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A Survey Paper on Comparative Analysis of Web Browsers

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Abstract: A web browser is an essential application program for accessing the Internet. As more and more services become available on the Internet, the issue of fast and secured access to online resources gains more importance. The growth of the internet has encouraged a high number of people to explore and take advantage of the World Wide Web (www). The window to the World Wide Web is a web browser, hence the development of various web browsers in the market today. This paper describes the analysis of the web browsers to conclude which browser is efficient for user. A comparative study of four web browsers namely Internet Explorer, Mozilla Firefox, Opera and Google chrome was carried out[2].
Keywords: Web browsers, disk usage, chrome, Firefox.

I. INTRODUCTION

The World Wide Web (WWW) is one of the most accessible parts of the Internet. Its ease of use allows people to perform tasks quickly and easily. Web browsers attempt to present to user the best presentation they can offer and other options to facilitate better services on the web. Similarly, browsers also attempt to notify the user when applications are downloaded and try to execute on the user's machine. However, the result of various browsers based on some useful characteristics differs. Though Web standards do exist, different browsers behave differently (in fact, the same browser may behave differently depending on the platform).

Various web browsers are playing a vital role in our daily life. Web browsers are involved in several security critical applications such as e-commerce, online shopping, and internet banking[1].

Moreover countless important actions which need privacy protection are done via the browsers, such as logging in our blogs, twitter, writing our personal dairy, sending and reading emails[2]. If a web browser cannot guarantee privacy and security, users will undoubtedly be harmed. Consequently, users do have an urgent requirement to know the security level of popular browsers. However, the security level of popular web browsers is difficult to evaluate and there can be many different outcomes when one evaluates the problem from different angles. In this paper, we selected most popular web browsers as our study samples.

II. RELATED RESEARCH

Yixian Cai and Yi Yuan (2012) explained the static trend of vulnerabilities of two browsers Internet Explorer and Mozilla Firefox. They studied the vulnerabilities relation between different versions of browsers. They developed two methods to count vulnerabilities, first one is difference of versions is ignored and second is take version difference into consideration. Result shows that Firefox has more vulnerabilities than Internet Explorer[2].

Vishal Anand, Deepanker Saxena (2013) analyzed the different browsers on the basis of CPU utilization, disk usage, browser usage and multiple tab performance. Through the analysis they have concluded that each browser showed their merits and demerits in certain field and we can only show comparative study of each of them[1].

Myugsik Kim, S.Lee and Youjip Won (2015) had studied Input charcterstics of mobile web browsers. They analyzed the input characterstics of browsers such as Chrome, Firefox, Opera and Dolphin. They analyzed that Firefox browser is the most efficient one with input behavior and Dolphin is worse[3].

III. ANALYSIS

For analysis we taken four browsers chrome, firefox, internet explore (IE)and opera. There performance is measured through different parameters. CPU utilization, Disk storage, multiple tabs performance, html5 and CSS support, Javascript engine and securities.

A. CPU Utilization

CPU utilization percentage is the per-cent of the CPU's cycle being spent on the given process[2]. This CPU time can also be interpreted as the amount of time it spent waiting for I/O operation.

IE was the best performer in CPU usage by a good margin. Opera came in second, followed hot on its heels by Chrome. Mozilla's performance was a little better than last time[3].

Web Browser	CPU Utilization
Chrome	High
Firefox	Medium
IE	Less
Opera	Medium

Table No. 1

B. Disk Usage

The browser also uses disk space while starting up and hence utilizes the Hard disk for the time span.

Web browser	Disk usage
Chrome	High
Firefox	Less
IE	Less
opera	Less

Table No. 2

C. Multiple tab Performance

Firefox shows the best results for multiple tab than Chrome because it has single process running that handles all the data[2]. Opera and IE are started struggle when it goes over 10 tabs.

Web browser	Time(in sec)
Chrome	33.554
Firefox	30.064
IE	36.445
opera	38.87

Table No.3

D. HTML5 and CSS support

According to html5test.com, an analysis shows that Chrome scores maximum in form elements as it provides almost all the possible features. CSS selectors and other attributes have maximum support by the chrome browser compared to the other available browsers. Opera also supports html5 elements and rank second by html5test.com[1]. Firefox on the other hand is famous for the micro data support as it creates the data dictionary[2]. So considering this, browsers can be segregated as web applications are more or less dependent on the browser being used by the user. More updated browser provides better user experience of the web application.

E. Securities

Firefox is a robust browser when it comes to both privacy and security. It is easily customizable and offers a lot of privacy features. Firefox is also updated regularly, which helps with threat management.in the other hand opera also have security features to make browing safer[2].

Chrome is easy to use and secure. Google Chrome comes with built-in transparency protection. The safe browsing features warn users when they run into phishing or malware sites. This browser is optimized for multiple devices. However, Chrome does have built-in data collection tools, which sometimes slows it down. Internet Explorer Enhanced Security Configuration (ESC) establishes security settings that define how users browse the internet and intranet websites. These settings also reduce the exposure of servers to websites that might present a security risk.

IV. CONLUSION

In this paper we have studied four different web browsers. Depending on the browser on your system, the capacity of the system in terms of memory, speed and brand, results will be obtained for the criteria of comparison of browsers.

Popular web browsers like Google Chrome, Internet Explorer, Mozilla Firefox and Opera have been taken for analysis. Performance evaluation has been done based on their performance in different user's environment. We found that web is advancing every day and browsers need to be updated to remain intact in the users system. Each browser showed their merits and demerits in certain field and we can only show comparative study of each of them. Chrome offered maximum support to HTML5 and CSS3 and other web technologies but on other hand, Firefox emerged as efficient browser in case of multi-tab usage[1]. From the test results of the four internet browsers, a researcher would find internet explorer best because of its speed of download and security feature while a graphic programmer will find Mozilla Firefox more favorable because of its high performance of page layout.

Mozilla Firefox's different versions share more vulnerabilities which explains the fact that Mozilla Firefox have far more vulnerability reports than Internet Explorer. If judging the safety level only by the number of vulnerability, Internet Explorer is safer than Mozilla Firefox[2]. Basically it depends on the type of users and type of usage of browsers.

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