



Mobile Applications

By any measure Apple’s App Store has been a great success, passing the milestone of one billion downloaded applications (*apps*) in less than ten months, and reaching 1.5 billion downloads in one year.¹ Indeed, the availability of a wide choice of apps can be critical to the commercial success of new smartphones. Even as more smartphones are sold, the creation of mobile applications to run on them is constrained by the fragmentation of the market between different platforms.

Mobile apps are add-on software for handheld devices, such as smartphones and personal digital assistants (PDA). Among the most popular are games, social networking, maps, news, business, weather and travel information. All of these leverage at least one of the device’s technical features: communications interfaces (Wi-Fi, WiBro/mobile WiMAX, GSM/EDGE, W-CDMA/UMTS/HSPA and Bluetooth), audio and video processors, camera, sensors or GPS module.

Handset manufacturers, mobile network operators and suppliers of mobile operating systems (see Table 1) are opening storefronts on-line in attempts to capitalize on growing consumer demand. High-end devices that are able to run mobile apps need an attractive and expanding range of these apps if they are to generate hardware sales and network revenues. Between 2008 and 2009, research firm Ovum expects the market for smartphones to grow by 23 per cent, against an overall decline in the total mobile phone market caused by the economic crisis.² Smartphone shipments are forecast to reach more than 400 million by 2014, nearly all capable of running apps from at least one store.

Table 1: Characteristics of selected mobile platforms³

| Vendor | Operating system (OS) | Programming Language | Application store (launch date) |
|-----------------------|-----------------------|----------------------|------------------------------------|
| Apple | iPhone OS | Objective-C | iPhone App Store (07/08) |
| LiMo Foundation | LiMo Platform (Linux) | Java, native (C/C++) | not yet available |
| Microsoft | Windows Mobile | Visual C#/C++ | Windows Mobile Marketplace (09/09) |
| Open Handset Alliance | Android (Linux) | Java | Android Market (10/08) |
| Palm | Palm OS | C/C++ | Palm App Catalog (06/09) |
| | webOS (Linux) | JavaScript, HTML5 | |
| Qualcomm | BREW | C/C++ | Plaza Retail (05/08) |
| RIM | BlackBerry OS | Java | BlackBerry App World (04/09) |
| Symbian Foundation | Symbian | C++ | Nokia Ovi Store (05/09) |

¹ Apple offers 65,000 different apps. The most popular downloads are listed at <http://www.apple.com/itunes/billion-app-countdown/>.

² Ovum: “Smartphones: the silver lining of the declining handset market.” <http://www.ovum.com/news/euronews.asp?id=7923>. Gartner projects global handset sales will fall by 4 per cent in 2009, see http://www.economist.com/businessfinance/displayStory.cfm?story_id=13832338.

³ Note that some handsets and app stores have carrier agreements and are not available worldwide.

ITU-T TechWatch Alert (July 2009)

Box 1: ITUing on your smartphone – Ideas for the first mobile ITU app?



The TechWatch Secretariat is interested in your ideas for mobile applications related to ITU, ITU-T Recommendations, etc. Which is your preferred mobile platform, and what kind of information about ITU would you like to be able to retrieve using your smartphone?

Please send your comments, ideas and suggestions to tsbtechwatch@itu.int and join the Technology Watch Correspondence Group, at <http://www.itu.int/ITU-T/techwatch/cg.html>.

Image: “Pi Outside” at Flickr. Uploaded by [topgold](#).

A recent market study by consultant Gravitytank of owners of smartphones revealed that 70 per cent of respondents had purchased and installed one app in the previous month and that users had an average of 21 installed apps.⁴ A quarter of these were paid apps, with prices starting at around US\$1. Many applications are offered free of charge, in order to win new customers for a future paid application, others are for customers of an already existing website or service (see Box 1). For instance, the *NY Times* app for BlackBerry and iPhone fetches the latest news and displays it proportioned to the screen of the device, with the option to customize the selection of news items.

In most cases, apps are programmed by third party developers. However, they remain subject to approval by store owners (in many cases, such as Apple, by the phone manufacturer itself) that take care of distribution, payment and limited marketing of the product, in return for some 30 per cent of the sales price of each application.

Since the billing system, rating by users and marketing mechanisms are common for thousands of apps, online stores represent a potentially highly profitable activity for their owners (see also “The Long Tail”⁵). The latest upgrade of the iPhone OS (3.0) extends this approach to microcommerce, allowing developers to sell premium content or services within their apps, using the store to collect one-off or subscription fees.⁶ Mobile marketing in the form of branded applications and in-application advertising is starting to take off and promising additional revenues.⁷ In addition, the software store business is a facilitator of hardware sales.

Rejection of a third party app can be triggered by objectionable content (e.g., obscenity) or duplication of functions contained in those bundled with the device. Some network operators fear “cannibalization” of existing services from new functionalities and therefore restrict applications such as:

⁴ Gravitytank: “And then there were apps.” <http://www.gravitytank.com/apps/>

⁵ Wired Magazine: “The Long Tail.” <http://www.wired.com/wired/archive/12.10/tail.html> (October 2004)

⁶ <http://developer.apple.com/iphone/program/sdk/inapppurchase.html>

⁷ AdvertisingAge: “Mobile Marketing: Is ‘App-vertising’ the Answer?” http://adage.com/digitalnext/post?article_id=136622 (13 May 2009)

ITU-T TechWatch Alert (July 2009)

- VoIP apps that challenge conventional voice calls (e.g., Skype⁸);
- IM (Instant Messaging) apps that challenge SMS; and
- Apps that would speed-up surfing and limit online traffic.

These, together with the fear of malware (malicious software), make vendors hesitant to allow developers direct access to the core functionalities of a device, including the phone module, the web browser, the email client and the media player.

Restrictions by manufacturers, vendors and providers have led to a practice, which for the iPhone became known as *jailbreaking*. After the installation of an unofficial software patch, users can bypass the official app distribution mechanism, and install unapproved grey-market applications. For instance, the application iPhoneModem⁹ allows the phone to share its Internet connection with a PC or Mac. Until recently, Apple did not approve Internet sharing applications.¹⁰ Generally, jailbreaking a device voids manufacturer warranty.

Variations and/or ambiguity in these manufacturer restrictions and the lack of interoperability between platforms are obstacles to development of the mobile apps market. Apps written by developers for one device must be rewritten, since application programming interfaces (API) and software development kits (SDK) are specific to each of the major platforms. This process slows time to market, limits market size, prevents customers from using purchased apps on devices of a different type, and causes customer confusion about availability and features.

However, the differences between mobile platforms seem to disappear in some areas. The open source WebKit browser engine¹¹ that concentrates some of the latest technologies for web browsers is the basis for most mobile web browsers; the API of OpenGL ES¹², a standard for graphics for embedded systems, is now widely used to address the graphics hardware of mobile devices.

Backed by the popularity of its founding member Google, the Open Handset Alliance (OHA) is a group of 47 companies whose stated purpose is a commitment to greater openness in the mobile ecosystem.¹³ Its flagship is the open source Linux-based mobile platform Android, which is already showing signs of rapid adoption by manufacturers, operators, application developers and users¹⁴, and is now to be found on some netbooks and other devices, including in-vehicle infotainment systems.¹⁵ Even before consumer

⁸ APC Magazine: "Mobile carriers seek to block Skype on iPhone, BlackBerry," <http://apcmag.com/mobile-carriers-seek-to-block-skype-on-iphone-blackberry.htm> (6 April 2009)

⁹ <http://www.iphonemodem.com/>

¹⁰ iPhone OS 3.0, released on 17 June 2009, supports Internet sharing ("tethering") in some countries.

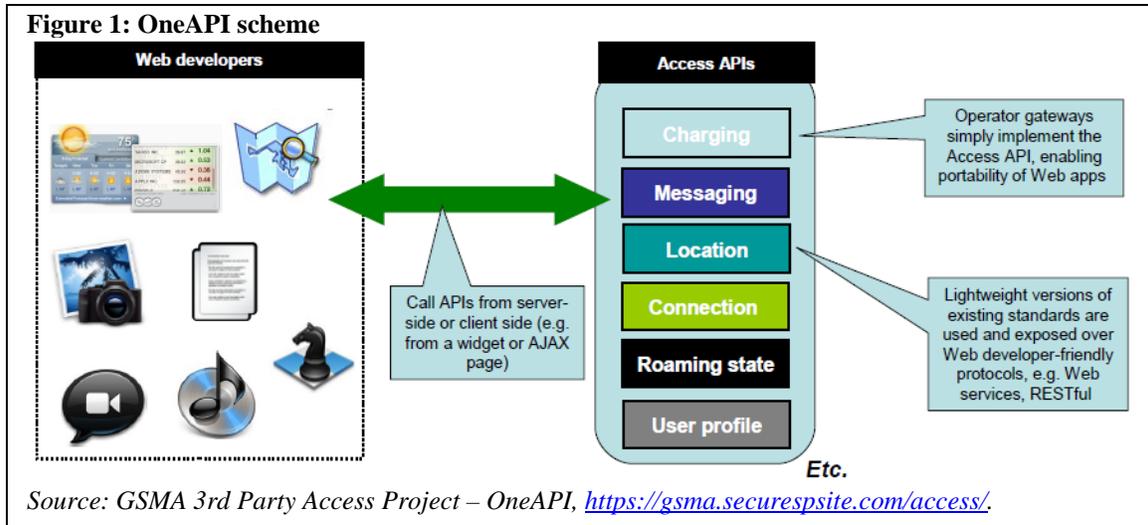
¹¹ <http://webkit.org/>

¹² <http://www.khronos.org/opengles/>

¹³ <http://www.openhandsetalliance.com/> (12 June 2009)

¹⁴ See Ovum source

¹⁵ http://www.conti-online.com/generator/www/de/en/continental/automotive/themes/passenger_cars/interior/connectivity/autolinq/pi_autolinq_en.html



devices equipped with Android were available, thousands of app developers jumped into this market, hoping to be ready for the launch of the first Android devices.

Available on some 30 different handset models, the LiMo Platform (Linux Mobile) is an open operating system for use by the whole mobile industry. The LiMo Foundation was founded by NEC, NTT docomo, Orange, Panasonic, Samsung and Vodafone, and has expanded to more than 50 international members.¹⁶

Another industry forum, the Open Mobile Terminal Platform (OMTP) aims at “simplifying the customer experience of mobile data services and improving mobile device security.”¹⁷ It recently published the BONDI specification, which defines interfaces for secure access to the core functionalities of a device from its web browser or user interface. This avoids developers being locked into one particular platform and enables them to write applications for all BONDI capable handsets.

The GSM Association’s OneAPI initiative¹⁸ seeks to define a commonly supported API to allow operators to disclose information about and capabilities of their mobile network to app developers. The API supports content creation and apps that are portable across the networks of different operators, and provide common interfaces for messaging, location, user data, connection and charging (see Figure 1). The initiative also aims at working with standards bodies on the needs of developers for APIs.

ITU has contributed to the considerable success of mobile communications and applications, including through its role as the global manager of the radio-frequency spectrum, publisher of the IMT-2000 family of standards (3G) and pioneer of IMT-Advanced standards (Beyond 3G). A unique international mobile subscriber identity (IMSI) conforming to ITU-T E.212 is stored in each SIM card and used for identification when interconnecting between (mobile) networks. Many handsets carry implementations of ITU-T Recommendations, for example, speech and audio codecs, such as G.718 or

¹⁶ <http://www.limofoundation.org/en/current-members/index.php>

¹⁷ <http://www.omtp.org/>

¹⁸ <https://gsma.securespsite.com/access/>

ITU-T TechWatch Alert (July 2009)

G.722.2, multimedia decoders for H.263 and H.264 or conform to handset specifications in ITU-T P.300 series of Recommendations.¹⁹

Software developers are demanding lightweight standards and interfaces, which are easily understood and adopted in their applications. In the field of multimedia, accessibility, hands-free communication/user-interfaces and mobile television are areas to keep an eye on. Also, the fusion of communications and location offers potential applications and (location-based) services far beyond automotive navigation systems. Finally, the challenge continues for mobile network operators, service providers and their customers to find solutions to user authentication, identity management and privacy. These points need to be addressed not only from a technical angle, but also under regulatory and policy perspectives, as laws increasingly obligate mobile operators to fulfill the same functions as fixed-line operators.

ITU estimates that by the end of 2007, about 85 countries worldwide had launched 3G networks, and that by the end of 2008, there were close to 335 million mobile broadband subscribers.²⁰ To date, mobile broadband uptake is predominantly in the developed world, where penetration has reached 14 per cent, compared to less than one per cent in the developing world. While these trends suggest that developing economies have much catching up to do, technological advances especially in the mobile sector are offering new possibilities and the potential to help more and more people communicate, and to take advantage of mobile apps and services at increasingly high speed.

Increased focus on standards for open and interoperable APIs would contribute to the success of mobile applications.

This ITU-T TechWatch Alert was prepared by Martin Adolph (tsbtechwatch@itu.int). The opinions expressed in this report are those of the author and do not necessarily reflect the views of the International Telecommunication Union or its membership. To find out more about ITU-T's Technology Watch Function, please visit <http://www.itu.int/ITU-T/techwatch>.

¹⁹ The vast majority of final ITU-T Recommendations are available as PDF free of charge, at <http://www.itu.int/ITU-T/publications/recs.html>.

²⁰ ITU: "Measuring the Information Society - The ICT Development Index." 2009 Edition, available at <http://www.itu.int/ITU-D/ict/publications/idi/2009/index.html>. Note: Not all mobile broadband subscribers are actual users of mobile broadband services. ITU considers those IMT-2000/3G mobile technologies that are supportive of broadband speeds in line with fixed broadband – i.e. CDMA2000 1X EVDO, W-CDMA and HSDPA – as mobile broadband.