

# Cmd targetcli, iscsi target Lio and Fedora 18

Posted on

Kernel since version 2.6.38 contains a new implementation of iSCSI target – Lio target. We'll show how to use shell utility targetcli for setting new target. We'll limit access to specific initiators for specific ip, login and password.

In first step we have on our server "ourtarget.domain.cz" targetcli install, configure and run targetcli autostart daemon that loads configuration at start of OS. The configuration is loaded from file /etc/target/saveconfig.json and is in json format

Note: file is editable by a common editor.

```
[root@ourtarget~]# yum install targetcli
```

```
[root@ourtarget~]# systemctl enable targetcli
```

```
[root@ourtarget~]# systemctl start targetcli
```

We'll check that everything is in order.

```
[root@ourtarget~]# systemctl status targetcli
```

```
targetcli.service - Restore LIO kernel target configuration
```

```
Loaded: loaded (/usr/lib/systemd/system/targetcli.service; enabled)
```

```
Active: active (exited) since St 2013-01-30 08:45:16 CET; 5 days ago
```

```
Main PID: 642 (code=exited, status=0/SUCCESS)
```

```
CGroup: name=systemd:/system/targetcli.service
```

```
led 30 08:45:16 ourtarget.domain.cz systemd[1]: Starting Restore LIO kernel target configuration...
```

```
led 30 08:45:16 ourtarget.domain.cz targetcli[642]: Restore file /etc/target/saveconfig.json not found
```

```
led 30 08:45:16 ourtarget.domain.cz systemd[1]: Started Restore LIO kernel target configuration.
```

```
[root@ourtarget~]# cat /sys/kernel/config/target/version
```

```
Target Engine Core ConfigFS Infrastructure v4.1.0-rc2-ml on Linux/x86_64 on 3.7.4-204.fc18.x86_64
```

Targetcli commands can be called externally from a running instance targetcli or python library.

```
[root@ourtarget ~]# targetcli
```

```
targetcli shell version 2.0rc1.fb19
```

```
Copyright 2011 by RisingTide Systems LLC and others.
```

```
For help on commands, type 'help'.
```

/> help

## COMMAND SYNTAX

=====

Commands are built using the following syntax:

[TARGET\_PATH] COMMAND\_NAME [OPTIONS]

The TARGET\_PATH indicates the path to run the command from. If omitted, the command will be run from your current path.

The OPTIONS depend on the command. Please use help COMMAND to get more information.

## 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

/> exit

An external call of targetcli that I continue to use it.

```
[root@ourtarget ~]# targetcli "version"  
targetcli version 2.0rc1.fb19
```

Check that configuration is empty.

```
[root@ourtarget ~]# targetcli "ls /"
```

```
o- / .....[...]  
  o- backstores .....[...]  
    | o- block .....[0 Storage Object]  
    | o- fileio .....[0 Storage Object]  
    | o- pscsi .....[0 Storage Object]  
    | o- ramdisk .....[0 Storage Object]
```

```
o- iscsi .....[0 Targets]
o- loopback .....[0 Targets]
```

```
[root@ourtarget ~]# cat /etc/target/saveconfig.json
{
  "fabric_modules": [],
  "storage_objects": [],
  "targets": []
}
```

A possible configuration will erase and set desired default behavior.

```
[root@ourtarget ~]# targetcli "clearconfig confirm=True; saveconfig"
All configuration cleared
```

```
[root@ourtarget ~]# targetcli "set global auto_save_on_exit=true"
Parameter auto_save_on_exit is now 'true'.
```

```
[root@ourtarget ~]# targetcli "set global auto_enable_tpvt=true"
Parameter auto_enable_tpvt is now 'true'.
```

Lio export target supports four types of data repositories (backstores) as follows:

- block – block device such as /dev/hda, /dev/vda, /dev/sda, logical volume (LVM), device mapper, benefits from direct access to devices and high performance.
- fileio – current file /home/datafile, according to documentation provided less performance, in own benchmark i measured very respectable values, see. below.
- pscsi – export scsi block device type, advantage is that communication takes place directly on the scsi layer. Suitable for experts, others use the block
- ramdisk – export of ramdisk with all advantages and disadvantages.

### Let us create iscsi target ...

As backstory use file (fileio) type sparse about size of 10TB . Sparse file has advantage that free space occupies just enough space on hdd contains much data. Downside is decrease of performance when the initial “puffing”. To improve performance, set the caching policy of “write back”. I do not have to remind you that ups is desirable:-)

```
[root@ourtarget ~]# targetcli "/backstores/fileio create name=ourtarget.domain.cz
file_or_dev=/data/ourtarget.domain.cz.iscsi size=10TB write_back=True
sparse=True"
```

```
Using params size=10TB write_back=True sparse=True
Created fileio ourtarget.domain.cz with size 10995116277760
Entering new node /backstores/fileio/ourtarget.domain.cz
```

```
[root@ourtarget ~]# ls -lh /data/ourtarget.domain.cz.iscsi
-rw-r--r-- 1 root root 10T 17 feb 23.55 /data/ourtarget.domain.cz.iscsi
```

```
[root@ourtarget ~]# du -sh /data/ourtarget.domain.cz.iscsi
0 /data/ourtarget.domain.cz.iscsi
```

```

[root@ourtarget ~]# targetcli "ls"
o- / ..... [0]
  o- backstores ..... [0]
[...]
```

o- block .....	[0
Storage Object]	
o- fileio .....	[1 Storage
Object]	
o- ourtarget.domain.cz .....	
[/data/ourtarget.domain.cz.iscsi (10.0TiB) write-back deactivated]	
o- pscsi .....	[0 Storage
Object]	
o- ramdisk .....	[0
Storage Object]	
o- iscsi .....	[0
Targets]	
o- loopback .....	[0
Targets]	

Next, set the target portal group (TGP), which define ip address and port on which target listens, individual LUNS, enabled iSCSI Initiator and ACL.

Target has name "iqn.2013-02.cz.domain.ourtarget: disk1" and ip address with port "10.0.0.10:3260", which will bind. Allow access for initiator "iqn.1994-05.com.redhat: initiator01" under the login "web" and password "secretdata".

```

[root@ourtarget ~]# targetcli "/iscsi create iqn.2013-02.cz.domain.ourtarget:disk1"
Created target iqn.2013-02.cz.savvy.server:disk1.
Created TPG 1.
Entering new node /iscsi/iqn.2013-02.cz.domain.ourtarget:disk1/tpg1

```

```

[root@ourtarget ~]# targetcli "/iscsi/iqn.2013-02.cz.domain.ourtarget:disk1/tpg1/luns create
storage_object=/backstores/fileio/ourtarget.domain.cz"
Created LUN 0.
Entering new node /iscsi/iqn.2013-02.cz.domain.ourtarget:disk1/tpg1/luns/lun0

```

```

[root@ourtarget~]# targetcli "/iscsi/iqn.2013-02.cz.domain.ourtarget:disk1/tpg1/portals create 10.0.0.10 ip_port=3260"
Using default IP port 3260
Created network portal 10.0.0.10:3260.
Entering new node /iscsi/iqn.2013-02.cz.domain.ourtarget:disk1/tpg1/portals/10.0.0.10:3260

```

```

[root@ourtarget ~]# targetcli "/iscsi/iqn.2013-02.cz.domain.ourtarget:disk1/tpg1/acls create wwn=iqn.1994-05.com.redhat:initiator01"
Created Node ACL for iqn.1994-05.com.redhat:initiator01

```

Created mapped LUN 0.

Entering new node /iscsi/iqn.2013-02.cz.domain.ourtarget:disk1/tpg1/acls/iqn.1994-05.com.redhat:initiator01

```
[root@ourtarget ~]# targetcli "/iscsi/iqn.2013-02.cz.domain.ourtarget:disk1/tpg1 set attribute authentication=1"
```

Parameter authentication is now '1'.

```
[root@ourtarget ~]# targetcli "/iscsi/iqn.2013-02.cz.domain.ourtarget:disk1/tpg1/acls/iqn.1994-05.com.redhat:initiator01 set auth userid=web"
```

Parameter userid is now 'web'.

```
[root@ourtarget ~]# targetcli "/iscsi/iqn.2013-02.cz.domain.ourtarget:disk1/tpg1/acls/iqn.1994-05.com.redhat:initiator01 set auth password=secretdata"
```

Parameter password is now 'secretdata'.

```
[root@ourtarget ~]# targetcli "saveconfig"
Configuration saved to /etc/target/saveconfig.json
```

Check what we have configured.

```
[root@ourtarget ~]# targetcli "ls /"
o- / ..... [..]
  o- backstores .....
  [...]
    | o- block ..... [0
Storage Object]
    | o- fileio ..... [1 Storage
Object]
    | | o- ourtarget.domain.cz ..... [/data/ourtarget.domain.cz.iscsi
(10.0TiB) write-back activated]
    | o- pscsi ..... [0 Storage
Object]
    | o- ramdisk ..... [0
Storage Object]
    o- iscsi ..... [1
Targets]
    | o- iqn.2013-
02.cz.domain.ourtarget:disk1 ..... [1
TPG]
    | o- tpg1 .....
[enabled, auth]
```

```

| o- acls ..... [1
ACL]
| | o- iqn.1994-05.com.redhat:initiator01 .....
[1 Mapped LUN, auth]
| | o- mapped_lun0 ..... [lun0
fileio/ourtarget.domain.cz (rw)]
| o- luns ..... [1
LUN]
| | o- lun0 ..... [fileio/ourtarget.domain.cz
(/data/ourtarget.domain.cz.iscsi)]
| o- portals ..... [1
Portal]
| o-
10.0.0.10:3260 ..... [OK]
o- loopback ..... [0
Targets]

```

Is interesting to look directly into the configuration file "saveconfig.json".

```

[root@ourtarget ~]# cat /etc/target/saveconfig.json
{
  "fabric_modules": [],
  "storage_objects": [
    {
      "attributes": {
        "block_size": 512,
        "emulate_dpo": 0,
        "emulate_fua_read": 0,
        "emulate_fua_write": 1,
        "emulate_rest_reord": 0,
        "emulate_tas": 1,
        "emulate_tpu": 0,
        "emulate_tpws": 0,
        "emulate_ua_intlck_ctrl": 0,
        "emulate_write_cache": 1,
        "enforce_pr_isids": 1,
        "fabric_max_sectors": 8192,
        "is_nonrot": 0,
        "max_unmap_block_desc_count": 0,
        "max_unmap_lba_count": 0,
        "optimal_sectors": 8192,
        "queue_depth": 32,
        "unmap_granularity": 0,
        "unmap_granularity_alignment": 0
      },

```

```
"dev": "/data/ourtarget.domain.cz.iscsi",
"name": "ourtarget.domain.cz",
"plugin": "fileio",
"size": 10995116277760,
"write_back": true,
"wwn": "fd209256-4fc2-49ad-a492-bb417b938be8"
}
],
"targets": [
{
  "fabric": "iscsi",
  "tpgs": [
    {
      "attributes": {
        "authentication": 1,
        "cache_dynamic_acls": 0,
        "default_cmdsn_depth": 16,
        "demo_mode_write_protect": 1,
        "generate_node_acls": 0,
        "login_timeout": 15,
        "netif_timeout": 2,
        "prod_mode_write_protect": 0
      },
      "enable": true,
      "luns": [
        {
          "index": 0,
          "storage_object": "/backstores/fileio/ourtarget.domain.cz"
        }
      ],
      "node_acls": [
        {
          "attributes": {
            "dataout_timeout": 3,
            "dataout_timeout_retries": 5,
            "default_erl": 0,
            "nopin_response_timeout": 30,
            "nopin_timeout": 15,
            "random_datain_pdu_offsets": 0,
            "random_datain_seq_offsets": 0,
            "random_r2t_offsets": 0
          },
          "chap_password": "secretdata",
          "chap_userid": "web",
          "mapped_luns": [
            {
```

```
        "index": 0,
        "tpg_lun": 0,
        "write_protect": false
    }
],
    "node_wwn": "iqn.1994-05.com.redhat:initiator01"
}
],
"parameters": {
    "AuthMethod": "CHAP",
    "DataDigest": "CRC32C,None",
    "DataPDUInOrder": "Yes",
    "DataSequenceInOrder": "Yes",
    "DefaultTime2Retain": "20",
    "DefaultTime2Wait": "2",
    "ErrorRecoveryLevel": "0",
    "FirstBurstLength": "65536",
    "HeaderDigest": "CRC32C,None",
    "IFMarkInt": "2048~65535",
    "IFMarker": "No",
    "ImmediateData": "Yes",
    "InitialR2T": "Yes",
    "MaxBurstLength": "262144",
    "MaxConnections": "1",
    "MaxOutstandingR2T": "1",
    "MaxRecvDataSegmentLength": "8192",
    "MaxXmitDataSegmentLength": "262144",
    "OFMarkInt": "2048~65535",
    "OFMarker": "No",
    "TargetAlias": "LIO Target"
},
"portals": [
    {
        "ip_address": "10.0.0.10",
        "port": 3260
    }
],
"tag": 1
}
],
"wwn": "iqn.2013-02.cz.domain.ourtarget:disk1"
}
]
}
```



We have successfully set target. Let's try to connect the initiator and measure speed.

```
[root@initiator01 ~]# iscsiadm -m discovery -t sendtargets -p 10.0.0.10  
10.0.0.10:3260,1 iqn.2013-02.cz.domain.ourtarget:disk1
```

```
[root@initiator01 ~]# iscsiadm -m node -T iqn.2013-02.cz.domain.ourtarget:disk1  
--op=update --name=node.session.auth.username --value=web
```

```
[root@initiator01 ~]# iscsiadm -m node -T iqn.2013-02.cz.domain.ourtarget:disk1  
--op=update --name=node.session.auth.password --value=secretdata
```

```
[root@initiator01 ~]# iscsiadm -m node --login  
Logging in to [iface: default, target: iqn.2013-02.cz.domain.ourtarget:disk1, portal:  
10.0.0.10,3260] (multiple)  
Login to [iface: default, target: iqn.2013-02.cz.domain.ourtarget:disk1, portal:  
10.0.0.10,3260] successful.
```

```
[root@initiator01 ~]# lsscsi  
[3:0:0:0] disk LIO-ORG FILEIO 4.0 /dev/sdb
```

```
[root@initiator01 ~]# hdparm -tT /dev/sdb  
/dev/sdb:  
Timing cached reads: 8724 MB in 2.00 seconds = 4362.02 MB/sec  
Timing buffered disk reads: 323 MB in 3.29 seconds = 98 MB/sec
```

And that's all folks ...

I will update article discovered errors, improvements etc.