REDEEMERS UNIVERSITY, EDE, OSUN STATE.

TERM PAPER - CSC 828 (INTERNET TECHNOLOGY)

ON

THE HISTORY OF THE INTERNET AND NETWORK TOPOLOGIES

BY

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1. History of the Internet

The Internet is one of the most transformative inventions in modern history. Its development began in the 1960s during the Cold War era when the U.S. Department of Defense funded a project known as ARPANET (Advanced Research Projects Agency Network). ARPANET was initially intended to allow communication between different research institutions in a way that would survive a nuclear attack by creating a decentralized network.

In 1969, ARPANET transmitted its first message between UCLA and Stanford, which marked the beginning of what we now call the Internet. Over the 1970s and 1980s, technologies such as TCP/IP (Transmission Control Protocol/Internet Protocol) were developed, enabling different networks to interconnect, leading to the creation of a “network of networks.”

The World Wide Web (WWW) was invented in 1989 by Tim Berners-Lee, a British scientist at CERN, who created HTML, HTTP, and the first web browser. The 1990s saw the commercialization of the Internet, leading to the dot-com boom. Since then, the Internet has grown to connect billions of people and devices around the globe, supporting services like email, social media, streaming, and e-commerce.

2. Network Topologies

Network topology refers to the physical or logical layout of connected devices and how they communicate in a network. The most common types of network topologies are:

a. Bus Topology

Layout: All devices share a single communication line (bus).

Advantages:

- Easy and cheap to install.

- Works well for small networks.

Disadvantages:

- Entire network fails if the bus cable is broken.

- Performance decreases with more devices.

b. Star Topology

Layout: All devices are connected to a central hub or switch.

Advantages:

- Easy to manage and troubleshoot.

- Failure of one device does not affect the network.

Disadvantages:

- Expensive due to more cabling.

- Failure of the central hub disrupts the entire network.

c. Ring Topology

Layout: Each device is connected to two others, forming a circle.

Advantages:

- Data flows in a predictable direction.

- Equal access for all devices.

Disadvantages:

- A break in the ring can shut down the network.

- Troubleshooting is difficult.

d. Mesh Topology

Layout: Every device is connected to every other device.

Advantages:

- High fault tolerance.

- Data can be rerouted if one connection fails.

Disadvantages:

- Expensive and complex.

- Hard to set up and maintain.

e. Tree Topology

Layout: A hybrid of star and bus topologies.

Advantages:

- Scalable and hierarchical.

- Easy to manage large networks.

Disadvantages:

- Dependent on the main bus; if it fails, the whole system goes down.

- Complex wiring.

Comparison of Network Topologies

Topology	**Cost**	**Reliability**	**Scalability**	**Complexity**	**Use Case**
Bus	Low	Low (single point)	Low	Simple	Small office or temporary setups
Star	Medium	High (except hub)	High	Moderate	Home networks, LANs
Ring	Medium	Medium (break = fail)	Moderate	Moderate	Old LANs, Token Ring networks
Mesh	High	Very High	Low (costly)	Complex	Military, high-reliability zones
Tree	High	Medium	High	Complex	Large organizations

Conclusion

The evolution of the Internet from a defense project to a global communication medium highlights human innovation and collaboration. At the core of network communication are topologies, each suited to different scenarios. Understanding their advantages and limitations helps in designing efficient, scalable, and robust networks.