

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



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# Synchronous **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	
Synchronous Volume Replication over a WAN	✓				✓		✓	✓	✓	✓	✓

**Synchronous 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.

## 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**

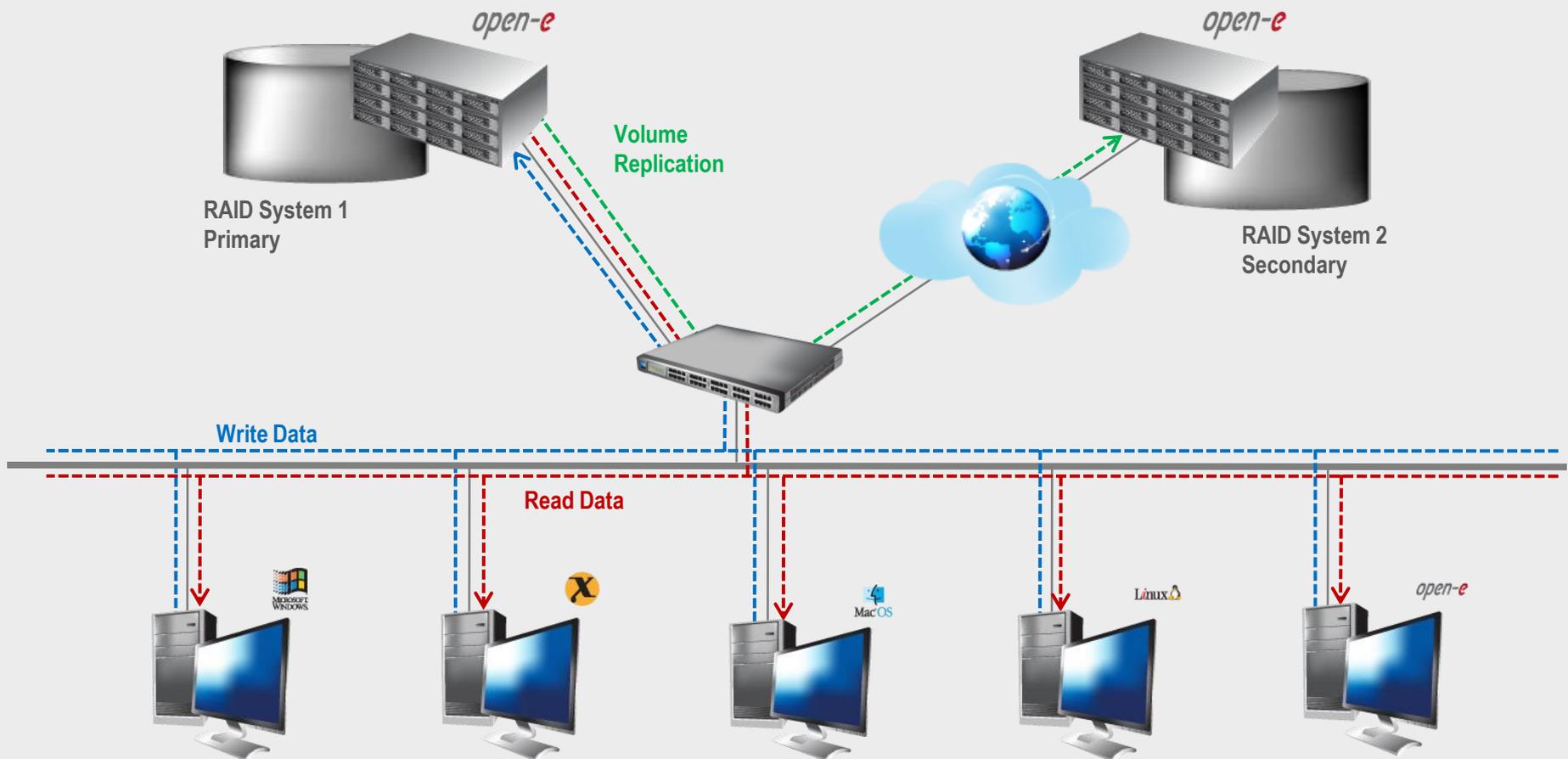
- Data redundancy
- Maximum data safety

### ■ **Disadvantages**

- High cost of WAN solution

# Synchronous **Volume Replication** over a WAN

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



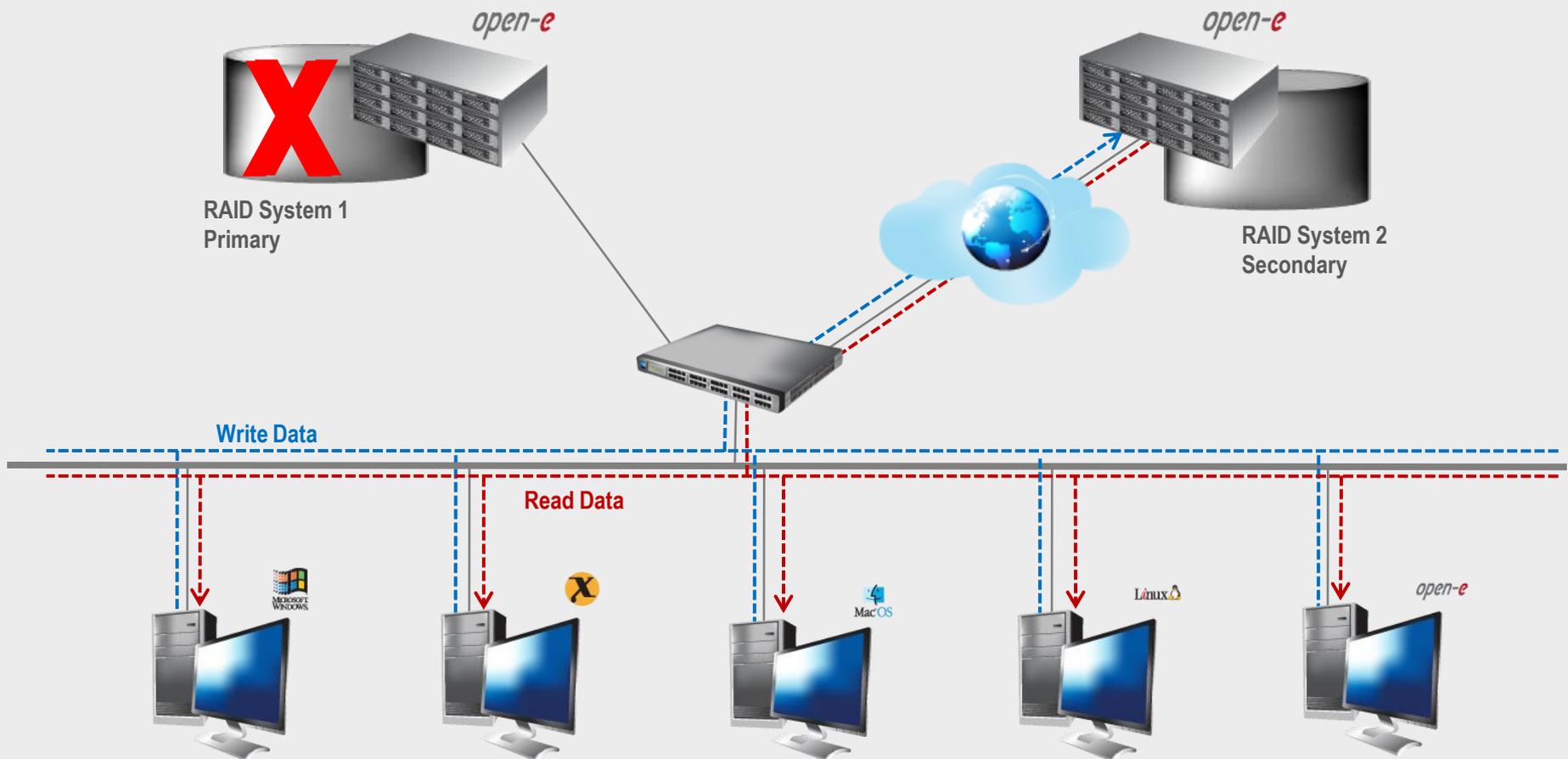
# Synchronous **Volume Replication** over a WAN

- 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.



# Synchronous Volume Replication over a WAN

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



TO SET UP VOLUME REPLICATION, PERFORM THE FOLLOWING STEPS:

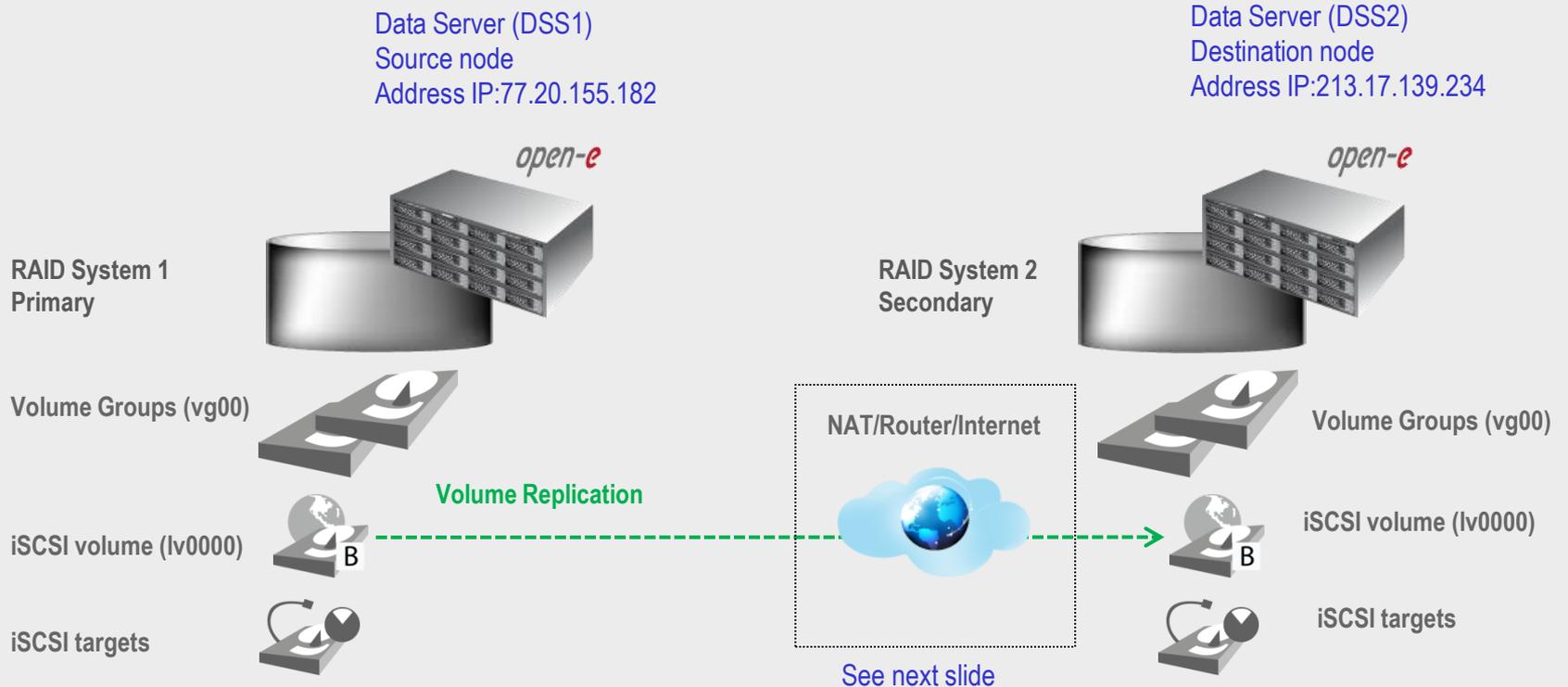
1. Hardware configuration
2. Configure DSS1 and DSS2 on the WAN
3. Configure the destination node
4. Configure the source node
5. Create the replication task
6. Check status of volume replication

# Setting up Synchronous 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 Synchronous **Volume Replication** over a WAN *open-e*

## 2. Configure DSS1 and DSS2 on the WAN

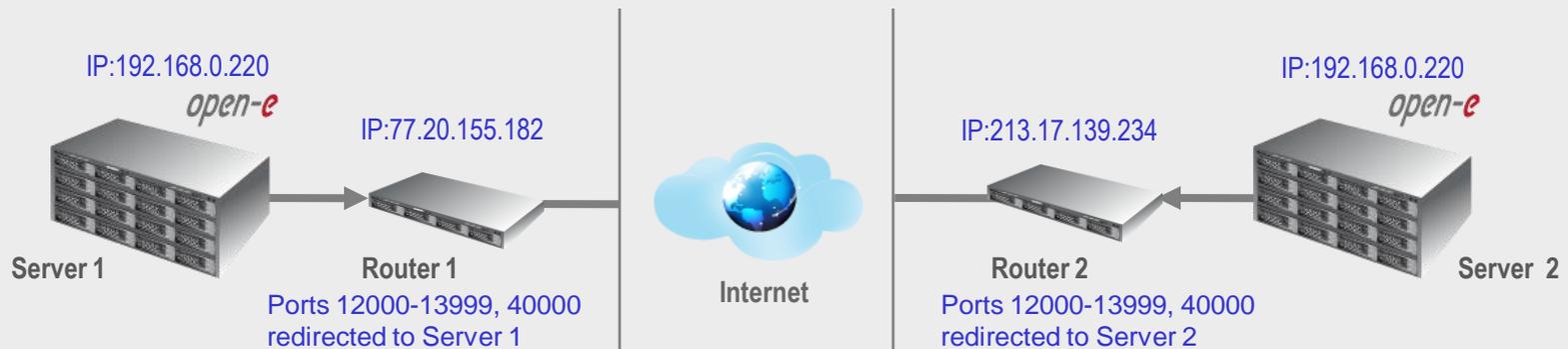
BELOW YOU CAN FIND OF SETTING THE **DSS1** AND **DSS2** ON THE WAN:

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

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

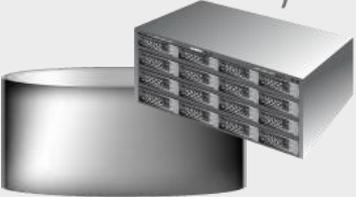
Please perform the following steps to set up of Synchronous Volume Replication on routers:

- 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 Synchronous Volume Replication over a WAN *open-e*

*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 DSS web interface with the following elements:

- Navigation tabs: **SETUP**, **CONFIGURATION** (selected), **MAINTENANCE**, **STATUS**, **HELP**.
- Sub-navigation tabs: **volume manager** (selected), **NAS settings**, **NAS resources**, **iSCSI target manager**, **FC target manager**.
- Left sidebar: **Vol. groups** and **Vol. replication**.
- Main content area: **Unit rescan** (with **rescan** button), **Unit manager** (with a table of units), and **Drive identifier** (with a table of units).

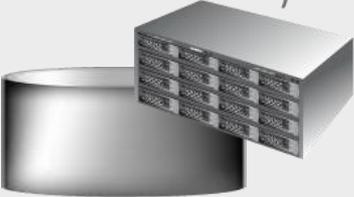
Unit	Size (GB)	Serial number	Status
<input checked="" type="checkbox"/> Unit S000	372.61	3NF0N4HX	available

Action:   
Name:

Unit	Serial number	Status
<input type="checkbox"/> Unit S000	3NF0N4HX	

# Setting up Synchronous Volume Replication over a WAN *open-e*

*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, the 'Vol. groups' list shows 'vg00' selected. Below it, the 'Vol. replication' section is visible. On the right, the 'Volume manager' configuration panel is shown for 'Volume group: vg00'. It includes a table of system volumes and configuration options for a new iSCSI volume.

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

Action: new iSCSI volume  
Options: Just create volume

Use volume replication

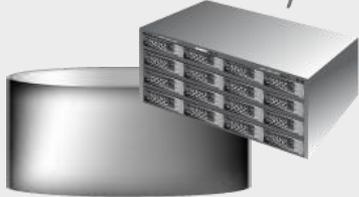
File I/O  
 Initialize  
 Block I/O

0 367.56  
add: 10.00 GB (+0.12 GB for replication)

apply

# Setting up Synchronous Volume Replication over a WAN *open-e*

*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.

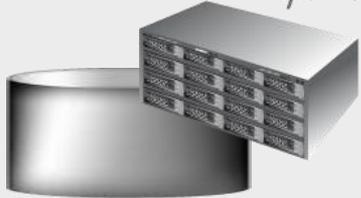
The screenshot shows the open-e Data Storage Server (DSS) web interface. The main navigation bar includes 'logout', 'DSS', 'DATA STORAGE SERVER', and the 'open-e' logo. Below this are tabs for 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. Under 'CONFIGURATION', there are sub-tabs for 'volume manager', 'NAS settings', 'NAS resources', 'iSCSI target manager', and 'FC target manager'. The 'volume manager' sub-tab is active, showing a tree view of 'Vol. groups' with 'vg00' selected. The main content area displays 'Volume group: vg00' and a 'Volume manager' section with 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	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

Below the table, there is an 'Action:' dropdown menu set to 'new NAS volume'. At the bottom, there are checkboxes for 'Use volume replication' and 'WORM'. The footer of the interface reads 'Data Storage Server. All rights reserved.'

# Setting up Synchronous Volume Replication over a WAN *open-e*

*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”.

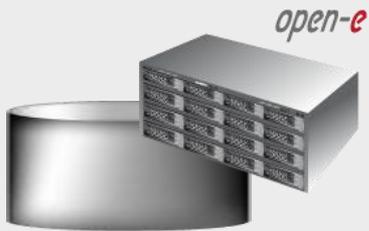
iSCSI targets



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

The screenshot shows the DSS (Data Storage Server) web interface. The top navigation bar includes 'logout', 'DSS', 'DATA STORAGE SERVER', and the 'open-e' logo. Below this is a menu with 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. Under the 'CONFIGURATION' tab, there are sub-tabs for 'volume manager', 'NAS settings', 'NAS resources', 'iSCSI target manager', and 'FC target manager'. The 'iSCSI target manager' tab is active, showing a 'Targets' section with a search icon and a 'Create new target' form. The form has a 'Name:' field with the value 'iqn.2009-02:dss2.target0' and an 'Alias:' field with the value 'target0'. There is a checked checkbox for 'Target Default Name' and an 'apply' button. Below this is a 'CHAP user target access' section with an unchecked checkbox for 'Enable CHAP user access authentication' and another 'apply' button. At the bottom, there is an 'Event Viewer' field and a footer that reads 'Data Storage Server. All rights reserved.'

# Setting up Synchronous Volume Replication over a WAN *open-e*



Data Server (DSS2)  
Destination node  
Address IP:213.17.139.234

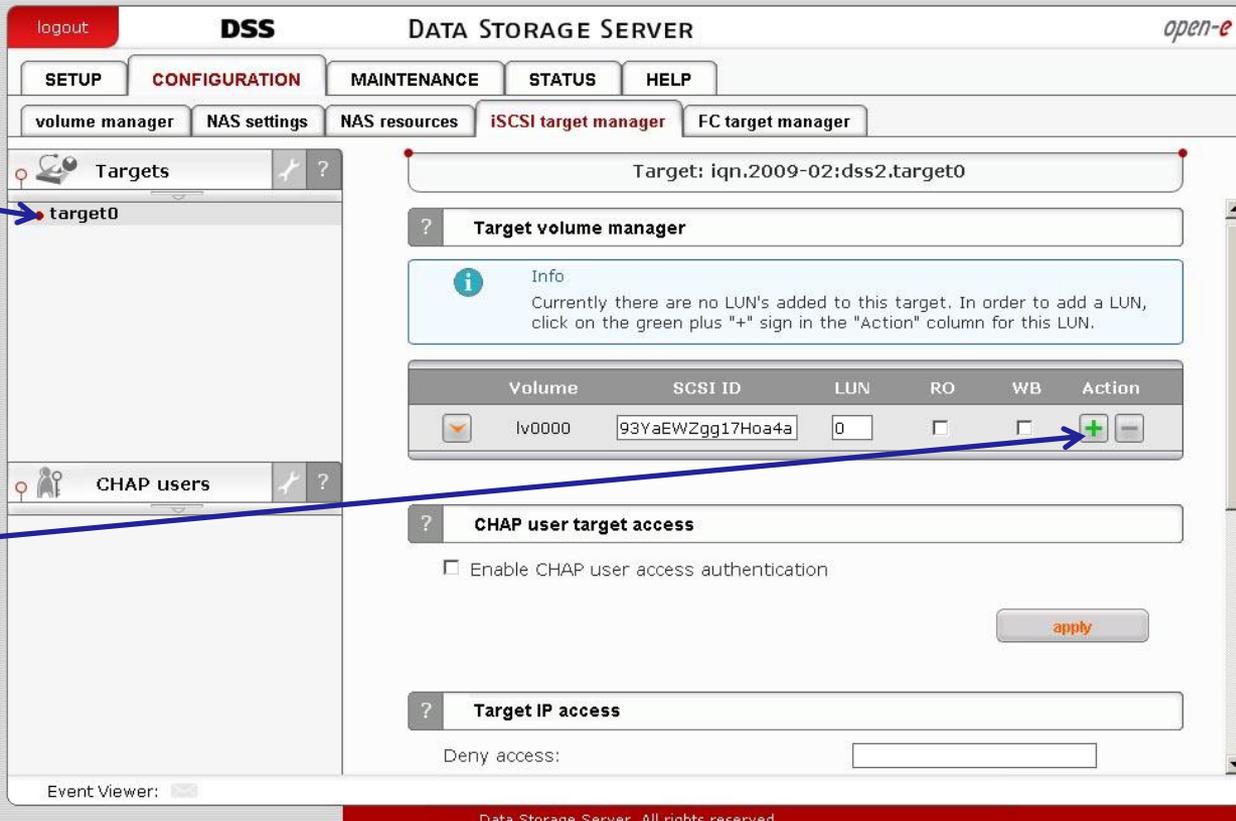
## 3. Configure the Destination Node

Select target0 within the Targets field.

iSCSI targets



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

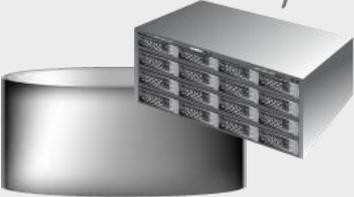


The screenshot shows the DSS (Data Storage Server) web interface. The main navigation tabs are SETUP, CONFIGURATION, MAINTENANCE, STATUS, and HELP. Under CONFIGURATION, there are sub-tabs for volume manager, NAS settings, NAS resources, iSCSI target manager, and FC target manager. The iSCSI target manager is active, showing a list of targets with 'target0' selected. Below the targets list, there is a table for iSCSI targets with columns for Volume, SCSI ID, LUN, RO, WB, and Action. The 'Action' column for the volume 'lv0000' is highlighted with a green plus button. The right-hand side of the interface shows the configuration details for the selected target, including a 'Target volume manager' section with an info message, a table for target volume access, and a 'CHAP user target access' section with a checkbox for 'Enable CHAP user access authentication'. An 'apply' button is located at the bottom right of the configuration area.

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

# Setting up Synchronous Volume Replication over a WAN *open-e*

*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



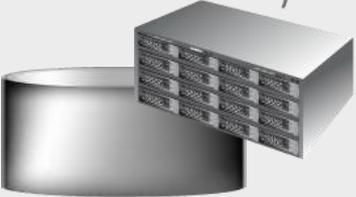
Next, under **Mirror Server IP** function, enter the IP address of the source node. In our example, this would be 77.20.155.182. Next check the **WAN** box and enter a unique combination of 6 to 12 characters in the **ReplicationID** field and click the **apply** button.

The screenshot shows the open-e DSS web interface. The main navigation tabs are 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 list of volume groups (vg00) and a 'Vol. replication' section. In the 'Vol. replication' section, there is a table with columns: Logical Volume, Init, Source, Destination, and Clear metadata. The row for 'lv0000' shows 'done' in the Init column, a checked box in the Destination column, and an unchecked box in the Clear metadata column. Below the table is an 'apply' button. Further down, there is a 'Mirror server IP' section with fields for IP address (77.20.155.182), WAN (checked), and ReplicationID (193WERacvQ). Below this is another 'apply' button. At the bottom, there is a 'Create new volume replication task' section with an info icon and the message 'Mirror Server IP is not set.' The footer of the interface reads 'Data Storage Server. All rights reserved.'

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

# Setting up Synchronous Volume Replication over a WAN *open-e*

*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.

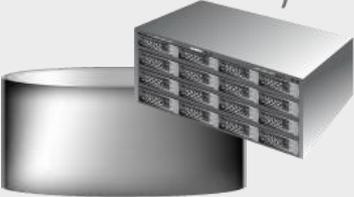
The screenshot shows the open-e DSS (Data Storage Server) web interface. The top navigation bar includes 'logout', 'DSS', 'DATA STORAGE SERVER', and the 'open-e' logo. Below this are tabs for 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. Under the 'CONFIGURATION' tab, there are sub-tabs for 'volume manager', 'NAS settings', 'NAS resources', 'iSCSI target manager', and 'FC target manager'. The 'volume manager' sub-tab is selected, showing a 'Vol. groups' section with a search icon and a help icon. Below this is a 'Vol. replication' section. The main content area displays a 'Unit rescan' section with a 'rescan' button. Below that is a 'Unit manager' section with a table of units:

Unit	Size (GB)	Serial number	Status
Unit S000	5588.27	98DC03C1	available

Below the table, there is an 'Action:' dropdown menu set to 'new volume group' and a 'Name:' text input field containing 'vg00'. An 'apply' button is located below these fields. At the bottom of the page, there is an 'Event Viewer:' section and a footer that reads 'Data Storage Server. All rights reserved'.

# Setting up Synchronous Volume Replication over a WAN *open-e*

*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.

The screenshot shows the 'DATA STORAGE SERVER' web interface. The 'CONFIGURATION' tab is active, and the 'volume manager' sub-tab is selected. On the left, under 'Vol. groups', the 'vg00' group is selected. On the right, the 'Volume manager' section shows a table of system volumes:

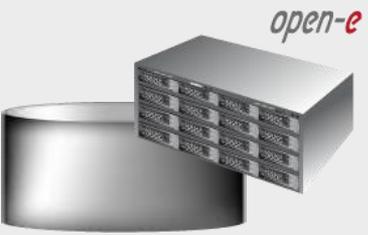
System volumes	Size (GB)
Reserved Pool	4.00
Reserved for snapshots	0.00
Reserved for system	1.00
Reserved for replication	0.00
Free	5583.22

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. Under 'Block I/O', the 'Initialize' checkbox is also checked. At the bottom, the 'add:' field is set to '10.00 GB (+0.12 GB for replication)'. An 'apply' button is visible at the bottom right.

### NOTE:

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

# Setting up Synchronous 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.

Volume group: vg00

Volume manager

Info  
Logical volume lv0000 has been created successfully.

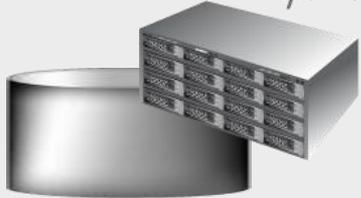
Logical Volume	Type	Snap.	Rep.	Init.	Blocksize (bytes)	Size (GB)
lv0000	B		✓		N/A	10.00
System volumes						
Reserved Pool						4.00
Reserved for snapshots						0.00
Reserved for system						1.00
Reserved for replication						0.13
Free						5573.09

Action: new NAS volume

Use volume replication  
 WORM

# Setting up Synchronous Volume Replication over a WAN *open-e*

*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”.

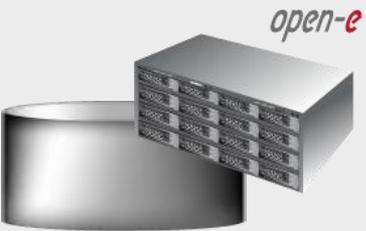
iSCSI targets



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

The screenshot shows the open-e Data Storage Server (DSS) web interface. The top navigation bar includes 'logout', 'DSS', 'DATA STORAGE SERVER', and the 'open-e' logo. Below this is a menu with 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. The 'CONFIGURATION' tab is active, and within it, the 'iSCSI target manager' sub-tab is selected. The main content area is divided into two sections: 'Targets' and 'CHAP users'. The 'Targets' section is currently active, displaying a 'Create new target' form. This form includes a checked checkbox for 'Target Default Name', a 'Name' field with the value 'iqn.2009-02:dss241.target0', and an 'Alias' field with the value 'target0'. An 'apply' button is located at the bottom right of this form. Below the 'Targets' section is the 'CHAP users' section, which has an unchecked checkbox for 'Enable CHAP user access authentication' and another 'apply' button. At the bottom of the interface, there is an 'Event Viewer' field and a footer that reads 'Data Storage Server. All rights reserved'.

# Setting up Synchronous 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

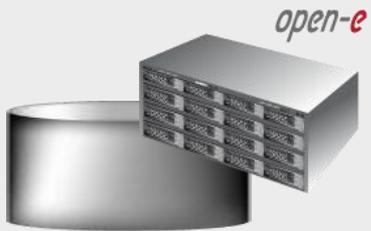


To assign a volume to the target, click the button  located under **Action**

The screenshot shows the 'iSCSI target manager' configuration page for a target named 'iqn.2009-02:dss241.target0'. The page includes a table for LUNs and an 'Action' column with a green plus button. A blue arrow points from the 'Targets' field in the left sidebar to the 'target0' entry in the table. Another blue arrow points from the 'Action' column's plus button to the text box below.

Volume	SCSI ID	LUN	RO	WB	Action
lv0000	gQbOSAsx15eVVfkK	0	<input type="checkbox"/>	<input type="checkbox"/>	 

# Setting up Synchronous 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 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.
- Target list: target0.
- Target details for target0:
  - Target: iqn.2009-02:dss241.target0
  - Target volume manager: [?]
  - Table of volumes:

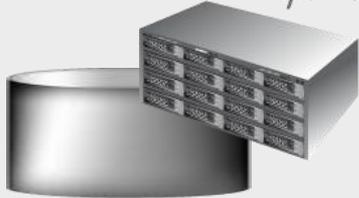
Volume	SCSI ID	LUN	RO	WB	Action
lv0000	gQbOSAsx15eVVfkK	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="button" value="+"/> <input type="button" value="-"/>
  - Volume replication: Source  
Size (GB): 10.00
  - CHAP user target access:  Enable CHAP user access authentication
  - Target IP access: Deny access: [input], Allow access: [input]
  - apply button

Event Viewer: [input]

Data Storage Server. All rights reserved

# Setting up Synchronous Volume Replication over a WAN *open-e*

*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 'volume manager' sub-tab is selected. The 'Vol. groups' section shows 'vg00'. The 'Vol. replication' section is expanded, showing a table for volume replication mode:

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:

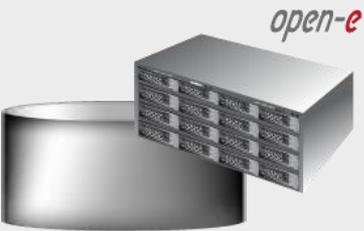
- IP address: 213.17.139.234
- WAN:
- ReplicationID: 193WERacvQ

An information message at the bottom states: 'Mirror Server IP is not set.' The 'apply' button is visible at the bottom right of the configuration section.

### NOTE:

The source and destination volumes must be of identical ReplicationID number.

# Setting up Synchronous 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



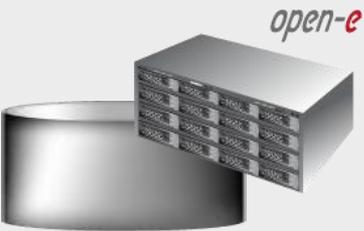
In the **Destination volume** field select the appropriate volume (in this example, **lv0000**), and click **create** to confirm.

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

- Navigation tabs: **SETUP**, **CONFIGURATION** (selected), **MAINTENANCE**, **STATUS**, **HELP**.
- Sub-navigation tabs: **volume manager** (selected), **NAS settings**, **NAS resources**, **iSCSI target manager**, **FC target manager**.
- Left sidebar: **Vol. groups** (vg00) and **Vol. replication**.
- Main content area: **ReplicationID:** 193WERAcvQ, **apply** button.
- Create new volume replication task** section:
  - Task name:** Replication\_WAN, with an arrow button.
  - Source volume:** lv0000 (dropdown).
  - Destination volume:** lv0000 (dropdown).
  - Bandwidth for SyncSource (MB):** 40.
  - Asynchronous protocol:**
  - create** button.
- Replication tasks manager** section: Info, No tasks have been found.
- Footer: Event Viewer: [off], Data Storage Server. All rights reserved.

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

# Setting up Synchronous 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 web console interface. The main navigation tabs are 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' sub-tab is active, showing a tree view with 'vg00' and 'Vol. replication' (containing 'Replication\_WAN').

On the right side, the 'WAN' checkbox is checked, and the 'ReplicationID' field contains '193WERacvQ'. An 'apply' button is visible below these fields.

Below the configuration fields, there is a section titled 'Create new volume replication task' with an information icon and the text: 'No volumes with replication functionality found or all volumes have a task assigned already.'

Below that is the 'Replication tasks manager' section, which contains a table with the following data:

Name	Start time	Action
Replication_WAN	n/a	

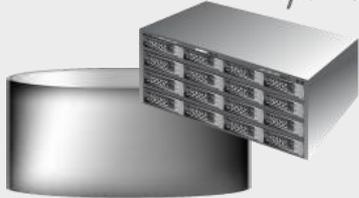
Below the table, the following details are listed:

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

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

# Setting up Synchronous Volume Replication over a WAN *open-e*

*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).

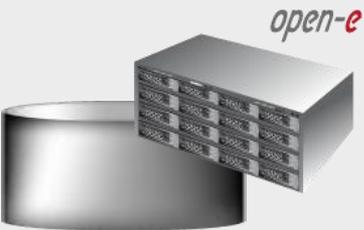
The screenshot shows the DSS web interface with the following elements:

- 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 (Replication\_WAN).
- Main content area: Volume replication task: Replication\_WAN.
- Replication tasks manager table:

Name	Start time	Action
Replication_WAN	2009-02-27 21:08:39	[Start] [Stop] [Delete]
- Source volume: lv0000  
Destination volume: lv0000  
Destination IP: 213.17.139.234  
Protocol type: Synchronous
- Create schedule for volume replication task:
  - Comment: [Text field]
  - Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday (checkboxes)
  - Start: [00] : [00]
  - Stop: [00] : [00]
  - Frequency:  Every week,  Every even week,  Every odd week

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

# Setting up Synchronous 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.

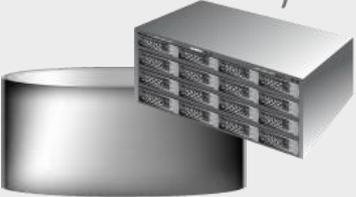
The screenshot shows the open-e DSS web interface. The main navigation bar includes 'logout', 'DSS', 'DATA STORAGE SERVER', and 'open-e'. Below this are tabs for 'SETUP', 'CONFIGURATION', 'MAINTENANCE', 'STATUS', and 'HELP'. Under 'CONFIGURATION', there are sub-tabs for 'volume manager', 'NAS settings', 'NAS resources', 'iSCSI target manager', and 'FC target manager'. The 'volume manager' tab is active, showing a tree view with 'Vol. groups' (containing 'vg00') and 'Vol. replication' (containing 'Replication\_WAN'). The 'Replication\_WAN' task is selected, and the 'Create schedule for volume replication task' form is displayed. The form includes a 'Comment' field with 'EveryDayAt8PM', a 'Schedule' section with checkboxes for all days of the week (Monday through Sunday), and a 'Frequency' section with radio buttons for 'Every week', 'Every even week', and 'Every odd week'. The 'Start' time is set to 20:00 and the 'Stop' time is set to 07:00. An 'apply' button is located at the bottom right of the form. Below the form is a 'Schedules for volume replication task' section with an information icon and the text 'No schedules found.' The footer of the interface reads 'Data Storage Server. All rights reserved.'

### 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 Synchronous Volume Replication over a WAN *open-e*

*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 DSS (Data Storage Server) web interface. The 'STATUS' tab is selected, and the 'tasks' sub-tab is active. The 'Volume Replication' task is selected in the left-hand menu. The main content area displays the 'Running tasks' section, which includes a table with the following data:

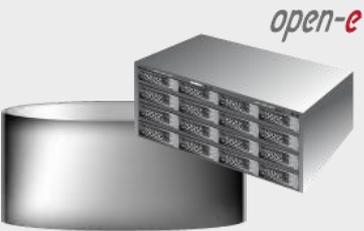
Name	Type	Start time
Replication_WAN	Volume replication	2009-02-27 21:08:39

Below this, the 'Tasks log' section displays a table with the following data:

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

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

# Setting up Synchronous 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.
WFRepotParams	Displayed when connection to the mirror server is in progress.
Connected	Source and destination servers have been connected successfully.
ServerFoOLess	Error on the mirror server side.
Timeout, BrokenPipe, NetworkFailure	Displayed when servers cannot communicate successfully while connected.
WFBIMap(SLT)	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 30<sup>th</sup> slide.

The screenshot shows the DSS web interface with the 'STATUS' tab selected. Under 'tasks', 'Volume Replication' is expanded, and 'Replication\_WAN' is selected. The task details are as follows:

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

Protocol type: Synchronous  
 Connection: SyncSource  
 Total size to replicate: 10240 MB  
 Remain to replicate: 10206 MB  
 Speed (avg): 308 kB/s (192 kB/s)  
 Time left: 7:15:29

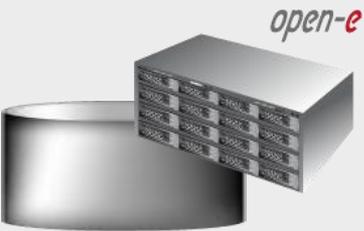
**Source info:**  
 Logical volume: lv0000  
 Consistency: Consistent

**Destination info:**  
 Logical volume: lv0000  
 Consistency: **Inconsistent**  
 IP address: 213.17.139.234

**Tasks log:**

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

# Setting up Synchronous 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.

Synchronous 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 DSS web interface with the 'tasks' tab selected. The 'Tasks: Volume Replication' section displays a table of running tasks:

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

Below the table, the task details are shown:

- Protocol type: Synchronous
- Connection: Connected
- Source info:**
  - Logical volume: lv0000
  - Consistency: Consistent
- Destination info:**
  - Logical volume: lv0000
  - Consistency: Consistent
  - IP address: 213.17.139.234

The 'Tasks log' section shows a log entry for the task:

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 Synchronous **Volume Replication** over a WAN *open-e*

## CONNECTION STATES:

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

Thank You!