🚀R&D DOCUMENT ON THE WORKING AND FUNCTIONALITY OF TCP/IP MODEL

TITLE :

Overview and layer-wise working of the TCP/IP Model.

PREPARED BY :

Richa Budhori

PURPOSE :

To explore the structure, functionalities and working of the TCP/IP Model in network communication.

🌐INTRODUCTION

- The TCP/IP model was created in the **1970s** by the **Defense Advance Research Project Agency (DARPA)** as a public networking model.
- It is a practical and implementation-oriented framework that defines **how data is transmitted and routed between networked devices.**
- Unlike OSI Model, TCP/IP is **protocol-specific** and widely adopted

✅ADVANTAGES OF TCP/IP MODEL

- Widely adopted
- Internet-compatible
- Flexible and scalable, supports large networks
- Allows interoperability
- Reliable transmission using TCP
- Easy to implement in real world systems

❌LIMITATIONS OF TCP/IP MODEL

- Doesn't clearly distinguish between services, interfaces, and protocols
- No strict separation of presentation and session layers
- Tightly bound to its protocols
- Difficult to replace or redesign due to wide adoption

🪜 STRUCTURE OF TCP/IP MODEL

The TCP/IP Model has 4 layers, each responsible for specific aspects of communication:

4. Application Layer

3. Transport Layer

2. Internet Layer

1. Network Access Layer

🔍 WORKING OF ALL THE LAYERS IN TCP/IP MODEL

Layer 1: Network Access Layer

Function: defines the protocols and hardwares required to handle physical transmission of data over the network medium.

Tasks: Data framing, MAC addressing, Physical Addressing

Protocols: Ethernet, ARP, PPP

Layer 2: Internet Layer

Function: defines the protocols for logical addressing and routing of packets over different networks.

Tasks: IP Addressing, finding the best routing path, and Packet fragmentation

Protocols: IP, IGMP, ICMP

Layer 3: Transport Layer

Function: Responsible for the reliable transmission of data and the error-free delivery of packets between applications on different hosts.

Tasks: Flow control, Error Handling, Port addressing

Protocols: TCP, UDP

Layer 4: Application Layer

Function: defines protocols for node-to-node application communication and provides network services directly to user applications.

Tasks: Data encoding and decoding, Network Resource Access

Protocols: HTTP, HTTPS, FTP, SMTP

📌CONCLUSION

The TCP/IP model is a widely used framework that enables reliable and efficient communication across networks. Its layered structure simplifies data transmission and forms the backbone of the modern internet.