Beginning System Administration DeCal

Week 4

March 9, 2009

I just the other day got, an internet was sent by my staff at 10 o'clock in the morning on Friday and I just got it yesterday. Why?

Because it got tangled up with all these things going on the internet commercially...

They want to deliver vast amounts of information over the internet. And again, the internet is not something you just dump something on. It's not a truck.

It's a series of tubes.

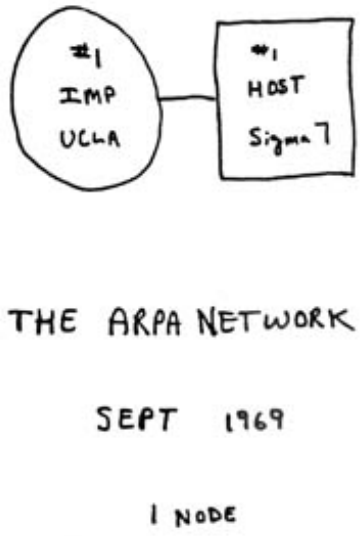
And if you don't understand those tubes can be filled and if they are filled, when you put your message in, it gets in line and its going to be delayed by anyone that puts into that tube enormous amounts of material, enormous amounts of material.

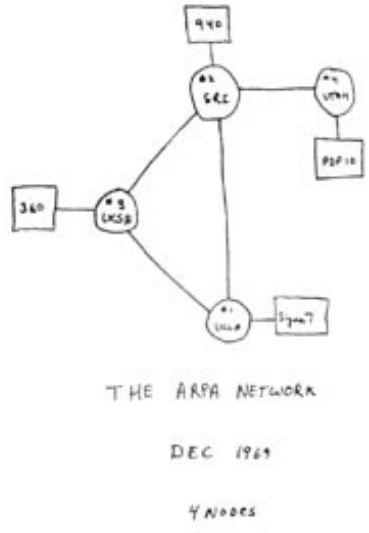
Senator Ted Stevens

(Brief) History of the Internet

- 1958 - Advanced Research Projects Agency (ARPA)
- ARPANET
  - Private military communications network
- 1988 - Commercial networks gain access to ARPANET

http://blog.icann.org/?p=115





The OSI Model

- Open Systems Interconnection Basic Reference Model
- 7 layers in 3 overall categories
- Physical Layer
  - Wires, hardware, equipment
- Transport Layer
  - Protocols for communication
  - “Hello? Are you there?”
- Application Layer
  - How do I read the data?

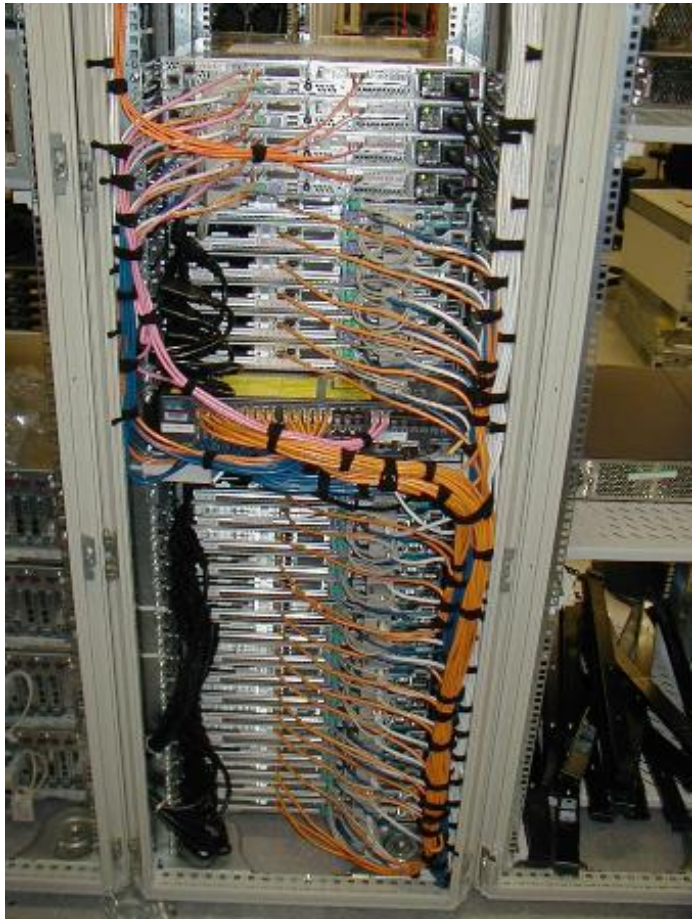
Administrivia

- `glookup` – no `submit`
  - Will try to keep these updated!
- put `inst` logins on assignments
- lab submission guidelines – not just copy & paste
- Read everything!

Physical Layer

- Standalone Networks
  - AT&T, Verizon, Spring
- Lots of wires
  - Ethernet, Fiber Optics
- Routers and Peering Points
  - How do I cross the web?

http://flickr.com/photos/digitalslurp



World Map

- http://image.guardian.co.uk/sys-images/Technology/Pix/pictures/2008/02/01/SeaCableHi.jpg
- http://upload.wikimedia.org/wikipedia/commons/d/d2/Internet˙map˙1024.jpg

Transport Layer

- Transmission Control Protocol (TCP/IP)
  - Reliable, in-order delivery
- User Datagram Protocol (UDP)
  - Short messages, non-guaranteed delivery
- Internet Protocol (IP)
  - IPv4 address: `xxx.xxx.xxx.xxx`
    - 4,294,967,296 addresses!
    - `http://technical.cns.berkeley.edu/internet/access/ucb-nets.shtml`
  - IPv6: 3×10^{38} addresses!

Application Layer

- Domains
  - Internet Corporation for Assigned Names and Numbers (ICANN)
  - `www.ocf.berkeley.edu` = 192.58.221.243
- DNS Servers
- Protocols
  - Web Browsers - HTTP
  - Mail - SMTP/IMAP/POP3
  - P2P - BitTorrent, GNUtella, Usenet, Winny, Skype

Extra Topics

- Firewalls
- Network Services
- IP Allocation
- Network Neutrality