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Configurations

- A configuration is a complete Java runtime environment, consisting of three things:
 - A Java virtual machine (VM)
 - · Native code to interface to the underlying system.
 - A set of core Java runtime classes.
- J2ME defines two configurations:
 - · Connected Limited Device Configuration (CLDC).
 - Connected Device Configuration (CDC).

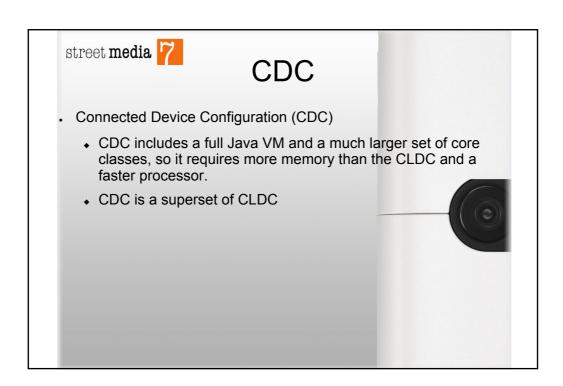


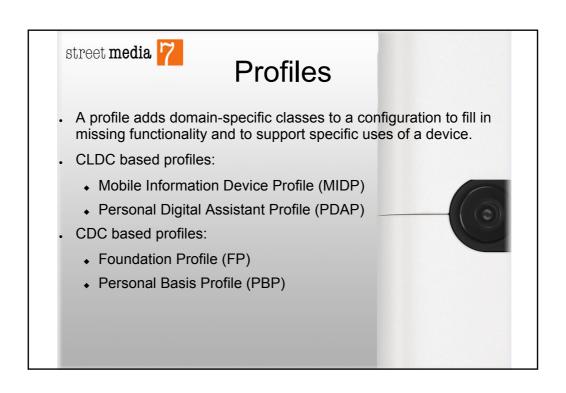
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CLDC

- CLDC is for very constrained (limited) devices:
 - devices with small amounts of memory and/or slow processors.
 - Basics from the java.lang, java.io and java.util packages, with a few additional classes from the new javax.microedition.j package.
- CLDC 1.0 & 1.1
- JVM fits in 128k
 - No floating point types
 - No object finalization







MIDP

- Devices that have the following minimal characteristics:
 - Enough memory to run MIDP applications
 - A bit addressable display at least 96 pixels wide by 56 pixels high, either monochrome or color.
 - A keypad, keyboard, or touch screen.
 - Two-way wireless networking capability.
- Comes i two versions MIDP1.0 and MIDP2.0



MIDP

- The MIDP adds APIs in a number of areas to the very basic APIs defined by the CLDC. The new features include:
 - Support for application lifecycle management similar to the way applets are defined in Java 2 Standard Edition.
 - · Persistent storage of data.
 - HTTP-based network connectivity based on the CLDC Generic Connection Framework.
 - Simple user interface support, with enough flexibility to build games or business applications.

Optional packages

- An optional package is a set of APIs in support of additional, common behaviors that don't really belong in one specific configuration or profile
- . Example of Optional packages:
 - Bluetooth API
 - Location API
 - Multimedia API
 - **•** ...

street media ?...and what is a MIDlet?

- . A MIDP application is referred to as a MIDlet.
 - MIDP does not support the running of traditional applications that use a static main method as their entry point.
 - Its entry point is a class that extends the javax.microedition.midlet.MIDlet class.
 - MIDP defines an application lifecycle model similar to applet model.



...and what is a MIDlet suite?

- One or more MIDlets are packaged together into what is referred to as a MIDlet suite.
- A MIDlet suite is basically a standard JAR (Java archive) file and a separate file called an application descriptor (JAD).
- All the user-defined classes required by the suite's MIDlets must be in the JAR file, along with any other resources that the MIDlets require
- The JAR file must also include a manifest with a number of MIDPspecific entries that describe the MIDlets in the suite.

Developing MIDlets

- The reality of MIDP programming today is that the applications you can write are constrained in many ways.
 - Memory is a particularly scarce resource.
 - · Limited screen size.
 - Limited processor.
 - There are bugs in the implementations of J2ME on sor phones
 - Operators as the posibility to brand the phones.

Porting applications

- Porting and testing applications is <u>very</u> time consuming since there are differences between different phone models such as:
- . Screen size
- . Memory
- . Processor
- . Bugs
- Operator problems
- . Specification divergence



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Tools

- To solve the problems with restricted devices and porting you'll need some tools.
 - Computer with Windows or Linux.
 - JDK (Java development kit)
 - WTK (wireless toolkit)
 - IDE (Eclipse, Jbuilder, ...)
 - A Java phone
- JDK, WTK and IDE can be downloaded from suns website or www.eclipse.org.





More tools

- There are some additional tools that migt be useful to have:
- ANT (To create a buildsystem)
- Antenna (ANT tasks to modify JAD files create package and obfuscate)
- J2ME Polish. A very useful tool to preprocess code. Simplif porting alot!!!
- Subversion or CVS. Version control system.
- Bluetooth.

street media ...and more tools

- Emulators. Very useful when testing MIDlets.
- Remember: They are not reliable.
- Emulators
 - · Nokia Carbide.
 - Siemens mobility toolkit 3.0.
 - Samsung JSDK.
 - SonyEricsson ME SDK for CLDC.
 - Motorola Launchpad.



Tips and tricks!

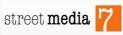
- Always think about the phones restrictions!!!
- . Do as much as possible on the serverside.
- Build small applications
 - Use obfuscators
 - Minimize grapics, sounds...
- Always think about the phones restrictions!!!
- Help your GC, set used objects to null
 - · Only create objects when you need them
 - · Release resources as quickly as posible



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More tricks

- Always think about performance
 - Optimize at the right place, use the profiler
 - Use local variables.
 - · Control your loops
 - Be careful with String concatenation. Take a look at Stringbuffer.
- Remember: DON'T trust the emulator.
- Remember: DON't trust the phone.



Useful sites

- http://forum.nokia.com // Nokias developer site, good forum, phone specs and articles.
- http://developer.sonyericsson.com // SonyEricsson related problems.
- www.j2metorums.com/forum // Good forum
- http://www.microjava.com// Good articles and a forum.

