Making the Future Secure with Java

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OWASP
The Open Web Application Security Project
• **Role** – Java platform strategy, vision, features, internal, external communications

• **Background** – 20+ years of programming and specializing in security

• **Former Employer** – Yahoo! Lead security for the User Data Analytics property. Run enterprise triage program.
Program

Agenda

- Brief Java Primer
- Security Policies & Program
- Platform Remediation Progress
- Security Features Delivered
- Call to Action
Brief Java Primer

Java is useful in many different ways…
What is Java?
An application platform, but what does that mean?

- **Specifications** – Java Community Process (JCP) drives rules defining Java

- **Implementations** – Transforming Java specifications into code like Java.exe, Javac.exe, utility libraries, etc.

- **Community Driven** – OpenJDK to drive open source implementation
### Where is Java?

**The Java ecosystem...**

<table>
<thead>
<tr>
<th>Desksops</th>
<th>Java deployed on 97 Percent desktops</th>
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<tbody>
<tr>
<td>Devices</td>
<td>Java deployed on 80 percent of mobile platforms</td>
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<td></td>
<td>Java deployed on 125 million television sets</td>
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<tr>
<td>Community</td>
<td>1 billion Java downloads per year</td>
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<td>9 million developers worldwide</td>
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How Serious is Java Security?

Security is a top organization priority

Java 8: Secure the train (Apr 18, 2013) – Mark Reinhold, Java Chief Architect
"...As a consequence of this renewed focus on security the Java 8 schedule, with a GA release in early September, is no longer achievable."
What is Oracle Doing in Java Security?
Efforts are broad but the message is simple...

• **Defend Java applets** – limit ability of attackers to use malicious applets as a means of attack

• **Accelerate Remediation** – accelerate production of security fixes

• **New Security Features** – new security countermeasures to strengthen Java
Security Policies & Program

Driving Java security decisions…
Security Policy
Larger areas of security policy at Oracle...

- SA/CPU RSS Feeds
- Security Blog
- eBlasts
- Java.com Security

- Architecture Review
- Peer Review
- Security Testing
- Post Mortems
- Anatomy of an Exploit

- CPU
- Security Alerts
Security Policies – Communications

Different modes of security communication...

• Security Alerts (RSS feed)
• Critical Patch Update Advisories
• eBlasts
• Blogs (Security Assurance, Java PM)
Security Policies – Communications (cont’d)

Why Oracle does not respond to published reports of alleged product vulnerabilities...

- Correcting and corroborating articles provides more information to attackers

- Many reports don’t provide the required engineering details for proper verification. Technical details like: pre-conditions, impacts, remediation/mitigation details are light or non-existent.

- Responding to individual reports forces communities to track vulnerabilities in social media sites – not good.
Security Policies – Communications (cont’d)

Why Oracle does not respond to published reports of alleged product vulnerabilities...

• The information Oracle releases is: precise, actionable, and everyone receives it at the same time.
Security Throughout the Development Lifecycle

Non-specific lifecycle methodology

<table>
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<tr>
<th>Concept</th>
<th>Analysis</th>
<th>Coding</th>
<th>Testing</th>
<th>Delivery</th>
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<tr>
<td>Risk Factors</td>
<td>Project Review</td>
<td>Peer Review</td>
<td>Security Tests</td>
<td>Java.com</td>
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<tr>
<td>• Less Scrutiny</td>
<td>• Architecture</td>
<td>• Manual</td>
<td>• Static Analysis</td>
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<tr>
<td>• More Scrutiny</td>
<td>• Compliance</td>
<td>• Automated</td>
<td>• Fuzzing</td>
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</table>
Outside the Development Lifecycle

- Concept
- Analysis
- Coding
- Testing
- Delivery

Throughout Development Cycle
- GPS
- Ethical Hacking
- Security Training
- Tech Talks
...and more.
Security Policies - Remediation

- Common Vulnerability Scoring System (CVSS)
- Vulnerabilities reviewed and CVSS score assigned
- Remediation strongly influenced by CVSS score
Security Policies - Remediation

• Critical Patch Updates (CPU) - Security patches
  – October, February, June for Java Platform Group
  – Java Platform Group Different from Oracle CPU

• Security Alerts (SA) – Emergency security patches
  – Avoid where not absolutely necessary.
## Java Critical Patch Updates (CPU)

<table>
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<tr>
<th>7 GA</th>
<th>7u1</th>
<th>7u2</th>
<th>7u3</th>
<th>7u4</th>
<th>7u5</th>
<th>7u6</th>
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<tr>
<td>CPU</td>
<td>Non CPU</td>
<td>CPU</td>
<td>Non CPU</td>
<td>CPU</td>
<td>Non CPU</td>
<td>SecAlert*</td>
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Every 4 months

### Rules for Java CPUs

- Main release for security vulnerabilities
- Covers all families (7, 6, 5.0, 1.4.2).
- CPU release triggers Auto-update
- Dates published 12 months in advance (but there have been changes)
- Security Alerts are released as necessary
- Based off the previous (non-CPU) release
- Released simultaneously on java.com and OTN
- Java moving to regular CPU cycle with other Oracle products, Oct 2013
Platform Remediation Progress

*Accelerating progress against backlog...*
Remediation Highlights

• Java Applets Running in Browsers – highest exploitation risk area

• Other Areas of Java – figures spotlight applets, we are concerned about all Java use cases, Server for example

• Progress – significant over last year
Remediated Vulnerabilities by Component Subtype
Security Features Delivered

Security controls for today’s challenges…
Security Feature Highlights

Enable/Disable Java (DELIVERED JAVA 7 UPDATE 10)
• Feature within the Java Control Panel to enable or disable Java plugins

Hardcoded Best Before Date on JRE (DELIVERED JAVA 7 UPDATE 10)
• Java changes the way it operates if known to be vulnerable. For example, security dialogs communicate more risk for some activities
Security Feature Highlights (cont’d)

Java Security Slider (DELIVERED JAVA 7 UPDATE 10)
• Adjust plugin security levels in accordance with end-user security risk preferences (or policies)

Signing for Sandboxed Applications (DELIVERED JAVA 7 UPDATE 21)
• Changing the security model to separate the notion of establishing identity of the signer and applet privileges. Previously, code-signing also granted applets privileges
Security Feature Highlights (cont’d)

Server JRE (DELIVERED JAVA 7 UPDATE 21)
• Standard Java distribution without the plugin support.

Removed “Low” and “Custom” From Security Slider (DELIVERED JAVA 7 UPDATE 21)
• Low and Custom have been removed to reduce risk of desktop exploitation
Dynamic Blacklisting (DELIVERED JAVA 7 UPDATE 21)

• Previously blacklisting was static to the Java release. Blacklisting is now updatable daily. Expanded scope of blacklisting includes: jars, code-signing certificates, and subsidiary CAs.

Lock JARs to Server (DELIVERED JAVA 7 UPDATE 25)

• Prevent applet code from being repurposed
Security Feature Highlights (cont’d)

Standardized Revocation Services (DELIVERED JAVA 7 UPDATE 25)
- Industry standard revocation services like CRL and OCSP are available in Java today.

Java Uninstaller (ONGOING)
- The goal of this effort is to cleanup old versions of Java that are no longer used. Old versions of Java can become a target for exploitation.
Security Feature Highlights (cont’d)

Dynamic Rule Set (DRS) (EARLY ACCESS JAVA 7 UPDATE 40)

- DRS constrains enterprise desktop applets to authorized resources based upon system administrator defined policies
Call to Action

Something we can all do…
Vulnerability Reporting & Security Feature Suggestions

• Report Vulnerabilities
  – Support Customers: My Oracle Support
  – Others: secalert_us@oracle.com

• Suggest New Features
  – http://bugreport.sun.com/bugreport/
Java Platform Support

• I provide the following as a service for those interested
• I’m in development, not sales. I do not receive a commission. ;o)

• 3 Options
  – Premier, 5 years from GA
  – Extended, Premier + 3 years
  – Sustaining, “as long as you own your Oracle products”
Java Root Certificate Program

• Like web browsers, Java ships with root certificates
• Like web browsers, Java roots establish intrinsic “trust” for Java users
• Of course, the public is always free to include their own certificates or remove our defaults
Securing Java

New Track for JavaOne Conference 2013 San Francisco

Challenge – many developers will never have the opportunity to attend a security conference

Answer – bring security education to developers
Upcoming CPU’s

• October 15, 2013 (transition to Oracle CPU schedule)
• January 14, 2014
• April 15, 2014
• July 15, 2014
Help Us Keep You Secure

• To end users...
  – Keep your JRE’s updated (auto-update on)
  – Practice defense-in-depth: harden OS, virus scanner, firewall

• To developers...
  – Support current JRE’s so end users can upgrade
  – Sign your applications (use timestamp)
  – Validate untrusted data (input/output validation)
  – Review OWASP Top-10
  – Follow Secure Coding Guidelines for Java Language
Help Us Keep You Secure (cont’d)

• Even more for developers...
  – Educate yourself
  – Attend JavaOne 2013 in San Francisco CA, USA
  – Alternatively review public media after conference concludes
Additional References/Links

Security transparency, information available to the public...

- [Java 8: Secure the train](#), Mark Reinhold, Java Chief Architect
- [Maintaining Security Worthiness of Java...](#), Nandini Ramani, Java Engineering Leader
- [Security Fixing Policies](#), Security policies available for public review
- [Oracle Security Vulnerability Disclosure Policies](#), Information around vulnerability disclosure
- [Secure Coding Standards](#), Security throughout development (SDLC) processes
- [Common Vulnerability Scoring System (CVSS)](#), Vulnerability risk management
Additional References/Links (cont’d)

Security transparency, information available to the public...

• **Critical Patch Update and Security Alerts**, Oracle’s security patch and security hot fixes
• **Reporting Vulnerabilities**, Report vulnerabilities for any Oracle products (including Java)
• **Oracle Lifetime Support Policy**, Public literature on support for Fusion Middleware products (including Java)
• **Including Certificate Authority Root Certificates in Java**, Information around including digital root certificates in Java
Additional References/Links (cont’d)

Security transparency, information available to the public...

- [Java Platform Group, Product Management Blog](https://example.com), News about Java security features and plans
- [Oracle Security Assurance Blog](https://example.com), News about Java Critical Patch Updates and Security Alerts
- [Secure Coding Guidelines for Java Language](https://example.com), Secure coding practices for Java language
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