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Secure WebServices

WSDL first approach with Apache CXF

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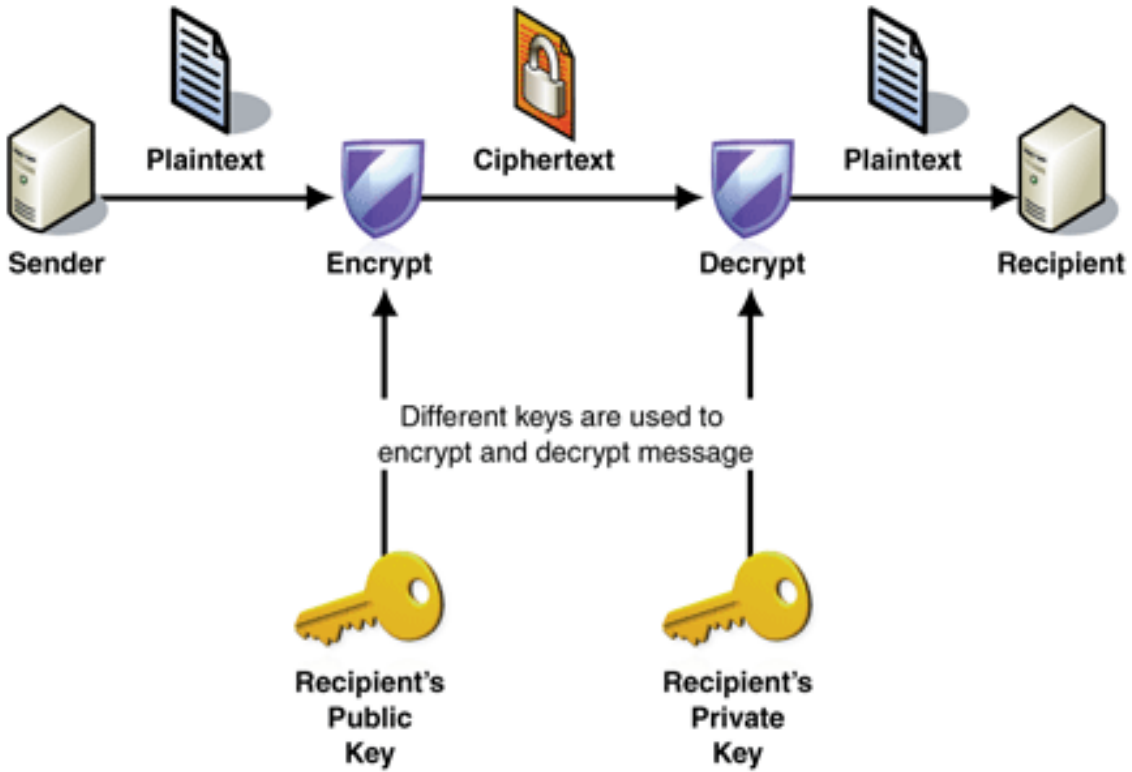
Agenda

- Use case
- SSL basics
- JAX-WS Service
- Keystores
- WS-Security
- CXF Interceptors
- WSS4J Interceptors

Agenda

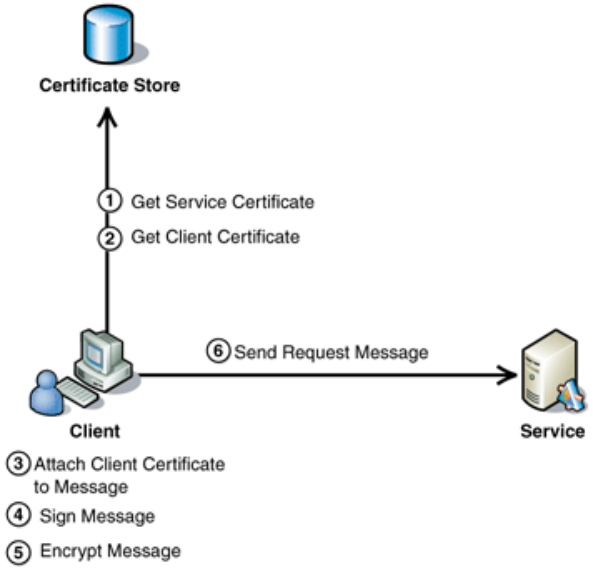
- encryptionKeyIdentifier
- Encryption Algorithms
- Write Policy
- Demo
- References
- Questions

Use case

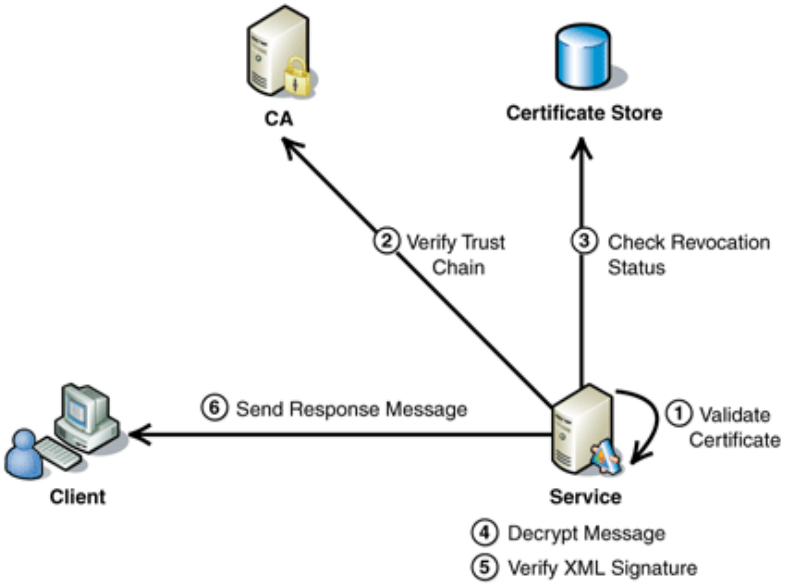

Plaintext
Ciphertext
Plaintext
Sender
Encrypt
Decrypt
Recipient
Different keys are used to
encrypt and decrypt message
Recipient's
Public
Key
Recipient's
Private
Key

Use case

client



service



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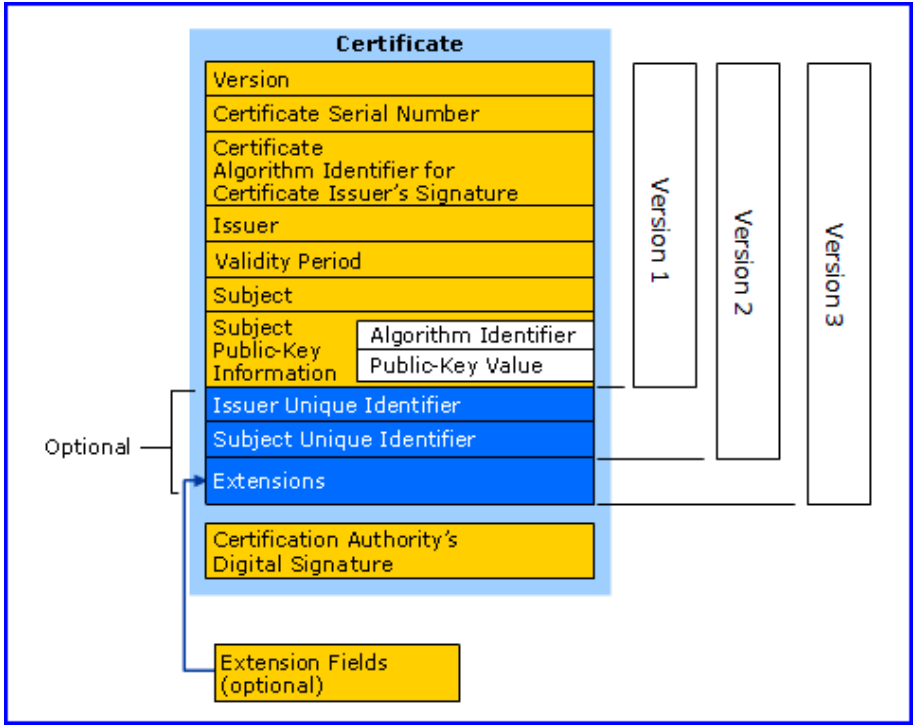
SSL basics

- use X.509 certificates and hence asymmetric cryptography
- encrypt the data of network connections in the application layer
- used web\browsers\mail\software

X.509

- Issuer - certification authority (CA)
- Authorization and issuing chains



JAX-WS Service

- prepare xsd
- write wsdl
- generate classes
- write cxf config
- generate client

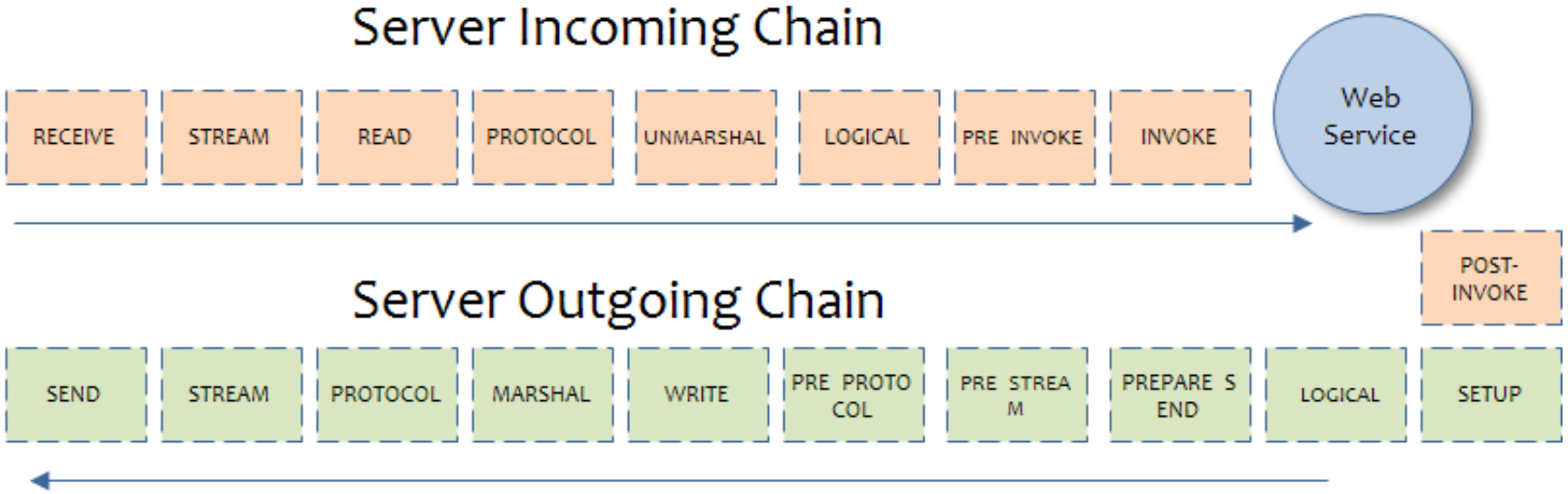
Keystores Manipulations

- generate private keys
- export keys
- import keys
- maven usage

WS-Security

- Based on policies
  - requires wsdl adjustments
- Based on interceptors
  - preserves wsdl
  - customizations done through code
  - customizations done through spring context

CXF Interceptors



WSS4J Interceptors

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- Password Callback Class
- WSS4JOutInterceptor (Phase.PRE_PROTOCOL)
  - action
  - signaturePropFile
  - signatureParts
  - encryptionPropFile
- WSS4JInInterceptor (Phase.PRE_PROTOCOL)
  - action
  - signaturePropFile
  - signatureParts
  - decryptionPropFile

Encryption Key Identifiers

- IssuerSerial (default)
- DirectReference
- X509KeyIdentifier
- Thumbprint
- SKIKeyIdentifier
- KeyValue (signature only)
- EncryptedKeySHA1 (encryption only)

Encryption Algorithms

- http://www.w3.org/TR/2002/REC-xmlenc-core-20021210/Overview.html#sec-Algorithms
- Based on JCE
- http://docs.oracle.com/javase/8/docs/technotes/guides/security/crypto/CryptoSpec.html

Write Policy

- WS-Policy Declaration

```
<wsp:Policy wsu:Id="UniqueIdentifier">
   <wsp:ExactlyOne>
      ...
   </wsp:ExactlyOne>
</wsp:Policy>
```

- Policy reference

```
<wsp:PolicyReference URI="#UniqueIdentifier"/>
```

Demo

https://github.com/Smava/wssecurity

References

http://cxf.apache.org/docs/ws-security.html
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Summary

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  - X.509
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