

Hardware Orchestration Recovery Processes

Provides a guide to common recovery processes when using Hardware Orchestration aspects of Ops Center Protector.

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Hardware Orchestration Potential Issues

The following are possible scenarios which could happen in a block-based protection environment, and how to recover from them.

How to Recover from Replication Metadata Mismatch with Array State

Protector saves metadata for replication records, based on what it believes the state should be after its most recent activity. This includes a number of elements of state, which get updated when Protector performs an operation. On a correctly functioning system, will represent the state of a replication as soon as Protector has performed an operation.

This differs from the status shown by the statistics systems, which monitor the pairs, LDEVs and other objects on the array. The statistic system polls the replication periodically, so may not always have the latest status. However, there are instances where the replication state is actually incorrect and the replication statistics shown in the replication pair screen (insert picture here) actually has the correct status. This can happen if a replication has been modified outside of Protector and/or some other exceptional circumstances.

Protector has various safeguards, and may not permit an operation based on the state information in its metadata. This section will describe what mitigation steps can be performed to fix replication record state mismatches.

The columns labelled "Remedies" contain a set of possible fixes for the described symptoms and states. **Each remedy is a self-contained remedy. Each list is ordered such that the most preferable solution is the first. If a remedy succeeds, do not proceed to later remedies.**

Health Check Tool Problem Code (see here for more info)	Symptoms	Protector State	Array State	Remedies to make Protector State match Array State	Remedies to make Array State match Protector State
RCC_PAUSED_ACTIVATIVE_RECORD_IN_PAIR	No specific symptoms - mismatch in displayed state	Replication State: Static	PAIR/PAIR	<p>Remedy A</p> <ol style="list-style-type: none"> 1. Resume the replication (see here for more info) <p>Remedy B</p> <ol style="list-style-type: none"> 1. Delete the record state file (see here for more info) 2. Resume the replication (see here for more info) <p>Remedy C</p> <ol style="list-style-type: none"> 1. Dissociate the replication and readopt the replication (see here for more info) 	<p>Remedy A</p> <ol style="list-style-type: none"> 1. Manually split the pairs outside of Protector

RCC_ACTIVE_RECORD_IN_PSUS_SSUS	No specific symptoms - mismatch in displayed state	Replication State: Active Dataflow Mover: Continuous	PSUS/SSUS	Remedy A 1. Pause the replication (see here for more info) Remedy B 1. Dissociate the replication and readopt the replication (see here for more info)	Remedy A 1. Trigger the replication (see here for more info) Remedy B 1. Manually resync the pairs outside of Protector
N/A	No specific symptoms - mismatch in displayed state	Replication State: Active Dataflow Mover: Batch	PAIR/PAIR	Remedy A 1. Dissociate the replication and readopt the replication (see here for more info)	Remedy A 1. Trigger the replication (see here for more info) Remedy B 1. Manually split the pairs outside of Protector
RCC_RECORD_IS_BUSY	<ul style="list-style-type: none"> When trying to perform an operation on a replication, the job fails. <ul style="list-style-type: none"> Example: an attempted pause operation fails with the following error: "Pause Block Replication failed. Error: A replication that is pausing may not be paused." (include log ids) 	Replication State: Ends with "-ing" examples include: pausing, resuming, mounting, un-mounting, reverting, swapping...	Any	Remedy A 1. Check for existing jobs for that record (see here for more info) 2. Wait for them to complete Remedy B 1. Delete the record state file (see here for more info) Remedy C 1. Restart the services on the destination storage proxy (see here for more info)	N/A
N/A	<ul style="list-style-type: none"> When trying to perform an operation on a replication, the job fails. <ul style="list-style-type: none"> Example: an attempted pause operation fails with the following error: "Pause Block Replication failed. Error: A replication that is incomplete may not be paused." (include log ids) 	Replication Type: Active /Refreshed Incomplete Copy	PAIR/PAIR COPY SMPL/SMPL	Remedy A 1. Trigger the replication (see here for more info) Remedy B 1. Dissociate the replication and readopt the replication (see here for more info)	N/A

RCC_RECORD_DIRECTION_INCORRECT	No specific symptoms - mismatch in displayed state	Replication Direction: Swapped	PAIR/PAIR (direction matches dataflow)	Remedy A 1. Dissociate the replication (see here for more info) 2. Redraw the dataflow to match current direction (see here for more info) 3. Readopt the replication (see here for more info)	Remedy A 1. Manually swap the pairs outside of Protector
RCC_RECORD_DIRECTION_INCORRECT	No specific symptoms - mismatch in displayed state	Replication Direction: Original	PAIR/PAIR (direction does not match dataflow)	Remedy A 1. Dissociate the replication (see here for more info) 2. Redraw the dataflow to match current direction (see here for more info) 3. Readopt the replication (see here for more info)	Remedy A 1. Manually swap the pairs outside of Protector

How to Recover from a Journal Full Event

Look at journal report and determine why journal filled up (connection issues, sizing issues, MP usage), resolve the journal issue outside of HDID. Once the journal issue is resolved either of the following methods should recover the state of the replication within HDID:

if the journal is full, storage array: the journal used very high, nearly 100%

LDEV ID	LDEV Name	Status	Capacity				Used Capacity	
			Total	Reserved	Used	Used (%)	Tier 1	Tier 2
00:2D:34	mary_journal-11	Normal	1.10 GB	0.00 GB	0.00 GB	0	0.00 GB	
00:2D:0D	MaryJNL_23_HUR-2d0c-3DC	Normal	2.00 GB	0.00 GB	0.08 GB	4	0.08 GB	
00:2D:2F	Mary_695_snapshots001	Normal	2.00 GB	0.00 GB	0.00 GB	0	0.00 GB	
00:2D:31	Mary_695_snapshots001	Normal	2.00 GB	0.00 GB	0.00 GB	0	0.00 GB	
00:2D:32	Mary_journal-2gb	Normal	2.00 GB	0.00 GB	2.00 GB	100	2.00 GB	
00:2D:33	Mary_journal-1gb	Normal	2.00 GB	0.00 GB	1.92 GB	96	1.92 GB	

pair status will be changed to PSUE in HDID pair status, and percent: 100%

Hitachi Block Device 'Portland' Replication '07/31/2020 13:44:40' Pairs															
Original Primaries						Original Secondaries						Properties			
Id	Storage	Status	Attribute	%	M I/O Mode	Id	Storage	Status	Attribute	%	M I/O Mode	Mirror Unit	Type	Fence Level	Quorum
0x2ced	412402	PFUS	P-VOL	100%	-/-	0x2ced	442673	PSUE	S-VOL	100%	-/-	h1	HUR	ASync	-
0x2cee	412402	PFUS	P-VOL	100%	-/-	0x2cee	442673	PSUE	S-VOL	100%	-/-	h1	HUR	ASync	-

Monitor Data Flow 'HUR-chesil-2CEF'

The diagram illustrates a replication setup. On the left, a server icon labeled 'chesil-2CEF Hitachi Block Host' is connected by a red dashed arrow to a server icon labeled 'Portland Hitachi Block Device'. The arrow is labeled 'HUR (Replicate HUR)'. A red warning icon is positioned above the arrow.

Applied Policies

HUR

Summary

In Progress
0

Notifications
Data flow in error state.

then you have to fix this full journal first, then resync in the storage array to save status from PFUF/PSUE to COPY

- Trigger the replication ([see here for more info](#))
- Re-activate the dataflow ([see here for more info](#))

How to Recover from a Pool Full Event

Look at pool report and determine why pool filled up (connection issues, sizing issues, MP usage), free space within the pool or increase pool. Note snapshots probably invalid/unrecoverable. Once the pool issue is resolved either of the following methods should recover the state of the replication within HDID

The screenshot shows the Hitachi Block Device 'Portland' Replications and Clones interface. At the top, there is a table with columns: Name, Type, Source, Application, Policy, Operation, Paused, Mounted, and Eligible for Teardown. Below this is a navigation bar with icons for Journals, Pools, Host Groups, Logical Devices, and Pairs. The 'Pools' section is highlighted, showing a pool with a red warning icon. Below this is a detailed view of the 'Pools' section, showing a table with columns: Name, Storage, Type, Status, Capacity, Free, and Total. The table shows two pools: 'Sus_Provisioning (0x000b)' and 'Mary_pool_TEST (0x0013)'. The 'Mary_pool_TEST (0x0013)' pool is highlighted in yellow and has a red warning icon. Below the table is a 'Logs' section with a table showing log entries. The log entry for 'Mary_pool_TEST (0x0013)' is highlighted in pink and contains the message: 'Dynamic Provisioning pool 'id 19' on Portland (442673) has exceeded the high water threshold of 80, manual intervention is required'.

Name	Type	Source	Application	Policy	Operation	Paused	Mounted	Eligible for Teardown
07/29/2020 09:28:33	Active Full Copy	chesil-2CEE-200GB	Hardware Volume Source Handler	HUR	HUR	No	-	No

Name	Storage	Type	Status	Capacity	Free	Total
✓ Sus_Provisioning (0x000b)	412402	HDT	POLN	<div style="width: 100%;"></div>	1.35 TB	2.53 TB
▲ Mary_pool_TEST (0x0013)	442673	HDT	POLF	<div style="width: 80%;"></div>	36.30 GB	195.89 GB

Master Date	Actioned By	Category	Level	Log ID	Log Message
07/29/2020 09:32:53	Portland	Storage Handler	▲	-	Dynamic Provisioning pool 'id 19' on Portland (442673) has exceeded the high water threshold of 80, manual intervention is required

- Trigger the replication ([see here for more info](#))
- Re-activate the dataflow ([see here for more info](#))

How to Recover from a PSUE Event

Look at replication outside of HDID to determine what caused the replication to go in to PSUE and resolve the issue. Once the replication issue is resolved either of the following methods should recover the state of the replication within HDID

Hitachi Block Device 'Portland' Replication '07/30/2020 13:20:12' Pairs

Original Primaries								Original Secondaries					Properties					
Id	Storage	Status	Attribute	%	M	I/O Mode		Id	Storage	Status	Attribute	%	M	I/O Mode	Mirror Unit	Type	Fence Level	Quorum
0x2ced	412402	PFUS	P-VOL	99%	-	-/-	→	0x2ced	442673	PSUE	S-VOL	100%	-	-/-	h1	HUR	ASYN	-
0x2cee	412402	PFUS	P-VOL	47%	-	-/-	→	0x2cee	442673	PSUE	S-VOL	100%	-	-/-	h1	HUR	ASYN	-
0x2cef	412402	PFUS	P-VOL	29%	-	-/-	→	0x2cef	442673	PSUE	S-VOL	100%	-	-/-	h1	HUR	ASYN	-

Block Device Journal Usage Report

Linked Record	Date	Storage Serial Number	Journal ID	Journal Status	Policy	Data Flow	Operation	Data Source Node	Source Node	Source Storage Node	Destination Node	Reported By	Capacity	Free	Tot
	07/30/2020 14:54:32	442673	0x04	SJSE	HUR	HUR-chesil-2CEF	HUR	chesil-2CEF	chesil	chesil	Portland	Portland	<input type="text"/>	1.89 GB	1.89 G
	07/30/2020 14:54:31	412402	0x00	PJSE	HUR	HUR-chesil-2CEF	HUR	chesil-2CEF	chesil	chesil	Portland	Portland	<input type="text"/>	1.89 GB	1.89 G
	07/30/2020 14:52:50	442673	0x04	SJSE	HUR	HUR-chesil-2CEF	HUR	chesil-2CEF	chesil	chesil	Portland	Portland	<input type="text"/>	1.89 GB	1.89 G

<input type="radio"/>	HUR-chesil-2CEF	0	0	
<input type="radio"/>	...	0	0	

Monitor Data Flow 'HUR-chesil-2CEF'

The diagram illustrates a data flow from a source host to a destination device. On the left, a server icon labeled 'chesil-2CEF Hitachi Block Host' is connected by a red dashed arrow to a storage icon labeled 'Portland Hitachi Block Device'. The arrow is labeled 'HUR (Replicate HUR)'. A red warning icon is positioned above the arrow. To the right, a 'Mover' panel displays the following information: Label: No label; Type: Continuous; Notifications: Error (red diamond icon), Warning (yellow triangle icon); Copy Progress: 51% (represented by a blue progress bar).

- Trigger the replication ([see here for more info](#))
- Re-activate the dataflow ([see here for more info](#))