ITMD-461

Class 1
January 13, 2015

ITMD-461

- Welcome to ITMD-461
  - Internet Technologies and Web Design
- Tonight's Agenda
  - Syllabus Review
  - A Bit of History
  - Software Development vs Web Development
  - How the Web Works
  - HTTP Request Response

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- Syllabus Review
- Blackboard Review

A Brief History of the Web

- 1963 – Ted Nelson coined term hypertext. Text linked content
- 1969 – ARPANET
  - First Real Packet Switched Network
  - Under Contract from ARPA by BBN of Cambridge, MA and under Bob Kahn
  - Connected mostly a handful of Universities
  - First link UCLA and Stanford
- 1972 – Email adapted for ARPANET
  - Ray Tomlinson of BBN, choose @ to separate name and host
- 1973-74 – TCP
  - Bob Kahn at DARPA and Vint Cerf at Stanford develop TCP
  - 1978 TCP finalized into TCP/IP

A Brief History of the Web

- 1980 - Tim Berners-Lee at CERN creates ENQUIRE
  - personal database of people and software models
  - simple Hypertext program
- 1983 – ARPANET switches over to TCP/IP from NCP
- 1984 – DNS system
  - made addresses on the Internet more human-friendly
- 1987 – About 30,000 hosts on Internet

A Brief History of the Web

- 1989 – Tim Berners-Lee of CERN develops a new technique for distributing information on the Internet.
  - Information Management: A Proposal
  - Based on Hypertext
  - Called it the World Wide Web
  - http://www.w3.org/History/1989/proposal-msw.html
- 1990 - World Wide Web protocols finished
  - HTML, HTTP, and URLs
- 1991 - First web page created
  - http://www.w3.org/History/19921103-hypertext/hypertext/WWW/TheProject.html

A Brief History of the Web

- 1993 - Mosaic – first major graphical web browser to make the Internet accessible to non-techies
  - Developed by Marc Andreeson and team at the National Center for Supercomputing Applications (NCSA), University of Illinois
  - Later forms Netscape
- 1994-95
  - CompuServe, America Online, and Prodigy start providing dial-up Internet access.
  - Netscape develops Navigator Browser and SSL

A Brief History of the Web

- 1995 continued
  - Ebay, Amazon, Vatican, Geocities all go online
  - Sun releases Java programming language
  - JavaScript created by Brendan Eich (originally called LiveScript) is released as part of Netscape Navigator
- 1996 – HoTMaIL, First webmail
- 1997 – Weblog term coined
  - NASA pathfinder sets traffic record with 46 million hits in a day

A Brief History of the Web

- 1998 – Google goes live
- 1999 – Napster
- 2001 – Wikipedia
- 2004 – Facebook
- 2005 – Youtube
- 2006 – Twitter
- 2007 – iPhone brings era of mobile web
- W3C How it all Started
  http://www.w3.org/2004/Talks/w3c10-HowItAllStarted/?n=0
- Web History Timeline - http://webdirections.org/history/#0

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- How is web development different from software development? How is it the same?
  - Types of code
  - Runtimes and environments
    - Browser as platform
  - Networking with the internet

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- When you make a piece of Desktop Software you
  - Code in a language like C++, C, Java, Objective C or C# / Visual Basic
  - Compile the code into an executable for one or more platforms
  - The user downloads your application and installs it on a platform (operating system)
  - Manage the software with updates, registry entries and logs.

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- When you make a web application, mobile web application, or website you
  - Write front-end HTML, CSS and Javascript code for the visual presentation and interaction with the user
  - Write backend code to interact with databases and, filesystem on the server. This code may or may not be compiled.
  - Deliver the application to the user via a URL
  - The browser is your platform and compiler
  - The server is where the code is made available to users via the HTTP protocol when using the Internet

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- Software Development
  - 1 language, local database, 1 or more compiled executables, platform restricted
- Web Development
  - HTML, CSS, Javascript, Backend language (like ROR or PHP or ASP.net or Java or Python) and Database. Platform un-restricted, including mobile

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- Chapter 1

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- Websites are requested and delivered to user's browsers via the HTTP Protocol.
- HTTP stands for Hyper Text Transfer Protocol
- OSI Model of networking
  - What other protocols are involved with this transaction?
    - TCP / IP
    - UDP
    - DNS
    - ARP

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- URI vs URL
  - A URL is a URI but a URI is not a URL, technically
- URI - uniform resource identifier
  - A URI identifies a resource either by location or name.
  - Don't necessarily know what the resource type is
  - http://www.iit.edu/logo
- URL - uniform resource locator
  - Technically type of URI
  - A URL defines the network location of a specific representation for a given resource.
  - Know what the resource type is
  - http://www.iit.edu/logo.png
- In practice they are used interchangeably but more often than not URI would be the generally correct term

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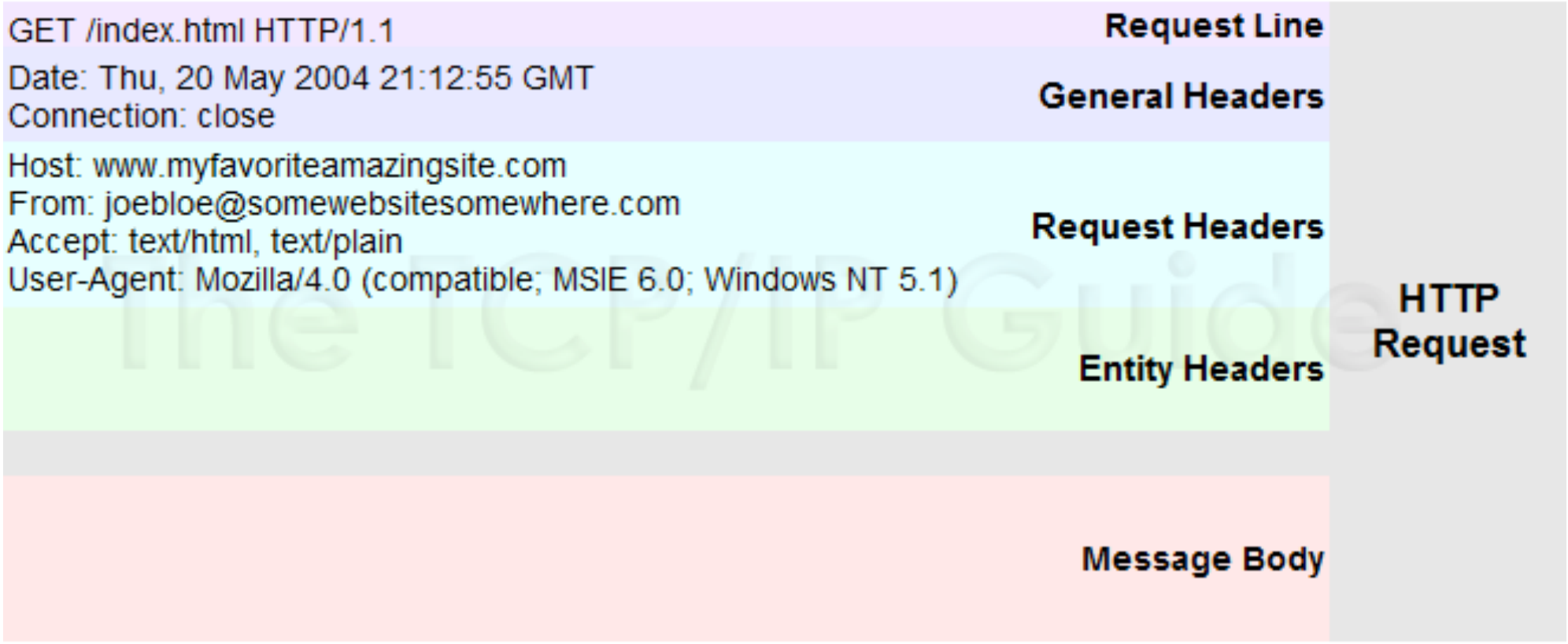
- Chapter 2

HTTP Request

- Client Parses the URI
  - protocol://server/request
- Client sends request to Server
  - Usually HTTP protocol
  - [METH] [REQUEST-URI] HTTP/[VER]
  - [fieldname1]: [field-value]
  - ...
  - [request body, if any (used for POST and PUT)]
- Example - GET / HTTP/1.1

HTTP Request



http://www.tcpipguide.com/free/t_HTTPRequestMessageFormat.htm

HTTP Request

- HTTP Methods
  - GET, POST, PUT, DELETE, HEAD, TRACE, CONNECT
  - First 4 are the common ones. Mostly GET.
  - http://www.w3.org/Protocols/rfc2616/rfc2616-sec9.html
- GET
  - Most common, Basically get me this document
  - Any variable or form data is sent as part of the URL
  - http://www.domain.com/?q=232&name=joe
  - Data q=232 and name=joe is available to target page

HTTP Request

- POST
  - Second most common method
  - Used often to send form data
  - Any variable or form data is sent in the request body and not appended to the URL
- PUT & DELETE
  - Used mostly with web programming frameworks
  - Used in Ruby on Rails
- HEAD
  - Returns only the Response headers from server

HTTP Response

- Server sends response to client
  - Usually HTTP Protocol
  - HTTP/[ver] code text
  - [fieldname1]: [field-value]
  - ...
  - [response body]
- First line is status of request
- Then multiple header fields can follow
- Lastly the response body follows

HTTP Response

HTTP/1.1 200 OK	**Status Line**	**HTTP Response**
Date: Thu, 20 May 2004 21:12:58 GMT Connection: close	**General Headers**	
Server: Apache/1.3.27 Accept-Ranges: bytes	**Response Headers**	
Content-Type: text/html Content-Length: 170 Last-Modified: Tue, 18 May 2004 10:14:49 GMT	**Entity Headers**	
<html> <head> <title>Welcome to the Amazing Site!</title> </head> <body> This site is under construction. Please come back later. Sorry! </body> </html>	**Message Body**	

http://www.tcpipguide.com/free/t_HTTPResponseMessageFormat.htm

HTTP Response

- Status Codes
  - 3 digit numbers grouped into 5 groups by first digit
- 1xx – Informational
  - No 1xx status codes are defined, expermental
- 2xx – Successful
  - 200 OK – Server did request and all is well
  - Rest of the 200's are mostly used for scripting, not commonly seen

HTTP Response

- Status Codes continued
- 3xx – Redirection
  - 301 Moved permanently
    - The resource is somewhere else and links and references should be updated
  - 302 Moved temporarily
    - Means same as 301 but links and references should not be updated since it may move again in the future
  - 304 Not modified
    - Returned if the if-modified-since header used
    - Basically means cached version should be displayed

HTTP Response

- Status Codes continued
- 4xx Client error
  - 400 Bad request – Incorrect request syntax
  - 401 Unauthorized
    - Client not allowed access to resource
    - May change if client retries with authorization header
  - 403 Forbidden
    - Client not allowed access to resource
    - Authorization header will not help
  - 404 Not found – Dead link

HTTP Response

- Status Codes continued
- 5xx Server error
  - 500 Internal server error
    - Something went wrong inside the server
  - 501 Not implements
    - The request is not supported by the server
  - 503 Service unavailable
    - Usually happens when a server is overloaded
- http://www.w3.org/Protocols/rfc2616/rfc2616-sec6.html

HTTP Response

- Response headers can include
  - Location
  - Server
  - Content-length
  - Content-type
  - Content-encoding
  - Expires
  - Last-modified
  - And others

HTTP 1.1

- HTTP/1.0
  - http://www.w3.org/Protocols/HTTP/1.0/spec.html
- HTTP/1.1 - 1999
  - http://www.w3.org/Protocols/rfc2616/rfc2616.html
- 1.0 vs 1.1
  - 1.0 only had GET, POST, HEAD Methods
  - 1.1 requires host header
  - 1.1 adds some cacheing and persistence and more
  - http://www2.research.att.com/~bala/papers/h0vh1.html

HTTP 2.0

- HTTP/2.0 is the next planned version
- Based on SPDY
  - http://en.wikipedia.org/wiki/SPDY
  - Effort by Google to speed up http protocol with things like compressing and multiplexing
  - Supported in some modern browsers now
- Still in development

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- Chapter 3

Software

AT A GLANCE

Popular Web Design Software Links

Web page authoring

Adobe Dreamweaver *www.adobe.com*

Microsoft Expression Web *www.microsoft.com/products/expression*

Nvu (open source web page editor) *www.nvu.com*

HTML editing

TextMate by MacroMates for Mac OS *www.macromates.com*

Sublime Text *www.sublimetext.com*

TextPad for Windows *www.textpad.com*

Coda by Panic Software *www.panic.com/coda/*

BBEdit by Bare Bones Software *www.barebones.com*

Image editing and drawing

Adobe Photoshop *www.adobe.com*

Adobe Photoshop Elements *www.adobe.com*

Adobe Illustrator *www.adobe.com*

Adobe Fireworks *www.adobe.com*

Corel Paint Shop Pro Photo *www.corel.com/paintshoppro*

GIMP *gimp.org*

Browsers

Microsoft Internet Explorer (Windows only) *www.microsoft.com/windows/internet-explorer/*

Firefox *www.firefox.com*

Google Chrome *www.google.com/chrome*

Opera *www.opera.com*

Safari *www.apple.com/safari*

Networking

WS_FTP, CuteFTP, AceFTP, and others for Windows available at: *www.download.com*

Transmit (for Macintosh OSX) *www.panic.com/transmit*

Cyberduck (for Macintosh OSX) *cyberduck.ch*

Fetch (for Macintosh OSX) *fetchsoftworks.com*

Cygwin (Linux emulator for Windows) *www.cygwin.com*

PuTTY (telnet/SSH terminal emulator) *www.chiark.greenend.org.uk/~sgtatham/putty/*

Software

- Text Editor
  - Notepad++ (windows)
  - Textpad (windows)
  - TextWrangler (mac)
  - Sublime Text 2 (multi-platform)
- SFTP
  - WinSCP (windows)
  - Filezilla (multi-platform)
  - Cyberduck (mac)
  - Transmit (mac)
- SSH (optional for some)
  - Terminal (mac & linux)
  - PuTTY (windows)

Readings

- Read Section I, Chapters 1-3, and get a head start on Section II in the book
- W3C How it all Started – pre W3C

  http://www.w3.org/2004/Talks/w3c10-HowItAllStarted/?n=0
- Web History Timeline - http://webdirections.org/history/#0