

## Chapter 24

# Firefox OS Ecosystem: Ambitions and Limits of an Open Source Operating System for Mobile Devices

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### ABSTRACT

*Firefox OS is an operating system for mobile devices. It is developed by Mozilla and is based on web technologies. Developed applications are therefore not tied to a given type of hardware. Mozilla works on standardisation of Web APIs, so that the device hardware could be accessed more easily. It also introduced its sign-in system for the Web and furthermore, it wants to redefine the way payments work for mobile applications. Firefox OS is not directly competing with Android and iOS, although it has some common target markets with Android. It could be an opportunity to weaken the iOS and Android duopoly. For now it targets users that don't have smartphones yet and is mostly used on low-end devices. The biggest challenge of Firefox OS is to assure a stable position in the mobile OS ecosystem and to get a large volume of users. Mozilla has an ambition to improve the web and make the web the platform. However developing the Firefox OS and ensuring its important place on the market is difficult because of technological and business limits that will be discussed in this chapter.*

### INTRODUCTION

Firefox OS is a new, emerging operating system that is developed for mobile devices such as smartphones and tablets, but there is also some ongoing work on smart TVs. It is developed by Mozilla as an open source solution that aims to be free from any proprietary technology. The aim of this chapter is to describe the Firefox OS environment. It gives a global view of the solution and also positions it relatively

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to other players, i.e. OS, identity and payment providers. The research is mainly focused on Web Apps and Web APIs but also on Mozilla's solutions concerning identity and payment.

In the first section, the general Firefox OS environment is presented. The characteristics and motivations of target users are given. Also operating systems, which can compete with Firefox OS, are described. In the end of this section the architecture and the design of Firefox OS are presented.

The second section is devoted to Web Apps and Web APIs. Web Apps are applications that are built using web technologies, i.e. HTML5, JavaScript and CSS. Web APIs allow accessing devices hardware and data stored on a given device. Thanks to Web APIs, Web Apps can interact with the hardware by using JavaScript. In this section the history of Web Apps is presented. It is followed by a comparison of Web Apps and native applications. Later more details of different types of Web Apps are given. The process of creating and distributing these applications is presented. Finally, different types of Web APIs and corresponding security policies are listed.

The third section is focused on the identity solution introduced by Mozilla. Mozilla Persona (previously known as BrowserID) is an alternative to Google Login or Facebook Connect. It allows signing in by using any of user's existing e-mail addresses. In this section the sign-in process is presented and the BrowserID protocol used by Persona is described in detail. Also the reasons of Mozilla Persona could not get enough users are given.

The fourth section is devoted to the payment solution. Mozilla's strategy and business model are given and paid apps with a receipt protocol are described. Also in-app payments and mozpay technology are presented in detail, including the whole payment flow. The research presented in this chapter is valid for Firefox OS v.1.0, but the changes in the following versions are also discussed. Mozilla's payment model is still a work in progress and may completely change in the future. For now Mozilla decided going to depreciate mozpay and focus more on payment provider primitives.

In the end of the chapter the conclusions are given. The strengths of the system are presented, as well as recent failures of identity and payment solutions. Also the future improvements and investments are discussed.

## **FIREFOX OS ENVIRONMENT**

Firefox OS (Mozilla Developer Network: Firefox OS, n.d.) is an operating system for mobile devices such as smartphones and tablets. It is developed by Mozilla but it aims to be free from any proprietary technology.

Firefox OS uses a Linux kernel and boots into a runtime engine that lets users run applications developed entirely using web technologies, like HTML5, JavaScript, CSS. Thanks to this solution, the entire user interface is a web application that is capable of launching other web apps, which are just web pages with enhanced services and access to device's hardware.

According to Mozilla evangelists, the founders of Firefox OS do not want it to compete with other actors, but it is supposed to improve the web in general, since for the Mozilla community the web is the platform (The Mozilla Blog, 2012). "Mozilla is dedicated to putting the power of the Web in people's hands, and Firefox OS frees consumers, developers, mobile providers and manufacturers from the limitations and restrictions of proprietary platforms," said Dr. Li Gong, Chief Operating Officer of Mozilla (The Mozilla Blog, 2014a).

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