Step-by-Step Guide

Open-E JovianDSS Fibre Channel High-Availability Cluster

Software Version: JovianDSS ver. 1.00 up25

Last update: August 2018

Open-E JovianDSS Fibre Channel High-Availability Cluster

The aim of this document is to demonstrate how to set up a High-Availability Cluster with Fibre Channel.

Open-E JovianDSS includes failover functionality for SMB, NFS and iSCSI, FC enabling you to set up High Availability Load-Balanced Storage Clusters.

By using the Open-E JovianDSS High Availability Cluster Feature Pack you can ensure reliability and redundancy through failover in case of a server crash.

The HA cluster management software enables you to quickly access all features related to your cluster setup.

Whether for initial configuration or re-configuration after a failover – everything is in one place and guarantees ease of use for the storage administrator.

Data can be simultaneously accessed via SMB, NFS or iSCSI and via one more Virtual IP addresses. Standalone VIP feature creates a connection to the data which is independent of the physical network path.

Fibre Channel HA Cluster uses Asymmetric Logical Unit Access (ALUA) to configure the paired targets. LUNs are visible on both configured targets by the initiator that has access to those LUNs by paths. Depending on the path status, the initiator knows which path should be used to access LUNs. The initiator accesses LUNs by using an active path, while standby path is used for a target that does not have access to LUNs. An active path is set for a target when the pool is present on the same node where the target is. A standby path is used for a target when a pool is present on the other node.

High availability is achieved by detecting hardware failures and automatically moving the VIP and for Fibre Channel the active path from the primary to the secondary node without the client servers noticing a timeout.

Software version up26 supports Single node Fibre Channel Target with all Fibre Channel clients.

Fibre Channel HA Cluster was tested and supported with RH Linux cluster and with VMware cluster only !

FC Cluster for VMware
(ALUA failover with VMware ESXi 6.5. or newer)

It is required to register SCST devices with VMW_SATP_DEFAULT_AP plugin in ESX root console.

Login to ESX console and add new rules for SCST file I/O and block I/O devices:

```
esxcli storage nmp satp rule add -s VMW_SATP_DEFAULT_AP -V "SCST_FIO" -M "Storage" -c tpgs_on -P VMW_PSP_MRU -e "SCST_FIO Storage Device" -o enable_action_OnRetryErrors
```

```
esxcli storage nmp satp rule add -s VMW_SATP_DEFAULT_AP -V "SCST_BIO" -M "Storage" -c tpgs_on -P VMW_PSP_MRU -e "SCST_BIO Storage Device" -o enable_action_OnRetryErrors
```

execute:

```
esxcli storage core claimrule load
```

check if new rule is listed in:

```
esxcli storage nmp satp rule list
```

reboot the VMware server

check if correct plugin is used for SCST devices:

```
esxcli storage nmp satp rule list | grep SCST
```

The Storage Array Type should be set to VMW_SATP_DEFAULT_AP

FC Cluster for RH Linux
(ALUA failover with RH Linux)

--- multipath install on RH: yum -install multipath-tools

/etc/multipath.conf

```
defaults {
   Uid_attribute      "ID_SERIAL"
   Getuid_callout     "/lib/udev/scsi_id --whitelisted --export --page=0x80 --device=/dev/%n"
}

blacklist_exceptions {
   Property          "ID_SERIAL"
}

devices {
device {
            Vendor               "SCST_[BF]IO"
            Product              "Storage"
            hardware_handler             "1 alua"
            path_selector        "service-time 0"
            path_grouping_policy   "failover"
            Failback                   "manual"
            prio                "alua"
            prio_args            ""
            Path_checker         "tur"
            Rr_weight            "priorities"
            Fast_io_fail_tmo             300
            No_path_retry        500
}
}
```

--- restart multipath: multipath -r
--- check multipath: multipath -l -v2

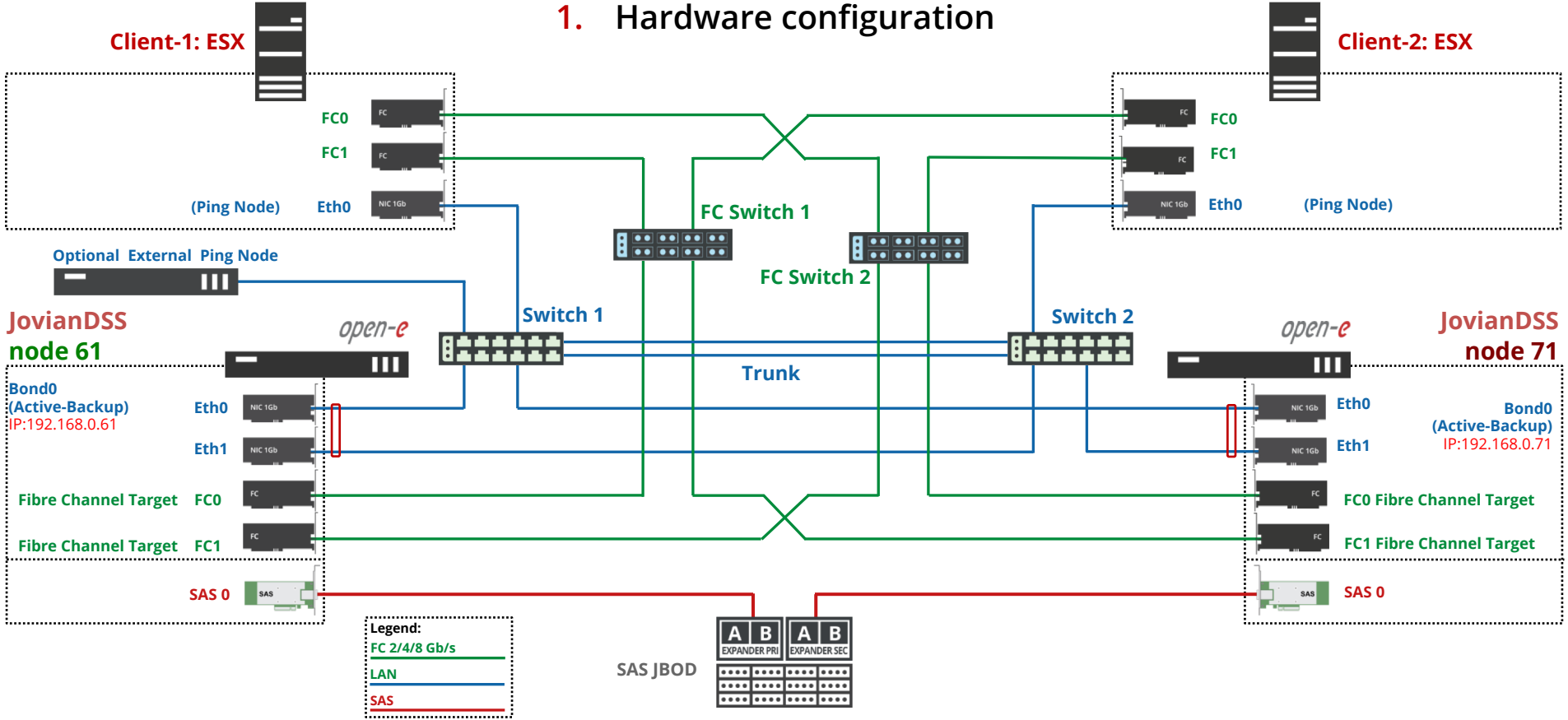
-- list WWN: cat /sys/class/fc_host/host*/port_name
this command list WWN in hex format : 0x2100000e1e28c7c0 (this is just example WWN)
but the GUI accept following format : 21:00:00:0e:1e:28:c7:c0
so this need to be typed manually (no copy & paste)

To set up a High-Availability Cluster, perform the following steps:

1. Hardware configuration
2. ESX Storage adapter
3. Storage settings
4. Cluster Binding
5. Ping Nodes
6. Start cluster
7. Pool
8. Add Initiator
9. Add group wizard
10. Add remote target
11. Rescan adapters
12. Check adapters after rescan
13. Edit multipath
14. Path check
15. Move cluster
16. Cluster check after test move

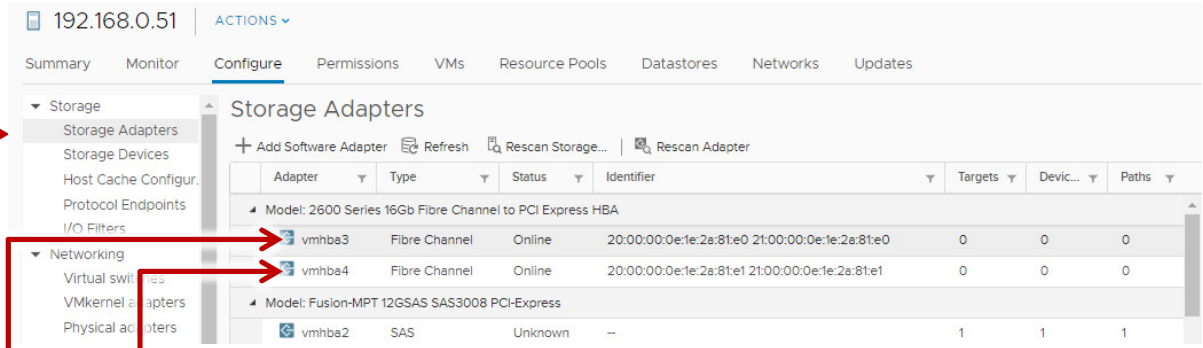
Open-E JovianDSS Fibre Channel High-Availability Cluster

1. Hardware configuration



2. ESX Storage adapter

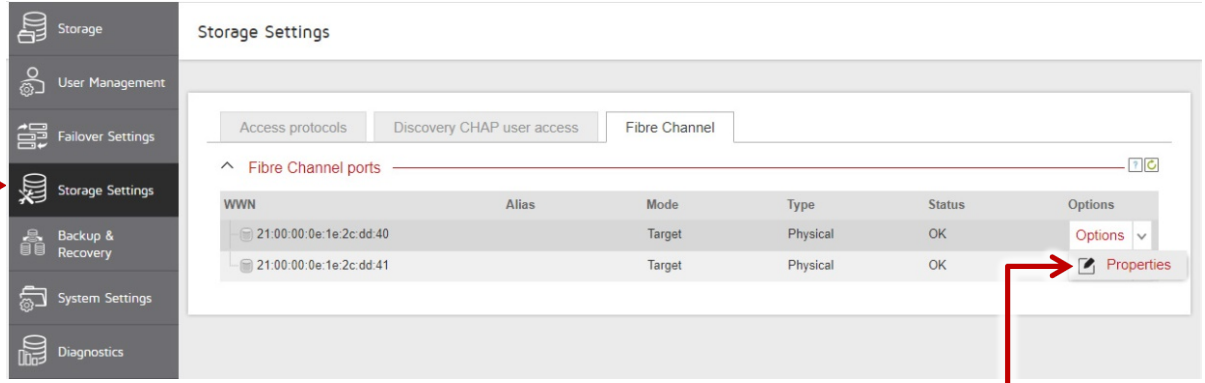
ESX host
IP Address: 192.168.0.51



In **Storage Adapters**, check the settings of both Fibre Channel adapters.

3. Storage settings

JovianDSS: **node 61**
IP Address: 192.168.0.61

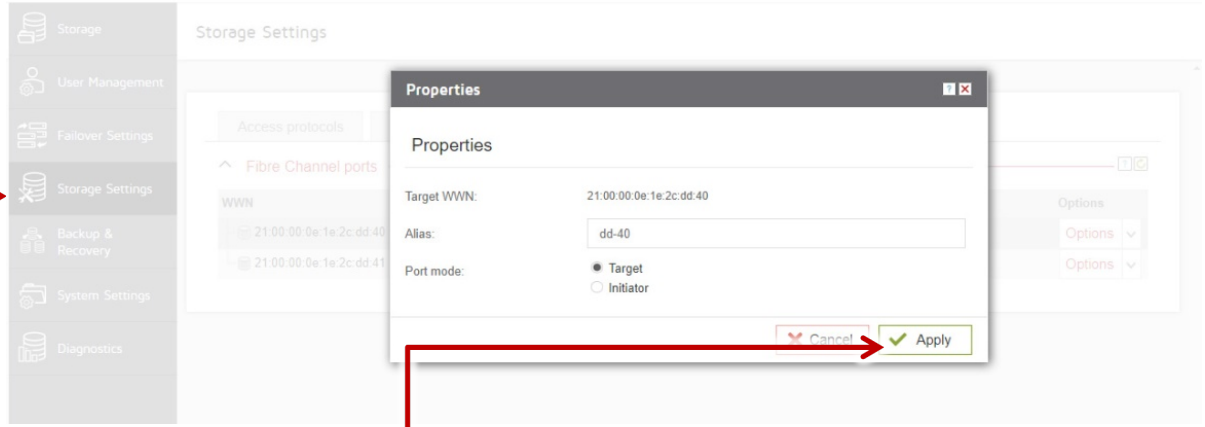


Go to menu **Storage Settings**. In the **Options** drop-down menu select **Properties**.

3. Storage settings

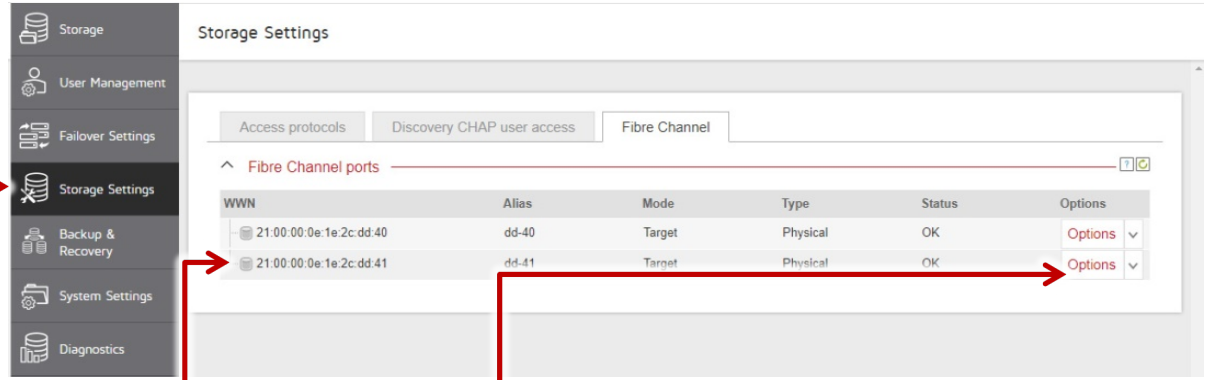
JovianDSS: **node 61**
IP Address: 192.168.0.61

In the **Properties** menu, enter the **Alias** name and click the **Apply** button.



3. Storage settings

JovianDSS: **node 61**
IP Address: 192.168.0.61

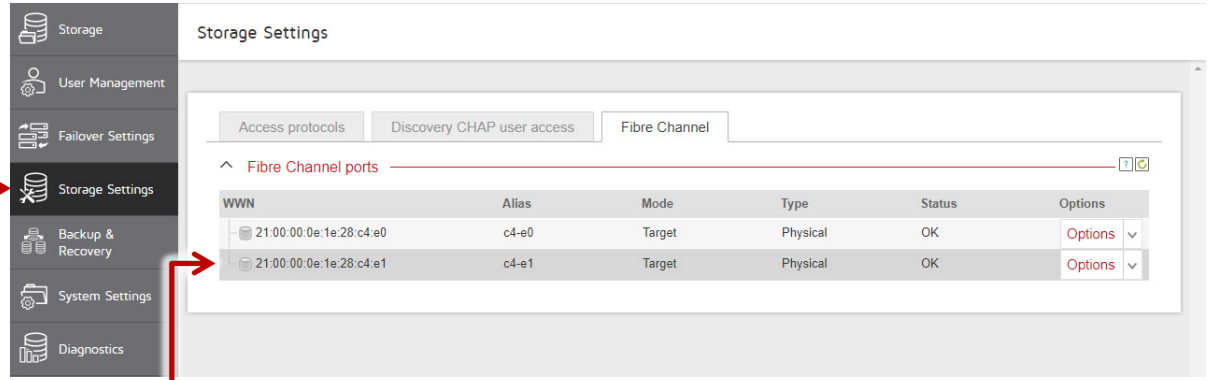


For another **WWN**, go to the **Options** drop-down menu for this WWN, select **Properties** and enter the **Alias** name accordingly. In this example second alias is **dd-41.**

3. Storage settings

JovianDSS: **node 71**
IP Address: 192.168.0.71

Targets on the second node are also active.

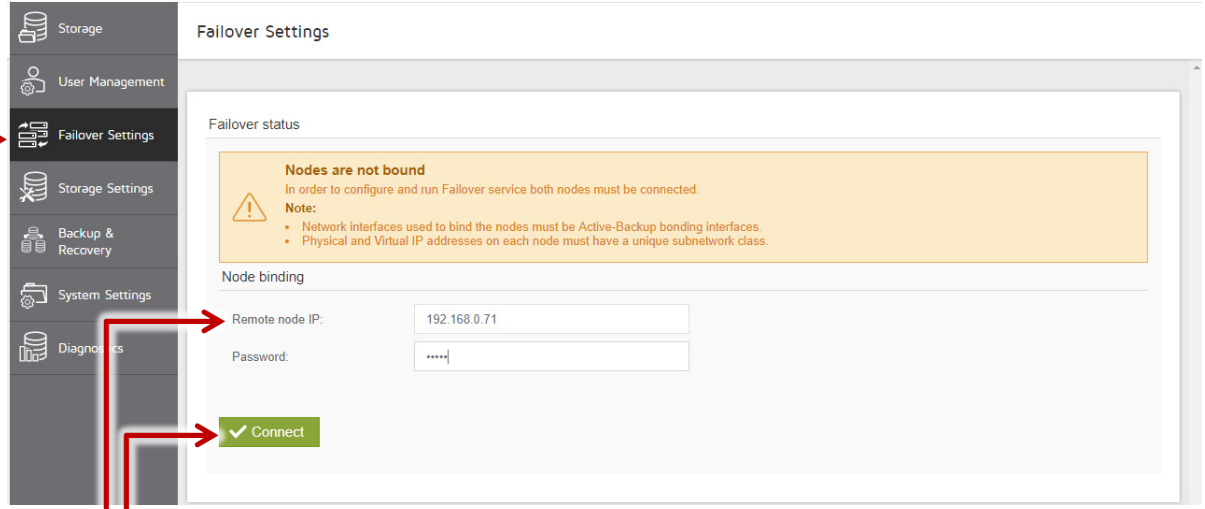


4. Cluster Binding

JovianDSS: **node 61**
IP Address: 192.168.0.61

In the main menu select the **Failover settings** and enter IP address of the Bond interface of the second node and enter the current administrator password (default: admin) and click on the **Connect** button.

The Bond interface will function as a ring path (heartbeat) and as the persistent reservation synchronization path.

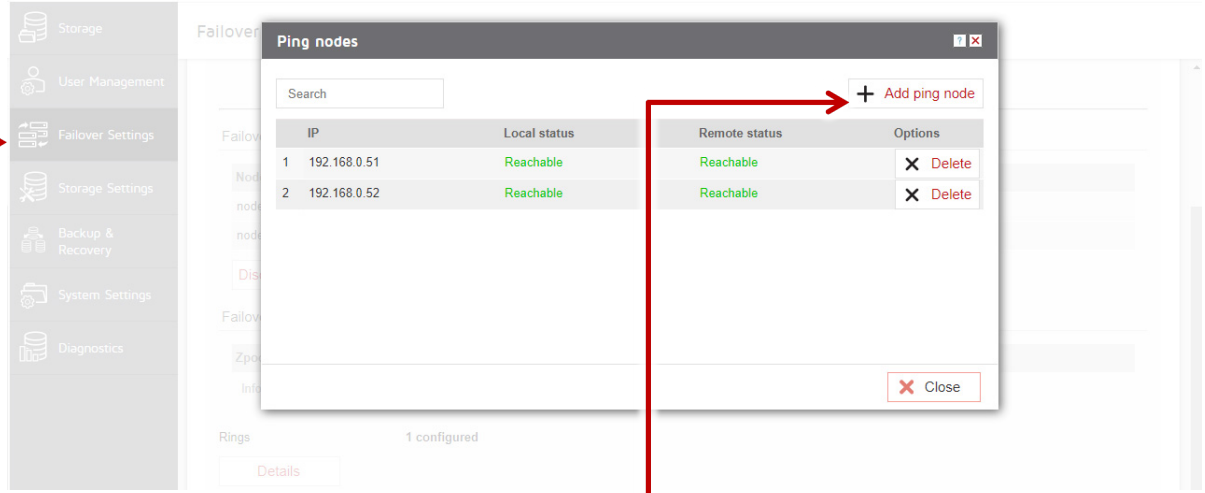


5. Ping nodes

JovianDSS: **node 61**
IP Address: 192.168.0.61

In **Failover settings** click the **Edit** button in the **Ping nodes** section and enter at least two ping nodes.

Ping node IP addresses must be reachable from Ring interfaces, so the ping node must use the same network subnet as the ring interfaces.

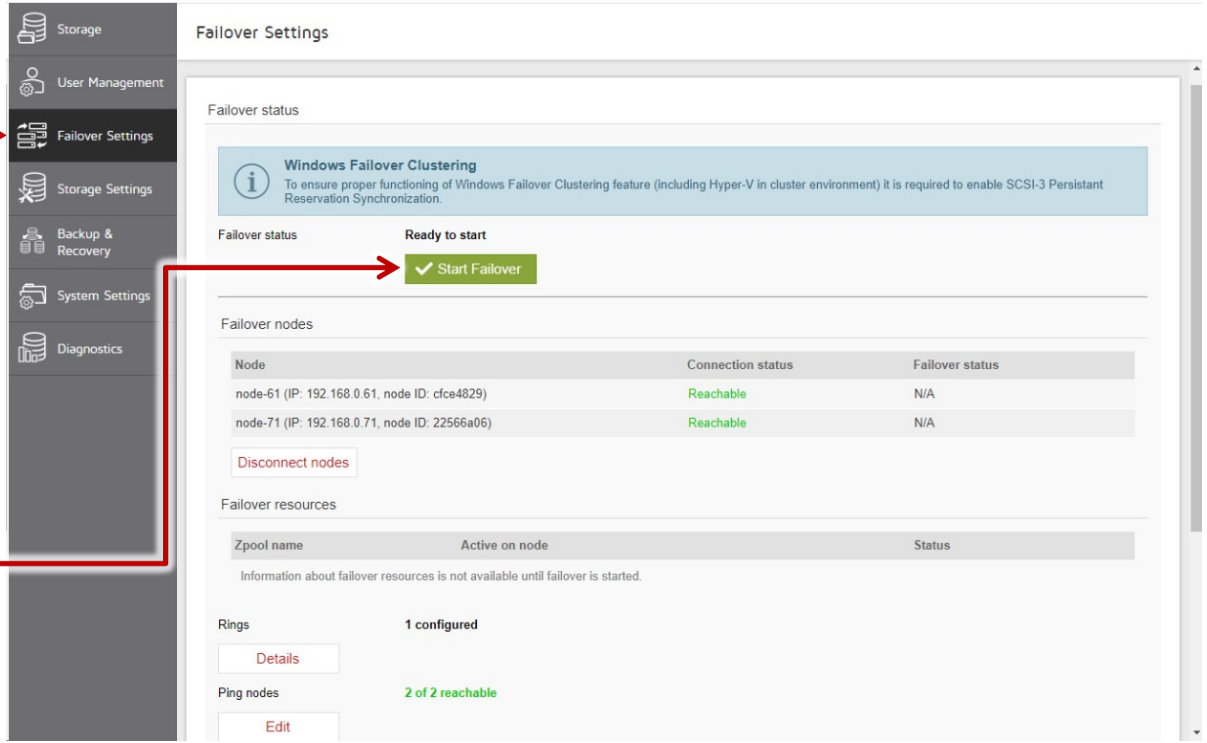


6. Start cluster

JovianDSS: **node 61**
IP Address: 192.168.0.61

Now, all required settings are completed.

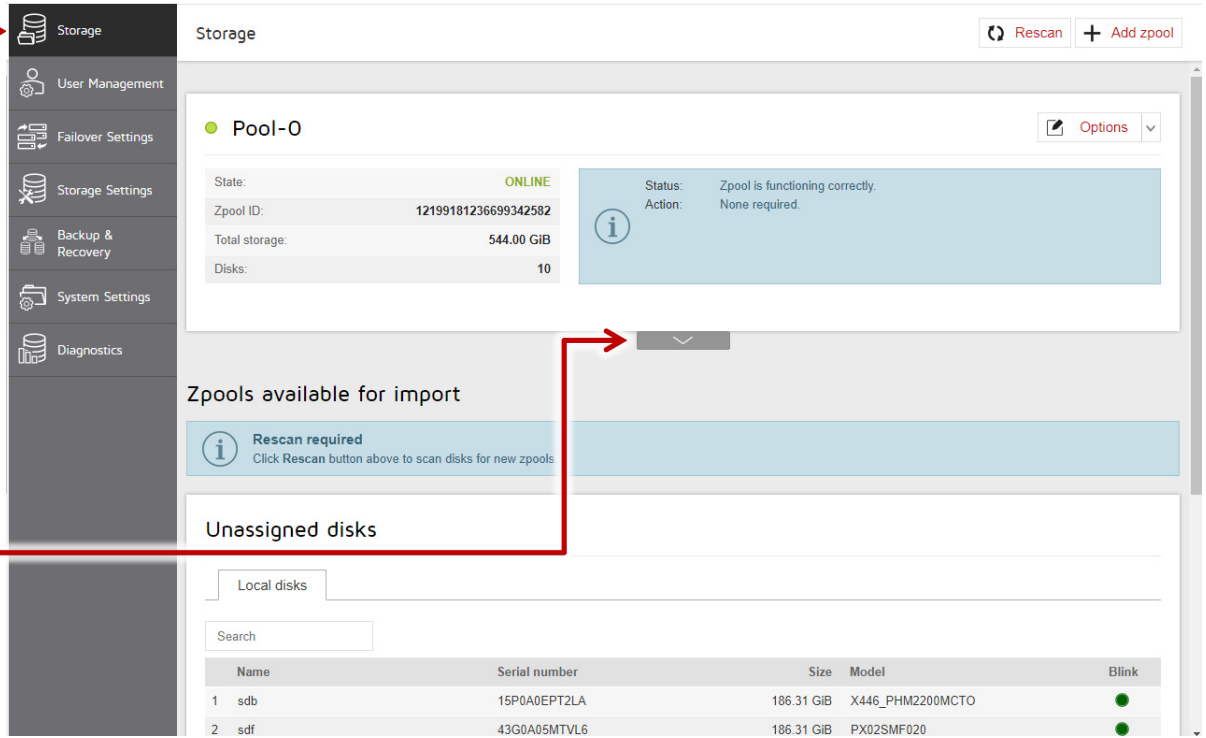
Click **the Start Failover** button in order to start the HA-cluster service.



7. Pool

JovianDSS: **node 61**
IP Address: 192.168.0.61

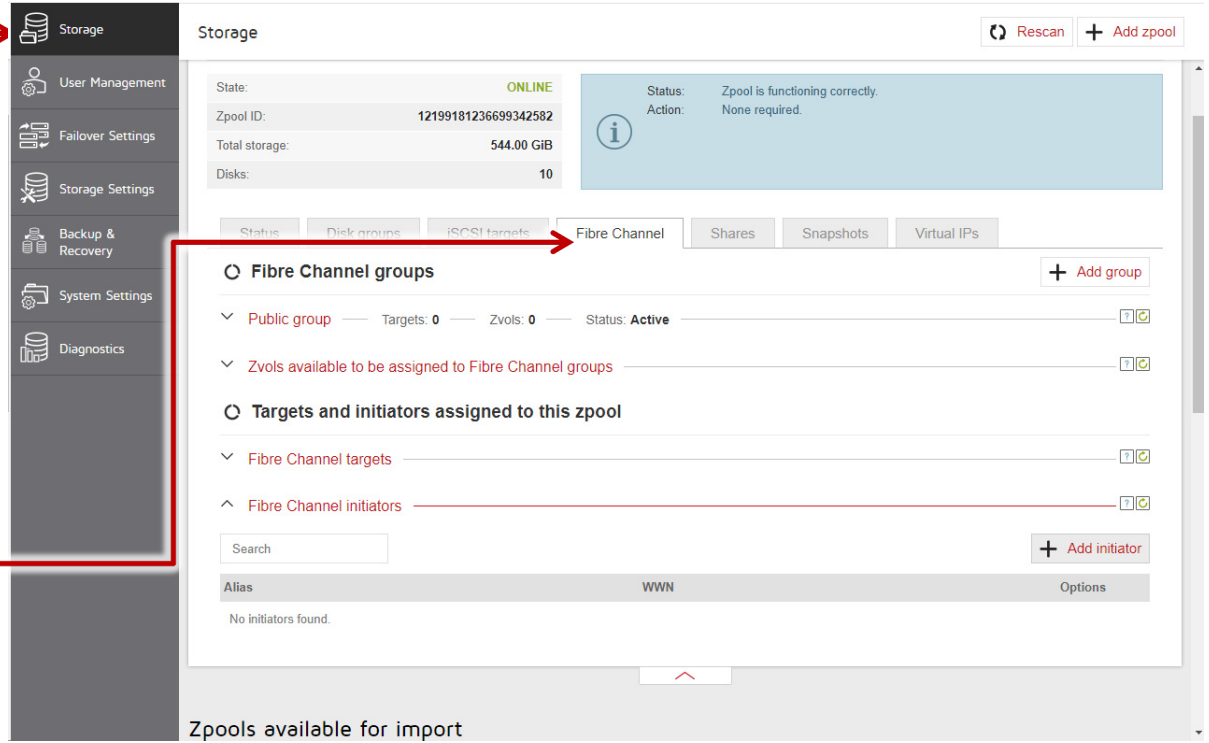
In the main menu, select **Storage**. In order to access the pool setup menu click the down arrow button in the middle bottom of the pool status section.



8. Add Initiator

JovianDSS: **node 61**
IP Address: 192.168.0.61

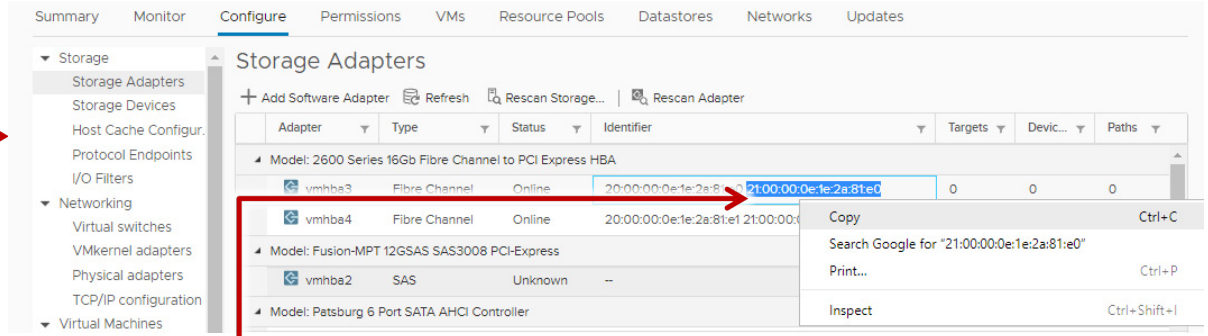
In the pool menu select **Fibre Channel**.



8. Add Initiator

ESX host
IP Address: 192.168.0.51

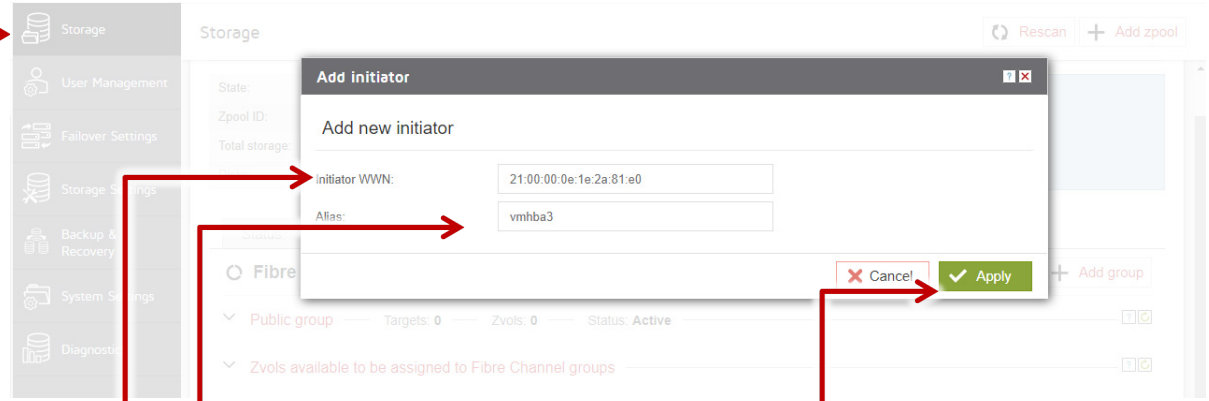
From **Storage Adapters** in VMware please select the text, then use the pop-up menu to copy the selected text to the clipboard.



8. Add Initiator

JovianDSS: **node 61**
IP Address: 192.168.0.61

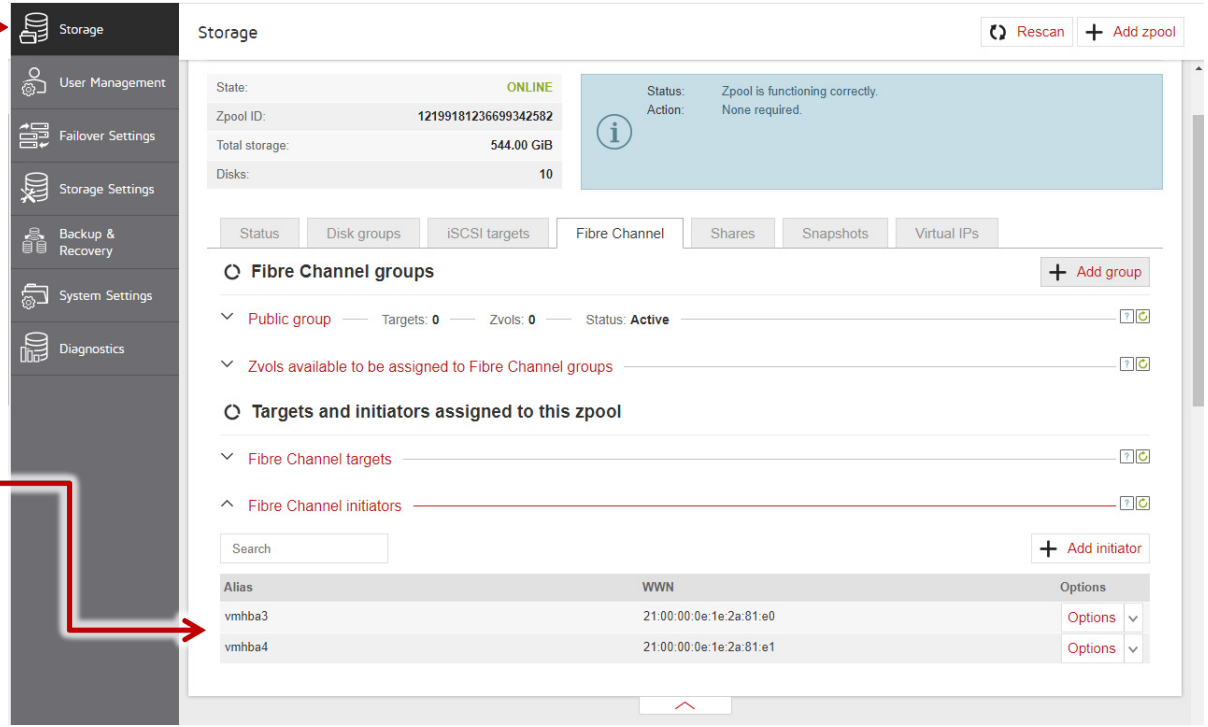
In **Add Initiator** please paste the previously saved text from the clipboard into the **Initiator WWN** field, and enter the **Alias** initiator. Next, click the **Apply** button. Repeat these steps for the second adapter.



8. Add Initiator

JovianDSS: **node 61**
IP Address: 192.168.0.61

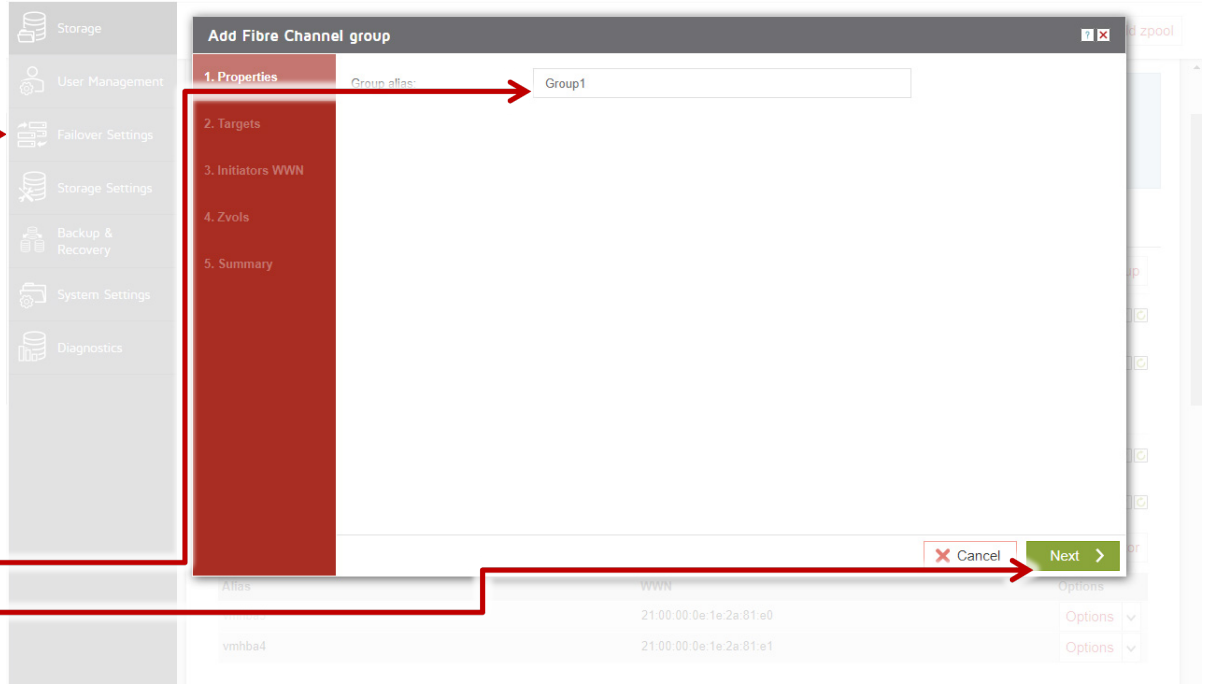
Initiators have been added.



9. Add group wizard

JovianDSS: **node 61**
IP Address: 192.168.0.61

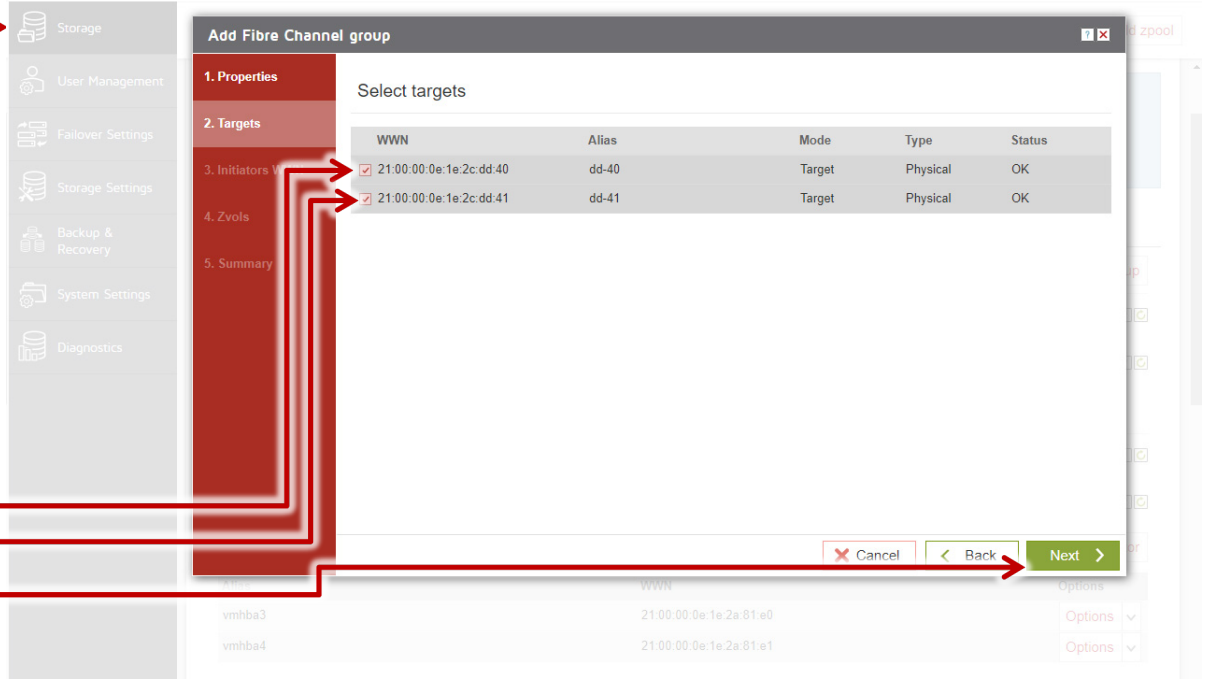
In **Add Fibre Channel group** wizard, in Properties step, please enter the name of **Group alias**. To confirm this name click the **Next** button.



9. Add group wizard

JovianDSS: **node 61**
IP Address: 192.168.0.61

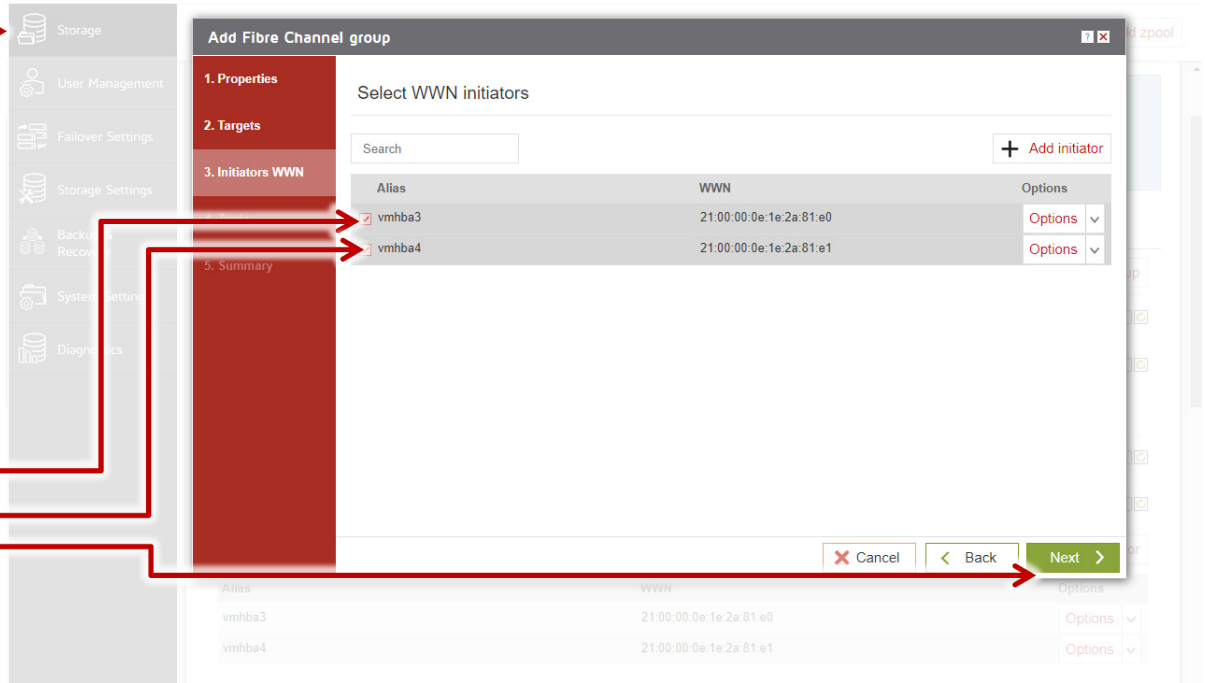
In the **Targets** step please Select proper WWNs and click the **Next** button.



9. Add group wizard

JovianDSS: **node 61**
IP Address: 192.168.0.61

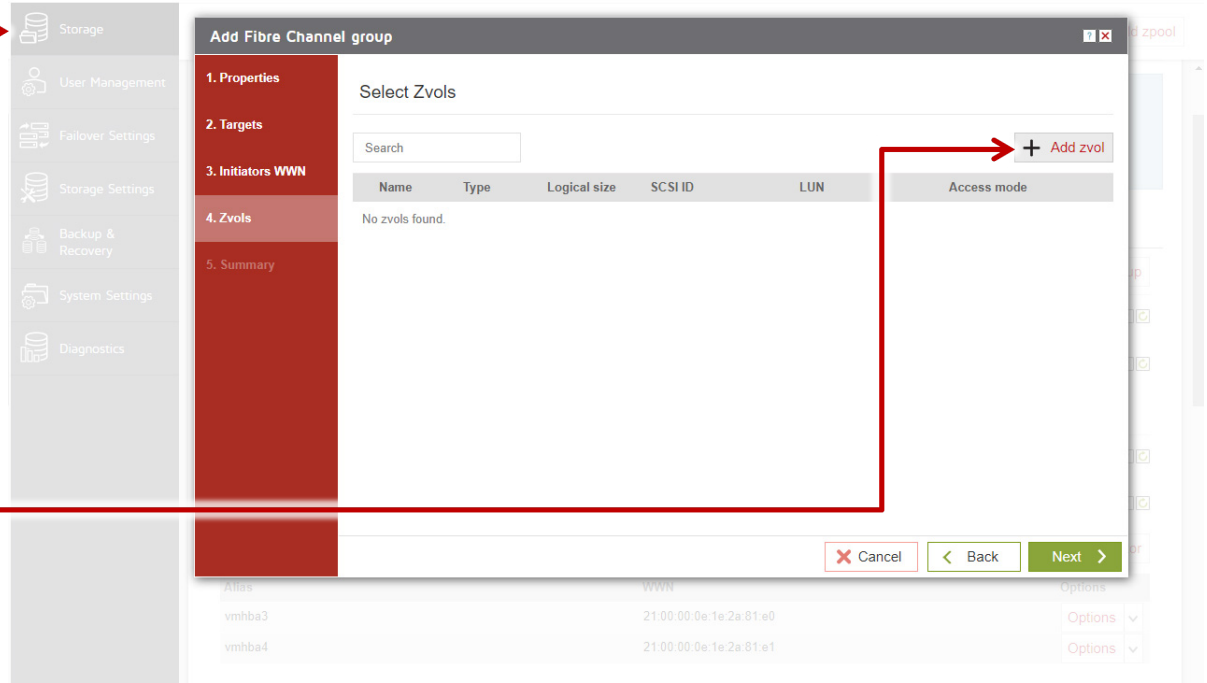
In the **Initiators WWN** step please select proper **Alias**es and click the **Next** button.



9. Add group wizard

JovianDSS: **node 61**
IP Address: 192.168.0.61

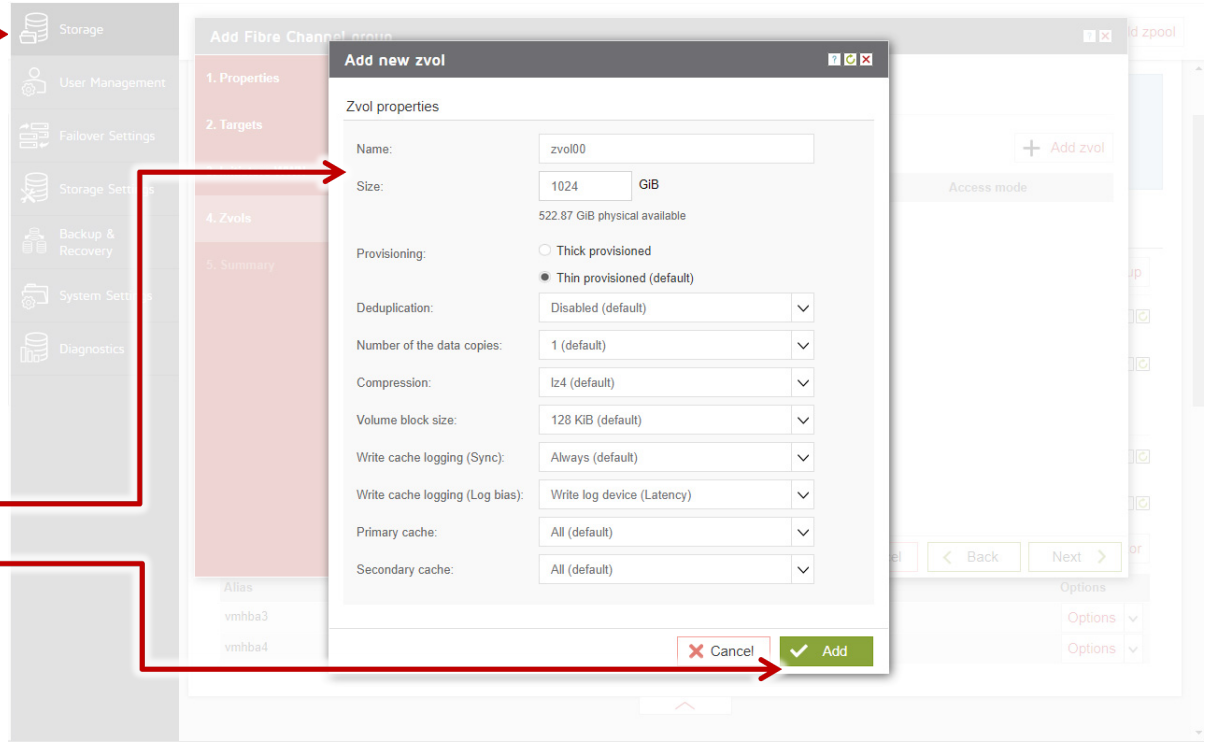
In **Zvols** step please click the **Add zvol** button.



9. Add group wizard

JovianDSS: **node 61**
IP Address: 192.168.0.61

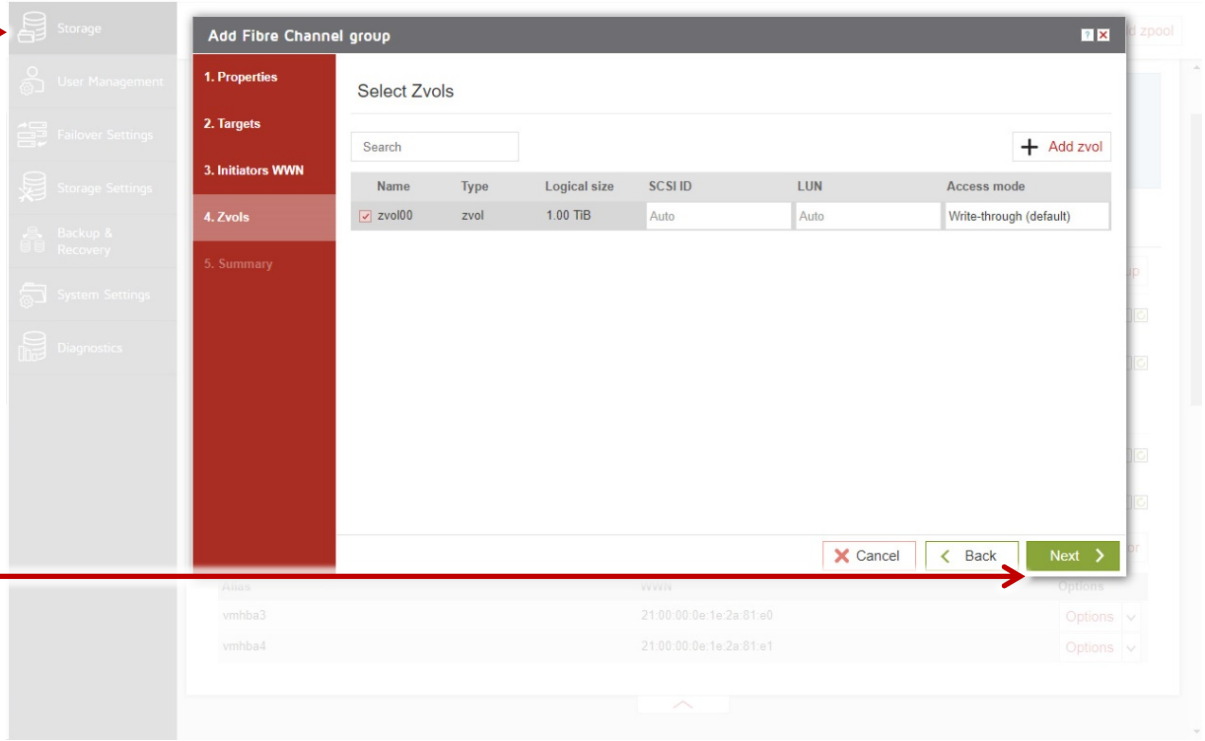
In **Add new zvol**, enter the name of a new Zvol and the appropriate size and click **Add** button.



9. Add group wizard

JovianDSS: **node 61**
IP Address: 192.168.0.61

After creating new **Zvols** click the **Next** button.

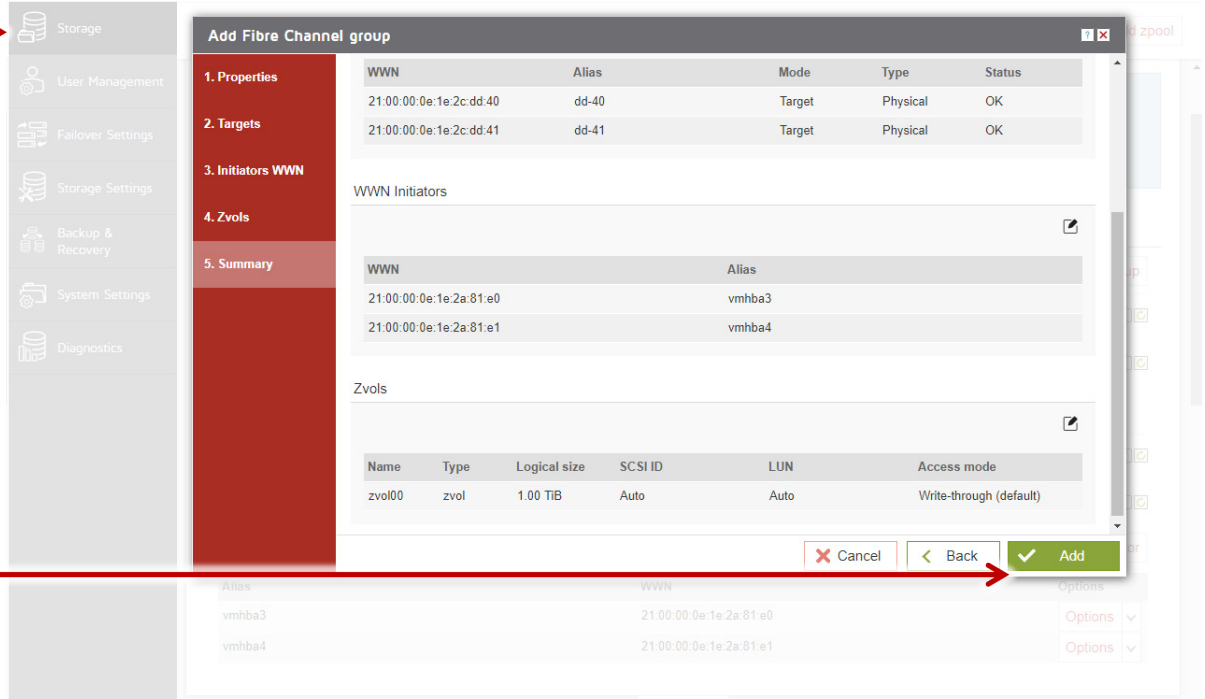


9. Add group wizard

JovianDSS: **node 61**
IP Address: 192.168.0.61

In **Summary** you are able to see an overview of the configuration of the **Fibre Channel Group**. If the settings need to be modified, click the **Back** button and make the required changes. If it is correct, click **Add**.

Go to the second node and create **Fibre Channel Group** accordingly.

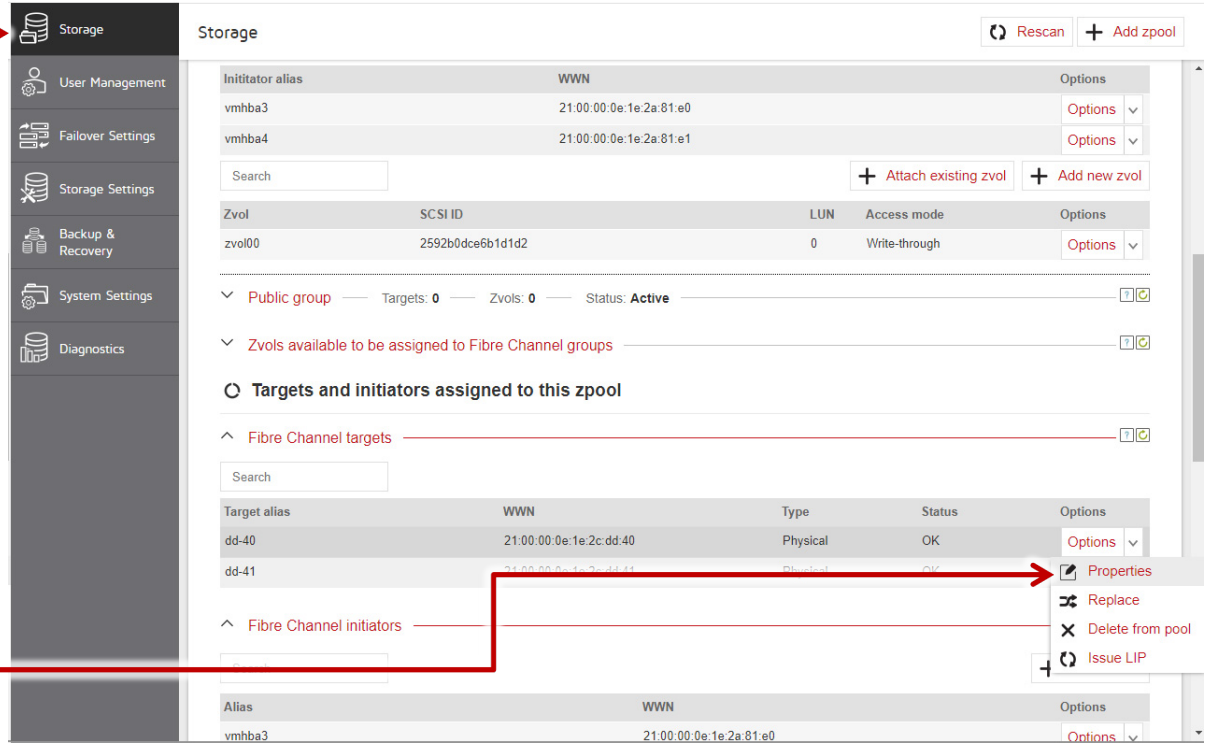


10. Add remote target

JovianDSS: **node 61**
IP Address: 192.168.0.61

After completion of the **Fibre Channel Group** wizard return to the **Storage**. Beside you will see the **Fibre channel targets** you are able to view and an overview of the configuration targets.

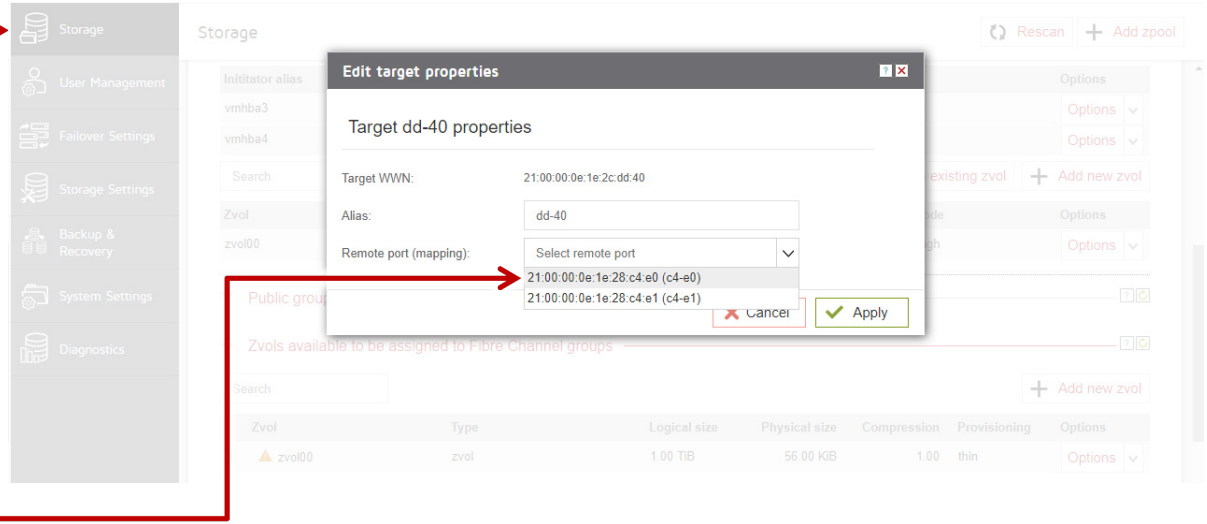
In the **Options** drop-down menu select **Properties**.



10. Add remote target

JovianDSS: **node 61**
IP Address: 192.168.0.61

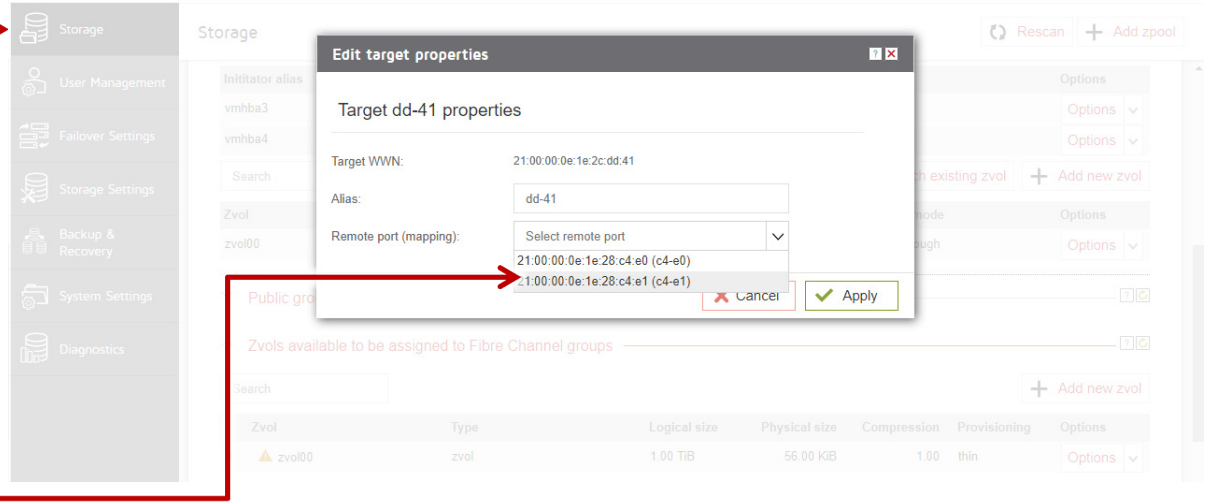
In the target properties select **Remote port** for alias **dd-40** and click the **Apply** button.



10. Add remote target

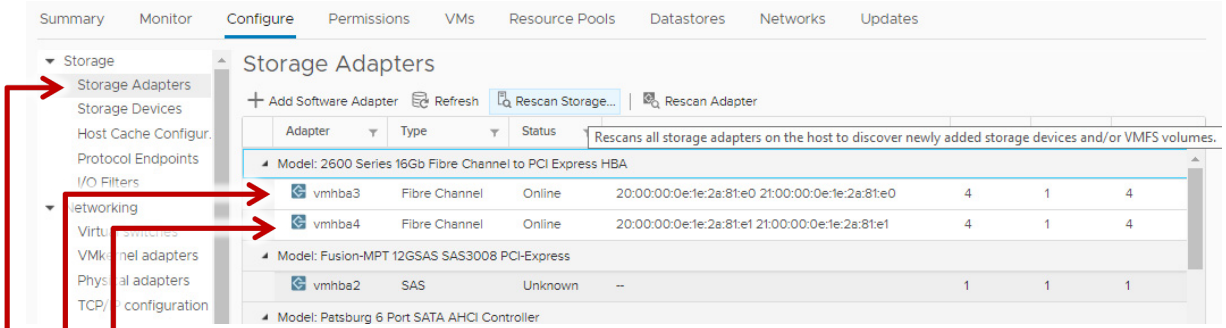
JovianDSS: **node 61**
IP Address: 192.168.0.61

Next, in this step select **Remote port** for the second target for the alias **dd-41**. Next, click the **Apply** button.



11. Rescan adapters

ESX host
IP Address: 192.168.0.51

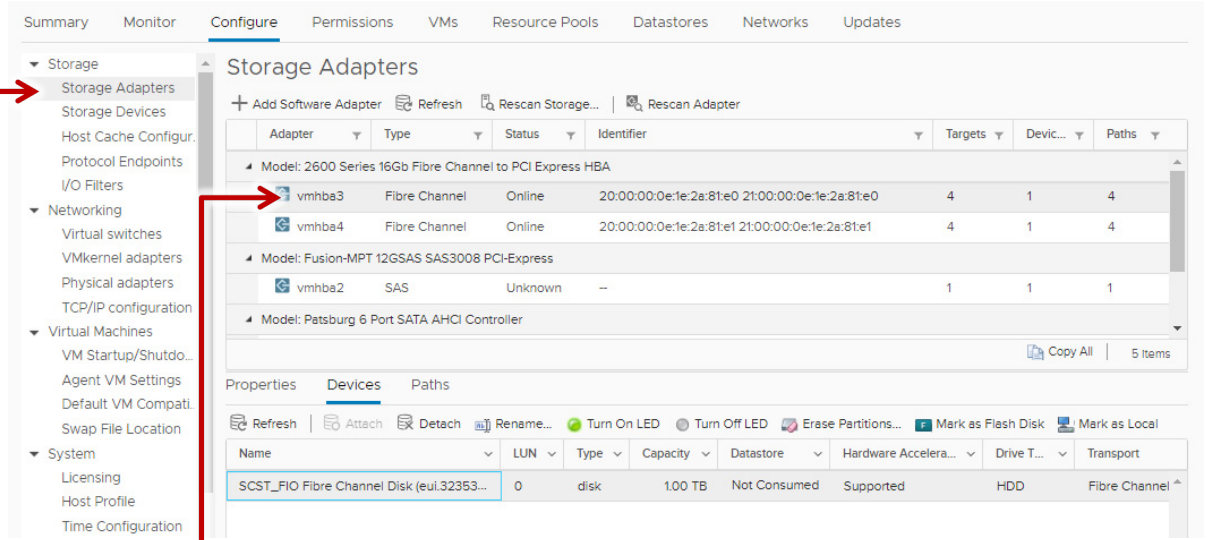


In **Storage Adapters**, you can check the connection of both remote ports for rescan.

12. Check adapters after rescan

ESX host
IP Address: 192.168.0.51

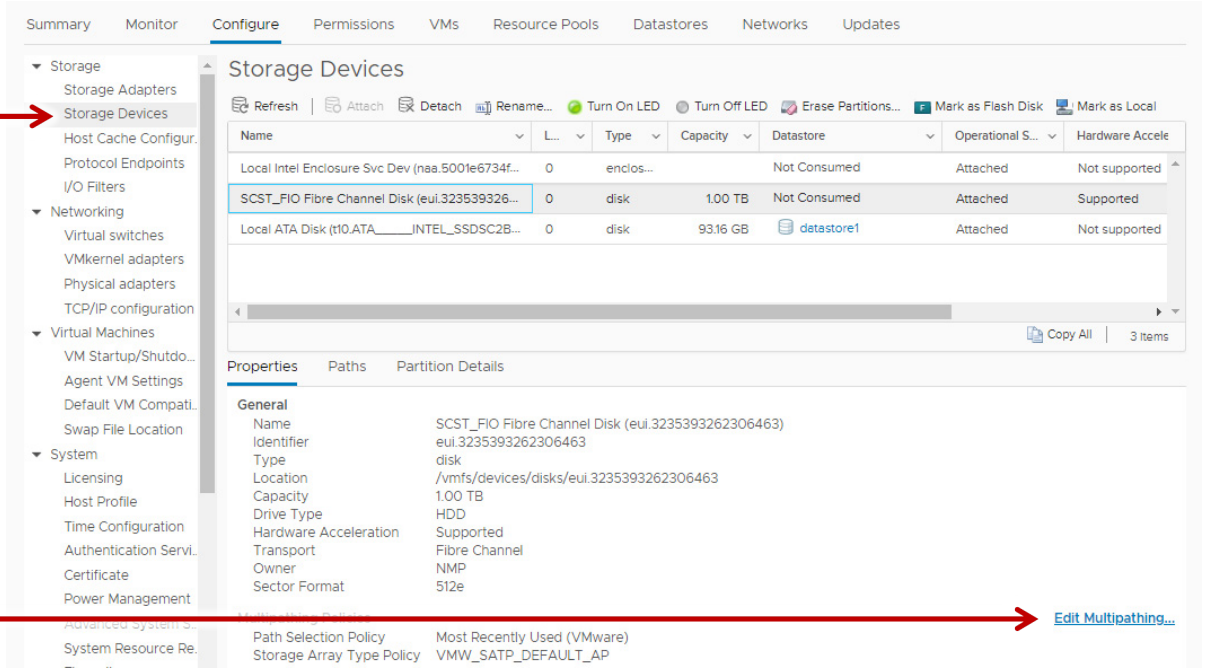
After the rescan, the new device (SCST_FIO) is listed below.



13. Edit multipath

ESX host
IP Address: 192.168.0.51

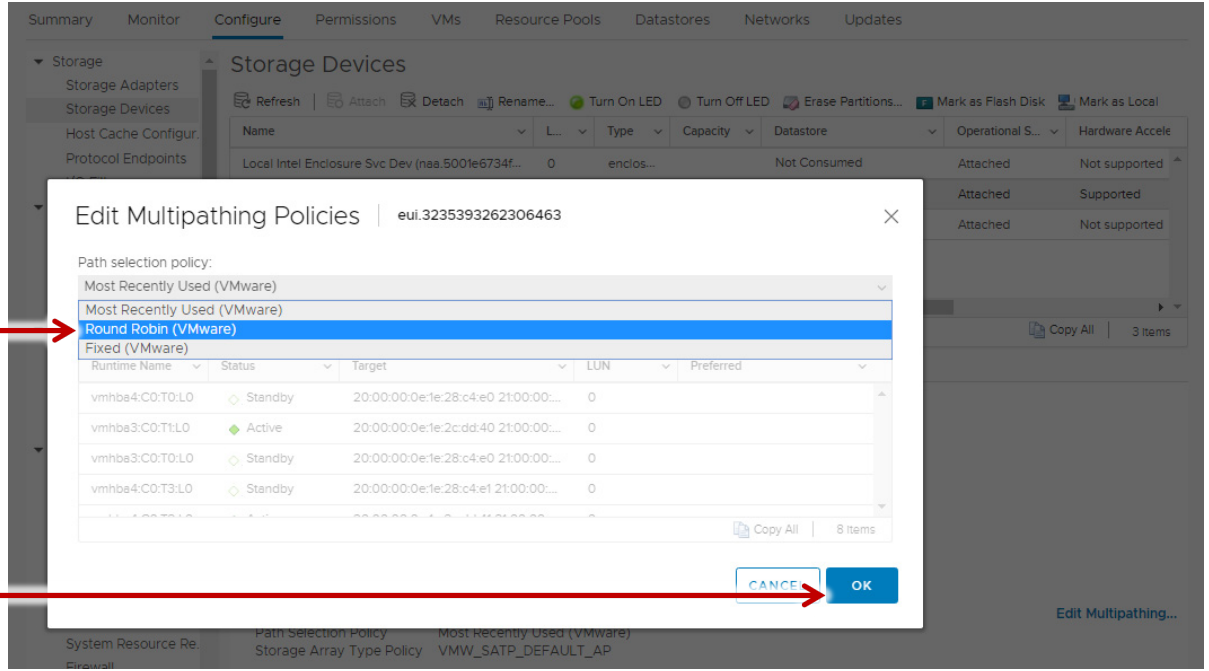
Next, go to **Storage Devices** and please click **Edit Multipath**.



13. Edit multipath

ESX host
IP Address: 192.168.0.51

In **Edit Multipathing Policies** select **Round Robin (VMware)** and click the **OK** button.

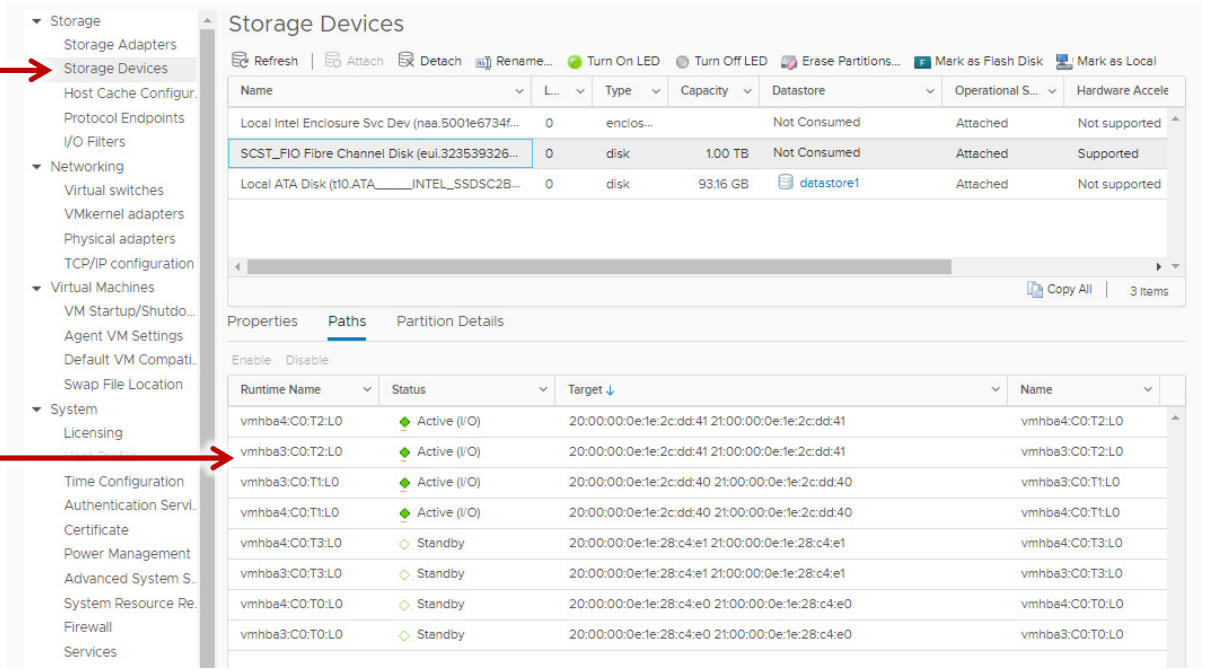


14. Path check

ESX host
IP Address: 192.168.0.51

Then, in **Storage Devices**, there should be 4 active and 4 passive paths listed.

The first initiator port “sees” 2 active target ports and the second initiator “sees” also the same 2 active targets. Similarly with standby paths.
The first initiator port “sees” 2 passive target ports and the second initiator “sees” also the same 2 passive targets.

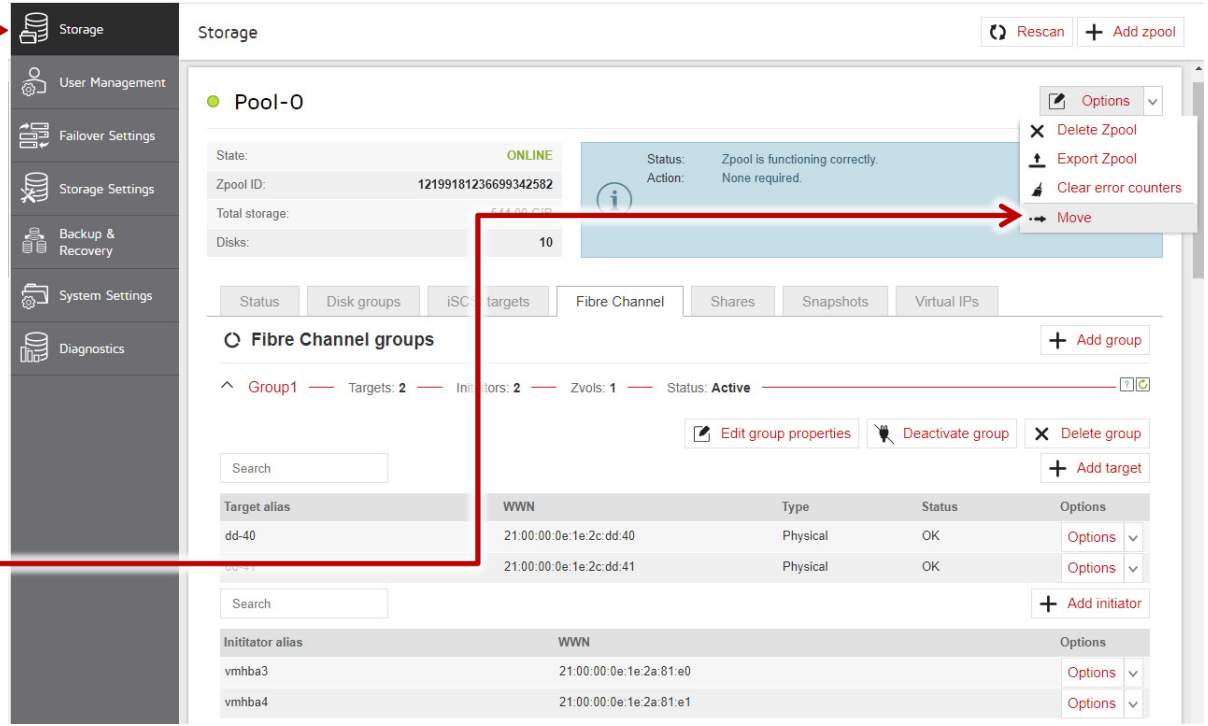


15. Move cluster

JovianDSS: **node 61**
IP Address: 192.168.0.61

Go to the main menu **Storage**. Now, in order to test failover, in the **Options** drop-down menu select **Move**.

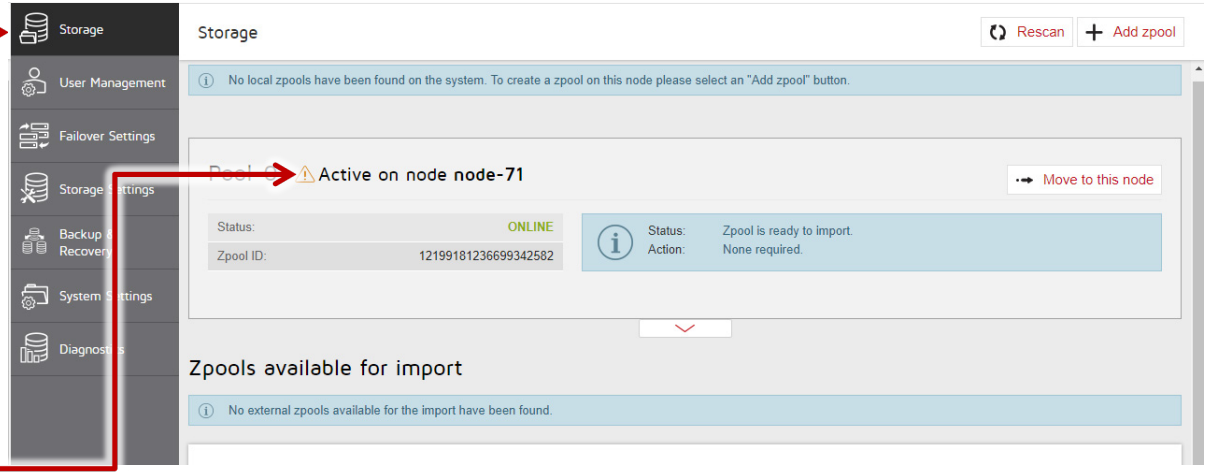
The pool will be exported on the current node and will be imported on the second node.



15. Move cluster

JovianDSS: **node 61**
IP Address: 192.168.0.61

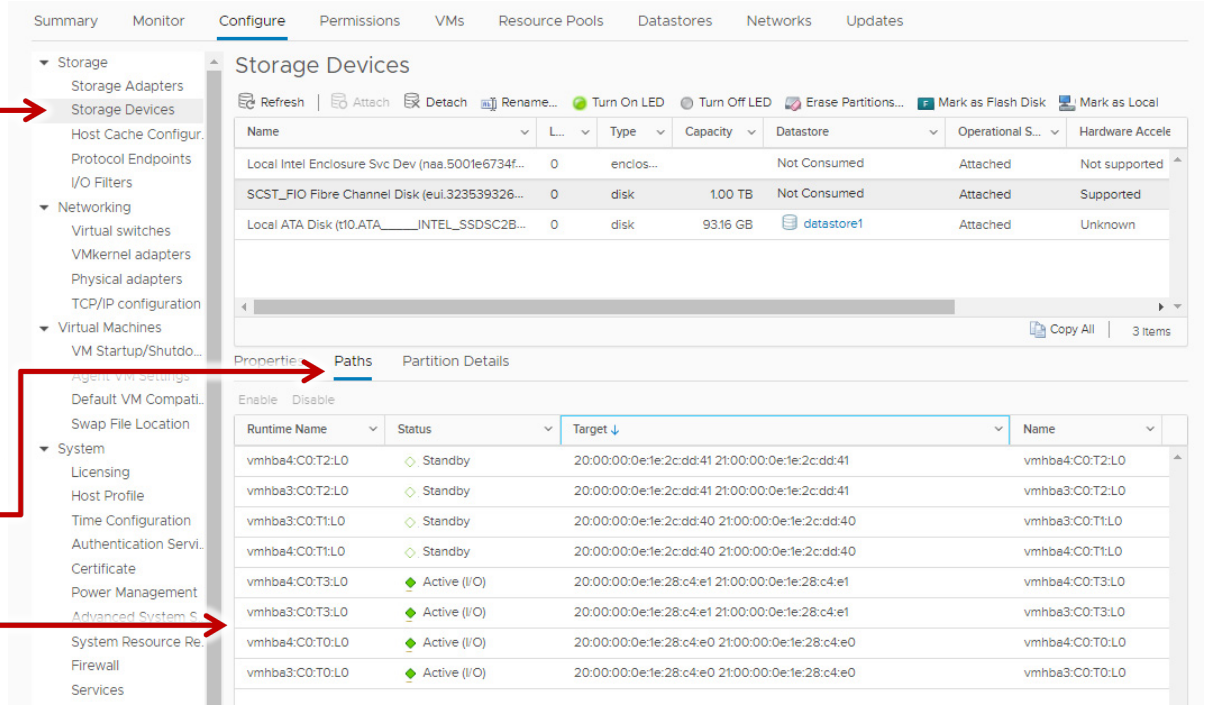
After moving, the pool is active on the node-7.



16. Cluster check after test move

ESX host
IP Address: 192.168.0.51

Now, In **Paths** we see the active-standby paths swapped.
(rescan or refresh on vCenter GUI may be required)



Thank You!