Java Card™ 2.1.1 Development Kit Release Notes

Sun Microsystems, Inc.
901 San Antonio Road
Palo Alto, CA 94303 USA
650 960-1300 fax 650 969-9131

Version 1.0P
June 1, 2000

Copyright © 2000 Sun Microsystems, Inc.

901 San Antonio Road, Palo Alto, CA 94303 USA

All rights reserved. Copyright in this document is owned by Sun Microsystems, Inc.

Sun Microsystems, Inc. (SUN) hereby grants to you at no charge a nonexclusive, nontransferable, worldwide, limited license (without the right to sublicense) under SUN's intellectual property rights that are essential to practice the Java Card™ technology to use this document for internal evaluation purposes only. Other than this limited license, you acquire no right, title, or interest in or to the document and you shall have no right to use the document for productive or commercial use.

RESTRICTED RIGHTS LEGEND

Use, duplication, or disclosure by the U.S. Government is subject to restrictions of FAR 52.227-14(g)(2)(6/87) and FAR 52.227-19(6/87), or DFAR 252.227-7015(b)(6/95) and DFAR 227.7202-1(a).

SUN MAKES NO REPRESENTATIONS OR WARRANTIES ABOUT THE SUITABILITY OF THE SOFTWARE, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT. SUN SHALL NOT BE LIABLE FOR ANY DAMAGES SUFFERED BY LICENSEE AS A RESULT OF USING, MODIFYING OR DISTRIBUTING THIS SOFTWARE OR ITS DERIVATIVES.

TRADEMARKS

Sun, Sun Microsystems, the Sun logo, Java, Java Card, SunDocs, and SunExpress are trademarks or registered trademarks of Sun Microsystems, Inc. in the United States and other countries. UNIX® is a registered trademark in the United States and other countries, exclusively licensed through X/Open Company, Ltd.

THIS PUBLICATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT.

THIS PUBLICATION COULD INCLUDE TECHNICAL INACCURACIES OR TYPOGRAPHICAL ERRORS. CHANGES ARE PERIODICALLY ADDED TO THE INFORMATION HEREIN; THESE CHANGES WILL BE INCORPORATED IN NEW EDITIONS OF THE PUBLICATION. SUN MICROSYSTEMS, INC. MAY MAKE IMPROVEMENTS AND/OR CHANGES IN THE PRODUCT(S) AND/OR THE PROGRAM(S) DESCRIBED IN THIS PUBLICATION AT ANY TIME.

Contents

1. Introduction 1

2. Contents of this Release 3

3. Java Card™ 2.1.1 Development Kit Release 5

The Java Card 2.1.1 Development Kit Tools Reference Implementation Executables 5

The Java Card 2.1.1 Framework and Sample Applets 6

4. Quality Assurance 7

Testing 7

Converter 7

Known Bugs in this Release 7

5. New Features in this Release 9

Converter 9

6. Known Limitations in this Release 11

General 11

API 11

Converter 11

JCWDE 12

7. Problems Fixed in this Release 13

CHAPTER 1

Introduction

This document contains the release notes for the Java Card™ 2.1.1 Development Kit.

You can use this release to:

- View and experiment with the reference implementation of:
  - Java Card 2.1.1 `Converter` tool.
  - Java Card 2.1.1 `capgen` tool.
  - Java Card 2.1.1 Java Card Workstation Development Environment (`JCWDE`) Simulator.
  - Java Card 2.1.1 `ApduTool` utility.
  - Java Card 2.1.1 Framework Classes.
- Exercise the reference implementation to:
  - Convert the sample applet packages and build a `CAP` file using the `Converter` tool.
  - Run the virtual machine in `JCWDE` and exercise the installer applet to install a set of sample applets and libraries.

The Java Card 2.1.1 Development Kit tools run on a workstation using a Java Virtual Machine (VM). UNIX and Windows NT versions are available for this release.

For more details on the reference implementation, please refer to the *Java Card™ 2.1.1 Development Kit User's Guide.*

CHAPTER 2

Contents of this Release

This release contains:

- The Java Card 2.1.1 `Converter` tool reference implementation pre-built binary.
- The Java Card 2.1.1 `capgen` tool reference implementation pre-built binary.
- The Java Card 2.1.1 Workstation Development Environment (`JCWDE`) Reference Implementation Pre-Built Binary.
- The Java Card 2.1.1 `ApduTool` utility reference implementation pre-built binary.
- The Java Card 2.1.1 Framework and sample packages to run against the cJDK.
- Java Card 2.1.1 Development Kit User's Guide.

CHAPTER 3

Java Card™ 2.1.1 Development Kit Release

This chapter describes what is and what is not included in this release.

The major components are the Java Card 2.1.1 tools reference implementation pre-built executables, and the example applets, including source code and pre-built executables.

These tools implement the *Java Card™ 2.1.1 Virtual Machine Specification*

The Java Card 2.1.1 Development Kit Tools Reference Implementation Executables

The executables in the `bin` directory are the UNIX shell scripts or the MS Windows batch files for running the `jcwde`, the `converter`, the `capgen` tool, the `apdutool` utility, and their corresponding `jar` files.

The Java Card 2.1.1 Framework and Sample Applets

The `api21` directory comprises the Java Card 2.1.1 `java.lang` package and a complete implementation of the Java Card 2.1.1 `javacard.framework` package. `jcwde` comprises the workstation development environment scaffolding code to allow Java Card applet development on a workstation. `samples` includes five sample Java Card 2.1.1 applets: `NullApp`, a basic applet which only returns error status; `HelloWorld`, a command APDU echo applet; `Wallet`, a simple electronic purse; `JavaPurse`, a smart card cash applet; `JavaLoyalty`, a loyalty applet which interacts with `JavaPurse`; and `SampleLibrary`, which contains the shared interface between `JavaPurse` and `JavaLoyalty`.

CHAPTER 4

Quality Assurance

Testing

This release has been installed and tested on Win NT 4.0 and Solaris 7 systems, using Sun's JDK 1.2.2.

Converter

The Java Card `Converter` supports class file format of versions in the range 45.0 through 45.65535 inclusive, in a manner similar to the Sun's JDK release 1.1.8.

Known Bugs in this Release

The following table lists identified bugs in this release with a moderate (3) to low (5) bug severity level.

TABLE 4-1 Known Bugs in This Release.

Bug Id	Component	Synopsis	Severity
4333022	`Converter`	converter doesn't handle correctly "wide" bytecode.	5
4334192	`Converter`	Incorrect jca-file is created by converter for simple method with try-finally block.	5
4337394	`Converter`	`Converter` doesn't check that 'AID' and 'version' parameters are byte-length values.	5
4337404	`Converter`	`Converter` doesn't check that applet's RID is the same as package's RID (JCVM Specification, 6.5).	5
4337405	`Converter`	The same AID can be assigned to more than one applet in the package.	5
4337406	`Converter`	The same AID can be assigned to applet and its package.	5
4337407	`Converter`	More than one AID can be assigned to applet.	5
4322301	`Installer`	`installer` cannot handle initialization of static array of 0 element	3

CHAPTER 5

New Features in this Release

Converter

The Java Card `Converter` tool has been enhanced, allowing you to do generate `CAP` files in one step.

CHAPTER 6

Known Limitations in this Release

General

The reference implementation does not include the `javacardx.crypto` API packages.

The reference implementation does not support default Java Card applet packages. Applet and library packages must be named.

API

javacardx.crypto

- binaries are not included.

javacard.security

- `getInstance()` methods of `KeyBuilder`, `MessageDigest`, `Signature` and `RandomData` throw `NO_SUCH_ALGORITHM` exception.

Converter

The class files input to the `converter` must have been compiled with the `-g` option.

Static fields can only be initialized to primitive compile-time constant values, or arrays of primitive compile-time constants. The `converter` supports static field initialization as in the following formats:

```
public static byte a = 1;
protected static short b = 4;
private static int c = 0xFFFF;
public static byte[] d = {1, 2, 3};
public static final short[] = { 0x11, 0x22, 0x33 };
public static int[] = new int[5];
```

The `converter` reports errors on other formats of static field initialization and static field initialization types that are not compliant to the *Java Card™ 2.1.1 Virtual Machine Specification*.

For instance, the following code is not currently supported:

```
public static int[] a;
static {
a = new int[3]; for (int i = 0; i < 3; i++)
a[i] = i;
}
```

JCWDE

- No transactions or firewall.
- No download; All applets configured in mask.
- Execution simulates first time power up of card.

CHAPTER 7

Problems Fixed in this Release

The following table lists the problems fixed in this release.

TABLE 7-1 Problems Fixed in This Release.

Bug Id	Component	Synopsis
4294687	converter	capgen fails on class with abstract method when param type external
4300131	converter	CAP file format: Descriptor component & directory component
4308473	converter	capgen problem with field tokens
4314190	converter	public static final byte[] b={(byte)0x10} and jcasm.jar
4334148	converter	capgen is unable to resolve SuperMethodref_info constant pool entry for method with package visibility.
4329152	installer	Installer error codes start with 0x60 which is not ISO compliant.
4329162	installer	Installer instruction byte (INS) values are not ISO compliant.
4275845	ref implementation	SecurityException is thrown when an applet calls APDU.waitExtension()
4290768	ref implementation	OwnerPIN class constructor does not flag PIN length <=0
4310578	ref implementation	Java Card jcdk APDU buffersize limitation
4334071	ref implementation	jcwde should print better diagnostic message on SW=0,0 status return

Bug Id	Component	Synopsis
4262908	tools	Java Card `jcasm.jar` `javacc` source code should be upgraded to a supported version
4260612	tools	`capgen` fails with `java.io.FileNotFoundException`
4267701	tools	`capgen` does not handle properly statically initialized arrays of 0 or 1 element
4291937	tools	bug in the reference location component of `capgen`