SGG 3643

Computer Programming III

The Internet, URLs, Protocols

Ivin Amri Musliman

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- Domains
- Internet Services
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Web References

- HyperText Markup Language (HTML) Home Page, http://www.w3.org/MarkUp/
- *Getting started with HTML* by Dave Raggett
- Quittner, Joshua. “Network Designer:Tim Berners-Lee”. 1999, Time Magazine. http://www.time.com/time/time100/scientist/profile/bernerslee.html

Web References II

- CSS Primer: http://www.moock.org/webdesign/css/index.html
- Elements of Style: http://www.webtechniques.com/archives/2001/03/desi/
- HTML with Style Tutorials: http://webreference.com/html/tutorials/
- Style Sheet Reference Guide: http://www.webreview.com/style/

Related Work

- XML: the universal format for structured documents and data on the Web. It allows you to define your own mark-up formats when HTML is not a good fit. XML is being used increasingly for data; for instance, W3C's metadata format RDF.
- W3C's Cascading Style Sheets language (CSS) provides a simple means to style HTML pages, allowing you to control visual and aural characteristics; for instance, fonts, margins, line-spacing, borders, colors, layers and more. W3C is also working on a new style sheet language written in XML called XSL, which provides a means to transform XML documents into HTML.

Related Work II

- Document Object Model
  - Provides ways for scripts to manipulate HTML using a set of methods and data types defined independently of particular programming languages or computer platforms. It forms the basis for dynamic effects in Web pages, but can also be exploited in HTML editors and other tools by extensions for manipulating HTML content.

Definitions

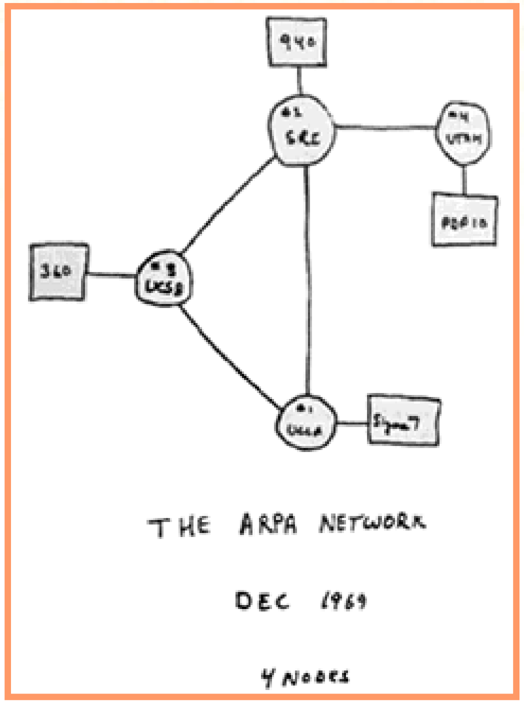
- “an internet-wide distributed hypermedia information retrieval system” [Liu et al. 1994]
- “the World Wide Web is a global, seamless environment in which all information (text, images, audio, video, computational services) that is accessible from the Internet and can be accessed in a consistent and simple way by using a standard set of naming and access conventions” [WebMaster Magazine 1996]
- “the World Wide Web (known as "WWW', "Web" or "W3") is the universe of network-accessible information, the embodiment of human knowledge” [W3C 1999]

The Web: Ideas and Objectives

- A uniform naming scheme for locating resources on the Web (e.g., URIs).
- Protocols, for access to named resources over the Web (e.g., HTTP).
- Hypertext, for visualization / presentation and easy navigation among resources (e.g. HTML, media objects).
- Availability on different computer systems
- Uniform access (reading and writing) using standard interface
- Integration of external information resources (i.e. database systems)

History

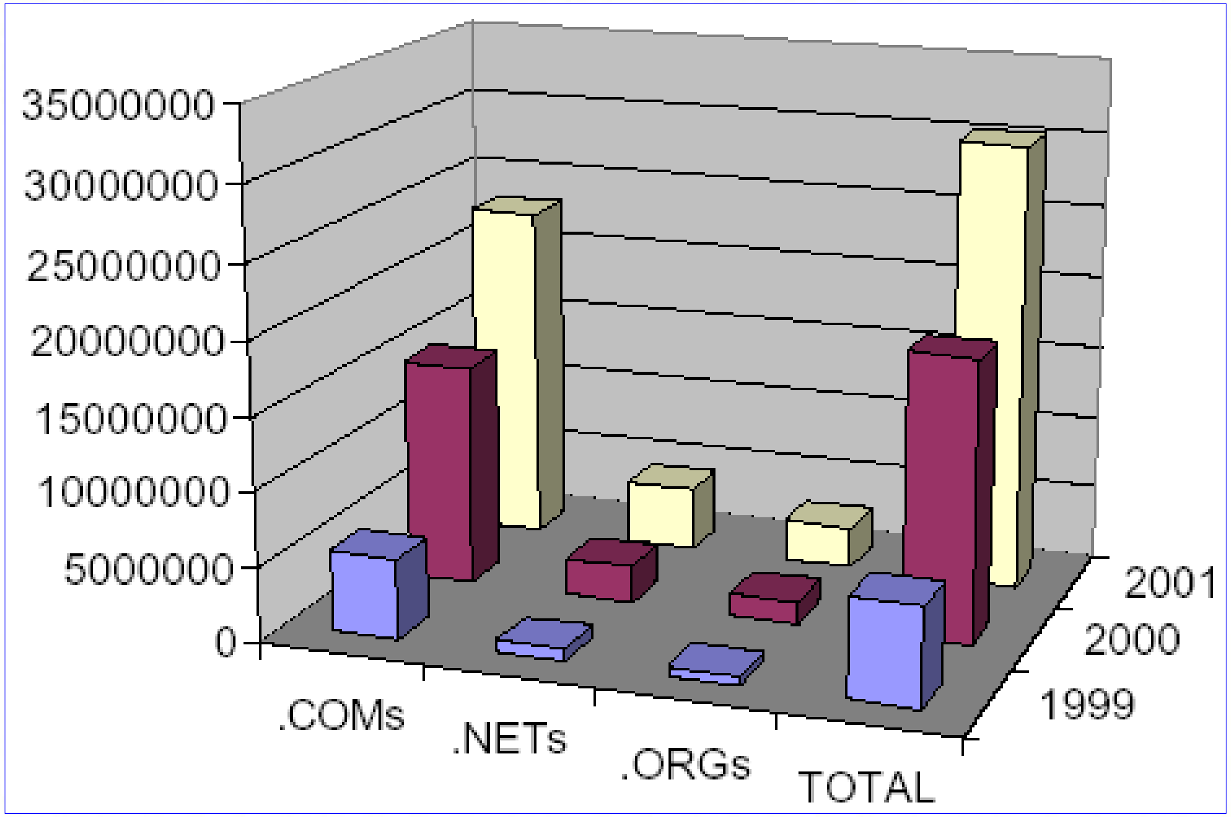
- 1965 “Hypertext” and “Hypermedia” (Ted Nelson)
- 1969 ARPANET (4 nodes)
- 1974 TCP protocol
- 1983 “Internet”
- 1989 World Wide Web (Berners-Lee, Cailliau; Release 1991)
- 1993 Mosaic Browser (Web increases 341634%
- per year)
- 1995 Web exceeds FTP in transfer volume



http://kartoweb.itc.nl/webcartography/webbook/ch06/ch06.htm

See also: A Brief History of the Internet, http://www.isoc.org/internet/history/brief.shtml

Internet Growth



Source: http://www.netfactual.com

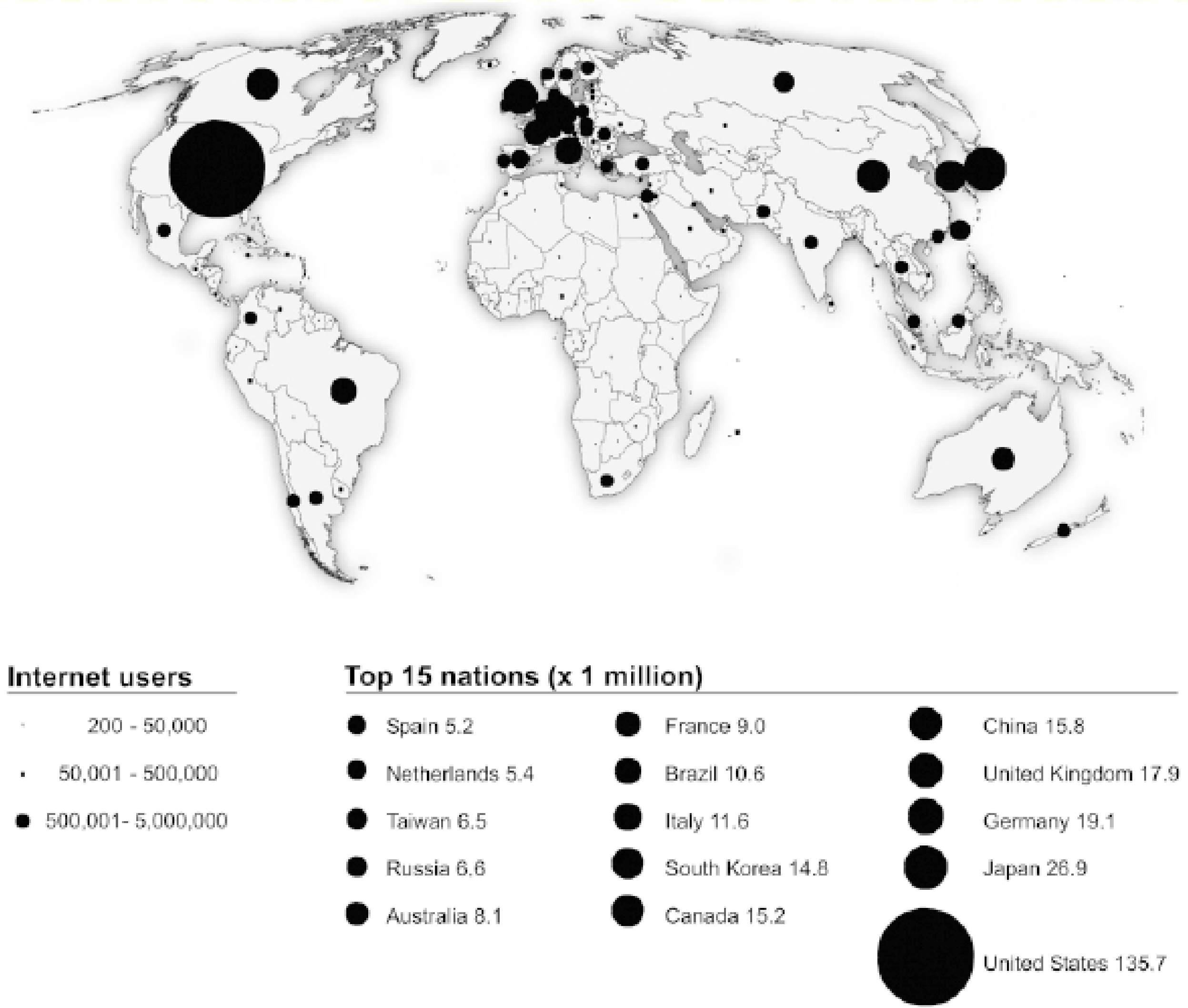
Some statistics

- Total domains registered worldwide:

31497437	INTERNATIONAL (COM)
21783099	INTERNATIONAL (EDU)
7429	INTERNATIONAL (NET)
3658670	INTERNATIONAL (ORG)
2408744	United Kingdom (CO.UK)

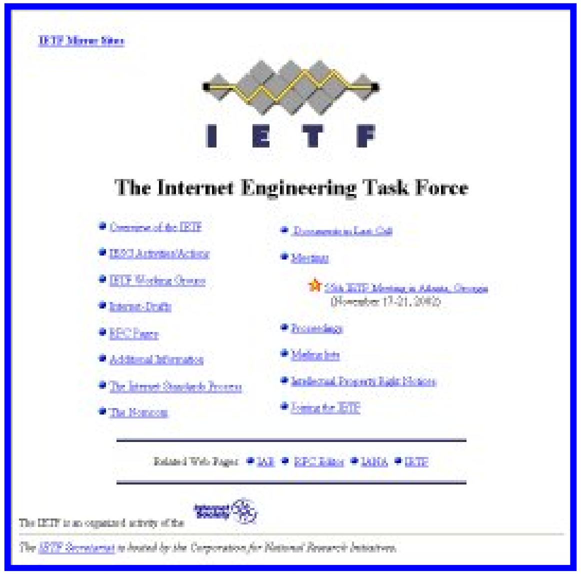
Source: http://www.domainstats.com/, Nov 23,2002

Use and Users of the Web



Corné P.J.M. van Elzakker: Use and Users of Maps on the Web, http://www.nacis.org/cp/cp37/CP37_34_50.pdf

Main organisations



IETF Mirror Sites

I E T F

The Internet Engineering Task Force

- Overview of the IETF
- IESG Activities/Actions
- IETF Working Groups
- Internet-Drafts
- RFC Pages
- Additional Information
- The Internet Standards Process
- The Nomcom

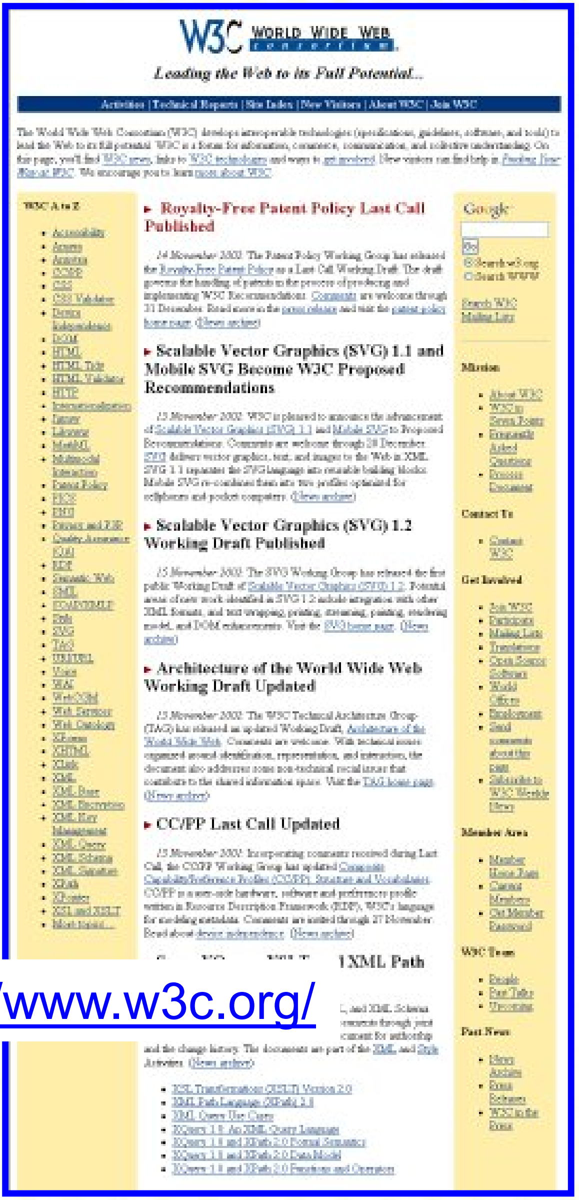
- Documents in Last Call
- Meetings
  - 55th IETF Meeting in Atlanta, Georgia (November 17-21, 2002)
- Proceedings
- Mailing lists
- Intellectual Property Rights Notices
- Joining the IETF

Related Web Pages: IAB RFC Editor IANA IRTF

The IETF is an organized activity of the Internet Society

The IETF Secretariat is hosted by the Corporation for National Research Initiatives.

http://www.ietf.org/



W3C WORLD WIDE WEB consortium

Leading the Web to its Full Potential...

Activities | Technical Reports | Site Index | New Visitors | About W3C | Join W3C

The World Wide Web Consortium (W3C) develops interoperable technologies (specifications, guidelines, software, and tools) to lead the Web to its full potential. W3C is a forum for information, commerce, communication, and collective understanding. On this page, you'll find W3C news, links to W3C technologies and ways to get involved. New visitors can find help in Finding Your Way at W3C. We encourage you to learn more about W3C.

W3C A to Z

- Accessibility
- Amaya
- Annotea
- CC/PP
- CSS
- CSS Validator
- Device Independence
- DOM
- HTML
- HTML Tidy
- HTML Validator
- HTTP
- Internationalization
- Jigsaw
- Libwww
- MathML
- Multimodal Interaction
- Patent Policy
- PICS
- PNG
- Privacy and P3P
- Quality Assurance (QA)
- RDF
- Semantic Web
- SMIL
- SOAP/XMLP
- Style
- SVG
- TAG
- URI/URL
- Voice
- WAI
- WebCGM
- Web Services
- Web Ontology
- XForms
- XHTML
- XLink
- XML
- XML Base
- XML Encryption
- XML Key Management
- XML Query
- XML Schema
- XML Signature
- XPath
- XPointer
- XSL and XSLT
- More topics...

Royalty-Free Patent Policy Last Call Published

14 November 2002: The Patent Policy Working Group has released the Royalty-Free Patent Policy as a Last Call Working Draft. The draft governs the handling of patents in the process of producing and implementing W3C Recommendations. Comments are welcome through 31 December. Read more in the press release and visit the patent policy home page. (News archive)

Scalable Vector Graphics (SVG) 1.1 and Mobile SVG Become W3C Proposed Recommendations

15 November 2002: W3C is pleased to announce the advancement of Scalable Vector Graphics (SVG) 1.1 and Mobile SVG to Proposed Recommendations. Comments are welcome through 20 December. SVG delivers vector graphics, text, and images to the Web in XML. SVG 1.1 separates the SVG language into reusable building blocks. Mobile SVG re-combines them into two profiles optimized for cellphones and pocket computers. (News archive)

Scalable Vector Graphics (SVG) 1.2 Working Draft Published

15 November 2002: The SVG Working Group has released the first public Working Draft of Scalable Vector Graphics (SVG) 1.2. Potential areas of new work identified in SVG 1.2 include integration with other XML formats, and text wrapping, printing, streaming, painting, rendering model, and DOM enhancements. Visit the SVG home page. (News archive)

Architecture of the World Wide Web Working Draft Updated

15 November 2002: The W3C Technical Architecture Group (TAG) has released an updated Working Draft, Architecture of the World Wide Web. Comments are welcome. With technical issues organized around identification, representation, and interaction, the document also addresses some non-technical social issues that contribute to the shared information space. Visit the TAG home page. (News archive)

CC/PP Last Call Updated

15 November 2002: Incorporating comments received during Last Call, the CC/PP Working Group has updated Composite Capability/Preference Profiles (CC/PP): Structure and Vocabularies. CC/PP is a user-side hardware, software and preference profile written in Resource Description Framework (RDF), W3C's language for modeling metadata. Comments are invited through 27 November. Read about device independence. (News archive)

[illegible] XML Path

[illegible], and XML Schema [illegible] comments through joint [illegible] comment for authorship and the change history. The documents are part of the XML and Style Activities. (News archive)

- XSL Transformations (XSLT) Version 2.0
- XML Path Language (XPath) 2.0
- XML Query Use Cases
- XQuery 1.0: An XML Query Language
- XQuery 1.0 and XPath 2.0 Formal Semantics
- XQuery 1.0 and XPath 2.0 Data Model
- XQuery 1.0 and XPath 2.0 Functions and Operators

Google

Go

○ Search w3.org
○ Search WWW

Search W3C Mailing Lists

Mission

- About W3C
- W3C in Seven Points
- Frequently Asked Questions
- Process Document

Contact Us

- Contact W3C

Get Involved

- Join W3C
- Participate
- Mailing Lists
- Translations
- Open Source Software
- World Offices
- Employment
- Send comments about this page
- Subscribe to W3C Weekly News

Member Area

- Member Home Page
- Current Members
- Get Member Password

W3C Team

- People
- Past Talks
- Upcoming

Past News

- News Archive
- Press Releases
- W3C in the Press

http://www.w3c.org/

Substantial ideas

- Document format
  - Hypertext Markup Language, HTML
  - Document Type Definition (DTD) Standardized General Markup Language (SGML)
- Transfer Protocol
  - Hypertext Transfer Protocol, HTTP (ASCII-coded Request-Reply protocol using TCP/IP)

Substantial ideas II

- Uniform identification schema: Uniform Resource Identifier (URI)
- Information resources
  - Information resources must be identifiable (per name, per adress / location)
  - Each resources in the Internet should be identifiable
  - Identification schema (string!) must be expandable and complete.

Uniform Resource Identifier

Uniform Resource Identifier (URI)

- Syntax for all Identificators [RFC2396]

  <uri> ::= <scheme>":"<scheme-specific-part>

- An absolute URI contains the name of the scheme being used (<scheme>) followed by a colon (":") and then a string (the <scheme-specific- part>) whose interpretation depends on the scheme.

- <scheme> Name schema for this URI
- <scheme-specific-part> contains actual identification corresponding to this scheme

Uniform Resource Identifier (URI) II

- URIs can be:
  - Locations / adresses: Uniform Resource Locator (URL)
  - Names: Uniform Resource Name (URN, Objective: Uniform names for all resources)
  - Metainformationen: Uniform Resource Characteristic (URC)

URI examples

- ftp://ftp.is.co.za/rfc/rfc1808.txt - ftp scheme for File Transfer Protocol services
- http://www.math.uio.no/faq/compression-faq/part1.html- http scheme for Hypertext Transfer Protocol services
- mailto:mduerst@ifi.unizh.ch- mailto scheme for electronic mail addresses
- news:comp.infosystems.www.servers.unix- news scheme for USENET news groups and articles
- telnet://melvyl.ucop.edu/- telnet scheme for interactive services via the TELNET Protocol

URN – experimental state

- URN [RFC 1737, RFC 2141, RFC 3061]
  (<scheme> ::= "urn")
  <urn> ::= "urn:" <nid> ":" <nss>
  - nid = Namespace Identifier
  - nss = Namespace Specific String
- Properties::
- Uniform Resource Names (URNs) are intended to serve as persistent, location-independent, resource identifiers.
  - globally unique (global scope and uniqueness)
  - persistent
  - Extensible, independent

Uniform Resource Locator (URL)

- URL scheme Definitionen [RFC1738]:

  http, https, ftp, news, mailto, telnet and others

- scheme-specific-part has the general format:

  ["//"] [user [":"password] "@"] host [":"port] ["/"url-path]

- relative URLs possible [RFC 1808]

- General scheme-specific-part can be reduced to:
  <http_URL> = "http://" <host> [":" <port>] [<abs_path>]

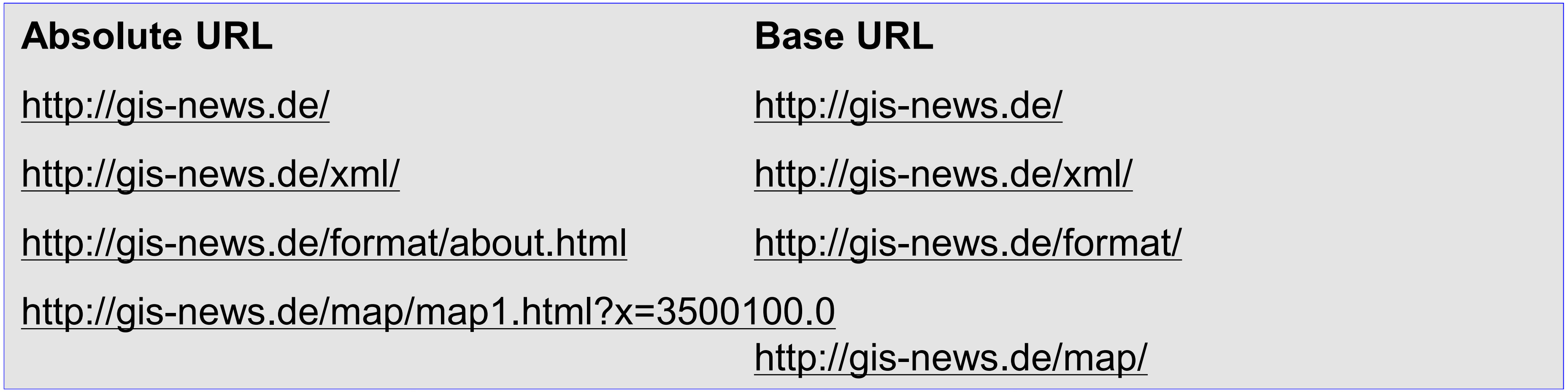
  Example: http://www.gis-news.de/links/xml.htm

URL: ["//"] [user [":"password] "@"] host [":"port] ["/"url-path]

- user: An optional user name. Some schemes (e.g., ftp) allow the specification of a user name.
- password: An optional password. If present, it follows the user name separated from it by a colon.
- The user name (and password), if present, are followed by a at-sign "@". Within the user and password field, any ":", "@", or "/" must be encoded.
- host: The fully qualified domain name of a network host, or its IP address (RFC 1034).
- port: The port number to connect to; in most cases: default port number.
- url-path: supplies the details of how the specified resource can be accessed. Note that the "/" between the host (or port) and the url-path is NOT part of the url-path.

Base URLs

- The Base URL of a resource is everything up to and including the last slash in its pathname.



Absolute URL	Base URL
http://gis-news.de/	http://gis-news.de/
http://gis-news.de/xml/	http://gis-news.de/xml/
http://gis-news.de/format/about.html	http://gis-news.de/format/
http://gis-news.de/map/map1.html?x=3500100.0	http://gis-news.de/map/

Absolute vs. relative URLs

- absolute URLs: identified a resource *independent* of their context.
- relative URLs: a way to identify a resource *relative* to their base URL.

Source: WebReference.com

Relative URL Examples

- Example:
  Base URL: http://WebReference.com/html/

Relative URI	Absolute URI
about.html	http://WebReference.com/html/about.html
tutorial1/	http://WebReference.com/html/tutorial1/
tutorial1/2.html	http://WebReference.com/html/tutorial1/2.html
/	http://WebReference.com/
//www.internet.com/	http://www.internet.com/
/experts/	http://WebReference.com/experts/
../	http://WebReference.com/
../experts/	http://WebReference.com/experts/
../../../	http://WebReference.com/
./	http://WebReference.com/html/
./about.html	http://WebReference.com/html/about.html

Rules for URI, URN and URL

Several Rules are prerequisites for uniform resource identifier:

- Character set: ISO Latin-1 (similar ASCII-character set)
- No blanks: Masqueraded by %20.
- Reserved characters are among others:
  - Escape character (**%**): Identification of characters.
  - /: Hierarchical separation of directory and file names.
  - Fragment Delimiter (**#**): Separates URI from a fragment or a partial field of a data object.
  - Query Delimiter (**?**): Separates query string of a ressource from the URI **à** see Common Gateway Interface (CGI)

http://www.utoronto.ca/webdocs/HTMLdocs/NewHTML/iso_table.html

Example:

- http://localhost/cgi-bin/mapserv.exe?img.x=348&img.y=318&zoomdir=1&zoomsize=2&layer=St%E4dte&layer=motorway&layer=roads&layer=Fl%FCsse&layer=H%F6henstufen&layer=Europe&map=C%3A%2FProgramme%2FApache+Group%2FApache%2Fhtdocs%2Fdemo.map&imgext=4.296614+49.186302+7.284114+52.174938&imgxy=274.5+274.5

IP-Addresses

IP-Addresses

- Every computer that communicates over the Internet is assigned an IP address that uniquely identifies the device and distinguishes it from other computers on the Internet.
- An IP address consists of 32 bits, often shown as 4 octets of numbers from 0-255 represented in decimal form instead of binary form.
- Example:

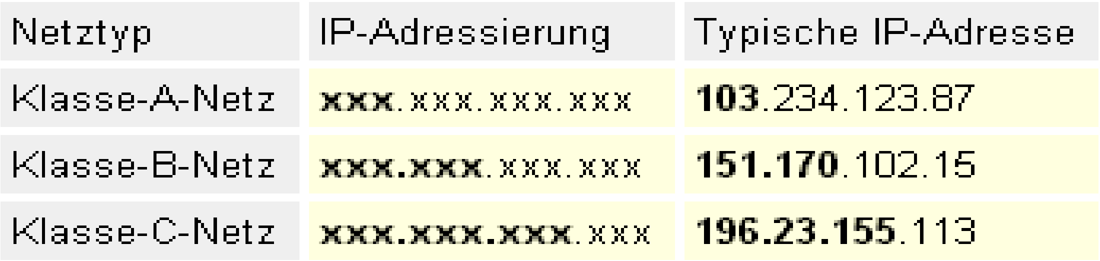
168.212.226.204

↓

10101000.11010100.11100010.11001100

IP-Addresses

- An IP address consists of two parts, one identifying the network and one identifying the node, or host.
- The Class of the address determines which part belongs to the network address and which part belongs to the node address. All nodes on a given network share the same network prefix but must have a unique host number.
- -> Network classes A, B, C [, D, E]



Netztyp	IP-Adressierung	Typische IP-Adresse
Klasse-A-Netz	**xxx**.xxx.xxx.xxx	**103**.234.123.87
Klasse-B-Netz	**xxx.xxx**.xxx.xxx	**151.170**.102.15
Klasse-C-Netz	**xxx.xxx.xxx**.xxx	**196.23.155**.113

Details: http://www.oreilly.com/catalog/coreprot/chapter/appb.html

IP Classes

- **Class C**

  This is the most widely used class by small businesses. When you look at the IP address, you'll notice that class C networks start with a first number that's between 192 and 223

  Example: $\underbrace{205.161.74}_{\text{Network identity}}.\underbrace{x}_{\text{Host in this network}}$

- There can be up to 2,097,151 class C networks and each network can handle close to 254 computers.

IP Classes B and A

- **Class B**
  IP addresses of this type starts with a number between 128 and 191. It's possible to have 16,384 of these networks and each class B network can handle up to 65,534 IP addresses or computers.

- **Class A**
  Starts with a number between 1 and 126. Only 126 of these networks are available, however each class A network can handle 16,777,214 IP addresses or computers.

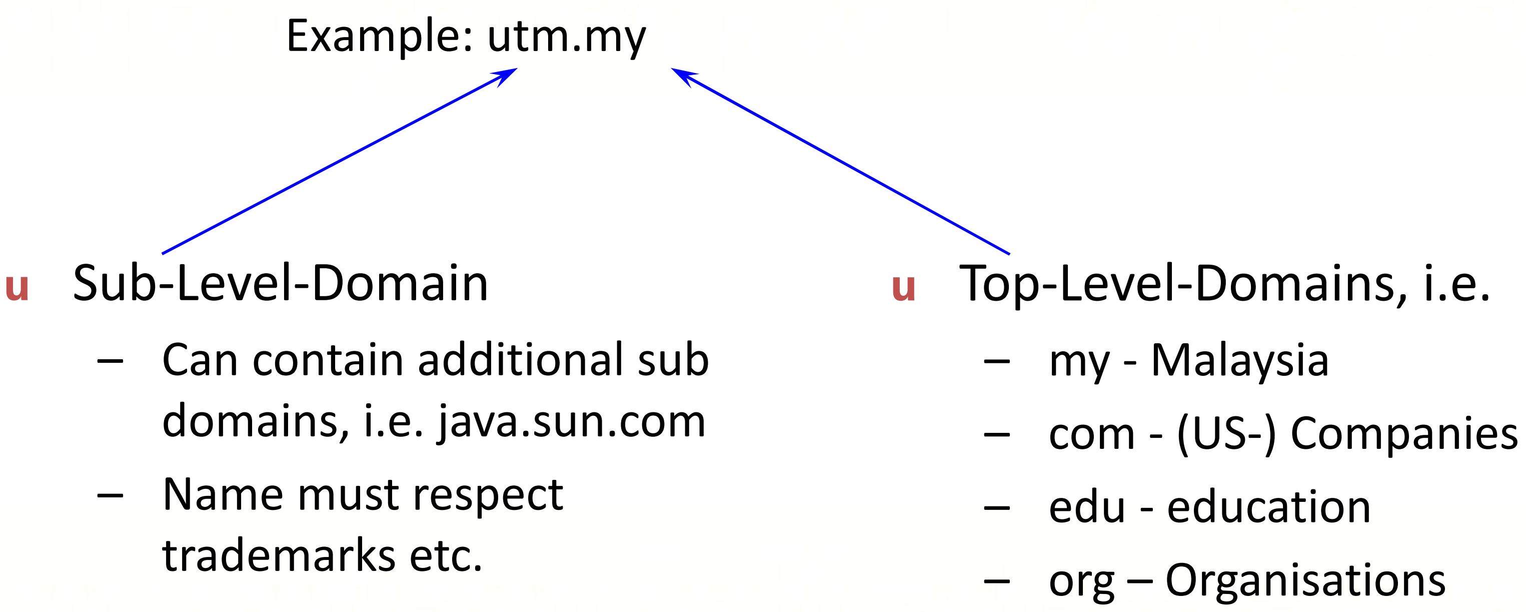
Class D and E Networks

- **Class D Network:**
  Binary addresses start with 1110, therefore the decimal number can be anywhere from 224 to 239. Class D networks are used to support multicasting.

- **Class E Network:**
  Binary addresses start with 1111, therefore the decimal number can be anywhere from 240 to 255. Class E networks are used for *experimentation*. They have never been documented or utilized in a standard way.

DNS - Domain Name Service

- Mapping of host names to IP addresses



Example: utm.my

- Sub-Level-Domain
  - Can contain additional sub domains, i.e. java.sun.com
  - Name must respect trademarks etc.
- Top-Level-Domains, i.e.
  - my - Malaysia
  - com - (US-) Companies
  - edu - education
  - org – Organisations

Responsible: National authorities, like Suruhanjaya Komunikasi & Multimedia Malaysia (SKMM), and Telekom Malaysia.

Domain Name: Definition

- A domain name is a unique, clear and descriptive addressing standard used to locate a specific destination on the Internet. They are primarily used to point to website pages or used in the creation of email addresses.

- A domain name often relates to the name of a business, organisation or service, and like any company name, it has to be registered.

Length and characters of domain names

- Usually between 3 and 63 characters long (excluding the suffix such as .com),
- Alphanumeric characters and the hyphen (e.g., 0 to 9, a to z and the hyphen (-)). Some domains can have less than 3 characters, or may not allow as many as 63, but as a general rule these are typical.
- A space cannot be used in a domain name, and should not begin or end with a hyphen (-).
- Recommendation: that the domain name be kept short for ease of use and to make it easier to remember.

Top Level Domains

- **Top Level Domain**: The highest level domains.
- They are either
  - gTLD - Generic Top Level Domain (e.g..com, .net) or
  - ccTLD - Country Code Top Level Domain, e.g. .my, .sg
  - Country codes can be found at ISO
- **Second Level Domain** (SLD) - Domain names with two or more suffixes, e.g. co.uk.

Internet Services

- World Wide Web (WWW)
- Newsgroups (News)
- E-Mail
- Telnet
- File Transfer (FTP)
- Chat (IRC)
- Gopher, …

Internet Services

- World-Wide Web

  An application that uses the Internet to transport hypertext/multimedia documents. These documents are viewed by a ***browser***
- Newsgroups
- e-mail
- telnet
- ftp

Internet Services

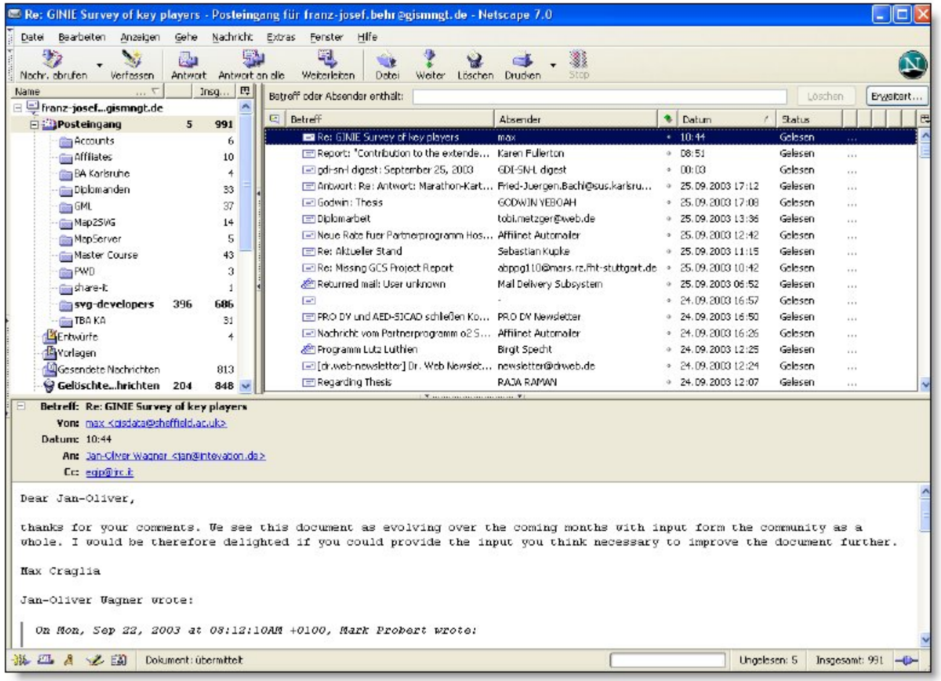
- World-Wide Web
- Newsgroups

  An on-line forum that allows users from all over the world to participate in a discussion about a specific topic
- e-mail
- telnet
- ftp

Internet Services

- World-Wide Web
- Newsgroups
- e-mail

  Electronic mail
- telnet
- ftp



Name		Insg...
franz-josef...gismngt.de		
Posteingang	**5**	**991**
Accounts		6
Affiliates		10
BA Karlsruhe		4
Diplomanden		33
GML		37
Map2SVG		14
MapServer		5
Master Course		43
PWD		3
share-it		1
svg-developers	**396**	**686**
TBA KA		31
Entwürfe		4
Vorlagen		
Gesendete Nachrichten		813
Gelöschte...hrichten	**204**	**848**

Betreff	Absender	Datum	Status
Re: GINIE Survey of key players	max	10:44	Gelesen
Report: "Contribution to the extende...	Karen Fullerton	08:51	Gelesen
gdi-sn-l digest: September 25, 2003	GDI-SN-L digest	00:03	Gelesen
Antwort: Re: Antwort: Marathon-Kart...	Fried-Juergen.Bachl@sus.karlsru...	25.09.2003 17:12	Gelesen
Godwin: Thesis	GODWIN YEBOAH	25.09.2003 17:08	Gelesen
Diplomarbeit	tobi.metzger@web.de	25.09.2003 13:36	Gelesen
Neue Rate fuer Partnerprogramm Hos...	Affilinet Automailer	25.09.2003 12:42	Gelesen
Re: Aktueller Stand	Sebastian Kupke	25.09.2003 11:15	Gelesen
Re: Missing GCS Project Report	abppg110@mars.rz.fht-stuttgart.de	25.09.2003 10:42	Gelesen
Returned mail: User unknown	Mail Delivery Subsystem	25.09.2003 06:52	Gelesen
	-	24.09.2003 16:57	Gelesen
PRO DV und AED-SICAD schließen Ko...	PRO DV Newsletter	24.09.2003 16:50	Gelesen
Nachricht vom Partnerprogramm o2 S...	Affilinet Automailer	24.09.2003 16:26	Gelesen
Programm Lutz Luithlen	Birgit Specht	24.09.2003 12:25	Gelesen
[dr.web-newsletter] Dr. Web Newslet...	newsletter@drweb.de	24.09.2003 12:24	Gelesen
Regarding Thesis	RAJA RAMAN	24.09.2003 12:07	Gelesen

Betreff: Re: GINIE Survey of key players
Von: max <gisdata@sheffield.ac.uk>
Datum: 10:44
An: Jan-Oliver Wagner <jan@intevation.de>
Cc: egip@jrc.it

```
Dear Jan-Oliver,

thanks for your comments. We see this document as evolving over the coming months with input form the community as a
whole. I would be therefore delighted if you could provide the input you think necessary to improve the document further.

Max Craglia

Jan-Oliver Wagner wrote:

  On Mon, Sep 22, 2003 at 08:12:10AM +0100, Mark Probert wrote:
```

Dokument: übermittelt   Ungelesen: 5   Insgesamt: 991

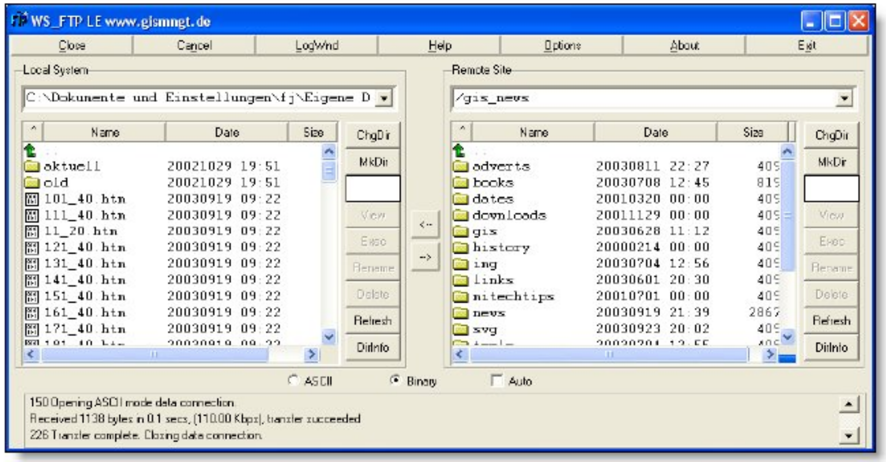
Internet Services

- World-Wide Web
- Newsgroups
- e-mail
- telnet

  A program which permits a user on one computer to use that computer as a terminal to access another, perhaps distant, computer
- ftp

Internet Services

- World-Wide Web
- Newsgroups
- e-mail
- telnet
- ftp



Local System

C:\Dokumente und Einstellungen\fj\Eigene D

Name	Date	Size
..		
aktuell	20021029 19:51	
old	20021029 19:51	
101_40.htm	20030919 09:22	
111_40.htm	20030919 09:22	
11_20.htm	20030919 09:22	
121_40.htm	20030919 09:22	
131_40.htm	20030919 09:22	
141_40.htm	20030919 09:22	
151_40.htm	20030919 09:22	
161_40.htm	20030919 09:22	
171_40.htm	20030919 09:22	

Remote Site

/gis_news

Name	Date	Size
..		
adverts	20030811 22:27	409
books	20030708 12:45	819
dates	20010320 00:00	409
downloads	20011129 00:00	409
gis	20030628 11:12	409
history	20000214 00:00	409
img	20030704 12:56	409
links	20030601 20:30	409
nitechtips	20010701 00:00	409
news	20030919 21:39	2867
svg	20030923 20:02	409

○ ASCII ● Binary □ Auto

```
150 Opening ASCII mode data connection.
Received 1138 bytes in 0.1 secs, (110.00 Kbps), transfer succeeded
226 Transfer complete. Closing data connection.
```

File Transfer Protocol: protocol for transferring files between computers – important for uploading your files to a web site!

MIME Types

- Multipurpose Internet Mail Extensions
- redefine the format of messages to allow for
  - textual message bodies in character sets other than US-ASCII,
  - an extensible set of different formats for non-textual message bodies (i.e. image media, audio media, video media, applications)
  - multi-part message bodies (data consisting of multiple entities of independent data types), and
  - textual header information in character sets other than US-ASCII.

MIME Types

- General form: type and subtype

  text/plain

- always case-insensitive.

Content-type: text/plain; charset=iso-8859-1

- The "text" media type is intended for sending material which is principally textual in form.
- A "charset" parameter may be used to indicate the character set of the body text.
- Plain: text that does not contain any formatting commands or directives. Plain text is intended to be displayed "as-is", that is, no interpretation of embedded formatting commands, font attribute specifications, processing instructions, interpretation directives, or content markup should be necessary for proper display.

Other content types

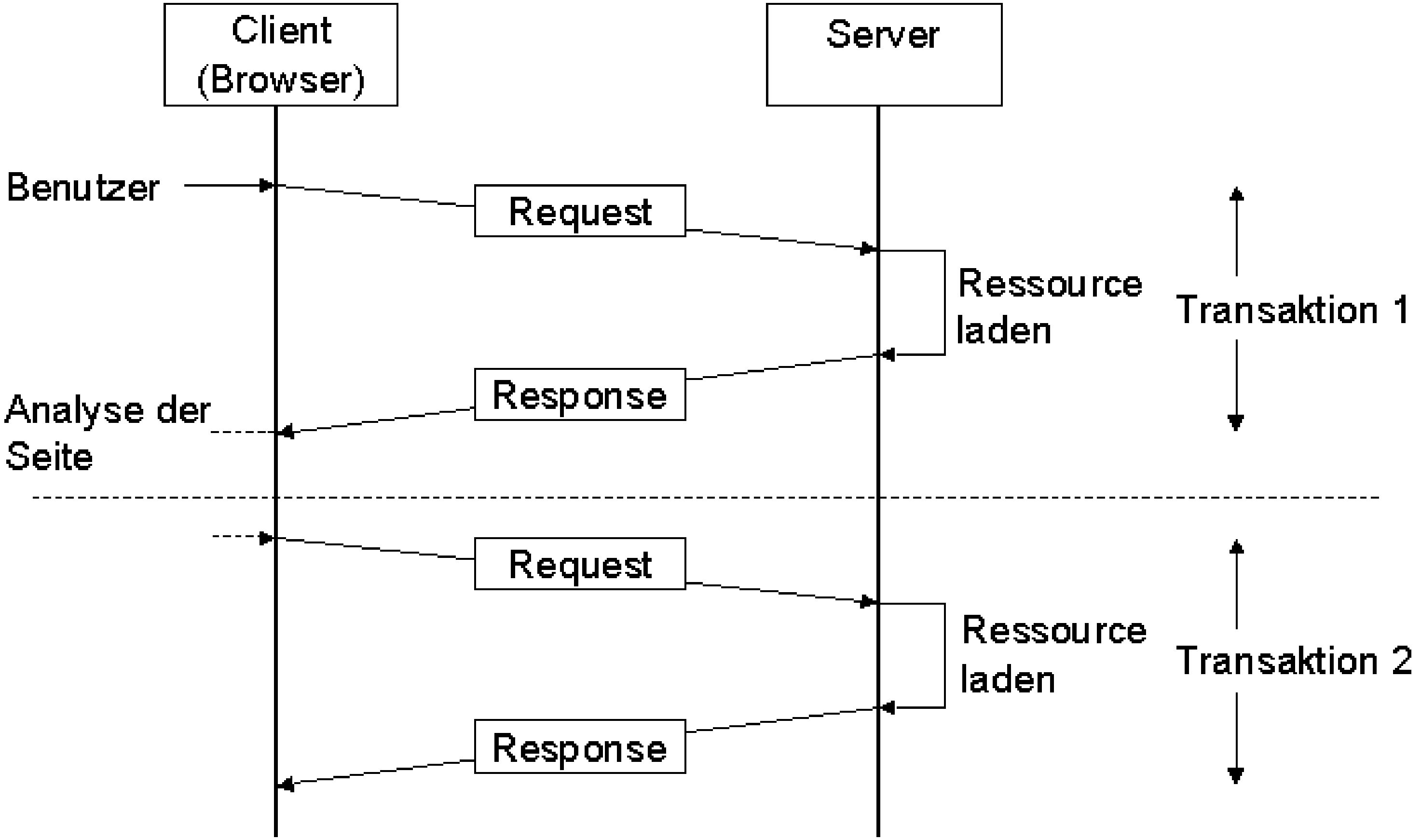
- text/html
- text/css
- image/jpeg
- application/excel

Hypertext Transfer Protocol, HTTP

- Properties:
  - Based on TCP/IP
  - stateless, HTTP 1.1: persistent connections.
  - ASCII coded
  - Transfer of text and multimedia resources, i.e. graphic, images, audio, video
  - based on MIME (multipurpose internet mail extensions)

More information:
http://www.mhonarc.org/~ehood/MIME/2046/rfc2046.html
http://www.w3.org/Protocols/

HTTP Example for Transaction

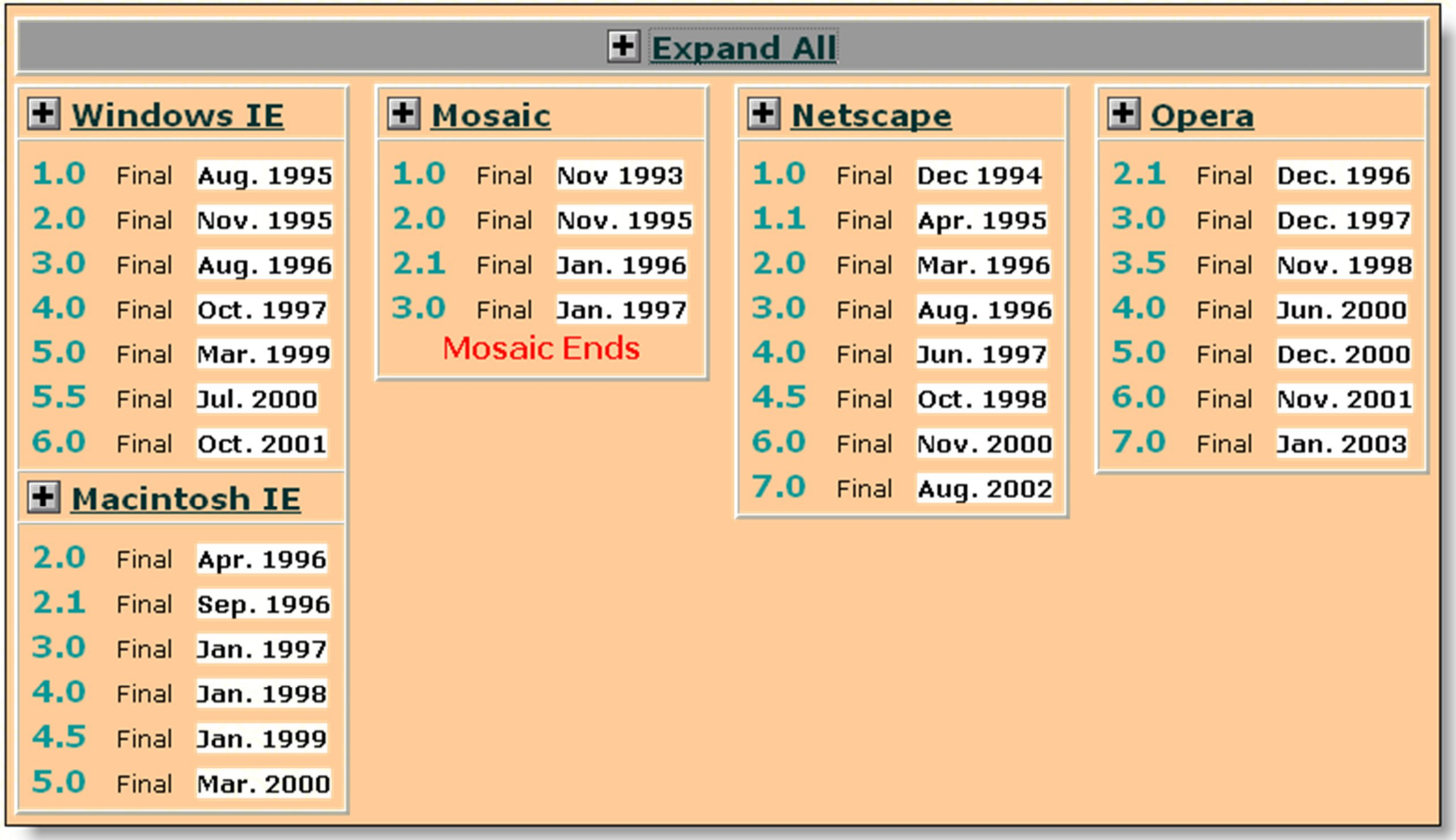


Source: http://www.teco.uni-karlsruhe.de/lehre/webe/webev221099/sld046.htm

HTML user clients (i.e. browser)

- HTTP: Client server oriented protocol
- “User Client”: browser
  - parses the characters of an HTML document into data characters and markup.
  - robust, extensible (i.e. plug-ins, JAVA)
  - supports the `ISO-8859-1’ character encoding scheme and processes each character in the ISO Latin Alphabet No. 1
  - allows the user to traverse hyperlinks from <a> elements in an HTML document.

HTML user clients (i.e. browser)



⊞ Expand All

⊞ Windows IE

1.0	Final	Aug. 1995
2.0	Final	Nov. 1995
3.0	Final	Aug. 1996
4.0	Final	Oct. 1997
5.0	Final	Mar. 1999
5.5	Final	Jul. 2000
6.0	Final	Oct. 2001

⊞ Macintosh IE

2.0	Final	Apr. 1996
2.1	Final	Sep. 1996
3.0	Final	Jan. 1997
4.0	Final	Jan. 1998
4.5	Final	Jan. 1999
5.0	Final	Mar. 2000

⊞ Mosaic

1.0	Final	Nov 1993
2.0	Final	Nov. 1995
2.1	Final	Jan. 1996
3.0	Final	Jan. 1997

Mosaic Ends

⊞ Netscape

1.0	Final	Dec 1994
1.1	Final	Apr. 1995
2.0	Final	Mar. 1996
3.0	Final	Aug. 1996
4.0	Final	Jun. 1997
4.5	Final	Oct. 1998
6.0	Final	Nov. 2000
7.0	Final	Aug. 2002

⊞ Opera

2.1	Final	Dec. 1996
3.0	Final	Dec. 1997
3.5	Final	Nov. 1998
4.0	Final	Jun. 2000
5.0	Final	Dec. 2000
6.0	Final	Nov. 2001
7.0	Final	Jan. 2003

http://www.blooberry.com/indexdot/history/browsers.htm

HTML user clients (i.e. browser)

- Today we have > 80% IE 5.0, 5.5 and IE6, less than 10% NN4.xx and approximately 3.5% IE4.
- Netscape 7, Opera and other browsers are fighting for the rest (http://www.upsdell.com/BrowserNews/stat.htm).
- 15% have browsers with Java disabled or unsupported.

HTTP request headers

- Here is an example request:

```
GET /X/Y.html HTTP/1.0
Connection: Keep-Alive
User-Agent: Mozilla/4.61 [en] (Win95; I)
Host: site.org:8000
Accept: image/gif, image/x-xbitmap, image/jpeg,
image/pjpeg, image/png, */*
Accept-Encoding: gzip
Accept-Language: en
Accept-Charset: iso-8859-1,*,utf-8
Extension: Security/Remote-Passphrase
```

HTTP response headers

- A possible response to that request:

Status Code

```
HTTP/1.1 200 OK
Date: Mon, 11 Oct 1999 18:55:17 GMT
Server: Apache/1.2.6 Red Hat
Last-Modified: Sun, 10 Oct 1999 22:45:13 GMT
Content-Length: 52
Content-Type: text/html

<html>
This is page Y.html in directory X.
</html>
```

Explanation of Status Code: ftp://ftp.isi.edu/in-notes/rfc2616.txt