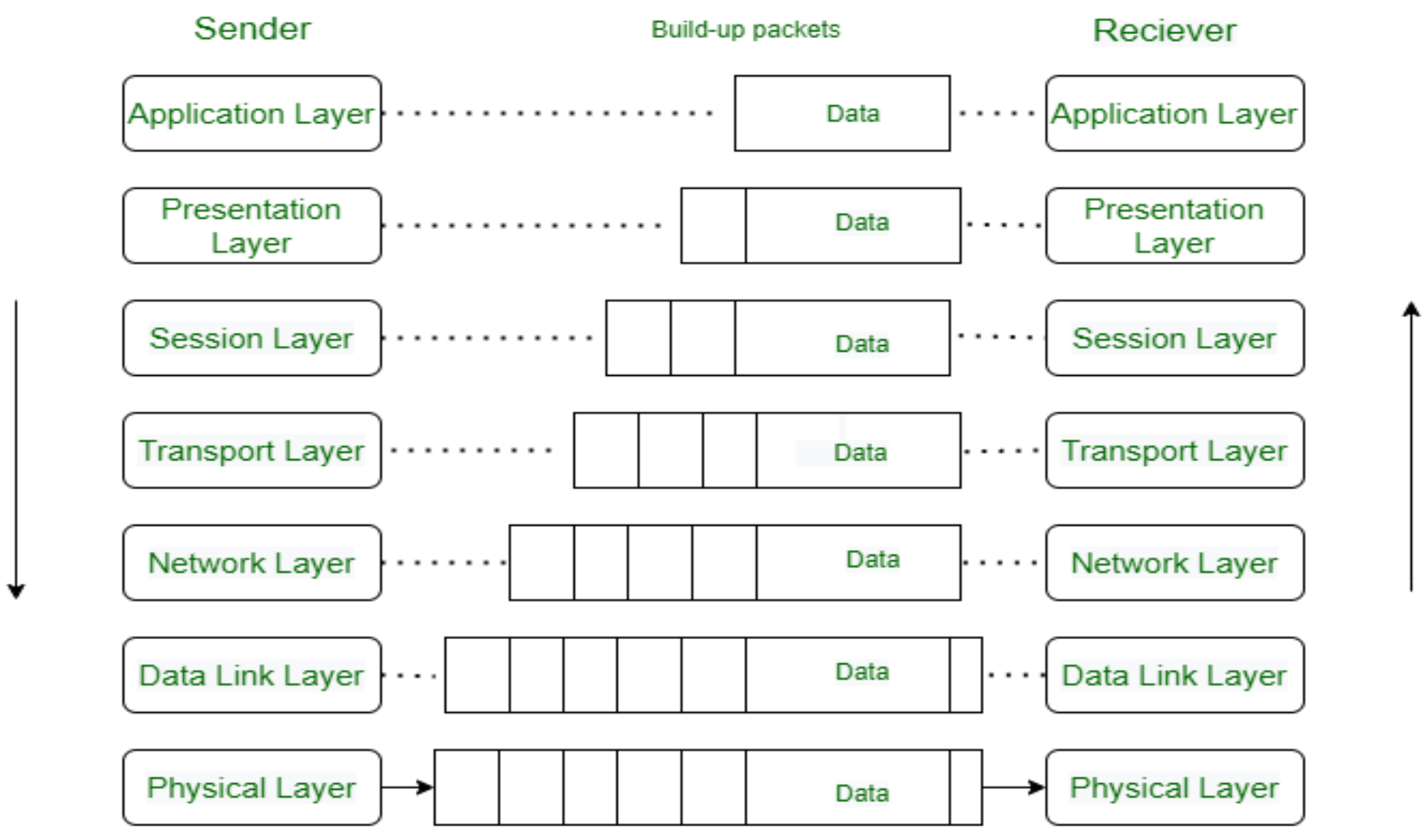
Techno India college of technology

NAME- Dikshit Raj
Roll NO – 31401221006
subject- Cyber Security
subject code-BCAC602

Network Reference Models: OSI and TCP/IP Models

OSI Models

The OSI model, created in 1984 by ISO, is a reference framework that explains the process of transmitting data between computers. It is divided into seven layers that work together to carry out specialised network functions, allowing for a more systematic approach to networking.


Sender
Build-up packets
Reciever
Application Layer
Data
Application Layer
Presentation Layer
Data
Presentation Layer
Session Layer
Data
Session Layer
Transport Layer
Data
Transport Layer
Network Layer
Data
Network Layer
Data Link Layer
Data
Data Link Layer
Physical Layer
Data
Physical Layer

Application Layer – Layer 7

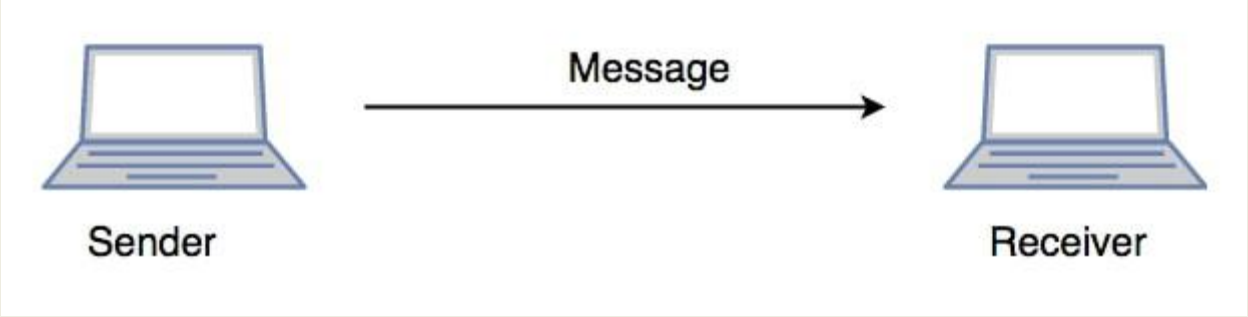
- The Application Layer is one of the seven layers in the OSI (Open Systems Interconnection) model of network architecture. It is the topmost layer and plays a crucial role in enabling communication between software applications running on different devices within a network. This layer acts as an interface between the network and the end-user applications, ensuring that data exchange and communication occur smoothly.

Presentation Layer – Layer 6

- The Presentation Layer is the sixth layer in the OSI (Open Systems Interconnection) model of network architecture. Its primary function is to handle the syntax and semantics of the information exchanged between applications, ensuring that data can be properly understood and interpreted by both the sender and the receiver. The Presentation Layer acts as a translator, converting data from the application layer into a format that can be transmitted over the network and then converting it back into a format that the receiving application can understand.

Session Layer – Layer 5

- The Session Layer is the fifth layer in the OSI (Open Systems Interconnection) model of network architecture. This layer is responsible for establishing, maintaining, and terminating sessions or connections between applications on different devices. A session, in this context, refers to a communication channel or dialogue between two systems, allowing them to exchange data over a network.



Transport Layer – Layer 4

- The Transport Layer is the fourth layer in the OSI (Open Systems Interconnection) model of network architecture. It is responsible for end-to-end communication and the reliable, efficient, and error-checked transfer of data between devices on a network. This layer acts as a bridge between the lower layers (Network, Data Link, and Physical) and the upper layers (Session, Presentation, and Application), providing services that enable reliable data exchange between applications running on different devices.

Network Layer – Layer 3

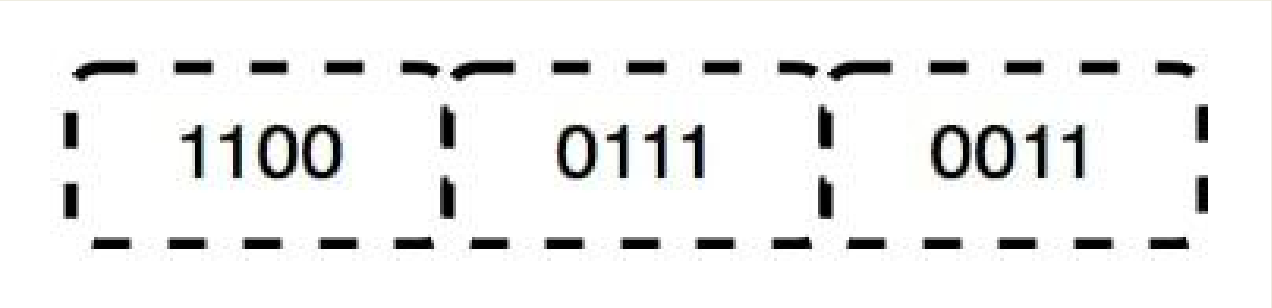
- The Network Layer is the third layer in the OSI (Open Systems Interconnection) model of network architecture. It is primarily responsible for routing packets of data between devices on different networks, making it a key component in establishing end-to-end communication across interconnected networks. The Network Layer focuses on logical addressing, routing, and the efficient transmission of data from the source to the destination.

Data Link Layer (DLL) – Layer 2

- The data link layer is responsible for the node-to-node delivery of the message. The main function of this layer is to make sure data transfer is error-free from one node to another, over the physical layer. When a packet arrives in a network, it is the responsibility of the DLL to transmit it to the Host using its MAC address.
  - ❖ The Data Link Layer is divided into two sublayers:
    1. Logical Link Control (LLC)
    2. Media Access Control (MAC)

Physical Layer – Layer 1

- The lowest layer of the OSI reference model is the physical layer. It is responsible for the actual physical connection between the devices. The physical layer contains information in the form of bits. It is responsible for transmitting individual bits from one node to the next. When receiving data, this layer will get the signal received and convert it into 0s and 1s and send them to the Data Link layer, which will put the frame back together.



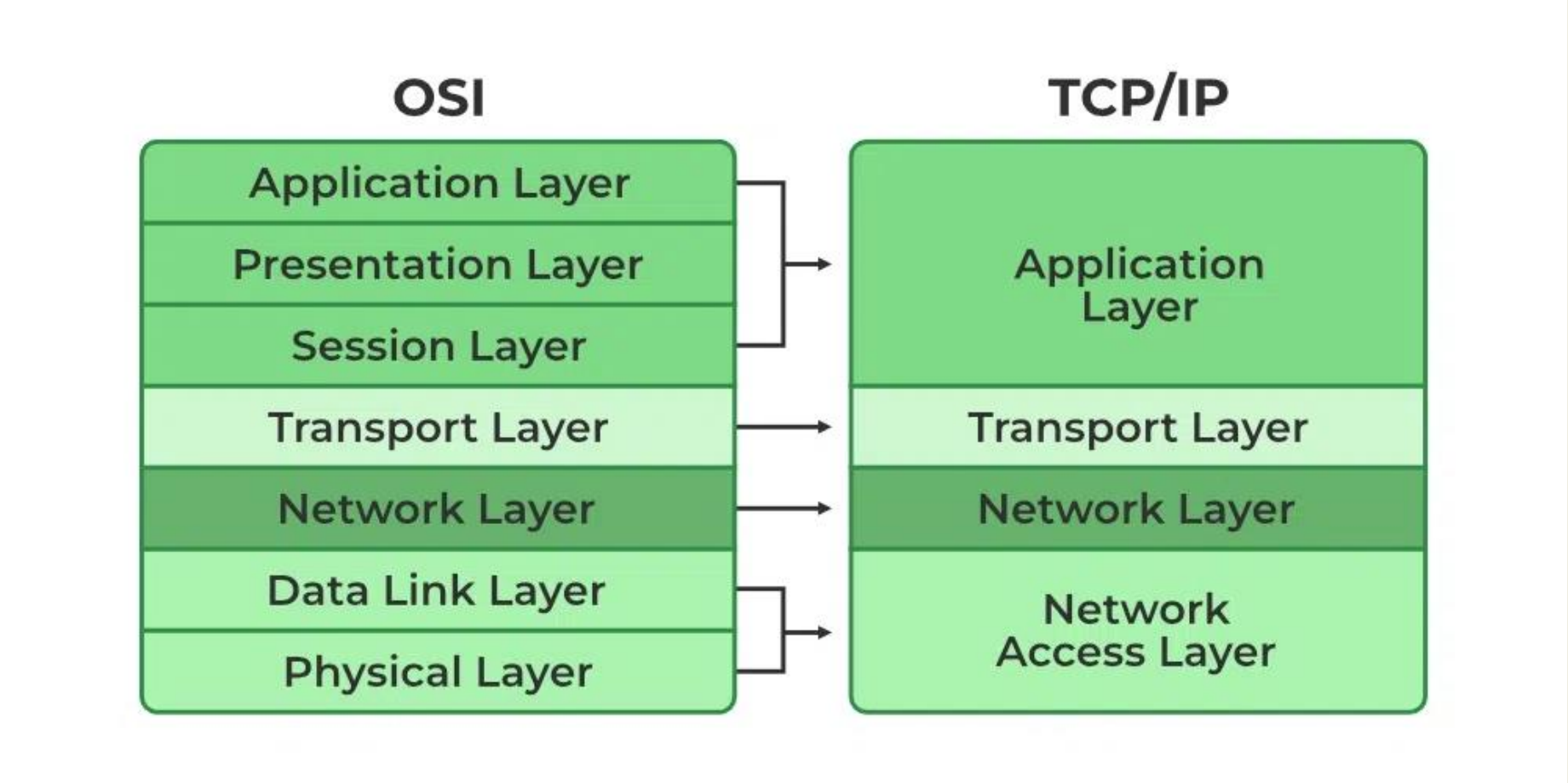
TCP/IP Models

- The TCP/IP model, also known as the Internet Protocol Suite, is a conceptual framework that serves as the foundation for the design and implementation of the Internet. Unlike the seven-layer OSI model, the TCP/IP model consists of four layers. Each layer represents a specific set of functionalities, and the model is named after the two most prominent protocols within it: Transmission Control Protocol (TCP) and Internet Protocol (IP).

❖ **Layers of TCP/IP Model**

1. Application Layer
2. Transport Layer(TCP/UDP)
3. Network/Internet Layer(IP)
4. Data Link Layer (MAC)
5. Physical Layer

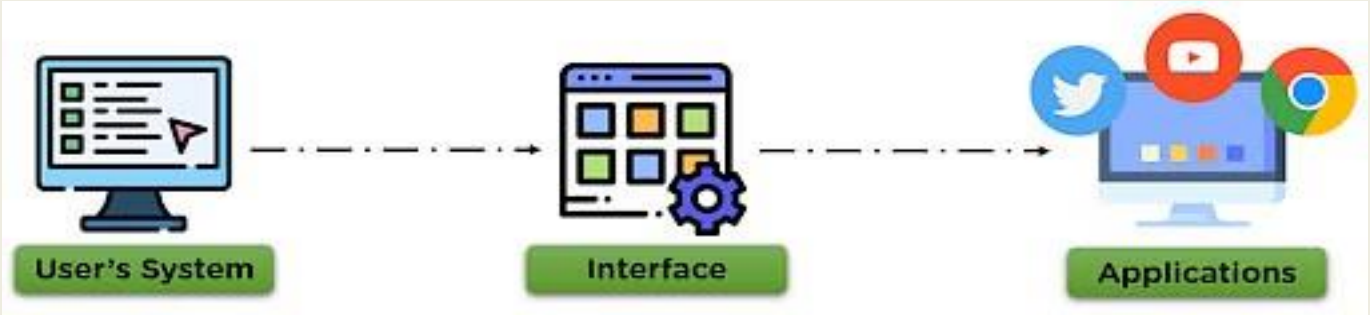
The diagrammatic comparison of the TCP/IP and OSI model is as follows:



Application Layer

This is the topmost layer which indicates the applications and programs that utilize the TCP/IP model for communicating with the user through applications and various tasks performed by the layer, including data representation for the applications executed by the user and forwards it to the transport layer.

The application layer maintains a smooth connection between the application and user for data exchange and offers various features as remote handling of the system, e-mail services, etc.



Transport Layer

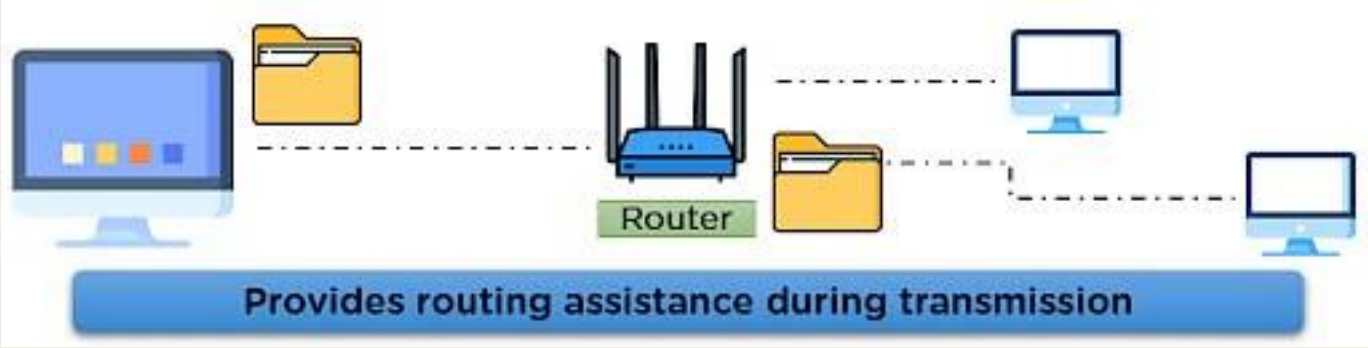
- This layer is responsible for establishing the connection between the sender and the receiver device and also performs the task of dividing the data from the application layer into packets, which are then used to create sequences.
- it also performs the task of maintaining the data, i.e., to be transmitted without error, and controls the data flow rate over the communication channel for smooth transmission of data.

Internet Layer

- The Internet layer performs the task of controlling the transmission of the data over the network modes and enacts protocols related to the various steps related to the transmission of data over the channel, which is in the form of packets sent by the previous layer.

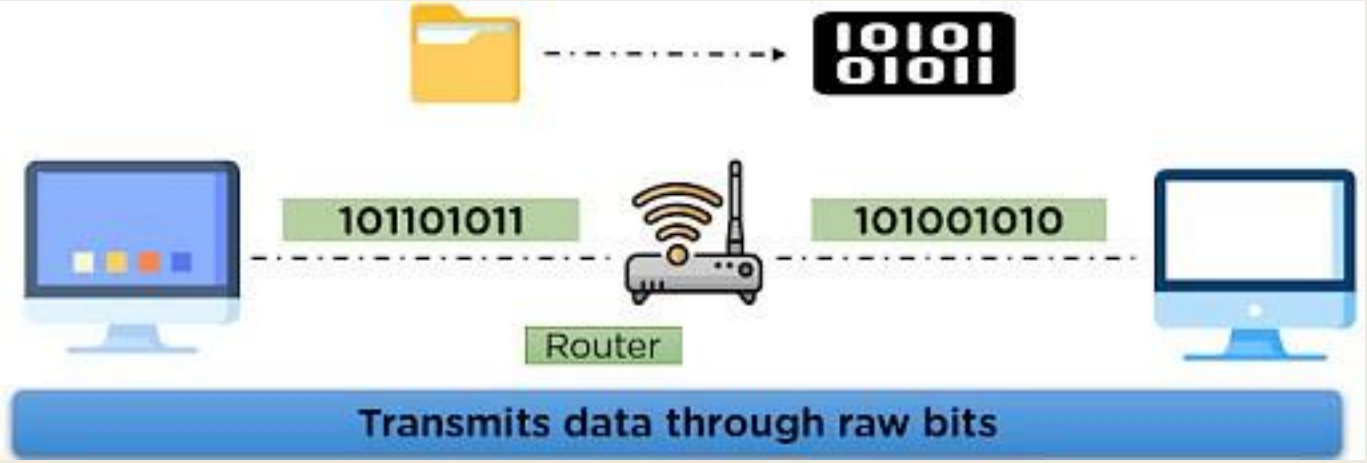
❖ This layer performs many important functions in the TCP/IP model, some of which are:

1. It is responsible for specifying the path that the data packets will use for transmission.
2. This layer is responsible for providing IP addresses to the system for the identification matters over the network channel.



Network Access Layer

- This layer is the combination of data-link and physical layer, where it is responsible for maintaining the task of sending and receiving data in raw bits, i.e., in binary format over the physical communication modes in the network channel.
- It uses the physical address of the system for mapping the path of transmission over the network channel.
- Till this point in this tutorial on what is TCP/IP model, you understood the basic idea behind the model and details about its layers, now compare the model with another network model.



Difference Between OSI Model and TCP/IP Model

TCP/IP	OSI
Implementation of OSI model	Reference model
Model around which Internet is developed	This is a theoretical model
Has only 4 layers	Has 7 layers
Considered more reliable	Considered a reference tool
Protocols are not strictly defined	Stricter boundaries for the protocols
Horizontal approach	Vertical approach
Combines the session and presentation layer in the application layer	Has separate session and presentation layer
Protocols were developed first and then the model was developed	Model was developed before the development of protocols
Supports only connectionless communication in the network layer	Supports connectionless and connection-oriented communication in the network layer
Protocol dependent standard	Protocol independent standard InstrumentationTools.com


THANK YOU
shutterstock.com · 271754564