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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:

<table>
<thead>
<tr>
<th>Managed Service Identity</th>
<th>OCCM QA1</th>
<th>No subscription is associated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credential Name</td>
<td>Azure Subscription</td>
<td>Marketplace Subscription</td>
</tr>
</tbody>
</table>

[Image: Diagram showing the flow from Cloud Manager to Azure account, with labels for Managed Identity, Custom role with permissions, and Connector]
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:

```
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.

Setting up and adding Azure credentials to Cloud Manager

There are two ways to manage Azure credentials in Cloud Manager. First, if you want to deploy Cloud Volumes ONTAP in different Azure accounts, 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.

When you deploy a Connector from Cloud Manager, Cloud Manager automatically adds the Azure account in which you deployed the Connector. An initial account is not added if you manually installed the Connector software on an existing system. Learn about Azure accounts and permissions.

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.
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**: Select **Web** and then enter any URL—for example, https://url

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](https://example.com).
   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**

      ```json
      "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_3.8.7.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).
   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**.

4. Click **Access Azure Service Management as organization users** and then click **Add permissions**.
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.

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 Azure 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. This enables you to launch Cloud Volumes ONTAP systems in that account.

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

**Result**

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

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**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.

### Edit Account & Add Subscription

**Credentials**

- Managed Service Identity

**Azure Subscription**

- OCCM Dev
- **OCCM QA1 (Default)**

*No subscription is associated with this account*
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