

ITMD-361

Class 1

Aug 22, 2017



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•Welcome to ITMD-361

- 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



A Brief History of the Web

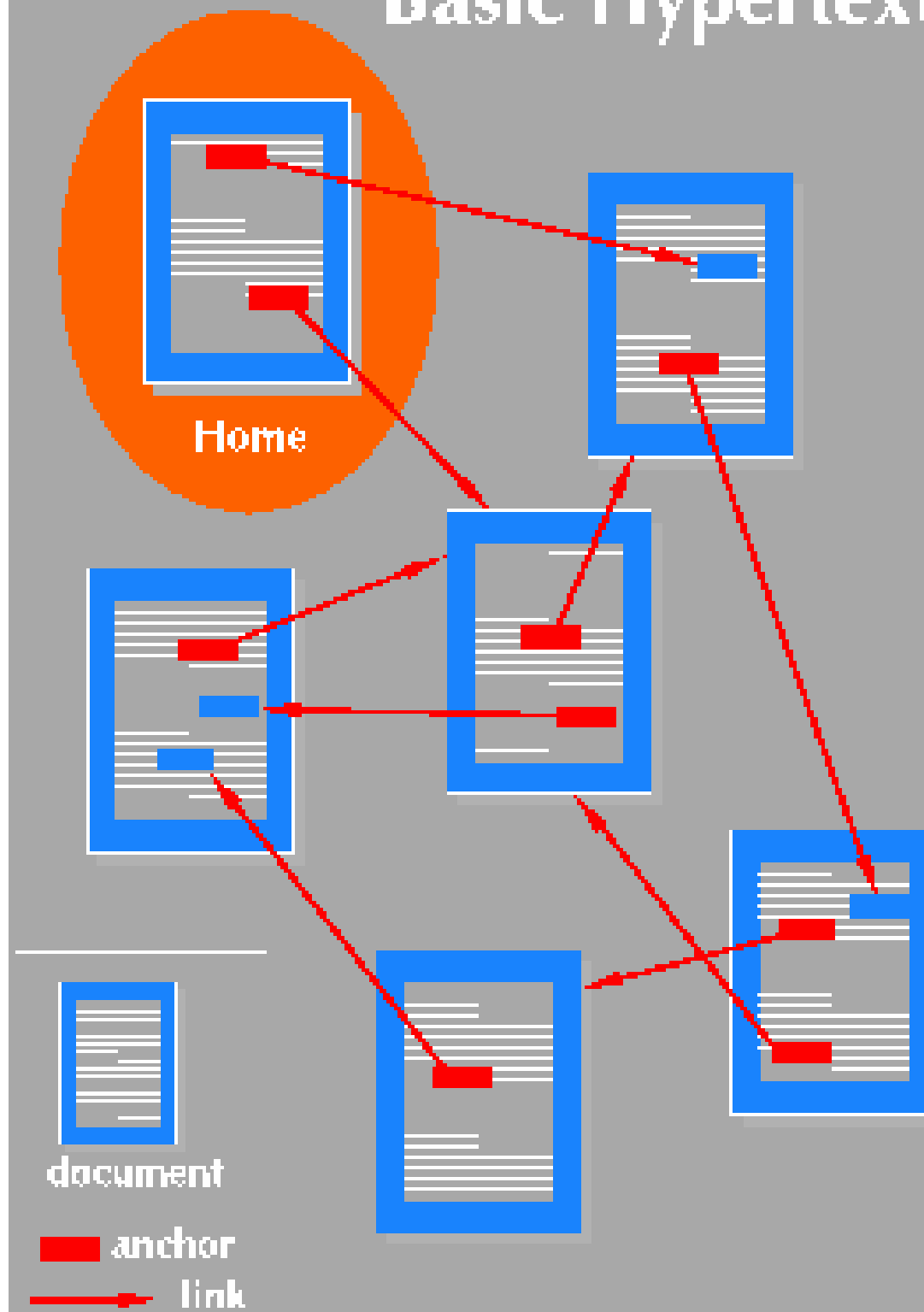
.1963 – Ted Nelson coined term hypertext. Text linked content

.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 linked UCLA and Stanford



Basic Hypertext



A Brief History of the Web

- 1972 – Email adapted for ARPANET
 - Ray Tomlinson of BBN, choose @ to separate name and host
- 1973-74 – TCP (Transmission Control Protocol)
 - Bob Kahn at DARPA and Vint Cerf at Stanford develop TCP
 - 1978 TCP finalized into TCP/IP
 - “The Network” of the internet



.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 (Domain Name 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>



A Brief History of the Web

- 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 Andreessen 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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How the Web Works

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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



Hypertext Transport Protocol ([http](#)), the message format computers use to exchange information on the Internet.

The code following the period ([.org](#)) is called the domain name. This domain indicates the information is sponsored by the smith organization.

Hypertext markup language ([html](#)) is a file extension that tells your browser this a webpage called jane.

<http://www.smith.org/~smith/rambling/jane.html>

[www](#) stands for World Wide Web.

The tilde (~) indicates a person named Smith's *personal* directory on the organization's website. Contents are not necessarily in keeping with the organization's official opinions.

([rambling](#)) A directory in the smith account called rambling. Probably just a folder for files similar to the jane.html file.



.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>



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•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

HTTP Requests



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

GET /index.html HTTP/1.1

Request Line

Date: Thu, 20 May 2004 21:12:55 GMT

Connection: close

General Headers

Host: www.myfavoriteamazingsite.com

From: joebloe@somewebsitesomewhere.com

Accept: text/html, text/plain

User-Agent: Mozilla/4.0 (compatible; MSIE 6.0; Windows NT 5.1)

Request Headers

Entity Headers

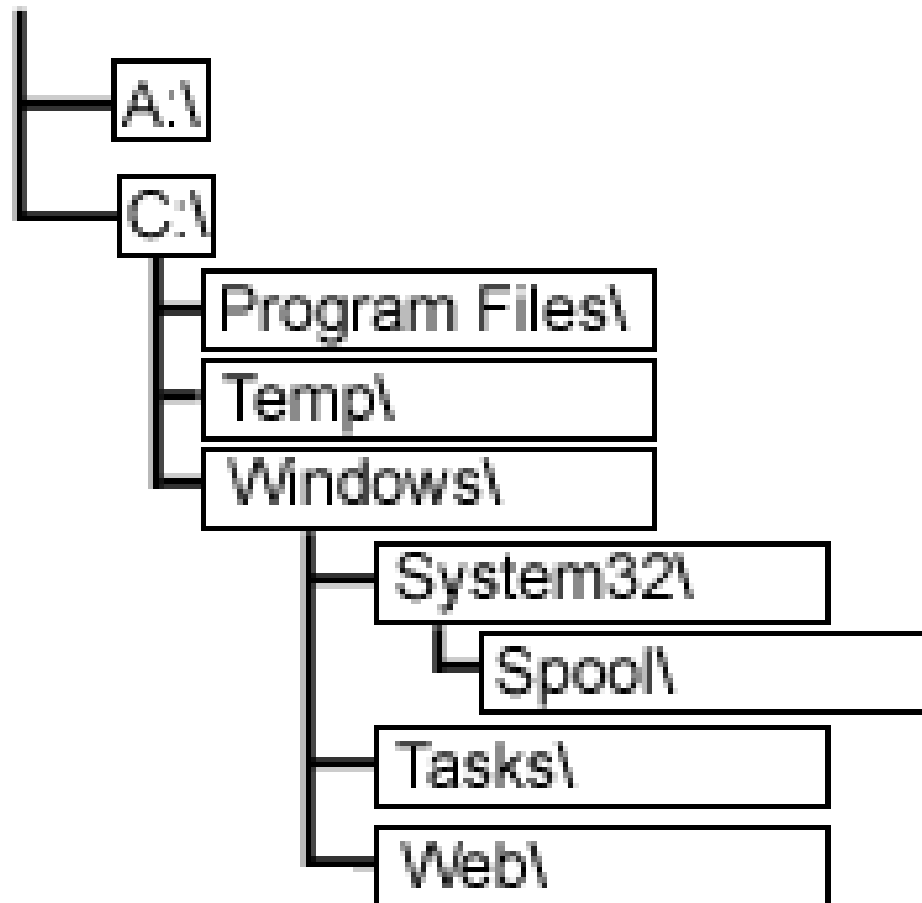
**HTTP
Request**

Message Body

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



Hierarchical file system



<http://www.computerhope.com>



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



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

http://www.tcipguide.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, experimental

.2xx – Successful

- 200 OK – Server did request and all is well
- Rest of the 200's are mostly used for scripting, not commonly seen



.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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Popular Software

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)

Software

SFTP

- WinSCP (windows)
- Filezilla (multi-platform)
- Cyberduck (mac)
- Transmit (mac)

SSH (optional for some)

- Terminal (mac & linux)
- PuTTY (windows)