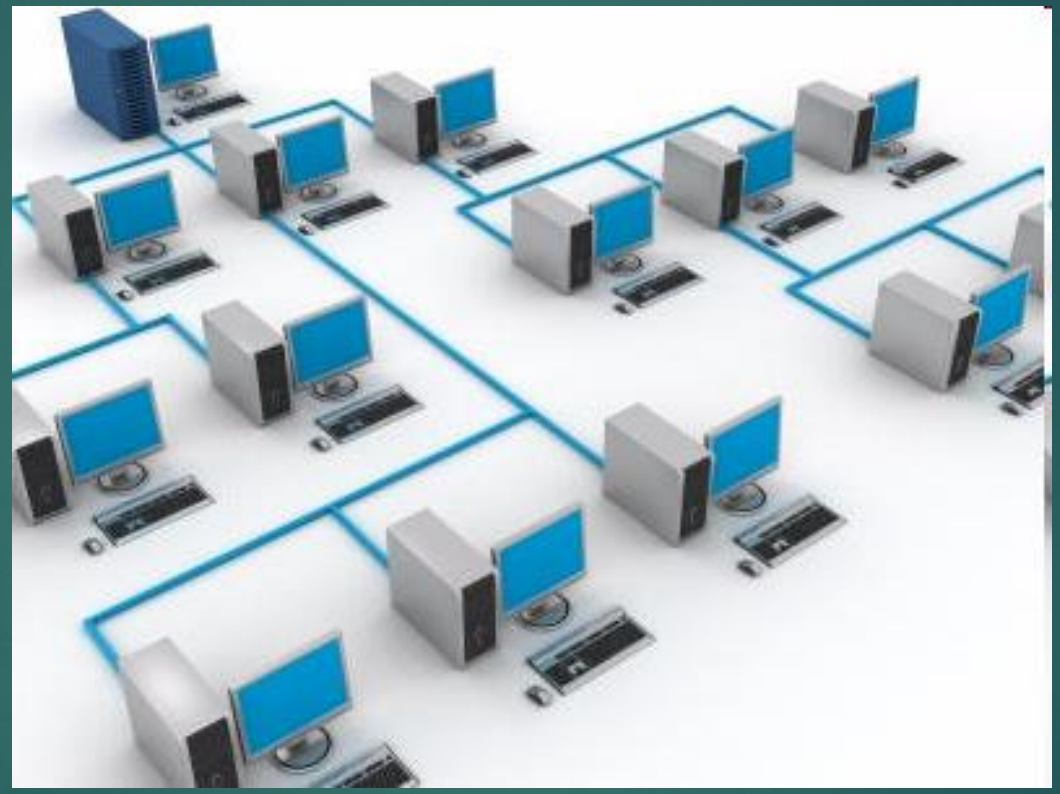
COMS 465:
Computer Mediated Communication

Plan

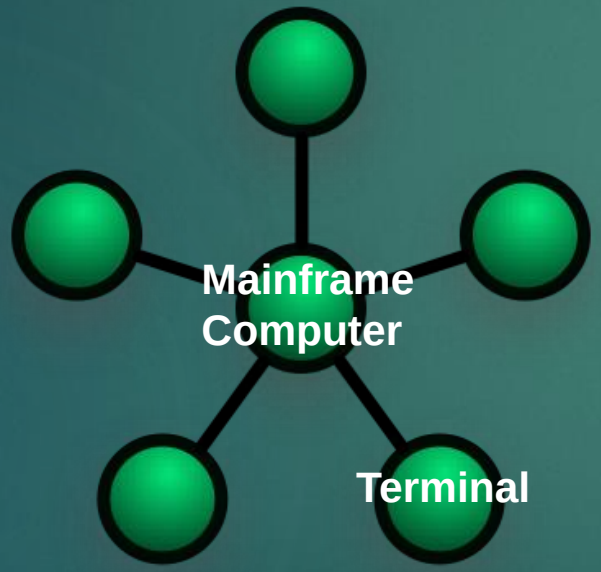
- Review
- World Wide Web
- Preview

Review

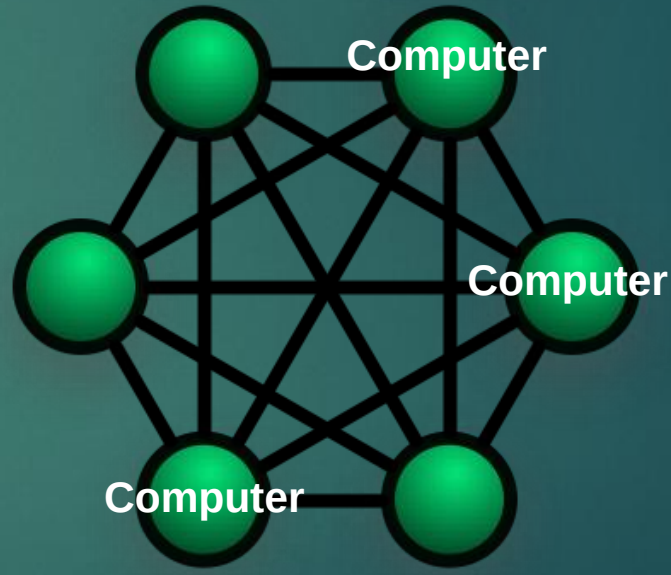


Computer Networks

Time Shared Mainframe

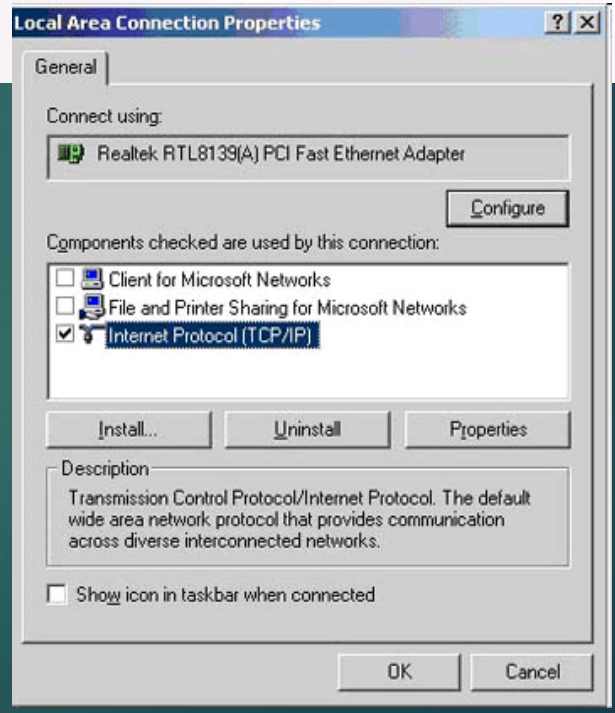


Computer Network



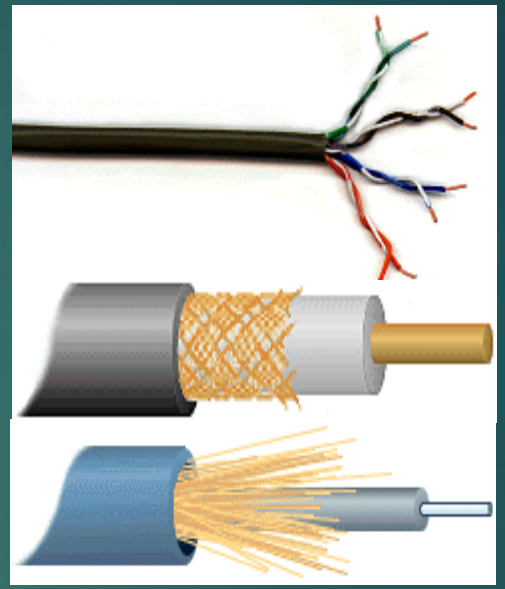
Computer Networks

- Components
  - Physical media
    - Transmission media
    - Switches/Routers
  - Standards and Protocols
    - Common language for sharing information



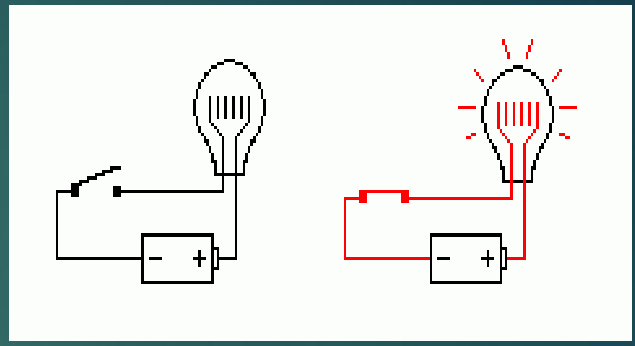
Computer Networks

- Transmission Media
  - Twisted Pair/Copper wire
    - Standard – 1 Kbps
    - Cat-5 – 100 Mbps
    - Cat-5e/6 – 1 Gbps
  - Coaxial cable – 10 Mbps
  - Fiber optic – 10 Gbps
  - Wireless – 80 Mbps

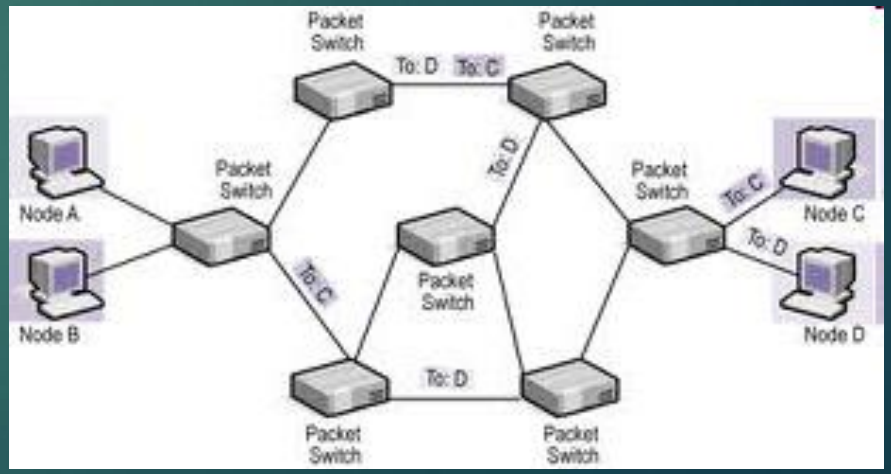


Computer Networks

- Switching
  - Determines how information moves through transmission media
  - Two types
    - Circuit Switching
    - Packet Switching



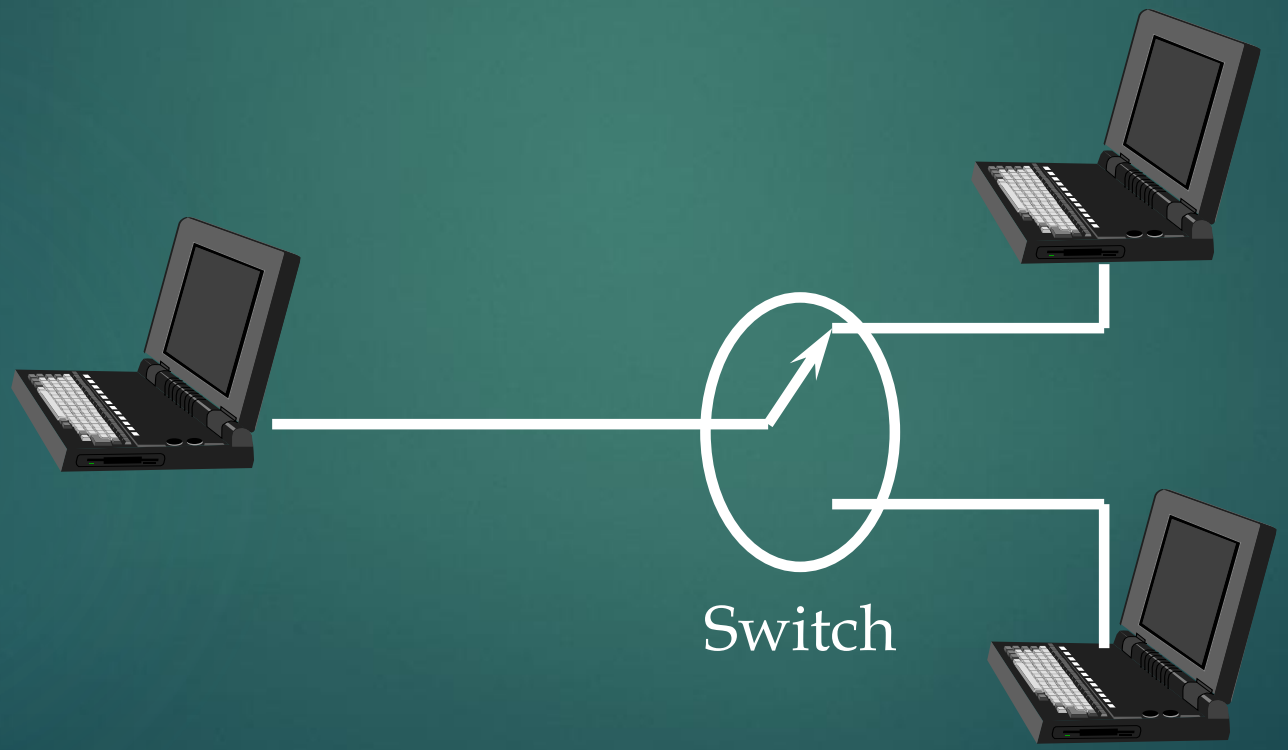
Circuit Switching



Packet Switching

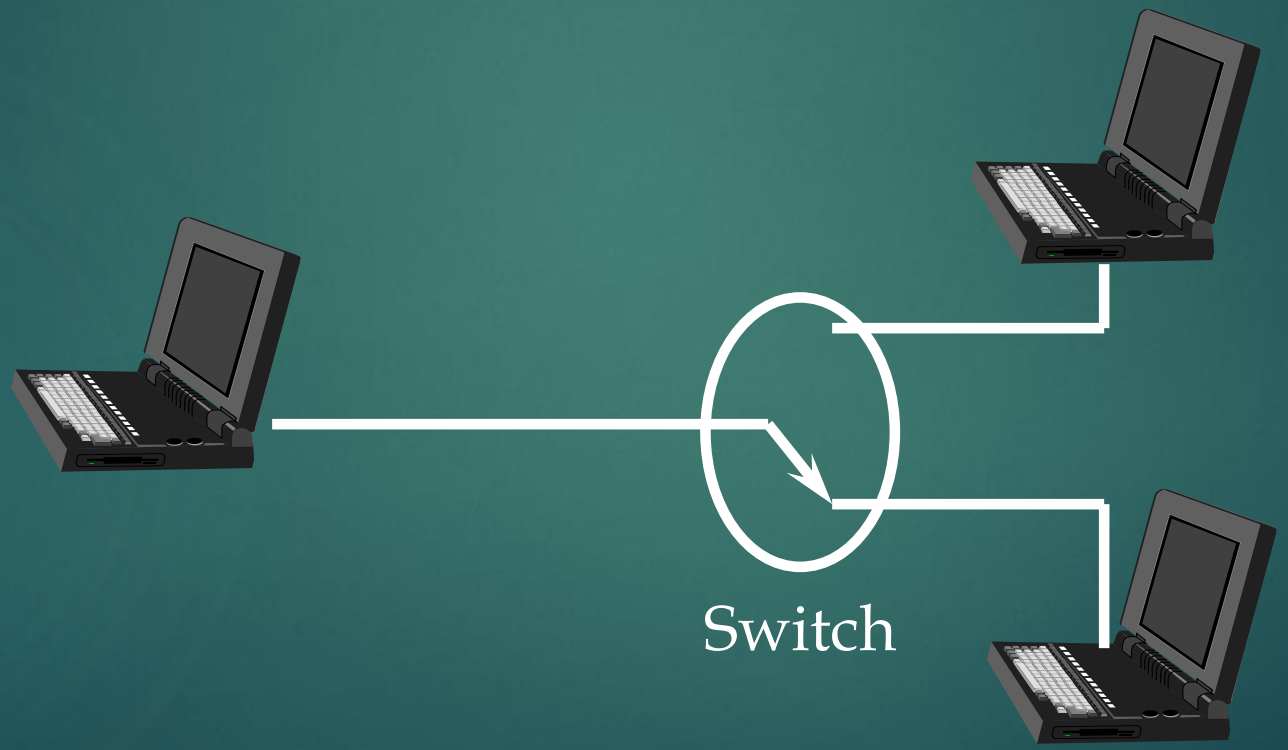
Computer Networks

- Circuit Switching



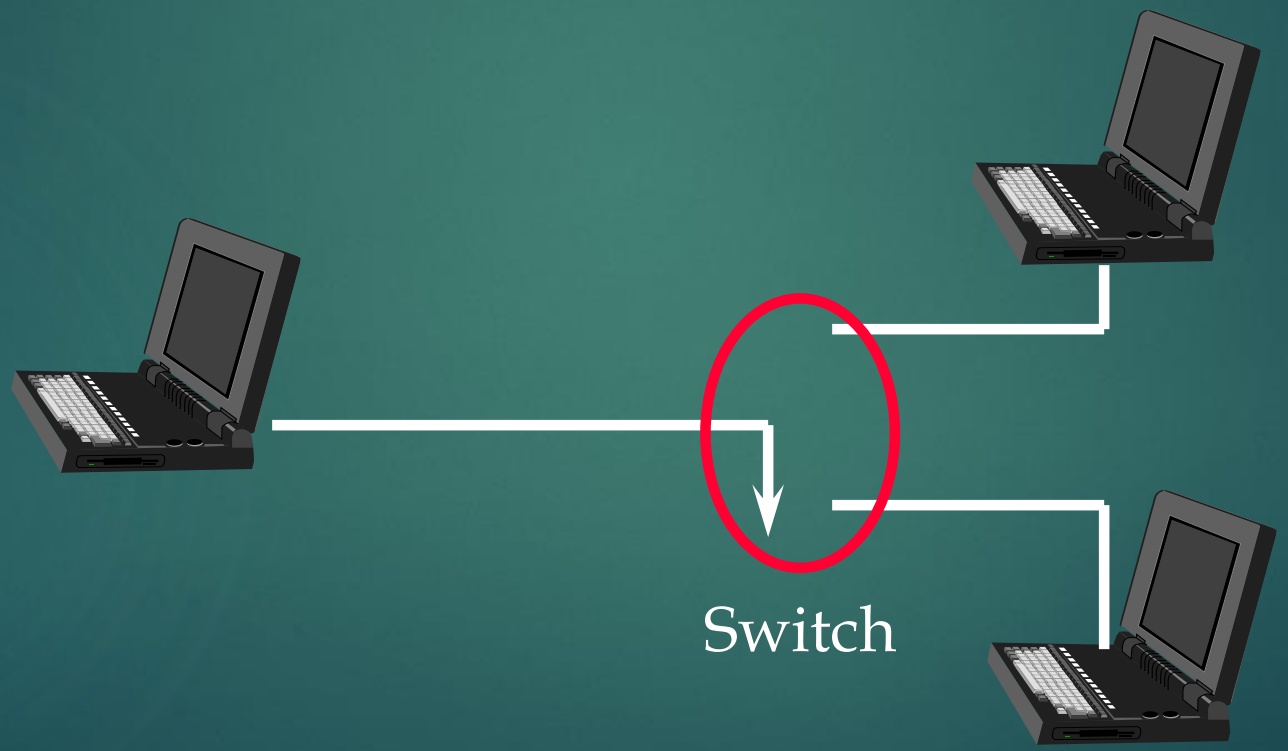
Computer Networks

- Circuit Switching



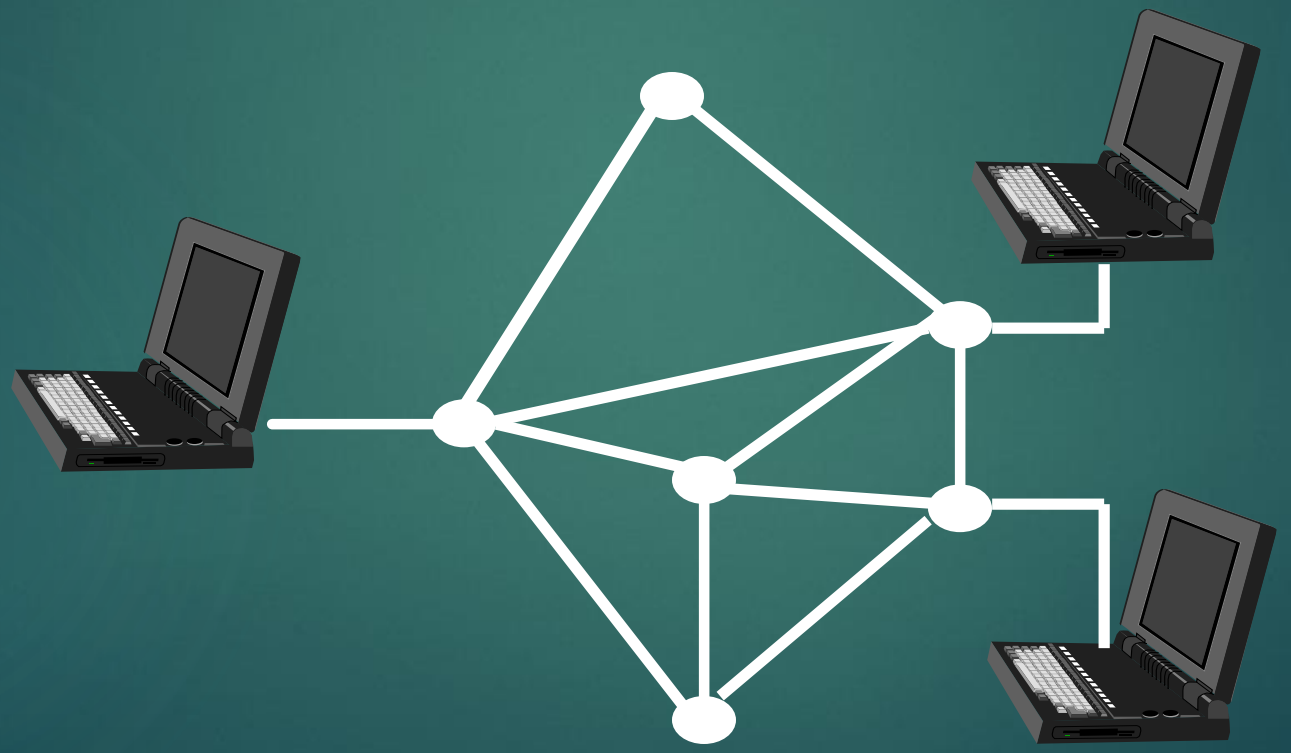
Computer Networks

- Circuit Switching



Computer Networks

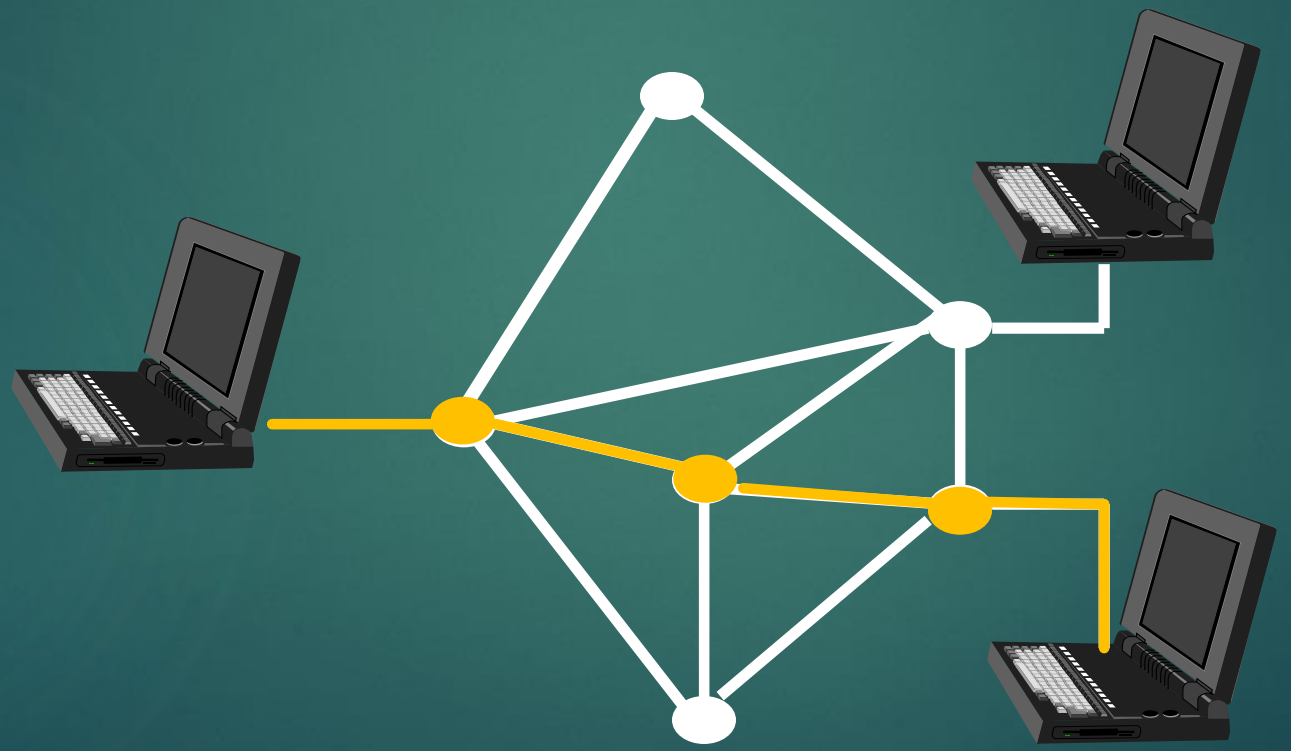
- Packet Switching



Routers

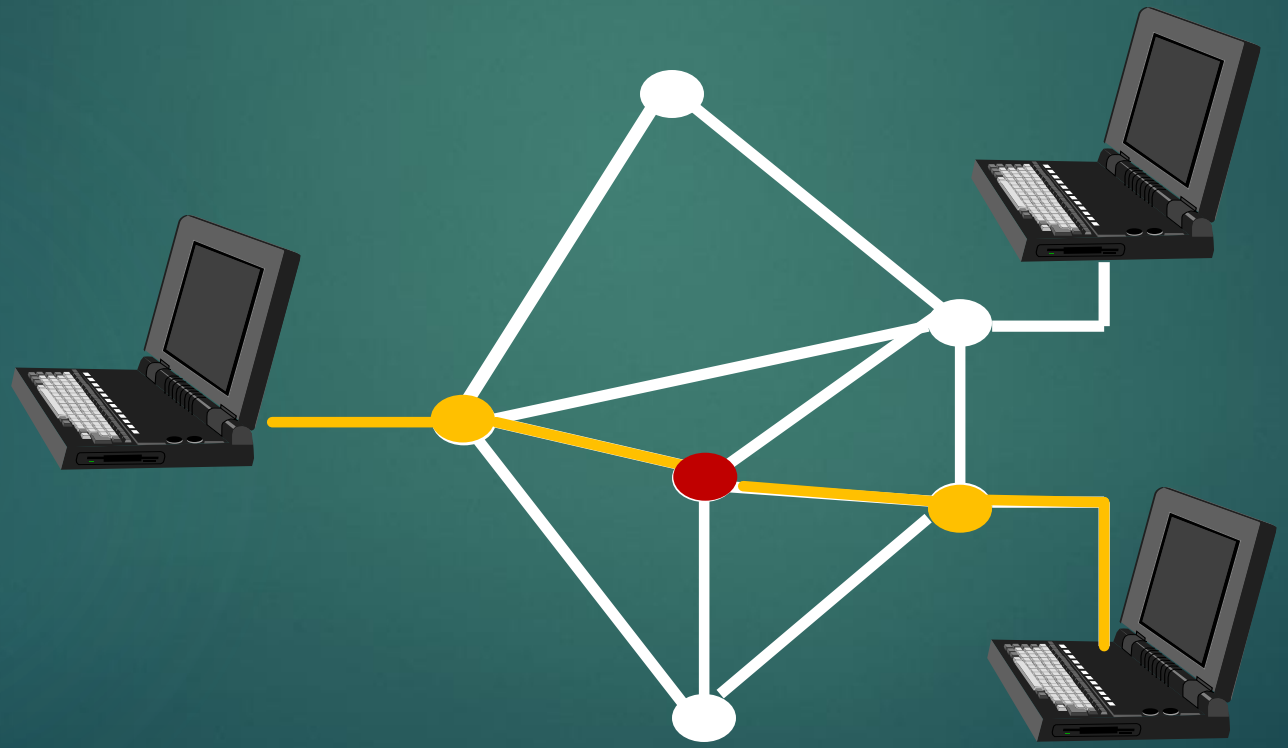
Computer Networks

- Packet Switching



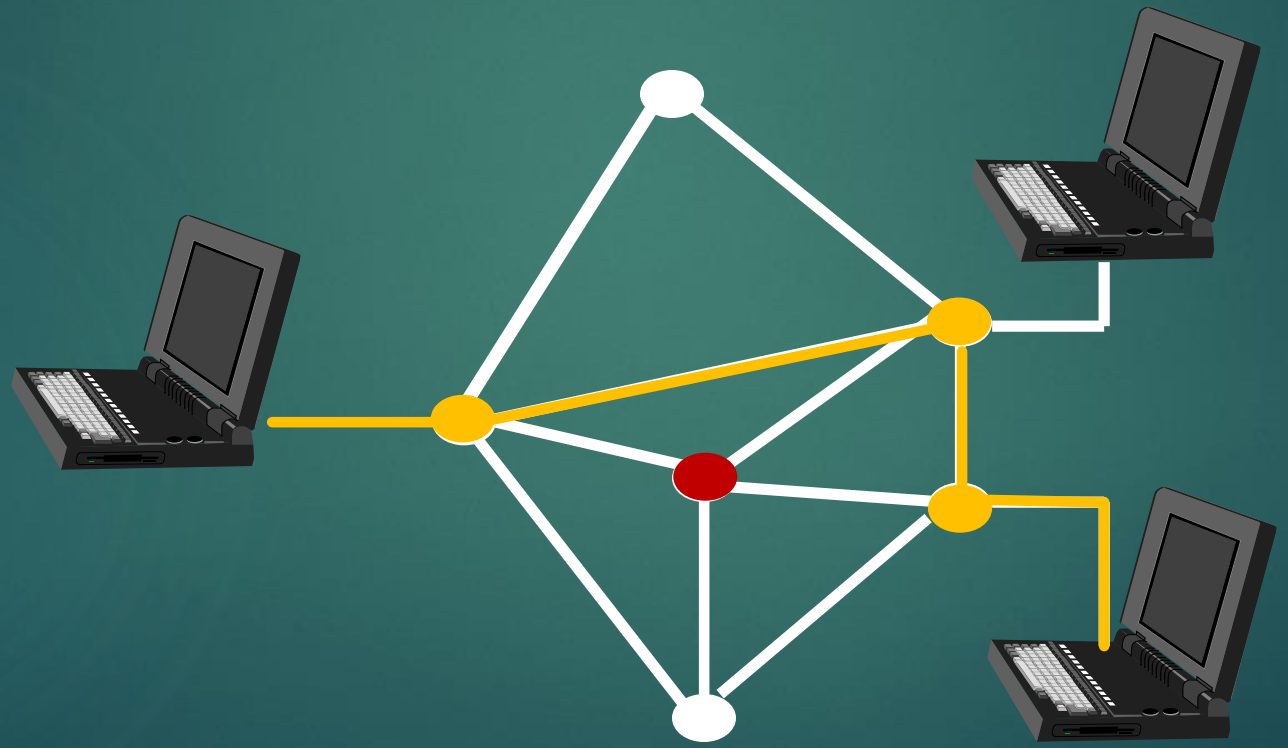
Computer Networks

- Packet Switching



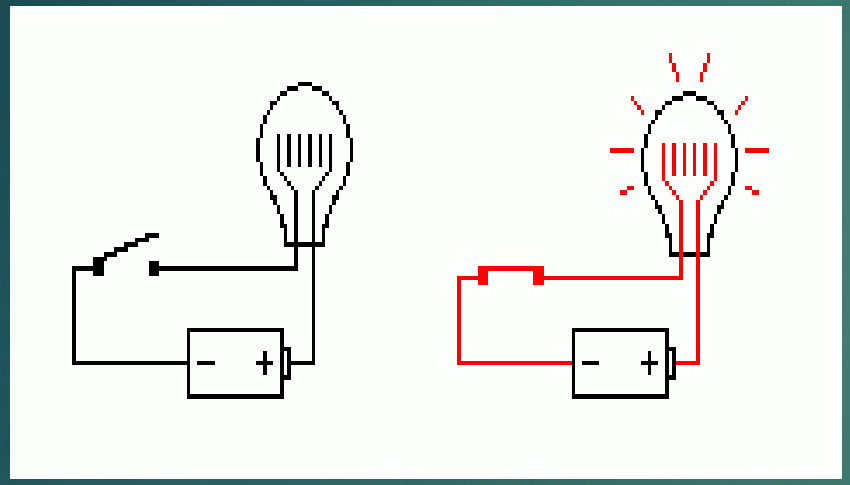
Computer Networks

- Packet Switching



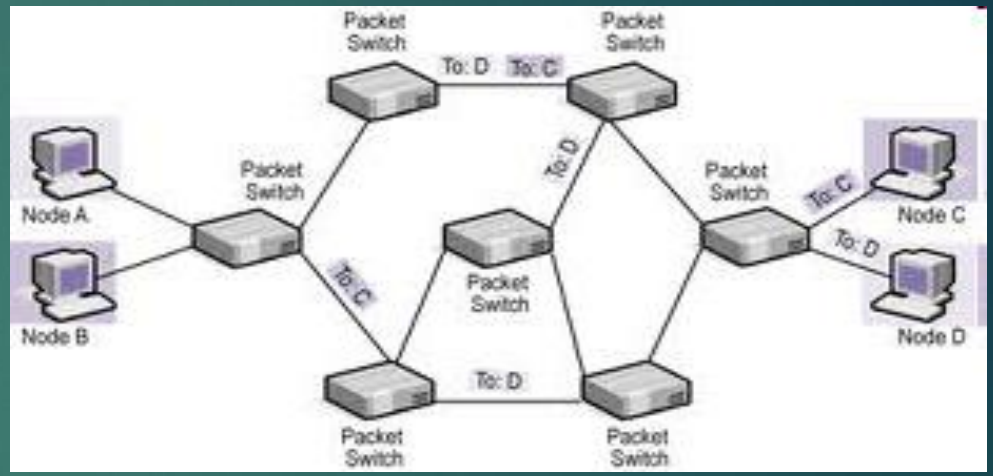
Computer Networks

Circuit Switching



Phyical end-to-end connection
Good for real-time voice and video communications
Slower through-put & less reliable

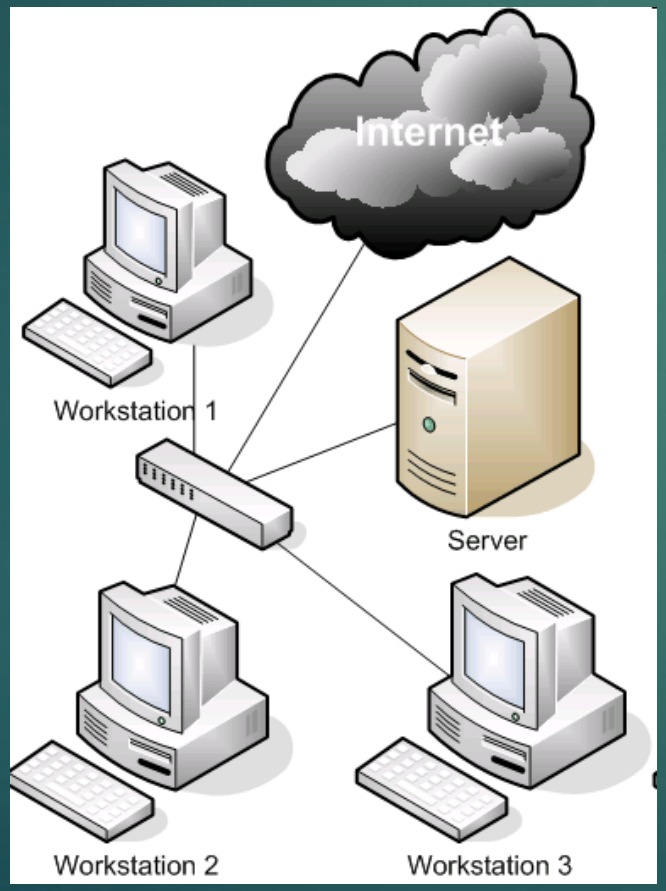
Packet Switching



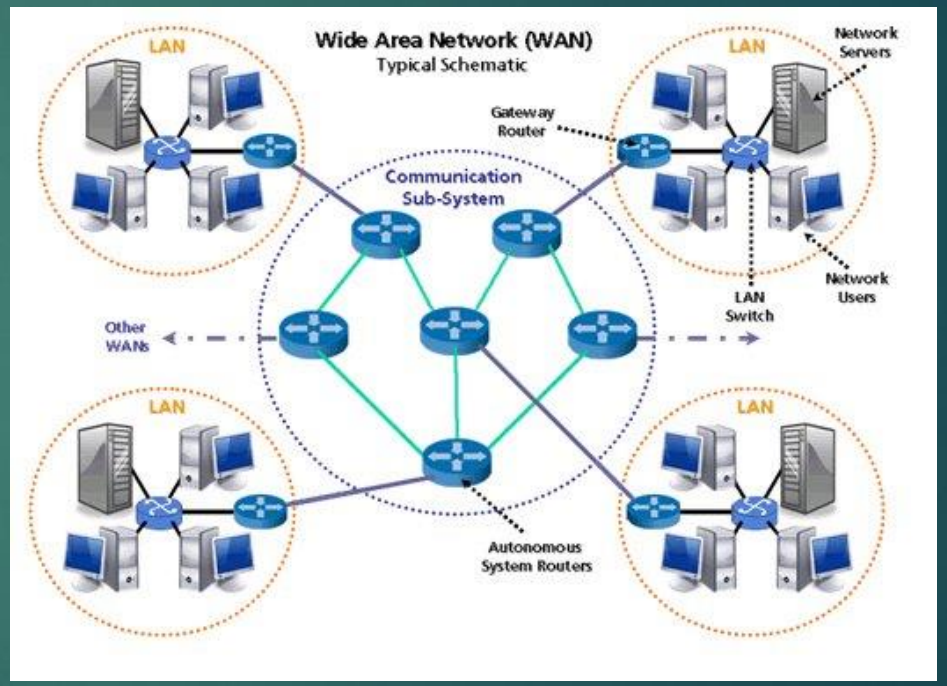
Connectionless network
Good for data communications
Faster through-put and more reliable
Latency & congestion problems

Computer Networks

LAN

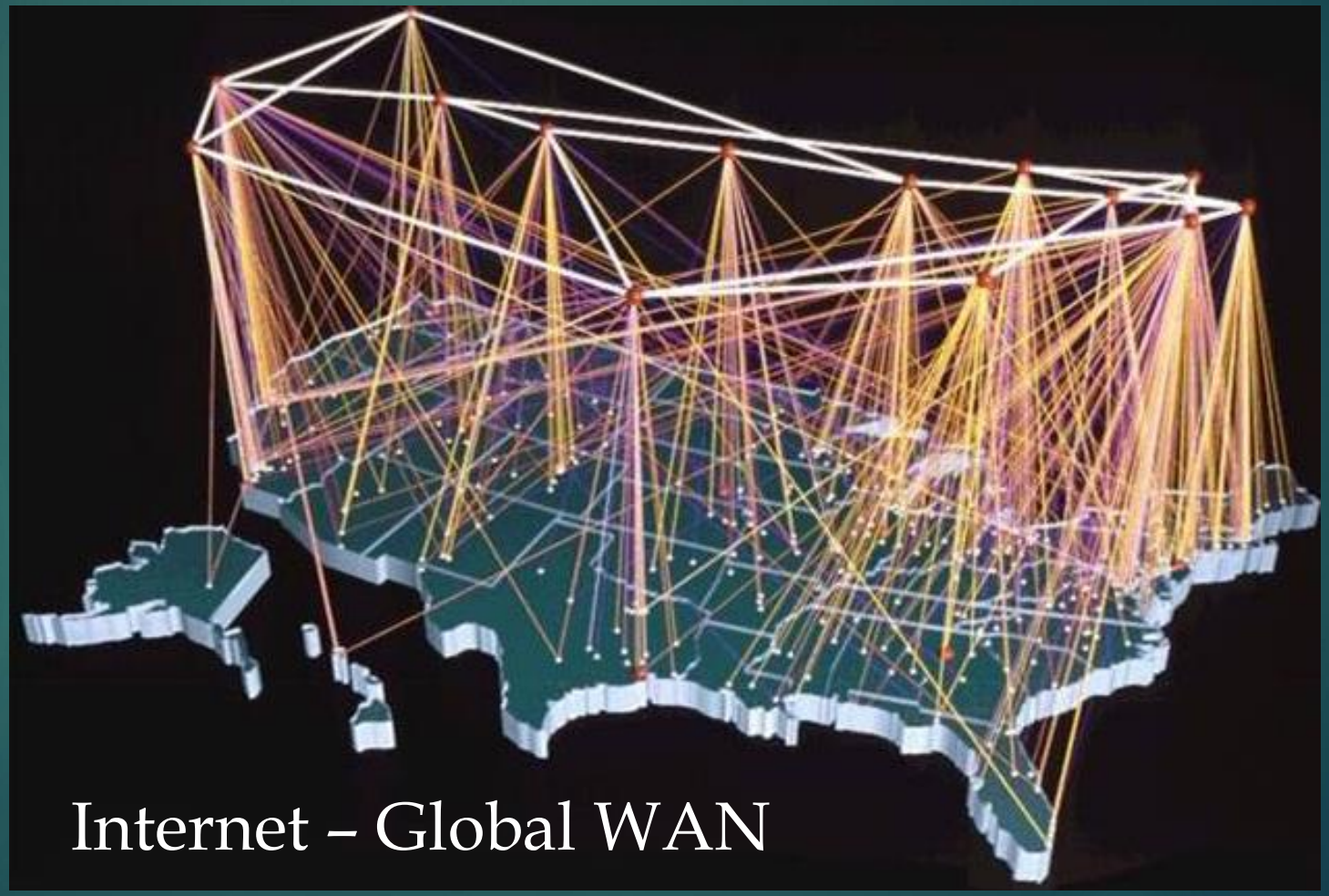


WAN



2 types of computer networks

Computer Networks



Internet – Global WAN

Internet

- History
  - J. C. R. Licklider
    - Proposed idea of a “galactic network” (1962)
    - Network through which any computer could directly access any other and exchange data

Internet

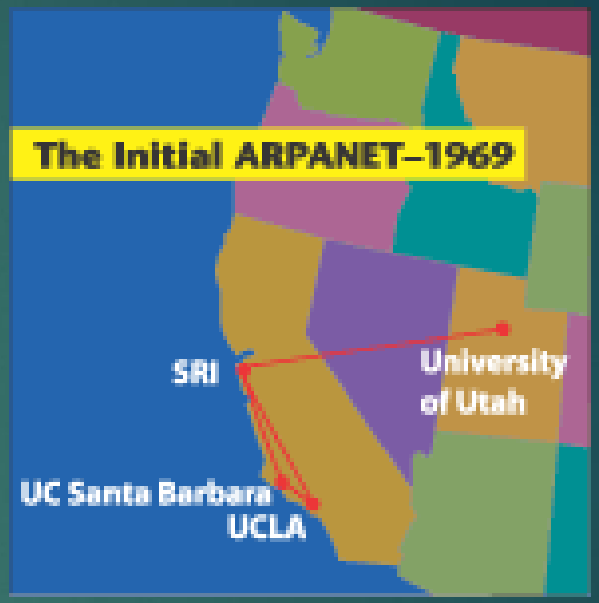
- History
  - U.S. DOD concerned about the vulnerability of computer networks for defense
  - Commissioned RAND Corporation to study the problem (1962)
    - Task: Design a computer network that could survive a nuclear attack by the USSR
    - Conclusion: Packet Switched network was the way to go (1964)

History of the Internet

- History
  - ARPANET
    - DARPA - Defense Advanced Research Projects Agency
    - Specify an experimental packet switched network (1968)
    - ARPANET on-line Sept. 1969

History of the Internet

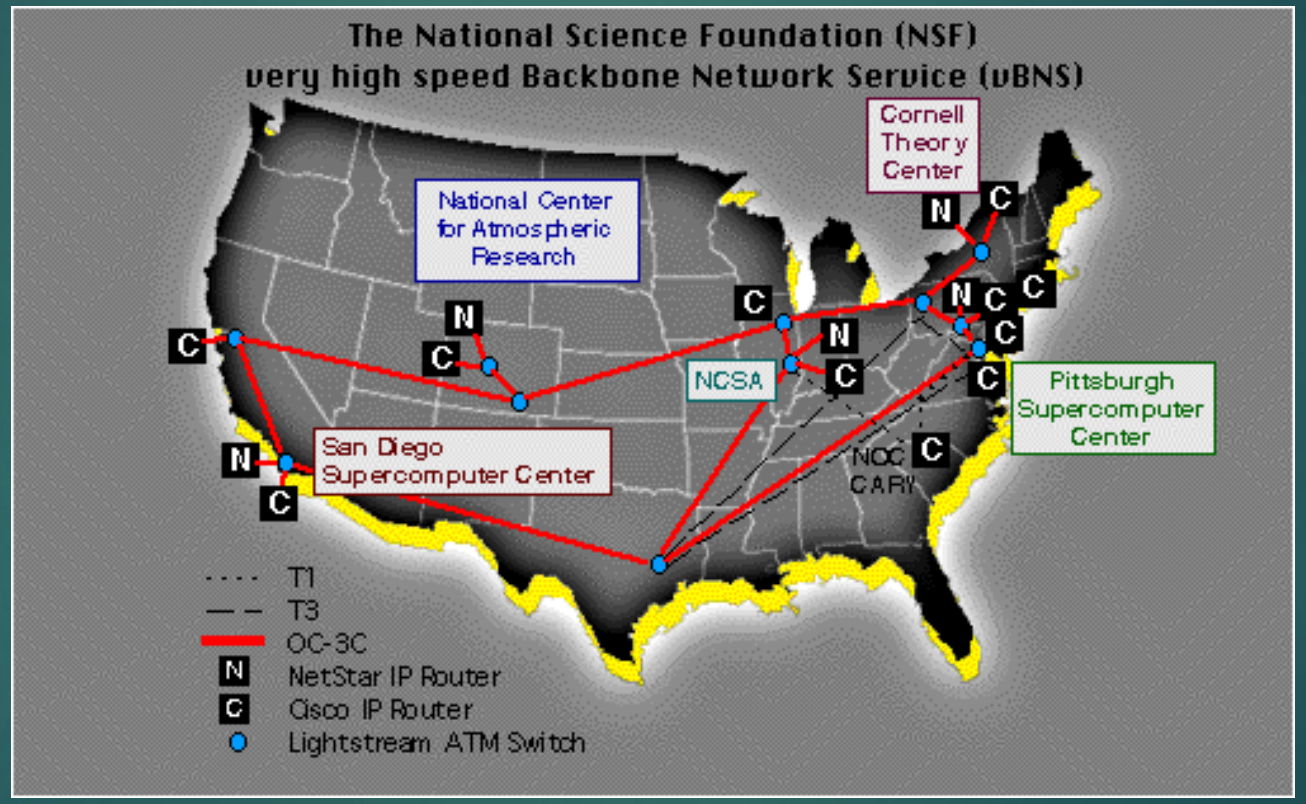
- ARPANET
  - Began with 4 nodes
    - UCLA
    - Stanford Research Institute
    - UCSB
    - University of Utah
  - Connect Universities and research centers doing DOD research



History of the Internet

- Expansion of ARPANET
  - Originally ARPANET was limited to the military and DOD researchers
  - In 1986 ARPANET technology is used by National Science Foundation to create another network - NSFNET
  - Whereas ARPANET was used primarily by DOD research facilities, NSFNET interconnected other educational institutions and government offices

History of the Internet



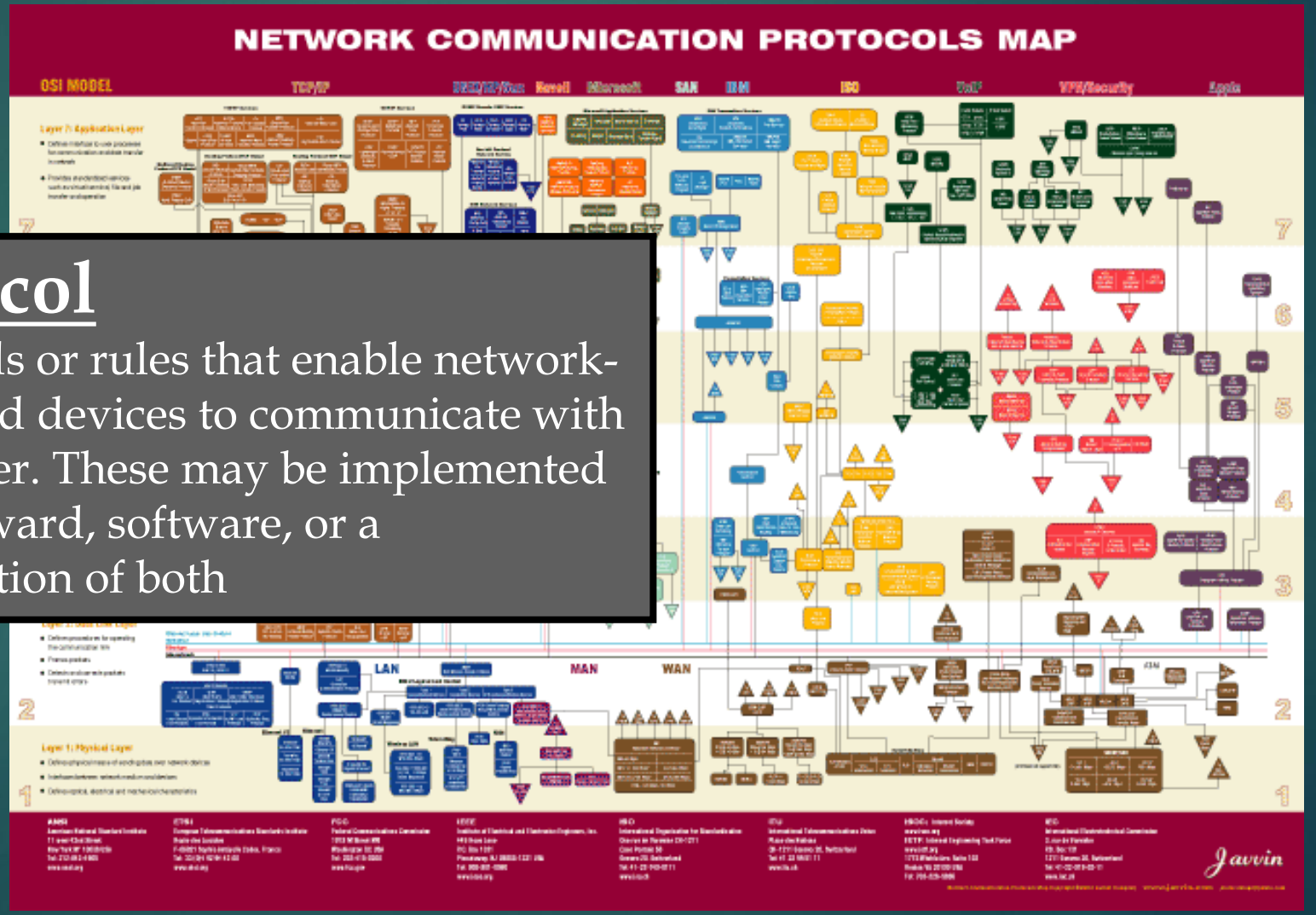
History of the Internet

- Expansion of ARPANET
  - 1991 ARPANET is split into MILNET and Internet
    - MILNET = military network for DOD
    - Internet = public network; administered by NSF
  - Privatization of Internet
    - 1993 NSF turns over basic administrative functions to InterNIC, a private corporation
    - 1995 NSFNET is decommissioned and all network traffic is moved to the very-high-speed Backbone Network Service (vBNS)
    - 1995 with the decommissioning of NSFNET, gov't subsidies for the network are removed and the Net is open to commercial traffic (e-commerce)

History of the Internet

- Currently
  - The Internet is a global computer network; It is not one network but a network of networks. Hence the name Inter-net (a network *between* networks).
  - Although originally administered and funded by US gov't, the current Internet has been almost completely privatized
  - Irony: a technology that was to be used for the defense of the US is now a system employed for international cooperation and communication

Computer Networks



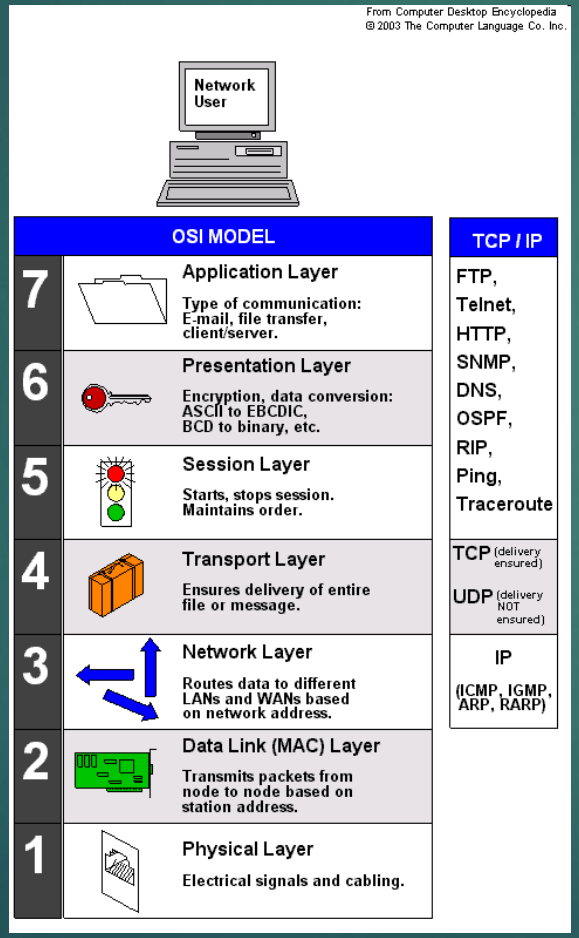
Protocol

Standards or rules that enable network-connected devices to communicate with each other. These may be implemented by hardward, software, or a combination of both

Internet Protocols

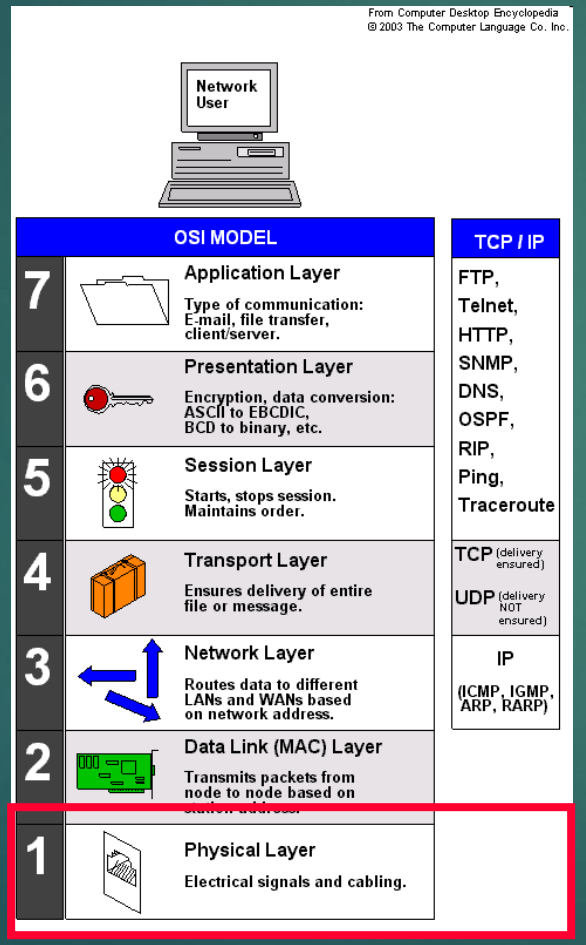
- Protocols for the Internet
  - **TCP/IP** - Transmission Control Protocol and Internet Protocol
    - Introduced in 1973 - Bob Kahn & Vinton Cerf
    - Accepted by ARPANET as the standard in 1982
    - Current protocol suite running on the Internet

Internet Protocols



Internet Protocol Stack

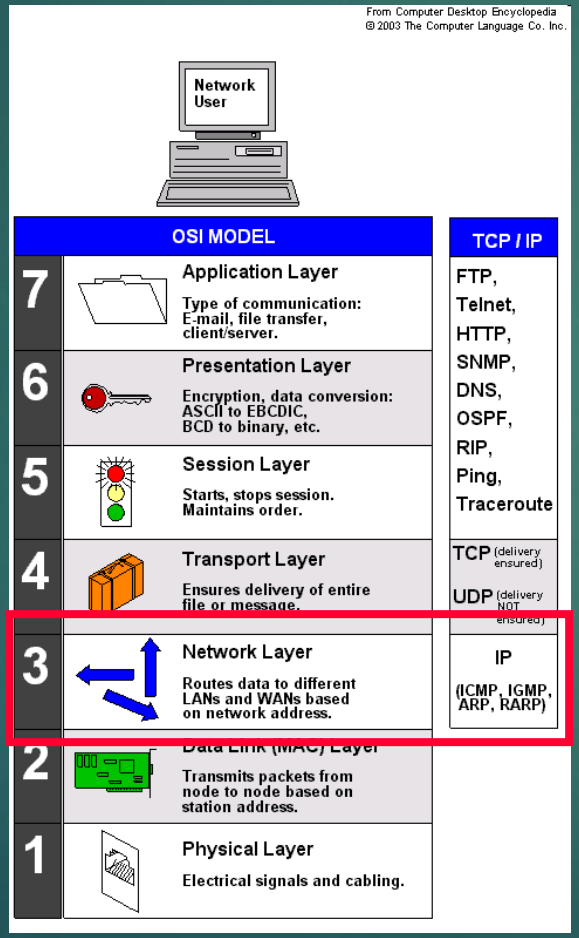
Internet Protocols



Physical Media

- Wires and cables
- Electrical Signals

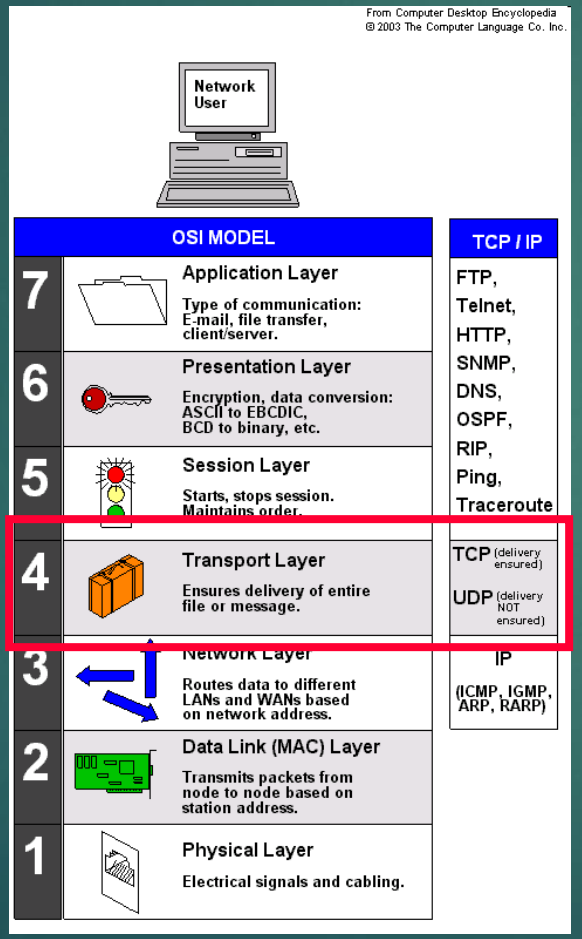
Internet Protocols



Internet Protocol (IP)

- Address system for routing data packets to their destination
- Ensure that a data packet is sent to the right place
- IP number: 131.245.23.01

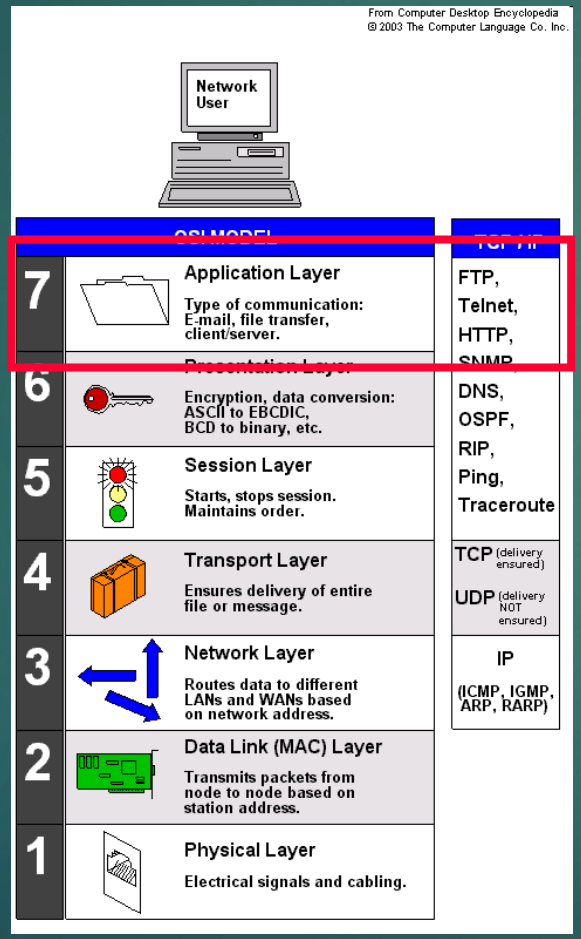
Internet Protocols



Transport Control Protocol (TCP)

- Divides message into packets to be managed by IP
- Reassembles packets back into the complete message at the other end

Internet Protocols

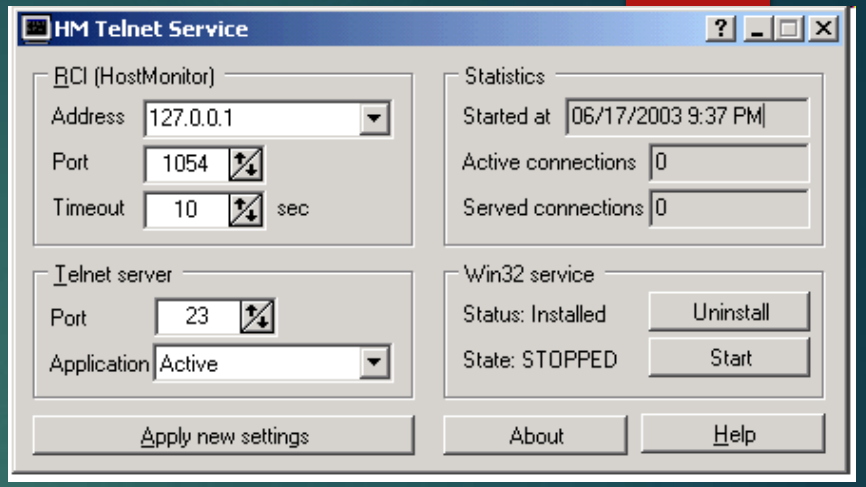


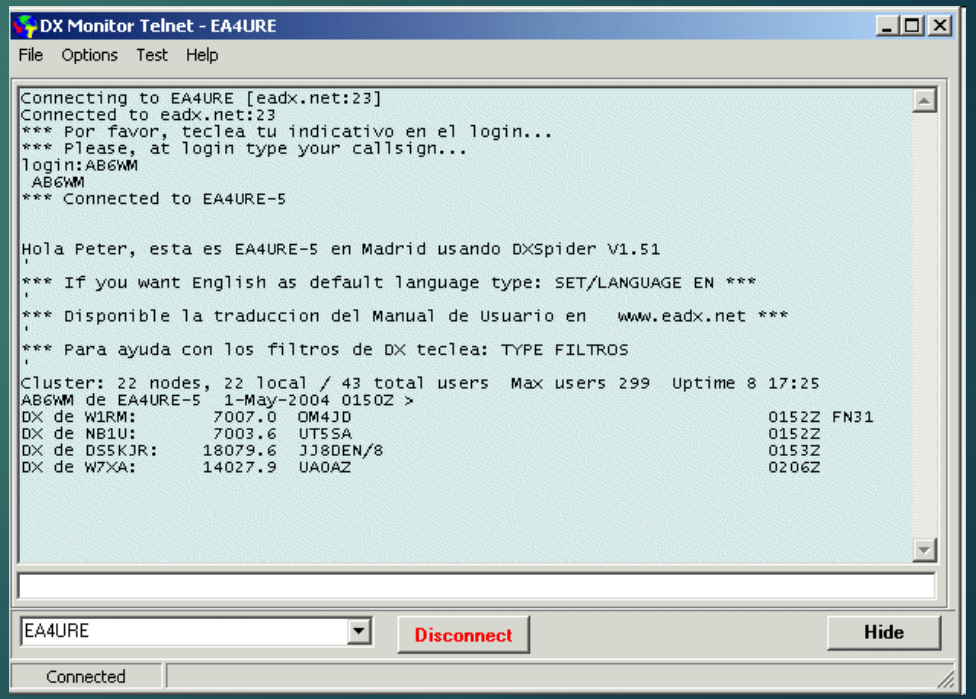
Application Layer

- Telnet
- File Transfer Protocol
- Email
- World Wide Web

Internet Applications

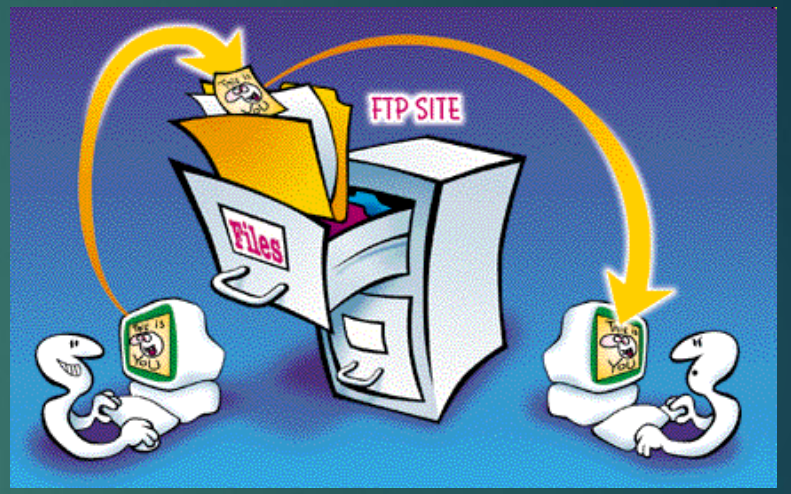
- Telnet
  - Introduced in 1972 (RFC-318)
  - Permit access of computer system from a remote location
  - *Telecomputing*

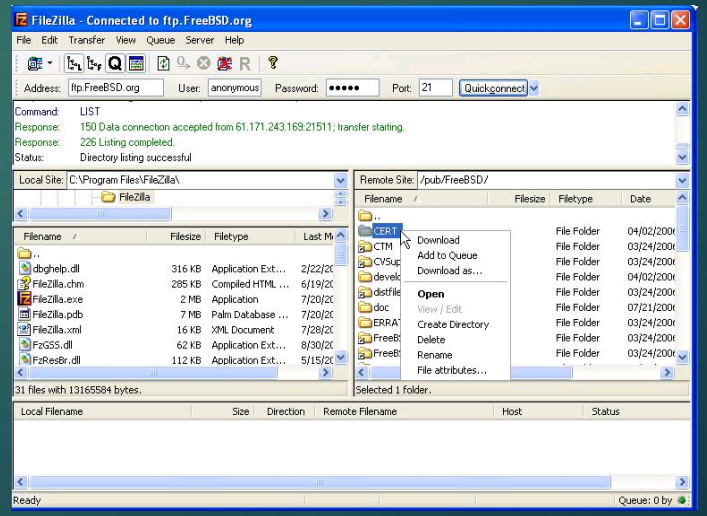




Internet Applications

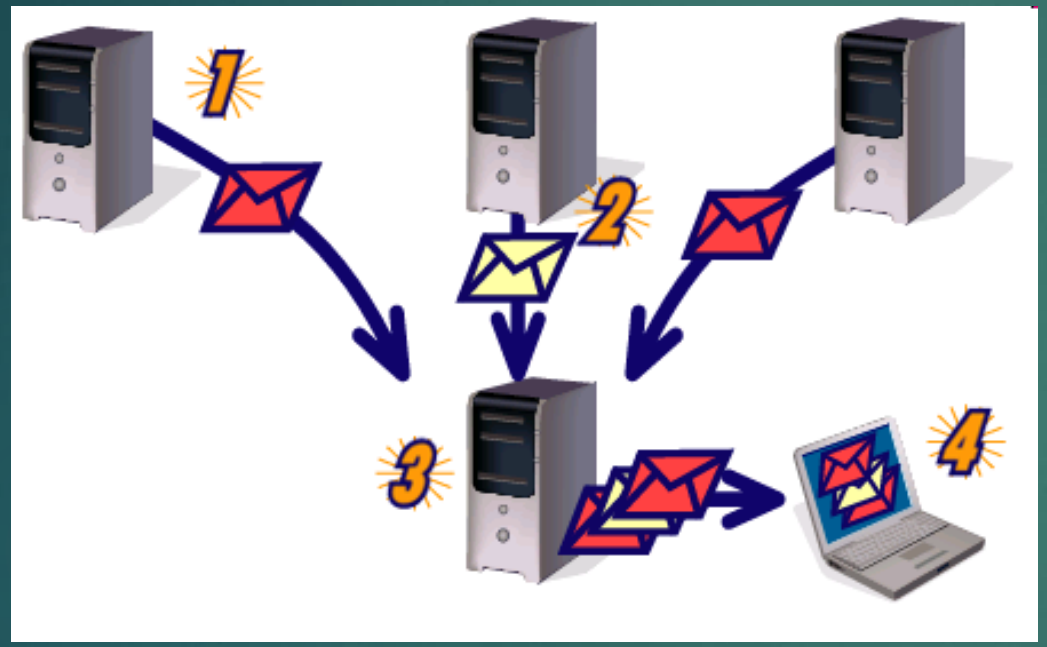
- FTP - File Transfer Protocol
  - Introduced in 1973 (RFC-454)
  - Permit the transfer of files from one system to another
  - Download files from the Internet





Internet Applications

- E-mail



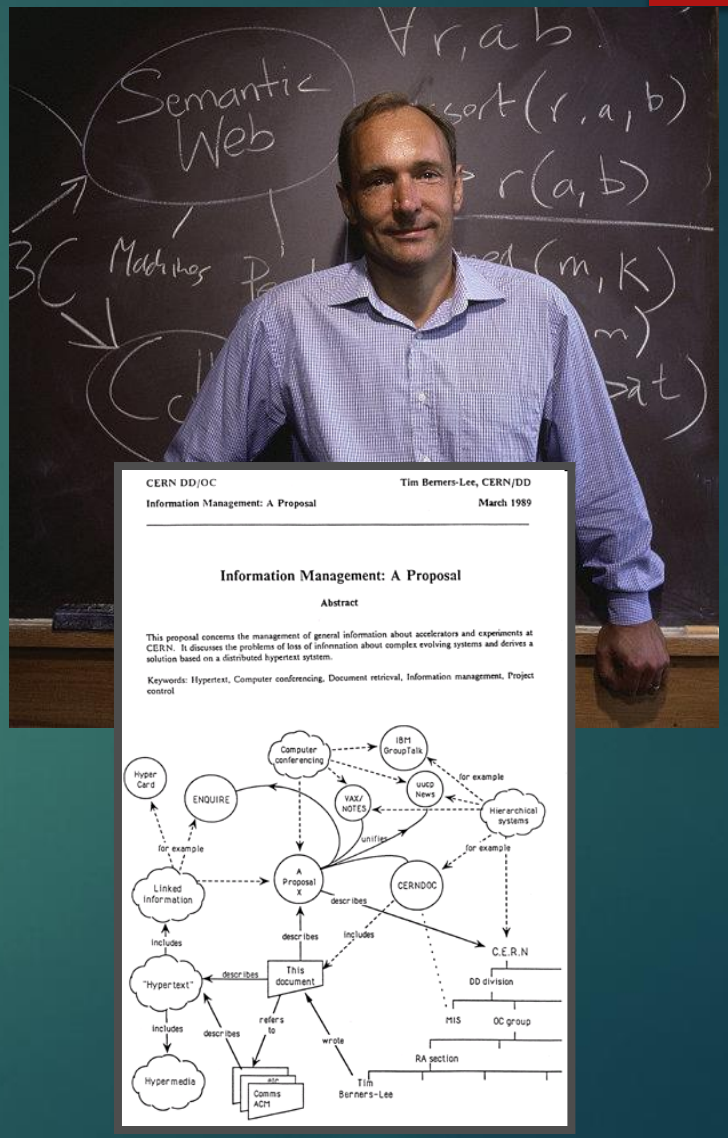
Ray Tomlinson (1941-2016)

http://www.youtube.com/watch?v=XhXk3wzemR4

1971 - First Email message sent
1974 - Email accounts for 75% of all traffic on ARPANET

Internet Applications

- World Wide Web
  - Invented by Tim Berners-Lee
  - Proposed in 1989
  - Operational in mid-1990s



Preview

- Web Programming
- Texts
  - The Evolution of the Web
  - W3Schools - HTML Tutorial
  - Maker Exercise #2 - Web Content