CS155b: E-Commerce

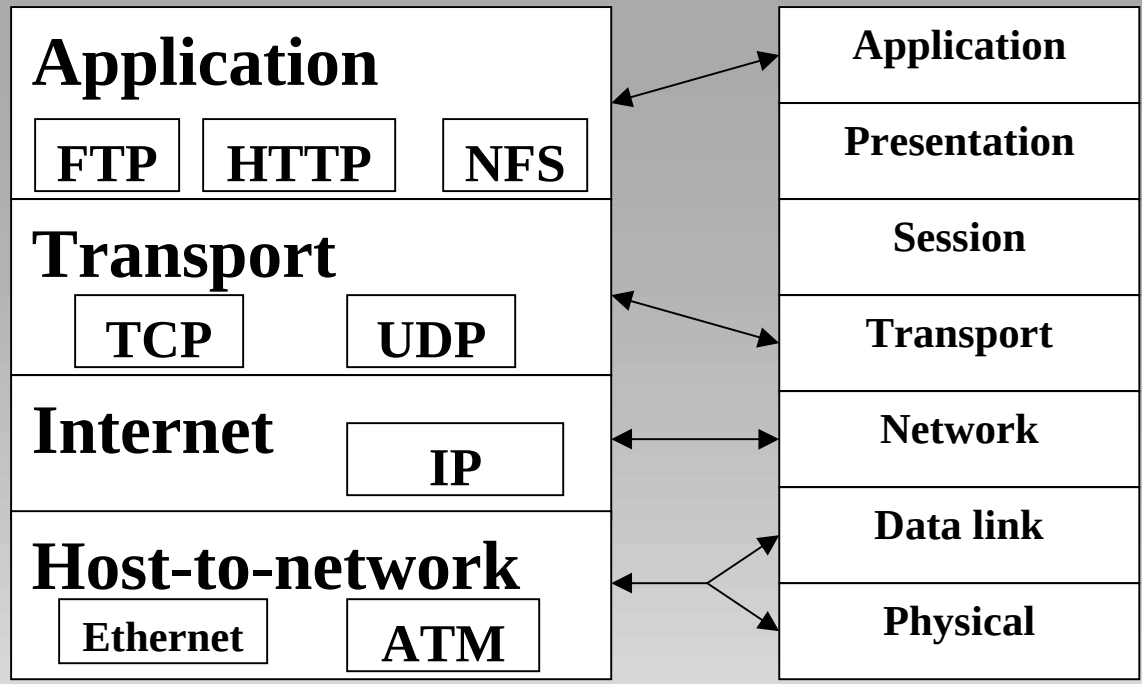
Lecture 5: Jan 23, 2001

Introduction to Security and Privacy Technology

(plus some review of last week)

Reading Assignment for this week:

Appendix E of The Digital Dilemma
(http://books.nap.edu/html/digital_dilemma/)



HTTP

- Standard protocol for web transfer
- Request-response interaction
- Request methods: GET, HEAD, PUT, POST, DELETE, …
- Response: Status line + additional info (*e.g.*, a web page)

HTML

- The language in which web pages are written
- Contains formatting commands
- Tells browser what to display & how to display

<HEAD> Welcome to Yale </HEAD>

- The head of this page is "Welcome to Yale"

<B> Great News! </B>

- Set "**Great News!**" in boldface

<A HREF="http://www.cs.yale.edu/index.html">Yale Computer Science Department </A>

-A link pointing to the web page: "*http://www.cs.yale.edu/index.html*"

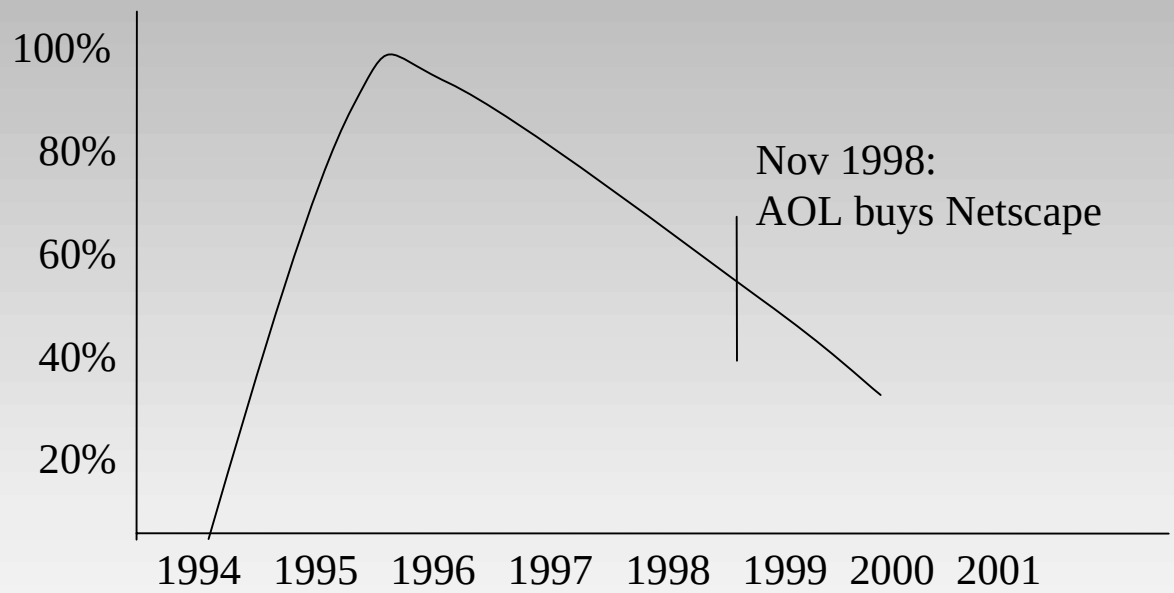
-with the text: "*Yale Computer Science Department*" displayed.

What does "*http://www.cs.yale.edu/index.html*" mean?

Protocol	**Host domain name**	Local file
http	www.cs.yale.edu	index.html

- **Late 1990:** WWW, HTTP, HTML, “Browser” invented by Tim Berners-Lee
- **Mid-1994:** Mosaic Communications founded (later renamed to Netscape Communications)
- **Summer of 1995:** Market share 80%+
- **August 1995:** Windows 95 released with Internet Explorer
- **January 1998:** Netscape announced that its browser would thereafter be **free;** the development of the browser would move to an **open-source** process

Estimated Market Share of Netscape



NOTE: data are from different sources and not exact

Perfectly Captures the *Essence* of Internet Business

- Enormous power of Internet architecture and ethos (*e.g.*, layering, "stupid network," open standards)
- Must bring new technology to market quickly to build market share
- Internet *is* the distribution channel
  - First via FTP, then via HTTP (using Netscape!)
  - Downloadable version available free and CD version sold

Uses Many “Internet Business Models”
(esp. those that involve making money by “giving away” an information product)

Complementary products (esp. server code)

- Bundling
  - Communicator includes browser, email tool, collaboration tool, calendar and scheduling tool, etc. One “learning curve,” integration, compatibility, etc.
- Usage monitoring
  - Datamining, strategic alliances
  - “Installed base” $\neq$ “Active installed base”

Browser as “Soul of the Internet”

- “New layer” (Note Internet architectural triumph!)
- Portal business
  - Early “electronic marketplace”
  - Necessity of strategic alliances
  - “Positive transfers” to customers
- (Temporarily?) Killed R&D efforts in user interfaces

Pluses and Minuses of Network Effects

+ Initial “Metcalf’s Law”- based boom

+ Initial boom accelerated by bundling, complementary products, etc.

- Market share ≠ lock in

  high market cap ≠ high switching costs

- Network effects strong for “browser” but weak for any particular browser

Exposed the True Nature of Microsoft

- 1995: Navigator released, MS rushes IE to market
- 1996: Version 3.0 of IE no longer technically inferior ("Openness" and standardization begets commoditization)
- MS exploits advantage with strategic allies (Windows!)
  - Contracts with ISPs to make IE the default
  - Incents OEMs not to load Netscape products
  - Exclusive access to premium content (from, *e.g.*, Star Trek)
- 1998: MS halts browser-based version of these "strategies" under DoJ scrutiny of its contracts with ISPs.

Internet-ERA Anti-Trust Questions are Still Open

- Can consumers benefit from full integration of browser and OS?
- How to prevent “pre-emptive strikes” on potential competitors in the Windows-monopoly universe?
  - (“post-desktop era” technical Solution?)
- Remember: DoJ case is not about protecting Netscape!

Security Technologies

- Encryption
  - Symmetric Key
  - Public Key
- Signature
- PKI
- Rights Management
- Time stamping
- Secure Containers

Recall general question we are addressing in CPSC155b:

"What is the underlying technological development, and what is its effect on business?"

But most of those security technologies are not new!

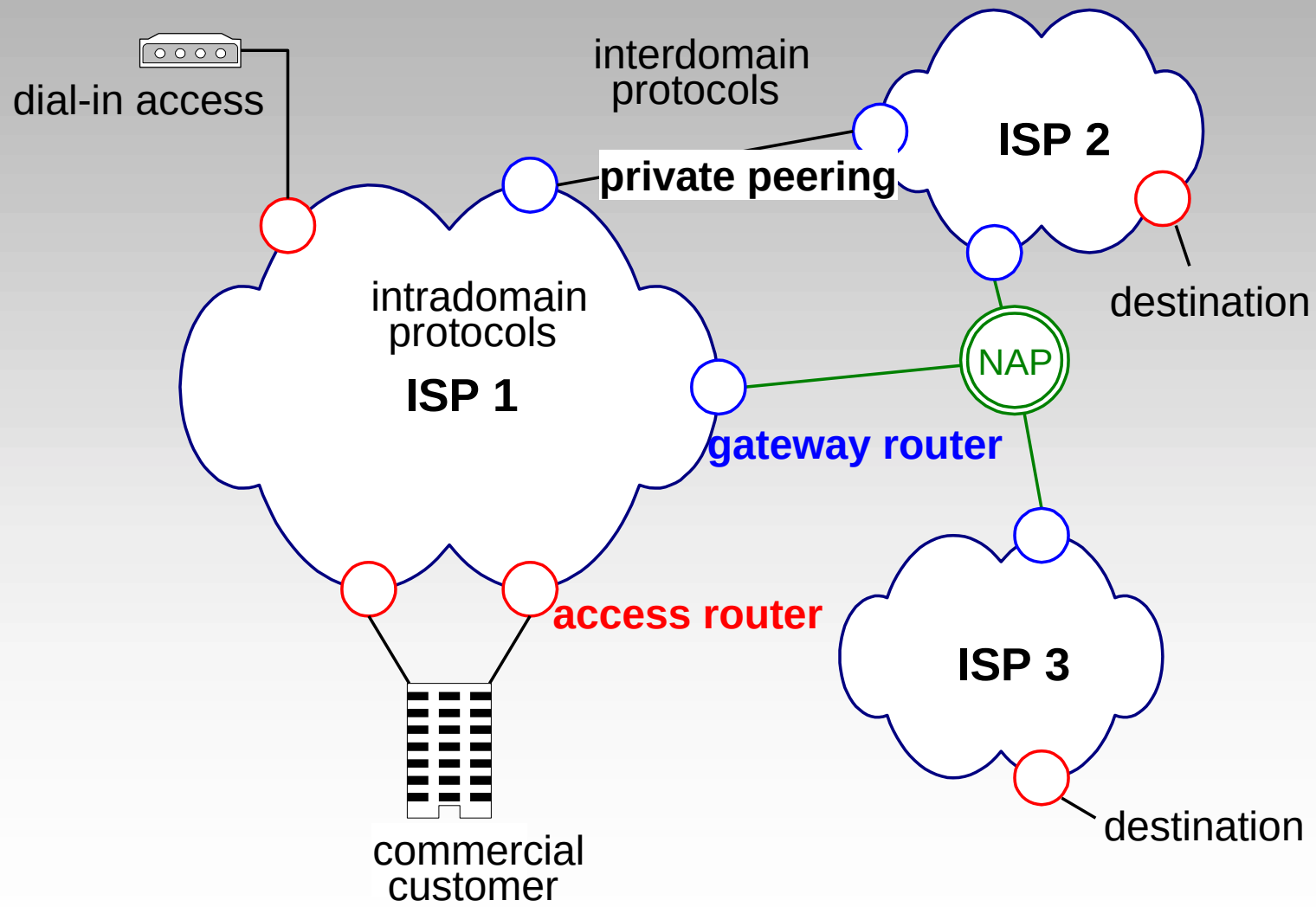
Newly Relevant to General Public

- Browser activity is *monitorable*
- One user's browser may interact with many websites

Many 'unknown' website operators can collect a lot of data about the behavior of browsers at specific IP addresses.

?? Threat or Opportunity ??

Internet Architecture



Getting an IP Packet From A to B

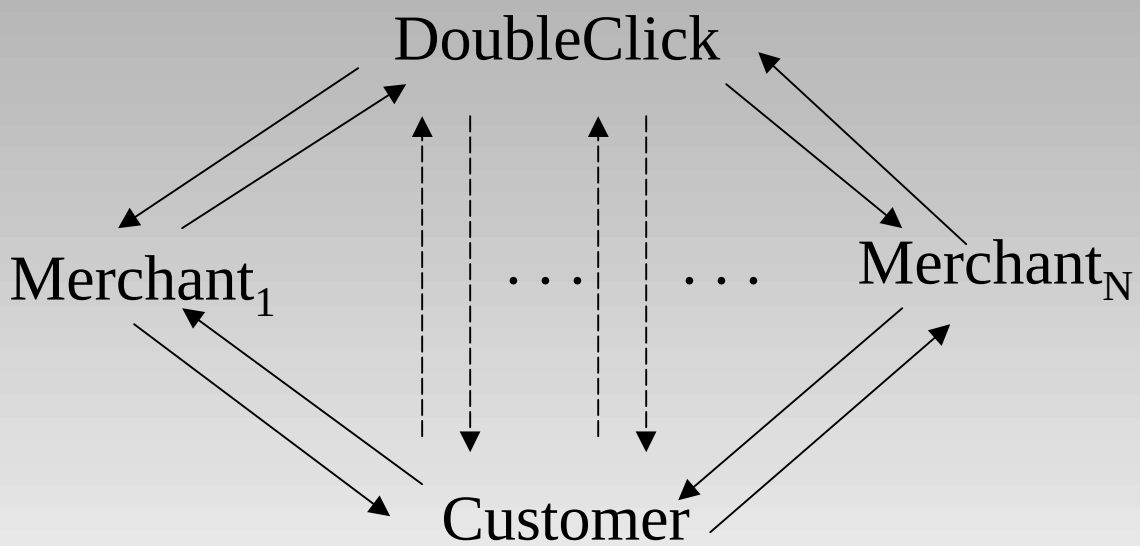
- Host must know at least three IP addresses
  - Host IP address (to use as its own source address)
  - Domain Name Service (to map names to addresses)
  - Default router to reach other hosts (e.g., gateway)
- Simple customer/company
  - Connected to a single service provider
  - Has just one router connecting to the provider
  - Has a set of IP addresses allocated in advance
  - Does not run an Internet routing protocol

Cookies

- Some user-profile information is stored on *user's* computer
- Benign uses of cookies
  - 'One-click shopping' information
  - Results of previous searches
  - Menu 'click streams'

→ Cookies can save customers' time and reduce load on servers

Controversial use: “Targeted Ads”



DoubleClick can get many *related* cookies

- Brouhaha when DoubleClick acquired Abacus, a ‘real-world’ syndicated data publisher
- Discussion Point: Do you feel threatened by DoubleClick?

  Why or why not?