

**A Step-by-Step Guide to
Asynchronous Volume Replication
(Block Based) over a WAN
with Open-E® DSS™**



Asynchronous **Volume 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	
Asynchronous Volume Replication over a WAN		✓			✓		✓	✓	✓	✓	✓

Asynchronous Volume Replication over WAN is block based and supports iSCSI, FC and NAS logical volumes. It provides data availability in case of source system disaster. When using Asynchronous Replication, the data on the standby node is consistent after the active node has failed, however the most recent updates performed prior to the crash could be lost.

REPLICATION BETWEEN TWO SYSTEMS OVER A WAN

■ **Recommended Resources**

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

■ **Benefits**

- Data redundancy
- Maximum data safety

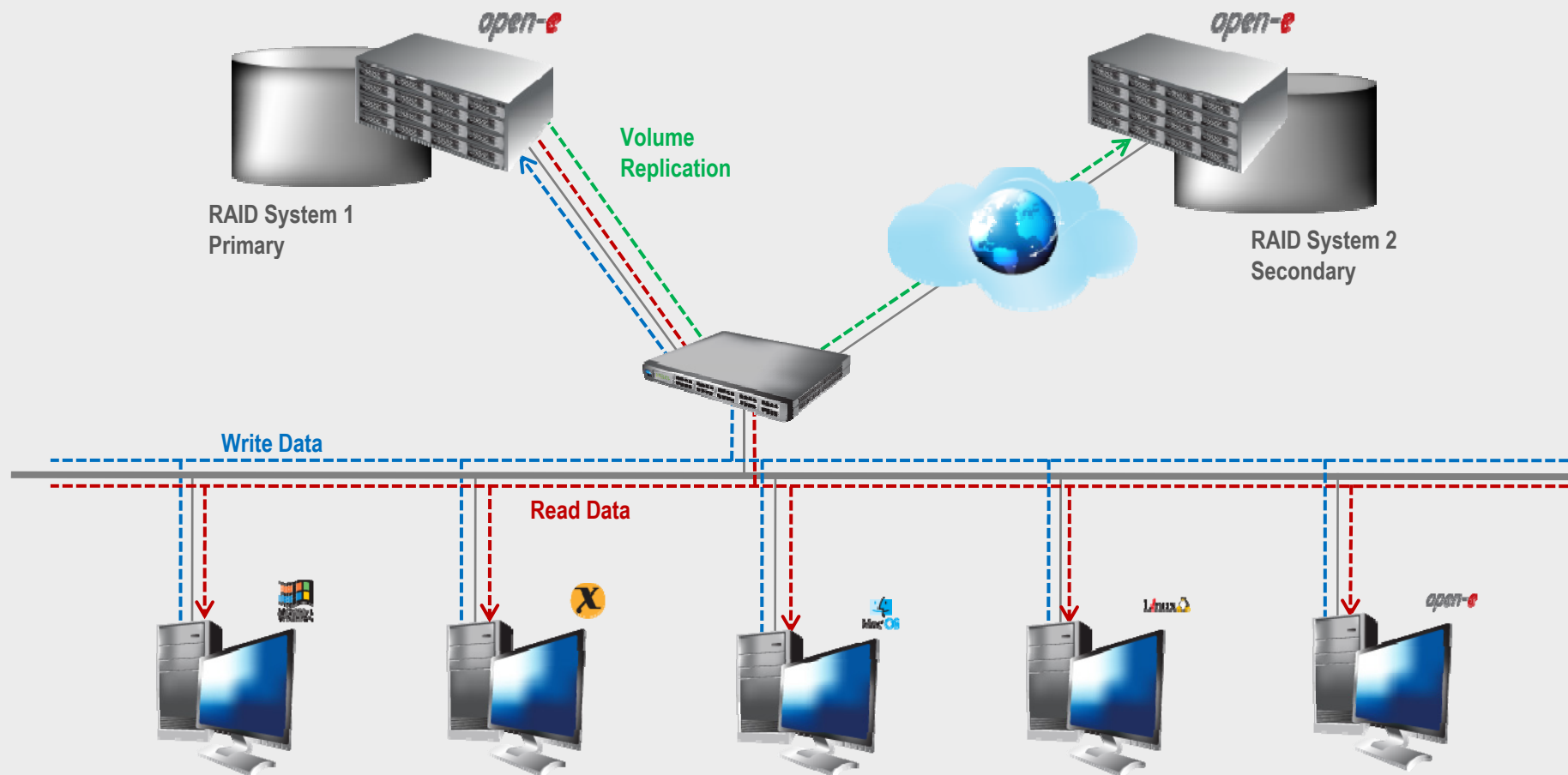
■ **Disadvantages**

- High cost of WAN solution

Asynchronous Volume Replication over a WAN

open-e

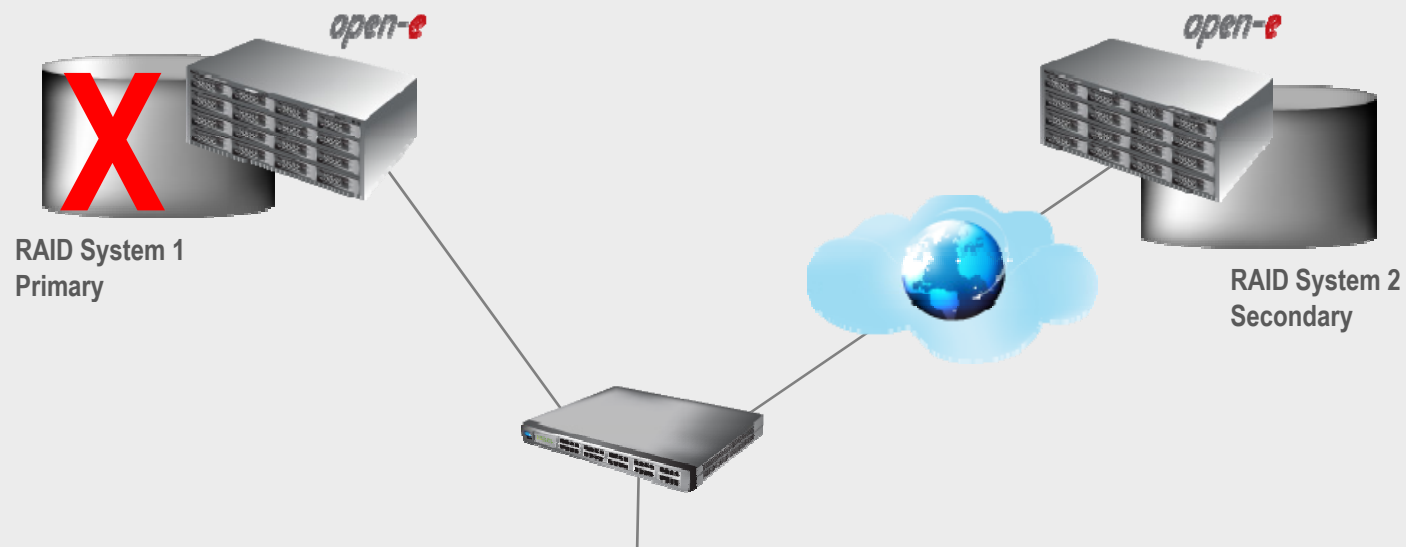
- Data is written and read to System 1
- Data is continuously replicated to System 2 via Internet connection



Asynchronous Volume Replication over a WAN

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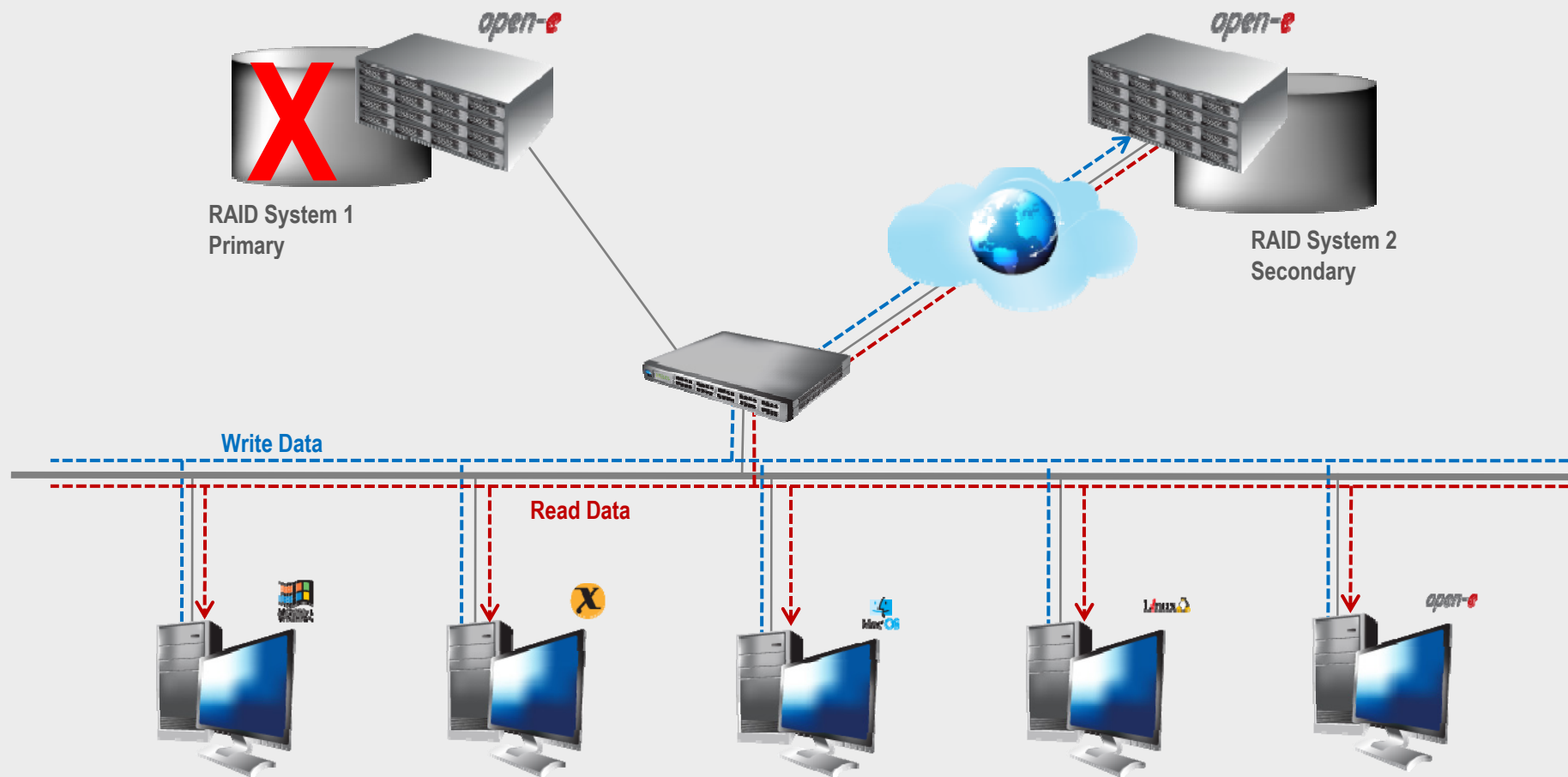
- In case of raid array error or disk drive error in the System 1, the server will send an e-mail notification to the administrator,
- In the case of a failure of system 1, users will be notified,
- Administrator then switches users to the System 2 over the WAN.



Asynchronous Volume Replication over a WAN

open-e

- After switching, replicated volume will be available on System 2



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

TO SET UP VOLUME REPLICATION, PERFORM THE FOLLOWING STEPS:

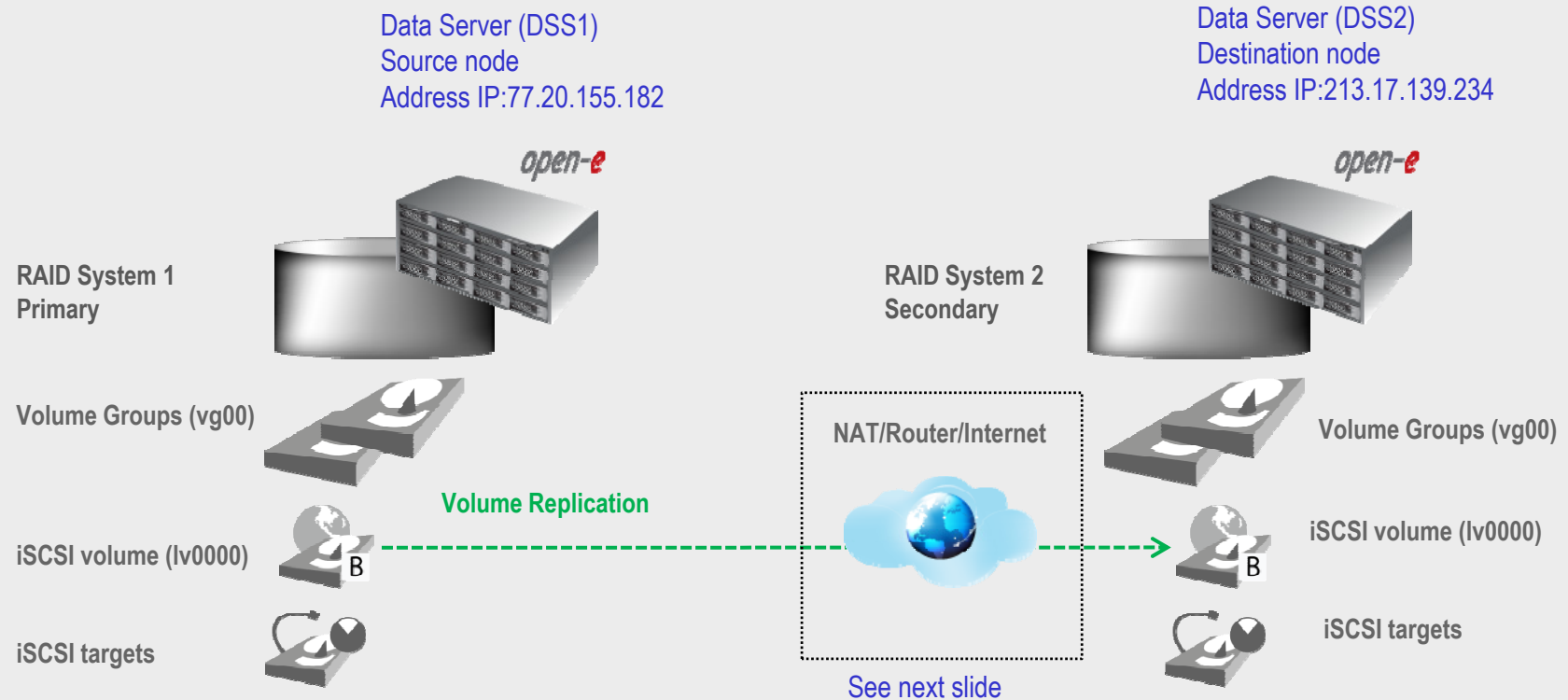
1. Hardware configuration
2. Configure DSS1 and DSS2 on the WAN
3. Configure the destination node
4. Configure the source node
5. Create the replication task
6. Check status of volume replication

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

Hardware Requirements

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

1. Hardware Configuration



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

2. Configure DSS1 and DSS2 on the WAN

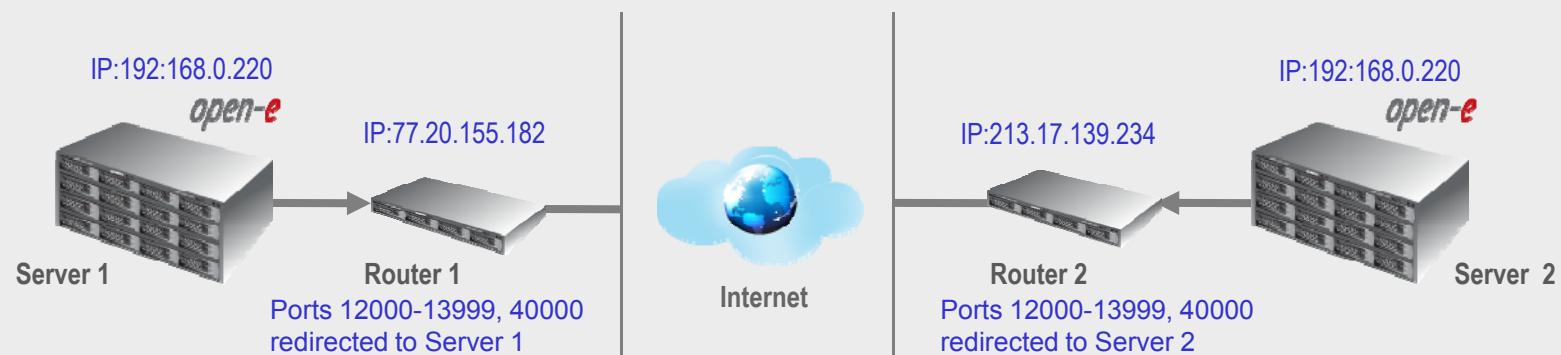
BELOW IS THE SETTING FOR DSS1 AND DSS2 FOR WAN:

DSS 1 - machine behind the NAT with local IP address,

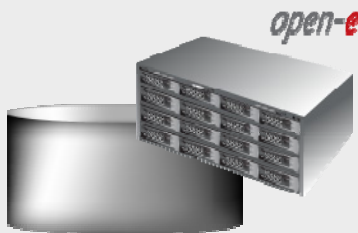
DSS 2 – Data Storage System with external internet IP address router/firewall

Please perform the following steps to set up of Asynchronous Volume Replication on routers:

- on **Router 1** redirect ports 12000-13999 and 40000 to **Server 1**,
- on **Router 2** redirect ports 12000-13999 and 40000 to **Server 2**.



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

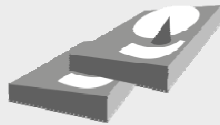


Data Server (DSS2)
Destination node
Address IP:213.17.139.234

3. Configure the Destination Node

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

Volume Groups (vg00)



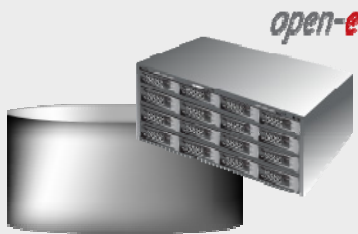
Add the selected physical units (Unit S000) to create a new volume group (in this case, vg00) and click **apply** button.

The screenshot shows the open-e DSS web interface. The 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 a 'Vol. groups' section with a search bar and a 'rescan' button. Below this is a 'Unit manager' section with a table of units. The table has columns for 'Unit', 'Size (GB)', 'Serial number', and 'Status'. One unit, 'Unit S000', is selected with a checkmark and has a status of 'available'. Below the table, there is a form with 'Action:' set to 'new volume group' and 'Name:' set to 'vg00'. An 'apply' button is visible below the form. At the bottom of the interface, there is an 'Event Viewer' and a footer that reads 'Data Storage Server. All rights reserved'.

Unit	Size (GB)	Serial number	Status
<input checked="" type="checkbox"/> Unit S000	372.61	3NF0N4HX	available

Action: new volume group
Name: vg00

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



Data Server (DSS2)
Destination node
Address IP:213.17.139.234

3. 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)



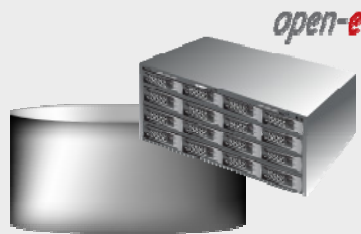
Next check box with **Use volume replication**

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, a list of volume groups shows 'vg00' selected. The main area displays the configuration for 'Volume group: vg00'. A table shows system volumes: Reserved Pool (4.00 GB), Reserved for snapshots (0.00 GB), Reserved for system (1.00 GB), Reserved for replication (0.00 GB), and Free (367.56 GB). Below the table, the 'Action' 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 also checked. A slider shows the volume size is set to 10.00 GB, with a note '(+0.12 GB for replication)'. The 'apply' button is visible at the bottom right.

System volumes	Size (GB)
Reserved Pool	4.00
Reserved for snapshots	0.00
Reserved for system	1.00
Reserved for replication	0.00
Free	367.56

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



Data Server (DSS2)
Destination node
Address IP:213.17.139.234

3. Configure the Destination Node

iSCSI volume (lv0000)



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

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

Info
Logical volume lv0000 has been created successfully.

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						357.44

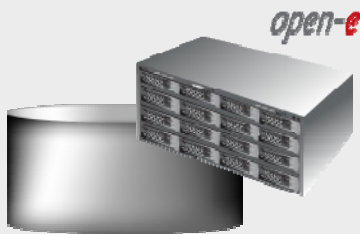
Action: new NAS volume

Use volume replication
 WORM

Event Viewer: [button]

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



Data Server (DSS2)
Destination node
Address IP:213.17.139.234

3. Configure the Destination Node

Under the „CONFIGURATION” tab, select „iSCSI target manager”.

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.

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: iqn.2009-02:dss2.target0
Alias: target0

apply

CHAP user target access

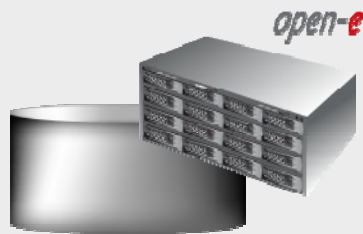
Enable CHAP user access authentication

apply

Event Viewer: [x]

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




Data Server (DSS2)
Destination node
Address IP:213.17.139.234

3. Configure the Destination Node



Select target0 within the Targets field.

iSCSI targets

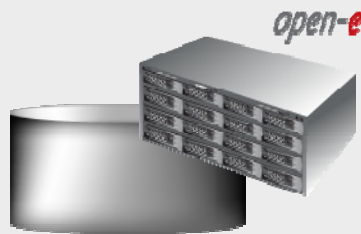


To assign a volume to the target, click the button  located under **Action**

The screenshot shows the 'iSCSI target manager' section of the DSS web interface. The 'Targets' list on the left contains 'target0'. The right pane shows configuration for 'Target: iqn.2009-02:dss2.target0'. Below the 'Info' section is a table with columns: Volume, SCSI ID, LUN, RO, WB, and Action. The table contains one row with Volume 'lv0000', SCSI ID '93YaEWZgg17Hoa4a', LUN '0', and checkboxes for RO and WB. A green plus button is visible in the Action column. Below the table are sections for 'CHAP user target access' (with an unchecked checkbox for 'Enable CHAP user access authentication') and 'Target IP access' (with a 'Deny access:' field). An 'apply' button is at the bottom right.

Volume	SCSI ID	LUN	RO	WB	Action
lv0000	93YaEWZgg17Hoa4a	0	<input type="checkbox"/>	<input type="checkbox"/>	 

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



Data Server (DSS2)
Destination node
Address IP:213.17.139.234

3. Configure the Destination Node

Under the „**CONFIGURATION**” tab, select „**volume manager**”. Select the **Vol. Replication**. Check box under **Destination** and click the **apply** button.

Volume Replication



Next, under **Mirror Server IP** function, enter the IP address of the source node. In our example, this would be 77.20.155.182. Next check the **WAN** box and enter a unique combination of 6 to 12 characters in the **ReplicationID** field and 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. The 'Vol. groups' section shows 'vg00'. The 'Volume replication mode' section has a table with the following data:

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

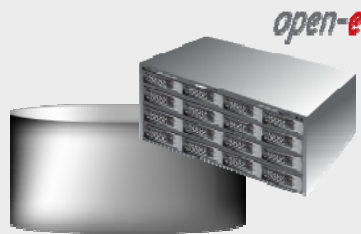
Below the table is an 'apply' button. The 'Mirror server IP' section has the following fields:

- IP address: 77.20.155.182
- WAN:
- ReplicationID: 193WERacvQ

Below these fields is another 'apply' button. At the bottom, there is a message: 'Info Mirror Server IP is not set.'

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

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



Data Server (DSS1)
Source node
Address IP:77.20.155.182

4. Configure the Source Node

Under the **CONFIGURATION** tab, select **volume manager**..

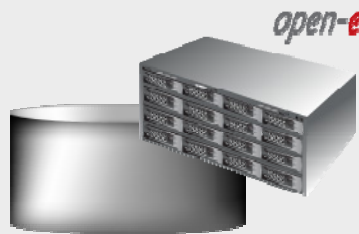
Volume Groups (vg00)



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: '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 table. The table has columns for 'Unit', 'Size (GB)', 'Serial number', and 'Status'. One unit, 'Unit S000', is selected with a checkmark. 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 visible below these fields. To the right of the 'Vol. groups' section is a 'Vol. replication' section. Below the 'Vol. groups' section, there is a 'Unit rescan' section with a 'rescan' button. Below that is a 'Unit manager' section with a table of units. The table has columns for 'Unit', 'Size (GB)', 'Serial number', and 'Status'. One unit, 'Unit S000', is selected with a checkmark. 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 visible below these fields. Below the 'Unit manager' section is a 'Drive identifier' section with a table of units. The table has columns for 'Unit', 'Serial number', and 'Status'. One unit, 'Unit S000', is selected with a checkmark. 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 visible below these fields. 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 Volume Replication over a WAN *open-e*



Data Server (DSS1)
Source node
Address IP:77.20.155.182

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

NOTE:

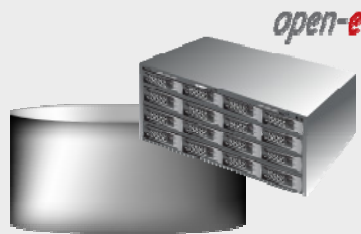
The source and destination volumes must be the exact same size. Remember to enable Volume Replication

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, under 'Vol. groups', the 'vg00' group is selected. Below it, the 'Vol. replication' section is visible. On the right, the 'Volume group: vg00' 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	5583.22

Below the table, the 'Action:' dropdown is set to 'new iSCSI volume' and the 'Options:' dropdown is set to 'Just create volume'. The 'Use volume replication' checkbox is checked. Underneath, there are radio buttons for 'File I/O' and 'Block I/O', with 'Block I/O' selected. A slider bar is visible, and at the bottom, the 'add:' field is set to '10.00 GB (+0.12 GB for replication)'. An 'apply' button is at the bottom right.

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



Data Server (DSS1)
Source node
Address IP:77.20.155.182

4. Configure the Source Node

iSCSI volume (lv0000)



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

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

Info
Logical volume lv0000 has been created successfully.

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						5573.09

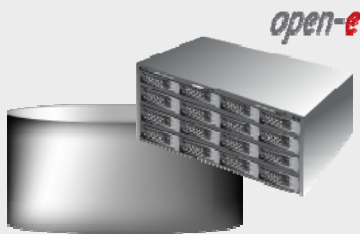
Action: new NAS volume

Use volume replication
 WORM

Event Viewer: []

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



Data Server (DSS1)
Source node
Address IP:77.20.155.182

4. Configure the Source Node

Under the „CONFIGURATION” tab, select „iSCSI target manager”.

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.

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: iqn.2009-02:dss241.target0

Alias: target0

apply

CHAP user target access

Enable CHAP user access authentication

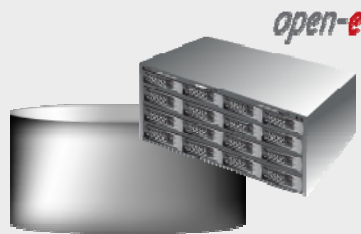
apply

CHAP users

Event Viewer: [x]

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



Data Server (DSS1)
Source node
Address IP:77.20.155.182

4. Configure the Source Node

Select target0 within the Targets field.

iSCSI targets

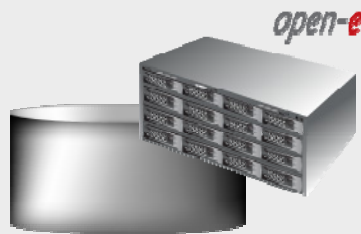


To assign a volume to the target, click the button  located under **Action**

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

- Navigation tabs: SETUP, CONFIGURATION (selected), MAINTENANCE, STATUS, HELP.
- Sub-navigation tabs: volume manager, NAS settings, NAS resources, **iSCSI target manager** (selected), FC target manager.
- Left sidebar: Targets (selected), CHAP users.
- Main content area: Target: iqn.2009-02:dss241.target0. Target volume manager section with an info message: "Currently there are no LUN's added to this target. In order to add a LUN, click on the green plus '+' sign in the 'Action' column for this LUN." A table lists LUNs with columns: Volume, SCSI ID, LUN, RO, WB, and Action. The first row shows Volume lv0000, SCSI ID gQbOSAsx15eVVfkK, LUN 0, and a green plus button in the Action column. Below the table is the CHAP user target access section with a checkbox for "Enable CHAP user access authentication" and an apply button. At the bottom is the Target IP access section with a "Deny access:" label and an input field.
- Footer: Event Viewer: [input] and Data Storage Server. All rights reserved.

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



Data Server (DSS1)
Source node
Address IP:77.20.155.182

4. Configure the Source Node

iSCSI targets

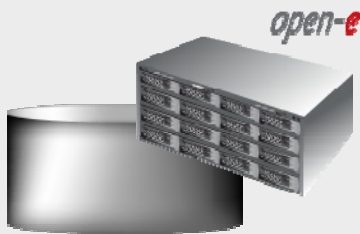


The source iSCSI target is now configured.

The screenshot shows the 'DSS DATA STORAGE SERVER' web interface. The 'CONFIGURATION' tab is active, and the 'iSCSI target manager' sub-tab is selected. The 'Targets' section on the left shows a list with 'target0' selected. A blue arrow points from the text box to the 'target0' entry. The main content area shows the configuration for 'Target: iqn.2009-02:dss241.target0'. Under 'Target volume manager', a table lists the volume 'lv0000' with SCSI ID 'gQbOSAsx15eVVfkk' and LUN '0'. Below the table, it shows 'Volume replication: Source' and 'Size (GB): 10.00'. The 'CHAP user target access' section has an unchecked checkbox for 'Enable CHAP user access authentication'. The 'Target IP access' section has input fields for 'Deny access:' and 'Allow access:'. An 'apply' button is visible at the bottom right of the configuration area. The footer of the interface reads 'Data Storage Server. All rights reserved'.

Volume	SCSI ID	LUN	RO	WB	Action
lv0000	gQbOSAsx15eVVfkk	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="button" value="+"/> <input type="button" value="-"/>

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



Data Server (DSS1)
Source node
Address IP:77.20.155.182

4. Configure the Source Node

Now, select the **Vol. replication** and check the 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 213.17.139.234. Next check the **WAN** box and enter the unique combination ID you entered in the destination node. Then, click the **apply** button.

The screenshot shows the 'DSS DATA STORAGE SERVER' web interface. The 'CONFIGURATION' tab is active, and the 'Vol. replication' sub-tab is selected. A table titled 'Volume replication mode' has the following data:

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

Below the table, the 'Mirror server IP' section is visible with the following fields:

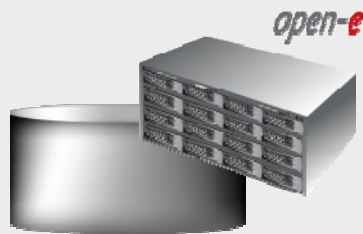
- IP address: 213.17.139.234
- WAN:
- ReplicationID: 193WERacvQ

An 'Info' message at the bottom of the page reads: 'Mirror Server IP is not set.'

NOTE:


The source and destination volumes must have the identical ReplicationID number.

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



Data Server (DSS1)
Source node
Address IP:77.20.155.182

5. Creating replication task

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

Volume Replication



In the **Destination volume** field select the appropriate volume (in this example, **lv0000**)
Next check the **Asynchronous protocol** box and click **create** to confirm.

The screenshot shows the DSS web interface with the following configuration for creating a new volume replication task:

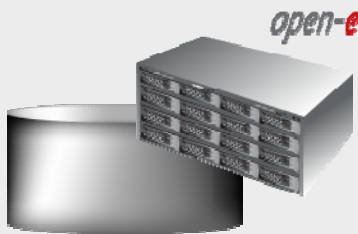
- ReplicationID: 193WERacvQ
- Task name: Replication_WAN
- Source volume: lv0000
- Destination volume: lv0000
- Bandwidth for SyncSource (MB): 40
- Asynchronous protocol:

Buttons: apply, create

Replication tasks manager: No tasks have been found.

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

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



Data Server (DSS1)
Source node
Address IP:77.20.155.182

5. Creating replication task

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

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

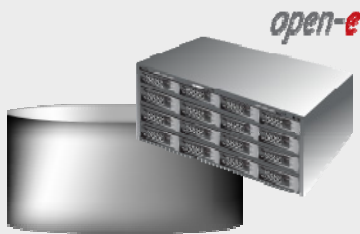
- Navigation tabs: SETUP, CONFIGURATION, MAINTENANCE, STATUS, HELP
- Sub-navigation tabs: volume manager, NAS settings, NAS resources, iSCSI target manager, FC target manager
- Left sidebar: Vol. groups (vg00), Vol. replication (Replication_WAN)
- Main content area: WAN: ; ReplicationID: 193WERacvQ; apply button
- Buttons: Create new volume replication task, Replication tasks manager
- Info box: No volumes with replication functionality found or all volumes have a task assigned already.
- Replication tasks manager table:

Name	Start time	Action
Replication_WAN	n/a	
Source volume: lv0000 Destination volume: lv0000 Destination IP: 213.17.139.234 Protocol type: Asynchronous		

Event Viewer:

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



Data Server (DSS1)
Source node
Address IP:77.20.155.182

5. Creating 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, Replication WAN).

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 contains 'volume manager', 'NAS settings', 'NAS resources', 'iSCSI target manager', and 'FC target manager'. The 'volume manager' section is active, showing 'Vol. groups' with 'vg00' and 'Vol. replication' with 'Replication_WAN'. The 'Replication tasks manager' section displays a table with the following data:

Name	Start time	Action
Replication_WAN	2009-02-27 21:08:39	[Start] [Stop] [Delete]

Below the table, the configuration for 'Replication_WAN' is shown:

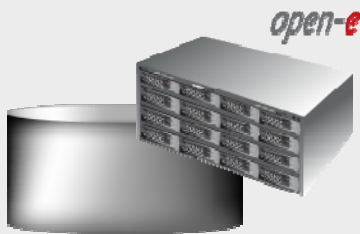
- Source volume: lv0000
- Destination volume: lv0000
- Destination IP: 213.17.139.234
- Protocol type: Asynchronous

The 'Create schedule for volume replication task' section includes a 'Comment' field, checkboxes for days of the week (Monday through Sunday), and time selection for 'Start' and 'Stop' (both set to 00:00). Frequency options include 'Every week' (selected), 'Every even week', and 'Every odd week'. The footer of the interface reads 'Data Storage Server. All rights reserved'.

NOTE:

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

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



Data Server (DSS1)
Source node
Address IP:77.20.155.182

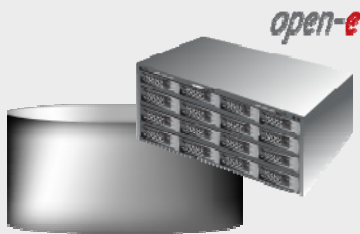
5. Creating replication task

In the “Create schedule for volume replication task” function, enter a comment for the new schedule and select for all days of the week. In this example choose **Every week** and select time for the start task (8 pm) and stop (7 am). Next, click the **apply** button.

NOTE:

In case of bandwidth limitation you can start the Volume Replication over the WAN in scheduled function at night in order not to load the connection which can be used by other applications.

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



Data Server (DSS1)
Source node
Address IP:77.20.155.182

6. Check status of volume replication

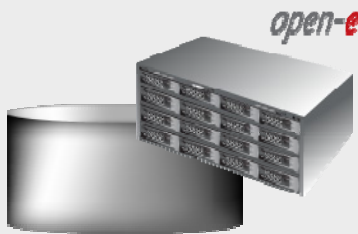
Under the „STATUS” tab, select „tasks” and select Volume Replication to display information on existing volume replication tasks

The screenshot shows the open-e Data Storage Server (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 a tree view of tasks: 'Tasks' (expanded), 'Backup', 'Restore from backup', 'Data Replication', 'Antivirus', 'Volume Replication' (selected), and 'Snapshots'. The main content area displays 'Tasks: Volume Replication' with two sections: 'Running tasks' and 'Tasks log'. The 'Running tasks' section contains a table with one entry: 'Replication_WAN' (Volume replication) starting at '2009-02-27 21:08:39'. The 'Tasks log' section contains a table with one entry: '2009-02-27 21:08:47' (Replication_WAN, Volume replication) with a status of 'OK' and action 'Started'. At the bottom, there is an 'Event Viewer' field and a footer that reads 'Data Storage Server. All rights reserved'.

Name	Type	Start time
Replication_WAN	Volume replication	2009-02-27 21:08:39

Time	Name	Type	Status	Action
2009-02-27 21:08:47	Replication_WAN	Volume replication	OK	Started

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



Data Server (DSS1)
Source node
Address IP:77.20.155.182

6. Check status of volume replication

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

All possible connection types (from **Connection** field) are described in table:

State	Description
StandAlone	Indicates that volume replication has been disabled
Unconnected	Mirror server is not connected
WFConnection	Mirror server waits for a connection
WFReportParams	Displayed when connection to the mirror server is in progress
Connected	Source and destination servers have been connected successfully
ServerForLess	Error on the mirror server side
Timeout, BrokenPipe, NetworkFailure	Displayed when servers cannot communicate successfully while connected
WFBitMap(S,T)	Displayed when the volume replication starts
SyncSource	Replication is in progress, the data is consistent
SyncTarget	Replication is in progress, the data is inconsistent

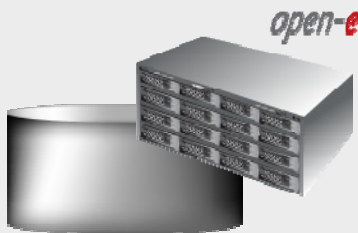
On the 30th slide.

The screenshot shows the DSS web interface with the 'tasks' tab selected. The 'Volume Replication' task is highlighted in the left sidebar. The main panel displays details for the 'Replication_WAN' task, including its type (Volume replication), start time (2009-02-27 21:08:39), and various parameters like protocol type (Asynchronous), connection (SyncSource), and source/destination info. The destination consistency is shown as 'Inconsistent' in red. A 'Tasks log' table at the bottom shows the task started at 21:08:47 with a status of 'OK'.

Name	Type	Start time
Replication_WAN	Volume replication	2009-02-27 21:08:39

Time	Name	Type	Status	Action
2009-02-27 21:08:47	Replication_WAN	Volume replication	OK	Started

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



Data Server (DSS1)
Source node
Address IP:77.20.155.182

6. Check status of volume replication

The replication tasks shows consistency status of the destination volume. This will state **Inconsistent** immediately upon starting a new replication.

This will switch to **Consistent** once reaching the state that both volumes are in sync. Destination volume has useful data only when replication task reaches **Consistent** state.

Asynchronous replication does not guarantee exact mirror of the data especially with slow uplink, but data remains consistent.

It could be that some of the most recent files are missing on destination volume. The amount of the not replicated data depends on the uplink speed and the amount of the new data on the source volume.

The screenshot shows the 'STATUS' page of the 'DATA STORAGE SERVER' (DSS) web interface. The 'tasks' tab is selected, showing a list of tasks on the left and details for 'Replication_WAN' on the right. The 'Running tasks' section shows the task is in progress with a start time of 2009-02-27 21:08:39. The 'Tasks log' section shows a log entry for the same task with a status of 'OK' and 'Started'.

Name	Type	Start time
Replication_WAN	Volume replication	2009-02-27 21:08:39

Protocol type: Asynchronous
Connection: Connected

Source info:
Logical volume: lv0000
Consistency: Consistent

Destination info:
Logical volume: lv0000
Consistency: Consistent
IP address: 213.17.139.234

Time	Name	Type	Status	Action
2009-02-27 21:08:47	Replication_WAN	Volume replication	OK	Started

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

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

CONNECTION STATES:

State	Description
StandAlone	Indicates that volume replication has been disabled.
Unconnected	Mirror server is not connected.
WFConnection	Mirror server waits for a connection.
WFReportParams	Displayed when connection to the mirror server is in progress.
Connected	Source and destination servers have been connected successfully.
ServerForDLess	Error on the mirror server side.
Timeout, BrokenPipe, NetworkFailure	Displayed when servers cannot communicate successfully while connected
WFBitMap{S,T}	Displayed when the volume replication starts.
SyncSource	Replication is in progress, the data is consistent.
SyncTarget	Replication in progress, the data is inconsistent.

Thank You!