CSCI 572: Computer Networks II (Fall 2023)

Mini-Project 3: Analyzing WiFi Behavior

In the class, we discussed WiFi's MAC layer protocol. The goal for this assignment is to study the behavior of WiFi infrastructure mode using ns-3. This project is a bit more open-ended than the previous two. One of the important skills to gain as a graduate student is how to approach open-ended research.

You need to do the following using Friis Propagation Loss Model.

1. Create a network topology that will have the hidden terminal issue; record nodes' RTS/CTS/ACK and data transmission times; analyze the recorded results; explain how WiFi's MAC protocol addresses the hidden terminal issue.

2. Create a network topology that will have the exposed terminal issue; record nodes' RTS/CTS/ACK and data transmission times; analyze the recorded results; explain how WiFi's MAC protocol addresses the exposed terminal issue.

3. Create a network topology where multiple nodes (at least three) are within proximity that will cause wireless interference; design your experiments to study the impact of the number of interfering nodes affect the network throughput.

In addition to the three simulations specified above, you are required to study item #3 above in a different physical environment. ns-3 has multiple built-in propagation loss models. Choose one that is different from Friis propagation loss model and redo item #3. Make sure you explain how the two models are different and how that has affected your results.

In your report, describe

- your simulation setup including parameters used, signal propagation model used, MAC layer protocol used, and network topology, etc.

- results including figures and explanation of the figures.

Submission

Write your report in LaTeX and then submit the PDF file on Canvas.