

IEEE Recommended Practice for Internet Practices—Web Page Engineering—Intranet/Extranet Applications

Sponsor

**Internet Best Practices Working Group
of the
IEEE Computer Society**

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Abstract: This standard defines recommended practices for Web page engineering. It addresses the needs of Webmasters and managers to effectively develop and manage World Wide Web projects (internally via an intranet or in relation to specific communities via an extranet). This standard discusses life cycle planning: identifying the audience, the client environment, objectives, and metrics, and continues with recommendations on server considerations, and specific Web page content. IEEE Std 2001-1999 defines conformance for both Web pages and tools that generate Web pages. This document is intended to reduce site-management costs, reduce legal risks, facilitate user satisfaction, and increase the productivity of Web applications for both maintainers and users.

Keywords: accessibility, Internet best practices, Internet ease-of-use, risk reduction, Web management, Web page engineering, World Wide Web

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Introduction

(This introduction is not part of IEEE Std 2001-1999, IEEE Recommended Practice for Internet Practices—Web Page Engineering—Intranet/Extranet Applications.)

The World Wide Web is expanding and its value is increasing as a method for locating and delivering information. This creates a significant engineering challenge. Locating applicable information requires that indexing information be incorporated into Web page development. Once an applicable page has been located, essential information may not be present, resulting in user frustration and a failure of the Web application to meet its purpose.

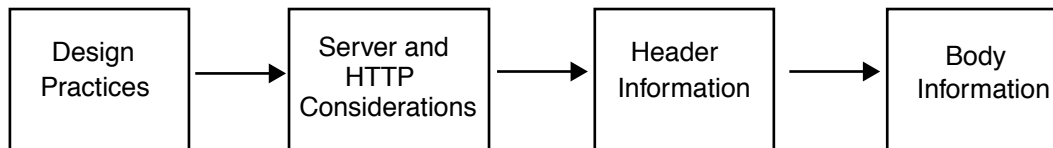
This is a first version of an accumulation of Web page development “recommended practices” that can serve to improve the effectiveness of Web pages for users, Web page developers, and the value of the Web in corporate and organizational applications. This immediate standard is focused on managed networks: Intranet (within an organization) and Extranet (between a group of collaborating organizations). Other projects are being evaluated by the Internet Best Practices working group (IBPwg) within the IEEE Computer Society. See <http://dx.doi.org/10.1041/standard/2001> for current details.

Web page engineering often is done with little consideration for the immediate or ongoing implications of Web site design or implementation. Some sites reflect “state of the art” delivery that can only be accessed with the most recent tools. This may be inconsistent with the business objectives for that site. Some sites will languish beyond their applicable life, occupying valuable resources (particularly as these are incorporated into organizational indexes, and delivered as prospective “query returns” by indexing and search services). Poor Web page engineering results in lost productivity and user frustration, and can even result in legal liabilities.

There is no clear prediction of when the World Wide Web or a specific site will be obsolete. There is a legitimate engineering concern that this life span may be significantly underestimated or disregarded entirely in many Web site designs. A timely example of this problem is the Year 2000 century date-change impact. However, it can manifest in many areas besides dates. Vendor products—past and future versions, format preferences, or selection of implementation languages may require future re-engineering as vendors and products fade. Corporate Web sites may not need to live beyond the life of the corporation, however, public sector and other institutional sites may well span centuries. A significant portion of the content of these sites may not require updating, except in cases of shortsighted design. The Magna Carta and the works of Shakespeare are examples of fairly stable content.

The recommended practices and requirements set forth in this standard are aimed to reduce the risks associated with Web page investments. Further revision of this standard is expected, partially to reflect changes in the Web environment, but also to reflect increased understanding of “recommended practices” in Web page engineering. There is a popular awareness of “Web years,” characterized by rapid advances in the platform technology for clients and servers. There is a potentially expensive, misinformed conclusion that might be drawn from this, which is that Web pages (and more directly, information content and services delivery) either are, or should, move forward at this same rate. Some of today’s Web pages will warrant long-term retention; and within the context of business operations (which is the core of Intranet/Extranet) re-engineering of last year’s Web pages is an investment that requires justification. The value of Web-based business operations is the delivery of the right information and services to the right persons at the right time with the least amount of effort. Success in Web-based business operations is based more on engineering design in response to an understanding of the target-user community and information, than it is on the rapidly evolving technology for Web platforms.

These recommended practice recommendations are presented in workflow order to parallel the expected engineering process. This leads to a certain overlap in concepts, and it is recommended that review of the entire standard be included in the design process so that later considerations can be identified. The workflow model is defined as follows:



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IEEE Recommended Practice for Internet Practices—Web Page Engineering—Intranet/Extranet Applications

1. Overview

This recommended practice provides guidance for designing and implementing well-engineered Web pages (WEPs) for use in intranet/extranet environments.

1.1 Scope

This standard defines recommended practices for WEP design and implementation for intranet/extranet environments, based on HTML (HyperText Markup Language) specifications, migration to XML (Extensible Markup Language), and related industry guidelines.

This standard does not address stylistic considerations or human-factors considerations in WEP design beyond limitations that reflect good engineering practice. Annex A contains topics which are not sufficiently mature or where there are not specific recommendations for inclusion in the current issue of this standard.

1.2 Purpose

This standard is intended to provide guidance to WEP developers in Web environments. The following issues are addressed:

- a) Copyright
- b) Proprietary data declarations
- c) Indexing and content classification of pages
- d) Use of epoch transparent dates
- e) Context (e.g., author, responsible organization, currency, etc.)
- f) Multinational sensitivities
- g) Browser tolerance
- h) Accommodation of persons with disabilities
- i) Bandwidth efficiencies
- j) Server operations (e.g., robot exclusion, caching options, etc.)
- k) Privacy

The goal of this standard is to improve the productivity of intranet/extranet Web operations in terms of locating relevant information, and efficient development and maintenance practices. This standard will focus on vendor- and product-independent considerations.

1.3 Conformance

This standard defines two forms of conformance: “IEEE Std 2001-1999 conforming Web page” and “IEEE Std 2001-1999 conforming Web page generation tool.” Throughout this standard, the use of the verb “shall” indicates a requirement of the standard; the use of the verb “should” indicates a recommendation; and the use of the verb “may” indicates an option or variation that is permitted by the standard. Although users of this standard are strongly encouraged to consider the recommendations of this standard, the implementation of recommendations is not a requirement of conformance.

1.3.1 IEEE Std 2001-1999 conforming Web page

A conforming Web page—a WEP—implements all the requirements of this standard. A Web page that conforms to this standard may indicate this by the use of the following tag:

```
<span class="IEEEstd2001">  
  <a href="http://dx.doi.org/10.1041/standard/2001/1999/logo/use"  
      
  </a>  
</span>
```

NOTE—The HTML Reference Designator (HREF) value will change with each version of this standard. Tools should use the HREF value to determine the version of the standard being used.

The image file may be downloaded and referenced using relative Uniform Resource Identifiers (URIs), but the target HTML file must be referenced by an absolute URI.

1.3.2 IEEE Std 2001-1999 conforming Web page generation tool

A product for generating WEPs dynamically, or as an authoring tool may claim to “Conform to IEEE Std 2001-1999” if it satisfies all of the following conditions:

- a) It produces pages that conform to one or more HTML Document Type Definitions (DTD) without extensions beyond the W3C Recommendations, and clearly documents the use of this function; or produces pages that conform to XML guidance for any properly structured user DTD, and clearly documents the use of this function.
- b) For versions HTML 3.2 and higher, or XML; it supports Cascading Style Sheets (CSS) 1.0 or higher, or supports XML style sheets and, in either case, documents the use of this function and identifies which recommendations are supported.
- c) It can generate pages that conform to all of the requirements, recommendations, and options of this standard. Tools may allow for creation of non-conforming pages as a user option.
- d) It supports validation against the user-selected DTD.

2. Normative references

This standard shall be used in conjunction with the following publications. When the following standards are superseded by an approved revision, the revision shall apply, except as noted. See Annex B for informative references. Uniform Resource Locators (URLs) provided in this standard are current as of the date submitted for publication. See <http://dx.doi.org/10.1041/standard/2001/1999/references> for a list of normative and informative reference URLs on-line, and most recent updates, where known.

ISO 639: 1988, Code for the representation of names of languages.¹

ISO 3166-1: 1997, Codes for the representation of names of countries and their subdivisions—Part 1: Country codes.

ISO 4217: 1995, Codes for the representation of currencies and funds.

W3C REC-CSS1-19900111, W3C Recommendation Cascading Style Sheets, level 1—W3C Recommendation, revised on 11 Jan 1999: (<http://www.w3.org/TR/REC-CSS1>).² This document specifies level 1 of the Cascading Style Sheet (CSS1) mechanism. CSS1 is a simple style sheet mechanism that allows authors and readers to attach style (e.g., fonts, colors, and spacing) to HTML documents. The CSS1 language is human readable and writable, and expresses style in common desktop publishing terminology. One of the fundamental features of CSS is that style sheets cascade; authors can attach a preferred style sheet, while readers may have a personal style sheet to adjust for human or technological handicaps. The rules for resolving conflicts between different style sheets are defined in this specification.

W3C REC-CSS2-19980512, W3C Recommendation Cascading Style Sheets, level 2 CSS2 Specification—W3C Recommendation, 12 May 1998 (<http://www.w3.org/TR/REC-CSS2/>).³ This specification defines Cascading Style Sheets, level 2 (CSS2). CSS2 is a style sheet language that allows authors and users to attach style (e.g., fonts, spacing, and aural cues) to structured documents (e.g., HTML documents and XML applications). By separating the presentation style of documents from the content of documents, CSS2 simplifies Web authoring and site maintenance.

CSS2 builds on CSS1 and, with very few exceptions, all valid CSS1 style sheets are valid CSS2 style sheets. CSS2 supports media-specific style sheets so that authors may tailor the presentation of their documents to visual browsers, aural devices, printers, Braille devices, hand-held devices, etc. This specification also supports content positioning, downloadable fonts, table layout, features for internationalization, automatic counters and numbering, and some properties related to user interface.

W3C REC-html40-19980424, W3C Recommendation HTML 4.0 Specification: W3C Recommendation, revised on 24-Apr-1998 (<http://www.w3.org/TR/REC-html40>) This is a World Wide Web Consortium (W3C) and Internet Engineering Task Force (IETF) Standard. This specification defines the Hyper Text Markup Language (HTML), Version 4.0, the publishing language of the World Wide Web. In addition to the text, multimedia, and hyperlink features of the previous versions of HTML, HTML 4.0 supports more multimedia options, scripting languages, style sheets, better printing facilities, and documents that are more accessible to users with disabilities. HTML 4.0 also takes great strides toward the internationalization of documents, with the goal of making the Web truly World Wide. HTML 4.0 is a Standard Generalized Markup Language (SGML) application conforming to ISO 8879: 1986, Standard Generalized Markup Language.

¹ISO publications are available from the ISO Central Secretariat, Case Postale 56, 1 rue de Varembe, CH-1211, Genève 20, Switzerland/Suisse (<http://www.iso.ch/>). ISO publications are also available in the United States from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA (<http://www.ansi.org/>).

²The particularly dated standards for Cascading Style Sheets, level 1 should be used.

³The particularly dated standards for Cascading Style Sheets, level 2 should be used.

W3C WAI WEBCONTENT 19990324, W3C Recommendation Web Content Accessibility Guidelines 1.0, WAI Page Author Guidelines—W3C Working Draft 15-Jan-1999 (<http://www.w3.org/TR/WAI-WEBCONTENT-19990324/>). This document is a list of guidelines that page authors should follow in order to make their pages more accessible for people with disabilities as well as more useful to other users, new page viewing technologies (mobile and voice), and electronic agents such as indexing robots. Tools that generate documents in HTML (authoring tools, file conversion packages, or other products) should make it easy for authors to produce documents that follow these guidelines. This document is part of a series of accessibility documents published by the W3C Web Accessibility Initiative.

3. Definitions, terminology, and acronyms

3.1 Definitions

3.1.1 archival pages: On-line data that is no longer maintained, is not expected to change, and may not be readily renderable by future tools.

3.1.2 extranet: A set of intranets connected for specific objectives.

3.1.3 intranet: A managed network operating strictly within a single legal entity. More than one intranet may exist within the legal entity, and may be isolated for security reasons.

3.1.4 managed network: A network or set of networks established and controlled by one or more organizations to meet specific organizational or business needs.

3.1.5 persistent URI: A Uniform Resource Identifier (URI) is persistent if it is a reference that does not need to change at the link in a document, and can still reach the desired object even though that object may have changed locations.

3.1.6 Web page: A digital multimedia object as delivered to a client system. A Web page may be generated dynamically from the server side, and may incorporate applets or other elements active on either the client or server side.

3.1.7 Web site: A collection of logically connected Web pages managed as a single entity. A Web site may contain one or more subordinate Web sites.

3.2 Terminology

This subclause describes terms used in a specific manner in this standard. The descriptions are not intended as definitions, but rather as explanations of the special usage.

3.2.1 Rfield: The designation for a Web page segment presented within a WEP, primarily for the human reader. Typically the contents are not structured for machine interpretation.

3.2.2 Mfield: The designation for a Web page segment presented within a WEP, in machine-readable format, which is not intended to be presented to the human reader.

3.2.3 RMfield: The designation for a Web page segment presented within a WEP, structured for both machine interpretation and for presentation to the human reader.

3.3 Acronyms

CSS	Cascading Style Sheets
CSS1	Cascading Style Sheets, level 1
CSS2	Cascading Style Sheets, level 2
DNS	Domain Name Service
DOI	Digital Object Identifier (trademark of the DOI Foundation, a form of URI)
DTD	Document Type Definition (for XML or SGML specifications)
GIF	Graphics Interchange Format
HREF	HTML Reference designator
HTML	HyperText Markup Language
HTTP	HyperText Transfer Protocol
IBPwg	Internet Best Practices working group
IETF	Internet Engineering Task Force
IP	Internet Protocol
IPR	Intellectual Property Rights
ISBN	International Standard Book Numbers
ITIC	Information Technology Industry Council
JPEG	Joint Photographic Experts Group (image format)
NMG	Network Motion Graphics
PDA	Personal Digital Assistant
PICS	Platform for Internet Content Selection
PNG	Portable Network Graphics
RDF	Resource Definition Framework
SGML	Standard Generalized Markup Language
SI Units	International System of Units: The Modern Metric System
TCP	Transport Control Protocol
URI	Uniform Resource Identifier (described in IETF RFC 2396: 1998 [B9] ⁴)
URL	Uniform Resource Locator
UTC	Coordinated Universal Time
W3C	World Wide Web Consortium
WEP	Well-engineered Web page (see 1.3.1) (This abbreviation is used in this standard to help identify specific statements including recommendations/requirements on well-engineered Web pages.)
XML	Extensible Markup Language
URN	Universal Resource Number

4. Design practices

The developer of a WEP should prepare a design plan, or follow an existing plan, covering the entire life cycle of the WEP including development, maintenance, and retirement. In general, intranet/extranet WEPs have as a significant objective the delivery of specific information to individuals who need that information.

WEP design shall incorporate consideration of the implications of both minimum and maximum Web site life expectancies.

WEPs shall have an identified page date, expiration date, and contact point. The design plan should address Web site maintainability.

WEPs shall have an identified set of metrics that can be evaluated.

⁴The numbers in brackets correspond to those of the bibliography in Annex B.