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TEC

TELECOMMUNICATION ENGINEERING CENTRE

टी ई सी संचारिका NEWSLETTER

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Software Platforms of Mobile Terminals

Symbian (Nokia, Samsung, LG, Sony Ericsson, etc.)						
OS 9.1	OS 9.2	OS 9.3	OS 9.4	SymbianPlatform		
S60						
3.0	3.1	3.2	5.0			
3rd Edition	3rd Edition, Feature Pack 1	3rd Edition, Feature Pack 2	5th Edition (Symbian^1)	Symbian^2	Symbian^3	Symbian^4

Research in Motion BlackBerry OS (BlackBerry)						
4.1 Branch	4.2 Branch	4.5 Branch	4.6 Branch	4.7 Branch	5.0 Branch	
4.1.0	4.2.1	4.5.0	4.6.0 4.6.1	4.7.0 4.7.1	5.0.0	

Apple iPhone OS (iPhone, iPod Touch, iPad)										
1.0		1.1				2.0	2.1	2.2	3.0	3.1
1.0.1	1.0.2	1.1.1	1.1.2	1.1.3	1.1.4	1.1.5	2.0.1 2.0.2	2.2.1	3.0.1 3.1.2	3.1.3
										3.2
										4.0

Microsoft Windows CE													
(HTC, Samsung, LG, Toshiba, Sony Ericsson, Dell, Acer, etc.)							(KIN 1, KIN 2)			(Zune, Zune HD)			
5.0		5.2					6.0						
Microsoft Windows Mobile							Microsoft Windows Phone 7		Microsoft KIN OS		Microsoft Zune OS		
5.0		6.0		6.1		6.5		7.0		1.0		1.x Branch 2.x Branch 3.x Branch 4.x Branch	
						6.5.1 6.5.3 6.5.5							

Linux - Smartphones																				
(HTC, Samsung, LG, Toshiba, Sony Ericsson, Dell, Acer, etc.)					(Nokia)		(Nokia, LG, Intel, etc.)		(Palm)				(Samsung)							
Google Android					Maemo	MeeGo		webOS							bada					
1.5	1.6		2.0		2.1		5.0		1.0 (Maemo 6.0)		1.0/1.1 Branch		1.2 Branch		1.3 Branch		1.4 Branch		1.x	
							1.0.2	1.0.3			1.0.4	1.1.0	1.2.0	1.2.1	1.3.1	1.3.5	1.3.5.1	1.4.0		
Google Chrome OS/Chromium OS					Intel Moblin		Ubuntu Netbook Edition													
Alpha Stages					2.0	2.1			8.04 (LTS)		8.10		9.04		9.10		10.04 (LTS)		10.10	
Linux - Netbooks																				

1.0 Introduction:

The functionality of mobile terminals has evolved tremendously over the 10 years, initially; there was just the voice transmission. Then, short message service (SMS) and web browsing (WAP and i-mode) were added. Later, interactions with vending machines (e-mode) and multimedia messaging services (MMS) became available. Most recently, video conferencing and interaction with the surrounding physical environment (i-area) became possible. This trend indicates a clear evolution toward Machine-to machine communications, which requires a sophisticated software infrastructure running in the mobile terminals.

2.0 Generic Terminal Software Platform:

The evolution of cell phone functionality is the result of the supplicated of the supporting infrastructure running in the phones. These building blocks are operating system kernel, run time environment, middleware, and applications.

The operating system kernel is the software responsible for managing, exporting, and arbitrate the hardware resources provided by the terminals. The operating system kernel is a vital component that hides the underlying hardware complexity and heterogeneity and enables the construction of software. All remaining building blocks depend on the operating system kernel. Operating system kernel for terminals have matured significantly over the last years, evolving from simple hardware monitors to sophisticated designs, similar to existing desktops' operating system. However, unlike existing desktop operating system kernel, mobile terminals impose restrictions on their operating system kernels, including low memory footprint, low dynamic memory usage, efficient protocols, and reliability.

The runtime environment provides a safe and managed execution environment and contributes to the development of portable

applications. Most existing runtime environments are based on a sandbox model that prevents applications from accessing unauthorized resources. The two best known runtime environments are Sun's JVM and Microsoft's .NET. Mobile handsets are highly heterogeneous in terms of hardware resources. As a result, traditional application development is a challenge that requires developers to take into account different hardware configurations. Java 2 Micro Edition and .NET Compact Framework allow developers to write applications that can be used in multiple devices. Only the runtime environment has to be customized to each hardware platform. This feature, combined with the ability to ensure security policies that restrict application access to hardware resources make J2ME and .NET Compact Framework a key component in the development of applications for mobile terminals.

Middleware comprises a collection of services that provide functionality to simplify the construction of applications that execute across heterogeneous platforms. Middleware includes support for remote communication (for example, remote procedure calls and object request brokers), synchronization, caching, Event notification, multimedia, security, and graphics. Middleware can leverage the execution runtime or it can interact directly with the operating system for improved performance.

Finally, the applications layer includes user software that leverages the previously mentioned building blocks. The number of applications is growing exponent and different applications have different requirements. For example, distributed applications require interaction and coordination with remote applications and, therefore, leverage the middleware services. Some applications require the runtime environment to execute, while other applications run natively and interact directly with the operating system kernel.

3.0 Terminal Software Platform Evolution:

1G and 2G phones correspond to the beginning of the era of cellular phones. The difference between 1G and 2G is the upgrade from analog to digital networks, however, phone functionality was identical and mostly voice oriented. Strictly speaking, phone did not have an OS as we now have, that is, a separate component running in privileged mode and supporting general-purpose applications. Applications and OS were packaged in a single binary image, customized to the hardware configuration of each phone. Furthermore, there were no runtime environment or middleware services. Users were not allowed to install software on the phones. Finally regarding security, GSM phones were equipped (and still are) with a subscribers identification module (SIM) card that protects phone in case of theft.

2.5G /3G phones represent a major step forward in terms of data connectivity and functionality they provide. These phones are equipped with a real OS that exports functionality including thread, process, and memory management, scheduling multimedia and graphic acceleration. Furthermore, these phones allow users to download applications at runtime, and therefore, have a runtime infrastructure that provides a safe execution environment for these applications. The runtime ensures that malicious applications cannot disrupt the basic phone functionality. These phones also provide middleware services to support personal information management applications, data synchronization, messaging, and secure transactions. Finally, most 2.5G/3G phones provide VPN, secure sockets, and encryption/decryption libraries to support the development of secure applications. The most noticeable feature with 2.5G/3G phones is the significant increase in data communication. In Japan, for example, the number of e-mails sent and received from phones is larger than the number sent and received from PCs.

XG phones will be clearly oriented towards data transmission. Their software infrastructure will evolve to provide advanced functionality in terms of OS, runtime infrastructure, middleware, and security. The operating system will be dynamically configurable and upgradeable. Furthermore, it will be highly optimized to reduce energy consumption, fault tolerant, and secure. The runtime environment will provide faster execution times and support for real-time applications. The middleware infrastructure will provide advanced services to enable seamless distributed computing and will be the basis for future ubiquitous computing. Finally, XG devices will provide hardware attachments to protect the data stored in the device in case of theft or unauthorized remote access. Also, these hardware attachments will protect the identity of the user, so it is not possible to use the device to impersonate the owner.

4.0 Popular Terminal Software Platform:

4.1 Symbian OS:

In the number of “smart mobile device” shipments, Symbian devices are the market leaders.

Symbian OS was created with three systems design principles in mind:

- the integrity and security of user data is paramount,
- user time must not be wasted, and
- all resources are scarce.

Symbian features pre-emptive multitasking and memory protection. It supports the following features:

- Rich suite of application services, including services for contracts, schedule, messaging, browsing, and system control.
- Java support
- Real time
- Hardware support, including different CPUs peripherals, and memory types.

- Messaging with support for MMS, EMS, SMS, POP3, IMAP4, SMTP and MHTML
- Multimedia, including image support, as well as video and audio streaming.
- Graphics with a graphics accelerator API
- Mobile telephony, with support for most existing carriers and ready for 3G networks.
- International support
- Data synchronization
- Device management/ Over the Air (OTA) provisioning
- Security
- Wireless connectivity, including Bluetooth and 802.11b.

4.2 Palm OS:

Palm OS is the popular software platform for PDAs, which has been extended with functionality for telephony, which provides the following features.

- Multimedia, including high resolution display, video and audio.
- Wireless connectivity, including 802.11b, Bluetooth, GSM, CDMA, and 2.5G and 3G networks.
- Security with different encryption algorithms and SSL
- Built in support for ARM processors
- PIM program built in
- Large collection of software and one of the largest software development communities
- PC synchronization.

The simplicity of usability and programmability make it a popular terminal software platform (especially for PDAs where it has the largest market share).

4.3 Windows Mobile:

Windows Mobile is a compact mobile operating system developed by Microsoft, and

designed for use in smart phones and mobile devices.

The current version is called "Windows Mobile 6.5". It is based on the Windows CE 5.2 kernel, and features a suite of basic applications developed using the Microsoft Windows API. It is designed to be somewhat similar to desktop versions of Windows, feature-wise and aesthetically.

The Windows CE .NET platform is a new version of the popular Windows OS specifically customized to embedded devices. Windows CE.NET is part of the Windows Mobile initiative, which includes a built-in bundle providing PIM functionality, e-mail, and browsing capabilities. The operating system provides the following features:

- Support for small-footprint optimization
- Hard real-time kernel
- Robust memory management
- Advanced power management
- Open communications platform (such as TCP/IP IPv6 and OBEX)
- Remote and system manageability (SNMP v2 Client, Device Management client)
- Standards support (such as UPnP, Bluetooth, XML and SOAP, and USB)
- Extensive store and file systems.
- Purpose-built server services.
 - Core server support
 - File transfer protocol (FTP) server
 - Remote access/ point-to-point (PPTP) server
 - File and print server support.

Finally, the NET Compact, Framework is a runtime environment developed by Microsoft that supports the development of safe, efficient, and portable applications.

4.4 Windows Phone 7

Windows Phone 7 was initially intended to be released during 2009, but it was delayed. Microsoft revealed details of Windows Phone 7,

which features a new operating system and integration with Xbox Live and Zune services. Phones currently running Windows Mobile 6.x will not be upgradeable to Windows Phone 7.

4.5 QUALCOMM BREW:

Binary Runtime Environment for Wireless (BREW) is a full terminal software platform from QUALCOMM that offers a method to run software applications on a mobile device.

BREW is a complete solution that includes both technical and business elements. It provides native support C and C++ and can be extended with additional runtime systems, such as Java Virtual Machine (JVM), thereby supporting additional languages, BREW support OTA (Over the air) application downloading and application management facts, e-mail, and instant messaging, BREW also provides support libraries for multimedia applications that are optimized to the device's hardware. Finally, BREW provides a unified billing mechanism.

4.6 Android:

Android is an operating system for mobile devices. It was initially developed by Android Inc., a firm later purchased by Google, and lately by the Open Handset Alliance.

Android is a software stack for mobile devices that includes an operating system, middleware and key applications. It provides the tools and applications necessary to begin developing applications on the android platform using the java programming language.

It has some of the advanced features that include:

- Application Framework
- Dalvik virtual machine
- integrated browser
- Optimized graphics

- SQLite for structured data storage
- Media support
- GSM telephony
- Bluetooth, EDGE, 3G and WiFi
- Camera, GPS, compass and accelerometer
- Rich Development Environment

All the applications like messaging Maps browser etc. are written in JAVA programming language. Android includes a set of core libraries that provides most of the functionality available in the core libraries of the Java programming language.

Android relies on Linux version 2.6 for core system services such as security, memory management, process management, network stack, and driver model. The kernel also acts as an abstraction layer between the hardware and the rest of the software stack.

4.7 Apple iOS:

Previously it was known as iphone OS. The iOS is Apple's Mobile Operating system developed originally for iPhone and later deployed in the iPod touch and iPod as well. It is Unix like operating system by nature.

The Operating System uses roughly 500MB memory of the device storage.

This has got multiple features which makes it stronger.

Some of these include:

- User interface-The User Interface of iOS is based on the concept of direct manipulation, using multi touch gesture. Interface control elements consist of sliders, switches and buttons.
- Home screen Included applications like: Phone, Mail, Messages, Calender, Safari, Photos, Camera, youtube, stocks, compass, contacts and many more.
- Multitasking: Multitasking is supported through the use of 7 background APIs (i.e. application programming interface) specifically, background

audio, voice over IP, background location, push notification, local notification, task finishing, fast app switching.

- Unsupported technologies: iOS does not support Adobe flash or Java. This adversely affects viewing Websites that use these technologies.

4.8 Blackberry OS:

BlackBerry OS is Research in Motion (RIM) 's proprietary mobile operating system, developed for its BlackBerry line of smartphone handhelds. The operating system provides multitasking and supports specialized input devices that have been adopted by RIM for use in its handhelds, particularly the trackwheel, trackball, and most recently, the trackpad and touchscreen.

The BlackBerry platform is perhaps best known for its native support for corporate email, through MIDP 1.0 and, more recently, a subset of MIDP 2.0, which allows complete wireless activation and synchronization with Microsoft Exchange, Lotus Domino, or Novell GroupWise email, calendar, tasks, notes, and contacts, when used in conjunction with BlackBerry Enterprise Server. The operating system also supports WAP 1.2.

Updates to the operating system may be automatically available from wireless carriers that support the BlackBerry OTASL (over the air software loading) service.

Third-party developers can write software using the available BlackBerry API (application programming interface) classes, although applications that make use of certain functionality must be digitally signed.

4.9 Comparison of Some Mobile Operating Systems:

Feature	iOS	Android	webOS	Windows Mobile	Black Berry OS	Symbian	MeeGo	Bada	Maemo
Company	Apple	Open Handset Alliance	HP/Palm	Microsoft	RIM	Symbian Foundation	Intel and Nokia	Samsung	Nokia
Current Version	4.0	2.2	1.4.3	6.5.3	5.0.0	9.5	1.0	5.0	
OS Family	Mac OS X/Unix-like	Linux	Linux	Windows CE 5.2	Mobile OS	Mobile OS	Linux	Mobile OS	Linux
Supported CPU Architecture	ARM (iDevices only)	ARM, MIPS, Power Architecture, x86	ARM	ARM	ARM	ARM, x86	ARM, x86	ARM	

References:

1. "Smart Phone & Next Generation Mobile Computing" , Pie Zheng, Lionel m Ni; ELSEVIER
2. "Next Gneration Mobile Systems 3G & beyond, Editor: Minoru Etoh, WILEY
3. Wikipedia



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The scope of this certificate of registration covers :

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Exclusion: Clauses 7.3 (Design & Development)

This certificate is valid upto : **21.06.2013**

22-06-2010

Date


(G.C. Saxena, CEO)
(for STQC Directorate)

*"Further clarifications regarding the scope of this certificate and the applicability of
ISO 9001 : 2008 requirements may be obtained from STQC Certification Services."*



Important Activities of TEC during April 2010 to June 2010

New /Revised GRs/IRs

- GR on Requirement of Lawful Interception System (LIS) for PSTN,
- IR on Switching Node with Network-Network Interface at STM-I,

Other Activities:

- TEC is now ISO 9001 : 2008 accredited organisation,
- Compendium on Next Generation Network release - II
- Approval of policy document "National IPv6 Deployment Roadmap" received.

Approvals issued by TEC during the period April 2010 to June 2010

Interface Approvals.....30
 Type Approvals06
 Certificate of Approvals.....12
 Service Approvals.....01



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जुलाई 2010

भाग 14

अंक 2

दूरसंचार इंजीनियरी केन्द्र

खुर्शीद लाल भवन

जनपथ

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