EECS 489 Discussion 11

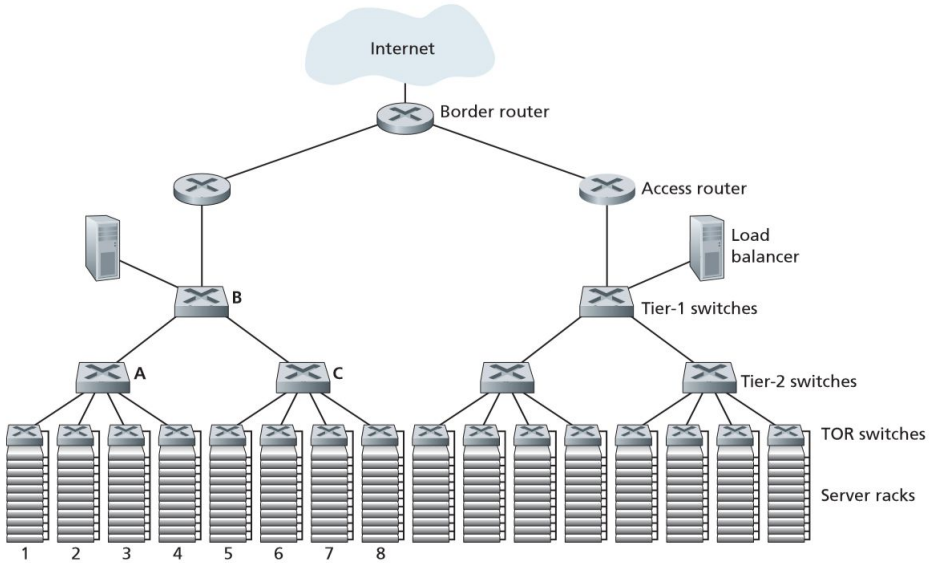
Q1

Suppose you walk into a room, connect to Ethernet, and want to download a Web page. What are all the protocol steps that take place, starting from powering on your PC to getting the Web page?

Q1

- Broadcast DHCP request to get an IP address
- Broadcast ARP message to get MAC of next hop router
- Issue a DNS query to get the IP address of the content server
- Construct a TCP connection to content server
    - At TCP layer, src addr is browser addr and dst addr is server addr, dst port is 80
    - At IP layer, src addr is browser addr and dst addr is server addr
    - At link layer, src MAC addr is browser MAC addr and dst MAC addr is next hop router MAC

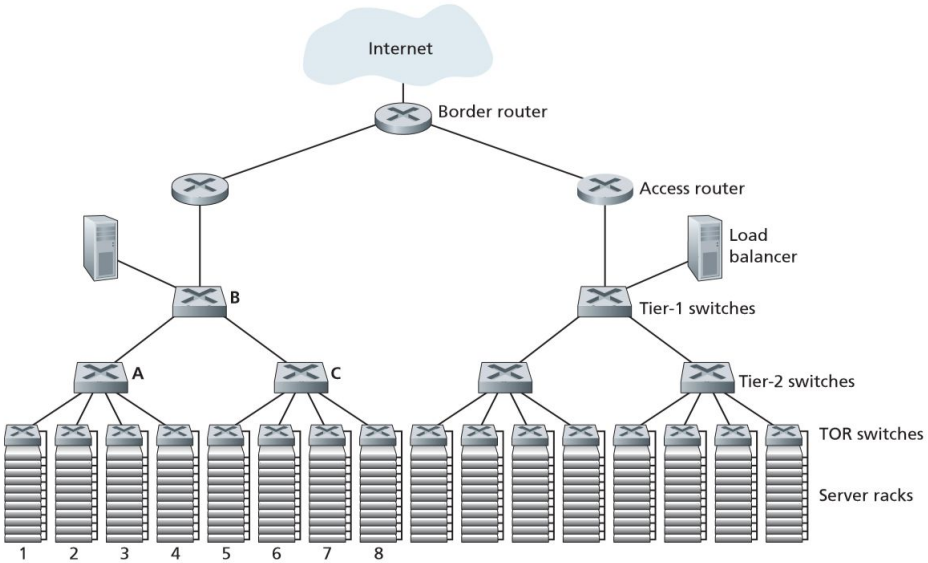
Q2



Consider the data center network with hierarchical topology in the figure to the left. Suppose now there are 80 pairs of flows, with ten flows between the first and ninth rack, ten flows between the second and tenth rack, and so on. Further suppose that all links in the network are 10 Gbps, except for the links between hosts and TOR switches, which are 1 Gbps.

- Each flow has the same data rate; determine the maximum rate of a flow.

Q2



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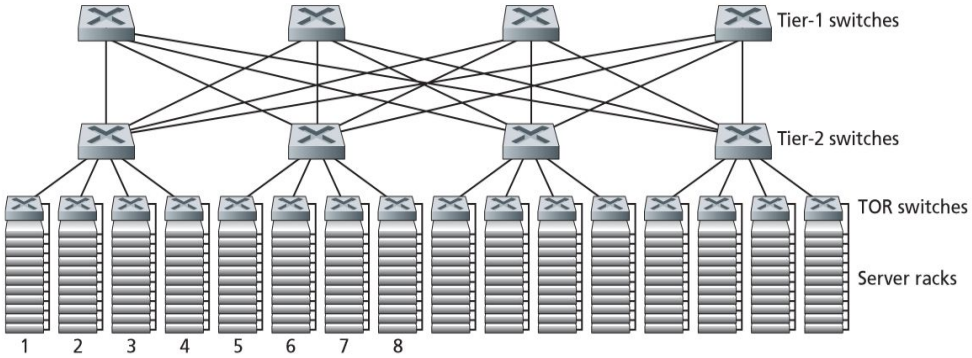
- Each flow has the same data rate; determine the maximum rate of a flow. 125 Mbps

Q2



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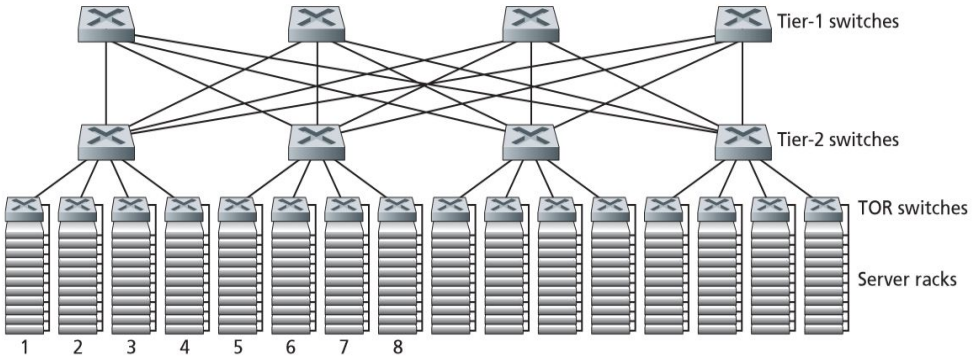
Q2



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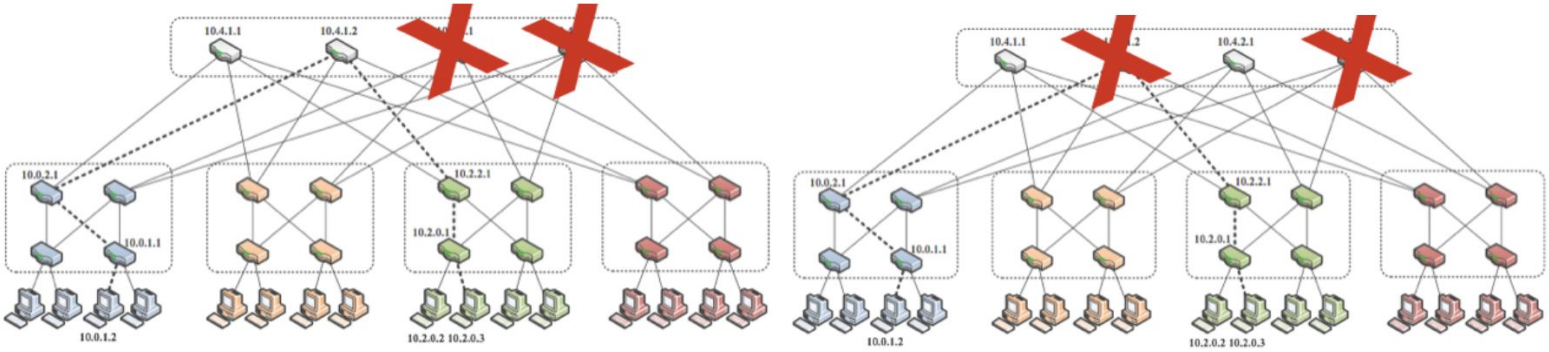
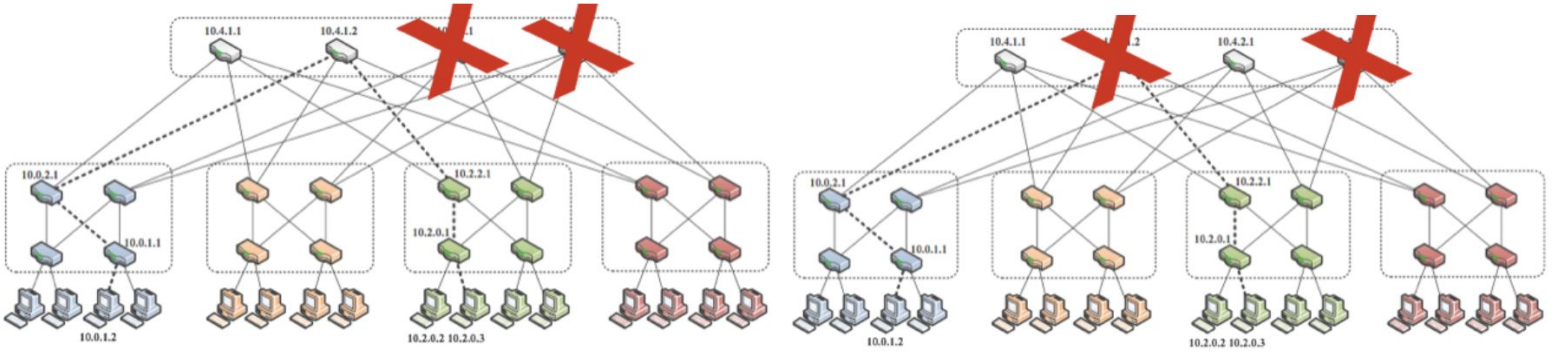
- Each flow has the same data rate; determine the maximum rate of a flow. 1 Gbps

Q3



With the switches marked with X eliminated, are these two topologies identical? Would they have identical responses to further failures? If not, can you point out one failure scenario where they behave differently?

Q3



In the left figure, if the top left switch fails, it is cut off from the network.

This is not the case for the figure on the right

Q4

How many end hosts does a fat-tree topology with k = 6 pods support?

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(k^3)/4