History of OSI MODEL

- The design of Ethernet preceded the development of the seven-layer OSI model
- The Open System Interconnection (OSI) model was developed and published in 1982 by the International Organization for Standard (ISO) as a generic model for data communication
- The OSI reference model specifies the seven layers of functionality

1.3 The OSI Model

1.4 TCP/IP Model

- Network Access Layer
- Internet Layer
- Transport Layer
- Application Layer

OSI MODEL

-Application Layer
-Presentation
-Session
-Transport
-Network
-Data Link
-Physical

Ethernet

- A LAN standard originally developed by Xerox and later extended by a joint venture between DEC, Intel and Xerox
- The access mechanism used in an Ethernet

•CSMA/CD

Token Ring

- A LAN standard originally developed by IBM, uses a logical ring topology
- Access method

•The token is passed from station to station in sequence until it encounters a station with data to send

ATM

- Designed to support the transmission of data, voice and video through a high data-rate transmission medium such as fiber-optic cable
- A protocol for transferring cells

•Cell (53 bytes) = Header (5 bytes) + Payload (48 bytes)

Gateways

- Operate over the entire range in all seven layers of the OSI model

- Internet routing devices
- Provides translation services between incompatible LANs or application

•Protocol converter which connects two or more heterogeneous system and translates among them

hop limit is a mechanism which limits the lifespan or lifetime of data in a computer or network.

Border Gateway Protocol (BGP) is a set of rules that determine the best network routes for data transmission on the internet.

Steganography is the practice of concealing information within another message or physical object to avoid detection.

Repeaters

- An electronic device that operates on the physical layer of the OSI model
- Boosts the transmission signal from one segment and continues the signal to another segment
- Allows us to extend the physical length of a network

•A repeater receives the signal before attenuation, regenerates the original bit pattern and puts the restored copy back on to the link

- IP address

•An IP address is called a logical address at the network level because it is usually implemented in software

Subnetting and supernetting

- In **subnetting**, one large network is **divided** while

In **supernetting,** several networks are **combined.**

User Datagram Protocol (UDP)

- **is suitable for a process that requires simple request-response communication with little concern for flow and error control**
- **UDP is used for management processes such as SNMP**

- **Conventional encryption**, also referred to as symmetric encryption or single-key encryption, was the only types of encryption in use prior to the development of public key encryption.

Message Authentication Code (MAC)

- generated by an algorithm that creates a small fixed-sized block
- depending on both message and some key

◈like encryption though need not be reversible
▣appended to message as a signature
▣receiver performs same computation on message and checks it matches the MAC
▣provides assurance that message is unaltered and comes from sender

Unicast is a type of communication where data is sent from one computer to another computer. In Unicast type of communication, there is only one sender, and one receiver.

Broadcast is a type of communication where data is sent from one computer once and a copy of that data will be forwarded to all the devices.

Multicast is a type of communication where multicast traffic is addressed for a group of devices on the network.

Types of Attack

- Malware.
- Denial-of-Service (DoS) Attacks.
- Phishing.
- Spoofing.
- Identity-Based Attacks.
- Code Injection Attacks.
- Supply Chain Attacks.
- Insider Threats.

Encryption is a way to scramble data so that only authorized parties can unscramble.

IP Datagram. A datagram is “a self-contained, independent entity of data carrying sufficient information to be routed from the source to the destination computer without reliance on earlier exchanges between this source and destination computer and the transporting network.”

CSMA/CD (Carrier Sense Multiple Access/ Collision Detection) is a media access control method that was widely used in Early Ethernet technology/LANs when there used to be shared Bus Topology and each node (Computers) were connected By Coaxial Cables.

A **network** may be defined by a set of points, or “nodes,” that are connected by lines, or “links.”

A **link-layer switch** (or switch) operates in both the physical and the data-link layers.