

# Web standards

Version 1.0

Juha Söderqvist

# Web Standards

- Web standards are rules and guidelines established by the World Wide Web Consortium ( W3C ) developed to promote consistency in the design code which makes up a web page. Without getting technical, simply it's the guideline for the mark-up language which determines how a web page.

# Web design and applications

HTML and CSS are the fundamental technologies for building Web pages

HTML provides the structure of the page, CSS the (visual and aural) layout, for a variety of devices. Along with graphics and scripting, HTML and CSS are the basis of building Web pages and Web Applications.

# HyperText Markup Language

What is HTML?

- HTML is the language for describing the structure of Web pages. HTML gives authors the means to: Publish online documents with headings, text, tables, lists, photos, etc.
- Retrieve online information via hypertext links, at the click of a button. Design forms for conducting transactions with remote services, for use in searching for information, making reservations, ordering products, etc.
- Include spread-sheets, video clips, sound clips, and other applications directly in their documents.

# HTML Versions

## Versions of HTML:

- HTML 1991
- HTML 2.0 1995
- HTML 3.2 1997
- HTML 4.01 1999
- XHTML 2000
- HTML5 2014

# HTML 5.1

## HTML CURRENT STATUS

2016-11-01 HTML 5.1

- This specification defines the 5th major version, first minor revision of the core language of the World Wide Web: the Hypertext Markup Language (HTML). In this version, new features continue to be introduced to help Web application authors, new elements continue to be introduced based on research into prevailing authoring practices, and special attention continues to be given to defining clear conformance criteria for user agents in an effort to improve interoperability.

# Cascading Style Sheets

What is CSS?

- CSS is the language for describing the presentation of Web pages, including colors, layout, and fonts. It allows one to adapt the presentation to different types of devices, such as large screens, small screens, or printers. CSS is independent of HTML and can be used with any XML-based markup language. The separation of HTML from CSS makes it easier to maintain sites, share style sheets across pages, and tailor pages to different environments. This is referred to as the separation of structure (or: content) from presentation.

# Cascading Style Sheets – CSS1-2

The first CSS specification to become an official W3C Recommendation is CSS level 1, published on December 17, 1996

- Håkon Wium Lie and Bert Bos are credited as the original developers.
- 1998 CSS 2 The W3C no longer maintains the CSS 2 recommendation
- 2004 CSS level 2 revision 1, often referred to as "CSS 2.1", fixes errors in CSS 2
- low priority work on CSS 2.2 began in 2015

# Cascading Style Sheets – CSS 3

CSS 3 Unlike CSS 2, which is a large single specification defining various features, CSS 3 is divided into several separate documents called "modules". Each module adds new capabilities or extends features defined in CSS 2, preserving backward compatibility. Work on CSS level 3 started around the time of publication of the original CSS 2 recommendation. The earliest CSS 3 drafts were published in June 1999

# Cascading Style Sheets – CSS

## Advantages

### **Separation of presentation and content**

CSS facilitates publication of content in multiple presentation formats based on nominal parameters. Nominal parameters include explicit user preferences, different web browsers, the type of device being used to view the content (a desktop computer or mobile Internet device), the geographic location of the user and many other variables.

### **Site-wide consistency**

When CSS is used effectively, in terms of inheritance and "cascading", a global style sheet can be used to affect and style elements site-wide. If the situation arises that the styling of the elements should be changed or adjusted, these changes can be made by editing rules in the global style sheet. Before CSS, this sort of maintenance was more difficult, expensive and time-consuming.

### **Bandwidth**

A stylesheet, internal or external, specifies the style once for a range of HTML elements selected by class, type or relationship to others. This is much more efficient than repeating style information inline for each occurrence of the element. An external stylesheet is usually stored in the browser cache, and can therefore be used on multiple pages without being reloaded, further reducing data transfer over a network.

### **Page reformatting**

With a simple change of one line, a different style sheet can be used for the same page. This has advantages for accessibility, as well as providing the ability to tailor a page or site to different target devices. Furthermore, devices not able to understand the styling still display the content.

### **Accessibility**

Without CSS, web designers must typically lay out their pages with techniques such as HTML tables that hinder accessibility for vision-impaired users

# Cascading Style Sheets – CSS

CSS frameworks are pre-prepared libraries that are meant to allow for easier, more standards-compliant styling of web pages using the Cascading Style Sheets language. CSS frameworks include Foundation, Blueprint, Bootstrap, Cascade Framework and Materialize. Like programming and scripting language libraries, CSS frameworks are usually incorporated as external .css sheets referenced in the HTML <head>.

# Audio and Video

The Web is about more than text and information, it is also a medium for expressing artistic creativity, data visualization, and optimizing the presentation of information for different audiences with different needs and expectations. Like graphics, the use of video and audio on Web sites enhances the experience for users, and W3C has several different and complementary technologies that work together with HTML, SVG and scripting to provide the creators of Web pages and Web Applications with the tools they need to deliver the best possible representation of their content.

# Audio and Video

Multiple source files can be specified using the `<source>` element in order to provide video or audio encoded in different formats for different browsers. For instance:

```
<video controls>
```

```
  <source src="SampleVideo.ogv" type="video/ogv">
```

```
  <source src="SampleVideo.mp4" type="video/mp4">
```

```
  Your browser does not support the <code>video</code>
```

```
</video>
```

This plays the Ogg video file in browsers supporting the Ogg format. If the browser doesn't support Ogg video, the browser uses the MPEG-4 file. See also the list of media formats supported by the audio and video elements in different browsers.

# Audio and Video

To display a video using HTML5, which works in the newest versions of all major browsers, you can serve your video in both WebM format and MPEG H.264 AAC format, using the <source> element like this:

```
<video controls>
  <source src="somevideo.webm" type="video/webm">
  <source src="somevideo.mp4" type="video/mp4">
  I'm sorry; your browser doesn't support HTML5 video in WebM with VP8/VP9 or MP4 with H.264.
  <!-- You can embed a Flash player here, to play your mp4 video in older browsers -->
</video>
```

For Web browsers that do not currently support <video>, it's possible to include alternative content — at the very least, this could include some text and a link to the video file itself, so that users can download it and play it in a media player application:

```
<video src=myVideo.webm
width=320
height=240
controls
poster=image.jpg>
Download my awesome video in <a href=myVideo.webm>WebM</a> or <a href=myVideo.mp4>MP4</a> format
</video>
```

# Audio and Video - Support

Feature	Chrome	Firefox (Gecko)	Internet Explorer	Opera	Safari
Basic support	3.0	3.5 (1.9.1)	9.0	10.50	3.1
<audio>: PCM in WAVE	(Yes)	3.5 (1.9.1)	No support	10.50	3.1
<audio>: Vorbis in WebM	(Yes)	4.0 (2.0)	No support	10.60	3.1 <sup>[1]</sup>
<audio>: Streaming Vorbis/Opus in WebM via MSE	?	36.0 (36.0) <sup>[2]</sup>	?	?	?
<audio>: Vorbis in Ogg	(Yes)	3.5 (1.9.1)	No support	10.50	No support
<audio>: MP3	(Yes) <sup>[4]</sup>	(Yes) <sup>[5]</sup>	9.0	(Yes)	3.1
<audio>: MP3 in MP4	?	?	?	?	(Yes)
<audio>: AAC in MP4	(Yes) <sup>[6]</sup>	(Yes) <sup>[7]</sup>	9.0	(Yes)	3.1
<audio>: Opus in Ogg	27.0	15.0 (15.0)	?	?	?
<audio>: FLAC	No support	51 (51)	No support	No support	No support
<audio>: FLAC in Ogg	No support	51 (51)	No support	No support	No support
<video>: VP8 and Vorbis in WebM	6.0	4.0 (2.0)	9.0 <sup>[8]</sup>	10.60	3.1 <sup>[9]</sup>
<video>: VP9 and Opus in WebM	29.0	28.0 (28.0) <sup>[36]</sup>	?	(Yes)	?
<video>: Streaming WebM via MSE	?	42.0 (42.0) <sup>[35]</sup>	?	?	?
<video>: Theora and Vorbis in Ogg	(Yes)	3.5 (1.9.1)	No support	10.50	No support
<video>: H.264 and MP3 in MP4	(Yes) <sup>[4]</sup>	(Yes) <sup>[10]</sup>	9.0	(Yes)	(Yes)
<video>: H.264 and AAC in MP4	(Yes) <sup>[4]</sup>	(Yes) <sup>[11]</sup>	9.0	(Yes)	3.1
<video>: FLAC in MP4	?	51 (51)	?	?	?
any other format	No support	No support	No support	No support	3.1 <sup>[12]</sup>



# Mobile Web

What technologies have been developed to fit mobile devices?

Over the past years, W3C has developed a number of Web technologies that explicitly take into account the specificities of mobile devices:

- \*CSS Mobile, a profile of the cascading style sheet language that matches the need of mobile Web authors
- \*SVG Tiny, a profile of the Web's scalable vector graphics format well-suited to the capabilities of mobile devices

The latest generation of mobile browsers are capable of using more advanced Web technologies, including features from HTML5, CSS 2.1 and 3, a number of rich JavaScript APIs, opening the way for Web-based mobile applications

# Javascript Web Apis

## JAVASCRIPT WEB APIS

While the most common scripting language ECMAScript (more widely known as JavaScript) is developed by Ecma, a great many of the APIs made available in browsers have been defined at W3C.

What is scripting?

A script is program code that doesn't need pre-processing (e.g. compiling) before being run. In the context of a Web browser, scripting usually refers to program code written in JavaScript that is executed by the browser when a page is downloaded, or in response to an event triggered by the user.

# Javascript Dynamic

Scripting can make Web pages more dynamic. For example, without reloading a new version of a page it may allow modifications to the content of that page, or allow content to be added to or sent from that page. The former has been called DHTML (Dynamic HTML), and the latter AJAX (Asynchronous JavaScript and XML).

The most basic scripting interface developed at W3C is the DOM, the Document Object Model which allows programs and scripts to dynamically access and update the content, structure and style of documents. DOM specifications form the core of DHTML.

Modifications of the content using the DOM by the user and by scripts trigger events that developers can make use of to build rich user interfaces

# ACCESSIBILITY

The power of the Web is in its universality.

Access by everyone regardless of disability is an essential aspect.

Tim Berners-Lee, W3C Director and inventor of the World Wide Web

## Web Accessibility Initiative (WAI) at W3C

The W3C Web Accessibility Initiative (WAI) brings together people from industry, disability organizations, government, and research labs from around the world to develop guidelines and resources to help make the Web accessible to people with disabilities including auditory, cognitive, neurological, physical, speech, and visual disabilities.

# ACCESSIBILITY



0123 456 7890

Alt text is the classic example. Images should include equivalent alternative text in the markup/code

If alt text isn't provided for images, the image information is inaccessible, for example, to people who cannot see and use a screen reader that reads aloud the information on a page, including the alt text for the visual image.

When equivalent alt text is provided, the information is available to everyone to people who are blind, as well as to people who turned off images on their mobile phone to lower bandwidth charges, people in a rural area with low bandwidth who turned off images to speed download, and others. It's also available to technologies that cannot see the image, such as search engines.

CODE SNIPPET:

```
<p>  
 0123 456 7890  
</p>  
<p>  
 0123 456 7891  
</p>
```

# ACCESSIBILITY

## Transcripts for Podcasts

### example transcript

Just as images aren't available to people who can't see, audio files aren't available to people who can't hear. Providing a text transcript makes the audio information accessible to people who are deaf or hard of hearing, as well as to search engines and other technologies that can't hear.

# Privacy

## Do Not Track?

Do Not Track is a technology that lets users express their preferences around online tracking while browsing the Web. Advertisers, analytics, publishers and other online services that respect the DNT signal will limit the behavioral tracking of their users. By creating a simple, persistent and technology-neutral preference, Do Not Track will enhance users' control of their browsing information and improve their online privacy.

The HTTP/DOM mechanism for expressing a Do Not Track preference and policies for server-side compliance are both currently in the process of standardization in the Tracking Protection Working Group..

# Privacy

When a web browser requests content or sends data using HTTP, it can include extra information optionally in one or more items called "headers". Do not track adds a header (DNT: 1), indicating that the user does not want to be tracked.[26] The browser user has no control over whether the request is honoured or not.

“Do Not Track” (DNT) is a privacy setting which is currently supported in IE, Firefox, Safari and Opera with Chrome support coming soon. When enabled, your browser informs advertising networks, websites and applications that you want to opt-out of tracking for purposes such as behavioral advertising.

# Privacy - DNT

## DNT Implementation

It's important to note that DNT is a draft specification and not a distinct technology. When enabled, the browser simply sends a field named DNT with a value of 1 in the HTTP header. This can be detected by your web server using PHP or any other code, e.g.

```
<?php
$DNT = 'HTTP_DNT';
if (isset($_SERVER[$DNT]) && $_SERVER[$DNT] == 1) {
// DO NOT TRACK enabled
}
else {
// DO NOT TRACK disabled
}
?>
```

DNT is voluntary. There is no legal requirement to use it and enforcement is an honor system — much like robots.txt.

# Privacy – robots.txt

The robots exclusion standard, also known as the robots exclusion protocol or simply robots.txt, is a standard used by websites to communicate with web crawlers and other web robots. The standard specifies how to inform the web robot about which areas of the website should not be processed or scanned.

Where is robots.txt

You must apply the following saving conventions so that Googlebot and other web crawlers can find and identify your robots.txt file: You must save your robots.txt code as a text file, You must place the file in the highest-level directory of your site (or the root of your domain)

put these two lines into the /robots.txt file on your server:

```
User-agent: *
```

```
Disallow: /.
```

# GRAPHICS

Web graphics are visual representations used on a Web site to enhance or enable the representation of an idea or feeling

## **What is PNG?**

Portable Network Graphics (PNG) is a static file format for the lossless, portable, well-compressed storage and exchange of raster images (bitmaps). It features rich color control, with indexed-color, grayscale, and truecolor support and alpha-channel transparency. PNG is designed for the Web, with streaming and progressive rendering capabilities. It is supported ubiquitously in Web browsers, graphical authoring tools, image toolkits, and other parts of the creative tool chain. PNG files have the file extension ".PNG" or ".png" and should be deployed using the Media Type "image/png".

## **What is SVG?**

Scalable Vector Graphics (SVG) is like HTML for graphics. It is a markup language for describing all aspects of an image or Web application, from the geometry of shapes, to the styling of text and shapes, to animation, to multimedia presentations including video and audio. It is fully interactive, and includes a scriptable DOM as well as declarative animation (via the SMIL specification). It supports a wide range of visual features such as gradients, opacity, filters, clipping, and masking.

# GRAPHICS

## Canvas

The Canvas API is a client-side scripting technology to allow for the rich creation or alteration of raster images (bitmaps) . It uses vector-based programmatic methods to create shapes, gradients, and other graphical effects, and because it has no DOM, it can perform very quickly.

Dedicated scripters can develop games or even full-featured applications using the Canvas API, alone or integrated into HTML or SVG. It is supported natively in most modern browsers (with script libraries extending support to all major browsers), and even on some mobile devices.

Web Computer Graphics Metafile (**WebCGM**) is the Web profile of CGM, the ISO standard for vector and composite vector/raster picture definition. CGM has a significant following in technical illustration, interactive electronic documentation, geophysical data visualization, amongst other application areas and is widely used in the fields of automotive engineering, aeronautics, and the defense industry.

WebCGM has many of the same graphical features as SVG.

# GRAPHICS

As a simple example of an SVG image file, here is a circle with a gradient to give it a 3D appearance:

```
<svg xmlns="http://www.w3.org/2000/svg" width="100%"  
height="100%" viewBox="0 0 100 100">  
  <defs>  
    <radialGradient id="rg" cx="100" cy="100" fx="80" fy="80"  
gradientUnits="userSpaceOnUse">  
      <stop offset="5%" stop-color="lightskyblue" />  
      <stop offset="100%" stop-color="darkblue" />  
    </radialGradient>  
  </defs>  
  <circle id="circle_1" cx="100" cy="100" r="95" fill="url(#rg)"/>  
</svg>
```

# INTERNATIONALIZATION

**One fundamental aspect of internationalization is to ensure that the technology supports text in any writing system of the world. This is why W3C technologies are built on the universal character set, Unicode.**

**For HTML5, the default character encoding is UTF-8.**

**This has not always been the case. The character encoding for the early web was ASCII.**

**Later, from HTML 2.0 to HTML 4.01, ISO-8859-1 was considered the standard.**

**With XML and HTML5, UTF-8 finally arrived, and solved a lot of character encoding problems.**

**Unicode**

**Character-set Description**

**UTF-8 A character in UTF8 can be from 1 to 4 bytes long. UTF-8 can represent any character in the Unicode standard. UTF-8 is backwards compatible with ASCII. UTF-8 is the preferred encoding for e-mail and web pages**

**UTF-16 16-bit Unicode Transformation Format is a variable-length character encoding for Unicode, capable of encoding the entire Unicode repertoire. UTF-16 is used in major operating systems and environments, like Microsoft Windows, Java and .NET**

**HTML 4 supports UTF-8. HTML 5 supports both UTF-8 and UTF-16!**

# INTERNATIONALIZATION

**HTML 4 supports UTF-8. HTML 5 supports both UTF-8 and UTF-16**

**If an HTML5 web page uses a different character set than UTF-8, it should be specified in the <meta> tag like:**

**Example**

**<meta charset="ISO-8859-1">**

# ISO-8859-1

ISO-8859-1 is the default character in HTML 4.01.

ISO (The International Standards Organization) defines the standard character sets for different alphabets/languages.

## ISO-8859-1 Character Set

The first part of ISO-8859-1 (entity numbers from 0-127) is the original ASCII character-set. It contains numbers, upper and lowercase English letters, and some special characters.

z 122 Latin small letter z

Since many web sites declare ISO-8859-1 and use the values from 128 to 159 as if they were using Windows-1252, most browsers will display these characters from the Windows-1252 character set instead of nothing.

€ 128 &euro; euro sign

The next part of ISO-8859-1 (codes from 160-191) contains commonly used special characters.

© &#169; &copy;copyright

## ISO-8859-1 Characters

The higher part of ISO-8859-1 (codes from 192-255, except 215 and 247) contains characters used in Western European countries.

Ö &#214; &Ouml; capital o, umlaut mark

ö &#246; &ouml; small o, umlaut mark

# MathML

**MathML (Mathematics Markup Language) is the Web's technology for storing and transporting mathematical formulas. It can be used both for including formulas in documents (such as essays and articles) and for exchange of data between mathematical software.**

## Examples

**The markup of a simple formula might look like this:**

$$\sqrt{x + \frac{a}{b}}$$

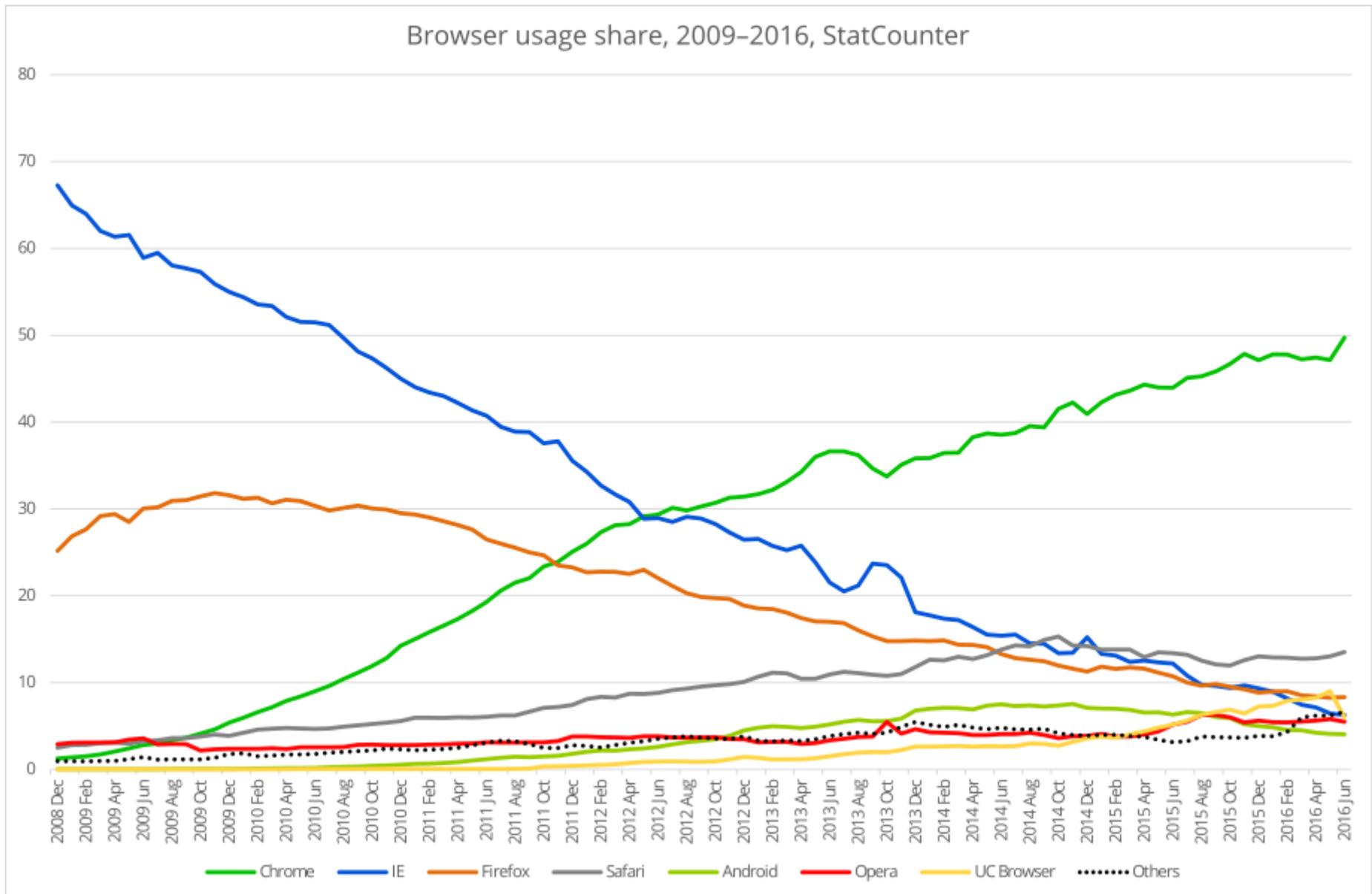
**<msqrt> <mi> x </mi> <mo> + </mo> <mfrac>  
<mi> a </mi> <mi> b </mi> </mfrac> </msqrt>**

# Webbrowser - Engines

## Layout engines

- **Gecko is developed by the Mozilla Foundation.**
- **Goanna is a fork of Gecko developed by Moonchild Productions.**
- **KHTML is developed by the KDE project.**
- **Presto is developed by Opera Software for use in Opera. Development stopped as Opera transitioned to Blink.**
- **Tasman was developed by Microsoft for use in Internet Explorer 5 for Macintosh.**
- **Trident is developed by Microsoft for use in the Windows versions of Internet Explorer 4 to Internet Explorer 11.**
- **WebKit is a fork of KHTML by Apple Inc. used in Apple Safari, Chromium and Google Chrome.**
- **Blink is a 2013 fork of WebKit's WebCore component by Google used in Chromium, Google Chrome and Opera.[20]**
- **Servo is an experimental web browser layout engine being developed cooperatively by Mozilla and Samsung.**
- **EdgeHTML is the engine developed by Microsoft for Edge. It is a largely rewritten fork of Trident with all legacy code removed.**

# Browser usage



# Webrowsers - StatCounter

**Global desktop stats from StatCounter (Top 5 browsers)**

**February 2015:**

- **IE 18.91%**
- **Chrome 48.71%**
- **Firefox 16.53%**
- **Safari 10.21%**
- **Opera 1.63%**
- **Mobile 32.98%**

# Webbrowsers - W3Counter

**W3Counter (May 2007 to present)**

**April 2016**

- **IE 9.6%**
- **Firefox 9.7%**
- **Chrome 57.2%**
- **Safari 13.4%**
- **Opera 4.1%**

# Webbrowsers - TheCounter.com

**2004 Q1**

**94.28% IE**

**2.70% FF,Netscape,mozilla**

**2009 Q4**

**66.42% IE**

**21.13% FF,Netscape,mozilla**

# Webbrowsers - 94-98

## GVU WWW user survey (January 1994 to October 1998)

Date	Mosaic	Netscape Navigator	Internet Explorer	Source
October 1998		64%	32.2%	<a href="#">Primary Browser in 12 Months</a>
April 1998		70%	22.7%	<a href="#">Browser Expected to Use in 12 Months</a>
October 1997		59.67%	15.13%	<a href="#">Browser Expected to Use in 12 Months</a>
April 1997		81.13%	12.13%	<a href="#">Browser Expected to Use in 12 Months</a>
October 1996		80.45%	12.18%	<a href="#">Browser Expected to Use in 12 Months</a>
April 1996		89.36%	3.76%	<a href="#">Browser Expected to Use in 12 Months</a>
April 1995	9%	54%		<a href="#">Hal Berghe's Cybernautica – "A Web Monopoly"</a>
October 1994	68%	18%		<a href="#">Result Graph – Browser</a>
January 1994	97%			<a href="#">General Results Graphs</a>

# Webbrowsers - 94-98

## GVU WWW user survey (January 1994 to October 1998)

Date	Mosaic	Netscape Navigator	Internet Explorer	Source
October 1998		64%	32.2%	<a href="#">Primary Browser in 12 Months</a>
April 1998		70%	22.7%	<a href="#">Browser Expected to Use in 12 Months</a>
October 1997		59.67%	15.13%	<a href="#">Browser Expected to Use in 12 Months</a>
April 1997		81.13%	12.13%	<a href="#">Browser Expected to Use in 12 Months</a>
October 1996		80.45%	12.18%	<a href="#">Browser Expected to Use in 12 Months</a>
April 1996		89.36%	3.76%	<a href="#">Browser Expected to Use in 12 Months</a>
April 1995	9%	54%		<a href="#">Hal Berghe's Cybernautica – "A Web Monopoly"</a>
October 1994	68%	18%		<a href="#">Result Graph – Browser</a>
January 1994	97%			<a href="#">General Results Graphs</a>

# Webbrowsers - Dataquest

## Dataquest (1995 to 1997)

Date	Internet Explorer	Netscape Navigator
1997	39.4%	57.6%
1996	20%	73%
1995	2.9%	80.1%

