Advanced Computer Networks

Assignment 2: Data centers: applications and traffic

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Solution 1

Part a
P(waiting for more than 200 milliseconds) = 0.87

Part b
P(waiting for more than 200 milliseconds) = 0.18

Solution 2

Part a
This scheme is trying to de-synchronize response from the backend servers because if they synchronize they could fill up the complete buffer on gatherer server which could create a lot of problems. This is popularly known as TCP incast

Part b
Drawback would be average latency would be increased.

Solution 3

Port mirroring is used on a network switch to send a copy of network packets seen on one switch port (or an entire VLAN) to a network monitoring connection on another switch port. This is commonly used for network appliances that require monitoring of network traffic such as an intrusion detection system, passive probe or real user monitoring (RUM) technology that is used to support application performance management

Solution 4

For example if we look at the paper from Facebook we could find a couple a example due to which traffic would not be rack local:

- Cache Leader servers won't have rack local traffic as they are achieve cache coherency and in order to do that they need to talk to servers within datacenter or outside datacenter.

- Cache Follower servers won't have rack local traffic as they are providing data from cache to other servers in the datacenter and that's what was evident from the paper.

Solution 5

Low link utilization does not imply less processing at the switch. Since there can be a possibility that there can be a lot of packets of small size i.e. less than MTU which would lead low link utilization but switches would require to perform a lot of computation since they have to do a lot of packet processing for ex: they need to look into a lot packets and forward it accordingly. At the fixed line rate small packets will create more traffic.