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ORAN_FHI7.2_Tutorial.md 5.80 KiB

OPEN AIR INTERFACE	**OAI 7.2 Fronthaul Interface 5G SA Tutorial**

Table of Contents

1. Prerequisites

The hardware on which we have tried this tutorial:

Hardware (CPU,RAM)	Operating System	NIC (Vendor,Driver,Firmware)
Intel(R) Xeon(R) Gold 6154 (2*18 Core), 64GB	RHEL 8.6 (4.18.0-372.26.1.rt7.183)	QLogic FastLinQ QL41000,qede,mbi 15.35.1
Intel(R) Xeon(R) Gold 6354 18-Core, 128GB	RHEL 8.7 (4.18.0-425.10.1.rt7.220)	Intel XXV710 for 25GbE SFP28,i40e,6.02 0x80003888
AMD EPYC 7513 32-Core Processor, 256GB	Ubuntu 20.04 (5.4.143-rt64)	Intel X710 for 10GbE SFP+,i40e,5.04 0x80002530

NOTE: These are not minimum hardware requirements. This is the configuration of our servers.

We always set our servers to maximum performance mode.

```
tuned-adm profile realtime
```

For PTP grandmaster we have used Fibrolan Falcon-RX. The O-RU which we have used for this tutorial is VVDN LPRU.

1.1 DPDK(Data Plane Development Kit)

Download DPDK version 20.05.0

```
wget http://fast.dpdk.org/rel/dpdk-20.05.tar.xz
```

DPDK Compilation

```
tar -xvf dpdk-20.05.tar.xz
cd dpdk-20.05
```

```
meson build
cd build
```

```
make install T=x86_64-native-linuxapp-gcc
```

1.2 Setup

We have mentioned the information for our setup but if you want more information then you can refer to below links,

1. O-RAN-SC O-DU Setup Configuration
2. O-RAN Cloud Platform Reference Designs 2.0,O-RAN.WG6.CLOUD-REF-v02.00,February 2021

1.2.1 RHEL

These arguments we tried on both RHEL 8.6 (4.18.0-372.26.1.rt7.183.el8_6.x86_64) and 8.7 (4.18.0-425.10.1.rt7.220.el8_7.x86_64)

Update Linux boot arguments

```
igb.max_vfs=2 intel_iommu=on iommu=pt intel_pstate=disable nosoftlockup tsc=nowatchdog mitigations=off cgroup_memor
```

1.2.1 Ubuntu

Install real timer kernel followed by updating boot arguments

```
isolcpus=0-2,8-17 nohz=on nohz_full=0-2,8-17 rcu_nocbs=0-2,8-17 rcu_nocb_poll nosoftlockup default_hugepagesz=1GB h
```

Isolated CPU 0-2 are used for DPDK/ORAN and CPU 8 for `ru_thread` in our example config

1.3 PTP configuration

You can refer to the following o-ran link for PTP configuration. In our setup we used Fibrolan Falcon-RX for PTP grandmaster.

```
git clone http://git.code.sf.net/p/linuxptp/code linuxptp
git checkout v2.0
make && make install

./ptp4l -i ens1f1 -m -H -2 -s -f configs/default.cfg
./phc2sys -w -m -s ens1f1 -R 8 -f configs/default.cfg
```

2. Build OAI-FHI gNB

2.1 Build ORAN Fronthaul Interface Library

Download ORAN FHI library

```
git clone https://gerrit.o-ran-sc.org/r/o-du/phy.git
cd phy
git checkout oran_release_bronze_v1.1
```

Apply patches (available in `oai_folder/cmake_targets/tools/oran_fhi_integration_patches/`)

```
git apply oran-fhi-1-compile-libxran-using-gcc-and-disable-avx512.patch
git apply oran-fhi-2-return-correct-slot_id.patch
git apply oran-fhi-3-disable-pkt-validate-at-process_mbuf.patch
git apply oran-fhi-4-process_all_rx_ring.patch
git apply oran-fhi-5-remove-not-used-dependencies.patch
```

Set up the environment (change the path if you use different folders)

```
export XRAN_LIB_DIR=~/phy/fhi_lib/lib/build
export XRAN_DIR=~/phy/fhi_lib
```

```
export RTE_SDK=~/dpdk-20.05
export RTE_TARGET=x86_64-native-linuxapp-gcc
```

```
cd phy/fhi_lib/
./build.sh
```

2.2 Build OAI gNB

```
git clone https://gitlab.eurecom.fr/oai/openairinterface5g.git
cd openairinterface5g
git checkout develop
source oaienv
cd cmake_targets
./build_oai --gNB --ninja -t oran_fhlib_5g (Add, -I if you are building for the first time on server for installing
```

3. Configure Server and OAI gNB

3.1 Update following in fronthaul interface configuration - oran.fhi.json

```
 * DU Mac-address: Parameter o_du_macaddr
 * RU MAC Address: Parameter o_ru_macaddr
 * PCI address: Parameter dpdk_dev_up and dpdk_dev_cp
```

3.2 Copy Fronthaul Configuration File

```
cd ran_build/build
cp ../../../targets/PROJECTS/GENERIC-NR-5GC/CONF/oran.fhi.json .
```

3.2 Bind Devices

```
echo "2" > /sys/class/net/ens1f1/device/sriov_numvfs
sudo ip link set ens1f1 vf 0 mac 00:11:22:33:44:66 spoofchk off
sudo ip link set ens1f1 vf 1 mac 00:11:22:33:44:66 spoofchk off
sudo modprobe vfio_pci
sudo /usr/local/bin/dpdk-devbind.py --bind vfio-pci 51:0e.0
sudo /usr/local/bin/dpdk-devbind.py --bind vfio-pci 51:0e.1
```

4. Run OAI gNB

4.1 Run OAI gNB

```
cd ran_build/build

sudo ./nr-softmodem -O ../../../targets/PROJECTS/GENERIC-NR-5GC/CONF/oran.fh.band78.fr1.273PRB.conf --sa --reorder-
```