Get started with standard mode

Setup and administration

NetApp
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Get started with standard mode

Getting started workflow (standard mode)

Get started with BlueXP in standard mode by preparing networking for the BlueXP console, signing up and creating an account, optionally creating a Connector, and subscribing to BlueXP.

In standard mode, BlueXP is accessible to users as a cloud service from the web-based console. Before you get started, you should have an understanding of BlueXP accounts, Connectors, and deployment modes.

1 Prepare networking for using the BlueXP console

Computers that access the BlueXP console should have connections to specific endpoints to complete a few administrative tasks. If your network restricts outbound access, you should ensure that these endpoints are allowed.

2 Sign up and create an account

Go to the BlueXP console and sign up. You'll be given the option to create an account, but you can skip that step if you're being invited to an existing account.

At this point, you're logged in and can start using several BlueXP services like Digital Advisor, Amazon FSx for ONTAP, Azure NetApp Files, and more. Learn what you can do without a Connector.

3 Create a Connector

You don't need a Connector to get started with BlueXP, but you can create a Connector to unlock all BlueXP features and services. The Connector is NetApp software that enables BlueXP to manage resources and processes within your hybrid cloud environment.

A BlueXP Account Admin can create a Connector in your cloud or on-premises network.

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

Note that if you want to use BlueXP services to manage storage and data in Google Cloud, then the Connector must be running in Google Cloud.

4 Subscribe to BlueXP

Subscribe to BlueXP from your cloud provider's marketplace to pay for BlueXP services at an hourly rate (PAYGO) or through an annual contract.

Prepare networking for using the BlueXP console

As you use the BlueXP web-based console that's provided through the SaaS layer, it contacts several endpoints when completing a few administrative tasks. Computers that access the BlueXP console should have connections to these endpoints.

These endpoints are contacted from a user's computer when completing specific actions from the BlueXP console. You should also refer to networking requirements for the Connector and for specific BlueXP services. For details, refer to the related links at the end of this page.

Endpoints	Purpose
https://console.bluexp.netapp.com https://*.console.bluexp.netapp.com	Your web browser contacts these URLs when you use the BlueXP web-based console.
https://aiq.netapp.com	Required to access BlueXP digital advisor.
AWS services (amazonaws.com): • CloudFormation • Elastic Compute Cloud (EC2) • Key Management Service (KMS) • Security Token Service (STS) • Simple Storage Service (S3)	Required to deploy a Connector from BlueXP in AWS. The exact endpoint depends on the region in which you deploy the Connector. Refer to AWS documentation for details.
https://management.azure.com https://login.microsoftonline.com	Required to deploy a Connector from BlueXP in most Azure regions.
https://management.microsoftazure.de https://login.microsoftonline.de	Required to deploy a Connector from BlueXP in Azure Germany regions.
https://management.usgovcloudapi.net https://login.microsoftonline.com	Required to deploy a Connector from BlueXP in Azure US Gov regions.
https://www.googleapis.com	Required to deploy a Connector from BlueXP in Google Cloud.
https://signin.b2c.netapp.com	Required to update NetApp Support Site (NSS) credentials or to add new NSS credentials to BlueXP.
https://netapp-cloud-account.auth0.com https://cdn.auth0.com https://services.cloud.netapp.com	Your web browser connects to these endpoints for centralized user authentication through BlueXP.
https://widget.intercom.io	For in-product chat that enables you to talk to NetApp cloud experts.

Beyond these endpoints, you also need to ensure that the Connector has outbound internet access to contact specific endpoints for day-to-day operations. You can find the list of these endpoints by following the links in

the next section below.

Related links

- Prepare networking for the Connector
  - Set up AWS networking
  - Set up Azure networking
  - Set up Google Cloud networking
  - Set up on-prem networking
- Prepare networking for BlueXP services

  Refer to the documentation for each BlueXP service.

  BlueXP documentation

Sign up to BlueXP

BlueXP is accessible from a web-based console. When you get started with BlueXP, your first step is to sign up using your existing NetApp Support Site credentials or by creating a NetApp cloud login.

About this task

You can sign up to BlueXP using one of the following options:

- Your existing NetApp Support Site (NSS) credentials
- A NetApp cloud login by specifying your email address and a password

Both options support a federated connection, which enables single sign-on using credentials from your corporate directory (federated identity). You can set up a federation connection after you sign up. Learn how to use identity federation with BlueXP.

Steps

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

   You can skip the sign up page if you have an NSS account. BlueXP will sign you up as part of this initial login.

3. If you don’t have an NSS account and you want to sign up by creating a NetApp cloud login, select **Sign up**.
4. On the **Sign up** page, enter the required information to create a NetApp cloud login.

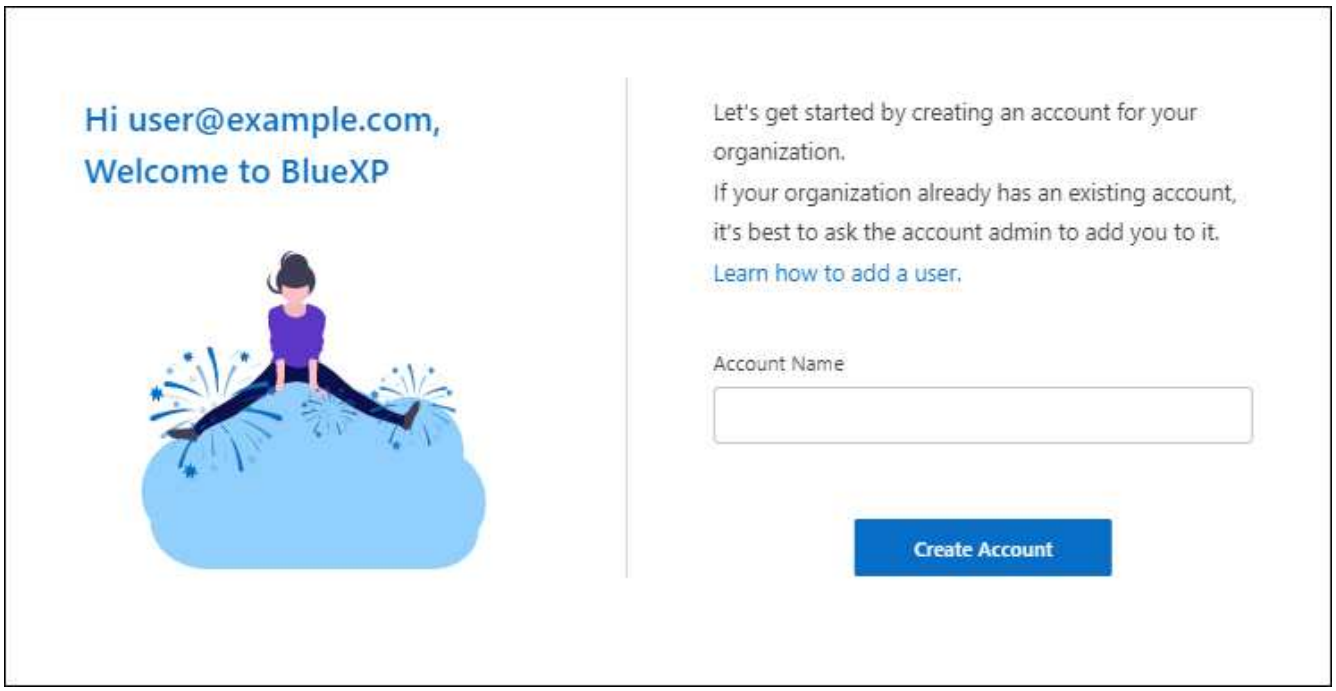
   Note that only English characters are allowed in the sign up form.

5. When prompted, review the End User License Agreement and accept the terms.
6. On the **Welcome** page, enter a name for your account.

   If your business already has an account and you want to join it, then you should close out of BlueXP and ask the owner to associate you with the account. After the owner adds you, you can log in and you’ll have

access to the account. Learn how to add members to an existing account.

An account is the top-level element in NetApp's identity platform. It enables you to add and manage users, roles, permissions, and working environments.



7. Select **Create Account**.

Result

You now have a BlueXP login and an account. In most cases, the next step is to create a Connector, which connects BlueXP's services to your hybrid cloud environment.

Create a Connector

AWS

Connector installation options in AWS

There are a few different ways to create a Connector in AWS. Directly from BlueXP is the most common way.

The following installation options are available:

- Create the Connector directly from BlueXP (this is the standard option)

  This action launches an EC2 instance running Linux and the Connector software in a VPC of your choice.

- Create a Connector from the AWS Marketplace

  This action also launches an EC2 instance running Linux and the Connector software, but the deployment is initiated directly from the AWS Marketplace, rather than from BlueXP.

- 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 BlueXP with the required permissions that it needs to authenticate and manage resources in AWS.

Create a Connector in AWS from BlueXP

To create a Connector in AWS from BlueXP, you need to set up your networking, prepare AWS permissions, and then create the Connector.

Before you begin

You should review Connector limitations.

Step 1: Set up networking

Ensure that the network location where you plan to install the Connector supports the following requirements. Meeting these requirements enables the Connector to manage resources and processes within your hybrid cloud environment.

VPC and subnet

When you create the Connector, you need to specify the VPC and subnet where the Connector should reside.

Connections to target networks

A Connector requires a network connection to the location where you're planning to create and manage working environments. 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 Connector must have an outbound internet connection to contact specific endpoints.

Endpoints contacted from the Connector

The Connector requires outbound internet access to contact the following endpoints in order to manage resources and processes within your public cloud environment for day-to-day operations.

Note that 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 resources in AWS. The exact endpoint depends on the AWS region that you're using. Refer to AWS documentation for details
https://support.netapp.com https://mysupport.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support.

Endpoints	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	To provide SaaS features and services within BlueXP. Note that the Connector is currently contacting "cloudmanager.cloud.netapp.com" but it will start contacting "api.bluexp.netapp.com" in an upcoming release.
https://*.blob.core.windows.net https://cloudmanagerinfraprod.azurecr.io	To upgrade the Connector and its Docker components.

Endpoints contacted from the BlueXP console

As you use the BlueXP web-based 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 Connector from the BlueXP console.

View the list of endpoints contacted from the BlueXP console.

Proxy server

If your organization requires deployment of a proxy server for all outgoing internet traffic, obtain the following information about your HTTP or HTTPS proxy. You'll need to provide this information during installation.

- IP address
- Credentials
- HTTPS certificate

Note that BlueXP does not support transparent proxy servers.

Ports

There's no incoming traffic to the Connector, unless you initiate it or if the Connector 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, BlueXP automatically configures those systems to use a proxy server that's included with the Connector. The only requirement is to ensure that the Connector's security group allows inbound connections over port 3128. You'll need to open this port after you deploy the Connector.

Enable NTP

If you're planning to use BlueXP classification to scan your corporate data sources, you should enable a Network Time Protocol (NTP) service on both the BlueXP Connector system and the BlueXP classification

system so that the time is synchronized between the systems. Learn more about BlueXP classification

You'll need to implement this networking requirement after you create the Connector.

Step 2: Set up AWS permissions

BlueXP needs to authenticate with AWS before it can deploy the Connector instance in your VPC. You can choose one of these authentication methods:

- Let BlueXP 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 Connector instance in AWS from BlueXP.

If needed, you can restrict the IAM policy by using the IAM `Condition` element. AWS documentation: Condition element

When BlueXP creates the Connector, it applies a new set of permissions to the Connector instance that enables the Connector to manage AWS resources.

Steps

1. Go to the AWS IAM console.
2. Select **Policies > Create policy**.
3. Select **JSON**.
4. Copy and paste the following policy:

   As a reminder, this policy contains only the permissions needed to launch the Connector instance in AWS from BlueXP. View permissions required for the Connector instance 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 BlueXP can assume or to an IAM user so that you can provide BlueXP with access keys:
   - (Option 1) Set up an IAM role that BlueXP 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 BlueXP 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 BlueXP when you create the Connector.
   - (Option 2) Set up permissions for an IAM user so that you can provide BlueXP 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 Connector from BlueXP, you can provide information about the role or access keys.

Step 3: Create the Connector

Create the Connector directly from the BlueXP web-based console.

About this task

Creating the Connector from BlueXP deploys an EC2 instance in AWS using a default configuration. After you create the Connector, you should not change to a smaller EC2 instance type that has less CPU or RAM. Learn about the default configuration for the Connector.

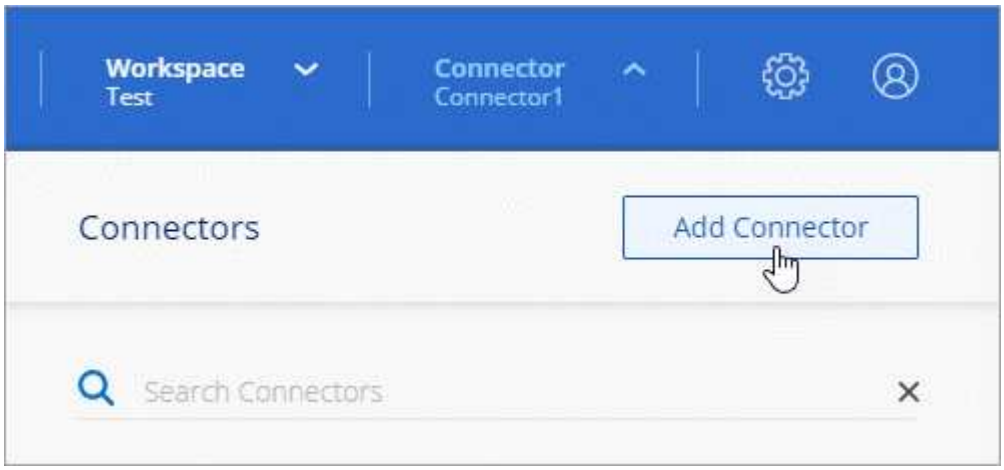
Before you begin

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 Connector.

Steps

1. Select the **Connector** drop-down and select **Add Connector**.



2. Choose **Amazon Web Services** as your cloud provider and select **Continue**.
3. On the **Deploying a Connector** 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 Connector:
   - **Get Ready**: Review what you'll need.
   - **AWS Credentials**: Specify your AWS region and then choose an authentication method, which is either an IAM role that BlueXP 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 Connector 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.

   - **Details**: Provide details about the Connector.
     - Enter a name for the instance.
     - Add custom tags (metadata) to the instance.
     - Choose whether you want BlueXP 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 Connector's EBS disks. You have the option to use the default encryption key or to use a custom key.

- **Network**: Specify a VPC, subnet, and key pair for the instance, choose whether to enable a public IP address, and optionally specify a proxy configuration.

  Make sure that you have the correct key pair to use with the Connector. Without a key pair, you will not be able to access the Connector virtual machine.

- **Security Group**: 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.

- **Review**: Review your selections to verify that your set up is correct.

5. Select **Add**.

   The instance should be ready in about 7 minutes. You should stay on the page until the process is complete.

Result

After the process is complete, the Connector is available for use from BlueXP.

If you have Amazon S3 buckets in the same AWS account where you created the Connector, you'll see an Amazon S3 working environment appear on the BlueXP canvas automatically. Learn how to manage S3 buckets from BlueXP

Create a Connector from the AWS Marketplace

To create a Connector from the AWS Marketplace, you need to set up your networking, prepare AWS permissions, review instance requirements, and then create the Connector.

Before you begin

You should review Connector limitations.

Step 1: Set up networking

Ensure that the network location where you plan to install the Connector supports the following requirements. Meeting these requirements enables the Connector to manage resources and processes within your hybrid cloud environment.

VPC and subnet

When you create the Connector, you need to specify the VPC and subnet where the Connector should reside.

Connections to target networks

A Connector requires a network connection to the location where you're planning to create and manage working environments. 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 Connector must have an outbound internet connection to contact specific endpoints.

Endpoints contacted from the Connector

The Connector requires outbound internet access to contact the following endpoints in order to manage resources and processes within your public cloud environment for day-to-day operations.

Note that 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 resources in AWS. The exact endpoint depends on the AWS region that you're using. Refer to AWS documentation for details
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	To provide SaaS features and services within BlueXP. Note that the Connector is currently contacting "cloudmanager.cloud.netapp.com" but it will start contacting "api.bluexp.netapp.com" in an upcoming release.
https://*.blob.core.windows.net https://cloudmanagerinfraprod.azurecr.io	To upgrade the Connector and its Docker components.

Proxy server

If your organization requires deployment of a proxy server for all outgoing internet traffic, obtain the following information about your HTTP or HTTPS proxy. You'll need to provide this information during installation.

- IP address
- Credentials
- HTTPS certificate

Note that BlueXP does not support transparent proxy servers.

Ports

There's no incoming traffic to the Connector, unless you initiate it or if the Connector 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, BlueXP automatically configures those systems to use a proxy server that's included with the Connector. The only requirement is to ensure that the Connector's security group allows inbound connections over port 3128. You'll need to open this port after you deploy the Connector.

Enable NTP

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

You'll need to implement this networking requirement after you create the Connector.

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 Connector from the AWS Marketplace, you'll be 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 Connector.
   c. Finish the remaining steps to create the policy.

      Depending on the BlueXP 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 Connector.
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 Connector, you need to choose an EC2 instance type that meets the following requirements.

CPU

4 cores or 4 vCPUs

RAM

14 GB

AWS EC2 instance type

An instance type that meets the CPU and RAM requirements above. We recommend t3.xlarge.

Step 4: Create the Connector

Create the Connector directly from the AWS Marketplace.

About this task

Creating the Connector from the AWS Marketplace deploys an EC2 instance in AWS using a default configuration. Learn about the default configuration for the Connector.

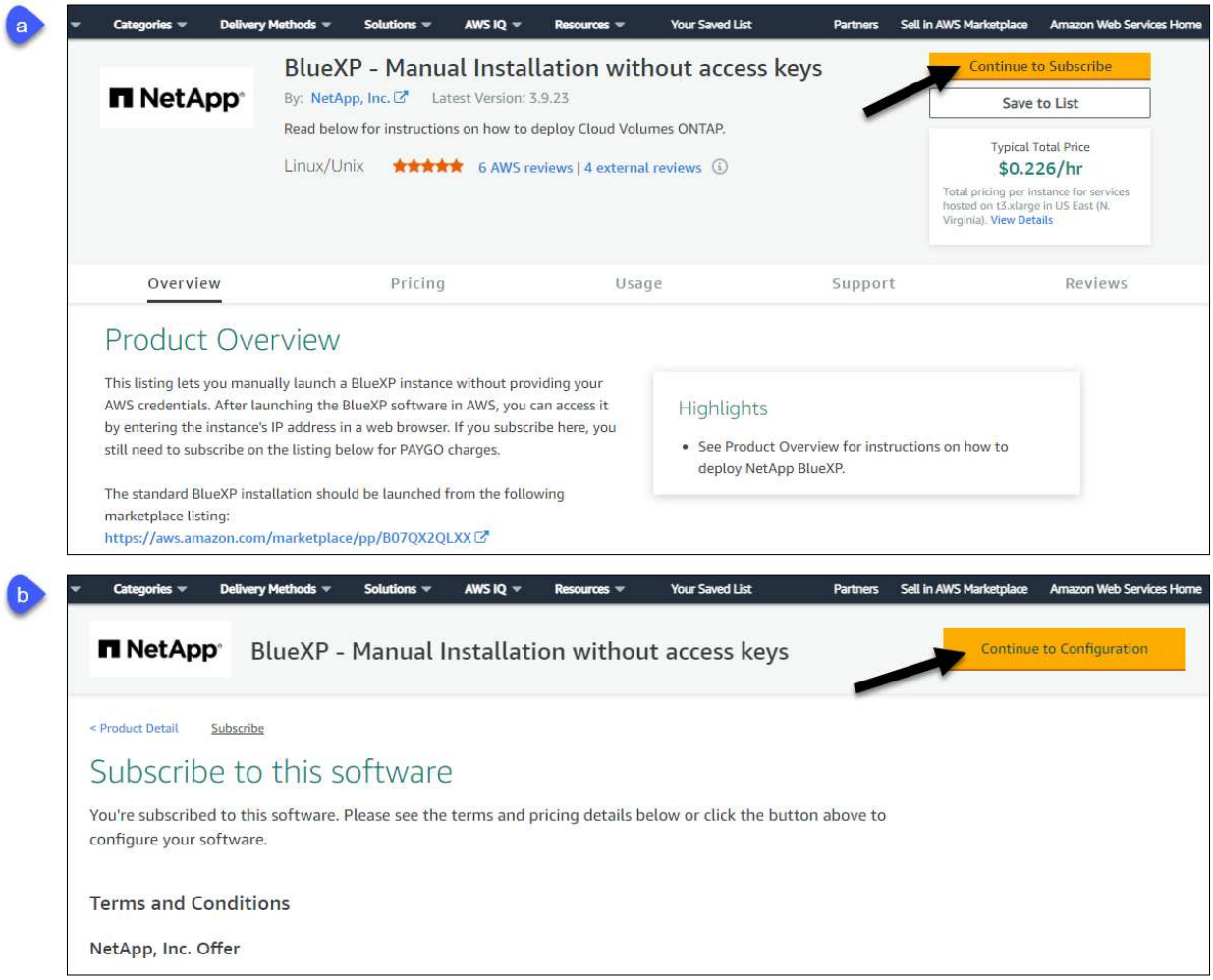
Before you begin

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 Connector.
- 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 BlueXP page on the AWS Marketplace
2. On the Marketplace page, select **Continue to Subscribe** and then select **Continue to Configuration**.



3. Change any of the default options and select **Continue to Launch**.
4. Under **Choose Action**, select **Launch through EC2** and then select **Launch**.

   These steps describe how to launch the instance from the EC2 Console because the console enables you to attach an IAM role to the Connector instance. This isn't possible using the **Launch from Website** action.

5. Follow the prompts to configure and deploy the instance:

   - **Name and tags**: Enter a name and tags for the instance.
   - **Application and OS Image**: Skip this section. The Connector AMI is already selected.
   - **Instance type**: Depending on region availability, choose an instance type that meets RAM and CPU requirements (t3.xlarge is 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 firewall settings that enable the required connection methods for the Connector instance: SSH, HTTP, and HTTPS.

       A few more rule are required for specific configurations.

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 Connector.
- **Summary**: Review the summary and select **Launch instance**.

AWS launches the software with the specified settings. The Connector instance and software should be running in approximately five minutes.

6. Open a web browser from a host that has a connection to the Connector virtual machine and enter the following URL:

   https://*ipaddress*

7. After you log in, set up the Connector:
   a. Specify the BlueXP account to associate with the Connector.
   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 BlueXP in standard mode. You should enable restricted mode only if you have a secure environment and want to disconnect this account from BlueXP backend services. If that's the case, follow steps to get started with BlueXP in restricted mode.

   d. Select **Let's start**.

Result

The Connector is now installed and set up with your BlueXP account.

Open a web browser and go to the BlueXP console to start using the Connector with BlueXP.

If you have Amazon S3 buckets in the same AWS account where you created the Connector, you'll see an Amazon S3 working environment appear on the BlueXP canvas automatically. Learn how to manage S3 buckets from BlueXP

Manually install the Connector in AWS

To manually install the Connector on your own Linux host, you need to review host requirements, set up your networking, prepare AWS permissions, install the Connector, and then provide the permissions that you prepared.

Before you begin

You should review Connector limitations.

Step 1: Review host requirements

The Connector software must run on a host that meets specific operating system requirements, RAM requirements, port requirements, and so on.

Dedicated host

The Connector is not supported on a host that is shared with other applications. The host must be a dedicated host.

Supported operating systems

- Ubuntu 22.04 LTS
- CentOS 7.6, 7.7, 7.8, and 7.9
- Red Hat Enterprise Linux 7.6, 7.7, 7.8, and 7.9

  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 Connector installation.

  The Connector is supported on English-language versions of these operating systems.

Hypervisor

A bare metal or hosted hypervisor that is certified to run Ubuntu, CentOS, or Red Hat Enterprise Linux is required.

Red Hat Solution: Which hypervisors are certified to run Red Hat Enterprise Linux?

CPU

4 cores or 4 vCPUs

RAM

14 GB

AWS EC2 instance type

An instance type that meets the CPU and RAM requirements above. We recommend t3.xlarge.

Key pair

When you create the Connector, you'll need to select an EC2 key pair to use with the instance.

Disk space in /opt

100 GiB of space must be available

Disk space in /var

20 GiB of space must be available

Docker Engine

Docker Engine is required on the host before you install the Connector.

- The minimum supported version is 19.3.1.
- The maximum supported version is 25.0.5.

  View installation instructions

Step 2: Set up networking

Ensure that the network location where you plan to install the Connector supports the following requirements. Meeting these requirements enables the Connector to manage resources and processes within your hybrid cloud environment.

Connections to target networks

A Connector requires a network connection to the location where you're planning to create and manage working environments. 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 Connector must have an outbound internet connection to contact specific endpoints.

Endpoints contacted during manual installation

When you manually install the Connector on your own Linux host, the installer for the Connector requires access to the following URLs during the installation process:

- https://support.netapp.com
- https://mysupport.netapp.com
- https://cloudmanager.cloud.netapp.com/tenancy
- https://stream.cloudmanager.cloud.netapp.com
- https://production-artifacts.cloudmanager.cloud.netapp.com
- https://*.blob.core.windows.net
- https://cloudmanagerinfraprod.azurecr.io

  The host might try to update operating system packages during installation. The host can contact different mirroring sites for these OS packages.

Endpoints contacted from the Connector

The Connector requires outbound internet access to contact the following endpoints in order to manage resources and processes within your public cloud environment for day-to-day operations.

Note that 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 resources in AWS. The exact endpoint depends on the AWS region that you're using. Refer to AWS documentation for details
https://support.netapp.com https://mysupport.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support.

Endpoints	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	To provide SaaS features and services within BlueXP. Note that the Connector is currently contacting "cloudmanager.cloud.netapp.com" but it will start contacting "api.bluexp.netapp.com" in an upcoming release.
https://*.blob.core.windows.net https://cloudmanagerinfraprod.azurecr.io	To upgrade the Connector and its Docker components.

Proxy server

If your organization requires deployment of a proxy server for all outgoing internet traffic, obtain the following information about your HTTP or HTTPS proxy. You'll need to provide this information during installation.

- IP address
- Credentials
- HTTPS certificate

Note that BlueXP does not support transparent proxy servers.

Ports

There's no incoming traffic to the Connector, unless you initiate it or if the Connector 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, BlueXP automatically configures those systems to use a proxy server that's included with the Connector. The only requirement is to ensure that the Connector's security group allows inbound connections over port 3128. You'll need to open this port after you deploy the Connector.

Enable NTP

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

Step 3: Set up permissions

You need to provide AWS permissions to BlueXP by using one of the following 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 BlueXP with the AWS access key for an IAM user who has the required permissions.

Follow the steps to prepare permissions for BlueXP.

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 Connector.
   c. Finish the remaining steps to create the policy.

      Depending on the BlueXP 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 Connector.
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 Connector.

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 Connector.
   c. Finish the remaining steps to create the policy.

      Depending on the BlueXP 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 Connector.
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 BlueXP after you install the Connector.

Result

You now have an IAM user that has the required permissions and an access key that you can provide to BlueXP.

Step 4: Install the Connector

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 Connector.
- Details about a proxy server, if a proxy is required for internet access from the Connector.

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

  Note that BlueXP does not support transparent proxy servers.

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

About this task

The installer that is available on the NetApp Support Site might be an earlier version. After installation, the Connector automatically updates itself if a new version is available.

Steps

1. Verify that docker is enabled and running.

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

2. 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 will fail.

3. Download the Connector software from the NetApp Support Site, and then copy it to the Linux host.

   You should download the "online" Connector installer that’s meant for use in your network or in the cloud. A separate "offline" installer is available for the Connector, but it’s only supported with private mode deployments.

4. Assign permissions to run the script.

   ```
   chmod +x BlueXP-Connector-Cloud-<version>
   ```

   Where <version> is the version of the Connector that you downloaded.

5. Run the installation script.

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

The --proxy and --cacert parameters are optional. If you have a proxy server, you will need to enter the parameters as shown. The installer doesn't prompt you to provide information about a proxy.

Here's an example of the command using both optional parameters:

```
 ./BlueXP-Connector-Cloud-v3.9.38 --proxy
https://user:password@10.0.0.30:8080/ --cacert
/tmp/cacert/certificate.cer
```

--proxy configures the Connector 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 the \ as shown above.
  - BlueXP doesn't support passwords that include the @ character.

--cacert specifies a CA-signed certificate to use for HTTPS access between the Connector and the proxy server. This parameter is required only if you specify an HTTPS proxy server or if the proxy is an intercepting proxy.

6. Wait for the installation to complete.

   At the end of the installation, the Connector service (occm) restarts twice if you specified a proxy server.

7. Open a web browser from a host that has a connection to the Connector virtual machine and enter the following URL:

   https://*ipaddress*

8. After you log in, set up the Connector:
   a. Specify the BlueXP account to associate with the Connector.
   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 BlueXP in

standard mode. You should enable restricted mode only if you have a secure environment and want to disconnect this account from BlueXP backend services. If that's the case, follow steps to get started with BlueXP in restricted mode.

d. Select **Let's start**.

Result

The Connector is now installed and is set up with your BlueXP account.

If you have Amazon S3 buckets in the same AWS account where you created the Connector, you'll see an Amazon S3 working environment appear on the BlueXP canvas automatically. Learn how to manage S3 buckets from BlueXP

Step 5: Provide permissions to BlueXP

Now that you've installed the Connector, you need to provide BlueXP with the AWS permissions that you previously set up. Providing the permissions enables BlueXP to manage your data and storage infrastructure in AWS.

IAM role

Attach the IAM role that you previously created to the Connector EC2 instance.

Steps

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

Result

BlueXP now has the permissions that it needs to perform actions in AWS on your behalf.

Go to the BlueXP console to start using the Connector with BlueXP.

AWS access key

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

Steps

1. Ensure that the correct Connector is currently selected in BlueXP.
2. In the upper right of the BlueXP console, select the Settings icon, and select **Credentials**.

3. Select **Add Credentials** and follow the steps in the wizard.
   a. **Credentials Location**: Select **Amazon Web Services > Connector**.
   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**.

Result

BlueXP now has the permissions that it needs to perform actions in AWS on your behalf.

Go to the BlueXP console to start using the Connector with BlueXP.

Azure

Connector installation options in Azure

There are a few different ways to create a Connector in Azure. Directly from BlueXP is the most common way.

The following installation options are available:

- Create a Connector directly from BlueXP (this is the standard option)

  This action launches a VM running Linux and the Connector software in a VNet of your choice.

- Create a Connector from the Azure Marketplace

  This action also launches a VM running Linux and the Connector software, but the deployment is initiated directly from the Azure Marketplace, rather than from BlueXP.

- 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 BlueXP with the required permissions that it needs to authenticate and manage resources in Azure.

Create a Connector in Azure from BlueXP

To create a Connector in Azure from BlueXP, you need to set up your networking, prepare Azure permissions, and then create the Connector.

Before you begin

You should review Connector limitations.

Step 1: Set up networking

Ensure that the network location where you plan to install the Connector supports the following requirements. Meeting these requirements enables the Connector to manage resources and processes within your hybrid cloud environment.

Azure region

If you use Cloud Volumes ONTAP, the Connector 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 Connector, you need to specify the VNet and subnet where the Connector should reside.

Connections to target networks

A Connector requires a network connection to the location where you're planning to create and manage working environments. 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 Connector must have an outbound internet connection to contact specific endpoints.

Endpoints contacted from the Connector

The Connector requires outbound internet access to contact the following endpoints in order to manage resources and processes within your public cloud environment for day-to-day operations.

Note that 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://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	To provide SaaS features and services within BlueXP. Note that the Connector is currently contacting "cloudmanager.cloud.netapp.com" but it will start contacting "api.bluexp.netapp.com" in an upcoming release.
https://*.blob.core.windows.net https://cloudmanagerinfraprod.azurecr.io	To upgrade the Connector and its Docker components.

Endpoints contacted from the BlueXP console

As you use the BlueXP web-based 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 Connector from the BlueXP console.

View the list of endpoints contacted from the BlueXP console.

Proxy server

If your organization requires deployment of a proxy server for all outgoing internet traffic, obtain the following information about your HTTP or HTTPS proxy. You'll need to provide this information during installation.

- IP address
- Credentials
- HTTPS certificate

Note that BlueXP does not support transparent proxy servers.

Ports

There's no incoming traffic to the Connector, unless you initiate it or if the Connector 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, BlueXP automatically configures those systems to use a proxy server that's included with the Connector. The only requirement is to ensure that the Connector's security group allows inbound connections over port 3128. You'll need to open this port after you deploy the Connector.

Enable NTP

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

You'll need to implement this networking requirement after you create the Connector.

Step 2: Create a custom role

Create an Azure custom role that you can assign to your Azure account or to a Microsoft Entra service principal. BlueXP authenticates with Azure and uses these permissions to create the Connector instance on your behalf.

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 Connector VM in Azure from BlueXP. Don't use this policy for other situations. When BlueXP creates the Connector, it applies a new set of permissions to the Connector VM that enables the Connector to manage the resources in your public cloud environment.

```
{
    "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/agreements/read",

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

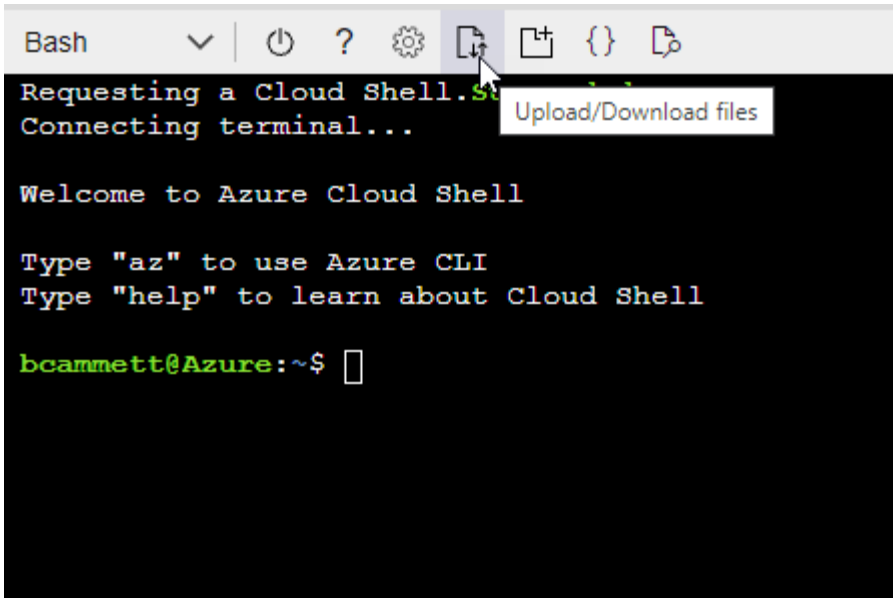
   Example

   ```
   "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.



c. Enter the following Azure CLI command:

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

You should now have a custom role called *Azure SetupAsService*. You can now apply this custom role to your user account or to a service principal.

Step 3: Set up authentication

When creating the Connector from BlueXP, you need to provide a login that enables BlueXP 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 BlueXP.

Azure account

Assign the custom role to the user who will deploy the Connector from BlueXP.

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 Connector 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**.

Result

The Azure user now has the permissions required to deploy the Connector from BlueXP.

Service principal

Rather than logging in with your Azure account, you can provide BlueXP with the credentials for an Azure service principal that has the required permissions.

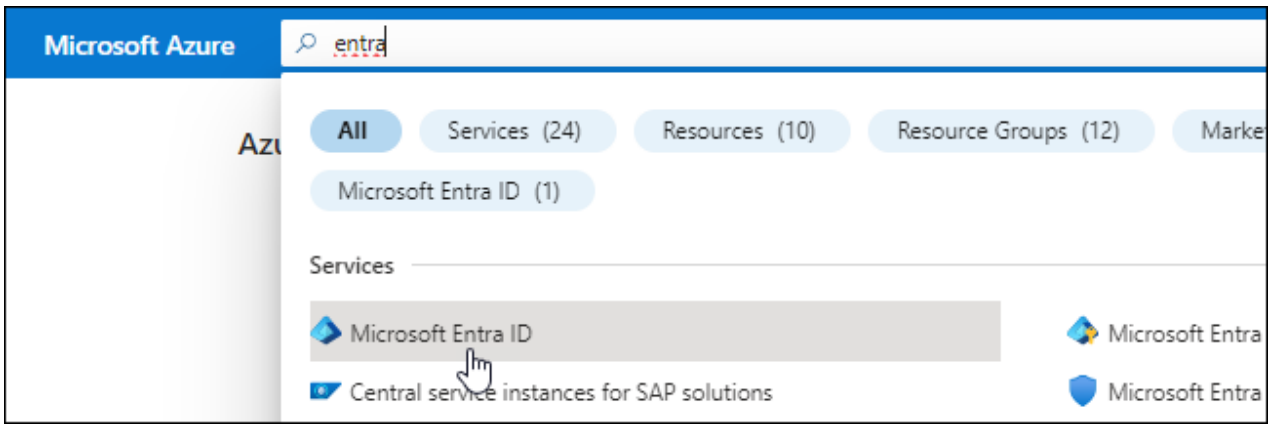
Create and set up a service principal in Microsoft Entra ID and obtain the Azure credentials that BlueXP needs.

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.

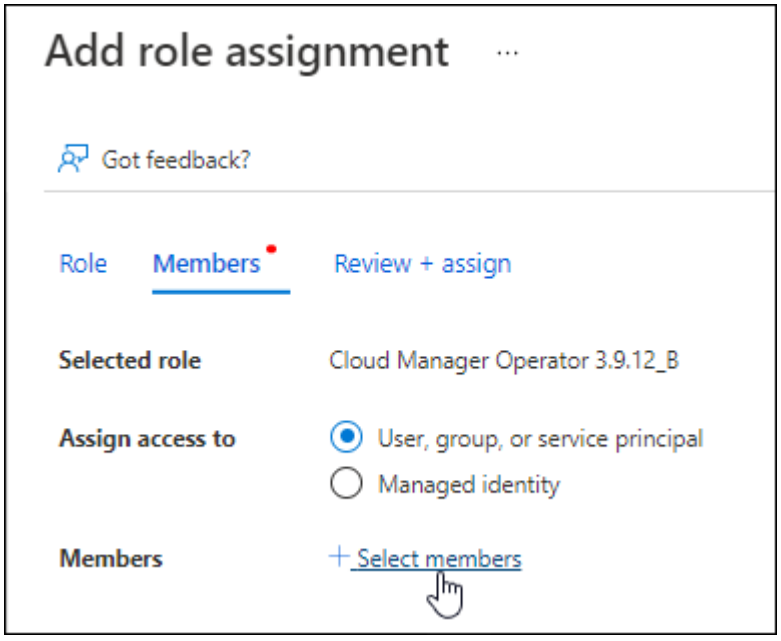


3. In the menu, select **App registrations**.
4. Select **New registration**.
5. Specify details about the application:
   - **Name**: Enter a name for the application.
   - **Account type**: Select an account type (any will work with BlueXP).
   - **Redirect URI**: You can leave this field blank.
6.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

   You've created the AD application and service principal.

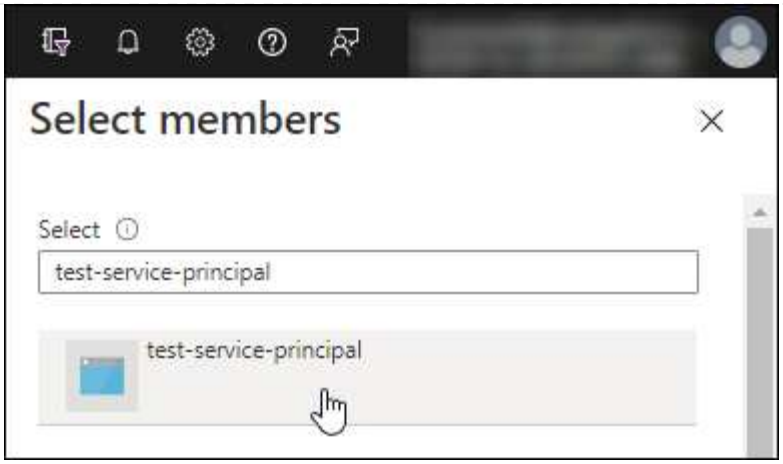
Assign the custom role to the application

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 **BlueXP 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**.



   c. Search for the name of the application.

      Here's an example:



d. Select the application and click **Select**.

e. Click **Next**.

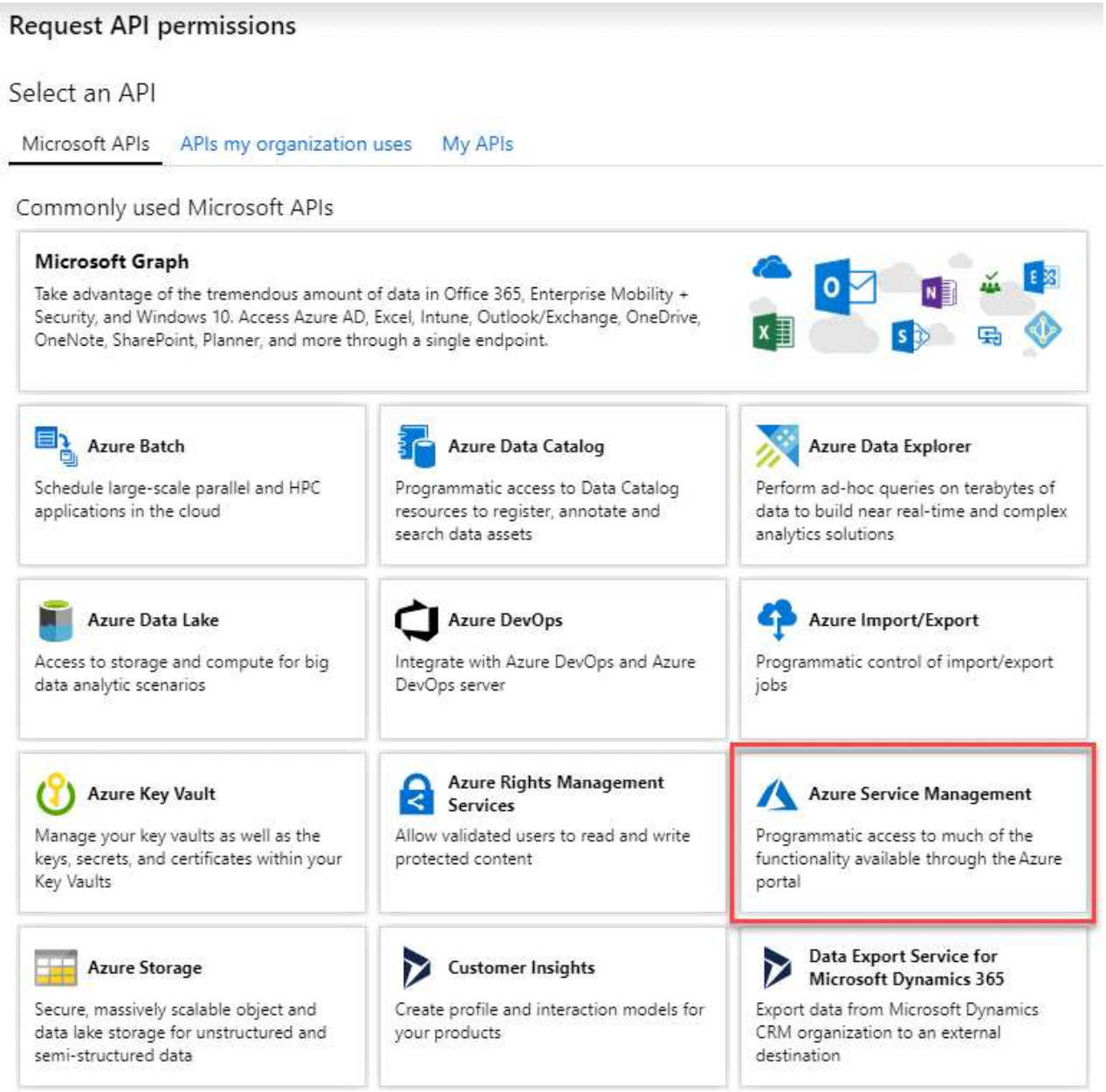
6. Click **Review + assign**.

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

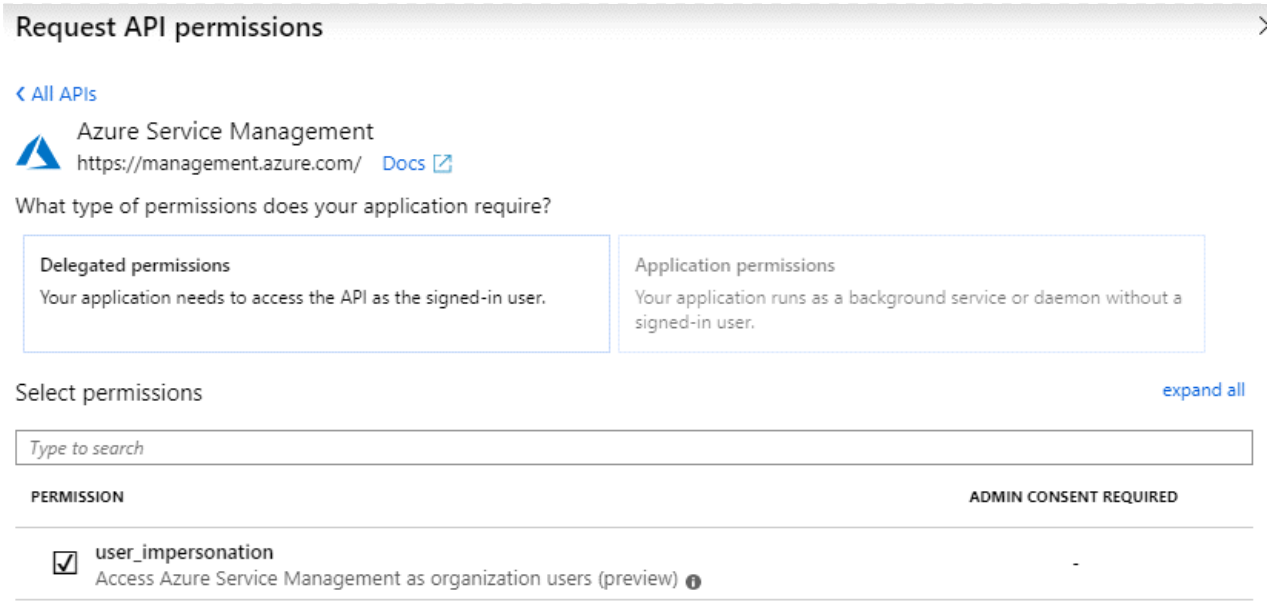
   If you want to manage resources in multiple Azure subscriptions, then you must bind the service principal to each of those subscriptions. For example, BlueXP enables you to select the subscription that you want to use when deploying Cloud Volumes ONTAP.

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**.

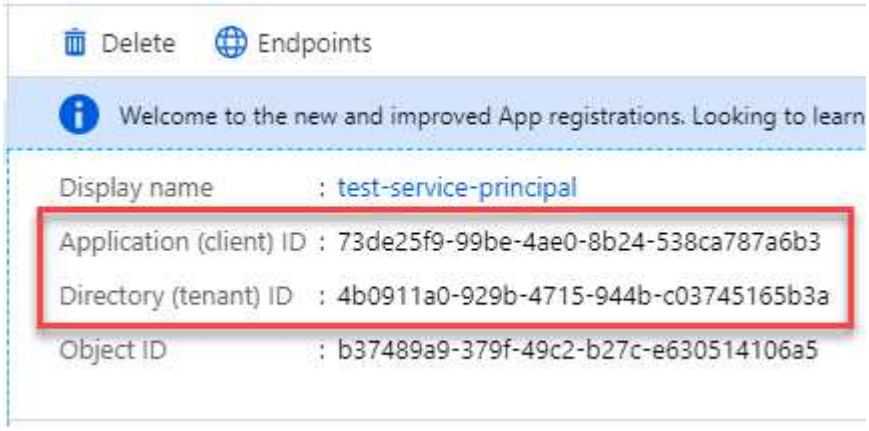


4. Select **Access Azure Service Management as organization users** and then select **Add permissions**.



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**.



When you add the Azure account to BlueXP, you need to provide the application (client) ID and the directory (tenant) ID for the application. BlueXP 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.

You now have a client secret that BlueXP can use it to authenticate with Microsoft Entra ID.

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 BlueXP when you create the Connector.

Step 4: Create the Connector

Create the Connector directly from the BlueXP web-based console.

About this task

Creating the Connector from BlueXP deploys a virtual machine in Azure using a default configuration. After you create the Connector, you should not change to a smaller VM type that has less CPU or RAM. Learn about the default configuration for the Connector.

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 Connector virtual machine. The other option for the authentication method is to use a password.

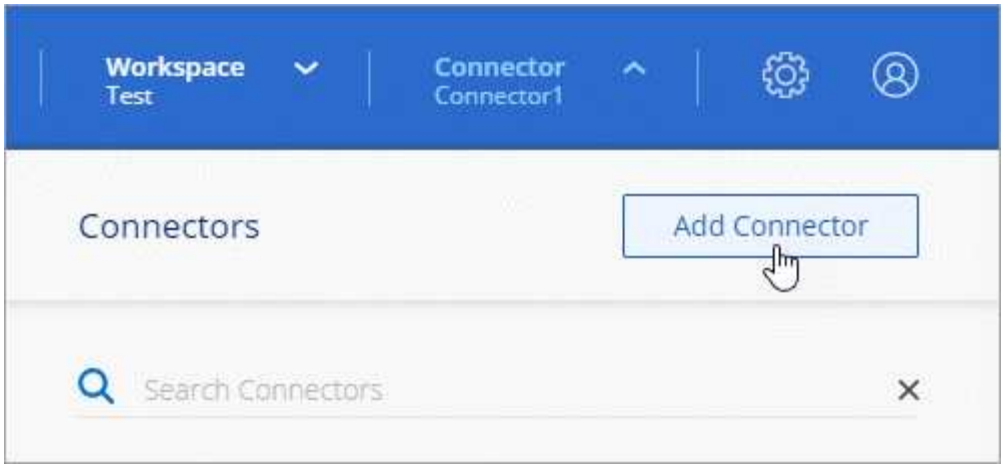
  Learn about connecting to a Linux VM in Azure

- If you don't want BlueXP to automatically create an Azure role for the Connector, then you'll need to create your own using the policy on this page.

  These permissions are for the Connector instance itself. It's a different set of permissions than what you previously set up to deploy the Connector VM.

Steps

1. Select the **Connector** drop-down and select **Add Connector**.



2. Choose **Microsoft Azure** as your cloud provider.
3. On the **Deploying a Connector** page:

   a. Under **Authentication**, select the authentication option that matches how you set up Azure permissions:

      - Select **Azure user account** 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 BlueXP will automatically use 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.

4. Follow the steps in the wizard to create the Connector:

   - **VM Authentication**: Choose an Azure subscription, a location, a new resource group or an existing resource group, and then choose an authentication method for the Connector 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

   - **Details**: Enter a name for the instance, specify tags, and choose whether you want BlueXP 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 Connector permissions to manage resources in that subscription (for example, Cloud Volumes ONTAP).

- **Network**: Choose a VNet and subnet, whether to enable a public IP address, and optionally specify a proxy configuration.
- **Security Group**: 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.

- **Review**: Review your selections to verify that your set up is correct.

5. Click **Add**.

   The virtual machine should be ready in about 7 minutes. You should stay on the page until the process is complete.

Result

After the process is complete, the Connector is available for use from BlueXP.

If you have Azure Blob storage in the same Azure subscription where you created the Connector, you'll see an Azure Blob storage working environment appear on the BlueXP canvas automatically. Learn how to manage Azure Blob storage from BlueXP

Create a Connector from the Azure Marketplace

To create a Connector from the Azure Marketplace, you need to set up your networking, prepare Azure permissions, review instance requirements, and then create the Connector.

Before you begin

You should review Connector limitations.

Step 1: Set up networking

Ensure that the network location where you plan to install the Connector supports the following requirements. Meeting these requirements enables the Connector to manage resources and processes within your hybrid cloud environment.

Azure region

If you use Cloud Volumes ONTAP, the Connector 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 Connector, you need to specify the VNet and subnet where the Connector should reside.

Connections to target networks

A Connector requires a network connection to the location where you're planning to create and manage working environments. 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 Connector must have an outbound internet connection to contact specific endpoints.

Endpoints contacted from the Connector

The Connector requires outbound internet access to contact the following endpoints in order to manage resources and processes within your public cloud environment for day-to-day operations.

Note that 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://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	To provide SaaS features and services within BlueXP. Note that the Connector is currently contacting "cloudmanager.cloud.netapp.com" but it will start contacting "api.bluexp.netapp.com" in an upcoming release.
https://*.blob.core.windows.net https://cloudmanagerinfraprod.azurecr.io	To upgrade the Connector and its Docker components.

Proxy server

If your organization requires deployment of a proxy server for all outgoing internet traffic, obtain the following information about your HTTP or HTTPS proxy. You'll need to provide this information during installation.

- IP address
- Credentials
- HTTPS certificate

Note that BlueXP does not support transparent proxy servers.

Ports

There's no incoming traffic to the Connector, unless you initiate it or if the Connector 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, BlueXP automatically configures those systems to use a proxy server that's included with the Connector. The only requirement is to ensure that the Connector's security group allows inbound connections over port 3128. You'll need to open this port after you deploy the Connector.

Enable NTP

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

You'll need to implement this networking requirement after you create the Connector.

Step 2: Review VM requirements

When you create the Connector, you need to choose a virtual machine type that meets the following requirements.

CPU

4 cores or 4 vCPUs

RAM

14 GB

Azure VM size

An instance type that meets the CPU and RAM requirements above. We recommend DS3 v2.

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 BlueXP with the credentials for an Azure service principal that has the required permissions.

Follow these steps to set up permissions for BlueXP.

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 BlueXP.

   Example

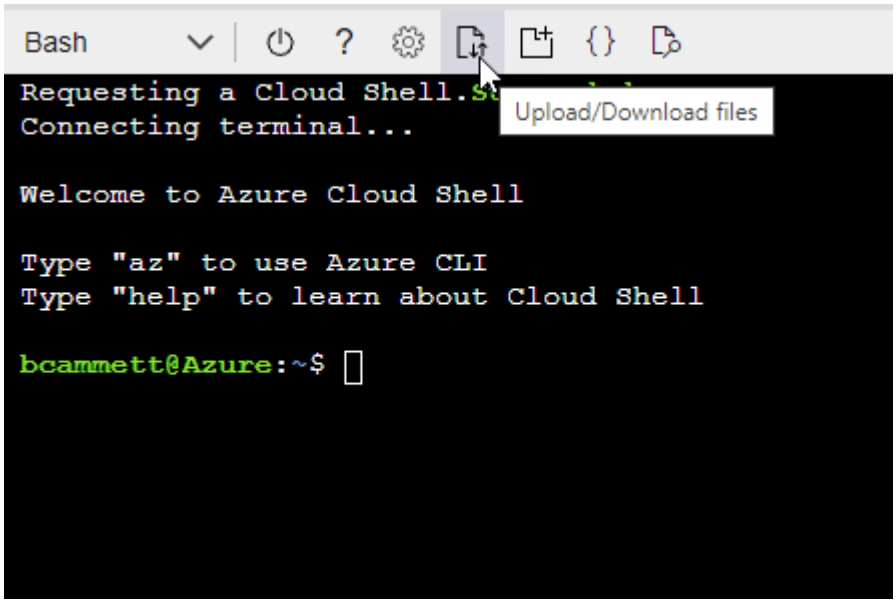
   ```
   "AssignableScopes": [
   "/subscriptions/d333af45-0d07-4154-943d-c25fbzzzzzzz",
   "/subscriptions/54b91999-b3e6-4599-908e-416e0zzzzzzz",
   "/subscriptions/398e471c-3b42-4ae7-9b59-ce5bbzzzzzzz"
   ```

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.



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

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

Result

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

Service principal

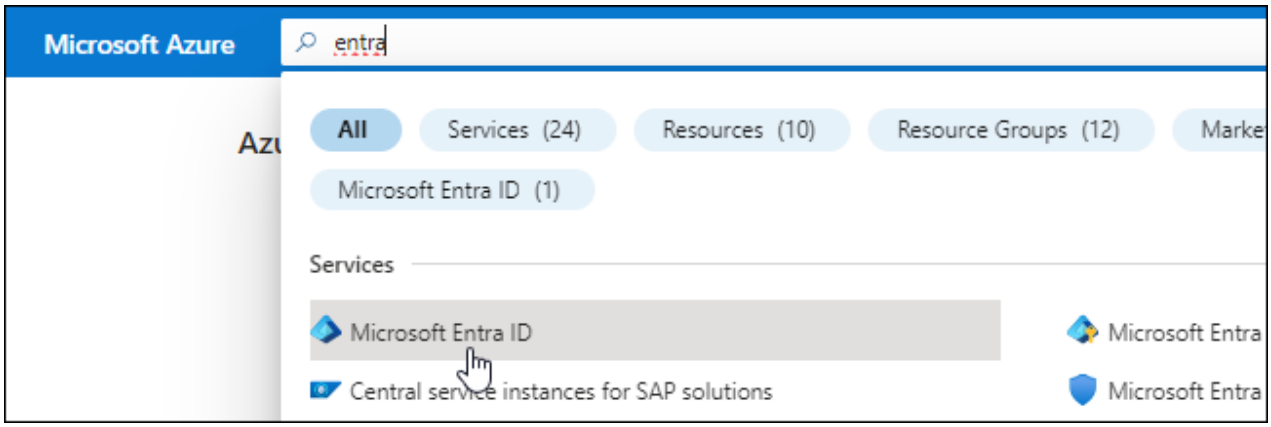
Create and set up a service principal in Microsoft Entra ID and obtain the Azure credentials that BlueXP needs.

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 BlueXP).
   - **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 Connector 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.

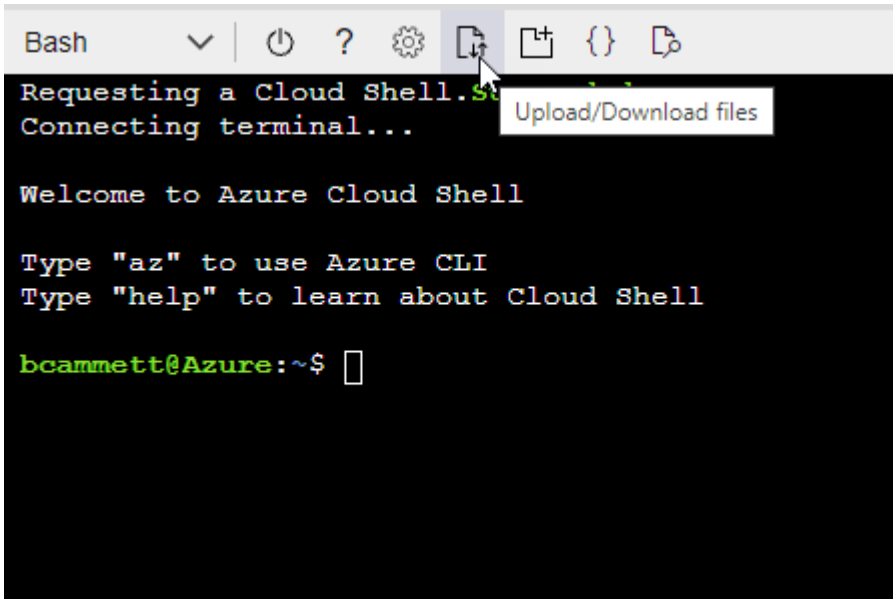
Example

```
"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.



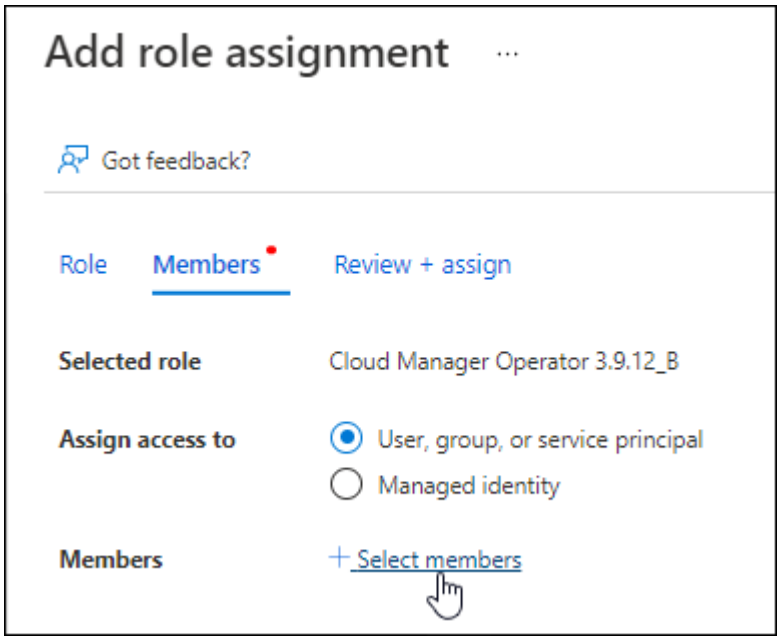
- Use the Azure CLI to create the custom role:

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

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

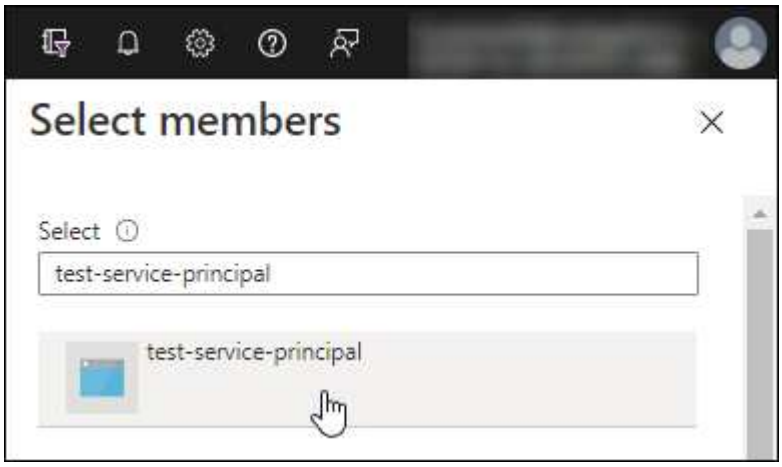
2. Assign the application to the role:

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 **BlueXP Operator** role and select **Next**.
e. In the **Members** tab, complete the following steps:
   - Keep **User, group, or service principal** selected.
   - Select **Select members**.



   - Search for the name of the application.

     Here's an example:



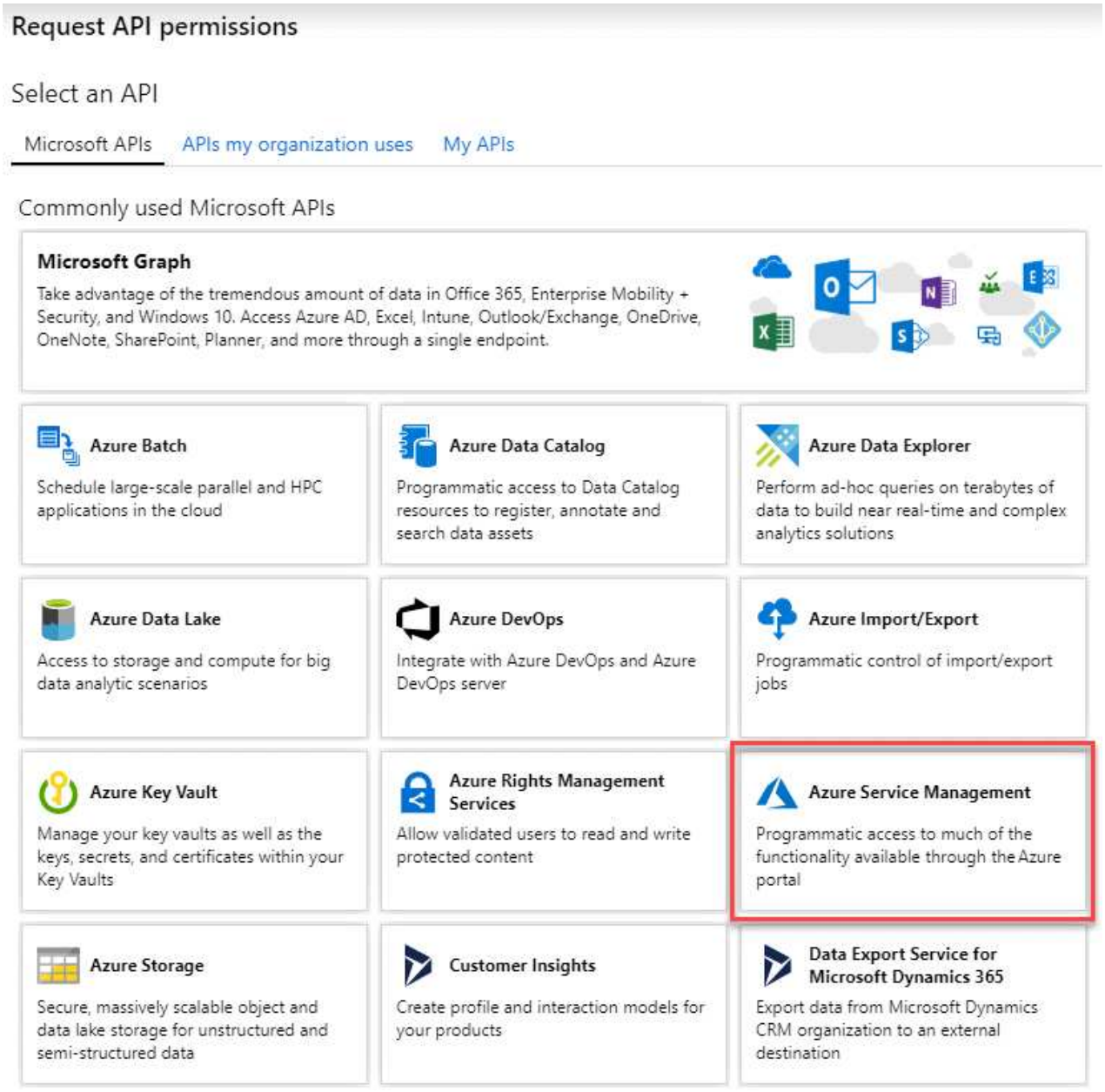
   - Select the application and select **Select**.
   - Select **Next**.
f. Select **Review + assign**.

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

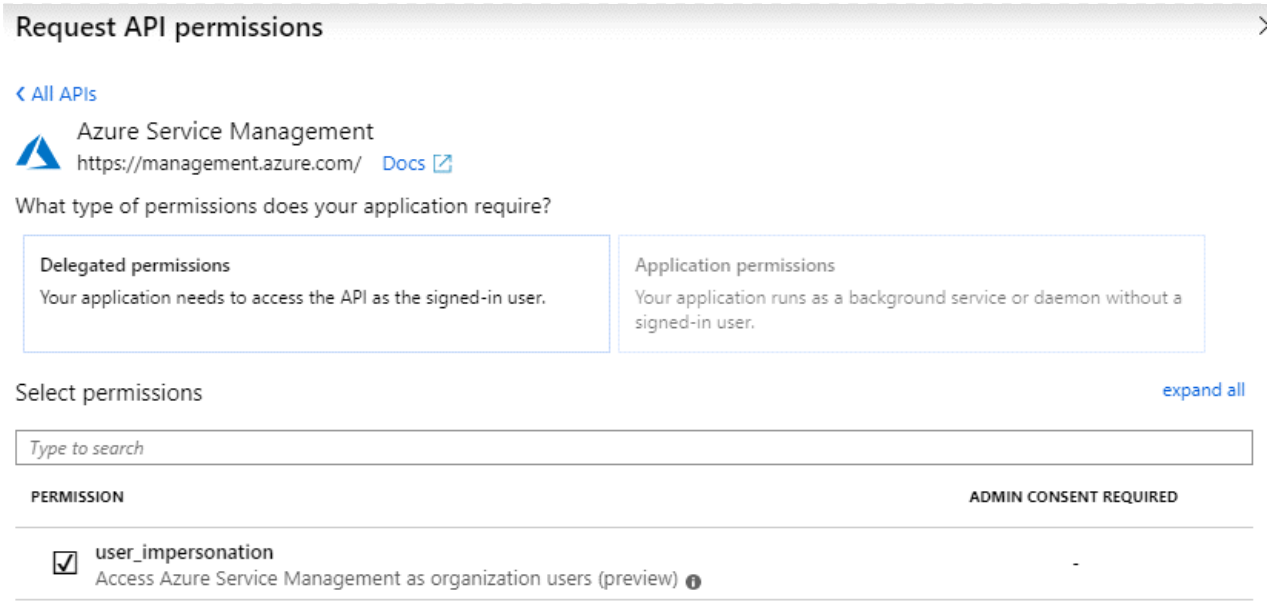
If you want to deploy Cloud Volumes ONTAP from multiple Azure subscriptions, then you must bind the service principal to each of those subscriptions. BlueXP enables you to select the subscription that you want to use when deploying Cloud Volumes ONTAP.

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**.

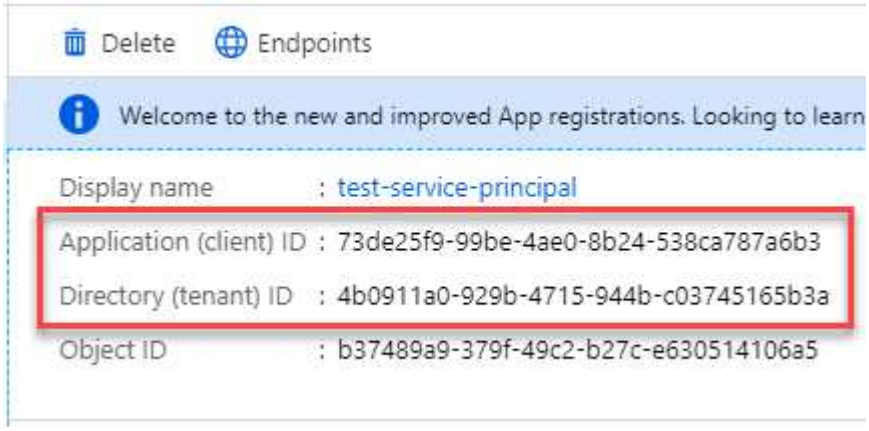


4. Select **Access Azure Service Management as organization users** and then select **Add permissions**.



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**.



When you add the Azure account to BlueXP, you need to provide the application (client) ID and the directory (tenant) ID for the application. BlueXP 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.

You now have a client secret that BlueXP can use it to authenticate with Microsoft Entra ID.

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 BlueXP when you add an Azure account.

Step 4: Create the Connector

Launch the Connector directly from the Azure Marketplace.

About this task

Creating the Connector from the Azure Marketplace deploys a virtual machine in Azure using a default configuration. Learn about the default configuration for the Connector.

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 Connector 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 BlueXP to automatically create an Azure role for the Connector, then you’ll need to create your own using the policy on this page.

  These permissions are for the Connector instance itself. It’s a different set of permissions than what you previously set up to deploy the Connector VM.

Steps

1. Go to the NetApp Connector 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 DS3 v2.
   - **Disks**: The Connector can perform optimally with either HDD or SSD disks.
   - **Network security group**: The Connector 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 Connector 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. The virtual machine and Connector software should be running in approximately five minutes.

5. Open a web browser from a host that has a connection to the Connector virtual machine and enter the following URL:

   https://*ipaddress*

6. After you log in, set up the Connector:
   a. Specify the BlueXP account to associate with the Connector.
   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 BlueXP in standard mode. You should enable restricted mode only if you have a secure environment and want to disconnect this account from BlueXP backend services. If that's the case, follow steps to get started with BlueXP in restricted mode.

   d. Select **Let's start**.

Result

The Connector is now installed and is set up with your BlueXP account.

If you have Azure Blob storage in the same Azure subscription where you created the Connector, you'll see an Azure Blob storage working environment appear on the BlueXP canvas automatically. Learn how to manage Azure Blob storage from BlueXP

Step 5: Provide permissions to BlueXP

Now that you've created the Connector, you need to provide BlueXP with the permissions that you previously set up. Providing the permissions enables BlueXP to manage your data and storage infrastructure in Azure.

Custom role

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

Steps

1. From the Azure Portal, open the **Subscriptions** service and select your subscription.
2. Select **Access control (IAM)** > **Add** > **Add role assignment**.
3. In the **Role** tab, select the **BlueXP Operator** role and select **Next**.

   BlueXP Operator is the default name provided in the BlueXP 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 Connector virtual machine was created, choose **Virtual machine**, and then select the Connector 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.

Result

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

What's next?

Go to the BlueXP console to start using the Connector with BlueXP.

Service principal

Steps

1. In the upper right of the BlueXP console, select the Settings icon, and select **Credentials**.

2. Select **Add Credentials** and follow the steps in the wizard.
   a. **Credentials Location**: Select **Microsoft Azure > Connector**.
   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

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

Manually install the Connector in Azure

To manually install the Connector on your own Linux host, you need to review host requirements, set up your networking, prepare Azure permissions, install the Connector, and then provide the permissions that you prepared.

Before you begin

You should review Connector limitations.

Step 1: Review host requirements

The Connector software must run on a host that meets specific operating system requirements, RAM requirements, port requirements, and so on.

Dedicated host

The Connector is not supported on a host that is shared with other applications. The host must be a dedicated host.

Supported operating systems

- Ubuntu 22.04 LTS
- CentOS 7.6, 7.7, 7.8, and 7.9
- Red Hat Enterprise Linux 7.6, 7.7, 7.8, and 7.9

  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 Connector installation.

  The Connector is supported on English-language versions of these operating systems.

Hypervisor

A bare metal or hosted hypervisor that is certified to run Ubuntu, CentOS, or Red Hat Enterprise Linux is required.

Red Hat Solution: Which hypervisors are certified to run Red Hat Enterprise Linux?

CPU

4 cores or 4 vCPUs

RAM

14 GB

Azure VM size

An instance type that meets the CPU and RAM requirements above. We recommend DS3 v2.

Disk space in /opt

100 GiB of space must be available

Disk space in /var

20 GiB of space must be available

Docker Engine

Docker Engine is required on the host before you install the Connector.

- The minimum supported version is 19.3.1.
- The maximum supported version is 25.0.5.

View installation instructions

Step 2: Set up networking

Ensure that the network location where you plan to install the Connector supports the following requirements. Meeting these requirements enables the Connector to manage resources and processes within your hybrid cloud environment.

Azure region

If you use Cloud Volumes ONTAP, the Connector 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

A Connector requires a network connection to the location where you're planning to create and manage working environments. 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 Connector must have an outbound internet connection to contact specific endpoints.

Endpoints contacted during manual installation

When you manually install the Connector on your own Linux host, the installer for the Connector requires access to the following URLs during the installation process:

- https://support.netapp.com
- https://mysupport.netapp.com
- https://cloudmanager.cloud.netapp.com/tenancy
- https://stream.cloudmanager.cloud.netapp.com
- https://production-artifacts.cloudmanager.cloud.netapp.com
- https://*.blob.core.windows.net
- https://cloudmanagerinfraprod.azurecr.io

The host might try to update operating system packages during installation. The host can contact

different mirroring sites for these OS packages.

Endpoints contacted from the Connector

The Connector requires outbound internet access to contact the following endpoints in order to manage resources and processes within your public cloud environment for day-to-day operations.

Note that 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://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	To provide SaaS features and services within BlueXP. Note that the Connector is currently contacting "cloudmanager.cloud.netapp.com" but it will start contacting "api.bluexp.netapp.com" in an upcoming release.
https://*.blob.core.windows.net https://cloudmanagerinfraprod.azurecr.io	To upgrade the Connector and its Docker components.

Proxy server

If your organization requires deployment of a proxy server for all outgoing internet traffic, obtain the following information about your HTTP or HTTPS proxy. You'll need to provide this information during installation.

- IP address
- Credentials
- HTTPS certificate

Note that BlueXP does not support transparent proxy servers.

Ports

There's no incoming traffic to the Connector, unless you initiate it or if the Connector 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, BlueXP automatically configures those systems to use a proxy server that's included with the Connector. The only requirement is to ensure that the Connector's security group allows inbound connections over port 3128. You'll need to open this port after you deploy the Connector.

Enable NTP

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

Step 3: Set up permissions

You need to provide Azure permissions to BlueXP 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 BlueXP with the credentials for an Azure service principal that has the required permissions.

Follow the steps to prepare permissions for BlueXP.

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 BlueXP.

   Example

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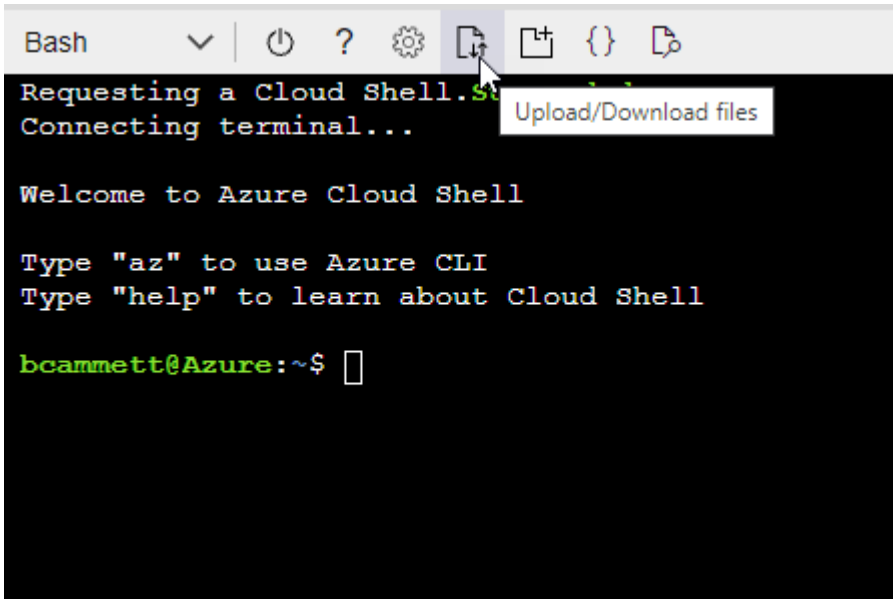
   "/subscriptions/d333af45-0d07-4154-943d-c25fbzzzzzzz",
   "/subscriptions/54b91999-b3e6-4599-908e-416e0zzzzzzz",
   "/subscriptions/398e471c-3b42-4ae7-9b59-ce5bbzzzzzzz"
   ```

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.



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

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

Result

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

Service principal

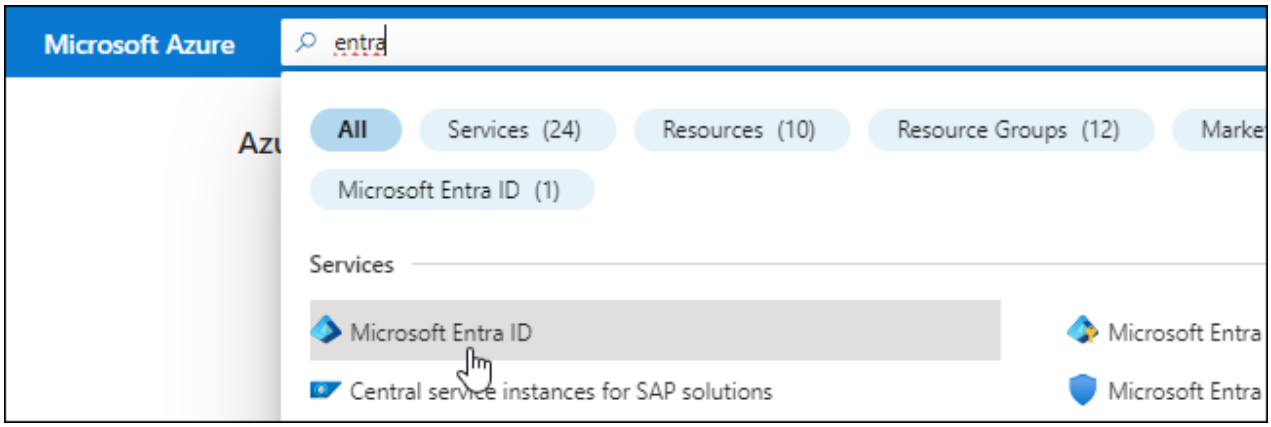
Create and set up a service principal in Microsoft Entra ID and obtain the Azure credentials that BlueXP needs.

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 BlueXP).
   - **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 Connector 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.

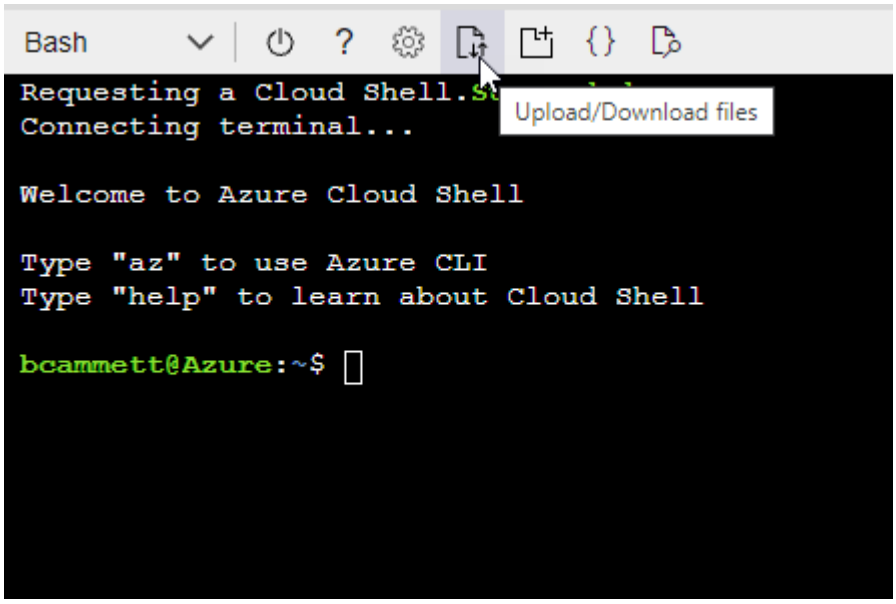
Example

```
"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.



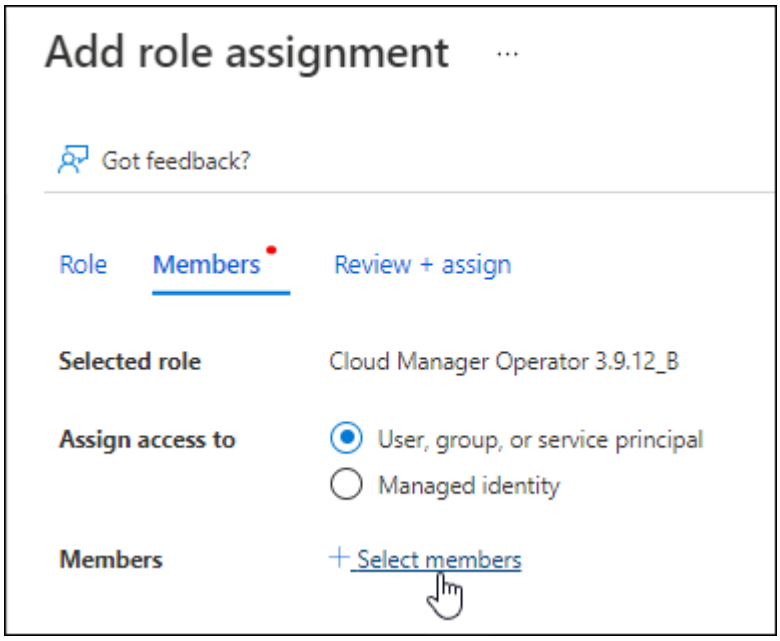
- Use the Azure CLI to create the custom role:

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

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

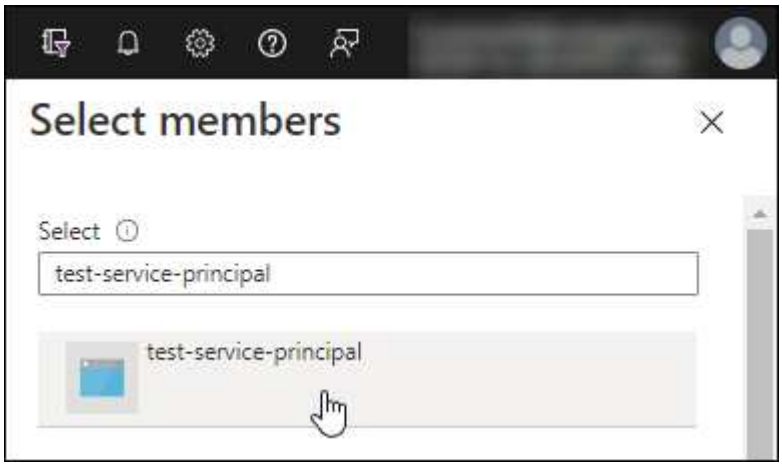
2. Assign the application to the role:

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 **BlueXP Operator** role and select **Next**.
e. In the **Members** tab, complete the following steps:
   - Keep **User, group, or service principal** selected.
   - Select **Select members**.



   - Search for the name of the application.

     Here's an example:



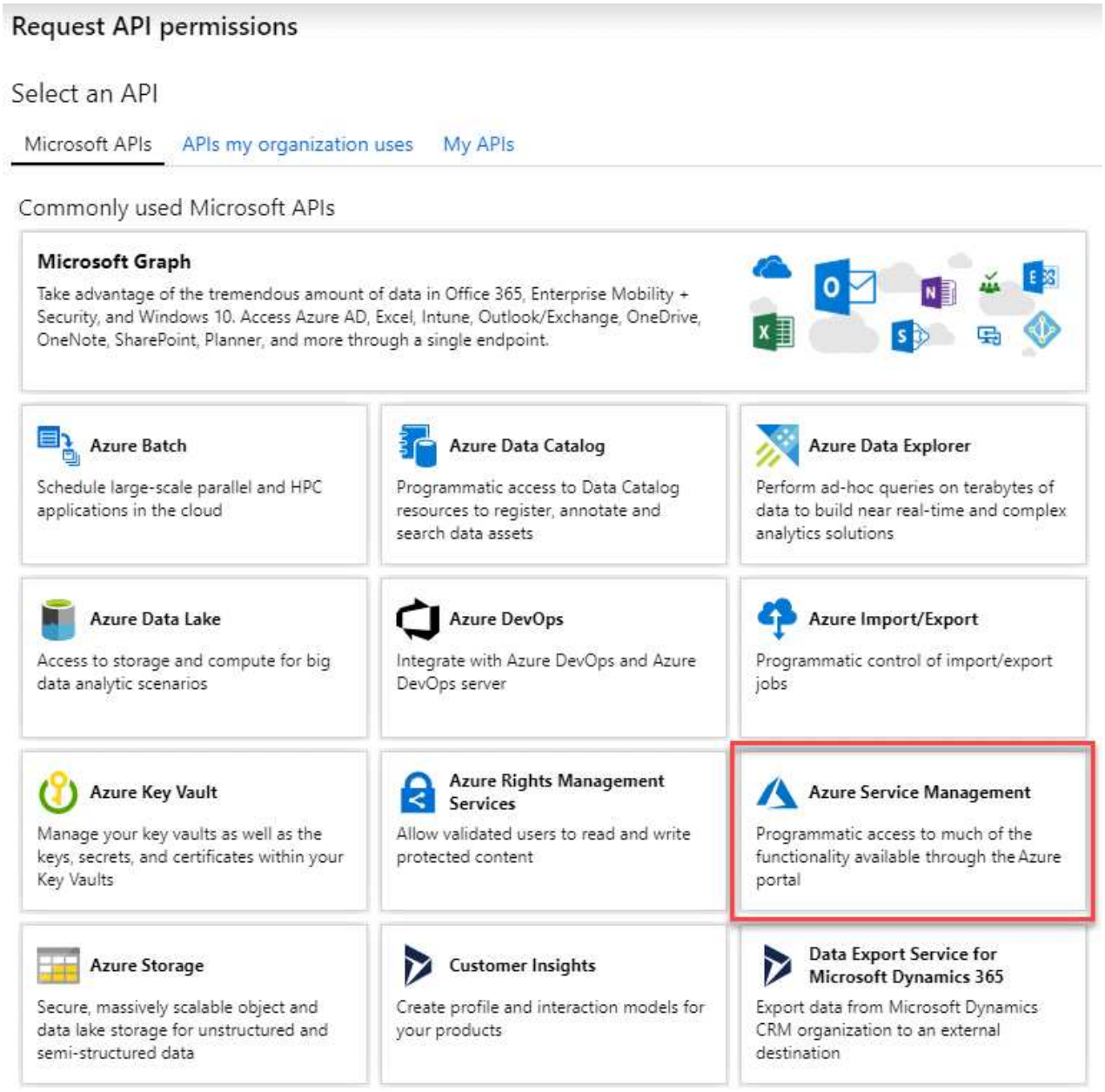
   - Select the application and select **Select**.
   - Select **Next**.
f. Select **Review + assign**.

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

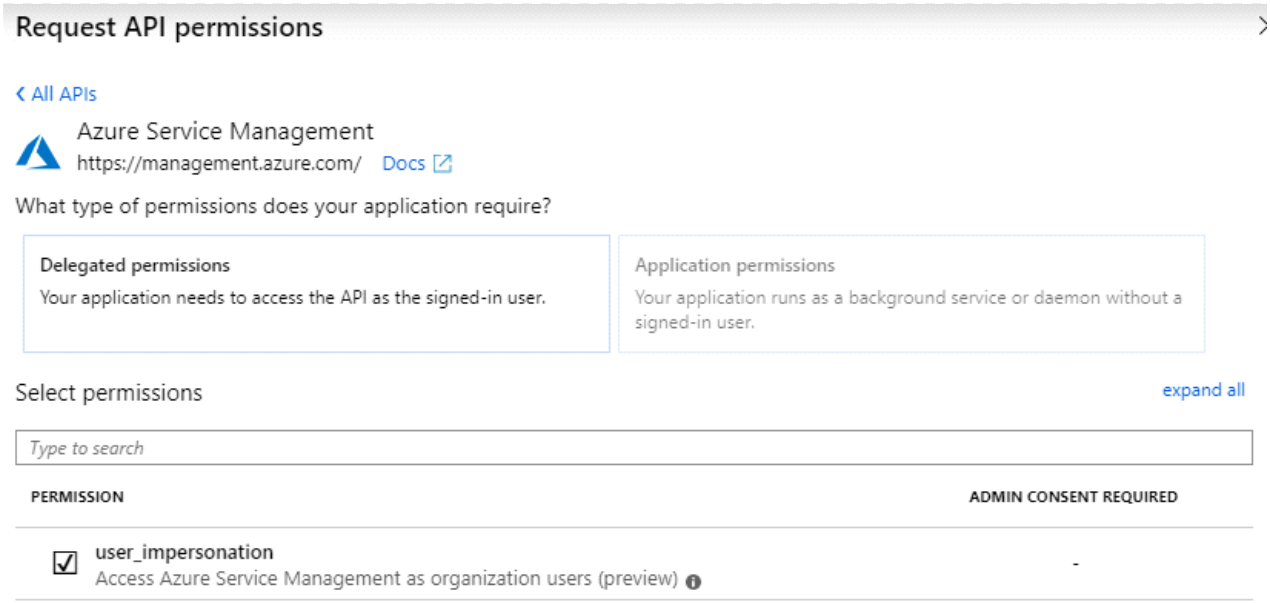
If you want to deploy Cloud Volumes ONTAP from multiple Azure subscriptions, then you must bind the service principal to each of those subscriptions. BlueXP enables you to select the subscription that you want to use when deploying Cloud Volumes ONTAP.

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**.

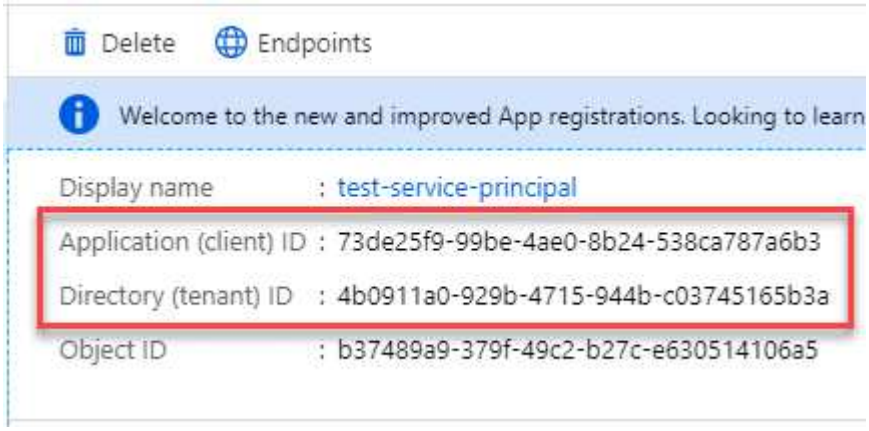


4. Select **Access Azure Service Management as organization users** and then select **Add permissions**.



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**.



When you add the Azure account to BlueXP, you need to provide the application (client) ID and the directory (tenant) ID for the application. BlueXP 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.

You now have a client secret that BlueXP can use it to authenticate with Microsoft Entra ID.

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 BlueXP when you add an Azure account.

Step 4: Install the Connector

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 Connector.
- Details about a proxy server, if a proxy is required for internet access from the Connector.

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

  Note that BlueXP does not support transparent proxy servers.
- A CA-signed certificate, if the proxy server uses HTTPS or if the proxy is an intercepting proxy.
- 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

The installer that is available on the NetApp Support Site might be an earlier version. After installation, the Connector automatically updates itself if a new version is available.

Steps

1. Verify that docker is enabled and running.

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

2. 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 will fail.

3. Download the Connector software from the NetApp Support Site, and then copy it to the Linux host.

   You should download the "online" Connector installer that’s meant for use in your network or in the cloud. A separate "offline" installer is available for the Connector, but it’s only supported with private mode deployments.

4. Assign permissions to run the script.

   ```
   chmod +x BlueXP-Connector-Cloud-<version>
   ```

   Where <version> is the version of the Connector that you downloaded.

5. Run the installation script.

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

   The --proxy and --cacert parameters are optional. If you have a proxy server, you will need to enter the parameters as shown. The installer doesn’t prompt you to provide information about a proxy.

   Here’s an example of the command using both optional parameters:

   ```
    ./BlueXP-Connector-Cloud-v3.9.38 --proxy
   https://user:password@10.0.0.30:8080/ --cacert
   /tmp/cacert/certificate.cer
   ```

   --proxy configures the Connector 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 the \ as shown above.
- BlueXP doesn't support passwords that include the @ character.

--cacert specifies a CA-signed certificate to use for HTTPS access between the Connector and the proxy server. This parameter is required only if you specify an HTTPS proxy server or if the proxy is an intercepting proxy.

6. Wait for the installation to complete.

   At the end of the installation, the Connector service (occm) restarts twice if you specified a proxy server.

7. Open a web browser from a host that has a connection to the Connector virtual machine and enter the following URL:

   https://*ipaddress*

8. After you log in, set up the Connector:
   a. Specify the BlueXP account to associate with the Connector.
   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 BlueXP in standard mode. You should enable restricted mode only if you have a secure environment and want to disconnect this account from BlueXP backend services. If that's the case, follow steps to get started with BlueXP in restricted mode.

   d. Select **Let's start**.

Result

The Connector is now installed and is set up with your BlueXP account.

If you have Azure Blob storage in the same Azure subscription where you created the Connector, you'll see an Azure Blob storage working environment appear on the BlueXP canvas automatically. Learn how to manage Azure Blob storage from BlueXP

Step 5: Provide permissions to BlueXP

Now that you've installed the Connector, you need to provide BlueXP with the Azure permissions that you previously set up. Providing the permissions enables BlueXP to manage your data and storage infrastructure in Azure.

Custom role

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

Steps

1. From the Azure Portal, open the **Subscriptions** service and select your subscription.
2. Select **Access control (IAM)** > **Add** > **Add role assignment**.
3. In the **Role** tab, select the **BlueXP Operator** role and select **Next**.

   BlueXP Operator is the default name provided in the BlueXP 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 Connector virtual machine was created, choose **Virtual machine**, and then select the Connector 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.

Result

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

What's next?

Go to the BlueXP console to start using the Connector with BlueXP.

Service principal

Steps

1. In the upper right of the BlueXP console, select the Settings icon, and select **Credentials**.

2. Select **Add Credentials** and follow the steps in the wizard.
   a. **Credentials Location**: Select **Microsoft Azure > Connector**.
   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

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

Google Cloud

Connector installation options in Google Cloud

There are a few different ways to create a Connector in Google Cloud. Directly from BlueXP is the most common way.

The following installation options are available:

- Create the Connector directly from BlueXP (this is the standard option)

  This action launches a VM instance running Linux and the Connector software in a VPC of your choice.

- Create the Connector using gcloud

  This action also launches a VM instance running Linux and the Connector software, but the deployment is initiated directly from Google Cloud, rather than from BlueXP.

- 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 BlueXP with the required permissions that it needs to authenticate and manage resources in Google Cloud.

Create a Connector in Google Cloud from BlueXP or gcloud

To create a Connector in Google Cloud from BlueXP or by using gcloud, you need to set up your networking, prepare Google Cloud permissions, enable Google Cloud APIs, and then create the Connector.

Before you begin

You should review Connector limitations.

Step 1: Set up networking

Set up your networking so the Connector 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.

VPC and subnet

When you create the Connector, you need to specify the VPC and subnet where the Connector should reside.

Connections to target networks

A Connector requires a network connection to the location where you're planning to create and manage working environments. 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 Connector must have an outbound internet connection to contact specific endpoints.

Endpoints contacted from the Connector

The Connector requires outbound internet access to contact the following endpoints in order to manage resources and processes within your public cloud environment for day-to-day operations.

Note that 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://www.googleapis.com/deploymentmanager/v2/projects	To manage resources in Google Cloud.
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	To provide SaaS features and services within BlueXP. Note that the Connector is currently contacting "cloudmanager.cloud.netapp.com" but it will start contacting "api.bluexp.netapp.com" in an upcoming release.
https://*.blob.core.windows.net https://cloudmanagerinfraprod.azurecr.io	To upgrade the Connector and its Docker components.

Endpoints contacted from the BlueXP console

As you use the BlueXP web-based 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 Connector from the BlueXP console.

View the list of endpoints contacted from the BlueXP console.

Proxy server

If your organization requires deployment of a proxy server for all outgoing internet traffic, obtain the following information about your HTTP or HTTPS proxy. You'll need to provide this information during installation.

- IP address
- Credentials
- HTTPS certificate

Note that BlueXP does not support transparent proxy servers.

Ports

There's no incoming traffic to the Connector, unless you initiate it or if the Connector 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, BlueXP automatically configures those systems to use a proxy server that's included with the Connector. The only requirement is to ensure that the Connector's security group allows inbound connections over port 3128. You'll need to open this port after you deploy the Connector.

Enable NTP

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

You'll need to implement this networking requirement after you create the Connector.

Step 2: Set up permissions to create the Connector

Before you can deploy a Connector from BlueXP or by using gcloud, you need to set up permissions for the Google Cloud user who will deploy the Connector VM.

Steps

1. Create a custom role in Google Cloud:
   a. Create a YAML file that includes the following permissions:

```
title: Connector deployment policy
description: Permissions for the user who deploys the Connector from
BlueXP
stage: GA
includedPermissions:
- 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
- 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.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 will deploy the Connector from BlueXP or by using gcloud.

Google Cloud docs: Grant a single role

Result

The Google Cloud user now has the permissions required to create the Connector.

Step 3: Set up permissions for the Connector

A Google Cloud service account is required to provide the Connector with the permissions that BlueXP needs to manage resources in Google Cloud. When you create the Connector, you'll need to associate this service account with the Connector VM.

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 Connector.

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 "connector" at the project level:

```
gcloud iam roles create connector --project=myproject --file=connector.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 Connector resides, then you'll need to provide the Connector's service account with access to those projects.

   For example, let's say the Connector 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 Connector's service account.
      - Select the Connector's custom role.
      - Select **Save**.

   For more details, refer to Google Cloud documentation

Result

The service account for the Connector VM is set up.

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 Connector	Custom	Service Project	Connector deployment policy	compute.networkUser	Deploying the Connector in the service project
Connector service account	Custom	Service project	Connector 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: BlueXP service account as serviceAccount.user	N/A	(Optional) For data tiering and BlueXP 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 BlueXP 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 BlueXP 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 BlueXP create them for you. BlueXP will create 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 BlueXP create them for you. These permissions reside in the BlueXP 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 data 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

Several Google Cloud APIs must be enabled before you can deploy the Connector and Cloud Volumes ONTAP in Google Cloud.

Step

1. Enable the following Google Cloud APIs in your project:
    - 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 BlueXP backup and recovery with customer-managed encryption keys (CMEK))

Google Cloud documentation: Enabling APIs

Step 6: Create the Connector

Create a Connector directly from the BlueXP web-based console or by using gcloud.

About this task

Creating the Connector deploys a virtual machine instance in Google Cloud using a default configuration. After you create the Connector, you should not change to a smaller VM instance that has less CPU or RAM. Learn about the default configuration for the Connector.

BlueXP

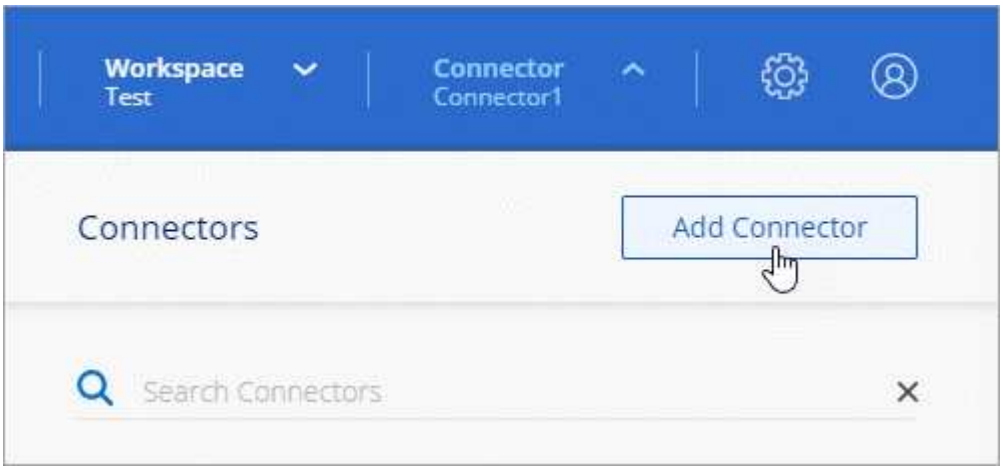
Before you begin

You should have the following:

- The required Google Cloud permissions to create the Connector and a service account for the Connector VM.
- A VPC and subnet that meets networking requirements.
- Details about a proxy server, if a proxy is required for internet access from the Connector.

Steps

1. Select the **Connector** drop-down and select **Add Connector**.



2. Choose **Google Cloud Platform** as your cloud provider.
3. On the **Deploying a Connector** 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 Connector:
   - 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.
   - **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

- **Review**: Review your selections to verify that your set up is correct.

5. Select **Add**.

   The instance should be ready in about 7 minutes. You should stay on the page until the process is complete.

Result

After the process is complete, the Connector is available for use from BlueXP.

If you have Google Cloud Storage buckets in the same Google Cloud account where you created the Connector, you'll see a Google Cloud Storage working environment appear on the BlueXP canvas automatically. Learn how to manage Google Cloud Storage from BlueXP

gcloud

Before you begin

You should have the following:

- The required Google Cloud permissions to create the Connector and a service account for the Connector VM.
- A VPC and subnet that meets networking requirements.
- An understanding of VM instance requirements.
  - **CPU**: 4 cores or 4 vCPUs
  - **RAM**: 14 GB
  - **Machine type**: We recommend n2-standard-4.

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

Steps

1. Log in to the gcloud SDK using your preferred methodology.

   In our examples, we'll use a local shell with the gcloud SDK installed, but you could use the native Google Cloud Shell in the Google Cloud console.

   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-4
  --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 Connector instance

network-path

(Optional) Add the name of the network to deploy the Connector into (for a Shared VPC, you need the full path)

subnet-path

(Optional) Add the name of the subnet to deploy the Connector into (for a Shared VPC, you need the full path)

kms-key-path

(Optional) Add a KMS key to encrypt the Connector'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 Connector using the NetApp golden image. The Connector instance and software should be running in approximately five minutes.

4. Open a web browser from a host that has a connection to the Connector instance and enter the following URL:

   https://*ipaddress*

5. After you log in, set up the Connector:
   a. Specify the BlueXP account to associate with the Connector.

      Learn about BlueXP accounts.

   b. Enter a name for the system.

Result

The Connector is now installed and set up with your BlueXP account.

Open a web browser and go to the BlueXP console to start using the Connector with BlueXP.

Manually install the Connector in Google Cloud

To manually install the Connector 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 Connector, and then provide the permissions that you prepared.

Before you begin

You should review Connector limitations.

Step 1: Review host requirements

The Connector software must run on a host that meets specific operating system requirements, RAM requirements, port requirements, and so on.

Dedicated host

The Connector is not supported on a host that is shared with other applications. The host must be a dedicated host.

Supported operating systems

- Ubuntu 22.04 LTS
- CentOS 7.6, 7.7, 7.8, and 7.9
- Red Hat Enterprise Linux 7.6, 7.7, 7.8, and 7.9

  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 Connector installation.

  The Connector is supported on English-language versions of these operating systems.

Hypervisor

A bare metal or hosted hypervisor that is certified to run Ubuntu, CentOS, or Red Hat Enterprise Linux is required.

Red Hat Solution: Which hypervisors are certified to run Red Hat Enterprise Linux?

CPU

4 cores or 4 vCPUs

RAM

14 GB

Google Cloud machine type

An instance type that meets the CPU and RAM requirements above. We recommend n2-standard-4.

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

Disk space in /opt

100 GiB of space must be available

Disk space in /var

20 GiB of space must be available

Docker Engine

Docker Engine is required on the host before you install the Connector.

- The minimum supported version is 19.3.1.
- The maximum supported version is 25.0.5.

  View installation instructions

Step 2: Set up networking

Set up your networking so the Connector 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

A Connector requires a network connection to the location where you're planning to create and manage working environments. 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 Connector must have an outbound internet connection to contact specific endpoints.

Endpoints contacted during manual installation

When you manually install the Connector on your own Linux host, the installer for the Connector requires access to the following URLs during the installation process:

- https://support.netapp.com
- https://mysupport.netapp.com
- https://cloudmanager.cloud.netapp.com/tenancy
- https://stream.cloudmanager.cloud.netapp.com
- https://production-artifacts.cloudmanager.cloud.netapp.com
- https://*.blob.core.windows.net
- https://cloudmanagerinfraprod.azurecr.io

  The host might try to update operating system packages during installation. The host can contact different mirroring sites for these OS packages.

Endpoints contacted from the Connector

The Connector requires outbound internet access to contact the following endpoints in order to manage resources and processes within your public cloud environment for day-to-day operations.

Note that 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://www.googleapis.com/deploymentmanager/v2/projects	To manage resources in Google Cloud.
https://support.netapp.com https://mysupport.netapp.com	To obtain licensing information and to send AutoSupport messages to NetApp support.

Endpoints	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	To provide SaaS features and services within BlueXP. Note that the Connector is currently contacting "cloudmanager.cloud.netapp.com" but it will start contacting "api.bluexp.netapp.com" in an upcoming release.
https://*.blob.core.windows.net https://cloudmanagerinfraprod.azurecr.io	To upgrade the Connector and its Docker components.

Proxy server

If your organization requires deployment of a proxy server for all outgoing internet traffic, obtain the following information about your HTTP or HTTPS proxy. You'll need to provide this information during installation.

- IP address
- Credentials
- HTTPS certificate

Note that BlueXP does not support transparent proxy servers.

Ports

There's no incoming traffic to the Connector, unless you initiate it or if the Connector 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, BlueXP automatically configures those systems to use a proxy server that's included with the Connector. The only requirement is to ensure that the Connector's security group allows inbound connections over port 3128. You'll need to open this port after you deploy the Connector.

Enable NTP

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

Step 3: Set up permissions for the Connector

A Google Cloud service account is required to provide the Connector with the permissions that BlueXP needs to manage resources in Google Cloud. When you create the Connector, you'll need to associate this service account with the Connector VM.

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 Connector.
   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 "connector" at the project level:

      ```
      gcloud iam roles create connector --project=myproject --file=connector.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 Connector resides, then you'll need to provide the Connector's service account with access to those projects.

   For example, let's say the Connector 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 Connector's service account.
      - Select the Connector's custom role.
      - Select **Save**.

   For more details, refer to Google Cloud documentation

Result

The service account for the Connector VM is set up.

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 Connector	Custom	Service Project	Connector deployment policy	compute.networkUser	Deploying the Connector in the service project
Connector service account	Custom	Service project	Connector 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: BlueXP service account as serviceAccount.user	N/A	(Optional) For data tiering and BlueXP 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 BlueXP 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 BlueXP 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 BlueXP create them for you. BlueXP will create 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 BlueXP create them for you. These permissions reside in the BlueXP 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 data 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

Several Google Cloud APIs must be enabled before you can deploy Cloud Volumes ONTAP systems in Google Cloud.

Step

1. Enable the following Google Cloud APIs in your project:
    - 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 BlueXP backup and recovery with customer-managed encryption keys (CMEK))

Google Cloud documentation: Enabling APIs

Step 6: Install the Connector

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 Connector.
- Details about a proxy server, if a proxy is required for internet access from the Connector.

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

  Note that BlueXP does not support transparent proxy servers.

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

About this task

The installer that is available on the NetApp Support Site might be an earlier version. After installation, the Connector automatically updates itself if a new version is available.

Steps

1. Verify that docker is enabled and running.

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

2. 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 will fail.

3. Download the Connector software from the NetApp Support Site, and then copy it to the Linux host.

   You should download the "online" Connector installer that’s meant for use in your network or in the cloud. A separate "offline" installer is available for the Connector, but it’s only supported with private mode deployments.

4. Assign permissions to run the script.

   ```
   chmod +x BlueXP-Connector-Cloud-<version>
   ```

   Where <version> is the version of the Connector that you downloaded.

5. Run the installation script.

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

   The --proxy and --cacert parameters are optional. If you have a proxy server, you will need to enter the parameters as shown. The installer doesn’t prompt you to provide information about a proxy.

   Here’s an example of the command using both optional parameters:

   ```
    ./BlueXP-Connector-Cloud-v3.9.38 --proxy
   https://user:password@10.0.0.30:8080/ --cacert
   /tmp/cacert/certificate.cer
   ```

   --proxy configures the Connector 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 the \ as shown above.
- BlueXP doesn't support passwords that include the @ character.

--cacert specifies a CA-signed certificate to use for HTTPS access between the Connector and the proxy server. This parameter is required only if you specify an HTTPS proxy server or if the proxy is an intercepting proxy.

6. Wait for the installation to complete.

   At the end of the installation, the Connector service (occm) restarts twice if you specified a proxy server.

7. Open a web browser from a host that has a connection to the Connector virtual machine and enter the following URL:

   https://*ipaddress*

8. After you log in, set up the Connector:
   a. Specify the BlueXP account to associate with the Connector.
   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 BlueXP in standard mode. You should enable restricted mode only if you have a secure environment and want to disconnect this account from BlueXP backend services. If that's the case, follow steps to get started with BlueXP in restricted mode.

   d. Select **Let's start**.

Result

The Connector is now installed and is set up with your BlueXP account.

If you have Google Cloud Storage buckets in the same Google Cloud account where you created the Connector, you'll see a Google Cloud Storage working environment appear on the BlueXP canvas automatically. Learn how to manage Google Cloud Storage from BlueXP

Step 7: Provide permissions to BlueXP

You need to provide BlueXP with the Google Cloud permissions that you previously set up. Providing the permissions enables BlueXP 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 Connector 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 BlueXP role to that project. You'll need to repeat this step for each project.

Result

BlueXP now has the permissions that it needs to perform actions in Google Cloud on your behalf.

Install and set up a Connector on premises

Install a Connector on premises and then log in and set it up to work with your BlueXP account.

Before you begin

You should review Connector limitations.

Step 1: Review host requirements

The Connector software must run on a host that meets specific operating system requirements, RAM requirements, port requirements, and so on. Ensure that your host meets these requirements before you install the Connector.

Dedicated host

The Connector is not supported on a host that is shared with other applications. The host must be a dedicated host.

Supported operating systems

- Ubuntu 22.04 LTS
- CentOS 7.6, 7.7, 7.8, and 7.9
- Red Hat Enterprise Linux 7.6, 7.7, 7.8, and 7.9

  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 Connector installation.

  The Connector is supported on English-language versions of these operating systems.

Hypervisor

A bare metal or hosted hypervisor that is certified to run Ubuntu, CentOS, or Red Hat Enterprise Linux is required.

Red Hat Solution: Which hypervisors are certified to run Red Hat Enterprise Linux?

CPU

4 cores or 4 vCPUs

RAM

14 GB

Disk space in /opt

100 GiB of space must be available

Disk space in /var

20 GiB of space must be available

Docker Engine

Docker Engine is required on the host before you install the Connector.

- The minimum supported version is 19.3.1.
- The maximum supported version is 25.0.5.

View installation instructions

Step 2: Set up networking

Set up your networking so the Connector 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

A Connector requires a network connection to the location where you're planning to create and manage working environments. 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 Connector must have an outbound internet connection to contact specific endpoints.

Endpoints contacted during manual installation

When you manually install the Connector on your own Linux host, the installer for the Connector requires access to the following URLs during the installation process:

- https://support.netapp.com
- https://mysupport.netapp.com
- https://cloudmanager.cloud.netapp.com/tenancy
- https://stream.cloudmanager.cloud.netapp.com
- https://production-artifacts.cloudmanager.cloud.netapp.com
- https://*.blob.core.windows.net
- https://cloudmanagerinfraprod.azurecr.io

  The host might try to update operating system packages during installation. The host can contact different mirroring sites for these OS packages.

Endpoints contacted from the Connector

The Connector requires outbound internet access to contact the following endpoints in order to manage resources and processes within your public cloud environment for day-to-day operations.

Note that 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 resources in AWS. The exact endpoint depends on the AWS region that you're using. Refer to AWS documentation for details
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://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://www.googleapis.com/deploymentmanager/v2/projects	To manage resources in Google Cloud.
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	To provide SaaS features and services within BlueXP. Note that the Connector is currently contacting "cloudmanager.cloud.netapp.com" but it will start contacting "api.bluexp.netapp.com" in an upcoming release.
https://*.blob.core.windows.net https://cloudmanagerinfraprod.azurecr.io	To upgrade the Connector and its Docker components.

Proxy server

If your organization requires deployment of a proxy server for all outgoing internet traffic, obtain the following information about your HTTP or HTTPS proxy. You'll need to provide this information during installation.

- IP address
- Credentials
- HTTPS certificate

Note that BlueXP does not support transparent proxy servers.

Ports

There's no incoming traffic to the Connector, unless you initiate it or if the Connector 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, BlueXP automatically configures those systems to use a proxy server that's included with the Connector. The only requirement is to ensure that the Connector's security group allows inbound connections over port 3128. You'll need to open this port after you deploy the Connector.

Enable NTP

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

Step 3: Set up cloud permissions

If you want to use BlueXP services in AWS or Azure with an on-premises Connector, then you need to set up permissions in your cloud provider so that you can add the credentials to the Connector after you install it.

Why not Google Cloud? When the Connector is installed on your premises, it can't manage your resources in Google Cloud. The Connector must be installed in Google Cloud to manage any resources that reside there.

AWS

When the Connector is installed on premises, you need to provide BlueXP with AWS permissions by adding access keys for an IAM user who has the required permissions.

You must use this authentication method if the Connector 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 Connector.
   c. Finish the remaining steps to create the policy.

      Depending on the BlueXP 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 Connector.
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 BlueXP after you install the Connector.

Result

You should now have access keys for an IAM user who has the required permissions. After you install the Connector, you'll need to associate these credentials with the Connector from BlueXP.

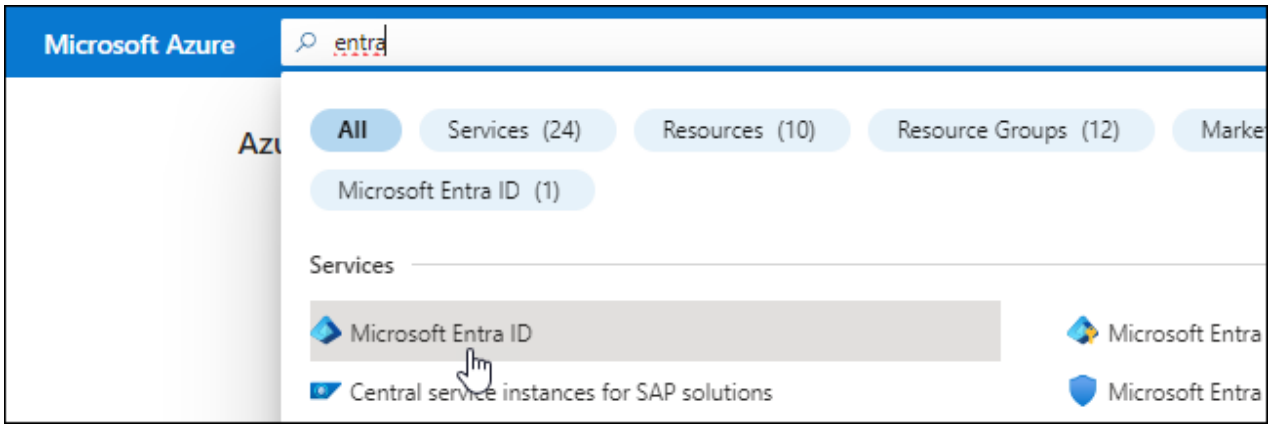
Azure

When the Connector is installed on premises, you need to provide BlueXP with Azure permissions by setting up a service principal in Microsoft Entra ID and obtaining the Azure credentials that BlueXP 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 BlueXP).
   - **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 Connector 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

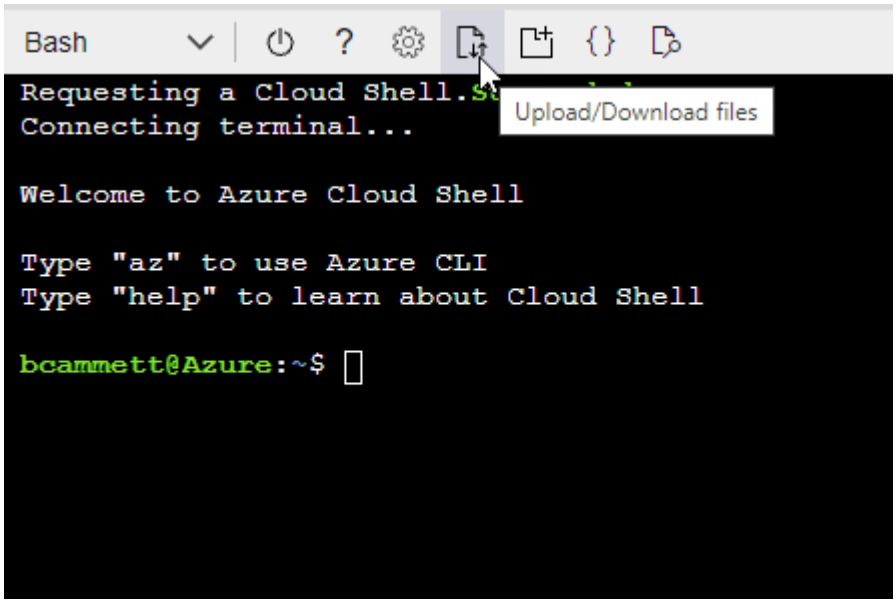
      ```
      "AssignableScopes": [
      "/subscriptions/d333af45-0d07-4154-943d-c25fbzzzzzzz",
      "/subscriptions/54b91999-b3e6-4599-908e-416e0zzzzzzz",
      "/subscriptions/398e471c-3b42-4ae7-9b59-ce5bbzzzzzzz"
      ```

   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.

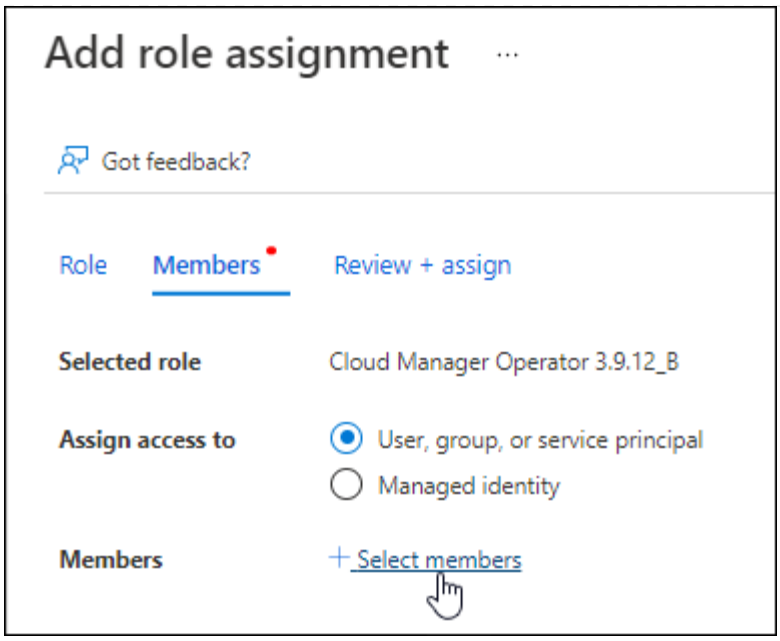


- Use the Azure CLI to create the custom role:

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

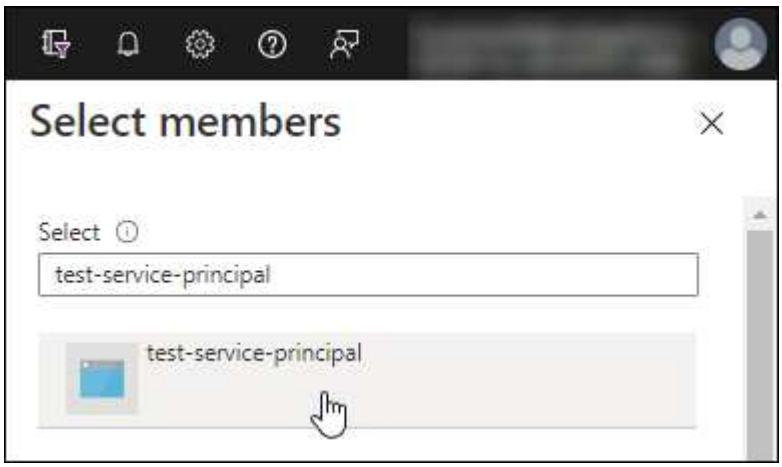
You should now have a custom role called BlueXP Operator that you can assign to the Connector virtual machine.

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 **BlueXP Operator** role and select **Next**.
   e. In the **Members** tab, complete the following steps:
      - Keep **User, group, or service principal** selected.
      - Select **Select members**.



- Search for the name of the application.

  Here's an example:



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

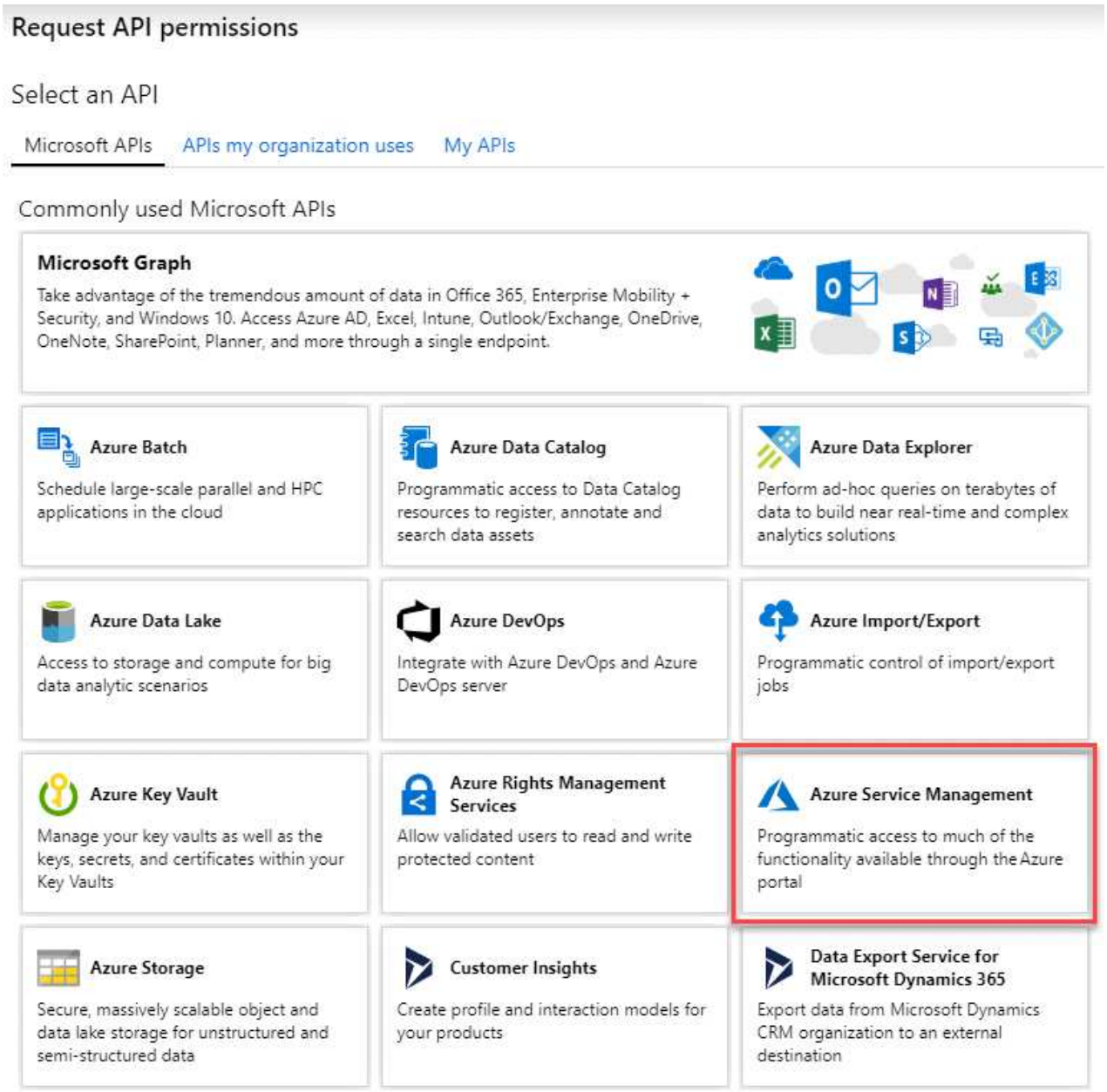
f. Select **Review + assign**.

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

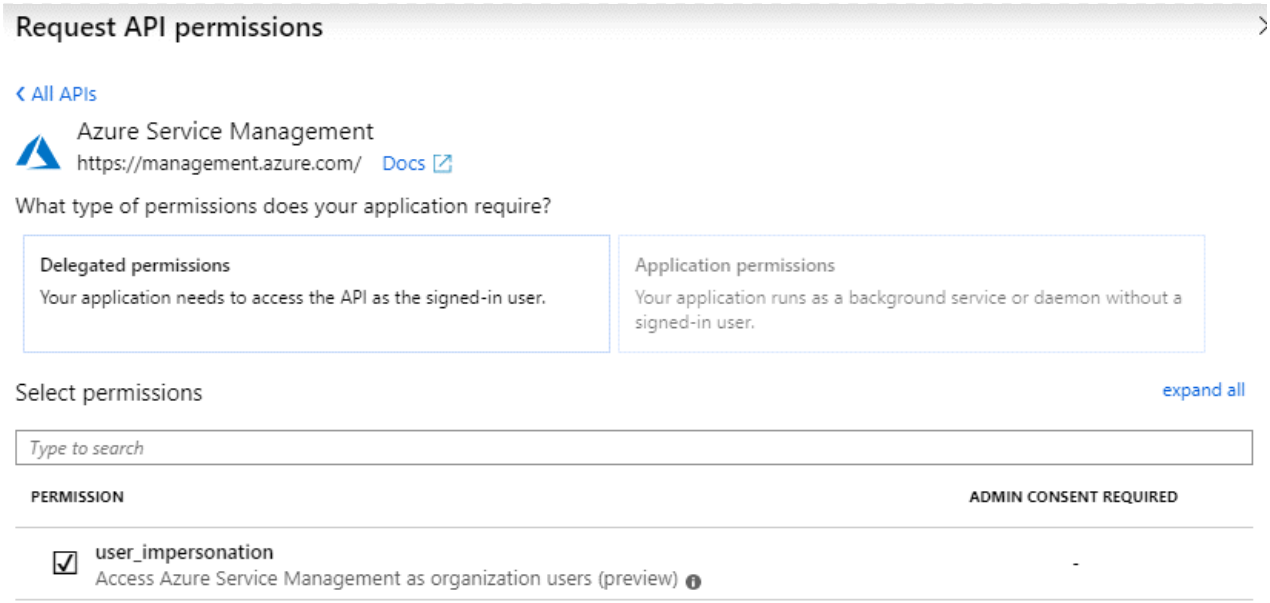
If you want to deploy Cloud Volumes ONTAP from multiple Azure subscriptions, then you must bind the service principal to each of those subscriptions. BlueXP enables you to select the subscription that you want to use when deploying Cloud Volumes ONTAP.

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**.

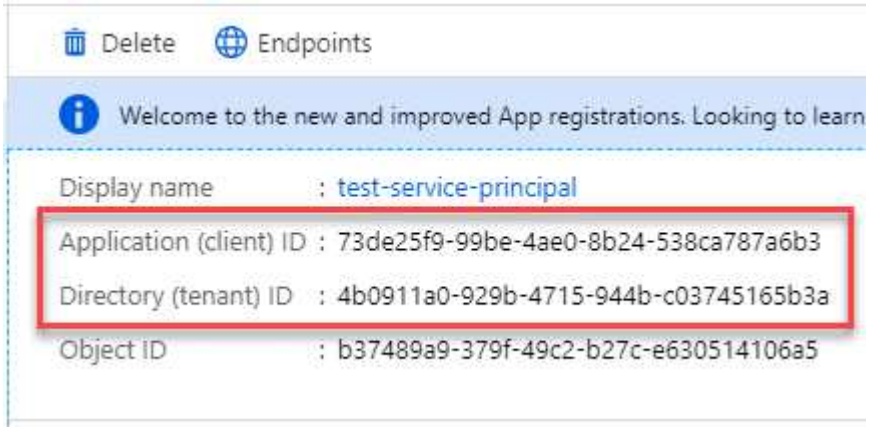


4. Select **Access Azure Service Management as organization users** and then select **Add permissions**.



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**.



When you add the Azure account to BlueXP, you need to provide the application (client) ID and the directory (tenant) ID for the application. BlueXP 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.

You now have a client secret that BlueXP can use it to authenticate with Microsoft Entra ID.

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. After you install the Connector, you'll need to associate these credentials with the Connector from BlueXP.

Step 4: Install the Connector

Download and install the Connector software on an existing Linux host on premises.

Before you begin

You should have the following:

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

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

  Note that BlueXP does not support transparent proxy servers.

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

About this task

The installer that is available on the NetApp Support Site might be an earlier version. After installation, the Connector automatically updates itself if a new version is available.

Steps

1. Verify that docker is enabled and running.

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

2. 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 will fail.

3. Download the Connector software from the NetApp Support Site, and then copy it to the Linux host.

   You should download the "online" Connector installer that's meant for use in your network or in the cloud. A separate "offline" installer is available for the Connector, but it's only supported with private mode deployments.

4. Assign permissions to run the script.

   ```
   chmod +x BlueXP-Connector-Cloud-<version>
   ```

   Where <version> is the version of the Connector that you downloaded.

5. Run the installation script.

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

   The --proxy and --cacert parameters are optional. If you have a proxy server, you will need to enter the parameters as shown. The installer doesn't prompt you to provide information about a proxy.

   Here's an example of the command using both optional parameters:

   ```
    ./BlueXP-Connector-Cloud-v3.9.38 --proxy
   https://user:password@10.0.0.30:8080/ --cacert
   /tmp/cacert/certificate.cer
   ```

   --proxy configures the Connector 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 the \ as shown above.
     - BlueXP doesn't support passwords that include the @ character.

   --cacert specifies a CA-signed certificate to use for HTTPS access between the Connector and the proxy server. This parameter is required only if you specify an HTTPS proxy server or if the proxy is an intercepting proxy.

Result

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

Step 5: Set up the Connector

Sign up or log in and then set up the Connector to work with your BlueXP account.

Steps

1. Open a web browser and enter the following URL:

   https://*ipaddress*

   ipaddress can be localhost, a private IP address, or a public IP address, depending on the configuration of the host. For example, if the Connector 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 Connector host.

2. Sign up or log in.
3. After you log in, set up BlueXP:
   a. Specify the BlueXP account to associate with the Connector.
   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 BlueXP in standard mode. (In addition, restricted mode isn't supported when the Connector is installed on premises.)

   d. Select **Let's start**.

Result

BlueXP is now set up with the Connector that you just installed.

Step 6: Provide permissions to BlueXP

After you install and set up the Connector, add your cloud credentials so that BlueXP has the required permissions to perform actions in AWS or Azure.

AWS

Before you begin

If you just created these credentials in AWS, it might take a few minutes until they are available for use. Wait a few minutes before you add the credentials to BlueXP.

Steps

1. In the upper right of the BlueXP console, select the Settings icon, and select **Credentials**.

2. Select **Add Credentials** and follow the steps in the wizard.
   a. **Credentials Location**: Select **Amazon Web Services > Connector**.
   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**.

Result

BlueXP now has the permissions that it needs to perform actions in AWS on your behalf.

You can now go to the BlueXP console to start using the Connector with BlueXP.

Azure

Before you begin

If you just created these credentials in Azure, it might take a few minutes until they are available for use. Wait a few minutes before you add the credentials to BlueXP.

Steps

1. In the upper right of the BlueXP console, select the Settings icon, and select **Credentials**.

2. Select **Add Credentials** and follow the steps in the wizard.
   a. **Credentials Location**: Select **Microsoft Azure > Connector**.
   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

BlueXP now has the permissions that it needs to perform actions in Azure on your behalf. You can now go to the BlueXP console to start using the Connector with BlueXP.

Subscribe to BlueXP (standard mode)

Subscribe to BlueXP from your cloud provider's marketplace to pay for BlueXP 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 BlueXP services:

- Backup and recovery
- Classification
- Cloud Volumes ONTAP
- Tiering

Before you begin

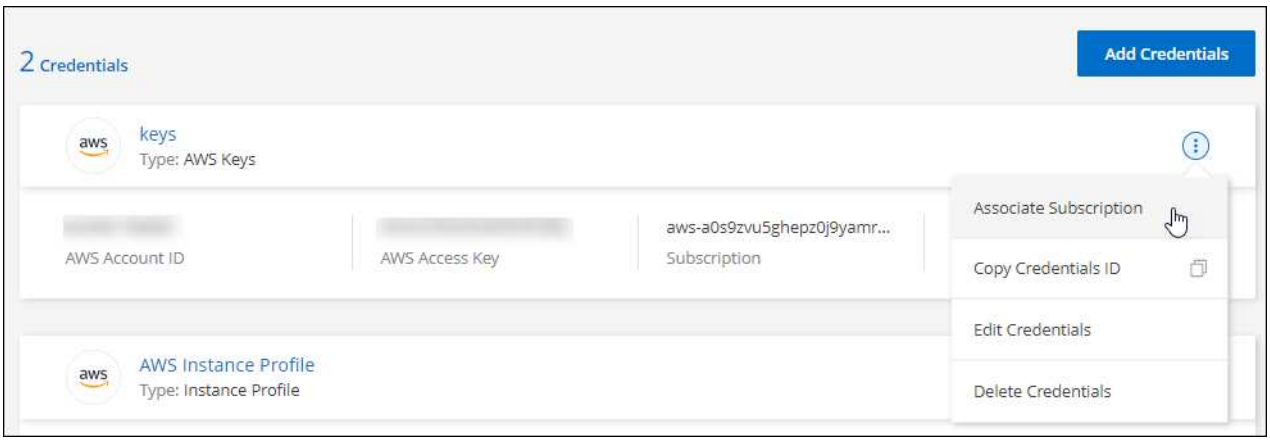
Subscribing to BlueXP involves associating a marketplace subscription with the cloud credentials that are associated with a Connector. If you followed the "Get started with standard mode" workflow, then you should already have a Connector. To learn more, view the Quick start for BlueXP in standard mode.

AWS

Steps

1. In the upper right of the BlueXP console, select the Settings icon, and select **Credentials**.
2. Select the action menu for a set of credentials and then select **Associate Subscription**.

   You must select credentials that are associated with a Connector. You can't associate a marketplace subscription with credentials that are associated with BlueXP.



3. To associate the credentials with an existing subscription, select the subscription from the down-down list and select **Associate**.
4. 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 BlueXP website.

   d. From the **Subscription Assignment** page:
      - Select the BlueXP 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 account with this new subscription.

        BlueXP replaces the existing subscription for all credentials in the 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 accounts, you'll need to manually associate the subscription by repeating these steps.

      - Select **Save**.

        The following video shows the steps to subscribe from the AWS Marketplace:

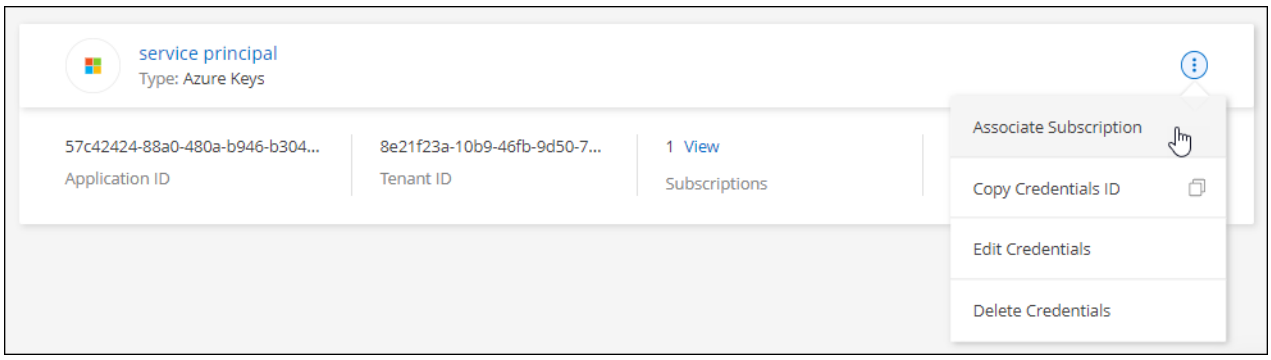
        Subscribe to BlueXP from the AWS Marketplace

Azure

Steps

1. In the upper right of the BlueXP console, select the Settings icon, and select **Credentials**.
2. Select the action menu for a set of credentials and then select **Associate Subscription**.

   You must select credentials that are associated with a Connector. You can't associate a marketplace subscription with credentials that are associated with BlueXP.



3. To associate the credentials with an existing subscription, select the subscription from the down-down list and select **Associate**.
4. 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 BlueXP website.

   e. From the **Subscription Assignment** page:
      - Select the BlueXP 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 account with this new subscription.

        BlueXP replaces the existing subscription for all credentials in the 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 accounts, you'll need to manually associate the subscription by repeating these steps.

      - Select **Save**.

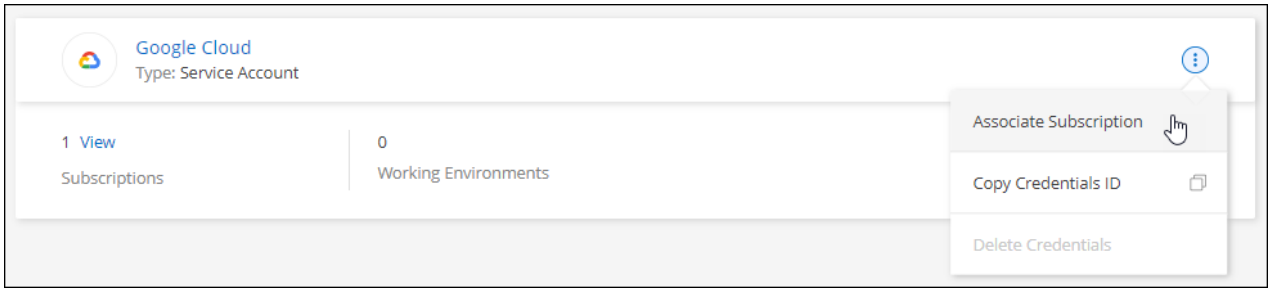
        The following video shows the steps to subscribe from the Azure Marketplace:

        Subscribe to BlueXP from the Azure Marketplace

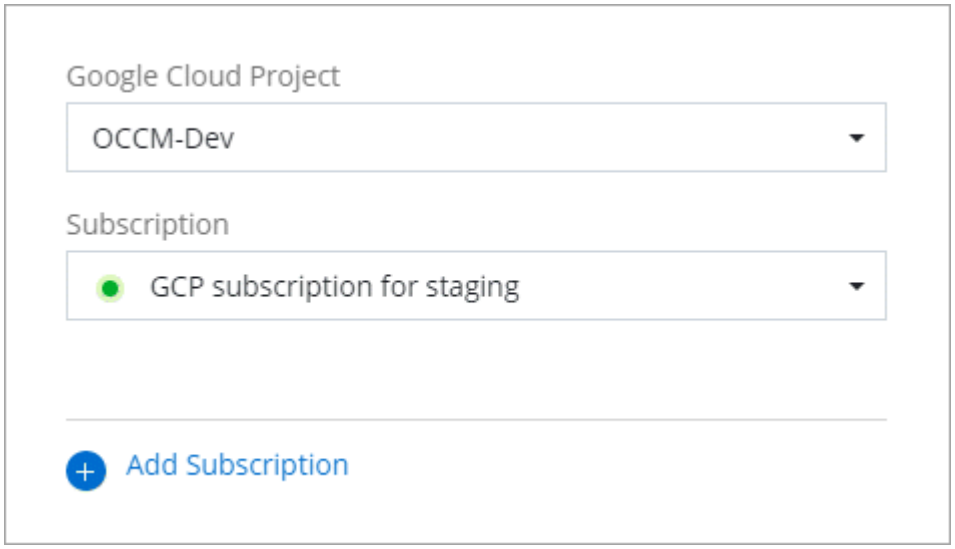
Google Cloud

Steps

1. In the upper right of the BlueXP console, select the Settings icon, and select **Credentials**.
2. Select the action menu for a set of credentials and then select **Associate Subscription**.



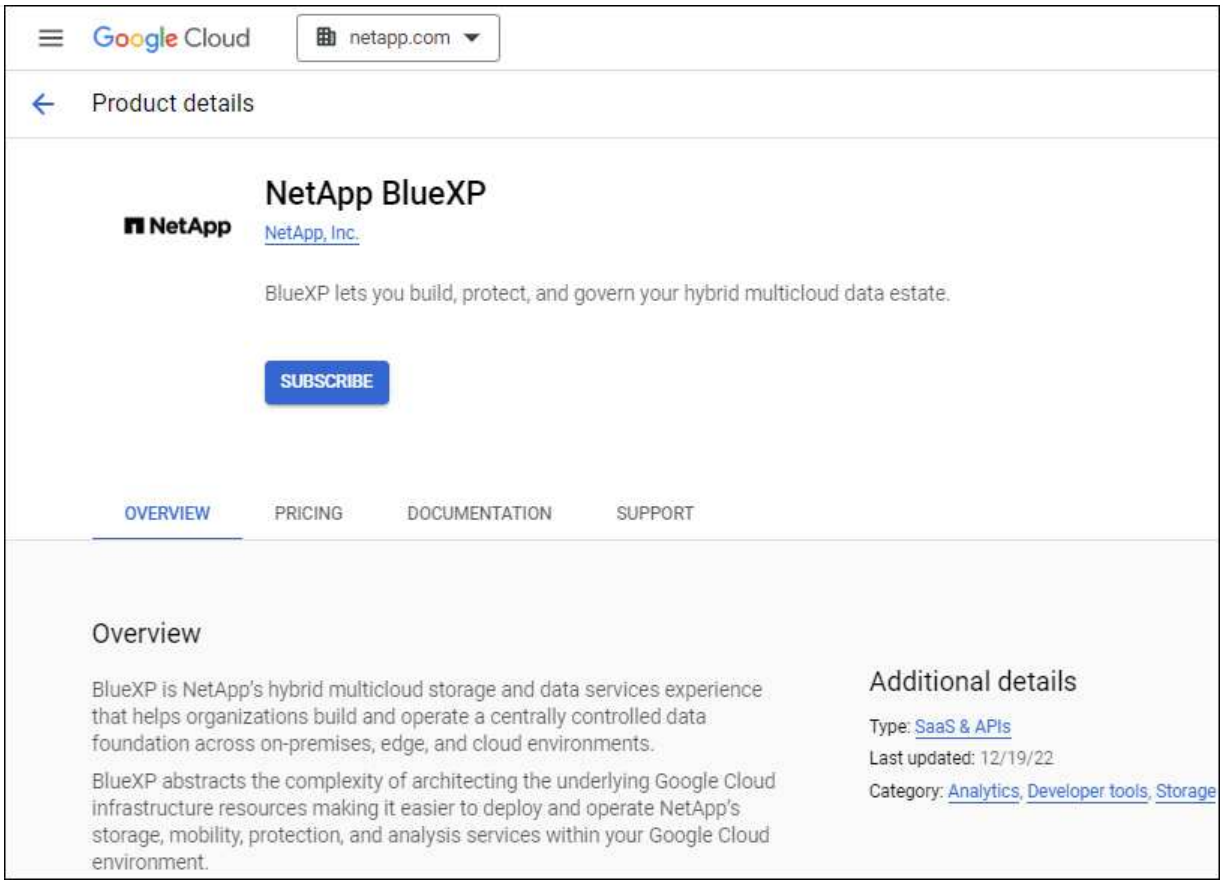
3. To associate the credentials with an existing subscription, select a Google Cloud project and subscription from the down-down list, and then select **Associate**.



4. 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 BlueXP login.

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



b. Select **Subscribe**.

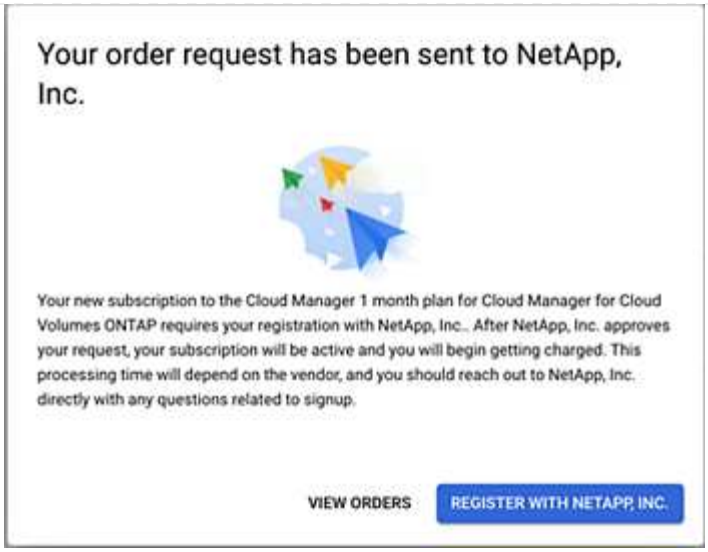
c. Select the appropriate billing account and agree to the terms and conditions.

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 to your BlueXP account. The process of linking a subscription isn't complete until you are redirected from this page and then sign in to BlueXP.



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

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

- Select the BlueXP 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 account with this new subscription.

  BlueXP replaces the existing subscription for all credentials in the 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.

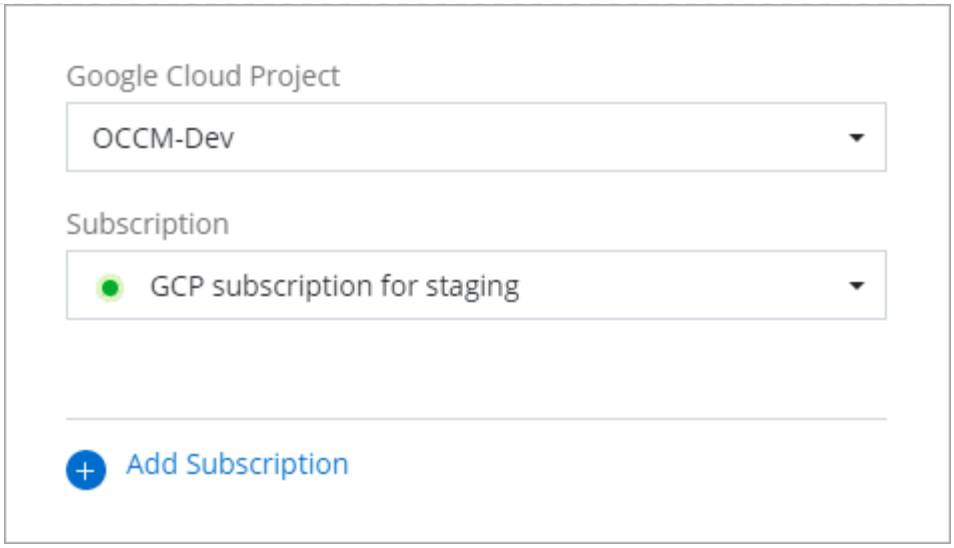
  For all other accounts, you'll need to manually associate the subscription by repeating these steps.

- Select **Save**.

  The following video shows the steps to subscribe from the Google Cloud Marketplace:

  Subscribe to BlueXP from the Google Cloud Marketplace

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



Related links

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

What you can do next (standard mode)

Now that you've logged in and set up BlueXP in standard mode, users can create and discover working environments and use BlueXP data services.

If you installed a Connector in AWS, Microsoft Azure, or Google Cloud, then BlueXP automatically discovers information about the Amazon S3 buckets, Azure Blob storage, or Google Cloud Storage buckets in the location where the Connector is installed. A working environment is automatically added to the BlueXP canvas.

For help, go to the home page for the BlueXP documentation to view the docs for all BlueXP services.

Related link

BlueXP deployment modes

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