CS348 Computer Networks

Assignment 1

Indian Institute of Technology, Patna

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Instructions : You have to upload the code along with the output graphs for this assignment in a tar file using the lab submission website on or before 20.01.2019. The file name should be assign1.tgz.

Problem 1. Write a program to simulate the functioning of a switching network(shown in figure 1) consisting of a source that are connected to a sink through a switch. You have to create the following objects:

- **Source** : The source must have an id that is automatically assigned. It must have a constant packet sending rate and will be connected to the switch through a link that must have a given bandwidth.
- **Switch** : The task of the switch is to service the arriving packets from the source to the input port and dispatch the same to the sink through a common output port. Although the link from the input port to the output port has infinite bandwidth but the link to the sink has a given finite bandwidth. The switch operates using packet switched technology. In packet switched mode, the switch uses a single queue at the output port. Packets arriving from the source are inserted in the queue in order of their arrival and dispatched to the sink by dequeuing one at a time.
- **Switch** : Each packet must have a source id and a time stamp when it is generated. The packets have same given size that is provided by the user.

You are free to create additional objects if you want. assume that the queues are infinitely large and all components follow a common global time.The simulation will run for a fixed given duration of time.

You have to record the following as output:

t

Figure 1: A switching network

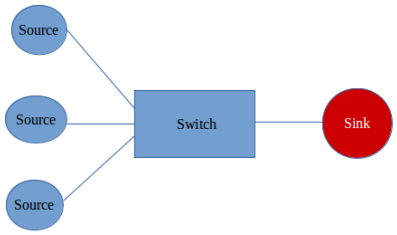

Figure 2: A switching network

- The average delay of the source with respect to different packet sending rates.
- Assume that the size of the queue of the switch is fixed. The packet loss rate at the switch with respect to different packet sending rates of the source.

If the number of sources is now increased to 3 where each source has a distinct link to the switch, however the link from the switch to the sink is shared between the sources as shown in figure 2, then record the following.

- The average delay of each of the sources with respect to different packet sending rates.
- Assume that the size of the queue of the switch is fixed. The packet loss rate at the switch with respect to different packet sending rates of each of the sources.