Replication API methods

Element Software

NetApp
March 05, 2025

Table of Contents

Replication API methods

Replication API methods enable you to connect two clusters for continuous data protection (CDP). When you connect two clusters, active volumes within a cluster can be continuously replicated to a second cluster to provide data recovery. By pairing volumes for replication, you can protect your data from events that might render it inaccessible.

- Cluster pairing order of operations
- Volume pairing order of operations
- Supported modes of replication for paired clusters
- CompleteClusterPairing
- CompleteVolumePairing
- ListClusterPairs
- ListActivePairedVolumes
- ModifyVolumePair
- RemoveClusterPair
- RemoveVolumePair
- StartClusterPairing
- StartVolumePairing

Find more information

- SolidFire and Element Software Documentation
- Documentation for earlier versions of NetApp SolidFire and Element products

Cluster pairing order of operations

You must establish a connection between a pair of storage clusters running Element software before remote replication can be used.

Use the following set of API methods to establish a cluster connection:

- StartClusterPairing:

  This API method creates and returns a pairing key that is used to establish a cluster pair. The key is encoded and contains information that is used to establish communications between clusters. A single cluster can be paired with up to four other clusters. However, a new key must be generated for each cluster pairing. The StartClusterPairing method generates a new key each time the method is called. Use each unique key with the CompleteClusterPairing method to pair each additional cluster.

  

  For security reasons, the pairing key should not be sent to other users via email. The key contains a user name and password.

- CompleteClusterPairing:

This method uses the pairing key created with the StartClusterPairing API method to create a cluster pair. Issue the CompleteClusterPairing API method with the clusterPairingKey parameter to the destination. The origination cluster is the cluster that created the key.

Find more information

- StartClusterPairing
- CompleteClusterPairing

Volume pairing order of operations

You must create a cluster pair between two corresponding clusters before volumes can be paired.

Use the following set of API methods to establish a cluster connection:

- StartVolumePairing:

  This API method creates and returns a volume pairing key that is used to create a volume pair. The key contains information that is used to establish communications between volumes.

- CompleteVolumePairing:

  This method uses the pairing key created with the StartVolumePairing API method to create a volume pair. Issue the CompleteVolumePairing API method with the volumeID and volumePairingKey parameters to the destination volume.

Only one of the paired volumes can be identified as a replication target volume. Use the ModifyVolumePair API method to establish the direction of the volume's data replication by identifying which volume is the target. Data is replicated from the source volume to the target volume.

Find more information

- StartVolumePairing
- CompleteVolumePairing
- ModifyVolumePair

Supported modes of replication for paired clusters

The following modes of replication are supported on the paired clusters:

- Asynchronous replication of data: The data sent to the replication target volume is sent asynchronously. The system does not wait for an acknowledgment to be sent before writing data.
- Synchronous replication of data: The data sent to the replication target volume is sent synchronously. When the I/O operations sent from the host are acknowledged by the system, the system acknowledgment is sent back to the host and the data is sent to the replication target volume.
- Snapshots-only replication of data: Only volume snapshots are replicated to the target cluster.

CompleteClusterPairing

The `CompleteClusterPairing` method is the second step in the cluster pairing process. Use this method with the encoded key received from the `StartClusterPairing` method to complete the cluster pairing process.

Parameters

This method has the following input parameter:

Name	Description	Type	Default value	Required
clusterPairingKey	A string of characters that is returned from the StartClusterPairing API method.	string	None	Yes

Return value

This method has the following return value:

Name	Description	Type
clusterPairID	Unique identifier for the cluster pair.	integer

Request example

Requests for this method are similar to the following example:

```
{
   "method": "CompleteClusterPairing",
   "params": {
        "clusterPairingKey" :
"7b22636c7573746572506169724944223a312c22636c75737465725061697255554944223
a223163656131333632 2d346338662d343631612d626537322d373435363661393533643263
6222c22636c7573746572556e697175654944223a2278736d36222c226d766970223a22313
9322e3136382e3133392e313232222c226e616d65223a224175746f54657374322d6330755
2222c2270617373776f7264223a22695e59686f20492d64774d7d4c67614b222c227270634
36f6e6e656374696f6e4944223a393133313432363439 2c22757365726e616d65223a225f5
f53465f706169725f50597a796647704c7246564432444a42227d"
   },
   "id" : 1
}
```

Response example

This method returns a response similar to the following example:

```
{
   "id" : 1,
   "result" : {
       "clusterPairID" : 1
   }
}
```

New since version

9.6

Find more information

StartClusterPairing

CompleteVolumePairing

You can use `CompleteVolumePairing` to complete the pairing of two volumes.

Parameters

This method has the following input parameters:

Name	Description	Type	Default value	Required
volumeID	The ID of volume that will complete the volume pair.	integer	None	Yes
volumePairingKey	The key returned from the StartVolumePairing API method.	string	None	Yes

Return value

This method has no return values.

Request example

Requests for this method are similar to the following example:

```
{
   "method": "CompleteVolumePairing",
   "params": {
        "volumeID" : 12,
        "volumePairingKey" :
"7b22636c7573746572506169724944223a312c22636c75737465725061697255554944223
a2231636561313336322d346338662d343631612d626537322d373435363661393533643263
6222c22636c7573746572556e697175654944223a2278736d36222c226d766970223a22313
9322e3136382e3133392e313232222c226e616d65223a224175746f54657374322d6330755
2222c2270617373776f7264223a22695e59686f20492d64774d7d4c67614b222c227270634
36f6e6e656374696f6e4944223a393133313432363439 2c22757365726e616d65223a225f5
f53465f706169725f50597a796647704c7246564432444a42227d"
        },
   "id" : 1
}
```

Response example

This method returns a response similar to the following example:

```
{
"id": 1,
"result": {}
}
```

New since version

9.6

Find more information

StartVolumePairing

ListClusterPairs

You can use the `ListClusterPairs` method to list all clusters that are paired with the current cluster. This method returns information about active and pending cluster pairings, such as statistics about the current pairing as well as the connectivity and latency (in milliseconds) of the cluster pairing.

Parameter

This method has no input parameter:

Return value

This method has the following return value:

Name	Description	Type
clusterPairs	Information about each paired cluster.	clusterPair array

Request example

Requests for this method are similar to the following example:

```
{
   "method": "ListClusterPairs",
   "params": {
      },
   "id" : 1
}
```

Response example

This method returns a response similar to the following example:

```
{
 "id": 1,
 "result": {
   "clusterPairs": [
     {
      "clusterName": "cluster2",
      "clusterPairID": 3,
      "clusterPairUUID": "9866fbeb-c2f8-4df3-beb9-58a5c4e49c9b",
      "clusterUUID": 5487,
      "latency": 1,
      "mvip": "172.1.1.5",
      "status": "Connected"
      "version": "8.0.0.1361"
     },
     {
      "clusterName": "cluster3",
      "clusterPairID": 2,
      "clusterPairUUID": "8132a699-ce82-41e0-b406-fb914f976042",
      "clusterUUID": 1383,
      "latency": 1,
      "mvip": "172.1.1.6",
      "status": "Connected"
      "version": "8.0.0.1361"
     }
   ]
 }
```


New since version

9.6

ListActivePairedVolumes

You can use the `ListActivePairedVolumes` method to list all of the active volumes paired with a volume. This method returns information about volumes with active and pending pairings.

Parameters

This method has no input parameters.

Return value

This method has the following return value:

Name	Description	Type
volumes	Volume information for the paired volumes.	volumePair array

Request example

Requests for this method are similar to the following example:

```
{
   "method": "ListActivePairedVolumes",
   "params": {
      },
   "id" : 1
}
```

Response example

Responses for this method are similar to the following example:

```
{
    "id": 1,
    "result": {
        "volumes": [
            {
                "access": "readWrite",
                "accountID": 1,
                "attributes": {},
                "blockSize": 4096,
                "createTime": "2016-06-24T15:21:59Z",
                "deleteTime": "",
                "enable512e": true,
                "iqn": "iqn.2010-01.com.solidfire:0oto.bk.24",
                "name": "BK",
                "purgeTime": "",
                "qos": {
                    "burstIOPS": 15000,
                    "burstTime": 60,
                    "curve": {
                        "4096": 100,
                        "8192": 160,
                        "16384": 270,
                        "32768": 500,
                        "65536": 1000,
                        "131072": 1950,
```

```
                        "262144": 3900,
                        "524288": 7600,
                        "1048576": 15000
                    },
                    "maxIOPS": 15000,
                    "minIOPS": 50
                },
                "scsiEUIDeviceID": "306f746f00000018f47acc0100000000",
                "scsiNAADeviceID": "6f47acc100000000306f746f00000018",
                "sliceCount": 1,
                "status": "active",
                "totalSize": 10737418240,
                "virtualVolumeID": null,
                "volumeAccessGroups": [],
                "volumeID": 24,
                "volumePairs": [
                    {
                        "clusterPairID": 2,
                        "remoteReplication": {
                            "mode": "Async",
                            "pauseLimit": 3145728000,
                            "remoteServiceID": 14,
                            "resumeDetails": "",
                            "snapshotReplication": {
                                "state": "Idle",
                                "stateDetails": ""
                            },
                            "state": "Active",
                            "stateDetails": ""
                        },
                        "remoteSliceID": 8,
                        "remoteVolumeID": 8,
                        "remoteVolumeName": "PairingDoc",
                        "volumePairUUID": "229fcbf3-2d35-4625-865a-
d04bb9455cef"
                    }
                ]
            }
        ]
    }
}
```


New since version

9.6

ModifyVolumePair

You can use the `ModifyVolumePair` method to pause or restart replication between a pair of volumes. This method is set on the source volume (the volume with read/write access).

Parameters

This method has the following input parameters:

Name	Description	Type	Default value	Required
volumeID	Identification number of the volume to be modified.	integer	None	Yes
pausedManual	Remote replication can be paused or restarted on the source (read/write) volume. Possible values: • true: Pause volume replication. • false: Restart volume replication. If no value is specified, no change in replication is performed.	boolean	None	No

mode	Volume replication mode. Possible values: • Async: Writes are acknowledged when they complete locally. The cluster does not wait for writes to be replicated to the target cluster. • Sync: The source acknowledges the write when the data is stored locally and on the remote cluster. • SnapshotsOnly: Only snapshots created on the source cluster are replicated. Active writes from the source volume are not replicated.	string	None	No

Return value

This method has no return value.

Request example

Requests for this method are similar to the following example:

```
{
  "method": "ModifyVolumePair",
  "params": {
    "pausedManual": false,
    "volumeID": 5,
    "mode": "sync"
   },
  "id": 1
}
```

Response example

This method returns a response similar to the following example:

```
{
   "id" : 1,
   "result" : {}
}
```

New since version

9.6

RemoveClusterPair

You can use the `RemoveClusterPair` method to close the open connections between two paired clusters.

Parameter

> Before you remove a cluster pair, you must first remove all volume pairing to the clusters with the RemoveVolumePair API method.

This method has the following input parameter:

Name	Description	Type	Default value	Required
clusterPairID	Unique identifier used to pair two clusters.	integer	None	Yes

Return value

This method has no return value.

Request example

Requests for this method are similar to the following example:

```
{
   "method": "RemoveClusterPair",
   "params": {
              "clusterPairID": 1
      },
   "id" : 1
}
```

Response example

This method returns a response similar to the following example:

```
{
   "id": 1,
   "result": {}
}
```

New since version

9.6

RemoveVolumePair

You can use the `RemoveVolumePair` method to remove the remote pairing between two volumes. Use this method on both the source and target volumes that are paired together. When you remove the volume pairing information, data is no longer replicated to or from the volume.

Parameter

This method has the following input parameter:

Name	Description	Type	Default value	Required
volumeID	ID of the volume on which to stop the replication process.	integer	None	Yes

Return value

This method has no return value.

Request example

Requests for this method are similar to the following example:

```
{
   "method": "RemoveVolumePair",
   "params": {
      "volumeID": 5
   "id" : 1
   }
}
```

Response example

This method returns a response similar to the following example:

```
{
   "id": 1,
   "result": {
   }
}
```

New since version

9.6

StartClusterPairing

You can use the `StartClusterPairing` method to create an encoded key from a cluster that is used to pair with another cluster. The key created from this API method is used in the `CompleteClusterPairing` method to establish a cluster pairing. You can pair a cluster with a maximum of four other clusters.

Parameter

This method has no input parameter.

Return values

This method has the following return values:

Name	Description	Type
clusterPairingKey	A string of characters that is used by the CompleteClusterPairing API method.	string
clusterPairID	Unique identifier for the cluster pair.	integer

Request example

Requests for this method are similar to the following example:

```
{
   "method": "StartClusterPairing",
   "params": {
      },
   "id" : 1
}
```

Response example

This method returns a response similar to the following example:

```
{
   "id": 1,
   "result": {
     "clusterPairID": 1,
     "clusterPairingKey":
"7b22636c7573746572506169724944223a312c22636c75737465725061697255554944223
a2231636561313336322d346338662d343631612d626537322d373435363661393536436
6222c22636c7573746572556e697175654944223a2278736d36222c226d766970223a22313
9322e3136382e3133392e313232222c226e616d65223a224175746f54657374322d6330755
2222c2270617373776f7264223a22695e59686f20492d64774d7d4c67614b222c227270634
36f6e6e656374696f6e4944223a393133313432363439 2c22757365726e616d65223a225f5
f53465f706169725f50597a796647704c7246564432444a42227d"
   }
}
```

New since version

9.6

Find more information

CompleteClusterPairing

StartVolumePairing

You can use the `StartVolumePairing` method to create an encoded key from a volume that is used to pair with another volume. The key that this method creates is used in the `CompleteVolumePairing` method to establish a volume pairing.

Parameters

This method has the following input parameters:

Name	Description	Type	Default value	Required
mode	The mode of the volume on which to start the pairing process. The mode can only be set if the volume is the source volume. Possible values: • `Async`: Writes are acknowledged when they complete locally. The cluster does not wait for writes to be replicated to the target cluster. (Default if no mode parameter specified.) • `Sync`: Source acknowledges write when the data is stored locally and on the remote cluster. • `SnapshotsOnly`: Only snapshots created on the source cluster are replicated. Active writes from the source volume are not replicated.	string	None	No

Name	Description	Type	Default value	Required
volumeID	The ID of the volume on which to start the pairing process.	integer	None	Yes

Return value

This method has the following return value:

Name	Description	Type
volumePairingKey	A string of characters that is used by the CompleteVolumePairing API method.	string

Request example

Requests for this method are similar to the following example:

```
{
   "method": "StartVolumePairing",
   "params": {
         "mode": "Async",
     "volumeID" : 14
      },
   "id" : 1
}
```

Response example

This method returns a response similar to the following example:

```
{
   "id" : 1,
   "result" : {
      "volumePairingKey" :
"7b226d766970223a223139322e3136382e3133392e313232222c22766f6c756d654944223
a312c22766f6c756d654e616d65223a2254657374222c22766f6c756d65506169725555494
4223a223639363234666362d323032652d343332352d613536392d656396336353563376
23561227d"
      }
}
```

New since version

9.6

Find more information

CompleteVolumePairing

Copyright information

Trademark information