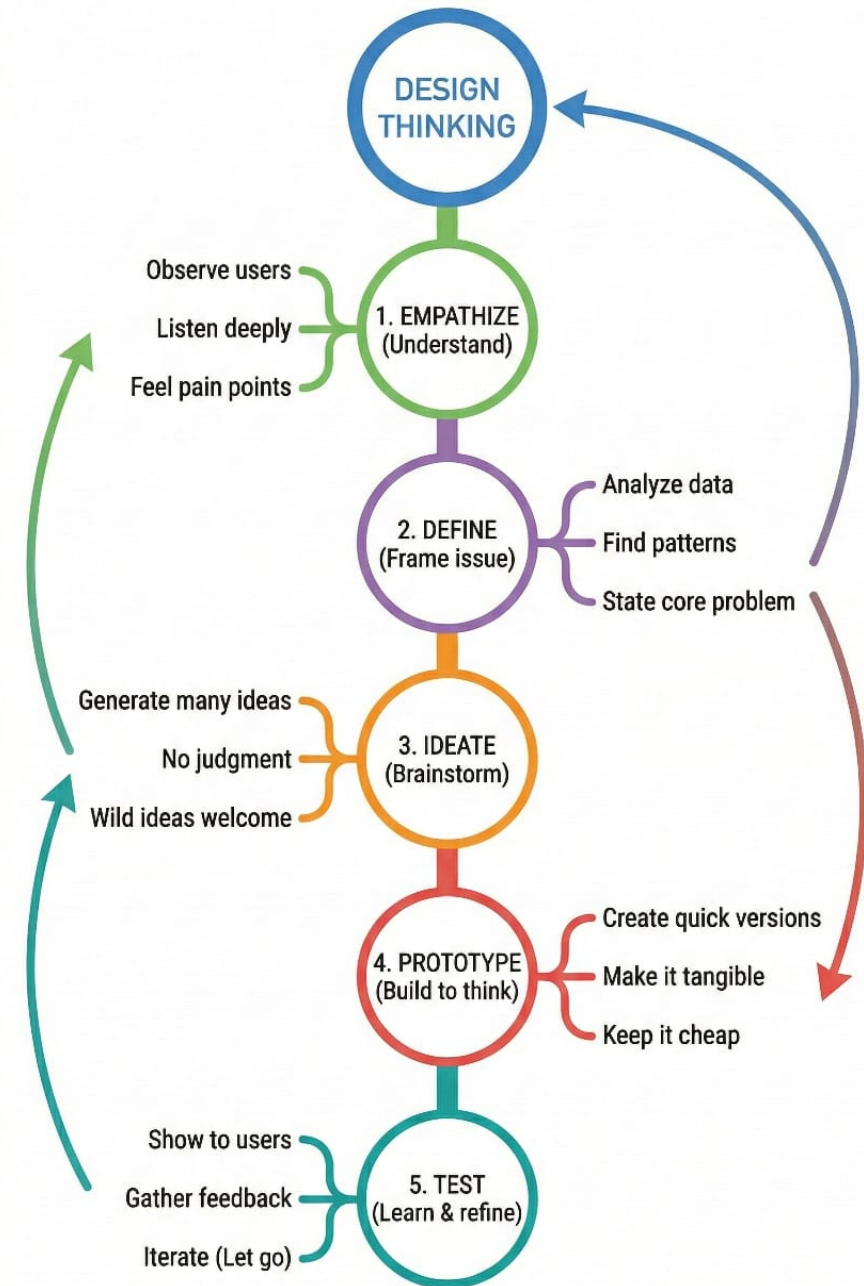


23ITT204 - COMPUTER NETWORKS

UNIT 1

Introduction and Application Layer

Data Communication in Computer Networks: Essentials for Today



CHAPTER 1 **Empathize**

What is Data Communication?

Seamless Exchange

Data communication involves the efficient exchange of digital data between two or more devices, leveraging various transmission mediums.

Core Elements

Every data communication system comprises a **Sender**, **Receiver**, the **Message** itself, the **Medium** of transmission, and precise **Protocols**.

Real-world Application

Consider sending a WhatsApp message: it undergoes encoding, transmission across complex networks, and then decoding at the recipient's end.

Pillars of Quality

Effective data communication is defined by its **Delivery**, **Accuracy**, **Timeliness**, and precise **Jitter** control to ensure smooth data flow.

Types of Networks & Transmission Media

1

Network Scope

Networks are classified by geographical size: **LAN** (Local Area Network) for small areas, **MAN** (Metropolitan Area Network) for cities, and **WAN** (Wide Area Network) for vast regions.

2

Physical Connections

Examples of wired media include **Twisted-pair cables** (ubiquitous in offices) and **Optical fibers** (the backbone of high-speed internet).

3

Wireless Reach

Wireless technologies like Wi-Fi and cellular networks provide flexible and widespread connectivity, crucial for mobile communication.

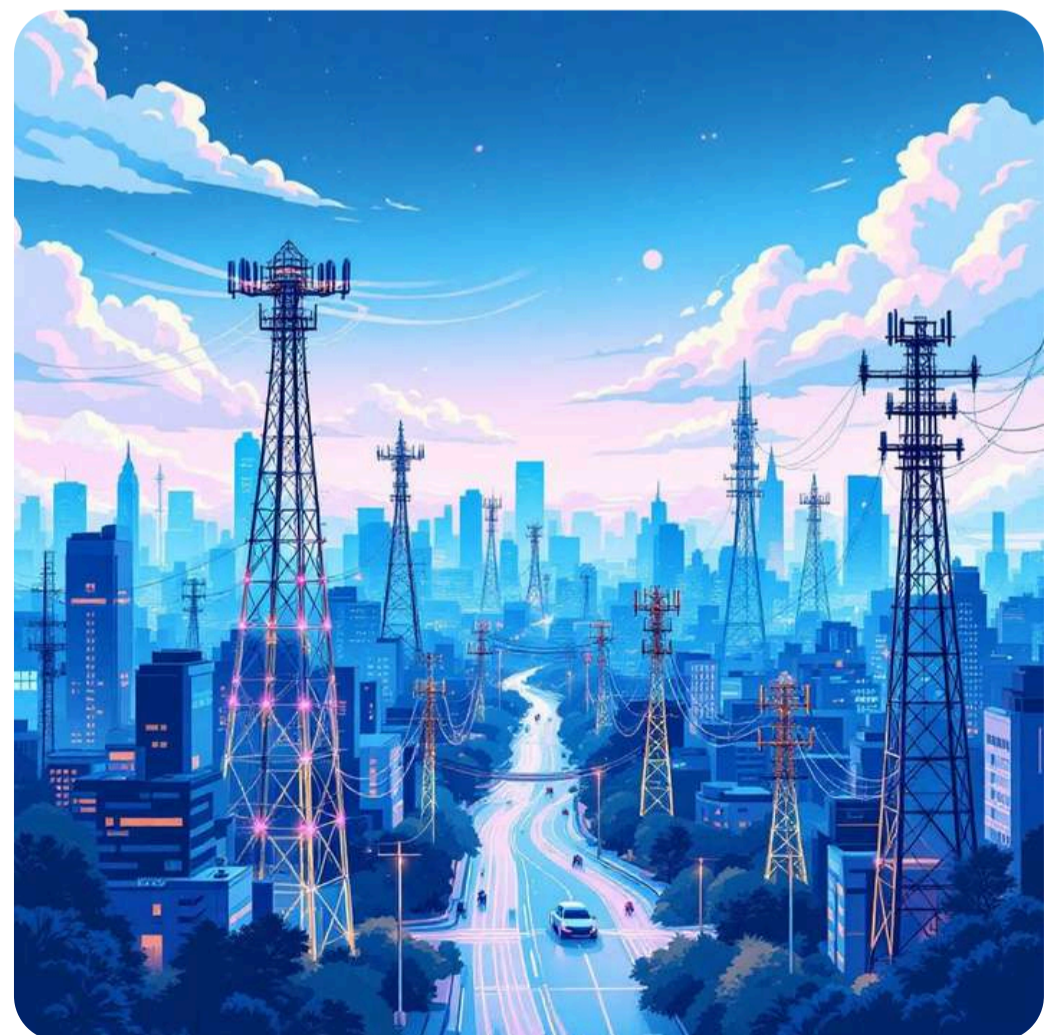
4

Structural Diversity

Various **network topologies** exist, such as Star, Ring, Bus, and Hybrid, each offering distinct advantages in terms of reliability and scalability.



- India's remarkable broadband expansion heavily relies on cutting-edge optical fiber and advanced wireless technologies to connect its vast population.



CHAPTER 3 **Ideate**

Communication Protocols: The Language of Networks



Defining Rules

Protocols are essential sets of rules that govern data exchange, ensuring all devices can "speak" and understand the same digital language.



Universal Standards

TCP/IP is fundamental to the internet, while **HTTP** drives web browsing, and various **Wi-Fi standards** enable wireless connectivity.



Layered Approach

Protocol layers modularize functions, simplifying design and promoting interoperability across diverse hardware and software platforms.



Ensuring Integrity

Protocols guarantee reliable, secure, and efficient communication, adapting across a multitude of devices and network infrastructures.

The Road Ahead

The widespread adoption of **IPv6** and the evolution of **5G protocols** are crucial drivers for India's ongoing digital transformation.