# ABSTRACT

Network simulation offers an efficient, cost-effective way to assess how the network will behave under different operating conditions. Simulation results can be analyzed to assess network performance, identify potential problems, understand the root cause, and resolve the issues prior to deployment. In this project we have checked the packet loss and time for sending the data and receiving the acknowledgment back to the source is observed by increasing the complexity of the network and by changing the bandwidth in which packet was transferred.

## Observation of packet loss and time taken for acknowledgment to reach the source end device

### Computer network containing 1 switch and 3 end devices

At first PC0 configured with IP address 10.10.10.1 sent four packet to PC2 with IP address 10.10.10.3. The bandwidth was set to 10Mbps and the packet was sent. The following results were observed as shown in Figure 6.

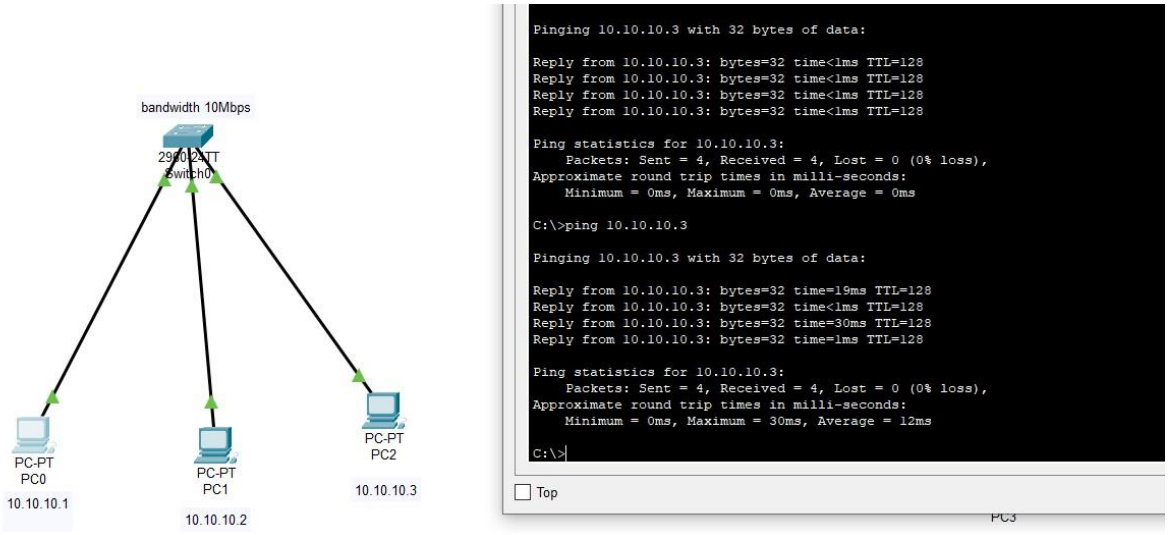
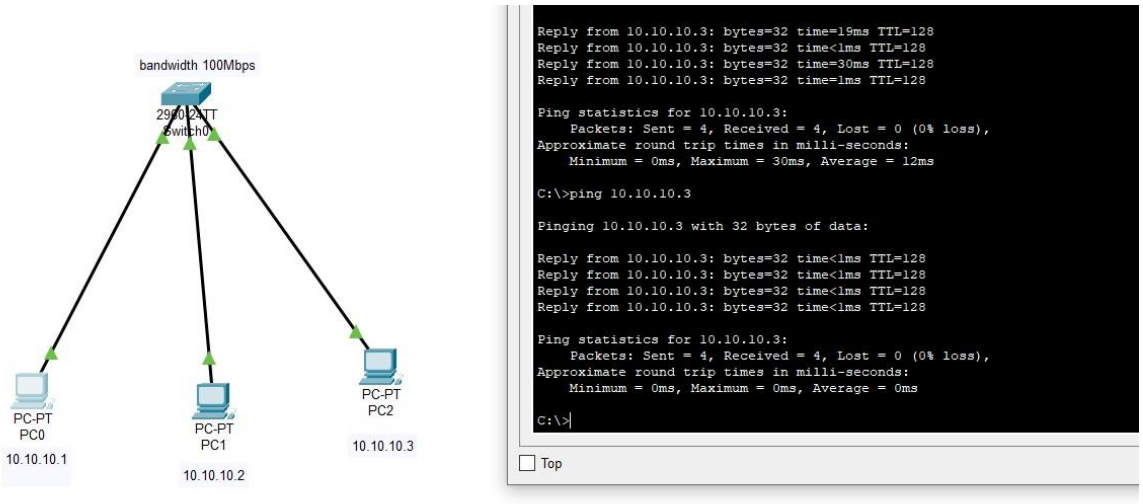



Figure 4: Observation of packet loss and time to receive acknowledgment in network containing 1 switch and 3 end devices with bandwidth 10Mbps

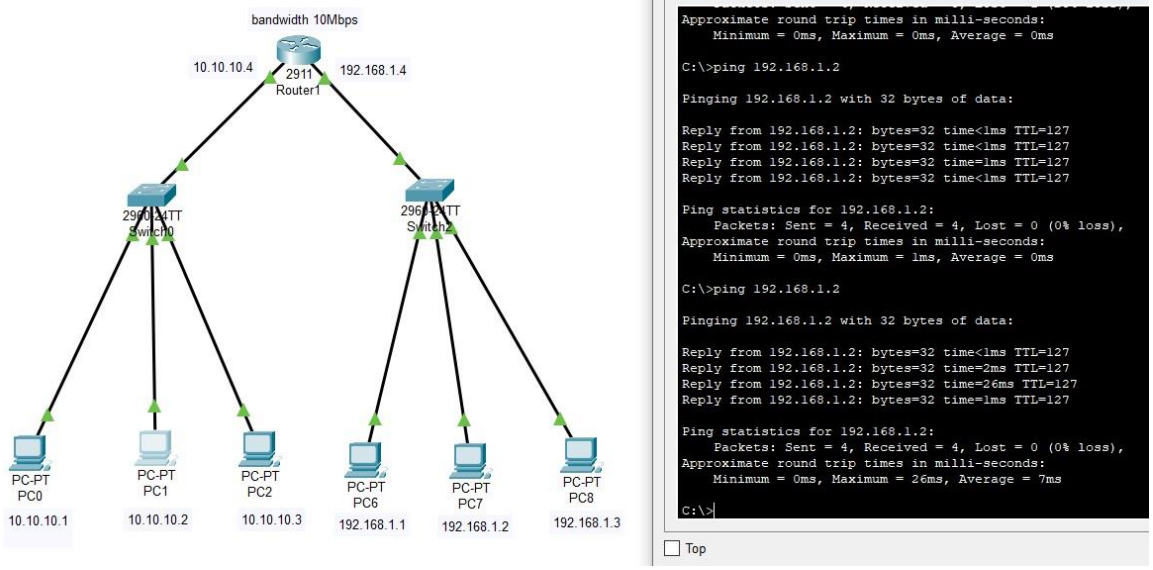



Observation of packet loss and time to receive acknowledgment in network containing 1 switch and 3 end devices with bandwidth 100Mbps

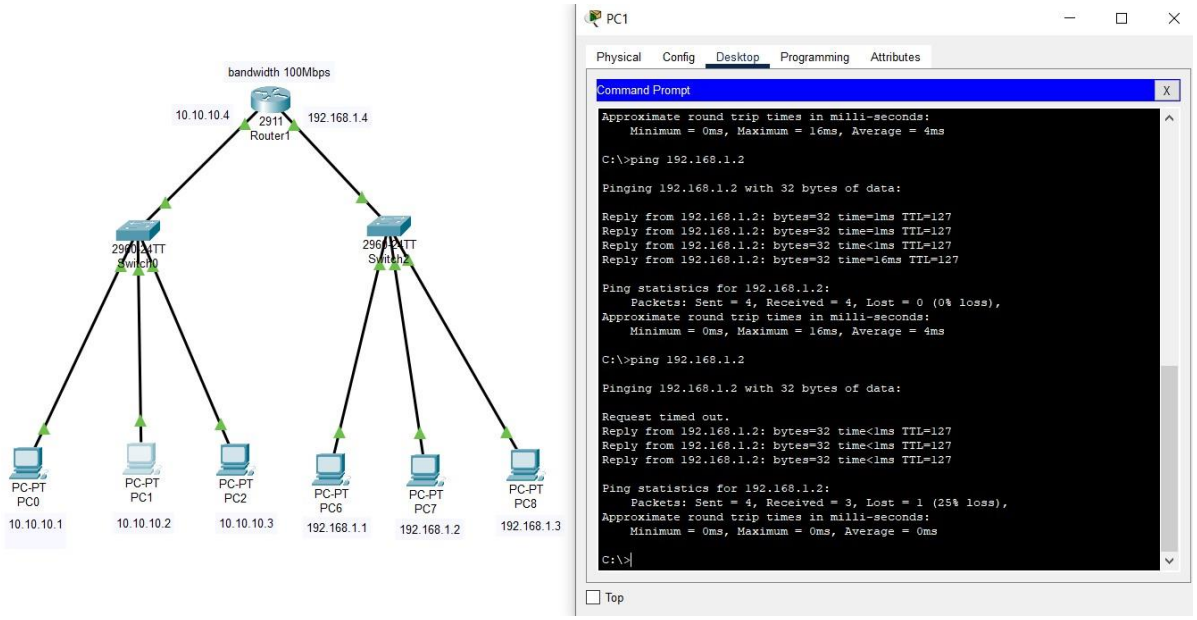
4 packets were sent and 4 packets were received the packet loss was 0. Acknowledge of first was received by PC0 with IP address 10.10.10.1 from PC2 with IP address 10.10.10.3 with 19ms delay. Acknowledgment from second packet was received with less than 1ms delay.

Acknowledgment from third packet was received with 30ms delay. And finally fourth packet's acknowledgement was received with time delay of 1ms. The band width was changed to 100Mbps and again the data were observed which is shown in Figure 7. We observed that no packets were lost and that the time for receiving acknowledgment from each packet was less than 1ms.

## Computer network containing 1 router 2 switches and 6 end devices




Observation of packet loss and time to receive acknowledgment in network containing 2 switch, 6 end devices and 1 router with bandwidth 10Mbps

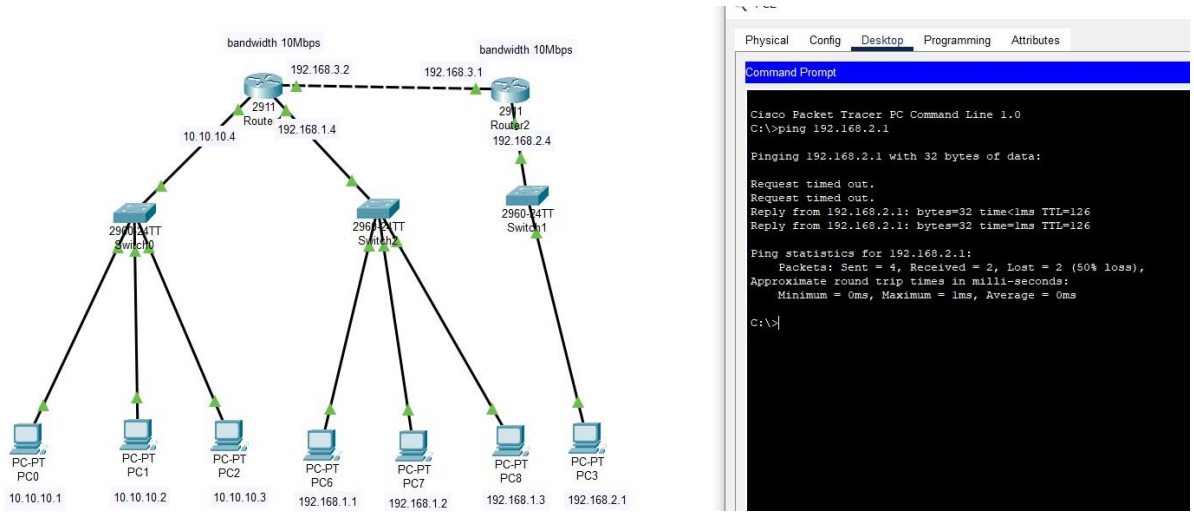



Observation of packet loss and time to receive acknowledgment in network containing 2 switch, 6 end devices and 1 router with bandwidth 100Mbps

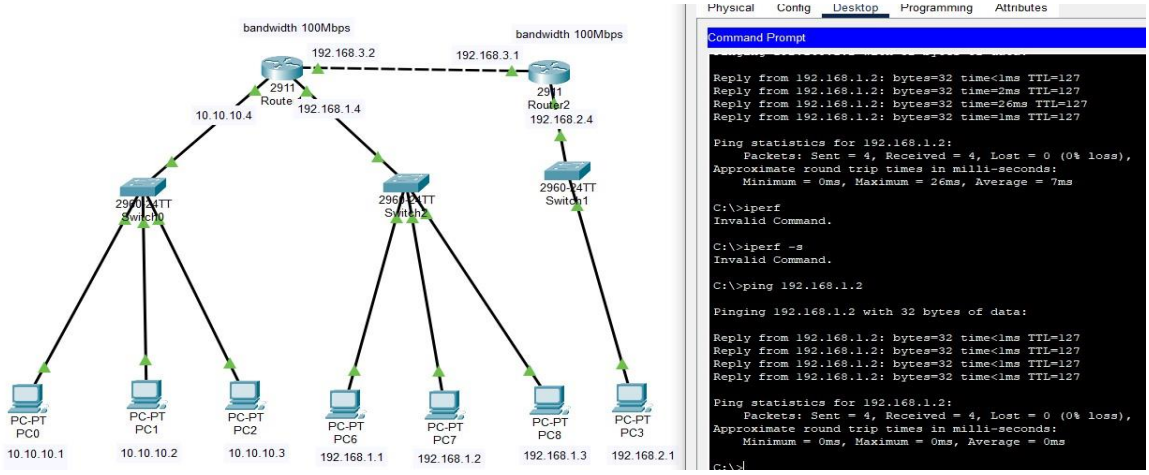
Now two switches were connected with the help of routers. At first bandwidth was set to be 10Mbps. Then the delay and packet loss were observed which is given by Figure 8. There were 0 loss of packet and first, second, third and fourth's packet acknowledgment from PC7 with IP address 192.168.1.2 was received by PC0 with IP address 10.10.10.1 with the time delay of less

than 1ms,2ms,26ms,1ms respectively. Again bandwidth was changed from 10Mbps to 100Mbps and the packet loss and the of receiving acknowledgement was observed which is shown in Figure 9. We observed that first packet was lost and other remaining 3 packet were delivered with the time delay of less than 1ms.

## Computer network containing 2 router 3 switches and 7 end devices




Observation of packet loss and time to receive acknowledgment in network containing 3 switch, 7 end devices and 2 router with bandwidth 10Mbps




Observation of packet loss and time to receive acknowledgment in network containing 3 switch, 7 end devices and 2 router with bandwidth 100Mbps

At first two routers along with the switches and the end devices were connected. The band width was kept 10Mbps as shown in Figure 10. Here we observed that 2 packets were lost and 2 packets

were delivered. The time delay for third packet in less than 1ms and for fourth packet the time delay is of 1ms. Again, bandwidth changed to 100Mbps as shown in Figure 11 and we found that there were no packet loss and the time required for each packet to receive the reply was found to be less than 1ms.

From the above result we can say that as the complexity of the network increases, there may be packet loss and when the bandwidth increases the time for packet to reach to destination and destination to sent acknowledgment decreases.

Packet lost and time for acknowledgement to be received by source from destination was observed in different network conditions. As the complexity of the network increases, there may be packet loss. When the bandwidth increases the time for packet to reach to destination and destination to sent acknowledgment decreases.