Web Services Security
X509 Binding

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Abstract:
This document describes how to use X509 Certificates with the WS-Security specification.

Status:
This is an interim draft. Please send comments to the editors.

Committee members should send comments on this specification to the wss@lists.oasis-open.org list. Others should subscribe to and send comments to the wss-comment@lists.oasis-open.org list. To subscribe, visit http://lists.oasis-open.org/ob/adm.pl.

For information on whether any patents have been disclosed that may be essential to implementing this specification, and any offers of patent licensing terms, please refer to

the Intellectual Property Rights section of the Security Services TC web page (http://www.oasis-open.org/who/intellectualproperty.shtml).

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1 Introduction

This specification describes the use of X509 certificates with respect to the WS-Security specification.

Note that Section 1 is non-normative.

2 Notations and Terminology

This section specifies the notations, namespaces, and terminology used in this specification.

2.1 Notational Conventions

The keywords "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC2119.

Namespace URIs (of the general form "some-URI") represent some application-dependent or context-dependent URI as defined in RFC2396.

This specification is designed to work with the general SOAP message structure and message processing model, and should be applicable to any version of SOAP. The current SOAP 1.2 namespace URI is used herein to provide detailed examples, but there is no intention to limit the applicability of this specification to a single version of SOAP.

Readers are presumed to be familiar with the terms in the Internet Security Glossary.

2.2 Namespaces

The XML namespace URIs that MUST be used by implementations of this specification are as follows (note that different elements in this specification are from different namespaces):

```
http://schemas.xmlsoap.org/ws/2002/xx/secext
http://schemas.xmlsoap.org/ws/2002/xx/utility
```

The following namespaces are used in this document:

Prefix	Namespace
S	http://www.w3.org/2001/12/soap-envelope
ds	http://www.w3.org/2000/09/xmldsig#
xenc	http://www.w3.org/2001/04/xmlenc#
wsse	http://schemas.xmlsoap.org/ws/2002/xx/secext
wsu	http://schemas.xmlsoap.org/ws/2002/xx/utility

2.3 Terminology

This specification employs the terminology defined in the WS-Security Core Specification.

Defined below are the basic definitions for additional terminology used in this specification.

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3 Usage

This section describes the profile (specific mechanisms and procedures) for the X509 binding of WS-Security.

Identification: urn:oasis:names:tc:WSS:1.0:bindings:WSS-X509-binding

Contact information: TBD

Description: Given below.

Updates: None.

3.1 Processing Model

The processing model for WS-Security with X509 certificates is no different from that of WS-Security with other token formats as described in WS-Security.

3.2 Attaching Security Tokens

The WS-Security specification indicates that X.509 certificates MAY be described inside of a `<ds:KeyInfo>` element, however, it is RECOMMENDED that they be specified using a `<wsse:BinarySecurityToken>`. If, however, an implementation needs to use `<ds:KeyInfo>`, it SHOULD place the `<ds:KeyInfo>` element as a child of the `<wsse:Security>` header rather than embedded within the signature. This allows receivers to have a single processing model.

The following value spaces are defined for @ValueType:

QName	Description
wsse:X509v3	X.509 v3 certificate

The following example illustrates a SOAP message with an X509 Certificate.

```
<S:Envelope xmlns:S="...">
    <S:Header>
        <wsse:Security xmlns:wsse="...">

            <wsse:BinarySecurityToken
              xmlns:wsse="http://schemas.xmlsoap.org/ws/2002/04/secext"
              Id="myToken"
              ValueType="wsse:X509v3"
              EncodingType="wsse:Base64Binary">
              MIIEZzCCA9CgAwIBAgIQEmtJZc0...
          </wsse:BinarySecurityToken>

            ...
        </wsse:Security>
    </S:Header>
    <S:Body>
        ...
```

```
    </S:Body>
</S:Envelope>
```

3.3 Identifying and Referencing Security Tokens

[TBS]

```
```

3.4 Proof-of-Possession of Security Tokens

As previously stated, the WS-Security specification does not dictate how subject confirmation must be performed.

[TBS]

3.5 Error Codes

When using X509 Certificates, it is RECOMMENDED to use the error codes defined in the WS-Security specification. However, implementations MAY use custom errors, defined in private namespaces if they desire. Care should be taken not to introduce security vulnerabilities in the errors returned.

3.6 Threat Model and Countermeasures

The use of X509 certificates with WS-Security introduces no new threats beyond those identified for WS-Security with other types of security tokens.

Message alteration and eavesdropping can be addressed by using the integrity and confidentiality mechanisms described in WS-Security. Replay attacks can be addressed by using message timestamps and caching, as well as other application-specific tracking mechanisms. For X.509 certificates ownership is verified by use of keys, man-in-the-middle attacks are generally mitigated.

It is strongly RECOMMENDED that all relevant and immutable message data be signed.

It should be noted that transport-level security MAY be used to protect the message and the security token.

4 Acknowledgements

This specification was developed as a result of joint work of many individuals from the WSS TC including: TBD

The input specifications for this document were developed as a result of joint work with many individuals and teams, including: Keith Ballinger, Microsoft, Bob Blakley, IBM, Allen Brown, Microsoft, Joel Farrell, IBM, Mark Hayes, VeriSign, Kelvin Lawrence, IBM, Scott Konersmann, Microsoft, David Melgar, IBM, Dan Simon, Microsoft, Wayne Vicknair, IBM.

5 References

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[WS-Security] TBS – point to the OASIS draft

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Appendix A: Revision History

Rev	Date	What
01	18-Sep-02	Initial draft based on input documents and editorial review

Appendix B: Notices

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