

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 our 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

- Evolution of the Internet, cont.
 - 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
```

```
www.ebay.com is an alias for hp-core.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