Lab B1: Network Simulator 3 – WiFi networks

Points 100

Objective:

To understand and modify simple WiFi based network scenarios. To understand basic performance metrics provided by the FlowMonitor tool of Ns3.

Description

Install and execute example simulations to get familiar with Ns3 environment. Next, study FlowMonitor tool within the Ns3 to analyze simulation results. Identify the provided performance measures and come up with derived performance metrics (using the info from simulation code and the FlowMonitor). Simulate grid topology for various traffic scenarios and propagation models, and analyze the results.

Tasks and Deliverables

1. Install Ns3 and run few examples including: “wifi-hidden-terminal.cc”, “wifi-simple-adhoc-grid.cc”, “src/propagation/examples/main-propagation-loss.cc”, etc. (**30 points**)
    a. Observe topology setup in “wifi-simple-adhoc-grid.cc”
    b. Observe the usage of the FlowMonitor in wireless-hidden-terminal.cc”
2. Familiarize yourself with FlowMonitor measures (see documentation of the FlowMonitor on nsnam.org website) (**70 points**)
    a. Add FlowMonitor to the “wifi-simple-adhoc-grid.cc”
    b. Identify at least 10 metrics, which are directly available in FlowMonitor. Print the data and use it to generate results (e.g for plotting)
    c. Came up with additional 10 metrics that can be calculated from FlowMonitor data (but are not directly available – see “throughput” in wifi-hidden-terminal example).
    d. Briefly discuss all the metrics and explain why they are important.
    e. Modify the generated traffic to create congestion (e.g. more packets, higher rate)
    f. Discuss results – compare them, explain the observed behavior. (**40 points out of 70**)

Highly recommended tutorials:

- https://www.nsnam.org/docs/tutorial/singlehtml/index.html
- https://www.nsnam.org/doxygen/classns3_1_1_nakagami_propagation_loss_model.html