



# CMJ251-Manajemen Jaringan Mobile

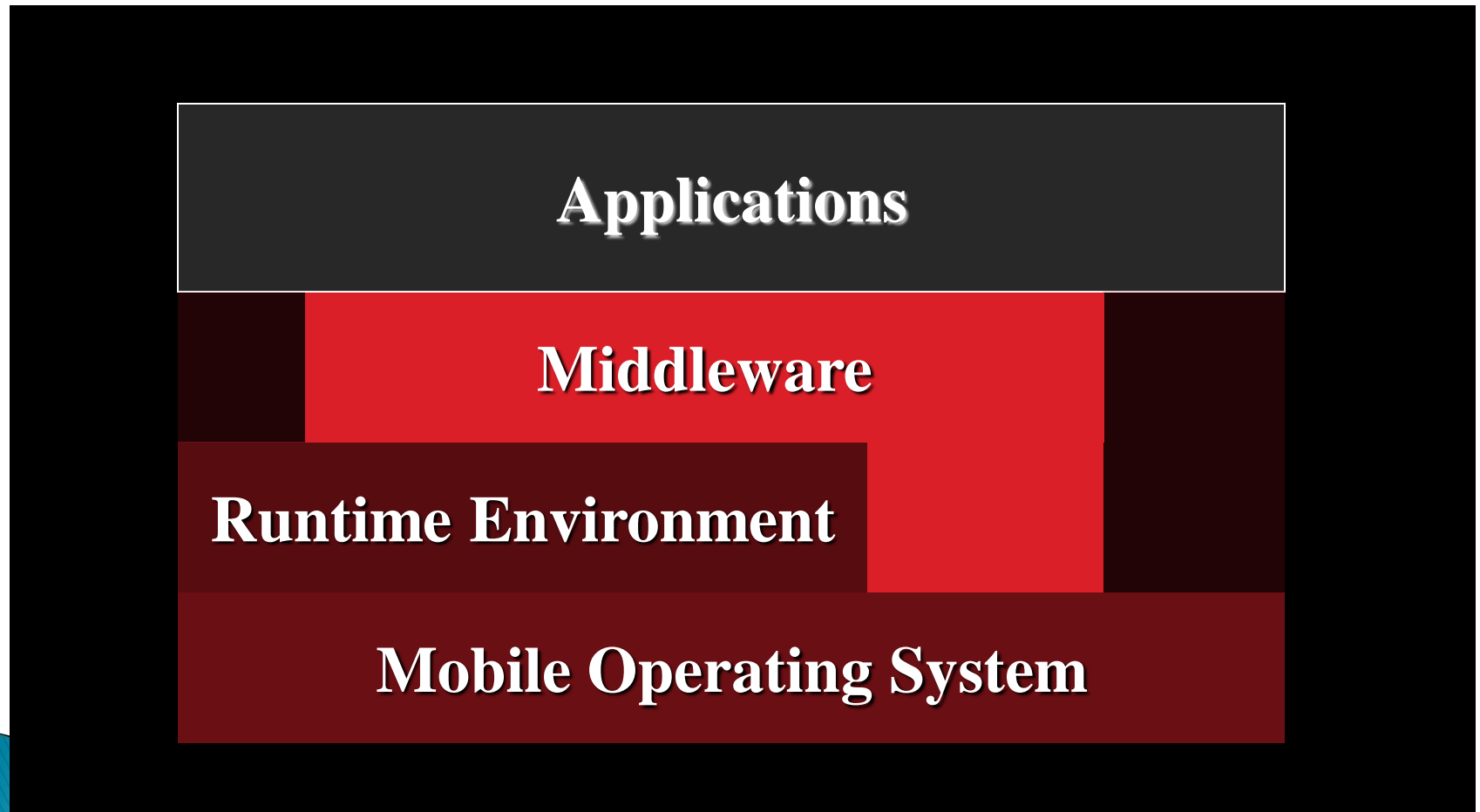
[www.esaunggul.ac.id](http://www.esaunggul.ac.id)

Dosen Pengampu :

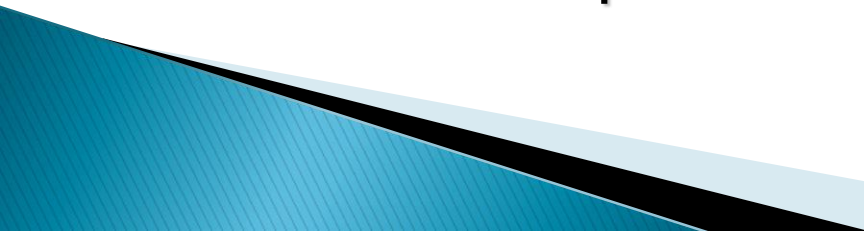
**5165-Kundang K Juman, Ir, MMSI**  
Prodi Teknik Informatika Fakultas Ilmu Komputer

**symbian**

# Generic Mobile Computing Platform



# Mobile Operating System (1)

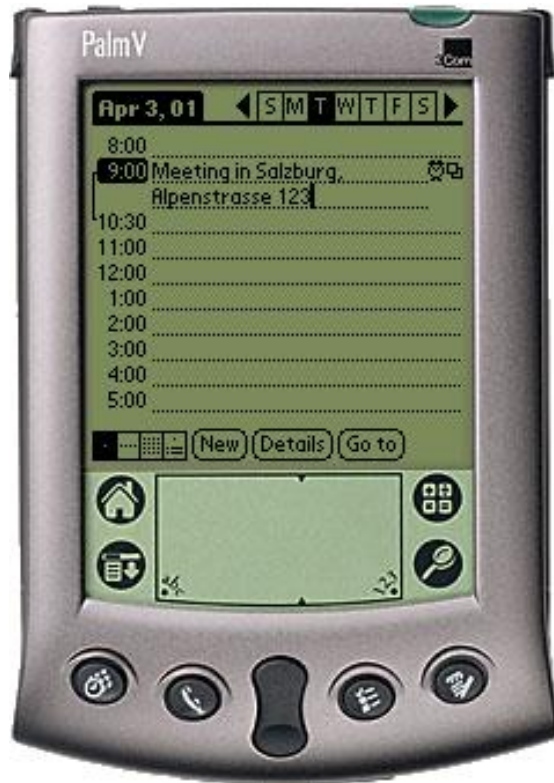
- ▶ It is the **software responsible** for managing, and exporting the hardware resources provided by devices.
  - ▶ It is **vital component** that **hides** the underlying hardware complexity and heterogeneity and enables the construction of software.
  - ▶ It is similar to the desktop operating system **with restricted components**.
  - ▶ It is including **low memory footprint, low dynamic memory usage, efficient power management framework, real-time support** for telephony and communication protocols and **reliability**.
- 



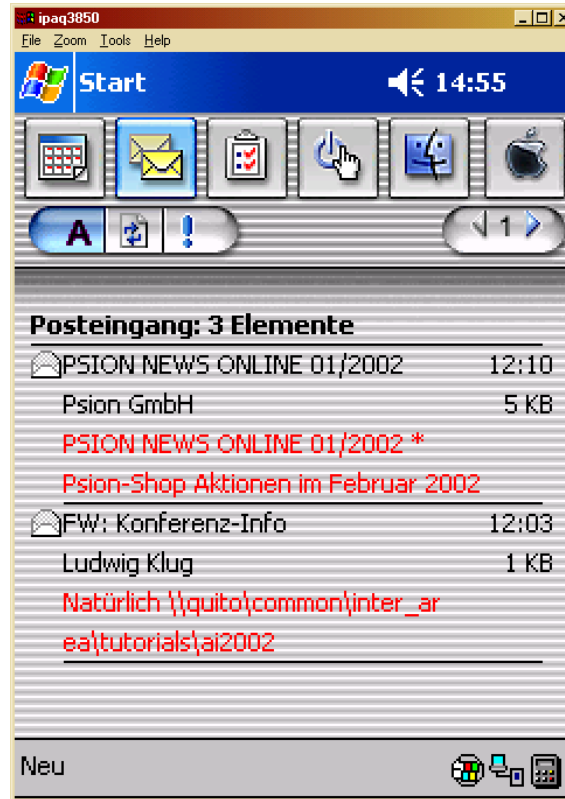
# Mobile Operating System (2)

1. Symbian OS
  2. Palm OS
  3. Windows CE .NET OS
- 

# Mobile OS Example



PalmOS



PocketPC



Symbian OS

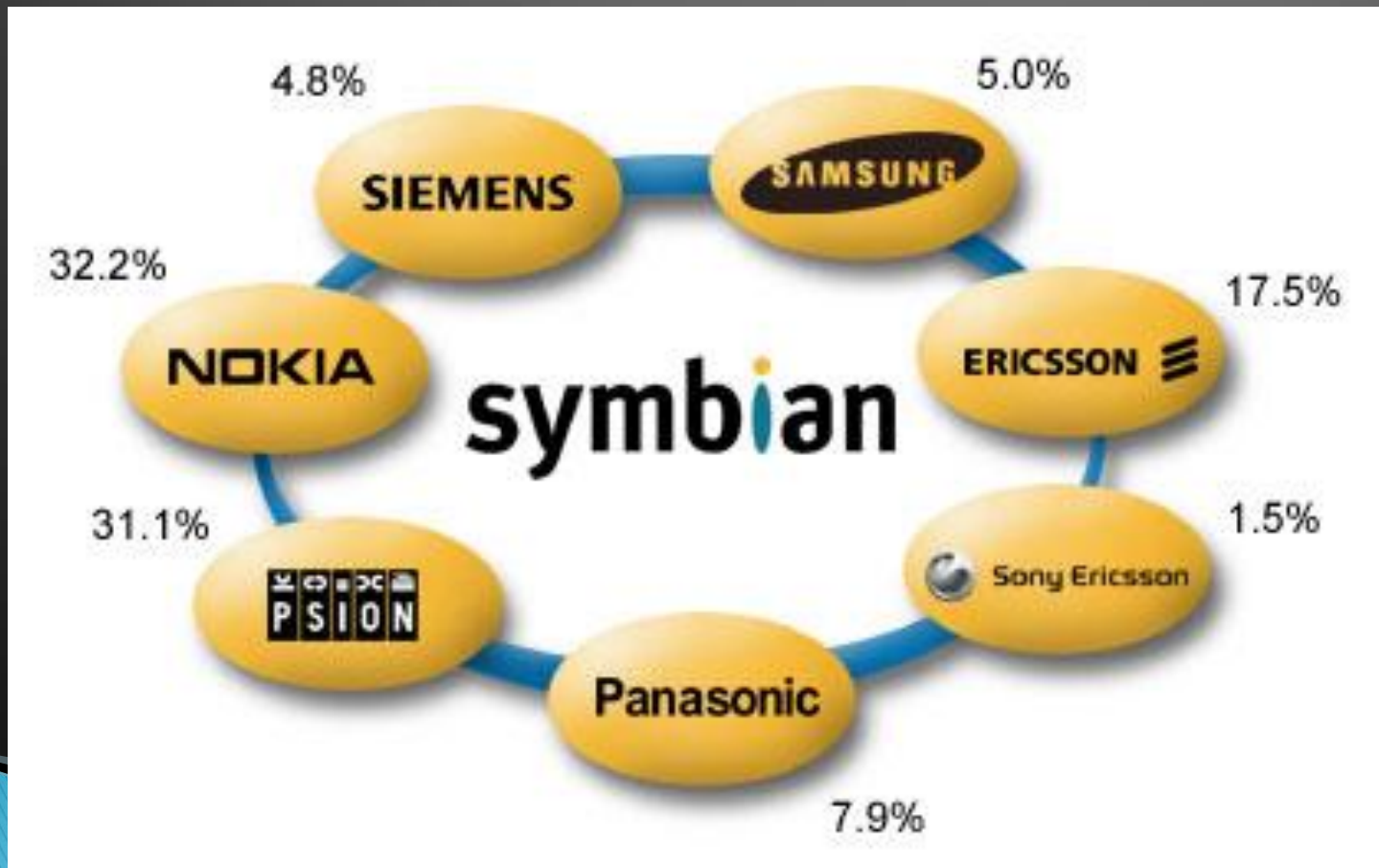
# Interface Symbian OS



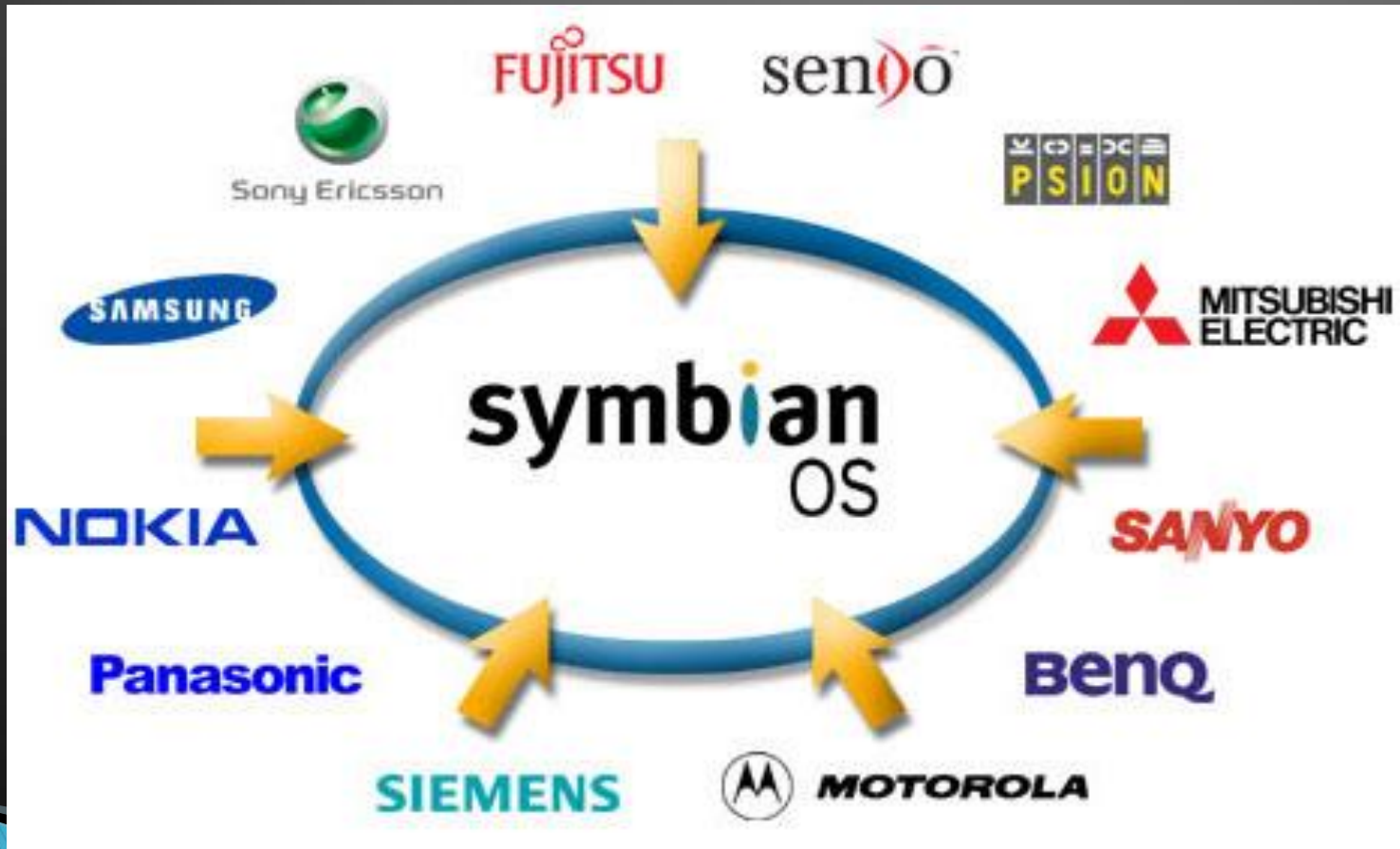
# Owners

Symbian was established as a private independent company in June 1998 and is owned by Ericsson, Nokia, Panasonic, Motorola, Psion, Samsung Electronics, Siemens and Sony Ericsson.

Headquartered in the UK, it has offices in Japan, Sweden, UK and the USA.



# Licenses

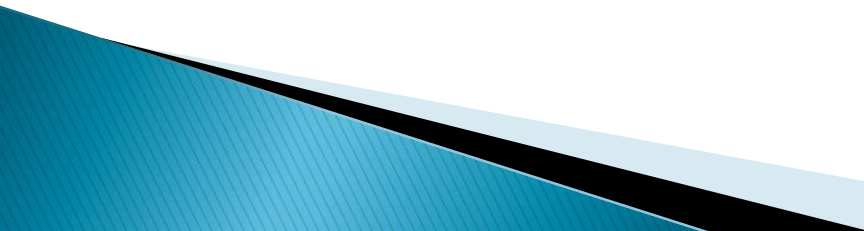


# Symbian OS

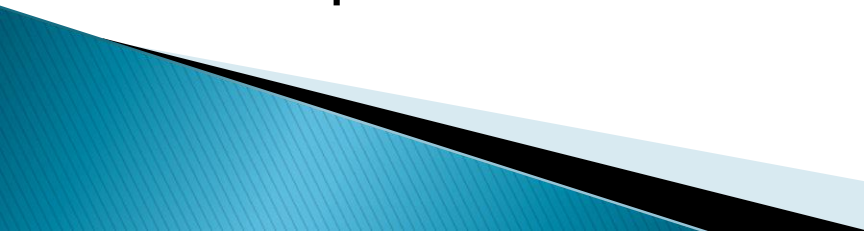
- ▶ Sistem operasi smartphome
- ▶ Dari versi 4.x – 9.x
- ▶ Sekarang versi 9.2 – 9.5
- ▶ Paling banyak dipasaran versi 6.1 dan 7.0
- ▶ Website: <http://www.symbian.com>
- ▶ Mendukung 2G, 2.5G, 3G dan 3.5G



# Fitur Umum

- ▶ **integrated multimode mobile telephony** – Symbian OS integrates the power of computing with mobile telephony, bringing advanced data services to the mass market
  - ▶ **open application environment** – Symbian OS enables mobile phones to be a **platform** for deployment of applications and services (programs and content) developed in a wide range of languages and content formats
  - ▶ **open standards and interoperability** – with a flexible and modular implementation, Symbian OS provides a core set of application programming interfaces (APIs) and technologies that is shared by all Symbian OS phones. Key industry standards are supported
- 

# Fitur Umum

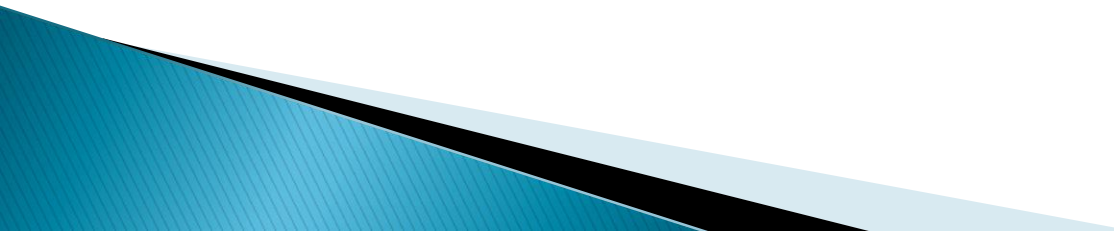
- ▶ **multi-tasking** – System services such as telephony, networking middleware and application engines all run in their own processes
  - ▶ **fully Object-oriented and component based**
  - ▶ **flexible user interface design** – by enabling flexible graphical user interface design on Symbian OS, Symbian is fostering innovation and is able to offer choice to manufacturers, carriers, enterprises and end-users. Using the same core operating system in different designs also eases application porting for third party developers
  - ▶ **robustness** – It ensures the integrity of data, even in the presence of unreliable communication and shortage of resources such as memory, storage and power.
- 



# Fitur Khusus 9.1

- ▶ **Rich suite of application services** – the suite includes services for contacts, scheduling, and messaging, OBEX for exchanging appointments (vCalendar) and business cards (vCard); integrated APIs for data management, text, clipboard and graphics
- ▶ **Java support** – supports the latest wireless Java standards, including MIDP 2.0, CLDC 1.1, JTWI (JSR185), Mobile Media API (JSR135), Java API for Bluetooth (JSR082), Wireless Messaging (JSR120), Mobile 3D Graphics API (JSR184) and Personal Information Management and FileCF APIs (JSR075)
- ▶ **Device Management/OTA provisioning** – OMA DM 1.1.2 compliant, OMA Client provisioning v1.1

# Fitur khusus 9.1

- ▶ **Messaging** – enhanced messaging (EMS) and SMS; internet mail using POP3, IMAP4, SMTP and MHTML; attachments
  - ▶ **Multimedia** – audio and video support for recording, playback and streaming; image conversion
  - ▶ **Graphics** – direct access to screen and keyboard for high performance; graphics accelerator API
- 

# Fitur Khusus 9.1

- ▶ **Communications protocols** – wide area networking stacks including TCP/IP (dual mode IPv4/v6) and WAP 2.0 (Connectionless WSP and WAP Push), personal area networking support including infrared (IrDA), Bluetooth and USB; support is also provided for multihoming and link layer Quality-of-Service (QoS) on GPRS and UMTS networks
- ▶ **Mobile telephony** – Symbian OS v9.1 is ready for the 3G market with support for WCDMA (3GPP R4); GSM circuit switched voice and data (CSD and EDGE CSD) and packet-based data (GPRS and EDGE GPRS); CDMA circuit switched voice, data and packet-based data (IS-95 and 1xRTT); SIM, RUIM, UICC Toolkit; other standards can be implemented by licensees through extensible APIs of the telephony subsystem

# Fitur Khusus 9.1

- ▶ **Realtime** – a realtime, multithreaded kernel provides the basis for a robust, power-efficient and responsive phone
- ▶ **Hardware support** – supports latest CPU architectures, peripherals and internal and external memory types
- ▶ **CDMA specific features** including CDMA network roaming, third party OTA API, NAM programming mode, CDMA SMS stack, NAI handset identification, interfaces to enable Mobile IP and bridge and router gateway modes of operation

# Fitur Khusus 9.1

- ▶ **International support** – supports the Unicode Standard version 3.0
- ▶ **Data synchronization** – Over-The-Air (OTA) synchronization support using OMA standards; PC-based synchronization over serial, Bluetooth, infrared and USB; a PC Connectivity framework providing the ability to transfer files and synchronize PIM data
- ▶ **Developing for Symbian OS** – content development options include: C++, Java (J2ME) MIDP 2.0, and WAP; tools are available for building C++ and Java applications; reference telephony abstraction layer for 2G, 2.5G, 3G, and 3.5G provided

# Why choose Symbian OS as a development platform?

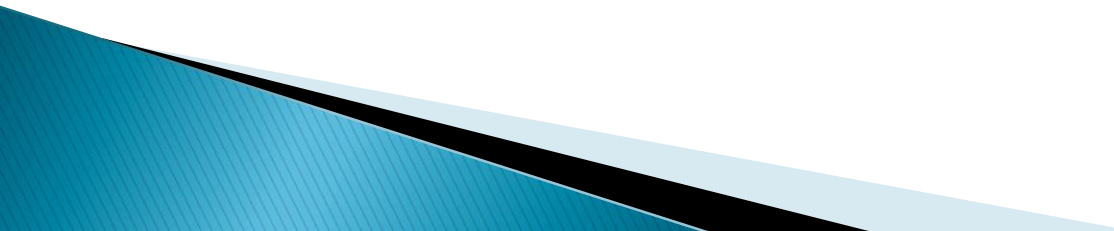
Because Symbian OS is written in **C++**

Clearly defined APIs allow the large developer community

Symbian C++ APIs enable extremely efficient multitasking and memory management.

Symbian OS is primarily event driven rather than multithreaded, potentially saving several kilobytes of overhead per thread.

# How reliable is Symbian OS?

- ▶ Preventing memory leaks with effective memory management;
  - ▶ Releasing resources as soon as they are no longer needed; (garbage collector)
  - ▶ Handling out-of-memory errors properly through an effective error-handling framework.
- 

# Is Symbian OS opensource???

- ▶ A common question is whether **Symbian OS** is "open". It is not open in the sense of **Open Source software** – the source code is not publicly available.
- ▶ Moreover, the APIs are publicly documented and anyone can develop software for **Symbian OS**.
- ▶ This contrasts with traditional embedded phone operating systems, which typically **cannot accept any aftermarket software** with the exception of **Java applications**.



# Evolution of Symbian OS (I)

- ▶ **Psion** – In 1980, Psion was founded by David Potter.
- ▶ **EpoC16** – After the failure of the MC400 Psion released its Series 3 devices from 1991 to 1998 which also used the EPOC16 OS, later known as SIBO, which supported a simple programming language called **OPL** and an IDE called **OVAL**.
- ▶ **EPOC OS Releases 1–3** – The Series 5 device, released in 1997, used the first iterations of the **EPOC32 OS**.
- ▶ **EPOC Release 4** – Oregon Osaris and Geofox 1 were released using ER4. In 1998, Symbian Ltd. was formed as a partnership between Ericsson, Nokia, Motorola and Psion, to explore the convergence between PDAs and mobile phones.
- ▶ **EPOC Release 5 a.k.a. Symbian OS v5** – Psion Series 5mx, Series 7, Psion Revo, Psion Netbook, netPad, Ericsson MC218 were released in 1999 using ER5.

**\*EPOC** is a family of operating systems developed by Psion for portable devices, primarily PDAs

# Evolution of Symbian OS (II)

- ▶ **ER5u a.k.a. Symbian OS v5.1**

u = **Unicode**. The first phone, the Ericsson R380 was released using ER5u in 2000. It was not an 'open' phone – software could not be installed. Notably, a number of never released Psion prototypes for next generation PDAs, including a Bluetooth Revo successor codenamed Conan were using ER5u.

- ▶ **Symbian OS v6.0 and v6.1** – Sometimes called ER6. The first 'open' Symbian OS phone, the Nokia 9210, was released on 6.0.

- ▶ **Symbian OS v7.0 and v7.0s** – First shipped in 2003. This is an important Symbian release which appeared with all contemporary user interfaces including UIQ (Sony Ericsson P800, P900, P910, Motorola A925, A1000), Series 80 (Nokia 9300, 9500), Series 90 (Nokia 7710), S60 (Nokia 6600, 7310), Psion sold its stake in Symbian.

# Evolution of Symbian OS (III)

- ▶ **Symbian OS v8.0**  
First shipped in 2004,
- ▶ **Symbian OS v8.1**  
Basically a cleaned-up version of 8.0, this was available in 8.1a and 8.1b versions,
- ▶ **Symbian OS v9.0**  
This version was used for internal Symbian purposes only. It was deproductised in 2004. v9.0.

# Evolution of Symbian OS (V)

## ▶ Symbian OS v9.1

Released early 2005. It includes many **new security related features**, particularly a controversial platform security module facilitating **mandatory code signing**.

S60 3rd Edition phones have Symbian OS 9.1. Sony Ericsson is shipping the M600i based on Symbian OS 9.1 and should ship the P990 in Q3 2006.

The earlier versions had a fatal defect where the phone **hangs temporarily after the owner sent hundreds of SMSes**. However, on 13 September 2006, Nokia released a small program to fix this defect.

# Evolution of Symbian OS (VI)

- ▶ **Symbian OS v9.2**

Released Q1 2006. Support for Bluetooth 2.0 (was 1.2) and OMA Device Management 1.2 (was 1.1.2). S60 3rd Edition Feature Pack 1 phones have Symbian OS 9.2.

- ▶ **Symbian OS v9.3**

Released on 12 July 2006. Upgrades include native support for Wifi 802.11, HSDPA, Vietnamese language support. On November 16, 2006, the 100 millionth smartphone running the OS was shipped.

- ▶ **Symbian OS v9.5**

Released in March 2007. Featured up to 25% reduced RAM usage resulting in better battery life thanks to introduction of Demand paging. Applications should launch up to 75% faster. Also supports SQL.



# Symbian Based Platform

UIQ



MOAP



S60



Application suites

UI implementation

UI framework

**symbian**  
OS

HW adaptation

Hardware

\*UIQ- User Interface Quartz



References Model			
Series 60	UIQ	Series 80	Series 90
<p>Nokia N-Gage, N-Gage QD            Nokia 7650, 3650, 3660            Nokia 6600, 6620, 6630, 6670, 6680, 6681, 6682, 7610            Sendo X, Siemens SX-1, Nokia 3250, E60, E61, E70, N70, N80, N90, N91 and others, coming out each month</p>	<p>Sony Ericsson P800, P900, P910i, P990i, W950i, M600            Motorola            A920/A925/A1000</p>	<p>Nokia 9210, 9210i            Nokia 9300, 9300i, 9500</p>	<p>Nokia 7710</p>

# UIQ

- ▶ UIQ is stylus-based interface (heavily influenced by the easy-to-use Palm OS one). The best known examples of UIQ devices are the **Sony Ericsson P800 and P900/P910i**, although there are others, including the Motorola A920/925/1000.
- ▶ The biggest downside of UIQ 2 is that some of the benefits of **multitasking have been removed** by the way programs revert to a neutral state when sent to the background. So you switch away to check your calendar or answer the phone and then have to re-open your document and find your place all over again. And again.
- ▶ UIQ 3 promises to **restore proper multitasking**, thankfully, but this won't be available until the Sony Ericsson P990i, W950 and M600 arrive mid to late 2006.



SE P990

Motorola  
M1000

Arima  
U300

Motorola  
MOTORIZR Z8

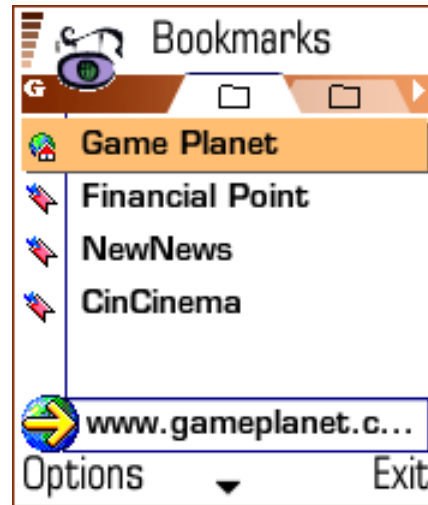
BenQ  
P30





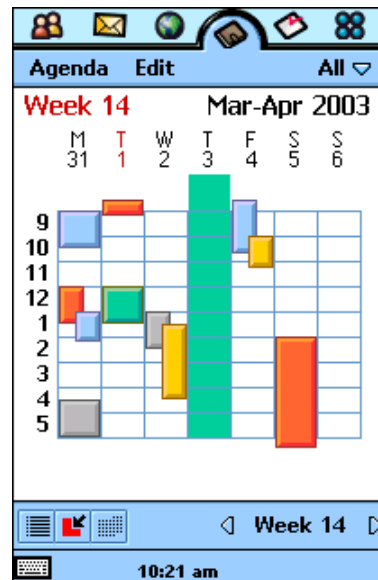
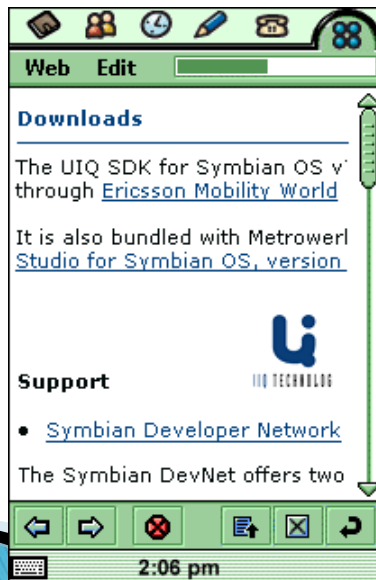
# Phones with numeric keypad

- Joystick-navigated
- Soft keys
- Simple widgets



# Phones with touch screens




















- Pen-based navigation
- Multimedia and browsing



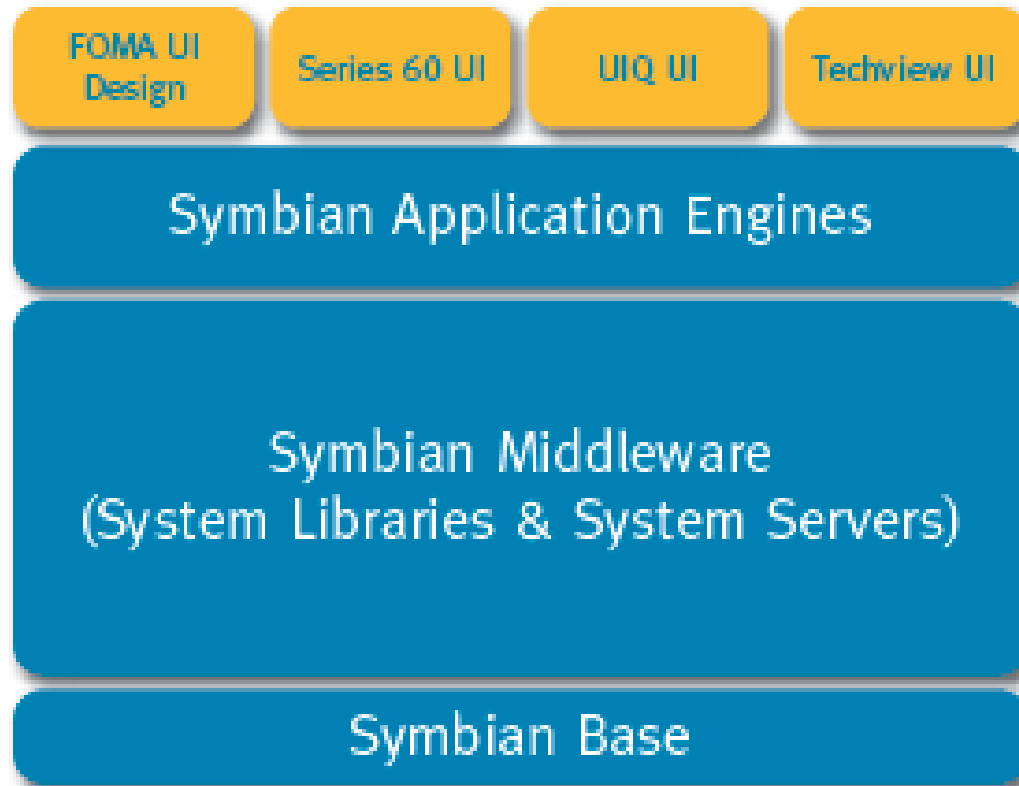
# Phones with full keyboards

- Editing information
- Reviewing business data

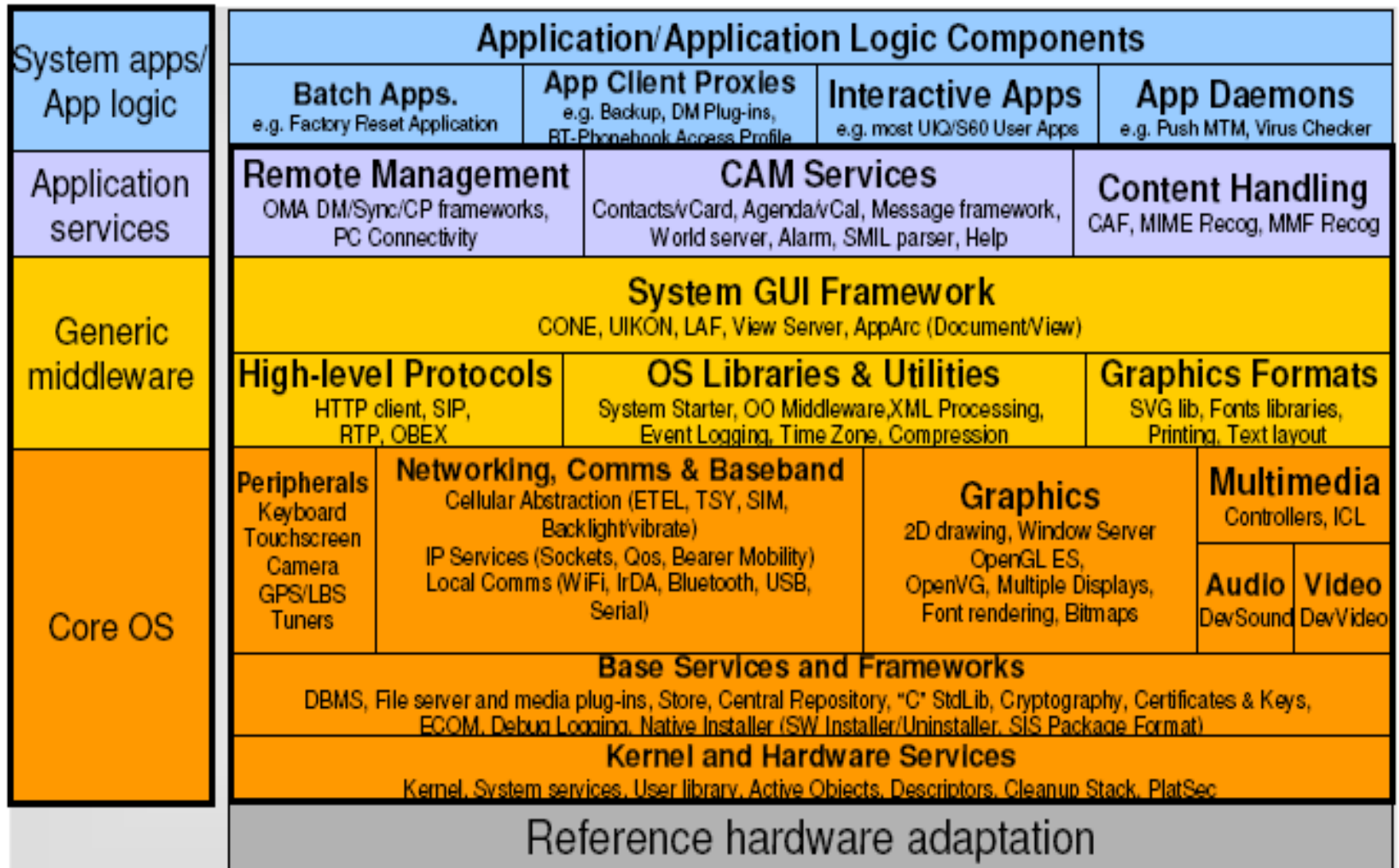


	<h3>Messaging</h3> <ul style="list-style-type: none"><li> <b>Inbox</b></li><li> <b>Outbox</b></li><li> <b>Drafts</b></li><li> <b>Sent</b></li><li> <b>cix</b></li><li> <b>freesevice</b></li></ul>	<h3>Inbox</h3> <p>4 messages (1 new)</p> <table border="1"><tr><td></td><td>Remote machine vCard</td><td>12:12 am</td></tr><tr><td></td><td>Remote machine vCard</td><td>12:08 am</td></tr><tr><td></td><td>Sandy Lovell can i claim the cost of sending</td><td>12:00 am</td></tr><tr><td></td><td>David Bull The meeting tomorrow is in meeti</td><td>12:00 am</td></tr></table>		Remote machine vCard	12:12 am		Remote machine vCard	12:08 am		Sandy Lovell can i claim the cost of sending	12:00 am		David Bull The meeting tomorrow is in meeti	12:00 am	<h3>Open</h3> <ul style="list-style-type: none"><li><b>Write mail</b></li><li><b>Write text message</b></li><li><b>Write Fax</b></li></ul>
	Remote machine vCard	12:12 am													
	Remote machine vCard	12:08 am													
	Sandy Lovell can i claim the cost of sending	12:00 am													
	David Bull The meeting tomorrow is in meeti	12:00 am													

# Symbian OS Architecture



# System view of Symbian OS



# Symbian OS v8

Application engines  
Contacts, agenda, office, SyncML,  
data management, browsing

Messaging  
SMS, EMS, MMS,  
email (POP3 & IMAP4)

Java MIDP  
Wireless messaging, Bluetooth,  
mobile media, 3D graphics (JSR184)

CLDC 1.1

Application framework  
Graphical user interface framework,  
text and graphical utilities

Personal area networking  
Bluetooth, infrared, USB

Multimedia  
Images, sounds, graphics

Communication infrastructure  
TCP, dual IPv4 & v6, HTTP, WAP stack

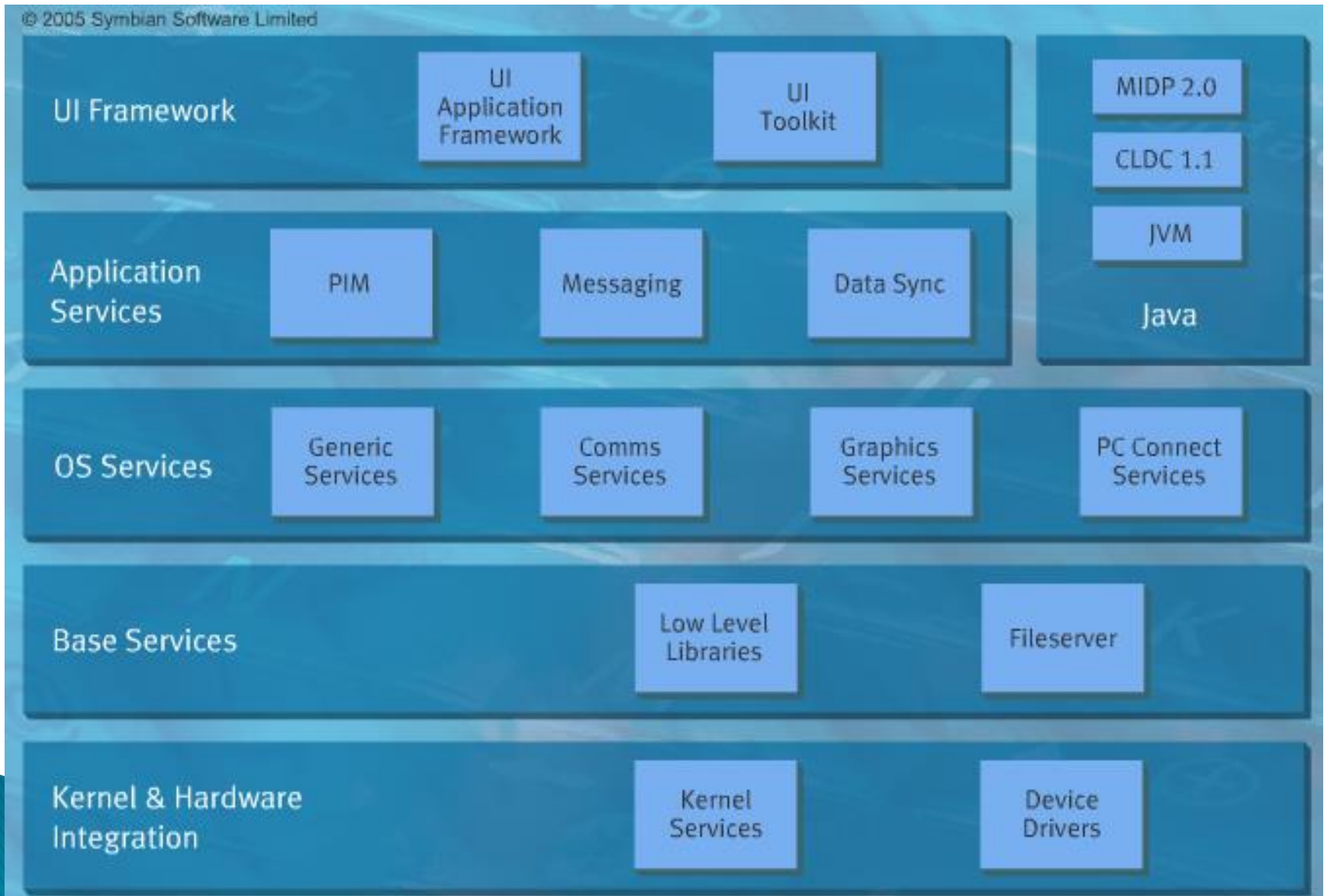
Security  
Cryptography, certificate management,  
software installation

Telephony  
GSM, GPRS, HSCSD, EDGE,  
CDMA (IS-95), cdma2000,  
WCDMA

Base  
User library, file server,  
Kernel, device driver



# Symbian OS v9



# Open Source Software for Symbian

## 9.1

### ▶ Utilities

- PuTTY, a telnet/ssh client
- Internet Radio
- SymTorrent, a bittorrent client
- Symella, a gnutella client
- Python interpreter
- Apache HTTP Server, a web server

### ▶ Game emulation

- ScummVM

### ▶ Multimedia

- OggPlay – Audio player with ogg vorbis audio format support