Cascading Style Sheets

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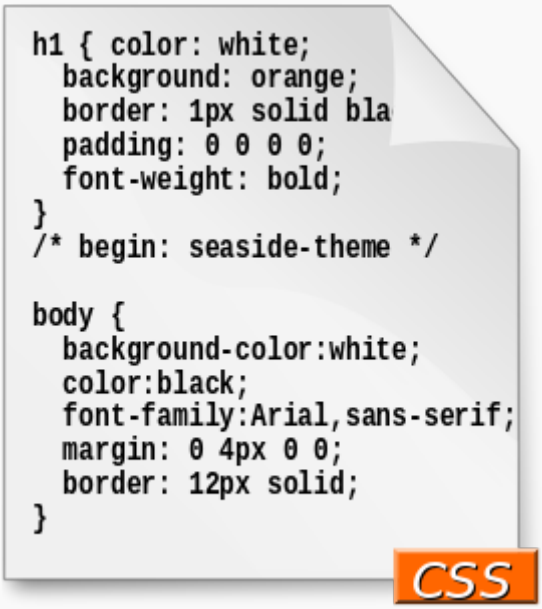
Cascading Style Sheets (CSS)



Filename extension	`.css`
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Developed by	Håkon Wium Lie · Bert Bos · World Wide Web Consortium ·
Initial release	December 17, 1996
Type of format	Style sheet language
Standards	Level 1 (Recommendation) (http://www.w3.org/TR/1999/REC-CSS1-19990111) Level 2 (ditto) (http://www.w3.org/TR/2008/REC-CSS2-20080411/) Level 2 Revision 1 (ditto) (http://www.w3.org/TR/2011/REC-CSS2-20110607/)

Cascading Style Sheets (**CSS**) is a style sheet language used for describing the presentation of a document written in a markup language.[1] Although most often used to set the visual style of web pages and user interfaces written in HTML and XHTML, the language can be applied to any XML document, including plain XML, SVG and XUL , and is applicable to rendering in speech, or on other media. Along with HTML and JavaScript, CSS is a cornerstone technology used by most websites to create visually engaging webpages, user interfaces for web applications, and user interfaces for many mobile applications.[2]

CSS is designed primarily to enable the separation of document content from document presentation, including aspects such as the layout, colors, and fonts.[3] This separation can improve content accessibility, provide more flexibility and control in the specification of presentation characteristics, enable multiple HTML pages to share formatting by specifying the relevant CSS in a separate .css file, and reduce complexity and repetition in the structural content.

Separation of formatting and content makes it possible to present the same markup page in different styles for different rendering methods, such as on-screen, in print, by voice (via speech-based browser or screen reader), and on Braille-based tactile devices. It can also display the web page differently depending on the screen size or viewing device. Readers can also specify a different style sheet, such as a CSS file stored on their own computer, to override the one the author specified.

Changes to the graphic design of a document (or hundreds of documents) can be applied quickly and easily, by editing a few lines in the CSS file they use, rather than by changing markup in the documents.

The CSS specification describes a priority scheme to determine which style rules apply if more than one rule matches against a particular element. In this so-called *cascade*, priorities (or *weights*) are calculated and assigned to rules, so that the results are predictable.

The CSS specifications are maintained by the World Wide Web Consortium (W3C). Internet media

type (MIME type) `text/css` is registered for use with CSS by RFC 2318 (March 1998). The W3C operates a free CSS validation service for CSS documents.[4]

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Syntax

CSS has a simple syntax and uses a number of English keywords to specify the names of various style properties.

A style sheet consists of a list of *rules*. Each rule or rule-set consists of one or more *selectors*, and a *declaration block*.

Selector

In CSS, *selectors* declare which part of the markup a style applies to by matching tags and attributes in the markup itself.

Selectors may apply to:

- all elements of a specific type, e.g. the second-level headers h2
- elements specified by attribute, in particular:
  - *id*: an identifier unique within the document
  - *class*: an identifier that can annotate multiple elements in a document
- elements depending on how they are placed relative to others in the document tree.

Classes and IDs are case-sensitive, start with letters, and can include alphanumeric characters and underscores. A class may apply to any number of instances of any elements. An ID may only be applied to a single element.

Pseudo-classes are used in CSS selectors to permit formatting based on information that is not contained in the document tree. One example of a widely used pseudo-class is `:hover`, which identifies content only when the user "points to" the visible element, usually by holding the mouse cursor over it. It is appended to a selector as in `a:hover` or `#elementid:hover`. A pseudo-class classifies document elements, such as `:link` or `:visited`, whereas a *pseudo-element* makes a selection that may consist of partial elements, such as `::first-line` or `::first-letter`.[5]

Selectors may be combined in many ways to achieve great specificity and flexibility.[6] Multiple selectors may be joined in a spaced list to specify elements by location, element type, id, class, or any combination thereof. The order of the selectors is important. For example, `div .myClass {color: red;}` applies to all elements of class myClass that are inside div elements, whereas `.myClass div {color: red;}` applies to all div elements that are in elements of class myClass.

The following table provides a summary of selector syntax indicating usage and the version of CSS that introduced it.[7]

Pattern	Matches	First defined in CSS level
E	an element of type E	1
E:link	an E element is the source anchor of a hyperlink of which the target is not yet visited (:link) or already visited (:visited)	1
E:active	an E element during certain user actions	1
E::first-line	the first formatted line of an E element	1
E::first-letter	the first formatted letter of an E element	1
.c	all elements with class="c"	1
#myid	the element with id="myid"	1
E.warning	an E element whose class is "warning" (the document language specifies how class is determined)	1
E#myid	an E element with ID equal to "myid"	1
E F	an F element descendant of an E element	1
*	any element	2
E[foo]	an E element with a "foo" attribute	2
E[foo="bar"]	an E element whose "foo" attribute value is exactly equal to "bar"	2
E[foo~="bar"]	an E element whose "foo" attribute value is a list of whitespace-separated values, one of which is exactly equal to "bar"	2
E[foo|="en"]	an E element whose "foo" attribute has a hyphen-separated list of values beginning (from the left) with "en"	2
E:first-child	an E element, first child of its parent	2
E:lang(fr)	an element of type E in language "fr" (the document language specifies how language is determined)	2
E::before	generated content before an E element's content	2
E::after	generated content after an E element's content	2
E > F	an F element child of an E element	2
E + F	an F element immediately preceded by an E element	2
E[foo^="bar"]	an E element whose "foo" attribute value begins exactly with the string "bar"	3
E[foo$="bar"]	an E element whose "foo" attribute value ends exactly with the string "bar"	3
E[foo*="bar"]	an E element whose "foo" attribute value contains the substring "bar"	3
E:root	an E element, root of the document	3

E:nth-child(n)	an E element, the n-th child of its parent	3
E:nth-last-child(n)	an E element, the n-th child of its parent, counting from the last one	3
E:nth-of-type(n)	an E element, the n-th sibling of its type	3
E:nth-last-of-type(n)	an E element, the n-th sibling of its type, counting from the last one	3
E:last-child	an E element, last child of its parent	3
E:first-of-type	an E element, first sibling of its type	3
E:last-of-type	an E element, last sibling of its type	3
E:only-child	an E element, only child of its parent	3
E:only-of-type	an E element, only sibling of its type	3
E:empty	an E element that has no children (including text nodes)	3
E:target	an E element being the target of the referring URI	3
E:enabled	a user interface element E that is enabled	3
E:disabled	a user interface element E that is disabled	3
E:checked	a user interface element E that is checked (for instance a radio-button or checkbox)	3
E:not(s)	an E element that does not match simple selector s	3
E ~ F	an F element preceded by an E element	3

Declaration block

A declaration block consists of a list of *declarations* in braces. Each declaration itself consists of a *property*, a colon (:), and a *value*. If there are multiple declarations in a block, a semi-colon (;) must be inserted to separate each declaration.[8]

Properties are specified in the CSS standard. Each property has a set of possible values. Some properties can affect any type of element, and others apply only to particular groups of elements.[9]

Values may be keywords, such as "center" or "inherit", or numerical values, such as 200px (200 pixels), 50vw (50 percent of the viewport width) or 80% (80 percent of the window width). Color values can be specified with keywords (e.g. "red"), hexadecimal values (e.g. #FF0000, also abbreviated as #F00), RGB values on a 0 to 255 scale (e.g. `rgb(255, 0, 0)`), RGBA values that specify both color and alpha transparency (e.g. `rgba(255, 0, 0, 0.8)`), or HSL or HSLA values (e.g. `hsl(000, 100%, 50%)`, `hsla(000, 100%, 50%, 80%)`).[10]

Use

Before CSS, nearly all presentational attributes of HTML documents were contained within the HTML markup. All font colors, background styles, element alignments, borders and sizes had to be explicitly described, often repeatedly, within the HTML. CSS lets authors move much of that information to another file, the style sheet, resulting in considerably simpler HTML.

For example, headings (`h1` elements), sub-headings (`h2`), sub-sub-headings (`h3`), etc., are defined structurally using HTML. In print and on the screen, choice of font, size, color and emphasis for these elements is *presentational*.

Before CSS, document authors who wanted to assign such typographic characteristics to, say, all `h2` headings had to repeat HTML presentational markup for each occurrence of that heading type. This made documents more complex, larger, and more error-prone and difficult to maintain. CSS allows the separation of presentation from structure. CSS can define color, font, text alignment, size, borders, spacing, layout and many other typographic characteristics, and can do so independently for on-screen and printed views. CSS also defines non-visual styles, such as reading speed and emphasis for aural text readers. The W3C has now deprecated the use of all presentational HTML markup.[11]

For example, under pre-CSS HTML, a heading element defined with red text would be written as:

```
<h1><font color="red"> Chapter 1. </font></h1>
```

Using CSS, the same element can be coded using style properties instead of HTML presentational attributes:

```
<h1 style="color: red;"> Chapter 1. </h1>
```

An "external" CSS file, as described below, can be associated with an HTML document using the following syntax:

```
<link href="path/to/file.css" rel="stylesheet">
```

An internal CSS code can be typed in the head section of the code. The coding is started with the style tag. For example,

```
<style>
```

Sources

CSS information can be provided from various sources. These sources can be the web browser, the user and the author. The information from the author can be further classified into inline, media type, importance, selector specificity, rule order, inheritance and property definition. CSS style information can be in a separate document or it can be embedded into an HTML document. Multiple style sheets can be imported. Different styles can be applied depending on the output device being used; for example, the screen version can be quite different from the printed version, so that authors can tailor the presentation appropriately for each medium.

The style sheet with the highest priority controls the content display. Declarations not set in the highest priority source are passed on to a source of lower priority, such as the user agent style. This process is called *cascading*.

One of the goals of CSS is to allow users greater control over presentation. Someone who finds red italic headings difficult to read may apply a different style sheet. Depending on the browser and the web site, a user may choose from various style sheets provided by the designers, or may

remove all added styles and view the site using the browser's default styling, or may override just the red italic heading style without altering other attributes.

CSS priority scheme (highest to lowest)

Priority	CSS source type	Description
1	Importance	The '`!important`' annotation overwrites the previous priority types
2	Inline	A style applied to an HTML element via HTML 'style' attribute
3	Media Type	A property definition applies to all media types, unless a media specific CSS is defined
4	User defined	Most browsers have the accessibility feature: a user defined CSS
5	Selector specificity	A specific contextual selector (`#heading p`) overwrites generic definition
6	Rule order	Last rule declaration has a higher priority
7	Parent inheritance	If a property is not specified, it is inherited from a parent element
8	CSS property definition in HTML document	CSS rule or CSS inline style overwrites a default browser value
9	Browser default	The lowest priority: browser default value is determined by W3C initial value specifications

Specificity

Specificity refers to the relative weights of various rules.[12] It determines which styles apply to an element when more than one rule could apply. Based on specification, a simple selector (e.g. H1) has a specificity of 1, class selectors have a specificity of 1,0, and ID selectors a specificity of 1,0,0. Because the specificity values do not carry over as in the decimal system, commas are used to separate the "digits"[13] (a CSS rule having 11 elements and 11 classes would have a specificity of 11,11, not 121).

Thus the following rules selectors result in the indicated specificity:

Selectors	Specificity
H1 {color: white;}	1
P EM {color: green;}	2
.grape {color: red;}	1,0
P.bright {color: blue;}	1,1
P.bright EM.dark {color: yellow;}	2,2
#id218 {color: brown;}	1,0,0
style=" "	1,0,0,0

Example

Consider this HTML fragment:

```
<!DOCTYPE html>
<html>
<head>
<meta charset="utf-8">
<style>
#xyz { color: red; }
</style>
</head>
<body>
<p id="xyz" style="color: blue;"> To demonstrate specificity </p>
</body>
</html>
```

In the above example, the declaration in the `style` attribute overrides the one in the `<style>` element because it has a higher specificity.

Inheritance

Inheritance is a key feature in CSS; it relies on the ancestor-descendant relationship to operate. Inheritance is the mechanism by which properties are applied not only to a specified element, but also to its descendants.[12] Inheritance relies on the document tree, which is the hierarchy of XHTML elements in a page based on nesting. Descendant elements may inherit CSS property values from any ancestor element enclosing them. In general, descendant elements inherit text-related properties, but box-related properties are not inherited. Properties that can be inherited are color, font, letter-spacing, line-height, list-style, text-align, text-indent, text-transform, visibility, white-space and word-spacing. Properties that cannot be inherited are background, border, display, float and clear, height, and width, margin, min- and max-height and -width, outline, overflow, padding, position, text-decoration, vertical-align and z-index.

Inheritance prevents certain properties from being declared over and over again in a style sheet, allowing the software developers to write less CSS. It enhances faster-loading of web pages by users and enables the clients to save money on bandwidth and development costs.

Example

Given the following style sheet:

```
h1 {
color: pink;
}
```

Suppose there is an h1 element with an emphasizing element (em) inside:

```
<h1>
This is to <em>illustrate</em> inheritance
</h1>
```

If no color is assigned to the em element, the emphasized word "illustrate" inherits the color of the parent element, h1. The style sheet h1 has the color pink, hence, the em element is likewise pink.

Whitespace

Whitespace between properties and selectors is ignored. This code snippet:

```
body{overflow:hidden;background:#000000;}
```

is functionally equivalent to this one:

```
body {
overflow: hidden;
background: #000000;
}
```

One common way to format CSS for readability is to indent each property and give it its own line.

Positioning

CSS 2.1 defines three positioning schemes:

Normal flow
: *Inline* items are laid out in the same way as the letters in words in text, one after the other across the available space until there is no more room, then starting a new line below. *Block* items stack vertically, like paragraphs and like the items in a bulleted list. Normal flow also includes relative positioning of block or inline items, and run-in boxes.

Floats
: A floated item is taken out of the normal flow and shifted to the left or right as far as possible in the space available. Other content then flows alongside the floated item.

Absolute positioning
: An absolutely positioned item has no place in, and no effect on, the normal flow of other items. It occupies its assigned position in its container independently of other items.[14]

Position property

There are four possible values of the `position` property. If an item is positioned in any way other than `static`, then the further properties `top`, `bottom`, `left`, and `right` are used to specify offsets and positions.

Static
: The default value places the item in the *normal flow*

Relative
: The item is placed in the *normal flow*, and then shifted or offset from that position. Subsequent flow items are laid out as if the item had not been moved.

Absolute
: Specifies *absolute positioning*. The element is positioned in relation to its nearest non-static ancestor.

Fixed
: The item is *absolutely positioned* in a fixed position on the screen even as the rest of the document is scrolled[14]

Float and clear

The `float` property may have one of three values. *Absolutely* positioned or *fixed* items cannot be floated. Other elements normally flow around floated items, unless they are prevented from doing so by their `clear` property.

left
: The item *floats* to the left of the line that it would have appeared in; other items may flow around its right side.

right
: The item *floats* to the right of the line that it would have appeared in; other items may flow around its left side.

clear
: Forces the element to appear underneath ('clear') floated elements to the left (`clear:left`), right (`clear:right`) or both sides (`clear:both`).[14][15]

History

CSS was first proposed by Håkon Wium Lie on October 10, 1994.[16] At the time, Lie was working with Tim Berners-Lee at CERN.[17] Several other style sheet languages for the web were proposed around the same time, and discussions on public mailing lists and inside World Wide Web Consortium resulted in the first W3C CSS Recommendation (CSS1)[18] being released in 1996. In particular, Bert Bos' proposal was influential; he became co-author of CSS1 and is regarded as co-creator of CSS.[19]

Håkon Wium Lie, chief technical officer of the Opera Software company and co-creator of the CSS web standard

Style sheets have existed in one form or another since the beginnings of Standard Generalized Markup Language (SGML) in the 1980s, and CSS was developed to provide style sheets for the web.[20] One requirement for a web style sheet language was for style sheets to come from different sources on the web. Therefore, existing style sheet languages like DSSSL and FOSI were not suitable. CSS, on the other hand, let a document's style be influenced by multiple style sheets by way of "cascading" styles.[20]

As HTML grew, it came to encompass a wider variety of stylistic capabilities to meet the demands of web developers. This evolution gave the designer more control over site appearance, at the cost of more complex HTML. Variations in web browser implementations, such as ViolaWWW and WorldWideWeb,[21] made consistent site appearance difficult, and users had less control over how web content was displayed. The browser/editor developed by Tim Berners-Lee had style sheets that were hard-coded into the program. The style sheets could therefore not be linked to documents on the web.[22] Robert Cailliau, also of CERN, wanted to separate the structure from the presentation so that different style sheets could describe different presentation for printing, screen-based presentations, and editors.[21]

Improving web presentation capabilities was a topic of interest to many in the web community and nine different style sheet languages were proposed on the www-style mailing list.[20] Of these nine proposals, two were especially influential on what became CSS: Cascading HTML Style Sheets[16] and Stream-based Style Sheet Proposal (SSP).[19][23] Two browsers served as testbeds for the initial proposals; Lie worked with Yves Lafon to implement CSS in Dave Raggett's Arena browser.[24][25][26] Bert Bos implemented his own SSP proposal in the Argo browser.[19] Thereafter, Lie and Bos worked together to develop the CSS standard (the 'H' was removed from the name because these style sheets could also be applied to other markup languages besides HTML).[17]

Lie's proposal was presented at the "Mosaic and the Web" conference (later called WWW2) in Chicago, Illinois in 1994, and again with Bert Bos in 1995.[17] Around this time the W3C was already being established, and took an interest in the development of CSS. It organized a workshop toward that end chaired by Steven Pemberton. This resulted in W3C adding work on CSS to the deliverables of the HTML editorial review board (ERB). Lie and Bos were the primary technical staff on this aspect of the project, with additional members, including Thomas Reardon of Microsoft, participating as well. In August 1996 Netscape Communication Corporation presented an alternative style sheet language called JavaScript Style Sheets (JSSS).[17] The spec was never finished and is deprecated.[27] By the end of 1996, CSS was ready to become official, and the CSS level 1 Recommendation was published in December.

Development of HTML, CSS, and the DOM had all been taking place in one group, the HTML Editorial Review Board (ERB). Early in 1997, the ERB was split into three working groups: HTML Working group, chaired by Dan Connolly of W3C; DOM Working group, chaired by Lauren Wood of SoftQuad; and CSS Working group, chaired by Chris Lilley of W3C.

The CSS Working Group began tackling issues that had not been addressed with CSS level 1, resulting in the creation of CSS level 2 on November 4, 1997. It was published as a W3C Recommendation on May 12, 1998. CSS level 3, which was started in 1998, is still under development as of 2014.

In 2005 the CSS Working Groups decided to enforce the requirements for standards more strictly. This meant that already published standards like CSS 2.1, CSS 3 Selectors and CSS 3 Text were pulled back from Candidate Recommendation to Working Draft level.

Difficulty with adoption

The CSS 1 specification was completed in 1996. Microsoft's Internet Explorer 3[17] was released in that year, featuring some limited support for CSS. IE 4 and Netscape 4.x added more support, but it was typically incomplete and had many bugs that prevented CSS from being usefully adopted. It was more than three years before any web browser achieved near-full implementation of the specification. Internet Explorer 5.0 for the Macintosh, shipped in March 2000, was the first browser to have full (better than 99 percent) CSS 1 support,[28] surpassing Opera, which had been the leader since its introduction of CSS support 15 months earlier. Other browsers followed soon afterwards, and many of them additionally implemented parts of CSS 2.

However, even when later 'version 5' browsers began to offer a fairly full implementation of CSS, they were still incorrect in certain areas and were fraught with inconsistencies, bugs and other quirks. The inconsistencies and variation in feature support made it difficult for designers to achieve a consistent appearance across browsers and platforms, leading to the use of workarounds such as CSS hacks and filters.

Problems with browsers' patchy adoption of CSS, along with errata in the original specification, led the W3C to revise the CSS 2 standard into CSS 2.1, which moved nearer to a working snapshot of current CSS support in HTML browsers. Some CSS 2 properties that no browser successfully implemented were dropped, and in a few cases, defined behaviors were changed to bring the standard into line with the predominant existing implementations. CSS 2.1 became a Candidate Recommendation on February 25, 2004, but CSS 2.1 was pulled back to Working Draft status on June 13, 2005,[29] and only returned to Candidate Recommendation status on July 19, 2007.[30]

In addition to these problems, the `.css` extension was used by a software product used to convert PowerPoint files into Compact Slide Show files,[31] so some web servers served all `.css`[32] as mime type `application/x-pointplus`[33] rather than `text/css`.

Variations

CSS has various levels and profiles. Each level of CSS builds upon the last, typically adding new features and typically denoted as CSS 1, CSS 2, CSS 3, and CSS 4. Profiles are typically a subset of one or more levels of CSS built for a particular device or user interface. Currently there are profiles for mobile devices, printers, and television sets. Profiles should not be confused with media types, which were added in CSS 2.

CSS 1

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.[34] [35] Among its capabilities are support for

- Font properties such as typeface and emphasis
- Color of text, backgrounds, and other elements
- Text attributes such as spacing between words, letters, and lines of text
- Alignment of text, images, tables and other elements
- Margin, border, padding, and positioning for most elements
- Unique identification and generic classification of groups of attributes

The W3C no longer maintains the CSS 1 Recommendation.[36]

CSS 2

CSS level 2 specification was developed by the W3C and published as a recommendation in May 1998. A superset of CSS 1, CSS 2 includes a number of new capabilities like absolute, relative, and fixed positioning of elements and z-index, the concept of media types, support for aural style sheets (which were later replaced by the CSS 3 speech modules)[37] and bidirectional text, and new font properties such as shadows.

The W3C no longer maintains the CSS 2 recommendation.[38]

CSS 2.1

CSS level 2 revision 1, often referred to as "CSS 2.1", fixes errors in CSS 2, removes poorly supported or not fully interoperable features and adds already implemented browser extensions to the specification. To comply with the W3C Process for standardizing technical specifications, CSS 2.1 went back and forth between Working Draft status and Candidate Recommendation status for many years. CSS 2.1 first became a Candidate Recommendation (http://www.w3.org/TR/2004/CR-CSS21-20040225/) on February 25, 2004, but it was reverted to a Working Draft on June 13, 2005 for further review. It returned to Candidate Recommendation on 19 July 2007 and then updated twice in 2009. However, because changes and clarifications were made, it again went back to Last Call Working Draft on 7 December 2010.

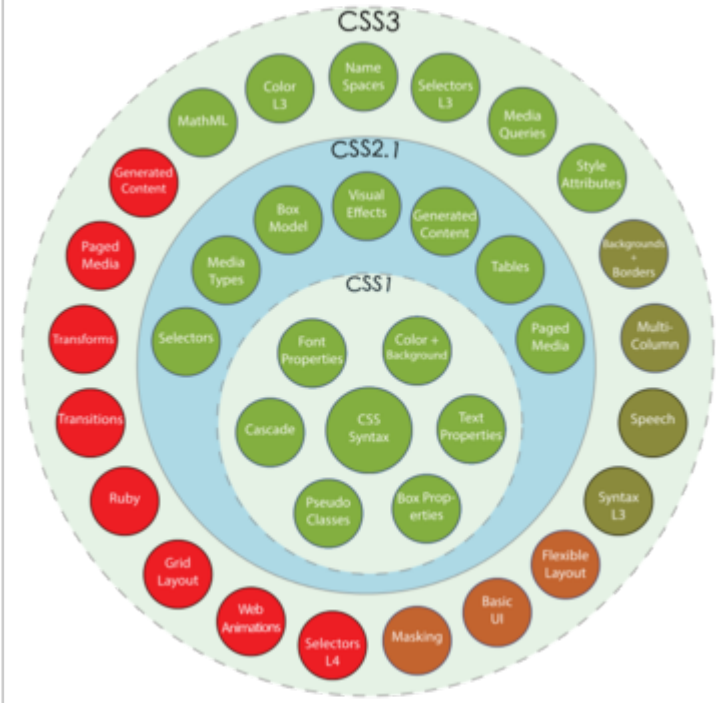
CSS 2.1 went to Proposed Recommendation on 12 April 2011.[39] After being reviewed by the W3C Advisory Committee, it was finally published as a W3C Recommendation on 7 June 2011.[40]

CSS 2.1 was planned as the first and final revision of level 2—but low priority work on CSS 2.2 began in 2015.

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.[41]

Due to the modularization, different modules have different stability and statuses.[42] As of June 2012, there are over fifty CSS modules published from the CSS Working Group.,[41] and four of these have been published as formal recommendations:



Taxonomy and status of CSS3 **modules**. Recommendation Candidate Recommendation Last Call Working Draft.

- 2012-06-19: Media Queries
- 2011-09-29: Namespaces (http://www.w3.org/Style/CSS/specs#namespace)
- 2011-09-29: Selectors Level 3 (http://www.w3.org/Style/CSS/specs#selectors)
- 2011-06-07: Color (http://www.w3.org/Style/CSS/specs#color)

Some modules have *Candidate Recommendation* (*CR*) status and are considered moderately stable. At *CR* stage, implementations are advised to drop vendor prefixes.[43]

Summary of main module-specifications

Module	Specification title	Status	Date
css3-background	CSS Backgrounds and Borders Module Level 3 (http://www.w3.org/TR/css3-background/)	*Candidate* Rec.	Sep 2014
css3-box	CSS basic box model (http://www.w3.org/TR/css3-box)	Working *Draft*,	Aug 2007
css-cascade-3	CSS Cascading and Inheritance Level 3 (http://www.w3.org/TR/css-cascade-3/)	*Candidate* Rec.	Oct 2013
css3-color	CSS Color Module Level 3 (http://www.w3.org/TR/css3-color)	*Recommendation*	Jun 2011
css3-content	CSS3 Generated and Replaced Content Module (http://www.w3.org/TR/css3-content/)	Working *Draft*	May 2003
css-fonts-3	CSS Fonts Module Level 3 (http://www.w3.org/TR/css-fonts-3/)	*Candidate* Rec.	Oct 2013
css3-gcpm	CSS Generated Content for Paged Media Module (http://www.w3.org/TR/css3-gcpm/)	Working *Draft*	May 2014
css3-layout	CSS Template Layout Module (http://www.w3.org/TR/css3-layout/)	Working *Draft*	Nov 2011
css3-mediaqueries	Media Queries (http://www.w3.org/TR/css3-mediaqueries/)	*Recommendation*	Jun 2012
css3-multicol	Multi-column Layout (http://www.w3.org/TR/css3-multicol)	*Candidate* Rec.	Apr 2011
css3-page	CSS Paged Media Module Level 3 (http://www.w3.org/TR/css3-page/)	Working *Draft*	Mar 2013
css3-selectors	Selectors Level 3 (http://www.w3.org/TR/css3-selectors/)	*Recommendation*	Sep 2011
css3-ui	CSS Basic User Interface Module Level 3 (CSS3 UI) (http://www.w3.org/TR/css3-ui/)	Working *Draft*	Jan 2012

CSS 4

There is no single, integrated CSS4 specification,[45] because it is split into separate modules. However, there are "level 4" modules.[46]

Because CSS3 split the CSS language's definition into modules, the modules have been allowed to level independently. Most modules are level 3—they build on things from CSS 2.1. A few level-4 modules exist (such as Image Values,[47][48] Backgrounds & Borders,[49] or Selectors),[50] which build on the functionality of a preceding level-3 module. Other modules defining entirely new functionality, such as Flexbox, have been designated as "level 1".[51]

The CSS Working Group sometimes publishes “Snapshots”, a collection of whole modules and parts of other drafts that are considered stable, interoperably implemented and hence ready to use. So far, three such best current practices document have been published as Notes, in 2007,[52] 2010[53] and 2015.[54]

Browser support

Each web browser uses a layout engine to render web pages, and support for CSS functionality is not consistent between them. Because browsers do not parse CSS perfectly, multiple coding techniques have been developed to target specific browsers with workarounds (commonly known as CSS hacks or CSS filters). Adoption of new functionality in CSS can be hindered by lack of support in major browsers. For example, Internet Explorer was slow to add support for many CSS 3 features, which slowed adoption of those features and damaged the browser's reputation among developers.[55] In order to ensure a consistent experience for their users, web developers often test their sites across multiple operating systems, browsers, and browser versions, increasing development time and complexity. Tools such as BrowserStack have been built to reduce the complexity of maintaining these environments.

In addition to these testing tools, many sites maintain lists of browser support for specific CSS properties, including CanIUse (http://caniuse.com/) and the Mozilla Developer Network. Additionally, the CSS 3 defines feature queries, which provide an `@supports` directive that will allow developers to target browsers with support for certain functionality directly within their CSS.[56] CSS that is not supported by older browsers can also sometimes be patched in using Javascript polyfills, which are pieces of Javascript code designed to make browsers behave consistently. These workarounds—and the need to support fallback functionality—can add complexity to development projects, and consequently, companies frequently define a list of browser versions that they will and will not support.

As websites adopt newer code standards that are incompatible with older browsers, these browsers can be cut off from accessing many of the resources on the web (sometimes intentionally).[57] Many of the most popular sites on the internet are not just visually degraded on older browsers due to poor CSS support, but do not work at all, in large part due to the evolution of Javascript and other web technologies.

Limitations

Some noted limitations of the current capabilities of CSS include:

Selectors are unable to ascend
: CSS currently offers no way to select a *parent* or *ancestor* of an element that satisfies certain criteria.[58] CSS Selectors Level 4, which is still in Working Draft status, proposes such a selector,[59] but only as part of the "complete" selector profile, not the "fast" profile used in dynamic CSS styling.[60] A more advanced selector scheme (such as XPath) would enable more sophisticated style sheets. The major reasons for the CSS Working Group previously rejecting proposals for parent selectors are related to browser performance and Incremental rendering issues.[61]

Cannot explicitly declare new scope independently of position
: Scoping rules for properties such as z-index look for the closest parent element with a position:absolute or position:relative attribute. This odd coupling has undesired effects. For example, it is impossible to avoid declaring a new scope when one is forced to adjust an element's position, preventing one from using the desired scope of a parent element.

Pseudo-class dynamic behavior not controllable
: CSS implements pseudo-classes that allow a degree of user feedback by conditional

application of alternate styles. One CSS pseudo-class, ":hover", is dynamic (equivalent of JavaScript "onmouseover") and has potential for abuse (e.g., implementing cursor-proximity popups),[62] but CSS has no ability for a client to disable it (no "disable"-like property) or limit its effects (no "nochange"-like values for each property).

Cannot name rules

There is no way to name a CSS rule, which would allow (for example) client-side scripts to refer to the rule even if its selector changes.

Cannot include styles from a rule into another rule

CSS styles often must be duplicated in several rules to achieve a desired effect, causing additional maintenance and requiring more thorough testing. Some new CSS features were proposed to solve this, but (as of February, 2016) are not yet implemented anywhere.[63]

Cannot target specific text without altering markup

Besides the `:first-letter` pseudo-element, one cannot target specific ranges of text without needing to utilize place-holder elements.

Resolved limitations

Vertical control limitations

Though horizontal placement of elements was always generally easy to control, vertical placement was frequently unintuitive, convoluted, or outright impossible. Simple tasks, such as centering an element vertically or placing a footer no higher than bottom of the viewport required either complicated and unintuitive style rules, or simple but widely unsupported rules.[58] The Flexible Box Module improved the situation considerably and vertical control is much more straightforward and supported in all of the modern browsers.[64] Older browsers still have those issues, but most of those (mainly Internet Explorer 9 and below) are no longer supported by their vendors.[65]

Absence of expressions

There was no standard ability to specify property values as simple expressions (such as `margin-left: 10% – 3em + 4px;`). This would be useful in a variety of cases, such as calculating the size of columns subject to a constraint on the sum of all columns. Internet Explorer versions 5 to 7 support a proprietary expression() statement,[66] with similar functionality. This proprietary expression() statement is no longer supported from Internet Explorer 8 onwards, except in compatibility modes. This decision was taken for "standards compliance, browser performance, and security reasons".[66] However, a candidate recommendation with a calc() value to address this limitation has been published by the CSS WG[67] and has since been supported in all of the modern browsers.[68]

Lack of column declaration

Although possible in current CSS 3 (using the `column-count` module),[69] layouts with multiple columns can be complex to implement in CSS 2.1. With CSS 2.1, the process is often done using floating elements, which are often rendered differently by different browsers, different computer screen shapes, and different screen ratios set on standard monitors. All of the modern browsers support this CSS 3 feature in one form or another.[70]

Advantages

Separation of content from presentation

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 (see Tableless web design#Accessibility).

CSS frameworks

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>`. They provide a number of ready-made options for designing and laying out the web page. Although many of these frameworks have been published, some authors use them mostly for rapid prototyping, or for learning from, and prefer to 'handcraft' CSS that is appropriate to each published site without the design, maintenance and download overhead of having many unused features in the site's styling.[71]

CSS authoring methodologies

As the size of CSS resources used in a project increases, the development team needs to decide on a common methodology to keep them organized. The goals are ease of development, ease of collaboration during development and performance of the deployed stylesheets in the browser. Popular methodologies include OOCSS - object oriented CSS, ACSS - atomic CSS, oCSS - organic Cascade Style Sheet, SMACSS - scalable and modular architecture for CSS and BEM - block, element, modifier.[72]

See also

- Acid3
- CSS frameworks
- Comparison of layout engines (CSS)
- Comparison of stylesheet languages
- CSS Zen Garden
- CSSTidy
- List of stylesheet languages
- Minification
- Progressive enhancement
- Responsive web design
- Validator
- X resources
- PostCSS

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External links

Wikibooks has a book on the topic of: ***Cascading Style Sheets***

- Official website (http://www.w3.org/Style/CSS)
- CSS (https://www.dmoz.org/Computers/Data_Formats/Style_Sheets/CSS/) at DMOZ

Wikimedia Commons has media related to ***Cascading Style Sheets***.

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