



ENTERPRISE LEVEL STORAGE OS
for EVERY BUSINESS

*A Step-by-Step Guide to
Synchronous Volume
Replication
(Block Based) over a LAN
with Open-E[®] DSS V6*

DSS V6
DATA STORAGE SOFTWARE

16 TB



Easy to use, GUI based management provides performance and security.



Reliable disk based backup and recovery, along with Snapshot capability enable fast and reliable backup and restore.



Easy to implement remote Replication, at block or volume level, enables cost-effective disaster recovery.



IP based storage management combines NAS and iSCSI functionality for centralized storage and storage consolidation.

Software Version: DSS ver. 6.00 up50

Presentation updated: December 2010

www.open-e.com

Synchronous Volume Replication over a LAN

	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 over a LAN	✓			✓			✓	✓	✓	✓	✓

- **Volume Replication** is a process of coping a source logical volume to a destination system.
 - Volume replication provides maximal availability in case one of the systems or units fails.

REPLICATION BETWEEN TWO SYSTEMS WITHIN ONE LAN

■ Recommended Resources

- Key Hardware (two systems)
 - ✓ x86 compatible,
 - ✓ RAID Controller,
 - ✓ HDD's,
 - ✓ Network Interface Cards.
- Software
 - ✓ Open-E DSS V6, 2 units.

■ Benefits

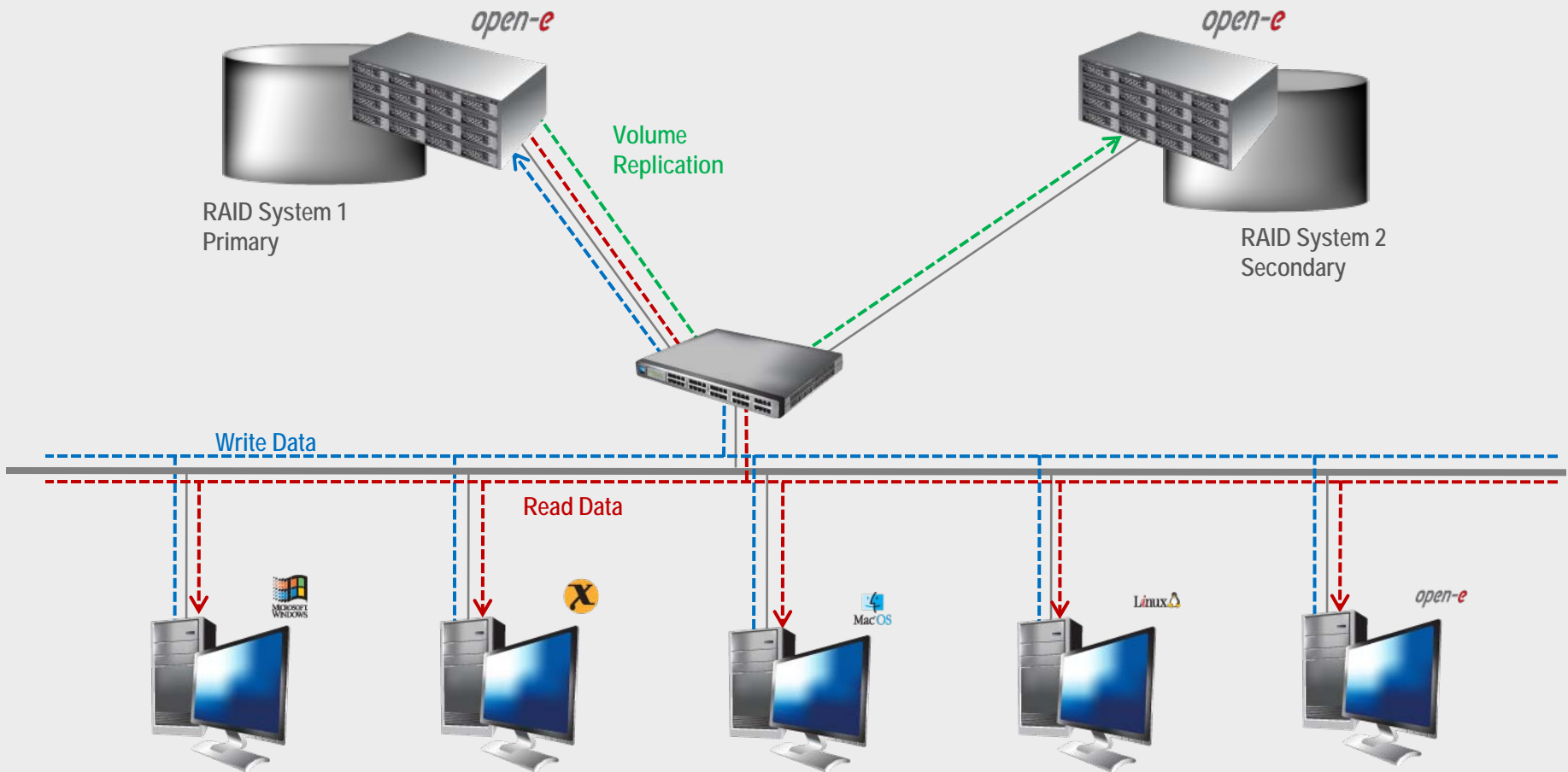
- Data Redundancy over a LAN,
- Enables continuous data access.

■ Disadvantages

- High cost of solution,
- Natural disasters can destroy local systems.

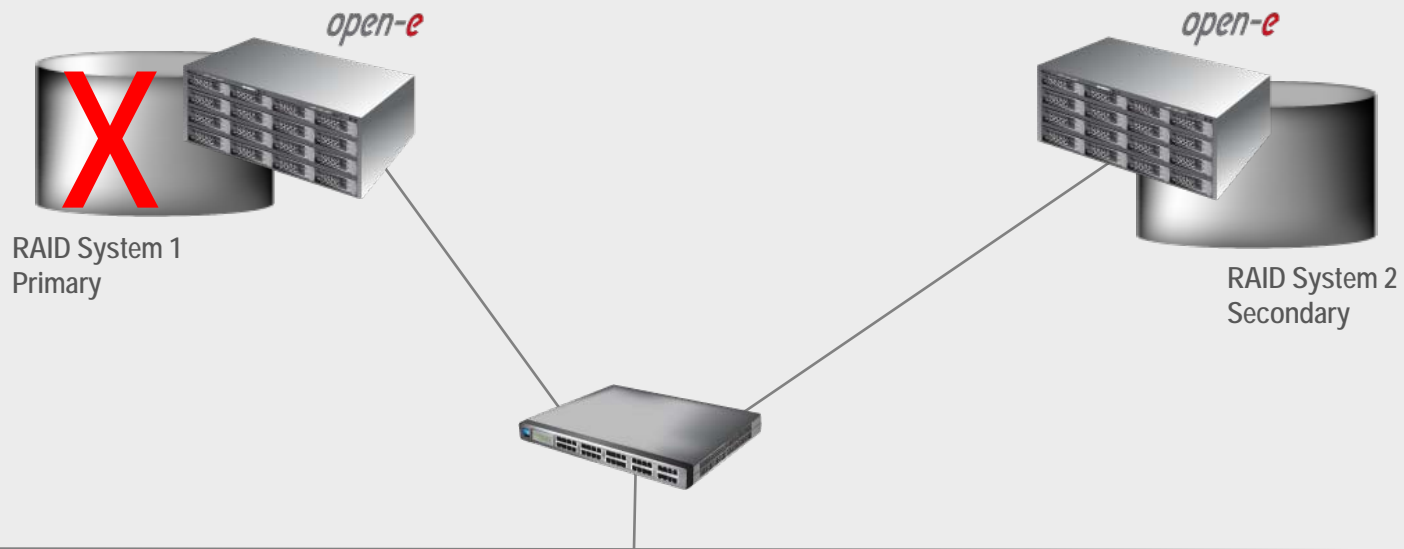
Synchronous Volume Replication over a LAN

- Data is written and read to System 1
- Data is continuously replicated to System 2



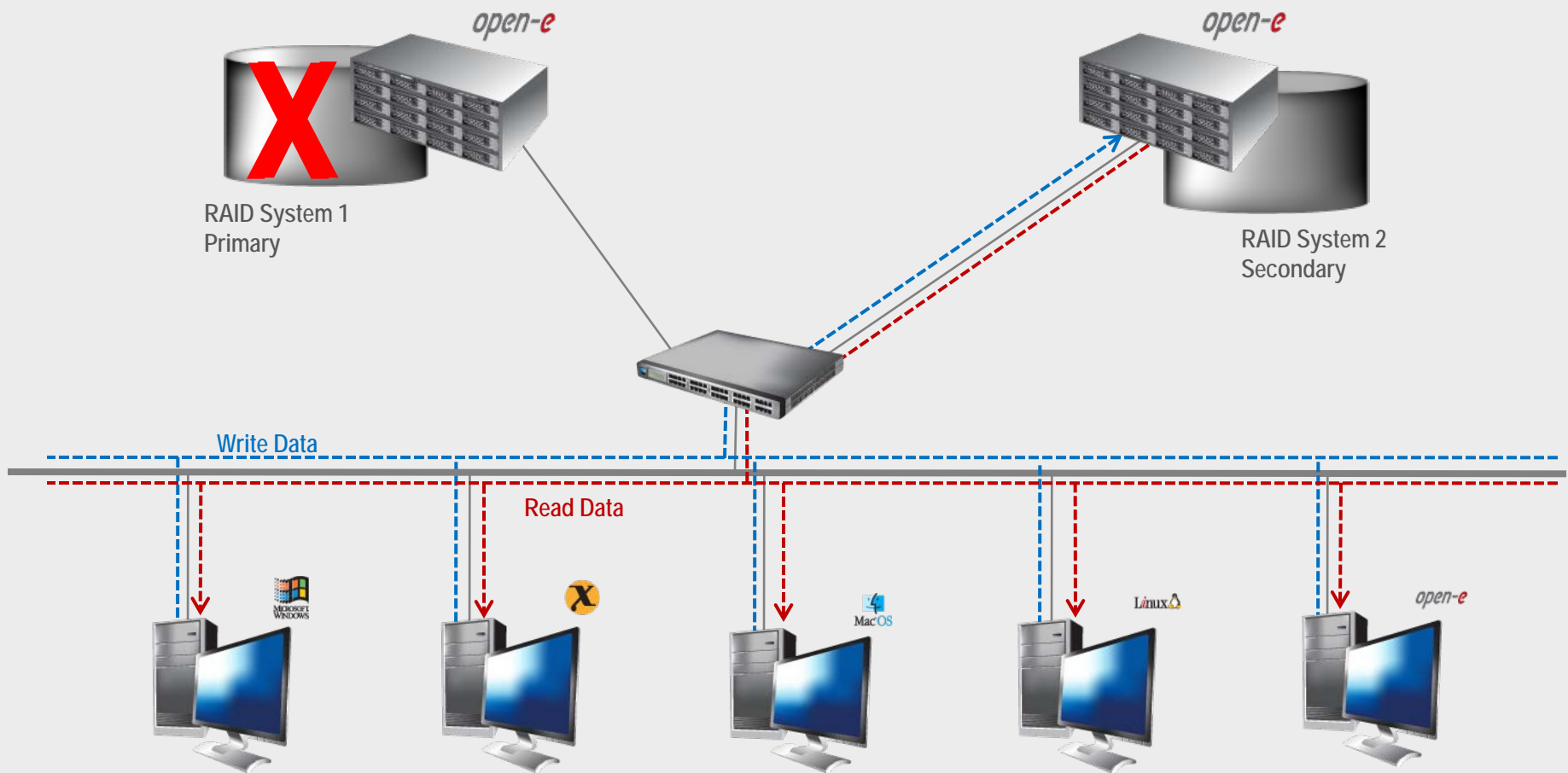
Synchronous Volume Replication over a LAN

- In case of raid array error or disk drive error on the System 1, the server will send an e-mail notification to the administrator,
- In the case of a failure of system 1, users will be notified,
- Administrator then switches users to the System 2.



Synchronous Volume Replication over a LAN

- After switching, replicated volume is available on System 2



TO SET UP VOLUME REPLICATION, PERFORM THE FOLLOWING STEPS:

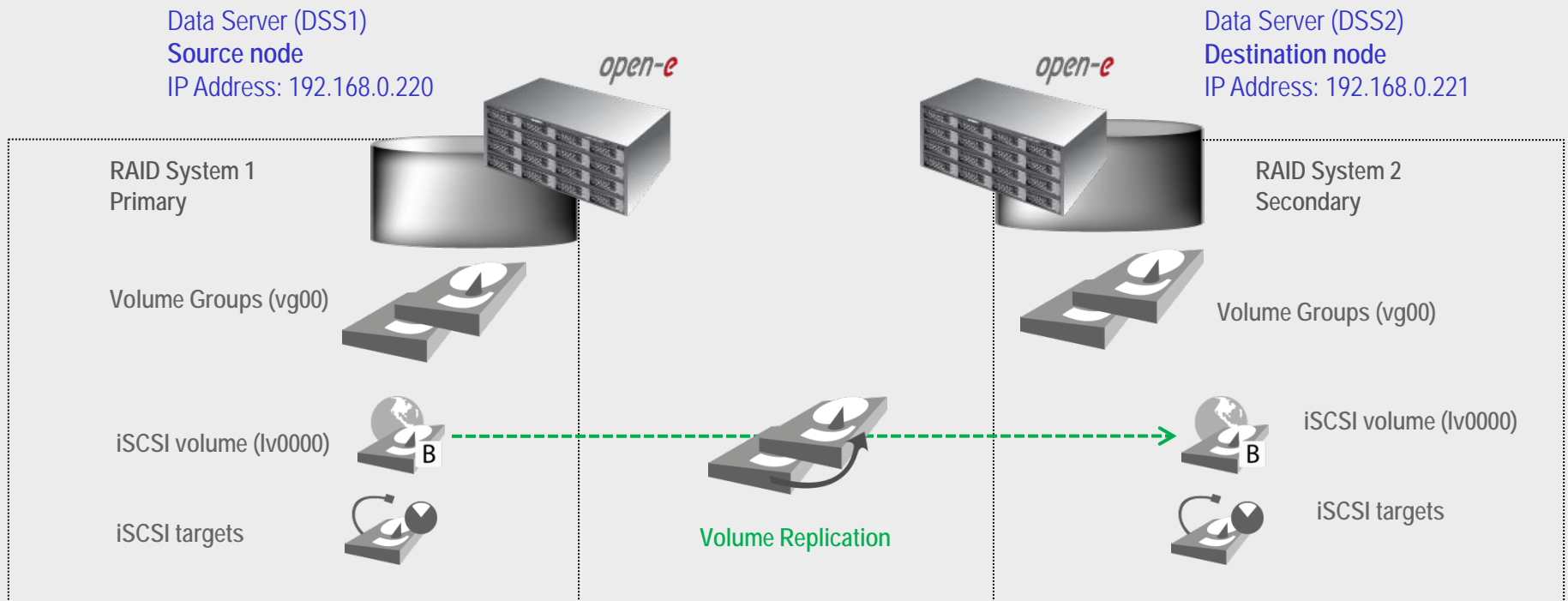
1. Configure Hardware
2. Configure the destination node
3. Configure the source node
4. Configure the replication task
5. Check the status of volume replication

Setting up Synchronous Volume Replication over a LAN *open-e*

Hardware Requirements

To run the Volume replication of Open-E DSS V6, a minimum of two systems are required. Both servers are working in the Local Area Network. An example configuration is shown below:

1. Configure Hardware



Setting up Synchronous Volume Replication over a LAN

open-e

Data Server (DSS2)

Destination node

IP Address: 192.168.0.221

2. Configure the Destination Node

Under the „CONFIGURATION“ menu, select „volume manager“.

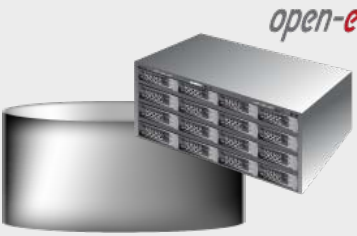
Volume Groups (vg00)

Add the selected physical units (Unit S000) to create a new volume group (in this case, vg00) and click **apply** button.

The screenshot shows the open-e web interface with the following elements:

- Header: open-e | ENTERPRISE CLASS STORAGE OS for EVERY BUSINESS | DATA STORAGE SOFTWARE V6
- Navigation: SETUP | CONFIGURATION | MAINTENANCE | STATUS | HELP
- Breadcrumbs: You are here: CONFIGURATION > volume manager > Vol. groups
- Left Panel: Vol. groups (selected), Vol. replication
- Unit rescan panel: rescan button
- Unit manager panel: Table with columns Unit, Size (GB), Serial number, Status. Row: Unit S000, 230.08, N/A, available. Action: new volume group, Name: vg00. apply button.
- Drive identifier panel: Table with columns Unit, Serial number, Status. Row: Unit S000, N/A. apply button.
- Footer: Event Viewer: [icon] | Data Storage Software V6 - All rights reserved

Setting up Synchronous Volume Replication over a LAN



Data Server (DSS2)
Destination node
IP Address: 192.168.0.221

2. Configure the Destination 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.

iSCSI volume (lv0000)



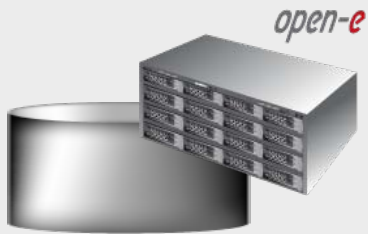
Next check the box to **Use volume replication**

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

The screenshot shows the open-e web interface for configuring a destination node. The breadcrumb trail is: CONFIGURATION > volume manager > Vol. groups > vg00. The 'Vol. groups' tab is active, showing a list with 'vg00' selected. The 'Vol. replication' tab is also visible. The 'Volume manager' panel on the right shows a table of reserved space and a 'Free' space of 222.03 GB. Below the table, the 'Action' dropdown is set to 'new iSCSI volume' and 'Options' is 'Just create volume'. The 'Use volume replication' checkbox is checked. Under 'Block I/O', the 'Initialize' checkbox is checked with a 'medium' rate. A slider for 'Block I/O' is set to 10 GB, with a note '(+0.12 GB for replication)'. An 'apply' button is at the bottom right. A footer note says 'Please apply changes or press "reload" button to discard'. The footer also contains 'Event Viewer: [icon]' and 'Data Storage Software V6 - All rights reserved'.

System volumes	Size (GB)
Reserved Pool	4.00
Reserved for snapshots	0.00
Reserved for system	4.00
Reserved for replication	0.00
Free	222.03

Setting up Synchronous Volume Replication over a LAN



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Data Server (DSS2)

Destination node

IP Address: 192.168.0.221

2. Configure the Destination Node

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



iSCSI volume (lv0000)

The screenshot shows the open-e web interface for configuring a logical volume. The breadcrumb trail is: CONFIGURATION > volume manager > Vol. groups > vg00. The 'Volume manager' section displays an information message: 'Logical volume lv0000 has been created successfully.' Below this is a table of logical volumes:

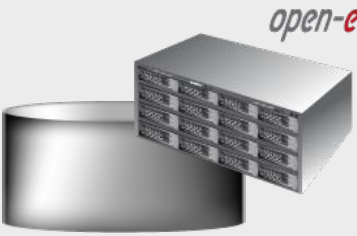
Logical Volume	Type	Snap.	Rep.	Init.	Blocksize (bytes)	Size (GB)
lv0000	B2		✓		N/A	10.00

Below the table, the 'System volumes' section shows the following sizes:

- Reserved Pool: 4.00 GB
- Reserved for snapshots: 0.00 GB
- Reserved for system: 4.00 GB
- Reserved for replication: 0.13 GB
- Free: 211.91 GB

The 'Action' dropdown is set to 'new NAS volume'. There are checkboxes for 'Use volume replication' and 'WORM', both of which are unchecked. At the bottom, there is a slider for size adjustment and an 'add:' field with a value of '0.00' and a unit of 'GB'. An 'apply' button is located at the bottom right.

Setting up Synchronous Volume Replication over a LAN



open-e Data Server (DSS2)
Destination node
IP Address: 192.168.0.221

2. Configure the Destination Node

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

Volume Replication



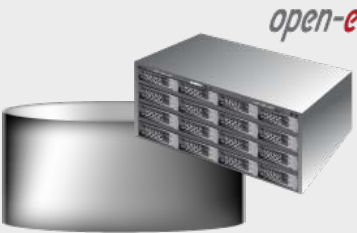
Next, under **Mirror Server IP** function, enter the IP address of the Primary node (in our example, this would be 192.168.1.220) and click the **apply** button.

The screenshot shows the open-e web interface with the following configuration steps highlighted by blue arrows:

- Vol. groups:** A tree view showing a group named 'vg00'.
- Vol. replication:** A sub-tab selected under 'vg00'.
- Volume replication mode:** A table with columns: Logical Volume, Init, Source, Destination, Clear metadata. The row for 'lv0000' shows 'done' in the Init column, an unchecked box in the Source column, and a checked box in the Destination column. An 'apply' button is below the table.
- Mirror server IP:** A section with 'IP address:' set to '192.168.0.220' and an unchecked 'WAN' checkbox. An 'apply' button is below.
- Create new volume replication task:** An info message stating 'Mirror Server IP is not set.'
- Replication tasks manager:** A section at the bottom of the configuration area.

At the bottom of the interface, it says 'Event Viewer: [icon]' and 'Data Storage Software V6 - All rights reserved'.

Setting up Synchronous Volume Replication over a LAN



open-e Data Server (DSS2)
Destination node
IP Address: 192.168.0.221

2. Configure the Destination Node

Choose „CONFIGURATION“, „iSCSI target manager“ and „Targets“ from the menu

iSCSI targets



In the Create new target function enter a name for the new target (as desired) in the Name field and click **apply** to confirm.

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SETUP | CONFIGURATION | MAINTENANCE | STATUS | HELP

You are here: CONFIGURATION > iSCSI target manager > Targets

Targets

Create new target

Target Default Name

Name:

Alias:

apply

Discovery CHAP user access

Enable CHAP user access authentication

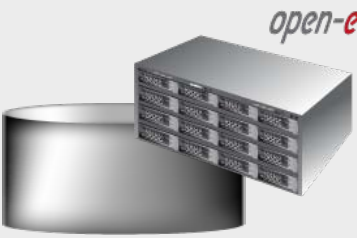
apply

CHAP users

Event Viewer:

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Setting up Synchronous Volume Replication over a LAN




Data Server (DSS2)
Destination node
IP Address: 192.168.0.221

2. Configure the Destination Node

Select target0 within the Targets field.

iSCSI targets



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

The configuration of the Destination Node (storage server) is now complete.

Setting up Synchronous Volume Replication over a LAN

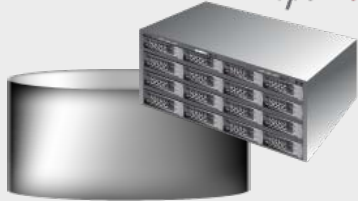
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Data Server (DSS1)

Source node

IP Address: 192.168.0.220

3. Configure the Source Node



Under the CONFIGURATION menu, select volume manager..

Volume Groups (vg00)



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

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SETUP | CONFIGURATION | MAINTENANCE | STATUS | HELP

You are here: CONFIGURATION > volume manager > Vol. groups

Vol. groups

Unit rescan

rescan

Unit manager

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

Action: new volume group
Name: vg00

apply

Please apply changes or press "reload" button to discard

Drive identifier

Unit	Serial number	Status
Unit S001	5RY135BZ	
Unit S000	9RY1GP7W	

apply

Event Viewer: [icon]

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Setting up Synchronous Volume Replication over a LAN

Data Server (DSS1)

Source node

IP Address: 192.168.0.220

3. Configure the Source 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.

iSCSI volume (lv0000)



Next check the box to **Use volume replication**. After assigning an appropriate amount of space for the iSCSI volume, click the **apply** button.

The screenshot shows the open-e web interface for configuring a source node. The breadcrumb trail is: CONFIGURATION > volume manager > Vol. groups > vg00. The 'Vol. groups' tab is active, showing a list with 'vg00' selected. The 'Vol. replication' tab is also visible. The 'Volume manager' section on the right contains a table of reserved space and configuration options.

System volumes	Size (GB)
Reserved Pool	4.00
Reserved for snapshots	0.00
Reserved for system	4.00
Reserved for replication	0.00
Free	457.72

Configuration options for the new iSCSI volume:

- Action: new iSCSI volume
- Options: Just create volume
- Use volume replication
- File I/O
 - Initialize
 - Rate: medium
- Block I/O
- add: 10 GB (+0.12 GB for replication)

The 'apply' button is highlighted in red.

NOTE:

The source and destination volumes must be of identical size. Remember to enable Volume Replication.

Setting up Synchronous Volume Replication over a LAN

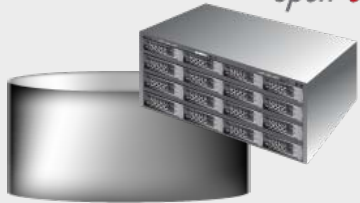
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Data Server (DSS1)

Source node

IP Address: 192.168.0.220

3. Configure the Source Node



iSCSI volume (lv0000)



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

The screenshot shows the open-e web interface for configuring a logical volume. The breadcrumb trail is: CONFIGURATION > volume manager > Vol. groups > vg00. The 'Volume manager' section displays a table of logical volumes and system volumes. A blue arrow points from the 'lv0000' entry in the table to a blue callout box. Below the table, there are options for 'Action' (set to 'new NAS volume'), 'Use volume replication' (unchecked), and 'WORM' (unchecked). A slider and an 'add' field are also visible.

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						4.00
Reserved for replication						0.13
Free						447.59

Setting up Synchronous Volume Replication over a LAN

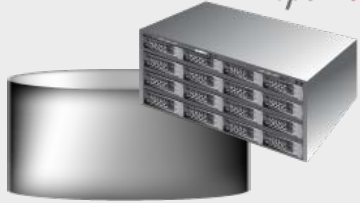
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Data Server (DSS1)

Source node

IP Address: 192.168.0.220

3. Configure the Source Node



Under the "CONFIGURATION" tab, select "iSCSI target manager" and Targets

iSCSI targets



In the Create new target function enter a name for the new target (as desired) in the Name field and click **apply** to confirm.

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SETUP | CONFIGURATION | MAINTENANCE | STATUS | HELP

You are here: CONFIGURATION > iSCSI target manager > Targets

Targets

Create new target

Target Default Name

Name:

Alias:

apply

Discovery CHAP user access

Enable CHAP user access authentication

apply

CHAP users

Event Viewer:

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Setting up Synchronous Volume Replication over a LAN

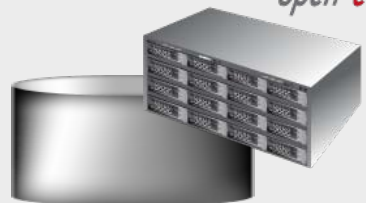
open-e

Data Server (DSS1)

Source node

IP Address: 192.168.0.220

3. Configure the Source Node



Select target0 within the Targets field.

iSCSI targets



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

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SETUP | CONFIGURATION | MAINTENANCE | STATUS | HELP

You are here: CONFIGURATION > iSCSI target manager > Targets > **iqn.2010-11:dss1.target0 (target0)**

Targets

- target0

Target volume manager

Info
Currently there are no LUN's added to this target. In order to add a LUN, click on the plus "+" sign in the "Action" column for this LUN.

Info
Please note that in order to access iSCSI-enabled data from an initiator, the target needs to have a LUN 0, otherwise the data in all other LUNs will be inaccessible. The data will also be inaccessible if you select an inactive snapshot or a destination volume (volume replication) as LUN 0.

Volume	SCSI ID	LUN	RO	WB	Action
lv0000	2E7dNXzW67oZPB1n	0	<input type="checkbox"/>	<input type="checkbox"/>	

Discovery CHAP user access

Enable CHAP user access authentication

apply

Target IP access

Deny access:

Allow access:

Event Viewer:

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Setting up Synchronous Volume Replication over a LAN

open-e

Data Server (DSS1)

Source node

IP Address: 192.168.0.220

3. Configure the Source Node

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

Volume Replication

Next, under **Mirror Server IP** function, enter the IP address of the destination node. In our example, this would be 192.168.0.240 click the **apply** button

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

IP address:

WAN

Info
Mirror Server IP is not set.

Setting up Synchronous Volume Replication over a LAN

Data Server (DSS1)

Source node

IP Address: 192.168.0.220

4. Configure replication task

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 **apply** to confirm.

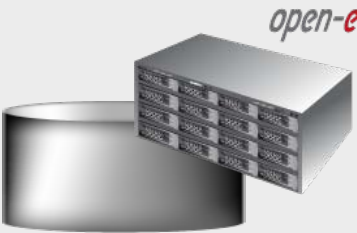
The configuration of the Source Node (storage server) is now complete.

The screenshot shows the open-e web interface for configuring a volume replication task. The breadcrumb trail is: CONFIGURATION > volume manager > Vol. replication. The interface is divided into several sections:

- Mirror server IP:** A form with an IP address field containing "192.168.0.221" and a checkbox for "WAN". An "apply" button is at the bottom right.
- Create new volume replication task:** A form with fields for "Task name" (containing "ReplicationTask"), "Source volume" (containing "lv0000"), "Destination volume" (containing "lv0000" with an arrow button), and "Bandwidth for SyncSource (MB)" (containing "40"). There is a checkbox for "Asynchronous protocol". A "create" button is at the bottom right.
- Replication tasks manager:** A section with an "Info" icon and the text "No tasks have been found."

At the bottom of the interface, there is an "Event Viewer" icon and a footer that reads "Data Storage Software V6 - All rights reserved".

Setting up Synchronous Volume Replication over a LAN



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Data Server (DSS1)

Source node

IP Address: 192.168.0.220

4. Configure replication task

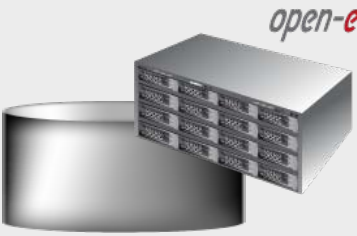
After the DSS V6 console has reloaded, you can start, stop or delete the task within the Replication task manager function.

The screenshot shows the open-e DSS V6 console interface. The top navigation bar includes 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The breadcrumb trail indicates the current location: 'You are here: CONFIGURATION > volume manager > Vol. replication'. The left sidebar shows 'Vol. groups' with a sub-item 'vg00' and 'Vol. replication'. The main content area is divided into several sections: 1. An 'apply' button. 2. A 'Mirror server IP' section with a text input field containing '192.168.0.221' and a checkbox for 'WAN'. 3. A 'Create new volume replication task' section with an 'Info' message: 'No volumes with replication functionality found or all volumes have a task assigned already.' 4. A 'Replication tasks manager' section containing a table with the following data:

Name	Start time	Action
ReplicationTask	n/a	[Start] [Stop] [Delete]

The bottom of the console shows an 'Event Viewer' icon and the footer text 'Data Storage Software V6 - All rights reserved'.

Setting up Synchronous Volume Replication over a LAN



open-e

Data Server (DSS1)

Source node

IP Address: 192.168.0.220

4. Configure replication task

Also, you can start, stop or delete the task within the **Replication Task Manager** function by clicking on the name replication (in this case, ReplicationTask)

NOTE:

Once the replication process has started, the replication direction cannot be changed.

The screenshot shows the open-e web interface with the following elements:

- Header: open-e | ENTERPRISE CLASS STORAGE OS for EVERY BUSINESS | DATA STORAGE SOFTWARE V6
- Navigation: SETUP | CONFIGURATION | MAINTENANCE | STATUS | HELP
- Breadcrumbs: You are here: CONFIGURATION > volume manager > Vol. replication > ReplicationTask
- Left sidebar: Vol. groups (vg00), Vol. replication (ReplicationTask)
- Main content: Replication tasks manager table and Create schedule for volume replication task form.

Name	Start time	Action
ReplicationTask	2010-11-17 23:23:41	[Start] [Stop] [Delete]

Source volume: lv0000
Destination volume: lv0000
Destination IP: 192.168.0.221
Protocol type: Synchronous

Comment: [Text Field]

Monday Saturday
 Tuesday Sunday
 Wednesday
 Thursday
 Friday

Start: [00] : [00]
Stop: [] : []

Every week
 Every even week
 Every odd week

[apply]

Setting up Synchronous Volume Replication over a LAN *open-e*

open-e

Data Server (DSS1)

Source node

IP Address: 192.168.0.220

5. Check the status of volume replication

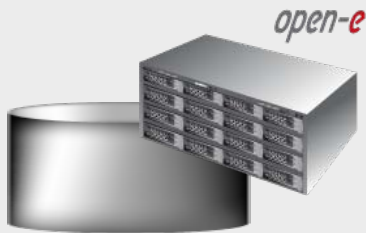
Under the „STATUS“ menu, select „tasks“, next select Volume Replication.

The screenshot shows the open-e web interface. At the top, there's a navigation bar with 'open-e' logo and 'ENTERPRISE CLASS STORAGE OS for EVERY BUSINESS'. Below that, a red bar says 'DATA STORAGE SOFTWARE V6'. The main navigation menu includes 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The breadcrumb trail indicates the current location: 'You are here: STATUS > tasks > Volume Replication'. On the left, a 'Tasks' sidebar menu is visible with options: Backup, Restore from backup, Data Replication, Antivirus, Volume Replication (selected), and Snapshots. The main content area is divided into two sections: 'Running tasks' and 'Tasks log'. The 'Running tasks' section shows a table with one entry: 'ReplicationTask' of type 'Volume replication' starting at '2010-11-17 23:23:41'. The 'Tasks log' section shows a table with one entry: 'ReplicationTask' of type 'Volume replication' with status 'OK' and action 'Started' at '2010-11-17 23:23:49'. At the bottom, there's an 'Event Viewer' icon and a footer that reads 'Data Storage Software V6 - All rights reserved'.

Name	Type	Start time
ReplicationTask	Volume replication	2010-11-17 23:23:41

Time	Name	Type	Status	Action
2010-11-17 23:23:49	ReplicationTask	Volume replication	OK	Started

Setting up Synchronous Volume Replication over a LAN *open-e*



open-e Data Server (DSS1)
Source node
IP Address: 192.168.0.220

5. Check the status of volume replication

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SETUP | CONFIGURATION | MAINTENANCE | STATUS | HELP

You are here: STATUS > tasks > Volume Replication

Tasks

- Backup
- Restore from backup
- Data Replication
- Antivirus
- Volume Replication**
- Snapshots

Running tasks

Name	Type	Start time
ReplicationTask	Volume replication	2010-11-17 23:23:41

Protocol type: Synchronous
Connection: SyncSource
Total size to replicate: 10240 MB
Remain to replicate: 8272 MB
Speed (avg): 11760 kB/s (10812 kB/s)
Time left: 0:11:58

Source info:
Logical volume: lv0000
Consistency: Consistent


Destination info:
Logical volume: lv0000
Consistency: **Inconsistent**
IP address: 192.168.0.221

Tasks log

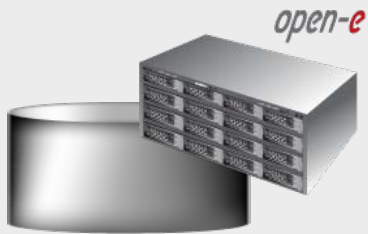
Time	Name	Type	Status	Action
2010-11-17 23:23:49	ReplicationTask	Volume replication	OK	Started

Event Viewer: [icon]

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Click on  button with task name (in this case **ReplicationTask**) to display detailed information on the current replication task.

Setting up Synchronous Volume Replication over a LAN *open-e*



Data Server (DSS1)
Source node
IP Address: 192.168.0.220

5. Check the status of volume replication

The replication task provides information about the consistency of the data on destination node. In this case the replication process for the destination node is ended.

Volume Replication, between source and destination nodes, is now complete

The screenshot shows the open-e web interface with the following components:

- Navigation:** SETUP, CONFIGURATION, MAINTENANCE, STATUS, HELP. Breadcrumbs: You are here: STATUS > tasks > Volume Replication.
- Tasks List:**
 - Backup
 - Restore from backup
 - Data Replication
 - Antivirus
 - Volume Replication** (highlighted)
 - Snapshots
- Running tasks:**

Name	Type	Start time
ReplicationTask	Volume replication	2010-11-17 23:23:41

Protocol type: Synchronous
Connection: Connected

Source info:
Logical volume: lv0000
Consistency: Consistent

Destination info:
Logical volume: lv0000
Consistency: Consistent
IP address: 192.168.0.221
- Tasks log:**

Time	Name	Type	Status	Action
2010-11-17 23:23:49	ReplicationTask	Volume replication	OK	Started

Thank you!