भारतीय सूचना प्रौद्योगिकी संस्थान गुवाहाटी

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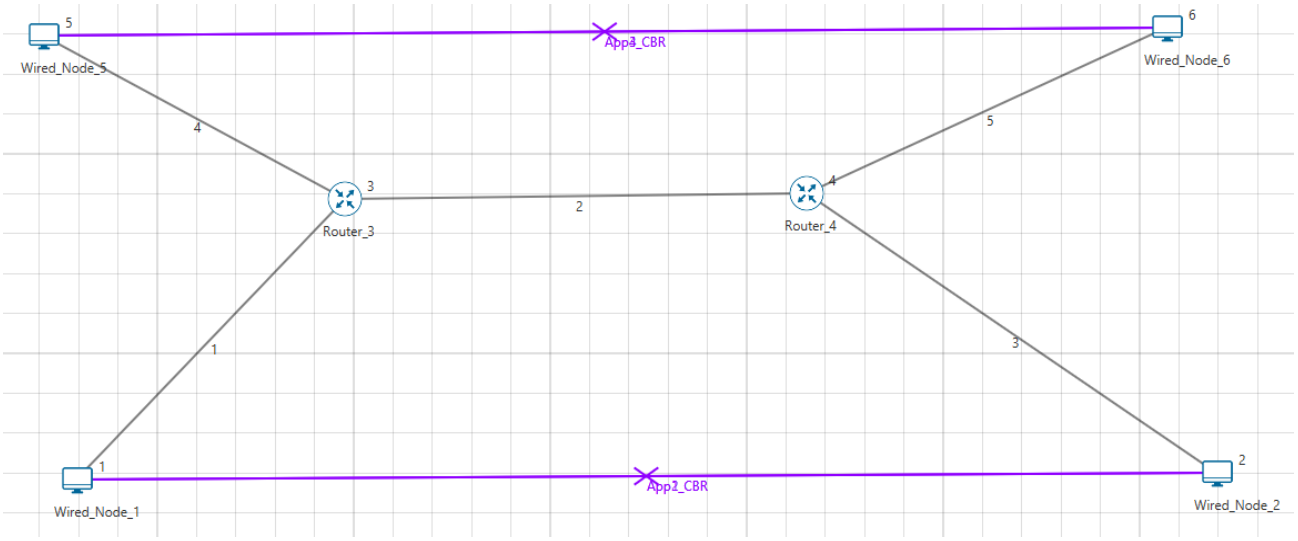
Computer Networks Lab (CS 353): Lab4/Assignment 3 (Graded)

Create the network scenario as shown below:



Two CBR (Constant bitrate) applications are configured between WiredNode1, and WiredNode2 with WN1 as the source for first application and WN2 as the source for the second. The inter-arrival time between packets is set to 2 seconds. Both the applications begin and end at the same time (consider start-time as 2 seconds and end-time as 40 seconds). The total simulation time is configured to 50 seconds. Similarly, two other CBR applications are created between WN5 and WN6, with same configuration parameters. Set the following link speeds (in Mbps): link 1 -> 50, link 3 -> 50, link 4-> 50, link 5 -> 50. Keeping these values along with all other factors specified above to be constant, if we change the link speed of link 2, with an initial value of 100mbps and step size of 10mbps and the final value of 10 Mbps, how do the following characteristics change? (Please plot necessary graphs)

1. The average delay incurred by link 2.
2. The average throughput achieved by link 2.
3. Packet loss (error + collision) rate exhibited by link 2.
4. What is the average delay per packet incurred by the link layer in Router 3? Is it identical to the corresponding value in Router 4?

Set link speed to 10 Mbps for link 2 (the backbone link connecting the routers) and 100 Mbps for links 1, 3, 4 and 5 (the access link connecting the wired nodes and the routers). Set value of BER (error rate) as 0 for all the links. Set propagation delay as 0 microseconds for the access links 1, 3, 4 and 5 and 100 microseconds for the backbone link 2. How does the throughput of link 2 change with the increase in the no. of CBR applications having the default configurations? Consider step size to be 4 i.e. one in each node, initial value as stated above and the final value to be 12.

The following metrics are to be documented:

a. Link-layer protocols between different nodes in the network.
b. Link-wise frames transmitted, errored, and collided.

c. Link-wise data and control frames.
d. Percentage of link-layer overhead.
e. Throughput achieved by different applications.
f. Filter, the Point-to-Point protocol related metrics for each link in the network topology.