

????

- iSCSI Storage: NetApp FAS8200
- Linux OS: CentOS 7
- Server H/W: HP DL380 Gen10
- iSCSI ?????: 10G SFP ???? x 2

????

???? nmtui ????????? IP ? Mask

?: ????????? Bonding?

?? iSCSI

?? iscsi ??

yum install iscsi-initiator-utils

?? iscsid.conf

vi /etc/iscsi/iscsid.conf

?? timeout

#node.session.timeo.replacement_timeout = 120

node.session.timeo.replacement_timeout = 5

?? node ?? Login

node.startup = automatic

?? initiator name

vi /etc/iscsi/initiatorname.iscsi

????????

iqn.<year-to-date>.<your-domain>.<your-hostname>:redhat-disk

??

InitiatorName=iqn.2019-02.mycompany.bdb7-a:redhat-disk

initiator name ??? Storage ??????

??? Host ?????????

?? multipath ? netapp_linux_unified_host_utilities

```

yum install device-mapper-multipath
yum install libhbaapi
rpm -ivh netapp_linux_unified_host_utilities-7-1.x86_64.rpm

```

?????? libhbaapi??? sanlun ???????

?? iSCSI storage

??????

```

iscsiadm -m iface -I iscsi_ens2f0 --op=new
iscsiadm -m iface -I iscsi_ens3f0 --op=new

```

Discovery for the storage

```
iscsiadm -m discovery -t sendtargets -p <ip-to-iscsi-storage>:3260
```

?? NetApp storage ????? iSCSI IPs?????????? IP ??????????????? IP?

```

[root@bdb7-b RPMs]# iscsiadm -m discovery -t sendtargets -p 10.18.104.32:3260
10.18.104.32:3260,1038 iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16
10.18.104.34:3260,1040 iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16
10.18.104.33:3260,1039 iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16
10.18.104.31:3260,1037 iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16
10.18.104.32:3260,1038 iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16
10.18.104.34:3260,1040 iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16
10.18.104.33:3260,1039 iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16
10.18.104.31:3260,1037 iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16

```

Login nodes

```
iscsiadm -m node -l all
```

??????????????

```

[root@bdb7-b RPMs]# iscsiadm -m node -l all
Logging in to [iface: iscsi_ens2f0, target:
iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16, portal: 10.18.104.32,3260]
(multiple)
Logging in to [iface: iscsi_ens3f0, target:
iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16, portal: 10.18.104.32,3260]
(multiple)
Logging in to [iface: iscsi_ens2f0, target:
iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16, portal: 10.18.104.34,3260]
(multiple)
Logging in to [iface: iscsi_ens3f0, target:
iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16, portal: 10.18.104.34,3260]

```

(multiple)

Logging in to [iface: iscsi_ens2f0, target:

iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16, portal: 10.18.104.33,3260]

(multiple)

Logging in to [iface: iscsi_ens3f0, target:

iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16, portal: 10.18.104.33,3260]

(multiple)

Logging in to [iface: iscsi_ens2f0, target:

iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16, portal: 10.18.104.31,3260]

(multiple)

Logging in to [iface: iscsi_ens3f0, target:

iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16, portal: 10.18.104.31,3260]

(multiple)

Login to [iface: iscsi_ens2f0, target:

iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16, portal: 10.18.104.32,3260]

successful.

Login to [iface: iscsi_ens3f0, target:

iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16, portal: 10.18.104.32,3260]

successful.

Login to [iface: iscsi_ens2f0, target:

iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16, portal: 10.18.104.34,3260]

successful.

Login to [iface: iscsi_ens3f0, target:

iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16, portal: 10.18.104.34,3260]

successful.

Login to [iface: iscsi_ens2f0, target:

iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16, portal: 10.18.104.33,3260]

successful.

Login to [iface: iscsi_ens3f0, target:

iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16, portal: 10.18.104.33,3260]

successful.

Login to [iface: iscsi_ens2f0, target:

iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16, portal: 10.18.104.31,3260]

successful.

Login to [iface: iscsi_ens3f0, target:

iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16, portal: 10.18.104.31,3260]

successful.

?? sanlun ?? LUN Disks

sanlun lun show

```
[root@bdb7-b RPMs]# sanlun lun show
```

controller(7mode/E-Series)/ vserver(cDOT/FlashRay) product	lun-pathname	device filename	host adapter	lun protocol	size
TPEDBISCSISVM01 500.1g cDOT	/vol/BDB7_B_4_vol/BDB7_B_4	/dev/sdag	host19	iSCSI	

```

TPEDBISCSISVM01    /vol/BDB7_B_4_vol/BDB7_B_4 /dev/sdaf  host20  iSCSI
500.1g cDOT
TPEDBISCSISVM01    /vol/BDB7_B_4_vol/BDB7_B_4 /dev/sdae  host17  iSCSI
500.1g cDOT
TPEDBISCSISVM01    /vol/BDB7_B_4_vol/BDB7_B_4 /dev/sdad  host18  iSCSI
500.1g cDOT
TPEDBISCSISVM01    /vol/BDB7_B_4_vol/BDB7_B_4 /dev/sdac  host16  iSCSI
500.1g cDOT
TPEDBISCSISVM01    /vol/BDB7_B_4_vol/BDB7_B_4 /dev/sdab  host15  iSCSI
500.1g cDOT
TPEDBISCSISVM01    /vol/BDB7_B_3_vol/BDB7_B_3 /dev/sdz   host20  iSCSI
500.1g cDOT
TPEDBISCSISVM01    /vol/BDB7_B_3_vol/BDB7_B_3 /dev/sdaa  host19  iSCSI
500.1g cDOT
TPEDBISCSISVM01    /vol/BDB7_B_4_vol/BDB7_B_4 /dev/sdy   host14  iSCSI
500.1g cDOT
TPEDBISCSISVM01    /vol/BDB7_B_3_vol/BDB7_B_3 /dev/sdx   host18  iSCSI
500.1g cDOT
TPEDBISCSISVM01    /vol/BDB7_B_3_vol/BDB7_B_3 /dev/sdw   host17  iSCSI
500.1g cDOT
TPEDBISCSISVM01    /vol/BDB7_B_3_vol/BDB7_B_3 /dev/sdt   host16  iSCSI  500.1g
cDOT
TPEDBISCSISVM01    /vol/BDB7_B_3_vol/BDB7_B_3 /dev/sdu   host15  iSCSI
500.1g cDOT
...

```

?? multipath

```
????????????? multipath.conf
```

```
mpathconf --enable --with_multipathd y
```

```
?? device alias name ? LUN WWID ???
```

```

???? RedHat 7.6 ? multipathd ??????? user_friendly_names yes
??? NetApp ? LUN disks ??????? mpath X ?????????? WWID?????????

```

```
????????????????????? WWID ???
```

```
?? /etc/multipath.conf
```

```
?????????????
```

```
...
```

```

multipaths {
    multipath {
        wwid 3600a0980383136312d3f4e387455564b
        alias mpath1
    }
}

```

```

multipath {
    wwid 3600a0980383136312d3f4e387455564c
    alias mpath2
}
multipath {
    wwid 3600a0980383136312d3f4e387455564d
    alias mpath3
}
multipath {
    wwid 3600a0980383136312d3f4e387455564e
    alias mpath4
}
}

```

wwid ????? multipath -l ??

alias ?????????LUN disks????????? sanlun lun show ??

?????

systemctl reload multipathd

?? multipath -l?????? WWID ? Alias Name

```

mpath2 (3600a0980383136312d3f4e387455564c) dm-5 NETAPP ,LUN C-Mode
size=500G features='4 queue_if_no_path pg_init_retries 50 retain_attached_hw_handle'
hwhandler='1 alua' wp=rw
|+- policy='service-time 0' prio=0 status=active
||- 12:0:0:1 sdo 8:224 active undef running
||- 13:0:0:1 sds 65:32 active undef running
||- 15:0:0:1 sdaa 65:160 active undef running
|`- 16:0:0:1 sdae 65:224 active undef running
`+- policy='service-time 0' prio=0 status=enabled
|- 10:0:0:1 sdg 8:96 active undef running
|- 11:0:0:1 sdk 8:160 active undef running
|- 14:0:0:1 sdw 65:96 active undef running
`- 9:0:0:1 sdc 8:32 active undef running

```

???? iSCSI LUNs

????????????????????????????????

?? /etc/fstab

? iSCSI disk ?????? _netdev

```

#device    mount point  FS  Options Backup fsck
/dev/myvg/mylv /mydisk     xfs  _netdev 0 0

```

?? netfs ??????

CentOS 7

systemctl enable remote-fs.target

CentOS 4/5/6

chkconfig netfs on

?? MTU ??

???? MTU ? 1500???? iSCSI ????????? 9000??? Linux ?????????? Switch ? iSCSI Storage (iSCSI Target) ?????
????

RedHat 7.x)

???????????????? frame ????????

UNSUCCESSFUL

ping -M do -c 4 -s 8196 10.1.1.21

PING 10.1.1.21 (10.1.1.21) 8185(8213) bytes of data.

PING 10.1.1.21(10.1.1.21) 8196(8224) bytes of data.

ping: local error: Message too long, mtu=1500

ping: local error: Message too long, mtu=1500

SUCCESSFUL

ping -M do -c 4 -s 1408 10.1.1.21

PING 10.1.1.21 (10.1.1.21) 1408(1436) bytes of data.

1416 bytes from 10.1.1.21: icmp_seq=1 ttl=58 time=224 ms

???? MTU (NOTE: ??????)

ip link set dev ens2f0 mtu 9000

???????? iSCSI ????????? ifcfg-ethXX??????

MTU="9000"

????????

????

?? disk path ????

- ??????? Storage LUN ????
- LUN ??? Size
- Storage ? path ????

```
[root@bdb7-a ~]# sanlun lun show -p
```

```

ONTAP Path: TPEDBISCSISVM01:/vol/BDB7_A_2_vol/BDB7_A_2
LUN: 1
LUN Size: 500.1g
Product: cDOT
Host Device: mpath2(3600a0980383136312d3f4e387455564c)
Multipath Policy: service-time 0
Multipath Provider: Native

```

```

-----
host    vserver
path    path    /dev/  host    vserver
state   type    node   adapter LIF
-----
up      primary sdo    host12  TPEDBISCSISVM01_iSCSI2
up      primary sds    host13  TPEDBISCSISVM01_iSCSI2
up      primary sdaa   host15  TPEDBISCSISVM01_iSCSI1
up      primary sdae   host16  TPEDBISCSISVM01_iSCSI1
up      secondary sdg    host10  TPEDBISCSISVM01_iSCSI4
up      secondary sdk    host11  TPEDBISCSISVM01_iSCSI3
up      secondary sdw    host14  TPEDBISCSISVM01_iSCSI4
up      secondary sdc    host9   TPEDBISCSISVM01_iSCSI3

```

```
?? multipathd ???????
```

```
multipathd show config
```

```
??: ??????? Storage????????????????????????????????????????
```

```
???? iSCSI connections
```

```
# iscsiadm -m session --op show
```

```

tcp: [1] 10.18.104.32:3260,1038 iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16
(non-flash)
tcp: [2] 10.18.104.33:3260,1039 iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16
(non-flash)
tcp: [3] 10.18.104.34:3260,1040 iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16
(non-flash)
tcp: [4] 10.18.104.34:3260,1040 iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16
(non-flash)
tcp: [5] 10.18.104.33:3260,1039 iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16
(non-flash)
tcp: [6] 10.18.104.31:3260,1037 iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16
(non-flash)
tcp: [7] 10.18.104.31:3260,1037 iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16
(non-flash)
tcp: [8] 10.18.104.32:3260,1038 iqn.1992-08.com.netapp:sn.58042162340f11e9892700a098e3ab45:vs.16
(non-flash)

```

```
#iSCSI Logout All  
iscsiadm --mode node --logoutall=all
```

```
#iSCSI Login All  
iscsiadm -m node -l
```