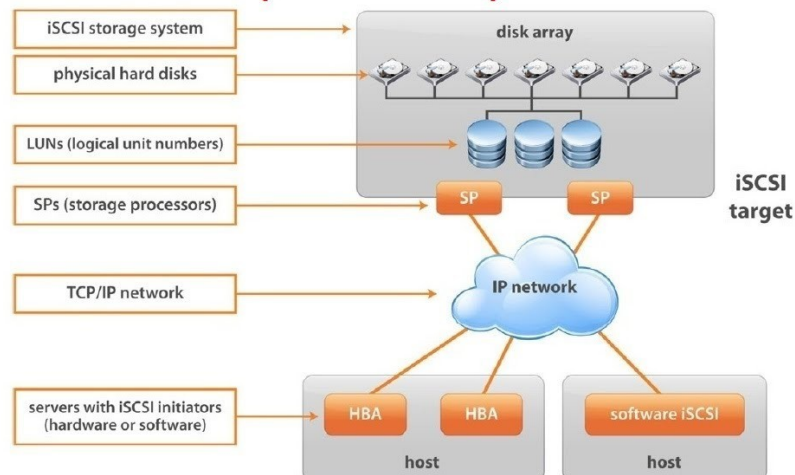


# Configure iSCSI Target (Server) & Initiator (Client) in Linux (RHEL)

## How to Setup iSCSI Server (Target) and Client (Initiator) in RHEL 7



### Install & Configure iSCSI Target (Server) as well as iSCSI Initiator (Client) in RHEL

=====

iSCSI stands for Internet Small Computer Systems Interface.

iSCSI is a transport layer protocol that works on top of the Transport Control Protocol (TCP). It enables block-level SCSI data transport between the iSCSI initiator and the storage target over TCP/IP networks.

iSCSI supports encrypting the network packets, and decrypts upon arrival at the target.

SCSI is a block-based set of commands that connects computing devices to networked storage, including spinning up storage media and data reads/writes.

The protocol uses initiators to send SCSI commands to storage device targets on remote servers. Storage targets may be SAN, NAS, tape, general-purpose servers – both SSD and HDD – LUNs, or others. The protocol allows admins to better utilize shared storage by allowing hosts to store data to remote networked storage, and virtualizes remote storage for applications that require direct attached storage.

NFS, Samba, AFS (NAS Based Tools) work at filesystem level, whereas iSCSI (SAN Based like AoE) works at block level.

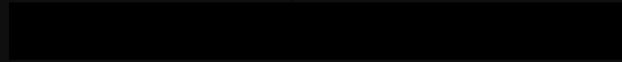
iSCSI Target => iSCSI Server

iSCSI initiator => iSCSI Client

iSCSI Target (Server) Configuration: (RHEL 7): 192.168.1.104

## yum repolist

Local Yum Repo Configuration:



## ifconfig

**hostnamectl set-hostname server.nehraqclasses.local**

**hostnamectl**

**yum install -y targetcli**

**lsblk**

OR

**fdisk -l**

**targetcli**

## ls

BLOCK = Block-device based LUN Storage Space like Disk e.g. /dev/sdb.

FILEIO = File based LUN Storage Space like file created with dd command.

PSCSI = (SCSI Pass-through) Physical Disk based LUN Storage Space like CD-ROM.

RamDisk= Ramdisk based LUN Storage Space for higher IO speed.

**/backstores/block create newlun /dev/sdb**

## ls

**/iscsi create**

## ls

iscsi

-iqn

-tpg1 = target portal group

-acl = provide the access to luns with the help of client iqn number

-luns = which lun has to mapped or to be accessed by client

-portals = network cards, ip address, port number

-0.0.0.0:3260

```
/iscsi/iqn.2003-01.org.linux-iscsi.server.x8664:sn.89b50c23d34a/tpg1/luns  
create /backstores/block/newlun
```

```
ls
```

Go to Client & Copy Number with cat /etc/iscsi/initiatorname.iscsi

```
/iscsi/iqn.2003-01.org.linux-iscsi.server.x8664:sn.89b50c23d34a/tpg1/acls  
create iqn.1994-05.com.redhat:3e9d906e8
```

```
ls
```

```
exit
```

Client Configuration: (RHEL 7): 192.168.1.105

---

```
yum repolist
```

```
ifconfig
```

```
hostnamectl set-hostname client.nehraclasses.local
```

```
hostnamectl
```

```
yum install -y iscsi-initiator-utils
```

```
lsblk
```

OR

```
fdisk -l
```

```
cat /etc/iscsi/initiatorname.iscsi
```

```
iscsiadm --help
```

```
iscsiadm -m discovery -t sendtargets -p 192.168.1.104
```

```
iscsiadm -m node -T iqn.2003-01.org.linux-iscsi.server.x8664:sn.89b50c23d34a  
192.168.1.104 -l
```

```
lsblk
```

```
OR
```

```
fdisk -l
```

```
cat /proc/scsi/scsi
```

```
mkdir -p /newlun
```

```
mkfs.ext4 /dev/sdb
```

```
mount /dev/sdb /newlun
```

```
cd /newlun
```

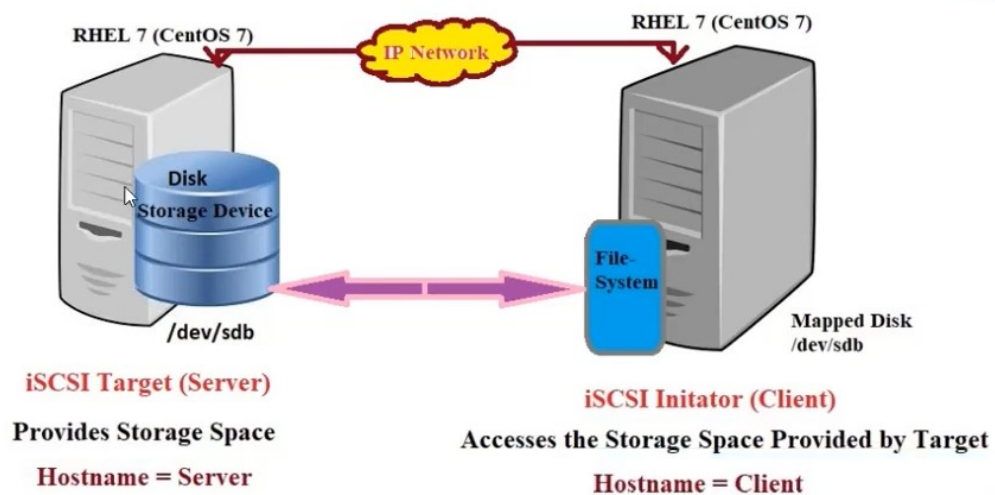
```
touch test{1..10}.txt
```

```
mkdir aa bb cc dd
```

```
ls -lh
```

Simplified iSCSI Target & Initiator Diagram

Nehra



```
[root@server ~]# ifconfig
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.1.104 netmask 255.255.255.0 broadcast 192.168.1.255
    inet6 fe80::a270:38d4:3497:d5a8 prefixlen 64 scopeid 0x20<link>
    ether 00:0c:29:ce:76:e3 txqueuelen 1000 (Ethernet)
    RX packets 4116 bytes 2009319 (1.9 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 1334 bytes 131787 (128.6 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 64 bytes 5440 (5.3 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 64 bytes 5440 (5.3 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

virbr0: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    inet 192.168.122.1 netmask 255.255.255.0 broadcast 192.168.122.255
    ether 52:54:00:9e:62:69 txqueuelen 1000 (Ethernet)
```

#### # another Machine ip add

```
[root@client ~]# clear
[root@client ~]# ifconfig
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.1.105 netmask 255.255.255.0 broadcast 192.168.1.255
    inet6 fe80::a04b:10fb:5109:55af prefixlen 64 scopeid 0x20<link>
    inet6 fe80::a270:38d4:3497:d5a8 prefixlen 64 scopeid 0x20<link>
    ether 00:0c:29:a9:7b:e2 txqueuelen 1000 (Ethernet)
    RX packets 3431 bytes 1896751 (1.8 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 1094 bytes 100844 (98.4 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 64 bytes 5440 (5.3 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 64 bytes 5440 (5.3 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

```
[root@server ~]# yum repolist
Loaded plugins: langpacks, product-id, search-disabled-repos, subscription-manager
This system is not registered with an entitlement server. You can use subscription-manager to register.
repo id                                repo name                                status
localrepo                              localrepo                                5,229
repolist: 5,229
[root@server ~]#
```



```
[root@server ~]# hostnamectl set-hostname server.nehraclasses.local
[root@server ~]# hostnamectl
  Static hostname: server.nehraclasses.local
    Icon name: computer-vm
    Chassis: vm
    Machine ID: 64d92f3de1064b2abca735acdbc50e5b
    Boot ID: 4adad5e800014c6a80a3effc34ba0a17
  Virtualization: vmware
  Operating System: Red Hat Enterprise Linux Server 7.7 (Maipo)
    CPE OS Name: cpe:/o:redhat:enterprise_linux:7.7:GA:server
    Kernel: Linux 3.10.0-1062.el7.x86_64
  Architecture: x86-64
[root@server ~]#
```

```
[root@server ~]# yum install -y targetcli
Loaded plugins: langpacks, product-id, search-disabled-repos, subscription-manager
This system is not registered with an entitlement server. You can use subscription-manager to register.
Resolving Dependencies
--> Running transaction check
--> Package targetcli.noarch 0:2.1.fb49-1.el7 will be installed
--> Processing Dependency: python-rtslib >= 2.1.fb41 for package: targetcli-2.1.fb49-1.el7.noarch
--> Processing Dependency: python-configshell for package: targetcli-2.1.fb49-1.el7.noarch
--> Running transaction check
--> Package python-configshell.noarch 1:1.1.fb25-1.el7 will be installed
--> Processing Dependency: python-urwid for package: 1:python-configshell-1.1.fb25-1.el7.noarch
--> Processing Dependency: pyparsing for package: 1:python-configshell-1.1.fb25-1.el7.noarch
--> Package python-rtslib.noarch 0:2.1.fb69-3.el7 will be installed
--> Processing Dependency: python-kmod for package: python-rtslib-2.1.fb69-3.el7.noarch
--> Running transaction check
--> Package pyparsing.noarch 0:1.5.6-9.el7 will be installed
```

```
Installing : targetcli-2.1.fb49-1.el7.noarch
Verifying : python-urwid-1.1.1-3.el7.x86_64
Verifying : targetcli-2.1.fb49-1.el7.noarch
Verifying : 1:python-configshell-1.1.fb25-1.el7.noarch
Verifying : python-rtslib-2.1.fb69-3.el7.noarch
Verifying : pyparsing-1.5.6-9.el7.noarch
Verifying : python-kmod-0.9-4.el7.x86_64
localrepo/productid
Installed:
  targetcli.noarch 0:2.1.fb49-1.el7

Dependency Installed:
  pyparsing.noarch 0:1.5.6-9.el7          python-configshell.noarch 1:1.1
  python-kmod.x86_64 0:0.9-4.el7          python-rtslib.noarch 0:2.1.fb69
  python-urwid.x86_64 0:1.1.1-3.el7

Complete!
[root@server ~]#
```

# 2GB used for iSCSI Storage will map to Client side iSCSI Target

```
[root@server ~]# lsblk
NAME        MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
sda          8:0    0   20G  0 disk
├─sda1       8:1    0    1G  0 part /boot
├─sda2       8:2    0   19G  0 part
│   └─rhel-root 253:0    0   17G  0 lvm  /
│       └─rhel-swap 253:1    0    2G  0 lvm  [SWAP]
sdb          8:16    0    2G  0 disk
sr0         11:0    1   4.2G  0 rom  /mnt
[root@server ~]#
```

# Client Machine

```
[root@client ~]# yum repolist
Loaded plugins: langpacks, product-id, search-disabled-repos, subscription-manager
This system is not registered with an entitlement server. You can use subscription-manager to register.
repo id                                repo name                                status
localrepo                              localrepo                                5,229
repolist: 5,229
[root@client ~]# hostnamectl set-hostname client.nehrclasses.local
[root@client ~]# hostnamectl
  Static hostname: client.nehrclasses.local
            Icon name: computer-vm
            Chassis: vm
            Machine ID: 64d92f3de1064b2abca735acdbc50e5b
            Boot ID: b251b967a0464f78a79c7bc5c9e2604d
    Virtualization: vmware
  Operating System: Red Hat Enterprise Linux Server 7.7 (Maipo)
        CPE OS Name: cpe:/o:redhat:enterprise_linux:7.7:GA:server
        Kernel: Linux 3.10.0-1062.el7.x86_64
    Architecture: x86-64
[root@client ~]#
```

```
[root@client ~]# lsblk
NAME                                MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
sda                                8:0    0   20G  0 disk
├─sda1                            8:1    0    1G  0 part /boot
├─sda2                            8:2    0   19G  0 part
│   └─rhel-root                  253:0    0   17G  0 lvm  /
│       └─rhel-swap              253:1    0    2G  0 lvm  [SWAP]
sr0                               11:0    1   4.2G  0 rom  /mnt
[root@client ~]#
```

```
[root@client ~]# yum install -y iscsi-initiator-utils
Loaded plugins: langpacks, product-id, search-disabled-repos, subscription-manager
This system is not registered with an entitlement server. You can use subscription-manager to register.
Package iscsi-initiator-utils-6.2.0.874-11.el7.x86_64 already installed and latest version
Nothing to do
[root@client ~]#
```

## # server

```
[root@server ~]# targetcli
targetcli shell version 2.1.fb49
Copyright 2011-2013 by Datera, Inc and others.
For help on commands, type 'help'.

/> help
```

/> help

```

AVAILABLE COMMANDS
=====
The following commands are available in the
current path:

- bookmarks action [bookmark]
- cd [path]
- clearconfig [confirm]
- exit
- get [group] [parameter...]
- help [topic]
- ls [path] [depth]
- pwd
- refresh
- restoreconfig [savefile] [clear_existing]
- saveconfig [savefile]
- sessions [action] [sid]
- set [group] [parameter=value...]
- status
- version

/> █

```

```

/> ls
o- / .....
  o- backstore .....
    o- block .....
    o- fileio .....
    o- pscsi .....
    o- ramdisk .....
  o- iscsi .....
  o- loopback .....
/> █

```

**BLOCK** = Block-device based LUN Storage Space like Disk e.g. /dev/sdb.  
**FILEIO** = File based LUN Storage Space like file created with dd command.  
**PSCSI** = (SCSI Pass-through) Physical Disk based LUN Storage Space like CD-ROM.  
**RamDisk** = Ramdisk based LUN Storage Space for higher IO speed.

```

/> /backstores/block create newlun /dev/sdb
Created block storage object newlun using /dev/sdb.
/> ls
o- / .....
  o- backstores .....
    o- block ..... [Storage Objects: 1]
      o- newlun ..... [/dev/sdb (2.0GiB) write-thru deactivated]
        o- alua ..... [ALUA Groups: 1]
          o- default_tg_pt_gp ..... [ALUA state: Active/optimized]
      o- fileio ..... [Storage Objects: 0]
      o- pscsi ..... [Storage Objects: 0]
      o- ramdisk ..... [Storage Objects: 0]
  o- iscsi ..... [Targets: 0]
  o- loopback ..... [Targets: 0]

```

**#Create Target IQN Number of Server + TPG number - Tagetted Portal Groups**

```

/> /iscsi create
Created target iqn.2003-01.org.linux-iscsi.server.x8664:sn.587a967e3ced.1
Created TPG 1.
Global pref auto_add_default_portal=true
Created default portal listening on all IPs (0.0.0.0), port 3260.
/> █

```



```

/> ls
o- / ..... [..]
o- backstores ..... [..]
  o- block ..... [Storage Objects: 1]
    o- newlun ..... [/dev/sdb (2.0GiB) write-thru deactivated]
      o- alua ..... [ALUA Groups: 1]
        o- default_tg_pt_gp ..... [ALUA state: Active/optimized]
  o- fileio ..... [Storage Objects: 0]
  o- pscsi ..... [Storage Objects: 0]
  o- ramdisk ..... [Storage Objects: 0]
o- iscsi ..... [Targets: 1]
  o- iqn.2003-01.org.linux-iscsi.server.x8664:sn.587a967e3ced ..... [TPGs: 1]
    o- tpg1 ..... [no-gen-acls, no-auth]
      o- acls ..... [ACLs: 0]
      o- luns ..... [LUNs: 0]
      o- portals ..... [Portals: 0]
      o- 0.0.0.0:3260 ..... [..]
o- loopback ..... [..]
/>

```

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```

/> /iscsi/iqn.2003-01.org.linux-iscsi.server.x8664:sn.587a967e3ced/tpg1/luns create /backstores/block/newlun
Created LUN 0.
/> ls

```

```

/> ls
o- / ..... [..]
o- backstores ..... [..]
  o- block ..... [Storage Objects: 1]
    o- newlun ..... [/dev/sdb (2.0GiB) write-thru activated]
      o- alua ..... [ALUA Groups: 1]
        o- default_tg_pt_gp ..... [ALUA state: Active/optimized]
  o- fileio ..... [Storage Objects: 0]
  o- pscsi ..... [Storage Objects: 0]
  o- ramdisk ..... [Storage Objects: 0]
o- iscsi ..... [Targets: 1]
  o- iqn.2003-01.org.linux-iscsi.server.x8664:sn.587a967e3ced ..... [TPGs: 1]
    o- tpg1 ..... [no-gen-acls, no-auth]
      o- acls ..... [ACLs: 0]
      o- luns ..... [LUNs: 1]
        o- lun0 ..... [block/newlun (/dev/sdb) (..)]
      o- portals ..... [Portals: 0]
      o- 0.0.0.0:3260 ..... [..]
o- loopback ..... [..]

```

# Cleint IQN number

```

[root@client ~]# cat /etc/iscsi/initiatorname.iscsi
InitiatorName=iqn.1994-05.com.redhat:3e9d906e8
[root@client ~]#

```

# Go bck to server

```

/iscsi/iqn.2003-01.org.linux-iscsi.server.x8664:sn.89b50c23d34a/tpg1/acls
create iqn.1994-05.com.redhat:3e9d906e8
Created Node ACL for iqn.1994-05.com.redhat:3e9d906e8
Created mapped LUN 0.
/>

```

```

o- / ..... [ ... ]
o- backstores ..... [ ... ]
o- block ..... [Storage Objects: 1]
o- newlun ..... [/dev/sdb (2.0GiB) write-thru activated]
o- alua ..... [ALUA Groups: 1]
o- default_tg_pt_gp ..... [ALUA state: Active/optimized]
o- fileio ..... [Storage Objects: 0]
o- pscsi ..... [Storage Objects: 0]
o- ramdisk ..... [Storage Objects: 0]
o- iscsi ..... [Targets: 1]
o- iqn.2003-01.org.linux-iscsi.server.x8664:sn.587a967e3ced ..... [TPGs: 1]
o- tpg1 ..... [no-gen-acls, no-auth]
o- acls ..... [ACLs: 1]
o- iqn.1994-05.com.redhat:3e9d906e8 ..... [Mapped LUNs: 1]
o- mapped_lun0 ..... [lun0 block/newlun (rw)]
o- luns .....
o- lun0 ..... [block/newlun (/dev/sdb
o- portals .....
o- 0.0.0.0:3260 .....
o- loopback .....

```

```

/> exit
Global pref auto_save_on_exit=true
Configuration saved to /etc/target/saveconfig.json
[root@server ~]#

```

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```

[root@server ~]# firewall-cmd --permanent --add-port=3260/tcp
success
[root@server ~]# firewall-cmd --reload
success
[root@server ~]#

```

## # client

```

[root@client ~]# iscsiadm --help
iscsiadm -m discoverydb [ -hV ] [ -d debug_level ] [ -P printlevel ] [ -t type -p ip:port -I ifaceN ...
[ -DL ] ] [ [ -p ip:port -t type ] [ -o operation ] [ -n name ] [ -v value ] [ -LD ] ]
iscsiadm -m discovery [ -hV ] [ -d debug_level ] [ -P printlevel ] [ -t type -p ip:port -I ifaceN ... [
-l ] ] [ [ -p ip:port ] [ -l | -D ] ]
iscsiadm -m node [ -hV ] [ -d debug_level ] [ -P printlevel ] [ -L all,manual,automatic ] [ -U all,ma
nual,automatic ] [ -S ] [ [ -T targetname -p ip:port -I ifaceN ] [ -l | -u | -R | -s ] ] [ [ -o opera
tion ] [ -n name ] [ -v value ] ]
iscsiadm -m session [ -hV ] [ -d debug_level ] [ -P printlevel ] [ -r sessionid | sysfsdir [ -R | -u
| -s ] [ -o operation ] [ -n name ] [ -v value ] ]
iscsiadm -m iface [ -hV ] [ -d debug_level ] [ -P printlevel ] [ -I ifacename | -H hostno|MAC ] [ [ -
o operation ] [ -n name ] [ -v value ] ] [ -C ping [ -a ip ] [ -b packetsize ] [ -c count ] [ -i in
terval ] ]
iscsiadm -m fw [ -d debug_level ] [ -l ]
iscsiadm -m host [ -P printlevel ] [ -H hostno|MAC ] [ [ -C chap [ -x chap_tbt_idx ] ] ] [ [ -C flashno
de [ -A portal_type ] [ -x flashnode_idx ] ] ] [ -C stats ] [ [ -o operation ] [ -n name ] [ -v val
ue ] ]

```

```

[root@client ~]# iscsiadm -m discovery -t sendtargets -p 192.168.1.104
192.168.1.104:3260,1 iqn.2003-01.org.linux-iscsi.server.x8664:sn.587a967e3ced
[root@client ~]#

```

## # map the learn we needed Target server IQN number



```
[root@server ~]# targetcli
targetcli shell version 2.1.fb49
Copyright 2011-2013 by Datera, Inc and others.
For help on commands, type 'help'.

/>
```

# ls

```
/> ls
o- / .....
  o- backstores .....
    o- block .....
      o- newlun ..... [/dev/sdb
        o- alua .....
          o- default_tg_pt_gp .....
      o- fileio .....
      o- pscsi .....
      o- ramdisk .....
    o- iscsi .....
      o- iqn.2003-01.org.linux-iscsi.server.x8664:sn.587a967e3ced .....
        o- tpg1 .....
          o- acls .....
            o- iqn.1994-05.com.redhat:3e9d906e8 .....
              o- mapped_lun0 .....
          o- luns .....
            o- lun0 ..... [block/newlun
          o- portals .....
            o- 0.0.0.0:3260 .....
        o- loopback .....
```

```
[root@client ~]# iscsiadm -m node -T iqn.2003-01.org.linux-iscsi.server.x8664:sn.587a967e3ced 192.168.1.104 -l
Logging in to [iface: default, target: iqn.2003-01.org.linux-iscsi.server.x8664:sn.587a967e3ced, portal: 192.168.1.104,3260] (multiple)
Login to [iface: default, target: iqn.2003-01.org.linux-iscsi.server.x8664:sn.587a967e3ced, portal: 192.168.1.104,3260] successful.
[root@client ~]#
```

# Additional disk exported from Targetted server - Succesfully mapped

```
[root@client ~]# lsblk
NAME        MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
sda          8:0    0   20G  0 disk
├─sda1       8:1    0    1G  0 part /boot
├─sda2       8:2    0   19G  0 part
├─rhel-root 253:0   0   17G  0 lvm  /
└─rhel-swap 253:1   0    2G  0 lvm  [SWAP]
sdb          8:16   0    2G  0 disk
sr0         11:0    1  4.2G  0 rom  /mnt
[root@client ~]#
```

#fdisk -l

```

Disk identifier: 0x0000373a

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1   *        2048      2099199      1048576   83   Linux
/dev/sda2            2099200      41943039      19921920   8e  Linux LVM

Disk /dev/mapper/rhel-root: 18.2 GB, 18249416704 bytes, 35643392 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/mapper/rhel-swap: 2147 MB, 2147483648 bytes, 4194304 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/sdb: 2147 MB, 2147483648 bytes, 4194304 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 4194304 bytes

[root@client ~]#

```

```

[root@client ~]# cat /proc/scsi/scsi
Attached devices:
Host: scsi0 Channel: 00 Id: 00 Lun: 00
  Vendor: VMware, Model: VMware Virtual S Rev: 1.0
  Type:   Direct-Access          ANSI  SCSI revision: 02
Host: scsi4 Channel: 00 Id: 00 Lun: 00
  Vendor: NECVMWar Model: VMware SATA CD01 Rev: 1.00
  Type:   CD-ROM                 ANSI  SCSI revision: 05
Host: scsi34 Channel: 00 Id: 00 Lun: 00
  Vendor: LIO-ORG Model: newlun Rev: 4.0
  Type:   Direct-Access          ANSI  SCSI revision: 05
[root@client ~]#

```

#### # file system

```

[root@client ~]# mkfs.ext4 /dev/sdb
mke2fs 1.42.9 (28-Dec-2013)
/dev/sdb is entire device, not just one partition!
Proceed anyway? (y,n) y
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=1024 blocks
131072 inodes, 524288 blocks
26214 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=536870912
16 block groups
32768 blocks per group, 32768 fragments per group
8192 inodes per group
Superblock backups stored on blocks:
    32768, 98304, 163840, 229376, 294912

Allocating group tables: done
Writing inode tables: done
Creating journal (16384 blocks): done
Writing superblocks and filesystem accounting information:

```

#### # mount the dir



```
[root@client ~]# mkdir /newlun
[root@client ~]# mount /dev/sdb /newlun
[root@client ~]# df -hT
```

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
devtmpfs	devtmpfs	894M	0	894M	0%	/dev
tmpfs	tmpfs	910M	0	910M	0%	/dev/shm
tmpfs	tmpfs	910M	11M	900M	2%	/run
tmpfs	tmpfs	910M	0	910M	0%	/sys/fs/cgroup
/dev/mapper/rhel-root	xfs	17G	4.0G	14G	24%	/
/dev/sr0	iso9660	4.2G	4.2G	0	100%	/mnt
/dev/sda1	xfs	1014M	182M	833M	18%	/boot
tmpfs	tmpfs	182M	0	182M	0%	/run/user/0
tmpfs	tmpfs	182M	12K	182M	1%	/run/user/42
/dev/sdb1	ext4	2.0G	6.0M	1.8G	1%	/newlun

```
[root@client ~]#
```

```
[root@client ~]# cd /newlun/
[root@client newlun]# ll
total 16
drwx----- 2 root root 16384 May 13 14:29 lost+found
[root@client newlun]#
```

```
[root@client newlun]# touch test{1..10}.txt
[root@client newlun]# mkdir aa bb cc dd
[root@client newlun]# cal > cal.txt
[root@client newlun]# ls -lh
total 36K
drwxr-xr-x. 2 root root 4.0K May 13 14:30 aa
drwxr-xr-x. 2 root root 4.0K May 13 14:30 bb
-rw-r--r--. 1 root root 150 May 13 14:30 cal.txt
drwxr-xr-x. 2 root root 4.0K May 13 14:30 cc
drwxr-xr-x. 2 root root 4.0K May 13 14:30 dd
drwx----- 2 root root 16K May 13 14:29 lost+found
-rw-r--r--. 1 root root 0 May 13 14:30 test10.txt
-rw-r--r--. 1 root root 0 May 13 14:30 test1.txt
-rw-r--r--. 1 root root 0 May 13 14:30 test2.txt
-rw-r--r--. 1 root root 0 May 13 14:30 test3.txt
-rw-r--r--. 1 root root 0 May 13 14:30 test4.txt
-rw-r--r--. 1 root root 0 May 13 14:30 test5.txt
-rw-r--r--. 1 root root 0 May 13 14:30 test6.txt
-rw-r--r--. 1 root root 0 May 13 14:30 test7.txt
-rw-r--r--. 1 root root 0 May 13 14:30 test8.txt
-rw-r--r--. 1 root root 0 May 13 14:30 test9.txt
[root@client newlun]#
```

# make it permanent

# cat /etc/mstab

```

cgroup /sys/fs/cgroup/freezer cgroup rw,seclabel,nosuid,nodev,noexec,relatime,freezer 0 0
cgroup /sys/fs/cgroup/pids cgroup rw,seclabel,nosuid,nodev,noexec,relatime,pids 0 0
cgroup /sys/fs/cgroup/memory cgroup rw,seclabel,nosuid,nodev,noexec,relatime,memory 0 0
cgroup /sys/fs/cgroup/devices cgroup rw,seclabel,nosuid,nodev,noexec,relatime,devices 0 0
cgroup /sys/fs/cgroup/perf_event cgroup rw,seclabel,nosuid,nodev,noexec,relatime,perf_event 0 0
cgroup /sys/fs/cgroup/hugetlb cgroup rw,seclabel,nosuid,nodev,noexec,relatime,hugetlb 0 0
cgroup /sys/fs/cgroup/cpu,cpuacct cgroup rw,seclabel,nosuid,nodev,noexec,relatime,cpuacct,cpu 0 0
cgroup /sys/fs/cgroup/blkio cgroup rw,seclabel,nosuid,nodev,noexec,relatime,blkio 0 0
cgroup /sys/fs/cgroup/cpuset cgroup rw,seclabel,nosuid,nodev,noexec,relatime,cpuset 0 0
configfs /sys/kernel/config configfs rw,relatime 0 0
/dev/mapper/rhel-root / xfs rw,seclabel,relatime,attr2,inode64,noquota 0 0
selinuxfs /sys/fs/selinux selinuxfs rw,relatime 0 0
systemd-1 /proc/sys/fs/binfmt_misc autofs rw,relatime,fd=35,pgrp=1,timeout=0,minproto=5,maxproto=5,direct,pipe_ino=14492 0 0
hugetlbfs /dev/hugepages hugetlbfs rw,seclabel,relatime 0 0
mqueue /dev/mqueue mqueue rw,seclabel,relatime 0 0
debugfs /sys/kernel/debug debugfs rw,relatime 0 0
/dev/sr0 /mnt iso9660 ro,relatime 0 0
/dev/sda1 /boot xfs rw,seclabel,relatime,attr2,inode64,noquota 0 0
sunrpc /var/lib/nfs/rpc_pipefs rpc_pipefs rw,relatime 0 0
tmpfs /run/user/0 tmpfs rw,seclabel,nosuid,nodev,relatime,size=186308k,mode=700 0 0
tmpfs /run/user/42 tmpfs rw,seclabel,nosuid,nodev,relatime,size=186308k,mode=700 0 0
/dev/sdb /newlun ext4 rw,seclabel,relatime,stripe=1024,data=ordered 0 0

```

**# make changes in fstab**

**# vim /etc/fstab**

```

# /etc/fstab
# Created by anaconda on Sun May 10 15:59:38 2020
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
/dev/mapper/rhel-root / xfs defaults 0 0
UUID=948d51ac-7de9-4d6a-bbaa-be76ad6dbb4e /boot xfs defaults 0 0
/dev/mapper/rhel-swap swap swap defaults 0 0
/dev/sr0 /mnt iso9660 ro,relatime 0 0
/dev/sdb /newlun ext4 rw,seclabel,relatime,stripe=1024,data=ordered 0 0

```

```

0- loopback ..... [targets: 0]
/> /iscsi/iqn.2003-01.org.linux-iscsi.server.x8664:sn.89b50c23d34a/tpg1/ delete
Command not found delete
/> /iscsi/iqn.2003-01.org.linux-iscsi.server.x8664:sn.89b50c23d34a/tpg1/acls/iqn.1994-05.com.redhat:3e9d906e8 delete
Missing required parameter mapped_lun
/> /backstores/block create newlun /dev/sdb
Created block storage object newlun using /dev/sdb.
/> /iscsi create
Created target iqn.2003-01.org.linux-iscsi.server.x8664:sn.09db7388d3a4.
Created TPG 1.
Global pref auto_add_default_portal=true
Created default portal listening on all IPs (0.0.0.0), port 3260.
/> /iscsi/iqn.2003-01.org.linux-iscsi.server.x8664:sn.89b50c23d34a/tpg1/luns create /backstores/block/newlun
Created LUN 0.
Created LUN 0->0 mapping in node ACL iqn.1994-05.com.redhat:3e9d906e8
/> /iscsi/iqn.2003-01.org.linux-iscsi.server.x8664:sn.89b50c23d34a/tpg1/acls/iqn.1994-05.com.redhat:3e9d906e8
This NodeACL already exists in configFS
/> exit
Global pref auto_save_on_exit=true
Configuration saved to /etc/target/saveconfig.json
[root@server ~]#

```

