

Chapter 17 – Supporting Modems.

How the phone system works:

Limitations of the phone system

8bit, 8Khz
400-3400hz

The Origin of Modems

The word "modem" is a contraction of the words **modulator-demodulator**.

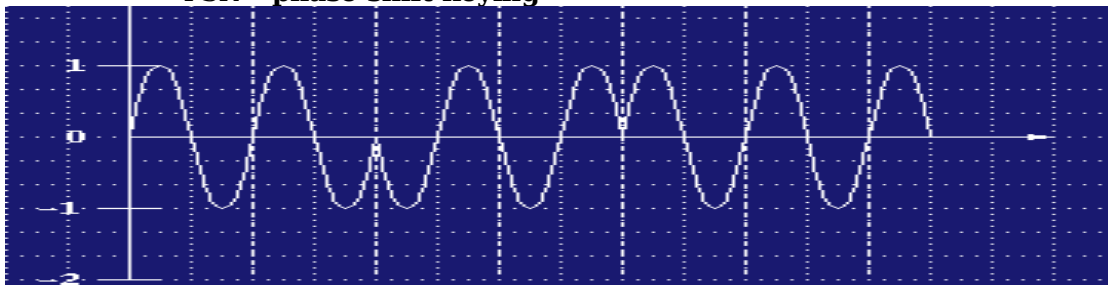


How a 300 bps modem works:

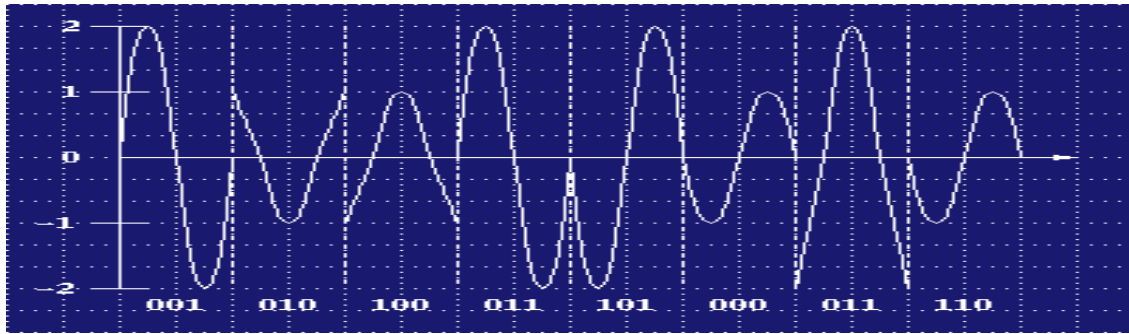
FSK -- **frequency shift keying**
1070hz 0 originating
1270hz 1
2025hz 0 Answering
2225hz 1

over 300 bps

PSK -- **phase-shift keying**



QAM -- quadrature amplitude modulation



28Kbps uses 24 bits per cycle

Current (and future?) Maximum Speeds

- 300 bps - 1960s through 1983 or so
- 1200 bps - Gained popularity in 1984 and 1985
- 2400 bps
- 9600 bps - First appeared in late 1990 and early 1991
- 19.2 kilobits per second (Kbps)
- 28.8 Kbps
- 33.6 Kbps
- 56 Kbps - Became the standard in 1998

Who sets these standards?

CCITT/UTI

V.90/ V.92

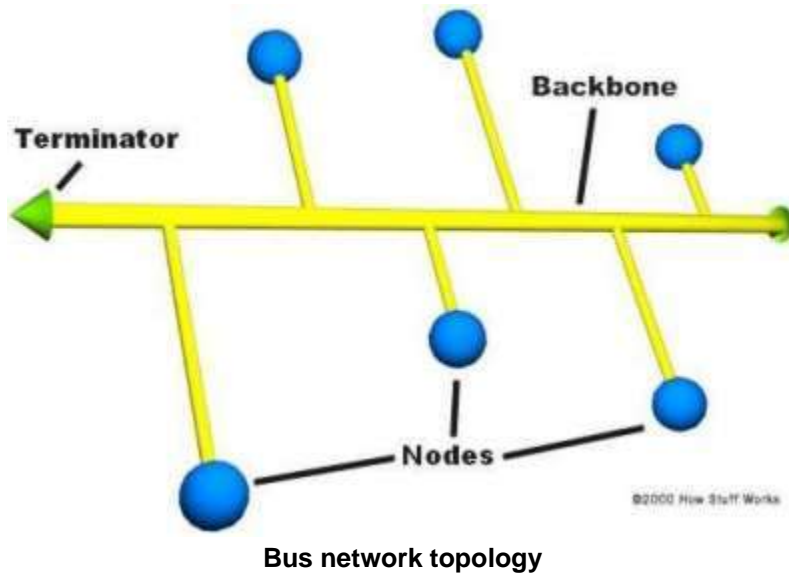
Data Compression and Error Correction:

Hardware vs Software Modems:

Chapter 18 - PCs on a Network

Network Topologies

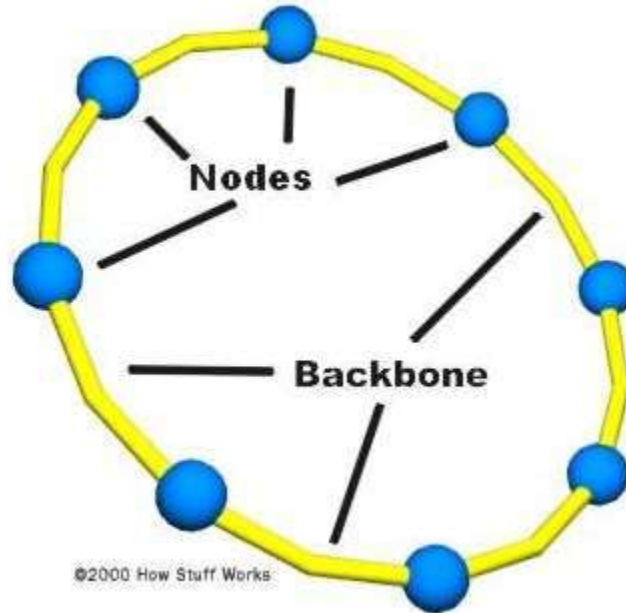
Bus - Each node is **daisy-chained** (connected one right after the other) along the same backbone, similar to [Christmas lights](#). Information sent from a node travels along the backbone until it reaches its destination node. Each end of a bus network must be **terminated** with a resistor to keep the signal that is sent by a node across the network from bouncing back when it reaches the end of the cable.



Pros

Cons

Ring - Like a bus network, rings have the nodes daisy-chained. The difference is that the end of the network comes back around to the first node, creating a complete circuit. In a ring network, each node takes a turn sending and receiving information through the use of a **token**. The token, along with any data, is sent from the first node to the second node, which extracts the data addressed to it and adds any data it wishes to send. Then, the second node passes the token and data to the third node, and so on until it comes back around to the first node again. Only the node with the token is allowed to send data. All other nodes must wait for the token to come to them.

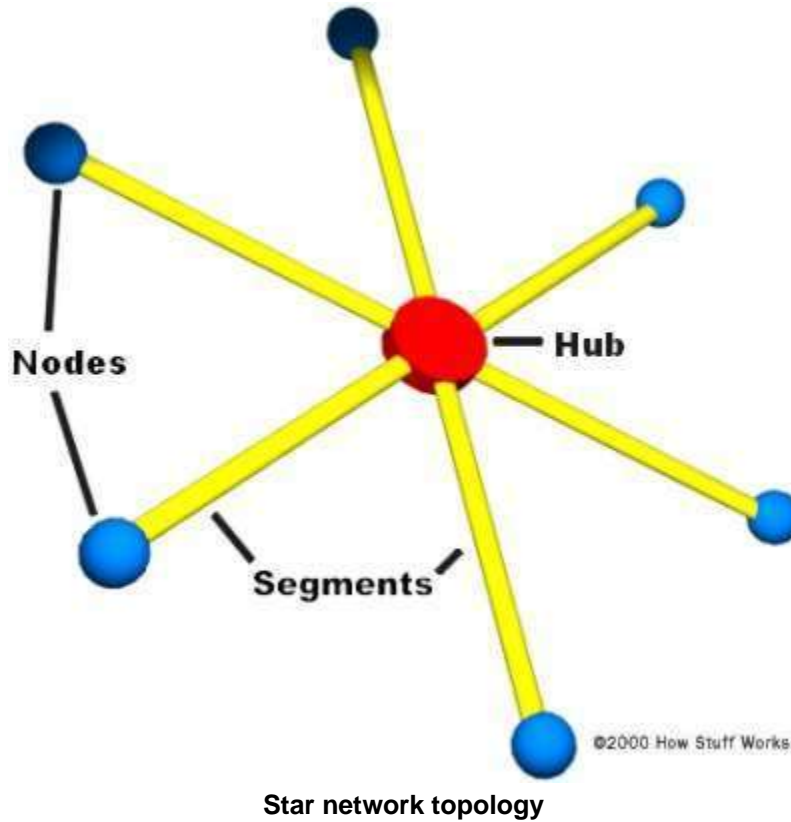


Ring network topology

PROs

CONs

Star - In a star network, each node is connected to a central device called a **hub**. The hub takes a signal that comes from any node and passes it along to all the other nodes in the network. A hub does not perform any type of filtering or routing of the data. It is simply a junction that joins all the different nodes together.



Using a Hub

PROs

CONs

Using a Switch

PROs

CONs

Network Protocols

Ethernet

Identifying a Network Interface Card with its MAC address

48bit

A computers DNA?

Ethernet Speeds

Other Network Hardware

Repeaters

Bridges (and why to use a switch instead)

Routers