# MOZILLA FIREFOX

- A browser for developers

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**IS201301002**

## 1) What is Mozilla Firefox?

Mozilla Firefox is a free and open-source web browser developed by the Mozilla Foundation. Firefox is available for Windows, OS X and Linux operating systems, with its mobile versions available for Android, and Firefox OS; where all of these versions use the Gecko layout engine to render web pages, which implements current and anticipated web standards, but an additional version – Firefox for iOS is also available that doesn't use Gecko. Gecko is a web browser engine used by many applications. It has been developed by Mozilla Foundation. Gecko is a free and open source project. It is designed to support the open internet standards (Standards and technical aspects defined for the world wide web). It is written in C++ and can be run on various platforms/OS's such as Linux, Windows, OS X and Solaris.

Firefox was created in 2002, under the name "Phoenix" by the Mozilla community members who wanted a standalone browser rather than the Mozilla Application Suite bundle. Even during its beta phase, Firefox proved to be popular by its testers and was praised for its speed, security and add-ons compared to Microsoft's then-dominant Internet Explorer 6. Firefox was released in November 2004, and was highly successful with 60 million downloads within nine months, which was the first time that Internet Explorer's dominance was challenged. Firefox is considered the spiritual successor of Netscape Navigator, as the Mozilla community was created by Netscape in 1998 before their acquisition by AOL.

## 2) Features

### Functional Features

**1) Tabbed Browsing**- Firefox supports tabbed browsing, which allows users to open several pages in one window. Firefox also permits the "homepage" to be a list of URLs delimited with vertical bars (|), which are automatically opened in separate tabs, rather than a single page. Firefox 2 supports more tabbed browsing features, including a "tab overflow" solution that keeps the user's tabs easily accessible when they would otherwise become illegible, "session store" which lets the user keep the opened tabs across the restarts, and an "undo close tab" feature. The tab browsing feature allows users to open multiple tabs or pages on one window. This is convenient for users who enjoy browsing and is also advantageous in ensuring ease of browsing. The tabs are easily made accessible and users can close tabs that are not in use for better usability.

**2) Pop-up blocking**- Firefox also includes integrated customizable pop-up blocking. Firefox was given this feature early in beta development, and it was a major comparative selling point of the browser until Internet Explorer gained the capability in the Windows XP SP2. Firefox's pop-up blocking can be turned off entirely to allow pop-ups from all sites. Firefox's pop-up blocking can be inconvenient at times — it prevents JavaScript-based links opening a new window while a page is loading unless the site is added to a "safe list" found in the options menu. In many cases it is possible to view the pop-up's URL by clicking the dialog that appears when one is blocked. This

makes it easier to decide if the pop-up should be displayed.

**3) Private Browsing**- Private Browsing, also known popularly as "Porn Mode", was introduced in Firefox 3.5. This feature lets users browse the Internet without leaving any traces in the browsing history.

**4) Download Manager**- An integrated customizable download manager is also included. Downloads can be opened automatically depending on the file type, or saved directly to disk. By default, Firefox downloads all files to a user's desktop on Mac and Windows or to the user's home directory on Linux, but it can be configured to prompt for a specific download location. Version 3.0 added support for cross-session resuming (stopping a download and resuming it after closing the browser). From within the download manager, a user can view the source URL from which a download originated as well as the location to which a file was downloaded.

**5) Live Bookmarks**- "Live Bookmarks", allow users to dynamically monitor changes to their favorite news sources. Instead of treating RSS-feeds as HTML pages like most news aggregators do, they are treated as bookmarks that are automatically updated in real-time with a link to the appropriate source.

**6) Session Restore**- The Session Restore feature restores windows, tabs, text typed in forms, and in-progress downloads from the last user session. It will be activated automatically when installing an application update or extension, and users will be asked if they want to resume their previous session after a system crash.

**7) Full page zoom**- From the View menu and via keyboard shortcuts, the new zooming feature lets users zoom in and out of entire pages, scaling the layout, text and images, or optionally only the text size. Zoom settings will be remembered for each site.

**8) Web-based protocol handlers**- Web applications, such as a user's favorite webmail provider, can now be used instead of desktop applications for handling mailto: links from other sites. Similar support is available for other protocols (Web applications will have to first enable this by registering as handlers with Firefox).

**9) Plugins**- Firefox supports plugins based on Netscape Plugin Application Program Interface (an application programming interface (API) that allow plug-ins (more specifically, browser extensions) to be developed for web browsers). Mozilla introduced various plugins for richer browsing experience. Mozilla supports more plugins than any other browser.

**10) Apps**- After the releases of Firefox OS based on stack of web technologies, Mozilla added a feature to install mobile apps on PC using Firefox as base. It is available for android and firefox OS.

## Non-functional Features

**1) Find as you type**- Firefox also has an incremental find feature known as "Find as you type", invoked by pressing Ctrl+F. With this feature enabled, a user can simply begin typing a word while viewing a web page, and Firefox automatically searches for it and highlights the first instance found. As the user types more of the word, Firefox refines its search. Also, if the user's exact query does not appear anywhere on the page, the "Find" box turns red. Ctrl+G can be pressed to go to the next found match. Alternatively the slash (/) key can be used instead to invoke the "quick search". The "quick search", in contrast to the normal search, lacks search controls and is wholly controlled by keyboard. In this mode highlighted links can be followed by pressing the enter key. The "quick

search" has an alternate mode which is invoked by pressing the apostrophe (') key, in this mode only links are matched.

**2) Mycroft web searchSmart bookmark**- A built-in Mycroft Web search function features extensible search-engine listing; by default, Firefox includes plugins for Google and Yahoo!, and also includes plugins for looking up a word on dictionary.com and browsing through Amazon.com listings. Other popular Mycroft search engines include Wikipedia, eBay, and IMDb.

**3) Chrome**- The chrome packages within Firefox control and implement the Firefox user interface.

**6) Inline spell checker**- A built-in spell checker enables users to quickly check the spelling of text entered into Web forms without having to use a separate application.

**7) Smart Location bar**- Firefox 3 includes a "Smart Location Bar". While most other browsers, such as Internet Explorer, will search through history for matching web sites as the user types a URL into the location bar, the Smart Location Bar will also search through bookmarks for a page with a matching URL. Additionally, Firefox's Smart Location Bar will also search through page titles, allowing the user to type in a relevant keyword, instead of a URL, to find the desired page. Firefox uses frecency and other heuristics to predict which history and bookmark matches the user is most likely to select.

**8) Library**- View, organize and search through bookmarks, tags and browsing history using the new Library window. Create or restore full backups of this data whenever with a few clicks.

**9) Smart Bookmark folders**- Users can quickly access their most visited bookmarks from the toolbar, or recently bookmarked and tagged pages from the bookmark menu. Smart Bookmark Folders can be created by saving a search query in the Library.

**11) Extensions support**- Features that the Firefox developers believe will be used by only a small number of its users are not included in Firefox, but instead left to be implemented as extensions. Many Mozilla Suite features, such as IRC chat (ChatZilla) and calendar have been recreated as Firefox extensions. Extensions are also sometimes a testing ground for features that are eventually integrated to the main codebase. For example, MultiZilla was an extension that provided tabbed browsing when Mozilla lacked that feature.

**12) Themes**- Firefox also supports a variety of themes for changing its appearance. Themes are simply packages of CSS and image files. Many themes can be downloaded from the Mozilla Update web site. We can customize the themes as per the needs. Various themes have various CSS and image files and when we select a theme, that CSS and image files are loaded onto the browser.

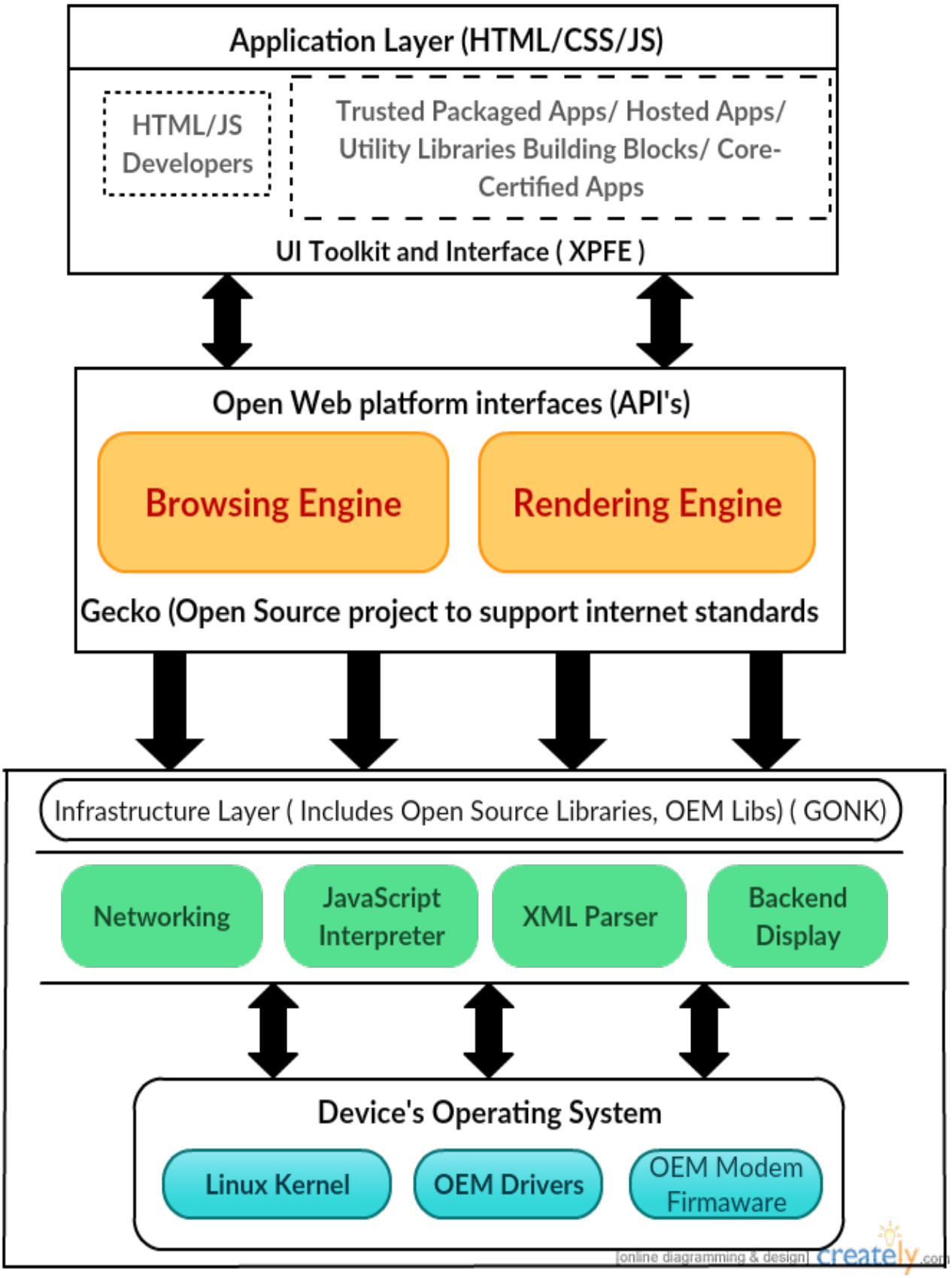
**13) Language packs**- Language packs are dictionaries for spell checking of input fields. The input text in the forms are spell checked using the existing language packs in firefox.

**14) Customizability**- Beyond the use of Add-ons, Firefox additional customization features.The position of the toolbars and interface are customizable. User stylesheets to change the style of webpages and Firefox's user interface.

## 3) DESIGN ARCHITECTURE OF MOZILLA FIREFOX

Following is the design architecture of firefox:

# Mozilla Firefox Design Architecture



## WORKFLOW OF MOZILLA FIREFOX

1) For front-end development, Mozilla uses many web standards such as HTML 5, XHTML, XML, SVG 1.1, CSS (with extensions), MathML, ECMAScript (JavaScript), DOM, XSLT, XPath, and APNG (Animated PNG) images with alpha transparency.

2) Gaia is the user interface of the Firefox OS platform. Anything drawn to the screen once Firefox OS is started up is a product of the Gaia layer. Gaia implements the lock screen, home screen, and all the standard applications you expect on a modern smartphone. Gaia is implemented entirely using HTML, CSS, and JavaScript. Its only interfaces to the underlying operating system are through open Web APIs, which are implemented by the Gecko layer. Third party applications can be installed alongside the Gaia layer. Gaia is the core web apps of the device, and user interface layer, all written in HTML5, CSS and JavaScript, with a number of exposed APIs to allow the UI code to interact with the phone hardware and Gecko functionality.

3) This is the open source project layer that helps to utilise the open internet standards; that is, the layer that provides all of the support for the open standards: HTML, CSS, and JavaScript. It makes sure those APIs work well on every operating system Gecko supports. This means that Gecko includes browsing engine and rendering engine. Browsing engine keeps track of the user's activiteis on the browser whereas rendering engine is responsible for rendering the data from the backend and displaying it over to the user. Gecko layer includes a networking, JavaScript virtual machine and graphic layout. Gecko is the web engine and presentation layer in Firefox OS that connects hardware to HTML by serving as the interface between web content and the underlying device. Gecko provides an HTML5 parsing and rendering engine, programmatic access to hardware functionality via secure web APIs, a comprehensive security framework, update management, and other core services.

4) Gonk is the kernel-level component in the Firefox OS stack that serves as the interface between Gecko and the underlying hardware. Gonk controls the underlying hardware and exposes hardware capabilities to Web APIs implemented in Gecko. Gonk can be seen as the “black box” that does all the complex, detailed work behind the scenes to control the mobile device by enacting requests at the hardware level.

5) Firefox supports the playback of video content protected by HTML5 Encrypted Media Extensions (EME). Firefox uses a sandbox security model, and limits scripts from accessing data from other websites based on the same-origin policy.

## MY DESIGN FOR THE FIREFOX

Mozilla's workflow is good in terms of quality, speed, security and privacy. All the components, which firefox uses currently, are responsible for making it what it is currently now. Many developers uses it. However, there are very few things that I would tend to improve in Firefox:

1) User interface of firefox can be improved more. Just like how it is in chrome, using which the customers feel more connected. Thus, the user interface of firefox can be improved.

2) Firefox sometimes consumes too much RAM/memory sometimes which causes it to crash or slow down. It is due to too much of plugins support it gives. One alternative is to turn off so many plugins either automatically or manually. Thus, I would like to design it in a way that it doesn't run

so many extensions at 1 go.

**All in all, Mozilla Firefox is one of the best browsers out there in the market. It is one of the most popular open source softwares.**