TIM 50 - Business Information Systems

Lecture 18

UC Santa Cruz

November 22, 2016
Announcements

- Teaching Evaluations
  - Opening soon
- Final Business Papers, Thursday 12/1
- Final Exam, Tuesday 12/6
  - 12:00 noon – 3:00 PM
Networks
## IP Addresses vs Mac Addresses

<table>
<thead>
<tr>
<th>Hierarchical</th>
<th>Not Hierarchical</th>
</tr>
</thead>
<tbody>
<tr>
<td>The beginning bits tell you which network the host is on</td>
<td>Beginning bits tell nothing useful</td>
</tr>
<tr>
<td>Ex: UCSC addresses start with 128.114.X.X</td>
<td></td>
</tr>
<tr>
<td>The last bits tell you which host of the network</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Changeable</th>
<th>Not Changeable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes with location of Host</td>
<td></td>
</tr>
</tbody>
</table>

- 4 bytes
- Only 4.2 billion

- 6 bytes
- 281 Trillion
Link and Network Layer Interaction

MAC Header

Ethernet Frame Payload

IP Header IP Payload

Strip MAC header off frame. Forward IP packet based on Routing table.
Some Typical Topologies

Home Network

- DSL Modem
- Telephone Line
- (to local Office)
- Router
- Ethernet Switch
- Computers
ISP Topology

Telephone Company Local Office

Leased Line to NAP

To Telephone Network

ISP Point of Presence

DSL Modem

DSL Modem

DSL Modem

DSLAM

Local Loop

Local Loop

Local Loop
Large E-Business

Presentation Logic (Assembling Web page)

Logic Flow of Interaction

Application Servers

Load Balancer

Web Servers

Incoming HTTP Requests

Interconnected with 10 gig etherner

Databases

Customers Merchandise Orders
Web Caching

- Speed up web page loading by storing previously seen components locally

http://www.ucsc.edu

Cache on Hard Drive

Web server
Content Distribution Networks - Basic idea (AKAMAI)

Local Office or ISP

Akamai Server

Web Page

Text....

Large Company

Web Server

INTERNET

NSP 1

NSP 2
Akamai EdgeSuite (Dynamic Site Accelerator)

Movies in Santa Cruz after 8pm?

Construct Page

Web Page

Movie A
Movie C

Web Page

Movie A
Movie C

Web Page

Movie A
Movie B
Movie C

Local Office or ISP

Akamai Server

Large Company

Web Server

INTERNET

NSP 1

NSP 2
The World Wide Web

- **Search engines**
  - Started in early 1990s as relatively simple software programs using keyword indexes

- **search engine marketing** – major source of revenue
  - Keyword auctions
The World Wide Web

- **Web 2.0**
  - Refers to more interactive Internet-based services enabling people to collaborate, share information, etc.

- **Blogs**: chronological, informal Web sites created by individuals using easy-to-use Weblog publishing tools

- **RSS (Really Simple Syndication)**: syndicates Web content so content can be automatically placed into another setting

- **Wikis**: collaborative Web sites where visitors can add, delete, or modify content on the site
Intranets and Extranets

- **Intranets**
  - Use existing network infrastructure with Internet connectivity standards software developed for the Web.
  - Create networked applications that can run on many types of computers.
  - Protected by firewalls.

- **Extranets**
  - Allow authorized vendors and customers access to an internal intranet.
  - Used for collaboration.
  - Also subject to firewall protection.
• Cellular systems
  • 2G -- Competing standards for cellular service
    • United States: CDMA
    • Most of rest of world: GSM
  • Third-generation (3G) networks
    • UMTS (GSM extension) ATT
    • CDMA 2000
  • 4G
    • LTE, WiMax
• Wireless computer networks and Internet access
  • Bluetooth (802.15)
    • Links up to 8 devices in 10-m area using low-power, radio-based communication
    • Useful for personal networking (PANs)
  • Wi-Fi (802.11)
    • Set of standard: 802.11a, 802.11b, 802.11g, 802.11n
    • Used for wireless LAN and wireless Internet access
    • Use access points: device with radio receiver/transmitter for connecting wireless devices to a wired LAN
Cloud computing
Cloud Computing

- **Cloud Computing**: refers to both
  - applications delivered as services over internet
    - aka *Software as a Service (SaaS)*
  - hardware / software in data centers providing those services -- a cloud
Cloud Computing

- 2 flavors:
  - Public Cloud, available to public
    - provides utility computing
  - Private Cloud
    - internal to company
Advantages

- **SaaS**
  - Control of Versioning
  - Users access anywhere
  - Ease of data sharing
  - Pay as you go

- **Additional +’s of Cloud Computing**
  - Deploy new services without building and provisioning data centers
    - E.g. Zynga Farmville
  - Scale up/down resources as needed