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The W3C vs. Internet Explorer: who really defines web standards?

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Abstract

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With so many Web users and so many platforms on which to access the Web, it is more important than ever that Web sites display correctly for all users. Both the Web developer and the Web browser must somehow come to an agreement as to how to interpret the code that makes up Web pages. Although the World Wide Web Consortium (W3C) publishes specifications for this purpose, the browser Internet Explorer in particular has violated many of these specifications, and most content creators are unaware of the standards. Web developers struggle to write pages that are interoperable in both standards-compliant browsers and Internet Explorer, often needing to give up standards for functionality. This essay attempts to answer whether the W3C or Internet Explorer has more authority in defining standards, and gives several solutions to reach a consensus.

Following a brief history of the Web and the "browser wars" that began the struggle of authority, the essay analyzes how characteristics and practices of the W3C threaten the establishment of its authority. It then explains how the popularity of Internet Explorer has given it considerable weight in issues of Web standards. Next, several possible actions are offered that the W3C, Internet Explorer, and Web developers can take to remove the dichotomy, mostly with the goal of reinforcing the authority of the W3C.

In conclusion, Internet Explorer currently holds the most authority, but that influence is slipping away as new versions with better standards compliancy are released. Everyone—the W3C, Internet Explorer, Web developers, and Web users—must take action to guide this step along towards a united Web.

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1. Introduction to the issue

1.1. Evolution of the Web

In 1989, Tim Berners-Lee conceived an idea that would revolutionize the way the world communicated and exchanged information. He proposed creating a global hypertext space of documents served up by servers and accessed by browsers, with. Each document would be written in HyperText Markup Language (HTML) and transferred with the HyperText Transfer Protocol (HTTP), and each would be network-identifiable by its Universal Document Identifier (UDI, now Uniform Resource Identifier, or URI) ("Facts About W3C"). Tim Berners-Lee created the Web. As he describes on his biographical Web site, he made his initial specifications of HTML, HTTP, and UDIs available on his Web server at CERN (Centre Européen de Recherche Nucléaire, now European Organization for Nuclear Research) so that others could quickly adopt the technology and discuss improvements. These specifications would eventually evolve into Web standards.

In the span of just a couple of years, CERN had unveiled the Web to the public, and others began writing Web browsers for other platforms (Cailliau). The most popular of these by far was Mosaic, developed by the National Center for Supercomputing Applications. Mosaic was the first browser to feature inline images, and it was easy to install and use, which significantly lowered the barrier of entry for the first generation of Web users (Murphy and Persson 4–5). Later, the first commercial browsers, Netscape and Microsoft Corporation's Internet Explorer[1], were both based on Mosaic, but they both eventually eclipsed it in popularity (Stewart).

1.2. The browser wars

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Before long, the Netscape and Internet Explorer were embroiled in the "browser wars" to claim market share. According to one of the original developers of Mosaic, Eric Sink, Netscape's popularity made it "the standard by which all other browsers were judged". Until Internet Explorer won the browser wars with the release of its superior version 4.0 (Lannerö), the primary goal of the Internet Explorer team was to beat Netscape. For example, in response to Netscape's pricing model of offering its browser for free to individuals and non-profit organizations, Microsoft began to offer Internet Explorer at no charge to all end users (Stewart). Microsoft also bundled Internet Explorer with its operating systems, starting with Windows 95 (Lannerö), ensuring that all Windows users would not even have to go through the installation process. With the release of version 3.0, Internet Explorer had introduced the first implementation of stylesheets (Wilson), which eliminated the need for Web developers to update every page of their Web sites whenever they wished to alter presentational aspects.

This browser competition also pushed the evolution of Web standards down a confused path. To lure in more Web users, the browser vendors had added proprietary features to their implementations of HTML, CSS (Cascading StyleSheets), and JavaScript, etc. Internet Explorer in particular deviated from accepted standards. For example, version 3.0 introduced ActiveX, a way to embed Windows applications in Web pages, as well as its own version of JavaScript called JScript, which included functions that would only work on the Windows platform (Lannerö).

1.3. Need for Web standards

Evidently, the Web was progressing in several directions simultaneously. Web site developers found themselves creating multiple versions of their Web sites catered to each browser and platform (Murphy and Persson). Imprecise implementations of HTML and other Web

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technologies prior to these browser versions also made backwards compatibility a difficult issue for those who did not want to exclude visitors using legacy browsers. Frustrated developers wanted a way to write code that could be parsed universally and yet could evolve out of existing implementations.

Having recognized a need for compromise early on, Tim Berners-Lee had founded the World Wide Web Consortium (W3C) in 1994 in order to define Web standards by which both browser vendors and Web developers could follow ("Facts About W3C"). The W3C was established as an alliance of several member groups and select individuals, all with a vested interest in maintaining Web standards, including browser vendors, Internet companies, university research labs, and prominent Web designers. In theory, the process of developing Web standards would be both open and democratic (Jacobs, "W3C Process"). Unfortunately, as the frustration among Web developers continued to indicate, the W3C was not a panacea to all of the Web developers' problems.

1.4. The true voice of authority

Since the very beginning, the global organization had struggled in establishing itself as a united, authoritative voice in the Web community. It has since become known as an "ivory tower" that houses a closed community working towards an idealistic Web rather than developing practical solutions (Holzschlag).

Meanwhile, Internet Explorer has become especially notorious among Web developers with its non-compliancy to the W3C's specifications, despite the fact that Microsoft has been a key member of the W3C since the organization's inception. Its nonstandard CSS implementation of the CSS box model (used in designing the layout of HTML page elements), for example, continues to plague Web developers to this day, and will continue to do so as long as it remains

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the most widely used Web browser. Alternative browsers such as Mozilla Firefox, Opera, and Apple Safari have been popular among Web developers for their lead in adopting the latest developments in standards, but they remain behind Internet Explorer in market share ("Browser Market Share").

Another problem is that new Web developers with little experience are often unaware of the W3C, so they just publish whatever "works". Should they use Internet Explorer, as most users do, they unintentionally advocate for writing code that only "looks good" in Internet Explorer over code that follows Web standards.

All of these issues confuse the very definition of Web "standards". Who really defines the Web standards: the W3C or Internet Explorer?[2] This essay attempts to answer this question of authority and offers several solutions for consolidating the two authorities.

2. The issue

2.1. The W3C

As the sole place where so many relevant parties discuss Web standards (Holzschlag), the W3C is recognized as the de facto authority in the field. However, whether or not other interested parties follow these standards is an entirely different question. One study at Google sampling over one billion documents showed that at least 93% of all Web pages have markup errors—as in, they do not follow specifications ("Web Authoring"; Hickson). This section will discuss how characteristics and practices of the W3C affect its authority.

2.1.1. A union of interests

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Unlike single companies, the W3C represents a diverse, global assembly of varying interests. Its

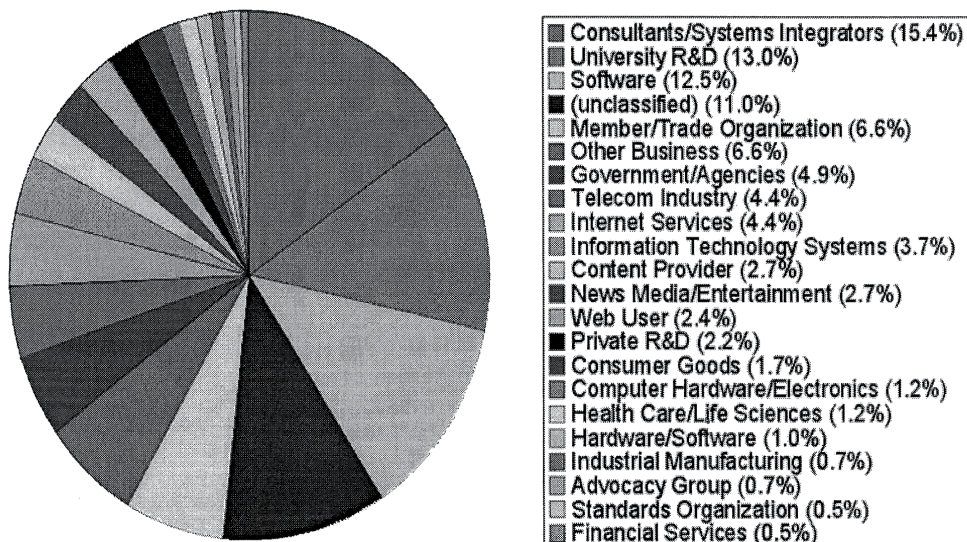339 members ("Current Members") belong to a spectrum of industries, as shown in the

Figure 1. Breakdown of W3C members by sector in September 2004 ("Distribution").

distribution pie chart below.

Many members are for-profit companies, such as Microsoft Corporation, Apple, Inc., and Opera

Software, while others are non-profit groups such as the Library of Congress, the Mozilla

Foundation, and numerous universities around the world ("Current Members").

Individuals may also apply to join, though they are relatively few in number, since the W3C's

"processes are designed for organizational participation and ... do not have the support structure

to handle large numbers of individual members." Individuals may also apply to join the Working

Groups that develop the specifications as "Invited Experts" ("Membership FAQ").

Such a wide range of interests among the membership ensures that many viewpoints are

expressed. This helps establish the authority of the W3C as a large, international organization

working for the good of everybody, and not just the profit-driven interests of a company.

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However, it does not address the fact that certain groups are given greater weight in discussions, as described in the following section.

2.1.2. Financial biases

The W3C has no stable financial model except through membership dues, research grants, and donations (Holzschlag; "Facts"), which means that the highest-paying members wield the most power. Molly Holzschlag, an Invited Expert to the CSS Working Proup, recalls, "I recently witnessed a member company representative shut down an entire line of discussion simply by saying, 'This compromises several of our patents. We will remove ourselves from the W3C if you proceed.'" The W3C cannot afford to lose its largest member companies and must give in to many of their demands, tarnishing its image of democracy.

Since membership dues are based on members' nature of activity (i.e. for-profit, other), annual gross revenue, and country of headquarters (Jacobs, "Membership Fees"), Microsoft Corporation provides a very substantial amount of economic support to the W3C. As one of its oldest members, Microsoft has a long history of active involvement in developing the W3C specifications. Ever since the early days of the W3C, the popularity of Internet Explorer has ensured that "any [working] group which didn't have their involvement was doomed to irrelevance" (Sink). Thus, Internet Explorer has the power to influence the development of specifications towards its own interests and idiosyncrasies, to be discussed in a later section.

In addition, since all members must provide for their own transportation to conventions, etc., many qualified individuals cannot participate because of the economic barrier (Holzschlag). This is a loss to the W3C because individuals often contribute the most independent thought in discussions and usually have extensive amounts of direct experience working with Web standards. "Laymen" Web developers often feel left out of the process, contributing the "ivory

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tower" perception of the W3C. This skews the perception that it is a fair process of equal

representation, which may reduce the Web community's support for the W3C.

2.1.3. Process

How do members contribute to standards development? The W3C Process Document gives this

basic outline toward standardization:

1. Interest in a particular topic is made known through a Member Submission, at a W3C-
   organized Workshop, or detected by a monitor in or outside of the W3C.

2. If there is enough interest, the Director (Berners-Lee) announces the development of a
   new Activity proposal or Working Group charter. With the support of enough W3C
   members, the Director approves the proposal or charter.

3. The Working Groups (made up of Member representatives, Invited Experts, and Team
   representatives—essentially everyone who is part of a member group or the W3C
   staff) draft the specifications and guidelines, which undergo a lengthy revision and
   review process. The review process includes the public.

4. When there is enough support for the final draft, it becomes a W3C Recommendation
   (the standard).

This process is designed to be very democratic so that the standards will have as much support as

possible. Unfortunately, by taking so many factors into consideration, the process acquires a

timeframe that is unusually long in the course of the development of the Web. Often many years

pass before the Recommendation is published; the current HTML 5 Working Group was

chartered in 2007 but hopes to publish in 2012 ("WHATWG HTML"; Hixie et al.). Although the

extensive process gives the final standard respectability and quality, it moves much slower than

development progresses in Web browsers like Internet Explorer, whose latest version, 8.0, was

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released just over two years after its previous version (Hachamovitch et al. 1, 4). This gives

Internet Explorer the opportunity to implement specifications before they have been set in stone

at the W3C, possibly finalizing the Working Group's plans before they can finish them.

2.1.4. Enforcement and advocacy

Once the W3C publishes the specification, their work on that particular version is done. This is

perhaps one of the most troubling facts undermining the authority of the W3C: they do not

enforce their specifications. Steve Bratt, the CEO of the W3C, puts the problem succinctly: "We

can put out new standards until we're blue in the face, but if people don't use them then what's

the use? Our approach is that we don't dictate and we don't enforce" (qtd. in "W3C:

Maintaining"). In fact, published standards are very pointedly called "Recommendations". The

assumed reasoning for this practice is that the Web is mostly a free and unregulated space and

should not have official policing.

The W3C does not do any advocacy work, except to offer badges that declare that the page on

which the badge is shown has valid HTML or CSS code (Thereaux)—"valid" meaning the code

has no syntactical errors according to W3C specifications. This badge promotes the following of

W3C specifications, but displaying it is voluntary and the badge is small and often placed in low-

priority sections of pages, and it does not explain who the W3C is nor why Web standards are

important.

Advocacy is instead left to independent groups such as The Web Standards Project (WaSP) and

Figure 2. W3C badge for pages with valid HTML 4.01 code (Thereaux).

Web Standards Group (Holzschlag). These groups support the following of W3C specifications

and bolster its authority by congregating articles, interviews, tutorials, and discussions for the

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promotion of Web standards. Notably, WaSP has published two high-profile browser tests,

Acid2 and Acid3, which test browsers' compliancy to the latest standards. In recent years, these

tests have been used to encourage browser vendors to correctly implement specifications

(Gunther). Internet Explorer has historically fallen behind all other major browsers in passing the

tests, but ongoing development for version 9.0 indicates that the developer team is striving to

catch up (Hachamovitch et al. 1), a sign that Internet Explorer may be more standards-compliant

in the future.

2.2. Internet Explorer

Browsers are supposed to follow W3C specifications to ensure interoperability of Web pages.

Problems occur when incorrect implementations, such as those of Internet Explorer, enter

mainstream usage. This section will describe how the popularity of Internet Explorer has led to

its becoming an authority in how Web pages are developed.

2.2.1. Popularity

Undeniably, Internet Explorer has a wide reach—it made up two-thirds of the browser market in

the third quarter (July, August, September) of 2009, according to Market Share by Net
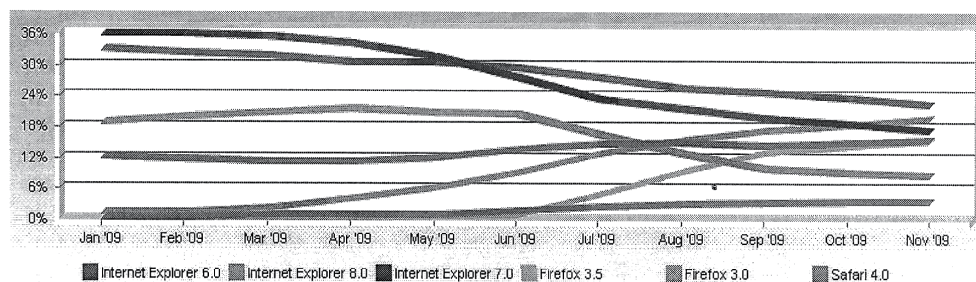

Figure 3. Browser share trends in 2009 up to November with versions ("Top Browser").

    a. The third blue line that is unlabeled represents "Other".

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Applications. It is equally important to look at version percentages, though, because Internet

Explorer compliancy varies by version and has begun to improve in the latest versions.

Internet Explorer 6.0, being the most popular version of Internet Explorer (and any browser) in

use today and the least compliant of those compared, represents the greatest challenge to Web

developers trying to follow standards. As figure 3 shows, though, the overall browser share of

Internet Explorer has recently declined slightly. This may be due to more innovative features or

better ease of use in other major browsers, but it also likely comes as a result of more Web

developers using the other browsers because the other browsers offer better support for the latest

standards.

2.2.2. "Best viewed in Internet Explorer"

Although less seen today, many Web pages display a "Best viewed in Internet Explorer 6.0+" or

similar version notice, encouraging not only Web users to use Internet Explorer and proliferate

its popularity, but also Web developers to develop especially for Internet Explorer. Microsoft

even supported this practice in the early years of Internet Explorer, remarking at the launch of

version 2.0, "More than 8,000 developers have already created Web sites best viewed with

Microsoft Internet Explorer."

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Even government sites, which should be impartial, promote Internet Explorer. The following screenshot was taken from the National Ocean Service Web site, with emphasis added.

Accessibility

Every attempt has been made to make this site compliant with Section 508 of the Americans with Disabilities Act. Additionally, we have provided a link to a detailed Site Index on every page. This index provides a direct link to most pages in the site for simple text navigation. Pages that are not listed in the index are supplement pages in the education section that are enlarged views of the images and illustrations in the educational tutorials.

Please notify us of any specific accessibility problems that you may encounter, or any suggestions you might have on how we could improve the site's access. Please email these comments and suggestions to: nos.web@noaa.gov.

(...)

Technical Information

Browsers: This site is best viewed in Netscape, version 6.0 and above, or Internet Explorer, version 5.0 and above. Web site visitors using earlier versions of these browsers may encounter occasional format anomalies when viewing and printing pages from the Web site. Performance of this site has not been tested on browsers other than Netscape and Internet Explorer.

Figure 4. Screenshot of page from National Ocean Services website showing "best viewed" notice, with emphasis added
http://oceanservice.noaa.gov/about/aboutsite.html. Reproduced with permission

The popularity of Internet Explorer makes it the standard by which many Web pages are to be rendered. Since the vast majority of the Web does not follow Web standards, as previously cited, it can be assumed that many of those pages were tested to work in mainly Internet Explorer, thereby establishing its implementations as the standard.

2.2.3. Workarounds to compliancy issues

Until older versions of Internet Explorer die out or newer versions become fully compliant and widely used, developers wishing to stay mostly standards-compliant must use special workarounds known as "hacks" to deal with Internet Explorer compliancy issues. These hacks exploit bugs or other unusual behaviors in the Internet Explorer parsers in order to send different

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code to the rendering engine so as to display the same intended effect as shown in other browsers. The problem with using hacks is that they often do not comply with standards themselves. Thus, Internet Explorer implementations again supersede the standards as specified by the W3C.

One of the most common hacks deals with an incorrect implementation of the CSS 1.0 box model in Internet Explorer versions less than 6.0 and in certain cases of 6.0 (Johansson). The box model is used to set dimensions of an HTML element, as well as its borders, margins, and
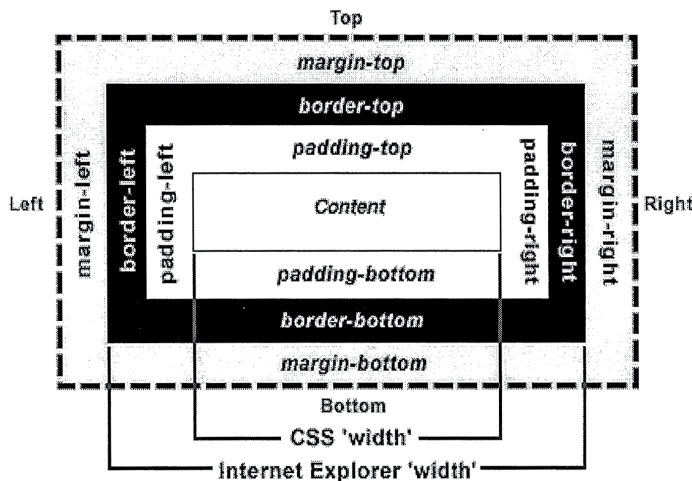

Figure 5. Difference between W3C box model and Internet Explorer box model in calculating width and height (Silver).

padding, but Internet Explorer in those versions calculates the width and height of the element incorrectly:

The discrepancy poses such a big problem for Web developers that in the future, CSS 3.0 will give the option of using either box model (Çelik). This is a strong example of how specifications in Internet Explorer may eventually become the "official" standard.

3. Solutions

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Now that issues of authority in both the W3C and Internet Explorer have been presented and compared, some possible solutions to eradicate the dichotomy of authority are offered and analyzed. For most purposes, the goal is to reinforce the authority of the W3C.

3.1. What Internet Explorer can do

3.1.1. Follow W3C specifications

The most obvious answer is that Internet Explorer should become fully compliant to W3C specifications. Eventually, the W3C would remain as the only authority on Web standards, and developers would no longer have to write workarounds to deal with issues specific to Internet Explorer. And in fact, better standards compliancy is what the Internet Explorer developer team is striving to achieve with each new version. However, it is often much easier said than done. For one thing, just because a better Internet Explorer version is released does not mean that users will upgrade. The fact that Internet Explorer 6.0 still holds the largest market share of any browser (as previously cited), even though version 8.0 was released in March 2009 (Hachamovitch et al. 1), reflects this trend. This means that developers will still have to consider older versions when they develop their Web sites.

Backwards compatibility, then, becomes the largest obstacle in this case. New versions of Internet Explorer have to be careful that fixed implementations do not break sites that were based on non-compliant implementations. Many of the "hacks" that deal with issues in older versions may also produce unexpected behavior in more compliant versions.

In spite of these challenges, though, this is a necessary step towards reducing the influence of older versions on the state of standards.

3.1.2. Remove legacy support

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To speed up the process of reducing the market share of older browsers and thereby eliminate the largest offenders of W3C specifications, Internet Explorer could remove legacy support sooner. Currently Microsoft plans to support Internet Explorer 6.0 until 2014, in parallel with support until 2014 for Windows XP—the operating system version 6.0 was bundled with (Hachamovitch et al. 1). By that time, the W3C may have published new specifications, and the newest browsers will probably have caught up. Although it makes sense as a business decision to continue support, shortening the life of older versions would compel users to finally upgrade to more compliant versions.

3.2. What the W3C can do

3.2.1 Advocate the use of standards

The W3C refuses to enforce their Recommendations, which greatly reduces the effectiveness of the specifications as the de facto standards of the Web. Perhaps they could concentrate on advocacy instead to spread the word about Web standards to Web developers—the more standards-compliant Web developers there are, the more pressure Internet Explorer will feel to follow the specifications.

The W3C could begin by lowering the learning curve for standards compliancy and publishing simplified versions of their Recommendations. Since the Recommendations generally target browser vendors and use very technical language, new Web developers usually learn from various tutorials on the Web that may not teach standards compliancy. If the W3C published similar tutorials, more developers may learn from them because of the sense of authenticity, and it would consequently reinforce the authority of the W3C. However, this solution may require some financial resources that the W3C does not have, due to its limited economic model.

3.2.2. Step down

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The extreme opposite of the above solution would be to disestablish the authority of the W3C. Why should this be a consideration? The Web is one of the fastest evolving technologies in the world right now. Waiting for the W3C to publish specifications every few years could stifle innovation. This route would allow Internet Explorer and other browsers to define the industry standards, letting competition push the pace of progress, as it did in the beginning years of the Web.

The reasons this is highly unviable are obvious, though. With no guiding force, the Web would face the same problem it faces today. If the W3C disbanded, a government-funded group may be necessary to prevent monopolization by one browser.

3.3. What Web developers can do

3.3.1. Only follow W3C specifications

As the content publishers of the Web, developers can choose which specifications they want to follow. To help push the Web in the right direction, they could decide to disregard Internet Explorer users or legacy browser users and only write standards-compliant code. Several high-traffic Web sites like YouTube have already taken this step and removed support for proper site functionality in Internet Explorer 5.5 and 6.0 (Buckler). This is easier for technology sites where most interested parties probably already use standards-compliant browsers. Hopefully this will encourage the rest of users to upgrade or switch to browsers that are more compliant, reducing the market share of Internet Explorer (particularly older versions).

3.3.2. Encourage visitors to upgrade or switch

If Web developers do not wish to exclude Internet Explorer or legacy browser users yet, they could display a friendly notice to visitors using those browsers to upgrade or switch. Campaigns

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such as IE6: Do NOT Want! encourage developers to issue such notices to visitors who use Internet Explorer 6.0 (Larre).

4. Conclusion

As the Web expands to more platforms, it is more important than ever that Web sites are interoperable in all Web browsers. As this essay has shown though, it can be difficult for Web developers to decide upon which standards to agree: the W3C specifications or the Internet Explorer implementations of those specifications.

The W3C specifications are recognized as the de facto Web standards—they are product of the joint efforts of many big names in the Web community, and they are the standards to which implementations in browsers are compared. Unfortunately, the history of the Web shows that browsers vendors can be far from perfect when it comes to interpreting these standards, and browsers will be driven by competition and business interests.

For now, it seems that Internet Explorer has the most influence over Web standards. But each new version is more standards-compliant than the previous one, and in several years, perhaps this issue of authority will have vanished. Coming from a long history of non-compliancy, Internet Explorer will face many obstacles in matching their industry standards to the accepted specifications. It will take the combined efforts of the W3C, browser vendors, Web developers, and Web users alike to unite the voices of authority.

4.1. Unresolved Questions

The scope of this essay does not cover the far-reaching goal of the Web. Should the Web strive for consensus or innovation? Web standards keep everyone on the same page, but true progress usually comes in the form of revolutionary independent ideas that cannot be implemented under a structure of mutual agreement. Many of the Web's technologies began as proprietary

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technologies. In fact, JavaScript started out as LiveScript at Netscape (Chapman). Thus, the

balance point between agreement and constriction could be further explored.

Also, this essay focuses on Internet Explorer because it is markedly the least standards-compliant

browser out of all the major competitors, but that is not to say that other browsers are perfect.

This essay did not explore how other browsers' errors may have impacted Web standards. Other

factors that were not considered include how Web users' browsing habits and tools affect Web

standards and how the use of technologies in Web sites determine which standards the W3C

focuses on.

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Notes

1. See trademark notice in Acknowledgements.

2. To be sure, Microsoft Corporation (and, subsequently, the Internet Explorer developer team) is a member of the W3C. In this essay, the W3C is treated as a whole, however.

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