

# Web Browser Standards V2.0

## Status of this Memo

This document proposes a standard for the National Institutes of Health (NIH) and requests discussion and suggestions for improvements. Distribution of this memo is unlimited.

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## 1 Introduction

This NIHRFC updates the Web Browsers Brick, which was last updated in January 2010. The standard has been expanded to address the rapidly changing web browser market and to support the primary uses for web browsers. The revised standard includes guidelines for Internet/Extranet Desktop Client Web Browsers, Intranet/Employee Desktop Client Web Browsers, Internet/Extranet Mobile Client Web Browsers Brick, and Intranet/Employee Mobile Client Web Browsers. Differentiation between the various usage patterns will enable development teams and content managers to better target their development and testing, based on the requirements of their specific audience.

## 2 Business Impacts

This standard will impact NIH in a number of ways, including impacts to business operations, mission activities, IT operations, and end user performance of work.

### ***2.1 Impacts to Business Operations and Mission Activities***

There should be minimal negative impacts to the business operations and mission activities of NIH, based on this revised standard. However, the standard may impact NIH business operations in the following ways:

- Specialty scientific equipment that requires specific, non-standard browsers will necessitate a waiver for the standard, which may be granted by the IC CIO or his/her delegate.
- Will promote the expanded provisioning of NIH mobile websites and applications that can be used by NIH's external stakeholders (consumers of NIH information and IT services) and by NIH employees.
- In the long-run will benefit NIH remote operations, performed by staff that travel frequently or work remotely.

### ***2.2 Impact to IT Operations***

This revised standard will effect IT operations at NIH in the following ways:

- Increased development costs for Internet/Extranet websites and applications.
- Reduced development costs for Intranet/Employee websites and applications.
- Reduced help desk and desktop support costs.
- Improved reliability of Internet, Extranet, and Intranet websites and applications.
- Improved security, based on a reduction in non-compliant browsers on employee computing devices.
- Change to development and testing standards and tools for IC development teams.
- Change to content management standards for content management staff.

## 2.3 Impacts to the End User

The impacts to end users can be broken down by the type of user accessing NIH resources.

- Public users and external business partners
  - Will have a more reliable user experience, because the NIH Internet/Extranet websites and applications will be developed and tested for the broadest array of browsers feasible.
  - Will benefit from the expansion of mobile web services offered by NIH.
- Employees and contractors
  - Will have a more reliable user experience, because the NIH Intranet websites and applications will be developed and tested for the specified and approved browsers.
  - Will benefit from the expansion of mobile web services offered by NIH.
  - Will be constrained in their choice of browser, unless a waiver is authorized.

## 3 Background

Browsers handle presentation layers of web pages via hypertext. Web browsers also provide a rich multimedia user experience through common browser plug-ins and advanced scripting languages. Some of the common web programming languages on which web browsers run includes Java script and Active content. Therefore, browsers are more tightly coupled to programming and selection of web content than ever before.

Ensuring custom developed code, commercial-off-the-shelf (COTS) software, and Software-as-a-Service implementations are compatible with users' installed browsers is an important consideration when developing or implementing software at NIH. Consideration for plug-ins, 508 compliance, branding guidelines, monitor resolutions, operating systems, platforms, and privacy requirements are important, too, when planning for testing.

In all cases, development teams should consult their available website statistics to understand their particular audiences' needs and usage patterns.

## 4 Changes to the Technology

There have been several important changes to the web browser market since early 2010. First, there has been a major redistribution of market share between established and emergent browser manufacturers. Second, open source browsers continue to gain ground in the market as well. Third, mobile web usage has continued its exponential growth and is expected to do so for the foreseeable future. This development has also led to a very fragmented device, platform, and mobile browser market that will continue to challenge NIH development teams. Fourth, HTML5 and dynamic scripting languages are increasingly employed to enable a dynamic, rich, multimedia-driven user experience.

Web browsers are a critical enabler of NIH's application architecture as the primary user interface to NIH enterprise applications, which are becoming increasingly more web-based.

These proposed changes to the Web Browser Brick were developed based on baseline statistical information about end users' browsers and platforms provided by [www.nih.gov](http://www.nih.gov), a survey of publically available statistical data, and known employee mobile usage patterns.

## 5 Internet/Extranet Desktop Client Web Browsers Brick

Web browsers are programs that “read” hypertext and display it as formatted text and images. Browsers allow users to view the contents of a site and navigate from one site to another. Increasingly, these browsers also employ scripting to create full-featured, dynamic, and interactive web applications. Web browsers have become the dominant user interface today.

Internet desktop client web browsers are desktop browsers used by external NIH stakeholders (grantees, researchers, patients, practitioners, etc.) to gain access to NIH's public Internet resources or browsers used by NIH's business partners to access extranet resources (collaboration tools, reporting tools, grant management resources, etc.) via an authenticated extranet session (via NIH Login, iTrust, NIH External Directory, etc.). In the future, it is expected that NIH's business partners will increasingly access extranet resources (collaboration tools, reporting tools, grant management resources, etc.) via an authenticated extranet session (via NIH Login, iTrust, NIH External Directory, etc.) on their mobile device. Because NIH has very little control over what browser public users and external business partners will use, content managers and web developers that support public-facing websites and extranet applications must develop and test for a wider variety of browsers.

**Table 1. Internet/Extranet Desktop Client Web Browsers Brick**

<b>Tactical Deployment (0-2 years)</b>	<b>Strategic Deployment (2-5 years)</b>	<b>Emerging (Technology to track)</b>
<ul style="list-style-type: none"> <li>■ Apple Safari v4 or newer</li> <li>■ Firefox v3 or newer</li> <li>■ Google Chrome v10 or newer</li> <li>■ Microsoft Internet Explorer v7</li> <li>■ or newer</li> </ul>	<ul style="list-style-type: none"> <li>■ Apple Safari v4 or newer</li> <li>■ Firefox v4 or newer</li> <li>■ Google Chrome v11 or newer</li> <li>■ Microsoft Internet Explorer v8 or newer</li> </ul>	<ul style="list-style-type: none"> <li>■ None</li> </ul>
<b>Containment (No new deployments)</b>	<b>Retirement (Technology to eliminate)</b>	<b>Baseline Environment (As of last review)</b>
<ul style="list-style-type: none"> <li>■ Apple Safari v3 or older</li> <li>■ Google Chrome v9 or older</li> <li>■ Microsoft Internet Explorer v6 or older</li> <li>■ Opera all versions</li> </ul>	<ul style="list-style-type: none"> <li>■ None</li> </ul>	<ul style="list-style-type: none"> <li>■ Apple Safari v3 - v5</li> <li>■ Firefox v3 – v5</li> <li>■ Google Chrome v5 - v12</li> <li>■ Microsoft Internet Explorer v6 - v9</li> <li>■ Opera</li> </ul>
<b>Comments</b>		
<ul style="list-style-type: none"> <li>■ NIH Internet/Extranet web application developers and web content providers must develop to accommodate multiple browsers and platforms, based on the statistical data provided by their chosen web analytics tool. If this information is not available, use this standard as the guideline. Common platforms include Windows, Mac, Linux, and Unix.</li> <li>■ The standard browsers were selected based on a review of the browser market and recent website statistics obtained from <a href="http://www.nih.gov">www.nih.gov</a>.</li> </ul>		

- Safari and Chrome are based on the WebKit open standard for browser rendering engines. Therefore, testing in one should ensure compatibility in the other. This fact has enabled some ICs to reduce their development and testing costs.
- NIH should continue to assess the manufacturers' velocity of updating browser versions. Most have moved to a rapid update cycle. As users move from legacy browsers to versions that support frequent upgrades, NIH will need to restructure this standard to account for this change in the market. As such, this standard should be reevaluated in one year.

## 6 Intranet/Employee Desktop Client Web Browsers Brick

Web browsers are programs that “read” hypertext and display it as formatted text and images. Browsers allow users to view the contents of a site and navigate from one site to another. Increasingly, these browsers also employ scripting to create full-featured, dynamic, and interactive web applications. Web browsers have become the dominant user interface today.

Intranet/Employee desktop client web browsers are desktop browsers used by NIH employees and contractors to access government resources within the NIH. Because NIH has significant control over what browser NIH employees will use, NIH can limit the variety of browsers within the enterprise to help reduce desktop support, help desk, development, and quality assurance costs.

**Table 2. Intranet/Employee Desktop Client Web Browsers Brick**

Tactical Deployment (0-2 years)	Strategic Deployment (2-5 years)	Emerging (Technology to track)
<ul style="list-style-type: none"> <li>■ Apple Safari v4 or newer</li> <li>■ Firefox (manufacturer supported version)</li> <li>■ Microsoft Internet Explorer v7 or newer</li> </ul>	<ul style="list-style-type: none"> <li>■ Apple Safari v4 or newer</li> <li>■ Firefox (manufacturer supported version)</li> <li>■ Internet Explorer v8 or newer</li> </ul>	<ul style="list-style-type: none"> <li>■ Google Chrome (all versions)</li> </ul>
Containment (No new deployments)	Retirement (Technology to eliminate)	Baseline Environment (As of last review)
<ul style="list-style-type: none"> <li>■ Apple Safari v3 or older</li> <li>■ Firefox v3 or older</li> <li>■ Microsoft Internet Explorer v6 or older</li> <li>■ Opera all versions</li> </ul>	<ul style="list-style-type: none"> <li>■ All browsers unsupported by manufacturer</li> <li>■ Firefox v4</li> </ul>	<ul style="list-style-type: none"> <li>■ Apple Safari v3 - v5</li> <li>■ Firefox v3 – v5</li> <li>■ Google Chrome v5 - v12</li> <li>■ Microsoft Internet Explorer v6 - v9</li> <li>■ Opera</li> </ul>
Comments		
<ul style="list-style-type: none"> <li>■ Tactical and Strategic products were selected to leverage NIH's investment in products that are a proven fit for NIH's known needs. Leveraging baseline products in the future will minimize the operations, maintenance, support and training costs for new products.</li> <li>■ Some baseline products have been designated as Containment. These products are either not as widely or successfully deployed at NIH, or they do not provide as much functionality, value, or Total Cost of Ownership as low as the selected Tactical and Strategic products.</li> <li>■ ICs have some control over what desktop browsers to deploy with their particular client image(s). To this end, NIH seeks to reduce the amount of variance in the NIH environment to reduce desktop support, help desk, development, and quality assurance costs. It is believed that this standard should accommodate the needs for most users. However, CIOs</li> </ul>		

should entertain waivers for browsers when a reasonable justification exists (i.e. web teams supporting public websites, users running specialized, web-based, scientific applications, back-office software development operations, etc.).

- **The IC CIO or his/her designee may approve exception requests for non-standard browsers to support specific IC mission requirements, rather than exercising the normal NIH Enterprise Architecture Exception Process.**
- In general, NIH development teams must also accommodate multiple browsers and platform combinations, based on their particular mission and user base. Common platforms in use at NIH include Windows, Mac, Linux, and Unix.
- Federal Desktop Core Configuration (FDCC) regulations affect Federal computers, including software configurations and browser functionality. Implementing FDCC across the set of tactical and strategic browsers (if implemented within an IC) is required.
- Safari and Chrome are based on the WebKit open standard for browser rendering engines. Therefore, testing in one should ensure compatibility in the other. This fact has enabled some ICs to reduce their development and testing costs.
- In the future NIH will shift its portfolio to standards-based browsers to reduce development costs.
- NIH should continue to assess the manufacturers' velocity of updating browser versions. Most have moved to a rapid update cycle. As users move from legacy browsers to versions that support frequent upgrades, NIH will need to restructure this standard to account for this change in the market. As such, this standard should be reevaluated in one year.
- Support teams and Information System Security Officers (ISSOs) must monitor the manufacturers' support and release schedules. Given the rapid update cycle of some browsers, manufacturers are discontinuing support for browsers very quickly.

## 7 Internet/Extranet Mobile Client Web Browsers Brick

Web browsers are programs that “read” hypertext and display it as formatted text and images. Browsers allow users to view the contents of a site and navigate from one site to another. Increasingly, these browsers also employ scripting to create full-featured, dynamic, and interactive web applications. Web browsers have become the dominant user interface today.

Mobile client web browsers are browsers embedded in or downloaded to cell phones or smart phones. Internet/Extranet mobile client web browsers are used by external NIH stakeholders (grantees, researchers, patients, practitioners, etc.) to gain access to NIH’s public Internet resources or extranet applications via the mobile Web. Because NIH has very little control over what mobile client or mobile browser public or extranet users will use, content managers and web developers that support public-facing websites or extranet applications must develop and test for a wider variety of browsers.

**Table 3. Internet/Extranet Mobile Client Web Browsers Brick**

<b>Tactical Deployment (0-2 years)</b>	<b>Strategic Deployment (2-5 years)</b>	<b>Emerging (Technology to track)</b>
<ul style="list-style-type: none"> <li>■ Android Browser (for Android devices)</li> <li>■ BlackBerry Browser v5 and newer</li> <li>■ Safari (for iPad, iPhone, and iPod)</li> </ul>	<ul style="list-style-type: none"> <li>■ Android Browser (for Android devices)</li> <li>■ BlackBerry Browser v6 and newer</li> <li>■ Safari (for iPad, iPhone, and iPod)</li> </ul>	<ul style="list-style-type: none"> <li>■ Blackberry Tablet Browser</li> <li>■ eReader Browsers (such as Amazon Kindle and Barnes &amp; Noble Nook)</li> <li>■ Game System Browsers</li> </ul>

		<ul style="list-style-type: none"> <li>■ Other Smart Phone Browsers</li> <li>■ Opera Mini</li> <li>■ Other Tablet Browsers</li> </ul>
<b>Containment (No new deployments)</b>	<b>Retirement (Technology to eliminate)</b>	<b>Baseline Environment (As of last review)</b>
<ul style="list-style-type: none"> <li>■ None</li> </ul>	<ul style="list-style-type: none"> <li>■ None</li> </ul>	<ul style="list-style-type: none"> <li>■ Android Browser (for Android devices)</li> <li>■ BlackBerry Browser v3 – v7</li> <li>■ Safari (for iPad, iPhone, and iPod)</li> </ul>
<b>Comments</b>		
<ul style="list-style-type: none"> <li>■ The standard browsers were selected based on a review of the mobile browser market and recent website statistics obtained from <a href="http://www.nih.gov">www.nih.gov</a>.</li> <li>■ While this standard will accommodate the majority of mobile web users, developers should employ techniques, such as browser detection via Wireless Universal Resource File (WURFL) APIs, to optimize the mobile user experience.</li> <li>■ Given the fragmentation of the mobile market, developers and software testers should be equipped with tools that support mobile, multi-platform testing. These tools are often integrated with collaborative software development environments.</li> <li>■ The Apple O/S (Safari browser), Android O/S (Android browser), and many other mobile browsers are based on the WebKit open standard for browser rendering engines. Therefore, testing in one should ensure compatibility in the other. This fact has enabled some ICs to reduce their development and testing costs.</li> </ul>		

## 8 Intranet/Employee Mobile Client Web Browsers Brick

Web browsers are programs that “read” hypertext and display it as formatted text and images. Browsers allow users to view the contents of a site and navigate from one site to another. Increasingly, these browsers also employ scripting to create full-featured, dynamic, and interactive web applications. Web browsers have become the dominant user interface today.

Mobile client web browsers are browsers embedded in or downloaded to cell phones or smart phones. Intranet/Employee mobile client web browsers are used by NIH employees and contractors to access government resources on the NIH intranet or to access web-based, mobile applications.

Because NIH has significant control over what mobile device and browser NIH end users will use, NIH can limit the variety of browsers within the enterprise to help reduce desktop support, help desk, development, and quality assurance costs.

**Table 4. Intranet/Employee Mobile Client Web Browsers Brick**

Tactical Deployment (0-2 years)	Strategic Deployment (2-5 years)	Emerging (Technology to track)
<ul style="list-style-type: none"> <li>■ BlackBerry Browser v5 and newer</li> <li>■ Safari (for iPad and iPhone)</li> </ul>	<ul style="list-style-type: none"> <li>■ BlackBerry Browser v6 and newer</li> <li>■ Safari (for iPad and iPhone)</li> </ul>	<ul style="list-style-type: none"> <li>■ Android Browser (for Android devices)</li> <li>■ Blackberry Tablet Browser</li> </ul>

		<ul style="list-style-type: none"> <li>■ eReader Browsers (such as Amazon Kindle and Barnes &amp; Noble Nook)</li> <li>■ Other Smart Phone Browsers</li> <li>■ Other Tablet Browsers</li> </ul>
Containment (No new deployments)	Retirement (Technology to eliminate)	Baseline Environment (As of last review)
<ul style="list-style-type: none"> <li>■ Blackberry v4 and older</li> </ul>	<ul style="list-style-type: none"> <li>■ None</li> </ul>	<ul style="list-style-type: none"> <li>■ BlackBerry Browser v3 - v7</li> <li>■ Safari (for iPad and iPhone)</li> </ul>
Comments		
<ul style="list-style-type: none"> <li>■ Tactical and Strategic products were selected to leverage NIH's investment in products that are a proven fit for NIH's known needs. Leveraging baseline products in the future will minimize the operations, maintenance, support and training costs for new products.</li> <li>■ Some baseline products have been designated as Containment. These products are either not as widely or successfully deployed at NIH, or they do not provide as much functionality, value, or Total Cost of Ownership as low as the selected Tactical and Strategic products.</li> <li>■ IT support staff and development teams should consult NIH's Mobile Device Policy for appropriate use of mobile devices within the NIH network, including standards for encryption, passwords, restrictions on use of sensitive data, prohibition against personal mobile devices, etc.</li> <li>■ Given the fragmentation of the mobile market, developers and software testers should be equipped with tools that support mobile, multi-platform testing. These tools are often integrated with collaborative software development environments.</li> <li>■ The Apple O/S (Safari browser), Android O/S (Android browser), and many other mobile browsers are based on the WebKit open standard for browser rendering engines. Therefore, testing in one should ensure compatibility in the other. This fact has enabled some ICs to reduce their development and testing costs.</li> </ul>		

## 9 References

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<http://en.wikipedia.org/wiki/WURFL>

## 10 Contact

To contact the NIHRFC Editor, send an email message to [EnterpriseArchitecture@mail.nih.gov](mailto:EnterpriseArchitecture@mail.nih.gov)

## 11 Security Considerations

Federal Desktop Core Configuration (FDCC) standards, NIH mobile security policies, remote access policies, and platform minimum-security requirements apply desktop client browsers and mobile devices accessing the NIH network.

## 12 Changes

Version	Date	Change	Authority	Author of Change
1.0	1/20/2010	Most recent approved version.	NIH Architecture Review Board (ARB)	Kiley Ohlson
1.1	7/5/2011	Major revision (draft)	NIHRFC0001	Steve Thornton
1.2	9/9/2011	<ul style="list-style-type: none"> <li>Added Firefox to Tactical for the</li> </ul>	NIHRFC0001	Steve Thornton

		<p>“Intranet/Employee Desktop Client Web Browsers Brick”</p> <ul style="list-style-type: none"> <li>• Removed Internet Explorer from Strategic for the “Intranet/Employee Desktop Client Web Browsers Brick”</li> <li>• Added language to the desktop client bricks to address the concern over rapid browser version updates.</li> <li>• Provided examples of eReaders.</li> <li>• Removed boilerplate language from Internet/Extranet browser bricks.</li> <li>• Other non-substantive copy edits.</li> </ul>		
1.3	9/21/2011	<ul style="list-style-type: none"> <li>• Added IE as strategic.</li> <li>• Updated Intranet browser Firefox versions.</li> </ul>	ITMC-EA Committee	Steve Thornton
2.0	09/27/2011	<ul style="list-style-type: none"> <li>• Approved by the ARB</li> </ul>	ARB	N/A

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