

# Java™ Technology for the Palm OS®

Introducing the PDA Profile



## The Java Environment

One of the key attributes of the Java programming language is the ability to increase application portability across different platforms. However, the individual characteristics of these various platforms have created the need for different sets of Java APIs for different devices. In response to these requirements, Sun Microsystems has defined three editions of the Java 2 platform: Micro (J2ME™), Standard (J2SE™), and Enterprise (J2EE™). Each edition is a collection of tools and resources that can be used for a particular type of product:

- a Java virtual machine (JVM) that suits a range of consumer devices,
- a library of APIs that are specialized for each type of device,
- a configuration that acts as the foundation of device capabilities
- a profile that specifies a minimum set of APIs for a particular kind of consumer device,
- and tools for deployment and device configuration

## Java 2 Platform, Micro Edition

The Java 2 Platform, Micro Edition (J2ME) is the edition of the Java 2 platform targeted at consumer electronics and embedded devices. J2ME consists of a virtual machine and a set of APIs suitable for providing tailored runtime environments for embedded electronics. J2ME has two primary components—profiles and configurations:

Profiles	Comprise a complete set of APIs for a specific class of devices
Configurations	Define the base set of APIs describing the virtual machine and the common runtime environment libraries for a large classification of devices

### What Configurations and Profiles are in J2ME?

J2ME consists of the following set of configurations and profiles that are either completed or under development:

PDA Profile (PDAP)	Personal Profile (PP)	Profiles
Mobile Information Device Profile (MIDP)	Personal Basis Profile (PBP)	
Connected Limited Device Configuration (CLDC) + Kilobyte Virtual Machine (KVM)	Connected Device Configuration (CDC) + Classic Virtual Machine (CVM)	Configurations
J2ME		

## PDA Profile

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The PDA Profile (PDAP) is a new Java standard for APIs targeting the class of devices that includes Personal Digital Assistants (PDAs), smart phones, and communicators. PDAP defines a set of Java APIs specifically designed to take advantage of the capabilities and functionality of both current and future devices.

The Mobile Information Device Profile (MIDP) is the emerging Java standard in the cellular industry. MIDP provides a very simple UI that takes advantage of most of the cell-phone UI models. The PDAP is built as a superset to MIDP so all functionality and existing MIDlet applications will continue to operate on Palm OS devices with the PDAP implementation.

### Who's Defining PDAP?

The PDA Profile is being defined as part of the Java Community Process (JCP), an open community process overseen by Sun Microsystems to define and maintain Java standards for all platforms. (For more information on the Java Community Process, please visit: [www.jcp.org](http://www.jcp.org).) The PDA Profile is being defined by an expert group of some of the most important device and Java companies in the industry, including such companies as Esmertec, IBM/OTI, kAWT development team, Motorola, Nokia, PalmSource, RIM, Samsung, Sharp, Siemens, Sony, Sun, Symbian, Vaultus, and Wind River.

The specification lead for PDAP is PalmSource, Inc., the Palm OS subsidiary of Palm, Inc. As the specification lead, PalmSource is responsible for delivering the written specification a reference implementation, a technology compatibility kit (TCK), and business and licensing terms.

### What's in the PDA Profile?

The PDA Profile incorporates several specific APIs that define a core set of PDA functionality. Specifically, the APIs in PDAP include the following features:

- **Sophisticated UI Model:** The UI model will be based on the existing AWT definition so that developers can access all of the common Java widgets that are also present on nearly all PDAs, including such widgets as buttons, lists, and menus. AWT also provides rich layout management capabilities that allow programmers to create detailed applications and efficiently use the small real estate on PDA screens.
- **Access to Native PIM Data:** One of the defining features of a PDA is the storage and management of Personal Information Management (PIM) data. PDAP will incorporate APIs that allow access to this native PIM data from within Java applications. (This has been a much-requested feature among Java developers.)
- **File System Connectivity:** The ability to add memory cards is rapidly becoming a standard feature on PDA devices. PDAP will include APIs allowing access to memory card contents from Java applications.
- **Serial Port Connectivity:** The ability for a PDA to communicate to a desktop through a serial or USB port is a critical function of a PDA. Infrared connections are also a common means of exchanging data. PDAP will have APIs that enable serial communications using these various means of establishing a connection.

- **Full MIDP Support:** The Mobile Information Device Profile (MIDP) is the emerging Java standard in the cell phone and communicator industry. PDAP has full support for MIDP, allowing seamless integration with the cellular industry and the many MIDP applications that are already being developed. MIDP also provides basic but necessary functionality such as HTTP connections, database access, and over-the-air provisioning.
- **Security Model:** PDAP will provide a simple yet secure model to prevent unintentional or malicious use of a device's data or resources. For example, user intervention will be required before any Java application is allowed to access any PIM data stored on the device.

## **When Will PDAP Be Available?**

The PDA Profile is being developed as part of the Java Community Process. This requires the specification to pass through a series of community and public reviews before the specification will become an actual Java standard. Currently, the estimated date for releasing the PDAP specification for public review is the beginning of May 2002. After the public review and any subsequent revisions, the specification is estimated to be released in its final version and become a Java standard in mid-June, 2002.

## **What Resources Will Be Available?**

PalmSource is responsible for making available the following items for PDAP:

- **API Specification Document:** This document describes the APIs within PDAP and will be available free of charge from both [www.jcp.org](http://www.jcp.org) and [www.palmsource.com](http://www.palmsource.com).
- **Binary Reference Implementation Virtual Machine:** This application is a reference demonstrating a valid implementation of the APIs in PDAP. The binary application will run on Palm OS 3.5 and higher and will be available for download from [www.palmsource.com](http://www.palmsource.com). In compliance with the JCP process and licensing terms, the binary will be available for research and development use, and PalmSource will provide a fee-based license for this implementation should any company wish to commercially deploy it with their application.
- **PDAP Licensee Kit:** This set of items is provided so that other companies that wish to implement their own version of a PDAP virtual machine may do so. Companies may license the PDAP from PalmSource to receive the following items to help them implement their own PDAP:
  - **Binary Reference Implementation of the VM:** PDAP licensees can use the application as a visual reference for their implementation to resolve any questions over expected behavior in the APIs.
  - **Source Code to the Reference Implementation:** PDAP licensees can use the source code as a written reference for their implementation to resolve any questions over expected behavior in the APIs.
  - **Technology Compatibility Kit (TCK):** PDAP licensees can use this Java-based testing kit to verify that their implementation of the PDAP is compliant with the PDAP specification.

## **PDAP vs. PersonalJava or Personal Profile**

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PersonalJava was the first attempt by Sun Microsystems to bring Java to embedded devices. While this effort only partially fulfilled its initial objective, PersonalJava still exists today and is evolving into the Personal Profile (PP) in J2ME. At a basic level, Personal Profile has very similar features to those of J2SE. However, Personal Profile is not adequately suited for use in PDA devices because PP is not tailored for the specific needs and constrained environment of PDAs. For example, while Personal Profile could be used to implement almost all features provided by PDAP (UI, PIM access, file system access, security, etc.), such an implementation would be over 3.5 MB in size – more than three times the size required by PDAP to accomplish the same task.

Moreover, Personal Profile requires the Connected Device Configuration (CDC), which does not provide some important features that are included in the Connected Limited Device Configuration (CLDC). By using CLDC, PDAP is able to deliver these features, including enhanced performance, increased battery life, and reduced memory footprint through the removal of less frequently used functionality and other optimization in the KVM. Without this level of optimization, Java applications would be much too slow for end users to use productively and much too large for effective deployment on PDA devices.