Chapter 15
Mobile Applications Programming Platforms and Development Tools

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ABSTRACT

Mobile devices have been gaining increasing acceptance as target devices for developing rich multimedia applications. However, available programming platforms and development environments have not been adequate for developing applications for such relatively resource-constrained devices. Manufacturers and software firms have only recently started promoting programming platforms and tools tailored to satisfy user, designer and mobile device applications requirements. This chapter reviews the main characteristics as well as the relative merits and disadvantages of the most popular mobile platform development options for mobile devices. It aims to serve as a reference point and guide for developers and practitioners in choosing a mobile platform for development on information appliances. It achieves this by providing a focused overview of popular mobile platforms (Java ME, Flash Lite,.NET Compact Framework, BREW, Android, Symbian, and Lazarus) and then it evaluates and compares those upon a variety of quantitative and qualitative criteria.

1. INTRODUCTION

Mobile devices have been gaining acceptance as a means to providing multimedia applications due to their physical characteristics, such as mobility, personalization and location-awareness. This is evident by a number of research prototypes and commercial projects that have been reported in literature in various fields like culture, tourism, e-commerce, learning, games etc. (Kenteris, Gavalas & Economou, 2009; Economou, Gavalas, Kenteris & Tsekouras, 2008; Cheverst, Davies, Mitchell, Friday & Efstratiou, 2000; Motiwalla, 2007; Ngai & Gunasekaran, 2007; Wilson, 2004; Woodruff, Aoki, Hurst & Szymanski, 2004; Proctor & Tellis, 2003; Anegg, Kunczier, Michmayr,

DOI: 10.4018/978-1-61520-655-1.ch015

Pospischil & Umlauft, 2002). Current Applications Programming Platforms and Development Tools used to develop applications for mobile devices give application developers options to use various technologies, like Java technology, Symbian OS, Open C, Python, Flash Lite from Adobe, or Web technologies (such as HTML, CSS, JavaScript and Ajax) to create highly functional mobile applications. Content developers can work with audio, video, MMS, Web technologies, and Flash Lite to create rich and compelling mobile content. Developers can build core functionality on top of core mobile devices platform technologies and then optimize applications and content for target devices through the use of well-documented user interfaces and technology extensions.

The remainder of the paper is structured as follows. First, background information about popular mobile platforms is provided highlighting their main features, merits and weakness. Then, these platforms are compared based upon quantitative and qualitative criteria related to application development, their capabilities, constraints and market success. The comparison is based on experiences gained by research pursued at the Cultural Heritage Management Lab (CHMLab), University of the Aegean, focusing on developing cultural and tourist multimedia applications for portable devices (e.g. Kenteris, Gavalas & Economou, 2009; Economou, Gavalas, Kenteris & Tsekouras, 2008; Gavalas & Economou, 2007), lessons learned by student projects, participation in forums and online developer communities, reviewing of literature/technology white papers and blogs related to mobile applications development platforms. A brief overview of development tools that support the rapid implementation of software applications upon the respective programming platforms is given. The paper closes with future trends and conclusions.

2. BACKGROUND

This section presents the typical Mobile Applications Programming Platforms for handheld devices, such as PDAs or mobile phones. It serves as a reference point and guide for developers in understanding the characteristics of mobile platforms for development on information appliances. The reviewed applications programming platforms are the following:

- Java ME
- .NET Compact Framework
- BREW
- Android
- Symbian
- Lazarus
- Flash Lite.

It is worth noting that the iPhone[1] and Blackberry[2] are major players on the smartphone environment. However, due to space limitation those are not discussed in this chapter.

2.1 Java ME

Java Micro Edition or Java ME (Java ME, 2008) (previously known as Java 2 Platform Micro Edition or J2ME), designed by Sun Microsystems, is a specification of a subset of the Java platform aimed at providing a certified collection of Java APIs for the development of software for a broad range of small, resource-constrained devices such as cell phones, PDAs and set-top boxes. It achieves this by introducing the concepts of configuration and profile. The former defines the minimum features of a Java Virtual Machine and a minimum set of libraries for a 'horizontal' family of devices, i.e. devices with similar processing and memory limitations, user interface requirements