

OAI install (compression) (fhidriver_E)

- PHY patch from OAI (click right button on file can download)

 phy_E.zip 3.4KB

- fhidriver_E tutorial

doc/ORAN_FH17.2_Tutorial.md · fhidriver_E · oai / openairinterfac...

Openairinterface 5G Wireless Implementation



https://gitlab.eurecom.fr/oai/openairinterface5g/-/blob/fhidriver_E/doc/ORA...



doc/ORAN_FH17.2_Tutorial.md · use_msgq_new_fhidriver_build_fi...

Openairinterface 5G Wireless Implementation



https://gitlab.eurecom.fr/oai/openairinterface5g/-/blob/use_msgq_new_fhid...



► cpu

▼ os and original kernel (origin)

```
[liteon@localhost ~]$ cat /etc/redhat-release
```

Red Hat Enterprise Linux release 9.2 (Plow)

```
[liteon@localhost ~]$ uname -a
```

Linux localhost.localdomain 5.14.0-284.11.1.el9_2.x86_64 #1 SMP PREEMPT_DYNAMIC Wed
Apr 12 10:45:03 EDT 2023 x86_64 x86_64 x86_64 GNU/Linux

▼ nic

```
[liteon@localhost ~]$ ethtool -i ens1f0
```

driver: ice

version: 5.14.0-284.11.1.el9_2.x86_64

firmware-version: 4.01 0x800135e7 1.3256.0

expansion-rom-version:

bus-info: 0000:12:00.0

supports-statistics: yes

supports-test: yes

supports-eeprom-access: yes

supports-register-dump: yes

supports-priv-flags: yes

▼ Add sudoer

[How to enable sudo on Red Hat Enterprise Linux | Red Hat Developer](#)

```
su usermod -aG wheel your_user_id # logout
```

▼ register redhat

```
subscription-manager register
```

Reference : <https://kknews.cc/code/nenqkq5.html>

▼ install RT kernel

[Installing RHEL 8 for Real Time Red Hat Enterprise Linux for Real Time 8 | Red Hat Customer Portal](#)

```
subscription-manager repos --enable rhel-9-for-x86_64-rt-rpms
```

```
dnf groupinstall RT
```

▼ RT kernel version

4.18.0-477.27.1.rt7.290.el8_8

▼ Add RT profile

```
sudo tuned-adm profile realtime
```

▼ install gcc11

```
sudo yum remove --skip-broken gcc
```

```
yum install gcc-toolset-11
```

▼ install python3 and meson

```
sudo dnf install python3-requests
```

```
sudo dnf install python3-pip
```

```
sudo pip3 install meson
```

▼ install ninja

<https://github.com/ninja-build/ninja/tree/v1.11.1>

```
git clone https://github.com/ninja-build/ninja.git
```

```
cd ninja
```

```
sudo dnf install cmake
```

```
cmake -Bbuild-cmake
```

```
cd build-cmake
```

```
sudo make install
```

- Move ninja from /usr/local/bin to /usr/bin allow

- ```
sudo cp /usr/local/bin/ninja /usr/bin/
```


- ▶ configs - config\_o\_du\_3450\_E.dat
- ▶ configs - mwc\_20899\_newfhi\_E\_3450.conf
- ▶ configs - usecase\_du\_3450.cfg

## gcc 11

```
sudo scl enable gcc-toolset-11 bash
```

## PTP(C1)

- ptp configure file

 default.cfg 1.8KB

```
git clone http://git.code.sf.net/p/linuxptp/code linuxptp cd linuxptp git
checkout v2.0 make sudo ./ptp4l -i ens1f2 -m -H -2 -s -f configs/default.cfg
sudo ./phc2sys -w -m -s ens1f2 -R 8 -f configs/default.cfg sudo ./ptp4l -i
ens1f0 -m -H -2 -f configs/default.cfg
```

## PTP(C3)

```
git clone http://git.code.sf.net/p/linuxptp/code linuxptp cd linuxptp git
checkout v2.0 make sudo ./ptp4l -i ens1f0 -m -H -2 -s -f configs/default.cfg
sudo ./phc2sys -w -m -s ens1f0 -R 8 -f configs/default.cfg
```

## DPDK install

```
wget http://fast.dpdk.org/rel/dpdk-20.11.7.tar.xz tar xvf dpdk-20.11.7.tar.xz &&
cd dpdk-stable-20.11.7 # use gcc 11 environment sudo scl enable gcc-toolset-11
bash /usr/local/bin/meson build ninja -C build sudo ninja install -C build
```

On Fedora-based OS, you may not have the `/usr/local/lib` or `/usr/local/lib64` paths in the `LD_LIBRARY_PATH`:

```
sudo echo "/usr/local/lib" > /etc/ld.so.conf.d/local-lib.conf sudo echo
"/usr/local/lib64" >> /etc/ld.so.conf.d/local-lib.conf sudo ldconfig -v | grep
rte_
```

Check if the PDK-CONFIG tool discovers the libraries:

```
command pkg-config --libs libdpdk --static # result -lrte_node -lrte_graph -
lrte_bpf -lrte_flow_classify -lrte_pipeline -lrte_table -lrte_port -lrte_fib -
lrte_ipsec -lrte_vhost -lrte_stack -lrte_security -lrte_sched -lrte_reorder -
lrte_rib -lrte_rawdev -lrte_pdump -lrte_power -lrte_member -lrte_lpm -
lrte_latencystats -lrte_kni -lrte_jobstats -lrte_ip_frag -lrte_gso -lrte_gro -
lrte_eventdev -lrte_efd -lrte_distributor -lrte_cryptodev -lrte_compressdev -
lrte_cfgfile -lrte_bitratestats -lrte_bbdev -lrte_acl -lrte_timer -lrte_hash -
lrte_metrics -lrte_cmdline -lrte_pci -lrte_ethdev -lrte_meter -lrte_net -
lrte_mbuf -lrte_mempool -lrte_rcu -lrte_ring -lrte_eal -lrte_telemetry -
lrte_kvargs -Wl,--whole-archive -lrte_common_cpt -lrte_common_dpaa -
lrte_common_iavf -lrte_common_octeontx -lrte_common_octeontx2 -lrte_bus_dpaa -
lrte_bus_fslmc -lrte_bus_ifpga -lrte_bus_pci -lrte_bus_vdev -lrte_bus_vmbus -
lrte_mempool_bucket -lrte_mempool_dpaa -lrte_mempool_dpaa2 -
lrte_mempool_octeontx -lrte_mempool_octeontx2 -lrte_mempool_ring -
lrte_mempool_stack -lrte_pmd_af_packet -lrte_pmd_ark -lrte_pmd_atlantic -
lrte_pmd_avp -lrte_pmd_axgbe -lrte_pmd_bond -lrte_pmd_bnxt -lrte_pmd_cxgbe -
lrte_pmd_dpaa -lrte_pmd_dpaa2 -lrte_pmd_e1000 -lrte_pmd_ena -lrte_pmd_enetc -
lrte_pmd_enic -lrte_pmd_failsafe -lrte_pmd_fm10k -lrte_pmd_i40e -lrte_pmd_hinic -
lrte_pmd_hns3 -lrte_pmd_iavf -lrte_pmd_ice -lrte_pmd_igc -lrte_pmd_ixgbe -
lrte_pmd_kni -lrte_pmd_liquidio -lrte_pmd_memif -lrte_pmd_netvsc -lrte_pmd_nfp -
lrte_pmd_null -lrte_pmd_octeontx -lrte_pmd_octeontx2 -lrte_pmd_pfe -
lrte_pmd_qede -lrte_pmd_ring -lrte_pmd_sfc -lrte_pmd_softnic -lrte_pmd_tap -
lrte_pmd_thunderx -lrte_pmd_vdev_netvsc -lrte_pmd_vhost -lrte_pmd_virtio -
lrte_pmd_vmxnet3 -lrte_rawdev_dpaa2_cmdif -lrte_rawdev_dpaa2_qdma -
lrte_rawdev_ioat -lrte_rawdev_ntb -lrte_rawdev_octeontx2_dma -
lrte_rawdev_octeontx2_ep -lrte_rawdev_skeleton -lrte_pmd_caam_jr -
lrte_pmd_dpaa_sec -lrte_pmd_dpaa2_sec -lrte_pmd_nitrox -lrte_pmd_null_crypto -
lrte_pmd_octeontx_crypto -lrte_pmd_octeontx2_crypto -lrte_pmd_crypto_scheduler -
lrte_pmd_virtio_crypto -lrte_pmd_octeontx_compress -lrte_pmd_qat -lrte_pmd_ifc -
```

```
lrte_pmd_dpaa_event -lrte_pmd_dpaa2_event -lrte_pmd_octeontx2_event -
lrte_pmd_opdl_event -lrte_pmd_skeleton_event -lrte_pmd_sw_event -
lrte_pmd_dsw_event -lrte_pmd_octeontx_event -lrte_pmd_bbdev_null -
lrte_pmd_bbdev_turbo_sw -lrte_pmd_bbdev_fpga_lte_fec -
lrte_pmd_bbdev_fpga_5gnr_fec -Wl,--no-whole-archive -lrte_node -lrte_graph -
lrte_bpf -lrte_flow_classify -lrte_pipeline -lrte_table -lrte_port -lrte_fib -
lrte_ipsec -lrte_vhost -lrte_stack -lrte_security -lrte_sched -lrte_reorder -
lrte_rib -lrte_rawdev -lrte_pdump -lrte_power -lrte_member -lrte_lpm -
lrte_latencystats -lrte_kni -lrte_jobstats -lrte_ip_frag -lrte_gso -lrte_gro -
lrte_eventdev -lrte_efd -lrte_distributor -lrte_cryptodev -lrte_compressdev -
lrte_cfgfile -lrte_bitratestats -lrte_bbdev -lrte_acl -lrte_timer -lrte_hash -
lrte_metrics -lrte_cmdline -lrte_pci -lrte_ethdev -lrte_meter -lrte_net -
lrte_mbuf -lrte_mempool -lrte_rcu -lrte_ring -lrte_eal -lrte_telemetry -
lrte_kvargs -Wl,-Bdynamic -pthread -lm -ldl
```

Once again on Fedora-based OS, you may not have the `/usr/local/lib` or `/usr/local/lib64` paths in the `PKG_CONFIG_PATH`:

```
export PKG_CONFIG_PATH=$PKG_CONFIG_PATH:/usr/local/lib64/pkgconfig/ pkg-config -
-libs libdpdk --static
```

## PHY



```
export XTRAN_LIB_DIR=/home/liteon/phy/fhi_lib/lib/build export
XTRAN_DIR=/home/liteon/phy/fhi_lib export RTE_SDK=/home/liteon/dpdk-stable-
20.11.7 export RTE_TARGET=x86_64-native-linuxapp-gcc export
RTE_INCLUDE=/usr/local/include
```

[gerrit.o-ran-sc Code Review - o-du/phy.git/summary](https://gerrit.o-ran-sc.org/r/o-du/phy.git/summary)

```
git clone https://gerrit.o-ran-sc.org/r/o-du/phy.git cd phy git checkout oran_e_
maintenance_release_v1.0 git apply phy_E.patch # install gcc 11 sudo yum remove
--skip-broken gcc sudo yum install gcc-toolset-11
```

```
cd ~/phy/fhi_lib/lib make XTRAN_LIB_SO=1
```

## install openairinterface5g

```

git clone https://gitlab.eurecom.fr/oai/openairinterface5g.git git checkout
remotes/origin/fhidriver_E cd ~/openairinterface5g/cmake_targets ./build_oai --
gNB --ninja -t oran_fhlib_5g (Add, -I if you are building for the first time on
server for installing external dependencies) # if it occurs error message when
doing command "./build_oai --gNB --ninja -t oran_fhlib_5g" # and the error
message is about "No asn1c found!", doing the following commands. sudo dnf
install libtool sudo dnf install blas sudo dnf install lapack cd ~ git clone
https://github.com/vlm/asn1c.git cd asn1c test -f configure || autoreconf -iv
./configure make sudo make install cd ~/openairinterface5g/cmake_targets
./build_oai --gNB --ninja -t oran_fhlib_5g --cmake-opt -
DASN1C_EXEC=/opt/asn1c/bin/asn1c # install lack lib from build rpm...
https://rpmfind.net/linux/rpm2html/search.php?query=epel-release download epel-
release-8-19.el8.noarch.rpm sudo yum localinstall epel-release-8-
19.el8.noarch.rpm wget
https://vault.centos.org/centos/8/PowerTools/x86_64/os/Packages/libconfig-devel-
1.5-9.el8.x86_64.rpm sudo yum localinstall libconfig-devel-1.5-9.el8.x86_64.rpm
wget https://vault.centos.org/centos/8/PowerTools/x86_64/os/Packages/lapack-
devel-3.8.0-8.el8.x86_64.rpm sudo yum localinstall lapack-devel-3.8.0-
8.el8.x86_64.rpm wget
https://vault.centos.org/centos/8/PowerTools/x86_64/os/Packages/ninja-build-
1.8.2-1.el8.x86_64.rpm sudo yum localinstall ninja-build-1.8.2-1.el8.x86_64.rpm
wget https://vault.centos.org/centos/8/PowerTools/x86_64/os/Packages/guile-
devel-2.0.14-7.el8.x86_64.rpm sudo yum localinstall guile-devel-2.0.14-
7.el8.x86_64.rpm wget
https://vault.centos.org/centos/8/PowerTools/x86_64/os/Packages/blas-devel-
3.8.0-8.el8.x86_64.rpm sudo yum localinstall blas-devel-3.8.0-8.el8.x86_64.rpm #
change user to liteon cd ~ sudo chown -R liteon:liteon dpdk-stable-20.11.7 sudo
chown -R liteon:liteon phy sudo chown -R liteon:liteon openairinterface5g # not
sure if it needs to be done sudo vi /etc/ld.so.conf # the contents of

```

```
/etc/ld.so.conf include ld.so.conf.d/*.conf /usr/local/lib /usr/local/lib64 sudo
ldconfig sudo cp ~/phy/fhi_lib/lib/build/libxran.so /usr/local/lib
```

## run openairinterface5g

```
sudo su sudo echo "2" > /sys/class/net/ens1f0/device/sriov_numvfs sudo ip link
set ens1f0 vf 0 mac 00:11:22:33:44:66 vlan 564 spoofchk off sudo ip link set
ens1f0 vf 1 mac 00:11:22:33:44:66 vlan 564 spoofchk off modprobe vfio_pci exit #
12:02.0 -> use "lspci | grep Virtual" to check sudo python3 /usr/local/bin/dpdk-
devbind.py --bind vfio-pci 12:02.0 sudo python3 /usr/local/bin/dpdk-devbind.py -
-bind vfio-pci 12:02.1 sudo modprobe sctp sudo cpupower idle-set -D 0 # 5gc sudo
ifconfig ens1f1 192.168.120.68/24 ping 192.168.120.12 # set correct MTU sudo
ifconfig ens1f0 mtu 1500 # set high ringbuffers, check with ethtool -g ens7f1
sudo ethtool -G ens1f0 rx 4096 tx 4096 # Set CPU governor to performance sudo
cpupower frequency-set -g performance sudo cpupower idle-set -D 0 # Set CPU-
frequency sudo cpupower frequency-set -u 3000000 sudo cpupower frequency-set -d
3000000 # execute program cd ~/openairinterface5g/cmake_targets/ran_build/build/
sudo LD_LIBRARY_PATH=. ./nr-softmodem -O mwc_20899_newfhi_E_3450.conf --sa --
reorder-thread-disable
```

## sctp in redhat 8.7

```
if "sudo modprobe sctp" occurs error sudo yum install kernel-modules-extra-
`uname -r` sudo yum install -y lksctp-tools lksctp-tools-devel lksctp-tools-doc
```

## RU Device

|                  |                                                                                                        |
|------------------|--------------------------------------------------------------------------------------------------------|
| Product name     | FlexFi - RU                                                                                            |
| Module id        | FF-RFI078I4                                                                                            |
| Firmware version | v01.01.02                                                                                              |
| Kernel           | Linux FF-RFI078I4 5.4.0 #1 SMP<br>Tue Jun 20 05:13:44 UTC 2023<br>aarch64 aarch64 aarch64<br>GNU/Linux |

## RU Configure

| parameter        | value        |
|------------------|--------------|
| RU MAC           | 00aaffbfffcc |
| DU MAC           | 001122334466 |
| compression bits | 8            |