Birla Institute of Technology & Science, Pilani
Work-Integrated Learning Programmes Division
Second Semester 2021-2022
Advanced Computer Networks (CS ZG525)
ASSIGNMENT

Due Date: 25-04-2022 [11:00 PM] **Max. Marks: 15**
Date of Posting: 14-04-2022 [11:00 PM]

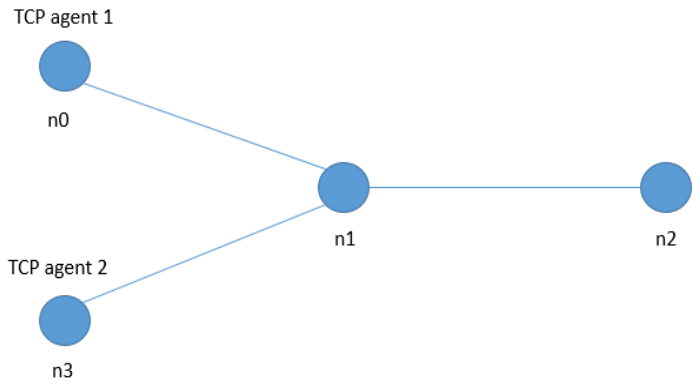
Instructions:
Take this assignment as learning opportunity and attempt with full integrity. The submitted files will be checked by a Plagiarism tool. Plagiarized submission will attract HUGE penalty.

Submission: Create a zip file of all deliverables and upload to TAXILA.

Objective:

The objective of this assignment is to get acquainted with the ns-2 network simulator and TCP protocol fairness. The assignment focuses on fairness between TCP flows with equal and unequal RTTs.

Problem Statement: Create the network topology shown in below figure. Create two TCP flows (Reno), one between node n0 and n2 and another between n3 and n2. Attach a DropTail queue to the link n0—n1 and n3—n1. In your simulation script, start both the TCP flows at the same time. Run the simulation for 50-100 seconds duration. Keep same value of MSS (Maximum segment size) for both the TCP connections. Your simulation script should create trace file and NAM file for graphical visualization of the simulation.



a) Assign the link parameters values as mentioned in the below table.

Link	Latency/Delay (in milli sec)	Bandwidth/Data rate	Link type
n0—n1	100	2Mbps	Full duplex
n3—n1	100	2Mbps	Full duplex
n1—n2	100	2Mbps	Full duplex

Tasks to be performed:

1. Using **Xgraph**, plot the throughput of the TCP flows w.r.t. time together in a same plot.
2. In every TCP-type class, the congestion window size of the TCP module is available in the variable ***cwnd_***. Plot the variation of congestion window w.r.t. time for both the flows. (Hint: you will have to obtain the value of **cwnd_** *repeatedly*)

b) Now change the link parameters as shown in the below table and repeat the tasks (1) and (2)

Link	Latency/Delay (in milli sec)	Bandwidth/Data rate	Link type
n0—n1	150	2Mbps	Full duplex
n3—n1	50	2Mbps	Full duplex
n1—n2	50	2Mbps	Full duplex

Analyze the plots to compare bandwidth share of both TCP connections for scenario (a) and (b). Write your observations in a doc file and convert it into pdf file.

Deliverables

1. **TCL script files (.tcl) for (a) and (b).**
2. **Plots for bandwidth and TCP window size for (a) and (b).**
3. **Trace file (.tr) for both simulations.**
4. **Observation file in pdf format.**

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