The World Wide Web Consortium

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Abstract
The mission of the World Wide Web Consortium (W3C) is to lead the World Wide Web to its full potential by developing common protocols that promote its evolution and ensure its interoperability. So (W3C) is a worldwide consortium of businesses and individual who collaborate with the vision of bringing conformity and technical advancement to the World Wide Web through the development of technologies and recommendations for its use. This paper provides some background on the W3C and processes related to the responsibilities and functions they exercise to enable W3C to accomplish its mission and to lay the groundwork for critical thinking regarding its role and influences in today's business world.

***Keywords*: www, w3c, development, standards, worldwide, web, consortium, business,**

I. Introduction

The World Wide Web Consortium (W3C) is the main international standards organization for the World Wide Web [1] (abbreviated WWW or W3). Founded and headed by Tim Berners-Lee, [4] after he left the European Organization for Nuclear Research (CERN) in October, 1994. It was founded at the Massachusetts Institute of Technology Laboratory for Computer Science (MIT/LCS) with support from the European Commission and the Defences Advanced Research Projects Agency (DARPA), which had pioneered the Internet. W3C was created to ensure compatibility and agreement among industry members in the adoption of new standards. Prior to its creation, incompatible versions of HTML were offered by different vendors, increasing the potential for inconsistency between web pages. The consortium was created to get all those vendors to agree on a set of core principles and components which would be supported by everyone.

The consortium is made up of member organizations which maintain full-time staff for the purpose of working together in the development of standards for the World Wide Web. As of 16 January 2012, the World Wide Web Consortium (W3C) has 336 Members [2].

II. Difference between the Web and the Internet:

From the definition in the Wikipedia: [9] "The Internet is a global system of interconnected computer networks that interchange data by packet switching using the standardized Internet Protocol Suite (TCP/IP)."

Thus, the Internet is defined by the TPC/IP standards.

The Web, on the other hand, is defined in W3C's Architecture of the World Wide Web, Volume I [6] as follows: "The World Wide Web (WWW or simply Web) is an information space in which the items of interest, referred to as resources, are identified by global identifiers called Uniform Resource Identifiers (URI)."

Thus, the Web is defined by other specifications. The first three specifications for Web technologies defined URLs, HTTP, and HTML.

III. W3C Achievements:

The W3C has achieved a great many things in its short. Here are just a few [3]:

- October 1996 - First W3C Recommendation published is Portable Network Graphics (PNG) 1.0
- December 1996 - Separating content from structure, CSS Level 1 is published
- February 1997 - Web Accessibility Initiative launched.
- December 1997 - HTML 4.0 adds tables, scripting, style sheets, internationalization, and accessibility features to Web publishing
- February 1998 - XML 1.0 promotes interoperability and domain-specific mark-up.
- August 2000 - Scalable Vector Graphics (SVG) 1.0 enriches Web graphics.
- May 2001 - XML Schema provides an essential piece for XML to reach its full potential.
- January 2002 - W3C launches Web Services Activity.
- May 2003 - W3C adopts royalty-free Patent Policy.
- February 2004 - RDF and OWL make a strong foundation for Semantic Web applications.
- March 2004 - W3C gives voice to the Web with Voice XML 2.0.
- December 2004 - W3C describes principles of Web architecture.
- February 2005 - Character Model brings unified approach to using characters on the Web.

The W3C is still very young and has only just begun as unifying force in the Web's development. The future remains to see what further they will contribute.

IV. W3C Process Document:

The W3C does its work in accordance with the Process Document [5], a thoroughly cross-referenced and annotated official document with fourteen sections which detail the consortium's organizational structure and describe its process in doing things like developing recommendations, holding meetings, and publishing reports. Central to W3C operations and comprehensively explained in the process document is something called the Recommendation Track. The Recommendation Track is merely the process by which an idea becomes a W3C recommendation. It includes the stages of Working Draft, Candidate Recommendation, Proposed

Recommendation, and finally W3C Recommendation… see figure (1) W3C Recommendation Stages.

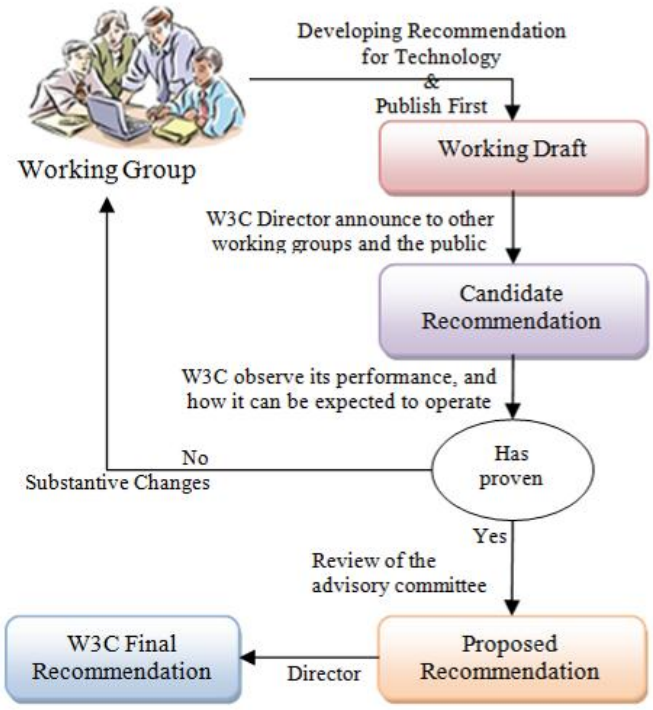

Figure (1): W3C Recommendation Track

The recommendation process begins when enough interest exists in officially recommending a technology that W3C members organize what is called a Working Group dedicated to developing a recommendation for that technology. A Working Group consists of representatives from W3C member organizations and the W3C's paid staff (known as the Team), as well as experts invited to participate in the process and a Chair to provide leadership. Once a Working Group has met and done enough work, they publish a First Public Working Draft which the W3C Director then must announce to other W3C groups and the public. This serves to place the groups work "on the map" at the W3C and get them underway on the recommendation track.

Throughout a Recommendation's life as a Working Draft, the Working Group must keep other W3C members and staff abreast of its developments as well as remain open to input from potential recommendation users. It does this by publishing reports every three months on which it receives feedback and which help formalize the group's collective thinking. This is especially important because within Working Groups (and indeed at all levels) the W3C strives to work by consensus whenever possible.

When consensus has been reached on a preponderance of the Working Group's desired outcomes, the group then publishes a Last Call Working Draft to signal that for more three weeks the draft will be subject to the review of the public and other Working Groups whose work is related or dependent on theirs. Once the final review process is complete, the draft becomes a Candidate Recommendation at which time the Director must announce a Call for Implementations to the Advisory Committee, a body consisting of a representative of each W3C member organization whose responsibility is to allocate the consortium's budget among its various operations.

Once the Candidate Recommendation has gone before the Advisory Committee and has been given a budget, it enters a stage in which it is implemented in practice so that the W3C may observe its performance and gain an understanding of how it can be expected to operate "in the real world." If at any time during implementation, it is found that substantive changes must be made to the technical document which describes the Candidate Recommendation, the Director must return it to the Working Group for further work.

Once each feature of the technical report makes it through implementation and the Candidate Recommendation has proven stable it again goes under the review of the Advisory Committee. At this stage, the report becomes a Proposed Recommendation which is subject to the appeal of Advisory Committee members. After four weeks of review and deliberation, the official opinion of the Advisory Committee (including results of votes on any appeals) are given to the Director who decides whether or not to make the Proposed Recommendation an official Recommendation of the W3C.

V. IMPORTANCE OF W3C

A. What does W3C do?

W3C's primary activity is to developing protocols and guidelines that ensure long-term growth for the Web. W3C's standards define key parts of what makes the World Wide Web work [8].

B. Why Do We Listen to the W3C?

The W3C has helped bring a consistency to the web with the technologies it has developed. People actually listen to what they say. It is important to consider why we listen to the W3C and follow their recommendations. The immediate reason is that companies like: Microsoft, Sun Microsystems, Macromedia, Google, Apple, America Online, Yahoo!, HP, Cisco Systems, and many others are members of the W3C. These companies have moulded the way we view computers and the Internet, so of course we ought to listen to them. If we didn't listen to them we would be swimming upstream and that isn't an easy thing to do, just ask Richard Stallman.

C. So Why Does Industry Listen to the W3C?

Fundamental to the notion of a World Wide Web is the idea that in order for it to truly perform on the worldwide, everyone who is a part of it has to use the same technologies. If Tim Berners-Lee had tried to sell the technology to people it would have ended up being a bunch of fragmented networks across the globe instead of the global information super highway we see today.

When we consider this, we see why organizations like Macromedia and Mozilla develop their products to conform to W3C recommendations. They want the Internet to stay consistent, and the technologies to act in the same manner across the world. The impacts on operations and revenue are

universal when your software doesn't need changed to fit hundreds of different configurations of server exchange and information protocol.

Some companies have tried in the past to control certain parts of the Internet, some of whom are members of the W3C. Controlling Internet or at least part of it might indeed make a company or person the richest in the world. So why do those companies listen to the W3C? It is because they belong to the W3C.

D. Why Do They Become Members of the W3C?

Every aspect of a company these days is touched by some form of technology, increasingly often specifically web technologies. A firm's members now communicate amongst themselves, with other firms, and with customers via web technologies. Internet technologies now manage information, accounting, production, advertising, and lots of other key components of a business. Operations that comprise the very heart of a company are now run on the Web and it is very important that they be stable.

The reason companies like Microsoft join the W3C is because they need the Web to be a stable place for their company and as such they want to have a say in how it evolves.

W3C's mission is to lead the Web to its full potential. W3C Member organizations provide resources to this end, and the W3C Team provides the technical leadership and organization to coordinate the effort [7].

VI. **WEB STANDARDS**

W3C standards define an Open Web Platform for application development that has the unprecedented potential to enable developers to build rich interactive experiences, powered by vast data stores, which are available on any device [12].

A. Web Design and Applications

Web Design and Applications involve the standards for building and Rendering Web pages, including HTML, CSS, SVG, Ajax, and other technologies for Web Applications. This section also includes information on how to make pages accessible to people with disabilities, to internationalize them, and make them work on mobile devices [13].

-- HTML 4.0 – Hypertext Mark-up Language:

Hypertext Markup Language (HTML) is widely used on the Web for adding structure to text documents. Browsers interpret these documents, representing the structure in media-specific ways to the user. For example, visual browsers typically display the strong element (…) as bold text, while text-to-speech readers might emphasize that text when pronouncing it [10].

-- XML 1.0 – Extensible Mark-up Language:

Extensible Markup Language (XML) is a markup language like HTML, but instead of having a single, fixed set of elements, it allows you to define your own – or use a set made by someone else. It even allows using multiple sets within a single document – by using XML namespaces [10].

XML is more flexible than HTML, primarily because of the ability to add your own elements and make your own structural systems, see figure (2). This makes it an ideal format for the organization of large quantities of data – it is already in use in many databases and search engines.

```
<addressbook>
  <entry>
    <name>Bill Gates</name>
    <email>bgates@microsoft.com</email>
  </entry>
  <entry>
    <name>Marc Andreesen</name>
    <email>marca@netscape.com</email>
  </entry>
  <entry>
    <name>Jon S. von Tetzchner</name>
    <email>jon@opera.com</email>
  </entry>
</addressbook>
```

Figure (2): Example of part of an XML document

-- XHTML 1.0, 1.1, and Modularization:

XHTML (eXtensible Hyper-Text Markup Language) is a family of XML markup languages that mirror or extend versions of the widely-used Hypertext Markup Language (HTML), the language in which web pages are written.

XHTML 1.0 is a reformulation of HTML as an XML application. XHTML 1.0 can be seen as ideologically coming from HTML 4.01, and being technically stricter because of XML's influence [10]. XHTML will display in your browser identically to the equivalent HTML. You might want to use XHTML if there is any chance you're going to need to reprocess your content, for example to send it to a PDA; XML's stricter syntax rules make automatic processing of XHTML much easier and cheaper than ordinary HTML.

-- CSS – Cascading Style –Sheets:

Cascading Style Sheets (CSS) is a mechanism for changing the appearance of HTML or XML elements, by assigning styles to element types, self-defined classes of elements or individual instances [10].

Style-sheets can be used to consistently define the appearance of an entire site. Following the introduction of CSS, the W3C recommended that layout-specific features in HTML be phased out and replaced by style-sheets, creating a simpler and more structural World Wide Web.

-- Graphics:

Web graphics are visual representations used on a Web site to enhance or enable the representation of an idea or feeling, in order to reach the Web site user. Graphics may entertain, educate, or emotionally impact the user, and are crucial to strength of branding, clarity of illustration, and ease of use for interfaces.

-- *Audio and video:*

Audio and video are used for enhancing the experience with Web pages (e.g. audio background) to serving music, family videos, presentations, etc. The Web content accessibility guidelines recommend to always providing alternatives for time-based media, such as captions, descriptions, or sign language.

B. Web Architecture

Web Architecture focuses on the foundation technologies and principles which sustain the Web, including URIs and HTTP [6].

-- *URI*

Uniform resource identifier (URI) is a string of characters used to identify a name or a resource. Such identification enables interaction with representations of the resource over a network using specific protocols. Schemes specifying a concrete syntax and associated protocols define each URI.

A URL is a URI that, in addition to identifying a network-homed resource, specifies the means of acting upon or obtaining the representation: either through description of the primary access mechanism, or through network "location". For example, the URL http://www.aast.edu/ identifies a resource Arab Academy's home page and implies that a representation of that resource is obtainable via HTTP from a network host named http://www.aast.edu/ .

-- *HTTP*

Hyper Text Transfer Protocol (HTTP) functions as a request-response protocol in the client-server computing model. In HTTP, a web browser, for example, acts as a client, while an application running on a computer hosting a web site functions as a server. The client submits an HTTP request message to the server. The server, which stores content, or provides resources, such as HTML files, or performs other functions on behalf of the client, returns a response message to the client. A response contains completion status information about the request and may contain any content requested by the client in its message body.

C. Semantic Web

The term “Semantic Web” refers to W3C’s vision of the Web of linked data. Semantic Web technologies enable people to create data stores on the Web, build vocabularies, and write rules for handling data.

D. Web of Services

Web of Services refers to message-based design frequently found on the Web and in enterprise software. The Web of Services is based on technologies such as HTTP, XML, SOAP, and others.

E. Web of Devices

W3C is focusing on technologies to enable Web access anywhere, anytime, using any device. This includes Web access from mobile phones and other mobile devices as well as use of Web technology in consumer electronics, printers, interactive television, and even automobiles.

F. Browsers and Authoring Tools

The web's usefulness and growth depends on its universality. We should be able to publish regardless of the software we use, the computer we have, the language we speak, whether we are wired or wireless, regardless of our sensory or interaction modes. We should be able to access the web from any kind of hardware that can connect to the Internet – stationary or mobile, small or large. W3C facilitates this listening and blending via international web standards. These standards ensure that all the crazy brilliance continues to improve a web that is open to us all.

VII. WEB STANDARDS ADVANTAGES:

A. Accessibility

To software/machines – Complying with web standards can give your web pages greater visibility in web searches. The structural information present in compliant documents makes it easy for search engines to access and evaluate the information in those documents, and they get indexed more accurately. [10]

Because use of web standards makes it easier for server-side as well as client-side software to understand the structure of your document, adding a search engine to your own site becomes easier and gives better results.

Standards are written so that old browsers will still understand the basic structure of your documents. Even if they can’t understand the newest and coolest additions to the standards, they’ll be able to display the content of your site. The same, of course, applies to robots – systems that collect information from your site on behalf of search engines and other indexers.

Compliant code gives you the opportunity of validating your page with a validation service. Validators process your documents and present you with a list of errors. This makes finding and correcting errors a lot easier, and can save you a lot of time.

Compliant documents can easily be converted to other formats, such as databases or Word documents. This allows for more versatile use of the information within documents on the World Wide Web, and simplified migration to new systems – hardware as well as software – including devices such as TVs and PDAs.

To people – Accessibility [11] is an important idea behind many web standards, especially HTML. Not only does this mean allowing the web to be used by people with disabilities, but also allowing web pages to be understood by people using browsers other than the usual ones – including voice browsers that read web pages aloud to people with sight impairments, Braille browsers that translate text into Braille, hand-held browsers with very little monitor space, teletext displays, and other unusual output devices.

As the variety of web access methods increases, adjusting or duplicating websites to satisfy all needs will become increasingly difficult. Following standards is a major step

towards solving this problem. Making your sites standards-compliant will help ensure not only that traditional browsers, old and new, will all be able to present sites properly, but also that they will work with unusual browsers and media.

Some consequences of ignoring standards are obvious: the most basic consequence is that you will restrict access to your site. How much business sense does it make to limit your audience to only a fraction of those who wish be a part of it? For a business site, denying access to even small portions of a target audience can make a big difference to your profit margin. For an educational site, it makes sense to allow access not only to affluent, able-bodied school-children with graphical browsers, but also to children in regions with poorly-developed infrastructure who are best served by text-only browsing, or disabled students using specialized browsers.

B. Stability

Most web standards are generally designed with forward- and backward-compatibility in mind — so that data using old versions of the standards will continue to work in new browsers, and data using new versions of the standards will "gracefully degrade" to produce an acceptable result in older browsers.

Because a website may go through several teams of designers during its lifetime, it is important that those people are able to comprehend the code and to edit it easily. Web standards offer a set of rules that every Web developer can follow, understand, and become familiar with: When one developer designs a site to the standards, another will be able to pick up where the former left off.

VIII. W3C VALIDATION

An important aspect of the vision of the W3C is the implementation of a new "generation" of the web. This so-called semantic web will operate entirely on the basis of computers and software exchanging machine-readable content which itself performs the intended functions of what are today processes performed by people who interpret web content.

An example of this can be seen in the case of XML, the so-called Extensible Mark-up Language. Whereas HTML (Hypertext Mark-up Language) provides a set of tags which present data in a manner readable by humans (providing format, facilitating illustration, etc.), XML aims to afford humans (and indeed computers) the means to define schemas that are interpreted automatically.

Yet another degree of semantic support for web applications can be found where the W3C has implemented online engines that validate instances where people and machines have used their recommendations. Such validators take in submissions and return results that dictate whether or not the content submitted complies with the recommendation with which the submitter wishes it to comply.

The use of validators represents an important step taken by the W3C to support its recommendations as well as general furthering of the semantic web. Recommendations the currently have W3C validators include CSS, XML, and RDF. Resources in W3C validation can be found at the W3C QA Toolbox [14].

IX. CONCLUSIONS

Most W3C work revolves around the standardization of Web technologies. To accomplish this work, W3C follows processes that promote the development of high-quality standards based on the consensus of the Membership, Team, and public. W3C processes promote fairness, responsiveness, and progress all facets of the W3C mission. The Process Document promotes the goals of quality and fairness in technical decisions by encouraging consensus, requiring reviews (by both Members and public) as part of the technical report development process, and through an appeal process for the Advisory Committee.

When the W3C produce a specification, it passes through various stages from Working Draft through to the final Recommendation. In the W3C's terminology, Recommendation does not mean "you should probably do this." It instead means "this is what we say you should do." A W3C Recommendation is the equivalent of a standard in many other industries.

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