[MS-OXWSPSNTIF]:
Push Notifications Web Service Protocol Specification

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Revision Summary

Date	Revision History	Revision Class	Comments
07/15/2009	1.0	Major	Initial Availability.

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1 Introduction

This document specifies the Push Notifications Web Service protocol, which is responsible for receiving subscribed events that are sent by the server.

1.1 Glossary

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

Hypertext Transfer Protocol (HTTP)
Hypertext Transfer Protocol over Secure Sockets Layer (HTTPS)
SOAP body
SOAP fault
SOAP header
SOAP message
Web Services Description Language (WSDL)
WSDL message
WSDL port type
XML
XML namespace
XML schema

The following terms are specific to this document:

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

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-OXGLOS] Microsoft Corporation, "Exchange Server Protocols Master Glossary", June 2008.

[MS-OXWSCDATA] Microsoft Corporation, "Common Web Service Data Types Specification", July 2009.

[MS-OXWSNTIF] Microsoft Corporation, "Notifications Web Service Protocol Specification", July 2009.

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

[RFC2396] Berners-Lee, T., Fielding, R., and Masinter, L., "Uniform Resource Identifiers (URI): Generic Syntax", RFC 2396, August 1998, http://www.ietf.org/rfc/rfc2396.txt.

[RFC2616] Fielding, R., et al., "Hypertext Transfer Protocol -- HTTP/1.1", RFC 2616, June 1999, http://www.ietf.org/rfc/rfc2616.txt.

[RFC2818] Rescorla, E., "HTTP over TLS", RFC 2818, May 2000, http://www.ietf.org/rfc/rfc2818.txt.

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[SOAP1.1] Box, D., et al., "Simple Object Access Protocol (SOAP) 1.1", May 2000, http://www.w3.org/TR/2000/NOTE-SOAP-20000508/.

[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.

[XMLNS] World Wide Web Consortium, "Namespaces in XML 1.0 (Second Edition)", August 2006, http://www.w3.org/TR/REC-xml-names/.

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

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

1.2.2 Informative References

None.

1.3 Protocol Overview

The Push Notifications Web Service protocol provides clients with subscribed event updates that are sent by the server. Clients subscribe to notifications, as specified in [MS-OXWSNTIF], creating a push subscription that tells the server where to send notifications. The client then creates a Web service that enables it to receive the notifications that are sent by the server.

1.4 Relationship to Other Protocols

The Push Notifications Web Service protocol uses SOAP over **HTTP** and SOAP over **HTTPS**, as shown in the following figures.

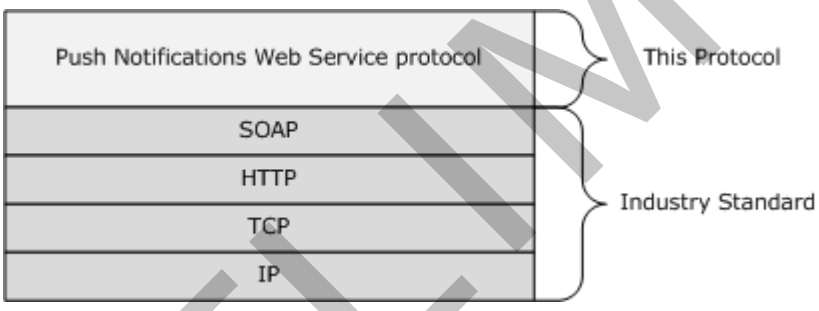

Figure 1: Push Notification Web Service protocol HTTP stack

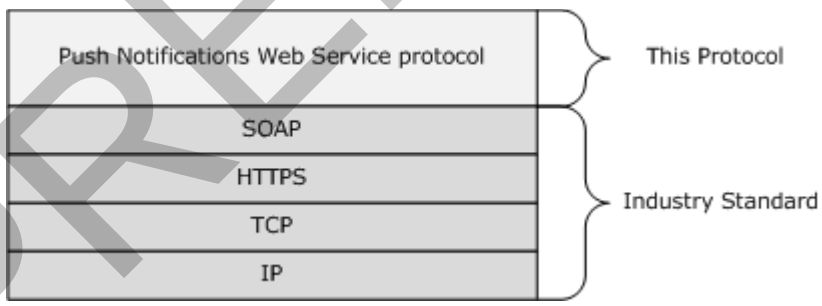

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Figure 2: Push Notification Web Service protocol HTTPS stack

The notification information that is sent to the Push Notifications Web Service protocol is used when requests are made by using the Notifications Web Service protocol [MS-OXWSNTIF].

1.5 Prerequisties/Preconditions

None.

1.6 Applicability Statement

The protocol specified in this document is applicable to environments that incorporate Web service–based push notifications.

1.7 Versioning and Capability Negotiation

This document covers versioning issues in the following areas:

- **Supported Transports:** This protocol uses SOAP 1.1, as specified in section 2.1.
- **Protocol Versions:** This protocol specifies only one **WSDL port type** version.
- **Security and Authentication Methods:** This protocol relies on the Web server that is hosting it to perform authentication.
- **Localization:** This protocol includes text strings in various messages. Localization considerations for such strings are specified in section 3.1.4.

Capability Negotiation: None.

1.8 Vendor Extensible Fields

None.

1.9 Standards Assignments

None.

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2 Messages

2.1 Transport

The SOAP version supported is SOAP 1.1. For details, see [SOAP1.1].

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 defined in [XMLSCHEMA1] and [XMLSCHEMA2], and **Web Services Description Language (WSDL)** as defined in [WSDL].

2.3 Namespaces

This specification defines and references various XML namespaces by 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
soap	http://schemas.xmlsoap.org/wsdl/soap/	[SOAP1.1]
tns	http://schemas.microsoft.com/exchange/services/2006/messages	[MS-OXWSPSNTIF]
s	http://www.w3.org/2001/XMLSchema	[XMLSCHEMA1]
targetNamespace	http://schemas.microsoft.com/exchange/services/2006/messages	[MS-OXWSPSNTIF]
wsdl	http://schemas.xmlsoap.org/wsdl/	[WSDL]
t	http://schemas.microsoft.com/exchange/services/2006/types	[MS-OXWSPSNTIF]

2.4 Simple Types

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

2.5 Complex Types

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

2.6 Elements

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

2.7 Attributes

This specification does not define any common **XML schema** attribute definitions.

2.8 Groups

This specification does not define any common **XML schema** group definitions.

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2.9 Attribute Groups

This specification does not define any common **XML schema** attribute group definitions.

2.10 Messages

This specification does not define any common **XML schema** message definitions.

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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 that are returned by the transport are passed directly back to the higher-layer protocol or application.

3.1 ExchangeServicePortType Server Details

The Push Notifications Web Service protocol defines a single port type.

Operation	Description
SendNotification	Sends subscription information from the server to the client application.

3.1.1 Abstract Data Model

The Push Notifications Web Service protocol is a stateless protocol.

3.1.2 Timers

None.

3.1.3 Initialization

None.

3.1.4 Message Processing Events and Sequencing

This protocol includes the operation listed in the following table.

Operation	Description
SendNotification (section 3.1.4.1)	Sends subscription information from the server to the client application.

3.1.4.1 SendNotification

The SendNotification operation sends subscription information from the server to the client application.

Request

Message Format	Description
tns:SendNotificationSoapIn	Specifies the **SOAP message** that requests the notification.

Response

Message Format	Description
tns:SendNotificationSoapOut	Specifies the SOAP message that is returned by the server in response.

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3.1.4.1.1 Simple Types

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

3.1.4.1.1.1 t:SubscriptionStatusType Simple Type

The SubscriptionStatusType simple type specifies the status of a push subscription.

```
<xs:simpleType name="SubscriptionStatusType">
  <xs:restriction
    base="xs:string"
  >
    <xs:enumeration
      value="OK"
     />
    <xs:enumeration
      value="Unsubscribe"
     />
  </xs:restriction>
</xs:simpleType>
```

Enumeration

The following values are defined by the **SubscriptionStatusType** simple type:

Value	Description
OK	Specifies that the server will continue to send notifications.
Unsubscribe	Specifies that the server will stop sending notifications and end the subscription.

3.1.4.1.2 Complex Types

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

3.1.4.1.2.1 m:SendNotificationResponseMessageType Complex Type

The **SendNotificationResponseMessageType** complex type specifies the status and result of a single SendNotification operation (section 3.1.4.1) request. The SendNotificationResponseMessageType complex type extends the m:ResponseMessageType complex type ([MS-OXWSCDATA] section 2.2.3.49).

```
<xs:complexType>
  <xs:complexContent>
    <xs:extension
      base="m:ResponseMessageType"
    >
      <xs:sequence>
        <xs:element name="Notification"
          type="t:NotificationType"
          minOccurs="1"
         />
      </xs:sequence>
    </xs:extension>
```

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```
  </xs:complexContent>
</xs:complexType>
```

Child Elements

Element	Type	Description
Notification	t:NotificationType	Specifies the subscription and the events that have occurred since the last notification.

3.1.4.1.2.2 m:SendNotificationResponseType Complex Type

The SendNotificationResponseType complex type specifies the push notifications that are sent by the server to the client application. The SendNotificationResponseType complex type extends the m:BaseResponseMessageType complex type ([MS-OXWSCDATA] section 2.2.3.15).

```
<xs:complexType name="SendNotificationResponseType">
  <xs:complexContent>
    <xs:extension
      base="m:BaseResponseMessageType"
     />
  </xs:complexContent>
</xs:complexType>
```

3.1.4.1.2.3 m:SendNotificationResultType Complex Type

The SendNotificationResultType complex type specifies the response of a client application to a push notification.

```
<xs:complexType name="SendNotificationResultType">
  <xs:sequence>
    <xs:element name="SubscriptionStatus"
      type="t:SubscriptionStatusType"
     />
  </xs:sequence>
</xs:complexType>
```

Child Elements

Element	Type	Description
SubscriptionStatus	t:SubscriptionStatusType	Specifies the status of a push subscription.

3.1.4.1.3 Elements

The following **XML schema** element definitions are specific to this operation.

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3.1.4.1.3.1 SendNotification Element

The SendNotification element specifies the push notifications that are sent by the server to the client application.

```
<xs:element name="SendNotification"
  type="m:SendNotificationResponseType"
 />
```

3.1.4.1.3.2 SendNotificationResult Element

The tns:SendNotificationResult element specifies the response of a client application to a push notification.

```
<xs:element name="SendNotificationResult"
  type="m:SendNotificationResultType"
 />
```

3.1.4.1.4 Messages

The following **WSDL message** definitions are specific to this operation.

3.1.4.1.4.1 tns:SendNotificationSoapIn

The SendNotificationSoapIn message contains two parts, as described in the following table.

Part Name	Element/Type	Description
request	tns:SendNotification	Specifies the request.
RequestVersion	t:RequestServerVersion	Specifies the schema version for the SendNotification operation (section 3.1.4.1.3.1) request.

3.1.4.1.4.2 tns:SendNotificationSoapOut

The SendNotificationSoapOut message contains one part, as described in the following table.

Part Name	Element/Type	Description
SendNotificationResult	tns:SendNotificationResult	Specifies the response message.

3.1.5 Timer Events

None.

3.1.6 Other Local Events

None.

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3.2 Client 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 that are returned by the transport are passed directly back to the higher-layer protocol or application.

3.2.1 Abstract Data Model

None.

3.2.2 Timers

None.

3.2.3 Initialization

None.

3.2.4 Message Processing Events and Sequencing

None.

3.2.5 Timer Events

None.

3.2.6 Other Local Events

None.

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4 Protocol Examples

None.

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5 Security

5.1 Security Considerations for Implementers

The Push Notifications Web Service protocol does not use any additional security mechanisms.

5.2 Index of Security Parameters

None.

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6 Appendix A: Full WSDL

The following table lists the **XML** files that are required in order to implement the functionality that is specified in this document. The contents of each file are included in this section.

File name	Description	Section
MS-OXWSPSNTIF.wsdl	Contains the **WSDL** for the implementation of this protocol.	6.1
MS-OXWSPSNTIF-types.xsd	Contains the XML schema type definitions that are used in this protocol.	6.2
MS-OXWSPSNTIF-messages.xsd	Contains the XML schema message definitions that are used in this protocol.	6.3

These files have to be placed in a common folder in order for the WSDL to validate and operate. Also, any schema files that are included in or imported into the MS-OXWSPSNTIF-types.xsd or MS-OXWSPSNTIF-messages.xsd schemas have to be placed in the common folder along with the files listed in the table.

6.1 WSDL

This section contains the contents of the MS-OXWSPSNTIF.wsdl file.

```
<?xml version="1.0" encoding="utf-8"?>
<wsdl:definitions xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
                  xmlns:soap12="http://schemas.xmlsoap.org/wsdl/soap12/"
                  xmlns:tns="http://schemas.microsoft.com/exchange/services/2006/messages"
                  xmlns:s="http://www.w3.org/2001/XMLSchema"

targetNamespace="http://schemas.microsoft.com/exchange/services/2006/messages"
                  xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
                  xmlns:t="http://schemas.microsoft.com/exchange/services/2006/types">
    <wsdl:types>
        <xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">
            <xs:import
namespace="http://schemas.microsoft.com/exchange/services/2006/messages" schemaLocation="MS-
OXWSPSNTIF-messages.xsd"/>
        </xs:schema>
    </wsdl:types>
    <wsdl:message name="SendNotificationSoapIn">
        <wsdl:part name="request" element="tns:SendNotification" />
        <wsdl:part name="RequestVersion" element="t:RequestServerVersion"/>
    </wsdl:message>
    <wsdl:message name="SendNotificationSoapOut">
        <wsdl:part name="SendNotificationResult" element="tns:SendNotificationResult" />
    </wsdl:message>
    <wsdl:portType name="NotificationServicePortType">
        <wsdl:operation name="SendNotification">
            <wsdl:input message="tns:SendNotificationSoapIn" />
            <wsdl:output message="tns:SendNotificationSoapOut" />
        </wsdl:operation>
    </wsdl:portType>


    <wsdl:binding name="NotificationServiceBinding" type="tns:NotificationServicePortType">
        <wsdl:documentation>
```

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```
            <wsi:Claim conformsTo="http://ws-i.org/profiles/basic/1.0" xmlns:wsi="http://ws-
i.org/schemas/conformanceClaim/" />
        </wsdl:documentation>
        <soap:binding transport="http://schemas.xmlsoap.org/soap/http" style="document" />

        <wsdl:operation name="SendNotification">
            <soap:operation
soapAction="http://schemas.microsoft.com/exchange/services/2006/messages/SendNotification" />
            <wsdl:input>
                <soap:header message="tns:SendNotificationSoapIn" part="RequestVersion"
use="literal"/>
                <soap:body parts="request" use="literal" />
            </wsdl:input>
            <wsdl:output>
                <soap:body use="literal" />
            </wsdl:output>
        </wsdl:operation>

    </wsdl:binding>

    <wsdl:binding name="NotificationServiceBinding12" type="tns:NotificationServicePortType">
        <soap12:binding transport="http://schemas.xmlsoap.org/soap/http" style="document" />

        <wsdl:operation name="SendNotification">
            <soap12:operation
soapAction="http://schemas.microsoft.com/exchange/services/2006/messages/SendNotification" />
            <wsdl:input>
                <soap12:header message="tns:SendNotificationSoapIn" part="RequestVersion"
use="literal"/>
                <soap12:body parts="request" use="literal" />
            </wsdl:input>
            <wsdl:output>
                <soap12:body use="literal" />
            </wsdl:output>
        </wsdl:operation>

    </wsdl:binding>

</wsdl:definitions>
```

6.2 Types Schema

This section contains the contents of the MS-OXWSPSNTIF-types.xsd file.

```
<?xml version="1.0" encoding="utf-8"?>
<xs:schema xmlns:t="http://schemas.microsoft.com/exchange/services/2006/types"
xmlns:tns="http://schemas.microsoft.com/exchange/services/2006/types"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://schemas.microsoft.com/exchange/services/2006/types"
elementFormDefault="qualified" version="Exchange2010" id="types">
    <xs:import namespace="http://www.w3.org/XML/1998/namespace"/>
    <xs:simpleType name="SubscriptionStatusType">
        <xs:restriction base="xs:string">
            <xs:enumeration value="OK"/>
            <xs:enumeration value="Unsubscribe"/>
        </xs:restriction>
```

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

6.3 Messages Schema

This section contains the contents of the MS-OXWSPSNTIF-messages.xsd file and information about additional files that this schema file requires to operate correctly.

MS-OXWSPSNTIF-types.xsd includes the file listed in the following table. To operate correctly, this file has to be in the folder that contains the WSDL, types schema, and messages schema files for this protocol.

File name	Defining specification
MS-OXWSCDATA-messages.xsd	[MS-OXWSCDATA] section 6
MS-OXWSNTIF-types.xsd	[MS-OXWSNTIF] section 6

```
<?xml version="1.0" encoding="utf-8"?>
<xs:schema xmlns:m="http://schemas.microsoft.com/exchange/services/2006/messages"
xmlns:tns="http://schemas.microsoft.com/exchange/services/2006/messages"
xmlns:t="http://schemas.microsoft.com/exchange/services/2006/types"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://schemas.microsoft.com/exchange/services/2006/messages"
elementFormDefault="qualified" version="Exchange2010" id="messages">
    <!--     CHANGE THE SCHEMA LOCATION TO REFLECT THE TYPES XSD ASSOCIATED WITH THIS
DOCUMENT
    <xs:import namespace="http://schemas.microsoft.com/exchange/services/2006/types"
schemaLocation="types.xsd"/>
    <xs:include/>
-->
    <xs:import namespace="http://schemas.microsoft.com/exchange/services/2006/types"
schemaLocation="MS-OXWSNTIF-types.xsd"/>
    <xs:import namespace="http://schemas.microsoft.com/exchange/services/2006/types"
schemaLocation="MS-OXWSPSNTIF-types.xsd"/>
    <xs:include schemaLocation="MS-OXWSCDATA-messages.xsd"/>
    <xs:complexType name="SendNotificationResponseMessageType">
        <xs:complexContent>
            <xs:extension base="m:ResponseMessageType">
                <xs:sequence>
                    <xs:element name="Notification" type="t:NotificationType"/>
                </xs:sequence>
            </xs:extension>
        </xs:complexContent>
    </xs:complexType>
    <xs:complexType name="SendNotificationResponseType">
        <xs:complexContent>
            <xs:extension base="m:BaseResponseMessageType"/>
        </xs:complexContent>
    </xs:complexType>
    <xs:element name="SendNotification" type="m:SendNotificationResponseType"/>
    <xs:complexType name="SendNotificationResultType">
        <xs:sequence>
            <xs:element name="SubscriptionStatus" type="t:SubscriptionStatusType"/>
        </xs:sequence>
    </xs:complexType>
    <xs:element name="SendNotificationResult" type="m:SendNotificationResultType"/>
```

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```
</xs:schema>
```

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7 Appendix B: Product Behavior

The information in this specification is applicable to the following product versions:

- Microsoft Exchange Server 2010

Exceptions, if any, are noted below. If a service pack number appears with the product version, behavior changed in that service pack. The new behavior also applies to subsequent service packs of the product unless otherwise specified.

Unless otherwise specified, any statement of optional behavior in this specification 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.

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8 Change Tracking

This section will report content and/or editorial changes, beginning with the next release.

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