CCN & IOT LAB

VI Semester

Course code: 18EC6DLIOT

COURSE OUTCOMES

- **CO 1:** Apply the difference between wired and wireless network

- **CO 2:** Evaluate the performance parameters of wired and wireless networks

- **CO 3:** Create different wired and wireless networks for data communication

PART A programmes

1. Implement a point to point network with four nodes and duplex links between them. Analyze the network performance by setting the queue size and varying the bandwidth.

2. Implement a four node point to point network with links n0-n2, n1-n2 and n2- n3. Apply TCP agent between n0-n3 and UDP between n1-n3. Apply relevant applications over TCP and UDP agents changing the parameter and determine the number of packets sent by TCP/UDP.

3. Implement Ethernet LAN using n (6-10) nodes. Compare the throughput by changing the error rate and data rate.

4. Implement Ethernet LAN using n nodes and assign multiple traffic to the nodes and obtain congestion window for different sources/ destinations.

5. Implement ESS with transmission nodes in Wireless LAN and obtain the performance parameters.

6. Implementation of any routing algorithm

- **TEXT BOOKS:**

1. **Introduction to Network Simulator NS2,** Issariyakul, Teerawat, Hossain, Ekram, , Springer US, 2012.

- A computer network is a system in which multiple computers are connected to each other to share information and resource.

•The goal of any computer network is to allow multiple computers to communicate.

•The type of communication can be as varied as the type of conversations you might have throughout the course of a day.

• For example, the communication might be a download of an MP3 audio file for your MP3 player;

•using a web browser to check college web page to see what circulars and notifications are announced;

•checking the latest sports scores;

• using an instant messaging service, such as Yahoo Messenger, to send text messages to a friend;

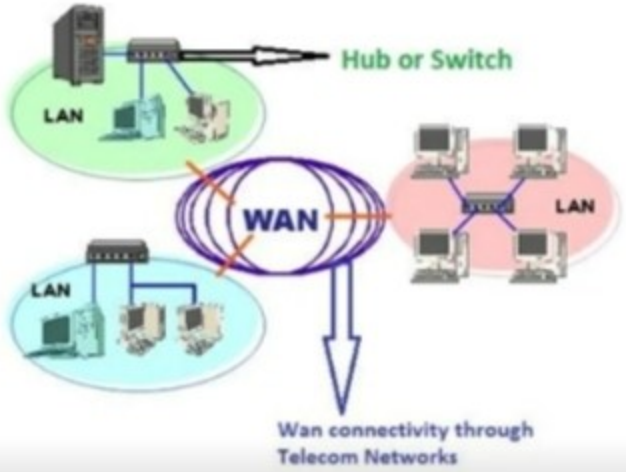
• or writing an email and sending it to a business associate.

Network Types

- Different types of networks are distinguished based on their size (in terms of the number of machines), their data transfer speed, and their reach.
- There are usually said to be two categories of networks:
- **Local Area Network (LAN)**is limited to a specific area, usually an office, and cannot extend beyond the boundaries of a single building.
- The first LANs were limited to a range (from a central point to the most distant computer) of 185 meters (about 600 feet) and no more than 30 computers. Today's technology allows a larger LAN.

Wide Area Network (WAN):

- If you have ever connected to the Internet, you have used the largest WAN on the planet.
- A WAN is any network that crosses metropolitan, regional, or national boundaries. Most networking professionals define a WAN as any network that uses routers and public network links. The Internet fits both definitions.



Elements of a Computer Network

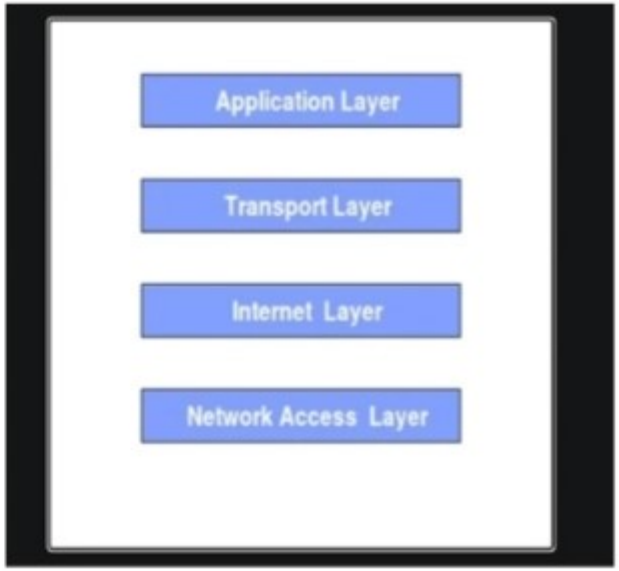
- Usually, five types of elements are present in a computer network and these elements collectively make a computer network.
- **End devices:** In a computer network, end devices communicate with each other and share information or resources. End devices can be a computer or a server or a smart phone. The users of a computer network usually use these end devices.
- **Medium:** With the medium, the end devices are connected with each other for sending or receiving information. The medium between end devices can be a cable or wireless transceiver.
- **Network Devices:** Network devices are those devices which are placed between end devices to route the information or data of end devices accurately. Common network devices are switch and router.
- **Message:** Message is the information or data which is sent by the end devices and it travels over the medium.
- **Rules:** Rules are used to control how messages flow across the whole network.

Significance of the OSI Models:

- Models are useful because they help us understand difficult concepts and complicated systems. When it comes to networking, there are several models that are used to explain the roles played by various technologies, and how they interact. Of these, the most popular and commonly used is the Open Systems Interconnection (OSI) Reference Model.
- The OSI model was designed to promote interoperability by creating a guideline for network data transmission between computers and components that have different hardware vendors, software, operating systems, and protocols
- The idea behind the OSI Reference Model is to provide a framework for both designing networking systems and for explaining how they work. The existence of the model makes it easier for networks to be analyzed, designed, built and rearranged.

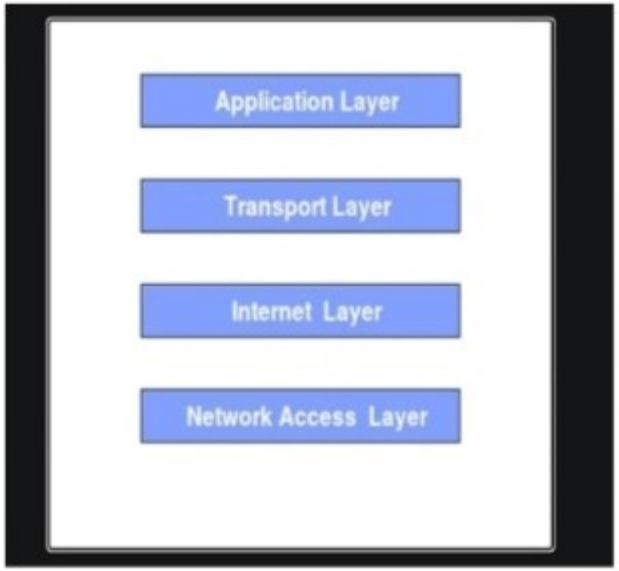
TCP/IP Reference Model

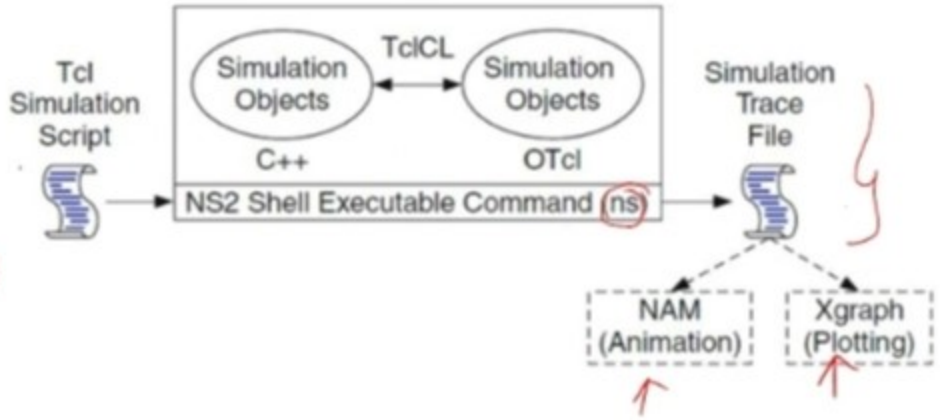
- **Network Layer:** Lowest layer that is connected with the physical transmission of data. TCP/IP does not specifically define any protocol here but supports all the standard protocols.
- **Internet Layer**: It defines the protocols for logical transmission of data over the network. The main protocol in this layer is Internet Protocol(IP) and is supported by the protocols ICMP, IGMP, RARP and ARP.



TCP/IP Reference Model

- **Network Layer:** Lowest layer that is connected with the physical transmission of data. TCP/IP does not specifically define any protocol here but supports all the standard protocols.
- **Internet Layer**: It defines the protocols for logical transmission of data over the network. The main protocol in this layer is Internet Protocol(IP) and is supported by the protocols ICMP, IGMP, RARP and ARP.
- **Transport Layer**: It is responsible for error-free end-to-end delivery of data. The protocols defined here are TCP and UDP.(User Datagram Protocol).
- **Application Layer:** This is the top... defines the interf...




Tcl
Simulation
Script
Simulation
Objects
TclCL
Simulation
Objects
C++
OTcl
NS2 Shell Executable Command (ns)
Simulation
Trace
File
NAM
(Animation)
Xgraph
(Plotting)


OTCL
Script
(.tcl extension file)
Execute
NS-2 Command
(ns test.tcl)
Output
(Trace and Nam file)
(.tr and .nam)
Parsing,
Graph plotting
(perl, awk, matlab)
Network
Animator
View nam file

- ***#Open the Trace file***

```
set tracefile1 [open out.tr w]
$ns trace-all $tracefile1
```

- ***#Open the NAM trace file***

```
set namfile [open out.nam w]
$ns namtrace-all $namfile
```

- **#Define a finish" procedure**

```
Proc finish { } {
global ns tracefile1 namfile
$ns flush-trace
Close $tracefile1 Close $namfile
Exec nam out.nam & Exit 0
```