



CELEBAL TECHNOLOGY INTERNSHIP (CSI)

Name: Harsh Tongariya

College: Arya College of Engineering Information Technology

Domain: Cloud Infra & Security

Student ID: CT_CSI_CI_1160

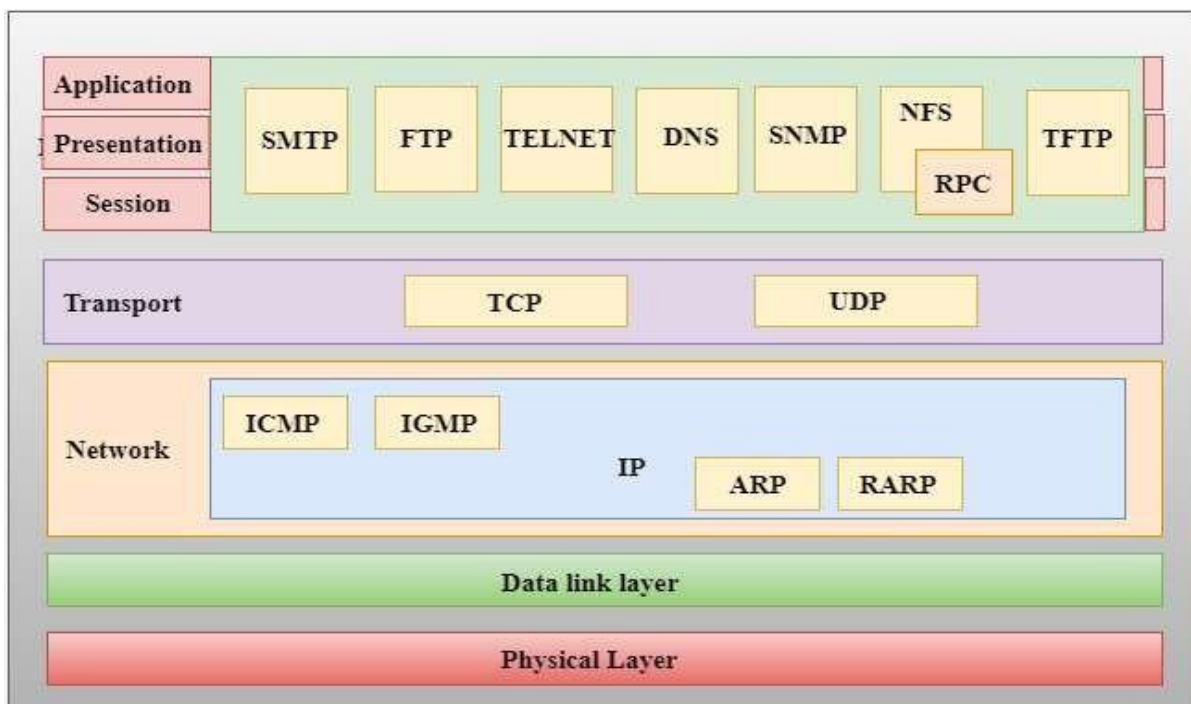
Working & Functionality of the TCP/IP Model

Objective:

To study and understand the architecture, working, and functionality of the TCP/IP Model used in computer networks and how it enables end-to-end data communication over the Internet.

1. Introduction

The TCP/IP model is the fundamental communication architecture for the Internet and most modern networks. Unlike the OSI model, which has seven layers, TCP/IP has four abstraction layers that describe how data should be formatted, addressed, transmitted, routed, and received across networks.



2. Architecture of TCP/IP Model

Layer Number	TCP/IP Layer	Corresponding OSI Layer(s)
4	Application Layer	Application, Presentation, Session
3	Transport Layer	Transport
2	Internet Layer	Network
1	Network Access Layer	Data Link + Physical

3. Layer-wise Functionality & Working

3.1 Application Layer

- Purpose: Interface between the user application and the network.
- Responsibilities:
 - * Provides services like file transfer, email, web browsing.
 - * Uses protocols like HTTP, FTP, SMTP, DNS, Telnet.
- Working: Formats and prepares data. Sends it to the Transport Layer.

3.2 Transport Layer

- Purpose: Reliable data transfer between source and destination.
- Protocols: TCP (reliable), UDP (unreliable)
- Responsibilities: Port addressing, flow and error control.
- Working: Segments data, assigns ports, handles retransmission.

3.3 Internet Layer

- Purpose: Logical addressing and routing.
- Main Protocol: IP (Internet Protocol)

- Responsibilities: Packet creation, IP addressing, routing.
- Other Protocols: ICMP, ARP, IGMP.
- Working: Encapsulates segments into packets and routes them.

3.4 Network Access Layer

- Purpose: Physical transmission of data.
- Responsibilities: MAC addressing, framing, media access.
- Working: Converts packets to frames and transmits them.

4. Data Flow Summary

Sender Side (Top to Bottom): 1.

Application generates data.

2. Transport adds port info.

3. Internet adds IP addresses.

4. Network Access sends bits.

Receiver Side (Bottom to Top):

1. Bits received and converted to frames.

2. IP packet routed.

3. Segment sent to the application.

4. Output is shown to the user.

5. Key Features of TCP/IP Model

- Robust, scalable, and fault-tolerant.

- Real-world and internet-based communication.
- Independent of hardware and OS.
- Layered abstraction with clear protocol roles.

6. Conclusion

The TCP/IP model serves as the backbone of internet communication, enabling data to travel efficiently and securely between devices. Understanding this model is crucial for networking professionals.

References <https://study-ccna.com/osi-tcp-ip-models/>