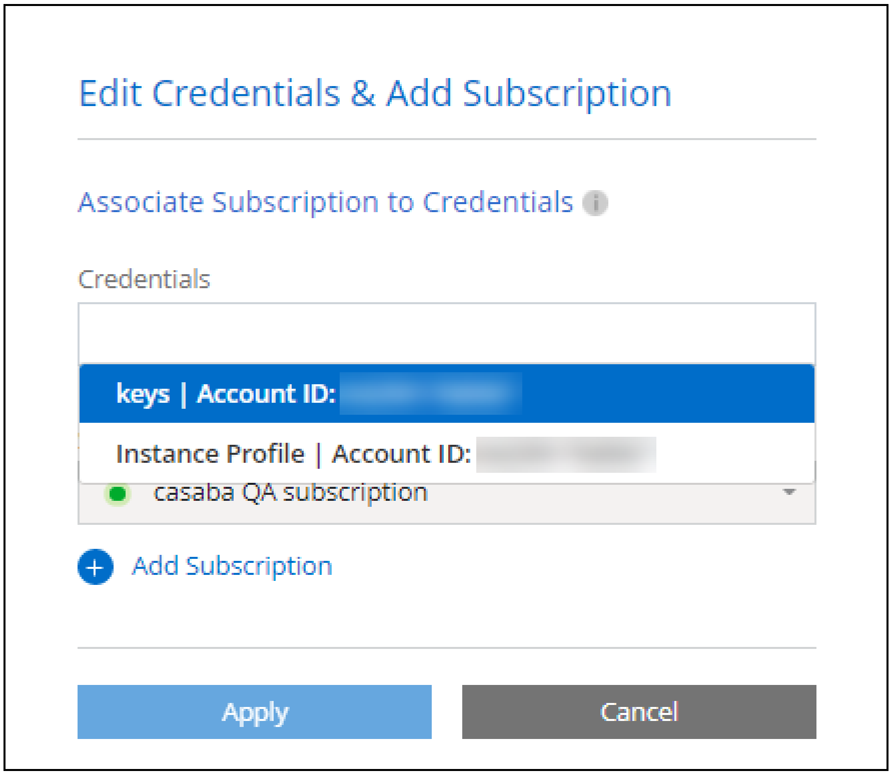
Add AWS credentials to use a Console agent with another AWS account

To use the Console with additional AWS accounts, provide AWS keys or the ARN of a role in a trusted account. The following image shows two additional accounts, one providing permissions through an IAM role in a trusted account and another through the AWS keys of an IAM user:



You add account credentials to the Console by specifying the Amazon Resource Name (ARN) of IAM role or the AWS keys for the IAM user.

For example, you can switch between credentials when creating a new Cloud Volumes ONTAP system:


Edit Credentials & Add Subscription

Associate Subscription to Credentials

Credentials

keys | Account ID: [redacted]

Instance Profile | Account ID: [redacted]

casaba QA subscription

Learn how to add AWS credentials to an existing agent.

Add AWS credentials to create a Console agent

Adding AWS credentials provides permissions to create a Console agent.

Learn how to add AWS credentials to the Console for creating a Console agent

Add AWS credentials for FSx for ONTAP

Add AWS credentials to the Console to provide the necessary permissions to create and manage an FSx for ONTAP system.

Learn how to add AWS credentials to the Console for Amazon FSx for ONTAP

Credentials and marketplace subscriptions

You must associate the credentials that you add to a Console agent with an AWS Marketplace subscription to pay for Cloud Volumes ONTAP at an hourly rate (PAYGO) and other NetApp data services or through an annual contract.
Learn how to associate an AWS subscription.

Note the following about AWS credentials and marketplace subscriptions:

- You can associate only one AWS Marketplace subscription with a set of AWS credentials
- You can replace an existing marketplace subscription with a new subscription

FAQ

The following questions are related to credentials and subscriptions.

How can I securely rotate my AWS credentials?

As described in the sections above, the Console enables you to provide AWS credentials in a few ways: an IAM role associated with the Console agent, by assuming an IAM role in a trusted account, or by providing AWS access keys.

With the first two options, the Console uses the AWS Security Token Service to obtain temporary credentials that rotate constantly. This process is the best practice—it's automatic and secure.

If you provide the Console with AWS access keys, you should rotate the keys by updating them in the Console at a regular interval. This is a completely manual process.

Can I change the AWS Marketplace subscription for Cloud Volumes ONTAP systems?

Yes, you can. When you change the AWS Marketplace subscription that's associated with a set of credentials, all existing and new Cloud Volumes ONTAP systems are charged against the new subscription.

Learn how to associate an AWS subscription.

Can I add multiple AWS credentials, each with different marketplace subscriptions?

All AWS credentials that belong to the same AWS account will be associated with the same AWS Marketplace subscription.

If you have multiple AWS credentials that belong to different AWS accounts, then those credentials can be associated with the same AWS Marketplace subscription or with different subscriptions.

Can I move existing Cloud Volumes ONTAP systems to a different AWS account?

No, it's not possible to move the AWS resources associated with your Cloud Volumes ONTAP system to a different AWS account.

How do credentials work for marketplace deployments and on-premises deployments?

The sections above describe the recommended deployment method for the Console agent, which is from the Console. You can also deploy an agent in AWS from the AWS Marketplace and you can manually install the Console agent software on your own Linux host or in your VCenter.

If you use the Marketplace, permissions are provided in the same way. You just need to manually create and set up the IAM role, and then provide permissions for any additional accounts.

For on-premises deployments, you can't set up an IAM role for the Console, but you can provide permissions using AWS access keys.

To learn how to set up permissions, refer to the following pages:

- Standard mode
  - Set up permissions for an AWS Marketplace deployment
  - Set up permissions for on-premises deployments
- Restricted mode
  - Set up permissions for restricted mode

Manage AWS credentials and marketplace subscriptions for NetApp Console

Add and manage AWS credentials so that you deploy and manage cloud resources in your AWS accounts from the NetApp Console. If you manage multiple AWS Marketplace subscriptions, you can assign each one of them to different AWS credentials from the Credentials page.

Overview

You can add AWS credentials to an existing Console agent or directly to the Console:

- Add additional AWS credentials to an existing agent

  Add AWS credentials to a Console agent to manage cloud resources. Learn how to add AWS credentials to a Console agent.

- Add AWS credentials to the Console for creating a Console agent

  Adding new AWS credentials to the Console provides the permissions needed to create a Console agent. Learn how to add AWS credentials to the NetApp Console.

- Add AWS credentials to the Console for FSx for ONTAP

  Add new AWS credentials to the Console to create and manage FSx for ONTAP. Learn how to set up permissions for FSx for ONTAP

How to rotate credentials

The NetApp Console enables you to provide AWS credentials in a few ways: an IAM role associated with the agent instance, by assuming an IAM role in a trusted account, or by providing AWS access keys. Learn more about AWS credentials and permissions.

With the first two options, the Console uses the AWS Security Token Service to obtain temporary credentials that rotate constantly. This process is the best practice because it's automatic and it's secure.

Manually rotate AWS access keys by updating them in the Console.

Add additional credentials to a Console agent

Add additional AWS credentials to a Console agent so that it has the permissions needed to manage resources and processes within your public cloud environment. You can either provide the ARN of an IAM role in another account or provide AWS access keys.

Learn how the NetApp Console uses AWS credentials and permissions.

Grant permissions

Grant permissions before adding AWS credentials to a Console agent. The permissions allow a Console agent to manage resources and processes within that AWS account. You can provide the permissions with the ARN of a role in a trusted account or AWS keys.

> ⓘ If you deployed a Console agent from the Console, it automatically added AWS credentials for the account in which you deployed a Console agent. This ensures the necessary permissions are in place for managing resources.

Choices

- Grant permissions by assuming an IAM role in another account
- Grant permissions by providing AWS keys

Grant permissions by assuming an IAM role in another account

You can set up a trust relationship between the source AWS account in which you deployed a Console agent and other AWS accounts by using IAM roles. You would then provide the Console with the ARN of the IAM roles from the trusted accounts.

If a Console agent is installed on-premises, you can’t use this authentication method. You must use AWS keys.

Steps

1. Go to the IAM console in the target account in which you want to provide a Console agent with permissions.
2. Under Access Management, select **Roles > Create Role** and follow the steps to create the role.

   Be sure to do the following:

   - Under **Trusted entity type**, select **AWS account**.
   - Select **Another AWS account** and enter the ID of the account where a Console agent instance resides.
   - Create the required policies by copying and pasting the contents of the IAM policies for a Console agent.
3. Copy the Role ARN of the IAM role so that you can paste it in the Console later on.

Result

The account has the required permissions. You can now add the credentials to a Console agent.

Grant permissions by providing AWS keys

If you want to provide the Console with AWS keys for an IAM user, then you need to grant the required permissions to that user. The the Console IAM policy defines the AWS actions and resources that the Console is allowed to use.

You must use this authentication method if a Console agent is installed on-premises. You can’t use an IAM role.

Steps

1. From the IAM console, create policies by copying and pasting the contents of the IAM policies for a Console agent.

   AWS Documentation: Creating IAM Policies

2. Attach the policies to an IAM role or an IAM user.
   - AWS Documentation: Creating IAM Roles
   - AWS Documentation: Adding and Removing IAM Policies

Add the credentials to an existing agent

After you provide an AWS account with the required permissions, you can add the credentials for that account to an existing agent. This enables you to launch Cloud Volumes ONTAP systems in that account using the same agent.

> New credentials in your cloud provider may take a few minutes to become available.

Steps

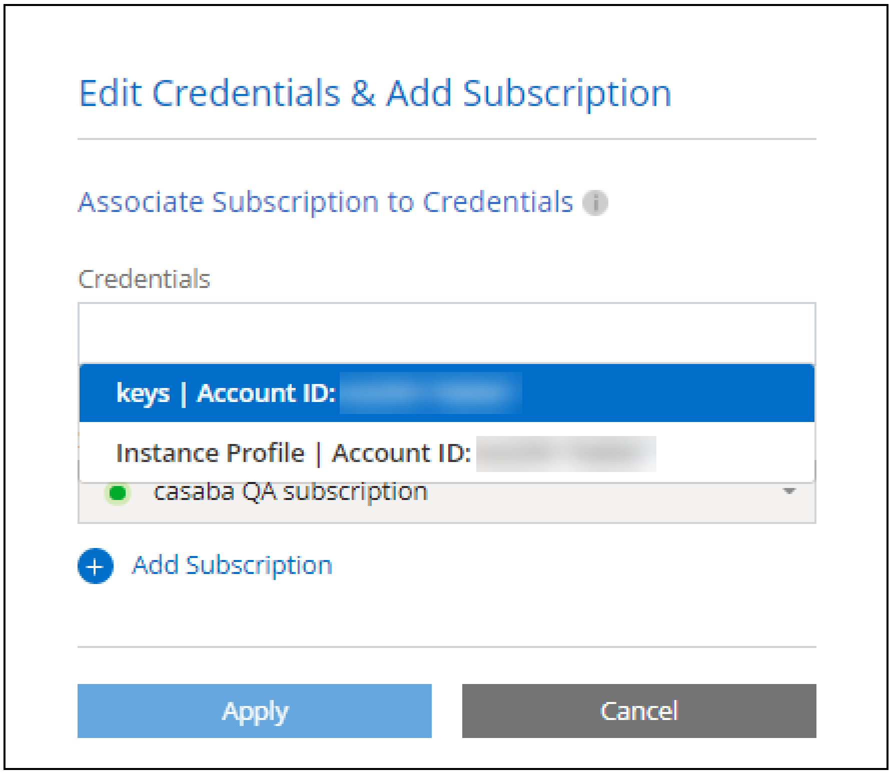
1. Use the top navigation bar to select a Console agent to which you want to add credentials.
2. In the left navigation bar, select **Administration > Credentials**.
3. On the **Organization credentials** page, select **Add Credentials** and follow the steps in the wizard.
   a. **Credentials Location**: Select **Amazon Web Services > Agent**.
   b. **Define Credentials**: Provide the ARN (Amazon Resource Name) of a trusted IAM role, or enter an AWS access key and secret key.
   c. **Marketplace Subscription**: Associate a Marketplace subscription with these credentials by subscribing now or by selecting an existing subscription.

      To pay for services at an hourly rate (PAYGO) or with an annual contract, you must associate AWS credentials with your AWS Marketplace subscription.

   d. **Review**: Confirm the details about the new credentials and select **Add**.

Result

You can now switch to a different set of credentials from the Details and Credentials page when adding a subscription to the Console.



Edit Credentials & Add Subscription

Associate Subscription to Credentials

Credentials

keys | Account ID: [redacted]

Instance Profile | Account ID: [redacted]

casaba QA subscription

Add credentials to the Console for creating a Console agent

Add AWS credentials by providing the ARN of an IAM role that gives the permissions needed to create a Console agent. You can choose these credentials when creating a new agent.

Set up the IAM role

Set up an IAM role that enables the NetApp Console software as a service (SaaS) layer to assume the role.

Steps

1. Go to the IAM console in the target account.
2. Under Access Management, select **Roles > Create Role** and follow the steps to create the role.

   Be sure to do the following:

   - Under **Trusted entity type**, select **AWS account**.
   - Select **Another AWS account** and enter the ID of the NetApp Console SaaS: 952013314444
   - For Amazon FSx for NetApp ONTAP specifically, edit the **Trust relationships** policy to include "AWS": "arn:aws:iam::952013314444:root".

     For example, the policy should look like this:

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Principal": {
        "AWS": "arn:aws:iam::952013314444:root",
        "Service": "ec2.amazonaws.com"
      },
      "Action": "sts:AssumeRole"
    }
  ]
}
```

Refer to AWS Identity and Access Management (IAM) documentation for more information on cross account resource access in IAM.

- Create a policy that includes the permissions required to create a Console agent.
  - View the permissions needed for FSx for ONTAP
  - View the agent deployment policy

3. Copy the Role ARN of the IAM role so that you can paste it in the Console in the next step.

Result

The IAM role now has the required permissions. You can now add it to the Console.

Add the credentials

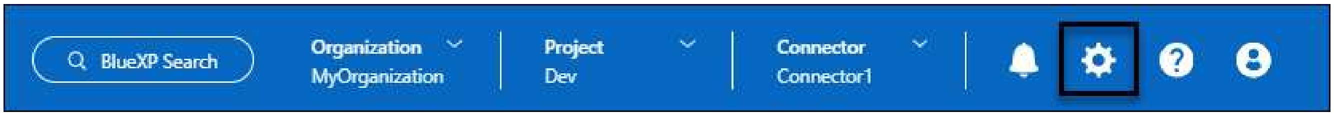
After you provide the IAM role with the required permissions, add the role ARN to the Console.

Before you begin

If you just created the IAM role, it might take a few minutes until they are available for use. Wait a few minutes before you add the credentials to the Console.

Steps

1. Select **Administration > Credentials**.



2. On the **Organization credentials** page, select **Add Credentials** and follow the steps in the wizard.
   a. **Credentials Location**: Select **Amazon Web Services > Console**.
   b. **Define Credentials**: Provide the ARN (Amazon Resource Name) of the IAM role.
   c. **Review**: Confirm the details about the new credentials and select **Add**.

Add credentials to the Console for Amazon FSx for ONTAP

For details, refer to the the Console documentation for Amazon FSx for ONTAP

Configure an AWS subscription

After you add your AWS credentials, you can configure an AWS Marketplace subscription with those credentials. The subscription enables you to pay for NetApp data services and Cloud Volumes ONTAP at an hourly rate (PAYGO) or using an annual contract.

There are two scenarios in which you might configure an AWS Marketplace subscription after you've already added the credentials:

- You didn't configure a subscription when you initially added the credentials.
- You want to change the AWS Marketplace subscription that is configured to the AWS credentials.

  Replacing the current marketplace subscription with a new subscription changes the marketplace subscription for any existing Cloud Volumes ONTAP systems and all new systems.

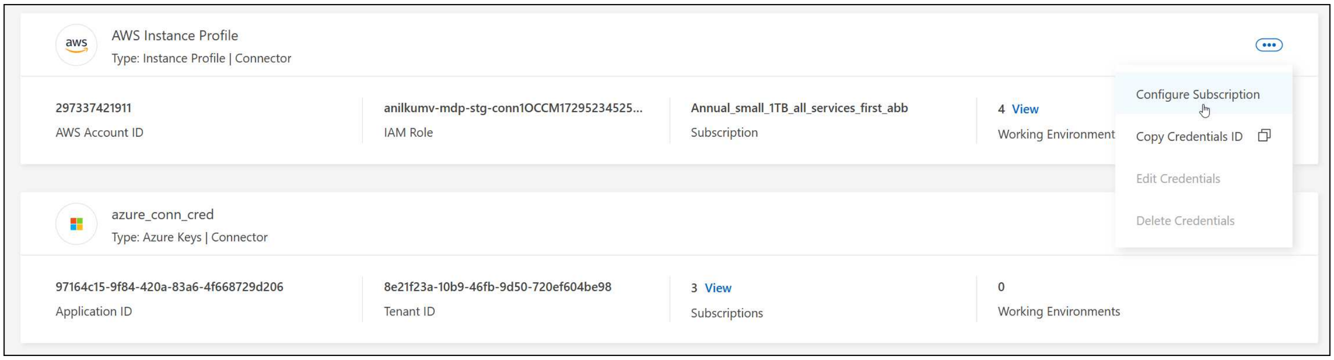
Before you begin

You need to create a Console agent before you can configure a subscription. Learn how to create a Console agent.

Steps

1. Select **Administration > Credentials**.
2. Select **Organization credentials**.
3. Select the action menu for a set of credentials that are associated with a Console agent and then select **Configure Subscription**.

   You must select credentials that are associated with a Console agent. You can't associate a marketplace subscription with credentials that are associated with the NetApp Console.



AWS Instance Profile
Type: Instance Profile | Connector

297337421911 AWS Account ID	anilkumv-mdp-stg-conn1OCCM17295234525... IAM Role	Annual_small_1TB_all_services_first_abb Subscription	4 View Working Environment

azure_conn_cred
Type: Azure Keys | Connector

97164c15-9f84-420a-83a6-4f668729d206 Application ID	8e21f23a-10b9-46fb-9d50-720ef604be98 Tenant ID	3 View Subscriptions	0 Working Environments

4. To associate the credentials with an existing subscription, select the subscription from the down-down list and select **Configure**.
5. To associate the credentials with a new subscription, select **Add Subscription > Continue** and follow the steps in the AWS Marketplace:
   a. Select **View purchase options**.
   b. Select **Subscribe**.
   c. Select **Set up your account**.

You'll be redirected to the NetApp Console.

d. From the **Subscription Assignment** page:

   - Select the Console organizations or accounts that you'd like to associate this subscription with.
   - In the **Replace existing subscription** field, choose whether you'd like to automatically replace the existing subscription for one organization or account with this new subscription.

     The Console replaces the existing subscription for all credentials in the organization or account with this new subscription. If a set of credentials wasn't ever associated with a subscription, then this new subscription won't be associated with those credentials.

     For all other organizations or accounts, you'll need to manually associate the subscription by repeating these steps.

   - Select **Save**.

Associate an existing subscription with your organization

When you subscribe to from the AWS Marketplace, the last step in the process is to associate the subscription with your organization. If you didn't complete this step, then you can't use the subscription with your organization.

- Learn about the Console deployment modes
- Learn about the Console identity and access management

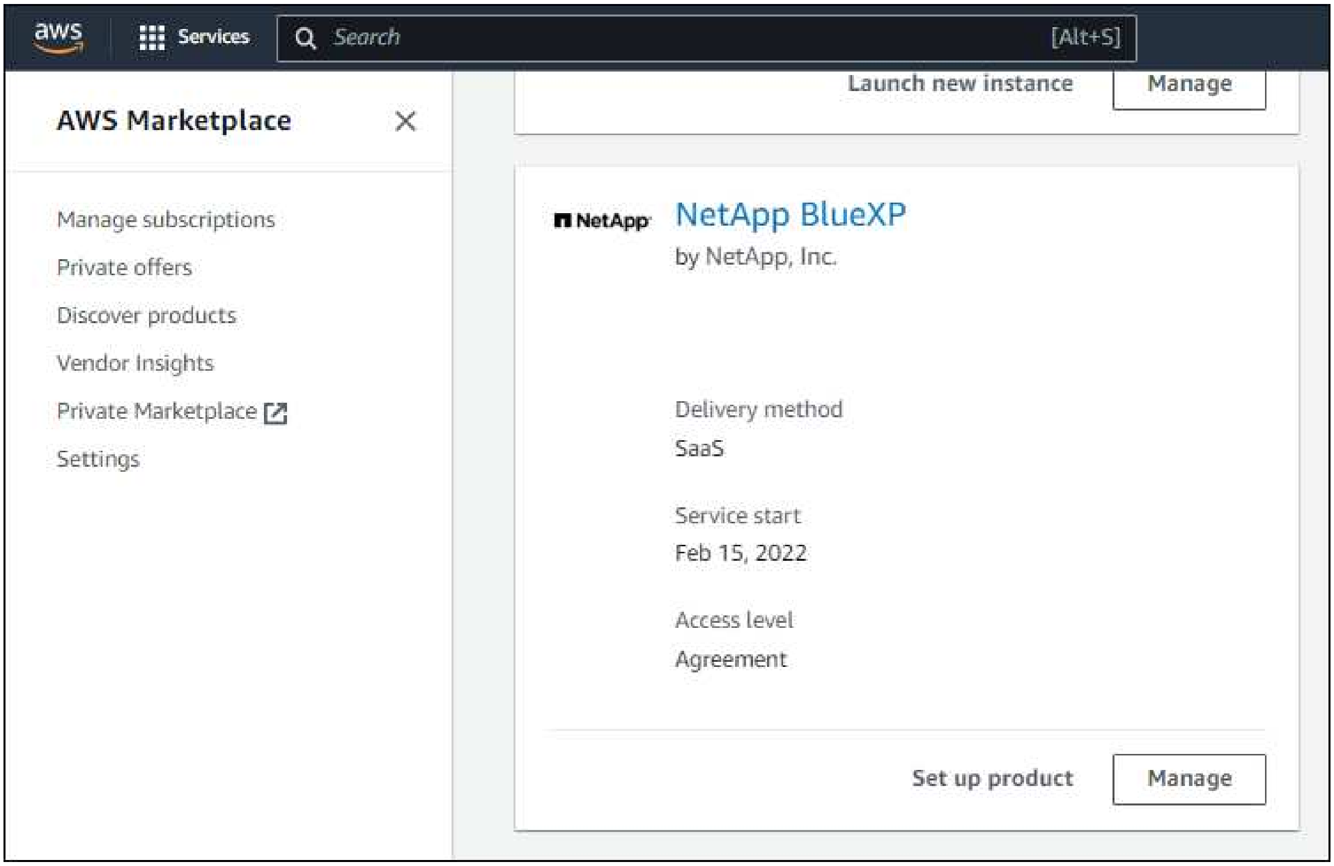
Follow the steps below if you subscribed to NetApp Intelligent Services from the AWS Marketplace, but you missed the step to associate the subscription with your account.

Steps

1. Confirm that you didn't associate your subscription with your Console organization.
   a. From the navigation menu, select **Administration > Licenses and subscriptions**.
   b. Select **Subscriptions**.
   c. Verify that your subscription doesn't appear.

      You'll only see the subscriptions that are associated with the organization or account that you're currently viewing. If you don't see your subscription, proceed with the following steps.

2. Log in to the AWS Console and navigate to **AWS Marketplace Subscriptions**.
3. Find the subscription.



NetApp BlueXP
by NetApp, Inc.

Delivery method
SaaS

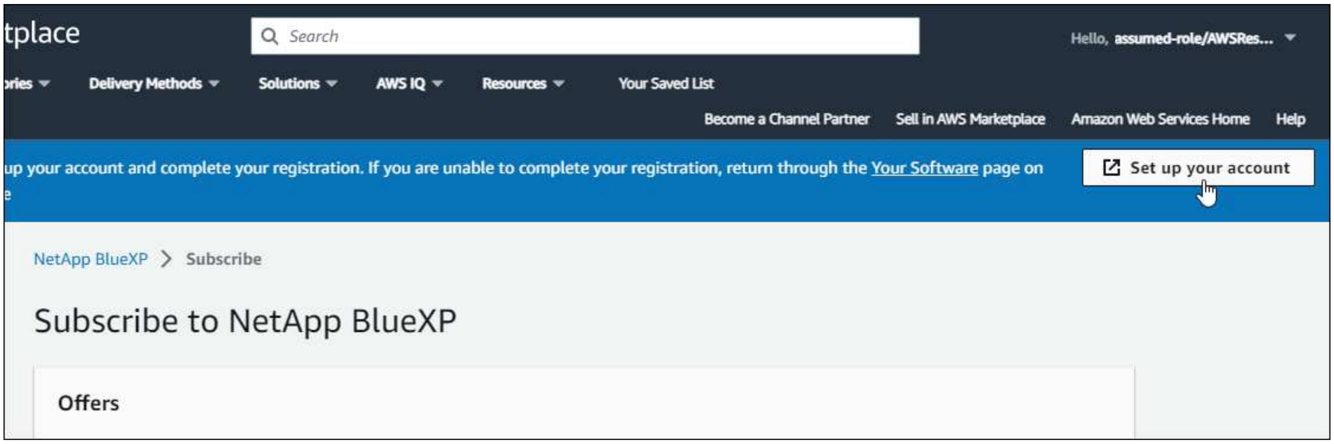
Service start
Feb 15, 2022

Access level
Agreement

4. Select **Set up product**.

   The subscription offer page should load in a new browser tab or window.

5. Select **Set up your account**.



up your account and complete your registration. If you are unable to complete your registration, return through the Your Software page on
e

Subscribe to NetApp BlueXP

   The **Subscription Assignment** page on netapp.com should load in a new browser tab or window.

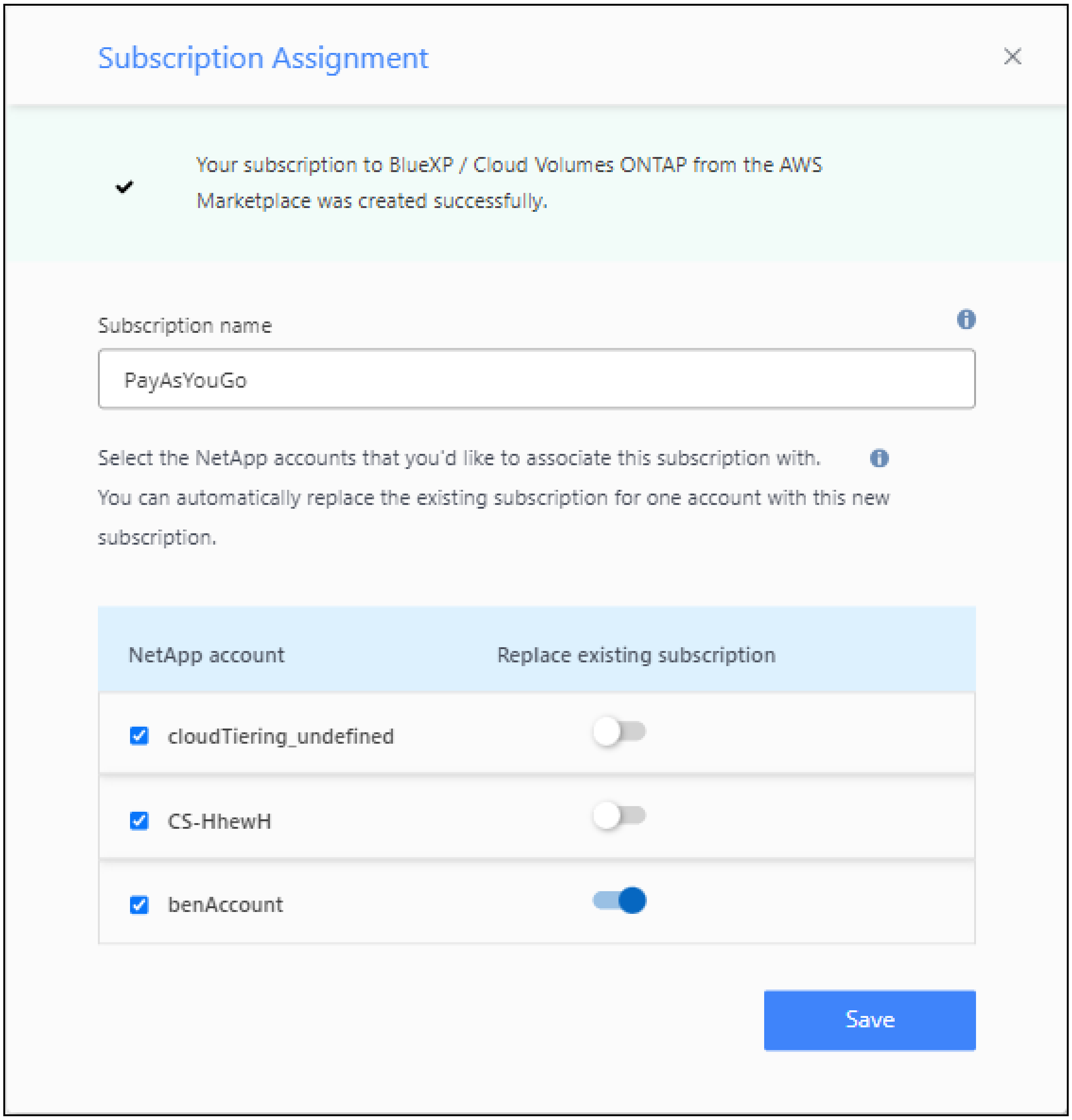
   Note that you might be prompted to log in to the Console first.

6. From the **Subscription Assignment** page:

   - Select the Console organizations or accounts that you'd like to associate this subscription with.
   - In the **Replace existing subscription** field, choose whether you'd like to automatically replace the existing subscription for one organization or account with this new subscription.

The Console replaces the existing subscription for all credentials in the organization or account with this new subscription. If a set of credentials wasn't ever associated with a subscription, then this new subscription won't be associated with those credentials.

For all other organizations or accounts, you'll need to manually associate the subscription by repeating these steps.



Subscription Assignment

✓ Your subscription to BlueXP / Cloud Volumes ONTAP from the AWS Marketplace was created successfully.

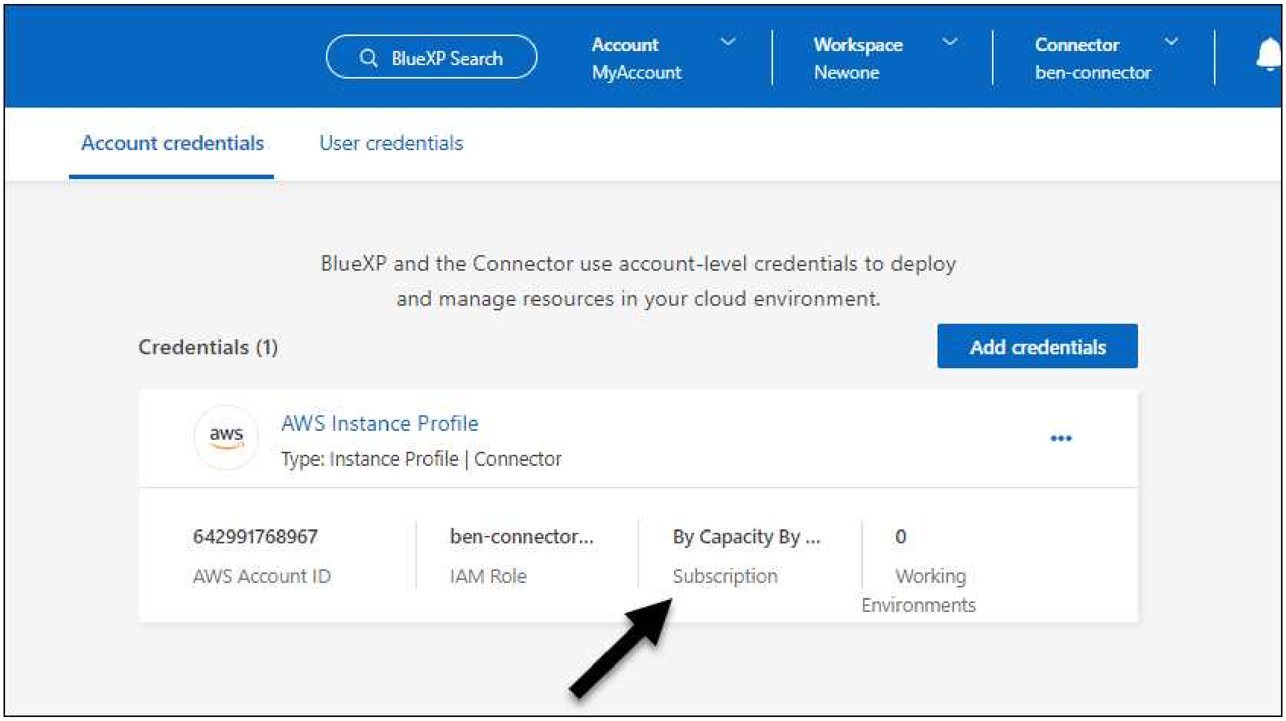
Subscription name: PayAsYouGo

Select the NetApp accounts that you'd like to associate this subscription with. You can automatically replace the existing subscription for one account with this new subscription.

NetApp account	Replace existing subscription
☑ cloudTiering_undefined	○
☑ CS-HhewH	○
☑ benAccount	●

7. Confirm that the subscription is associated with your organization.
   a. From the navigation menu, select **Administration > License and subscriptions**.
   b. Select **Subscriptions**.
   c. Verify that your subscription appears.
8. Confirm that the subscription is associated with your AWS credentials.
   a. Select **Administration > Credentials**.
   b. On the **Organization credentials** page, verify that the subscription is associated with your AWS credentials.

Here’s an example.



BlueXP and the Connector use account-level credentials to deploy and manage resources in your cloud environment.

Credentials (1)

AWS Instance Profile
Type: Instance Profile | Connector

642991768967
AWS Account ID

ben-connector...
IAM Role

By Capacity By ...
Subscription

0
Working Environments

Edit credentials

Edit your AWS credentials by changing the account type (AWS keys or assume role), by editing the name, or by updating the credentials themselves (the keys or the role ARN).

> You can’t edit the credentials for an instance profile that are associated with a Console agent instance or an Amazon FSx for ONTAP instance. You can only rename the credentials for an FSx for ONTAP instance.

Steps

1. Select **Administration > Credentials**.
2. On the **Organization credentials** page, select the action menu for a set of credentials and then select **Edit Credentials**.
3. Make the required changes and then select **Apply**.

Delete credentials

If you no longer need a set of credentials, you can delete them. You can only delete credentials that aren’t associated with a system.

> You can’t delete the credentials for an instance profile that is associated with a Console agent.

Steps

1. Select **Administration > Credentials**.
2. On the **Organization credentials** or **Account credentials** page, select the action menu for a set of credentials and then select **Delete Credentials**.
3. Select **Delete** to confirm.

Azure

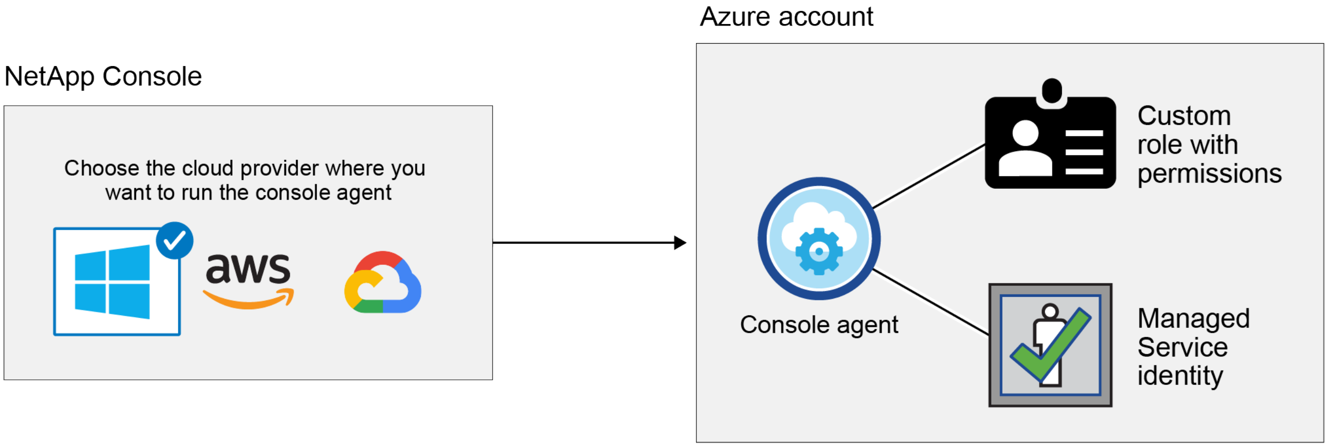
Learn about Azure credentials and permissions in NetApp Console

Learn how the NetApp Console uses Azure credentials to perform actions on your behalf and how those credentials are associated with marketplace subscriptions. Understanding these details can be helpful as you manage the credentials for one or more Azure subscriptions. For example, you might want to learn when to add additional Azure credentials to the Console.

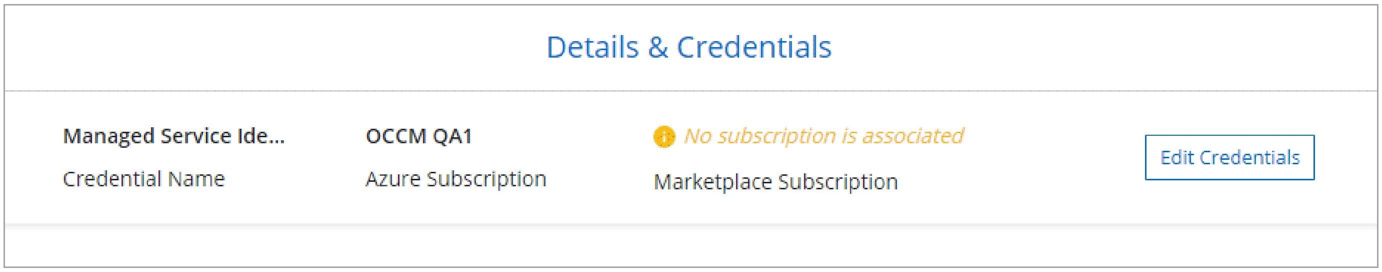
Initial Azure credentials

When you deploy a Console agent from the Console, you need to use an Azure account or service principal that has permissions to deploy the Console agent virtual machine. The required permissions are listed in the Agent deployment policy for Azure.

When the Console deploys the Console agent virtual machine in Azure, it enables a system-assigned managed identity on the virtual machine, creates a custom role, and assigns it to the virtual machine. The role provides the Console with the permissions required to manage resources and processes within that Azure subscription. Review how the Console uses the permissions.


NetApp Console
Choose the cloud provider where you want to run the console agent
aws
Azure account
Custom role with permissions
Console agent
Managed Service identity

If you create a new system for Cloud Volumes ONTAP, the Console selects these Azure credentials by default:


Details & Credentials

Credential Name	Azure Subscription	Marketplace Subscription	
Managed Service Ide...	OCCM QA1	No subscription is associated	Edit Credentials

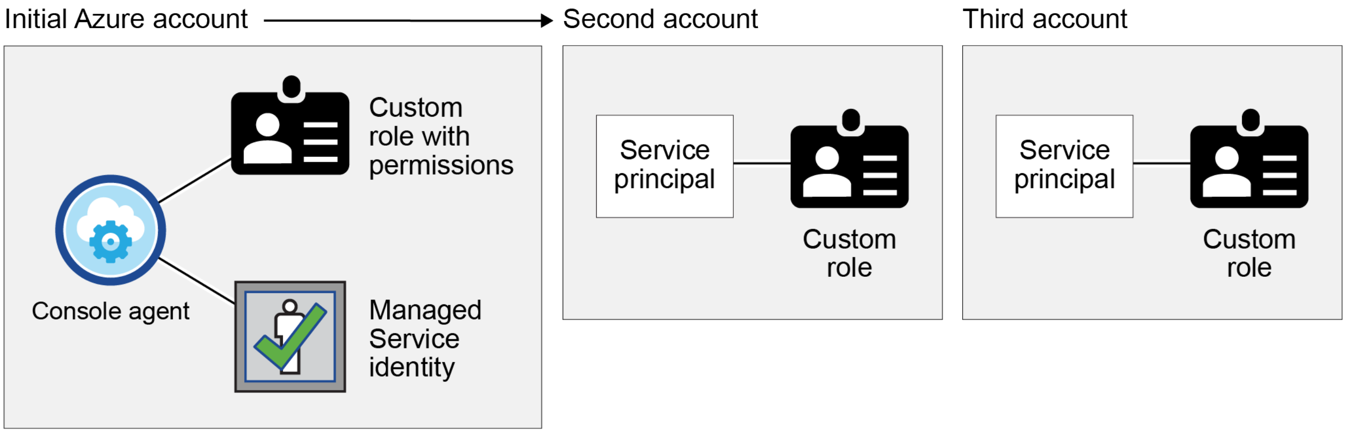
You can deploy all of your Cloud Volumes ONTAP systems using the initial Azure credentials, or you can add additional credentials.

Additional Azure subscriptions for a managed identity

The system-assigned managed identity assigned to the Console agent VM is associated with the subscription in which you launched the Console agent. If you want to select a different Azure subscription, then you need to associate the managed identity with those subscriptions.

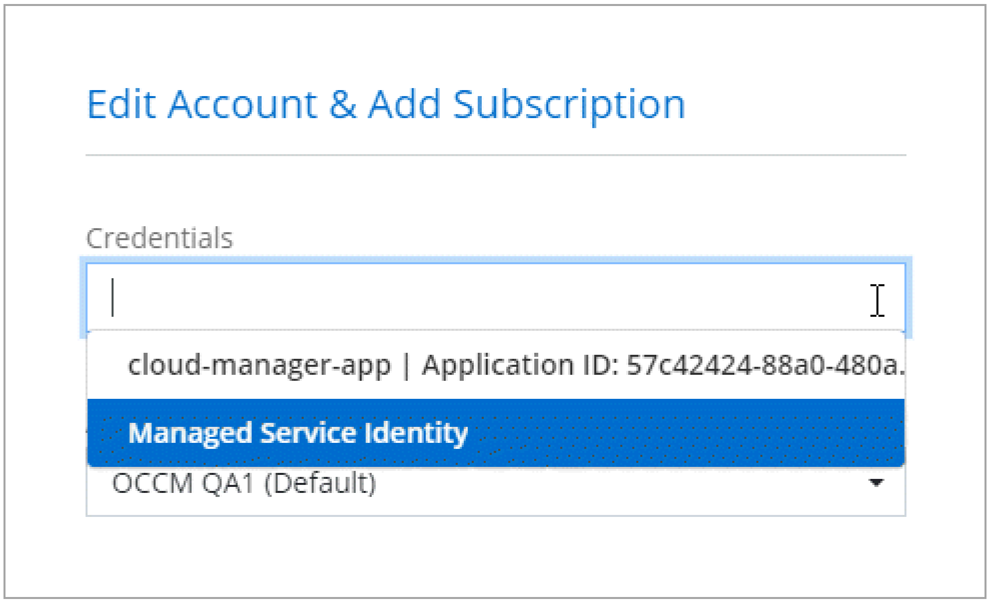
Additional Azure credentials

If you want to use different Azure credentials with the Console, then you must grant the required permissions by creating and setting up a service principal in Microsoft Entra ID for each Azure account. The following image shows two additional accounts, each set up with a service principal and custom role that provides permissions:



You would then add the account credentials to the Console by providing details about the AD service principal.

For example, you can switch between credentials when creating a new Cloud Volumes ONTAP system:



Edit Account & Add Subscription

Credentials

cloud-manager-app | Application ID: 57c42424-88a0-480a.

Managed Service Identity

OCCM QA1 (Default)

Credentials and marketplace subscriptions

The credentials that you add to a console agent must be associated with an Azure Marketplace subscription so that you can pay for Cloud Volumes ONTAP at an hourly rate (PAYGO) or NetApp data services or through an annual contract.

Learn how to associate an Azure subscription.

Note the following about Azure credentials and marketplace subscriptions:

- You can associate only one Azure Marketplace subscription with a set of Azure credentials
- You can replace an existing marketplace subscription with a new subscription

FAQ

The following question is related to credentials and subscriptions.

Can I change the Azure Marketplace subscription for Cloud Volumes ONTAP systems?

Yes, you can. When you change the Azure Marketplace subscription that's associated with a set of Azure credentials, all existing and new Cloud Volumes ONTAP systems will be charged against the new subscription.

Learn how to associate an Azure subscription.

Can I add multiple Azure credentials, each with different marketplace subscriptions?

All Azure credentials that belong to the same Azure subscription will be associated with the same Azure Marketplace subscription.

If you have multiple Azure credentials that belong to different Azure subscriptions, then those credentials can be associated with the same Azure Marketplace subscription or with different marketplace subscriptions.

Can I move existing Cloud Volumes ONTAP systems to a different Azure subscription?

No, it's not possible to move the Azure resources associated with your Cloud Volumes ONTAP system to a different Azure subscription.

How do credentials work for marketplace deployments and on-premises deployments?

The sections above describe the recommended deployment method for the Console agent, which is from the Console. You can also deploy a console agent in Azure from the Azure Marketplace, and you can install the Console agent software on your own Linux host.

If you use the Marketplace, you can provide permissions by assigning a custom role to the Console agent VM and to a system-assigned managed identity, or you can use a Microsoft Entra service principal.

For on-premises deployments, you can't set up a managed identity for the Console agent, but you can provide permissions by using a service principal.

To learn how to set up permissions, refer to the following pages:

- Standard mode
  - Set up permissions for an Azure Marketplace deployment
  - Set up permissions for on-premises deployments
- Restricted mode
  - Set up permissions for restricted mode

Manage Azure credentials and marketplace subscriptions for NetApp Console

Add and manage Azure credentials so that the NetApp Console has the permissions that it needs to deploy and manage cloud resources in your Azure subscriptions. If you manage multiple Azure Marketplace subscriptions, you can assign each one of them to different Azure credentials from the Credentials page.

Overview

There are two ways to add additional Azure subscriptions and credentials in the Console.

1. Associate additional Azure subscriptions with the Azure managed identity.
2. To deploy Cloud Volumes ONTAP using different Azure credentials, grant Azure permissions using a service principal and add its credentials to the Console.

Associate additional Azure subscriptions with a managed identity

The Console enables you to choose the Azure credentials and Azure subscription in which you want to deploy Cloud Volumes ONTAP. You can't select a different Azure subscription for the managed identity profile unless you associate the managed identity with those subscriptions.

About this task

A managed identity is the initial Azure account when you deploy a Console agent from the Console. When you deploy the Console agent, the Console assigns the Console Operator role to the Console agent virtual machine.

Steps

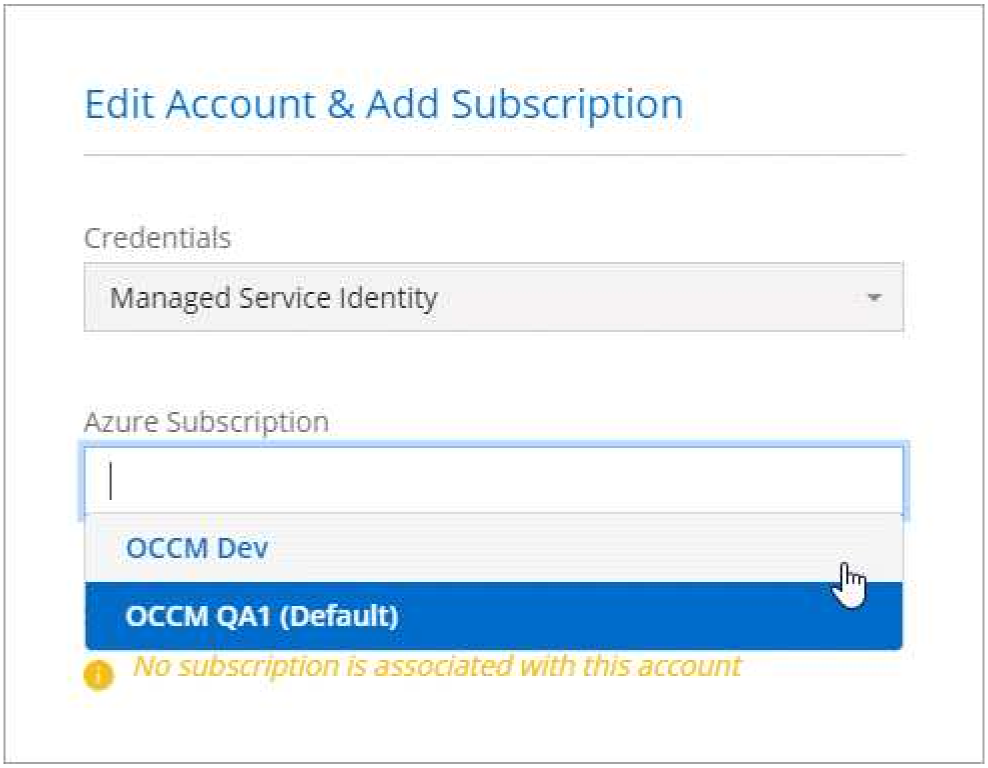
1. Log in to the Azure portal.
2. Open the **Subscriptions** service and then select the subscription in which you want to deploy Cloud Volumes ONTAP.
3. Select **Access control (IAM)**.
   a. Select **Add** > **Add role assignment** and then add the permissions:
      - Select the **Console Operator** role.

        > ⓘ Console Operator is the default name provided in a Console agent policy. If you chose a different name for the role, then select that name instead.

      - Assign access to a **Virtual Machine**.
      - Select the subscription in which a Console agent virtual machine was created.
      - Select a Console agent virtual machine.
      - Select **Save**.
4. Repeat these steps for additional subscriptions.

Result

When creating a new system, you can now select from multiple Azure subscriptions for the managed identity profile.



Edit Account & Add Subscription

Credentials

Managed Service Identity

Azure Subscription

OCCM Dev

OCCM QA1 (Default)

No subscription is associated with this account

Add additional Azure credentials to NetApp Console

When you deploy a Console agent from the Console, the Console enables a system-assigned managed identity on the virtual machine that has the required permissions. The Console selects these Azure credentials by default when you create a new system for Cloud Volumes ONTAP.

> An initial set of credentials isn't added if you manually installed a Console agent software on an existing system. Learn about Azure credentials and permissions.

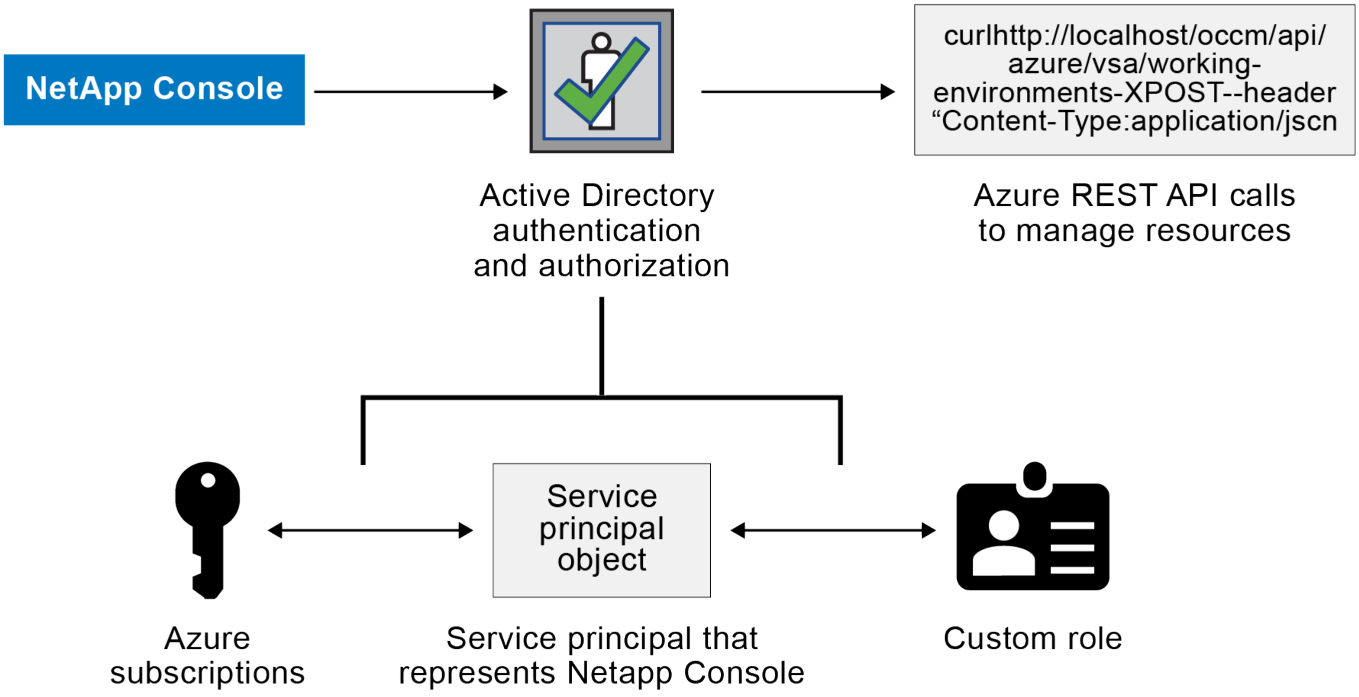
If you want to deploy Cloud Volumes ONTAP using *different* Azure credentials, then you must grant the required permissions by creating and setting up a service principal in Microsoft Entra ID for each Azure account. You can then add the new credentials to the Console.

Grant Azure permissions using a service principal

The Console needs permissions to perform actions in Azure. You can grant the required permissions to an Azure account by creating and setting up a service principal in Microsoft Entra ID and by obtaining the Azure credentials that the Console needs.

About this task

The following image depicts how the Console obtains permissions to perform operations in Azure. A service principal object, which is tied to one or more Azure subscriptions, represents the Console in Microsoft Entra ID and is assigned to a custom role that allows the required permissions.



Steps

1. Create a Microsoft Entra application.
2. Assign the application to a role.
3. Add Windows Azure Service Management API permissions.
4. Get the application ID and directory ID.
5. Create a client secret.

Create a Microsoft Entra application

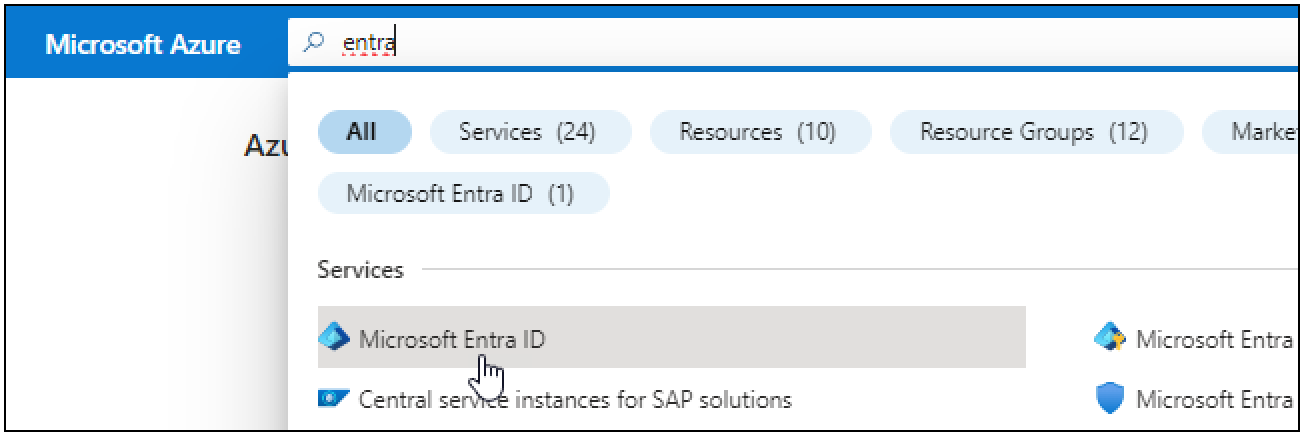
Create a Microsoft Entra application and service principal that the Console can use for role-based access control.

Steps

1. Ensure that you have permissions in Azure to create an Active Directory application and to assign the application to a role.

   For details, refer to Microsoft Azure Documentation: Required permissions

2. From the Azure portal, open the **Microsoft Entra ID** service.



3. In the menu, select **App registrations**.
4. Select **New registration**.
5. Specify details about the application:
   - **Name**: Enter a name for the application.
   - **Account type**: Select an account type (any will work with the NetApp Console).
   - **Redirect URI**: You can leave this field blank.
6. Select **Register**.

   You've created the AD application and service principal.

Assign the application to a role

You must bind the service principal to one or more Azure subscriptions and assign it the custom "Console Operator" role so the Console has permissions in Azure.

Steps

1. Create a custom role:

   Note that you can create an Azure custom role using the Azure portal, Azure PowerShell, Azure CLI, or REST API. The following steps show how to create the role using the Azure CLI. If you would prefer to use a different method, refer to Azure documentation

   a. Copy the contents of the custom role permissions for the Console agent and save them in a JSON file.

   b. Modify the JSON file by adding Azure subscription IDs to the assignable scope.

   You should add the ID for each Azure subscription from which users will create Cloud Volumes ONTAP systems.

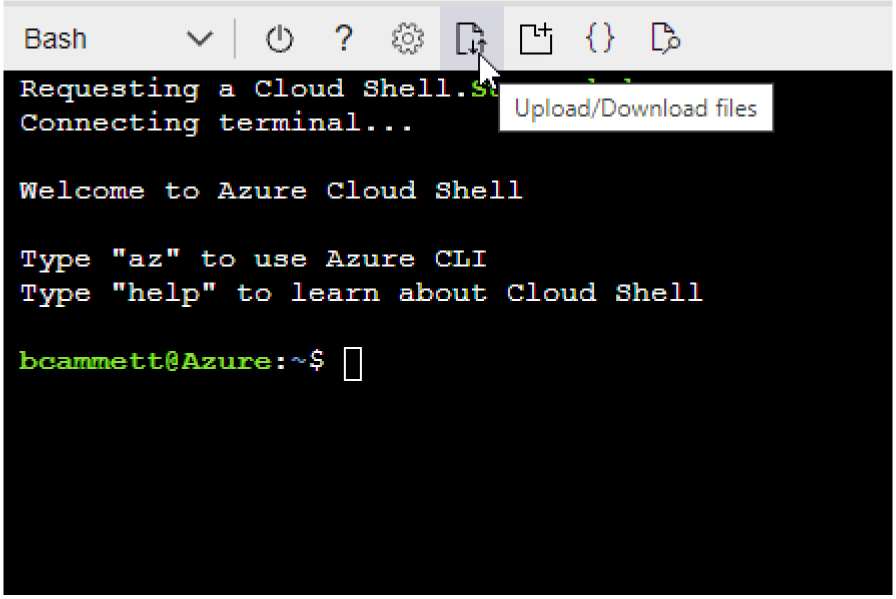
   Example

```
"AssignableScopes": [
"/subscriptions/d333af45-0d07-4154-943d-c25fbzzzzzzz",
"/subscriptions/54b91999-b3e6-4599-908e-416e0zzzzzzz",
"/subscriptions/398e471c-3b42-4ae7-9b59-ce5bbzzzzzzz"
]
```

c. Use the JSON file to create a custom role in Azure.

The following steps describe how to create the role by using Bash in Azure Cloud Shell.

- Start Azure Cloud Shell and choose the Bash environment.
- Upload the JSON file.



```
Requesting a Cloud Shell.Su
Connecting terminal...

Welcome to Azure Cloud Shell

Type "az" to use Azure CLI
Type "help" to learn about Cloud Shell

bcammett@Azure:~$
```

- Use the Azure CLI to create the custom role:

```
az role definition create --role-definition agent_Policy.json
```

You should now have a custom role called Console Operator that you can assign to the Console agent virtual machine.

2. Assign the application to the role:

a. From the Azure portal, open the **Subscriptions** service.

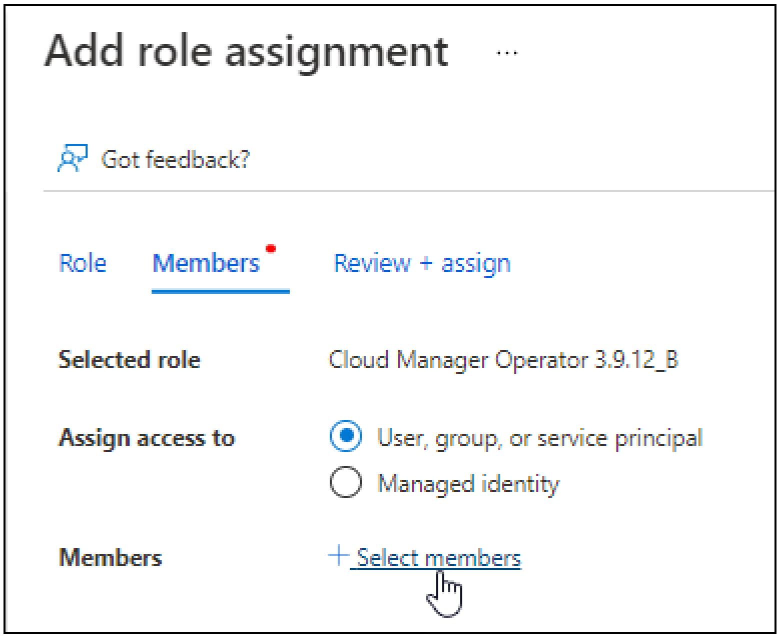
b. Select the subscription.

c. Select **Access control (IAM) > Add > Add role assignment**.

d. In the **Role** tab, select the **Console Operator** role and select **Next**.

e. In the **Members** tab, complete the following steps:

- Keep **User, group, or service principal** selected.
- Select **Select members**.



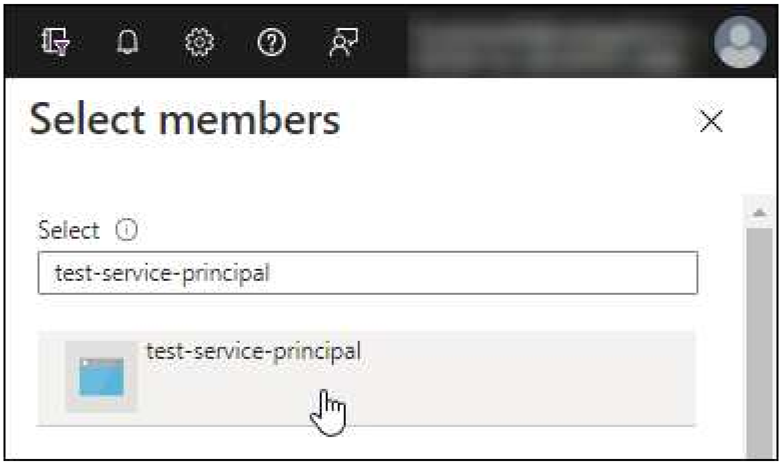
Selected role: Cloud Manager Operator 3.9.12_B

Assign access to: ● User, group, or service principal ○ Managed identity

Members: + Select members

- Search for the name of the application.

  Here's an example:



Select: test-service-principal

test-service-principal

- Select the application and select **Select**.
- Select **Next**.

f. Select **Review + assign**.

The service principal now has the required Azure permissions to deploy the Console agent.

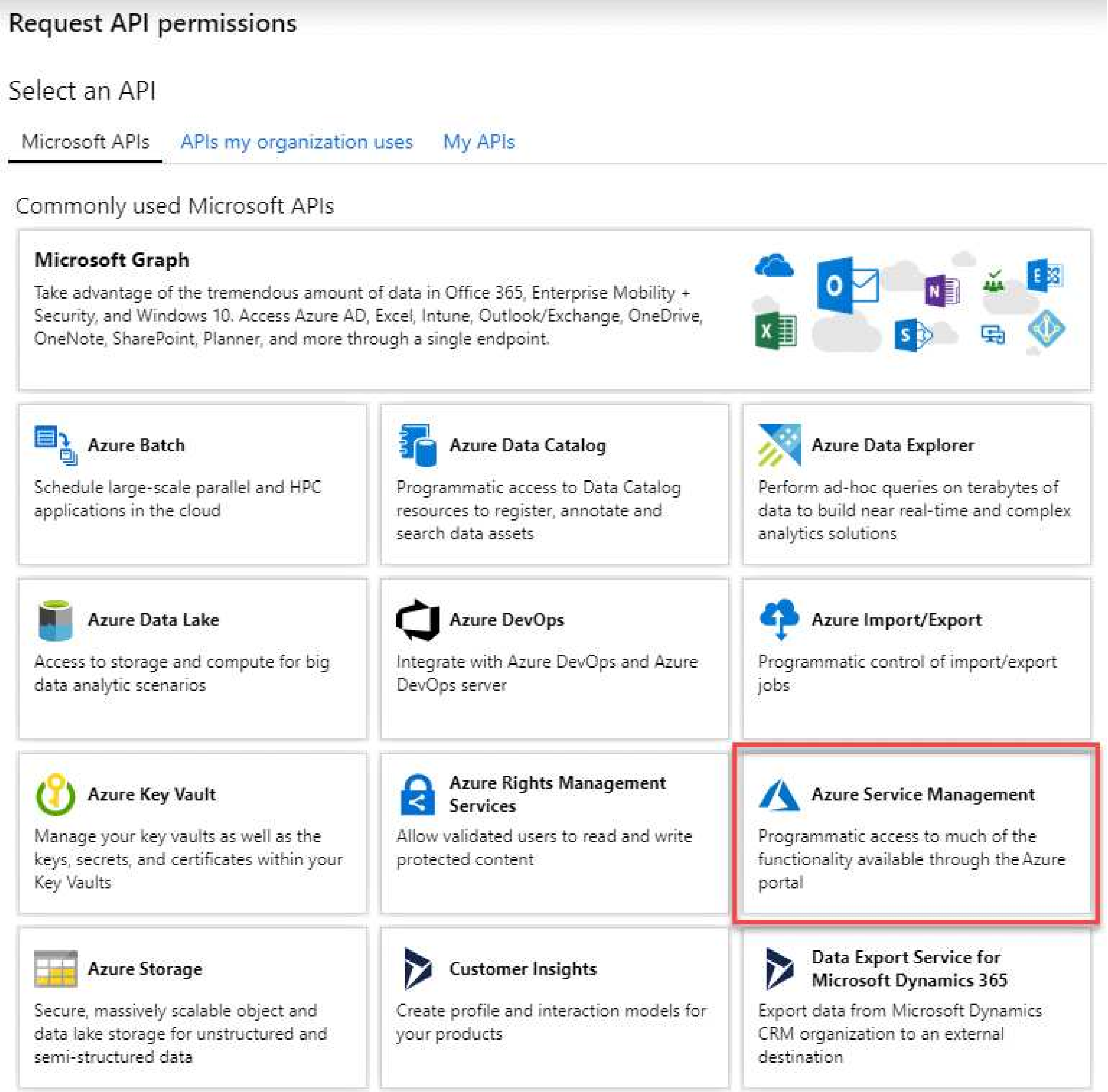
If you want to deploy Cloud Volumes ONTAP from multiple Azure subscriptions, then you must bind the service principal to each of those subscriptions. In the NetApp Console, you can select the subscription that you want to use when deploying Cloud Volumes ONTAP.

Add Windows Azure Service Management API permissions

You must assign "Windows Azure Service Management API" permissions to the service principal.

Steps

1. In the **Microsoft Entra ID** service, select **App registrations** and select the application.
2. Select **API permissions > Add a permission**.
3. Under **Microsoft APIs**, select **Azure Service Management**.



Request API permissions

Select an API

Microsoft APIs | APIs my organization uses | My APIs

Commonly used Microsoft APIs

Microsoft Graph
Take advantage of the tremendous amount of data in Office 365, Enterprise Mobility + Security, and Windows 10. Access Azure AD, Excel, Intune, Outlook/Exchange, OneDrive, OneNote, SharePoint, Planner, and more through a single endpoint.

Azure Batch
Schedule large-scale parallel and HPC applications in the cloud

Azure Data Catalog
Programmatic access to Data Catalog resources to register, annotate and search data assets

Azure Data Explorer
Perform ad-hoc queries on terabytes of data to build near real-time and complex analytics solutions

Azure Data Lake
Access to storage and compute for big data analytic scenarios

Azure DevOps
Integrate with Azure DevOps and Azure DevOps server

Azure Import/Export
Programmatic control of import/export jobs

Azure Key Vault
Manage your key vaults as well as the keys, secrets, and certificates within your Key Vaults

Azure Rights Management Services
Allow validated users to read and write protected content

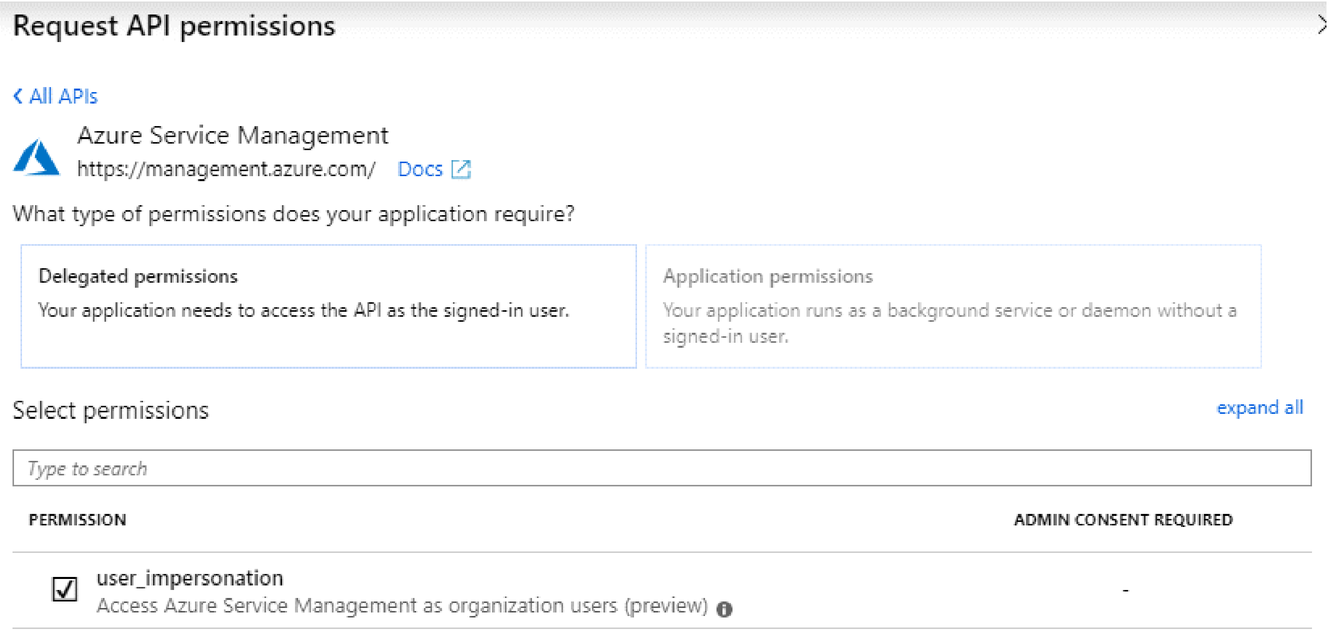
Azure Service Management
Programmatic access to much of the functionality available through the Azure portal

Azure Storage
Secure, massively scalable object and data lake storage for unstructured and semi-structured data

Customer Insights
Create profile and interaction models for your products

Data Export Service for Microsoft Dynamics 365
Export data from Microsoft Dynamics CRM organization to an external destination

4. Select **Access Azure Service Management as organization users** and then select **Add permissions**.



Request API permissions

< All APIs

Azure Service Management
https://management.azure.com/ Docs

What type of permissions does your application require?

Delegated permissions
Your application needs to access the API as the signed-in user.

Application permissions
Your application runs as a background service or daemon without a signed-in user.

Select permissions

expand all

Type to search

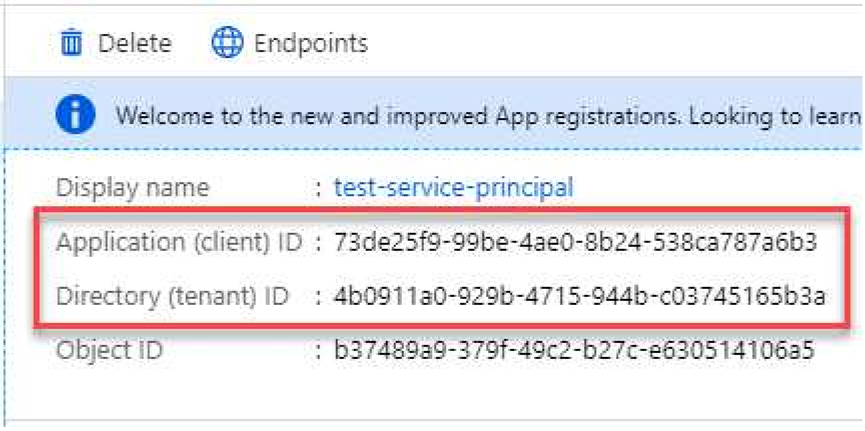
PERMISSION	ADMIN CONSENT REQUIRED
☑ user_impersonation Access Azure Service Management as organization users (preview)	-

Get the application ID and directory ID

When you add the Azure account to the Console, you need to provide the application (client) ID and the directory (tenant) ID for the application. The Console uses the IDs to programmatically sign in.

Steps

1. In the **Microsoft Entra ID** service, select **App registrations** and select the application.
2. Copy the **Application (client) ID** and the **Directory (tenant) ID**.



Delete Endpoints

Welcome to the new and improved App registrations. Looking to learn

Display name	: test-service-principal
Application (client) ID	: 73de25f9-99be-4ae0-8b24-538ca787a6b3
Directory (tenant) ID	: 4b0911a0-929b-4715-944b-c03745165b3a
Object ID	: b37489a9-379f-49c2-b27c-e630514106a5

When you add the Azure account to the Console, you need to provide the application (client) ID and the directory (tenant) ID for the application. The Console uses the IDs to programmatically sign in.

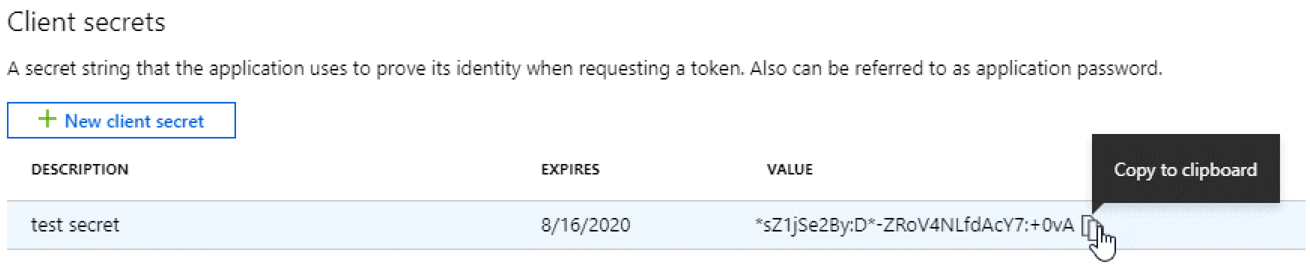
Create a client secret

Create a client secret and provide its value to the Console for authentication with Microsoft Entra ID.

Steps

1. Open the **Microsoft Entra ID** service.

2. Select **App registrations** and select your application.
3. Select **Certificates & secrets > New client secret**.
4. Provide a description of the secret and a duration.
5. Select **Add**.
6. Copy the value of the client secret.



Client secrets

A secret string that the application uses to prove its identity when requesting a token. Also can be referred to as application password.

DESCRIPTION	EXPIRES	VALUE
test secret	8/16/2020	*sZ1jSe2By:D*-ZRoV4NLfdAcY7:+0vA

Result

Your service principal is now setup and you should have copied the application (client) ID, the directory (tenant) ID, and the value of the client secret. You need to enter this information in the Console when you add an Azure account.

Add the credentials to the Console

After you provide an Azure account with the required permissions, you can add the credentials for that account to the Console. Completing this step enables you to launch Cloud Volumes ONTAP using different Azure credentials.

Before you begin

If you just created these credentials in your cloud provider, it might take a few minutes until they are available for use. Wait a few minutes before you add the credentials to the Console.

Before you begin

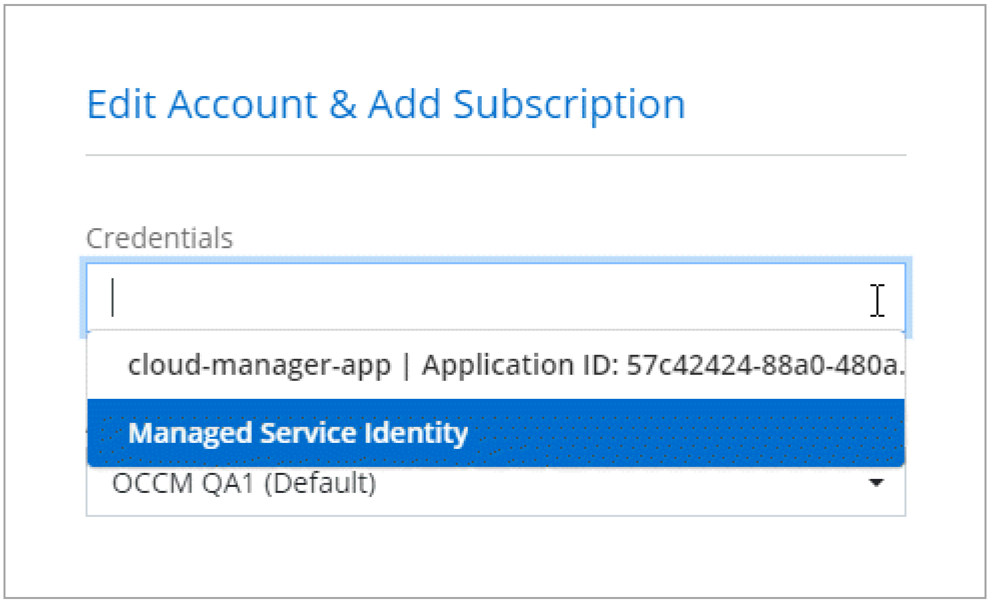
You need to create a Console agent before you can change Console settings. Learn how to create a Console agent.

Steps

1. Select **Administration > Credentials**.
2. Select **Add Credentials** and follow the steps in the wizard.
   a. **Credentials Location**: Select **Microsoft Azure > Agent**.
   b. **Define Credentials**: Enter information about the Microsoft Entra service principal that grants the required permissions:
      - Application (client) ID
      - Directory (tenant) ID
      - Client Secret
   c. **Marketplace Subscription**: Associate a Marketplace subscription with these credentials by subscribing now or by selecting an existing subscription.
   d. **Review**: Confirm the details about the new credentials and select **Add**.

Result

You can switch to a different set of credentials from the Details and Credentials page when adding a system to the Console



Edit Account & Add Subscription

Credentials

cloud-manager-app | Application ID: 57c42424-88a0-480a.

Managed Service Identity

OCCM QA1 (Default)

Manage existing credentials

Manage the Azure credentials that you've already added to the Console by associating a Marketplace subscription, editing credentials, and deleting them.

Associate an Azure Marketplace subscription to credentials

After you add your Azure credentials to the Console, you can associate an Azure Marketplace subscription to those credentials. You can use the subscription to create a pay-as-you-go Cloud Volumes ONTAP system and access NetApp data services.

There are two scenarios in which you might associate an Azure Marketplace subscription after you've already added the credentials to the Console:

- You didn't associate a subscription when you initially added the credentials to the Console.
- You want to change the Azure Marketplace subscription that is associated with Azure credentials.

  Replacing the current marketplace subscription updates it for existing and new Cloud Volumes ONTAP systems.

Steps

1. Select **Administration > Credentials**.
2. Select **Organization credentials**.
3. Select the action menu for a set of credentials that are associated with a Console agent and then select **Configure Subscription**.

   You must select credentials that are associated with a Console agent. You can't associate a marketplace subscription with credentials that are associated with the NetApp Console.
4. To associate the credentials with an existing subscription, select the subscription from the down-down list

and select **Configure**.

5. To associate the credentials with a new subscription, select **Add Subscription > Continue** and follow the steps in the Azure Marketplace:
    a. If prompted, log in to your Azure account.
    b. Select **Subscribe**.
    c. Fill out the form and select **Subscribe**.
    d. After the subscription process is complete, select **Configure account now**.

        You'll be redirected to the NetApp Console.

    e. From the **Subscription Assignment** page:
        - Select the Console organizations or accounts that you'd like to associate this subscription with.
        - In the **Replace existing subscription** field, choose whether you'd like to automatically replace the existing subscription for one organization or account with this new subscription.

            The Console replaces the existing subscription for all credentials in the organization or account with this new subscription. If a set of credentials wasn't ever associated with a subscription, then this new subscription won't be associated with those credentials.

            For all other organizations or accounts, you'll need to manually associate the subscription by repeating these steps.

        - Select **Save**.

Edit credentials

Edit your Azure credentials in the Console. For example, you can update the client secret if a new secret was created for the service principal application.

Steps

1. Select **Administration > Credentials**.
2. Select **Organization credentials**.
3. Select the action menu for a set of credentials and then select **Edit Credentials**.
4. Make the required changes and then select **Apply**.

Delete credentials

If you no longer need a set of credentials, you can delete them. You can only delete credentials that aren't associated with a system.

Steps

1. Select **Administration > Credentials**.
2. Select **Organization credentials**.
3. On the **Organization credentials** page, select the action menu for a set of credentials and then select **Delete Credentials**.
4. Select **Delete** to confirm.

Google Cloud

Learn about Google Cloud projects and permissions

Learn how the NetApp Console uses Google Cloud credentials to perform actions on your behalf and how those credentials are associated with marketplace subscriptions. Understanding these details can be helpful as you manage the credentials for one or more Google Cloud projects. For example, you might want to learn about the service account that's associated with the Console agent VM.

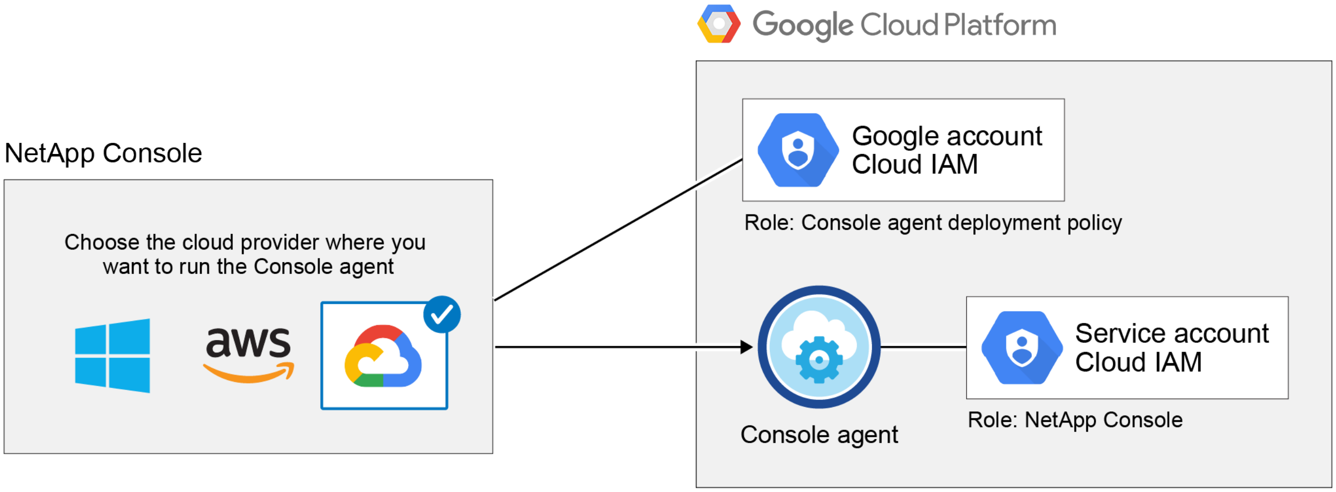
Project and permissions for NetApp Console

Before you can use the Console to manage resources in your Google Cloud project, you must first deploy a Console agent. The agent can't be running on your premises, or in a different cloud provider.

Two sets of permissions must be in place before you deploy a Console agent directly from the Console:

1. You need to deploy a Console agent using a Google account that has permissions to launch the Console agent from the Console.
2. When deploying the Console agent, you are prompted to select a service account for the agent The Console gets permissions from the service account to create and manage Cloud Volumes ONTAP systems, to manage backups using NetApp backup and recovery, and more. Permissions are provided by attaching a custom role to the service account.

The following image depicts the permission requirements described in numbers 1 and 2 above:


Google Cloud Platform
NetApp Console
Choose the cloud provider where you want to run the Console agent
aws
Google account Cloud IAM
Role: Console agent deployment policy
Console agent
Service account Cloud IAM
Role: NetApp Console

To learn how to set up permissions, refer to the following pages:

- Set up Google Cloud permissions for standard mode
- Set up permissions for restricted mode

Credentials and marketplace subscriptions

When you deploy a Console agent in Google Cloud, the Console creates a default set of credentials for the Google Cloud service account in the project in which the Console agent resides. These credentials must be associated with a Google Cloud Marketplace subscription so that you can pay for Cloud Volumes ONTAP and NetApp data services.

Learn how to associate a Google Cloud Marketplace subscription.

Note the following about Google Cloud credentials and marketplace subscriptions:

- Only one set of Google Cloud credentials can be associated with a Console agent
- You can associate only one Google Cloud Marketplace subscription with the credentials
- You can replace an existing marketplace subscription with a new subscription

Project for Cloud Volumes ONTAP

Cloud Volumes ONTAP can reside in the same project as the Console agent, or in a different project. To deploy Cloud Volumes ONTAP in a different project, you need to first add the Console agent service account and role to that project.

- Learn how to set up the service account
- Learn how to deploy Cloud Volumes ONTAP in Google Cloud and select a project

Manage Console agent permissions for Google Cloud deployments

Occasionally, NetApp updates the permissions required for the service account used for the Console agent when it is deployed in Google Cloud.

Verify the required Google permissions list.

Use Google Cloud Console to update the IAM role assigned to the service account to match the new set of permissions.

Google Cloud docs: Edit a custom role

Identity and access management

Learn about NetApp Console identity and access management

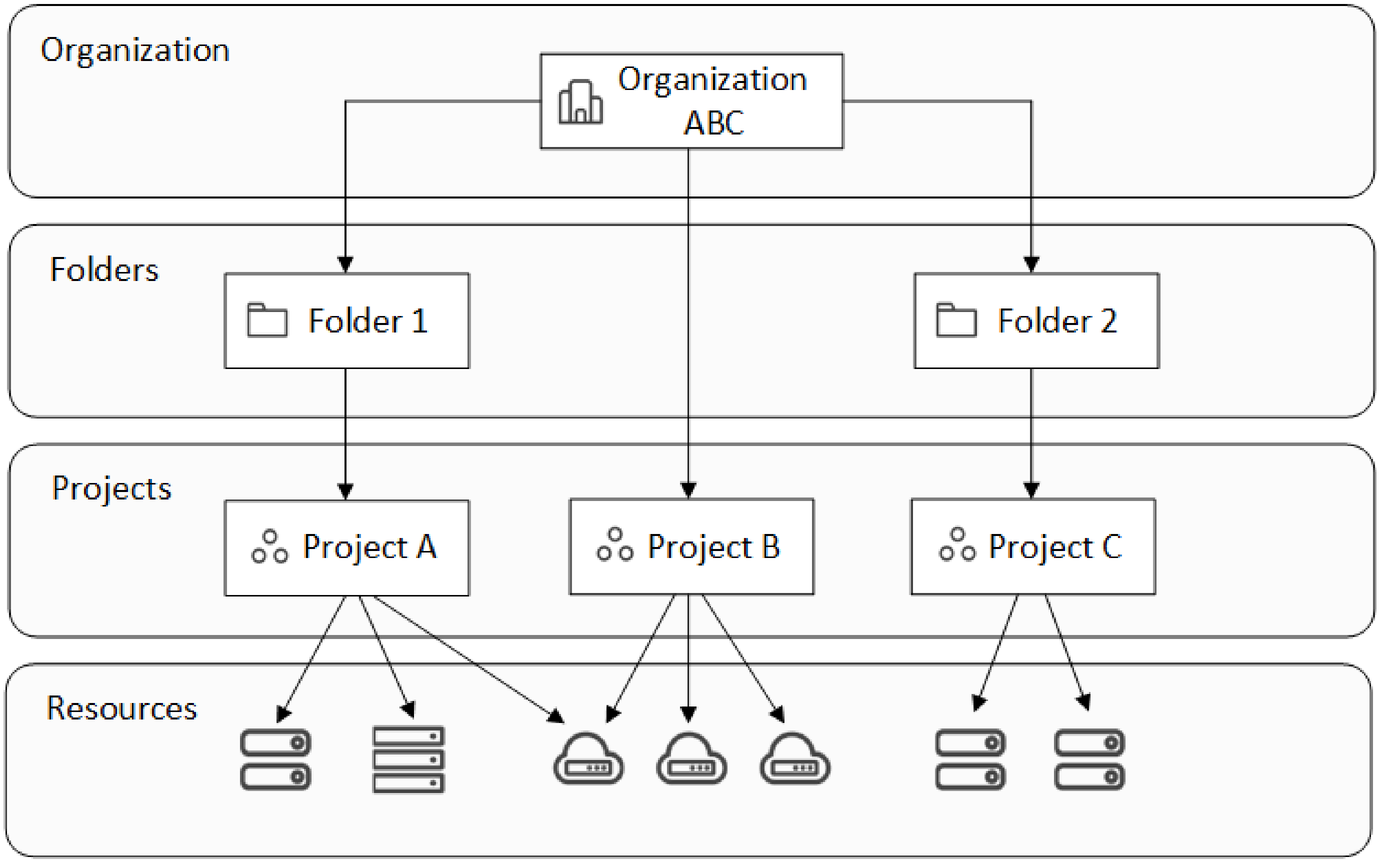
Use NetApp Console’s Identity and Access Management (IAM) to organize your NetApp resources and control access according to your business structure—by location, department, or project.

Resources are arranged hierarchically: the organization is at the top, followed by folders (which can contain other folders or projects), and then projects, which contain storage systems, workloads, and agents.

Assign role-based access control (RBAC) permissions to members at the organization, folder, or project level to ensure users have the appropriate access to resources.

> ⓘ You must have the *Super admin*, *Organization admin* , or *Folder or project admin* roles to manage IAM in NetApp Console.

The following image illustrates this hierarchy at a basic level.



]

Identity and access management components

Within NetApp Console, you organize your storage resources using three main components: organizational components, resource components, and user access components.

Projects and folders within your organization

Within your IAM structure, you work with three organizational components are organizations, projects, and folders. You can grant users access by assigning them roles at any of these levels.

Organization

An *organization* is the top level of the Console IAM system and typically represents your company. Your organization consists of folders, projects, members, roles, and resources. Agents are associated with specific projects in the organization.

Projects

A *project* is used to provide access to a storage resource. You must assign a resources to project before anyone can access them. You can assign multiple resources to a single project and you can also have multiple projects. You then assign users permissions to the project to give them access to the resources within it.

For example, you can associate an on-premises ONTAP system with a single project or with all projects in your organization, depending on your needs.

Learn how to add projects to your organization.

Folders

Group related projects in *folders* to organize them by location, site, or business unit. You can’t associate resources directly with folders, but assigning a user a role at the folder level gives them access to all projects in that folder.

Learn how to add folders to your organization.

Resources

Resources include storage systems, Keystone subscriptions, as well as Console agents.

+
You must associate a resource with a project before anyone can access it.

+

For example, you might associate a Cloud Volumes ONTAP system with one project or with all projects in your organization. How you associate a resource depends on your organization’s needs.

+

Learn how to associate resources to projects.

Storage systems and Keystone subscriptions

Storage systems are the primary resources that you manage in NetApp Console. NetApp Console supports management of both on-premises and cloud storage systems. You must add a storage system to a project before anyone can access it.

Storage systems are automatically associated with the project where they are added, but you can also associate them with other projects or folders from the **Resources** page.

Keystone subscriptions are also resources that you can associate with projects in order to grant users access to the subscription in NetApp Console.

Console agents

Organization admins create Console agents to manage storage systems and enable NetApp data services. Agents are initially tied to the project where they are created, but admins can add them to other projects or folders from the Agents page.

Associating an agent with a project enables management of resources in that project, while associating an agent with a folder lets folder or project admins decide which projects should use the agent. Agents must be linked to specific projects to provide management capabilities.

Learn how to associate agents with projects.

Members and roles

Members

Members of your organization are user accounts or service accounts. A service account is typically used by an application to complete specified tasks without human intervention.

You need to add members to your organization after they sign up for NetApp Console. Once added, you can assign them roles to provide access to resources. You can manually add service accounts from within the Console or automate their creation and management through the NetApp Console IAM API.

Learn how to add members to your organization.

Access roles

The Console provides access roles that you can assign to the members of your organization.

When you associate a member with a role, you can grant that role for the entire organization, a specific folder, or a specific project. The role that you select gives a member permissions to the resources in the selected part of the hierarchy.

NetApp Console provides granular roles that adhere to the principles of "least privilege" which means access roles are designed to give users access to only that that they need

This means users may have multiple roles assigned to them as their duties expand.

Learn about access roles.

IAM strategy examples

Small organization strategy

For organizations with fewer than 50 users and centralized storage management, consider a simplified approach using Super admin and Super viewer roles.

Example: ABC Corporation (5-person team)

- **Structure:** Single organization with 3 projects (Production, Development, Backup)
- **Roles:**
  - 2 senior members: **Super admin** role for full administrative access
  - 3 team members: **Super viewer** role for monitoring without modification rights
- **Agent strategy:** Single agent associated with all projects for shared resource access
- **Benefits:** Simplified administration, reduced role complexity, suitable for teams requiring broad access

Multi-regional enterprise strategy

For large organizations with regional operations and specialized teams, implement a hierarchical approach with folders representing geographical or business unit boundaries.

Example: XYZ Corporation (multinational company)

- **Structure:** Organization > Regional folders (North America, Europe, Asia-Pacific) > Project folders per region
- **Platform roles:**
  - 1 **Organization admin**: Global oversight and policy management
  - 3 **Folder or project admins**: Regional control (one per region)
  - 1 **Federation admin**: Corporate identity provider integration
- **Storage roles by region:**
  - 9 **Storage admin**: Discover and manage storage systems in assigned regions
  - 2 **Storage viewer**: Monitor storage resources across regions
  - 1 **System health specialist**: Manage storage health without system modifications

- **Data service roles:**
  - **Backup and Recovery admin**: Per-project based on backup responsibilities
  - **Ransomware Resilience admin**: Security team monitoring across projects
- **Agent strategy:** Regional agents associated with appropriate geographical projects
- **Benefits:** Enhanced security through role segregation, regional autonomy, and compliance with local regulations

Departmental specialization strategy

For organizations with specialized teams requiring specific data service access, use targeted role assignments based on functional responsibilities.

Example: TechCorp (mid-size technology company)

- **Structure:** Organization > Department folders (IT, Security, Development) > Project-specific resources
- **Specialized roles:**
  - Security team: **Ransomware Resilience admin** and **Classification viewer** roles
  - Backup team: **Backup and Recovery super admin** for comprehensive backup operations
  - Development team: **Storage admin** for test environment management
  - Compliance team: **Operation support analyst** for monitoring and support case management
- **Agent strategy:** Agents linked to departmental projects based on resource ownership
- **Benefits:** Tailored access control, improved operational efficiency, and clear accountability for specialized tasks

Next steps with IAM in NetApp Console

- Get started with IAM in NetApp Console
- Monitor or audit IAM activity
- Learn about the API for NetApp Console IAM

Get started with identity and access in NetApp Console

When you sign up for the NetApp Console, you're prompted to create a new organization. The organization includes one member (an Organization admin) and one default project. To set up identity and access management (IAM) to meet your business needs, you'll need to customize your organization's hierarchy, add additional members, add or discover resources, and associate those resources across your hierarchy.

You need the **Org admin** or **Super admin** permissions to manage identity and access for your organization. With **Folder or project admin** permissions, you can manage only the folders and projects you have access to.

Follow these steps to set up a new organization. The order may vary based on your organization's needs.

1 Edit the default project or add to your organization's hierarchy

Use the default project or create additional projects and folders matching your business hierarchy.

Learn how to organize your resources with folders and projects.

2

Associate members with your organization

After users sign up for NetApp Console, you must explicitly add them to your Console organization. You also have the option to add service accounts to your organization.

Learn how to manage members and their permissions.

3

Add or discover resources

Add or discover resources (systems) to the Console. Organization members manage systems from within a project.

Learn how to create or discover resources:

- Amazon FSx for NetApp ONTAP
- Azure NetApp Files
- Cloud Volumes ONTAP
- E-Series systems
- On-premises ONTAP clusters
- StorageGRID

4

Associate resources with additional projects

Adding or discovering a system in the Console automatically associates the resource with the currently selected project. To make that resource available to another project in your organization, associate it with the respective project. If a Console agent is used to manage the resource, associate the Console agent with the respective project.

- Learn how to manage your organization’s resource hierarchy.
- Learn how to associate a Console agent with a folder or project.

Related information

- Learn about identity and access management in NetApp Console
- Learn about the API for identity and access

Set up your Console organization

Add folders and projects to your NetApp Console organization

Add folders and projects to match your business structure. After you create folders and projects, you can associate resources with them and manage member access to those projects.

The Console automatically creates one project for you when you create a new organization. Most organizations have the need for more than one project, as well as folders to keep things organized. Learn about the resource hierarchy in NetApp Console.

Using folders and projects to organize resources

In NetApp Console, an organization contains folders and projects that help you organize your resources. Folders help you group related projects, and projects help you manage resources and member access.

Folders

Folders help you organize related projects. You can create nested folders to represent different levels of your organization's structure. For example, you might create a top-level folder for each business unit and then create subfolders for different teams within that business unit. You then create projects within folders.

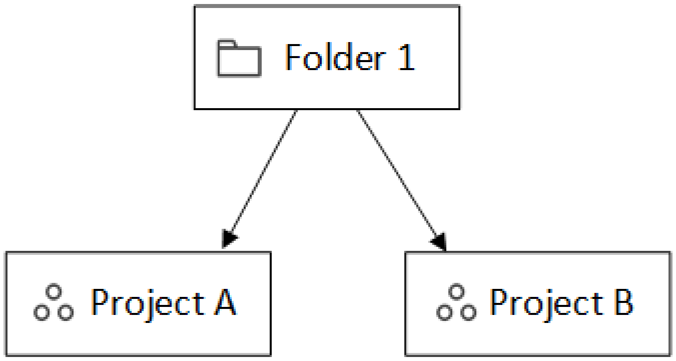
Folders also enable you to manage member access more efficiently using role inheritance. When you assign roles to members at the folder level, they inherit permissions for all child projects and folders.

> Folders are an organizational tool and not visible to members who do not have IAM permissions such as the Org admin, Folder or project admin, or Super admin roles. Members access projects, not folders.

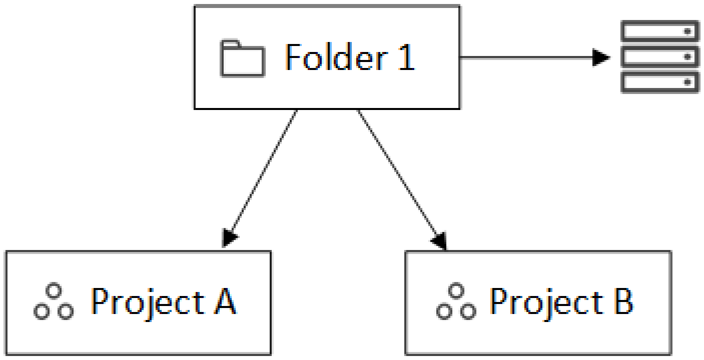
Org admins can delegate administrative responsibilities by creating folders. After creating a folder, an Org admin can assign a member the Folder or project admin roles for particular folders. These members can then manage all projects within that folder without having access to the entire organization.

Folders can have other folders or projects as children, but they cannot have resources directly associated with them. Resources must be associated with a project.

> **When to associate a resource with a folder**
>
> An *Organization administrator* can associate a resource with a folder so a *Folder or project administrator* can link it to the appropriate projects in the folder.
>
> For example, let's say you have a folder that contains two projects:

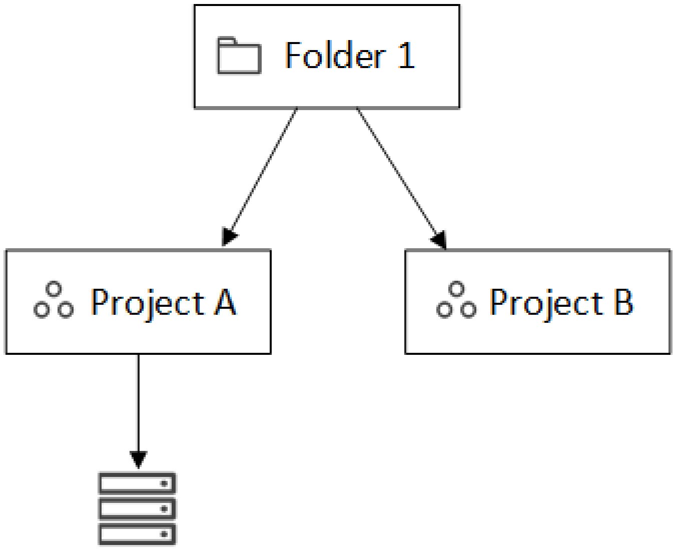


> The *Organization admin* can associate a resource with the folder:



Associating a resource with a folder does not make it accessible to all projects; only the *folder or project admin* can see it. The *Folder or project admin* decides which projects can access it and associates the resource with the appropriate projects.

In this example, the admin associates the resource with Project A:



Members who have permissions for project A can now access the resource.

Projects

Associate resources with projects to allow members to manage them. Resources must be associated with a project for management and user access.

An organization can have one or many projects. A project can be directly under the organization or inside a folder. If an agent is used to discover resources within a project, you must also associate the agent with that project.

Users navigate between assigned projects on the **Systems** page to manage the resources associated with each project.

Add a folder or project

Add projects to manage resources and folders to group related projects.
When you create a new organization, the Console includes one project.

You can create up to seven levels of folders and projects in your organization’s resource structure. Create nested folders to organize your resources as needed.

Steps

1. Select **Administration > Identity and access**.
2. Select **Organization**.
3. From the **Organization** page, select **Add folder or project**.
4. Select **Folder** or **Project**.
5. Enter folder or project details:

    - **Name and location**: Enter a name and choose a location for the folder or project. You can place folders or projects under the organization or inside another folder.
    - **Resources**: Select the resources that you want to associate with this folder or project. If you haven’t added storage systems to the Console yet, you can do this step later.

        > ⓘ Members can’t access resources in a folder until those resources are assigned to a project. Use folders to hold resources temporarily until you create the necessary projects. This can help the Organization admin delegate resource allocation to a Folder or project admin, who then assigns resources to projects within the folder.

    - **Access**: Select **Add a member** to assign access and a role. You can add or remove members from the project or folder at any time.

        Learn about access roles.

6. Select **Add**.

Rename a folder or project

Rename a folder or project as needed. Renaming does not affect associated resources or member access.

Steps

1. From the **Organization** page, navigate to a project or folder in the table, select ••• and then select **Edit folder** or **Edit project**.
2. On the **Edit** page, enter a new name and select **Apply**.

Delete a folder or project

Delete folders and projects you no longer need, such as after team restructuring or project completion.

Before you delete a folder or project, make sure it does not contain any resources. Learn how to remove resources.

Steps

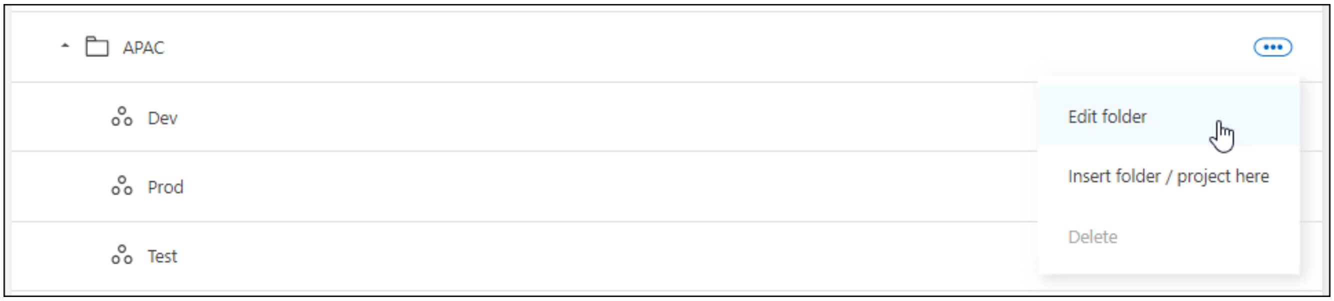
1. From the **Organization** page, navigate to a project or folder in the table, select ••• and then select **Delete**.
2. Confirm that you want to delete the folder or project.

View the resources associated with a folder or project

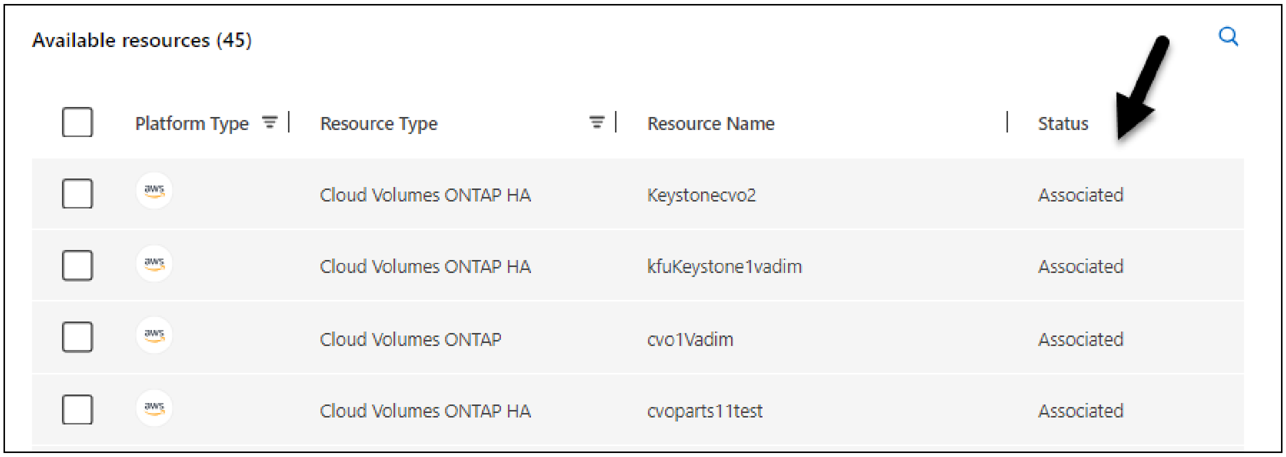
View which resources and members are associated with a folder or project.

Steps

1. From the **Organization** page, navigate to a project or folder in the table, select ••• and then select **Edit folder** or **Edit project**.



2. On the **Edit** page, you can view details about the selected folder or project by expanding the **Resources** or **Access** sections.
   - Select **Resources** to view the associated resources. In the table, the **Status** column identifies the resources that are associated with the folder or project.



Available resources (45)

□	Platform Type	Resource Type	Resource Name	Status
□	aws	Cloud Volumes ONTAP HA	Keystonecvo2	Associated
□	aws	Cloud Volumes ONTAP HA	kfuKeystone1vadim	Associated
□	aws	Cloud Volumes ONTAP	cvo1Vadim	Associated
□	aws	Cloud Volumes ONTAP HA	cvoparts11test	Associated

Change the resources associated with a folder or project

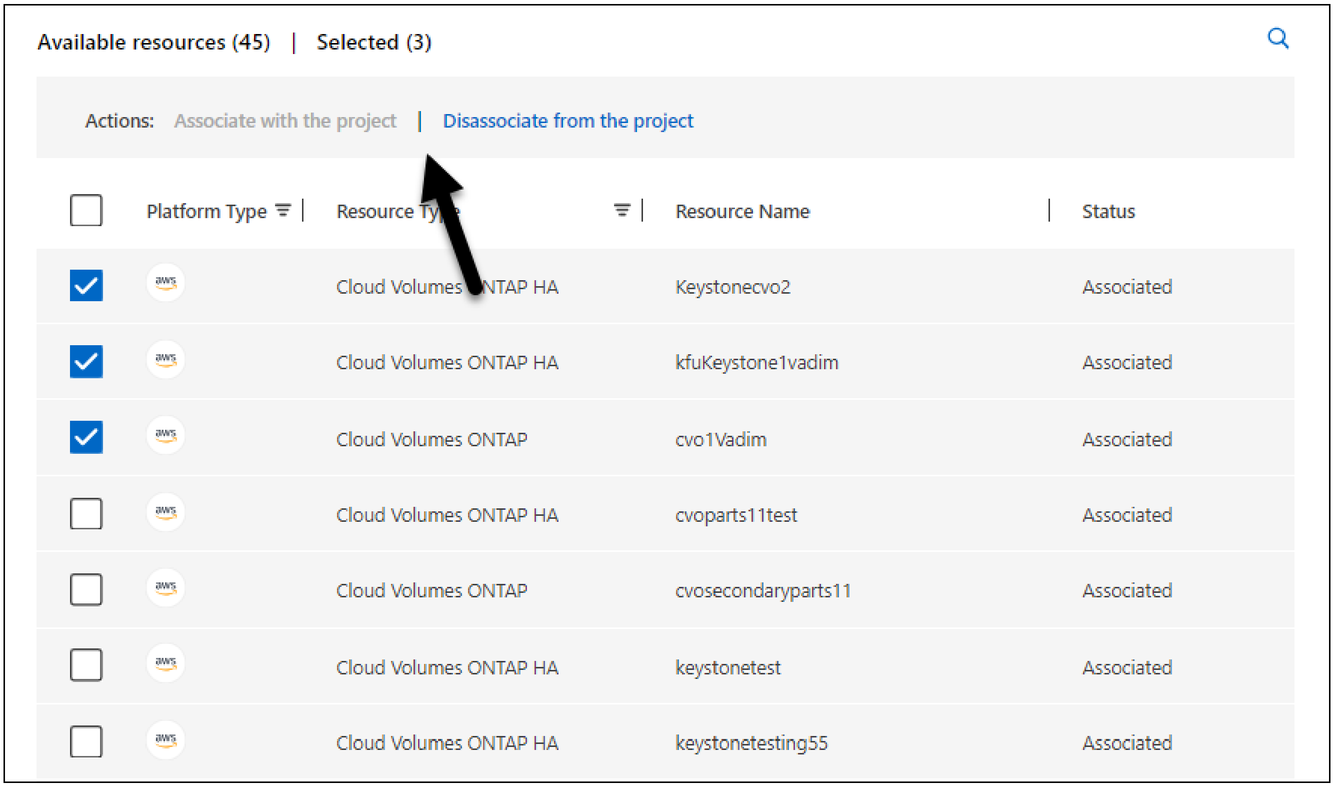
You can change the resources associated with a folder or project as your organization’s needs change.

Steps

1. From the **Organization** page, navigate to a project or folder in the table, select ••• and then select **Edit folder** or **Edit project**.
2. On the **Edit** page, select **Resources**.

   In the table, the **Status** column identifies the resources that are associated with the folder or project.

3. Select the resources that you’d like to associate or disassociate.
4. Based on the resources that you selected, select either **Associate with the project** or **Disassociate from the project**.



Available resources (45) | Selected (3)

Actions: Associate with the project | Disassociate from the project

□	Platform Type	Resource Type	Resource Name	Status
☑	aws	Cloud Volumes ONTAP HA	Keystonecvo2	Associated
☑	aws	Cloud Volumes ONTAP HA	kfuKeystone1vadim	Associated
☑	aws	Cloud Volumes ONTAP	cvo1Vadim	Associated
□	aws	Cloud Volumes ONTAP HA	cvoparts11test	Associated
□	aws	Cloud Volumes ONTAP	cvosecondaryparts11	Associated
□	aws	Cloud Volumes ONTAP HA	keystonetest	Associated
□	aws	Cloud Volumes ONTAP HA	keystonetesting55	Associated

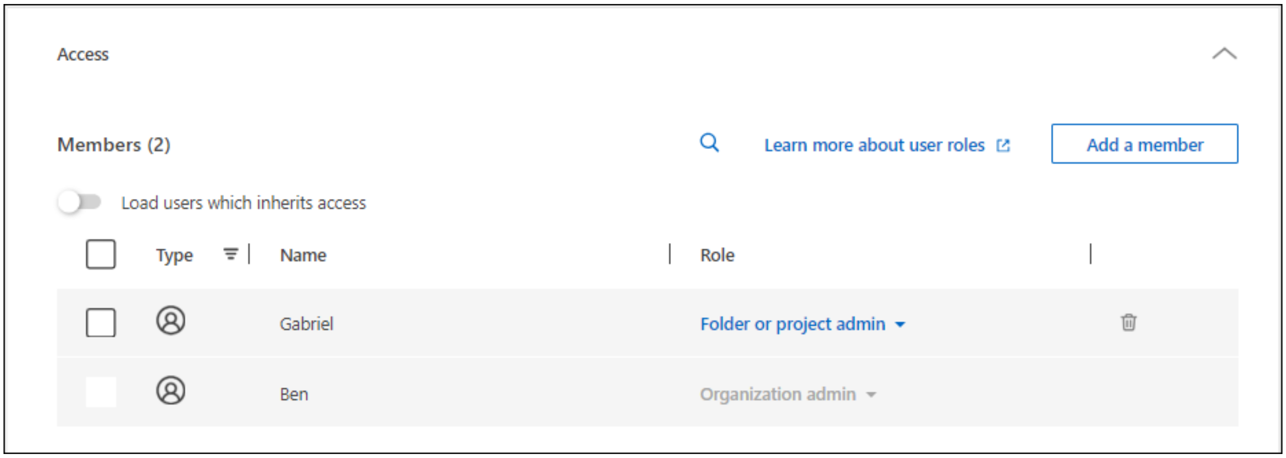
5. Select **Apply**.

View members associated with a folder or project

You can view the members associated with a folder or project from the **Organization** page.

Steps

1. From the **Organization** page, navigate to a project or folder in the table, select ••• and then select **Edit folder** or **Edit project**.
2. On the **Edit** page, select **Access** to view the list of members who have access to the selected folder or project.
   - Select **Access** to view the members who have access to the folder or project.



Access

Members (2)

Learn more about user roles

Add a member

Load users which inherits access

□	Type	Name	Role
□	○	Gabriel	Folder or project admin ▾
	○	Ben	Organization admin ▾

Modify member access to a folder or project

Modify member access to control resource access. Remember that roles assigned at the folder level are inherited by all child projects and folders.

You cannot change member access at lower levels if it is inherited from the folder or organization level. Change the member's permission at the higher hierarchy level to change access Alternatively, you can manage permissions from the Members page.

Steps

1. From the **Organization** page, navigate to a project or folder in the table, select ••• and then select **Edit folder** or **Edit project**.
2. On the **Edit** page, select **Access** to view the list of members who have access to the selected folder or project.
3. Modify member access:
   - **Add a member**: Select the member that you'd like to add to the folder or project and assign them a role.
   - **Change a member's role**: For any members with a role other than Organization Admin, select their existing role and then choose a new role.
   - **Remove member access**: For members who have a role defined at the folder or project for which you're viewing, you can remove their access.
4. Select **Apply**.

Related information

- Learn about identity and access in NetApp Console
- Get started with identity and access
- Learn about the identity and access API

Add resources to folders and projects in NetApp Console

Control user access to resources by adding them to projects and folders in your NetApp Console organization. Grant access to users at the project level.

A *resource* is an entity that the Console is aware of, such as a storage resource, a Console agent, or a Backup and Recovery workload.

You can view and manage resources from the **Resources** page in the Console.

Console resource types

You can associate several types of resources to projects in your NetApp Console organization:

Storage resources

Storage resources are the most common type of resource in your organization and represent both on-premises and cloud storage systems. When you add a storage system to the Console, you can add it to a folder or project. Until then, the Console marks it as undiscovered and does not display it on the **Resources** page.

Console agents

If you used a Console agent to discover storage systems, add the agent to the same folder or project. This allows users to perform agent-enabled functions, such as data services or Console-native storage management. You can add agents to folders or projects from the **Agents** page in the Console. Learn how to associate a Console agent with a folder or project.

Keystone subscriptions

If you have Keystone subscriptions in your organization, you can view them on the **Resources** page. You can associate Keystone subscriptions with folders or projects to provide access to members who have permissions for those folders or projects.

View the resources in your organization

You can view both discovered and undiscovered resources associated with your organization. The system finds storage resources and marks them as undiscovered until you add them to the Console.

> The Console excludes Amazon FSx for NetApp ONTAP resources from the Resources page because users cannot associate them with a role. You can view these resources on the **Systems** page or from Workloads.

Steps

1. Select **Administration > Identity and access**.
2. Select **Resources**.
3. Select **Advanced Search & Filtering**.
4. Use the available options to find a resource:
   - **Search by resource name**: Enter a text string and select **Add**.
   - **Platform**: Select one or more platforms, such as Amazon Web Services.
   - **Resources**: Select one or more resources, such as Cloud Volumes ONTAP.
   - **Organization, folder, or project**: Select the entire organization, a specific folder, or a specific project.
5. Select **Search**.

Associate a resource with folders and projects

Associate a resource to a folder or project to make it available to members who have permissions for that folder or project.

Steps

1. From the **Resources** page, navigate to a resource in the table, select ••• and then select **Associate to folders or projects**.
2. Select a folder or project and then select **Accept**.
3. To associate an additional folder or project, select **Add folder or project** and then select the folder or project.

   Note that you can only select from the folders and projects for which you have admin permissions.

4. Select **Associate resources**.
   - If you associated the resource with projects, members who have permissions for those projects now have the ability to access the resource from the Console.

    - If you associated the resource with a folder, a *Folder or project admin* can now access the resource and associate it with a project within the folder. Learn about associating a resource with a folder.

After you finish

If you discover a resource using a Console agent, associate the Console agent with the project to grant access. Otherwise, the Console agent and its associated resource are not accessible by members without the *Organization admin* role.

Learn how to associate a Console agent with a folder or project.

View the folders and projects associated with a resource

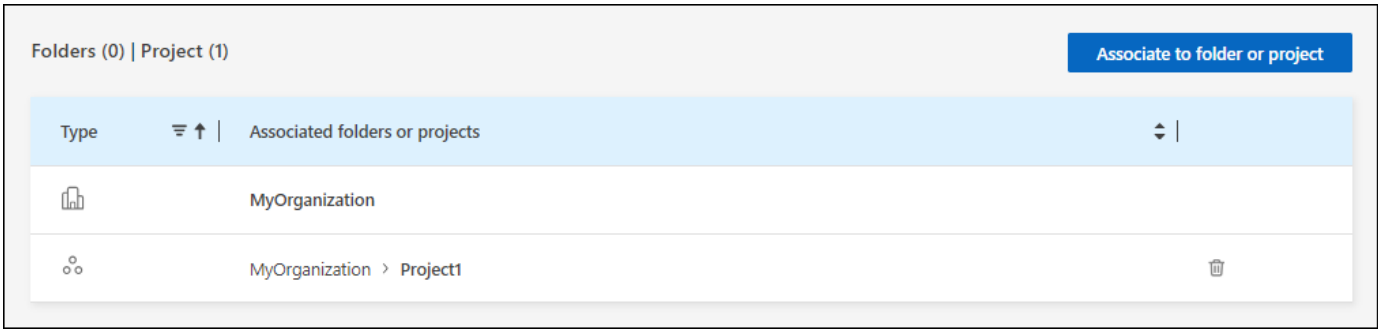
You can view the folders and projects that are associated with a particular resource.

ⓘ If you need to find out which organization members have access to the resource, you can view the members who have access to the folders and projects that are associated with the resource.

Steps

1. From the **Resources** page, navigate to a resource in the table, select ••• and then select **View details**.

The following example shows a resource that is associated with one project.



Folders (0) | Project (1)

Type	Associated folders or projects	
	MyOrganization	
	MyOrganization › Project1	🗑

ⓘ To see which organization members have access to the resource, view members with access to associated folders and projects.

Remove a resource from a folder or project

To remove a resource from a folder or project, remove its association. This prevents members from managing the resource in that folder or project.

ⓘ To remove a discovered resource from the entire organization, go to the **Systems** page and remove the system.

Steps

1. From the **Resources** page, navigate to a resource in the table, select ••• and then select **View details**.
2. To remove a resource from a folder or project, select 🗑 next to the folder or project.
3. Select **Delete** to remove the association.

Related information

- Learn about identity and access in NetApp Console

- Get started with identity and access in NetApp Console
- Learn about the API for identity and access

Associate a Console agent with other folders and projects

Associate Console agents with specific projects to enable resource management and data service access. Resources discovered through a Console agent require both the resource and agent to be associated with the same respective projects for team access.

Super admins and Org admins can create agents and associate any agent with any project or folder. Folder or project admins can only associate existing agents with folders and projects that they have permissions for. Learn more about the actions that a *Folder or project admin* can complete.

Steps

1. Select **Administration > Identity and access** > **Agents**.
2. From the table, find the Console agent that you want to associate.

   Use the search above the table to find a specific Console agent or filter the table by resource hierarchy.

3. To view the folders and projects linked to the Console agent, select ••• and then select **View details**.

   The page displays details about the folders and projects that are associated with the Console agent.

4. Select **Associate to folder or project**.
5. Select a folder or project and then select **Accept**.
6. To associate the Console agent with an additional folder or project, select **Add a folder or project** and then select the folder or project.
7. Select **Associate Agent**.

After you finish

Associate the Console agent's resources with the same folders and projects from the **Resources** page.

Learn how to associate a resource with folders and projects.

Related information

- Learn about NetApp Console agents
- Learn about NetApp Console identity and access management
- Get started with identity and access
- Learn about the API for identity and access management

Add users to your Console organization

Add users to a NetApp Console organization

Within the Console, you grant users access to projects or folders to according to an access role. A *access role* contains a set of permissions that enables a member (user or service account) to perform specific actions at the assigned level of the resource hierarchy.

Required access roles

Super admin, Org admin, or Folder or project admin (for folders and projects that they are administering). Learn about access roles.

Understand how access is granted in NetApp Console

NetApp Console uses role-based access control (RBAC) to manage permissions. Assign roles to users individually or through federated groups. Each role defines allowed actions for specific resources.

Note the following about granting access in NetApp Console:

- All users must first sign up for the NetApp Console before they can be granted access to resources
- You must explicitly assign a role to each user in the Console before they can access resources, even if they are members of a federated group that has been assigned a role.
- You can add service accounts directly from the Console and assign them roles.

Add members to your organization

NetApp Console supports three types of members: user accounts, service accounts, and federated groups.

Users must sign up for NetApp Console before you can add them and assign a role, even if they are in a federated group. Create service accounts directly in the Console.

All members must have at least one role explicitly assigned to them in order to access resources.

When adding a member, choose the resource level (organization, folder, or project) and assign a role or roles with the needed permissions.

Add a user

Users sign up for the NetApp Console, but an Org admin or Folder or project admin must add them to an organization, folder, or project so they can access resources.

Before you begin:

The user must have already signed up for the NetApp Console. If they haven’t signed up yet, direct them to sign up for the NetApp Console.

> ⓘ If you are adding a user that is part of a federated group, ensure that the user has already signed up for the NetApp Console and been explicitly assigned a role in the Console. NetApp recommends assigning minimum access role such as Organization viewer.

Steps

1. Select **Administration > Identity and access**.
2. Select **Members**.
3. Select **Add a member**.
4. For **Member Type**, keep **User** selected.
5. For **User’s email**, enter the user’s email address that is associated with the login that they created.
6. Use the **Select an organization, folder, or project** section to choose the level of your resource hierarchy that the member should have permissions for.

   Note the following:

  - You can select only the folders and projects for which you have permissions.
  - When you select an organization or folder, you grant the member permissions to all its contents.
  - You can only assign the **Organization admin** role at the organization level.

7. **Select a category** then select a **Role** that provides the member with permissions for the resources that are associated with the organization, folder, or project that you selected.

   Learn about access roles.

8. To give access to more folders, projects, or roles, select **Add role**, choose the folder, project, or role category, and select a role.
9. Select **Add**.

   The Console emails instructions to the user.

Add a service account

Service accounts allow you to automate tasks and securely connect with Console APIs. Choose a client ID and secret for simple setups, or JWT (JSON Web Token) for stronger security in automated or cloud-native environments. Select the method that meets your security requirements.

Before you begin:

For JWT authentication, prepare your public key or certificate.

Steps

1. Select **Administration > Identity and access**.
2. Select **Members**.
3. Select **Add a member**.
4. For **Member Type**, select **Service account**.
5. Enter a name for the service account.
6. To use JWT authentication, select **Use private key JWT authentication** and upload your public RSA key or certificate. Skip if using client ID and secret.

   Your X.509 certificate. It must be in PEM, CRT, or CER format.

   a. Set up expiry notifications for your certificate. Choose between seven days or 30 days. Expiry notifications are emailed and shown in the Console to users with the Super admin or Org admin role.

7. Use the **Select an organization, folder, or project** section to choose the level of your resource hierarchy that the member should have permissions for.

   Note the following:

   - You can only select from the folders and projects for which you have permissions.
   - Selecting an organization or folder grants the member permissions to all its contents.
   - You can only assign the **Organization admin** role at the organization level.

8. Select a **Category** then select a **Role** that gives the member permissions for the resources in the organization, folder, or project you selected.

   Learn about access roles.

9. To give access to more folders, projects, or roles, select **Add role**, choose the folder, project, or role category, and select a role.
10. If you didn’t choose to use JWT authentication, download or copy the client ID and client secret.

    The Console shows the client secret only once. Copy it securely; you can recreate it later if you lose it.

11. If you chose JWT authentication, download or copy the client ID and JWT audience. The Console displays this information only once and does not allow you to retrieve it later.
12. Select **Close**.

Add a federated group to your organization

You can add a federated group from your identity provider (IdP) to your organization and assign it a role or roles. Members of the federated group inherit the roles that you assign to the group in the Console.

Before you can assign a role to a federated group, ensure the following:

- Set up federation between your IdP and the Console. Learn how to set up federation.
- The group must already exist in your IdP and been assigned app access to the Console.
- Users belonging to the group must have already signed up for the NetApp Console and been explicitly assigned a role in the Console. NetApp recommends assigning minimum access role such as Organization viewer.

Steps

1. Select **Administration > Identity and access**.
2. Select **Members**.
3. Select **Add a member**.
4. For **Member Type**, select **Federated Group**.
5. Select the federation of which the group is a member
6. For **Group name**, enter the exact name of the group in your IdP.
7. Use the **Select an organization, folder, or project** section to choose the level of your resource hierarchy that the member should have permissions for.

    Note the following:

    - You can only select from the folders and projects for which you have permissions.
    - Selecting an organization or folder grants the member permissions to all its contents.
    - You can only assign the **Organization admin** role at the organization level.
8. Select a **Category** then select a **Role** that gives the member permissions for the resources in the organization, folder, or project you selected.

    Learn about access roles.

9. To give access to more folders, projects, or roles, select **Add role**, choose the folder, project, or role category, and select a role.

Related information

- Learn about identity and access management in NetApp Console
- Get started with identity and access
- NetApp Console access roles
- Learn about the API for identity and access

Manage user access and security

Learn about NetApp Console role-based access control (RBAC)

Manage user access to NetApp Console with role-based access control (RBAC), assigning predefined roles at the organization, folder, or project level. Each role grants specific permissions that define what actions users can perform within their assigned scope.

NetApp designs Console roles with least-privilege, so each role includes only the permissions needed for its tasks. This approach enhances security by limiting access to what each member requires.

After you organize resources into folders and projects, assign organization members a role or roles for specific folders or projects, that allow them to perform only the ir responsibilities.

For example, you can assign a member the Ransomware Resilience admin role for a specific project level, allowing them to perform Ransomware Resilience operations for resources within that project, without granting them broader access to the entire organization. This same user can be granted the role for several projects within your organization.

You can assign users multiple roles for the same scope or different scopes, depending on their responsibilities. For example, a smaller organization might have the same user manage both Ransomware Resilience and Backup and Recovery tasks at the organization level, while a larger organization might have different users assigned to each role at the project level.

Types of Console organization members

There are three types of members in a NetApp Console organization:
* *User accounts*: Individual users who log in to the NetApp Console to manage resources. Users must sign up for the NetApp Console before they can be added to an organization.
* *Service accounts*: Non-human accounts used by applications or services to interact with the NetApp Console via APIs. You can add service accounts directly to your Console organization.
* *Federated groups*: Groups synchronized from your identity provider (IdP) that allow you to manage access for multiple users collectively. Each user within a federated group must have signed up for the NetApp Console and been added to your organization with an access role before they can access resources granted to the group.

Learn how to add members to your organization.

Predefined roles in NetApp Console

NetApp Console includes predefined roles that you can assign to organization members. Each role includes permissions that specify what actions a member can do within their assigned scope (organization, folder, or project).

NetApp Console roles use least-privilege principles that ensure members have only the permissions needed for their tasks, and categorizes roles by the type of access they provide:

- Platform roles: Provide Console administration permissions
- Data services roles: Provide permissions for managing specific data services, such as Ransomware Resilience and Backup and Recovery
- Application roles: Provide permissions for managing storage as well as audit Console events and alerts

You can assign multiple roles to a member based on their responsibilities. For example, you might assign a member both the Ransomware Resilience admin role and the Backup and Recovery admin role for a specific project.

Learn about the predefined roles available in NetApp Console.

Manage member access in NetApp Console

Manage member access in your Console organization. Assign roles to set permissions. Remove members when they leave.

Required access roles

Super admin, Org admin, or Folder or project admin (for folders and projects that they are administering). Link:reference-iam-predefined-roles.html[Learn about access roles].

You can assign access roles on a project or folder basis. For example, assign a role to a user for two specific projects or assign the role at the folder level to give a user the Ransomware Resilience admin role for all projects in a folder

> ⓘ Add your folders and projects before assigning users access. Learn how to add folders and projects.

Understand how access is granted in NetApp Console

NetApp Console uses a role-based access control (RBAC) model to manage user permissions. You can assign predefined roles to members individually or through federated groups. You can add and assign roles to service accounts, as well as federated groups. Each role defines what actions a member can perform at the associated resources.

Note the following about granting access in NetApp Console:

- All users must first sign up for the NetApp Console before they can be granted access to resources.
- You must explicitly assign a role to each user in the Console before they can access resources, even if they are members of a federated group that has been assigned a role.
- You can add service accounts directly from the Console and assign them roles.

Using role inheritance

When you assign a role at the organization, folder, or project level in NetApp Console, that role is automatically inherited by all resources within the selected scope. For example, folder-level roles apply to all contained projects, while project-level roles apply to all resources within that project.

View organization members

To understand which resources and permissions are available to a member, you can view the roles assigned to the member at different levels of your organization’s resource hierarchy. Learn how to use roles to control access to Console resources.

Steps

1. Select **Administration > Identity and access**.
2. Select **Members**.

   The **Members** table lists the members of your organization.

3. From the **Members** page, navigate to a member in the table, select ••• and then select **View details**.

View roles(s) assigned to a member

You can verify which roles they are currently assigned.

If you have the *Folder or project admin* role, the page displays all members in the organization. However, you can only view and manage member permissions for the folders and projects for which you have permissions. Learn more about the actions that a *Folder or project admin* can complete.

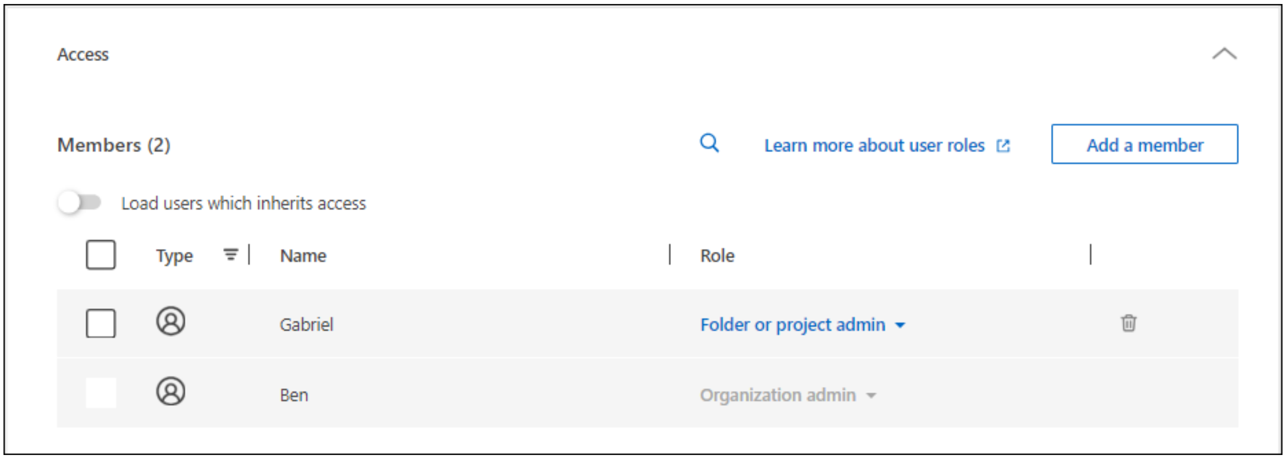
1. From the **Members** page, navigate to a member in the table, select ••• and then select **View details**.
2. In the table, expand the respective row for organization, folder, or project where you want to view the member’s assigned role and select **View** in the **Role** column.

View members associated with a folder or project

You can view members who have access to a specific folder or project.

Steps

1. Select **Administration > Identity and access**.
2. Select **Organization**.
3. From the **Organization** page, navigate to a project or folder in the table, select ••• and then select **Edit folder** or **Edit project**.
   - Select **Access** to view the members who have access to the folder or project.



□	Type	Name	Role
□		Gabriel	Folder or project admin
		Ben	Organization admin

Assign or modify member access

After a user signs up for NetApp Console, you can add them to your organization and assign them a role to provide access to resources. Learn how to add members to your organization.

You can adjust a member’s access by adding or removing roles as needed.

Add an access role to a member

You typically assign a role when adding a member to your organization, but you can update it at any time by removing or adding roles.

You can assign a user an access role for your organization, folder, or project.

Members can have multiple roles within the same project and in different projects. For example, smaller organizations may assign all available access roles to the same user, while larger organizations may have users do more specialized tasks. Alternatively, you could also assign one user the Ransomware Resilience admin role at the organization level. In that example, the user would be able to perform Ransomware Resilience tasks on all projects within your organization.

Your access role strategy should align with the way you have organized your NetApp resources.

Steps

1. Select **Administration > Identity and access**.
2. Select **Members**.
3. Select one of the member tabs: **Users**, **Service accounts**, or **Federated groups**.
4. Select the actions menu ••• next to the member that you want to assign a role and select **Add a role**.
5. To add a role, complete the steps in the dialog box:
   - **Select an organization, folder, or project**: Choose the level of your resource hierarchy that the member should have permissions for.

     If you select the organization or a folder, the member will have permissions to everything that resides within the organization or folder.
   - **Select a category**: Choose a role category. Learn about access roles.
   - Select a **Role**: Choose a role that provides the member with permissions for the resources that are associated with the organization, folder, or project that you selected.
   - **Add role**: If you want to provide access to additional folders or projects within your organization, select **Add role**, specify another folder or project or role category, and then select a role category and a corresponding role.
6. Select **Add new roles**.

Change a member’s assigned role

Change a member’s roles to update their access.

> ⓘ Users must have at least one role assigned to them. You can’t remove all roles from a user. If you need to remove all roles, you must delete the user from your organization.

Steps

1. Select **Administration > Identity and access**.
2. Select **Members**.
3. Select one of the member tabs: **Users**, **Service accounts**, or **Federated groups**.
4. From the **Members** page, navigate to a member in the table, select ••• and then select **View details**.

5. In the table, expand the respective row for organization, folder, or project where you want to change the member's assigned role and select **View** in the **Role** column to view the roles assigned to this member.
6. You can change an existing role for a member or remove a role.
    a. To change a member's role, select **Change** next to the role you want to change. You can only change a role to a role within the same role category. For example, you can change from one data service role to another. Confirm the change.
    b. To unassign a member's role, select 🗑 next to the role to remove the respective role from the member.. You'll be asked to confirm the removal.

Remove a member from your organization

Remove a member if they leave your organization.

When you remove a member, the system revokes their Console permissions but retains their Console and NetApp Support Site accounts.

> ⓘ **Federated members**
>
> - Federated users automatically lose access to the NetApp Console when they are removed from your IdP. But you should still remove them from your Console organization to keep your member list up to date.
> - If you remove a user from a federated group in your IdP, they lose the Console access associated with that group. However, they still retain any access associated with an explicit role assigned to them in the Console.

Steps

1. Select **Administration > Identity and access**.
2. Select **Members**.
3. Select one of the member tabs: **Users**, **Service accounts**, or **Federated groups**.
4. From the **Members** page, navigate to a member in the table, select ••• then select **Delete user**.
5. Confirm that you want to remove the member from your organization.

User security

Secure user access to your NetApp Console organization by managing member security settings. You can reset user passwords, manage multi-factor authentication (MFA), and recreate service account credentials.

Required access roles

Super admin, Org admin, or Folder or project admin (for folders and projects that they are administering). Link:reference-iam-predefined-roles.html[Learn about access roles].

Reset user passwords (local users only)

Org admins cannot reset user passwords for local users. However, they can instruct users to reset their own passwords.

Instruct a user to reset their password from the Console login page by selecting **Forgot password?**.

> This option is not available for users in a federated organization.

Manage a user’s multi-factor authentication (MFA)

If a user loses access to their MFA device, you can either remove or disable their MFA configuration.

> Multi-factor authentication is only available for local users. Federated users cannot enable MFA.

Users must set up MFA again when they log in after removal. If the user temporarily loses access to their MFA device, they can use their saved recovery code to log in.

If they do not have their recovery code, temporarily disable MFA to allow login. When you disable MFA for a user, it is disabled for only eight hours and then re-enabled automatically. The user is allowed one login during that time without MFA. After the eight hours, the user must use MFA to log in.

> To manage a user’s multi-factor authentication, you must have an email address in the same domain as the affected user.

Steps

1. Select **Administration > Identity and access**.
2. Select **Members**.

   The **Members** table lists the members of your organization.

3. From the **Members** page, navigate to a member in the table, select ••• and then select **Manage multi-factor authentication**.
4. Choose whether to remove or to disable the user’s MFA configuration.

Recreate the credentials for a service account

You can create new credentials for a service if you lose or need to update them.

Creating new credentials deletes the old ones. You cannot use the old credentials.

Steps

1. Select **Administration > Identity and access**.
2. Select **Members**.
3. In the **Members** table, navigate to a service account, select ••• and then select **Recreate secrets**.
4. Select **Recreate**.
5. Download or copy the client ID and client secret.

   The Console shows the client secret only once. Make sure you copy or download it and store it securely.

NetApp Console access roles

Learn about NetApp Console access roles

Identity and access management (IAM) in the NetApp Console provides predefined roles that you can assign to the members of your organization across different levels of your resource hierarchy. Before you assign these roles, you should understand the permissions that each role includes. Roles fall into the following categories: platform, application, and data service.

Platform roles

Platform roles grant NetApp Console administration permissions, including role assignment and user management. The Console has several platform roles.

Platform role	Responsibilities
Organization admin	Allows a user unrestricted access to all projects and folders within an organization, add members to any project or folder, as well as perform any task and use any data service that does not have an explicit role associated with it. Users with this role manage your organization by creating folders and projects, assigning roles, adding users, and managing systems if they have the proper credentials. This is the only access role that can create Console agents.
Folder or project admin	Allows a user unrestricted access to assigned projects and folders. Can add members to folders or projects they manage, as well as perform any task and use any data service or application on resources within the folder or project they are assigned. Folder or project admins cannot create Console agents.
Federation admin	Allows a user to create and manage federations with the Console, which enables single-sign on (SSO).
Federation viewer	Allows a user to view existing federations with the Console. Cannot create or manage federations.
Partnership admin	Allows a user to create and manage partnerships.
Partnership viewer	Allows a user to view existing partnerships. Cannot create or manage partnerships.
Super admin	Gives the user a subset of admin roles. This role is designed for smaller organizations that may not need to distribute Console responsibilities across multiple users.
Super viewer	Gives the user a subset viewer roles. This role is designed for smaller organizations that may not need to distribute Console responsibilities across multiple users.

Application roles

The following is a list of roles in the application category. Each role grants specific permissions within its designated scope. Users without the required application or platform role cannot access the respective application.

Application role	Responsibilities
Google Cloud NetApp Volumes admin	Users with the Google Cloud NetApp Volumes role can discover and manage Google Cloud NetApp Volumes.
Google Cloud NetApp Volumes viewer	Users with the Google Cloud NetApp Volumes user role can view Google Cloud NetApp Volumes.
Keystone admin	Users with the Keystone admin role can create service requests. Allows users to monitor and view usage, resources, and admin details within the Keystone tenant they are accessing.
Keystone viewer	Users with the Keystone viewer role CANNOT create service requests. Allows users to monitor and view consumption, assets, and administrative information within the Keystone tenant they are accessing.
ONTAP Mediator setup role	Service accounts with the ONTAP Mediator setup role can create service requests. This role is required in a service account to configure an instance of the ONTAP Cloud Mediator.
Operation support analyst	Provides access to alerts and monitoring tools and ability to enter and manage support cases.
Storage admin	Administer storage health and governance functions, discover storage resources, as well as modify and delete existing systems.
Storage viewer	View storage health and governance functions, as well as view previously discovered storage resources. Cannot discover, modify, or delete existing storage systems.
System health specialist	Administer storage and health and governance functions, all permissions of the Storage admin except cannot modify or delete existing systems.

Data service roles

The following is a list of roles in the data service category. Each role grants specific permissions within its designated scope. Users who do not have the required data service role or a platform role will be unable to access the data service.

Data service role	Responsibilities
Backup and Recovery super admin	Perform any actions in NetApp Backup and Recovery.
Backup and Recovery admin	Perform backups to local snapshots, replicate to secondary storage, and back up to object storage.
Backup and Recovery restore admin	Restore workloads in the Backup and Recovery.
Backup and Recovery clone admin	Clone applications and data in the Backup and Recovery.
Backup and Recovery viewer	View Backup and Recovery information.
Disaster Recovery admin	Perform any actions in NetApp Disaster Recovery service.
Disaster Recovery failover admin	Perform failover and migrations.

Data service role	Responsibilities
Disaster Recovery application admin	Create replication plans, change replication plans, and start test failovers.
Disaster Recovery viewer	View information only.
Classification viewer	Allows users to view NetApp Data Classification scan results. Users with this role can view compliance information and generate reports for resources that they have permission to access. These users can't enable or disable scanning of volumes, buckets, or database schemas. Classification does not have an admin role.
Ransomware Resilience admin	Manage actions on the Protect, Alerts, Recover, Settings, and Reports tabs of NetApp Ransomware Resilience.
Ransomware Resilience viewer	View workload data, view alert data, download recovery data, and download reports in Ransomware Resilience.
Ransomware Resilience user behavior admin	Configure, manage, and view suspicious user behavior detection, alerts, and monitoring in Ransomware Resilience.
Ransomware Resilience user behavior viewer	View suspicious user behavior alerts and insights in Ransomware Resilience.
SnapCenter admin	Provides the ability to back up snapshots from on-premises ONTAP clusters using NetApp Backup and Recovery for applications. A member who has this role can complete the following actions: * Complete any action from Backup and Recovery > Applications * Manage all systems in the projects and folders for which they have permissions * Use all NetApp Console services SnapCenter does not have a viewer role.

Related links

- Learn about NetApp Console identity and access management
- Get started with NetApp Console IAM
- Manage NetApp Console members and their permissions
- Learn about the API for NetApp Console IAM

NetApp Console platform access roles

Assign platform roles to users to grant permissions to manage the NetApp Console, assign roles, add users, create Console agents, and manage federations.

Example for organization roles for a large multi-national organization

XYZ Corporation organizes data storage access by region—North America, Europe, and Asia-Pacific—providing regional control with centralized oversight.

The **Organization admin** in XYZ Corporation's Console creates an initial organization and separate folders for each region. The **Folder or project admin** for each region organizes projects (with associated resources) within the region’s folder.

Regional admins with the **Folder or project admin** role actively manage their folders by adding resources and users. These regional admins can also add, remove, or rename folders and projects they manage. The **Organization admin** inherits permissions for any new resources, maintaining visibility of storage usage across the entire organization.

Within the same organization, one user is assigned the **Federation admin** role to manage the federation of the organization with their corporate IdP. This user can add or remove federated organizations, but cannot manage users or resources within the organization. The **Organization admin** assigns a user the **Federation viewer** role to check federation status and view federated organizations.

The following tables indicate the actions that each Console platform role can perform.

Organization administration roles

Task	Organization admin	Folder or project admin
Create agents	Yes	No
Create, modify or delete systems from the Console (add or discover systems)	Yes	Yes
Create folders and projects, including deleting	Yes	No
Rename existing folders and projects	Yes	Yes
Assign roles and add users	Yes	Yes
Associate resources with folders and projects	Yes	Yes
Associate agents with folders and projects	Yes	No
Remove agents from folders and projects	Yes	No
Manage agents (edit certificates, settings, and so on)	Yes	No
Manage credentials from Administration > Credentials	Yes	Yes
Create, manage, and view federations	Yes	No
Register for support and submit cases through the Console	Yes	Yes
Use data services that are not associated with an explicit access role	Yes	Yes
View the Audit page and notifications	Yes	Yes

Federation roles

Task	Federation admin	Federation viewer
Create a federation	Yes	No
Verify a domain	Yes	No
Add a domain to a federation	Yes	No
Disable and delete federations	Yes	No

Task	Federation admin	Federation viewer
Test federations	Yes	No
View federations and their details	Yes	Yes

Partnership roles

Task	Partnership admin	Partnership viewer
Can create a partnership	Yes	No
Assign roles to partner members	Yes	No
Can add members to a partnership	Yes	No
Can view organization partnership details	Yes	Yes

Super admin and viewer roles

The **Super admin** role provides full access to manage Console features, storage, and data services. This role suits those overseeing administration and governance. In contrast, the **Super viewer** role offers read-only access, ideal for auditors or stakeholders who need visibility without making changes.

Organizations should use **Super admin** access sparingly to minimize security risks and align with the principle of least privilege. Most organizations should assign fine-grained roles with only the necessary permissions to reduce risk and improve auditability.

Example for super roles

ABC Corporation has a small team of five that leverages the NetApp Console for data services and storage management. Instead of distributing multiple roles, they assign the **Super admin** role to two senior team members who handle all administrative tasks, including user management and resource configuration. The remaining three team members are assigned the **Super viewer** role, allowing them to monitor storage health and data service status without the ability to modify settings.

Role	Inherited roles
Super admin	• Organization admin • Folder or project admin • Federation admin • Partnership admin • Ransomware Resilience admin • Disaster recovery admin • Backup super admin • Storage admin • Keystone admin • Google Cloud NetApp Volumes admin

Role	Inherited roles
Super viewer	• Organization viewer • Federation viewer • Partnership viewer • Ransomware Resilience viewer • Disaster recovery viewer • Backup viewer • Storage viewer • Keystone viewer • Google Cloud NetApp Volumes viewer

Application roles

Google Cloud NetApp Volumes roles in NetApp Console

You can assign the following role to users to provide them access to the Google Cloud NetApp Volumes in the NetApp Console.

Google Cloud NetApp Volumes uses the following role:

- **Google Cloud NetApp Volumes admin**: Discover and manage Google Cloud NetApp Volumes in the Console.
- **Google Cloud NetApp Volumes viewer**: View Google Cloud NetApp Volumes in the Console.

Keystone access roles in NetApp Console

Keystone roles provide access to the Keystone dashboards and allow users to view and manage their Keystone subscription. There are two Keystone roles: Keystone admin and Keystone viewer. The main difference between the two roles is the actions they can take in Keystone. The Keystone admin role is the only role that is allowed to create service requests or modify subscriptions.

Example for Keystone roles in NetApp Console

XYZ Corporation has four storage engineers from different departments who view Keystone subscription information. Although all of these users need to monitor the Keystone subscription, only the team lead is allowed to make service requests. Three of the team members are given the **Keystone viewer** role, while the team lead is given the **Keystone admin** role so that there is a point of control over service requests for the company.

The following table indicates the actions that each Keystone role can perform.

Feature and action	Keystone admin	Keystone viewer
View the following tabs: Subscription, Assets, Monitor, and Administration	Yes	Yes

Feature and action	Keystone admin	Keystone viewer
Keystone subscription page:		
View subscriptions	Yes	Yes
Amend or renew subscriptions	Yes	No
Keystone assets page:		
View assets	Yes	Yes
Manage assets	Yes	No
Keystone alerts page:		
View alerts	Yes	Yes
Manage alerts	Yes	No
Create alerts for self	Yes	Yes
Licenses and subscriptions:		
Can view licenses and subscriptions	Yes	Yes
Keystone reports page:		
Download reports	Yes	Yes
Manage reports	Yes	Yes
Create reports for self	Yes	Yes
Service requests:		
Create service requests	Yes	No
View service requests created by any user within the Organization	Yes	Yes

Operational support analyst access role for NetApp Console

You can assign the Operational support analyst role to users to provide them access to alerts and monitoring. Users with this role can also open support cases.

Operational support analyst

Task	Can perform
Manage own user credentials from Settings > Credentials	Yes
View discovered resources	Yes
Register for support and submit cases through the Console	Yes
View the Audit page and notifications	Yes
View, download, and configure alerts	Yes

Storage access roles for NetApp Console

You can assign the following roles to users to provide them access to the storage management features in the NetApp Console. You can assign users an administrative role to manage storage or a viewer role for monitoring.

> These roles are not available from the NetApp Console partnership API.

Administrators can assign storage roles to users for the following storage resources and features:

Storage resources:

- On-premises ONTAP clusters
- StorageGRID
- E-Series

Console services and features:

- Digital advisor
- Software updates
- Lifecycle planning
- Sustainability

Example for storage roles in NetApp Console

XYZ Corporation, a multinational company, has a large team of storage engineers and storage administrators. They allow this team to manage storage assets for their regions while limiting access to core Console tasks like user management, agent creation, and license management.

Within a team of 12, two users are given the **Storage viewer** role which allows them to monitor the storage resources associated with the Console projects they are assigned to. The remaining nine are given the **Storage admin** role which includes the ability to manage software updates, access ONTAP System Manager through the Console, as well as discover storage resources (add systems). One person on the team is given the **System health specialist** role so they can manage the health of the storage resources in their region, but not modify or delete any systems. This person can also perform software updates on the storage resources for projects they are assigned.

The organization has two additional users with the **Organization admin** role who can manage all aspects of the Console, including user management, agent creation, and license management, as well as several users with the **Folder or project admin** role who can perform Console administration tasks for the folders and projects they are assigned to.

The following table shows the actions each storage role performs.

Feature and action	**Storage admin**	**System health specialist**	**Storage viewer**
Storage Management:			
Discover new resources (create systems)	Yes	Yes	No
View discovered systems	Yes	Yes	No
Delete systems from the Console	Yes	No	No
Modify systems	Yes	No	No
Create agents	No	No	No
Digital advisor			
View all pages and functions	Yes	Yes	Yes
Licenses and subscriptions			
View all pages and functions	No	No	No
Software updates			
View landing page and recommendations	Yes	Yes	Yes
Review potential version recommendations and key benefits	Yes	Yes	Yes
View update details for a cluster	Yes	Yes	Yes
Run pre-update checks and download upgrade plan	Yes	Yes	Yes
Install software updates	Yes	Yes	No
Lifecycle planning			
Review capacity planning status	Yes	Yes	Yes
Choose next action (best practice, tier)	Yes	No	No
Tier cold data to cloud storage and free up storage	Yes	Yes	No

Feature and action	Storage admin	System health specialist	Storage viewer
Set up reminders	Yes	Yes	Yes
Sustainability			
View dashboard and recommendations	Yes	Yes	Yes
Download report data	Yes	Yes	Yes
Edit carbon mitigation percentage	Yes	Yes	No
Fix recommendations	Yes	Yes	No
Defer recommendations	Yes	Yes	No
System manager access			
May enter credentials	Yes	Yes	No
Credentials			
User credentials	Yes	Yes	No

Data services roles

NetApp Backup and Recovery roles in NetApp Console

You can assign the following roles to users to provide them access to NetApp Backup and Recovery within the Console. Backup and Recovery roles give you the flexibility to assign users a role specific to the tasks they need to accomplish within your organization. How you assign roles depends on your own business and storage management practices.

The service uses the following roles that are specific to NetApp Backup and Recovery.

- **Backup and Recovery super admin**: Perform any actions in NetApp Backup and Recovery.
- **Backup and Recovery Backup admin**: Perform backups to local snapshots, replicate to secondary storage, and back up to object storage actions in NetApp Backup and Recovery.
- **Backup and Recovery Restore admin**: Restore workloads using NetApp Backup and Recovery.
- **Backup and Recovery Clone admin**: Clone applications and data using NetApp Backup and Recovery.
- **Backup and Recovery viewer**: View information in NetApp Backup and Recovery, but not perform any actions.

For details about all NetApp Console access roles, see the Console setup and administration documentation.

Roles used for common actions

The following table indicates the actions that each NetApp Backup and Recovery role can perform for all workloads.

Feature and action	Backup and Recovery super admin	Backup and Recovery backup admin	Backup and Recovery restore admin	Backup and Recovery clone admin	Backup and Recovery viewer
Add, edit, or delete hosts	Yes	No	No	No	No
Install plugins	Yes	No	No	No	No
Add credentials (host, instance, vCenter)	Yes	No	No	No	No
View dashboard and all tabs	Yes	Yes	Yes	Yes	Yes
Start free trial	Yes	No	No	No	No
Initiate discovery of workloads	No	Yes	Yes	Yes	No
View license information	Yes	Yes	Yes	Yes	Yes
Activate license	Yes	No	No	No	No
View hosts	Yes	Yes	Yes	Yes	Yes
Schedules:					
Activate schedules	Yes	Yes	Yes	Yes	No
Suspend schedules	Yes	Yes	Yes	Yes	No
Policies and protection:					
View protection plans	Yes	Yes	Yes	Yes	Yes
Create, modify, or delete protection plans	Yes	Yes	No	No	No
Restore workloads	Yes	No	Yes	No	No
Create, split, or delete clones	Yes	No	No	Yes	No
Create, modify, or delete policy	Yes	Yes	No	No	No

Feature and action	Backup and Recovery super admin	Backup and Recovery backup admin	Backup and Recovery restore admin	Backup and Recovery clone admin	Backup and Recovery viewer
Reports:					
View reports	Yes	Yes	Yes	Yes	Yes
Create reports	Yes	Yes	Yes	Yes	No
Delete reports	Yes	No	No	No	No
Import from SnapCenter and manage host:					
View imported SnapCenter data	Yes	Yes	Yes	Yes	Yes
Import data from SnapCenter	Yes	Yes	No	No	No
Manage (migrate) host	Yes	Yes	No	No	No
Configure settings:					
Configure log directory	Yes	Yes	Yes	No	No
Associate or remove instance credentials	Yes	Yes	Yes	No	No
Buckets:					
View buckets	Yes	Yes	Yes	Yes	Yes
Create, edit, or delete bucket	Yes	Yes	No	No	No

Roles used for workload-specific actions

The following table indicates the actions that each NetApp Backup and Recovery role can perform for specific workloads.

Kubernetes workloads

This table indicates the actions that each NetApp Backup and Recovery role can perform for actions specific to Kubernetes workloads.

Feature and action	Backup and Recovery super admin	Backup and Recovery backup admin	Backup and Recovery restore admin	Backup and Recovery viewer
View clusters, namespaces, storage classes, and API resources	Yes	Yes	Yes	Yes

Feature and action	Backup and Recovery super admin	Backup and Recovery backup admin	Backup and Recovery restore admin	Backup and Recovery viewer
Add new Kubernetes clusters	Yes	Yes	No	No
Update cluster configurations	Yes	No	No	No
Remove clusters from management	Yes	No	No	No
View applications	Yes	Yes	Yes	Yes
Create and define new applications	Yes	Yes	No	No
Update application configurations	Yes	Yes	No	No
Remove applications from management	Yes	Yes	No	No
View protected resources and backup status	Yes	Yes	Yes	Yes
Create backups and protect applications with policies	Yes	Yes	No	No
Unprotect apps and delete backups	Yes	Yes	No	No
View recovery points and resource viewer results	Yes	Yes	Yes	Yes
Restore applications from recovery points	Yes	No	Yes	No
View Kubernetes backup policies	Yes	Yes	Yes	Yes
Create Kubernetes backup policies	Yes	Yes	Yes	No
Update backup policies	Yes	Yes	Yes	No
Delete backup policies	Yes	Yes	Yes	No
View execution hooks and hook sources	Yes	Yes	Yes	Yes
Create execution hooks and hook sources	Yes	Yes	Yes	No

Feature and action	Backup and Recovery super admin	Backup and Recovery backup admin	Backup and Recovery restore admin	Backup and Recovery viewer
Update execution hooks and hook sources	Yes	Yes	Yes	No
Delete execution hooks and hook sources	Yes	Yes	Yes	No
View execution hook templates	Yes	Yes	Yes	Yes
Create execution hook templates	Yes	Yes	Yes	No
Update execution hook templates	Yes	Yes	Yes	No
Delete execution hook templates	Yes	Yes	Yes	No
View workload summary and analytics dashboards	Yes	Yes	Yes	Yes
View StorageGRID buckets and storage targets	Yes	Yes	Yes	Yes

NetApp Disaster Recovery roles in NetApp Console

You can assign the following roles to users to provide them access to NetApp Disaster Recovery within the Console. Disaster Recovery roles give you the flexibility to assign users a role specific to the tasks they need to accomplish within your organization. How you assign roles depends on your own business and storage management practices.

Disaster Recovery uses the following roles:

- **Disaster recovery admin**: Perform any actions.
- **Disaster recovery failover admin**: Perform failover and migrations.
- **Disaster recovery application admin**: Create replication plans. Modify replication plans. Start test failovers.
- **Disaster recovery viewer**: View information only.

The following table indicates the actions that each role can perform.

Feature and action	Disaster recovery admin	Disaster recovery failover admin	Disaster recovery application admin	Disaster recovery viewer
View dashboard and all tabs	Yes	Yes	Yes	Yes
Start free trial	Yes	No	No	No

Feature and action	Disaster recovery admin	Disaster recovery failover admin	Disaster recovery application admin	Disaster recovery viewer
Initiate discovery of workloads	Yes	No	No	No
View license information	Yes	Yes	Yes	Yes
Activate license	Yes	No	Yes	No
On the Sites tab:				
View sites	Yes	Yes	Yes	Yes
Add, modify, or delete sites	Yes	No	No	No
On the Replication plans tab:				
View replication plans	Yes	Yes	Yes	Yes
View replication plan details	Yes	Yes	Yes	Yes
Create or modify replication plans	Yes	Yes	Yes	No
Create reports	Yes	No	No	No
View snapshots	Yes	Yes	Yes	Yes
Perform failover tests	Yes	Yes	Yes	No
Perform failovers	Yes	Yes	No	No
Perform failbacks	Yes	Yes	No	No
Perform migrations	Yes	Yes	No	No
On the Resource groups tab:				
View resource groups	Yes	Yes	Yes	Yes
Create, modify, or delete resource groups	Yes	No	Yes	No
On the Job Monitoring tab:				
View jobs	Yes	No	Yes	Yes
Cancel jobs	Yes	Yes	Yes	No

Ransomware Resilience access roles for NetApp Console

Ransomware Resilience roles provide users access to NetApp Ransomware Resilience. Ransomware Resilience supports the following roles:

Baseline roles

- Ransomware Resilience admin - Configure Ransomware Resilience settings; investigate and respond to encryption alerts
- Ransomware Resilience viewer - View encryption incidents, reports, and discovery settings

User behavior activity roles
Suspicious user activity detection alerts provide visibility into data such as file activity events; these alerts include file names and file actions (such as Read, Write, Delete, Rename) performed by the user. To limit the visibility of this data, only users with these roles can manage or view these alerts.

- Ransomware Resilience user behavior admin - Activate suspicious user activity detection, investigate and respond to suspicious user activity alerts
- Ransomware Resilience user behavior viewer - View suspicious user activity alerts

> ⓘ User behavior roles are not standalone roles; they are designed to be added to Ransomware Resilience admin or viewer roles. For more information, see User behavior roles.

Consult the following tables for detailed descriptions of each role.

Baseline roles

The following table describes the actions available to the Ransomware Resilience admin and viewer roles.

Feature and action	Ransomware Resilience admin	Ransomware Resilience viewer
View dashboard and all tabs	Yes	Yes
On dashboard, update recommendation status	Yes	No
Start free trial	Yes	No
Initiate discovery of workloads	Yes	No
Initiate rediscovery of workloads	Yes	No
On the Protect tab:		
Add, modify, or delete protection plans for *encryption* policies	Yes	No
Protect workloads	Yes	No
Identify exposure to sensitive data with Data Classification	Yes	No

Feature and action	Ransomware Resilience admin	Ransomware Resilience viewer
List protection plans and details	Yes	Yes
List protection groups	Yes	Yes
View protection group details	Yes	Yes
Create, edit, or delete protection groups	Yes	No
Download data	Yes	Yes
On the Alerts tab:		
View encryption alerts and alert details	Yes	Yes
Edit encryption incident status	Yes	No
Mark encryption alert for recovery	Yes	No
View encryption incident details	Yes	Yes
Dismiss or resolve encryption incidents	Yes	No
Get full list of impacted files in encryption event	Yes	No
Download encryption event alerts data	Yes	Yes
Block user (with Workload Security agent configuration)	Yes	No
On the Recover tab:		
Download impacted files from encryption event	Yes	No
Restore workload from encryption event	Yes	No
Download recovery data from encryption event	Yes	Yes
Download reports from encryption event	Yes	Yes
On the Settings tab:		
Add or modify backup destinations	Yes	No
List backup destinations	Yes	Yes

Feature and action	Ransomware Resilience admin	Ransomware Resilience viewer
View connected SIEM targets	Yes	Yes
Add or modify SIEM targets	Yes	No
Configure readiness drill	Yes	No
Start, reset, or edit readiness drill	Yes	No
Review readiness drill status	Yes	Yes
Update discovery configuration	Yes	No
View discovery configuration	Yes	Yes
On the Reports tab:		
Download reports	Yes	Yes

User behavior roles

To configure suspicious user behavior settings and respond to alerts, a user must have the Ransomware Resilience user behavior admin role. To only view suspicious user behavior alerts, a user should have the Ransomware Resilience user behavior viewer role.

User behavior roles should be conferred on users with existing Ransomware Resilience admin or viewer priviliges who need access to suspicious user activity settings and alerts. A user with the Ransomware Resilience admin role, for example, should receive the Ransomware Resilience user behavior admin role to configure user activity agents and block or unblock users. The Ransomware Resilience user behavior admin role should not be conferred on a Ransomware Resilience viewer.

> ⓘ To activate suspicious user activity detection, you must have the Console Organization admin role.

The following table describes the actions available to the Ransomware Resilience user behavior admin and viewer roles.

Feature and action	Ransomware Resilience user behavior admin	Ransomware Resilience user behavior viewer
On the Settings tab:		
Create, modify, or delete user activity agent	Yes	No
Create or delete user directory connector	Yes	No
Pause or resume data collector	Yes	No

Feature and action	Ransomware Resilience user behavior admin	Ransomware Resilience user behavior viewer
Run data breach readiness drill	Yes	No
On the Protect tab:		
Add, modify, or delete protection plans for *suspicious user behavior* policies	Yes	No
On the Alerts tab:		
View user activity alerts and alert details	Yes	Yes
Edit user activity incident status	Yes	No
Mark user activity alert for recovery	Yes	No
View user activity incident details	Yes	Yes
Dismiss or resolve user activity incidents	Yes	No
Get full list of impacted files by suspicious user	Yes	Yes
Download user activity event alerts data	Yes	Yes
Block or unblock user	Yes	No
On the Recover tab:		
Download impacted files for user activity event	Yes	No
Restore workload from user activity event	Yes	No
Download recovery data from user activity event	Yes	Yes
Download reports from user activity event	Yes	Yes

Identity and access API

Organization and project IDs

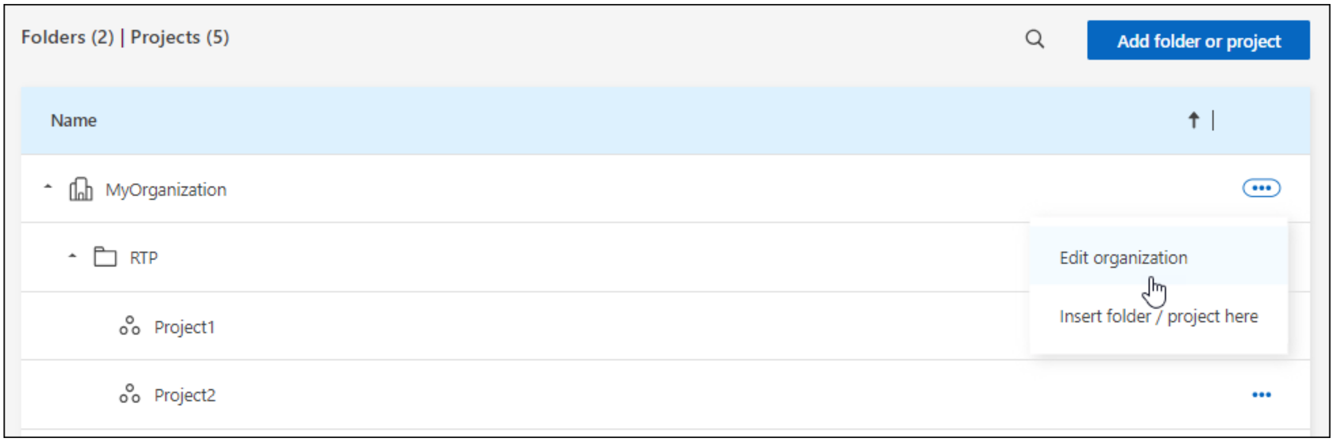
Your NetApp Console organization has a name and an ID. You can choose a name for your organization to help identify it. You may also need to retrieve the organization ID for certain integrations.

Rename your organization

You can rename your organization. This is helpful if you support more than organization.

Steps

1. Select **Administration > Identity and access**.
2. Select **Organization**.
3. From the **Organization** page, navigate to the first row in the table, select ••• and then select **Edit organization**.



4. Enter a new organization name and select **Apply**.

Get the organization ID

The organization ID is used for certain integrations with the Console.

You can view the organization ID from the Organizations page and copy it to the clipboard for your needs.

Steps

1. Select **Administration > Identity and access** > **Organization**.
2. On the **Organization** page, look for your organization ID in the summary bar and copy it to the clipboard. You can save this for use later or copy it directly to where you need to use it.

Obtain the ID for a project

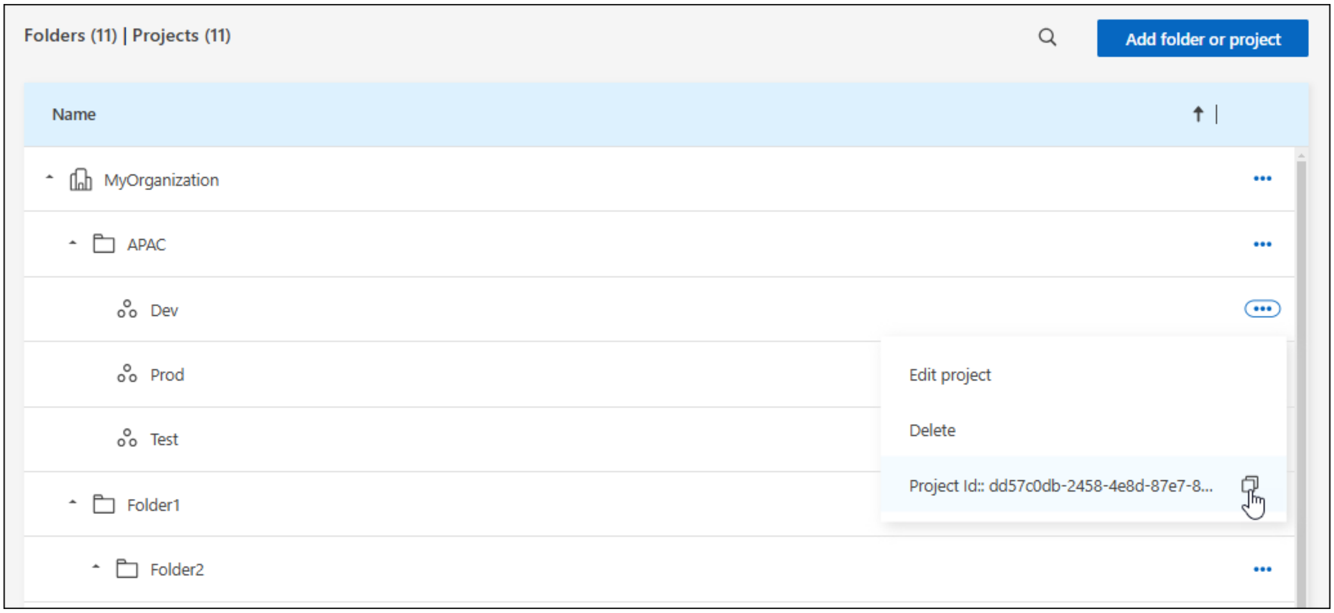
You'll need to obtain the ID for a project if you are using the API. For example, when creating a Cloud Volumes ONTAP system.

Steps

1. From the **Organization** page, navigate to a project in the table and select •••

   The project ID displays.

2. To copy the ID, select the copy button.



Related information

- Learn about identity and access management
- Get started with identity and access
- Learn about the API for identity and access

Security and compliance

Identity federation

Enable single sign-on by using identity federation with NetApp Console

Single-sign on (federation) simplifies the login process and enhances security by allowing users to log in to the NetApp Console using their corporate credentials. You can enable single sign-on (SSO) with your identity provider (IdP) or with the NetApp Support site.

Required role

Organization admin, Federation admin, Federation viewer. Learn more about access roles.

Identity federation with NetApp Support Site

Federating with the NetApp Support Site allows users to log in to the Console, Active IQ Digital Advisor, and other associated apps using the same credentials.

> If you federate with the NetApp Support Site, you can’t also federate with your corporate identity management provider. Choose which one works best for your organization.

Steps

1. Download and complete the NetApp Federation Request Form.
2. Submit the form to the email address specified in the form.

   The NetApp support team reviews and processes your request.

Set up a federated connection with your identity provider

You can set up a federated connection with your identity provider to enable single sign-on (SSO) for the Console. The process involves configuring your identity provider to trust NetApp as a service provider and then creating the connection in the Console.

> ⓘ If you previously configured federation using NetApp Cloud Central (an external application to the Console), you need to import your federation using the Federation page to manage it within the Console. Learn how to import your federation.

Supported identity providers

NetApp supports the following protocols and identity providers for federation:

Protocols

- Security Assertion Markup Language (SAML) identity providers
- Active Directory Federation Services (AD FS)

Identity providers

- Microsoft Entra ID
- PingFederate

Federation with NetApp Console workflow

NetApp supports service provider-initiated (SP-initiated) SSO only. You need to first configure the identity provider to trust NetApp as a service provider. Then, you can create a connection in the Console that uses the identity provider's configuration.

You can federate with your email domain or with a different domain that you own. To federate with a domain different from your email domain, first verify you own the domain.

1 Verify your domain (if not using your email domain)

To federate with a domain different from your email domain, verify that you own it. You can federate your email domain without any extra steps.

2 Configure your IdP to trust NetApp as a service provider

Configure your identity provider to trust NetApp by creating a new application and providing details like the ACS URL, Entity ID or other credential information. Service provider information varies by identity provider, so refer to the documentation for your specific identity provider for details. You'll need to work with your IdP administrator to complete this step.

3 Create the federated connection in the Console

Provide the SAML metadata URL or file from your identity provider to create the connection. This information is used to establish the trust relationship between the Console and your identity provider. The information you provide depends on the IdP that you are using. For example, if you're using Microsoft Entra ID, you need to provide the client ID, secret, and domain.

4 **Test your federation in the Console**

Test your federated connection before enabling it. Use the test option on the Federation page in the Console to verify that your test user can authenticate successfully. If the test is successful, you can enable the connection.

5 **Enable your connection in the Console**

After you enable the connection, users can log in to the Console using their corporate credentials.

Review the topic for your respective protocol or IdP to get started:

- Set up a federated connection with AD FS
- Set up a federated connection with Microsoft Entra ID
- Set up a federated connection with PingFederate
- Set up a federated connection with a SAML identity provider

Domain verification

Verify the email domain for your federated connection

If you want to federate with a domain that is different than your email domain, you must first verify that you own the domain. You can only use verified domains for federation.

Required roles

The Federation admin role is required to make create and manage federations. Federation viewer can view the Federation page. Learn more about access roles.

Verifying your domain involves adding a TXT record to your domain's DNS settings. This record is used to prove that you own the domain and allows the NetApp Console to trust the domain for federation. You may need to coordinate with your IT or network administrator to complete this step.

Steps

1. Select **Administration > Identity and access**.
2. Select **Federation** to view the **Federations** page.
3. Select **Configure new federation**.
4. Select **Verify domain ownership**.
5. Enter the domain that you want to verify and select **Continue**.
6. Copy the TXT record that is provided.
7. Go to your domain's DNS settings and configure the TXT value that was provided as a TXT record for your domain. Work with your IT or network administrator if needed.
8. After the TXT record is added, return to the Console and select **Verify**.

Configure federations

Federate NetApp Console with Active Directory Federation Services (AD FS)

Federate your Active Directory Federation Services (AD FS) with the NetApp Console to enable single sign-on (SSO) for the NetApp Console. This allows users to log in to the Console using their corporate credentials.

Required roles

The Federation admin role is required to make create and manage federations. Federation viewer can view the Federation page. Learn more about access roles.

> You can federate with your corporate IdP or with the NetApp Support Site. NetApp recommends choosing one or the other, but not both.

NetApp supports service provider-initiated (SP-initiated) SSO only. First, configure the identity provider to trust the NetApp Console as a service provider. Then, create a connection in the Console using your identity provider's configuration.

You can set up federation with your AD FS server to enable single sign-on (SSO) for NetApp Console. The process involves configuring your AD FS to trust the Console as a service provider and then creating the connection in the NetApp Console.

Steps

1. Select **Administration > Identity and access**.
2. Select **Federation** to view the **Federations** page.
3. Select **Configure new federation**.
4. Enter your domain details:
   a. Choose whether you want to use a verified domain or your email domain. The email domain is the domain associated with the account you are logged in with.
   b. Enter the name of the federation you are configuring.
   c. If you choose a verified domain, select the domain from the list.
5. Select **Next**.
6. For your connection method, choose **Protocol** and then select **Active Directory Federation Services (AD FS)**.
7. Select **Next**.
8. Create a Relying Party Trust in your AD FS server. You can use PowerShell or manually configure it on your AD FS server. Consult the AD FS documentation for details on how to create a relying party trust.

   a. Create the trust using PowerShell by using following script:

   ```
   (new-object Net.WebClient -property @{Encoding = [Text.Encoding]
   ::UTF8}).DownloadString("https://raw.github.com/auth0/AD FS-
   auth0/master/AD FS.ps1") | iex
   AddRelyingParty "urn:auth0:netapp-cloud-account" "https://netapp-
   cloud-account.auth0.com/login/callback"
   ```

   b. Alternatively, you can create the trust manually in the AD FS management console. Use the following NetApp Console values when creating the trust:
      - When creating the Relying Trust Identifier, use the **YOUR_TENANT** value: `netapp-cloud-account`

- When you select **Enable support for the WS-Federation**, use the **YOUR_AUTH0_DOMAIN** value: `netapp-cloud-account.auth0.com`

c. After creating the trust, copy the metadata URL from your AD FS server or download the federation metadata file. You'll need this URL or file to complete the connection in the Console.

NetApp recommends using the metadata URL to let the NetApp Console automatically retrieve the latest AD FS configuration. If you download the federation metadata file, you will need to update it manually in the NetApp Console whenever there are changes to your AD FS configuration.

9. Return to the Console, and select **Next** to create the connection.
10. Create the connection with AD FS.
    a. Enter the **AD FS URL** that you copied from your AD FS server in the previous step or upload the federation metadata file that you downloaded from your AD FS server.
11. Select **Create connection**. Creating the connection might take a few seconds.
12. Select **Next**.
13. Select **Test connection** to test your connection. You are directed to a login page for your IdP server. Log in with your IdP credentials. After you log in, go back to the Console to enable the connection.

    ⓘ When using the Console in restricted mode, copy the URL to either an incognito browser window or a separate browser to log in to your IdP.

14. In the Console, select **Next** to review the summary page.
15. Set up notifications.

    Choose between seven days or 30 days. The system emails expiry notifications and shows them in the Console to any user with the following roles: Super admin, Org admin, Federation admin, and Federation viewer.

16. Review the federation details and then select **Enable federation**.
17. Select **Finish** to complete the process.

After you enable the federation, users log in to the NetApp Console using their corporate credentials.

Federate NetApp Console with Microsoft Entra ID

Federate with your Microsoft Entra ID IdP provider to enable single sign-on (SSO) for the NetApp Console. This allows users to log in using their corporate credentials.

Required roles

The Federation admin role is required to make create and manage federations. Federation viewer can view the Federation page. Learn more about access roles.

ⓘ You can federate with your corporate IdP or with the NetApp Support Site. NetApp recommends choosing one or the other, but not both.

NetApp supports service provider-initiated (SP-initiated) SSO only. You need to first configure the identity provider to trust NetApp as a service provider. Then, you can create a connection in the Console that uses the identity provider's configuration.

You can set up a federated connection with Microsoft Entra ID to enable single sign-on (SSO) for the Console .

The process involves configuring your Microsoft Entra ID to trust the Console as a service provider and then creating the connection in the Console.

Steps

1. Select **Administration > Identity and access**.
2. Select **Federation** to view the **Federations** page.
3. Select **Configure new federation**.

Domain details

4. Enter your domain details:
   a. Choose whether you want to use a verified domain or your email domain. The email domain is the domain associated with the account you are logged in with.
   b. Enter the name of the federation you are configuring.
   c. If you choose a verified domain, select the domain from the list.
5. Select **Next**.

Connection method

6. For your connection method, choose **Provider** and then select **Microsoft Entra ID**.
7. Select **Next**.

Configuration instructions

1. Configure your Microsoft Entra ID to trust NetApp as a service provider. You need to do this step on your Microsoft Entra ID server.
   a. Use the following values when registering your Microsoft Entra ID app to trust the Console:
      - For the **Redirect URL** , use `https://services.cloud.netapp.com`
      - For the **Reply URL**, use `https://netapp-cloud-account.auth0.com/login/callback`
   b. Create a client secret for your Microsoft Entra ID app. You'll need to provide the client ID, the client secret, and the Entra ID domain name to complete the federation.
2. Return to the Console, and select **Next** to create the connection.

Create connection

1. Create the connection with Microsoft Entra ID
   a. Enter the client ID and Client secret that you created in the previous step.
   b. Enter the Microsoft Entra ID domain name.
2. Select **Create connection**. The system creates the connection in a few seconds.

Test and enable the connection

1. Select **Next**.
2. Select **Test connection** to test your connection. You are directed to a login page for your IdP server. Log in with your IdP credentials. After you log in, go back to the Console to enable the connection.

> ⓘ When using the Console in restricted mode, copy the URL to either an incognito browser window or a separate browser to log in to your IdP.

3. In the Console, select **Next** to review the summary page.
4. Set up notifications.

   Choose between seven days or 30 days. The system emails expiry notifications and shows them in the Console to any user with the following roles: Super admin, Org admin, Federation admin, and Federation viewer.

5. Review the federation details and then select **Enable federation**.
6. Select **Finish** to complete the process.

After you enable the federation, users log in to the NetApp Console using their corporate credentials.

Federate NetApp Console with PingFederate

Federate with your PingFederate IdP provider to enable single sign-on (SSO) for the NetApp Console. This allows users to log in using their corporate credentials.

Required roles

The Federation admin role is required to make create and manage federations. Federation viewer can view the Federation page. Learn more about access roles.

> ⓘ You can federate with your corporate IdP or with the NetApp Support Site. NetApp recommends choosing one or the other, but not both.

NetApp supports service provider-initiated (SP-initiated) SSO only. You need to first configure the identity provider to trust NetApp as a service provider. Then, you can create a connection in the Console that uses the identity provider's configuration.

You can set up a federated connection with PingFederate to enable single sign-on (SSO) for the Console . The process involves configuring your PingFederate server to trust the Console as a service provider and then creating the connection in the Console .

Steps

1. Select **Administration > Identity and access**.
2. Select **Federation** to view the **Federations** page.
3. Select **Configure new federation**.
4. Enter your domain details:
   a. Choose whether you want to use a verified domain or your email domain. The email domain is the domain associated with the account you are logged in with.
   b. Enter the name of the federation you are configuring.
   c. If you choose a verified domain, select the domain from the list.
5. Select **Next**.
6. For your connection method, choose **Provider** and then select **PingFederate**.
7. Select **Next**.

8. Configure your PingFederate server to trust NetApp as a service provider. You need to do this step on your PingFederate server.
    a. Use the following values when configuring PingFederate to trust the NetApp Console:
        - For the **Reply URL** or **Assertion Consumer Service (ACS) URL**, use `https://netapp-cloud-account.auth0.com/login/callback`
        - For the **Logout URL**, use `https://netapp-cloud-account.auth0.com/logout`
        - For **Audience/Entity ID**, use `urn:auth0:netapp-cloud-account:<fed-domain-name-saml>` where <fed-domain-name-pingfederate> is the domain name for the federation. For example, if your domain is `example.com`, the Audience/Entity ID would be `urn:auth0:netappcloud-account:fed-example-com-pingfederate`.

    b. Copy the PingFederate server URL. You will need this URL when creating the connection in the Console.
    c. Download the X.509 certificate from your PingFederate server. It needs to be in Base64-encoded PEM format (.pem, .crt, .cer).
9. Return to the Console, and select **Next** to create the connection.
10. Create the connection with PingFederate
    a. Enter the PingFederate server URL that you copied in the previous step.
    b. Upload the X.509 signing certificate. The certificate must be in PEM, CER, or CRT format.
11. Select **Create connection**. The system creates the connection in a few seconds.
12. Select **Next**.
13. Select **Test connection** to test your connection. You are directed to a login page for your IdP server. Log in with your IdP credentials. After you log in, go back to the Console to enable the connection.

    > ⓘ When using the Console in restricted mode, copy the URL to either an incognito browser window or a separate browser to log in to your IdP.

14. In the Console, select **Next** to review the summary page.
15. Set up notifications.

    Choose between seven days or 30 days. The system emails expiry notifications and shows them in the Console to any user with the following roles: Super admin, Org admin, Federation admin, and Federation viewer.

16. Review the federation details and then select **Enable federation**.
17. Select **Finish** to complete the process.

After you enable the federation, users log in to the NetApp Console using their corporate credentials.

Federate with a SAML identity provider

Federate with your SAML 2.0 IdP provider to enable single sign-on (SSO) for the NEtApp Console. This allows users to log in using their corporate credentials.

Required role

The Federation admin role is required to make create and manage federations. Federation viewer can view the Federation page. Learn more about access roles.

> You can federate with your corporate IdP or with the NetApp Support Site. You can't federate with both.

NetApp supports service provider-initiated (SP-initiated) SSO only. You need to first configure the identity provider to trust NetApp as a service provider. Then, you can create a connection in the Console that uses the identity provider's configuration.

You can set up a federated connection with your SAML 2.0 provider to enable single sign-on (SSO) for the Console. The process involves configuring your provider to trust NetApp as a service provider and then creating the connection in the Console.

Steps

1. Select **Administration > Identity and access**.
2. Select **Federation** to view the **Federations** page.
3. Select **Configure new federation**.
4. Enter your domain details:
    a. Choose whether you want to use a verified domain or your email domain. The email domain is the domain associated with the account you are logged in with.
    b. Enter the name of the federation you are configuring.
    c. If you choose a verified domain, select the domain from the list.
5. Select **Next**.
6. For your connection method, choose **Protocol** and then select **SAML Identity Provider**.
7. Select **Next**.
8. Configure your SAML identity provider to trust NetApp as a service provider. You need to do this step on your SAML provider server.
    a. Ensure that your IdP has the attribute `email` set to the user's email address. This is required for the Console to identify users correctly:

```
<saml:AttributeStatement
xmlns:x500="urn:oasis:names:tc:SAML:2.0:profiles:attribute:X500"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <saml:Attribute Name="email"
NameFormat="urn:oasis:names:tc:SAML:1.1:nameid-format:X509SubjectName">
        <saml:AttributeValue
xsi:type="xs:string">email@domain.com</saml:AttributeValue>
    </saml:Attribute>
</saml:AttributeStatement>
```

a. Use the following values when registering your SAML application with the Console:
    - For the **Reply URL** or **Assertion Consumer Service (ACS) URL**, use `https://netapp-cloud-account.auth0.com/login/callback`
    - For the **Logout URL**, use `https://netapp-cloud-account.auth0.com/logout`

   - For **Audience/Entity ID**, use `urn:auth0:netapp-cloud-account:<fed-domain-name-saml>` where <fed-domain-name-saml> is the domain name you want to use for federation. For example, if your domain is `example.com`, the Audience/Entity ID would be `urn:auth0:netapp-cloud-account:fed-example-com-samlp`.

b. After creating the trust, copy the following values from your SAML provider server:

   - Sign In URL
   - Sign Out URL (optional)

c. Download the X.509 certificate from your SAML provider server. It needs to be in PEM, CER, or CRT format.

   1. Return to the Console, and select **Next** to create the connection.
   2. Create the connection with SAML.

d. Enter the **Sign In URL** of your SAML server.

e. Upload the X.509 certificate that you downloaded from your SAML provider server.

f. Optionally, enter the **Sign Out URL** of your SAML server.

   1. Select **Create connection**. The system creates the connection in a few seconds.
   2. Select **Next**.
   3. Select **Test connection** to test your connection. You are directed to a login page for your IdP server. Log in with your IdP credentials. After you log in, go back to the Console to enable the connection.

   > ⓘ When using the Console in restricted mode, copy the URL to either an incognito browser window or a separate browser to log in to your IdP.

   1. In the Console, select **Next** to review the summary page.
   2. Set up notifications.

      Choose between seven days or 30 days. The system emails expiry notifications and shows them in the Console to any user with the following roles: Super admin, Org admin, Federation admin, and Federation viewer.

   3. Review the federation details and then select **Enable federation**.
   4. Select **Finish** to complete the process.

After you enable the federation, users log in to the NetApp Console using their corporate credentials.

Manage federations

Manage federations in NetApp Console

You can manage your federation in the NetApp Console. You can disable it, update expired credentials, as well as disable it if you no longer need it.

Required roles

The Federation admin role is required to make create and manage federations. Federation viewer can view the Federation page. Learn more about access roles.

You can also add an additional verified domain to an existing federation, which allows you to use multiple domains for your federated connection.

> - If you configured federation using NetApp Cloud Central, import it via the **Federation** page to manage it in the Console. Learn how to import your federation
> - You can view Federation management events such as enabling, disabling, and updating federations on the Audit page. Learn more about monitoring operations in the NetApp Console.

Enable a federation

If you have created a federation but it is not enabled, you can enable it through the **Federation** page. Enabling a federation allows users associated with the federation to log in to the Console using their corporate credentials. Create and test the federation successfully before enabling it.

Steps

1. Select **Administration > Identity and access**.
2. Select the **Federation** tab.
3. Select the actions menu ••• next to the federation that you want to enable and select **Enable**.

Add a verified domain to an existing federation

You can add a verified domain to an existing federation in the Console to use multiple domains with the same identity provider (IdP).

You must have already verified the domain in the Console before you can add it to a federation. If you haven't verified the domain yet, you can do so by following the steps in Verify your domain in the Console.

Steps

1. Select **Administration > Identity and access**.
2. Select the **Federation** tab.
3. Select the actions menu ⋮ next to the federation that you want to add a verified domain to and select **Update domains**. The **Update domains** dialog box displays the domain already associated with this federation.
4. Select a verified domain from the list of available domains.
5. Select **Update**. New domain users may gain federated Console access within 30 seconds.

Updating an expiring federated connection

You can update the details of a federation in the Console. For example, you'll need to update the federation if the credentials such as a certificate or client secret expire. When needed, update the notification date to remind you to update the connection before it expires.

> Update the Console first before updating your IdP to avoid login issues. Stay logged into the Console during the process.

Steps

1. Select **Administration > Identity and access**.
2. Select the **Federation** tab.
3. Select the actions menu (three vertical dots) next to the federation that you want to update and select **Update federation**.

4. Update the details of the federation as needed.
5. Select **Update**.

Test an existing federation

Test the connection of an existing federation to verify that it works. This can help you identify any issues with the federation and troubleshoot them.

Steps

1. Select **Administration > Identity and access**.
2. Select the **Federation** tab.
3. Select the actions menu ⋮ next to the federation that you want to add a verified domain to and select **Test connection**.
4. Select **Test**. The system prompts you to log in with your corporate credentials. If the connection is successful, you are redirected to the NetApp Console. If the connection fails, you see an error message indicating the issue with the federation.
5. Select **Done** to return to the **Federation** tab.

Disable a federation

If you no longer need a federation, you can disable it. This prevents users associated with the federation from logging in to the Console using their corporate credentials. You can re-enable the federation later if needed.

Disable a federation before deleting it, such as when decommissioning the IdP or discontinuing federation. This allows you to re-enable it later if needed.

Steps

1. Select **Administration > Identity and access**.
2. Select the **Federation** tab.
3. Select the actions menu ⋮ next to the federation that you want to add a verified domain to and select **Disable**.

Delete a federation

If you no longer need a federation, you can delete it. This removes the federation and prevents any users associated with the federation from logging in to the Console using their corporate credentials. For example, if the IdP is being decommissioned or if the federation is no longer needed.

You cannot recover a federation after you delete it. You must create a new federation.

> ⓘ You must disable a federation before you can delete it. You cannot undelete a federation after you delete it.

Steps

1. Select **Administration > Identity and access** .
2. Select **Federations** to view the **Federations** page.
3. Select the actions menu ⋮ next to the federation that you want to add a verified domain to and select **Delete**.

Import your federation to NetApp Console

If you have previously set up federation through NetApp Cloud Central (an external application to the NetApp Console) the Federation page prompts you to import your existing federated connection to the Console so you can manage it in the new interface. You can then take advantage of the latest enhancements without having to recreate your federated connection.

> After you import your existing federation, you can manage the federation from the **Federations** page. Learn more about managing federations.

Required role

Organization admin or Federation admin. Learn more about access roles.

Steps

1. Select **Administration > Identity and access**.
2. Select the **Federation** tab.
3. Select **Import Federation**.

Enforce ONTAP permissions for ONTAP Advanced View (ONTAP System Manager)

By default, the Console agent credentials allow users to access the Advanced View (ONTAP System Manager). You can prompt users for their ONTAP credentials instead. This ensures that a user’s ONTAP permissions are applied when they work with ONTAP clusters in both Cloud Volumes ONTAP and ONTAP on-premises clusters.

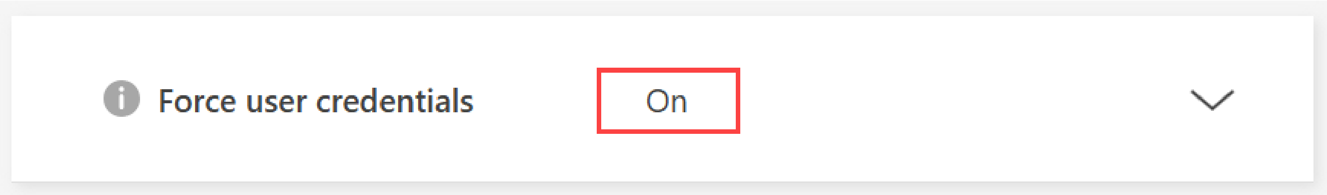
> You must have the Organization admin role to edit Console agent settings.

Steps

1. Select **Administration > Agents**.
2. On the **Overview** page, select the action menu for a Console agent and select **Edit agent**.

   The Console agent must be active to edit it.

3. Expand the **Force Credentials** option.
4. Select the checkbox to enable the **Force Credentials** option and then select **Save**.
5. Verify that the **Force Credentials** option is enabled.


Force user credentials On

Enable read-only mode for a NetApp Console organization

As a security precaution, you can enable read-only mode for your NetApp Console organization. In read-only mode, users can view resources and settings but cannot make any changes.

In read-only mode, users with admin roles must manually elevate their permissions to make changes, which ensures that changes are intentional.

Required access roles

Super admin or Org admin.

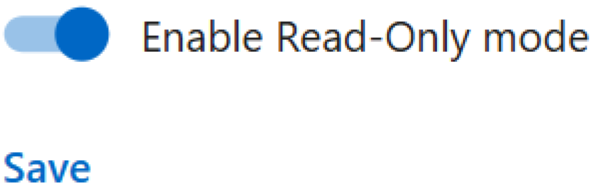
Enable read-only mode for your Console organization

Enable read-only mode to restrict changes to your Console organization. All users can still view resources. Users with admin roles cannot perform any actions in the Console without manually elevating their permissions.

When read-only mode is enabled, users see a banner that notifies them that the organization is in read-only mode. Users must go to User settings to elevate their role.

Steps

1. Select **Administration > Identity and access**.
2. From the **Organizations** tab, select **Edit organization settings** for the organization that you want to set to read-only mode.
3. In the **Read-only mode** section, enable read-only mode by moving the toggle to the **On** position and then select **Save**.



Sign up for NetApp Console as the initial organization administrator

If your company doesn’t have a NetApp Console organization, sign up to create one. The first user is the administrator and manages accounts and permissions. You can update roles and add administrators later.

Steps

1. Open a web browser and go to the NetApp Console
2. If you have a NetApp Support Site account, enter the email address associated with your account directly on the **Log in** page.

   The Console signs you up as part of this initial login with your NetApp Support Site credentials.

3. If you want to sign up by creating a Console login, select **Sign up**.
   a. On the **Sign up** page, enter the required information and select **Next**.

      Only English characters are allowed in the sign up form.

b. Check your inbox for an email from NetApp that includes instructions to verify your email address.

   Verify your email address to complete sign up.

4. After you log in, review and accept the End User License Agreement.
5. On the **Welcome** page, create an organization.
6. Select **Let’s Start**.

+ As a first-time administrator, follow the guided process to add storage, create a Console agent, and more. Learn about using the Console Assistant.

Next steps

As an administrator, after you complete the steps included in the Console Assistant, you should plan your identity and access strategy, add users to your organization, and assign roles. Learn about identity and access management for NetApp Console

Sign up or login to NetApp Console when an organization already exists

If your company already has a NetApp Console organization, sign up or log in to access it. Your sign-up or log-in method depends on whether your company uses identity federation or has NetApp Support Site credentials. If not, create a NetApp Console log-in.

Steps

1. Open a web browser and go to the NetApp Console
2. If you have a NetApp Support Site account or if your company has set up single sign-on (SSO), enter your associated email address or SSO credentials on the **Log in** page. Follow the prompts to complete login.

   In both of these cases, you are signed up for the Console as part of this initial login.

3. If you want to sign up by creating a Console login, select **Sign up**.
   a. On the **Sign up** page, enter the required information and select **Next**.

   ⓘ Only English characters are allowed in the sign up form.

   b. Check your inbox for an email from NetApp that includes instructions to verify your email address.

   Verify your email address to complete sign up.

4. After you log in, review and accept the End User License Agreement.
5. If the system prompts you to create an organization, close the dialog box and tell a Console admin so they can add you to your Console organization and give you access. Learn how to contact an organization administrator.

Next steps

After you are given access to your organization, you can start managing storage and using the data services that you are assigned.

Manage organization partnerships

Partnerships in NetApp Console

Creating partnerships between organizations in the NetApp Console lets partners securely manage NetApp resources across organizational boundaries, streamlining collaboration and enhancing security.

Required roles

Partnership admin Learn more about access roles.

Partnerships allow secure management of NetApp resources across organizations using role-driven relationships in the Console. The initiating organization grants access to its resources, while the accepting organization provides the users or service accounts to be granted access. Partnerships are established through a self-service workflow, giving the initiating organization full control over which resources are shared, what roles are assigned, and the ability to onboard, manage, or revoke partner access as needed.

Customers can authorize MSPs or resellers to manage NetApp environments without requiring complicated setups. Customers can control which clusters partners can access and what roles they have, and can revoke access at any time to maintain security and compliance.

As a partner, you gain centralized visibility and control across customer environments. You can easily switch to a customer’s organization to manage resources, run data services, and monitor health within defined boundaries, reducing custom tooling and ensuring alignment with each customer’s policies.

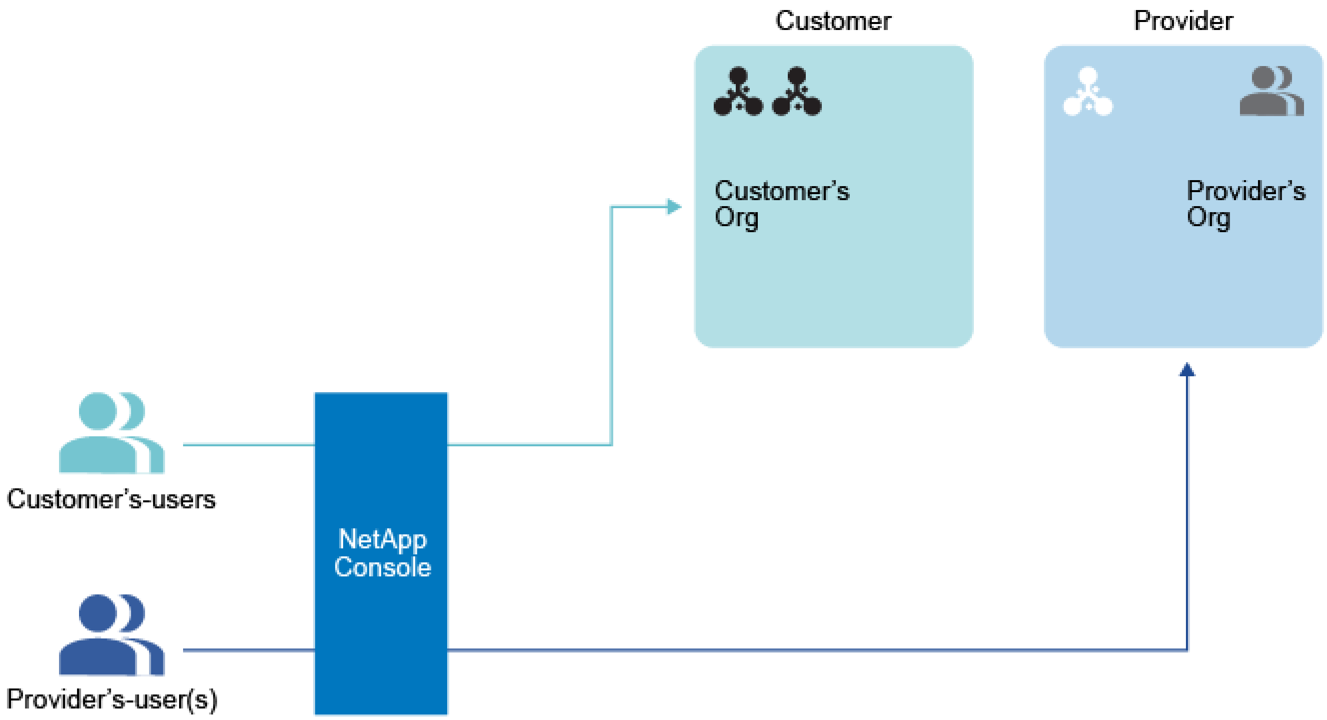
1 Assign one or more users the Partnership admin role

Assign ene or more users in both the initiating and receiving organizations the Partnership admin role to create and manage partnerships. you can assign the Partnership viewer role to users who only need to view partnerships, and not manage.

2 Share your organization ID with the initiating organization

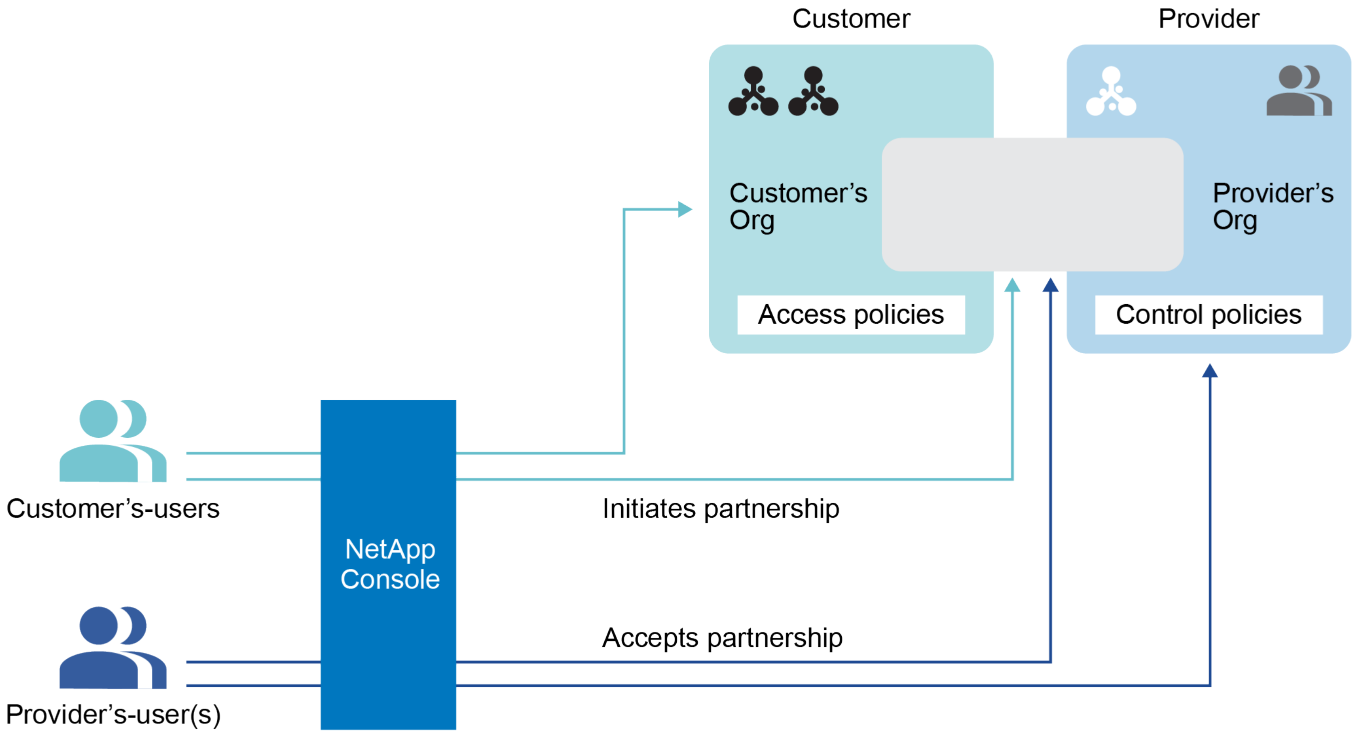
To initiate a partnership, the initiator must know the organization ID of the target organization. Only the respective organization can access this organization ID. Share it directly with the initiating organization outside the NetApp Console via email or another method.

The initiating organization is the organization granting access to its resources.



3 **Initiate the partnership within NetApp Console**

The organization initiating the partnership does so from within the NetApp Console by sending a partnership request.



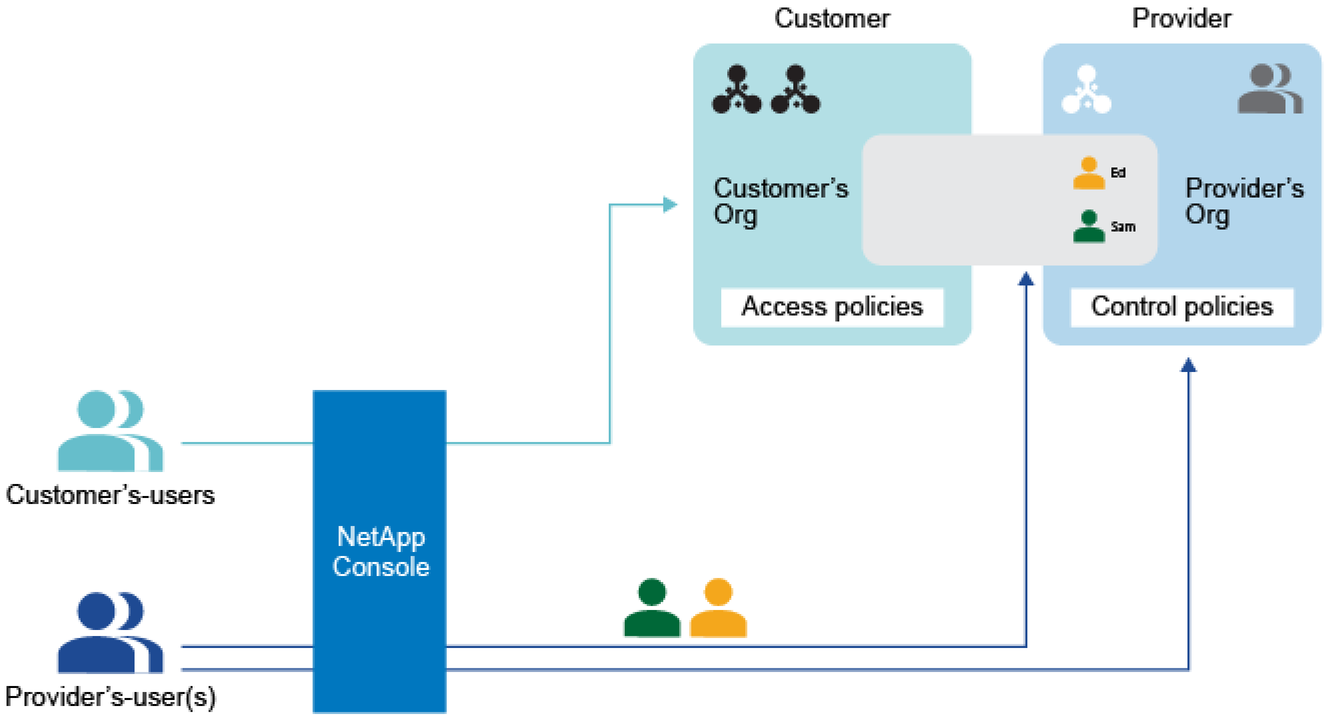
4 Approve the partnership

The receiving organization must accept the request.

The receiving organization is the organization being granted access to resources.

5 Assign users to the partnership

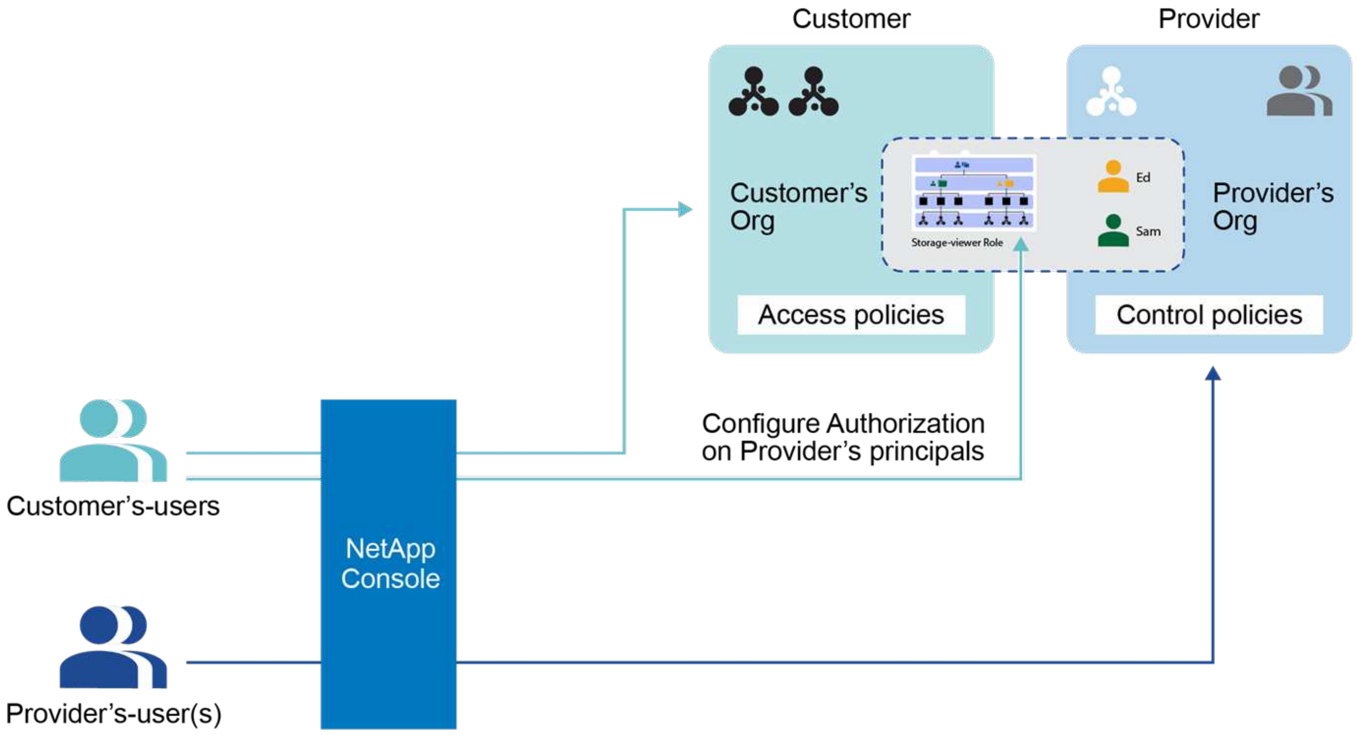
The receiving organization assigns specific users or service accounts from your organization to the partnership. The initiating organization assigns roles to these users.



6 Grant assigned users access to resources

If you are the initiating organization, you can grant access to specific resources to the users that were assigned to the partnership. You can revoke access at any time.

You do this by assigning roles for particular projects or folders within your organization.



Manage partnerships in NetApp Console

Create partnerships to establish secure, managed connections between your organization and trusted partners for collaborative NetApp resource management.

Partnerships let you securely manage NetApp resources across boundaries with role-driven relationships in the Console. The initiating organization grants access to its resources, while the accepting organization provides the users or service accounts to be granted access. Partnerships are established through a self-service workflow, giving the initiating organization full control over which resources are shared, what roles are assigned, and the ability to onboard, manage, or revoke partner access as needed.

Required roles

The **Partnership admin** role is required to make create and manage partnerships. The **Partnership viewer** can view the Partnerships page. Learn more about access roles.

Initiate an organization partnership

You can request a partnership with another organization if you know their organization ID. The receiving organization approves the request before the partnership can proceed.

Before you begin, ensure you have the organization ID of the partner organization and that you have been assigned the **Partnership admin** role.

Steps

1. Select **Administration > Identity and access**.
2. Select the **Partnerships** tab.
3. Select **Add partnership**.
4. In the **Create partnership** dialog box, enter the partner organization ID of the requested partner and select

Add.

The partnership request is sent to the partner organization for approval. You can view the status of the partnership request on the **Partnerships** page.

Approve an organization partnership

An organization partnership request must be accepted by the receiving organization before the partnership can proceed. You must have the **Partnership admin** role to approve and manage partnerships.

Steps

1. Select **Administration > Identity and access**.
2. Select **Partnerships**.
3. Select the **Partnership received** tab.
4. Navigate to the received partnership you want to approve and select ••• and then select **Approve**.
5. Review the details of the partnership, including the name and organization ID of the organization that requested the partnership and select **Next.**
6. Optional, add organization members to the partnership and select **Apply**.

   You can add additional members through the **Partnership** page at any time.

   > ⓘ Any members you add become visible in the partner's organization where the partner can assign them to resources.

Result

The partnership you approved now shows a status of **Established**. Users with the **Partnership admim** or **Partnership viewer** roles in either organization can view the partnership.

View partnership status

View the status of your partnerships.

Required role

Partnership admin, Partnership viewer. Learn more about access roles.

Steps

1. Select **Administration > Identity and access**.
2. Select the **Partnerships**.
3. Select either the **Initiated partnerships** the **Received partnerships** tab.
4. Review the respective table that displays partnerships and their statuses.

Disable an organization partnership

You must be a member of the initiating organization to disable a partnership. Disabling a partnership immediately revokes access to any resources in your organization that were shared with the partner organization.

Required role

Partnership admin. Learn more about access roles.

Steps

1. Select **Administration > Identity and access**.
2. Select the **Partnerships**.
3. Select either the **Initiated partnerships** tab.
4. Review the respective table that displays partnerships and their statuses.
5. Navigate to the initiated partnership you want to disable and select ••• and then select **Disable**.

Manage members for a partnership organization

You can add users to a partnership by adding them to the partner organization. After you add users, the partner organization is responsible for assigning them roles for particular resources in their organization.

Required roles

The **Partnership admin** role is required to make create and manage partnerships. The **Partnership viewer** can view the Partnerships page. Learn more about access roles.

You can remove users from a partnership at any time. Removing a user from a partnership immediately revokes their access to any resources in partner organization.

Add members to a partnership

When you add members to a partnership, the **Partnership admin** of the partner organization must assign them roles for particular resources in their organization before they can access those resources.

After you add members to a partnership, the members display as members in the partner organization where the partner can assign them to resources.

Steps

1. Select **Administration > Identity and access**.
2. Select **Partnerships**.
3. Select the **Partnership received** tab.
4. Select the actions menu ••• next to the established partnership that you want to members and select **Add members**.
5. Choose one or more members to add to to the partnership and select **Add**.

Remove members from a partnership

You can remove members from a partnership at any time. Removing a user from a partnership immediately revokes their access to any resources in partner organization.

If you want to adjust the role that a member has or the resources they can access, the Partnership admin of the partner organization must make those changes.

Steps

1. Select **Administration > Identity and access**.
2. Select **Partnerships**.

3. Select the **Partnership received** tab.
4. Select the actions menu ••• next to member that you want to remove and select **Remove association**.
5. Confirm the action by selecting **Remove** in the dialog box.

View role information for a user

You can view the role that has been assigned to a user and the associated resources.

You cannot change the role associated with a user. If you have questions about the resources or the role provided, contact the administrator of the partner organization.

Steps

1. Select **Administration > Identity and access**.
2. Select **Partnerships**.
3. Select the **Partnership received** tab.
4. From the **Members** page, navigate to a member in the table, select ••• and then select **View details**.
5. In the table, expand the respective row for organization, folder, or project where you want to view the member’s assigned role and select the number in the **Role** column.

Provide resource access to partnership users

You can grant access to partnership users by assigning them specific roles for folders and projects within your organization.

Required roles

Partnership admin. Learn more about access roles.

A partner organization must first add members to the partnership before you can assign them roles for resources in your organization. Learn how to add members to a partnership.

Understand roles for partnership users

You can manage roles for members of partner organizations in the same way that you do for your own. However, not all roles are available to partnership users. In particular, you can’t grant partner users a role that allows software updates. Updating ONTAP software generally requires direct network access.

You can assign following roles to partner users:

- Organization admin
- Folder or project admin
- Federation admin
- Federation viewer
- Backup and recovery admin
- Backup viewer
- Restore admin
- Clone admin
- Disaster recovery admin

- Disaster recovery failover admin
- Disaster recovery application admin
- Disaster recovery viewer
- Operations support analyst
- Classification viewer

Learn more about predefined roles

Add a role to a partner user

You provide access to your organization’s resources by adding a role to a member. When you assign a role, you specify one resource and one role. You can assign more than one role to a user.

For example, if you had two projects and wanted the same user to have the role of Backup and recovery admin for both, you would need to provide the role to the user for each project. Similarly if you wanted to provide a user with two different roles for the same project, you would need to assign each role separately.

Steps

1. Select **Administration > Identity and access**.
2. Select **Partnerships**.
3. Select the **Partnership initiated** tab.
4. Select the actions menu ••• next to the established partnership that you want view and select **View details**.

   The **Member** list displays the members that the partner organization has added to the partnership.

5. Select the actions menu ••• next to the member that you want to assign a role and select **Add a role**.
6. To add a role, complete the steps in the dialog box:
   - **Select an organization, folder, or project**: Choose the level of your resource hierarchy that the member should have permissions for.

     If you select the organization or a folder, the member will have permissions to everything that resides within the organization or folder.

   - **Select a category**: Choose a role category. Learn about access roles.
   - Select a **Role**: Choose a role that provides the member with permissions for the resources that are associated with the organization, folder, or project that you selected.
   - **Add role**: If you want to provide access to additional folders or projects within your organization, select **Add role**, specify another folder or project or role category, and then select a role category and a corresponding role.
7. Select **Add new roles**.

Change or remove a role from a partner user

You can change or remove a role that you have assigned to a member of a partner organization.

Steps

1. Select **Administration > Identity and access**.
2. Select **Partnerships**.

3. Select the **Partnership initiated** tab.
4. Select the actions menu ••• next to the established partnership that you want view and select **View details**.

   The **Member** list displays the members that the partner organization has added to the partnership.

5. From the **Members** page, navigate to a member in the table, select ••• and then select **View details**.
6. In the table, expand the respective row for organization, folder, or project where you want to change the member's assigned role and select **View** in the **Role** column to view the roles assigned to this member.
7. You can change an existing role for a member or remove a role.
   a. To change a member's role, select **Change** next to the role you want to change. You can only change a role to a role within the same role category. For example, you can change from one data service role to another. Confirm the change.
   b. To unassign a member's role, select 🗑 next to the role to remove the respective role from the member.. You'll be asked to confirm the removal.

Work in a partner organization

Once you have been given a role in a partner organization, you can switch to that organization and perform actions that you have permission to perform.

Use the Organization menu to switch between your organizations and any partner organizations you have access to. Learn more about switching organizations and projects.

You'll be able to see the resources that have been shared with you in the partner organization and perform actions based on the role that has been assigned to you. Work with your partnership admin to ensure you have the appropriate role for the resources you need to access.

Monitor NetApp Console operations

You can monitor the status of the operations that the Console is performing to see if there are any issues that you need to address. You can view the status from the Audit page, the Notification Center, or have notifications sent to your email.

The table highlights the features of the Audit page and Notification Center by comparing them.

Notification Center	Audit page
Shows high level status for events and actions	Provides details for each event or action for further investigation
Shows status for the current login session (the information does not appear in the Notification Center after you log off)	Retains status for the last month
Shows only actions initiated in the user interface	Shows all actions from the UI or APIs
Shows user-initiated actions	Shows all actions, whether user-initiated or system-initiated
Filter results by importance	Filter by service, action, user, status, and more

Notification Center	Audit page
Provides the ability to email notifications to users and to others	No email capability

Audit user activity from the Audit page

Use the Audit page to identify who performed an action or its status.

The Audit page shows the actions that users completed to manage your organization or account. This includes management actions such as associating users, creating systems, creating agents, and more.

You can also verify who added a member to an organization or that a project was deleted successfully.

Steps

1. Select **Administration > Audit**.
2. Use the filters above the table to change which actions display in the table.

   For example, you can use the **Service** filter to show actions related to a specific service, or you can use the **User** filter to show actions related to a specific user account.

Download audit logs from the Audit page

You can download the audit logs from the Audit page to a CSV file. This enables you to keep a record of the actions that users perform in your organization. The CSV file includes all columns in the downloaded CSV file, regardless of filters or displayed columns on the Audit page.

Steps

1. In the **Audit** page, select the download icon in the upper right corner of the table.

Monitor activities using the Notification Center

Notifications track Console operations to confirm success. They enable you to view the status for many Console actions that you initiated during your current login session. Not all Console services report information into the Notification Center.

You can display the notifications by selecting the notification bell (🔔3) in the menu bar. The color of the little bubble in the bell indicates the highest level severity notification that is active. So if you see a red bubble, it means there’s an important notification that you should look at.

You can also configure the Console to send certain types of notifications by email so you can be informed of important system activity even when you’re not logged into the system. Emails can be sent to any users who are part of your organization, or to any other recipients who need to be aware of certain types of system activity. See how to set email notification settings.

Comparing the Notification Center with alerts

The Notification Center enables you to view the status of operations you’ve initiated and set up alert notifications for certain types of system activities. Meanwhile, alerts enable you to view issues or potential risks in your ONTAP storage environment related to capacity, availability, performance, protection, and security.

Learn more about NetApp Console alerts

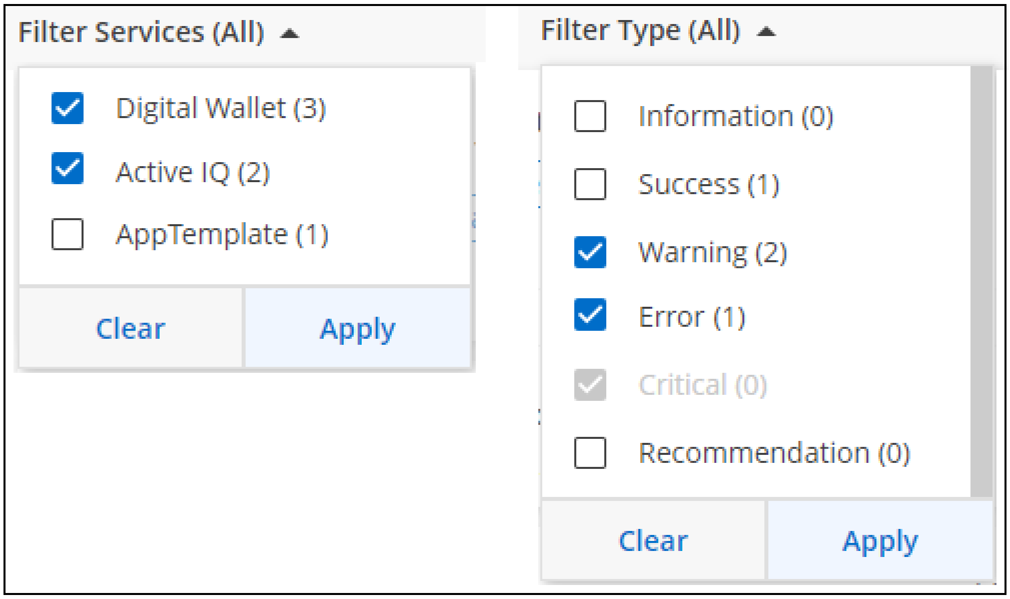
Notification types

The Console classifies notifications into the following categories:

Notification type	Description
Critical	A problem occurred that might lead to service disruption if corrective action is not taken immediately.
Error	An action or process ended with failure, or could lead to failure if corrective action is not taken.
Warning	An issue that you should be aware of to make sure it does not reach the critical severity. Notifications of this severity do not cause service disruption, and immediate corrective action might not be required.
Recommendation	A system recommendation for you to take an action to improve the system or a certain service; for example: costs saving, suggestion for new services, recommended security configuration, etc.
Information	A message that provides additional information about an action or process.
Success	An action or process completed successfully.

Filter notifications

By default you’ll see all active notifications in the Notification Center. You can filter the notifications that you see to show only those notifications that are important to you. You can filter by "Service" and by notification "Type".



Filter Services (All)

☑ Digital Wallet (3)
☑ Active IQ (2)
□ AppTemplate (1)

Filter Type (All)

□ Information (0)
□ Success (1)
☑ Warning (2)
☑ Error (1)
☑ Critical (0)
□ Recommendation (0)

For example, if you want to see only "Error" and "Warning" notifications for Console operations, select those entries and you’ll see only those types of notifications.

Dismiss notifications

You can remove notifications from the page if you no longer need to see them. You can dismiss notifications individually or all at once.

To dismiss all notifications, in the Notification Center, select ⋮ and select **Dismiss All**.

To dismiss individual notifications, hover your cursor over the notification and select **Dismiss**.

Set email notification settings

You can send specific types of notifications by email so you can be informed of important system activity even when you’re not logged in. Emails can be sent to any users who are part of your organization or account, or to any other recipients who need to be aware of certain types of system activity.

> ⓘ
> - The Console sends email notifications for the agent, licenses and subscriptions, NetApp Copy and Sync, and NetApp Backup and Recovery.
> - Sending email notifications is not supported when the Console agent is installed in a site without internet access.

The filters you set in the Notification Center do not determine the types of notifications you receive by email. By default, any Organization admin will receive emails for all "Critical" and "Recommendation" notifications. These notifications are across all services - you can’t choose to receive notifications for only certain services, for example agents or NetApp Backup and Recovery.

All other users and recipients are configured not to receive any notification emails - so you’ll need to configure notification settings for any additional users.

You must have the Organization admin role to customize the notifications settings.

Steps

1. Select **Administration > Notifications settings**.
2. Select **Organization users** or **Additional recipients**.

   The **Additional recipients** page allows you to configure the Console to notify people who are members of your Console organization.

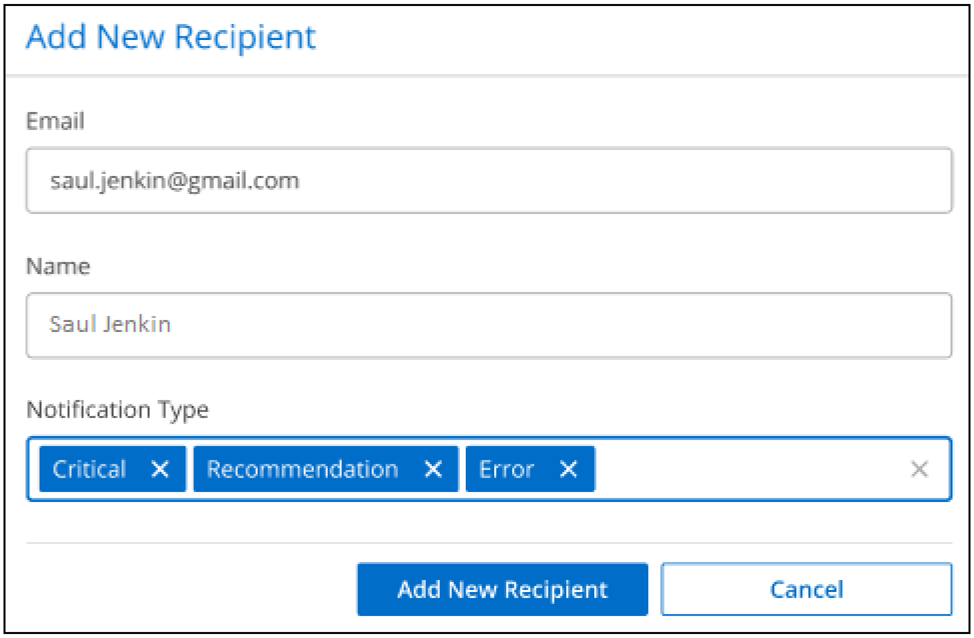
3. Select a user, or multiple users, from either the *Organization users* page or the *Additional Recipients* page, and choose the type of notifications to be sent:
   - To make changes for a single user, select the menu in the Notifications column for that user, check the types of Notifications to be sent, and select **Apply**.
   - To make changes for multiple users, check the box for each user, select **Manage Email Notifications**, check the types of Notifications to be sent, and select **Apply**.

Add additional email recipients

The users who appear in the *Organization users* page are populated automatically from the users in your organization or account. You can add email addresses in the *Additional Recipients* page for other people, or groups, who do not have access to the Console, but who need to be notified about certain types of alerts and notifications.

Steps

1. From the **Notifications settings** page, select **Add New Recipients**.



Add New Recipient

Email

saul.jenkin@gmail.com

Name

Saul Jenkin

Notification Type

Critical ✕ Recommendation ✕ Error ✕

2. Enter the name, email address, and select the types of notifications that recipient will receive, and select **Add New Recipient**.

Reference

Agent maintenance console

Agent validation with the maintenance console

You can use the Console agent maintenance console to validate the installation and configuration of a Console agent.

Access the agent maintenance console

You can access the maintenance Console from the Console agent host. Navigate to the following directory:

```
/opt/application/netapp/service-manager-2/agent-maint-console
```

config-checker validate

The `config-checker validate` command allows you to validate the configuration of a Console agent.

Parameters

`--services <comma-separated list of services to validate>` --**REQUIRED**--

Choose one or more services to validate. Valid service names are:
*`PLATFORM` which validates network connectivity to required Console endpoints.

`--validationTypes <comma-separated list validation types to run>` --**REQUIRED**--
Choose from one or more validation types to run. Valid validation types are:
* `NETWORK` which validates network connectivity to required Console endpoints.

`--proxy <url>` --**OPTIONAL**--

Specifies the proxy server URL to use for the validation. Required if your agent is configured to use a proxy server.

`--certs <paths>` --**OPTIONAL**--

Specifies the path to one or more certificate files to use for the validation. The certificate files must be in PEM format. Separate multiple paths with commas. This parameter is required if your agent uses a custom certificate.

Config-checker validate examples

Basic validation:

```
./agent-maint-console config-checker validate --services PLATFORM
--validationTypes NETWORK
```

Validation where a proxy server is used for the agent:

```
./agent-maint-console config-checker validate --services PLATFORM
--validationTypes NETWORK --proxy http://proxy.company.com:8080
```

Validation where a certificate is used for the agent:

```
./agent-maint-console config-checker validate --services PLATFORM
--validationTypes NETWORK --certs /path/to/cert1.pem,/path/to/cert2.pem
```

View help for any command

To view help for any command, append `--help` to the command. For example, to view help for the `proxy add` command, use the following command:

```
./agent-maint-console proxy add --help
```

Transparent proxy commands

You can use the Console agent maintenance console to configure a Console agent to use a transparent proxy server.

Access the agent maintenance console

You can access the maintenance Console from the Console agent host. Navigate to the following directory:

```
/opt/application/netapp/service-manager-2/agent-maint-console
```

View help for any command

To view help for any command, append `--help` to the command. For example, to view help for the `proxy add` command, use the following command:

```
./agent-maint-console proxy add --help
```

proxy get

The `proxy get` command displays information about the current transparent proxy server configuration. To view the current transparent proxy server configuration, use the following command:

Proxy get example

To view the current transparent proxy server configuration, use the following command:

```
./agent-maint-console proxy get
```

proxy add

The `proxy add` command configures the agent to use a transparent proxy server.

Parameters

`-c <certificate file>`

Specifies the path to the certificate file for the proxy server. The certificate file must be in PEM format. Ensure that the certificate file is in the same directory as the command or specify the full path to the certificate file.

Proxy add example

To add a transparent proxy server, use the following command, where `/home/ubuntu/myCA1.pem` is the path to the certificate file for the proxy server. The certificate file must be in PEM format:

```
./agent-maint-console proxy add -c /home/ubuntu/myCA1.pem
```

proxy update

The `proxy update` command allows you to update the certificate of a transparent proxy.

Parameters

`-c <certificate file>` specifies the path to the certificate file for the proxy server. The certificate file must be in PEM format.

Ensure that the certificate file is in the same directory as the command or specify the full path to the certificate file.

Proxy update example

To update the certificate for a transparent proxy server, use the following command, where `/home/ubuntu/myCA1.pem` is the path to the new certificate file for the proxy server. The certificate file must be in PEM format:

```
./agent-maint-console proxy update -c /home/ubuntu/myCA1.pem
```

proxy remove

The `proxy remove` command removes the transparent proxy server configuration from the agent.

Proxy remove example

To remove transparent proxy server, use the following command:

```
./agent-maint-console proxy remove
```

Cloud Provider agent permissions and network requirements

Permissions summary for NetApp Console

You'll need to provide the Console agent appropriate permissions so that it can perform operations in your cloud environment. Use the links on this page to quickly access the permissions that you need based on your goal.

AWS permissions

The NetApp Console requires AWS permissions for a Console agent and for individual services.

Console agents

Goal	Description	Link
Deploy a Console agent from the Console To deploy a Console agent in AWS, the user needs specific permissions.	Set up AWS permissions	Provide permissions for a Console agent

NetApp Backup and Recovery

Goal	Description	Link
Back up on-premises ONTAP clusters to Amazon S3 with NetApp Backup and Recovery	When activating backups on your ONTAP volumes, NetApp Backup and Recovery prompts you to enter an access key and secret for an IAM user that has specific permissions.	Set up S3 permissions for backups

Cloud Volumes ONTAP

Goal	Description	Link
Provide permissions for Cloud Volumes ONTAP nodes	An IAM role must be attached to each Cloud Volumes ONTAP node in AWS. The same is true for the HA mediator. The default option is to let the Console create the IAM roles for you, but you can use your own when creating the system in the Console.	Learn how to set up the IAM roles yourself

NetApp Copy and Sync

Goal	Description	Link
Deploy the data broker in AWS	The AWS user account you use to deploy the data broker must have the needed permissions.	Permissions required to deploy the data broker in AWS
Provide permissions for the data broker	When NetApp Copy and Sync deploys the data broker, it creates an IAM role for the data broker instance. You can deploy the data broker using your own IAM role, if you prefer.	Requirements to use your own IAM role with the AWS data broker
Enable AWS access for a manually installed data broker	If you use the data broker with a sync relationship that includes an S3 bucket, then you should prepare the Linux host for AWS access. When you install the data broker, you'll need to provide AWS keys for an IAM user that has programmatic access and specific permissions.	Enabling access to AWS

FSx for ONTAP

Goal	Description	Link
Create and manage FSx for ONTAP	To create or manage an Amazon FSx for NetApp ONTAP system, you need to add AWS credentials to the Console by providing the ARN of an IAM role that gives the Console the permissions needed.	Learn how to set up AWS credentials for FSx

NetApp Cloud Tiering

Goal	Description	Link
Tier on-premises ONTAP clusters to Amazon S3	When you enable NetApp Cloud Tiering to AWS, you enter an access key and secret key. These credentials are passed to the ONTAP cluster so that ONTAP can tier data to the S3 bucket.	Set up S3 permissions for tiering

Azure permissions

The Console requires Azure permissions for a Console agent and for individual services.

Console agent

Goal	Description	Link
Deploy a Console agent from the Console	When you deploy a Console agent from the Console, you need to use an Azure account or service principal that has permissions to deploy a Console agent VM in Azure.	Set up Azure permissions

Goal	Description	Link
Provide permissions for a Console agent	When the Console deploys a Console agent VM in Azure, it creates a custom role that provides the permissions required to manage resources and processes within that Azure subscription. You need to set up the custom role yourself if you launch a Console agent from the marketplace, if you manually install a Console agent, or if you add more Azure credentials to a Console agent. Keep the policy up to date as new permissions are added in later releases.	Azure permissions for a Console agent

NetApp Backup and Recovery

Goal	Description	Link
Back up Cloud Volumes ONTAP to Azure blob storage	When using NetApp Backup and Recovery to back up Cloud Volumes ONTAP, you need to add permissions to a Console agent in the following scenarios: • You want to use "Search & Restore" functionality • You want to use customer-managed encryption keys (CMEK)	• Back up Cloud Volumes ONTAP data to Azure Blob storage with Backup and Recovery
Back up on-premises ONTAP clusters to Azure blob storage	When using NetApp Backup and Recovery to back up on-premises ONTAP clusters, you need to add permissions to a Console agent to use the "Search & Restore" functionality.	Back up on-premises ONTAP data to Azure Blob storage with Backup and Recovery

NetApp Copy and sync

Goal	Description	Link
Deploy the data broker in Azure	The Azure user account that you use to deploy the data broker must have the required permissions.	Permissions required to deploy the data broker in Azure

Google Cloud permissions

The Console requires Google Cloud permissions for a Console agent and for individual services.

Console agents

Goal	Description	Link
Deploy a Console agent from the Console	The Google Cloud user who deploys a Console agent from the Console needs specific permissions to deploy a Console agent in Google Cloud.	Set up permissions to create a Console agent

Goal	Description	Link
Provide permissions for a Console agent	The service account for a Console agent must have specific permissions for day-to-day operations. You need to associate the service account with a Console agent during deployment. Keep the policy up to date as new permissions are added in later releases.	Set up permissions for a Console agent

NetApp Backup and Recovery

Goal	Description	Link
Back up Cloud Volumes ONTAP to Google Cloud	When using NetApp Backup and Recovery to back up Cloud Volumes ONTAP, you need to add permissions to a Console agent in the following scenarios: • You want to use "Search & Restore" functionality • You want to use customer-managed encryption keys (CMEK)	• Back up Cloud Volumes ONTAP data to Google Cloud Storage with Backup and Recovery • Permissions for CMEKs
Back up on-premises ONTAP clusters to Google Cloud	When using NetApp Backup and Recovery to back up on-premises ONTAP clusters, you need to add permissions to a Console agent to use the "Search & Restore" functionality.	Back up on-premises ONTAP data to Google Cloud Storage with Backup and Recovery

NetApp Copy and Sync

Goal	Description	Link
Deploy the data broker in Google Cloud	Ensure that the Google Cloud user who deploys the data broker has the required permissions.	Permissions required to deploy the data broker in Google Cloud
Enable Google Cloud access for a manually installed data broker	If you plan to use the data broker with a sync relationship that includes a Google Cloud Storage bucket, then you should prepare the Linux host for Google Cloud access. When you install the data broker, you'll need to provide a key for a service account that has specific permissions.	Enabling access to Google Cloud

StorageGRID permissions

The Console requires StorageGRID permissions for two services.

NetApp Backup and Recovery

Goal	Description	Link
Back up on-premises ONTAP clusters to StorageGRID	When you prepare StorageGRID as a backup target for ONTAP clusters, NetApp Backup and Recovery prompts you to enter an access key and secret for an IAM user that has specific permissions.	Prepare StorageGRID as your backup target

NetApp Cloud Tiering

Goal	Description	Link
Tier on-premises ONTAP clusters to StorageGRID	When you set up NetApp Cloud Tiering to StorageGRID, you need to provide Cloud Tiering with an S3 access key and secret key. Cloud tiering uses the keys to access your buckets.	Prepare tiering to StorageGRID

AWS agent permissions and security rules

AWS permissions for the Console agent

When the NetApp Console launches a Console agent in AWS, it attaches a policy to the agent that provides the agent with permissions to manage resources and processes within that AWS account. The agent uses the permissions to make API calls to several AWS services, including EC2, S3, CloudFormation, IAM, the Key Management Service (KMS), and more.

IAM policies

The IAM policies available below provide the permissions that a Console agent needs to manage resources and processes within your public cloud environment based on your AWS region.

Note the following:

- If you create a Console agent in a standard AWS region directly from the Console, the Console automatically applies policies to the agent.
- You need to set up the policies yourself if you deploy the agent from the AWS Marketplace, if you manually install the agent on a Linux host, or if you want to add additional AWS credentials to the Console.
- In either case, you need to ensure that the policies are up to date as new permissions are added in subsequent releases. If new permissions are required, they will be listed in the release notes.
- If needed, you can restrict the IAM policies by using the IAM `Condition` element. AWS documentation: Condition element
- To view step-by-step instructions for using these policies, refer to the following pages:
  - Set up permissions for an AWS Marketplace deployment
  - Set up permissions for on-premises deployments
  - Set up permissions for restricted mode

Select your region to view the required policies:

Standard regions

For standard regions, the permissions are spread across two policies. Two policies are required due to a maximum character size limit for managed policies in AWS.

Policy #1

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Action": [
        "ec2:DescribeAvailabilityZones",
        "ec2:DescribeInstances",
        "ec2:DescribeInstanceStatus",
        "ec2:RunInstances",
        "ec2:ModifyInstanceAttribute",
        "ec2:DescribeInstanceAttribute",
        "ec2:DescribeRouteTables",
        "ec2:DescribeImages",
        "ec2:CreateTags",
        "ec2:CreateVolume",
        "ec2:DescribeVolumes",
        "ec2:ModifyVolumeAttribute",
        "ec2:CreateSecurityGroup",
        "ec2:DescribeSecurityGroups",
        "ec2:RevokeSecurityGroupEgress",
        "ec2:AuthorizeSecurityGroupEgress",
        "ec2:AuthorizeSecurityGroupIngress",
        "ec2:RevokeSecurityGroupIngress",
        "ec2:CreateNetworkInterface",
        "ec2:DescribeNetworkInterfaces",
        "ec2:ModifyNetworkInterfaceAttribute",
        "ec2:DescribeSubnets",
        "ec2:DescribeVpcs",
        "ec2:DescribeDhcpOptions",
        "ec2:CreateSnapshot",
        "ec2:DescribeSnapshots",
        "ec2:GetConsoleOutput",
        "ec2:DescribeKeyPairs",
        "ec2:DescribeRegions",
        "ec2:DescribeTags",
        "ec2:AssociateIamInstanceProfile",
        "ec2:DescribeIamInstanceProfileAssociations",
        "ec2:DisassociateIamInstanceProfile",
        "ec2:CreatePlacementGroup",
        "ec2:DescribeReservedInstancesOfferings",
        "ec2:AssignPrivateIpAddresses",
        "ec2:CreateRoute",
        "ec2:DescribeVpcs",
        "ec2:ReplaceRoute",
        "ec2:UnassignPrivateIpAddresses",
        "ec2:DeleteSecurityGroup",
        "ec2:DeleteNetworkInterface",
        "ec2:DeleteSnapshot",
        "ec2:DeleteTags",
        "ec2:DeleteRoute",
        "ec2:DeletePlacementGroup",
        "ec2:DescribePlacementGroups",
        "ec2:DescribeVolumesModifications",
        "ec2:ModifyVolume",
        "cloudformation:CreateStack",
        "cloudformation:DescribeStacks",
        "cloudformation:DescribeStackEvents",
        "cloudformation:ValidateTemplate",
        "cloudformation:DeleteStack",
        "iam:PassRole",
        "iam:CreateRole",
        "iam:PutRolePolicy",
        "iam:CreateInstanceProfile",
        "iam:AddRoleToInstanceProfile",
        "iam:RemoveRoleFromInstanceProfile",
        "iam:ListInstanceProfiles",
        "iam:DeleteRole",
        "iam:DeleteRolePolicy",
        "iam:DeleteInstanceProfile",
        "iam:GetRolePolicy",
        "iam:GetRole",
        "sts:DecodeAuthorizationMessage",
        "sts:AssumeRole",
        "s3:GetBucketTagging",
        "s3:GetBucketLocation",
        "s3:ListBucket",
        "s3:CreateBucket",
        "s3:GetLifecycleConfiguration",
        "s3:ListBucketVersions",
        "s3:GetBucketPolicyStatus",
        "s3:GetBucketPublicAccessBlock",
        "s3:GetBucketPolicy",
        "s3:GetBucketAcl",
        "s3:PutObjectTagging",
        "s3:GetObjectTagging",
        "s3:DeleteObject",
        "s3:DeleteObjectVersion",
        "s3:PutObject",
        "s3:ListAllMyBuckets",
        "s3:GetObject",
        "s3:GetEncryptionConfiguration",
        "kms:ReEncrypt*",
        "kms:CreateGrant",
        "fsx:Describe*",
        "fsx:List*",
        "kms:GenerateDataKeyWithoutPlaintext"
      ],
      "Resource": "*",
      "Effect": "Allow",
      "Sid": "cvoServicePolicy"
    },
    {
      "Action": [
        "ec2:StartInstances",
        "ec2:StopInstances",
        "ec2:DescribeInstances",
        "ec2:DescribeInstanceStatus",
        "ec2:RunInstances",
        "ec2:TerminateInstances",
        "ec2:DescribeInstanceAttribute",
        "ec2:DescribeImages",
        "ec2:CreateTags",
        "ec2:CreateVolume",
        "ec2:CreateSecurityGroup",
        "ec2:DescribeSubnets",
        "ec2:DescribeVpcs",
        "ec2:DescribeRegions",
        "cloudformation:CreateStack",
        "cloudformation:DeleteStack",
        "cloudformation:DescribeStacks",
        "ec2:DescribeVpcEndpoints",
        "kms:ListAliases",
        "glue:GetDatabase",
        "glue:GetTable",
        "glue:GetPartitions"
      ],
      "Resource": "*",
      "Effect": "Allow",
      "Sid": "backupPolicy"
    },
    {
      "Action": [
        "s3:GetBucketLocation",
        "s3:ListAllMyBuckets",
        "s3:ListBucket",
        "s3:CreateBucket",
        "s3:GetLifecycleConfiguration",
        "s3:PutLifecycleConfiguration",
        "s3:PutBucketTagging",
        "s3:ListBucketVersions",
        "s3:GetBucketAcl",
        "s3:PutBucketPublicAccessBlock",
        "s3:GetObject",
        "s3:PutEncryptionConfiguration",
        "s3:DeleteObject",
        "s3:DeleteObjectVersion",
        "s3:ListBucketMultipartUploads",
        "s3:PutObject",
        "s3:PutBucketAcl",
        "s3:AbortMultipartUpload",
        "s3:ListMultipartUploadParts",
        "s3:DeleteBucket",
        "s3:GetObjectVersionTagging",
        "s3:GetObjectVersionAcl",
        "s3:GetObjectRetention",
        "s3:GetObjectTagging",
        "s3:GetObjectVersion",
        "s3:PutObjectVersionTagging",
        "s3:PutObjectRetention",
        "s3:DeleteObjectTagging",
        "s3:DeleteObjectVersionTagging",
        "s3:GetBucketObjectLockConfiguration",
        "s3:GetBucketVersioning",
        "s3:PutBucketObjectLockConfiguration",
        "s3:PutBucketVersioning",
        "s3:BypassGovernanceRetention",
        "s3:PutBucketPolicy",
        "s3:PutBucketOwnershipControls"
      ],
      "Resource": [
        "arn:aws:s3:::netapp-backup-*"
      ],
      "Effect": "Allow",
      "Sid": "backupS3Policy"
    },
    {
      "Action": [
        "s3:CreateBucket",
        "s3:GetLifecycleConfiguration",
        "s3:PutLifecycleConfiguration",
        "s3:PutBucketTagging",
        "s3:ListBucketVersions",
        "s3:GetBucketPolicyStatus",
        "s3:GetBucketPublicAccessBlock",
        "s3:GetBucketAcl",
        "s3:GetBucketPolicy",
        "s3:PutBucketPublicAccessBlock",
        "s3:DeleteBucket"
      ],
      "Resource": [
        "arn:aws:s3:::fabric-pool*"
      ],
      "Effect": "Allow",
      "Sid": "fabricPoolS3Policy"
    },
    {
      "Action": [
        "ec2:DescribeRegions"
      ],
      "Resource": "*",
      "Effect": "Allow",
      "Sid": "fabricPoolPolicy"
    },
    {
      "Condition": {
        "StringLike": {
          "ec2:ResourceTag/netapp-adc-manager": "*"
        }
      },
      "Action": [
        "ec2:StartInstances",
        "ec2:StopInstances",
        "ec2:TerminateInstances"
      ],
      "Resource": [
        "arn:aws:ec2:*:*:instance/*"
      ],
      "Effect": "Allow"
    },
    {
      "Condition": {
        "StringLike": {
          "ec2:ResourceTag/WorkingEnvironment": "*"
        }
      },
      "Action": [
        "ec2:StartInstances",
        "ec2:TerminateInstances",
        "ec2:AttachVolume",
        "ec2:DetachVolume",
        "ec2:StopInstances",
        "ec2:DeleteVolume"
      ],
      "Resource": [
        "arn:aws:ec2:*:*:instance/*"
      ],
      "Effect": "Allow"
    },
    {
      "Action": [
        "ec2:AttachVolume",
        "ec2:DetachVolume"
      ],
      "Resource": [
        "arn:aws:ec2:*:*:volume/*"
      ],
      "Effect": "Allow"
    },
    {
      "Condition": {
        "StringLike": {
          "ec2:ResourceTag/WorkingEnvironment": "*"
        }
      },
      "Action": [
        "ec2:DeleteVolume"
      ],
      "Resource": [
        "arn:aws:ec2:*:*:volume/*"
      ],
      "Effect": "Allow"
    }
  ]
}
```

Policy #2

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Action": [
        "ec2:CreateTags",
        "ec2:DeleteTags",
        "ec2:DescribeTags",
        "tag:getResources",
        "tag:getTagKeys",
        "tag:getTagValues",
        "tag:TagResources",
        "tag:UntagResources"
      ],
      "Resource": "*",
      "Effect": "Allow",
      "Sid": "tagServicePolicy"
    }
  ]
}
```

GovCloud (US) regions

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "iam:ListInstanceProfiles",
        "iam:CreateRole",
        "iam:DeleteRole",
        "iam:PutRolePolicy",
        "iam:CreateInstanceProfile",
        "iam:DeleteRolePolicy",
        "iam:AddRoleToInstanceProfile",
        "iam:RemoveRoleFromInstanceProfile",
        "iam:DeleteInstanceProfile",
        "ec2:ModifyVolumeAttribute",
        "sts:DecodeAuthorizationMessage",
        "ec2:DescribeImages",
        "ec2:DescribeRouteTables",
        "ec2:DescribeInstances",
        "iam:PassRole",
        "ec2:DescribeInstanceStatus",
        "ec2:RunInstances",
        "ec2:ModifyInstanceAttribute",
        "ec2:CreateTags",
        "ec2:CreateVolume",
        "ec2:DescribeVolumes",
        "ec2:DeleteVolume",
        "ec2:CreateSecurityGroup",
        "ec2:DeleteSecurityGroup",
        "ec2:DescribeSecurityGroups",
        "ec2:RevokeSecurityGroupEgress",
        "ec2:AuthorizeSecurityGroupEgress",
        "ec2:AuthorizeSecurityGroupIngress",
        "ec2:RevokeSecurityGroupIngress",
        "ec2:CreateNetworkInterface",
        "ec2:DescribeNetworkInterfaces",
        "ec2:DeleteNetworkInterface",
        "ec2:ModifyNetworkInterfaceAttribute",
        "ec2:DescribeSubnets",
        "ec2:DescribeVpcs",
        "ec2:DescribeDhcpOptions",
        "ec2:CreateSnapshot",
        "ec2:DeleteSnapshot",
        "ec2:DescribeSnapshots",
        "ec2:StopInstances",
        "ec2:GetConsoleOutput",
        "ec2:DescribeKeyPairs",
        "ec2:DescribeRegions",
        "ec2:DeleteTags",
        "ec2:DescribeTags",
        "cloudformation:CreateStack",
        "cloudformation:DeleteStack",
        "cloudformation:DescribeStacks",
        "cloudformation:DescribeStackEvents",
        "cloudformation:ValidateTemplate",
        "s3:GetObject",
        "s3:ListBucket",
        "s3:ListAllMyBuckets",
        "s3:GetBucketTagging",
        "s3:GetBucketLocation",
        "s3:CreateBucket",
        "s3:GetBucketPolicyStatus",
        "s3:GetBucketPublicAccessBlock",
        "s3:GetBucketAcl",
        "s3:GetBucketPolicy",
        "kms:ReEncrypt*",
        "kms:CreateGrant",
        "ec2:AssociateIamInstanceProfile",
        "ec2:DescribeIamInstanceProfileAssociations",
        "ec2:DisassociateIamInstanceProfile",
        "ec2:DescribeInstanceAttribute",
        "ec2:CreatePlacementGroup",
        "ec2:DeletePlacementGroup"
      ],
      "Resource": "*"
    },
    {
      "Sid": "fabricPoolPolicy",
      "Effect": "Allow",
      "Action": [
        "s3:DeleteBucket",
        "s3:GetLifecycleConfiguration",
        "s3:PutLifecycleConfiguration",
        "s3:PutBucketTagging",
        "s3:ListBucketVersions",
        "s3:GetBucketPolicyStatus",
        "s3:GetBucketPublicAccessBlock",
        "s3:GetBucketAcl",
        "s3:GetBucketPolicy",
        "s3:PutBucketPublicAccessBlock"
      ],
      "Resource": [
        "arn:aws-us-gov:s3:::fabric-pool*"
      ]
    },
    {
      "Sid": "backupPolicy",
      "Effect": "Allow",
      "Action": [
        "s3:DeleteBucket",
        "s3:GetLifecycleConfiguration",
        "s3:PutLifecycleConfiguration",
        "s3:PutBucketTagging",
        "s3:ListBucketVersions",
        "s3:GetObject",
        "s3:ListBucket",
        "s3:ListAllMyBuckets",
        "s3:GetBucketTagging",
        "s3:GetBucketLocation",
        "s3:GetBucketPolicyStatus",
        "s3:GetBucketPublicAccessBlock",
        "s3:GetBucketAcl",
        "s3:GetBucketPolicy",
        "s3:PutBucketPublicAccessBlock"
      ],
      "Resource": [
        "arn:aws-us-gov:s3:::netapp-backup-*"
      ]
    },
    {
      "Effect": "Allow",
      "Action": [
        "ec2:StartInstances",
        "ec2:TerminateInstances",
        "ec2:AttachVolume",
        "ec2:DetachVolume"
      ],
      "Condition": {
        "StringLike": {
          "ec2:ResourceTag/WorkingEnvironment": "*"
        }
      },
      "Resource": [
        "arn:aws-us-gov:ec2:*:*:instance/*"
      ]
    },
    {
      "Effect": "Allow",
      "Action": [
        "ec2:AttachVolume",
        "ec2:DetachVolume"
      ],
      "Resource": [
        "arn:aws-us-gov:ec2:*:*:volume/*"
      ]
    }
  ]
}
```

Secret regions

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "ec2:DescribeInstances",
        "ec2:DescribeInstanceStatus",
        "ec2:RunInstances",
        "ec2:ModifyInstanceAttribute",
        "ec2:DescribeRouteTables",
        "ec2:DescribeImages",
        "ec2:CreateTags",
        "ec2:CreateVolume",
        "ec2:DescribeVolumes",
        "ec2:ModifyVolumeAttribute",
        "ec2:DeleteVolume",
        "ec2:CreateSecurityGroup",
        "ec2:DeleteSecurityGroup",
        "ec2:DescribeSecurityGroups",
        "ec2:RevokeSecurityGroupEgress",
        "ec2:RevokeSecurityGroupIngress",
        "ec2:AuthorizeSecurityGroupEgress",
        "ec2:AuthorizeSecurityGroupIngress",
        "ec2:CreateNetworkInterface",
        "ec2:DescribeNetworkInterfaces",
        "ec2:DeleteNetworkInterface",
        "ec2:ModifyNetworkInterfaceAttribute",
        "ec2:DescribeSubnets",
        "ec2:DescribeVpcs",
        "ec2:DescribeDhcpOptions",
        "ec2:CreateSnapshot",
        "ec2:DeleteSnapshot",
        "ec2:DescribeSnapshots",
        "ec2:GetConsoleOutput",
        "ec2:DescribeKeyPairs",
        "ec2:DescribeRegions",
        "ec2:DeleteTags",
        "ec2:DescribeTags",
        "cloudformation:CreateStack",
        "cloudformation:DeleteStack",
        "cloudformation:DescribeStacks",
        "cloudformation:DescribeStackEvents",
        "cloudformation:ValidateTemplate",
        "iam:PassRole",
        "iam:CreateRole",
        "iam:DeleteRole",
        "iam:PutRolePolicy",
        "iam:CreateInstanceProfile",
        "iam:DeleteRolePolicy",
        "iam:AddRoleToInstanceProfile",
        "iam:RemoveRoleFromInstanceProfile",
        "iam:DeleteInstanceProfile",
        "s3:GetObject",
        "s3:ListBucket",
        "s3:GetBucketTagging",
        "s3:GetBucketLocation",
        "s3:ListAllMyBuckets",
        "ec2:AssociateIamInstanceProfile",
        "ec2:DescribeIamInstanceProfileAssociations",
        "ec2:DisassociateIamInstanceProfile",
        "ec2:DescribeInstanceAttribute",
        "ec2:CreatePlacementGroup",
        "ec2:DeletePlacementGroup",
        "iam:ListinstanceProfiles"
      ],
      "Resource": "*"
    },
    {
      "Sid": "fabricPoolPolicy",
      "Effect": "Allow",
      "Action": [
        "s3:DeleteBucket",
        "s3:GetLifecycleConfiguration",
        "s3:PutLifecycleConfiguration",
        "s3:PutBucketTagging",
        "s3:ListBucketVersions"
      ],
      "Resource": [
        "arn:aws-iso-b:s3:::fabric-pool*"
      ]
    },
    {
      "Effect": "Allow",
      "Action": [
        "ec2:StartInstances",
        "ec2:StopInstances",
        "ec2:TerminateInstances",
        "ec2:AttachVolume",
        "ec2:DetachVolume"
      ],
      "Condition": {
        "StringLike": {
          "ec2:ResourceTag/WorkingEnvironment": "*"
        }
      },
      "Resource": [
        "arn:aws-iso-b:ec2:*:*:instance/*"
      ]
    },
    {
      "Effect": "Allow",
      "Action": [
        "ec2:AttachVolume",
        "ec2:DetachVolume"
      ],
      "Resource": [
        "arn:aws-iso-b:ec2:*:*:volume/*"
      ]
    }
  ]
}
```

Top Secret regions

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "ec2:DescribeInstances",
        "ec2:DescribeInstanceStatus",
        "ec2:RunInstances",
        "ec2:ModifyInstanceAttribute",
        "ec2:DescribeRouteTables",
        "ec2:DescribeImages",
        "ec2:CreateTags",
        "ec2:CreateVolume",
        "ec2:DescribeVolumes",
        "ec2:ModifyVolumeAttribute",
        "ec2:DeleteVolume",
        "ec2:CreateSecurityGroup",
        "ec2:DeleteSecurityGroup",
        "ec2:DescribeSecurityGroups",
        "ec2:RevokeSecurityGroupEgress",
        "ec2:RevokeSecurityGroupIngress",
        "ec2:AuthorizeSecurityGroupEgress",
        "ec2:AuthorizeSecurityGroupIngress",
        "ec2:CreateNetworkInterface",
        "ec2:DescribeNetworkInterfaces",
        "ec2:DeleteNetworkInterface",
        "ec2:ModifyNetworkInterfaceAttribute",
        "ec2:DescribeSubnets",
        "ec2:DescribeVpcs",
        "ec2:DescribeDhcpOptions",
        "ec2:CreateSnapshot",
        "ec2:DeleteSnapshot",
        "ec2:DescribeSnapshots",
        "ec2:GetConsoleOutput",
        "ec2:DescribeKeyPairs",
        "ec2:DescribeRegions",
        "ec2:DeleteTags",
        "ec2:DescribeTags",
        "cloudformation:CreateStack",
        "cloudformation:DeleteStack",
        "cloudformation:DescribeStacks",
        "cloudformation:DescribeStackEvents",
        "cloudformation:ValidateTemplate",
        "iam:PassRole",
        "iam:CreateRole",
        "iam:DeleteRole",
        "iam:PutRolePolicy",
        "iam:CreateInstanceProfile",
        "iam:DeleteRolePolicy",
        "iam:AddRoleToInstanceProfile",
        "iam:RemoveRoleFromInstanceProfile",
        "iam:DeleteInstanceProfile",
        "s3:GetObject",
        "s3:ListBucket",
        "s3:GetBucketTagging",
        "s3:GetBucketLocation",
        "s3:ListAllMyBuckets",
        "ec2:AssociateIamInstanceProfile",
        "ec2:DescribeIamInstanceProfileAssociations",
        "ec2:DisassociateIamInstanceProfile",
        "ec2:DescribeInstanceAttribute",
        "ec2:CreatePlacementGroup",
        "ec2:DeletePlacementGroup",
        "iam:ListinstanceProfiles"
      ],
      "Resource": "*"
    },
    {
      "Sid": "fabricPoolPolicy",
      "Effect": "Allow",
      "Action": [
        "s3:DeleteBucket",
        "s3:GetLifecycleConfiguration",
        "s3:PutLifecycleConfiguration",
        "s3:PutBucketTagging",
        "s3:ListBucketVersions"
      ],
      "Resource": [
        "arn:aws-iso:s3:::fabric-pool*"
      ]
    },
    {
      "Effect": "Allow",
      "Action": [
        "ec2:StartInstances",
        "ec2:StopInstances",
        "ec2:TerminateInstances",
        "ec2:AttachVolume",
        "ec2:DetachVolume"
      ],
      "Condition": {
        "StringLike": {
          "ec2:ResourceTag/WorkingEnvironment": "*"
        }
      },
      "Resource": [
        "arn:aws-iso:ec2:*:*:instance/*"
      ]
    },
    {
      "Effect": "Allow",
      "Action": [
        "ec2:AttachVolume",
        "ec2:DetachVolume"
      ],
      "Resource": [
        "arn:aws-iso:ec2:*:*:volume/*"
      ]
    }
  ]
}
```

How the AWS permissions are used

The following sections describe how the permissions are used for each NetApp Console management or data service. This information can be helpful if your corporate policies dictate that permissions are only provided as needed.

Amazon FSx for ONTAP

The Console agent makes the following API requests to manage an Amazon FSx for ONTAP file system:

- ec2:DescribeInstances
- ec2:DescribeInstanceStatus
- ec2:DescribeInstanceAttribute
- ec2:DescribeRouteTables
- ec2:DescribeImages
- ec2:CreateTags
- ec2:DescribeVolumes
- ec2:DescribeSecurityGroups
- ec2:DescribeNetworkInterfaces
- ec2:DescribeSubnets
- ec2:DescribeVpcs

- ec2:DescribeDhcpOptions
- ec2:DescribeSnapshots
- ec2:DescribeKeyPairs
- ec2:DescribeRegions
- ec2:DescribeTags
- ec2:DescribeIamInstanceProfileAssociations
- ec2:DescribeReservedInstancesOfferings
- ec2:DescribeVpcEndpoints
- ec2:DescribeVpcs
- ec2:DescribeVolumesModifications
- ec2:DescribePlacementGroups
- kms:CreateGrant
- kms:ListAliases
- fsx:Describe*
- fsx:List*

Amazon S3 bucket discovery

The Console agent makes the following API request to discover Amazon S3 buckets:

s3:GetEncryptionConfiguration

NetApp Backup and Recovery

The agent makes the following API requests to manage backups in Amazon S3:

- s3:GetBucketLocation
- s3:ListAllMyBuckets
- s3:ListBucket
- s3:CreateBucket
- s3:GetLifecycleConfiguration
- s3:PutLifecycleConfiguration
- s3:PutBucketTagging
- s3:ListBucketVersions
- s3:GetBucketAcl
- s3:PutBucketPublicAccessBlock
- s3:GetObject
- ec2:DescribeVpcEndpoints
- kms:ListAliases
- s3:PutEncryptionConfiguration

The agent makes the following API requests when you use the Search & Restore method to restore volumes and files:

- s3:CreateBucket
- s3:DeleteObject
- s3:DeleteObjectVersion
- s3:GetBucketAcl
- s3:ListBucket
- s3:ListBucketVersions
- s3:ListBucketMultipartUploads
- s3:PutObject
- s3:PutBucketAcl
- s3:PutLifecycleConfiguration
- s3:PutBucketPublicAccessBlock
- s3:AbortMultipartUpload
- s3:ListMultipartUploadParts

The agent makes the following API requests when you use DataLock and NetApp Ransomware Resilience for your volume backups:

- s3:GetObjectVersionTagging
- s3:GetBucketObjectLockConfiguration
- s3:GetObjectVersionAcl
- s3:PutObjectTagging
- s3:DeleteObject
- s3:DeleteObjectTagging
- s3:GetObjectRetention
- s3:DeleteObjectVersionTagging
- s3:PutObject
- s3:GetObject
- s3:PutBucketObjectLockConfiguration
- s3:GetLifecycleConfiguration
- s3:ListBucketByTags
- s3:GetBucketTagging
- s3:DeleteObjectVersion
- s3:ListBucketVersions
- s3:ListBucket
- s3:PutBucketTagging
- s3:GetObjectTagging
- s3:PutBucketVersioning
- s3:PutObjectVersionTagging

- s3:GetBucketVersioning
- s3:GetBucketAcl
- s3:BypassGovernanceRetention
- s3:PutObjectRetention
- s3:GetBucketLocation
- s3:GetObjectVersion

The agent makes the following API requests if you use a different AWS account for your Cloud Volumes ONTAP backups than you're using for the source volumes:

- s3:PutBucketPolicy
- s3:PutBucketOwnershipControls

Legacy permissions for Backup and Recovery

You only need the following permissions if you enabled legacy indexing features before the release of indexing v2:

- kms:List*
- kms:Describe*
- athena:StartQueryExecution
- athena:GetQueryResults
- athena:GetQueryExecution
- athena:StopQueryExecution
- glue:CreateDatabase
- glue:CreateTable
- glue:BatchDeletePartition

Classification

The agent makes the following API requests to deploy NetApp Data Classification:

- ec2:DescribeInstances
- ec2:DescribeInstanceStatus
- ec2:RunInstances
- ec2:TerminateInstances
- ec2:CreateTags
- ec2:CreateVolume
- ec2:AttachVolume
- ec2:CreateSecurityGroup
- ec2:DeleteSecurityGroup
- ec2:DescribeSecurityGroups
- ec2:CreateNetworkInterface

- ec2:DescribeNetworkInterfaces
- ec2:DeleteNetworkInterface
- ec2:DescribeSubnets
- ec2:DescribeVpcs
- ec2:CreateSnapshot
- ec2:DescribeRegions
- cloudformation:CreateStack
- cloudformation:DeleteStack
- cloudformation:DescribeStacks
- cloudformation:DescribeStackEvents
- iam:AddRoleToInstanceProfile
- ec2:AssociateIamInstanceProfile
- ec2:DescribeIamInstanceProfileAssociations

The agent makes the following API requests to scan S3 buckets when you use NetApp Data Classification:

- iam:AddRoleToInstanceProfile
- ec2:AssociateIamInstanceProfile
- ec2:DescribeIamInstanceProfileAssociations
- s3:GetBucketTagging
- s3:GetBucketLocation
- s3:ListAllMyBuckets
- s3:ListBucket
- s3:GetBucketPolicyStatus
- s3:GetBucketPolicy
- s3:GetBucketAcl
- s3:GetObject
- iam:GetRole
- s3:DeleteObject
- s3:DeleteObjectVersion
- s3:PutObject
- sts:AssumeRole

Cloud Volumes ONTAP

The agent makes the following API requests to deploy and manage Cloud Volumes ONTAP in AWS.

Purpose	Action	Used for deployment?	Used for daily operations?	Used for deletion?
Create and manage IAM roles and instance profiles for Cloud Volumes ONTAP instances	iam:ListInstanceProfiles	Yes	Yes	No
	iam:CreateRole	Yes	No	No
	iam:DeleteRole	No	Yes	Yes
	iam:PutRolePolicy	Yes	No	No
	iam:CreateInstanceProfile	Yes	No	No
	iam:DeleteRolePolicy	No	Yes	Yes
	iam:AddRoleToInstanceProfile	Yes	No	No
	iam:RemoveRoleFromInstanceProfile	No	Yes	Yes
	iam:DeleteInstanceProfile	No	Yes	Yes
	iam:PassRole	Yes	No	No
	ec2:AssociateIamInstanceProfile	Yes	Yes	No
	ec2:DescribeIamInstanceProfileAssociations	Yes	Yes	No
	ec2:DisassociateIamInstanceProfile	No	Yes	No
Decode authorization status messages	sts:DecodeAuthorizationMessage	Yes	Yes	No
Describe the specified images (AMIs) available to the account	ec2:DescribeImages	Yes	Yes	No
Describe the route tables in a VPC (required for HA pairs only)	ec2:DescribeRouteTables	Yes	No	No

Purpose	Action	Used for deployment?	Used for daily operations?	Used for deletion?
Stop, start, and monitor instances	ec2:StartInstances	Yes	Yes	No
	ec2:StopInstances	Yes	Yes	No
	ec2:DescribeInstances	Yes	Yes	No
	ec2:DescribeInstanceStatus	Yes	Yes	No
	ec2:RunInstances	Yes	No	No
	ec2:TerminateInstances	No	No	Yes
	ec2:ModifyInstanceAttribute	No	Yes	No
Verify that enhanced networking is enabled for supported instance types	ec2:DescribeInstanceAttribute	No	Yes	No
Tag resources with the "WorkingEnvironment" and "WorkingEnvironmentId" tags which are used for maintenance and cost allocation	ec2:CreateTags	Yes	Yes	No
Manage EBS volumes that Cloud Volumes ONTAP uses as backend storage	ec2:CreateVolume	Yes	Yes	No
	ec2:DescribeVolumes	Yes	Yes	Yes
	ec2:ModifyVolumeAttribute	No	Yes	Yes
	ec2:AttachVolume	Yes	Yes	No
	ec2:DeleteVolume	No	Yes	Yes
	ec2:DetachVolume	No	Yes	Yes

Purpose	Action	Used for deployment?	Used for daily operations?	Used for deletion?
Create and manage security groups for Cloud Volumes ONTAP	ec2:CreateSecurityGroup	Yes	No	No
	ec2:DeleteSecurityGroup	No	Yes	Yes
	ec2:DescribeSecurityGroups	Yes	Yes	Yes
	ec2:RevokeSecurityGroupEgress	Yes	No	No
	ec2:AuthorizeSecurityGroupEgress	Yes	No	No
	ec2:AuthorizeSecurityGroupIngress	Yes	No	No
	ec2:RevokeSecurityGroupIngress	Yes	Yes	No
Create and manage network interfaces for Cloud Volumes ONTAP in the target subnet	ec2:CreateNetworkInterface	Yes	No	No
	ec2:DescribeNetworkInterfaces	Yes	Yes	No
	ec2:DeleteNetworkInterface	No	Yes	Yes
	ec2:ModifyNetworkInterfaceAttribute	No	Yes	No
Get the list of destination subnets and security groups	ec2:DescribeSubnets	Yes	Yes	No
	ec2:DescribeVpcs	Yes	Yes	No
Get DNS servers and the default domain name for Cloud Volumes ONTAP instances	ec2:DescribeDhcpOptions	Yes	No	No
Take snapshots of EBS volumes for Cloud Volumes ONTAP	ec2:CreateSnapshot	Yes	Yes	No
	ec2:DeleteSnapshot	No	Yes	Yes
	ec2:DescribeSnapshots	No	Yes	No
Capture the Cloud Volumes ONTAP console, which is attached to AutoSupport messages	ec2:GetConsoleOutput	Yes	Yes	No

Purpose	Action	Used for deployment?	Used for daily operations?	Used for deletion?
Get the list of available key pairs	ec2:DescribeKeyPairs	Yes	No	No
Get the list of available AWS regions	ec2:DescribeRegions	Yes	Yes	No
Manage tags for resources associated with Cloud Volumes ONTAP instances	ec2:DeleteTags	No	Yes	Yes
	ec2:DescribeTags	No	Yes	No
Create and manage stacks for AWS CloudFormation templates	cloudformation:CreateStack	Yes	No	No
	cloudformation:DeleteStack	Yes	No	No
	cloudformation:DescribeStacks	Yes	Yes	No
	cloudformation:DescribeStackEvents	Yes	No	No
	cloudformation:ValidateTemplate	Yes	No	No

Purpose	Action	Used for deployment?	Used for daily operations?	Used for deletion?
Create and manage an S3 bucket that a Cloud Volumes ONTAP system uses as a capacity tier for data tiering	s3:CreateBucket	Yes	Yes	No
	s3:DeleteBucket	No	Yes	Yes
	s3:GetLifecycleConfiguration	No	Yes	No
	s3:PutLifecycleConfiguration	No	Yes	No
	s3:PutBucketTagging	No	Yes	No
	s3:ListBucketVersions	No	Yes	No
	s3:GetBucketPolicyStatus	No	Yes	No
	s3:GetBucketPublicAccessBlock	No	Yes	No
	s3:GetBucketAcl	No	Yes	No
	s3:GetBucketPolicy	No	Yes	No
	s3:PutBucketPublicAccessBlock	No	Yes	No
	s3:GetBucketTagging	No	Yes	No
	s3:GetBucketLocation	No	Yes	No
	s3:ListAllMyBuckets	No	No	No
	s3:ListBucket	No	Yes	No
Enable data encryption of Cloud Volumes ONTAP using the AWS Key Management Service (KMS)	kms:ReEncrypt*	Yes	No	No
	kms:CreateGrant	Yes	Yes	No
	kms:GenerateDataKeyWithoutPlaintext	Yes	Yes	No
Create and manage an AWS spread placement group for two HA nodes and the mediator in a single AWS Availability Zone	ec2:CreatePlacementGroup	Yes	No	No
	ec2:DeletePlacementGroup	No	Yes	Yes
Create reports	fsx:Describe*	No	Yes	No
	fsx:List*	No	Yes	No

Purpose	Action	Used for deployment?	Used for daily operations?	Used for deletion?
Create and manage aggregates that support the Amazon EBS Elastic Volumes feature	ec2:DescribeVolumesModifications	No	Yes	No
	ec2:ModifyVolume	No	Yes	No
Check whether the Availability Zone is an AWS Local Zone and validates that all deployment parameters are compatible	ec2:DescribeAvailabilityZones	Yes	No	Yes

Change log

As permissions are added and removed, we'll note them in the sections below.

11 November 2025

The following permissions are no longer required for NetApp Backup and Recovery unless you use legacy indexing. These permissions have been removed from the policies on this page:

- kms:List*
- kms:Describe*
- athena:StartQueryExecution
- athena:GetQueryResults
- athena:GetQueryExecution
- athena:StopQueryExecution
- glue:CreateDatabase
- glue:CreateTable
- glue:BatchDeletePartition

9 September 2024

Permissions were removed from policy #2 for standard regions because the NetApp Console no longer supports NetApp edge caching and discovery and management of Kubernetes clusters.

View the permissions that were removed from the policy

```
{
    "Action": [
        "ec2:DescribeRegions",
        "eks:ListClusters",
        "eks:DescribeCluster",
        "iam:GetInstanceProfile"
    ],
    "Resource": "*",
    "Effect": "Allow",
    "Sid": "K8sServicePolicy"
},
{
    "Action": [
        "cloudformation:DescribeStacks",
        "cloudwatch:GetMetricStatistics",
        "cloudformation:ListStacks"
    ],
    "Resource": "*",
    "Effect": "Allow",
    "Sid": "GFCservicePolicy"
},
{
    "Condition": {
        "StringLike": {
            "ec2:ResourceTag/GFCInstance": "*"
        }
    },
    "Action": [
        "ec2:StartInstances",
        "ec2:TerminateInstances",
        "ec2:AttachVolume",
        "ec2:DetachVolume"
    ],
    "Resource": [
        "arn:aws:ec2:*:*:instance/*"
    ],
    "Effect": "Allow"
}
```

9 May 2024

The following permission is now required for Cloud Volumes ONTAP:

ec2:DescribeAvailabilityZones

6 June 2023

The following permission is now required for Cloud Volumes ONTAP:

kms:GenerateDataKeyWithoutPlaintext

14 February 2023

The following permission is now required for NetApp Cloud Tiering:

ec2:DescribeVpcEndpoints

Console agent security group rules in AWS

The AWS security group for the agent requires both inbound and outbound rules. The NetApp Console automatically creates this security group when you create a Console agent from the Console. You need to set up this security group for all other installation options.

Inbound rules

Protocol	Port	Purpose
SSH	22	Provides SSH access to the agent host
HTTP	80	• Provides HTTP access from client web browsers to the local user interface • Used during the Cloud Volumes ONTAP upgrade process
HTTPS	443	Provides HTTPS access to the local user interface and connections from the NetApp Data Classification instance
TCP	3128	Provides Cloud Volumes ONTAP with internet access. You must manually open this port after deployment.

Outbound rules

The predefined security group for the agent opens all outbound traffic. If that is acceptable, follow the basic outbound rules. If you need more rigid rules, use the advanced outbound rules.

Basic outbound rules

The predefined security group for the agent includes the following outbound rules.

Protocol	Port	Purpose
All TCP	All	All outbound traffic
All UDP	All	All outbound traffic

Advanced outbound rules

If you need rigid rules for outbound traffic, you can use the following information to open only those ports that are required for outbound communication by the agent

The source IP address is the agent host.

Service	Protocol	Port	Destination	Purpose
API calls and AutoSupport	HTTPS	443	Outbound internet and ONTAP cluster management LIF	API calls to AWS, to ONTAP, to NetApp Data Classification, and sending AutoSupport messages to NetApp
API calls	TCP	3000	ONTAP HA mediator	Communication with the ONTAP HA mediator
	TCP	8080	Data Classification	Probe to Data Classification instance during deployment
DNS	UDP	53	DNS	Used for DNS resolve by the Console

Azure permissions and required security rules

Azure permissions for the Console agent

When the NetApp Console launches a Console agent in Azure, it attaches a custom role to the VM that provides the agent with permissions to manage resources and processes within that Azure subscription. The agent uses the permissions to make API calls to several Azure services.

Whether or not you need to create this custom role for the agent depends on how you deployed it.

Deploying from NetApp Console

When you use the Console to deploy the agent virtual machine in Azure, it enables a system-assigned managed identity on the virtual machine, creates a custom role, and assigns it to the virtual machine. The role provides the Console with the permissions required to manage resources and processes within that Azure subscription. The role's permissions are kept up-to-date when the agent is upgraded. You don't need to create this role for the agent or manage updates.

Deploying manually or from Azure marketplace

When you deploy the agent from the Azure Marketplace or if you manually install the agent on a Linux host, then you need to set up the custom role yourself and maintain its permissions with any changes.

You'll need to ensure that the role is up to date as new permissions are added in subsequent releases. If new permissions are required, they will be listed in the release notes.

- To view step-by-step instructions for using these policies, refer to the following pages:
  - Set up permissions for an Azure Marketplace deployment
  - Set up permissions for on-premises deployments
  - Set up permissions for restricted mode

```
{
  "Name": "Console Operator",
  "Actions": [
    "Microsoft.Compute/disks/delete",
    "Microsoft.Compute/disks/read",
    "Microsoft.Compute/disks/write",
    "Microsoft.Compute/locations/operations/read",
    "Microsoft.Compute/locations/vmSizes/read",
    "Microsoft.Resources/subscriptions/locations/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/deallocate/action",
    "Microsoft.Compute/virtualMachines/start/action",
    "Microsoft.Compute/virtualMachines/vmSizes/read",
    "Microsoft.Compute/virtualMachines/write",
    "Microsoft.Compute/images/read",
    "Microsoft.Network/locations/operationResults/read",
    "Microsoft.Network/locations/operations/read",
    "Microsoft.Network/networkInterfaces/read",
    "Microsoft.Network/networkInterfaces/write",
    "Microsoft.Network/networkInterfaces/join/action",
    "Microsoft.Network/networkSecurityGroups/read",
    "Microsoft.Network/networkSecurityGroups/write",
    "Microsoft.Network/networkSecurityGroups/join/action",
    "Microsoft.Network/virtualNetworks/read",
    "Microsoft.Network/virtualNetworks/checkIpAddressAvailability/read",
    "Microsoft.Network/virtualNetworks/subnets/read",
    "Microsoft.Network/virtualNetworks/subnets/write",
    "Microsoft.Network/virtualNetworks/subnets/virtualMachines/read",
    "Microsoft.Network/virtualNetworks/virtualMachines/read",
    "Microsoft.Network/virtualNetworks/subnets/join/action",
    "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",
    "Microsoft.Storage/checknameavailability/read",
    "Microsoft.Storage/operations/read",
    "Microsoft.Storage/storageAccounts/listkeys/action",
    "Microsoft.Storage/storageAccounts/read",
    "Microsoft.Storage/storageAccounts/delete",
    "Microsoft.Storage/storageAccounts/write",
    "Microsoft.Storage/storageAccounts/blobServices/containers/read",
    "Microsoft.Storage/storageAccounts/listAccountSas/action",
    "Microsoft.Storage/usages/read",
    "Microsoft.Compute/snapshots/write",
    "Microsoft.Compute/snapshots/read",
    "Microsoft.Compute/availabilitySets/write",
    "Microsoft.Compute/availabilitySets/read",
    "Microsoft.Compute/disks/beginGetAccess/action",

"Microsoft.MarketplaceOrdering/offertypes/publishers/offers/plans/agreemen
ts/read",

"Microsoft.MarketplaceOrdering/offertypes/publishers/offers/plans/agreemen
ts/write",
    "Microsoft.Network/loadBalancers/read",
    "Microsoft.Network/loadBalancers/write",
    "Microsoft.Network/loadBalancers/delete",
    "Microsoft.Network/loadBalancers/backendAddressPools/read",
    "Microsoft.Network/loadBalancers/backendAddressPools/join/action",
    "Microsoft.Network/loadBalancers/loadBalancingRules/read",
    "Microsoft.Network/loadBalancers/probes/read",
    "Microsoft.Network/loadBalancers/probes/join/action",
    "Microsoft.Authorization/locks/*",
    "Microsoft.Network/routeTables/join/action",
    "Microsoft.NetApp/netAppAccounts/read",
    "Microsoft.NetApp/netAppAccounts/capacityPools/read",
    "Microsoft.NetApp/netAppAccounts/capacityPools/volumes/write",
    "Microsoft.NetApp/netAppAccounts/capacityPools/volumes/read",
    "Microsoft.NetApp/netAppAccounts/capacityPools/volumes/delete",
    "Microsoft.Network/privateEndpoints/write",

"Microsoft.Storage/storageAccounts/PrivateEndpointConnectionsApproval/acti
on",
    "Microsoft.Storage/storageAccounts/privateEndpointConnections/read",
    "Microsoft.Storage/storageAccounts/managementPolicies/read",
    "Microsoft.Storage/storageAccounts/managementPolicies/write",
    "Microsoft.Network/privateEndpoints/read",
    "Microsoft.Network/privateDnsZones/write",
    "Microsoft.Network/privateDnsZones/virtualNetworkLinks/write",
    "Microsoft.Network/virtualNetworks/join/action",
    "Microsoft.Network/privateDnsZones/A/write",
    "Microsoft.Network/privateDnsZones/read",
    "Microsoft.Network/privateDnsZones/virtualNetworkLinks/read",
    "Microsoft.Resources/deployments/operationStatuses/read",
    "Microsoft.Insights/Metrics/Read",
    "Microsoft.Compute/virtualMachines/extensions/write",
    "Microsoft.Compute/virtualMachines/extensions/delete",
    "Microsoft.Compute/virtualMachines/extensions/read",
    "Microsoft.Compute/virtualMachines/delete",
    "Microsoft.Network/networkInterfaces/delete",
    "Microsoft.Network/networkSecurityGroups/delete",
    "Microsoft.Resources/deployments/delete",
    "Microsoft.Compute/diskEncryptionSets/read",
    "Microsoft.Compute/snapshots/delete",
    "Microsoft.Network/privateEndpoints/delete",
    "Microsoft.Compute/availabilitySets/delete",
    "Microsoft.KeyVault/vaults/read",
    "Microsoft.KeyVault/vaults/accessPolicies/write",
    "Microsoft.Compute/diskEncryptionSets/write",
    "Microsoft.KeyVault/vaults/deploy/action",
    "Microsoft.Compute/diskEncryptionSets/delete",
    "Microsoft.Resources/tags/read",
    "Microsoft.Resources/tags/write",
    "Microsoft.Resources/tags/delete",
    "Microsoft.Network/applicationSecurityGroups/write",
    "Microsoft.Network/applicationSecurityGroups/read",

"Microsoft.Network/applicationSecurityGroups/joinIpConfiguration/action",
    "Microsoft.Network/networkSecurityGroups/securityRules/write",
    "Microsoft.Network/applicationSecurityGroups/delete",
    "Microsoft.Network/networkSecurityGroups/securityRules/delete",
    "Microsoft.Synapse/workspaces/write",
    "Microsoft.Synapse/workspaces/read",
    "Microsoft.Synapse/workspaces/delete",
    "Microsoft.Synapse/register/action",
    "Microsoft.Synapse/checkNameAvailability/action",
    "Microsoft.Synapse/workspaces/operationStatuses/read",
    "Microsoft.Synapse/workspaces/firewallRules/read",
    "Microsoft.Synapse/workspaces/replaceAllIpFirewallRules/action",
    "Microsoft.Synapse/workspaces/operationResults/read",

"Microsoft.Synapse/workspaces/privateEndpointConnectionsApproval/action",
    "Microsoft.ManagedIdentity/userAssignedIdentities/assign/action",
    "Microsoft.Compute/images/write",
    "Microsoft.Network/loadBalancers/frontendIPConfigurations/read",
    "Microsoft.Compute/virtualMachineScaleSets/write",
    "Microsoft.Compute/virtualMachineScaleSets/read",
    "Microsoft.Compute/virtualMachineScaleSets/delete"
  ],
  "NotActions": [],
  "AssignableScopes": [],
  "Description": "Console Permissions",
  "IsCustom": "true"
}
```

How Azure permissions are used

The following sections describe how the permissions are used for each NetApp storage system and data service. This information can be helpful if your corporate policies dictate that permissions are only provided as needed.

Azure NetApp Files

The agent makes the following API requests when you use NetApp Data Classification to scan Azure NetApp Files data:

- Microsoft.NetApp/netAppAccounts/read
- Microsoft.NetApp/netAppAccounts/capacityPools/read
- Microsoft.NetApp/netAppAccounts/capacityPools/volumes/write
- Microsoft.NetApp/netAppAccounts/capacityPools/volumes/read
- Microsoft.NetApp/netAppAccounts/capacityPools/volumes/delete

NetApp Backup and Recovery

The following sections describe how permissions are used for NetApp Backup and Recovery.

Minimal NetApp Backup and Recovery permissions

The Console agent makes the following API requests for basic NetApp Backup and Recovery functionality:

- Microsoft.Storage/storageAccounts/listkeys/action
- Microsoft.Storage/storageAccounts/read
- Microsoft.Storage/storageAccounts/write
- Microsoft.Storage/storageAccounts/blobServices/containers/read
- Microsoft.Storage/storageAccounts/listAccountSas/action
- Microsoft.Resources/subscriptions/locations/read
- Microsoft.Resources/subscriptions/resourceGroups/read
- Microsoft.Resources/subscriptions/resourcegroups/resources/read
- Microsoft.Resources/subscriptions/resourceGroups/write
- Microsoft.Storage/storageAccounts/managementPolicies/read
- Microsoft.Storage/storageAccounts/managementPolicies/write
- Microsoft.Authorization/locks/write
- Microsoft.Authorization/locks/read

The following is a custom policy for Backup and Recovery that uses the fewest possible permissions and the narrowest possible scope:

```
{
  "id":
"/subscriptions/{subscriptionId}/providers/Microsoft.Authorization/roleDef
initions/{roleDefinitionGuid}",
  "properties": {
    "roleName": "Custom Role",
    "description": "Minimal permissions required for Backup and
Recovery.",
    "assignableScopes": [
      "/subscriptions/{subscriptionId}",

"/subscriptions/{subscriptionId}/resourceGroups/{resourceGroupNameContaini
ngConnectorAndStorageAccount}",

"/subscriptions/{subscriptionId}/resourceGroups/{resourceGroupNameContaini
ngConnectorAndStorageAccount}/providers/Microsoft.Storage/storageAccounts/
{storageAccountNameWithObjectLockPreprovisioned}"
    ],
    "permissions": [
      {
        "actions": [
          "Microsoft.Storage/storageAccounts/listkeys/action",
          "Microsoft.Storage/storageAccounts/read",
          "Microsoft.Storage/storageAccounts/write",

"Microsoft.Storage/storageAccounts/blobServices/containers/read",
          "Microsoft.Storage/storageAccounts/listAccountSas/action",
          "Microsoft.Resources/subscriptions/locations/read",

"Microsoft.Resources/subscriptions/resourcegroups/resources/read",
          "Microsoft.Resources/subscriptions/resourceGroups/write",
          "Microsoft.Resources/subscriptions/resourceGroups/read",
          "Microsoft.Storage/storageAccounts/managementPolicies/read",
          "Microsoft.Storage/storageAccounts/managementPolicies/write",
          "Microsoft.Authorization/locks/write",
          "Microsoft.Authorization/locks/read"
        ],
        "notActions": [],
        "dataActions": [],
        "notDataActions": []
      }
    ]
  }
}
```

Advanced Backup and Recovery permissions

The console agent makes the following API requests for advanced Backup and Recovery operations and Search & Restore features. These permissions enable management of networking, key vaults, and managed identities:

- Microsoft.KeyVault/vaults/accessPolicies/write
- Microsoft.KeyVault/vaults/read
- Microsoft.ManagedIdentity/userAssignedIdentities/assign/action
- Microsoft.Network/networkInterfaces/delete
- Microsoft.Network/networkInterfaces/read
- Microsoft.Network/networkSecurityGroups/delete
- Microsoft.Network/privateDnsZones/read
- Microsoft.Network/privateDnsZones/write
- Microsoft.Network/privateEndpoints/read
- Microsoft.Network/privateEndpoints/write
- Microsoft.Network/virtualNetworks/join/action
- Microsoft.Resources/deployments/delete

Legacy permissions for Backup and Recovery

The agent makes the following API requests when you use the Search & Restore functionality. You only need these permissions if you enabled legacy indexing features before the release of indexing v2 in February 2025:

- Microsoft.Synapse/workspaces/write
- Microsoft.Synapse/workspaces/read
- Microsoft.Synapse/workspaces/delete
- Microsoft.Synapse/register/action
- Microsoft.Synapse/checkNameAvailability/action
- Microsoft.Synapse/workspaces/operationStatuses/read
- Microsoft.Synapse/workspaces/firewallRules/read
- Microsoft.Synapse/workspaces/replaceAllIpFirewallRules/action
- Microsoft.Synapse/workspaces/operationResults/read
- Microsoft.Synapse/workspaces/privateEndpointConnectionsApproval/action

NetApp Data Classification

The agent makes the following API requests when you use Data Classification.

Action	Used for set up?	Used for daily operations?
Microsoft.Compute/locations/operations/read	Yes	Yes
Microsoft.Compute/locations/vmSizes/read	Yes	Yes

Action	Used for set up?	Used for daily operations?
Microsoft.Compute/operations/read	Yes	Yes
Microsoft.Compute/virtualMachines/instanceView/read	Yes	Yes
Microsoft.Compute/virtualMachines/powerOff/action	Yes	No
Microsoft.Compute/virtualMachines/read	Yes	Yes
Microsoft.Compute/virtualMachines/restart/action	Yes	No
Microsoft.Compute/virtualMachines/start/action	Yes	No
Microsoft.Compute/virtualMachines/vmSizes/read	No	Yes
Microsoft.Compute/virtualMachines/write	Yes	No
Microsoft.Compute/images/read	Yes	Yes
Microsoft.Compute/disks/delete	Yes	No
Microsoft.Compute/disks/read	Yes	Yes
Microsoft.Compute/disks/write	Yes	No
Microsoft.Storage/checknameavailability/read	Yes	Yes
Microsoft.Storage/operations/read	Yes	Yes
Microsoft.Storage/storageAccounts/listkeys/action	Yes	No
Microsoft.Storage/storageAccounts/read	Yes	Yes
Microsoft.Storage/storageAccounts/write	Yes	No
Microsoft.Storage/storageAccounts/blobServices/containers/read	Yes	Yes
Microsoft.Network/networkInterfaces/read	Yes	Yes
Microsoft.Network/networkInterfaces/write	Yes	No
Microsoft.Network/networkInterfaces/join/action	Yes	No
Microsoft.Network/networkSecurityGroups/read	Yes	Yes

Action	Used for set up?	Used for daily operations?
Microsoft.Network/networkSecurityGroups/write	Yes	No
Microsoft.Resources/subscriptions/locations/read	Yes	Yes
Microsoft.Network/locations/operationResults/read	Yes	Yes
Microsoft.Network/locations/operations/read	Yes	Yes
Microsoft.Network/virtualNetworks/read	Yes	Yes
Microsoft.Network/virtualNetworks/checkIpAddressAvailability/read	Yes	Yes
Microsoft.Network/virtualNetworks/subnets/read	Yes	Yes
Microsoft.Network/virtualNetworks/subnets/virtualMachines/read	Yes	Yes
Microsoft.Network/virtualNetworks/virtualMachines/read	Yes	Yes
Microsoft.Network/virtualNetworks/subnets/join/action	Yes	No
Microsoft.Network/virtualNetworks/subnets/write	Yes	No
Microsoft.Network/routeTables/join/action	Yes	No
Microsoft.Resources/deployments/operations/read	Yes	Yes
Microsoft.Resources/deployments/read	Yes	Yes
Microsoft.Resources/deployments/write	Yes	No
Microsoft.Resources/resources/read	Yes	Yes
Microsoft.Resources/subscriptions/operationresults/read	Yes	Yes
Microsoft.Resources/subscriptions/resourceGroups/delete	Yes	No
Microsoft.Resources/subscriptions/resourceGroups/read	Yes	Yes
Microsoft.Resources/subscriptions/resourcegroups/resources/read	Yes	Yes

Action	Used for set up?	Used for daily operations?
Microsoft.Resources/subscriptions/resourceGroups/write	Yes	No

Cloud Volumes ONTAP

The agent makes the following API requests to deploy and manage Cloud Volumes ONTAP in Azure.

Purpose	Action	Used for deployment?	Used for daily operations?	Used for deletion?
Create and manage VMs	Microsoft.Compute/locations/operations/read	Yes	Yes	No
	Microsoft.Compute/locations/vmSizes/read	Yes	Yes	No
	Microsoft.Resources/subscriptions/locations/read	Yes	No	No
	Microsoft.Compute/operations/read	Yes	Yes	No
	Microsoft.Compute/virtualMachines/instanceView/read	Yes	Yes	No
	Microsoft.Compute/virtualMachines/powerOff/action	Yes	Yes	No
	Microsoft.Compute/virtualMachines/read	Yes	Yes	No
	Microsoft.Compute/virtualMachines/restart/action	Yes	Yes	No
	Microsoft.Compute/virtualMachines/start/action	Yes	Yes	No
	Microsoft.Compute/virtualMachines/deallocate/action	No	Yes	Yes
	Microsoft.Compute/virtualMachines/vmSizes/read	No	Yes	No
	Microsoft.Compute/virtualMachines/write	Yes	Yes	No
	Microsoft.Compute/virtualMachines/delete	Yes	Yes	Yes
	Microsoft.Resources/deployments/delete	Yes	No	No
Enable deployment from a VHD	Microsoft.Compute/images/read	Yes	No	No
	Microsoft.Compute/images/write	Yes	No	No

Purpose	Action	Used for deployment?	Used for daily operations?	Used for deletion?
Create and manage network interfaces in the target subnet	Microsoft.Network/networkInterfaces/read	Yes	Yes	No
	Microsoft.Network/networkInterfaces/write	Yes	Yes	No
	Microsoft.Network/networkInterfaces/join/action	Yes	Yes	No
	Microsoft.Network/networkInterfaces/delete	Yes	Yes	No
Create and manage network security groups	Microsoft.Network/networkSecurityGroups/read	Yes	Yes	No
	Microsoft.Network/networkSecurityGroups/write	Yes	Yes	No
	Microsoft.Network/networkSecurityGroups/join/action	Yes	No	No
	Microsoft.Network/networkSecurityGroups/delete	No	Yes	Yes

Purpose	Action	Used for deployment?	Used for daily operations?	Used for deletion?
Get network information about regions, the target VNet and subnet, and add the VMs to VNets	Microsoft.Network/locations/operationResults/read	Yes	Yes	No
	Microsoft.Network/locations/operations/read	Yes	Yes	No
	Microsoft.Network/virtualNetworks/read	Yes	No	No
	Microsoft.Network/virtualNetworks/checkIpAddressAvailability/read	Yes	No	No
	Microsoft.Network/virtualNetworks/subnets/read	Yes	Yes	No
	Microsoft.Network/virtualNetworks/subnets/virtualMachines/read	Yes	Yes	No
	Microsoft.Network/virtualNetworks/virtualMachines/read	Yes	Yes	No
	Microsoft.Network/virtualNetworks/subnets/join/action	Yes	Yes	No

Purpose	Action	Used for deployment?	Used for daily operations?	Used for deletion?
Create and manage resource groups	Microsoft.Resources/deployments/operations/read	Yes	Yes	No
	Microsoft.Resources/deployments/read	Yes	Yes	No
	Microsoft.Resources/deployments/write	Yes	Yes	No
	Microsoft.Resources/resources/read	Yes	Yes	No
	Microsoft.Resources/subscriptions/operationresults/read	Yes	Yes	No
	Microsoft.Resources/subscriptions/resourceGroups/delete	Yes	Yes	Yes
	Microsoft.Resources/subscriptions/resourceGroups/read	No	Yes	No
	Microsoft.Resources/subscriptions/resourcegroups/resources/read	Yes	Yes	No
	Microsoft.Resources/subscriptions/resourceGroups/write	Yes	Yes	No

Purpose	Action	Used for deployment?	Used for daily operations?	Used for deletion?
Manage Azure storage accounts and disks	Microsoft.Compute/disks/read	Yes	Yes	Yes
	Microsoft.Compute/disks/write	Yes	Yes	No
	Microsoft.Compute/disks/delete	Yes	Yes	Yes
	Microsoft.Storage/checknameavailability/read	Yes	Yes	No
	Microsoft.Storage/operations/read	Yes	Yes	No
	Microsoft.Storage/storageAccounts/listkeys/action	Yes	Yes	No
	Microsoft.Storage/storageAccounts/read	Yes	Yes	No
	Microsoft.Storage/storageAccounts/delete	No	Yes	Yes
	Microsoft.Storage/storageAccounts/write	Yes	Yes	No
	Microsoft.Storage/usages/read	No	Yes	No
Enable backups to Blob storage and encryption of storage accounts	Microsoft.Storage/storageAccounts/blobServices/containers/read	Yes	Yes	No
	Microsoft.KeyVault/vaults/read	Yes	Yes	No
	Microsoft.KeyVault/vaults/accessPolicies/write	Yes	Yes	No
Enable VNet service endpoints for data tiering	Microsoft.Network/virtualNetworks/subnets/write	Yes	Yes	No
	Microsoft.Network/routeTables/join/action	Yes	Yes	No

Purpose	Action	Used for deployment?	Used for daily operations?	Used for deletion?
Create and manage Azure managed snapshots	Microsoft.Compute/snapshots/write	Yes	Yes	No
	Microsoft.Compute/snapshots/read	Yes	Yes	No
	Microsoft.Compute/snapshots/delete	No	Yes	Yes
	Microsoft.Compute/disks/beginGetAccess/action	No	Yes	No
Create and manage availability sets	Microsoft.Compute/availabilitySets/write	Yes	No	No
	Microsoft.Compute/availabilitySets/read	Yes	No	No
Enable programmatic deployments from the marketplace	Microsoft.MarketplaceOrdering/offertypes/publishers/offers/plans/agreements/read	Yes	No	No
	Microsoft.MarketplaceOrdering/offertypes/publishers/offers/plans/agreements/write	Yes	Yes	No

Purpose	Action	Used for deployment?	Used for daily operations?	Used for deletion?
Manage a load balancer for HA pairs	Microsoft.Network/loadBalancers/read	Yes	Yes	No
	Microsoft.Network/loadBalancers/write	Yes	No	No
	Microsoft.Network/loadBalancers/delete	No	Yes	Yes
	Microsoft.Network/loadBalancers/backendAddressPools/read	Yes	No	No
	Microsoft.Network/loadBalancers/backendAddressPools/join/action	Yes	No	No
	Microsoft.Network/loadBalancers/frontendIPConfigurations/read	Yes	Yes	No
	Microsoft.Network/loadBalancers/loadBalancingRules/read	Yes	No	No
	Microsoft.Network/loadBalancers/probes/read	Yes	No	No
	Microsoft.Network/loadBalancers/probes/join/action	Yes	No	No
Enable management of locks on Azure disks	Microsoft.Authorization/locks/*	Yes	Yes	No

Purpose	Action	Used for deployment?	Used for daily operations?	Used for deletion?
Enable private endpoints for HA pairs when there’s no connectivity outside the subnet	Microsoft.Network/privateEndpoints/write	Yes	Yes	No
	Microsoft.Storage/storageAccounts/PrivateEndpointConnectionsApproval/action	Yes	No	No
	Microsoft.Storage/storageAccounts/privateEndpointConnections/read	Yes	Yes	Yes
	Microsoft.Network/privateEndpoints/read	Yes	Yes	Yes
	Microsoft.Network/privateDnsZones/write	Yes	Yes	No
	Microsoft.Network/privateDnsZones/virtualNetworkLinks/write	Yes	Yes	No
	Microsoft.Network/virtualNetworks/join/action	Yes	Yes	No
	Microsoft.Network/privateDnsZones/A/write	Yes	Yes	No
	Microsoft.Network/privateDnsZones/read	Yes	Yes	No
	Microsoft.Network/privateDnsZones/virtualNetworkLinks/read	Yes	Yes	No
Required for some VM deployments, depending on the underlying physical hardware	Microsoft.Resources/deployments/operationStatuses/read	Yes	Yes	No
Remove resources from a resource group in case of deployment failure or deletion	Microsoft.Network/privateEndpoints/delete	Yes	Yes	No
	Microsoft.Compute/availabilitySets/delete	Yes	Yes	No

Purpose	Action	Used for deployment?	Used for daily operations?	Used for deletion?
Enable the use of customer-managed encryption keys when using the API	Microsoft.Compute/diskEncryptionSets/read	Yes	Yes	Yes
	Microsoft.Compute/diskEncryptionSets/write	Yes	Yes	No
	Microsoft.KeyVault/vaults/deploy/action	Yes	No	No
	Microsoft.Compute/diskEncryptionSets/delete	Yes	Yes	Yes
Configure an application security group for an HA pair to isolate the HA interconnect and cluster network NICs	Microsoft.Network/applicationSecurityGroups/write	No	Yes	No
	Microsoft.Network/applicationSecurityGroups/read	No	Yes	No
	Microsoft.Network/applicationSecurityGroups/joinIpConfiguration/action	No	Yes	No
	Microsoft.Network/networkSecurityGroups/securityRules/write	Yes	Yes	No
	Microsoft.Network/applicationSecurityGroups/delete	No	Yes	Yes
	Microsoft.Network/networkSecurityGroups/securityRules/delete	No	Yes	Yes
Read, write, and delete tags associated with Cloud Volumes ONTAP resources	Microsoft.Resources/tags/read	No	Yes	No
	Microsoft.Resources/tags/write	Yes	Yes	No
	Microsoft.Resources/tags/delete	Yes	No	No
Encrypt storage accounts during creation	Microsoft.ManagedIdentity/userAssignedIdentities/assign/action	Yes	Yes	No

Purpose	Action	Used for deployment?	Used for daily operations?	Used for deletion?
Use Virtual Machine Scale Sets in Flexible orchestration mode in order to specify specific zones for Cloud Volumes ONTAP	Microsoft.Compute/virtualMachineScaleSets/write	Yes	No	No
	Microsoft.Compute/virtualMachineScaleSets/read	Yes	No	No
	Microsoft.Compute/virtualMachineScaleSets/delete	No	No	Yes

Tiering

The agent makes the following API requests when you set up NetApp Cloud Tiering.

- Microsoft.Storage/storageAccounts/listkeys/action
- Microsoft.Resources/subscriptions/resourceGroups/read
- Microsoft.Resources/subscriptions/locations/read

The Console agent makes the following API requests for daily operations.

- Microsoft.Storage/storageAccounts/blobServices/containers/read
- Microsoft.Storage/storageAccounts/managementPolicies/read
- Microsoft.Storage/storageAccounts/managementPolicies/write
- Microsoft.Storage/storageAccounts/read

Change log

As permissions are added and removed, we’ll note them in the sections below.

11 November 2025

A custom JSON policy was added that reflects the fewest possible permissions and narrowest possible scope.

The following permissions were added to the minimal Backup and Recovery permissions list:

- Microsoft.Authorization/locks/write
- Microsoft.Authorization/locks/read

The following permissions are no longer needed for Backup and Recovery unless you are using legacy indexing:

- Microsoft.Synapse/workspaces/write
- Microsoft.Synapse/workspaces/read
- Microsoft.Synapse/workspaces/delete
- Microsoft.Synapse/register/action
- Microsoft.Synapse/checkNameAvailability/action

- Microsoft.Synapse/workspaces/operationStatuses/read
- Microsoft.Synapse/workspaces/firewallRules/read
- Microsoft.Synapse/workspaces/replaceAllIpFirewallRules/action
- Microsoft.Synapse/workspaces/operationResults/read
- Microsoft.Synapse/workspaces/privateEndpointConnectionsApproval/action

The following permissions were moved to the "Additional Backup and Recovery permissions" section because they are not required for a minimal configuration:

- Microsoft.Storage/storageAccounts/listkeys/action
- Microsoft.Storage/storageAccounts/read
- Microsoft.Storage/storageAccounts/write
- Microsoft.Storage/storageAccounts/blobServices/containers/read
- Microsoft.Storage/storageAccounts/listAccountSas/action
- Microsoft.Resources/subscriptions/locations/read
- Microsoft.Resources/subscriptions/resourceGroups/read
- Microsoft.Resources/subscriptions/resourcegroups/resources/read
- Microsoft.Resources/subscriptions/resourceGroups/write
- Microsoft.Storage/storageAccounts/managementPolicies/read
- Microsoft.Storage/storageAccounts/managementPolicies/write

9 September 2024

The following permissions were removed from the JSON policy because the Console no longer supports discovery and management of Kubernetes clusters:

- Microsoft.ContainerService/managedClusters/listClusterUserCredential/action
- Microsoft.ContainerService/managedClusters/read

22 August 2024

The following permissions were added to the JSON policy because they are required for Cloud Volumes ONTAP support of Virtual Machine Scale Sets:

- Microsoft.Compute/virtualMachineScaleSets/write
- Microsoft.Compute/virtualMachineScaleSets/read
- Microsoft.Compute/virtualMachineScaleSets/delete

5 December 2023

The following permissions are no longer needed for NetApp Backup and Recovery when backing up volume data to Azure Blob storage:

- Microsoft.Compute/virtualMachines/read
- Microsoft.Compute/virtualMachines/start/action
- Microsoft.Compute/virtualMachines/deallocate/action

- Microsoft.Compute/virtualMachines/extensions/delete
- Microsoft.Compute/virtualMachines/delete

These permissions are required for other Console storage services, so they'll still remain in the custom role for the agent if you're using those other storage services.

12 May 2023

The following permissions were added to the JSON policy because they are required for Cloud Volumes ONTAP management:

- Microsoft.Compute/images/write
- Microsoft.Network/loadBalancers/frontendIPConfigurations/read

The following permissions were removed from the JSON policy because they are no longer required:

- Microsoft.Storage/storageAccounts/blobServices/containers/write
- Microsoft.Network/publicIPAddresses/delete

23 March 2023

The "Microsoft.Storage/storageAccounts/delete" permission is no longer needed for Data Classification.

This permission is still required for Cloud Volumes ONTAP.

5 January 2023

The following permissions were added to the JSON policy:

- Microsoft.Storage/storageAccounts/listAccountSas/action
- Microsoft.Synapse/workspaces/privateEndpointConnectionsApproval/action

  These permissions are required for NetApp Backup and Recovery.

- Microsoft.Network/loadBalancers/backendAddressPools/join/action

  This permission is required for Cloud Volumes ONTAP deployment.

Console agent security group rules in Azure

The Azure security group for the agent requires both inbound and outbound rules. The NetApp Console automatically creates this security group when you create a Console agent from the Console. for other installation options, You need to set up this security group manually.

Inbound rules

Protocol	Port	Purpose
SSH	22	Provides SSH access to the agent host

Protocol	Port	Purpose
HTTP	80	• Provides HTTP access from client web browsers to the local user interface • Used during the Cloud Volumes ONTAP upgrade process
HTTPS	443	Provides HTTPS access from client web browsers to the local user interface, and connections from the NetApp Data Classification instance
TCP	3128	Provides Cloud Volumes ONTAP with internet access to send AutoSupport messages to NetApp Support. You must manually open this port after deployment. Learn how the agent is used as a proxy for AutoSupport messages

Outbound rules

The predefined security group for the agent opens all outbound traffic. If that is acceptable, follow the basic outbound rules. If you need more rigid rules, use the advanced outbound rules.

Basic outbound rules

The predefined security group for the agent includes the following outbound rules.

Protocol	Port	Purpose
All TCP	All	All outbound traffic
All UDP	All	All outbound traffic

Advanced outbound rules

If you need rigid rules for outbound traffic, you can use the following information to open only those ports that are required for outbound communication by the agent.

ⓘ The source IP address is the agent host.

Service	Protocol	Port	Destination	Purpose
API calls and AutoSupport	HTTPS	443	Outbound internet and ONTAP cluster management LIF	API calls to Azure, to ONTAP, to NetApp Data Classification, and sending AutoSupport messages to NetApp
API calls	TCP	8080	Data Classification	Probe to Data Classification instance during deployment
DNS	UDP	53	DNS	Used for DNS resolve by the Console

Google Cloud permissions and required firewall rules

Google Cloud permissions for the Console agent

The Console agent requires permissions to perform actions in Google Cloud. These permissions are included in a custom role provided by NetApp. You should understand what the agent does with these permissions.

Google Cloud user account permissions

The custom role below gives a Google Cloud user the permissions needed to deploy an agent. Apply this custom role to the user who will deploy the agent.

View Google Cloud user account permissions

```
title: Console agent deployment policy
description: Permissions for the user who deploys the Console agent
stage: GA
includedPermissions:

- cloudbuild.builds.get
- compute.disks.create
- compute.disks.get
- compute.disks.list
- compute.disks.setLabels
- compute.disks.use
- compute.firewalls.create
- compute.firewalls.delete
- compute.firewalls.get
- compute.firewalls.list
- compute.globalOperations.get
- compute.images.get
- compute.images.getFromFamily
- compute.images.list
- compute.images.useReadOnly
- compute.instances.attachDisk
- compute.instances.create
- compute.instances.get
- compute.instances.list
- compute.instances.setDeletionProtection
- compute.instances.setLabels
- compute.instances.setMachineType
- compute.instances.setMetadata
- compute.instances.setTags
- compute.instances.start
- compute.instances.updateDisplayDevice
- compute.machineTypes.get
- compute.networks.get
- compute.networks.list
- compute.networks.updatePolicy
- compute.projects.get
- compute.regions.get
- compute.regions.list
- compute.subnetworks.get
- compute.subnetworks.list
- compute.zoneOperations.get
- compute.zones.get
- compute.zones.list
- config.deployments.create
- config.operations.get
- config.deployments.delete
- config.deployments.deleteState
- config.deployments.get
- config.deployments.getState
- config.deployments.list
- config.deployments.update
- config.deployments.updateState
- config.previews.get
- config.previews.list
- config.revisions.get
- config.resources.list
- deploymentmanager.compositeTypes.get
- deploymentmanager.compositeTypes.list
- deploymentmanager.deployments.create
- deploymentmanager.deployments.delete
- deploymentmanager.deployments.get
- deploymentmanager.deployments.list
- deploymentmanager.manifests.get
- deploymentmanager.manifests.list
- deploymentmanager.operations.get
- deploymentmanager.operations.list
- deploymentmanager.resources.get
- deploymentmanager.resources.list
- deploymentmanager.typeProviders.get
- deploymentmanager.typeProviders.list
- deploymentmanager.types.get
- deploymentmanager.types.list
- resourcemanager.projects.get
- compute.instances.setServiceAccount
- iam.serviceAccounts.actAs
- iam.serviceAccounts.create
- iam.serviceAccounts.list
- iam.serviceAccountKeys.create
- storage.buckets.create
- storage.buckets.get
- storage.objects.create
- storage.folders.create
- storage.objects.list
```

Service account permissions

The custom role below gives the Google Cloud service account attached to the Console agent the permissions needed to manage resources and processes in your Google Cloud network.

Apply this custom role to a service account attached to the Console agent VM.

- Set up Google Cloud permissions for standard mode
- Set up permissions for restricted mode

View Google service account permissions

Ensure the role is up to date as new permissions are added or removed in subsequent releases. The change log lists any required new permissions. Review the Google permissions change log Review how to add Google Cloud service accounts

```
title: NetApp Console agent
description: Permissions for the service account associated with the
Console agent.
stage: GA
includedPermissions:
- cloudbuild.builds.get
- cloudbuild.connections.list
- cloudbuild.repositories.accessReadToken
- cloudbuild.repositories.list
- cloudquotas.quotas.get
- cloudkms.cryptoKeys.getIamPolicy
- cloudkms.cryptoKeys.setIamPolicy
- cloudkms.keyRings.get
- cloudkms.keyRings.getIamPolicy
- cloudkms.keyRings.setIamPolicy
- config.artifacts.import
- config.deployments.create
- config.deployments.delete
- config.deployments.deleteState
- config.deployments.get
- config.deployments.getLock
- config.deployments.getState
- config.deployments.update
- config.deployments.updateState
- config.previews.upload
- config.revisions.get
- config.revisions.getState
- config.deployments.getLock
- config.deployments.list
- config.deployments.lock
- config.operations.get
- config.previews.get
- config.previews.list
- config.resources.list
- compute.regionBackendServices.create
- compute.regionBackendServices.get
- compute.regionBackendServices.list
- compute.regionBackendServices.update
- compute.networks.updatePolicy
- compute.addresses.createInternal
- compute.addresses.deleteInternal
- compute.addresses.list
- compute.addresses.setLabels
- compute.addresses.useInternal
- compute.backendServices.create
- compute.disks.create
- compute.disks.createSnapshot
- compute.disks.delete
- compute.disks.get
- compute.disks.list
- compute.disks.setLabels
- compute.disks.use
- compute.firewalls.create
- compute.firewalls.delete
- compute.firewalls.get
- compute.firewalls.list
- compute.forwardingRules.create
- compute.forwardingRules.delete
- compute.forwardingRules.get
- compute.forwardingRules.setLabels
- compute.globalOperations.get
- compute.healthChecks.create
- compute.healthChecks.delete
- compute.healthChecks.get
- compute.healthChecks.useReadOnly
- compute.images.get
- compute.images.getFromFamily
- compute.images.list
- compute.images.useReadOnly
- compute.instances.addAccessConfig
- compute.instances.attachDisk
- compute.instances.create
- compute.instances.delete
- compute.instances.detachDisk
- compute.instances.get
- compute.instances.getSerialPortOutput
- compute.instances.list
- compute.instances.setDeletionProtection
- compute.instances.setLabels
- compute.instances.setMachineType
- compute.instances.setMetadata
- compute.instances.setTags
- compute.instances.start
- compute.instances.stop
- compute.instances.updateDisplayDevice
- compute.instances.use
- compute.instanceGroups.create
- compute.instanceGroups.delete
- compute.instanceGroups.get
- compute.instanceGroups.update
- compute.instanceGroups.use
- compute.addresses.get
- compute.instances.updateNetworkInterface
- compute.instances.setMinCpuPlatform
- compute.machineTypes.get
- compute.networks.get
- compute.networks.list
- compute.projects.get
- compute.regions.get
- compute.regions.list
- compute.regionBackendServices.delete
- compute.regionBackendServices.use
- compute.resourcePolicies.create
- compute.resourcePolicies.delete
- compute.resourcePolicies.get
- compute.snapshots.create
- compute.snapshots.delete
- compute.snapshots.get
- compute.snapshots.list
- compute.snapshots.setLabels
- compute.subnetworks.get
- compute.subnetworks.list
- compute.subnetworks.use
- compute.subnetworks.useExternalIp
- compute.zoneOperations.get
- compute.zones.get
- compute.zones.list
- compute.instances.setServiceAccount
- deploymentmanager.compositeTypes.get
- deploymentmanager.compositeTypes.list
- deploymentmanager.deployments.create
- deploymentmanager.deployments.delete
- deploymentmanager.deployments.get
- deploymentmanager.deployments.list
- deploymentmanager.manifests.get
- deploymentmanager.manifests.list
- deploymentmanager.operations.get
- deploymentmanager.operations.list
- deploymentmanager.resources.get
- deploymentmanager.resources.list
- deploymentmanager.typeProviders.get
- deploymentmanager.typeProviders.list
- deploymentmanager.types.get
- deploymentmanager.types.list
- logging.logEntries.list
- logging.privateLogEntries.list
- logging.logEntries.create
- logging.logEntries.route
- monitoring.timeSeries.list
- resourcemanager.projects.get
- storage.buckets.create
- storage.buckets.delete
- storage.buckets.get
- storage.buckets.list
- storage.objects.create
- storage.objects.delete
- storage.objects.list
- storage.objects.update
- cloudkms.cryptoKeyVersions.useToEncrypt
- cloudkms.cryptoKeys.get
- cloudkms.cryptoKeys.list
- cloudkms.keyRings.list
- storage.buckets.update
- iam.serviceAccounts.actAs
- iam.serviceAccounts.create
- iam.serviceAccounts.get
- iam.serviceAccounts.getIamPolicy
- iam.serviceAccounts.list
- iam.serviceAccountKeys.create
- storage.objects.get
- storage.objects.list
- storage.buckets.getIamPolicy
```

How Google Cloud permissions are used

The Console agent uses the permissions in the custom role to manage Cloud Volumes ONTAP resources and NetApp data services processes in your Google Cloud network. The following sections describe how the agent uses these permissions.

Permissions used for Cloud Volumes ONTAP

The Console agent uses the permissions in the custom role to manage Cloud Volumes ONTAP resources and processes in your Google Cloud network. The following sections describe how the agent uses these permissions.

Permissions for Cloud Volumes ONTAP

Actions	Purpose	Used for deployment?	Used for daily operations?	Used for deletion?
config.deployments.create	To deploy the Cloud Volumes ONTAP virtual machine instance using Google Cloud Infrastructure Manager.	Yes	No	No
config.deployments.delete		No	No	Yes
config.deployments.deleteState		No	No	Yes
config.deployments.get		No	Yes	No
config.deployments.getLock		No	Yes	No
config.deployments.getState		No	Yes	No
config.deployments.list		No	Yes	No
config.deployments.lock		No	Yes	No
config.deployments.update		No	Yes	No
config.deployments.updateState		No	Yes	No
config.operations.get		No	Yes	No
config.previews.get		No	Yes	No
config.previews.list		No	Yes	No
config.resources.list		No	Yes	No
config.revisions.get		No	Yes	No
compute.disks.create	To create and manage disks for Cloud Volumes ONTAP.	Yes	Yes	No
compute.disks.createSnapshot		No	Yes	No
compute.disks.delete		No	Yes	Yes
compute.disks.get		No	Yes	No
compute.disks.list		Yes	Yes	No
compute.disks.setLabels		Yes	Yes	No
compute.disks.use		No	Yes	No

Actions	Purpose	Used for deployment?	Used for daily operations?	Used for deletion?
compute.firewalls.create	To create firewall rules for Cloud Volumes ONTAP.	Yes	No	No
compute.firewalls.delete		No	Yes	Yes
compute.firewalls.get		Yes	Yes	No
compute.firewalls.list		Yes	Yes	No
compute.forwardingRules.create	Create forwarding rules for traffic routing to backend services.	No	Yes	No
compute.forwardingRules.delete	Delete existing forwarding rules.	No	Yes	No
compute.forwardingRules.get	Retrieve details about existing forwarding rules.	No	Yes	No
compute.forwardingRules.setLabels	Set or update labels on forwarding rules for organization.	No	Yes	No
compute.globalOperations.get	To get the status of operations.	Yes	Yes	No
compute.healthChecks.create	Create and manage health checks to monitor backend service health.	No	Yes	No
compute.healthChecks.delete		No	Yes	No
compute.healthChecks.get		No	Yes	No
compute.healthChecks.useReadOnly		No	Yes	No
compute.images.get	To get images for VM instances.	Yes	No	No
compute.images.getFromFamily		Yes	No	No
compute.images.list		Yes	No	No
compute.images.useReadOnly		Yes	No	No

Actions	Purpose	Used for deployment?	Used for daily operations?	Used for deletion?
compute.instances.attachDisk	To attach and detach disks to Cloud Volumes ONTAP.	Yes	Yes	No
compute.instances.detachDisk		No	Yes	Yes
compute.instances.create	To create and delete Cloud Volumes ONTAP VM instances.	Yes	No	No
compute.instances.delete		No	No	Yes
compute.instances.get	To list VM instances.	Yes	Yes	No
compute.instances.getSerialPortOutput	To get console logs.	Yes	Yes	No
compute.instances.list	To retrieve the list of instances in a zone.	Yes	Yes	No
compute.instances.setDeletionProtection	To set deletion protection on the instance.	Yes	No	No
compute.instances.setLabels	To add labels.	Yes	No	No
compute.instances.setMachineType	To change the machine type for Cloud Volumes ONTAP.	Yes	Yes	No
compute.instances.setMinCpuPlatform		Yes	Yes	No
compute.instances.setMetadata	To add metadata.	Yes	Yes	No
compute.instances.setTags	To add tags for firewall rules.	Yes	Yes	No
compute.instances.start	To start and stop Cloud Volumes ONTAP.	Yes	Yes	No
compute.instances.stop		Yes	Yes	No
compute.instances.updateDisplayDevice		Yes	Yes	No
compute.instances.use	Use virtual machine instances (start, stop, connect operations).	No	Yes	No

Actions	Purpose	Used for deployment?	Used for daily operations?	Used for deletion?
compute.machineTypes.get	To get the numbers of cores to check quotas.	Yes	No	No
compute.projects.get	To support multi-projects.	Yes	No	No
compute.resourcePolicies.create	Create and manage resource policies for automated resource management.	No	Yes	No
compute.resourcePolicies.delete		No	Yes	No
compute.resourcePolicies.get		No	Yes	No
compute.snapshots.create	To create and manage persistent disk snapshots.	Yes	Yes	No
compute.snapshots.delete		No	Yes	Yes
compute.snapshots.get		No	Yes	No
compute.snapshots.list		No	Yes	No
compute.snapshots.setLabels		Yes	Yes	No
compute.networks.get	To get the networking information needed to create a new Cloud Volumes ONTAP virtual machine instance.	Yes	Yes	No
compute.networks.list		Yes	Yes	No
compute.regions.get		Yes	Yes	No
compute.regions.list		Yes	Yes	No
compute.subnetworks.get		Yes	Yes	No
compute.subnetworks.list		Yes	Yes	No
compute.zoneOperations.get		Yes	Yes	No
compute.zones.get		Yes	Yes	No
compute.zones.list		Yes	Yes	No

Actions	Purpose	Used for deployment?	Used for daily operations?	Used for deletion?
deploymentmanager.compositeTypes.get	To deploy the Cloud Volumes ONTAP virtual machine instance using Google Cloud Deployment Manager.	Yes	No	No
deploymentmanager.compositeTypes.list		Yes	No	No
deploymentmanager.deployments.create		Yes	No	No
deploymentmanager.deployments.delete		Yes	No	No
deploymentmanager.deployments.get		Yes	No	No
deploymentmanager.deployments.list		Yes	No	No
deploymentmanager.manifests.get		Yes	No	No
deploymentmanager.manifests.list		Yes	No	No
deploymentmanager.operations.get		Yes	No	No
deploymentmanager.operations.list		Yes	No	No
deploymentmanager.resources.get		Yes	No	No
deploymentmanager.resources.list		Yes	No	No
deploymentmanager.typeProviders.get		Yes	No	No
deploymentmanager.typeProviders.list		Yes	No	No
deploymentmanager.types.get		Yes	No	No
deploymentmanager.types.list		Yes	No	No
logging.logEntries.list	To get stack log drives.	Yes	Yes	No
logging.privateLogEntries.list		Yes	Yes	No

Actions	Purpose	Used for deployment?	Used for daily operations?	Used for deletion?
logging.logEntries.create	Create and route log entires for monitoring, debugging, and auditing.	Yes	Yes	No
logging.logEntries.route		Yes	Yes	No
resourcemanager.projects.get	To support multi-projects.	Yes	Yes	No
storage.buckets.create	To create and manage a Google Cloud Storage bucket for data tiering.	Yes	Yes	No
storage.buckets.delete		No	Yes	Yes
storage.buckets.get		No	Yes	No
storage.buckets.list		No	Yes	No
storage.buckets.update		No	Yes	No
cloudkms.cryptoKeyVersions.useToEncrypt	To use customer-managed encryption keys from the Cloud Key Management Service with Cloud Volumes ONTAP.	Yes	Yes	No
cloudkms.cryptoKeys.get		Yes	Yes	No
cloudkms.cryptoKeys.list		Yes	Yes	No
cloudkms.keyRings.list		Yes	Yes	No
cloudbuild.builds.get		Yes	No	No
compute.instances.setServiceAccount	To set a service account on the Cloud Volumes ONTAP instance. This service account provides permissions for data tiering to a Google Cloud Storage bucket.	Yes	Yes	No
iam.serviceAccounts.actAs		Yes	No	No
iam.serviceAccounts.create		Yes	No	No
iam.serviceAccounts.getIamPolicy		Yes	Yes	No
iam.serviceAccounts.list		Yes	Yes	No
iam.serviceAccountKeys.create		Yes	No	No

Actions	Purpose	Used for deployment?	Used for daily operations?	Used for deletion?
storage.objects.create	Create and manage objects (files) in Google Cloud Storage bucket.	Yes	Yes	No
storage.objects.delete		No	No	Yes
storage.objects.get		Yes	Yes	No
storage.objects.list		Yes	Yes	No
compute.addresses.list	To retrieve the addresses in a region when deploying an HA pair.	Yes	No	No
compute.addresses.createInternal	Create internal IP addresses within VPC network for resource allocation.	No	Yes	No
compute.addresses.deleteInternal	Delete internal IP addresses for resource cleanup.	No	Yes	No
compute.addresses.setLabels	Update labels on Address resource.	No	Yes	No
compute.addresses.useInternal	Use internal IP addresses for network communication.	No	Yes	No
compute.backendServices.create	To configure a backend service for distributing traffic in an HA pair.	Yes	No	No

Actions	Purpose	Used for deployment?	Used for daily operations?	Used for deletion?
compute.regionBackendServices.create	Create and manage backend services for traffic routing.	Yes	No	No
compute.regionBackendServices.delete		No	Yes	No
compute.regionBackendServices.get		Yes	No	No
compute.regionBackendServices.update		Yes	Yes	No
compute.regionBackendServices.list		Yes	No	No
compute.regionBackendServices.use		No	Yes	No
compute.networks.updatePolicy	To apply firewall rules on the VPCs and subnets for an HA pair.	Yes	No	No
compute.instanceGroups.get	To create and manage storage VMs on Cloud Volumes ONTAP HA pairs.	Yes	Yes	No
compute.addresses.get		Yes	Yes	No
compute.instances.updateNetworkInterface		Yes	Yes	No
compute.instanceGroups.create		No	Yes	No
compute.instanceGroups.delete		No	Yes	No
compute.instanceGroups.update		No	Yes	No
compute.instanceGroups.use		No	Yes	No
monitoring.timeSeries.list	To discover information about Google Cloud Storage buckets.	Yes	Yes	No
storage.buckets.getIamPolicy		Yes	Yes	No

Permissions used for NetApp Backup and Recovery

The Console agent uses the permissions in the custom role to manage NetApp Backup and Recovery resources and processes in your Google Cloud network. The following sections describe how the agent uses these permissions.

View permissions for NetApp Backup and Recovery

Actions	Purpose	Used for deployment?	Used for daily operations?	Used for deletion?
• cloudkms.cryptoKeys.get • cloudkms.cryptoKeys.getIamPolicy • cloudkms.cryptoKeys.list • cloudkms.cryptoKeys.setIamPolicy • cloudkms.keyRings.get • cloudkms.keyRings.getIamPolicy • cloudkms.keyRings.list • cloudkms.keyRings.setIamPolicy	To select your own customer-managed keys in the NetApp Backup and Recovery activation wizard instead of using the default Google-managed encryption keys.	Yes	Yes	No

Permissions used for NetApp Data Classification

The Console agent uses the permissions in the custom role to manage NetApp Data Classification resources and processes in your Google Cloud network. The following sections describe how the agent uses these permissions.

View permissions for NetApp Data Classification

Actions	Purpose	Used for deployment?	Used for daily operations?	Used for deletion?
• compute.subnetworks.use • compute.subnetworks.useExternalIp • compute.instances.addAccessConfig	To enable NetApp Data Classification.	Yes	No	No

Change log

Added and removed permissions are noted below.

08 December 2025

NetApp is moving from Google Cloud Deployment Manager to Google Cloud Infrastructure Manager (IM) to deploy and run the Console agent in Google Cloud. The following permissions were added to support this change.

The following added permissions are required for the Google Cloud user who deploys the agent:

- storage.buckets.create
- storage.buckets.get
- storage.objects.create
- storage.folders.create
- storage.objects.list
- iam.serviceAccount.actAs
- config.deployments.create
- config.operations.get

The following additional permissions are required for the service account in Google Cloud used for day-to-day operations:

- cloudbuild.connections.list
- cloudbuild.repositories.accessReadToken
- cloudbuild.repositories.list
- cloudquotas.quotas.get
- config.artifacts.import

- config.deployments.deleteState
- config.deployments.getLock
- config.deployments.getState
- config.deployments.updateState
- config.previews.upload
- config.revisions.getState
- logging.logEntries.create
- storage.objects.create
- storage.objects.delete
- storage.objects.update
- iam.serviceAccounts.get

The following added permissions are required to deploy Cloud Volumes ONTAP:

- cloudbuild.builds.get
- config.deployments.delete
- config.deployments.deleteState
- config.deployments.get
- config.deployments.getState
- config.deployments.list
- config.deployments.update
- config.deployments.updateState
- config.previews.get
- config.previews.list
- config.revisions.get
- config.resources.list
- iam.serviceAccountKeys.create
- iam.serviceAccounts.create

The following added permissions are required for the service account used for day-to-day operations of Cloud Volumes ONTAP.

- compute.addresses.createInternal
- compute.addresses.deleteInternal
- compute.addresses.setLabels
- compute.addresses.useInternal
- compute.forwardingRules.create
- compute.forwardingRules.delete
- compute.forwardingRules.get
- compute.forwardingRules.setLabels

- compute.healthChecks.create
- compute.healthChecks.delete
- compute.healthChecks.get
- compute.healthChecks.useReadOnly
- compute.instanceGroups.create
- compute.instanceGroups.delete
- compute.instanceGroups.update
- compute.instanceGroups.use
- compute.instances.use
- compute.regionBackendServices.delete
- compute.regionBackendServices.update
- compute.regionBackendServices.use
- compute.resourcePolicies.create
- compute.resourcePolicies.delete
- compute.resourcePolicies.get
- logging.logEntries.route
- config.deployments.create
- config.deployments.delete
- config.deployments.get
- config.deployments.update
- config.revisions.get
- config.deployments.lock
- config.operations.get

26 November 2025

The permissions are updated to add clarity about their usage, but no permissions were added or removed. Three columns are added to indicate whether each permission is used for deployment, daily operations, or deletion. Apart from this, a few permissions are segregated based on their use for NetApp Data Classification and NetApp Backup and Recovery.

06 February 2023

The following permission was added to this policy:

- compute.instances.updateNetworkInterface

This permission is required for Cloud Volumes ONTAP.

27 January, 2023

The following permissions were added to this policy:

- cloudkms.cryptoKeys.getIamPolicy

- cloudkms.cryptoKeys.setIamPolicy
- cloudkms.keyRings.get
- cloudkms.keyRings.getIamPolicy
- cloudkms.keyRings.setIamPolicy

These permissions are required for NetApp Backup and Recovery.

Agent firewall rules in Google Cloud

The Google Cloud firewall rules for the agent requires both inbound and outbound rules. The NetApp Console automatically creates this security group when you create a Console agent from the Console. for other installation options, you need to set up this security group manually.

Inbound rules

Protocol	Port	Purpose
SSH	22	Provides SSH access to the agent host
HTTP	80	• Provides HTTP access from client web browsers to the local user interface • Used during the Cloud Volumes ONTAP upgrade process
HTTPS	443	Provides HTTPS access from client web browsers to the local user interface
TCP	3128	Provides Cloud Volumes ONTAP with internet access. You must manually open this port after deployment.

Outbound rules

The agent’s predefined firewall rules open all outbound traffic. Follow basic outbound rules if acceptable, or use advanced outbound rules for stricter requirements.

Basic outbound rules

The predefined firewall rules for the agent include the following outbound rules.

Protocol	Port	Purpose
All TCP	All	All outbound traffic
All UDP	All	All outbound traffic

Advanced outbound rules

If you need rigid rules for outbound traffic, you can use the following information to open only those ports that are required for outbound communication by the agent.

ⓘ The source IP address is the agent host.

Service	Protocol	Port	Destination	Purpose
API calls and AutoSupport	HTTPS	443	Outbound internet and ONTAP cluster management LIF	API calls to Google Cloud, to ONTAP, to NetApp Data Classification, and sending AutoSupport messages to NetApp
API calls	TCP	8080	Data Classification	Probe to Data Classification instance during deployment
DNS	UDP	53	DNS	Used for DNS resolve by Data Classification

Required network access for 3.9.55 and below

NetApp Console, the NetApp Console agent, and NetApp data services require outbound internet access to contact necessary endpoints.

ⓘ This topic documents the network access required for versions of the NetApp Console standard mode 3.9.55 and below. For required endpoints for 4.0.0 and above, review the required endpoints for 4.0.0 and higher.

You need to set up network access for the following:

- Computers that access the NetApp Console as software as a service (SaaS)
- Console agents you install on-premises or in the cloud.

Update your endpoint list to the revised list for 4.0.0 and higher

Starting with version 4.0.0, Console agents require fewer endpoints. Existing deployments before 4.0.0 remain supported. After upgrading to 4.0.0 or later, you may remove the old endpoints from your allow list when convenient.

NetApp recommends updating firewall rules to use the revised endpoint list, which is smaller, more secure, and easier to manage. NetApp removes the need for wildcard entries, and endpoints for agent upgrades support all data services.

Endpoints for 3.9.55 and below	Endpoints for 4.0.0 and above	Purpose
• https://support.netapp.com • https://mysupport.netapp.com	• https://mysupport.netapp.com • https://signin.b2c.netapp.com • https://support.netapp.com	For licensing and contacting NetApp Support.

Endpoints for 3.9.55 and below	Endpoints for 4.0.0 and above	Purpose
• https://*.api.bluexp.netapp.com • https://api.bluexp.netapp.com • https://*.cloudmanager.cloud.netapp.com • https://cloudmanager.cloud.netapp.com • https://netapp-cloud-account.auth0.com • https://netapp-cloud-account.us.auth0.com • https://console.bluexp.netapp.com • https://*.console.bluexp.netapp.com	• https://api.bluexp.netapp.com • https://netapp-cloud-account.auth0.com • https://netapp-cloud-account.us.auth0.com • https://console.netapp.com • https://components.console.bluexp.netapp.com • https://cdn.auth0.com	For day-to-day operations.
• https://*.blob.core.windows.net • https://cloudmanagerinfraprod.azurecr.io	• https://bluexpinfraprod.eastus2.data.azurecr.io • https://bluexpinfraprod.azurecr.io	To obtain images for Console agent upgrades.

Steps

1. Verify that your agent is version 4.0.0 or higher. View agent version.
2. Whitelist the endpoints in Supported endpoints for 4.0.0 and higher.
3. Restart the service manager 2 service on each agent by running the following command:

   ```
   systemctl restart netapp-service-manager.service
   ```

4. Run the following command and verify that the agent's status shows as *active(running)*:

   –

   ```
   systemctl status netapp-service-manager.service
   ```

5. Remove the old endpoints from your firewall allow list.

Endpoints for NetApp Console and Console agents for 3.9.55 and below

These endpoints are used for Console agents 3.9.55 and below.

Endpoints	Purpose
https://support.netapp.com https://mysupport.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support.
https://*.api.bluexp.netapp.com https://api.bluexp.netapp.com https://*.cloudmanager.cloud.netapp.com https://cloudmanager.cloud.netapp.com https://netapp-cloud-account.auth0.com https://netapp-cloud-account.us.auth0.com	To provide features and services within the NetApp Console.
Choose between two sets of endpoints: • Option 1 (recommended) https://bluexpinfraprod.eastus2.data.azurecr.io https://bluexpinfraprod.azurecr.io • Option 2 https://*.blob.core.windows.net https://cloudmanagerinfraprod.azurecr.io	To obtain images for Console agent upgrades. NetApp recommends allowing Option 1 endpoints in your firewall as they are more secure and disallowing Option 2 endpoints, unless you are using Ransomware Resilience or Backup and Recovery. Note the following about these endpoints: • Option 1 endpoints are supported in 3.9.47 and higher. Releases previous to 3.9.47 do not support backwards compatibility. • The Console agent initiates contact with the endpoints in option 2 first. If those endpoints are not accessible, it automatically contacts the endpoints in option 1. • If you use the Console agent with NetApp Backup and Recovery or Ransomware Resilience, the system does not support Option 1 endpoints. Allow Option 2 endpoints and disallow Option 1.

Cloud provider endpoints contacted by the Console agent

Console agents must have access to additional endpoints if they are deployed in your cloud provider.

Enable access to the cloud provider endpoints before installing the Console agent.

- Set up AWS network access for a Console agent
- Set up Azure network access for a Console agent
- Set up Google Cloud network access for a Console agent

Cloud provider endpoints are the same for all versions.

Data services endpoints contacted by the Console agent

The Console agent requires additional outbound internet access to support some NetApp data services and Cloud Volumes ONTAP.

Endpoints for Cloud Volumes ONTAP

- Endpoints for Cloud Volumes ONTAP in AWS
- Endpoints for Cloud Volumes ONTAP in Azure
- Endpoints for Cloud Volumes ONTAP in Google Cloud

Require the use of IMDSv2 on Amazon EC2 instances

The NetApp Console supports the Amazon EC2 Instance Metadata Service Version 2 (IMDSv2) with the Console agent and with Cloud Volumes ONTAP (including the mediator for HA deployments). In most cases, IMDSv2 is automatically configured on new EC2 instances. IMDSv1 was enabled prior to March 2024. If required by your security policies, you might need to manually configure IMDSv2 on your EC2 instances.

Before you begin

- The Console agent version must be 3.9.38 or later.
- Cloud Volumes ONTAP must be running one of the following versions:
  - 9.12.1 P2 (or any subsequent patch)
  - 9.13.0 P4 (or any subsequent patch)
  - 9.13.1 or any version after this release
- This change requires you to restart the Cloud Volumes ONTAP instances.
- These steps require the use of the AWS CLI because you must change the response hop limit to 3.

About this task

IMDSv2 provides enhanced protection against vulnerabilities. Learn more about IMDSv2 from the AWS Security Blog

The Instance Metadata Service (IMDS) is enabled as follows on EC2 instances:

- For new Console agent deployments from the Console or using Terraform scripts, IMDSv2 is enabled by default on the EC2 instance.
- If you launch a new EC2 instance in AWS and then manually install the Console agent software, IMDSv2 is also enabled by default.
- If you launch the Console agent from the AWS Marketplace, IMDSv1 is enabled by default. You can manually configure IMDSv2 on the EC2 instance.
- For existing Console agents, IMDSv1 is still supported but you can manually configure IMDSv2 on the EC2 instance if you prefer.
- For Cloud Volumes ONTAP, IMDSv1 is enabled by default on new and existing instances. You can manually configure IMDSv2 on the EC2 instances if you prefer.

Steps

1. Require the use of IMDSv2 on the Console agent instance:
   a. Connect to the Linux VM for the Console agent.

      When you created the Console agent instance in AWS, you provided an AWS access key and secret key. You can use this key pair to SSH to the instance. The user name for the EC2 Linux instance is ubuntu (for Console agents created prior to May 2023, the user name was ec2-user).

      AWS Docs: Connect to your Linux instance

   b. Install the AWS CLI.

      AWS Docs: Install or update to the latest version of the AWS CLI

   c. Use the `aws ec2 modify-instance-metadata-options` command to require the use of IMDSv2 and to change the PUT response hop limit to 3.

      Example

```
aws ec2 modify-instance-metadata-options \
    --instance-id <instance-id> \
    --http-put-response-hop-limit 3 \
    --http-tokens required \
    --http-endpoint enabled
```

> The `http-tokens` parameter sets IMDSv2 to required. When `http-tokens` is required, you must also set `http-endpoint` to enabled.

2. Require the use of IMDSv2 on Cloud Volumes ONTAP instances:
   a. Go to the Amazon EC2 console
   b. From the navigation pane, select **Instances**.
   c. Select a Cloud Volumes ONTAP instance.
   d. Select **Actions > Instance settings > Modify instance metadata options**.
   e. On the **Modify instance metadata options** dialog box, select the following:
      - For **Instance metadata service**, select **Enable**.
      - For **IMDSv2**, select **Required**.
      - Select **Save**.
   f. Repeat these steps for other Cloud Volumes ONTAP instances, including the HA mediator.
   g. Stop and start the Cloud Volumes ONTAP instances

Result
The Console agent instance and Cloud Volumes ONTAP instances are now configured to use IMDSv2.

Default configuration for the Console agent

Learn about Console agent default configurations for standard deployments (with internet access) across AWS, Azure, and Google Cloud, as well as restricted deployments (without internet access) for on-premises environments.

Default configuration with internet access

The following configuration details apply if you deployed a Console agent from the NetApp Console, from your cloud provider’s marketplace, or if you manually installed a Console agent on an on-premises Linux host that has internet access.

Console agent VM details for AWS

If you deployed a Console agent from the Console or from the cloud provider’s marketplace, note the following:

- The EC2 instance type is t3.2xlarge.
- The operating system for the image is Ubuntu 22.04 LTS.

  The operating system does not include a GUI. You must use a terminal to access the system.
- The installation includes Docker Engine, which is the required container orchestration tool.
- The user name for the EC2 Linux instance is ubuntu (for agents created prior to May 2023, the user name is ec2-user).
- The default system disk is a 100 GiB gp2 disk.

Console agent VM details for Azure

If you deployed a Console agent from the Console or from the cloud provider’s marketplace, note the following:

- The VM type is Standard_D8s_v3.
- The operating system for the image is Ubuntu 22.04 LTS.

  The operating system does not include a GUI. You must use a terminal to access the system.
- The installation includes Docker Engine, which is the required container orchestration tool.
- The default system disk is a 100 GiB premium SSD disk.

Console agent VM details for Google Cloud

If you deployed a Console agent from the Console, note the following:

- The VM instance is n2-standard-8.
- The operating system for the image is Ubuntu 22.04 LTS.

  The operating system does not include a GUI. You must use a terminal to access the system.
- The installation includes Docker Engine, which is the required container orchestration tool.
- The default system disk is a 100 GiB SSD persistent disk.

Installation folder

The agent installation folder is in the following location:

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

Log files

Log files are contained in the following folders:

- `/opt/application/netapp/cloudmanager/log`
  or
- `/opt/application/netapp/service-manager-2/logs` (starting with new 3.9.23 installations)

  The logs in these folders provide details about the Console agent.
- `/opt/application/netapp/cloudmanager/docker_occm/data/log`

  The logs in this folder provide details about cloud services and the Console service that runs on the Console agent.

Console agent service

- The Console agent 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.

Ports

The agent uses the following ports on the Linux host:

- 80 for HTTP access
- 443 for HTTPS access

Default configuration without internet access

The following configuration applies if you manually installed the Console agent on an on-premises Linux host that doesn't have internet access. Learn more about this installation option.

- The agent installation folder is in the following location:

  ```
  /opt/application/netapp/ds
  ```
- Log files are contained in the following folders:

  ```
  /var/lib/docker/volumes/ds_occmdata/_data/log
  ```

  The logs in this folder provide details about the Console agent and docker images.
- All services are running inside docker containers

  The services are dependent on the docker runtime service running
- The agent uses the following ports on the Linux host:

- 80 for HTTP access
- 443 for HTTPS access

Knowledge and support

Register for support

Support registration is required to receive technical support specific to the NetApp Console and its storage solutions and data services. Support registration is also required to enable key workflows for Cloud Volumes ONTAP systems.

Registering for support does not enable NetApp support for a cloud provider file service. For technical support related to a cloud provider file service, its infrastructure, or any solution using the service, refer to "Getting help" in the documentation for that product.

- Amazon FSx for ONTAP
- Azure NetApp Files
- Google Cloud NetApp Volumes

Support registration overview

There are two forms of registration to activate support entitlement:

- Registering your NetApp Console account serial number (your 20 digit 960xxxxxxxxx serial number located on the Support Resources page in the Console).

  This serves as your single support subscription ID for any service within the Console. Each Console account must be registered.

- Registering the Cloud Volumes ONTAP serial numbers associated with a subscription in your cloud provider's marketplace (these are 20 digit 909201xxxxxxxx serial numbers).

  These serial numbers are commonly referred to as *PAYGO serial numbers* and get generated by the NetApp Console at the time of Cloud Volumes ONTAP deployment.

Registering both types of serial numbers enables capabilities like opening support tickets and automatic case generation. Registration is completed by adding NetApp Support Site (NSS) accounts to the Console as described below.

Register NetApp Console for NetApp support

To register for support and activate support entitlement, one user in your NetApp Console account must associate a NetApp Support Site account with their Console login. How you register for NetApp support depends on whether you already have a NetApp Support Site (NSS) account.

Existing customer with an NSS account

If you're a NetApp customer with an NSS account, you simply need to register for support through the Console.

Steps

1. Select **Administration** > **Credentials**.
2. Select **User Credentials**.

3. Select **Add NSS credentials** and follow the NetApp Support Site (NSS) authentication prompt.
4. To confirm that the registration process was successful, select the Help icon, and select **Support**.

   The **Resources** page should show that your Console account is registered for support.

   Note that other Console users will not see this same support registration status if they have not associated a NetApp Support Site account with their login. However, that doesn't mean that your account is not registered for support. As long as one user in the organization has followed these steps, then your account has been registered.

Existing customer but no NSS account

If you're an existing NetApp customer with existing licenses and serial numbers but *no* NSS account, you need to create an NSS account and associate it with your Console login.

Steps

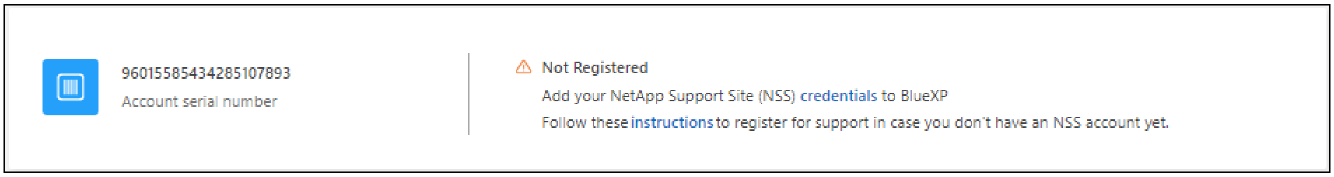
1. Create a NetApp Support Site account by completing the NetApp Support Site User Registration form
   a. Be sure to select the appropriate User Level, which is typically **NetApp Customer/End User**.
   b. Be sure to copy the Console account serial number (960xxxx) used above for the serial number field. This will speed up the account processing.
2. Associate your new NSS account with your Console login by completing the steps under Existing customer with an NSS account.

Brand new to NetApp

If you are brand new to NetApp and you don't have an NSS account, follow each step below.

Steps

1. In the upper right of the Console, select the Help icon, and select **Support**.
2. Locate your account ID serial number from the Support Registration page.



96015585434285107893
Account serial number

⚠ Not Registered
Add your NetApp Support Site (NSS) credentials to BlueXP
Follow these instructions to register for support in case you don't have an NSS account yet.

3. Navigate to NetApp's support registration site and select **I am not a registered NetApp Customer**.
4. Fill out the mandatory fields (those with red asterisks).
5. In the **Product Line** field, select **Cloud Manager** and then select your applicable billing provider.
6. Copy your account serial number from step 2 above, complete the security check, and then confirm that you read NetApp's Global Data Privacy Policy.

   An email is immediately sent to the mailbox provided to finalize this secure transaction. Be sure to check your spam folders if the validation email doesn't arrive in few minutes.

7. Confirm the action from within the email.

   Confirming submits your request to NetApp and recommends that you create a NetApp Support Site account.

8. Create a NetApp Support Site account by completing the NetApp Support Site User Registration form
    a. Be sure to select the appropriate User Level, which is typically **NetApp Customer/End User**.
    b. Be sure to copy the account serial number (960xxxx) used above for the serial number field. This will speed up processing.

After you finish

NetApp should reach out to you during this process. This is a one-time onboarding exercise for new users.

Once you have your NetApp Support Site account, associate the account with your Console login by completing the steps under Existing customer with an NSS account.

Associate NSS credentials for Cloud Volumes ONTAP support

Associating NetApp Support Site credentials with your Console account is required to enable the following key workflows for Cloud Volumes ONTAP:

- Registering pay-as-you-go Cloud Volumes ONTAP systems for support

  Providing your NSS account is required to activate support for your system and to gain access to NetApp technical support resources.

- Deploying Cloud Volumes ONTAP when you bring your own license (BYOL)

  Providing your NSS account is required so that the Console can upload your license key and to enable the subscription for the term that you purchased. This includes automatic updates for term renewals.

- Upgrading Cloud Volumes ONTAP software to the latest release

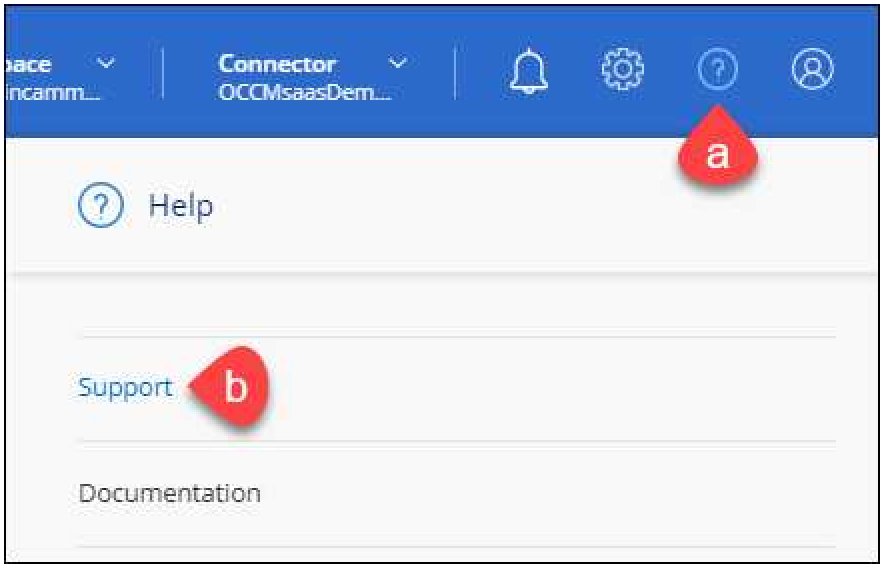
Associating NSS credentials with your NetApp Console account is different than the NSS account that is associated with a Console user login.

These NSS credentials are associated with your specific Console account ID. Users who belong to the Console organization can access these credentials from **Support > NSS Management**.

- If you have a customer-level account, you can add one or more NSS accounts.
- If you have a partner or reseller account, you can add one or more NSS accounts, but they can’t be added alongside customer-level accounts.

Steps

1. In the upper right of the Console, select the Help icon, and select **Support**.



2. Select **NSS Management > Add NSS Account**.
3. When you're prompted, select **Continue** to be redirected to a Microsoft login page.

   NetApp uses Microsoft Entra ID as the identity provider for authentication services specific to support and licensing.

4. At the login page, provide your NetApp Support Site registered email address and password to perform the authentication process.

   These actions enable the Console to use your NSS account for things like license downloads, software upgrade verification, and future support registrations.

   Note the following:

   - The NSS account must be a customer-level account (not a guest or temp account). You can have multiple customer-level NSS accounts.
   - There can be only one NSS account if that account is a partner-level account. If you try to add customer-level NSS accounts and a partner-level account exists, you'll get the following error message:

     "The NSS customer type is not allowed for this account as there are already NSS Users of different type."

     The same is true if you have pre-existing customer-level NSS accounts and try to add a partner-level account.

   - Upon successful login, NetApp will store the NSS user name.

     This is a system-generated ID that maps to your email. On the **NSS Management** page, you can display your email from the ••• menu.

   - If you ever need to refresh your login credential tokens, there is also an **Update Credentials** option in the ••• menu.

     Using this option prompts you to log in again. Note that the token for these accounts expire after 90 days. A notification will be posted to alert you of this.

Get help

NetApp provides support for NetApp Console and its cloud services in a variety of ways. Extensive free self-support options are available 24/7, such as knowledge base (KB) articles and a community forum. Your support registration includes remote technical support via web ticketing.

Get support for a cloud provider file service

For technical support related to a cloud provider file service, its infrastructure, or any solution using the service, refer to the documentation for that product.

- Amazon FSx for ONTAP
- Azure NetApp Files
- Google Cloud NetApp Volumes

To receive technical support specific to NetApp and its storage solutions and data services, use the support options described below.

Use self-support options

These options are available for free, 24 hours a day, 7 days a week:

- Documentation

  The NetApp Console documentation that you're currently viewing.

- Knowledge base

  Search through the NetApp knowledge base to find helpful articles to troubleshoot issues.

- Communities

  Join the NetApp Console community to follow ongoing discussions or create new ones.

Create a case with NetApp support

In addition to the self-support options above, you can work with a NetApp Support specialist to resolve any issues after you activate support.

Before you get started

- To use the **Create a Case** capability, you must first associate your NetApp Support Site credentials with your Console login. Learn how to manage credentials associated with your Console login.
- If you're opening a case for an ONTAP system that has a serial number, then your NSS account must be associated with the serial number for that system.

Steps

1. In NetApp Console, select **Help > Support**.
2. On the **Resources** page, choose one of the available options under Technical Support:

a. Select **Call Us** if you'd like to speak with someone on the phone. You'll be directed to a page on netapp.com that lists the phone numbers that you can call.

b. Select **Create a Case** to open a ticket with a NetApp Support specialist:

   - **Service**: Select the service that the issue is associated with. For example, **NetApp Console** when specific to a technical support issue with workflows or functionality within the Console.
   - **System**: If applicable to storage, select **Cloud Volumes ONTAP** or **On-Prem** and then the associated working environment.

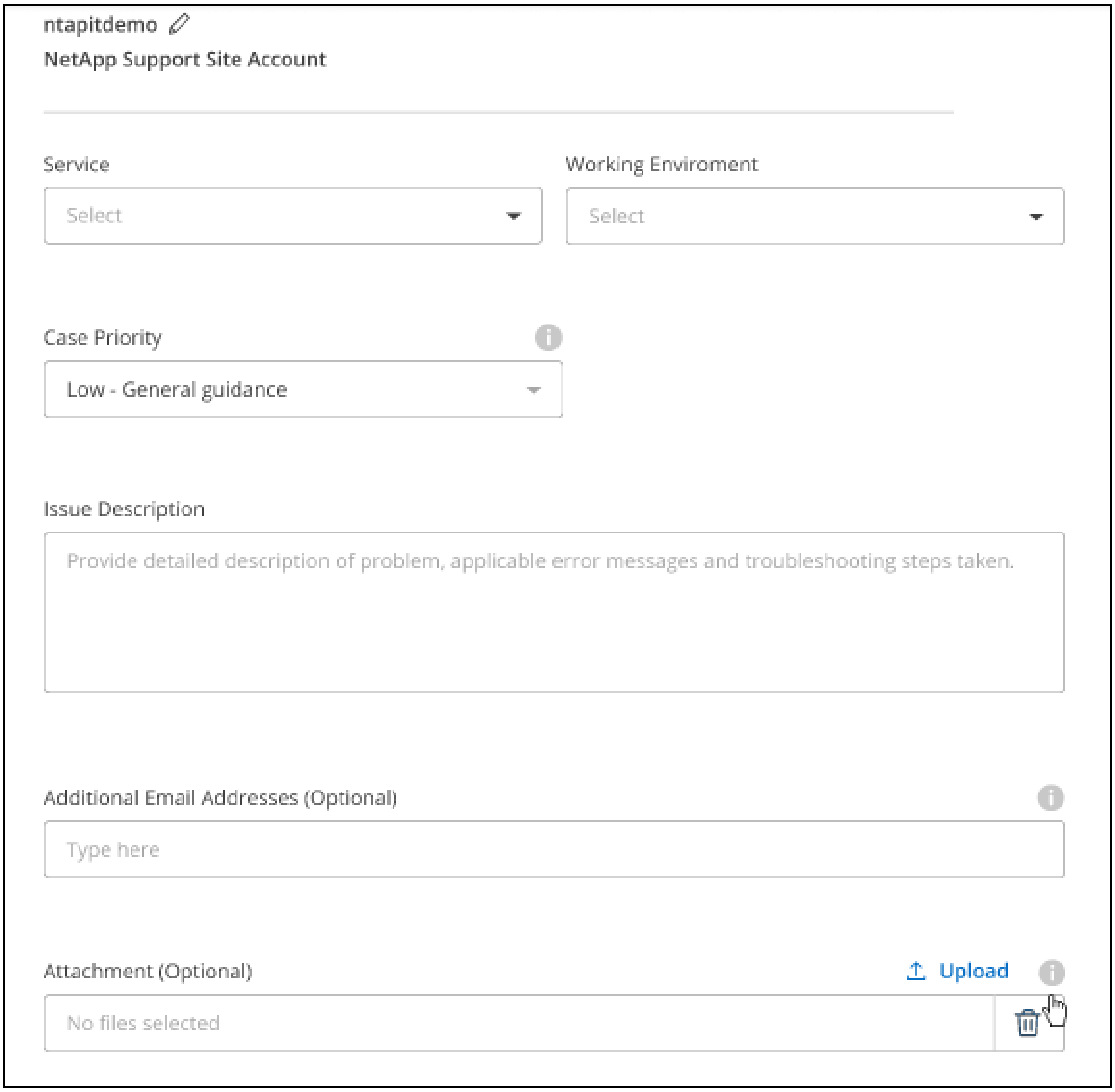
     The list of systems are within scope of the Console organization, and Console agent you have selected in the top banner.

   - **Case Priority**: Choose the priority for the case, which can be Low, Medium, High, or Critical.

     To learn more details about these priorities, hover your mouse over the information icon next to the field name.

   - **Issue Description**: Provide a detailed description of your problem, including any applicable error messages or troubleshooting steps that you performed.
   - **Additional Email Addresses**: Enter additional email addresses if you'd like to make someone else aware of this issue.
   - **Attachment (Optional)**: Upload up to five attachments, one at a time.

     Attachments are limited to 25 MB per file. The following file extensions are supported: txt, log, pdf, jpg/jpeg, rtf, doc/docx, xls/xlsx, and csv.



ntapitdemo

NetApp Support Site Account

Service: Select

Working Enviroment: Select

Case Priority: Low - General guidance

Issue Description: Provide detailed description of problem, applicable error messages and troubleshooting steps taken.

Additional Email Addresses (Optional): Type here

Attachment (Optional): No files selected

After you finish

A pop-up will appear with your support case number. A NetApp Support specialist will review your case and get back to you soon.

For a history of your support cases, you can select **Settings > Timeline** and look for actions named "create support case." A button to the far right lets you expand the action to see details.

It’s possible that you might encounter the following error message when trying to create a case:

"You are not authorized to Create a Case against the selected service"

This error could mean that the NSS account and the company of record it’s associated with is not the same company of record for the NetApp Console account serial number (ie. 960xxxx) or the working environment serial number. You can seek assistance using one of the following options:

- Submit a non-technical case at https://mysupport.netapp.com/site/help

Manage your support cases

You can view and manage active and resolved support cases directly from the Console. You can manage the cases associated with your NSS account and with your company.

Note the following:

- The case management dashboard at the top of the page offers two views:
  - The view on the left shows the total cases opened in the past 3 months by the user NSS account you provided.
  - The view on the right shows the total cases opened in the past 3 months at your company level based on your user NSS account.

  The results in the table reflect the cases related to the view that you selected.

- You can add or remove columns of interest and you can filter the contents of columns like Priority and Status. Other columns provide just sorting capabilities.

  View the steps below for more details.

- At a per-case level, we offer the ability to update case notes or close a case that is not already in Closed or Pending Closed status.

Steps

1. In the NetApp Console, select **Help > Support**.
2. Select **Case Management** and if you're prompted, add your NSS account to the Console.

   The **Case management** page shows open cases related to the NSS account that is associated with your Console user account. This is the same NSS account that appears at the top of the **NSS management** page.

3. Optionally modify the information that displays in the table:
   - Under **Organization's cases**, select **View** to view all cases associated with your company.
   - Modify the date range by choosing an exact date range or by choosing a different time frame.
   - Filter the contents of the columns.
   - Change the columns that appear in the table by selecting ⊕ and then choosing the columns that you'd like to display.
4. Manage an existing case by selecting ••• and selecting one of the available options:
   - **View case**: View full details about a specific case.
   - **Update case notes**: Provide additional details about your problem or select **Upload files** to attach up to a maximum of five files.

     Attachments are limited to 25 MB per file. The following file extensions are supported: txt, log, pdf, jpg/jpeg, rtf, doc/docx, xls/xlsx, and csv.

   - **Close case**: Provide details about why you're closing the case and select **Close case**.

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