

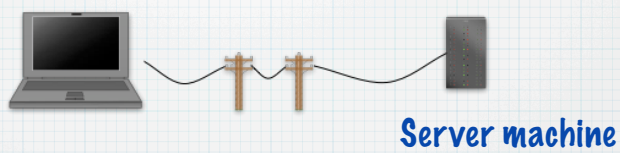
## World Wide Web

WWW usage requires a combination of standards and protocols

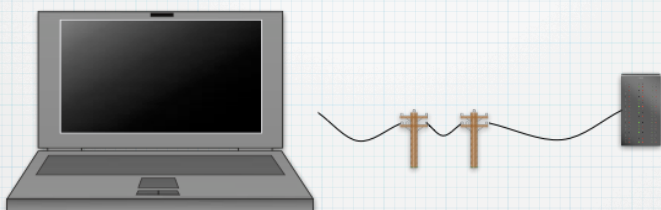
DHCP	TCP/IP	DNS
HTTP	HTML	MIME

## World Wide Web - how it works

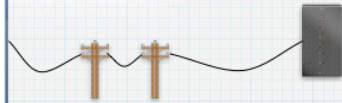
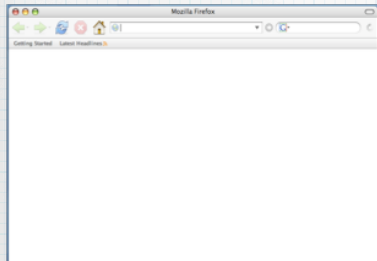
User on a machine somewhere



Being more specific...



## Web Browser software

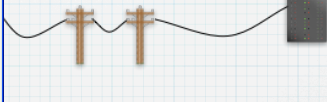


## Web Browser software



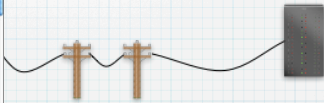
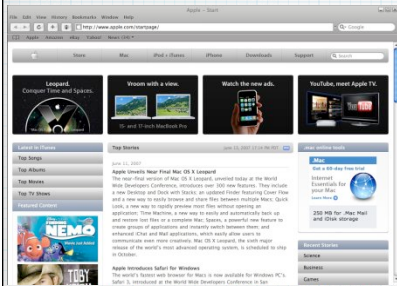
Firefox

## Web Browser software



Internet Explorer

## Web Browser software

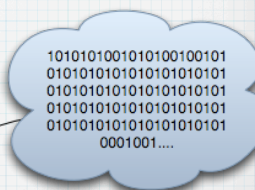
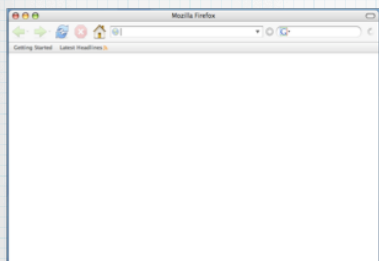


## Safari

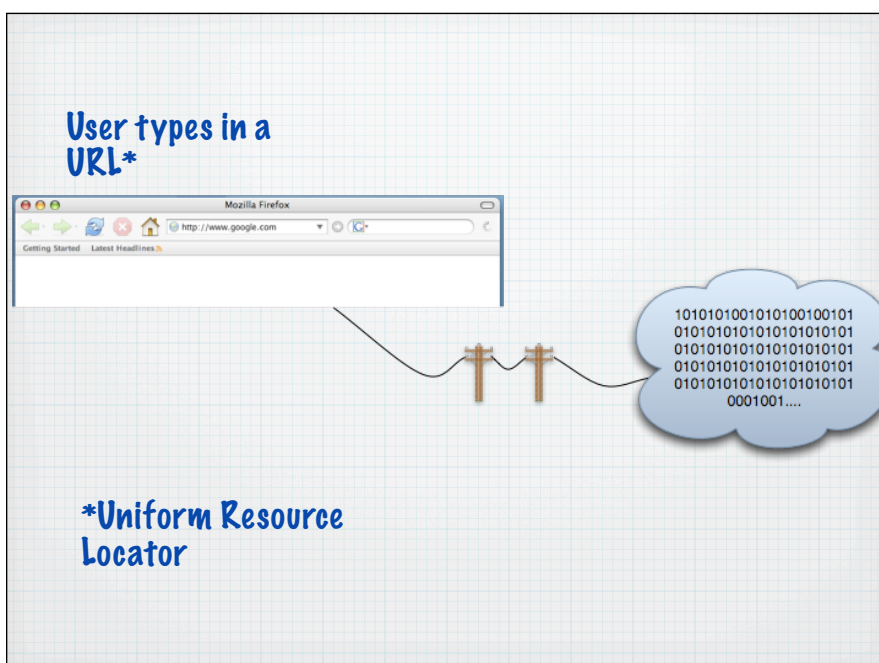
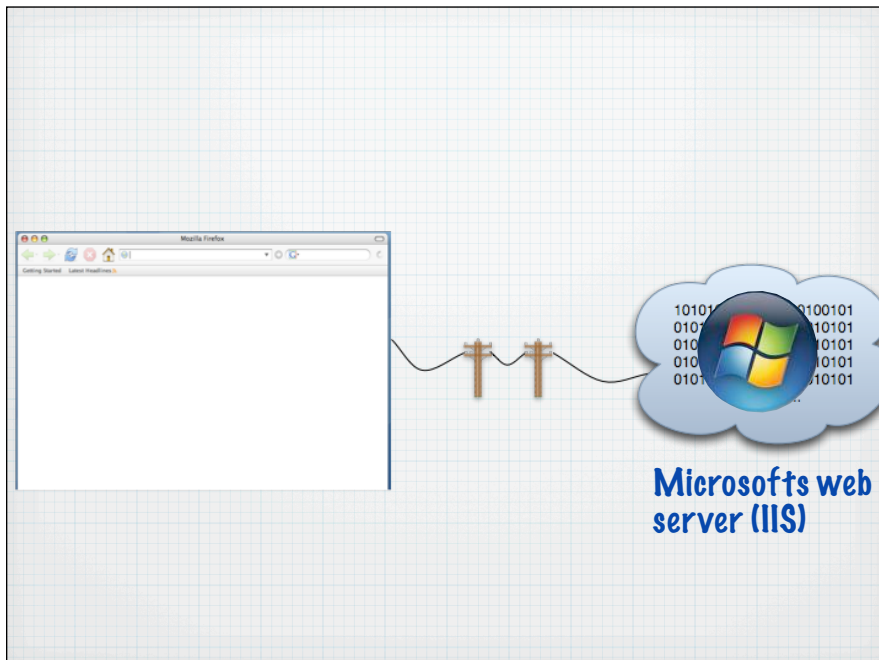
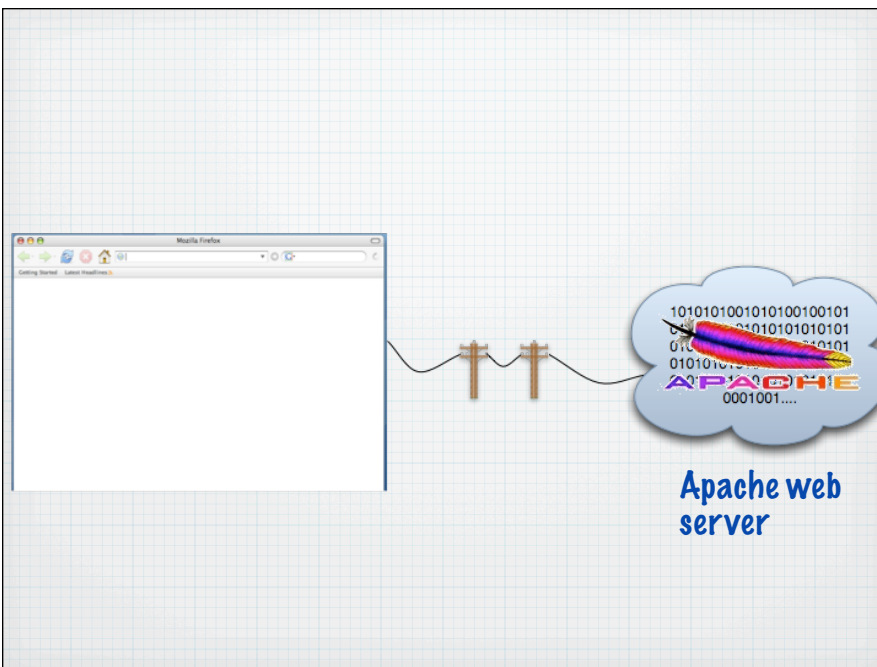
## Web Browser software

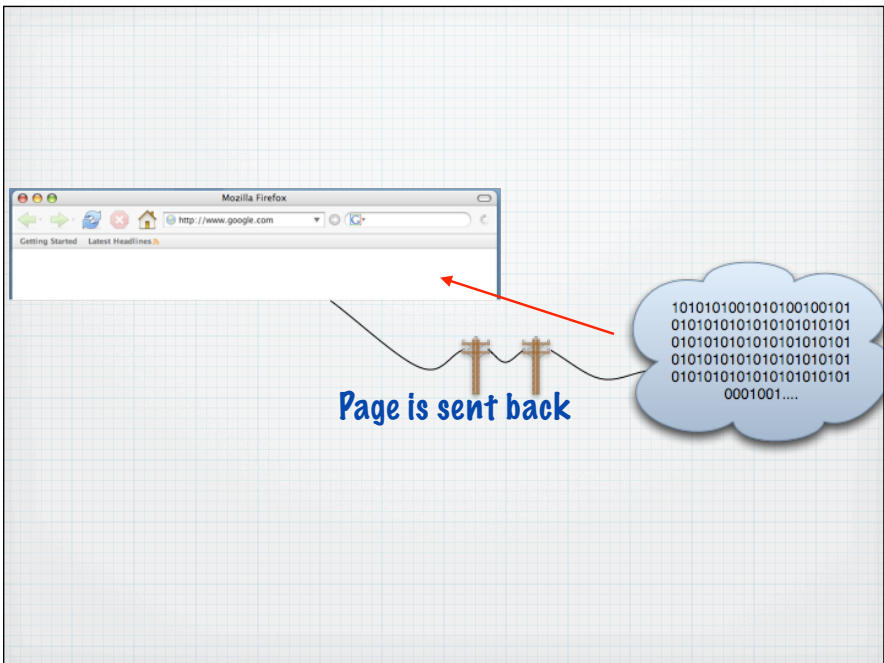
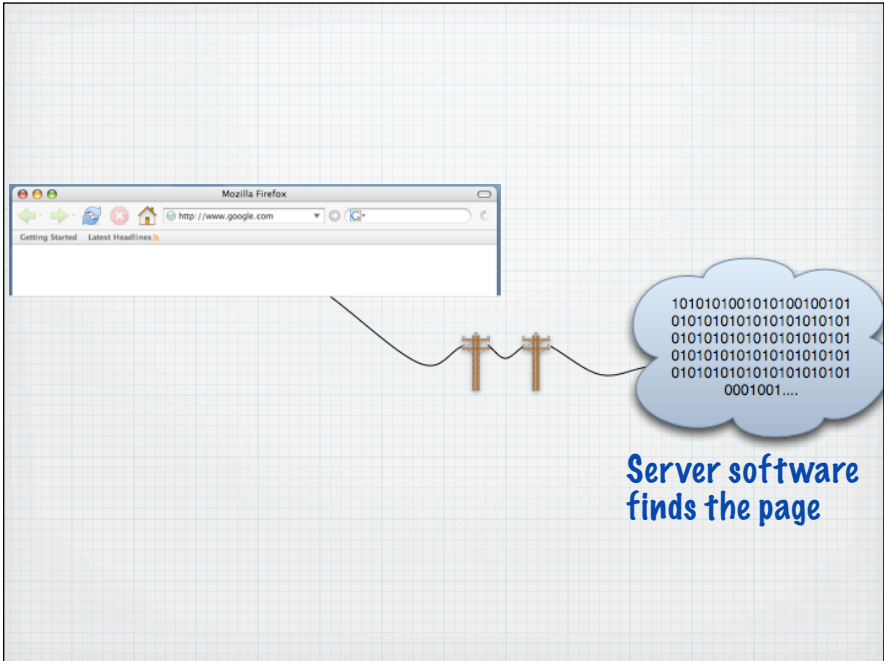
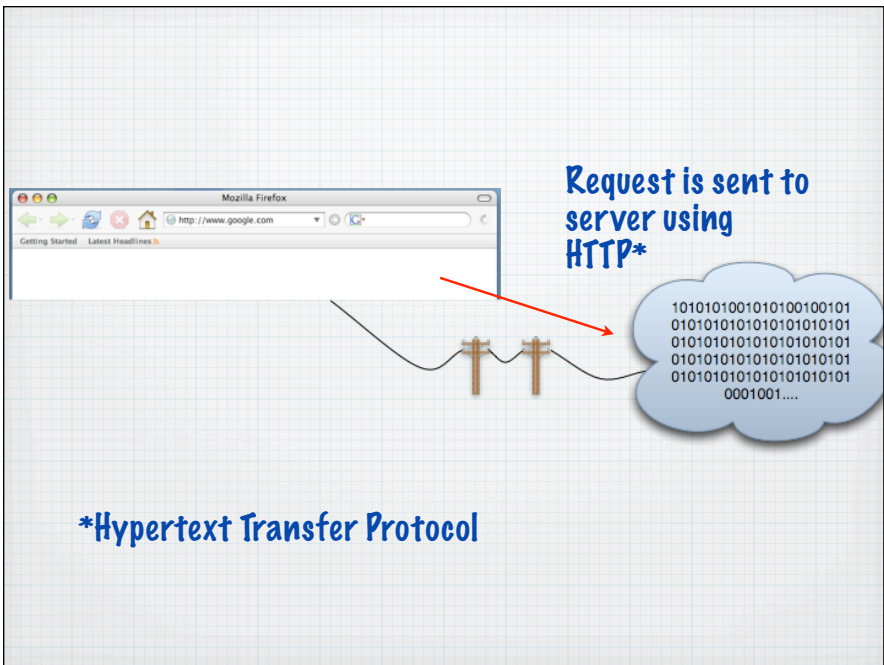


## Safari on iPhone



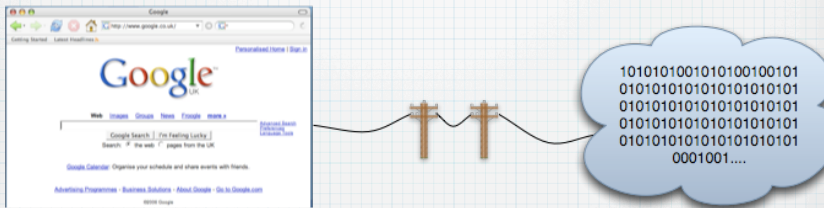
## Web server software







## 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

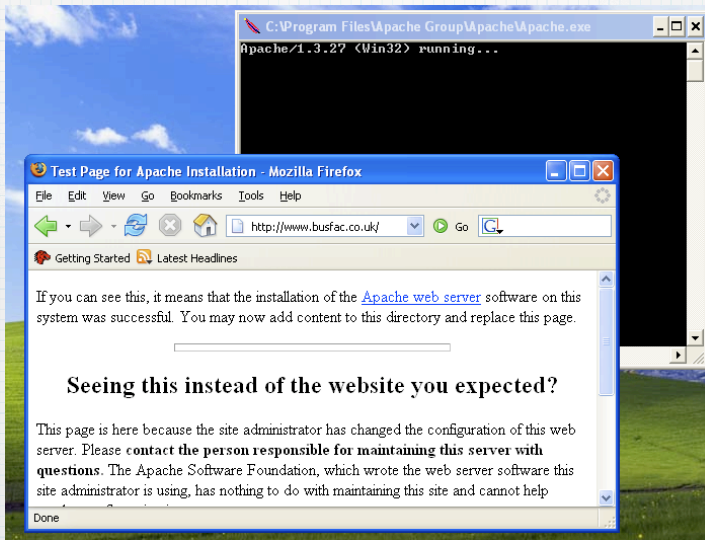
## Demo

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

```
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

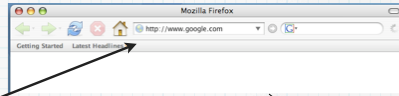


## In more detail then

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)



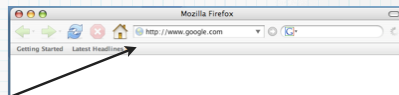
protocol: // server : port / directory / file

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)



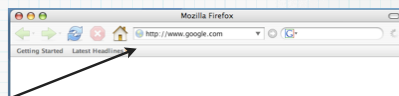
protocol: // server : port / directory / file

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

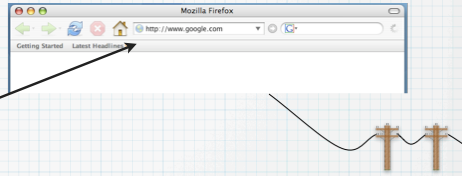
http: // www.kingston.ac.uk

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

**1&1 DOMAINS**  
REGISTER YOUR OWN DOMAIN NAME

**.com .net .org**  
**£4.99**  
PER YEAR

**2**  
days left

Three easy steps to register your domain!

**Step 1**  
Enter your chosen domain name in the first box below.

**Step 2**  
Select the top level domain (TLD) in the second box.

**Step 3**  
Hit go and see if your chosen domain is available!

**Domain Check**

www.  .

[Domain Transfer](#)

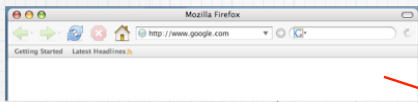
All inclusive features for Instant Domain package holders.

1&1 provides in excess of a simple domain name and extension, sign up for the Instant Domain Service and you could benefit from these additional features!

**The best prices**

Domain	£/year
<b>.com</b>	<del>£8.89</del> <b>£4.99</b>
<b>.net</b>	<del>£8.89</del> <b>£4.99</b>
<b>.org</b>	<del>£8.89</del> <b>£4.99</b>
<b>.co.uk</b>	<b>£1.99</b>
<b>.me.uk</b>	<b>£1.99</b>
<b>.org.uk</b>	<b>£1.99</b>
<b>.name</b>	<b>£8.89</b>
<b>.eu</b>	<b>£8.89</b>
<b>.us</b>	<b>£8.89</b>
<b>.info</b>	<b>£8.89</b>
<b>.biz</b>	<b>£8.89</b>
<b>.mobi</b>	<b>£12.99</b>

## 2. Browser sends HTTP request



Request is sent to server using HTTP

101010100101010010010101  
010101010101010101010101  
010101010101010101010101  
010101010101010101010101  
010101010101010101010101  
010101010101010101010101  
0001001....

- 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

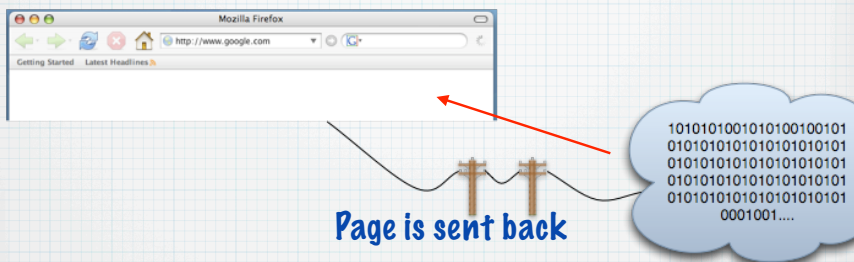
## HTTP GET request

- Example

GET   file\_request   protocol\_version

```
GET /~kul2492/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



- 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



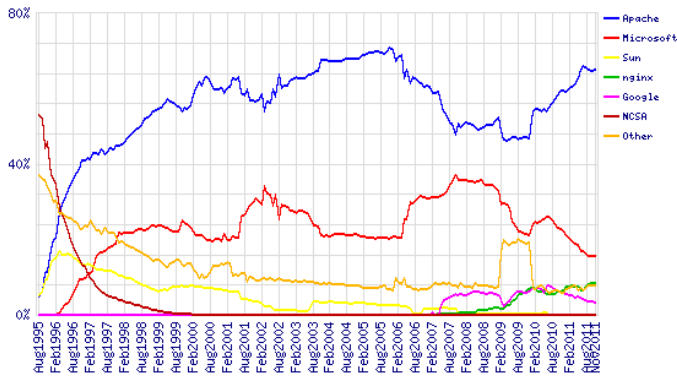
First web server machine

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 Top Servers Across All Domains  
August 1995 - November 2011



Developer	October 2011	Percent	November 2011	Percent	Change
Apache	326,008,432	64.67%	341,880,662	65.00%	0.32
Microsoft	78,937,065	15.66%	81,261,099	15.45%	-0.21
nginx	43,037,079	8.54%	44,731,780	8.50%	-0.03
Google	17,487,924	3.47%	17,749,748	3.37%	-0.09

## 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**
- **Key part of .Net**

## 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

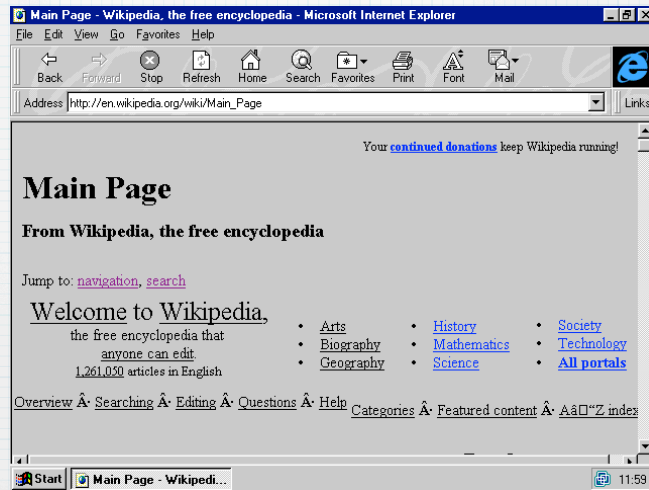
- Look and feel of Windows (whatever version)





## Internet Explorer - Advantages

- Look and feel of Windows (whatever version)



## Internet Explorer - Advantages

- Look and feel of Windows (whatever version)



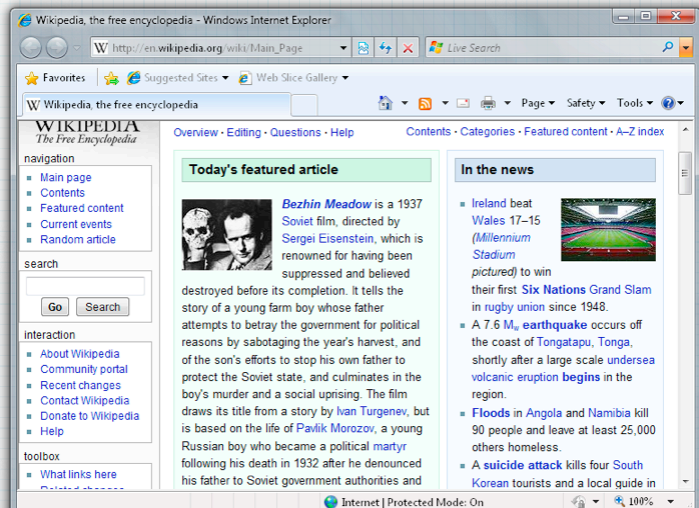
## Internet Explorer - Advantages

- Look and feel of Windows (whatever version)



## Internet Explorer - Advantages

- 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)
- Bloating 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 HTML engine

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

[http://www.campaignmonitor.com/blog/archives/2007/01/microsoft\\_takes\\_email\\_design\\_b.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](mailto: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

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It's been a while and we've got a seriously bumper 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.



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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...

[Sign in now](#)

Outlook (pre 2007)

To make sure you get this email each month, please add [davidg@campaignmonitor.com](mailto: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.

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[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	Announced April '11

## Internet Explorer - Disadvantages

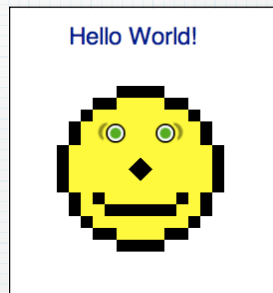
Many browser CSS comparison sites:

<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



<http://www.webstandards.org/action/acid2/>

## Internet Explorer Version 6 in ACID 2



## Internet Explorer Version 7 in ACID 2



## 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

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

- Very fast development cycle

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

## Firefox - History

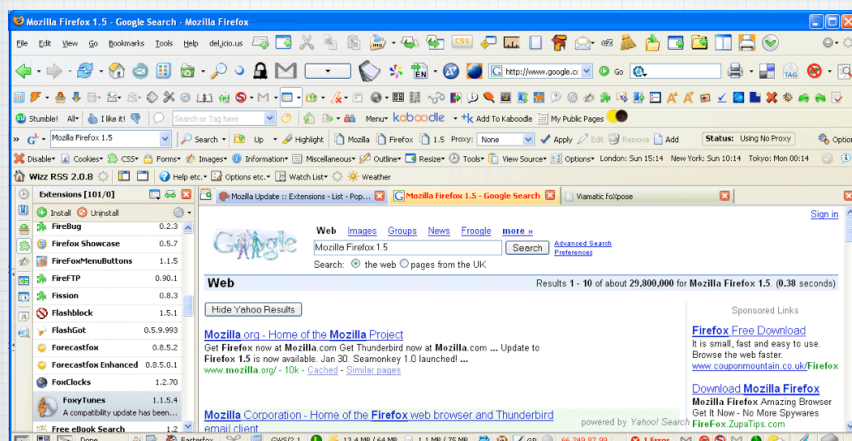
- Release cycle was slowing ...
- ... so rapid release implemented

v5.0	June 2011
v6.0	August 2011
v7.0	September 2011
v8.0	November 2011
v9.0	...
v10	in build

## Firefox

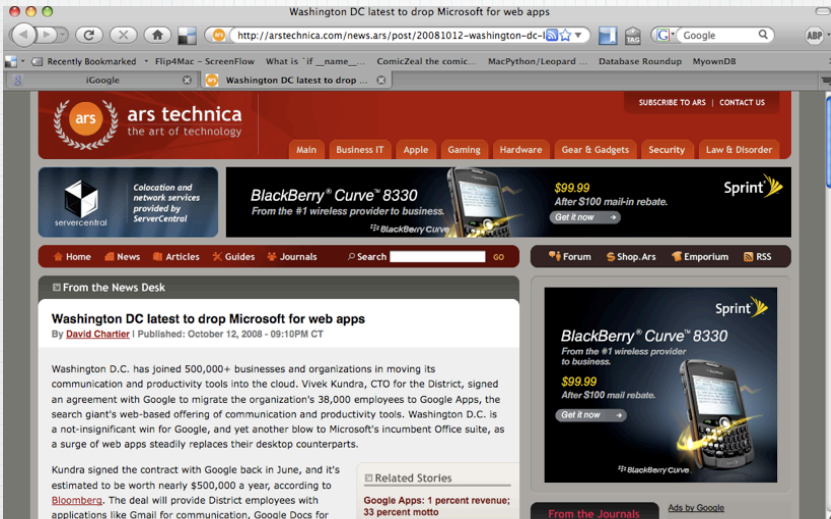
- First browser to promote the idea of extensions
- Allow users to add the feature they want

- Perhaps too many here:

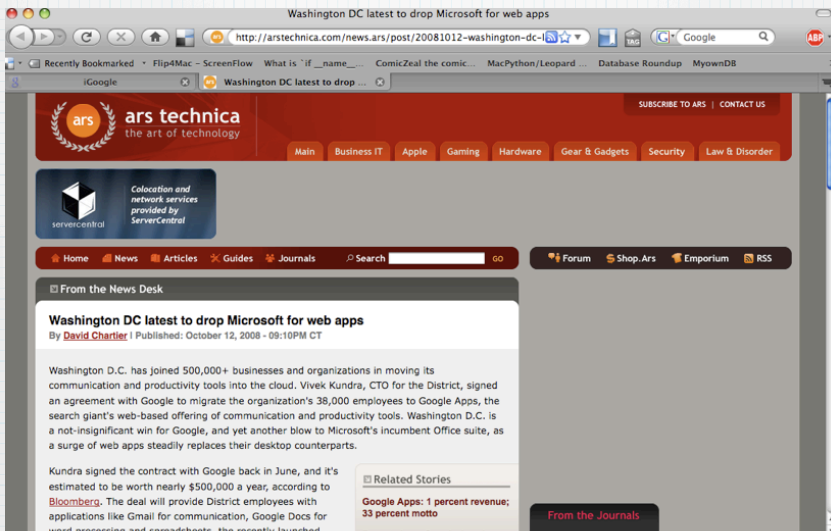




## • Plug in example - Adblock [before]



## • Plug in example - Adblock [after]



## Firefox - Advantages

- Free apart from download costs
- Not tied to Operating System
- Nice design elements

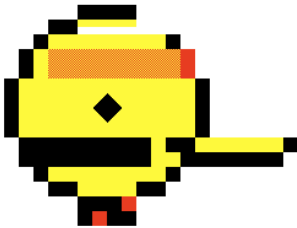
Tabbed browsing, pop up window configuration, anti-phishing

## Firefox - Disadvantages

- Separate download
- No support for Microsoft non standard extensions
- Not integrated into the Windows platform (Outlook and Office)

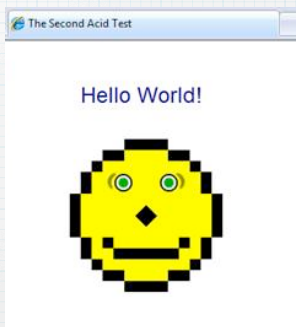
## Firefox 2.0 in ACID 2

Hello World!



## Firefox in ACID 2 (April 2006)

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

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

v1	June 2003
v2	April 2005
v3	June 2007
v4	June 2008
v5	June 2010
v5.1.1	Oct 2011

- 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

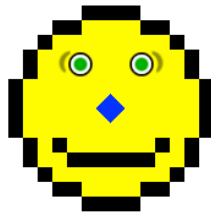
- Very different architecture

v0.2	September 08
...	...
v5.0.307	Jan 2010
...	...
v9.0.587	November 2010
...	...
v17.0.9	November 2011

- Process Independent tabs (reducing crashes)
- Open source and Web-Kit rendering engine
- Look for the Google Chrome comic online, which explains the architecture

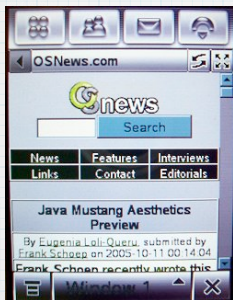
## Google Chrome V 0.2 - passes ACID 2 from beginning

Hello World!



## Mobile web

- Many different mobile browsers







## Mobile web

- Generally don't support all web standards
- Offer 'cut down' experience
- Better ones are derived from proper PC browser rendering engines
- Expensive data plan, charged by the MB

## iPhone Safari

- Closest so far to standard web experience



Synchronised bookmarks

Javascript, CSS support

Touch screen zoom

Inclusive data plan

Derived from Safari and webkit

## ACID 3

ACID 3 increases  
focus on DOM

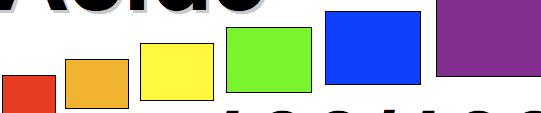
- DOM2 Core
- DOM2 Events
- DOM2 HTML
- DOM2 Range
- DOM2 Style (getComputedStyle, ...)
- DOM2 Traversal (NodeIterator, TreeWalker)
- DOM2 Views (defaultView)
- ECMAScript
- HTML4 (<object>, <iframe>, ...)
- HTTP (Content-Type, 404, ...)
- Media Queries
- Selectors (:lang, :nth-child(), combinators, 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>

## ACID 3

**Acid3**

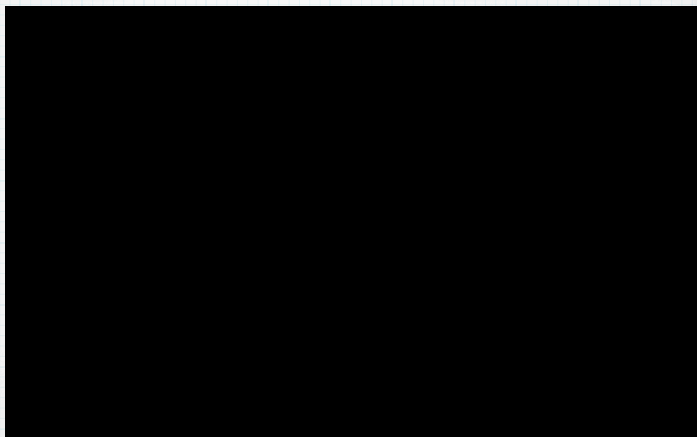


**100/100**

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>

## ACID 3



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

## ACID 3

Firefox 3.6

# Acid3



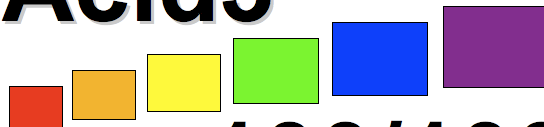
## 93/100

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](#).

## ACID 3

Firefox 70.1

# 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 4

# Acid3

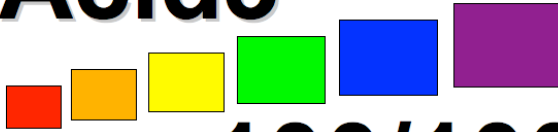


## 100/100

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

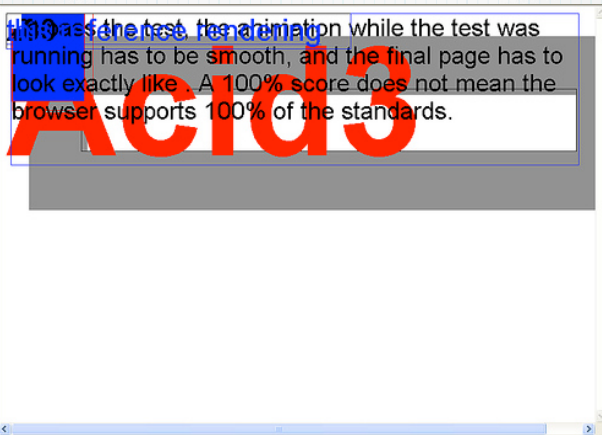
# Acid3



## 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  
IE 7.0



ACID 3  
IE 8.0

FAIL

# Acid3



## 20/100

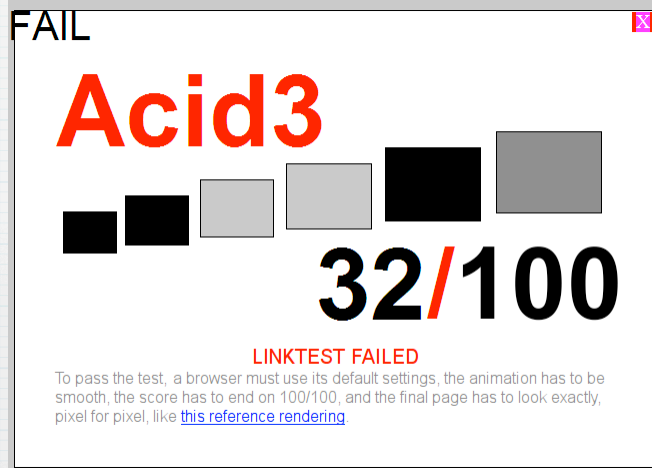
LINKTEST FAILED

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](#).



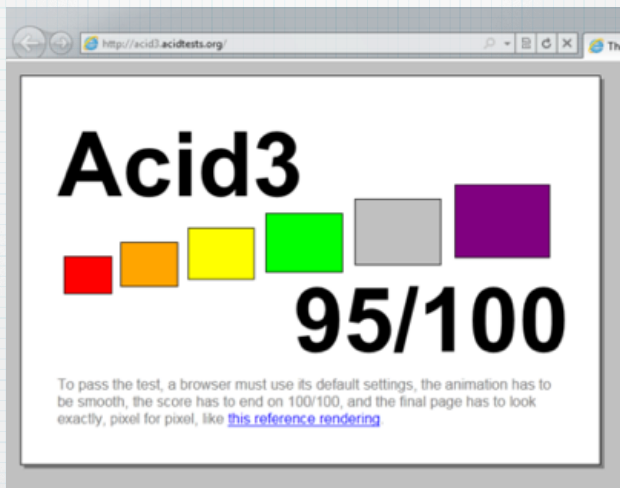
## ACID 3

IE 9.0 Pre-beta



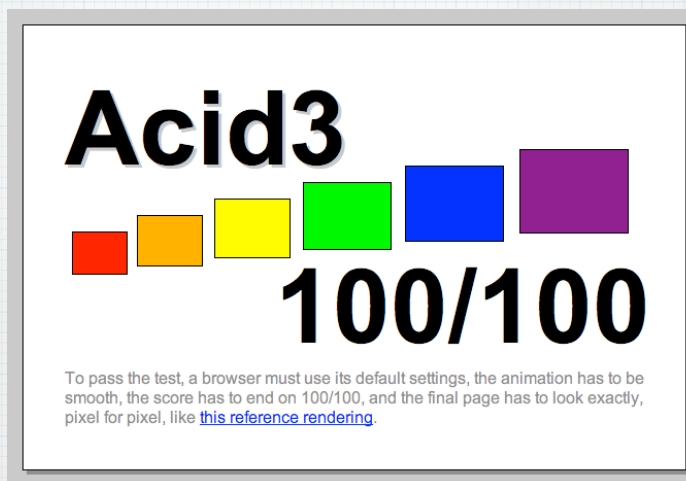
## ACID 3

IE 9.0 Beta



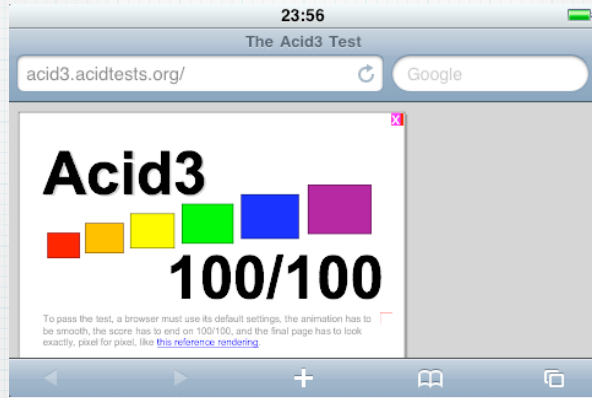
## ACID 3

IE 9.0



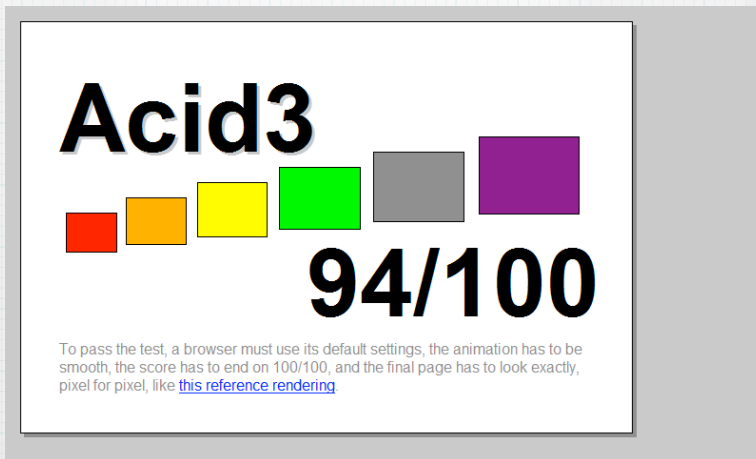
## ACID 3

### Mobile Safari



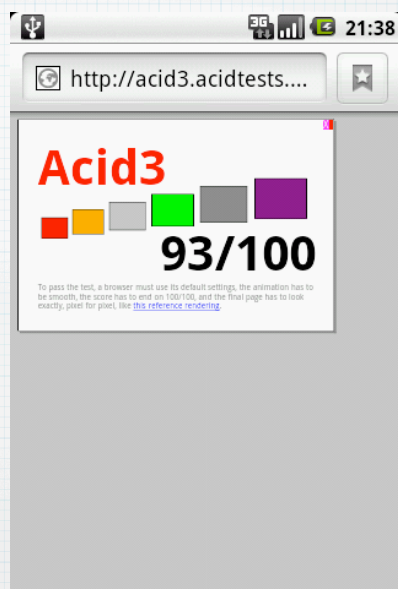
## ACID 3

### Mobile Firefox



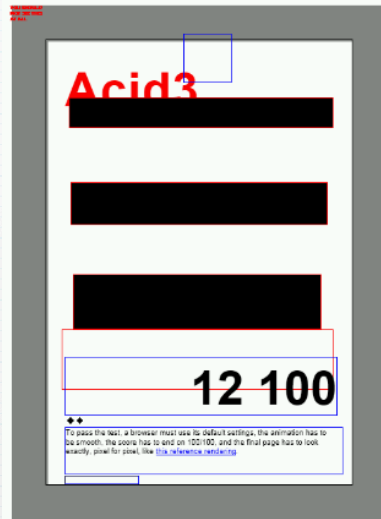
## ACID 3

### Android



## ACID 3

Internet Explorer  
Windows Mobile 7



## ACID 3

Internet Explorer  
Windows Mobile  
(latest version)

