ADVANCED COMPUTER NETWORKS
Assignment 7: Flow control and Data Center TCP

Assigned on: 2 April 2015
Due by: 16 April 2015

Question 1: Deadline aware TCP

Reading material: Deadline-aware Datacenter TCP [3]

a) Which of the deadline aware TCP will adapt better with other traffic?

Question 2: MCTCP

Reading material: Multipath TCP [1] Assume that you are in a datacenter with Fat-tree topology which is designed to provide high cross-section bandwidth, and assume that you have Equal cost MultiPath (ECMP) support available to load balance the connections.

Now, if you run a benchmark where each machine in the data-center is trying to communicate with another machine selected at random using TCP, then in theory you should be able to reach cross-section bandwidth. But in practice typically you don’t reach cross-section bandwidth, with normal TCP.

a) Explain why it is unlikely that you will reach full cross-section bandwidth in a fat-tree without MC-TCP?

b) Explain how MC-TCP helps with this problem?

Question 3: Flow control

a) Why flow control is important for high speed network?

b) Give two problems with credit based flow control.

c) Give two problems with on-off based flow control.
Question 4: Buffer management

a) Explain what is the problem with buffer utilization in cut-through forwarding?

b) Explain how this is solved by wormhole forwarding?

c) Explain what is "Head-of-line blocking" problem, and in which of the techniques among stop-and-forward, cut-through and wormhole forwarding suffer from it?

Question 5: End to end argument

a) Explain the flow control implemented by Infiniband network in context of end-to-end argument [2].

b) Give a argument in favor of implementing the flow control in network.

c) Give a argument against implementing the flow control in network.

References

