

Course Overview

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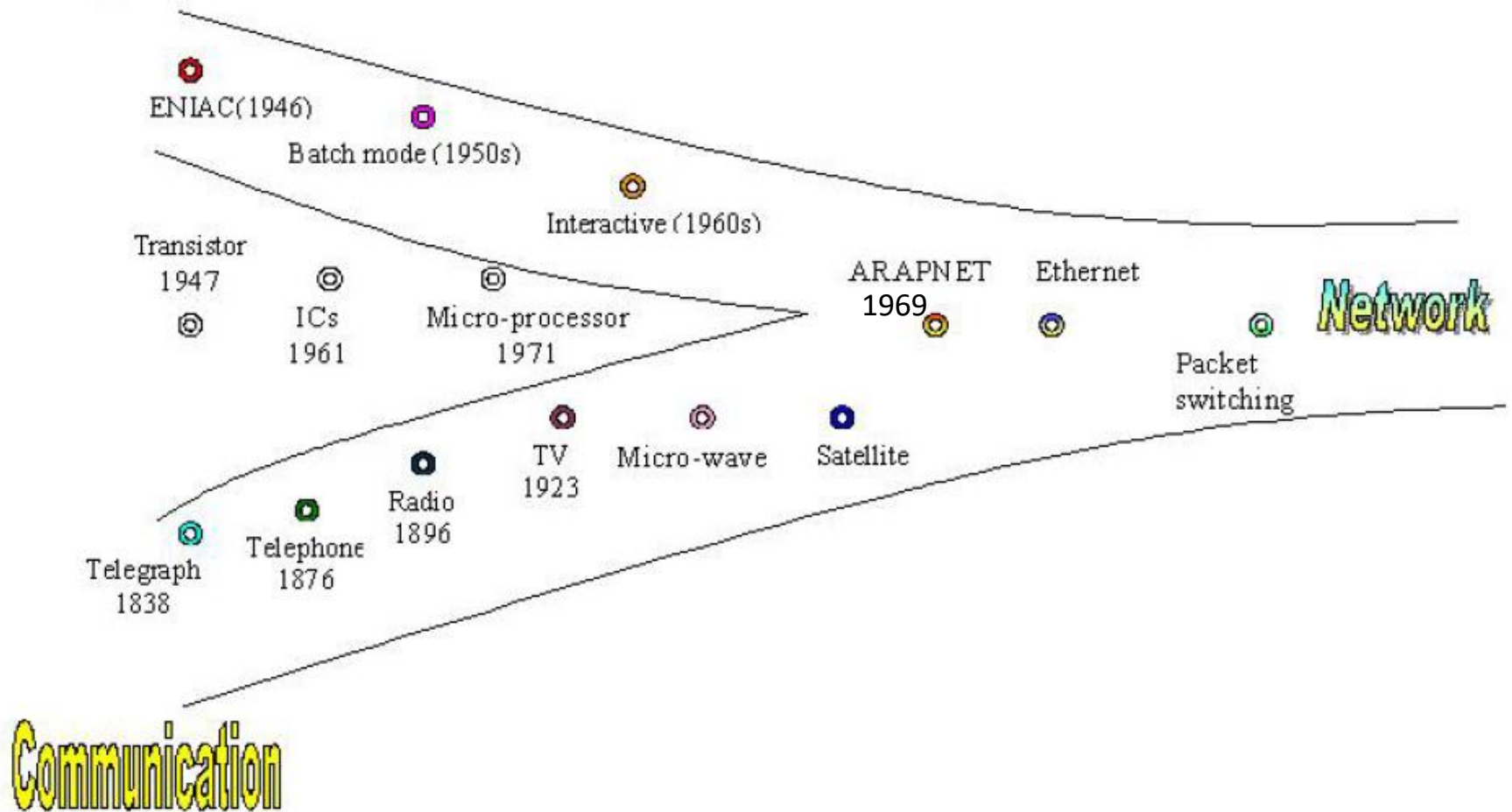
What is a computer network?



- **Network**: In simple terms it means an interconnected set of some objects.
 - Radio, Television, Railway, Highway, Bank Network
- **Computer Network**: an interconnected set of autonomous computers.
- These computers can exchange information with each other through the **communication network system**.
- It is basically the convergence of two technologies of this century - **Computer** and **Communication**.

Evolution of Computer Network

Computer



Purpose of a Computer Network



- **Transfer data** from machine A to machine B
- Facilitate access to remote information
- Facilitate **sharing of data**
- Facilitates person to person communication
- Facilitate **Interactive Environment**
- Enable machines of different speeds to communicate with each other

Objective of the Course

To understand the

- organization of computer networks
- factors influencing the performances
- Internet structure
- various protocols of the Internet
- how these protocols address the standard problems of networking and the Internet
- basics of network security

Hands-on experience

- networking fundamentals through practical sessions

Lecture Sequence

- **Basics:** Layer approach, Packet switching techniques, Performance metrics: delay, loss, throughput, bandwidth delay product, latency
- **Applications:** Network programming, socket abstraction, client server architecture, peer-to-peer communication, naming and addressing, E-mail, SMTP, POP3, FTP, remote login, WWW, DNS, TELNET
- **Transport Layer:** TCP, flow control, error control, congestion control, header, services, connection management, timers, UDP
- **Network Layer:** Internetworking, Tunnelling, Encapsulation, IP Addressing; Subnetting, Supernetting, IPv4, Fragmentation
Routing algorithms: distance vector and link state
Unicast Routing protocols and few related protocols
: ICMP, ARP, RARP, DHCP, IPv6, RIP, OSPF, NAT

Lecture Sequence



- **Advanced Internetworking**, Internet Structure, BGP, Multicast routing, DVMRP, MORPF, Queuing disciplines and buffer management techniques
- **Data link layer**: framing, medium access mechanisms – ALOHA, Pure ALOHA, CSMA, CSMA/CD, CSMA/CA, CDMA, TDMA, Ethernet, WiFi
- **Network security**: Network Security, Private Key Cryptography, Public Key Cryptography, Digital Signature, Firewall
- **Advanced topics**, SDN and Open flow Architectures, SDN Applications
- **Conclusion**

Lab Experiments



- Understanding Network **Hardware**
- Practice different **commands** related to networking
- Develop networking **applications** using socket programming
- Set up **LANs** and internetworking between networks
- Analyze the **performance** of a large network
- Implement few protocols in network **simulator** and observe protocol performance

Evaluation Process

- Mid-Sem 1 : 15%
- Mid-Sem 2 : 15%
- End-Sem : 35%
- Attendance: 05%
- Class Test : 10%
- Lab Work /
Term Project: 20%

Reference Books

1. [Stallings](#), W., (2010), *Data and Computer Communications*, Prentice Hall
2. [Peterson](#), L. L. & Davie, B. S., (2008), *Computer Networks: A Systems Approach*, Morgan Kaufmann
3. [Ross](#), K. W. & Kurose, J. F., (2010), *Computer Networks: A Top Down Approach*, Pearson Education
4. [Forouzan](#), B. A., (2012), *Data Communications and Networking*, McGraw-Hill

Thanks!