

[MS-WSTEP]: WS-Trust X.509v3 Token Enrollment Extensions

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Revision Summary

Date	Revision History	Revision Class	Comments
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1 Introduction

The WS-Trust X.509v3 Token Enrollment Protocol Extensions are extensions of WS-Trust that are used by a system to request that a **certificate** be issued.

The communication is initiated by a requesting client who requests a new certificate, retrieval of an issued certificate, or retrieval of a server certificate. The server processes the request and generates a response based on the request type.

Sections 1.8, 2, and 3 of this specification are normative and can contain the terms MAY, SHOULD, MUST, MUST NOT, and SHOULD NOT as defined in RFC 2119. Sections 1.5 and 1.9 are also normative but cannot contain those terms. All other sections and examples in this specification are informative.

1.1 Glossary

The following terms are defined in [\[MS-GLOS\]](#):

- Abstract Syntax Notation One (ASN.1)**
- certificate**
- certification authority (CA)**
- globally unique identifier (GUID)**
- Hypertext Transfer Protocol over Secure Sockets Layer (HTTPS)**
- Public Key Cryptography Standards (PKCS)**
- SOAP action**
- SOAP body**
- SOAP fault**
- SOAP fault code**
- SOAP fault detail**
- SOAP header**
- SOAP header block**
- SOAP message**
- SOAP mustUnderstand attribute**
- Unicode**
- Uniform Resource Locator (URL)**
- Web Services Description Language (WSDL)**
- WSDL message**
- WSDL port type**
- WSDL operation**
- X.509**
- XML**
- XML namespace**
- XML schema (XSD)**

The following terms are specific to this document:

Certificate Management Messages over CMS (CMC): An internet standard for transport mechanisms for CMS [\[RFC2797\]](#).

Cryptographic Message Syntax (CMS): An internet standard for cryptographically protected messages [\[RFC3852\]](#).

Security Token Service (STS): A special type of server defined in WS-Trust [\[WSTrust1.3\]](#).

MAY, SHOULD, MUST, SHOULD NOT, MUST NOT: These terms (in all caps) are used as described in [\[RFC2119\]](#). All statements of optional behavior use either MAY, SHOULD, or SHOULD NOT.

1.2 References

References to Microsoft Open Specifications documentation do not include a publishing year because links are to the latest version of the documents, which are updated frequently. References to other documents include a publishing year when one is available.

A reference marked "(Archived)" means that the reference document was either retired and is no longer being maintained or was replaced with a new document that provides current implementation details. We archive our documents online [\[Windows Protocol\]](#).

1.2.1 Normative References

We conduct frequent surveys of the normative references to assure their continued availability. If you have any issue with finding a normative reference, please contact dochelp@microsoft.com. We will assist you in finding the relevant information. Please check the archive site, <http://msdn2.microsoft.com/en-us/library/E4BD6494-06AD-4aed-9823-445E921C9624>, as an additional source.

[MS-WCCE] Microsoft Corporation, "[Windows Client Certificate Enrollment Protocol](#)".

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997, <http://www.rfc-editor.org/rfc/rfc2119.txt>

[RFC2797] Myers, M., Liu, X., Schaad, J., and Weinstein, J., "Certificate Management Messages Over CMS", RFC 2797, April 2000, <http://www.ietf.org/rfc/rfc2797.txt>

[RFC2986] Nystrom, M., and Kaliski, B., "PKCS#10: Certificate Request Syntax Specification", RFC 2986, November 2000, <http://www.ietf.org/rfc/rfc2986.txt>

[RFC3066] Alvestrand, H., "Tags for the Identification of Language", RFC 3066, January 2001, <http://www.ietf.org/rfc/rfc3066.txt>

[RFC3852] Housley, R., "Cryptographic Message Syntax (CMS)", RFC 3852, July 2004, <http://www.ietf.org/rfc/rfc3852.txt>

[RFC5246] Dierks, T., and Rescorla, E., "The Transport Layer Security (TLS) Protocol Version 1.2", RFC 5246, August 2008, <http://www.ietf.org/rfc/rfc5246.txt>

[WSDL] Christensen, E., Curbera, F., Meredith, G., and Weerawarana, S., "Web Services Description Language (WSDL) 1.1", W3C Note, March 2001, <http://www.w3.org/TR/2001/NOTE-wsdl-20010315>

[WSS] OASIS, "Web Services Security: SOAP Message Security 1.1 (WS-Security 2004)", February 2006, <http://www.oasis-open.org/committees/download.php/16790/wss-v1.1-spec-os-SOAPMessageSecurity.pdf>

[WSSUTP] OASIS Standard, "Web Services Security UsernameToken Profile 1.0", March 2004, <http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-username-token-profile-1.0.pdf>

[WSTrust1.3] Lawrence, K., Kaler, C., Nadalin, A., et al., "WS-Trust 1.3", March 2007, <http://docs.oasis-open.org/ws-sx/ws-trust/200512/ws-trust-1.3-os.html>

[WSTrust1.3Schema] OASIS Standard, "WS-Trust 1.3", <http://docs.oasis-open.org/ws-sx/ws-trust/200512/ws-trust-1.3.xsd>

[XMLNS] Bray, T., Hollander, D., Layman, A., et al., Eds., "Namespaces in XML 1.0 (Third Edition)", W3C Recommendation, December 2009, <http://www.w3.org/TR/2009/REC-xml-names-20091208/>

[XMLSCHEMA1] Thompson, H.S., Beech, D., Maloney, M., and Mendelsohn, N., Eds., "XML Schema Part 1: Structures", W3C Recommendation, May 2001, <http://www.w3.org/TR/2001/REC-xmlschema-1-20010502/>

[XMLSCHEMA2] Biron, P.V., and Malhotra, A., Eds., "XML Schema Part 2: Datatypes", W3C Recommendation, May 2001, <http://www.w3.org/TR/2001/REC-xmlschema-2-20010502/>

1.2.2 Informative References

[MS-GLOS] Microsoft Corporation, "[Windows Protocols Master Glossary](#)".

[SCEP] Nourse, A., and Vilhuber, J. Ed., "Cisco Systems' Simple Certificate Enrollment Protocol", April 2009, <http://tools.ietf.org/html/draft-nourse-scep-19>

1.3 Overview

The WS-Trust X.509v3 Token Enrollment Extensions (WSTEP) defines the token enrollment profile for WS-Trust [\[WSTrust1.3\]](#) to allow a client to request **X.509v3** certificates.

Existing **certificate authorities** support **ASN.1** formats such as PKCS#10 ([\[RFC2986\]](#)), PKCS#7 ([\[RFC3852\]](#)), or CMC ([\[RFC2797\]](#)) to encode a certificate request, and those requests are carried in an existing protocol, such as Windows Client Certificate Enrollment Protocol [\[MS-WCCE\]](#) or Cisco's SCEP ([\[SCEP\]](#)). WSTEP also carries those requests from the client to the issuer.

WSTEP provides for issuance, renewal, and delayed-issuance scenarios for X.509v3 digital certificates. The server is known in WS-Trust [\[WSTrust1.3\]](#) terminology as a **Security Token Service (STS)**.

The WS-Trust protocol [\[WSTrust1.3\]](#) definition provides the framework for the STS and for enrollment profile extensions. A typical client interacts with a STS with a request security token (RST) message. The STS responds to a client request security token message with a request security token response (RSTR) or a **SOAP fault**.

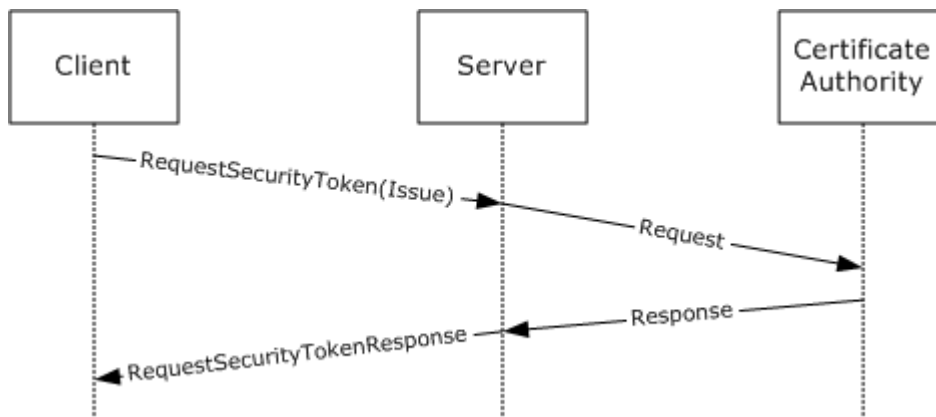


Figure 1: Typical sequence for certificate enrollment

The following figure shows a scenario in which a request cannot be satisfied immediately. In this scenario, the client makes a request, and the server reply indicates that the request is pending some other action. The client then queries the request at a later time, presumably after any

conditions for its satisfaction have been met, and receives a reply that the request was issued, rejected, or is still pending.

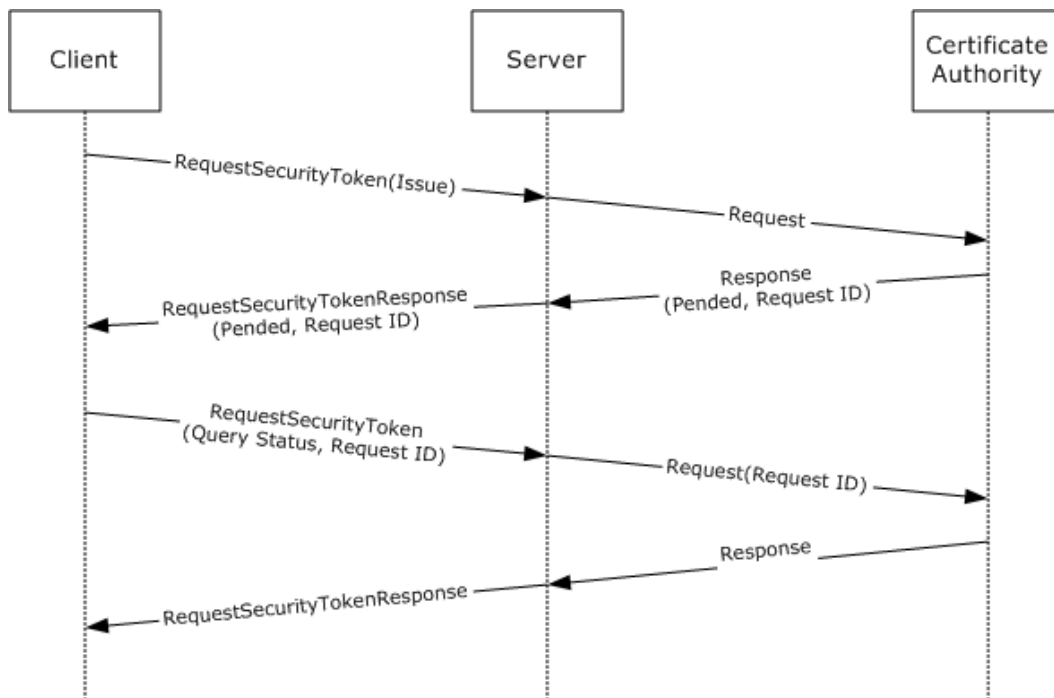


Figure 2: Typical sequence for a pended certificate enrollment request

In some circumstances, the client request may be rejected. In these instances, the STS responds with a SOAP fault. The following figure shows the typical sequence.

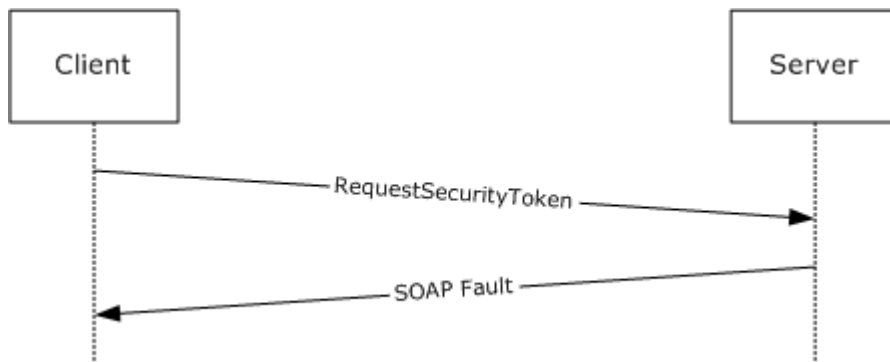


Figure 3: Typical sequence for a rejected certificate renewal request

The following figure is an example of a message exchange for a renewal request. A renewal request uses an existing certificate and requests a new lifespan. From the point of view of the WSTEP protocol, this is the same as an issue request, as the message format is unchanged.

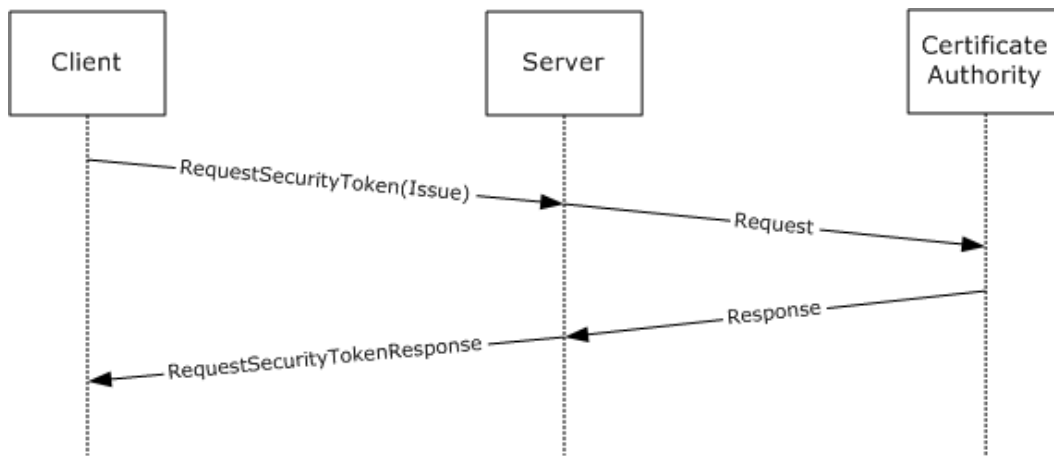


Figure 4: Typical sequence for a certificate renewal request

1.4 Relationship to Other Protocols

The following figure shows the WSTEP Protocol stack diagram.

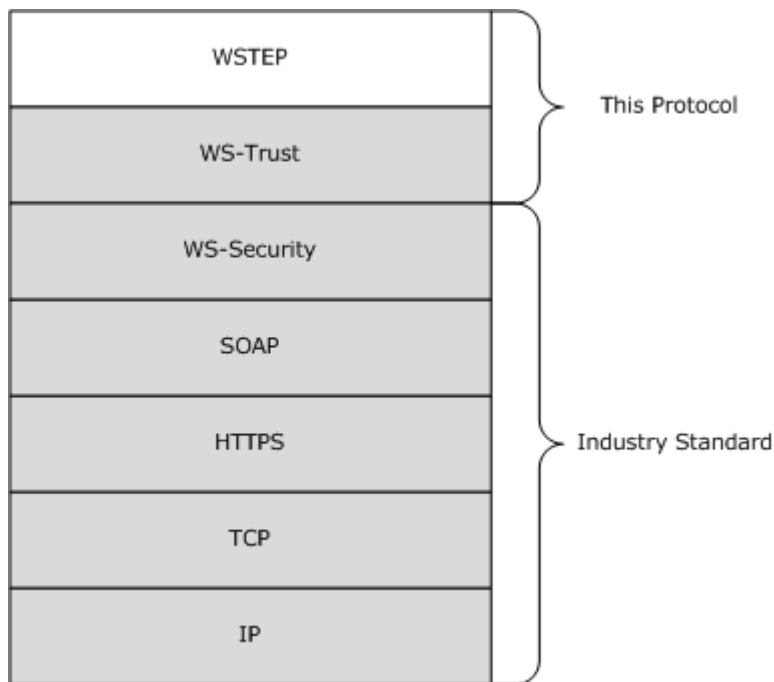


Figure 5: WSTEP Protocol stack diagram

The WSTEP protocol specification is a profile of the WS-Trust Protocol [\[WSTrust1.3\]](#) and makes use of the SOAP and **Hypertext Transfer Protocol over Secure Sockets Layer (HTTPS)** protocols for messaging and security.

1.5 Prerequisites/Preconditions

The WSTEP protocol specification facilitates the issuance of X.509v3 certificates. A server implementation of the protocol requires the functionality of a certificate authority, capable of interpreting requests in at least one of PKCS#7, PKCS#10, or **Certificate Management Messages over CMS (CMC)**.

1.6 Applicability Statement

The WSTEP protocol specification is applicable only for requests for X.509v3 certificates.

1.7 Versioning and Capability Negotiation

The WSTEP protocol specification does not include versioning and capability negotiation.

1.8 Vendor-Extensible Fields

The WSTEP protocol specification does not include any vendor-extensible fields. WSTEP adheres to the WS-Trust 1.3 [\[WSTrust1.3\]](#) provided extension points.

1.9 Standards Assignments

None.

2 Messages

2.1 Transport

SOAP version 1.2 MUST be used for messaging for the WSTEP protocol. HTTPS protocol MUST be used as the transport.

2.2 Common Message Syntax

This section contains common definitions used by this protocol. The syntax of the definitions uses the **XML schema** as defined in [\[XMLSCHEMA1\]](#) and [\[XMLSCHEMA2\]](#), and the **Web Services Description Language** as defined in [\[WSDL\]](#).

2.2.1 Namespaces

This specification defines and references various **XML namespaces**, using the mechanisms specified in [\[XMLNS\]](#). Although this specification associates a specific **XML namespace** prefix for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

Prefixes and XML namespaces used in this specification are as follows.

Prefix	Namespace URI	Reference
xs	http://www.w3.org/2001/XMLSchema	[XMLSCHEMA1]
wst	http://docs.oasis-open.org/ws-sx/ws-trust/200512	[WSTrust1.3]
auth	http://schemas.xmlsoap.org/ws/2006/12/authorization	[XMLSCHEMA1]
wsu	http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd	
wsse	http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd	
wstep	http://schemas.microsoft.com/windows/pki/2009/01/enrollment	MS-WSTEP

2.2.2 Messages

None.

2.2.3 Elements

This specification does not define any common XML schema element definitions.

2.2.4 Complex Types

This specification does not define any common XML schema complex type definitions.

2.2.5 Simple Types

The WSTEP protocol specification does not define any common XML schema simple type definitions.

2.2.6 Attributes

The WSTEP protocol specification does not define any common XML schema attribute definitions.

2.2.7 Groups

The WSTEP protocol specification does not define any common XML schema group definitions.

2.2.8 Attribute Groups

The WSTEP protocol specification does not define any common XML schema attribute group definitions.

3 Protocol Details

The client side of this protocol is a simple pass-through. No additional timers or other state is required on the client side of this protocol. Calls made by the higher-layer protocol or application are passed directly to the transport layer, and the results returned by the transport are passed directly back to the higher-layer protocol or application.

This section addresses the message processing model for the protocol. It includes related information required by an implementation to successfully send and consume protocol messages.

3.1 SecurityTokenService Server Details

The **SecurityTokenService** hosts a message endpoint that receives **RequestSecurityToken** messages. When received, the server processes the client request and sends it to the certificate authority. Upon receiving a response from the certificate authority, a response is generated, and the server sends either a **RequestSecurityTokenResponse** message or a SOAP fault. When the message has been sent to the client, the server returns to the waiting state.

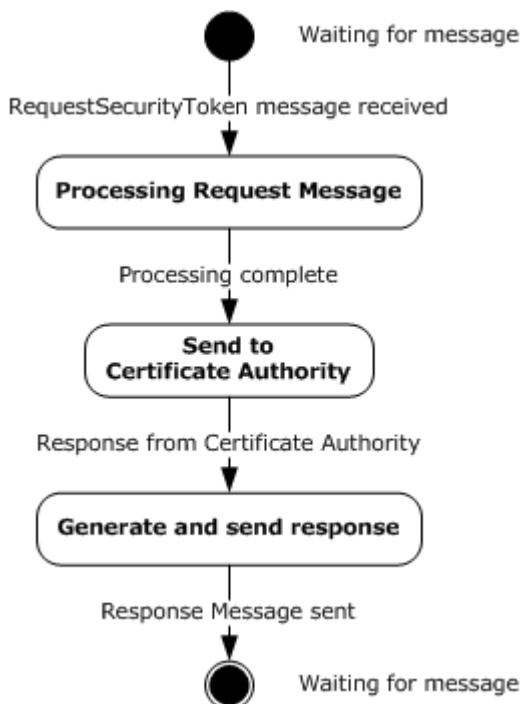


Figure 6: Security token service state model

The items of information that are communicated between the server and the certificate authority are specified in this section, but the method of communication used, including timeout and error handling (local API, local remote procedure call (RPC), or some other protocol) is not specified.

The certificate authority MAY have additional requirements that MUST be met in order to issue an X509v3 Certificate, such as manager approval, payment processing, or validation of request information. In these instances, a certificate authority response indicating the issuance is pending.

3.1.1 Abstract Data Model

A server supporting the WSTEP protocol maintains a relationship to an issuer which processes messages submitted by the server. When communicating with requestors, a server can support a variety of languages.

Issuer: An address of a certificate authority (CA). The format of the stored address is specific to the implementation and to the form of communication used between the Issuer and the Server.

SupportedLanguages: A list of language identifiers supported by the server. The set of languages are of type `xml:lang` and defined in [\[RFC3066\]](#).

DefaultLanguage: The default language for the server. `DefaultLanguage` is of type `xml:lang`, and the set of supported languages is defined in [\[RFC3066\]](#).

3.1.1.1 Authentication

The WS-Trust X509v3 Enrollment Extensions use the authentication provisions in WS-Security ([\[WSS\]](#)) for the X509v3 Security Token issuer to authenticate the X509v3 Security Token requestor. This section defines the schema used to express the credential descriptor for each supported credential type.

3.1.1.1.1 Kerberos Authentication

Authentication using Kerberos is done at the transport layer.

3.1.1.1.2 X.509v3 Certificate Authentication

Authentication using X509v3 certificates is done at the transport level using Transport Level Security (TLS) 1.2 as defined in [\[RFC5246\]](#).

3.1.1.1.3 Username and Password Authentication

The username and password credential is provided in a request message using the WS-Security Username Token Profile 1.0. The username is provided as defined in section 3.1 of the Ws-Security document [\[WSSUTP\]](#).

3.1.1.1.4 No (Anonymous) Authentication

If no authentication is provided at either the transport layer or the message layer, the request is considered to be anonymous. Anonymous authentication is supported only for renewal requests, where the signature from the existing certificate on the request object serves as authentication for the X509v3 Security Token requestor.

3.1.2 Timers

None.

3.1.3 Initialization

The *SupportedLanguages* object MUST be initialized with the set of languages that the server supports.

The *DefaultLanguage* parameter MUST be initialized with the language that is to be used by the server when a request does not define a language preference, or the preference is not in *SupportedLanguages*.<1>

3.1.4 Message Processing Events and Sequencing Rules

Operation	Description
wst:RequestSecurityToken2	The wst:RequestSecurityToken2 operation is the sole operation in the WSTEP protocol. It provides the mechanism for certificate enrollment requests, retrieval of pending certificate status, and the request of the server key exchange certificate. The wst:RequestSecurityToken2 operation is defined in WS-Trust 1.3 [WSTrust1.3] .

3.1.4.1 wst:RequestSecurityToken2

The wst:RequestSecurityToken2 operation provides the mechanism for certificate enrollment requests, retrieval of pending certificate status, and the request of the server key exchange certificate. The wst:SecurityTokenService port and wst:RequestSecurityToken2 operation are defined in the [\[WSTrust1.3\]](#) WSDL wsdl:portType definition.

```
<wsdl:operation name="RequestSecurityToken2">
  <wsdl:input message="wst:RequestSecurityTokenMsg" />
  <wsdl:output message="wst:RequestSecurityTokenResponseCollectionMsg" />
</wsdl:operation>
```

WSTEP makes use of the wst:RequestSecurityToken2 operation. The wst:RequestSecurityToken operation defined in the SecurityTokenService operation is not used. The wst:RequestSecurityTokenMsg message consists of a single object definition: the client request. The client request is made using the acceptable SOAP actions as defined in section [3.1.4.2](#) and RequestType values, as defined in section [3.1.4.1.2.7](#).

3.1.4.1.1 Messages

The following WSDL message definitions are specific to this operation.

3.1.4.1.1.1 wst:RequestSecurityTokenMsg

The wst:RequestSecurityTokenMsg is an incoming message, and is defined in WS-Trust 1.3 [\[WSTrust1.3\]](#) WSDL.

wst:RequestSecurityToken: An instance of a **wst:RequestSecurityTokenType** complex type as defined in section [3.1.4.1.3.3](#). The **wst:RequestSecurityToken** element defines the client request and the required information for it to be processed.

3.1.4.1.1.2 wst:RequestSecurityTokenResponseCollectionMsg

The wst:RequestSecurityTokenResponseCollectionMsg is an outgoing message, and is defined in WS-Trust 1.3 [\[WSTrust1.3\]](#) WSDL.

wst:RequestSecurityTokenResponseCollectionMsg: An instance of a **wst:RequestSecurityTokenResponseCollection** element as defined in section [3.1.4.1.2.6](#). This element contains the results of the client request.

3.1.4.1.2 Elements

3.1.4.1.2.1 wstep:CertificateEnrollmentWSDetail

The **wstep:CertificateEnrollmentWSDetail** element is used to convey additional information to a client as part of the SOAP fault structure when a server returns a SOAP fault.

```
<xs:element name="CertificateEnrollmentWSDetail" nillable="true"
type="wstep:CertificateEnrollmentWSDetailType" />
```

wstep:CertificateEnrollmentWSDetail: An instance of a `<wstep:CertificateEnrollmentWSDetailType>` as defined in section [3.1.4.1.3.7](#). If there is no additional information, the **wstep:CertificateEnrollmentWSDetail** SHOULD be omitted in the SOAP fault.

3.1.4.1.2.2 DispositionMessage

```
<xs:element name="DispositionMessage"
type="wstep:DispositionMessageType" nillable="true" />
```

DispositionMessage: An instance of a `DispositionMessageType` object as defined in section [3.1.4.1.3.1](#).

3.1.4.1.2.3 wst:KeyExchangeToken

The `<wst:KeyExchangeToken>` element is defined in WS-Trust 1.3 [\[WSTrust1.3\]](#) section 8.4.

wst:KeyExchangeToken: The `wst:KeyExchangeToken` element provides a key exchange token that can be used in certificate enrollment requests that include the private key.

3.1.4.1.2.4 RequestID

```
<xs:element name="RequestID"
type="xs:string" nillable="true"/>
```

RequestID: A string identifier used to identify a request.

3.1.4.1.2.5 wst:RequestSecurityToken

The `<wst:RequestSecurityToken>` element is defined in WS-Trust 1.3 [\[WSTrust1.3\]](#), section 3.1.

wst:RequestSecurityToken: An instance of a **wst:RequestSecurityTokenType** object as specified in section [3.1.4.1.3.3](#).

3.1.4.1.2.6 RequestSecurityTokenResponseCollection

The `RequestSecurityTokenResponseCollection` is defined in WS-Trust 1.3 [\[WSTrust1.3\]](#), section 3.2.

RequestSecurityTokenResponseCollection: An instance of a **wst:RequestSecurityTokenResponseCollectionType** object as specified in section [3.1.4.1.3.5](#).

3.1.4.1.2.7 wst:RequestType

The <wst:RequestType> element is defined in [\[WSTrust1.3\]](#) section 3.1.

wst:RequestType: An instance of a <wst:RequestTypeOpenEnum> object as defined in [\[WSTrust1.3\]](#) XML schema definition(XSD).

The <wst:RequestType> MUST have one of the following values:

```
"http://docs.oasis-open.org/ws-sx/ws-trust/200512/Issue"  
"http://schemas.microsoft.com/windows/pki/2009/01/enrollment/QueryTokenStatus"  
"http://docs.oasis-open.org/ws-sx/ws-trust/200512/KET"
```

If the <wst:RequestType> has any other value, the server MUST respond with a SOAP fault.

3.1.4.1.2.8 wst:TokenType

The <TokenType> element is defined in [\[WSTrust1.3\]](#), section 3.1.

wst:TokenType: For the X.509 enrollment extension to WS-Trust, the <wst:tokentype> element MUST be <http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-x509-token-profile-1.0#X509v3>.

3.1.4.1.3 Complex Types

The following XML schema complex type definitions are specific to this operation.

3.1.4.1.3.1 DispositionMessageType

The DispositionMessageType is an extension to the string type that allows an attribute definition of the language for the string. The DispositionMessageType is used to provide additional information about the server processing.

```
<xs:complexType name="DispositionMessageType">  
  <xs:simpleContent>  
    <xs:extension base="xs:string">  
      <xs:attribute ref="xml:lang" use="optional" />  
    </xs:extension>  
  </xs:simpleContent>  
</xs:complexType>
```

xs:string: The string element contains the literal string disposition message returned from the server. The string element contains an xml:lang attribute that defines the language for the string. The language SHOULD be provided for each string element instance.

xml:lang: The language reference xml:lang, indicating the natural or formal language the string element content is written in.

3.1.4.1.3.2 wst:RequestedSecurityTokenType

The wst:RequestedSecurityTokenType is defined in WS-Trust XML schema definition (XSD) [\[WSTrust1.3Schema\]](#).

```

<xs:complexType name="RequestedSecurityTokenType">
  <xs:sequence>
    <xs:any namespace="##any" processContents="lax" />
  </xs:sequence>
</xs:complexType>

```

The WSTEP extends wst: RequestedSecurityTokenType with two additional elements.

```

<xs:element ref="wsse:BinarySecurityToken" />
<xs:element ref="wsse:SecurityTokenReference" />

```

wsse:BinarySecurityToken: The wsse:BinarySecurityToken element contains the issued certificate. The issued certificate follows the encoding and data structure defined in [\[MS-WCCE\]](#) section 2.2.2.8.

wsse:SecurityTokenReference: A URI reference used to indicate where a pending Certificate Request can be retrieved. The server MUST provide its own URI as the value of the <wsse:BinarySecurityTokenReference:Reference> element as specified in [\[WS-Trust1.3\]](#) section 4.2.

3.1.4.1.3.3 wst:RequestSecurityTokenType

The **wst:RequestSecurityTokenType** complex type contains the elements for the security token request in the RequestSecurityTokenMsg message. It is the client-provided object for a certificate enrollment request. **wst:RequestSecurityTokenType** is defined in the WS-Trust [\[WS-Trust1.3\]](#) XML schema definition (XSD).

```

<xs:complexType name="RequestSecurityTokenType">
  <xs:annotation>
    <xs:documentation>
      Actual content model is non-deterministic, hence wildcard. The following shows intended
      content model:
      <xs:element ref='wst:TokenType' minOccurs='0' />
      <xs:element ref='wst:RequestType' />
      <xs:element ref='wsp:AppliesTo' minOccurs='0' />
      <xs:element ref='wst:Claims' minOccurs='0' />
      <xs:element ref='wst:Entropy' minOccurs='0' />
      <xs:element ref='wst:Lifetime' minOccurs='0' />
      <xs:element ref='wst:AllowPostdating' minOccurs='0' />
      <xs:element ref='wst:Renewing' minOccurs='0' />
      <xs:element ref='wst:OnBehalfOf' minOccurs='0' />
      <xs:element ref='wst:Issuer' minOccurs='0' />
      <xs:element ref='wst:AuthenticationType' minOccurs='0' />
      <xs:element ref='wst:KeyType' minOccurs='0' />
      <xs:element ref='wst:KeySize' minOccurs='0' />
      <xs:element ref='wst:SignatureAlgorithm' minOccurs='0' />
      <xs:element ref='wst:Encryption' minOccurs='0' />
      <xs:element ref='wst:EncryptionAlgorithm' minOccurs='0' />
      <xs:element ref='wst:CanonicalizationAlgorithm' minOccurs='0' />
      <xs:element ref='wst:ProofEncryption' minOccurs='0' />
      <xs:element ref='wst:UseKey' minOccurs='0' />
      <xs:element ref='wst:SignWith' minOccurs='0' />
      <xs:element ref='wst:EncryptWith' minOccurs='0' />
      <xs:element ref='wst:DelegateTo' minOccurs='0' />
      <xs:element ref='wst:Forwardable' minOccurs='0' />
    </xs:documentation>
  </xs:annotation>
</xs:complexType>

```

```

    <xs:element ref='wst:Delegatable' minOccurs='0' />
    <xs:element ref='wsp:Policy' minOccurs='0' />
    <xs:element ref='wsp:PolicyReference' minOccurs='0' />
    <xs:any namespace='##other' processContents='lax' minOccurs='0' maxOccurs='unbounded'
  />
</xs:documentation>
</xs:annotation>
<xs:sequence>
  <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
</xs:sequence>
<xs:attribute name="Context" type="xs:anyURI" use="optional" />
<xs:anyAttribute namespace="##other" processContents="lax" />
</xs:complexType>

```

WSTEP extends <wst:RequestSecurityTokenType> with the following elements:

```

<xs:element ref="wsse:BinarySecurityToken" minOccurs="0"
maxOccurs="1" />
<xs:element ref="auth:AdditionalContext" minOccurs="0"
maxOccurs="1" />
<xs:element ref="wstep:RequestKET" minOccurs="0" maxOccurs="1"
<xs:element ref="wstep:RequestID" minOccurs="0" maxOccurs="1" />

```

Only the elements specified below are used in WSTEP. Any element received that is not specified below SHOULD be ignored.

wst:TokenType: Refers to the wst:TokenType definition in section [3.1.4.1.2.8](#).

wst:RequestType: Refers to the wst:RequestType definition in section [3.1.4.1.2.7](#). The wst:RequestType is used to identify the type of the security token request.

wst:RequestKET: Used when requesting a key exchange token as defined in [\[WSTrust1.3\]](#) section 8.4.

wsse:BinarySecurityToken: Provides the DER ASN.1 representation of the certificate request. The type of token is defined by the wst:TokenType element. For the X.509 enrollment extension the wst:TokenType MUST be specified as in section [3.1.4.1.2.8](#). The certificate request follows the formatting from [\[MS-WCCE\]](#) section 2.2.2.6. The EncodingType attribute of the wsse:BinarySecurityToken element MUST be set to base64Binary.

auth:AdditionalContext: The auth:AdditionalContext element is used to provide extra information in a wst:RequestSecurityToken message. It is an optional element, and SHOULD be omitted if there is no extra information to be passed.

wstep:RequestID: An instance of **wstep:RequestID** as specified in section [3.1.4.1.2.4](#).

WSTEP extends <wst:RequestSecurityTokenType> with an additional attribute:

```

<xs:attribute name="PreferredLanguage" type="xs:language"
use="optional" />

```

Only the attribute specified below is used in WSTEP. Any attribute received that is not specified below SHOULD be ignored.

wstep:PreferredLanguage: The **wstep:PreferredLanguage** attribute defines the preferred language to be used in a server response.

3.1.4.1.3.4 wst:RequestSecurityTokenResponseType

The wst:RequestSecurityTokenResponseType contains the elements that are part of a server response to a wst:RequestSecurityToken message. wst:RequestSecurityTokenResponseType is defined in the WS-Trust [\[WSTrust1.3\]](#) XML schema definition (XSD).

```
<xs:complexType name="RequestSecurityTokenResponseType">
  <xs:annotation>
    <xs:documentation>
      Actual content model is non-deterministic, hence wildcard. The following shows intended
      content model:
      <xs:element ref='wst:TokenType' minOccurs='0' />
      <xs:element ref='wst:RequestType' />
      <xs:element ref='wst:RequestedSecurityToken' minOccurs='0' />
      <xs:element ref='wsp:AppliesTo' minOccurs='0' />
      <xs:element ref='wst:RequestedAttachedReference' minOccurs='0' />
      <xs:element ref='wst:RequestedUnattachedReference' minOccurs='0' />
      <xs:element ref='wst:RequestedProofToken' minOccurs='0' />
      <xs:element ref='wst:Entropy' minOccurs='0' />
      <xs:element ref='wst:Lifetime' minOccurs='0' />
      <xs:element ref='wst:Status' minOccurs='0' />
      <xs:element ref='wst:AllowPostdating' minOccurs='0' />
      <xs:element ref='wst:Renewing' minOccurs='0' />
      <xs:element ref='wst:OnBehalfOf' minOccurs='0' />
      <xs:element ref='wst:Issuer' minOccurs='0' />
      <xs:element ref='wst:AuthenticationType' minOccurs='0' />
      <xs:element ref='wst:Authenticator' minOccurs='0' />
      <xs:element ref='wst:KeyType' minOccurs='0' />
      <xs:element ref='wst:KeySize' minOccurs='0' />
      <xs:element ref='wst:SignatureAlgorithm' minOccurs='0' />
      <xs:element ref='wst:Encryption' minOccurs='0' />
      <xs:element ref='wst:EncryptionAlgorithm' minOccurs='0' />
      <xs:element ref='wst:CanonicalizationAlgorithm' minOccurs='0' />
      <xs:element ref='wst:ProofEncryption' minOccurs='0' />
      <xs:element ref='wst:UseKey' minOccurs='0' />
      <xs:element ref='wst:SignWith' minOccurs='0' />
      <xs:element ref='wst:EncryptWith' minOccurs='0' />
      <xs:element ref='wst:DelegateTo' minOccurs='0' />
      <xs:element ref='wst:Forwardable' minOccurs='0' />
      <xs:element ref='wst:Delegatable' minOccurs='0' />
      <xs:element ref='wsp:Policy' minOccurs='0' />
      <xs:element ref='wsp:PolicyReference' minOccurs='0' />
      <xs:any namespace='##other' processContents='lax' minOccurs='0' maxOccurs='unbounded'
    />
  </xs:documentation>
</xs:annotation>
  <xs:sequence>
    <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:attribute name="Context" type="xs:anyURI" use="optional" />
  <xs:anyAttribute namespace="##other" processContents="lax" />
</xs:complexType>
```

WSTEP extends the wst:RequestSecurityTokenResponseType with the following elements:

```

    <xs:element ref="wstep:DispositionMessage" />
    <xs:element ref="wsse:BinarySecurityToken" minOccurs="0" maxOccurs="1" />
    <xs:element ref="wstep:RequestID" minOccurs="0" maxOccurs="1"
  <xs:element ref="wst:KeyExchangeToken" minOccurs="0" maxOccurs="1" />
  />

```

Only the elements documented as follows are used by WSTEP. Any element received that is not documented as follows SHOULD be ignored.

wst:TokenType: Refers to the TokenType definition in section [3.1.4.1.2.8](#).

wstep:DispositionMessage: Refers to the definition in section [3.1.4.1.2.2](#). The wstep:DispositionMessage element is used to convey any additional server disposition information as part of the response message.

wsse:BinarySecurityToken: Refers to the wsse:BinarySecurityToken definition in section [3.1.4.1.3.2](#).

wst: KeyExchangeToken: Refers to the wst:KeyExchangeToken definition in section [3.1.4.1.2.3](#).

wst:RequestedSecurityToken: An instance of a wst:RequestedSecurityTokenType object as defined in section [3.1.4.1.3.2](#).

wstep:RequestID: An instance of a **wstep:RequestID** as defined in section [3.1.4.1.2.4](#) that conveys the request identifier of the originating request.

3.1.4.1.3.5 wst:RequestSecurityTokenResponseCollectionType

The <wst:RequestSecurityTokenResponseCollectionType> is defined in the [\[WSTrust1.3\]](#) XML schema definition (XSD) as a collection of one or more <wst:RequestSecurityTokenResponse> elements. The WS-Trust X.509v3 Token Enrollment Extensions further constrain the [\[WSTrust1.3\]](#) definition and the <wst:RequestSecurityTokenResponseCollection> collection MUST contain at most one <wst:RequestSecurityTokenResponse> element.

```

<xs:complexType name="RequestSecurityTokenResponseCollectionType">
  <xs:annotation>
    <xs:documentation>
      The <wst:RequestSecurityTokenResponseCollection> element (RSTRC) MUST be used to return a
      security token or response to a security token request on the final
      response.</xs:documentation>
    </xs:annotation>
    <xs:sequence>
      <xs:element ref="wst:RequestSecurityTokenResponse" minOccurs="1" maxOccurs="unbounded" />
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>

```

wst:RequestSecurityTokenResponse: An instance of a [wst:RequestSecurityTokenResponseType](#) object. The <wst:RequestSecurityTokenResponseCollectionType> MUST contain only one <RequestSecurityTokenResponse> element.

3.1.4.1.3.6 wst:RequestTypeEnum

The <wst:RequestTypeEnum> is defined in WS-Trust [\[WSTrust1.3\]](#) XML schema definition (XSD). WSTEP defines the following values for <wst:RequestTypeEnum>.

```
"http://schemas.microsoft.com/windows/pki/2009/01/enrollment/QueryTokenStatus"
```

WSTEP makes use of the Key Exchange Token request type defined in [\[WSTrust1.3\]](#) section 10:

```
"http://docs.oasis-open.org/ws-sx/ws-trust/200512/KET"
```

and the issue request type defined in [\[WSTrust1.3\]](#) XML Schema Definition (XSD)] :

```
"http://docs.oasis-open.org/ws-sx/ws-trust/200512/Issue"
```

3.1.4.1.3.7 wstep:CertificateEnrollmentWSDetailType

The <wstep:CertificateEnrollmentWSDetailType> contains additional information pertaining to error conditions.

```
<xs:complexType name="CertificateEnrollmentWSDetailType">
  <xs:sequence>
    <xs:element minOccurs="0" maxOccurs="1" name="BinaryResponse" nillable="true"
type="xs:string" />
    <xs:element minOccurs="0" maxOccurs="1" name="ErrorCode" nillable="true" type="xs:int"
/>
    <xs:element minOccurs="0" maxOccurs="1" name="InvalidRequest" nillable="true"
type="xs:boolean" />
    <xs:element minOccurs="0" maxOccurs="1" name="RequestID" type="xs:string"
nillable="true" />
  </xs:sequence>
</xs:complexType>
```

wstep:BinaryResponse: The wstep:BinaryResponse element is used to provide a response if the Issuer generates one. If there is no response to provide, the wstep:BinaryResponse element MUST be nil.

wstep:ErrorCode: An integer value representing a server error. If there is no error to provide, wstep:ErrorCode MUST be specified as nil.

wstep:InvalidRequest: If the request is denied by the Issuer the server MUST return true. For other errors the wstep:InvalidRequest SHOULD be false.

wstep:RequestID: If the Issuer provides a wstep:RequestID to the server, it MUST be provided to a client. If no wstep:RequestID is provided by the Issuer, the wstep:RequestID element should be specified as nil.

3.1.4.1.4 Attributes

There are no attributes that are specific to this operation.

3.1.4.2 Processing Rules

An incoming **SOAP message** MUST be processed to evaluate the **SOAP actions** and authentication information.

If the user is authenticated successfully using the provided authentication information, message processing MUST continue, and the authentication information SHOULD be provided to the Issuer. If the authentication fails, the server MUST respond with a SOAP fault.

If the SOAP action is "http://schemas.microsoft.com/windows/pki/2009/01/enrollment/RST/wstep" the server must follow the Request Security Token Processing Rules per section [3.1.4.2.1](#).

If the SOAP action is "http://docs.oasis-open.org/ws-sx/ws-trust/200512/RST/KET" the server must follow the Key Exchange Token Processing Rules per section [3.1.4.2.2](#).

If any other SOAP action is defined, the server SHOULD respond with a SOAP fault.

3.1.4.2.1 WSTEP Action: Request Security Token Processing Rules

A <wst:RequestSecurityTokenMsg> MUST contain a <wst:RequestType> element as defined in section [3.1.4.1.2.7](#). If the <wst:RequestType> element is absent, nil, or undefined, the server MUST respond with a SOAP fault.

If a **wstep:PreferredLanguage** attribute is not present in a <RequestSecurityTokenType> object, or the value is not in SupportedLanguages, the server SHOULD use DefaultLanguage.

If the <wst:RequestType> is "http://docs.oasis-open.org/ws-sx/ws-trust/200512/Issue", the server MUST process the request per section [3.1.4.2.1.1](#).

If the <wst:RequestType> is "http://schemas.microsoft.com/windows/pki/2009/01/enrollment/QueryTokenStatus" the server MUST process the request per section [3.1.4.2.1.2](#).

If the <wst:RequestType> is any other value, the server MUST respond with a SOAP fault.

3.1.4.2.1.1 New and Renewal Request Processing

A wst:RequestSecurityToken message with a wst:RequestType value of "http://docs.oasis-open.org/ws-sx/ws-trust/200512/Issue" is used for the purposes of issuing an X.509v3 certificate or for renewal of an existing X.509v3 certificate.

For this type of message, a server has additional syntax constraints on the request message.

wsse:BinarySecurityToken: If the wsse:BinarySecurityToken element is absent or undefined, the server MUST respond with a SOAP fault.

wstep:RequestID: If the **wstep:RequestID** element is present and defined, the server SHOULD ignore it.

The server MUST provide the **wsse:BinarySecurityToken** to the Issuer and SHOULD provide the **auth:AdditionalContext** (see section [3.1.4.1.3.3](#)) to the Issuer.

If the Issuer responds with an error, the server MUST respond with a SOAP fault. If the Issuer indicates the issuance is pending, the server MUST use the Issuer response to generate a pending **wst:RequestSecurityTokenResponseCollectionMsg** message. If the Issuer responds with an issued certificate, the server MUST respond with a **wst:RequestSecurityTokenResponseCollectionMsg** message providing the issued certificate.

3.1.4.2.1.2 QueryTokenStatus Request Processing

A **wst:RequestSecurityToken** message with a <wst:RequestType> of "http://schemas.microsoft.com/windows/pki/2009/01/enrollment/QueryTokenStatus" is used to retrieve an issued certificate or check the status of a certificate request that was pending.

For this type of message, the server has additional syntax constraints on the request message.

The **wstep:RequestID** element is a null-terminated **Unicode** string that contains a certificate request identifier (as defined in section [3.1.4.1.2.4](#)). If the <wstep:RequestID> element is absent, defined as nil, or contains no value the server MUST return a SOAP fault.

The server MUST provide the **wstep:RequestID** to the Issuer.

If the Issuer responds with an error, the server MUST respond with a SOAP fault. If the Issuer indicates the issuance is pending, the server MUST use the Issuer response to generate a pending **wst:RequestSecurityTokenResponseCollectionMsg** message. If the Issuer responds with an issued certificate, the server MUST respond with a **wst:RequestSecurityTokenResponseCollectionMsg** message providing the issued certificate.

3.1.4.2.2 KET Action: Request Security Token Processing Rules

A **wst:RequestSecurityTokenMsg** MUST contain a <wst:RequestType> element as defined in section [3.1.4.1.2.7](#). If the <wst:RequestType> element is absent, nil, or undefined, the server MUST respond with a SOAP fault.

If the <wst:RequestType> is "http://docs.oasis-open.org/ws-sx/ws-trust/200512/KET" the server MUST process the request per section [3.1.4.2.2.1](#).

If the <wst:RequestType> is any other value, the server MUST respond with a SOAP fault.

3.1.4.2.2.1 Key Exchange Token Request Processing

A RequestSecurityToken message of wst:RequestType of "http://docs.oasis-open.org/ws-sx/ws-trust/200512/KET" is used to retrieve the Key Exchange Token.

For this type of message, a server has additional syntax constraints on the **wst:RequestSecurityTokenMsg** message.

If the <wst:RequestKET> element is absent, the server MUST return a SOAP fault.

The server requests the Key Exchange Token from the issuer. If the issuer responds with an error, the server MUST respond with a SOAP fault. Otherwise, the server uses the Issuer response to generate a **wst:RequestSecurityTokenResponseCollectionMsg** message.

The <wst:RequestSecurityTokenResponse> element in the server response follows the [\[WSTrust1.3\]](#) definition in section 8, but for key exchange in the WSTEP protocol, the <wst:KeyExchangeToken> element MUST be present, and provides the key exchange token provided from the Issuer.

3.1.5 Timer Events

None.

3.1.6 Other Local Events

None.

4 Protocol Examples

4.1 RequestSecurityToken Request/Response Message Sequence

In the following message sequence, the username/password authentication headers have been included in the message sequences for clarity.

4.1.1 Standard Certificate Request

4.1.1.1 RequestSecurityToken Message (Issue Request)

```
<s:Envelope xmlns:a="http://www.w3.org/2005/08/addressing"
xmlns:s="http://www.w3.org/2003/05/soap-envelope">
  <s:Header>
    <a:Action s:mustUnderstand="1">
http://schemas.microsoft.com/windows/pki/2009/01/enrollment/RST/wstep</a:Action>
    <a:MessageID>urn:uuid:b5d1a601-5091-4a7d-b34b-5204c18b5919</a:MessageID>
    <a:ReplyTo>
    <a:Address>http://www.w3.org/2005/08/addressing/anonymous</a:Address>
    </a:ReplyTo>
  </s:Header>
  <s:Body xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema">
    <RequestSecurityToken xmlns="http://docs.oasis-open.org/ws-sx/ws-trust/200512">
    <TokenType>http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-x509-token-profile-
1.0#X509v3</TokenType>
    <RequestType>http://docs.oasis-open.org/ws-sx/ws-trust/200512/Issue</RequestType>
    <BinarySecurityToken EncodingType="http://docs.oasis-open.org/wss/2004/01/
oasis-200401-wss-wssecurity-secext-1.0.xsd#base64binary"
ValueType="http://docs.oasis-open.org/wss/2004/01/
oasis-200401-wss-wssecurity-secext-1.0.xsd#PKCS7"
xmlns="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-
1.0.xsd">MIIEDCCAvQCAQAwADCCASiDQYJKoZIhvcNAQEBBQADggEPADCCAQoCggEBANPk
/1AOEvYikbMjvabzApKyJkqLnaXWm2FvnO6UNctXWf9WchbbumLqkIas9BUcMiSE
Eh4tVZNfugi3bahnjUjTG9MIvAZd3/C0YfuLX8y19mcIVWZhyYZVwUeMh4GYS5ht
90NFZP0vXb7c0brSRyvhwWzq+kG7om24qMTZBgSIRsajcDVY+uGLdhixy4AtXNw5
pzzRdS/1QBF1wsDT3C0bceWy2uej2hsLYoLyGdd0fHkly/tOusoyjc3itw2o3P9j
k+bP4eDG2ukrjMMcjqxQ500Bze7hXQf2hrNEJRTd6pPIOdAub8Hz/DiPYaEY75XN
EQepc11nLmq2GQ9YghcCAWEAAcCAcUwGgYKKwYBBAGCNw0CAzEMFgo2LjEuNzA1
My4yMGQCSsGAQQBgjcVFDFXMFUCAUMLzktMTM1MUMwNDA1QS5kOS0xMzUxQzA0
MDZBLm50dGVzdC5taWNyb3NvZnQuY29tDBJEOS0xMzUxQzA0MDZBXXGFiYnkMC0N1
c1Rlc3QuZlMhMHQGCisGAQQBgjcNAgIxZjBkAgEBHlwATQBpAGMAcGvBvAHMAbWBM
AHQAIAABFAG4AaABhAG4AYwBlAGQAIABDAlAeQBWAHQABWbNAHIAIYQBWAQAQbJ
ACAAUABYAG8AdgBpAGQAZQByACAAdgAxAc4AMAMBADCBYgYJKoZIhvcNAQkOMYG8
MIG5MBCGCSsGAQQBgjcUAQKHHggAVQBzAGUAcjApBgNVHSUEIjAgBgorBgEEAYI3
CgMEBggrBgEFBQcDBAYIKwYBBQUHAWIwDgYDVDR0PAQH/BAQDAgWgMEQGCsqsIb3
DQEJdWQ3MDUwDgYIKoZIhvcNAwICAgCAMA4GCCGqSIb3DQMEAgIAgDAHBGUrDgMC
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H5/6UiS+uqtSVzaJmA0a9vzxJQfgARCucr49wM3YUek=</BinarySecurityToken>
    <RequestID xsi:nil="true"
xmlns="http://schemas.microsoft.com/windows/pki/2009/01/enrollment" />
  </RequestSecurityToken>
</s:Body>
</s:Envelope>
```

4.1.1.2 Server RequestSecurityToken Response

```
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xmlns:a="http://www.w3.org/2005/08/addressing">
  <s:Header>
    <a:Action s:mustUnderstand="1">
http://schemas.microsoft.com/windows/pki/2009/01/enrollment/RSTRC/wstep</a:Action>
    <ActivityId CorrelationId="a0f231a3-ccf2-4b9c-99a6-bc353a59b5d0"
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95427c83-902c-48db-9529-f61cc1d8c035</ActivityId>
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  </s:Header>
  <s:Body>
    <RequestSecurityTokenResponseCollection
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    <RequestSecurityTokenResponse>
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oasis-200401-wss-x509-token-profile-1.0#X509v3</TokenType>
    <DispositionMessage xml:lang="en-US"
xmlns="http://schemas.microsoft.com/windows/pki/2009/01/enrollment">
Issued</DispositionMessage>
    <BinarySecurityToken
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EncodingType="http://docs.oasis-open.org/wss/2004/01/
oasis-200401-wss-wssecurity-secext-1.0.xsd#base64binary"
xmlns="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-
1.0.xsd">MIIRLAYJKoZIHvcNAQcCoIIRhTCCEYECAQMxCzAJBgUrDgMCGGUAMH0GCCsGAQUF
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AgECBgorBgEeAYI3CgoBMTEwLwIBADADAgEBMSUwIwYJKwYBBAGCNxURMRYEFFfIs
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```

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I05oofT8Td5Z2wACKunoU/xrvrWoPoS58TtkSDGkd/BWq8R6ZzaFdfjAF26bGB7Hi f5
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<RequestedSecurityToken>

```

    <BinarySecurityToken ValueType="http://docs.oasis-open.org/wss/2004/01/
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EncodingType="http://docs.oasis-open.org/wss/2004/01/
oasis-200401-wss-wssecurity-secext-1.0.xsd#base64binary"
xmlns="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-
1.0.xsd">MIIGjjCCBxagAwIBAgIKGNnV0wAAAAAPTANBgkqhkiG9w0BAQUFADAZMRswGQYD
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DTA5MDMwNTE4MjU0NVVoXDEwMDMwNTE4MjU0NVVwgb4xEzARBgoJkiaJk/IsZAEZ
FgNjb20xGTAXBgJkiaJk/IsZAEZFgltaWYyb3NvZnQvUETJIFRlYW0xZDASBgNVBAMMC0ZCX0VudFNlYkNBMB4X
DTA5MDMwNTE4MjU0NVVoXDEwMDMwNTE4MjU0NVVwgb4xEzARBgoJkiaJk/IsZAEZ
FgZudHRlc3QxHTAbBgoJkiaJk/IsZAEZFglkOS0xMzUxQzA0MDZBMQ4wDAYDVQQD
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eTXL+066yJKNzeK3Dajc/2OT5s/h4Mba6RGMwxyOrFDnQ4HN7uFdB/aGs0QLFN3q
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KoZIHvcNAQkPBDcwnTAObggqhkig9w0DAgICAIAwDgYIKoZIhvcNAwQCAgCAMAcG
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KwYBQUHAQEgEgc0wgcowgccGCCsGAQUFBzAchoG6bGRhcDovLy9DTj1lGQ19FbnRT
dWJdQSxDTj1BSUesQ049UHvibG1jJTIwS2V5JT1wU2Vydm1jZXMsQ049U2Vydm1j
ZXMsQ049Q29uZmlndXJhdGlvbixEQz1kOS0xMzUxQzA0MDZBLERDPW50dGVzdCxE
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xTk=</BinarySecurityToken>
    </RequestedSecurityToken>
    <RequestID
xmlns="http://schemas.microsoft.com/windows/pki/2009/01/enrollment">61</RequestID>
    </RequestSecurityTokenResponse>
    </RequestSecurityTokenResponseCollection>
    </s:Body>
    </s:Envelope>

```

4.1.2 Key Exchange Token Request

4.1.2.1 Client Exchange Token Request

```

    <s:Envelope xmlns:a="http://www.w3.org/2005/08/addressing"
xmlns:s="http://www.w3.org/2003/05/soap-envelope">
    <s:Header>
    <a:Action s:mustUnderstand="1">
http://docs.oasis-open.org/ws-sx/ws-trust/200512/RST/KET</a:Action>
    <a:MessageID>urn:uuid:c2884a79-b943-45c6-ac02-7256071de309</a:MessageID>

```

```

<a:ReplyTo>
<a:Address>http://www.w3.org/2005/08/addressing/anonymous</a:Address>
</a:ReplyTo>
</s:Header>
<s:Body xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema">
<RequestSecurityToken xmlns="http://docs.oasis-open.org/ws-sx/ws-trust/200512">
<TokenType>http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-x509-token-profile-
1.0#X509v3</TokenType>
<RequestType>http://docs.oasis-open.org/ws-sx/ws-trust/200512/KET</RequestType>
<RequestKET />
<RequestID xsi:nil="true"
xmlns="http://schemas.microsoft.com/windows/pki/2009/01/enrollment" />
</RequestSecurityToken>
</s:Body>
</s:Envelope>

```

4.1.2.2 Server Key Exchange Token Response

```

<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
xmlns:a="http://www.w3.org/2005/08/addressing">
<s:Header>
<a:Action s:mustUnderstand="1">
http://docs.oasis-open.org/ws-sx/ws-trust/200512/RSTR/KETFinal</a:Action>
<ActivityId CorrelationId="45f6782a-fb93-4a48-b0bb-a21496ba1f3c"
xmlns="http://schemas.microsoft.com/2004/09/ServiceModel/Diagnostics">
17f6073c-c108-4268-9ce4-713ed86894b6</ActivityId>
<a:RelatesTo>urn:uuid:c2884a79-b943-45c6-ac02-7256071de309</a:RelatesTo>
</s:Header>
<s:Body>
<RequestSecurityTokenResponseCollection
xmlns="http://docs.oasis-open.org/ws-sx/ws-trust/200512">
<RequestSecurityTokenResponse>
<TokenType>http://docs.oasis-open.org/wss/2004/01/
oasis-200401-wss-x509-token-profile-1.0#X509v3</TokenType>
<RequestedSecurityToken>
<KeyExchangeToken>
<BinarySecurityToken ValueType="http://docs.oasis-open.org/wss/2004/01/
oasis-200401-wss-x509-token-profile-1.0#X509v3"
EncodingType="http://docs.oasis-open.org/wss/2004/01/
oasis-200401-wss-wssecurity-secext-1.0.xsd#base64binary"
xmlns="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-
1.0.xsd">MIIFoJCCBIqgAwIBAgIKGNn1JQAAAAAQDANBgkqhkiG9w0BAQUFADAzMRswGQYD
VQQLExJNaWYyb3NvZnZnQGUETJIFRlYW0xZDAsbGkqgkhiG9w0BAQUFADAzMRswGQYD
DTA5MDMwNTE4MjYyMl0xZDAsbGkqgkhiG9w0BAQUFADAzMRswGQYD
b2Z0IFBLSzBUZWFtMRkwFwYDVQOQDBBGM0ZCZ0VudFN1YkNBMB4X
DTA5MDMwNTE4MjYyMl0xZDAsbGkqgkhiG9w0BAQUFADAzMRswGQYD
hkiG9w0BAQUFADAzMRswGQYD
BXOqJClcZOLjqrSkdc4KnUHV+XXohDO6ETCJ5vkXw90ThT6YWDqpno6G0PJ+h9S3
rmyz1EvXaXg4/eTnDygRVji5QgyXUWK5/BSJFDF160yG2LlueeS7Eux13Rnl2m2
IuvL40ExvhM08XVobhAqmYilYgkJYImeT2Uq1mVJ0hxjAPi4SY56z2rHdsLFt1Pf
tpQIrhPjfwSa3ILMoaw5JODCYf7ixL4IyTaJQJ4+vSttcz0Jyezje0m7mNS8k6aw
P0bzJnGMZkiq50q9TYN0ZfBYGE0cQRLLyPCITIoav6np0lZEkvCsCQIDAQABo4IC
sTCCAqQHQYDVR0OBByEFDO96yx8TPm5xHhJkxqrsGmokCeJMB8GAlUdIwQYMBAA
FJ+3jZGC0QuD0DHiPfaXeoF15VzIMIHRBgNVHR8EgeMwgeAwgd2ggdgggdeGgdRs
ZGFwOi8vLONOPU2CX0VudFN1YkNBLENOPtktMTM1MUMwNDA3Q3SxDTj1DRFAsQ049
UHVibGljJTIs2V5JTIwU2VydmljZXMxQ049U2VydmljZXMxQ049Q29uZmlndXJh
dGlvbixEQz1kOS0xMzUxQzA0MDZBLERDPW50dGVzdCxEQz1taWNYb3NvZnZnREME9

```

```

Y29tP2N1cnRpZmljYXRlUmV2b2NhdGlvbKxpc3Q/YmFzZT9vYmplY3RDdGFzZcz1j
UkxEaXN0cmliXFRpb25Qb2ludDCB2gYIKwYBBQUHAQEgc0wgcowgccGCCsGAQUF
BzAChOG6bGRhcDovLy9DTj1GQl9FbnRTdWJDQSxDTj1BSUESQ049UHVibGljJTIw
S2V5JTIwU2VydmljZXMsQ049U2Vydm1jZXMsQ049Q29uZmlndXJhdGlvbixEQzlk
OS0xMzUxQzA0MDZBLERDPW50dGVzdCxEQz1taWNyb3NvZnQsREM9Y29tP2NBQ2Vy
dGlmaWNhdGU/YmFzZT9vYmplY3RDdGFzZcz1jZXJ0aWZpY2F0aW9uQXV0aG9yaXR5
MCMGCSSGAQQBgjcUAgQWWhQAQwBBAEUAeABjAGgAYQBUAGcAZTA3BgkrBgEAYI3
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BgnVHSUEDTALBgkrBgEAYI3FQUwDgYDVR0PAQH/BAQDAgUgMBwGCSsGAQQBgjcV
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yF+HNuMSjyoXmVzoHwB3J7/9ULMpI6lc0BrLVIKghMmCuIDkIuv67WQj/6NfG7uR
shWg/QbRwuEQk2ls9D9dtZwrN7XWgBbNAF6FnwZg7X9GqIDQ9erb6sZPYWg5Gbiz
XVTXYIKj</BinarySecurityToken>
</KeyExchangeToken>
</RequestedSecurityToken>
</RequestSecurityTokenResponse>
</RequestSecurityTokenResponseCollection>
</s:Body>
</s:Envelope>

```

4.1.3 Retrieval of a previously pended certificate request with Query Token Status

4.1.3.1 Client Request

```

<s:Envelope xmlns:a="http://www.w3.org/2005/08/addressing"
xmlns:s="http://www.w3.org/2003/05/soap-envelope">
  <s:Header>
    <a:Action s:mustUnderstand="1">
http://schemas.microsoft.com/windows/pki/2009/01/enrollment/RST/wstep</a:Action>
    <a:MessageID>urn:uuid:ce330bb2-0ca2-473b-a29a-19e9264666ff</a:MessageID>
    <a:ReplyTo>
    <a:Address>http://www.w3.org/2005/08/addressing/anonymous</a:Address>
    </a:ReplyTo>
    </s:Header>
    <s:Body xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema">
    <RequestSecurityToken xmlns="http://docs.oasis-open.org/ws-sx/ws-trust/200512">
    <TokenType>http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-x509-token-profile-
1.0#X509v3</TokenType>
    <RequestType>http://schemas.microsoft.com/windows/pki/2009/01/enrollment/QueryTokenStatus</
RequestType>
    <RequestID
xmlns="http://schemas.microsoft.com/windows/pki/2009/01/enrollment">65</RequestID>
    </RequestSecurityToken>
    </s:Body>
  </s:Envelope>

```


4.1.4 Message exchange with a server fault

4.1.4.1 Client Request

See section [4.1.1.1](#) for an example of a client request.

4.1.4.2 Server Fault Response

```
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
xmlns:a="http://www.w3.org/2005/08/addressing">
  <s:Header>
    <a:Action s:mustUnderstand="1">http://schemas.microsoft.com/net/2005/12/
windowscommunicationfoundation/dispatcher/fault</a:Action>
    <a:RelatesTo>urn:uuid:ce330bb2-0ca2-473b-a29a-19e9264666ff</a:RelatesTo>
    <ActivityId CorrelationId="4f0e4425-4883-41c1-b704-771135d18f84"
xmlns="http://schemas.microsoft.com/2004/09/ServiceModel/Diagnostics">
eda7e63d-0c42-455d-9c4f-47ab85803a50</ActivityId>
  </s:Header>
  <s:Body>
    <s:Fault>
      <s:Code>
        <s:Value>s:Receiver</s:Value>
        <s:Subcode>
          <s:Value xmlns:a="http://schemas.microsoft.com/net/2005/12/windowscommunicationfoundation/
dispatcher">a:InternalServiceFault</s:Value>
        </s:Subcode>
      </s:Code>
      <s:Reason>
        <s:Text xml:lang="en-US">The server was unable to process the request
due to an internal error. For more information about the error, either turn
on IncludeExceptionDetailInFaults (either from ServiceBehaviorAttribute or
from the &lt;&serviceDebug>&gt; configuration behavior) on the server in order to
send the exception information back to the client, or turn on tracing as per
the Microsoft .NET Framework 3.0 SDK documentation and inspect the server
trace logs.</s:Text>
      </s:Reason>
    </s:Fault>
  </s:Body>
</s:Envelope>
```

4.1.5 Certificate Renewal

4.1.5.1 Client Renewal Request

```
<s:Envelope xmlns:a="http://www.w3.org/2005/08/addressing"
xmlns:s="http://www.w3.org/2003/05/soap-envelope">
  <s:Header>
    <a:Action s:mustUnderstand="1">http://schemas.microsoft.com/windows/pki/2009/
01/enrollment/RST/wstep</a:Action>
    <a:MessageID>urn:uuid:b0a9b388-2581-451d-8c03-270d4ffe2928</a:MessageID>
    <a:ReplyTo>
      <a:Address>http://www.w3.org/2005/08/addressing/anonymous</a:Address>
    </a:ReplyTo>
  </s:Header>
```

```
<s:Body xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <RequestSecurityToken xmlns="http://docs.oasis-open.org/ws-sx/ws-trust/200512">
    <TokenType>http://docs.oasis-open.org/wss/2004/01/
oasis-200401-wss-x509-token-profile-1.0#X509v3</TokenType>
    <RequestType>http://docs.oasis-open.org/ws-sx/ws-trust/200512/Issue</RequestType>
    <BinarySecurityToken EncodingType="http://docs.oasis-open.org/wss/2004/01/
oasis-200401-wss-wssecurity-secext-1.0.xsd#base64binary"
ValueType="http://docs.oasis-open.org/wss/2004/01/
oasis-200401-wss-wssecurity-secext-1.0.xsd#PKCS7"
xmlns="http://docs.oasis-open.org/wss/2004/01/
oasis-200401-wss-wssecurity-secext-1.0.xsd">
MIUIIAYJKoZiHvcNAQcCoIIUETCCFA0CAQExCzAJBgUrDgMCGGUAMIIL9wYJKoZI
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bTEZMBCGCgmsJomT8ixkARKWCW1pY3Jvc29mdDEWMBQGCgmsJomT8ixkARKWBm50
dGVzdDEdMBSGCgmsJomT8ixkARKWDWQ5LTEzNTFDMDQwNkExDjAMBGNVBAMTBVVz
ZXJzMQ0wCwYDVQDEWRhYmJ5MTYwNAYJKoZIhvcNAQkBFidhYmJ5QEQLTEzNTFD
MDQwNkEuTlRURVNULklJQ1JPU09GVC5DT00wggEiMA0GCsGqIb3DQEBBAQUAA4IB
DwAwggEKAoIBAQQD7WYEmBjJrlifOS4zEY2JZG7yTThp8cXI5OLdYS0bWXLZLWJ3
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QGK6Mrnr1jPQyUU/1IOVQxukjZnzT1ly9E/XfPloqTm6p3F6GksLe0kT0MIq0xqX
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NdDgza8eyNweleJlJzxWbGtGjPhXrjL8wqppxOCS1VgOvdDEDU3mCoCaOLw4i5pU
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AgMxDBYKNI4xLjcwNTMuMjBkBgkrBgEEAYI3FRQxVzBVAgEFDC85LTEzNTFDMDQw
NUEuZDktMTMlMUMwNDA2QS5udHRlc3QubWljcm9zb2Z0LmNvbWwSRDktMTMlMUMw
NDA2QVxhYmJ5MDAtDzXNUZXR0LmV4ZTB0BgorBgEEAYI3DQICMwYwZAIABAR5cAE0A
aQBjAHIAbWZAG8AZGzB0ACAARQBuAGgAYQBwAGMAZQBkACAAQwByAHkAcAB0AG8A
ZwByAGEAcABOAGkAYwAgAFAAcgBvAHYAaQBkAGUAcgAgAHYAMQAUADADAQAwwgE5
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AgIAgDAOBggqhkjG9w0DBAICAIABwYFKw4DAgcwCgYIKoZIhvcNAwcawYDVR0R
BGQwYqA3BgorBgEEAYI3FAIDoCkMJ2FiYn1AZDktMTMlMUMwNDA2QS5udHRlc3Qu
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DgQWBBT2ht3VPgSMOvf7763YZRfhpYez0zCCBqEGCSsGAQQBgjcNATGCBpIwggAO
MIIFdQADAQAgEAgoy2d8GAAAAA+MA0GCsGqIb3DQEBBQUAMDMxGzAZBgNVBAsT
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9w0BCQ8ENzA1MA4GCCqGSIb3DQMCAGIAgDAOBggqhkjG9w0DBAICAIABwYFKw4D
AgcwCgYIKoZIhvcNAwcwFwYJKwYBBAGCNxQCBAoeCABVAHMAZQBwMIHaBggrBgEF
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LENOFUJQsxDtj1QdWJsaWMLMjBLZXklMjBTZXJ2aWNLcyxDTj1TZXJ2aWNLcyxD
Tj1Db25maWdlcmF0aW9uLERDPWQ5LTEzNTFDMDQwNkEsREM9bnR0ZXN0LERDPW1p
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```

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CgSjJomT8ixkARkWCWlpY3Jvc29mdDEWMBQGCgSjJomT8ixkARkWBm50dGVzdDEd
MBsGCGSjJomT8ixkARkWDQW5LTEzNTFDMDQWnkExDjAMBGNVBAAMTBBVzZXJzMQ0w
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TlRURVNUk1JQ1JPU09GVC5DT00wggEiMA0GCSqGSIb3DQEBBQUAA4IBDwAwggEK
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zTCBjyCBxwYIKwYBBQUHMAKggbpsZGFwOi8vL0NOPUZCX0VudFN1YknBLENOPUFJ
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BQCDAjANBggkqhkiG9w0BAQUFAAOCAQEAge5W3XJ3766qGf8Y+r2YulGmQ0cskpa7
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zkjw+ZOTZUxqNYIXhevKru3P3ndhFENhSm/qC5Wovg7igCsDh9XJ/G6zkQ8SEbl
vkBU21rjPoyKYaEUXz/Y0yViIxpYCPFrByDU50ngXhwOhBcbAc5RImhI807xEO4W
YQ13sBxW1IsFuxMsmzWlTJrFauvjoPt96Hflog96p9w8D1zKxtlhqCI+XqI1qur
30aWtKmxTQTxG8uBCrczYAgfWGk=</BinarySecurityToken>
<RequestID xsi:nil="true"
xmlns="http://schemas.microsoft.com/windows/pki/2009/01/enrollment" />
</RequestSecurityToken>
</s:Body>
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</RequestSecurityTokenResponseCollection>
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```

5 Security

5.1 Security Considerations for Implementers

None.

5.2 Index of Security Parameters

None.

6 Appendix A: Full WSDL

The WSTEP protocol is a profile extension of WS-Trust1.3. As such, it does not have a WSDL.

WS-Trust 1.3 WSDL: The full WSDL for WS-Trust can be found at: <http://docs.oasis-open.org/ws-sx/ws-trust/200512/ws-trust-1.3.wsdl>.

WSTEP XML Schema: For the convenience of implementation, the XML schema is provided here.

```
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
           xmlns:wstep="http://schemas.microsoft.com/windows/pki/2009/01/enrollment"
           targetNamespace="http://schemas.microsoft.com/windows/pki/2009/01/enrollment"
           elementFormDefault="qualified">

  <xs:import namespace="http://www.w3.org/XML/1998/namespace"
            schemaLocation="http://www.w3.org/2001/xml.xsd" />

  <xs:element name="DispositionMessage" type="wstep:DispositionMessageType" nillable="true"
  />
  <xs:complexType name="DispositionMessageType">
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      <xs:extension base="xs:string">
        <xs:attribute ref="xml:lang" use="optional" />
      </xs:extension>
    </xs:simpleContent>
  </xs:complexType>
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  type="wstep:CertificateEnrollmentWSDetailType" />
  <xs:complexType name="CertificateEnrollmentWSDetailType">
    <xs:sequence>
      <xs:element minOccurs="0" maxOccurs="1" name="BinaryResponse" nillable="true"
      type="xs:string" />
      <xs:element minOccurs="0" maxOccurs="1" name="ErrorCode" nillable="true" type="xs:int"
      />
      <xs:element minOccurs="0" maxOccurs="1" name="InvalidRequest" nillable="true"
      type="xs:boolean" />
      <xs:element minOccurs="0" maxOccurs="1" name="RequestID" type="xs:string"
      nillable="true" />
    </xs:sequence>
  </xs:complexType>
  <xs:element name="RequestID" type="xs:string" nillable="true" />
  <xs:attribute name="PreferredLanguage" type="xml:language" use="optional"/>
</xs:schema>
```


7 Appendix B: Product Behavior

The information in this specification is applicable to the following Microsoft products or supplemental software. References to product versions include released service packs:

- Windows 7 operating system
- Windows Server 2008 R2 operating system
- Windows 8 operating system
- Windows Server 2012 operating system
- Windows 8.1 operating system
- Windows Server 2012 R2 operating system

Exceptions, if any, are noted below. If a service pack or Quick Fix Engineering (QFE) number appears with the product version, behavior changed in that service pack or QFE. The new behavior also applies to subsequent service packs of the product unless otherwise specified. If a product edition appears with the product version, behavior is different in that product edition.

Unless otherwise specified, any statement of optional behavior in this specification that is prescribed using the terms SHOULD or SHOULD NOT implies product behavior in accordance with the SHOULD or SHOULD NOT prescription. Unless otherwise specified, the term MAY implies that the product does not follow the prescription.

[<1> Section 3.1.3:](#) Windows servers set the *DefaultLanguage* parameter to the installed language.

8 Change Tracking

This section identifies changes that were made to the [MS-WSTEP] protocol document between the January 2013 and August 2013 releases. Changes are classified as New, Major, Minor, Editorial, or No change.

The revision class **New** means that a new document is being released.

The revision class **Major** means that the technical content in the document was significantly revised. Major changes affect protocol interoperability or implementation. Examples of major changes are:

- A document revision that incorporates changes to interoperability requirements or functionality.
- An extensive rewrite, addition, or deletion of major portions of content.
- The removal of a document from the documentation set.
- Changes made for template compliance.

The revision class **Minor** means that the meaning of the technical content was clarified. Minor changes do not affect protocol interoperability or implementation. Examples of minor changes are updates to clarify ambiguity at the sentence, paragraph, or table level.

The revision class **Editorial** means that the language and formatting in the technical content was changed. Editorial changes apply to grammatical, formatting, and style issues.

The revision class **No change** means that no new technical or language changes were introduced. The technical content of the document is identical to the last released version, but minor editorial and formatting changes, as well as updates to the header and footer information, and to the revision summary, may have been made.

Major and minor changes can be described further using the following change types:

- New content added.
- Content updated.
- Content removed.
- New product behavior note added.
- Product behavior note updated.
- Product behavior note removed.
- New protocol syntax added.
- Protocol syntax updated.
- Protocol syntax removed.
- New content added due to protocol revision.
- Content updated due to protocol revision.
- Content removed due to protocol revision.
- New protocol syntax added due to protocol revision.

- Protocol syntax updated due to protocol revision.
- Protocol syntax removed due to protocol revision.
- New content added for template compliance.
- Content updated for template compliance.
- Content removed for template compliance.
- Obsolete document removed.

Editorial changes are always classified with the change type **Editorially updated**.

Some important terms used in the change type descriptions are defined as follows:

- **Protocol syntax** refers to data elements (such as packets, structures, enumerations, and methods) as well as interfaces.
- **Protocol revision** refers to changes made to a protocol that affect the bits that are sent over the wire.

The changes made to this document are listed in the following table. For more information, please contact protocol@microsoft.com.

Section	Tracking number (if applicable) and description	Major change (Y or N)	Change type
Z Appendix B: Product Behavior	Modified this section to include references to Windows 8.1 operating system and Windows Server 2012 R2 operating system.	Y	Content updated.

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