INTRODUCTION OF J2ME

Java™ 2 Platform,
Micro Edition

The Java™ platform for consumer and
embedded devices.

MOBILE SOLUTIONS

Java

Sun
microsystems

J2ME
Java Mobility Software

OVERVIEW

- What is J2ME.
- How does J2ME work?
- Java J2ME Carriers and Products.
- The Two Configuration of J2ME.
- Profiles in J2ME
- MIDP & MIDlets
- Wireless Java
- J2ME Vendors and Products
- References

WHAT IS J2ME

J2ME is a family of specifications that defines various downsized versions of the standard Java 2 platform; these downsized versions can be used to program consumer electronic devices ranging from cell phones to highly capable Personal Data Assistants (PDAs), smart phones, and set-top boxes.

---J2ME in a Nutshell -A Desktop Quick Reference
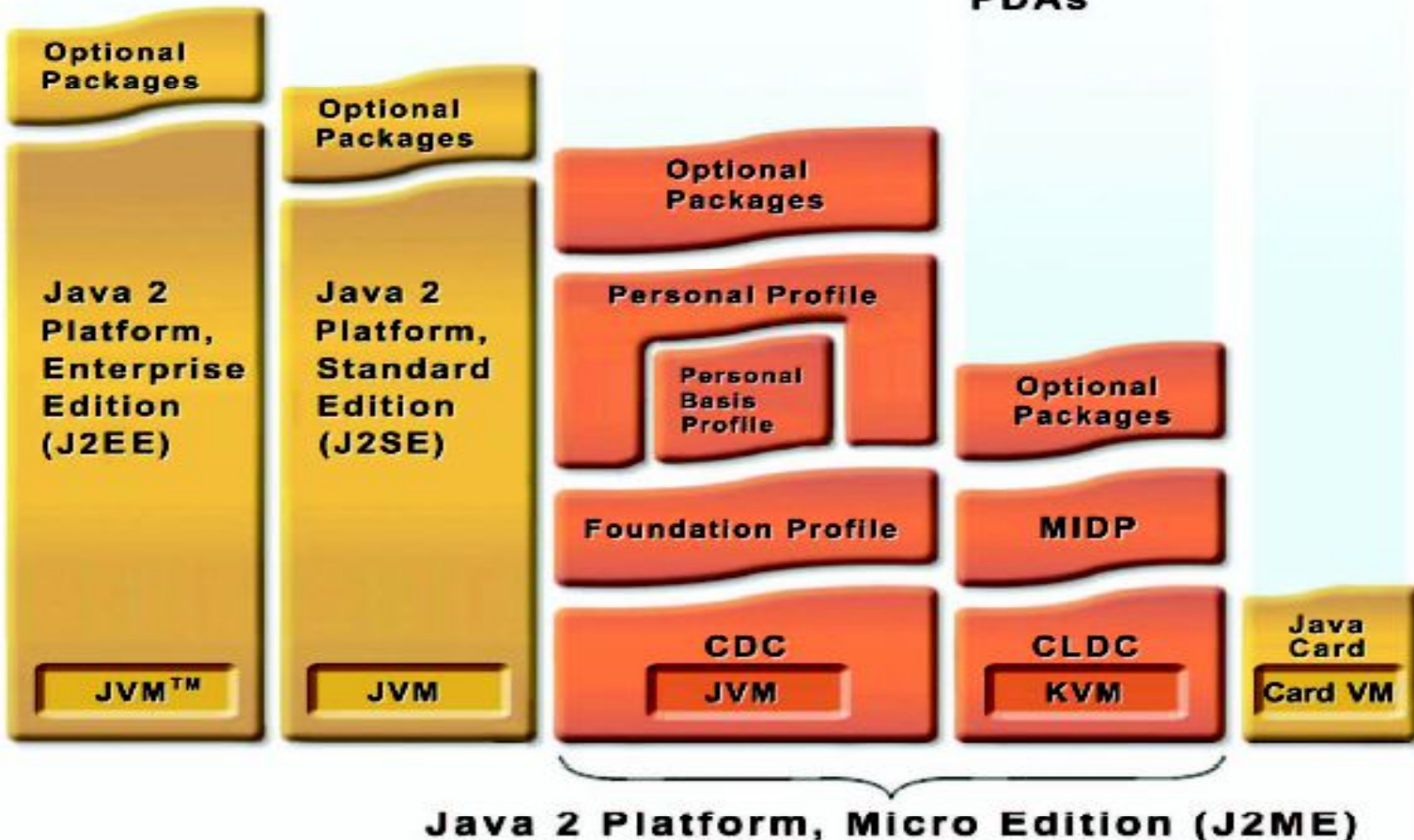
By Kim Topley

JAVA FAMILY

-- java.sun.com (2003)

J2ME CATEGORY

Principle: Different hardware corresponds different JVMs, hardware which base on CDC have powerful JVMs, and hardware which base on CIDC have KVM to support.

----Picture form Java.sun.com

Connected Limited Device Configuration (CLDC)

CLDC is aimed at the low end of the consumer electronics range. A typical CLDC platform is a cell phone or PDA with around 512 KB of available memory. For this reason, CLDC is closely associated with wireless Java, which is concerned with allowing cell phone users to purchase and download small Java applications known as MIDlets to their handsets. A large and growing number of cell phone vendors have signed agreements with Sun Microsystems that will allow them to begin using this technology, so the number of handsets with the capability to be programmed in Java will probably grow rapidly in the next few years.

----- J2ME in a Nutshell -A Desktop Quick Reference
By Kim Topley

TWO CONFIGURATIONS J2ME CURRENTLY DEFINES 2

Connected Device Configuration (CDC)

CDC addresses the needs of devices that lie between those addressed by CLDC and the full desktop systems running J2SE. These devices have more memory (typically 2 MB or more) and more capable processors, and they can, therefore, support a much more complete Java software environment. CDC might be found on high-end PDAs and in smart phones, web telephones, residential gateways, and set-top boxes.

----- **J2ME in a Nutshell** -A Desktop Quick Reference

By Kim Topley

PROFILES J2ME CURRENTLY DEFINES

- Mobile Information Device Profile (MIDP)
- PDA Profile (PDAP)
- Foundation Profile
- Personal Basis and Personal Profiles
- RMI Profile
- Game Profile

The Mobile Information Device Profile and MIDlets

- The *Mobile Information Device Profile*, or MIDP for short, is one such profile, intended for use on small footprint devices with a limited user interface in the form of a small screen with some kind of input capability.

- Java applications that run on MIDP devices are known as MIDlets. A MIDlet consists of atleast one Java class

MIDP Hardware Requirements

Hardware	Minimum Requirement
Display	96 X 54 Pixels 65,536 colors
Memory	32 KB workspace 128KB MIDP Implementation 8KB for MIDlets run
Input Device	the device has the equivalent of a keypad that allows the user to type the numbers 0 through 9,together with the equivalent of arrow keys and a select button
Connectivity	HTTP 1.1; TCP/IP

MIDlet Security

- No "sand Box" as J2EE or J2SE. Because it is expensive in terms of memory resources.

- No MIDlet APIs that allow access to information already on the device, such as address and telephone number lists or calendars, and it is not possible for a MIDlet to directly control the device.

- A MIDlet can store information on a device, but that storage is private to that MIDlet and its suite, so the MIDlet can harm only its own data.

Wireless Java: Networking and Persistent Storage

Two Essentials

- The devices that the J2ME platform is intended for are, by their nature, reliant for their usefulness on the ability to communicate with the outside world.

- The ability to store information and access it from applications running on that device. The type of storage available, and the amount of space available, varies greatly from device to device.

MIDlet Management and Storage

A MIDlet consists of one or more class files and associated resources stored in a JAR file. Several MIDlets may be combined into a MIDlet suite. All the MIDlets that make up a given suite are packaged in the same JAR file and are managed as a single unit: they are installed together in the simulated nonvolatile device storage Furthermore, they all execute in the same instance of the Java VM. MIDlets almost always be installed over a network or via a local connection to an associated host system. Because the JAR file that contains a MIDlet suite may be large, each suite has an associated Java Archive Descriptor file (JAD) that is small enough to download quickly, but which contains enough information about the suite to allow the user to decide whether to install it. The Application Management Software of a MIDP device (such as a cell phone) typically first downloads the JAD file, whose location is specified by its URL. If the user decides to install the MIDlet suite, the AMS downloads the JAR file, which can be located by using one of the attributes in the JAD. The MIDlet suite is then stored on the device, and subsequently, the MIDlets it contains can be loaded from the locally installed copy..

HOW DOES J2ME WORK?

J2ME — Java Mobility Software

Java Technology Application

Server

Mobile Telecommunications Carrier
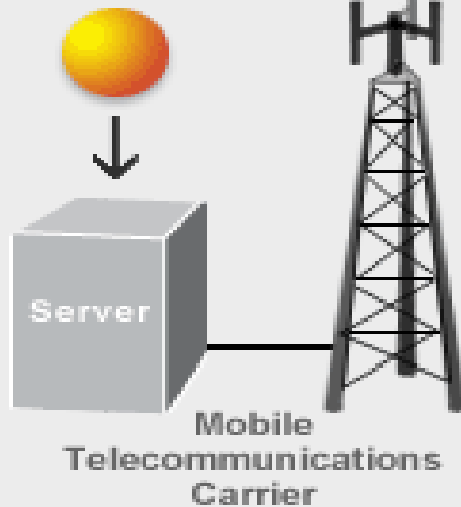
Application Transmitted

Java Technology-Enabled Mobile Device

Downloading Java technology-based games and applications to mobile phones

THE LATEST JAVA-ENABLED MOBILE DEVICES, YOU CAN VIEW A LIST OF APPLICATIONS, GAMES, AND SERVICES AND CHOOSE WHICH ONE INTERESTS YOU. THE APPLICATION IS THEN SENT OVER THE AIR TO YOUR HANDSET, WHERE IT IS INSTALLED AND INSTANTLY AVAILABLE TO USE. YOU ARE NO LONGER LIMITED TO THE SMALL SELECTION OF GAMES AND APPLICATIONS THAT CAME WITH YOUR PHONE. AND WITH NEW CONTENT BEING RELEASED DAILY FROM TOP ENTERTAINMENT AND SOFTWARE COMPANIES, YOU CAN ALWAYS FIND NEW, FUN APPLICATIONS TO DOWNLOAD.

Networking Architecture for Small Devices

- *Memory requirements*

  Was judged to be too great for the small footprint devices that CLDC is designed for.

- *Consistency*

  The differences are significant when it comes to using a serial device, because you need to install an extra package and use yet another programming model. Given the diversity of devices and communication mechanisms that the CLDC might be required to support, a more uniform API was clearly required.

- *Implementation flexibility*

  An architecture based entirely around interfaces, so that application code would not be tied to particular classes. Thus, vendors are free to provide socket and HTTP implementations that are appropriate for their specific devices.

HTTP Connections

- The only communications protocol that every MIDP device is required to provide

- HTTP makes use of stream sockets to carry messages between an HTTP client (usually a web browser) and a web server that often (but not always) returns an HTML page to the client.

Two Potential Problems

- Many of handset devices, particularly cell phones, do not have a direct connection to the internet and therefore almost certainly do not support sockets.

- The MIDP user interface components do not provide any support for displaying HTML, so there is no built-in browser capability in a MIDP device.
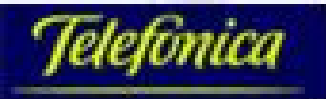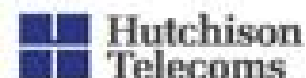
Answer

It is the responsibility of the device vendor to arrange for the device to be able to support HTTP even if it does not have a direct connection to the Internet. In most cases, this means that the device needs to connect to a gateway that can switch HTTP messages to whatever protocol is used to connect to the Internet gateway. In the wireless environment, for example, the device might use WSP (the Wireless Session Protocol) to connect to a WAP gateway that can bridge between a wireless network and the Internet. However this mapping is achieved, it must be done in such a way that the MIDP application cannot tell whether it is directly connected to the Internet.

J2ME — Java Mobility Software

Hutchison Telecoms

AT&T Wireless

AIS

KDDI

orange

Bell

中国移动（香港）有限公司 CHINA MOBILE (HONG KONG) LIMITED

LG TeleCom

SONOFON

cingular WIRELESS

中国联通 CHINA UNICOM

m1

TELECOM ITALIA

NEXTEL

中華電信

New World Mobility — Better than you think

Telefonica

Sprint

NTT Do Co Mo

Reliance Growth is Life

sonera

TELUS

DTAC makes it easy

數碼通 SmarTone

TELIA

StarHub

T·Mobile

HK CSL

SUNDAY

vodafone

J-PHONE vodafone

WIND

To date, over 250 different handset models from more than 40 manufacturers have been developed with Java technology, with more than 100 million of these handsets shipped worldwide.

---http://www.java.com/en/learn/mobile_(2003)

J2ME Programming Environments

- JBUILDER 7 OR 8 + BORLAND MOBILESET 3.1 (Most Power Developing tools)
- SUN JDK 1.4 + J2ME Wireless Toolkit
- Jdk1.4+J2ME CLDC 1.04，MIDP 2.0
- SDKs from the mobile providers, e.g. Nokia etc.

References

- *http://jcp.org/jsr/detail/30.jsp*
- *http://java.sun.com/products/consumer-embedded/*
- *http://java.sun.com/j2me/j2me-ds.pdf*
- *Topley,K. J2ME in a Nutshell -A Desktop Quick Reference*
- *http://wireless.java.sun.com/*
- *http://www.scc-kk.co.jp/lib_scc/catalog/books/B-228/B-228.pdf*
- *http://chinaunix.net/jh/26/128217.html*
- *http://developer.java.sun.com/developer/products/j2me/*
- *http://wireless.java.sun.com/midp/articles/#appmodels*
- *http://wireless.java.sun.com/midp/articles/getstart/*
- *http://www.java.com/en/learn/mobile*

THANK YOU

ANY QUESTIONS?