

# Instant Recovery for HP StorageWorks Enterprise Virtual Array in CA+BC Configurations

Technical White Paper



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## Introduction

This white paper describes the steps to be followed for executing instant recovery (IR) in Continuous Access (CA) + Business Copy (BC) environments of HP StorageWorks Enterprise Virtual Array (EVA) using HP OpenView Storage Data Protector.

The purpose of the white paper is to provide you with the following:

- An understanding of the different situations where CA+BC impacts instant recovery.
- Understanding instant recovery concepts.
- Description of CA+BC EVA configurations supported for instant recovery.
- Planning and performing instant recovery in CA+BC EVA configurations.

The CA+BC ZDB functionality for HP StorageWorks EVA is available in Data Protector A.06.00.

## Before Reading On

You should be familiar with the following before proceeding further with this document:

- HP OpenView Storage Data Protector A.06.00 Zero Downtime Backup Administrator's Guide
- HP OpenView Storage Data Protector A.06.00 Zero Downtime Backup Concepts Guide
- HP OpenView Storage Management Appliance Software User Guide
- Any related HP StorageWorks CA EVA documentation
- Any related failover or cluster-failover documentation, such as HP StorageWorks Cluster Extension EVA User Guide

## Terminology Conventions

Term	Description
BC	Business Copy (local replication of a source volume to a target volume on the same array).
CA	Continuous Access (replication between the two arrays).
CV EVA	Command View EVA (Web-based HP StorageWorks EVA management software).
DR group	Data replication group. A named group of a set of virtual disks that are replicated to the same specified destination, fail over together if a single vDisk in the collection fails, and preserve write order within this collection.
EVA	HP StorageWorks Enterprise Virtual Array.
HOME	The preferred storage system for the source vDisk(s) of a DR group. By default, this is the storage system on which a source vDisk is created.
IR	Instant recovery.
Local Site	The site where the source EVA vDisk is located.
omnidbsmis	Data Protector CLI; used for configuring SMISA, listing IR session specific details, etc.
Remote Site	The site to which the source vDisk is remotely replicated.
Site	Location of the EVA array.
SMA	Storage Management Appliance
SMI-S	Storage Management Initiative Specification
SMISA	SMI-S Agent (Data Protector integration agent for HP StorageWorks EVA family arrays using SMI-S Provider).
WWN	World Wide Name (a unique identifier of an array, a virtual storage pool in the array, etc).

## Overview

With instant recovery, lost or corrupted data (or rather, the whole volumes containing it) is replaced with known good data. This good data resides on whole storage volumes, or vDisks, that had previously been created as a BC during a zero downtime backup. These replicated target volumes are used for restoration internally within the array involving no other backup medium or device.

The general SMISA IR flow is as follows:

- 1) The application system is prepared for restore by dismounting filesystems and taking volume groups offline.
- 2) Source volumes are masked or unrepresented from the application system.
- 3) The identities of each matched pair of source and target storage volumes are exchanged. This involves the WWN, the name, and the comments of each volume.
- 4) The exchanged storage volume is unmasked or presented to the application system.
- 5) Volume groups are put online and filesystems are remounted.

Each source storage volume that is backed up using ZDB has a matching target replica volume. Note that to enable IR, each pair of matched replica and source storage volumes *must* reside on the same disk array. This is required for a valid exchange of identities, stated in the general IR flow.

However, when a source volume is attached to a DR group and thus participates in remote replication, the EVA does not allow the WWN of that vDisk to be modified. Therefore, to prepare your environment for instant recovery and successfully recover your data, you need to carry out the following steps:

- 1) Prepare the storage volumes and the storage environment for IR following manual procedures.
- 2) Perform IR with these volumes using SMISA.
- 3) Return the storage volumes and storage environment to the state it was before IR (optional).

The rest of this document outlines different CA+BC configurations and the manual steps to be followed to successfully perform instant recovery.

## Supported Instant Recovery Configurations

The manual steps needed to prepare the environment for IR and bring it back after IR differs based on the current configuration of CA+BC or DR group connections.

Setup identification is based on the following environment information:

- Current site for the source side of any DR groups that include the source storage volumes
- Whether the BC or target storage volumes are on the same array (local) as the source storage volumes, or on the remote side of the DR group (remote)

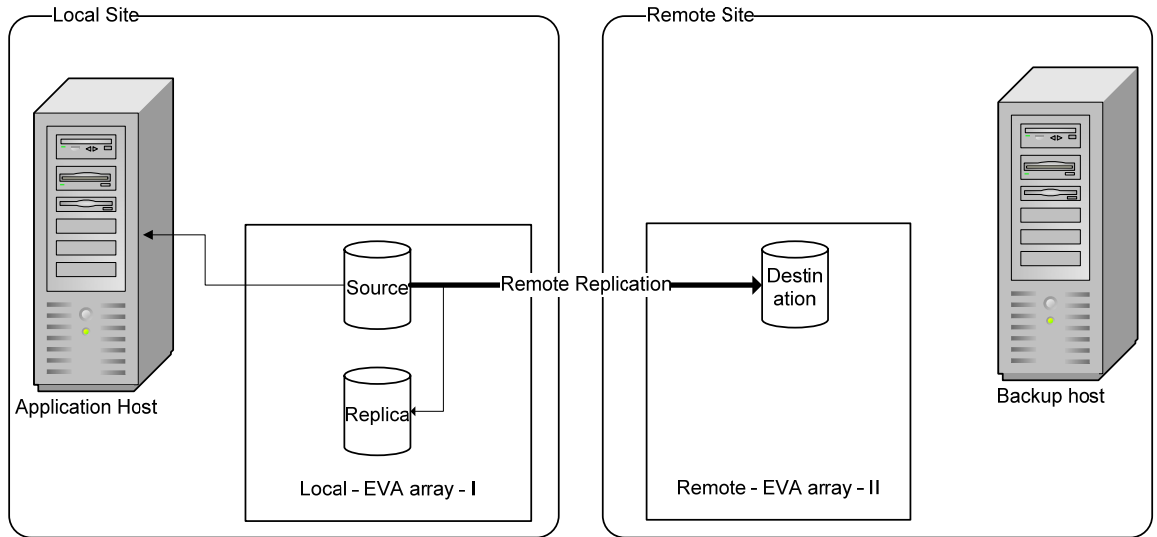
From this information, there are two possible configurations:

- Configuration I - Business Copy is on the local side of the CA link
- Configuration II - Business Copy is on the remote side of the CA link

## Configuration I - Local Business Copy

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Figure 1. Replica(s) on the Local Site



In this setup, at the time of IR, the source and replica storage volumes reside on the current local site.

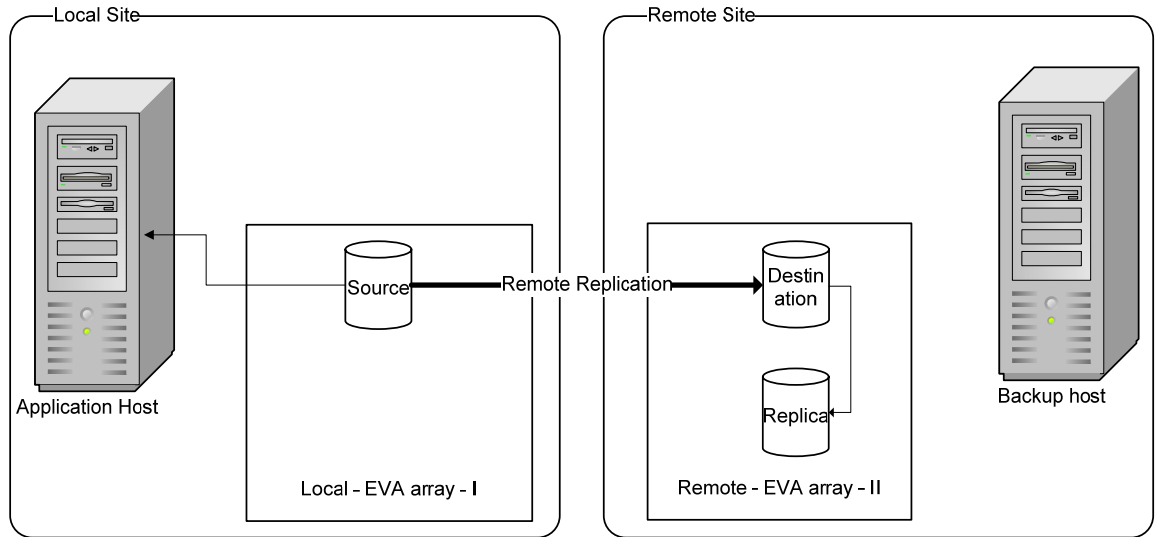
**Note:**

The source storage volume, denoted as "Source" in Figure 1, acts as both the source of the replica storage volume and the source for the remotely replicated storage volume, which is marked as "Destination" in Figure 1.

Such configuration may be a result of any of the following:

- Performing a BC backup of a volume that is remotely replicated at backup time
- Adding remote replication to a storage volume that was previously backed up by a BC backup
- Performing a CA+BC backup, and the BC is on the current local site

Figure 2. Replica(s) on the Remote Site



In this setup, at the time of IR, customer environment has the source vDisk residing on the local site. At the same time, the remote replica (the replica of the source vDisk replicated using CA) and its (local) replica are on the remote site.

**Note:**

The source storage volume, denoted as "Destination" in Figure 2, acts only as the source of the replica storage volume. This source storage volume is acting also the destination of the remote replication link.

Such configuration may be a result of any of the following:

- Performing a BC backup of a storage volume that is remotely replicated, and then failing over the environment
- Adding remote replication to a volume that was previously backed up by a BC backup, and then failing over the environment
- Performing a CA+BC backup, and the BC is on the current remote site

## Instant Recovery in CA+BC Environments

### General Instant Recovery Flow

As previously stated, the general IR flow in CA+BC environments is:

- 1) Preparing the storage volumes and the storage environment for IR following manual procedures.
- 2) Performing IR with these volumes using SMISA.
- 3) Returning the storage volumes and storage environment to the state it was before IR (optional).

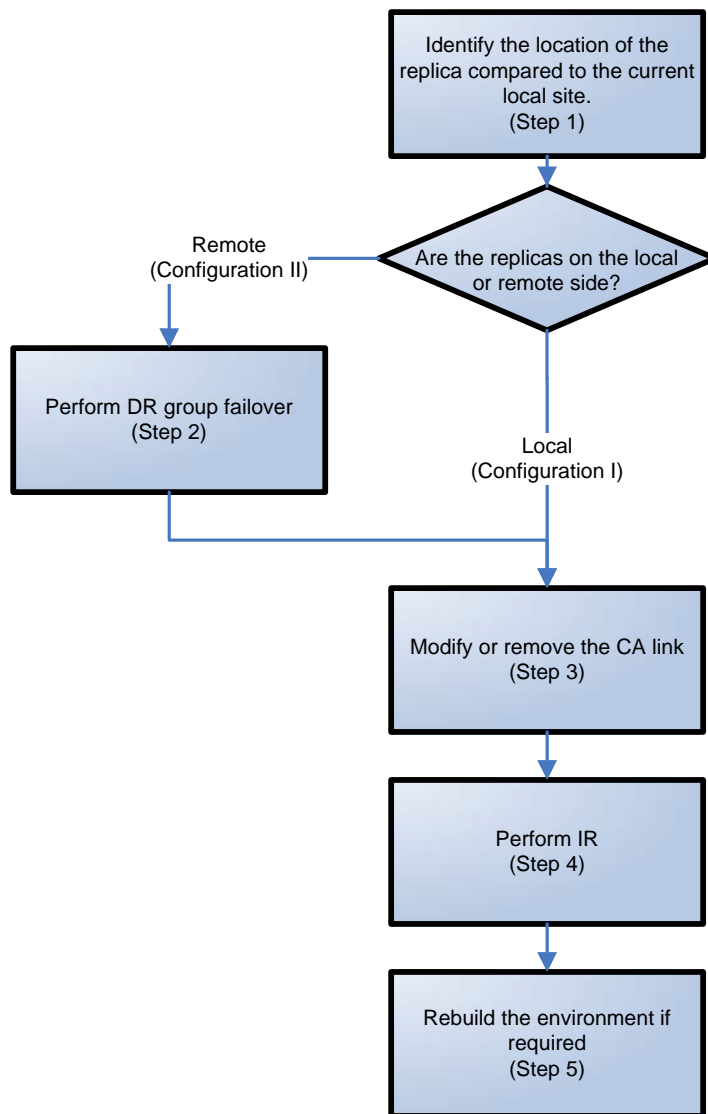
The initial step of preparation consists of the following:

- 1) Understanding the current configuration of the environment

- 2) Performing a DR group failover (optional)
- 3) Modifying the DR group so that the source storage volumes involved in restore no longer participate in the DR group

The following flow chart summarizes this general process.

Figure 3. General IR Flow in CA+BC Environments



## Step 1: Identifying Current Configuration

The following steps help identify the location of the source and target volumes:

1. Select the session for which IR will be performed.  
List the sessions available for instant recovery using the Data Protector GUI (the Instant Recovery context) or the Data Protector CLI (the omnidbsmis command).

```
# omnidbsmis -list -session -ir
Found 2 StorageWorks EVA SMI-S session(s) in the internal database:

Session ID                Backup Specification
=====
2006/06/20-5             VolDpdevpa2
2006/06/20-6             VolDpdevpa2
#
```

2. Identify the source objects and the CA link information.

Query the objects of the specific session using the omnidbsmis command. The example shown is for the session that has an ID of 2006/06/20-5.

```
# omnidbsmis -show -session 2006/06/20-5

Info on session "2006/06/20-5":

Target volume virtual disk name : \Virtual Disks\SNEHA\DP-2006.06.20-5-04497CA1A\ACTIVE
Target volume virtual disk ID   : 6005-08b4-0010-3a70-0000-9000-0661-0000
Target volume virtual disk WWN  : 6005-08b4-0010-3a70-0000-9000-0661-0000
StorageWorks EVA name          : DPCA
StorageWorks EVA ID            : 5000-1fe1-5005-dc00
Target volume snapshot type    : snapclone
Source volume virtual disk ID   : 6005-08b4-0010-3a70-0000-9000-0042-0000
Session ID                      : 2006/06/20-5
Creation Date                    : Tue Jun 20 15:42:42 2006

IR flag                          : 1
Backup specification             : VolDpdevpa2
Application System               : dpdevpa2.india.hp.com
Backup System                    : dpdevpa2.india.hp.com
#
```

From the above output, the following information is gathered:

- Target/replica vDisk UUID, WWN, and the name:
  1. WWN and UUID - 6005-08b4-0010-3a70-0000-9000-0661-0000
  2. Name - \Virtual Disks\SNEHA\DP-2006.06.20-5-04497CA1A\ACTIVE
- Source (of the replica) vDisk UUID:
  1. UUID - 6005-08b4-0010-3a70-0000-9000-0042-0000
- The EVA name and the WWN where the matched source and target volumes exist:
  1. Name - DPCA
  2. WWN - 5000-1fe1-5005-dc00

Using this information, the source storage volume and the EVA where it resides can be located. The target storage volume or the target vDisk may also be located to verify that it still exists.

Connect to the Storage Management Appliance or any other CV EVA management host that manages the specific EVA. Browse through the Virtual Disk Folder until the vDisk with a matching UUID is found.

In the screenshot below, the source vDisk with a UUID of 6005-08b4-0010-3a70-0000-9000-0042-0000 has been located:

Figure 4. Locating the Source vDisk

**Vdisk Active Member Properties**

Save changes | Create snapshot | Create snapclone | ?

General | Presentation | **Data Replication**

**Identification**

Name:	ACTIVE
Family Name:	vgDpdevpa2
World Wide LUN Name:	6005-08b4-0010-3a70-0000-9000-0042-0000
UUID:	6005-08b4-0010-3a70-0000-9000-0042-0000

**Attributes**

Type:	Original
Disk Group:	First
Redundancy:	Vraid0
Write Protect:	No

**Condition/State**

Operational State: ✔ Good

**Date/Time**

Created: 12-Jun-2006 16:21:02

**Capacity**

Requested: 10 GB

Allocated: 10 GB

**Cache Policies**

Read cache: On

Mirror cache: Mirrored

Write cache:

Requested: Write-back

Actual: Write-back

**Comments**

\_\_\_\_\_

**Data Replication tab**

**UID of the source disk**

Next, select the Data Replication tab to identify CA link properties for this vDisk. The following information should be gathered from this panel:

- DR Group name
- DR Mode

Figure 5. Checking the DR Mode

**Vdisk Active Member Properties**

Remove member | ?

General | Presentation | **Data Replication**

**Data Replication Properties**

DR group:	DR Group 001
DR Mode:	Source (active-passive)
Group Failsafe mode:	Enabled
Group Failsafe state:	Unlocked
Group log state:	Not in use

**Destination Vdisks**

Vdisk	Copy State	Copy Status
\\DPRND\Virtual Disks\qaiiaux10_FSACTIVE	Normal	n/a

**DR group name**

**Source/Destination property of the DR group**



The “DR Mode” is used to identify the configuration of the current environment:

- If the DR mode is “Source”, the current environment is Configuration I - Local Business Copy. In this case, proceed to [Step 3: Modifying or Removing the CA Link](#).
- If the DR mode is “Destination”, the current configuration is Configuration II - Remote Business Copy. In this case, proceed to [Step 2: Performing Failover](#).

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**Note:**

Complex environments may include a mixture of Configuration I and Configuration II. In this scenario, Business Copies exist that are both local and remote when compared to the source storage volumes. To handle this, perform the actions stated in [Step 2: Performing Failover](#) only to the DR groups with the “Destination” DR mode.

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## Step 2: Performing Failover

Using the gathered information regarding DR groups, perform failover as appropriate for the environment. For simple environments, this may include interactions with CV EVA or CA GUI, as well as some configuration steps on the application system. Refer to the appropriate documentation for full understanding before taking such actions.

For more complex environments, including clusters or other high-availability solutions, refer to the respective documentation for that solution before performing any failover actions.

After the failover has been performed, proceed to [Step 3: Modifying or Removing the CA Link](#).

## Step 3: Modifying or Removing the CA Link

Modify the environment so that the source vDisks no longer participate in a DR group. This may be accomplished in either of two methods:

- 1) Reducing the DR group by removing each source vDisk: this may be done if there is a more complex environment and persisting the DR groups would ease reconfiguration of the environment.
- 2) Deleting the DR group completely: this may be done if the CA links are no longer needed or are easily reconfigurable.

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**Note**

Before taking any actions, record the information pertaining to the DR groups. This includes such things as the vDisks participating in the DR group, which EVA arrays are being replicated to, the mode of operation, and other specific details.

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Refer to the CV EVA user documentation or other specific documentation for the detailed process for either of these two methods.

In the case of a DR group reduction, there may only be source storage volumes inside the DR group. A DR group must always have at least one vDisk participating. In this case, it is advisable to create a temporary vDisk and add it to the DR group. With this temporary storage volume, all source storage volumes may be removed from the DR group, and the DR group will still persist.

When this has been completed, proceed to [Step 4: Performing Instant Recovery](#).

## Step 4: Performing Instant Recovery

Using the Data Protector GUI or CLI, execute the instant recovery with the selected session. This should complete successfully with the appropriately reconfigured environment.

When this has been completed, proceed to [Step 5: Rebuilding the CA Link \(optional\)](#).

## Step 5: Rebuilding the CA Link (optional)

If required, return the new source vDisks to the specific DR groups. Using the previously recorded information regarding the environment and specific DR groups, either rebuild or recreate the DR groups.

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### Note:

Ensure that the newly recovered storage volumes are used for this rebuild of the CA links. These storage volumes should have the same name and the same WWN as the previously used storage volumes. However, as these are different vDisks, the UUIDs are not the same as those vDisks being previously used by the application system.

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Refer to the CV EVA documentation for this specific process. Additional steps to bring the environment to the same initial state may also be needed. This may include failing over the CA links again, to return operation to the correct EVA arrays and application servers.