



COMS 465:
Computer Mediated Communication

Plan

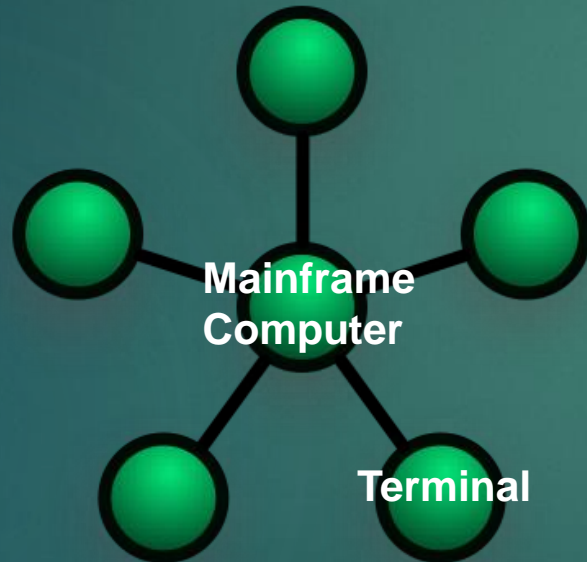
- ▶ Review
- ▶ World Wide Web
- ▶ Preview

Review

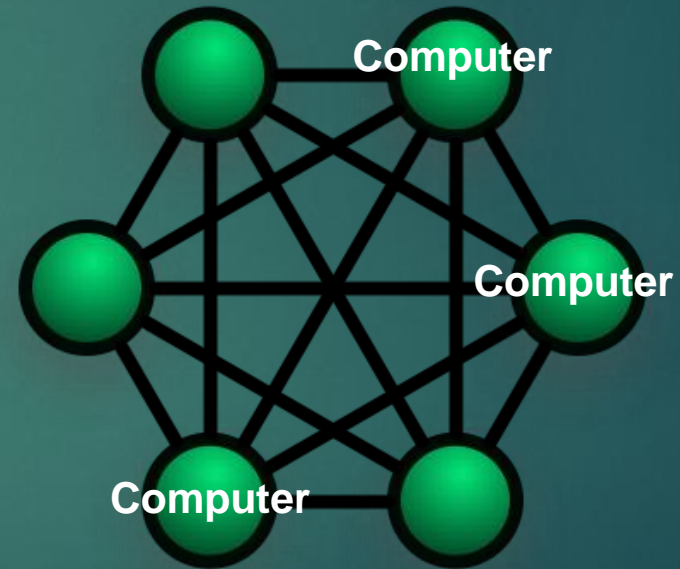


Computer Networks

Time Shared Mainframe

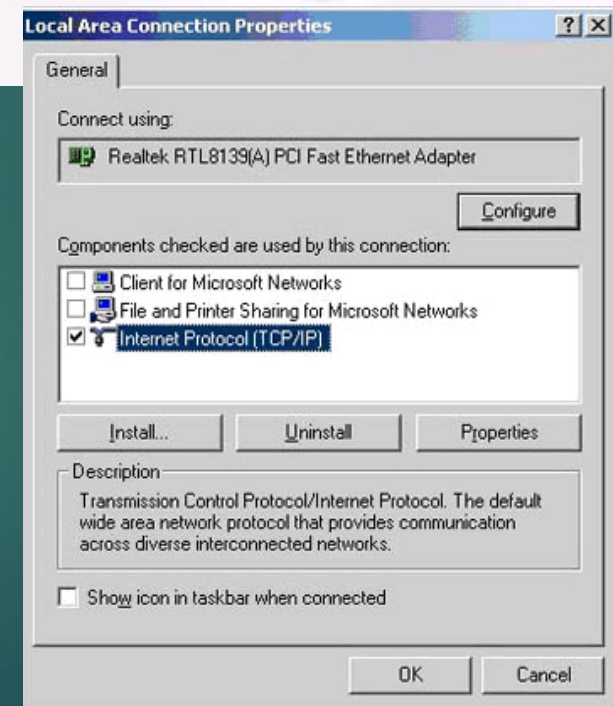


Computer Network



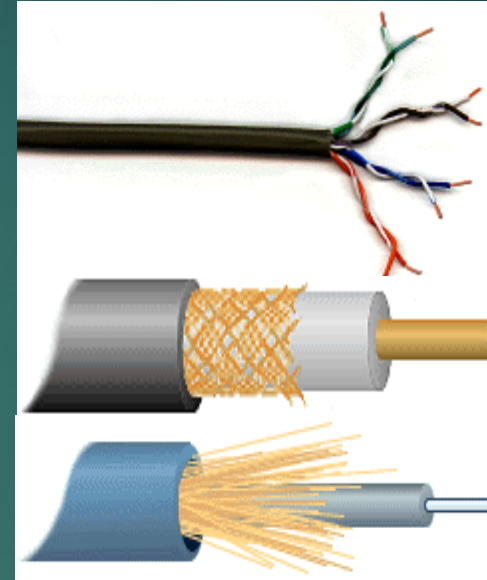
Computer Networks

- ▶ 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



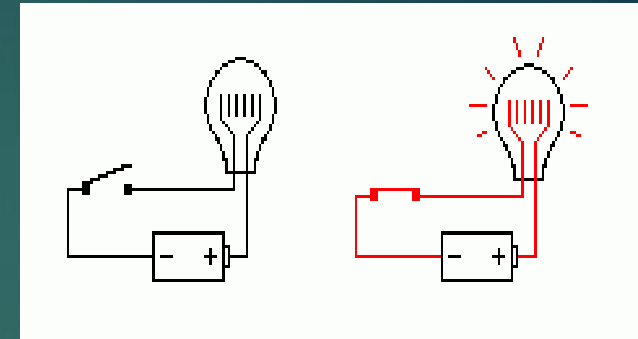
Computer Networks

- ▶ Switching

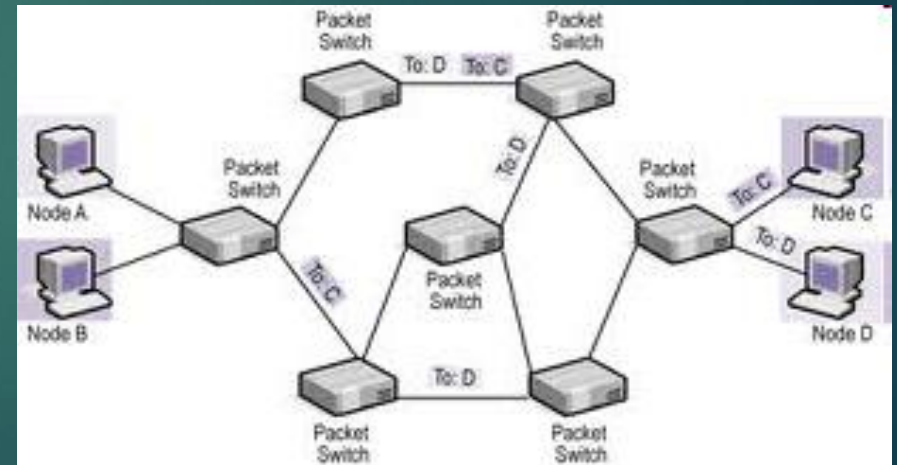
- ▶ Determines how information moves through transmission media

- ▶ Two types

- ▶ Circuit Switching
 - ▶ Packet Switching



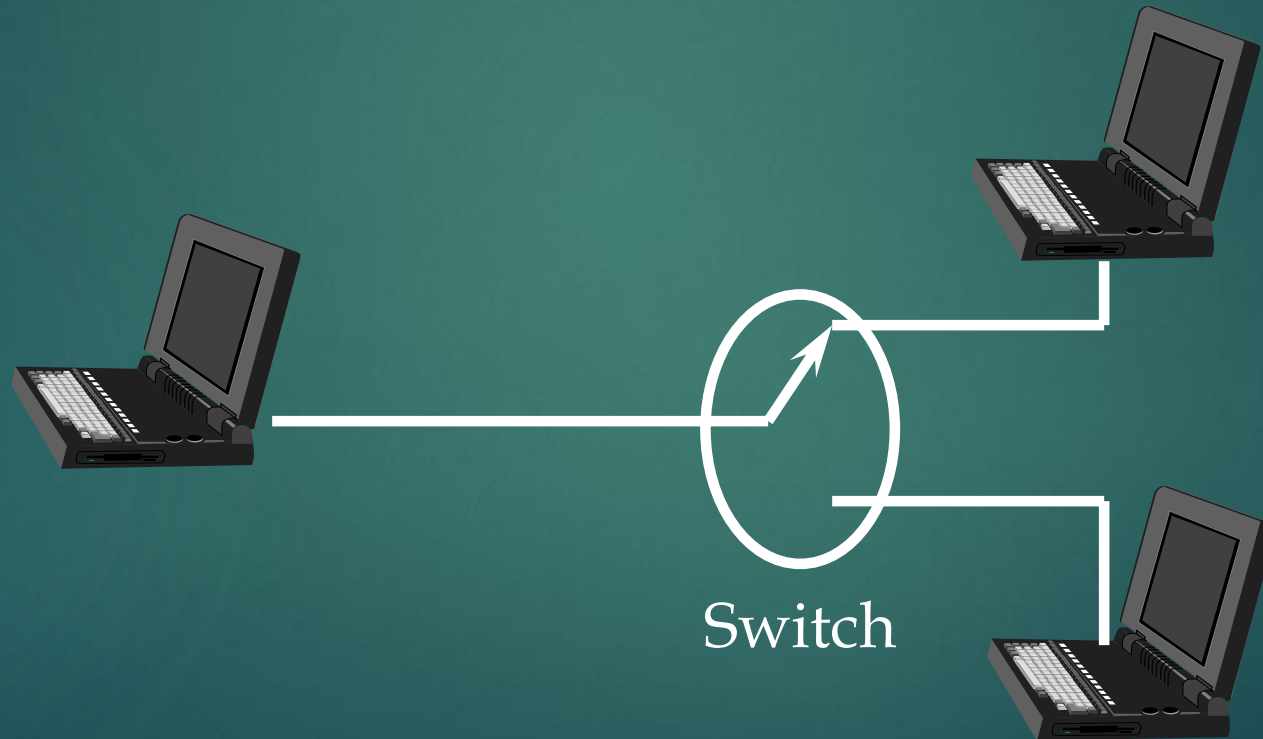
Circuit Switching



Packet Switching

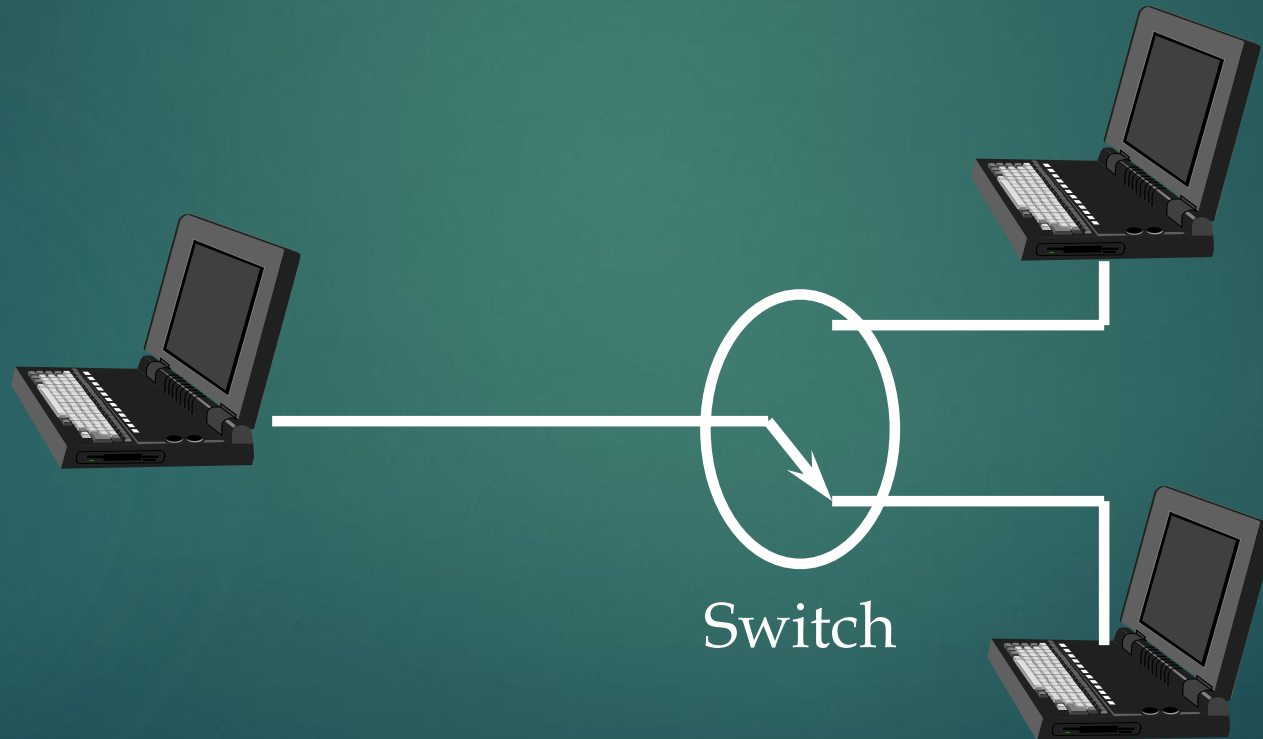
Computer Networks

▶ Circuit Switching



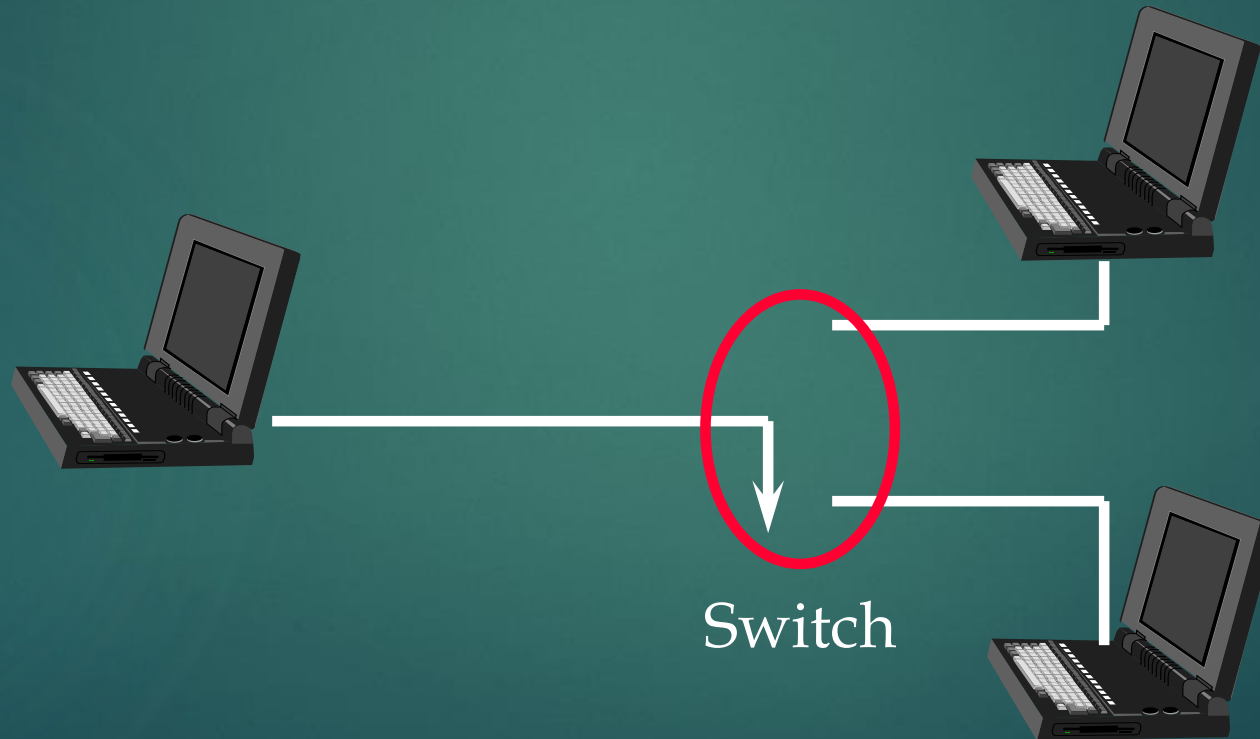
Computer Networks

▶ Circuit Switching



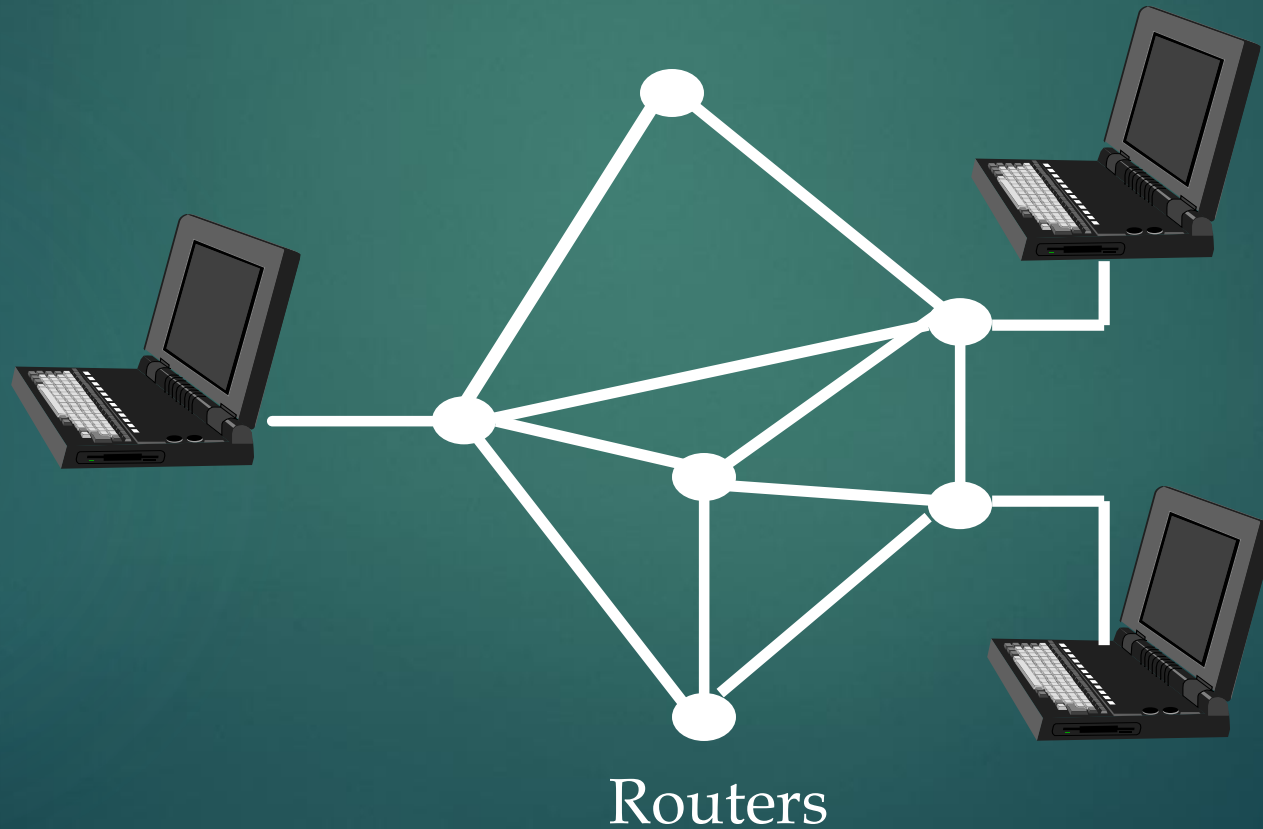
Computer Networks

▶ Circuit Switching



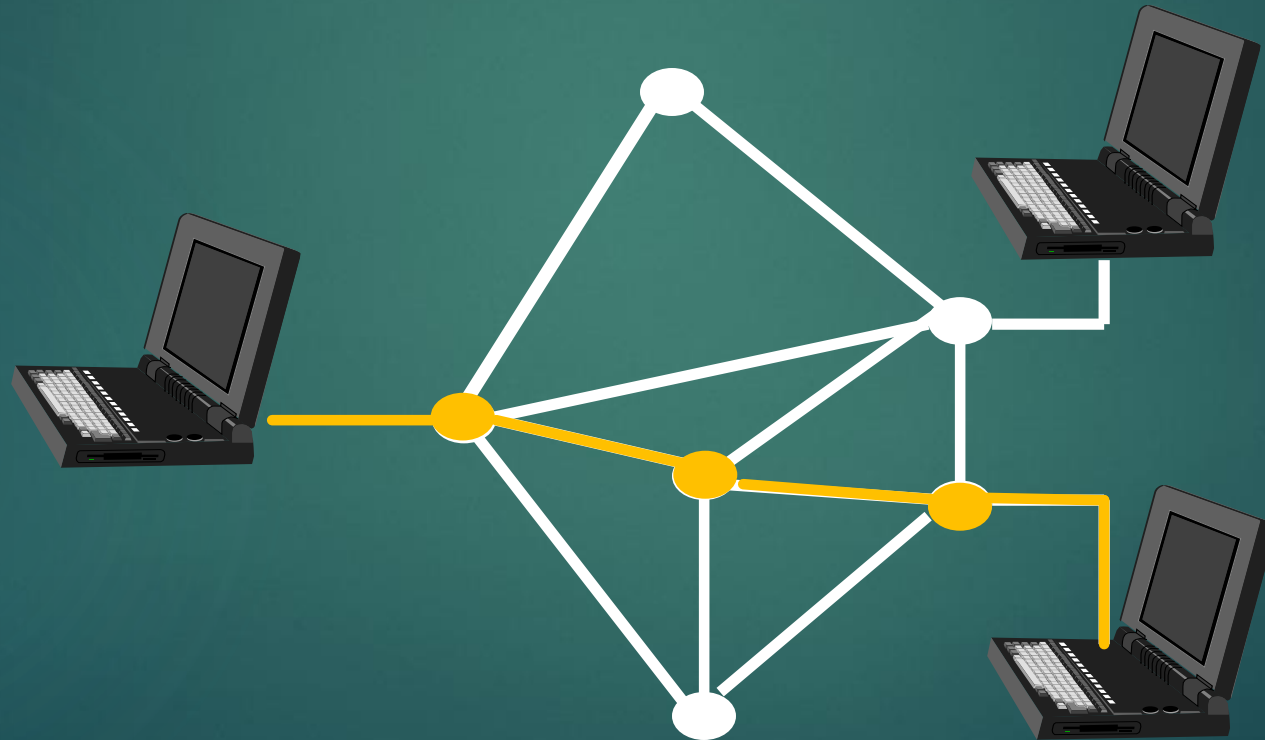
Computer Networks

▶ Packet Switching



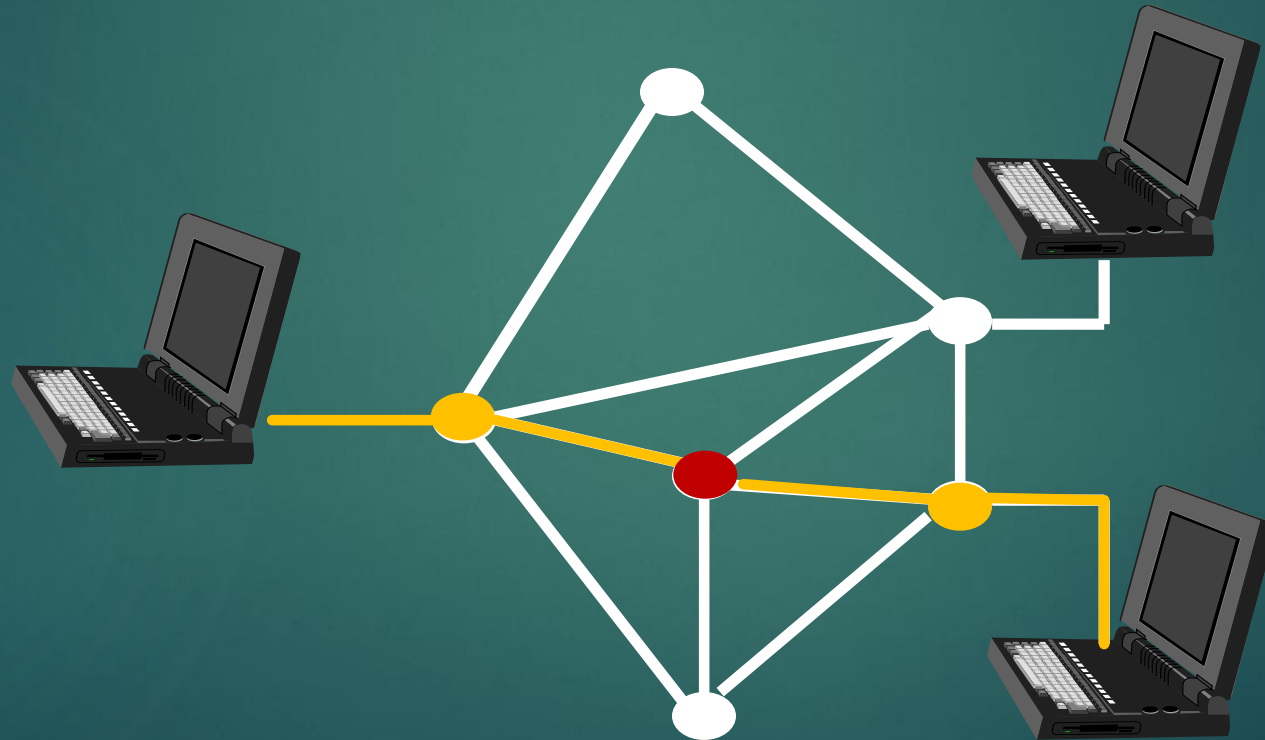
Computer Networks

▶ Packet Switching



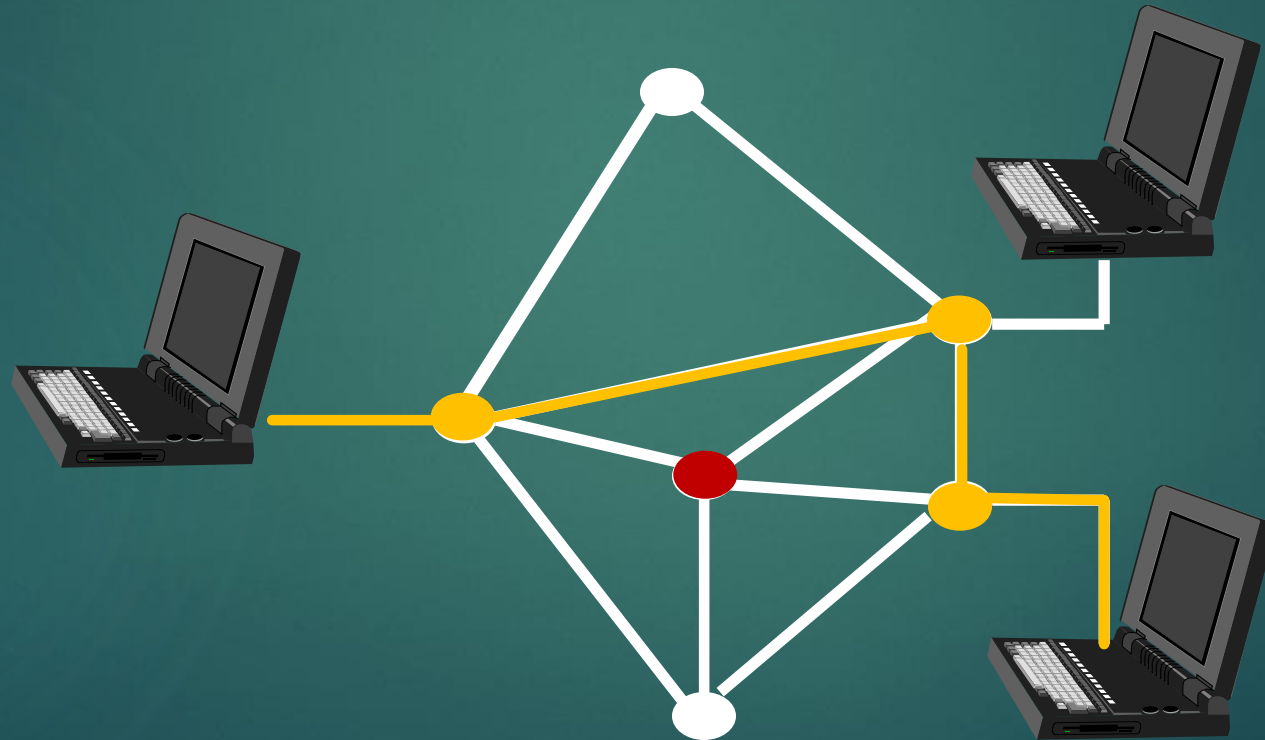
Computer Networks

▶ Packet Switching



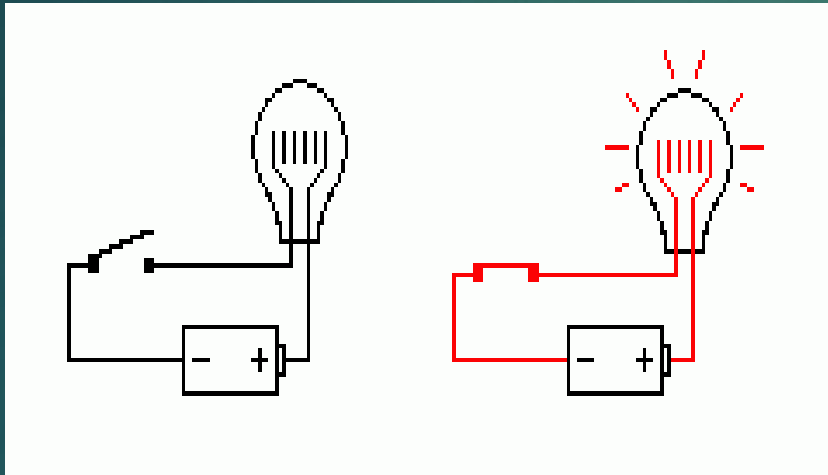
Computer Networks

▶ Packet Switching



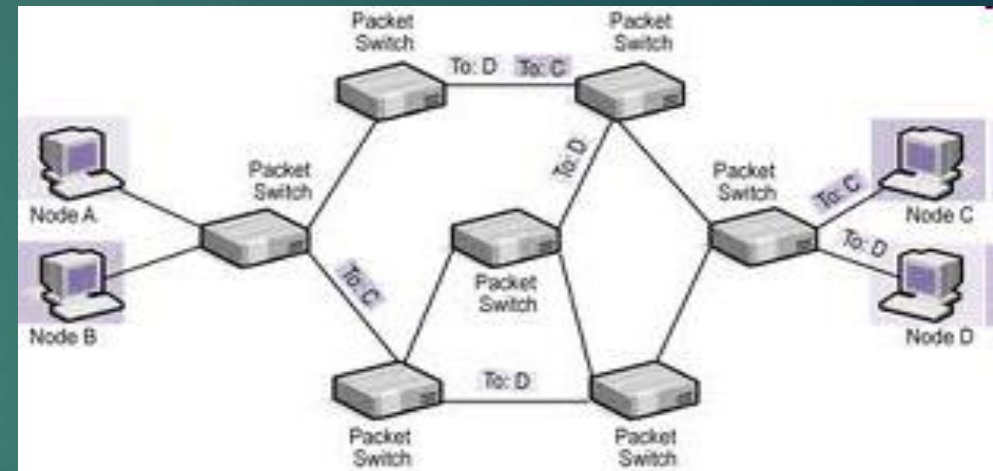
Computer Networks

Circuit Switching



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

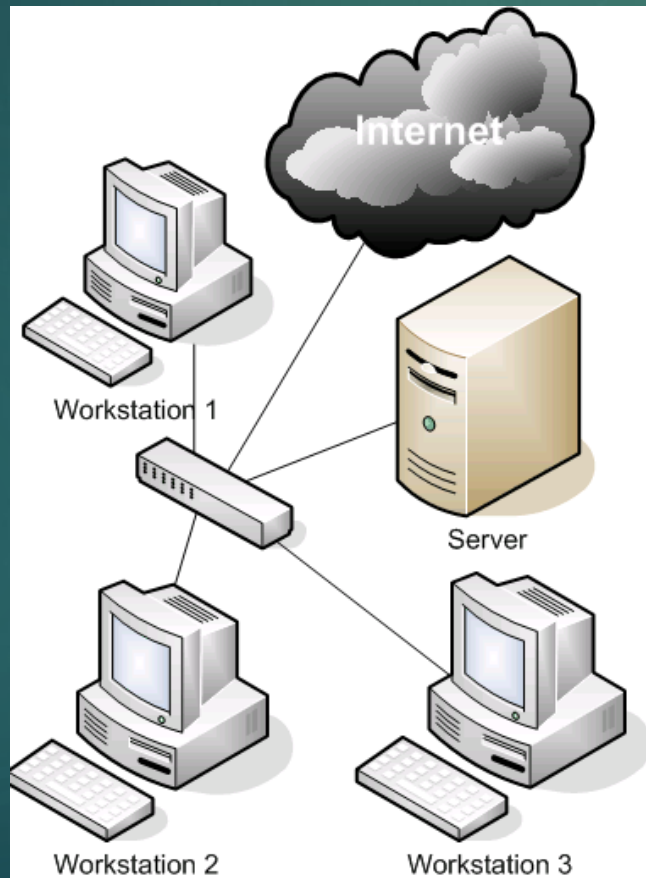
Packet Switching



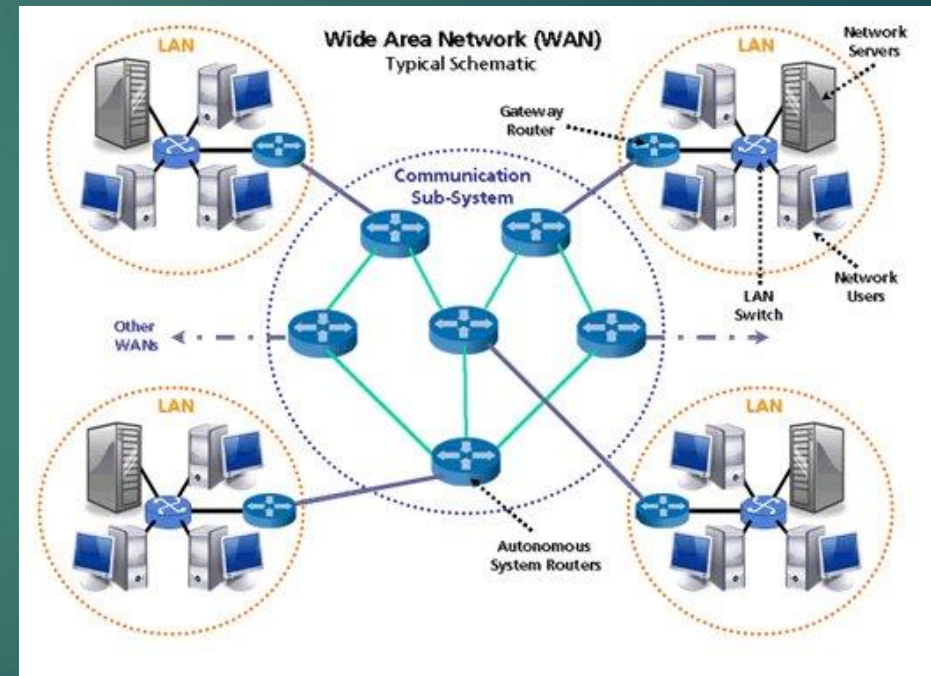
Connectionless network
Good for data communications
Faster through-put and more reliable
Latency & congestion problems

Computer Networks

LAN

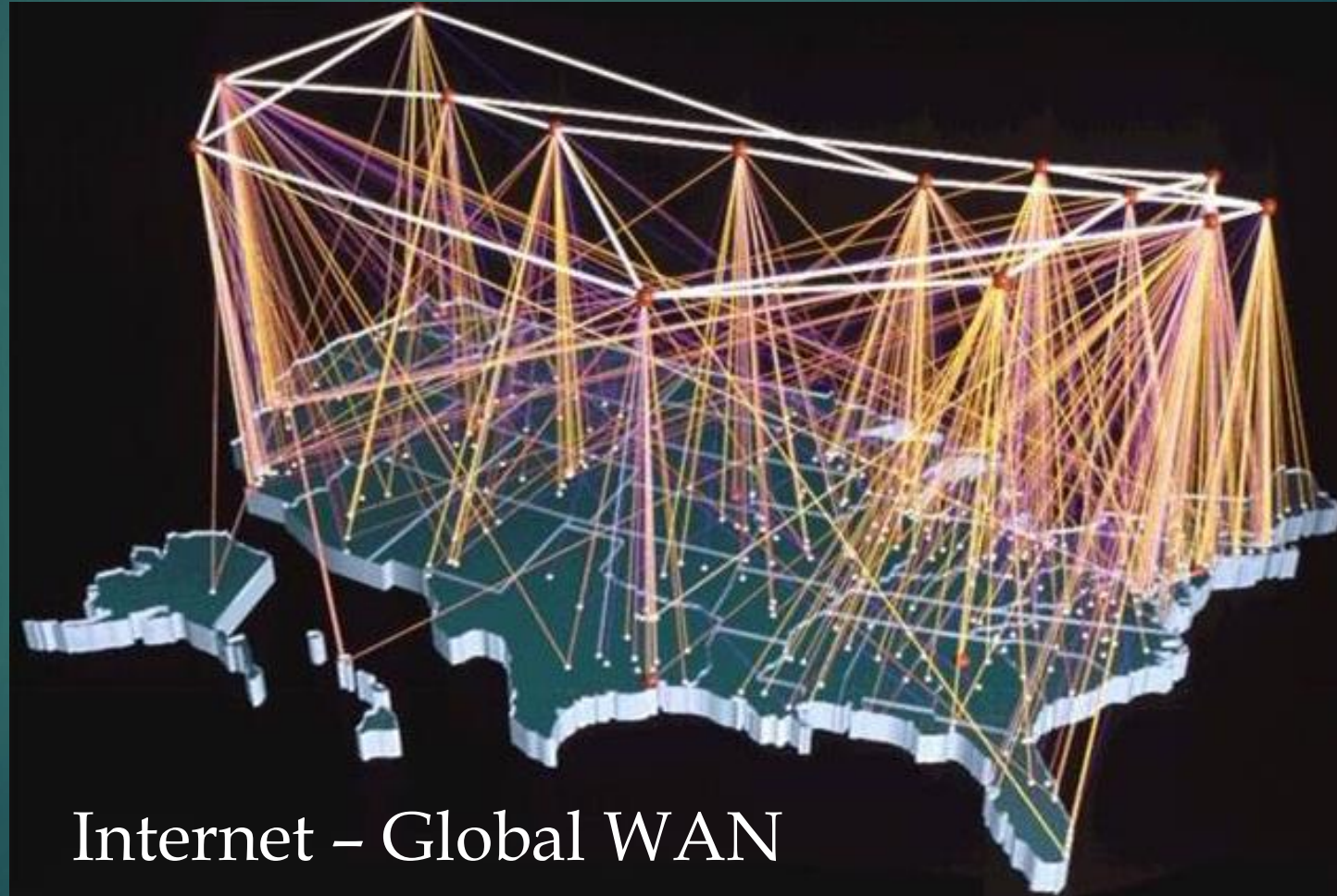


WAN



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

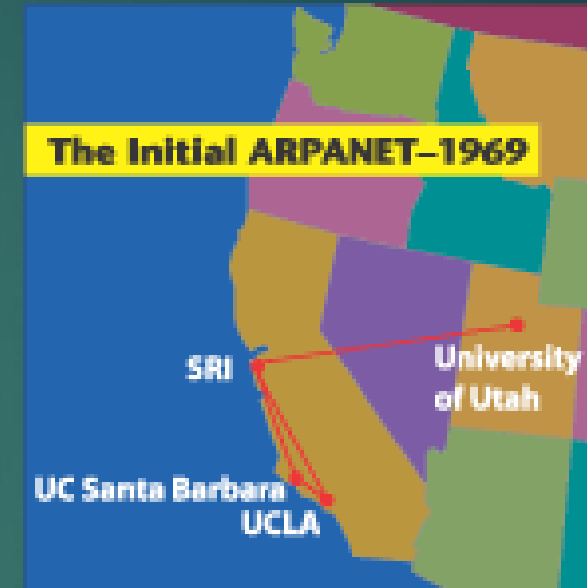
- ▶ DARPA - Defense Advanced Research Projects Agency
 - ▶ Specify an experimental packet switched network (1968)
 - ▶ ARPANET on-line Sept. 1969



History of the Internet

▶ ARPANET

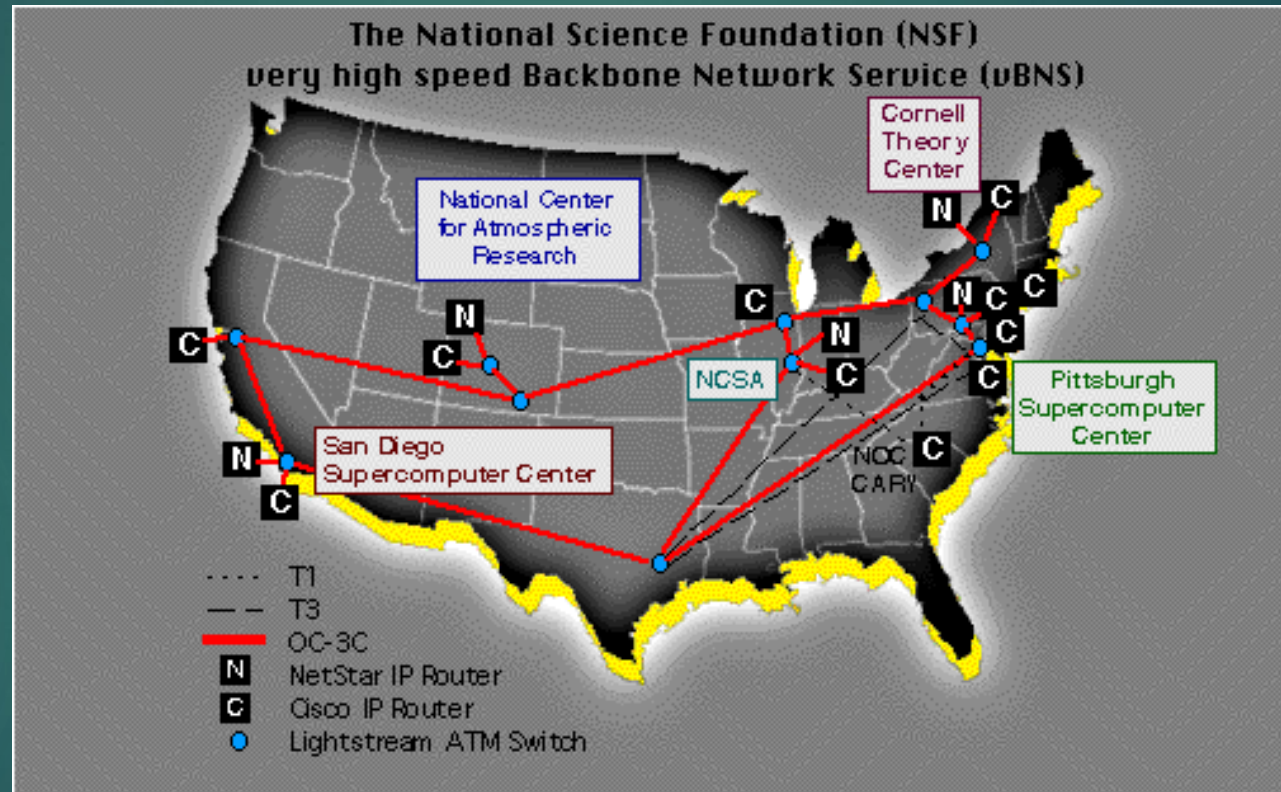
- ▶ Began with 4 nodes
 - ▶ UCLA
 - ▶ Stanford Research Institute
 - ▶ UCSB
 - ▶ University of Utah
- ▶ Connect Universities and research centers doing DOD research



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

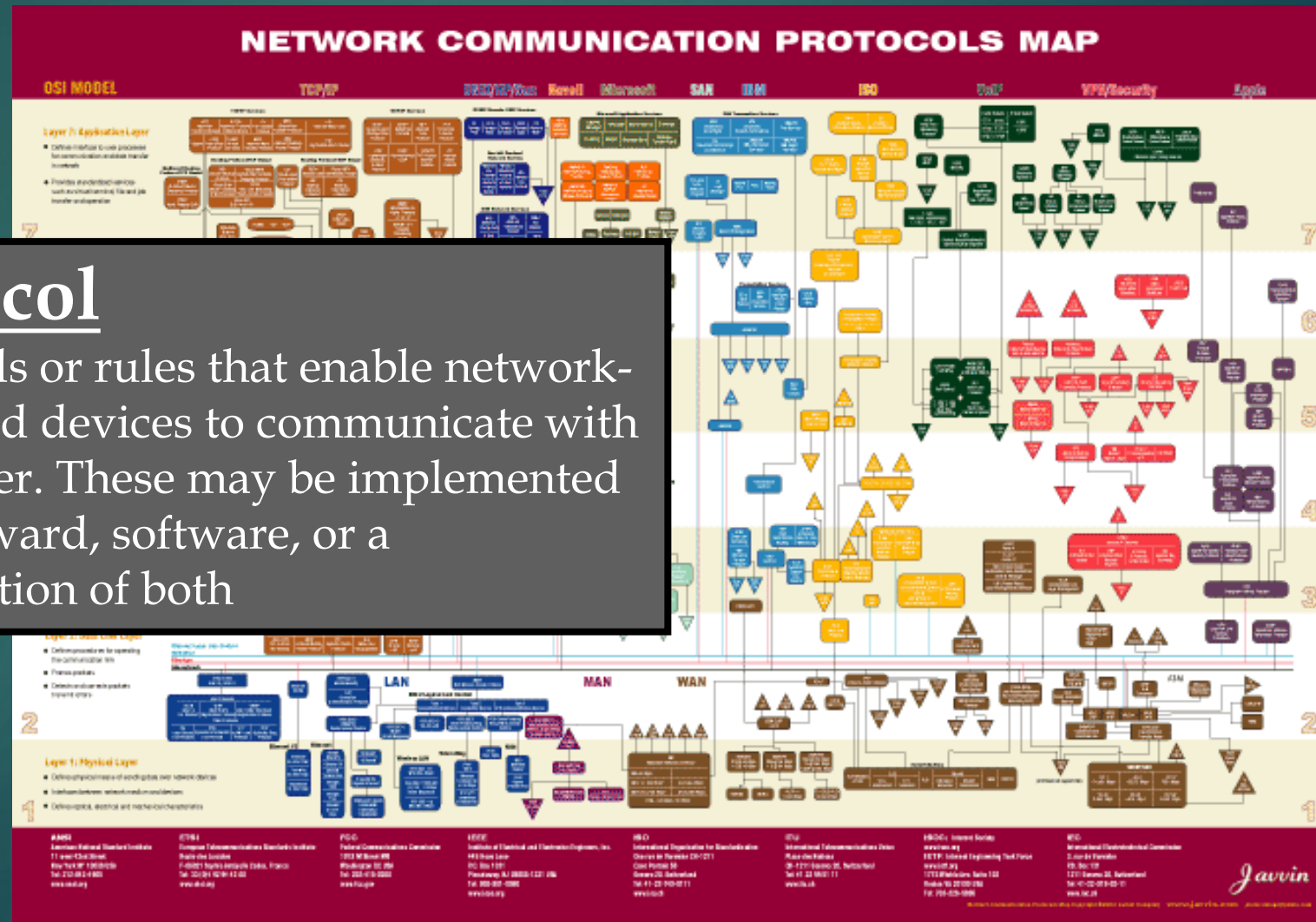
▶ Currently

- ▶ 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 hardware, software, or a combination of both



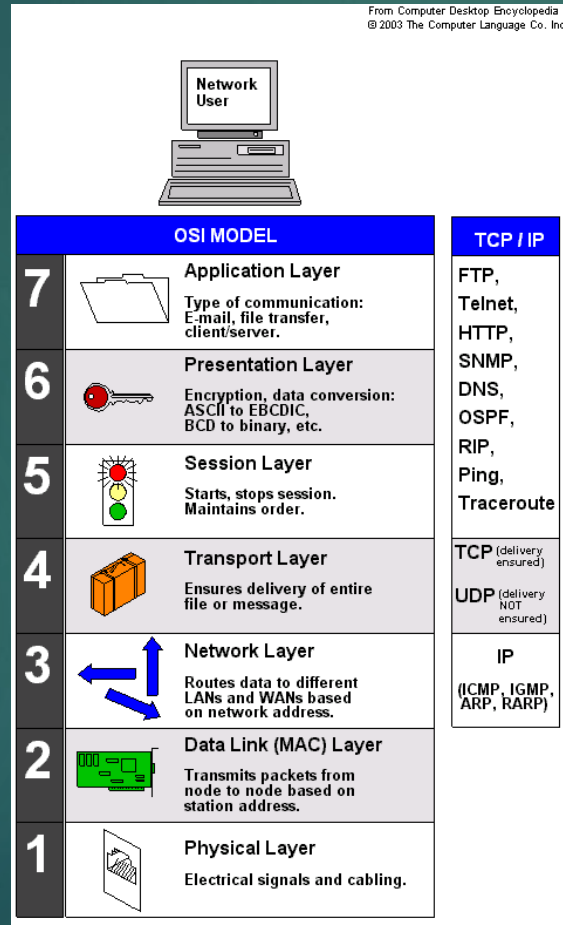
Internet Protocols

- ▶ Protocols for the Internet

- ▶ **TCP/IP** - Transmission Control Protocol and Internet Protocol

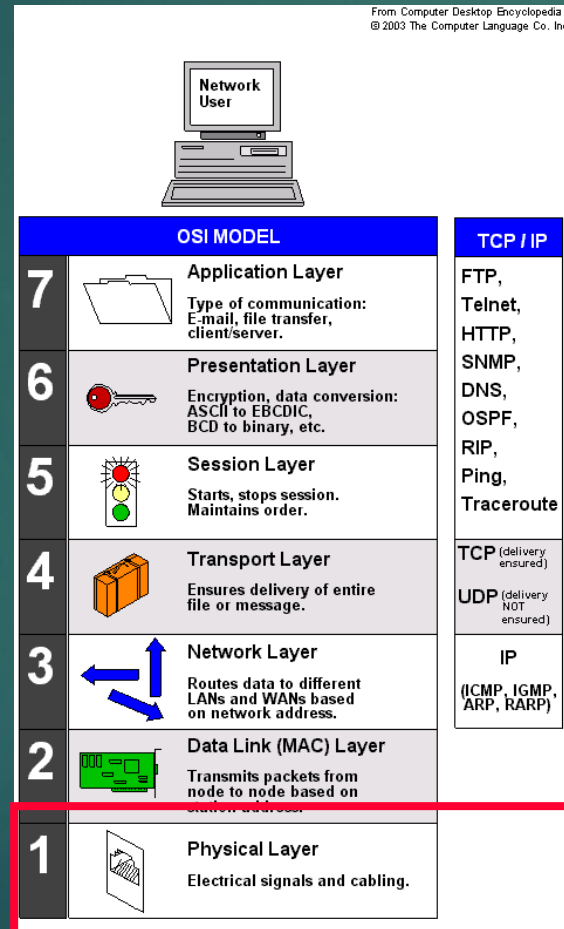
- ▶ Introduced in 1973 - Bob Kahn & Vinton Cerf
 - ▶ Accepted by ARPANET as the standard in 1982
 - ▶ Current protocol suite running on the Internet

Internet Protocols



Internet Protocol Stack

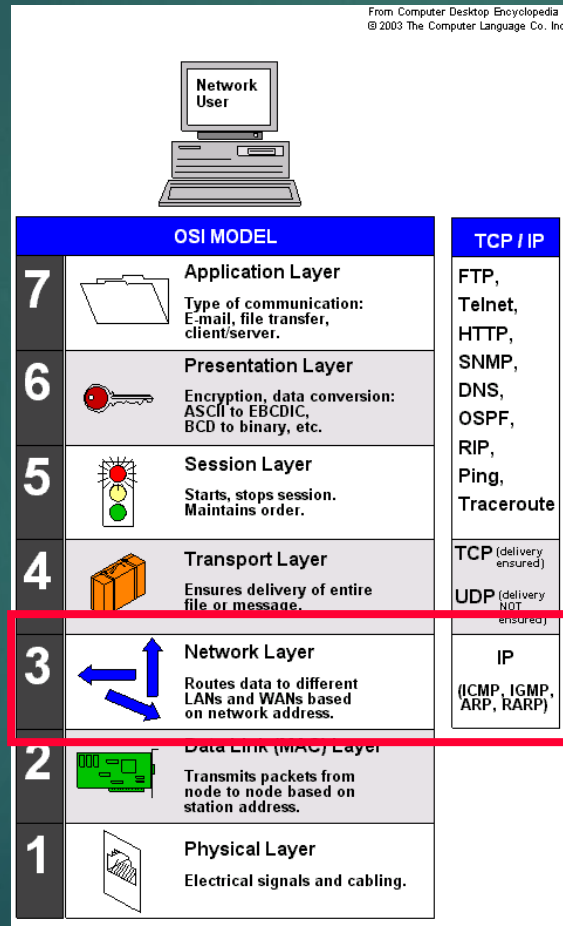
Internet Protocols



Physical Media

- Wires and cables
- Electrical Signals

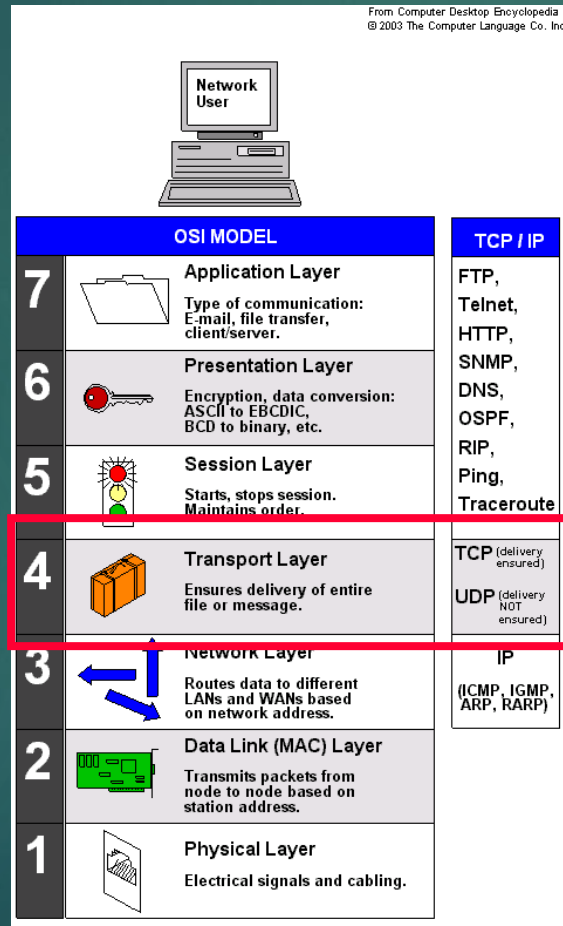
Internet Protocols



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

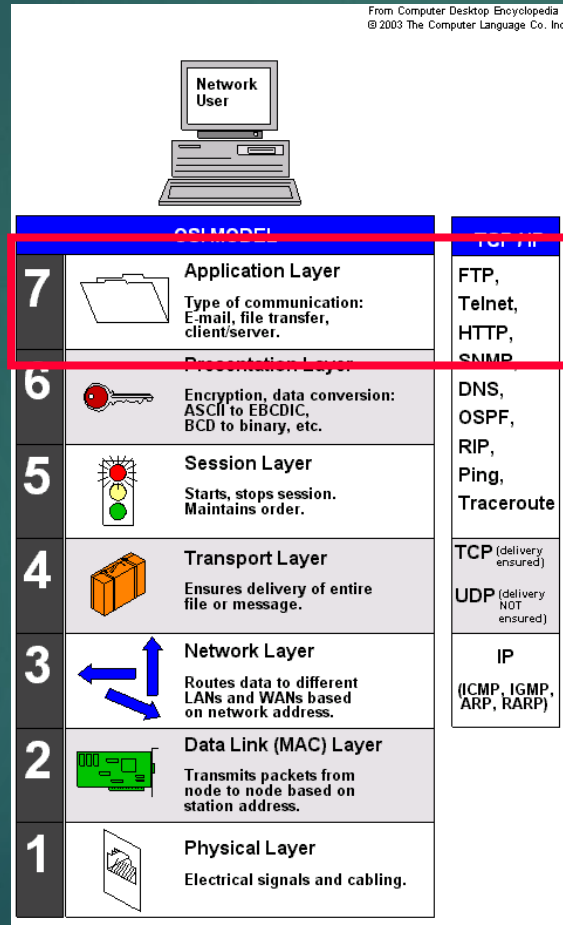
Internet Protocols



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



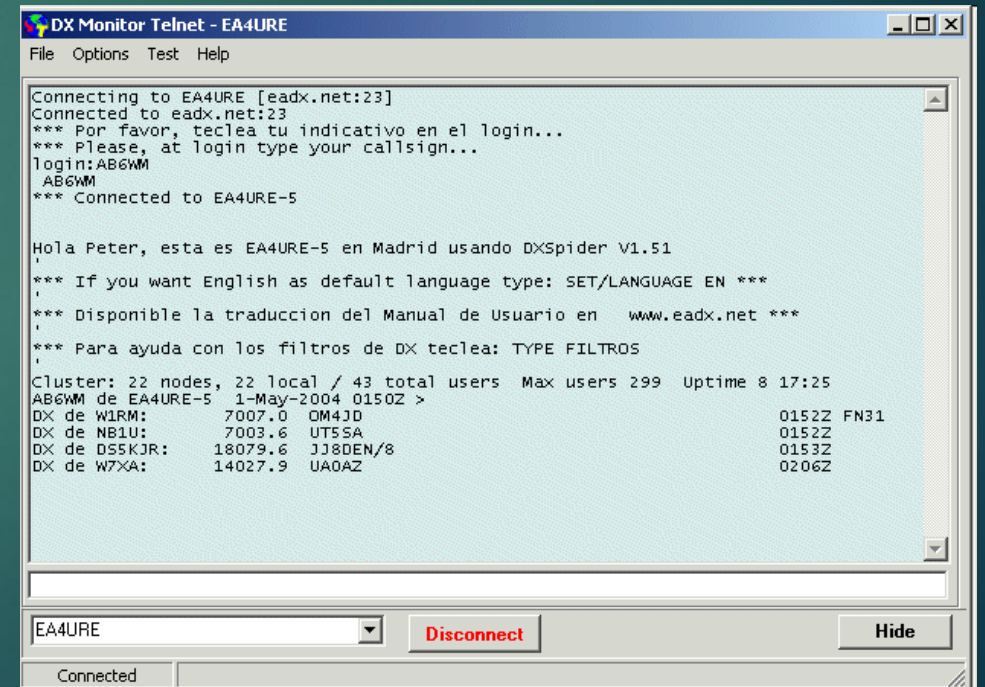
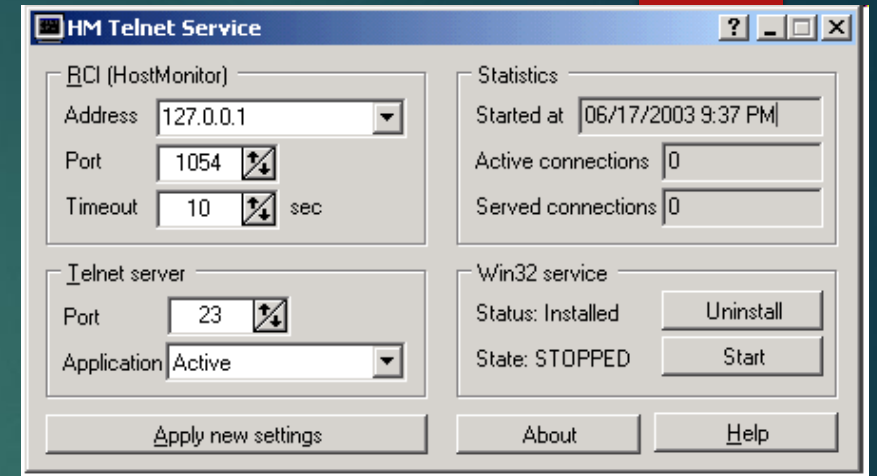
Application Layer

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

Internet Applications

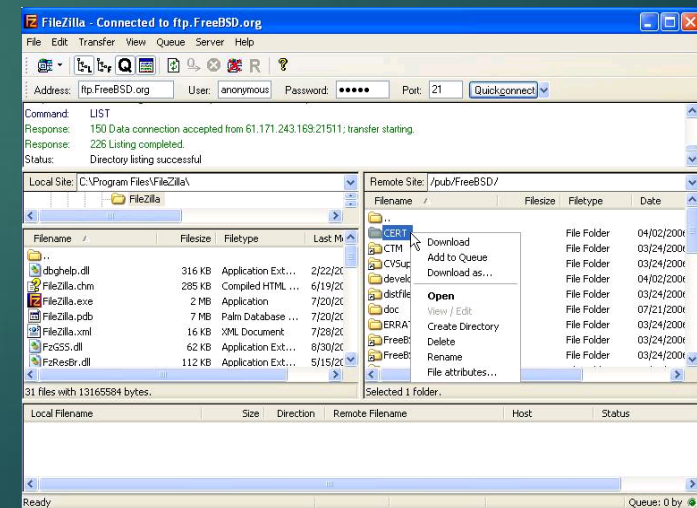
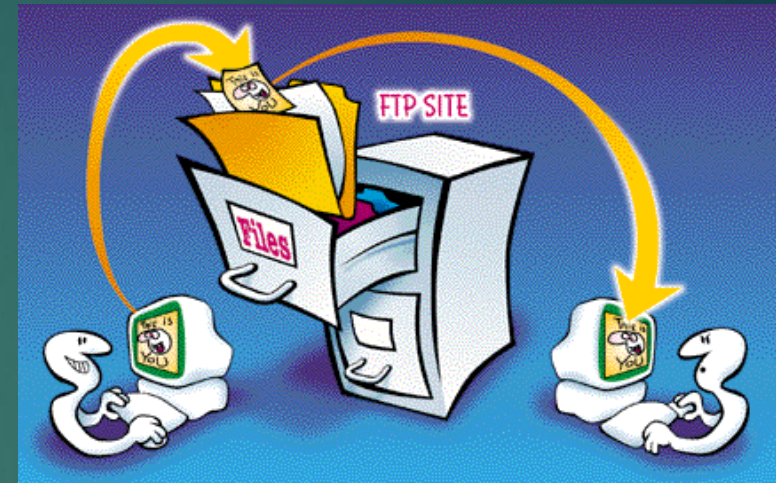
▶ Telnet

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



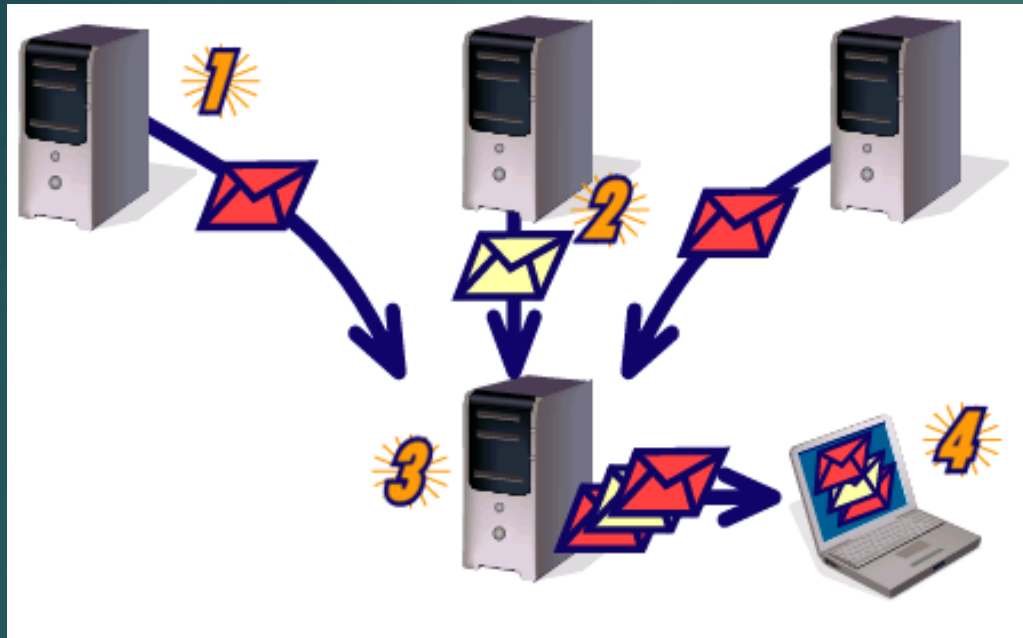
Internet Applications

- ▶ 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)

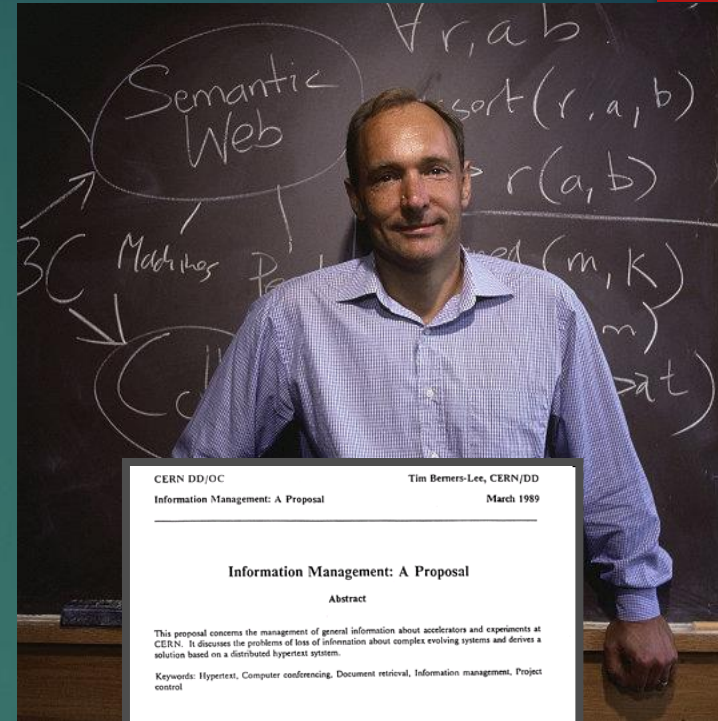
<http://www.youtube.com/watch?v=XhXk3wzemR4>

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



CERN DD/OC Tim Berners-Lee, CERN/DD
Information Management: A Proposal March 1989

Information Management: A Proposal

Abstract

This proposal concerns the management of general information about accelerators and experiments at CERN. It discusses the problems of loss of information about complex evolving systems and derives a solution based on a distributed hypertext system.

Keywords: Hypertext, Computer conferencing, Document retrieval, Information management, Project control

The diagram illustrates a network of interconnected concepts and documents. At the center is 'A Proposal x', which 'describes' 'CERNDOC' and 'This document'. 'This document' 'includes' 'Hypermedia' and 'Hypertext', and 'refers to' 'CERNDOC'. 'Hypermedia' 'includes' 'Hypertext', which 'describes' 'This document'. 'Linked Information' 'includes' 'Hypertext' and 'ENQUIRE'. 'ENQUIRE' 'describes' 'Computer conferencing'. 'Computer conferencing' 'unifies' 'VAX/NOTES' and 'UUCP News'. 'UUCP News' 'describes' 'Hierarchical systems'. 'Hierarchical systems' 'describes' 'CERNDOC'. 'CERNDOC' 'describes' 'CERN'. 'CERN' is linked to 'DD division', 'MIS', 'OC group', and 'RA section'. 'Tim Berners-Lee' is shown as the author of 'This document'.

Preview

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

```
C:\Users\User\Desktop\webpage.html - Notepad++
File Edit Search View Encoding Language Settings Macro Run Plugins Window ?
webpage.html x
1 <html>
2   <head>
3     <title>HTML Exercise</title>
4   </head>
5
6   <body bgcolor="#556B73" text="#EBF2F5">
7     <h1 style="color:#E6DDA5">Hello World</h1>
8
9     This is my first web page. I made it at
10    <a href="http://www.niu.edu">NIU</a>
11
12    <p>The web was invented by Tim Berners-Lee</p>
13    
14
15
16
17  </body>
18  </html>
19
20
Hyper Text length: 346 lines: 25 |Ln: 19 Col: 1 Sel: 0 | 0 | Dos/Windows ANSI as UTF-8 INS
```