

Global-Active Device and VMware vSphere Metro Storage Cluster Configuration on Hitachi Storage

Implementation Guide

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Feedback

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Revision History

Revision	Changes	Date
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Executive Summary

This document provides guidelines on how to configure VMware vSphere Metro Storage Cluster using Hitachi Storages.

1. Introduction:

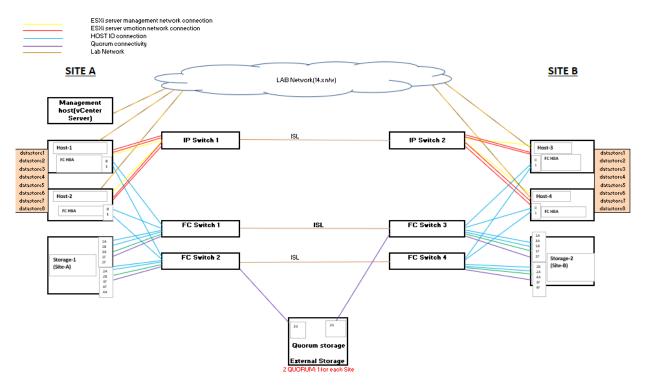
A VMware vSphere Metro Storage Cluster (vMSC) configuration is a specific storage configuration that combines replication with array-based clustering. These solutions are typically deployed in environments where the distance between data centers is limited, often metropolitan or campus environments.

1.1 Purpose:

This article provides step by step information for configuring/deploying a VMware metro storage cluster across 2 data centers using Hitachi Storage Array Platforms. It also includes various failure scenarios in used cases.

1.2 vMSC block diagram:





1.3 Hardware requirement:

Hardware used for vMSC tests must be listed under VMware vCG. The following components create a VMware vSphere Metro Storage Cluster environment:

- a. 4 ESXi hosts, 2 in each site, having 4 port NIC card and 2 port FC HBA or CNA as per requirement. All ESXi hosts will be running 2 VMs each (at minimum).
- b. 2 *IP switches for management network and vMotion connections between hosts/VMs.
- c. 4 *FC switch or iSCSI switch as per requirement for SAN connectivity to the datacenter storage network.

- d. 2 *GAD Quorum Disks i.e. iSCSI disk from virtual machine or separate FC/iSCSI storage system such as Hitachi VSP F/G or other supported 3rd-party storage.
- e. One management host i.e. vCenter server.

2. Global-Active Device (GAD) vMSC Configuration:

Configuration steps of vMSC with global-active device (GAD) can be divided in 5 areas. They are as follows:

2.1 Host configuration:

- vSphere 6.0U2, 6.5 or 6.7 ESXi host servers The physical hosts on both data centers running the virtual machines and managed by vCenter Server.
- Host HBA/CNA connectivity to FC/iSCSI switches to be made as per block diagram for SAN connectivity to the datacenter storage network.
- I NIC port of 4 port NIC card of each host to be connected to free NIC port of another host on the same site for vMotion connectivity between hosts.
- 2 NIC ports of 4 port NIC card of each host to be connected to iSCSI switches of that site for management network connectivity.
- All the 4 hosts along with their VMs are part of a single vSphere Cluster under a VMware Datacenter.
- 2 VMs will reside in each host and RDM LUNs or vmfs volumes from datastore to be assigned to those VMs as per requirement.
- Host multipathing: All the four ESXi hosts must be configured with multipathing software, either with NMP (VMware Native Multipathing) or with HDLM (Hitachi Dynamic Link Manager) to load-balance I/O between all available preferred & non preferred paths.
- NMP/HDLM multipathing software integrates with GAD to provide load balancing, path optimization, path failover, and path failback capabilities for vSphere hosts.
- When HDLM is chosen as multipathing software, first HDLM for VMware zip file is copied to the required server. Then after unzipping the file, 5 no. of vib files will be there under 5 different folders. All the vib files needs to be installed first to get HDLM installed on the server. Commands are as below:
 - esxcli software vib install -v /<HDLM location>/vib20/hex-hdlm-dlnkmgr/*.vib
 - esxcli software vib install -v /<HDLM location>/vib20/psp-hdlm-exlbk/*.vib
 - esxcli software vib install -v /<HDLM location>/vib20/psp-hdlm-exlio/*.vib
 - esxcli software vib install -v /<HDLM location>/vib20/psp-hdlm-exrr/*.vib
 - esxcli software vib install -v /<HDLM location>/vib20/satp-hdlm/*.vib

Now, to check whether Hitachi LUNs are managed by HDLM, run the following commands:

esxcli storage nmp device list

Output for a LUN should be like below:

Device Display Name: HITACHI Fibre Channel Disk (naa.60060e8008753e000050753e00000133)

Storage Array Type: HTI_SATP_HDLM

Storage Array Type Device Config: {device config options }

Path Selection Policy: HTI_PSP_HDLM_EXLIO

Path Selection Policy Device Config:

Path Selection Policy Device Custom Config:

Working Paths: vmhba65:C0:T0:L0, vmhba64:C0:T0:L0

Is USB: false

- When NMP is chosen as multipathing software, ALUA rules must be set on ESXi hosts prior to version ESXi6.7 update 1 for Hitachi LUNs as below:
 - esxcli storage nmp satp rule add -V HITACHI -M "OPEN-V" -P VMW_PSP_RR -s VMW_SATP_ALUA -c tpgs_on
 - esxcli storage core claimrule load

For ESXi 6.7update1 and above hosts, ALUA rule is already enabled on OS and no additional command is required to enable/configure ALUA on hosts.

2.2 Switch configuration:

- 2 * network switches are configured for LAN connectivity to the datacenter network from each host and VMs (ref. vMSC block diagram on 1.2).
- 4 * FC switches are configured to connect ESXi hosts of both sites to the datacenter storage network(FC). For configuring metro cluster environment, FC switch 1 in site-1 needs to be in cascade with FC switch-3 in site-2, similarly FC switch 2 in site-1 with FC switch-4 in site-2.
- For iSCSI vMSC configuration, 4 iSCSI switches are needed, and they are configured similarly in a cascade switch connection.

2.3 Primary/ Secondary storage configuration:

- 2 * Hitachi storages are configured one in each site and connected to FC/iSCSI switches of respective site as shown in block diagram.
- Each site storage will have 2 sets of LUNs, one set for primary volumes and another set for secondary volumes. All these LUNs will be made available to all the 4 hosts on both sites.
- Each site storage will have two pair of storage ports for MCU(initiator)-RCU(target) pair. These connections will act as the storage replication link between the primary-secondary storages (ref. vMSC block diagram).
- Site-1 storage primary volumes will be in GAD pair with secondary volumes of Site-2 storage. Similarly, Site-2 storage primary volumes will be in GAD pair with secondary volumes of Site-1 storage.
- For NMP-ALUA configurations, ALUA setting must be enabled on PVOLs of both the sites. Following is the command for enabling ALUA on Hitachi LUNs:
 - raidcom modify Idev -Idev_id <Idev_id> -alua enable -fx -IH<horcm_instance>

For example,

- raidcom modify Idev -Idev_id 08:10 -alua enable -fx -IH4545
- Also, path optimization settings need to be done on primary and secondary storage hostgroups as mentioned below:
 - raidcom modify lun -port cl1-d HOSTGROUP -lun_id all -asymmetric_access_state optimized -l10 (On PVOL host group)
 - raidcom modify lun -port cl1-d HOSTGROUP -lun_id all -asymmetric_access_state non_optimized -I10 (On SVOL host group)
- HMO78 needs to be set on Host group having SVOLs for all HDLM configurations. This option is not required for NMP-ALUA configurations.

2.4 Quorum storage configuration:

- 2 *quorum disks are assigned for each site GAD pair set.
- Quorum disk can be configured by either assigning an iSCSI disk from the local disk of server hosting a Microsoft Windows Server or separate storage system such as Hitachi VSP F/G or other supported 3rd-party storage
 - Steps to configure Windows Server local disk as iSCSI Quorum disk for VSP storage units Go to Server Manager -> File and Storage Services -> iSCSI -> New iSCSI Virtual Disk. Follow the steps to create iSCSI disks.

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Disks Storage Pools	Path	Status	Virtual Disk Status	Target Name	Target Status	Initiator ID			
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Work Folders	CAUSESIVIENTUALDISEA/Quor C Last refreshed on 3/6/202 ISCSI TARGETS	0 6:10:02 AM	Connected New iSCSI Virtual Refresh Import iSCSI Virtu		2019 Connected	IQNsiqn.1994-04.jp.co.hit	chirsd h8h i 123rd93c, IQNiqn	1994-04.jp.co.hitachirsd.h8	h.i.123cd9.4c
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	Name	Server Name	Target IQN			Target Status	Initiator ID		
	iqn.1990-07.com.vmsc:wir	2019 WIN-261J3535T2	iqn.1990-07.com.vm	isc:win2019		Connected	IQN:iqn.1994-04.jp.co.hitach	irrsd.h8h.i.123cd9.3c, IQN:ic	n.1994-04.jp
	<								

Figure 2: Create iSCSI disks

2. Under iSCSi Targets, Right click 'View all Targets' ->Properties -> Initiators. Add the IQN of the storage ports that will be used as External Ports for Quorum.

Figure 3: Add External Ports for Quorum

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ii ≥ ⊳	Storage	i		-					Target Status	Initiator ID				
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	iSCSI			Show All					Connected			.1994-04.jp.co.hitachi:rsd.h8h.i.1		
	Work Fold		General	+	Initiators				Connected	IQN:iqn.1994-04.jp.co.hita	achi:rsd.h8h.i.123cd9.3c, IQN:iqr	.1994-04.jp.co.hitachi:rsd.h8h.i.1	23cd9.4c, IQN:iq	n.19
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					IQN	iqn.1994-04.jp.co.hitachi:rsd.h8h.i.12	23cd9.4c							
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2.5 GAD configuration:

- 2 sets of GAD pair are configured in each site storage for vMSC environment.
- GAD pair can be created using storage GUI or from CCI.
- To create GAD pair from Raid Manager CCI server, steps are as follows:
 - On Primary storage:
 - 1. First, create DP pool for Primary volumes on site-1 storage. Repeat the same steps to create DP pool for Primary volumes on site-2 storage.

raidcom add dp_pool -pool_name <pool_name> -ldev_id <ldev_id> -l<Primary storage horcm instance>

Create LDEVs from this DP pool for Primary volumes in site-1 storage. Repeat the same steps to create Primary volumes on site-2 storage. Command to create each LDEV is as follows:

raidcom add ldev -pool <pool_id> -ldev_id <ldev_id> -capacity <pool_capacity> l<primary_storage_horcm_instance>

Format the newly created LDEV:

raidcom initialize ldev -ldev_id <ldev_id> -operation fmt -l<primary_storage_horcm_instance >

2. Create host group, set host mode options for Primary volumes host group in site-1 storage. Repeat these steps to create Primary volumes host group in site-2 storage as well.

Command to create host group:

raidcom add host_grp -port <host_group_id> -host_grp_name <host_group_name> -I<primary_storage_horcm_instance>

Command to set host mode and host mode options:

raidcom modify host_grp -port <host_group_id> -host_mode 21 -host_mode_opt 54 63 114 78 - I<primary_storage_horcm_instance>

Set Port topology and add HBA port wwns(for all 4 hosts) at Host Group:

raidcom modify port -port <port_id> -port_speed 0 -topology f_port -security_switch y l<primary_storage_horcm_instance> raidcom add hba_wwn -port <host_group_id> -hba_wwn <HBA_WWN> l<primary_storage_horcm_instance>

Assign LDEVs to host group:

raidcom add lun -port <host_group_id> -lun_id 0 -ldev_id <ldev_id> -I<primary_storage_horcm_instance>

On Secondary storage:

1. First, create resource group of primary storage(site-1) type on secondary storage (site-2) and assign respective secondary resources to it. Then repeat these steps to create resource group of primary storage(site-2) type on secondary storage (site-1) and assign respective secondary resources to it.

raidcom add resource -resource_name <resource_group_name> -virtual_type <primary_storage_serial_number> <storage_model_type> -IH<secondary_storage_horcm_instance> Reserve the host group ID in the resource group of the storage system at the secondary site.

raidcom add resource -resource_name <resource_group_name> -port <secondary_hostgroup_ID> -IH<secondary_storage_horcm_instance>

Delete the virtual LDEV ID of the volumes from secondary storage which will be used for creating GAD pairs.

raidcom unmap resource -ldev_id <LDEV_ID> -virtual_ldev_id <virtual_LDEV_ID> -IH<secondary_storage_horcm_instance>

Reserve the LDEV ID's in the resource group.

raidcom add resource -resource_name <resource_group_name> -ldev_id <LDEV_ID> - I<secondary_storage_horcm_instance>

Setting the reservation attribute to the volume for the secondary volume of GAD pair. Set the reservation attribute for GAD to the LDEV ID's

raidcom map resource -ldev_id <LDEV_ID> -virtual_ldev_id reserve -IH<secondary_storage_horcm_instance>

For the LDEV ID to which the reservation attribute was set, ffff is displayed for VIR_LDEV (virtual LDEV ID)

2. Create host group of GAD Secondary site Storage and set Host Mode Options:

raidcom add host_grp -port <Host_group_ID> -host_grp_name <host_group_name> -IH<secondary_storage_horcm_instance>

raidcom modify host_grp -port <Host_group_ID> -host_mode 21 -host_mode_opt 54 63 78 114 -IH<secondary_storage_horcm_instance>

Set Port topology and add HBA port wwn of all the 4 hosts of both sites at Host Group

raidcom modify port -port <Port_ID> -port_speed 0 -topology f_port -security_switch y - IH<secondary_storage_horcm_instance>

raidcom add hba_wwn -port <Host_group_ID> -hba_wwn <HBA_WWN> -IH<secondary_storage_horcm_instance>

 Create DP Pool and LDEVs for secondary volumes of Site-1 GAD pair. Repeat these steps for creating DP Pool and LDEVs for secondary volumes of Site-2 GAD pair.

raidcom add dp_pool_pool_name <Secondary_pool_name> -ldev_id <Pool_volume_LDEV_ID> -l<secondary_storage_horcm_instance>

Create secondary volumes with the same capacity as the primary volumes.

raidcom add ldev -pool <pool_id> -ldev_id <LDEV_ID> -capacity <LDEV_size> -IH<secondary_storage_horcm_instance>

Adding an LU path to the secondary volume.

raidcom add lun -port <Host_grp_ID> -lun_id 0 -ldev_id <LDEV_ID> -IH<secondary_storage_horcm_instance>

GAD Pair Creation:

Use the below command in site-1 storage to create site-1 GAD Pair. Repeat this step to create site-2 GAD pair on Site-2 storage.

paircreate -g <GAD_PAIR_Name> -f never -vl -jq 7 -IH<primary_storage_horcm_instance>

o To create GAD pair from SVP, steps are as follows:

On Primary storage:

1. First, create DP pool for Primary volumes on site-1 storage. Repeat the same steps to create DP pool for Primary volumes on site-2 storage.

Figure 4: Create DP Pools

Explorer	VHSC.	_SB(6)											Updated : 2020/07/	15 02:35
Storage Systems	ILAS.H	M900-66.17/5/5	(415322) > I	Paula > vMSC_SE										
TLAB HM900-66.17(5/8:415577)	State	/8			Norma			Ther	Management			Auto		
Tasks 🗧	Pool	Name (ID)			VMSC_580			Cycl	le Time			24Hours		
C Reports	Pool	VOL with System	n Area (Name)	00:00:49(PoolVOLISCEL_VMS	<)	Mon	storing Period			00:00 - 23:59		
* Components	Pool	Туре			DT(Active	Flash)		Mon	Note Note			Continuous Mode		
100 Parity Groups	RAID) Level			5(3D+1P)			Mon	itoring Status			In Progress		
Contral Devices	Drive	туре			55D			Ret	ent Monitor Date			2020/07/15 00:00	(e.)	
- C Pools	Cach	e Mode						Poo	l Hanagement Ti	esk:				
CAD POOL PRI(7)									scation Result			Completed		
HDID_POOL_SEC(4)	1000								ocation Speed			3(Standard)		
AM GAD Pool SEC(5)		ect V-VOLs when						No						
TPpool_ser(0)		ect V-VOLs when	ALC: PROVIDE AND A	ull Pool				No						
TPool2 win(1)		ber of Pool VOLI ber of V-VOLE							fax Allowed: 102					
xev-cost_rec(a)		ber of V-VOLE						24 (Max Allowed: 65	280)				
		Capacity (Used)							21 G6 / 2.92 T6	10.0.3				
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UMSC_38(6)	and the second second	ng Effect							0-1 (0.00 ME)	2.05130130 - 5	verver/10 verser	3)		
WWDC_pool_pg(2)		L Capacity (Use	d/Total)						21 GB / 2.07 TB	78.943				
* N Portz/Host Groups/ISCS2 Tai		Defined Threah		Depletion)					% / 80.%	(e. ve)				
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General Tasks			LDEV		Parity	Cepecity		BAID			Previsioning		Catha	
Create Host Groups	-	LDEV 10	Name	Status	Group 1D	Uzable	Mapped	Level	Drive Type	Tiel ID	Type	Attribute	Mode	Shrinkable
E Greate ISCSI Targets	1000	00.00.49	Postvol	Normal	1-2	1493.88 08	175.21.08	5(3D+1P)	\$50	Tier1	Resi:	Pool VOL		Yes
Create LDEVs		00100145	PeolVOI	Rormal	1-2	1499.98 08	0.00 68	5(30+1P) 5(30+1P)	\$50	Tiers	Basic	Pool VOL		Yes
M Add LUN Paths	10	. sublits	Postation	- contrast		1479.98 08	0.00 08	a(a)+10]		1.47.5		Page talk		
Create Pools														
Add External Volumes														

Create LDEVs from this DP pool for Primary volumes in site-1 storage. Repeat the same steps to create Primary volumes on site-2 storage. Command to create each LDEV is as follows:

Figure 5: Create LDEVs

lorer	vMSC_SB(6)											/15 02:39 (
rage Systems	ILAB HM900-66.17(S/N	(415577) > Pools	> vMSC_SB(6)									
ILAB HM900-66.17(S/N:415577)	Pool Volumes Vi	tual Volumos										
🚰 Tasks	Tool volumes VI	tuur voiumes										
🙀 Reports	Create LDEVs A	dd LUN Paths Ex	pand V-VOLs Mor	e Actions 🛛 🔻							Sele	ected: 0 of
1 Components	AFilter ON OFF	Select All Pages	Column Settings								Options v K 🗧 1	/1 >
🐕 Parity Groups				Capacity				Used Capac	ity			
Cogical Devices	LDEV ID	LDEV Name	Status	Total	Reserved	Used	Used (%)	Tier 1	Tier 2	Tier 3	Capacity Saving	Number of Paths
Pools									THEF 2	THEF 5		
GAD_POOL_PRI(7)	00:00:04	siteb-pvol	Normal	250.00 GB	0.00 GB	13.61 GB	5	13.61 GB			Disabled	2
HDID_POOL_SEC(4)	00:00:05	siteb-pvol	Normal	250.00 GB	0.00 GB	13.86 GB	5	13.86 GB			Disabled	
AM_GAD_Pool_SEC(5)		siteb-pvol siteb-pvol	Normal	250.00 GB	0.00 GB	17.67 GB 27.48 GB	7	17.67 GB 27.48 GB			Disabled	
TPpool1 win(0)	00:00:07	siteb-pvol	Normal	230.00 GB	0.00 GB	27.48 GB	10	1.23 GB			Disabled	
TPpool2_win(1)	00:00:09	siteb-pvol	Normal	8.00 GB	0.00 GB	1.23 GB	15	1.23 GB			Disabled	
N-CIRT-FC(8)	00:00:4B	siteb-pvol	Normal	8.00 GB	0.00 GB	1.18 GB	14	1.18 GB			Disabled	
sicert_pool_pb(3)	00:00:4C	siteb-pvol	Normal	8.00 GB	0.00 GB	1.18 GB	14	1.18 GB		-	Disabled	
4SC_SB(6) <	00:00:4F	siteb-pvol	Normal	8.00 GB	0.00 GB	3.56 GB	44	3.56 GB			Disabled	
MSC_pool_pg(2)	00:00:50	siteb-pvol	Normal	8.00 GB	0.00 GB	3.56 GB	44	3.56 GB			Disabled	
<pre>vMsC_p001_pg(2) s/Host Groups/iSCSI Tar</pre>	00:00:51	siteb-pvol	Normal	8.00 GB	0.00 GB	3.60 GB	45	3.60 GB			Disabled	
CL1-A	00:00:52	siteb-pvol	Normal	8.00 GB	0.00 GB	3.56 GB	44	3.56 GB	-	-	Disabled	
	00:00:53	siteb-svol	Normal	250.00 GB	0.00 GB	14.19 GB	5	14.19 GB	-	-	Disabled	
CL3-A	00:00:54	siteb-svol	Normal	250.00 GB	0.00 GB	13.49 GB	5	13.49 GB			Disabled	
	00:00:55	siteb-svol	Normal	250.00 GB	0.00 GB	17.51 GB	7	17.51 GB			Disabled	
on	00:00:56	siteb-svol	Normal	250.00 GB	0.00 GB	19.19 GB	7	19.19 GB			Disabled	
×	00:00:57	siteb-svol	Normal	8.00 GB	0.00 GB	1.23 GB	15	1.23 GB			Disabled	
ks	00:00:58	siteb-svol	Normal	8.00 GB	0.00 GB	1.23 GB	15	1.23 GB		-	Disabled	
	00:00:59	siteb-svol	Normal	8.00 GB	0.00 GB	1.18 GB	14	1.18 GB	-		Disabled	
SI Targets	00:00:5A	siteb-svol	Normal	8.00 GB	0.00 GB	1.18 GB	14	1.18 GB		•	Disabled	
EVs	00:00:5B	siteb-svol	Normal	8.00 GB	0.00 GB	3.56 GB	44	3.56 GB			Disabled	
aths	00:00:5C	siteb-svol	Normal	8.00 GB	0.00 GB	3.52 GB	44	3.52 GB	-	-	Disabled	
	00:00:5D	siteb-svol	Normal	8.00 GB	0.00 GB	3.52 GB	44	3.52 GB	-	-	Disabled	
	00:00:5E	siteb-svol	Normal	8.00 GB	0.00 GB	3.56 GB	44	3.56 GB	-	-	Disabled	

2. Create host group, set host mode options for Primary volumes host group in site-1 storage. Repeat these steps to create Primary volumes host group in site-2 storage as well.

Figure 6: Create Host Groups

plorer	1D-G02 (02)							Last Updated : 2020/07/15 02:49
torage Systems	ILAB HM900-66.1	17(S/N:415577) > Ports/Hos	t Groups/iSCSI Targets >	<u>CL1-D</u> > 1D-G02 (
🇊 ILAB HM900-66.17(S/N:415577)	Volume Migratio	ion 🔻						
🔞 Tasks	iSCSI Target Al	lias	1D-G02 (02)			Host Mode		21 [VMware Extension]
😭 Reports	iSCSI Target Na	ame	iqn.1994-04.jp.co.hitach	hi:rsd.h8h.t.15577.	1d002	Port Security		Enabled
🎢 Components	Port ID		CL1-D			Authentication	Method	None
' 👫 Parity Groups	Virtual Storage	Machine	VSP E990 / 415577				Mutual CHAP	Disabled
🏠 Logical Devices							User Name	
'🏠 Pools		Uset Made Options	CIIAD II			^		
🏽 🎆 Ports/Host Groups/iSCSI Tar	Hosts LUNs	Host Mode Options	CHAP Users					
'to CLI-A	Edit Host	Add Hosts Remove Hosts	Export					Selected: 0
'to CL3-A	\$Filter ON							Options V K E 1 / 1
'😭 CL5-A	Armer On		olonin octango		iSCSI Target	iSCSI Target		
1 CL7-A	Port ID	HBA iSCSI Name		Host Name	Alias	Name		
* 😭 СL1-В	CL1-D	ign.1990-07.com.emulex	:00-00-c9-da-c7-ff	81	1D-G02 (02)	iqn.1994-0		
		ign.1990-07.com.emulex	:00-90-fa-1a-d9-e9	74-0	1D-G02 (02)	iqn.1994-0		
🕅 1B-G00 (00)	CL1-D							
18-GO0 (00)	CL1-D	iqn.1998-01.com.vmware	siteahost2-154b9676:	78	1D-G02 (02)	iqn.1994-0		

Set host mode and host mode options:

Figure 7: Set Host Mode Options

xplorer	1D-G02 (02)						Lest Updated + 2020	0/07/15 02:47
Storage Systems	ILAB HM90	0-66.17(5/N:415577) > E	forts/Host.Groups//ISCS1.Targets > CL1-D > 1						
1 ILAB HM900-66.17(5/NI415577)	Volume N	Kigration 💌							
Maska 🖓	ISCSI Tar	rget Alias	10-902 (02)			Host Mode		21 (VMware Extension)	
Reports	ISCSI Ter	rget Name	ign.1994-04.jp.co.hitechired.h8h.t	15577.1d002		Port Security		Enabled	
Components	Port ID		CL1-D			Authentication	Method	None	
Parity Groups	Virtual St	iorage Machine	VSP 8990 / 415577				Mutual CHAP	Disabled	
Logical Devices							User Name		
10 Pools	Hosts	LUNS Host Mode Op	THAD HOURS						
* Ports/Host Groups/ISCSI Tar * CL1-A		SI Targets Export	CHAP USES		_				Total: 256
100.1-A 100.03-A	Edit (SC			_		_	_	Options w + + 1	2001-0021
10 CL1-A	Edit (SC	SI Targets Export		Status	1.	-	-	Options v 100 0 1	2001-0021
10 0.1-A 10 0.3-A 10 0.3-A	Rineso & Filter Mode	St Targets Export		Status Enabled	1.			Options w 0 0 1	2001-0021
100 0.1-4 100 0.3-4 100 0.3-4 100 0.3-4	Edit ISC 2 Filter Node No.	St Targets Export On OH Column S Option Description (VAAI) Support Option	ettings		1.	-	-	Options • 10 1	2001-0021
10 a.1-A 10 a.1-A 10 a.1-A 10 a.1-A 10 a.1-A	Edit iso 2 Filter No. 34	SI Targets Export On Off Column S Option Description (VAAI) Support Option (VAAI) Support option	ettings for the EXTENDED COPY sommand	Enabled	1.			Options v 6 1	2001-0021
*© CL1-A *© CL3-A *© CL3-A *© CL3-A *© CL1-8 (\$) 18-600 (00)	Edit ISC 2 Filter Node No. 54 63	SI Targets Export On Off Column S Option Description (VAAI) Support Option (VAAI) Support option	ettings for the EXTENDED COPY command for viborage APIs based on T10 standards	Enabled Enabled Enabled Disabled	1.			Options w III II I	2001-0021
*@ CL3-A *@ CL3-A *@ CL5-A *@ CL3-B (D18-000 (00) (D18-000 (00) (D18-000 (00)	Edit (50 2 Filter Mode No. 54 63 4 63	St Targets Export On Off Column 5 Option Description (VAA1) Support Option (VAA1) Support option The automatic asynche Reserved	ettings for the EXTENDED COPY command for twistnopge APIs based on T10 standards onous rediamation on ESN6.3 or later	Enabled Enabled Enabled Disabled Disabled	1.			Options v (10) 11	2011-072
*ອີດ1-A *ອີດ3-A *ອີດ3-A *ອີດ2-A *ອີດ2-8 (D18-000 (00) (D584+35177 (02) (D544-35179 (03)	Edit (60 2 Filter Mode Ito, 54 63 114 0 1 2	St Tergets Groot Ov OT Column S Option Description (VAAI) Support Option The automatic asynch Reserved Reserved VERTAS Database Edi	ettings for the EXTENDED COPY command for twistnopge APIs based on T10 standards onous rediamation on ESN6.3 or later	Enabled Enabled Enabled Disabled Disabled Disabled	3.			Options w (c) = 1	2011-072
* CL-A * CL-A * CL-A * CL-A * CL-B (D1B-000(00) (D3B-0117(02) (D3B-0117(02) (D3B-0117(02) (D3B-0117(02) (D3B-0117(02) (D3B-0117(02) (D3B-0117(02)) * CL-B	Edit 450 & Filter No.e 54 63 114 0 1 2 2 3	St Yangets Export OK OF Column S: Option Description (VAAI) Support Option The automatic asynch Reserved VIRITAS Database Edi Reserved	ettings for the EXTENDED COPY command for twistnopge APIs based on T10 standards onous rediamation on ESN6.3 or later	Enabled Enabled Enabled Disabled Disabled Disabled Disabled	3.4			Option • = 1	2011-072
10 С.1А 10 С.2А 10 С.2А	Edit (60 2 Filter Mode Ito, 54 63 114 0 1 2	St Tergets Groot Ov OT Column S Option Description (VAAI) Support Option The automatic asynch Reserved Reserved VERTAS Database Edi	ettings for the EXTENDED COPY command for twistnopge APIs based on T10 standards onous rediamation on ESN6.3 or later	Enabled Enabled Enabled Disabled Disabled Disabled	1.			Option w 0 0 1	2001-0021

Assign LDEVs to host group:

Figure 8: Assign LDEVs

Explorer	1D-1	602 (02)										Lint	Updated = 202	
Storage Systems	ILAB	HM900-66.1	7(5/0-4155)	7) > Ports/Hos	t Groups/ISC51 Ti	argets > <u>CL1-0</u> > 1D-002 (02)								
* TILAB HM900-66.17(S/N-415577)	Eve	lume Migrati	on 🔻											
😭 Tasks	15/	CSI Target Al	las		10-602 (02)			Host Mode				21 [VMware Exten	sion]	
Reports	-15/	CSI Target Na	ame		ign.1994-04.jp.	co.hitachirsd.h8h.t.15577.1d0	12	Port Security			1	Enabled		
1 Components	Po	et ID			CL1+D			Authentication		Method	9	None		
Parity Groups	Vir	tual Storage	Machine		VSP E990 / 415	577			1	Mutual CHAP		Disabled		
Copical Devices									1	Uper Name				
100 Pools	(Internet	TRACTOR		entreprogramment in			~							
* - Ports/Host Groups/ISCSI Tai	Hos	ts LUNS	Host Mo	de Options	CHAP Users									
CLI-A		ldd LUN Path	a Corvil	UN Paths Edi	t Command Devi	tes More Actions							5	elected: 0 o
1 🕝 CL3-A		Filter ON		ect All Pages C	aluma Cattings							Ontrop	w [16] +]	/1
* CL3-A		Pitter J. GR.		ect out out you get	oronne petonga						Used	Coperation	A CONTRACTOR OF THE OWNER	1. 1.
* CL7-A		Port ID	LUN ID	LDEV ID	LDEV	Pool Name (ID)	Capacity				Capacity	Provisioning	Number	ALUA Node
- CL1-8		Port 10	1001110	10013-10	Name	P001 Halling (107	Total	Reserved	Used	Used (%)	Tier 1	Type	of Paths	HEAR HOUR
\$18-G00 (00)		CL1-D	66	00.00.04	siteb-pvol	vMSC_S8(6)	250.00 GB	0.00 GB	13.61 GB	5	13.61 GB	DP	2	Enabled
	< 🖂	CL1-D	61	00.00.03	siteb-pvol	vMSC_S8(6)	250.00 GB	0.00 68	13.86 68	5	13.86 68	DP	2	Enabled
		CL1-D	Ø :	90.00.05	siteb-pvol	VMSC_SB(6)	250.00 GB	0.00 GB	17.67 GB	7	17.67 GB	DP	2	Enabled
					siteb-ovol	auto control	250.00 GB	0.00 08	27.48 68	10	27.48 68	DP	2	Enabled
C SAN-15179 (03)	16	CL1-D	61	00:00:07	siteb-pvol	vMSC_S8(6)	250.00 GB							
	1		61	00:00:07	siteb-pvol	VMSC_SB(6) VMSC_SB(6)	230.00 GB 8.00 GB		1.23 68	15	1.23 GB	DP	2	Enabled
COXEN-CIRT (01)	10	CL1-D	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					0.00 GB	1.23 GB	15 15	1.23 GB 1.23 GB	DP	2	Enabled Enabled
Сіхня-саят (01) *С сцв •С сцв		CL1-D CL1-D	8 1 8 2 8 5	00.00.09 00.00.09 00.00.48	siteb-pvol	VMSC_S8(6) VMSC_S8(6) VMSC_S8(6)	8.00 GB 8.00 GB 8.00 GB	0.00 GB 0.00 GB 0.00 GB	1.23 GB 1.18 GB		1.23 G6 1.18 G8		2	Enabled Enabled
රි XEH-CRT (01) ් ී CL3-8 ලී CL3-8 0 Analytics		CL1-D CL1-D	81 82 81 81	00.00.03 00.00.03 00.00.48 00.00.40	siteb-pvol siteb-pvol	vMSC_S8(6) vMSC_S8(6) vMSC_S8(6) vMSC_S8(6)	8.00 G8 8.00 G8 8.00 G8 8.00 G8	0.00 GB 0.00 GB 0.00 GB 0.00 GB	1.23 68 1.18 68 1.18 68	15 14 14	1.23 66	DP DP DP	2 2 2 2 2	Enabled Enabled Enabled
ि XBI-CIRT (01) ' ि CL3-8 ' ि CL3-8 0 Analytics		CL1-0 CL1-0 CL1-0 CL1-0 CL1-0 CL1-0	81 82 85 82 81	00.00.00 00.00.02 00.00.48 00.00.46 00.00.46	siteb-pvol siteb-pvol siteb-pvol siteb-pvol siteb-pvol	VMSC_S8(6) VMSC_S8(6) VMSC_S8(6) VMSC_S8(6) VMSC_S8(6) VMSC_S8(6)	8.00 G8 8.00 G8 8.00 G8 8.00 G8 8.00 G8 8.00 G8	0.00 GB 0.00 GB 0.00 GB 0.00 GB 0.00 GB	1.23 68 1.18 68 1.18 68 3.56 68	15 14 14 44	1.23 GB 1.18 GB 1.18 GB 3.36 GB	DP DP DP DP	2 2 2	Enabled Enabled Enabled Enabled
CDXEN-CIRT (01) CCL3-8 CL3-8 CL3-8 Analytics Analytics Administration		CL1-0 CL1-0 CL1-0 CL1-0 CL1-0 CL1-0		00.00.00 00.00.09 00.00.48 00.00.46 00.00.46 00.00.46	siteb-pvol siteb-pvol siteb-pvol siteb-pvol siteb-pvol siteb-pvol	VMSC_S8(6) VMSC_S8(6) VMSC_S8(6) VMSC_S8(6) VMSC_S8(6) VMSC_S8(6)	8.00 G8 8.00 G8 8.00 G8 8.00 G8 8.00 G8 8.00 G8 8.00 G8	0.00 G8 0.00 G8 0.00 G8 0.00 G8 0.00 G8 0.00 G8	1.23 68 1.18 68 1.18 68 3.56 68 3.56 68	15 14 14 44 44	1.23 GB 1.18 GB 1.18 GB 3.36 GB 3.56 GB	DP DP DP DP DP	2	Enabled Enabled Enabled Enabled Enabled
لللك KBH-CIRT (01) الله حدة الله حدة Analytics Administration		CL1-0 CL1-0 CL1-0 CL1-0 CL1-0 CL1-0 CL1-0	81 82 85 82 81	00.00.00 00.00.02 00.00.48 00.00.46 00.00.46	siteb-pvol siteb-pvol siteb-pvol siteb-pvol siteb-pvol	VMSC_S8(6) VMSC_S8(6) VMSC_S8(6) VMSC_S8(6) VMSC_S8(6) VMSC_S8(6)	8.00 G8 8.00 G8 8.00 G8 8.00 G8 8.00 G8 8.00 G8	0.00 G8 0.00 G8 0.00 G8 0.00 G8 0.00 G8 0.00 G8 0.00 G8 0.00 G8	1.23 68 1.18 68 1.18 68 3.56 68	15 14 14 44	1.23 GB 1.18 GB 1.18 GB 3.36 GB	DP DP DP DP	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Enabled Enabled Enabled Enabled

• On Secondary storage:

1. First, create resource group of primary storage(site-1) type on secondary storage (site-2) and assign respective secondary resources to it. Then repeat these steps to create resource group of primary storage(site-2) type on secondary storage (site-1) and assign respective secondary resources to it.

Delete the virtual LDEV ID of the volumes from secondary storage which will be used for creating GAD pairs.

Figure 9: Delete Virtual LDEV ID

/s.
DEV
v :

Setting the reservation attribute to the volume for the secondary volume of GAD pair.

Set the reservation attribute for GAD to the LDEV ID's

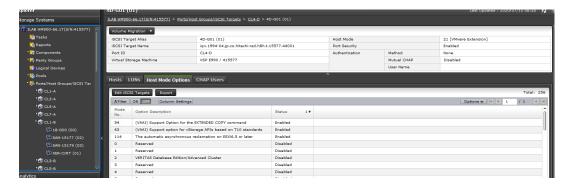
Figure 10: Set Reservation Attribute

Assign GAD Rese	rves		
1.Confirm			
Enter a name for t Confirm the setting	he task. gs in the list and click Apply to add the task in the Tasks q	ueue for execution.	
Task Name:	200715-AssignGADReserves (Max. 32 Characters)		
Selected LI)EVs		
LDEV ID	Virtual Storage Machine	Capacity Saving	
00:00:17	VSP E990 / 415577	Disabled	

2. Create host group of GAD Secondary site Storage and set Host Mode Options

Figure 11: Secondary Site Host Group and Host Mode Options

Explorer	4D-G0	1 (01)						Last Updated : 2020/07/15 08:27
Storage Systems	ILAB HM	1900-66.1	7(S/N:415577) > Ports/Host Groups/iSCSI Targe					
* 🗊 ILAB HM900-66.17(S/N:415577)	Volum	ne Migratio	an 🐨					
Casks 🖓	ISCS1	Target Ali	as 4D-G01 (01)			Host Mode		21 [VMware Extension]
C Reports	ISCSI	Target Na	ign.1994-04.jp.co.	itachi:rsd.h8h.t.15577	.4d001	Port Security		Enabled
* 💏 Components	Port 1	D	CL4-D			Authentication	Method	None
* Parity Groups	Virtual	l Storage	Machine VSP E990 / 41557				Mutual CHAP	Disabled
Cogical Devices							User Name	
100 Pools			Host Mode Options CHAP Users			â		
Ports/Host Groups/ISCSI Tar	Hosts	LUNS	Host Mode Options CHAP Users					
1 CL1-A	Edit	Host /	Add Hosts Remove Hosts Export					Selected: 0
1 CL3-A	A Culo	ne I nu I	City Salart All Dages Column Settings					
'C CL3-A 'C CL5-A		ter ON			ISCOL Taunak	ISCRI Tarrest		Options 💓 🕪 😢 1 / 1
		ter ON	HEA ISCSI Name	Host Name	ISCSI Target Alias	ISCSI Target Name		Options v] 1 / 1
1 CLS-A	P	and the second second		Host Name				_ Options •] (b) € 1 / 1
* CLS-A * 🛃 CL7-A		Port ID	HBA ISCSI Name		Alias	Name		[Options ¥][16]] € 1 / 1
*C: CLS-A *C: CL7-A *C: CL3-B		Port ID CL4-D	HBA ISCSI Name iqn.1990-07.com.emulex:00-00-c9-da-c7-ff	81 74-1	Alias 4D-G01 (01)	Name ign.1994-0		Cptions y 🕪 🐑 1 / 1
* CL5-A * CL7-A * CL1-8 © 18-600 (00)		Port ID CL4-D CL4-D	HBA ISCSI Name iqn.1990-07.com.emulex:00-00-c9-da-c7-ff iqn.1990-07.com.emulex:00-90-fa-1a-d9-ed	81 74-1 5 78	Alias 4D-G01 (01) 4D-G01 (01)	Name ign.1994-0 ign.1994-0		Options y je i / 1 / 1
CLS-A CL7-A CL1-8 (0) 18-600 (00) (0) 5AN-15177 (02)		Port ID CL4-D CL4-D CL4-D	HBA ISCSI Name Iqn.1990-07.com.emulex:00-00-c3-da-c7-ff Iqn.1990-07.com.emulex:00-90-fa-1a-d3-ed Iqn.1998-01.com.vmvare:siteahost2-154b96;	81 74-1 5 78	Aliss 4D-G01 (01) 4D-G01 (01) 4D-G01 (01)	Name iqn.1994-0 iqn.1994-0 iqn.1994-0		_Options v_](b) ⊕ 1 / 1
* CL3-A * CL3-A * CL3-A * CL3-B CL3-B CL3-B CL3-B B-G00 (00) (C) B-G00 (00) (C) B		Port ID CL4-D CL4-D CL4-D	HBA ISCSI Name Iqn.1990-07.com.emulex:00-00-c3-da-c7-ff Iqn.1990-07.com.emulex:00-90-fa-1a-d3-ed Iqn.1998-01.com.vmvare:siteahost2-154b96;	81 74-1 5 78	Aliss 4D-G01 (01) 4D-G01 (01) 4D-G01 (01)	Name iqn.1994-0 iqn.1994-0 iqn.1994-0		_Options v _][+] +] 1 /1
CL5-A CL5-A CL7-A CL1-B CL1-B CL1-B CL1-B CL1-B CL1-B CL1-B CL1-A CL1-B CL1-A CL1-A CL1-A CL1-A CL1-A CL1-A CL1-A CL1-A CL1-A CL1-A CL1-A CL1-A CL1-B CL1-A CL1-B CL1-A CL1-B CL1-A CL1-B CL1-A CL1-B CL1-A CL1-B CL1-A CL1-B CL1-A CL1-B CL1-A CL1-B CL1-A CL1-B CL1-A CL1-B CL1-A CL1-B CL1-A CL1-B CL1-A CL1-B CL1-A CL1-B CL1-CL1-B CL1-CL1-B CL1-CL1-B CL1-CL1-B CL1-CL1-B CL1-CL1-B CL1-CL1-B CL		Port ID CL4-D CL4-D CL4-D	HBA ISCSI Name Iqn.1990-07.com.emulex:00-00-c3-da-c7-ff Iqn.1990-07.com.emulex:00-90-fa-1a-d3-ed Iqn.1998-01.com.vmvare:siteahost2-154b96;	81 74-1 5 78	Aliss 4D-G01 (01) 4D-G01 (01) 4D-G01 (01)	Name iqn.1994-0 iqn.1994-0 iqn.1994-0		_Options w_] (k) (k) k / 1
* CL3-A * CL3-A * CL3-B © 18-600 (00) © 36A+15177 (02) © 36A+15177 (03) © 36A+-CIAT (03) * C 32-B		Port ID CL4-D CL4-D CL4-D	HBA ISCSI Name Iqn.1990-07.com.emulex:00-00-c3-da-c7-ff Iqn.1990-07.com.emulex:00-90-fa-1a-d3-ed Iqn.1998-01.com.vmvare:siteahost2-154b96;	81 74-1 5 78	Aliss 4D-G01 (01) 4D-G01 (01) 4D-G01 (01)	Name iqn.1994-0 iqn.1994-0 iqn.1994-0		_Options v _] (* (+ 1 / 1
* CL3-A * CL7-A * CL7-B (C18-B (C18-B) (C18-AV-15177 (02) (C18-AV-15177 (03) (C18-AV-15177 (03) (C18-CL8T (03) * CL3-B * CL3-B		Port ID CL4-D CL4-D CL4-D	HBA ISCSI Name Iqn.1990-07.com.emulex:00-00-c3-da-c7-ff Iqn.1990-07.com.emulex:00-90-fa-1a-d3-ed Iqn.1998-01.com.vmvare:siteahost2-154b96;	81 74-1 5 78	Aliss 4D-G01 (01) 4D-G01 (01) 4D-G01 (01)	Name iqn.1994-0 iqn.1994-0 iqn.1994-0		_Options w_] ⊕ ⊕ 1 / 1



 Create DP Pool and LDEVs for secondary volumes of Site-1 GAD pair. Repeat these Steps for creating DP Pool and LDEVs for secondary volumes of Site-2 GAD pair. Create secondary volumes with the same capacity as the primary volumes.

Figure 12: Create DP Pool and LDEVs

1

xplorer	vMSC_SB(6)										Last Updated : 2020/07	
Storage Systems	ILAB HM900-66.17(S/	<u>N:415577)</u> > <u>Pools</u>										
• 🛐 ILAB HM900-66.17(S/N:415577)	Pool Volumes V											
😭 Tasks	Pool volumes V	irtual volumes										
1 Reports	Create LDEVs	Add LUN Paths	cpand V-VOLs Mor	e Actions							Sele	lected: 12
* Components	& Filter ON OFF	Colect All Dege	Column Settings								Options v If 6 1	/ 1
Parity Groups	A HILL ON COM	j (Jeneccon Pages	(Colonni seconga)	Capacity				Used Capaci	b.,			/ •
Cogical Devices	LDEV ID	LDEV Name	Status								Capacity Saving	Number of Path
• 🔂 Pools				Total	Reserved	Used	Used (%)	Tier 1	Tier 2	Tier 3		or Pati
GAD POOL PRI(7)	00.00.04	siteb-pvol	Normal	250.00 GB	0.00 GB	13.61 GB	5	13.61 GB			Disabled	
M HDID_POOL_SEC(4)	00:00:05	siteb-pvol	Normal	250.00 GB	0.00 GB	13.86 GB	5	13.86 GB		1.1	Disabled	
	00:00:06	siteb-pvol	Normal	250.00 GB	0.00 GB	17.71 GB	7	17.71 GB			Disabled	
JAM_GAD_Pool_SEC(5)	O0100107 O	siteb-pvol	Normal	250.00 GB	0.00 GB	27.48 GB	10	27.48 GB			Disabled	
TPpool1_win(0)	E 00:00:08	siteb-pvol	Normal	8.00 GB	0.00 GB	1.23 GB	15	1.23 GB	1.1	1.1	Disabled	
TPpool2_win(1)	00:00:09	siteb-pvol	Normal	8.00 GB	0.00 GB	1.23 GB	15	1.23 GB			Disabled	
XEN-CIRT-FC(8)	00100117		Normal	10.00 GB	0.00 GB	0.00 GB	0	0.00 GB	1.1		Disabled	
iscsicert_pool_pb(3)	00:00:48	siteb-pvol	Normal	8.00 GB	0.00 GB	1.18 GB	14	1.18 GB			Disabled	
(0) vMSC_SB(6)	🔲 🔲 🔕 <u>00:00:4C</u>	siteb-pvol	Normal	8.00 GB	0.00 GB	1.18 GB	14	1.18 GB	-	-	Disabled	
() vMSC_pool_pg(2)	🔲 🥃 <u>00:00:4</u> E	siteb-pvol	Normal	8.00 GB	0.00 GB	3.56 GB	44	3.56 GB			Disabled	
* 5 Ports/Host Groups/iSCSI Tar	00:00:50	siteb-pvol	Normal	8.00 GB	0.00 GB	3.56 GB	44	3.56 GB		-	Disabled	
1 CL1-A	00:00:51	siteb-pvol	Normal	8.00 GB	0.00 GB	3.60 GB	45	3.60 GB			Disabled	
Princia-a ♡	00:00:52	siteb-pvol	Normal	8.00 GB	0.00 GB	3.56 GB	44	3.56 GB		1.1	Disabled	
alvtics	V 00:00:53	siteb-svol	Normal	250.00 GB	0.00 GB	14.19 GB		14.19 GB				
	✓ E 00:00:54		Normal			13.49 GB		13.49 G8				
Iministration	✓ E 00:00:55	siteb-svol	🥥 Normal	250.00 GB	0.00 GB	17.51 GB	7	17.51 GB		-	Disabled	
¥	✓ B 00:00:56	siteb-svol	Normal	250.00 GB	0.00 GB	19.19 GB	7	19.19 GB			Disabled	
neral Tasks	✓	siteb-svol	Normal	8.00 GB	0.00 GB	1.23 GB	15	1.23 GB			Disabled	
Create Host Groups	✓ E 00:00:58	siteb-svol	🥥 Normal	8.00 GB	0.00 GB	1.23 GB	15	1.23 GB	-	-	Disabled	
Create ISCSI Targets	✓ B 00:00:59	siteb-svol	🥥 Normal	8.00 GB	0.00 GB	1.18 GB	14	1.18 GB		-	Disabled	
Create LDEVs	🗹 🖪 <u>00:00:5A</u>	siteb-svol	Normal	8.00 GB	0.00 GB	1.18 GB	14	1.18 GB		-	Disabled	
	✓ E 00:00:58	siteb-svol	🥥 Normal	8.00 GB	0.00 GB	3.56 GB	44	3.56 68	-	-	Disabled	
Add LUN Paths	✓ B 00:00:5C	siteb-svol	🥥 Normal	8.00 GB	0.00 GB	3.52 GB		3.52 GB			Disabled	
Create Pools	M 🗐 00:00:50	sitebravol	Normal	8.00 GB	0.00 GB	3.52 GB	44	3.52 GB			Disabled	
Add External Volumes	V E 00:00:5E	siteb-svol	Normal	8.00 GB	0.00 GB	3.56 GB		3.56 68			Disabled	

Adding an LU path to the secondary volume.

Figure 13: Add LU Path

lorer	4D-0	501 (01)														
rage Systems	ILAB	HM900-66.1	7(S/N:41557	7) > Ports/Hos	t Groups/iSCSI T	argets > <u>CL4-D</u> > 4D-G01 (0										
ILAB HM900-66.17(S/N:415577)	Vo	lume Migratic	n 🔻													
🛗 Tasks	iSCSI Target Alias 40-G01 (01)							Host Mode					21 [VMware Extension]			
🏠 Reports	ISCSI Target Name				ign.1994-04.jp.co.hitachirsd.h8h.t.15577.4d001 Port Security							Enabled				
Components	Port ID				CL4-D			Authentication Method				None				
Rearity Groups	Virtual Storage Machine				VSP E990 / 415	SP E990 / 415577			Mutual CHAP			Disabled				
The Logical Devices																
* 🕻 Pools		_					^									
* 🚯 Ports/Host Groups/iSCSI Tar	Hos	its LUNs	Host Mod	le Options	CHAP Users											
CLI-A		dd LUN Path:		JN Paths Edi	t Command Devi	ces More Actions 🔻								Selected: 0 of		
CL3-A						More Actions										
CLS-A	^	Filter ON	OFF Sel	ect All Pages C	olumn Settings						1	Options	★ K< €	1 / 1 🌛		
1 CL7-A		Port ID	LUNID	LDEV ID	DEV ID LDEV Poo	Pool Name (ID)	Capacity	Capacity				Provisioning	Number	ALUA Mode		
* 💣 СL1-В		Port to	CONTRO	000010			Total	Reserved	Used	Used (%)	Tier 1	Туре	of Paths	ALON HOUL		
\$18-G00 (00)		CL4-D	Ø 2	00:00:53	siteb-svol	VMSC SB(6)	250.00 GB	0.00 GB	14.19.68	5	14.19 GB	DP	2	Enabled		
3 SAN-15177 (02)	. 8	CL4-D	C 1	00:00:54	siteb-svol	VMSC_SB(6)	250.00 GB	0.00 GB	13.49 GB	5	13.49 GB	DP	2	Enabled		
00 SAN-15179 (03)		CL4-D	2	00:00:55	siteb-svol	vMSC_SB(6)	250.00 GB	0.00 GB	17.51 GB	7	17.51 GB	DP	2	Enabled		
A XEN-CIRT (01)		CL4-D	X 3	00:00:56	siteb-svol	vMSC_SB(6)	250.00 GB	0.00 GB	19.19 GB	7	19.19 GB	DP	2	Enabled		
1 CL3-B		CL4-D	4	00:00:57	siteb-svol	vMSC SB(6)	8.00 GB	0.00 GB	1.23 GB	15	1.23 GB	DP	2	Enabled		
• CL5-B ~		CL4-D	Ø 5	00:00:58	siteb-svol	vMSC_SB(6)	8.00 GB	0.00 GB	1.23 GB	15	1.23 68	DP	2	Enabled		
/tics		CL4-D	6	00:00:59	siteb-svol	vMSC_S8(6)	8.00 GB	0.00 GB	1.18 GB	14	1.18 GB	DP	2	Enabled		
nistration		CL4-D	💕 Z	00:00:5A	siteb-svol	vMSC_SB(6)	8.00 GB	0.00 GB	1.18 GB	14	1.18 GB	DP	2	Enabled		
histration		CL4-D	💕 <u>8</u>	00:00:58	siteb-svol	vMSC_SB(6)	8.00 GB	0.00 GB	3.56 GB	44	3.56 GB	DP	2	Enabled		
ral Tasks		CL4-D	82	0010015C	siteb-svol	vMSC_SB(6)	8.00 GB	0.00 GB	3.52 GB	44	3.52 GB	DP	2	Enabled		
		CL4-D	8 10	00:00:50	siteb-svol	vMSC_SB(6)	8.00 GB	0.00 GB	3.52 GB	44	3.52 GB	DP	2	Enabled		
eate Host Groups		CL4-D	3 11	00:00:5E	siteb-svol	vMSC_SB(6)	8.00 GB	0.00 GB	3.56 GB	44	3.56 GB	DP	2	Enabled		
reate iSCSI Targets																

GAD Pair Creation:

Figure 14: GAD Pair Creation

	Remote Storage Sys	stem: Model / Seria	l Number		Path Group	ID â			lected Pairs		_			
s		VSP Ex00, V	SP Fx00 and VSP Gx00	/ 415855	V 03 V			Sel	ect All Pages				Options 🔻	
nents	Primary Volume Sele	ection:							Local Storage S	lystem				
iroups	Selection Object	: 🔘 Fib	re (i) iSCSI						LDEV ID	LDEV Name	Port ID	Host Group Name / ISCSI Target Alias	iSCSI Target	
Devices		0	0									IDCD1 Target Allas	name	
	LU Selection:	Port II		lias										
ost Grou		CL1-I	1D-G01 (01)		•									Selected: 0
al Storag	Available LC)EVs												1 / 1
tion	\$Filter ON	OFF Select All Page	es Options 🖝 🔀	< 1 /	1 ⇒ ≫									System
al Repli	✔ Port ID	Host Group Name /	iSCSI Target	LUN ID	LDEV ID									bystern
mote Re	_	ISCSI Target Alias	Name	LON ID	LDEV ID									mber
umals	CL1-D	1D-G01 (01)	iqn.1994-04.j	. 0	00:00:0A									:00 and VSP Gx00
emote Co	CL1-D	1D-G01 (01)	iqn.1994-04.j		00:00:0B									00 and VSP Gx00
inote etc	CL1-D	1D-G01 (01)	iqn.1994-04.j	. 2	00:00:0C		Add 🕨				No D	ata		00 and VSP Gx0
							////				100	ci uci		00 and VSP Gx0
														00 and VSP Gx0
														00 and VSP Gx00
	<				> 3 of 3									00 and VSP Gx0
				Selected:	3 OF 3									00 and VSP Gx0
	Secondary Volume S	Selection:				_								00 and VSP Gx0
1		Volume: Port ID												00 and VSP Gx0
~	Base Secondary	volume: Port ID	Host Group ID/ iSCSI Target ID	LON ID										00 and VSP Gx0
6														00 and VSP Gx00
Groups		CL5-A		0 •										00 and VSP Gx00
Targets			(00-FE)	(0-2047,										00 and VSP Gx00
s				Decimal in	put)									00 and VSP Gx00
	Selection Type:	(Inte	rval	0	•	*				_			>	:00 and VSP Gx00
hs									hange Settings	Remove		Sele	cted: 0 of 0	:00 and VSP Gx00
5	<								nange oetengs			000		:00 and VSP Gx00
l Volumes											4 Beck	Next Finish	Cancel ?	:00 and VSP Gx0
											Beck	rinsh	Canter 1	:00 and VSP Gx0
	more)												_	

For NMP-ALUA configuration, while creating ALUA pair ALUA mode must be enabled.

Figure 15: Enable ALUA Mode

Replication	Base Secondary Volume:	Port ID Host Group ID/ LUN ID iSCSI Target ID							System
🐺 Remote Re		CL5-A V 00 V 0 V							mber
Nournals		(00-FE) (0-2047,							:00 and V
Remote Co		Decimal input)							00 and V
	Selection Type:			Add 🕨		NC	Data_		:00 and V:
	Selection Type:	Interval							:00 and V:
		Relative Primary Volume							:00 and V
	virror ID:	(-							:00 and V
		0	•						:00 and V
	Quorum Disks:	09(00:00:5F)	•						:00 and V
tion	CTG ID:	Not Assign	•						:00 and V
~	☆ Options								00 and V
isks	Initial Copy Type:	Entire Volume	•						00 and V
									:00 and V:
lost Groups	Copy Pace:	15 Tracks							:00 and V:
SCSI Targets		(1-15)							
DEVs	ALUA Mode:	Depends on Primary Volume Settings		U					:00 and V:
Paths		Depends on Primary Volume Settings	,	*				>	:00 and VS
		Enable		_	Change Settings	Remove		Selected: 0 of 0	:00 and V:
Pools		Disable							
ernal Volumes							Back Next	Finish Cancel ?	00 and V

3. Failure scenarios:

This section deals with the typical failure scenarios in a GAD vMSC environment and the results for each scenario

Remote connection failure for a particular site

GAD pair behaves differently for failing remote connections for each site.

Test simulation result of Storage TC ports failure (ALUA/NMP) for a particular Site (A or B):

- Disabled Site A Storage TC ports:
 → Site A PVOLs win and Site B corresponding SVOLs block.
 → Site B PVOLs win and Site A corresponding SVOLs block.
- 2. Disabled Site B Storage TC ports:
 - \rightarrow Site A PVOLs block and Site B corresponding SVOLs win.
 - \rightarrow Site B PVOLs win and Site A corresponding SVOLs block.

Test simulation result of Storage TC ports failure (HDLM) for a particular Site (A or B):

- Disabled Site A Storage TC ports:

 → Site A PVOLs win and Site B corresponding SVOLs block.
 → Site B PVOLs win and Site A corresponding SVOLs block.
- 2. Disabled Site B Storage TC ports:
 - ightarrow Site A PVOLs win and Site B corresponding SVOLs block.
 - ightarrow Site B PVOLs win and Site A corresponding SVOLs block.

Note:

- For ESXi 6.7, the parameter for action_OnRetryErrors is ON by default.
- For ESXi 6.7U3B, the same parameter is OFF by default.
- When using NMP/ALUA as multipath, set HMO78=OFF
- Ensure for NMP/ALUA, ALUA enabled per LUN / Dedicated Ports for PVOLs and SVOLs enabled with HG Optimized and Non-optimized Paths.

- vSphere GUI on all ESXi hosts showing LUN status: "Active (IO)" à PVOLs and "Active" à SVOLs.
- Zero IOPS observed on SVOLs Storage Ports and generated IO workload observed on PVOLs Storage Ports.
- For NMP/ALUA the host sends CMD=A30A to all the paths, and the storage that notifies Quorum first, survives.
- With HDLM, it was confirmed no ALUA RTPG A3h command send and therefore both PVOLs survived on both storages.

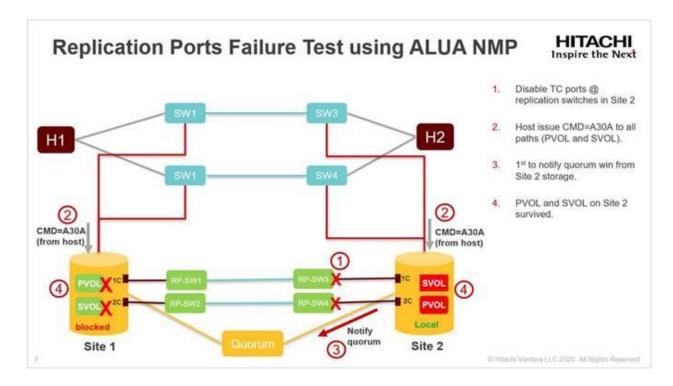


Figure 16: Replication Ports Failure Test

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