



# Manage cloud provider credentials

## Cloud Manager

NetApp  
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# Manage cloud provider credentials

## AWS

### AWS credentials and permissions

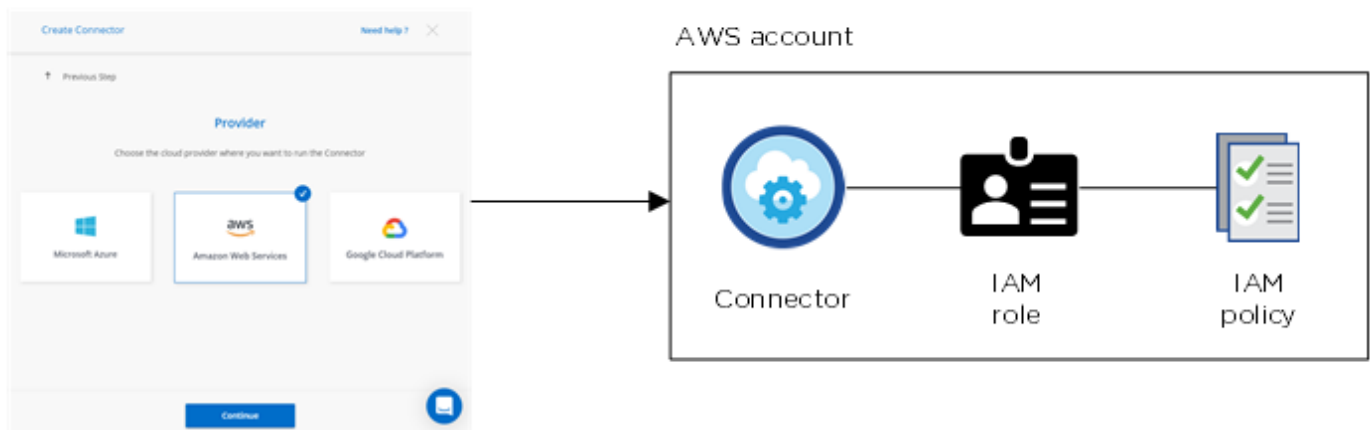
Cloud Manager enables you to choose the AWS credentials to use when deploying Cloud Volumes ONTAP. You can deploy all of your Cloud Volumes ONTAP systems using the initial AWS credentials, or you can add additional credentials.

#### Initial AWS credentials

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

When Cloud Manager launches the Connector instance in AWS, it creates an IAM role and an instance profile for the instance. It also attaches a policy that provides Cloud Manager with permissions to manage resources and processes within that AWS account. [Review how Cloud Manager uses the permissions](#).

Cloud Manager

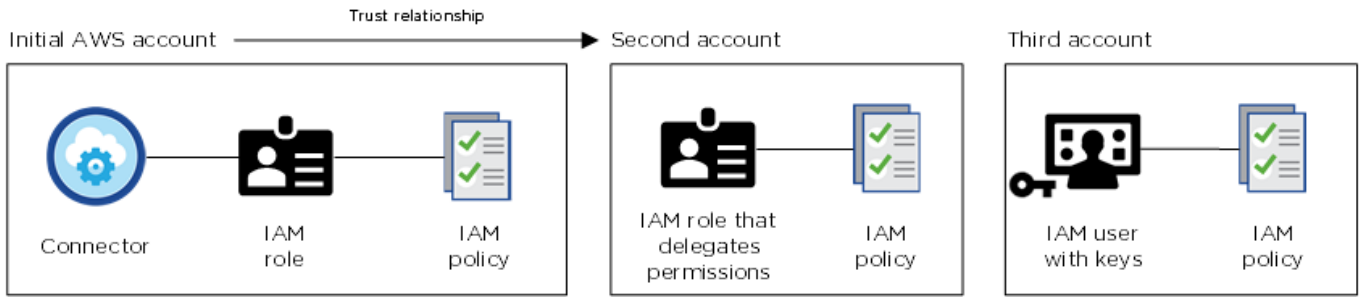


Cloud Manager selects these AWS credentials by default when you create a new working environment for Cloud Volumes ONTAP:

Details & Credentials			
Instance Profile		QA Subscription	<a href="#">Edit Credentials</a>
Credentials	Account ID	Marketplace Subscription	

#### Additional AWS credentials

If you want to launch Cloud Volumes ONTAP in different AWS accounts, then you can either [provide AWS keys for an IAM user 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 would then [add the account credentials to Cloud Manager](#) by specifying the Amazon Resource Name (ARN) of the IAM role, or the AWS keys for the IAM user.

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

## Edit Account & Add Subscription

---

**Credentials**

Keys | Account ID: XXXXXXXXXX

Instance Profile | Account ID: XXXXXXXXXX

● QA Subscription

### Associate Subscription to Credentials

To create a pay-as-you-go Cloud Volumes ONTAP system, you need to select AWS credentials that are associated with a subscription to Cloud Volumes ONTAP from the AWS Marketplace.

+ [Add Subscription](#)

Apply

Cancel

## What about Marketplace deployments and on-prem deployments?

The sections above describe the recommended deployment method for the Connector, which is from Cloud Manager. You can also deploy a Connector in AWS from the [AWS 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 IAM role, and then provide permissions for any additional accounts.

For on-premises deployments, you can't set up an IAM role for the Cloud Manager system, but you can provide permissions just like you would for additional AWS accounts.

## How can I securely rotate my AWS credentials?

As described above, Cloud Manager enables you to provide AWS credentials in a few ways: an IAM role associated with the Connector instance, by assuming an IAM role in a trusted account, or by providing AWS access keys.

With the first two options, Cloud Manager uses the AWS Security Token Service to obtain temporary credentials that rotate constantly. This process is the best practice—it's automatic and it's secure.

If you provide Cloud Manager with AWS access keys, you should rotate the keys by updating them in Cloud Manager at a regular interval. This is a completely manual process.

## Managing AWS credentials and subscriptions for Cloud Manager

When you create a Cloud Volumes ONTAP system, you need to select the AWS credentials and subscription to use with that system. If you manage multiple AWS subscriptions, you can assign each one of them to different AWS credentials from the Credentials page.

Before you add AWS credentials to Cloud Manager, you need to provide the required permissions to that account. The permissions enable Cloud Manager to manage resources and processes within that AWS account. How you provide the permissions depends on whether you want to provide Cloud Manager with AWS keys or the ARN of a role in a trusted account.



When you deployed a Connector from Cloud Manager, Cloud Manager automatically added AWS credentials for the account in which you deployed the Connector. This initial account is not added if you manually installed the Connector software on an existing system. [Learn about AWS credentials and permissions](#).

### Choices

- [Granting permissions by providing AWS keys](#)
- [Granting permissions by assuming IAM roles in other accounts](#)

## How can I securely rotate my AWS credentials?

Cloud Manager enables you to provide AWS credentials in a few ways: an IAM role associated with the Connector 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, Cloud Manager uses the AWS Security Token Service to obtain temporary credentials that rotate constantly. This process is the best practice, it's automatic and it's secure.

If you provide Cloud Manager with AWS access keys, you should rotate the keys by updating them in Cloud Manager at a regular interval. This is a completely manual process.

### Granting permissions by providing AWS keys

If you want to provide Cloud Manager with AWS keys for an IAM user, then you need to grant the required permissions to that user. The Cloud Manager IAM policy defines the AWS actions and resources that Cloud Manager is allowed to use.

#### Steps

1. Download the Cloud Manager IAM policy from the [Cloud Manager Policies](#) page.
2. From the IAM console, create your own policy by copying and pasting the text from the Cloud Manager IAM policy.

[AWS Documentation: Creating IAM Policies](#)

3. Attach the policy to an IAM role or an IAM user.
  - [AWS Documentation: Creating IAM Roles](#)
  - [AWS Documentation: Adding and Removing IAM Policies](#)

#### Result

The account now has the required permissions. [You can now add it to Cloud Manager.](#)

### Granting permissions by assuming IAM roles in other accounts

You can set up a trust relationship between the source AWS account in which you deployed the Connector instance and other AWS accounts by using IAM roles. You would then provide Cloud Manager with the ARN of the IAM roles from the trusted accounts.

#### Steps

1. Go to the target account where you want to deploy Cloud Volumes ONTAP and create an IAM role by selecting **Another AWS account**.

Be sure to do the following:

- Enter the ID of the account where the Connector instance resides.
- Attach the Cloud Manager IAM policy, which is available from the [Cloud Manager Policies](#) page.

2. Go to the source account where the Connector instance resides and select the IAM role that is attached to the instance.

- a. Click **Attach policies** and then click **Create policy**.
- b. Create a policy that includes the "sts:AssumeRole" action and the ARN of the role that you created in the target account.

### Example

```
{
  "Version": "2012-10-17",
  "Statement": {
    "Effect": "Allow",
    "Action": "sts:AssumeRole",
    "Resource": "arn:aws:iam::ACCOUNT-B-ID:role/ACCOUNT-B-ROLENAME"
  }
}
```

### Result

The account now has the required permissions. [You can now add it to Cloud Manager](#).

### Adding AWS credentials to Cloud Manager

After you provide an AWS account with the required permissions, you can add the credentials for that account to Cloud Manager. This enables you to launch Cloud Volumes ONTAP systems in that account.

#### 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.

#### Steps

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



2. Click **Add Credentials** and select **AWS**.
3. Provide AWS keys or the ARN of a trusted IAM role.
4. Confirm that the policy requirements have been met and click **Continue**.
5. Choose the subscription that you want to associate with the credentials, or click **Add Subscription** if you don't have one yet.

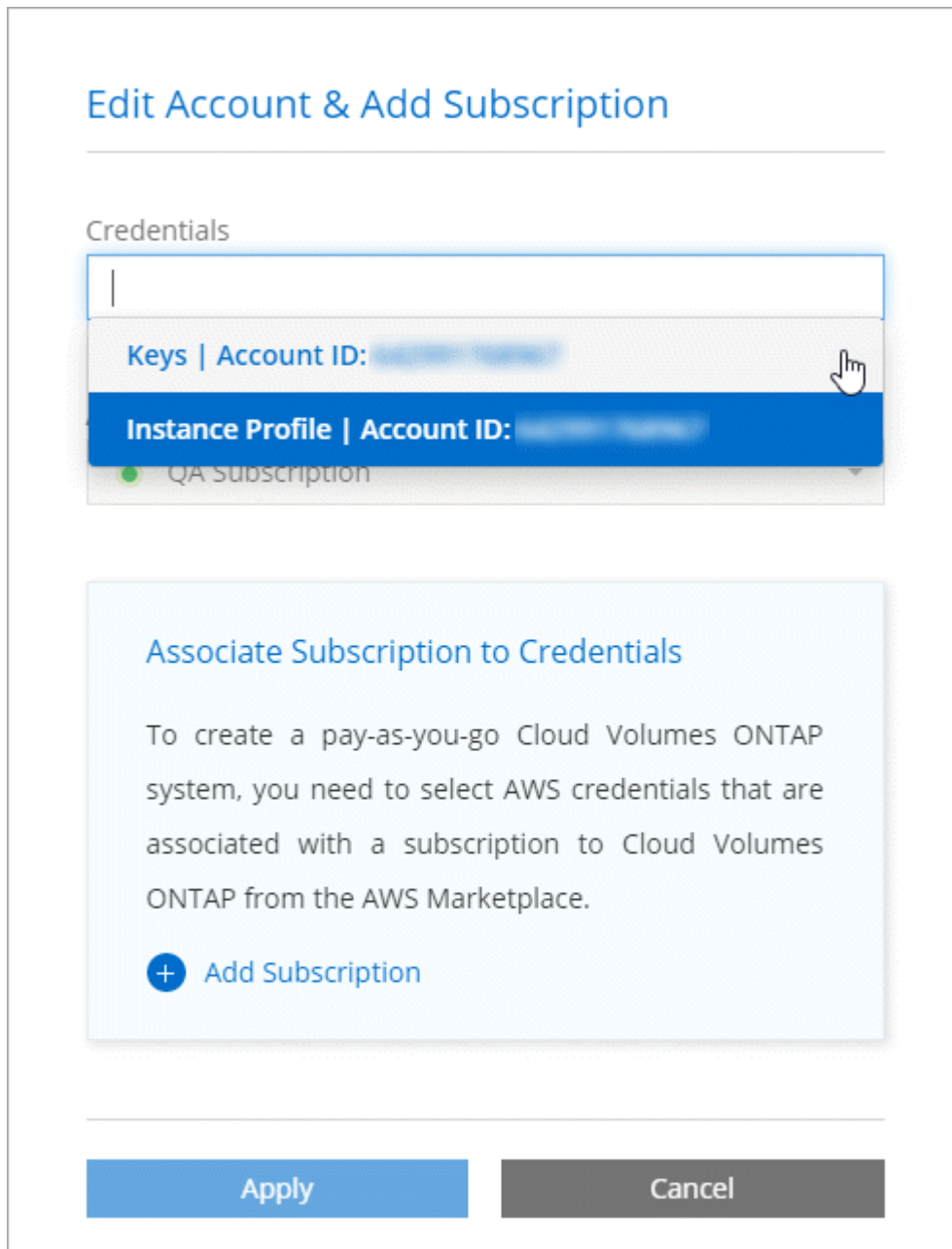
To pay for Cloud Volumes ONTAP at an hourly rate (PAYGO) or with an annual contract, AWS credentials must be associated with a subscription to Cloud Volumes ONTAP from the AWS Marketplace.

6. Click **Add**.

### Result

You can now switch to a different set of credentials from the Details and Credentials page when creating a new

working environment:



### Associating an AWS subscription to credentials

After you add your AWS credentials to Cloud Manager, you can associate an AWS Marketplace subscription with those credentials. The subscription enables you to pay for Cloud Volumes ONTAP at an hourly rate (PAYGO) or using an annual contract, and to use other NetApp cloud services.

There are two scenarios in which you might associate an AWS 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 AWS Marketplace subscription with a new subscription.

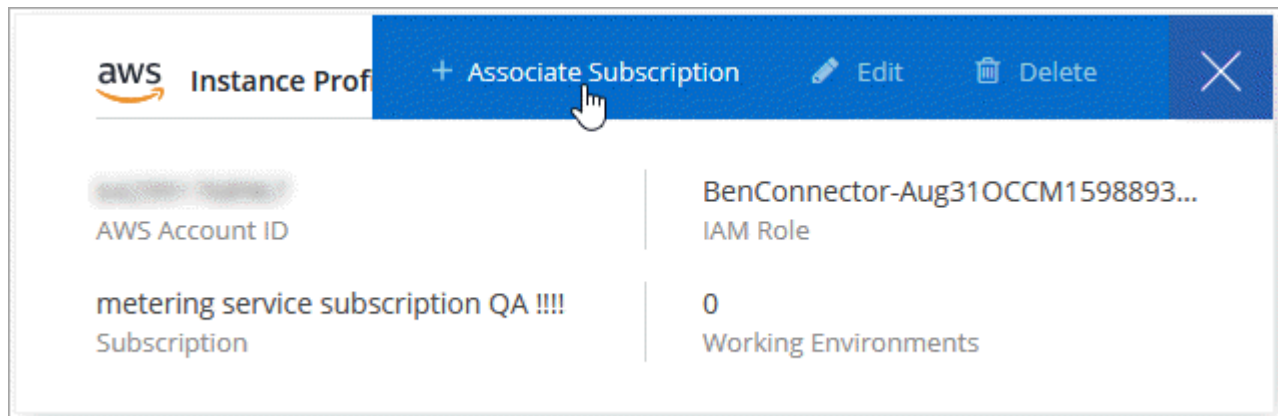
### What you'll need

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.

► [https://docs.netapp.com/us-en/occm//media/video\\_subscribing\\_aws.mp4](https://docs.netapp.com/us-en/occm//media/video_subscribing_aws.mp4) (video)

## Azure

### Azure credentials and permissions

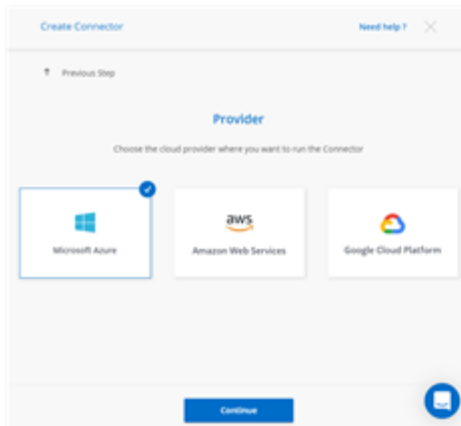
Cloud Manager enables you to choose the Azure credentials to use when deploying Cloud Volumes ONTAP. You can deploy all of your Cloud Volumes ONTAP systems using the initial Azure credentials, or you can add additional credentials.

#### Initial Azure credentials

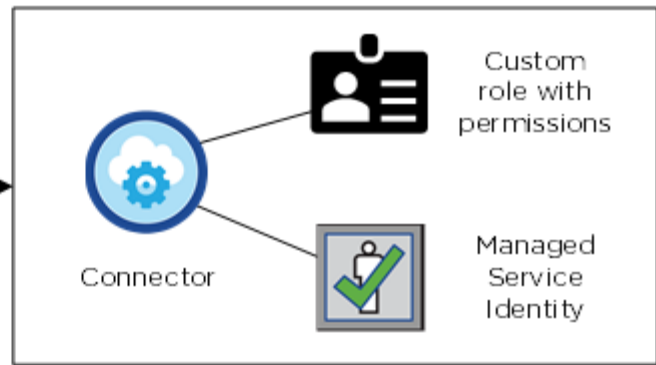
When you deploy a Connector from Cloud Manager, you need to use an Azure account that has permissions to deploy the Connector virtual machine. The required permissions are listed in the [Connector deployment policy for Azure](#).

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



## Azure account



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	<span style="color: orange;">ⓘ</span> No subscription is associated	<a href="#">Edit Credentials</a>
Credential Name	Azure Subscription	Marketplace Subscription	

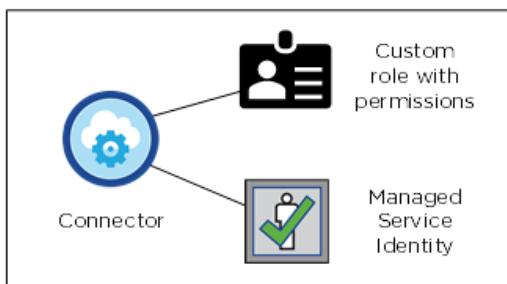
### Additional Azure subscriptions for a managed identity

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](#).

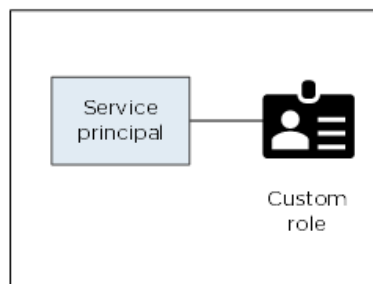
### Additional Azure credentials

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:

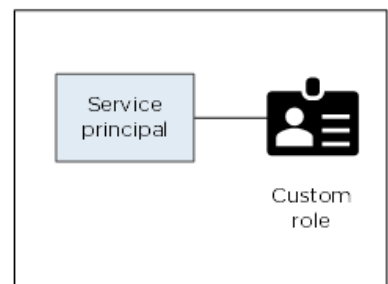
Initial Azure account



Second account



Third account



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:

## Edit Account & Add Subscription

### Credentials

cloud-manager-app | Application ID: 57c42424-88a0-480a-  
**Managed Service Identity**  
OCCM QA1 (Default) ▼

### 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.](#)

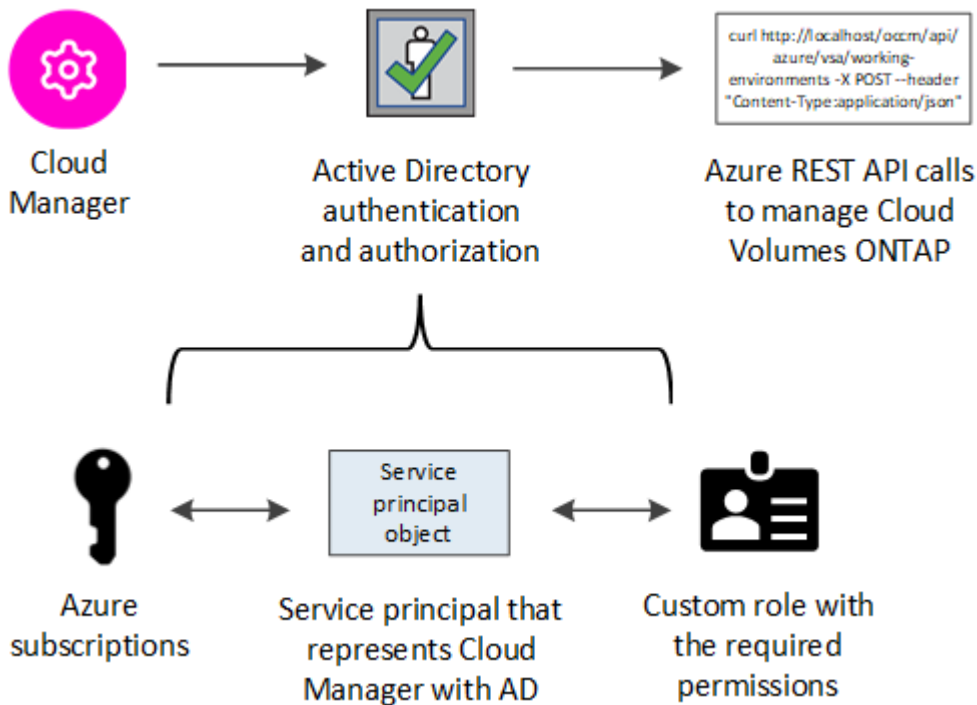
If you want to deploy Cloud Volumes ONTAP using *different* Azure credentials, then you must grant the required permissions by creating and setting up a service principal in Azure Active Directory for each Azure account. You can then add the new credentials to Cloud Manager.

### 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

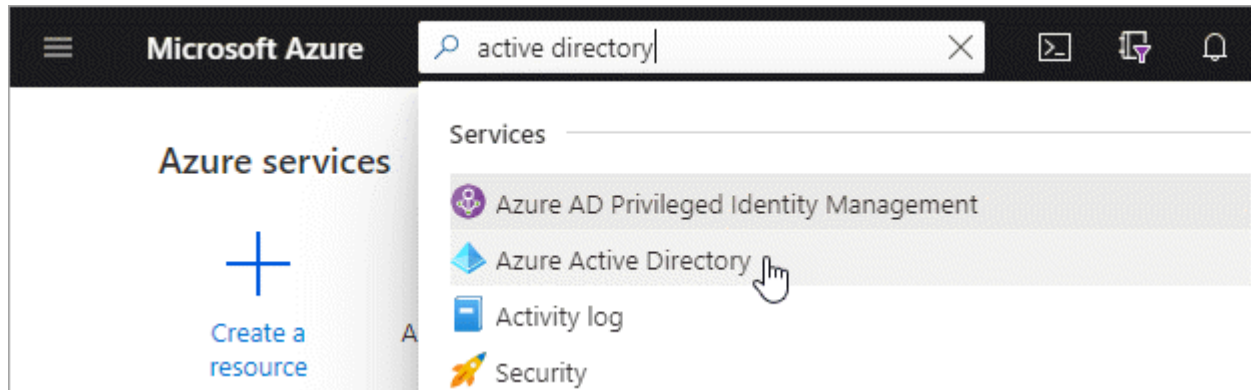
Create an Azure Active Directory (AD) application and service principal that Cloud Manager can use for role-based access control.

## 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. Create a custom role:
  - a. Download the [Cloud Manager Azure policy](#).
  - 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 example shows how to create a custom role using the Azure CLI 2.0:

```
az role definition create --role-definition  
C:\Policy_for_cloud_Manager_Azure_3.9.8.json
```

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

2. 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:

The screenshot shows the 'Add role assignment' dialog box. It has a title bar with a close button. Below the title bar, there are three dropdown menus. The first is labeled 'Role' and has 'OnCommand Cloud Manager Operator' selected. The second is labeled 'Assign access to' and has 'Azure AD user, group, or service principal' selected. The third is labeled 'Select' and has 'test-service-principal' selected with a green checkmark. Below the dropdowns, there is a search bar with 'test-service-principal' entered and a green checkmark. A hand cursor is pointing at the search bar.

- 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

<b>Microsoft Graph</b> 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. 		
 <b>Azure Batch</b> Schedule large-scale parallel and HPC applications in the cloud	 <b>Azure Data Catalog</b> Programmatic access to Data Catalog resources to register, annotate and search data assets	 <b>Azure Data Explorer</b> Perform ad-hoc queries on terabytes of data to build near real-time and complex analytics solutions
 <b>Azure Data Lake</b> Access to storage and compute for big data analytic scenarios	 <b>Azure DevOps</b> Integrate with Azure DevOps and Azure DevOps server	 <b>Azure Import/Export</b> Programmatic control of import/export jobs
 <b>Azure Key Vault</b> Manage your key vaults as well as the keys, secrets, and certificates within your Key Vaults	 <b>Azure Rights Management Services</b> Allow validated users to read and write protected content	 <b>Azure Service Management</b> Programmatic access to much of the functionality available through the Azure portal
 <b>Azure Storage</b> Secure, massively scalable object and data lake storage for unstructured and semi-structured data	 <b>Customer Insights</b> Create profile and interaction models for your products	 <b>Data Export Service for Microsoft Dynamics 365</b> 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](#)

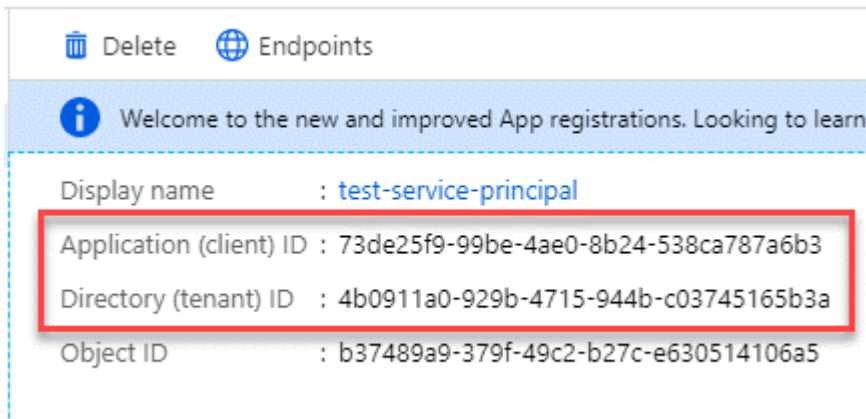
PERMISSION	ADMIN CONSENT REQUIRED
<input checked="" type="checkbox"/> <b>user_impersonation</b> Access Azure Service Management as organization users (preview) 	-

## 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**.



The screenshot shows the 'Endpoints' tab of an Azure Active Directory application registration. A red box highlights the 'Application (client) ID' and 'Directory (tenant) ID' fields. The 'Display name' is 'test-service-principal' and the 'Object ID' is 'b37489a9-379f-49c2-b27c-e630514106a5'.

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

## 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.

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](#).

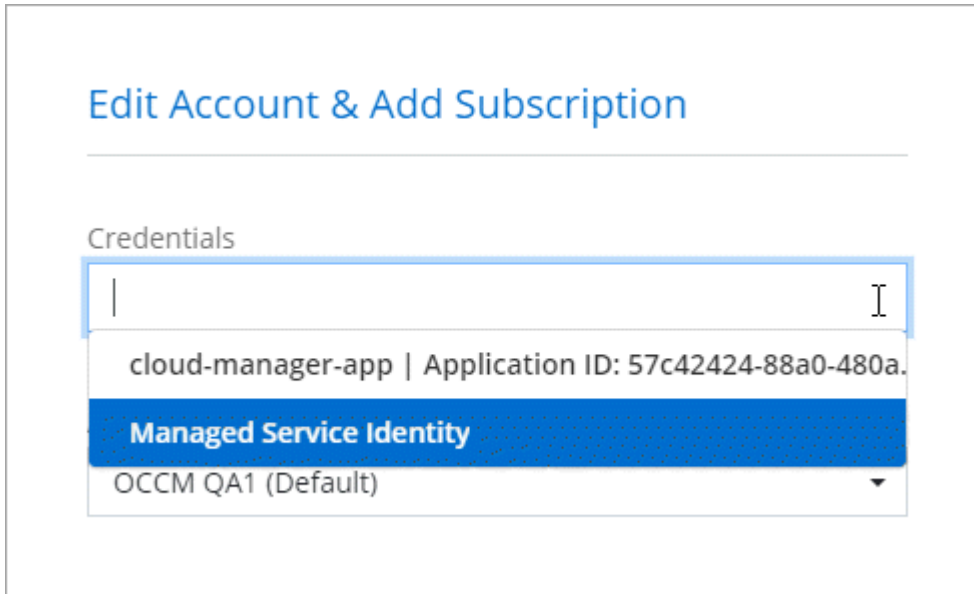
4. Confirm that the policy requirements have been met and then click **Continue**.
5. Choose the pay-as-you-go subscription that you want to associate with the credentials, or click **Add Subscription** if you don't have one yet.

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:

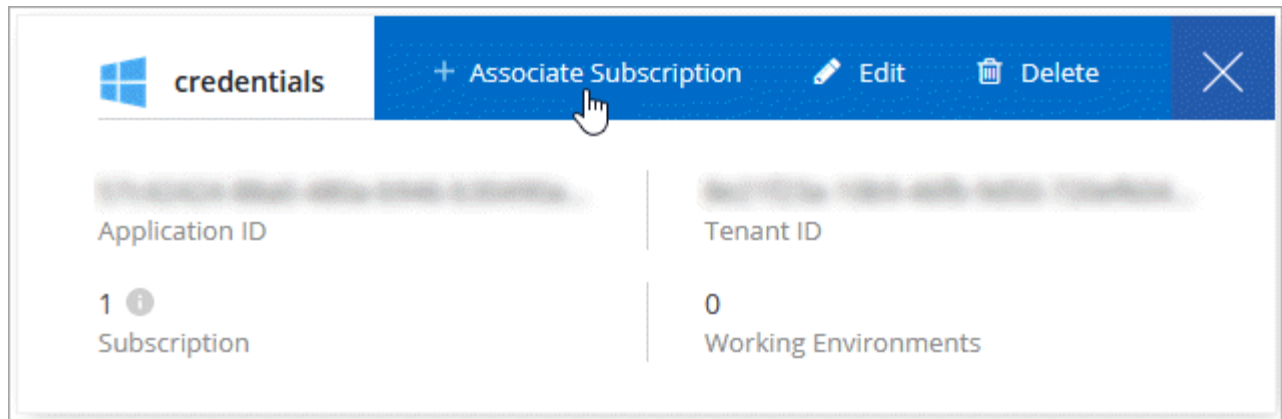
- You didn't associate a subscription when you initially added the credentials to Cloud Manager.
- You want to replace an existing Azure Marketplace subscription with a new subscription.

## 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](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.



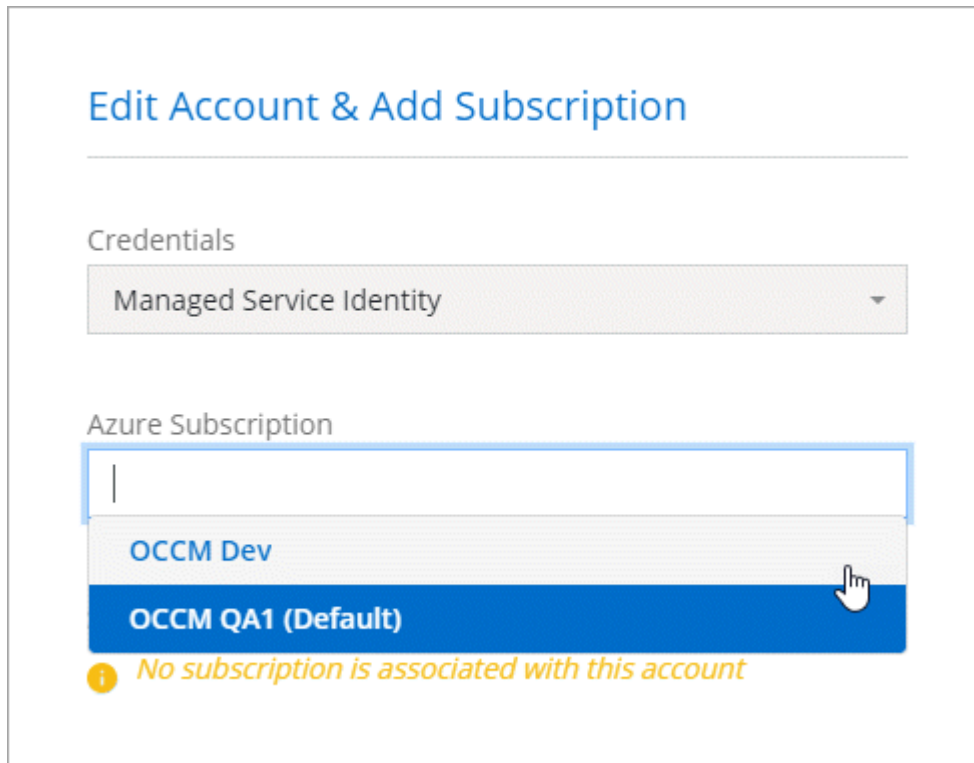
Cloud Manager Operator is the default name provided in the [Cloud Manager policy](#). If you chose a different name for the role, then select that name instead.

- 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.



## GCP

### Google Cloud projects, permissions, and accounts

A service account provides Cloud Manager with permissions to deploy and manage Cloud Volumes ONTAP systems that are in the same project as the Connector, or in different projects.

#### Project and permissions for Cloud Manager

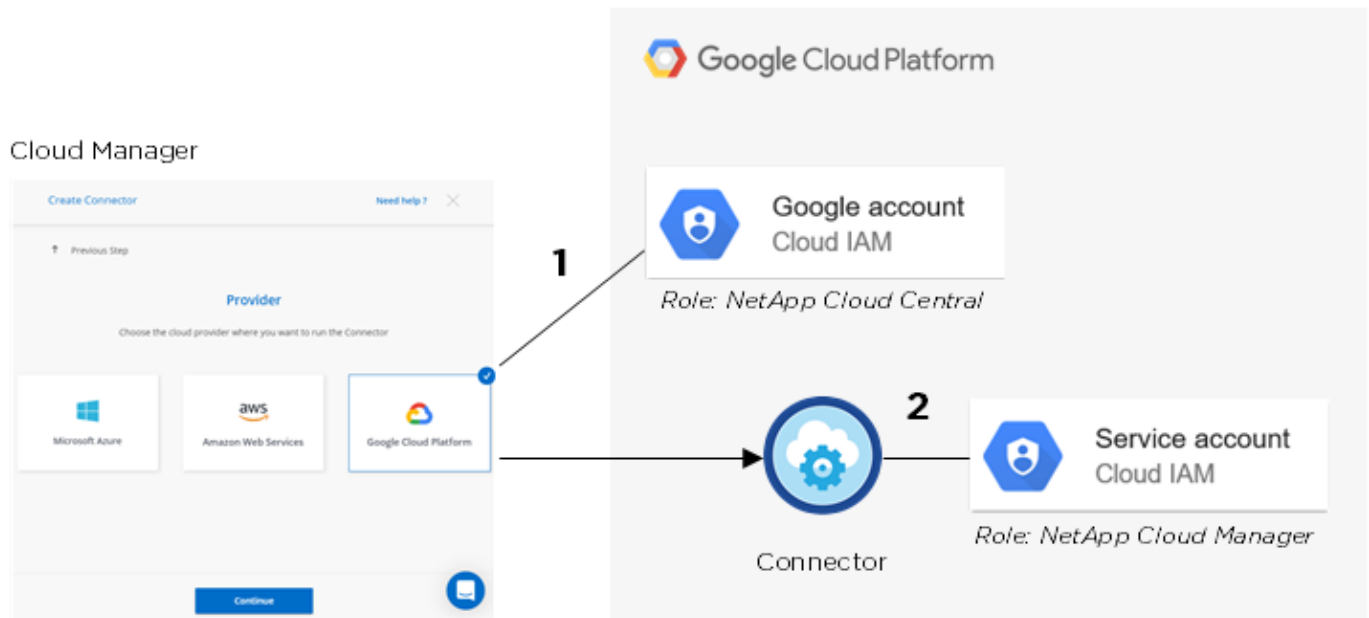
Before you can deploy Cloud Volumes ONTAP in Google Cloud, you must first deploy a Connector in a Google Cloud project. The Connector can't be running on your premises, or in a different cloud provider.

Two sets of permissions must be in place before you deploy a Connector directly from Cloud Manager:

1. You need to deploy a Connector using a Google account that has permissions to launch the Connector VM instance from Cloud Manager.
2. When deploying the Connector, you are prompted to select a [service account](#) for the VM instance. Cloud Manager gets permissions from the service account to create and manage Cloud Volumes ONTAP systems on your behalf. Permissions are provided by attaching a custom role to the service account.

We have set up two YAML files that include the required permissions for the user and the service account. [Learn how to use the YAML files to set up permissions.](#)

The following image depicts the permission requirements described in numbers 1 and 2 above:



## Project for Cloud Volumes ONTAP

Cloud Volumes ONTAP can reside in the same project as the Connector, or in a different project. To deploy Cloud Volumes ONTAP in a different project, you need to first add the Connector service account and role to that project.

- [Learn how to set up service account \(see step 2\).](#)
- [Learn how to deploy Cloud Volumes ONTAP in GCP and select a project.](#)

## Account for data tiering



Cloud Manager requires a GCP account for Cloud Volumes ONTAP 9.6, but not for 9.7 and later. If you want to use data tiering with Cloud Volumes ONTAP 9.7 or later, then follow step 4 in [Getting started with Cloud Volumes ONTAP in Google Cloud Platform](#).

Adding a Google Cloud account to Cloud Manager is required to enable data tiering on a Cloud Volumes ONTAP 9.6 system. Data tiering automatically tiers cold data to low-cost object storage, enabling you to reclaim space on your primary storage and shrink secondary storage.

When you add the account, you need to provide Cloud Manager with a storage access key for a service account that has Storage Admin permissions. Cloud Manager uses the access keys to set up and manage a Cloud Storage bucket for data tiering.

After you add a Google Cloud account, you can then enable data tiering on individual volumes when you create, modify, or replicate them.

- [Learn how to set up and add GCP accounts to Cloud Manager.](#)
- [Learn how to tier inactive data to low-cost object storage.](#)

## Managing GCP credentials and subscriptions for Cloud Manager

You can manage two types of Google Cloud Platform credentials from Cloud Manager: the credentials that are associated with the Connector VM instance and storage access

keys used with a Cloud Volumes ONTAP 9.6 system for [data tiering](#).

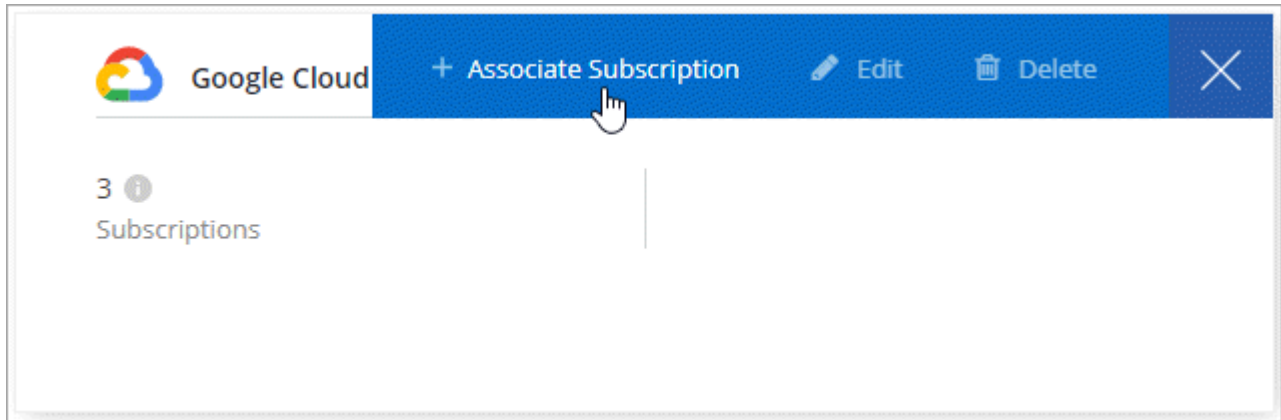
### Associating a Marketplace subscription with GCP credentials

When you deploy a Connector in GCP, Cloud Manager creates a default set of credentials that are associated with the Connector VM instance. These are the credentials that Cloud Manager uses to deploy Cloud Volumes ONTAP.

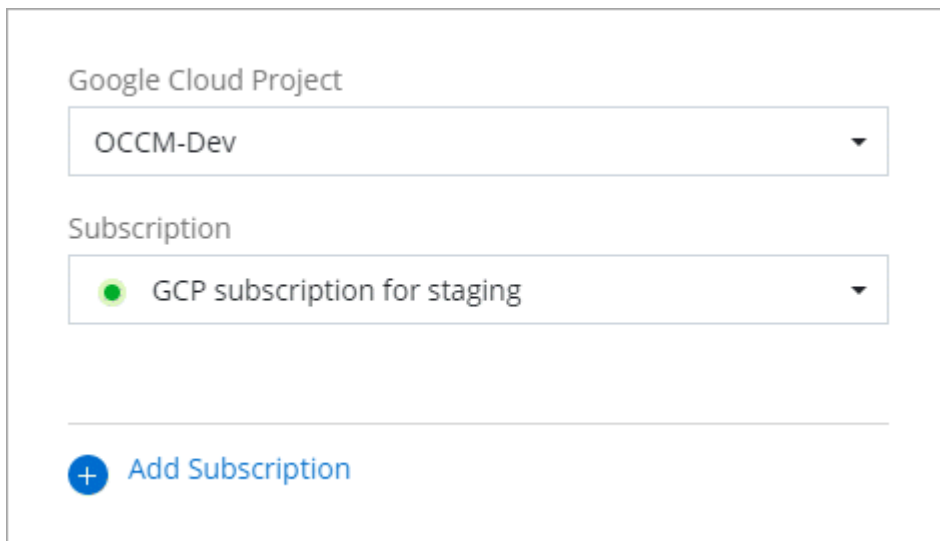
At any time, you can change the Marketplace subscription that's associated with these credentials. The subscription enables you to create a pay-as-you-go Cloud Volumes ONTAP system, and to use other NetApp cloud services.

#### 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 Google Cloud project and subscription from the down-down list or click **Add Subscription** and follow the steps to create a new subscription.



5. Click **Associate**.

## Setting up and adding GCP accounts for data tiering with Cloud Volumes ONTAP 9.6

If you want to enable a Cloud Volumes ONTAP 9.6 system for [data tiering](#), you need to provide Cloud Manager with a storage access key for a service account that has Storage Admin permissions. Cloud Manager uses the access keys to set up and manage a Cloud Storage bucket for data tiering.



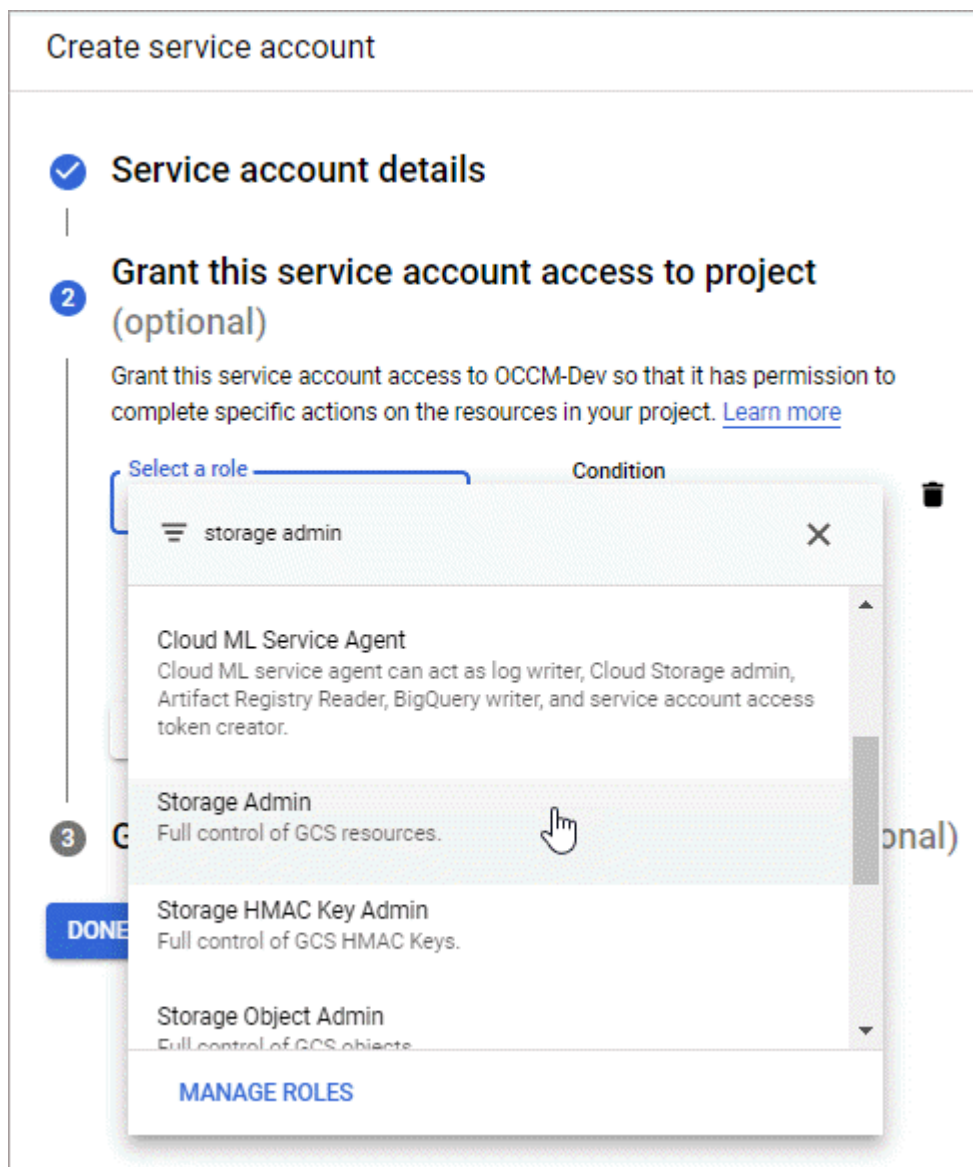
If you want to use data tiering with Cloud Volumes ONTAP 9.7 or later, then follow step 4 in [Getting started with Cloud Volumes ONTAP in Google Cloud Platform](#).

### Setting up a service account and access keys for Google Cloud Storage

A service account enables Cloud Manager to authenticate and access Cloud Storage buckets used for data tiering. The keys are required so that Google Cloud Storage knows who is making the request.

#### Steps

1. Open the GCP IAM console and [create a service account that has the Storage Admin role](#).



2. Go to [GCP Storage Settings](#).

3. If you're prompted, select a project.
4. Click the **Interoperability** tab.
5. If you haven't already done so, click **Enable interoperability access**.
6. Under **Access keys for service accounts**, click **Create a key for a service account**.
7. Select the service account that you created in step 1.

## Select a service account

Email	Name	Keys
<input checked="" type="radio"/> data-tiering-for-netapp@top-monitor-250116.iam.gserviceaccount.com	data tiering for netapp	—

CANCEL
CREATE KEY
| CREATE NEW ACCOUNT

8. Click **Create Key**.
9. Copy the access key and secret.

You'll need to enter this information in Cloud Manager when you add the GCP account for data tiering.

### Adding a GCP account to Cloud Manager

Now that you have an access key for a service account, you can add it 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 **Google Cloud**.
3. Enter the access key and secret for the service account.

The keys enable Cloud Manager to set up a Cloud Storage bucket for data tiering.

4. Confirm that the policy requirements have been met and then click **Create Account**.

#### What's next?

You can now enable data tiering on individual volumes on a Cloud Volumes ONTAP 9.6 system when you create, modify, or replicate them. For details, see [Tiering inactive data to low-cost object storage](#).



But before you do, be sure that the subnet in which Cloud Volumes ONTAP resides is configured for Private Google Access. For instructions, refer to [Google Cloud Documentation: Configuring Private Google Access](#).

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