Beginner-Friendly OAI Lab Experiment

Objective:

To set up and run a basic LTE network using OpenAirInterface (OAI) on a Linux-based system using simulated UE.

Requirements:

- A machine with Ubuntu 20.04 or later
- Internet connectivity
- Basic knowledge of Linux command-line
- Git, cmake, build-essential packages
- Docker (optional but recommended)
- srsUE or UERANSIM for UE simulation

Procedure:

1. **Install Dependencies**:
   sudo apt update
   sudo apt install git cmake build-essential

2. **Clone the OAI Repository**:
   git clone https://gitlab.eurecom.fr/oai/openairinterface5g.git

3. **Build OAI RAN Components**:
   cd openairinterface5g
   source oaienv
   cd cmake_targets
   ./build_oai -I

4. **Run OAI eNodeB**:

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Configure the file 'enb.conf' with appropriate IP and radio parameters.

Use the command:

sudo ./lte-softmodem -O enb.conf

5. **Run OAI EPC (MME + S/P-GW)**:

Configure the file 'mme.conf', 'spgw.conf' etc.

Start EPC components using:

sudo ./run_epc -O mme.conf

6. **Simulate a UE**:

Option 1: Use srsUE (from srsRAN project)

Option 2: Use UERANSIM for 5G or LTE UE simulation

7. **Check Connectivity**:

Use ping or iperf between UE and external network (if routing is enabled).

8. **Observe Logs and Analyze Packets**:

Use Wireshark to analyze packet flow between eNB and EPC.

Expected Outcome:

A working LTE network setup with eNodeB and EPC running on your system. A simulated UE should be able to attach and initiate data sessions.

Troubleshooting Tips:

- Ensure network interfaces are correctly configured.
- Use Wireshark to debug S1AP and GTP messages.
- Check the logs in /tmp/oai_build_* for compilation issues.

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Further Learning:

- Explore the OAI 5G stack (gNB and 5GC)
- Try deploying with Docker for easier management
- Read OAI documentation and join community discussions