



# **Mirror and backup protection on a remote cluster**

**ONTAP 9**

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# Mirror and backup protection on a remote cluster

## Create a mirror relationship for a new bucket (remote cluster)

When you create new S3 buckets, you can protect them immediately to an S3 SnapMirror destination on a remote cluster.



### About this task

You will need to perform tasks on both source and destination systems.

### Before you begin


- Requirements for ONTAP versions, licensing, and S3 server configuration have been completed.
- A peering relationship exists between source and destination clusters, and a peering relationship exists between source and destination storage VMs.
- CA Certificates are needed for the source and destination VMs. You can use self-signed CA certificates or certificates signed by an external CA vendor.

## System Manager

1. If this is the first S3 SnapMirror relationship for this storage VM, verify that root user keys exist for both source and destination storage VMs and regenerate them if they do not:
  - a. Click **Storage > Storage VMs** and then select the storage VM.
  - b. In the **Settings** tab, click  in the **S3** tile.
  - c. In the **Users** tab, verify that there is an access key for the root user.
  - d. If there is not, click  next to **root**, then click **Regenerate Key**.  
Do not regenerate the key if one already exists.
2. Edit the storage VM to add users, and to add users to groups, in both the source and destination storage VMs:

Click **Storage > storage VMs**, click the storage VM, click **Settings** and then click  under S3.

See [Add S3 users and groups](#) for more information.

3. On the source cluster, create an S3 SnapMirror policy if you don't have an existing one and you don't want to use the default policy:
  - a. Click **Protection > Overview**, and then click **Local Policy Settings**.
  - b. Click  next to **Protection Policies**, then click **Add**.
    - Enter the policy name and description.
    - Select the policy scope, cluster or SVM
    - Select **Continuous** for S3 SnapMirror relationships.
    - Enter your **Throttle** and **Recovery Point Objective** values.
4. Create a bucket with SnapMirror protection:
  - a. Click **Storage > Buckets**, then click **Add**. Verifying permissions is optional but recommended.
  - b. Enter a name, select the storage VM, enter a size, then click **More Options**.
  - c. Under **Permissions**, click **Add**.
    - **Principal** and **Effect** - select values corresponding to your user group settings or accept the defaults.
    - **Actions**- make sure the following values are shown:

```
GetObject, PutObject, DeleteObject, ListBucket, GetBucketAcl, GetObjectAcl, ListBucketMultipartUploads, ListMultipartUploadParts
```

- **Resources** - use the defaults (*bucketname*, *bucketname/\**) or other values you need.

See [Manage user access to buckets](#) for more information about these fields.

- d. Under **Protection**, check **Enable SnapMirror (ONTAP or Cloud)**. Then enter the following values:
  - Destination
    - **TARGET: ONTAP System**

- **CLUSTER:** Select the remote cluster.
  - **STORAGE VM:** Select a storage VM on the remote cluster.
  - **S3 SERVER CA CERTIFICATE:** Copy and paste the contents of the *source* certificate.
  - Source
    - **S3 SERVER CA CERTIFICATE:** Copy and paste the contents of the *destination* certificate.
5. Check **Use the same certificate on the destination** if you are using a certificate signed by an external CA vendor.
  6. If you click **Destination Settings**, you can also enter your own values in place of the defaults for bucket name, capacity, and performance service level.
  7. Click **Save**. A new bucket is created in the source storage VM, and it is mirrored to a new bucket that is created the destination storage VM.

### Back up locked buckets

Beginning with ONTAP 9.14.1, you can back up locked S3 buckets and restore them as required.

When defining the protection settings for a new or existing bucket, you can enable object locking on destination buckets, provided that the source and destination clusters run ONTAP 9.14.1 or later, and that object locking is enabled on the source bucket. The object locking mode and lock retention tenure of the source bucket become applicable for the replicated objects on the destination bucket. You can also define a different lock retention period for the destination bucket in the **Destination Settings** section. This retention period is also applied to any non-locked objects replicated from the source bucket and S3 interfaces.

For information about how to enable object locking on a bucket, see [Create a bucket](#).

### CLI

1. If this is the first S3 SnapMirror relationship for this SVM, verify that root user keys exist for both source and destination SVMs and regenerate them if they do not:

```
vserver object-store-server user show
```

Verify that there is an access key for the root user. If there is not, enter:

```
vserver object-store-server user regenerate-keys -vserver svm_name -user
root
```

Do not regenerate the key if one already exists.

2. Create buckets in both the source and destination SVMs:

```
vserver object-store-server bucket create -vserver svm_name -bucket
bucket_name [-size integer[KB|MB|GB|TB|PB]] [-comment text]
[additional_options]
```

3. Add access rules to the default bucket policies in both the source and destination SVMs:

```
vserver object-store-server bucket policy add-statement -vserver svm_name
-bucket bucket_name -effect {allow|deny} -action object_store_actions
-principal user_and_group_names -resource object_store_resources [-sid
text] [-index integer]
```

### Example

```
src_cluster::> vsserver object-store-server bucket policy add-  
statement -bucket test-bucket -effect allow -action  
GetObject,PutObject,DeleteObject,ListBucket,GetBucketAcl,GetObjectAc  
l,ListBucketMultipartUploads,ListMultipartUploadParts -principal -  
-resource test-bucket, test-bucket /*
```

4. On the source SVM, create an S3 SnapMirror policy if you don't have an existing one and you don't want to use the default policy:

```
snapmirror policy create -vsserver svm_name -policy policy_name -type  
continuous [-rpo integer] [-throttle throttle_type] [-comment text]  
[additional_options]
```

#### Parameters:

- `type continuous` - the only policy type for S3 SnapMirror relationships (required).
- `-rpo` - specifies the time for recovery point objective, in seconds (optional).
- `-throttle` - specifies the upper limit on throughput/bandwidth, in kilobytes/seconds (optional).

### Example

```
src_cluster::> snapmirror policy create -vsserver vs0 -type  
continuous -rpo 0 -policy test-policy
```

5. Install CA server certificates on the admin SVMs of the source and destination clusters:
  - a. On the source cluster, install the CA certificate that signed the *destination* S3 server certificate:

```
security certificate install -type server-ca -vsserver src_admin_svm  
-cert-name dest_server_certificate
```
  - b. On the destination cluster, install the CA certificate that signed the *source* S3 server certificate:

```
security certificate install -type server-ca -vsserver dest_admin_svm  
-cert-name src_server_certificate
```

If you are using a certificate signed by an external CA vendor, install the same certificate on the source and destination admin SVM.

See the `security certificate install` man page for details.

6. On the source SVM, create an S3 SnapMirror relationship:

```
snapmirror create -source-path src_svm_name:/bucket/bucket_name  
-destination-path dest_peer_svm_name:/bucket/bucket_name, ...} [-policy  
policy_name]
```

You can use a policy you created or accept the default.

### Example

```
src_cluster::> snapmirror create -source-path vs0-src:/bucket/test-  
bucket -destination-path vs1-dest:bucket/test-bucket-mirror -policy  
test-policy
```

7. Verify that mirroring is active:

```
snapmirror show -policy-type continuous -fields status
```

## Create a mirror relationship for an existing bucket (remote cluster)

You can begin protecting existing S3 buckets at any time; for example, if you upgraded an S3 configuration from a release earlier than ONTAP 9.10.1.

### About this task

You need to perform tasks on both the source and destination clusters.




### Before you begin

- Requirements for ONTAP versions, licensing, and S3 server configuration have been completed.
- A peering relationship exists between source and destination clusters, and a peering relationship exists between source and destination storage VMs.
- CA Certificates are needed for the source and destination VMs. You can use self-signed CA certificates or certificates signed by an external CA vendor.



### Steps

You can create a mirror relationship using System Manager or the ONTAP CLI.

## System Manager

1. If this is the first S3 SnapMirror relationship for this storage VM, verify that root user keys exist for both source and destination storage VMs and regenerate them if they do not:
  - a. Select **Storage > Storage VMs** and then select the storage VM.
  - b. In the **Settings** tab, click  in the **S3** tile.
  - c. In the **Users** tab, verify that there is an access key for the root user.
  - d. If there is not, click  next to **root**, then click **Regenerate Key**.  
Do not regenerate the key if one already exists.
2. Verify that user and group access is correct in both the source and destination storage VMs: Select **Storage > storage VMs**, then select the storage VM, then **Settings**. Finally, select  under **S3**.

See [Add S3 users and groups](#) for more information.

3. On the source cluster, create an S3 SnapMirror policy if you don't have an existing one and you don't want to use the default policy:
  - a. Select **Protection > Overview**, and then click **Local Policy Settings**.
  - b. Select  next to **Protection Policies**, then click **Add**.
  - c. Enter the policy name and description.
  - d. Select the policy scope, cluster or SVM
  - e. Select **Continuous** for S3 SnapMirror relationships.
  - f. Enter your **Throttle** and **Recovery Point Objective** values.
4. Verify that the bucket access policy of the existing bucket still meets your needs:
  - a. Click **Storage > Buckets** and then select the bucket you want to protect.
  - b. In the **Permissions** tab, click  **Edit**, then click **Add** under **Permissions**.
    - **Principal and Effect**: select values corresponding to your user group settings, or accept the defaults.
    - **Actions**: make sure the following values are shown:

```
GetObject, PutObject, DeleteObject, ListBucket, GetBucketAcl, GetObjectAcl, ListBucketMultipartUploads, ListMultipartUploadParts
```

- **Resources**: use the defaults (*bucketname*, *bucketname/\**) or other values you need.

See [Manage user access to buckets](#) for more information about these fields.

5. Protect an existing bucket with S3 SnapMirror protection:
  - a. Click **Storage > Buckets** and then select the bucket you want to protect..
  - b. Click **Protect** and enter the following values:
    - Destination
      - **TARGET**: ONTAP System



- **CLUSTER:** Select the remote cluster.
  - **STORAGE VM:** Select a storage VM on the remote cluster.
  - **S3 SERVER CA CERTIFICATE:** Copy and paste the contents of the *source* certificate.
  - **Source**
    - **S3 SERVER CA CERTIFICATE:** Copy and paste the contents of the *destination* certificate.
6. Check **Use the same certificate on the destination** if you are using a certificate signed by an external CA vendor.
  7. If you click **Destination Settings**, you can also enter your own values in place of the defaults for bucket name, capacity, and performance service level.
  8. Click **Save**. The existing bucket is mirrored to a new bucket in the destination storage VM.

### Back up locked buckets

Beginning with ONTAP 9.14.1, you can back up locked S3 buckets and restore them as required.

When defining the protection settings for a new or existing bucket, you can enable object locking on destination buckets, provided that the source and destination clusters run ONTAP 9.14.1 or later, and that object locking is enabled on the source bucket. The object locking mode and lock retention tenure of the source bucket become applicable for the replicated objects on the destination bucket. You can also define a different lock retention period for the destination bucket in the **Destination Settings** section. This retention period is also applied to any non-locked objects replicated from the source bucket and S3 interfaces.

For information about how to enable object locking on a bucket, see [Create a bucket](#).

### CLI

1. If this is the first S3 SnapMirror relationship for this SVM, verify that root user keys exist for both source and destination SVMs and regenerate them if they do not:

```
vserver object-store-server user show
```

Verify that there is an access key for the root user. If there is not, enter:

```
vserver object-store-server user regenerate-keys -vserver svm_name -user root
```

Do not regenerate the key if one already exists.

2. Create a bucket on the destination SVM to be the mirror target:

```
vserver object-store-server bucket create -vserver svm_name -bucket dest_bucket_name [-size integer[KB|MB|GB|TB|PB]] [-comment text] [additional_options]
```

3. Verify that the access rules of the default bucket policies are correct in both the source and destination SVMs:

```
vserver object-store-server bucket policy add-statement -vserver svm_name -bucket bucket_name -effect {allow|deny} -action object_store_actions -principal user_and_group_names -resource object_store_resources [-sid text] [-index integer]
```

### Example

```
src_cluster::> vserver object-store-server bucket policy add-  
statement -bucket test-bucket -effect allow -action  
GetObject,PutObject,DeleteObject,ListBucket,GetBucketAcl,GetObjectAc  
l,ListBucketMultipartUploads,ListMultipartUploadParts -principal -  
-resource test-bucket, test-bucket /*
```

4. On the source SVM, create an S3 SnapMirror policy if you don't have an existing one and you don't want to use the default policy:

```
snapmirror policy create -vserver svm_name -policy policy_name -type  
continuous [-rpo integer] [-throttle throttle_type] [-comment text]  
[additional_options]
```

#### Parameters:

- `continuous` – the only policy type for S3 SnapMirror relationships (required).
- `-rpo` – specifies the time for recovery point objective, in seconds (optional).
- `-throttle` – specifies the upper limit on throughput/bandwidth, in kilobytes/seconds (optional).

### Example

```
src_cluster::> snapmirror policy create -vserver vs0 -type  
continuous -rpo 0 -policy test-policy
```

5. Install CA certificates on the admin SVMs of source and destination clusters:

- a. On the source cluster, install the CA certificate that signed the *destination* S3 server certificate:  

```
security certificate install -type server-ca -vserver src_admin_svm  
-cert-name dest_server_certificate
```
- b. On the destination cluster, install the CA certificate that signed the *source* S3 server certificate:  

```
security certificate install -type server-ca -vserver dest_admin_svm  
-cert-name src_server_certificate
```

If you are using a certificate signed by an external CA vendor, install the same certificate on the source and destination admin SVM.

See the `security certificate install` man page for details.

6. On the source SVM, create an S3 SnapMirror relationship:

```
snapmirror create -source-path src_svm_name:/bucket/bucket_name  
-destination-path dest_peer_svm_name:/bucket/bucket_name, ...} [-policy  
policy_name]
```

You can use a policy you created or accept the default.

### Example

```
src_cluster::> snapmirror create -source-path vs0:/bucket/test-bucket -destination-path vs1:/bucket/test-bucket-mirror -policy test-policy
```

7. Verify that mirroring is active:

```
snapmirror show -policy-type continuous -fields status
```

## Takeover and serve data from the destination bucket (remote cluster)

If the data in a source bucket becomes unavailable, you can break the SnapMirror relationship to make the destination bucket writable and begin serving data.

### About this task


When a takeover operation is performed, source bucket is converted to read-only and original destination bucket is converted to read-write, thereby reversing the S3 SnapMirror relationship.

When the disabled source bucket is available again, S3 SnapMirror automatically resynchronizes the contents of the two buckets. It is not necessary to explicitly resynchronize the relationship, as is required for volume SnapMirror deployments.

The takeover operation must be initiated from the remote cluster.

### System Manager

Failover from the unavailable bucket and begin serving data:

1. Click **Protection > Relationships**, then select **S3 SnapMirror**.
2. Click , select **Failover**, then click **Failover**.

### CLI

1. Initiate a failover operation for the destination bucket:  

```
snapmirror failover start -destination-path svm_name:/bucket/bucket_name
```
2. Verify the status of the failover operation:  

```
snapmirror show -fields status
```

### Example

```
dest_cluster::> snapmirror failover start -destination-path dest_svm1:/bucket/test-bucket-mirror
```

## Restore a bucket from the destination storage VM (remote cluster)

If data in a source bucket is lost or corrupted, you can repopulate your data by restoring objects from a destination bucket.

### About this task


You can restore the destination bucket to an existing bucket or a new bucket. The target bucket for the restore operation must be larger than the destination bucket's logical used space.

If you use an existing bucket, it must be empty when starting a restore operation. Restore does not "roll back" a bucket in time; rather, it populates an empty bucket with its previous contents.

The restore operation must be initiated from the remote cluster.

## System Manager

Restore the backed up data:

1. Click **Protection > Relationships**, then select **S3 SnapMirror**.
2. Click  and then select **Restore**.
3. Under **Source**, select **Existing Bucket** (the default) or **New Bucket**.
  - To restore to an **Existing Bucket** (the default), complete these actions:
    - Select the cluster and storage VM to search for the existing bucket.
    - Select the existing bucket.
    - Copy and paste the contents of the *destination* S3 server CA certificate.
  - To restore to a **New Bucket**, enter the following values:
    - The cluster and storage VM to host the new bucket.
    - The new bucket's name, capacity, and performance service level.  
See [Storage service levels](#) for more information.
    - The contents of the *destination* S3 server CA certificate.
4. Under **Destination**, copy and paste the contents of the *source* S3 server CA certificate.
5. Click **Protection > Relationships** to monitor the restore progress.

## Restore locked buckets

Beginning with ONTAP 9.14.1, you can back up locked buckets and restore them as needed.

You can restore an object-locked bucket to a new or existing bucket. You can select an object-locked bucket as the destination in the following scenarios:

- **Restore to a new bucket:** When object locking is enabled, a bucket can be restored by creating a bucket that also has object locking enabled. When you restore a locked bucket, the object locking mode and retention period of the original bucket are replicated. You can also define a different lock retention period for the new bucket. This retention period is applied to non-locked objects from other sources.
- **Restore to an existing bucket:** An object-locked bucket can be restored to an existing bucket, as long as versioning and a similar object-locking mode are enabled on the existing bucket. The retention tenure of the original bucket is maintained.
- **Restore non-locked bucket:** Even if object locking is not enabled on a bucket, you can restore it to a bucket that has object locking enabled and is on the source cluster. When you restore the bucket, all the non-locked objects become locked, and the retention mode and tenure of the destination bucket become applicable to them.

## CLI

1. Create the new destination bucket for restore. For more information, see [Create a backup relationship for a new bucket \(cloud target\)](#).
2. Initiate a restore operation for the destination bucket:

```
snapmirror restore -source-path svm_name:/bucket/bucket_name -destination  
-path svm_name:/bucket/bucket_name
```

**Example**

```
dest_cluster::> snapmirror restore -source-path src_vs1:/bucket/test-  
bucket -destination-path dest_vs1:/bucket/test-bucket-mirror
```

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