Networking

- Evolution of the Internet
  - 1958: in response to Sputnik the Advanced Research Projects Agency (ARPA) is created
  - 1969: ARPANET commissioned by DoD
    - architecture consisted of Interface Message Processors (IMPs)
    - first four IMPS installed
  - early 70s: Term Internet was used over ARPANET

Networking

- Evolution of the Internet, cont.
  - early 70s: IP protocol moved data from one site to another, but without guarantee
  - then TCP (transmission control protocol) was added on top of IP to establish “reliability”
  - UDP (user datagram protocol) added low overhead method, but it does not guarantee message arrival
  - IP addresses had to be uniquely defined for each Network Information Center (NIC)
Networking

- Evolution of the Internet, cont.
- classes of networks were defined, e.g., Class A or Class B
- now internet applications could be built, e.g., telnet and ftp
- 1980s: new hosts were added at a rate that required daily network host table modifications
  - each ARPANET site had to download new host tables each day to stay up-to-date
  - the number of available hostnames was dwindling, since each hostname in the entire network had to be unique

Networking

- Domain Name Service (DNS)
  - DNS and BIND (Berkeley Internet Name Daemon) proposed
    - hierarchy of domain naming of network hosts
    - method for providing address information to anyone who requested it
Networking

- Evolution of the Internet, cont.
  - Common top-level domain names
    - biz: business
    - com: commercial
    - edu: educational
    - gov: governmental
    - info: unrestricted (i.e., anything)
    - mil: military
    - net: network service provider
    - org: nonprofit organization
    - XX: two-letter country code

Networking

- Command `host`
  - Utility: `host [ hostname | IPaddress ]`
  - contacts the local Name Service and requests the IP address for a given hostname.
  - It can also do a reverse lookup, where by specifying an IP address you receive the hostname for that address.
Networking

- Command `host`

```
-bash-3.2$ host www.ebay.com
hp-core.ebay.com has address 66.211.181.15
hp-core.ebay.com has address 66.211.181.19
hp-core.ebay.com has address 66.135.200.27
hp-core.ebay.com has address 66.135.200.145
hp-core.ebay.com has address 66.211.181.11
-bash-3.2$
```

```
-bash-3.2$ host 66.211.181.15
15.181.211.66.in-addr.arpa domain name pointer hp-core.ebay.com.
-bash-3.2$
```

Networking

- The Web of the 90s

  - millions of users and no real app until...
  - Mosaic, the first browser came out
    - could do things without having to use e.g., telnet or ftp
    - Mosaic could display pages of information textually and graphically
    - Mosaic used a page description language called HyperText Markup Language (HTML)
      - the hyperlink was most revolutionary aspect
      - now one could “navigate”
      - but: each participating site had to set up servers to provide this info
Networking

The Web of the 90s

Some of the people involved in the early releases of Mosaic later formed Netscape Communications Inc.

The Web vs the Internet

“Did you mean the Internet of the web of information available on the Internet?”

Internet: the networked infrastructure

Web: the web of information (HTML documents) connected to others (via hyperlinks)

Networking

Security, or “lack thereof”

Internet security is a huge topic

Internet was not designed with electronic commerce in mind

Major risks (as per our book)

- information copying
- information modification
- impersonation
- denial of service
Networking

- Security, or “lack thereof”
  - Common definition in terms of
    - confidentiality
    - integrity
    - availability
    - authenticity
    - non-repudiation

Networking

- Other issues
  - Copyright
  - Censorship
  - Misinformation
  - Acceptable Use