Wireless Networks - Spring 2019
Assignment #3

Create a program (name it as ”wifi-test.cc”) with one WiFi access point (AP) and 2 station nodes where the first station node is the primary data node and the second station node will create traffic. Set the distance between AP and the station nodes as 30m. You need to measure the performance of the data transmission of the first station node in different network conditions. For understanding of WiFi characteristics, you can refer to the document: https://www.nsnam.org/bugzilla/attachment.cgi?id=2230 . For applications, write the custom TCP application on all the nodes as used in Assignment 2 using MyApp class.

For performance measurement, use the following two settings :
i) Measure the performance at the network layer (layer 3) using ”Flow Monitor” . Refer to the code in ”examples/wireless/power-adaptation-interference.cc” and add the code in your program to measure all the statistics as in the example code.

ii) Measure the performance at the application layer in the packetsink trace source. To understand the details of how tracing works, refer to the documentation : https://www.nsnam.org/docs/tutorial/html/tracing.html. However, for quick start, you can refer to the following posts in the ns-3 google group:
a) https://groups.google.com/forum/#!searchin/ns-3-users/PacketSink$2FRx|sort:date/ns-3-users/fUJ7FwnLnLo/qHfUeMDjBAAJ
b) https://groups.google.com/forum/#!searchin/ns-3-users/PacketSink$2FRx|sort:date/ns-3-users/FihwkwFhIpY/RaUtRFi6BQAJ
In the ReceivePacket function that is written as a callback function as you see in the above posts, set a counter to measure number of packets received. However, you only need to count the packets from the primary station node.

Hint : To measure the data from the primary data station only, you need to check the IP address in the ”ReceivePacket” function to match with the IP address you set for the first station node using Ipv4AddressHelper.

Now measure the performance in terms of the above methods and metrics for following combination of the parameters:

1. Use two propagation loss model in the WiFi : LogDistancePropagationLossModel and Cost231PropagationLossModel
Hint: Referl to the document https://www.nsnam.org/docs/models/html/propagation.html.

2. For the applications, use a data rate of 1 Mbps TCP application for the primary node. However, for the second station node that creates traffic, use two kinds of applications:
a) a periodic application with two different data rates 1 Mbps and 10 Mbps.
b) a bursty application with burst size 20 and 100 per second.

Hint : In the ”MyApp::ScheduleTx” function control the inter-arrival time of packets . For periodic traffic keep the fixed inter-packet time based on data rate. For bursty traffic use a burst of 20 packets per second, i.e. for group of 20 packets the inter-packet time is zero and then the scheduler schedules the next burst for 1 second.

For all the combinations (total 2x2x2 = 8 combinations: 2 propagation models, 2 periodic traffic and 2 bursty traffic), measure the performance of the primary station node that transmits 10000 packets with 1 Mbps data rate. Show the statistics all all cases in terms of output from flowmonitor and application layer throughput.