

History and Evolution of the Browser

Felix Biedermann, Robert Philippsohn, Jonas Morela

University of Stuttgart, Institute for Architecture of Application Systems
Universitätsstraße 38, 70569 Stuttgart, Germany

Abstract. Summary of our paper (70-250 words)

1 Introduction

1.1 What is a Browser

A Browser is an application that interprets HTML documents and data to render them to a Web page making the Web accessible. A browser lets you visit websites and do activities within them like login, view multimedia, link from one site to another, visit one page from another, print, send and receive email, among many other activities. The most common browser software titles on the market are: Microsoft Internet Explorer, Google's Chrome, Mozilla Firefox, Apple's Safari, and Opera. Browser availability depends on the operating system your computer is using (for example: Microsoft Windows, Linux, Ubuntu, Mac OS, among others).

2 History

2.1 The first browsers

The first browser for the web was also an invention of the founder of the web, Tim Berners-Lee. The browser was called *WorldWideWeb* and was introduced to the world in the year 1990. A few years later, in 1994, the Browser was renamed *Nexus*. The browser *WorldWideWeb* was, a part of the fact that it was the first browser, also the first HTML editor. To view pictures you had to follow the link of the picture, download it and open it on the computer. Another browser with a different name but a similar functionality was *Lynx*, which was published 1992 by Thomas Dickey.

2.2 First graphical browsers

When the Web was published Tim Berners-Lee wanted his invention to succeed. To ensure the success he knew he needed more people to get interested. He needed as many developers as possible to work on web based projects, so there is a constant flow of new content, and he needed the general public to get occupied with the web to make it a long lasting success. For that reason Tim Berners-Lee helped many project that tried to produce new graphical based browsers. In the year 1992 many browser were invented by students as small projects with exactly that goal, were *ViolaWWW* or otherwise called *Viola* was one of the most prominent and *Erwise* was one of the lesser known graphical browsers. But not long after *Viola* came a new competitor. This new browser was *Mosaic*.

2.3 Mosaic

In January 1993 *Mosaic* was published for free and its distribution numbers skyrocketed. Marc Andreessen and Eric Bina, the developers of the *Mosaic* browser, constructed the browser with the intention that a broader audience could use

the World Wide Web. That was only possible when the team of NCSA engineers would make their browser accessible for other systems than Unix. Andreessen and Bina, together with some of their NCSA associates, worked on the versions for Mac and PC which came out in late spring of the same year. With this the user numbers of *Mosaic* rose even higher, with 5000 downloads per month. After the graduation of Marc Andreessen and Eric Bina they met James H. Clark, the founder of Silicon Graphics, and discussed how to make the Web commercialisable. That set the starting point for a new Browser called *Netscape*. So Andreessen and Bina left NCSA, with some of their colleagues, in 1994 and settled down in Silicon Valley. After the 2 left the NCSA assigned all commercial rights for *Mosaic* to Spyglass, Inc. Spyglass licensed their technology to many other companies, including Microsoft. In the year 1997 the NCSA discontinued the support for the *Mosaic*, shifting their research focus to other development projects. The last release for the *Mosaic* browser dates back to August 1997.

2.4 Netscape

Netscape marks the beginning of many important things, that shaped the idea of the browser we know today. The first version of the browser was launched in October 1994 and was programmed by the NCSA team of Andreessen and Bina, that they acquired. In the beginning the team was not sure how to earn money with their browser, but later on their browser marked the end of research-project status of the Web and started the era of the Web of commercial interest and exploitation. The Browser also invented the cookie feature, what lets the browser save data, and the Secure Socket Layer (SSL), what protects the privacy and integrity of transactions. The first browser was the *Mosaic Netscape* release 0.9. Because of problems with the name the company adapted the name *Netscape Communications* and launched by the end of december the *Netscape Navigator 1.0*, what also solved the problem with the name conflict regarding the NCSA Mosaic browser.

Because of the few competitors in the field of browsers, *Netscape* became the most popular browser in a short time. The main income for the company was through B2B-business and the stock markets. Especially the stock markets were lucrative, because on the first day (August 9th, 1995) their stock price rose from 28\$ per share to a high of 74.75\$ and at the end of the day they closed off with 58.25\$. That was a great sign and it didn't end there; yet. They rose in popularity, until Microsoft started competing in the Web sector. With Microsoft and Netscape Communications the browser wars started.

2.5 Internet Explorer

Internet Explorer 1.0 (furthermore called IE) was the first attempt of Microsoft on 17 August 1995 to dethrone Netscape as the market leader on the browser territory. For the first 2 versions of IE, Microsoft used the licensed code of Spyglass Inc. from *Mosaic*, as a starting point. The first version that was mostly independently made in the company, would be IE 3.0. It introduced as the first

browser ever CSS and it was the first version that did not use the Spyglass source code; only Spyglass technology. It was also the first true competitor for *Netscape*. The following years would become known as the **Browser Wars** between Netscape and IE, where both parties would improve their browser in a rapid pace. The tides turned with IE 4.0, where Microsoft changed their strategy. Before IE 4.0 their browser was a free browser for the home, like Netscape, but Microsofts' browser was inferior in technology and had to be installed first, before you could use it. But IE 4.0 shipped with all Windows and Macintosh PCs', means the first browser most people interacted with after they bought a new PC was IE and not Netscape. With that IE dethroned Netscape as the most used browser and send Netscape into the depths of nothingness. After the defeat of Netscape the development of Microsofts browser slacked down after the release of IE 6.0 in 2001. But this error made it possible for new competitors to emerge and evolve.

2.6 Mozilla Firefox

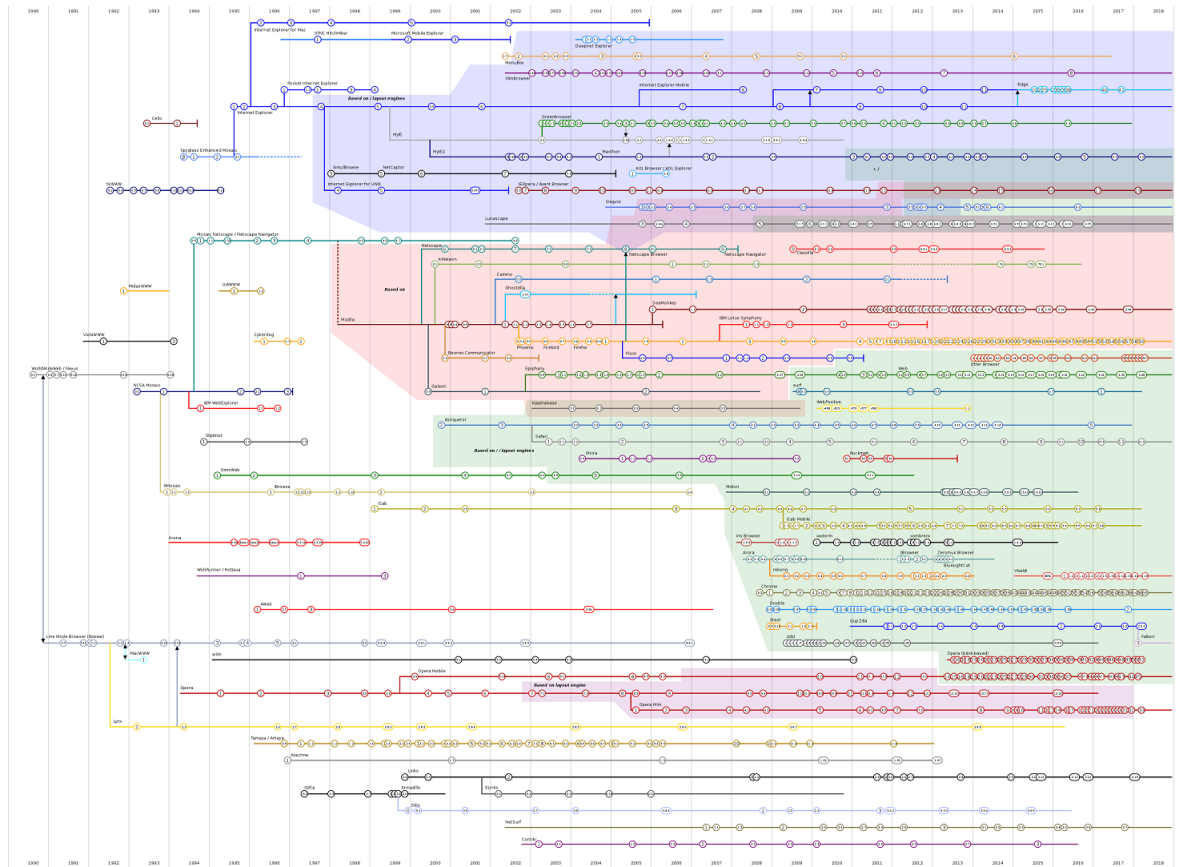
Mozilla Firefox, originally called Phoenix or Firebird, is an unofficial offspring of Netscape created in the year 1998. The first version of Firefox, Firefox 1.0, was released in 2004. Firefox and its predecessor were created on the bases of the Netscape source code, which was published on march 31, 1998.

2.7 Opera

2.8 Safari

2.9 Google Chrome

2.10 Timeline of all browsers



A timeline of all browsers and browser versions ever made. [1]

2.11 Important Personalities

1. Tim Berners-Lee
2. Marc Andreessen
3. Bill Gates

3 Evolution

3.1 The meaning of Evolution

With every new browser and browser version being released features and improvement have been added. Browsers became more secure, user and developer friendly, and more efficient. These were implemented because of new technologies, bugs being discovered and in trying to run out the competition. If you add all of the changes to a timeline you can overview the Evolution of the browser.

3.2 How Patches influenced Browsers

“I call such changes patches, as they are attempts to fix the original design of the web” Marco Aiello *The Web was Done by Amateurs* S. 65

By changing the Web, patches also influenced browsers when they were introduced. In this chapter we will have a short summary of what these patches were and how browsers evolved and adapted through these changes.

Cookies Like mentioned before Cookies were introduced with Netscape in 1994 for websites to be able to save data to be remembered for processes on the clients side. The original idea The webbrowser is being used by the server of the website to save textinformation on the Computer of the client. These have made it possible to save login and shopping cart informations but also made Webtracking possible. Later they received criticism for being able to damage the users privacy and threatening security when surfing the web. Under the EU's GDPR Law websites are now forced now ask and inform users about saving data in their Browser.

SSL

CSS

Java

Scripting

SVG

3.3 Basic Technological Changes

HTTP

HTML

URL

3.4 Features

History

Incognito mode Private browsing was first added in 2005 by *Safari* on Mac. The feature has since been adapted by many other browsers so that most modern browser have some form of private browsing.

Bookmarks Bookmarks were a quite early feature and have been included since *Mosaic* in 1993, although called hotlists back then. Newer browsers have expanded the feature of bookmarks. *Firefox* for example, introduced so called "Live Bookmarks" which are essentially bookmarks provided as RSS feed.

Browser Extensions As the first major browser, *Internet Explorer* introduced browser extensions with Version 5 in 1999. The other major browsers also added extensions over the years with Firefox in 2004, Opera in 2009 and Google Chrome and Safari in 2010. Nowadays most browsers support extensions to customize the user experience.

Tabs The first web browsers did not have tabs as we know them from most modern browsers. While many may consider *Opera* to be the browser to introduce tabbed browsing, *Opera* had a *Multiple Document Interface* instead. This may seem similar but is substantial different to a *Tabbed Document Interface*. The actual first browser supporting tabs was the *Internet Explorer Shell "Net-Captor"*, first released in 1997. The browser to mainstream browser tabs was however Firefox or more specifically its predecessor *Phoenix*.

Browser Cache

4 Browsers nowadays (compared)

5 Future of the Browser

5.1 Future based on past guess

5.2 Quantentechik?

5.3 Devices

6 Evaluation

7 Summery/Conclusion

8 Sources

[1] https://upload.wikimedia.org/wikipedia/commons/thumb/7/74/Timeline_of_web_browsers.svg/3560px-Timeline_of_web_browsers.svg.png