

**Step-by-Step Guide to
Synchronous
Volume Replication
(Block Based)
with Failover over a LAN
Supported by Open-E® DSS™**



Synchronous Volume Replication with Failover over a LAN *open-e*

	Replication Mode		Source/Destination			Data Transfer		Volume Type			
	Synchronous	Asynchronous	w/ System	LAN	WAN	File based	Block based	NAS	iSCSI		FC
									File-IO	Block-IO	
Synchronous Volume Replication with Failover over a LAN	✓			✓			✓			✓	

- **Open-E DSS Synchronous Volume Replication with Failover** is a fault tolerance process via iSCSI volume replication, that creates mirrored target data volumes.
 - Data is copied in real-time, and every change is immediately mirrored from the primary server to the secondary storage server.
 - In case of a failure, scheduled maintenance of the primary server, or loss of the primary data source, failover automatically switches operations to the secondary storage server, so processes can be continued as usual.

Synchronous **Volume Replication with Failover** over a LAN *open-e*

VOLUME REPLICATION WITH FAILOVER BETWEEN TWO SYSTEMS WITHIN ONE LAN

■ **Recommended Resources**

- Key Hardware (two systems)
 - ✓ x86 compatible
 - ✓ RAID Controller with **Batery Backup Unit**
 - ✓ HDD's
 - ✓ Network Interface Cards
 - ✓ Ping Node (ping node it is any permanently (24/7) available host in the network. In particular case the ping node function can be performed by the server storing the data on the iSCSI failover volume).
- Software
 - ✓ Open-E DSS, 2 units

■ **Benefits**

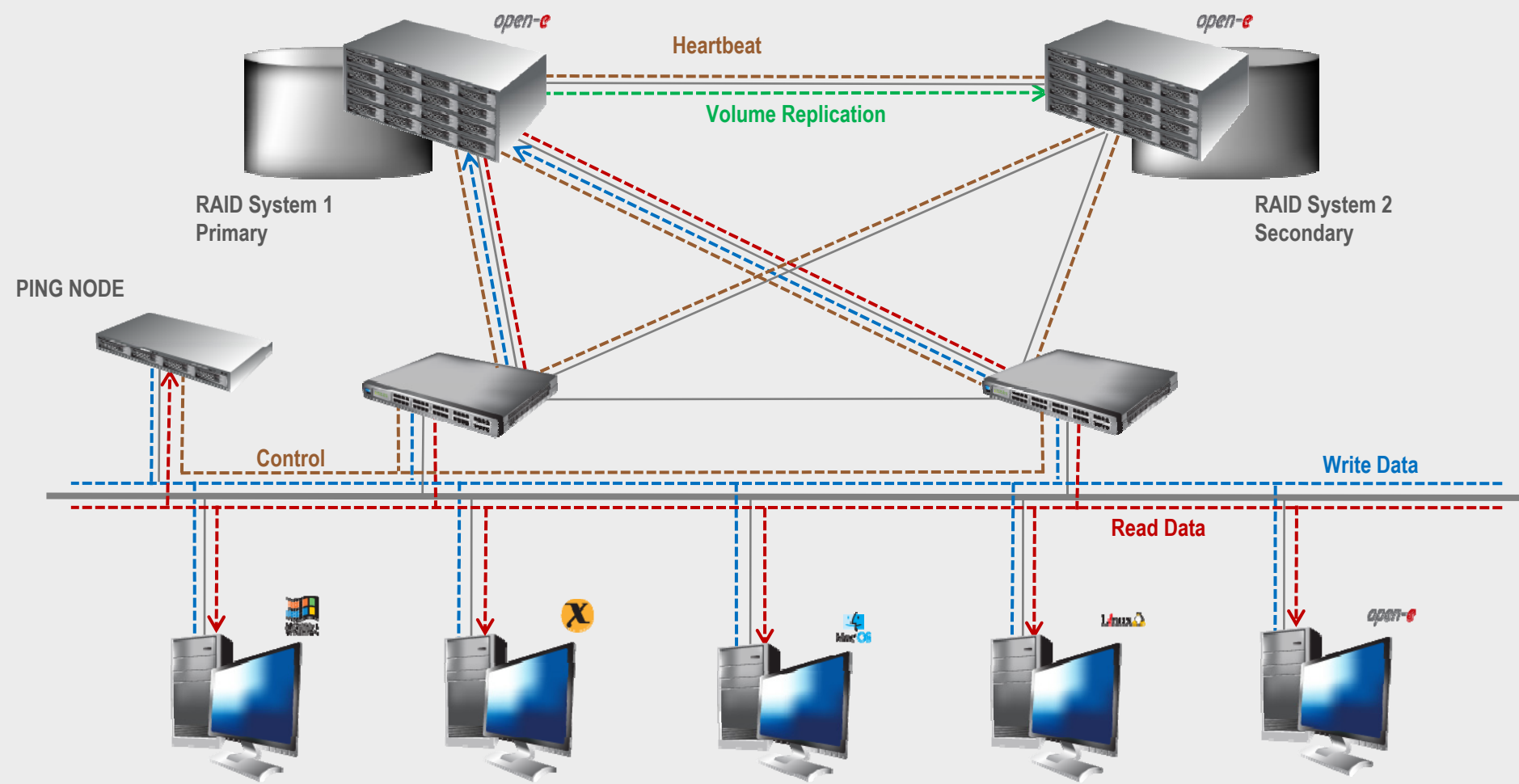
- Eliminate business disruption
- Data Redundancy over a LAN
- Switch Redundancy

■ **Disadvantages**

- High cost of solution
- Natural disasters (earthquake, fire, flood...) can destroy local systems

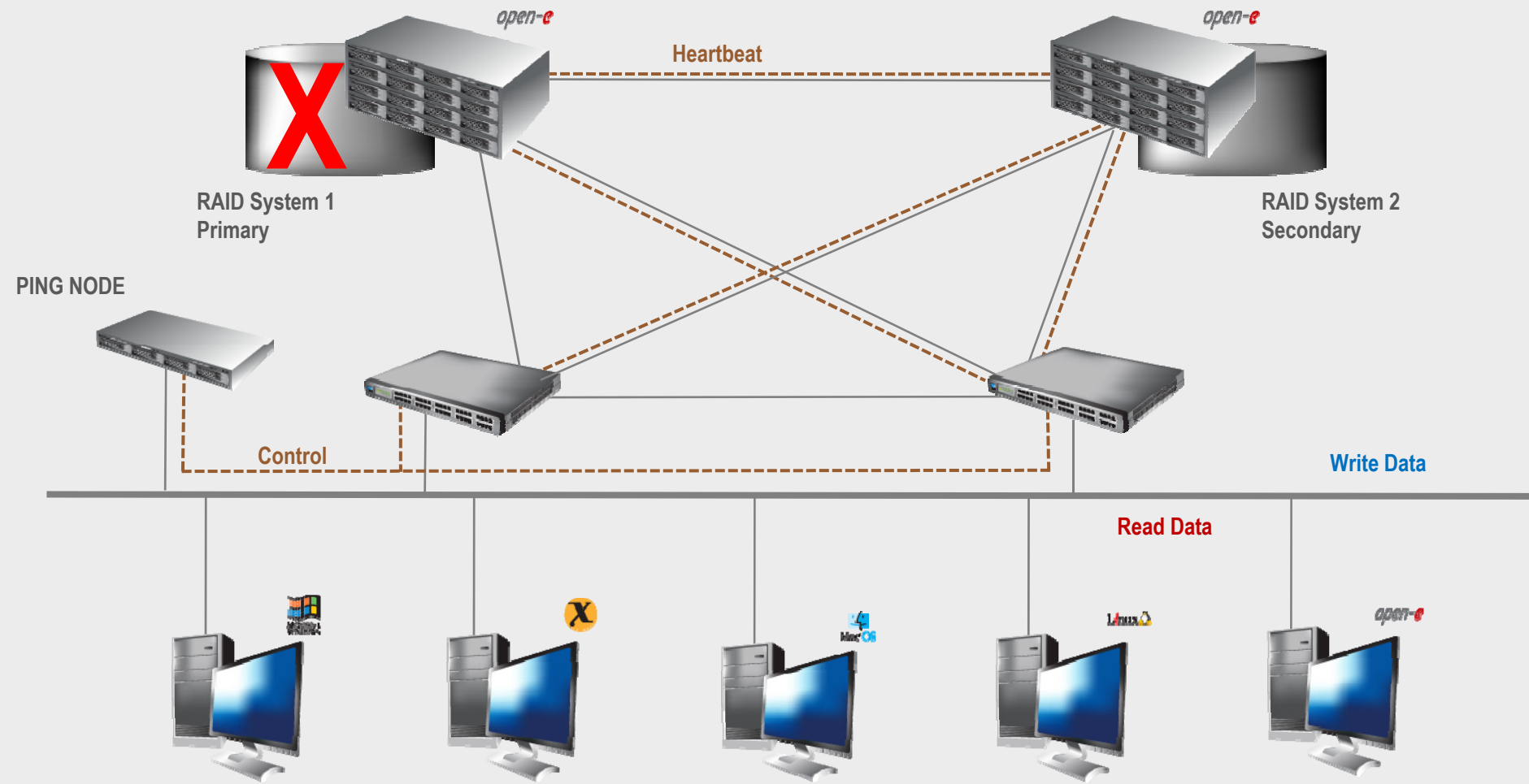
Synchronous Volume Replication with Failover over a LAN *open-e*

- Data is written and read to System 1 (primary)
- Data is continually replicated to System 2 (secondary)



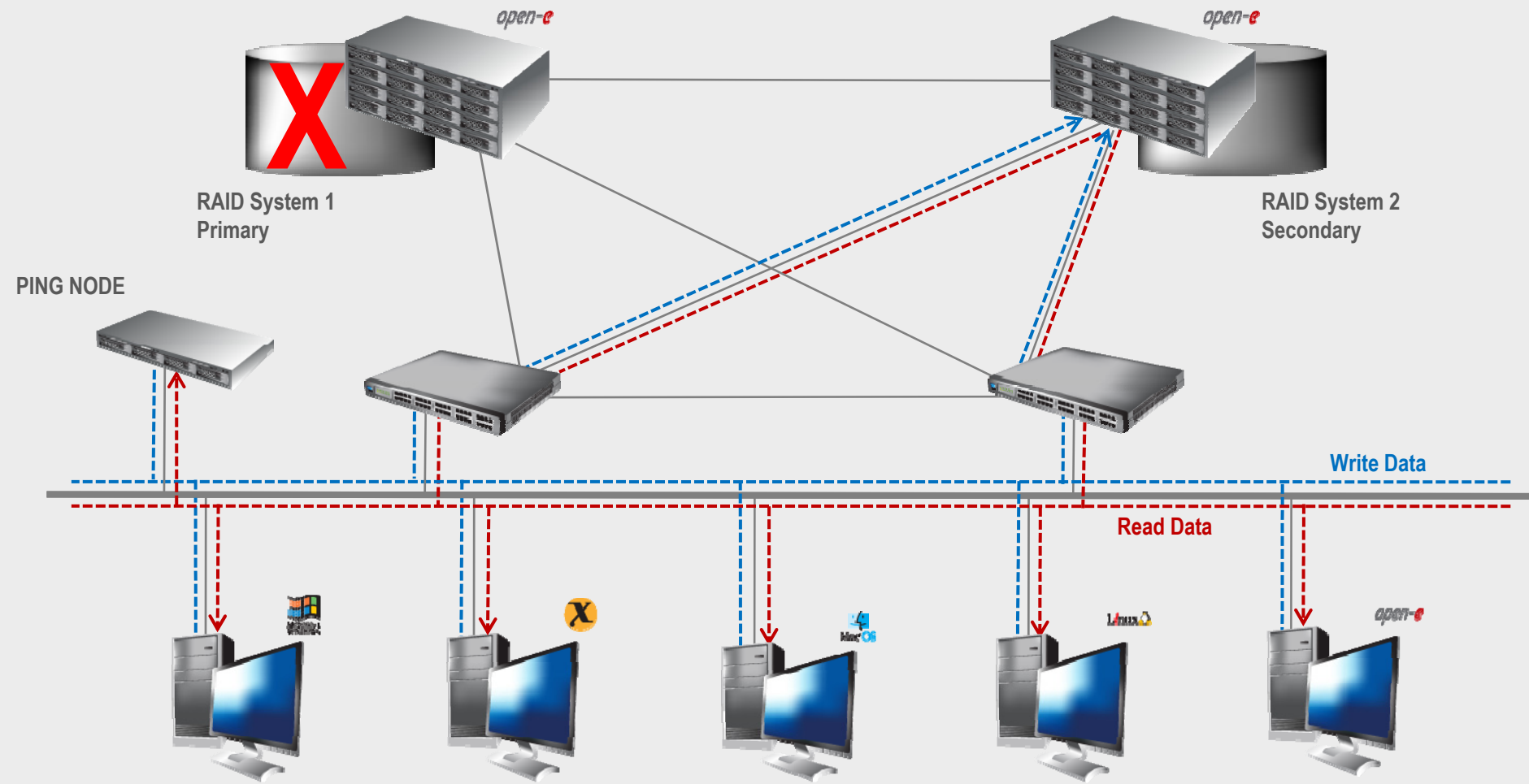
Synchronous Volume Replication with Failover over a LAN *open-e*

- In case of raid array or disk drive error on System 1(primary), the server will send an e-mail notification to the administrator
- iSCSI Auto Failover determines there is no connection between the servers
- After a few seconds Automatic Failover is executed and users are switched to System 2 (secondary)



Synchronous Volume Replication with Failover over a LAN *open-e*

- After switching, the replicated volume is available on System 2 (secondary)



Synchronous **Volume Replication with Failover** over a LAN *open-e*

TO SET UP VOLUME REPLICATION WITH FAILOVER, PERFORM THE FOLLOWING STEPS:

1. Hardware configuration
2. Configure the Secondary node
 - Create a Volume Group, iSCSI Volume
 - Configure Volume Replication mode (destination mode) – settings mirror IP address
3. Configure the Primary node
 - Create a Volume Group, iSCSI Volume
 - Configure Volume Replication mode (source mode) – settings mirror IP address, creating Volume Replication task and start replication task.
4. Create new target on Secondary node
5. Create new target on Primary node
6. Configure virtual IP and Auxiliary connection
7. Configure iSCSI Failover
8. Start Failover Service
9. Test Failover Function
10. Run Failback Function

Synchronous Volume Replication with Failover over a LAN *open-e*

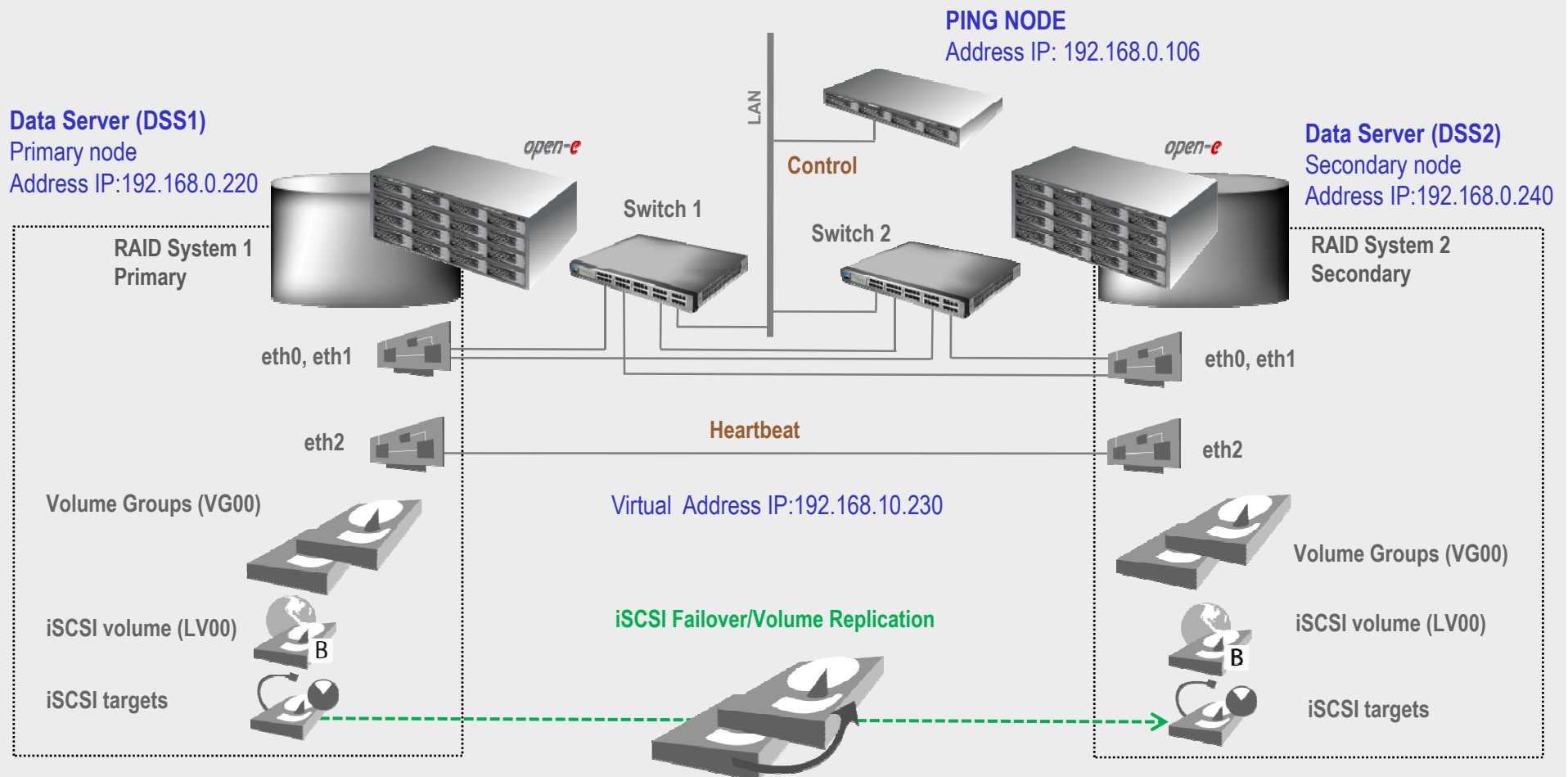
1. Hardware Configuration

Hardware Requirements:

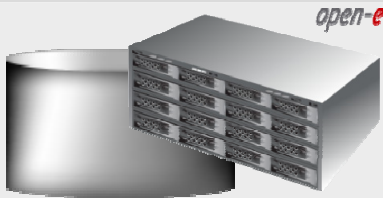
To run the Volume Replication with Failover, two DSS systems are required.

Both servers must be located and working in the Local Area Network.

See below for the example configuration :



Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

2. Configure the Secondary node

Under the „CONFIGURATION” tab, select „volume manager”



Volume Groups (vg00)

Add the selected physical units (Unit S001 or other) to create a new volume group (in this case, vg00) and click **apply** button

The screenshot shows the open-e DSS web interface. The top navigation bar includes 'logout', 'DSS', 'DATA STORAGE SERVER', and 'open-e'. Below this are tabs for 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. Under the 'CONFIGURATION' tab, there are sub-tabs for 'volume manager', 'NAS settings', 'NAS resources', 'iSCSI target manager', and 'FC target manager'. The 'volume manager' sub-tab is active, showing a 'Vol. groups' section with a search icon and a 'Vol. replication' section with a search icon. On the right, there are sections for 'Unit rescan' (with a 'rescan' button), 'Unit manager' (with a table of units), and 'Drive identifier' (with a table of units). The 'Unit manager' table has the following data:

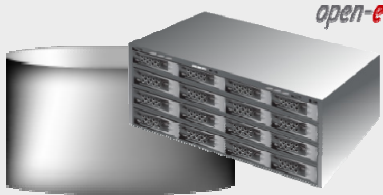
Unit	Size (GB)	Serial number	Status
Unit S001	230.08	N/A	available

Below the table, there is an 'Action:' dropdown menu set to 'new volume group' and a 'Name:' text input field containing 'vg00'. An 'apply' button is located below these fields. The 'Drive identifier' table has the following data:

Unit	Serial number	Status
Unit S001	N/A	

At the bottom of the interface, there is an 'Event Viewer' field and a footer that reads 'Data Storage Server. All rights reserved'.

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

2. Configure the Secondary node

Select the appropriate volume group (**vg00**) from the list on the left and create a **new iSCSI volume** of the required size. This logical volume will be the destination of the replication process.

Next check the box with **Use volume replication**

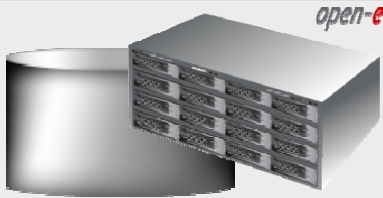
After assigning an appropriate amount of space for the iSCSI volume, click the **apply** button

The screenshot shows the 'DATA STORAGE SERVER' web interface. The 'CONFIGURATION' tab is active, and the 'volume manager' sub-tab is selected. On the left, under 'Vol. groups', the 'vg00' group is selected. Below that, the 'Vol. replication' sub-tab is active. The main area shows the configuration for a new iSCSI volume within the 'vg00' group. The 'Volume manager' section includes a table of system volumes:

System volumes	Size (GB)
Reserved Pool	4.00
Reserved for snapshots	0.00
Reserved for system	1.00
Reserved for replication	0.00
Free	225.03

The configuration options are: Action: 'new iSCSI volume', options: 'Just create volume'. The 'Use volume replication' checkbox is checked. Under 'File I/O', 'Initialize' is checked. Under 'Block I/O', 'Block I/O' is selected. A slider shows the volume size set to 10.00 GB, with a note '(+0.12 GB for replication)'. The 'apply' button is highlighted.

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

2. Configure the Secondary node

The destination iSCSI Volume Block I/O is now configured.



iSCSI volume (lv0000)

logout **DSS** DATA STORAGE SERVER *open-e*

SETUP **CONFIGURATION** MAINTENANCE STATUS HELP

volume manager NAS settings NAS resources iSCSI target manager FC target manager

Vol. groups

vg00

Volume group: vg00

Volume manager

Logical Volume	Type	Snap.	Rep.	Init.	Blocksize (bytes)	Size (GB)
lv0000	B		✓		N/A	10.00
System volumes						
Reserved Pool						4.00
Reserved for snapshots						0.00
Reserved for system						1.00
Reserved for replication						0.13
Free						214.91

Action: new NAS volume

Use volume replication

WORM

0 214.91

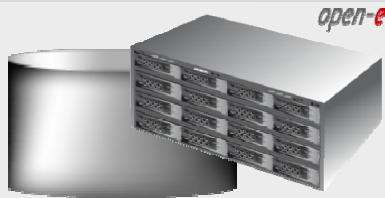
add: 0.00 GB

apply

Event Viewer:

Data Storage Server. All rights reserved

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

2. Configure the Secondary node

Now, select the **Vol. replication** and check the box under **Destination** and click the **apply** button

Next, under **Mirror Server IP** function, enter the IP address of the Primary node (in our example, this would be 192.168.0.220) and click the **apply** button

logout **DSS** DATA STORAGE SERVER *open-e*

SETUP CONFIGURATION MAINTENANCE STATUS HELP

software license about Data Storage Server

Vol. groups

vg00

Vol. replication

Volume replication mode

Logical Volume	Init	Source	Destination	Clear metadata
lv0000	done		<input checked="" type="checkbox"/>	<input type="checkbox"/>

apply

Mirror server IP

IP address: 192.168.0.220

WAN:

apply

Create new volume replication task

Info
No volumes with replication functionality found or all volumes have a task assigned already.

Event Viewer: [x]

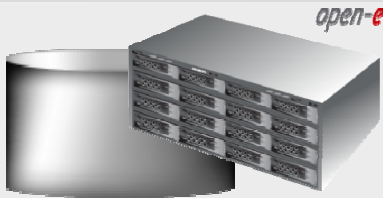
Data Storage Server. All rights reserved

NOTE:

The Mirror server IP Address must be on the same subnet in order for the replication to communicate. VPN connections can work providing you are not using a NAT. Please follow example:

- Source: 192.168.0.220
- Destination: 192.168.0.240

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

3. Configure the Primary node

Under the „CONFIGURATION” tab, select „volume manager”

Add the selected physical units (Unit MD0 or other) to create a new volume group (in this case, vg00) and click **apply** button

The screenshot shows the open-e DSS web interface. The main navigation bar includes 'logout', 'DSS', 'DATA STORAGE SERVER', and 'open-e'. Below this are tabs for 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. Under the 'CONFIGURATION' tab, there are sub-tabs for 'volume manager', 'NAS settings', 'NAS resources', 'iSCSI target manager', and 'FC target manager'. The 'volume manager' sub-tab is selected, showing a 'Vol. groups' section with a search icon and a question mark. Below this is a 'Vol. replication' section. On the right side, there are three main sections: 'Unit rescan' with a 'rescan' button, 'Unit manager' with a table of units and an 'apply' button, and 'Drive identifier' with another table. The 'Unit manager' table has the following data:

Unit	Size (GB)	Serial number	Status
Unit MD0	465.77	N/A	available

The 'Action' dropdown is set to 'new volume group' and the 'Name' field contains 'vg00'. The 'Drive identifier' table has the following data:

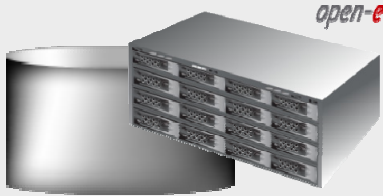
Unit	Serial number	Status
Unit S000	Y636PANE	

At the bottom of the interface, there is an 'Event Viewer' field and a footer that reads 'Data Storage Server. All rights reserved'.



Volume Groups (vg00)

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

3. Configure the Primary node

Select the appropriate volume group (**vg00**) from the list on the left and create a **new iSCSI volume** of the required size. This logical volume will be the destination of the replication process

Next, check box **Use volume replication**

After assigning an appropriate amount of space for the iSCSI volume, click the **apply** button

The screenshot shows the 'DSS DATA STORAGE SERVER' web interface. The 'CONFIGURATION' tab is active, and the 'volume manager' sub-tab is selected. On the left, the 'Vol. groups' list shows 'vg00' selected. Below it, the 'Vol. replication' section has the 'Use volume replication' checkbox checked. In the main configuration area, the 'Volume group' is set to 'vg00'. The 'Volume manager' section shows a table of system volumes:

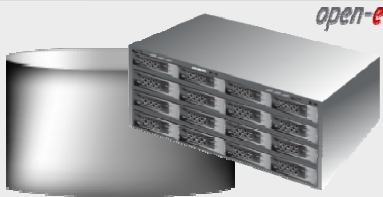
System volumes	Size (GB)
Reserved Pool	4.00
Reserved for snapshots	0.00
Reserved for system	1.00
Reserved for replication	0.00
Free	460.72

Below the table, the 'Action' dropdown is set to 'new iSCSI volume' and the 'Options' dropdown is set to 'Just create volume'. The 'File I/O' radio button is selected, and the 'Initialize' checkbox is checked. A slider for volume size is set to 10.00 GB, with a note '(+0.12 GB for replication)'. The 'apply' button is highlighted in orange.

NOTE:

The source and destination volumes must be of identical size.

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

3. Configure the Primary node

The destination iSCSI Volume Block I/O is now configured.



iSCSI volume (lv0000)

Volume group: vg00

Logical Volume	Type	Snap.	Rep.	Init.	Blocksize (bytes)	Size (GB)
lv0000	B		✓		N/A	10.00
System volumes						Size (GB)
Reserved Pool						4.00
Reserved for snapshots						0.00
Reserved for system						1.00
Reserved for replication						0.13
Free						450.59

Action: new NAS volume

Use volume replication
 WORM

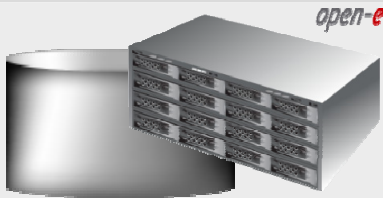
add: 0.00 GB

apply

Event Viewer: [icon]

Data Storage Server. All rights reserved

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

3. Configure the Primary node

Now, select **Vol. replication**, and check the box under **Destination** and click the **apply** button

Next , under **Mirror Server IP** function, enter the IP address of the Secondary node (in our example this would be 192.168.0.240) and click the **apply** button

The screenshot shows the 'DATA STORAGE SERVER' web interface. The 'CONFIGURATION' tab is active, and the 'Vol. replication' sub-tab is selected. A table lists logical volumes, with 'lv0000' having 'done' in the 'Init' column and a checked box in the 'Destination' column. Below the table, the 'Mirror server IP' section has the IP address '192.168.0.240' entered in the 'IP address' field. The 'Create new volume replication task' section is also visible, with 'lv0000' selected as the source volume.

Logical Volume	Init	Source	Destination	Clear metadata
lv0000	done	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

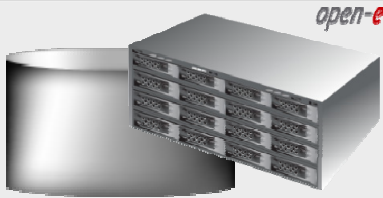
Mirror server IP

IP address: 192.168.0.240
WAN:

Create new volume replication task


Task name:
Source volume: lv0000
Destination volume:
Bandwidth for SyncSource (MB): 40
Asynchronous protocol:

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

3. Configure the Primary node

Enter the task name in field **Task name** next click on the button 

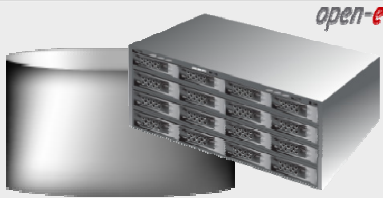
In the **Destination volume** field select the appropriate volume (in this example, **lv0000**) and click **create** to confirm

The screenshot shows the 'DSS DATA STORAGE SERVER' web interface. The 'CONFIGURATION' tab is active, and the 'volume manager' sub-tab is selected. On the left, a tree view shows 'Vol. groups' containing 'vg00' and 'Vol. replication'. The main area is titled 'Mirror server IP' and contains the following fields:

- Mirror server IP:** IP address: 192.168.0.240, WAN:
- Create new volume replication task:** Task name: Task-01 (with an arrow button), Source volume: lv0000, Destination volume: lv0000, Bandwidth for SyncSource (MB): 40, Asynchronous protocol:


Buttons for 'apply' and 'create' are visible. At the bottom, there is an 'Event Viewer' section with an information icon and the text 'Info No tasks have been found.' The footer of the interface reads 'Data Storage Server. All rights reserved.'

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

3. Configure the Primary node

Now, in the **Replication task manager** function, click on  button under to start the Replication task on the Primary node

logout **DSS** DATA STORAGE SERVER *open-e*

SETUP **CONFIGURATION** MAINTENANCE STATUS HELP

volume manager NAS settings NAS resources iSCSI target manager FC target manager

Vol. groups

- vg00

Vol. replication

- Task-01

Mirror server IP




IP address: 192.168.0.240

WAN:

Create new volume replication task

Info: No volumes with replication functionality found or all volumes have a task assigned already.

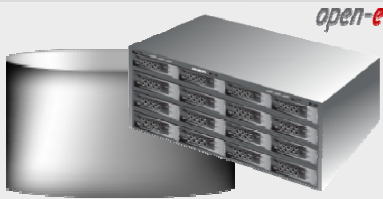
Replication tasks manager

Name	Start time	Action
Task-01	n/a	  

Event Viewer:

Data Storage Server. All rights reserved

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

3. Configure the Primary node

In the **Replication tasks manager** function information is available about the current running replication task

The screenshot shows the open-e Data Storage Server (DSS) web interface. The main navigation bar includes 'logout', 'DSS', 'DATA STORAGE SERVER', and 'open-e'. Below this are tabs for 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. A secondary navigation bar contains 'volume manager', 'NAS settings', 'NAS resources', 'iSCSI target manager', and 'FC target manager'. The left sidebar shows a tree view with 'Vol. groups' (containing 'vg00') and 'Vol. replication' (containing 'Task-01'). The main content area is divided into several sections: 'Mirror server IP' with a text input field containing '192.168.0.240' and a 'WAN' checkbox; 'Create new volume replication task' with an information icon and a message: 'No volumes with replication functionality found or all volumes have a task assigned already.'; and 'Replication tasks manager' which displays a table of running tasks.

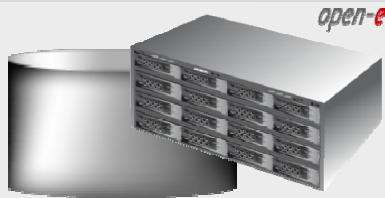
Name	Start time	Action
Task-01	2009-03-27 23:26:30	[Play] [Stop] [Close]

Below the table, the following details are shown for Task-01:

- Source volume: lv0000
- Destination volume: lv0000
- Destination IP: 192.168.0.240
- Protocol type: Synchronous

The footer of the interface reads 'Data Storage Server. All rights reserved'.


Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

3. Configure the Primary node

Under the „STATUS” tab,
select „tasks” and Volume
Replication

Click on the  button with
task name (in this case
Task-01) to display detailed
information on the current
replication task

Tasks: Volume Replication

Name	Type	Start time
Task-01	Volume replication	2009-03-27 23:26:30

Protocol type: Synchronous
Connection: Connected

Source info:
Logical volume: lv0000
Consistency: Consistent

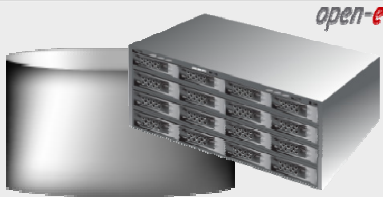
Destination info:
Logical volume: lv0000
Consistency: Consistent
IP address: 192.168.0.240

Time	Name	Type	Status	Action
2009-03-27 23:26:39	Task-01	Volume replication	OK	Started

NOTE:

Please allow the replication task to complete similar to above with status being “Consistent” before writing to the iSCSI Logical Volume.

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

4. Create new target on the Secondary node

Choose „CONFIGURATION” and „iSCSI target manager” from the menu

In the Create new target function, uncheck the box Target Default Name, and enter a name for the new target in the Name field and click **apply** to confirm

logout **DSS** DATA STORAGE SERVER *open-e*

SETUP **CONFIGURATION** MAINTENANCE STATUS HELP

volume manager NAS settings NAS resources **iSCSI target manager** FC target manager

Targets

Create new target

Target Default Name

Name: mytarget

Alias: target0

apply

CHAP user target access

Enable CHAP user access authentication

apply

Event Viewer: [x]

Data Storage Server. All rights reserved

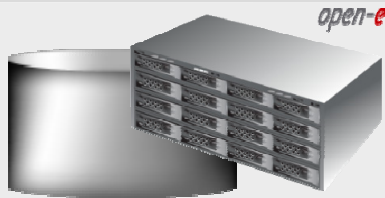
iSCSI targets



NOTE:

Both systems must have the same Target name.

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

4. Create new target on the Secondary node

Select target0 within the Targets field.

To assign a volume to the target, click the + button located under Action

The screenshot shows the 'iSCSI target manager' configuration page for a target named 'mytarget'. The 'Targets' field on the left contains 'target0'. The 'Action' column of the volume table has a green plus button. An info message is displayed above the volume table.

Volume	Scsi id	LUN	RO	WB	Action
lv0000	MQ4q1YoeY3R9Pj4v	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="button" value="+"/>

Volume replication: Destination
Size (GB): 10.00

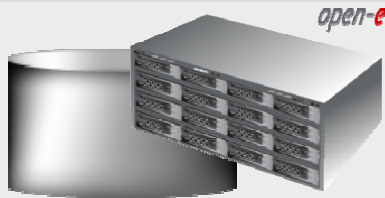
NOTE:

Both systems must have the same SCSI field name.

WARNING:

Please do not switch on the write back (WB) cache !

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

5. Create new target on the Primary node

Choose „CONFIGURATION” and „iSCSI target manager” from the menu

In the Create new target function, uncheck the box Target Default Name, and enter a name for the new target in the Name field and click **apply** to confirm

logout **DSS** DATA STORAGE SERVER *open-e*

SETUP **CONFIGURATION** MAINTENANCE STATUS HELP

volume manager NAS settings NAS resources **iSCSI target manager** FC target manager

Targets

? Create new target

Target Default Name

Name: mytarget

Alias: target0

apply

? CHAP user target access

Enable CHAP user access authentication

apply

Event Viewer: []

Data Storage Server. All rights reserved

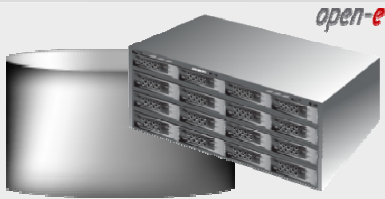
iSCSI targets



NOTE:

Both systems must have the same Target name.

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

5. Create new target on the Primary node

Select the target0 within the Targets field

To assign a volume to the target, click the button **+** located under **Action**

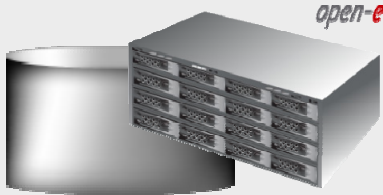
The screenshot shows the open-e DSS web interface. The top navigation bar includes 'logout', 'DSS', 'DATA STORAGE SERVER', and 'open-e'. Below this are tabs for 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. Under 'CONFIGURATION', there are sub-tabs for 'volume manager', 'NAS settings', 'NAS resources', 'iSCSI target manager', and 'FC target manager'. The 'iSCSI target manager' tab is active, showing a 'Target: mytarget' field. Below this is a 'Target volume manager' section with a table of volumes. The table has columns for 'Volume', 'Scsi id', 'LUN', 'RO', 'WB', and 'Action'. The first row shows 'lv0000', 'MQ4q1YoeY3R9Pj4v', '0', and checkboxes for 'RO' and 'WB'. A green '+' button is in the 'Action' column. Below the table is a 'CHAP user target access' section with a checkbox for 'Enable CHAP user access authentication' and an 'apply' button. At the bottom, there is a 'Target IP access' section with 'Deny access:' and 'Allow access:' fields. An 'Event Viewer' field is at the bottom left. A footer at the bottom right says 'Data Storage Server. All rights reserved'.

Volume	Scsi id	LUN	RO	WB	Action
lv0000	MQ4q1YoeY3R9Pj4v	0	<input type="checkbox"/>	<input type="checkbox"/>	+

WARNING:

Please do not switch on the write back cache (WB) !

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

6. Configure Virtual IP and Auxiliary connection

Choose „**SETUP**” and „**network**” from the menu

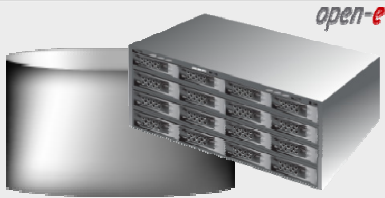
Now, select the **eth0** within **iSCSI Failover**. In the **Virtual IP Settings** function check box **Enable virtual IP** and enter **IP address, Netmask, Broadcast**, and click the **apply** button.

In the **Auxiliary connection** function check box **Use this network interface to communicate between the nodes** and click the **apply** button.

NOTE:

There need to be at least two *auxiliary connections*. The interface with the virtual IP can also serve as one of the auxiliary connections. Please set the Virtual IP Address in a different network subnet then the physical IP Address. To have additional iSCSI Failover systems, please set this pair in a different network subnet from the other iSCSI Failover systems. This limitation will be removed in the future.

Synchronous Volume Replication with Failover over a LAN *open-e*



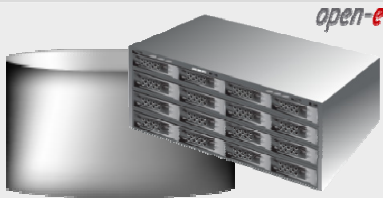
Data Server (DSS1)
Primary node
Address IP:192.168.0.220

6. Configure Virtual IP and Auxillary connection

Now, select the **eth1** within **iSCSI Failover**.
In the **Auxiliary connection** function check box **Use this network interface to communicate between the nodes** and click the **apply** button.

The screenshot shows the open-e Data Storage Server (DSS) configuration interface. The top navigation bar includes 'logout', 'DSS', 'DATA STORAGE SERVER', and the 'open-e' logo. Below this are tabs for 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. A secondary navigation bar includes 'network', 'administrator', 'H/W RAID', 'S/W RAID', 'Fibre Channel', 'iSCSI Initiator', 'hardware', and 'GUI'. The main content area is divided into two sections: 'Interfaces' and 'iSCSI Failover'. The 'Interfaces' section shows a tree view with 'eth0' and 'eth1'. The 'iSCSI Failover' section also shows a tree view with 'eth0' and 'eth1', where 'eth1' is selected. To the right of these sections are two configuration panels: 'Virtual IP Settings' and 'Auxiliary connection'. The 'Virtual IP Settings' panel shows a MAC address of '00:04:23:b9:86:fb' and an unchecked checkbox for 'Enable virtual IP'. The 'Auxiliary connection' panel has a checked checkbox for 'Use this network interface to communicate between the nodes'. Both panels have an 'apply' button. A blue box on the left contains instructions, with arrows pointing to the 'eth1' selection in the 'iSCSI Failover' section and the checked checkbox in the 'Auxiliary connection' section. The footer of the interface reads 'Data Storage Server. All rights reserved'.

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

6. Configure Virtual IP and Auxillary connection

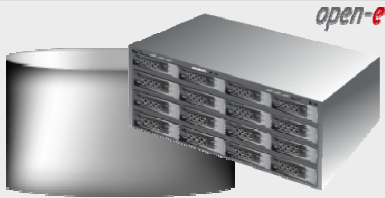
Choose, „**SETUP**” and „**network**” from the menu

Now, select the **eth0** within **iSCSI Failover**.
In the **Virtual IP Settings** function check the box **Enable virtual IP** and enter **IP address, Netmask, Broadcast**, and click the **apply** button.

In the **Auxiliary connection** function check box **Use this network interface to communicate between the nodes** and click the **apply** button.

The screenshot shows the open-e DSS web interface. The top navigation bar includes 'logout', 'DSS', 'DATA STORAGE SERVER', and the 'open-e' logo. Below this is a menu with 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. Under 'SETUP', there is a sub-menu with 'network', 'administrator', 'H/W RAID', 'S/W RAID', 'Fibre Channel', 'iSCSI Initiator', 'hardware', and 'GUI'. The 'network' section is expanded, showing 'Interfaces' and 'iSCSI Failover'. The 'Virtual IP Settings' section is active, displaying the following fields: MAC (00:19:5b:5d:24:a1), Enable virtual IP (checked), IP address (192.168.10.230), Netmask (255.255.255.0), and Broadcast (192.168.10.255). The 'Auxiliary connection' section is also active, with a checked box for 'Use this network interface to communicate between the nodes'. Arrows from the text boxes point to the 'network' menu item, the 'eth0' selection in 'iSCSI Failover', the 'Enable virtual IP' checkbox, the IP address field, and the 'Use this network interface...' checkbox.

Synchronous Volume Replication with Failover over a LAN *open-e*



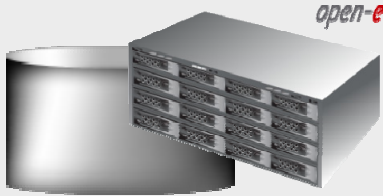
Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

6. Configure Virtual IP and Auxillary connection

Now, select the eth1 within iSCSI Failover. In the Auxiliary connection function check box Use this network interface to communicate between the nodes and click the **apply** button.

The screenshot shows the open-e Data Storage Server (DSS) web interface. The top navigation bar includes 'logout', 'DSS', 'DATA STORAGE SERVER', and the 'open-e' logo. Below this are tabs for 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. A secondary navigation bar contains 'network', 'administrator', 'H/W RAID', 'S/W RAID', 'Fibre Channel', 'iSCSI Initiator', 'hardware', and 'GUI'. The main content area is divided into two sections: 'Interfaces' and 'iSCSI Failover'. The 'Interfaces' section shows a tree view with 'eth0' and 'eth1'. The 'iSCSI Failover' section also shows a tree view with 'eth0' and 'eth1', where 'eth1' is selected. To the right of these sections are two configuration panels: 'Virtual IP Settings' and 'Auxiliary connection'. The 'Virtual IP Settings' panel shows a MAC address of '00:03:1d:02:91:71' and an unchecked checkbox for 'Enable virtual IP'. The 'Auxiliary connection' panel has a checked checkbox for 'Use this network interface to communicate between the nodes.' Both panels have an 'apply' button. A blue box on the left contains instructions, with arrows pointing from the 'eth1' selection in the 'iSCSI Failover' section to the 'Auxiliary connection' checkbox and from the 'eth1' selection in the 'Interfaces' section to the 'Virtual IP Settings' panel.

Synchronous Volume Replication with Failover over a LAN *open-e*



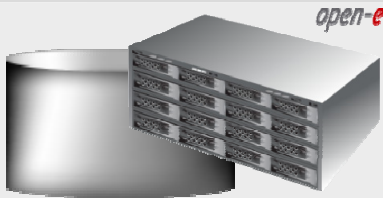
Data Server (DSS1)
Primary node
Address IP:192.168.0.220

7. Configure iSCSI Failover

Now, select iSCSI Failover

In the Failover configuration function, check the box **Enable iSCSI failover functionality** and enter the **Secondary node IP address** and the **Ping Node IP** and click the **apply** button

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

7. Configure iSCSI Failover

Now, select iSCSI Failover

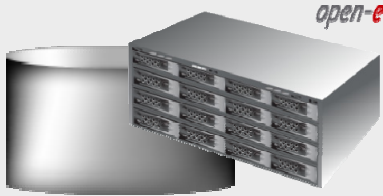
Now, in **Failover configuration** function , check the box **Enable iSCSI failover functionality** and enter Primary node IP address and also the **Ping Node IP** and click the **apply** button

The screenshot shows the open-e DSS web interface. The top navigation bar includes 'logout', 'DSS', 'DATA STORAGE SERVER', and the 'open-e' logo. Below this are tabs for 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. A secondary navigation bar includes 'network', 'administrator', 'H/W RAID', 'S/W RAID', 'Fibre Channel', 'iSCSI Initiator', 'hardware', and 'GUI'. The main content area is divided into two panes. The left pane, titled 'Interfaces', shows a tree view with 'eth0' and 'eth1' under both 'Interfaces' and 'iSCSI Failover' sections. The right pane, titled 'Failover configuration', contains the following settings:

- Enable iSCSI failover functionality
 - Primary node on localhost
 - Secondary node IP: [input field]
 - Ping node IP: [input field]
 - Show advanced
 - Secondary node on localhost
 - Primary node IP: [input field with value 192.168.0.220]
 - Show advanced
- [apply button]

Below the configuration section is a 'Failover Tasks' section with two search boxes for 'iSCSI Tasks' and 'Failover Tasks'. At the bottom of the interface, there is an 'Event Viewer' section and a footer that reads 'Data Storage Server. All rights reserved'.

Synchronous Volume Replication with Failover over a LAN *open-e*



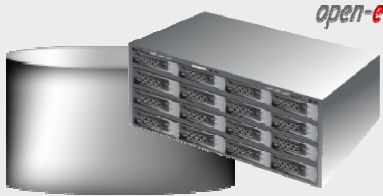
Data Server (DSS1)
Primary node
Address IP:192.168.0.220

7. Configure iSCSI Failover

Move the iSCSI Tasks to be used for the failover service to the Failover Tasks area by clicking  button and click **apply**

The screenshot shows the open-e Data Storage Server (DSS) web interface. The main navigation bar includes 'logout', 'DSS', 'DATA STORAGE SERVER', and 'open-e'. Below this are tabs for 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. A secondary navigation bar includes 'network', 'administrator', 'H/W RAID', 'S/W RAID', 'Fibre Channel', 'iSCSI Initiator', 'hardware', and 'GUI'. The 'iSCSI Initiator' tab is selected, showing two sections: 'Interfaces' and 'iSCSI Failover', both listing 'eth0' and 'eth1'. The 'Failover Tasks' section is open, displaying two columns: 'iSCSI Tasks' and 'Failover Tasks'. The 'iSCSI Tasks' column is empty, while the 'Failover Tasks' column contains 'Task-01'. A blue arrow points from the text box to the right-pointing arrow button between the two columns. An 'apply' button is located at the bottom right of the 'Failover Tasks' section. The footer of the interface reads 'Data Storage Server. All rights reserved'.

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

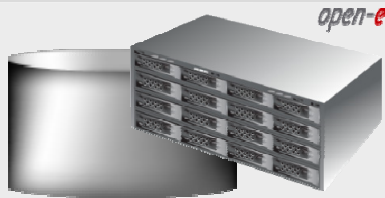
8. Start Failover Service

At this point both nodes are ready to start the Failover service

Event Viewer: [icon]

Data Storage Server. All rights reserved

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

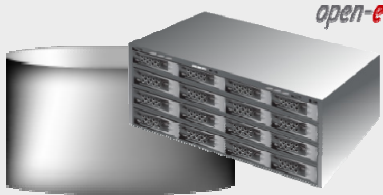
8. Start Failover Service

After clicking the **start** button configuration of both nodes will be complete

NOTE:

You can now connect via your iSCSI initiator and use your targets via the Virtual IP address e.g. 192.168.0.230 (For example, in a Microsoft Windows environment, download Microsoft iSCSI Initiator ver 2.0 or later).

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

8. Start Failover Service

After start Failover, check the status in **Failover status** function. All must read OK. In the task status, the destination volume must be consistent

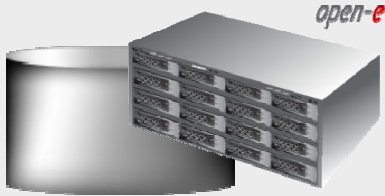
iSCSI Failover/Volume Replication



The screenshot shows the open-e Data Storage Server (DSS) GUI. The main navigation bar includes 'logout', 'DSS', and 'DATA STORAGE SERVER'. Below this are tabs for 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. A secondary navigation bar includes 'network', 'administrator', 'H/W RAID', 'S/W RAID', 'Fibre Channel', 'iSCSI Initiator', 'hardware', and 'GUI'. The 'Failover status' page is active, showing a table with 'Names' and 'Status' columns. The table contains sections for 'Global status', 'Communication via:', and 'Task status'. The 'Global status' section shows 'Service running' as 'ok', 'Node status' as 'primary/active', and 'Ping node' as 'ok'. The 'Communication via:' section shows 'eth0' and 'eth1' both as 'ok'. The 'Task status' section shows 'Task-01' as 'running'. Below the table, there is a 'Connection:' status of 'Connected', 'Source info:' (Logical volume: lv0000, Consistency: Consistent), and 'Destination info:' (Logical volume: lv0000, Consistency: Consistent, IP address: 192.168.0.240). The footer of the GUI reads 'Data Storage Server. All rights reserved'.

Names	Status
Global status	
Service running	ok
Node status	primary/active
Ping node	ok
Communication via:	
eth0	ok
eth1	ok
Task status	
Task-01	running
Connection:	Connected
Source info:	
Logical volume:	lv0000
Consistency:	Consistent
Destination info:	
Logical volume:	lv0000
Consistency:	Consistent
IP address:	192.168.0.240

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

9. Test Failover Function

logout **DSS** DATA STORAGE SERVER *open-e*

SETUP CONFIGURATION MAINTENANCE STATUS HELP

network administrator H/W RAID S/W RAID Fibre Channel iSCSI Initiator hardware GUI

Interfaces ?

- eth0
- eth1

iSCSI Failover ?

- eth0
- eth1

apply

? Failover manager

start stop

In order to delegate (switch) active server state to the passive server click the Manual failover button. This will initiate a failover event and switch the primary server to suspend mode, while the secondary server will be promoted to active mode. Please note this will stop the volume replication process.

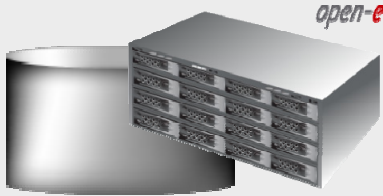
Manual failover

Event Viewer: [x]

Data Storage Server. All rights reserved

In order to test Failover in **Manual Failover**, function, click on the **Manual failover** button

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

9. Test Failover Function

logout **DSS** DATA STORAGE SERVER *open-e*

SETUP CONFIGURATION MAINTENANCE STATUS HELP

network administrator H/W RAID S/W RAID Fibre Channel iSCSI Initiator hardware GUI

Interfaces

- eth0
- eth1

iSCSI Failover

- eth0
- eth1

Info
Server is entering suspend mode...

Failover manager

start stop

In order to delegate (switch) active server state to the passive server click the Manual failover button. This will initiate a failover event and switch the primary server to suspend mode, while the secondary server will be promoted to active mode. Please note this will stop the volume replication process.

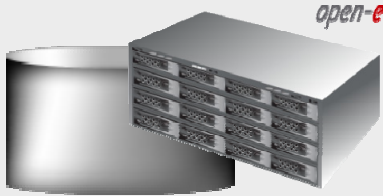
Manual failover

Event Viewer: [x]

Data Storage Server. All rights reserved

After clicking on the **Manual failover** button, primary node enters suspend mode

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

9. Test Failover Function

The Failover status function shows the **Global status** of the primary node. Status service is in **suspend** mode and the node is inactive

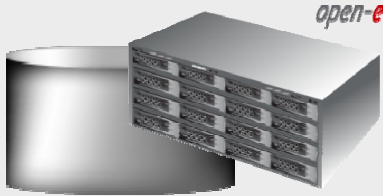
The screenshot shows the open-e DSS web interface. The main navigation bar includes 'logout', 'DSS', 'DATA STORAGE SERVER', and 'open-e'. Below this are tabs for 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. A secondary navigation bar includes 'network', 'administrator', 'H/W RAID', 'S/W RAID', 'Fibre Channel', 'iSCSI Initiator', 'hardware', and 'GUI'. The 'network' section is active, showing 'Interfaces' and 'iSCSI Failover' sub-sections. The 'Failover status' section is expanded, displaying a table with the following data:

Names	Status
Global status	
Service running	suspend
Node status	inactive
Ping node	ok
Communication via:	
eth0	unknown
eth1	unknown
Task status	
Task-01	stopped

Below the table is the 'Failover configuration' section, which contains an information icon and the text: 'While a failover is turned on, you cannot make changes to its configuration.'

At the bottom of the interface, there is an 'Event Viewer' section and a footer that reads 'Data Storage Server. All rights reserved'.

Synchronous Volume Replication with Failover over a LAN *open-e*



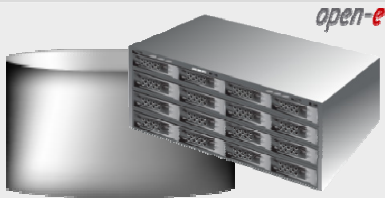
Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

9. Test Failover Function

In Failover status function
Global status shows the status
of the secondary node. The
Node status is active and
service status is degraded

Names	Status
Global status	
Service running	degraded
Node status	secondary/active
Ping node	ok
Communication via:	
eth0	failed
eth1	failed
Task status	
Task-01_reverse	stopped

Synchronous Volume Replication with Failover over a LAN *open-e*



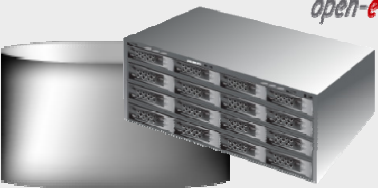
Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

10. Run Failback Function

In order to run Failback in Failover manager function click on the **Sync volumes** button first

The screenshot shows the web interface for a Data Storage Server (DSS). The main navigation bar includes 'logout', 'DSS', and 'DATA STORAGE SERVER'. Below this are tabs for 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. A secondary menu includes 'network', 'administrator', 'H/W RAID', 'S/W RAID', 'Fibre Channel', 'iSCSI Initiator', 'hardware', and 'GUI'. The 'Interfaces' section shows 'eth0' and 'eth1'. The 'Failover manager' section is highlighted, containing an information box: 'Info: When in secondary mode, the start and stop buttons control this node only. Please use the relevant buttons on the primary node to control both nodes.' Below the info box are 'start' and 'stop' buttons. A 'Sync volumes' button is highlighted with an arrow from the blue text box. Below this is a 'Failback' button and an 'Event Viewer' section. The footer reads 'Data Storage Server. All rights reserved'.

Synchronous Volume Replication with Failover over a LAN *open-e*



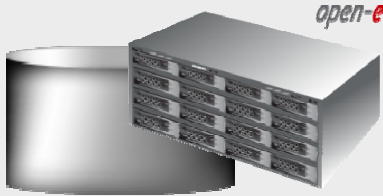
Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

10. Run Failback Function

After synchronization the task status of the destination volume must be **Consistent**

Names	Status
Global status	
Service running	degraded
Node status	secondary/active
Ping node	ok
Communication via:	
eth0	failed
eth1	failed
Task status	
Task-01_reverse	running
Connection: Connected	
Source info:	
Logical volume:	lv0000
Consistency:	Consistent
Destination info:	
Logical volume:	lv0000
Consistency:	Consistent
IP address:	192.168.0.220

Synchronous Volume Replication with Failover over a LAN *open-e*



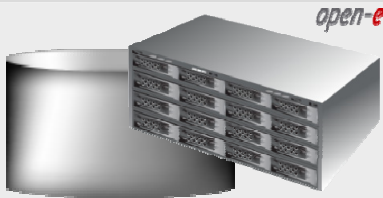
Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

10. Run Failback Function

The screenshot shows the DSS (Data Storage Server) GUI. The top navigation bar includes 'logout', 'DSS', 'DATA STORAGE SERVER', and the 'open-e' logo. Below this are tabs for 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. A secondary row of tabs includes 'network', 'administrator', 'H/W RAID', 'S/W RAID', 'Fibre Channel', 'iSCSI Initiator', 'hardware', and 'GUI'. The main content area is divided into two sections: 'Interfaces' and 'iSCSI Failover', both showing 'eth0' and 'eth1' options. The right-hand side of the GUI features an information box stating 'Volume replication process started. Please go to Failover Status to check the status of your tasks.' Below this is the 'Failover manager' section, which includes another information box explaining that in secondary mode, start and stop buttons control this node only. It contains 'start' and 'stop' buttons. Further down, there is a 'Sync volumes' button and a 'Failback' button. A blue arrow points from a text box on the left to the 'Failback' button.

In order to return the active server state to the Primary server click on the **Failback** button

Synchronous Volume Replication with Failover over a LAN *open-e*



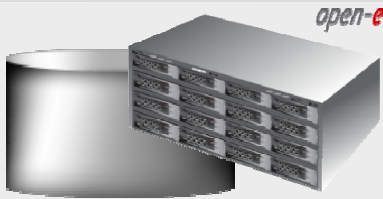
Data Server (DSS1)
Primary node
Address IP:192.168.0.220

10. Run Failback Function

After clicking on **Failback** button (in **Failover manager** function on Secondary node) Primary node is now active

The screenshot shows the open-e Data Storage Server (DSS) web interface. The top navigation bar includes 'logout', 'DSS', 'DATA STORAGE SERVER', and the 'open-e' logo. Below this are tabs for 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. A secondary row of tabs includes 'network', 'administrator', 'H/W RAID', 'S/W RAID', 'Fibre Channel', 'iSCSI Initiator', 'hardware', and 'GUI'. The main content area is divided into two sections: 'Interfaces' and 'iSCSI Failover'. Both sections list 'eth0' and 'eth1'. The 'iSCSI Failover' section is active, showing a 'Failover manager' panel with 'start' and 'stop' buttons. Below this panel is a 'Manual failover' button. An information message box at the top of the Failover manager section states: 'Info: Your node is now active' with a green checkmark. A blue arrow points from the text box on the left to this message box. At the bottom of the interface, there is an 'Event Viewer' field and a footer that reads 'Data Storage Server. All rights reserved'.

Synchronous Volume Replication with Failover over a LAN *open-e*



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

10. Run Failback Function

Primary node is active again and ready for Failover.

iSCSI Failover/Volume Replication



Names	Status
Global status	
Service running	ok
Node status	primary/active
Ping node	ok
Communication via:	
eth0	ok
eth1	ok
Task status	
Task-01	running

Failover configuration

Info
While a failover is turned on, you cannot make changes to its configuration.

Event Viewer: [icon]

Data Storage Server. All rights reserved

The configuration and testing of iSCSI Failover/Failback is now complete.

Thank You!