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# Using SYMCLI with EMC Open Replicator for Symmetrix

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## ***Abstract***

EMC Open Replicator for Symmetrix uses an existing SAN infrastructure to migrate data to a DMX Symmetrix array from older Symmetrix, CLARiiON, and third-party storage arrays. You can also copy data from a DMX to these other types of arrays for backup, archiving, and other ILM purposes.

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## Introduction

EMC® Open Replicator for Symmetrix® is a software product that runs entirely within the DMX Symmetrix array, making use of an existing SAN infrastructure to provide data migration, backup, and ILM solutions. Data migration involves copying data from various types of arrays to a DMX Symmetrix array. The DMX remote copy operation allows you to copy data to a DMX from a CLARiiON®, older Symmetrix, or third-party storage array such as IBM, Hewlett-Packard, and Hitachi Data Systems.

EMC Open Replicator for Symmetrix also allows you to move data *from* a DMX to these other types of arrays on the SAN, providing backup, archiving, and other ILM solutions. Copying data from the local DMX to devices on remote storage arrays can be either a full or incremental copy operation.

You control remote copy operations from a host locally attached to the DMX array. Devices on the DMX *control array* are known as *control devices*. Devices on the *remote array* are called *remote devices*.

Online operations allow a DMX host application such as a database or file server to be up and running while the DMX is copying data from or to remote devices during pull or push operations. Where the local DMX control array is pushing data and the control devices are online, a consistent point-in-time copy can be sent to the remote array by using an ECA (Enginuity™ Consistency Assist) window to temporarily prevent host I/O to the control devices while the remote copy process starts the session.

On the DMX control array, interoperability intelligence protects local devices from collisions with the Open Replicator copies. For example, it protects snap targets from being an Open Replicator target (data collision). When both the control and remote devices are located on Symmetrix arrays and visible to the control host, EMC Open Replicator for Symmetrix validates both to prevent data collisions.

## Purpose and Scope

This document describes DMX remote copy functionality included in versions of EMC Solutions Enabler version 6.0 and higher, running on Symmetrix arrays using Enginuity version 5x71 and higher.

## Related Documentation

The following white papers provide information related to the concepts discussed in this paper:

- *Using SYMCLI to Perform TimeFinder/Snap Operations* (P/N 300-001-381)
- *Using SYMCLI to Perform TimeFinder/Clone Operations* (P/N 300-001-382)
- *Using SYMCLI to Perform TimeFinder/Mirror Control Operations* (P/N 300-000-074)
- *Using SYMCLI to Perform Control Operations with SRDF Family Products* (P/N 300-000-076)

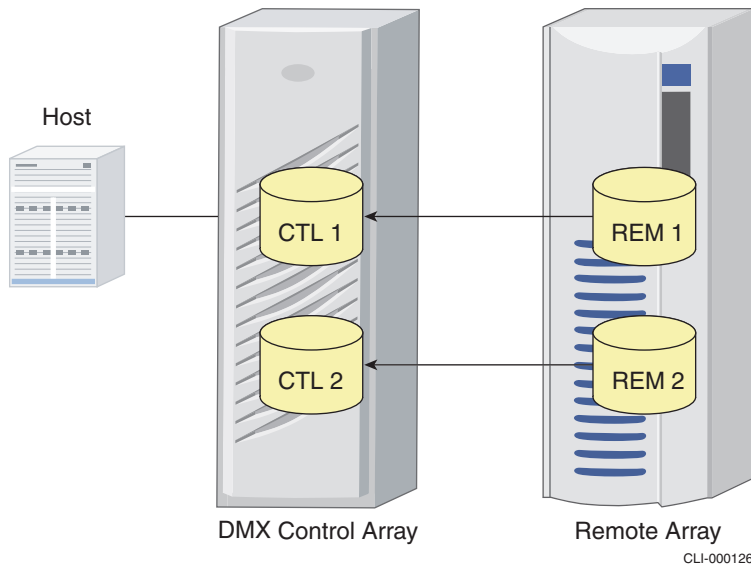
## Practical Uses

EMC Open Replicator facilitates data mobility without interfering with host applications that perform ongoing business operations. You can copy, relocate, and incrementally update remote data volumes between various storage arrays at high speeds with no impact to application performance.

Copying data from a DMX to other storage arrays is useful for backups or any ILM solution where you want to move data from high-end storage (high performance, highly available storage for real-time access) to mid-tier or low-end storage. Critical customer information is handled by the top tier of high-performance storage. Over time, as this information becomes less critical and is accessed less frequently, it is moved to lower-cost mid-tier storage. Some fixed-content images like bank checks need to be archived for up to seven years to comply with federal retention regulations. By using DMX remote copy capability to move fixed-content data and little-used data to lower-cost mid-tier storage, you can free up valuable high-end space for more frequently accessed data.

## Moving Data to a DMX Symmetrix Array

Using EMC Open Replicator to move data to a DMX Symmetrix array from various types of arrays allows you to migrate data from an older storage configuration on the SAN to newer DMX storage. As shown in Figure 1, a host that is locally attached to a DMX control array can initiate the copying of data to the DMX from a remote array (for example, a CLARiiON, older Symmetrix, or third-party storage array).



**Figure 1. Moving Data to a DMX from Another Array on the SAN**

Figure 1 shows data being pulled from remote devices to DMX control devices (for example, REM1 to CTL1, and REM2 to CTL2). The copying shown in this figure represents two remote copy sessions—one for each DMX control device involved in a copy operation.

Copying to the DMX control array from a remote array can be either immediate or deferred:

- A deferred copy of those tracks on a full device that contain the data of interest. Copying occurs when there are reads/writes to the DMX control device. The device pair state remains CopyOnAccess until you terminate the copy session or all tracks have been accessed.
- An immediate copy of the *full* remote device to the control device requires the `-copy` option. For pull operations like this, only full copying is allowed (not differential).

The first step is to define one or more control/remote device pairings in a text file. You specify a control device or remote device either by its unique LUN WWN or by a combination of the array ID and the device name (array ID:device). Enter the DMX control device in the left-hand column, and the remote device in the right-hand column. If the LUN WWN for REM1 in Figure 1 is 123456781234567820000000c920b484, for example, then it is paired with a DMX control device (CTL1) specified by its array ID (000187900041) and device name (0102). The LUN WWN for REM2 is 123456781234567810000000c9274156, and it is paired with CTL2 (device 0103) on the DMX control array.

```
symdev=000187900041:0102   wwn=123456781234567820000000c920b484
symdev=000187900041:0103   wwn=123456781234567810000000c9274156
```

Usually the local DMX control devices (in this case, 0102 and 0103) can be in the “array ID:device” format, because they are visible to the controlling DMX host. If the remote devices are also visible to the

controlling DMX host (as in the case of a discovered CLARiiON array<sup>1</sup>), the host can also see the LUN WWNs of the remote devices. If the remote devices are not visible, you can obtain their LUN WWNs with STORAPI or platform-native tools on the remote host.<sup>2</sup>

A two-command sequence allows you to copy data from remote devices to control devices. For example, to make a full and immediate copy of the data as specified by the control/remote device pairings defined in file `tango`, include the `-copy` option. The `-pull` parameter specifies that the DMX control array is pulling the data to it. The `-hot` parameter indicates that the control devices are online. Optionally, you can give the copy session a name that functions as a label for all remote copy sessions created and started via the file (for example, all sessions started on “Monday”).

1. `symrcopy create -copy -name Monday -pull -hot -file tango`

Creates one or more remote copy sessions (assigns a session ID for each session), sets up a track protection bitmap for each of the paired devices, and places each control/remote pair in the Created state.

2. `symrcopy activate -file tango`

Starts one or more remote copy sessions defined in the file `tango`. Copying begins.

Online operations allow a DMX host application such as a database or file server to be up and running while the DMX is copying data from remote devices. For information about offline copying, refer to the section “Online and Offline Copying.”

The conditions for copying data online to the DMX array are:

- The control device may be Read/Write enabled.
- The remote device should be Write Disabled (that is, not being updated by a remote host).
- If the DMX host attempts to *read* from the local DMX control device tracks that have not been copied yet, the system copies those tracks immediately to the control device and then services the I/O request.
- If the DMX host attempts to *write* to the local DMX control device tracks that have not been copied yet, the host writes those tracks immediately and removes them from the list of tracks that needs to be copied. If the control device tracks have already been copied when a host-write request is made on those tracks, the host-write overwrites those tracks.
- All directors that have the DMX control device mapped must participate in the session. If any director cannot “see” the remote device in the SAN during the discovery process, the create operation will fail.
- The control devices do not have to be the same RAID type or meta configuration, but the control device capacity must be equal to or larger than the remote device extents that are being copied.

The DMX remote copy system takes a device lock on all visible storage devices that participate in the copy session. The device lock lasts for the duration of the `symrcopy` command (`create` or `activate`, for example), not for the duration of the copy.

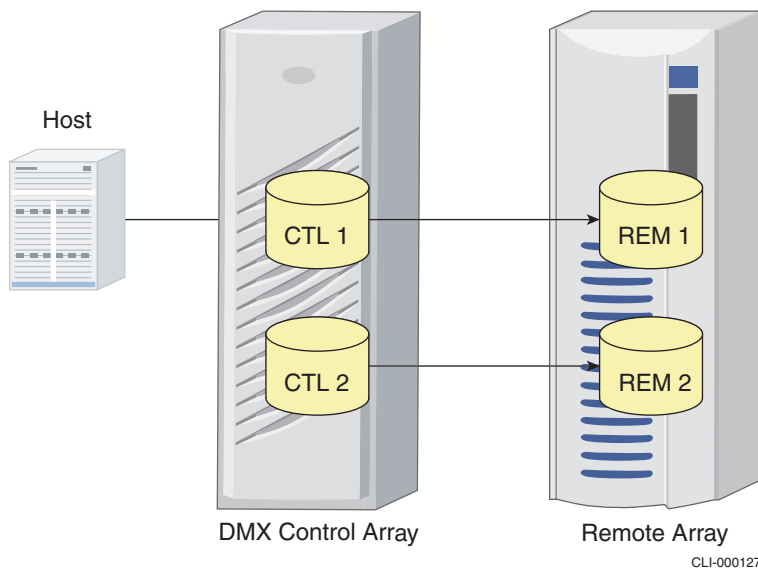
---

<sup>1</sup> Refer to “Example 2: Pushing DMX Data Offline to a Symmetrix and a Discovered CLARiiON array.”

<sup>2</sup> If the remote array is a Symmetrix array and the remote host is running a version of Solutions Enabler prior to version 5.5, a bug may cause the `symdev list -wwn` command to provide an incorrect LUN WWN.

## Copying Data from a DMX to Other Arrays

EMC Open Replicator allows you to copy data from a DMX control array to other types of arrays on the SAN. This capability is useful for backups or any situation where you want to move data from high-end storage to mid-tier or low-end storage. Figure 2 shows a host locally attached to a DMX control array that has initiated the copying of data to a remote array (for example, a CLARiiON, older Symmetrix, or third-party storage array).



**Figure 2. Online Copying from a DMX to Another Array on the SAN**

With an *online* remote copy operation, you can copy data from a single control device to a single remote device as shown by the push operation in Figure 2 (CTL1 to REM1, and CTL2 to REM2). Host impact requires the one-remote-device limit.

With an *offline* remote copy operation, you can copy data concurrently from a single control device to as many as 16 remote devices. For more information about using an offline remote copy, refer to the section “Online and Offline Copying.”

Copying from a DMX control array to a remote array can be either immediate or deferred:

- A deferred copy of those tracks on a full device that contain the data of interest. Copying occurs when there are writes to the DMX control device. The device pair state remains CopyOnWrite until you terminate the copy session or all tracks have been written.
- An immediate copy of the *full* control device to the remote device requires the `-copy` option. You can also add the `-differential` option, which means that any subsequent remote copy operation for the same session will copy only the changed data.

First, define the control/remote device pairings in a text file as described in the previous section (entering the control device always in the left-hand column). Then perform the create/activate command sequence. For example, to make a full and immediate copy (`-copy`) of the data as specified by the control/remote device pairings defined in a file named `samba` and label those copy sessions with the name “Tuesday”:

```
symrcopy create -copy -name Tuesday -push -hot -file samba
symrcopy activate -file samba
```

The `-push` parameter specifies that the DMX control array is pushing data to other arrays. The `-hot` parameter indicates an online operation.

Where the local DMX is pushing data and the control devices are online, a consistent point-in-time copy can be copied to the remote device by using an ECA window to temporarily prevent host I/O while the remote copy process starts the session. To achieve consistent copies, include the `-consistent` option with the `symrcopy activate` command. For example:

```
symrcopy create -copy -name Tuesday -push -hot -file samba
symrcopy activate -file samba -consistent
```

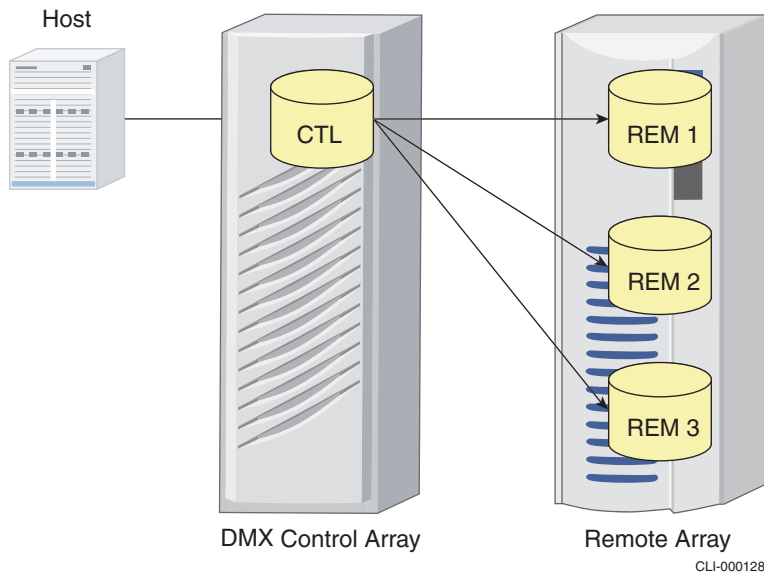
The conditions for copying data online from the DMX array to other arrays are:

- The control device may be Read/Write enabled.
- The remote device should not be accessible to its host.
- If the DMX host attempts to write to control device tracks that have not been copied yet, the system copies those tracks immediately to the remote device and then services the I/O request.
- All directors that have the DMX control device mapped must participate in the session. If any director cannot “see” the remote device in the SAN during the discovery process, the create operation will fail.

## Online and Offline Copying

Online operations allow a DMX host application such as a database or file server to be up and running while the DMX is copying data from or to remote devices.

However, there are reasons to sometimes perform remote copy sessions *offline*. For example, with online copying from a DMX to other arrays, a control device is limited to one remote device. An *offline* operation allows you to copy data concurrently to from a single control device to as many as 16 remote devices. Figure 3 shows an offline session that copies data concurrently from a single DMX control device to three remote devices, which may be on the same remote array as shown here or on three different arrays.



**Figure 3. Offline Copying from a DMX to Another Array on the SAN**

With online copying either to or from a DMX, *all* directors that have the DMX control device mapped must participate in a copy session. If any director cannot see the remote device in the SAN during the discovery

process initiated by the `symrcopy create` command, the session cannot be created. *Offline* copying avoids this possibility by using one or more directors that discovered the remote device.

While *online* copying from a DMX to other arrays is in progress, if something goes wrong on the network, the remote copy operation will fail. The controlling DMX host can keep writing to the control device because it is Read/Write Enabled to the host; thus, there is no impact on the application.

With *offline* copying, the control device is Not Ready (disabled for both reads and writes) to the DMX host, which does impact the application. With a network problem, however, the offline copy operation does not fail. The remote copy system can keep trying to perform the copy operation until the network is up again.

To copy data offline *to* a DMX, or *from* a DMX to other arrays, first ensure that the DMX control device is in the state Not Ready (refer to “Example 2: Pushing DMX Data Offline to a Symmetrix and a Discovered CLARiiON array.” The `symrcopy create` command checks the state of the DMX control devices for offline use. If the devices are not in the correct state, the result is a message to that effect.

The following commands copy data offline (`-cold`) from the DMX control array (`-push`) to a remote array whose devices are specified in the file `samba`.

```
symrcopy create -copy -name Tuesday -push -cold -file samba
symrcopy activate -file samba
```

## Differential Copying

DMX remote copy operations allow you to use the `-differential` option the first time you perform a full copy. By doing that, all subsequent copying during that copy session automatically performs incremental copies, capturing only new writes to the control device.

A differential or incremental copy operation copies only those device tracks that have changed since the initial full copy was performed. To do this, however, the copy session that existed for the full copy must still exist. You must also set up the differential copy during a full copy operation. For example:

```
symrcopy create -copy -name Tuesday -push -hot -file samba -differential
```

The `-differential` option creates a special SDDF session to keep track of changed data.

The `symrcopy activate` command initiates a full copy of the control device to the remote device.

```
symrcopy activate -file samba
```

In a push operation, however, it is imperative that the remote devices not be accessed by their host if a subsequent differential push (recreate and activate) will be performed. If the remote data needs to be accessed during this time, you need to make a copy of it on the remote storage array.

To copy subsequent writes to the control device during this copy session, use `symrcopy recreate` to copy just those tracks that have changed since the full copy completed. For example:

```
symrcopy recreate -name Tuesday -file samba
symrcopy activate -file samba
```

## Setting Defaults for the Copy and Differential Options

You can set an environment variable that affects the `symrcopy create` command. You can set the `SYMCLI_RCOPY_COPY_MODE` environment variable to any of the following values: `COPY_DIFF`, `COPY_NODIFF`, `NOCOPY_DIFF`, `NOCOPY_NODIFF`. If you set the `-copy` or `-differential` options on the command line, these options take precedence over any value set by this variable.

## Terminating a Copy Session

The remote copy session originates when you issue the `create` command and ends when you issue the `terminate` command. A DMX control device cannot participate in two active sessions simultaneously. Once you create a session with a particular control device, you cannot create another session with that same device until the original session is completed (in the Copied state) or terminated.<sup>3</sup> For example, to end all sessions defined in the file `samba`:

```
symrcopy terminate -file samba
```

## Adjusting a Copy Session for Performance

DMX remote copy operations allow you to pause an active copy session (Copy-In-Progress) and then resume it. Pausing an active session suspends background I/O (new writes to the remote device) until you resume the session. In an online operation, copying continues during the pause but performance may improve, because the only tracks that are copied are those that need to be moved before honoring the host I/O (that is, copy-on-first-write writes or copy-on-access reads). The following command changes the state of all sessions defined in the file `samba` from CopyInProg to CopyOnAccess:

```
symrcopy set mode nocopy -file samba
```

You can resume an existing copy session at the paused point. The following command changes the state of all sessions defined in the file `samba` from CopyOnAccess to CopyInProg:

```
symrcopy set mode copy -file samba
```

You can also alter performance while a copy session is in the CopyInProg state. With online and offline copying, there is a slight pause (usually several milliseconds) between each track write. You can speed up a copy operation by reducing or eliminating this pause. For *online* push/pull operations, setting a `pace` value (the default is 5) requires knowing the trade-offs. Setting a `pace` value to 0, the fastest copy, has the greatest impact on applications running on the control devices. If you set a higher `pace` value, there is less impact to the application, but the total copy time increases. The example sets the fastest copy pace.

```
symrcopy -file samba set pace 0
```

Table 1 describes performance tradeoffs when an application is running and you are pushing data online.

**Table 1. Performance When Pushing Data Online from a Control Array to Remote Array**

| Copy Method                        | Performance                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -copy, pace=0                      | Worst application impact, best Open Replicator copy time.                                                                                                                                                                                                                                                                                                  |
| -copy, pace=9                      | Less application impact, slower Open Replicator copy time.                                                                                                                                                                                                                                                                                                 |
| -nocopy                            | The least amount of application impact. However, the host must write all tracks on the control device before the session state is Copied. Because writing all tracks seldom occurs, you will probably need to perform the <code>set mode copy</code> at some point to push the remaining data.                                                             |
| BCV or clone as the control device | Using TimeFinder BCVs or clones as the control devices (source for the push) has virtually no impact on the application because the BCVs are split from the application devices and mapped to a different FA. Thus, this method provides the best Open Replicator copy time, but the tradeoff is the requirement for more storage (BCVs or clone devices). |

<sup>3</sup> A given DMX control device can have a maximum of eight DMX remote copy sessions, but only one session at a time can be active.

## Restrictions

- A DMX control device can belong to only one *active* copy session at a time. If one session is active, you cannot start another session with that same device until the first session is completed (in the Copied state) or terminated.
- Some remote arrays on the SAN may also be RDF-connected to the DMX control array. However, remote arrays that are more than two RDF hops away from the DMX control array cannot currently be discovered. Consequently, these remote devices that are accessible only through the SAN cannot be specified with Symmetrix device names. You may need to obtain the LUN WWNs of remote devices with STORAPI tools or platform-native tools.
- A control array cannot copy to one of its own devices in the same session. Copying within the same array is more efficient with products like TimeFinder<sup>®</sup>/Mirror and TimeFinder/Snap.
- To pull data offline to a DMX, the DMX control device must be in the Not Ready state; otherwise, the create operation will fail.
- To push data offline from a DMX to other arrays, the DMX control device must be in the Not Ready state; otherwise, the create operation will fail.
- To push data online from a DMX to other arrays, the limit is one remote device for each control device.
- To pull data online to a DMX, only full copies are possible (no differential copying).
- With online copying either to or from a DMX, all directors that have the DMX control device mapped must participate in the session. If any director cannot see the remote device in the SAN during the discovery process, the create operation will fail.

## Limitations

- Currently, DMX remote copy operations work only with FBA devices via Fibre Channel directors.
- DMX remote copy operations cannot guarantee that data on a remote device will not change during a copy operation. This may lead to inconsistent data on the DMX control device when copying to this device, or on the remote device when copying to that device. The specific extents of a remote device should not be a destination for other copying or host writes while a DMX copy operation is copying to those extents.
- When you copy from a DMX control device to multiple remote devices, the DMX copy operation creates one SDDF session to track changes within the copy session. Subsequent incremental copying will resynchronize all remote devices at the same time. You cannot resynchronize the remote devices independently.

## Displaying Copy Sessions

You can use the `symrcopy list` command to provide information about copy sessions running on the DMX Symmetrix controlling array. For example, the DMX array whose ID is 000000006190.

```
symrcopy -sid 6190 list
```

The `symrcopy query` command displays the state of those copy sessions defined in a copy file. For example, to display the copy sessions defined in the file `samba`:

```
symrcopy query -file samba
```

The `symrcopy verify` command verifies whether the control/remote device pairs are in a particular state. For example, to verify whether the device pairs defined in the file `samba` are in the Copied state:

```
symrcopy verify -file samba -copied
```

Output from the command indicates whether none, not all, or all control/remote device pairs are in the Copied state.

You can verify other states by using one of the following options: `-createinprog`, `-created`, `-recreateinprog`, `-recreated`, `-copyinprog`, `-terminateinprog`, `-copied`, `-copyonaccess`, `-copyonwrite`, `-failed`, `-verifyinprog`.

## Example 1: Pulling Data Online to a DMX Array

This example shows the migration of data from an older array to a DMX Symmetrix array and was performed using Solutions Enabler version 6.0. The hardware setup consists of the DMX control array whose array ID is 000187900041 (abbreviated as 41) connected to a controlling host. The remote array on the SAN is an older Symmetrix array. Three remote devices are each identified by their LUN WWN. Three control devices on the DMX are E9, EA, and EB. The control device capacity must be equal to or larger than the remote device extents that are being copied.

For online copying to the DMX, the control devices may be Read/Write enabled. The remote devices should not be receiving any updates from their host.

The first step in a DMX remote copy operation is to define the control/remote device pairings in a text file. You specify a control device or remote device either by its unique LUN WWN or by a combination of the array ID and the device name (array ID:device). Enter the DMX control devices in the left-hand column, and the remote devices in the right-hand column. The `vi` command uses the `vi` text editor to create a text file named `tango`. The first pair entered in this file is control device E9 on the DMX control array 000187900041 paired with the remote device whose LUN WWN is 6006048000000000314353594D303737.

```
# vi tango
```

```
symdev=000187900041:E9   wwn=6006048000000000314353594D303737
symdev=000187900041:EA   wwn=6006048000000000314353594D303738
symdev=000187900041:EB   wwn=6006048000000000314353594D303739
```

The `symrcopy create` command creates three online copy sessions so that data on the remote devices specified in file `tango` can be copied to the control devices when the copy operation is started. The `-pull` parameter specifies that the DMX control array is pulling the data to it. The `-hot` parameter indicates that the DMX remains online during the operation. The `-name` option gives these sessions the label name `Monday`.

```
# symrcopy create -copy -name Monday -pull -hot -file tango -noprompt
```

```
'Create' operation execution is in progress for the device list in
device file 'tango'. Please wait...
```

```
'Create' operation successfully executed for the device list
in device file 'tango'.
```

The `symrcopy query` command indicates that the sessions for the control/remote device pairs in the file `tango` are in the Created state and are considered to be active sessions. When the control host can “see” the remote devices (in this case, a remote Symmetrix array), Open Replicator converts the remote device LUN WWN identifier (specified in file `tango`) to the “array ID:device” format (for example, 000000003143:0077).

```
# symrcopy query -file tango
```

```
Device File Name      : tango
```

| Control Device    | Remote Device                      | Flags   | Status      | Done |
|-------------------|------------------------------------|---------|-------------|------|
| SID:symdev        | Protected<br>Tracks Identification | RI CDSH | CTL <=> REM | (%)  |
| 000187900041:00E9 | 138090 000000003143:0077           | SD X..X | Created     | N/A  |
| 000187900041:00EA | 138090 000000003143:0078           | SD X..X | Created     | N/A  |
| 000187900041:00EB | 138090 000000003143:0079           | SD X..X | Created     | N/A  |
| Total             | -----                              |         |             |      |
| Track(s)          | 414270                             |         |             |      |
| MB(s)             | 12945.9                            |         |             |      |

Legend:

R (Remote Device Vendor Identification)

S = Symmetrix, C = Clariion, . = Unknown.

I: (Remote Device Specification Identifier)

D = Device Name, W = LUN WWN, World Wide Name.

Flags:

(C): X = The background copy setting is active for this pair.  
 . = The background copy setting is not active for this pair.  
 (D): X = The session is a differential copy session.  
 . = The session is not a differential copy session.  
 (S): X = The session is pushing data to the remote device(s).  
 . = The session is pulling data from the remote device(s).  
 (H): X = The session is a hot copy session.  
 . = The session is a cold copy session.

The `symrcopy activate` command activates the copy sessions for the pairings in the file `tango`. Copying from the remote array to the control array begins.

```
# symrcopy activate -file tango -noprompt
```

'Activate' operation execution is in progress for the device list in device file 'tango'. Please wait...

'Activate' operation successfully executed for the device list in device file 'tango'.

The `symrcopy query` command with the `-detail` option indicates that the sessions for the device pairs defined in the file `tango` are in the `CopyInProgress` state and the percent (%) completion. The display also contains other details such as the pace. The default pace value of 5 provides relatively fast copy time with only a moderate impact on the application.

```
# symrcopy query -file tango -detail
```

Device File Name : tango

| Control Device    | Remote Device                                      | Flags   | Status         | Done  | Pace  | Name   |
|-------------------|----------------------------------------------------|---------|----------------|-------|-------|--------|
| -----             | -----                                              | -----   | -----          | ----- | ----- | -----  |
| SID:symdev        | Protected Modified<br>Tracks Tracks Identification | RI CDSH | CTL <=> REM    | (%)   |       |        |
| -----             | -----                                              | -----   | -----          | ----- | ----- | -----  |
| 000187900041:00E9 | 128083 0 000000003143:0077                         | SD X..X | CopyInProgress | 7     | 5     | Monday |
| 000187900041:00EA | 123742 0 000000003143:0078                         | SD X..X | CopyInProgress | 10    | 5     | Monday |
| 000187900041:00EB | 127455 0 000000003143:0079                         | SD X..X | CopyInProgress | 7     | 5     | Monday |
| Total             | -----                                              |         |                |       |       |        |
| Track(s)          | 379280                                             |         |                |       |       |        |
| MB(s)             | 11852.5                                            |         |                |       |       |        |

Legend:

R (Remote Device Vendor Identification)  
S = Symmetrix, C = Clariion, . = Unknown.

I: (Remote Device Specification Identifier)  
D = Device Name, W = LUN WWN, World Wide Name.

**Flags:**

(C): X = The background copy setting is active for this pair.  
      . = The background copy setting is not active for this pair.  
(D): X = The session is a differential copy session.  
      . = The session is not a differential copy session.  
(S): X = The session is pushing data to the remote device(s).  
      . = The session is pulling data from the remote device(s).  
(H): X = The session is a hot copy session.  
      . = The session is a cold copy session.

The `symrcopy verify` command checks at 60-second intervals (-i) to verify whether the control/remote device pairs are in the Copied state.

# **symrcopy verify -i 60 -file tango**

NONE of the devices are in the 'Copied' state.

NONE of the devices are in the 'Copied' state.

NOT ALL of the devices are in the 'Copied' state.

ALL of the devices are in the 'Copied' state.

A subsequent symrcopy query command indicates that the sessions for the device pairs defined in the file tango are now in the Copied state and that copying is 100% complete.

# symrcopy query -file tango

Device File Name : tango

| Control Device    | Remote Device                      | Flags   | Status      | Done  |
|-------------------|------------------------------------|---------|-------------|-------|
| -----             | -----                              | -----   | -----       | ----- |
| SID:symdev        | Protected<br>Tracks Identification | RI CDSH | CTL <=> REM | (%)   |
| -----             | -----                              | -----   | -----       | ----- |
| 000187900041:00E9 | 0 000000003143:0077                | SD X..X | Copied      | 100   |
| 000187900041:00EA | 0 000000003143:0078                | SD X..X | Copied      | 100   |
| 000187900041:00EB | 0 000000003143:0079                | SD X..X | Copied      | 100   |
| Total             | -----                              |         |             |       |
| Track(s)          | 0                                  |         |             |       |
| MB(s)             | 0.0                                |         |             |       |

Legend:

R (Remote Device Vendor Identification)

S = Symmetrix, C = Clariion, . = Unknown.

I: (Remote Device Specification Identifier)

D = Device Name, W = LUN WWN, World Wide Name.

Flags:

(C): X = The background copy setting is active for this pair.  
 . = The background copy setting is not active for this pair.  
 (D): X = The session is a differential copy session.  
 . = The session is not a differential copy session.  
 (S): X = The session is pushing data to the remote device(s).  
 . = The session is pulling data from the remote device(s).  
 (H): X = The session is a hot copy session.  
 . = The session is a cold copy session.

The `symrcopy list` command displays three inactive copy sessions on the DMX control array whose `sid` is 000187900041 (abbreviated as 41).

```
# symrcopy list -sid 41
```

Symmetrix ID: 000187900041

| Control Device | Remote Device                      | Flags   | Status      | Done  |
|----------------|------------------------------------|---------|-------------|-------|
| -----          | -----                              | -----   | -----       | ----- |
| Sym            | Protected<br>Tracks Identification | RI CDSH | CTL <=> REM | (%)   |
| -----          | -----                              | -----   | -----       | ----- |
| 00E9           | 0 000000003143:0077                | SD X..X | Copied      | 100   |
| 00EA           | 0 000000003143:0078                | SD X..X | Copied      | 100   |
| 00EB           | 0 000000003143:0079                | SD X..X | Copied      | 100   |
| Total -----    |                                    |         |             |       |
| Tracks         | 0                                  |         |             |       |
| MB(s)          | 0.0                                |         |             |       |

Legend:

R (Remote Device Vendor Identification)

S = Symmetrix, C = Clariion, . = Unknown.

I: (Remote Device Specification Identifier)

D = Device Name, W = LUN WWN, World Wide Name.

Flags:

- (C): X = The background copy setting is active for this pair.  
 . = The background copy setting is not active for this pair.
- (D): X = The session is a differential copy session.  
 . = The session is not a differential copy session.
- (S): X = The session is pushing data to the remote device(s).  
 . = The session is pulling data from the remote device(s).
- (H): X = The session is a hot copy session.  
 . = The session is a cold copy session.

The `symrcopy terminate` command ends all copy sessions defined in the file `tango`.

```
# symrcopy terminate -file tango -noprompt
```

```
'Terminate' operation execution is in progress for the device list in  
device file 'tango'. Please wait...
```

```
'Terminate' operation successfully executed for the device list  
in device file 'tango'.
```

Another `symrcopy list` command verifies that there are no longer any copy sessions on the DMX control array.

```
# symrcopy list -sid 41
```

```
Symmetrix ID: 000187900041
```

```
  No Devices with RCopy sessions were found.
```

## Example 2: Pushing DMX Data Offline to a Symmetrix and a Discovered CLARiiON Array

This example shows *offline* copying of data from a DMX control array to two remote arrays on the SAN and was performed using Solutions Enabler version 6.0. The hardware setup consists of the DMX control array (sid 58) connected to a controlling host. Two remote arrays on the SAN are a Symmetrix array and a CLARiiON array. The single DMX control device is 1C5. An initial copy session copies to two remote devices (one on the Symmetrix and one on the CLARiiON).<sup>4</sup> A subsequent copy session copies again from the same control device to devices on the two remote arrays. The remote device capacity must be equal to or larger than the control device extents that are being copied.

This example also illustrates how to discover and reference CLARiiON devices via the SYMCLI without having to use their LUN WWNs. First shown is how to discover a CLARiiON array that is directly connected to the controlling host. The second illustration shows a more common configuration in which the controlling host has to discover the CLARiiON array over the network.

This first `symcfg discover` command shows how to obtain the CLARiiON information if your SYMAPI controlling host is physically connected to the CLARiiON array.

```
# symcfg discover -clariion
```

This operation may take up to a few minutes. Please be patient...

The `symcfg list` command with the `-clariion` option displays the CLARiiON array that was discovered by the controlling host.

```
# symcfg list -clariion
```

| C L A R I I O N |       |                     |              |                     |                     |
|-----------------|-------|---------------------|--------------|---------------------|---------------------|
| ClarID          | Model | Firmware<br>Version | Num<br>Disks | Num Phys<br>Devices | Num Clar<br>Devices |
| APM00034801589  | 700   | 2.16.700.3.149      | 35           | 156                 | 223                 |

<sup>4</sup> If copying data *online* from a DMX to other arrays, the control device cannot copy to multiple remote devices.

The `symdev list` command displays devices on the CLARiiON array. The display shows physical device names for those devices that have been mapped to a front-end director and been recognized by the host. (Front-end mapping is a mechanism for exporting the logical view of a device to a host directly connected to the array.) The ellipsis (...) indicates output that was omitted for brevity.

```
# symdev list -clariion
```

```
Clariion ID: APM00034801589
```

| Device |               | Device |          |                                  |
|--------|---------------|--------|----------|----------------------------------|
| Num    | Physical Name | Config | Cap (MB) | WWN                              |
| 0034   | rdmp/c4t0d7s2 | RAID-5 | 5120     | 60060160F2810D00FC7ED16CC3D5D811 |
| 0035   | rdmp/c4t0d6s2 | RAID-5 | 5120     | 60060160F2810D00FD7ED16CC3D5D811 |
| 0036   | rdmp/c4t0d5s2 | RAID-5 | 5120     | 60060160F2810D00FE7ED16CC3D5D811 |
| 0037   | rdmp/c4t0d4s2 | RAID-5 | 5120     | 60060160F2810D00FF7ED16CC3D5D811 |
| 0038   | rdmp/c4t0d3s2 | RAID-5 | 5120     | 60060160F2810D00007FD16CC3D5D811 |
| 0039   | rdmp/c4t0d2s2 | RAID-5 | 5120     | 60060160F2810D00017FD16CC3D5D811 |
| 0040   | rdmp/c4t0d1s2 | RAID-5 | 4315     | 60060160F2810D00F859A07BC3D5D811 |
| 0041   | rdmp/c4t0d0s2 | RAID-5 | 4315     | 60060160F2810D00F959A07BC3D5D811 |
| 0212   | Not Visible   | RAID-5 | 4315     | 60060160F2810D001F6947834B3AD911 |
| 0213   | Not Visible   | RAID-5 | 4315     | 60060160F2810D002E65F3904B3AD911 |
| 0214   | Not Visible   | RAID-5 | 4315     | 60060160F2810D002F65F3904B3AD911 |
| 0215   | Not Visible   | RAID-5 | 4315     | 60060160F2810D003065F3904B3AD911 |
| 0216   | Not Visible   | RAID-5 | 4315     | 60060160F2810D003165F3904B3AD911 |
| 0217   | Not Visible   | RAID-5 | 4315     | 60060160F2810D003265F3904B3AD911 |
| 0218   | Not Visible   | RAID-5 | 4315     | 60060160F2810D003365F3904B3AD911 |
| 0219   | Not Visible   | RAID-5 | 4315     | 60060160F2810D003465F3904B3AD911 |
| 0220   | Not Visible   | RAID-5 | 4315     | 60060160F2810D003565F3904B3AD911 |
| 0221   | Not Visible   | RAID-5 | 4315     | 60060160F2810D003665F3904B3AD911 |
| 0222   | Not Visible   | RAID-5 | 4315     | 60060160F2810D003765F3904B3AD911 |

If your host does not have direct access to the CLARiiON array, you need to discover it over the network. To do this, you must first provide authorization information that allows the host to access one or both CLARiiON storage processors (A and B). The following `symcfg authorization` commands are issued from a host that is not directly connected to the CLARiiON array. These commands use the `-host` parameter to specify the names of the storage processors (api1064 and api1065), including the username and password necessary for this host to have authorization.

```
# symcfg authorization add -host api1064 -username clariion -password clariion
# symcfg authorization add -host api1065 -username clariion -password clariion
```

The following command uses the `vi` text editor to create a file named `clariion` that contains the IP address of each CLARiiON storage processor that you want to discover remotely. The IP address of storage processor A (172.23.193.64) is always entered in the left-hand column. The IP address of storage processor B is 172.23.193.65. If you want to discover only one of the storage processors, enter a dash (-) in the column of the undeclared processor.

```
# vi clariion

172.23.193.64  172.23.193.65
```

The `symcfg discover` command discovers the CLARiiON storage processors by including the `-file` parameter and the name of the file (`clariion`) that lists the IP addresses.

```
# symcfg discover -clariion -file clariion
```

This operation may take up to a few minutes. Please be patient...  
Discovering Clariion at SpA: 172.23.193.64 and SpB: 172.23.193.65 ... Done

The `symcfg list` command displays the CLARiiON array that was discovered remotely over the network by the second controlling host. The display reports only the number of physical device names that are visible to the controlling host, which does not “see” *remote* physical device names. Thus, the heading “Num Phys Devices” indicates zero.

```
# symcfg list -clariion
```

| C L A R I I O N |       |                     |              |                     |                     |
|-----------------|-------|---------------------|--------------|---------------------|---------------------|
| ClarID          | Model | Firmware<br>Version | Num<br>Disks | Num Phys<br>Devices | Num Clar<br>Devices |
| APM00034801589  | 700   | 2.16.700.3.149      | 35           | 0                   | 223                 |

The `symdev list` command issued from this second host displays the devices on the CLARiiON array.

```
# symdev list -clariion
```

```
Clariion ID: APM00034801589
```

| Device |               | Device |          |                                  |
|--------|---------------|--------|----------|----------------------------------|
| Num    | Physical Name | Config | Cap (MB) | WWN                              |
| 0034   | Not Visible   | RAID-5 | 5120     | 60060160F2810D00FC7ED16CC3D5D811 |
| 0035   | Not Visible   | RAID-5 | 5120     | 60060160F2810D00FD7ED16CC3D5D811 |
| 0036   | Not Visible   | RAID-5 | 5120     | 60060160F2810D00FE7ED16CC3D5D811 |
| 0037   | Not Visible   | RAID-5 | 5120     | 60060160F2810D00FF7ED16CC3D5D811 |
| 0038   | Not Visible   | RAID-5 | 5120     | 60060160F2810D00007FD16CC3D5D811 |
| 0039   | Not Visible   | RAID-5 | 5120     | 60060160F2810D00017FD16CC3D5D811 |
| 0040   | Not Visible   | RAID-5 | 4315     | 60060160F2810D00F859A07BC3D5D811 |
| 0041   | Not Visible   | RAID-5 | 4315     | 60060160F2810D00F959A07BC3D5D811 |
| .....  |               |        |          |                                  |
| 0212   | Not Visible   | RAID-5 | 4315     | 60060160F2810D001F6947834B3AD911 |
| 0213   | Not Visible   | RAID-5 | 4315     | 60060160F2810D002E65F3904B3AD911 |
| 0214   | Not Visible   | RAID-5 | 4315     | 60060160F2810D002F65F3904B3AD911 |
| 0215   | Not Visible   | RAID-5 | 4315     | 60060160F2810D003065F3904B3AD911 |
| 0216   | Not Visible   | RAID-5 | 4315     | 60060160F2810D003165F3904B3AD911 |
| 0217   | Not Visible   | RAID-5 | 4315     | 60060160F2810D003265F3904B3AD911 |
| 0218   | Not Visible   | RAID-5 | 4315     | 60060160F2810D003365F3904B3AD911 |
| 0219   | Not Visible   | RAID-5 | 4315     | 60060160F2810D003465F3904B3AD911 |
| 0220   | Not Visible   | RAID-5 | 4315     | 60060160F2810D003565F3904B3AD911 |
| 0221   | Not Visible   | RAID-5 | 4315     | 60060160F2810D003665F3904B3AD911 |
| 0222   | Not Visible   | RAID-5 | 4315     | 60060160F2810D003765F3904B3AD911 |

Identifying control and remote devices and ensuring that they are in the correct state are prerequisites for the DMX remote copy operation. To copy data offline *from* a DMX to other arrays, first ensure that the DMX control device is Not Ready to its host. For example, if the control device is not in the correct state, you can execute the `symdev not_ready` command from the local host connected to the DMX control array. (Keep in mind that the remote devices should not be receiving any updates from their host during the copy operation.)

```
# symdev not_ready 1c5 -sid 58 -noprompt
```

'Not Ready' Device operation successfully completed for the device.

The first step in a copy operation is to define the control/remote device pairings in a text file. The following command uses the vi text editor to create a text file named `samba`. The first pairing entered in this file is control device 1C5 on DMX control array 000187720758 (abbreviated as 58), and it is paired with device 39 on the remote CLARiiON whose ID is APM00034801589. The second line pairs the same control device with a second remote device (19C) located on a remote Symmetrix array whose ID is 000184500160.

```
# vi samba
```

```
symdev=58:1C5 clardev=APM00034801589:39
symdev=58:1C5 symdev=000184500160:19C
```

The `symrcopy create` command with the `-cold` option creates a single offline copy session for the controlling DMX push operation. The `-copy` option specifies a full and immediate copy. Remote copy operations allow you to use the `-differential` option the first time you perform a full copy. By doing this, all subsequent copying during that copy session automatically performs incremental copies, capturing only new writes to the control device. It is imperative, however, that the remote devices not be accessed by their host if a subsequent differential push (recreate and activate) will be performed. If the remote data needs to be accessed during this time, you need to make a copy of it on the remote storage array.

```
# symrcopy create -name Wednesday -copy -push -cold -file samba -differential -noprompt
```

'Create' operation execution is in progress for the device list in device file 'samba'. Please wait...

'Create' operation successfully executed for the device list in device file 'samba'.

The `symrcopy query` command indicates that the control/remote device pairs for the session defined in the file `samba` are in the Created state.

# **symrcopy -file samba query**

Device File Name : samba

| Control Device    | Remote Device                      | Flags   | Status      | Done |
|-------------------|------------------------------------|---------|-------------|------|
| SID:symdev        | Protected<br>Tracks Identification | RI CDSH | CTL <=> REM | (%)  |
| 000187720758:01C5 | 138090 APM00034801589:0039         | CD XXX. | Created     | N/A  |
| -                 | - 000184500160:019C                | SD -    | -           | -    |
| Total             | -----                              |         |             |      |
| Track(s)          | 138090                             |         |             |      |
| MB(s)             | 4315.3                             |         |             |      |

Legend:

R (Remote Device Vendor Identification)

S = Symmetrix, C = Clariion, . = Unknown.

I: (Remote Device Specification Identifier)

D = Device Name, W = LUN WWN, World Wide Name.

Flags:

(C): X = The background copy setting is active for this pair.  
 . = The background copy setting is not active for this pair.  
 (D): X = The session is a differential copy session.  
 . = The session is not a differential copy session.  
 (S): X = The session is pushing data to the remote device(s).  
 . = The session is pulling data from the remote device(s).  
 (H): X = The session is a hot copy session.  
 . = The session is a cold copy session.

The `symrcopy activate` command starts the copy operation for the device pairs defined in the file `samba`. Copying from the control device to the two remote devices begins.

```
# symrcopy -file samba activate -noprompt
```

'Activate' operation execution is in progress for the device list in device file 'samba'. Please wait...

'Activate' operation successfully executed for the device list in device file 'samba'.

The `symrcopy query` command with the `-detail` option indicates that the device pairs defined in the file `samba` are in the `CopyInProg` state and that copying is 3% complete. Note that the default pace value 5 provides a moderately fast copy operation but with some impact on the application.

```
# symrcopy -file samba query -detail
```

Device File Name : samba

| Control Device    | Remote Device                                      | Flags   | Status      | Done | Pace | Name      |
|-------------------|----------------------------------------------------|---------|-------------|------|------|-----------|
| SID:symdev        | Protected Modified<br>Tracks Tracks Identification | RI CDSH | CTL <=> REM | (%)  |      |           |
| 000187720758:01C5 | 133419 0 APM00034801589:0039                       | CD XXX. | CopyInProg  | 3    | 5    | Wednesday |
| -                 | - 000184500160:019C                                | SD -    | -           | -    | -    | -         |
| Total             | -----                                              |         |             |      |      |           |
| Track(s)          | 133419                                             |         |             |      |      |           |
| MB(s)             | 4169.3                                             |         |             |      |      |           |

## Legend:

R (Remote Device Vendor Identification)

S = Symmetrix, C = Clariion, . = Unknown.

I: (Remote Device Specification Identifier)

D = Device Name, W = LUN WWN, World Wide Name.

## Flags:

(C): X = The background copy setting is active for this pair.

. = The background copy setting is not active for this pair.

(D): X = The session is a differential copy session.

. = The session is not a differential copy session.

(S): X = The session is pushing data to the remote device(s).

. = The session is pulling data from the remote device(s).

(H): X = The session is a hot copy session.

. = The session is a cold copy session.

The `symrcopy set pace` command slows up the copy operation by setting the pace value to 7. This setting will result in less impact on the application.

```
# symrcopy -file samba set pace 7 -noprompt
```

```
'Set Pace' operation execution is in progress for the device list in
device file 'samba'. Please wait...
```

```
'Set Pace' operation successfully executed for the device list
in device file 'samba'.
```

A subsequent `symrcopy query` command indicates that the device pairs defined in the file `samba` are still Copy-In-Progress (now 15% complete).

# **symrcopy -file samba query -detail**

Device File Name : samba

| Control Device    | Remote Device                                      | Flags   | Status      | Done | Pace | Name      |
|-------------------|----------------------------------------------------|---------|-------------|------|------|-----------|
| SID:symdev        | Protected Modified<br>Tracks Tracks Identification | RI CDSH | CTL <=> REM | (%)  |      |           |
| 000187720758:01C5 | 116667 0 APM00034801589:0039                       | CD XXX. | CopyInProg  | 15   | 7    | Wednesday |
| -                 | - 000184500160:019C                                | SD -    | -           | -    | -    | -         |
| Total             | -----                                              |         |             |      |      |           |
| Track(s)          | 116667                                             |         |             |      |      |           |
| MB(s)             | 3645.8                                             |         |             |      |      |           |

Legend:

R (Remote Device Vendor Identification)

S = Symmetrix, C = Clariion, . = Unknown.

I: (Remote Device Specification Identifier)

D = Device Name, W = LUN WWN, World Wide Name.

Flags:

(C): X = The background copy setting is active for this pair.  
 . = The background copy setting is not active for this pair.  
 (D): X = The session is a differential copy session.  
 . = The session is not a differential copy session.  
 (S): X = The session is pushing data to the remote device(s).  
 . = The session is pulling data from the remote device(s).  
 (H): X = The session is a hot copy session.  
 . = The session is a cold copy session.

The `symrcopy verify` command checks at 30-second intervals (`-i`) to verify whether the control/remote device pairs are in the Copied state.

```
# symrcopy -file samba verify -i 30
```

NONE of the devices are in the 'Copied' state.

NONE of the devices are in the 'Copied' state.

.....  
NONE of the devices are in the 'Copied' state.

ALL of the devices are in the 'Copied' state.

A subsequent `symrcopy query` command indicates that the device pairs defined in the file `samba` are in the Copied state (100% complete). This session is now considered to be inactive.

```
# symrcopy -file samba query -detail
```

Device File Name : samba

| Control Device    | Remote Device      | Flags                 | Status  | Done        | Pace | Name        |
|-------------------|--------------------|-----------------------|---------|-------------|------|-------------|
| SID:symdev        | Protected Modified |                       |         |             |      |             |
| Tracks            | Tracks             | Identification        | RI CDSH | CTL <=> REM | (%)  |             |
| 000187720758:01C5 | 0                  | 0 APM00034801589:0039 | CD XXX. | Copied      | 100  | 7 Wednesday |
| -                 | -                  | - 000184500160:019C   | SD -    | -           | -    | -           |
| Total             | -----              |                       |         |             |      |             |
| Track(s)          | 0                  |                       |         |             |      |             |
| MB(s)             | 0.0                |                       |         |             |      |             |

Legend:

R (Remote Device Vendor Identification)  
S = Symmetrix, C = Clariion, . = Unknown.

I: (Remote Device Specification Identifier)  
D = Device Name, W = LUN WWN, World Wide Name.

## Flags:

(C): X = The background copy setting is active for this pair.  
 . = The background copy setting is not active for this pair.  
 (D): X = The session is a differential copy session.  
 . = The session is not a differential copy session.  
 (S): X = The session is pushing data to the remote device(s).  
 . = The session is pulling data from the remote device(s).  
 (H): X = The session is a hot copy session.  
 . = The session is a cold copy session.

Because the first copy session is now inactive, a new copy session can be created using the same control device and other remote devices. The following command uses the vi text editor to create a text file named foxtrot. The first pairing entered in this file is again control device 1C5 on DMX array 58. It is paired with a different remote CLARiiON device (specified this time by its LUN WWN). The second line pairs the same control device with a different remote device (19D) on the Symmetrix array whose abbreviated ID is 60.

```
# vi foxtrot
```

```
symdev=58:1C5   wwn=60060160F2810D00007FD16CC3D5D811
symdev=58:1C5   symdev=60:19D
```

The `symrcopy create` command with the `-cold` option creates another offline copy session for a second DMX push operation. The `-copy` option specifies a full and immediate copy. Remote copy operations allow you to use the `-differential` option the first time you perform a full copy. By doing this, all subsequent copying during that copy session automatically performs incremental copies. The `-name` option gives this session the label name Thursday.

```
# symrcopy create -name Thursday -copy -push -cold -file foxtrot -differential -noprompt
```

```
'Create' operation execution is in progress for the device list in
device file 'foxtrot'. Please wait...
```

```
'Create' operation successfully executed for the device list
in device file 'foxtrot'.
```

The `symrcopy query` command indicates that the control/remote pairs for the session defined in the file `foxtrot` are in the Created state. Note that Open Replicator converted the CLARiiON device LUN WWN identifier (specified in file `foxtrot`) to its “array ID:device” format (APM00034801589:0038).

# **symrcopy -file foxtrot query -detail**

Device File Name : foxtrot

| Control Device    | Remote Device                                      | Flags   | Status      | Done | Pace | Name     |
|-------------------|----------------------------------------------------|---------|-------------|------|------|----------|
| SID:symdev        | Protected Modified<br>Tracks Tracks Identification | RI CDSH | CTL <=> REM | (%)  |      |          |
| 000187720758:01C5 | 138090 0 APM00034801589:0038                       | CD XXX. | Created     | N/A  | 7    | Thursday |
| -                 | - 000184500160:019D                                | SD -    | -           | -    | -    | -        |
| Total             | -----                                              |         |             |      |      |          |
| Track(s)          | 138090                                             |         |             |      |      |          |
| MB(s)             | 4315.3                                             |         |             |      |      |          |

Legend:

R (Remote Device Vendor Identification)

S = Symmetrix, C = Clariion, . = Unknown.

I: (Remote Device Specification Identifier)

D = Device Name, W = LUN WWN, World Wide Name.

Flags:

(C): X = The background copy setting is active for this pair.  
. = The background copy setting is not active for this pair.  
(D): X = The session is a differential copy session.  
. = The session is not a differential copy session.  
(S): X = The session is pushing data to the remote device(s).  
. = The session is pulling data from the remote device(s).  
(H): X = The session is a hot copy session.  
. = The session is a cold copy session.

The `symrcopy activate` command starts the copy operation for the device pairs defined in the file `foxtrot`. Copying from the control device to two remote devices begins.

```
# symrcopy -file foxtrot activate -noprompt
```

'Activate' operation execution is in progress for the device list in device file 'foxtrot'. Please wait...

'Activate' operation successfully executed for the device list in device file 'foxtrot'.

The `symrcopy list` command indicates that the previous copy sessions on the DMX control array (sid 58) are in the Copied state and considered inactive. The active copy sessions defined in the file `foxtrot` are in progress (CopyInProgress).

```
# symrcopy list -sid 58
```

Symmetrix ID: 000187720758

| Control Device |           | Remote Device       | Flags   | Status         | Done |
|----------------|-----------|---------------------|---------|----------------|------|
| -----          |           | -----               | ----    | -----          | ---- |
|                | Protected |                     |         |                |      |
| Sym            | Tracks    | Identification      | RI CDSH | CTL <=> REM    | (%)  |
| -----          | -----     | -----               | --      | -----          | ---- |
| 01C5           | 0         | APM00034801589:0039 | CD XXX. | Copied         | 100  |
| -              | -         | 000184500160:019C   | SD -    | -              | -    |
| 01C5           | 130669    | APM00034801589:0038 | CD XXX. | CopyInProgress | 5    |
| -              | -         | 000184500160:019D   | SD -    | -              | -    |
| Total          |           | -----               |         |                |      |
| Tracks         |           | 130669              |         |                |      |
| MB(s)          |           | 4083.4              |         |                |      |

**Legend:**

R (Remote Device Vendor Identification)

S = Symmetrix, C = Clariion, . = Unknown.

I: (Remote Device Specification Identifier)

D = Device Name, W = LUN WWN, World Wide Name.

**Flags:**

(C): X = The background copy setting is active for this pair.

. = The background copy setting is not active for this pair.

(D): X = The session is a differential copy session.

. = The session is not a differential copy session.

(S): X = The session is pushing data to the remote device(s).

. = The session is pulling data from the remote device(s).

(H): X = The session is a hot copy session.

. = The session is a cold copy session.

The `symrcopy verify` command checks every 30 seconds to verify whether the control/remote device pairs are in the Copied state.

```
# symrcopy -file foxtrot verify -i 30
```

NONE of the devices are in the 'Copied' state.

NONE of the devices are in the 'Copied' state.

.....  
NONE of the devices are in the 'Copied' state.

ALL of the devices are in the 'Copied' state.

A subsequent `symrcopy list` command displays again the copy sessions on the DMX control array whose sid is 58. All sessions are in the Copied state.

# **symrcopy list -sid 58**

Symmetrix ID: 000187720758

| Control Device | Remote Device                      | Flags   | Status      | Done  |
|----------------|------------------------------------|---------|-------------|-------|
| -----          | -----                              | -----   | -----       | ----- |
| Sym            | Protected<br>Tracks Identification | RI CDSH | CTL <=> REM | (%)   |
| -----          | -----                              | -----   | -----       | ----- |
| 01C5           | 0 APM00034801589:0039              | CD XXX. | Copied      | 100   |
| -              | - 000184500160:019C                | SD -    | -           | -     |
| 01C5           | 0 APM00034801589:0038              | CD XXX. | Copied      | 100   |
| -              | - 000184500160:019D                | SD -    | -           | -     |
| Total          | -----                              |         |             |       |
| Tracks         | 0                                  |         |             |       |
| MB(s)          | 0.0                                |         |             |       |

Legend:

R (Remote Device Vendor Identification)

S = Symmetrix, C = Clariion, . = Unknown.

I: (Remote Device Specification Identifier)

D = Device Name, W = LUN WWN, World Wide Name.

Flags:

(C): X = The background copy setting is active for this pair.  
 . = The background copy setting is not active for this pair.  
 (D): X = The session is a differential copy session.  
 . = The session is not a differential copy session.  
 (S): X = The session is pushing data to the remote device(s).  
 . = The session is pulling data from the remote device(s).  
 (H): X = The session is a hot copy session.  
 . = The session is a cold copy session.

Because copy operations are complete, you can use the `symdev ready` command to make the control device ready again to the DMX control host. Once the device is ready, the host can again perform reads and writes to the device. For example, to make the control device 1C5 ready again.

```
# symdev ready 1c5 -sid 58 -noprompt
```

```
'Ready' Device operation successfully completed for the device.
```

After a time interval when write I/O occurs on the control device, you may wish to perform an incremental copy operation to the same remote devices to move changed data there. To do so, you need to first make the control device Not Ready again to its DMX control host.

```
# symdev not_ready 1c5 -sid 58 -noprompt
```

```
'Not Ready' Device operation successfully completed for the device.
```

The `symrcopy recreate` command recreates the samba copy session for the DMX control device and sets it up for a differential copy operation. (For brevity, the example does not recreate the foxtrot copy session, but it can be done in a similar way.)

```
# symrcopy -file samba recreate -noprompt
```

```
'Recreate' operation execution is in progress for the device list in  
device file 'samba'. Please wait...
```

```
'Recreate' operation successfully executed for the device list  
in device file 'samba'.
```

The `symrcopy activate` command starts the copy session defined in the file samba. Differential copying from control device to the remote devices begins.

```
# symrcopy -file samba activate -noprompt
```

```
'Activate' operation execution is in progress for the device list in  
device file 'samba'. Please wait...
```

```
'Activate' operation successfully executed for the device list  
in device file 'samba'.
```

The `symdev ready` command shows here that you cannot make the device ready while the copy is in progress.

```
# symdev ready 1c5 -sid 58 -noprompt
```

A specified device is involved in a Copy session and cannot be modified

The `symrcopy query` command shows that the sessions for the device pairs defined in the file `samba` are now in the Copied state.

```
# symrcopy -file samba query
```

```
Device File Name      : samba
```

| Control Device    | Remote Device                      | Flags   | Status      | Done  |
|-------------------|------------------------------------|---------|-------------|-------|
| -----             | -----                              | -----   | -----       | ----- |
| SID:symdev        | Protected<br>Tracks Identification | RI CDSH | CTL <=> REM | (%)   |
| -----             | -----                              | -----   | -----       | ----- |
| 000187720758:01C5 | 0 APM00034801589:0039              | CD XXX. | Copied      | 100   |
| -                 | - 000184500160:019C                | SD -    | -           | -     |
| Total             | -----                              |         |             |       |
| Track(s)          | 0                                  |         |             |       |
| MB(s)             | 0.0                                |         |             |       |

Legend:

R (Remote Device Vendor Identification)

S = Symmetrix, C = Clariion, . = Unknown.

I: (Remote Device Specification Identifier)

D = Device Name, W = LUN WWN, World Wide Name.

Flags:

(C): X = The background copy setting is active for this pair.

. = The background copy setting is not active for this pair.

(D): X = The session is a differential copy session.

. = The session is not a differential copy session.

(S): X = The session is pushing data to the remote device(s).  
      . = The session is pulling data from the remote device(s).  
(H): X = The session is a hot copy session.  
      . = The session is a cold copy session.

Now that the copy is complete, a subsequent `symdev ready` command can make the control device ready again to the DMX control host..

```
# symdev ready 1c5 -sid 58 -noprompt
```

'Ready' Device operation successfully completed for the device.

The `symrcopy terminate` command ends the control device copy session defined in the file `samba`.

```
# symrcopy -file samba terminate -noprompt
```

'Terminate' operation execution is in progress for the device list in device file 'samba'. Please wait...

'Terminate' operation successfully executed for the device list in device file 'samba'.

The `symrcopy terminate` command ends the control device copy session defined in the file `foxtrot`.

```
# symrcopy -file foxtrot terminate -noprompt
```

'Terminate' operation execution is in progress for the device list in device file 'foxtrot'. Please wait...

'Terminate' operation successfully executed for the device list in device file 'foxtrot'.

The `symrcopy list` command indicates that there are no longer any copy sessions on the DMX control array (sid 58).

```
# symrcopy list -sid 58
```

Symmetrix ID: 000187720758

No Devices with RCopy sessions were found.

## Example 3: Pushing DMX Data Online to Other Arrays

The following example was performed using Solutions Enabler version 6.0. It pushes data online from two DMX control devices to two remote CLARiiON devices, using various performance parameters.

The `vi` command uses the `vi` text editor to create a text file named `rumba` to set up the Open Replicator copy pairings. The first pairing is control device `1E3` on DMX control array `58` paired with a remote CLARiiON device whose LUN WWN is `60060160F2810D007E40DA1ABE00D911`. The second pairing is control device `1E4` on DMX control array `58` paired with a remote CLARiiON device whose LUN WWN is `60060160F2810D007D40DA1ABE00D911`.

```
# vi rumba
symdev=58:1E3   wwn=60060160F2810D007E40DA1ABE00D911
symdev=58:1E4   wwn=60060160F2810D007D40DA1ABE00D911
```

The `symrcopy create` command with the `-hot` option creates two online copy sessions for the controlling DMX push operation. The `-copy` option specifies a full and immediate copy. Remote copy operations allow you to use the `-differential` option the first time you perform a full copy. By doing this, all subsequent copying during that copy session automatically performs incremental copies, capturing only new writes to the control device. The `-name` option gives these sessions the label name `Friday`.

```
# symrcopy create -name Friday -copy -push -hot -file rumba -differential -noprompt
```

```
'Create' operation execution is in progress for the device list in device file 'rumba'. Please wait...
```

```
'Create' operation successfully executed for the device list
in device file 'rumba'.
```

The `symrcopy activate` command starts the copy operation for the device pairs defined in the file `rumba`. Copying from the control devices to the two remote devices begins. Using the `-consistent` option creates a consistent point-in-time copy.

```
# symrcopy activate -file rumba -consistent -noprompt
```

```
'Activate' operation execution is in progress for the device list in device file 'rumba'. Please wait...
```

```
'Activate' operation successfully executed for the device list in device file 'rumba'.
```

The symrcopy query command shows that copying is in progress (CopyInProg).

# symrcopy query -file rumba

Device File Name : rumba

| Control Device    | Remote Device                           | Flags   | Status      | Done |
|-------------------|-----------------------------------------|---------|-------------|------|
| SID:symdev        | Protected<br>Tracks Identification      | RI CDSH | CTL <=> REM | (%)  |
| 000187720758:01E3 | 130588 60060160F2810D007E40DA1ABE00D911 | CW XXXX | CopyInProg  | 5    |
| 000187720758:01E4 | 115750 60060160F2810D007D40DA1ABE00D911 | CW XXXX | CopyInProg  | 16   |
| Total             | -----                                   |         |             |      |
| Track(s)          | 246338                                  |         |             |      |
| MB(s)             | 7698.1                                  |         |             |      |

Legend:

R (Remote Device Vendor Identification)

S = Symmetrix, C = Clariion, . = Unknown.

I: (Remote Device Specification Identifier)

D = Device Name, W = LUN WWN, World Wide Name.

Flags:

(C): X = The background copy setting is active for this pair.  
 . = The background copy setting is not active for this pair.  
 (D): X = The session is a differential copy session.  
 . = The session is not a differential copy session.  
 (S): X = The session is pushing data to the remote device(s).  
 . = The session is pulling data from the remote device(s).  
 (H): X = The session is a hot copy session.  
 . = The session is a cold copy session.

Setting the pace to 9 slows down the copy operation but results in less impact on the application.

```
# symrcopy set pace 9 -file rumba -noprompt
```

'Set Pace' operation execution is in progress for the device list in device file 'rumba'. Please wait...

'Set Pace' operation successfully executed for the device list in device file 'rumba'.

Another symrcopy query shows that the copy operation is still in progress and that the percent “Done” is not much greater than previously.

```
# symrcopy query -file rumba -detail
```

Device File Name : rumba

| Control Device    | Remote Device      | Flags                              | Status  | Done        | Pace | Name     |
|-------------------|--------------------|------------------------------------|---------|-------------|------|----------|
| SID:symdev        | Protected Modified |                                    |         |             |      |          |
|                   | Tracks Tracks      | Identification                     | RI CDSH | CTL <=> REM | (%)  |          |
| 000187720758:01E3 | 124405             | 0 60060160F2810D007E40DA1ABE00D911 | CW XXXX | CopyInProg  | 9    | 9 Friday |
| 000187720758:01E4 | 100767             | 0 60060160F2810D007D40DA1ABE00D911 | CW XXXX | CopyInProg  | 27   | 9 Friday |
| Total             | -----              |                                    |         |             |      |          |
| Track(s)          | 225172             |                                    |         |             |      |          |
| MB(s)             | 7036.6             |                                    |         |             |      |          |

Legend:

R (Remote Device Vendor Identification)

S = Symmetrix, C = Clariion, . = Unknown.

I: (Remote Device Specification Identifier)

D = Device Name, W = LUN WWN, World Wide Name.

Flags:

(C): X = The background copy setting is active for this pair.

. = The background copy setting is not active for this pair.

(D): X = The session is a differential copy session.  
 . = The session is not a differential copy session.  
 (S): X = The session is pushing data to the remote device(s).  
 . = The session is pulling data from the remote device(s).  
 (H): X = The session is a hot copy session.  
 . = The session is a cold copy session.

The `symrcopy set mode nocopy` command alters the copy operation for the least amount of impact on the application, changing the status from `CopyInProgress` to `CopyOnWrite`.

```
# symrcopy set mode nocopy -file rumba -noprompt
```

'Set Mode NoCopy' operation execution is in progress for the device list in device file 'rumba'. Please wait...

'Set Mode NoCopy' operation successfully executed for the device list in device file 'rumba'.

The `symrcopy query` command with the `-detail` option indicates that the copy status is now `CopyOnWrite`. Copying occurs only when there are writes to the DMX control device. The device pair state remains `CopyOnWrite` until you terminate the copy session or all tracks have been written. The host must write all tracks on the control device before the session state is `Copied`. Because writing all tracks seldom occurs, you will probably perform `set mode copy` at some point (perhaps when the application is least used) to push the remaining data.

```
# symrcopy list -detail -sid 58
```

Symmetrix ID: 000187720758

| Control Device |                  |                 | Remote Device                    |    | Flags | Status      | Done | Pace | Name   |
|----------------|------------------|-----------------|----------------------------------|----|-------|-------------|------|------|--------|
| Sym            | Protected Tracks | Modified Tracks | Identification                   | RI | CDSH  | CTL <=> REM | (%)  |      |        |
| 01E3           | 132725           | 0               | 60060160F2810D007E40DA1ABE00D911 | .W | .XXX  | CopyOnWrite | 19   | 9    | Friday |
| 01E4           | 127398           | 0               | 60060160F2810D007D40DA1ABE00D911 | .W | .XXX  | CopyOnWrite | 36   | 9    | Friday |
| Total          |                  | -----           |                                  |    |       |             |      |      |        |
|                | Tracks           | 260123          |                                  |    |       |             |      |      |        |
|                | MB(s)            | 8128.8          |                                  |    |       |             |      |      |        |

## Legend:

R (Remote Device Vendor Identification)

S = Symmetrix, C = Clariion, . = Unknown.

I: (Remote Device Specification Identifier)

D = Device Name, W = LUN WWN, World Wide Name.

## Flags:

(C): X = The background copy setting is active for this pair.

. = The background copy setting is not active for this pair.

(D): X = The session is a differential copy session.

. = The session is not a differential copy session.

(S): X = The session is pushing data to the remote device(s).

. = The session is pulling data from the remote device(s).

(H): X = The session is a hot copy session.

. = The session is a cold copy session.

The `symrcopy set mode copy` command changes the operation so that continuous copying resumes.

```
# symrcopy set mode copy -file rumba -noprompt
```

'Set Mode Copy' operation execution is in progress for the device list in device file 'rumba'. Please wait...

'Set Mode Copy' operation successfully executed for the device list in device file 'rumba'.

The `symrcopy verify` command checks every 30 seconds to verify whether the control/remote device pairs are in the Copied state.

```
# symrcopy verify -file rumba -i 30
```

NONE of the devices are in the 'Copied' state.

NONE of the devices are in the 'Copied' state.

.....  
NOT ALL of the devices are in the 'Copied' state.

ALL of the devices are in the 'Copied' state.

The `symrcopy query` command confirms that the copy operation is 100 percent complete.

```
# symrcopy query -file rumba -detail
```

```
Device File Name      : rumba
```

| Control Device    | Protected | Modified | Remote Device                    | Flags   | Status      | Done | Pace | Name   |
|-------------------|-----------|----------|----------------------------------|---------|-------------|------|------|--------|
| SID:symdev        | Tracks    | Tracks   | Identification                   | RI CDSH | CTL <=> REM | (%)  |      |        |
| 000187720758:01E3 | 0         | 0        | 60060160F2810D007E40DA1ABE00D911 | CW XXXX | Copied      | 100  | 9    | Friday |
| 000187720758:01E4 | 0         | 0        | 60060160F2810D007D40DA1ABE00D911 | CW XXXX | Copied      | 100  | 9    | Friday |
| Total             | -----     |          |                                  |         |             |      |      |        |
| Track(s)          | 0         |          |                                  |         |             |      |      |        |
| MB(s)             | 0.0       |          |                                  |         |             |      |      |        |

Legend:

R (Remote Device Vendor Identification)

S = Symmetrix, C = Clariion, . = Unknown.

I: (Remote Device Specification Identifier)

D = Device Name, W = LUN WWN, World Wide Name.

Flags:

(C): X = The background copy setting is active for this pair.  
 . = The background copy setting is not active for this pair.  
 (D): X = The session is a differential copy session.  
 . = The session is not a differential copy session.  
 (S): X = The session is pushing data to the remote device(s).  
 . = The session is pulling data from the remote device(s).  
 (H): X = The session is a hot copy session.  
 . = The session is a cold copy session.

The `symrcopy terminate` command ends the control device copy sessions defined in the file `rumba`.

```
# symrcopy terminate -file rumba -noprompt
```

```
'Terminate' operation execution is in progress for the device list in  
device file 'rumba'. Please wait...
```

```
'Terminate' operation successfully executed for the device list  
in device file 'rumba'.
```

## Example 4: Pushing Data Using BCVs as the Control Devices

This example shows the pushing of data from a DMX control array using TimeFinder BCVs as the control devices. It was performed using Solutions Enabler version 6.0. The example shows how to get the full data initially to the remote devices via the BCVs, then repeats it incrementally. An important setup requirement is that the BCVs be mapped to an FA, and that FA must be zoned to the remote storage array. Also, the FA should not be the same FA for the control standard devices. The example uses two standard devices and two BCV devices on a DMX control array (sid 35) running Enginuity version 5671, and two remote devices on a remote Symmetrix array (sid 60).

To perform TimeFinder operations, the example first needs to create a device group (conga), add the two standard devices (86 and 87), and associate the BCV devices (B8 and B9) to the device group.

```
# symdbg create conga
# symld -g conga addall dev -range 86:87 -sid 35
# symbcv -g conga associateall dev -range B8:B9 -sid 35
```

The `vi` command uses the `vi` text editor to create a text file (also named `conga`) to set up the Open Replicator copy pairings. For example, the first pairing is BCV B8 on Symmetrix 35 with a remote device whose LUN WWN is 6006048000018450016053594D374646.

```
# vi conga
```

```
symdev=35:B8   wwn=6006048000018450016053594D374646
symdev=35:B9   wwn=6006048000018450016053594D383030
```

The TimeFinder `symmir establish` command synchronizes the DMX control array's BCV pairs defined in device group `conga`. The result is a full copy of the data from the DMX standard devices to its BCV devices.

```
# symmir -g conga establish -full -noprompt
```

```
'Full Establish' operation execution is in progress for
device group 'conga'. Please wait...
```

```
'Full Establish' operation successfully initiated for device group 'conga'.
```

The `symmir verify` command checks at 60-second intervals to verify when the BCV pairs are synchronized.

```
# symmir -g conga verify -i 60
```

None of the devices in group 'conga' are in the 'Synchronized or Restored' state.

None of the devices in group 'conga' are in the 'Synchronized or Restored' state.

All of the devices in group 'conga' are in the 'Synchronized or Restored' state.

The `symmir split` command with the `-consistent` option splits the DMX control array's BCV pairs so that the data is consistent after the split. To make the BCV inaccessible to the host after the split, use the `-not_ready` option.

```
# symmir -g conga split -consistent -noprompt -not_ready
```

'Split' operation execution is in progress for device group 'conga'. Please wait...

'Split' operation successfully executed for device group 'conga'.

The `symmir verify -split` command checks at 60-second intervals to determine when the BCV pairs have completed splitting in the background (`-bg`).

```
# symmir -g conga verify -split -bg -i 60
```

All of the devices in group 'conga' have finished splitting in the background.

The `symmir query` command shows that the BCVs in the device group are split, which means they are ready to be the control devices in the Open Replicator copy sessions.

```
# symmir -g conga query
```

```
Device Group (DG) Name: conga
DG's Type           : REGULAR
DG's Symmetrix ID    : 000187900035
```

| Standard Device |      |             | BCV Device |        |             | State       |
|-----------------|------|-------------|------------|--------|-------------|-------------|
| Logical         | Sym  | Inv. Tracks | Logical    | Sym    | Inv. Tracks | STD <=> BCV |
| DEV001          | 0086 | 0           | BCV001     | 00B8 * | 0           | Split       |
| DEV002          | 0087 | 0           | BCV002     | 00B9 * | 0           | Split       |
| Total           |      | -----       |            |        | -----       |             |
| Track(s)        |      | 0           |            |        | 0           |             |
| MB(s)           |      | 0.0         |            |        | 0.0         |             |

Legend:

(\*): The paired BCV device is associated with this group.

The `symrcopy create` command with the `-cold` and `-push` options creates two offline copy sessions for those pairings defined in the `conga` text file. The `-copy` option specifies a full and immediate copy. Remote copy operations allow you to use the `-differential` option the first time you perform a full copy. By doing this, all subsequent copying during that copy session automatically performs incremental copies, capturing only new writes to the control device. It is imperative, however, that the remote devices not be accessed by their host if a subsequent differential push (recreate and activate) will be performed. If the remote data needs to be accessed during this time, you need to make a copy of it on the remote storage array.

```
# symrcopy create -file conga -copy -differential -cold -push -noprompt
```

```
'Create' operation execution is in progress for the device list in device file 'conga'. Please wait...
```

```
'Create' operation successfully executed for the device list  
in device file 'conga'.
```

The `symrcopy activate` command starts the copy operation for the device pairs defined in the text file `conga`. Copying from the control devices to the two remote devices begins.

```
# symrcopy activate -file conga -noprompt
```

```
'Activate' operation execution is in progress for the device list in device file 'conga'. Please wait...
```

```
'Activate' operation successfully executed for the device list in device file 'conga'.
```

The `symrcopy verify` command checks at 60-second intervals to verify whether the control/remote device pairs are in the Copied state.

```
# symrcopy verify -file conga -i 60
```

```
NONE of the devices are in the 'Copied' state.
```

```
NONE of the devices are in the 'Copied' state.
```

```
NOT ALL of the devices are in the 'Copied' state.
```

```
ALL of the devices are in the 'Copied' state.
```

The `symrcopy query` command shows that the control/remote device pairs are in the Copied state.

# **symrcopy -file conga query**

Device File Name : conga

| Control Device    | Remote Device                      | Flags   | Status      | Done |
|-------------------|------------------------------------|---------|-------------|------|
| SID:symdev        | Protected<br>Tracks Identification | RI CDSH | CTL <=> REM | (%)  |
| 000187900035:00B8 | 0 000184500160:07FF                | SD XXX. | Copied      | 100  |
| 000187900035:00B9 | 0 000184500160:0800                | SD XXX. | Copied      | 100  |
| Total             | -----                              |         |             |      |
| Track(s)          | 0                                  |         |             |      |
| MB(s)             | 0.0                                |         |             |      |

Legend:

R (Remote Device Vendor Identification)

S = Symmetrix, C = Clariion, . = Unknown.

I: (Remote Device Specification Identifier)

D = Device Name, W = LUN WWN, World Wide Name.

Flags:

(C): X = The background copy setting is active for this pair.  
 . = The background copy setting is not active for this pair.  
 (D): X = The session is a differential copy session.  
 . = The session is not a differential copy session.  
 (S): X = The session is pushing data to the remote device(s).  
 . = The session is pulling data from the remote device(s).  
 (H): X = The session is a hot copy session.  
 . = The session is a cold copy session.

A TimeFinder symmir query command displays the device group conga and shows that changes have occurred (invalid tracks) on the DMX control array's standard devices while they were split from the BCVs.

# **# symmir -g conga query**

Device Group (DG) Name: conga  
 DG's Type : REGULAR  
 DG's Symmetrix ID : 000187900035

| Standard Device |      |             | BCV Device |        |             | State       |
|-----------------|------|-------------|------------|--------|-------------|-------------|
| Logical         | Sym  | Inv. Tracks | Logical    | Sym    | Inv. Tracks | STD <=> BCV |
| DEV001          | 0086 | 3125        | BCV001     | 00B8 * | 30          | Split       |
| DEV002          | 0087 | 3125        | BCV002     | 00B9 * | 30          | Split       |
| Total           |      | -----       |            |        | -----       |             |
| Track(s)        |      | 6250        |            |        | 60          |             |
| MB(s)           |      | 195.3       |            |        | 1.9         |             |

Legend:

(\*): The paired BCV device is associated with this group.

The `symmir establish` command incrementally re-establishes the TimeFinder BCV pairs.

```
# symmir -g conga establish -noprompt
```

'Incremental Establish' operation execution is in progress for device group 'conga'. Please wait...

'Incremental Establish' operation successfully initiated for device group 'conga'.

The `symmir verify` command checks at 60-second intervals to verify when the BCV pairs reach the Synchronized state.

```
# symmir -g conga verify -i 60
```

None of the devices in group 'conga' are in the 'Synchronized or Restored' state.

All of the devices in group 'conga' are in the 'Synchronized or Restored' state.

The `symmir split` command splits the BCV pairs again in a consistent fashion, making the BCV devices Not Ready to their host.

```
# symmir -g conga split -consistent -noprompt -not_ready
```

'Split' operation execution is in progress for device group 'conga'. Please wait...

'Split' operation successfully executed for device group 'conga'.

The `symmir verify -split` command verifies again when the BCV pairs are finished splitting in the background.

```
# symmir -g conga verify -split -bg
```

All of the devices in group 'conga' have finished splitting in the background.

The `symrcopy recreate` command recreates the copy sessions defined in the text file `conga`.

```
# symrcopy recreate -file conga -noprompt
```

'Recreate' operation execution is in progress for the device list in device file 'conga'. Please wait...

'Recreate' operation successfully executed for the device list in device file 'conga'.

The `symrcopy query` command shows the control/remote pairs in the Recreated state. Note that the protected track count for the control devices is the same as their invalid track count displayed in the previous `symmir query` command.

```
# symrcopy query -file conga
```

Device File Name : conga

| Control Device    | Protected | Remote Device     | Flags   | Status      | Done |
|-------------------|-----------|-------------------|---------|-------------|------|
| SID:symdev        | Tracks    | Identification    | RI CDSH | CTL <=> REM | (%)  |
| 000187900035:00B8 | 3125      | 000184500160:07FF | SD XXX. | Recreated   | N/A  |
| 000187900035:00B9 | 3125      | 000184500160:0800 | SD XXX. | Recreated   | N/A  |
| Total             | -----     |                   |         |             |      |
| Track(s)          | 6250      |                   |         |             |      |
| MB(s)             | 195.3     |                   |         |             |      |

Legend:

R (Remote Device Vendor Identification)  
S = Symmetrix, C = Clariion, . = Unknown.

I: (Remote Device Specification Identifier)  
D = Device Name, W = LUN WWN, World Wide Name.

Flags:

(C): X = The background copy setting is active for this pair.

. = The background copy setting is not active for this pair.  
 (D): X = The session is a differential copy session.  
 . = The session is not a differential copy session.  
 (S): X = The session is pushing data to the remote device(s).  
 . = The session is pulling data from the remote device(s).  
 (H): X = The session is a hot copy session.  
 . = The session is a cold copy session.

The `symrcopy activate` command activates the copy sessions. This initiates an incremental copy operation that copies only those device tracks that have changed since the initial full copy was performed.

```
# symrcopy activate -file conga -noprompt
```

'Activate' operation execution is in progress for the device list in device file 'conga'. Please wait...

'Activate' operation successfully executed for the device list in device file 'conga'.

The `symrcopy verify` command checks at 60-second intervals to verify whether the control/remote device pairs are in the Copied state.

```
# symrcopy verify -file conga -i 60
```

NONE of the devices are in the 'Copied' state.

NONE of the devices are in the 'Copied' state.

NOT ALL of the devices are in the 'Copied' state.

ALL of the devices are in the 'Copied' state.