

**Step-by-Step Guide to
Asynchronous Data Replication
(File Based) over a WAN
Supported by Open-E® DSS™**



Asynchronous Data Replication over a WAN

	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	
Data Replication over a LAN		✓			✓	✓		✓			

- ASYNCHRONOUS DATA REPLICATION over a WAN** enables **asynchronous** file and folder copy from one storage system to another over the Wide Area Network:
 - With Asynchronous Replication, a point-in-time or 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 snapshot copy of the data, the source storage system creates a delta set of all of the changes since the snapshot 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.

Asynchronous **Data Replication** over a WAN

REPLICATION BETWEEN TWO SYSTEMS OVER A WAN

■ **Recommended Resources**

- Key Hardware (two system)
 - ✓ x86 compatible
 - ✓ RAID Controller
 - ✓ HDD's
 - ✓ Network Interface Cards
- Software:
 - ✓ Open-E DSS (recommended) or Open-E NAS-R3, 2 units

■ **Benefits**

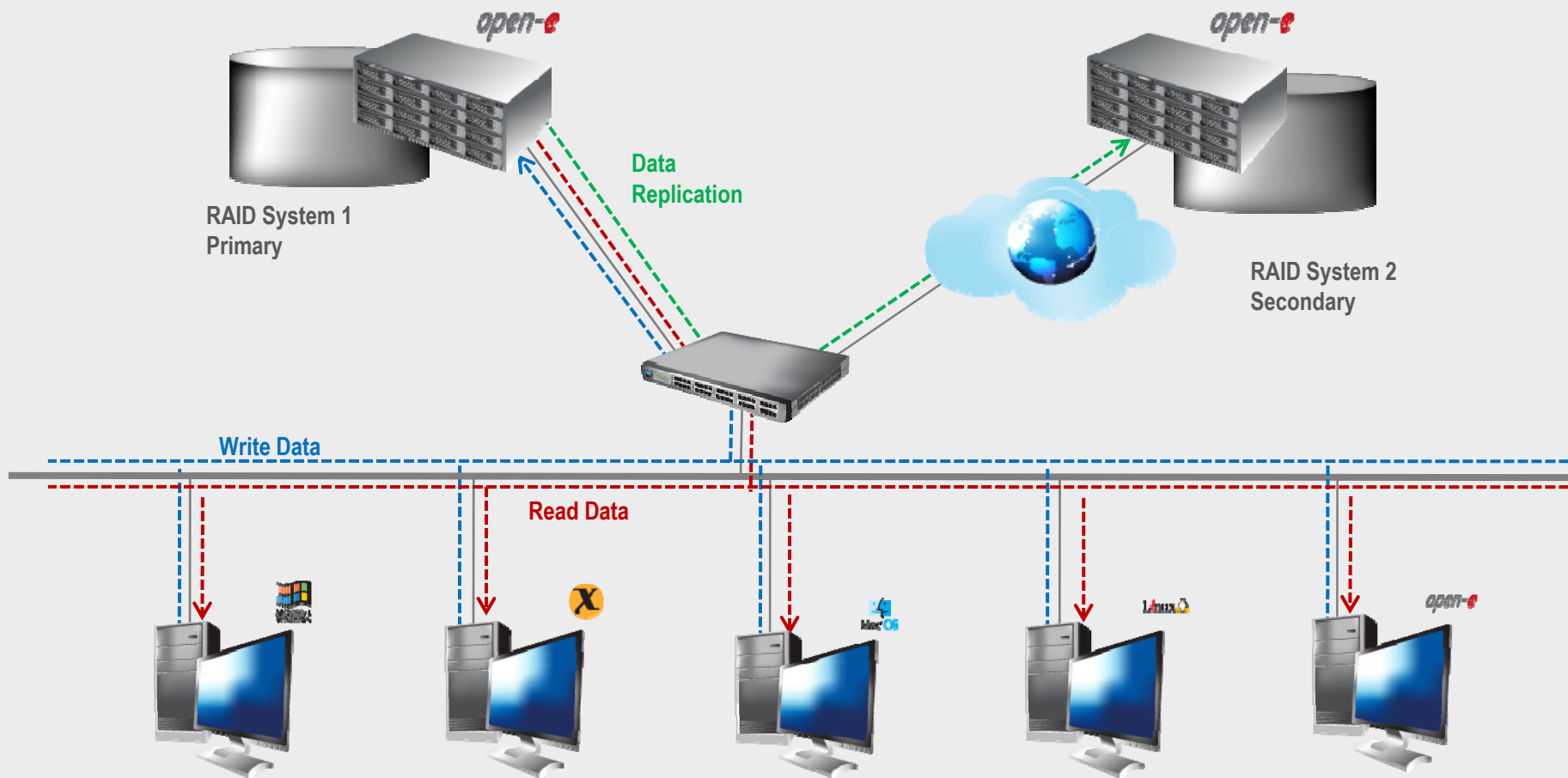
- Data redundancy
- Maximum data safety

■ **Disadvantages**

- High cost of WAN solution

Asynchronous Data Replication over a WAN

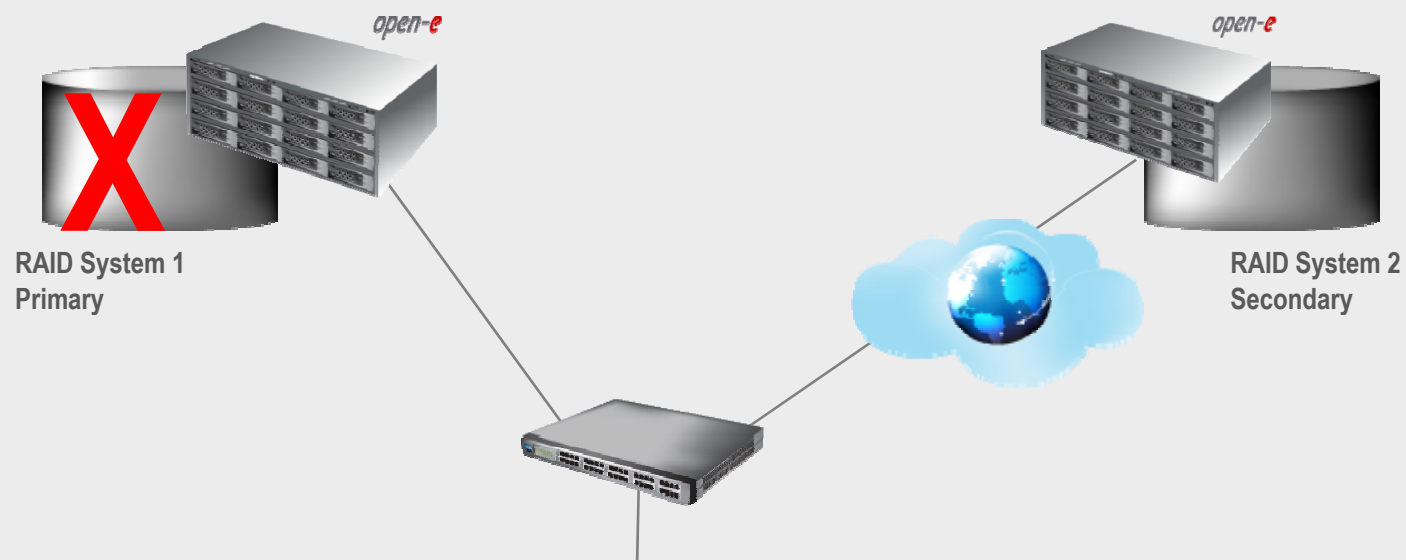
- Data is written and read in System 1
- Periodically data is replicated to System 2 via Internet connection.



Asynchronous Data Replication over a WAN

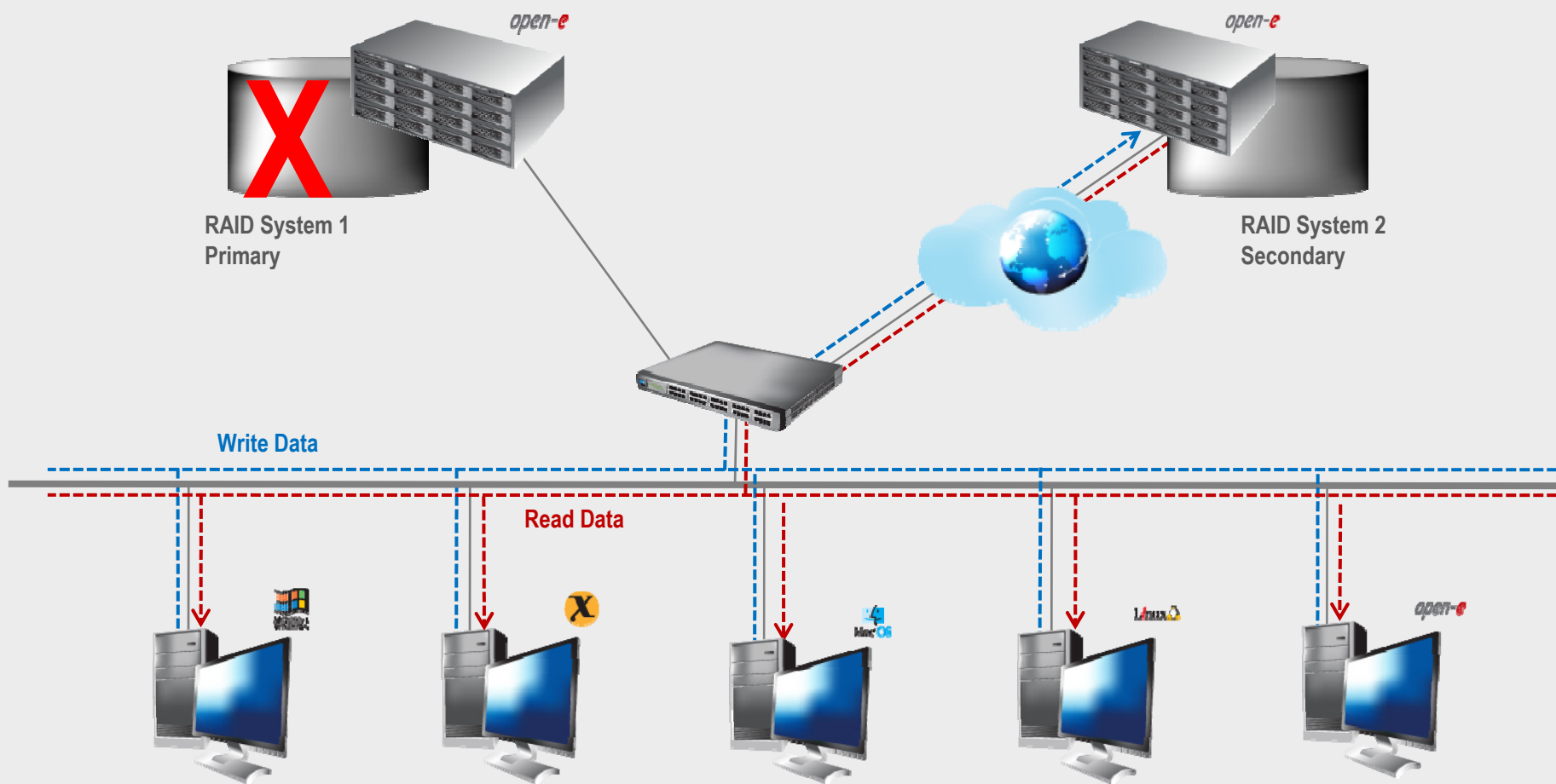
open-e

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



Asynchronous Data Replication over a WAN

- After switching, replicated data is available on System 2



Setting up Asynchronous **Data Replication** over a WAN



TO SET UP DATA REPLICATION, PERFORM THE FOLLOWING STEPS:

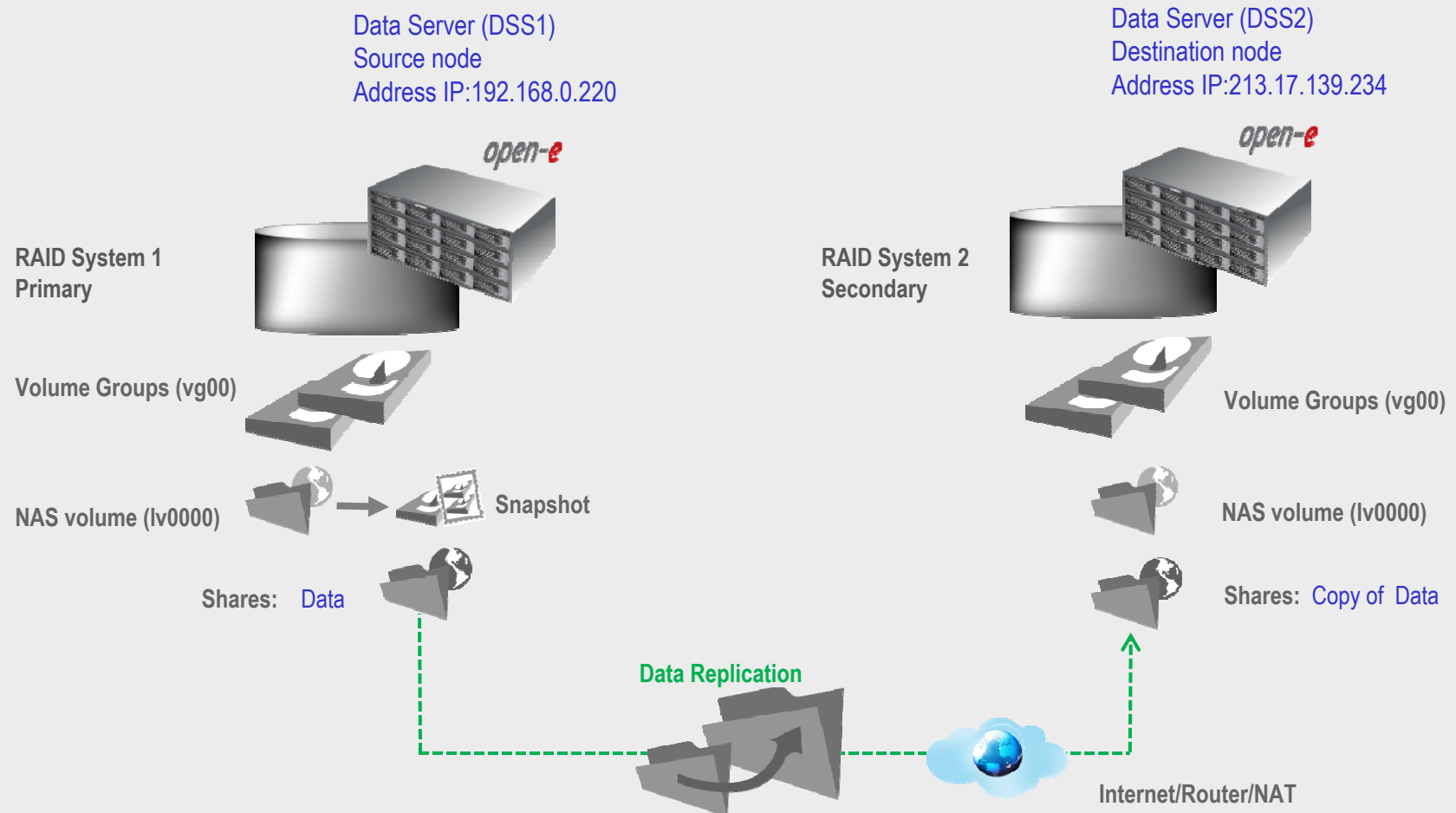
1. Hardware configuration
2. Configure DSS1 and DSS2 on the WAN
3. Configure the destination node
4. Configure the source node
5. Schedule replication

Setting up Asynchronous Data Replication over a WAN *open-e*

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 Wide Area Network. An example configuration is shown below:



Setting up Asynchronous **Data Replication** over a WAN *open-e*

2. Configure DSS1 and DSS2 on the WAN

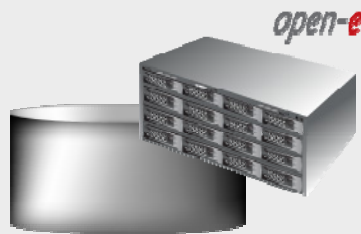
BELOW YOU CAN FIND OF SETTING THE DSS1 AND DSS2 ON THE WAN:

- DSS 1 - machine behind the NAT with local IP address,
- Forwarding port 873 to local ip from DSS 1 in your router (eg. below screenshot)

Port Range					
Application	Start	End	Protocol	IP Address	Enable
DSS	873	to 873	TCP	192.168.0.220	<input checked="" type="checkbox"/>
DSS	443	to 446	TCP	192.168.0.220	<input checked="" type="checkbox"/>
		to	TCP	192.168.0.	<input type="checkbox"/>
		to	TCP	192.168.0.	<input type="checkbox"/>

- DSS 2 – Data Storage System with external internet IP address router/firewall

Setting up Asynchronous Data Replication over a WAN



Data Server (DSS2)
Destination node
Address IP:213.17.139.234

3. Configure the Destination Node

Under the „CONFIGURATION” tab, 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 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 help icon. Below this is a 'Vol. replication' section. On the right side, there are three sections: 'Unit rescan' with a 'rescan' button; 'Unit manager' with a table of units and an 'apply' button; and 'Drive identifier' with a table of units and an 'apply' button. The 'Unit manager' table has the following data:

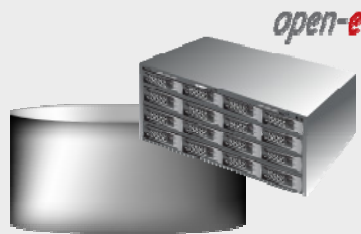
Unit	Size (GB)	Serial number	Status
Unit S000	372.61	3NF0N4HX	available

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

Unit	Serial number	Status
Unit S000	3NF0N4HX	

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

Setting up Asynchronous Data Replication over a WAN



Data Server (DSS2)
Destination node
Address IP:213.17.139.234

3. Configure the Destination Node

Volume Groups (vg00)



NAS volume (lv0000)



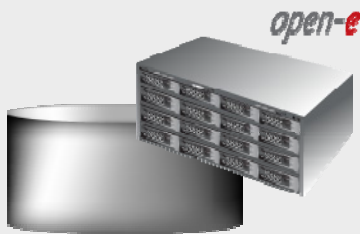
Select the appropriate volume group (vg00) from the list on the left and create a **new NAS volume** of the required size. This logical volume will be the destination of the replication process.

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

The screenshot shows the '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' with 'vg00' selected. The main panel 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 are checkboxes for 'Use volume replication' and 'WORM'. A slider and input field are used to specify the size, currently 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						327.56

Setting up Asynchronous Data Replication over a WAN



Data Server (DSS2)
Destination node
Address IP:213.17.139.234

3. 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

apply

? **NDMP data server**
 Enable NDMP data server
apply

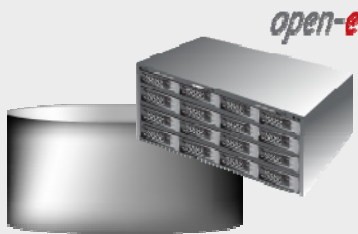
? **Data replication agent**
 Enable Data replication Agent
apply

? **Antivirus setup**
Info
No shares found.

Event Viewer: [x]

Data Storage Server. All rights reserved

Setting up Asynchronous Data Replication over a WAN



Data Server (DSS2)
Destination node
Address IP:213.17.139.234

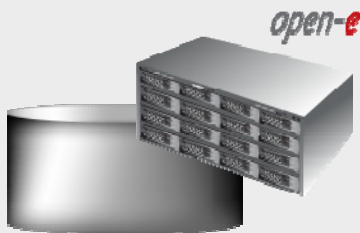
3. Configure the Destination Node

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 WAN



Data Server (DSS2)
Destination node
Address IP:213.17.139.234

3. 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.

Shares: Copy of Data

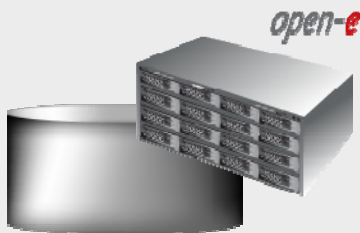


Data Replication



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

Setting up Asynchronous Data Replication over a WAN



Data Server (DSS1)
Source node
Address IP:192.168.0.220

4. Configure the Source Node

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

Volume Groups (vg00)



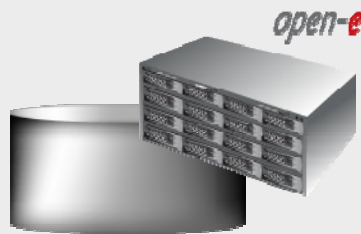
Add the selected physical units (Unit MD0) to create a new volume group (in this case, vg00) and click **apply** button.

The screenshot shows the DSS web interface with the following elements:

- Navigation tabs: SETUP, CONFIGURATION, MAINTENANCE, STATUS, HELP.
- Sub-navigation tabs: volume manager, NAS settings, NAS resources, iSCSI target manager, FC target manager.
- Left sidebar: Vol. groups, Vol. replication.
- Main content area: Unit rescan, Unit manager, Drive identifier.
- Unit manager table:

Unit	Size (GB)	Serial number	Status
<input type="checkbox"/> Unit S001	6286.81	35E615C9	available
- Action dropdown: new volume_group
- Name input field: vg00
- Buttons: rescan, apply

Setting up Asynchronous Data Replication over a WAN



Data Server (DSS1)
Source node
Address IP:192.168.0.220

4. 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 **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

Volume group: vg00

Volume manager

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						6241.81

Action: new NAS volume

Use volume replication

WORM

0 6241.81

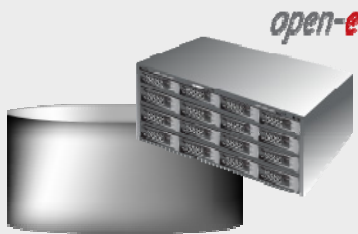
add: 0.00 GB

apply

Event Viewer: [icon]

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Setting up Asynchronous Data Replication over a WAN



Data Server (DSS1)
Source node
Address IP:192.168.0.220

4. 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.

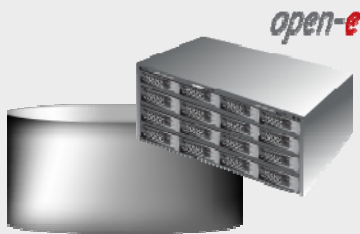
After assigning an appropriate amount of space for the **snapshot**, click the **apply** button.

The screenshot shows the 'DSS DATA STORAGE SERVER' web interface. The 'CONFIGURATION' tab is active, and the 'volume manager' sub-tab is selected. The 'Vol. replication' section is expanded for volume group 'vg00'. A table lists logical volumes and system volumes:

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						6237.81

Below the table, the 'Action:' dropdown is set to 'new snapshot'. There are checkboxes for 'Use volume replication' and 'WORM'. A slider bar is visible with '0' on the left and '6237.81' on the right. The 'add:' field is set to '0.00 GB'. The 'apply' button is highlighted in orange.

Setting up Asynchronous Data Replication over a WAN



Data Server (DSS1)
Source node
Address IP:192.168.0.220

4. 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 DSS web interface with the following elements:

- Navigation tabs: SETUP, CONFIGURATION, MAINTENANCE, STATUS, HELP.
- Sub-navigation tabs: volume manager, NAS settings, NAS resources, iSCSI target manager, FC target manager.
- Left sidebar: Vol. groups (vg00), Vol. replication.
- Main content area: Volume group: vg00 configuration page.

The configuration page includes:

- Action: new NAS volume
- Use volume replication:
- WORM:
- Progress bar: 0 to 6237.81
- add: 0.00 GB
- apply button

Below the configuration is a "Snapshot definition" table:

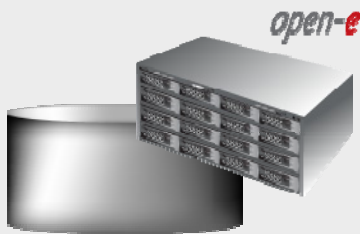
Name	LV	Status
→ snap00000	lv0000	unused

At the bottom of the table, there is an "apply" button. A blue arrow points from the text box to this button.

Event Viewer: [icon]

Data Storage Server. All rights reserved

Setting up Asynchronous Data Replication over a WAN



Data Server (DSS1)
Source node
Address IP:192.168.0.220

4. Configure the Source Node

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

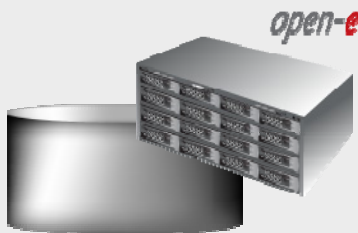
Data Replication



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

The screenshot shows the 'DSS DATA STORAGE SERVER' web interface. The 'CONFIGURATION' tab is active, and the 'NAS settings' sub-tab is selected. The interface includes several configuration sections: 'NDMP data server' with an unchecked 'Enable NDMP data server' checkbox; 'Data replication agent' with a checked 'Enable Data replication Agent' checkbox; and 'Antivirus setup'. Each section has an 'apply' button. An information box at the bottom states 'Info No shares found.' The footer of the interface reads 'Data Storage Server. All rights reserved.'

Setting up Asynchronous Data Replication over a WAN



Data Server (DSS1)
Source node
Address IP:192.168.0.220

4. 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

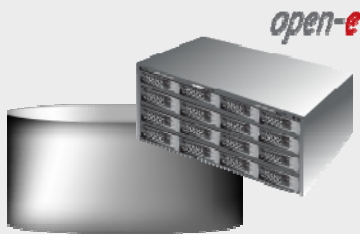


To create a share, enter the share name in field Name. In this example a new share named **Data** has been created

The screenshot shows the DSS web interface with the following elements:

- Logout button and DSS DATA STORAGE SERVER header.
- Navigation tabs: SETUP, CONFIGURATION (selected), MAINTENANCE, STATUS, HELP.
- Sub-navigation tabs: volume manager, NAS settings (selected), NAS resources (selected), iSCSI target manager, FC target manager.
- Left sidebar menu: Shares (selected), Users, Groups.
- Main content area: 'Create new share' form with fields for Name (Data), Comment, Default path (/lv0000/Data), and Specified path (/). An apply button is present.
- Below the form: 'ACL (Access control list)' section with a 'Browser' button and 'Users & Groups' / 'Access Permissions' sub-tabs.
- Footer: Data Storage Server. All rights reserved.

Setting up Asynchronous Data Replication over a WAN



Data Server (DSS1)
Source node
Address IP:192.168.0.220

4. 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

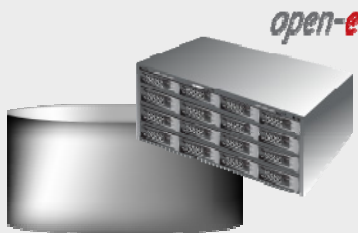


The screenshot shows the 'DATA STORAGE SERVER' web interface. The 'CONFIGURATION' tab is active, and the 'NAS resources' sub-tab is selected. On the left sidebar, the 'Shares' section is expanded to show '1. Data'. Below it, 'Users' and 'Groups' sections are visible. The main content area shows the configuration for 'Share: Data'. Under the 'Data replication agent settings' section, the checkbox 'Use data replication' is checked. Below this, there are input fields for 'Login name:', 'Password:', 'Confirm password:', and 'Allow access IP:'. At the bottom right of this section is an 'apply' button. Below the replication settings is a 'Remove share' section with a 'remove' button. The interface includes a top navigation bar with 'logout', 'DSS', and 'DATA STORAGE SERVER' labels, and a bottom status bar that reads 'Data Storage Server. All rights reserved'.

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 WAN

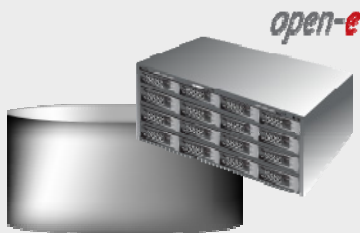


Data Server (DSS1)
Source node
Address IP:192.168.0.220

4. 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.


Setting up Asynchronous Data Replication over a WAN



Data Server (DSS1)
Source node
Address IP:192.168.0.220

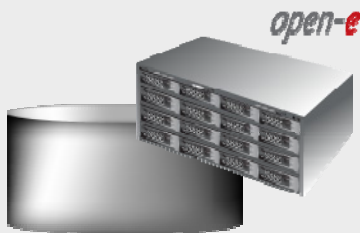
4. Configure the Source Node

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, 213.17.139.234) 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.

The screenshot shows the 'DSS DATA STORAGE SERVER' web interface. The 'MAINTENANCE' tab is active, and the 'Data replication' sub-tab is selected. The 'Create new data replication task' form is displayed with the following values: Task name: Replication_D01; Source share: data; Snapshot: snap00000; Destination IP: 213.17.139.234; Destination share: Copy of Data. The 'Log replication errors' and 'Use ACL' checkboxes are checked. An 'apply' button is at the bottom right. Below the form, a message box states 'No tasks have been found.'

Setting up Asynchronous Data Replication over a WAN



Data Server (DSS1)
Source node
Address IP:192.168.0.220

4. 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 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 'Data replication' section is expanded to show 'Replication_D01'. The configuration details for this task are as follows:

Attribute	Value
Destination IP:	213.17.139.234
Source share:	data
Snapshot:	snap00000
Destination share:	Copy of Data
Log replication errors:	Yes
Use ACL:	Yes
Don't delete files:	No

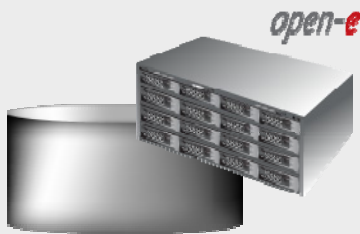
Below the table, there is a section for 'Create schedule for data replication task' with the following fields:

- Comment:
- Select time:
- Interval:

An 'apply' button is located at the bottom right of the configuration area. The footer of the console reads 'Data Storage Server. All rights reserved'.

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

Setting up Asynchronous Data Replication over a WAN

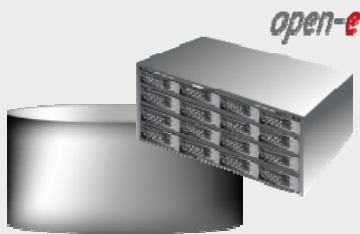


Data Server (DSS1)
Source node
Address IP:192.168.0.220

5. 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.

Setting up Asynchronous Data Replication over a WAN



Data Server (DSS1)
Source node
Address IP:192.168.0.220

6. 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 following elements:

- Navigation tabs: SETUP, CONFIGURATION, MAINTENANCE (selected), STATUS, HELP.
- Sub-navigation tabs: shutdown, connections, snapshot, backup (selected), restore, antivirus, miscellaneous, software update.
- Left sidebar: Data replication (selected), Replication_D01.
- Main content area: Checkboxes for 'Log replication errors' (checked), 'Use ACL' (checked), and 'Don't delete files' (unchecked). An 'apply' button is present.
- Modal window: 'Data replication tasks' with a table listing tasks.

Name	Start time	Action
Replication_D01	2008-12-03 23:46:54	[Play] [Stop] [Close]

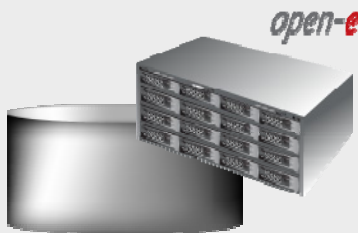
Below the table, configuration details are listed:

- Destination IP: 213.17.139.234
- 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

Event Viewer: [Off]

Footer: Data Storage Server. All rights reserved

Setting up Asynchronous Data Replication over a WAN



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 DSS web interface with the 'STATUS' tab selected. The 'tasks' menu is highlighted, and the 'Data Replication' sub-menu is selected. The main content area displays a table of running tasks and a tasks log.

Name	Type	Start time
Replication_D01	Data replication	2008-12-03 23:46:54

Time	Name	Type	Status	Action
2008-12-03 23:47:08	Replication_D01	Data replication	OK	Started
2008-12-03 20:20:57	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

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

Thank You!