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

DSS ver. 5.00 up60 February 12, 2009

April 2009

Asynchronous **Volume Replication** over a WAN

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	Replication Mode		Source/Destination			Data Transfer		Volume Type			
									iSCSI		
	Synchronous	Asynchronous	w/ System	LAN	WAN	File based	Block based	NAS	File-IO	Block-IO	FC
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.

Asynchronous **Volume Replication** over a WAN

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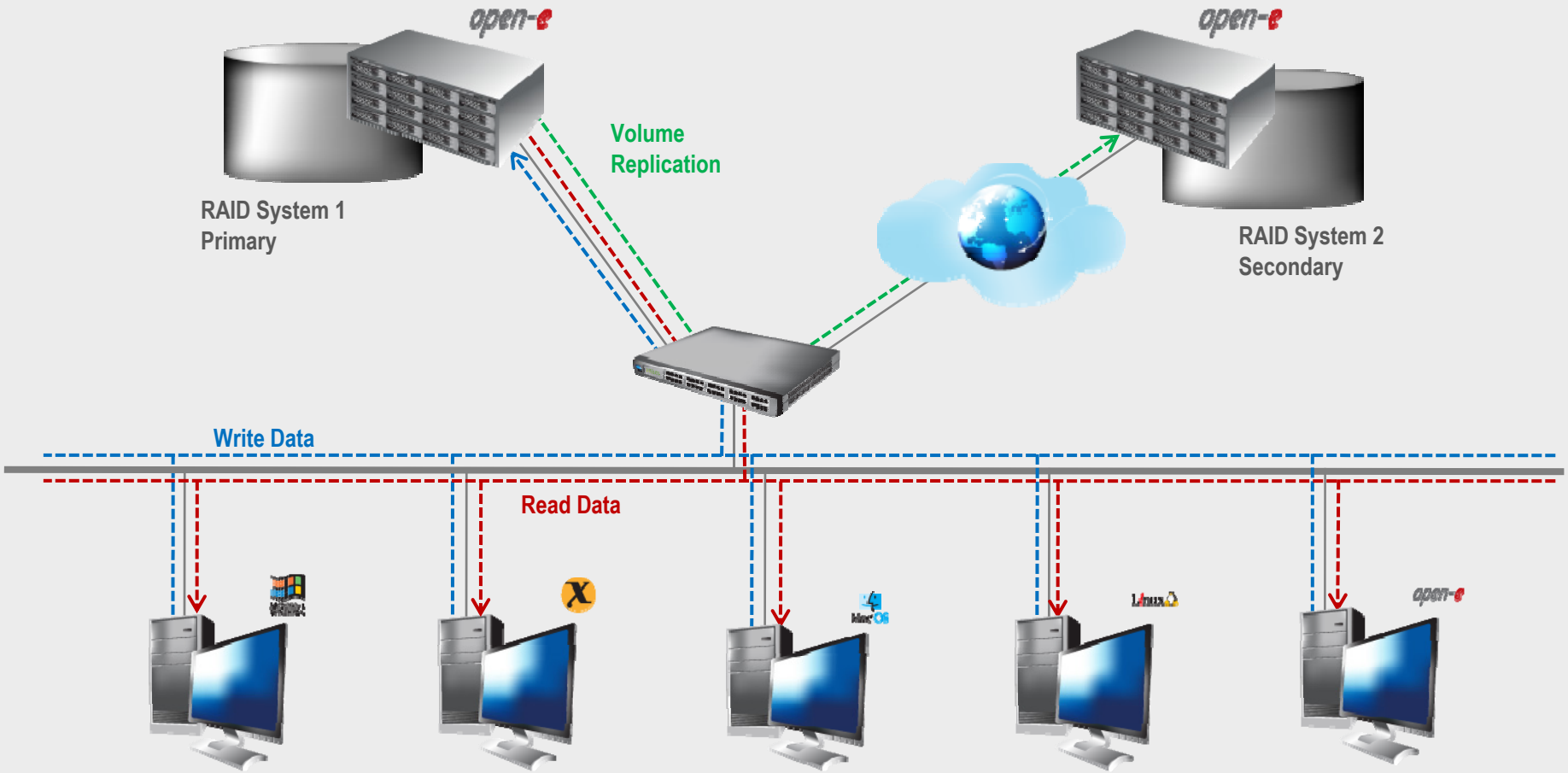
REPLICATION BETWEEN TWO SYSTEMS OVER A WAN

- **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

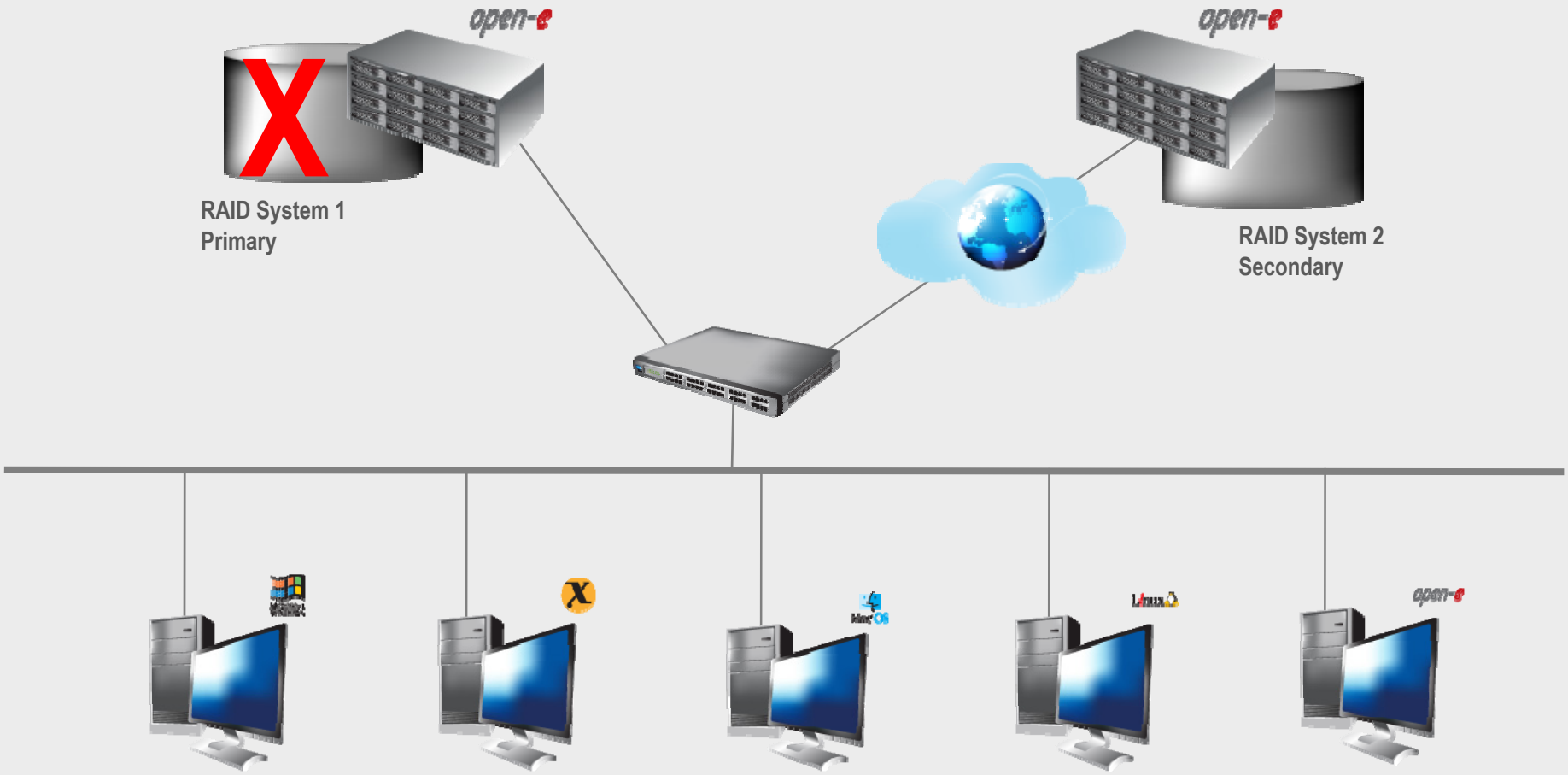
Asynchronous **Volume Replication** over a WAN

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



Asynchronous **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.



Asynchronous **Volume Replication** over a WAN

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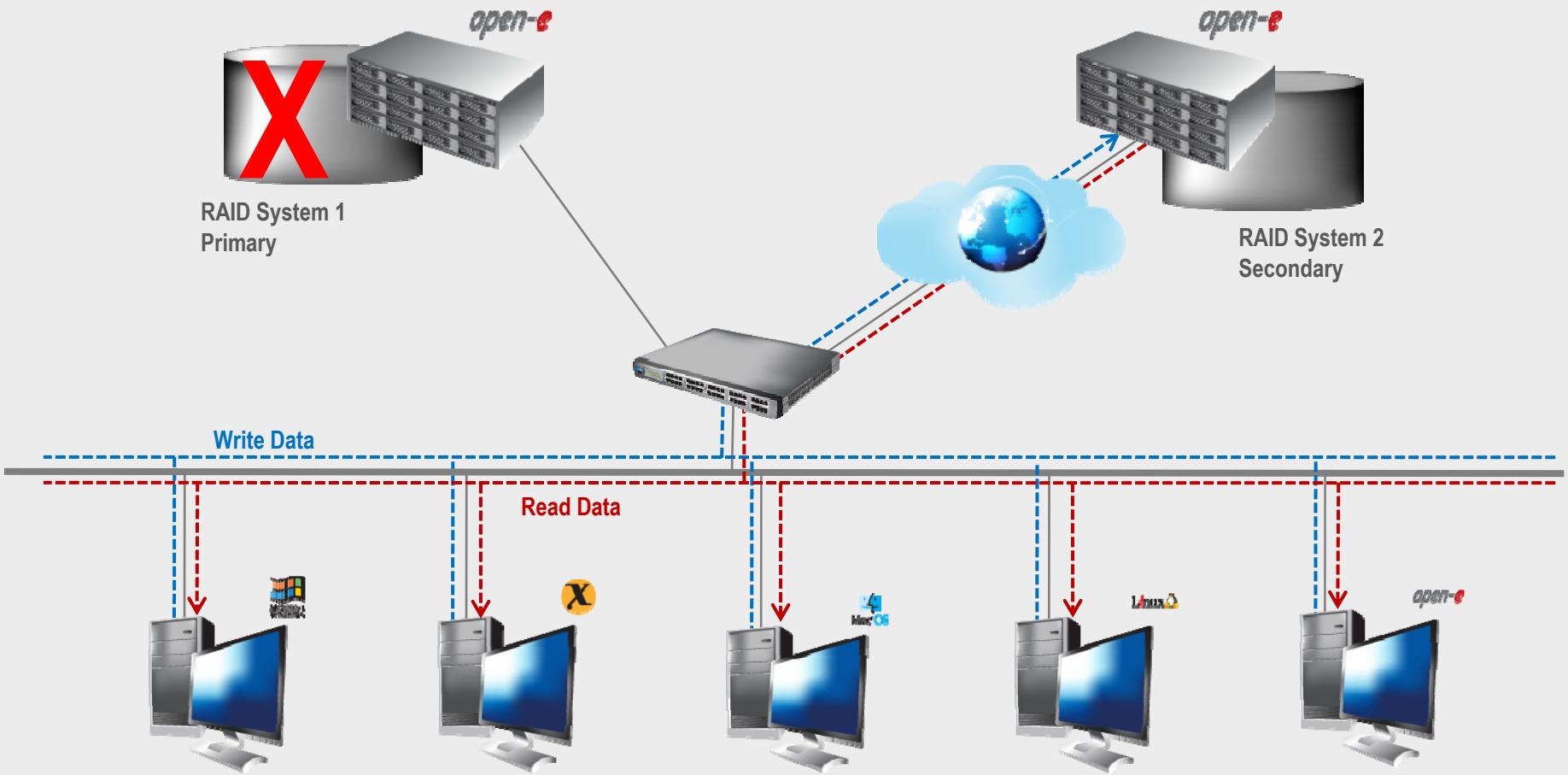
- After switching, replicated volume will be available on System 2



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

TO SET UP VOLUME REPLICATION, PERFORM THE FOLLOWING STEPS:

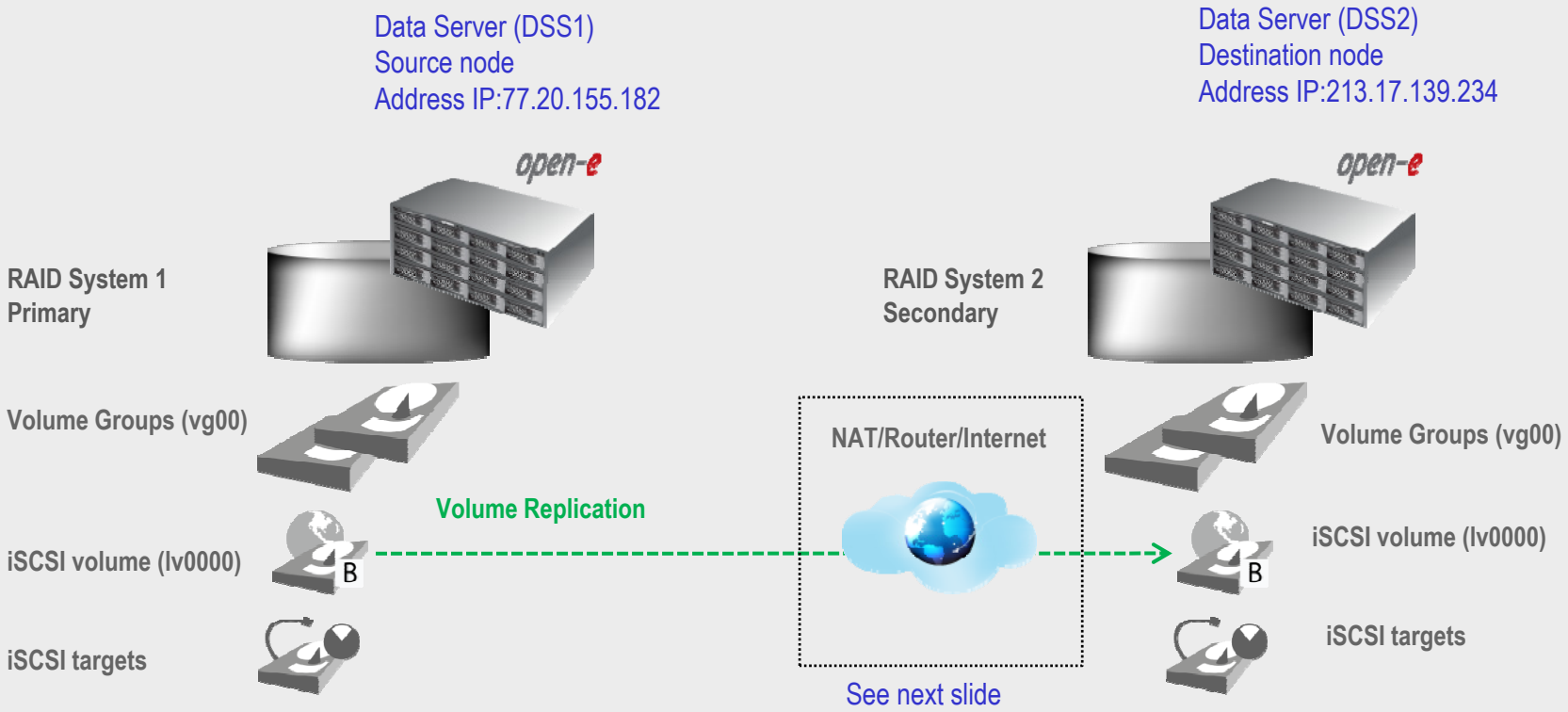
1. Hardware configuration
2. Configure DSS1 and DSS2 on the WAN
3. Configure the destination node
4. Configure the source node
5. Create the replication task
6. Check status of volume replication

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

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

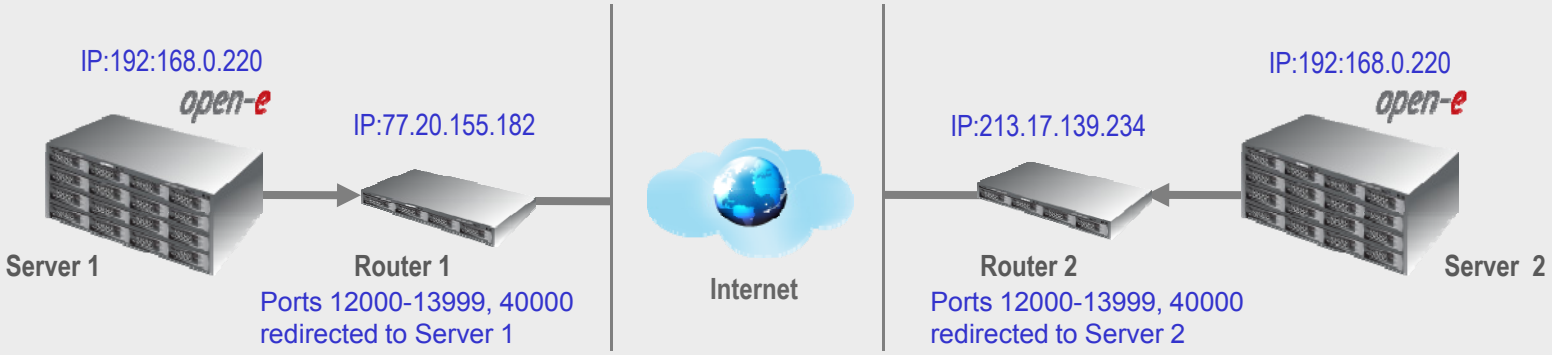
2. Configure DSS1 and DSS2 on the WAN

BELOW IS THE SETTING FOR DSS1 AND DSS2 FOR WAN:

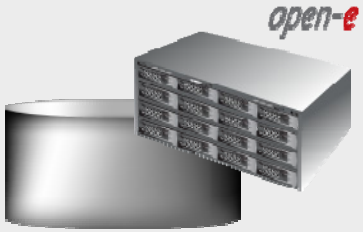
DSS 1 - machine behind the NAT with local IP address,
DSS 2 – Data Storage System with external internet IP address router/firewall

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

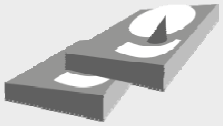


Data Server (DSS2)
Destination node
Address IP:213.17.139.234

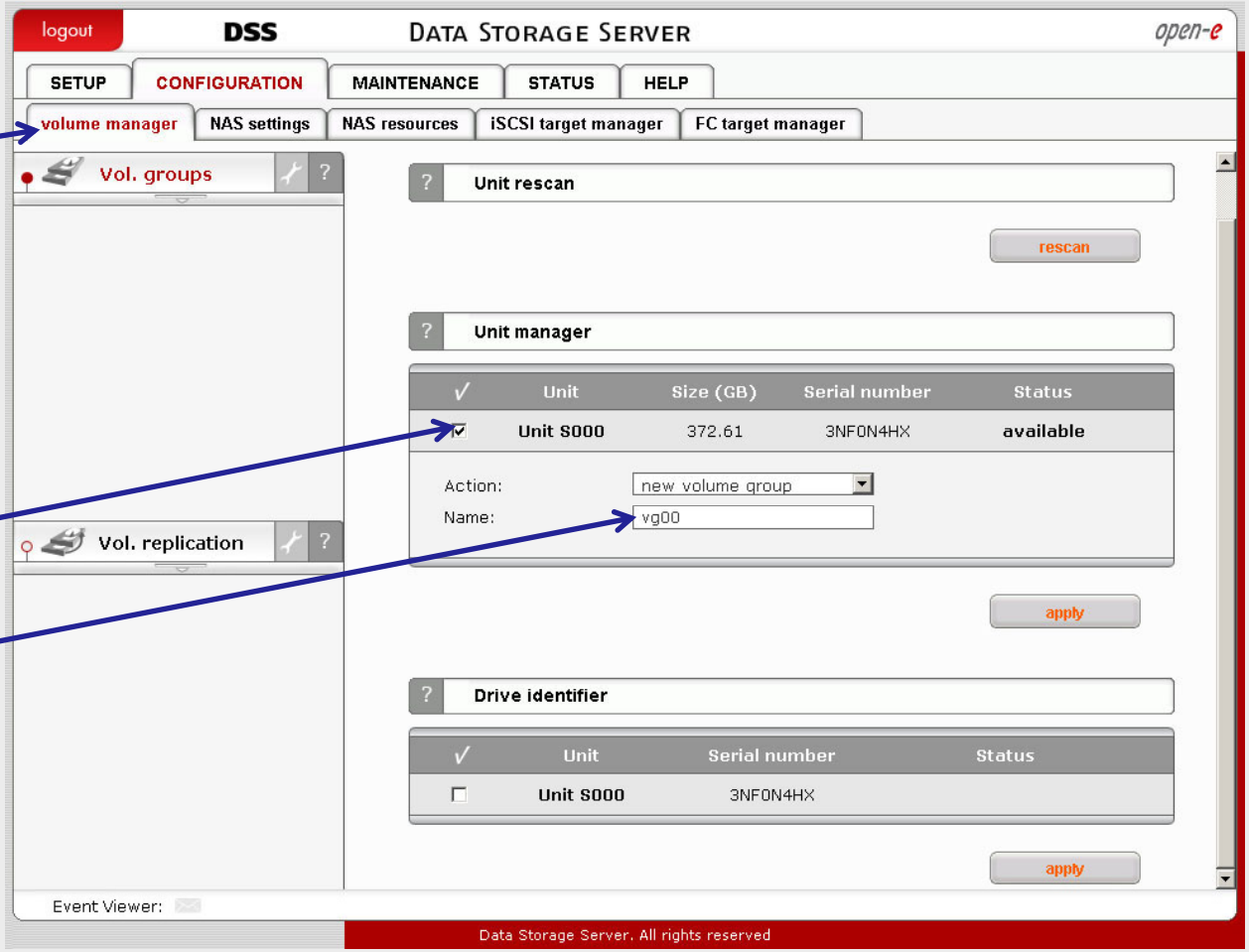
3. Configure the Destination Node

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

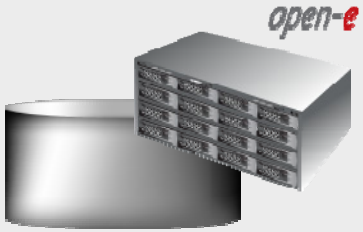
Volume Groups (vg00)



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



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



Data Server (DSS2)
Destination node
Address IP:213.17.139.234

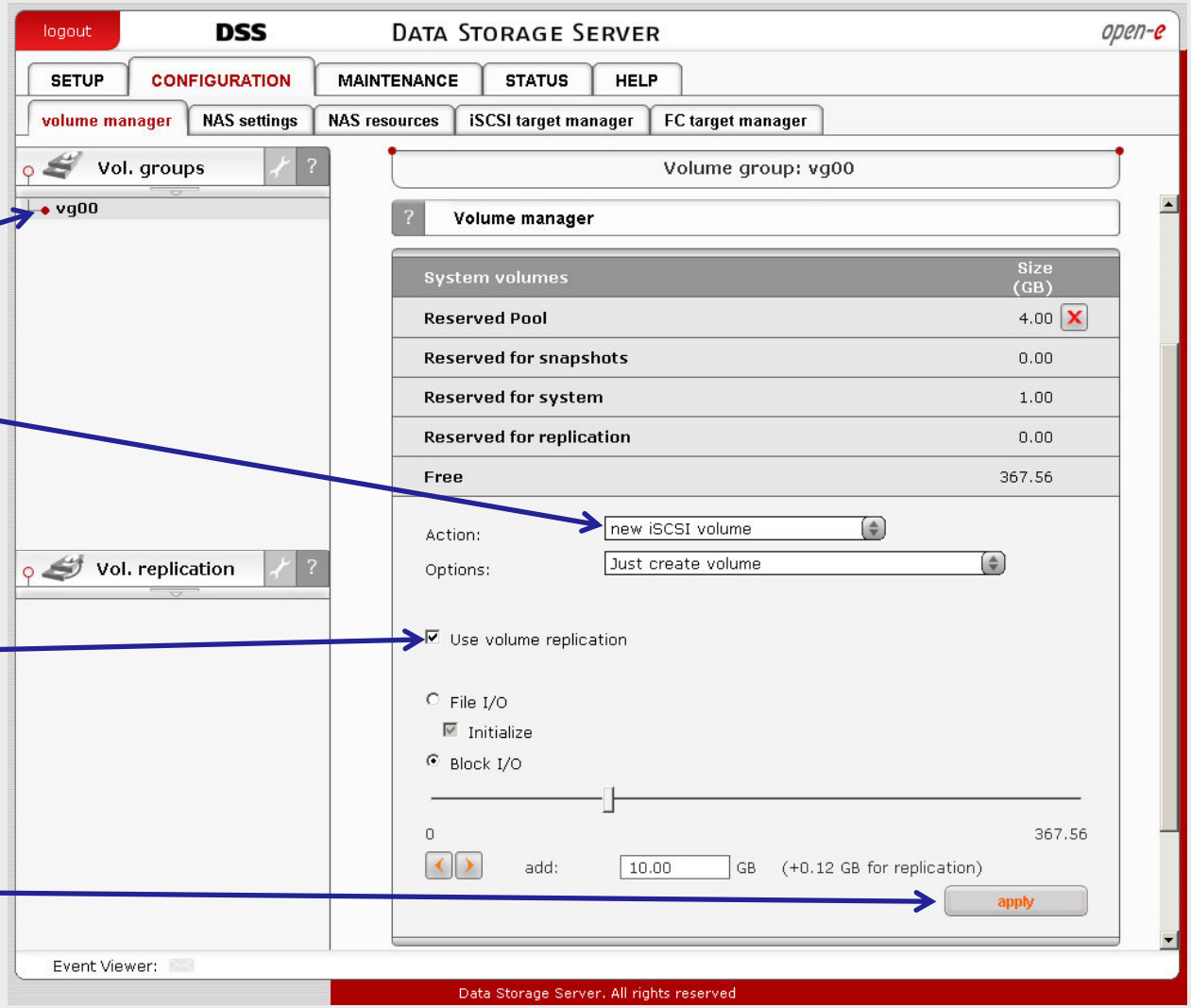
3. Configure the Destination Node

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.

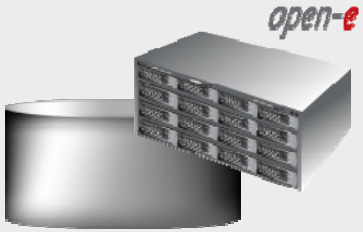
iSCSI volume (lv0000)

Next check box with **Use volume replication**

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



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

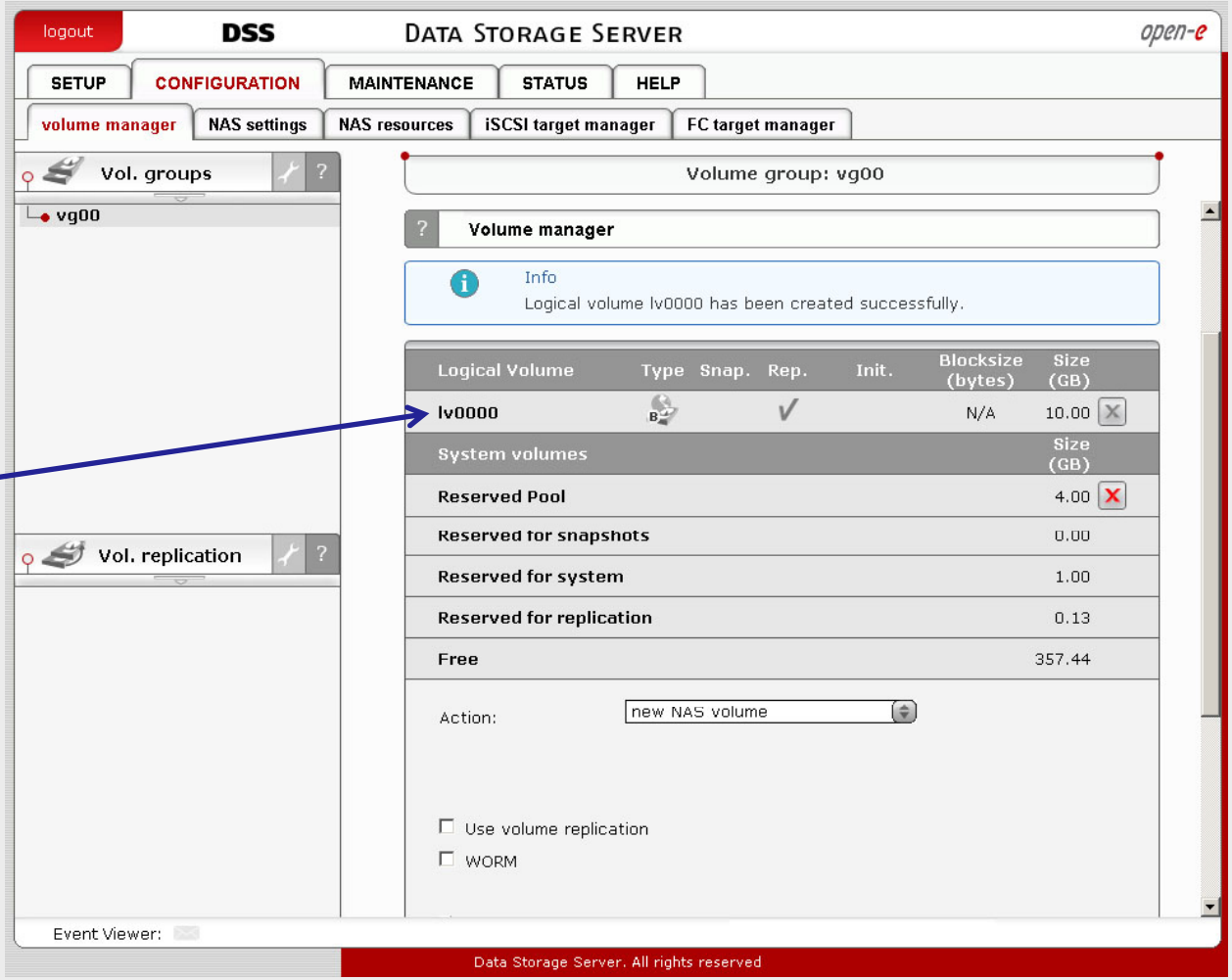


Data Server (DSS2)
Destination node
Address IP:213.17.139.234

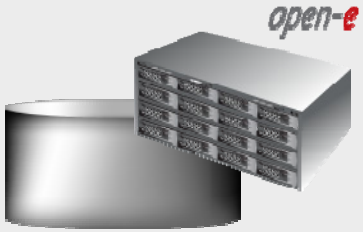
3. Configure the Destination Node

iSCSI volume (lv0000)

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



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



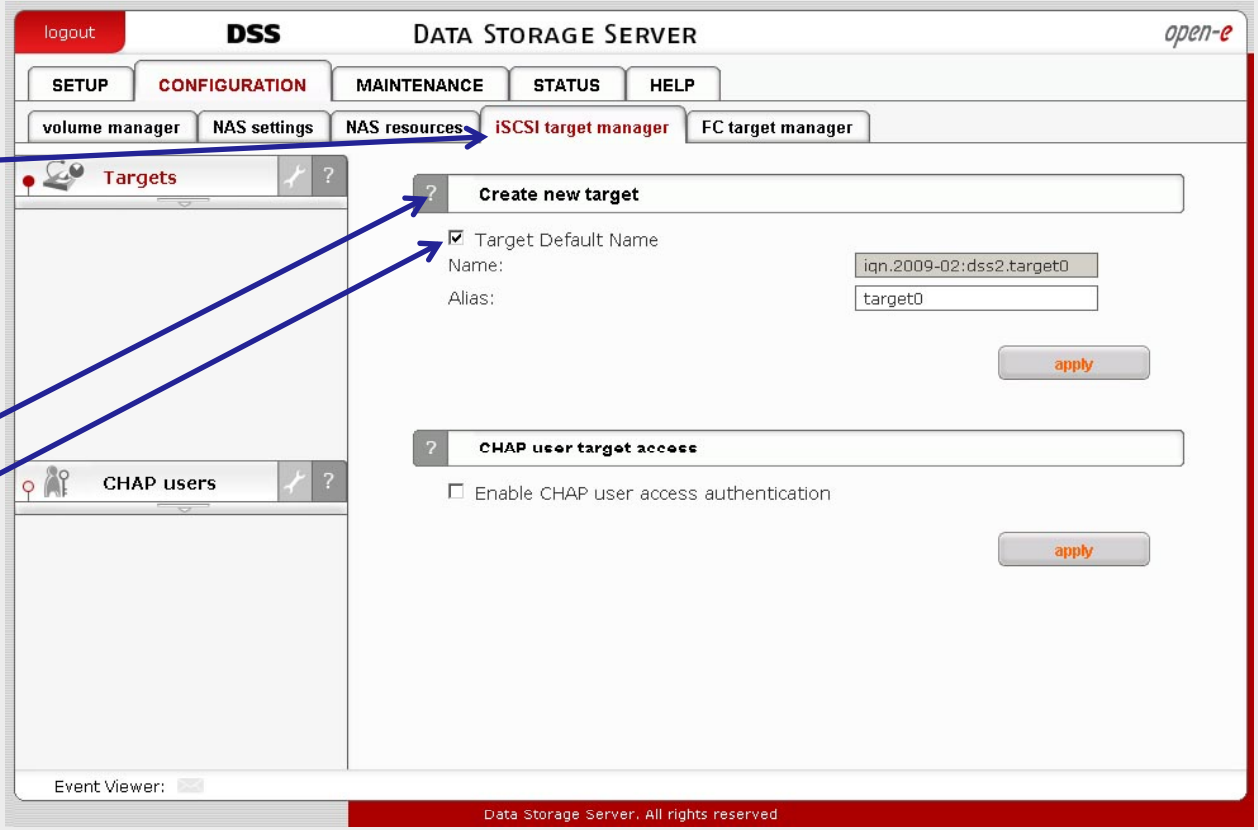
Data Server (DSS2)
Destination node
Address IP:213.17.139.234

3. Configure the Destination Node

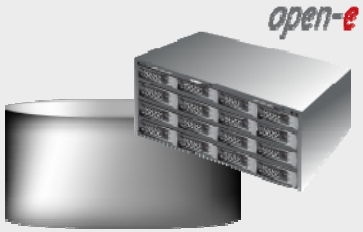
Under the „**CONFIGURATION**" tab, select „**iSCSI target manager**".

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.



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



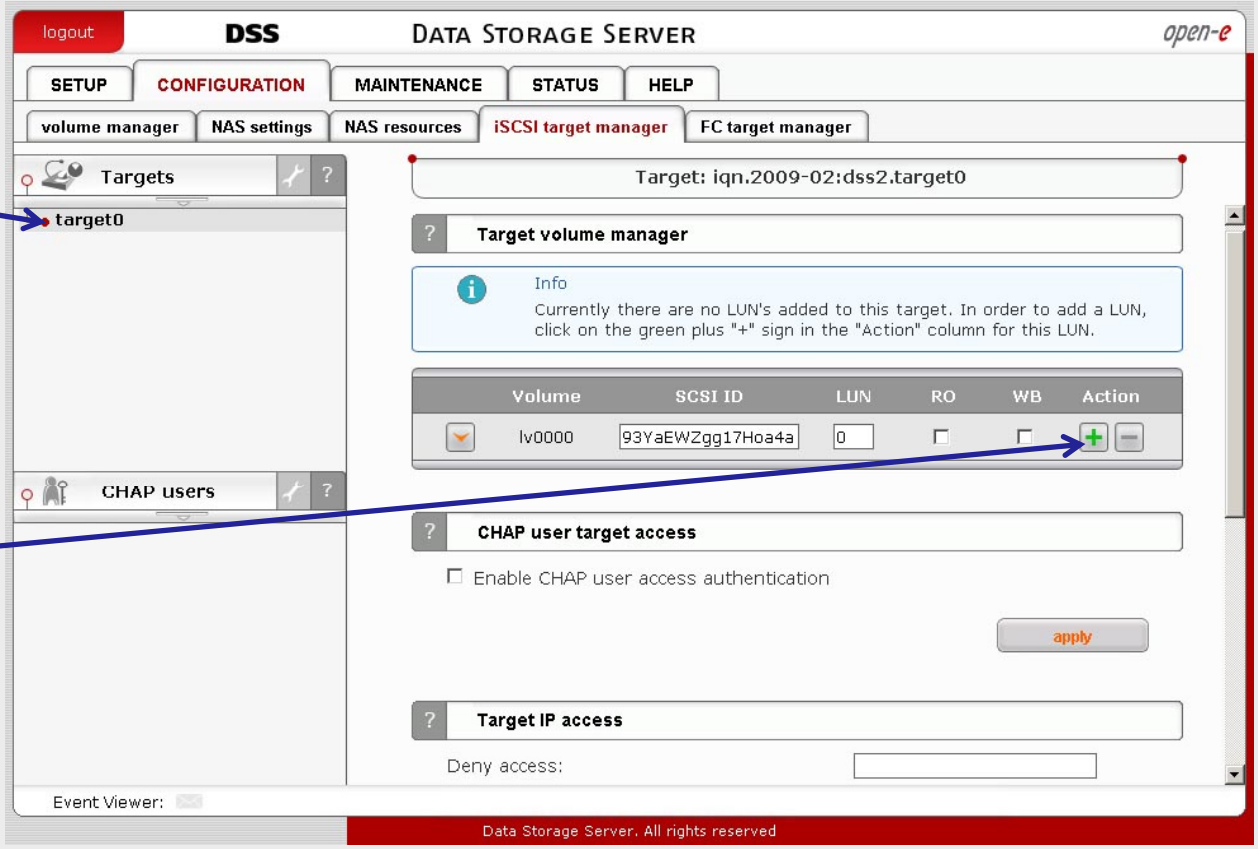
Data Server (DSS2)
Destination node
Address IP:213.17.139.234

3. Configure the Destination Node

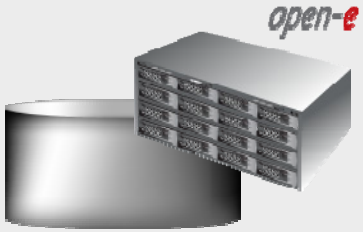
Select **target0** within the **Targets** field.

iSCSI targets

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



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



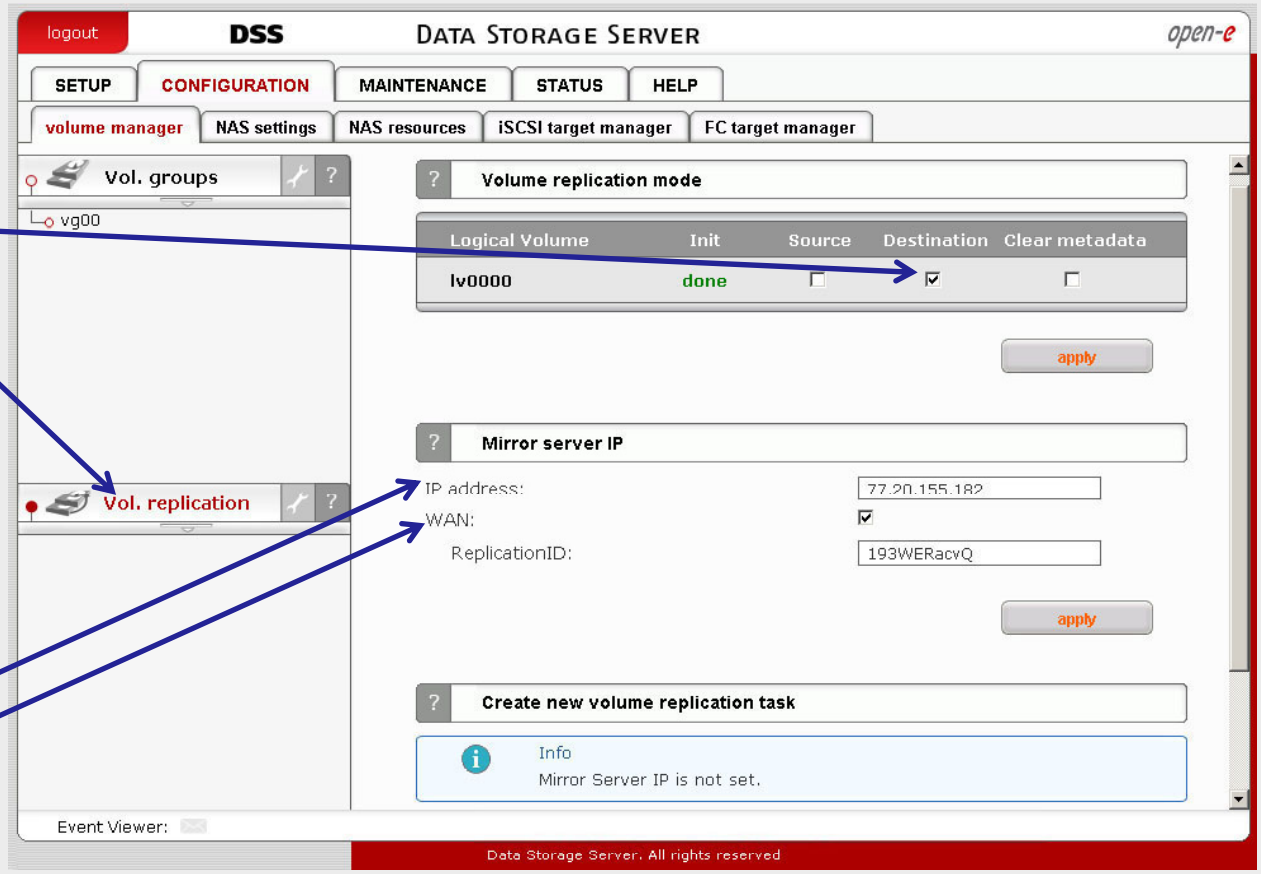
Data Server (DSS2)
Destination node
Address IP:213.17.139.234

3. Configure the Destination Node

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

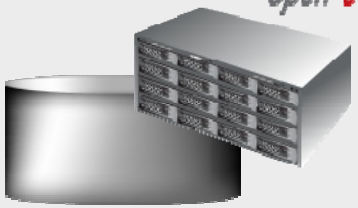
Volume Replication

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

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



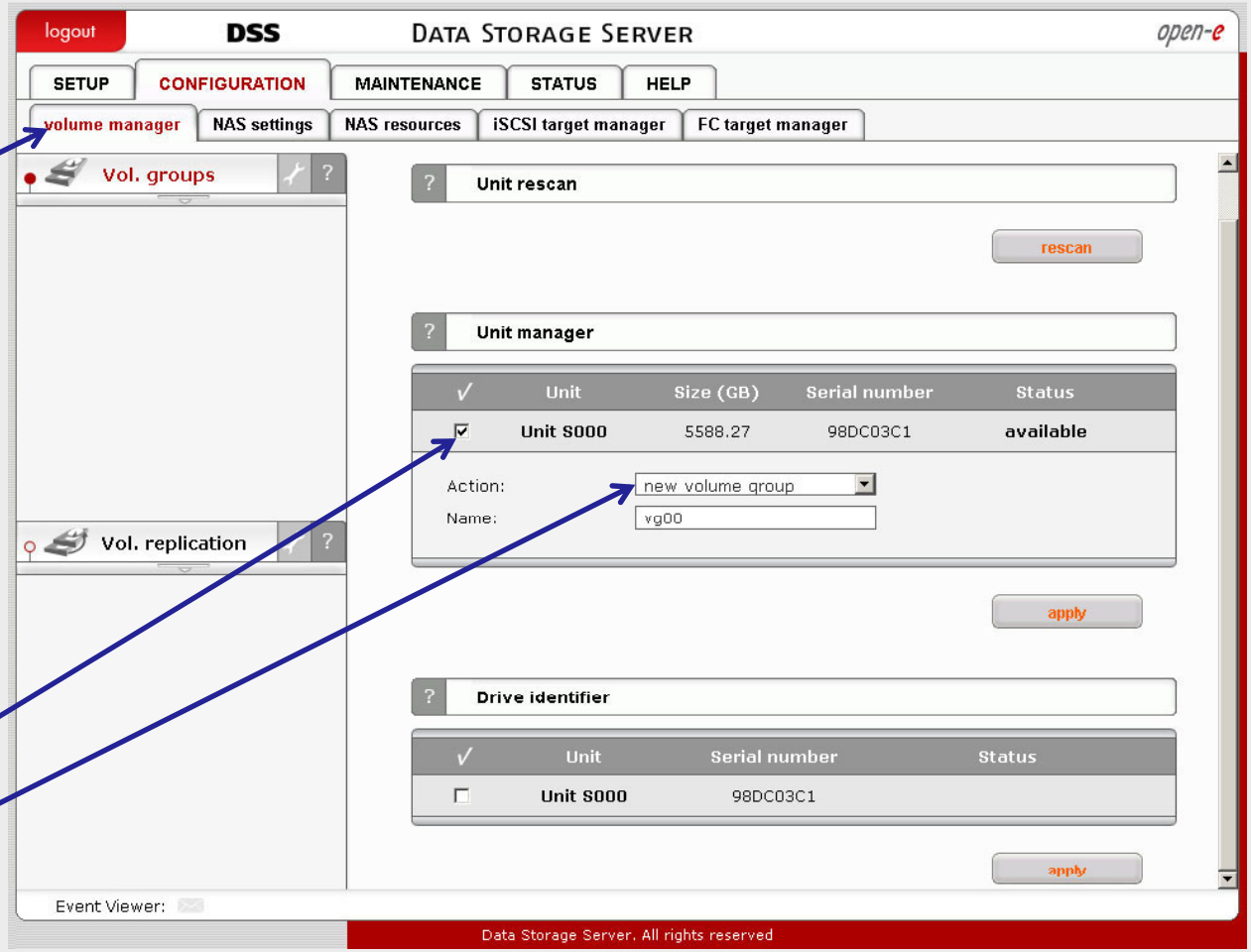
Data Server (DSS1)
Source node
Address IP:77.20.155.182

4. Configure the Source Node

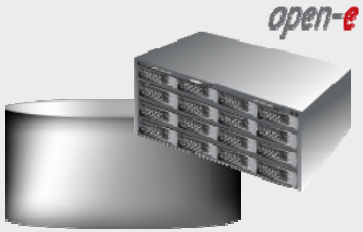
Under the **CONFIGURATION** tab, select **volume manager**..

Volume Groups (vg00)

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



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



Data Server (DSS1)
Source node
Address IP:77.20.155.182

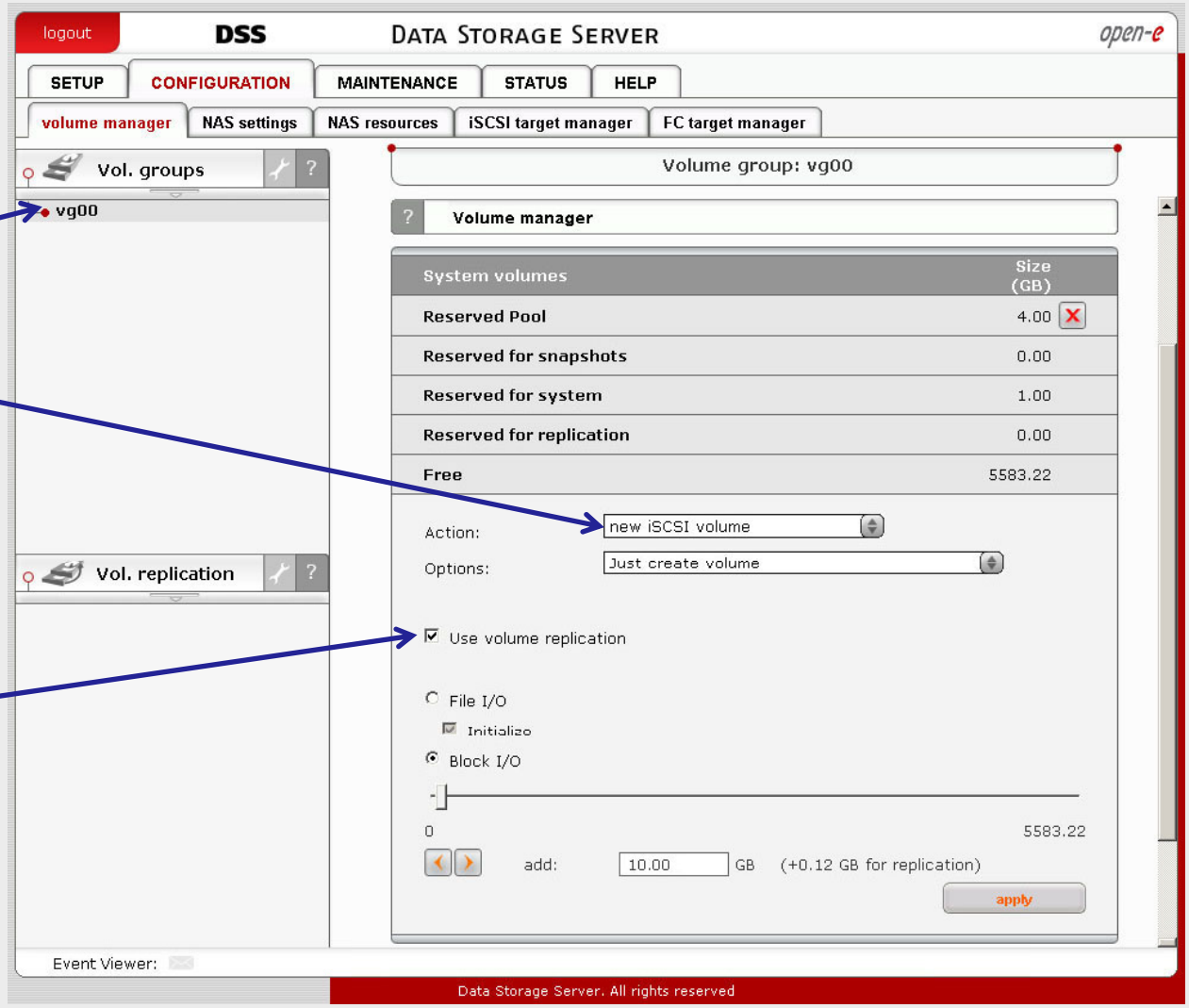
4. Configure the Source Node

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.

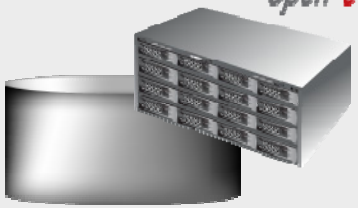
iSCSI volume (lv0000)

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



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

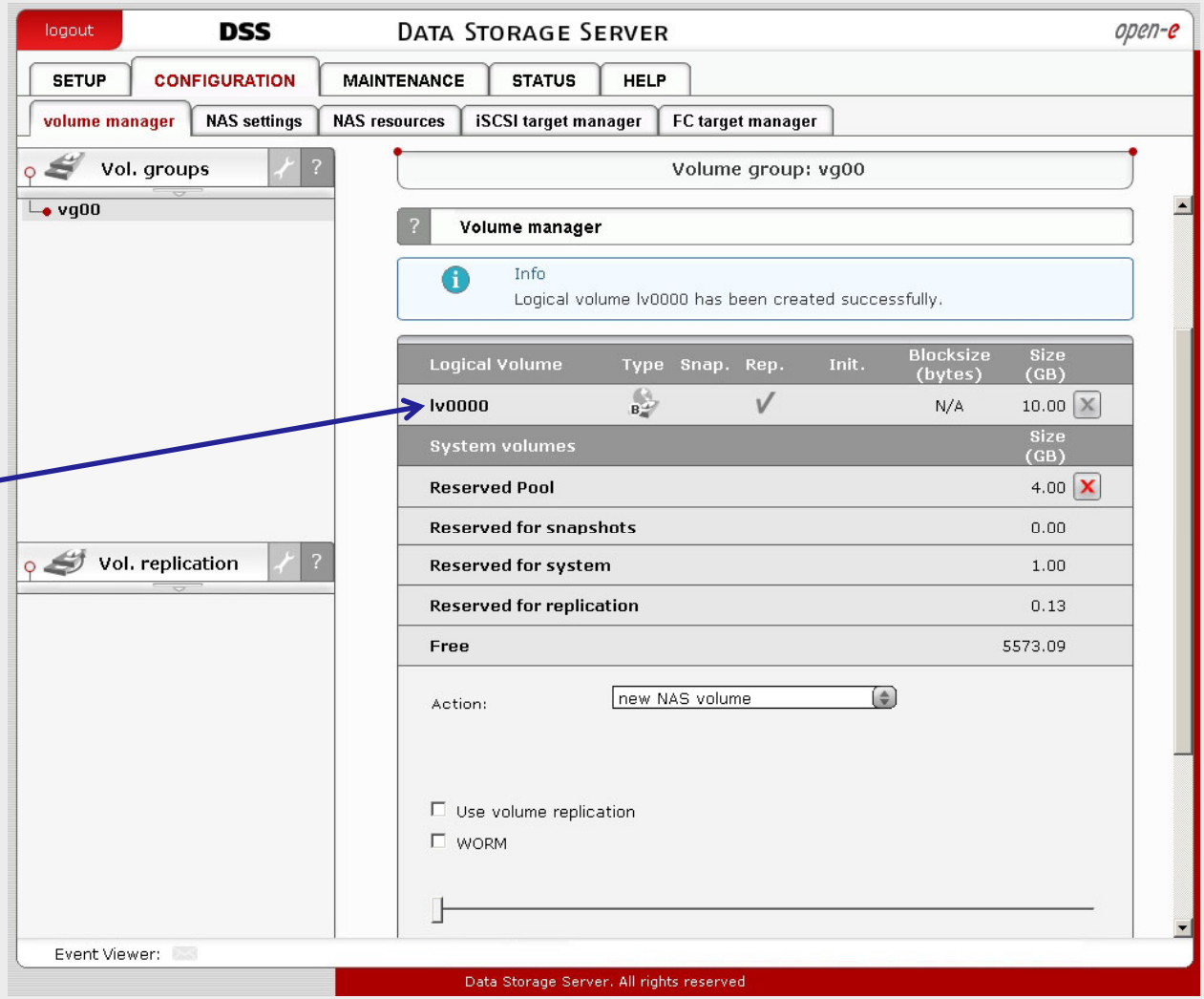


Data Server (DSS1)
Source node
Address IP:77.20.155.182

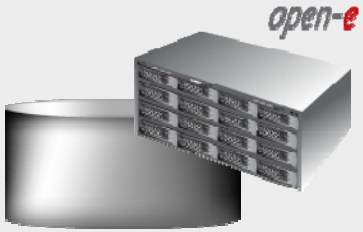
4. Configure the Source Node

iSCSI volume (lv0000)

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



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



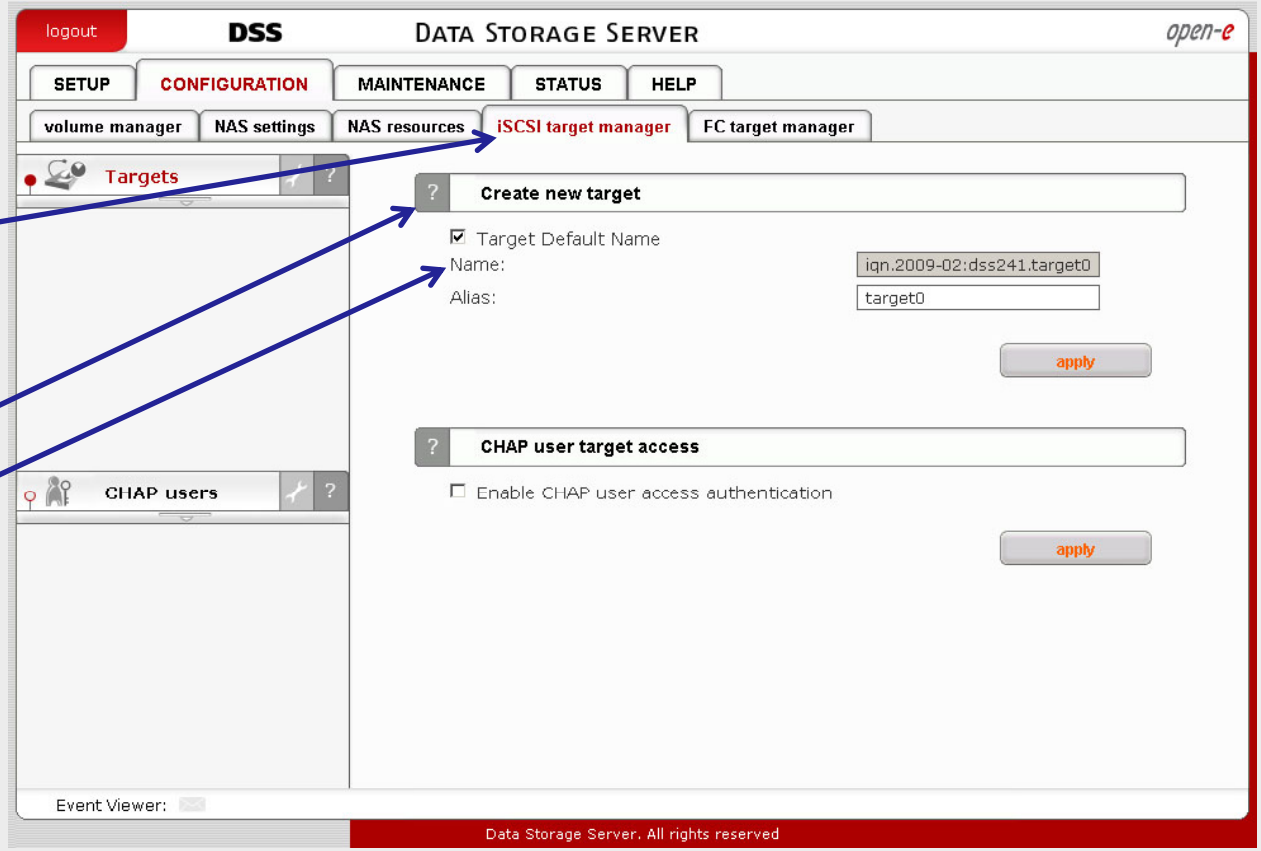
Data Server (DSS1)
Source node
Address IP:77.20.155.182

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.



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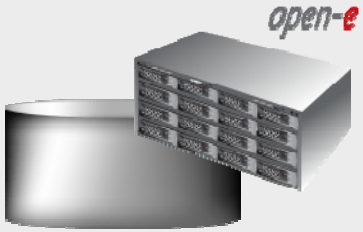


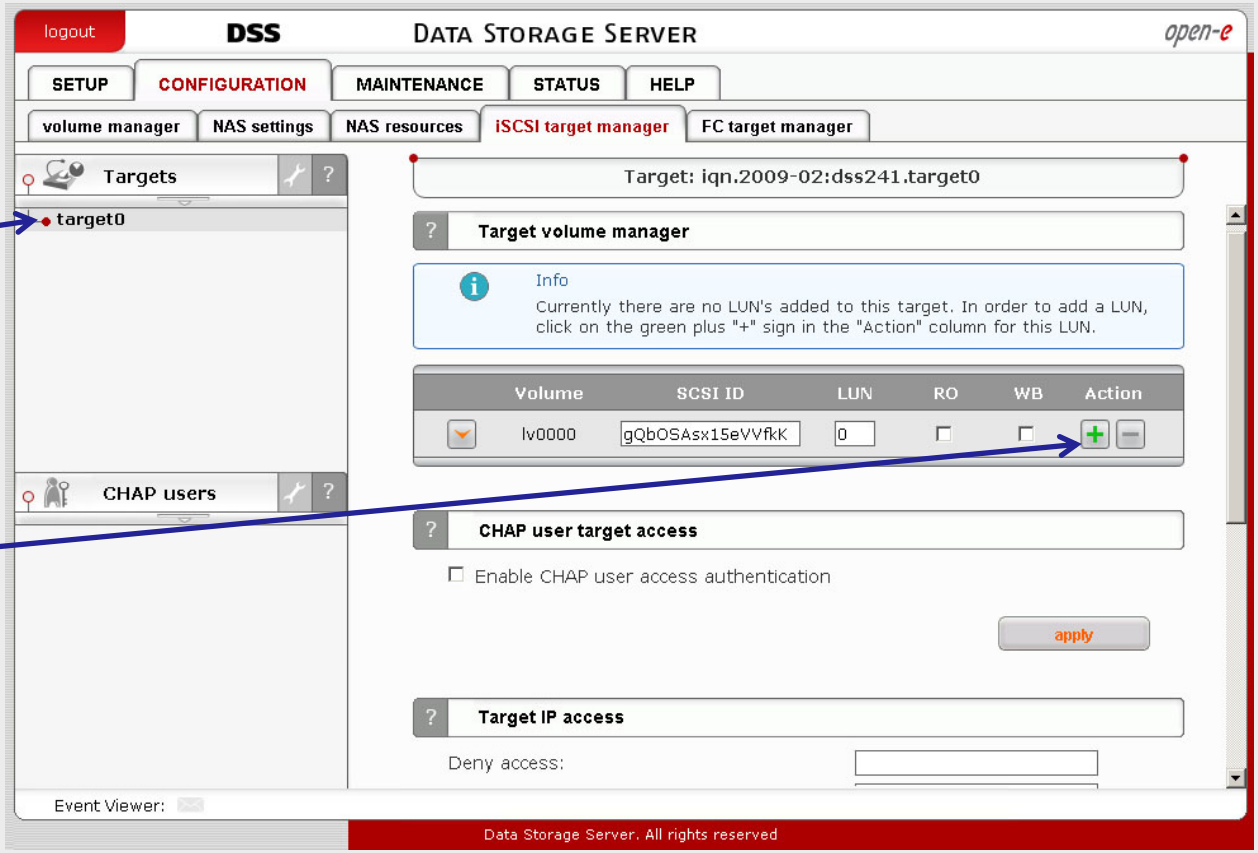
Data Server (DSS1)
Source node
Address IP:77.20.155.182

4. Configure the Source Node

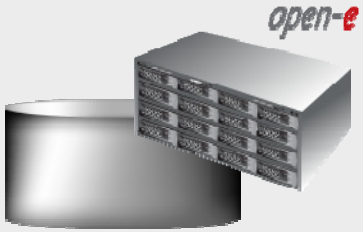
Select **target0** within the **Targets** field.

iSCSI targets

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



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

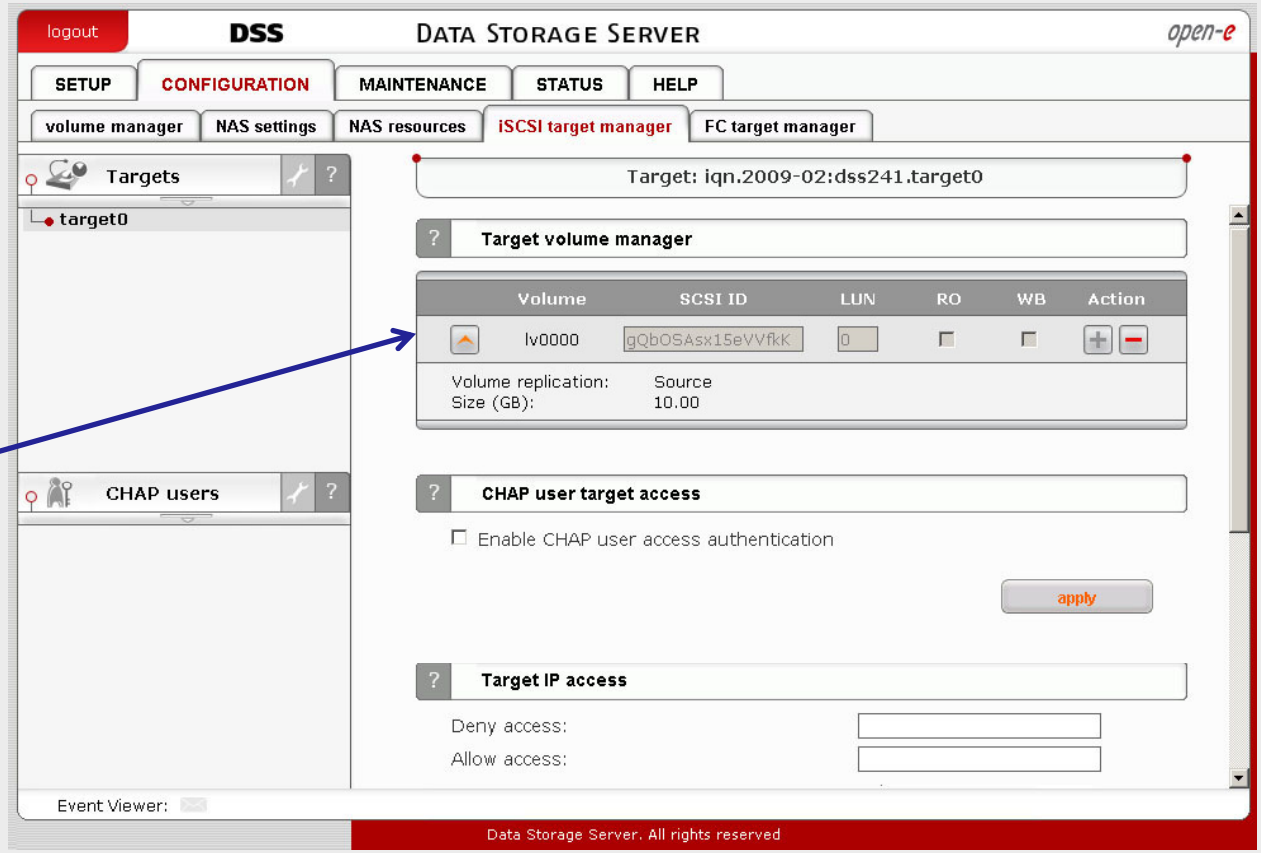


Data Server (DSS1)
Source node
Address IP:77.20.155.182

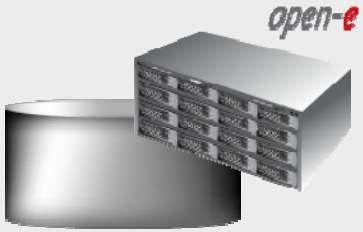
4. Configure the Source Node

iSCSI targets

The source **iSCSI target** is now configured.



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



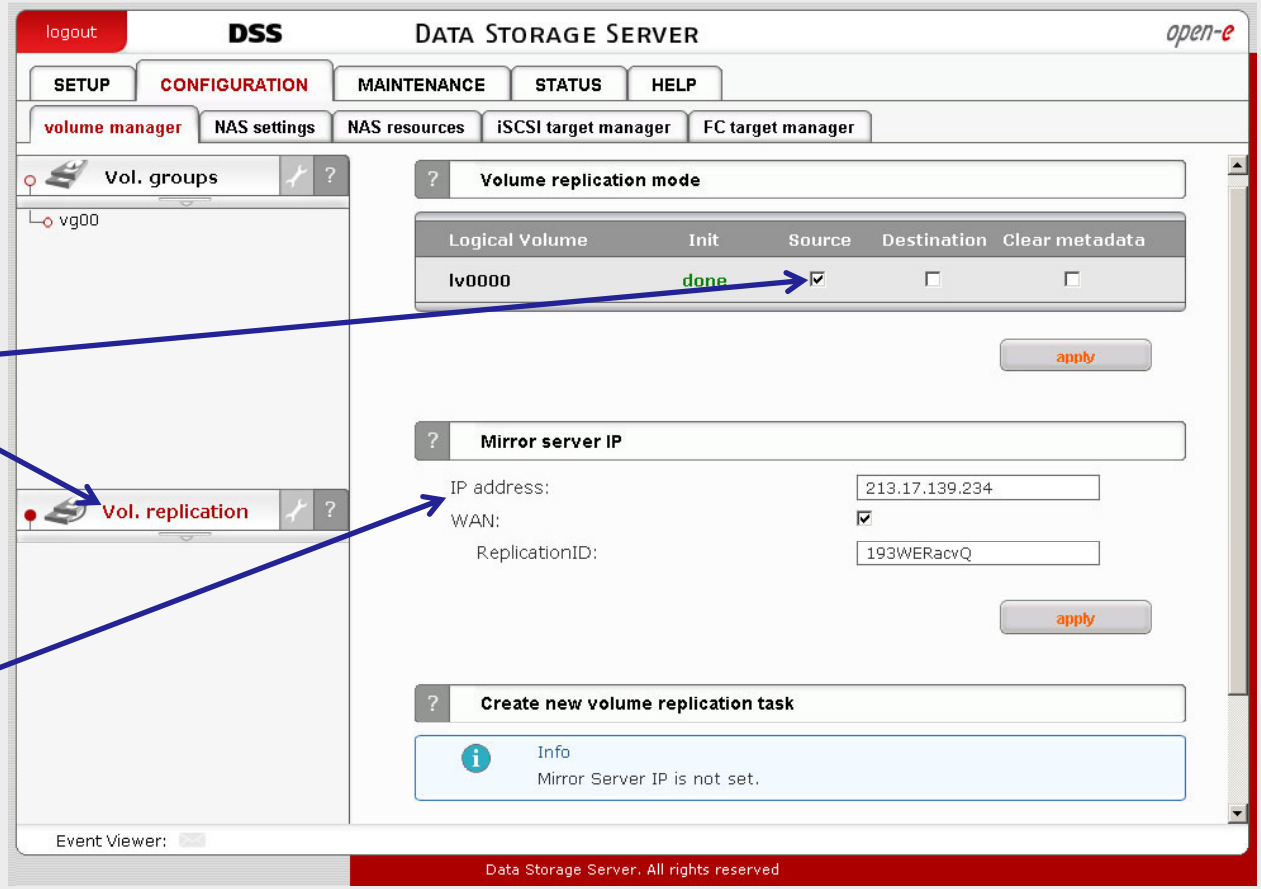
Data Server (DSS1)
Source node
Address IP:77.20.155.182

4. Configure the Source Node

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

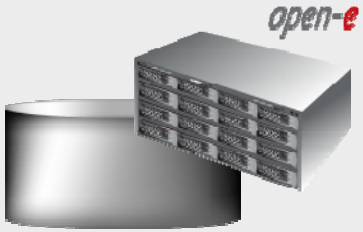
Volume Replication

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.



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

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



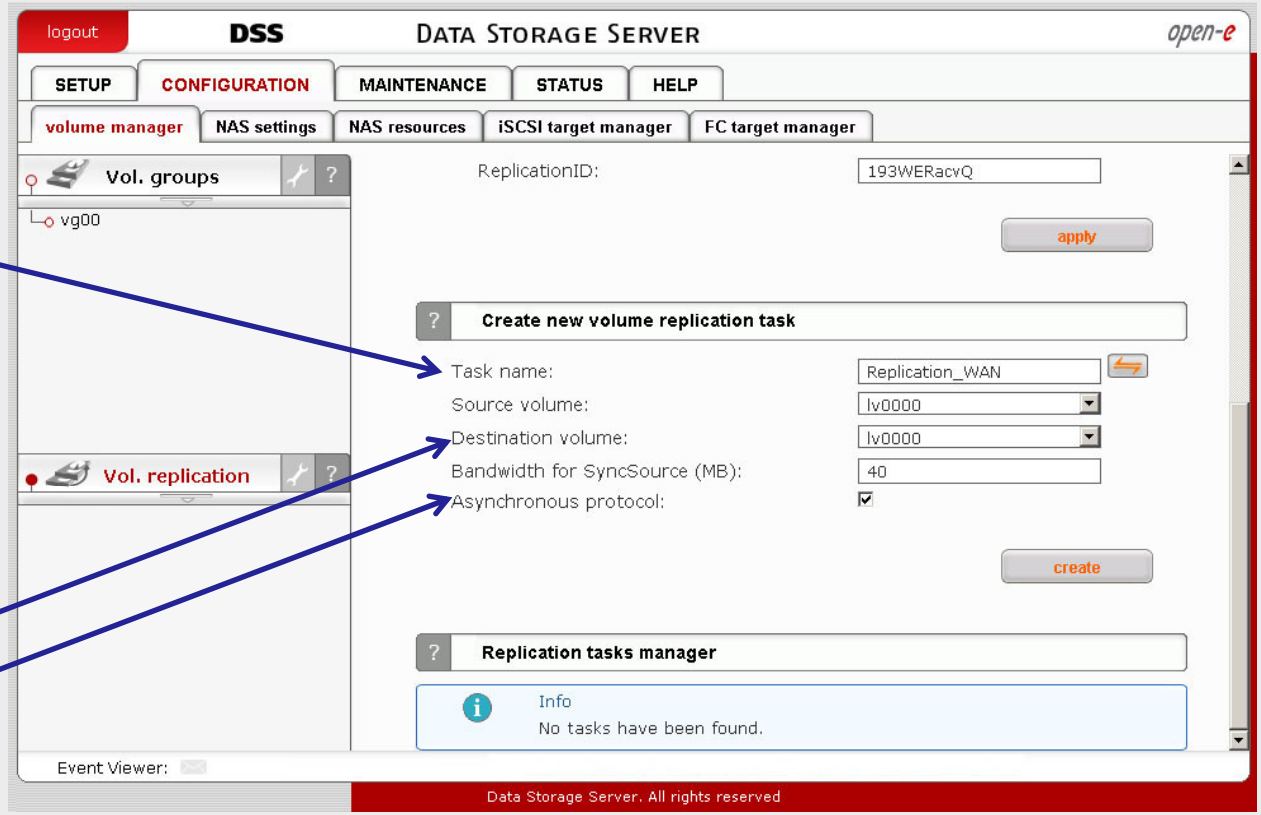
Data Server (DSS1)
Source node
Address IP:77.20.155.182

5. Creating replication task

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

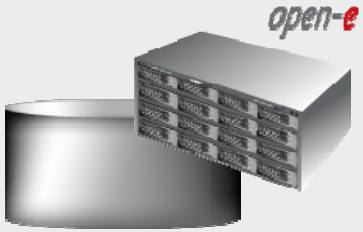
Volume Replication

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

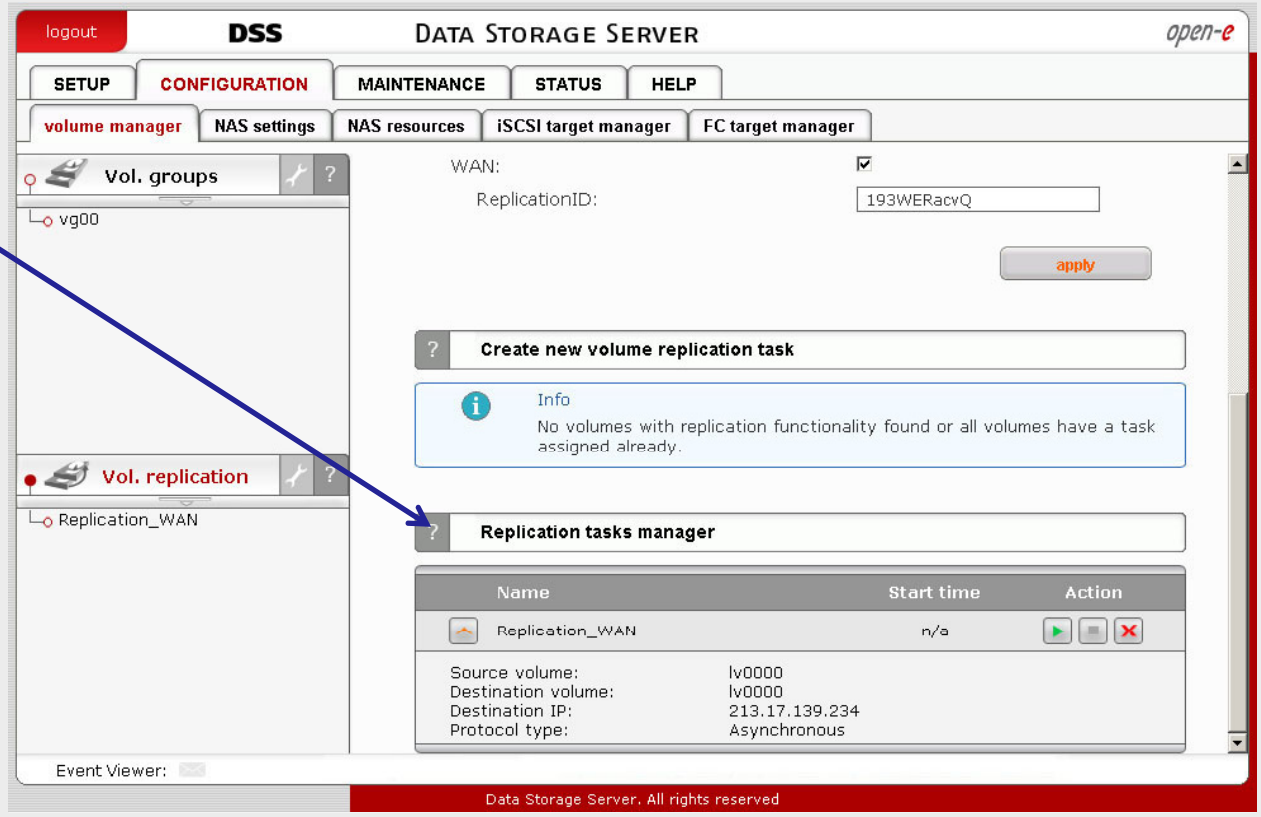
Setting up Asynchronous **Volume Replication** over a WAN



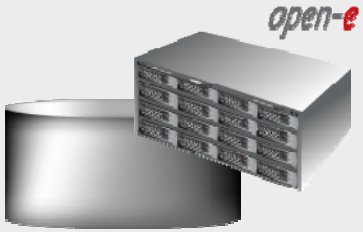
Data Server (DSS1)
Source node
Address IP:77.20.155.182

5. Creating replication task

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



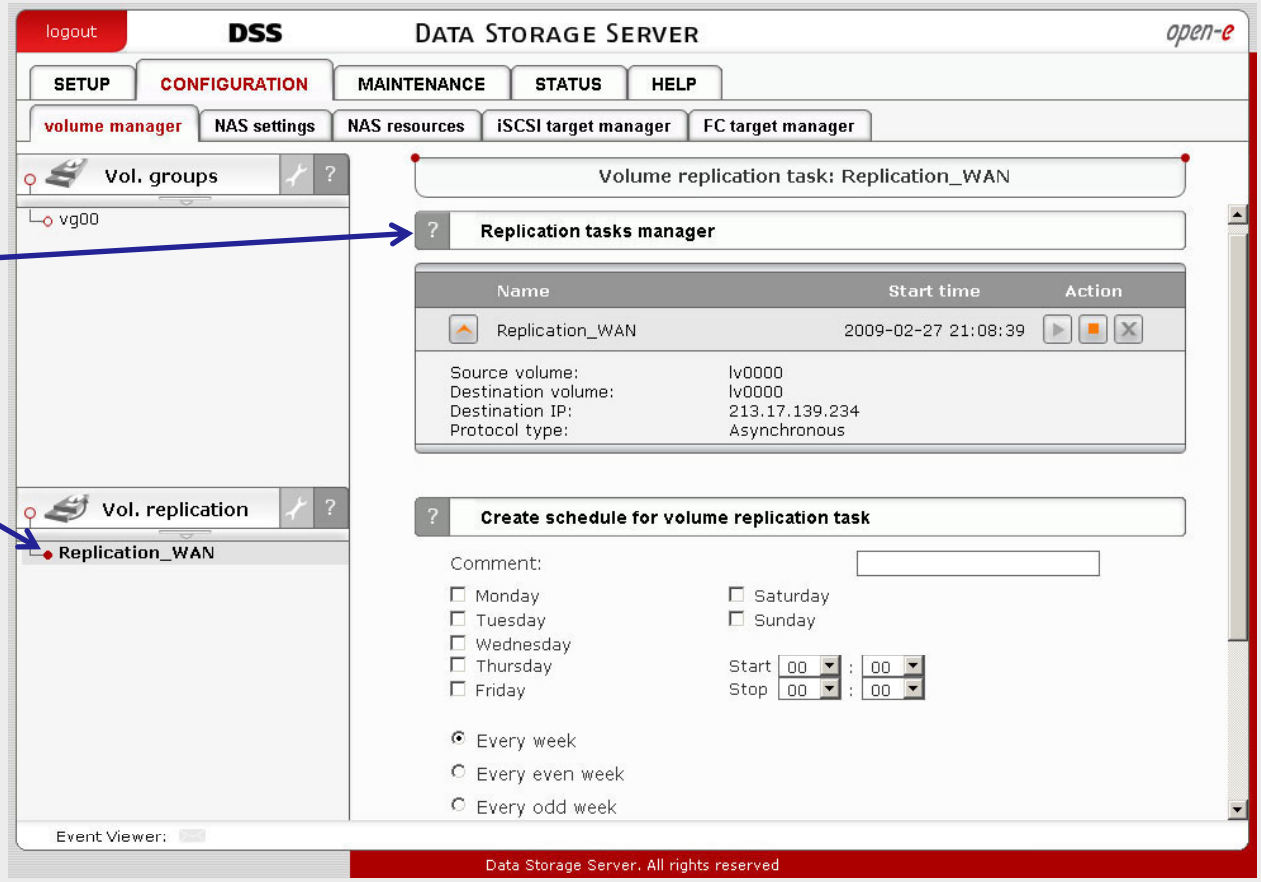
Setting up Asynchronous **Volume Replication** over a WAN



Data Server (DSS1)
Source node
Address IP:77.20.155.182

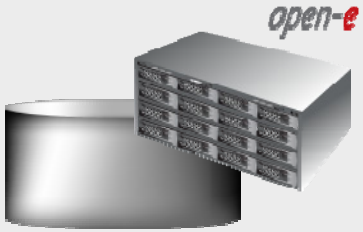
5. Creating replication task

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**).



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

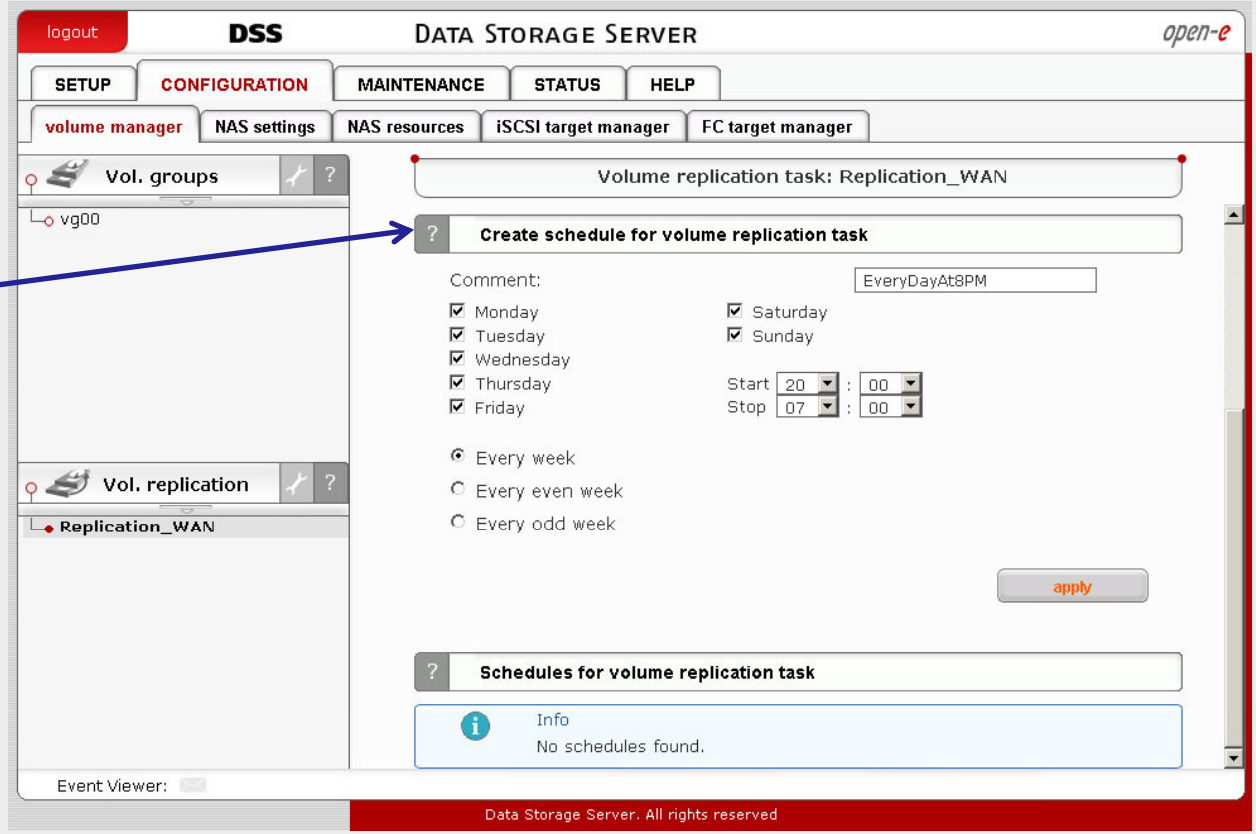
Setting up Asynchronous **Volume Replication** over a WAN



Data Server (DSS1)
Source node
Address IP:77.20.155.182

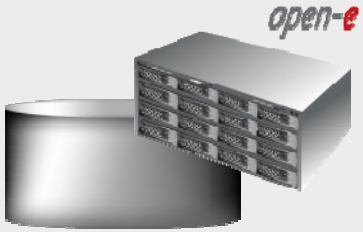
5. Creating replication task

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.

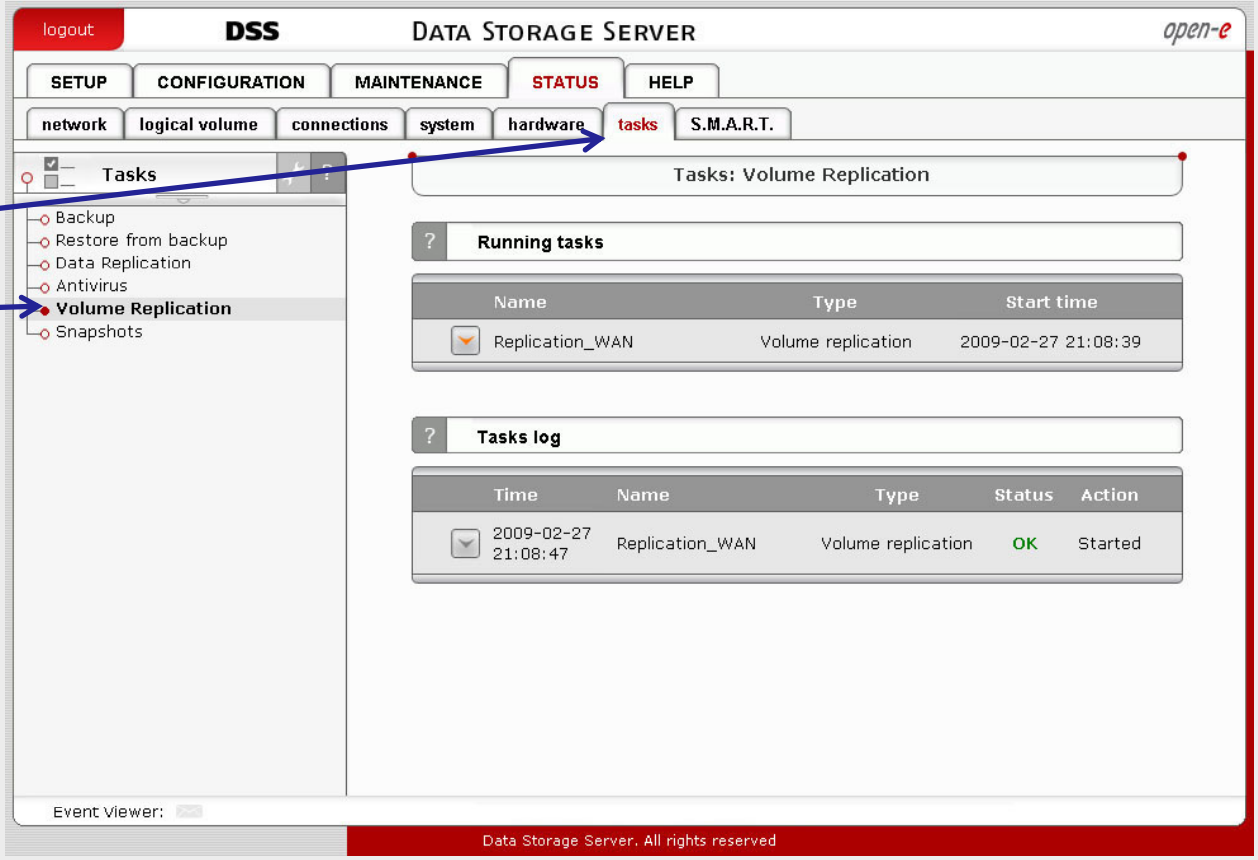
Setting up Asynchronous **Volume Replication** over a WAN



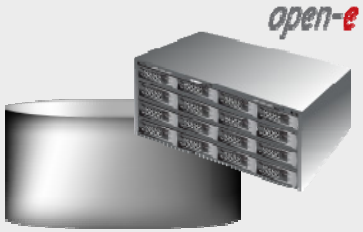
Data Server (DSS1)
Source node
Address IP:77.20.155.182

6. Check status of volume replication

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



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



Data Server (DSS1)
Source node
Address IP:77.20.155.182

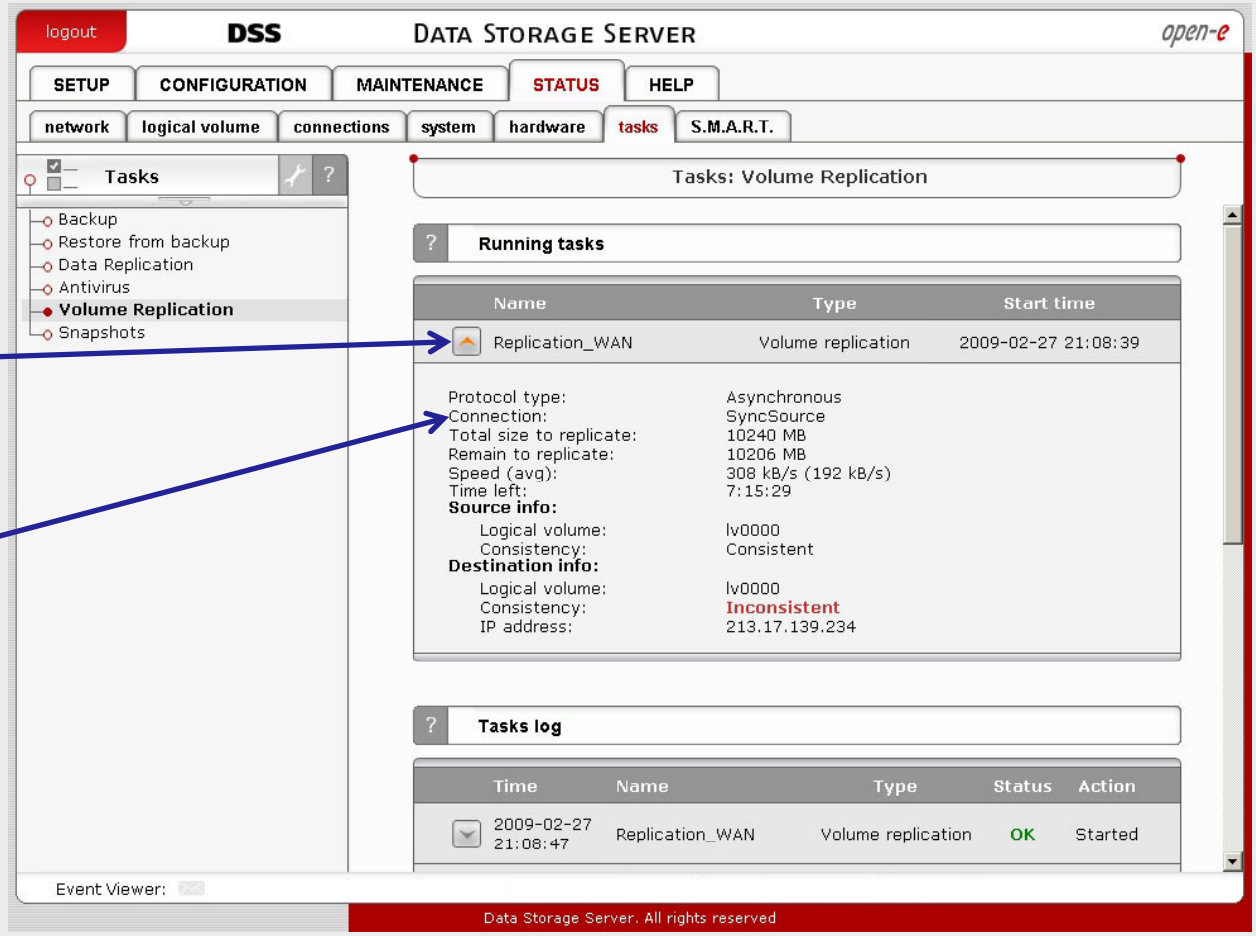
6. Check status of volume replication

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

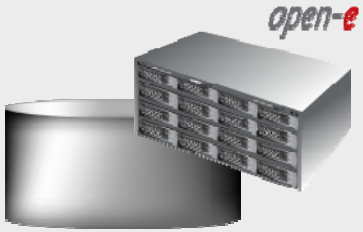
All possible connection types (from **Connection** field) are described in table:

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.
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.

On the 30th slide.



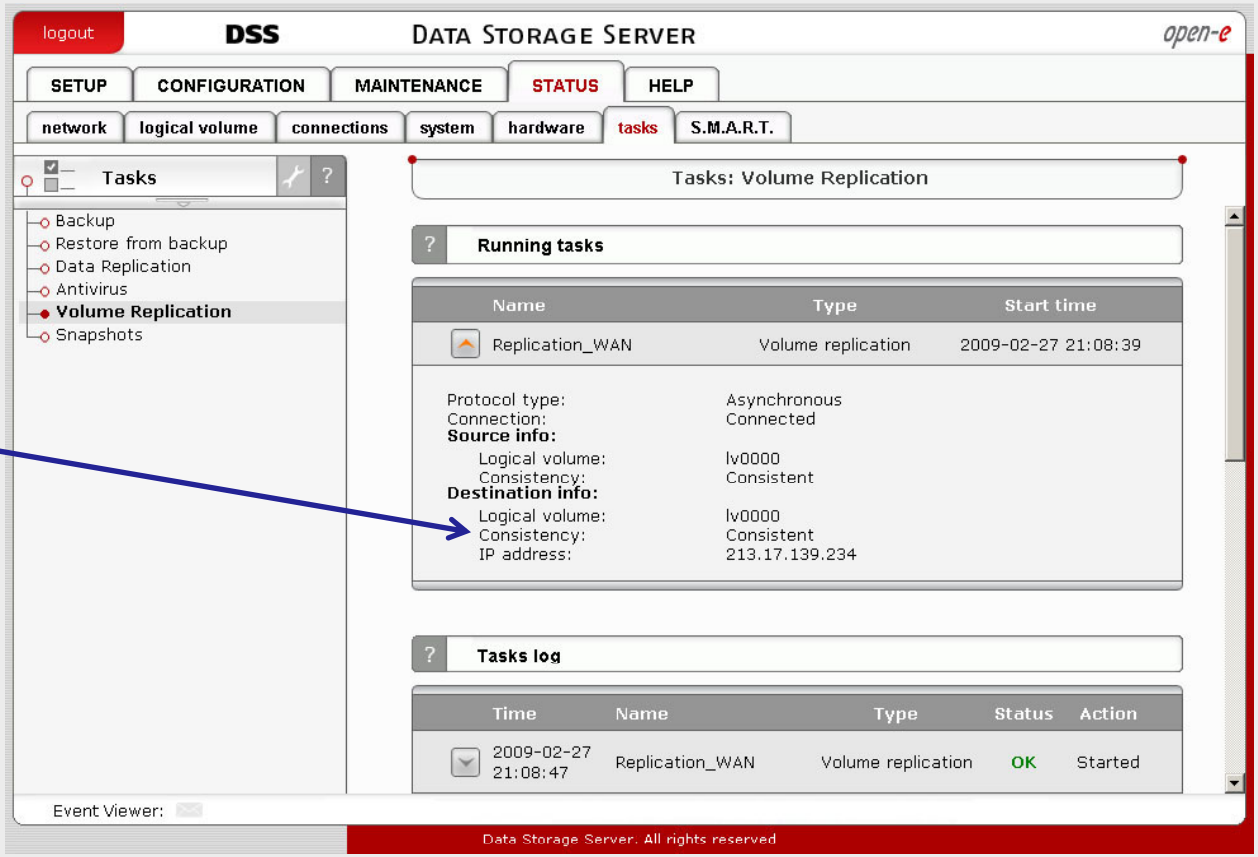
Setting up Asynchronous **Volume Replication** over a WAN



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.



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

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

CONNECTION STATES:

State	Description
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Thank You!