

COMP1047-Networks-Lab2 Network Calculations

1. How long (in seconds) does it take to transmit a 0.1 GB (Giga Bytes) message over a network with 100Mbps (Mega bits per second) data transfer rate and 100 ms (milliseconds) latency?
2. Consider the network of four routers shown in Figure 1. Each link has a capacity of 50Mbps. Assume there is no contention on the access links or for router backplane resources, i.e., the only constraints are the link capacities between routers. There are four flows in the network, labelled $F1$, $F2$, $F3$ and $F4$, which pass through the routers indicated. $F1$ traverses $R3 \rightarrow R1$, $F2$ traverses $R1 \rightarrow R2$, $F3$ traverses $R2 \rightarrow R4$, and $F4$ shares the links with every other flow and traverses $R3 \rightarrow R1 \rightarrow R2 \rightarrow R4$.

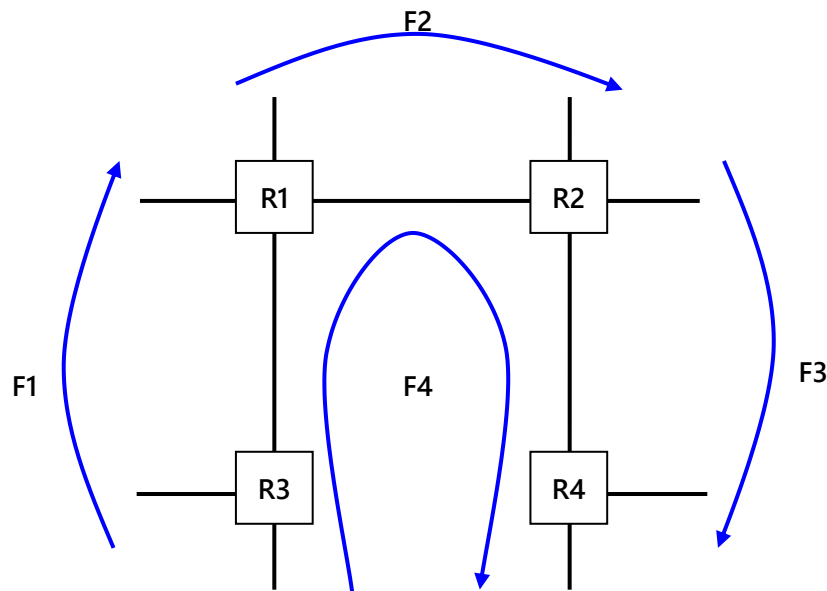


Figure 1

Assume each router implements: First In First Out (FIFO) queuing. If each flow consists of an identical and constant bit rate UDP flow with equal packet sizes, what is the resulting rate for each flow? Assume that FIFO drops packets with a uniform probability.

3. We assume the URL of a webpage is “<http://www.abc.com/index.html>”, with no web cache on your computer for the corresponding IP address. The file “index.html” has cited 8 small images. In the process, the Domain Name Resolution request and response time is denoted as RTT_d , and the Round Trip Time for web object by HTTP request to transmit is denoted as RTT_h . Please give:

(1) Domain name.

(2) The minimum time that the browser resolves the URL for the corresponding IP address.

(3) If browser has no configuration for parallel TCP connections, how long does it take for us to browse the webpage full content (including the cited images) through HTTP1.0 (excluding the time for the Domain Name Resolution)?

(4) If browser has the configuration for 5 parallel TCP connections, how long does it take for us to browse the webpage full content (including the cited images) through HTTP1.0 (excluding the time for the Domain Name Resolution)?