World Wide Web

WWW usage requires a combination of standards and protocols
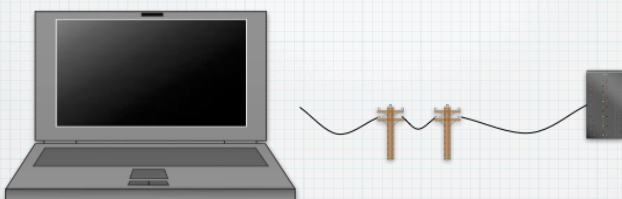
DHCP	TCP/IP	DNS
HTTP	HTML	MIME

World Wide Web - how it works

User on a machine somewhere

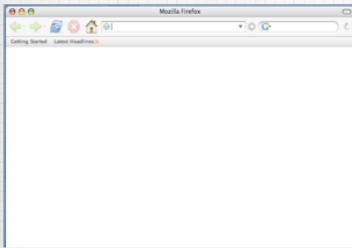Server machine

---
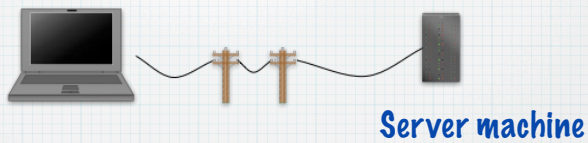
Being more specific...
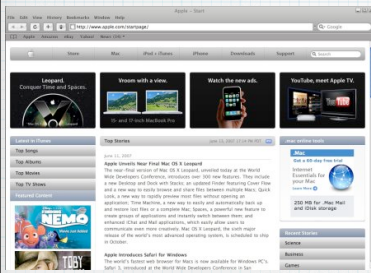
Web Browser software

Web Browser software

Firefox

Web Browser software

Internet Explorer

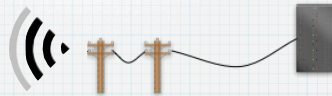Web Browser software

Safari

Web Browser software

Safari on iPhone
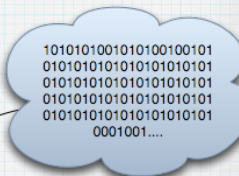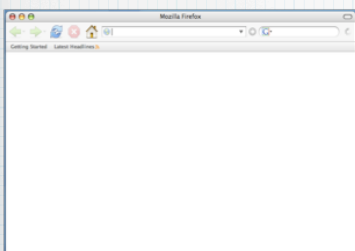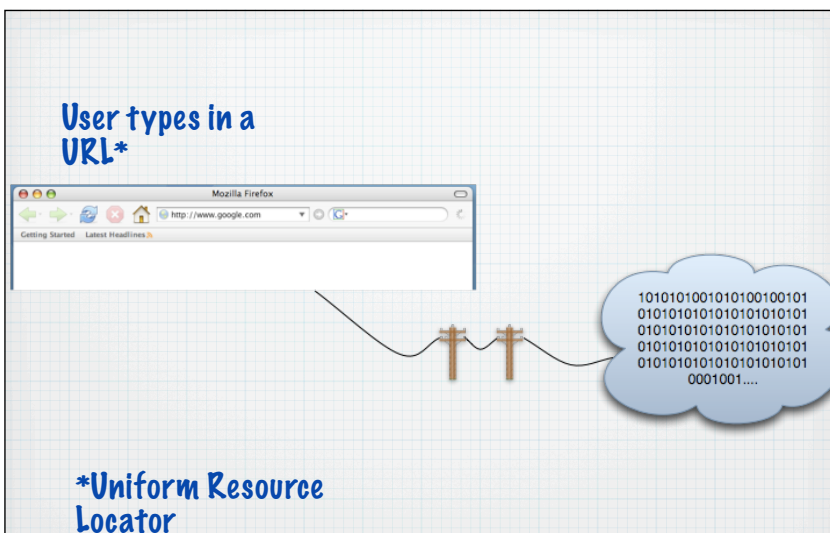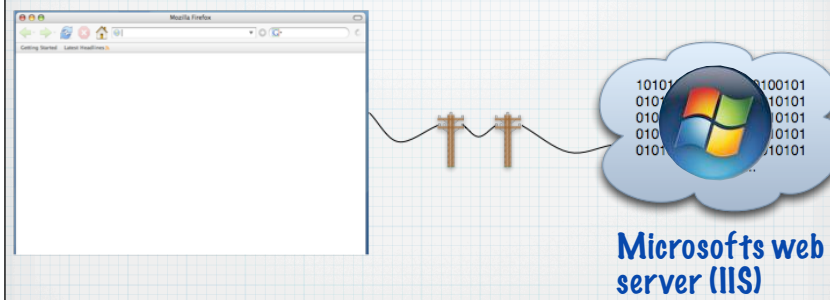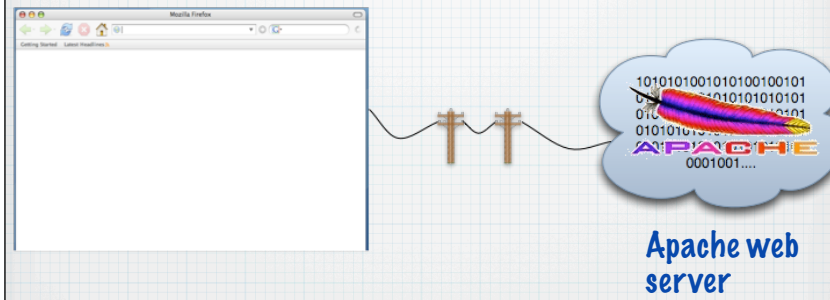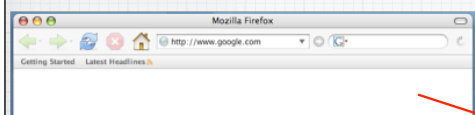
10101010010101001001 01
0101010101010101010101
0101010101010101010101
0101010101010101010101
0101010101010101010101
0001001....

Web server
software

Apache web server

Microsofts web server (IIS)

User types in a URL*

*Uniform Resource Locator

Request is sent to server using HTTP*

*Hypertext Transfer Protocol
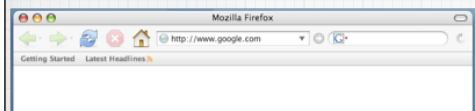
Server software finds the page

Page is sent back

Browser displays the page
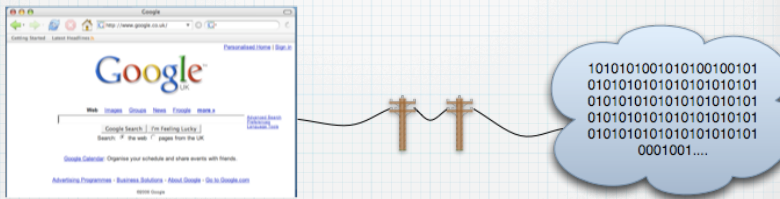
Demo

- Changing a hosts file to associate a name with an IP number

- Installing and running a web server

- Publishing some files in the public directory

Demo

- Changing a hosts file to associate a name with an IP number


```
hosts - Notepad
File  Edit  Format  View  Help
# Copyright (c) 1993-1999 Microsoft Corp.
#
# This is a sample HOSTS file used by Microsoft TCP/IP for windows.
#
# This file contains the mappings of IP addresses to host names. Each
# entry should be kept on an individual line. The IP address should
# be placed in the first column followed by the corresponding host name
# The IP address and the host name should be separated by at least one
# space.
#
# Additionally, comments (such as these) may be inserted on individual
# lines or following the machine name denoted by a '#' symbol.
#
# For example:
#
#      102.54.94.97     rhino.acme.com          # source server
#       38.25.63.10     x.acme.com              # x client host

127.0.0.1        localhost
127.0.0.1        www.busfac.co.uk|
```
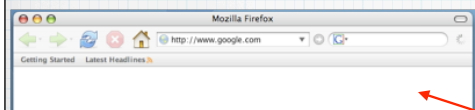
Demo

- Installing and running web server
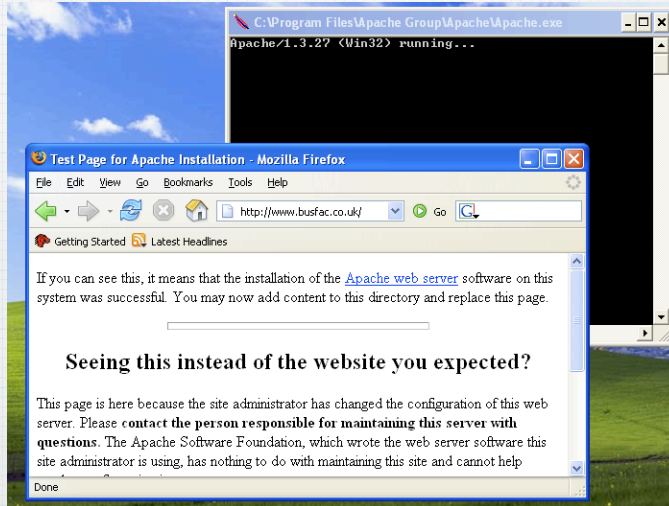
Demo

- Publishing some files in the public directory

In more detail then

1. User types in web page request using a special format
2. Browser sends HTTP request
3. Server sends HTTP response
4. Browser renders and displays page

In more detail then

1. User types in web page request using this format (structure specified in HTTP)
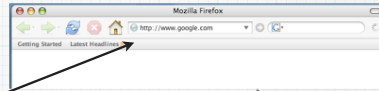
protocol: // server : port / directory / file

http: // www.oracle.com / downloads / list.html

The file list.html in the web server directory downloads on the HTTP server located on named machine www.oracle.com

---

In more detail then

1. User types in web page request using this format (structure specified in HTTP)
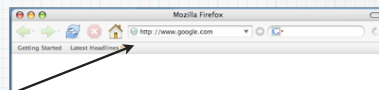
protocol: // server : port / directory / file

http: // www.kingston.ac.uk / index.html

The file index.html in the root web server directory on the HTTP server located on named machine www.kingston.ac.uk

---

In more detail then

1. User types in web page request using this format (structure specified in HTTP)

protocol: // server : port / directory / file

http: // www.kingston.ac.uk

The default file (generally called index.html) in the root web server directory - these filenames are specified in the Web server configuration file

In more detail then

1. User types in web page request using this format (structure specified in HTTP)
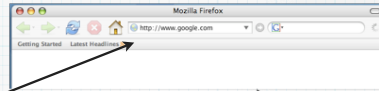
protocol: // server : port / directory / file

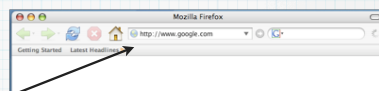http: // www.kingston.ac.uk : 80 / index.html

The file index.html in the root directory of the HTTP server listening on port 80 on machine www.kingston.ac.uk

---

http: // www.kingston.ac.uk : 80 / index.html

Several software services may run on the same machine - the port number is used to distinguish them

80 is the default port number for HTTP servers (again specified in the web server configuration files)

Other examples:

http: // www.kingston.ac.uk / ˜ku12492

The file index.html in the web server directory for user ku12492

Typically ˜ is used to provide a shortcut link to a sub directory on the web server rather than specifying the full path

Using port 80 by default (even though not specified)

Domain name registration

- **Many different companies**

- **Quite cheap**

- **Can be difficult to get a good name**

- **Domain name squatters**

2.Browser sends HTTP request

Request is sent to server using HTTP

- DNS used for name lookup

- TCP session attempts to connect to web server

- If web server exists and can be connected to, GET request is issued

---

HTTP GET request

- Uses this syntax (specified in HTTP 1.1)

    GET file_request protocol_version

  followed by

    browser and client information

HTTP GET request

GET   file_request   protocol_version

- **Example**

```
GET /~ku12492/example/index.html HTTP/1.1
Host: www.kingston.ac.uk
User-Agent: Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.3a)
Accept: text/xml,application/xml,application/xhtml+xml,text/html;
Accept-Language: en-us,en;q=0.5
Accept-Encoding: gzip,deflate,compress;q=0.9
Accept-Charset: ISO-8859-1,utf-8;q=0.7,*;q=0.7
Keep-Alive: 300
Connection: keep-alive
```

3.Server sends HTTP response

Page is sent back

```
1010101001010100100101
0101010101010101010101
0101010101010101010101
0101010101010101010101
0101010101010101010101
      0001001....
```
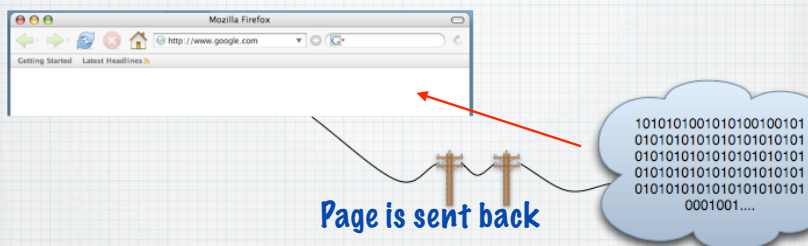
- HTTP servers listen and respond to HTTP GET requests
- Look for requested named page in file system
- Return the page, or an error number if the page does not exist

---

HTTP GET response

- **Uses this syntax (specified in HTTP 1.1)**

protocol status_code description

followed by

header block
document stream

HTTP GET response

- Example

```
HTTP/1.1 200 OK
Date: Sun, 26 Nov 2006 09:18:33 GMT
Server: Apache/1.3.27 (Unix)
Last-Modified: Tue, 14 Jan 2006 11:46:32 GMT
Accept-Ranges: bytes
Content-Length: 3181
Keep-Alive: timeout=15, max=99
Connection: Keep-Alive
Content-Type: text/html

<html>
<head>
<title>Example Page</title>
```

MIME types

- Multimedia Internet Mail Extensions

- Originally created to indicate what kind of file was attached to an email message...

- ...and how it could be transmitted and processed

```
text/css
text/javascript
image/gif
```

http://www.iana.org/assignments/media-types/

Web pages consist of html text, images and more

- HTTP can be used to transfer text, binary or other 'types' of files

- Requires viewers at the client end (accessible by the browser)

Web Server architecture

- HTTP processor
  - To receive and send HTTP encoded streams
- Script processor
  - Server side programming
  - May be module based so that any language can be switched in
- Security and Management system
  - User groups and passwords

Web Server architecture

- Normal PC specification
  - Needs efficient networking, average graphics capability, large storage

First web server machine

Now in Microcosm, CERN museum in Geneva, Switzerland

Web Server software

- Sites like Netcraft monitor the statistics

  http://news.netcraft.com/

- Two competing products have 85% of the market share

Market Share for Active Sites Across All Domains

Legend: Apache, Microsoft, Sun, nginx, Google, Other
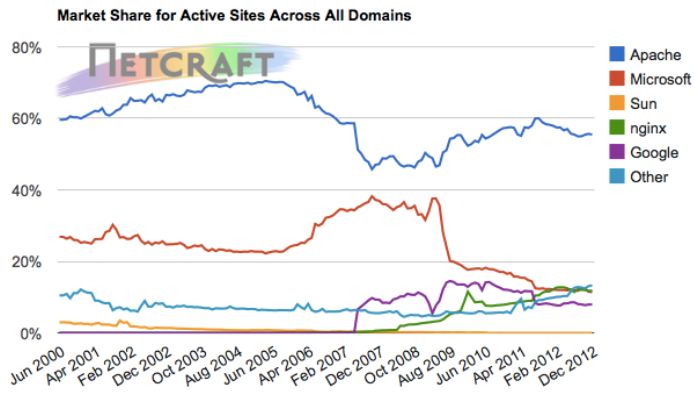
Developer	November 2012	Percent	December 2012	Percent	Change
Apache	104,040,006	55.66%	103,128,107	55.47%	-0.19
nginx	22,018,545	11.78%	21,993,817	11.83%	0.05
Microsoft	21,554,022	11.53%	21,224,672	11.42%	-0.12
Google	14,845,775	7.94%	14,837,660	7.98%	0.04

Internet Information Server

- Microsoft's Web Server (20-30% of Market)

- Native support for Active Server Pages

- Supports Microsoft's 'extensions'

- Integrates into Microsoft's Active Directory management system

- Windows OS specific (and integrated)

(continued)

- Easy to install (possibly a disadvantage)

- Possibly the most hacked software - ever

- Appalling security record for many years

Apache

- Open Source Web Server
- Free and most widely used (50-60% of market)
- Not bound to slow development and release cycle
- Cross platform
- Supports all server side languages (including ASP)

Web browser architecture

- HTTP processor
  - To create and receive HTTP encoded streams
- Script processor
  - Client side programming
- Mark up language processor (Parser)
  - HTML, XHTML or XML family

and ...

- Layout and Rendering engine
  - To show processed mark up on screen
- Object Model
  - Enables the document to be processed as a tree data structure
  - Now standardised by W3C (DOM)

Internet Explorer - History

- Originally licensed from NCSA Mosaic

- National Centre for Supercomputing Applications at the University of Illinois

- IE 4.0 beat Netscape 4.0 when bundled with Windows 98

- Originally a better browser on Windows (faster)

- Major application required for Microsoft's .Net initiative

Internet Explorer

- Based on the Trident rendering engine

No name	IE4	Initial rendering engine
No name	IE5	improved CSS1.0 support and had sweeping changes in CSS2 rendering
No name	IE5.5	More corrections to CSS handling
No name	IE6	Corrected the box model and added quirks mode with DTD switching
Trident 3	IE7	fixed many CSS rendering issues and added partial PNG alpha support
Trident 4	IE8	first version to pass the Acid 2 test
Trident 5	IE9	Added support for SVG, XHTML, HTML5 and CSS3

Internet Explorer - Advantages

- Look and feel of Windows (whatever version)

Internet Explorer - Advantages

• Look and feel of Windows (whatever version)
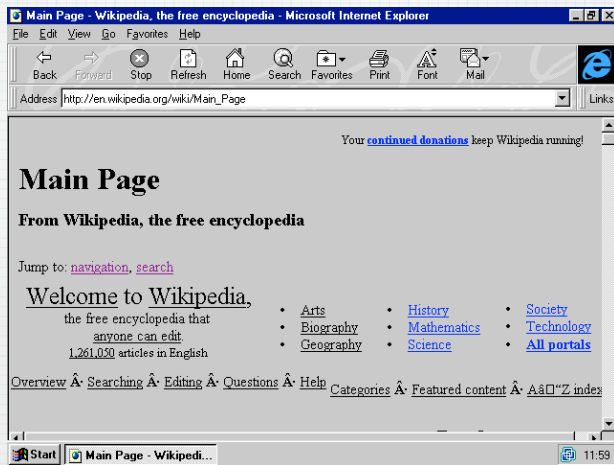
Internet Explorer - Advantages

- Look and feel of Windows (whatever version)

Internet Explorer - Advantages

- Look and feel of Windows (whatever version)

Internet Explorer - Advantages
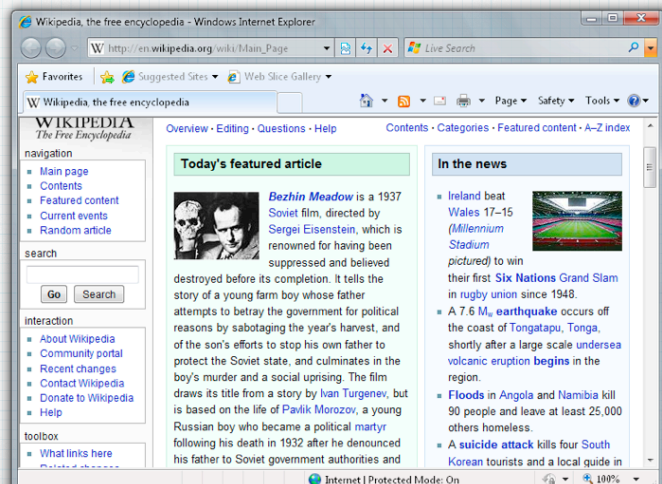
- Free

- Standard part of Windows so optimised

- Integrated into Operating System so HTTP engine available in other Windows applications

- Supports Microsoft's IIS extensions

- Supports client side programming language Basic and Active X

Internet Explorer - Disadvantages

- Not free (paid for in Windows cost)

- Can't be removed from Windows (limited platforms)

- Bloated software (large - slow support for new standards)

- Integrated into Operating System so HTTP engine available in other Windows applications

- Supports Microsoft's IIS extensions (not standard)

Bizarrely ...

- Microsoft has 4 different rendering engines

Trident

Microsoft Word HTMLengine

Microsoft Expression engine

Windows Mobile HTML engine

Trident

Developed for IE and now used widely in Windows

Internet Explorer for Windows from 4.0 onwards
Windows file manager/shell, Windows Explorer
Add/Remove Programs tool used to render the list of installed programs
Microsoft InfoPath
Microsoft Encarta and related products
Microsoft Compiled HTML Help
Microsoft Outlook (prior to 2007)
Microsoft Outlook Express
MSN Messenger
Windows Media Player, which uses Trident to render the "Media Information" pages

Microsoft Word HTMLengine

Developed for use Word to create/view HTML

Microsoft Office
Outlook 2007 onwards

Many critics of the Outlook change

http://www.sitepoint.com/newsletter/viewissue.php?id=3&issue=156#5

http://blog.wired.com/monkeybites/2007/01/outlook_2007_ad.html

http://www.campaignmonitor.com/blog/archives/2007/01/microsoft_takes_email_design_b.html

---

To make sure you get this email each month, please add *davidg@campaignmonitor.com* to your contacts. Read why you should ask your recipients to do this too. Having trouble viewing this, check it out in your browser.

CampaignMonitor

December 2006
Not-So-Monthly Tips & Updates

Welcome to the December issue of Campaign Monitor's Tips & Updates.

It's been a while and we've got a seriously bumber issue for you this month. Don't miss the new designs in our gallery, some very useful tips, a cool competition and some much requested new features and updates.

Inspiration, Tips and a Competition

11 awesome new email designs in the gallery

You guys have been at it again. We've added no less than 11 amazing email designs to the gallery since our last newsletter, with plenty more to come before the year is up.

Inside the new .Mac webmail client

Mark takes a peek inside Apples brand new .Mac webmail client to test its support for CSS and standards based emails. The result wasn't pretty but there is a workaround for the desperate.

Stay in the loop
Our Blog

For all the latest product news, tips and talk on email newsletters and list management, head to the Campaign Monitor Blog.

📶 Subscribe to the feed

Sign in to your account now

Check out the new features, sign in to your account now...

Outlook (pre 2007)

To make sure you get this email each month, please add davidg@campaignmonitor.com to your contacts. Read why you should ask your recipients to do this too. Having trouble viewing this, check it out in your browser.

December 2006
Not-So-Monthly Tips & Updates

Welcome to the December issue of Campaign Monitor's Tips & Updates.

It's been a while and we've got a seriously bumber issue for you this month. Don't miss the new designs in our gallery, some very useful tips, a cool competition and some much requested new features and updates.

Inspiration, Tips and a Competition

11 awesome new email designs in the gallery

You guys have been at it again. We've added no less than 11 amazing email designs to the gallery since our last newsletter, with plenty more to come before the year is up.

Inside the new .Mac webmail client

Mark takes a peek inside Apples brand new .Mac webmail client to test its support for CSS and standards based emails. The result wasn't pretty but there is a workaround for the desperate.

Optimizing for Gmail's snippets and Outlook's AutoPreview

We tested a cool little method you can use to ensure your email has the best chance possible of being opened in Gmail and Outlook. The best part is, it only takes 30 seconds to do.

30% of your recipients don't even know your images are missing

Another study that hits home how important it is to ensure your email looks and works great with images on or off. Those of you still sending predominantly image based emails, here's the slap in the face you need.

Holiday Competition - 60,000 email credits up for grabs

Outlook (2007 +)

Microsoft Expression Engine

For Microsofts new range of competitor products to Adobe

Windows Mobile HTML engine

Developed for browsers on mobiles

Pocket PC
Windows Mobile

Internet Explorer - Disadvantages

- Major problem - poor support for standards

v1	July 1995
v2	November 1995
v3	August 1996
v4	September 1997
v5	March 1999
v6	August 2001
v7	October 2006
v8	March 2009
v9	March 2011
v10	October 2012

Internet Explorer - Disadvantages

Many browser CSS comparison sites:

http://www.webdevout.net/browser-support-css

ACID 2

- ACID 2 test indicates nature of CSS standards compliance

Generates a picture created with XHTML and CSS

Hello World!

http://www.webstandards.org/action/acid2/
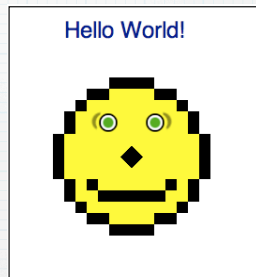
Internet Explorer Version 6 in ACID 2
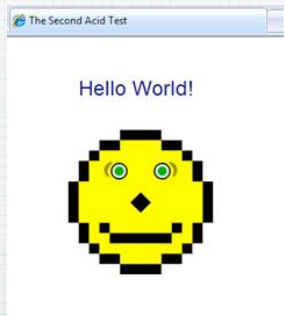
Hello World!

Internet Explorer Version 7 in ACID 2

Hello World!

Internet Explorer Version 8 March 2009

IE Version 8 passes ACID 2 (finally)

Firefox - History

- Born out of Netscape / Mozilla

- Open Source

- Gecko rendering engine - good support for standards

- Written in the Mozilla development environment

Firefox - History

- Very fast development cycle

v1	November 2004
v1.5	November 2005
v2	October 2006
v3	June 2008
v3.5	June 2009
v3.6	January 2010
v4.0	March 2011

- Design aim - keep the browser simple, small and fast

Firefox - History

- Release cycle was slowing ...

  - ... so rapid release implemented

v5.0	June 2011
v6.0	August 2011
v7.0	September 2011
v8.0	November 2011
v9.0	...
v17	November 2012

Firefox

- First browser to promote the idea of extensions
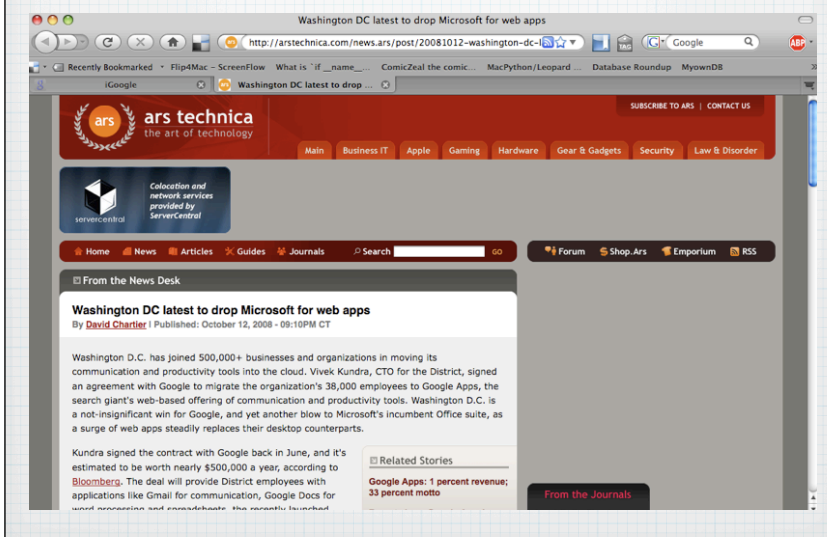
- Allow users to add the feature they want

- Perhaps too many here:
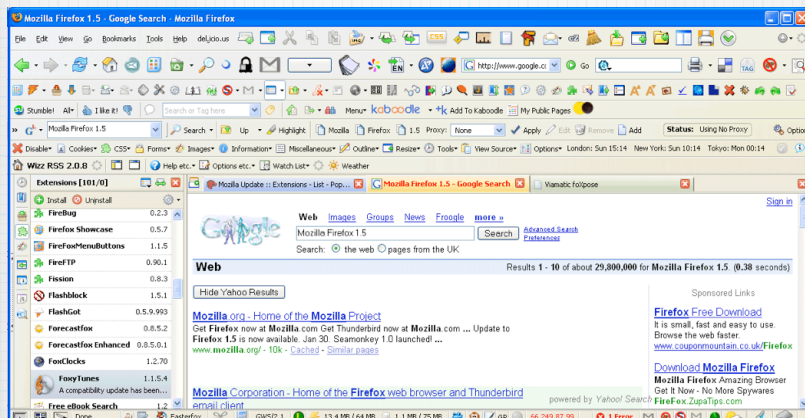
• Plug in example - Adblock [before]


• Plug in example - Adblock [after]

Firefox - Advantages

• Free apart from download costs

• Not tied to Operating System

• Nice design elements

Tabbed browsing, pop up window configuration, anti-phishing

Firefox - Disadvantages

- Separate download

- No support for Microsoft non standard extensions

- Not integrated into the Windows platform (Outlook and Office)

Firefox in ACID 2 (April 2006)

Hello World!

The Second Acid Test

Hello World!
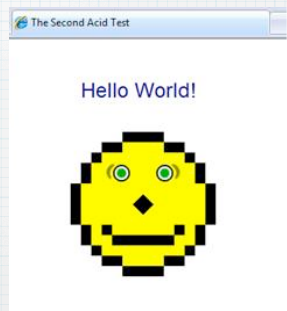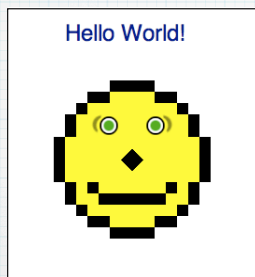
(IE8 March 2009)

Safari

- Apple

- Open Source

- WebKit rendering engine derived from KHTML

- Mac OS X and PC

- iPhone and iPad

Opera

- Opera Software

- Propriety/Moving to Open Source

- Presto rendering engine

- Multiplatform

Safari - History

v1	June 2003
v2	April 2005
v3	June 2007
v4	June 2008
v5	June 2010
v5.11	Oct 2011
v6	July 2012

- Produced to counter Microsofts "we'll stop supporting IE on Mac" threat

- Forked from the open source KHTML rendering engine on Linux (not Mozilla)

- First browser to pass ACID 2 in 2005

- Same code base used on Mac OS X, iPhone and iPad

Opera - History

v2	June 1996
...	...
v9.5	Oct 2007
...	...

- v1 - research project at Telenor (telecommunications company in Norway)

- Fast, multiplatform, large market share on mobiles

- One of the first browsers to offer CSS support

Chief technical officer of the Opera Software company Håkon Wium Lie - creator of CSS web standard

Google Chrome

v0.2	September 08
...	...
v5.0.307	Jan 2010
...	...
v9.0.587	November 2010
...	...
v24.0	November 2012
...	...

- Very different architecture

- Process Independent tabs (reducing crashes)

- Open source and Web-Kit rendering engine

- Look for the Google Chrome comic online, which explains the architecture

Google Chrome V 0.2 - passes ACID 2 from beginning
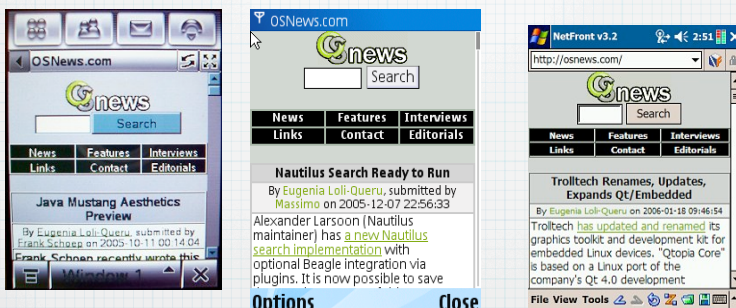
Hello World!
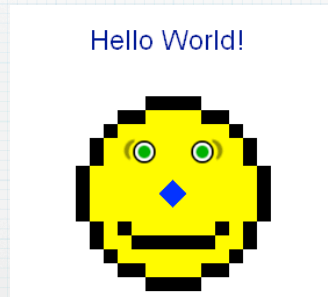
Original Mobile web

- Generally didn't support all web standards

- Offered 'cut down' experience

- Better ones were derived from proper PC browser rendering engines

- Expensive data plan, charged by the MB

Original Mobile web

- Many different mobile browsers

Until ... iPhone Safari

- **Closest to standard web experience**

| Synchronised bookmarks |
| Javascript, CSS support |
| Touch screen zoom |
| Inclusive data plan |
| Derived from Safari and webkit |

Mobile Browsing

- **Two most popular**

Slide 1

ACID 3

ACID 3 increases focus on DOM

- DOM2 Core
- DOM2 Events
- DOM2 HTML
- DOM2 Range
- DOM2 Style (getComputedStyle, ...)
- DOM2 Traversal (NodeIterator, TreeWalker)
- DOM2 Views (defaultView)
- ECMAScript
- HTML4 (<object>, <iframe>, ...)
- HTTP (Content-Type, 404, ...)
- Media Queries
- Selectors (:lang, :nth-child(), combinators, dynamic changes, ...)
- XHTML 1.0
- CSS2 (@font-face)
- CSS2.1 ('inline-block', 'pre-wrap', parsing...)
- CSS3 Color (rgba(), hsla(), ...)
- CSS3 UI ('cursor')
- data: URIs

Still in development

http://www.webstandards.org/action/acid3

Slide 2

ACID 3

Acid3

100/100

To pass the test, a browser must use its default settings, the animation has to be smooth, the score has to end on 100/100, and the final page has to look exactly, pixel for pixel, like this reference rendering.

http://annevankesteren.nl/2008/01/acid3

Slide 3

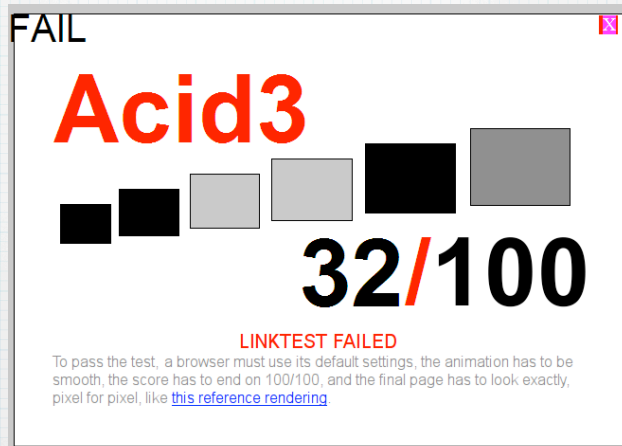**ACID 3**

http://annevankesteren.nl/2008/01/acid3
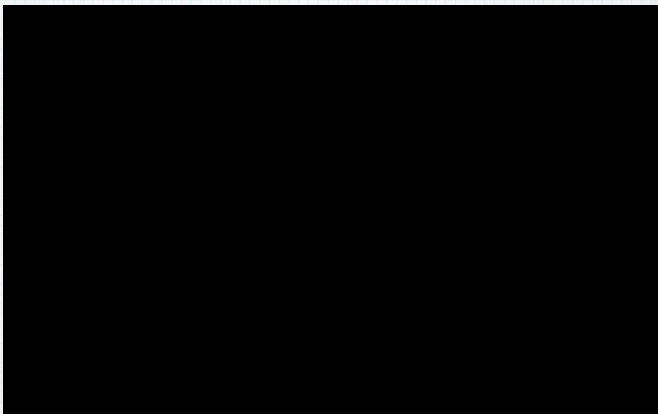
Acid3

93/100

To pass the test, a browser must use its default settings, the animation has to be smooth, the score has to end on 100/100, and the final page has to look exactly, pixel for pixel, like this reference rendering.
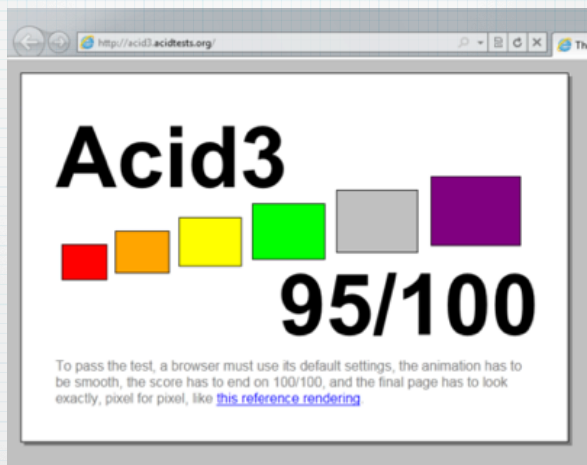
Acid3

100/100

To pass the test, a browser must use its default settings, the animation has to be smooth, the score has to end on 100/100, and the final page has to look exactly, pixel for pixel, like this reference rendering.

Acid3

100/100

To pass the test, a browser must use its default settings, the animation has to be smooth, the score has to end on 100/100, and the final page has to look exactly, pixel for pixel, like this reference rendering.

ACID 3

Safari 5

ACID 3

IE 7.0

ACID 3

IE 8.0

ACID 3

IE 9.0 Pre-beta

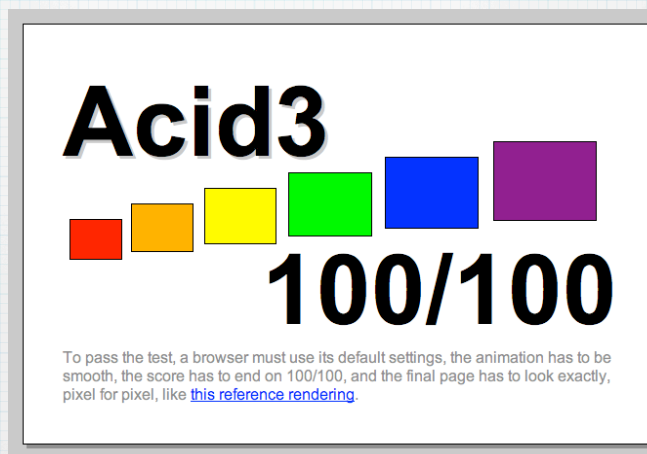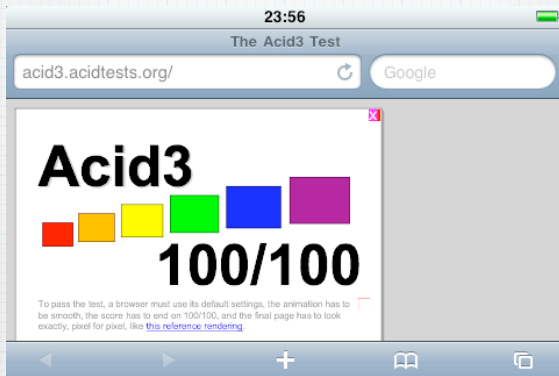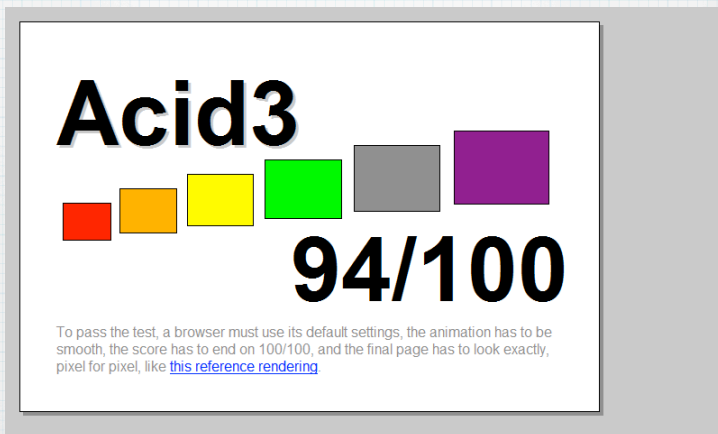

ACID 3

IE 9.0 Beta

ACID 3

IE 9.0

ACID 3

Mobile Safari
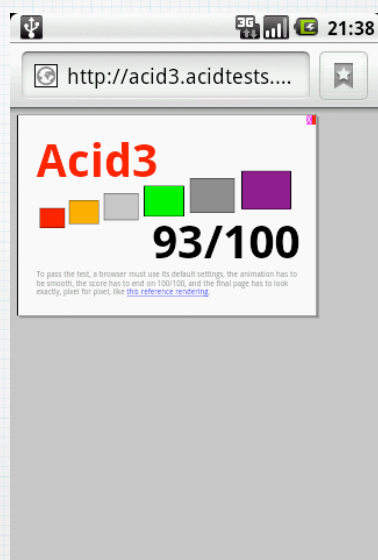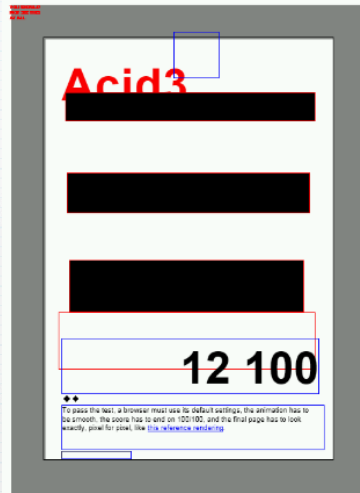

ACID 3

Mobile Firefox

ACID 3

Android

ACID 3

Internet Explorer
Windows Mobile 7

ACID 3

Internet Explorer
Windows Mobile
(latest version)