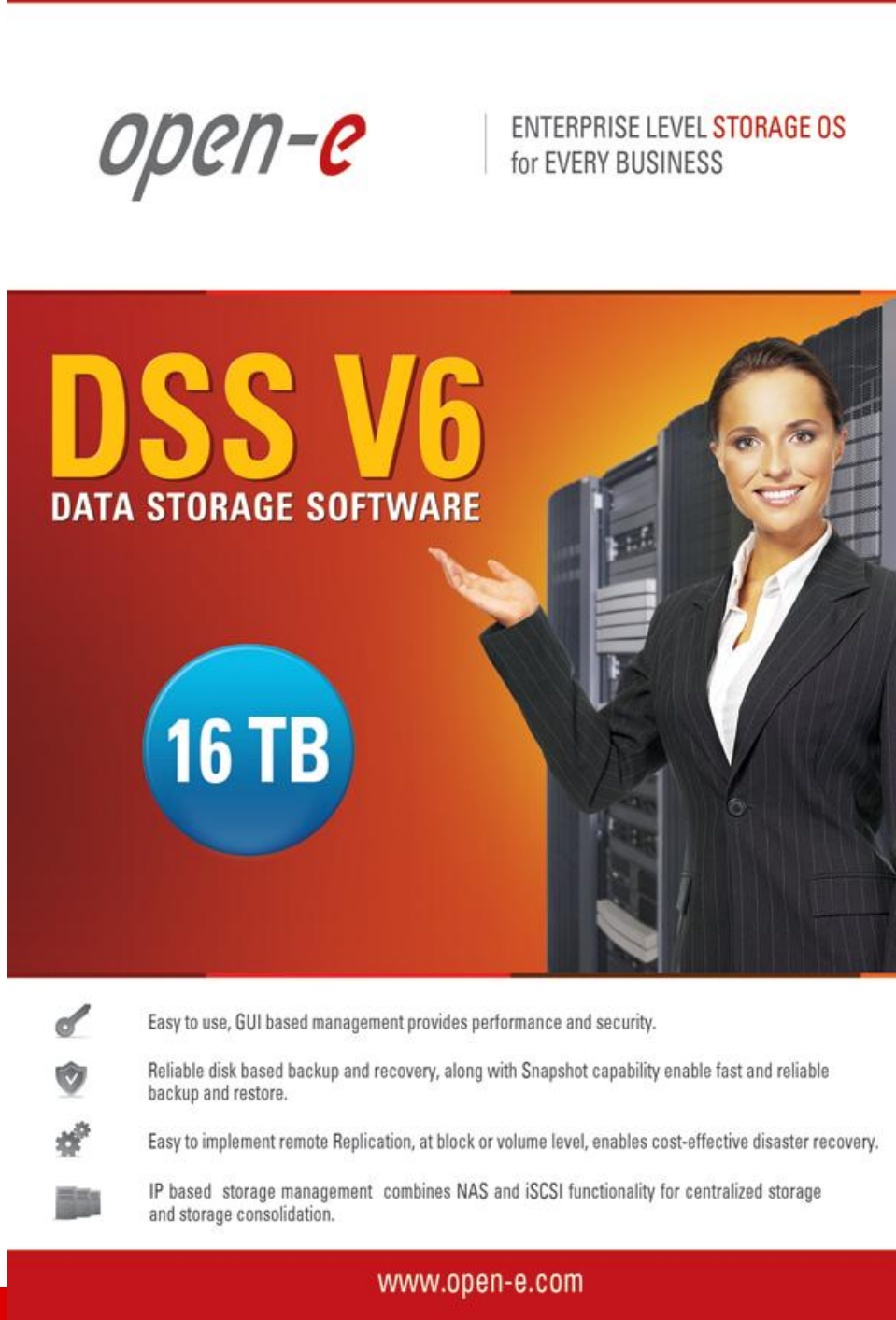
How to setup DSS V6 iSCSI Failover with XenServer using Multipath

Software Version: DSS ver. 6.00 up55

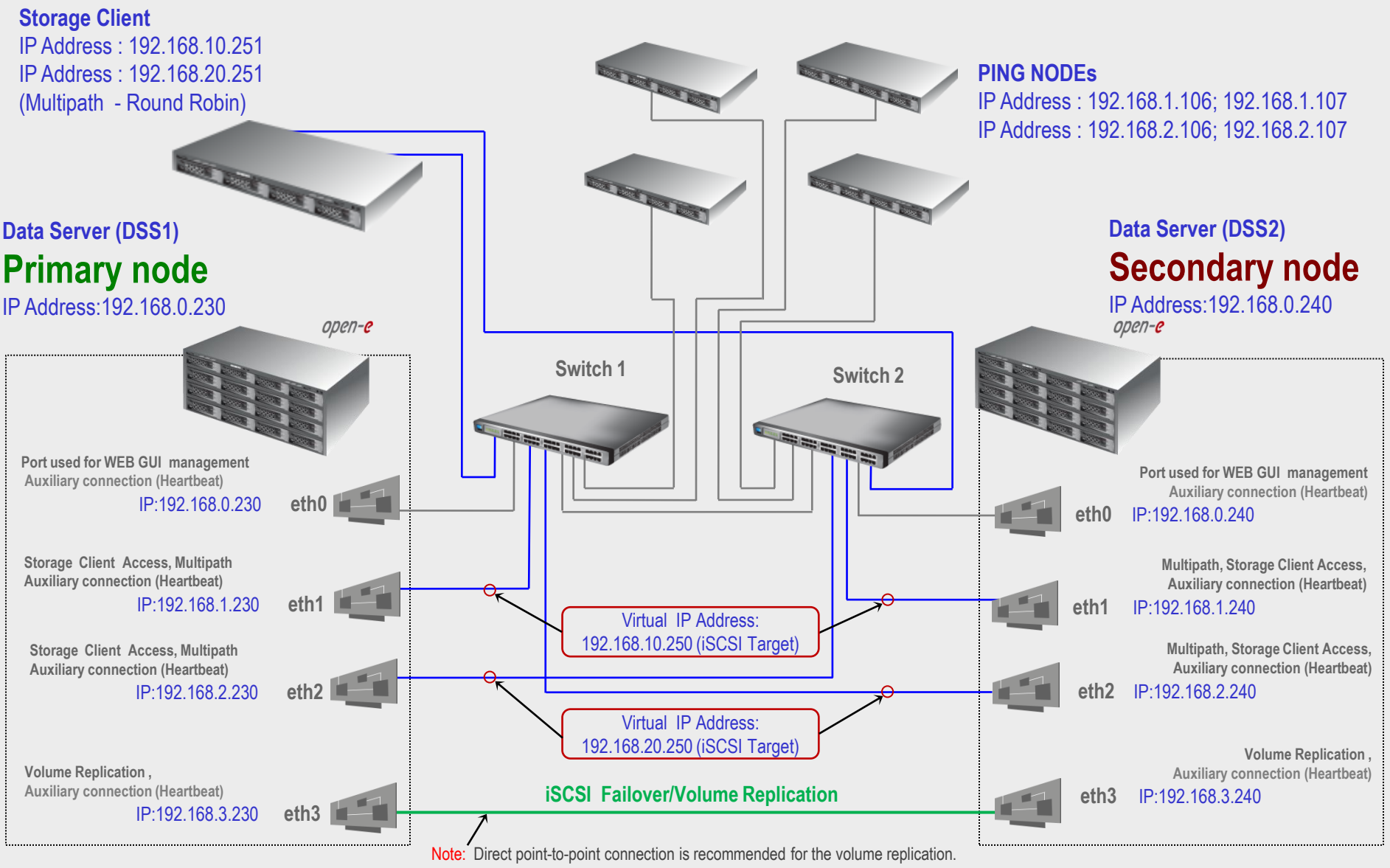
Presentation updated: February 2011



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

1. Hardware configuration:
   - Settings server names, ethernet ports on both nodes.
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 iSCSI Failover (primary and secondary node, unicast)
7. Configure virtual IP and Auxiliary connection
8. Start Failover Service
9. Test Failover Function
10. Run Failback Function
11. Configure MPIO on XenServer (49÷74 slides)

Synchronous **Volume Replication with Failover with Multipath**



Synchronous **Volume Replication with Failover with Multipath**

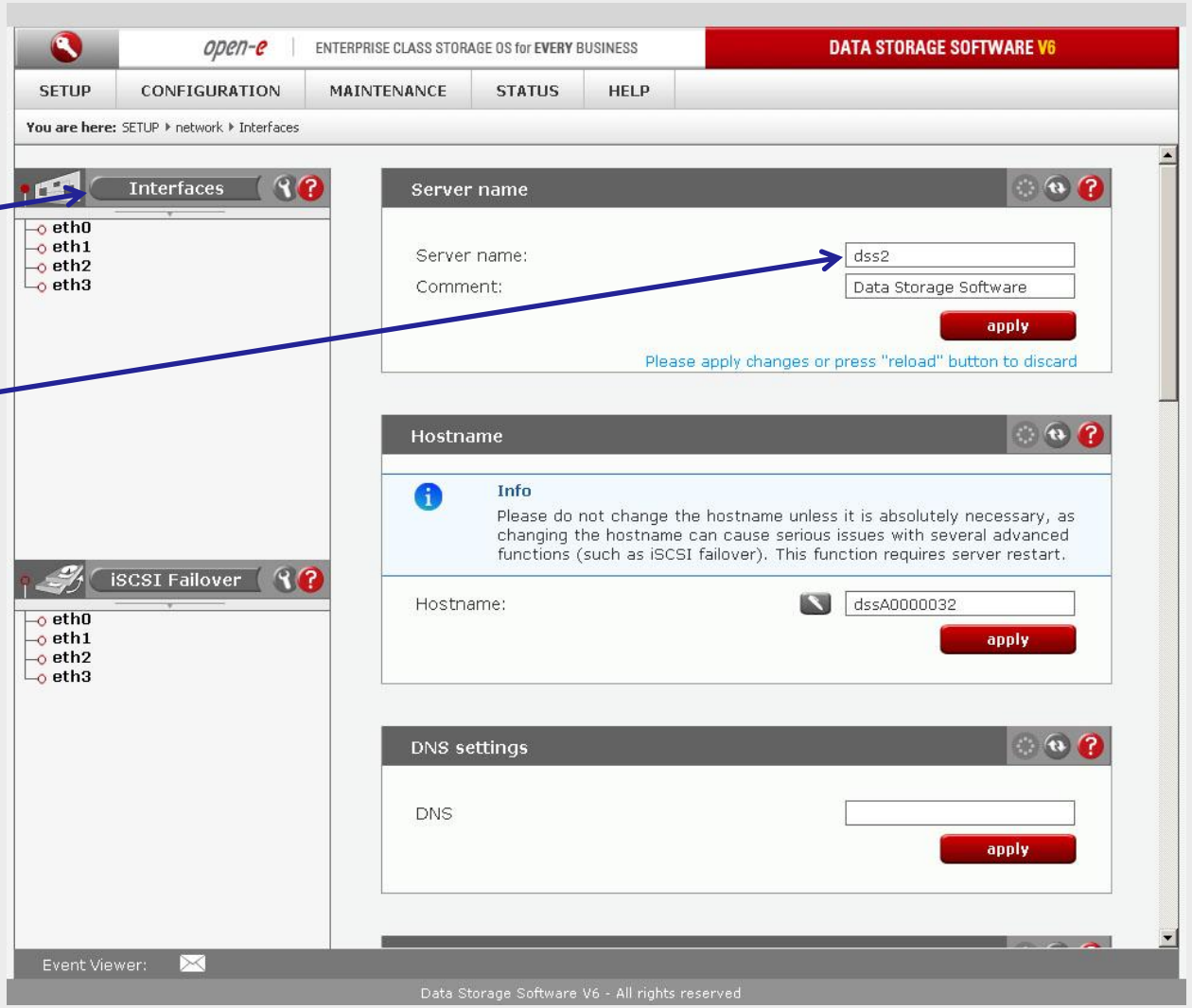
Data Server (DSS2)

Secondary node

IP Address:192.168.0.240

1. Hardware Configuration

After logging on the DSS V6 please go to **„SETUP"** tab, **„network"** and **„Interfaces"**. In **„Server name"** function enter Server name, in this example **„dss2"** and click apply button. (All connections will be restarted)



Synchronous **Volume Replication with Failover with Multipath**

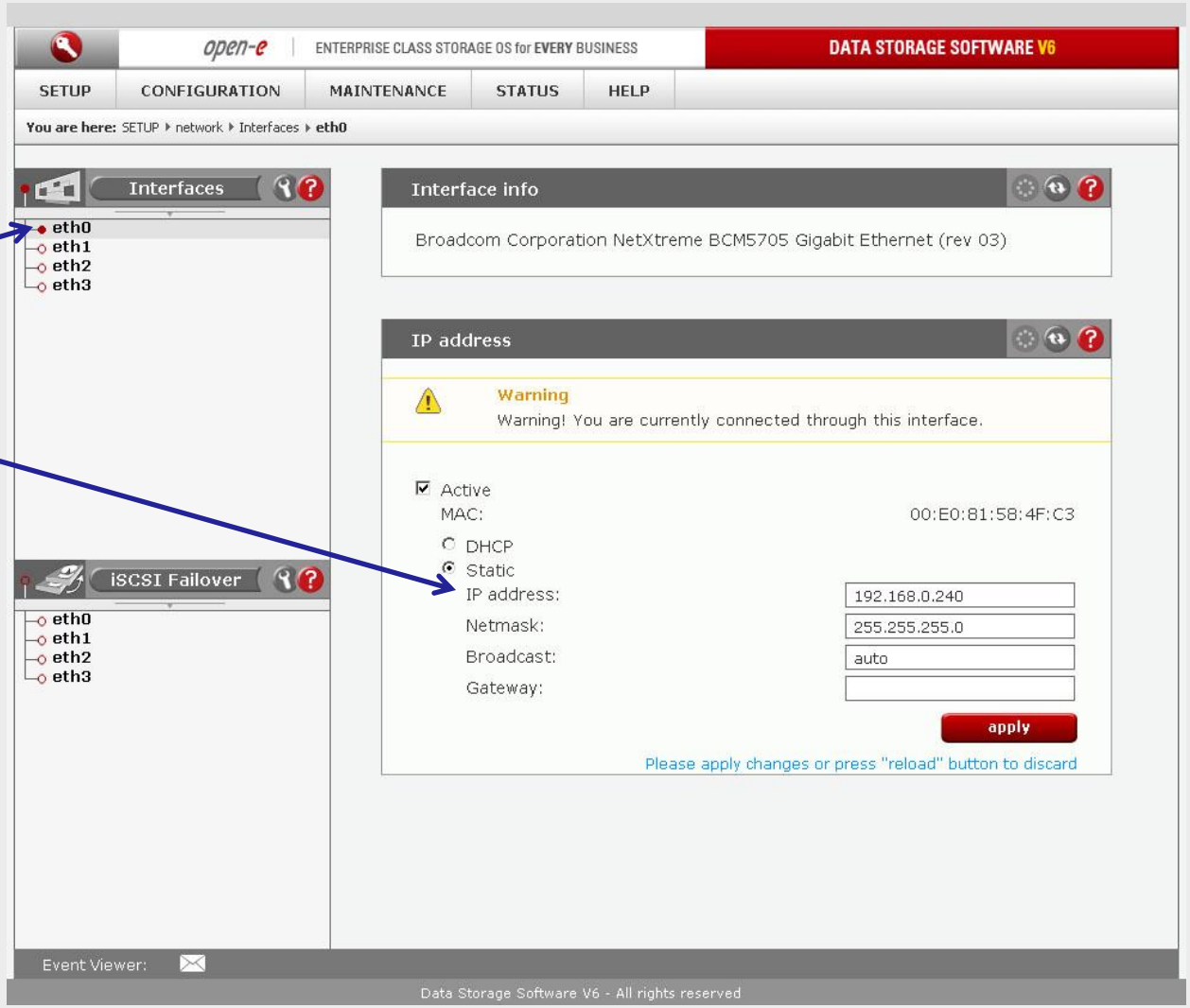
Data Server (DSS2)

Secondary node

IP Address:192.168.0.240

1. Hardware Configuration

Next select **eth0** interface and change IP Address from 192.168.0.220 in field **IP address** to 192.168.0.240, and click **apply** button. (This will restart network configuration).



Synchronous **Volume Replication with Failover with Multipath**

Data Server (DSS2)

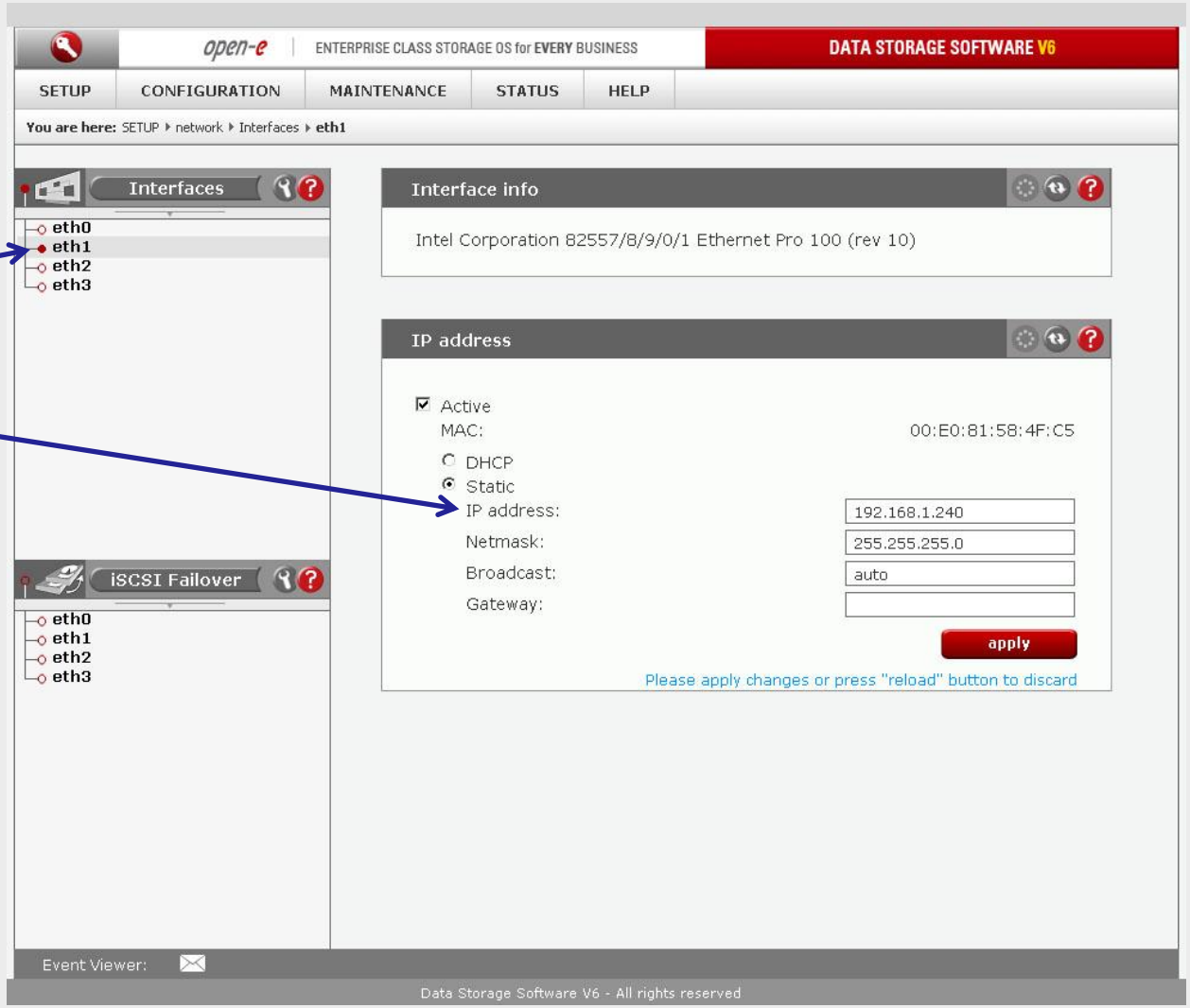
Secondary node

IP Address:192.168.0.240

1. Hardware Configuration

Now select **eth1** interface and change IP address from 192.168.1.220 in field **IP address** to 192.168 .1.240 and click **apply** button.

Next change IP address for **eth2** and **eth3** from 192.168.2.220 and 192.168.3.220 to 192.168 .2.240 and 192.168 .3.240 accordingly.



Synchronous **Volume Replication with Failover with Multipath**

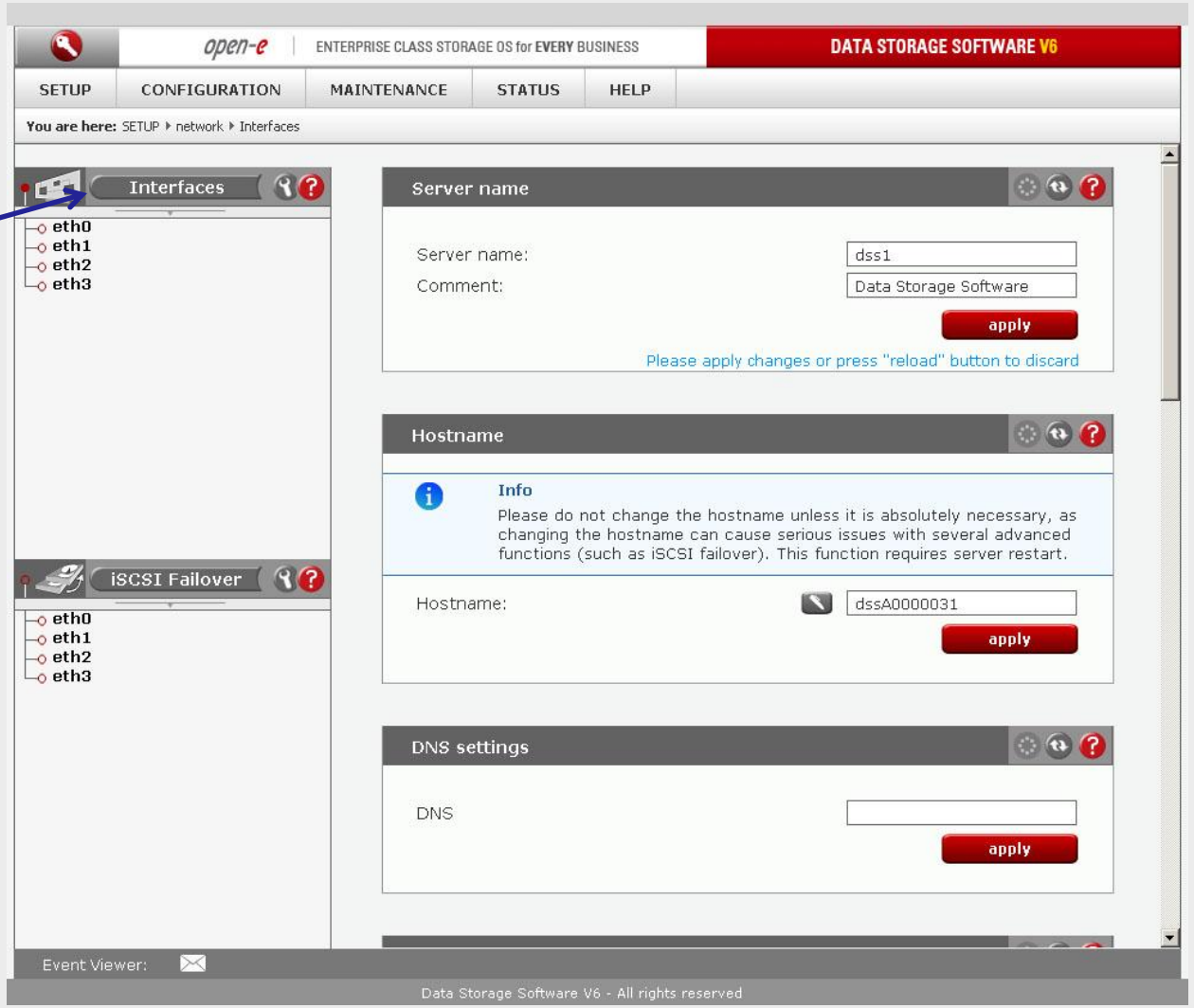
Data Server (DSS1)

Primary node

IP Address:192.168.0.230

1. Hardware Configuration

After logging on the primary node please go to **„SETUP"** tab, **„network"** and **„Interfaces"**. In **„Server name"** function enter Server name. In this example enter **dss1** and click apply button. (All connection will be restarted).



Synchronous **Volume Replication with Failover with Multipath**

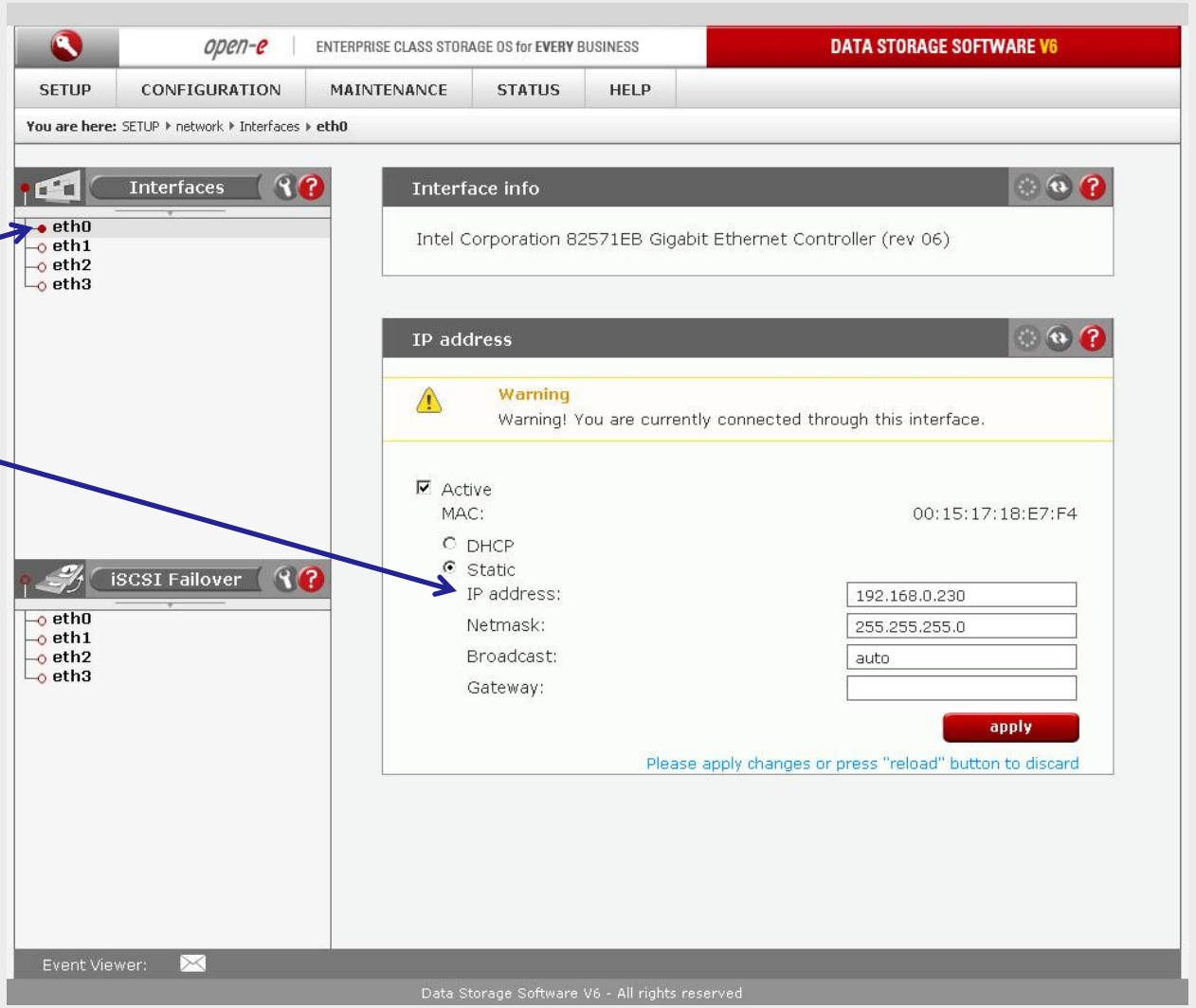
Data Server (DSS1)

Primary node

IP Address:192.168.0.230

1. Hardware Configuration

Next select **eth0** interface and change IP Address from 192.168.0.220 in field **IP address** to 192.168.0.230, and click **apply** button. (This will restart network configuration).



Synchronous **Volume Replication with Failover with Multipath**

Data Server (DSS1)

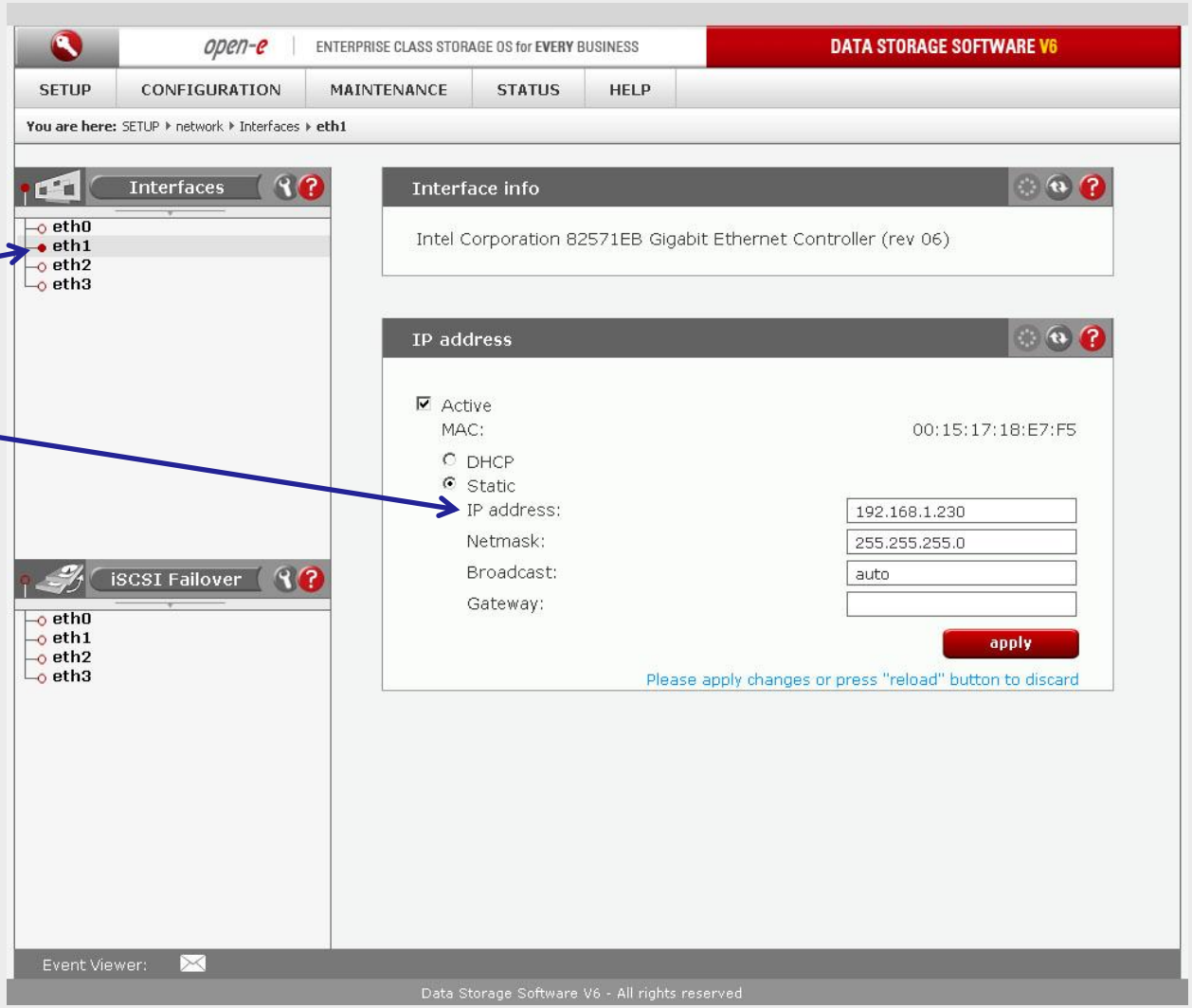
Primary node

IP Address:192.168.0.230

1. Hardware Configuration

Now select **eth1** interface and change IP address from 192.168.1.220 in field **IP address** to 192.168 .1.230 and click **apply** button.

Next change IP address for **eth2** and **eth3** from 192.168.2.220 and 192.168.3.220 to 192.168 .2.230 and 192.168 .3.230 accordingly.



Synchronous **Volume Replication with Failover with Multipath**

Data Server (DSS2)

Secondary node

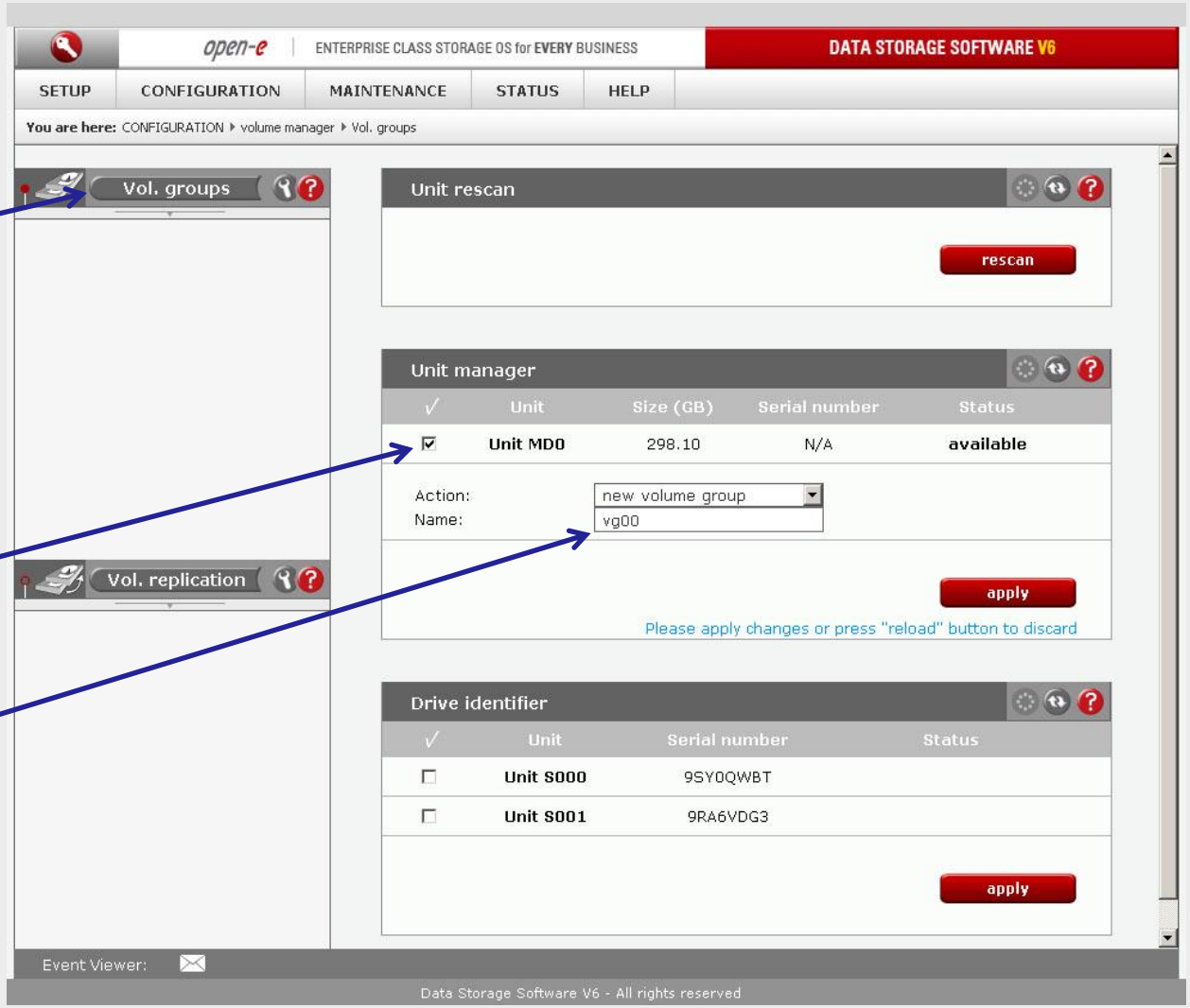
IP Address:192.168.0.240

2. Configure the Secondary node

Under the **„CONFIGURATION"** tab, select **„volume manager"** and next **Vol. Groups.**

Volume Groups (vg00)

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



Synchronous **Volume Replication with Failover with Multipath**

Data Server (DSS2)

Secondary node

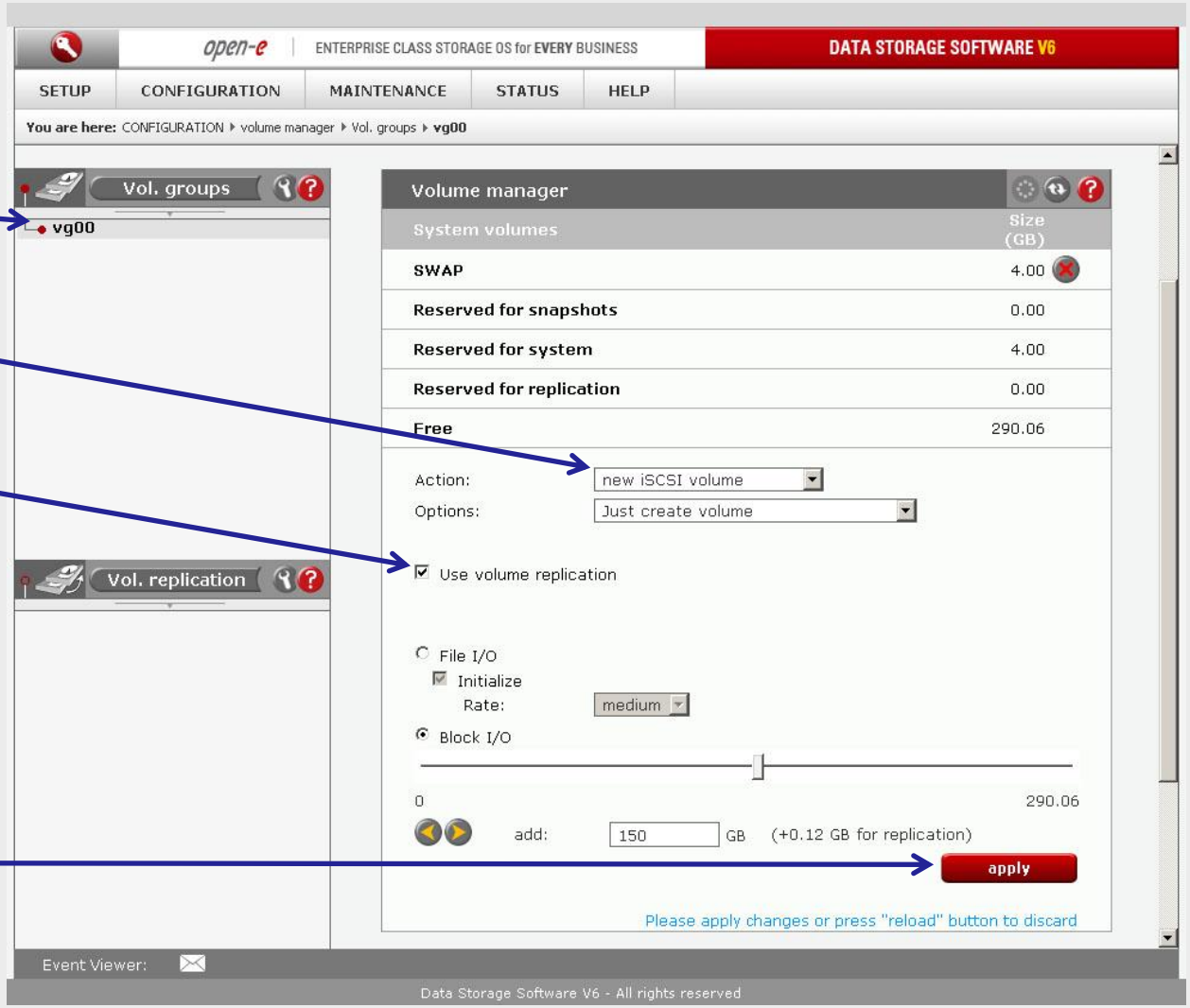
IP Address:192.168.0.240

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 with Multipath**

Data Server (DSS2)

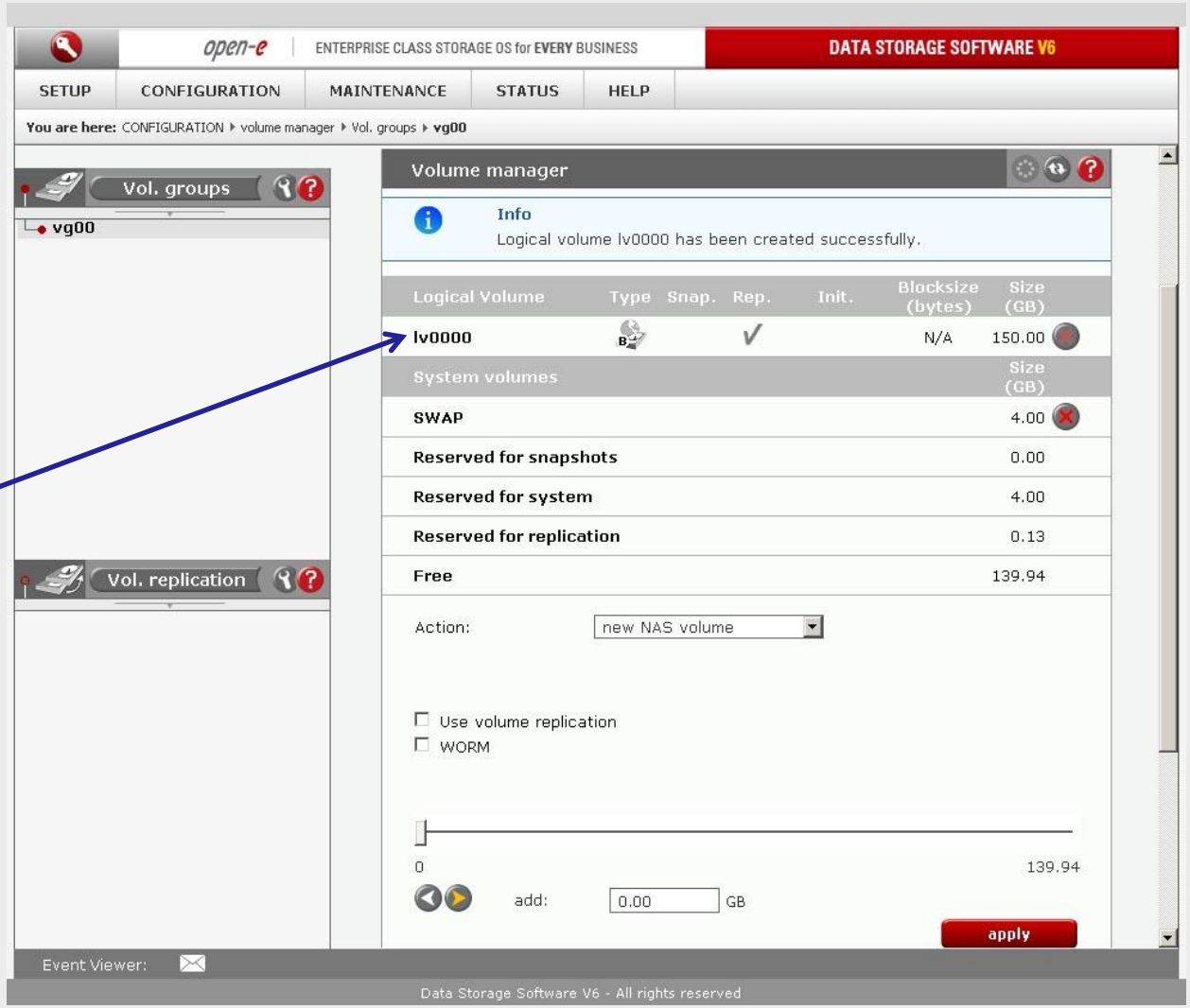
Secondary node

IP Address: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 with Multipath**

Data Server (DSS2)

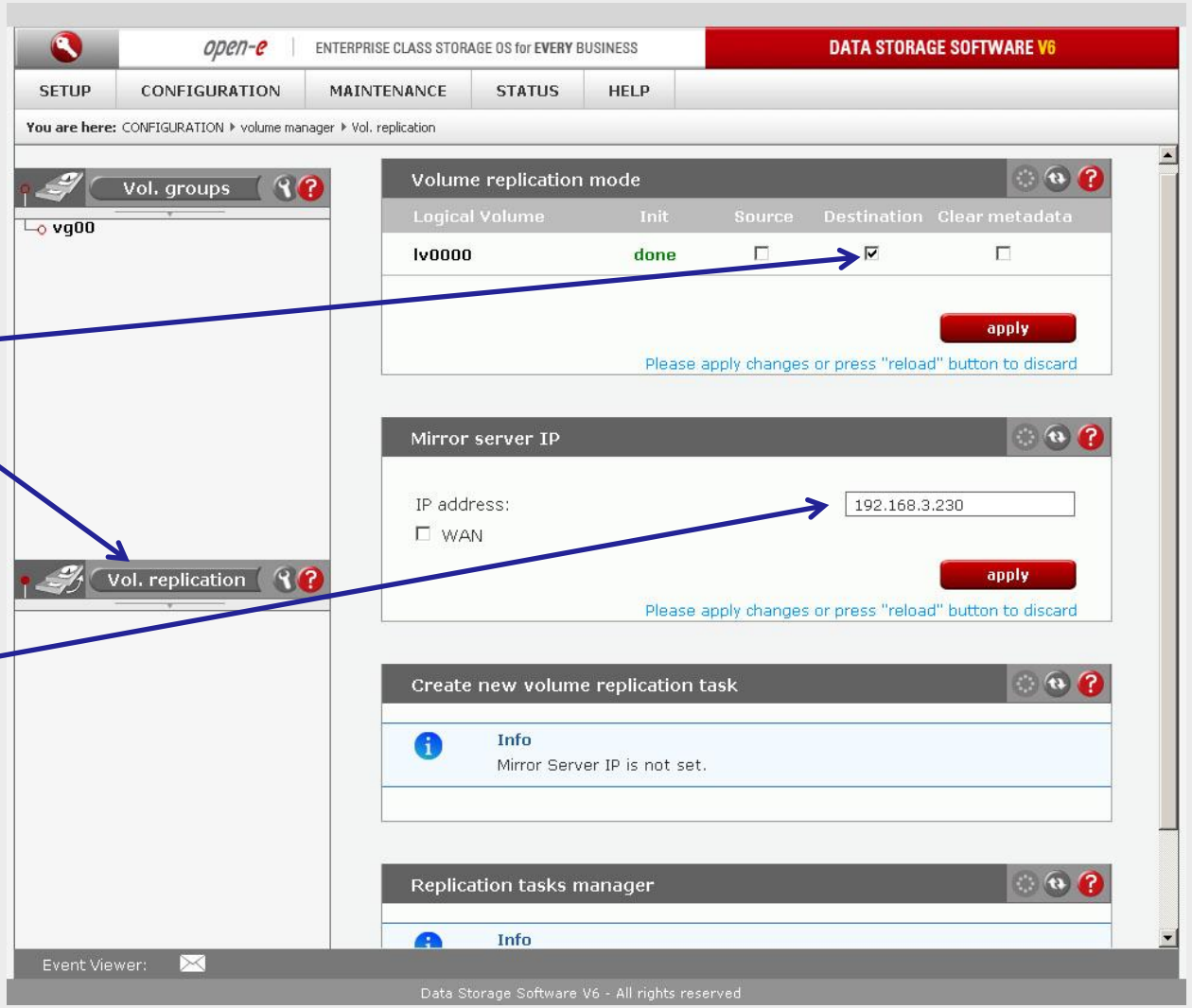
Secondary node

IP Address: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 192.168.3.230) 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: 192.168.3.230
- Destination: 192.168.3.240

Synchronous **Volume Replication with Failover with Multipath**

Data Server (DSS1)

Primary node

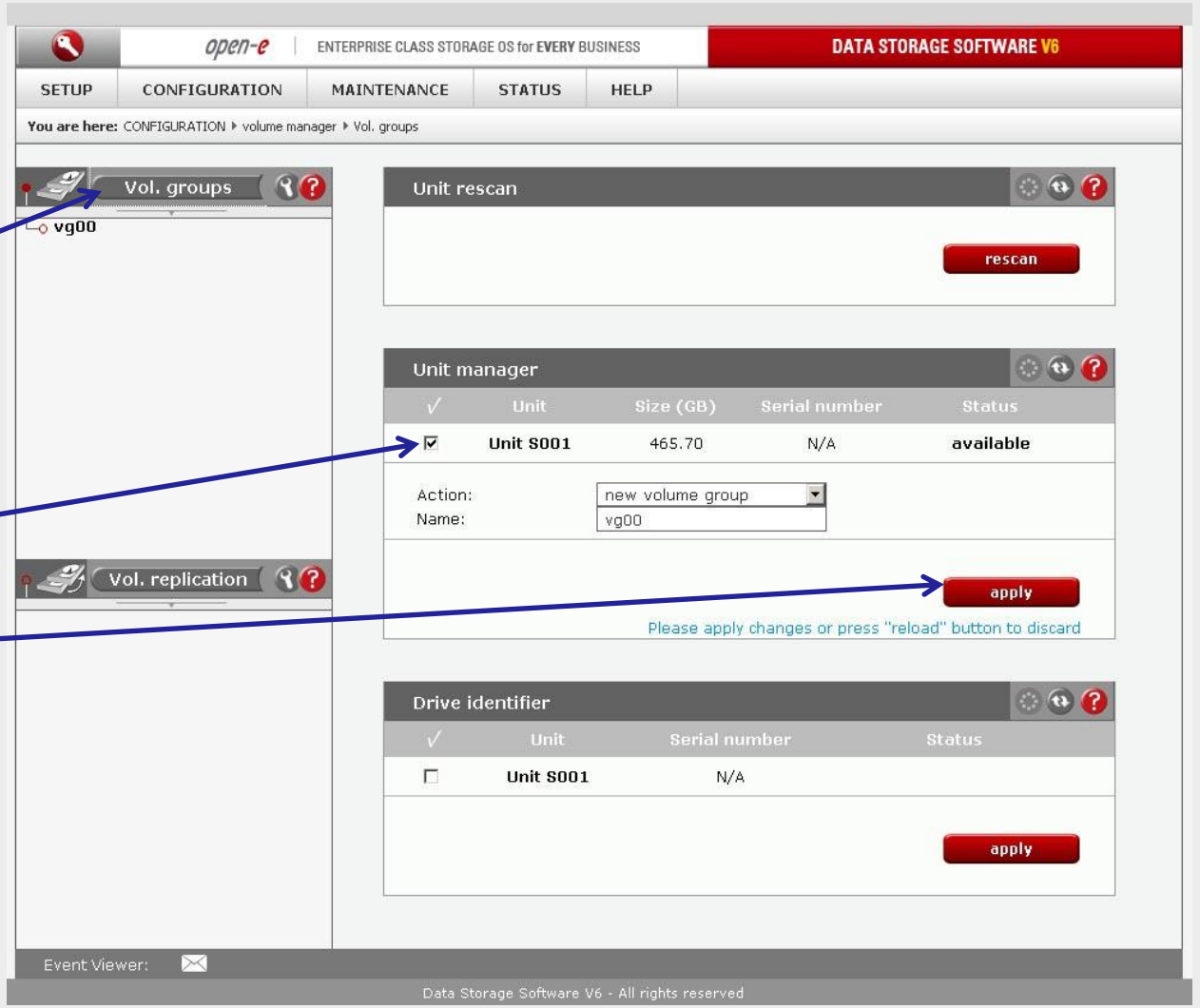
IP Address:192.168.0.230

3. Configure the Primary node

Under the **„CONFIGURATION"** tab, select **„volume manager"** and next **„Vol. Groups"**

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

Volume Groups (vg00)



Synchronous **Volume Replication with Failover with Multipath**

Data Server (DSS1)

Primary node

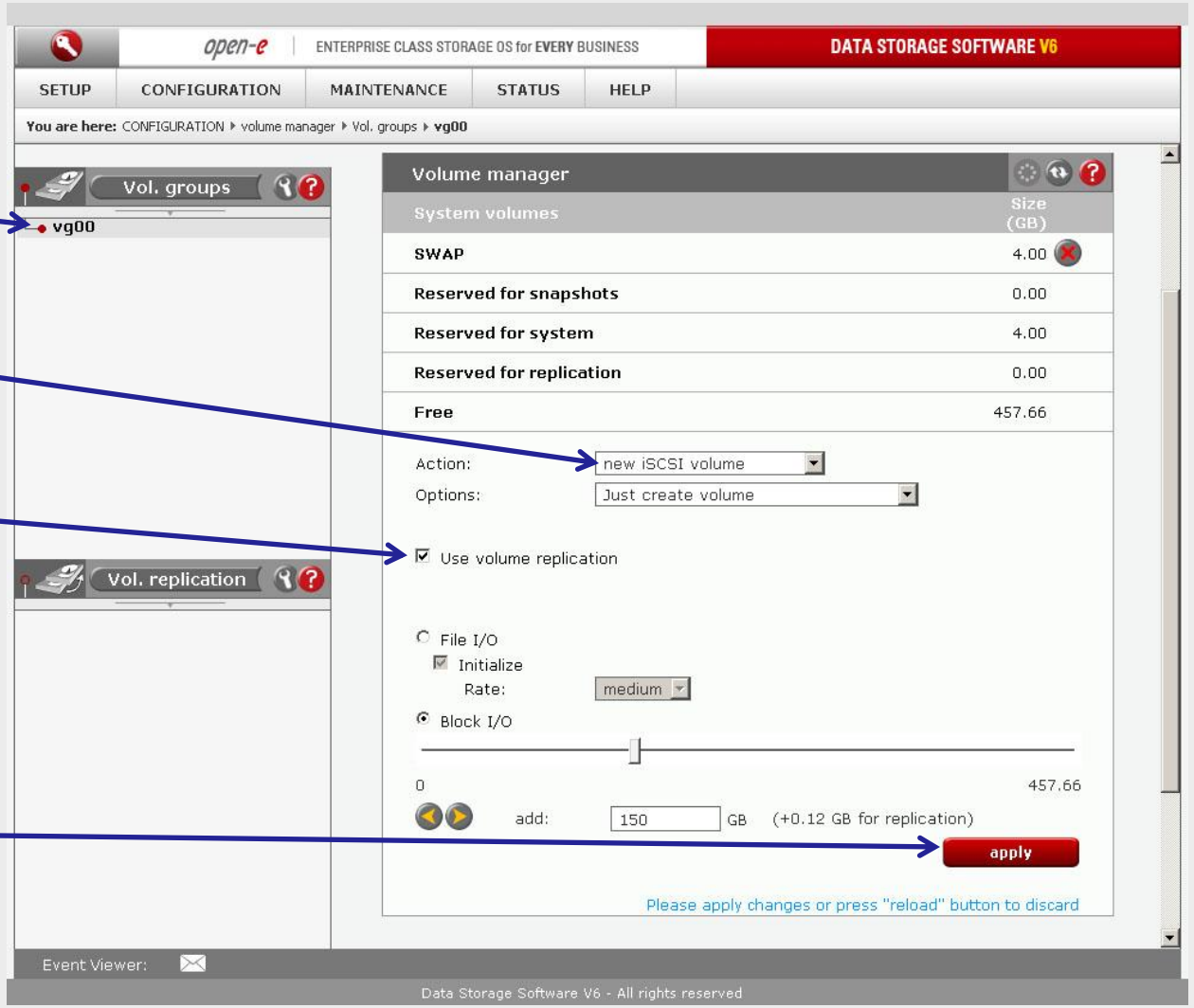
IP Address:192.168.0.230

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 with Multipath**

Data Server (DSS1)

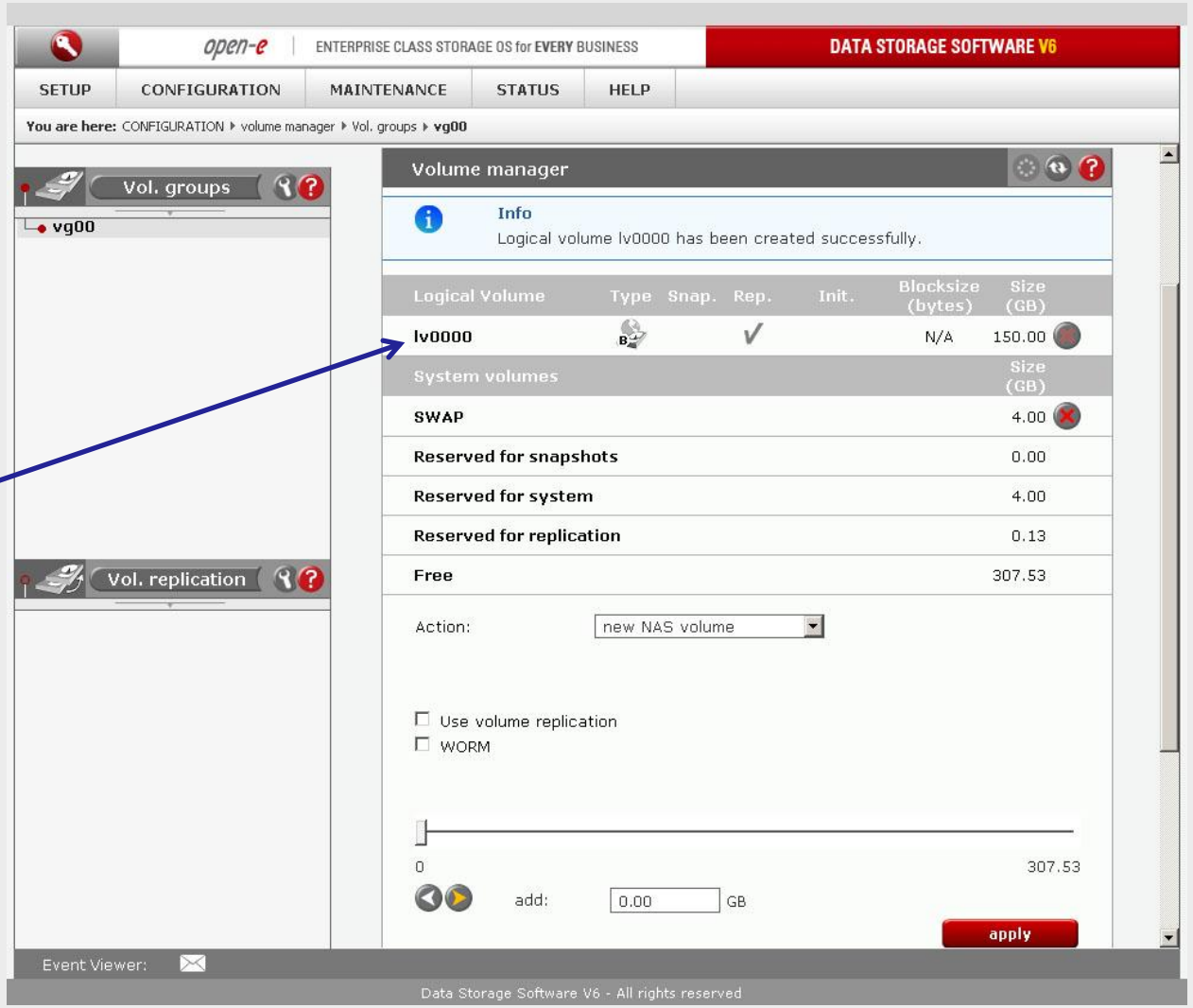
Primary node

IP Address:192.168.0.230

3. Configure the Primary node

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

iSCSI volume (lv0000)



Synchronous **Volume Replication with Failover with Multipath**

Data Server (DSS1)

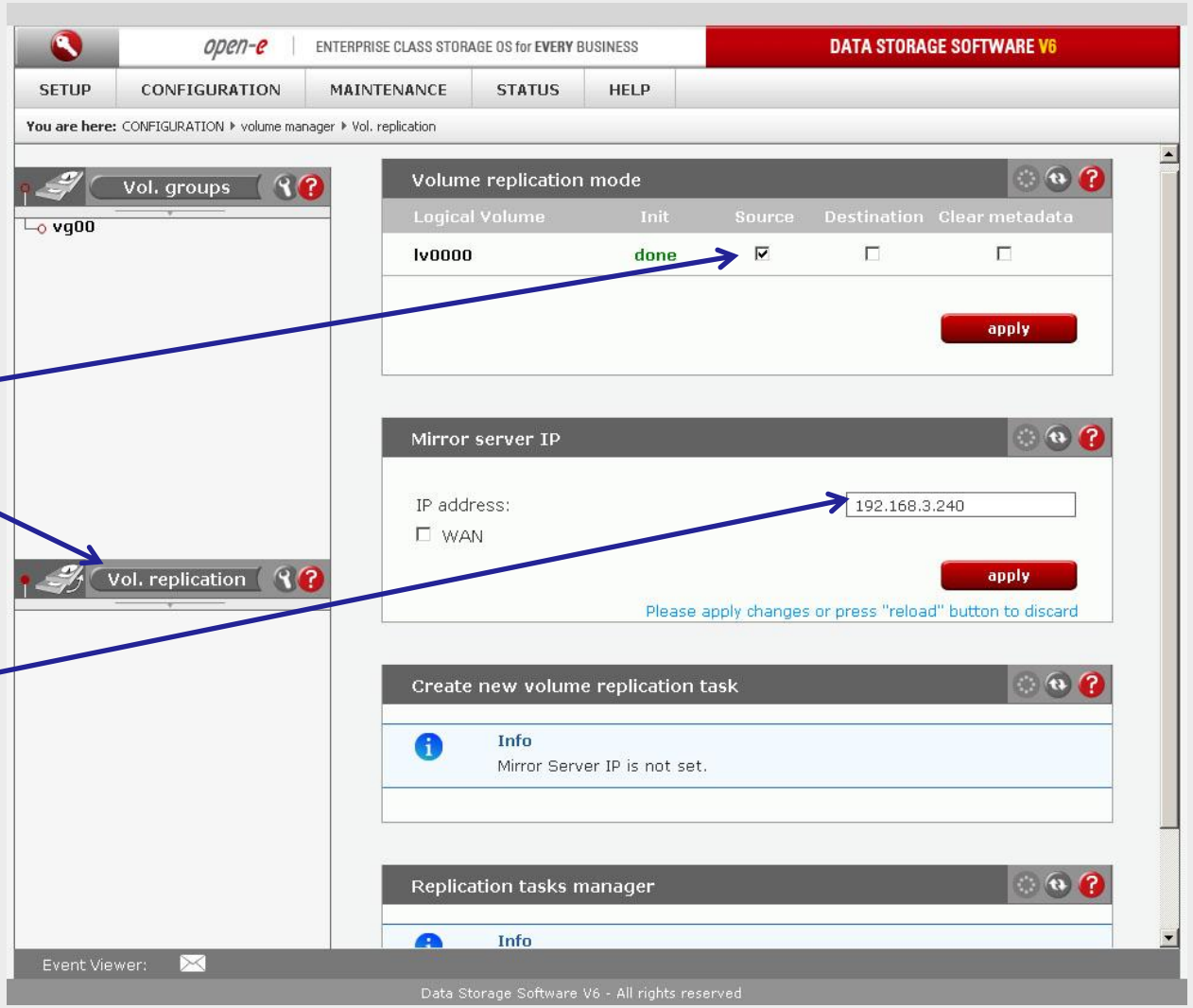
Primary node

IP Address:192.168.0.230

3. Configure the Primary node

Now, select **Vol. replication**, and check the box under **Source** 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 192.168.3.240) and click the apply button



Synchronous **Volume Replication with Failover with Multipath**

Data Server (DSS1)

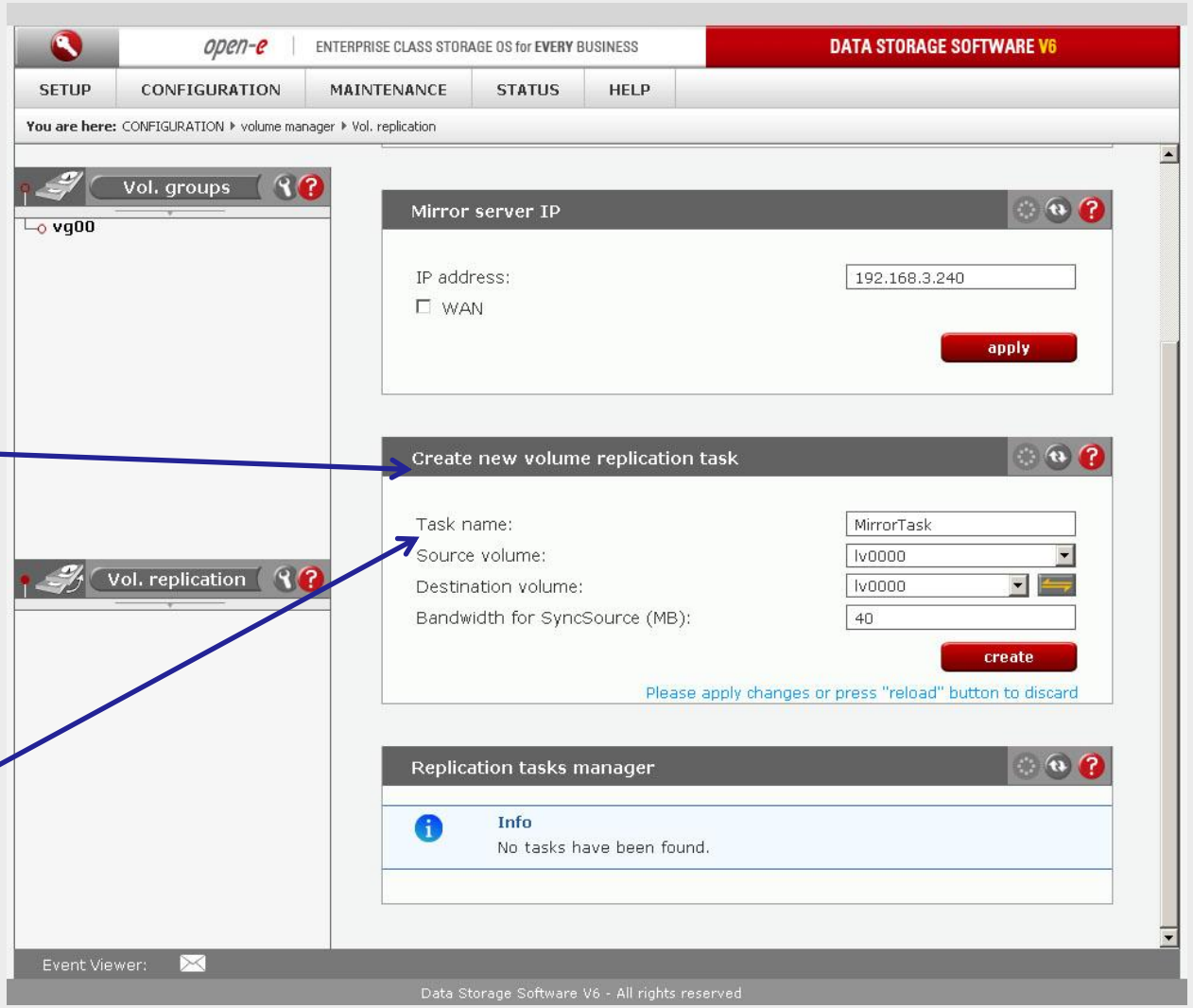
Primary node

IP Address:192.168.0.230

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 with Multipath**

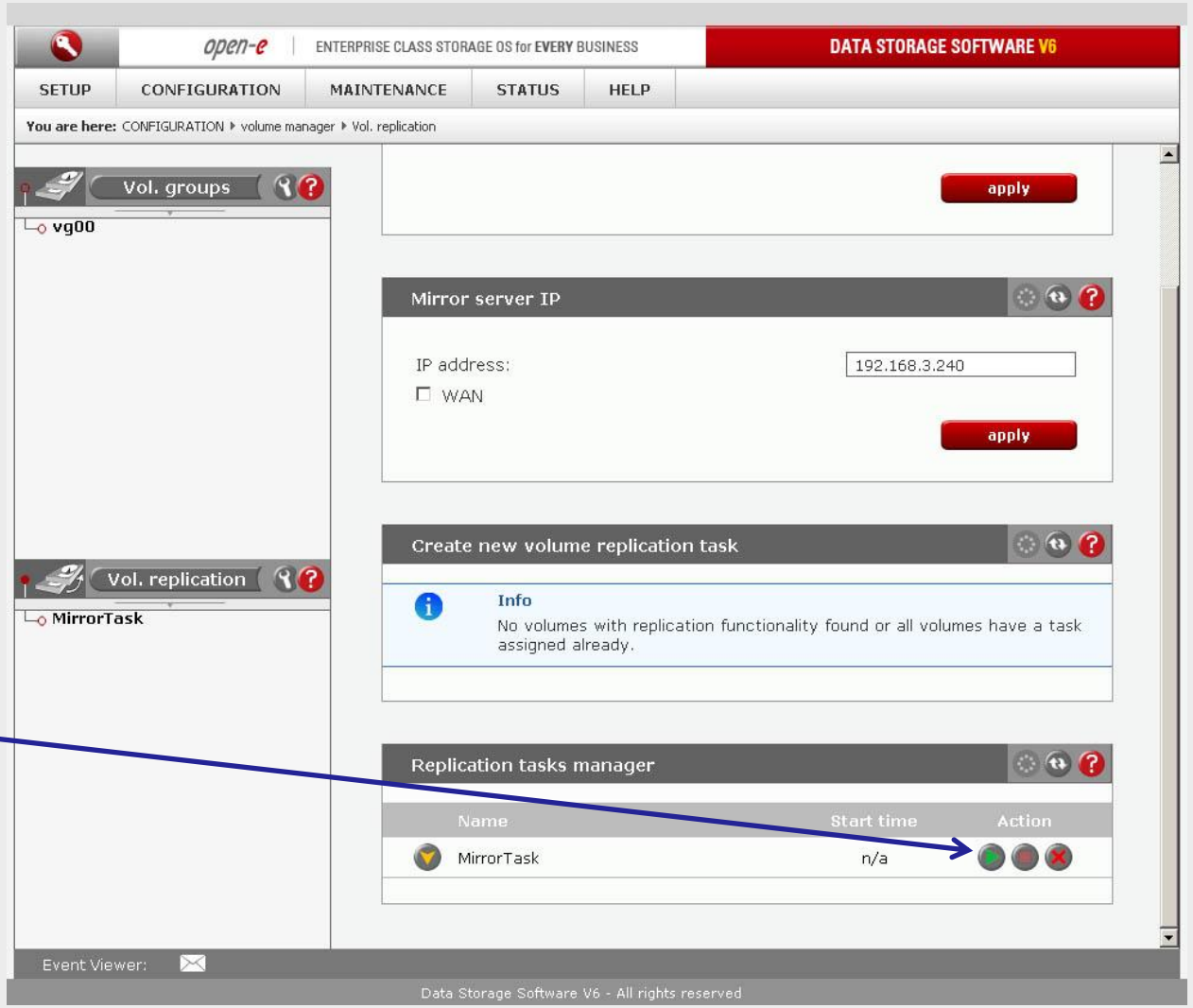
Data Server (DSS1)

Primary node

IP Address:192.168.0.230

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



Synchronous **Volume Replication with Failover with Multipath**

Data Server (DSS1)

Primary node

IP Address:192.168.0.230

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 with Multipath**

Data Server (DSS1)

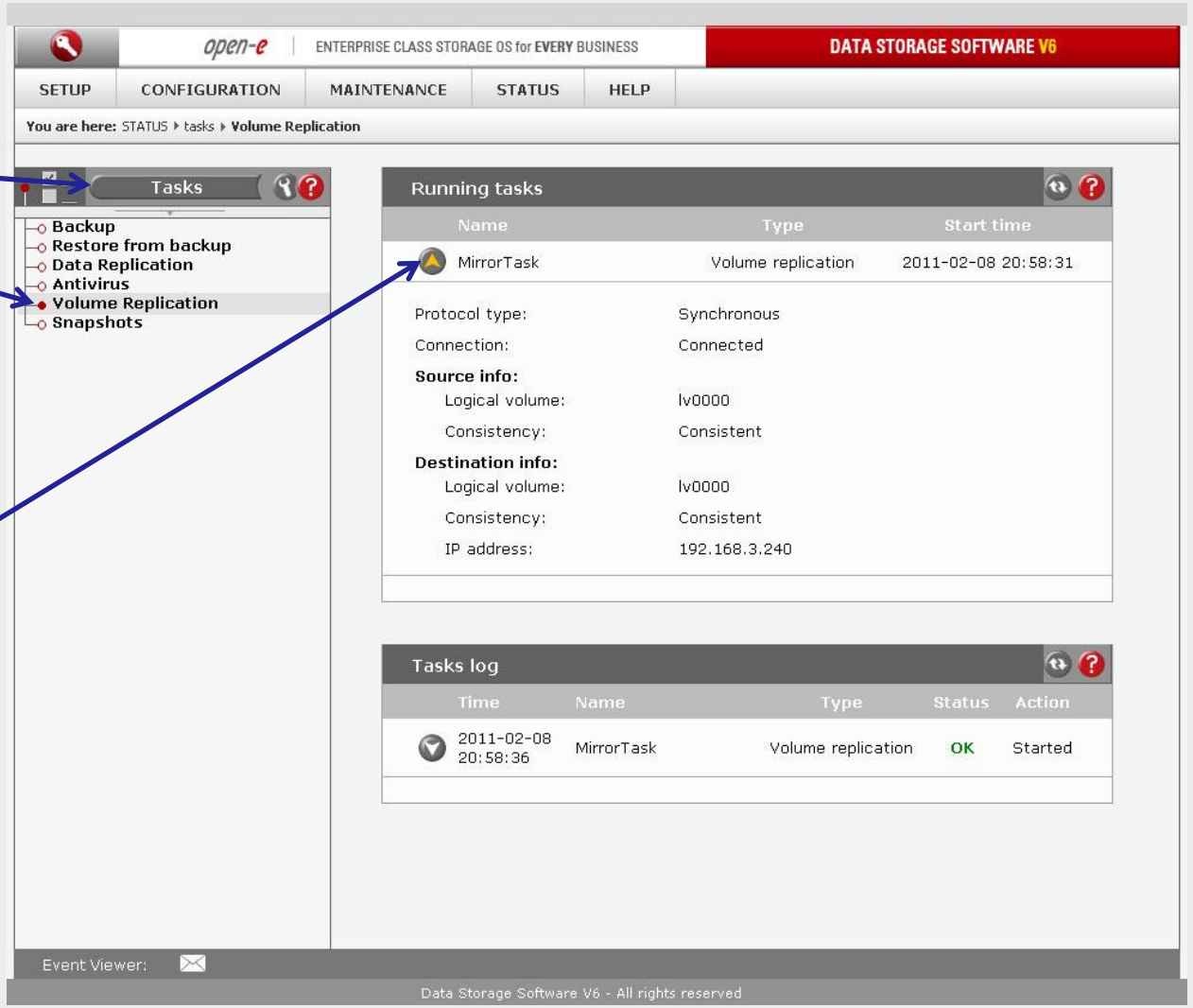
Primary node

IP Address:192.168.0.230

3. Configure the Primary node

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

Click on the button with task name (in this case MirrorTask) 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 with Multipath**

Data Server (DSS2)

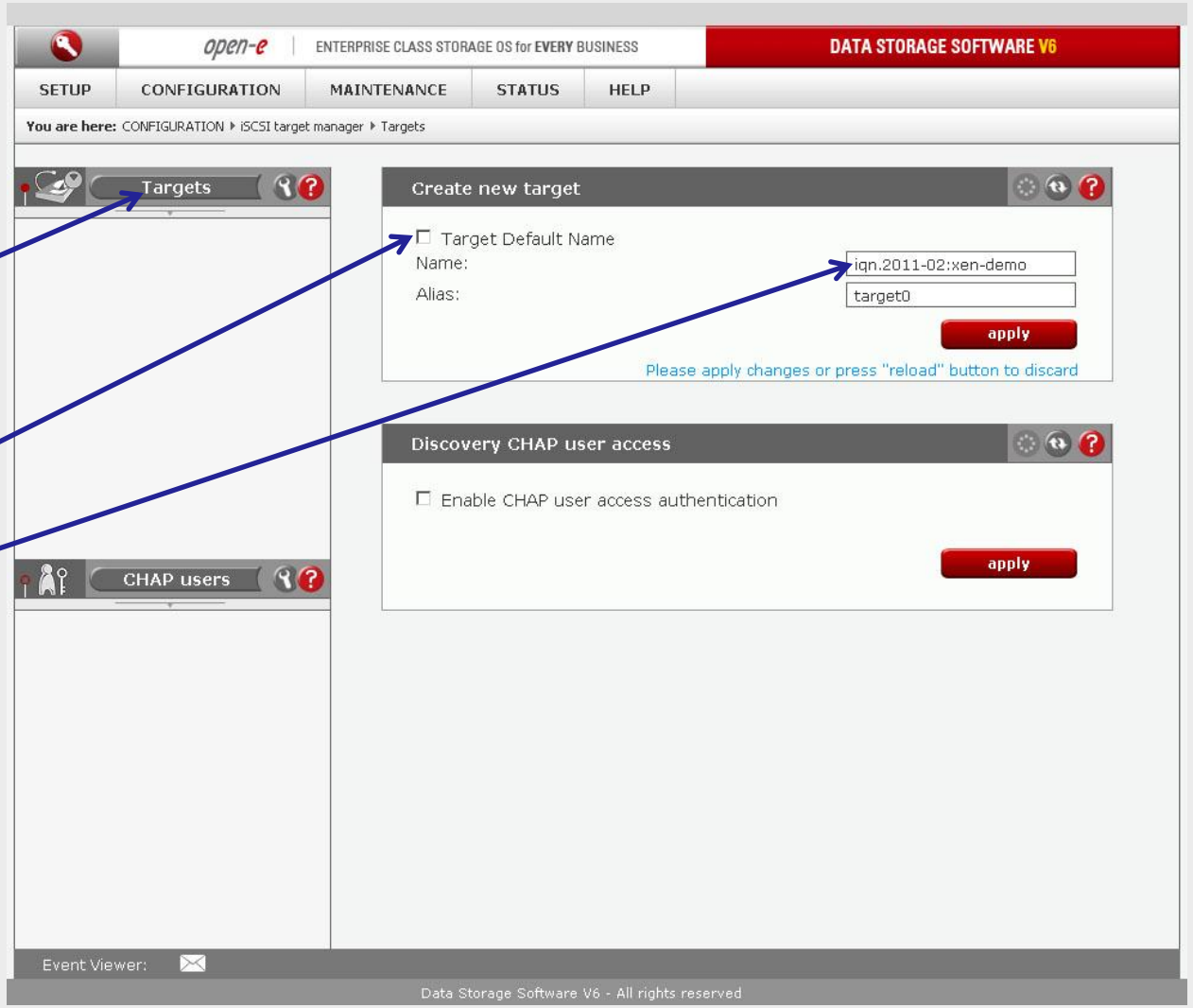
Secondary node

IP Address:192.168.0.240

4. Create new target on the Secondary node

Choose **„CONFIGURATION", „iSCSI target manager"** and **„Targets"** 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 with Multipath**

Data Server (DSS2)

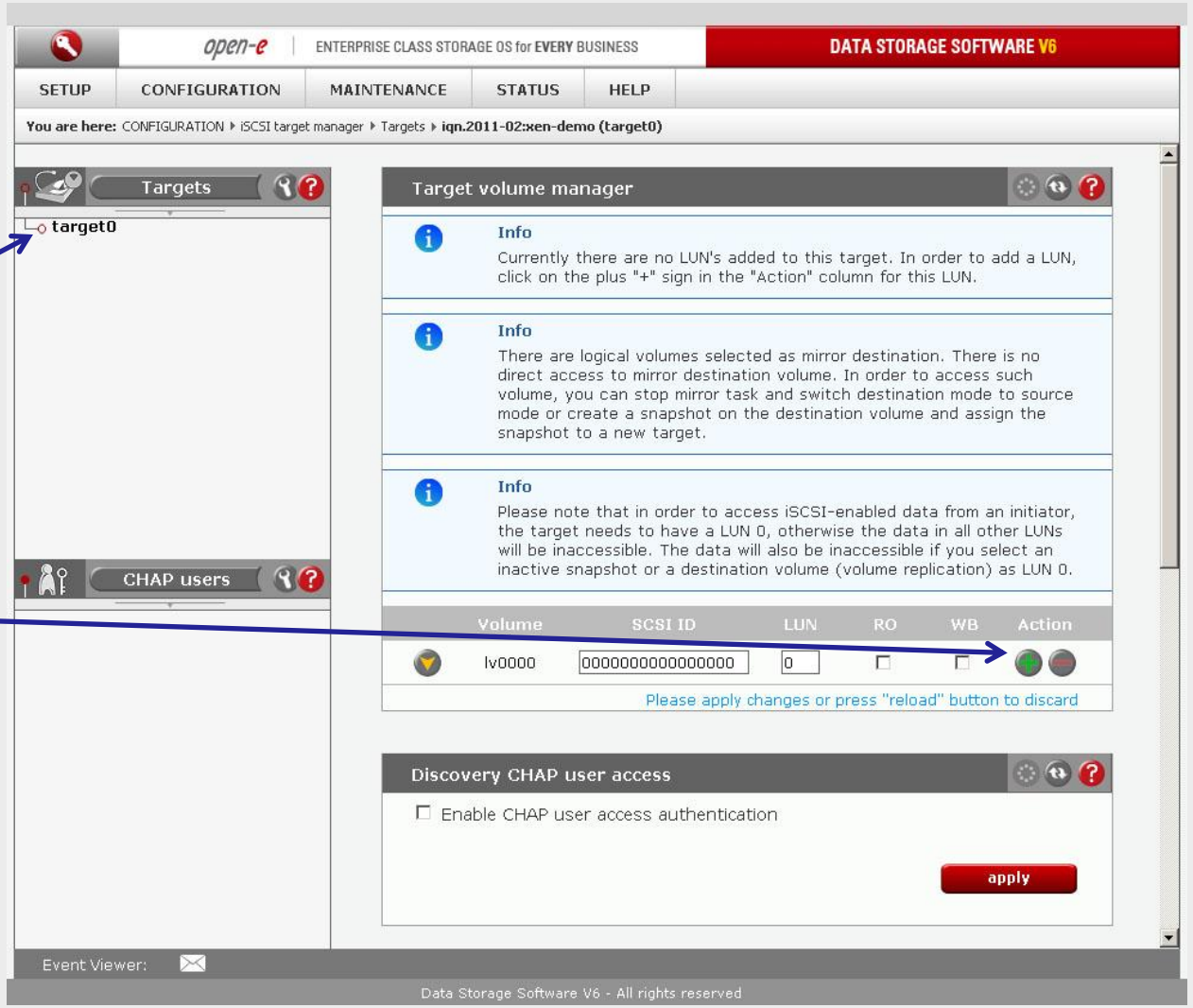
Secondary node

IP Address: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 ID and LUN#

WARNING:

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

Synchronous **Volume Replication with Failover with Multipath**

Data Server (DSS1)

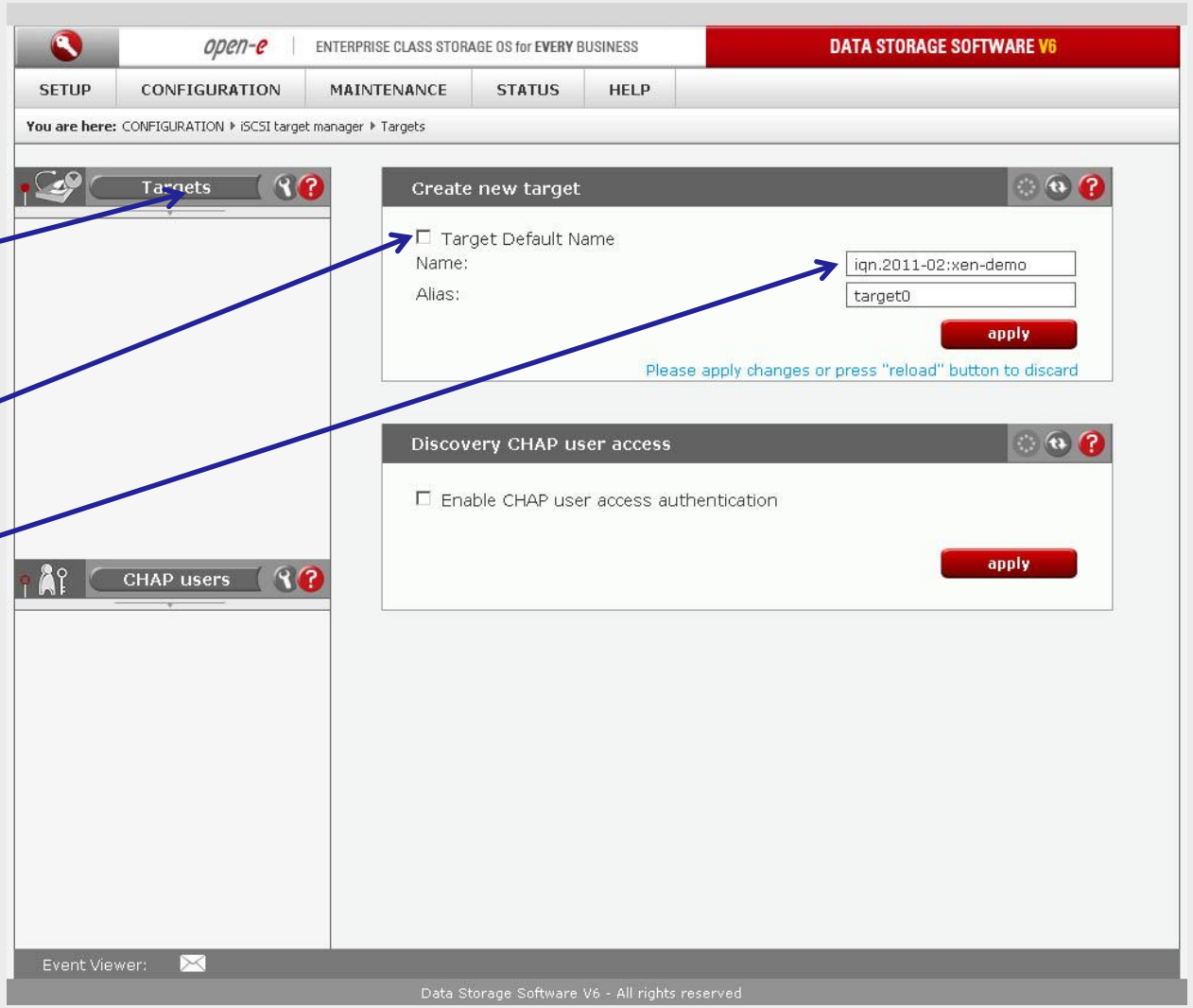
Primary node

IP Address:192.168.0.230

5. Create new target on the Primary node

Choose **„CONFIGURATION"** and **„iSCSI target manager"** and **„Targets"** 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 with Multipath**

Data Server (DSS1)

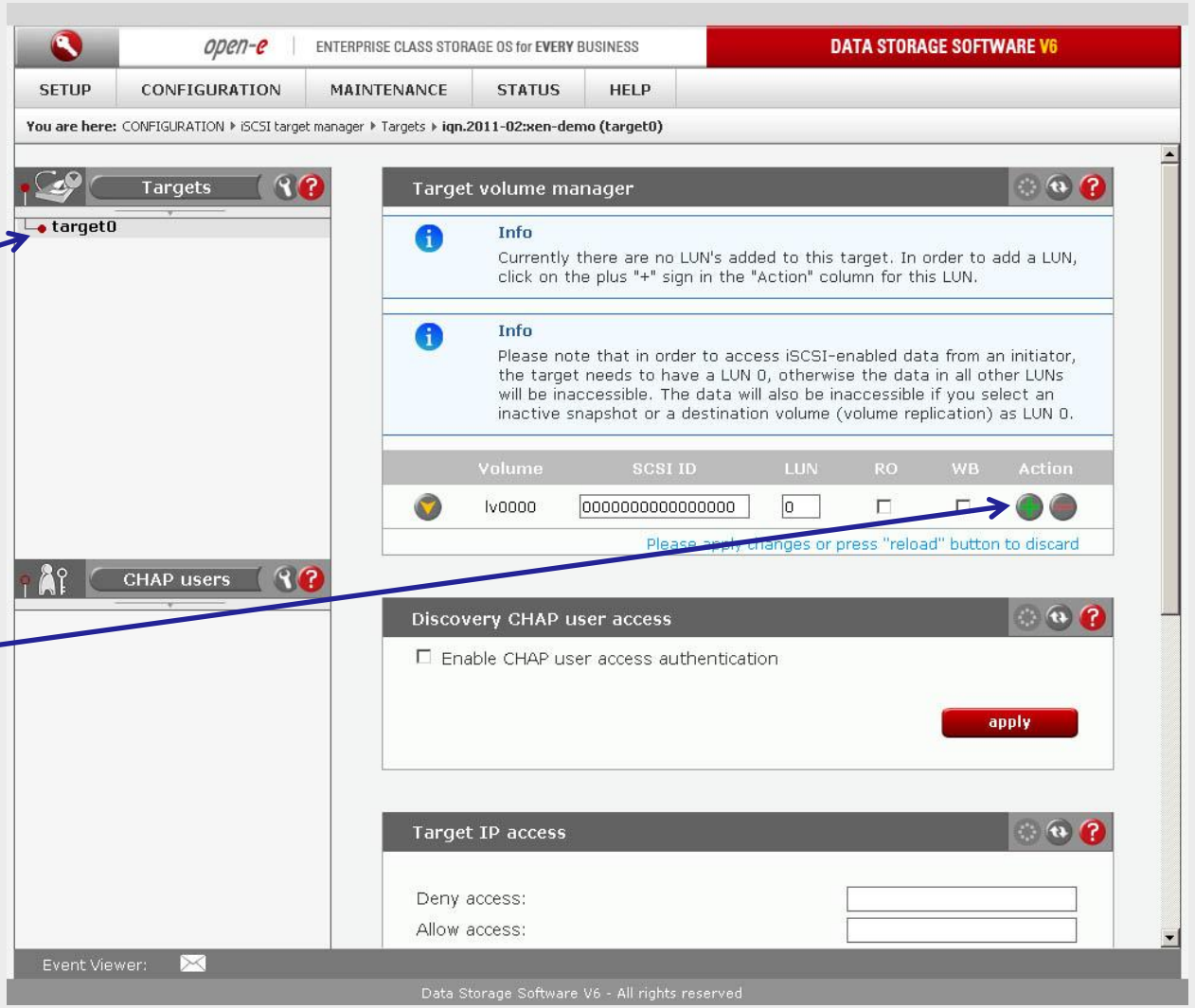
Primary node

IP Address:192.168.0.230

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 with Multipath**

Data Server (DSS1)

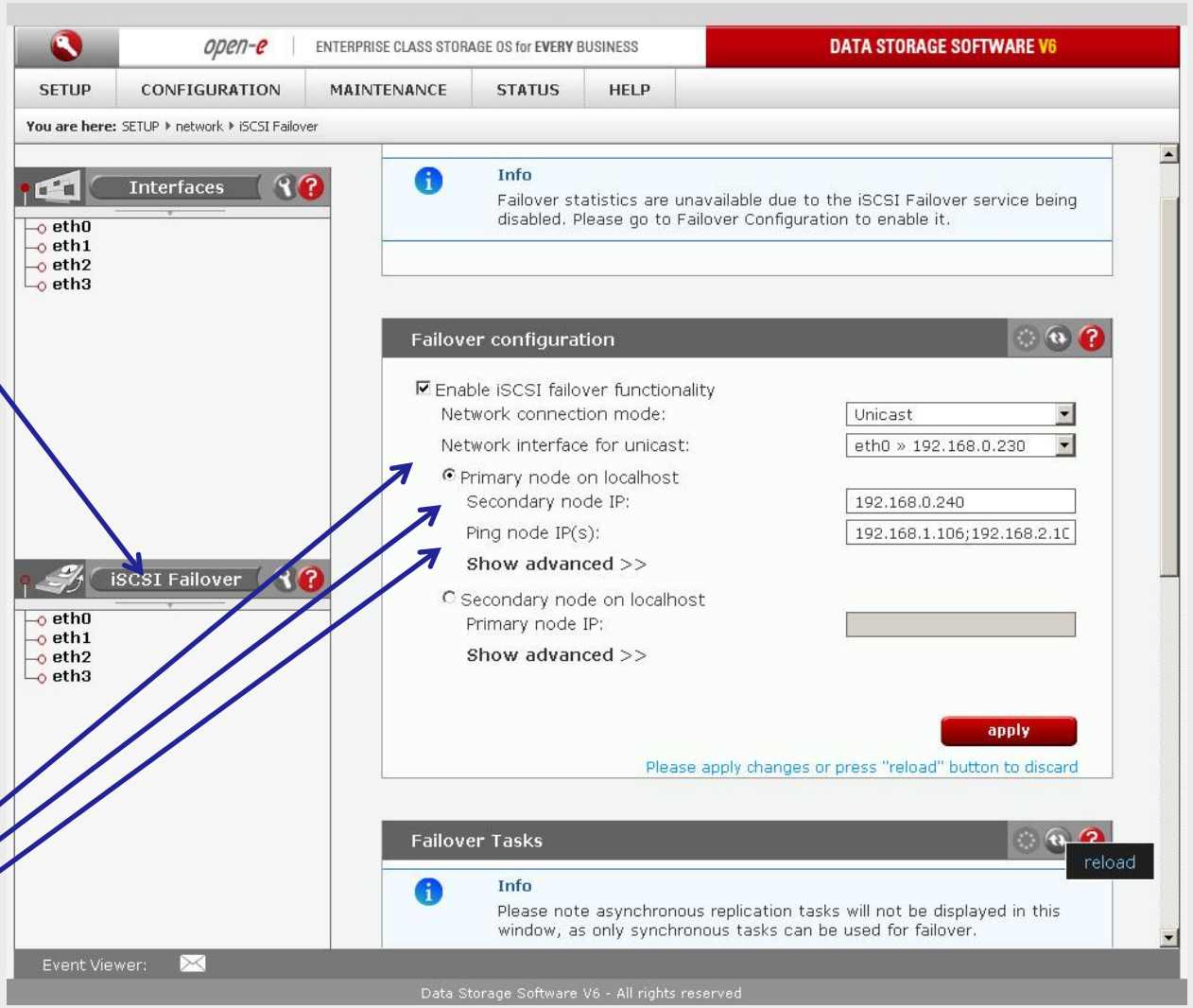
Primary node

IP Address:192.168.0.230

6. Configure iSCSI Failover

Now, select **iSCSI Failover**

In the **Failover configuration** function, check the box **Enable iSCSI failover functionality.** Select **Network connection mode** (in this example **Unicast)** and select **Network interface for unicast** (192.168.0.230). Next enter the Secondary node IP and the **Ping Node IP** (must be on the same subnet) and click the apply button.



Synchronous **Volume Replication with Failover with Multipath**

Data Server (DSS2)

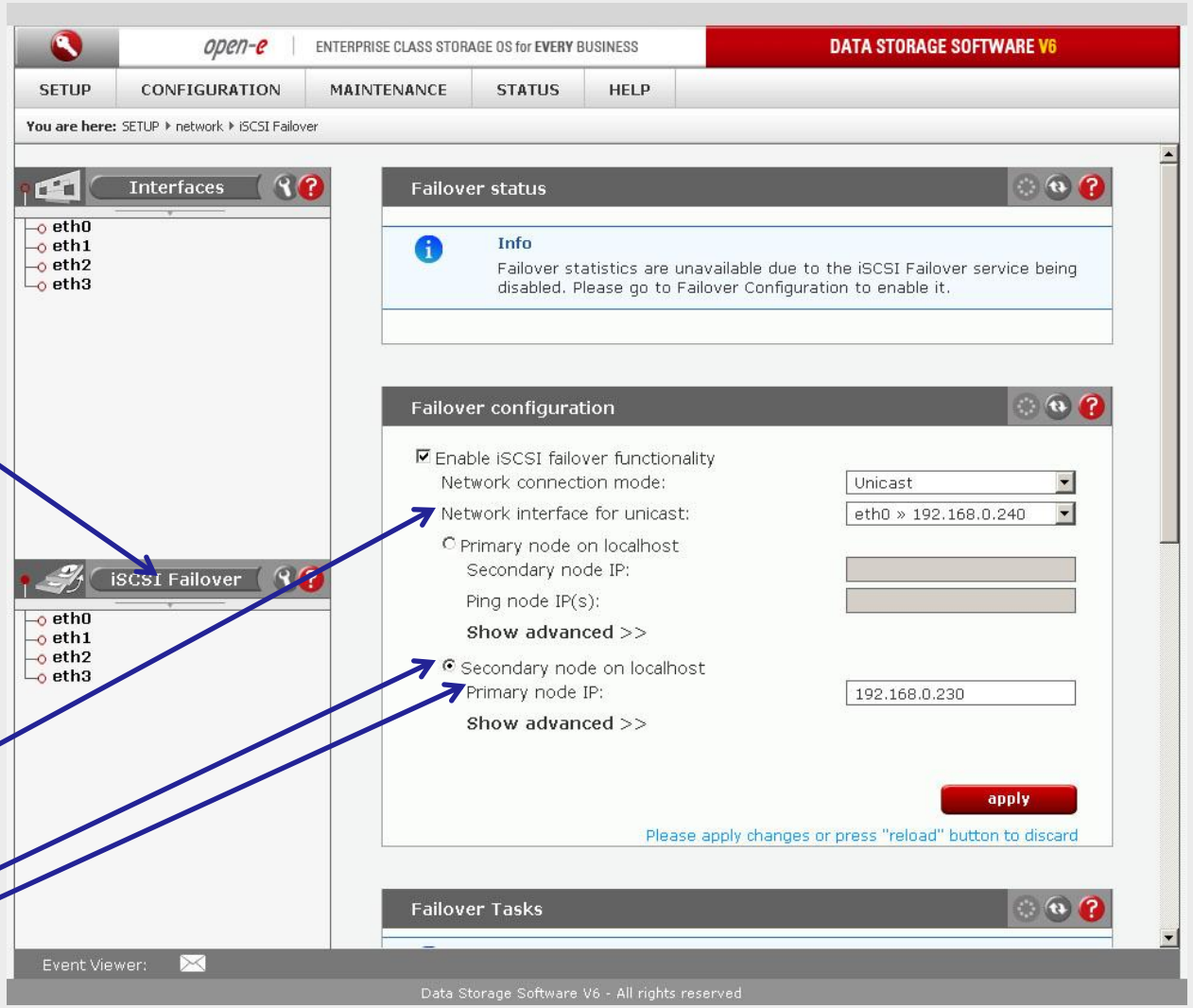
Secondary node

IP Address:192.168.0.240

6. Configure iSCSI Failover

Now, select **iSCSI Failover**

Now, in **Failover configuration** function , check the box **Enable iSCSI failover functionality.** Select **Network connection mode** (in this example **Unicast)** and select **Network interface for unicast** (bond0). After choose **Secondary node on localhost** enter **Primary node IP** address and click the **apply** button



Synchronous **Volume Replication with Failover with Multipath**

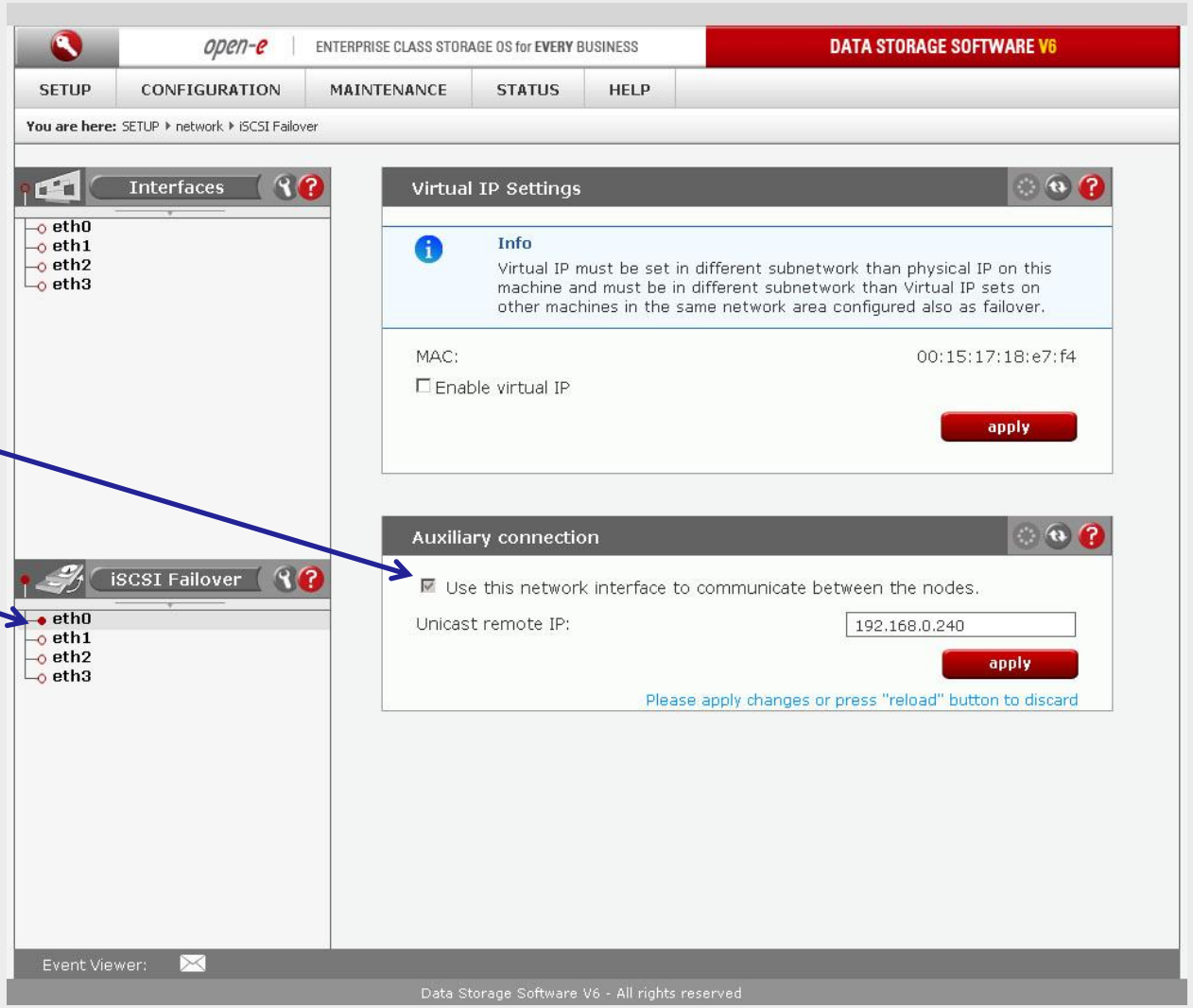
Data Server (DSS1)

Primary node

IP Address:192.168.0.230

7. Configure Virtual IP and Auxillary connection

Now, select the **eth0** within **iSCSI Failover.**
In the **Auxiliary connection** function check box **Use this network interface to communicate between the nodes** next enter IP address for **Unicast remote IP** and click the apply button.



Synchronous **Volume Replication with Failover with Multipath**

Data Server (DSS1)

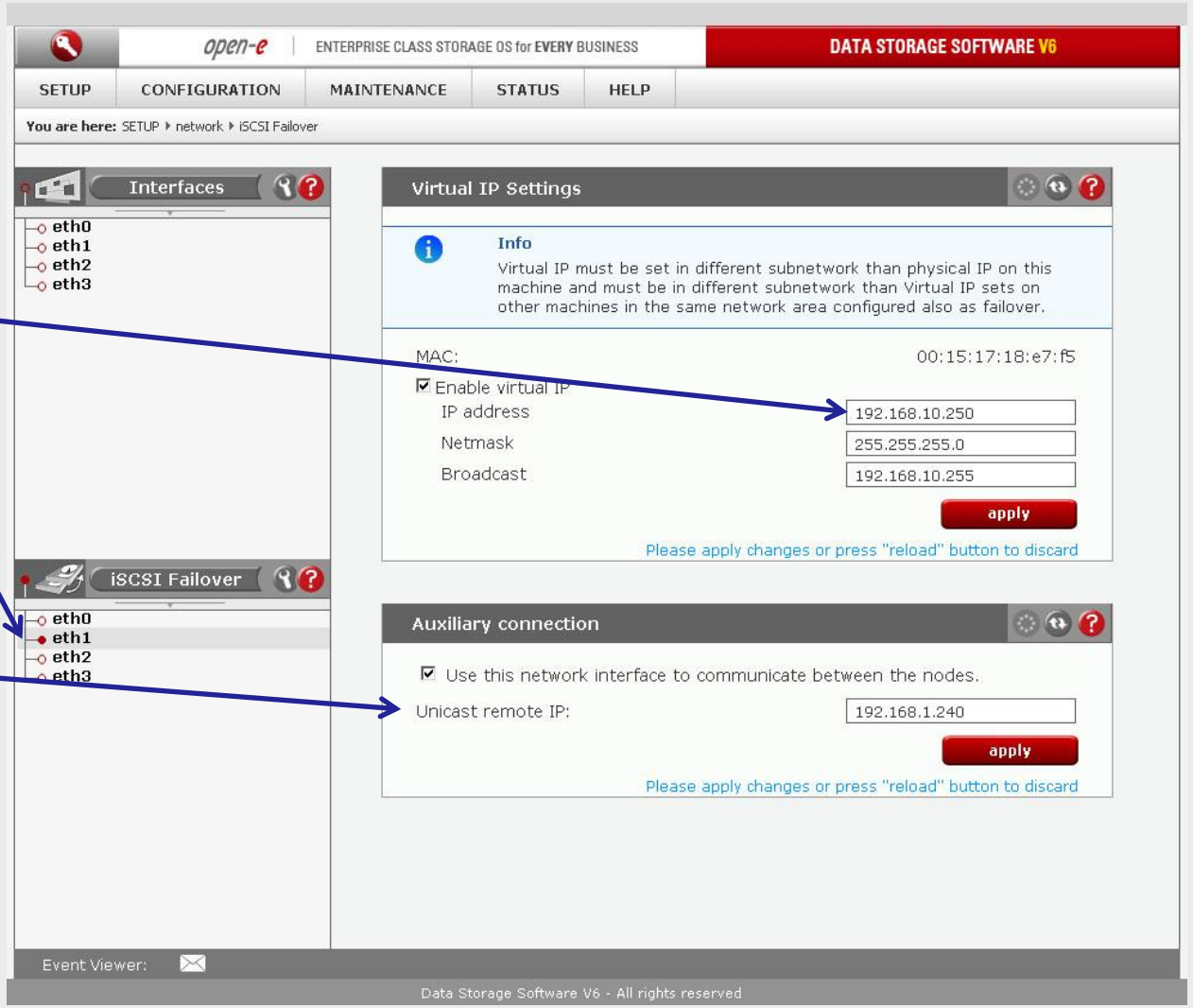
Primary node

IP Address:192.168.0.230

7. Configure Virtual IP and Auxillary connection

Now, select the **eth1** 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.

By setting the address of the secondary node in a **Failover configuration**, automatic detection of the interface for communication. This step is necessary to complement the destination IP address used in unicast.



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 with Multipath**

Data Server (DSS1)

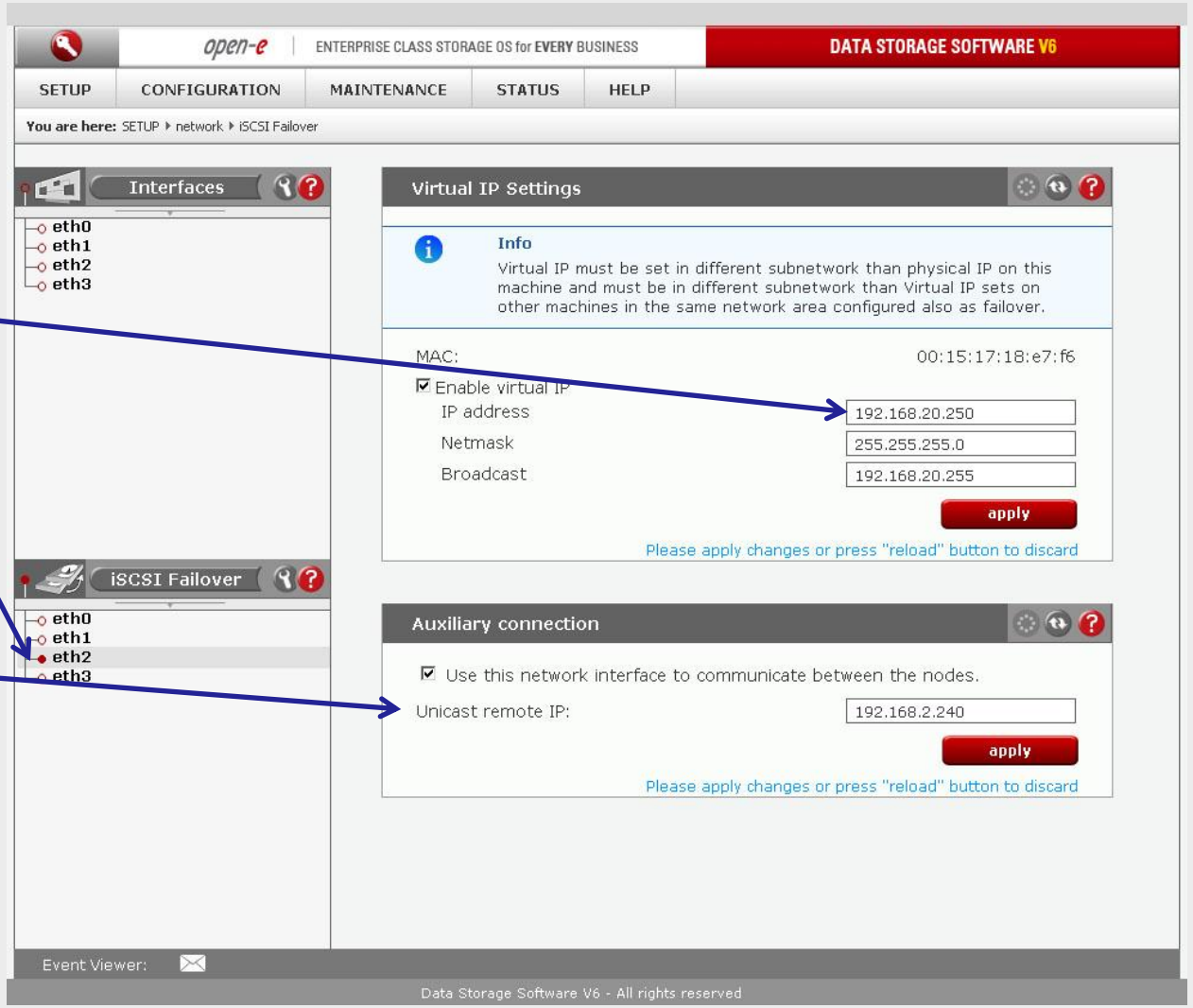
Primary node

IP Address:192.168.0.230

7. Configure Virtual IP and Auxillary connection

Now, select the **eth2** 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.

By setting the address of the secondary node in a **Failover configuration**, automatic detection of the interface for communication. This step is necessary to complement the destination IP address used in unicast.



Synchronous **Volume Replication with Failover with Multipath**

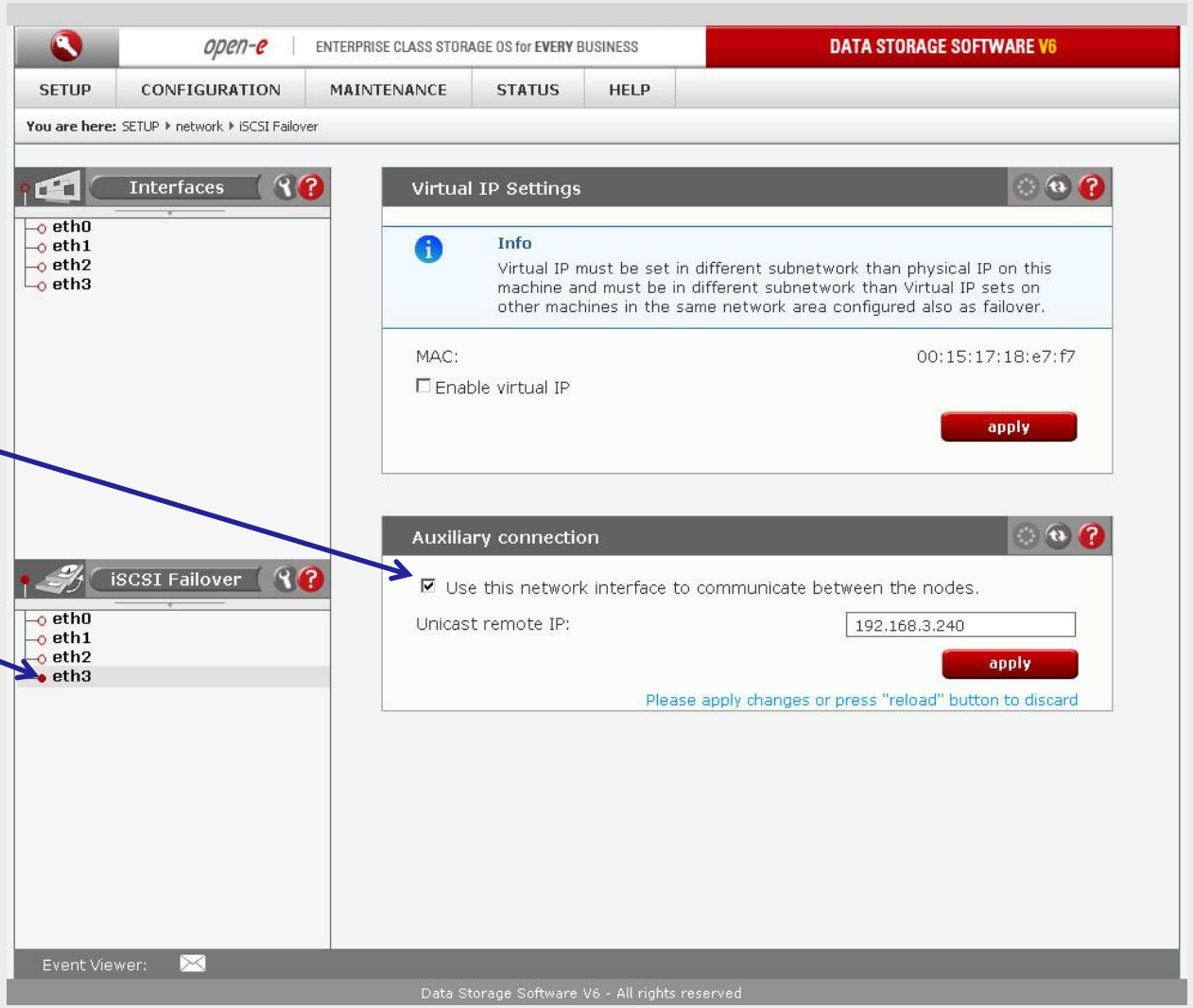
Data Server (DSS1)

Primary node

IP Address:192.168.0.230

7. Configure Virtual IP and Auxillary connection

Now, select the **eth3** within **iSCSI Failover.**
In the **Auxiliary connection** function check box **Use this network interface to communicate between the nodes** next enter IP address for **Unicast remote IP** and click the apply button.



Synchronous **Volume Replication with Failover with Multipath**

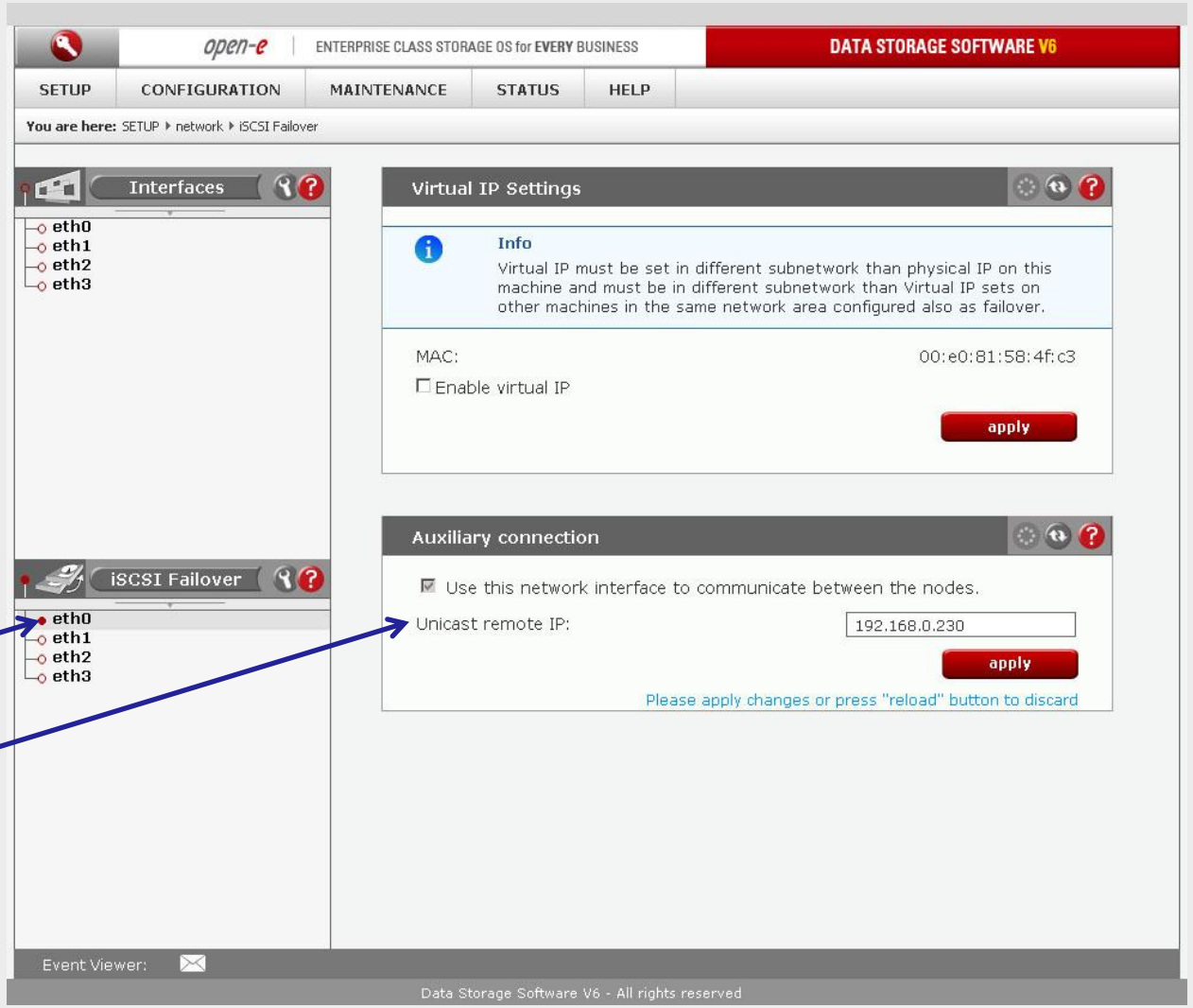
Data Server (DSS2)

Secondary node

IP Address:192.168.0.240

7. Configure Virtual IP and Auxillary connection

Now, select the **eth0** within **iSCSI Failover.**
In the **Auxiliary connection** function enter IP address for **Unicast remote IP** and click the apply button.



Synchronous **Volume Replication with Failover with Multipath**

Data Server (DSS2)

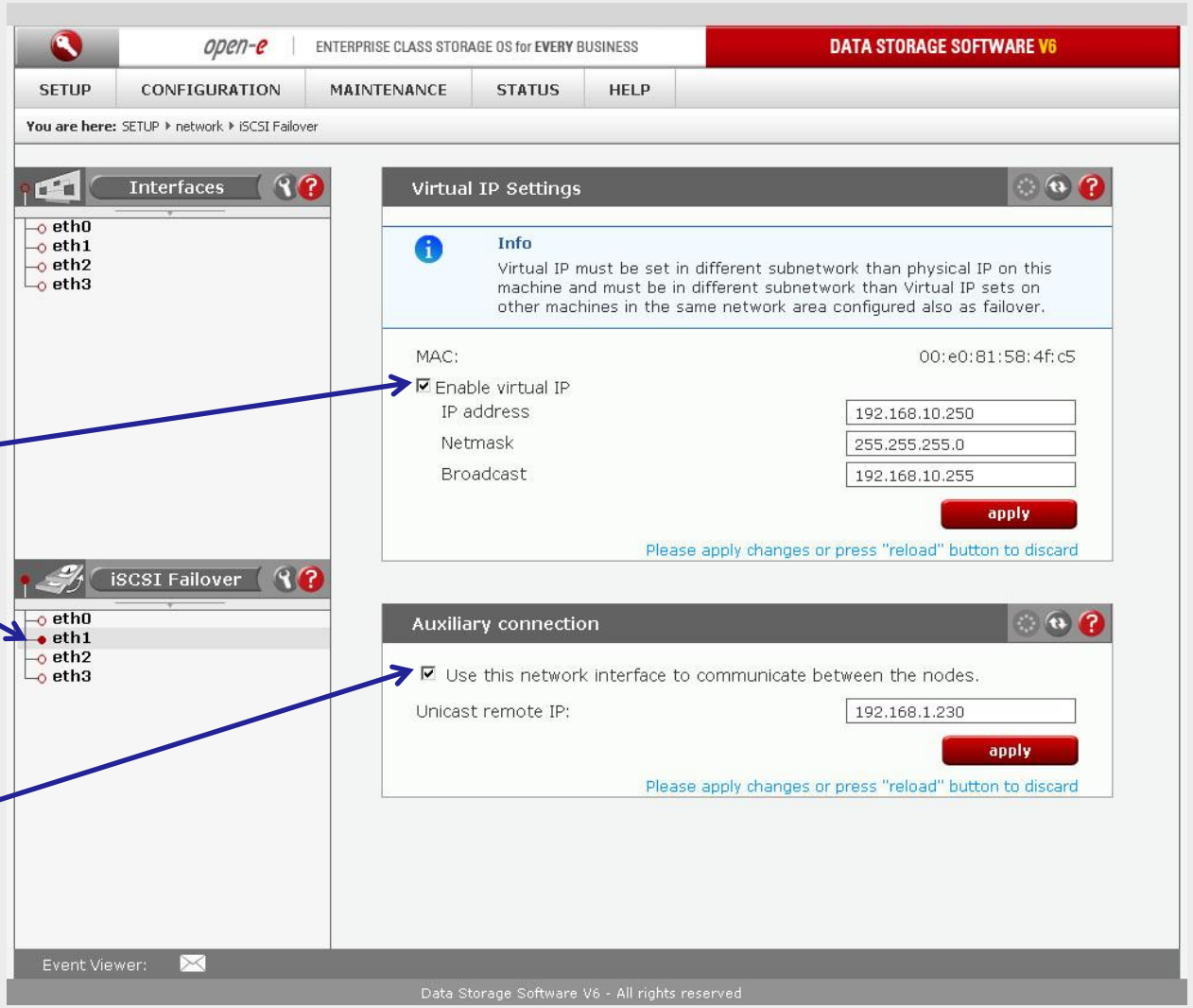
Secondary node

IP Address:192.168.0.240

7. Configure Virtual IP and Auxillary connection

Now, select the **eth1** 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.

By setting the address of the primary node in a **Failover configuration**, automatic detection of the interface for communication. This step is necessary to complement the destination IP address used in unicast.



Synchronous **Volume Replication with Failover with Multipath**

Data Server (DSS2)

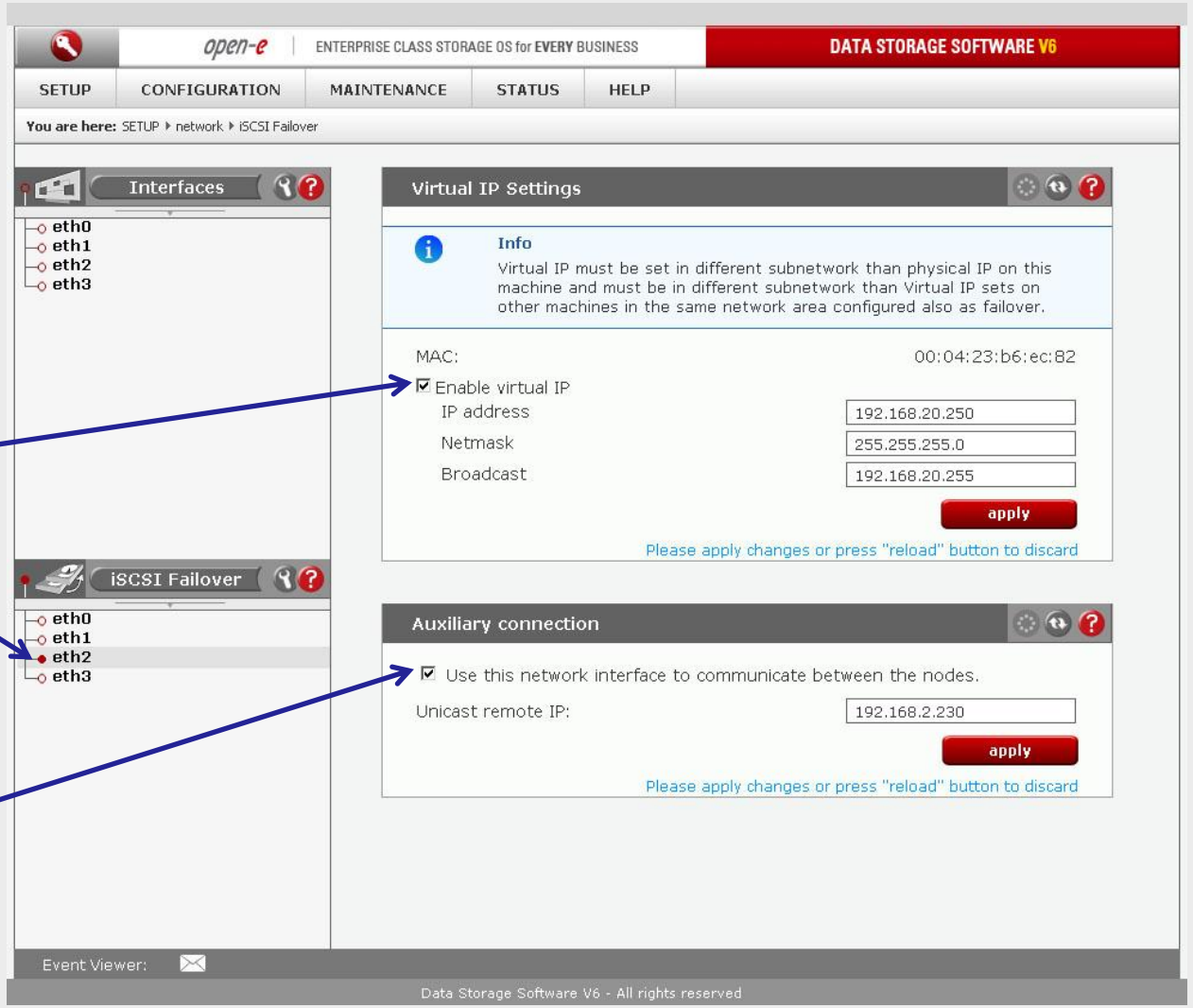
Secondary node

IP Address:192.168.0.240

7. Configure Virtual IP and Auxillary connection

Next, select the **eth2** 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.

By setting the address of the primary node in a **Failover configuration**, automatic detection of the interface for communication. This step is necessary to complement the destination IP address used in unicast.



Synchronous **Volume Replication with Failover with Multipath**

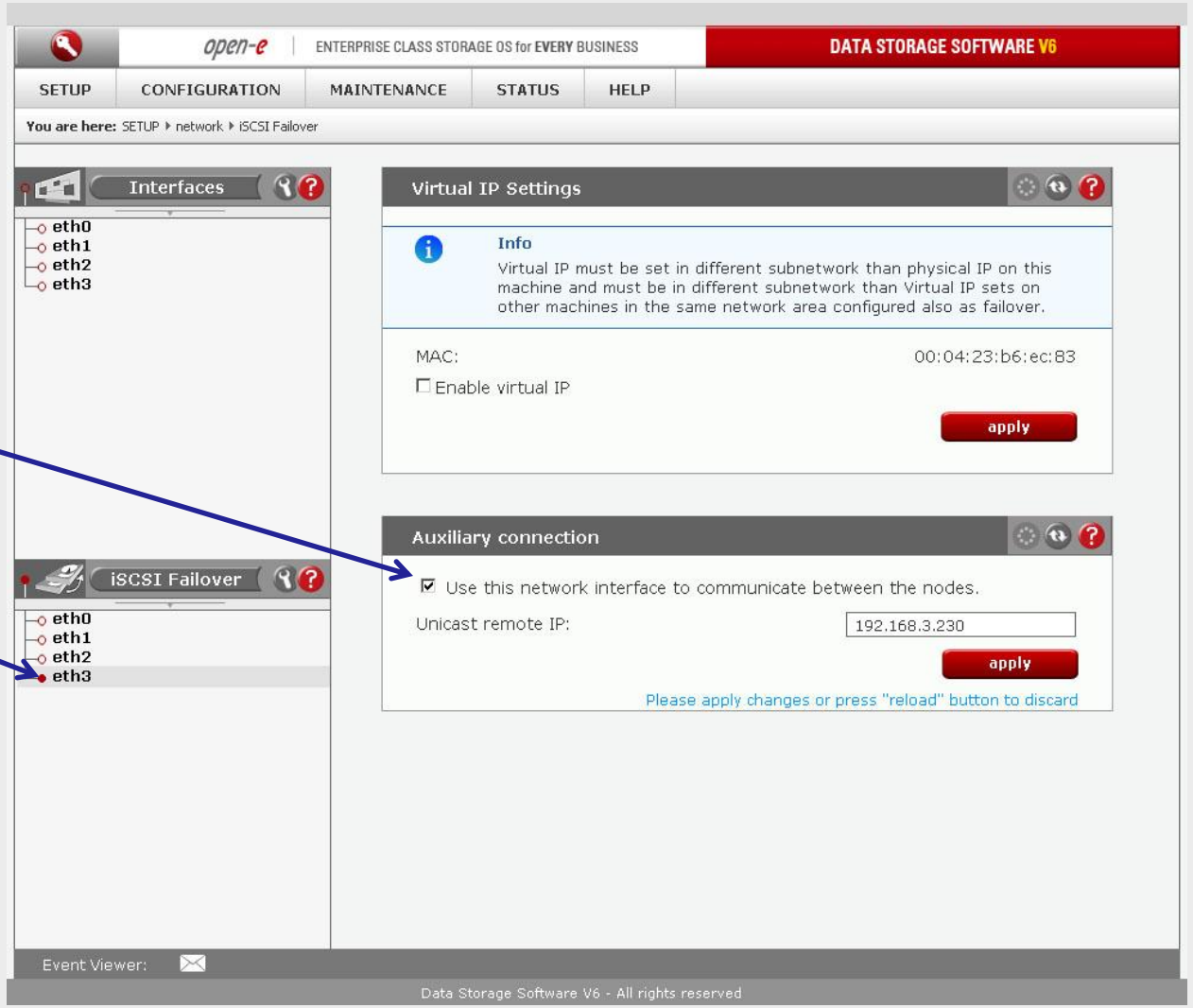
Data Server (DSS2)

Secondary node

IP Address:192.168.0.240

7. Configure Virtual IP and Auxillary connection

Now, select the **eth3** within **iSCSI Failover.**
In the **Auxiliary connection** function check box **Use this network interface to communicate between the nodes** next enter IP address for **Unicast remote IP** and click the apply button.



Synchronous **Volume Replication with Failover with Multipath**

Data Server (DSS1)

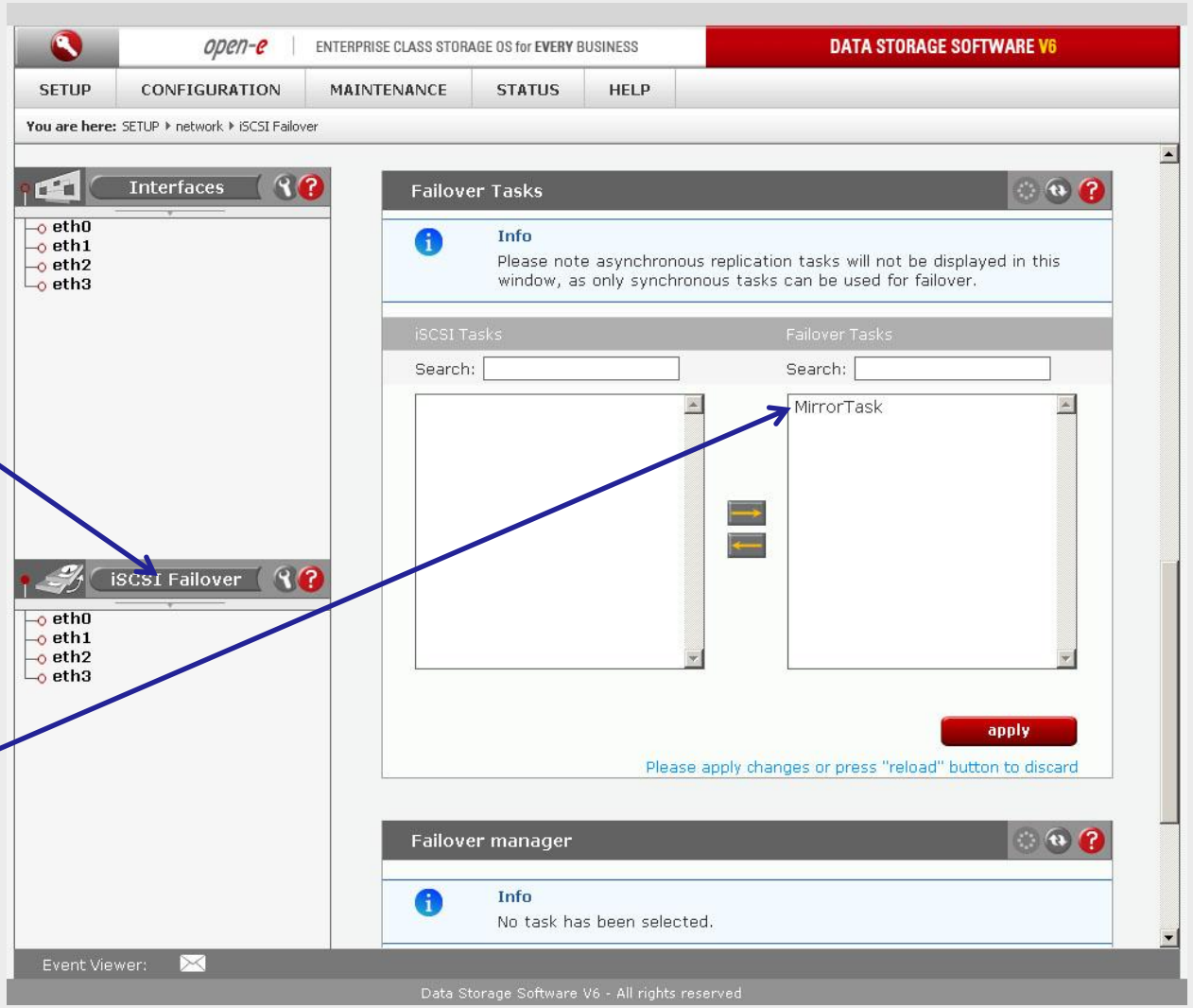
Primary node

IP Address:192.168.0.230

8. Start Failover Service

Next, select **iSCSI Failover**

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



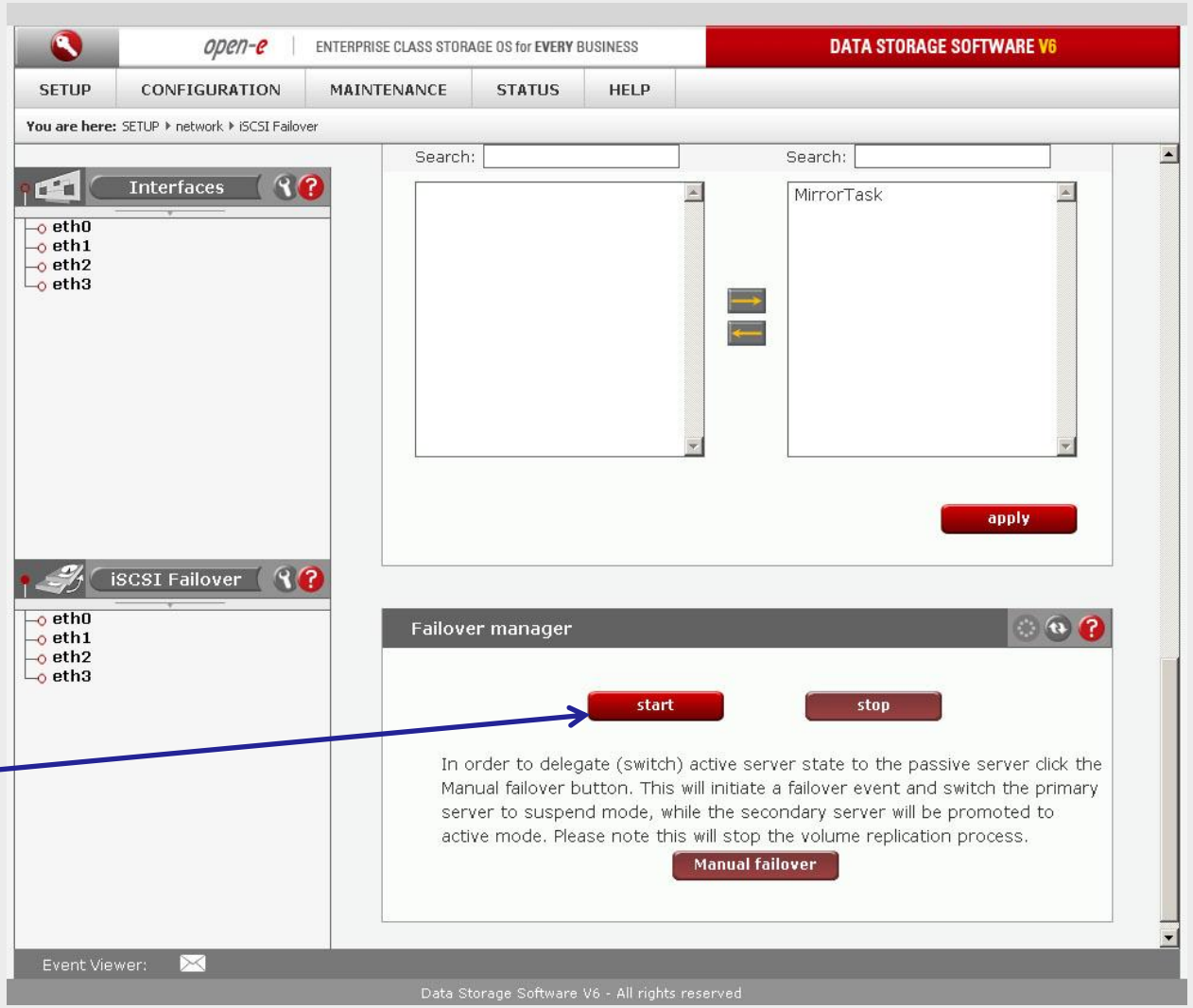
Synchronous **Volume Replication with Failover with Multipath**

Data Server (DSS1)

Primary node

IP Address:192.168.0.230

8. Start Failover Service



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

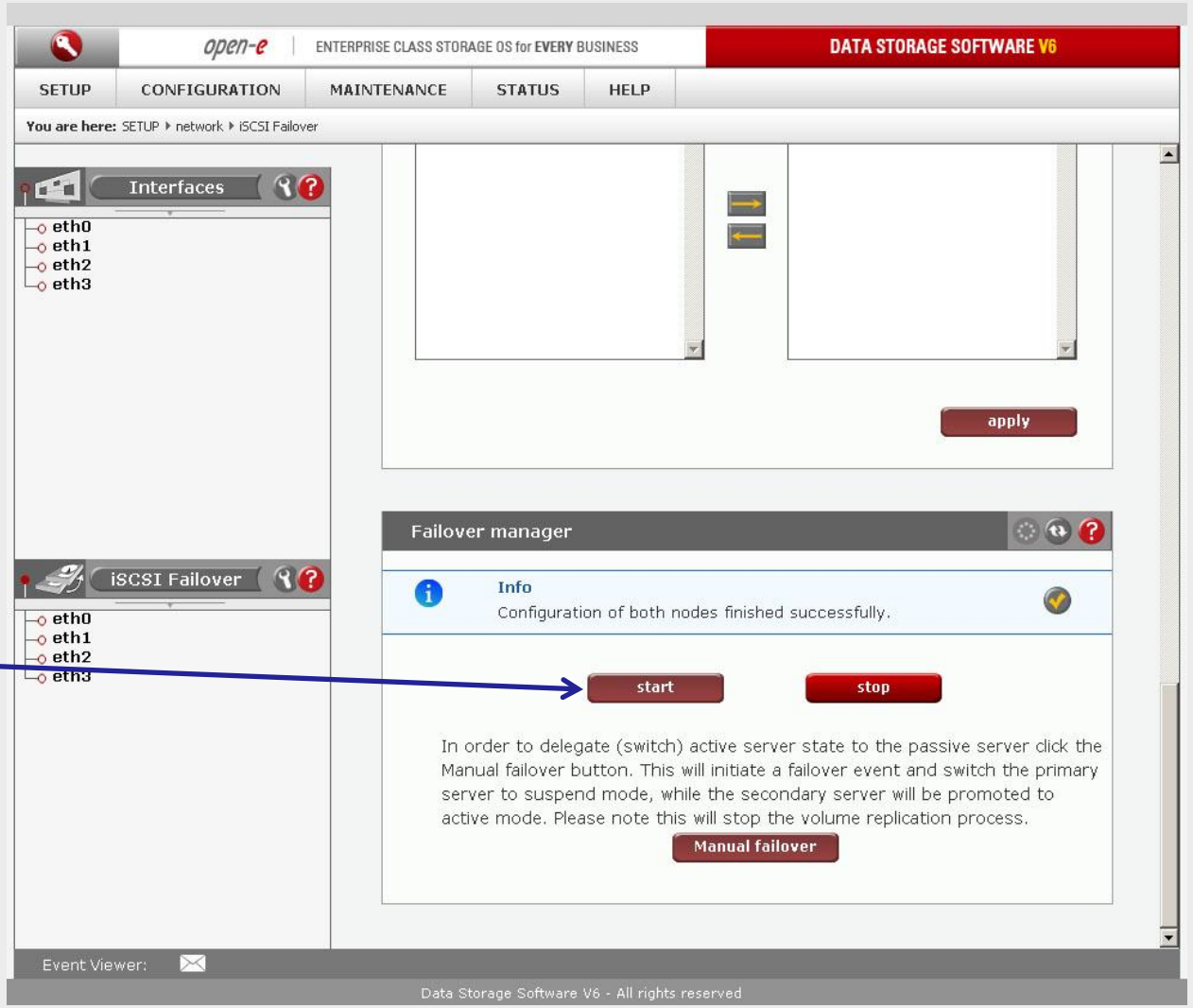
Synchronous **Volume Replication with Failover with Multipath**

Data Server (DSS1)

Primary node

IP Address:192.168.0.230

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. 192.168.10.250 (For example, in a Microsoft Windows environment, download Microsoft iSCSI Initiator ver 2.0 or later).

Synchronous **Volume Replication with Failover with Multipath**

Data Server (DSS1)

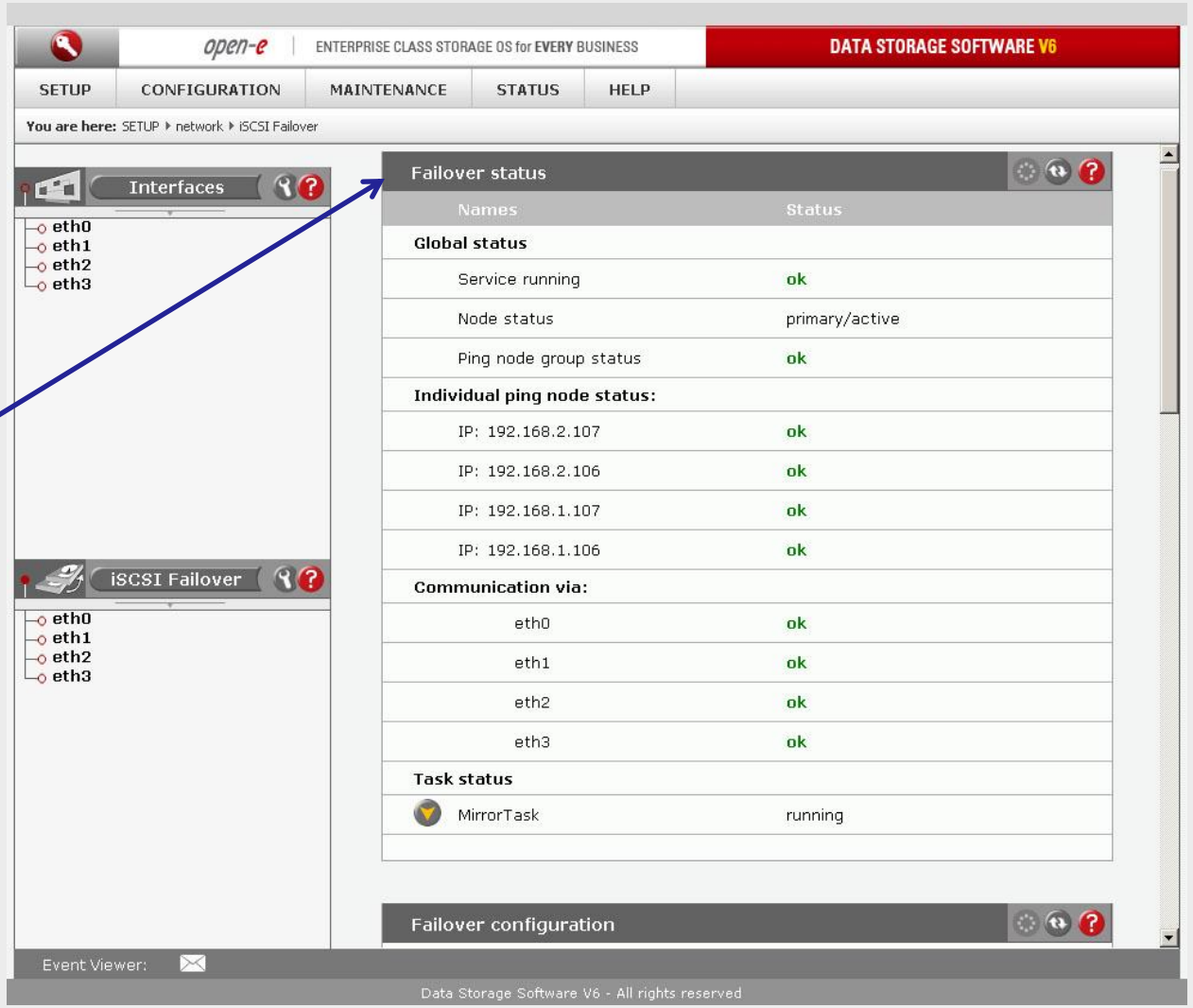
Primary node

IP Address:192.168.0.230

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



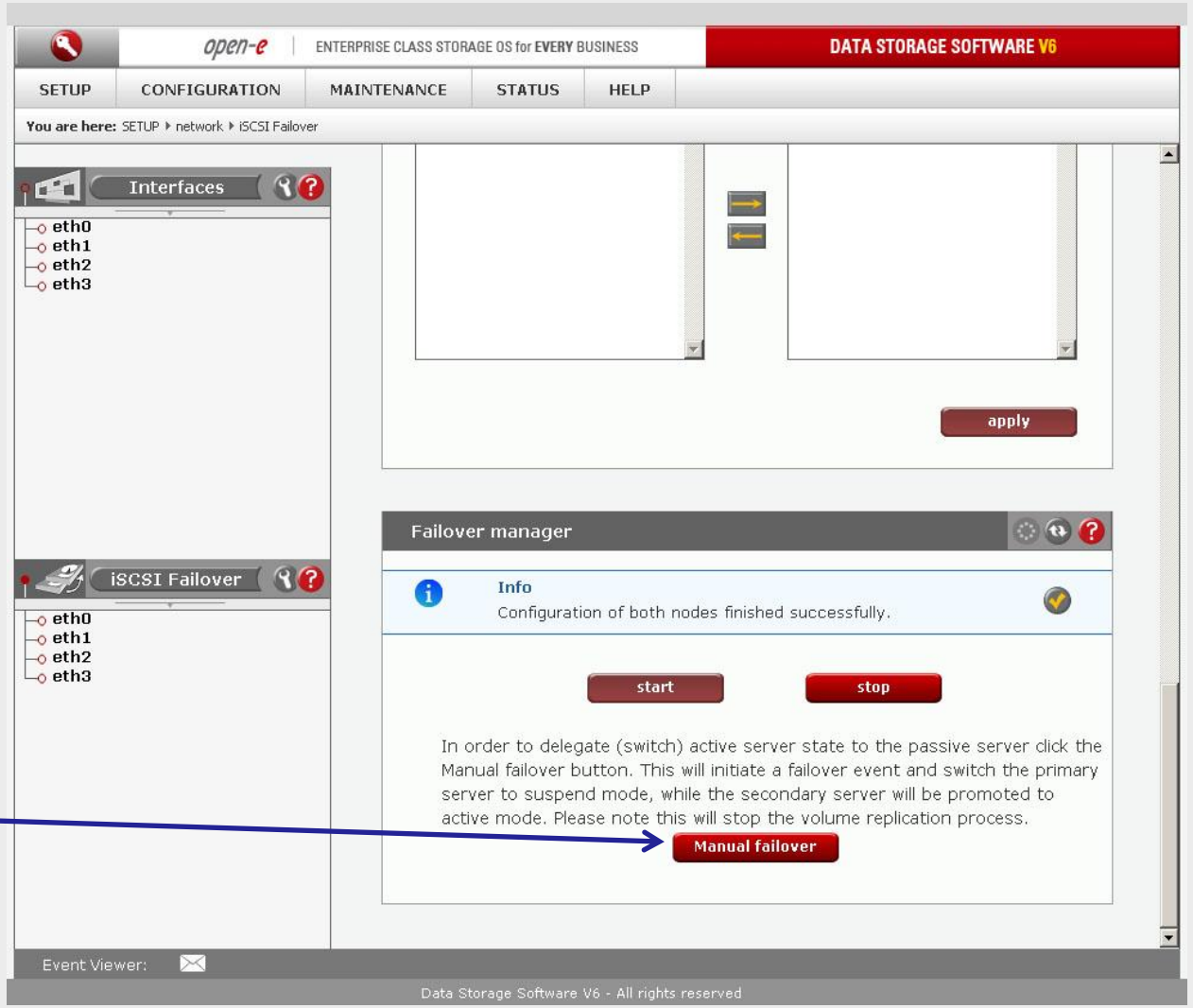
Synchronous **Volume Replication with Failover with Multipath**

Data Server (DSS1)

Primary node

IP Address:192.168.0.230

9. Test Failover Function



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

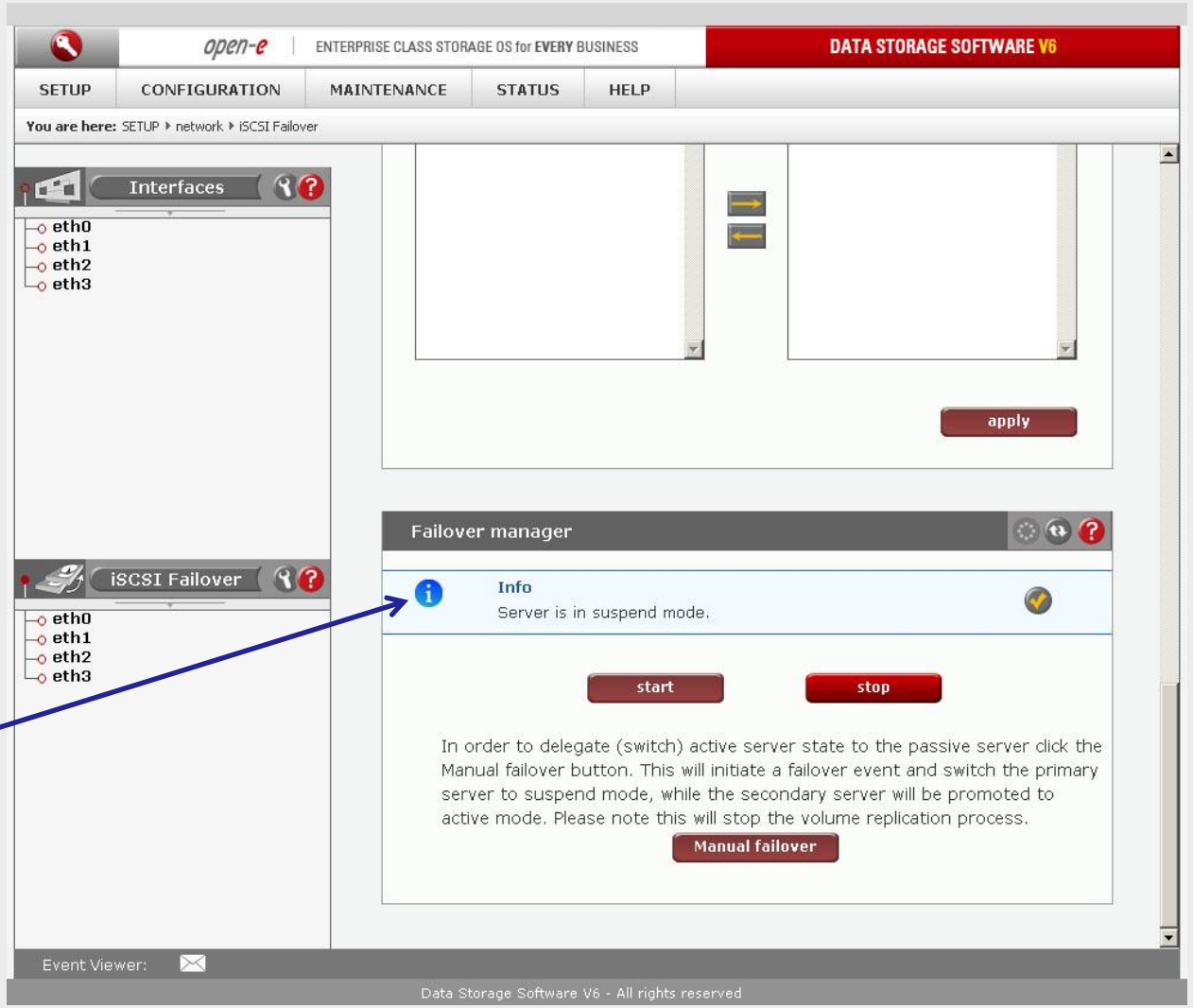
Synchronous **Volume Replication with Failover with Multipath**

Data Server (DSS1)

Primary node

IP Address:192.168.0.230

9. Test Failover Function



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

Synchronous **Volume Replication with Failover with Multipath**

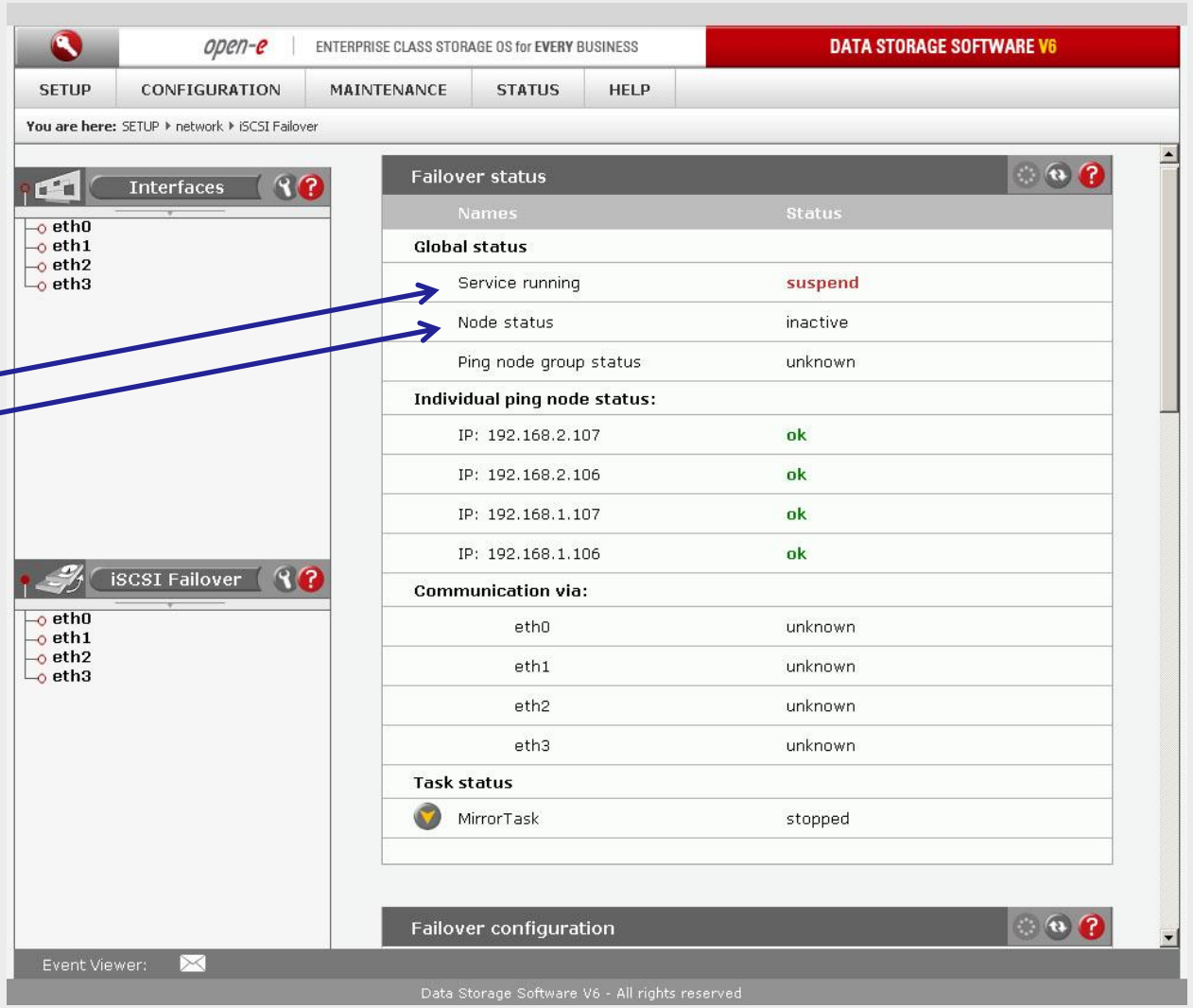
Data Server (DSS1)

Primary node

IP Address:192.168.0.230

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 with Multipath**

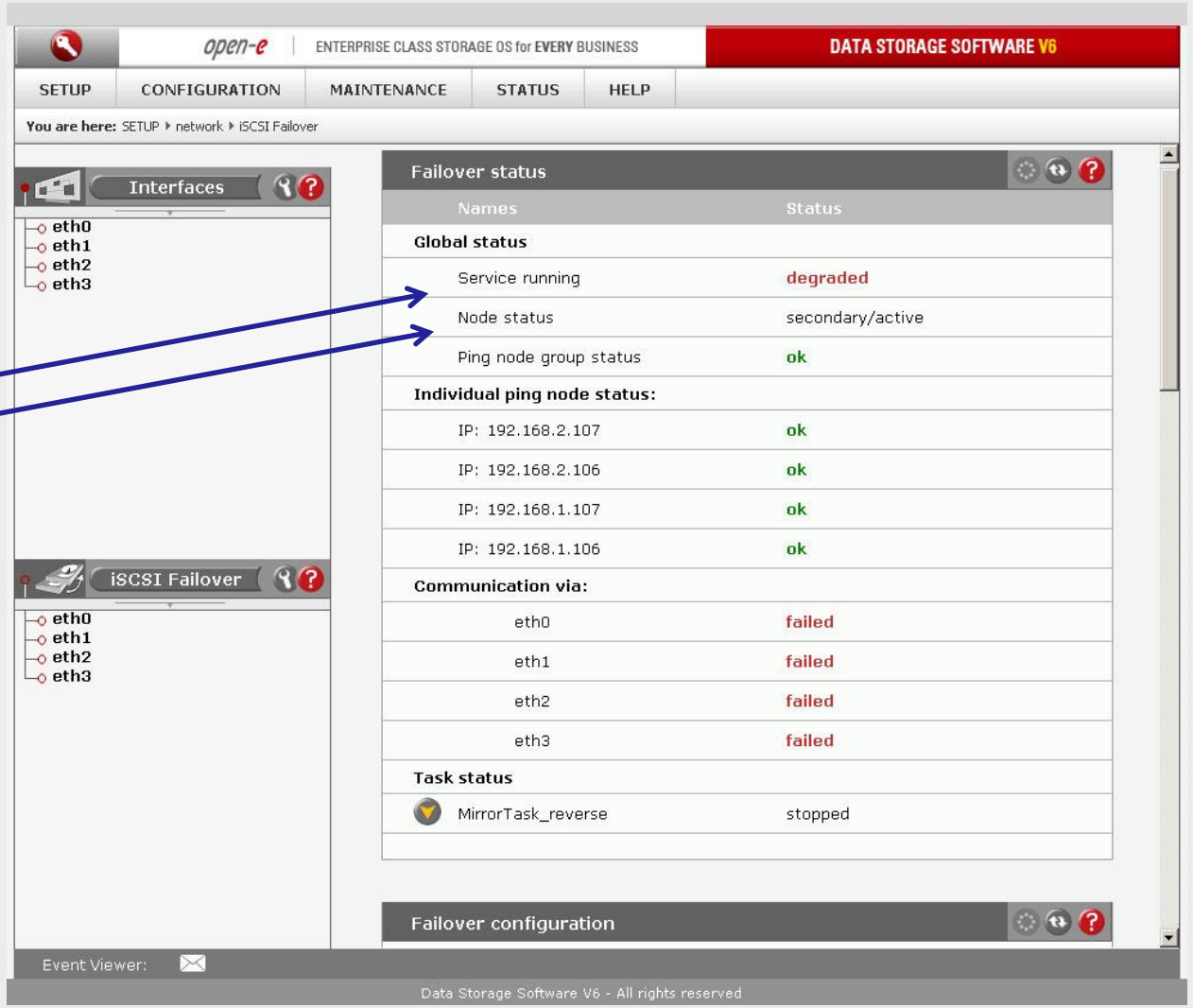
Data Server (DSS2)

Secondary node

IP Address:192.168.0.240

9. Test Failover Function

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



Synchronous **Volume Replication with Failover with Multipath**

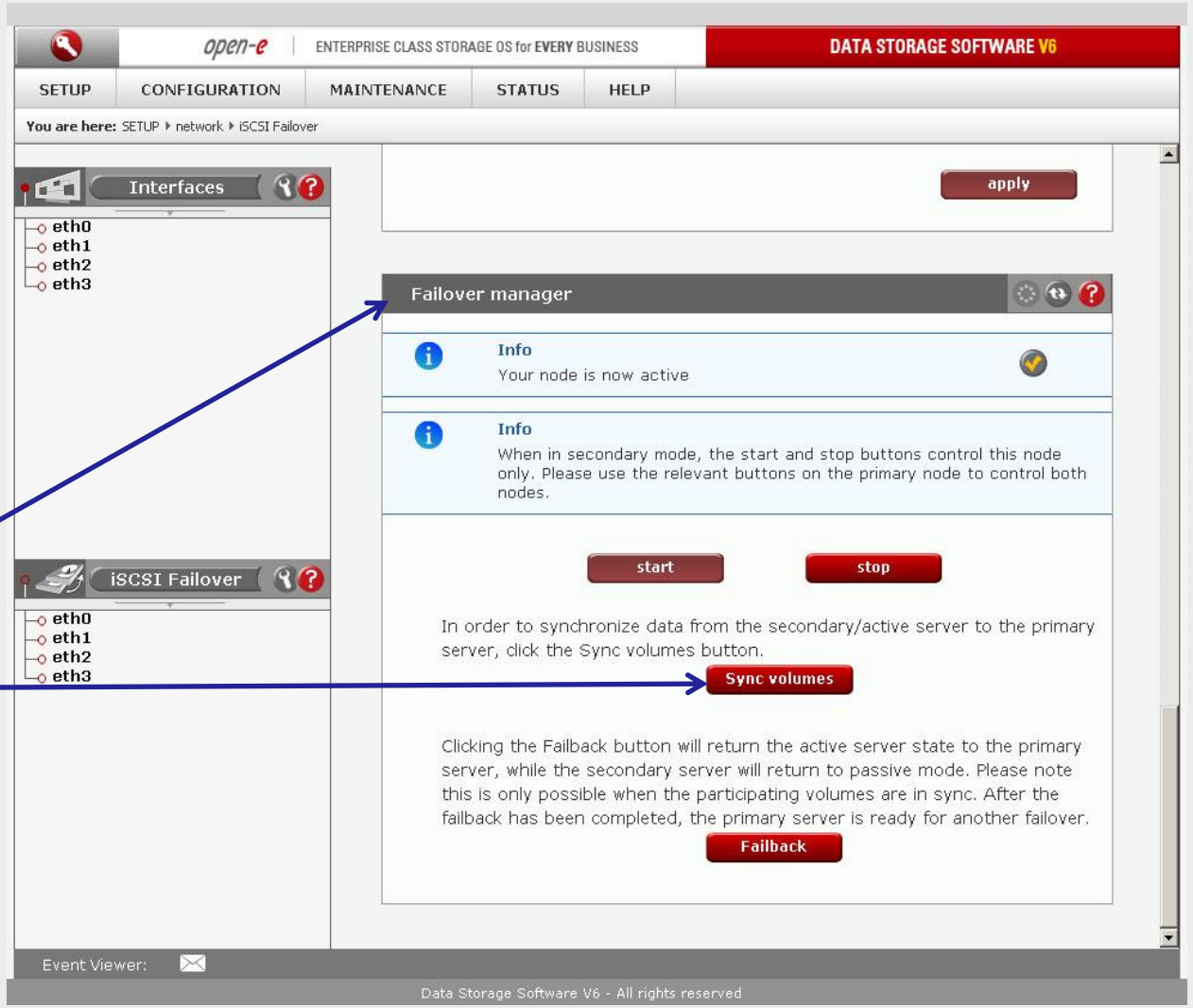
Data Server (DSS2)

Secondary node

IP Address:192.168.0.240

10. Run Failback Function

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



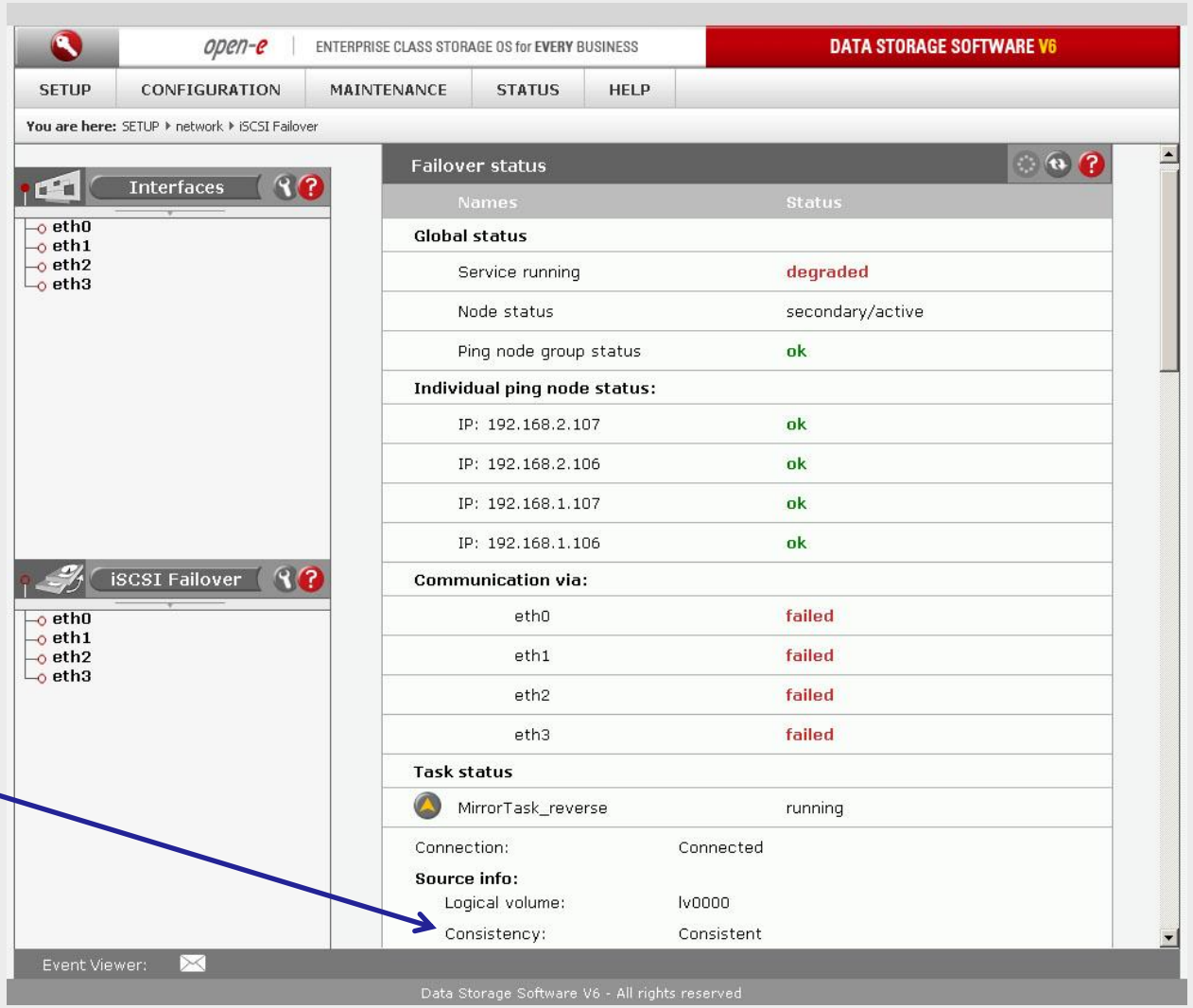
Synchronous **Volume Replication with Failover with Multipath**

Data Server (DSS2)

Secondary node

IP Address:192.168.0.240

10. Run Failback Function



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

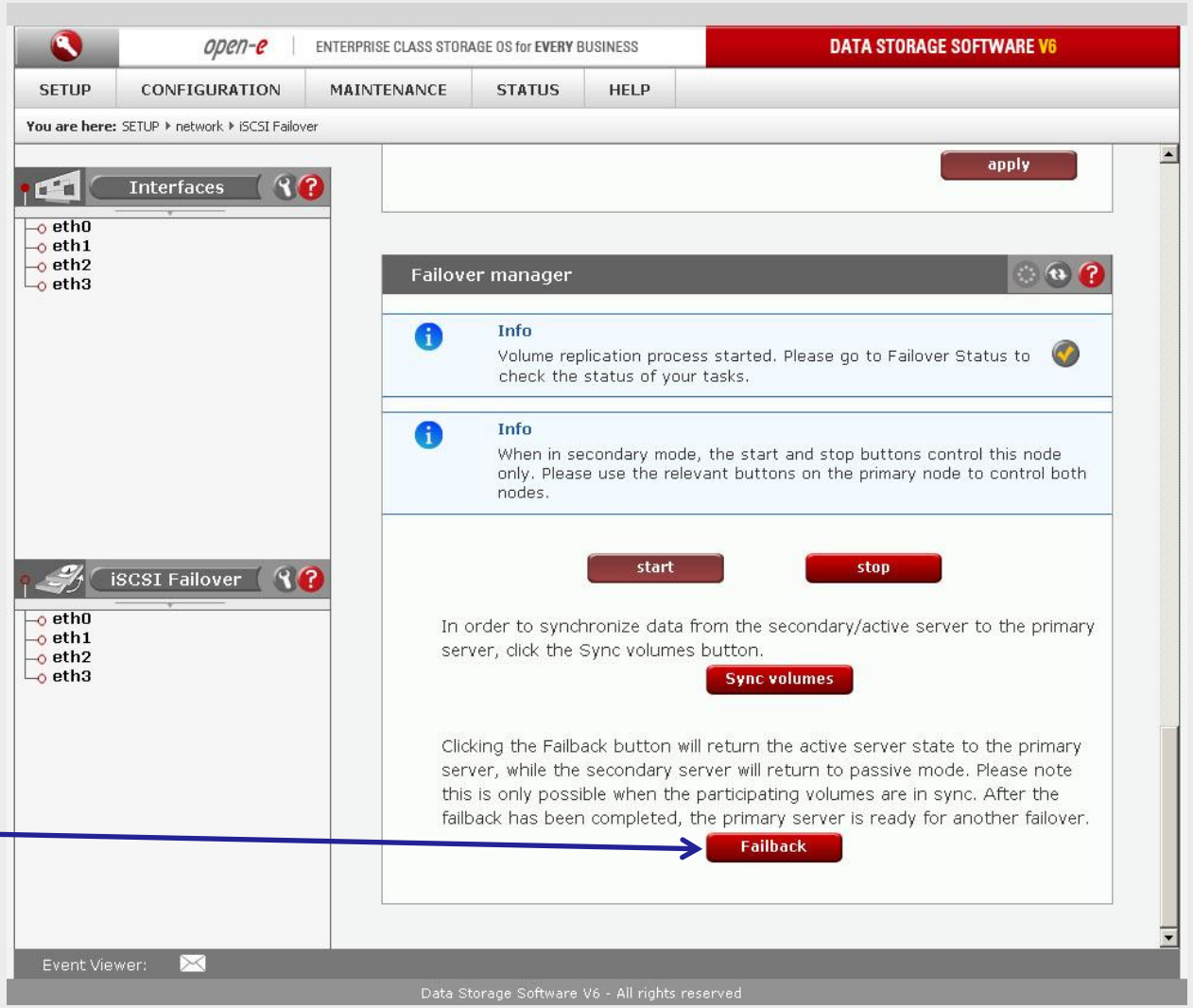
Synchronous **Volume Replication with Failover with Multipath**

Data Server (DSS2)

Secondary node

IP Address: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 with Multipath**

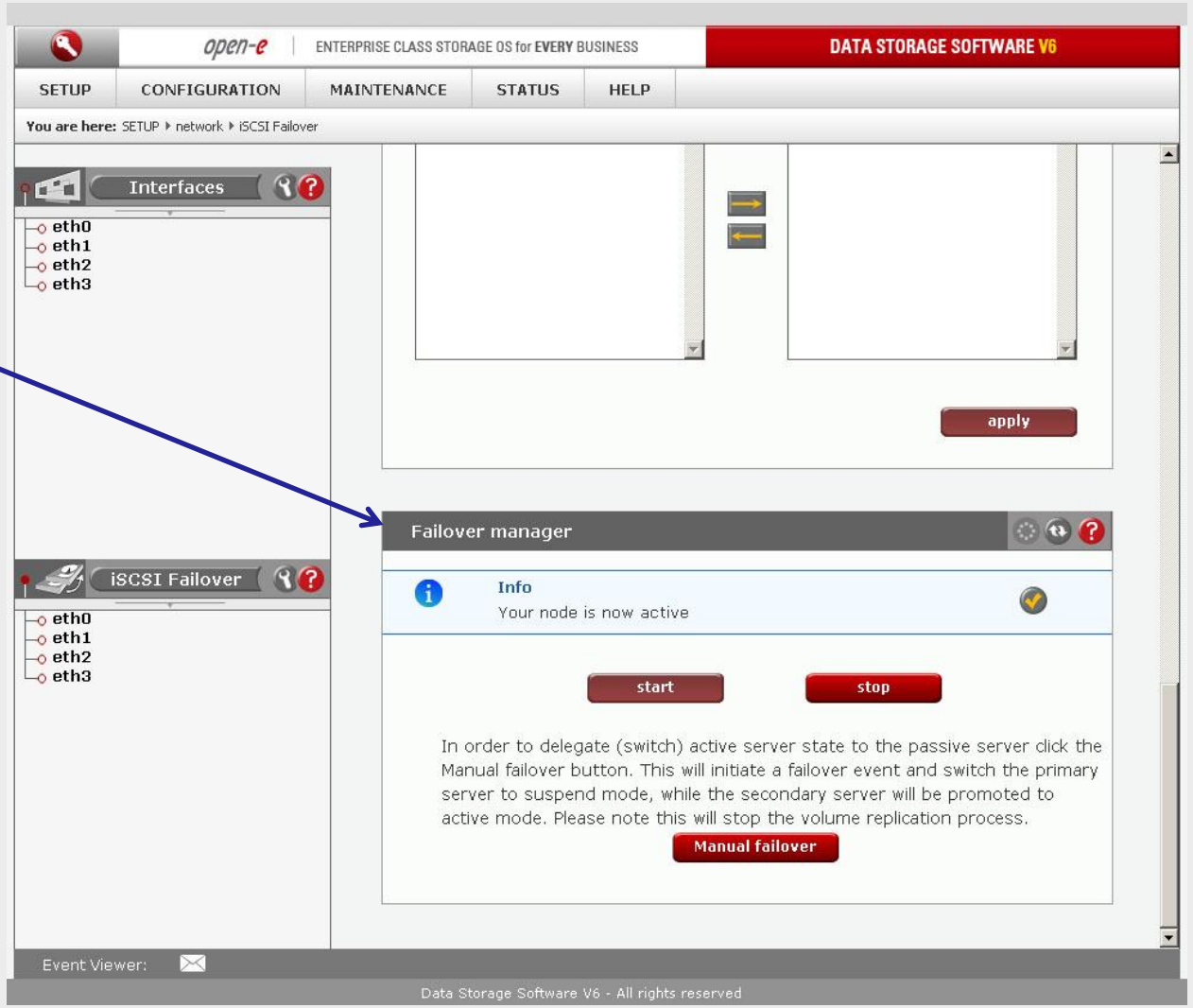
Data Server (DSS1)

Primary node

IP Address:192.168.0.230

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 with Multipath**

Data Server (DSS1)

Primary node

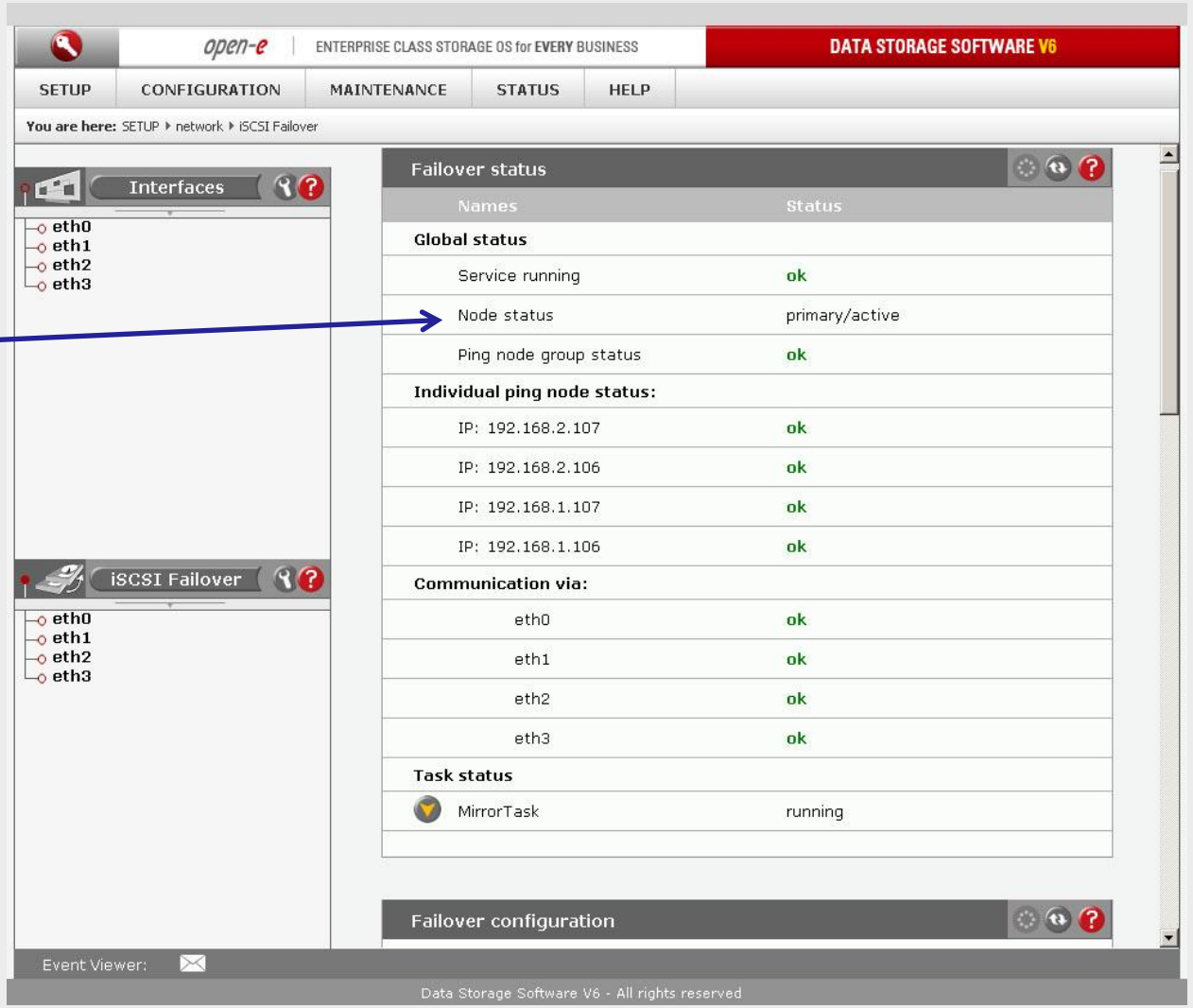
IP Address:192.168.0.230

10. Run Failback Function

Primary node is active again and ready for Failover.

iSCSI Failover/Volume Replication

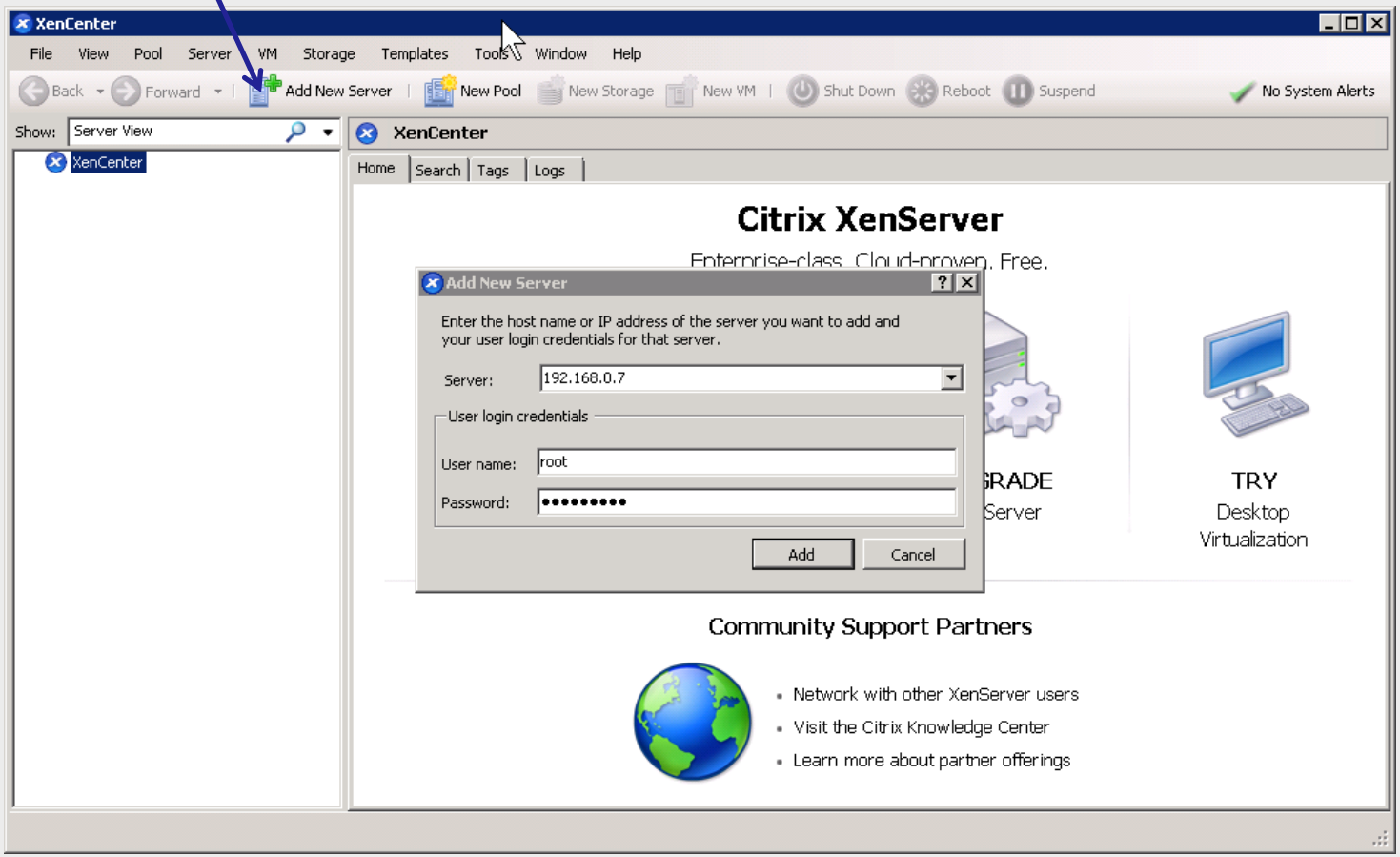
The configuration and testing of iSCSI Failover/Failback is now finished.



Configure MPIO on XenServer

Navigate in the XenCenter and click on **„Add New Server"**.

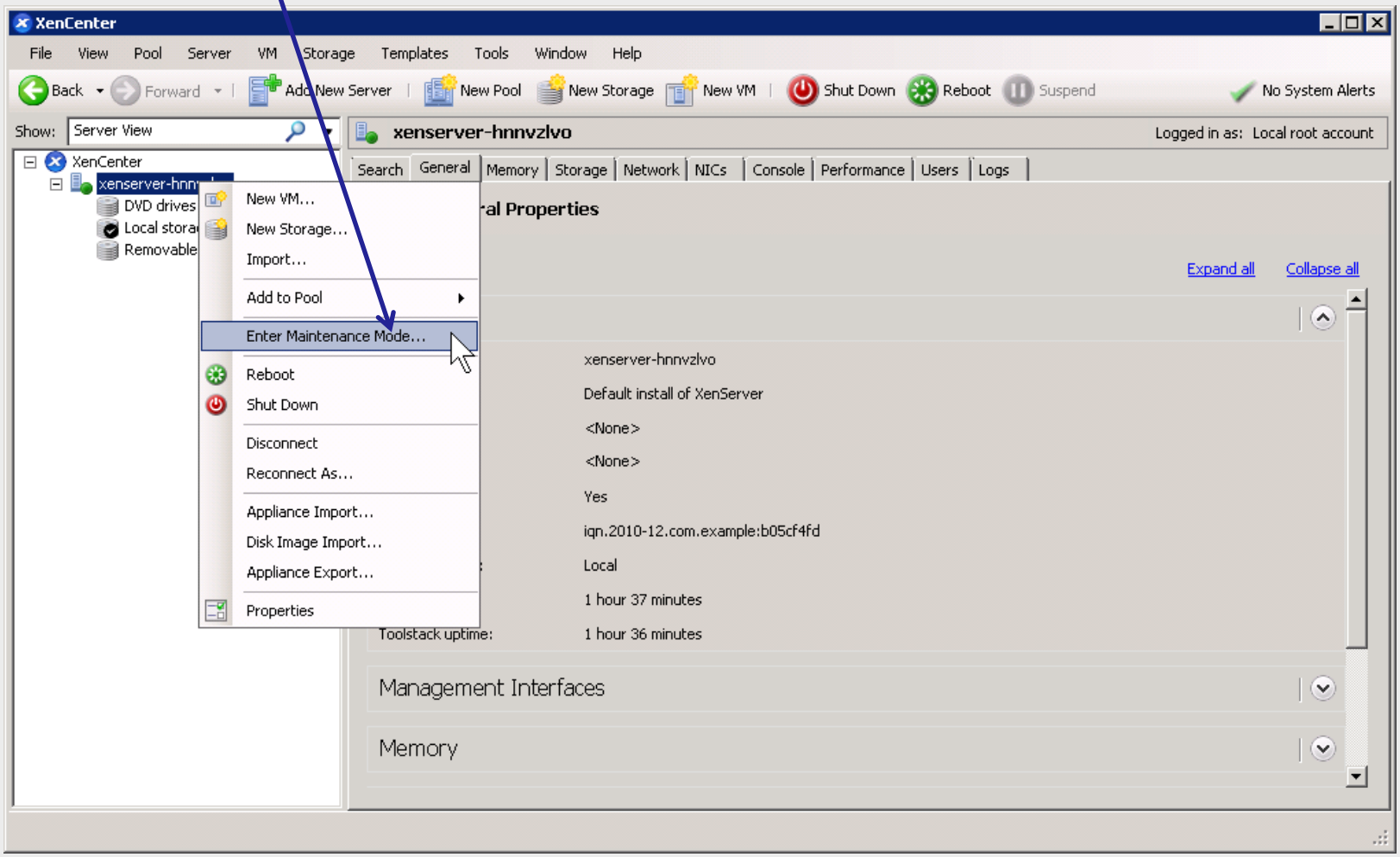
Step 1



Configure MPIO on XenServer

Enter Maintenance Mode

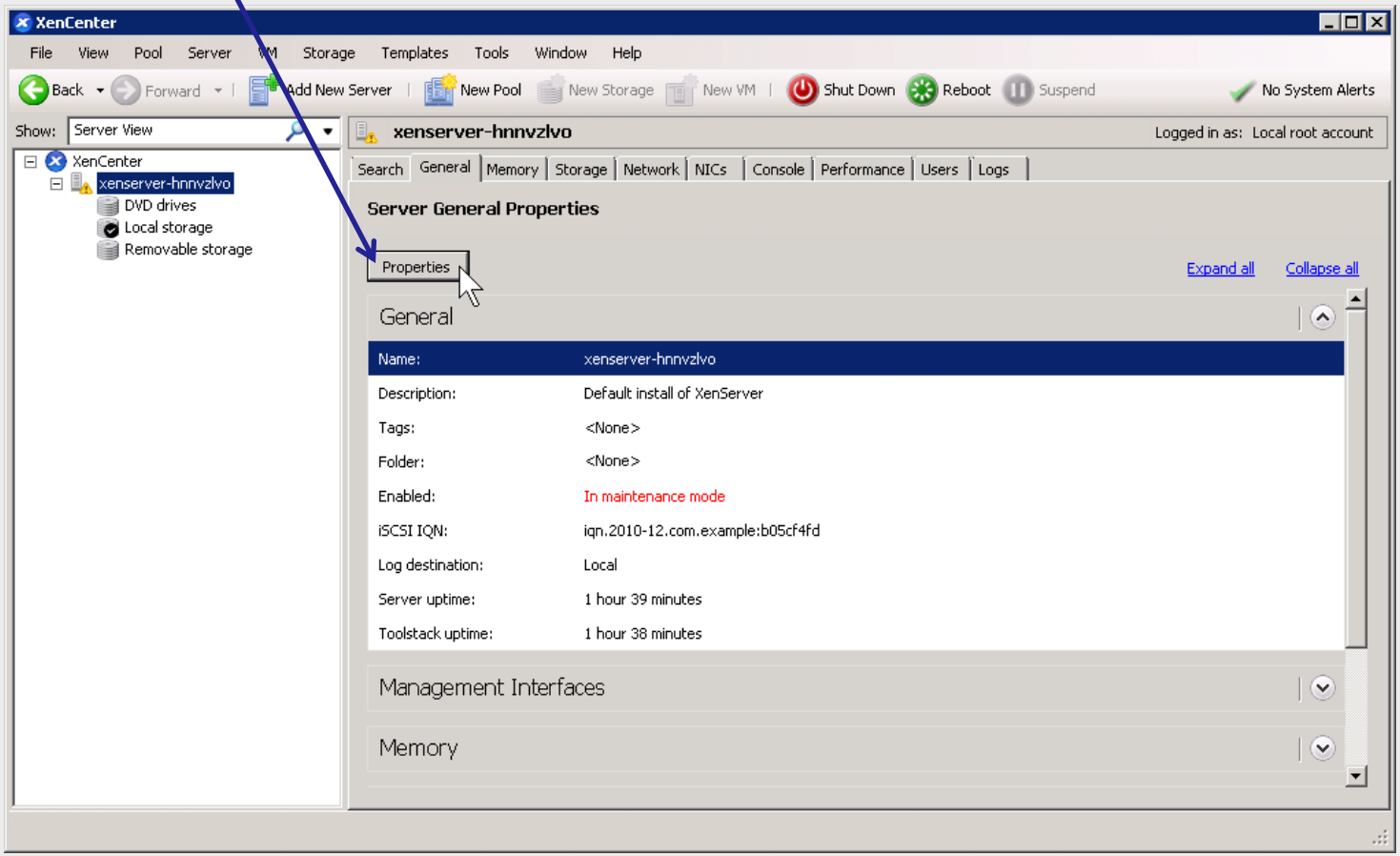
Step 2



Configure MPIO on XenServer

In the Maintenance Mode in General tab please click on the **„Properties”** button.

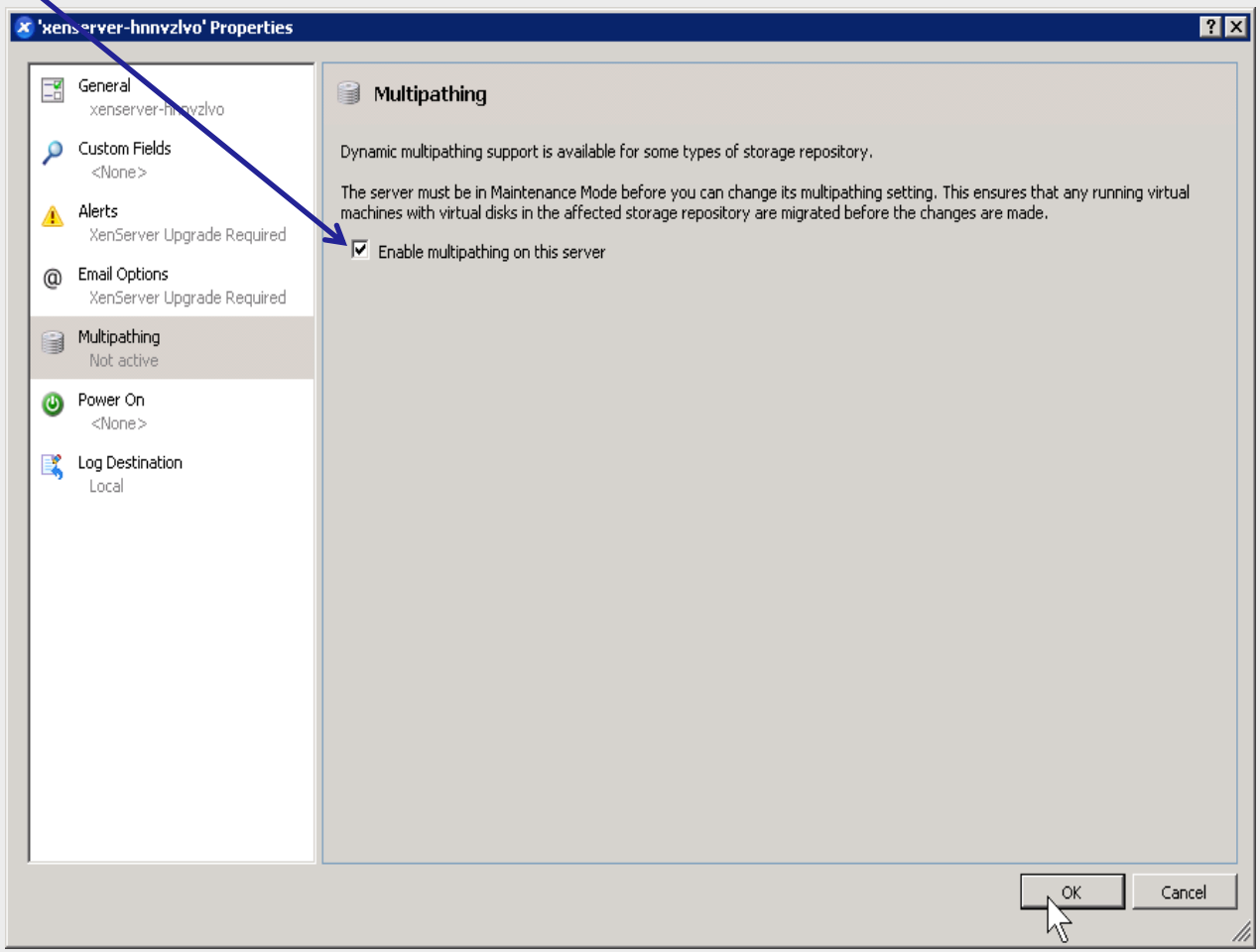
Step 3



Configure MPIO on XenServer

In the Multipathing section click on the **„Enable multipathing on this server"** and the **„OK"** to

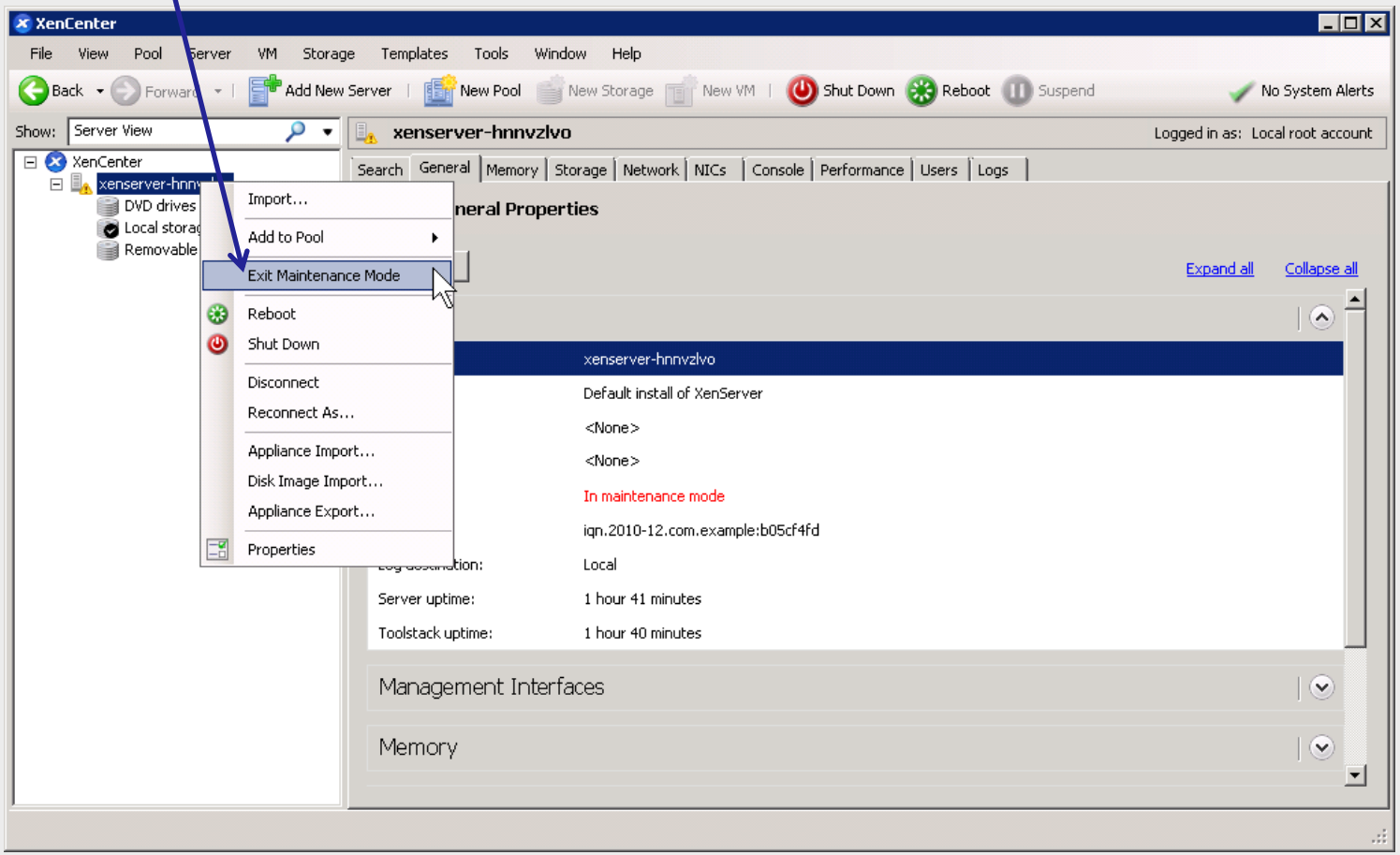
Step 4



Configure MPIO on XenServer

Exit Maintenance Mode

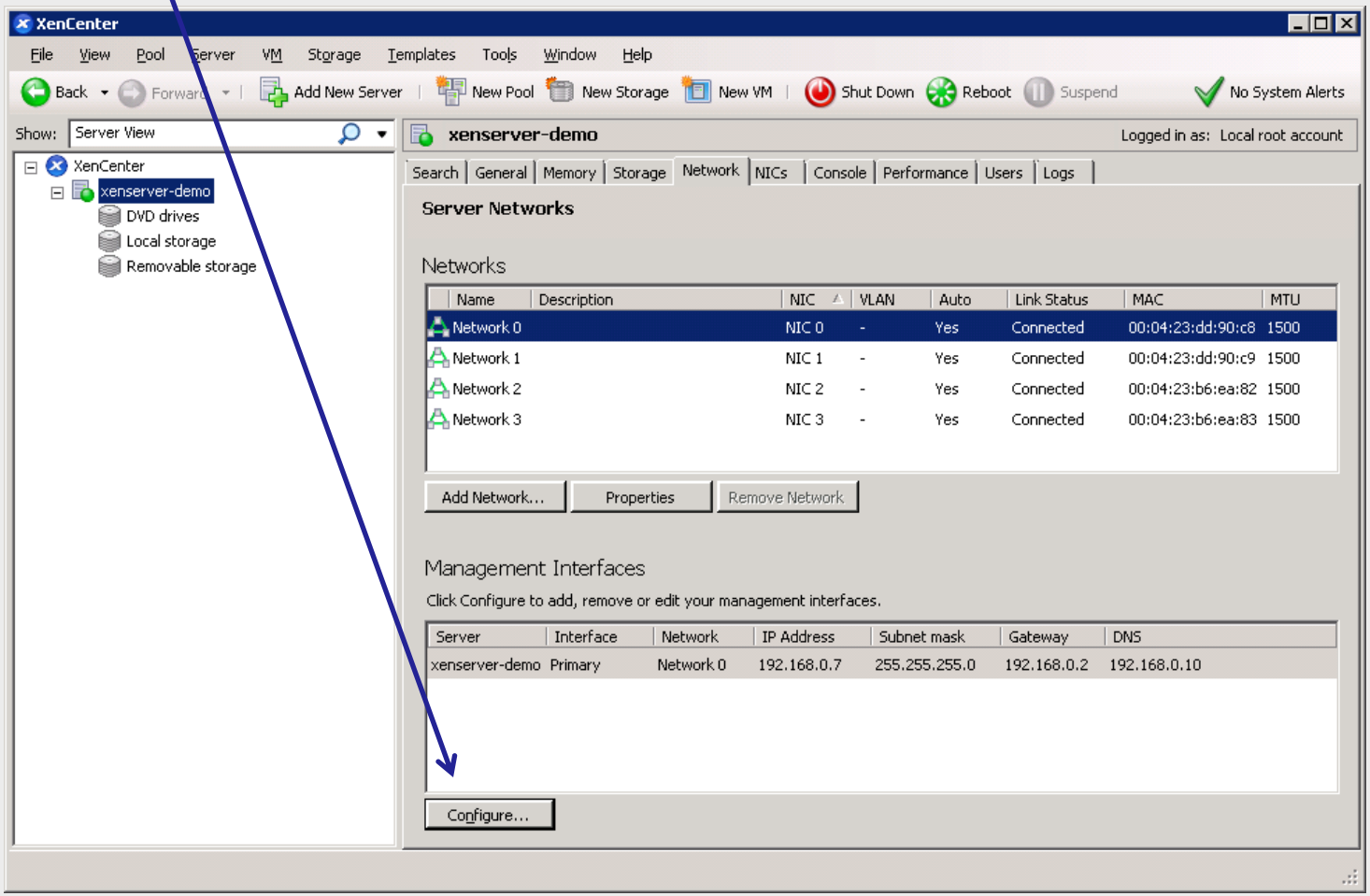
Step 5



Configure MPIO on XenServer

Navigate to the Network tab and click on „**Configure …**" button.

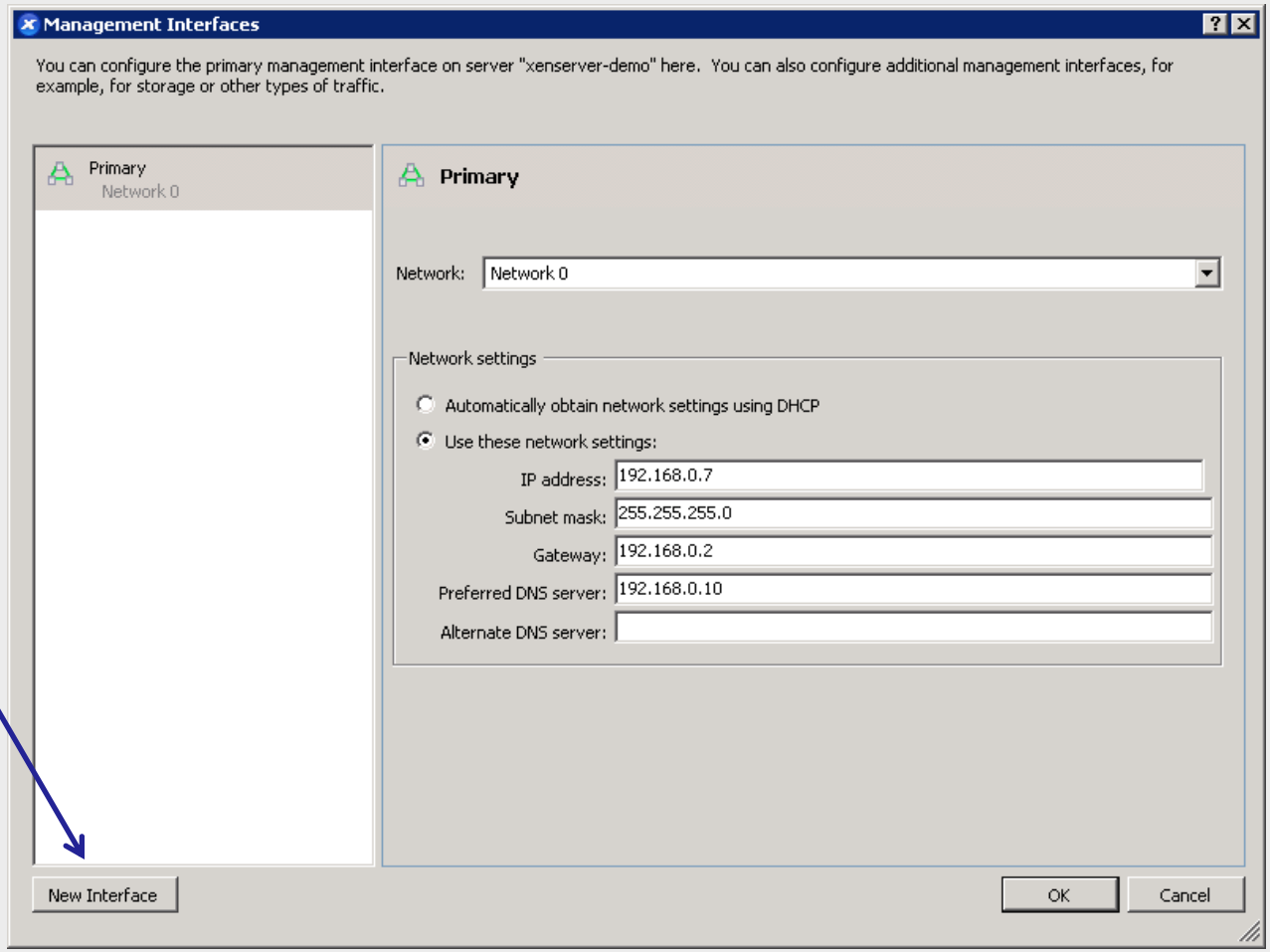
Step 6



Configure MPIO on XenServer

Step 7

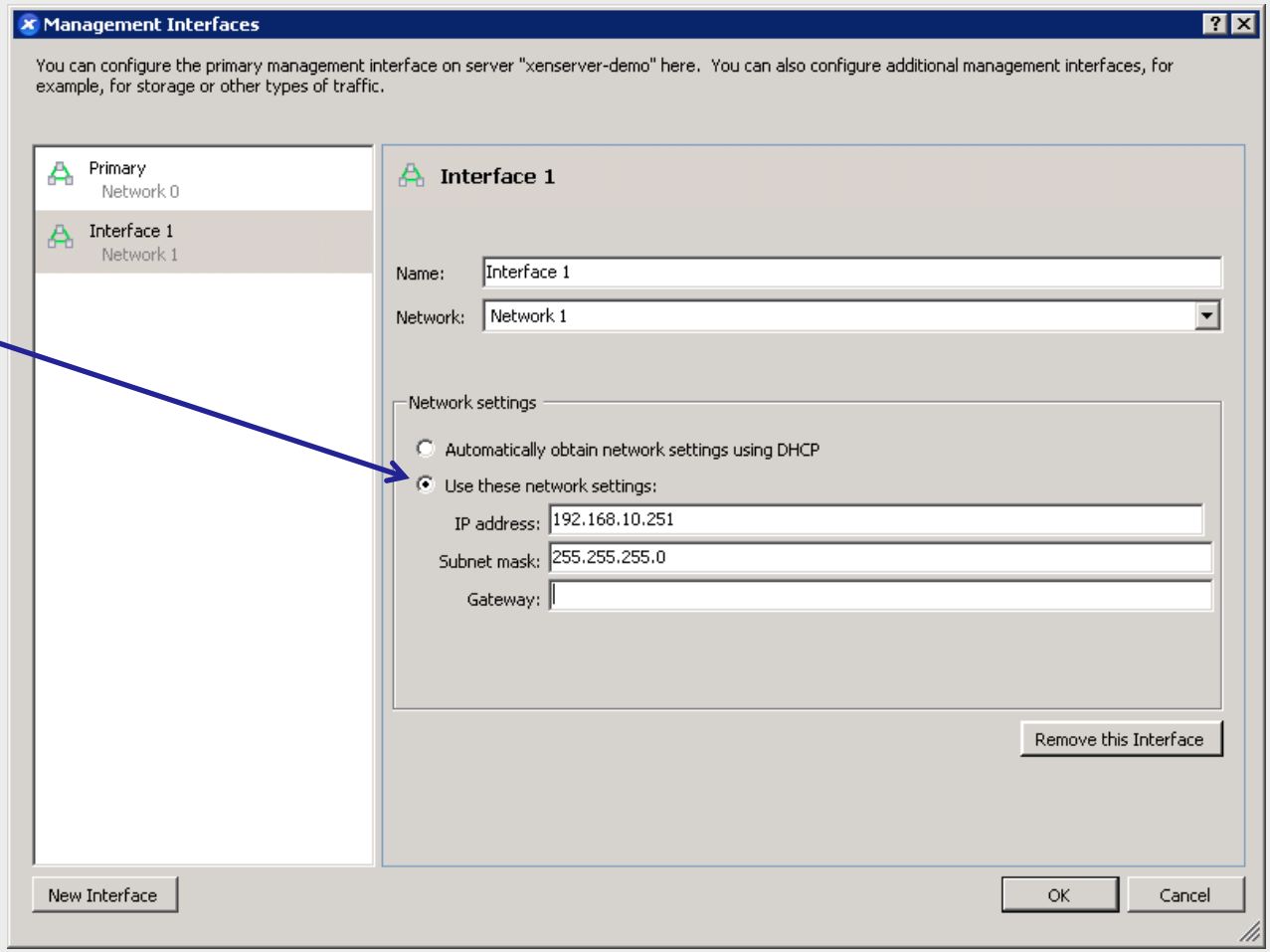
In **„Management Interfaces"** menu, please click on **„New Interface"** button.



Configure MPIO on XenServer

Step 8

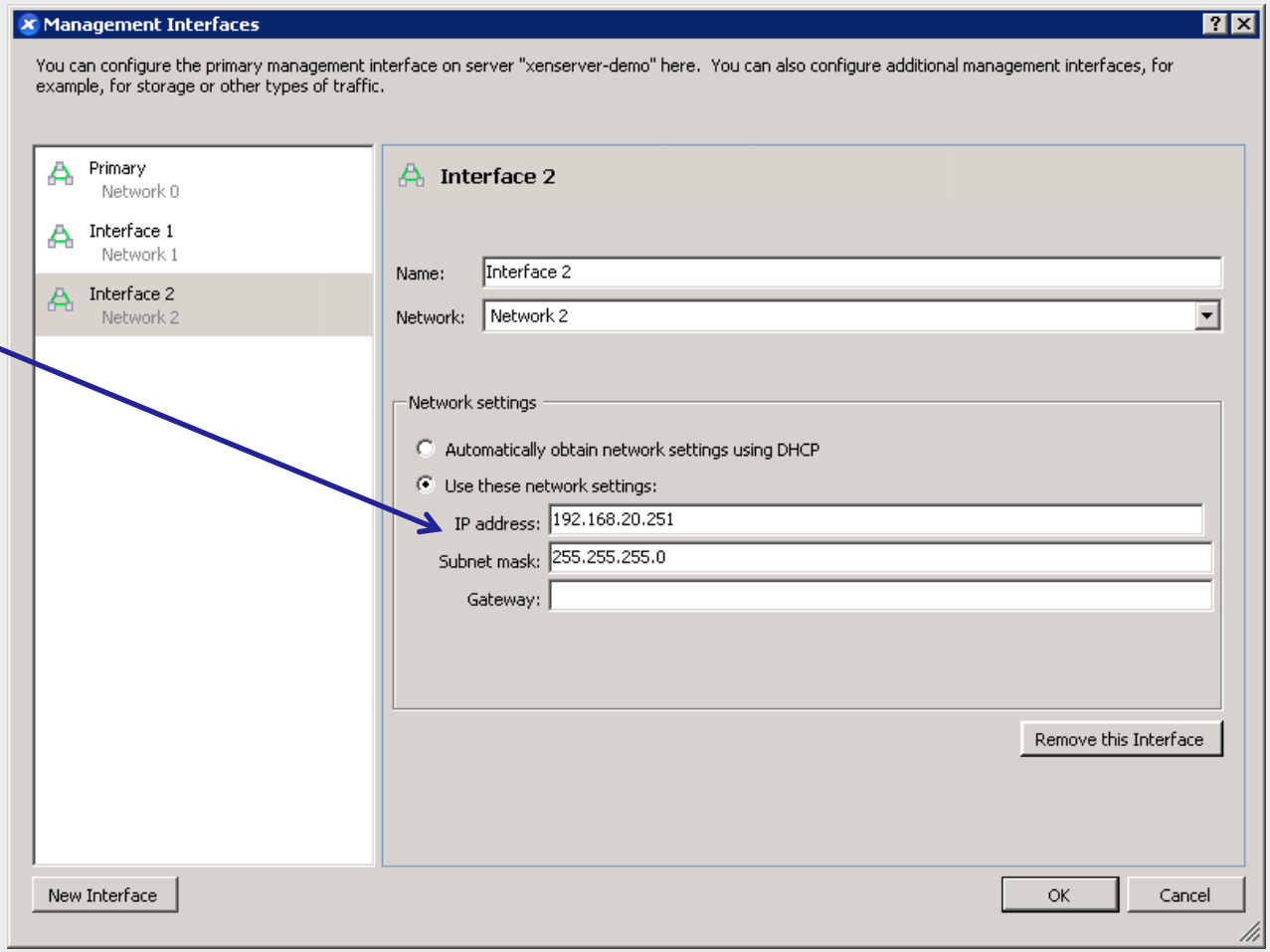
Next, please enter IP address and Subnet mask of the **first** path and click on the **„OK"** button.



Configure MPIO on XenServer

Step 9

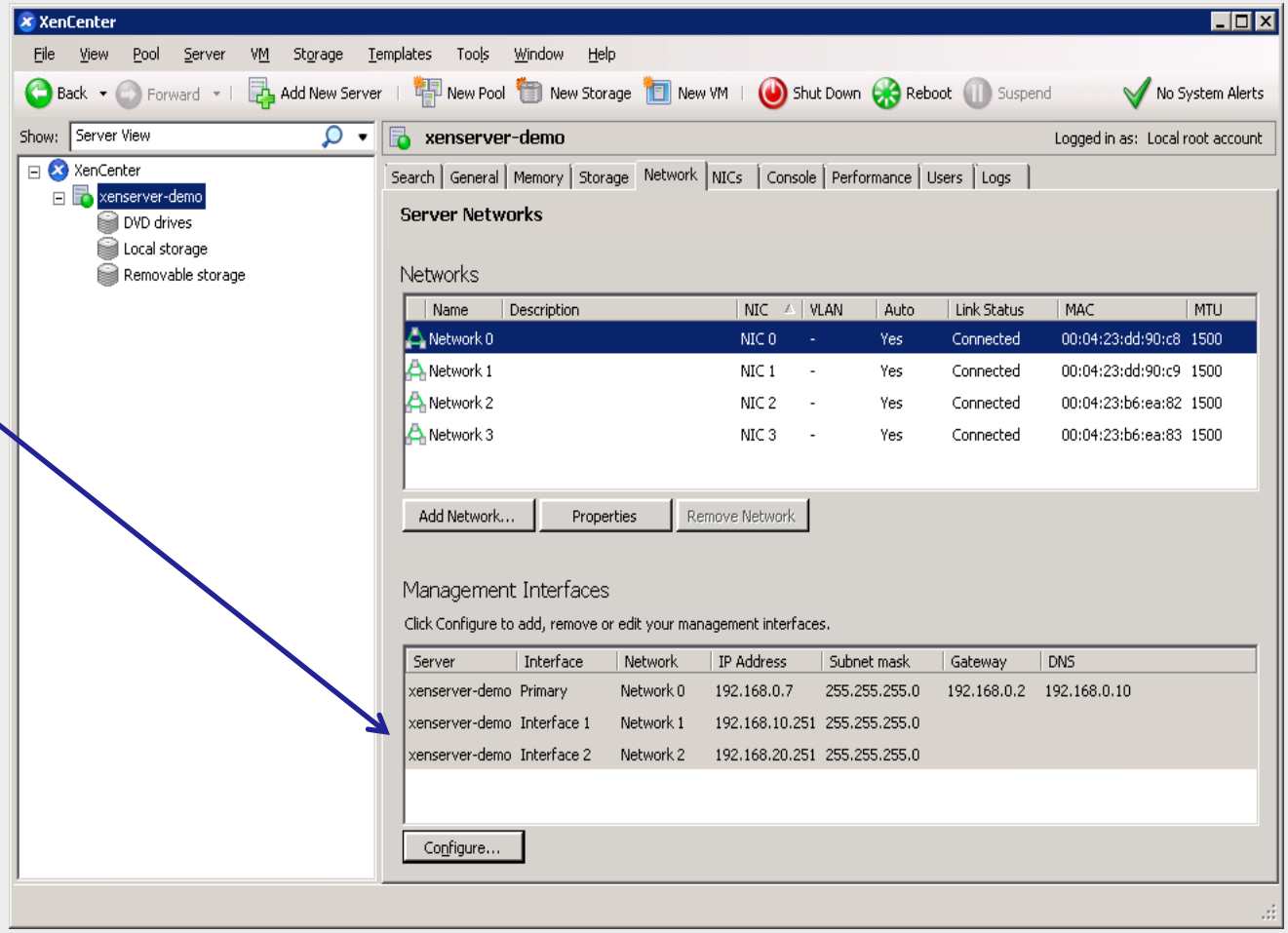
Next, please enter IP address and Subnet mask of the **second** path and click on the **„OK"** button.



Configure MPIO on XenServer

Step 10

In the **„Management Interfaces"** section there are two interfaces configured.
In this example:
192.168.10.251
192.168.20.251



Using XenServer CLI

Edit the multipath configuration file:

/etc/multipath.conf

and add blue lines into “devices” section.

nano /etc/multipath.conf

…

some vendor specific modifications

devices {

device {

vendor "SCST_FIO|SCST_BIO"

product "*"

path_selector "round-robin 0"

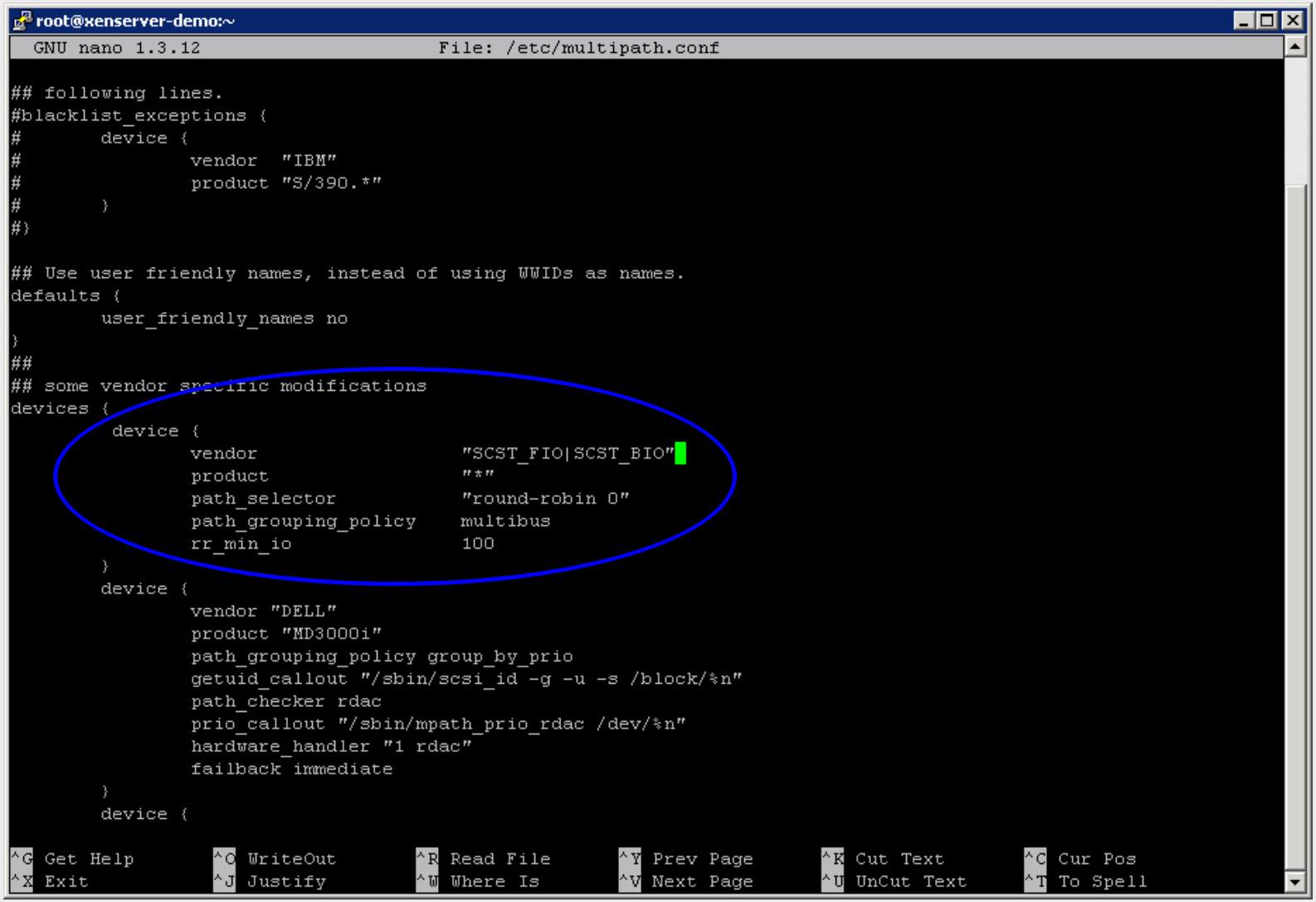
path_grouping_policy multibus

rr_min_io 100 }

…

Exit the nano editor with save: ctrl-x -> Y -> enter to confirm

Using XenServer CLI – edit /etc/multipath.conf



Using XenServer CLI

In order to disable the phisiclal IP network subnet please edit rc.local file:

nano /etc/rc.local

And add the line:

iptables -I INPUT -s 192.168.0.230 -j DROP

Exit the Nano with save: ctrl-x -> Y -> enter to confirm

Run the rc.local script with:

/etc/rc.local

NOTE: it is not nessesary to disable the secondary NIC: 192.168.0.240 becouse it is not exported while XenServer connecting to the SR.

In order to test the settings please run:

iptables -L

In order to add or remove directly from command line please use followinng commands:

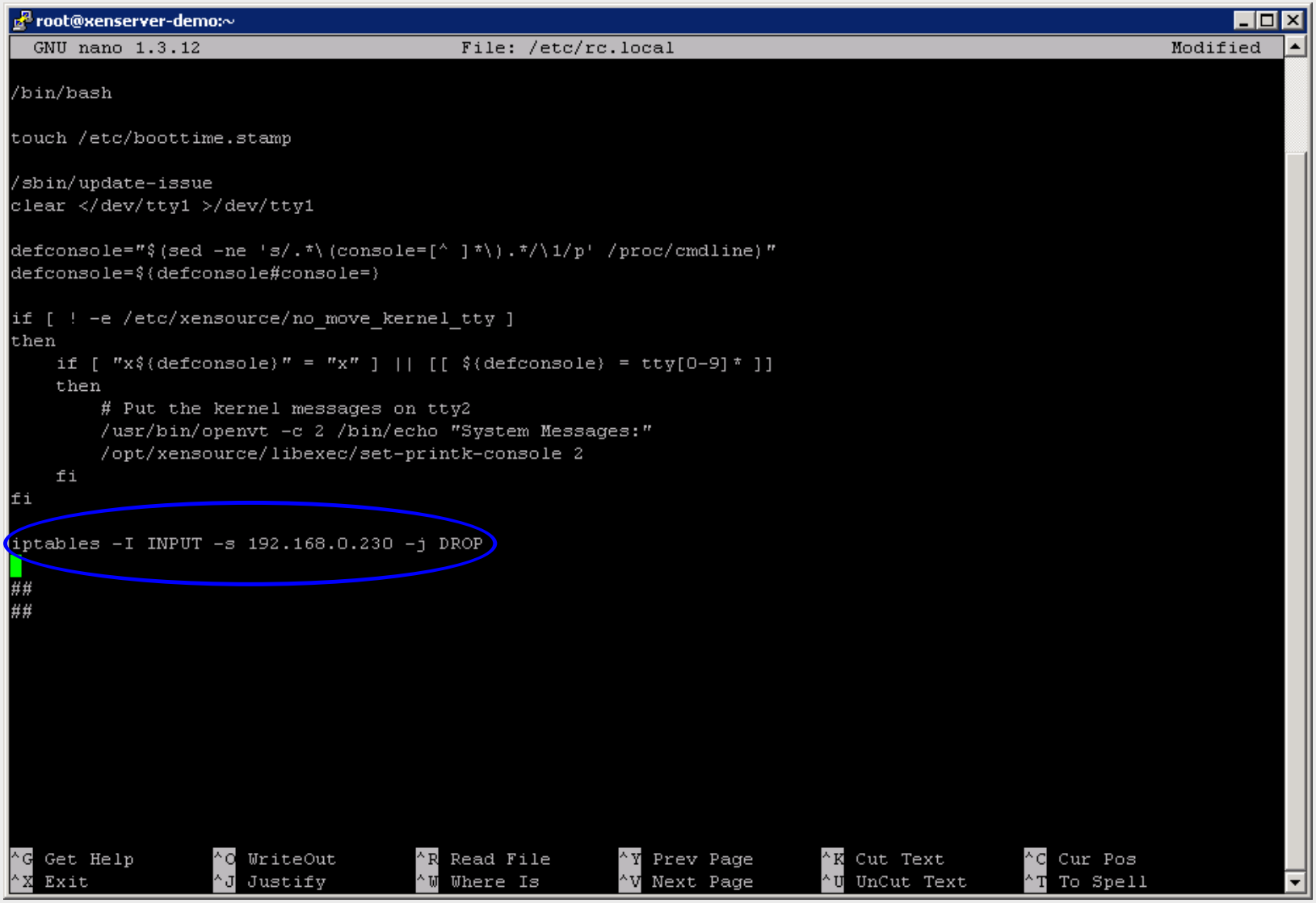
Enter “DROP” action for 192.168.0.230

iptables -I INPUT -s 192.168.0.230 -j DROP

Remove the “DROP” action for 192.168.0.230

iptables -D INPUT -s 192.168.0.230 -j DROP

Using XenServer CLI – edit /etc/rc.local

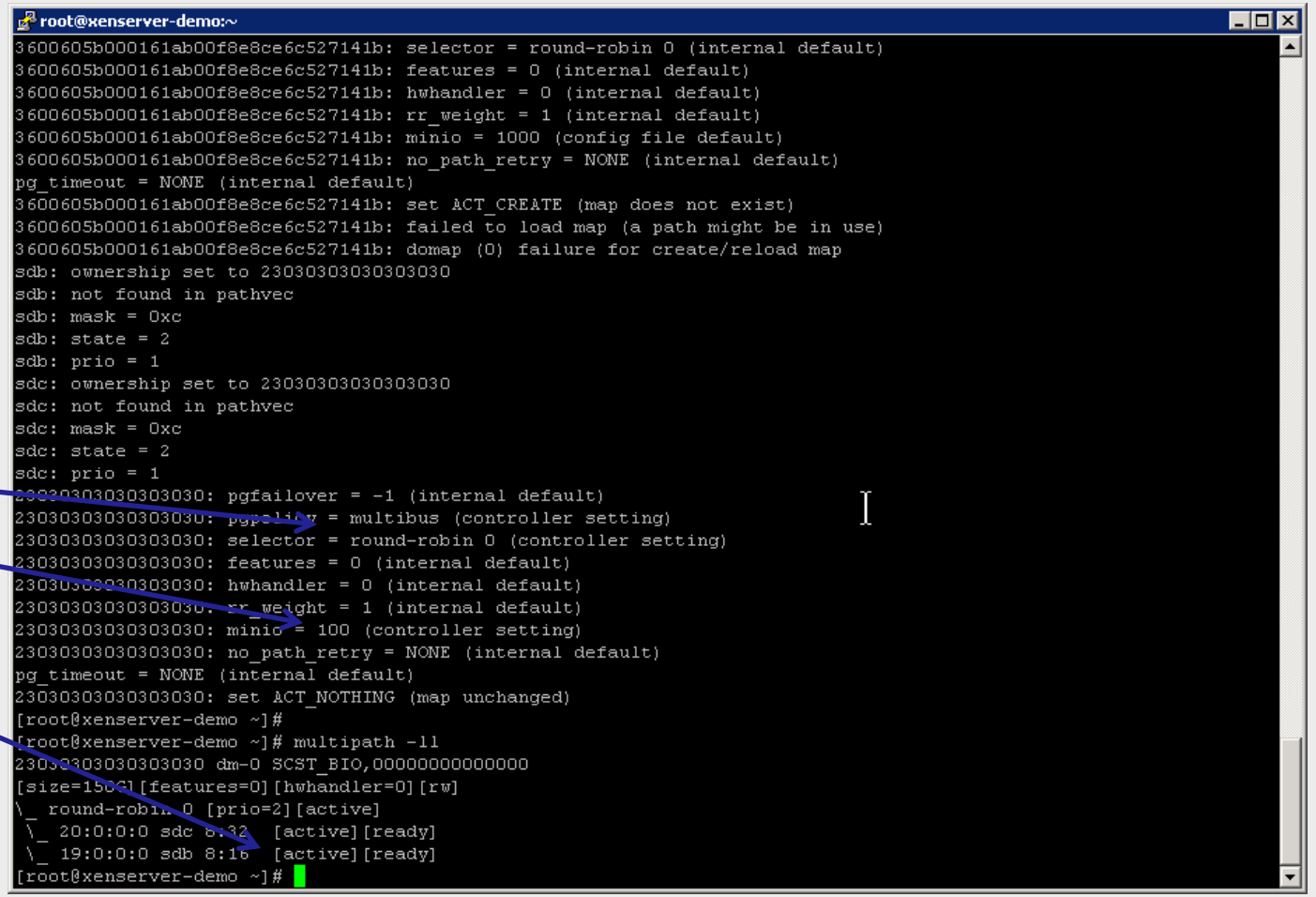


Using XenServer CLI

In order to check the settings, please run the list command:
Miltipath –v3
Miltipath -ll

Now:
pgpolicy = multibus
minio =100

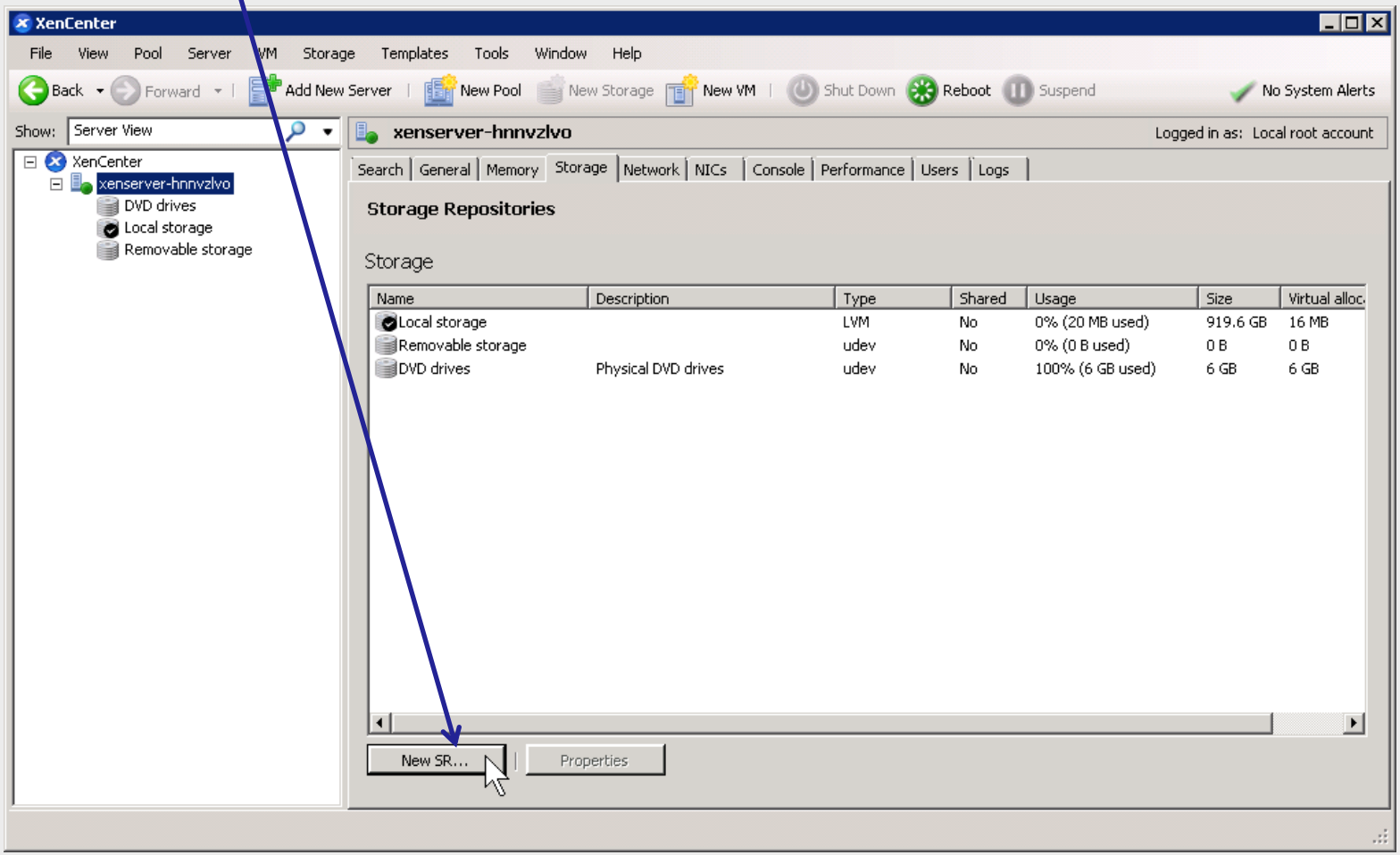
And both paths are
[active] [ready]



Configure MPIO on XenServer

Next, in the **„Storage" tab** click on **„New SR ..."** button.

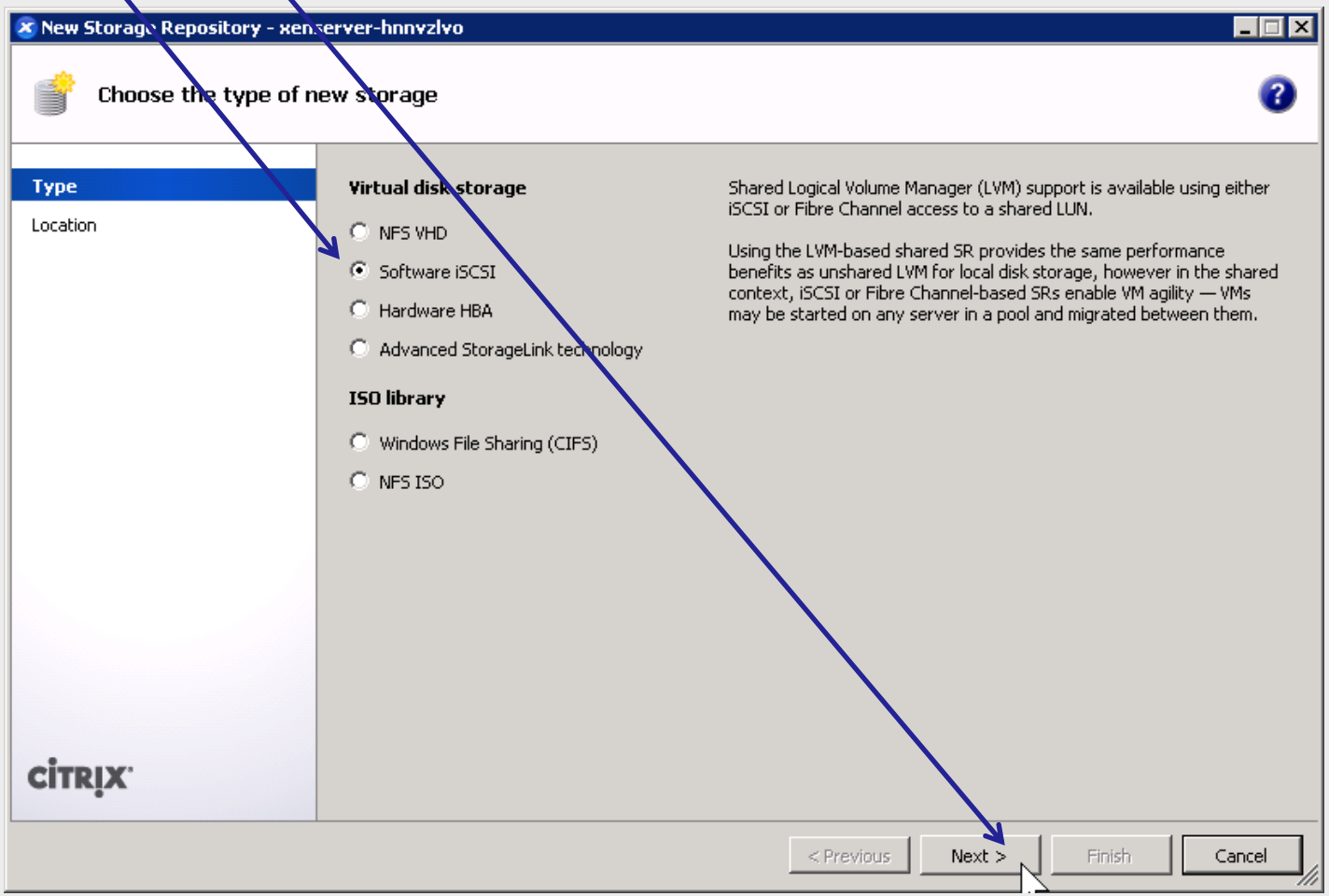
Step 11



Configure MPIO on XenServer

Now, select the **„Software iSCSI "** and click on the **„Next >"** button.

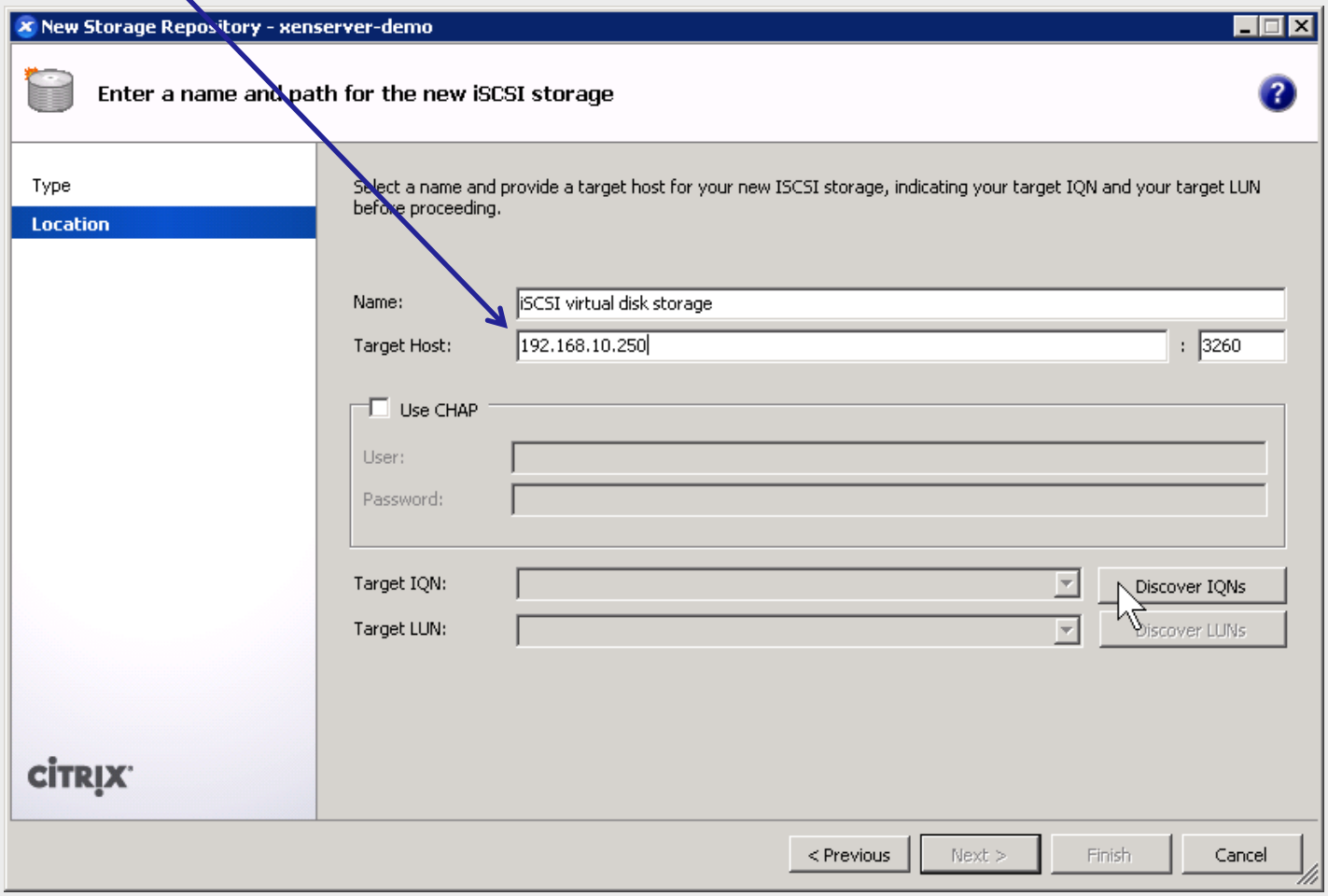
Step 12



Configure MPIO on XenServer

In the Target Hosts field please enter IP address of the **first** NIC of iSCSI targets and click on the **„Discover IQNs"** button.

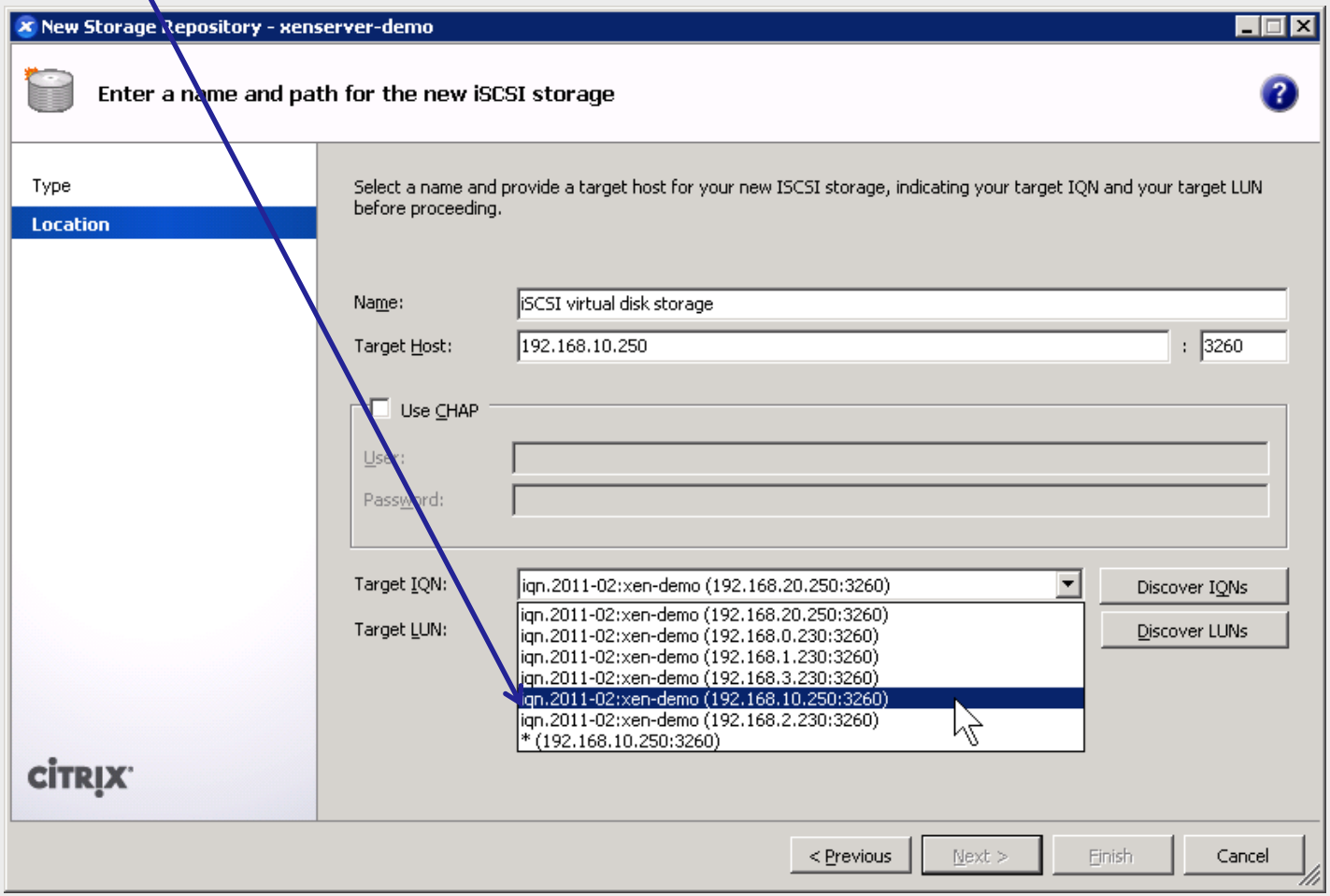
Step 13



Configure MPIO on XenServer

Now, please select the target showing on the first NIC **iqn.2011-02:xen.demo (192.168.10.250)**.

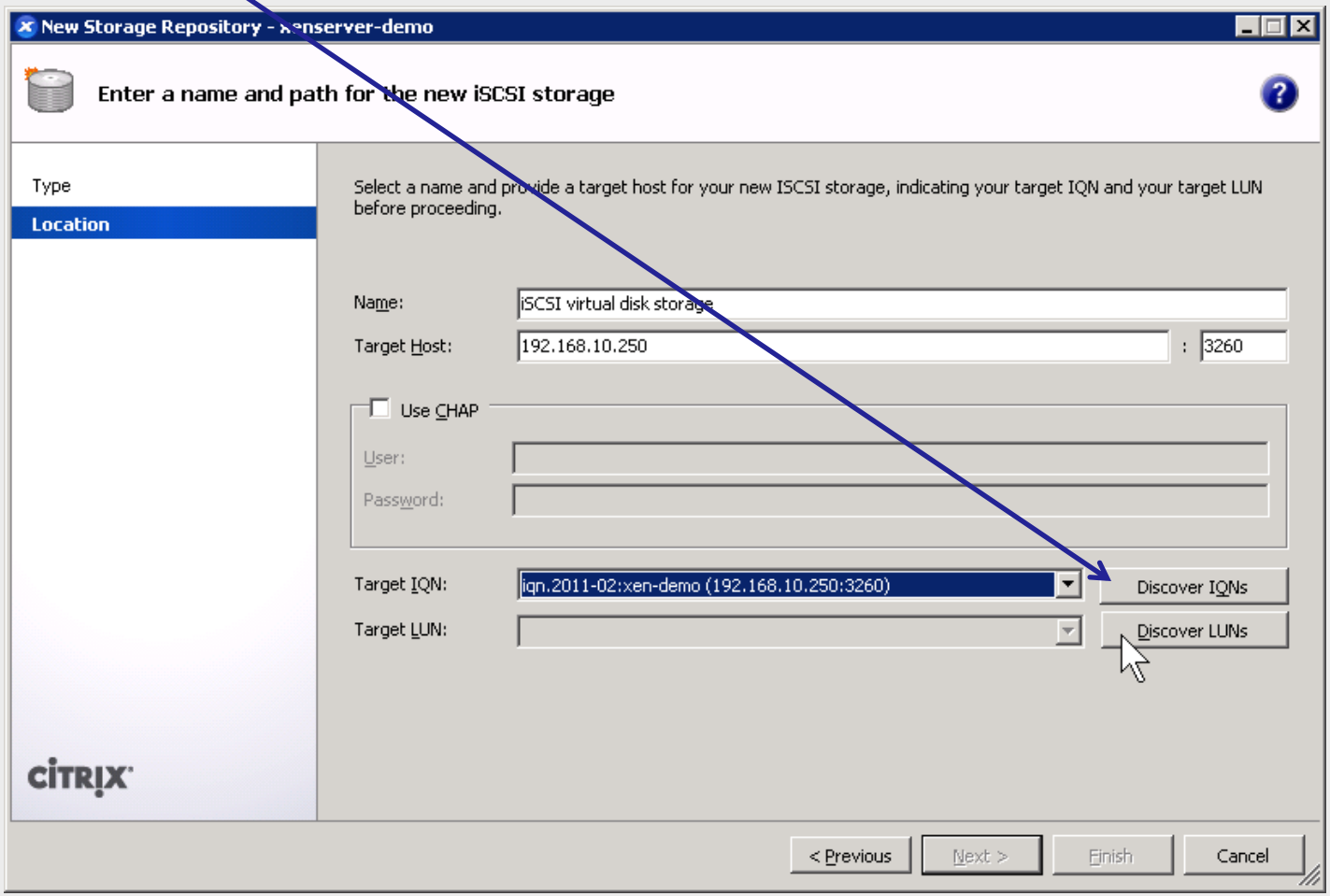
Step 14



Configure MPIO on XenServer

Next, please click **„Discover LUNs"** button and select the LUN.

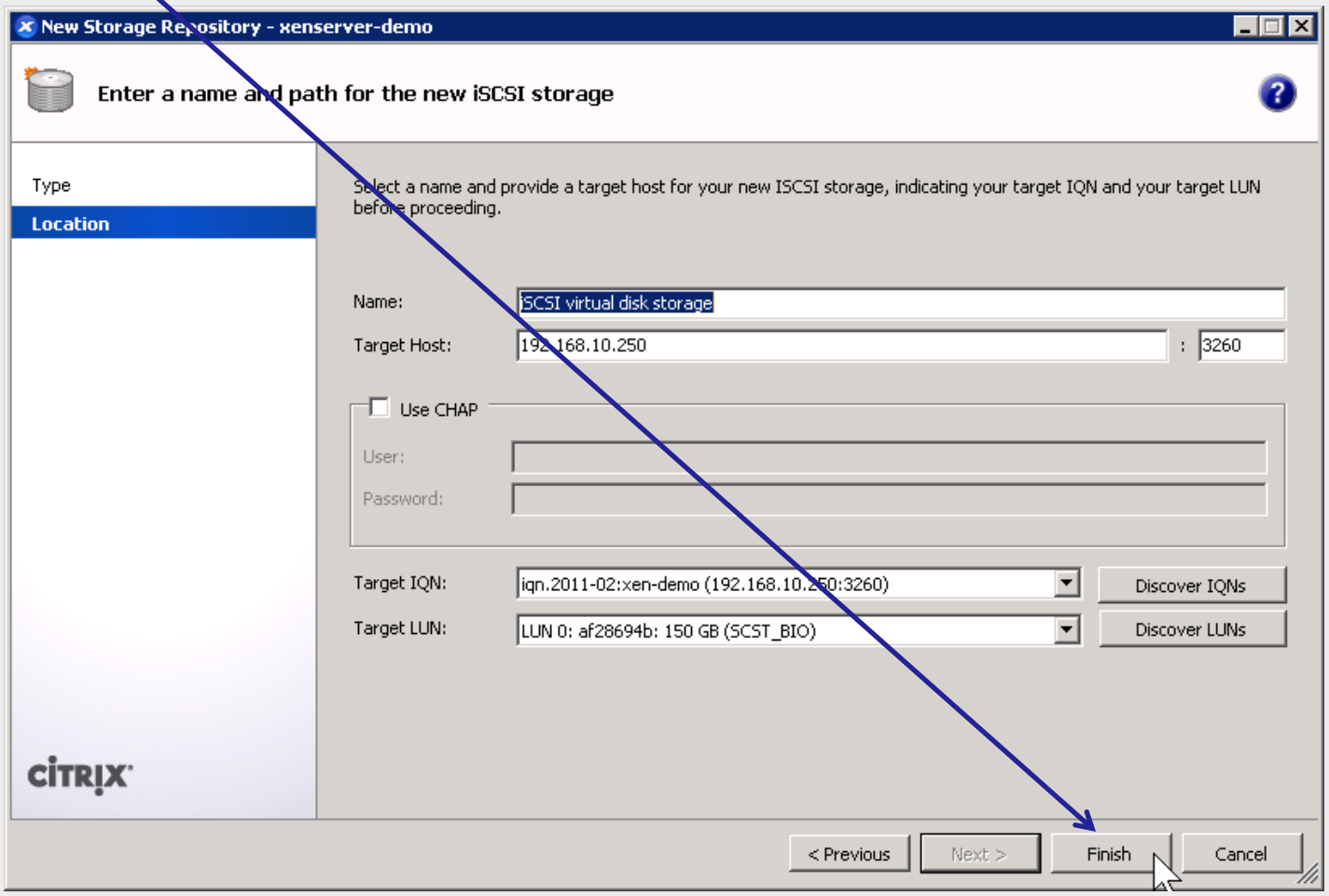
Step 15



Configure MPIO on XenServer

Next, please click **„Finish"** button .

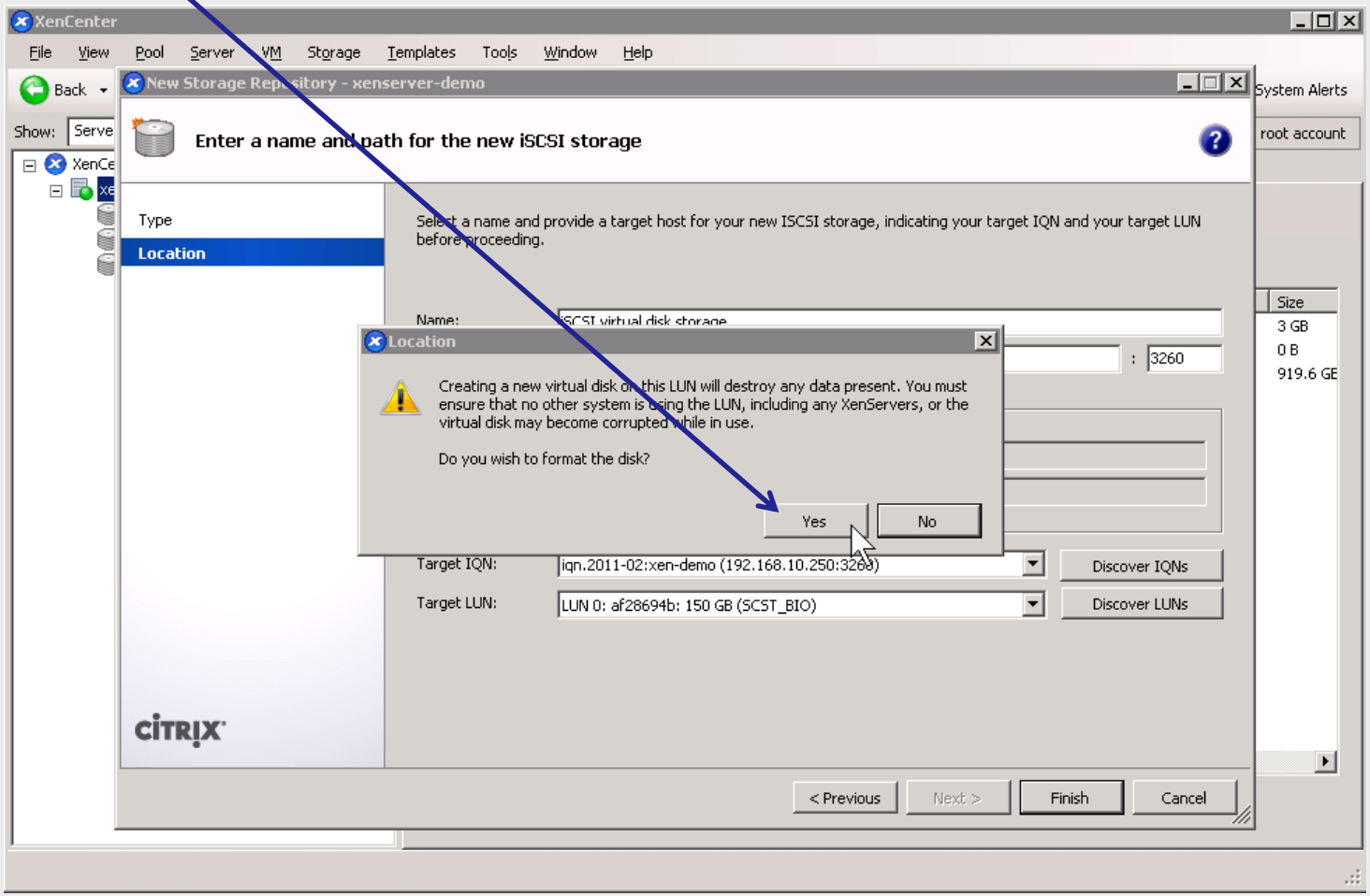
Step 16



Configure MPIO on XenServer

Next, please format the disk.
Please read the warring message.

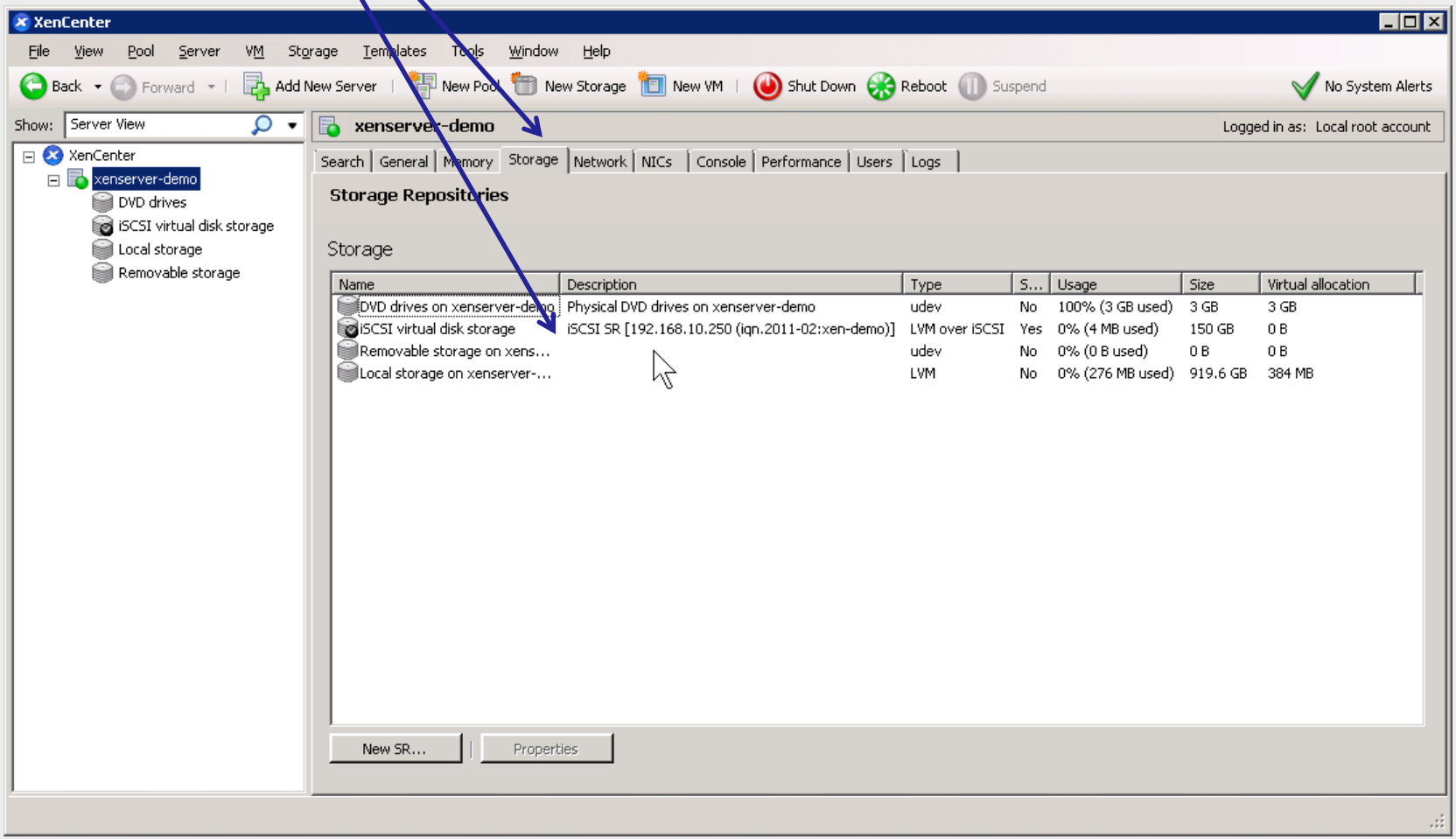
Step 17



Configure MPIO on XenServer

In the **„Storage"** tab, new "iSCSI virtual disk storage" appear.

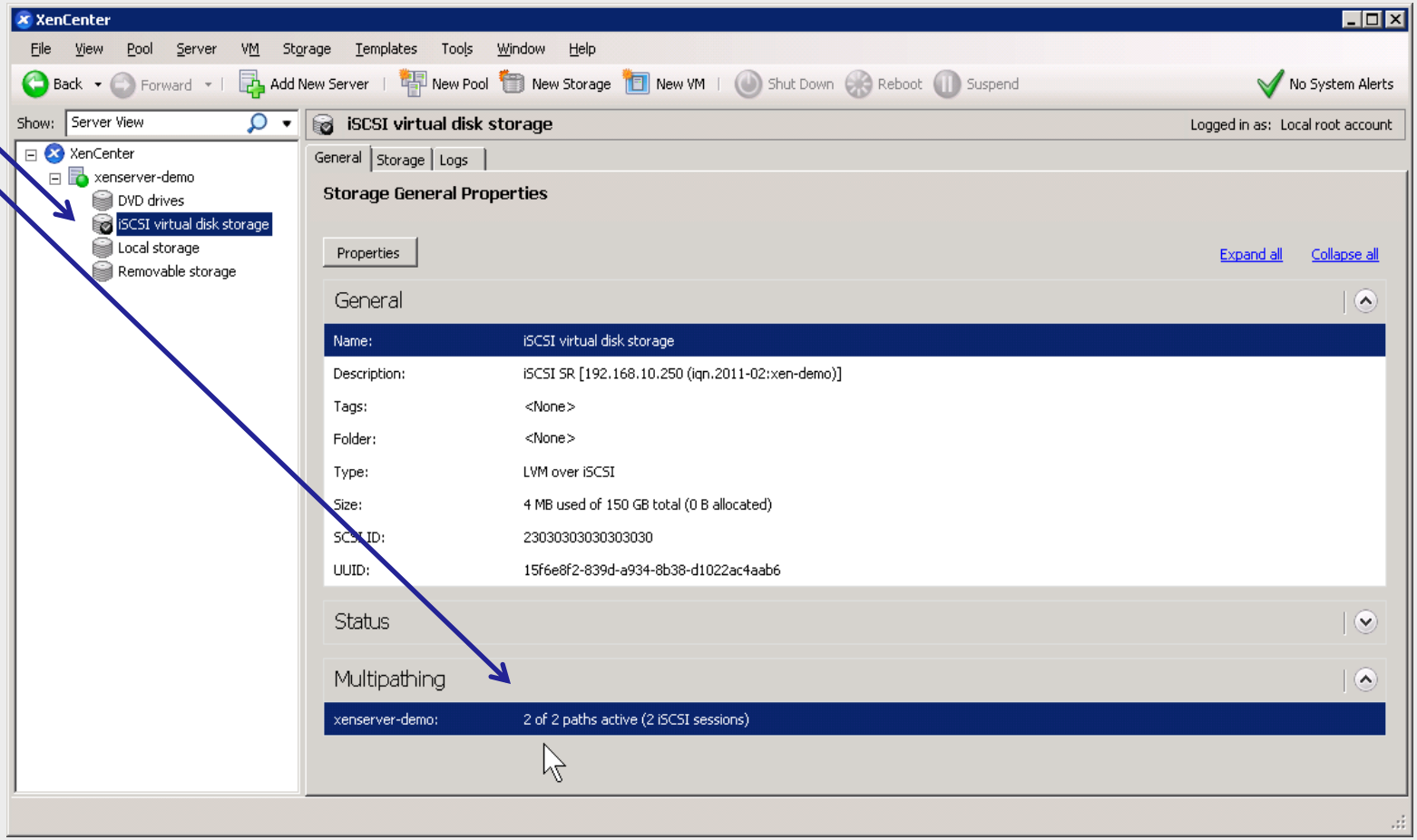
Step 18



Configure MPIO on XenServer

In order to check Multipath settings, please select the “iSCSI virtual disk storage” and in the “General” tab Multipathing section must show “2 of 2 paths active”.

Step 19



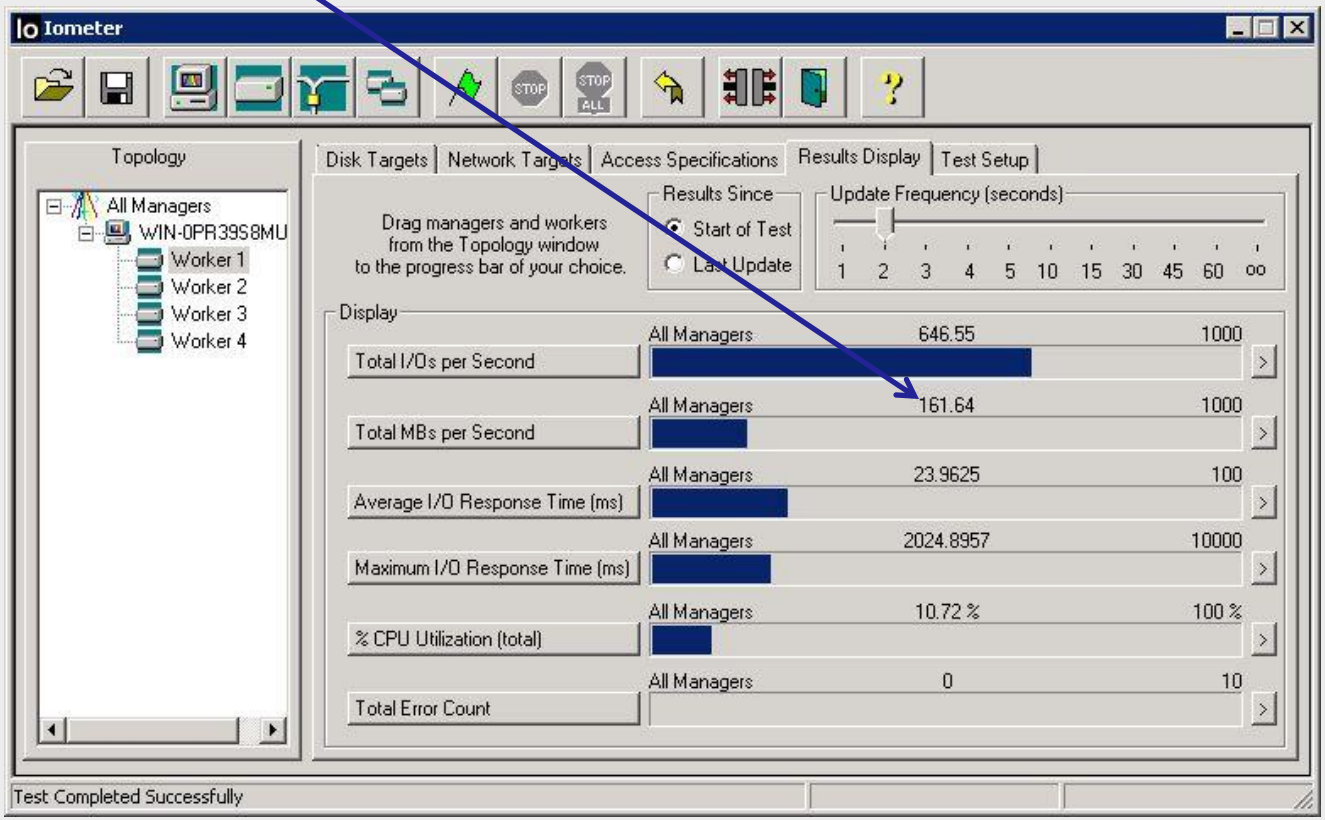
Configure MPIO on XenServer

Now install the Windows 2008 virtual machine on the new added iSCSI Virtual disk storage and run Iometer in order to check the performance.

Multipath I/O on DSS V6 with XenServer

Step 20

Verify the performance with **„Iometer"** running on



Now you have completed the configuration of Multipath I/O on DSS V6 with XenServer.

Thank you!