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Systems and software engineering — Engineering and management of websites for systems, software, and services information

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National foreword

This British Standard is the UK implementation of ISO/IEC/IEEE 23026:2015. It supersedes BS ISO/IEC 23026:2006 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee IST/15, Software and systems engineering.

A list of organizations represented on this committee can be obtained on request to its secretary.

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INTERNATIONAL STANDARD

ISO/IEC/ IEEE 23026

First edition
2015-05-15

Systems and software engineering — Engineering and management of websites for systems, software, and services information

Ingénierie des systèmes et du logiciel — Ingénierie et gestion de sites web pour les systèmes, logiciels et services d'information

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

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The main task of ISO/IEC JTC 1 is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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ISO/IEC/IEEE 23026 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems engineering*, in cooperation with the Systems and Software Engineering Standards Committee of the IEEE Computer Society, under the Partner Standards Development Organization cooperation agreement between ISO and IEEE.

This first edition of ISO/IEC/IEEE 23026 replaces and supersedes ISO/IEC 23026:2006, which was the adoption of IEEE Std 2001 (TM)-2002, IEEE Recommended Practice for the Internet — Website Engineering, Website Management, and Website Life Cycle. The IEEE contributed IEEE Std 2001-2002 as a source for this standard.

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Introduction

The increase in use of the World Wide Web for every type of communication, and the accelerating development of new technical protocols, products, and services, for website development and hosting, have both simplified and complicated the engineering and management of websites. Because of the ready availability of commercial website providers, it has become simpler for information and communications technology (ICT) enterprises of all sizes to launch websites to present technical information. The growth in global communities of interest in software, systems, and services has expanded the creation of information from many sources. To a large extent, use of digital communications, particularly those accessible through the Internet or Intranets, has supplanted printed publications for conveying technical information. This trend applies to systems and user documentation as well as to service management and operational plans, policies, and procedures.

Other factors have also affected the design and operation of websites since the original publication of ISO/IEC 23026–IEEE Std 2001-2002, a source for this International Standard. The prevalence of automated search engines to locate technical information results in new considerations for website design. The increasing sophistication of information security threats to technical enterprises and their information, as well as concerns for the privacy of Internet users, have markedly complicated the process of delivering ICT information over the Web. This revision of ISO/IEC 23026 therefore has increased emphasis on information security and privacy concerns.

The diversity of websites for commercial marketing and social networking purposes reflects different interests and media choices from those websites that deliver ICT reference information. This revision of ISO/IEC 23026 applies primarily to websites whose purpose is to deliver information about ICT systems, software, and services. It includes increased emphasis on the human factors concerns for making information easily retrievable and usable for the intended audience. It recommends practices for websites based on World Wide Web Consortium (W3C®) and related industry guidelines, which have changed significantly since the original version of this International Standard. With rapid changes in technology, users may seek current technical guidance to fulfill the intent of this International Standard. It continues to address the entire life cycle of website strategy, design, and ongoing sustainment that are the responsibility of the website owner.

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Systems and software engineering — Engineering and management of websites for systems, software, and services information

1 Scope

This International Standard defines system engineering and management requirements for the life cycle of websites including strategy, design, engineering, testing and validation, and management and sustainment for Intranet and Extranet environments.

This International Standard applies to those using web technology to present information and communications technology (ICT) information, such as user documentation for systems and software, life-cycle documentation for systems and software engineering projects, and documentation of policies, plans, and procedures for IT service management. This International Standard provides requirements for website owners and website providers, managers responsible for establishing guidelines for website development and operations, for software developers and operations and maintenance staff who may be external or internal to the website owner's organization. It applies to websites for public access and for limited access, such as for users, customers, and subscribers seeking information on IT products and services.

The goal of this International Standard is to improve the usability of informational websites and ease of maintenance of managed Web operations in terms of:

a) locating relevant and timely information,

b) applying information security management,

c) facilitating ease of use,

d) providing for consistent and efficient development and maintenance practices.

This International Standard is not intended for websites used primarily for marketing or sales, or to deliver instructional material, or to provide Graphical User Interfaces (GUI) for business or consumer transactional application processing. However, this International Standard may provide useful insights for managing such sites.

This International Standard focuses on vendor- and product-independent considerations. It does not include specifications for application development tools, programming languages used for archiving site content or for presentation of content on the web, metadata tags, or protocols for web page design based on World Wide Web Consortium (W3C®) and related industry guidelines. It does not address tools or systems used for management or storage of information content (data, documents) that may be presented on websites.

This International Standard does not address the design and architecture of software supporting the Internet.

2 Conformance

Throughout this International Standard, "shall" is used to express a provision that is normative, "should" to express a recommendation among other possibilities, and "may" to indicate a course of action permissible within the limits of this International Standard.

Use of the nomenclature of this International Standard for the parts of a website is not required to claim conformance to the International Standard.

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EXAMPLE Referring to the home page as the landing page or main page.

Conformance to this International Standard may only be claimed by an organization if all of the requirements in the standard are met by the organization or by its suppliers.

EXAMPLE When conformance is claimed for a website for which one organization provides the site content and another supplier is responsible for website presentation and operation, the site owner may claim conformance if each of the requirements are met by an identified party.

This International Standard may be included or referenced in contracts or similar agreements when the parties (called the acquirer and the supplier) agree that the supplier shall deliver services in accordance with the standard. This International Standard may also be adopted as an in-house standard by a project or organization that decides to develop and maintain a website in accordance with the standard.

3 Normative references

There are no normative references for this International Standard. The user is encouraged to consult the latest edition of the referenced documents (including any amendments) listed in the Bibliography.

4 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC/IEEE 24765 (www.computer.org/sevocab) and the following apply.

4.1
archival page
content that is preserved as a record and not expected to change

Note 1 to entry: Due to technology upgrades, some archival pages cannot be readily rendered unless they are upgraded along with active pages.

4.2
audience
category of users sharing the same or similar characteristics and needs (for example, purpose in using the documentation, tasks, education level, abilities, training, and experience) that determine the content, structure, and use of the intended documentation

Note 1 to entry: There may be a number of different audiences for a software product's documentation (for example, management, data entry, maintenance).

4.3
body metadata
elements in the body of an HTML document providing administrative and/or navigational facilities for the user or administrator

4.4
breadcrumb trail
navigational aid with a displayed series of hyperlinks which lead from the home page to the current page, allowing the user to return to previously viewed pages

4.5
browser
application allowing a person to retrieve and read hypertext, to view the contents of hypertext nodes (Web pages), to navigate from one Web page to another, and to interact with the content, such as changing the visual appearance of the displayed content

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4.6
content (object)
interactive or non-interactive object containing information represented by text, image, video, sound, or other media

4.7
cookie
small file that is stored in and retrieved from user web storage to maintain state information, including identification of users and transaction coherency

4.8
faceted search
progressive search which allows users to narrow the results by selecting values for one or more attributes

4.9
feature
functional or non-functional distinguishing characteristic of a system, usually an enhancement to an existing system

4.10
frame
mechanism for dividing a browser window into independent windows for displaying different content or different parts of the same content (document)

4.11
global navigation
set of navigation links available on all pages of a website

4.12
home page
page of a website through which users typically enter the website, and whose URL is typically published or linked as the main web address of the site or organization

Note 1 to entry: Synonym: center page, front page, index page, main page, start page, top page.

4.13
Internet
worldwide interlinked computer systems and networks connected by gateways that enable the transfer of data between them

4.14
intranet
managed network operating within an organization with controlled and limited access

4.15
link
reference from some part of one document to some part of another document or another part of the same document

Note 1 to entry: Synonym: hyperlink

4.16
managed network
network or set of networks established and controlled by one or more organizations to meet specific organizational or business needs

4.17
managed website
site created and maintained based on organizational guidelines

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4.18
mirror site
duplicate copy of a website maintained on a different host typically to provide redundancy, higher performance, or local access

4.19
navigation
process of accessing on-screen information by moving between different locations in a website or electronic document

4.20
orphan page
page on a website with no link from the home page or other page on the website

4.21
persistent
for a URL, describing 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

4.22
responsive web design
method for web page construction to detect the user's screen size and orientation and dynamically change the layout accordingly

4.23
site map
textual or graphical overview of the navigation structure of a website

4.24
thumbnail
miniature image file displayed for quick identification of a larger image or video file

4.25
Uniform Resource Locator
URL
mechanism for identifying resources on the Internet (such as web pages) by specifying the address of the resource and the access protocol used

Note 1 to entry: The term as specified by the IETF is uniform resource identifier (URI) of which URL is a subset.

4.26
user profile
set of attributes that are unique to a specific user or user group, such as job function or subscription to a service, used to control the parts of the system or web page that users can access

4.27
webmaster
person or group responsible to the website owner for ongoing maintenance of the site's presentation and availability

4.28
web page
coherent presentation of a set of content objects and associated interaction objects delivered to users through a browser in accordance with Internet protocols

Note 1 to entry: A Web page may be generated dynamically from the server side, and may incorporate multimedia, applets or other elements active on either the client or server side.

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4.29
website
collection of logically connected web pages managed as a single entity

Note 1 to entry: A website may contain one or more subordinate websites.

4.30
website owner
organization responsible for the site content and site design

Note 1 to entry: The website owner may select a supplier as the website provider or may also be the website provider.

4.31
website provider
organization responsible for operation of the website and delivery of site content to users

Note 1 to entry: The website provider may also be the site owner, webmaster, site designer, or the internet service provider for the site.

5 Abbreviated terms

3D	three-dimensional
CI	Configuration Item
CSS	Cascading Style Sheets
CVE	Common Vulnerabilities and Exposures
CVSS	Common Vulnerability Scoring System
DNS	Domain Name Service
DOI	Digital Object Identifier™
DTD	Document Type Definition (for XML or SGML specifications)
FTP	File Transfer Protocol
GIF	Graphics Interchange Format
GUI	Graphical User Interface
HREF	HTML reference designator
HTML	HyperText Markup Language
HTTP	HyperText Transfer Protocol
ICT	information and communications technology
IETF	Internet Engineering Task Force
IP	Internet Protocol
IPR	Intellectual Property Rights
JFC	Java Foundation Class
JPEG	Joint Photographic Experts Group (image format)
JPG	Joint Photographic Group
MAC	Media Access Control
OTP	One-time password
PII	Personally Identifiable Information
PIN	Personal Identification Number
PNG	Portable Network Graphics
RDF	Resource Description Framework
RWD	Responsive Web Design
SGML	Standard Generalized Markup Language
SSL	Secure Sockets Layer
TCP	Transport Control Protocol
TLS	Transport Layer Security
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
UTC	Coordinated Universal Time
WAI	Web Accessibility Initiative (W3C)
WAP	Wireless Application Protocol
WCAG	Web Content Accessibility Guidelines

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W3C	World Wide Web Consortium
XHTML	Extended HyperText Markup Language
XML	Extensible Markup Language

6 Planning websites for systems, software, and services documentation

6.1 Defining the purpose, users, and context of the website

This International Standard addresses websites that have the general purpose of providing information about ICT systems, software, or service management. Within this scope, a broad range of purposes, audience (users), and resulting types of content can be included, such as policies, plans, specifications, operating procedures and instructions (user manuals), service descriptions, service agreements, knowledge management articles, help desk scripts, test plans, technical reports, and descriptions of concepts.

The website owner shall document the purpose and intended users of the website.

This information may be placed in a plan, charter, or policy and represented by use cases or scenarios. It influences the decisions on what information content belongs on the website and how to organize and present the content. This governing document or another explicit statement of purpose, suitable for use by possible stakeholders, should be posted as part of the website. The owner of the website should consider how the company's technical and strategic direction should influence code and feature choices that are extensible or scalable for future use.

The users of the website can include internal management and technical staff, external customers, or the general public. Thus, the website content could include general user information or procedures and specialized technical information for reference by trained technical users. Websites may be intended for a specific group, such as internal helpdesk or external customers. Some websites may allow users to add content as part of a collaborative community, or to post comments in a wiki. Some sites include both technical information for existing customers and marketing presentations for prospective customers. Some sites can be hosted by the owner of the technical information; other sites can run on services offered by unrelated website providers, who may have their own marketing information and third party advertisements displayed alongside the website owners' technical content. Sites can be intended for local or global use and offered in one or multiple languages.

Websites are often developed to serve a number of purposes and users of different technical backgrounds. Therefore, the site should be designed to allow users to easily gain an overview of the scope of the content and functionality provided. The introductory pages of the site should include a description of the purpose and intended uses of the website, with links to topics accessible within one link or search which satisfy the information needs of casual users. Global navigation features and search functions should allow more technical users to quickly reference needed information.

The effective communication of the content to the user is the primary purpose of an informational website. Ease of access to information by targeted-user communities is an example of one of the possible design goals. A website may address one or more diverse sets of users. Representatives of these user communities, which may include persons with disabilities, should be included in the design process and the ongoing evaluation of the site.

The target user community may have a wide diversity of connection speeds, display devices, or selected presentation formats within the display windows; this may establish some presentation constraints (consider displaying Web pages to small screens on mobile devices). Websites may consist of static pages, system generated pages, and dynamic pages, and may include user-generated content. Furthermore, any of these options may be combined for the purpose of providing the intended information to the website's users.

6.2 Establishing the informational website design strategy

If the website includes marketing material or advertising for other organizations not part of the website owner's organization, the home page shall include or link to disclosures relating to separation of editorial content and advertising, and the presence of sponsored content and sponsored links.

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The designer shall consider the need of users to use content on mobile devices or to print content. Considering the needs of search engines and differently abled users, the designer shall provide a text equivalent or label for graphical, video, and audio content.

Site documentation for websites presenting ICT information shall have an identified set of measures to evaluate whether the website is meeting its goals. The plan shall include the set of measures to be collected and analyzed, the methods that will be used for the evaluation, and the acceptance criteria for approval of the website design.

The designer shall document the targeted computing environments for the website for future sustainment. The selection of implementation tools (e.g., servers, generators, and release levels or versions of HTML, CSS, XML, and scripting) shall be based on the evaluation of the target client communities and plans for site maintenance.

Responsive Web Design (RWD) is a method for web page construction to detect the user's screen size and orientation and dynamically change the layout accordingly, so the site produces output which is viewable and navigable with the devices and web software of the intended site users. It employs the use of flexible layouts (columns), scalable images, and CSS media queries. For content to be responsive to various devices and browser viewport sizes, layouts and content should adhere to the following principles:

- Page element sizing of the site should be built with a flexible grid system that uses relative units such as percentages for width/height and em's for font size.
- Flexible images that are used in the design should be in relative units or make use of appropriate CSS (e.g. using CSS property overflow: hidden).

Different views should be enabled in different contexts by employing media queries. Media queries allow designers to build multiple layouts using the same HTML documents by selectively serving stylesheets based on the user agent’s features, such as the browser window’s size, orientation (landscape or portrait), screen resolution, and color. Navigation elements should scale and dynamically be placed so as to not obscure information and degrade the user's experience. For mobile devices, navigation icons may be hidden with appropriate visual cues for the user that indicate interaction.

Organizational effectiveness, competitive success, and even meeting legal obligations and avoiding liabilities can depend on timely access to critical information within an organization. Intranet/Extranet design should consider these factors, particularly as the Internet is used to displace other methods for information delivery. Usability testing and other methods of obtaining user feedback should be actively pursued as part of this process.

Separation of content and presentation management is a primary design principle.

EXAMPLE Use of cascading style sheets (CSS) to take care of the presentation management needs and use of content templates to take care of structure management can simplify site management.

The website should exhibit consistency of design (uniform look and feel for the site). The website designer should adopt, adapt, or develop a style guide to assist in implementing a coherent strategy.

In situations where related organizations own related and interconnected websites, a coherent strategy should be implemented to allow consistent global navigation, search and information retrieval, security, and identification of site ownership among the related sites.

Websites should adopt and conform to a policy regarding the separation of informational content from advertising and marketing content.

NOTE 1 The American Society of Magazine Editors’ editorial guideline for digital media, available at http://www.magazine.org/asme/editorial-guidelines is a baseline industry standard for issues relating to the distinct treatment of editorial content, advertising, and special advertising sections.

The website designer should select the types of media needed to best present the informational content for the intended audience (text, graphics, video, animation).

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NOTE 2 Some search tools cannot access content presented within frames.

The website designer should consider performance considerations affecting site and data store design: the expected number and persistence of users, type and volume of information to be viewed or retrieved, and use of static or dynamic information.

The website designer should consider the characteristics of the client and server environment and its impact on access to the presented material by the target-user community. Plans should include contingencies for technical obsolescence and growth.

The website design should be documented. Website design documentation should include statements about the page formats generated, including HTML version (and in some cases excluded functionality), CSS version, XML version and XML DTD(s), graphics formats, scripting and/or byte code executable versions and/or limitations, human-language considerations (as well as character sets), bandwidth considerations, and other characteristics from this standard or as identified during the design phase. The documentation should be updated based on actual experience. Specification in terms of vendor-specific products not under the control of the website owner should be avoided along with the associated loss of product independence.

If the website is hosted by a website provider, that provider may provide site documentation or specifications for available design and navigation features applicable to the Web pages for an entire network, and encourage or enforce conformance to these.

The website design should consider the needed levels of access control for the site, including whether all or some content is available to the worldwide public and some is limited to internal users, customers or subscribers, or prospective customers who provide their contact information.

The website owner should use methods and tools to collect and analyze site usage data as an aid to improving the usability of the site content.

EXAMPLE Measures may include user comments and ratings, or trends in the number of help desk calls related to services or software functions documented on the website.

6.3 Developing a strategy for website lifecycle management

The developer of a website for information reference shall prepare a project plan, or follow an existing plan, covering the entire life cycle of the site. The life cycle includes implementation (strategy, design, development, testing, and configuration) and maintenance (release management, updates, and retirement.)

The plan for the informational website should define when, how, and by whom specific activities are to be performed, including options and alternatives. The plan should include the following items:

a) Website owner,

b) Website purpose, scope, and intended user communities,

c) Intended lifespan of the website and frequency of change to the content,

d) Applicable standards and policies, including privacy, information security, and intellectual policy,

e) Applicable organizational guidance, including style guides,

f) Roles and responsibilities for site development and content development,

g) Roles and responsibilities for validating website content and usability, achieving performance targets, and conducting performance testing,

h) Constraints on website platform or infrastructure,

i) Schedules and resource estimates,

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j) User support needs (webmaster, help desk, end-user documentation, telephone line).

NOTE 1 10.2 contains further information on planning for site management and sustainment.

Website designers and developers should prepare a requirements specification for a website, including performance, availability, and information security requirements. Website developers should trace the website's functional and non-functional requirements to the website's strategic plan or charter from the Website owner.

NOTE 2 ISO/IEC/IEEE 15289:2011 provides additional information for plans, policies, specifications, and procedures, including project management plans, information management plans, documentation plans, information security plans, service availability and continuity plans, and system requirements specifications.

If a website is complex or if it implements interactive functionality, it may be useful to consider it as a software product and to apply standards for software development and maintenance. In these cases, one or more projects should be initiated to execute the responsibility to plan and manage the website throughout its entire life cycle from conception through retirement.

The design process for an informational website should include stakeholders' involvement and participation throughout the website life-cycle activities: development, operations, and maintenance. To this end, website developers should identify categories of stakeholders early in the design phase so at least a representative sample of them can participate in the website development activities. The designers should consider typical access patterns for their users. This process should facilitate concurrent validation and verification of website requirements.

7 Designing websites for systems, software, and services documentation

7.1 Information architecture

7.1.1 Information structure of a website

The website shall have a defined structure for organization of its information content and functions.

The structure (site map) should reflect the information-seeking tasks to be performed by the users, allowing them to readily grasp the site's organization and find the needed information. The structure should be visible on every page, such as through menus, tabs, or display of higher-level pages in a breadcrumb trail. When the users' task is primarily to find technical information, the site structure should reflect the logical organization of the enterprise or the products, services, systems, procedures and instructions, or concepts to be presented. The site organization should place frequently used information where it is readily accessible (one click) from the main website page (home page). Frequently used features like search, and site logon, logout, and registration (if applicable) should also be readily visible on the home page. A well organized site structure can also simplify maintenance and sustainment of the site as information is added or archived in the future. Page content should be classified as stable or dynamic and the likely frequency of changes and updates should be identified.

The structure of a Website may be hierarchical or flat. Figure 1 illustrates hierarchical information architecture for related websites.

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NOTE All elements of this diagram may represent separately managed websites. Such management should reflect reference to the applicable policies of the organization hierarchy. Websites are not implicitly hierarchical.

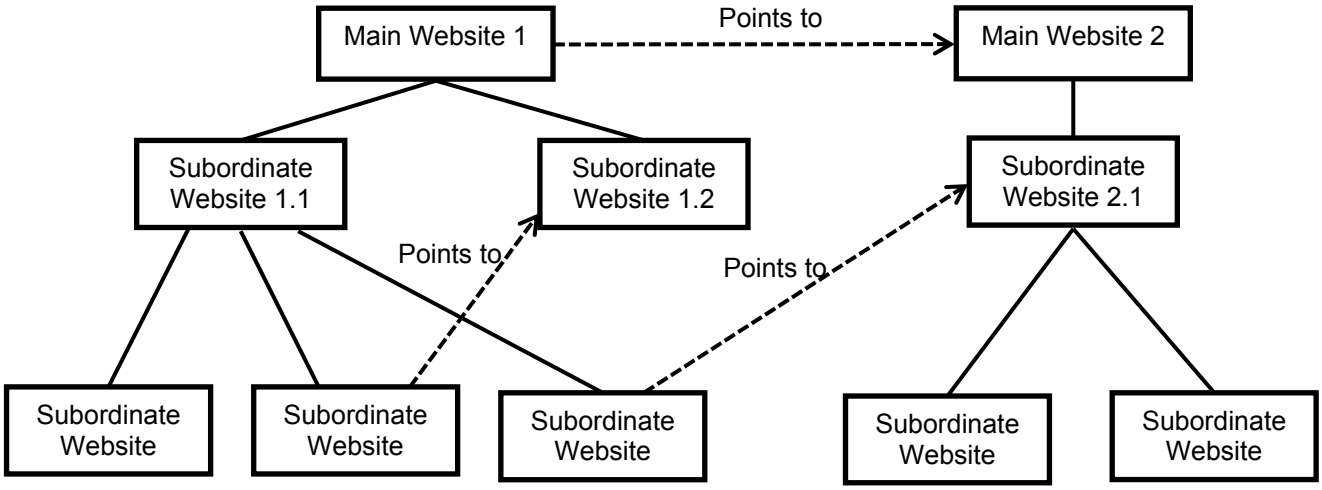


Figure 1 — Example of website information architecture

A site map document or illustration may be created for URLs and metadata for those URLs. The site map should be labeled as a site map and tested for usability with accessibility-compatible website readers.

The segmentation of content into pages for display may follow a choice of principles for ease of use. Windows and browsers can easily scroll and zoom to accommodate various amounts of content. Extended text presented on a single page is more easily comprehended when headings identify topics on the page. Very long pages, which typically require scrolling several times to view all the content, should display links to headings at the top of the page, serving as a table of contents. Important or summarized content should appear at the top of the web page, with less important or detailed content accessible through scrolling.

7.1.2 Shared resources

Default files for compliance to legal regulation or policy, copyright information, contact information, style sheets, and other site-specific data may be created for a site, or inherited from a broader organizational context.

7.1.3 Website home page

A website shall include a home page. The home page shall provide a comprehensive view and links to the types of information available on the site.

Websites that are part of a larger site construct shall contain a link to that overall site's home page. The home page shall either contain, or provide links to:

a) “top level pages” (home pages) for this site,

b) purpose of the site and intended users or tasks the website supports,

c) disclosures of the site owner and the responsible webmaster (site maintainer),

d) terms and conditions of use,

e) privacy and information-sharing policy, including cookie policy and identity-capturing policy,

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