[MS-OCAUTHWS]:
OC Authentication Web Service Protocol Specification

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Revision Summary

Date	Revision History	Revision Class	Comments
03/31/2010	0.1	Major	Initial Availability
04/30/2010	0.2	Editorial	Revised and edited the technical content
06/07/2010	0.3	Editorial	Revised and edited the technical content
06/29/2010	0.4	Editorial	Changed language and formatting in the technical content.
07/23/2010	0.4	No change	No changes to the meaning, language, or formatting of the technical content.
09/27/2010	1.0	Major	Significantly changed the technical content.
11/15/2010	1.0	No change	No changes to the meaning, language, or formatting of the technical content.
12/17/2010	1.0	No change	No changes to the meaning, language, or formatting of the technical content.
03/18/2011	1.0	No change	No changes to the meaning, language, or formatting of the technical content.
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01/20/2012	2.0	Major	Significantly changed the technical content.
04/11/2012	2.0	No change	No changes to the meaning, language, or formatting of the technical content.

Table of Contents

1 Introduction

This document specifies the OC Authentication Web Service Protocol. This protocol defines the message formats, server behavior, and client behavior for the purposes of authentication and certificate enrollment.

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]:

authentication
certificate
certificate chain
certification
certification authority (CA)
Coordinated Universal Time (UTC)
fully qualified domain name (FQDN)
GUID
Hypertext Transfer Protocol (HTTP)
Hypertext Transfer Protocol over Secure Sockets Layer (HTTPS)
Kerberos
NT LAN Manager (NTLM) Authentication Protocol
private key
public key
security token
universally unique identifier (UUID)
X.509

The following terms are defined in [MS-OFCGLOS]:

base64 encoding
endpoint
proxy
Security Assertion Markup Language (SAML)
security token service (STS)
Session Initiation Protocol (SIP)
Simple Object Access Protocol (SOAP)
SOAP fault
SOAP message
Transport Layer Security (TLS)
Uniform Resource Identifier (URI)
Uniform Resource Locator (URL)
user agent server (UAS)
Web application
Web service
Web Services Description Language (WSDL)
XML namespace
XML schema
XML schema definition (XSD)

The following terms are specific to this document:

Web ticket: A security token that is sent by a protocol client to a Web application during authentication (2). The security token can be included in either the body or the header of an HTTP message.

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.

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.

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[MS-OAUTH2EX] Microsoft Corporation, "OAuth 2.0 Authentication Protocol Extensions".

[MS-OCER] Microsoft Corporation, "Client Error Reporting Protocol Specification".

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1.2.2 Informative References

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[MS-OFCGLOS] Microsoft Corporation, "Microsoft Office Master Glossary".

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1.3 Protocol Overview (Synopsis)

This protocol can be used to generate a **security token**, which can subsequently be used for **authentication (2)** with other services. This protocol also allows a protocol client to request **X.509** v3 **certificates (2)**, which can subsequently be used for certificate-based authentication (2).

This protocol is used by the Web Ticket Service, which is described in section 1.3.1. This protocol is also used by the Certificate Provisioning Service, which is described in section 1.3.2.

1.3.1 Web Ticket Service

The Web Ticket Service is a **security token service (STS)**. The type of credentials that a client presents to the Web Ticket Service is described in section 3.2. The security token returned in the response is called a **Web ticket**.

The client presents the Web ticket as its credentials when authenticating to certain **Web applications**. See the individual Web application specifications for details. The Web ticket can be presented in the body of the **Hypertext Transfer Protocol (HTTP)** message or in the HTTP header, depending on the type of Web application.

1.3.1.1 Web Service Web Applications

The following figure illustrates this protocol for Web applications that are **Web services**.

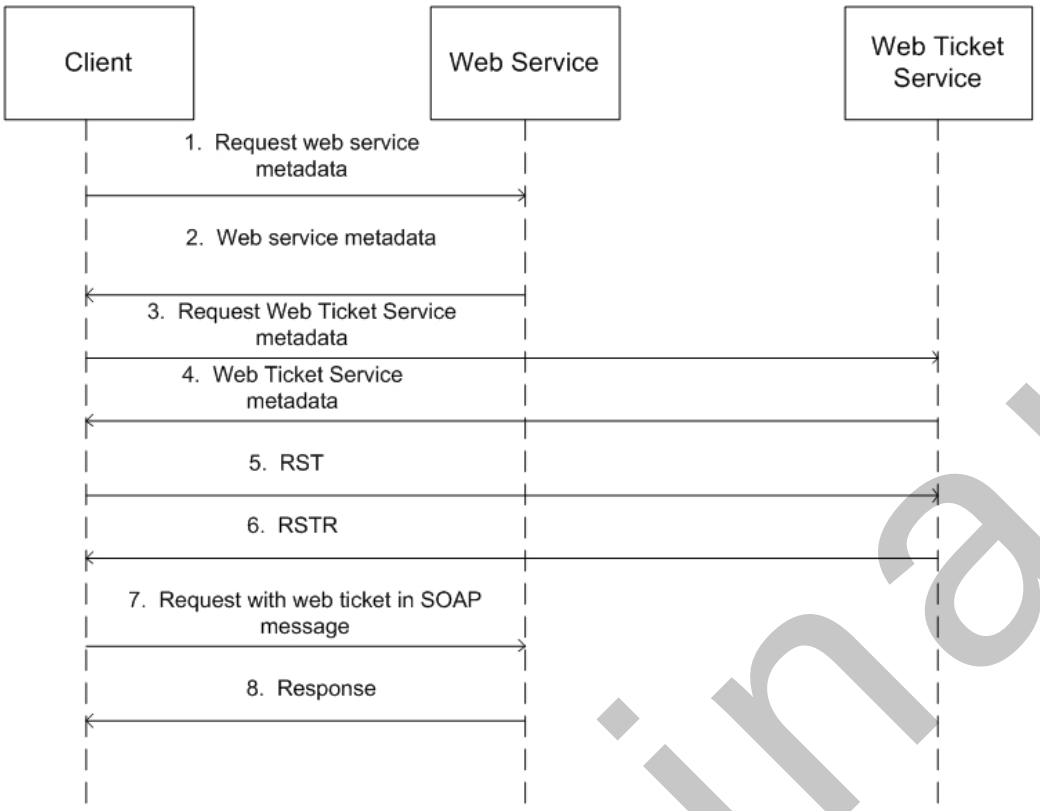

Figure 1: This protocol for Web service Web applications

1. The client requests the Web service's metadata using WS Metadata Exchange protocol as described in [WS-MetaDataExchange].
2. The Web service metadata is returned. The client discovers the **Uniform Resource Locator (URL)** of the Web Ticket Service. See details in section 3.2.
3. The client requests the Web Ticket Service's metadata.
4. The Web Ticket Service metadata is returned. The following authentication (2) types can be associated with the bindings in the metadata: Windows authentication, OCS-signed certificate authentication, and Live ID authentication. For details, see section 3.2.
5. The client sends an RST (Request Security Token). For details, see section 3.2.4.1.1.1.
6. The Web Ticket Service responds with an RSTR (Request Security Token Response). For details, see section 3.2.4.1.1.2.
7. The client sends a request to the Web service, with the Web ticket attached. For details, see section 3.2.
8. The Web service sends a response.

1.3.1.2 Non-Web Service Web Applications

The following figure illustrates this protocol for Web applications that are non-Web services.

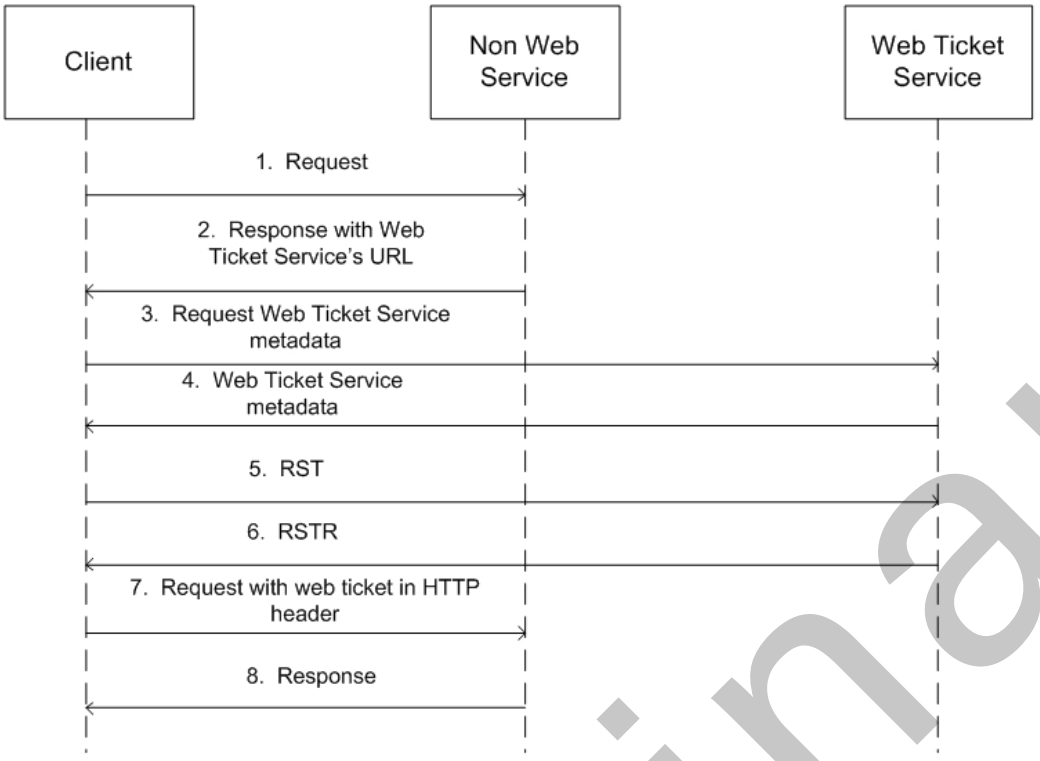

Figure 2: This protocol for non-Web service Web applications

1. The client sends a GET or POST HTTP request to the non-Web service Web application with content defined by the requirements of that application.
2. A response with status code 401 and a HTTP header containing the URL of the Web Ticket Service. For details, see section 3.2.
3. The client requests the Web Ticket Service's metadata using WS Metadata Exchange protocol as described in [WS-MetaDataExchange].
4. The Web Ticket Service metadata is returned. The following authentication (2) types can be associated with the bindings in the metadata: Windows authentication, OCS-signed certificate authentication, and Live ID authentication. For details, see section 3.2.
5. The client sends an RST (Request Security Token). For details, see section 3.2.4.1.1.1.
6. The Web Ticket Service responds with a RSTR (Request Security Token Response). For details, see section 3.2.4.1.1.2.
7. The client sends a request to the non-Web service Web application, with the Web ticket in an HTTP header. For details, see section 3.2.
8. The Web service sends a response.

1.3.2 Certificate Provisioning Service

The Certificate Provisioning Service provides an X.509 v3 certificate (2) for the authenticated user to the client. The client can use the obtained certificate (2) for authentication (2) against other

services. One example of an authentication (2) mechanism that uses this certificate (2) can be found in [MS-SIPAE] section 4.4.

1.4 Relationship to Other Protocols

The Web Ticket Service and Web applications that accept Web tickets as client credentials use **Simple Object Access Protocol (SOAP)** over **Hypertext Transfer Protocol over Secure Sockets Layer (HTTPS)**, as described in [RFC2818], SOAP 1.1, as described in [SOAP1.1], and WS-Trust 1.3, as described in [WS-Trust1.3], as shown in the following figure.

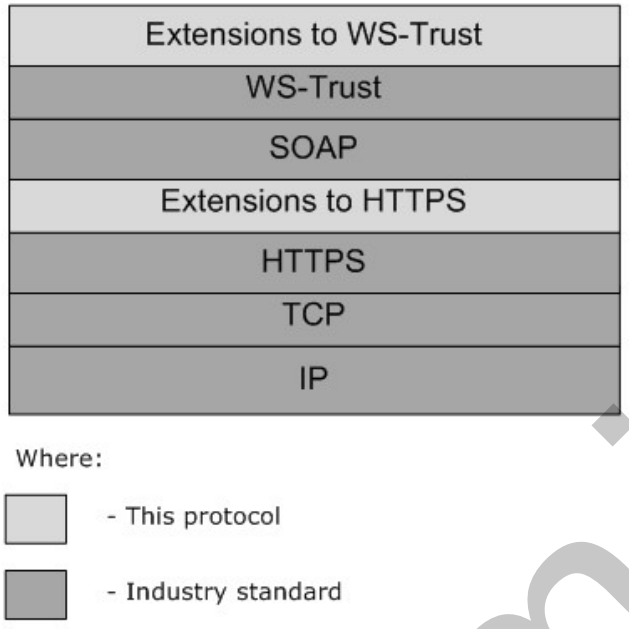

Figure 3: This protocol in relation to other protocols

1.5 Prerequisites/Preconditions

This protocol facilitates the issuance of X.509 v3 certificates (2). A server implementation of the protocol requires the functionality of a **certification authority (CA) (2)**, capable of interpreting requests in PKCS#10, as described in [RFC2986], and generating the appropriate certificate (2).

Protocol clients are required to be able to understand PKCS#7 format, as described in [RFC2315] and [RFC5652], and X.509 v3 certificate (2) format, as described in [RFC5280], which are used by the server to send the **certificate chain** and the certificate (2).

A protocol client needs to retrieve the Web Ticket Service URL before using this protocol. The two ways for the client to do so are shown in the figures in section 1.3.1.1. If the client retrieves it from a Web service, the URL ought to be read from the metadata document of a participating Web service, from the **wsp:Policy/sp:IssuedToken/sp:Issuer/wsa:Address** element associated with the service's binding that accepts a Web ticket, as described in [WSSP1.2]. If the client retrieves it from a non-Web service, the Web application is required to return it in a 401 response in an HTTP header extension named **X-MS-WebTicketURL**.

1.6 Applicability Statement

This protocol is applicable when clients require authentication (2) with servers using X.509 v3 certificates (2).

1.7 Versioning and Capability Negotiation

None.

1.8 Vendor-Extensible Fields

This protocol provides extensibility by the use of **any** and **anyAttribute** in the schema, as specified in [XMLSCHEMA1]. Vendors can choose to include their own elements by taking advantage of this extensibility.

1.9 Standards Assignments

None.

2 Messages

2.1 Transport

This protocol uses the **SOAP message** protocol for formatting request and response messages, as specified in [SOAP1.2/1] and [SOAP1.2/2]. It transmits those messages using HTTPS, as specified in [RFC2818].

2.2 Common Message Syntax

This section contains common definitions that are used by this protocol. The syntax of the definitions uses **XML schema**, as specified in [XMLSCHEMA1] and [XMLSCHEMA2], and **WSDL**, as specified in [WSDL].

The table in section 2.2.1 lists common namespaces.

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.

Prefix	Namespace URI	Reference
xs	http://www.w3.org/2001/XMLSchema	[XMLSCHEMA1]
xsi	http://www.w3.org/2001/XMLSchema-instance	[XMLSCHEMA1]
xml	http://www.w3.org/XML/1998/namespace	[XMLSCHEMA1]
wst	http://docs.oasis-open.org/ws-sx/ws-trust/200512/	[WS-Trust1.3]
tns	http://schemas.microsoft.com/OCS/AuthWebServices/	
soap	http://schemas.xmlsoap.org/wsdl/soap/	[SOAP1.1]
wsdl	http://schemas.xmlsoap.org/wsdl/	[WSDL]
wstep	http://schemas.microsoft.com/windows/pki/2009/01/enrollment	[MS-WSTEP]
auth	http://schemas.xmlsoap.org/ws/2006/12/authorization	[WSFederation]
wsse	http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd	[WSSE 1.0]
wsp	http://schemas.xmlsoap.org/ws/2004/09/policy	[MS-WSPOL]
saml	urn:oasis:names:tc:SAML:1.0:assertion	[SAMLCore]
af	urn:component:Microsoft.Rtc.WebAuthentication.2010	
http	http://schemas.microsoft.com/ws/06/2004/policy/http	[MS-WSPOL]
wsaw	http://www.w3.org/2006/05/addressing/wsdl	[WSA1.0]
sp	http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702	[WSSP1.2]

Prefix	Namespace URI	Reference
wsa	http://www.w3.org/2005/08/addressing	[WSA1.0 Core]
wsx	http://schemas.xmlsoap.org/ws/2004/09/mex	
soap12	http://schemas.xmlsoap.org/wsdl/soap12	[SOAP1.2/1]
wsu	http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd	
wsap	http://schemas.xmlsoap.org/ws/2004/08/addressing/policy	
msc	http://schemas.microsoft.com/ws/2005/12/wsdl/contract	[MS-WSPOL]
wsam	http://www.w3.org/2007/05/addressing/metadata	[WSA1.0 Metadata]
soapenc	http://schemas.xmlsoap.org/soap/encoding	

2.2.2 Messages

None.

2.2.3 Elements

None.

2.2.4 Complex Types

The following table summarizes the set of common XML schema complex type definitions defined by this specification. XML schema complex type definitions that are specific to a particular operation are described with the operation.

Complex type	Description
af:OCSDiagnosticsFaultType	Authentication-specific error information in the **SOAP fault** detail. It is returned for some failures during Live ID authentication (2) or Web ticket verification at a Web service.
af:MSWebAuthenticationType	WS-Policy assertion that describes the Live ID environment.
af:BindingType	WS-Policy assertion that the protocol client can communicate with the associated port. The absence of this assertion means that the client MUST NOT communicate with the associated WSDL port.
tns:ErrorInfoType	The base type of all the types that describe errors in any operation.

2.2.4.1 af:OCSDiagnosticsFault

The **af:OCSDiagnosticsFault** element is a child element of **s:Fault/s:detail**, as defined in [SOAP1.1].

```
<xs:complexType name="OCSDiagnosticsFaultType">
  <xs:sequence>
    <xs:element name="Ms-Diagnostics-Fault" type="af:MsDiagnosticsFaultType" minOccurs="1" />
    <xs:any processContents="lax" namespace="##any" minOccurs="0" maxOccurs="unbounded" />
```

```
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>


  <xs:complexType name="MsDiagnosticsFaultType">
    <xs:sequence>
      <xs:element name="ErrorId" type="xs:positiveInteger" minOccurs="1" maxOccurs="1" />
      <xs:element name="Reason" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:any processContents="lax" namespace="##any" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
```

The **af:ErrorId** element carries a unique positive integer value for each specific error condition.

The **af:Reason** element carries a string that provides a reason for an explanation of specific error.

Error IDs and reason string used by OC Authentication Web Service are documented in Section 6.22 of [MS-OCER].

2.2.4.2 af:MSWebAuthenticationType

The **af:MSWebAuthenticationType** element is a WS-Policy assertion and a child element of the **wsp:Policy** element. It contains policy elements that provide information about a security token service that can issue tokens accepted by OC Authentication Web Service.

```
  <xs:complexType name="MSWebAuthenticationType">
    <xs:sequence>
      <xs:element name="Policy" type="wsp:Policy" minOccurs="1" />
      <xs:any processContents="lax" namespace="##any" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
    <xs:anyAttribute namespace="##other" processContents="lax" />
  </xs:complexType>
```

The **af:LiveIdEnvironmentType** element is a child element of the **wsp:Policy** element inside **af:MSWebAuthenticationType**. It describes the environment in which the security token service operates.

```
  <xs:simpleType name="LiveIdEnvironmentType">
    <xs:restriction base="xs:string" >
      <xs:enumeration value="PRODUCTION" />
      <xs:enumeration value="PPE" />
      <xs:enumeration value="INT" />
    <xs:restriction>
  </xs:simpleType>
```

The **"PRODUCTION"** enumeration value indicates production environment.The **"PPE"** enumeration value indicates pre-production environment.The **"INT"** enumeration value indicates integration environment.

2.2.4.3 af:BindingType

The **af:BindingType** element is a WS-Policy assertion and a child element of the **wsp:Policy** element.

```
<xs:complexType name="BindingType">
  <xs:sequence>
    <xs:any processContents="lax" namespace="##any" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
</xs:complexType>
```

2.2.4.4 tns:ErrorInfoType

The **tns:ErrorInfoType** type is defined as follows.

```
<xs:complexType name="ErrorInfoType">
  <xs:sequence>
    <xs:element name="Description" type="xs:string" minOccurs="0" maxOccurs="1" />
    <xs:element name="AdditionalContext" minOccurs="0" maxOccurs="1">
      <xs:complexType>
        <xs:sequence>
          <xs:any processContents="lax" namespace="##any" minOccurs="0" maxOccurs="unbounded"
/>
        </xs:sequence>
      </xs:complexType>
    </xs:element>
  </xs:sequence>
  <xs:anyAttribute namespace="##other" processContents="lax" />
</xs:complexType>
```

tns:Description: Contains a textual description of the error.

tns:AdditionalContext: Can contain any implementation-defined context.

2.2.5 Simple Types

The following table summarizes the set of common XML schema simple type definitions defined by this specification. XML schema simple type definitions that are specific to a particular operation are described with the operation.

Simple type	Description
tns:ResponseClassType	Specifies whether the response for an operation is success, warning, or failure.

2.2.5.1 tns:ResponseClassType

The **tns:ResponseClassType** type is defined as follows.

```
<xs:simpleType name="ResponseClassType">
  <xs:restriction base="xs:string">
    <xs:enumeration value="Success" />
    <xs:enumeration value="Warning" />
```

```
      <xs:enumeration value="Error" />
    </xs:restriction>
  </xs:simpleType>
```

The enumeration values have the usual meaning, and are used by the server to represent the class of the response.

2.2.6 Attributes

The following table summarizes the set of common XML schema attribute definitions defined by this specification. XML schema attribute definitions that are specific to a particular operation are described with the operation.

Attribute	Description
tns:ResponseClass	An instance of **ResponseClassType** that specifies the class of **Response**.

2.2.6.1 ResponseClass

The **ResponseClass** attribute is defined as follows.

```
<xs:attribute name="ResponseClass" type="tns:ResponseClassType" use="required" />
```

This attribute is an instance of type **ResponseClassType**, which is defined in section 2.2.5.1. It appears as a required attribute in all the responses of the **GetAndPublishCert** operation.

2.2.7 Groups

None.

2.2.8 Attribute Groups

None.

3 Protocol Details

The client side of this protocol is simply a pass-through. That is, 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, and the results returned by the transport are passed directly back to the higher-layer protocol or application.

3.1 Certificate Provisioning Service Server Details

The Certificate Provisioning Service hosts a message **endpoint (5)** that receives **GetAndPublishCert** messages. When received, the server uses the **certification** request, which is part of the message, to generate and sign a certificate (2). It then stores the certificate (2) in an implementation-defined manner, so that it can be used to verify a client certificate (2) presented for authentication (2). After that, it sends the certificate (2) to the client as part of **GetAndPublishCertResponse**, as specified in section 3.1.4.1.2.2.

3.1.1 Abstract Data Model

This section describes a conceptual model of possible data organization that an implementation maintains to participate in this protocol. The described organization is provided to facilitate the explanation of how the protocol behaves. This document does not mandate that implementations adhere to this model as long as their external behavior is consistent with that described in this document.

The server SHOULD keep the following states:

Certificate Issuer: A **proxy** with which the server can communicate with a CA (2), used for generating X.509 v3 certificates (2). The nature of the proxy is implementation-dependent.

Trusted Certificate Authorities: A list of CAs (2) whose certificate chains are required to be trusted by the protocol clients in order for them to create **Transport Layer Security (TLS)** connections with the server. This list MUST have sufficient data that the certificates (2) in the chain can be located.

3.1.2 Timers

None.

3.1.3 Initialization

The CA (2) that would be used for generating X.509 v3 certificates (2) SHOULD be initialized with at least one **public key**/**private key** pair, used for signing the certificates (2).

The certificate (2) issuer proxy SHOULD be constructed and initialized, so that it can communicate with the CA (2).

The Trusted Certificate Authorities list SHOULD be initialized.

3.1.4 Message Processing Events and Sequencing Rules

The following table summarizes the list of WSDL operations as defined by this specification:

Operation	Description
GetAndPublishCert	A mechanism for clients to get a certificate (2), which can then be used for

Operation	Description
	authentication (2) purposes.

3.1.4.1 GetAndPublishCert

This operation is defined as part of the **CertProvisioningService portType**.

```
<wsdl:operation name="GetAndPublishCert">
    <wsdl:input message="tns:GetAndPublishCertMsg" />
    <wsdl:output message="tns:GetAndPublishCertResponseMsg" />
</wsdl:operation>
```

GetAndPublishCert generates a X.509 v3 certificate (2) using the PKCS#10 certification request in the request, and then stores the certificate (2) in an implementation-specific manner, so that it can be used to verify client certificates (2) supplied during authentication (2).

If an error occurs during processing, an error response MUST be sent using the **ErrorInfo** element in **GetAndPublishCertResponse**, as specified in section 3.1.4.1.2.2.

SOAP faults SHOULD NOT be used for error reporting.

3.1.4.1.1 Messages

The following table summarizes the set of WSDL message definitions that are specific to this operation.

Message	Description
tns:GetAndPublishCertMsg	The request for certificate provisioning.
tns:GetAndPublishCertResponseMsg	The response for certificate provisioning.

3.1.4.1.1.1 tns:GetAndPublishCertMsg

The **tns:GetAndPublishCertMsg** represents the incoming message and is defined as follows.

```
<wsdl:message name="GetAndPublishCertMsg">
    <wsdl:part name="request" element="tns:GetAndPublishCert" />
</wsdl:message>
```

tns:GetAndPublishCert: Refers to the **GetAndPublishCert** definition in section 3.1.4.1.2.1.

3.1.4.1.1.2 tns:GetAndPublishCertResponseMsg

The **tns:GetAndPublishCertResponseMsg** represents the outgoing message and is defined as follows.

```
<wsdl:message name="GetAndPublishCertResponseMsg">
    <wsdl:part name="response" element="tns:GetAndPublishCertResponse" />
</wsdl:message>
```

tns:GetAndPublishCertResponse: Refers to the **GetAndPublishCertResponse** definition in section 3.1.4.1.2.2.

3.1.4.1.2 Elements

The following table summarizes the XML schema element definitions that are specific to this operation.

Element	Description
tns:GetAndPublishCert	Container for the client request for certificate provisioning.
tns:GetAndPublishCertResponse	Container for the response to a request for certificate provisioning.

3.1.4.1.2.1 tns:GetAndPublishCert

The **tns:GetAndPublishCert** element contains the client request, and is defined as follows.

```
<xs:element name="GetAndPublishCert" type="tns:GetAndPublishCertType" />
```

tns:GetAndPublishCertType: Refers to the **GetAndPublishCertType** definition in section 3.1.4.1.3.1.

3.1.4.1.2.2 tns:GetAndPublishCertResponse

The **tns:GetAndPublishCertResponse** element contains the response from server, and is defined as follows.

```
<xs:element name="GetAndPublishCertResponse" type="tns:GetAndPublishCertResponseType" />
```

tns:GetAndPublishCertResponseType: Refers to the **GetAndPublishCertResponseType** definition in section 3.1.4.1.3.2.

3.1.4.1.2.3 wst:RequestSecurityToken

The **wst:RequestSecurityToken** element is defined in [WS-Trust1.3] section 3.1, and further extended in [MS-WSTEP] section 3.1.4.1.2.5. For this protocol, this element MUST be a child of the **GetAndPublishCert** element and has the following extra restrictions:

1. **/wst:RequestedSecurityToken/wst:RequestType** MUST be "http://docs.oasis-open.org/ws-sx/ws-trust/200512/Issue".
2. **/wst:RequestedSecurityToken/wst:TokenType** MUST be "http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-x509-token-profile-1.0#X509v3".
3. **/wst:RequestedSecurityToken/wsse:BinarySecurityToken** MUST contain a PKCS#10 Certification Signing Request (CSR) encoded with **base64 encoding** (Section 2.2.2.4.1 of [MS-WCCE])
4. **/wst:RequestedSecurityToken/wsBinarySecurityToken/@EncodingType** MUST be "http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd#base64binary".

5. The **/wst:RequestedSecurityToken/wsse:BinarySecurityToken/@ValueType** attribute MUST be "http://schemas.microsoft.com/OCS/AuthWebServices.xsd#PKCS10".

Any optional element or attribute not mentioned in this section SHOULD be ignored.

The server SHOULD be able to process **ValidityPeriod** and **ValidityPeriodUnits**, as specified in [MS-WCCE] section 3.1.1.4.3.1.1.

3.1.4.1.2.4 wst:RequestSecurityTokenResponse

The **wst:RequestSecurityTokenResponse** element is defined in [WS-Trust1.3] section 3.2, and is further extended in [MS-WSTEP] section 3.1.4.1.3.4. For this protocol, this element is a child of the **GetAndPublishCertResponse** element.

In case of an error, this element MUST NOT be present in the **GetAndPublishCertResponse**.

In case of success, the following restrictions MUST be adhered to:

1. **/wst:RequestSecurityTokenResponse/wstep:DispositionMessage** MUST be "Issued".
2. **/wst:RequestSecurityTokenResponse /wstep:DispositionMessage/@lang** attribute MUST be "en-US".
3. **/wst:RequestSecurityTokenResponse/wst:TokenType** MUST be "http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-x509-token-profile-1.0#X509v3".
4. **/wst:RequestSecurityTokenResponse/wst:RequestedSecurityToken** MUST contain **BinarySecurityToken**, which MUST contain the X.509 v3 certificate (2) using base64 encoding.
5. The **Common Name** of the **Subject (Section 4.1.2.6 of** [RFC3280]**)** in the returned certificate (2) MUST have the same value as the **Entity** attribute in the client request.
6. **SubjectKeyIdentifier (Section 4.2.1.2 of** [RFC3280]**)** in the returned certificate (2) SHOULD contain the value of the **DeviceId** attribute in the client request.
7. **/wst:RequestSecurityTokenResponse/wst:RequestedSecurityToken/wsse:BinarySecurityToken/@ValueType** MUST be "http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-x509-token-profile-1.0#X509v3".
8. **/wst:RequestSecurityTokenResponse/wst:RequestedSecurityToken/wsse:BinarySecurityToken/@EncodingType** MUST be "http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd#base64binary".
9. **/wst:RequestSecurityTokenResponse/wsse:BinarySecurityToken** MUST contain the **BinarySecurityToken** that came as part of the incoming request.

Any element or attribute not mentioned in this section SHOULD be ignored.

3.1.4.1.3 Complex Types

The following table summarizes the XML schema complex type definitions that are specific to this operation.

Complex type	Description
tns:GetAndPublishCertType	Describes the client request for certificate provisioning.
tns:GetAndPublishCertResponseType	Describes the server response to a request for certificate provisioning.
tns:GetAndPublishCertErrorInfoType	Describes any failure in a **GetAndPublishCert** operation.

3.1.4.1.3.1 tns:GetAndPublishCertType

The **tns:GetAndPublishCertType** type describes the client request and is defined as follows.

```
<xs:complexType name="GetAndPublishCertType">
  <xs:sequence>
    <xs:element ref="wst:RequestSecurityToken" minOccurs="1" maxOccurs="1" />
    <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:attribute name="DeviceId" type="xs:string" use="required" />
  <xs:attribute name="Entity" type="xs:anyURI" use="required" />
  <xs:anyAttribute namespace="##other" processContents="lax" />
</xs:complexType>
```

wst:RequestSecurityToken: Refers to the **RequestSecurityToken**, as defined in section 3.1.4.1.2.3.

DeviceId: Refers to the **DeviceId**, as defined in section 3.1.4.1.5.1.

Entity: Refers to the **Entity**, as defined in section 3.1.4.1.5.2.

3.1.4.1.3.2 tns:GetAndPublishCertResponseType

The **tns:GetAndPublishCertResponseType** type describes the server response and is defined as follows.

```
<xs:complexType name="GetAndPublishCertResponseType">
  <xs:sequence>
    <xs:element ref="wst:RequestSecurityTokenResponse" minOccurs="0" maxOccurs="1" />
    <xs:element name="ErrorInfo" type="tns:GetAndPublishCertErrorInfoType" minOccurs="0"
maxOccurs="1" />
  </xs:sequence>
  <xs:attribute name="DeviceId" type="xs:string" use="required" />
  <xs:attribute name="Entity" type="xs:anyURI" use="required" />
  <xs:attribute name="ResponseClass" type="tns:ResponseClassType" use="required" />
  <xs:anyAttribute namespace="##other" processContents="lax" />
</xs:complexType>
```

wst:RequestSecurityTokenResponse: Refers to **RequestSecurityTokenResponse** element in section 3.1.4.1.2.4.

ErrorInfo: This element contains information about the error that occurred, if the operation is not successful. It MUST be an instance of the **GetAndPublishCertErrorInfoType**, as defined in section 3.1.4.1.3.3.

DeviceId: Refers to the **DeviceId** definition in section 3.1.4.1.5.1. This attribute contains the same value as the one contained in the **DeviceId** attribute of the client request.

Entity: Refers to the **Entity** definition in section 3.1.4.1.5.2. This attribute contains the same value as the one contained in **Entity** attribute of the client request.

ResponseClass: Refers to the **ResponseClass** definition in section 2.2.6.1.

3.1.4.1.3.3 tns:GetAndPublishCertErrorInfoType

The **tns:GetAndPublishCertErrorInfoType** type is defined as follows.

```
<xs:complexType name="GetAndPublishCertErrorInfoType">
  <xs:complexContent>
    <xs:extension base="ErrorInfoType">
      <xs:sequence />
      <xs:attribute name="ResponseCode" type="GetAndPublishCertResponseCodeType"
use="required" />
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
```

It is used to describe any failure in a **GetAndPublishCert** operation.

tns:ResponseCode: It MUST be an instance of a **GetAndPublishCertResponseCodeType**, as defined in section 3.1.4.1.4.1, and contains a code that describes the failure.

3.1.4.1.4 Simple Types

The following table summarizes the XML schema simple type definitions that are specific to this operation.

Simple type	Description
tns:GetAndPublishResponseCodeType	The status of the certificate provisioning request.

3.1.4.1.4.1 tns:GetAndPublishResponseCodeType

The **tns:GetAndPublishResponseCodeType** type is defined as follows.

```
<xs:simpleType name="GetAndPublishCertResponseCodeType">
  <xs:restriction base="xs:string">
    <xs:enumeration value="NoError" />
    <xs:enumeration value="InternalError" />
    <xs:enumeration value="InvalidPublicKey" />
    <xs:enumeration value="InvalidValidityPeriod" />
    <xs:enumeration value="InvalidEKU" />
    <xs:enumeration value="InvalidSipUri" />
    <xs:enumeration value="InvalidCSR" />
    <xs:enumeration value="DataStoreUnavailable" />
    <xs:enumeration value="InvalidDeviceId" />
    <xs:enumeration value="RequestMalformed" />
    <xs:enumeration value="AccountDisabled" />
    <xs:enumeration value="UserImproperlyProvisioned" />
  </xs:restriction>
```

```
</xs:simpleType>
```

"NoError": Indicates success.

"InternalError": Indicates an unexpected server error.

"InvalidPublicKey": Indicates that the certification request did not contain a valid public key.

"InvalidValidityPeriod": Indicates that the CSR contained an invalid or unacceptable validity period.

"InvalidEKU": Indicates that the CSR contained invalid Enhanced Key Usage.

"InvalidSipUri": Indicates that the **Entity**, as defined in section 3.1.4.1.5.2, is invalid.

"InvalidCSR": Indicates that the CSR is invalid.

"DataStoreUnavailable": Indicates that the store where the certificate (2) was supposed to be stored was not available.

"InvalidDeviceId": Indicates that the **DeviceId**, as defined in section 3.1.4.1.5.1, is invalid.

"AccountDisabled": Indicates that the account of the user operating the client is disabled.

"UserImproperlyProvisioned": Indicates that the user is not provisioned on a server that supports this protocol.

3.1.4.1.5 Attributes

The following table summarizes the XML schema attribute definitions that are specific to this operation.

Attribute	Description
DeviceId	Part of **GetAndPublishCertType**, as specified in section 3.1.4.1.3.1, and **GetAndPublishCertResponseType**, as specified in section 3.1.4.1.3.2.
Entity	Part of **GetAndPublishCertType** and **GetAndPublishCertResponseType.**

3.1.4.1.5.1 DeviceId

The **DeviceId** attribute is part of **GetAndPublishCertType** and **GetAndPublishCertResponseType**, and is defined as follows.

```
<xs:attribute name="DeviceId" type="xs:string" use="required" />
```

This is an identifier for the device on which the client is operating, and serves to identify a device unique among the various devices that the same user might be using simultaneously. It MUST be unique for each device being used by the same user. **DeviceId** MUST be convertible to a **GUID**. If the client uses an identifier for the device with any other service, which uses the certificate (2) retrieved using the **GetAndPublishCert** operation for authentication (2), **DeviceId** and the aforementioned identifier MUST be equal or it MUST be possible for the **DeviceId** to be generated using the identifier using a deterministic mathematical transformation. This transformation MUST be known to the certificate (2) verification engine.

3.1.4.1.5.2 Entity

The **Entity** attribute is part of **GetAndPublishCertType** and **GetAndPublishCertResponseType**, and is defined as follows.

```
<xs:attribute name="Entity" type="xs:anyURI" use="required" />
```

This is an identifier for the user who is using the client. It MUST be same as the **Session Initiation Protocol (SIP) Uniform Resource Identifier (URI)** for the authenticated user, as specified in [RFC3261] section 19.1, without the "sip:" prefix.

3.1.4.1.6 Groups

None.

3.1.4.1.7 Attribute Groups

None.

3.1.5 Timer Events

None.

3.1.6 Other Local Events

None.

3.2 Web Ticket Service Server Details

The Web Ticket Service issues Web tickets using its **IssueToken** operation, which follows the protocol described in [WS-Trust1.3], except where indicated in section 3.2.4.1.1.1 and section 3.2.4.1.1.2.

Clients MUST authenticate to the Web Ticket Service using one of the following authentication (2) protocols:

- Windows authentication
- OCS-signed certificate authentication
- Live ID authentication
- OAuth2 authentication

Windows authentication (2) follows the **Kerberos** and the **NT LAN Manager (NTLM) Authentication Protocol**, as specified in [RFC4559]. If Windows authentication (2) fails, the errors defined in section 3.2.4.1 are returned.

Certificate (2) authentication (2) signed by a **user agent server (UAS)** follows SOAP Message Security 1.1, as specified in [WSS], to validate an X.509 security token, as specified in [WSSX509TP]. If OCS-signed certificate (2) authentication (2) fails, the errors defined in section 3.2.4.1 are returned. The certificate signed by the UAS can be obtained from the Certificate Provisioning Service described in section 3.1 of this document.

The Live ID token is presented as a **Security Assertion Markup Language (SAML)** token, as specified in [SAMLCore], and verified using SOAP Message Security 1.1, as specified in [WSS]. The way in which the client retrieves the SAML token is out of the scope of this document. The type of Live ID environment for which the server is configured is specified in the Web service metadata as MSWebAuthentication policy assertion. See section 2.2.4.2 for MSWebAuthentication policy assertion schema. If Live ID authentication (2) fails, the errors defined in section 3.2.4.1 are returned.

The OAuth2 authentication follows the OAuth 2.0 Authorization Protocol described in [IETFDRAFT-OAuth2.0] with Microsoft Extensions described in [MS-OAUTH2EX]. The protocol server extracts the OAuth2 token from the Authorization header of the HTTP request and validates that:

- the token carries an actor token that was issued by the Authorization Server that protocol server trusts;
- the actor token is signed by a certificate associated with the Authorization Server that issued the token;
- the actor token nameid (name identifier) claim value matches the issuer claim in the token;
- both the token itself and actor token carry audience claim with a value in the following format: 00000004-0000-0ff1-ce00-000000000000/<host_fqdn>@<realm>, where:
  - 00000004-0000-0ff1-ce00-000000000000 is identifier associated with the protocol server described in the document,
  - <host_fqdn> is a placeholder which represents the Fully Qualified Domain Name (FQDN) of the protocol server,
  - <realm> is a place holder which represents a realm value configured for the protocol server;
- the token carries at least one of the following claims: nameid (name identifier), smtp (e-mail address), sip (SIP address) and values in these claims match corresponding values of exactly one user in the UAS database.

If validation of OAuth2 token fails, the errors defined in section 3.2.4.1 are returned.

Sending the Web Ticket as Credentials to a Web Service Web Application

After the client receives a Web ticket from the Web Ticket Service, the client MUST attach the Web ticket, as it would a SAML token, to its requests to a participating Web service.

If the Web ticket fails validation, **OCSDiagnosticsFaults**, as described in section 2.2.4.1, SHOULD be returned. The following table describes the relevant **OCSDiagnosticsFaults**.

faultcode	ErrorId	Reason
wsse:InvalidSecurityToken	28032	The Web ticket is invalid.
wsse:InvalidSecurityToken	28033	The Web ticket has expired.
		Proof Web tickets are only valid at the same Web

faultcode	ErrorId	Reason
wsse:InvalidSecurityToken	28034	server where they were requested.

The Web service MAY also return faults specified in [WSSE 1.0].

The Web ticket can be sent as a signed security token or a proof-of-possession token, as specified in [WS-Trust1.3].

Sending the Web Ticket as Credentials to a Non-Web Service Web Application

After the client receives a Web ticket from the Web Ticket Service, the client MUST send the Web ticket in an HTTP header extension in its request to participating non-Web services.

```
X-MS-WebTicket = ticket-data *(";" ticket-extns)
ticket-data = "opaque" "=" base64-ticket
base64-ticket = 1*(ALPHA / DIGIT / "+" / "/")     ; base-64 encoded SAML token
ticket-extns: 1*(ALPHA / DIGIT / "-") "=" 1*(ALPHA / DIGIT / "-")
```

The Web ticket, or SAML token, used to construct the **base64-ticket** MUST be a signed security token, as specified in [WS-Trust1.3].

If the Web ticket fails validation, an error response MUST be returned with an HTTP extension header called **X-Ms-diagnostics**, as described in section 3.2.4.1. The following table describes the relevant fault codes.

Faultcode	ErrorId	Reason
wsse:InvalidSecurityToken	28032	The Web ticket is invalid.
wsse:InvalidSecurityToken	28033	The Web ticket has expired.

3.2.1 Abstract Data Model

This section describes a conceptual model of possible data organization that an implementation maintains to participate in this protocol. The described organization is provided to facilitate the explanation of how the protocol behaves. This document does not mandate that implementations adhere to this model as long as their external behavior is consistent with that described in this document.

The Web Ticket Service SHOULD keep the following states:

Fully Qualified Domain Name of the Web Server Farm: This **fully qualified domain name (FQDN)** is used to verify the address in the **wst:RequestSecurityToken/wsp:AppliesTo/wsa:EndpointReference/wsa:Address** element of the RST. The logic for determining this FQDN is implementation-dependent.

3.2.2 Timers

None.

3.2.3 Initialization

None.

3.2.4 Message Processing Events and Sequencing Rules

- The following table describes the WSDL operation for the Web Ticket Service.

Operation	Description
IssueToken	Provides a Web ticket given one of the following credentials: ▪ Windows authentication ▪ Live ID ▪ A certificate (2) signed by a UAS. The operation is at the Web Ticket Service.

3.2.4.1 IssueToken

The **IssueToken** interface provides an operation that returns a Web ticket for a client.

```
<wsdl:portType name="IWebTicketService">
    <wsdl:operation name="IssueToken">
        <wsdl:input wsaw:Action="http://docs.oasis-open.org/ws-sx/ws-trust/200512/RST/Issue"
message="tns:IWebTicketService_IssueToken_InputMessage"/>
        <wsdl:output wsaw:Action="http://docs.oasis-open.org/ws-sx/ws-
trust/200512/RSTRC/IssueFinal" message="tns:IWebTicketService_IssueToken_OutputMessage"/>
    </wsdl:operation>
</wsdl:portType>
```

If there is an error while processing the credentials of the user, then depending on the authentication (2) type used, the response message contains the error details in a custom HTTP header or in a SOAP fault.

HTTP X-Ms-diagnostics Header

The **X-Ms-diagnostics** header is an HTTP header that is returned if Windows authentication or certificate (2) authentication (2) signed by the UAS fails at the Web Ticket Service for the reasons in this section.

The header has the following format.

```
X-Ms-diagnostics = errorId ";" source ";" reason ";" fault
errorId = 1*DIGIT
source = DQUOTE 1*(ALPHA / DIGIT / "-" / "." / "_" / "~") DQUOTE
                                        ; Fully qualified domain name of server
token = DQUOTE 1*( ALPHA / DIGIT / "-" / "." / "_" / "~") DQUOTE
fault = DQUOTE 1*(ALPHA) ":" 1*(ALPHA) DQUOTE
```

The HTTP response code and the details of the **X-Ms-diagnostics** header are described later for each authentication (2) type.

The following table lists Windows authentication errors.

Type of error	Response code	ErrorId	token	faultcode
The user was authenticated but could not be found in the UAS database.	403	28000	User is not SIP enabled.	wsse:FailedAuthentication
Some unexpected error occurred in the system.	500	28001	Internal error while processing Windows authentication (2) or authorization.	wsse:FailedAuthentication

SOAP Faults

The following **OCSDiagnosticsFaults**, as defined in section 2.2.4.1, are returned for Live ID authentication (2) failures, OCS-signed certificate (2) failures, or if there are internal errors processing the RST after Windows authentication or certificate (2) credentials signed by the UAS are successfully verified. The following table lists SOAP errors.

faultcode	ErrorId	Reason
wsse:SecurityTokenUnavailable	28028	The Live ID token encryption key cannot be resolved. Check that the token is obtained for this site in the appropriate Live ID environment.
wsse:SecurityTokenUnavailable	28017	The Live ID token signing key cannot be resolved. Check that the token is obtained from the appropriate Live ID environment.
wsse:UnsupportedSecurityToken	28018	The Live ID token was produced with the incorrect site policy.
wsse:FailedAuthentication	28019	The Live ID token identity is not associated with a user account.
wsse:InvalidSecurity	28020	There is no valid security token.
wsse:UnsupportedSecurityTokenType	28021	The security token type is unsupported.
wsse:InvalidSecurityToken	28022	There is no valid subject statement.
wsse:InvalidSecurity	28023	There is no valid message security.
wsse:FailedAuthentication	28024	Authentication (2) failed.

The "key cannot be resolved" errors above indicate that protocol server could not locate the key referenced in the token in local or remote stores that it knows about.The "incorrect site policy" error above indicates that Live ID token presented to the protocol server was constructed using policy that the server does not understand.

The following table lists certificate (2) authentication (2) errors while processing the contents of a certificate (2) signed by the UAS.

faultcode	ErrorId	Reason
wsse:FailedAuthentication	28011	The certificate (2) is expired.
wsse:FailedAuthentication	28012	The certificate (2) is invalid.
wsse:FailedAuthentication	28013	The certificate (2) is not found.
wsse:FailedAuthentication	28014	The user was not found when queried in the database.
wsse:FailedAuthentication	28015	There was an internal error while processing a certificate (2) authentication (2) or authorization provided by the UAS.

The following table lists internal failures that occur after Windows authentication and UAS certificate (2) credentials are successfully verified.

SubCode	ErrorId	Reason
wsse:InvalidSecurity	28025	There is no valid security principal.
wsse:InvalidSecurity	28026	There is no valid security identity.
wsse:InvalidSecurity	28027	There is no valid message security.

The following table lists failures that occur while processing the RST.

SubCode	ErrorId	Reason
wst:RequestFailed	28035	The SIP URI in the claim type requirements of the Web ticket request does not match the SIP URI associated with the presented credentials.

3.2.4.1.1 Messages

The following table summarizes the set of WSDL message definitions that are specific to this operation.

Message	Description
wst:RequestSecurityTokenMsg	A request for a token to be issued.
wst:RequestSecurityTokenResponseMsg	The response to a request for a token to be issues.

3.2.4.1.1.1 wst:RequestSecurityTokenMsg

The **wst:RequestSecurityTokenMsg** is an incoming message, and is defined in [WS-Trust1.3], with the exception that only the following elements need to be in the message:

/wst:RequestSecurityToken/@Context: A required attribute that MUST be set to a **universally unique identifier (UUID)**.

/wst:RequestSecuritytoken/wst:TokenType: A required element that MUST be set to "http://docs.oasis-open.org/wss/oasis-wss-saml-token-profile-1.1#SAMLV1.1".

/wst:RequestSecurityToken/wst:RequestType: A required element that MUST be set to "http://docs.oasis-open.org/ws-sx/ws-trust/200512/Issue".

/wst:RequestSecurityToken/wsp:AppliesTo/wsa:EndpointReference/wsa:Address: A required element that MUST be set to the HTTP URL of the service for which the token is being requested. For example, the element could be set to the HTTP URL of the Certificate Provisioning Web Service. The server MUST validate that this address is part of the server farm.

/wst:RequestSecurityToken/wst:Entropy/wst:BinarySecret: This required element specifies a base64 encoded sequence of cryptographically random octets representing the requestor's entropy. The key size MUST be obtained from the WS-Policy, as specified in [MS-WSPOL], for the Web Ticket Service and SHOULD NOT be less than 128 bits. The entropy size SHOULD be the same size as the key size.

/wst:RequestSecuritytoken/wst:KeyType: A required element that MUST be set to "http://docs.oasis-open.org/ws-sx/ws-trust/200512/SymmetricKey".

/wst:RequestSecuritytoken/wst:Claims: An optional element representing a specific claim. Its **Dialect** attribute MUST be set to "urn:component:Microsoft.Rtc.WebAuthentication.2010:authclaims".

/wst:RequestSecuritytoken/wst:Claims/auth:ClaimType: An optional element, as specified in [WSFederation], representing a specific claim type. If this element is present, its **Uri** attribute MUST be set to "http://schemas.xmlsoap.org/ws/2005/05/identity/claims/uri".

/wst:RequestSecuritytoken/wst:Claims/auth:ClaimType/auth:Value: An optional element, as specified in [WSFederation], representing the SIP URI of the user for which the Web ticket will be created. If this element is included, the SIP URI MUST match the credentials submitted with the RST. If the element is not included, the server SHOULD use the credentials submitted with the RST to determine the SIP URI. If the SIP URI does not match the credentials, the server SHOULD respond with a fault message carrying fault code **wst:RequestFailed** as described in previous section.

If any one of the above required elements is not supplied or the element syntax does not conform to the syntax requirement specified in this section, the server SHOULD respond with a fault message carrying fault code **wst:InvalidRequest** as described in Section 3 of [WS-Trust1.3].

3.2.4.1.1.2 wst:RequestSecurityTokenResponseMsg

The **wst:RequestSecurityTokenResponseMsg** is an outgoing message, and is defined in [WS-Trust1.3], with the exception that only the following elements need be in the message:

/wst:RequestSecurityTokenResponse/@Context: A required attribute that MUST be set to the value from the corresponding request.

/wst:RequestSecuritytokenResponse/wst:TokenType: A required element that MUST be set to "http://docs.oasis-open.org/wss/oasis-wss-saml-token-profile-1.1#SAMLV1.1".

/wst:RequestSecurityTokenResponse/wst:RequestedSecurityToken/saml:Assertion: A required element that MUST be returned. This element and its contents SHOULD be treated as an opaque XML token by the User Agent.

/wst:RequestSecurityTokenResponse/wst:Lifetime/wsu:Created: An optional element that indicates the **Coordinated Universal Time (UTC)** when the token was created.

/wst:RequestSecurityTokenResponse/wst:Lifetime/wsu:Expires: A required element that indicates the **UTC** time when the token expires.

/wst:RequestSecurityTokenResponse/wst:RequestedUnattachedReference: An optional element that indicates how to reference the returned token when that token does not support

references using URI fragments (XML ID). This information is included because the token is considered opaque to the requestor.

/wst:RequestSecurityTokenResponse/wst:RequestedAttachedReference: An optional element that indicates how to reference the token when it is not placed inside the message. This information is included because the token is considered opaque to the requestor.

/wst:RequestSecurityTokenResponse/wsp:AppliesTo/wsa:EndpointReference/wsa:Address: A required element that MUST be set to the URL of the HTTP URL of the server farm or service to which the ticket applies. Clients SHOULD perform a prefix match on this URL to determine which services the ticket applies to.

/wst:RequestSecurityTokenResponse/wst:RequestedProofToken/wst:ComputedKey: This required element MUST be set to the element specified in the **ComputedKeyAlgorithm** element of the metadata from the Web Ticket Service's binding. For example, it could be set to http://docs.oasis-open.org/ws-sx/ws-trust/200512/CK/PSHA1.

/wst:RequestSecurityTokenResponse/wst:Entropy/wst:BinarySecret: This required element specifies a base64 encoded sequence of cryptographically random octets representing the Web Ticket Service's entropy. The size of the element SHOULD be the same as the KeySize specified in the WS-Policy associated with the binding at a Web service that accepts a Web ticket.

3.2.4.1.2 Elements

Elements are defined in the **XML schema definition (XSD)** associated with [WS-Trust1.3].

3.2.4.1.3 Complex Types

Complex types are defined in the XSD associated with [WS-Trust1.3].

3.2.4.1.4 Simple Types

Simple types are defined in the XSD associated with [WS-Trust1.3].

3.2.4.1.5 Attributes

Attributes are defined in the XSD associated with [WS-Trust1.3].

3.2.4.1.6 Groups

None.

3.2.4.1.7 Attribute Groups

None.

3.2.5 Timer Events

None.

3.2.6 Other Local Events

None.

4 Protocol Examples

4.1 GetAndPublishCert

This section contains an example of a request and response for a **GetAndPublishCert** operation.

4.1.1 Request

The following example is a request in a **GetAndPublishCert** operation.

```
<s:Envelope xmlns:s="http://schemas.xmlsoap.org/soap/envelope/">
  <s:Header>
    <To s:mustUnderstand="1"
xmlns="http://schemas.microsoft.com/ws/2005/05/addressing/none">https://server.contoso.com/Ce
rtProv/CertProvisioningService.svc</To>
    <Action s:mustUnderstand="1"
xmlns="http://schemas.microsoft.com/ws/2005/05/addressing/none">http://schemas.microsoft.com/
OCS/AuthWebServices/GetAndPublishCert</Action>
  </s:Header>
  <s:Body xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema">
    <GetAndPublishCert DeviceId="{161CCE75-E0C7-5F60-BDD1-054099725B0B}"
Entity="alice@contoso.com" xmlns="http://schemas.microsoft.com/OCS/AuthWebServices/">
      <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://schemas.microsoft.com/OCS/AuthWebServices.xsd#PKCS10"
xmlns="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd">
-----BEGIN NEW CERTIFICATE REQUEST-----
          MIIDmjCCAwMCAQAwGDEWMBQGA1UEAwwNdGVzdEB0ZXN0LmNvbTCBnzANBgkqhkiG
          9w0BAQEFAAOBjQAwgYkCgYEAtvIRlSA9B8KyYvaxpkJIiJ/gpZbsQ0PbKKpmJST0
          wbEu1+5uYGu1jrlBapHHQuP8BHhsL8GBeYBytkeUifUGJLYckx4EAX4yC84NRyLw
          4gq757DmEm0tka2d0Yi45dyZXjRPX4vKaMTvCIutnZisw/8G1TSWWWxUL9aQqhkH
          ancCAwEAAaCCAkAwGgYKKwYBBAGCNw0CAzEMFgo2LjAuNjAwMi4yMFYGCSsGAQQB
          gjcVFDFJMEcCAQkMKG5hbWVuZHJhLXIyazgucmVkbW9uZC5jb3JwLm1pY3Jvc29m
          dC5jb20MD1JFRE1PTkRcbmFrdW1hcgwHY2VydHJlcTB0BgorBgEEAYI3DQICMWYw
          ZAIBAR5cAE0AaQBjAHIAbwBzAG8AZgB0ACAARQBuAGgAYQBuAGMAZQBkACAAQwBy
          AHkAcAB0AG8AZwByAGEAcABoAGkAYwAgAFAAcgBvAHYAaQBkAGUAcgAgAHYAMQAu
          ADADAQAwgZ8GCisGAQQBgjcNAgExgZAwLB4cAHYAYQBsAGkAZABpAHQAeQBQAGUA
          cgBpAG8AZB4MAE0AbwBuAHQAaABzMCweJgBWAGEAbABpAGQAaQB0AHkAUABlAHIA
          aQBvAGQAVQBuAGkAdABzHgIANjAyHiYAQwBlAHIAdABpAGYAaQBjAGEAdABlAFQA
          ZQBtAHAAbABhAHQAZR4IAFUAcwBlAHIwgbEGCSqGSIb3DQEJDjGBozCBoDAXBgkr
          BgEEAYI3FAIECh4IAFUAcwBlAHIwCwYDVR0PBAQDAgWgMBMGA1UdJQQMMAoGCCsG
          AQUFBwMCMEQGCSqGSIb3DQEJDwQ3MDUwDgYIKoZIhvcNAwICAgCAMA4GCCqGSIb3
          DQMEAgIAgDAHBgUrDgMCBzAKBggqhkiG9w0DBzAdBgNVHQ4EFgQUF6WGh2KP4bGp
          6EKbyH+Ta43+sNUwDQYJKoZIhvcNAQEFBQADgYEAHxyeh68rKO4qRH7q30PXRqh/
          CD0egJZG43mzvoqBsvk1O1PiWl/tI9RJcxommgojHHth5KE9Up3dInvcSL9JrCHv
          AbTbpq4mLkQeU/ZduBNKMw7h1kEDqqn8L4ELmH5H7wkk5VE382Nc28ZeHyBZvvRH
          dq9NY8SqvRrO9r8o5f4=
          -----END NEW CERTIFICATE REQUEST-----</BinarySecurityToken>
        <RequestID
xmlns="http://schemas.microsoft.com/windows/pki/2009/01/enrollment">4792483c-70b5-4591-b138-
1a503a26d65b</RequestID>
      </RequestSecurityToken>
    </GetAndPublishCert>
  </s:Body>
```

```
</s:Envelope>
```

4.1.2 Response

The following example is a response in a **GetAndPublishCert** operation.

```
<s:Envelope xmlns:s="http://schemas.xmlsoap.org/soap/envelope/">
  <s:Header>
    <Action s:mustUnderstand="1"
xmlns="http://schemas.microsoft.com/ws/2005/05/addressing/none">http://schemas.microsoft.com/
OCS/AuthWebServices/GetAndPublishCertResponse</Action>
  </s:Header>
  <s:Body xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema">
    <GetAndPublishCertResponse ResponseClass="Success" DeviceId="{161CCE75-E0C7-5F60-BDD1-
054099725B0B}" Entity="alice@contoso.com"
xmlns="http://schemas.microsoft.com/OCS/AuthWebServices/">
      <RequestSecurityTokenResponse 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>
        <DispositionMessage xml:lang="en-US"
xmlns="http://schemas.microsoft.com/windows/pki/2009/01/enrollment"
>Issued</DispositionMessage>
        <BinarySecurityToken EncodingType="http://docs.oasis-open.org/wss/2004/01/oasis-
200401-wss-wssecurity-secext-1.0.xsd#base64binary"
ValueType="http://schemas.microsoft.com/OCS/AuthWebServices.xsd#PKCS10"
xmlns="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd">---
--BEGIN NEW CERTIFICATE REQUEST-----
          MIIDmjCCAwMCAQAwGDEWMBQGA1UEAwwNdGVzdEB0ZXN0LmNvbTCBnzANBgkqhkiG
          9w0BAQEFAAOBjQAwgYkCgYEAtvIRlSA9B8KyYvaxpkJIiJ/gpZbsQ0PbKKpmJST0
          wbEu1+5uYGu1jrlBapHHQuP8BHhsL8GBeYBytkeUifUGJLYckx4EAX4yC84NRyLw
          4gq757DmEm0tka2d0Yi45dyZXjRPX4vKaMTvCIutnZisw/8G1TSWWWxUL9aQqhkH
          ancCAwEAAaCCAkAwGgYKKwYBBAGCNw0CAzEMFgo2LjAuNjAwMi4yMFYGCSsGAQQB
          gjcVFDFJMEcCAQkMKG5hbWVuZHJhLXIyazgucmVkbW9uZC5jb3JwLm1pY3Jvc29m
          dC5jb20MD1JFRE1PTkRcbmFrdW1hcgwHY2VydHJlcTB0BgorBgEEAYI3DQICMWYw
          ZAIBAR5cAE0AaQBjAHIAbwBzAG8AZgB0ACAARQBuAGgAYQBuAGMAZQBkACAAQwBy
          AHkAcAB0AG8AZwByAGEAcABoAGkAYwAgAFAAcgBvAHYAaQBkAGUAcgAgAHYAMQAu
          ADADAQAwgZ8GCisGAQQBgjcNAgExgZAwLB4cAHYAYQBsAGkAZABpAHQAeQBQAGUA
          cgBpAG8AZB4MAE0AbwBuAHQAaABzMCweJgBWAGEAbABpAGQAaQB0AHkAUABlAHIA
          aQBvAGQAVQBuAGkAdABzHgIANjAyHiYAQwBlAHIAdABpAGYAaQBjAGEAdABlAFQA
          ZQBtAHAAbABhAHQAZR4IAFUAcwBlAHIwgbEGCSqGSIb3DQEJDjGBozCBoDAXBgkr
          BgEEAYI3FAIECh4IAFUAcwBlAHIwCwYDVR0PBAQDAgWgMBMGA1UdJQQMMAoGCCsG
          AQUFBwMCMEQGCSqGSIb3DQEJDwQ3MDUwDgYIKoZIhvcNAwICAgCAMA4GCCqGSIb3
          DQMEAgIAgDAHBgUrDgMCBzAKBggqhkiG9w0DBzAdBgNVHQ4EFgQUF6WGh2KP4bGp
          6EKbyH+Ta43+sNUwDQYJKoZIhvcNAQEFBQADgYEAHxyeh68rKO4qRH7q30PXRqh/
          CD0egJZG43mzvoqBsvk1O1PiWl/tI9RJcxommgojHHth5KE9Up3dInvcSL9JrCHv
          AbTbpq4mLkQeU/ZduBNKMw7h1kEDqqn8L4ELmH5H7wkk5VE382Nc28ZeHyBZvvRH
          dq9NY8SqvRrO9r8o5f4=
          -----END NEW CERTIFICATE REQUEST-----</BinarySecurityToken>
        <RequestedSecurityToken>
          <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-x509-token-profile-1.0#X509v3"
xmlns="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd">
            MIIDUzCCAj+gAwIBAgIK9VHsicQY22Nt2DAJBgUrDgMCHQUAMCAxHjAcBgNVBAMT
            FUNvbW11bmljYXRpb25zIFNlcnZlcjAeFw0xMDAyMTMwODM5MTFaFw0xMDA4MTIw
            ODM5MTFaMCoxKDAmBgNVBAMTH25rMUBvY3NkZXYubnR0ZXN0Lm1pY3Jvc29mdC5j
            b20wgZ8wDQYJKoZIhvcNAQEBBQADgY0AMIGJAoGBALbyEZUgPQfCsmL2saZCSIif
```

```
            4KWW7END2yiqZiUk9MGxLtfubmBrtY65QWqRx0Lj/AR4bC/BgXmAcrZHlIn1BiS2
            HJMeBAF+MgvODUci8OIKu+ew5hJtLZGtndGIuOXcmV40T1+LymjE7wiLrZ2YrMP/
            BtU0lllsVC/WkKoZB2p3AgMBAAGjggEPMIIBCzATBgNVHSUEDDAKBggrBgEFBQcD
            AjAvBgNVHQ4EKAQmezE2MUNDRTc1LUUwQzctNUY2MC1CREQxLTA1NDA5OTcyNUIw
            Qn0wYQYDVR0jBFowWIApbmFtZW5kcmEtdjJrOC5vY3NkZXYubnR0ZXN0Lm1pY3Jv
            c29mdC5jb22hK4IpbmFtZW5kcmEtdjJrOC5vY3NkZXYubnR0ZXN0Lm1pY3Jvc29m
            dC5jb20wNAYDVR0SBC0wK4IpbmFtZW5kcmEtdjJrOC5vY3NkZXYubnR0ZXN0Lm1p
            Y3Jvc29mdC5jb20wKgYDVR0RBCMwIYEfbmsxQG9jc2Rldi5udHRlc3QubWljcm9z
            b2Z0LmNvbTAJBgUrDgMCHQUAA4IBAQDJqQNY46t0+CLmyjdt83k/gXPTzIrzyotQ
            L+wdgkUn+kYpXCeuu5kPQ5CQothvJPgmF5f6r97/L3n19mWoBQgWzeZkVToSrjT5
            YaJ7Djs1UPhAL8LSH9nzAqkTh7eMtWdtcwTactjIWWVF+63L1JaCbCR7q87WY/zO
            36/YHnJ8OXXDeMs6Nvt3dfvkReIRgAF7ecIYo89FtyGP5sCHocQCRKbHIDJLGHbD
            6P1K+10W8cf4UuZmceCfh6J3rp0XpXhHydc/4vZvxuUWJfw7pOrFBldXZYgi0uKV
            jPwlPkDaGxUM+7yBirmMHQOjv4s79eeUPHvDhPnsjZMja2AP6eim
          </BinarySecurityToken>
        </RequestedSecurityToken>
        <RequestID
xmlns="http://schemas.microsoft.com/windows/pki/2009/01/enrollment">4792483c-70b5-4591-b138-
1a503a26d65b</RequestID>
      </RequestSecurityTokenResponse>
    </GetAndPublishCertResponse>
  </s:Body>
</s:Envelope>
```

4.2 IssueToken

This section contains an example of a request and response for an **IssueToken** operation.

4.2.1 Request

The following example is a request in an **IssueToken** operation.

```
<s:Envelope xmlns:s="http://schemas.xmlsoap.org/soap/envelope/">
  <s:Body>
    <RequestSecurityToken Context="2fdf3b92-4341-4eeb-b898-44ef4994cd55"
xmlns="http://docs.oasis-open.org/ws-sx/ws-trust/200512">
      <TokenType>http://docs.oasis-open.org/wss/oasis-wss-saml-token-profile-
1.1#SAMLV1.1</TokenType>
      <RequestType>http://schemas.xmlsoap.org/ws/2005/02/trust/Issue</RequestType>
      <AppliesTo xmlns="http://schemas.xmlsoap.org/ws/2004/09/policy">
        <EndpointReference xmlns="http://www.w3.org/2005/08/addressing">
          <Address>https://pool0.vdomain.com/GroupExpansion/Service.svc</Address>
        </EndpointReference>
      </AppliesTo>
      <Entropy>
        <BinarySecret>pElGrLu4aRHp9KKXicKdS3hnHi+6sXCgHEZiqPomYgk=</BinarySecret>
      </Entropy>
      <KeyType>http://docs.oasis-open.org/ws-sx/ws-trust/200512/SymmetricKey</KeyType>
    </RequestSecurityToken>
  </s:Body>
</s:Envelope>
```

4.2.2 Response

The following example is a response in an **IssueToken** operation.

```
<s:Envelope xmlns:s="http://schemas.xmlsoap.org/soap/envelope/">
  <s:Body>
    <RequestSecurityTokenResponseCollection xmlns="http://docs.oasis-open.org/ws-sx/ws-
trust/200512">
      <RequestSecurityTokenResponse Context="2fdf3b92-4341-4eeb-b898-44ef4994cd55">
        <TokenType>http://docs.oasis-open.org/wss/oasis-wss-saml-token-profile-
1.1#SAMLV1.1</TokenType>
        <RequestedSecurityToken>
          <saml:Assertion MajorVersion="1" MinorVersion="1" AssertionID="SamlSecurityToken-
7e62744e-bb8b-4f79-a4c8-623c866adf8c"
Issuer="https://Server.Vdomain.com/webticket/webticketservice.svc" IssueInstant="2010-02-
11T21:40:47.004Z" xmlns:saml="urn:oasis:names:tc:SAML:1.0:assertion">
            <saml:Conditions NotBefore="2010-02-11T21:40:47.004Z" NotOnOrAfter="2010-02-
11T22:40:47.004Z">
              <saml:AudienceRestrictionCondition>
                <saml:Audience>https://pool0.vdomain.com/</saml:Audience>
              </saml:AudienceRestrictionCondition>
            </saml:Conditions>
            <saml:AuthenticationStatement
AuthenticationMethod="urn:oasis:names:tc:SAML:1.0:am:unspecified"
AuthenticationInstant="2010-02-11T21:40:47.225Z">
              <saml:Subject>
                <saml:NameIdentifier
Format="http://schemas.xmlsoap.org/ws/2005/05/identity/claims/uri">sip:v_luser1@vdomain.com</
saml:NameIdentifier>
                <saml:SubjectConfirmation>
                  <saml:ConfirmationMethod>urn:oasis:names:tc:SAML:1.0:cm:holder-of-
key</saml:ConfirmationMethod>
                  <KeyInfo xmlns="http://www.w3.org/2000/09/xmldsig#">
                    <e:EncryptedKey xmlns:e="http://www.w3.org/2001/04/xmlenc#">
                      <e:EncryptionMethod Algorithm="http://www.w3.org/2001/04/xmlenc#kw-
aes256"></e:EncryptionMethod>
                      <KeyInfo>
                        <KeyName>8cc79744ef14800</KeyName>
                      </KeyInfo>
                      <e:CipherData>

<e:CipherValue>wyI/Nw4+7Z58OyNf3saoPfiqp04n5X7EBqrmec2T9TphxDMwb6+fkw==</e:CipherValue>
                      </e:CipherData>
                    </e:EncryptedKey>
                  </KeyInfo>
                </saml:SubjectConfirmation>
              </saml:Subject>
            </saml:AuthenticationStatement>
            <Signature xmlns="http://www.w3.org/2000/09/xmldsig#">
              <SignedInfo>
                <CanonicalizationMethod Algorithm="http://www.w3.org/2001/10/xml-exc-
c14n#"></CanonicalizationMethod>
                <SignatureMethod Algorithm="http://www.w3.org/2000/09/xmldsig#rsa-
sha1"></SignatureMethod>
                <Reference URI="#SamlSecurityToken-7e62744e-bb8b-4f79-a4c8-623c866adf8c">
                  <Transforms>
                    <Transform Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-
signature"></Transform>
                    <Transform Algorithm="http://www.w3.org/2001/10/xml-exc-
c14n#"></Transform>
                  </Transforms>
                  <DigestMethod
Algorithm="http://www.w3.org/2001/04/xmlenc#sha256"></DigestMethod>
                  <DigestValue>enTQ3mTVzgi6mbLytyjK1vIXfxCbJQz8/niGwWqc74k=</DigestValue>
                </Reference>
```

```
            </SignedInfo>

<SignatureValue>KaFH+iScjrxSfVfkINKvWj4hmlcGty0sgirY4Ws5OIa39nGIAkBH29ieZNRy8tGWYbUTvqb8LvP/x
/rmBViB/G1zYJLMSxFyigZYnIfU2zRM61PORQVNMXhJXe1lhkvJAqGmQjDt0C+3vj01gbvifzJdSXvG109PLaHN2s2lbK
ZPOAAHxaVlsczkXtKEV/4GfmzDgga2zdK+1R7cNx+A4QdwolbWcCpzx1Jj2+UekSpVZ7huVazxbF9foemiMUhruQR+Z7G
E3nP12UU5WPw9Cl+26B7a9DR2/MZM+Ax0g3FojhhzGpZbF//T/XIRIoBPD4mloYzh5XYdaK4bZskqzQ==</SignatureV
alue>
            <KeyInfo>
              <o:SecurityTokenReference xmlns:o="http://docs.oasis-
open.org/wss/2004/01/oasis-200401-wss-wssecurity-secext-1.0.xsd">
                <o:KeyIdentifier ValueType="http://docs.oasis-open.org/wss/oasis-wss-soap-
message-security-1.1#ThumbprintSHA1">cooXvCIM4bC0T0+4uxdrK7jU64I=</o:KeyIdentifier>
              </o:SecurityTokenReference>
            </KeyInfo>
          </Signature>
        </saml:Assertion>
      </RequestedSecurityToken>
      <Lifetime>
        <Created xmlns="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-
utility-1.0.xsd">2010-02-11T21:40:47.0048342Z</Created>
        <Expires xmlns="http://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-wssecurity-
utility-1.0.xsd">2010-02-11T22:40:47.0048342Z</Expires>
      </Lifetime>
      <RequestedAttachedReference>
        <o:SecurityTokenReference xmlns:o="http://docs.oasis-open.org/wss/2004/01/oasis-
200401-wss-wssecurity-secext-1.0.xsd">
          <o:KeyIdentifier ValueType="http://docs.oasis-open.org/wss/oasis-wss-saml-token-
profile-1.0#SAMLAssertionID">SamlSecurityToken-7e62744e-bb8b-4f79-a4c8-
623c866adf8c</o:KeyIdentifier>
        </o:SecurityTokenReference>
      </RequestedAttachedReference>
      <RequestedUnattachedReference>
        <o:SecurityTokenReference xmlns:o="http://docs.oasis-open.org/wss/2004/01/oasis-
200401-wss-wssecurity-secext-1.0.xsd">
          <o:KeyIdentifier ValueType="http://docs.oasis-open.org/wss/oasis-wss-saml-token-
profile-1.0#SAMLAssertionID">SamlSecurityToken-7e62744e-bb8b-4f79-a4c8-
623c866adf8c</o:KeyIdentifier>
        </o:SecurityTokenReference>
      </RequestedUnattachedReference>
      <AppliesTo xmlns="http://schemas.xmlsoap.org/ws/2004/09/policy">
        <EndpointReference xmlns="http://www.w3.org/2005/08/addressing">
          <Address>https://pool0.vdomain.com/</Address>
        </EndpointReference>
      </AppliesTo>
      <RequestedProofToken>
        <ComputedKey>http://docs.oasis-open.org/ws-sx/ws-
trust/200512/CK/PSHA1</ComputedKey>
      </RequestedProofToken>
      <Entropy>
        <BinarySecret>rrVofgKABHqpcvaUYgcSkFFt2+ef+dQltq5QDCWa7C8=</BinarySecret>
      </Entropy>
    </RequestSecurityTokenResponse>
  </RequestSecurityTokenResponseCollection>
 </s:Body>
</s:Envelope>
```

5 Security

5.1 Security Considerations for Implementers

None.

5.2 Index of Security Parameters

None.

6 Appendix A: Full WSDL

For ease of implementation, the full WSDLs are provided in the following sections.

WSDL name	Prefix	Section
Certificate provisioning service		6.1
Web ticket service		6.2

6.1 Certificate Provisioning Service

```
<?xml version="1.0" encoding="utf-8" ?>
<wsdl:definitions
    xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
    xmlns:tns="http://schemas.microsoft.com/OCS/AuthWebServices/"
    xmlns:xs="http://www.w3.org/2001/XMLSchema"
    xmlns:wst="http://docs.oasis-open.org/ws-sx/ws-trust/200512/"
    targetNamespace="http://schemas.microsoft.com/OCS/AuthWebServices/">

  <wsdl:types>
    <xs:schema id="ocsauth"
targetNamespace="http://schemas.microsoft.com/OCS/AuthWebServices/"
elementFormDefault="qualified">

      <xs:import namespace="http://docs.oasis-open.org/ws-sx/ws-trust/200512/"
schemaLocation="http://docs.oasis-open.org/ws-sx/ws-trust/200512/ws-trust-1.3.xsd" />

      <xs:simpleType name="ResponseClassType">
        <xs:restriction base="xs:string">
          <xs:enumeration value="Success" />
          <xs:enumeration value="Warning" />
          <xs:enumeration value="Error" />
        </xs:restriction>
      </xs:simpleType>

      <xs:complexType name="ErrorInfoType">
        <xs:sequence>
          <xs:element name="Description" type="xs:string" minOccurs="0" maxOccurs="1" />
          <xs:element name="AdditionalContext" minOccurs="0" maxOccurs="1">
            <xs:complexType>
              <xs:sequence>
                <xs:any processContents="lax" namespace="##any" minOccurs="0"
maxOccurs="unbounded" />
              </xs:sequence>
            </xs:complexType>
          </xs:element>
        </xs:sequence>
        <xs:anyAttribute namespace="##other" processContents="lax" />
      </xs:complexType>

      <!--
      GetAndPublishCert
      -->
      <xs:element name="GetAndPublishCert" type="tns:GetAndPublishCertType" />
      <xs:complexType name="GetAndPublishCertType">
        <xs:sequence>
          <xs:element ref="wst:RequestSecurityToken" minOccurs="1" maxOccurs="1" />
```

```
          <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded" />
        </xs:sequence>
        <xs:attribute name="DeviceId" type="xs:string" use="required" />
        <xs:attribute name="Entity" type="xs:anyURI" use="required" />
        <xs:anyAttribute namespace="##other" processContents="lax" />
      </xs:complexType>

      <xs:element name="GetAndPublishCertResponse" type="tns:GetAndPublishCertResponseType"
/>
      <xs:complexType name="GetAndPublishCertResponseType">
        <xs:sequence>
          <xs:element ref="wst:RequestSecurityTokenResponse" minOccurs="0" maxOccurs="1" />
          <xs:element name="ErrorInfo" type="tns:GetAndPublishCertErrorInfoType"
minOccurs="0" maxOccurs="1" />
        </xs:sequence>
        <xs:attribute name="DeviceId" type="xs:string" use="required" />
        <xs:attribute name="Entity" type="xs:anyURI" use="required" />
        <xs:attribute name="ResponseClass" type="tns:ResponseClassType" use="required" />
        <xs:anyAttribute namespace="##other" processContents="lax" />
      </xs:complexType>

      <xs:complexType name="GetAndPublishCertErrorInfoType">
        <xs:complexContent>
          <xs:extension base="tns:ErrorInfoType">
            <xs:sequence />
            <xs:attribute name="ResponseCode" type="tns:GetAndPublishCertResponseCodeType"
use="required" />
          </xs:extension>
        </xs:complexContent>
      </xs:complexType>

      <xs:simpleType name="GetAndPublishCertResponseCodeType">
        <xs:restriction base="xs:string">
          <xs:enumeration value="NoError" />
          <xs:enumeration value="InternalError" />
          <xs:enumeration value="InvalidPublicKey" />
          <xs:enumeration value="InvalidValidityPeriod" />
          <xs:enumeration value="InvalidEKU" />
          <xs:enumeration value="InvalidSipUri" />
          <xs:enumeration value="InvalidCSR" />
          <xs:enumeration value="DataStoreUnavailable" />
          <xs:enumeration value="InvalidDeviceId" />
          <xs:enumeration value="RequestMalformed" />
          <xs:enumeration value="AccountDisabled" />
          <xs:enumeration value="UserImproperlyProvisioned" />
        </xs:restriction>
      </xs:simpleType>
    </xs:schema>>
  </wsdl:types>

  <wsdl:message name="GetAndPublishCertMsg">
    <wsdl:part name="request" element="tns:GetAndPublishCert" />
  </wsdl:message>
  <wsdl:message name="GetAndPublishCertResponseMsg">
    <wsdl:part name="response" element="tns:GetAndPublishCertResponse" />
  </wsdl:message>

  <wsdl:portType name="CertProvisioningService">
```

```
    <wsdl:operation name="GetAndPublishCert">
      <wsdl:input message="tns:GetAndPublishCertMsg" />
      <wsdl:output message="tns:GetAndPublishCertResponseMsg" />
    </wsdl:operation>
  </wsdl:portType>
</wsdl:definitions>
```

6.2 Web Ticket Service

```
<xml version="1.0" encoding="utf-8"?>
<wsdl:definitions name="WebTicketService" targetNamespace="http://tempuri.org/"
xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
xmlns:wsa10="http://www.w3.org/2005/08/addressing"
xmlns:wsx="http://schemas.xmlsoap.org/ws/2004/09/mex"
xmlns:soap12="http://schemas.xmlsoap.org/wsdl/soap12/" xmlns:wsu="http://docs.oasis-
open.org/wss/2004/01/oasis-200401-wss-wssecurity-utility-1.0.xsd"
xmlns:wsp="http://schemas.xmlsoap.org/ws/2004/09/policy"
xmlns:wsap="http://schemas.xmlsoap.org/ws/2004/08/addressing/policy"
xmlns:msc="http://schemas.microsoft.com/ws/2005/12/wsdl/contract"
xmlns:wsam="http://www.w3.org/2007/05/addressing/metadata"
xmlns:wsaw="http://www.w3.org/2006/05/addressing/wsdl" xmlns:tns="http://tempuri.org/"
xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:soapenc="http://schemas.xmlsoap.org/soap/encoding/">
  <wsp:Policy wsu:Id="WebTicketServiceWinNegotiate_policy">
    <wsp:ExactlyOne>
      <wsp:All>
        <http:NegotiateAuthentication
xmlns:http="http://schemas.microsoft.com/ws/06/2004/policy/http"/>
        <af:Binding xmlns:af="urn:component:Microsoft.Rtc.WebAuthentication.2010"/>
        <sp:TransportBinding xmlns:sp="http://schemas.xmlsoap.org/ws/2005/07/securitypolicy">
          <wsp:Policy>
            <sp:TransportToken>
              <wsp:Policy>
                <sp:HttpsToken RequireClientCertificate="false"/>
              </wsp:Policy>
            </sp:TransportToken>
            <sp:AlgorithmSuite>
              <wsp:Policy>
                <sp:Basic256/>
              </wsp:Policy>
            </sp:AlgorithmSuite>
            <sp:Layout>
              <wsp:Policy>
                <sp:Strict/>
              </wsp:Policy>
            </sp:Layout>
          </wsp:Policy>
        </sp:TransportBinding>
      </wsp:All>
    </wsp:ExactlyOne>
  </wsp:Policy>
  <wsp:Policy wsu:Id="WebTicketServiceCert_policy">
    <wsp:ExactlyOne>
      <wsp:All>
        <af:Binding xmlns:af="urn:component:Microsoft.Rtc.WebAuthentication.2010"/>
        <sp:TransportBinding xmlns:sp="http://schemas.xmlsoap.org/ws/2005/07/securitypolicy">
          <wsp:Policy>
            <sp:TransportToken>
```

```
              <wsp:Policy>
                <sp:HttpsToken RequireClientCertificate="false"/>
              </wsp:Policy>
            </sp:TransportToken>
            <sp:AlgorithmSuite>
              <wsp:Policy>
                <sp:Basic256/>
              </wsp:Policy>
            </sp:AlgorithmSuite>
            <sp:Layout>
              <wsp:Policy>
                <sp:Strict/>
              </wsp:Policy>
            </sp:Layout>
            <sp:IncludeTimestamp/>
          </wsp:Policy>
        </sp:TransportBinding>
        <sp:EndorsingSupportingTokens
xmlns:sp="http://schemas.xmlsoap.org/ws/2005/07/securitypolicy">
          <wsp:Policy>
            <sp:X509Token
sp:IncludeToken="http://schemas.xmlsoap.org/ws/2005/07/securitypolicy/IncludeToken/AlwaysToRe
cipient">
              <wsp:Policy>
                <sp:RequireThumbprintReference/>
                <sp:WssX509V3Token10/>
              </wsp:Policy>
            </sp:X509Token>
            <sp:SignedParts>
              <sp:Header Name="To" Namespace="http://www.w3.org/2005/08/addressing"/>
            </sp:SignedParts>
          </wsp:Policy>
        </sp:EndorsingSupportingTokens>
        <sp:Wss11 xmlns:sp="http://schemas.xmlsoap.org/ws/2005/07/securitypolicy">
          <wsp:Policy>
            <sp:MustSupportRefKeyIdentifier/>
            <sp:MustSupportRefIssuerSerial/>
            <sp:MustSupportRefThumbprint/>
            <sp:MustSupportRefEncryptedKey/>
          </wsp:Policy>
        </sp:Wss11>
        <sp:Trust10 xmlns:sp="http://schemas.xmlsoap.org/ws/2005/07/securitypolicy">
          <wsp:Policy>
            <sp:MustSupportIssuedTokens/>
            <sp:RequireClientEntropy/>
            <sp:RequireServerEntropy/>
          </wsp:Policy>
        </sp:Trust10>
        <wsaw:UsingAddressing/>
      </wsp:All>
    </wsp:ExactlyOne>
  </wsp:Policy>
  <wsp:Policy wsu:Id="WebTicketServicePin_policy">
    <wsp:ExactlyOne>
      <wsp:All>
        <http:BasicAuthentication
xmlns:http="http://schemas.microsoft.com/ws/06/2004/policy/http"/>
        <af:PinAuthentication xmlns:af="urn:component:Microsoft.Rtc.WebAuthentication.2010"/>
        <af:Binding xmlns:af="urn:component:Microsoft.Rtc.WebAuthentication.2010"/>
```

```
        <sp:TransportBinding xmlns:sp="http://schemas.xmlsoap.org/ws/2005/07/securitypolicy">
          <wsp:Policy>
            <sp:TransportToken>
              <wsp:Policy>
                <sp:HttpsToken RequireClientCertificate="false"/>
              </wsp:Policy>
            </sp:TransportToken>
            <sp:AlgorithmSuite>
              <wsp:Policy>
                <sp:Basic256/>
              </wsp:Policy>
            </sp:AlgorithmSuite>
            <sp:Layout>
              <wsp:Policy>
                <sp:Strict/>
              </wsp:Policy>
            </sp:Layout>
          </wsp:Policy>
        </sp:TransportBinding>
      </wsp:All>
    </wsp:ExactlyOne>
  </wsp:Policy>
  <wsp:Policy wsu:Id="WebTicketServiceAuth_policy">
    <wsp:ExactlyOne>
      <wsp:All>
        <af:FormsAuthentication
xmlns:af="urn:component:Microsoft.Rtc.WebAuthentication.2010"/>
        <af:Binding xmlns:af="urn:component:Microsoft.Rtc.WebAuthentication.2010"/>
        <sp:TransportBinding xmlns:sp="http://schemas.xmlsoap.org/ws/2005/07/securitypolicy">
          <wsp:Policy>
            <sp:TransportToken>
              <wsp:Policy>
                <sp:HttpsToken RequireClientCertificate="false"/>
              </wsp:Policy>
            </sp:TransportToken>
            <sp:AlgorithmSuite>
              <wsp:Policy>
                <sp:Basic256/>
              </wsp:Policy>
            </sp:AlgorithmSuite>
            <sp:Layout>
              <wsp:Policy>
                <sp:Lax/>
              </wsp:Policy>
            </sp:Layout>
            <sp:IncludeTimestamp/>
          </wsp:Policy>
        </sp:TransportBinding>
        <sp:SignedSupportingTokens
xmlns:sp="http://schemas.xmlsoap.org/ws/2005/07/securitypolicy">
          <wsp:Policy>
            <sp:UsernameToken
sp:IncludeToken="http://schemas.xmlsoap.org/ws/2005/07/securitypolicy/IncludeToken/AlwaysToRe
cipient">
              <wsp:Policy>
                <sp:WssUsernameToken10/>
              </wsp:Policy>
            </sp:UsernameToken>
          </wsp:Policy>
```

```
        </sp:SignedSupportingTokens>
        <sp:Wss10 xmlns:sp="http://schemas.xmlsoap.org/ws/2005/07/securitypolicy">
          <wsp:Policy>
            <sp:MustSupportRefKeyIdentifier/>
            <sp:MustSupportRefIssuerSerial/>
          </wsp:Policy>
        </sp:Wss10>
      </wsp:All>
    </wsp:ExactlyOne>
  </wsp:Policy>
  <wsp:Policy wsu:Id="WebTicketServiceAnon_policy">
    <wsp:ExactlyOne>
      <wsp:All>
        <af:AnonAuthentication
xmlns:af="urn:component:Microsoft.Rtc.WebAuthentication.2010"/>
        <af:Binding xmlns:af="urn:component:Microsoft.Rtc.WebAuthentication.2010"/>
        <sp:TransportBinding xmlns:sp="http://schemas.xmlsoap.org/ws/2005/07/securitypolicy">
          <wsp:Policy>
            <sp:TransportToken>
              <wsp:Policy>
                <sp:HttpsToken RequireClientCertificate="false"/>
              </wsp:Policy>
            </sp:TransportToken>
            <sp:AlgorithmSuite>
              <wsp:Policy>
                <sp:Basic256/>
              </wsp:Policy>
            </sp:AlgorithmSuite>
            <sp:Layout>
              <wsp:Policy>
                <sp:Lax/>
              </wsp:Policy>
            </sp:Layout>
            <sp:IncludeTimestamp/>
          </wsp:Policy>
        </sp:TransportBinding>
        <sp:SignedSupportingTokens
xmlns:sp="http://schemas.xmlsoap.org/ws/2005/07/securitypolicy">
          <wsp:Policy>
            <sp:UsernameToken
sp:IncludeToken="http://schemas.xmlsoap.org/ws/2005/07/securitypolicy/IncludeToken/AlwaysToRe
cipient">
              <wsp:Policy>
                <sp:WssUsernameToken10/>
              </wsp:Policy>
            </sp:UsernameToken>
          </wsp:Policy>
        </sp:SignedSupportingTokens>
        <sp:Wss10 xmlns:sp="http://schemas.xmlsoap.org/ws/2005/07/securitypolicy">
          <wsp:Policy>
            <sp:MustSupportRefKeyIdentifier/>
            <sp:MustSupportRefIssuerSerial/>
          </wsp:Policy>
        </sp:Wss10>
      </wsp:All>
    </wsp:ExactlyOne>
  </wsp:Policy>
  <wsdl:types>
    <xsd:schema targetNamespace="http://tempuri.org/Imports">
```

```
      <xsd:import
schemaLocation="https://server.vdomain.com/WebTicket/WebTicketService.svc/mex?xsd=xsd0"
namespace="http://schemas.microsoft.com/Message"/>
    </xsd:schema>
  </wsdl:types>
  <wsdl:message name="IWebTicketService_IssueToken_InputMessage">
    <wsdl:part name="rst" type="q1:MessageBody"
xmlns:q1="http://schemas.microsoft.com/Message"/>
  </wsdl:message>
  <wsdl:message name="IWebTicketService_IssueToken_OutputMessage">
    <wsdl:part name="IssueTokenResult" type="q2:MessageBody"
xmlns:q2="http://schemas.microsoft.com/Message"/>
  </wsdl:message>
  <wsdl:portType name="IWebTicketService">
    <wsdl:operation name="IssueToken">
      <wsdl:input wsaw:Action="http://docs.oasis-open.org/ws-sx/ws-trust/200512/RST/Issue"
message="tns:IWebTicketService_IssueToken_InputMessage"/>
      <wsdl:output wsaw:Action="http://docs.oasis-open.org/ws-sx/ws-
trust/200512/RSTRC/IssueFinal" message="tns:IWebTicketService_IssueToken_OutputMessage"/>
    </wsdl:operation>
  </wsdl:portType>
  <wsdl:binding name="WebTicketServiceWinNegotiate" type="tns:IWebTicketService">
    <wsp:PolicyReference URI="#WebTicketServiceWinNegotiate_policy"/>
    <soap:binding transport="http://schemas.xmlsoap.org/soap/http"/>
    <wsdl:operation name="IssueToken">
      <soap:operation soapAction="http://docs.oasis-open.org/ws-sx/ws-trust/200512/RST/Issue"
style="document"/>
      <wsdl:input>
        <soap:body use="literal"/>
      </wsdl:input>
      <wsdl:output>
        <soap:body use="literal"/>
      </wsdl:output>
    </wsdl:operation>
  </wsdl:binding>
  <wsdl:binding name="WebTicketServiceCert" type="tns:IWebTicketService">
    <wsp:PolicyReference URI="#WebTicketServiceCert_policy"/>
    <soap:binding transport="http://schemas.xmlsoap.org/soap/http"/>
    <wsdl:operation name="IssueToken">
      <soap:operation soapAction="http://docs.oasis-open.org/ws-sx/ws-trust/200512/RST/Issue"
style="document"/>
      <wsdl:input>
        <soap:body use="literal"/>
      </wsdl:input>
      <wsdl:output>
        <soap:body use="literal"/>
      </wsdl:output>
    </wsdl:operation>
  </wsdl:binding>
  <wsdl:binding name="WebTicketServicePin" type="tns:IWebTicketService">
    <wsp:PolicyReference URI="#WebTicketServicePin_policy"/>
    <soap:binding transport="http://schemas.xmlsoap.org/soap/http"/>
    <wsdl:operation name="IssueToken">
      <soap:operation soapAction="http://docs.oasis-open.org/ws-sx/ws-trust/200512/RST/Issue"
style="document"/>
      <wsdl:input>
        <soap:body use="literal"/>
      </wsdl:input>
      <wsdl:output>
        <soap:body use="literal"/>
```

```
      </wsdl:output>
    </wsdl:operation>
  </wsdl:binding>
  <wsdl:binding name="WebTicketServiceAuth" type="tns:IWebTicketService">
    <wsp:PolicyReference URI="#WebTicketServiceAuth_policy"/>
    <soap:binding transport="http://schemas.xmlsoap.org/soap/http"/>
    <wsdl:operation name="IssueToken">
      <soap:operation soapAction="http://docs.oasis-open.org/ws-sx/ws-trust/200512/RST/Issue"
style="document"/>
      <wsdl:input>
        <soap:body use="literal"/>
      </wsdl:input>
      <wsdl:output>
        <soap:body use="literal"/>
      </wsdl:output>
    </wsdl:operation>
  </wsdl:binding>
  <wsdl:binding name="WebTicketServiceAnon" type="tns:IWebTicketService">
    <wsp:PolicyReference URI="#WebTicketServiceAnon_policy"/>
    <soap:binding transport="http://schemas.xmlsoap.org/soap/http"/>
    <wsdl:operation name="IssueToken">
      <soap:operation soapAction="http://docs.oasis-open.org/ws-sx/ws-trust/200512/RST/Issue"
style="document"/>
      <wsdl:input>
        <soap:body use="literal"/>
      </wsdl:input>
      <wsdl:output>
        <soap:body use="literal"/>
      </wsdl:output>
    </wsdl:operation>
  </wsdl:binding>
</wsdl:definitions>
```

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:

- Microsoft® Lync™ Server 2010
- Microsoft® Lync™ 2010
- Microsoft® Lync Server 15 Technical Preview
- Microsoft® Lync 15 Technical Preview

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.

8 Change Tracking

No table of changes is available. The document is either new or has had no changes since its last release.

9 Index