ECE 545 Quiz 4

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1. The collision detection mechanism (used in Ethernet) may not be effective in designing a wireless medium access control (MAC) protocol due to the hidden terminal (node) problem. In wireless networks, the sender may not be able to detect collisions that occur at the receiver side or between other senders because they are out of range, resulting in performance degradation.

2. One technique that can improve host-to-host communication throughput in a data center network is load balancing. This technique involves directing external requests to a load balancer, which then distributes the requests to different hosts based on their current load. By balancing the load across the hosts, the network can handle a greater volume of traffic and prevent any one host from becoming overloaded, thereby improving overall throughput.

3. When designing a wireless medium access control (MAC) protocol, the collision detection mechanism used in Ethernet could not be applied effectively due to the nature of wireless transmissions. In wired networks, collision detection is possible because signals propagate quickly through the physical medium, allowing for fast detection of collisions. However, in wireless networks, signals propagate at the speed of light, making it difficult to detect collisions before the transmission has already taken place. Additionally, wireless transmissions are subject to interference and noise, which further complicates the detection of collisions. As a result, wireless MAC protocols typically rely on other mechanisms, such as collision avoidance, to manage access to the wireless medium.