

Java Micro Edition (ME) Tech Talk

Imesh Gunaratne

IFS R&D

Agenda

- Introduction to Java Micro Edition (ME)
- Evolution of Java ME
- Java ME Specification
- Java Technology Stack
- CLDC/MIDP Configuration
- CDC Configuration
- Optional Packages
- Getting started with Java ME

Introduction

Java Micro Edition (ME)



“A complete Java Specification for mobile and embedded devices with limited memory, display and power capacity and limited wireless connections to the internet”

Mobile Devices



Smart Phones



Personal Digital Assistants
(PDA)



Barcode Readers

Embedded Devices



TV Set-top Boxes



Navigation Systems

Operating Systems



Virtual Machines

- Sun only provides a reference implementation for Java ME.
- Due to some reason Sun has tended not to provide free binary implementations of its Java ME runtime environment for mobile devices
- Third party Java Virtual Machines:
 - ▶ IBM J9
 - ▶ CrEme
 - ▶ Esmertec Jbed
 - ▶ Symbian JVM
 - ▶ Blackberry JVM by RIM

Evolution

Evolution of Java ME



Personal Java

The Initial version of Java micro edition based on Java 1.1.8

Java 2 Micro Edition (J2ME)

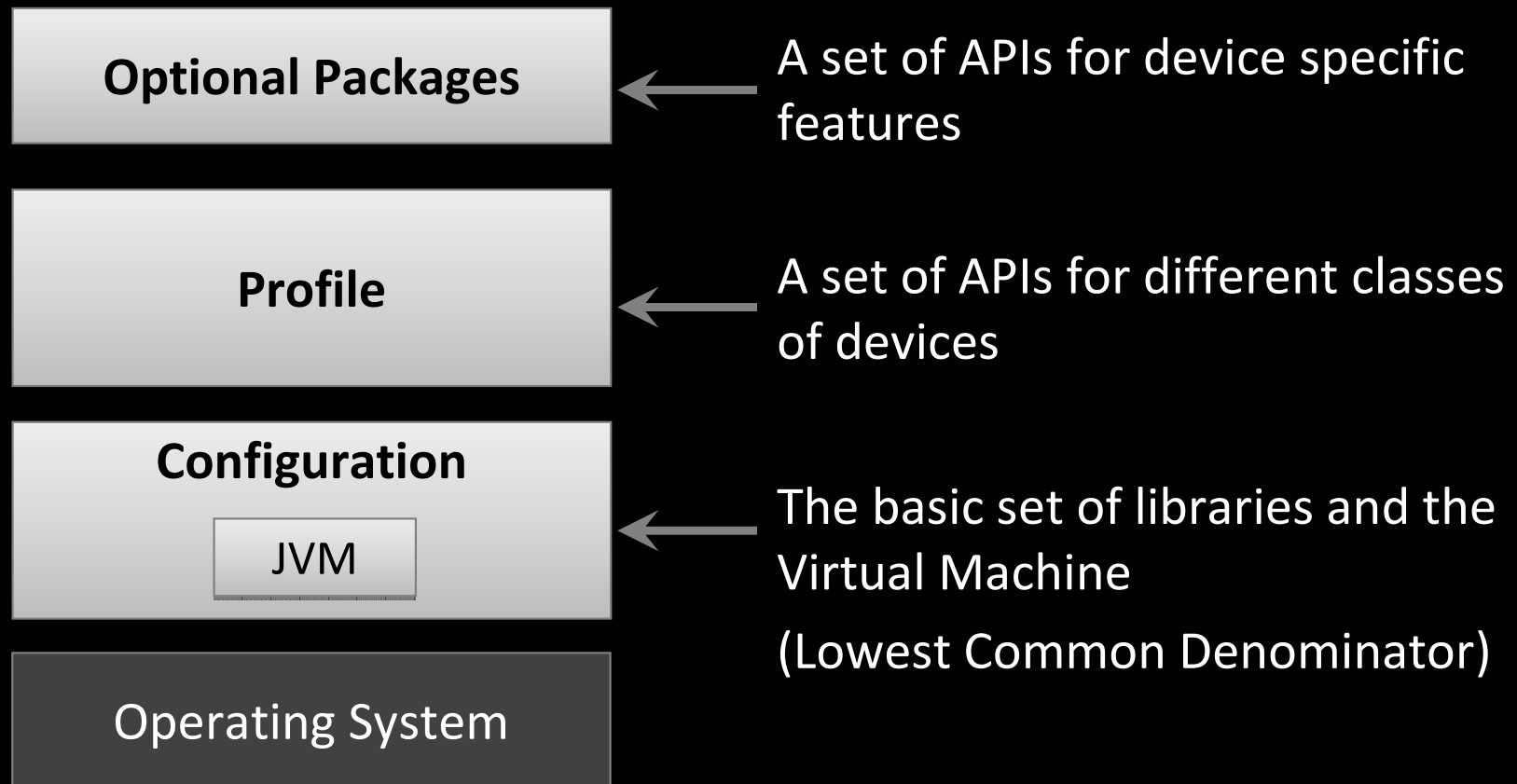
Personal Java was replaced by J2ME

Java Micro Edition (Java ME)

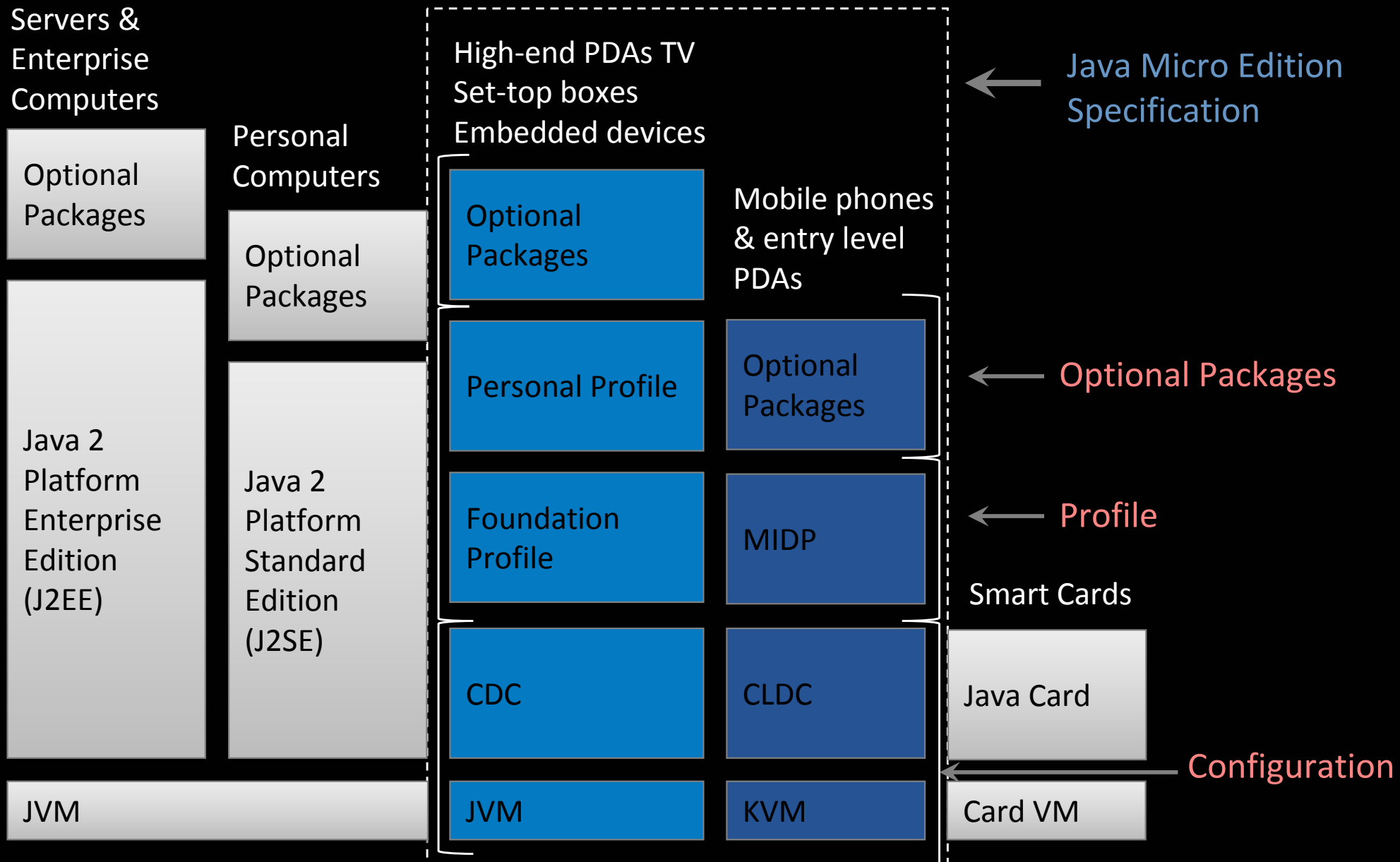
J2ME was renamed to Java ME

Specification

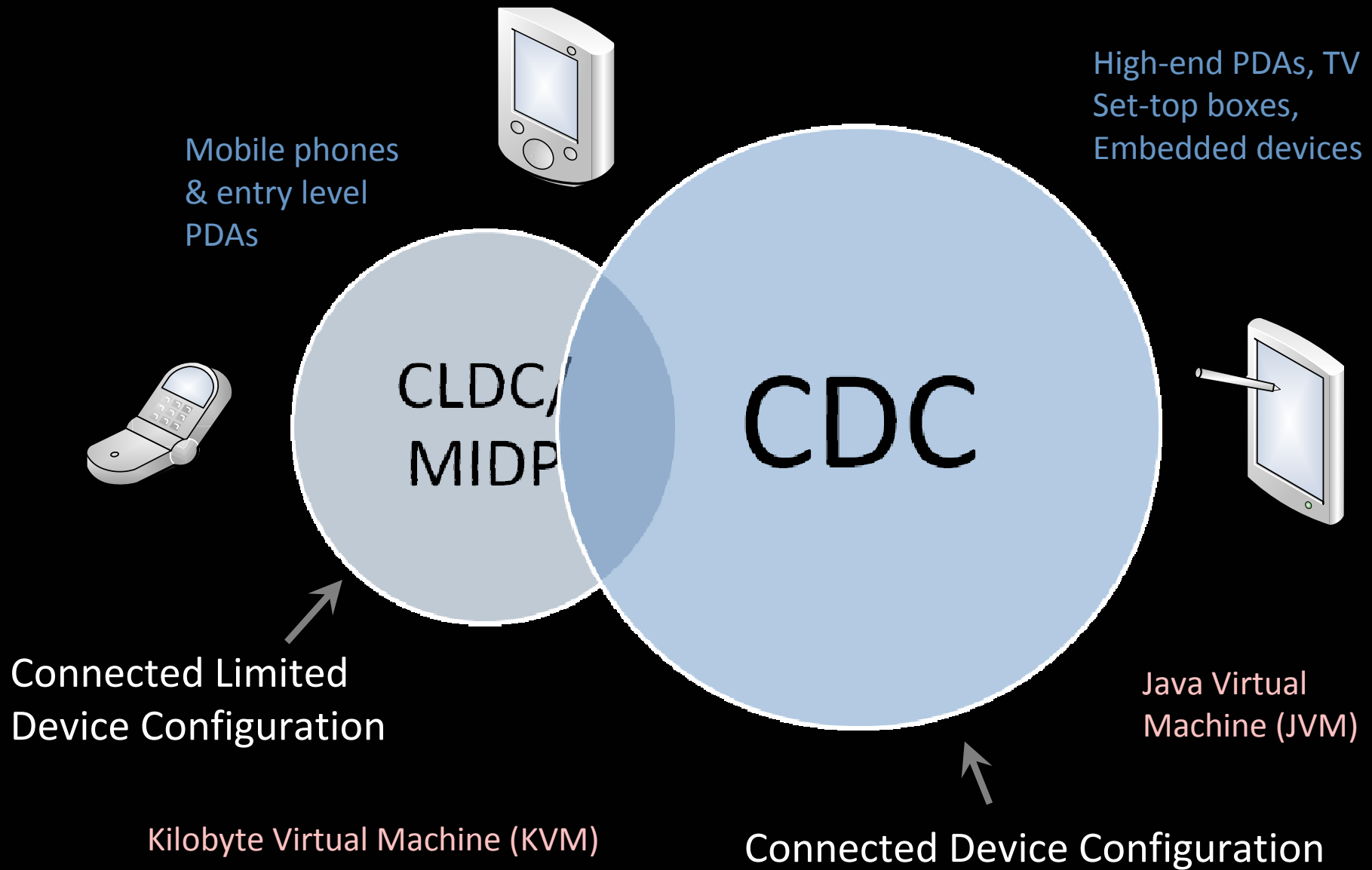
Java ME Specification



Java Technology Stack



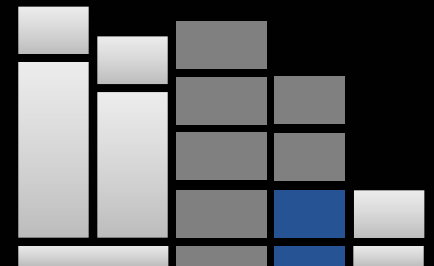
Two Configurations



CLDC/MIDP

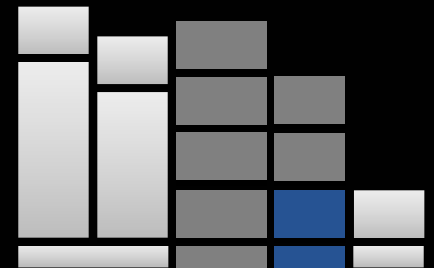
Connected Limited Device Configuration (CLDC)

- Java Specification Request (JSR) 30 approved in August 1999.
- A result of Java Community Process (JCP SM).
- First public release; CLDC 1.0 in May 2000.
- Designed for devices which typically have 128 to 512 KB of memory.
- Reference implementation Kilobyte Virtual Machine (KVM).
- Contains a strict subset of the Java-class libraries



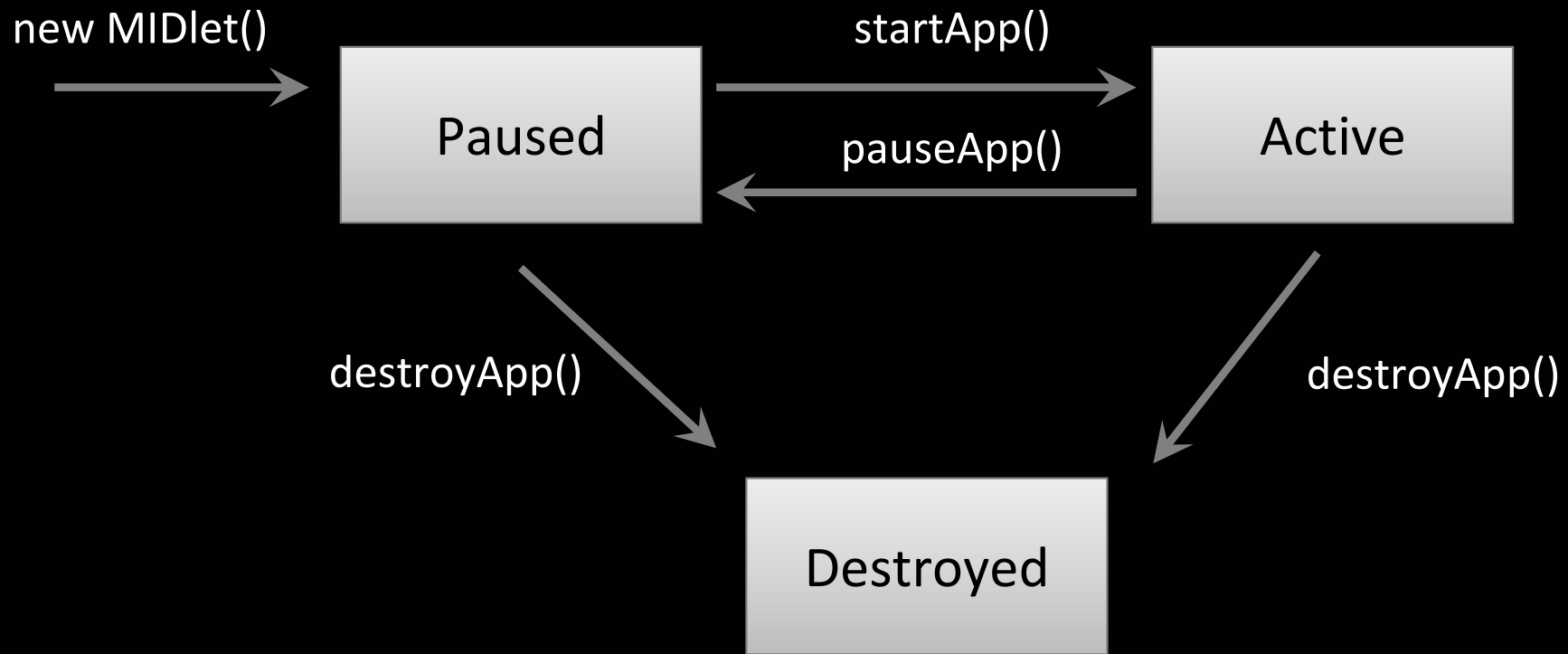
Mobile Information Device Profile

- Designed for mobile phones and PDAs.
- Operates on CLDC configuration.
- Includes a GUI API, Multimedia API and Gaming API.
- Applications written for this profile are called MIDlets.
- Current release: MIDP 2.1 (JSR 118)
- MIDP 3.0 is being developed under JSR 271.



CLDC/MIDP Application Life Cycle

Life Cycle of a MIDlet



A Basic CLDC/MIDP Application

```
package sampleapp;
import javax.microedition.midlet.*;
public class SampleMIDlet extends MIDlet
{
    public SampleMIDlet()
    {
    }
    public void startApp()
    {
    }
    public void pauseApp()
    {
    }
    public void destroyApp(boolean unconditional)
    {
    }
}
```

MIDP GUI Library

- All MIDP GUI classes are in LCDUI Package.
- `javax.microedition.lcdui.*`

Interfaces:

- ▶ Choice
- ▶ CommandListener
- ▶ ItemStateListener

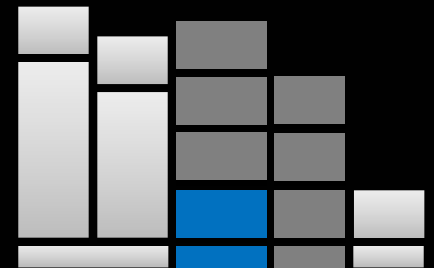
Classes:

- ▶ Alert
- ▶ AlertType
- ▶ Canvas
- ▶ ChoiceGroup
- ▶ Command
- ▶ DateField
- ▶ Display
- ▶ Displayable
- ▶ Font
- ▶ Form
- ▶ Gauge
- ▶ Graphics
- ▶ Image
- ▶ ImageItem
- ▶ Item
- ▶ List
- ▶ Screen
- ▶ StringItem
- ▶ TextBox
- ▶ TextField
- ▶ Ticker

CDC

Connected Device Configuration (CDC)

- A subset of Java Standard Edition.
- Contains almost all the libraries of Java SE except GUI related.
- Optimized for multi-threaded low memory conditions.
- Three profiles are based on CDC:
 - ▶ Foundation Profile
 - ▶ Personal Basis Profile
 - ▶ Personal Profile
- Designed for Mobile & Embedded Devices with higher Processing Power, Memory and Display.
- Current Release: CDC 1.1.2 (JSR 218)



Optional Packages

Optional Packages

- JSR 82 Java APIs for Bluetooth
- JSR 205 Wireless Messaging API (WMA) V1.0
- JSR 135 Mobile Media API (MMAPI)
- JSR 172 Webservices API
- JSR 179 Location API
- JSR 180 SIP API
- JSR 183 Mobile 3D Graphics API for J2ME
- JSR 185 Java Technology for the Wireless Industry
- JSR 205 Wireless Messaging API (WMA) V2.0

Implementation

Getting Started with Java ME

- Java Development Kit (JDK)
- Sun Java Wireless Toolkit
- A Device Emulator
- Integrated Development Environment (IDE)
 - ▶ NetBeans IDE (includes Sun CLDC/MIDP emulator)
 - ▶ Eclipse IDE (with EclipseME plugin)



Database Management Systems for Java ME



A Sun supported distribution of open source Apache Derby database.

<http://developers.sun.com/javadb>



McObject's Perst open source, object-oriented embedded database.

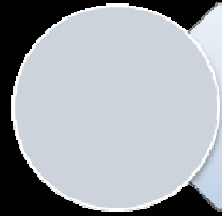
http://www.mcobject.com/j2me_database



An open source rational database for the Java Me platform.

<http://sourceforge.net/projects/microdb>

Data binding Frameworks for Java ME



**NetBeans
DataBindingME**

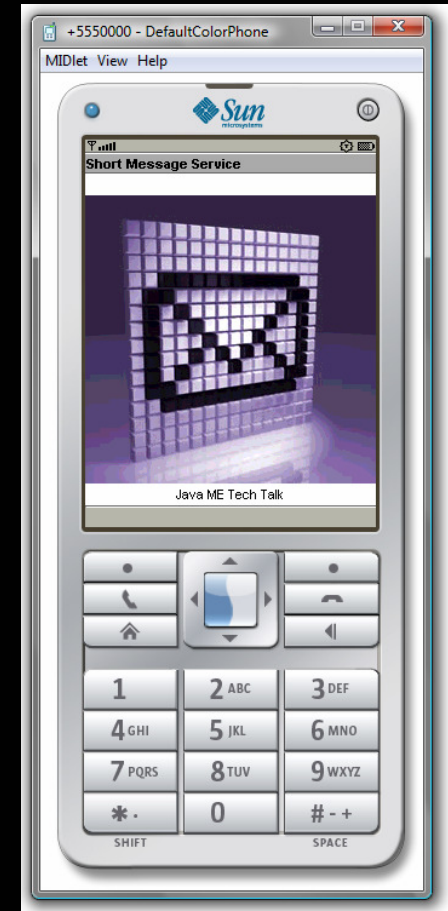
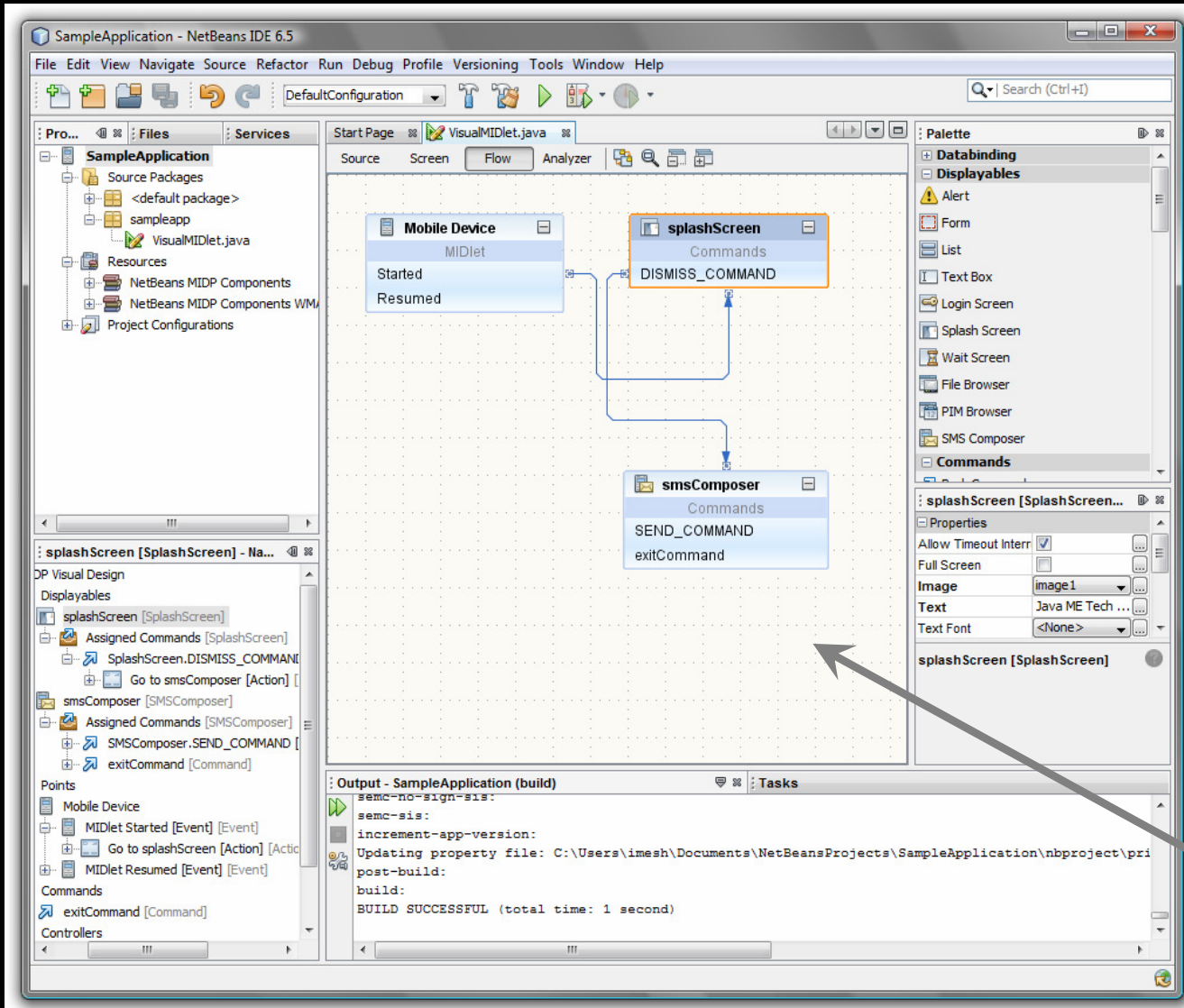
A databinding framework for JavaME
utilizing Expression Language.

<http://databindingme.dev.java.net>

A Sample MIDP Application

NetBeans IDE 6.5

Sun MIDP Emulator



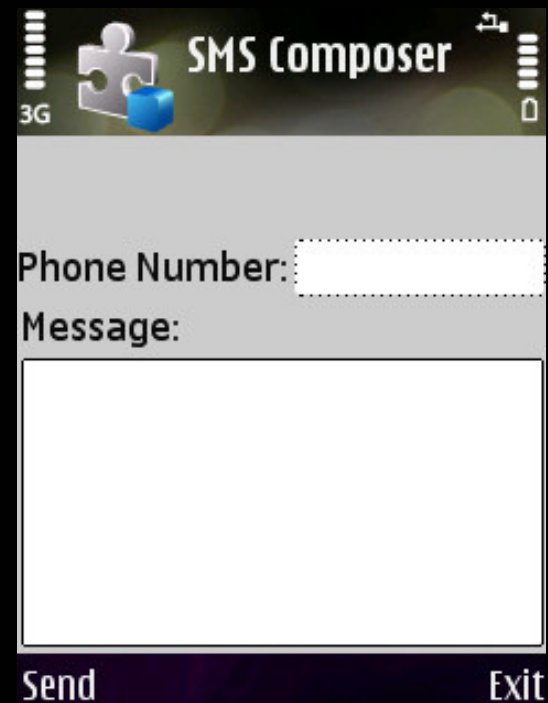
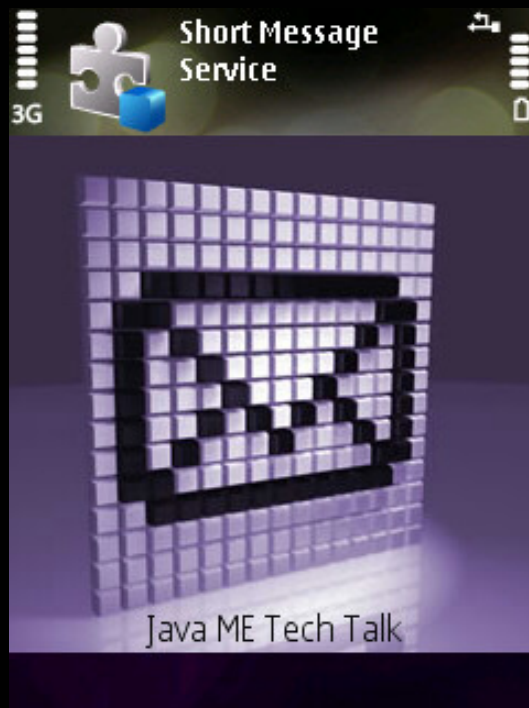
Application Work Flow

A Sample MIDP Application

- Once the application is compiled it creates two files.
 - ▶ A Java ARchive (JAR) File
 - Contains Java classes and associated meta data.
 - ▶ A Java Application Descriptor (JAD) File
 - Contains MIDlet information.

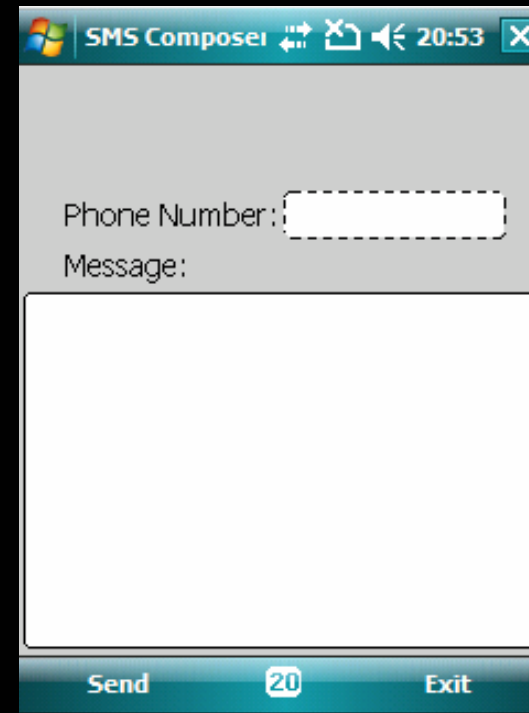
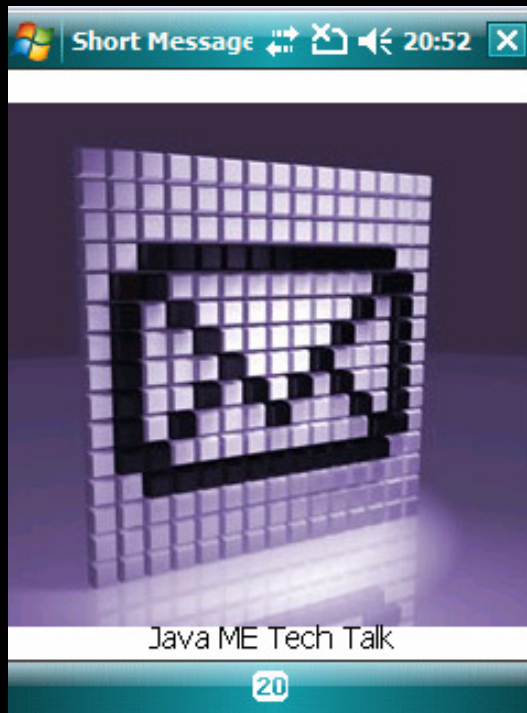
A Sample MIDP Application

Running on Symbian S60 - Nokia N95



A Sample MIDP Application

Running on Windows Mobile 6 – HTC XDA 2



Questions?

Thank You!

References

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<http://java.sun.com/javame/technology/index.jsp>
- Sun Developer Network
<http://java.sun.com/javame>
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<http://developers.sun.com/mobility/midp/articles/ui>
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<http://www.netbeans.org/features/javame/>
- NetBeans CDC Emulator Setup Guide
<http://www.netbeans.org/kb/60/mobility/cdcemulator-setup.html>
- EclipseME
<http://eclipseme.org>