Chrome and IE comparisons

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Purpose

The purpose of the document is to present comparison among the web browsers on the basis of commonly used testing methods, such as speed, JavaScript performance, and compliance with HTML5and CSS3 technologies. The comparison results and the conclusion study of each testing method helps you to evaluate why using Google Chrome is recommended for the ezDI applications over the other web browsers.

Target audience

The guide is primarily intended for the hospital staff, who are responsible for managing the administrative needs of the hospital and performing routine task using the ezDI applications, such as ezCAC and ezCDI.

Using this guide

The following table provides the organization details of this guide:

Chapter or Appendix	Description
Introduction	This chapter gives you an overview of the Google Chrome web browser and also introduces you to some security features of it.
Get started	This chapter comprises information about the system configurations on which the ezDI team analyzed the performance statics of the web browsers (Chrome and IE). Additionally, this chapter also describes the usage and popularity data of the different web browsers.
Testing parameters	This chapter contains information about using different testing parameters to compare Chrome and IE.
Standard benchmarking tools	This chapter includes information about using different standard benchmarking tools to measure the performance metrics of the different web browsers.

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Guide conventions

The following table describes the conventions used in this guide:

This…	Indicates
Text in bold	The name of the UI items. For example, **Relaunch**.
Note	This contains useful information. Please pay special attention highlighted in this way.

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Chapter 1. Introduction

Google Chrome is a freeware web browser developed by Google. It was first released in 2008 for Microsoft Windows, and was later ported to Linux, OS X, iPhone OS (iOS) and Android. The Google Chrome web browser loads, displays and interacts with the vast array of applications very quickly and efficiently. The following are the other benefits when using the web browser:

- Extremely fast web browser; it loads and displays web pages very quickly
- Simple design and user –friendly interface
- Easy to browse using the address bar at any time
- Takes very less time (in seconds) to install the required application
- Automatically translate pages into the preferred language
- Easy to change the color and theme of the web browser
- Easy to access to the most frequently-used web pages (the Start page lists the web pages that are frequently accessed)
- Browse internet using Chrome's new private feature: Incognito
- Easy to drag tabs in separate windows, without difficulty, and back in again with your mouse
- Other search results remain unaffected even if a site crashes in an opened tab

Security features

Google Chrome makes the following security features available that helps you combat the most common problems- phishing and malwares:

- Safe browsing
- Sand boxing
- Auto-updates

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Note

There are more security features, such as Location Tracking, Pop-up Blocker, Private Browsing mode, Clear data, Plugins, and Password from security. For more information about the security features and the best practices, see http://resources.infosecinstitute.com/security-features-and-risks-in-google-chrome/

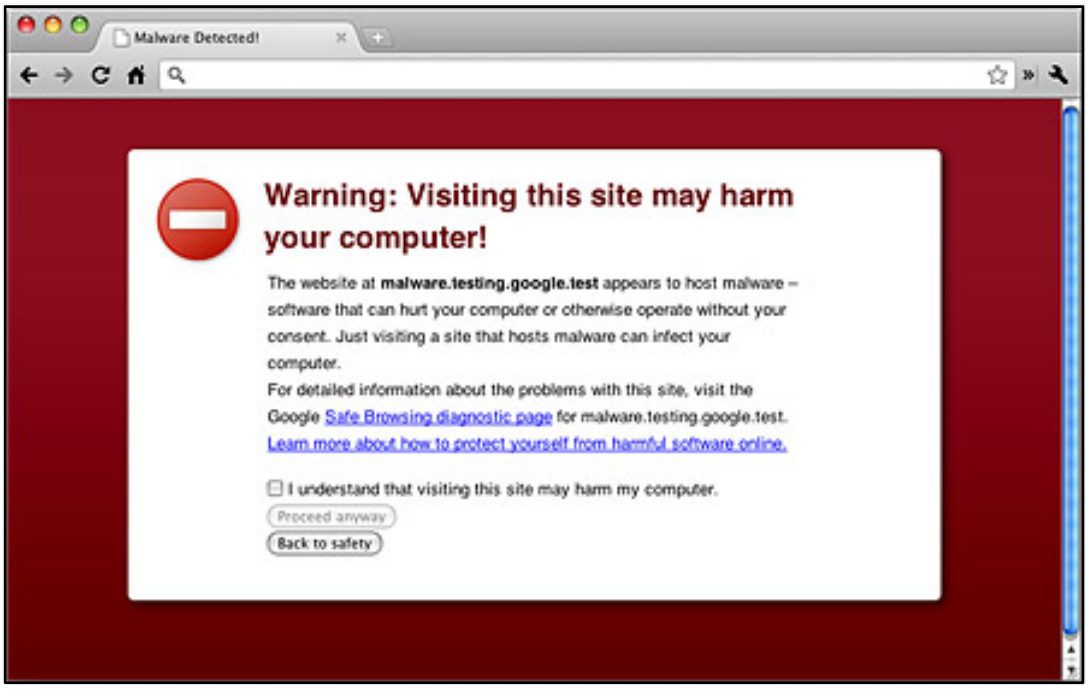
Safe browsing

As an internet user, phishing and malware are the most important and major concerns. The security setting available in the Google Chrome web browser helps you to protect your computer from harmful software while browsing the web by:

- Identifying unsafe websites
- Understanding malwares
- Notifying users

The following warning message is displayed before download of any unauthorized software:

Figure 1: Warning message



To turn on the security setting to protect from malware or phishing, do the following:

1. Click the Google Chrome web browser icon to open.
2. On the top right of the navigation bar, click the Chrome menu icon.
3. Click **Settings**.
4. On the **Settings** web page, click **Show advanced settings** to expand the options.
5. In the **Privacy** section, select the **Protect you and your device from dangerous sites** check box.

The safe browsing security setting is completed.

Sand boxing

The sand boxing security feature creates an additional layer of security in your web browser. The feature sets a separate process for each application that you open in the web browser, which helps in:

- Isolating programs that reduces the instances of installing virus on your machine
- Preventing malicious or malfunctioning programs, which can damage your computer

Note

For more information about sand boxing, click https://www.youtube.com/watch?v=29e0CtgXZSI

Auto-updates

The auto-update feature automatically updates the latest security settings and fix the issues related to the web browser.

To update the security features, do the following:

1. On the top right of the navigation bar, click the Chrome menu icon.
2. Click **Update Google Chrome**.

   Note

   If the option is not displayed, this indicates the latest version is updated already.
3. Click **Relaunch**.

When the updates are completed, you are notified to restart your machine. The security features of the web browser are updated.

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Chapter 2. Get started

The chapter comprises information about the system configurations on which the performance details of the web browsers (Chrome and IE) have been measured. The statistical data provides the performance of Google Chrome and IE web browser. The usage and popularity data also helps you to find out the suitability of using Google Chrome over the other web browsers.

This chapter includes the following:

- System configurations
- Performance benchmarking statistics
- Browser popularity and usage statistics

System configurations

This section lists the system configurations on which the ezDI team has measured the performance details of the Google Chrome and IE web browser.

Note

The performance details of the web browsers (Chrome and IE) are restricted to the system configurations used by ezDI team listed in the following table. The performance details can vary by using different software and version. For example, the performance of the system is different in case the RAM is 4 GB or 2 GB. For more information about performance details, see Performance benchmarking statistics.

Table 1: Technology and software details

Type of tool or technology	Software and version
OS	Windows 7
RAM	8 GB
Processor	Intel(R) Core(TM)- i3-3220 CPU @ 3.30GHz
System type	64-bit Operating System
Internet Explorer	Internet Explorer 11 and Internet Explorer 10

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Google Chrome	Google Chrome 31 and above
Opera	Opera 12.12 and above
Safari	Safari 5.1
Mozilla Firefox	Mozilla Firefox 18 and above
Internet speed	1.99 Mbps
Download rate	254.8 Kbps
Number of documents	80 and 283
Test URL	https://demoezcac.ezdicloud.com/ezCACWeb

Performance benchmarking statistics

The ezDI team has compared the performance parameters of Google Chrome and IE by using the system configuration details mentioned in the System Configuration section.

The comparisons mentioned in the following table is based on the two sample cases: one sample with a case of eighty documents, and another sample with a case of two hundred and eighty three documents.

Table 2: Performance benchmarking statistical data

Parameters of (80 documents)	IE (Seconds)	Chrome (Seconds)	Parameters of (283 Docs)	IE (Seconds)	Chrome (Seconds)
Edit case	14	12	Edit case	25	19.66
Accept code	6	4	Accept code	6	4
Reject code	5	3	Reject code	5	3
Add code to admitting	3.74	3	Add code to admitting	4.36	3.81
Add code to principal	3.66	3.21	Add code to principal	4.29	4

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Highlight evidence	3.28	3	Highlight evidence	7.52	3
Native scroll Issue	Yes	No	Native scroll Issue	Yes	No
Sticky header Issue	Yes	No	Sticky header issue	Yes	No

Note

The test result (in number) that are lower in count, is recommended.

Browser popularity and usage statistics

The monthly usage data (displayed in the following table) of the Google Chrome web browser indicates that it is widely used than other web browsers.

Table 3: Popularity and usage statistics data

Month	Chrome	IE	Firefox	Safari	Opera
July 2016	71.9 %	5.2 %	17.1 %	3.2 %	1.1 %
June 2016	71.7 %	5.6 %	17.0 %	3.3 %	1.1 %
May 2016	71.4 %	5.7 %	16.9 %	3.6 %	1.2 %
April 2016	70.4 %	5.8 %	17.5 %	3.7 %	1.3 %
March 2016	69.9 %	6.1 %	17.8 %	3.6 %	1.3 %
February 2016	69.0 %	6.2 %	18.6 %	3.7 %	1.3 %
January 2016	68.4 %	6.2 %	18.8 %	3.7 %	1.4 %

Note

- Click the heading names in the table to view the detailed information about the web browsers.
- For more information about the web browsers, click http://www.w3schools.com/browsers/browsers_stats.asp

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Chapter 3. Testing parameters

The compatibility and performance of the web browsers are measured on the different parameters: the speed of the web browser when browsing, browser's support for CSS3 and HTML5 features, and JavaScript performance when working on the web pages. This chapter contains information about the testing parameters that have been used to measure the performance metrics of the different web browsers:

- Speed
- Compliance with standards
- JavaScript performance test

Speed

The speed testing is performed on the different web browsers using the following testing methods:

- Web page loading time
- Cold restoring time

Web page loading time

The testing method is used to calculate a web page loading time (in seconds) when you type the URL in the Address bar and press the Enter key.

Note

- The time (in seconds) that is lower in count, is recommended.
- The time performance of the web browser is calculated when you are able to browse and User Interaction features are accessible.

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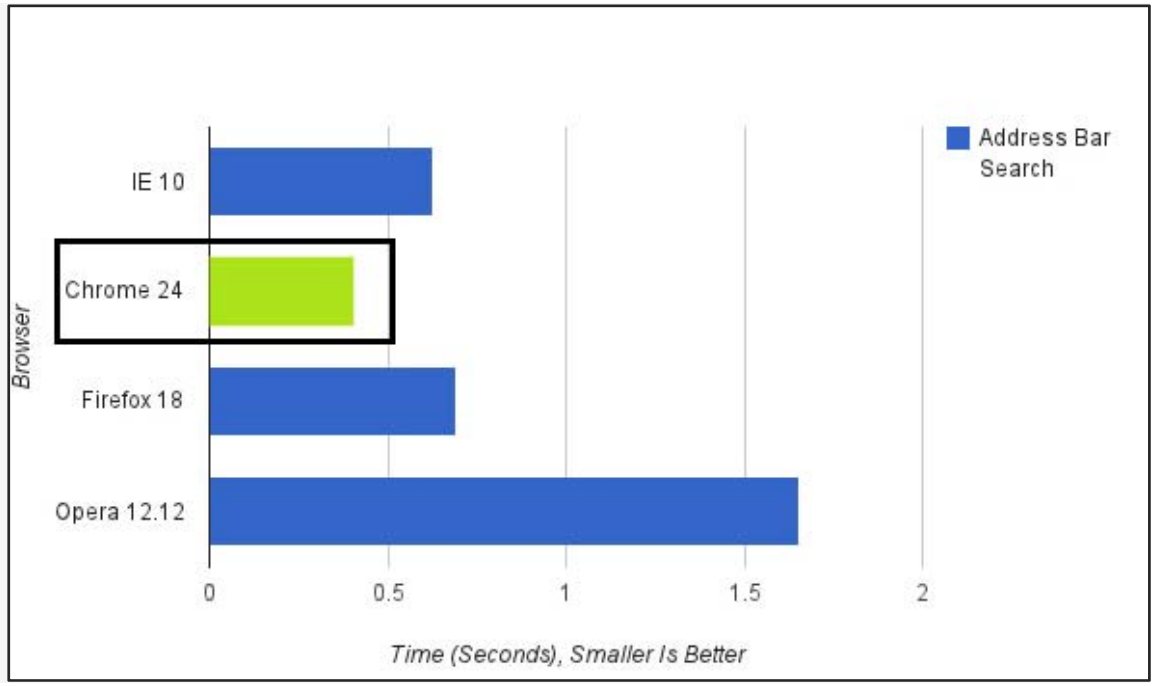
Figure 2: Web page loading time



Conclusion: The test result in the *Figure 2* displays Google Chrome loaded the page quickly (in less than 0.5 seconds) and UI features of the web page were also accessible as compare to the other web browsers.

Cold restoring time

The testing method is used to calculate the restoring time (in seconds) when the web browser is loaded second time and then subsequent times after the computer is rebooted.

Note

- The time (in seconds) that is lower in count, is recommended.
- The time performance of the web browser is calculated when you are able to browse and User Interaction features are accessible.

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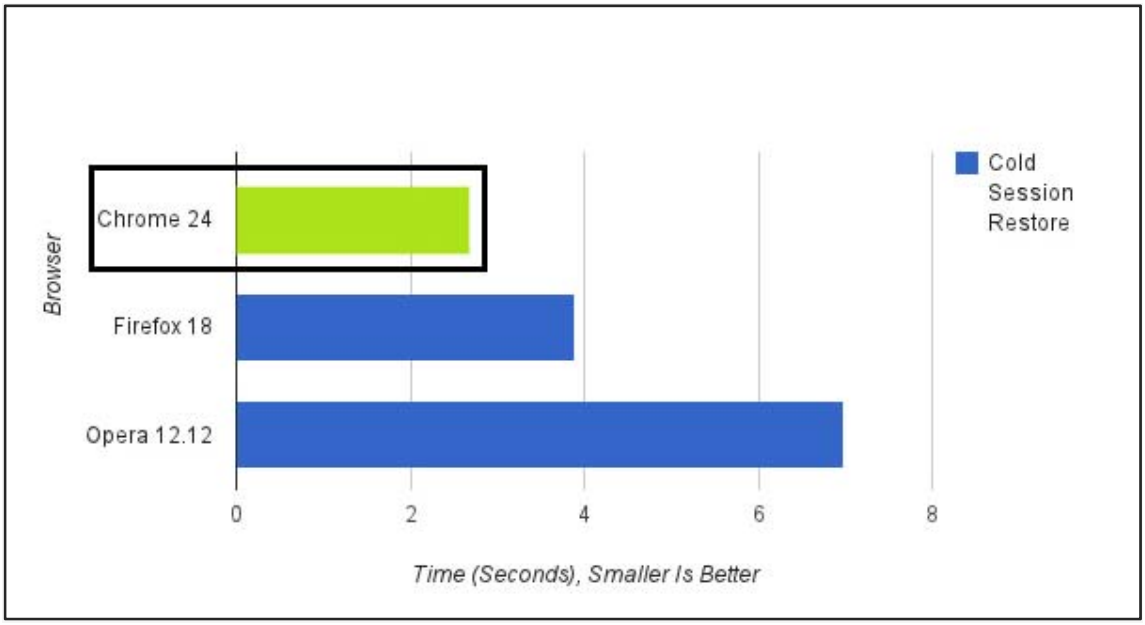
Figure 3: Cold restore time



Conclusion: The test result in the *Figure 3* displays Google Chrome restored the earlier session very quickly (in less than 3 seconds) as compare to other web browsers when the computer was rebooted.

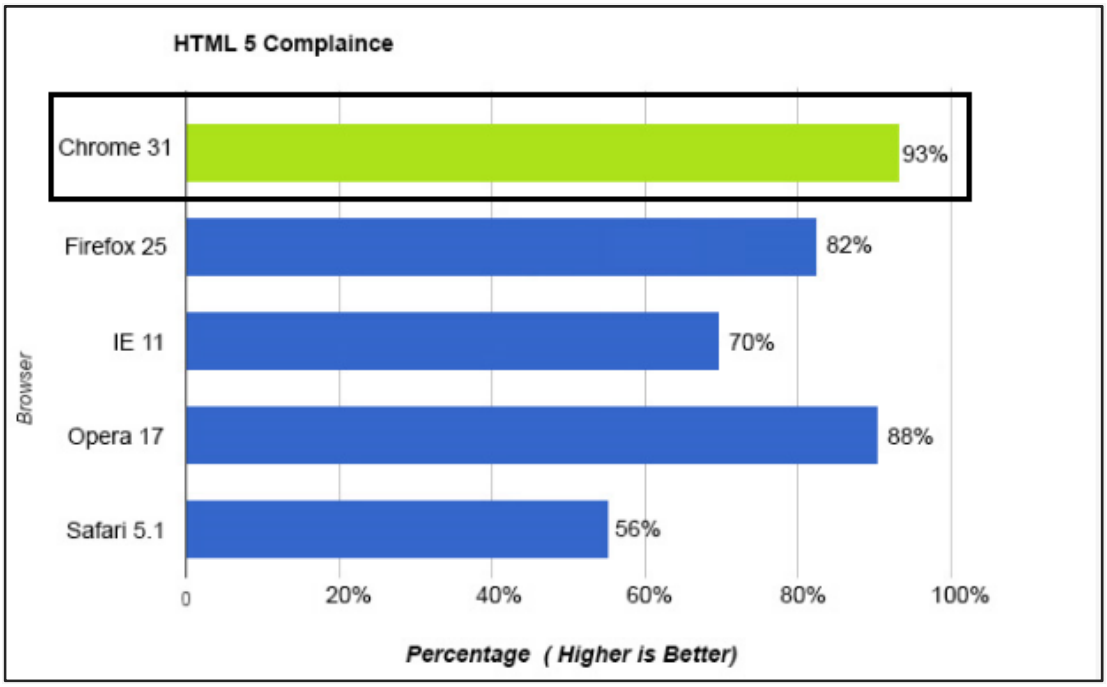
Compliance with HTML5 and CSS3

HTML5 and CSS3 have become the preferred technologies in the development of a web applications. The purpose of the testing is to ensure web browsers' support for CSS3 and HTML5 features that is used to read the HTML format.

Note
The result that is higher in percentage value, is recommended.

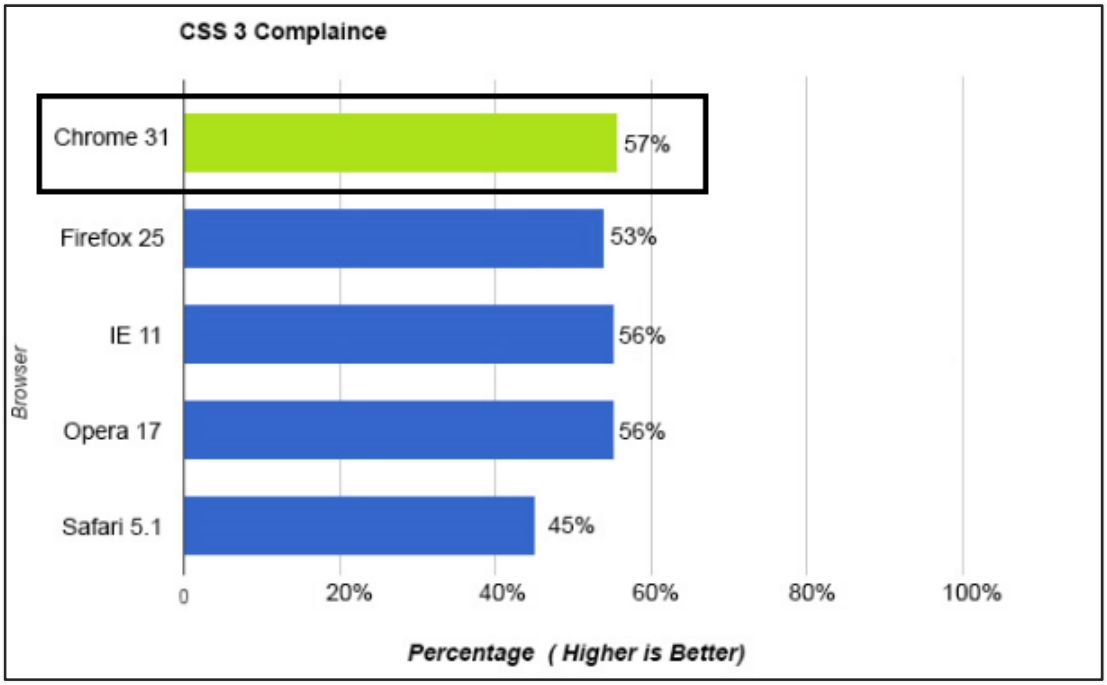
The following image displays the **HTML5 Compliance** and **CSS3 Compliance** testing results (in percentage), respectively:

Figure 4: HTML5 Compliance testing



Conclusion: The test result in the *Figure 4* displays Google Chrome highly supports (93%) HTML 5 technology and provides much more flexibility and reliability as compared to other web browsers.

Figure 5: CSS3 Compliance testing



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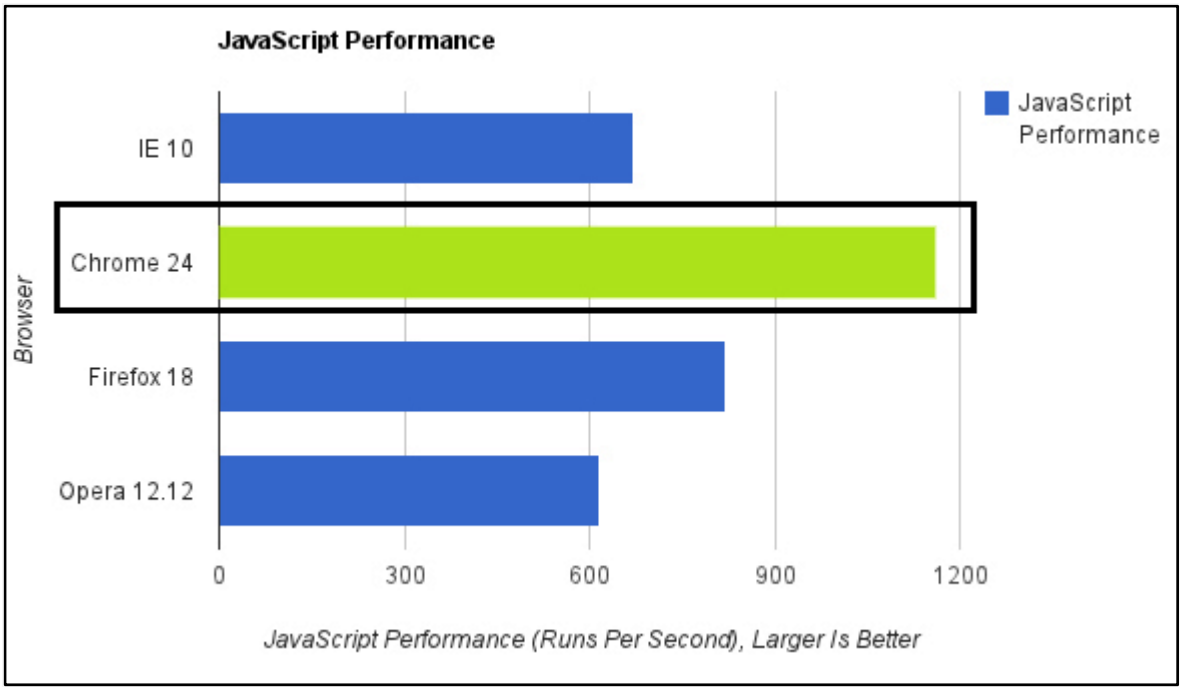
Conclusion: The test result in the *Figure 5* displays Google Chrome highly supports (93%) CSS3 technology and provides much more flexibility and reliability as compared to other web browsers.

JavaScript performance test

The testing method displays the web browsers' performance on using the different functionality on the web pages, such as form submission, validation, animation, and interactivity. For more information, click https://blog.mid.as/2013/11/13/best-web-browser-internet-explorer-11-firefox-25-opera-17-safari-5/

Figure 6: Java Performance (Aggregate) testing method



Conclusion: The test result in *Figure 6* displays Chrome is better than other web browsers. Chrome parses asynchronous and deferred scripts on a separate thread when starts downloading a web page. This process helps in completing the parsing in milliseconds (time) after the web page is downloaded. Due to the parsing process, the speed of loading a web page is ten times faster. The process is particularly effective on large scripts and slow network connections.

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Chapter 4. Standard benchmarking tools

This chapter contains information about the following standard testing methods of the web browsers:

- JetStream test score
- Octane score
- HTML5 test results

JetStream test results

JavaScript benchmark suite provide measures that ensure a web application can start quickly and run smoothly without interruptions. For more information about JetStream in details, click http://browserbench.org/JetStream/in-depth.html

Table 4: JetStream test results

Browser name and version	Test results
Chrome (Winner)	122.93
IE-11	106.23

Note

- The test result (in number) that are higher in count, is recommend.
- For more information about JetStream, click http://browserbench.org/JetStream/

Conclusion: The test result in the *Table 4* indicates Google Chrome is faster (122.3) and more reliable as compared to other web browsers.

Octane score

The tool is used to measure a JavaScript engine's performance by running a suite of test representative on complex and demanding web applications. The purpose is to measure the performance of JavaScript code encountered in complex web applications, which running on the mobile and desktop browsers.

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Table 5: Octane test results

Browser name and version	Test results
Chrome (Winner)	17344
IE-11	12329

Note

- The test result (in number) that are higher in count, is recommend.
- For more information about Octane, click https://developers.google.com/octane/

Conclusion: The test result in the *Table 5* displays Google Chrome performance metrics (17344) are better than other web browsers in performing complex operations. Additionally, high results in JavaScript engine testing indicates better user experience as well.

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HTML5 test results

The HTML5 test performed on different web browsers (Google Chrome 50, Internet Explorer 11, Internet Explorer 10, and Firefox) to analyze the performance based on the following criteria:

- User interaction
- Performance and security

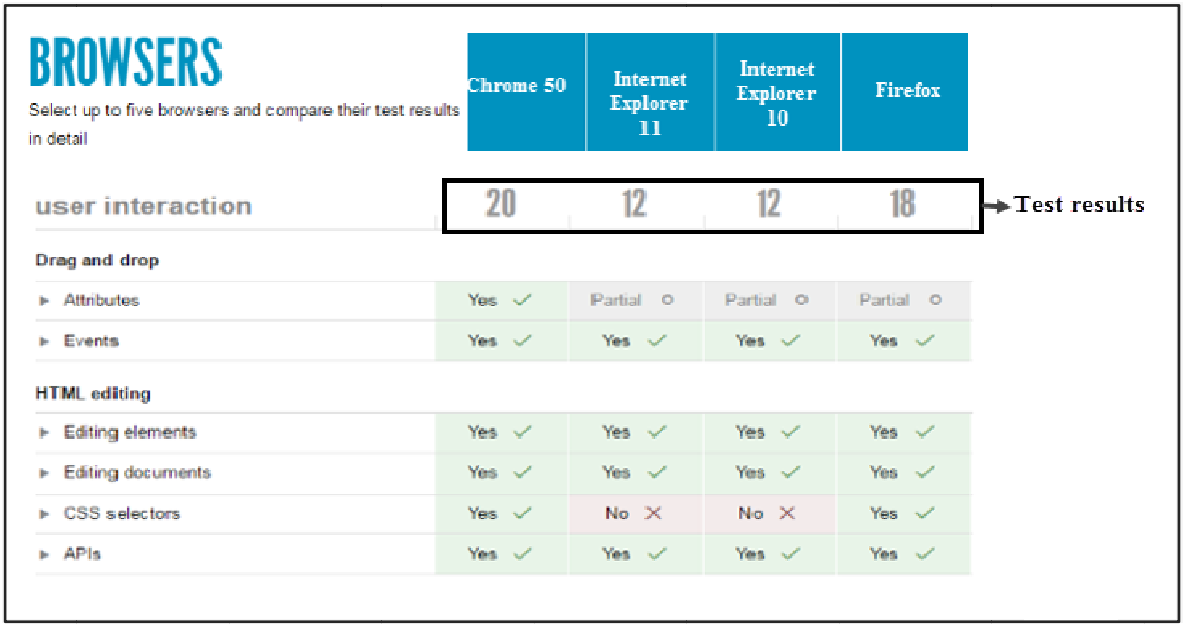
Note

The results (in number) that are higher in count, is recommended.

User interaction

Google Chrome highly supports UI feature, such as drag and HTML editing elements that gives more flexibility to the UI developers to develop interactive and user friendly applications.

Figure 7: User interaction results



BROWSERS

Select up to five browsers and compare their test results in detail

	Chrome 50	Internet Explorer 11	Internet Explorer 10	Firefox
user interaction	20	12	12	18
Drag and drop				
Attributes	Yes	Partial	Partial	Partial
Events	Yes	Yes	Yes	Yes
HTML editing				
Editing elements	Yes	Yes	Yes	Yes
Editing documents	Yes	Yes	Yes	Yes
CSS selectors	Yes	No	No	Yes
APIs	Yes	Yes	Yes	Yes

Test results

Conclusion: The test result in the *Figure 7* indicates the User Interaction (UI) features, such as *Drag and drop* and *HTML editing features,* available in the Google Chrome web browsers are more functional than other web browsers.

Performance and security

HTML 5 test performed on different web browsers to measure performance and security parameters.

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Figure 8: Performance and security results

BROWSERS

Select up to five browsers and compare their test results in detail

	Chrome 50	Internet Explorer 11	Internet Explorer 10	Firefox
performance	12	10	10	11
Workers				
Web Workers	Yes ✓	Yes ✓	Yes ✓	Yes ✓
Shared Workers	Yes ✓	No ✗	No ✗	Yes ✓
Other				
`window.requestIdleCallback`	Yes ✓	No ✗	No ✗	No ✗
security	26	13	10	24
Web Cryptography API	Yes ✓	Prefixed ✓	No ✗	Yes ✓
Content Security Policy 1	Yes ✓	No ✗	No ✗	Yes ✓
Content Security Policy 2	Yes ✓	No ✗	No ✗	No ✗
Cross-Origin Resource Sharing	Yes ✓	Yes ✓	Yes ✓	Yes ✓
Subresource Integrity	Yes ✓	No ✗	No ✗	Yes ✓
Cross-document messaging	Yes ✓	Yes ✓	Yes ✓	Yes ✓

Test results

Conclusion: The test result in the *Figure 8* demonstrates Google Chrome is better in performance and security metrics as compared to other web browsers.

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Summary

The ezDI team aimed at identifying the most suitable web browser for the ezDI applications by using different testing methods. The results helped the team to scrutinize web browsers on various parameters, such as performance, speed, and security.

Common testing methods used for the comparison: Speed, JavaScript performance, Compliance with HTML5 and CSS3 standards were used to compare web browsers based on the test results documented in the Testing parameters chapter.

The testing methods and the conclusion study of each method helps you to identify the suitability of using Google Chrome for the ezDI applications.

Our recommendation: ezDI recommends using Google Chrome browser that would provide you the best performance and user experience for the ezDI applications. For more details about the ezDI applications, please visit www.ezdi.com.

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References

The following are the reference links that you can view to get more information about the web browsers:

http://www.toptenreviews.com/software/internet/best-internet-browser-software/
https://www.maketecheasier.com/3-tools-benchmark-web-browser/
https://html5test.com/compare/browser/mybrowser/ie-11/ie-10.html
http://css3test.com/
https://www.google.co.in/chrome/browser/features.html#security
http://www.alltechshare.com/google-chrome-features/

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