[MS-PPSDECO]:

PerformancePoint Services Decomposition Tree Protocol

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Revision Summary

Date	Revision History	Revision Class	Comments
7/13/2009	0.1	Major	Initial Availability
8/28/2009	0.2	Editorial	Revised and edited the technical content
11/6/2009	0.3	Editorial	Revised and edited the technical content
2/19/2010	1.0	Editorial	Revised and edited the technical content
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4/30/2010	1.02	Editorial	Revised and edited the technical content
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6/29/2010	1.04	Editorial	Changed language and formatting in the technical content.
7/23/2010	1.04	None	No changes to the meaning, language, or formatting of the technical content.
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7/15/2016	2.0	None	No changes to the meaning, language, or formatting of the technical content.
9/14/2016	2.0	None	No changes to the meaning, language, or formatting of the technical content.

Table of Contents

1   Introduction

The PerformancePoint Services Decomposition Tree Protocol is used by a protocol client to do contribution analysis on data known to the protocol server.

Sections 1.5, 1.8, 1.9, 2, and 3 of this specification are normative. All other sections and examples in this specification are informative.

1.1   Glossary

This document uses the following terms:

data source: A database, web service, disk, file, or other collection of information from which data is queried or submitted. Supported data sources vary based on application and data provider.

level: A relative position in a hierarchy of data. A level is frequently used when describing how to navigate a hierarchy in an Online Analytical Processing (OLAP) database or a PivotTable report.

list: A container within a SharePoint site that stores list items. A list has a customizable schema that is composed of one or more fields.

measure: In a cube, a set of values that are typically numeric and are based on a column in the fact table of the cube. Measures are the central values that are aggregated and analyzed.

node: A location in a diagram that can have links to other locations.

Secure Sockets Layer (SSL): A security protocol that supports confidentiality and integrity of messages in client and server applications that communicate over open networks. SSL uses two keys to encrypt data-a public key known to everyone and a private or secret key known only to the recipient of the message. SSL supports server and, optionally, client authentication (2) using X.509 certificates (2). For more information, see [X509]. The SSL protocol is precursor to Transport Layer Security (TLS). The TLS version 1.0 specification is based on SSL version 3.0 [SSL3].

server: A computer on which the remote procedure call (RPC) server is executing.

SOAP action: The HTTP request header field used to indicate the intent of the SOAP request, using a URI value. See [SOAP1.1] section 6.1.1 for more information.

SOAP body: A container for the payload data being delivered by a SOAP message to its recipient. See [SOAP1.2-1/2007] section 5.3 for more information.

SOAP fault: A container for error and status information within a SOAP message. See [SOAP1.2-1/2007] section 5.4 for more information.

Web Services Description Language (WSDL): An XML format for describing network services as a set of endpoints that operate on messages that contain either document-oriented or procedure-oriented information. The operations and messages are described abstractly and are bound to a concrete network protocol and message format in order to define an endpoint. Related concrete endpoints are combined into abstract endpoints, which describe a network service. WSDL is extensible, which allows the description of endpoints and their messages regardless of the message formats or network protocols that are used.

WSDL message: An abstract, typed definition of the data that is communicated during a **WSDL operation** [WSDL]. Also, an element that describes the data being exchanged between web service providers and clients.

WSDL operation: A single action or function of a web service. The execution of a WSDL operation typically requires the exchange of messages between the service requestor and the service provider.

XML namespace: A collection of names that is used to identify elements, types, and attributes in XML documents identified in a URI reference [RFC3986]. A combination of XML namespace and local name allows XML documents to use elements, types, and attributes that have the same names but come from different sources. For more information, see [XMLNS-2ED].

XML namespace prefix: An abbreviated form of an **XML namespace**, as described in [XML].

XML schema: A description of a type of XML document that is typically expressed in terms of constraints on the structure and content of documents of that type, in addition to the basic syntax constraints that are imposed by XML itself. An XML schema provides a view of a document type at a relatively high level of abstraction.

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

1.2 References

Links to a document in the Microsoft Open Specifications library point to the correct section in the most recently published version of the referenced document. However, because individual documents in the library are not updated at the same time, the section numbers in the documents may not match. You can confirm the correct section numbering by checking the Errata.

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.

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

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

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

[SOAP1.2/1] Gudgin, M., Hadley, M., Mendelsohn, N., Moreau, J., and Nielsen, H.F., "SOAP Version 1.2 Part 1: Messaging Framework", W3C Recommendation, June 2003, http://www.w3.org/TR/2003/REC-soap12-part1-20030624

[SOAP1.2/2] Gudgin, M., Hadley, M., Mendelsohn, N., Moreau, J., and Nielsen, H.F., "SOAP Version 1.2 Part 2: Adjuncts", W3C Recommendation, June 2003, http://www.w3.org/TR/2003/REC-soap12-part2-20030624

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

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

[XMLSCHEMA2] Biron, P.V., 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 Overview

This protocol allows a protocol client to do contribution analysis on a data value using a **data source** or data source context known to the protocol server.

The protocol allows a protocol client to retrieve grouped, named actions that apply to a specific data value, or named properties and values associated with that **node**, and then using action name and context retrieved in a previous call, retrieve additional values that contribute to the value.

The protocol server returns all data points or some data points, and provides or denies summary data for those data points not returned.

A typical scenario for using this protocol is to display an interactive contribution analysis visualization.

1.4 Relationship to Other Protocols

This protocol uses the SOAP message protocol for formatting request and response messages, as described in [SOAP1.1], [SOAP1.2/1] and [SOAP1.2/2]. It transmits those messages by using HTTP, as described in [RFC2616], or Hypertext Transfer Protocol over Secure Sockets Layer (HTTPS), as described in [RFC2818].

The following diagram shows the underlying messaging and transport stack used by the protocol:
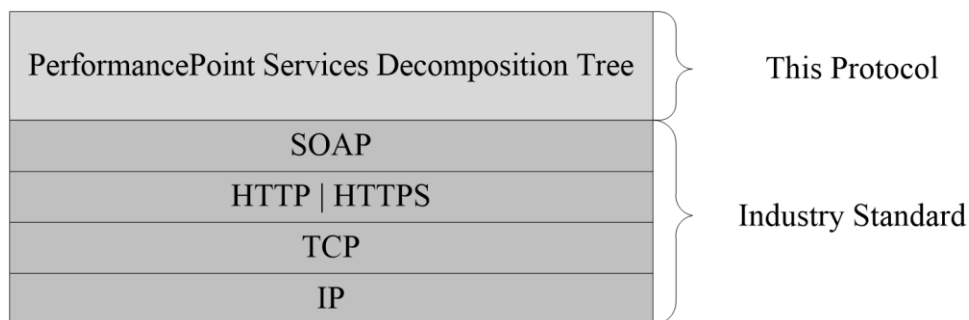
Figure 1: This protocol in Relation to Other Protocols

1.5 Prerequisites/Preconditions

This protocol operates against a site that is identified by a URL that is known by protocol clients. The protocol server endpoint is formed by appending "/_vti_bin/PPS/PPSDecompRenderingService.asmx" to the URL of the site, for example:

http://www.example.com/Repository/_vti_bin/ PPS/PPSDecompRenderingService.asmx.

This protocol assumes that authentication has been performed by the underlying protocols.

1.6   Applicability Statement

This protocol enables communication between a protocol server, which makes connections to a variety of data sources, and a protocol client.

1.7   Versioning and Capability Negotiation

This document specifies versioning issues in the following areas:

- **Supported Transports:** This protocol uses multiple transports with SOAP as specified in section Transport (see section 2.1)

- **Security and Authentication Methods:** The security and authentication methods supported by this protocol are specified in section Security (see section 5).

- **Localization:** This protocol includes text strings in various messages. Localization considerations for such strings are specified in the Common Message Syntax (Section 2.2) and Message Processing Events and Sequencing Rules (Section 3.1.4) sections.

1.8   Vendor-Extensible Fields

None.

1.9   Standards Assignments

None.

2 Messages

Occasionally, instances occur where this web service's WSDL specifies optionality (for example, minOccurs="0" and maxOccurs="1") that conflicts with the stated behavior in this document, or the document doesn't contain the stated behavior. In such cases where the document and the WSDL conflict, the document takes precedence. In cases where the document doesn't specify optionality, the argument has to be present, even if the WSDL specifies that the argument is optional (for example, minOccurs="0").

In cases where an argument is optional and the WSDL specifies both "minOccurs=0" and "Nillable=true", treat the argument as only "minOccurs=0".

2.1   Transport

Protocol servers MUST support SOAP over HTTP. Protocol servers SHOULD additionally support SOAP over HTTPS for securing communication with protocol clients.

Protocol messages MUST be formatted as specified either in [SOAP1.1], section 4 or in [SOAP1.2/1], section 5. Protocol server faults MUST be returned either using HTTP Status Codes as specified in [RFC2616], section 10 or using **SOAP faults** as specified either in [SOAP1.1], section 4.4 or in [SOAP1.2/1], section 5.4. The version of the SOAP fault returned MUST correspond to the version of SOAP used for the request **WSDL message**.

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].

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
http	http://schemas.xmlsoap.org/wsdl/http/	[RFC2616]
soap	http://schemas.xmlsoap.org/wsdl/soap/	[SOAP1.1]
soap12	http://schemas.xmlsoap.org/wsdl/soap12/	[SOAP1.2/1] [SOAP1.2/2]
tns	http://www.microsoft.com/performancepoint/scorecards	
wsdl	http://schemas.xmlsoap.org/wsdl/	[WSDL]
xs	http://www.w3.org/2001/XMLSchema	[XMLSCHEMA1] [XMLSCHEMA2]

2.2.2 Messages

This specification does not define any common WSDL message definitions.

2.2.3 Elements

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

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
ArrayOfDecompRenderResultLevel	The **ArrayOfDecompRenderResultLevel** complex type specifies an array of **DecompRenderResultLevel** complex types (section 2.2.4.3).
ArrayOfDecompRenderResultNode	The **ArrayOfDecompRenderResultNode** complex type specifies an array of **DecompRenderResultNode** complex types (section 2.2.4.4).
DecompRenderResultLevel	The **DecompRenderResultLevel** complex type represents an ordered list of nodes and count of nodes, where total count includes nodes not returned.
DecompRenderResultNode	The **DecompRenderResultNode** complex type represents the details of a node.
DecompRenderResultRecord	The **DecompRenderResultRecord** complex type specifies details and results of a query.

2.2.4.1 ArrayOfDecompRenderResultLevel

Namespace: http://www.microsoft.com/performancepoint/scorecards

The **ArrayOfDecompRenderResultLevel** complex type specifies an array of **DecompRenderResultLevel** complex types (section 2.2.4.3).

```
<xs:complexType name="ArrayOfDecompRenderResultLevel"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:sequence>
    <xs:element minOccurs="0" maxOccurs="unbounded" name="DecompRenderResultLevel"
nillable="true" type="tns:DecompRenderResultLevel"/>
  </xs:sequence>
</xs:complexType>
```

DecompRenderResultLevel: The details about a **level**.

2.2.4.2 ArrayOfDecompRenderResultNode

Namespace: http://www.microsoft.com/performancepoint/scorecards

The **ArrayOfDecompRenderResultNode** complex type specifies an array of **DecompRenderResultNode** complex types (section 2.2.4.4).

```
<xs:complexType name="ArrayOfDecompRenderResultNode"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:sequence>
    <xs:element minOccurs="0" maxOccurs="unbounded" name="DecompRenderResultNode"
nillable="true" type="tns:DecompRenderResultNode"/>
  </xs:sequence>
</xs:complexType>
```

DecompRenderResultNode: The details about a node.

2.2.4.3 DecompRenderResultLevel

Namespace: http://www.microsoft.com/performancepoint/scorecards

The **DecompRenderResultLevel** complex type represents an ordered list of nodes and count of nodes, where total count includes nodes not returned.

```
<xs:complexType name="DecompRenderResultLevel" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:sequence>
    <xs:element minOccurs="0" maxOccurs="1" name="SortedBy" type="xs:string"/>
    <xs:element minOccurs="0" maxOccurs="1" name="HierarchyName" type="xs:string"/>
    <xs:element minOccurs="1" maxOccurs="1" name="TotalNodeCount" type="xs:int"/>
    <xs:element minOccurs="0" maxOccurs="1" name="UniqueName" type="xs:string"/>
    <xs:element minOccurs="0" maxOccurs="1" name="Caption" type="xs:string"/>
    <xs:element minOccurs="0" maxOccurs="1" name="Nodes"
type="tns:ArrayOfDecompRenderResultNode"/>
  </xs:sequence>
</xs:complexType>
```

SortedBy: Specifies the direction in which the resulting ArrayOfDecompRenderResultNode is sorted by DecompRenderResultNode Value. This element MUST be "ASCENDING" or "DESCENDING" (without quotes), or any case variation of those two values.

HierarchyName: If present, server MAY pass an empty string, this element MUST be ignored by client.

TotalNodeCount: Specifies the total number of nodes. This element MUST be equal to or greater than the number of DecompRenderResultNode elements returned in the Nodes element. This is not the actual number of DecompRenderResultNode element returned.

UniqueName: Uniquely identifies the level and is defined by the web service. This element MUST NOT be NULL or EMPTY.

Caption: Specifies the user-friendly name of the resulting level.

Nodes: Specifies a collection of DecompRenderResultNode elements.

2.2.4.4 DecompRenderResultNode

Namespace: http://www.microsoft.com/performancepoint/scorecards

The **DecompRenderResultNode** complex type represents the details of a node.

```
<xs:complexType name="DecompRenderResultNode" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:sequence>
    <xs:element minOccurs="1" maxOccurs="1" name="Value" type="xs:double"/>
    <xs:element minOccurs="0" maxOccurs="1" name="FormattedValue" type="xs:string"/>
    <xs:element minOccurs="1" maxOccurs="1" name="HasChildren" type="xs:boolean"/>
    <xs:element minOccurs="0" maxOccurs="1" name="UniqueName" type="xs:string"/>
```

```
        <xs:element minOccurs="0" maxOccurs="1" name="Caption" type="xs:string"/>
        <xs:element minOccurs="1" maxOccurs="1" name="BottomSumValue" type="xs:double"/>
        <xs:element minOccurs="0" maxOccurs="1" name="BottomSumFormattedValue" type="xs:string"/>
        <xs:element minOccurs="1" maxOccurs="1" name="TopSumValue" type="xs:double"/>
        <xs:element minOccurs="0" maxOccurs="1" name="TopSumFormattedValue" type="xs:string"/>
    </xs:sequence>
  </xs:complexType>
```

Value: Specifies the raw numeric value of the node.

FormattedValue: Specifies the user-friendly value of the node.

HasChildren: The protocol server SHOULD return TRUE if the AutoExpand method called using this node's **UniqueName** will return a positive number of DecompRenderResultNode elements. Otherwise, the server MUST return FALSE.

UniqueName: Uniquely identifies the node and is defined by the web service. This element MUST NOT be NULL or EMPTY.

Caption: Specifies the user-friendly name of this node.

BottomSumValue: If the **MeasureIsAdditive** property of the associated DecompRenderResultRecord is TRUE, this element SHOULD specify the sum of all the **Values** of the DecompRenderResultNodes occurring after this node in the resulting ArrayOfDecompRenderResultNode.

BottomSumFormattedValue: If the **MeasureIsAdditive** property of the associated DecompRenderResultRecord is TRUE, this element SHOULD specify the user-friendly value of the **BottomSumValue**.

TopSumValue: If the **MeasureIsAdditive** property of the associated DecompRenderResultRecord is TRUE, this element SHOULD specify the sum of all the **Values** of the DecompRenderResultNodes occurring before this node in the resulting ArrayOfDecompRenderResultNode.

TopSumFormattedValue: If the **MeasureIsAdditive** property of the associated DecompRenderResultRecord is TRUE, this SHOULD specify the user-friendly value of the **TopSumValue**.

2.2.4.5 DecompRenderResultRecord

Namespace: http://www.microsoft.com/performancepoint/scorecards

The **DecompRenderResultRecord** complex type specifies details and results of a query.

```
  <xs:complexType name="DecompRenderResultRecord" xmlns:xs="http://www.w3.org/2001/XMLSchema">
    <xs:sequence>
      <xs:element minOccurs="0" maxOccurs="1" name="Levels"
type="tns:ArrayOfDecompRenderResultLevel"/>
      <xs:element minOccurs="0" maxOccurs="1" name="MeasureCaption" type="xs:string"/>
      <xs:element minOccurs="0" maxOccurs="1" name="MeasureUniqueName" type="xs:string"/>
      <xs:element minOccurs="1" maxOccurs="1" name="MeasureIsAdditive" type="xs:boolean"/>
      <xs:element minOccurs="0" maxOccurs="1" name="NavigationContext" type="xs:string"/>
      <xs:element minOccurs="0" maxOccurs="1" name="ErrorMsg" type="xs:string"/>
      <xs:element minOccurs="0" maxOccurs="1" name="ErrorDetails" type="xs:string"/>
    </xs:sequence>
  </xs:complexType>
```

Levels: MUST specify an ArrayOfDecompRenderResultLevel containing no more than one DecompRenderResultLevel element.

MeasureCaption: Specifies the user-friendly name of the associated **measure**.

MeasureUniqueName: Uniquely identifies the measure and is defined by the web service. This element MUST NOT be NULL or EMPTY.

MeasureIsAdditive: If TRUE, the **TopSumValue**, **TopSumFormattedValue**, BottomSumValue, and **BottomSumFormattedValue** elements of all the DecompRenderResultNode element instances contained in the **Levels** element of this DecompRenderResultRecord MUST specify sum values. If FALSE, the protocol client MUST ignore the **TopSumValue**, **TopSumFormattedValue**, **BottomSumValu**e, and **BottomSumFormattedValue** values.

NavigationContext: Specifies a session-specific value that specifies the current state of the protocol server.

ErrorMsg: Specifies an error message in the case of an application error on the protocol server.

ErrorDetails: Specifies the error details in the case of an application error on the protocol server.

2.2.5 Simple Types

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

2.2.6 Attributes

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

2.2.7 Groups

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

2.2.8 Attribute Groups

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

2.2.9 Common Data Structures

This specification does not define any common XML schema data structures.

3   Protocol Details

This protocol allows protocol servers to perform implementation-specific localization of text in various messages. The localization of this text is an implementation-specific behavior of the protocol server and not significant for interoperability.

Occasionally, instances occur where this web service's WSDL specifies optionality (for example, minOccurs="0" and maxOccurs="1") that conflicts with the stated behavior in this document, or the document doesn't contain the stated behavior. In such cases where the document and the WSDL conflict, the document takes precedence. In cases where the document doesn't specify optionality, the argument has to be present, even if the WSDL specifies that the argument is optional (for example, minOccurs="0").

In cases where an argument is optional and the WSDL specifies both "minOccurs=0" and "Nillable=true", treat the argument as only "minOccurs=0".

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.

Except where specified, protocol clients SHOULD interpret HTTP Status Codes returned by the protocol server as specified in [RFC2616], section 10.

3.1   Server Details

The following is a high-level sequence diagram illustrating the operation of the protocol.
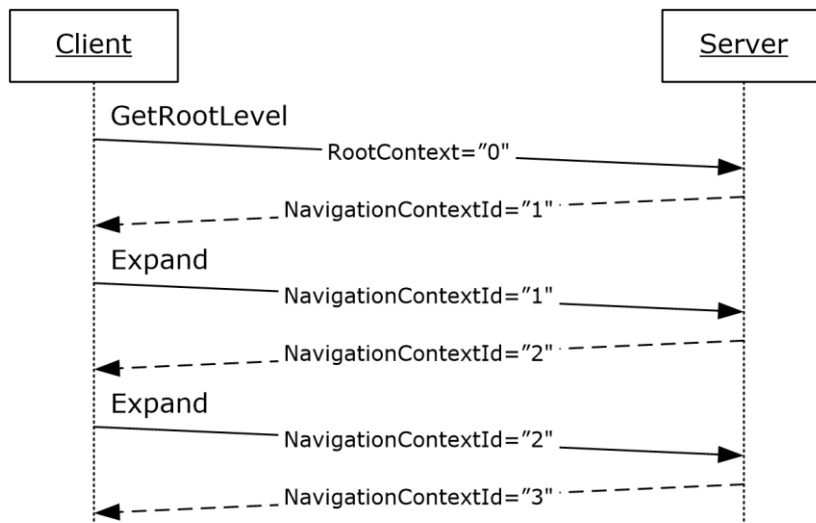
Figure 2: Protocol high level sequence diagram

First, a protocol client establishes a session with a protocol server with the **GetRootLevel** operation (section 3.1.4.5). The client passes in a *RootContextId* known to the server. The server responds with a *NavigationContextId* which represents a session state variable. Navigation operations, **AutoExpand** (section 3.1.4.1) and **Expand** (section 3.1.4.3), require the client to pass the session state to the server. The protocol server will respond to each navigation operation with a new session state variable.

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.

Root Context: The session state known to protocol server and protocol client prior to use of operation **GetRootLevel** (section 3.1.4.5).

This state allows the protocol server to keep private information it uses to generate responses, for example connection strings to data sources.

Navigation Context: The session state representing an ordered sequence of navigation operations following use of operation **GetRootLevel**. Navigation operations are **AutoExpand** (section 3.1.4.1) and **Expand** (section 3.1.4.3).

This state allows the protocol server to track the ordered sequence of navigation operations performed. For example, for the following operations:

- **GetRootLevel**, *navigationContextId* "0", protocol server responds with *navigationContext* 1"

- **Expand**, *navigationContext* "1" and *itemUniqueName* "[Product].[52]", protocol server responds with *navigationContext* "2"

- **Expand**, *navigationContext* "2" and *itemUniqueName*"[Customer].[79]"

The protocol server references Decomposition Navigation Context identified by "2" (representing the preceding **Expand** operation and its parameters, and the preceding **GetRootLevel** operation and its parameters) to respond to the final **Expand** operation.

3.1.2 Timers

If a request exceeds a timeout period, the **server** MUST return a SOAP FAULT response.

3.1.3 Initialization

This protocol operates against a site that is identified by a URL that is known by protocol clients. The protocol server endpoint is formed by appending "/_vti_bin/PPS/PPSDecompRenderingService.asmx" to the URL of the site, for example:
http://www.example.com/_vti_bin/PPS/PPSDecompRenderingService.asmx.

A connection that uses the underlying protocol layers that are specified in section 1.4 MUST be established before using this protocol.

3.1.4 Message Processing Events and Sequencing Rules

This section specifies the protocol operations.

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

Operation	Description
AutoExpand	The **AutoExpand** operation is used to get additional node data for a specific node, where named actions are not known. Also see **Expand** section 3.1.4.3.
CreateNavigationList	The **CreateNavigationList** operation returns a list of named actions for use with the *navigationItemUniqueName* element of the **Expand** operation (section 3.1.4.3).

Operation	Description
Expand	The **Expand** operation is used to get additional node data for a specific node, using a named action.
GetMemberProperties	The **GetMemberProperties** operation returns properties associated with a specified node.
GetRootLevel	The **GetRootLevel** operation is used to start a session. A protocol client MUST use this operation to retrieve the Navigation Context session state variable before using other operations.

3.1.4.1 AutoExpand

The **AutoExpand** operation is used to get additional node data for a specific node, where named actions are not known. Also see **Expand** section 3.1.4.3.

The following is the WSDL port type specification of the **AutoExpand WSDL operation**.

```
<wsdl:operation name="AutoExpand" xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/">
  <wsdl:input message="tns:AutoExpandSoapIn"/>
  <wsdl:output message="tns:AutoExpandSoapOut"/>
</wsdl:operation>
```

A session state variable is required to successfully complete this operation. As part of the **AutoExpandSoapIn** request message (section 3.1.4.1.1.1), **navigationContext** MUST contain a value obtained from a **DecompRenderResultRecord** result from a previous successful request to either a **GetRootLevel** (section 3.1.4.5), **AutoExpand** (section 3.1.4.1), or **Expand** (section 3.1.4.3) operation.

A session state variable, *Navigation Context,* is created in this operation. The *NavigationContext* value is returned as part of the **DecompRenderResultRecord** element. All requests using other protocol messages, such as the **AutoExpand**, **Expand**, **CreateNavigationList** (section 3.1.4.2) and **GetMemberProperties** (section 3.1.4.4), require such a session state variable.

In the event of an application error on the protocol server during the operation, the protocol server MUST return a SOAP FAULT response.

3.1.4.1.1 Messages

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

Message	Description
AutoExpandSoapIn	The request WSDL message for the **AutoExpand** WSDL operation.
AutoExpandSoapOut	The response WSDL message for the **AutoExpand** WSDL operation.

3.1.4.1.1.1 AutoExpandSoapIn

The request WSDL message for the **AutoExpand** WSDL operation.

The **SOAP action** value is:

```
http://www.microsoft.com/performancepoint/scorecards/AutoExpand
```

The **SOAP body** contains the **AutoExpand** element.

3.1.4.1.1.2   AutoExpandSoapOut

The response WSDL message for the **AutoExpand** WSDL operation.

The SOAP body contains the **AutoExpandResponse** element.

3.1.4.1.2 Elements

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

Element	Description
AutoExpand	The input data for the **AutoExpand** WSDL operation.
AutoExpandResponse	The result data for the **AutoExpand** WSDL operation.

3.1.4.1.2.1   AutoExpand

The **AutoExpand** element specifies the input data for the **AutoExpand** WSDL operation.

```
<xs:element name="AutoExpand" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:complexType>
    <xs:sequence>
      <xs:element minOccurs="0" maxOccurs="1" name="levelUniqueName" type="xs:string"/>
      <xs:element minOccurs="0" maxOccurs="1" name="itemUniqueName" type="xs:string"/>
      <xs:element minOccurs="0" maxOccurs="1" name="sortType" type="xs:string"/>
      <xs:element minOccurs="0" maxOccurs="1" name="navigationContext" type="xs:string"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
```

levelUniqueName: Uniquely identifies the level to expand. This identifier is defined by the web service and is the **DecompRenderResultLevel** unique name. It MUST NOT be NULL or EMPTY.

itemUniqueName: Uniquely identifies the node to expand. This identifier is defined by the web service and is the **DecompRenderResultNode** unique name. It MUST NOT be NULL or EMPTY.

sortType: Specifies how the result nodes are sorted. This element MUST be "ASCENDING" or "DESCENDING" (without quotes), and MUST NOT be case sensitive. The **DecompRenderResultNode** elements in **ExpandResponse** (section 3.1.4.3.2.2) MUST be sorted according to the specified value. If empty, NULL, or not specified, the protocol server MUST use "DESCENDING".

navigationContext: A session identifier which defines the state of the client. MUST be the *NavigationContext* value from a **DecompRenderResultRecord** element obtained from a previous successful request to either a **GetRootLevel** (section 3.1.4.5), **AutoExpand** (section 3.1.4.1) or **Expand** (section 3.1.4.3) operation. This element MUST NOT be NULL and MUST NOT be empty.

3.1.4.1.2.2   AutoExpandResponse

The **AutoExpandResponse** element specifies the result data for the **AutoExpand** WSDL operation.

```
<xs:element name="AutoExpandResponse" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:complexType>
    <xs:sequence>
      <xs:element minOccurs="0" maxOccurs="1" name="AutoExpandResult"
type="tns:DecompRenderResultRecord"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
```

AutoExpandResult: A **DecompRenderResultRecord** element (section 2.2.4.5). In the event of an application error on the protocol server, this element will not occur.

3.1.4.1.3 Complex Types

None.

3.1.4.1.4 Simple Types

None.

3.1.4.1.5 Attributes

None.

3.1.4.1.6 Groups

None.

3.1.4.1.7 Attribute Groups

None.

3.1.4.2 CreateNavigationList

The **CreateNavigationList** operation returns a list of named actions for use with the *navigationItemUniqueName* element of the **Expand** operation (section 3.1.4.3).

The following is the WSDL port type specification of the **CreateNavigationList** WSDL operation.

```
<wsdl:operation name="CreateNavigationList" xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/">
  <wsdl:input message="tns:CreateNavigationListSoapIn"/>
  <wsdl:output message="tns:CreateNavigationListSoapOut"/>
</wsdl:operation>
```

Two tiers of information are returned. The first tier is a list of all the possible groups a node can expand to. Each group within that first tier SHOULD have a list of named actions.

A session state variable is required to successfully complete this operation. As part of the **CreateNavigationListSoapIn** request message (section 3.1.4.2.1.1), **navigationContext** MUST contain a value obtained from a **DecompRenderResultRecord** result from a previous successful request to either a **GetRootLevel** (section 3.1.4.5), **AutoExpand** (section 3.1.4.1), or **Expand** operation.

In the event of an application error on the protocol server during the operation, the protocol server MUST return a SOAP FAULT response.

3.1.4.2.1 Messages

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

Message	Description
CreateNavigationListSoapIn	The request WSDL message for the **CreateNavigationList** WSDL operation.
CreateNavigationListSoapOut	The response WSDL message for the **CreateNavigationList** WSDL operation.

3.1.4.2.1.1   CreateNavigationListSoapIn

The request WSDL message for the **CreateNavigationList** WSDL operation.

The SOAP action value is:

```
http://www.microsoft.com/performancepoint/scorecards/CreateNavigationList
```

The SOAP body contains the **CreateNavigationList** element.

3.1.4.2.1.2   CreateNavigationListSoapOut

The response WSDL message for the **CreateNavigationList** WSDL operation.

The SOAP body contains the **CreateNavigationListResponse** element.

3.1.4.2.2 Elements

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

Element	Description
CreateNavigationList	The input data for the **CreateNavigationList** WSDL operation.
CreateNavigationListResponse	The result data for the **CreateNavigationList** WSDL operation.

3.1.4.2.2.1   CreateNavigationList

The **CreateNavigationList** element specifies the input data for the **CreateNavigationList** WSDL operation.

```
<xs:element name="CreateNavigationList" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:complexType>
    <xs:sequence>
      <xs:element minOccurs="0" maxOccurs="1" name="levelUniqueName" type="xs:string"/>
      <xs:element minOccurs="0" maxOccurs="1" name="itemUniqueName" type="xs:string"/>
      <xs:element minOccurs="0" maxOccurs="1" name="navigationContext" type="xs:string"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
```

levelUniqueName: Uniquely identifies the level to expand. This identifier is defined by the web service and is the **DecompRenderResultLevel** unique name. It MUST NOT be NULL or EMPTY.

itemUniqueName: Uniquely identifies the node to expand. This identifier is defined by the web service and is the **DecompRenderResultNode** unique name. It MUST NOT be NULL or EMPTY.

navigationContext: A session identifier which defines the state of the client. This element MUST be the *NavigationContext* value from a **DecompRenderResultRecord** element obtained from a previous successful request to either a **GetRootLevel** (section 3.1.4.5), **AutoExpand** (section 3.1.4.1) or **Expand** (section 3.1.4.3) operation. This element MUST NOT be NULL and MUST NOT be empty.

3.1.4.2.2.2   CreateNavigationListResponse

The **CreateNavigationListResponse** element specifies the result data for the **CreateNavigationList** WSDL operation.

```
<xs:element name="CreateNavigationListResponse" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:complexType>
    <xs:sequence>
      <xs:element minOccurs="0" maxOccurs="1" name="CreateNavigationListResult"
type="tns:DecompNavigationList"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
```

CreateNavigationListResult: A **DecompNavigationList** value (section 3.1.4.2.3.1). In the event of an application error on the protocol server, this value will not occur.

3.1.4.2.3 Complex Types

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

Complex type	Description
ArrayOfDecompNavigationAction	Specifies an array of DecompNavigationAction complex types (section 3.1.4.2.3.5).
ArrayOfDecompNavigationGroup	Specifies an array of DecompNavigationGroup complex types (section 3.1.4.2.3.3).
DecompNavigationAction	Contains details about a named action.
DecompNavigationGroup	Contains details about a group of named actions.
DecompNavigationList	Contains a collection of possible grouped, named actions.

3.1.4.2.3.1   DecompNavigationList

Namespace: http://www.microsoft.com/performancepoint/scorecards

The **DecompNavigationList** complex type contains a collection of possible grouped, named actions.

```
<xs:complexType name="DecompNavigationList" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:sequence>
    <xs:element minOccurs="0" maxOccurs="1" name="Groups"
type="tns:ArrayOfDecompNavigationGroup"/>
  </xs:sequence>
</xs:complexType>
```

Groups: A collection of **DecompNavigationGroup** objects (section 3.1.4.2.3.3).

3.1.4.2.3.2   ArrayOfDecompNavigationGroup

Namespace: http://www.microsoft.com/performancepoint/scorecards

The **ArrayOfDecompNavigationGroup** complex type specifies an array of **DecompNavigationGroup** complex types (section 3.1.4.2.3.3).

```
<xs:complexType name="ArrayOfDecompNavigationGroup"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:sequence>
    <xs:element minOccurs="0" maxOccurs="unbounded" name="DecompNavigationGroup"
nillable="true" type="tns:DecompNavigationGroup"/>
  </xs:sequence>
</xs:complexType>
```

DecompNavigationGroup: Contains details about a group of named actions.

3.1.4.2.3.3   DecompNavigationGroup

Namespace: http://www.microsoft.com/performancepoint/scorecards

The **DecompNavigationGroup** complex type contains details about a group of named actions.

```
<xs:complexType name="DecompNavigationGroup" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:sequence>
    <xs:element minOccurs="0" maxOccurs="1" name="Name" type="xs:string"/>
    <xs:element minOccurs="0" maxOccurs="1" name="Caption" type="xs:string"/>
    <xs:element minOccurs="0" maxOccurs="1" name="Actions"
type="tns:ArrayOfDecompNavigationAction"/>
  </xs:sequence>
</xs:complexType>
```

Name: If present, the server MAY pass an empty string, this element MUST be ignored by the client.

Caption: MUST specify the user-friendly name of the group.

Actions: MUST specify a collection of **DecompNavigationAction** complex types (section 3.1.4.2.3.5).

3.1.4.2.3.4   ArrayOfDecompNavigationAction

Namespace: http://www.microsoft.com/performancepoint/scorecards

The **ArrayOfDecompNavigationAction** complex type specifies an array of **DecompNavigationAction** complex types (section 3.1.4.2.3.5).

```
<xs:complexType name="ArrayOfDecompNavigationAction"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:sequence>
    <xs:element minOccurs="0" maxOccurs="unbounded" name="DecompNavigationAction"
nillable="true" type="tns:DecompNavigationAction"/>
  </xs:sequence>
</xs:complexType>
```

DecompNavigationAction: Contains details about a named action.

3.1.4.2.3.5   DecompNavigationAction

Namespace: http://www.microsoft.com/performancepoint/scorecards

The **DecompNavigationAction** complex type contains details about a named action.

```
<xs:complexType name="DecompNavigationAction" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:sequence>
    <xs:element minOccurs="0" maxOccurs="1" name="Name" type="xs:string"/>
    <xs:element minOccurs="0" maxOccurs="1" name="Caption" type="xs:string"/>
    <xs:element minOccurs="0" maxOccurs="1" name="ParentCaption" type="xs:string"/>
    <xs:element minOccurs="1" maxOccurs="1" name="Enabled" type="xs:boolean"/>
  </xs:sequence>
</xs:complexType>
```

Name: MUST specify the unique name of the action.

Caption: MUST specify the user-friendly name of the action.

ParentCaption: Specifies a user-friendly categorization for this action.

Enabled: If FALSE, the protocol client MUST NOT pass this action's name as the value of the **navigationItemUniqueName** parameter of the **Expand** method (section 3.1.4.3). If TRUE, this action's name SHOULD be passed as the value of the **navigationItemUniqueName** parameter of the **Expand** method.

3.1.4.2.4 Simple Types

None.

3.1.4.2.5 Attributes

None.

3.1.4.2.6 Groups

None.

3.1.4.2.7 Attribute Groups

None.

3.1.4.3 Expand

The **Expand** operation is used to get additional node data for a specific node, using a named action.

The following is the WSDL port type specification of the **Expand** WSDL operation.

```
<wsdl:operation name="Expand" xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/">
  <wsdl:input message="tns:ExpandSoapIn"/>
  <wsdl:output message="tns:ExpandSoapOut"/>
</wsdl:operation>
```

A session state variable is required to successfully complete this operation. As part of the **ExpandSoapIn** request message (section 3.1.4.3.1.1), **navigationContext** MUST contain a value obtained from a **DecompRenderResultRecord** result from a previous successful request to either a **GetRootLevel** (section 3.1.4.5), **AutoExpand** (section 3.1.4.1), or **Expand** (section 3.1.4.3) operation.

A session state variable, *Navigation Context,* is created in this operation. The *NavigationContext* value is returned as part of the **DecompRenderResultRecord** element. All requests using other protocol messages, such as the **AutoExpand**, **Expand**, **CreateNavigationList** (section 3.1.4.2) and **GetMemberProperties** (section 3.1.4.4) operations, require such a session state variable.

In the event of an application error on the protocol server during the operation, the protocol server MUST return a SOAP FAULT response.

3.1.4.3.1 Messages

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

Message	Description
ExpandSoapIn	The request WSDL message for the **Expand** WSDL operation.
ExpandSoapOut	The response WSDL message for the **Expand** WSDL operation.

3.1.4.3.1.1 ExpandSoapIn

The request WSDL message for the **Expand** WSDL operation.

The SOAP action value is:

```
http://www.microsoft.com/performancepoint/scorecards/Expand
```

The SOAP body contains the **Expand** element.

3.1.4.3.1.2 ExpandSoapOut

The response WSDL message for the **Expand** WSDL operation.

The SOAP body contains the **ExpandResponse** element.

3.1.4.3.2 Elements

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

Element	Description
Expand	The input data for the **Expand** WSDL operation.
ExpandResponse	The result data for the **Expand** WSDL operation.

3.1.4.3.2.1 Expand

The **Expand** element specifies the input data for the **Expand** WSDL operation.

```
<xs:element name="Expand" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:complexType>
    <xs:sequence>
      <xs:element minOccurs="0" maxOccurs="1" name="levelUniqueName" type="xs:string"/>
      <xs:element minOccurs="0" maxOccurs="1" name="itemUniqueName" type="xs:string"/>
```

```
        <xs:element minOccurs="0" maxOccurs="1" name="navigationItemUniqueName"
type="xs:string"/>
        <xs:element minOccurs="0" maxOccurs="1" name="sortType" type="xs:string"/>
        <xs:element minOccurs="0" maxOccurs="1" name="navigationContext" type="xs:string"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
```

levelUniqueName: Uniquely identifies the level to expand. This identifier is defined by the web service and is the **DecompRenderResultLevel** unique name. It MUST NOT be NULL or EMPTY.

itemUniqueName: Uniquely identifies the node to expand. This identifier is defined by the web service and is the **DecompRenderResultNode** unique name. It MUST NOT be NULL or EMPTY.

navigationItemUniqueName: MUST be the *Name* value from a **DecompNavigationAction** element obtained from a previous call to **CreateNavigationList** operation (section 3.1.4.2). This element MUST NOT be NULL and MUST NOT be empty.

sortType: Specifies how the result nodes are sorted. This element MUST be "ASCENDING" or "DESCENDING" (without quotes), and MUST NOT be case sensitive. The **DecompRenderResultNode** elements in the **ExpandResponse** element (section 3.1.4.3.2.2) MUST be sorted according to the specified value. If empty, NULL, or not specified, the protocol server MUST use "DESCENDING".

navigationContext: A session identifier which defines the state of the client. This element MUST be the *NavigationContext* value from a **DecompRenderResultRecord** element obtained from a previous successful request to either a **GetRootLevel** (section 3.1.4.5), **AutoExpand** (section 3.1.4.1)**,** or **Expand** (section 3.1.4.3) operation. It MUST NOT be NULL and MUST NOT be empty.

3.1.4.3.2.2   ExpandResponse

The **ExpandResponse** element specifies the result data for the **Expand** WSDL operation.

```
<xs:element name="ExpandResponse" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:complexType>
    <xs:sequence>
      <xs:element minOccurs="0" maxOccurs="1" name="ExpandResult"
type="tns:DecompRenderResultRecord"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
```

ExpandResult: A **DecompRenderResultRecord** value (section 2.2.4.5). In the event of an application error on the server, this value will not occur.

3.1.4.3.3 Complex Types

None.

3.1.4.3.4 Simple Types

None.

3.1.4.3.5 Attributes

None.

3.1.4.3.6 Groups

None.

3.1.4.3.7 Attribute Groups

None.

3.1.4.4 GetMemberProperties

The **GetMemberProperties** operation returns properties associated with a specified node.

The following is the WSDL port type specification of the **GetMemberProperties** WSDL operation.

```
<wsdl:operation name="GetMemberProperties" xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/">
  <wsdl:input message="tns:GetMemberPropertiesSoapIn"/>
  <wsdl:output message="tns:GetMemberPropertiesSoapOut"/>
</wsdl:operation>
```

This operation returns a list of member properties associated with a node.

A session state variable is required to successfully complete this operation. As part of the **GetMemberPropertiesSoapIn** request message (section 3.1.4.4.1.1), **navigationContext** MUST contain a value obtained from a **DecompRenderResultRecord** result from a previous successful request to either a **GetRootLevel** (section 3.1.4.5), **AutoExpand** (section 3.1.4.1), or **Expand** (section 3.1.4.3) operation.

In the event of an application error on the protocol server during the operation, the protocol server MUST return a SOAP FAULT response.

3.1.4.4.1 Messages

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

Message	Description
GetMemberPropertiesSoapIn	The request WSDL message for the **GetMemberProperties** WSDL operation.
GetMemberPropertiesSoapOut	The response WSDL message for the **GetMemberProperties** WSDL operation.

3.1.4.4.1.1 GetMemberPropertiesSoapIn

The request WSDL message for the **GetMemberProperties** WSDL operation.

The SOAP action value is:

```
http://www.microsoft.com/performancepoint/scorecards/GetMemberProperties
```

The SOAP body contains the **GetMemberProperties** element.

3.1.4.4.1.2 GetMemberPropertiesSoapOut

The response WSDL message for the **GetMemberProperties** WSDL operation.

The SOAP body contains the **GetMemberPropertiesResponse** element.

3.1.4.4.2 Elements

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

Element	Description
GetMemberProperties	The input data for the **GetMemberProperties** WSDL operation.
GetMemberPropertiesResponse	The result data for the **GetMemberProperties** WSDL operation.

3.1.4.4.2.1   GetMemberProperties

The **GetMemberProperties** element specifies the input data for the **GetMemberProperties** WSDL operation.

```
<xs:element name="GetMemberProperties" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:complexType>
    <xs:sequence>
      <xs:element minOccurs="0" maxOccurs="1" name="navigationContext" type="xs:string"/>
      <xs:element minOccurs="0" maxOccurs="1" name="itemUniqueName" type="xs:string"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
```

navigationContext: A session identifier which defines the state of the client. This element MUST be the *NavigationContext* value from a **DecompRenderResultRecord** element obtained from a previous request to either a **GetRootLevel** (section 3.1.4.5), **AutoExpand** (section 3.1.4.1) or **Expand** (section 3.1.4.3) operation. It MUST NOT be NULL and MUST NOT be empty.

itemUniqueName: Uniquely identifies the node to expand. This identifier is defined by the web service and is the **DecompRenderResultNode** unique name. It MUST NOT be NULL or EMPTY.

3.1.4.4.2.2   GetMemberPropertiesResponse

The **GetMemberPropertiesResponse** element specifies the result data for the **GetMemberProperties** WSDL operation.

```
<xs:element name="GetMemberPropertiesResponse" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:complexType>
    <xs:sequence>
      <xs:element minOccurs="0" maxOccurs="1" name="GetMemberPropertiesResult"
type="tns:DecompMemberProperties"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
```

GetMemberPropertiesResult: A **DecompMemberProperties** value.

3.1.4.4.3 Complex Types

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

Complex type	Description
ArrayOfDecompMemberProperty	Specifies an array of DecompMemberProperty complex types (section 3.1.4.4.3.3).
DecompMemberProperties	Contains details about properties of the associated node.
DecompMemberProperty	Contains details about a property of the associated node.

3.1.4.4.3.1   DecompMemberProperties

Namespace: http://www.microsoft.com/performancepoint/scorecards

The **DecompMemberProperties** complex type contains details about properties of the associated node.

```
<xs:complexType name="DecompMemberProperties" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:sequence>
    <xs:element minOccurs="0" maxOccurs="1" name="MemberName" type="xs:string"/>
    <xs:element minOccurs="0" maxOccurs="1" name="Properties"
type="tns:ArrayOfDecompMemberProperty"/>
  </xs:sequence>
</xs:complexType>
```

MemberName: If present, the server MAY pass an empty string, this element MUST be ignored by the client.

Properties: Specifies a collection of **DecompMemberProperty** elements.

3.1.4.4.3.2   ArrayOfDecompMemberProperty

Namespace: http://www.microsoft.com/performancepoint/scorecards

The **ArrayOfDecompMemberProperty** complex type specifies an array of **DecompMemberProperty** complex types (section 3.1.4.4.3.1).

```
<xs:complexType name="ArrayOfDecompMemberProperty"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:sequence>
    <xs:element minOccurs="0" maxOccurs="unbounded" name="DecompMemberProperty"
nillable="true" type="tns:DecompMemberProperty"/>
  </xs:sequence>
</xs:complexType>
```

DecompMemberProperty: Contains details about a property.

3.1.4.4.3.3   DecompMemberProperty

Namespace: http://www.microsoft.com/performancepoint/scorecards

The **DecompMemberProperty** complex type contains details about a property of the associated node.

```
<xs:complexType name="DecompMemberProperty" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:sequence>
    <xs:element minOccurs="0" maxOccurs="1" name="Name" type="xs:string"/>
    <xs:element minOccurs="0" maxOccurs="1" name="Caption" type="xs:string"/>
```

```
        <xs:element minOccurs="0" maxOccurs="1" name="Value" type="xs:string"/>
    </xs:sequence>
  </xs:complexType>
```

Name: MUST be ignored.

Caption: Specifies the user-friendly name of the property.

Value: Specifies the value of the property.

3.1.4.4.4 Simple Types

None.

3.1.4.4.5 Attributes

None.

3.1.4.4.6 Groups

None.

3.1.4.4.7 Attribute Groups

None.

3.1.4.5 GetRootLevel

The **GetRootLevel** operation is used to start a session. A protocol client MUST use this operation to retrieve the Navigation Context session state variable before using other operations.

The following is the WSDL port type specification of the **GetRootLevel** WSDL operation.

```
<wsdl:operation name="GetRootLevel" xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/">
  <wsdl:input message="tns:GetRootLevelSoapIn"/>
  <wsdl:output message="tns:GetRootLevelSoapOut"/>
</wsdl:operation>
```

This operation, if successful, will return a non-empty **DecompRenderResultRecord** complex type (section 2.2.4.5) that contains data for a specific node in the form of a **DecompRenderResultLevel** (section 2.2.4.3) and a **DecompRenderResultNode** (section 2.2.4.4).

A session state variable, *Navigation Context,* is created in this operation. The *NavigationContext* value is returned as part of the **DecompRenderResultRecord** element. All requests using other protocol messages, such as **AutoExpand** (section 3.1.4.1), **Expand** (section 3.1.4.3), **CreateNavigationList** (section 3.1.4.2) and **GetMemberProperties** (section 3.1.4.4), require such a session state variable.

In the event of an application error on the protocol server during the operation, the protocol server MUST return a SOAP FAULT response.

3.1.4.5.1 Messages

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

Message	Description
GetRootLevelSoapIn	The request WSDL message for the **GetRootLevel** WSDL operation.
GetRootLevelSoapOut	The response WSDL message for the **GetRootLevel** WSDL operation.

3.1.4.5.1.1 GetRootLevelSoapIn

The request WSDL message for the **GetRootLevel** WSDL operation.

The SOAP action value is:

```
http://www.microsoft.com/performancepoint/scorecards/GetRootLevel
```

The SOAP body contains the **GetRootLevel** element.

3.1.4.5.1.2 GetRootLevelSoapOut

The response WSDL message for the **GetRootLevel** WSDL operation.

The SOAP body contains the **GetRootLevelResponse** element.

3.1.4.5.2 Elements

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

Element	Description
GetRootLevel	The input data for the **GetRootLevel** WSDL operation.
GetRootLevelResponse	The result data for the **GetRootLevel** WSDL operation.

3.1.4.5.2.1 GetRootLevel

The **GetRootLevel** element specifies the input data for the **GetRootLevel** WSDL operation.

```
<xs:element name="GetRootLevel" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:complexType>
    <xs:sequence>
      <xs:element minOccurs="0" maxOccurs="1" name="navigationType" type="xs:string"/>
      <xs:element minOccurs="0" maxOccurs="1" name="navigationContextId" type="xs:string"/>
      <xs:element minOccurs="0" maxOccurs="1" name="tupleRecord"
type="tns:DecompTupleRecord"/>
      <xs:element minOccurs="0" maxOccurs="1" name="viewState" type="xs:string"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
```

navigationType: MUST be "olap" (without quotes.)

navigationContextId: MUST be a string identifying the Root Context session state known to the protocol server. This element MUST NOT be NULL and MUST NOT be empty. An implementation of this protocol, for example, could pass the identifier of the initial report containing the cell that is being analyzed as the value of this parameter.

tupleRecord: MUST be a **DecompTupleRecord** value (section 3.1.4.5.3.1). Specifies specific named filters to be applied to the response. It MUST NOT be NULL.

viewState: MAY be empty. If empty, this value is ignored. If not empty, this value is xml-formatted and is a set of name-value pairs, where the names MUST be a string type and unique, and its associated value MUST be a string type. For example:

```
<ViewState>
  <GridViewDataInputs />
  <TimeFilters />
</ViewState>
```

3.1.4.5.2.2   GetRootLevelResponse

The **GetRootLevelResponse** element specifies the result data for the **GetRootLevel** WSDL operation.

```
<xs:element name="GetRootLevelResponse" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:complexType>
    <xs:sequence>
      <xs:element minOccurs="0" maxOccurs="1" name="GetRootLevelResult"
type="tns:DecompRenderResultRecord"/>
    </xs:sequence>
  </xs:complexType>
</xs:element>
```

GetRootLevelResult: A **DecompRenderResultRecord** value (section 2.2.4.5). In the event of an application error on the protocol server, this value will not occur.

3.1.4.5.3 Complex Types

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

Complex type	Description
ArrayOfString	Specifies an array of strings.
DecompTupleRecord	Names specific filters to be applied.

3.1.4.5.3.1   DecompTupleRecord

Namespace: http://www.microsoft.com/performancepoint/scorecards

The **DecompTupleRecord** complex type names specific filters to be applied.

```
<xs:complexType name="DecompTupleRecord" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:sequence>
    <xs:element minOccurs="0" maxOccurs="1" name="RowSelections" type="tns:ArrayOfString"/>
    <xs:element minOccurs="0" maxOccurs="1" name="ColumnSelections"
type="tns:ArrayOfString"/>
    <xs:element minOccurs="0" maxOccurs="1" name="BackgroundMeasureName" type="xs:string"/>
  </xs:sequence>
</xs:complexType>
```

RowSelections: MUST specify zero or more filter names. The names MUST be known to the protocol server. These named filters are applied to the response to scope it to a subset of results that match.

ColumnSelections: MUST specify zero or more filter names. The names MUST be known to the protocol server. These named filters are applied to the response to scope it to a subset of results that match.

BackgroundMeasureName: MAY be empty. Uniquely identifies a measure. This element MUST be known to the protocol server. Measures are the central values that are aggregated and analyzed.

3.1.4.5.3.2   ArrayOfString

Namespace: http://www.microsoft.com/performancepoint/scorecards

The **ArrayOfString** complex type specifies an array of strings.

```
<xs:complexType name="ArrayOfString" xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:sequence>
    <xs:element minOccurs="0" maxOccurs="unbounded" name="string" nillable="true"
type="xs:string"/>
  </xs:sequence>
</xs:complexType>
```

string: This element MUST NOT be null and MUST conform to the XML data type string.

3.1.4.5.4 Simple Types

None.

3.1.4.5.5 Attributes

None.

3.1.4.5.6 Groups

None.

3.1.4.5.7 Attribute Groups

None.

3.1.5   Timer Events

None.

3.1.6   Other Local Events

None.

4 Protocol Examples

4.1 Starting a Session and Expanding to a Second Level

In this example, the protocol client starts a session with the protocol server, receives a node, then uses the default named action to retrieve additional nodes.

The named filter [Product].[Product Categories].[All Products] and measure name [Measures].[Internet Order Count] are already known to the protocol client from previous interactions with a data source being used by the implementation of the protocol server. The navigation context value {b1150827-c56c-963f-a02c-b5a526402953} is known to the protocol client from previous interactions with the implementation of the protocol server.

Using these values, the protocol client constructs the following **GetRootLevel** message:

```
<s:Envelope
xmlns:s="http://schemas.xmlsoap.org/soap/envelope/"><s:Body><GetRootLevel
xmlns:i="http://www.w3.org/2001/XMLSchema-instance"
xmlns="http://www.microsoft.com/performancepoint/scorecards"><navigationType>olap</
navigationType><navigationContextId>{b1150827-c56c-963f-a02c-
b5a526402953}</navigationContextId><tupleRecord><RowSelections><string>[Product].[P
roduct Categories].[All
Products]</string></RowSelections><ColumnSelections><string>[Measures].[Internet
Order
Count]</string></ColumnSelections></tupleRecord><viewState></viewState></GetRootLev
el></s:Body></s:Envelope>
```

The protocol server responds with the following:

```
<?xml version="1.0" encoding="utf-8"?><soap:Envelope
xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"><soap:Body><GetRootLevelResponse
xmlns="http://www.microsoft.com/performancepoint/scorecards"><GetRootLevelResult><Levels><Dec
ompRenderResultLevel><SortedBy>DESCENDING</SortedBy><HierarchyName>[Product].[Product
Categories]</HierarchyName><TotalNodeCount>1</TotalNodeCount><UniqueName>[Product].[Product
Categories].[(All)]</UniqueName><Caption>(All)</Caption><Nodes><DecompRenderResultNode><Value
>27659</Value><FormattedValue>27,659</FormattedValue><HasChildren>true</HasChildren><UniqueNa
me>[Product].[Product Categories].[All Products]</UniqueName><Caption>All
Products</Caption><BottomSumValue>0</BottomSumValue><TopSumValue>0</TopSumValue></DecompRende
rResultNode></Nodes></DecompRenderResultLevel></Levels><MeasureCaption>Internet Order
Count</MeasureCaption><MeasureUniqueName>[Measures].[Internet Order
Count]</MeasureUniqueName><MeasureIsAdditive>false</MeasureIsAdditive><NavigationContext>{"Ty
pe":"olap","NavigationContext":"%7B430cc761-8437-7443-d7ea-aa397ef1b132%7D","Title":"Protocol
Sample
Report"}</NavigationContext></GetRootLevelResult></GetRootLevelResponse></soap:Body></soap:En
velope>
```

The protocol client renders this data for the user.

The protocol client constructs the following **AutoExpand** message using the values of the elements *DecompRenderResultLevel/UniqueName*, *DecompRenderResultLevel/Nodes[0]/DecompRenderResultNode/UniqueName*, and *DecompRenderResultLevel/NavigationContext* from the first response:

```
<s:Envelope xmlns:s="http://schemas.xmlsoap.org/soap/envelope/"><s:Body><AutoExpand
xmlns:i="http://www.w3.org/2001/XMLSchema-instance"
xmlns="http://www.microsoft.com/performancepoint/scorecards"><levelUniqueName>[Product].[Prod
uct Categories].[(All)]</levelUniqueName><itemUniqueName>[Product].[Product Categories].[All
Products]</itemUniqueName><sortType>DESCENDING</sortType><navigationContext>{"Type":"olap","N
avigationContext":"%7B430cc761-8437-7443-d7ea-aa397ef1b132%7D","Title":"Protocol Sample
Report"}</navigationContext></AutoExpand></s:Body></s:Envelope>
```

The protocol server responds with the following:

```
<?xml version="1.0" encoding="utf-8"?><soap:Envelope
xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"><soap:Body><AutoExpandResponse
xmlns="http://www.microsoft.com/performancepoint/scorecards"><AutoExpandResult><Levels><Decom
pRenderResultLevel><SortedBy>DESCENDING</SortedBy><HierarchyName>[Product].[Product
Categories]</HierarchyName><TotalNodeCount>3</TotalNodeCount><UniqueName>[Product].[Product
Categories].[Category]</UniqueName><Caption>Category</Caption><Nodes><DecompRenderResultNode>
<Value>18208</Value><FormattedValue>18,208</FormattedValue><HasChildren>true</HasChildren><Un
iqueName>[Product].[Product
Categories].[Category].&amp;[4]</UniqueName><Caption>Accessories</Caption><BottomSumValue>0</
BottomSumValue><TopSumValue>0</TopSumValue></DecompRenderResultNode><DecompRenderResultNode><
Value>15205</Value><FormattedValue>15,205</FormattedValue><HasChildren>true</HasChildren><Uni
queName>[Product].[Product
Categories].[Category].&amp;[1]</UniqueName><Caption>Bikes</Caption><BottomSumValue>0</Bottom
SumValue><TopSumValue>0</TopSumValue></DecompRenderResultNode><DecompRenderResultNode><Value>
7461</Value><FormattedValue>7,461</FormattedValue><HasChildren>true</HasChildren><UniqueName>
[Product].[Product
Categories].[Category].&amp;[3]</UniqueName><Caption>Clothing</Caption><BottomSumValue>0</Bot
tomSumValue><TopSumValue>0</TopSumValue></DecompRenderResultNode></Nodes></DecompRenderResult
Level></Levels><MeasureCaption>Internet Order
Count</MeasureCaption><MeasureUniqueName>[Measures].[Internet Order
Count]</MeasureUniqueName><MeasureIsAdditive>false</MeasureIsAdditive><NavigationContext>{"Ty
pe":"olap","NavigationContext":"%7B4ca709b5-7e78-9571-e7be-f6f89e3b0e6d%7D","Title":"Protocol
Sample
Report"}</NavigationContext></AutoExpandResult></AutoExpandResponse></soap:Body></soap:Envelo
pe>
```

The protocol client renders the response data for the user.

4.2 Retrieving a List of Named Actions and Expanding to a Third Level

In this scenario, the protocol client has previously started a session with the protocol server (Example
1.) It retrieves a list of named actions for one of the nodes from the second set of nodes retrieved in
Example 1, then it retrieves a third set of nodes using a named action.

The protocol client constructs the following **CreateNavigationList** message using the values of the
elements *DecompRenderResultLevel/UniqueName*,
DecompRenderResultLevel/Nodes[0]/DecompRenderResultNode/UniqueName, and
DecompRenderResultLevel/NavigationContext from the second protocol server response in Example 1:

```
<s:Envelope xmlns:s="http://schemas.xmlsoap.org/soap/envelope/"><s:Body><CreateNavigationList
xmlns:i="http://www.w3.org/2001/XMLSchema-instance"
xmlns="http://www.microsoft.com/performancepoint/scorecards"><levelUniqueName>[Product].[Prod
uct Categories].[Category]</levelUniqueName><itemUniqueName>[Product].[Product
Categories].[Category].&amp;[4]</itemUniqueName><navigationContext>{"Type":"olap","Navigation
Context":"%7B4ca709b5-7e78-9571-e7be-f6f89e3b0e6d%7D","Title":"Protocol Sample
Report"}</navigationContext></CreateNavigationList></s:Body></s:Envelope>
```

The protocol server responds with the following:

```xml
<?xml version="1.0" encoding="utf-8"?><soap:Envelope
xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"><soap:Body><CreateNavigationListResponse
xmlns="http://www.microsoft.com/performancepoint/scorecards"><CreateNavigationListResult><Gro
ups><DecompNavigationGroup><Name>[Product]</Name><Caption>Product</Caption><Actions><DecompNa
vigationAction><Name>[Product].[Product
Categories].[Category]</Name><Caption>Category</Caption><ParentCaption>Categories</ParentCapt
ion><Enabled>false</Enabled></DecompNavigationAction><DecompNavigationAction><Name>[Product].
[Product
Categories].[Subcategory]</Name><Caption>Subcategory</Caption><ParentCaption>Categories</Pare
ntCaption><Enabled>true</Enabled></DecompNavigationAction><DecompNavigationAction><Name>[Prod
uct].[Product
Categories].[Product]</Name><Caption>Product</Caption><ParentCaption>Categories</ParentCaptio
n><Enabled>true</Enabled></DecompNavigationAction><DecompNavigationAction><Name>[Product].[Pr
oduct Model Lines].[Product Line]</Name><Caption>Product Line</Caption><ParentCaption>Model
Lines</ParentCaption><Enabled>true</Enabled></DecompNavigationAction><DecompNavigationAction>
<Name>[Product].[Product Model
Lines].[Model]</Name><Caption>Model</Caption><ParentCaption>Model
Lines</ParentCaption><Enabled>true</Enabled></DecompNavigationAction><DecompNavigationAction>
<Name>[Product].[Stock Level].[Safety Stock Level]</Name><Caption>Safety Stock
Level</Caption><ParentCaption>Stock
Level</ParentCaption><Enabled>true</Enabled></DecompNavigationAction><DecompNavigationAction>
<Name>[Product].[Stock Level].[Product]</Name><Caption>Product</Caption><ParentCaption>Stock
Level</ParentCaption><Enabled>true</Enabled></DecompNavigationAction><DecompNavigationAction>
<Name>[Product].[Class].[Class]</Name><Caption>Class</Caption><Enabled>true</Enabled></Decomp
NavigationAction><DecompNavigationAction><Name>[Product].[Color].[Color]</Name><Caption>Color
</Caption><Enabled>true</Enabled></DecompNavigationAction><DecompNavigationAction><Name>[Prod
uct].[Days to Manufacture].[Days to Manufacture]</Name><Caption>Days to
Manufacture</Caption><Enabled>true</Enabled></DecompNavigationAction><DecompNavigationAction>
<Name>[Product].[Dealer Price].[Dealer Price]</Name><Caption>Dealer
Price</Caption><Enabled>true</Enabled></DecompNavigationAction><DecompNavigationAction><Name>
[Product].[End Date].[End Date]</Name><Caption>End
Date</Caption><Enabled>true</Enabled></DecompNavigationAction><DecompNavigationAction><Name>[
Product].[Large Photo].[Large Photo]</Name><Caption>Large
Photo</Caption><Enabled>true</Enabled></DecompNavigationAction><DecompNavigationAction><Name>
[Product].[List Price].[List Price]</Name><Caption>List
Price</Caption><Enabled>true</Enabled></DecompNavigationAction><DecompNavigationAction><Name>
[Product].[Model Name].[Model Name]</Name><Caption>Model
Name</Caption><Enabled>true</Enabled></DecompNavigationAction><DecompNavigationAction><Name>[
Product].[Reorder Point].[Reorder Point]</Name><Caption>Reorder
Point</Caption><Enabled>true</Enabled></DecompNavigationAction><DecompNavigationAction><Name>
[Product].[Size].[Size]</Name><Caption>Size</Caption><Enabled>true</Enabled></DecompNavigatio
nAction><DecompNavigationAction><Name>[Product].[Size Range].[Size Range]</Name><Caption>Size
Range</Caption><Enabled>true</Enabled></DecompNavigationAction><DecompNavigationAction><Name>
[Product].[Standard Cost].[Standard Cost]</Name><Caption>Standard
Cost</Caption><Enabled>true</Enabled></DecompNavigationAction><DecompNavigationAction><Name>[
Product].[Start Date].[Start Date]</Name><Caption>Start
Date</Caption><Enabled>true</Enabled></DecompNavigationAction><DecompNavigationAction><Name>[
Product].[Status].[Status]</Name><Caption>Status</Caption><Enabled>true</Enabled></DecompNavi
gationAction><DecompNavigationAction><Name>[Product].[Style].[Style]</Name><Caption>Style</Ca
ption><Enabled>true</Enabled></DecompNavigationAction><DecompNavigationAction><Name>[Product]
.[Weight].[Weight]</Name><Caption>Weight</Caption><Enabled>true</Enabled></DecompNavigationAc
tion></Actions></DecompNavigationGroup><DecompNavigationGroup><Name>[Promotion]</Name><Captio
n>Promotion</Caption><Actions><DecompNavigationAction><Name>[Promotion].[Promotions].[Categor
y]</Name><Caption>Category</Caption><ParentCaption>Promotions</ParentCaption><Enabled>true</E
nabled></DecompNavigationAction><DecompNavigationAction><Name>[Promotion].[Promotions].[Type]
</Name><Caption>Type</Caption><ParentCaption>Promotions</ParentCaption><Enabled>true</Enabled
></DecompNavigationAction><DecompNavigationAction><Name>[Promotion].[Promotions].[Promotion]<
/Name><Caption>Promotion</Caption><ParentCaption>Promotions</ParentCaption><Enabled>true</Ena
bled></DecompNavigationAction><DecompNavigationAction><Name>[Promotion].[Discount
Percent].[Discount Percent]</Name><Caption>Discount
Percent</Caption><Enabled>true</Enabled></DecompNavigationAction><DecompNavigationAction><Nam
e>[Promotion].[End Date].[End Date]</Name><Caption>End
Date</Caption><Enabled>true</Enabled></DecompNavigationAction><DecompNavigationAction><Name>[
Promotion].[Max Quantity].[Max Quantity]</Name><Caption>Max
Quantity</Caption><Enabled>true</Enabled></DecompNavigationAction><DecompNavigationAction><Na
me>[Promotion].[Min Quantity].[Min Quantity]</Name><Caption>Min
```

```
Quantity</Caption><Enabled>true</Enabled></DecompNavigationAction><DecompNavigationAction><Na
me>[Promotion].[Promotion Category].[Promotion
Category]</Name><Caption>Category</Caption><Enabled>true</Enabled></DecompNavigationAction><D
ecompNavigationAction><Name>[Promotion].[Promotion Type].[Promotion
Type]</Name><Caption>Type</Caption><Enabled>true</Enabled></DecompNavigationAction><DecompNav
igationAction><Name>[Promotion].[Start Date].[Start Date]</Name><Caption>Start
Date</Caption><Enabled>true</Enabled></DecompNavigationAction></Actions></DecompNavigationGro
up></Groups></CreateNavigationListResult></CreateNavigationListResponse></soap:Body></soap:En
velope>
```

The protocol client renders this data in a hierarchical user interface.

The user of the protocol client selects an action by its *DecompNavigationAction/Caption* value
"Subcategory".

The protocol client constructs the following **Expand** message using the
DecompNavigationAction/Name value of the action:

```
<s:Envelope xmlns:s="http://schemas.xmlsoap.org/soap/envelope/"><s:Body><Expand
xmlns:i="http://www.w3.org/2001/XMLSchema-instance"
xmlns="http://www.microsoft.com/performancepoint/scorecards"><levelUniqueName>[Product].[Prod
uct Categories].[Category]</levelUniqueName><itemUniqueName>[Product].[Product
Categories].[Category].&amp;[4]</itemUniqueName><navigationItemUniqueName>[Product].[Product
Categories].[Subcategory]</navigationItemUniqueName><sortType>DESCENDING</sortType><navigatio
nContext>{"Type":"olap","NavigationContext":"%7B4ca709b5-7e78-9571-e7be-
f6f89e3b0e6d%7D","Title":"Protocol Sample
Report"}</navigationContext></Expand></s:Body></s:Envelope>
```

The protocol server responds with the following:

```
<?xml version="1.0" encoding="utf-8"?><soap:Envelope
xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"><soap:Body><ExpandResponse
xmlns="http://www.microsoft.com/performancepoint/scorecards"><ExpandResult><Levels><DecompRen
derResultLevel><SortedBy>DESCENDING</SortedBy><HierarchyName>[Product].[Product
Categories]</HierarchyName><TotalNodeCount>8</TotalNodeCount><UniqueName>[Product].[Product
Categories].[Subcategory]</UniqueName><Caption>Subcategory</Caption><Nodes><DecompRenderResul
tNode><Value>9867</Value><FormattedValue>9,867</FormattedValue><HasChildren>true</HasChildren
><UniqueName>[Product].[Product
Categories].[Subcategory].&amp;[37]</UniqueName><Caption>Tires and
Tubes</Caption><BottomSumValue>0</BottomSumValue><TopSumValue>0</TopSumValue></DecompRenderRe
sultNode><DecompRenderResultNode><Value>6440</Value><FormattedValue>6,440</FormattedValue><Ha
sChildren>true</HasChildren><UniqueName>[Product].[Product
Categories].[Subcategory].&amp;[31]</UniqueName><Caption>Helmets</Caption><BottomSumValue>0</
BottomSumValue><TopSumValue>0</TopSumValue></DecompRenderResultNode><DecompRenderResultNode><
Value>4768</Value><FormattedValue>4,768</FormattedValue><HasChildren>true</HasChildren><Uniqu
eName>[Product].[Product Categories].[Subcategory].&amp;[28]</UniqueName><Caption>Bottles and
Cages</Caption><BottomSumValue>0</BottomSumValue><TopSumValue>0</TopSumValue></DecompRenderRe
sultNode><DecompRenderResultNode><Value>2121</Value><FormattedValue>2,121</FormattedValue><Ha
sChildren>true</HasChildren><UniqueName>[Product].[Product
Categories].[Subcategory].&amp;[30]</UniqueName><Caption>Fenders</Caption><BottomSumValue>0</
BottomSumValue><TopSumValue>0</TopSumValue></DecompRenderResultNode><DecompRenderResultNode><
Value>908</Value><FormattedValue>908</FormattedValue><HasChildren>true</HasChildren><UniqueNa
me>[Product].[Product
Categories].[Subcategory].&amp;[29]</UniqueName><Caption>Cleaners</Caption><BottomSumValue>0<
/BottomSumValue><TopSumValue>0</TopSumValue></DecompRenderResultNode><DecompRenderResultNode>
<Value>733</Value><FormattedValue>733</FormattedValue><HasChildren>true</HasChildren><UniqueN
ame>[Product].[Product Categories].[Subcategory].&amp;[32]</UniqueName><Caption>Hydration
Packs</Caption><BottomSumValue>0</BottomSumValue><TopSumValue>0</TopSumValue></DecompRenderRe
sultNode><DecompRenderResultNode><Value>328</Value><FormattedValue>328</FormattedValue><HasCh
ildren>true</HasChildren><UniqueName>[Product].[Product
Categories].[Subcategory].&amp;[26]</UniqueName><Caption>Bike
Racks</Caption><BottomSumValue>0</BottomSumValue><TopSumValue>0</TopSumValue></DecompRenderRe
```

```
sultNode><DecompRenderResultNode><Value>249</Value><FormattedValue>249</FormattedValue><HasCh
ildren>true</HasChildren><UniqueName>[Product].[Product
Categories].[Subcategory].&amp;[27]</UniqueName><Caption>Bike
Stands</Caption><BottomSumValue>0</BottomSumValue><TopSumValue>0</TopSumValue></DecompRenderR
esultNode></Nodes></DecompRenderResultLevel></Levels><MeasureCaption>Internet Order
Count</MeasureCaption><MeasureUniqueName>[Measures].[Internet Order
Count]</MeasureUniqueName><MeasureIsAdditive>false</MeasureIsAdditive><NavigationContext>{"Ty
pe":"olap","NavigationContext":"%7Bc10f24bc-3a2a-403a-c2e9-eab0313455d5%7D","Title":"Protocol
Sample
Report"}</NavigationContext></ExpandResult></ExpandResponse></soap:Body></soap:Envelope>
```

The protocol client renders the response data for the user.

4.3 Retrieving Properties

In this scenario, the protocol client has previously started a session with the protocol server (Example 1) and has retrieved an additional set of nodes (Example 2.) It retrieves a list of properties for the nodes retrieved in Example 2.

The protocol client constructs the following **GetMemberProperties** message, using the values of the elements *DecompRenderResultLevel/NavigationContext* and *DecompRenderResultLevel/Nodes[0]/DecompRenderResultNode/UniqueName* from the second protocol server response in Example 2:

```
<s:Envelope xmlns:s="http://schemas.xmlsoap.org/soap/envelope/"><s:Body><GetMemberProperties
xmlns:i="http://www.w3.org/2001/XMLSchema-instance"
xmlns="http://www.microsoft.com/performancepoint/scorecards"><navigationContext>{"Type":"olap
","NavigationContext":"%7Bc10f24bc-3a2a-403a-c2e9-eab0313455d5%7D","Title":"Protocol Sample
Report"}</navigationContext><itemUniqueName>[Product].[Product
Categories].[Subcategory].&amp;[37]</itemUniqueName></GetMemberProperties></s:Body></s:Envelo
pe>
```

The protocol server responds with the following:

```
<?xml version="1.0" encoding="utf-8"?><soap:Envelope
xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"><soap:Body><GetMemberPropertiesResponse
xmlns="http://www.microsoft.com/performancepoint/scorecards"><GetMemberPropertiesResult><Memb
erName>[Product].[Product
Categories].[Subcategory].&amp;[37]</MemberName><Properties><DecompMemberProperty><Name>Categ
ory</Name><Caption>Category</Caption><Value>Accessories</Value></DecompMemberProperty></Prope
rties></GetMemberPropertiesResult></GetMemberPropertiesResponse></soap:Body></soap:Envelope>
```

The protocol client renders the response data for the user.

5   Security

5.1   Security Considerations for Implementers

It is possible to use **Secure Sockets Layer (SSL)** to securely implement this protocol. The protocol exposes data sources to potential tampering or data disclosure without SSL.

The security permissions required for all operations are inherited from the parent **list** item.

5.2   Index of Security Parameters

None.

6 Appendix A: Full WSDL

For ease of implementation, the full WSDL is provided in this appendix.

```xml
<?xml version="1.0" encoding="UTF-8"?>
<wsdl:definitions xmlns:soap12="http://schemas.xmlsoap.org/wsdl/soap12/"
xmlns:http="http://schemas.xmlsoap.org/wsdl/http/"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:tns="http://www.microsoft.com/performancepoint/scorecards"
xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
targetNamespace="http://www.microsoft.com/performancepoint/scorecards"
xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/">
  <wsdl:types>
    <xs:schema elementFormDefault="qualified"
targetNamespace="http://www.microsoft.com/performancepoint/scorecards">
      <xs:element name="AutoExpand">
        <xs:complexType>
          <xs:sequence>
            <xs:element minOccurs="0" maxOccurs="1" name="levelUniqueName" type="xs:string"/>
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type="xs:boolean"/>
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          <xs:element minOccurs="0" maxOccurs="1" name="UniqueName" type="xs:string"/>
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type="xs:string"/>
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type="xs:string"/>
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type="xs:string"/>
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type="tns:DecompRenderResultRecord"/>
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       </xs:element>
       <xs:element name="CreateNavigationList">
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type="tns:DecompNavigationList"/>
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       </xs:element>
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type="tns:DecompMemberProperties"/>
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        </xs:element>
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type="tns:ArrayOfDecompMemberProperty"/>
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type="xs:string"/>
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type="tns:DecompTupleRecord"/>
```

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type="tns:ArrayOfString"/>
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type="tns:ArrayOfString"/>
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type="xs:string"/>
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type="tns:DecompRenderResultRecord"/>
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        <wsdl:output message="tns:AutoExpandSoapOut"/>
      </wsdl:operation>
      <wsdl:operation name="Expand">
        <wsdl:input message="tns:ExpandSoapIn"/>
        <wsdl:output message="tns:ExpandSoapOut"/>
      </wsdl:operation>
      <wsdl:operation name="CreateNavigationList">
        <wsdl:input message="tns:CreateNavigationListSoapIn"/>
        <wsdl:output message="tns:CreateNavigationListSoapOut"/>
      </wsdl:operation>
      <wsdl:operation name="GetMemberProperties">
        <wsdl:input message="tns:GetMemberPropertiesSoapIn"/>
        <wsdl:output message="tns:GetMemberPropertiesSoapOut"/>
      </wsdl:operation>
      <wsdl:operation name="GetRootLevel">
        <wsdl:input message="tns:GetRootLevelSoapIn"/>
        <wsdl:output message="tns:GetRootLevelSoapOut"/>
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    </wsdl:portType>
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type="tns:PPSDecompRenderingServiceSoap">
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      <wsdl:operation name="AutoExpand">
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soapAction="http://www.microsoft.com/performancepoint/scorecards/AutoExpand"
style="document"/>
        <wsdl:input>
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        </wsdl:input>
        <wsdl:output>
          <soap:body use="literal"/>
        </wsdl:output>
      </wsdl:operation>
      <wsdl:operation name="Expand">
        <soap:operation
soapAction="http://www.microsoft.com/performancepoint/scorecards/Expand" style="document"/>
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        <wsdl:input>
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        </wsdl:input>
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        </wsdl:output>
      </wsdl:operation>
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        <soap:operation
soapAction="http://www.microsoft.com/performancepoint/scorecards/CreateNavigationList"
style="document"/>
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        </wsdl:input>
        <wsdl:output>
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        </wsdl:output>
      </wsdl:operation>
      <wsdl:operation name="GetMemberProperties">
        <soap:operation
soapAction="http://www.microsoft.com/performancepoint/scorecards/GetMemberProperties"
style="document"/>
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        </wsdl:input>
        <wsdl:output>
          <soap:body use="literal"/>
        </wsdl:output>
      </wsdl:operation>
      <wsdl:operation name="GetRootLevel">
        <soap:operation
soapAction="http://www.microsoft.com/performancepoint/scorecards/GetRootLevel"
style="document"/>
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        </wsdl:input>
        <wsdl:output>
          <soap:body use="literal"/>
        </wsdl:output>
      </wsdl:operation>
    </wsdl:binding>
    <wsdl:binding name="PPSDecompRenderingServiceSoap12"
type="tns:PPSDecompRenderingServiceSoap">
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soapAction="http://www.microsoft.com/performancepoint/scorecards/AutoExpand"
style="document"/>
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        </wsdl:input>
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        </wsdl:output>
      </wsdl:operation>
      <wsdl:operation name="Expand">
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soapAction="http://www.microsoft.com/performancepoint/scorecards/Expand" style="document"/>
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        </wsdl:input>
        <wsdl:output>
          <soap12:body use="literal"/>
        </wsdl:output>
      </wsdl:operation>
      <wsdl:operation name="CreateNavigationList">
        <soap12:operation
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style="document"/>
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      </wsdl:operation>
      <wsdl:operation name="GetMemberProperties">
        <soap12:operation
soapAction="http://www.microsoft.com/performancepoint/scorecards/GetMemberProperties"
style="document"/>
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        </wsdl:input>
        <wsdl:output>
          <soap12:body use="literal"/>
        </wsdl:output>
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      <wsdl:operation name="GetRootLevel">
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style="document"/>
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          <soap12:body use="literal"/>
        </wsdl:input>
        <wsdl:output>
          <soap12:body use="literal"/>
        </wsdl:output>
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  </wsdl:binding>
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  </wsdl:message>
  <wsdl:message name="AutoExpandSoapOut">
    <wsdl:part name="parameters" element="tns:AutoExpandResponse"/>
  </wsdl:message>
  <wsdl:message name="CreateNavigationListSoapIn">
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  </wsdl:message>
  <wsdl:message name="ExpandSoapIn">
    <wsdl:part name="parameters" element="tns:Expand"/>
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  <wsdl:message name="ExpandSoapOut">
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  </wsdl:message>
  <wsdl:message name="GetMemberPropertiesSoapIn">
    <wsdl:part name="parameters" element="tns:GetMemberProperties"/>
  </wsdl:message>
  <wsdl:message name="GetMemberPropertiesSoapOut">
    <wsdl:part name="parameters" element="tns:GetMemberPropertiesResponse"/>
  </wsdl:message>
  <wsdl:message name="GetRootLevelSoapIn">
    <wsdl:part name="parameters" element="tns:GetRootLevel"/>
  </wsdl:message>
  <wsdl:message name="GetRootLevelSoapOut">
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  </wsdl:message>
</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 SharePoint Server 2010

- Microsoft SharePoint Server 2013

- Microsoft SharePoint Server 2016

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