Duke gets his pilots license: Java on the Palm

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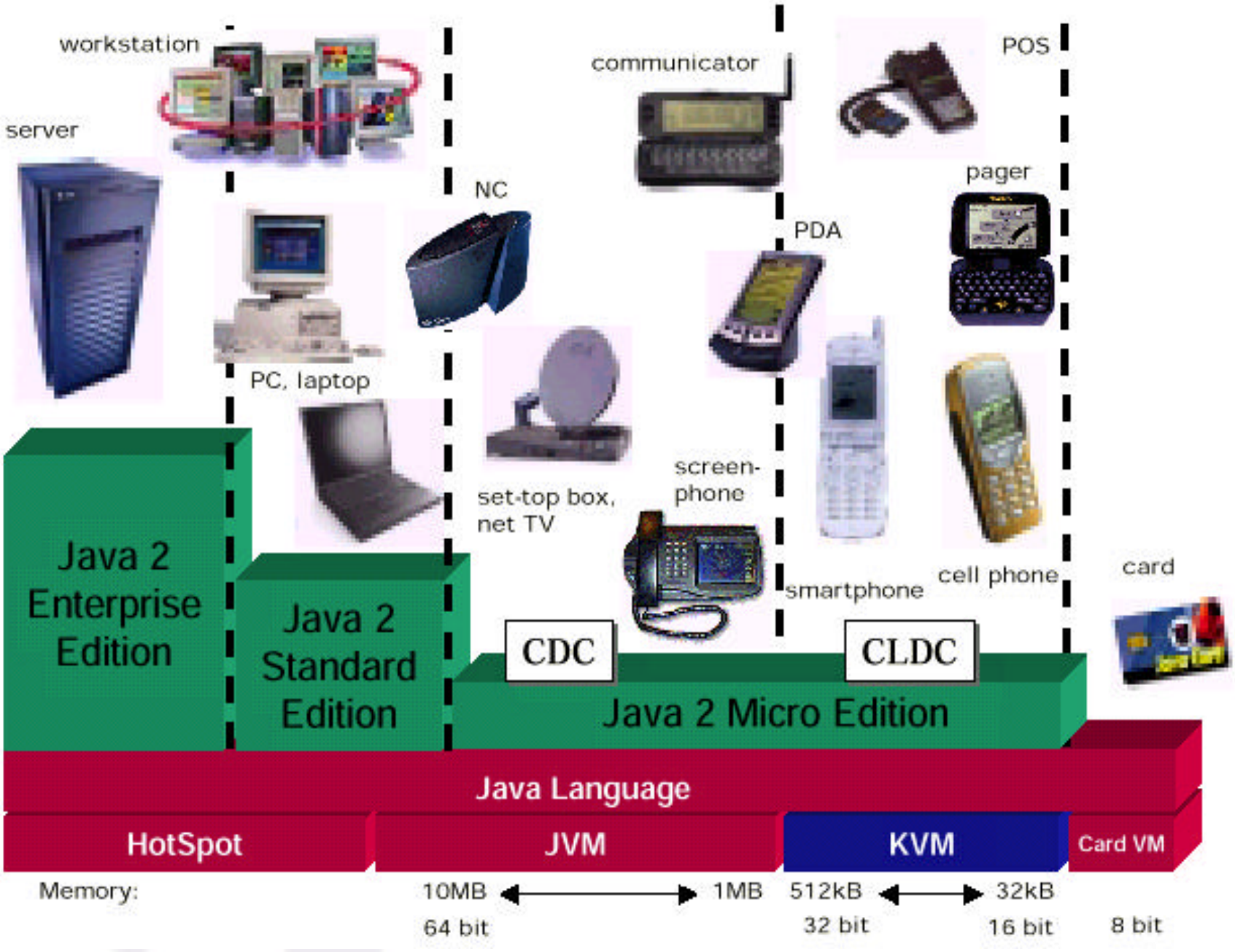
Agenda

- The Java 2 Micro Edition
- The KVM
- Configurations and Profiles
- The Palm OS and Palm Databases
- kjava and kAWT
- Example App
- Setting up your environment/Testing (the POSE)
- Future Directions

The J2ME

- An implementation of Java intended for the consumer device market.
- Covers the range of extremely tiny “devices” such as smart cards or a pager all the way up to the set-top box
- Fits with the Sun Java strategy of Java not only as a language but an environment.

J2ME


workstation
server
communicator
POS
pager
NC
PDA
PC, laptop
set-top box,
net TV
screen-
phone
smartphone
cell phone
card
Java 2
Enterprise
Edition
Java 2
Standard
Edition
CDC
CLDC
Java 2 Micro Edition
Java Language
HotSpot
JVM
KVM
Card VM
Memory:
10MB
1MB
512kB
32kB
64 bit
32 bit
16 bit
8 bit

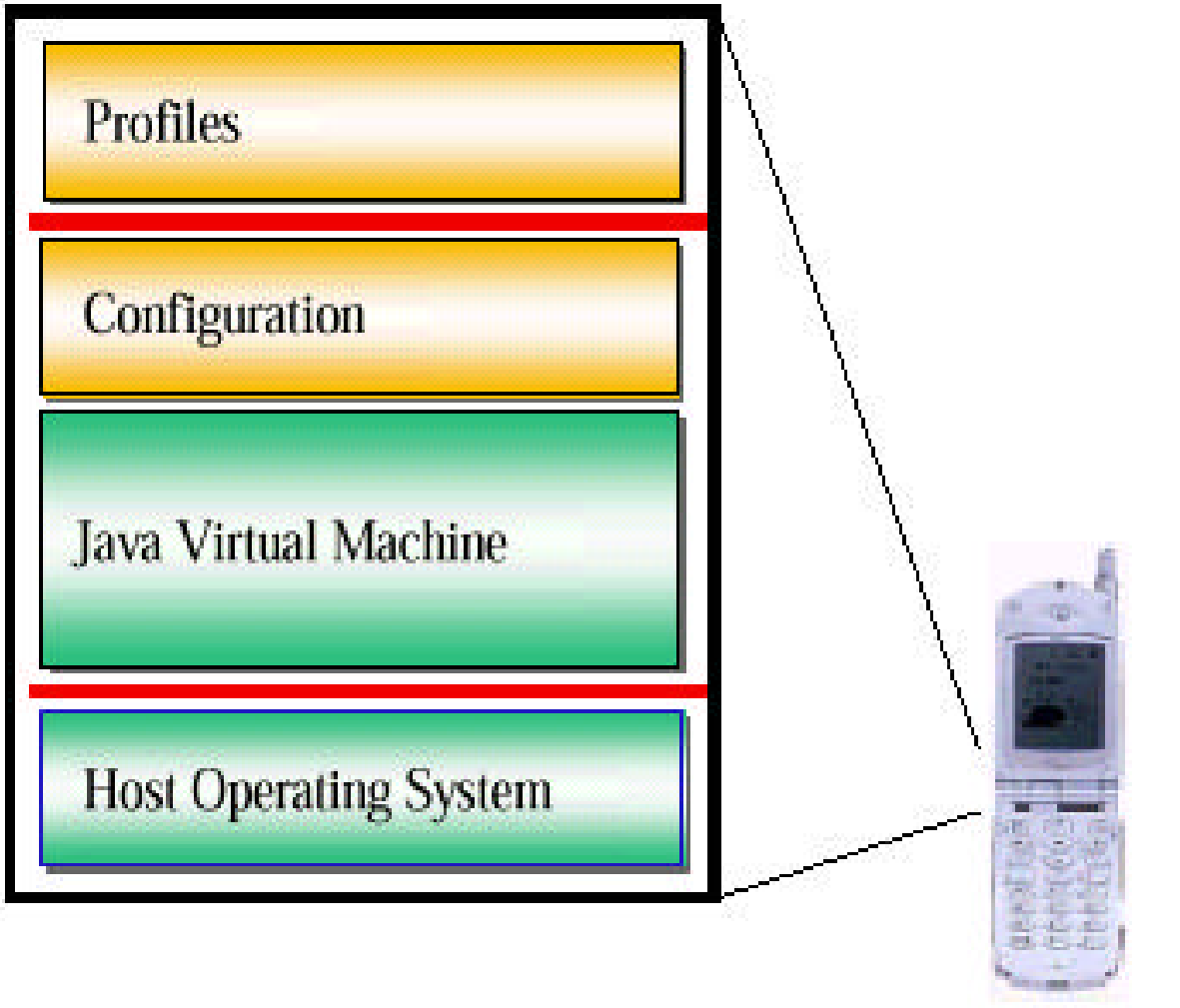
The KVM

- Kilobyte virtual machine
- Designed to have a small (40-80kb) memory footprint in the core VM.
- Is highly portable. Using compile time options it can run on a variety of devices.

The KVM

- Contains many of the same classes as J2ME, but with differences.
- Java.lang.Object has no finalize method.
- No reflection, no custom classloaders,
- no floating point data types.

Configurations and Profiles



Configurations

- define a Java platform for a “horizontal” category or grouping of devices with similar requirements on total memory budget and other hardware capabilities.
- Abstract and general, it contains a set of Java features for a category of devices.

The CLDC

- Connected Limited Device Configuration
- For occasionally connected devices that are resource constrained.

The CLDC

- Addresses the following:
  - Core Java libraries (java.lang.*, java.util.*)
  - Input/output
  - Networking
  - Security
  - Internationalization

The CLDC

- What it does **not** address:
  - Application life-cycle management (application installation, launching,deletion)
  - User interface
  - Event handling
  - High-level application model (the interaction between the user and the application)

Profiles

- layered on top of (and thus extends) a configuration. A profile addresses the specific demands of a certain “vertical” market segment or device family.
- Profiles typically include class libraries that are far more domain-specific than the class libraries provided in a configuration.

Profiles

- Currently there is only one profile, the MIDP - Mobile Information Device Profile.
- JSR 000075 - PDA Profile is in the works, but not yet released in beta.

The Palm OS

- Palm OS currently has approx. 78% of the PDA market, including the Palm Pilot, Handspring Visor and Sony Clie.
- Palms typically have between 2-8 meg of memory, and no hard drive - ram and rom only.

Palm Databases

- A Pdb is the means of storing data on a Palm.
- There is no file system on a Palm.
  - Records can be read and written by key, but not yet through Java.
  - A record is simply a byte array - you must parse it into fields.

kjava

- Released with the first version of the CLDC, it is extremely limited and not meant for anything other than reference.
- com.sun.kjava.Database remains the only API into the Palm Database Manager.

kAWT

- An implementation of AWT for the J2ME
- A vast improvement over kjava
- Free for development, runtime fees apply for commercial development :(

Example App

- Metra schedule application for the Palm Pilot.
- Features a simply interface, because Palm users want information quickly.

Coding Environement

- What do I need to program Java for the Palm?
- The J2ME
- The Palm OS Emulator
  - not required but it certainly eases things
- kAWT (for any GUI design that is not painful).

Setting up your environment

- Change your classpath to move or remove the Java 2 standard edition classes.
- Using your favorite IDE, compile your classes as normal.

Preverify your classes

- “Normal” classfile verification is too bloated for the KVM.
- The KVM classfile verification depends on a StackMap attribute, which the Preverifier inserts.
- Classes run through the Preverify tool are still valid J2SE classes.

Preverify your classes

- preverify -classpath c:\j2me_cldc\bin\api\classes;c:\myDir - d c:\myDir myDir

Create a Palm App

- MakePalmApp comes with CLDC
- Takes Java classes or JAR file and creates a prc file.
  - java palm.database.MakePalmApp -version "0.5" -JARtoPRC c:\TrainSchedule\schedule.jar TrainSchedule

Download to POSE

- Before you use the POSE you must:
- have a ROM image
  - downloadable from palmos.com.
  - install from your palm pilot.
- install the KVM and KVMUtil

Future Directions

- Rate of change within the wireless world is extremely fast.

Future Directions

- Devices are becoming more heterogeneous (VisorPhone)

Future Directions

- There will likely be more profiles in the next several months.
- More devices will support MIDP by year end (Nokia, Motorola, Ericsson)

Where to get more information

- www.palmos.com/
- www.javasoft.com/products/cldc/
- www.javasoft.com/products/midp/
- www.kawt.de/
- www.kvmworld.com/
- www.ebe-online.de/home/tweiske/sw.htm
  - Utility to convert csv files to pdb.
- This presentation available at www.objectsinc.com/download/