

Department of Computer Science, Electrical and Space Engineering

Luleå University of Technology

D7030E Advanced wireless networks

LAB 4 LTE module

The objective of this assignment is to get familiar with ns-3 module dedicated for LTE and investigate the behavior of the system against different settings.

For this Lab the scenario should be written by you. However, you will find all the patterns in the tutorial for LTE: <http://www.nsnam.org/docs/release/3.20/models/html/lte-user.html>. You are highly recommended to study it as the first step for the Lab.

The following topology should be implemented in your scenario.

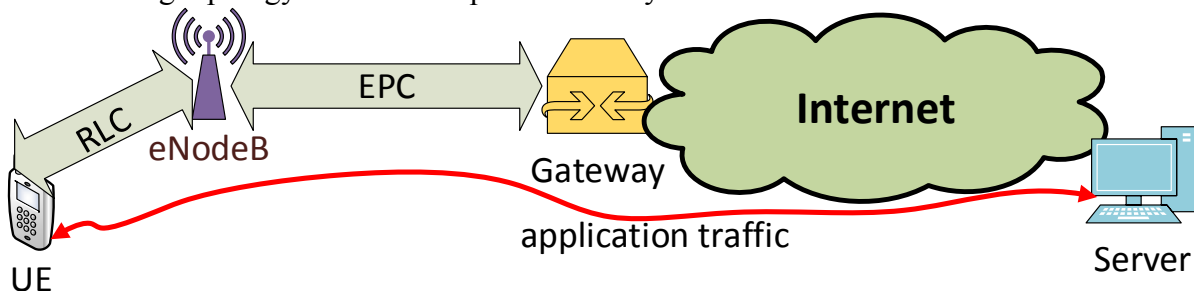


Figure 1. Scenario for the Lab

Specification for scenario:

1. "ns3::LteAmc::AmcModel": LteAmc::PiroEW2010
2. Attributes for LteHelper
 - Pathloss model: TwoRayGroundPropagationLossModel
 - SchedulerType: PffMacScheduler
 - DLEarfcn: 100
 - ULEarfcn: 18100
 - DLBandwidth= ULBandwidth: 50
3. Study different antenna configurations (parabolic, cosine and isotropic)
4. Enable routing between the Server and the UE
5. For application use OnOffHelper with "UdpSocketFactory" deployed on a server
 - Try simulations with 3 different DataRates for the socket
6. Record PCAP trace from the server's side
7. Record traces from LteHelper

Tasks:

1. Write simulation scenario

2. Be able to describe the content of traces from LTE system
3. Describe which differences in traces you have observed for different antenna configurations (parabolic, cosine and isotropic). Especially, observe cases, when UE is not aligned with antenna's direction (possible only for parabolic and cosine antennas).
4. Calculate the throughput between the eNodeB and UE for different application's Data rates
5. Calculate the throughput between the eNodeB and UE for one fixed application's Data Rate and different distances between eNodeB and UE for the isotropic antenna type.

NOTE1: **BEFORE DOING STEPS 4 and 5.** Figure out how number of transmitted bytes is changed with distance in DIRlcStats and DIPdcpStats traces, then decide which of them to use for throughput calculation. Motivate your choice.

Congrats, you have just accomplished the last lab in this course!