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_configfs.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/iqn.foo/tpgt_1/lun/lun_0
   target:/mnt/sdb/lio-core-2.6.git# cd /sys/kernel/config/target/nab5000/iqn.foo/tpgt_1/lun/lun_0/
   target:/sys/kernel/config/target/nab5000/iqn.foo/tpgt_1/lun/lun_0# ln -s /sys/kernel/config/target/core/iblock_0/lvm

   target:/sys/kernel/config/target/nab5000/iqn.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
   |-- iqn.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_idents
2. Make tcm_mod_dump_fabric_ops() smarter and generate function pointer defs directly from include/target/target_core_fabric_ops.hstruct target_core_fabric_ops structure members.

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