COMPENG 4DK4 LAB2

Richard Qiu – 400318681 – Group 1

# Experiment

## 2.

The Packet length is 1000 bits, and the output link operator has a bit rate of 1 Mbps, to make sure there are no packet losses during the transmission, we need to meet the below requirement.

0 < PACKET\_ARRIVAL\_RATE \* PACKET\_LENGTH < LINK\_BIT\_RATE

By simulating each arrival rate with 10 different random seeds and find the average mean delay. The result can be obtained below.





As we can see from the simulation graph, the mean delay curve starts from the y-axis intercept at 1.00 when x=0 and approaches the infinity when the arrival rate approaches the x-asymptote 1000.

## 3.

By adding a counter to count how many packets have the delay exceeds 40msec while manually adjust the packet arrival rate and simulation with 10 different random seeds, I find out to meet the 2% packet delay requirement, when the arrival rate is at 133 packets/second, the average 40msec delay fraction is 1.969% which meets the question requirement.

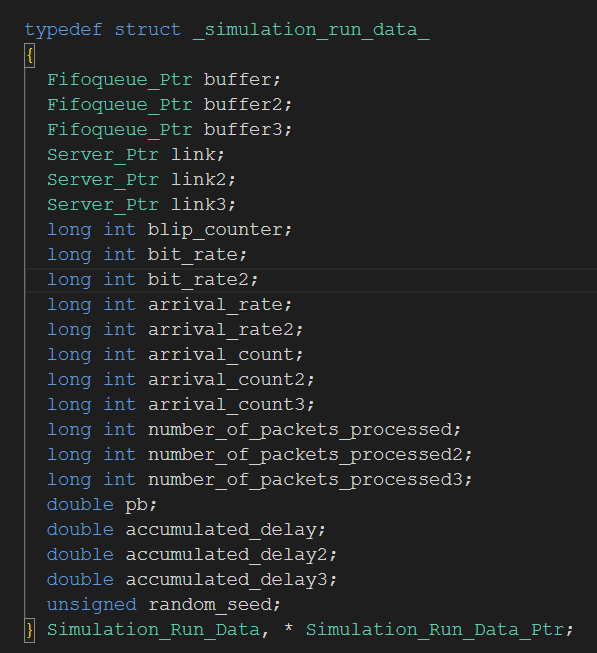
A computer screen with white text

Description automatically generated

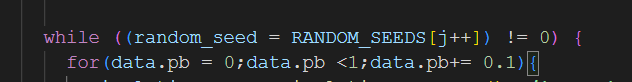
The random seed list is {333333, 444444, 555555, 666666, 777777, 888888, 1000000, 2000000, 3000000, 400318681};

## 4.

To perform a three packet switches, I have added two buffers and two links and other necessary members in the data struct as shown below.



The pb(probability) will be independent change to model this system performance.



Firstly, I performed 10 simulations runs where increment the pb by 1 to see how this model performed.