Web Services Security Kerberos Token Profile

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Abstract:

This document describes how to use Kerberos tickets 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 Kerberos tokens 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.

[TBS]

3 Usage

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

Identification: urn:oasis:names:tc:WSS:1.0:profiles:WSS-Kerberos-token

Contact information: TBD

Description: Given below.

Updates: None.

3.1 Processing Model

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

3.2 Attaching Security Tokens

Kerberos are attached to SOAP messages using WS-Security by TBS.

The following value spaces are defined for @ValueType:

QName	Description
wsse:Kerberosv5TGT	Kerberos v5 ticket as defined in Section 5.3.1 of Kerberos. This ValueType is used when the ticket is a ticket granting ticket (TGT)
wsse:Kerberosv5ST	Kerberos v5 ticket as defined in Section 5.3.1 of Kerberos. This ValueType is used when the ticket is a service ticket (ST

The following example illustrates a SOAP message with a Kerberos token.

```
<S:Envelope xmlns:S="...">
    <S:Header>
        <wsse:Security xmlns:wsse="...">
            <wsse:BinarySecurityToken
            xmlns:wsse="http://schemas.xmlsoap.org/ws/2002/xx/secext"
                wsu:Id="myToken"
                ValueType="wsse:Kerberosv5ST"
                EncodingType="wsse:Base64Binary">
                MIIEZzCCA9CgAwIBAgIQEmtJZc0...
            </wsse:BinarySecurityToken>
            ...
        </wsse:Security>
    </S:Header>
    <S:Body>
        ...
    </S:Body>
</S:Envelope>
```

3.3 Identifying and Referencing Kerberos Tokens

An attached Kerberos Token is referenced by means of the wsse:SecurityTokenReference element. The wsu:Id attribute of the wsse:SecurityTokenReference element has the value of the wsu:Id attribute specified in the wsse:BinarySecurityToken.

```
Example TBS
```

3.4 Authentication

When a Kerberos ticket is referenced as a signature key, the signature algorithm MUST be a hashed message authentication code. In particular, it is RECOMMENDED to use HMAC-SHA1 (required by XML Signature), with the session key in the ticket used as the shared secret key.

The value of the signature key is the value of the Kerberos shared secret.

3.5 Encryption

When a Kerberos ticket is referenced as an encryption key, the encryption algorithm MUST be a symmetric encryption algorithm.

The value of the encryption key is the value of the Kerberos shared secret.

3.6 Error Codes

When using Kerberos tokens, 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.

3.7 Threat Model and Countermeasures

The use of Kerberos assertion tokens with WS-Security introduces no new threats beyond those identified for Kerberos or 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 Kerberos tokens 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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[SOAP] W3C Note, "SOAP: Simple Object Access Protocol 1.1," 08 May 2000.

[URI] T. Berners-Lee, R. Fielding, L. Masinter, "Uniform Resource Identifiers (URI): Generic Syntax," RFC 2396, MIT/LCS, U.C. Irvine, Xerox Corporation, August 1998.

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

[XML-ns] W3C Recommendation, "Namespaces in XML," 14 January 1999.

[XML Signature] W3C Recommendation, "XML Signature Syntax and Processing," 12 February 2002.

Appendix A: Revision History

Rev	Date	What
01	18-Sep-02	Initial draft based on input documents and editorial review
03	30-Jan-03	Changes in title

Appendix B: Notices

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