

**Nokia 7710 Widescreen Multimedia
Smartphone:
Developer Introductory White Paper**

Version 1.0; November 2, 2004

Nokia 7710

NOKIA

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Change History

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1 Introduction

This document provides an introduction to and overview of the Nokia 7710 Widescreen Multimedia Smartphone and the range of technologies it encompasses. The content of this document includes:

- ◆ A description of the technologies included in the Nokia 7710 smartphone.
- ◆ An overview of the features of devices that incorporate the Nokia 7710 smartphone.
- ◆ An overview of the technologies, tools, and techniques that can be used to develop applications and content for devices incorporating the Nokia 7710 smartphone.
- ◆ A review of the business case for developing applications and content for the Nokia 7710 smartphone and the support programs Nokia offers to developers.

2 Nokia 7710 Smartphone Features

This section describes the technologies implemented in the Nokia 7710 smartphone.

2.1 Symbian OS v7.0s

The Nokia 7710 smartphone is built on Symbian OS v7.0s, which provides developers with a comprehensive set of open, fully object-oriented APIs with which sophisticated mobile applications can be readily created. Some of the key features of Symbian OS v7.0s are:

- ◆ *Telephony* — Comprehensive support covering GSM, with GSM, General Packet Radio Service (GPRS), and Enhanced Data Rates for Global Evolution (EDGE).
- ◆ *Communication* — With multihoming across supported wide- and personal-area networks with HTTP and WAP stack.
- ◆ *Messaging* — With support for Bearer Independent Object (BIO) Messaging, Short Message Service (SMS), Enhanced Messaging Service (EMS), Multimedia Messaging Service (MMS), e-mail, and fax.
- ◆ *Multimedia* — A comprehensive pluggable multimedia framework, Image Conversion Library (ICL), and camera support.
- ◆ *Applications engines* — Providing fundamental engines for a wide range of standard application types, such as contacts, calendar, word processing, and spreadsheet.

Developers who wish to know more about Symbian OS v7.0s should refer to *Symbian OS Version 7.0s Functional Description*, available from the Symbian Web site (www.symbian.com).

2.2 Java™

The Nokia 7710 smartphone supports installing and running Java applications. The supported Java technology is Java™ 2 Platform, Micro Edition (J2ME™), consisting of MIDP 2.0 (JSR-118) and Connected Limited Device Configuration (CLDC) 1.1.

In addition, the following Java APIs are supported:

- ◆ Java Wireless Messaging API (JSR-120).
- ◆ Java Mobile Media API (JSR-135).
- ◆ Java Bluetooth API (JSR-82).

2.3 Browser

The Nokia 7710 smartphone browser supports HTTP 1.0/1.1, HTML 4.01, XHTML 1.0 and 1.1 (also XHTML Basic and XHTML OMA Mobile Profile), Secure Sockets Layer (SSL) 3.0/Transport Layer Security (TLS) 1.0, ECMAScript/JavaScript™, Cascading Style Sheets (CSS) level 1/level 2/Mobile profile and Document Object Model (DOM) level 1/level 2. Other features include audio and video support, a Macromedia 6 Flash plug-in, SVG-T mobile profile support, click-to-browse, fit to screen and the ability to save web pages to a local folder.

2.4 Messaging

The Nokia 7710 smartphone supports sending, receiving, and creating the following types of messages: SMS; MMS — with full 3GPP Synchronized Multimedia Integration Language (SMIL) support; e-mail (IMAP4, POP3); and WAP Push messaging and Smart Messaging. Open Mobile Alliance (OMA) download over the air (OTA) is also supported for the receipt of application files.

The Nokia 7710 smartphone supports messaging-based downloads for small items. It inherently handles MIME content types. All supported content types can be delivered via OMA download, PC connectivity (via USB and Bluetooth wireless technology), MMS messages, and e-mail.

Supported content types include:

- ◆ *Pictures* — a wide range of formats, including GIF, animated GIF, JPEG, PNG, and WBMP.
- ◆ *Java MIDlets* — Java Application Descriptor (JAD) and Java Archive (JAR) files.
- ◆ *Native Symbian applications* — Nokia 7710 smartphone native Symbian applications in the Symbian OS installation file (.sis) format.
- ◆ *Audio files* — MP3, AAC, AMR-NB, AMR-WB, WAV, MIDI, and RealAudio 7 and 8.
- ◆ *Video files* — 3GPP and MP4 as well as RealMedia (.ram and .rm). Encoding: H.263 or MPEG-4 (Profile 0 Level 10).
- ◆ *Personal Information Manager (PIM) files* — vCard and vCalendar.
- ◆ *Ring tones* — MP3, WAV, MIDI, AMR, AAC, and Nokia ring tone.
- ◆ *Icons and logos* — Operator logo icons and calling line identification logos (as defined in the *Nokia Smart Messaging Specification 3.0.0*, available from the Forum Nokia Web site at www.forum.nokia.com).

2.5 OMA Digital Rights Management

The Nokia 7710 smartphone supports the OMA forward-lock method for Digital Rights Management (DRM) of content, which allows a vendor or operator to send content or software to one specific device but does not allow the content or software to be forwarded to other devices. For example, this scheme can be used to protect information provided via a subscription-based information service, such as news, sports, ring tones, screen savers, applications, and games. The user's device can play, display, or execute, but it cannot pass the data or code on to others.

The content itself is hidden within the DRM message that is delivered to the device. In the forward-lock method, the DRM message contains only the media object. Content that has been protected using DRM can be received via HTTP download, OMA download, or MMS.

2.6 OMA Client Provisioning

Client provisioning is a mechanism that allows devices to be configured with minimal user interaction. It involves a formatted message containing setting details sent to the device. On receipt, users are informed that setting details have been received and are asked whether or not they want to apply them. If users choose to apply the settings, the settings are applied automatically.

The Nokia 7710 smartphone supports OMA Client Provisioning for configuring Internet access points, MMS, SyncML Data Synchronization (DS), SyncML DM, and e-mail.

2.7 Device Manager

SyncML DM version 1.1.1 device management capabilities allow operators or device owners to provide settings information, over HTTP, for the Device Manager, Internet settings (including GPRS and CSD), SyncML settings, MMS settings, and e-mail settings.

These capabilities can be extended using the plug-in architecture, which enables the Device Manager to handle settings information for new applications.

2.8 Data Synchronization

The Nokia 7710 smartphone supports SyncML DS version 1.1.1 for synchronization of calendar, tasks, and contacts. Synchronization can be done locally via Bluetooth wireless technology or USB, or remotely via HTTP. Synchronization options include two-way, one-way from the server, one-way from the client, server-alerted synchronization, slow synchronization, and refresh synchronization.

2.9 User interface

The 640 x 320-pixel pen-based UI is built on established paradigms and provides users with an intuitive way to interact with the Nokia 7710 smartphone's applications, as shown in Figure 1.

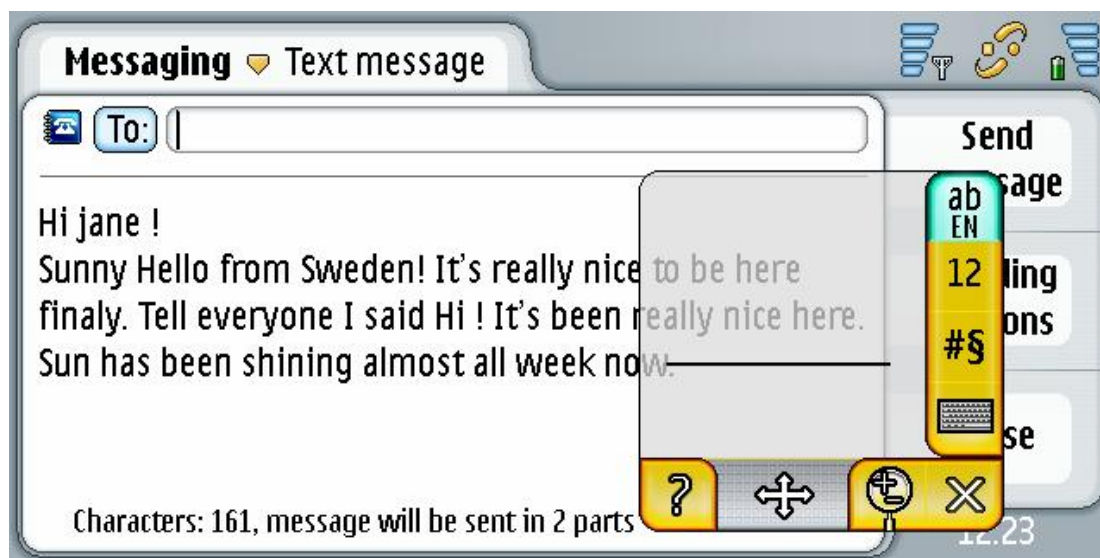


Figure 1: The 640 x 320-pixel pen-based UI provides an intuitive way for users to interact with the Nokia 7710 smartphone.

In addition to direct touchscreen interaction, the UI incorporates three basic interface keys that allow users to activate the main application desk, select menu items, and navigate within the UI.

Text entry is handled by means of an on-screen keyboard or a touchscreen area that supports handwriting recognition.

Developers can find more information on the 640 x 320-pixel pen-based UI in the document *Nokia 7710 UI Style Guide*, which can be found in the Documents section of the Forum Nokia Web site (www.forum.nokia.com/documents).

2.10 Applications

The applications included on the Nokia 7710 smartphone include:

- ◆ Communication applications, such as telephone, messaging, and Internet browser with Macromedia Flash player.
- ◆ Media applications such as image viewer, an integrated video and still camera, a music player, a voice recorder, RealPlayer, and FM radio with Visual Radio, which enables listeners to access synchronized Web content that provides additional interactive content based on the audio. For more information on Visual Radio, see the Visual Radio Web site (www.visualradio.com).
- ◆ PIM with calendar, tasks, and contacts applications.
- ◆ Office support with word processor, sheet, and presentation viewer applications.

3 Developing Applications For The Nokia 7710 Smartphone

This section discusses the creation of applications and content for the Nokia 7710 smartphone. It reviews the development options available for creating applications and content and the tools that aid the development process, and, finally, it looks at the Develop/Optimize approach to the efficient creation of applications and content that can easily be made available on the Developer Platforms.

3.1 Technologies

The Nokia 7710 smartphone provides developers with the opportunity to create C++ and Java MIDlet applications, browsing services using HTML or XHTML, messaging services using MMS, and content such as themes, ring tones and wallpapers.

3.1.1 Native Symbian OS C++

C++ is the native programming language of the Nokia 7710 smartphone. The version of C++ used is Symbian's own implementation, which is optimized for small devices with memory constraints. The Standard Template Library (STL) is not supported, and other changes have been made to the standard C++ language.

Public C++ APIs allow the developer to harness the full capabilities of the platform and allow access to a variety of application engines such as the `PhotoAlbum` and `Phonebook`, and to a multitude of technologies, such as Bluetooth connectivity, graphics, multimedia, messaging, networking, and telephony.

Developers can learn more about creating C++ applications for the Nokia 7710 smartphone from the documents *Getting Started With C++ Application Development On The Nokia 7710 Device* and *Designing C++ Applications For The Nokia 7710 Device*. These documents can be found in the Documents section of the Forum Nokia Web site (www.forum.nokia.com/documents).

3.1.2 Java

Support is provided for J2ME, CLDC 1.1, and MIDP 2.0. The following additional Java APIs are also supported:

- ◆ Java FileConnection and Personal Information Management (PIM) APIs (JSR-75) allow applications to access the file system in the internal or MMC card memory on a Nokia 7710 smartphone as well as information included in the contacts and calendar applications.
- ◆ Java Bluetooth API (JSR-82), which allows applications to exploit Bluetooth connectivity. Standard Bluetooth protocol RFCOMM is supported, as well as Service Discovery, but OBEX is not supported.
- ◆ Java Wireless Messaging API (JSR-120), which supports the sending and receiving of SMS messages via GSM and CDMA in addition to WMA Push.
- ◆ Java Mobile Media API (JSR-135), which provides the ability to play back and record images, sound, and video, and includes methods to manipulate the camera. The implementation does not support sounds while streaming nor is full MIDI control supported.

The legacy Nokia UI API is also supported to aid developers who wish to bring their MIDP 1.0 applications to the Nokia 7710 smartphone from Series 40 Developer Platform 1.0 or Series 60 Developer Platform 1.0.

3.1.3 Browsing

Web authors can use XHTML or HTML to create Web sites suitable for the Nokia 7710 smartphone. Because the browser supports XHTML, content compatible with the browsers on Series 40 Developer Platform 2.0 and Series 60 Developer Platform Second Edition can also be viewed.

Developers can learn more about creating Web content for the Nokia 7710 smartphone from the document *Designing XHTML/HTML Content For The Nokia 7710 Device*, which can be found in the Documents section of the Forum Nokia Web site (www.forum.nokia.com/documents).

3.1.4 Theme Development

Third-party developers and users can create themes for the Nokia 7710 smartphone using the Nokia 7710 Theme Studio for Symbian OS. With the Theme Studio, a developer or user can create, edit, and view themes to customize wallpaper, application icons, color schemes, and other elements of the user interface. The Nokia 7710 Theme Studio for Symbian OS will create the appropriate *.sis files, which can then be deployed to a Nokia 7710 smartphone. The Theme Studio will be available for download from the Tools and SDKs section of the Forum Nokia Web site (www.forum.nokia.com/tools).

3.1.5 Content development

Content developers can create content using MMS or in any of the supported graphic, video, or audio formats.

Developers can learn more about creating content for the Nokia 7710 smartphone and protecting it with DRM from the document *Designing Content For The Nokia 7710 Device*, which can be found in the Documents section of the Forum Nokia Web site (www.forum.nokia.com/documents).

3.2 Development Tools

Java and C++ developers who want to develop applications for the Nokia 7710 smartphone can download the Nokia 7710 MIDP SDK for Symbian OS from the Tools and SDKs section of the Forum Nokia Web site (www.forum.nokia.com/tools). Full production versions of the tools are under development and will be released soon.

3.2.1 Native Symbian OS C++

Applications are created with the Nokia 7710 SDK for Symbian OS that provides developers with access to the public APIs, application examples, documentation, and a Nokia 7710 smartphone emulator. The SDK provides all the tools necessary to create Nokia 7710 smartphone applications using the Microsoft Visual Studio 6.0, Microsoft Visual Studio .NET 2003, Borland C++ BuilderX 1.5, and Metrowerks CodeWarrior Development Tools for Symbian OS development environments.

The Nokia 7710 SDK for Symbian OS, is available for download from the Tools and SDKs section of the Forum Nokia Web site (www.forum.nokia.com/tools).

3.2.2 Java

Nokia 7710 MIDP SDK for Symbian OS is currently available from the Tools and SDKs section of the Forum Nokia Web site (www.forum.nokia.com/tools). The SDK provides everything necessary to create MIDP 2.0 applications for the Nokia 7710 smartphone.

The Nokia 7710 MIDP SDK for Symbian OS will plug into the Nokia Developer's Suite for the J2ME.

3.2.3 Audio development

Developers wishing to create audio content for the Nokia 7710 smartphone may be interested in the Nokia Audio Suite, a tool for creating SP-MIDI polyphonic ring tones, which is available from the Tools and SDKs section of the Forum Nokia Web site (www.forum.nokia.com/tools).

3.2.4 Content development

Developers wishing to create mobile Internet content such as XHTML, WAP, and MMS (including SMIL transitions and time line) may be interested in the Nokia Mobile Internet Toolkit. This toolkit allows content to be previewed on supported SDKs and for DRM protection to be applied to such content. The Nokia Mobile Internet Toolkit is available from the Tools and SDKs section of the Forum Nokia Web site (www.forum.nokia.com/tools).

3.3 Develop/Optimize

Developers are encouraged to adopt the best-practice architecture, one that separates the application engine and UI layers, in creating applications for the Nokia 7710 smartphone. Such an architecture will make it possible to easily optimize applications for UIs by replacing the UI layer in the application.

With that architecture, developers can readily migrate applications for the Nokia 7710 smartphone to Series 60 Developer Platform Second Edition and Series 80 Developer Platform 2.0, as well as Series 40 Developer Platform 2.0 when applications are written using Java. Where an application has been written using the common platform APIs, developers should need to optimize the application only for the UIs available on the target platform.

4 Known Issues

Where issues are identified with the technology implemented in the Nokia 7710 smartphone, information will be made available in the Documents section of the Forum Nokia Web site (www.forum.nokia.com/documents).

5 Business Case

5.1 Business Opportunities

The mobile sector is creating exciting new opportunities for content and application developers. This section examines why developers should consider creating mobile content and applications, and the value proposition created by the Nokia 7710 smartphone.

5.2 The Business Case For Creating Mobile Applications And Content

The availability of smart mobile devices with high-quality screens and audio systems, coupled with the advent of reliable high-speed data networks, is generating consumer demand for applications and media that can be used anytime and anywhere. As a result, the market for mobile applications and content experienced significant growth in 2003.

Jupiter Research estimates that in 2003 the European mobile-content market was worth 970 million euros. This broke down to 505 million euros spent on customization (ring tones, logos, and screen savers), 211 million euros on gaming, 149 million euros on news, and 105 million euros on other applications. Furthermore, Jupiter Research forecasts that the European market for mobile content will grow to 1.9 billion euros in 2004 and rise to 5.3 billion euros by 2006. This growing demand is creating real revenue opportunities for developers.

The availability of Nokia's Series 30 devices, as well as devices incorporating the Series 40 Developer Platform, the Series 60 Developer Platform, and the Series 80 Developer Platform, is encouraging users to download ring tones, logos, and screen savers.

- ◆ WES (Wireless Entertainment Services Finland Ltd.) is a developer of high-quality mobile-entertainment content, including ring tones, logos, branded graphics, animations, MMS-based content, and Java games. WES has worldwide distribution channels through more than 50 mobile operators and portals. By July 2004, its cumulative sales had exceeded 120 million mobile-content items.

While ring tones, logos, and screen savers account for half of the revenue in the European market, there remains a significant market for other content, which is led by a demand for games.

- ◆ Mforma Group's Top Gun Air Combat game was downloaded more than 340,000 times in 2003 through operators in Europe and North America, with more than 50 percent of downloads being to Nokia devices.

But games are not the end of the story: News, personal productivity, and business applications, among others, have been finding considerable success. Typical success stories include:

- ◆ Forty reporters at the British Broadcasting Corporation (BBC) have Nokia 3650 smartphones equipped with enhanced third-party video-capture software that allows them to capture up to 40 minutes of broadcast-quality video that can be wirelessly sent to servers at the BBC for play. "This is all part of the revolution in which mobile technology is transforming what we do," says Adrian Van Klaveren, head of newsgathering, BBC News.
- ◆ When MobiMate, a company with its roots in the PDA market, ported its WorldMate application — which has sold more than half a million licenses — to Symbian OS, it saw most of its subsequent monthly downloads, of around 15,000 licenses, come from mobile devices.

Mobile applications and content cover every imaginable interest and demand, from mass-market to specialist niches. The fact that consumers carry their mobile devices with them also creates a demand across time unmatched by any other medium. Tapping into this new demand for mobile applications and services offers developers significant opportunities for revenue growth.

5.3 The Business Case For Creating Mobile Applications And Content For The Nokia 7710 Smartphone

The Nokia 7710 smartphone is designed to provide active consumers with a near-desktop experience wherever they are. Nokia 7710 smartphone owners will demand high-quality content and applications.

The Nokia 7710 smartphone offers developers the opportunity either to exploit their existing portfolios of Developer Platform applications and content or to create new unique and exciting offerings. Nokia believes that the mobile services market will grow at a compound annual growth rate (CAGR) of 30 percent between now and 2008. The Nokia 7710 smartphone, as an extension of Nokia's smartphone offerings, provides developers with a new opportunity to be a part of this growth.

5.4 Marketing Tools

Nokia connects mobile application developers to the market in multiple ways. Through Forum Nokia, developers can find connections and access points to leading operators and software channels, such as Handango, Nokia Software Market, Jamba!, Buongiorno, and iTouch. For full details, please visit the Business Opportunities section of the Forum Nokia Web site (www.forum.nokia.com/business).

Nokia has launched a developer program, Forum Nokia PRO, which provides its members with exclusive access to business opportunities through industry and customer events, customer matchmaking, marketing catalogs, and several other programs. Membership in Forum Nokia PRO also provides developers with access to Preminet, Nokia's end-to-end solution for the delivery of mobile applications to consumers through operators and communities worldwide. For full details, please visit the Forum Nokia PRO section of the Forum Nokia Web site (www.forum.nokia.com/pro).

6 Summary

The Nokia 7710 smartphone sets a new consumer standard in mobile communications. Its large screen provides users with a near-desktop browsing experience, and a full set of applications will provide businesspeople and consumers with all the tools they require for daily communication and information gathering.

While the Nokia 7710 smartphone breaks new ground for consumers, it is built on technologies that today's mobile developers already know. Native C++ applications are supported by Symbian OS v7.0s, an operating system built for mobile devices. Java application developers have access to the power of MIDP 2.0 in addition to standard API extensions for Bluetooth connectivity, wireless messaging, and mobile media. Browsing developers can use HTML or XHTML, while other content can be incorporated into MMS or delivered in one of a range of image, video, and audio file formats.

The use of open technologies allows developers to leverage their research and development investment across multiple device families. The Nokia 7710 smartphone shares the Symbian OS environment with Series 60 Developer Platform Second Edition and Series 80 Developer Platform 2.0, and shares Java and content technologies with Series 40 Developer Platform 2.0, Series 60 Developer Platform Second Edition, and Series 80 Developer Platform 2.0.

7 References

The following documents, available from the Documents section of the Forum Nokia Web site (www.forum.nokia.com/documents), were referenced in this paper:

- ◆ *Symbian OS Version 7.0s Functional Description.*
- ◆ *Nokia Smart Messaging Specification 3.0.0.*
- ◆ *Nokia 7710 UI Style Guide.*
- ◆ *Getting Started With C++ Application Development On The Nokia 7710 Device.*
- ◆ *Designing C++ Applications For The Nokia 7710 Device.*
- ◆ *Designing XHTML/HTML Content For The Nokia 7710 Device.*
- ◆ *Designing Content For The Nokia 7710 Device.*