School of Computer and Information Sciences
University of Hyderabad

Advanced Computer Networks - Assignment

Date: 12 Apr. 2019   **Max. Marks: 20**

   NOTE: Answer <u>**ALL THE**</u> questions.

1. Assume that you have invented a new network layer protocol for forwarding. If you were using a traditional network versus an SDN, what exactly needs to be done to ensure that forwarding using this protocol happens without disruption to a production network? Assume that you have a completely generalized forwarding abstraction unlike OpenFlow which still needs to understand the exact header formats.

2. Assume that an ISP defines 3 classes of service with 3 drop precedences. Show the WRED graph of drop probability versus average queue length for this. Also, describe how MPLS can be used for forwarding the data with QoS enabled – i.e., what is the FEC and how do you handle drop precedence with MPLS?

3. Assume the LLDP method of discovering topology in SDN and that OpenFlow is the protocol used for communication between the controller and the switches. If a switch goes down, how does the controller detect this? If a port goes down, how does the controller detect this? There can be many right answers. Do NOT just read from the Internet but try to answer from your understanding of OpenFlow messages and LLDP topology discovery mechanism.

4. Network Function Virtualization took off after the advent of SDN and virtualization of compute and storage. How do the multiple tables of OpenFlow introduced in V 1.1 help in NFV? Assume there are three tables in the OpenFlow switch corresponding to firewall, NAT and router. Take two examples of packets – one requiring a firewall followed by routing versus another requiring NAT followed by routing – and explain how the packets will be processed in the switch using the multiple table concept? Assume that first there is a firewall and then NAT followed by routing in the pipeline.

5. How do RDMA write and read operations work? Explain with the help of the work queue pair and completion queue.

****** ALL THE BEST ******