JavaOne℠

Sun's 1997 Worldwide Java Developer Conference

100% Pure Java™

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Overview

- **What** is 100% Pure Java^{TM}?
- **Who** participates in the initiative?
- **How** can you make your programs be 100% Pure?
  - Write Pure Java
  - Check and Test
  - Validation

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What Is 100% Pure Java?

- Purity is an indicator for portability
- Purity: does a program rely only on the Java Platform?
- Purity is measurable

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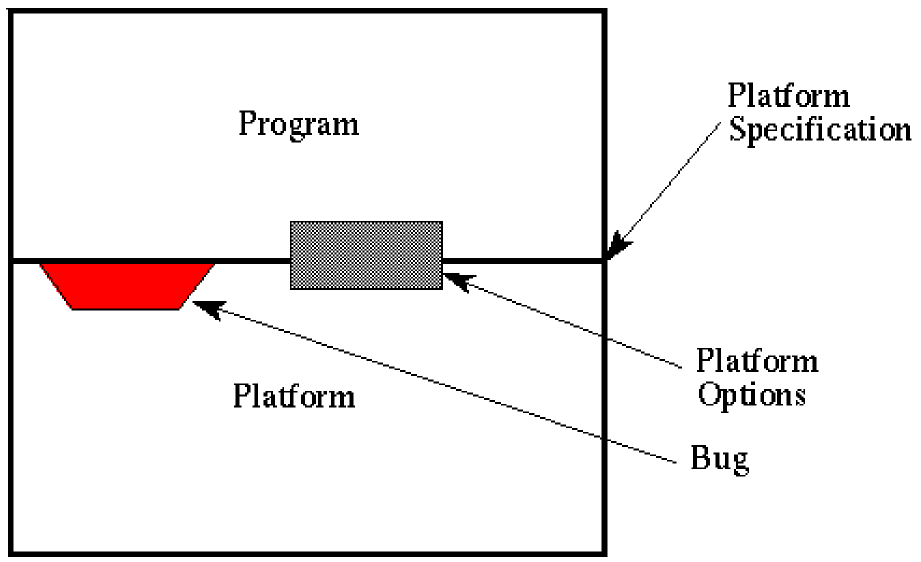
Programs on Platforms



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Portability and Purity

- Portability depends on the functionality of the program
- Purity depends on how the program sits on the Java™ Platform
- Why aren’t they identical?

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Portability Is Not Simple

- Here’s a portable program that produces a different result on each platform:

```
class ShowOS {
    public static void main(String[] args) {
        String os = System.getProperty("os.name");
        System.out.println(os);
    }
}
```

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...Portability Isn’t Simple

- How can we tell the difference between that program and the following?

```
class NoOS {
   public static void main(String[] args) {
      String os = System.getProperty("os.name");
      if (os.equals("Solaris")) {
         throw new RuntimeException();
      }
   }
}
```

Purity and Portability

How does Purity relete to Portability?

- Purity is a concrete measure of a program
- Portability is an abstract aspect of program behavior
- Purity is a predictor for portability

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Who Does What?

Partners in Purity

- Independent validation center (initially KeyLabs)
- SunTest
- JavaSoft
- Developers

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Responsibilities: Validation Center

- Accept application (which starts the certification process)
- Validate submissions
  - Install software
  - Replay developer’s checking
  - Evaluate explanations
- Report results

What Is SunTest?

- A Sun™ business unit
  - Part of Sun Laboratories, where Java was also born
- Focus: Java testing tools
- Expertise: testing tools, Java
- **`http://www.suntest.com`**

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Responsibilities: SunTest

- Tools: JavaPureCheck, JavaSpin
  - Develop
  - Maintain and enhance
  - Support (hard questions)
- Process
  - Design

Responsibilities: JavaSoft

- Definition of "100% Pure Java"
  - Publication of the Cookbook
  - Clarification as questions arise
  - Coordination with the Java Platform definition
- Marketing

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Responsibilities: Developer

- Develop
- Pre-test
  - Our goal is for the process to take less than two weeks from start to finish, including validation
- Brand

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Why Certify Your Program?

- Portability saves you trouble
- Purity is a message to your customers
- Sun supports 100% Pure Java programs

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Process Requirements

Requirements of the Validation Process

- Rapid
- Objective
- Repeatable
- Inexpensive
- Predictable

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100% Pure Java Certification

- The process is intended to be an aid to developers
  - Assist you to make your programs portable
  - Cookbook and tools offer advice as well as requirements
- The process will evolve
  - Specific plans for improvement will be mentioned later
  - "Listen to developers" is the most important part of the plan

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Steps in Certification

Details of how you can get 100% Pure Java certification

- Write portable Java
- Check your program (statically)
- Test your program
- Explain any apparent problems
- Submit a validation package

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Write Portable Java

The most important part of certification

- Get the kit
- Read the Cookbook
- Use the tools

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Check Early, Check Often

- You can use the static checker throughout your development cycle
- Does not require complete program to run
- Identifies portability pitfalls
- Make 100% Pure Java part of your development process

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Test Your Program

- The static checker raises questions
- You create a dynamic test driver to answer those questions
- A coverage metric measures the test

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JavaPureCheck

The static purity checker

- Reads class files
- Checks these properties:
  - String constants
  - Class declarations
  - Method definitions
  - Method references
- Quick and easy

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Results from JavaPureCheck

Results from the static check fall into these four categories

- Pure
- Advice
- Warning
  - Requires explanation
- Error
  - Requires variance

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The Dynamic Test

Providing a dynamic test driver

- Automated exerciser
- Requirements
  - Must be Java program, so it will run on Java platforms
  - Must run to completion
  - Must provide adequate coverage

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Creating a Dynamic Test Driver

- By hand
- By tool
  - JavaSpin, for AWT programs, included in test kit

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Coverage Requirements for the Test Driver

- Coverage is an objective measure of test quality
- Measurement
  - Coverage measurement tools included in JDK™ 1.1
  - Special-purpose coverage reporter included as part of certification package
- Initial Criteria
  - 100% method coverage for classes flagged by JavaPureCheck
  - 50% method coverage for entire program

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Unmeasurables

Things the validation process can’t measure

- User interface quality
- Fitness to requirements

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Explanations

What do you do about warnings?

- Fix!
- Dynamic test
- Explanations & promises
- Variances

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Sanity Check

An install check

- Did the program install correctly?
- Do the basic functions work?

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Validation Package

What you submit to the validation center

- Program
  - Install procedure (or program)
- Results from JavaPureCheck
- Dynamic test driver
  - Expected coverage measure
- Explanations

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Applying for Certification

- Visit the 100% Pure Web site

  `http://java.sun.com/100percent`

- Certification Package
  - Tools
  - Detailed instructions
- Submission

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Risk Reduction Measures

What we've done to reduce your risk

- Validation process is…
  - Repeatable
  - Automated
  - Objective

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If Anything Goes Wrong...

...or needs clarification

- The retest process
- The clarification process
- Variances

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Audits

The "Internal Revenue Service" model

- Validation process is designed for good faith
- Certification may be audited by Sun

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Recertification

- Required for a product update that adds new features
- Must use the current certification process

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Learning Together

- Planned improvements
  - More specific warnings from JavaPureCheck
  - More precise coverage information
- Work with developers

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For More Information...

... and to get started with certification

- 100% Pure Java

  `http://java.sun.com/100percent`
- FAQs, support, tools

  `http://www.suntest.com`
- To apply for certification

  `http://www.keylabs.com`

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Display the Brand Proudly

- Comarketing opportunities
- Customer confidence
- Full participation in the Java phenomenon

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