



Permissions

Set up and administration

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Permissions

Permissions summary for BlueXP

In order to use the features and services in BlueXP, you'll need to provide permissions so that BlueXP can perform operations in your cloud environment. Use the links on this page to quickly access the permissions that you need based on your goal.

AWS permissions

| Purpose | Description | Link |
|-------------------------------|---|--|
| Connector deployment | The user who creates a Connector from BlueXP needs specific permissions to deploy the instance in AWS. | Create a Connector in AWS from BlueXP |
| Connector operation | <p>When BlueXP launches the Connector, it attaches a policy to the instance that provides the permissions required to manage resources and processes in your AWS account.</p> <p>You need to set up the policy yourself if you launch a Connector from the marketplace or if you add more AWS credentials to a Connector.</p> <p>You also need to ensure that the policy is up to date as new permissions are added in subsequent releases.</p> | AWS permissions for the Connector |
| Cloud Volumes ONTAP operation | An IAM role must be attached to each Cloud Volumes ONTAP node in AWS. The same is true for the HA mediator. The default option is to let BlueXP create the IAM roles for you, but you can use your own. | Learn how to set up the IAM roles yourself |

Azure permissions

| Purpose | Description | Link |
|----------------------|--|---|
| Connector deployment | When you deploy a Connector from BlueXP, you need to use an Azure account or service principal that has permissions to deploy the Connector VM in Azure. | Create a Connector in Azure from BlueXP |

| Purpose | Description | Link |
|---------------------|--|---|
| Connector operation | <p>When BlueXP deploys the Connector VM in Azure, it creates a custom role that provides the permissions required to manage resources and processes within that Azure subscription.</p> <p>You need to set up the custom role yourself if you launch a Connector from the marketplace or if you add more Azure credentials to a Connector.</p> <p>You also need to ensure that the policy is up to date as new permissions are added in subsequent releases.</p> | Azure permissions for the Connector |

Google Cloud permissions

| Purpose | Description | Link |
|----------------------|---|--|
| Connector deployment | The Google Cloud user who deploys a Connector from BlueXP needs specific permissions to deploy the Connector in Google Cloud. | Set up permissions to deploy the Connector |
| Connector operation | <p>The service account for the Connector VM instance must have specific permissions for day-to-day operations. You need to associate the service account with the Connector when you deploy it from BlueXP.</p> <p>You also need to ensure that the policy is up to date as new permissions are added in subsequent releases.</p> | Set up a service account for the Connector |

AWS permissions for the Connector

When BlueXP launches the Connector instance in AWS, it attaches a policy to the instance that provides the Connector with permissions to manage resources and processes within that AWS account. The Connector uses the permissions to make API calls to several AWS services, including EC2, S3, CloudFormation, IAM, the Key Management Service (KMS), and more.

IAM policies

The IAM policies available below provide the permissions that a Connector needs to manage resources and processes within your public cloud environment based on your AWS region.

If you create a Connector in a standard AWS region directly from BlueXP, BlueXP automatically applies policies to the Connector. You don't need to do anything in this case.

If you deploy the Connector from the AWS Marketplace or if you manually install the Connector on a Linux host, then you'll need to set up the policies yourself.

You also need to ensure that the policies are up to date as new permissions are added in subsequent releases.

Select your region to view the required policies:

Standard regions

For standard regions, the permissions are spread across two policies. Two policies are required due to a maximum character size limit for managed policies in AWS.

The first policy provides permissions for the following services:

- Cloud Backup
- Cloud Data Sense
- Cloud Tiering
- Cloud Volumes ONTAP
- FSx for ONTAP
- S3 bucket discovery

The second policy provides permissions for the following services:

- AppTemplate tagging
- Global File Cache
- Kubernetes

Policy #1

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "cvoServicePolicy",
      "Effect": "Allow",
      "Action": [
        "ec2:DescribeInstances",
        "ec2:DescribeInstanceStatus",
        "ec2:RunInstances",
        "ec2:ModifyInstanceAttribute",
        "ec2:DescribeInstanceAttribute",
        "ec2:DescribeRouteTables",
        "ec2:DescribeImages",
        "ec2:CreateTags",
        "ec2:CreateVolume",
        "ec2:DescribeVolumes",
        "ec2:ModifyVolumeAttribute",
        "ec2:CreateSecurityGroup",
        "ec2:DescribeSecurityGroups",
        "ec2:RevokeSecurityGroupEgress",
        "ec2:AuthorizeSecurityGroupEgress",
        "ec2:AuthorizeSecurityGroupIngress",
        "ec2:RevokeSecurityGroupIngress",
        "ec2:CreateNetworkInterface",
        "ec2:DescribeNetworkInterfaces",
        "ec2:ModifyNetworkInterfaceAttribute",
        "ec2:DescribeSubnets",
        "ec2:DescribeVpcs",
        "ec2:DescribeDhcpOptions",
        "ec2:CreateSnapshot",
        "ec2:DescribeSnapshots",
        "ec2:GetConsoleOutput",
        "ec2:DescribeKeyPairs",
        "ec2:DescribeRegions",
        "ec2:DescribeTags",
        "ec2:AssociateIamInstanceProfile",
        "ec2:DescribeIamInstanceProfileAssociations",
        "ec2:DisassociateIamInstanceProfile",
        "ec2:CreatePlacementGroup",
        "ec2:DescribeReservedInstancesOfferings",
        "ec2:AssignPrivateIpAddresses",
        "ec2:CreateRoute",
        "ec2:DescribeVpcs",
```

```
"ec2:ReplaceRoute",
"ec2:UnassignPrivateIpAddresses",
"ec2:DeleteSecurityGroup",
"ec2:DeleteNetworkInterface",
"ec2:DeleteSnapshot",
"ec2:DeleteTags",
"ec2:DeleteRoute",
"ec2:DeletePlacementGroup",
"ec2:DescribePlacementGroups",
"cloudformation:CreateStack",
"cloudformation:DescribeStacks",
"cloudformation:DescribeStackEvents",
"cloudformation:ValidateTemplate",
"cloudformation:DeleteStack",
"iam:PassRole",
"iam:CreateRole",
"iam:PutRolePolicy",
"iam:CreateInstanceProfile",
"iam:AddRoleToInstanceProfile",
"iam:RemoveRoleFromInstanceProfile",
"iam:ListInstanceProfiles",
"iam:DeleteRole",
"iam:DeleteRolePolicy",
"iam:DeleteInstanceProfile",
"iam:GetRolePolicy",
"iam:GetRole",
"sts:DecodeAuthorizationMessage",
"sts:AssumeRole",
"s3:GetBucketTagging",
"s3:GetBucketLocation",
"s3:ListBucket",
"s3:CreateBucket",
"s3:GetLifecycleConfiguration",
"s3:ListBucketVersions",
"s3:GetBucketPolicyStatus",
"s3:GetBucketPublicAccessBlock",
"s3:GetBucketPolicy",
"s3:GetBucketAcl",
"s3:PutObjectTagging",
"s3:GetObjectTagging",
"s3:DeleteObject",
"s3:DeleteObjectVersion",
"s3:PutObject",
"s3:ListAllMyBuckets",
"s3:GetObject",
"s3:GetEncryptionConfiguration",
```



```

        "kms:List*",
        "kms:ReEncrypt*",
        "kms:Describe*",
        "kms:CreateGrant",
        "ce:GetReservationUtilization",
        "ce:GetDimensionValues",
        "ce:GetCostAndUsage",
        "ce:GetTags",
        "fsx:Describe*",
        "fsx:List*"
    ],
    "Resource": "*"
},
{
    "Sid": "backupPolicy",
    "Effect": "Allow",
    "Action": [
        "ec2:StartInstances",
        "ec2:StopInstances",
        "ec2:DescribeInstances",
        "ec2:DescribeInstanceStatus",
        "ec2:RunInstances",
        "ec2:TerminateInstances",
        "ec2:DescribeInstanceAttribute",
        "ec2:DescribeImages",
        "ec2:CreateTags",
        "ec2:CreateVolume",
        "ec2:CreateSecurityGroup",
        "ec2:DescribeSubnets",
        "ec2:DescribeVpcs",
        "ec2:DescribeRegions",
        "cloudformation:CreateStack",
        "cloudformation>DeleteStack",
        "cloudformation:DescribeStacks",
        "kms:List*",
        "kms:Describe*",
        "ec2:describeVpcEndpoints",
        "kms:ListAliases",
        "athena:StartQueryExecution",
        "athena:GetQueryResults",
        "athena:GetQueryExecution",
        "glue:GetDatabase",
        "glue:GetTable",
        "glue:CreateTable",
        "glue:CreateDatabase",
        "glue:GetPartitions",
    ]
}

```

```

        "glue:BatchCreatePartition",
        "glue:BatchDeletePartition"
    ],
    "Resource": "*"
},
{
    "Sid": "backupS3Policy",
    "Effect": "Allow",
    "Action": [
        "s3:GetBucketLocation",
        "s3:ListAllMyBuckets",
        "s3:ListBucket",
        "s3:CreateBucket",
        "s3:GetLifecycleConfiguration",
        "s3:PutLifecycleConfiguration",
        "s3:PutBucketTagging",
        "s3:ListBucketVersions",
        "s3:GetBucketAcl",
        "s3:PutBucketPublicAccessBlock",
        "s3:GetObject",
        "s3:PutEncryptionConfiguration",
        "s3:DeleteObject",
        "s3:DeleteObjectVersion",
        "s3:ListBucketMultipartUploads",
        "s3:PutObject",
        "s3:PutBucketAcl",
        "s3:AbortMultipartUpload",
        "s3:ListMultipartUploadParts",
        "s3:DeleteBucket",
        "s3:GetObjectVersionTagging",
        "s3:GetObjectVersionAcl",
        "s3:GetObjectRetention",
        "s3:GetObjectTagging",
        "s3:GetObjectVersion",
        "s3:PutObjectVersionTagging",
        "s3:PutObjectRetention",
        "s3:DeleteObjectTagging",
        "s3:DeleteObjectVersionTagging",
        "s3:GetBucketObjectLockConfiguration",
        "s3:GetBucketVersioning",
        "s3:PutBucketObjectLockConfiguration",
        "s3:PutBucketVersioning",
        "s3:BypassGovernanceRetention",
        "s3:PutBucketPolicy",
        "s3:PutBucketOwnershipControls"
    ],

```

```

        "Resource": [
            "arn:aws:s3:::netapp-backup-*"
        ]
    },
    {
        "Sid": "fabricPoolS3Policy",
        "Effect": "Allow",
        "Action": [
            "s3:CreateBucket",
            "s3:GetLifecycleConfiguration",
            "s3:PutLifecycleConfiguration",
            "s3:PutBucketTagging",
            "s3:ListBucketVersions",
            "s3:GetBucketPolicyStatus",
            "s3:GetBucketPublicAccessBlock",
            "s3:GetBucketAcl",
            "s3:GetBucketPolicy",
            "s3:PutBucketPublicAccessBlock",
            "s3>DeleteBucket"
        ],
        "Resource": [
            "arn:aws:s3:::fabric-pool*"
        ]
    },
    {
        "Sid": "fabricPoolPolicy",
        "Effect": "Allow",
        "Action": [
            "ec2:DescribeRegions"
        ],
        "Resource": "*"
    },
    {
        "Effect": "Allow",
        "Action": [
            "ec2:StartInstances",
            "ec2:StopInstances",
            "ec2:TerminateInstances"
        ],
        "Condition": {
            "StringLike": {
                "ec2:ResourceTag/netapp-adc-manager": "*"
            }
        },
        "Resource": [
            "arn:aws:ec2:*:*:instance/*"
        ]
    }
}

```

```

    ]
  },
  {
    "Effect": "Allow",
    "Action": [
      "ec2:StartInstances",
      "ec2:TerminateInstances",
      "ec2:AttachVolume",
      "ec2:DetachVolume",
      "ec2:StopInstances",
      "ec2>DeleteVolume"
    ],
    "Condition": {
      "StringLike": {
        "ec2:ResourceTag/WorkingEnvironment": "*"
      }
    },
    "Resource": [
      "arn:aws:ec2:*:*:instance/*"
    ]
  },
  {
    "Effect": "Allow",
    "Action": [
      "ec2:AttachVolume",
      "ec2:DetachVolume"
    ],
    "Resource": [
      "arn:aws:ec2:*:*:volume/*"
    ]
  },
  {
    "Effect": "Allow",
    "Action": [
      "ec2>DeleteVolume"
    ],
    "Condition": {
      "StringLike": {
        "ec2:ResourceTag/WorkingEnvironment": "*"
      }
    },
    "Resource": [
      "arn:aws:ec2:*:*:volume/*"
    ]
  }
]

```

```
}
```

Policy #2

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "K8sServicePolicy",
      "Effect": "Allow",
      "Action": [
        "ec2:DescribeRegions",
        "eks:ListClusters",
        "eks:DescribeCluster",
        "iam:GetInstanceProfile"
      ],
      "Resource": "*"
    },
    {
      "Sid": "GFCservicePolicy",
      "Effect": "Allow",
      "Action": [
        "cloudformation:DescribeStacks",
        "cloudwatch:GetMetricStatistics",
        "cloudformation:ListStacks"
      ],
      "Resource": "*"
    },
    {
      "Effect": "Allow",
      "Action": [
        "ec2:StartInstances",
        "ec2:TerminateInstances",
        "ec2:AttachVolume",
        "ec2:DetachVolume"
      ],
      "Condition": {
        "StringLike": {
          "ec2:ResourceTag/GFCInstance": "*"
        }
      },
      "Resource": [
        "arn:aws:ec2:*:*:instance/*"
      ]
    },
    {
```

```
"Sid": "tagServicePolicy",
"Effect": "Allow",
"Action": [
    "ec2:CreateTags",
    "ec2>DeleteTags",
    "ec2:DescribeTags",
    "tag:getResources",
    "tag:getTagKeys",
    "tag:getTagValues",
    "tag:TagResources",
    "tag:UntagResources"
],
"Resource": "*"
}
]
}
```

```

{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "iam:ListInstanceProfiles",
        "iam:CreateRole",
        "iam>DeleteRole",
        "iam:PutRolePolicy",
        "iam:CreateInstanceProfile",
        "iam>DeleteRolePolicy",
        "iam:AddRoleToInstanceProfile",
        "iam:RemoveRoleFromInstanceProfile",
        "iam>DeleteInstanceProfile",
        "ec2:ModifyVolumeAttribute",
        "sts:DecodeAuthorizationMessage",
        "ec2:DescribeImages",
        "ec2:DescribeRouteTables",
        "ec2:DescribeInstances",
        "iam:PassRole",
        "ec2:DescribeInstanceStatus",
        "ec2:RunInstances",
        "ec2:ModifyInstanceAttribute",
        "ec2:CreateTags",
        "ec2:CreateVolume",
        "ec2:DescribeVolumes",
        "ec2>DeleteVolume",
        "ec2:CreateSecurityGroup",
        "ec2>DeleteSecurityGroup",
        "ec2:DescribeSecurityGroups",
        "ec2:RevokeSecurityGroupEgress",
        "ec2:AuthorizeSecurityGroupEgress",
        "ec2:AuthorizeSecurityGroupIngress",
        "ec2:RevokeSecurityGroupIngress",
        "ec2:CreateNetworkInterface",
        "ec2:DescribeNetworkInterfaces",
        "ec2>DeleteNetworkInterface",
        "ec2:ModifyNetworkInterfaceAttribute",
        "ec2:DescribeSubnets",
        "ec2:DescribeVpcs",
        "ec2:DescribeDhcpOptions",
        "ec2:CreateSnapshot",
        "ec2>DeleteSnapshot",

```

```

        "ec2:DescribeSnapshots",
        "ec2:StopInstances",
        "ec2:GetConsoleOutput",
        "ec2:DescribeKeyPairs",
        "ec2:DescribeRegions",
        "ec2>DeleteTags",
        "ec2:DescribeTags",
        "cloudformation:CreateStack",
        "cloudformation>DeleteStack",
        "cloudformation:DescribeStacks",
        "cloudformation:DescribeStackEvents",
        "cloudformation:ValidateTemplate",
        "s3:GetObject",
        "s3:ListBucket",
        "s3:ListAllMyBuckets",
        "s3:GetBucketTagging",
        "s3:GetBucketLocation",
        "s3:CreateBucket",
        "s3:GetBucketPolicyStatus",
        "s3:GetBucketPublicAccessBlock",
        "s3:GetBucketAcl",
        "s3:GetBucketPolicy",
        "kms:List*",
        "kms:ReEncrypt*",
        "kms:Describe*",
        "kms:CreateGrant",
        "ec2:AssociateIamInstanceProfile",
        "ec2:DescribeIamInstanceProfileAssociations",
        "ec2:DisassociateIamInstanceProfile",
        "ec2:DescribeInstanceAttribute",
        "ce:GetReservationUtilization",
        "ce:GetDimensionValues",
        "ce:GetCostAndUsage",
        "ce:GetTags",
        "ec2:CreatePlacementGroup",
        "ec2>DeletePlacementGroup"
    ],
    "Resource": "*"
},
{
    "Sid": "fabricPoolPolicy",
    "Effect": "Allow",
    "Action": [
        "s3>DeleteBucket",
        "s3:GetLifecycleConfiguration",
        "s3:PutLifecycleConfiguration",

```



```

        "s3:PutBucketTagging",
        "s3:ListBucketVersions",
        "s3:GetBucketPolicyStatus",
        "s3:GetBucketPublicAccessBlock",
        "s3:GetBucketAcl",
        "s3:GetBucketPolicy",
        "s3:PutBucketPublicAccessBlock"
    ],
    "Resource": [
        "arn:aws-us-gov:s3:::fabric-pool*"
    ]
},
{
    "Sid": "backupPolicy",
    "Effect": "Allow",
    "Action": [
        "s3:DeleteBucket",
        "s3:GetLifecycleConfiguration",
        "s3:PutLifecycleConfiguration",
        "s3:PutBucketTagging",
        "s3:ListBucketVersions",
        "s3:GetObject",
        "s3:ListBucket",
        "s3:ListAllMyBuckets",
        "s3:GetBucketTagging",
        "s3:GetBucketLocation",
        "s3:GetBucketPolicyStatus",
        "s3:GetBucketPublicAccessBlock",
        "s3:GetBucketAcl",
        "s3:GetBucketPolicy",
        "s3:PutBucketPublicAccessBlock"
    ],
    "Resource": [
        "arn:aws-us-gov:s3:::netapp-backup-*"
    ]
},
{
    "Effect": "Allow",
    "Action": [
        "ec2:StartInstances",
        "ec2:TerminateInstances",
        "ec2:AttachVolume",
        "ec2:DetachVolume"
    ],
    "Condition": {
        "StringLike": {

```

```

        "ec2:ResourceTag/WorkingEnvironment": "*"
    },
    "Resource": [
        "arn:aws-us-gov:ec2:*:*:instance/*"
    ],
    {
        "Effect": "Allow",
        "Action": [
            "ec2:AttachVolume",
            "ec2:DetachVolume"
        ],
        "Resource": [
            "arn:aws-us-gov:ec2:*:*:volume/*"
        ]
    }
]
}

```

```

{
  "Version": "2012-10-17",
  "Statement": [{
    "Effect": "Allow",
    "Action": [
      "ec2:DescribeInstances",
      "ec2:DescribeInstanceStatus",
      "ec2:RunInstances",
      "ec2:ModifyInstanceAttribute",
      "ec2:DescribeRouteTables",
      "ec2:DescribeImages",
      "ec2:CreateTags",
      "ec2:CreateVolume",
      "ec2:DescribeVolumes",
      "ec2:ModifyVolumeAttribute",
      "ec2>DeleteVolume",
      "ec2:CreateSecurityGroup",
      "ec2>DeleteSecurityGroup",
      "ec2:DescribeSecurityGroups",
      "ec2:RevokeSecurityGroupEgress",
      "ec2:RevokeSecurityGroupIngress",
      "ec2:AuthorizeSecurityGroupEgress",
      "ec2:AuthorizeSecurityGroupIngress",
      "ec2:CreateNetworkInterface",
      "ec2:DescribeNetworkInterfaces",
      "ec2>DeleteNetworkInterface",
      "ec2:ModifyNetworkInterfaceAttribute",
      "ec2:DescribeSubnets",
      "ec2:DescribeVpcs",
      "ec2:DescribeDhcpOptions",
      "ec2:CreateSnapshot",
      "ec2>DeleteSnapshot",
      "ec2:DescribeSnapshots",
      "ec2:GetConsoleOutput",
      "ec2:DescribeKeyPairs",
      "ec2:DescribeRegions",
      "ec2>DeleteTags",
      "ec2:DescribeTags",
      "cloudformation:CreateStack",
      "cloudformation>DeleteStack",
      "cloudformation:DescribeStacks",
      "cloudformation:DescribeStackEvents",
      "cloudformation:ValidateTemplate",
      "iam:PassRole",

```

```

        "iam:CreateRole",
        "iam:DeleteRole",
        "iam:PutRolePolicy",
        "iam:CreateInstanceProfile",
        "iam:DeleteRolePolicy",
        "iam:AddRoleToInstanceProfile",
        "iam:RemoveRoleFromInstanceProfile",
        "iam:DeleteInstanceProfile",
        "s3:GetObject",
        "s3:ListBucket",
        "s3:GetBucketTagging",
        "s3:GetBucketLocation",
        "s3:ListAllMyBuckets",
        "kms:List*",
        "kms:Describe*",
        "ec2:AssociateIamInstanceProfile",
        "ec2:DescribeIamInstanceProfileAssociations",
        "ec2:DisassociateIamInstanceProfile",
        "ec2:DescribeInstanceAttribute",
        "ec2:CreatePlacementGroup",
        "ec2:DeletePlacementGroup",
        "iam:ListInstanceProfiles"
    ],
    "Resource": "*"
},
{
    "Sid": "fabricPoolPolicy",
    "Effect": "Allow",
    "Action": [
        "s3:DeleteBucket",
        "s3:GetLifecycleConfiguration",
        "s3:PutLifecycleConfiguration",
        "s3:PutBucketTagging",
        "s3:ListBucketVersions"
    ],
    "Resource": [
        "arn:aws-iso:s3:::fabric-pool*"
    ]
},
{
    "Effect": "Allow",
    "Action": [
        "ec2:StartInstances",
        "ec2:StopInstances",
        "ec2:TerminateInstances",
        "ec2:AttachVolume",

```

```

        "ec2:DetachVolume"
    ],
    "Condition": {
        "StringLike": {
            "ec2:ResourceTag/WorkingEnvironment": "*"
        }
    },
    "Resource": [
        "arn:aws-iso:ec2:*:*:instance/*"
    ]
},
{
    "Effect": "Allow",
    "Action": [
        "ec2:AttachVolume",
        "ec2:DetachVolume"
    ],
    "Resource": [
        "arn:aws-iso:ec2:*:*:volume/*"
    ]
}
]
}

```

How the AWS permissions are used

The following sections describe how the permissions are used for each NetApp cloud service. This information can be helpful if your corporate policies dictate that permissions are only provided as needed.

AppTemplate tags

The Connector makes the following API requests to manage tags on AWS resources when you use the AppTemplate Tagging service:

- ec2:CreateTags
- ec2>DeleteTags
- ec2:DescribeTags
- tag:getResources
- tag:getTagKeys
- tag:getTagValues
- tag:TagResources
- tag:UntagResources

Cloud Backup

The Connector makes the following API requests to deploy the restore instance for Cloud Backup:

- ec2:StartInstances
- ec2:StopInstances
- ec2:DescribeInstances
- ec2:DescribeInstanceStatus
- ec2:RunInstances
- ec2:TerminateInstances
- ec2:DescribeInstanceAttribute
- ec2:DescribeImages
- ec2:CreateTags
- ec2:CreateVolume
- ec2:CreateSecurityGroup
- ec2:DescribeSubnets
- ec2:DescribeVpcs
- ec2:DescribeRegions
- cloudformation:CreateStack
- cloudformation>DeleteStack
- cloudformation:DescribeStacks

The Connector makes the following API requests to manage backups in Amazon S3:

- s3:GetBucketLocation
- s3:ListAllMyBuckets
- s3:ListBucket
- s3:CreateBucket
- s3:GetLifecycleConfiguration
- s3:PutLifecycleConfiguration
- s3:PutBucketTagging
- s3:ListBucketVersions
- s3:GetBucketAcl
- s3:PutBucketPublicAccessBlock
- kms:List*
- kms:Describe*
- s3:GetObject
- ec2:describeVpcEndpoints
- kms:ListAliases
- s3:PutEncryptionConfiguration

The Connector makes the following API requests when you use the Search & Restore method to restore volumes and files:

- s3:CreateBucket
- s3:DeleteObject
- s3:DeleteObjectVersion
- s3:GetBucketAcl
- s3:ListBucket
- s3:ListBucketVersions
- s3:ListBucketMultipartUploads
- s3:PutObject
- s3:PutBucketAcl
- s3:PutLifecycleConfiguration
- s3:PutBucketPublicAccessBlock
- s3:AbortMultipartUpload
- s3:ListMultipartUploadParts
- athena:StartQueryExecution
- athena:GetQueryResults
- athena:GetQueryExecution
- athena:StopQueryExecution
- glue:CreateDatabase
- glue:CreateTable
- glue:BatchDeletePartition

The Connector makes the following API requests when you use DataLock and Ransomware protection for your volume backups:

- s3:GetObjectVersionTagging
- s3:GetBucketObjectLockConfiguration
- s3:GetObjectVersionAcl
- s3:PutObjectTagging
- s3:DeleteObject
- s3:DeleteObjectTagging
- s3:GetObjectRetention
- s3:DeleteObjectVersionTagging
- s3:PutObject
- s3:GetObject
- s3:PutBucketObjectLockConfiguration
- s3:GetLifecycleConfiguration
- s3:ListBucketByTags

- s3:GetBucketTagging
- s3:DeleteObjectVersion
- s3:ListBucketVersions
- s3:ListBucket
- s3:PutBucketTagging
- s3:GetObjectTagging
- s3:PutBucketVersioning
- s3:PutObjectVersionTagging
- s3:GetBucketVersioning
- s3:GetBucketAcl
- s3:BypassGovernanceRetention
- s3:PutObjectRetention
- s3:GetBucketLocation
- s3:GetObjectVersion

The Connector makes the following API requests if you use a different AWS account for your Cloud Volumes ONTAP backups than you're using for the source volumes:

- s3:PutBucketPolicy
- s3:PutBucketOwnershipControls

Cloud Data Sense

The Connector makes the following API requests to deploy the Cloud Data Sense instance:

- ec2:DescribeInstances
- ec2:DescribeInstanceStatus
- ec2:RunInstances
- ec2:TerminateInstances
- ec2:CreateTags
- ec2:CreateVolume
- ec2:AttachVolume
- ec2:CreateSecurityGroup
- ec2>DeleteSecurityGroup
- ec2:DescribeSecurityGroups
- ec2:CreateNetworkInterface
- ec2:DescribeNetworkInterfaces
- ec2>DeleteNetworkInterface
- ec2:DescribeSubnets
- ec2:DescribeVpcs
- ec2:CreateSnapshot

- ec2:DescribeRegions
- cloudformation:CreateStack
- cloudformation>DeleteStack
- cloudformation:DescribeStacks
- cloudformation:DescribeStackEvents
- iam:AddRoleToInstanceProfile
- ec2:AssociateIamInstanceProfile
- ec2:DescribeIamInstanceProfileAssociations

The Connector makes the following API requests to scan S3 buckets when you use Cloud Data Sense:

- iam:AddRoleToInstanceProfile
- ec2:AssociateIamInstanceProfile
- ec2:DescribeIamInstanceProfileAssociations
- s3:GetBucketTagging
- s3:GetBucketLocation
- s3:ListAllMyBuckets
- s3:ListBucket
- s3:GetBucketPolicyStatus
- s3:GetBucketPolicy
- s3:GetBucketAcl
- s3:GetObject
- iam:GetRole
- s3:DeleteObject
- s3:DeleteObjectVersion
- s3:PutObject
- sts:AssumeRole

Cloud Tiering

The Connector makes the following API requests to tier data to Amazon S3 when you use Cloud Tiering.

| Action | Used for set up? | Used for daily operations? |
|------------------------------|------------------|----------------------------|
| s3:CreateBucket | Yes | No |
| s3:PutLifecycleConfiguration | Yes | No |
| s3:GetLifecycleConfiguration | Yes | Yes |
| ec2:DescribeRegions | Yes | Yes |

Cloud Volumes ONTAP

The Connector makes the following API requests to deploy and manage Cloud Volumes ONTAP in AWS.

| Purpose | Action | Used for deployment? | Used for daily operations? | Used for deletion? |
|---|--|----------------------|----------------------------|--------------------|
| Create and manage IAM roles and instance profiles for Cloud Volumes ONTAP instances | iam:ListInstanceProfiles | Yes | Yes | No |
| | iam:CreateRole | Yes | No | No |
| | iam:DeleteRole | No | Yes | Yes |
| | iam:PutRolePolicy | Yes | No | No |
| | iam:CreateInstanceProfile | Yes | No | No |
| | iam:DeleteRolePolicy | No | Yes | Yes |
| | iam:AddRoleToInstanceProfile | Yes | No | No |
| | iam:RemoveRoleFromInstanceProfile | No | Yes | Yes |
| | iam:DeleteInstanceProfile | No | Yes | Yes |
| | iam:PassRole | Yes | No | No |
| | ec2:AssociateIamInstanceProfile | Yes | Yes | No |
| | ec2:DescribeIamInstanceProfileAssociations | Yes | Yes | No |
| | ec2:DisassociateIamInstanceProfile | No | Yes | No |
| Decode authorization status messages | sts:DecodeAuthorizationMessage | Yes | Yes | No |
| Describe the specified images (AMIs) available to the account | ec2:DescribeImages | Yes | Yes | No |
| Describe the route tables in a VPC (required for HA pairs only) | ec2:DescribeRouteTables | Yes | No | No |

| Purpose | Action | Used for deployment? | Used for daily operations? | Used for deletion? |
|--|-------------------------------|----------------------|----------------------------|--------------------|
| Stop, start, and monitor instances | ec2:StartInstances | Yes | Yes | No |
| | ec2:StopInstances | Yes | Yes | No |
| | ec2:DescribeInstances | Yes | Yes | No |
| | ec2:DescribeInstanceStatus | Yes | Yes | No |
| | ec2:RunInstances | Yes | No | No |
| | ec2:TerminateInstances | No | No | Yes |
| | ec2:ModifyInstanceAttribute | No | Yes | No |
| Verify that enhanced networking is enabled for supported instance types | ec2:DescribeInstanceAttribute | No | Yes | No |
| Tag resources with the "WorkingEnvironment" and "WorkingEnvironmentId" tags which are used for maintenance and cost allocation | ec2:CreateTags | Yes | Yes | No |
| Manage EBS volumes that Cloud Volumes ONTAP uses as back-end storage | ec2:CreateVolume | Yes | Yes | No |
| | ec2:DescribeVolumes | Yes | Yes | Yes |
| | ec2:ModifyVolumeAttribute | No | Yes | Yes |
| | ec2:AttachVolume | Yes | Yes | No |
| | ec2>DeleteVolume | No | Yes | Yes |
| | ec2:DetachVolume | No | Yes | Yes |

| Purpose | Action | Used for deployment? | Used for daily operations? | Used for deletion? |
|--|-------------------------------------|----------------------|----------------------------|--------------------|
| Create and manage security groups for Cloud Volumes ONTAP | ec2:CreateSecurityGroup | Yes | No | No |
| | ec2:DeleteSecurityGroup | No | Yes | Yes |
| | ec2:DescribeSecurityGroups | Yes | Yes | Yes |
| | ec2:RevokeSecurityGroupEgress | Yes | No | No |
| | ec2:AuthorizeSecurityGroupEgress | Yes | No | No |
| | ec2:AuthorizeSecurityGroupIngress | Yes | No | No |
| | ec2:RevokeSecurityGroupIngress | Yes | Yes | No |
| Create and manage network interfaces for Cloud Volumes ONTAP in the target subnet | ec2:CreateNetworkInterface | Yes | No | No |
| | ec2:DescribeNetworkInterfaces | Yes | Yes | No |
| | ec2:DeleteNetworkInterface | No | Yes | Yes |
| | ec2:ModifyNetworkInterfaceAttribute | No | Yes | No |
| Get the list of destination subnets and security groups | ec2:DescribeSubnets | Yes | Yes | No |
| | ec2:DescribeVpcs | Yes | Yes | No |
| Get DNS servers and the default domain name for Cloud Volumes ONTAP instances | ec2:DescribeDhcpOptions | Yes | No | No |
| Take snapshots of EBS volumes for Cloud Volumes ONTAP | ec2:CreateSnapshot | Yes | Yes | No |
| | ec2:DeleteSnapshot | No | Yes | Yes |
| | ec2:DescribeSnapshots | No | Yes | No |
| Capture the Cloud Volumes ONTAP console, which is attached to AutoSupport messages | ec2:GetConsoleOutput | Yes | Yes | No |

| Purpose | Action | Used for deployment? | Used for daily operations? | Used for deletion? |
|---|------------------------------------|----------------------|----------------------------|--------------------|
| Get the list of available key pairs | ec2:DescribeKeyPairs | Yes | No | No |
| Get the list of available AWS regions | ec2:DescribeRegions | Yes | Yes | No |
| Manage tags for resources associated with Cloud Volumes ONTAP instances | ec2:DeleteTags | No | Yes | Yes |
| | ec2:DescribeTags | No | Yes | No |
| Create and manage stacks for AWS CloudFormation templates | cloudformation:CreateStack | Yes | No | No |
| | cloudformation:DeleteStack | Yes | No | No |
| | cloudformation:DescribeStacks | Yes | Yes | No |
| | cloudformation:DescribeStackEvents | Yes | No | No |
| | cloudformation:ValidateTemplate | Yes | No | No |

| Purpose | Action | Used for deployment? | Used for daily operations? | Used for deletion? |
|---|-------------------------------|----------------------|----------------------------|--------------------|
| Create and manage an S3 bucket that a Cloud Volumes ONTAP system uses as a capacity tier for data tiering | s3:CreateBucket | Yes | Yes | No |
| | s3:DeleteBucket | No | Yes | Yes |
| | s3:GetLifecycleConfiguration | No | Yes | No |
| | s3:PutLifecycleConfiguration | No | Yes | No |
| | s3:PutBucketTagging | No | Yes | No |
| | s3:ListBucketVersions | No | Yes | No |
| | s3:GetBucketPolicyStatus | No | Yes | No |
| | s3:GetBucketPublicAccessBlock | No | Yes | No |
| | s3:GetBucketAcl | No | Yes | No |
| | s3:GetBucketPolicy | No | Yes | No |
| | s3:PutBucketPublicAccessBlock | No | Yes | No |
| | s3:GetBucketTagging | No | Yes | No |
| | s3:GetBucketLocation | No | Yes | No |
| | s3:ListAllMyBuckets | No | No | No |
| | s3:ListBucket | No | Yes | No |
| Enable data encryption of Cloud Volumes ONTAP using the AWS Key Management Service (KMS) | kms:List* | Yes | Yes | No |
| | kms:ReEncrypt* | Yes | No | No |
| | kms:Describe* | Yes | Yes | No |
| | kms:CreateGrant | Yes | Yes | No |
| Obtain AWS cost data for Cloud Volumes ONTAP | ce:GetReservationUtilization | No | Yes | No |
| | ce:GetDimensionValues | No | Yes | No |
| | ce:GetCostAndUsage | No | Yes | No |
| | ce:GetTags | No | Yes | No |

| Purpose | Action | Used for deployment? | Used for daily operations? | Used for deletion? |
|---|---------------------------------|----------------------|----------------------------|--------------------|
| Create and manage an AWS spread placement group for two HA nodes and the mediator in a single AWS Availability Zone | ec2:CreatePlacementGroup | Yes | No | No |
| | ec2:DeletePlacementGroup | No | Yes | Yes |
| Create reports | fsx:Describe* | No | Yes | No |
| | fsx:List* | No | Yes | No |
| Create and manage aggregates that support the Amazon EBS Elastic Volumes feature | ec2:DescribeVolumeModifications | No | Yes | No |
| | ec2:ModifyVolume | No | Yes | No |

Global File Cache

The Connector makes the following API requests to deploy Global File Cache instances during deployment:

- cloudformation:DescribeStacks
- cloudwatch:GetMetricStatistics
- cloudformation:ListStacks

FSx for ONTAP

The Connector makes the following API requests to manage FSx for ONTAP:

- ec2:DescribeInstances
- ec2:DescribeInstanceStatus
- ec2:DescribeInstanceAttribute
- ec2:DescribeRouteTables
- ec2:DescribeImages
- ec2:CreateTags
- ec2:DescribeVolumes
- ec2:DescribeSecurityGroups
- ec2:DescribeNetworkInterfaces
- ec2:DescribeSubnets
- ec2:DescribeVpcs
- ec2:DescribeDhcpOptions
- ec2:DescribeSnapshots
- ec2:DescribeKeyPairs
- ec2:DescribeRegions

- ec2:DescribeTags
- ec2:DescribeIamInstanceProfileAssociations
- ec2:DescribeReservedInstancesOfferings
- ec2:describeVpcEndpoints
- ec2:DescribeVpcs
- ec2:DescribeVolumesModifications
- ec2:DescribePlacementGroups
- kms:List*
- kms:Describe*
- kms:CreateGrant
- kms:ListAliases
- fsx:Describe*
- fsx:List*

Kubernetes

The Connector makes the following API requests to discover and manage Amazon EKS clusters:

- ec2:DescribeRegions
- eks:ListClusters
- eks:DescribeCluster
- iam:GetInstanceProfile

S3 bucket discovery

The Connector makes the following API request to discover Amazon S3 buckets:

s3:GetEncryptionConfiguration

Azure permissions for the Connector

When BlueXP launches the Connector VM in Azure, it attaches a custom role to the VM that provides the Connector with permissions to manage resources and processes within that Azure subscription. The Connector uses the permissions to make API calls to several Azure services.

Custom role permissions

The custom role shown below provides the permissions that a Connector needs to manage resources and processes within your Azure network.

When you create a Connector directly from BlueXP, BlueXP automatically applies this custom role to the Connector.

If you deploy the Connector from the Azure Marketplace or if you manually install the Connector on a Linux host, then you'll need to set up the custom role yourself.

You also need to ensure that the role is up to date as new permissions are added in subsequent releases.

```
{
  "Name": "BlueXP Operator",
  "Actions": [
    "Microsoft.Compute/disks/delete",
    "Microsoft.Compute/disks/read",
    "Microsoft.Compute/disks/write",
    "Microsoft.Compute/locations/operations/read",
    "Microsoft.Compute/locations/vmSizes/read",
    "Microsoft.Resources/subscriptions/locations/read",
    "Microsoft.Compute/operations/read",
    "Microsoft.Compute/virtualMachines/instanceView/read",
    "Microsoft.Compute/virtualMachines/powerOff/action",
    "Microsoft.Compute/virtualMachines/read",
    "Microsoft.Compute/virtualMachines/restart/action",
    "Microsoft.Compute/virtualMachines/deallocate/action",
    "Microsoft.Compute/virtualMachines/start/action",
    "Microsoft.Compute/virtualMachines/vmSizes/read",
    "Microsoft.Compute/virtualMachines/write",
    "Microsoft.Compute/images/read",
    "Microsoft.Network/locations/operationResults/read",
    "Microsoft.Network/locations/operations/read",
    "Microsoft.Network/networkInterfaces/read",
    "Microsoft.Network/networkInterfaces/write",
    "Microsoft.Network/networkInterfaces/join/action",
    "Microsoft.Network/networkSecurityGroups/read",
    "Microsoft.Network/networkSecurityGroups/write",
    "Microsoft.Network/networkSecurityGroups/join/action",
    "Microsoft.Network/virtualNetworks/read",

    "Microsoft.Network/virtualNetworks/checkIpAddressAvailability/read",
    "Microsoft.Network/virtualNetworks/subnets/read",
    "Microsoft.Network/virtualNetworks/subnets/write",

    "Microsoft.Network/virtualNetworks/subnets/virtualMachines/read",

    "Microsoft.Network/virtualNetworks/virtualMachines/read",

    "Microsoft.Network/virtualNetworks/subnets/join/action",
    "Microsoft.Resources/deployments/operations/read",
    "Microsoft.Resources/deployments/read",
    "Microsoft.Resources/deployments/write",
    "Microsoft.Resources/resources/read",

    "Microsoft.Resources/subscriptions/operationresults/read",
```

```

"Microsoft.Resources/subscriptions/resourceGroups/delete",

"Microsoft.Resources/subscriptions/resourceGroups/read",

"Microsoft.Resources/subscriptions/resourcegroups/resources/read",

"Microsoft.Resources/subscriptions/resourceGroups/write",
    "Microsoft.Storage/checknameavailability/read",
    "Microsoft.Storage/operations/read",
    "Microsoft.Storage/storageAccounts/listkeys/action",
    "Microsoft.Storage/storageAccounts/read",
    "Microsoft.Storage/storageAccounts/delete",
    "Microsoft.Storage/storageAccounts/write",

"Microsoft.Storage/storageAccounts/blobServices/containers/read",

"Microsoft.Storage/storageAccounts/blobServices/containers/write",

"Microsoft.Storage/storageAccounts/listAccountSas/action",
    "Microsoft.Storage/usages/read",
    "Microsoft.Compute/snapshots/write",
    "Microsoft.Compute/snapshots/read",
    "Microsoft.Compute/availabilitySets/write",
    "Microsoft.Compute/availabilitySets/read",
    "Microsoft.Compute/disks/beginGetAccess/action",

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

"Microsoft.MarketplaceOrdering/offertypes/publishers/offers/plans/agreements/write",
    "Microsoft.Network/loadBalancers/read",
    "Microsoft.Network/loadBalancers/write",
    "Microsoft.Network/loadBalancers/delete",

"Microsoft.Network/loadBalancers/backendAddressPools/read",

"Microsoft.Network/loadBalancers/backendAddressPools/join/action",

"Microsoft.Network/loadBalancers/loadBalancingRules/read",
    "Microsoft.Network/loadBalancers/probes/read",
    "Microsoft.Network/loadBalancers/probes/join/action",
    "Microsoft.Authorization/locks/*",
    "Microsoft.Network/routeTables/join/action",
    "Microsoft.NetApp/netAppAccounts/read",

```

```
"Microsoft.NetApp/netAppAccounts/capacityPools/read",

"Microsoft.NetApp/netAppAccounts/capacityPools/volumes/write",

"Microsoft.NetApp/netAppAccounts/capacityPools/volumes/read",

"Microsoft.NetApp/netAppAccounts/capacityPools/volumes/delete",
    "Microsoft.Network/privateEndpoints/write",

"Microsoft.Storage/storageAccounts/PrivateEndpointConnectionsApproval/action",

"Microsoft.Storage/storageAccounts/privateEndpointConnections/read",

"Microsoft.Storage/storageAccounts/managementPolicies/read",

"Microsoft.Storage/storageAccounts/managementPolicies/write",
    "Microsoft.Network/privateEndpoints/read",
    "Microsoft.Network/privateDnsZones/write",

"Microsoft.Network/privateDnsZones/virtualNetworkLinks/write",
    "Microsoft.Network/virtualNetworks/join/action",
    "Microsoft.Network/privateDnsZones/A/write",
    "Microsoft.Network/privateDnsZones/read",

"Microsoft.Network/privateDnsZones/virtualNetworkLinks/read",

"Microsoft.Resources/deployments/operationStatuses/read",
    "Microsoft.Insights/Metrics/Read",
    "Microsoft.Compute/virtualMachines/extensions/write",
    "Microsoft.Compute/virtualMachines/extensions/delete",
    "Microsoft.Compute/virtualMachines/extensions/read",
    "Microsoft.Compute/virtualMachines/delete",
    "Microsoft.Network/networkInterfaces/delete",
    "Microsoft.Network/networkSecurityGroups/delete",
    "Microsoft.Resources/deployments/delete",
    "Microsoft.Compute/diskEncryptionSets/read",
    "Microsoft.Compute/snapshots/delete",
    "Microsoft.Network/privateEndpoints/delete",
    "Microsoft.Compute/availabilitySets/delete",
    "Microsoft.KeyVault/vaults/read",
    "Microsoft.KeyVault/vaults/accessPolicies/write",
    "Microsoft.Compute/diskEncryptionSets/write",
    "Microsoft.KeyVault/vaults/deploy/action",
    "Microsoft.Compute/diskEncryptionSets/delete",
    "Microsoft.Resources/tags/read",
```

```

        "Microsoft.Resources/tags/write",
        "Microsoft.Resources/tags/delete",
        "Microsoft.Network/applicationSecurityGroups/write",
        "Microsoft.Network/applicationSecurityGroups/read",

"Microsoft.Network/applicationSecurityGroups/joinIpConfiguration/action",

"Microsoft.Network/networkSecurityGroups/securityRules/write",
        "Microsoft.Network/applicationSecurityGroups/delete",

"Microsoft.Network/networkSecurityGroups/securityRules/delete",

"Microsoft.ContainerService/managedClusters/listClusterUserCredential/action",
        "Microsoft.ContainerService/managedClusters/read",
        "Microsoft.Synapse/workspaces/write",
        "Microsoft.Synapse/workspaces/read",
        "Microsoft.Synapse/workspaces/delete",
        "Microsoft.Synapse/register/action",
        "Microsoft.Synapse/checkNameAvailability/action",
        "Microsoft.Synapse/workspaces/operationStatuses/read",
        "Microsoft.Synapse/workspaces/firewallRules/read",

"Microsoft.Synapse/workspaces/replaceAllIpFirewallRules/action",
        "Microsoft.Synapse/workspaces/operationResults/read",
        "Microsoft.Network/publicIPAddresses/delete",

"Microsoft.Synapse/workspaces/privateEndpointConnectionsApproval/action",

"Microsoft.ManagedIdentity/userAssignedIdentities/assign/action"
    ],
    "NotActions": [],
    "AssignableScopes": [],
    "Description": "BlueXP Permissions",
    "IsCustom": "true"
}

```

How Azure permissions are used

The following sections describe how the permissions are used for each NetApp cloud service. This information can be helpful if your corporate policies dictate that permissions are only provided as needed.

AppTemplate tags

The Connector makes the following API requests to manage tags on Azure resources when you use the AppTemplate Tagging service:

- Microsoft.Resources/resources/read
- Microsoft.Resources/subscriptions/operationresults/read
- Microsoft.Resources/subscriptions/resourceGroups/read
- Microsoft.Resources/subscriptions/resourcegroups/resources/read
- Microsoft.Resources/tags/read
- Microsoft.Resources/tags/write

Azure NetApp Files

The Connector makes the following API requests to manage Azure NetApp Files working environments:

- Microsoft.NetApp/netAppAccounts/read
- Microsoft.NetApp/netAppAccounts/capacityPools/read
- Microsoft.NetApp/netAppAccounts/capacityPools/volumes/write
- Microsoft.NetApp/netAppAccounts/capacityPools/volumes/read
- Microsoft.NetApp/netAppAccounts/capacityPools/volumes/delete

Cloud Backup

The Connector makes the following API requests for backup and restore operations:

- Microsoft.Compute/virtualMachines/read
- Microsoft.Compute/virtualMachines/start/action
- Microsoft.Compute/virtualMachines/deallocate/action
- Microsoft.Storage/storageAccounts/listkeys/action
- Microsoft.Storage/storageAccounts/read
- Microsoft.Storage/storageAccounts/write
- Microsoft.Storage/storageAccounts/blobServices/containers/read
- Microsoft.Storage/storageAccounts/listAccountSas/action
- Microsoft.KeyVault/vaults/read
- Microsoft.KeyVault/vaults/accessPolicies/write
- Microsoft.Network/networkInterfaces/read
- Microsoft.Resources/subscriptions/locations/read
- Microsoft.Network/virtualNetworks/read
- Microsoft.Network/virtualNetworks/subnets/read
- Microsoft.Resources/subscriptions/resourceGroups/read
- Microsoft.Resources/subscriptions/resourcegroups/resources/read
- Microsoft.Resources/subscriptions/resourceGroups/write
- Microsoft.Authorization/locks/*
- Microsoft.Network/privateEndpoints/write
- Microsoft.Network/privateEndpoints/read

- Microsoft.Network/privateDnsZones/virtualNetworkLinks/write
- Microsoft.Network/virtualNetworks/join/action
- Microsoft.Network/privateDnsZones/A/write
- Microsoft.Network/privateDnsZones/read
- Microsoft.Network/privateDnsZones/virtualNetworkLinks/read
- Microsoft.Compute/virtualMachines/extensions/delete
- Microsoft.Compute/virtualMachines/delete
- Microsoft.Network/networkInterfaces/delete
- Microsoft.Network/networkSecurityGroups/delete
- Microsoft.Resources/deployments/delete
- Microsoft.Network/publicIPAddresses/delete
- Microsoft.Storage/storageAccounts/blobServices/containers/write
- Microsoft.ManagedIdentity/userAssignedIdentities/assign/action

The Connector makes the following API requests when you use the Search & Restore functionality:

- Microsoft.Synapse/workspaces/write
- Microsoft.Synapse/workspaces/read
- Microsoft.Synapse/workspaces/delete
- Microsoft.Synapse/register/action
- Microsoft.Synapse/checkNameAvailability/action
- Microsoft.Synapse/workspaces/operationStatuses/read
- Microsoft.Synapse/workspaces/firewallRules/read
- Microsoft.Synapse/workspaces/replaceAllIpFirewallRules/action
- Microsoft.Synapse/workspaces/operationResults/read
- Microsoft.Synapse/workspaces/privateEndpointConnectionsApproval/action

Cloud Data Sense

The Connector makes the following API requests when you use Cloud Data Sense.

| Action | Used for set up? | Used for daily operations? |
|---|------------------|----------------------------|
| Microsoft.Compute/locations/operations/read | Yes | Yes |
| Microsoft.Compute/locations/vmSizes/read | Yes | Yes |
| Microsoft.Compute/operations/read | Yes | Yes |
| Microsoft.Compute/virtualMachines/instanceView/read | Yes | Yes |
| Microsoft.Compute/virtualMachines/powerOff/action | Yes | No |

| Action | Used for set up? | Used for daily operations? |
|--|------------------|----------------------------|
| Microsoft.Compute/virtualMachines/read | Yes | Yes |
| Microsoft.Compute/virtualMachines/restart/action | Yes | No |
| Microsoft.Compute/virtualMachines/start/action | Yes | No |
| Microsoft.Compute/virtualMachines/vmSizes/read | No | Yes |
| Microsoft.Compute/virtualMachines/write | Yes | No |
| Microsoft.Compute/images/read | Yes | Yes |
| Microsoft.Compute/disks/delete | Yes | No |
| Microsoft.Compute/disks/read | Yes | Yes |
| Microsoft.Compute/disks/write | Yes | No |
| Microsoft.Storage/checknameavailability/read | Yes | Yes |
| Microsoft.Storage/operations/read | Yes | Yes |
| Microsoft.Storage/storageAccounts/listkeys/action | Yes | No |
| Microsoft.Storage/storageAccounts/read | Yes | Yes |
| Microsoft.Storage/storageAccounts/write | Yes | No |
| Microsoft.Storage/storageAccounts/delete | No | Yes |
| Microsoft.Storage/storageAccounts/blobServices/containers/read | Yes | Yes |
| Microsoft.Network/networkInterfaces/read | Yes | Yes |
| Microsoft.Network/networkInterfaces/write | Yes | No |
| Microsoft.Network/networkInterfaces/join/action | Yes | No |
| Microsoft.Network/networkSecurityGroups/read | Yes | Yes |
| Microsoft.Network/networkSecurityGroups/write | Yes | No |
| Microsoft.Resources/subscriptions/locations/read | Yes | Yes |

| Action | Used for set up? | Used for daily operations? |
|---|------------------|----------------------------|
| Microsoft.Network/locations/operationResults/read | Yes | Yes |
| Microsoft.Network/locations/operations/read | Yes | Yes |
| Microsoft.Network/virtualNetworks/read | Yes | Yes |
| Microsoft.Network/virtualNetworks/checkIpAddressAvailability/read | Yes | Yes |
| Microsoft.Network/virtualNetworks/subnets/read | Yes | Yes |
| Microsoft.Network/virtualNetworks/subnets/virtualMachines/read | Yes | Yes |
| Microsoft.Network/virtualNetworks/virtualMachines/read | Yes | Yes |
| Microsoft.Network/virtualNetworks/subnets/join/action | Yes | No |
| Microsoft.Network/virtualNetworks/subnets/write | Yes | No |
| Microsoft.Network/routeTables/join/action | Yes | No |
| Microsoft.Resources/deployments/operations/read | Yes | Yes |
| Microsoft.Resources/deployments/read | Yes | Yes |
| Microsoft.Resources/deployments/write | Yes | No |
| Microsoft.Resources/resources/read | Yes | Yes |
| Microsoft.Resources/subscriptions/operationresults/read | Yes | Yes |
| Microsoft.Resources/subscriptions/resourceGroups/delete | Yes | No |
| Microsoft.Resources/subscriptions/resourceGroups/read | Yes | Yes |
| Microsoft.Resources/subscriptions/resourcegroups/resources/read | Yes | Yes |
| Microsoft.Resources/subscriptions/resourceGroups/write | Yes | No |

Cloud Tiering

The Connector makes the following API requests when you set up Cloud Tiering.

- Microsoft.Storage/storageAccounts/listkeys/action
- Microsoft.Resources/subscriptions/resourceGroups/read
- Microsoft.Resources/subscriptions/locations/read

The Connector makes the following API requests for daily operations.

- Microsoft.Storage/storageAccounts/blobServices/containers/read
- Microsoft.Storage/storageAccounts/blobServices/containers/write
- Microsoft.Storage/storageAccounts/managementPolicies/read
- Microsoft.Storage/storageAccounts/managementPolicies/write
- Microsoft.Storage/storageAccounts/read

Cloud Volumes ONTAP

The Connector makes the following API requests to deploy and manage Cloud Volumes ONTAP in AWS.

| Purpose | Action | Used for deployment? | Used for daily operations? | Used for deletion? |
|--|---|----------------------|----------------------------|--------------------|
| Create VMs, stop, start, delete, and obtain the status of the system | Microsoft.Compute/locations/operations/read | Yes | Yes | No |
| | Microsoft.Compute/locations/vmSizes/read | Yes | Yes | No |
| | Microsoft.Resources/subscriptions/locations/read | Yes | No | No |
| | Microsoft.Compute/operations/read | Yes | Yes | No |
| | Microsoft.Compute/virtualMachines/instanceView/read | Yes | Yes | No |
| | Microsoft.Compute/virtualMachines/powerOff/action | Yes | Yes | No |
| | Microsoft.Compute/virtualMachines/read | Yes | Yes | No |
| | Microsoft.Compute/virtualMachines/restart/action | Yes | Yes | No |
| | Microsoft.Compute/virtualMachines/start/action | Yes | Yes | No |
| | Microsoft.Compute/virtualMachines/deallocate/action | No | Yes | Yes |
| | Microsoft.Compute/virtualMachines/vmSizes/read | No | Yes | No |
| | Microsoft.Compute/virtualMachines/write | Yes | Yes | No |
| Enable deployment from a VHD | Microsoft.Compute/images/read | Yes | No | No |

| Purpose | Action | Used for deployment? | Used for daily operations? | Used for deletion? |
|---|---|----------------------|----------------------------|--------------------|
| Create and manage network interfaces in the target subnet | Microsoft.Network/networkInterfaces/read | Yes | Yes | No |
| | Microsoft.Network/networkInterfaces/write | Yes | Yes | No |
| | Microsoft.Network/networkInterfaces/join/action | Yes | Yes | No |
| Create predefined network security groups | Microsoft.Network/networkSecurityGroups/read | Yes | Yes | No |
| | Microsoft.Network/networkSecurityGroups/write | Yes | Yes | No |
| | Microsoft.Network/networkSecurityGroups/join/action | Yes | No | No |
| Get network information about regions, the target VNet and subnet, and add the VMs to VNets | Microsoft.Network/locations/operationResults/read | Yes | Yes | No |
| | Microsoft.Network/locations/operations/read | Yes | Yes | No |
| | Microsoft.Network/virtualNetworks/read | Yes | No | No |
| | Microsoft.Network/virtualNetworks/checkIpAddressAvailability/read | Yes | No | No |
| | Microsoft.Network/virtualNetworks/subnets/read | Yes | Yes | No |
| | Microsoft.Network/virtualNetworks/subnets/virtualMachines/read | Yes | Yes | No |
| | Microsoft.Network/virtualNetworks/virtualMachines/read | Yes | Yes | No |
| | Microsoft.Network/virtualNetworks/subnets/join/action | Yes | Yes | No |

| Purpose | Action | Used for deployment? | Used for daily operations? | Used for deletion? |
|-----------------------------------|---|----------------------|----------------------------|--------------------|
| Create and manage resource groups | Microsoft.Resources/deployments/operations/read | Yes | Yes | No |
| | Microsoft.Resources/deployments/read | Yes | Yes | No |
| | Microsoft.Resources/deployments/write | Yes | Yes | No |
| | Microsoft.Resources/resources/read | Yes | Yes | No |
| | Microsoft.Resources/subscriptions/operationresults/read | Yes | Yes | No |
| | Microsoft.Resources/subscriptions/resourceGroups/delete | Yes | Yes | Yes |
| | Microsoft.Resources/subscriptions/resourceGroups/read | No | Yes | No |
| | Microsoft.Resources/subscriptions/resourcegroups/resources/read | Yes | Yes | No |
| | Microsoft.Resources/subscriptions/resourceGroups/write | Yes | Yes | No |

| Purpose | Action | Used for deployment? | Used for daily operations? | Used for deletion? |
|---|--|----------------------|----------------------------|--------------------|
| Manage Azure storage accounts and disks | Microsoft.Compute/disks/read | Yes | Yes | Yes |
| | Microsoft.Compute/disks/write | Yes | Yes | No |
| | Microsoft.Compute/disks/delete | Yes | Yes | Yes |
| | Microsoft.Storage/checknameavailability/read | Yes | Yes | No |
| | Microsoft.Storage/operations/read | Yes | Yes | No |
| | Microsoft.Storage/storageAccounts/listkeys/action | Yes | Yes | No |
| | Microsoft.Storage/storageAccounts/read | Yes | Yes | No |
| | Microsoft.Storage/storageAccounts/delete | No | Yes | Yes |
| | Microsoft.Storage/storageAccounts/write | Yes | Yes | No |
| | Microsoft.Storage/usage/read | No | Yes | No |
| Enable backups to Blob storage and encryption of storage accounts | Microsoft.Storage/storageAccounts/blobServices/containers/read | Yes | Yes | No |
| | Microsoft.KeyVault/vaults/read | Yes | Yes | No |
| | Microsoft.KeyVault/vaults/accessPolicies/write | Yes | Yes | No |
| Enable VNet service endpoints for data tiering | Microsoft.Network/virtualNetworks/subnets/write | Yes | Yes | No |
| | Microsoft.Network/routeTables/join/action | Yes | Yes | No |

| Purpose | Action | Used for deployment? | Used for daily operations? | Used for deletion? |
|--|---|----------------------|----------------------------|--------------------|
| Create and manage Azure managed snapshots | Microsoft.Compute/snapshots/write | Yes | Yes | No |
| | Microsoft.Compute/snapshots/read | Yes | Yes | No |
| | Microsoft.Compute/snapshots/delete | No | Yes | Yes |
| | Microsoft.Compute/disks/beginGetAccess/action | No | Yes | No |
| Create and manage availability sets | Microsoft.Compute/availabilitySets/write | Yes | No | No |
| | Microsoft.Compute/availabilitySets/read | Yes | No | No |
| Enable programmatic deployments from the marketplace | Microsoft.MarketplaceOrdering/offertypes/publishers/offers/plans/agreements/read | Yes | No | No |
| | Microsoft.MarketplaceOrdering/offertypes/publishers/offers/plans/agreements/write | Yes | Yes | No |

| Purpose | Action | Used for deployment? | Used for daily operations? | Used for deletion? |
|---|---|----------------------|----------------------------|--------------------|
| Manage a load balancer for HA pairs | Microsoft.Network/loadBalancers/read | Yes | Yes | No |
| | Microsoft.Network/loadBalancers/write | Yes | No | No |
| | Microsoft.Network/loadBalancers/delete | No | Yes | Yes |
| | Microsoft.Network/loadBalancers/backendAddressPools/read | Yes | Yes | No |
| | Microsoft.Network/loadBalancers/backendAddressPools/join/action | Yes | No | No |
| | Microsoft.Network/loadBalancers/loadBalancingRules/read | Yes | No | No |
| | Microsoft.Network/loadBalancers/probes/read | Yes | No | No |
| | Microsoft.Network/loadBalancers/probes/join/action | Yes | No | No |
| Enable management of locks on Azure disks | Microsoft.Authorization/locks/* | Yes | Yes | No |

| Purpose | Action | Used for deployment? | Used for daily operations? | Used for deletion? |
|--|---|----------------------|----------------------------|--------------------|
| Enable private endpoints for HA pairs when there's no connectivity outside the subnet | Microsoft.Network/privateEndpoints/write | Yes | Yes | No |
| | Microsoft.Storage/storageAccounts/PrivateEndpointConnectionsApproval/action | Yes | No | No |
| | Microsoft.Storage/storageAccounts/privateEndpointConnections/read | Yes | Yes | Yes |
| | Microsoft.Network/privateEndpoints/read | Yes | Yes | Yes |
| | Microsoft.Network/privateDnsZones/write | Yes | Yes | No |
| | Microsoft.Network/privateDnsZones/virtualNetworkLinks/write | Yes | Yes | No |
| | Microsoft.Network/virtualNetworks/join/action | Yes | Yes | No |
| | Microsoft.Network/privateDnsZones/A/write | Yes | Yes | No |
| | Microsoft.Network/privateDnsZones/read | Yes | Yes | No |
| | Microsoft.Network/privateDnsZones/virtualNetworkLinks/read | Yes | Yes | No |
| Required by Azure for some VM deployments, depending on the underlying physical hardware | Microsoft.Resources/deployments/operationStatuses/read | Yes | Yes | No |
| Remove resources from a resource group in case of deployment failure or deletion | Microsoft.Network/privateEndpoints/delete | Yes | Yes | No |
| | Microsoft.Compute/availabilitySets/delete | Yes | Yes | No |

| Purpose | Action | Used for deployment? | Used for daily operations? | Used for deletion? |
|--|--|----------------------|----------------------------|--------------------|
| Enable the use of customer-managed encryption keys when using the API | Microsoft.Compute/diskEncryptionSets/read | Yes | Yes | Yes |
| | Microsoft.Compute/diskEncryptionSets/write | Yes | Yes | No |
| | Microsoft.KeyVault/vaults/deploy/action | Yes | No | No |
| | Microsoft.Compute/diskEncryptionSets/delete | Yes | Yes | Yes |
| Configure an application security group for an HA pair to isolate the HA interconnect and cluster network NICs | Microsoft.Network/applicationSecurityGroups/write | No | Yes | No |
| | Microsoft.Network/applicationSecurityGroups/read | No | Yes | Yes |
| | Microsoft.Network/applicationSecurityGroups/joinIpConfiguration/action | No | Yes | No |
| | Microsoft.Network/networkSecurityGroups/securityRules/write | Yes | Yes | No |
| | Microsoft.Network/applicationSecurityGroups/delete | No | Yes | No |
| | Microsoft.Network/networkSecurityGroups/securityRules/delete | No | Yes | Yes |
| Read, write, and delete tags associated with Cloud Volumes ONTAP resources | Microsoft.Resources/tags/read | No | Yes | No |
| | Microsoft.Resources/tags/write | Yes | Yes | No |
| | Microsoft.Resources/tags/delete | Yes | No | No |
| Encrypt storage accounts during creation | Microsoft.ManagedIdentity/userAssignedIdentities/assign/action | Yes | Yes | No |

Global File Cache

The Connector makes the following API requests when you use Global File Cache:

- Microsoft.Insights/Metrics/Read
- Microsoft.Compute/virtualMachines/extensions/write
- Microsoft.Compute/virtualMachines/extensions/read
- Microsoft.Compute/virtualMachines/extensions/delete
- Microsoft.Compute/virtualMachines/delete
- Microsoft.Network/networkInterfaces/delete
- Microsoft.Network/networkSecurityGroups/delete
- Microsoft.Resources/deployments/delete

Kubernetes

The Connector makes the following API requests to discover and manage clusters running in Azure Kubernetes Service (AKS):

- Microsoft.Compute/virtualMachines/read
- Microsoft.Resources/subscriptions/locations/read
- Microsoft.Resources/subscriptions/operationresults/read
- Microsoft.Resources/subscriptions/resourceGroups/read
- Microsoft.Resources/subscriptions/resourcegroups/resources/read
- Microsoft.ContainerService/managedClusters/read
- Microsoft.ContainerService/managedClusters/listClusterUserCredential/action

Change log

As permissions are added and removed, we'll note them in the sections below.

5 January, 2023

The following permissions were added to the JSON policy:

- Microsoft.Storage/storageAccounts/listAccountSas/action
- Microsoft.Synapse/workspaces/privateEndpointConnectionsApproval/action

These permissions are required for Cloud Backup.

- Microsoft.Network/loadBalancers/backendAddressPools/join/action

This permission is required for Cloud Volumes ONTAP deployment.

1 December, 2022

The following permissions were added to the JSON policy:

- Microsoft.Storage/storageAccounts/blobServices/containers/write

This permission is required for Cloud Backup and Cloud Tiering.

- Microsoft.Network/publicIPAddresses/delete

This permissions is required for Cloud Backup.

The following permissions were removed from the JSON policy because they are no longer required:

- Microsoft.Compute/images/write
- Microsoft.Network/loadBalancers/frontendIPConfigurations/read
- Microsoft.Storage/storageAccounts/regeneratekey/action

Google Cloud permissions for the Connector

BlueXP requires permissions to perform actions in Google Cloud. These permissions are included in a custom role provided by NetApp. You might want to understand what BlueXP does with these permissions.

Service account permissions

The custom role shown below provides the permissions that a Connector needs to manage resources and processes within your Google Cloud network.

You'll need to apply this custom role to a service account that gets attached to the Connector VM. [View step-by-step instructions](#).

You also need to ensure that the role is up to date as new permissions are added in subsequent releases.

```
title: NetApp BlueXP
description: Permissions for the service account associated with the
Connector instance.
stage: GA
includedPermissions:
- iam.serviceAccounts.actAs
- compute.regionBackendServices.create
- compute.regionBackendServices.get
- compute.regionBackendServices.list
- compute.networks.updatePolicy
- compute.backendServices.create
- compute.addresses.list
- compute.disks.create
- compute.disks.createSnapshot
- compute.disks.delete
- compute.disks.get
- compute.disks.list
- compute.disks.setLabels
- compute.disks.use
```

- compute.firewalls.create
- compute.firewalls.delete
- compute.firewalls.get
- compute.firewalls.list
- compute.globalOperations.get
- compute.images.get
- compute.images.getFromFamily
- compute.images.list
- compute.images.useReadOnly
- compute.instances.addAccessConfig
- compute.instances.attachDisk
- compute.instances.create
- compute.instances.delete
- compute.instances.detachDisk
- compute.instances.get
- compute.instances.getSerialPortOutput
- compute.instances.list
- compute.instances.setDeletionProtection
- compute.instances.setLabels
- compute.instances.setMachineType
- compute.instances.setMetadata
- compute.instances.setTags
- compute.instances.start
- compute.instances.stop
- compute.instances.updateDisplayDevice
- compute.machineTypes.get
- compute.networks.get
- compute.networks.list
- compute.projects.get
- compute.regions.get
- compute.regions.list
- compute.snapshots.create
- compute.snapshots.delete
- compute.snapshots.get
- compute.snapshots.list
- compute.snapshots.setLabels
- compute.subnetworks.get
- compute.subnetworks.list
- compute.subnetworks.use
- compute.subnetworks.useExternalIp
- compute.zoneOperations.get
- compute.zones.get
- compute.zones.list
- compute.instances.setServiceAccount
- deploymentmanager.compositeTypes.get
- deploymentmanager.compositeTypes.list

- deploymentmanager.deployments.create
- deploymentmanager.deployments.delete
- deploymentmanager.deployments.get
- deploymentmanager.deployments.list
- deploymentmanager.manifests.get
- deploymentmanager.manifests.list
- deploymentmanager.operations.get
- deploymentmanager.operations.list
- deploymentmanager.resources.get
- deploymentmanager.resources.list
- deploymentmanager.typeProviders.get
- deploymentmanager.typeProviders.list
- deploymentmanager.types.get
- deploymentmanager.types.list
- logging.logEntries.list
- logging.privateLogEntries.list
- resourcemanager.projects.get
- storage.buckets.create
- storage.buckets.delete
- storage.buckets.get
- storage.buckets.list
- cloudkms.cryptoKeyVersions.useToEncrypt
- cloudkms.cryptoKeys.get
- cloudkms.cryptoKeys.list
- cloudkms.keyRings.list
- storage.buckets.update
- iam.serviceAccounts.getIamPolicy
- iam.serviceAccounts.list
- storage.objects.get
- storage.objects.list
- monitoring.timeSeries.list
- storage.buckets.getIamPolicy

How Google Cloud permissions are used

| Actions | Purpose |
|---|---|
| <ul style="list-style-type: none"> - compute.disks.create - compute.disks.createSnapshot - compute.disks.delete - compute.disks.get - compute.disks.list - compute.disks.setLabels - compute.disks.use | To create and manage disks for Cloud Volumes ONTAP. |

| Actions | Purpose |
|--|--|
| <ul style="list-style-type: none"> - compute.firewalls.create - compute.firewalls.delete - compute.firewalls.get - compute.firewalls.list | To create firewall rules for Cloud Volumes ONTAP. |
| <ul style="list-style-type: none"> - compute.globalOperations.get | To get the status of operations. |
| <ul style="list-style-type: none"> - compute.images.get - compute.images.getFromFamily - compute.images.list - compute.images.useReadOnly | To get images for VM instances. |
| <ul style="list-style-type: none"> - compute.instances.attachDisk - compute.instances.detachDisk | To attach and detach disks to Cloud Volumes ONTAP. |
| <ul style="list-style-type: none"> - compute.instances.create - compute.instances.delete | To create and delete Cloud Volumes ONTAP VM instances. |
| <ul style="list-style-type: none"> - compute.instances.get | To list VM instances. |
| <ul style="list-style-type: none"> - compute.instances.getSerialPortOutput | To get console logs. |
| <ul style="list-style-type: none"> - compute.instances.list | To retrieve the list of instances in a zone. |
| <ul style="list-style-type: none"> - compute.instances.setDeletionProtection | To set deletion protection on the instance. |
| <ul style="list-style-type: none"> - compute.instances.setLabels | To add labels. |
| <ul style="list-style-type: none"> - compute.instances.setMachineType - compute.instances.setMinCpuPlatform | To change the machine type for Cloud Volumes ONTAP. |
| <ul style="list-style-type: none"> - compute.instances.setMetadata | To add metadata. |
| <ul style="list-style-type: none"> - compute.instances.setTags | To add tags for firewall rules. |
| <ul style="list-style-type: none"> - compute.instances.start - compute.instances.stop - compute.instances.updateDisplayDevice | To start and stop Cloud Volumes ONTAP. |
| <ul style="list-style-type: none"> - compute.machineTypes.get | To get the numbers of cores to check quotas. |
| <ul style="list-style-type: none"> - compute.projects.get | To support multi-projects. |
| <ul style="list-style-type: none"> - compute.snapshots.create - compute.snapshots.delete - compute.snapshots.get - compute.snapshots.list - compute.snapshots.setLabels | To create and manage persistent disk snapshots. |
| <ul style="list-style-type: none"> - compute.networks.get - compute.networks.list - compute.regions.get - compute.regions.list - compute.subnetworks.get - compute.subnetworks.list - compute.zoneOperations.get - compute.zones.get - compute.zones.list | To get the networking information needed to create a new Cloud Volumes ONTAP virtual machine instance. |

| Actions | Purpose |
|---|--|
| <ul style="list-style-type: none"> - 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 | To deploy the Cloud Volumes ONTAP virtual machine instance using Google Cloud Deployment Manager. |
| <ul style="list-style-type: none"> - logging.logEntries.list - logging.privateLogEntries.list | To get stack log drives. |
| <ul style="list-style-type: none"> - resourcemanager.projects.get | To support multi-projects. |
| <ul style="list-style-type: none"> - storage.buckets.create - storage.buckets.delete - storage.buckets.get - storage.buckets.list - storage.buckets.update | To create and manage a Google Cloud Storage bucket for data tiering. |
| <ul style="list-style-type: none"> - cloudkms.cryptoKeyVersions.useToEncrypt - cloudkms.cryptoKeys.get - cloudkms.cryptoKeys.list - cloudkms.keyRings.list | To use customer-managed encryption keys from the Cloud Key Management Service with Cloud Volumes ONTAP. |
| <ul style="list-style-type: none"> - compute.instances.setServiceAccount - iam.serviceAccounts.actAs - iam.serviceAccounts.getIamPolicy - iam.serviceAccounts.list - storage.objects.get - storage.objects.list | To set a service account on the Cloud Volumes ONTAP instance. This service account provides permissions for data tiering to a Google Cloud Storage bucket. |
| <ul style="list-style-type: none"> - compute.addresses.list | To retrieve the addresses in a region when deploying an HA pair. |
| <ul style="list-style-type: none"> - compute.backendServices.create - compute.regionBackendServices.create - compute.regionBackendServices.get - compute.regionBackendServices.list | To configure a backend service for distributing traffic in an HA pair. |
| <ul style="list-style-type: none"> - compute.networks.updatePolicy | To apply firewall rules on the VPCs and subnets for an HA pair. |
| <ul style="list-style-type: none"> - compute.subnetworks.use - compute.subnetworks.useExternallp - compute.instances.addAccessConfig | To enable Cloud Data Sense. |

| Actions | Purpose |
|--|--|
| <ul style="list-style-type: none"> - container.clusters.get - container.clusters.list | To discover Kubernetes clusters running in Google Kubernetes Engine. |
| <ul style="list-style-type: none"> - compute.instanceGroups.get - compute.addresses.get | To create and manage storage VMs on HA pairs. |
| <ul style="list-style-type: none"> - monitoring.timeSeries.list - storage.buckets.getIamPolicy | To discover information about Google Cloud Storage buckets. |

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