Step-by-Step Guide to Synchronous Volume Replication (Block Based) with Failover over a LAN Supported by Open-E® DSS™

DSS ver. 5.00 up60 February 12, 2009

May 2009

Synchronous **Volume Replication with Failover** over a LAN

	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
Synchronous Volume Replication with Failover over a LAN	✓			✓			✓			✓	

- **Open-E DSS Synchronous Volume Replication with Failover** is a fault tolerance process via iSCSI volume replication, that creates mirrored target data volumes.
  - Data is copied in real-time, and every change is immediately mirrored from the primary server to the secondary storage server.
  - In case of a failure, scheduled maintenance of the primary server, or loss of the primary data source, failover automatically switches operations to the secondary storage server, so processes can be continued as usual.

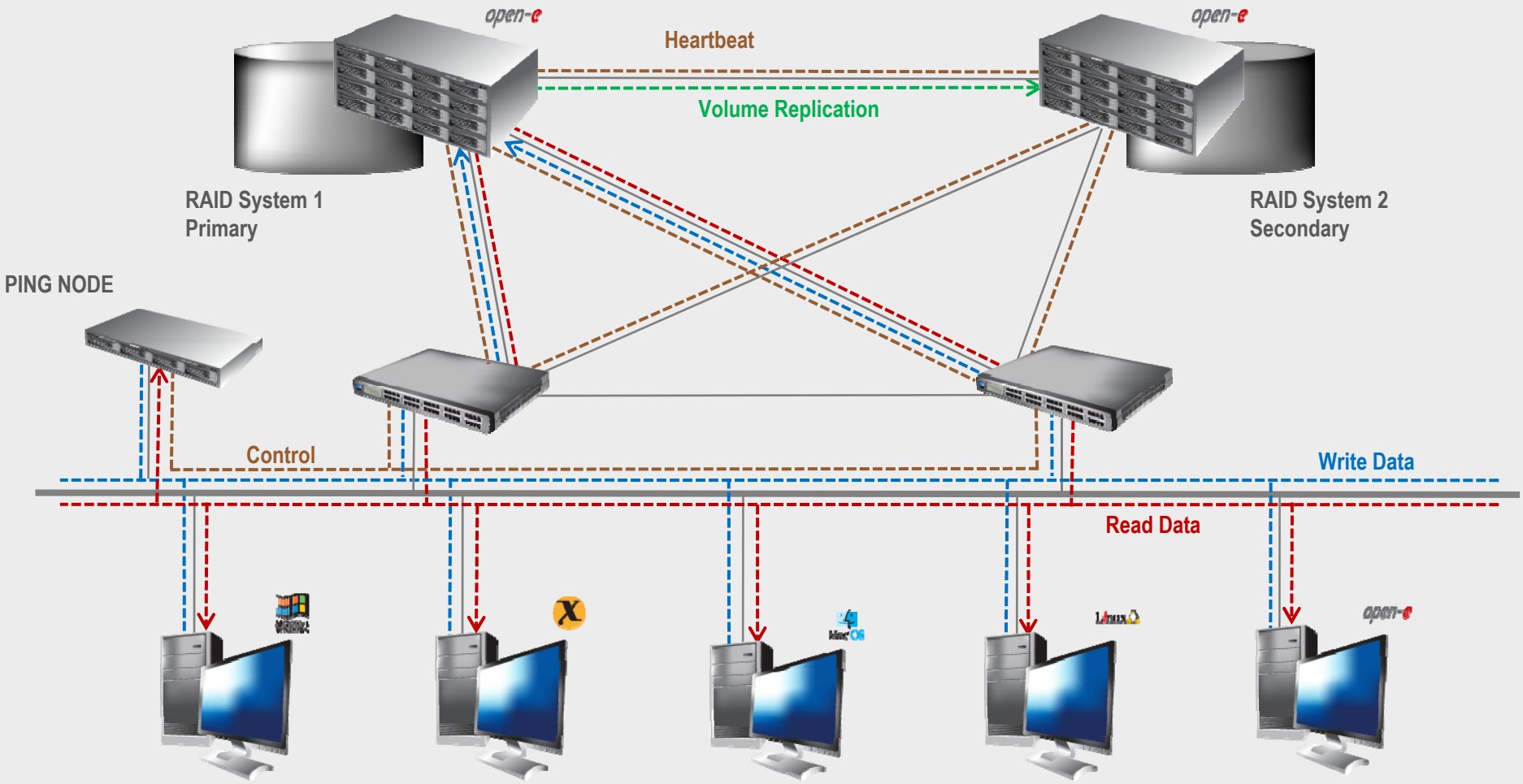
Synchronous **Volume Replication with Failover** over a LAN

VOLUME REPLICATION WITH FAILOVER BETWEEN TWO SYSTEMS WITHIN ONE LAN

- **Recommended Resources**
  - Key Hardware (two systems)
    - ✓ x86 compatible
    - ✓ RAID Controller with **Batery Backup Unit**
    - ✓ HDD‘s
    - ✓ Network Interface Cards
    - ✓ Ping Node (ping node it is any permanently (24/7) available host in the network. In particular case the ping node function can be performed by the server storing the data on the iSCSI failover volume).
  - Software
    - ✓ Open-E DSS, 2 units
- **Benefits**
  - Eliminate business disruption
  - Data Redundancy over a LAN
  - Switch Redundancy
- **Disadvantages**
  - High cost of solution
  - Natural disasters (earthquake, fire, flood...) can destroy local systems

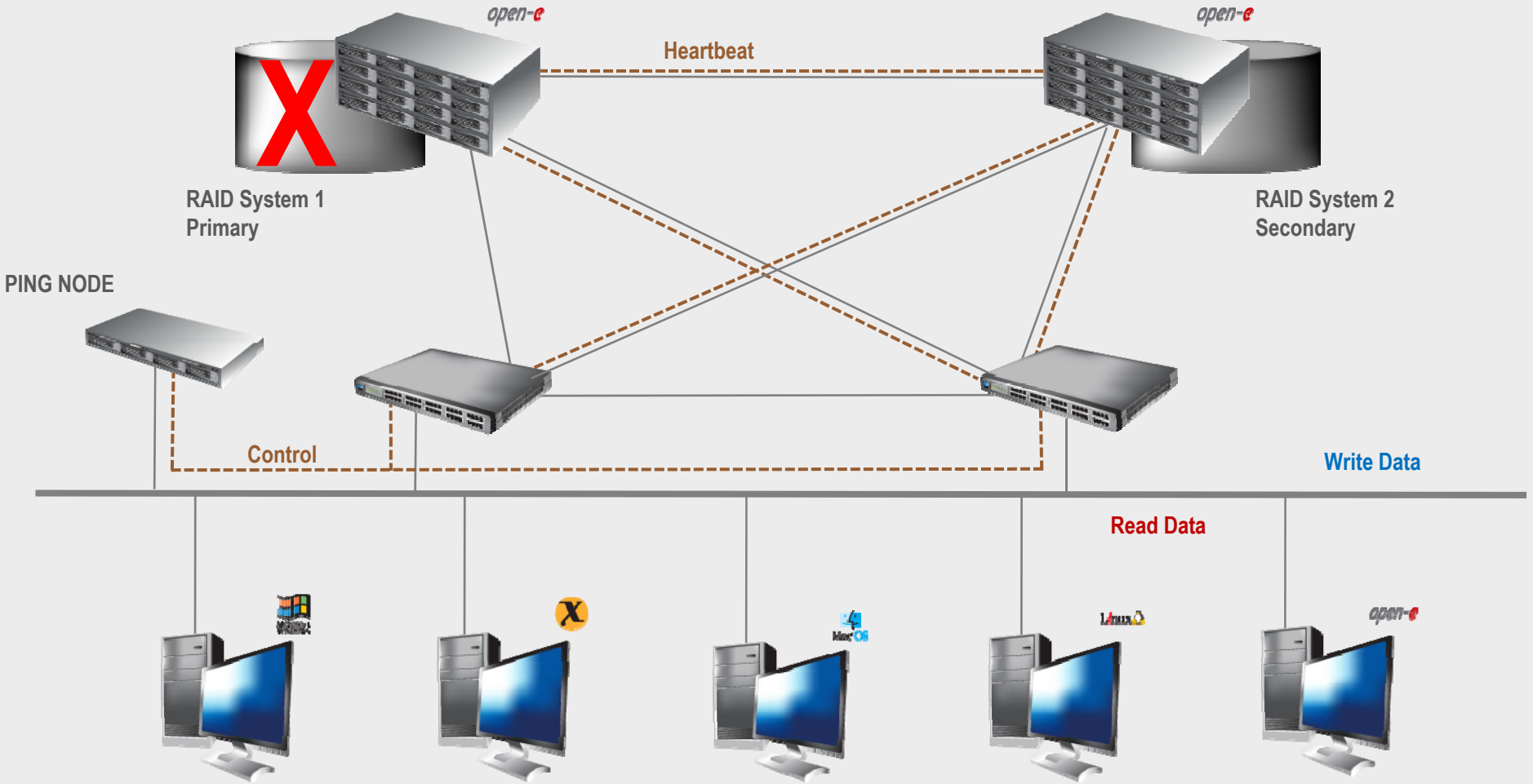
Synchronous **Volume Replication with Failover** over a LAN

- Data is written and read to System 1 (primary)
- Data is continually replicated to System 2 (secondary)



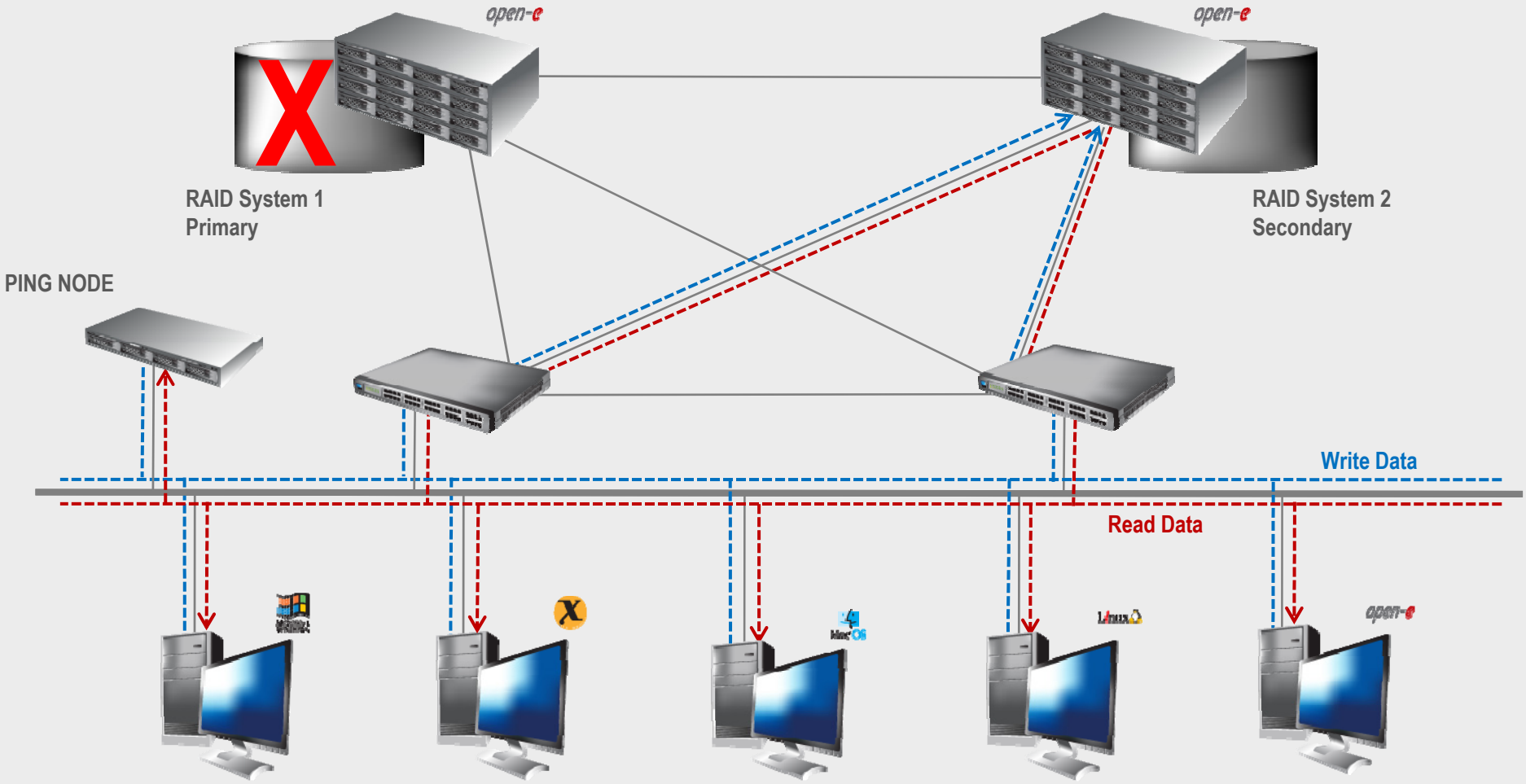
Synchronous **Volume Replication with Failover** over a LAN

- In case of raid array or disk drive error on System 1(primary), the server will send an e-mail notification to the administrator
- iSCSI Auto Failover determines there is no connection between the servers
- After a few seconds Automatic Failover is executed and users are switched to System 2 (secondary)



Synchronous **Volume Replication with Failover** over a LAN

- After switching, the replicated volume is available on System 2 (secondary)



Synchronous **Volume Replication with Failover** over a LAN

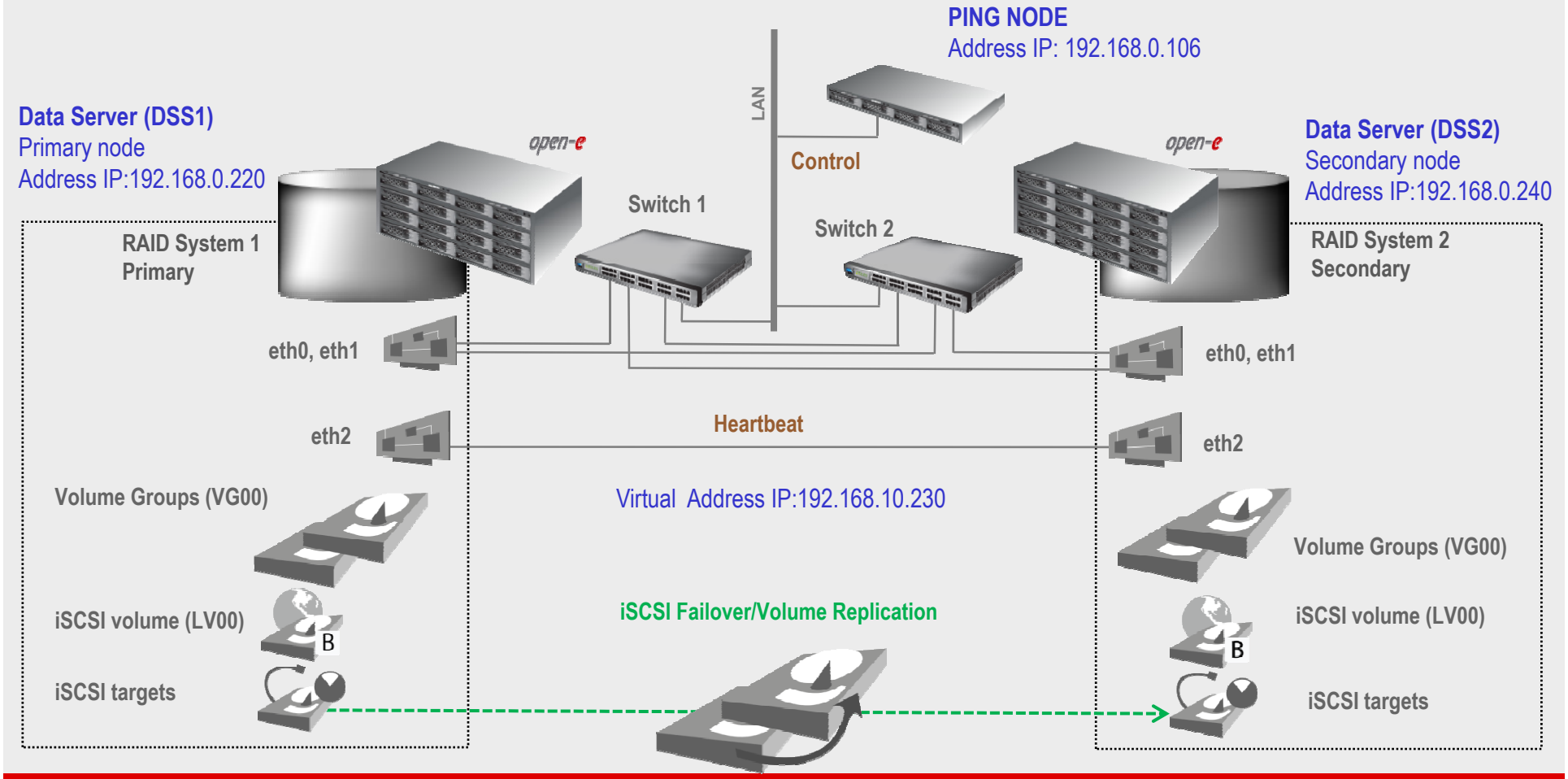
TO SET UP VOLUME REPLICATION WITH FAILOVER, PERFORM THE FOLLOWING STEPS:

1. Hardware configuration
2. Configure the Secondary node
   - Create a Volume Group, iSCSI Volume
   - Configure Volume Replication mode (destination mode) – settings mirror IP address
3. Configure the Primary node
   - Create a Volume Group, iSCSI Volume
   - Configure Volume Replication mode (source mode) – settings mirror IP address, creating Volume Replication task and start replication task.
4. Create new target on Secondary node
5. Create new target on Primary node
6. Configure virtual IP and Auxiliary connection
7. Configure iSCSI Failover
8. Start Failover Service
9. Test Failover Function
10. Run Failback Function

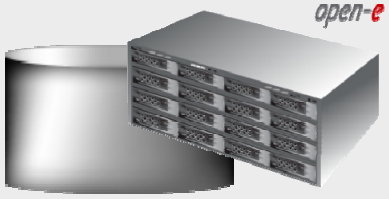
Synchronous **Volume Replication with Failover** over a LAN

1. Hardware Configuration

Hardware Requirements:
To run the Volume Replication with Failover, two DSS systems are required.
Both servers must be located and working in the Local Area Network.
See below for the example configuration :



Synchronous **Volume Replication with Failover** over a LAN



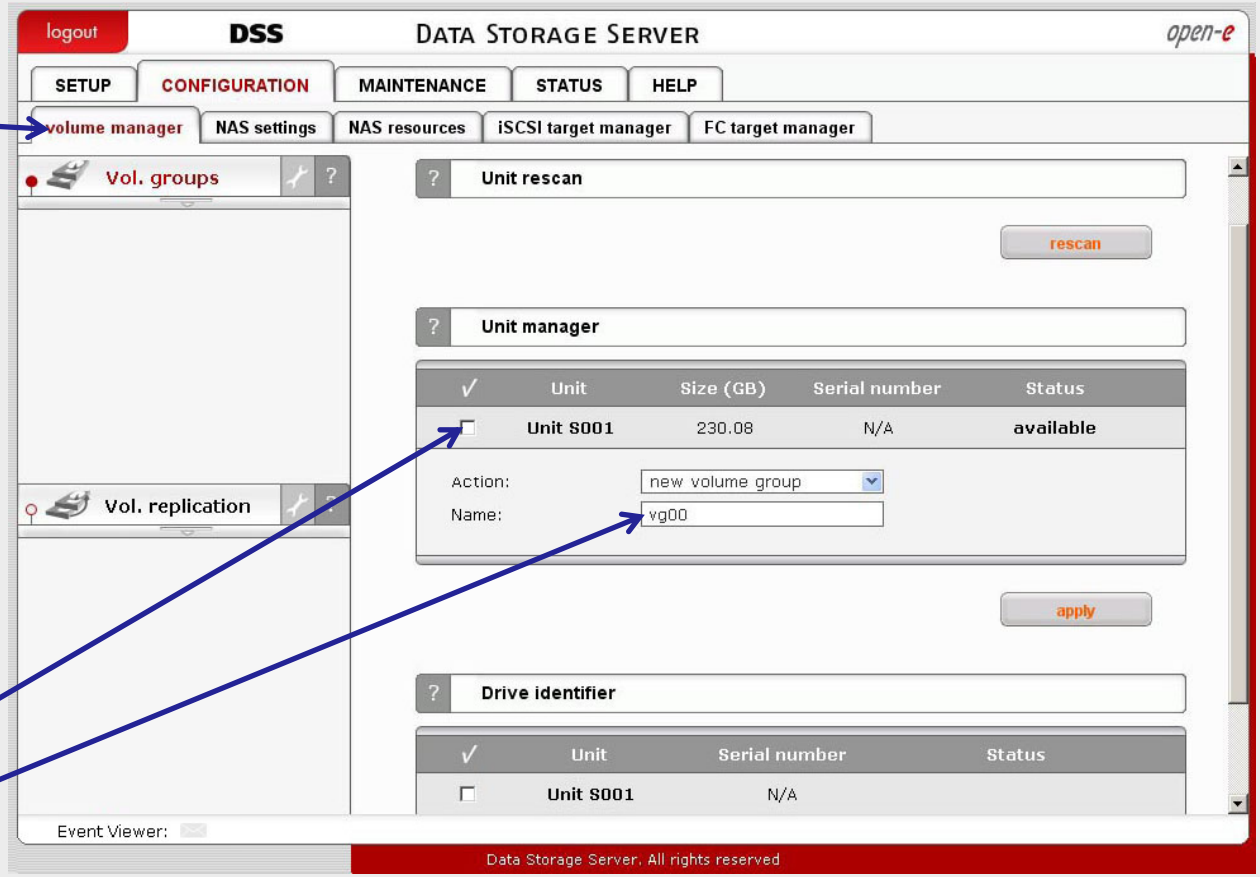
Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

2. Configure the Secondary node

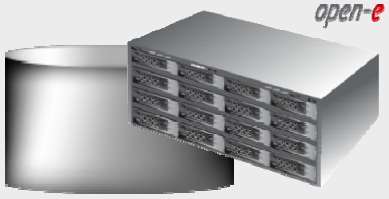
Under the **„CONFIGURATION"** tab, select **„volume manager"**

Volume Groups (vg00)

Add the selected physical units (**Unit S001** or other) to create a new volume group (in this case, **vg00**) and click **apply** button



Synchronous **Volume Replication with Failover** over a LAN



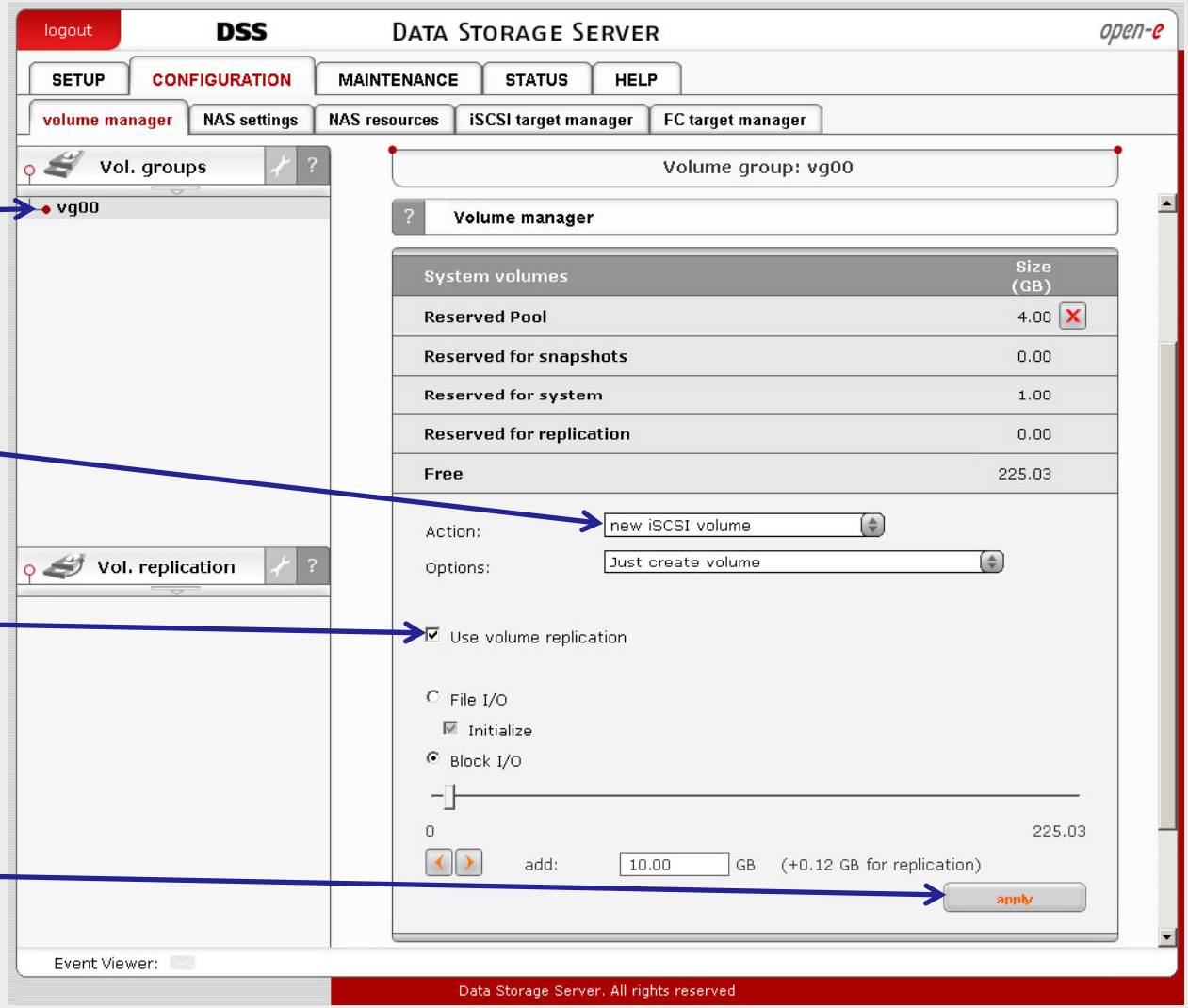
Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

2. Configure the Secondary node

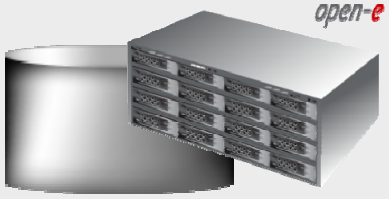
Select the appropriate volume group (**vg00**) from the list on the left and create a **new iSCSI volume** of the required size. This logical volume will be the destination of the replication process.

Next check the box with **Use volume replication**

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



Synchronous **Volume Replication with Failover** over a LAN

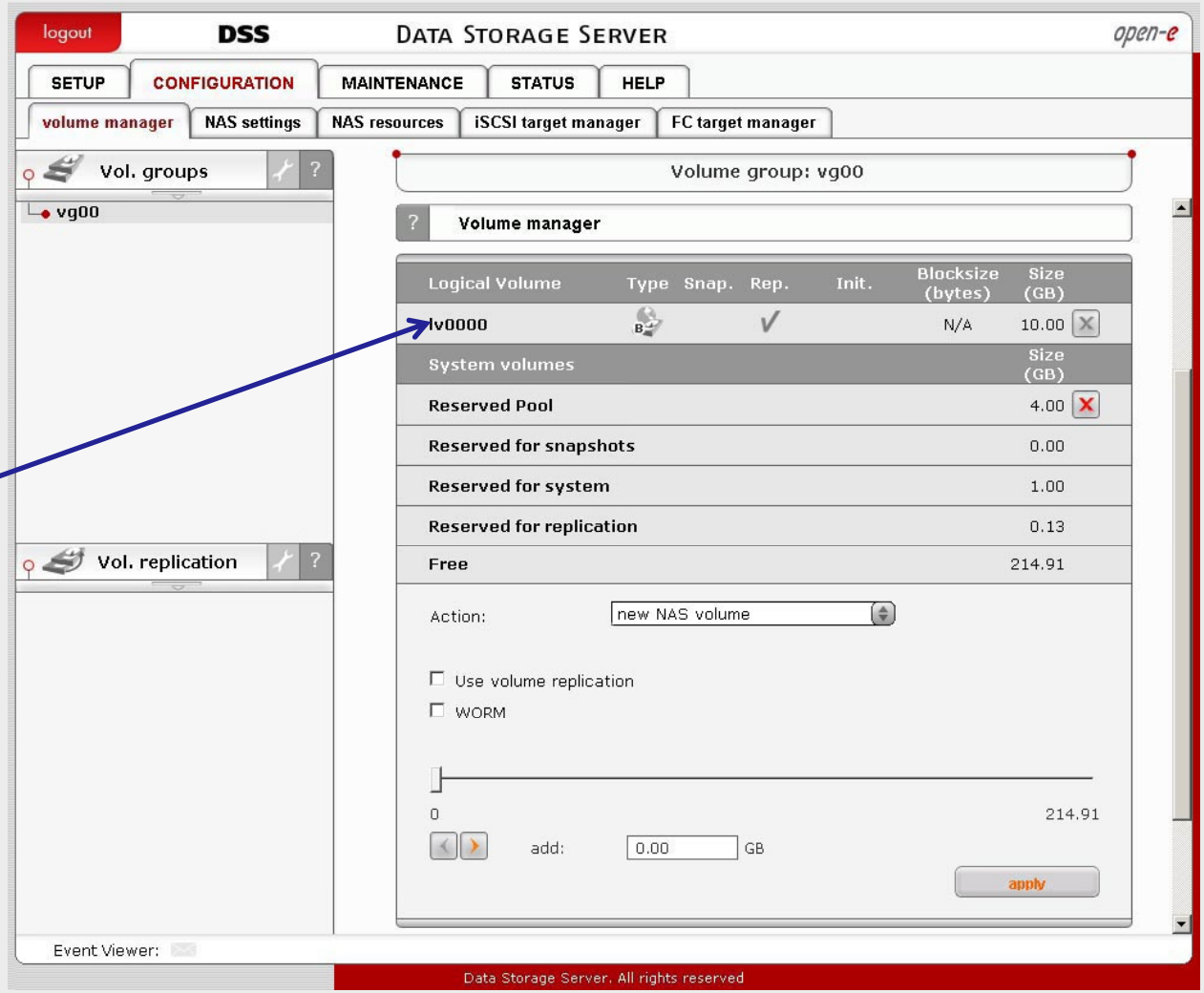


Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

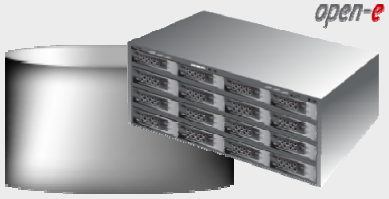
2. Configure the Secondary node

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

iSCSI volume (lv0000)



Synchronous **Volume Replication with Failover** over a LAN

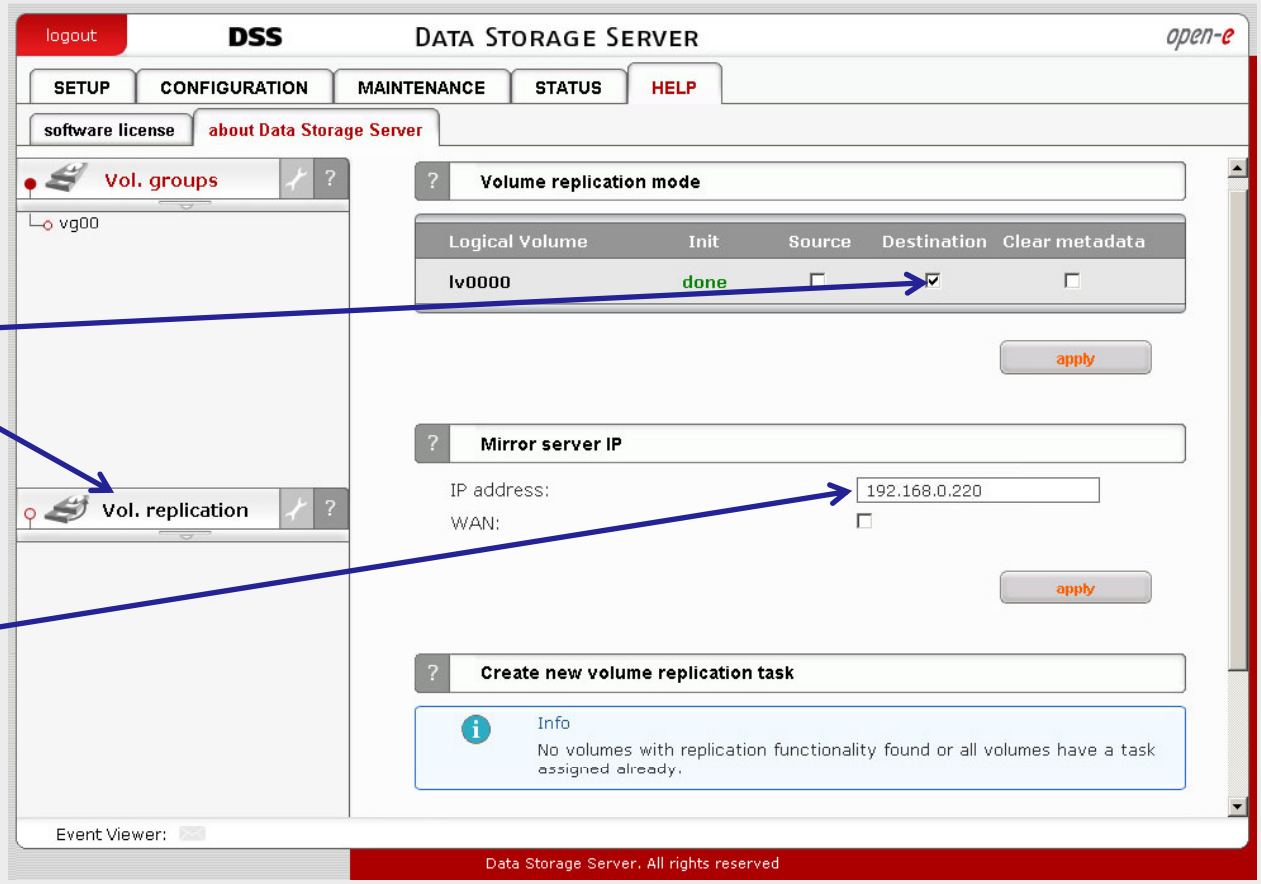


Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

2. Configure the Secondary node

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

Next, under **Mirror Server IP** function, enter the IP address of the Primary node (in our example, this would be 192.168.0.220) and click the **apply** button

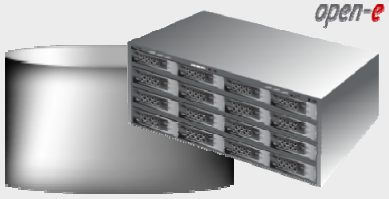


NOTE:

The Mirror server IP Address must be on the same subnet in order for the replication to communicate. VPN connections can work providing you are not using a NAT. Please follow example:

- Source: 192.168.0.220
- Destination: 192.168.0.240

Synchronous **Volume Replication with Failover** over a LAN



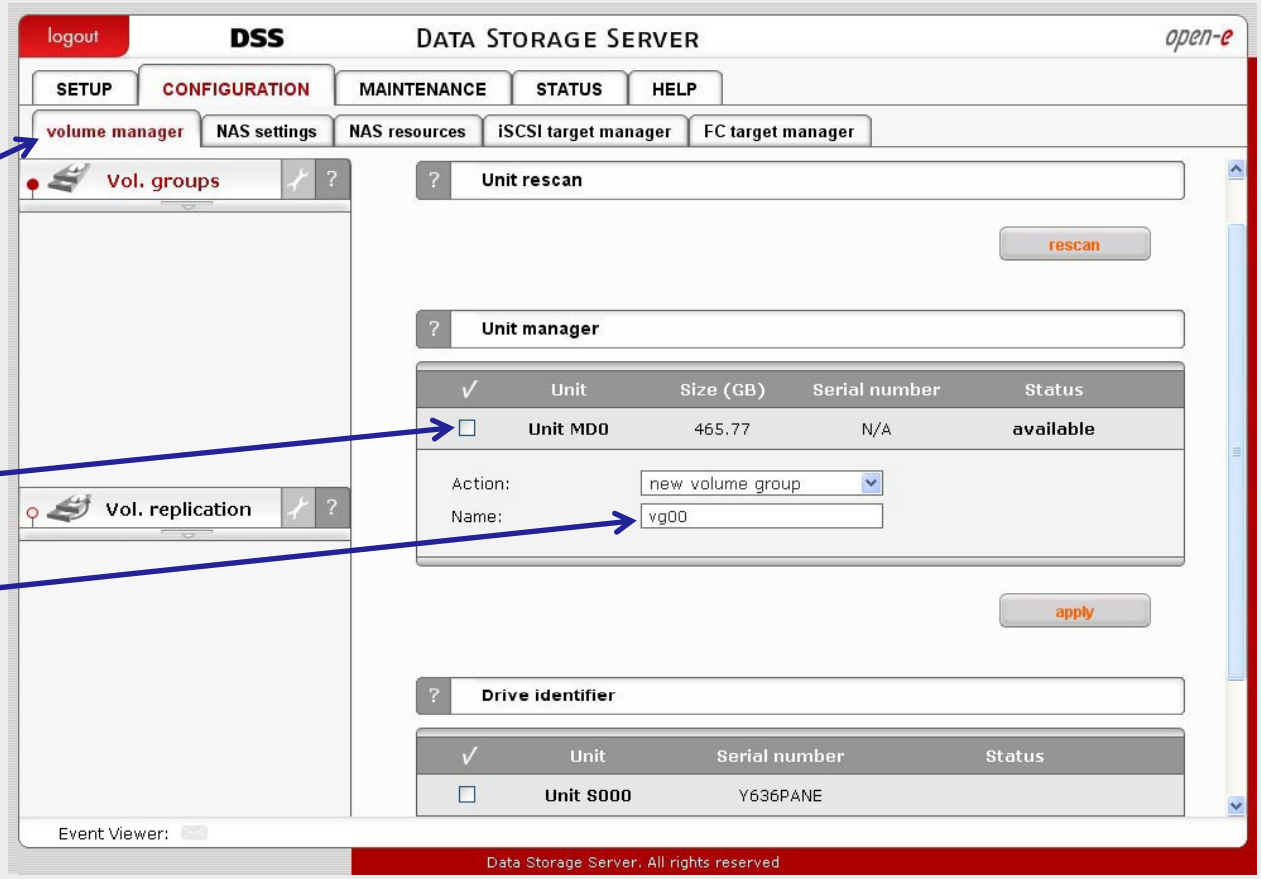
Data Server (DSS1)
Primary node
Address IP:192.168.0.220

3. Configure the Primary node

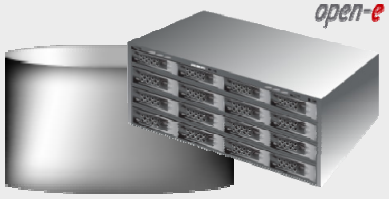
Under the **„CONFIGURATION"** tab, select **„volume manager"**

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

Volume Groups (vg00)



Synchronous **Volume Replication with Failover** over a LAN



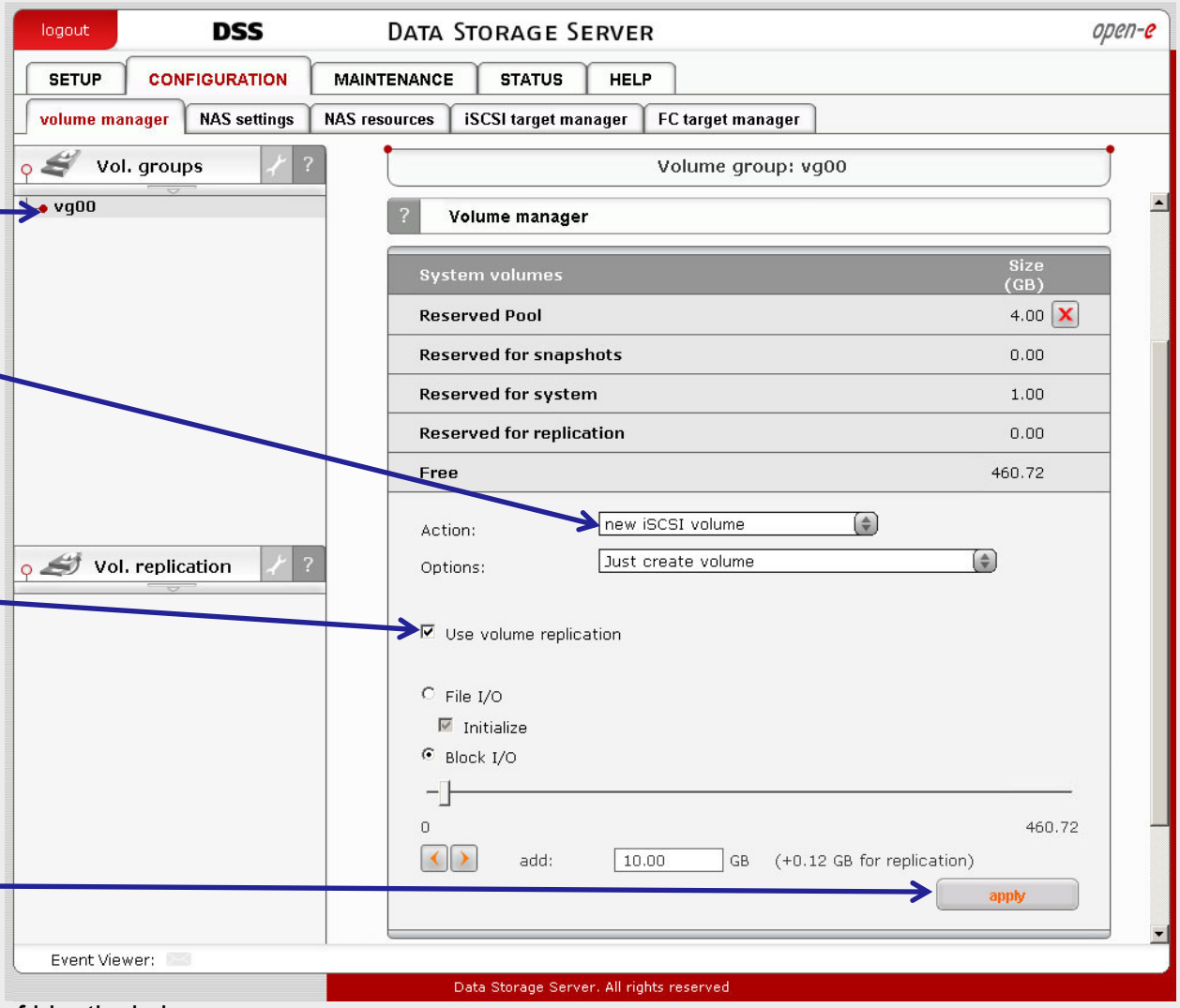
Data Server (DSS1)
Primary node
Address IP:192.168.0.220

3. Configure the Primary 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

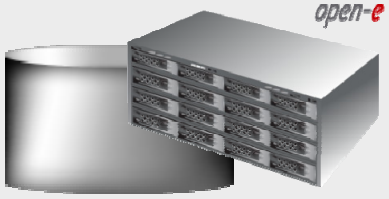
Next , check box **Use volume replication**

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



NOTE:
The source and destination volumes must be of identical size.

Synchronous **Volume Replication with Failover** over a LAN

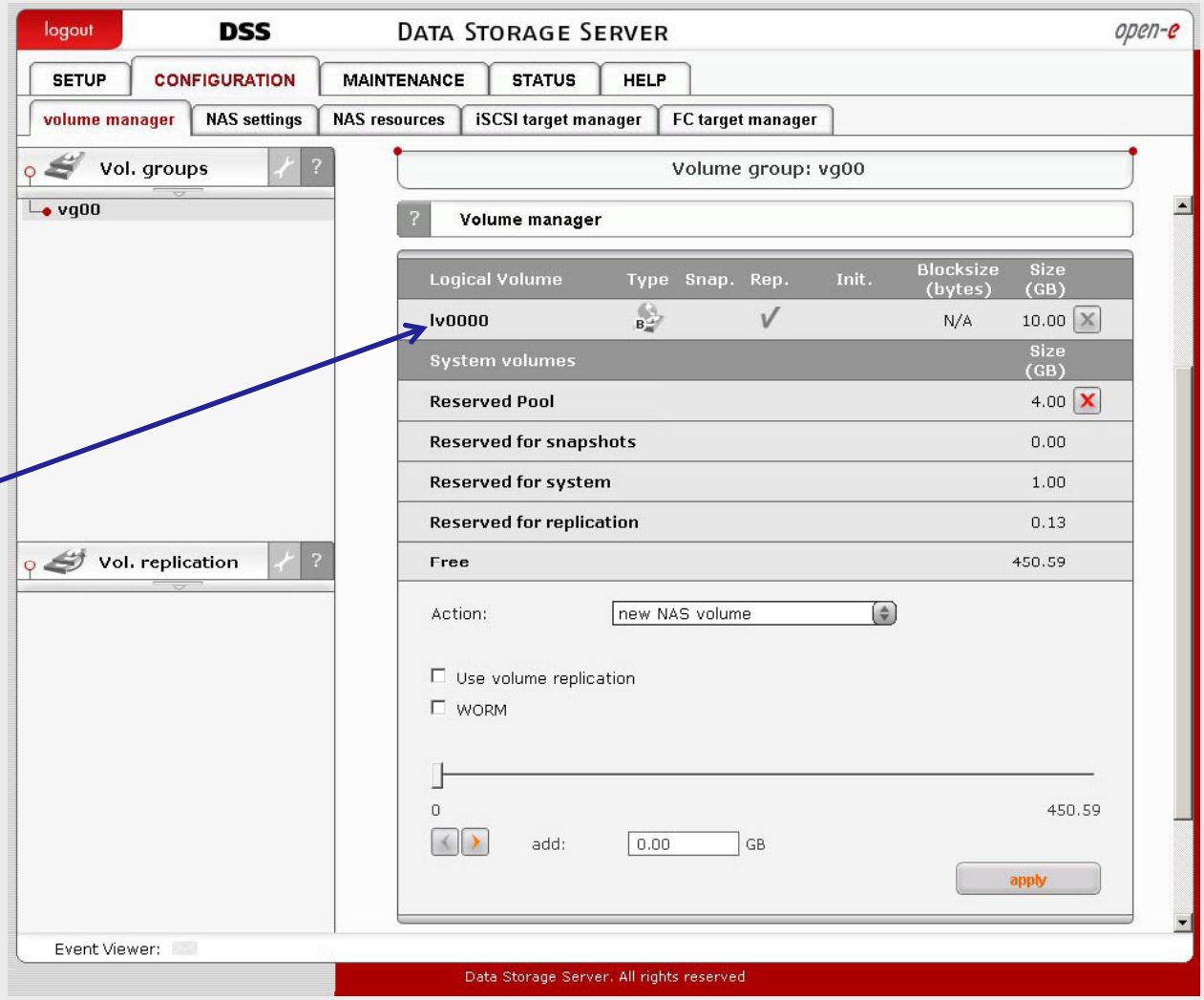


Data Server (DSS1)
Primary node
Address IP:192.168.0.220

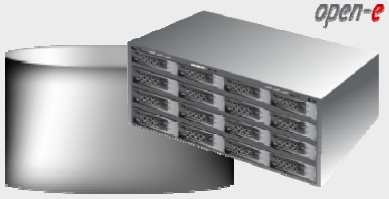
3. Configure the Primary node

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

iSCSI volume (lv0000)



Synchronous **Volume Replication with Failover** over a LAN

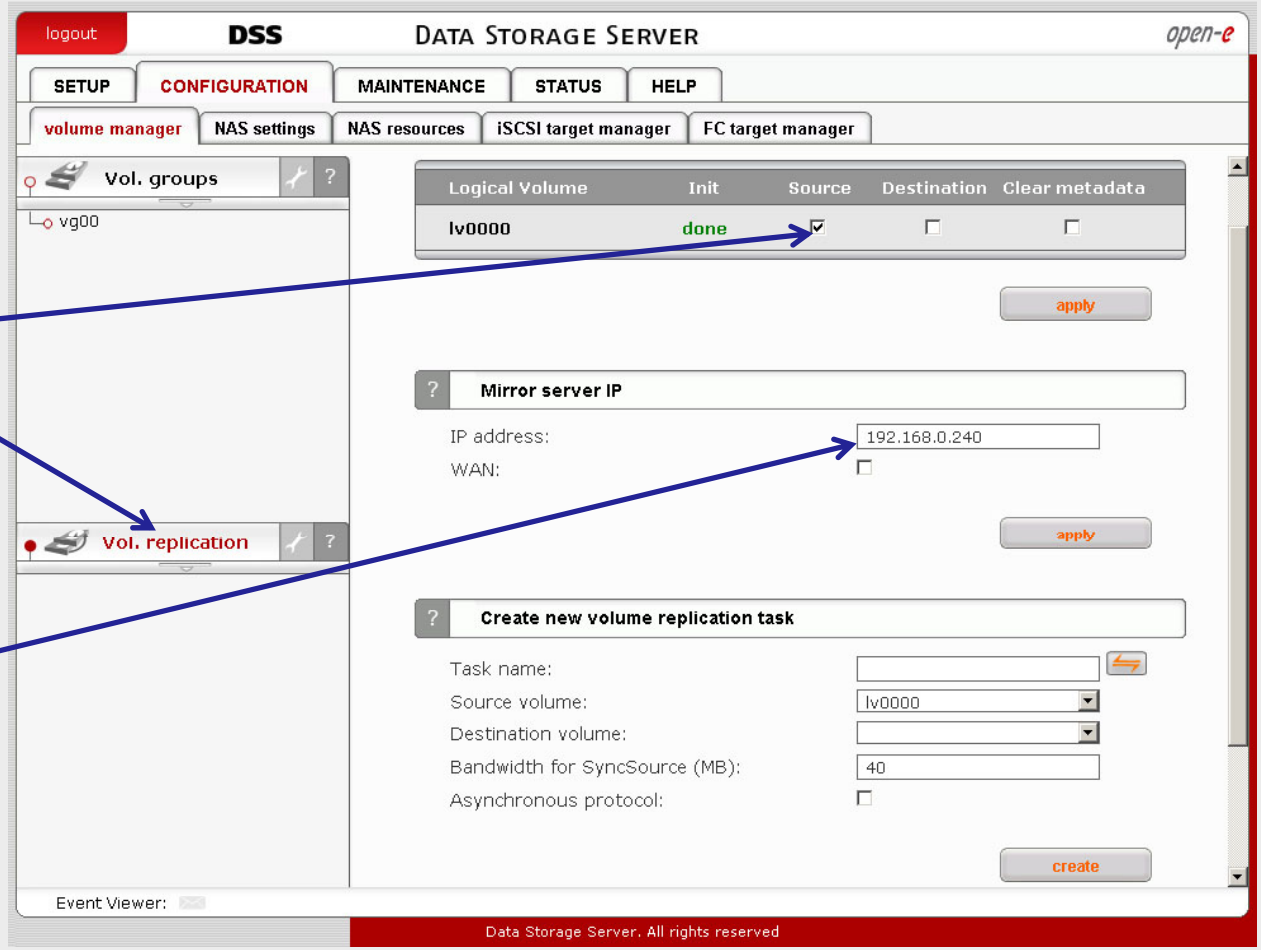


Data Server (DSS1)
Primary node
Address IP:192.168.0.220

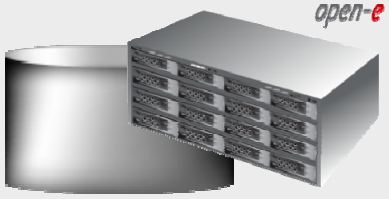
3. Configure the Primary node

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

Next , under **Mirror Server IP** function, enter the IP address of the Secondary node (in our example this would be 192.168.0.240) and click the **apply** button



Synchronous **Volume Replication with Failover** over a LAN

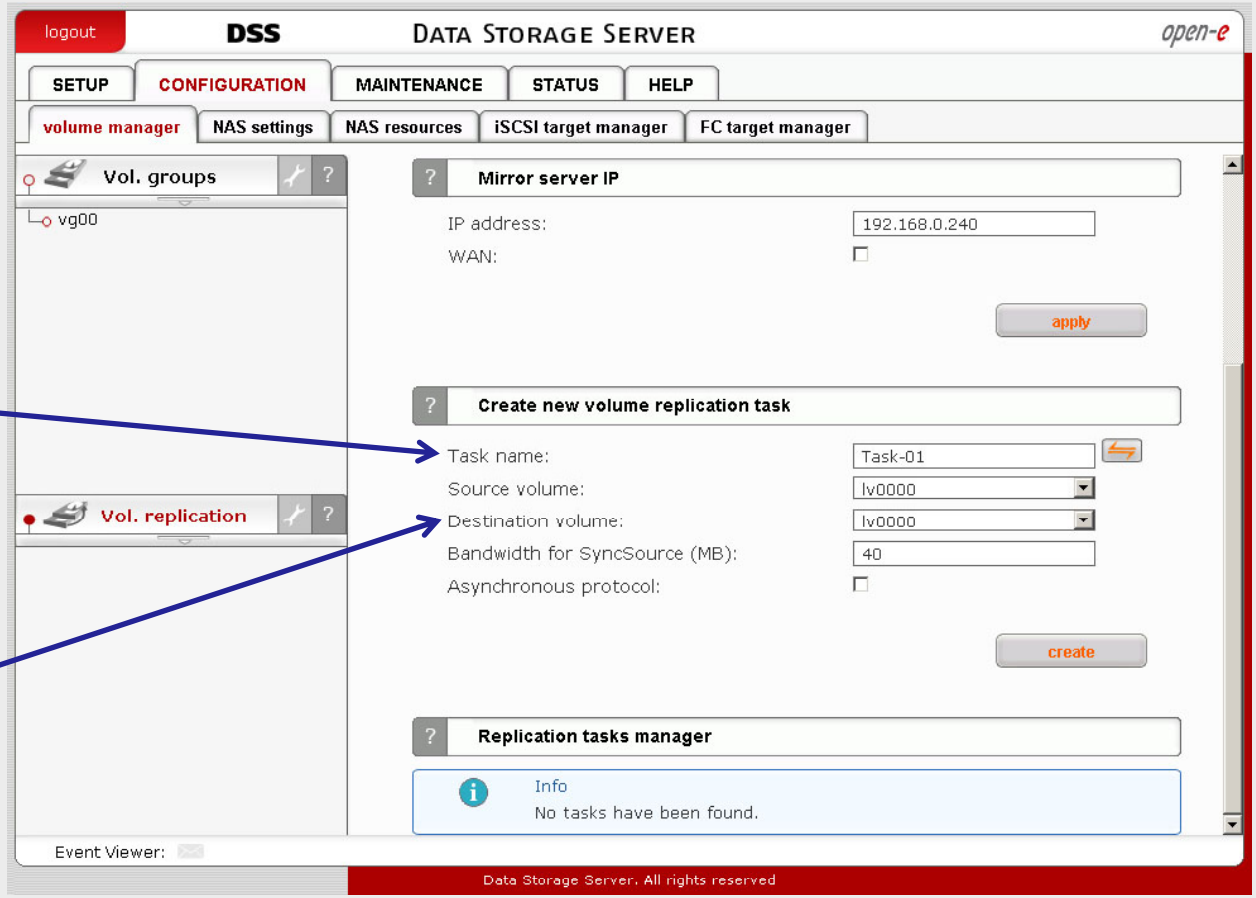


Data Server (DSS1)
Primary node
Address IP:192.168.0.220

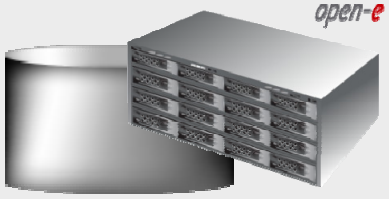
3. Configure the Primary node

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

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



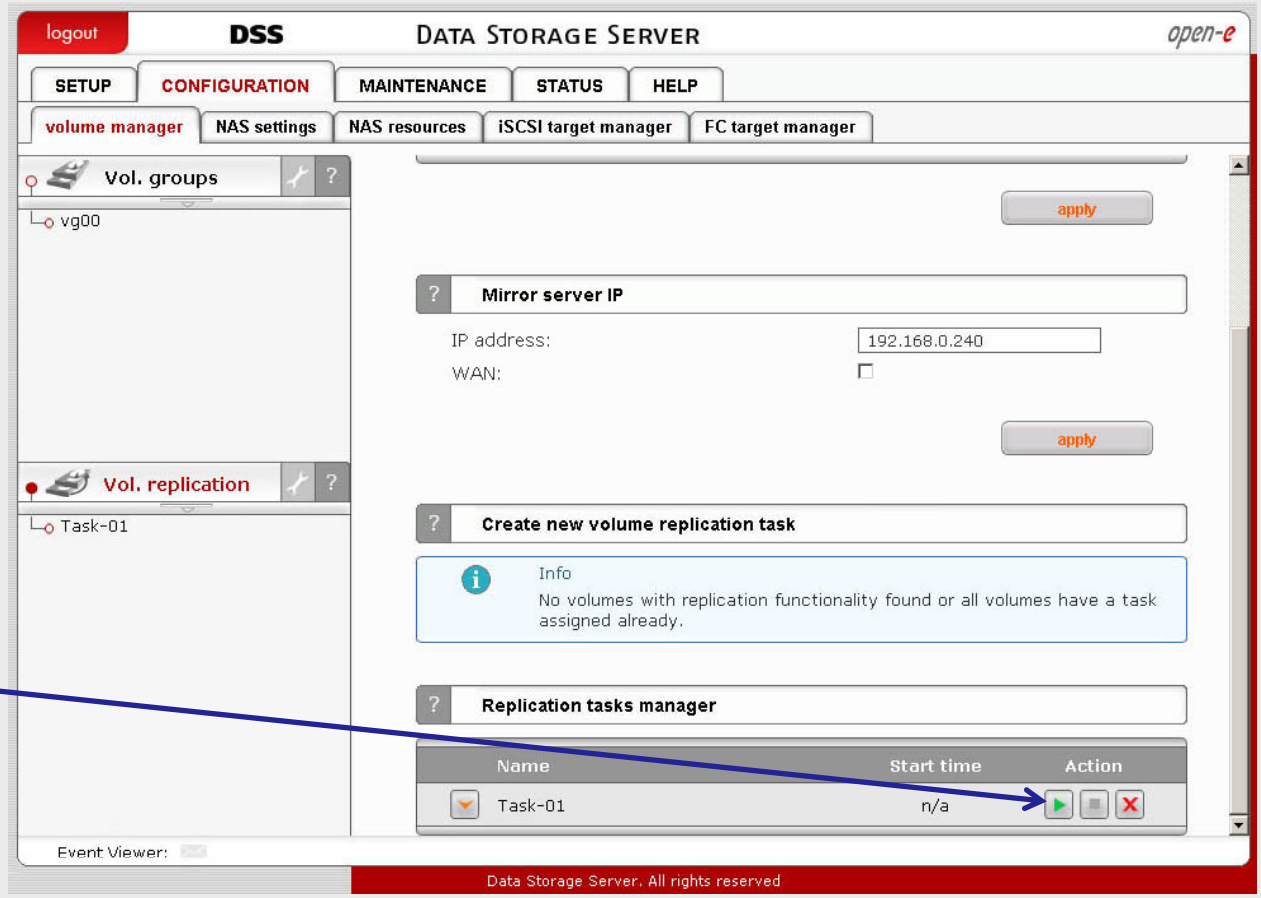
Synchronous **Volume Replication with Failover** over a LAN



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

3. Configure the Primary node

Now, in the **Replication task manager** function, click on ▶ button under to start the Replication task on the Primary node



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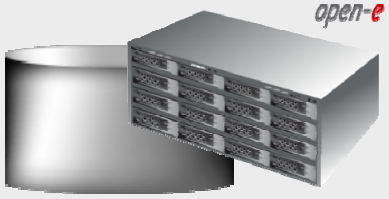
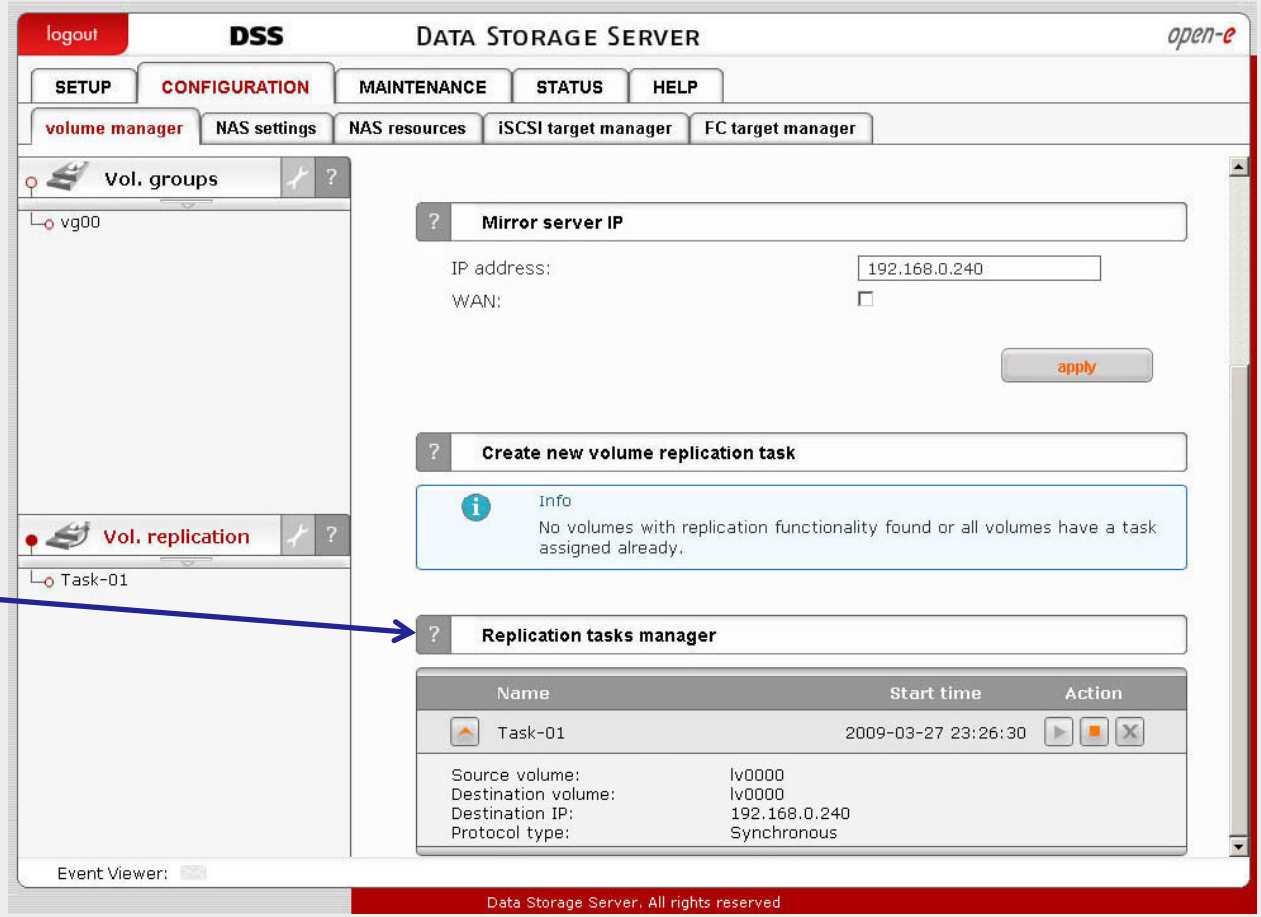


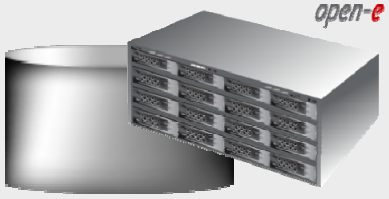
Data Server (DSS1)
Primary node
Address IP:192.168.0.220

3. Configure the Primary node

In the **Replication tasks manager** function information is available about the current running replication task



Synchronous **Volume Replication with Failover** over a LAN

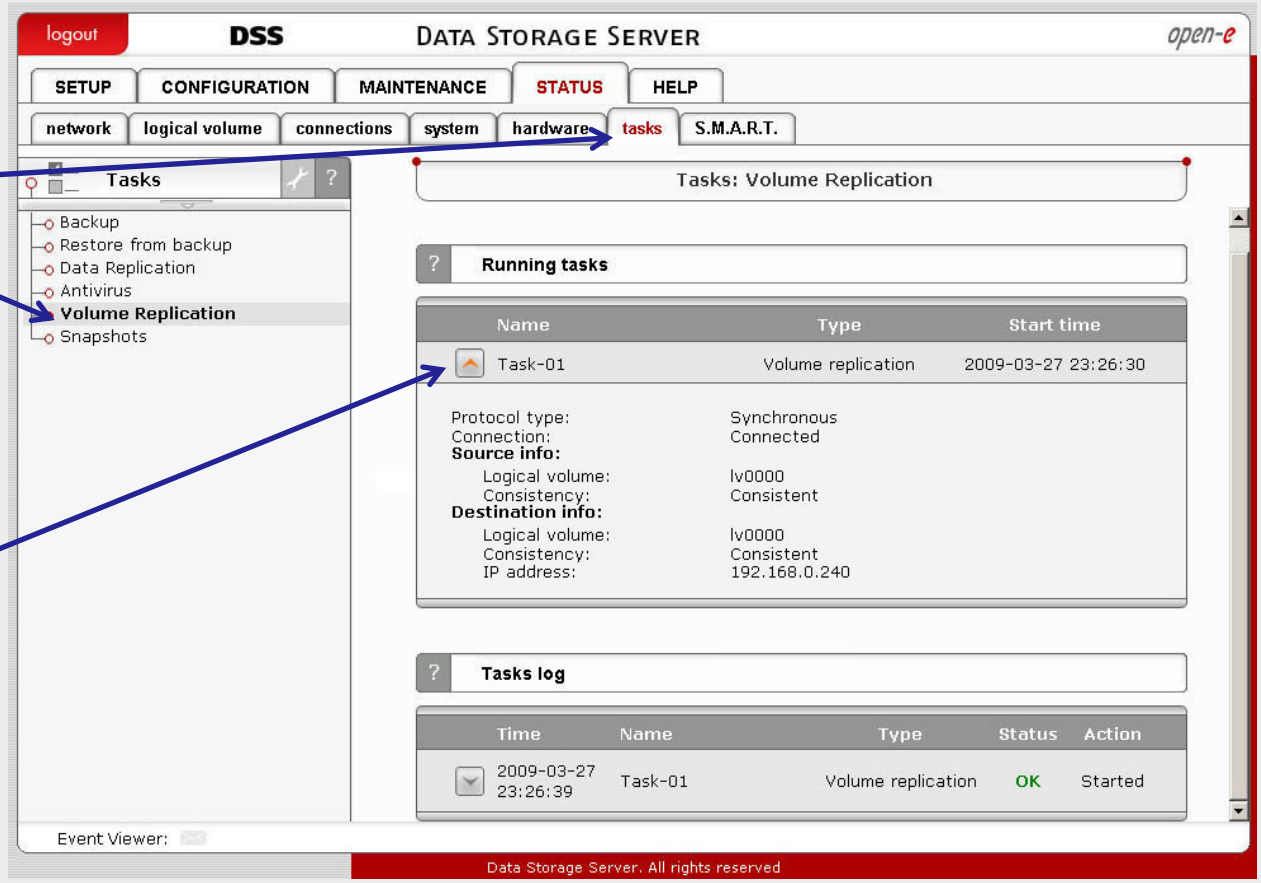


Data Server (DSS1)
Primary node
Address IP:192.168.0.220

3. Configure the Primary node

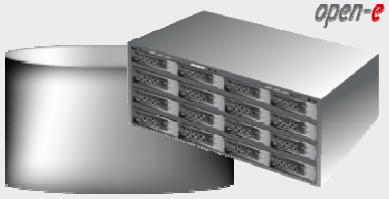
Under the **„STATUS"** tab, select **„tasks"** and **Volume Replication**

Click on the button with task name (in this case Task-01) to display detailed information on the current replication task



NOTE:
Please allow the replication task to complete similar to above with status being "Consistent" before writing to the iSCSI Logical Volume.

Synchronous **Volume Replication with Failover** over a LAN

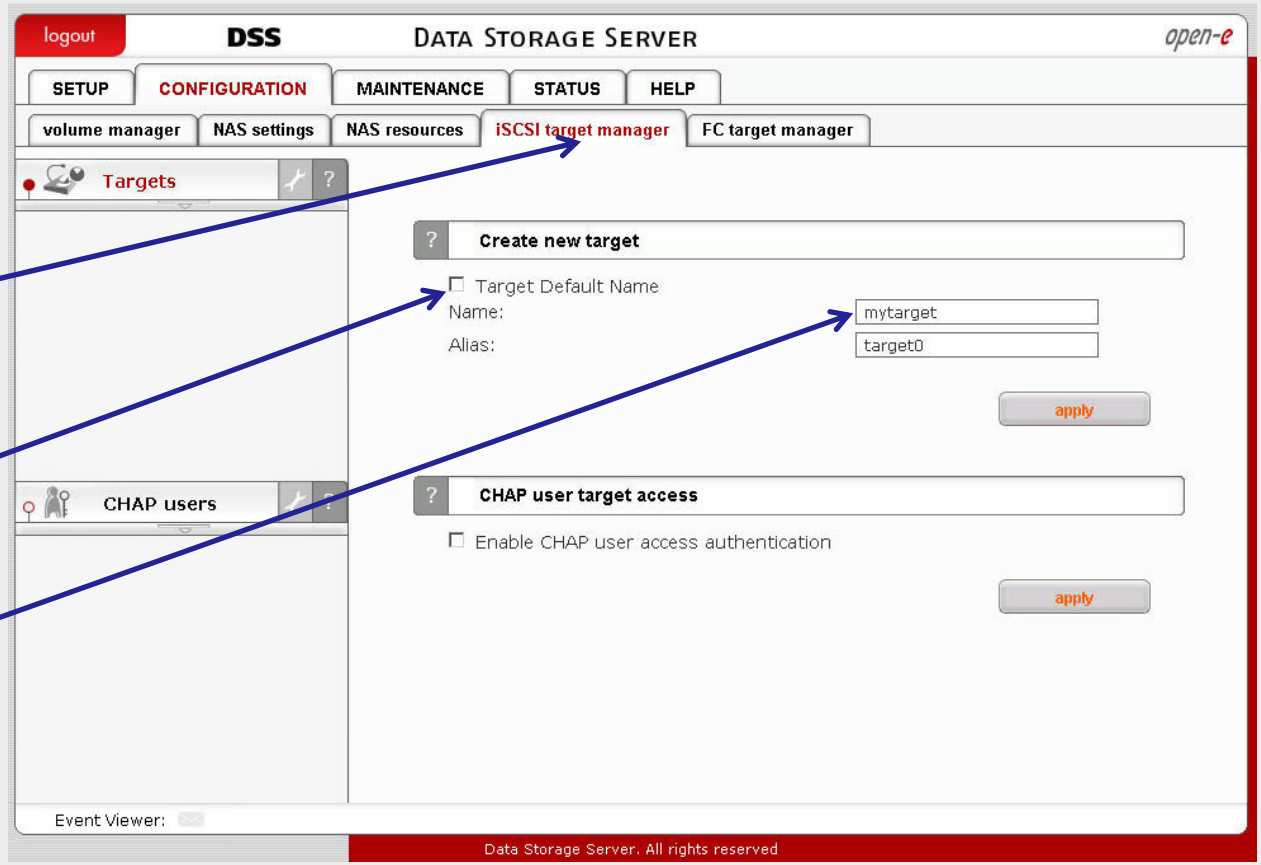


Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

4. Create new target on the Secondary node

Choose **„CONFIGURATION"** and **„iSCSI target manager"** from the menu

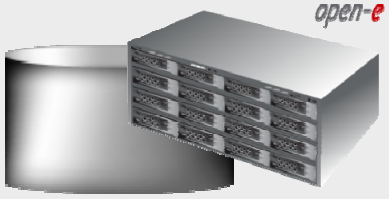
In the **Create new target** function, uncheck the box **Target Default Name**, and enter a name for the new target in the Name field and click **apply** to confirm



iSCSI targets

NOTE:
Both systems must have the same Target name.

Synchronous **Volume Replication with Failover** over a LAN

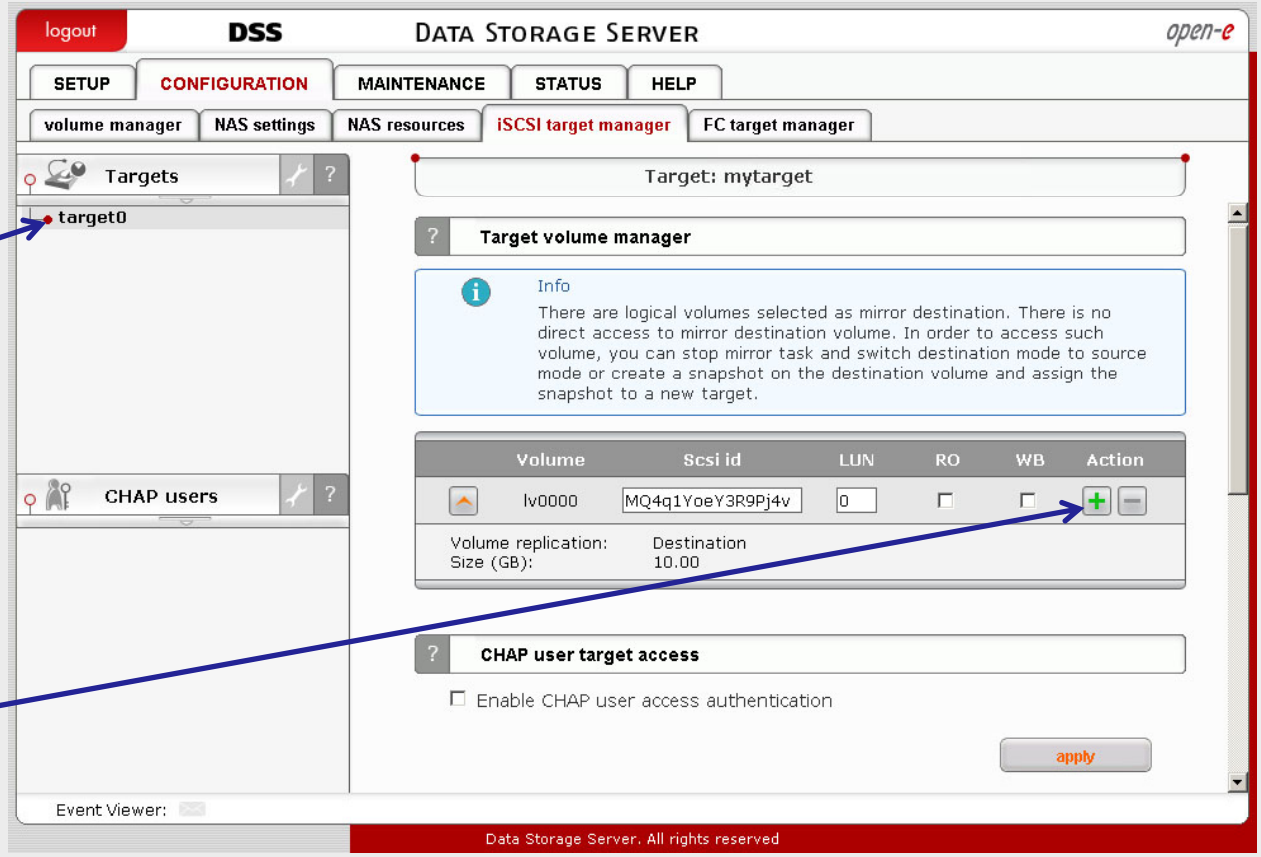


Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

4. Create new target on the Secondary node

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

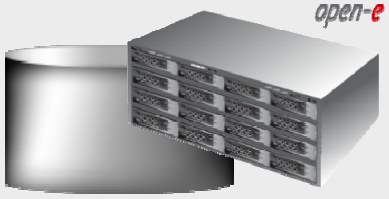
To assign a volume to the target, click the button located under **Action**



NOTE:
Both systems must have the same SCSI field name.

WARNING:
Please do not switch on the write back (WB) cache !

Synchronous **Volume Replication with Failover** over a LAN

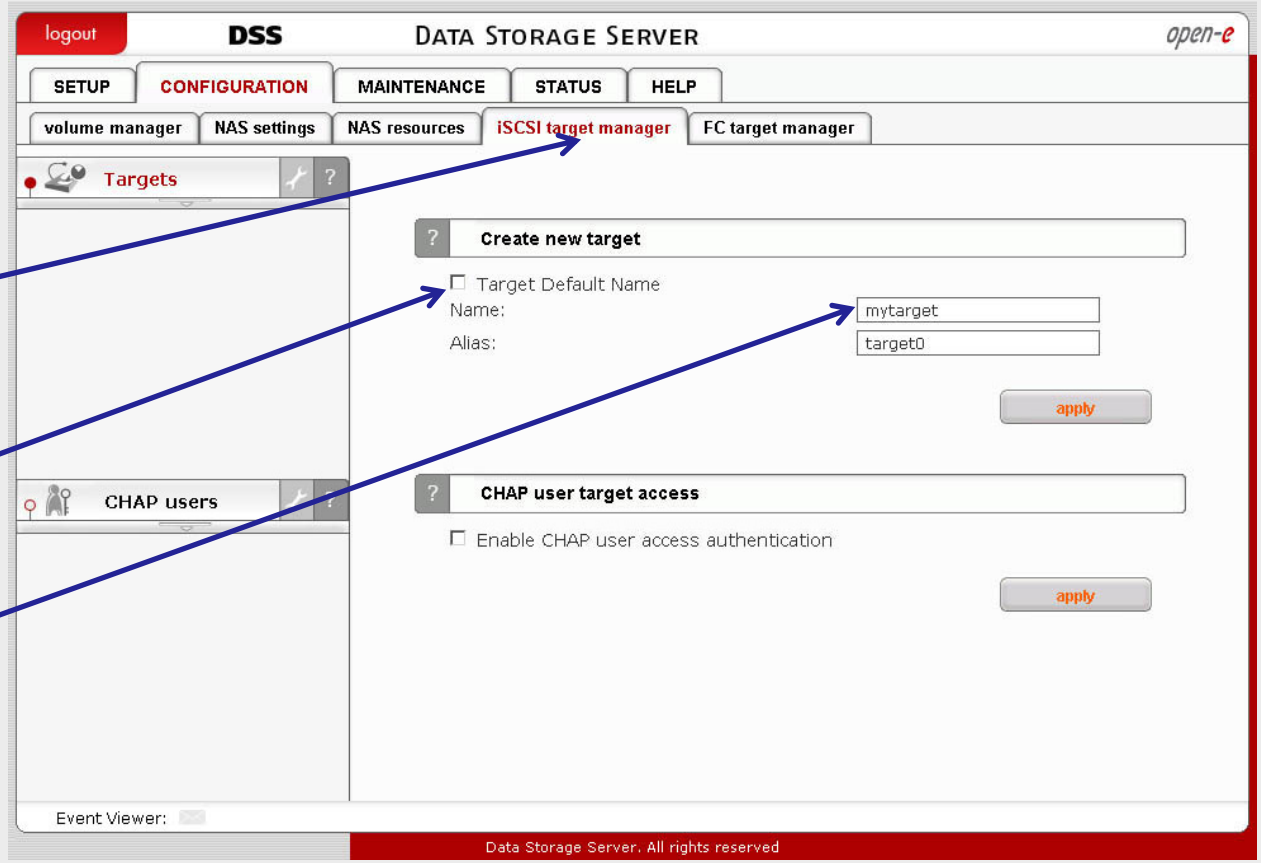


Data Server (DSS1)
Primary node
Address IP:192.168.0.220

5. Create new target on the Primary node

Choose **„CONFIGURATION"** and **„iSCSI target manager"** from the menu

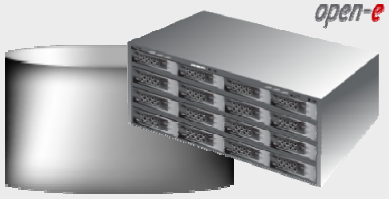
In the **Create new target** function, uncheck the box **Target Default Name**, and enter a name for the new target in the **Name** field and click **apply** to confirm



iSCSI targets

NOTE:
Both systems must have the same Target name.

Synchronous **Volume Replication with Failover** over a LAN

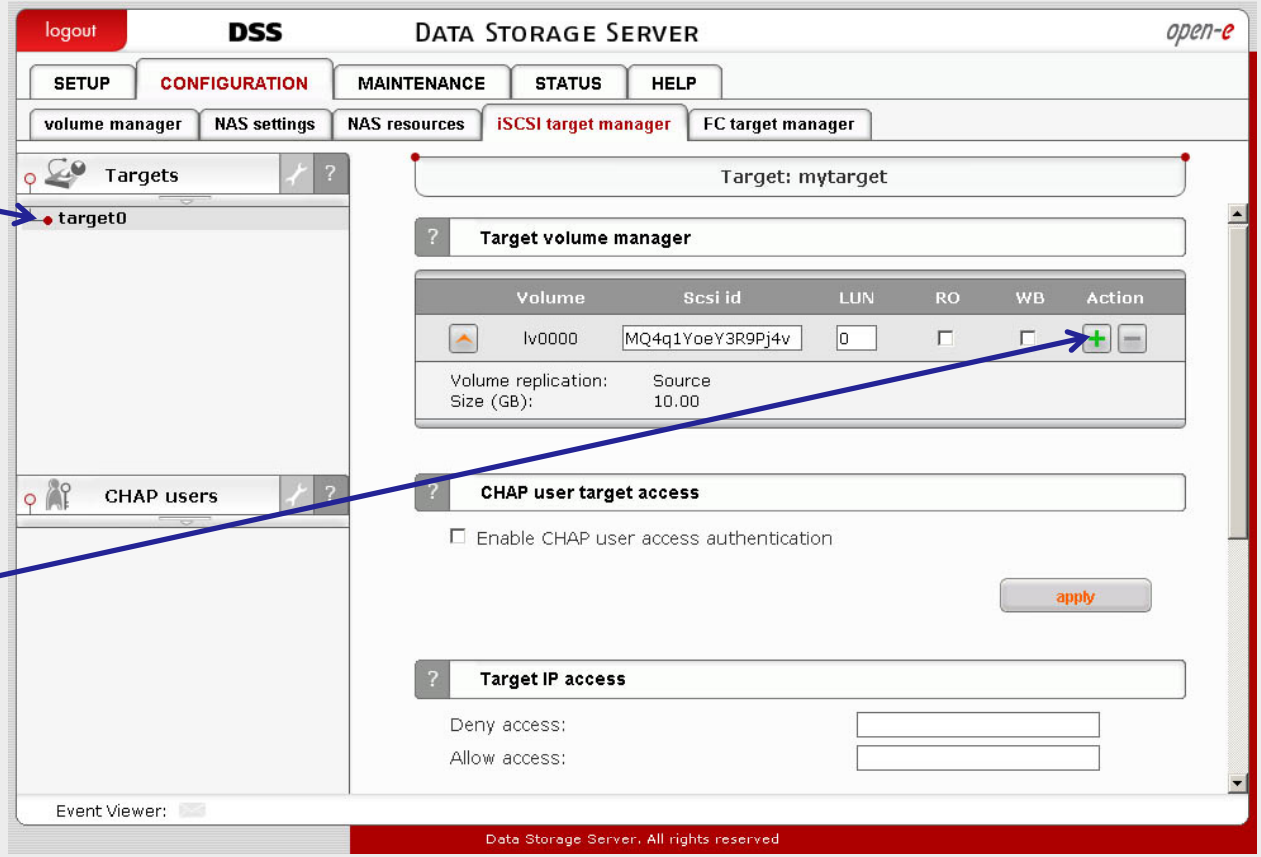


Data Server (DSS1)
Primary node
Address IP:192.168.0.220

5. Create new target on the Primary node

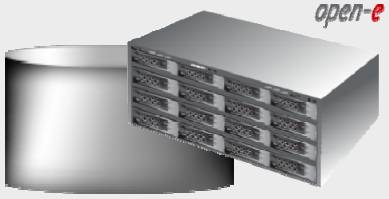
Select the **target0** within the **Targets** field

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



WARNING:
Please do not switch on the write back cache (WB) !

Synchronous **Volume Replication with Failover** over a LAN



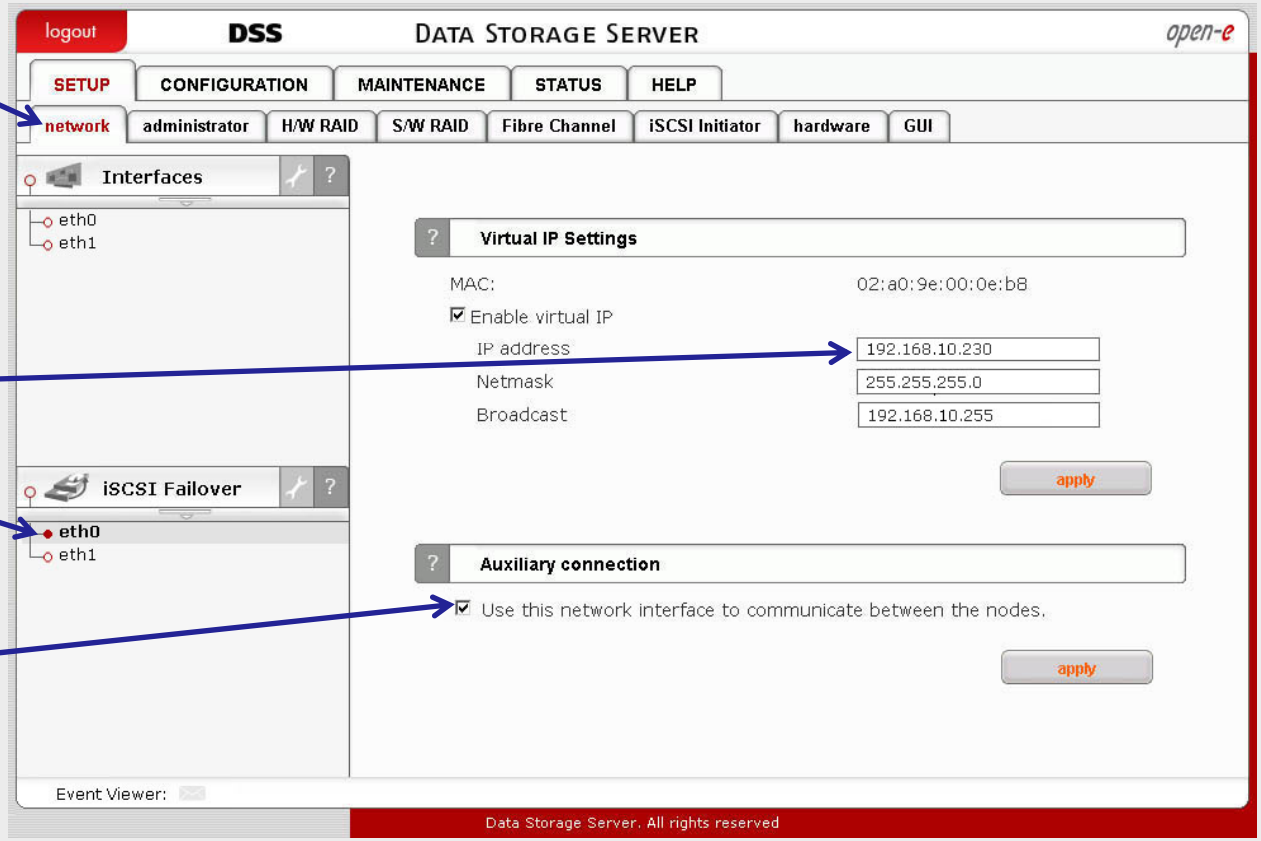
Data Server (DSS1)
Primary node
Address IP:192.168.0.220

6. Configure Virtual IP and Auxillary connection

Choose **„SETUP"** and **„network"** from the menu

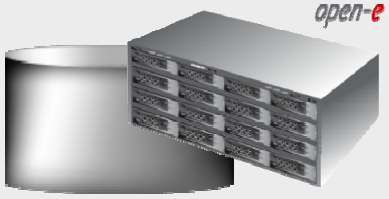
Now, select the **eth0** within **iSCSI Failover.**
In the **Virtual IP Settings** function check box **Enable virtual IP** and enter **IP address, Netmask, Broadcast**, and click the **apply** button.

In the **Auxiliary connection** function check box **Use this network interface to communicate between the nodes** and click the **apply** button.



NOTE:
There need to be at least two *auxiliary connections*. The interface with the virtual IP can also serve as one of the auxiliary connections. Please set the Virtual IP Address in a different network subnet then the physical IP Address. To have additional iSCSI Failover systems, please set this pair in a different network subnet from the other iSCSI Failover systems. This limitation will be removed in the future.

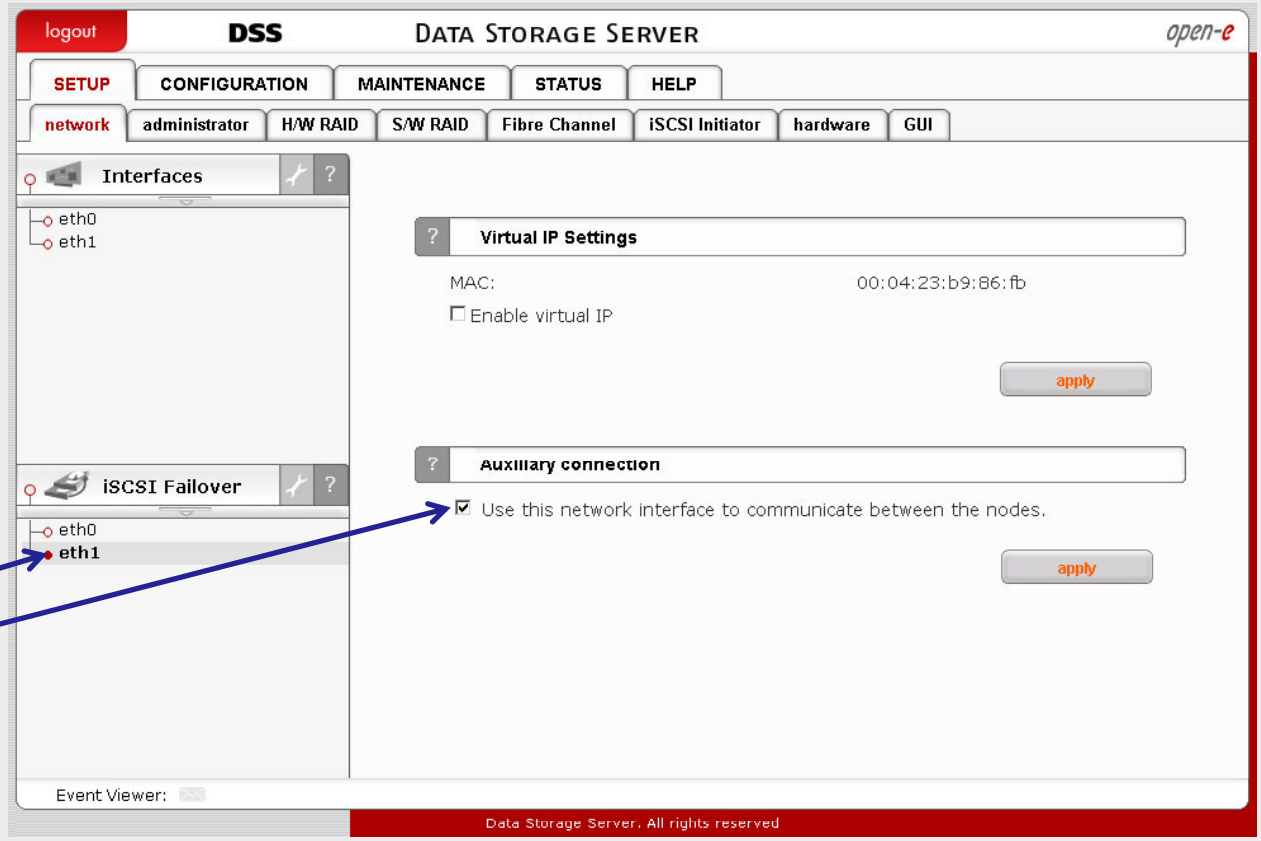
Synchronous **Volume Replication with Failover** over a LAN



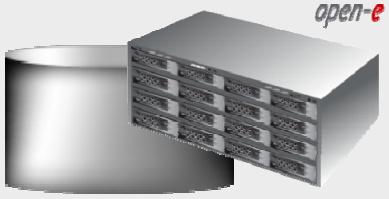
Data Server (DSS1)
Primary node
Address IP:192.168.0.220

6. Configure Virtual IP and Auxillary connection

Now, select the **eth1** within **iSCSI Failover.**
In the **Auxiliary connection** function check box **Use this network interface to communicate between the nodes** and click the **apply** button.



Synchronous **Volume Replication with Failover** over a LAN



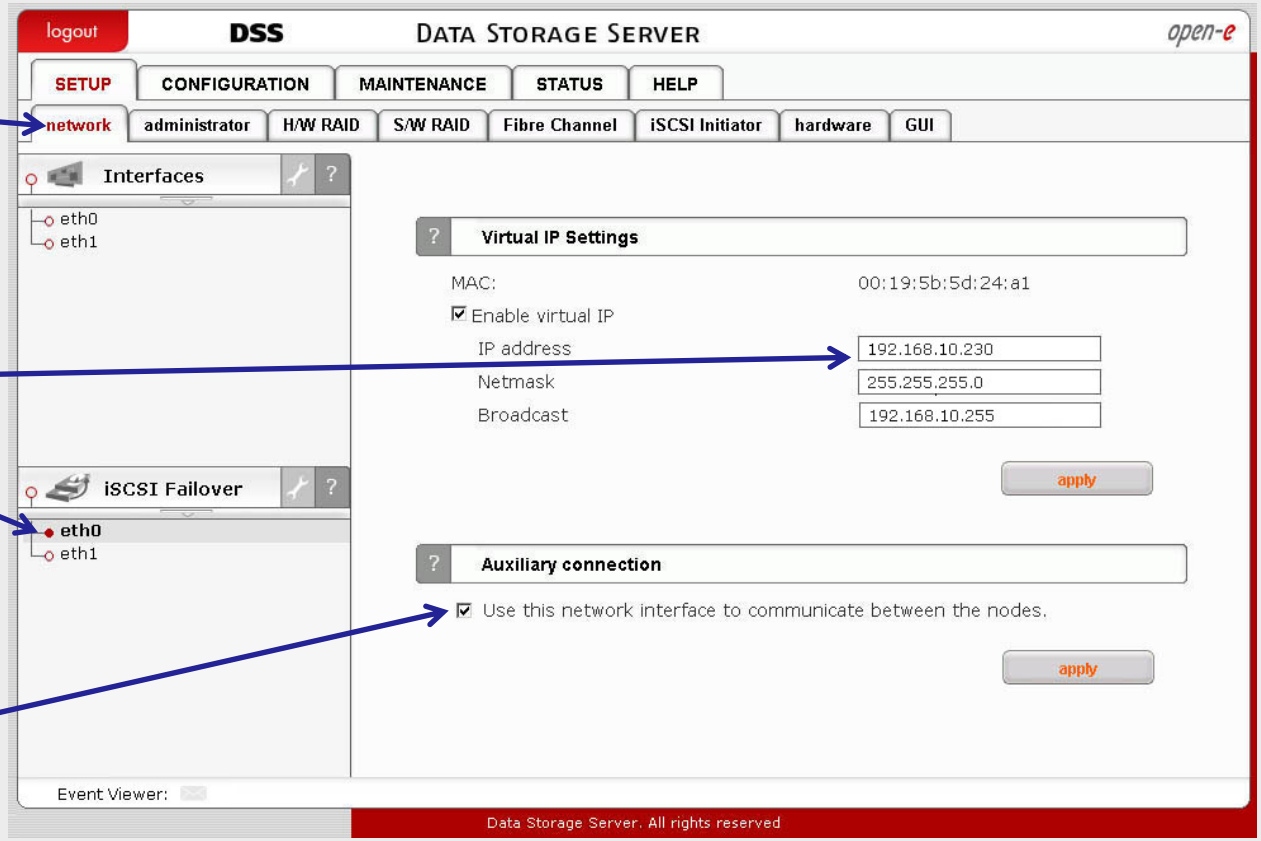
Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

6. Configure Virtual IP and Auxillary connection

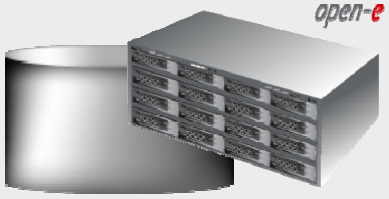
Choose, **„SETUP"** and **„network"** from the menu

Now, select the **eth0** within **iSCSI Failover.**
In the **Virtual IP Settings** function check the box **Enable virtual IP** and enter **IP address, Netmask, Broadcast**, and click the **apply** button.

In the **Auxiliary connection** function check box **Use this network interface to communicate between the nodes** and click the **apply** button.



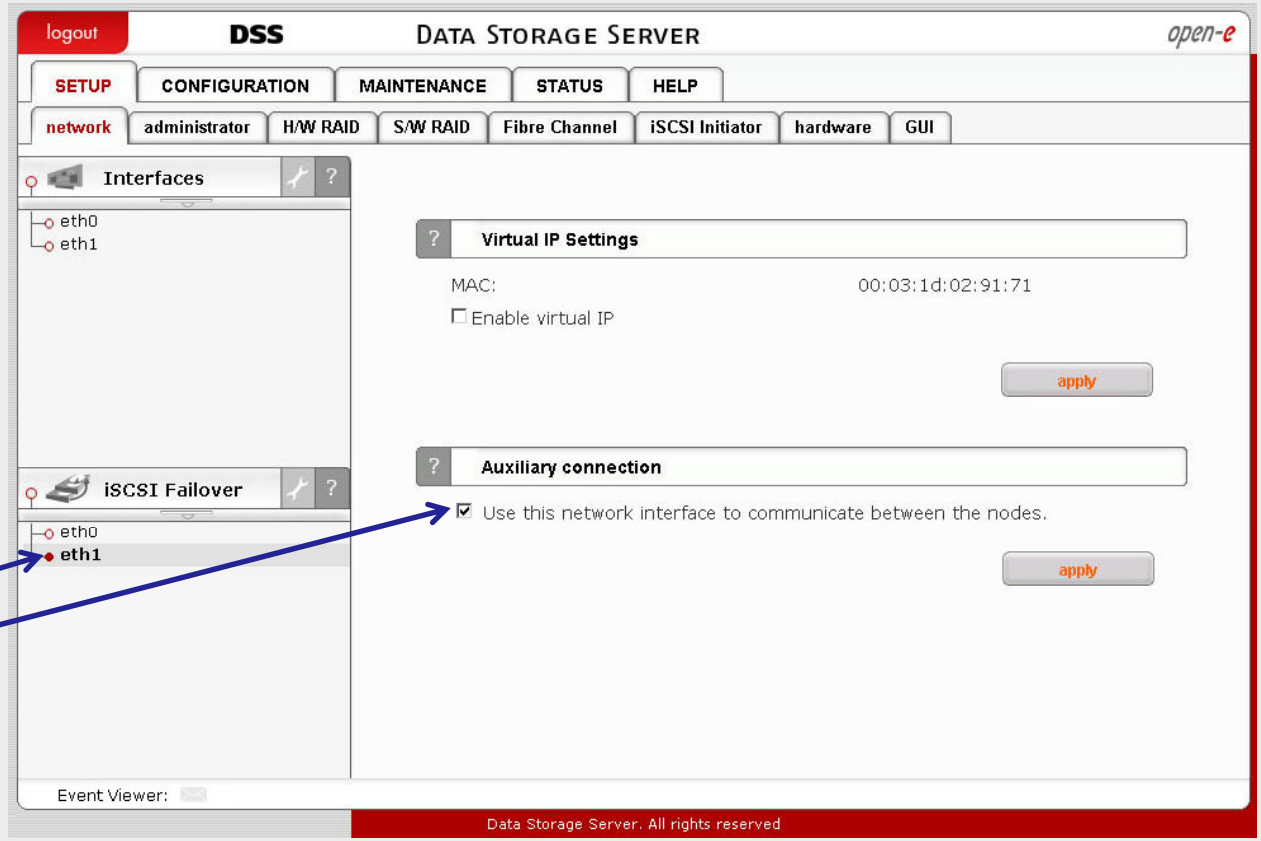
Synchronous **Volume Replication with Failover** over a LAN



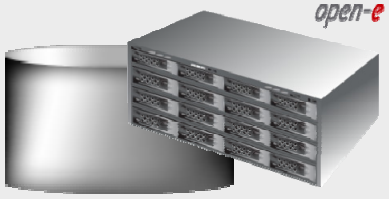
Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

6. Configure Virtual IP and Auxillary connection

Now, select the **eth1** within **iSCSI Failover.**
In the **Auxiliary connection** function check box **Use this network interface to communicate between the nodes** and click the **apply** button.



Synchronous **Volume Replication with Failover** over a LAN

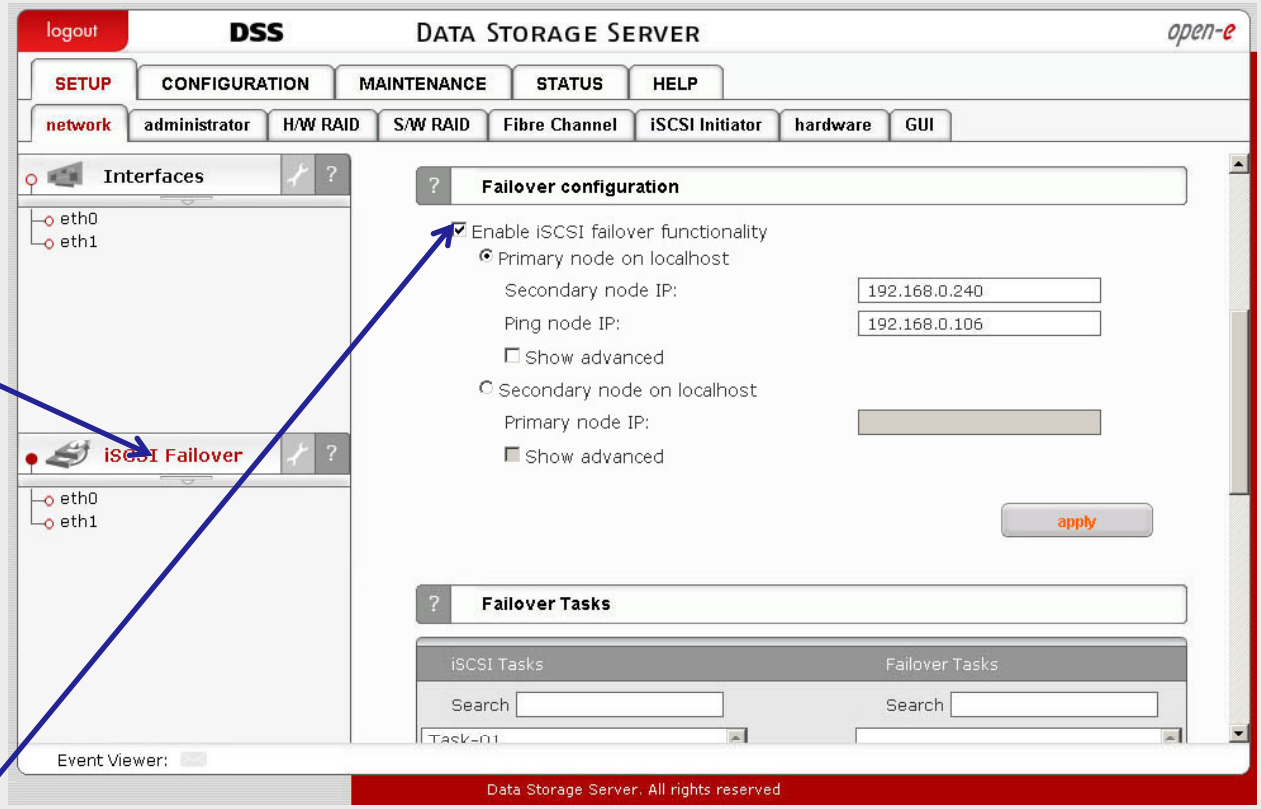


Data Server (DSS1)
Primary node
Address IP:192.168.0.220

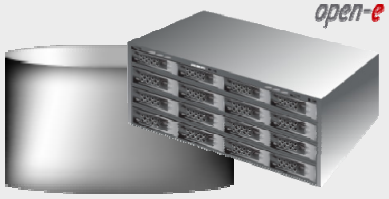
7. Configure iSCSI Failover

Now, select **iSCSI Failover**

In the **Failover configuration** function, check the box **Enable iSCSI failover functionality** and enter the Secondary node IP address and the **Ping Node IP** and click the **apply** button



Synchronous **Volume Replication with Failover** over a LAN

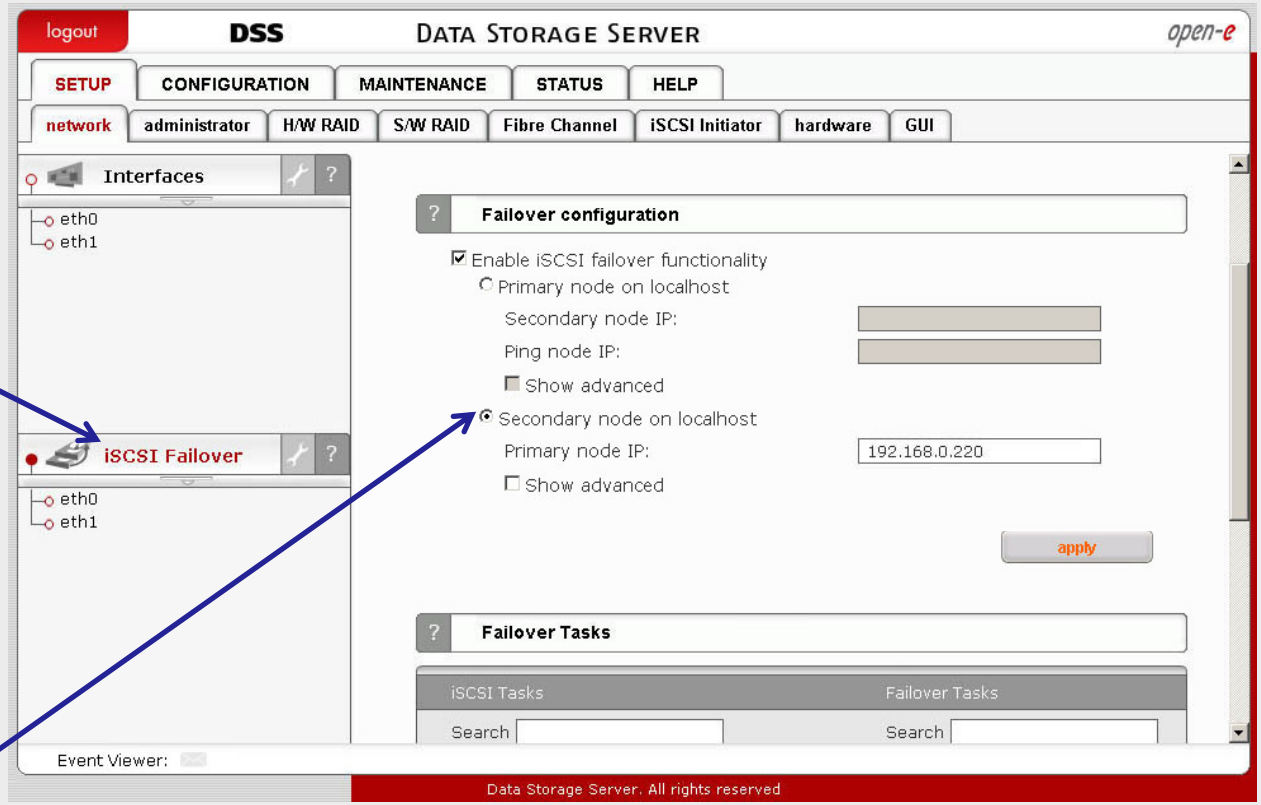


Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

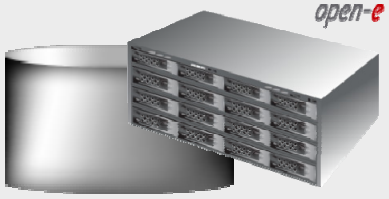
7. Configure iSCSI Failover

Now, select **iSCSI Failover**

Now, in **Failover configuration** function , check the box **Enable iSCSI failover functionality** and enter Primary node IP address and also the **Ping Node IP** and click the **apply** button



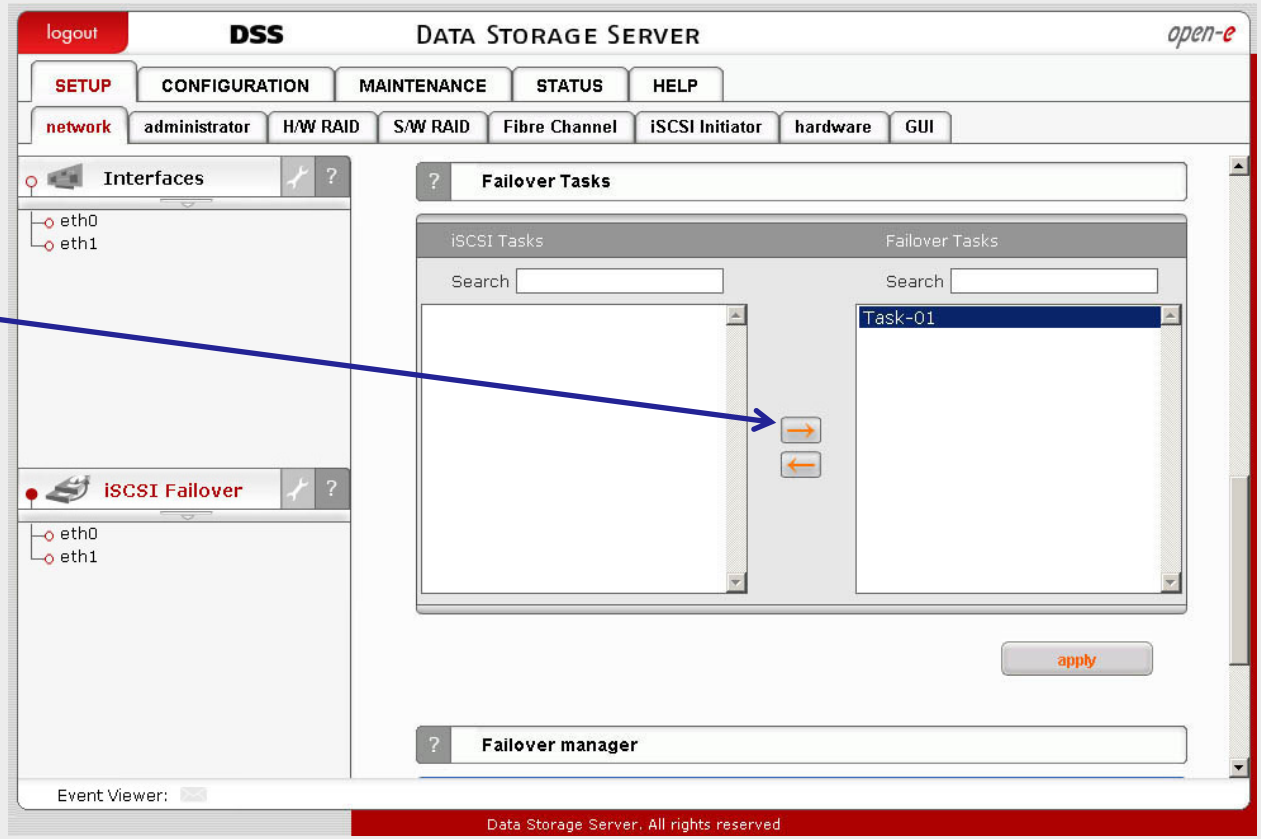
Synchronous **Volume Replication with Failover** over a LAN



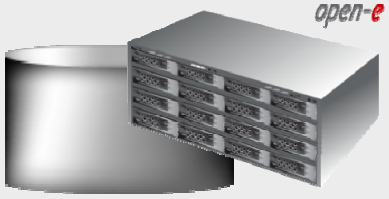
Data Server (DSS1)
Primary node
Address IP:192.168.0.220

7. Configure iSCSI Failover

Move the **iSCSI Tasks** to be used for the failover service to the **Failover Tasks** area by clicking → button and click **apply**

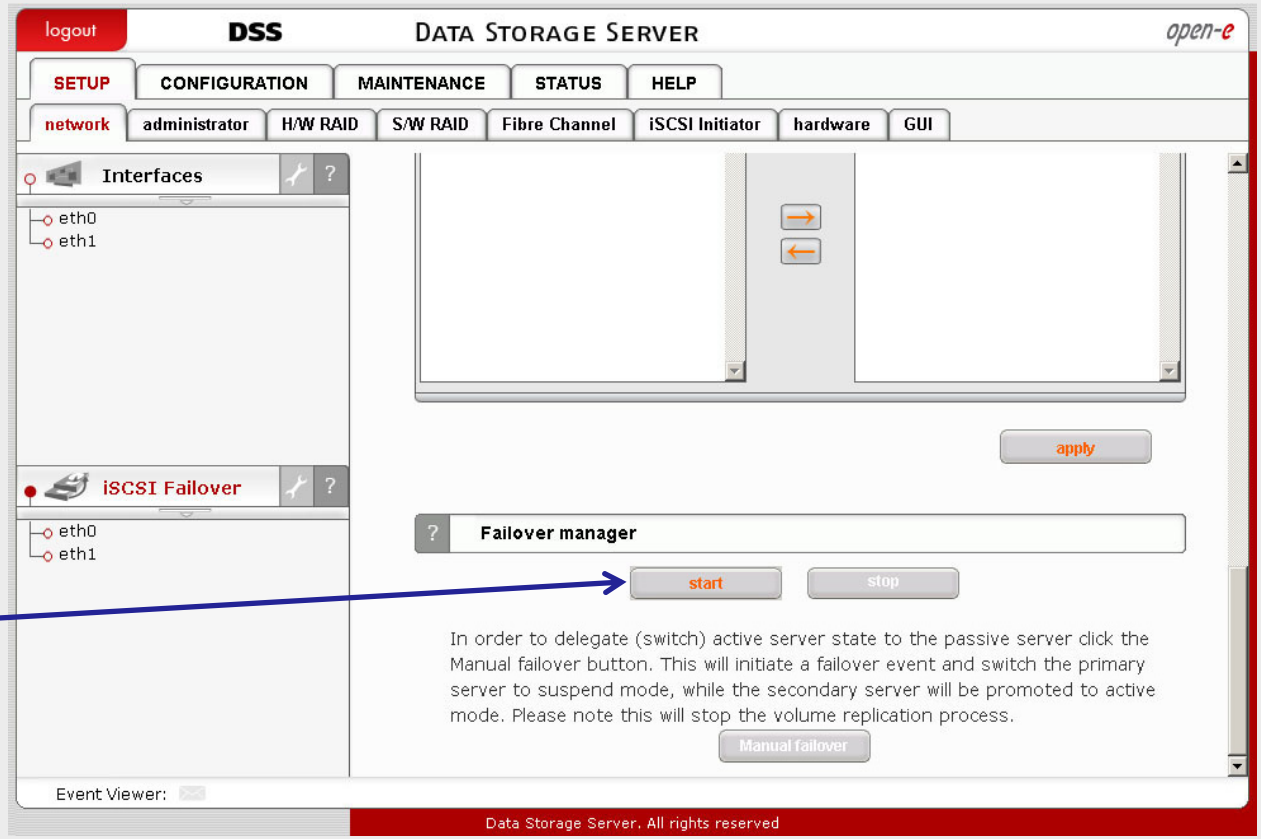


Synchronous **Volume Replication with Failover** over a LAN



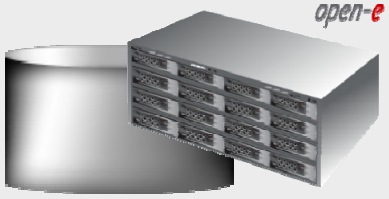
Data Server (DSS1)
Primary node
Address IP:192.168.0.220

8. Start Failover Service



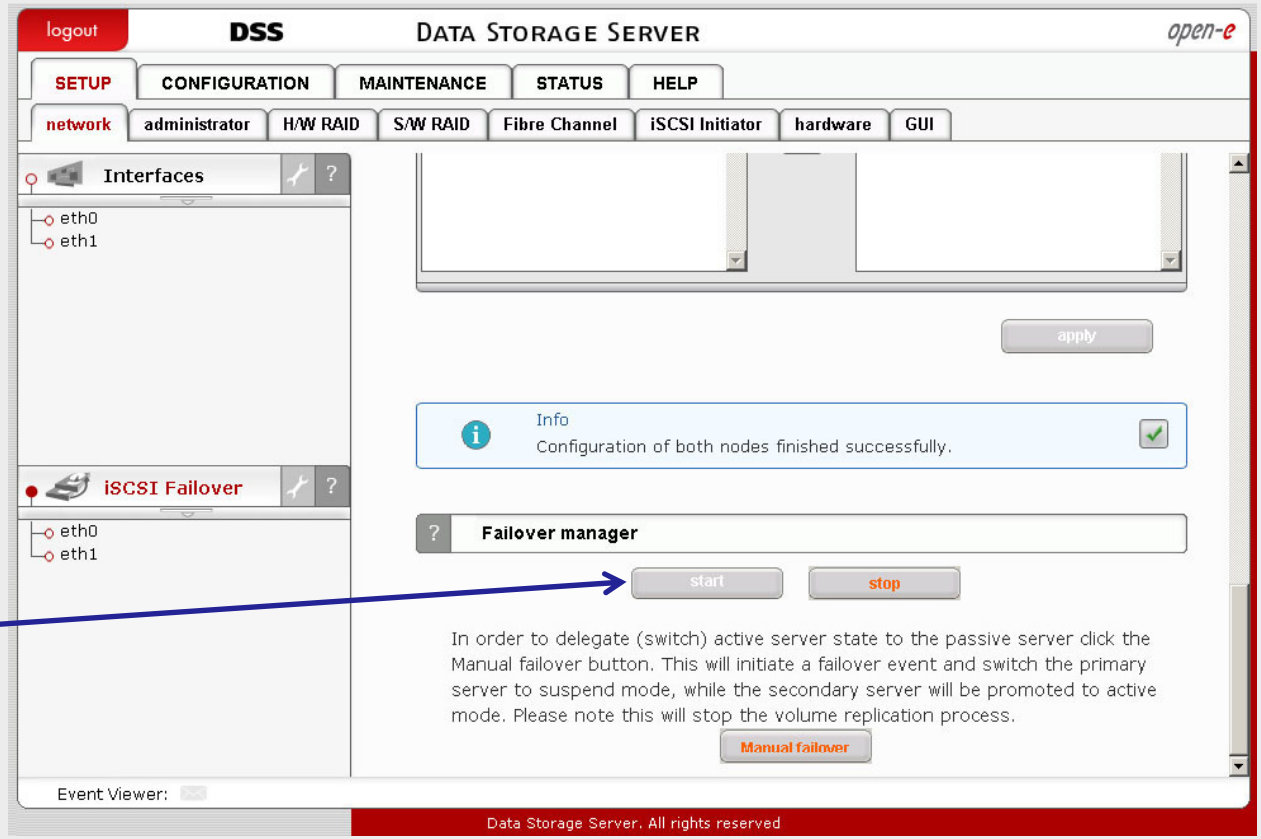
At this point both nodes are ready to start the Failover service

Synchronous **Volume Replication with Failover** over a LAN



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

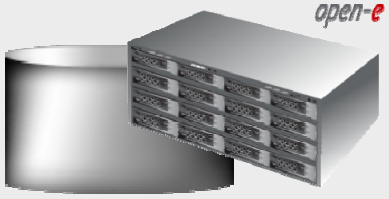
8. Start Failover Service



After clicking the **start** button configuration of both nodes will be complete

NOTE:
You can now connect via your iSCSI initiator and use your targets via the Virtual IP address e.g. 192.168.0.230 (For example, in a Microsoft Windows environment, download Microsoft iSCSI Initiator ver 2.0 or later).

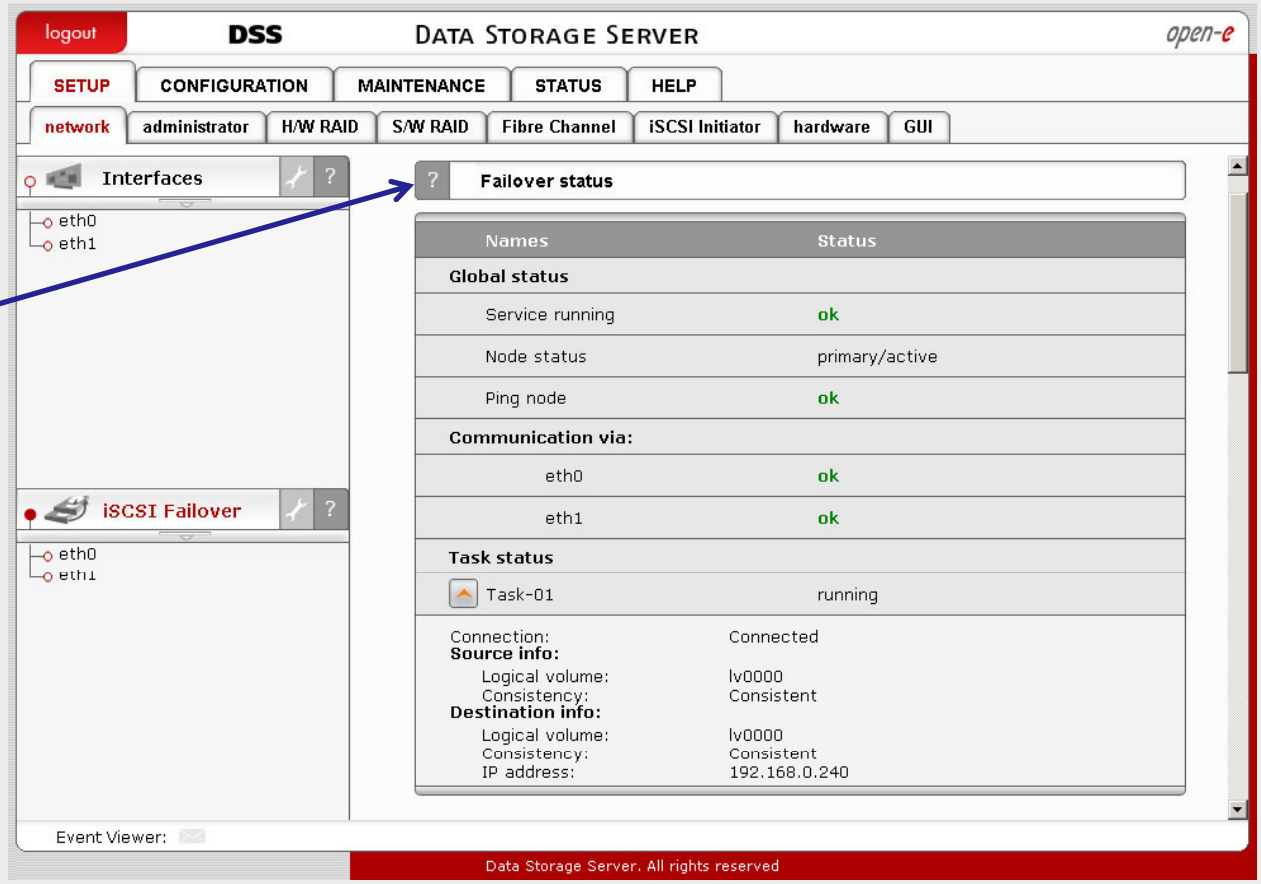
Synchronous **Volume Replication with Failover** over a LAN



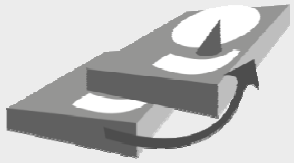
Data Server (DSS1)
Primary node
Address IP:192.168.0.220

8. Start Failover Service

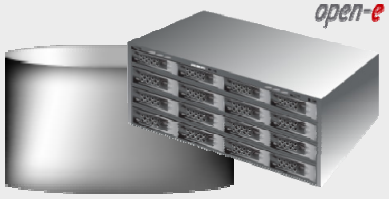
After start Failover, check the status in **Failover status** function. All must read OK. In the task status, the destination volume must be consistent



iSCSI Failover/Volume Replication

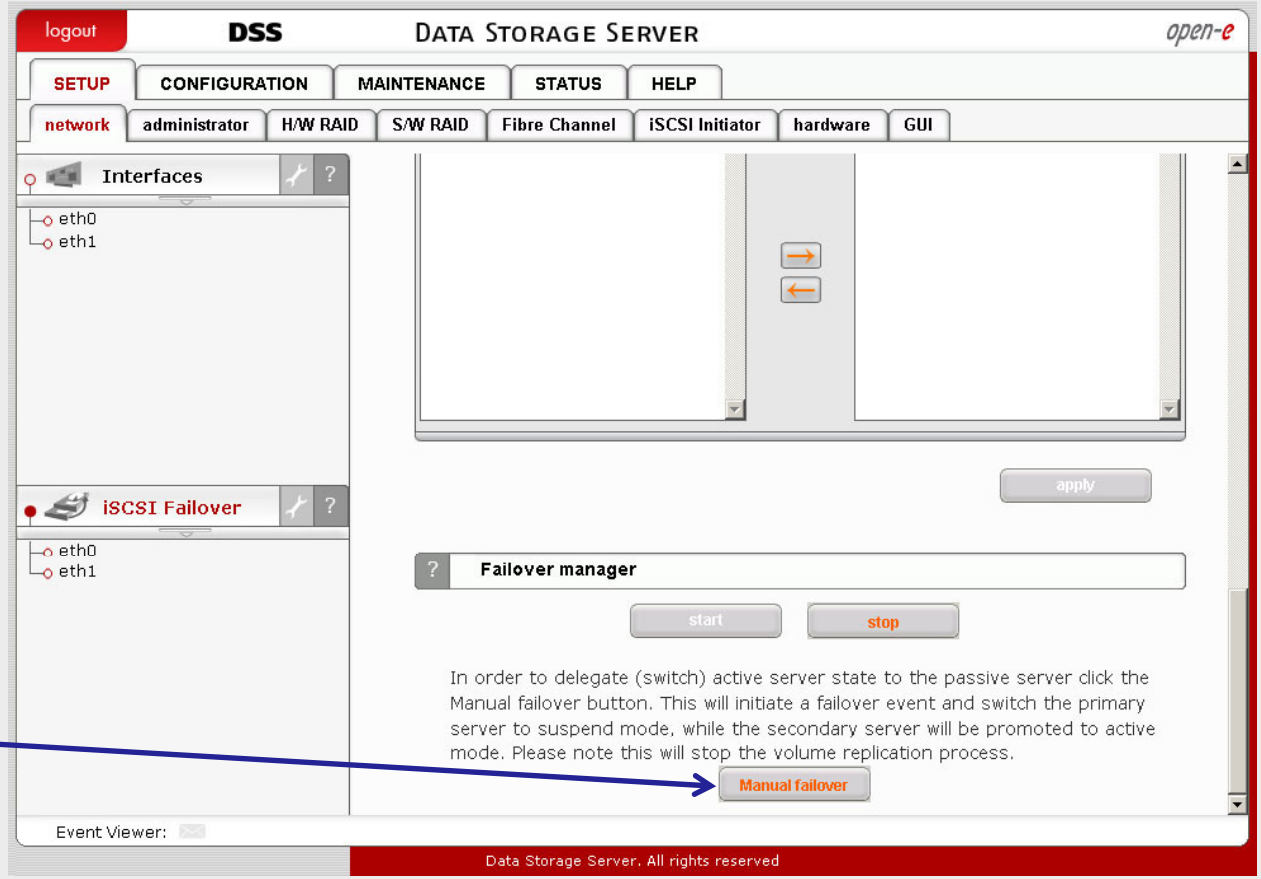


Synchronous **Volume Replication with Failover** over a LAN



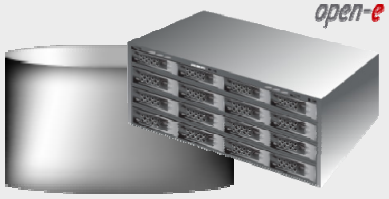
Data Server (DSS1)
Primary node
Address IP:192.168.0.220

9. Test Failover Function



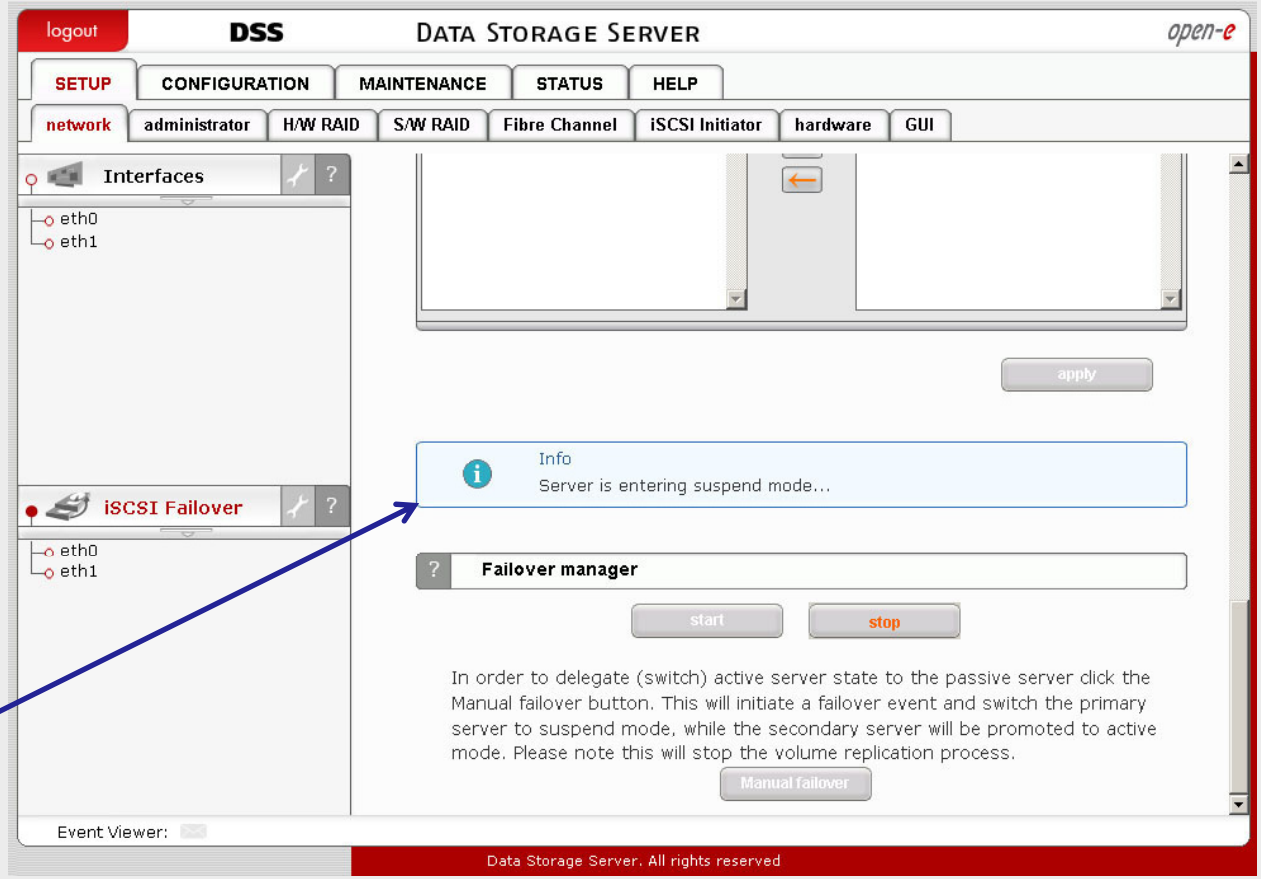
In order to test Failover in **Manual Failover,** function, click on the **Manual failover** button

Synchronous **Volume Replication with Failover** over a LAN



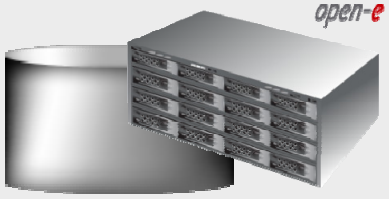
Data Server (DSS1)
Primary node
Address IP:192.168.0.220

9. Test Failover Function



After clicking on the **Manual failover** button, primary node enters suspend mode

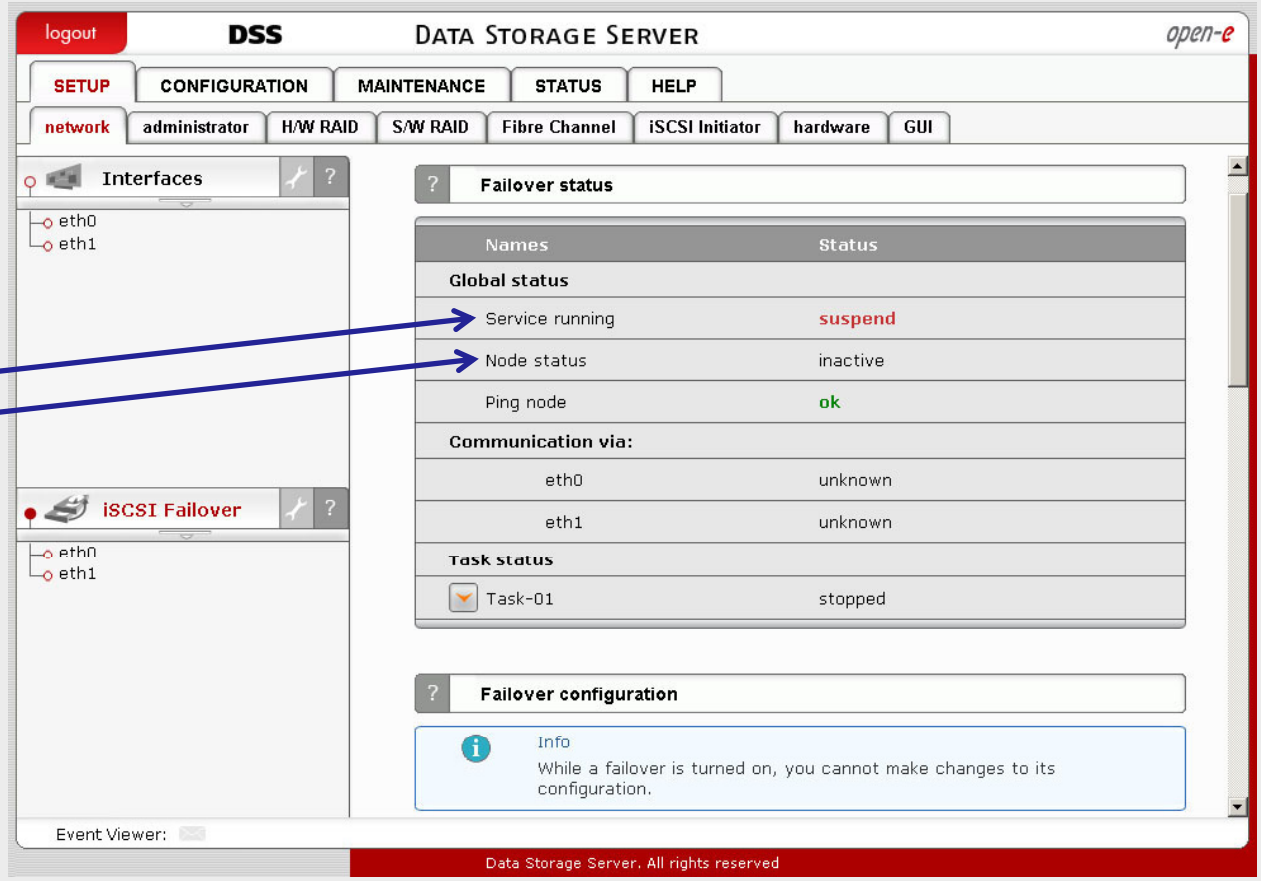
Synchronous **Volume Replication with Failover** over a LAN



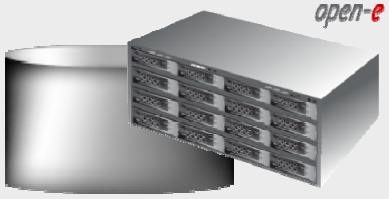
Data Server (DSS1)
Primary node
Address IP:192.168.0.220

9. Test Failover Function

The **Failover status** function shows the **Global status** of the primary node. Status service is in **suspend** mode and the node is inactive



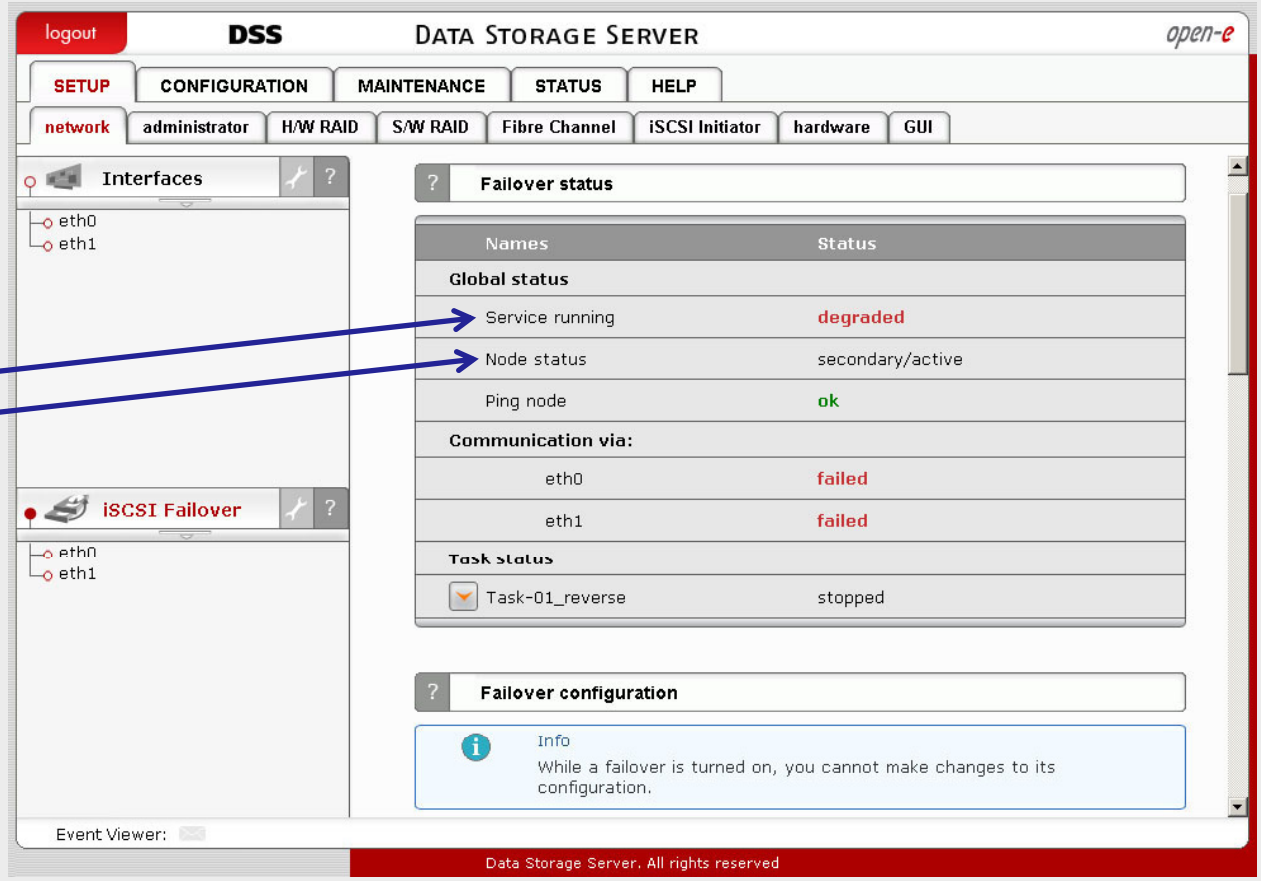
Synchronous **Volume Replication with Failover** over a LAN



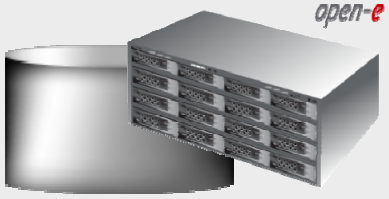
Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

9. Test Failover Function

In **Failover status** function **Global status** shows the status of the secondary node. The Node status is active and service status is **degraded**



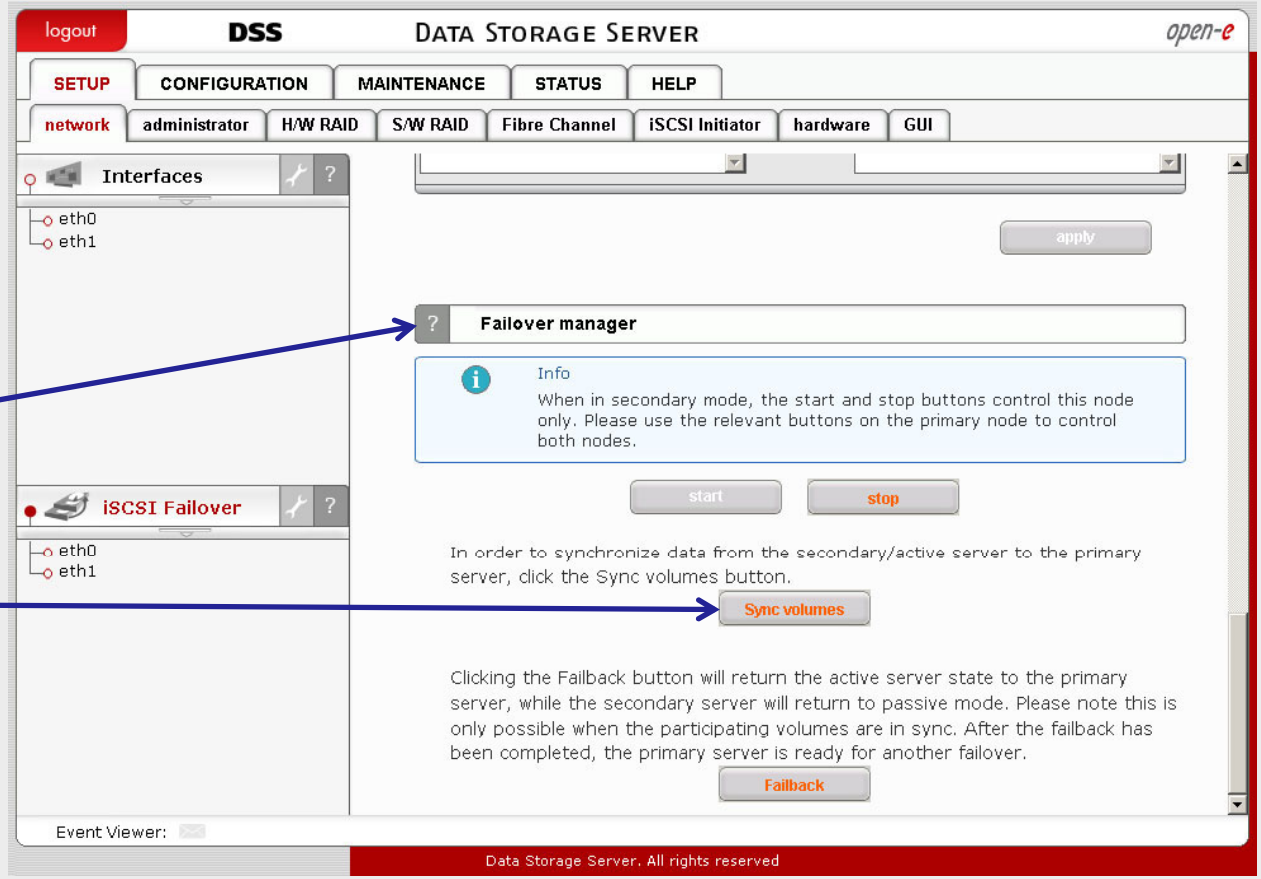
Synchronous **Volume Replication with Failover** over a LAN



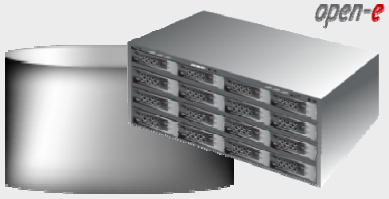
Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

10. Run Failback Function

In order to run Failback in **Failover manager** function click on the **Sync volumes** button first



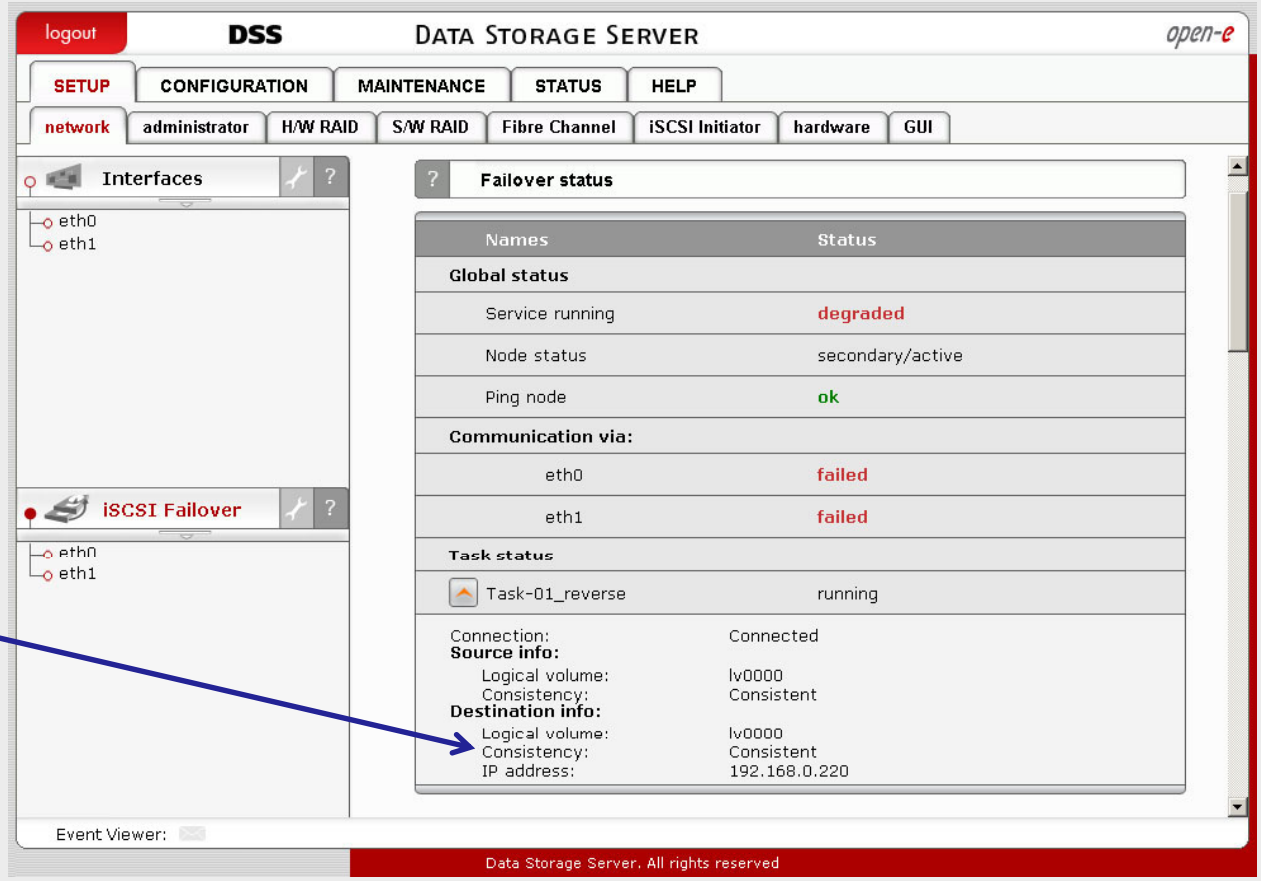
Synchronous **Volume Replication with Failover** over a LAN



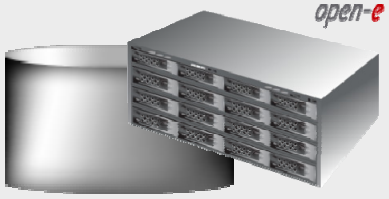
Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

10. Run Failback Function

After synchronization the task status of the destination volume must be **Consistent**

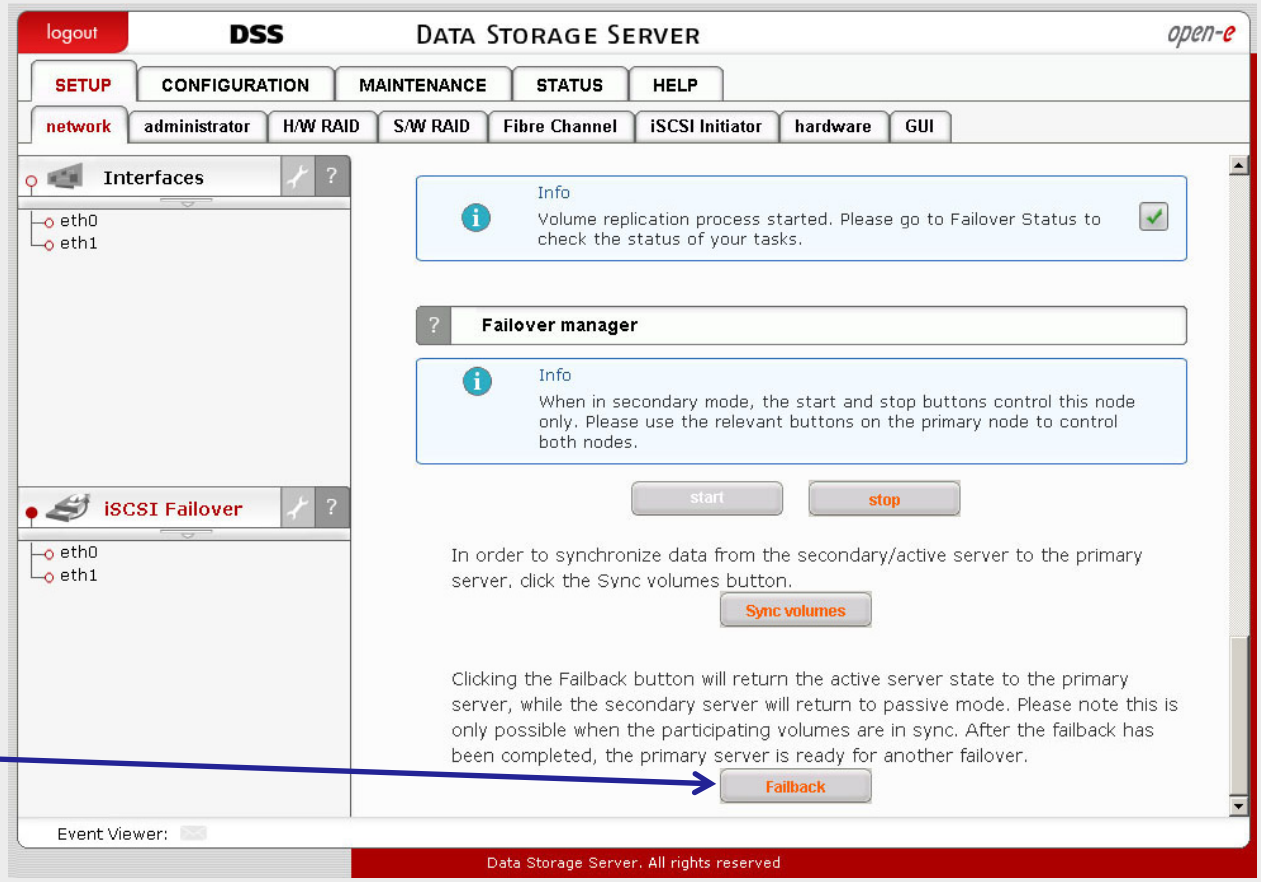


Synchronous **Volume Replication with Failover** over a LAN



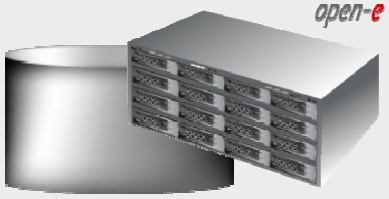
Data Server (DSS2)
Secondary node
Address IP:192.168.0.240

10. Run Failback Function



In order to return the active server state to the Primary server click on the **Failback** button

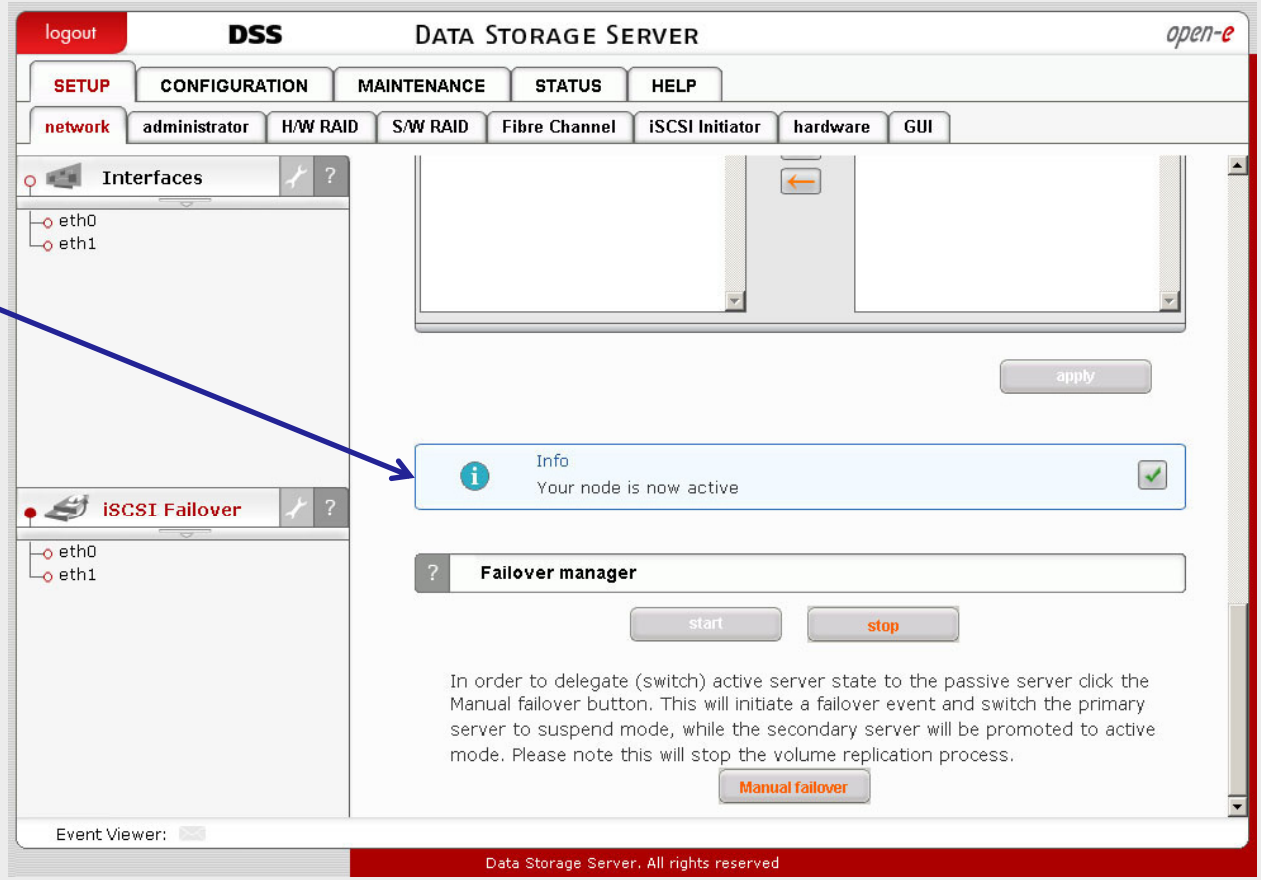
Synchronous **Volume Replication with Failover** over a LAN



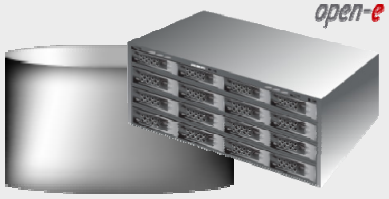
Data Server (DSS1)
Primary node
Address IP:192.168.0.220

10. Run Failback Function

After clicking on **Failback** button (in **Failover manager** function on Secondary node) Primary node is now active



Synchronous **Volume Replication with Failover** over a LAN

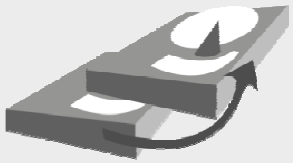


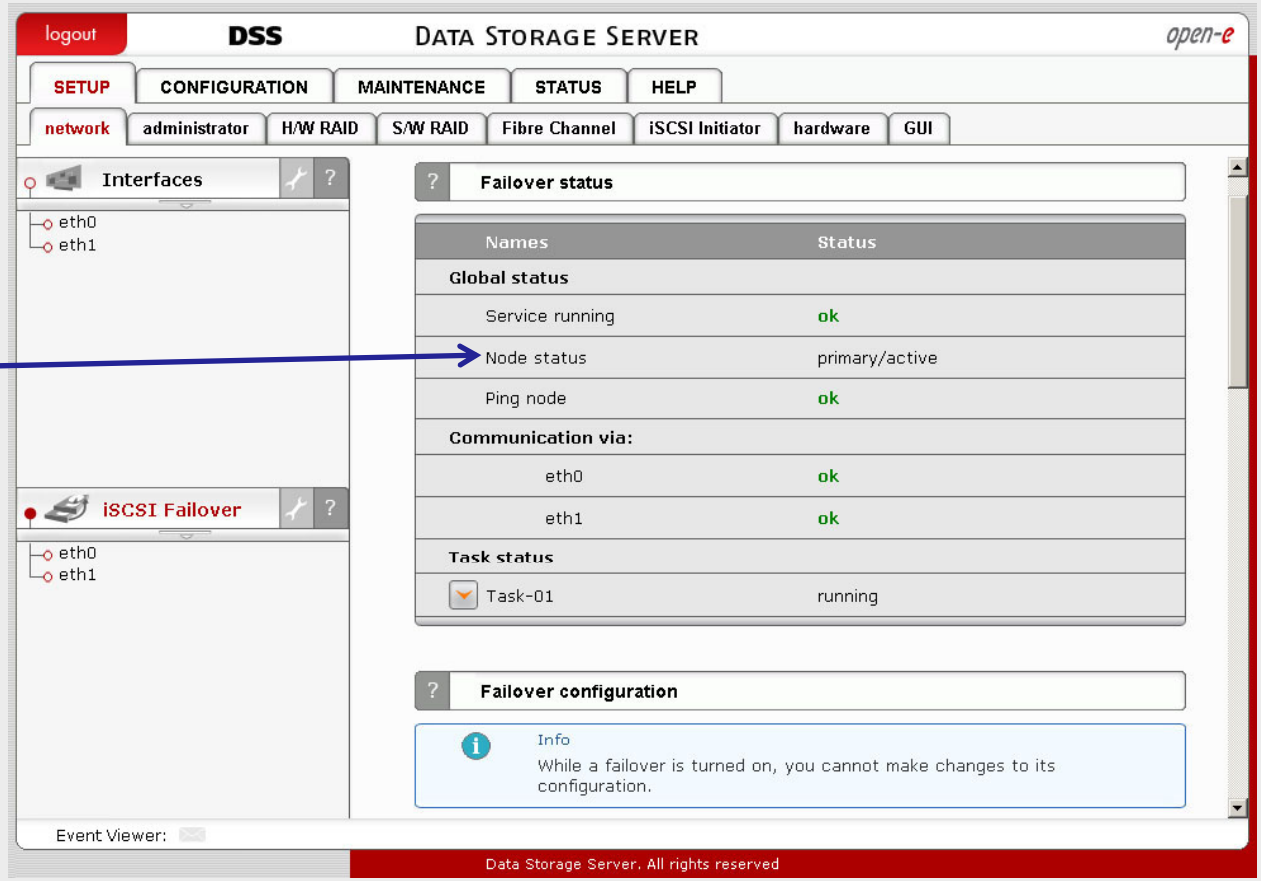
Data Server (DSS1)
Primary node
Address IP:192.168.0.220

10. Run Failback Function

Primary node is active again and ready for Failover.

iSCSI Failover/Volume Replication





The configuration and testing of iSCSI Failover/Failback is now complete.

Thank You!