Q&A with the Security Group

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Who we are

- Members of the Java Security Libraries Team at Oracle and the OpenJDK Security Group
- Responsible for the maintenance and evolution of the core security libraries in Java SE/JDK
  - Security Manager
  - APIs and Libraries: Cryptography (JCE), PKI, SSL/TLS (JSSE), SASL, JAAS, GSSAPI/Kerberos, XML Signature
  - Tools: keytool, jarsigner, policytool

New JDK 8 Security Features Highlights

- **13** new features!
  - New features span the entire security stack
- **Significant** crypto improvements
  - Hardware-accelerated crypto performance improvements
  - Support for new and stronger algorithms
- **Significant** JSSE (SSL/TLS) improvements
  - More secure out of the box defaults
  - Support for the SNI Extension
  - New GCM cipher suites

13 New Security Features

http://openjdk.java.net/jeps

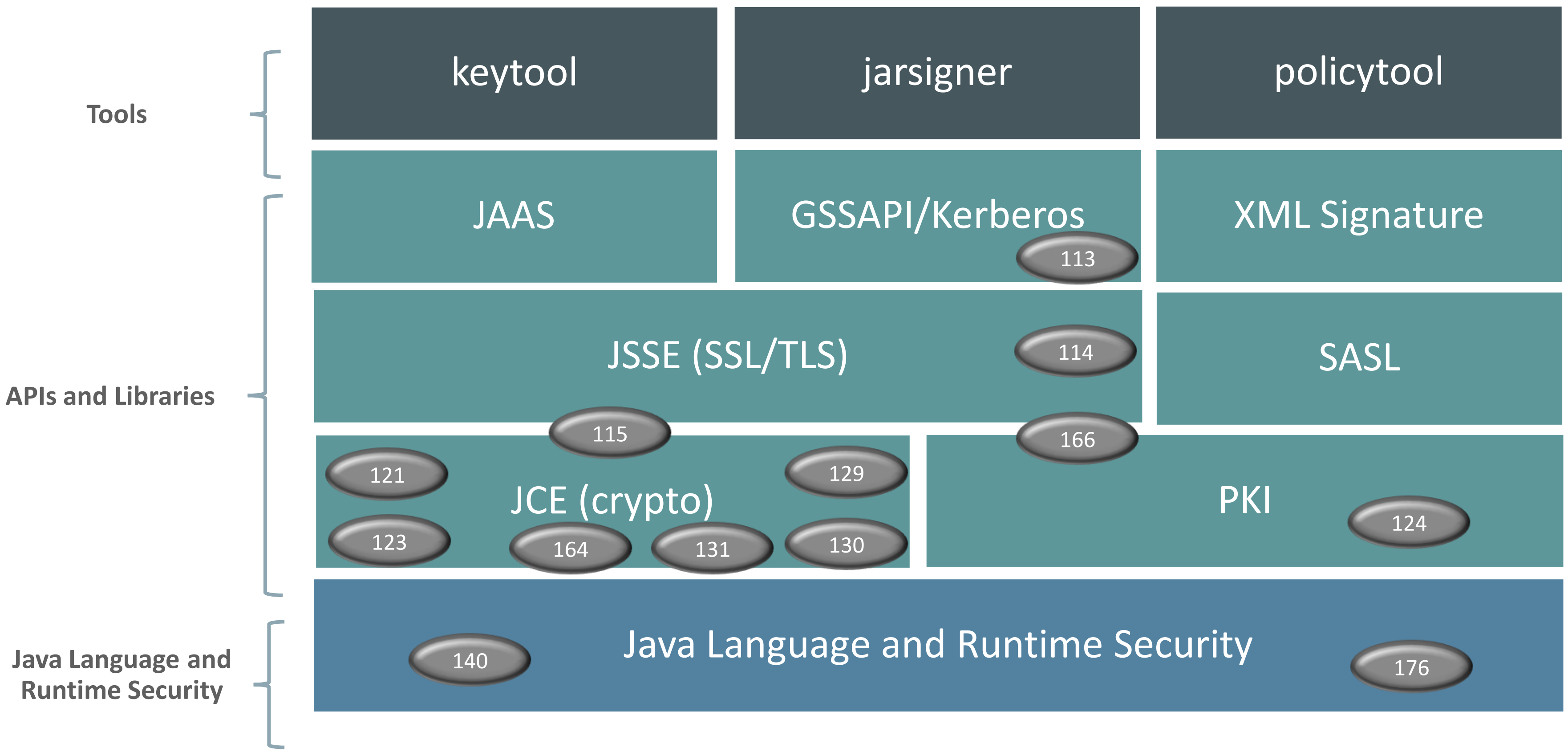
JEP	Title
113	MS-SFU Kerberos 5 Extensions
114	TLS Server Name Indication (SNI) Extension
115	AEAD CipherSuites
121	Stronger Algorithms for Password-Based Encryption
123	Configurable Secure Random-Number Generation
124	Enhance the Certificate Revocation-Checking API
129	NSA Suite B Cryptographic Algorithms

13 New Security Features (continued)

http://openjdk.java.net/jeps

JEP	Title
130	SHA-224 Message Digests
131	PKCS#11 Crypto Provider for 64-bit Windows
140	Limited doPrivileged
164	Leverage CPU Instructions for AES Cryptography
166	Overhaul JKS-JCEKS-PKCS12 Keystores
176	Mechanical Checking of Caller-Sensitive Methods

Java SE Security Conceptual Diagram
Where the features are



Tools

keytool

jarsigner

policytool

APIs and Libraries

JAAS

GSSAPI/Kerberos

113

XML Signature

JSSE (SSL/TLS)

114

SASL

115

166

121

129

JCE (crypto)

123

164

131

130

PKI

124

Java Language and Runtime Security

Java Language and Runtime Security

140

176

JEP = JDK Enhancement-Proposal

JDK 8 Cryptography Features

- SHA-224 MessageDigests
- `SecureRandom` improvements
  - New `SecureRandom.getInstanceStrong API`
- Strengthened DSA and Diffie-Hellman support
  - 2048-bit keypairs and SHA256WithDSA Signature algorithm
- Hardware-accelerated AES crypto performance
  - JVM intrinsics dramatically improve performance on x86 and SPARC (8u20)
- Authenticated AES GCM `Cipher` mode
- Stronger Algorithms for Password-Based Encryption (PBE)

JDK 8 TLS/SSL Features

- Authenticated GCM Cipher Suites
- Server Name Indication (SNI) Extension
  - Indicates the hostname of the server the client wants to establish a session with
  - Useful when a server has multiple domains that share the same IP address
- TLS 1.1 and 1.2 enabled by default on client
- Server Cipher Suite Preference
  - New `SSLParameters.setUseCipherSuitesOrder()` method
- Stronger Server Ephemeral Diffie-Hellman Parameters

Other Notable JDK 8 Security Features

- Major KeyStore enhancements
  - New DKS (Domain) KeyStore type
- New Revocation Checking `PKIXRevocationChecker` API
- Support for MS-SFU Kerberos 5 Extensions
- Limited doPrivileged
- X.509 Certificates with RSA keys less than 1024 bits disabled by default
- Kerberos 5 DES encryption types are disabled by default

New JDK 8 Update Security Features

- 8u20
  - AES intrinsics on Solaris/SPARC
  - New root CA certificates for Buypass, Chunghwa, Trend Micro and Trustwave
- 8u40
  - Leverage CPU Instructions to Improve SHA Performance on SPARC (http://openjdk.java.net/jeps/207)

Potential JDK 9 Security Features

- Cryptography
  - JVM Hardware Crypto Acceleration (http://openjdk.java.net/jeps/8046943)
  - Transition the default keystore type from JKS to PKCS12
- TLS/SSL
  - DTLS (http://openjdk.java.net/jeps/8043758)
  - OCSP Stapling
  - Application-Layer Protocol Negotiation Extension
- Improve Security Manager Performance (http://openjdk.java.net/jeps/8043631)

Other Recommended Sessions

- CON5778: Understanding the New JDK 8 Security Features
  - Wednesday 11:30 AM - Hilton - Imperial Ballroom A
- CON6693: Java Secure Coding Guidelines
  - Wednesday 10:00 AM – Hilton – Golden Gate 6/7/8
- CON2368: Inside the CERT Oracle Secure Coding Standard for Java
  - Thursday 4:00 PM – Hilton – Golden Gate 6/7/8
- CON3326: Applying Java's Cryptography
  - Wednesday 4:30 PM – Hilton – Golden Gate 6/7/8
- HOL6325: Java Native Interface: Harden Your Native Code
  - Tuesday 7:00 PM – Hilton – Franciscan A/B

More Information

- Security Guides and Overview
  - http://docs.oracle.com/javase/8/docs/technotes/guides/security/index.html
- OpenJDK Security Group: http://openjdk.java.net/groups/security/
  - Mailing list: security-dev@openjdk.java.net
- JEPs: http://openjdk.java.net/jeps
- JDK 8 downloads: http://www.oracle.com/technetwork/java/javase/downloads/index.html
- JDK 8 docs: http://docs.oracle.com/javase/8/
- Twitter: @seanjmullan

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Q & A