



Step-by-Step Guide

Open-E JovianDSS Fibre Channel High-Availability Cluster

The aim of this document is to demonstrate how to set up a High-Availability Cluster with Fibre Channel.

Open-E JovianDSS includes failover functionality for SMB, NFS and iSCSI, FC enabling you to set up High Availability Load-Balanced Storage Clusters.

By using the Open-E JovianDSS High Availability Cluster Feature Pack you can ensure reliability and redundancy through failover in case of a server crash.

The HA cluster management software enables you to quickly access all features related to your cluster setup.

Whether for initial configuration or re-configuration after a failover – everything is in one place and guarantees ease of use for the storage administrator.

Data can be simultaneously accessed via SMB, NFS or iSCSI and via one more Virtual IP addresses. Standalone VIP feature creates a connection to the data which is independent of the physical network path.

Fibre Channel HA Cluster uses Asymmetric Logical Unit Access (ALUA) to configure the paired targets. LUNs are visible on both configured targets by the initiator that has access to those LUNs by paths. Depending on the path status, the initiator knows which path should be used to access LUNs. The initiator accesses LUNs by using an active path, while standby path is used for a target that does not have access to LUNs. An active path is set for a target when the pool is present on the same node where the target is. A standby path is used for a target when a pool is present on the other node.

High availability is achieved by detecting hardware failures and automatically moving the VIP and for Fibre Channel the active path from the primary to the secondary node without the client servers noticing a timeout.

Software version up26 supports Single node Fibre Channel Target with all Fibre Channel clients.

Fibre Channel HA Cluster was tested and supported with RH Linux cluster and with VMware cluster only !

FC Cluster for VMware

(ALUA failover with VMware ESXi 6.5. or newer)

It is required to register SCST devices with VMW_SATP_DEFAULT_AP plugin in ESX root console.

Login to ESX console and add new rules for SCST file I/O and block I/O devices:

```
esxcli storage nmp satp rule add -s VMW_SATP_DEFAULT_AP -V "SCST_FIO" -M "Storage" -c tpgs_on -P VMW_PSP_MRU -e "SCST_FIO Storage Device" -o disable_action_OnRetryErrors
```

```
esxcli storage nmp satp rule add -s VMW_SATP_DEFAULT_AP -V "SCST_BIO" -M "Storage" -c tpgs_on -P VMW_PSP_MRU -e "SCST_BIO Storage Device" -o disable_action_OnRetryErrors
```

execute:

```
esxcli storage core claimrule load
```

check if new rule is listed in:

```
esxcli storage nmp satp rule list
```

reboot the VMware server

check if correct plugin is used for SCST devices:

```
esxcli storage nmp satp rule list | grep SCST
```

The Storage Array Type should be set to VMW_SATP_DEFAULT_AP

FC Cluster for RH Linux (ALUA failover with RH Linux)

--- multipath install on RH: `yum -install multipath-tools`

`/etc/multipath.conf`

```
defaults {
  Uid_attribute      "ID_SERIAL"
  Getuid_callout     "/lib/udev/scsi_id --whitelisted --export --page=0x80 --device=/dev/%n"
}
```

```
blacklist_exceptions {
  Property           "ID_SERIAL"
}
```

```
devices {
  device {
    Vendor           "SCST_[BF]IO"
    Product          "Storage"
    hardware_handler "1 alua"
    path_selector     "service-time 0"
    path_grouping_policy "failover"
    Failback         "manual"
    prio             "alua"
    prio_args        ""
    Path_checker      "tur"
    Rr_weight         "priorities"
    Fast_io_fail_tmo 300
    No_path_retry    500
  }
}
```

--- restart multipath: `multipath -r`

--- check multipath: `multipath -l -v2`

-- list WWN: `cat /sys/class/fc_host/host*/port_name`
this command list WWN in hex format : 0x2100000e1e28c7c0 (this is just example WWN)
but the GUI accept following format : 21:00:00:0e:1e:28:c7:c0
so this need to be typed manually (no copy & paste)

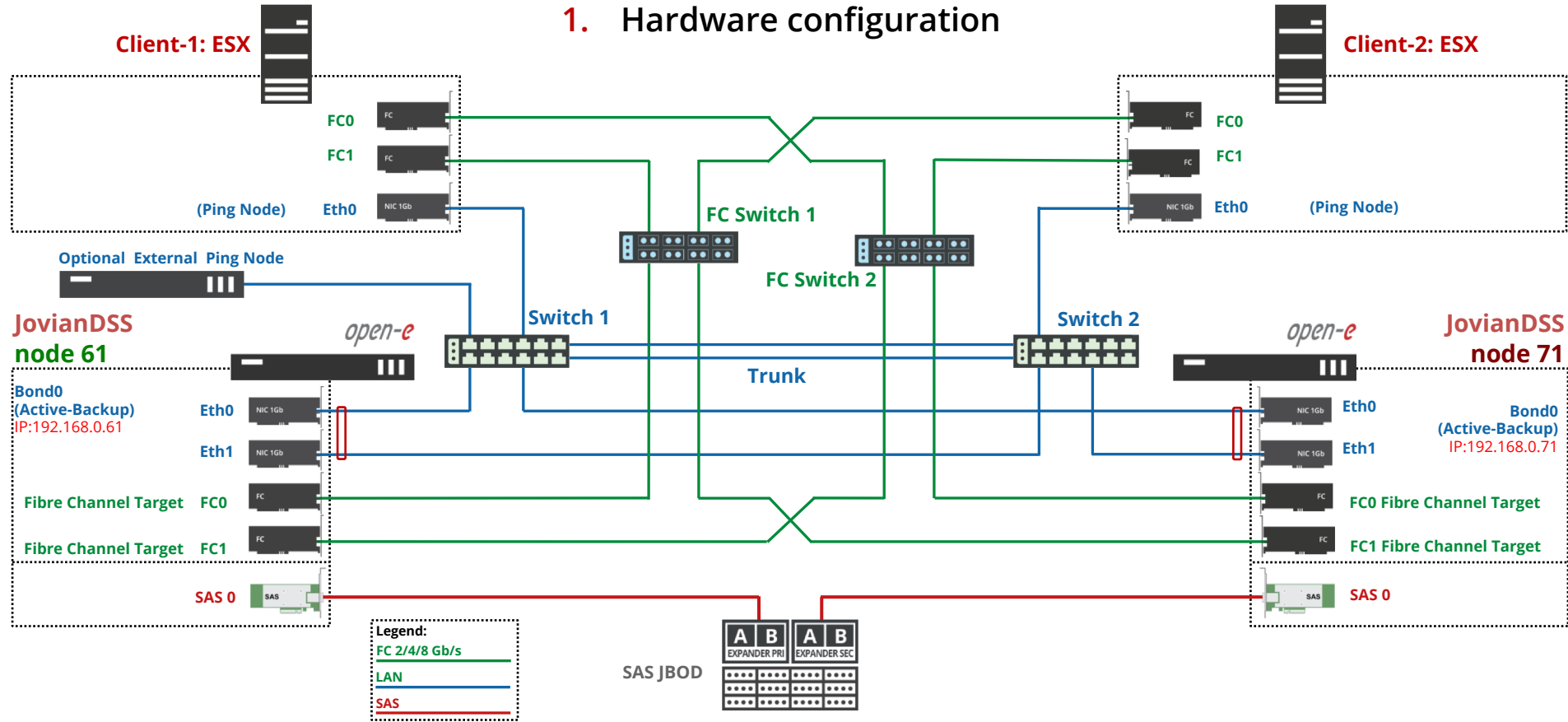
To set up a High-Availability Cluster, perform the following steps:

1. Hardware configuration
2. ESX Storage adapter
3. Storage settings
4. Cluster Binding
5. Ping Nodes
6. Start cluster
7. Pool
8. Add Initiator
9. Add group wizard
10. Add remote target
11. Rescan adapters
12. Check adapters after rescan
13. Edit multipath
14. Path check
15. Move cluster
16. Cluster check after test move

Open-E JovianDSS Fibre Channel High-Availability Cluster



1. Hardware configuration



2. ESX Storage adapter



ESX host
IP Address: 192.168.0.51

In **Storage Adapters**, check the settings of both Fibre Channel adapters.

The screenshot shows the ESX configuration interface for storage adapters. The left sidebar lists categories like Storage, Networking, and VMkernel adapters. The main area is titled 'Storage Adapters' and contains a table of installed adapters. Two Fibre Channel adapters (vmhba3 and vmhba4) are highlighted with red arrows pointing from the text box on the left. A third adapter (vmhba2) is a SAS adapter.

Adapter	Type	Status	Identifier	Targets	Devic...	Paths
Model: 2600 Series 16Gb Fibre Channel to PCI Express HBA						
vmhba3	Fibre Channel	Online	20:00:00:0e:1e:2a:81:e0 21:00:00:0e:1e:2a:81:e0	0	0	0
vmhba4	Fibre Channel	Online	20:00:00:0e:1e:2a:81:e1 21:00:00:0e:1e:2a:81:e1	0	0	0
Model: Fusion-MPT 12GSAS SAS3008 PCI-Express						
vmhba2	SAS	Unknown	--	1	1	1

3. Storage settings

JovianDSS: **node 61**
IP Address: 192.168.0.61

WWN	Alias	Mode	Type	Status	Options
21:00:00:0e:1e:2c:dd:40		Target	Physical	OK	Options
21:00:00:0e:1e:2c:dd:41		Target	Physical	OK	Properties

Go to menu **Storage Settings**. In the **Options** drop-down menu select **Properties**.

3. Storage settings

JovianDSS: **node 61**
IP Address: 192.168.0.61

In the **Properties** menu, enter the **Alias** name and click the **Apply** button.

The screenshot shows the Open-E management interface. On the left is a navigation menu with options: Storage, User Management, Failover Settings, Storage Settings, Backup & Recovery, System Settings, and Diagnostics. The 'Storage Settings' menu item is selected. The main area shows 'Storage Settings' with 'Access protocols' and 'Fibre Channel ports' sections. Under 'Fibre Channel ports', two WWN addresses are listed: 21:00:00:0e:1e:2c:dd:40 and 21:00:00:0e:1e:2c:dd:41. A 'Properties' dialog box is open over the first WWN. It contains the following fields: 'Target WWN' (21:00:00:0e:1e:2c:dd:40), 'Alias' (dd-40), and 'Port mode' (Target selected, Initiator unselected). At the bottom of the dialog are 'Cancel' and 'Apply' buttons. A red arrow points from the 'Apply' button in the dialog to the 'Apply' button in the screenshot. Another red arrow points from the 'Properties' dialog to the 'Storage Settings' menu item in the navigation menu.

3. Storage settings

JovianDSS: **node 61**

IP Address: 192.168.0.61

For another **WWN**, go to the **Options** drop-down menu for this WWN, select **Properties** and enter the **Alias** name accordingly. In this example second alias is **dd-41**.

The screenshot shows the 'Storage Settings' page in the Open-E management console. The left sidebar contains navigation options: Storage, User Management, Failover Settings, Storage Settings (selected), Backup & Recovery, System Settings, and Diagnostics. The main content area is titled 'Storage Settings' and has tabs for 'Access protocols', 'Discovery CHAP user access', and 'Fibre Channel'. Under the 'Fibre Channel' tab, there is a section for 'Fibre Channel ports' with a table of configurations.

WWN	Alias	Mode	Type	Status	Options
21:00:00:0e:1e:2c:dd:40	dd-40	Target	Physical	OK	Options
21:00:00:0e:1e:2c:dd:41	dd-41	Target	Physical	OK	Options

3. Storage settings

JovianDSS: **node 71**
IP Address: 192.168.0.71

WWN	Alias	Mode	Type	Status	Options
21:00:00:0e:1e:28:c4:e0	c4-e0	Target	Physical	OK	Options
21:00:00:0e:1e:28:c4:e1	c4-e1	Target	Physical	OK	Options

Targets on the second node are also active.

4. Cluster Binding

JovianDSS: **node 61**
IP Address: 192.168.0.61

In the main menu select the **Failover settings** and enter IP address of the Bond interface of the second node and enter the current administrator password (default: admin) and click on the **Connect** button.

The Bond interface will function as a ring path (heartbeat) and as the persistent reservation synchronization path.

Storage

User Management

Failover Settings

Storage Settings

Backup & Recovery

System Settings

Diagnostics

Failover Settings

Failover status

Nodes are not bound
In order to configure and run Failover service both nodes must be connected.

Note:

- Network interfaces used to bind the nodes must be Active-Backup bonding interfaces.
- Physical and Virtual IP addresses on each node must have a unique subnetwork class.

Node binding

Remote node IP:

Password:

5. Ping nodes

JovianDSS: **node 61**
IP Address: 192.168.0.61

In **Failover settings** click the **Edit** button in the **Ping nodes** section and enter at least two ping nodes.

Ping node IP addresses must be reachable from Ring interfaces, so the ping node must use the same network subnet as the ring interfaces.

The screenshot shows the 'Failover Settings' interface with a 'Ping nodes' dialog box open. The dialog box contains a search field and a table with two columns: 'Local status' and 'Remote status'. The table lists two ping nodes with IP addresses 192.168.0.51 and 192.168.0.52, both with a 'Reachable' status. There are 'Delete' buttons for each node and an 'Add ping node' button at the top right. A 'Close' button is at the bottom right. A red arrow points from the 'Edit' button in the 'Ping nodes' section of the main interface to the 'Add ping node' button in the dialog box.

IP	Local status	Remote status	Options
1 192.168.0.51	Reachable	Reachable	<input type="checkbox"/> Delete
2 192.168.0.52	Reachable	Reachable	<input type="checkbox"/> Delete

6. Start cluster

JovianDSS: **node 61**
IP Address: 192.168.0.61

Now, all required settings are completed.

Click **the Start Failover** button in order to start the HA-cluster service.

Failover Settings

Failover status

Windows Failover Clustering
To ensure proper functioning of Windows Failover Clustering feature (including Hyper-V in cluster environment) it is required to enable SCSI-3 Persistent Reservation Synchronization.

Failover status: **Ready to start**

Start Failover

Failover nodes

Node	Connection status	Failover status
node-61 (IP: 192.168.0.61, node ID: cfce4829)	Reachable	N/A
node-71 (IP: 192.168.0.71, node ID: 22566a06)	Reachable	N/A

[Disconnect nodes](#)

Failover resources

Zpool name	Active on node	Status
Information about failover resources is not available until failover is started.		

Rings: **1 configured**

[Details](#)

Ping nodes: **2 of 2 reachable**

[Edit](#)

7. Pool

JovianDSS: **node 61**
IP Address: 192.168.0.61

In the main menu, select **Storage**. In order to access the pool setup menu click the down arrow button in the middle bottom of the pool status section.

The screenshot shows the Open-E Storage management interface. On the left is a navigation menu with options: Storage, User Management, Failover Settings, Storage Settings, Backup & Recovery, System Settings, and Diagnostics. The main content area is titled 'Storage' and shows the configuration for 'Pool-0'. The pool status is 'ONLINE'. A status box indicates 'Zpool is functioning correctly. Action: None required.' Below this, there is a section for 'Zpools available for import' with a 'Rescan required' message. At the bottom, the 'Unassigned disks' section is visible, showing a table of local disks.

Name	Serial number	Size	Model	Blink
1 sdb	15P0A0EPT2LA	186.31 GiB	X446_PHM2200MCTO	●
2 sdf	43G0A05MTVL6	186.31 GiB	PX02SMF020	●

8. Add Initiator

JovianDSS: **node 61**
IP Address: 192.168.0.61

In the pool menu select **Fibre Channel**.

Storage

State: **ONLINE**

Zpool ID: 12199181236699342582

Total storage: 544.00 GiB

Disks: 10

Status: Zpool is functioning correctly.
Action: None required.

Storage Settings

Backup & Recovery

System Settings

Diagnostics

Rescan Add zpool

Status Disk groups iSCSI targets **Fibre Channel** Shares Snapshots Virtual IPs

Fibre Channel groups + Add group

- Public group — Targets: 0 — Zvols: 0 — Status: Active
- Zvols available to be assigned to Fibre Channel groups

Targets and initiators assigned to this zpool

- Fibre Channel targets
- Fibre Channel initiators

Search + Add initiator

Alias	WWN	Options
No initiators found.		

Zpools available for import

8. Add Initiator



ESX host
IP Address: 192.168.0.51

From **Storage Adapters** in VMware please select the text, then use the pop-up menu to copy the selected text to the clipboard.

Summary Monitor **Configure** Permissions VMs Resource Pools Datastores Networks Updates

Storage Adapters

+ Add Software Adapter Refresh Rescan Storage... Rescan Adapter

Adapter	Type	Status	Identifier	Targets	Devic...	Paths
Model: 2600 Series 16Gb Fibre Channel to PCI Express HBA						
vmhba3	Fibre Channel	Online	20:00:00:0e:1e:2a:81:e0	0	0	0
vmhba4	Fibre Channel	Online	20:00:00:0e:1e:2a:81:e1	21:00:00:0e:1e:2a:81:e0		
Model: Fusion-MPT 12GSAS SAS3008 PCI-Express						
vmhba2	SAS	Unknown	--			
Model: Patsburg 6 Port SATA AHCI Controller						

Copy Ctrl+C
Search Google for "21:00:00:0e:1e:2a:81:e0"
Print... Ctrl+P
Inspect Ctrl+Shift+I

8. Add Initiator

JovianDSS: **node 61**

IP Address: 192.168.0.61

In **Add Initiator** please paste the previously saved text from the clipboard into the **Initiator WWN** field, and enter the **Alias** initiator. Next, click the **Apply** button. Repeat these steps for the second adapter.

The screenshot shows the 'Add initiator' dialog box in the Open-E JovianDSS web interface. The dialog box is titled 'Add initiator' and contains the following fields and buttons:

- Add new initiator** (Section header)
- Initiator WWN:** 21:00:00:0e:1e:2a:81:e0
- Alias:** vmhba3
- Buttons:** Cancel (with a red X icon), Apply (with a green checkmark icon), and Add group (with a plus icon).

Red arrows indicate the flow of the process: from the text box to the 'Initiator WWN' field, then to the 'Alias' field, and finally to the 'Apply' button.

8. Add Initiator

JovianDSS: **node 61**
IP Address: 192.168.0.61

Initiators have been added.

The screenshot shows the 'Storage' configuration page in the Open-E management console. The left sidebar contains navigation options: Storage, User Management, Failover Settings, Storage Settings, Backup & Recovery, System Settings, and Diagnostics. The main content area shows the 'Storage' configuration for a zpool with the following details:

- State: ONLINE
- Zpool ID: 12199181236699342582
- Total storage: 544.00 GiB
- Disks: 10

A status message indicates: 'Status: Zpool is functioning correctly. Action: None required.'

Below the zpool details, there are tabs for 'Status', 'Disk groups', 'iSCSI targets', 'Fibre Channel', 'Shares', 'Snapshots', and 'Virtual IPs'. The 'Fibre Channel' tab is selected, showing:

- Fibre Channel groups:** Public group (Targets: 0, Zvols: 0, Status: Active)
- Targets and initiators assigned to this zpool:**
 - Fibre Channel targets
 - Fibre Channel initiators

A search bar and an '+ Add initiator' button are visible. Below, a table lists the added initiators:

Alias	WWN	Options
vmhba3	21:00:00:0e:1e:2a:81:e0	Options ▼
vmhba4	21:00:00:0e:1e:2a:81:e1	Options ▼

9. Add group wizard

JovianDSS: **node 61**

IP Address: 192.168.0.61

In **Add Fibre Channel group** wizard, in Properties step, please enter the name of **Group alias**. To confirm this name click the **Next** button.

Alias	WWN
vmhba4	21:00:00:0e:1e:2a:81:e0
	21:00:00:0e:1e:2a:81:e1

9. Add group wizard

JovianDSS: **node 61**
IP Address: 192.168.0.61

In the **Targets** step please Select proper WWNs and click the **Next** button.

WWN	Alias	Mode	Type	Status
<input checked="" type="checkbox"/> 21:00:00:0e:1e:2c:dd:40	dd-40	Target	Physical	OK
<input checked="" type="checkbox"/> 21:00:00:0e:1e:2c:dd:41	dd-41	Target	Physical	OK

9. Add group wizard

JovianDSS: **node 61**
IP Address: 192.168.0.61

In the **Initiators WWN** step please select proper **Aliases** and click the **Next** button.

Add Fibre Channel group

1. Properties
2. Targets
3. Initiators WWN
5. Summary

Select WWN initiators

Search + Add initiator

Alias	WWN	Options
<input checked="" type="checkbox"/> vmhba3	21:00:00:0e:1e:2a:81:e0	Options ▾
<input checked="" type="checkbox"/> vmhba4	21:00:00:0e:1e:2a:81:e1	Options ▾

Cancel < Back Next >

9. Add group wizard

JovianDSS: **node 61**
IP Address: 192.168.0.61

In **Zvols** step please click the **Add zvol** button.

Storage

User Management

Failover Settings

Storage Settings

Backup & Recovery

System Settings

Diagnostics

Add Fibre Channel group

1. Properties

2. Targets

3. Initiators WWN

4. Zvols

5. Summary

Select Zvols

Search

Name	Type	Logical size	SCSI ID	LUN	Access mode
No zvols found.					

+ Add zvol

Cancel Back Next

Alias	WWN	Options
vmhba3	21:00:00:0e:1e:2a:81:e0	Options
vmhba4	21:00:00:0e:1e:2a:81:e1	Options

9. Add group wizard

JovianDSS: **node 61**
IP Address: 192.168.0.61

In **Add new zvol**, enter the name of a new Zvol and the appropriate size and click **Add** button.

The screenshot shows the 'Add new zvol' dialog box in the Open-E JovianDSS web interface. The dialog is titled 'Add new zvol' and contains the following fields and options:

- Name: zvol00
- Size: 1024 GIB (522.87 GIB physical available)
- Provisioning: Thin provisioned (default), Thick provisioned
- Deduplication: Disabled (default)
- Number of the data copies: 1 (default)
- Compression: lz4 (default)
- Volume block size: 128 KiB (default)
- Write cache logging (Sync): Always (default)
- Write cache logging (Log bias): Write log device (Latency)
- Primary cache: All (default)
- Secondary cache: All (default)

At the bottom of the dialog are 'Cancel' and 'Add' buttons. Red arrows point from the text boxes to the 'Name' field, the 'Size' field, and the 'Add' button.

9. Add group wizard

JovianDSS: **node 61**

IP Address: 192.168.0.61

After creating new **Zvols** click the **Next** button.

The screenshot shows the 'Add Fibre Channel group' wizard in the Open-E management interface. The wizard is at step 4, 'Zvols', where a table shows 'zvol00' selected. The 'Next' button is highlighted with a red arrow.

Name	Type	Logical size	SCSI ID	LUN	Access mode
<input checked="" type="checkbox"/> zvol00	zvol	1.00 TiB	Auto	Auto	Write-through (default)

Buttons:

9. Add group wizard

open-e

JovianDSS: **node 61**

IP Address: 192.168.0.61

In **Summary** you are able to see an overview of the configuration of the **Fibre Channel Group**. If the settings need to be modified, click the **Back** button and make the required changes. If it is correct, click **Add**.

Go to the second node and create **Fibre Channel Group** accordingly.

Add Fibre Channel group

1. Properties

WWN	Alias	Mode	Type	Status
21:00:00:0e:1e:2c:dd:40	dd-40	Target	Physical	OK
21:00:00:0e:1e:2c:dd:41	dd-41	Target	Physical	OK

2. Targets

3. Initiators WWN

4. Zvols

5. Summary

WWN Initiators

WWN	Alias
21:00:00:0e:1e:2a:81:e0	vmhba3
21:00:00:0e:1e:2a:81:e1	vmhba4

Zvols

Name	Type	Logical size	SCSI ID	LUN	Access mode
zvol00	zvol	1.00 TiB	Auto	Auto	Write-through (default)

Cancel Back Add

Alias	wwn
vmhba3	21:00:00:0e:1e:2a:81:e0
vmhba4	21:00:00:0e:1e:2a:81:e1

10. Add remote target

JovianDSS: **node 61**
IP Address: 192.168.0.61

After completion of the **Fibre Channel Group** wizard return to the **Storage**. Beside you will see the **Fibre channel targets** you are able to view and an overview of the configuration targets.

In the **Options** drop-down menu select **Properties**.

The screenshot shows the Open-E Storage management interface. The left sidebar contains navigation options: Storage, User Management, Failover Settings, Storage Settings, Backup & Recovery, System Settings, and Diagnostics. The main content area is titled 'Storage' and displays a table of initiators and a table of targets. A red arrow points from the 'Storage' menu item in the sidebar to the main content area. Another red arrow points from the 'Options' dropdown menu of the 'dd-41' target to the 'Properties' option.

Initiator alias	WWN	Options
vmhba3	21:00:00:0e:1e:2a:81:e0	Options
vmhba4	21:00:00:0e:1e:2a:81:e1	Options

Zvol	SCSI ID	LUN	Access mode	Options
zvol00	2592b0dce6b1d1d2	0	Write-through	Options

Public group — Targets: 0 — Zvols: 0 — Status: Active

Zvols available to be assigned to Fibre Channel groups

Targets and initiators assigned to this zpool

Fibre Channel targets

Target alias	WWN	Type	Status	Options
dd-40	21:00:00:0e:1e:2c:dd:40	Physical	OK	Options
dd-41	21:00:00:0e:1e:2c:dd:41	Physical	OK	Options

Fibre Channel initiators

Alias	WWN	Options
vmhba3	21:00:00:0e:1e:2a:81:e0	Options

10. Add remote target

open-e

JovianDSS: **node 61**
IP Address: 192.168.0.61

In the target properties select **Remote port** for alias **dd-40** and click the **Apply** button.

The screenshot shows the Open-E storage management interface. On the left is a navigation menu with options: Storage, User Management, Failover Settings, Storage Settings, Backup & Recovery, System Settings, and Diagnostics. The main area displays 'Storage' settings for initiator aliases 'vmhba3' and 'vmhba4', and a 'Zvol' device 'zvol00'. A modal window titled 'Edit target properties' is open, showing 'Target dd-40 properties'. The 'Target WWN' is '21:00:00:0e:1e:2c:dd:40' and the 'Alias' is 'dd-40'. The 'Remote port (mapping)' dropdown is open, showing two options: '21:00:00:0e:1e:28:c4:e0 (c4-e0)' and '21:00:00:0e:1e:28:c4:e1 (c4-e1)'. The 'Apply' button is highlighted in green. Below the dialog, a table lists 'Zvols available to be assigned to Fibre Channel groups'.

Zvol	Type	Logical size	Physical size	Compression	Provisioning	Options
zvol00	zvol	1.00 TiB	56.00 KiB	1.00	thin	Options

10. Add remote target

JovianDSS: **node 61**
IP Address: 192.168.0.61

Next, in this step select **Remote port** for the second target for the alias **dd-41**. Next, click the **Apply** button.

Zvol	Type	Logical size	Physical size	Compression	Provisioning	Options
zvol00	zvol	1.00 TiB	56.00 KiB	1.00	thin	Options

11. Rescan adapters



ESX host
IP Address: 192.168.0.51

In **Storage Adapters**, you can check the connection of both remote ports for rescan.

Summary Monitor **Configure** Permissions VMs Resource Pools Datastores Networks Updates

Storage Adapters

+ Add Software Adapter Refresh Rescan Storage... Rescan Adapter

Adapter	Type	Status	Rescans all storage adapters on the host to discover newly added storage devices and/or VMFS volumes.			
Model: 2600 Series 16Gb Fibre Channel to PCI Express HBA						
vmhba3	Fibre Channel	Online	20:00:00:0e:1e:2a:81:e0 21:00:00:0e:1e:2a:81:e0	4	1	4
vmhba4	Fibre Channel	Online	20:00:00:0e:1e:2a:81:e1 21:00:00:0e:1e:2a:81:e1	4	1	4
Model: Fusion-MPT 12GSAS SAS3008 PCI-Express						
vmhba2	SAS	Unknown	--	1	1	1
Model: Patsburg 6 Port SATA AHCI Controller						

12. Check adapters after rescan



ESX host
IP Address: 192.168.0.51

After the rescan, the new device
(SCST_FIO) is listed below.

Storage Adapters

Adapter	Type	Status	Identifier	Targets	Devic...	Paths
Model: 2600 Series 16Gb Fibre Channel to PCI Express HBA						
vmhba3	Fibre Channel	Online	20:00:00:0e:1e:2a:81:e0 21:00:00:0e:1e:2a:81:e0	4	1	4
vmhba4	Fibre Channel	Online	20:00:00:0e:1e:2a:81:e1 21:00:00:0e:1e:2a:81:e1	4	1	4
Model: Fusion-MPT 12GSAS SAS3008 PCI-Express						
vmhba2	SAS	Unknown	--	1	1	1
Model: Patsburg 6 Port SATA AHCI Controller						

Properties | **Devices** | Paths

Name	LUN	Type	Capacity	Datastore	Hardware Accelera...	Drive T...	Transport
SCST_FIO Fibre Channel Disk (eui.32353...)	0	disk	1.00 TB	Not Consumed	Supported	HDD	Fibre Channel

13. Edit multipath



ESX host
IP Address: 192.168.0.51

Next, go to **Storage Devices** and please click **Edit Multipath**.

Summary Monitor **Configure** Permissions VMs Resource Pools Datastores Networks Updates

Storage
Storage Adapters
Storage Devices
Host Cache Configur.
Protocol Endpoints
I/O Filters
Networking
Virtual switches
VMkernel adapters
Physical adapters
TCP/IP configuration
Virtual Machines
VM Startup/Shutdo...
Agent VM Settings
Default VM Compati..
Swap File Location
System
Licensing
Host Profile
Time Configuration
Authentication Servi..
Certificate
Power Management
Advanced system s..
System Resource Re..

Storage Devices

Refresh Attach Detach Rename... Turn On LED Turn Off LED Erase Partitions... Mark as Flash Disk Mark as Local

Name	L...	Type	Capacity	Datastore	Operational S...	Hardware Accel...	
Local Intel Enclosure Svc Dev (naa.5001e6734f...	0	enclos...			Not Consumed	Attached	Not supported
SCST_FIO Fibre Channel Disk (eui.323539326...	0	disk	1.00 TB		Not Consumed	Attached	Supported
Local ATA Disk (t10.ATA_____INTEL_SSDSC2B...	0	disk	93.16 GB	datastore1		Attached	Not supported

Copy All 3 items

Properties

General Paths Partition Details

Property	Value
Name	SCST_FIO Fibre Channel Disk (eui.3235393262306463)
Identifier	eui.3235393262306463
Type	disk
Location	/vmfs/devices/disks/eui.3235393262306463
Capacity	1.00 TB
Drive Type	HDD
Hardware Acceleration	Supported
Transport	Fibre Channel
Owner	NMP
Sector Format	512e
Path Selection Policy	Most Recently Used (VMware)
Storage Array Type Policy	VMW_SATP_DEFAULT_AP

[Edit Multipathing...](#)

13. Edit multipath



ESX host
IP Address: 192.168.0.51

In Edit Multipathing Policies select
Round Robin (VMware) and click the
OK button.

Summary Monitor **Configure** Permissions VMs Resource Pools Datastores Networks Updates

Storage Devices

Local Intel Enclosure Svc Dev (naa.5001e6734f... 0 encios... Not Consumed Attached Not supported

Local Intel Enclosure Svc Dev (naa.5001e6734f... 0 encios... Not Consumed Attached Supported

Local Intel Enclosure Svc Dev (naa.5001e6734f... 0 encios... Not Consumed Attached Not supported

Copy All 3 items

Copy All 8 items

CANCEL OK

System Resource Re... Path Selection Policy Most Recently Used (VMware)
Firewall Storage Array Type Policy VMW_SATP_DEFAULT_AP

Runtime Name	Status	Target	LUN	Preferred
vmhba4:C0:T0:L0	Standby	20:00:00:0e:1e:28:c4:e0 21:00:00:...	0	
vmhba3:C0:T1:L0	Active	20:00:00:0e:1e:2c:dd:40 21:00:00:...	0	
vmhba3:C0:T0:L0	Standby	20:00:00:0e:1e:28:c4:e0 21:00:00:...	0	
vmhba4:C0:T3:L0	Standby	20:00:00:0e:1e:28:c4:e1 21:00:00:...	0	

14. Path check



ESX host
IP Address: 192.168.0.51

Then, in **Storage Devices**, there should be 4 active and 4 passive paths listed.

The first initiator port “sees” 2 active target ports and the second initiator “sees” also the same 2 active targets. Similarly with standby paths.

The first initiator port “sees” 2 passive target ports and the second initiator “sees” also the same 2 passive targets.

The screenshot shows the 'Storage Devices' configuration page. The left sidebar lists various system components, with 'Storage Devices' selected. The main area displays a table of storage devices:

Name	L...	Type	Capacity	Datastore	Operational S...	Hardware Accele	
Local Intel Enclosure Svc Dev (naa.5001e6734f...	0	enclos...			Not Consumed	Attached	Not supported
SCST_FIO Fibre Channel Disk (eui.323539326...	0	disk	1.00 TB		Not Consumed	Attached	Supported
Local ATA Disk (t10.ATA____INTEL_SSDSC2B...	0	disk	93.16 GB	datastore1		Attached	Not supported

Below the table, the 'Paths' tab is active, showing a list of paths:

Runtime Name	Status	Target	Name
vmhba4:C0:T2:L0	Active (I/O)	20:00:00:0e:1e:2c:dd:41 21:00:00:0e:1e:2c:dd:41	vmhba4:C0:T2:L0
vmhba3:C0:T2:L0	Active (I/O)	20:00:00:0e:1e:2c:dd:41 21:00:00:0e:1e:2c:dd:41	vmhba3:C0:T2:L0
vmhba3:C0:T1:L0	Active (I/O)	20:00:00:0e:1e:2c:dd:40 21:00:00:0e:1e:2c:dd:40	vmhba3:C0:T1:L0
vmhba4:C0:T1:L0	Active (I/O)	20:00:00:0e:1e:2c:dd:40 21:00:00:0e:1e:2c:dd:40	vmhba4:C0:T1:L0
vmhba4:C0:T3:L0	Standby	20:00:00:0e:1e:28:c4:e1 21:00:00:0e:1e:28:c4:e1	vmhba4:C0:T3:L0
vmhba3:C0:T3:L0	Standby	20:00:00:0e:1e:28:c4:e1 21:00:00:0e:1e:28:c4:e1	vmhba3:C0:T3:L0
vmhba4:C0:T0:L0	Standby	20:00:00:0e:1e:28:c4:e0 21:00:00:0e:1e:28:c4:e0	vmhba4:C0:T0:L0
vmhba3:C0:T0:L0	Standby	20:00:00:0e:1e:28:c4:e0 21:00:00:0e:1e:28:c4:e0	vmhba3:C0:T0:L0

15. Move cluster

open-e

JovianDSS: node 61

IP Address: 192.168.0.61

Go to the main menu **Storage**. Now, in order to test failover, in the **Options** drop-down menu select **Move**.

The pool will be exported on the current node and will be imported on the second node.

The screenshot displays the Open-E JovianDSS Storage management interface. The left sidebar shows the navigation menu with 'Storage' selected. The main content area shows the configuration for 'Pool-0', which is in an 'ONLINE' state. A status message indicates 'Zpool is functioning correctly. None required.' The 'Options' dropdown menu is open, showing options: 'Delete Zpool', 'Export Zpool', 'Clear error counters', and 'Move'. A red arrow points from the 'Options' menu to the 'Move' option. Below the pool information, the 'Fibre Channel groups' section is visible, showing 'Group1' with 2 targets and 1 zvol. A table lists the targets and initiators with their WWN, Type, Status, and Options.

Target alias	WWN	Type	Status	Options
dd-40	21:00:00:0e:1e:2c:dd:40	Physical	OK	Options
dd-41	21:00:00:0e:1e:2c:dd:41	Physical	OK	Options

Initiator alias	WWN	Options
vmhba3	21:00:00:0e:1e:2a:81:e0	Options
vmhba4	21:00:00:0e:1e:2a:81:e1	Options

15. Move cluster

JovianDSS: **node 61**
IP Address: 192.168.0.61

After moving, the pool is active on the node-7.

The screenshot shows the 'Storage' management page. The left sidebar contains navigation options: Storage, User Management, Failover Settings, Storage Settings, Backup & Recovery, System Settings, and Diagnostics. The main content area shows a message: 'No local zpools have been found on the system. To create a zpool on this node please select an "Add zpool" button.' Below this, a pool is listed with the status 'Active on node node-71' and a 'Move to this node' button. The pool details show 'Status: ONLINE' and 'Zpool ID: 12199181236699342582'. A message below the pool states 'Zpool is ready to import. Action: None required.' At the bottom, there is a section for 'Zpools available for import' with a message: 'No external zpools available for the import have been found.'

16. Cluster check after test move



ESX host
IP Address: 192.168.0.51

Now, In **Paths** we see the active-standby paths swapped.
(rescan or refresh on vCenter GUI may be required)

Summary Monitor **Configure** Permissions VMs Resource Pools Datastores Networks Updates

Storage Devices

Refresh Attach Detach Rename... Turn On LED Turn Off LED Erase Partitions... Mark as Flash Disk Mark as Local

Name	L.	Type	Capacity	Datastore	Operational S.	Hardware Accele	
Local Intel Enclosure Svc Dev (naa.5001e6734f...	0	enclos...			Not Consumed	Attached	Not supported
SCST_FIO Fibre Channel Disk (eui.323539326...	0	disk	1.00 TB		Not Consumed	Attached	Supported
Local ATA Disk (t10.ATA_____INTEL_SSDSC2B...	0	disk	93.16 GB	datstore1		Attached	Unknown

Properties Paths Partition Details

Enable Disable

Runtime Name	Status	Target	Name
vmhba4:C0:T2:L0	Standby	20:00:00:0e:1e:2c:dd:41 21:00:00:0e:1e:2c:dd:41	vmhba4:C0:T2:L0
vmhba3:C0:T2:L0	Standby	20:00:00:0e:1e:2c:dd:41 21:00:00:0e:1e:2c:dd:41	vmhba3:C0:T2:L0
vmhba3:C0:T1:L0	Standby	20:00:00:0e:1e:2c:dd:40 21:00:00:0e:1e:2c:dd:40	vmhba3:C0:T1:L0
vmhba4:C0:T1:L0	Standby	20:00:00:0e:1e:2c:dd:40 21:00:00:0e:1e:2c:dd:40	vmhba4:C0:T1:L0
vmhba4:C0:T3:L0	Active (I/O)	20:00:00:0e:1e:28:c4:e1 21:00:00:0e:1e:28:c4:e1	vmhba4:C0:T3:L0
vmhba3:C0:T3:L0	Active (I/O)	20:00:00:0e:1e:28:c4:e1 21:00:00:0e:1e:28:c4:e1	vmhba3:C0:T3:L0
vmhba4:C0:T0:L0	Active (I/O)	20:00:00:0e:1e:28:c4:e0 21:00:00:0e:1e:28:c4:e0	vmhba4:C0:T0:L0
vmhba3:C0:T0:L0	Active (I/O)	20:00:00:0e:1e:28:c4:e0 21:00:00:0e:1e:28:c4:e0	vmhba3:C0:T0:L0

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Thank You!
