

NetSim Version 5.0 – List of Lab experiments for Simulation and Programming

Part A: List of Simulation Lab Experiments

ATM

1. Study the effect of Peak Cell Rate (per Sec) and Cell Delay Variation Tolerance on the performance of an ATM Networks
2. Study the effect of overheads for Voice and Data traffic on the performance of an ATM Networks
3. Study the effect of buffer capacity in ATM Switch on the performance of an ATM network.

CDMA

4. Study how call-blocking probability varies as the load on a CDMA network is continuously increased.
5. Study how the number of channels increases and the Call blocking probability decreases as the Voice activity factor of a CDMA network is decreased.

Fast Ethernet

6. Compare the performance of Store and Forward, Cut Through and Fragment Free switching techniques in an error prone switched network.
7. Study the working of the spanning tree algorithm by varying the priority among the switches.

GSM

8. Study how call blocking probability varies as the load on a GSM network is continuously increased.
9. Study how the number of channels increases and the Call blocking probability decreases as the bandwidth of a GSM network is increased.
10. Study the effect of mobility on Call blocking probability and Call dropping probability.

MANET

11. To create scenario and study the performance of MANET mobility model using NetSim simulation.

MPLS

12. Study how the LSP varies for different traffic in MPLS -TE (Traffic Engineering)
13. Compare and contrast MPLS with traffic engineering and normal routing by analyzing the overall network delay (ms)
14. Compare and contrast MPLS with traffic engineering and normal routing by analyzing the overall network loss (%)

15. Compare and contrast MPLS with traffic engineering and normal routing by analyzing the link utilization (%)

Routing

16. Study how network Loss varies as the buffer size of Routers is increased.
17. Study the concept of Periodic timer in RIP protocol.
18. Study the concept of shortest path in OSPF by varying the Link weight.
19. Compare and contrast Routing Protocols RIP and OSPF by analyzing the formation of routing tables.

TCP

20. Study about how TCP controls congestion in the network.
21. Compare Old Tahoe and Tahoe Congestion Control Algorithms
22. Study how Old Tahoe & Tahoe behaves under no congestion and no error case.
23. Study the utilization of Wide Area Network varies as the numbers of intermediate devices are increased.

Token Ring

24. Compare and contrast the performance of a Token Ring network of 6 - 12 nodes vs. the performance of similar networks running Wireless LAN.

Traditional Ethernet

25. To study the loss incurred in a network running traditional Ethernet as the number of transmitting nodes are increased (from 6 to 15).
26. To study the delay in a network running traditional Ethernet as the number of transmitting nodes are increased (from 6 to 15).
27. Observe and infer the effect of persistent over Frame Loss and Medium Access Time in a network with fixed number of transmitting nodes.

WiMax

28. To study how the utilization of a Wi-MAX (IEEE 802.16 – 2004) network varies for UGS (Unsolicited Grant Service) QoS Class as the number of transmitting SSs increase.
29. To study the Call Blocking probability of a Wi-MAX (IEEE 802.16 – 2004) network varies for UGS (Unsolicited Grant Service) QoS Class as the number of transmitting SSs increase beyond the bandwidth limit.

Wireless LAN

30. Compare the working of data transmission methods: Basic access and RTS/CTS mechanism in WLAN - IEEE 802.11b
31. To study how the utilization of a Wireless LAN (IEEE 802.11b, 11Mbps) network varies as the number of transmitting nodes increase.

32. To study how the loss, utilization and transmission time of a Wireless LAN (IEEE 802.11b) network varies as the distance between the Access Point and the wireless nodes is varied.

Part B: List of C / C++ Programming Lab Exercises
(Source code is provided along with)

1. Address Resolution Protocol
2. Assignments of Sites to Concentrators
3. Cryptography
 - Substitution
 - Transposition
 - XOR
 - Advanced
 - a) Data Encryption Standard
 - b) Rivest Shamir Adleman (RSA)
 - c) Wired Equivalent Privacy (WEP)
4. Distance Vector Routing
5. Error Correcting Code
 - Hamming Code
6. Error Detection Code
 - Cyclic Redundancy Check (CRC)
 - Longitudinal Redundancy Check (LRC)
7. Framing Sequence
 - Bit Stuffing
 - Character Stuffing
8. Generic Cell Rate Algorithm
 - Virtual Scheduling Algorithm
9. IPV4 Addressing
 - Address Mask
 - Binary Conversion
 - Classless Inter Domain Routing
 - Network Address
 - Special Addresses
 - Sub-netting
10. Leaky Bucket Algorithm

11. Multi Level Multi Access
12. PC to PC Communication
 - Socket Programming
13. Scheduling
 - First In First Out (FIFO)
 - Max - Min Fair (MMF)
14. Shortest Path
 - Floyd's
 - Link State
15. Sorting Technique
 - Bubble Sort
 - Insertion Sort
 - Quick Sort
 - Selection Sort
16. Spanning Tree
 - Borovska
 - Kruskal
 - Prims
17. Transmission Flow Control
 - Go Back N
 - Selective Repeat
 - Stop and Wait