

Network Simulation

Labwork 3: Building Topologies (Part 1)

Bus network topology

1. Building a bus network topology of 3 nodes (0, 1, 2) on a LAN using CSMA channel
2. Implement scenario of node 0 is a client and node 2 is an echo server. They exchange 100 packets within 10s. Capture the pcap trace from node 1.
3. Create a topology of “n” CSMA devices. Implement the scenario of $n = 5$, on which there are 2 pairs of client-server (0-2) and (1-3) exchanging packets at the same time. Each pair exchanges 10 packets/s. Run the simulation for 10s. Compare the packet delivery ratio and average delay of received packets at each server.

Result

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At time +2s client1 sent 1024 bytes to 10.1.2.3 port 9
At time +2s client2 sent 1024 bytes to 10.1.2.4 port 9
At time +2.00612s server1 received 1024 bytes from 10.1.2.1 port 49153
At time +2.00612s server1 sent 1024 bytes to 10.1.2.1 port 49153
At time +2.00812s server2 received 1024 bytes from 10.1.2.2 port 49153
At time +2.00812s server2 sent 1024 bytes to 10.1.2.2 port 49153
At time +2.00924s client1 received 1024 bytes from 10.1.2.3 port 9
At time +2.01524s client2 received 1024 bytes from 10.1.2.4 port 9
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At time +3s client1 sent 1024 bytes to 10.1.2.3 port 9
At time +3s client2 sent 1024 bytes to 10.1.2.4 port 9
At time +3.00009s server1 received 1024 bytes from 10.1.2.1 port 49153
At time +3.00009s server1 sent 1024 bytes to 10.1.2.1 port 49153
At time +3.00019s client1 received 1024 bytes from 10.1.2.3 port 9
At time +3.00065s server2 received 1024 bytes from 10.1.2.2 port 49153
At time +3.00065s server2 sent 1024 bytes to 10.1.2.2 port 49153
At time +3.00074s client2 received 1024 bytes from 10.1.2.4 port 9
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At time +4s client1 sent 1024 bytes to 10.1.2.3 port 9
At time +4s client2 sent 1024 bytes to 10.1.2.4 port 9
At time +4.00009s server1 received 1024 bytes from 10.1.2.1 port 49153
At time +4.00009s server1 sent 1024 bytes to 10.1.2.1 port 49153
At time +4.00019s client1 received 1024 bytes from 10.1.2.3 port 9
At time +4.00029s server2 received 1024 bytes from 10.1.2.2 port 49153
At time +4.00029s server2 sent 1024 bytes to 10.1.2.2 port 49153
At time +4.00038s client2 received 1024 bytes from 10.1.2.4 port 9
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At time +5s client1 sent 1024 bytes to 10.1.2.3 port 9
At time +5s client2 sent 1024 bytes to 10.1.2.4 port 9
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At time +5.00009s server1 received 1024 bytes from 10.1.2.1 port 49153
At time +5.00009s server1 sent 1024 bytes to 10.1.2.1 port 49153
At time +5.00019s client1 received 1024 bytes from 10.1.2.3 port 9
At time +5.00033s server2 received 1024 bytes from 10.1.2.2 port 49153
At time +5.00033s server2 sent 1024 bytes to 10.1.2.2 port 49153
At time +5.00042s client2 received 1024 bytes from 10.1.2.4 port 9

At time +6s client1 sent 1024 bytes to 10.1.2.3 port 9
At time +6s client2 sent 1024 bytes to 10.1.2.4 port 9
At time +6.00009s server1 received 1024 bytes from 10.1.2.1 port 49153
At time +6.00009s server1 sent 1024 bytes to 10.1.2.1 port 49153
At time +6.00019s client1 received 1024 bytes from 10.1.2.3 port 9
At time +6.00046s server2 received 1024 bytes from 10.1.2.2 port 49153
At time +6.00046s server2 sent 1024 bytes to 10.1.2.2 port 49153
At time +6.00055s client2 received 1024 bytes from 10.1.2.4 port 9

At time +7s client1 sent 1024 bytes to 10.1.2.3 port 9
At time +7s client2 sent 1024 bytes to 10.1.2.4 port 9
At time +7.00009s server1 received 1024 bytes from 10.1.2.1 port 49153
At time +7.00009s server1 sent 1024 bytes to 10.1.2.1 port 49153
At time +7.00019s client1 received 1024 bytes from 10.1.2.3 port 9
At time +7.00039s server2 received 1024 bytes from 10.1.2.2 port 49153
At time +7.00039s server2 sent 1024 bytes to 10.1.2.2 port 49153
At time +7.00049s client2 received 1024 bytes from 10.1.2.4 port 9

At time +8s client1 sent 1024 bytes to 10.1.2.3 port 9
At time +8s client2 sent 1024 bytes to 10.1.2.4 port 9
At time +8.00009s server1 received 1024 bytes from 10.1.2.1 port 49153
At time +8.00009s server1 sent 1024 bytes to 10.1.2.1 port 49153
At time +8.00019s client1 received 1024 bytes from 10.1.2.3 port 9
At time +8.00044s server2 received 1024 bytes from 10.1.2.2 port 49153
At time +8.00044s server2 sent 1024 bytes to 10.1.2.2 port 49153
At time +8.00053s client2 received 1024 bytes from 10.1.2.4 port 9

At time +9s client1 sent 1024 bytes to 10.1.2.3 port 9
At time +9s client2 sent 1024 bytes to 10.1.2.4 port 9
At time +9.00009s server1 received 1024 bytes from 10.1.2.1 port 49153
At time +9.00009s server1 sent 1024 bytes to 10.1.2.1 port 49153
At time +9.00019s client1 received 1024 bytes from 10.1.2.3 port 9
At time +9.00065s server2 received 1024 bytes from 10.1.2.2 port 49153
At time +9.00065s server2 sent 1024 bytes to 10.1.2.2 port 49153
At time +9.00075s client2 received 1024 bytes from 10.1.2.4 port 9

At time +10s client1 sent 1024 bytes to 10.1.2.3 port 9
At time +10s client2 sent 1024 bytes to 10.1.2.4 port 9
At time +10.0001s server1 received 1024 bytes from 10.1.2.1 port 49153
At time +10.0001s server1 sent 1024 bytes to 10.1.2.1 port 49153
At time +10.0002s client1 received 1024 bytes from 10.1.2.3 port 9
At time +10.0003s server2 received 1024 bytes from 10.1.2.2 port 49153
At time +10.0003s server2 sent 1024 bytes to 10.1.2.2 port 49153

At time +10.0004s client2 received 1024 bytes from 10.1.2.4 port 9

At time +11s client1 sent 1024 bytes to 10.1.2.3 port 9
At time +11s client2 sent 1024 bytes to 10.1.2.4 port 9
At time +11.0001s server1 received 1024 bytes from 10.1.2.1 port 49153
At time +11.0001s server1 sent 1024 bytes to 10.1.2.1 port 49153
At time +11.0002s client1 received 1024 bytes from 10.1.2.3 port 9
At time +11.0003s server2 received 1024 bytes from 10.1.2.2 port 49153
At time +11.0003s server2 sent 1024 bytes to 10.1.2.2 port 49153
At time +11.0004s client2 received 1024 bytes from 10.1.2.4 port 9

Conclusion

- The packet delivery ratio of received packets at the 2 servers is the same.
- The average delay of received packets at server 2 is larger than at server 1.