



We will use Multipath for link HA and improved performance. Install the needed packages first:

```
root@proxmox01:~# apt-get install open-iscsi multipath-tools root@proxmox02:~# apt-get install open-iscsi multipath-tools
```

Then we discover the target and login on both proxmox nodes:

```
root@proxmox01:~# systemctl start open-iscsi.service
```

```
root@proxmox01:~# iscsiadm -m discovery -t st -p 192.168.0.180
192.168.0.180:3260,1 iqn.2016-02.local.virtual:virtual.vg1
10.20.1.180:3260,1 iqn.2016-02.local.virtual:virtual.vg1

root@proxmox01:~# iscsiadm -m node --login

root@proxmox01:~# iscsiadm -m node
10.20.1.180:3260,1 iqn.2016-02.local.virtual:virtual.vg1
192.168.0.180:3260,1 iqn.2016-02.local.virtual:virtual.vg1

root@proxmox02:~# iscsiadm -m session -P 1
Target: iqn.2016-02.local.virtual:virtual.vg1 (non-flash)
Current Portal: 10.20.1.180:3260,1
Persistent Portal: 10.20.1.180:3260,1
*****
Interface:
*****
Iface Name: default
Iface Transport: tcp
Iface Initiatorname: iqn.1993-08.org.debian:01:674b46a9745
Iface IPaddress: 10.20.1.186
Iface Hwaddress: <empty>
Iface Netdev: <empty>
SID: 1
iSCSI Connection State: LOGGED IN
iSCSI Session State: LOGGED_IN
Internal iscsid Session State: NO CHANGE
Current Portal: 192.168.0.180:3260,1
Persistent Portal: 192.168.0.180:3260,1
*****
Interface:
*****
Iface Name: default
Iface Transport: tcp
Iface Initiatorname: iqn.1993-08.org.debian:01:674b46a9745
Iface IPaddress: 192.168.0.186
Iface Hwaddress: <empty>
Iface Netdev: <empty>
SID: 2
iSCSI Connection State: LOGGED IN
iSCSI Session State: LOGGED_IN
Internal iscsid Session State: NO CHANGE
```

```
root@proxmox01:~# ls SCSI
[0:0:0:0]    cd/dvd  QEMU      QEMU DVD-ROM    1.4.  /dev/sr0
[2:0:0:0]    disk    SCST_FIO  VDISK-LUN01     311   /dev/sdb
[3:0:0:0]    disk    SCST_FIO  VDISK-LUN01     311   /dev/sda
```

We can see two new SCSI block devices have been introduced to the system, /dev/sda and /dev/sdb. Next is Multipathing setup. First we find the WWID of the new device:

```
root@proxmox01:~# /lib/udev/scsi_id -g -d /dev/sda
23238363932313833

root@proxmox01:~# /lib/udev/scsi_id -g -d /dev/sdb
23238363932313833
```

that we then use in the Multipath config file /etc/multipath.conf that we create, for both proxmox nodes:



```
defaults {
    user_friendly_names    yes
    polling_interval        2
    path_selector           "round-robin 0"
    path_grouping_policy    multibus
    path_checker            readsector0
    getuid_callout          "/lib/udev/scsi_id -g -u -d /dev/%n"
    rr_min_io               100
    failback                immediate
    no_path_retry           queue
}
blacklist {
    wwid .*
}
blacklist_exceptions {
    wwid "23238363932313833"
    property "(ID SCSI_VPD|ID_WWN|ID_SERIAL)"
}
multipaths {
    multipath {
        wwid "23238363932313833"
        alias mylun
    }
}
```

and after loading Multipath kernel modules on both proxmox nodes:

```
root@proxmox02:~# modprobe -v dm_multipath
insmod /lib/modules/4.2.6-1-pve/kernel/drivers/scsi/device_handler/scsi_dh.ko
insmod /lib/modules/4.2.6-1-pve/kernel/drivers/md/dm-multipath.ko

root@proxmox02:~# modprobe -v dm_round_robin
insmod /lib/modules/4.2.6-1-pve/kernel/drivers/md/dm-round-robin.ko
```

and restarting Multipath service/daemon for both proxmox nodes:

```
root@proxmox01:~# systemctl stop multipath-tools.service
root@proxmox01:~# systemctl start multipath-tools.service
root@proxmox02:~# systemctl status -l multipath-tools.service
multipath-tools.service - LSB: multipath daemon
Loaded: loaded (/etc/init.d/multipath-tools)
Active: active (running) since Fri 2016-03-04 17:40:44 AEDT; 6s ago
Process: 8177 ExecStop=/etc/init.d/multipath-tools stop (code=exited, status=0/SUCCESS)
Process: 8191 ExecStart=/etc/init.d/multipath-tools start (code=exited, status=0/SUCCESS)
CGroup: /system.slice/multipath-tools.service
└─8195 /sbin/multipathd

Mar 04 17:40:44 proxmox02 multipath-tools[8191]: Starting multipath daemon: multipathd.
Mar 04 17:40:44 proxmox02 multipathd[8195]: sda: using deprecated getuid callout
Mar 04 17:40:44 proxmox02 multipathd[8195]: sdb: using deprecated getuid callout
Mar 04 17:40:44 proxmox02 multipathd[8195]: mylun: load table [0 41934848 multipath 1
queue_if_no_path 0 1 1 round-robin 0 2 1 8:0 1 8:16 1]
Mar 04 17:40:44 proxmox02 multipathd[8195]: mylun: event checker started
Mar 04 17:40:44 proxmox02 multipathd[8195]: path checkers start up
```

we can see the multipath device mylun created:

```
root@proxmox01:~# multipath -ll
mylun (23238363932313833) dm-1 SCST_FIO,VDISK-LUN01
size=20G features='1 queue_if_no_path' hwhandler='0' wp=rw
`-+- policy='round-robin 0' prio=1 status=active
   |- 2:0:0:0 sdb 8:16 active ready running
   `- 3:0:0:0 sda 8:0 active ready running

root@proxmox01:~# dmsetup ls
```



```
pve-swap    (251:3)
pve-root    (251:0)
mylun       (251:1)
pve-data    (251:4)
vg_drbd0-vm--107--disk--1    (251:5)
vg_proxmox-lv_proxmox    (251:2)
```

Next we create the volume group on one proxmox node only:

```
root@proxmox01:~# pvcreate /dev/mapper/mylun root@proxmox01:~# vgcreate vg_iscsi /dev/mapper/mylun
```

Finally, using the PVE web GUI, we add new LVM storage using the newly created vg_iscsi volume group in the Datacenter and set it as Active and Shared.

The screenshot shows the Proxmox VE 5.2-10 web interface. On the left, the 'Server View' sidebar shows a 'Datacenter' tree with a 'gamora' node containing various VMs. The main panel shows the 'Datacenter' view with a left sidebar menu where 'Storage' is selected. A dropdown menu is open over the 'Add' button, showing options like 'Directory', 'LVM', 'LVM-Thin', 'NFS', 'CIFS', 'GlusterFS', 'iSCSI', 'RBD', 'ZFS over iSCSI', and 'ZFS'. The 'LVM' option is highlighted. Below this, a modal window titled 'Add: LVM' is open, showing the configuration for a new LVM storage. The fields are: ID: yondu, Nodes: All (No restrictions), Base storage: Existing volume groups, Volume group: yondu_iscsi, Content: Disk image, Container, Enable: checked, and Shared: checked. An 'Add' button is at the bottom right of the modal.

Type	Content
Directory	VZDump bac
Directory	VZDump bac
Directory	Disk image, (
NFS	VZDump bac
Directory	Disk image, I
NFS	VZDump bac
NFS	VZDump bac
LVM	Disk image, (

Add: LVM

ID: Nodes:

Base storage: Enable: ☒

Volume group: Shared: ☒

Content:

Add

At the end, in order to log in and establish the sessions to the iSCSI targets on reboot we set the startup mode to automatic in the iscsi initiator config file /etc/iscsi/iscsid.conf on both proxmox nodes:

```
[...]
node.startup = automatic
[...]
```



We can see all the shared VG's and volumes created in the cluster on both nodes for all 3 storage types we have setup above:

```
root@proxmox01:~# vgs
VG          #PV #LV #SN Attr   VSize  VFree
pve         1   3   0 wz--n- 31.87g 3.87g
vg_drbd0    1   1   0 wz--n-  9.31g 3.31g
vg_drbd1    1   1   0 wz--n- 11.68g 5.68g
vg_iscsi    1   1   0 wz--n- 19.99g 13.99g
vg_proxmox  1   1   0 wz--n- 20.00g  0

root@proxmox01:~# lvs
LV          VG          Attr      LSize  Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert
data        pve          -wi-ao---- 16.38g
root        pve          -wi-ao----  7.75g
swap        pve          -wi-ao----  3.88g
vm-107-disk-1 vg_drbd0    -wi-ao----  6.00g
vm-106-disk-1 vg_drbd1    -wi-ao----  6.00g
vm-108-disk-1 vg_iscsi    -wi-ao----  6.00g
lv_proxmox  vg_proxmox  -wi-ao---- 20.00g

root@proxmox02:~# vgs
VG          #PV #LV #SN Attr   VSize  VFree
pve         1   3   0 wz--n- 31.87g 3.87g
vg_drbd0    1   1   0 wz--n-  9.31g 3.31g
vg_drbd1    1   1   0 wz--n- 11.68g 5.68g
vg_iscsi    1   1   0 wz--n- 19.99g 13.99g
vg_proxmox  1   1   0 wz--n- 20.00g  0

root@proxmox02:~# lvs
LV          VG          Attr      LSize  Pool Origin Data%  Meta%  Move Log Cpy%Sync Convert
data        pve          -wi-ao---- 16.38g
root        pve          -wi-ao----  7.75g
swap        pve          -wi-ao----  3.88g
vm-107-disk-1 vg_drbd0    -wi-ao----  6.00g
vm-106-disk-1 vg_drbd1    -wi-ao----  6.00g
vm-108-disk-1 vg_iscsi    -wi-ao----  6.00g
lv_proxmox  vg_proxmox  -wi-ao---- 20.00g
```