

Asynchronous Data Replication over a LAN

	Replication Mode		Source/Destination			I/O type		Volume Type		
	Synchronous	Asynchronous	w/ System	LAN	WAN	File based	Block based	NAS	iSCSI	FC
Data Replication over a LAN		✓		✓		✓		✓		

- **ASYNCHRONOUS DATA REPLICATION over a LAN** enables **asynchronous** file and folder copy from one storage system to another over Local Area Network:
 - With asynchronous replication a point-in-time – snapshot copy of data on the source is made and copied from the source to the target storage system.
 - Once the target system has the point-in-time copy of the data, the source storage system creates a delta set of all of the changes since the point-in-time copy was created. This delta set doesn't include every write or change, just the last set of changes prior to the snapshot.
 - For maximum flexibility, you can run a data replication task in two directions: one system can be both the source and the destination at the same time, allowing cross data backups on several systems. Replication can be used in disaster recovery or for disk-to-disk backup. Replication provides maximal availability in case one system or unit fails or in case of a site disaster.

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 (recommended) or Open-E iSCSI-R3, 2 units.

■ **Benefits**

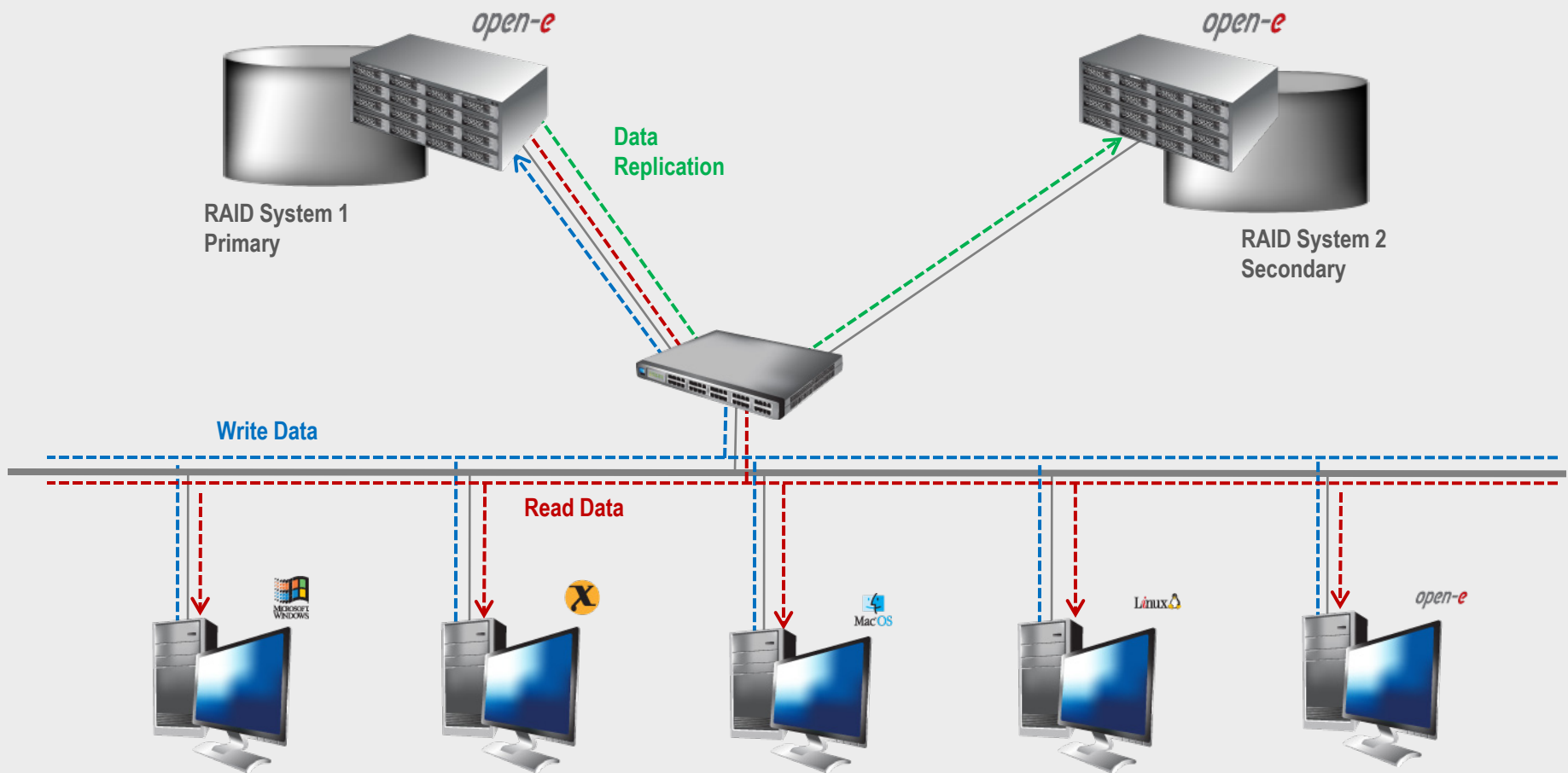
- Data Redundancy over a LAN,
- Enables continuous data access.

■ **Disadvantages**

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

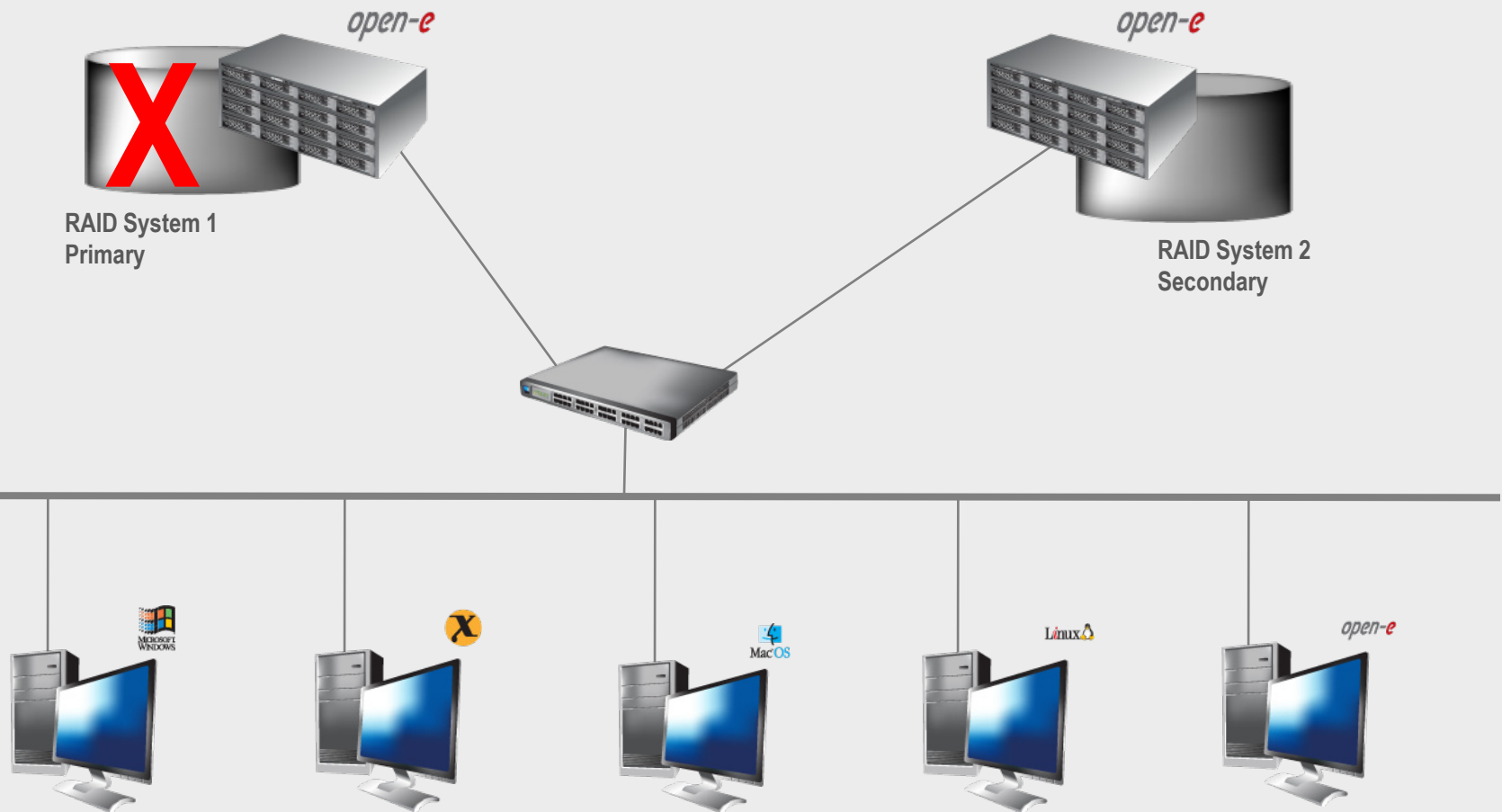
Asynchronous Data Replication over a LAN

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



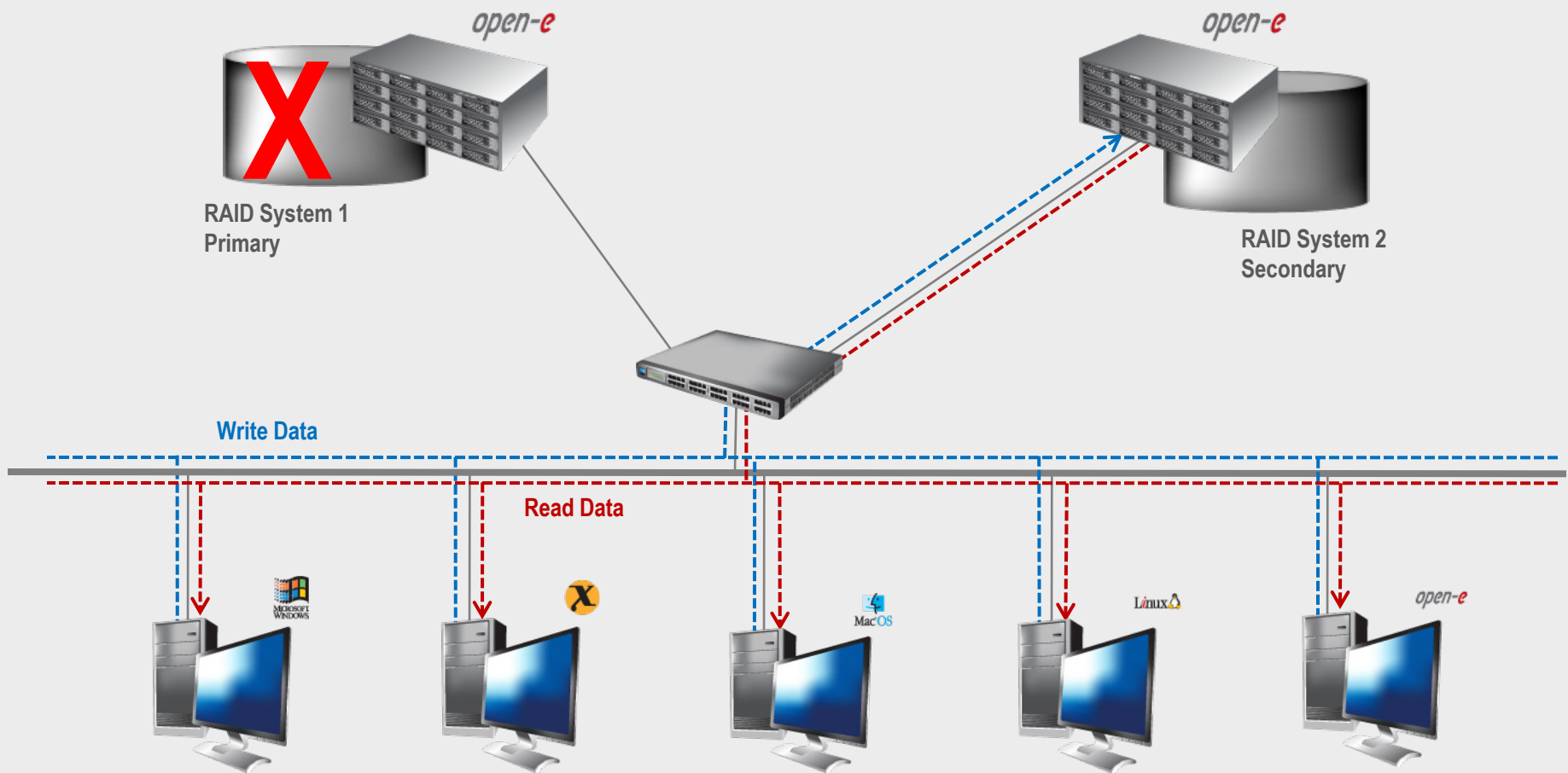
Asynchronous Data Replication over a LAN

- 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.



Asynchronous Data Replication over a LAN

- After switching, replicated volume is available on System 2



TO SET UP DATA REPLICATION, PERFORM THE FOLLOWING STEPS:

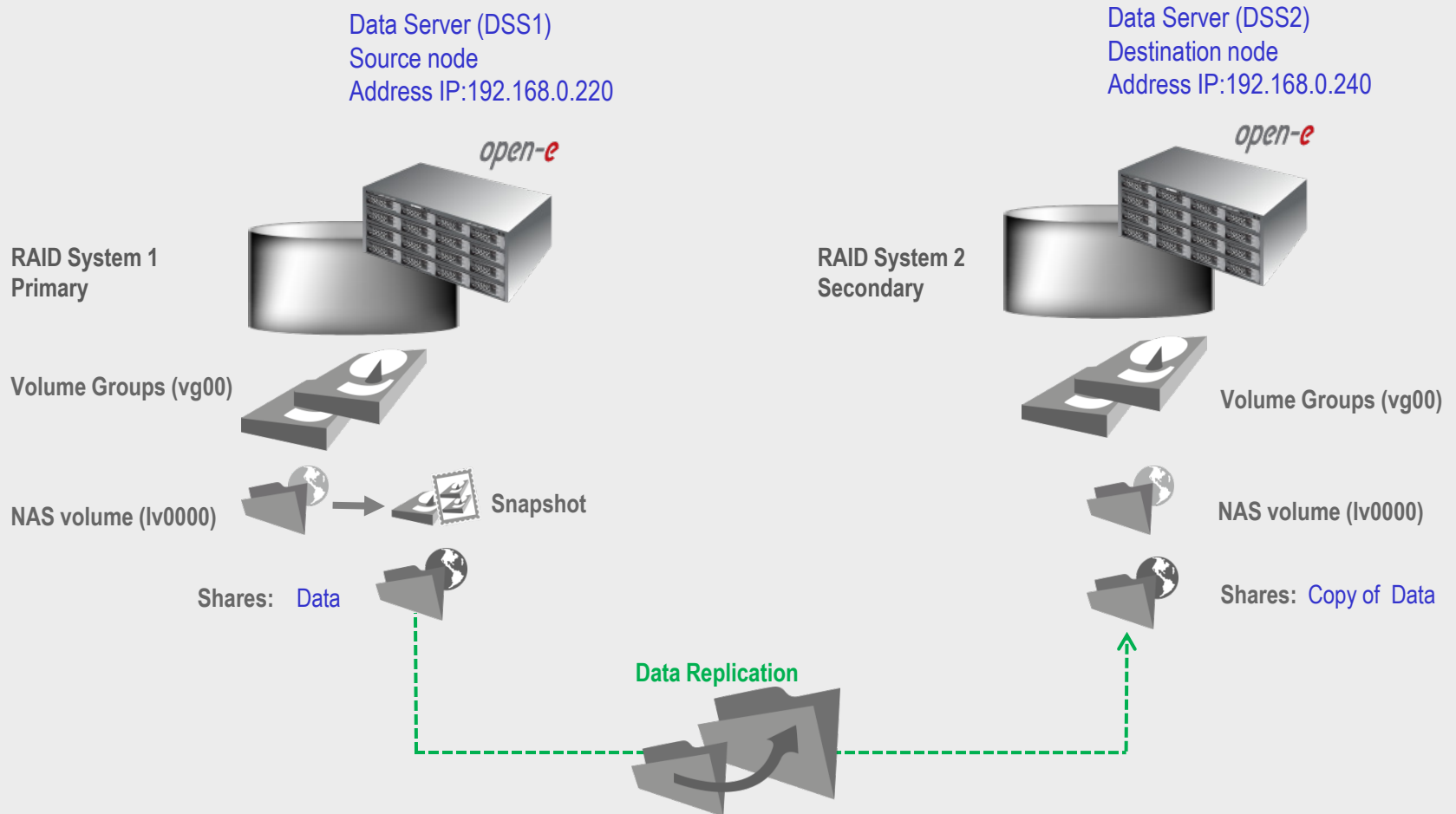
1. Hardware configuration
2. Configure the destination node
3. Configure the source node
4. Configure Schedule replication
5. Checking status data replication

Setting up Asynchronous Data Replication over a LAN

1. Hardware Configuration

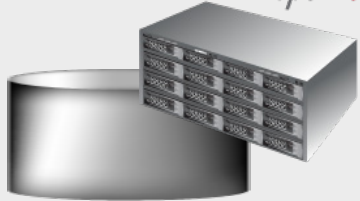
Hardware Requirements

To run the data replication of Open-E DSS (or NAS R-3), a minimum of two systems are required. Logical volumes working in slave mode must have snapshots created and enabled. Both servers are working in the Local Area Network. An example configuration is shown below:



Setting up Asynchronous Data Replication over a LAN

open-e



Data Server (DSS2)
Destination node
Address IP:192.168.0.240

2. Configure the Destination Node

Under the „CONFIGURATION” tab, 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.

The screenshot shows the open-e DSS web interface. The main navigation bar includes 'logout', 'DSS', and 'DATA STORAGE SERVER'. 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 'Vol. groups' and 'Vol. replication' sections. The 'Unit manager' section contains a table of units:

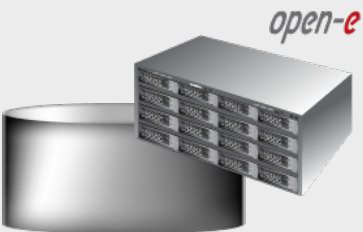
Unit	Size (GB)	Serial number	Status
Unit MD0	74.62	N/A	available

Below the table, the 'Action' dropdown is set to 'new volume_group' and the 'Name' field contains 'vg00'. The 'apply' button is visible at the bottom of this section. The 'Drive identifier' section shows a table with one unit:

Unit	Serial number	Status
Unit H0	S01JJ50Y893447	

The status at the bottom left is 'status: ✓'. The footer text reads 'Data Storage Server. All rights reserved'.

Setting up Asynchronous Data Replication over a LAN



Data Server (DSS2)
Destination node
Address IP:192.168.0.240

2. Configure the Destination Node

Volume Groups (vg00)



NAS volume (lv0000)



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

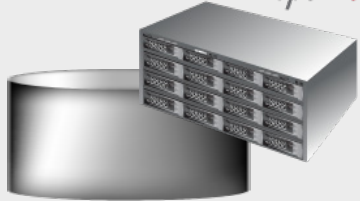
After assigning an appropriate amount of space for the NAS volume, click the **apply** button

The screenshot shows the 'open-e' web interface for a 'DATA STORAGE SERVER'. 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 is visible. The main area displays the configuration for 'Volume group: vg00'. A table lists logical volumes, including 'lv0000' with a size of 40.00 GB. Below the table, the 'Action:' dropdown is set to 'new NAS volume'. There is an unchecked checkbox for 'Use volume replication' and a slider for volume size. The 'add:' field is set to '0.00 GB'. An 'apply' button is at the bottom right. The status bar at the bottom indicates 'status: ✓' and 'Data Storage Server. All rights reserved'.

Logical Volume	Type	Snap.	Rep.	Init.	Blocksize (bytes)	Size (GB)
lv0000					N/A	40.00
System volumes						
						Size (GB)
Reserved for swap						4.00
Reserved for snapshots						0.00
Reserved for system						1.00
Reserved for replication						0.00
Free						29.56

Setting up Asynchronous Data Replication over a LAN

open-e



Data Server (DSS2)
Destination node
Address IP:192.168.0.240

2. Configure the Destination Node

Under the „CONFIGURATION” tab, select „NAS settings” menu.

Data Replication



Check the Enable Data replication Agent box, and click the “Apply” button

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

SETUP **CONFIGURATION** MAINTENANCE STATUS HELP

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

? NDMP data server
 Enable NDMP data server
apply

? Data replication agent
 Enable Data replication Agent
apply

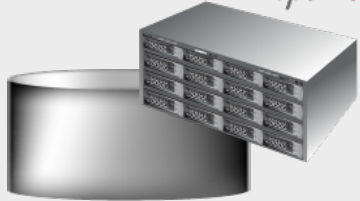
? Antivirus setup
 Use antivirus
 Use quarantine

status: ✓

Data Storage Server. All rights reserved

Setting up Asynchronous Data Replication over a LAN

open-e



Data Server (DSS2)
Destination node
Address IP:192.168.0.240

2. Configure the Destination Node

Under the „CONFIGURATION” tab, select „NAS settings” menu.

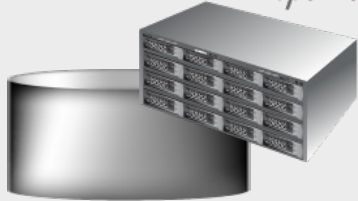
Shares: Copy of Data



A tree listing of NAS shared volumes (**Shares**) will appear on the left side of the DSS console. In the example, a shared volume named „Copy of Data” has been created.

Setting up Asynchronous Data Replication over a LAN

open-e



Data Server (DSS2)
Destination node
Address IP:192.168.0.240

2. Configure the Destination Node

After creating the new shared volume, configure it:

- Click on the share name (**Copy of Data**),
- Check the box **Use data replication** within **Data replication agent settings** function.
- Click on the **apply** button.

The screenshot shows the open-e web interface for a Data Storage Server (DSS). The 'CONFIGURATION' tab is selected, and the 'NAS resources' section is active. A share named 'Copy of Data' is selected. The 'Data replication agent settings' section is expanded, showing a checked box for 'Use data replication'. Below this are input fields for 'Login name:', 'Password:', 'Confirm password:', and 'Allow access IP:'. The 'apply' button is highlighted with a blue arrow. The 'Remove share' section is also visible at the bottom.

Shares: Copy of Data

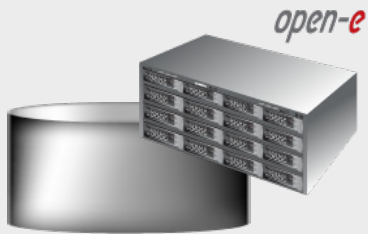


Data Replication



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

Setting up Asynchronous Data Replication over a LAN



Data Server (DSS1)
Source node
Address IP:192.168.0.220

3. Configure the Source Node

Under the „CONFIGURATION” tab, 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.

The screenshot shows the open-e DSS web interface. The main navigation bar includes 'logout', 'DSS', 'DATA STORAGE SERVER', and the 'open-e' logo. Below this are tabs for 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. Under the 'CONFIGURATION' tab, there are sub-tabs: '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 help icon. Below this is a 'Vol. replication' section with similar icons. On the right side of the interface, there are sections for 'Unit rescan' (with a 'rescan' button), 'Unit manager', and 'Drive identifier'. The 'Unit manager' section contains a table with the following data:

Unit	Size (GB)	Serial number	Status
<input type="checkbox"/> Unit MD0	466.59	N/A	available

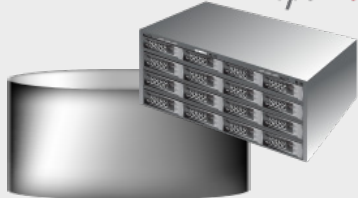
Below the table, there is an 'Action:' dropdown menu set to 'new volume_group' and a 'Name:' input field containing 'vg00'. An 'apply' button is located below these fields. The 'Drive identifier' section shows a table with the following data:

Unit	Serial number	Status
<input type="checkbox"/> Unit S000	Y636PANE	

At the bottom left of the interface, there is a 'status:' indicator with a green checkmark. At the bottom right, there is a footer: 'Data Storage Server. All rights reserved'.

Setting up Asynchronous Data Replication over a LAN

open-e



Data Server (DSS1)
Source node
Address IP:192.168.0.220

3. Configure the Source Node

Volume Groups (vg00)



NAS volume (lv0000)



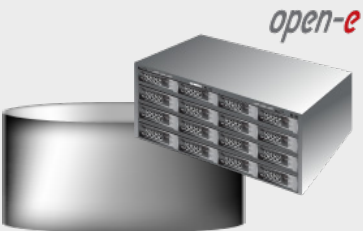
Select the appropriate volume group (**vg00**) from the list on the left and create a **new NAS volume** of the required size. This logical volume will be the source of the replication process.

After assigning an appropriate amount of space for the NAS volume, click the **apple** 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 is visible. On the right, the 'Volume group: vg00' configuration page is shown. A table lists logical volumes, including 'lv0000' with a size of 40.00 GB. Below the table, the 'Action:' dropdown is set to 'new NAS volume'. There are checkboxes for 'Use volume replication' and 'WORM'. A slider and input field for 'add:' are set to '0.00 GB'. An 'apply' button is at the bottom right.

Logical Volume	Type	Snap.	Rep.	Init.	Blocksize (bytes)	Size (GB)
lv0000					N/A	40.00
System volumes						
Reserved for swap						4.00
Reserved for snapshots						0.00
Reserved for system						1.00
Reserved for replication						0.00
Free						421.53

Setting up Asynchronous Data Replication over a LAN



Data Server (DSS1)
Source node
Address IP:192.168.0.220

3. Configure the Source Node

Snapshot



To run the replication process, you must first define a **new snapshot** in **Volume manager** function to be taken of the volume to be replicated.

After assigning an appropriate amount of space for the **snapshot**, click the **apply** button.

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 ?

Volume group: vg00

Volume manager

Logical Volume	Type	Snap.	Rep.	Init.	Blocksize (bytes)	Size (GB)
lv0000					N/A	40.00
snap00000	S				N/A	4.00
System volumes						
						Size (GB)
Reserved for swap						4.00
Reserved for snapshots						4.00
Reserved for system						1.00
Reserved for replication						0.00
Free						417.53

Action: new snapshot

Use volume replication

WORM

0 417.53

add: 0.00 GB

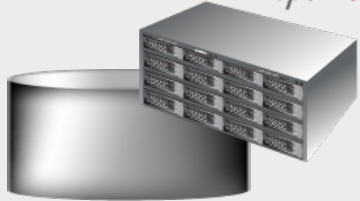
apply

status: ✓

Data Storage Server. All rights reserved

Setting up Asynchronous Data Replication over a LAN

open-e



Data Server (DSS1)
Source node
Address IP:192.168.0.220

3. Configure the Source Node

NAS volume
(lv0000)



Snapshot

Assign the snapshot (**snap00000**) to the logical volume to be replicated (in this example: **lv0000**) and click the **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 'CONFIGURATION', there are sub-tabs for 'volume manager', 'NAS settings', 'NAS resources', 'iSCSI target manager', and 'FC target manager'. The 'volume manager' tab is active, showing a tree view with 'Vol. groups' and 'Vol. replication'. The 'Vol. groups' section shows a group named 'vg00'. The right-hand pane is titled 'Volume group: vg00' and contains the following configuration options:

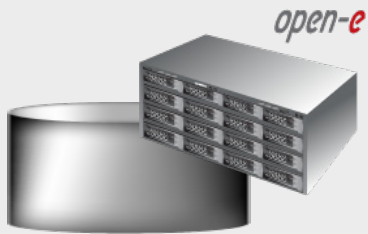
- Action: new NAS volume
- Use volume replication
- WORM
- A slider for volume size, currently set at 0, with a maximum of 417.53 GB.
- add: 0.00 GB
- apply button

Below this is the 'Snapshot definition' section, which contains a table:

Name	LV	Status
→ snap00000	lv0000	unused

At the bottom of the interface, there is a status indicator 'status: ✓' and an 'apply' button. A red footer bar at the bottom contains the text 'Data Storage Server. All rights reserved'.

Setting up Asynchronous Data Replication over a LAN



Data Server (DSS1)
Source node
Address IP:192.168.0.220

3. Configure the Source Node

Under the „CONFIGURATION” tab, select „NAS settings” menu.

Data Replication



Check the **Enable Data replication Agent** box, and click the **apply** button

Next, also check the **Use local backup** box in **Local backup settings** function, and click the **apply** button

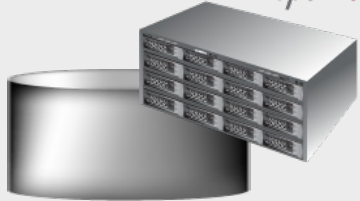
The screenshot shows the DSS web interface with the following configuration details:

- Navigation:** SETUP, CONFIGURATION (selected), MAINTENANCE, STATUS, HELP. Sub-menu: volume manager, NAS settings (selected), NAS resources, iSCSI target manager, FC target manager.
- Data replication agent:** Enable Data replication Agent. **apply** button.
- Antivirus setup:** Info: No shares found.
- Local backup settings:** Use local backup. Select backup database location: Default share on LV: lv0000. Other share: <choose share>. Create database. Move database. **apply** button.

status: ✓
Data Storage Server. All rights reserved

Setting up Asynchronous Data Replication over a LAN

open-e



Data Server (DSS1)
Source node
Address IP:192.168.0.220

3. Configure the Source Node

Under the „**CONFIGURATION**” tab, select „**NAS resources**” menu, to see a tree listing all the NAS shared volumes (**Shares**).

Shares: Data

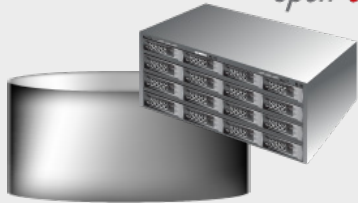


To create a share, enter the share name in field **Name**. In this example a new share named **Data** has been created

The screenshot shows the open-e DSS web interface. The main navigation bar includes 'logout', 'DSS', and 'DATA STORAGE SERVER'. 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 'NAS resources' sub-tab is active, showing a tree view with 'Shares', 'Users', and 'Groups'. The 'Shares' section is expanded, showing a list with one entry: 'Data'. To the right, the 'Create new share' form is visible, with the 'Name' field containing 'Data', the 'Default path' dropdown set to '/lv0000/Data', and an 'apply' button. Below the form is the 'ACL (Access control list)' section. At the bottom of the interface, there are buttons for 'Browser', 'Users & Groups', and 'Access Permissions'. The footer of the interface reads 'Data Storage Server. All rights reserved'.

Setting up Asynchronous Data Replication over a LAN

open-e



Data Server (DSS1)
Source node
Address IP:192.168.0.220

3. Configure the Source Node

After creating the new shared volume, configure it:

- Click on its name (Data),
- Check the box **Use data replication**, within the **Data replication agent settings** function.
- Click on the **apply** button

Shares: Data



Data Replication

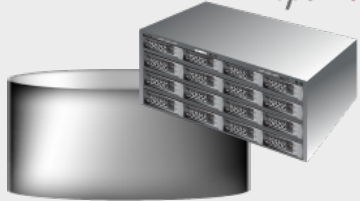


NOTE:

It is strongly recommended to protect the replication protocol with a user name and password, along with a list of allowed IP address. This will prevent local network users from accessing this share. **The user name and password must be the same as on the destination node.**

Setting up Asynchronous Data Replication over a LAN

open-e



Data Server (DSS1)
Source node
Address IP:192.168.0.220

3. Configure the Source Node

After the share to be replicated has been configured, go to the „**MAINTENANCE**” tab and select „**backup**” to choose the Data Replication function.

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

SETUP CONFIGURATION **MAINTENANCE** STATUS HELP

shutdown connections snapshot **backup** restore antivirus miscellaneous software update

Backup pools

Backup devices

Backup tasks

Data replication

Create new data replication task

Task name:

Source share:

Snapshot:

Destination IP:

Destination share:

Destination agent login:

Destination agent password:

Log replication errors

Use ACL

Don't delete files

apply

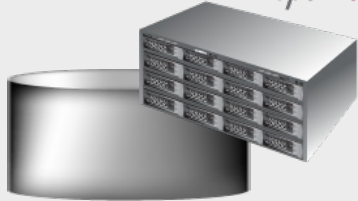
Data replication tasks

Info
No tasks have been found.

status: ✓

Data Storage Server. All rights reserved


Setting up Asynchronous Data Replication over a LAN



Data Server (DSS1)
Source node
Address IP:192.168.0.220

3. Configure the Source Node

Select the source share to be replicated. Under **Create new data replication task** function, enter a name for the task and select the **Source share** to be replicated. At this point, a snapshot (**snap00000**) of the source share will automatically be assigned.

In the **Destination IP** field, enter the IP address of the destination server (in this example, 192.168.0.240) and the user name/password (if applicable) for the destination. Next, configure the **Destination share** field by clicking on the  button. In this example, the **Copy of Data** share is appear. Click on the **apply** button.

logout **DSS** DATA STORAGE SERVER

SETUP CONFIGURATION **MAINTENANCE** STATUS HELP

shutdown connections snapshot **backup** restore antivirus miscellaneous software update

Backup pools ?

Create new data replication task

Task name: Replication_D01

Source share: Data

Snapshot: snap00000

Destination IP: 192.168.0.240

Destination share: Copy of Data

Destination agent login:

Destination agent password:

Log replication errors

Use ACL

Don't delete files

apply

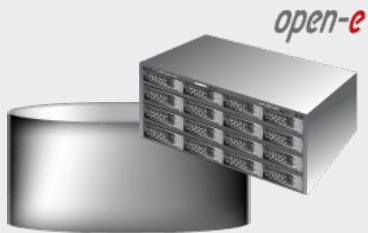
Data replication tasks

Info
No tasks have been found.

status: ✓

Data Storage Server. All rights reserved

Setting up Asynchronous Data Replication over a LAN



Data Server (DSS1)
Source node
Address IP:192.168.0.220

3. Configure the Source Node

After the DSS WEB console, has been reloaded, the new task should appear (Replication_D01). Obtain additional information about a selected replication task by accessing the **Data replication task** function

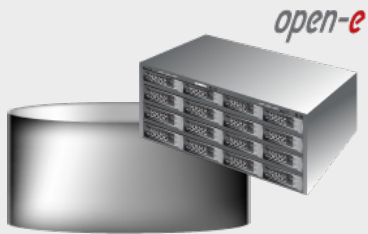
The screenshot shows the DSS (Data Storage Server) WEB console interface. The main menu includes SETUP, CONFIGURATION, MAINTENANCE, STATUS, and HELP. Under MAINTENANCE, there are sub-menus for shutdown, connections, snapshot, backup, restore, antivirus, miscellaneous, and software update. The 'backup' sub-menu is active, showing a list of backup pools, backup devices, backup tasks, and data replication tasks. The 'Data replication' section is selected, showing a task named 'Replication_D01'. The task details are displayed in a table:

Attribute	Value
Destination IP:	192.168.0.240
Source share:	Data
Snapshot:	snap00000
Destination share:	Copy of Data
Log replication errors:	Yes
Use ACL:	Yes
Don't delete files:	No

Below the table, there is a section for 'Create schedule for data replication task' with fields for Comment, Select time (Interval), and Interval (10 min. time period). An 'apply' button is visible at the bottom right. The status bar at the bottom indicates 'Data Storage Server. All rights reserved'.

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

Setting up Asynchronous Data Replication over a LAN



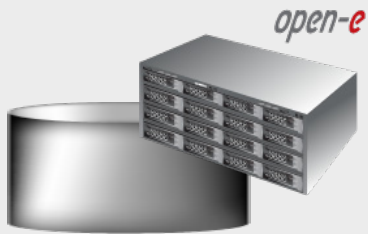
Data Server (DSS1)
Source node
Address IP:192.168.0.220

4. Configure Schedule replication

Using the **Create schedule for data replication task** function, set the desired replication schedules or explicitly start, stop and delete data replication tasks, as desired.

The screenshot shows the 'open-e DSS DATA STORAGE SERVER' web interface. The 'MAINTENANCE' tab is active, and the 'backup' sub-tab is selected. The main content area displays 'Data replication task: Replication_D01'. A blue arrow points from the text box to the 'Create schedule for data replication task' section, which includes a 'Comment' field, a 'Select time' dropdown menu set to 'Interval', and an 'Interval' dropdown menu set to '10 min. time period'. Below this is an 'apply' button. Other sections include 'Schedule for data replication task' (with an info message 'No schedules found.'), and 'Remove data replication task' (with a 'remove' button). The interface also shows a sidebar with 'Backup pools', 'Backup devices', 'Backup tasks', and 'Data replication' sections. The status bar at the bottom indicates 'status: ✓' and 'Data Storage Server. All rights reserved'.

Setting up Asynchronous Data Replication over a LAN



Data Server (DSS1)
Source node
Address IP:192.168.0.220

5. Checking status data replication

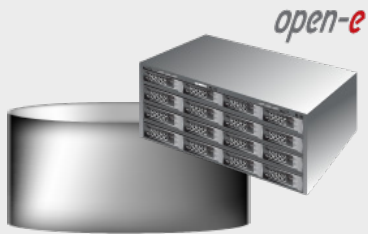
In Data replication tasks function set the desired data replication to start, stop and delete tasks

The screenshot shows the DSS web interface with the 'MAINTENANCE' tab selected. Under the 'backup' sub-tab, the 'Data replication tasks' section is expanded to show a table of tasks. The 'Replication_D01' task is highlighted, and its configuration details are shown in a pop-up window.

Name	Start time	Action
Replication_D01	2008-08-29 23:30:40	[Start] [Stop] [Delete]

Destination IP:	192.168.0.240
Source share:	Data
Snapshot:	snap00000
Destination share:	Copy of Data
Destination agent login:	
Log replication errors:	yes
Use ACL:	yes
Don't delete files:	no

Setting up Asynchronous Data Replication over a LAN



Data Server (DSS1)
Source node
Address
IP:192.168.0.220

5. Checking status data replication

To obtain detailed information about the progress of data replication tasks, under the „STATUS“ tab, select „tasks“ menu. Next click Data Replication tasks and select the Tasks

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 'STATUS' tab, there are sub-tabs for 'network', 'logical volume', 'connections', 'system', 'hardware', 'tasks', and 'S.M.A.R.T.'. The 'tasks' sub-tab is selected, and a left-hand menu shows 'Tasks' expanded with 'Data Replication' selected. The main content area displays 'Tasks: Data Replication' with sections for 'Running tasks' and 'Tasks log'. The 'Tasks log' section contains a table with the following data:

Time	Name	Type	Status	Action
2008-08-29 23:31:09	Replication_D01	Data replication	OK	Started
2008-08-29 23:29:44	Replication_D01	Data replication	OK	Finished
Files overall:		431		
Files transferred:		26		
Preparing time:		4.79 sec		
Sent:		267.71 MB		
Transfer:		14.90 MB/s		
2008-08-29 23:29:23	Replication_D01	Data replication	OK	Started

At the bottom of the interface, there is a 'status: ✓' indicator and a footer that reads 'Data Storage Server. All rights reserved'.

The configuration of the source and destination nodes for asynchronous data replication is now complete.

Thank You!