Java Technology Overview

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How To Use Course Materials

- Lecture The instructor will present information specific to the topic of the module. This information will help you learn the knowledge and skills necessary to succeed with the exercises.

- Exercise Lab exercises will give you the opportunity to practice your skills and apply the concepts presented in the lecture.

- Think Beyond Thought-provoking questions are posed to help you apply the content of the module or predict the content in the next module.

Course Goal

- The main goal of this course is to provide you with the knowledge for Java programming language, Java Virtual Machine, Java platform and how to run your first java application

Course Overview

This course covers the following areas:

- What's Java?
- History of Java
- Introduction to Java's Architecture
- Introduction to Java runtime and IDE (Integration development environment)
- Run your first Java application

Two Value

- Communication
- Feedback

What is the Java Technology?

Java Technology is:

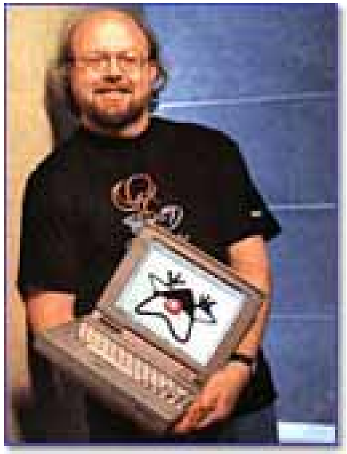
- A programming language
- A development environment
- An application environment
- A deployment environment

Primary Goals of the Java Technology

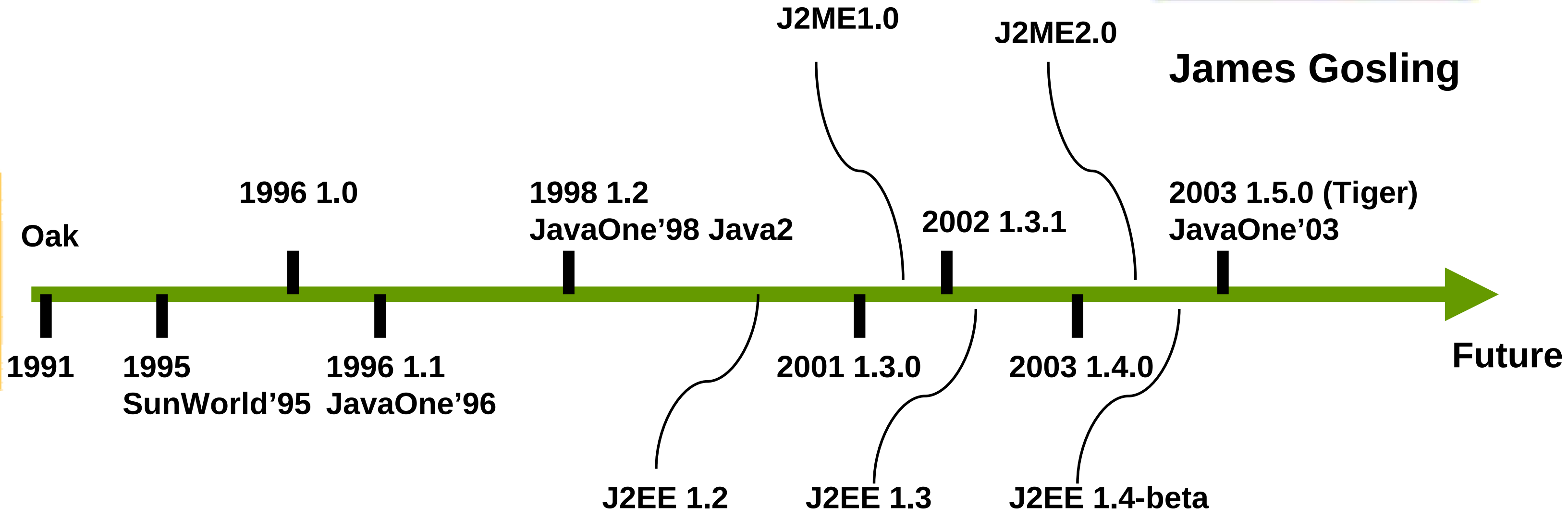
- Provides an easy-to-use language by:
  - Avoiding the pitfalls of other languages
  - Being object-oriented
  - Enabling users to create clear code
- Provides an interpreted environment for:
  - Improved speed of development
  - Code portability
  - Loads classes dynamically, that is, at the time they are actually needed
  - Furnishes better security

History of Java

http://java.about.com/cs/articles/a/javahistory.htm



James Gosling



Oak

1991

1995
SunWorld’95

1996 1.0

1996 1.1
JavaOne’96

1998 1.2
JavaOne’98 Java2

J2EE 1.2

J2ME1.0

2001 1.3.0

J2EE 1.3

2002 1.3.1

J2ME2.0

2003 1.4.0

J2EE 1.4-beta

2003 1.5.0 (Tiger)
JavaOne’03

Future

What’s Java?

In discussing Java, it is important to distinguish between the Java programming language, the Java Virtual Machine, and the Java platform.

- The Java Programming Language

  The Java programming language is a object-oriented language in which Java applications (including applets, servlets, and JavaBeans components) are written.

- The Java Virtual Machine

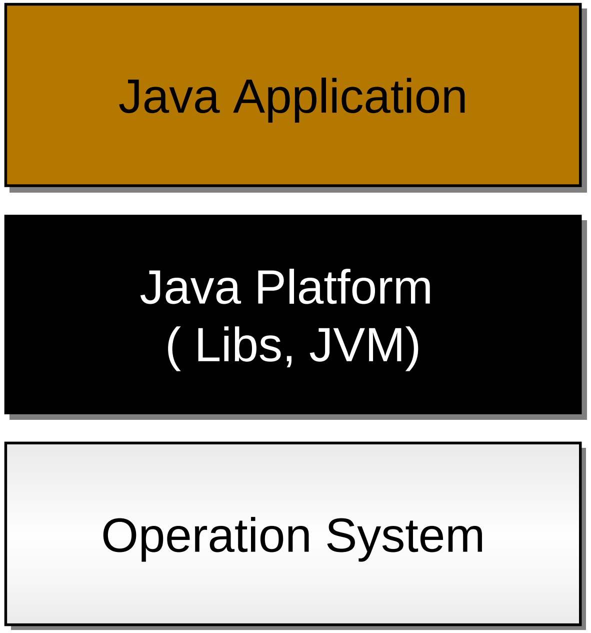
  The Java virtual machine is an abstract computer. A Java virtual machine's main job is to load class files and execute the bytecodes they contain.

- The Java Platform

  The combination of the Java virtual machine and Java API is called the *Java Platform* (or, starting with version 1.2, the *Java 2 Platform*).

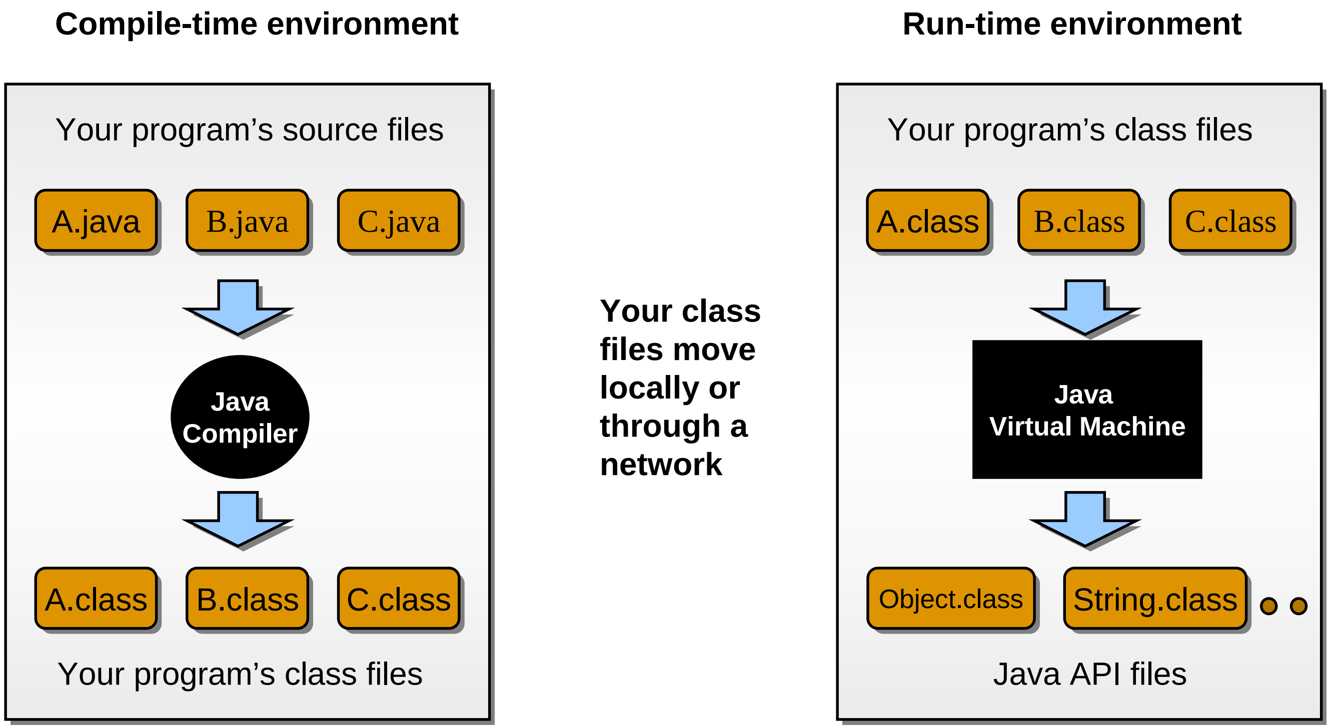
Java's Architecture

Java programs run on top of the Java Platform



Java's Architecture

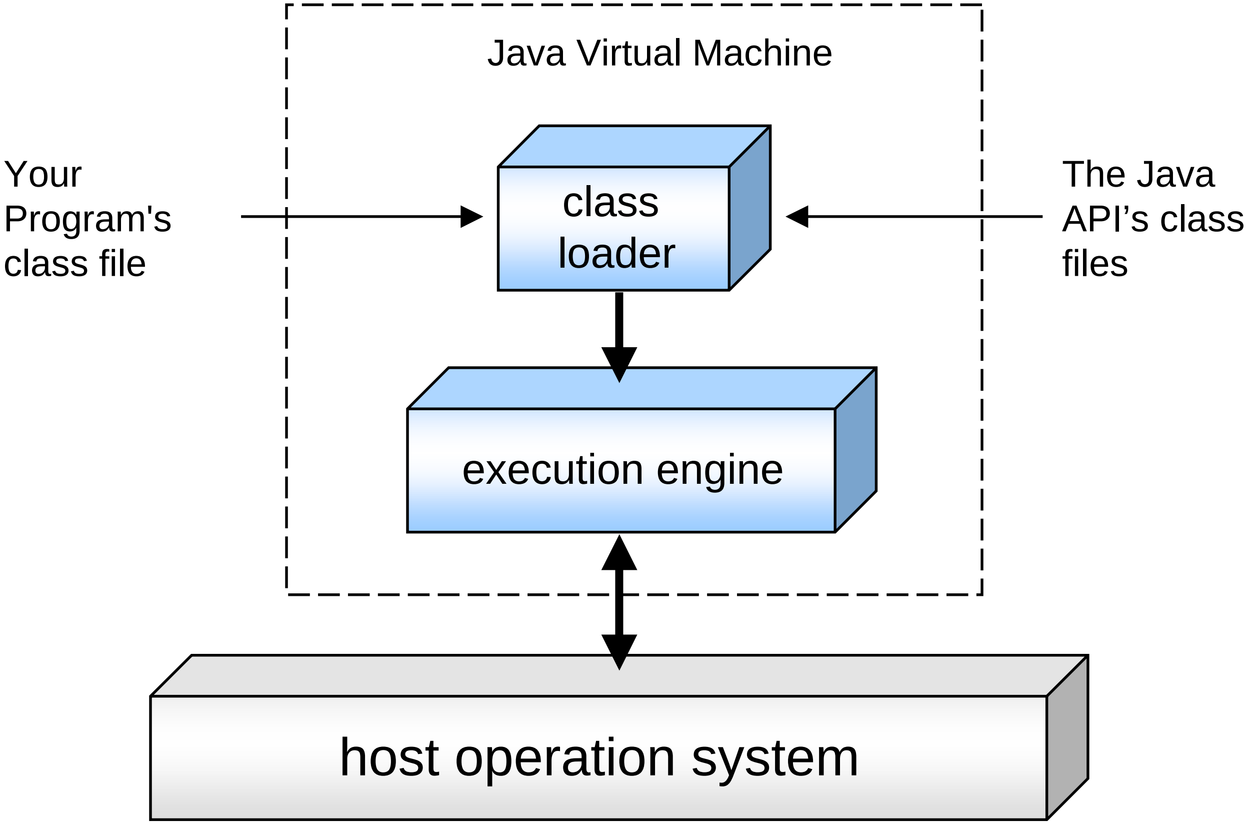
Java Programming Environment



Your class files move locally or through a network

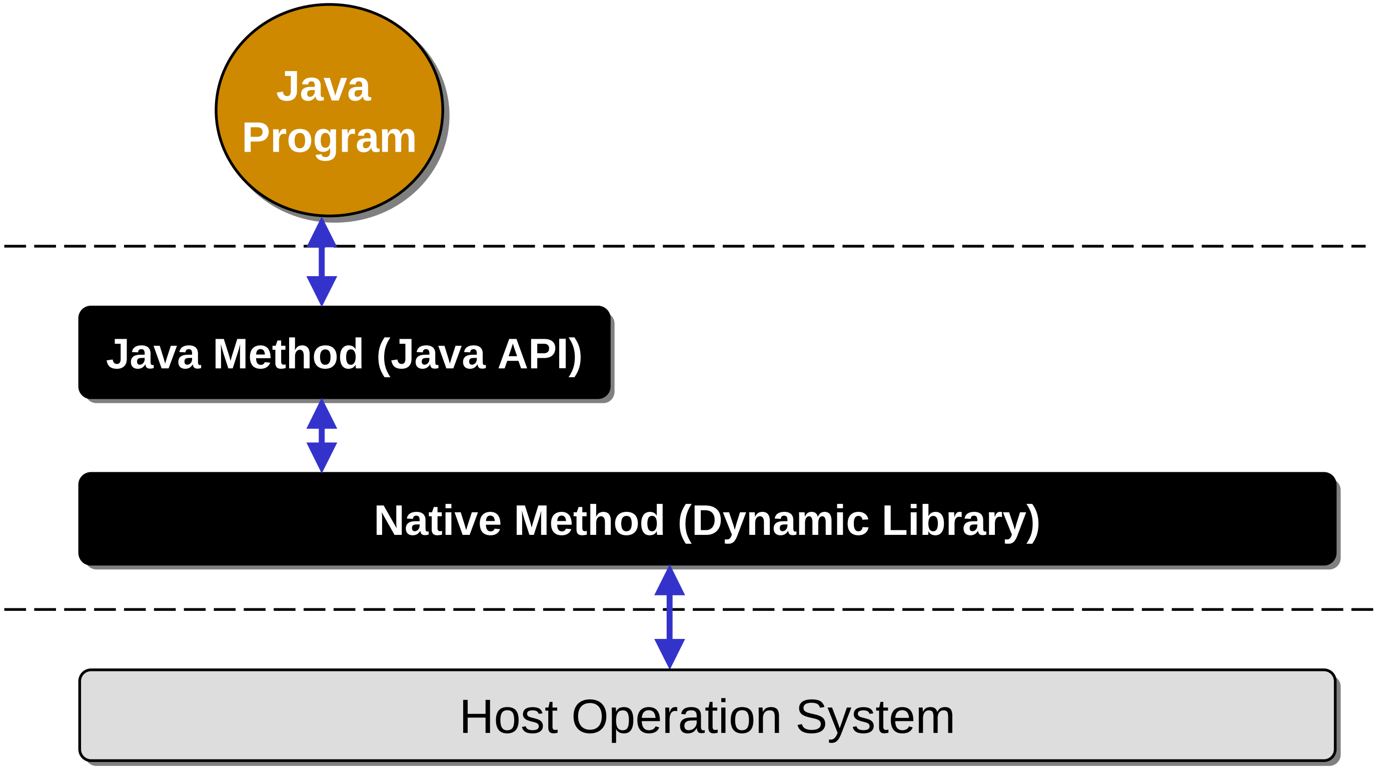
Java’s Architecture

Java virtual machine implemented in software



Java’s Architecture

A platform-independent Java program



Java Program

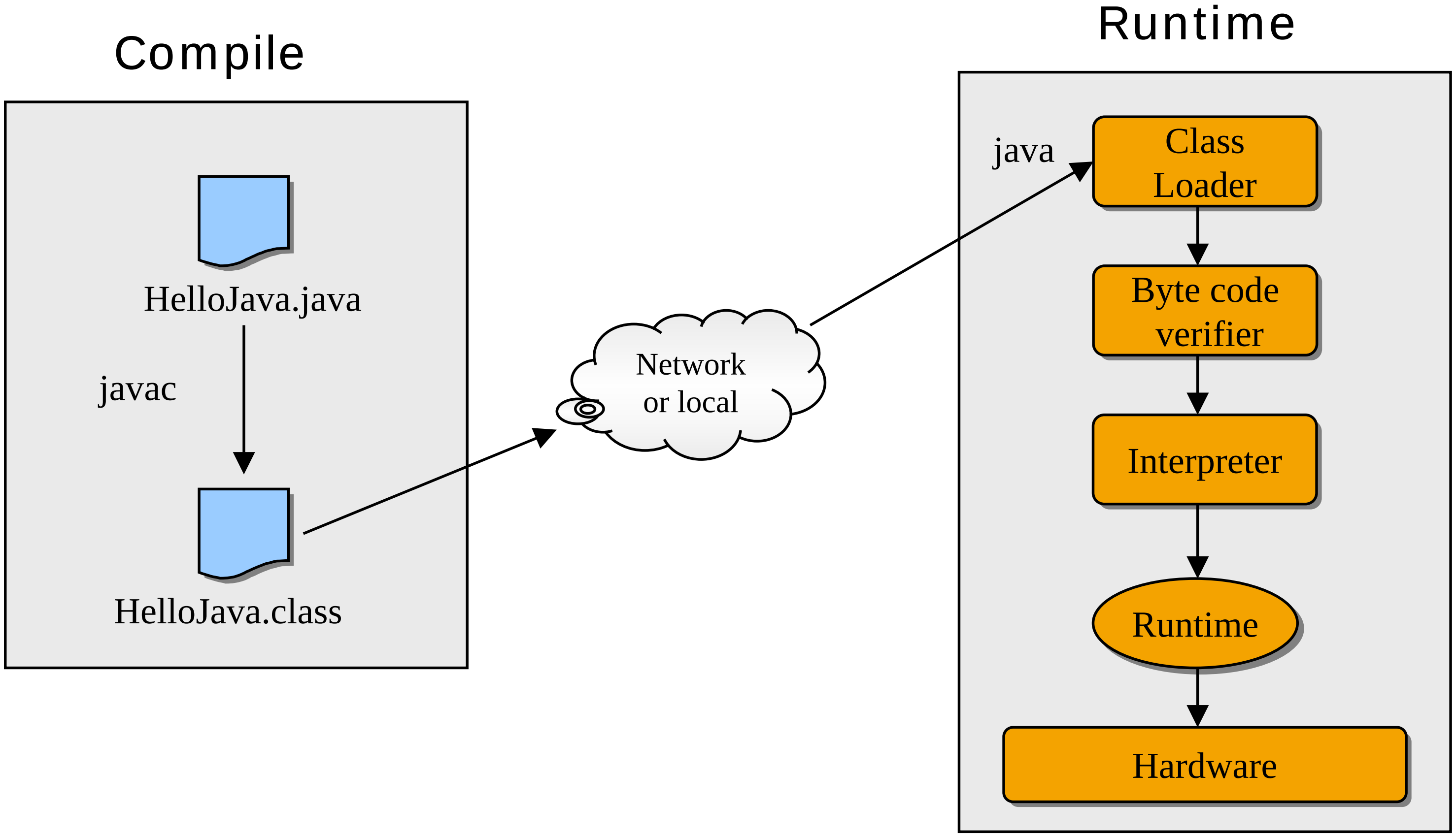
Java Method (Java API)

Native Method (Dynamic Library)

Host Operation System

Java’s Architecture

Operation of JRE (Java runtime environment)



Java’s Architecture

- Tasks performed by JRE
  - Loads code – Performed by the class loader
  - Verifies code – Performed by the bytecode verifier
  - Executes code – Performed by the runtime interpreter

Java’s Architecture

- Class Loader
  - Loads all classes necessary for the execution of a program
  - Maintains class of the local file system in separate “namespaces”
  - Prevents spoofing

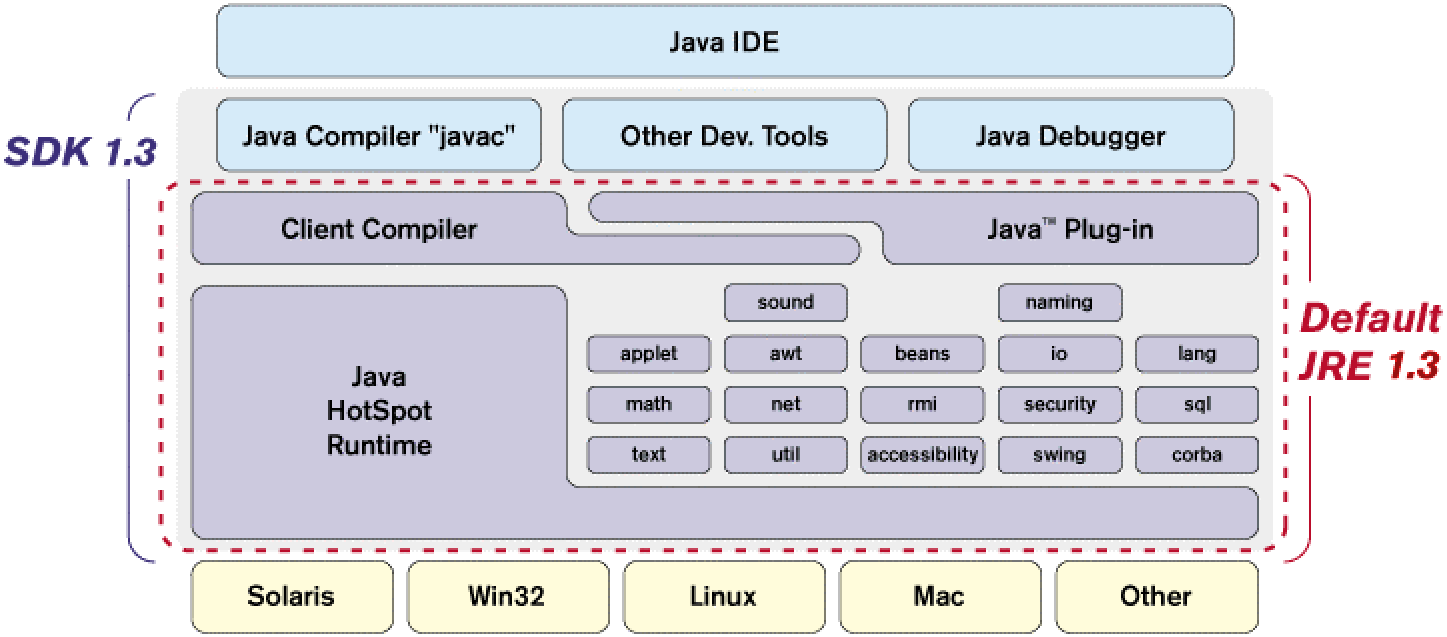
Java's Architecture

- Bytecode Verifier

  Ensures that:

  - The code adheres to the JVM specification
  - The code does not violate system integrity
  - The code causes no operand stack overflows or underflows
  - The parameter types for all operational code are correct
  - No illegal data conversions (the conversion of integers to pointers) have occurred

J2SE's Architecture



The Java "White Paper"

- Simple

- Object-Oriented 100% pure

  Simply stated, object-oriented design is a technique for programming that focuses on the data (= objects) and on the interfaces to that object.

- **Distributed**

  Java has an extensive library of routines for coping with TCP/IP protocols like HTTP and FTP. Java applications can open and access objects across the Net via URLs with the same ease as when accessing a local file system.

The Java “White Paper”

- **Robust**

  Java puts a lot of emphasis on early checking for possible problems,later dynamic (run-time) checking. Java has a garbage collection that eliminates the possibility of overwriting memory

- **Architecture Neutral**

  The compiler generates an architecture-neutral object file format—the compiled code is executable on many processors, given the presence of the Java run time system.

- Interpreted

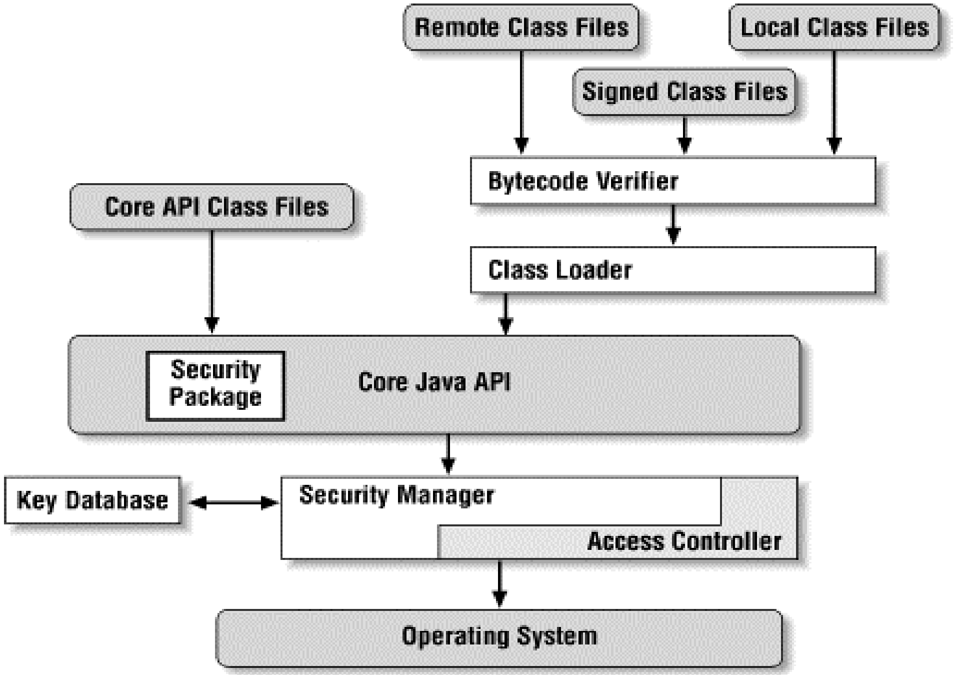
  The Java interpreter can execute Java bytecodes directly on any machine to which the interpreter has been ported.

The Java “White Paper”

- **Secure**

  Any Java code, whether it is an applet, a servlet, a JavaBeans component, or a complete Java application, can be run with restricted permissions that prevent it from doing harm to the host system.

Applet Security http://java.sun.com/sfaq/



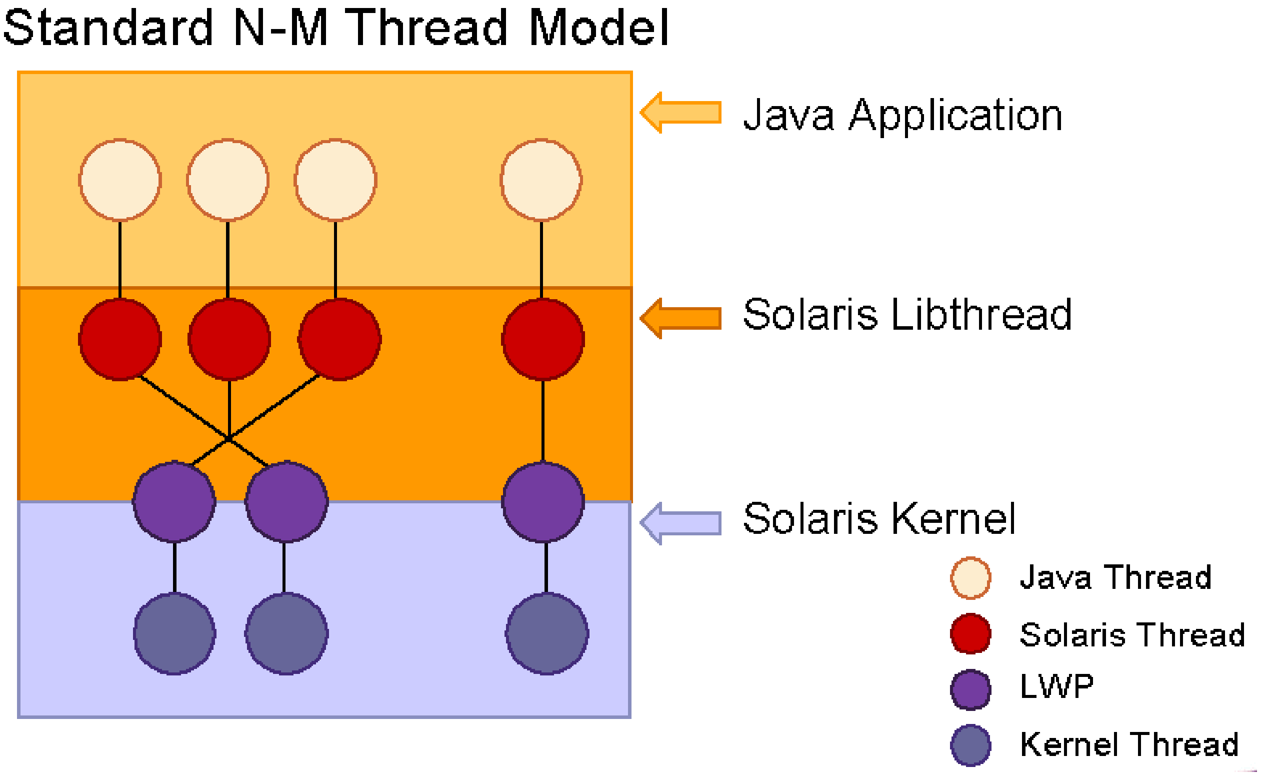
The Java “White Paper”

- Dynamic

Libraries can freely add new methods and instance variables without any effect on their clients.

The Java “White Paper”

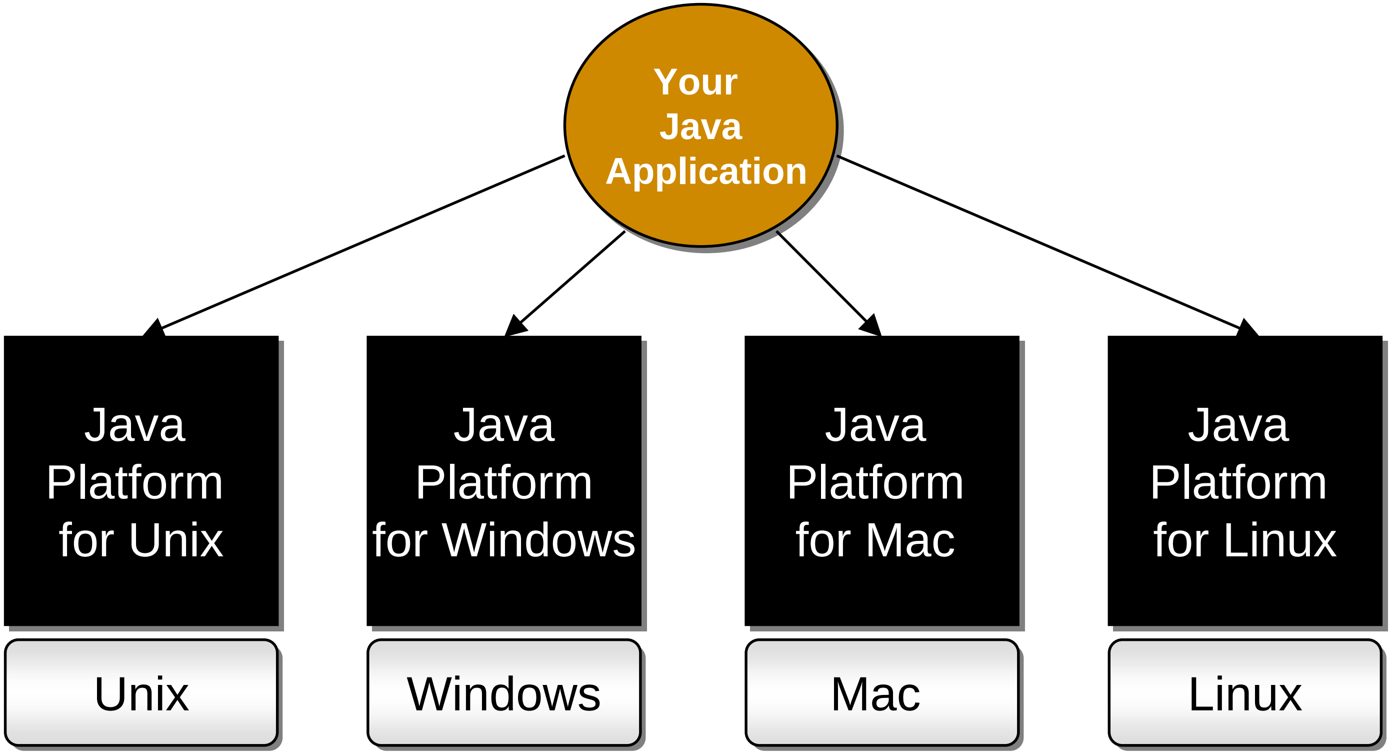
- Multithread



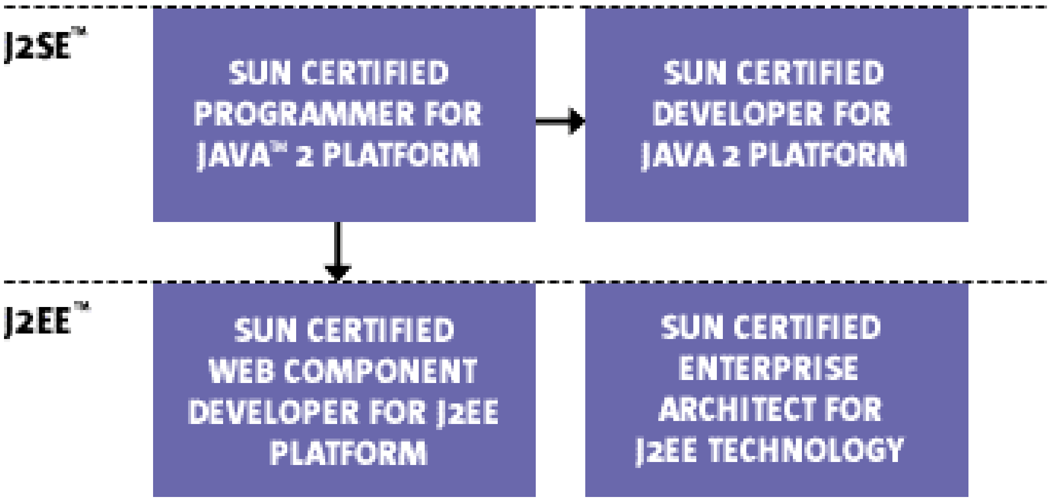
The Java “White Paper”

- **Portable**

  Write Once, Run Anywhere



Java Technology Certification Learning Path



J2SE™

SUN CERTIFIED PROGRAMMER FOR JAVA™ 2 PLATFORM

SUN CERTIFIED DEVELOPER FOR JAVA 2 PLATFORM

J2EE™

SUN CERTIFIED WEB COMPONENT DEVELOPER FOR J2EE PLATFORM

SUN CERTIFIED ENTERPRISE ARCHITECT FOR J2EE TECHNOLOGY

Java Technology Certification Learning Path

- **SCJP** This certification is for programmers interested in demonstrating proficiency in the fundamentals of the Java programming language using the Java 2 Platform, Standard Edition (J2SE[tm] technology).

- **SCJD** This performance-based certification is for programmers and developers who are already familiar with the basic structure and syntax of the Java programming language, and who have a need to demonstrate advanced proficiency in developing complex, production-level applications using Java 2 Platform, Standard Edition (J2SE[tm] technology).

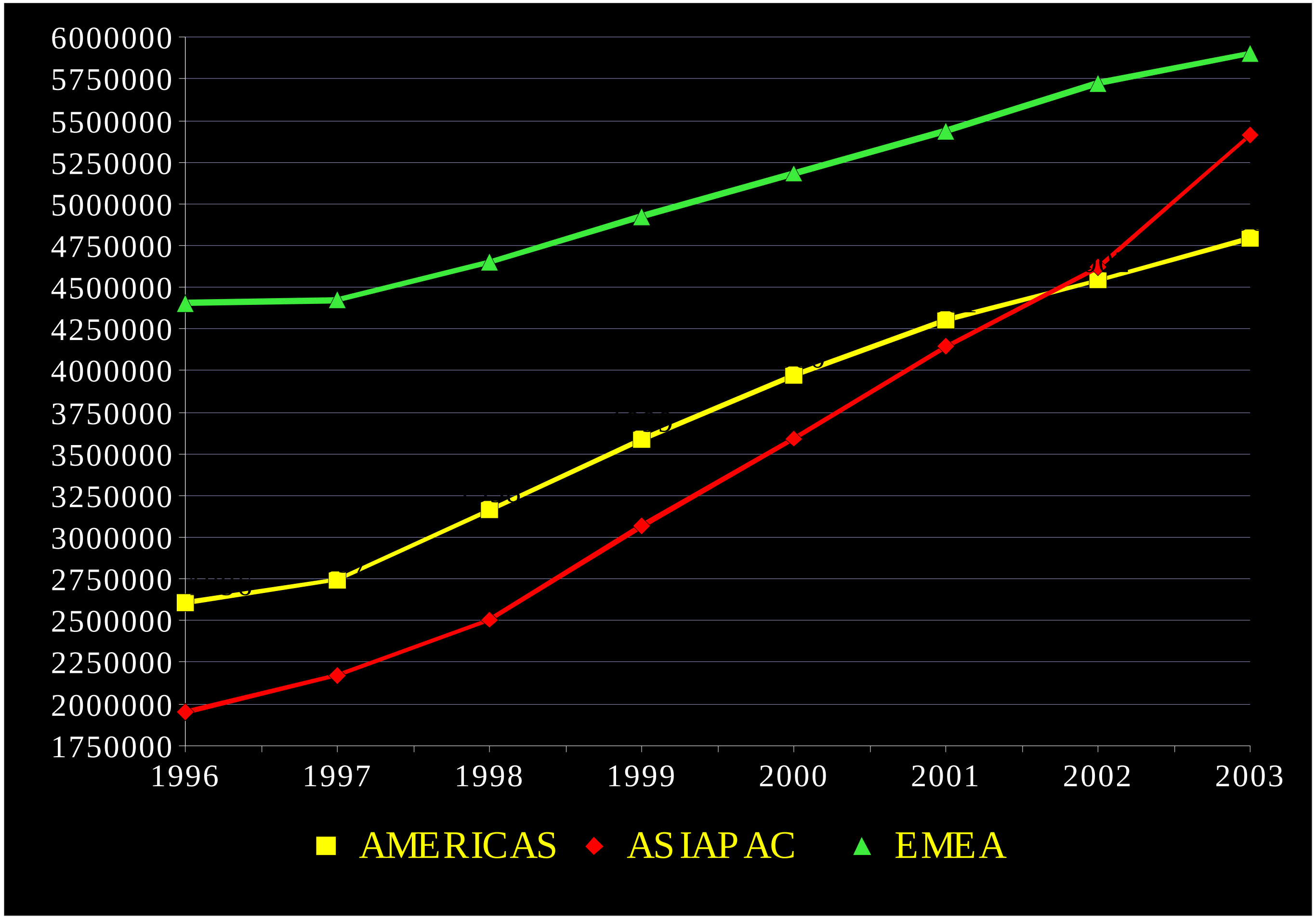
Java Technology Certification Learning Path

- **SCWCD** This certification is for programmers specializing in the application of JSP and servlet technologies used to present Web services and dynamic Web content using Java 2 Platform, Enterprise Edition technology.

- **SCEA** This certification is for enterprise architects responsible for architecting and designing Java[tm] 2 Platform, Enterprise Edition technology compliant applications, which are scalable, flexible and highly secure.

Worldwide Developer Growth

IDC: Java developers



Install JDK

- JDK 1.4.1 or higher
- Set JDK Environment Path

```
JAVA_HOME=c:\jdk1.4.1

PATH=.;%JAVA_HOME%\bin

ClASSPATH=.;%JAVA_HOME%\lib\dt.jar;%JAVA_HOME%\lib\tools.jar
```

JAVA IDE

- SUNONE Studio 4.0, 5.0 Sun Microsystems
- Websphere Studio 5.0 IBM
- JBuilder 7.0, 8.0, 9.0 Borland
- IntelliJ IDEA 3.0 (Recommended) JetBrains
- Eclipse 2.1 (Recommended free open source) www.eclipse.org
- NetBeans3.5 (free open source) www.netbeans.org

Run your first java application

```
public class HelloJava {

    public void hello() {
        System.out.println("Hello Java!");
    }

    public static void main(String[] args) {
        HelloJava helloJava = new HelloJava();
        helloJava.hello();
    }
}
```

Run your first java application

- Compile it

```
javac HelloJava.java
```

- Run it

```
java HelloJava
```

- The result

```
Hello Java!
```

Check your Progress

Before continuing on to the next course, check to be sure that you can:

- Describe key features of Java Technology
- Define the terms class and application
- Write, compile, and run a simple Java application
- Describe the JVM function
- List the three tasks performed by JRE

Think Beyond

- How can you benefit from using this programming language in your work environment?

Exercise:

- Install JDK
- Install a Java IDE
- Write , Compile and Run your first simple java application

Further Reading

- David Flanagan **Java in a Nutshell, 4th Edition** O'Reilly 2002
- Bill Venners **Inside The Java Virtual Machine** McGraw-Hill 2000
- Cay S. Horstmann, Gary Cornell **Core Java 2 - Volume I –Fundamentals** Fifth Edition Prentice Hall 2000
- Cay S. Horstmann, Gary Cornell **Core Java 2 - Volume II –Advanced Features** Fifth Edition Prentice Hall 2000
- **Thinking In Java** 1nd, 2nd, 3nd Bruce Eckel Prentice-Hall 2000
- Laura Lemay, Charles L.Perkius **Teach You Java In 21 Day** Sam 1996

Resources

- ftp://202.118.6.106/incoming/！学习资料/Java专区
- www.javaworld.com
- www.javadigest.net
- http://java.sun.com
- www.onjava.com
- www.java.net
- www.apache.org
- www.china-pub.com

Q&A

Thank You!