
**RECOMMENDATION ON SEPARATING CONTENT
FROM PRESENTATION STANDARDS FOR
CALIFORNIA STATE WEB PAGES**

**INFORMATION ORGANIZATION, USABILITY, CURRENCY,
AND ACCESSIBILITY WORKING GROUP**

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Executive Summary

Most California state web pages have been developed using HTML (hypertext markup language) code within the web page itself to manage style, page layout, and content. The web development industry has placed a clear emphasis on separating content from its presentation. Over the past ten years, the industry has developed Cascading Style Sheets (CSS) to accomplish this.

Cascading Style Sheets allow web developers to control presentation elements such as fonts, colors, and page layouts from a central location while content is maintained separately. This simplifies the development of new pages, improving overall accessibility of the website, facilitating easier site management, and enabling flexibility in meeting user expectations. Individual pages refer to the central Cascading Style Sheets rather than defining presentation within each page's coding. With the use of CSS, all web pages referencing the Cascading Style Sheet can be updated with a change to a single file.

This recommendation provides the business case for adopting Cascading Style Sheets as the standard method for defining style and positioning in state government web pages. The benefits of Cascading Style Sheets are addressed, as are the barriers to implementation. A more detailed recommendation will be developed by the end of the summer. This recommendation will address the specifications associated with implementing Cascading Style Sheets and the web page elements needed to support separation of presentation from content.

Section I – Business Case

Overview

As California's Internet presence has grown, most of the web pages in existence have been constructed with markup language or code that controls both the presentation and content within each individual page. This markup language dictates how a web browser displays information to a user. The design elements cover font, color, size, position, navigation, brand and other attributes as needed to deliver a page in an intended format. Tables are frequently used within web pages to position information. File size and load times increase because of the greater complexity and volume of code included in a web page that contains code for style and positioning as well as content. More compelling, each time a change is required in the appearance of a web page, the code must be modified. If a change is implemented across a site, each and every individual page must be edited. Each line of code increases the work effort associated with implementing design changes.

Over the past ten years, the web community has been developing and implementing tools and methodologies to simplify web page creation and maintenance through the use of Cascading Style Sheets (CSS). Style sheets allow webmasters to apply format and positioning to web pages across a website, controlling the appearance without compromising the structure. The existing State of California templates use Cascading Style Sheets for style, but not positioning. While somewhat useful, this does not take full advantage of the power of style sheets.

There are three levels of Cascading Style Sheets defined by the World Wide Web Consortium (W3C). The first level addresses style. The second level addresses style, automatic numbering, page breaks, and positioning. The third level, still under development at W3C, will address advanced functionality including, but not limited to, new selectors, borders, backgrounds, vertical text, and speech and user interaction.

Why HTML Doesn't Work

There are limitations to designing pages in HTML. Web developers have created work-around solutions, but these can present new issues in accessibility, search functionality, usability, performance, and maintenance. For instance, some developers create text in image files to expand style choices. To the end user, these images appear as text on the screen. However, image files are larger than HTML text files resulting in longer page load times. Furthermore, images cannot be seen by text-only browsers or by the web spiders used by the major search engines to index the web. Low vision users encounter problems with image text because increasing text size through the browser does not change the text within the image.

Another common method of web page development in HTML involves using tables to position information within a page. This presents accessibility issues, although data tables can be made accessible. Tables used for layout present problems for people using screen-readers or web-enabled telephone services. Tables may display inconsistently in different browsers. Positioning through tables requires additional coding to define the table layout, resulting in lengthier code. As more users turn to

small-screen mobile devices, there will also be problems with tables presenting only one cell of the table per screen.

Making global changes to a website can be time-consuming and labor-intensive if presentation elements are coded into individual web pages. This creates an inflexible and less agile website. When a change is made to the site, each page must be updated individually. For instance, in 2003 the Governor requested a change to the web page banner and color scheme. The new banner was larger, requiring web developers using tables for positioning to adjust the size of the tables on all pages and the scripts supporting those tables. Most of California's web content is designed in an outdated manner that is difficult to maintain, manage, and change, and is inconsistent with recommended accessibility and usability standards and guidelines. A few departments have implemented industry best practices to separate presentation from content through the use of Cascading Style Sheets and/or content management systems. These departments were able to adjust their websites more efficiently than departments that had to hand-code all the changes.

Establishing a robust set of standards and guidelines regarding the use of Cascading Style Sheets provides the state with more methods for achieving flexibility, accessibility, usability, and consistency as envisioned in "[Government Services on the Web: California In-Touch](#)" and "[Policy and Management Issues Framework: Statewide Portal Project](#)". Cascading Style Sheets are compatible with a variety of web development and delivery tools and languages. Continuous improvement in adopting methods that support design improvement is critical to the state. As departments continue to improve and expand their websites and web infrastructure, content management systems can be implemented to further separate content from presentation. Content management systems empower business users to produce content while allowing the webmaster to focus on development of master templates that leverage central administration concepts such as Cascading Style Sheets.

Benefits

SIMPLIFIED MAINTENANCE

Cascading Style Sheets simplify development and maintenance of websites. Pages within websites typically follow a standard format and layout. Common elements such as branding (logos) and navigation appear consistently across pages. Text has consistent style and size from page to page. There are common elements that appear on every page. A single style sheet can be developed and applied to every page that should have a similar design. When changes are needed, they can be made once to the single style sheet, and the changes are automatically applied to every page referencing that style sheet. As new content is created, the style sheet can be applied to the new content to create a new page. This is faster, less labor-intensive, and more accurate than making the changes to each affected page.

SUPPORT ACCESSIBILITY AND USABILITY

The majority of accessibility and usability needs are addressed through proper coding and presentation rather than the content. The use of Cascading Style Sheets improves

accessibility when properly implemented. Pages designed using Cascading Style Sheets also provide more options for end users. People can apply their own style sheets to make the pages more accessible for their unique needs. Accessibility improvements include end-user adjustable font sizes, a framework for speech style sheets, and elimination of improper use of tables for layout. In addition, pages designed using Cascading Style Sheets can be adapted for various end user devices, replacing the need for web developers to maintain separate content for desktop screens, mobile devices, and printers.

EASIER WEBSITE REVIEW

Style sheets not only allow departments to better focus their efforts, but also improve the state's and individual department's website review abilities. Because most web page "look and feel" code is contained in the style sheet rather than on individual pages, oversight is simplified. The style sheets can be reviewed for adherence to standards rather than each individual page, reducing the effort necessary to ensure quality. This enables organizations to implement review processes resulting in increased compliance with standards.

IMPROVED CONSISTENCY

Because changes are made once to the style sheet and applied across the pages using that style sheet, there is greater consistency between pages. The opportunities for human error are reduced and can be more easily corrected. This consistency throughout a website can vastly improve the user experience.

GREATER FLEXIBILITY

Web users are becoming more diverse and might view web content on desktops, laptops, and mobile devices such as Personal Digital Assistants (PDAs) and cell phones. Style sheets can be created to present web pages in a format suitable for the end user device without requiring departments to maintain separate copies of content. In addition to display flexibility, style sheets allow web developers to more easily change the appearance and functionality of web pages. This will enable the state to keep its web presence current and to meet the ever-changing needs and expectations of its users. Without style sheets, changing the look and feel of a website requires web developers to change every page within the site. Using style sheets, these changes can be made once to the style sheet then reflected on all pages using that style sheet.

SMALLER FILE SIZE

Web pages that rely on HTML coding to provide style and positioning are much more complex and longer than pages that use Cascading Style Sheets. Pages including text that was formatted in images or complex formatting instructions can take a long time to load. Using Cascading Style Sheets for format and positioning delivers page files that are smaller and load faster than hard-coded pages. This benefits users with mobile devices and slower Internet access, but also results in a faster and better experience for all users.

Section II - Recommended Standards and Guidelines

Standards

Use Cascading Style Sheets to apply style, formatting, and positioning to web pages.

Guidelines

In addition to Cascading Style Sheets, departments with large or complex websites may opt to use Cascading Style Sheets in conjunction with master templates and/or a content management system to further separate HTML design elements from content for ease of maintenance and to simplify web authoring.

Recommendation

Combining the standard with the guidelines, we recommend that California adopt as a standard the separation of content from presentation through the use of Cascading Style Sheets. We recommend a tri-level implementation to accommodate departments of different sizes, skill levels, and technology requirements.

Method 1 – Redesign an entire site using Cascading Style Sheets for style and positioning.

Method 2 – Through a web development tool, create and implement master templates utilizing Cascading Style Sheets for style and positioning.

Method 3 - Through a content management system, create and implement master templates utilizing Cascading Style Sheets for style and positioning.

Section III – Recommended Approaches to Implementation

Cascading Style Sheets should be developed to support State of California website design(s). These style sheets should be reviewed by the IOUCA, or a sufficiently qualified delegate, for technical accuracy and adherence to the web standards, paying special attention to design, accessibility, and usability. The validated style sheets should then be made available to all state web developers through a central online repository. This will allow the state to create the style sheets once, and then reuse them across departments. Changes can be centrally managed to improve consistency across department lines. Master templates using these style sheets could be developed by those departments using web development tools or content management systems and made available through the central code repository for use by other departments with compatible systems.

Detailed standards pertaining to implementation of Cascading Style Sheets and web page elements will be developed and provided in a separate recommendation. Additional recommendations with respect to supporting technologies may be included. The IOUCA will work in conjunction with the Portal Redesign Project and the California Enterprise Architecture Project to develop the detailed standards.

Future vs. Existing Pages

Ultimately, if the state chooses to pursue Cascading Style Sheets as a standard it should be applied to existing and future pages. While simply applying the Cascading Style Sheets to all future pages would place less of a burden on department resources, it would result in inconsistent look and feel across the department's website. In fact, the efforts to support two types of pages will likely prove to be an extra burden in the long run. Redesigning the entire site to use Cascading Style Sheets for style and positioning will be labor-intensive and time-consuming initially, but will provide the greatest benefits in the long term. Once pages have been redesigned to use the style sheets, formatting changes can be made globally through the style sheet. Updating existing pages to use Cascading Style Sheets can be done during a scheduled site redesign. This will make future changes and site redesigns much easier.

Barriers to Implementation

TIME AND RESOURCES

Implementing Cascading Style Sheets across all California web pages will require many departments to redesign their websites, amending each page individually. Pages that were hard-coded using HTML and layout tables to provide positioning and formatting will need to be rewritten to replace the existing code with the style sheet. This will require significant effort, particularly for departments with a high page count. However, this investment will enable future design changes to occur with significantly fewer resource requirements.

SKILL SETS AND TRAINING

The state will need to address the varying skill levels and training needs of its web developers. By providing the Cascading Style Sheets in a central repository, web developers will not necessarily need to learn to create style sheets; however, they will need some instruction and assistance to understand and apply the style sheets to their website. Support tools and online instructions could be created and made available through the webmasters page (www.webmasters.ca.gov/styleguide), but may not be sufficient by themselves.

BROWSER COMPATIBILITY

The state will need to address the issue of web browser support of Cascading Style Sheets. Although Cascading Style Sheets have been in existence for over ten years, web browsers vary in their levels of support for each version of CSS. With knowledge and skill web masters using the latest CSS version for the latest browsers will continue to enable older browsers to use or ignore CSS commands (depending on browser abilities) to display meaningful content. Browsers that ignore the style sheets will preserve content and be accessible, but the appearance will not be the same quality as in a browser that fully supports CSS.

Section IV – Tools for Implementation

Templates

Although each department could create their own template designs, the state will develop ready-to-use templates that use Cascading Style Sheets to improve consistency across departments, lessen the burden on department resources and help address the issue of varying skill sets across department web developers. The state will need to make decisions about how much flexibility departments would have in the design or modification of templates and Cascading Style Sheets.

Downloadable code repository

Templates and Cascading Style Sheets can be made available to state web developers through a central code repository located on the webmasters page (www.webmasters.ca.gov/styleguide). Style sheets posted on the site should be vetted for adherence to state government standards.

Training

Training resources will need to be developed to assist web developers in understanding how to apply and maintain Cascading Style Sheets for their websites. Web developers will need to know how to apply Cascading Style Sheets, how to work with the Cascading Style Sheets, how style sheets display in different web browsers, and how to apply styles to the content section of their pages. . Specific training needs and solutions will be identified in the detailed recommendations that will follow this recommendation.

General resources

The Worldwide Web Consortium (W3C) provides the standards supporting Cascading Style Sheets, tools to assist web developers in implementing Cascading Style Sheets, and a validation tool to ensure that the style sheets are functioning as planned. In addition, because style sheets are the industry standard, there are a myriad of resources available online.

Section V - Vetting Process

Department reviews are being conducted by webmasters and web developers for applicability in a real-world environment. Input from the reviews will be discussed and incorporated into the recommended standards where applicable.

This recommendation has been reviewed by:

- The State Portal Review Board,
- The Department of Social Services.
- The State Portal Steering Committee

This recommendation for separating content from presentation is being concurrently reviewed by:

- The Department of Health Services,
- The Department of Motor Vehicles, and

On adoption by the State Portal Steering Committee, the recommended standards and guidelines contained within become policy for all California departments and agencies reporting to the Governor and the State Chief Information Officer.

The standards and guidelines are intended to be living documents. An open review period will follow adoption, soliciting feedback from all state departments and agencies that choose to review the draft.

Section VI - Glossary and References

Glossary

Cascading Style Sheet	A programming technique that allows authors and readers to attach style (e.g. fonts, colors, positioning and spacing) to HTML, XHTML, an XML documents through an application that retrieves web pages from servers and displays them through the user's web browser.
Content Management System	A computer software system that specifically separates content and presentation. Web developers can manage the presentation and design aspects of a website while allowing content providers to create and edit the content without needed web design skills.
HTML	Hypertext Markup Language. The most common language used to create web pages on the Internet.
Markup Language	A standardized computer language that defines the structure of a web page including content, images, links, and formatting instructions. Common markup languages include HTML, XHTML, and XML.
Master Template	A file in a web development tool that can be created in accordance with the web page design and standards, then applied when creating new pages. Master templates allow web developers to create common page elements once, and then reuse them for similar pages.
Style	A group of characteristics that can be applied to content for formatting.
Positioning	The layout of a web page, indicating where elements should appear on the page.
Layout Tables	A way of positioning information on web pages by using tables to align text and images. This technique was popular in the early web pages, but is now considered primitive and poor design.
Web Browser	A computer application that retrieves web pages from servers and displays them for the user. Common examples are Internet Explorer and Firefox.

Web Development Tool	Website production and management software that generates HTML code; the web developer can add Cascading Style Sheets and other website features.
Web Page Elements	The parts that make up a web page such as header, footer, content, etc.
Web Spiders	A program that reads web pages for indexing purposes. Web spiders - also called crawlers, bots, or robots – are used by the major search engines.

Reference list

World Wide Web Consortium (<http://www.w3.org/Style/CSS/>)

* Cascading Style Sheets: The Definitive Guide, 2nd Edition. Eric A. Meyer. 2004. O'Reilly Media, Inc.

* Cascading Style Sheets: Designing for the Web, 3rd Edition. Hakon Wium Lie and Bert Bos. 2005. This book is available through the Safari Online Library.

A List Apart (<http://alistapart.com/>)

*NOTE: These titles and other resources on cascading style sheets are available online to state staff through the California State Library. Look for “Safari Tech Books Online” (under E-Books) on Electronic Resources for California State Government Employees at <<http://www.library.ca.gov/csl/csldatabases.cfm>>. For more information, contact the State Information and Reference Center at (916) 654-0261, Monday through Friday, 9:30 a.m. to 4:00 p.m., or email: cslsirc@library.ca.gov.

Document History

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