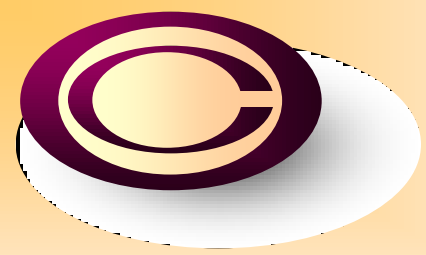


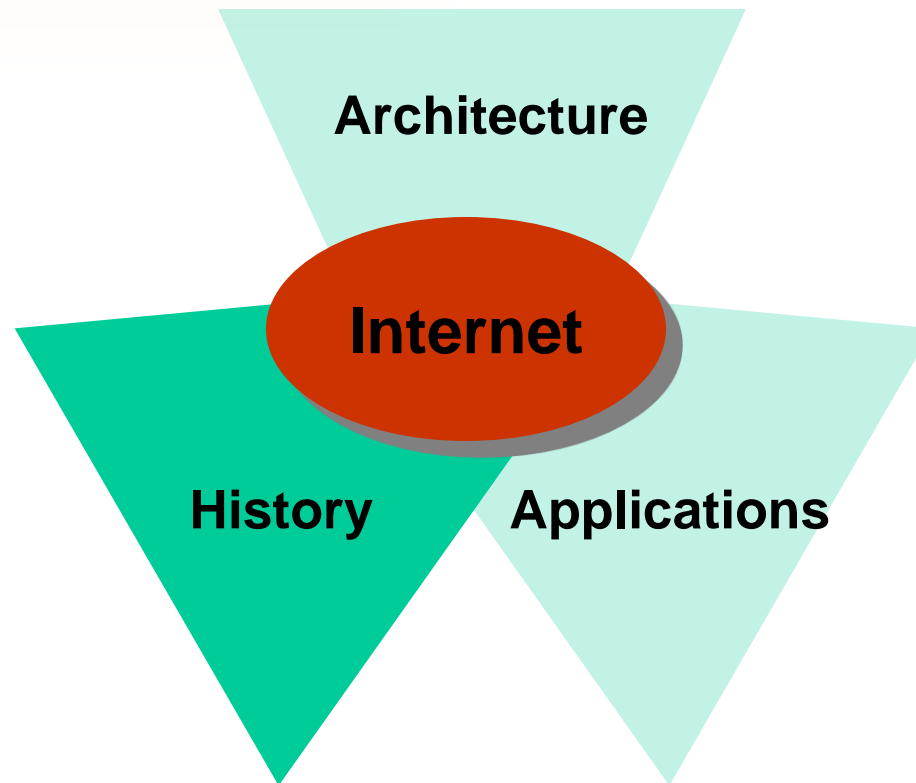
Internet Basics

Mike O'Connor

October, 2008



Agenda



50's & 60's

JFK elected

Late '50's

ARPA (Advanced Research Projects Agency) founded. The development of information technologies is a primary focus.

Early '60's

Packet-switching concept outlined by Paul Baran and his colleagues of the Rand Corporation.

1965

ARPA sponsors a study entitled *A Cooperative Network of Time Sharing Computers*

1967

ACM Symposium on Operating Principles, packet-switching plans presented

ARPA's university and commercial contractors attend meeting to discuss protocol for exchanging messages between computers

Concept for the ARPANET packet switch, the IMP (interface message processor), is developed

1968

ARPA releases a Request for Quotation (RFQ) to build a network of 4 IMPs, with a possible growth to 19

1969

DoD contracts a team of business, academic and government researchers to collaborate on the ARPANET

Four sites are chosen as the homes of the first ARPANET IMPs; UCLA, SRI, UCSB and the University of Utah

John Glenn orbits the earth

JFK assassinated

First Xerox copier

RFK and MLK assassinated

Apollo landing

Early 70's

1970

Creation of the NCP (network control protocol), direct precursor to TCP

1971

Computers are now connect at nearly two dozen sites, including Harvard University and MIT

Protocols for remote terminal access (telnet) and file transfer (FTP) are defined by the Network Working Group (NWG)

1972

Public demonstration of ARPANET at International Conference on Computer Communications in Washington DC

First e-mail message is sent via the ARPANET by Ray Tomlinson of BBN

1973

ARPANET's first international connections between England and Norway

1974

Vint Cerf and Bob Kahn publish the paper defining Transmission Control Protocol (TCP), to allow computer communication across of system of networks

1975

Network grows beyond 63 IMPs, requiring a major change in standards for network addresses

“All in the family” TV show begins a 12-year run

Nixon reelected

Watergate break-in

Nixon resigns

Fall of Saigon, end of the Viet Nam war

Late 70's

Jimmy Carter is elected

1976

First Internet routers developed by BBN, Stanford and University College, London

First computerized word-processor

CCITT defines X.25 protocol for public packet networks

AT&T Bell Labs develops UUCP (Unix to Unix copy protocol)

Star Wars

1977

First TCP for Unix (on a DEC PDP-11/44)

Margaret Thatcher elected

1979

USENET established

Apocalypse Now

Early 80's

Sony Walkman introduced in Japan

1980

ARPANET now spans the country, connecting over 400 host computers at university, government and military sites. More than 10,000 people have access.

MTV premiers

1981

Computers at 200 sites are linked via the ARPANET

The change from NCP to TCP is mandated by Jan. 1, 1983

Prince Charles and Princess Di are married

1982

US Department of Defense decides to build the Defense Data Network, based on ARPANET technology

E.T., The Extra Terrestrial

1983

ARPANET splits into ARPANET and MILNET

TCP/IP is established. The Internet is now in place

US invades Grenada

Domain name server protocol developed at the University of Wisconsin

MCI Mail launched

Mikhail Gorbachev takes over, introduces glasnost (openness) & perestroika (restructuring)

1984

Root domain name server established

Number of ARPANET hosts passes 1,000

Late 80's

**1st "personal" laser printer
Apple Laser Writer - \$7,000**

We Are the World

"Just Say No"

George Bush elected

**Internet is used as a
tool of student revolt
in China**

Sex, Lies and Videotape

1986

The National Science Foundation implements the NSFNET, a system of regional networks of routers connected over a backbone network

1987

There are now 4000 bulletin boards linked by hobbyist networks

Merit Networks Inc., together with IBM and MCI, win contract to manage the NSF backbone

1988

The ARPANET averages 77,448,692 packets per day

The dismantling of the ARPANET begins

1989

The ARPANET ceases to exist

Number of hosts on the Internet passes 100,000

The number of requests for on-line files via FTP and Info-Server averages 1,000 per month

Early 90's

1990

The Electronic Frontier Foundation is founded

1991

Commercial Internet Exchange (CIX) is formed

Gopher is introduced, developed at the University of Minnesota

WAIS (wide area information search) is released

1992

The Internet links more than 17,000 networks in 33 countries

World Wide Web is launched

1993

NSF creates the InterNIC

More than 1,500,000 hosts on the Internet

1994

Commercial users out-number research and academic users by 2-to-1 ratio

Mosaic eclipses Gopher, and the Web becomes the most rapidly-expanding application in history

1995

Popular media "discover" the Internet

NSFNET reverts to research-only network, main US traffic routed through interconnected network providers

The Savings and Loan scandal

The Gulf War

Bill Clinton elected

Jerry Garcia dies

Forrest Gump

Late 90's

Hubble telescope

**Mishaps on the Mir
space station**

**Hong Kong returned
to Chinese rule**

**Northern Ireland
peace plan**

Titanic

Frank Sinatra dies

1996

30,000,000 Internet hosts

Spam (unsolicited email messages) becomes a serious problem on the Internet

Communications Decency Act, a bill aimed at controlling Web content, is passed

Java introduced

1997

Pretty Good Privacy (PGP) software introduced

Communications Decency Act declared unconstitutional

Domain-names are sold for over \$100,000

Streaming media (RealVideo, etc.) is introduced

1998

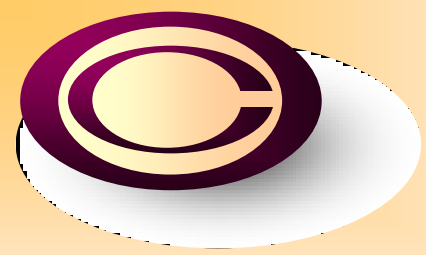
Netscape loses the browser battle to Microsoft

Matt Drudge publishes early reports of Clinton's affair with Monica Lewinski, and the Starr Report is released first to the Internet

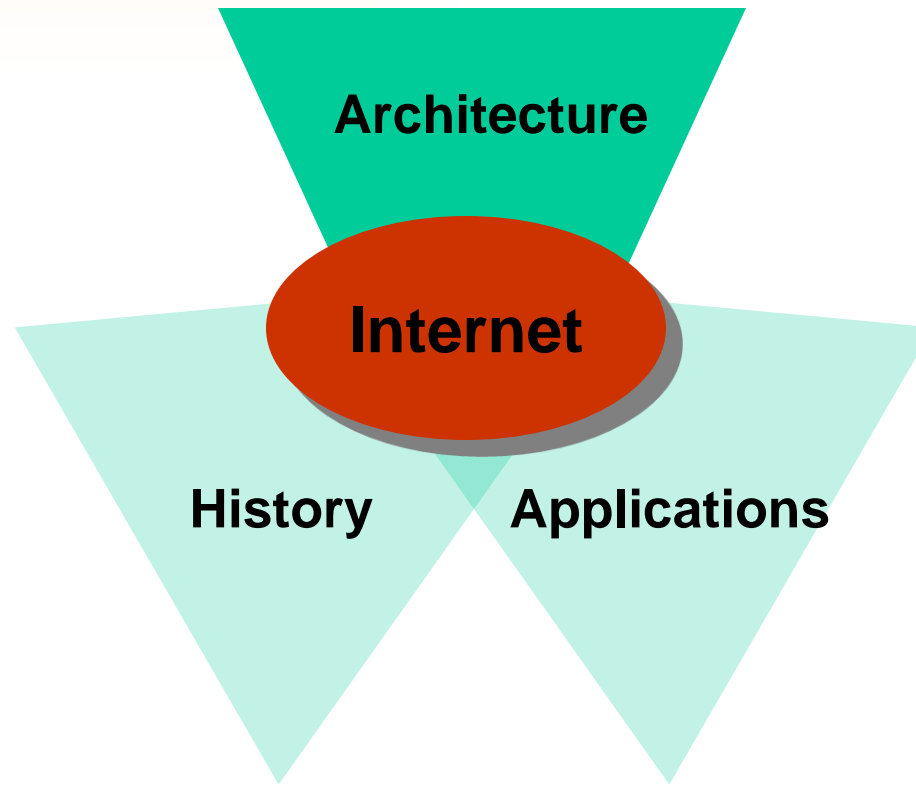
Winter Olympics on the Net

Live Web-cast of a birth

Domain name system privatized



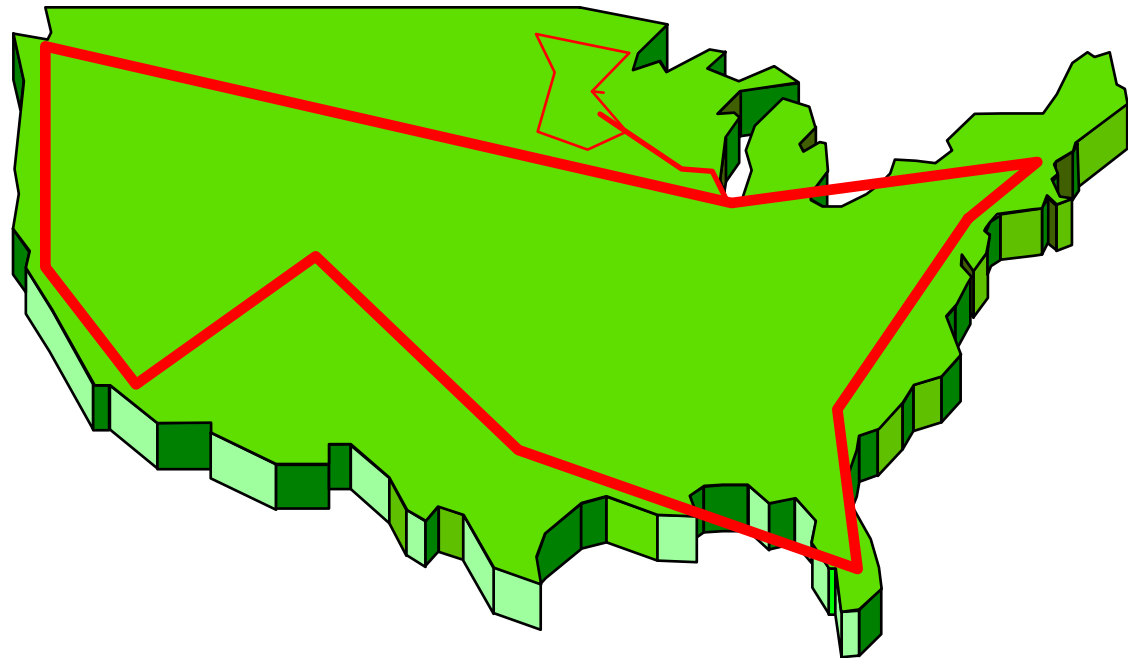
Agenda



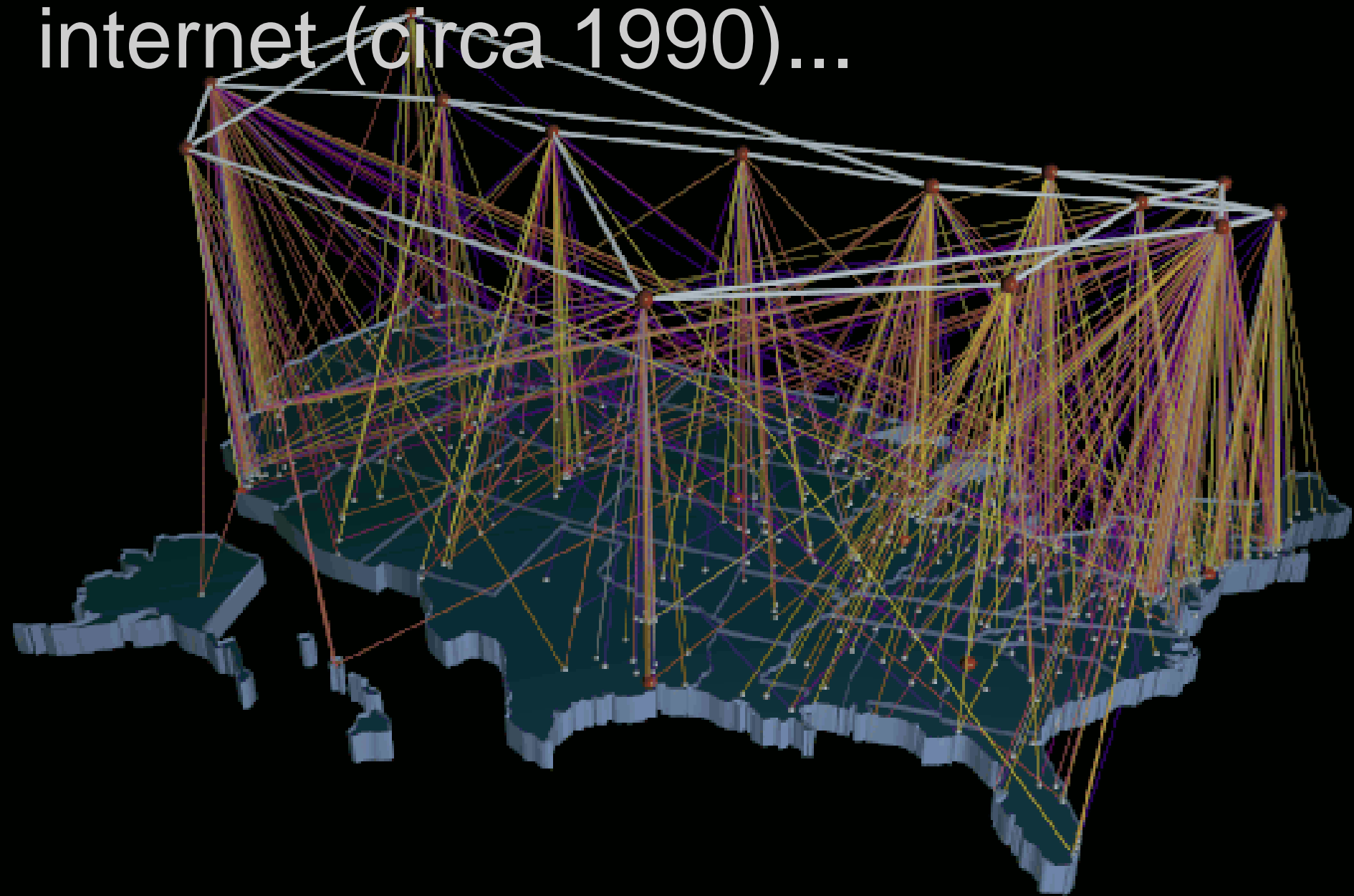
An internet is many things, depending on your point of view.

It's a physical network of networks

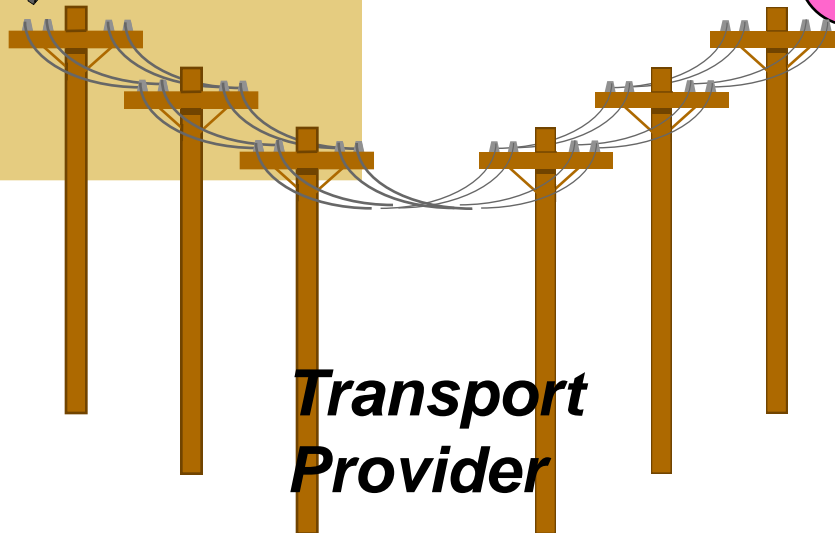
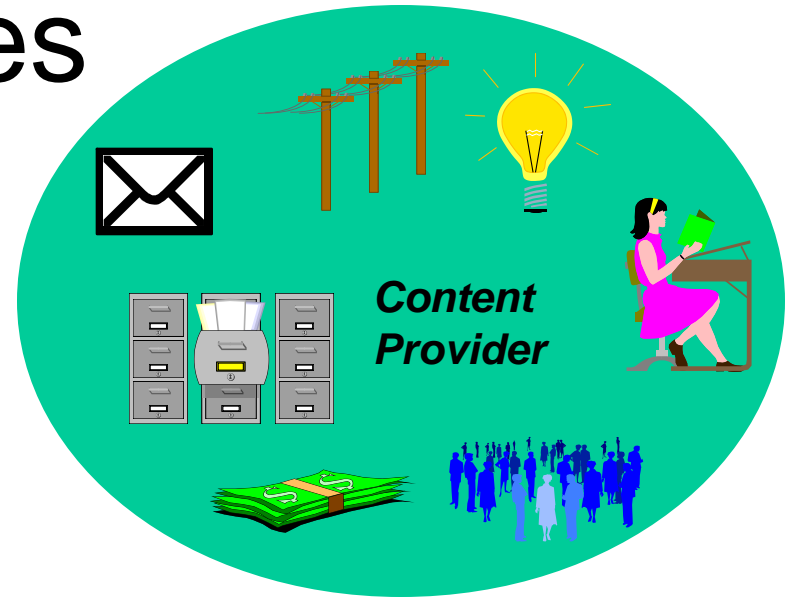
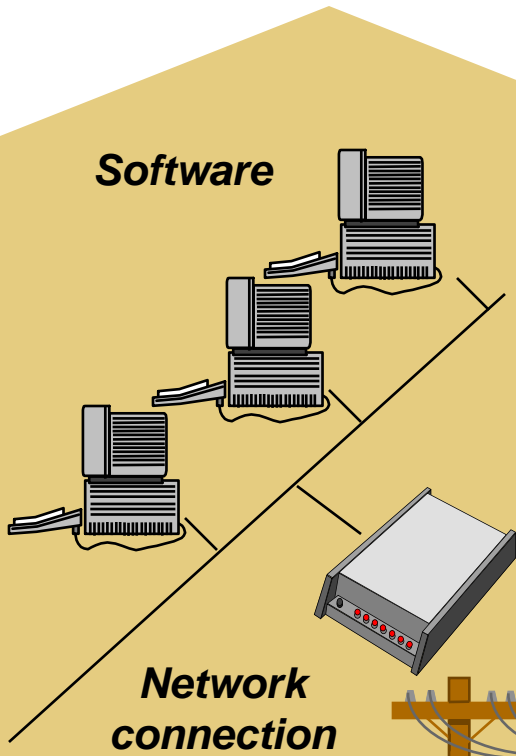
- Started by the military (ARPANET)
- Subsidized in the US by NSF
- Connects many networks worldwide



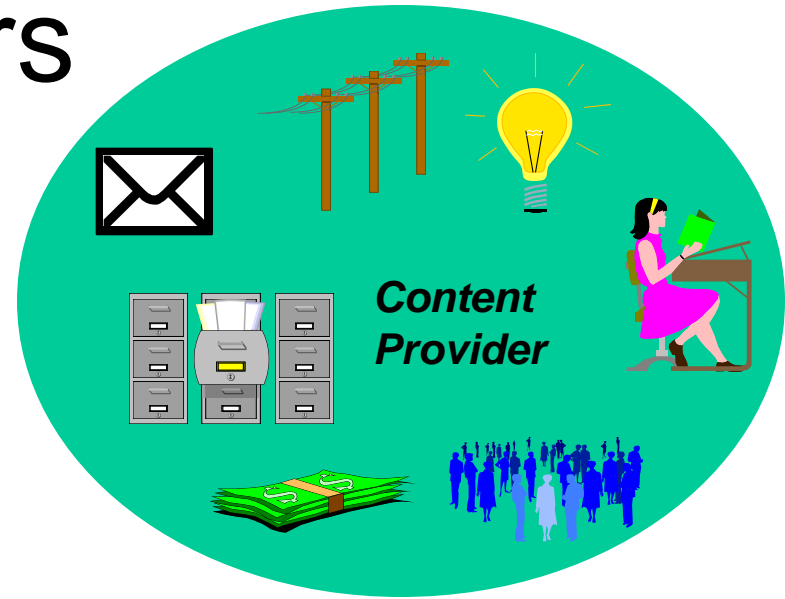
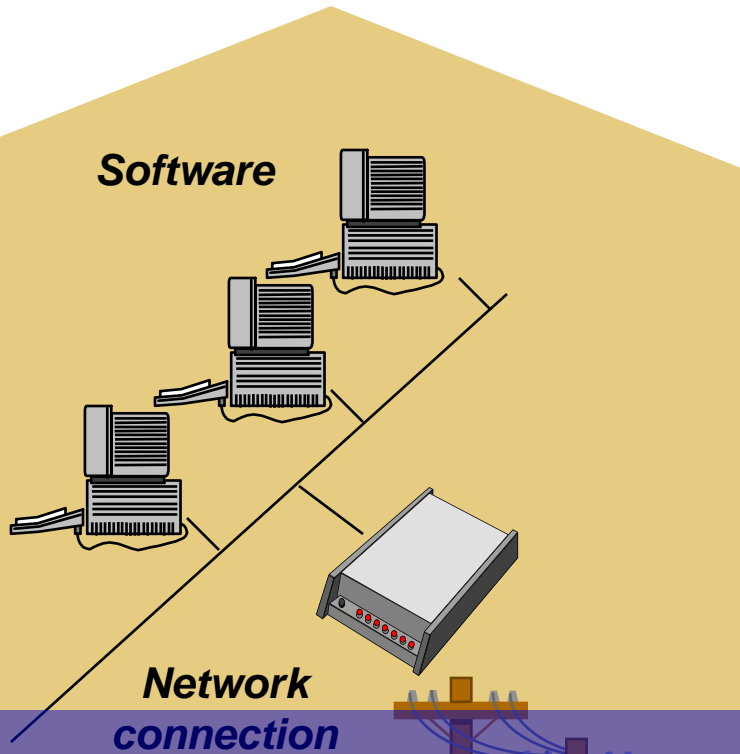
Here's a neat view of THE internet (circa 1990)...



The pieces

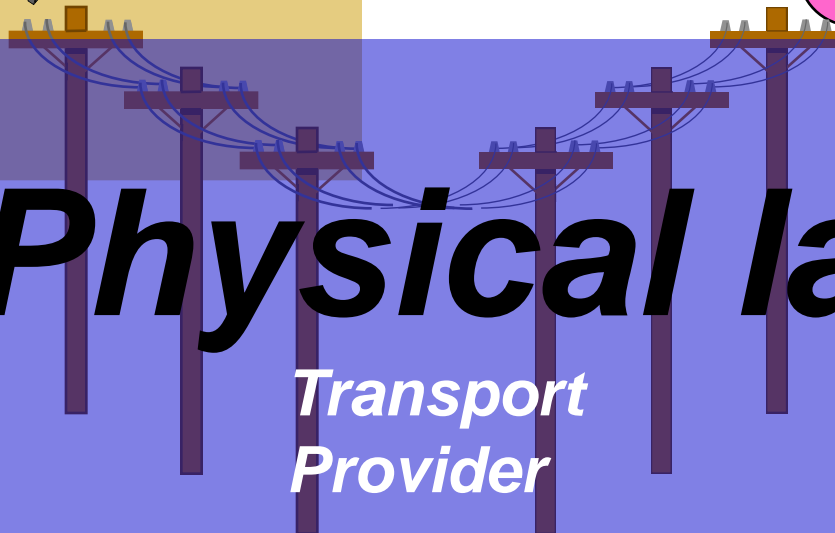


The layers



Physical layer

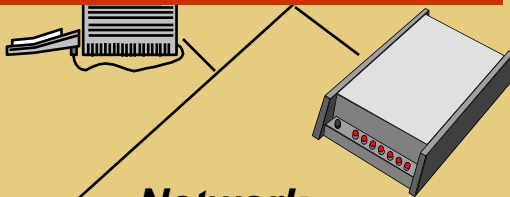
Transport Provider



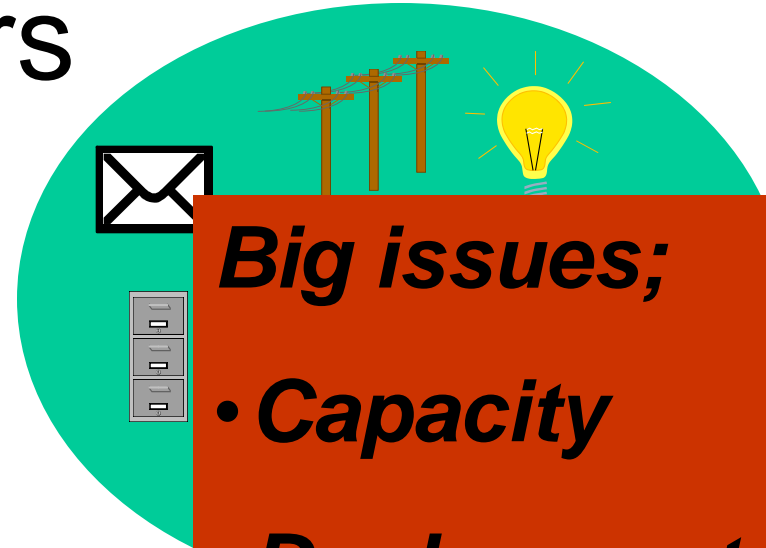
The layers

Big stuff;

- **Wires**
- **Right-of-way**

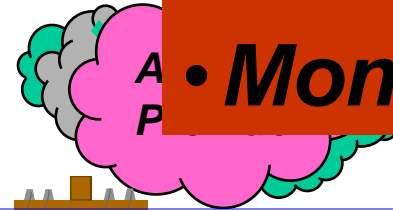


**Network
connection**



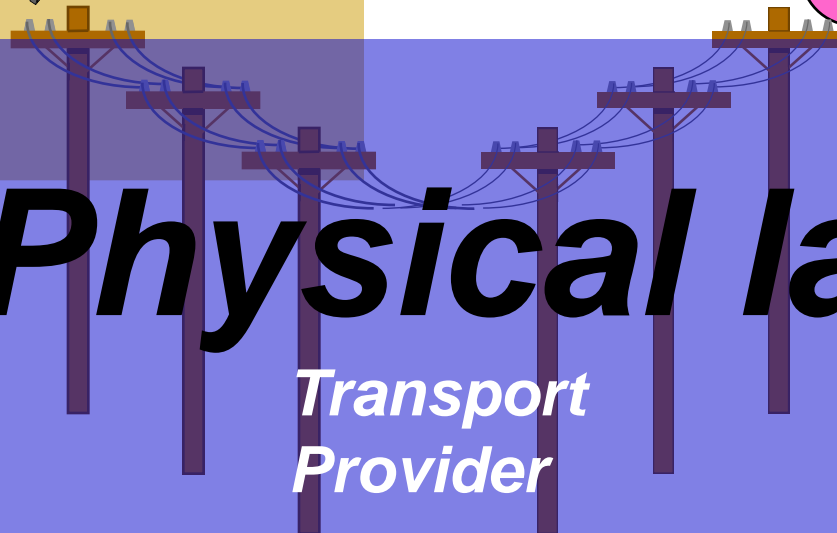
Big issues;

- **Capacity**
- **Deployment**
- **Monopoly**

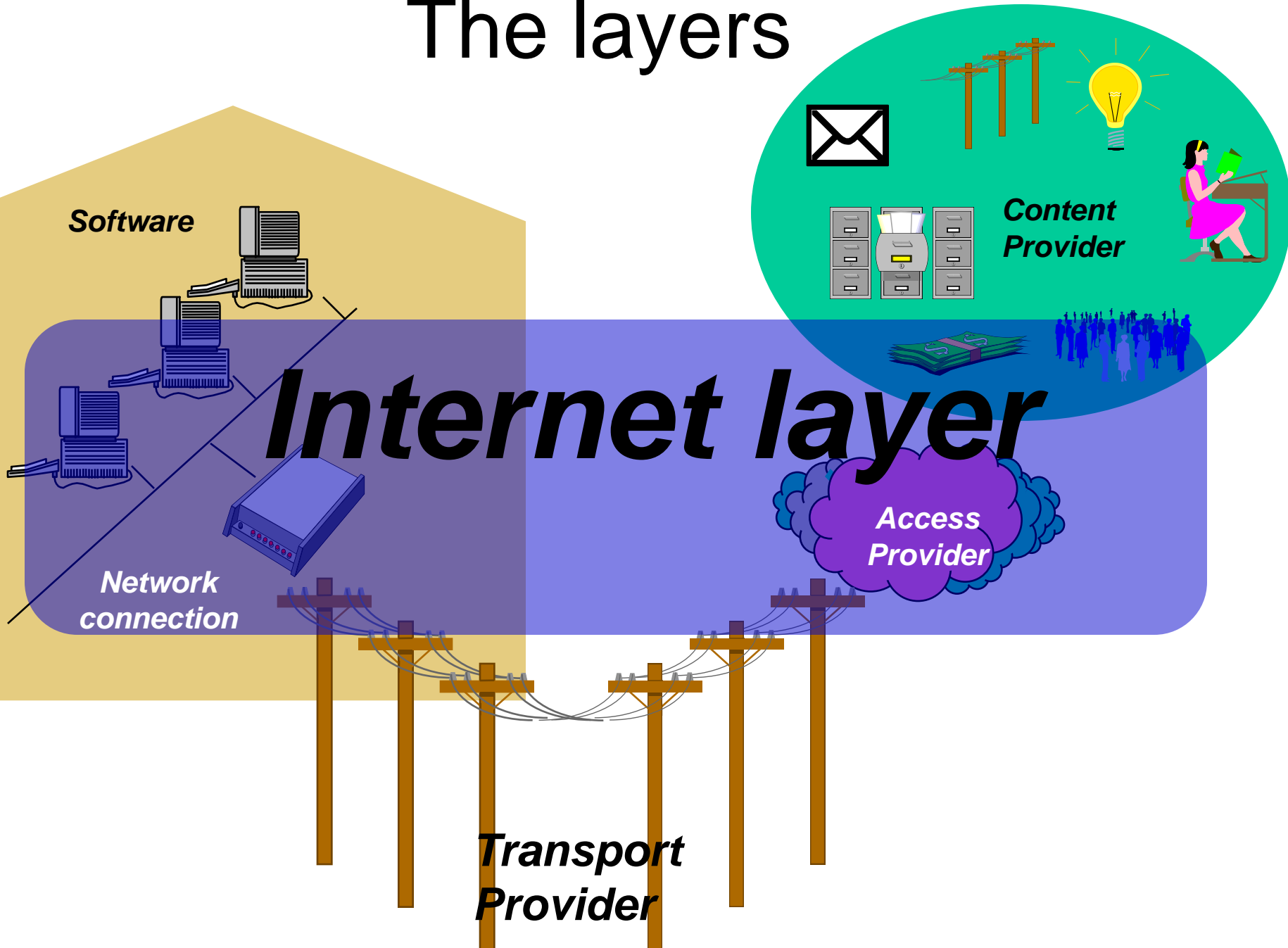


Physical layer

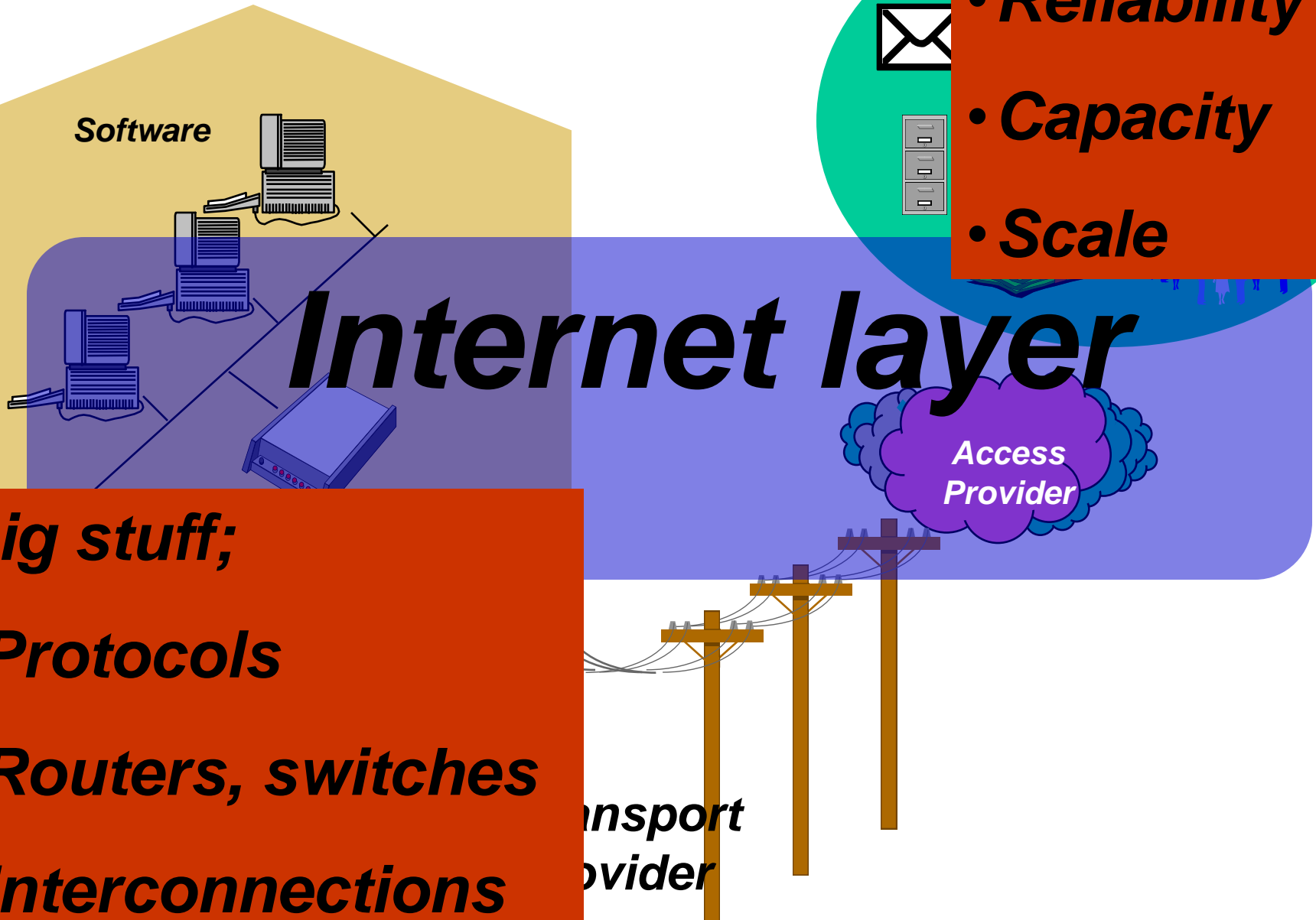
**Transport
Provider**



The layers



The layers



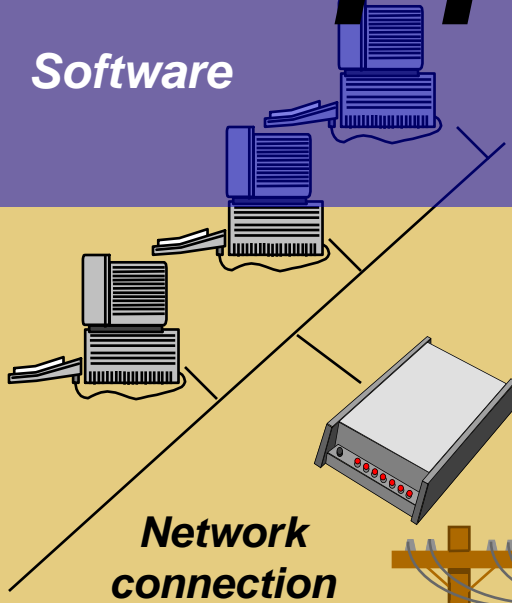
Big stuff;

- **Protocols**
- **Routers, switches**
- **Interconnections**

The layers

Application layer

Software

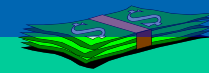


Network connection

Content Provider



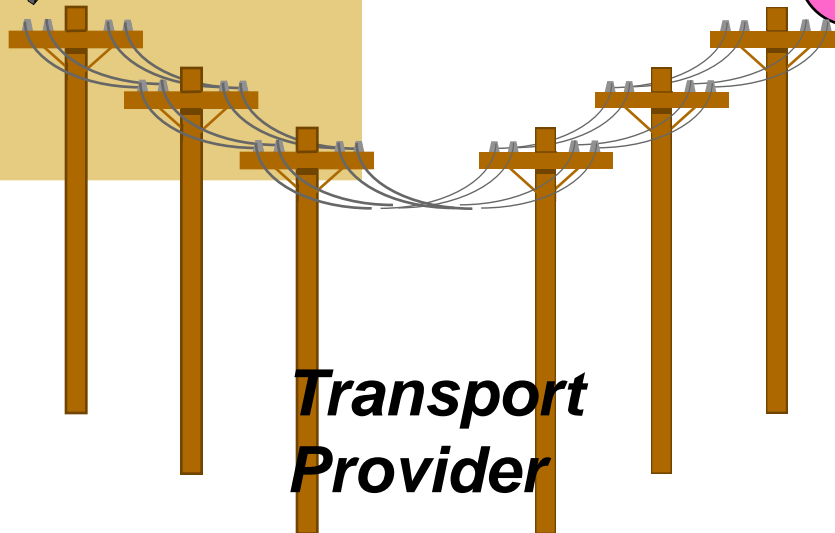
Content Provider



Access Provider



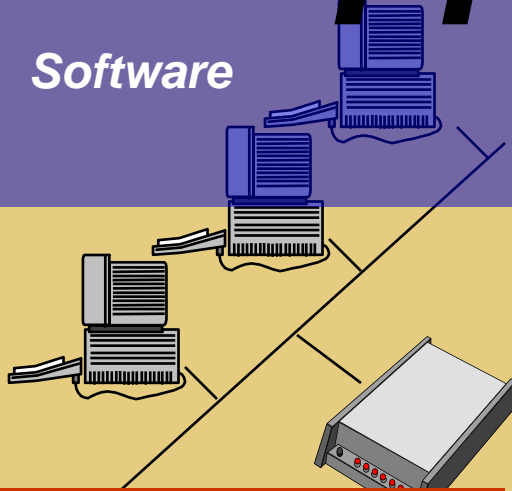
Transport Provider



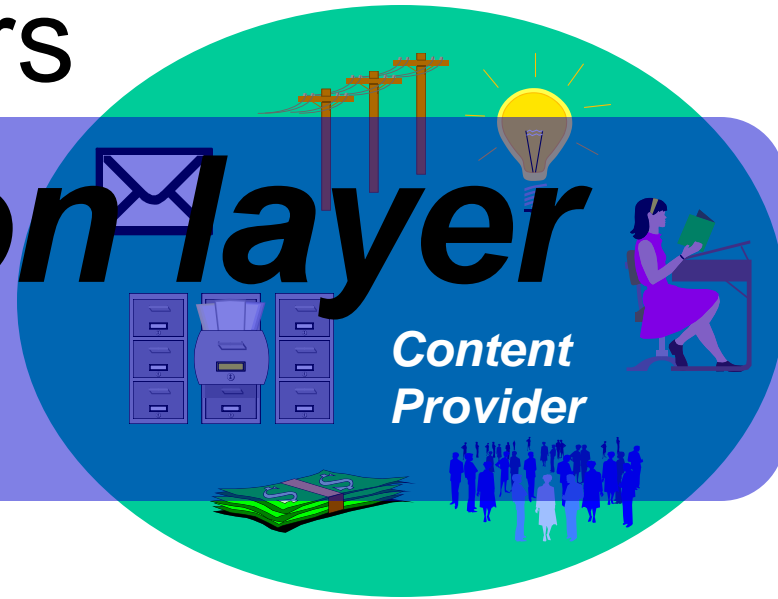
The layers

Application layer

Software



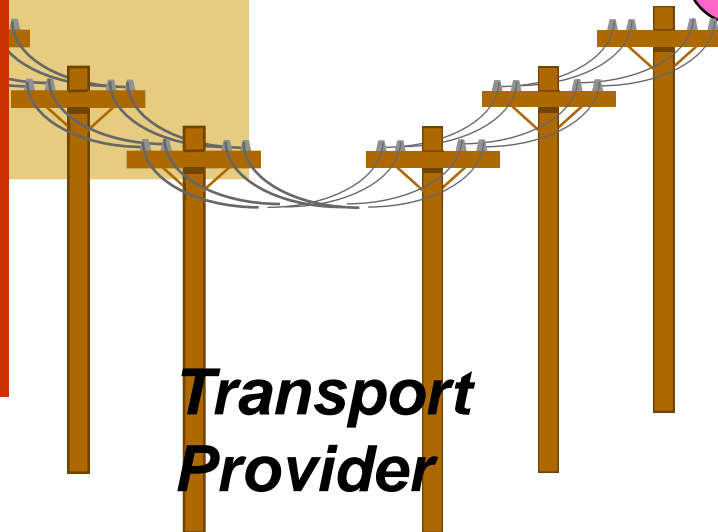
Content Provider



Access Provider



Transport Provider

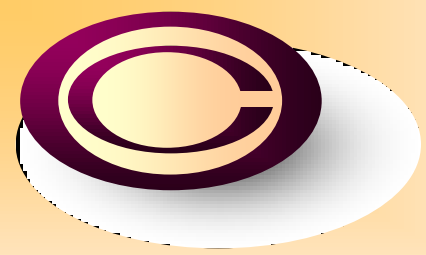


Big stuff;

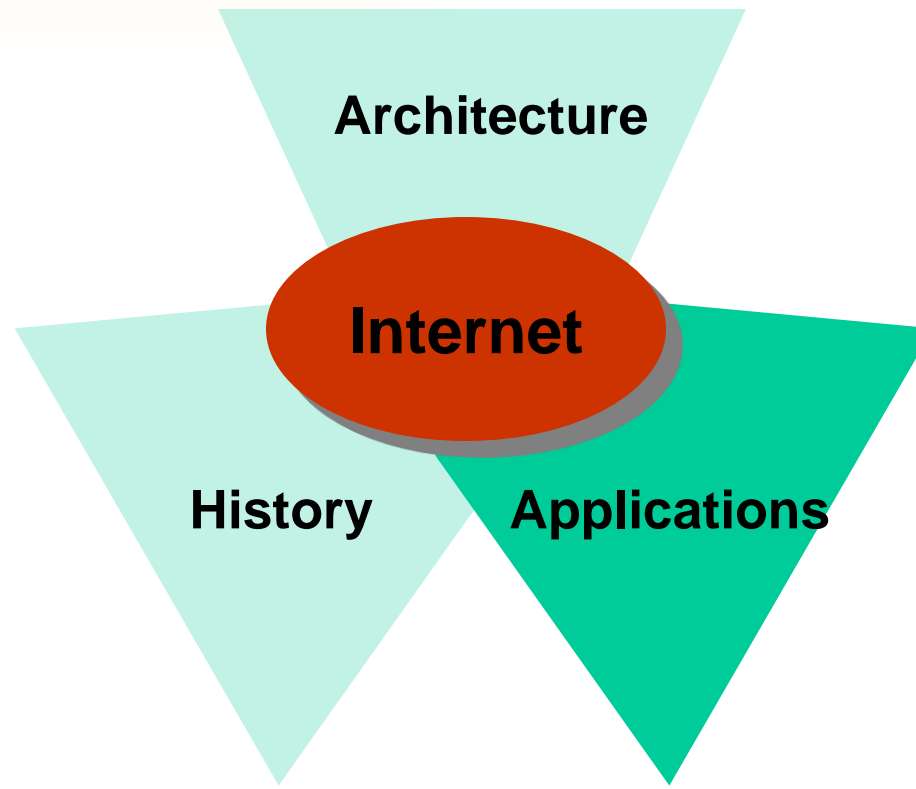
- *Software*
- *Data*

Big issues;

- *Ease of use*
- *Privacy*
- *Security*

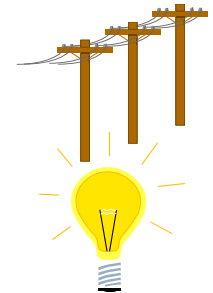


Agenda



Applications

- Email, messaging, VoIP
- Remote computing
- Media
- File sharing
- Search
- Discussions, communities
- E-Commerce



Impact on users

Commerce

Digital Divide

The Internet changes business, trade, shopping, production, employment, and investment

How might the Internet encourage a flattening of the socio-economic hierarchy, to what extent might certain groups be "left behind", and what is the opportunity-cost of allowing the gap between "haves" and "have nots" to widen?

Neighborhood

Architecture

The Internet changes civic layout, architecture, public spaces, and local informal communities

Internet

History

Applications

Education

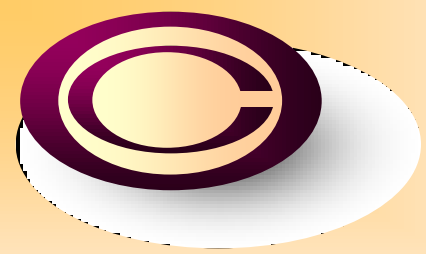
Globalization

Governance

The Internet changes knowledge production, the value of information and the system of education.

The Internet accelerates globalization. What might be the impact on a community? What can a community do to better position itself for the changes to come?

The Internet changes decision-making, collection of taxes, public services, community development organizations



Questions?

