

91.113 Exploring the Internet, Fall 2011

Lecture 4 Internet Basics, part II



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What are bits, bytes,
kilobytes, megabytes, and
gigabytes?



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Units of Memory

- A file is a collection of data
- Each file has a name
- The online experience of what we see and hear is comprised of files
- The software that we use needs files to run
- The larger the file, the more time is needed to download the file to your computer.

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- The size of files is measurable
- The smallest unit of data is the bit.
 - A bit is either a 1 or a 0
 - All data (and files) are a pattern of bits
- **1 byte = 8 bits**
 - Each byte can represent a letter, number or symbol.
 - The set of upper and lowercase letters, numbers, and other symbols is called the ASCII character set.

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		Least Significant Bits															
		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
		0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
M o s	0 000	NUL (0) 00	SOH (1) 01	STX (2) 02	ETX (3) 03	EOT (4) 04	ENQ (5) 05	ACK (6) 06	BEL (7) 07	BS (8) 08	HT (9) 09	LF (10) 0A	VT (11) 0B	FF (12) 0C	CR (13) 0D	SO (14) 0E	SI (15) 0F
	1 001	DLE (16) 10	DC1 (17) 11	DC2 (18) 12	DC3 (19) 13	DC4 (20) 14	NAK (21) 15	SYN (22) 16	ETB (23) 17	CAN (24) 18	EM (25) 19	SUB (26) 1A	ESC (27) 1B	FS (28) 1C	GS (29) 1D	RS (30) 1E	US (31) 1F
S i g n i f i c a n t	2 010	SP (32) 20	! (33) 21	" (34) 22	# (35) 23	\$ (36) 24	% (37) 25	& (38) 26	' (39) 27	((40) 28) (41) 29	* (42) 2A	+ (43) 2B	, (44) 2C	- (45) 2D	. (46) 2E	/ (47) 2F
	3 011	0 (48) 30	1 (49) 31	2 (50) 32	3 (51) 33	4 (52) 34	5 (53) 35	6 (54) 36	7 (55) 37	8 (56) 38	9 (57) 39	: (58) 3A	; (59) 3B	< (60) 3C	= (61) 3D	> (62) 3E	? (63) 3F
B i t s	4 100	@ (64) 40	A (65) 41	B (66) 42	C (67) 43	D (68) 44	E (69) 45	F (70) 46	G (71) 47	H (72) 48	I (73) 49	J (74) 4A	K (75) 4B	L (76) 4C	M (77) 4D	N (78) 4E	O (79) 4F
	5 101	P (80) 50	Q (81) 51	R (82) 52	S (83) 53	T (84) 54	U (85) 55	V (86) 56	W (87) 57	X (88) 58	Y (89) 59	Z (90) 5A	[(91) 5B	\ (92) 5C] (93) 5D	^ (94) 5E	_ (95) 5F
B i t s	6 110	 (96) 60	a (97) 61	b (98) 62	c (99) 63	d (100) 64	e (101) 65	f (102) 66	g (103) 67	h (104) 68	i (105) 69	j (106) 6A	k (107) 6B	l (108) 6C	m (109) 6D	n (110) 6E	o (111) 6F
	7 111	p (112) 70	q (113) 71	r (114) 72	s (115) 73	t (116) 74	u (117) 75	v (118) 76	w (119) 77	x (120) 78	y (121) 79	z (122) 7A	{ (123) 7B	 (124) 7C	} (125) 7D	-- (126) 7E	DEL (127) 7F

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- Kilobytes (K): 1K = 1024 bytes
 - Megabytes (MB): 1MB = 1024 kilobytes
 - Gigabytes (GB): 1GB = 1024 megabytes
 - Besides the size, there are two types of files:
 - ASCII text files contain ASCII characters
 - Binary files contain characters that cannot be typed on the keyboard, generated by software


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One page of plain ASCII text (54 single-spaced lines, 10pt)	5KB
One color cartoon on a Web page	50KB
One high-resolution photograph	500KB
One floppy disk (high-density/double-sided)	1.44MB
Three minutes of music (compressed MP3 format)	3MB
One medium-sized Web site (text and graphics)	50MB
60 minutes of video (compressed MPEG-4 format)	390MB
One CD-ROM	640MB
A hard drive for a new PC (in the year 2006)	120GB
One DVD	4.7–17GB

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Objectives

- Understand Host Machines & Host Names
- Understand the Client/Server Model
- Components of an web address
- Hands-on Exercise



What are Host Machines and Host Names?



Host Machines and Host Names

- Each computer on the Internet is a host machine.
- Each computer has a unique Internet Protocol (IP) address, such as 124.110.24.1
 - Some computers have a permanent IP address
 - Some computers borrow an IP address while they are connected to the Internet
- An IP address is not human-friendly

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- The IP address for most host machines are mapped to a Domain Name Service (DNS) address in order to be more people-friendly
- The DNS address consists of a host name followed by a domain name
- Example DNS Address: mail.yahoo.com
 - Host Name is: mail
 - Domain Name is: yahoo.com

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- Each domain name consists of:
 - Institutional site name
 - Top Level Domain name (TLD)
- Example: cs.uml.edu
 - cs.uml is the Dept. of Computer Science at the University of Massachusetts at Lowell
 - edu refers to an educational site

- Examples of TLDs include:
 - .com a commercial organization
 - .edu a US educational site
 - .net a network site
 - .org an organization site
 - .au Australia
 - .fr France
 - .es Spain
 - .cn China

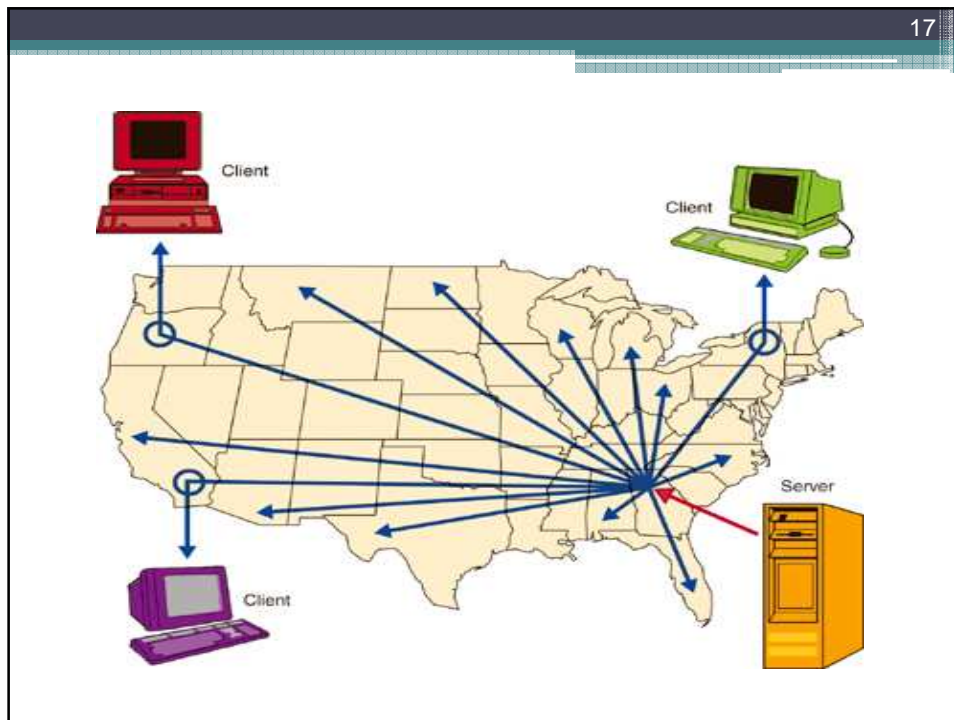
- While each machine has a unique IP address, it can have multiple DNS addresses (called aliases)
- Anyone can register a DNS address
- When you type in a DNS address, a domain name server translates it into an IP address.

What is a Client/Server Model?



The Client/Server Software Model

- Clients and servers are host machines
- A client is the host machine that requests information from the server
- The server is a resource that provides a service for (many) clients
- The client/server interaction is the foundation for all Internet communication



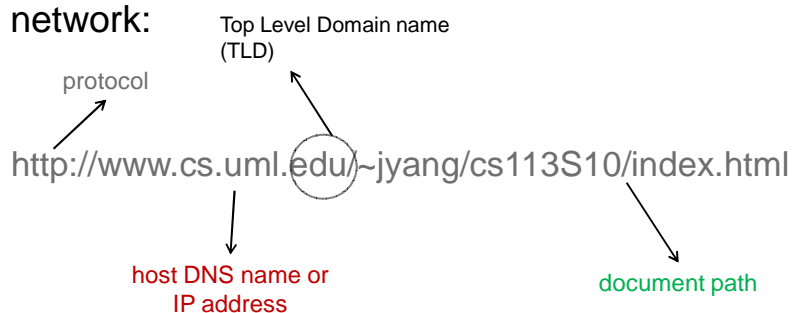
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- Some companies use servers that do not need to be installed on the client to supply commercial software to clients
 - Application Service Providers (ASPs) provide software on Web servers through subscriptions
 - Suitable selection of ASP software shift the online computing load from the client side to the server side, requiring more-powerful servers

How to tell the components of an web address?



Uniform Resource Locators (URLs)

- URL refer to the address of a document on a network:



Browser Tips and Tricks



- Turn off graphics
 - Graphics files can be large and take a long time to download
 - If you have a slow Internet connection, then you may spend time waiting for pages to load.
 - You can set your browser to not download graphics

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- Don't let a "404 Not Found" message stop you dead
 - The error means that the specified URL was not found
 - Check that the URL was correct
 - The page may have been removed or moved
 - You can always backtrack through the URL to see if a related part of the site is available

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Hands-on Exercises

Hands-on Exercise (7)

- Identify host name and domain name of the following addresses:
 - www.google.com
 - calendar.google.com

Hands-on Exercise (8)

- Identify the components of the following address
 - <http://teaching.cs.uml.edu/~heines/courses/2009-10-spring-courses.jsp>

Hands-on Exercise (9)

- How many bits does 1KB have?