



Azure

Cloud Manager

NetApp
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Azure

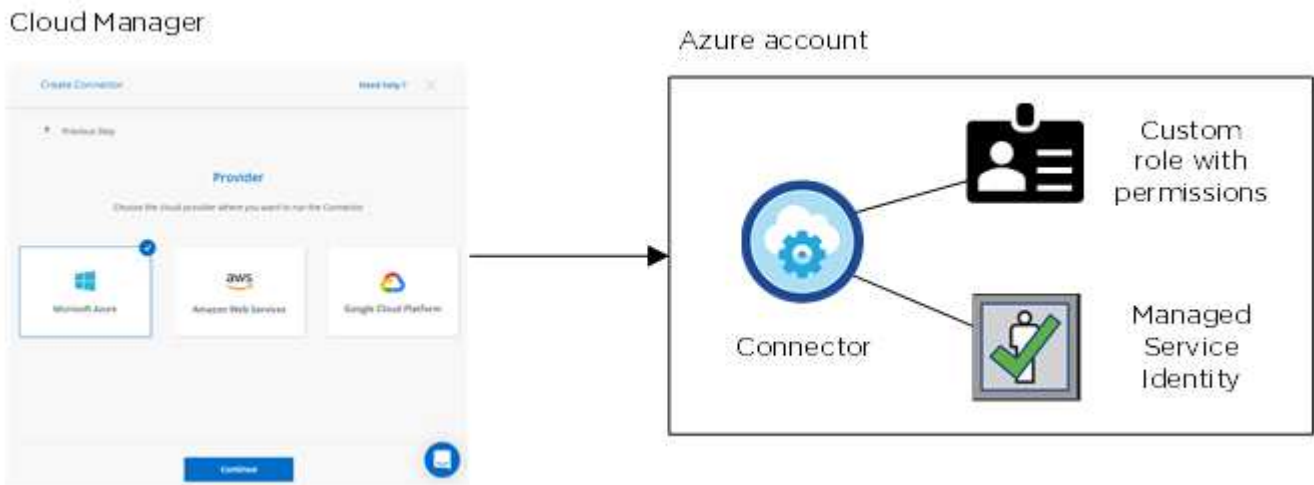
Azure credentials and permissions

Cloud Manager enables you to choose the Azure credentials to use when deploying Cloud Volumes ONTAP. You can deploy all of your Cloud Volumes ONTAP systems using the initial Azure credentials, or you can add additional credentials.

Initial Azure credentials

When you deploy a Connector from Cloud Manager, you need to use an Azure account that has permissions to deploy the Connector virtual machine. The required permissions are listed in the [Connector deployment policy for Azure](#).

When Cloud Manager deploys the Connector virtual machine in Azure, it enables a [system-assigned managed identity](#) on virtual machine, creates a custom role, and assigns it to the virtual machine. The role provides Cloud Manager with permissions to manage resources and processes within that Azure subscription. [Review how Cloud Manager uses the permissions](#).



Cloud Manager selects these Azure credentials by default when you create a new working environment for Cloud Volumes ONTAP:

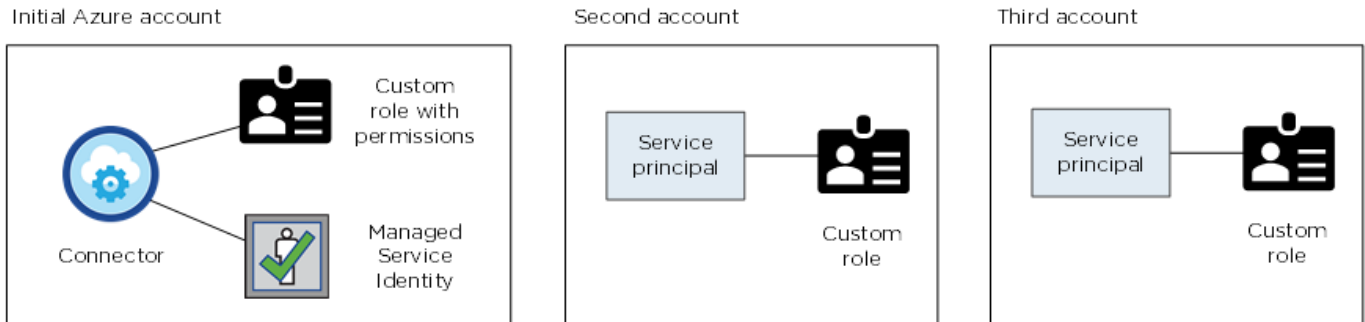
Details & Credentials			
Managed Service Ide...	OCCM QA1	ⓘ No subscription is associated	Edit Credentials
Credential Name	Azure Subscription	Marketplace Subscription	

Additional Azure subscriptions for a managed identity

The managed identity is associated with the subscription in which you launched the Connector. If you want to select a different Azure subscription, then you need to [associate the managed identity with those subscriptions](#).

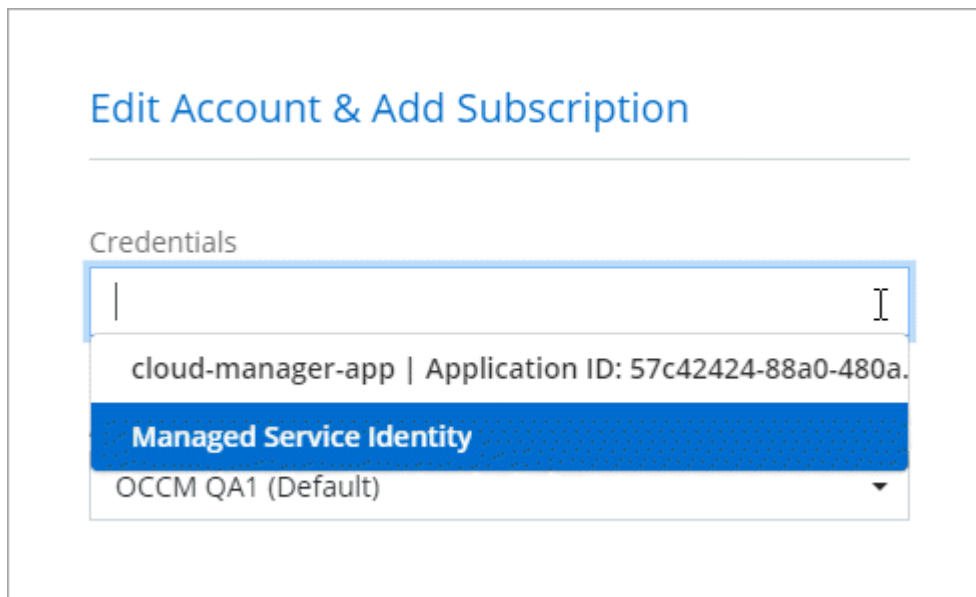
Additional Azure credentials

If you want to deploy Cloud Volumes ONTAP using different Azure credentials, then you must grant the required permissions by [creating and setting up a service principal in Azure Active Directory](#) 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 Cloud Manager](#) by providing details about the AD service principal.

After you add another set of credentials, you can switch to them when creating a new working environment:



What about Marketplace deployments and on-prem deployments?

The sections above describe the recommended deployment method for the Connector, which is from NetApp Cloud Central. You can also deploy a Connector in Azure from the [Azure Marketplace](#), and you can [install the Connector on-premises](#).

If you use the Marketplace, permissions are provided in the same way. You just need to manually create and set up the managed identity for the Connector, and then provide permissions for any additional accounts.

For on-premises deployments, you can't set up a managed identity for the Connector, but you can provide permissions just like you would for additional accounts by using a service principal.

Managing Azure credentials and subscriptions for Cloud Manager

When you create a Cloud Volumes ONTAP system, you need to select the Azure credentials to use with that system. You also need to choose a Marketplace subscription, if you're using pay-as-you-go licensing. Follow the steps on this page if you need to use multiple Azure credentials or multiple Azure Marketplace subscriptions for Cloud Volumes ONTAP.

There are two ways to manage Azure credentials in Cloud Manager. First, if you want to deploy Cloud Volumes ONTAP using different Azure credentials, then you need to provide the required permissions and add the credentials to Cloud Manager. The second way is to associate additional subscriptions with the Azure managed identity.

Adding additional Azure credentials to Cloud Manager

When you deploy a Connector from Cloud Manager, Cloud Manager enables a system-assigned managed identity on the virtual machine that has the required permissions. Cloud Manager selects these Azure credentials by default when you create a new working environment for Cloud Volumes ONTAP.



An initial set of credentials isn't added if you manually installed the Connector software on an existing system. [Learn about Azure credentials and permissions.](#)

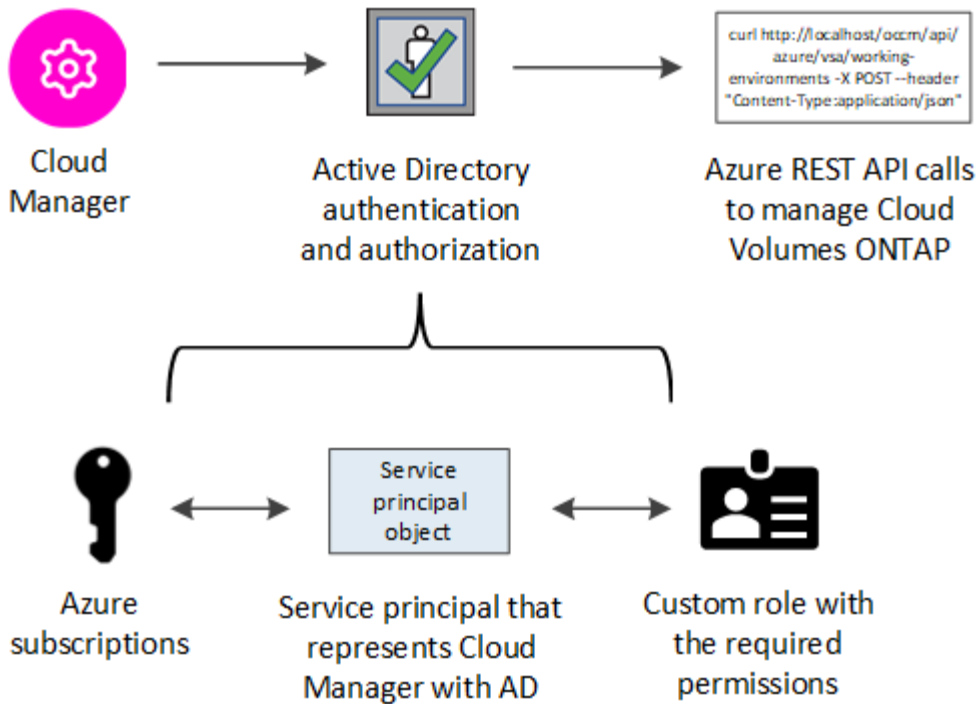
If you want to deploy Cloud Volumes ONTAP using *different* Azure credentials, then you must grant the required permissions by creating and setting up a service principal in Azure Active Directory for each Azure account. You can then add the new credentials to Cloud Manager.

Granting Azure permissions using a service principal

Cloud Manager 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 Azure Active Directory and by obtaining the Azure credentials that Cloud Manager needs.

About this task

The following image depicts how Cloud Manager obtains permissions to perform operations in Azure. A service principal object, which is tied to one or more Azure subscriptions, represents Cloud Manager in Azure Active Directory and is assigned to a custom role that allows the required permissions.



Steps

1. [Create an Azure Active Directory 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.](#)

Creating an Azure Active Directory application

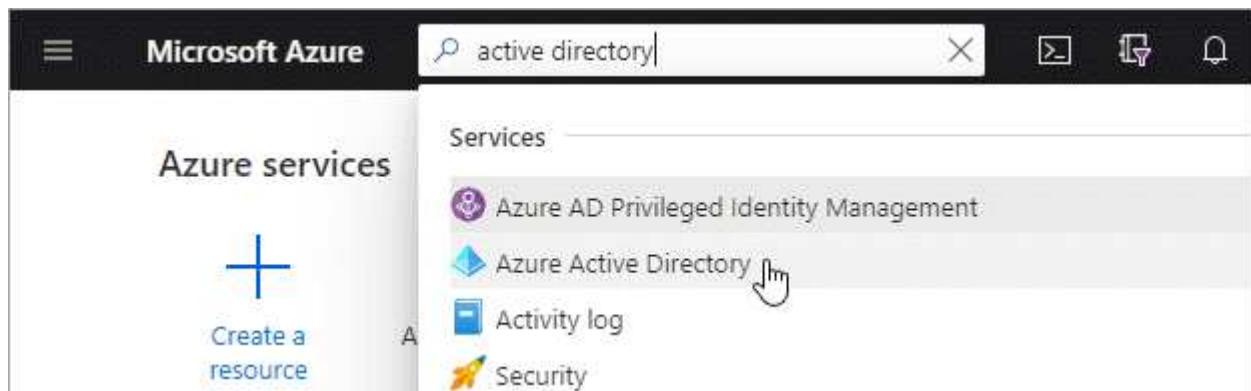
Create an Azure Active Directory (AD) application and service principal that Cloud Manager can use for role-based access control.

Before you begin

You must have the right 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.](#)

Steps

1. From the Azure portal, open the **Azure Active Directory** service.



2. In the menu, click **App registrations**.
3. Click **New registration**.
4. Specify details about the application:
 - **Name**: Enter a name for the application.
 - **Account type**: Select an account type (any will work with Cloud Manager).
 - **Redirect URI**: You can leave this field blank.
5. Click **Register**.

Result

You've created the AD application and service principal.

Assigning the application to a role

You must bind the service principal to one or more Azure subscriptions and assign it the custom "OnCommand Cloud Manager Operator" role so Cloud Manager has permissions in Azure.

Steps

1. Download the [Cloud Manager Azure policy](#).



Right-click the link and click **Save link as...** to download the file.

2. 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.

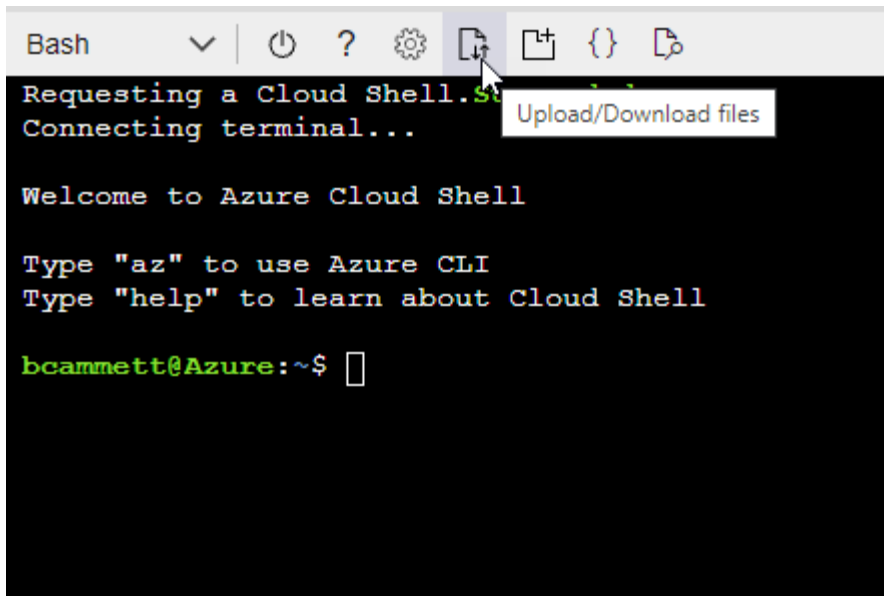
Example

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

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.



c. Enter the following Azure CLI command:

```
az role definition create --role-definition  
Policy_for_cloud_Manager_Azure_3.9.8.json
```

You should now have a custom role called *Cloud Manager Operator*.

4. Assign the application to the role:
 - a. From the Azure portal, open the **Subscriptions** service.
 - b. Select the subscription.
 - c. Click **Access control (IAM) > Add > Add role assignment**.
 - d. Select the **Cloud Manager Operator** role.
 - e. Keep **Azure AD user, group, or service principal** selected.
 - f. Search for the name of the application (you can't find it in the list by scrolling).

Here's an example:

Add role assignment ✕

Role ⓘ
OnCommand Cloud Manager Operator

Assign access to ⓘ
Azure AD user, group, or service principal

Select ⓘ
test-service-principal ✓

test-service-principal

- g. Select the application and click **Save**.

The service principal for Cloud Manager now has the required Azure permissions for that subscription.

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

Adding Windows Azure Service Management API permissions

The service principal must have "Windows Azure Service Management API" permissions.

Steps


1. In the **Azure Active Directory** service, click **App registrations** and select the application.
2. Click **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. Click **Access Azure Service Management as organization users** and then click **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](#)

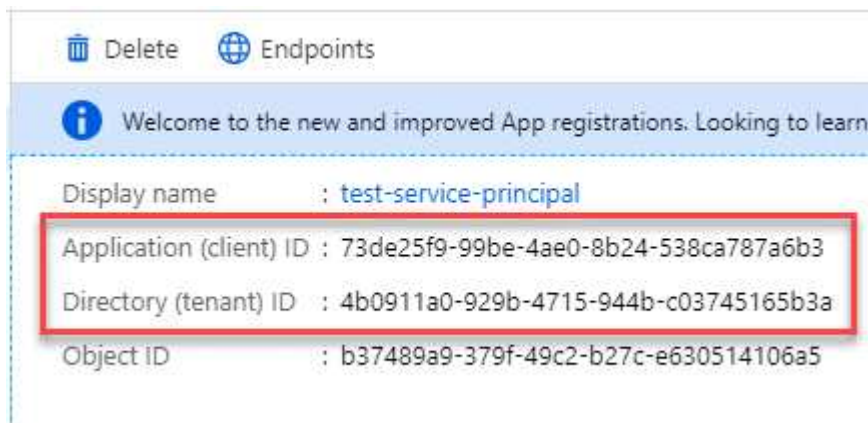
PERMISSION	ADMIN CONSENT REQUIRED
<input checked="" type="checkbox"/> user_impersonation Access Azure Service Management as organization users (preview) 	-

Getting the application ID and directory ID

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

Steps

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



Creating a client secret

You need to create a client secret and then provide Cloud Manager with the value of the secret so Cloud Manager can use it to authenticate with Azure AD.



When you add the account to Cloud Manager, Cloud Manager refers to the client secret as the Application Key.

Steps

1. Open the **Azure Active Directory** service.

2. Click **App registrations** and select your application.
3. Click **Certificates & secrets > New client secret**.
4. Provide a description of the secret and a duration.
5. Click **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*-ZR0v4NLfdAcY7:+0vA

Copy to clipboard

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 Cloud Manager when you add an Azure account.

Adding the credentials to Cloud Manager

After you provide an Azure account with the required permissions, you can add the credentials for that account to Cloud Manager. Completing this step enables you to launch Cloud Volumes ONTAP using different Azure credentials.

Before you get started

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 Cloud Manager.

What you'll need

You need to create a Connector before you can change Cloud Manager settings. [Learn how](#).

Steps

1. In the upper right of the Cloud Manager console, click the Settings icon, and select **Credentials**.



2. Click **Add Credentials** and select **Microsoft Azure**.
3. Enter information about the Azure Active Directory service principal that grants the required permissions:
 - Application (client) ID: See [Getting the application ID and directory ID](#).
 - Directory (tenant) ID: See [Getting the application ID and directory ID](#).
 - Client Secret: See [Creating a client secret](#).
4. Confirm that the policy requirements have been met and then click **Continue**.

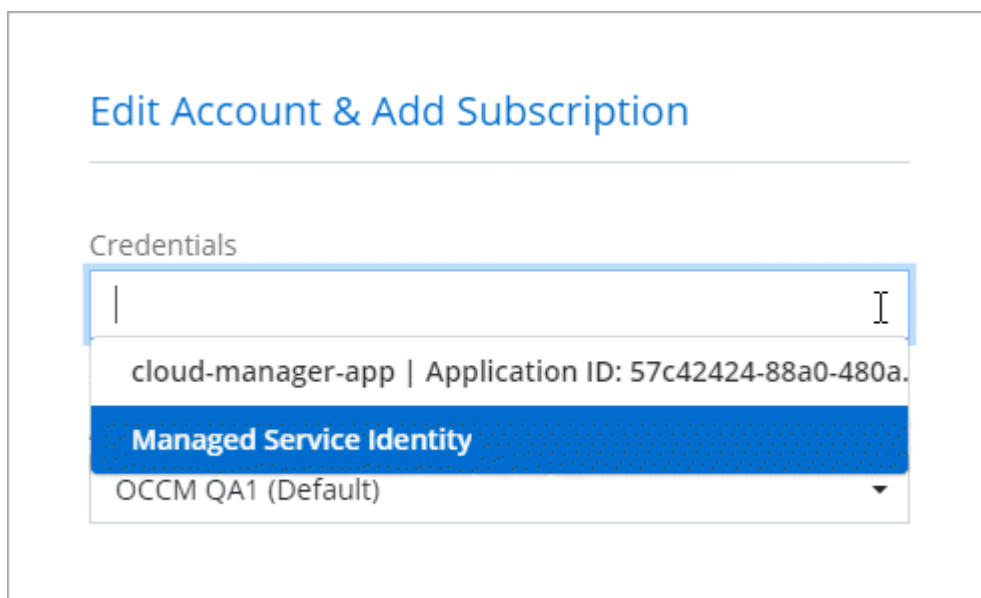
5. Choose the pay-as-you-go subscription that you want to associate with the credentials, or click **Add Subscription** if you don't have one yet.

To create a pay-as-you-go Cloud Volumes ONTAP system, Azure credentials must be associated with a subscription to Cloud Volumes ONTAP from the Azure Marketplace.

6. Click **Add**.

Result

You can now switch to different set of credentials from the Details and Credentials page [when creating a new working environment](#):



Associating an Azure Marketplace subscription to credentials

After you add your Azure credentials to Cloud Manager, you can associate an Azure Marketplace subscription to those credentials. The subscription enables you to create a pay-as-you-go Cloud Volumes ONTAP system, and to use other NetApp cloud services.

There are two scenarios in which you might associate an Azure Marketplace subscription after you've already added the credentials to Cloud Manager:

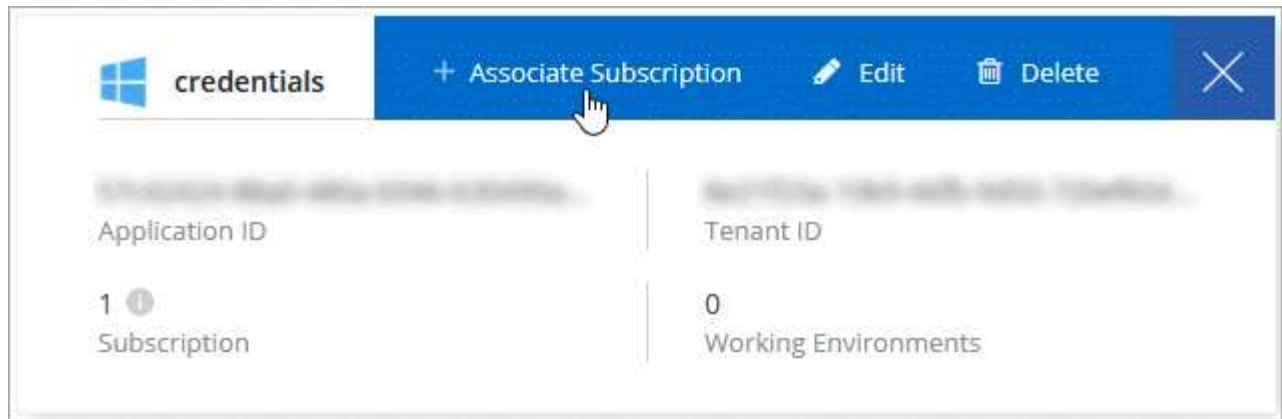
- You didn't associate a subscription when you initially added the credentials to Cloud Manager.
- You want to replace an existing Azure Marketplace subscription with a new subscription.

What you'll need

You need to create a Connector before you can change Cloud Manager settings. [Learn how](#).

Steps

1. In the upper right of the Cloud Manager console, click the Settings icon, and select **Credentials**.
2. Hover over a set of credentials and click the action menu.
3. From the menu, click **Associate Subscription**.



4. Select a subscription from the down-down list or click **Add Subscription** and follow the steps to create a new subscription.

The following video starts from the context of the working environment wizard, but shows you the same workflow after you click **Add Subscription**:

► https://docs.netapp.com/us-en/occm//media/video_subscribing_azure.mp4 (video)

Associating additional Azure subscriptions with a managed identity

Cloud Manager 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 Connector from Cloud Manager. When you deployed the Connector, Cloud Manager created the Cloud Manager Operator role and assigned it to the Connector 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. Click **Access control (IAM)**.
 - a. Click **Add > Add role assignment** and then add the permissions:

- Select the **Cloud Manager Operator** role.

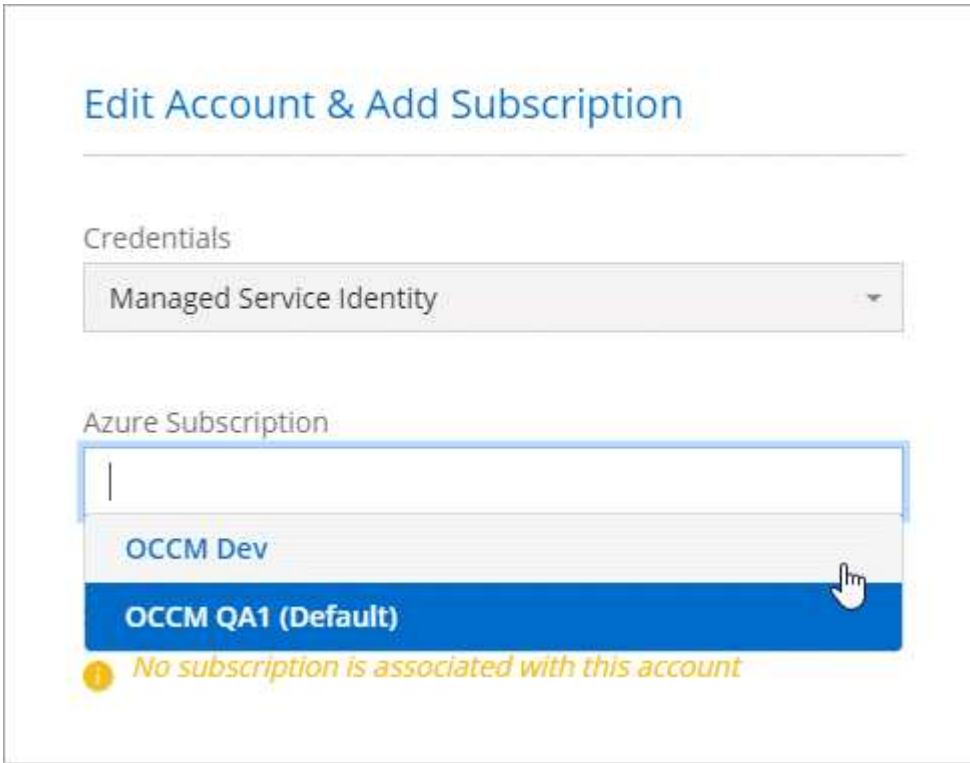


Cloud Manager Operator is the default name provided in the [Cloud Manager policy](#). If you chose a different name for the role, then select that name instead.

- Assign access to a **Virtual Machine**.
 - Select the subscription in which the Connector virtual machine was created.
 - Select the Connector virtual machine.
 - Click **Save**.
4. Repeat these steps for additional subscriptions.

Result

When you create a new working environment, you should now have the ability to select from multiple Azure subscriptions for the managed identity profile.



The screenshot displays a web interface titled "Edit Account & Add Subscription". Under the "Credentials" section, a dropdown menu is set to "Managed Service Identity". Below this, the "Azure Subscription" section features a search input field with a vertical cursor. A dropdown menu is open, showing two options: "OCCM Dev" and "OCCM QA1 (Default)". The "OCCM QA1 (Default)" option is highlighted in blue, and a mouse cursor is hovering over it. Below the dropdown, a yellow warning icon and text state: "No subscription is associated with this account".

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