

The TCM v4 fabric module script generator

Greetings all,

This document is intended to be a mini-HOWTO for using the `tcm_mod_builder.py` script to generate a brand new functional TCM v4 fabric .ko module of your very own, that once built can be immediately be loaded to start access the new TCM/ConfigFS fabric skeleton, by simply using:

```
modprobe $TCM_NEW_MOD
mkdir -p /sys/kernel/config/target/$TCM_NEW_MOD
```

This script will create a new `drivers/target/$TCM_NEW_MOD/`, and will do the following

1. Generate new API callers for `drivers/target/target_core_fabric_configs.c` logic -> `make_tpg()`, -> `drop_tpg()`, -> `make_wwn()`, -> `drop_wwn()`. These are created into `$TCM_NEW_MOD/$TCM_NEW_MOD_configs.c`
2. Generate basic infrastructure for loading/unloading LKMs and TCM/ConfigFS fabric module using a skeleton struct `target_core_fabric_ops` API template.
3. Based on user defined T10 Proto_Ident for the new fabric module being built, the TransportID / Initiator and Target WWPN related handlers for SPC-3 persistent reservation are automatically generated in `$TCM_NEW_MOD/$TCM_NEW_MOD_fabric.c` using `drivers/target/target_core_fabric_lib.c` logic.
4. NOP API calls for all other Data I/O path and fabric dependent attribute logic in `$TCM_NEW_MOD/$TCM_NEW_MOD_fabric.c`

`tcm_mod_builder.py` depends upon the mandatory '-p \$PROTO_IDENT' and '-m \$FABRIC_MOD_name' parameters, and actually running the script looks like:

```
target:/mnt/sdb/lio-core-2.6.git/Documentation/target# python tcm_mod_builder.py -p iSCSI -m tcm_nab5000
tcm_dir: /mnt/sdb/lio-core-2.6.git/Documentation/target/../../
Set fabric_mod_name: tcm_nab5000
Set fabric_mod_dir:
/mnt/sdb/lio-core-2.6.git/Documentation/target/../../drivers/target/tcm_nab5000
Using proto_ident: iSCSI
Creating fabric_mod_dir:
/mnt/sdb/lio-core-2.6.git/Documentation/target/../../drivers/target/tcm_nab5000
Writing file:
/mnt/sdb/lio-core-2.6.git/Documentation/target/../../drivers/target/tcm_nab5000/tcm_nab5000_base.h
Using tcm_mod_scan_fabric_ops:
/mnt/sdb/lio-core-2.6.git/Documentation/target/../../include/target/target_core_fabric_ops.h
Writing file:
/mnt/sdb/lio-core-2.6.git/Documentation/target/../../drivers/target/tcm_nab5000/tcm_nab5000_fabric.c
Writing file:
/mnt/sdb/lio-core-2.6.git/Documentation/target/../../drivers/target/tcm_nab5000/tcm_nab5000_fabric.h
Writing file:
/mnt/sdb/lio-core-2.6.git/Documentation/target/../../drivers/target/tcm_nab5000/tcm_nab5000_configfs.c
Writing file:
/mnt/sdb/lio-core-2.6.git/Documentation/target/../../drivers/target/tcm_nab5000/Kbuild
Writing file:
/mnt/sdb/lio-core-2.6.git/Documentation/target/../../drivers/target/tcm_nab5000/Kconfig
Would you like to add tcm_nab5000to drivers/target/Kbuild..? [yes,no]: yes
Would you like to add tcm_nab5000to drivers/target/Kconfig..? [yes,no]: yes
```

At the end of `tcm_mod_builder.py`, the script will ask to add the following line to `drivers/target/Kbuild`:

```
obj-$(CONFIG_TCM_NAB5000) += tcm_nab5000/
```

and the same for `drivers/target/Kconfig`:

```
source "drivers/target/tcm_nab5000/Kconfig"
```

1. Run 'make menuconfig' and select the new CONFIG_TCM_NAB5000 item:

```
<M> TCM_NAB5000 fabric module
```

2. Build using 'make modules', once completed you will have:

```
target:/mnt/sdb/lio-core-2.6.git# ls -la drivers/target/tcm_nab5000/
total 1348
drwxr-xr-x 2 root root 4096 2010-10-05 03:23 .
drwxr-xr-x 9 root root 4096 2010-10-05 03:22 ..
-rw-r--r-- 1 root root 282 2010-10-05 03:22 Kbuild
-rw-r--r-- 1 root root 171 2010-10-05 03:22 Kconfig
-rw-r--r-- 1 root root 49 2010-10-05 03:23 modules.order
-rw-r--r-- 1 root root 738 2010-10-05 03:22 tcm_nab5000_base.h
-rw-r--r-- 1 root root 9096 2010-10-05 03:22 tcm_nab5000_configfs.c
-rw-r--r-- 1 root root 191200 2010-10-05 03:23 tcm_nab5000_configfs.o
-rw-r--r-- 1 root root 40504 2010-10-05 03:23 tcm_nab5000_configfs.o.cmd
-rw-r--r-- 1 root root 5414 2010-10-05 03:22 tcm_nab5000_fabric.c
-rw-r--r-- 1 root root 2016 2010-10-05 03:22 tcm_nab5000_fabric.h
-rw-r--r-- 1 root root 190932 2010-10-05 03:23 tcm_nab5000_fabric.o
-rw-r--r-- 1 root root 40713 2010-10-05 03:23 tcm_nab5000_fabric.o.cmd
-rw-r--r-- 1 root root 401861 2010-10-05 03:23 tcm_nab5000.ko
-rw-r--r-- 1 root root 265 2010-10-05 03:23 tcm_nab5000.ko.cmd
-rw-r--r-- 1 root root 459 2010-10-05 03:23 tcm_nab5000.mod.c
-rw-r--r-- 1 root root 23896 2010-10-05 03:23 tcm_nab5000.mod.o
-rw-r--r-- 1 root root 22655 2010-10-05 03:23 tcm_nab5000.mod.o.cmd
-rw-r--r-- 1 root root 379022 2010-10-05 03:23 tcm_nab5000.o
-rw-r--r-- 1 root root 211 2010-10-05 03:23 tcm_nab5000.o.cmd
```

3. Load the new module, create a `lun_0` configfs group, and add new TCM Core IBLOCK backstore symlink to port:

```
target:/mnt/sdb/lio-core-2.6.git# insmod drivers/target/tcm_nab5000.ko
target:/mnt/sdb/lio-core-2.6.git# mkdir -p /sys/kernel/config/target/nab5000/ign.foo/tpgt_1/lun/lun_0
target:/mnt/sdb/lio-core-2.6.git# cd /sys/kernel/config/target/nab5000/ign.foo/tpgt_1/lun/lun_0/
target:/sys/kernel/config/target/nab5000/ign.foo/tpgt_1/lun/lun_0# ln -s /sys/kernel/config/target/core/iblock_0/lv

target:/sys/kernel/config/target/nab5000/ign.foo/tpgt_1/lun/lun_0# cd -
target:/mnt/sdb/lio-core-2.6.git# tree /sys/kernel/config/target/nab5000/
/sys/kernel/config/target/nab5000/
|-- discovery_auth
|-- ign.foo
|   |-- tpgt_1
|   |   |-- acls
|   |   |-- attrib
|   |   |-- lun
|   |   |-- lun_0
```

```

|      |      |-- alua_tg_pt_gp
|      |      |-- alua_tg_pt_offline
|      |      |-- alua_tg_pt_status
|      |      |-- alua_tg_pt_write_md
|      |      `-- nab5000_port -> ../../../../target/core/iblock_0/lvm_test0
|      |-- np
|      `-- param
|-- version

target:/mnt/sdb/lio-core-2.6.git# lsmod
Module                Size  Used by
tcm_nab5000            3935   4
iscsi_target_mod      193211 0
target_core_stgt       8090   0
target_core_pscsi     11122   1
target_core_file       9172   2
target_core_iblock     9280   1
target_core_mod        228575 31
tcm_nab5000,iscsi_target_mod,target_core_stgt,target_core_pscsi,target_core_file,target_core_iblock
libfc                  73681   0
scsi_debug             56265   0
scsi_tgt               8666   1 target_core_stgt
configfs               20644   2 target_core_mod

```

Future TODO items

1. Add more T10 proto_ids
2. Make `tcm_mod_dump_fabric_ops()` smarter and generate function pointer defs directly from `include/target/target_core_fabric_ops.h` struct `target_core_fabric_ops` structure members.

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