

Unit 1

INTRODUCTION TO THE WEB

2CP08: WEB TECHNOLOGIES

K J SHARMA

Contents

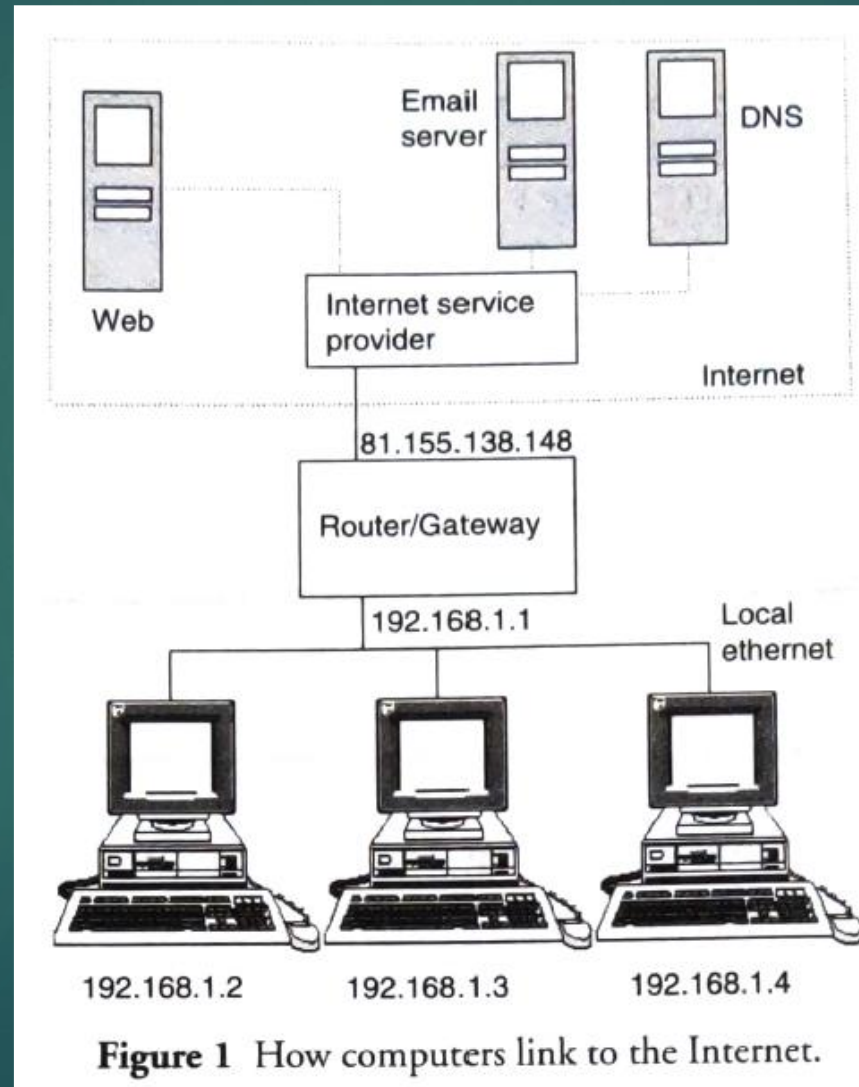


- ▶ Concept of WWW
- ▶ Internet and WWW
- ▶ HTTP Protocol : Request and Response
- ▶ Web browser and Web servers
- ▶ Web 1.0, Web 2.0, and Web 3.0
- ▶ Designing an Effective Web Site
- ▶ Web Site Design Issues
- ▶ Planning a Web Site
- ▶ Navigation

Concept of WWW

- ▶ 1960s ARPANET: Defense Advanced Research Projects Agency (DARPA)
- ▶ 1989s European Particle Physics Laboratory, introduce Hypertext space, any network accessible information could be refereed to by single "Universal Document identifier"
- ▶ 1990s: Development of web browser and web server, WWW, URIs, HTML, HTTP
- ▶ 1991s to 1994s load first web server info.cern.ch increase factor of ten every year
- ▶ 1994s W3C World wide webs consortium: act as neutral forum

Internet and WWW



OSI Model

Table1 OSI model

<i>OSI Level</i>	<i>Stack Layer</i>	<i>Protocol</i>
7	Application	HTTP, SMTP, SNMP, FTP, Telnet, SSH, Scp, NFS, RTSP
6	Presentation	XDR, ASN.1, SMB, AFP
5	Session	TLS, SSH, RPC, NetBIOS, ASP
4	Transport	TCP, UDP, RTP, SCTP, SPX, ATP
3	Network	IP, ICMP, IGMP, X.25, CLNP, ARP, RARP, BGP, OSPF, RIP, IPX, DDP
2	Data Link	Ethernet, Token Ring, PPP, HDLC, Frame Relay, ISDN, ATM, 802.11 Wi-Fi, FDDI
1	Physical	Electrical, radio, laser

Internet Layered Model


Table 2 Internet layered model

<i>OSI Level</i>	<i>Stack Layer</i>	<i>Protocol</i>
7	Application	HTTP, SMTP, SNMP, FTP, Telnet, SSH, Scp, DNS
4	Transport	TCP, UDP, RTP, SCTP, SPX, ATP
3	Network	IP, ICMP, IGMP, X.25, CLNP, ARP, RARP, BGP, OSPF, RIP, IPX, DDP
2	Data Link	Ethernet, Token Ring, PPP, HDLC, Frame Relay, ISDN, ATM, 802.11 Wi-Fi, FDDI
1	Physical	Electrical, radio, laser

Protocols and Programs

FTP

```
>ftp mysuperserver.co.uk
Connected to mysuperserver.co.uk.
220 FTP Server ready.
Name (mysuperserver.co.uk:ralphmoseley): ralph101
331 Password required for ralph101.
Password:
230 User ralph101 logged in.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp>put myIndex.doc
```

- 
1. ftp – start an ftp session
 2. ls – list files
 3. get – download a file from the server
 4. put – upload a file to the server
 5. mkdir – make a directory on the server
 6. cd – change to a new directory on the server
 7. close – close the connection
 8. open – open a new connection
 9. bin – binary mode transfer
 10. asc – ASCII text mode transfer.

EMAIL

- ▶ SMTP Client
- ▶ POP3
- ▶ IM

Remote Machine Access

SSH, TELNET

```
Raptor-Computer: ~ ralphmoseley$ ssh ralph@192.168.1.4
Password: [type password]
Last login: Sat Mar 12 18:50:54 2005 from 192.168.1.2
Copyright (c) 1980, 1983, 1986, 1988, 1990, 1991, 1993, 1994
The Regents of the University of California. All rights
reserved.

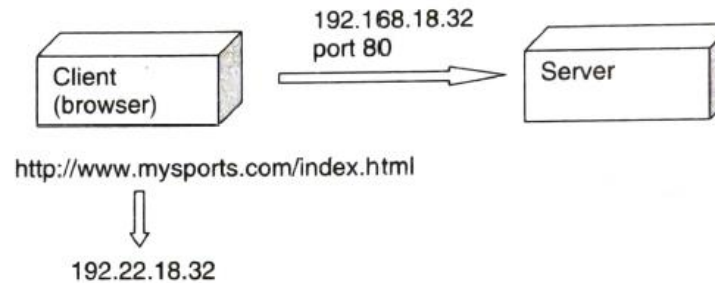
FreeBSD 4.10-RELEASE (GENERIC) 0: Tue May 25 22:47:12 GMT 2004
Welcome to FreeBSD!

aphid# ls
.cshrc      .login      .rnd        server.csr
.history    .mysql_history mbox         server.key
.klogin     .profile    server.crt
aphid# logout
Connection to 192.168.1.4 closed.
```

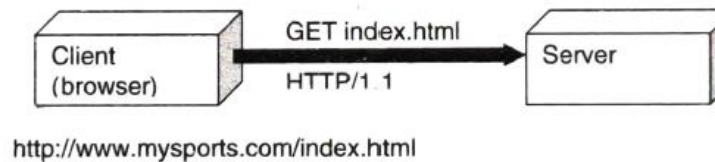
Web Pages



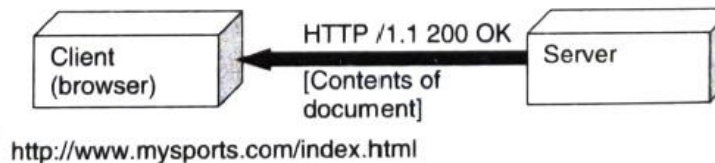
The first stage is the user typing a URL in the browser address window.



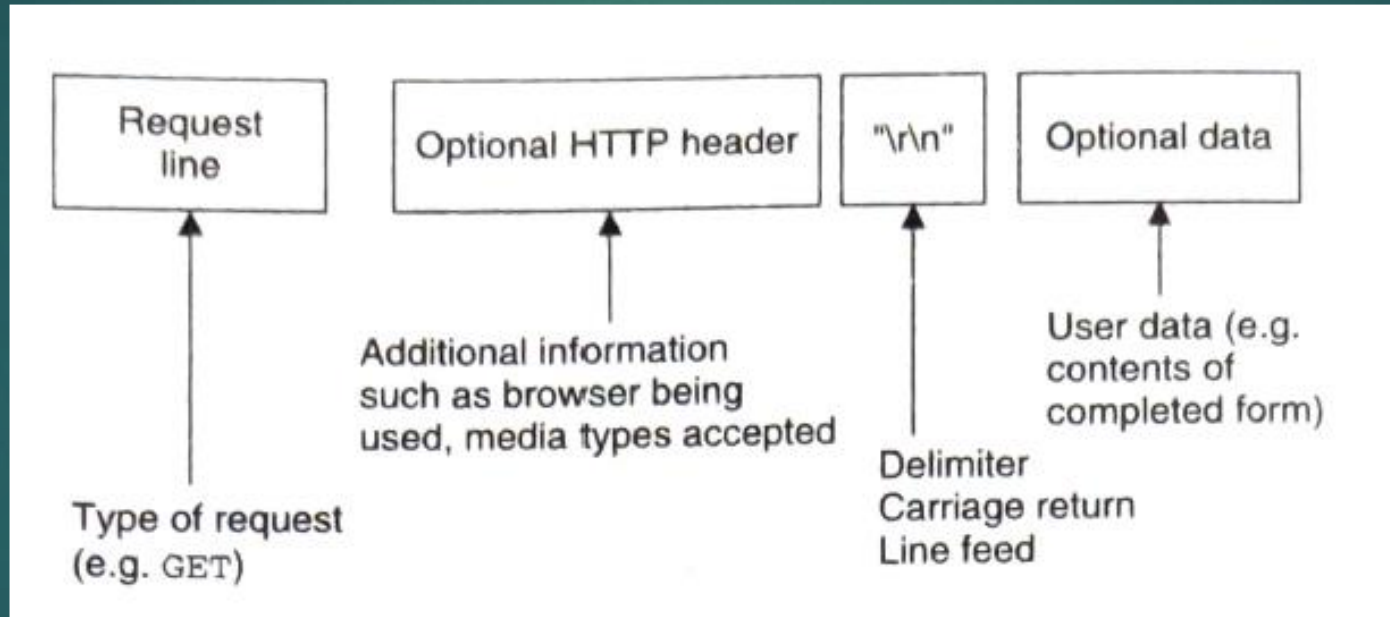
In the next stage the URL is converted to an IP address, which is then used to make a connection to the server at that location via port 80, the one used for HTTP and the Web.



Once the connection is established, the client application extracts the file name that is required from the URL and sends the request down the established connection. When received, the server looks up the request.



GET /index.html HTTP/1.0



```
$ telnet aphid.dynalias.net 80
Trying 81.155.138.148...
Connected to 81.155.138.148.
Escape character is '^]'.
GET /index.html HTTP/1.0

HTTP/1.1 200 OK
Date: Fri, 04 Mar 2005 20:02:01 GMT
Server: Apache/1.3.29 (Unix) PHP/4.3.6 mod_ssl/2.8.16
      OpenSSL/0.9.7d
Last-Modified: Mon, 06 Sep 2004 12:43:33 GMT
ETag: "4c9003-a71-413c5b75"
Accept-Ranges: bytes
Content-Length: 2673
Connection: close
Content-Type: text/html

<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 Final//EN">
<HTML>
<!--Web page here -->
</HTML>
Connection closed by foreign host.
```

1. HTTP request message.
2. HTTP response message.
3. HTTP methods.
4. HTTP status codes.

1. 404 = Not found
2. 401 = Unauthorized
3. 500 = Internal server error
4. 501 = Not implemented.

Secure Connection

<i>Communication</i>	<i>Application</i>	<i>Protocol</i>	<i>Port</i>	<i>Security</i>
Web page	Browser	HTTP	80	–
Web page	Browser	HTTPS	443	Secure
Files[Binary/Text]	FTP	FTP	21	–
Files[Binary/Text]	SFTP	SFTP	22	Secure
Files[Binary/Text]	FTP	FTPS	990	Secure
Commands	Telnet	Telnet	23	–
Commands	SSH	SSH	22	Secure
Instant Messaging	IRC	IRC	194	Not usually secure

Application and Development Tools

- ▶ IDE's.
- ▶ VS Code
- ▶ Webstrom/PHPstrom
- ▶ Netbeans
- ▶ Sublime
- ▶ IntelliJ IDEA
- ▶ Brackets
- ▶ Code::Blocks
- ▶ Notepad++

What is inside a Browser?

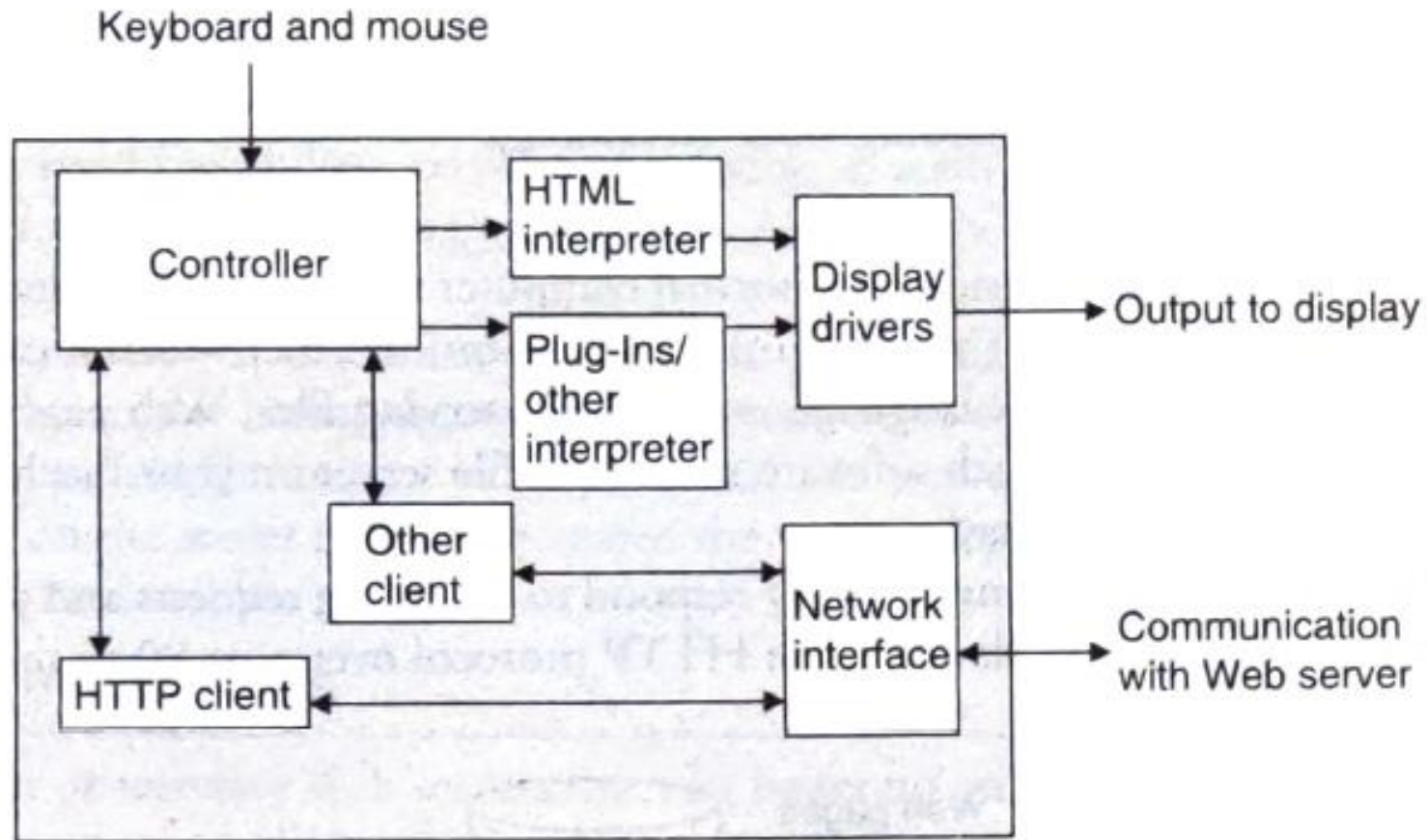


Figure 2 Architecture of a browser.

Web Server

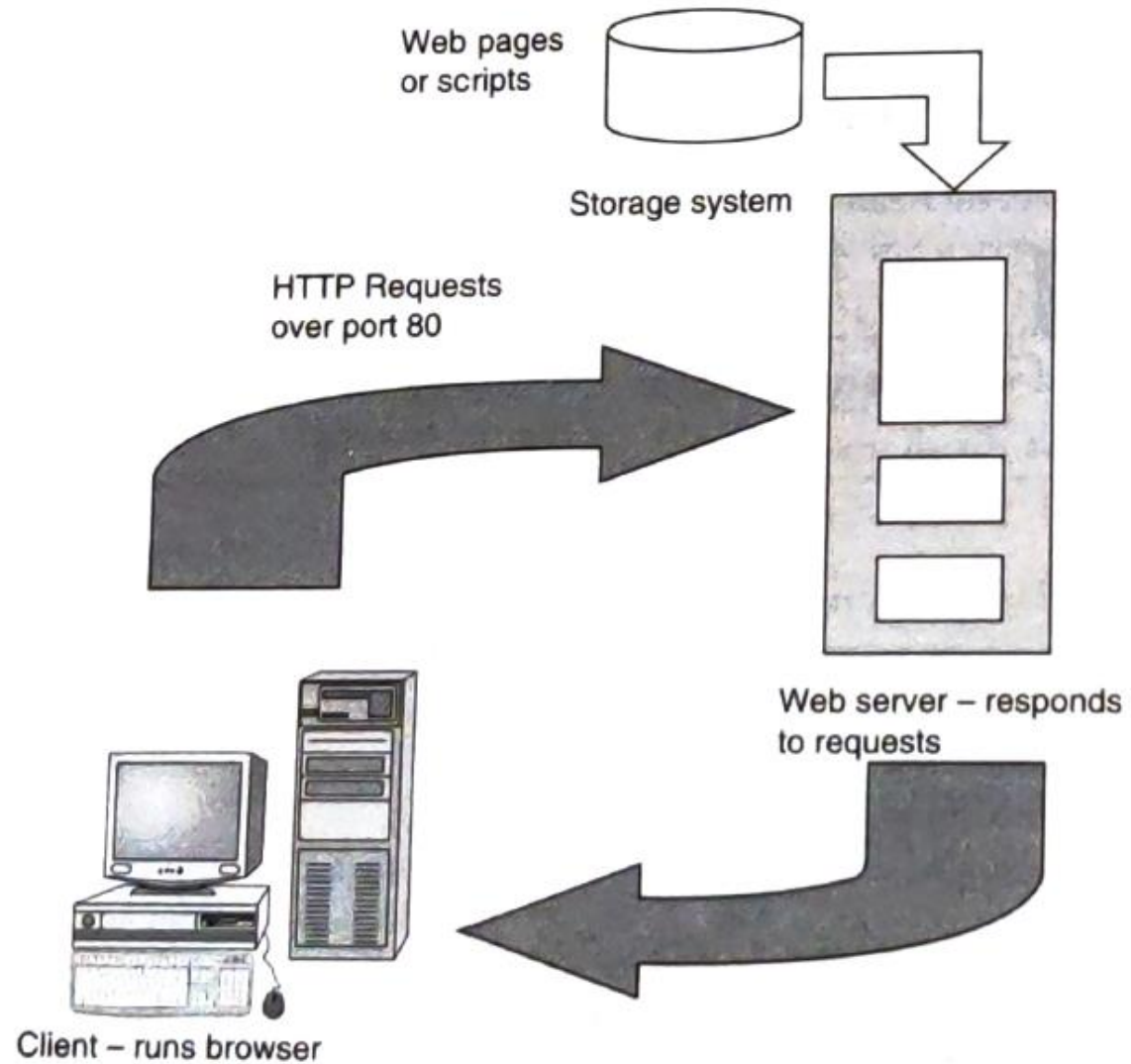


Figure 3 Client and (Web) server model.

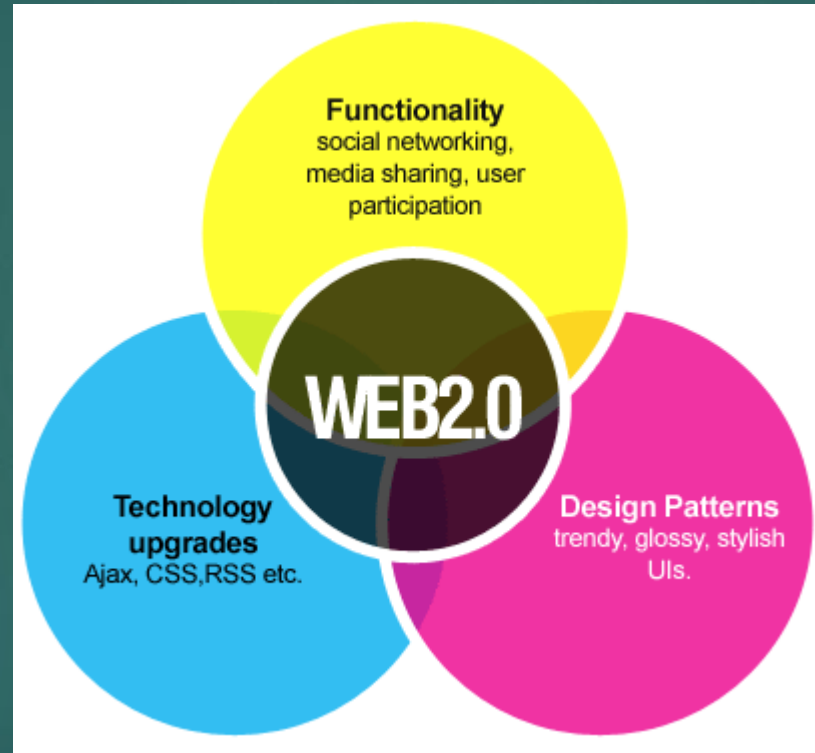
Server Choice

1. Apache HTTPd Server from the Apache Project.
2. Internet Information Services (IIS) from Microsoft.
3. Personal Web Server from Microsoft (superseded by IIS).
4. Sun Java System Web Server (formerly Sun ONE Web Server) from Sun Microsystems.
5. Zeus Web Server from Zeus Technology.
6. Abyss Web Server from Aprelium Technologies.
7. AOL server from America Online, open source.
8. BEA WebLogic from BEA Systems.
9. Light tpd.

Testing

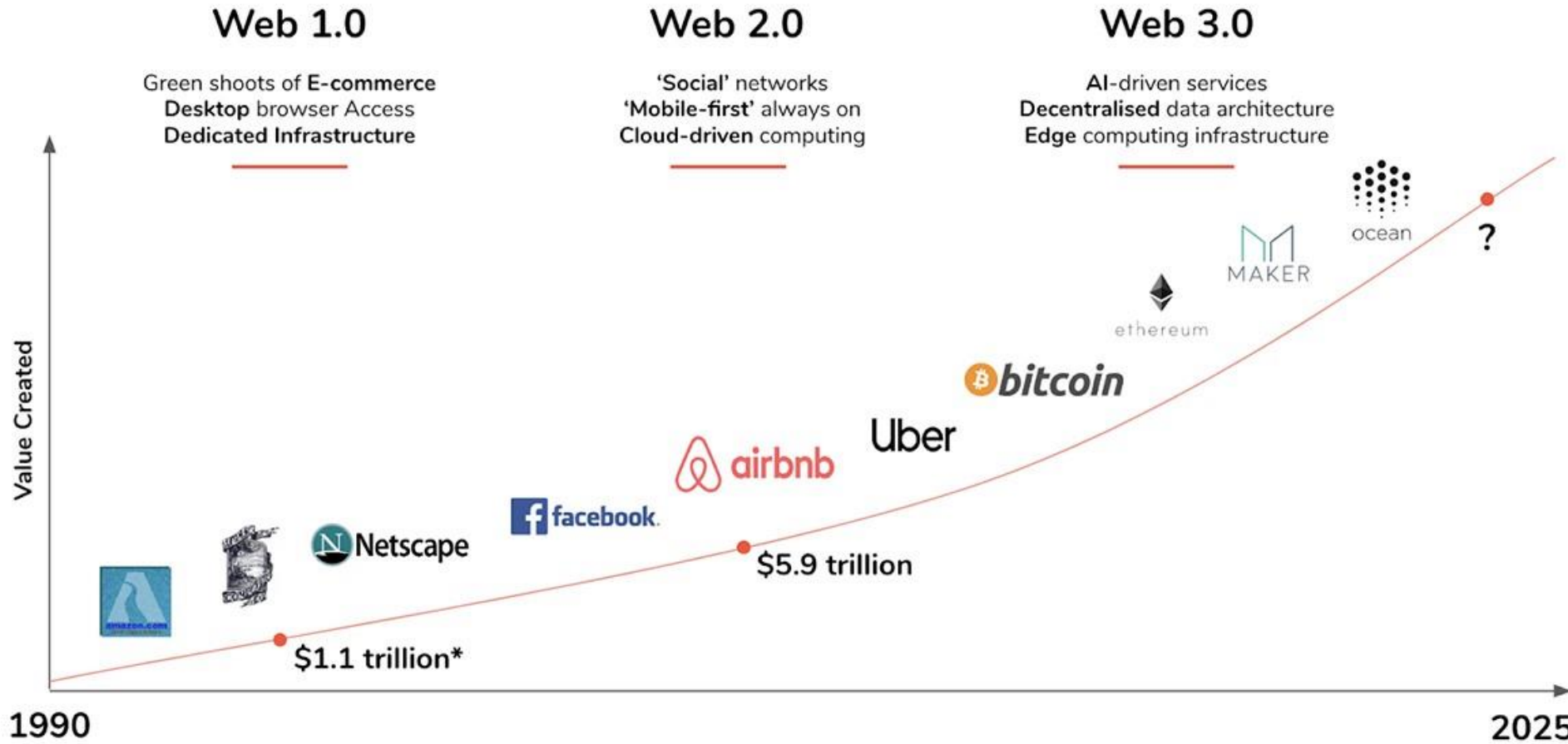
- ▶ Localhost
- ▶ 127.0.0.1
- ▶ Logical IP

Web 2.0



The Evolution of the Web

FABRIC
VENTURES



* Internet companies market cap as of 2000

Web3, also known as Web 3.0, is an idea for a new Internet that incorporates decentralisation based on Block chain.

Web 1.0 / 2.0 / 3.0 Summary

Crawl	Walk	Run
Web 1.0	Web 2.0	Web 3.0
Mostly Read-Only	Wildly Read-Write	Portable & Personal
Company Focus	Community Focus	Individual Focus
Home Pages	Blogs / Wikis	Lifestreams / Waves
Owning Content	Sharing Content	Consolidating Content
Web Forms	Web Applications	Smart Applications
Directories	Tagging	User Behavior
Page Views	Cost Per Click	User Engagement
Banner Advertising	Interactive Advertising	Behavioral Advertising
Britannica Online	Wikipedia	The Semantic Web
HTML / Portals	XML / RSS	RDF / RDFS / OWL

Designing an Effective Web Site

- ▶ Web Site Design Issues
- ▶ Planning a Website
- ▶ Navigation

Web Site Design Issues

1. Browser and operating Systems

- ▶ Different web browsers and their versions affect the way a page is rendered
- ▶ Older version browsers
- ▶ e.g. CSS Not supported by older browsers
- ▶ Different view in different OS
- ▶ W3C Standard

Web Site Design Issues



2. Bandwidth and cache

- ▶ User have different bandwidth
- ▶ No patience to wait for 10-15 seconds
- ▶ Temporary memory is called cache to store graphics

Web Site Design Issues

3. Display Resolution

- ▶ 800 x 600
- ▶ 1024 x 768
- ▶ FHD
- ▶ 4K
- ▶ 8K
- ▶ Flexible design to fit in different resolution

Mobile Tablet

Gaudi

Park Guell

Casa Batlló

Casa Milo



Antonio Gaudi
Artist & Architect

Antonio Gaudi:

The voices of Barcelona blur in a mix of Spanish and Catalan in much the way Gaudi's work blurs the lines between architecture and artwork.

From the tiled benches in Guell Park to the towers over Casa Milo and Casa Batlló, I fell in love with Gaudi's work on my first trip to Barcelona.

Park Guell

The benches as Lizard fountain in Park Guell make up part of the UNESCO World Heritage Site know as, "The Works of Antonio Gaudi."

The park features Gaudi's famous Lizard Fountain, as well as benches and other extraordinary examples of Gaudi's talent with tiles.

Casa Batlló

The first time I strolled down the Passeig de Gràcia (Catalan for the Promenade of Grace), I stopped in my tracks in front of Gaudi's Casa Batlló.

The 'house,' wedged between two 'normal' buildings, looks more like a giant sculpture than any house I'd ever seen anywhere else.

Casa Milo

A popular attraction in Barcelona, Casa Milo, also known as La Pedrera, is arguably one of the most famous buildings designed by Gaudi.

The roof features a collection of chimneys and towers that like they'd fit right in as characters in a Dr. Suess book.

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Web design by Janine Warner, <http://www.digitalfamily.com>. Photos by <http://www.istockphoto.com>.

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Desktop

Gaudi

Park Guell

Casa Batlló

Casa Milo



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Artist & Architect

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Web Site Design Issues

4. Look and Feel

▶ Website theme

- ▶ Use logo of the company
- ▶ Color scheme
- ▶ Message related to firm e.g. global warming slogan

▶ Fonts, Graphics and colors

- ▶ Different fonts have different readability affect the user psychology
- ▶ Maintain consistency of text
- ▶ Height, width , line ending, spacing, paragraph boundaries
- ▶ Availability of fonts visitors machine, if not by default font displayed

Web Site Design Issues

4. Look and Feel

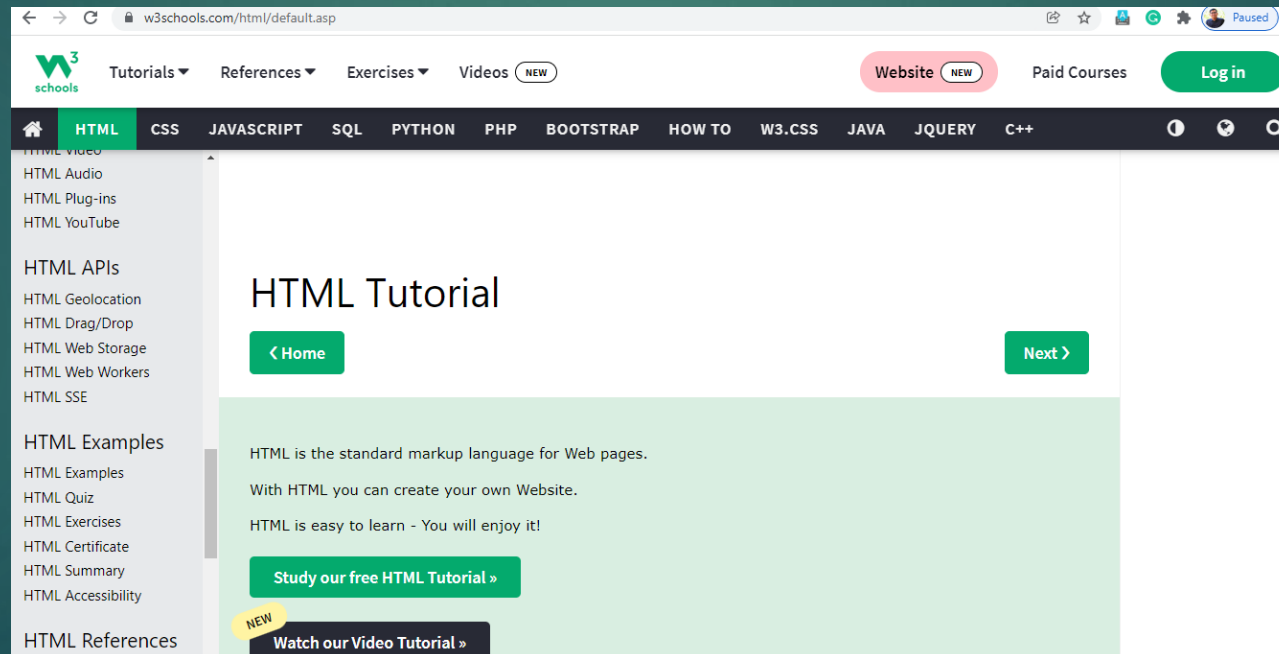
▶ Presentation and access

- ▶ Web page divided in visually different area to present the contents with different importance.
- ▶ Make different parts of the page visible by using white spaces
- ▶ Keep page simple and focused if required
- ▶ Do not overload to much content
- ▶ Don't make page to lengthy, if designed such page, then provide link to top of the page or bottom of page.
- ▶ Links between pages and section should exhibit consistency in appearance and meaning
- ▶ Navigation transition between pages, should reflect the consistency

Web Site Design Issues

5. Page Layout and linking

- Website consists of individual web pages that are linked together using various navigation links



Web Site Design Issues

6. Locating Information

- Center, Top, Right, Bottom and Left.



The screenshot displays the Wikipedia homepage layout. On the left is a vertical sidebar with navigation links: Main page, Contents, Current events, Random article, About Wikipedia, Contact us, Donate, Contribute, Help, Learn to edit, Community portal, Recent changes, Upload file, Tools, What links here, Related changes, Special pages, Permanent link, Page information, Wikidata item, and Print/export. The main content area features a 'Welcome to Wikipedia' message, a 'From today's featured article' section highlighting the band Jamiroquai, and a 'Did you know ...' section. The right sidebar contains a 'In the news' section with a list of current events, a portrait of Desmond Tutu, and a 'Nominate an article' link. At the top right, there are user login options and a search bar.

WIKIPEDIA
The Free Encyclopedia

Main page
Contents
Current events
Random article
About Wikipedia
Contact us
Donate

Contribute
Help
Learn to edit
Community portal
Recent changes
Upload file


Tools
What links here
Related changes
Special pages
Permanent link
Page information
Wikidata item
Print/export

Not logged in · Talk · Contributions · Create account · Log in

Main Page **Talk** Read View source View history Search Wikipedia

Welcome to **Wikipedia**,
the free encyclopedia that anyone can edit.
6,430,580 articles in English

From today's featured article

 **Jamiroquai** are an English funk and acid jazz band from London. Formed in 1992, they are fronted by vocalist Jay Kay, and were prominent in the London-based funk and acid jazz movement of the 1990s. They built on their acid jazz sound in their early releases and later drew from rock, disco, electronic and Latin music. Lyrically, they have addressed social and environmental justice. The band made their debut under Acid Jazz Records, but they subsequently found mainstream success under Sony. Three of their albums have charted at number one in the UK under this label: *Emergency on Planet Earth*, *Synkronized* and *A Funk Odyssey*. The band's 1998 single "Deeper Underground" was also number one in their home country. Jamiroquai has sold more than 26 million albums worldwide. Their third album, *Travelling Without Moving*, received a Guinness World Record for the best-selling funk album in history. ([Full article...](#))


Recently featured: Ezra Meeker · Pepi I Meryre · *Sesame Street* research
[Archive](#) · [By email](#) · [More featured articles](#)

Did you know ...

- ... that Dante used the [third circle of hell](#) (*illustrated*) to discuss

In the news

- The Supreme Court of Russia orders the closure of **Memorial**, Russia's oldest and most influential human rights group, for alleged violations of the country's foreign agent law.
- In cricket, Australia retains **The Ashes** after winning the first three Tests against England.
- South African archbishop and human rights activist **Desmond Tutu** (*pictured*) dies at the age of 90.
- Ariane flight VA256, carrying the **James Webb Space Telescope**, is launched from the Guiana Space Centre.
- **A ferry fire** in Bangladesh kills at least 40 people.

 Desmond Tutu

Ongoing: COVID-19 pandemic
Recent deaths: John Madden · Keri Hulme · Harry Reid · Phua Bah Lee · P. A. Ibrahim Haji · Franklin A. Thomas

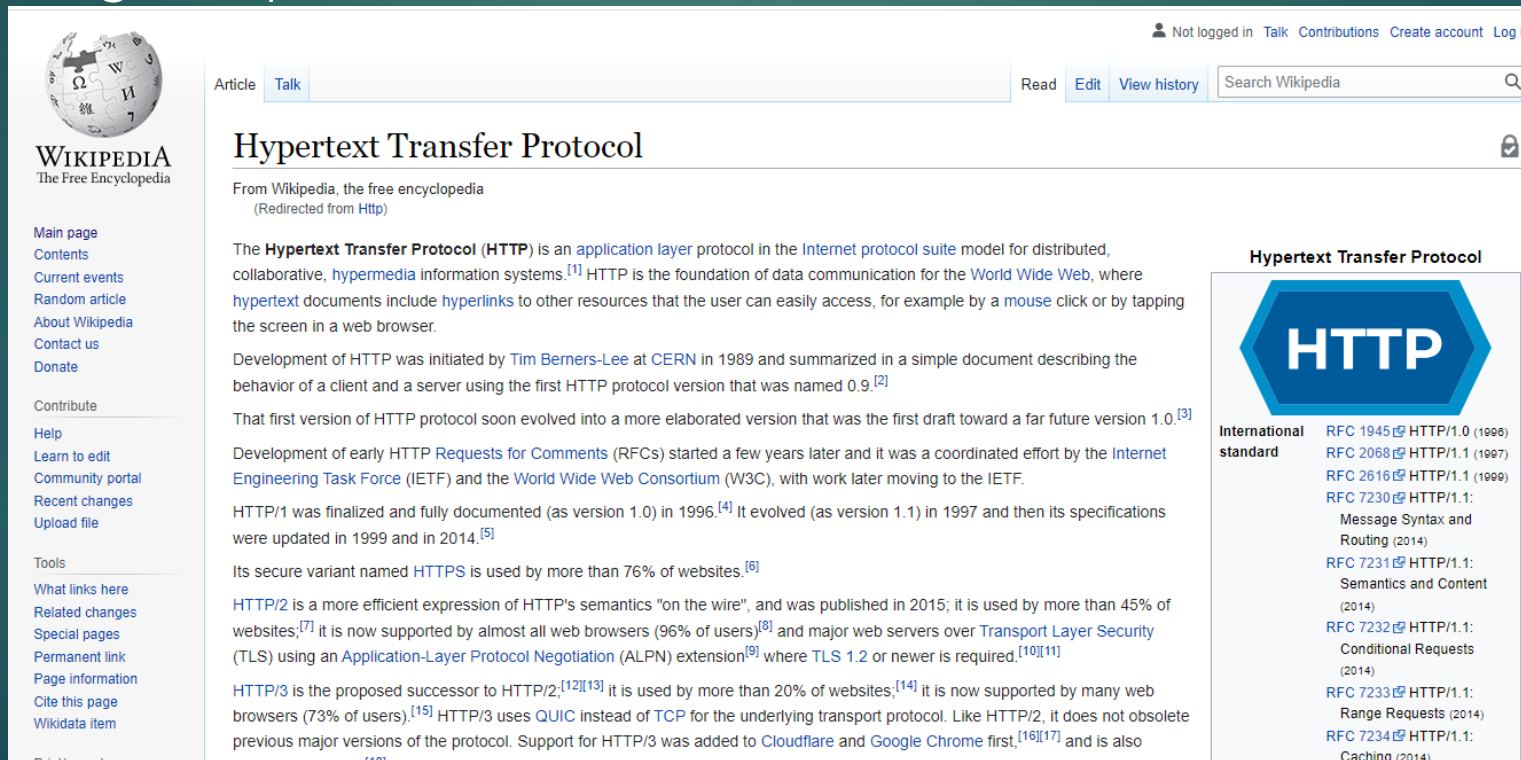
[Nominate an article](#)

On this day

Web Site Design Issues

7. Make design User Centric

- ▶ Left to right, top to bottom



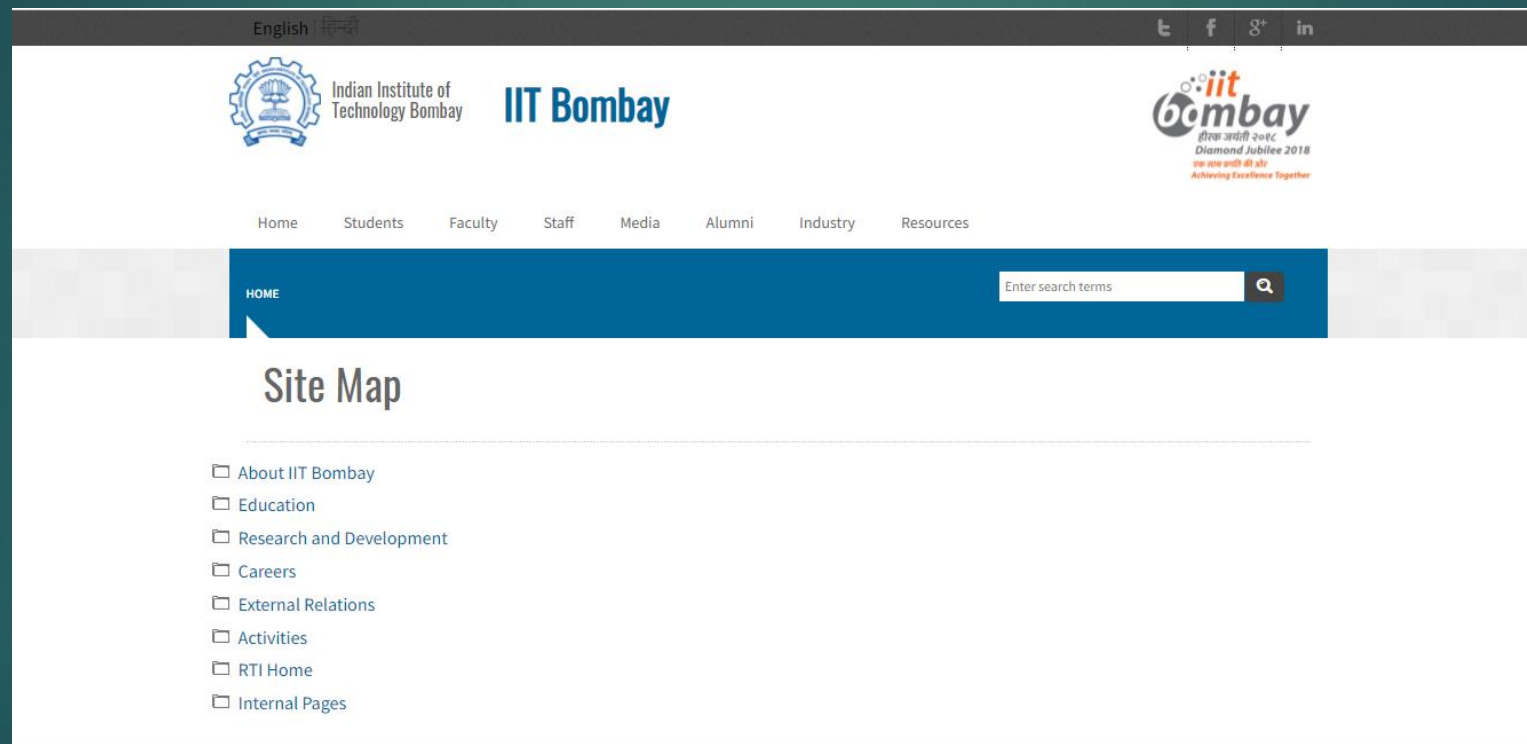
The screenshot shows the Wikipedia article for the Hypertext Transfer Protocol (HTTP). The layout is user-centric, organized from left to right and top to bottom. On the left is a sidebar with navigation links. The main content area on the right contains the article text, which starts with a redirect notice and then provides a detailed overview of the protocol, its development, and its evolution. On the far right, there is a sidebar titled 'Hypertext Transfer Protocol' that lists international standards (RFCs) for HTTP versions 1.0, 1.1, and 1.2, along with their publication years and key features.

Wikipedia Article Structure:

- Left Sidebar (Navigation):**
 - Main page
 - Contents
 - Current events
 - Random article
 - About Wikipedia
 - Contact us
 - Donate
 - Contribute
 - Help
 - Learn to edit
 - Community portal
 - Recent changes
 - Upload file
 - Tools
 - What links here
 - Related changes
 - Special pages
 - Permanent link
 - Page information
 - Cite this page
 - Wikidata item
- Main Content Area:**
 - Article title: **Hypertext Transfer Protocol**
 - Redirect notice: From Wikipedia, the free encyclopedia (Redirected from [Http](#))
 - Introduction: The **Hypertext Transfer Protocol (HTTP)** is an application layer protocol in the Internet protocol suite model for distributed, collaborative, **hypermedia** information systems.^[1] HTTP is the foundation of data communication for the **World Wide Web**, where **hypertext** documents include **hyperlinks** to other resources that the user can easily access, for example by a **mouse** click or by tapping the screen in a web browser.
 - Development: Development of HTTP was initiated by **Tim Berners-Lee** at **CERN** in 1989 and summarized in a simple document describing the behavior of a client and a server using the first HTTP protocol version that was named 0.9.^[2]
 - Evolution: That first version of HTTP protocol soon evolved into a more elaborated version that was the first draft toward a far future version 1.0.^[3]
 - Standards: Development of early HTTP **Requests for Comments** (RFCs) started a few years later and it was a coordinated effort by the **Internet Engineering Task Force** (IETF) and the **World Wide Web Consortium** (W3C), with work later moving to the IETF.
 - Finalization: HTTP/1 was finalized and fully documented (as version 1.0) in 1996.^[4] It evolved (as version 1.1) in 1997 and then its specifications were updated in 1999 and in 2014.^[5]
 - Secure Variant: Its secure variant named **HTTPS** is used by more than 76% of websites.^[6]
 - HTTP/2: **HTTP/2** is a more efficient expression of HTTP's semantics "on the wire", and was published in 2015; it is used by more than 45% of websites.^[7] It is now supported by almost all web browsers (96% of users)^[8] and major web servers over **Transport Layer Security** (TLS) using an **Application-Layer Protocol Negotiation** (ALPN) extension^[9] where **TLS 1.2** or newer is required.^{[10][11]}
 - HTTP/3: **HTTP/3** is the proposed successor to HTTP/2;^{[12][13]} it is used by more than 20% of websites.^[14] It is now supported by many web browsers (73% of users).^[15] HTTP/3 uses **QUIC** instead of **TCP** for the underlying transport protocol. Like HTTP/2, it does not obsolete previous major versions of the protocol. Support for HTTP/3 was added to **Cloudflare** and **Google Chrome** first.^{[16][17]} and is also
- Right Sidebar (Standards):**
 - Hypertext Transfer Protocol**
 - International standard**
 - RFC 1945** [HTTP/1.0](#) (1996)
 - RFC 2068** [HTTP/1.1](#) (1997)
 - RFC 2616** [HTTP/1.1](#) (1999)
 - RFC 7230** [HTTP/1.1: Message Syntax and Routing](#) (2014)
 - RFC 7231** [HTTP/1.1: Semantics and Content](#) (2014)
 - RFC 7232** [HTTP/1.1: Conditional Requests](#) (2014)
 - RFC 7233** [HTTP/1.1: Range Requests](#) (2014)
 - RFC 7234** [HTTP/1.1: Caching](#) (2014)

Web Site Design Issues

8. Sitemap



Planning a Web site

- ▶ Why are we developing this website?
- ▶ What do we achieve by developing this website?
- ▶ Who are the people who will use this website?
- ▶ What are the information contents?
- ▶ How are these contents organized? What are the possible ways?
- ▶ How the files prepared are organized?

Planning a Web site

1. Objective and Goal
2. Audience / User profile
3. Identifying and Organizing contents
4. Towards the publishing of web site

Planning a Web site

1. Objective and Goal

- ▶ Objective must clear
- ▶ benefit

Planning a Web site

2. Audience / User profile

- ▶ Children website
- ▶ Technology savvy
- ▶ Music
- ▶ Common users

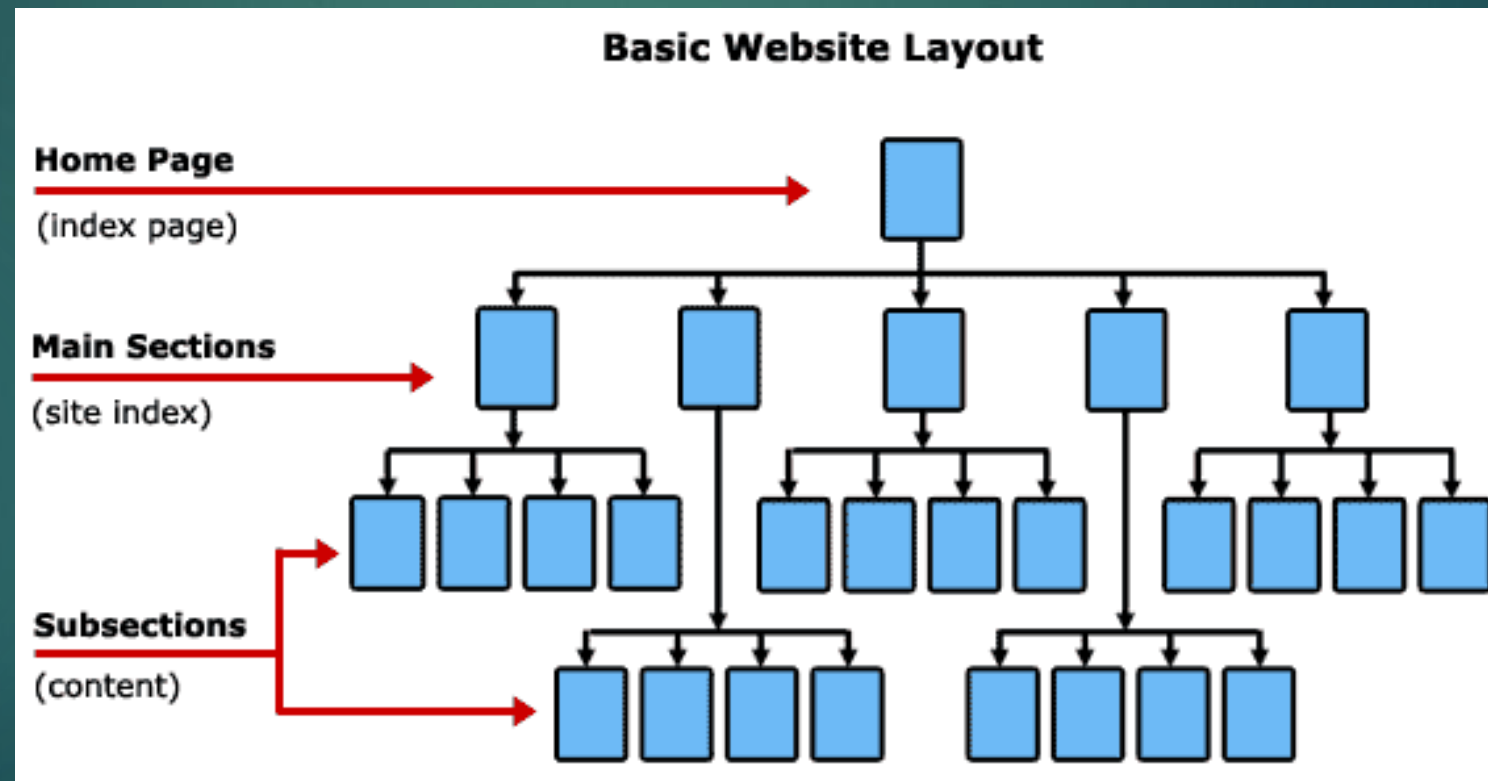
Planning a Web site

3. Identifying and Organizing contents

- ▶ Contents include text, graphics, forms, sound and video.
- ▶ Contents should be unambiguous, clear, spell, checked, precise and accurate.
- ▶ Contents should be relevant, recent and matching to site objective.
- ▶ Contents should fulfil the information need of the users.
- ▶ Contents should be well organized.

Planning a Web site

3. Identifying and Organizing contents



Planning a Web site

4. Towards the publishing of web site

Implement each page using various technologies

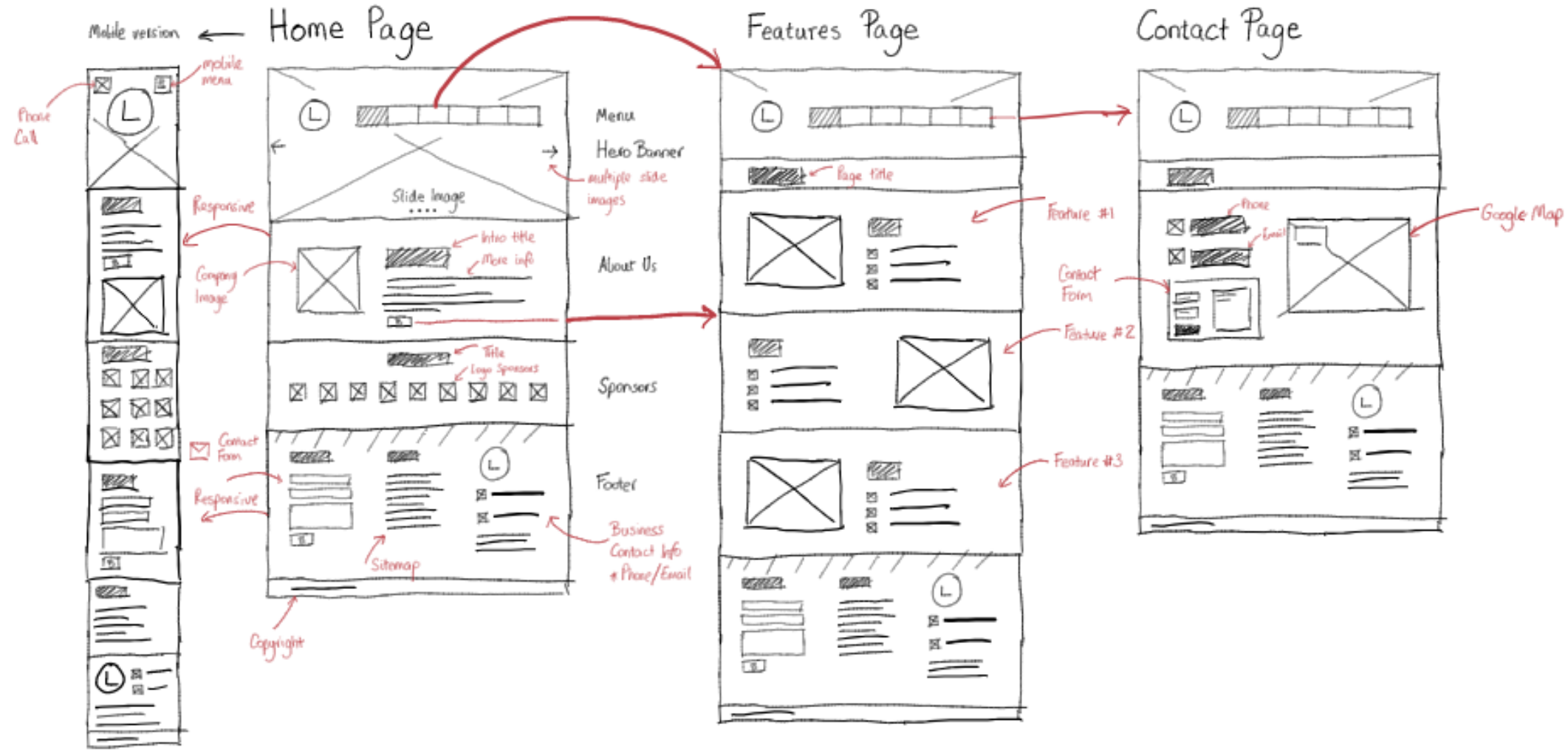
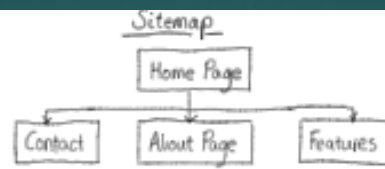
Organize the files containing your web pages and other contents
images, script

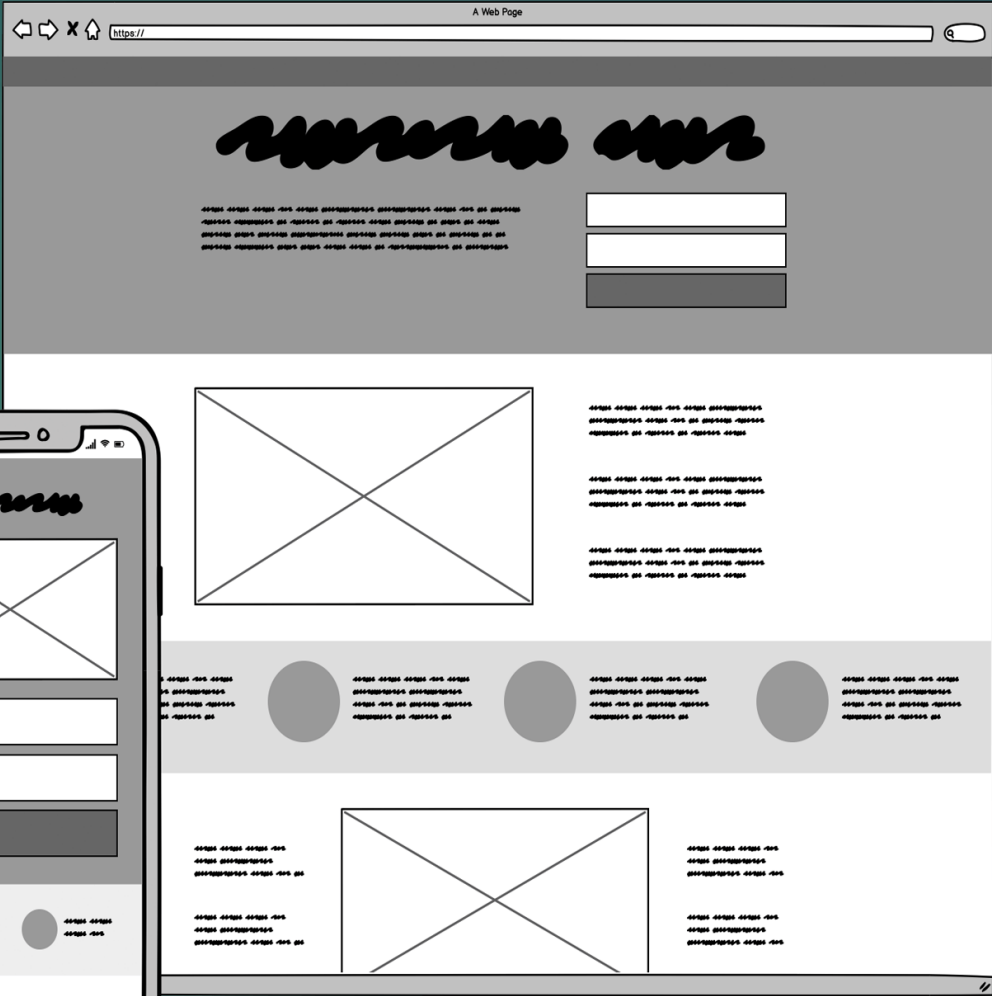
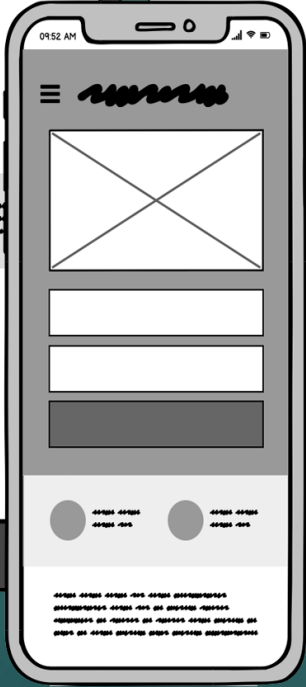
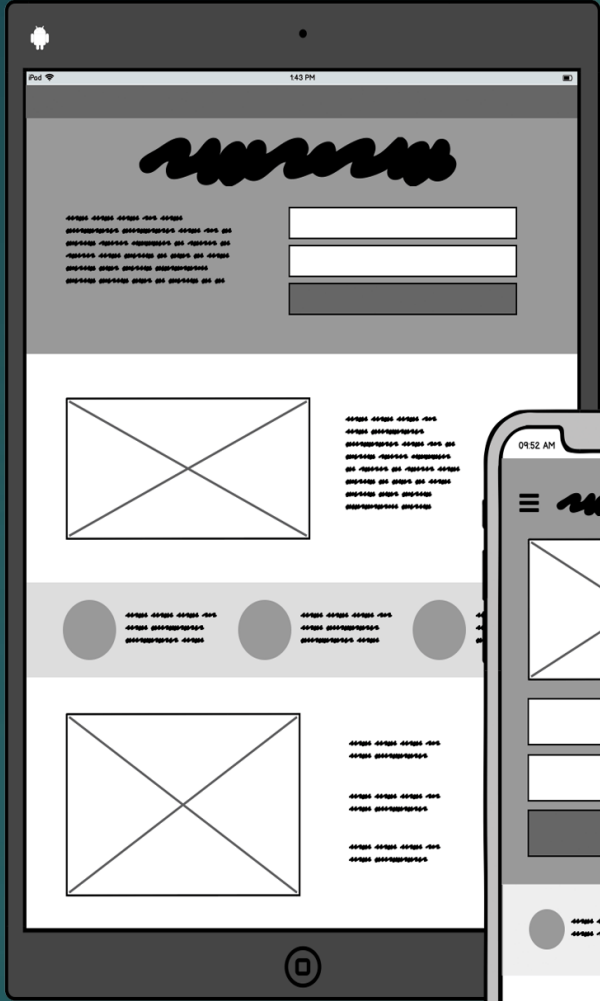
Test your individual pages

Register your domain

Upload your website on web server

Access your website form any browser





Navigation

- ▶ Navigation links are either text based, i.e. word or phrase is used as link or graphical images, icon or logo is used as a link.
- ▶ Navigation links should be clear and meaningful.
- ▶ It should be consistent.
- ▶ Link should be understandable.
- ▶ Organize the links such that contents are group logically.
- ▶ Provide search link, contact us, about us
- ▶ Provide way to return page from anywhere using link 'Home'
- ▶ Provide the user with information regarding location. i.e. where is she/he?
- ▶ Website having many clear sections, provide navigation menu.
- ▶ Horizontal or vertical navigation bar can be provided.