

**Oracle Utilities Smart Grid Gateway  
Adapter for Sensus RNI**

Configuration Guide

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Oracle Utilities Smart Grid Gateway adapter for Sensus Configuration Guide

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Primary Author: TUGBU Documentation

Contributing Author: TUGBU Documentation

Contributor: TUGBU Documentation

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# Chapter 1

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## Overview

This chapter provides an overview of this configuration guide and an introduction to the Oracle Utilities Smart Grid Gateway adapter for Sensus RNI, including the following:

- **What Is This Book?**
- **Other Documentation**
- **Oracle Utilities Application Framework Configuration Tools**

## What Is This Book?

This guide describes how to configure the Oracle Utilities Smart Grid Gateway adapter for Sensus RNI. It is intended for implementers and system administrators responsible for configuration and initial setup of the application.

The Oracle Utilities Smart Grid Gateway adapter for Sensus RNI is based on the Oracle Utilities Application Framework (OUAF). For information about using and configuring basic Framework functions, see the Oracle Utilities Application Framework documentation. This guide only covers configuration of functions specific to the Oracle Utilities Smart Grid Gateway adapter for Sensus RNI.

The body of this guide presents conceptual information to help you understand how the system works as well as how the various configuration options affect system functionality. Once you have an understanding of the system's capabilities, you can plan your data setup and design any customizations you want to implement.

When you are ready to implement your design, use **Chapter 2: General Configuration** to guide you through the setup process of admin data. This section lists each object that can be configured, defines any prerequisites for configuration.

This guide includes the following chapters:

- **Chapter 1: Overview** (this chapter) provides an overview of the Oracle Utilities Smart Grid Gateway adapter for Sensus RNI architecture and of the configuration tools and process used in implementing the product.
- **Chapter 2: General Configuration** provides an overview of some general configuration options used by the Oracle Utilities Smart Grid Gateway adapter for Sensus RNI.

## Other Documentation

This section describes other documentation provided with the Oracle Utilities Smart Grid Gateway adapter for Sensus RNI.

### Installation Documentation

Installation documentation describes the steps involved in the installation and initial set up of the system, and includes the following documents:

- Oracle Utilities Smart Grid Gateway Quick Install Guide
- Oracle Utilities Smart Grid Gateway DBA Guide
- Oracle Utilities Smart Grid Gateway Installation Guide

### User Documentation

User documentation provides conceptual information and procedures related to working with the various objects used in the system, and includes the following documents:

- Oracle Utilities Application Framework Business Process Guide
- Oracle Utilities Application Framework Administration Guide
- Oracle Utilities Service and Measurement Data Foundation User's Guide
- Oracle Utilities Smart Grid Gateway User's Guide

### Supplemental Documentation

Supplemental documentation provides technical information related to system administration tasks and include the following documents:

- Oracle Utilities Smart Grid Gateway Server Administration Guide

- Oracle Utilities Smart Grid Gateway Batch Server Administration Guide
- Oracle Utilities Smart Grid Gateway Configuration Guide
- Oracle Utilities Smart Grid Gateway Security Guide

The Oracle Utilities Smart Grid Gateway adapter for Sensus RNI uses Oracle Service Bus (OSB) and Oracle Business Process Execution Language (BPEL) as middleware components. These tools are part of the Oracle SOA Suite. See the Oracle SOA Suite Documentation library (<http://www.oracle.com/technetwork/middleware/soasuite/documentation/index.html>) for more information about using these tools.

## Embedded Help

Oracle Utilities Smart Grid Gateway, like all Oracle Utilities Application Framework applications, provides extensive internal documentation. For example, detailed descriptions of system objects are included in the objects' maintenance portals. The lifecycle of each business object is described on the Lifecycle tab and depicted in flow diagrams on the Summary tab. This information is extremely useful for implementers and system administrators.

Embedded help is provided for all non-obvious fields in most portals and zones. If a field has associated help text, a ? icon appears next to the field when the zone is displayed.

## Online Help

Oracle Utilities Smart Grid Gateway also includes context-sensitive help for all the user interface screens users will typically work with as they use the system. Online help contains conceptual information and procedures related to working with the various objects used in the system.

The online help is divided into the following three sections:

- Oracle Utilities Application Framework: Describes the features and functions of the application framework (F1)
- Oracle Utilities Service and Measurement Data Foundation: Describes the features and functions provided in the Service and Measurement Data Foundation (D1)
- Oracle Utilities Smart Grid Gateway: Describes the features and functions provided in the smart grid gateway application (D6)

## Oracle Utilities Application Framework Configuration Tools

Please refer to the general configuration guide for information on the Oracle Utilities Application Framework (OUAF) configuration tools that can be used to create and customize system entities, such as business objects, portals, zones, and UI maps. Refer to the Oracle Utilities Application Framework configuration tools documentation for instructions on using tools such as:

- **Configuration Process Overview**
- **Data Areas**
- **Algorithms**
- **Entity Naming Conventions**

This configuration guide does not duplicate the concepts and procedures presented in the Oracle Utilities Application Framework configuration tools documentation; rather, it will identify the specific objects used by the Oracle Utilities Smart Grid Gateway adapter for Sensus RNI that can be configured and customized using the configuration tools, as well as application parameters and objects that can be managed within the application components themselves.

This guide assumes that all individuals responsible for system configuration and implementation will be familiar with the Oracle Utilities Application Framework and will have completed training on the Oracle Utilities Application Framework Configuration Tools.



# Chapter 2

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## General Configuration

This chapter provides details on the components and configurations required for the Smart Grid Gateway adapter for Sensus RNI including the following:

- **Understanding the Adapter**
- **Understanding the Adapter Processing**
- **Configuring a Sensus RNI Head-End System**
- **Configuring Sensus Extendable Lookups**
- **Extending the Adapter for Sensus**
- **The Test Harness**

## Understanding the Adapter

The Oracle Utilities Smart Grid Gateway Adapter for Sensus RNI supports communication with the Sensus Regional Network Interface (RNI), including measurement data and device event loading, and command messaging in support of commissioning, connect, disconnect, decommissioning, status check, and on-demand read. The following table describes the attributes of the adapter:

Attribute	Details
Currently Supported Version	Sensus RNI 3.1
Protocol	MultiSpeak 3.0 & 4.1. RNI 3.1 and the SGG Sensus RNI adapter support MultiSpeak 4.1
Market(s)	Worldwide
Architecture	Long range radio WAN (mesh)

The adapter uses Oracle Service Bus (OSB) and Oracle Business Process Execution Language (BPEL) to facilitate communication between Oracle Utilities Smart Grid Gateway and the Sensus RNI.

The following functionality is included:

**Measurement Data and Device Event Loading** - data parsing and transformation via Oracle Service Bus from Sensus RNI format into the Oracle Utilities Service and Measurement Data Foundation unified format for measurement data and device events.

**Measurement Data and Device Event Processing** - configurable mapping for Sensus RNI status codes and device event names to Oracle Utilities Service and Measurement Data Foundation standard values.

**Smart Meter Command Processing** - sending/receiving messages to/from the Sensus RNI application to initiate smart meter commands from Oracle Utilities Smart Grid Gateway. The Sensus RNI adapter supports the following types of commands and communications:

- **Meter Commissioning** - business objects and BPEL processes to support issuing meter commissioning commands.
- **Remote Connect** - business objects and BPEL processes to support issuing remote connect commands.
- **Remote Disconnect** - business objects and BPEL processes to support issuing remote disconnect commands
- **Meter Decommissioning** - business objects and BPEL processes to support issuing meter decommissioning commands.
- **On-Demand Read** - business objects and BPEL processes to support issuing on-demand read commands.
- **Device Status Check** - business objects and BPEL processes to support issuing device status check commands.

## Understanding the Adapter Processing

This section provides details concerning the OSB processing, BPEL Processes, and OUAF objects supplied as part of the base package. This information illustrates how the base package objects were designed, and can serve as the basis for any customizations you create as part of your implementation.

This section includes:

- **Initial Measurement Data Load and Device Events**
- **Device Communication**

### Initial Measurement Data Load and Device Events

The initial measurement data load and subsequent device event processing use OSB to poll for, parse, and transform the head-payloads into the Oracle Utilities Smart Grid Gateway service format. Payloads contain measurements and meter events in some head-end specific format OSB then places each service call into a JMS queue within the Oracle Utilities applications. The JMS client consumes the entries and invokes the respective services in parallel then a service creates initial measurements with data in a common format with head-end-specific processing as needed. A second service creates device events with data in a common format

#### Initial Measurement

The usage data exported from the AMI head-end system as a file in Sensus RNI format is loaded into Oracle Utilities as Initial measurement data. The following OSB projects, delivered in the base product, help manage the usage processing:

1. SGG-D6-USAGE-BASE - contains components responsible for “actual” processing of incoming data. It should not be modified during configuration. This can be upgraded without affecting the customization and environment settings added to SGG-D6-USAGE-CM.
2. SGG-D6-USAGE-CM allows for customization and simplifies future upgrades.

The runtime configuration settings for the SGG-D6-USAGE-CM project are stored in the xquery file EnvironmentSettings.xq. You can use this file to adjust initial measurement data processing. For example, if you want to load raw data you would specify “true” for the content of the populateRawIMD element.

The following table describes the elements included in the EnvironmentSettings.xq file:

Element	Description
populateRawIMD	Determines if the initial measurement data is populated as raw data. Valid values are: <ul style="list-style-type: none"> <li>• true</li> <li>• false</li> </ul>
callPreProcessing	Determines if the preprocessing proxy service is called. Valid values are: <ul style="list-style-type: none"> <li>• true</li> <li>• false</li> </ul>
callPostProcessing	Determines if the postprocessing proxy service is called. Valid values are: <ul style="list-style-type: none"> <li>• true</li> <li>• false</li> </ul>

Element	Description
destinationRootElementInterval	Holds the name of XAI inbound service for the interval IMD seeder.
destinationRootElementScalar	Holds the name of XAI inbound service for the scalar IMD seeder. In most cases it is the same as destinationRootElementInterval.

### Processing Large Input Files

In some environments, the OSB project may begin processing a large input file before it has been completely copied to the input directory. To prevent this, configure the MinimumAge property in the “InboundProxyService” proxy service for the SGG-D6-USAGE-CM project. The MinimumAge property specifies the minimum age of files to be retrieved, based on the last modified time stamp. This enables large files to be completely copied to the input directory before they are retrieved for processing.

See Working with Adapter OSB Projects in the *Oracle Utilities Smart Grid Gateway Configuration Guide* for more information about setting the MinimumAge property.

### Device Events

The device event data exported from the head-end system as a file in Sensus RNI format is loaded into Oracle Utilities as a Device Event. One of your configuration tasks is to customize the device events processing.

The required functionality is delivered in the base product as two OSB projects:

1. SGG-D6-EVENT-BASE contains components responsible for “actual” processing of incoming data. It can be upgraded in future without affecting the customization and environment settings that done in SGG-D6-EVENT-CM project.
2. SGG-D6-EVENT-CM allows the customization and simplifies the future upgrades.

### Base Package Business Objects

The Sensus RNI adapter base package includes the following initial measurement and device event business objects:

Business Object Name	Description
D6-InitialLoadIMDInterval	Sensus Initial Load IMD - Interval  Used when loading Sensus interval measurements into the system for the first time.
D6-InitialLoadIMDScalar	Sensus Initial Load IMD - Scalar
D6-DeviceEventMappingLookup	Sensus Device Event Mapping
D6-HeadendUOMLookup	Sensus UOM Code to Standard UOM Mapping
D6-IntStsCodeToCondMapLookup	Sensus Interval Status Mapping  This is a child BO of Interval Status Code to Condition Mapping

### Sensus Device Event Mapping BO

The Sensus RNI head-end system is capable of sending a large selection of device events. The adapter maps these events into standard Oracle Utilities Smart Grid Gateway event names and

categories. To meet this end, a Sensus-specific extendable lookup business object, D6-DeviceEventMappingLookup, holds device event names specific to Sensus RNI.

## Device Communication

The basic communication for all business processing is essentially the same. A communication request is sent from the Oracle Utilities application to Sensus RNI. This request would be for a connect/disconnect, commission/decommission, measurement data, device status check, or an on-demand read. The designated BPEL process transforms the request from Oracle Utilities format to MultiSpeak format and invokes the related Sensus RNI web service. Sensus RNI then returns a reply, and the BPEL process transforms the reply message back to the appropriate format so that Oracle Utilities can receive the response.

The following sections describe the key components in this processing, including:

- **Communication Flows**
- **Base Package Business Objects**
- **External System**
- **Outbound Message Types**
- **XAI Configuration**
- **BPEL Processes**

### Communication Flows

The table below lists the communications created for each Sensus RNI command:

Command	Outbound Communication	Inbound Communication	Completion Event
Remote Connect	Sensus – Initiate Connect Disconnect	Sensus – Connect / Disconnect State Change	Connect Device Completion Event
Remote Disconnect	Sensus – Initiate Connect Disconnect	Sensus – Connect / Disconnect State Change	Disconnect Device Completion Event
Device Commissioning	Sensus – Meter Add Notification		Device Commissioning Completion Event
Device Decommissioning	Sensus – Meter Remote Notification		Device Decommissioning Completion Event
On-Demand Read (Scalar)	Sensus – Initiate Meter Read By Meter ID	Sensus – Reading Changed Notification	Create IMD Completion Event
On-Demand Read (Interval)		Interval data not supported	
Device Status Check	Sensus – Initiate Outage Detection	Sensus – Outage Detection Event Notification	

### Base Package Business Objects

The Sensus RNI Adapter base package includes the following communication business objects:

Business Object Name	Description
D6-ConnectDisconStateChgNtf	Sensus - Connect/Disconnect State Change

<b>Business Object Name</b>	<b>Description</b>
D6-InitiateConnectDisconnect	Sensus - Initiate Connect Disconnect
D6-InitiateOutageDetection	Sensus - Initiate Outage Detection
D6-InitiateMeterByMeterId	Sensus - Initiate Meter Read By Meter ID
D6-MeterAddNotification	Sensus - Meter Add Notification
D6-MeterRemoveNotification	Sensus - Meter Remove Notification
D6-OutageDetectEvtNotification	Sensus - Outage Detection Event Notification
D6-ReadingChgNotification	Sensus - Reading Changed Notification
D6-UnsolicitedEvtNotification	Sensus - Unsolicited Event Notification

### Sensus Event Data Mapping

The Sensus event file format maps as follows into the business object, D1-DeviceEventMappingLookup:

<b>Sensus Flat File Field</b>	<b>Device Event Seeder BO Element</b>	<b>Comments</b>
Transaction ID (from Header record)	External Source Identifier	This is the file name.
Device Identifier	External Device Identifier	
Event Name	External Event Name	
Event Creation Date/Time	Event Date/Time	
Device Type	External Device Type	This element has no real bearing on the device type within MDM/SGG. Its valid values include (although the element itself is free-form): Meter Collector Router
Service Location ID	External Service Location ID	
Communication Module Serial Number	External Communication Module Identifier	
Event Category ID	External Event Category	
Event Severity	External Event Severity	Valid values include (although the element itself is free-form): Alert Information
Status Value	External Status Value	This represents additional information that relates to the event itself.

Sensus Flat File Field	Device Event Seeder BO Element	Comments
Status Date/Time	External Status Date/Time	The date & time at which the additional information referenced above had occurred.

### External System

You must create an External System for each external system to which Oracle Utilities Smart Grid Gateway will send messages. Each external system defines a set of outbound message types that will be sent to that system. Each external system outbound message type also specifies the following:

- The processing method used to send the message (Batch, XAI, or Real-time)
- The corresponding XAI senders
- Batch Control (if Processing Method is set to Batch)
- Message XSL, W3C Schema, and Response XSL (as applicable)

### Outbound Message Types

Acknowledgement and response messages are sent and received validating that commands have been transmitted.

### XAI Configuration

The XML Application Integration (XAI) utility allows you to configure your system to receive information from and to send information to external applications using XML. The Sensus RNI adapter for Smart Grid Gateway uses one XAI inbound service to map device events. This is the same XAI inbound service used by the D1 application.

### XAI Inbound Services

XAI inbound systems define the details of how messages are received from an external system, including the inbound communication business object (or business service or service script) to be invoked when the response message is received. As in the case of inbound communication business objects, the set of XAI inbound services you need to create is based on the types of messages the system is designed to send.

The Oracle Utilities Smart Grid Gateway adapter for Sensus RNI includes the following XAI inbound services:

XAI Inbound Service	Description
D1-BulkRequestHeader	Bulk Request Header Schema Name: D1-BulkRequestHeader
D1-BulkRequestUpdate	Bulk Request Update Schema Name: D1-BULKUPD
D1-BulkResponse	Bulk Response Schema Name: D1-BulkResponse



XAI Inbound Service	Description
D1-DeviceEventSeeder	<p>Used for upload of device events.</p> <p>Schema Name: D1-DeviceEventSeeder.</p> <p>The Device Event Seeder business object serves as a means of adding device events both from outside the application and from online. Its pre-processing algorithms determine the device event type - which in turn defines the device event BO that should be used to create the device event.</p> <p>If a device event type can't be determined, the device event is created using this BO. Such a device event can then be re-processed - and if successful, a new device event is created.</p>
D1-InitialLoadIMD	<p>Used for initial measurement upload.</p> <p>Schema Name: D1-IMDSeeder.</p> <p>The IMDSeeder business object is used to determine the type of initial measurement business object to instantiate when receiving usage readings from a head-end system.</p>
D1-DeviceStatusCheck	<p>Device Status Check</p> <p>Schema Name: D1-DeviceStatusCheck</p> <p>This service is invoked by the integration layer to instantiate a Device Status Check command.</p>
D1-InitialLoadIMD	<p>Used by OSB to instantiate an IMD</p> <p>Schema Name: D1-IMDSeeder</p> <p>This XAI Inbound service is used by OSB to instantiate an Initial Measurement Data for incoming interval usage in the Sensus format.</p>
D1-RemoteConnect	<p>Remote Connect</p> <p>Schema Name: D1-RemoteConnect</p> <p>This service is invoked by the integration layer to instantiate a Remote Connect command.</p>
D1-RemoteDisconnect	<p>Remote Disconnect</p> <p>Schema Name: D1-RemoteDisconnect</p> <p>This service is invoked by the integration layer to instantiate a Remote Disconnect command.</p>

XAI Inbound Service	Description
D6-ConDisconStChgNotification	<p>Initiate Connect Disconnect response.</p> <p>Schema Name: D6-ConnectDisconStateChgNtf</p> <p>Retrieve response from the Initiate Connect Disconnect command.</p>
D6-OutageDetectionEventNotification	<p>Initiate Outage Detection Response</p> <p>Schema Name: D6-OutageDetectEvtNotification</p> <p>Retrieve response from the Initiate Outage Detection Event Notification command.</p>
D6-ReadingChangedNotification	<p>Reading Changed Notification</p> <p>Schema Name: D6-ReadingChgNotification</p> <p>Notification that a Sensus device reading has changed.</p>
D6-UnsolicitedEventNotification	<p>Unsolicited Event Response</p> <p>Schema Name: D6-UnsolicitedEvtNotification</p> <p>Retrieve unsolicited notifications when an event triggers an alarm on the meter.</p>

## XAI Senders

XAI senders define the details of how messages are sent to an external system. As in the case of outbound communication business objects and outbound message types, the set of XAI senders you need to create is based on the types of messages the system is designed to accept.

## BPEL Processes

These processes are responsible for performing the conversion from Oracle Utilities format to MultiSpeak 4.1 format, invoking process callouts and invoking the remote endpoint to trigger the device events.

**OnDemandRead Composite Process** - Invokes the remote endpoint to trigger the on-demand read event. An asynchronous reply responds to the OUAF layer when the reading arrives.

**ConnectDisconnect Composite Process** - Invokes the remote endpoint to trigger the connect/disconnect event. An asynchronous reply responds to the OUAF layer when confirmation of the requested event arrives.

**CommissionDecommission Composite Process** - Invokes the remote endpoint to trigger the commission or decommission event. After the synchronous call completes, a one of the following second business callout services is invoked to determined if the related “received” or “completed” callout should be executed:

- `isExecutingCommissionReceivedCallout`
- `isExecutingCommissionCompletedCallout`
- `isExecutingDecommissionReceivedCallout`
- `isExecutingDecommissionCompletedCallout`

**DeviceStatusCheck Composite** - Invokes the remote endpoint to trigger the initiate outage detection event. An asynchronous reply responds to the OUAF layer when confirmation of the requested event arrives.

**ProcessCallout Composite** - This business callout provides a point at which customers and implementers can incorporate custom business logic and transformations. This composite includes the WSDLs and processing logic for all of the MultiSpeak processes. The default implementation of each method is a direct return of the input.

## Web Services

These web services are all defined in the Sensus RNI head end system. The WSDLs were added to a Meta Data Storage (MDS) layer in OUAF and all references to the WSDL point to this MDS location. These web services have HTTP security by default. You may need to modify the security as a part of your implementation.

Web Service	Related BPEL Process	Description
CB_ServerService	ConnectDisconnect	<p>This web service defines the return interface, the means by which the status is returned to the calling system.</p> <p>This web service is only be invoked by the head end system, not OUAF. Only the CDStateChangeNotification web method is implemented in the composite.</p> <p>The endpointURI format is: http://&lt;EM_SERVER&gt;:&lt;EM_SERVER_PORT&gt;/soa-infra/services/Sensus/ConnectDisconnect/CB_ServerService</p>
CB_Server	OnDemandRead	<p>This web service defines the return interface, the means by which the reading is returned to the calling system.</p> <p>This web service is only be invoked by the head end system, not OUAF. Only the ReadingChangedNotification web method is implemented in the composite.</p> <p>The endpointURI format is: http://&lt;EM_SERVER&gt;:&lt;EM_SERVER_PORT&gt;/soa-infra/services/Sensus/OnDemandRead/CB_Server</p>
OA_ServerService	DeviceStatusCheck	<p>This web service defines the asynchronous return for InitiateOutageDetectionEventRequest for solicited responses. It is also used for unsolicited alarms.</p> <p>This web service is only be invoked by the head end system, not OUAF. Only the ODEventNotification, PingURL, and GetMethods web methods are implemented in the composite.</p> <p>The endpointURI format is: http://&lt;EM_SERVER&gt;:&lt;EM_SERVER_PORT&gt;/soa-infra/services/Sensus/DeviceStatusCheck/OA_ServerService</p>

**Sensus RNI Web Services**

The following table describes the Sensus RNI web services and operations used for the Oracle Utilities Smart Grid Gateway command messaging:

<b>Smart Grid Gateway Command</b>	<b>AMI Adapter Business Objects</b>	<b>Sensus Web Services</b>	<b>Sensus Operations</b>
Device Commissioning	D6-MeterAddNotification	MR	MeterAddNotification
Device Decommissioning	D6-MeterRemoveNotification	MR	MeterRemoveNotification
Remote Connect/ Remote Disconnect	D6-InitiateConnectDisconnect	CD	InitiateConnectDisconnect
	D6-ConnectDisconStateChgNtf	CB	CDStatesChangedNotification (async reply)
Device Status Check	D6-InitiateOutageDetection	OD	InitiateOutageDetectionEventRequest
	D6-OutageDetectEvtNotification	OA	ODEventNotification (async reply)
On-Demand Read	D6-InitiateMeterByMeterId	MR	InitiateMeterReadingsByMeterID
	D6-ReadingChangedNotification	CB	ReadingChangedNotification (async reply)

## Configuring a Sensus RNI Head-End System

This section outlines the configuration required for the Oracle Utilities Smart Grid Gateway Adapter for Sensus RNI to communicate with the Sensus RNI. This includes:

- **XAI Inbound Services**
- **XAI Senders**
- **Outbound Message Types**
- **External System**
- **Service Provider**
- **Processing Methods for Service Provider**

### XAI Inbound Services

XAI inbound services define the details of how messages are received from an external system. This includes incoming usage and device events, as well as messages sent from the Sensus Regional Network Interface (RNI) in response to a command request.

The following XAI Inbound Services must be configured in your system. If these are not present in your configuration, add them. Refer to the Oracle Utilities Application Framework documentation for more information about creating XAI inbound services.

<b>XAI Inbound Service Name</b>	<b>Description</b>	<b>Schema Type</b>	<b>Schema Name</b>
D1-DeviceEventSeeder	Device Event Seeder	Business Object	D1-DeviceEventSeeder
D1-DeviceStatusCheck	Device Status Check	Business Object	D1-DeviceStatusCheck
D1-InitialLoadIMD	IMD Seeder	Business Object	D1-IMDSeeder
D1-PayloadErrorNotif	Payload Error Notification	Business Object	D1-PayloadErrorNotif
D1-PayloadStatistics	Payload Statistics	Business Object	D1-PayloadStatistics
D1-PayloadSummary	Payload Summary	Business Object	D1-PayloadSummary
D6-ConDisconStChgNotification	Initiate Connect Disconnect Response	Business Object	D6- ConnectDisconStateChgNtf
D6-OutageDetectionEventNotification	Initiate Outage Detection Response	Business Object	D6- OutageDetectEvtNotification
D6-ReadingChangedNotification	Reading Changed Notification	Business Object	D6-ReadingChgNotification
D6-UnsolicitedEventNotification	Unsolicited Event Response	Business Object	D6-UnsolicitedEvtNotification

## XAI Senders

XAI senders define the details of how messages are sent to an external system, such as messages containing device command requests.

The following XAI Senders must be configured in your system. If these are not present in your configuration, add them. Refer to the Oracle Utilities Application Framework documentation for more information about creating XAI senders.

XAI Sender	Description	Operation	Service
D6-CONDISCON	Sensus Initiate Connect/Disconnect	InitiateConnectDisconnect	ConnectDisconnect
D6-INTOUTDET	Initiate Outage Detection Request	InitiateOutageDetectionEventRequest	OD_ServerService
D6-InitMID	Initiate Meter Read By Meter ID Outbound Message	InitiateMeterReadingsByMeterID	OnDemandReadService

Note: The following apply to all of the above XAI senders:

Main Tab:

- **Invocation Type:** Real-time
- **XAI Class:** RTHTTPSNDR (Sender routes message via HTTP real-time)
- **MSG Encoding:** UTF-8 message encoding

Context Tab:

- **HTTP Header:** SOAPAction:<OPERATION>
- **HTTP Login User:** <USER\_ID>
- **HTTP Login Password:** <PASSWORD>
- **HTTP Method:** POST
- **HTTP URL 1:** http://<EM\_SERVER>:<EM\_SERVER\_PORT>/soa-infra/services/Sensus/<SERVICE>

where:

- **<OPERATION>**: the operation performed by the XAI Sender (see Operation column in the table above)
- **<USER\_ID>**: the user ID used to log into WebLogic Enterprise Manager
- **<PASSWORD>**: the password used to log into WebLogic Enterprise Manager
- **<EM\_SERVER\_IP>**: the machine name or IP address of server where the WebLogic Enterprise Manager is installed
- **<EM\_SERVER\_PORT>**: the port where the WebLogic Enterprise Manager is installed
- **<SERVICE>**: the service invoked by the XAI Sender (see Service column in the table above)

## Outbound Message Types

Outbound message types define specific types of messages sent to an external system, such as messages containing device command requests.

The following outbound message types must be configured in your system. If these are not present in your configuration, add them. Refer to the Oracle Utilities Application Framework documentation for more information about creating outbound message types.

Outbound Message Type	Description
D6-CONDISCON	Sensus Initiate Connect Disconnect
D6-INITMTR	Initiate Meter Read By Meter ID
D6-INTOUTDET	Initiate Outage Detection Request

Note: The following apply to all of the above outbound message types:

- **Business Object:** D1-OutboundMessage (Outbound Message)
- **Priority:** Priority 50

## External System

External systems represent external applications with which the Smart Grid Gateway will exchange messages or data. In the case of the Smart Grid Gateway adapters, external systems represent the head-end systems with which the adapters communicate.

An external system that represents the Sensus RNI must be present in your system. If this is not present in your configuration, add it, along with the following Outbound Message Types. Refer to the Oracle Utilities Application Framework documentation for more information about creating external systems.

### External System - Sensus:

- **External System:** Sensus
- **Description:** Sensus
- **Outbound Message Types:**

Outbound Message Type	XAI Sender
D6-CONDISCON (Sensus Initiate Connect Disconnect)	D6-CONDISCON (Sensus Initiate Connect/Disconnect)
D6-INITMTR (Initiate Meter Read By Meter ID)	D6-InitMID (Initiate Meter Read By Meter ID Outbound Message)
D6-INTOUTDET (Initiate Outage Detection Request)	D6-INTOUTDET (Initiate Outage Detection Request)

Note: The following apply to all of the above outbound message types:

- **Processing Method:** Real-time
- **Message XSL:** D6-Request.xsl
- **Response XSL:** D6-Response.xsl



## Service Provider

Service providers represent external entities that serve various roles relative to the application, including head-end systems, billing systems to which the application sends bill determinant data, market participants in a deregulated environment, outage management systems that receive meter event data from the application, or other parties that require or provide information to the system. The head-end systems that collect and send measurement data and meter events to the application are defined as service providers.

A service provider that represents the Sensus RNI must be present in your system. If this is not present in your configuration, add it. Refer to the Oracle Utilities Service and Measurement Data Foundation documentation for more information about creating service providers.

### Service Provider - Sensus:

- **Service Provider:** Sensus
- **Description:** Sensus
- **External Reference ID:** Sensus
- **External System:** Sensus
- **Our Name/ID in Their System:**
- **AMI Device ID Type:** Internal Meter Number
- **AMI Measuring Component ID Type:** Channel ID

## Processing Methods for Service Provider

Processing methods define the format or means by which a service provider receives and/or sends data from and/or to the application, including bill determinants, usage data, or device events. Processing methods are also used to define how to create information internal to the application such as initial measurement data and device events. Processing methods can also be used to define how command requests are sent to the Sensus RNI.

The following types of processing methods must be configured for the Sensus service provider. Refer to the Oracle Utilities Service and Measurement Data Foundation documentation for more information about configuring processing methods.

### Initial Measurement Creation

Initial measurement creation processing methods define the business objects used to create initial measurements. The IMD Seeder XAI Inbound Service uses this processing method to determine which type of initial measurement business object to instantiate when receiving usage from the Sensus RNI.

#### Processing Method - Initial Measurement Creation

- **Service Provider:** Sensus
- **Processing Role:** Initial Measurement Creation
- **Description:** Sensus Initial Measurement Creation
- **Status:** Active
- **Default Processing Method:**
  - **Business Object:** D6-InitialLoadIMDInterval (Sensus Initial Load IMD - Interval)
- **Override Processing Method:**
  - **Measuring Component Type:** Electric Residential kWh Scalar
  - **Business Object:** D6-InitialLoadIMDScalar (Sensus Initial Load IMD - Scalar)

## Device Event Mapping

Device event mapping processing methods define how head-end-specific device events are mapped to standard device event names. The Device Event Seeder XAI Inbound Service uses this processing method to determine which type of device event business object to instantiate when receiving device events from the Sensus RNI.

### Processing Method - Device Event Mapping

- **Service Provider:** Sensus
- **Processing Role:** Device Event Mapping
- **Description:** Sensus Device Event Mapping
- **Status:** Active
- **Default Processing Method:**
  - **Business Object:** D6-DeviceEventMappingLookup (Sensus Device Event Mapping)
- **Override Processing Method:** based on implementation-specific requirements

## UOM Mapping

UOM mapping processing methods define how head-end-specific unit of measure (UOM) codes are mapped to standard UOM codes. This processing method is used to determine how to map Sensus UOM codes to standard UOM codes when receiving usage from the Sensus RNI.

### Processing Method - UOM Mapping

- **Service Provider:** Sensus
- **Processing Role:** UOM Mapping
- **Description:** Sensus UOM Mapping
- **Status:** Active
- **Default Processing Method:**
  - **Business Object:** D6-HeadendUOMLookup (Sensus UOM Code to Standard UOM Mapping)
- **Override Processing Method:** based on implementation-specific requirements

## Commands

Command processing methods define how command requests are sent to a head-end system. More specifically, they define the type of outbound communication business object to create for each type of command, and the outbound message type to send to the head-end system.

The following types of command processing methods can be configured for the Sensus service provider, based on the requirements of each implementation.

### Device Commission

- **Service Provider:** Sensus
- **Processing Role:** Device Commission
- **Description:** Sensus Device Commission
- **Status:** Active
- **Processing Method:**
  - **Default Business Object:** D6-MeterAddNotification (Sensus Meter Add Notification)
  - **Default Outbound Message Type:** Sensus Commissioning Outbound Message Type

**Device Decommission**

- **Service Provider:** Sensus
- **Processing Role:** Device Decommission
- **Description:** Sensus Device Decommission
- **Status:** Active
- **Processing Method:**
  - **Default Business Object:** D6-MeterRemoveNotification (Sensus - Meter Remove Notification)
  - **Default Outbound Message Type:** Meter Decommissioning

**Device Status Check**

- **Service Provider:** Sensus
- **Processing Role:** Device Status Check
- **Description:** Initiate Outage Detection
- **Status:** Active
- **Processing Method:**
  - **Default Business Object:** D6-InitiateOutageDetection (Sensus - Initiate Outage Detection)
  - **Default Outbound Message Type:** Initiate Outage Detection Request

**On-Demand Read (Scalar)**

- **Service Provider:** Sensus
- **Processing Role:** On-Demand Read (Scalar)
- **Description:** On-Demand Read Sensus (Scalar)
- **Status:** Active
- **Processing Method:**
  - **Default Business Object:** D6-InitiateMeterByMeterId (Sensus - Initiate Meter Read by Meter ID)
  - **Default Outbound Message Type:** Initiate Meter Read by Meter ID

**Remote Connect**

- **Service Provider:** Sensus
- **Processing Role:** Remote Connect
- **Description:** Sensus Initiate Connect
- **Status:** Active
- **Processing Method:**
  - **Default Business Object:** D6-InitiateConnectDisconnect (Sensus - Initiate Connect Disconnect)
  - **Default Outbound Message Type:** Connect Device

**Remote Disconnect**

- **Service Provider:** Sensus
- **Processing Role:** Remote Disconnect
- **Description:** Sensus Initiate Disconnect

- **Status:** Active
- **Processing Method:**
  - **Default Business Object:** D6-InitiateConnectDisconnect (Sensus - Initiate Connect Disconnect)
  - **Default Outbound Message Type:** Initiate Connect Disconnect

## Configuring Sensus Extendable Lookups

This section outlines some of the extendable lookups that must be configured for use with the Sensus adapter. These include:

- **Sensus Device Event Mapping**
- **Sensus UOM Code to Standard UOM Mapping**
- **Sensus Interval Status Code to Condition Mapping**

Refer to the Oracle Utilities Application Framework documentation for more information about working with extendable lookups.

### Sensus Device Event Mapping

The Sensus Device Event Mapping extendable lookup is used to determine which type of device event business object to instantiate when receiving device events from the Sensus RNI.

Each value defined for the Sensus Device Event Mapping extendable lookup should include the following:

- **Head-End System Event Name:** The event name used by the Sensus RNI
- **Description:** A description of the device event
- **Status:** The status of the lookup value (can be Active or Inactive)
- **Standard Event Name:** The standard event name for device events of this type, from the “Standard Event Name” extendable lookup.

**Example:** The Sensus “Tampering” device event name could be mapped to the “Device Tampering” standard device event name as follows:

- **Head-End System Event Name:** Tampering
- **Description:** Tampering Detected
- **Status:** Active
- **Standard Event Name:** Device Tampering

### Sensus UOM Code to Standard UOM Mapping

Usage received from Sensus may use utility-specific unit of measures (UOMs). These custom UOMs must be mapped to standard UOM codes. The Sensus UOM Code to Standard UOM Mapping extendable lookup is used to determine how to map Sensus UOM codes to standard UOM codes when receiving usage from the Sensus RNI.

Each value defined for the Sensus UOM Code to Standard UOM Mapping extendable lookup should include the following:

- **Unit of Measure:** The unit of measure defined in the system. See *Defining Units of Measure* in the *Oracle Utilities Service and Measurement Data Foundation User's Guide* for more information about creating UOM codes for use with Oracle Utilities Smart Grid Gateway.
- **Head-end UOM:** The unit of measure code used by the Sensus RNI
- **Description:** A description of the unit of measure code.
- **Status:** The status of the lookup value (can be Active or Inactive)

**Example:** The Sensus “KWH” unit of measure code could be mapped to the “Kilowatt Hours” standard UOM code as follows:

- **Unit of Measure:** Kilowatt Hours
- **Head-end UOM:** kWh

- **Description:** Sensus Kilowatt Hours

## Sensus Interval Status Code to Condition Mapping

Interval usage received from the Sensus RNI can include Sensus interval status codes that indicate the status or condition of the interval value. These interval status codes must be mapped to standard condition codes in the system. The Sensus Interval Status Code to Condition Mapping extendable lookup is used to determine how to map Sensus interval status codes to standard status codes when receiving usage from the Sensus RNI.

Each value defined for the Sensus Interval Status Code to Condition Mapping extendable lookup should include the following:

- **Interval Status:** The Sensus interval status code
- **Description:** A description of the interval status code.
- **Status:** The status of the lookup value (can be Active or Inactive)
- **Condition:** The condition code to which the interval status code is to be mapped, from the Measurement Condition extendable lookup.

**Example:** The Sensus “Missing” interval status code could be mapped to the “Missing” condition code as follows:

- **Interval Status:** Missing
- **Condition:** Missing
- **Description:** Sensus Missing

## Extending the Adapter for Sensus

The Oracle Utilities Smart Grid Gateway Adapter for Sensus supports a number of commands, including:

- Commission Device
- Decommission Device
- Device Status Check
- On-Demand Read
- Remote Connect
- Remote Disconnect

The Adapter for Sensus can be extended to support additional commands provided by the Sensus RNI. See **Creating Custom Commands** on page 9-26 of the *Oracle Utilities Smart Grid Gateway Configuration Guide* for more information about adding commands to the Sensus adapter.

## The Test Harness

Oracle Utilities Smart Grid Gateway Adapter for Sensus RNI includes a test harness that can be configured to simulate a general head-end system for testing the two-way commands. The test harness includes a BPEL composite, web services for standard meter functions, and an XML file that can be used to contain information for one or more meters. This chapter describes the test harness and its components, including:

- **Test Harness Design**
- **Test Harness Security Credentials**
- **Locating the WSDL for the Test Harness**
- **Web Services**

### Test Harness Design

The Sensus RNI Harness is divided into two main layers. The “front end” set of services implements the Sensus RNI specified interfaces. They receive requests corresponding to the following:

- [http://www.multispeak.org/Version\\_4.1\\_Release MR\\_Server](http://www.multispeak.org/Version_4.1_Release_MR_Server)
  - MeterAddNotification
  - MeterRemoveNotification
  - InitiateMeterReadingsByMeterID
- [http://www.multispeak.org/Version\\_4.1\\_Release CD\\_Server](http://www.multispeak.org/Version_4.1_Release_CD_Server)
  - InitiateConnectDisconnect
- [http://www.multispeak.org/Version\\_4.1\\_Release CB\\_Server](http://www.multispeak.org/Version_4.1_Release_CB_Server)
  - CDStatesChangedNotification (async reply)
  - ReadingChangedNotification (async reply)
- [http://www.multispeak.org/Version\\_4.1\\_Release OD\\_Server](http://www.multispeak.org/Version_4.1_Release_OD_Server)
  - InitiateOutageDetectionEventRequest

Each of these services calls into the “back end” layer, which defines meters and sets their attributes. These meters are stored in a file within the test harness called meterdb.xml. This file can be modified pre-deployment. Post-deployment changes to the file are not supported. However, the Test Harness retains an in-memory “database” of the meters in the file. The in-memory representation can be modified using the Utility web services. Note that any changes to the in-memory structure will be lost when the server is restarted or the Test Harness composite is redeployed.

### Test Harness Security Credentials

The test harness is configured with the following default multispeak credentials for RNI security:

- MultiSpeakUserID/MultiSpeakPwd

For more information about configuring security for the SOA system for the Sensus RNI adapter, see the *Oracle Utilities Smart Grid Gateway Installation Guide*.

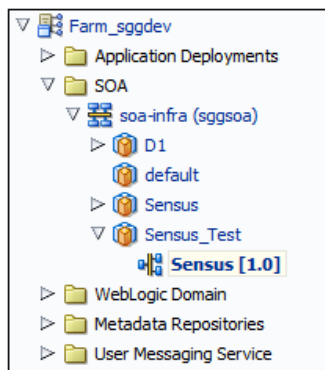


## Locating the WSDL for the Test Harness

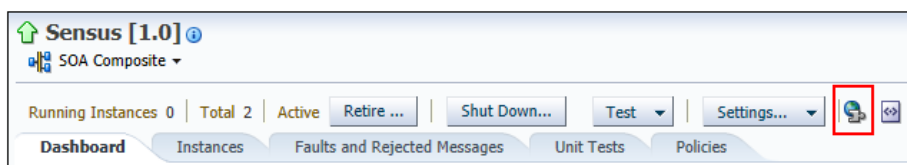
Follow these procedures to locate the test harness WSDL:

### How to Use Enterprise Manager to Locate the WSDL

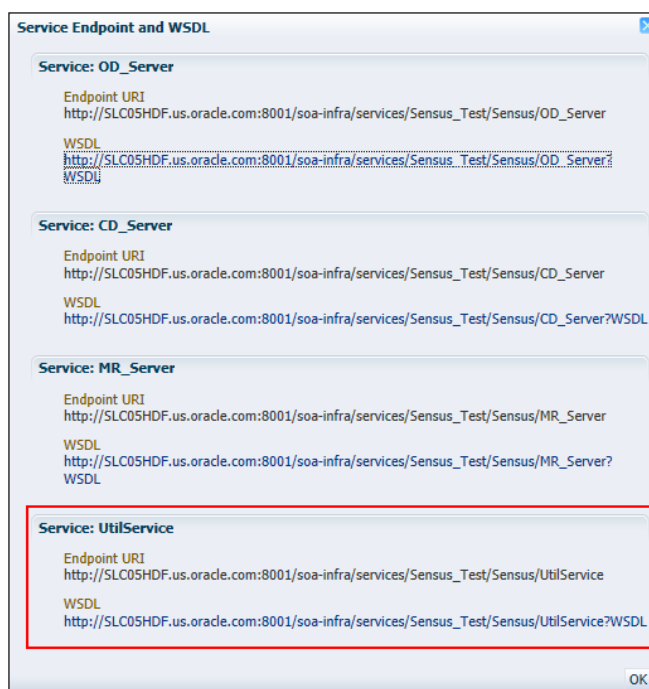
1. Open Enterprise Manager and use the navigation pane to open the dashboard of the test harness composite:



2. The top bar of the dashboard contains several buttons and icons. One of these is a “world” icon with a puzzle piece over it. Click this icon to display a list of the WSDLs and endpoint URIs for the composite:



3. Click the UtilService WSDL URL link to see the WSDL in the browser, or right click and save it to your machine



Depending on your requirements, it may be necessary to download the associated schema found in the wsdl:types section. The URL can be pasted into a browser tab and downloaded in the same manner as the WSDL. The main schema has imported schemas that may also be required.

### **How to Use a Direct URL to locate the WSDL**

The WSDL can be accessed without Enterprise Manager by understanding the paths used on the SOA server. In general, they have the following form:

```
http://{server name}:{port number}/soa-infra/services/{partition}/  
{Composite}/{Web Service}?WSDL
```

So by default, the test harness WSDL can be found at

```
http://{server name}:{port number}/soa-infra/services/Sensus_Test/  
Sensus/UtilService?WSDL
```

## Web Services

This section describes the web services included in the test harness BPEL composite, including:

- **General Services**
- **Locate Meter Services**
- **Meter Administration Services**
- **Meter Attribute Administration Services**

### General Services

This section describes the general services of the test harness composite, including:

- **LoadMeterIndex**
- **ViewAuditTrail**

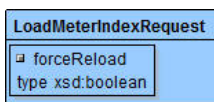
### LoadMeterIndex

This web service loads the data store from the internal file. By default if the store is already in memory, it will *not* reload. This behavior can be overridden with the forceReload parameter.

**Input** - LoadMeterIndexInput

**Part:** payload

**Element:** LoadMeterIndexRequest

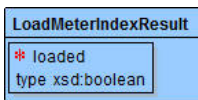


Parameter	Description
forceReload	A switch telling the system whether to reload the meter index from the configuration file. Default value is false.

**Output** - LoadMeterIndexOutput

**Part:** payload

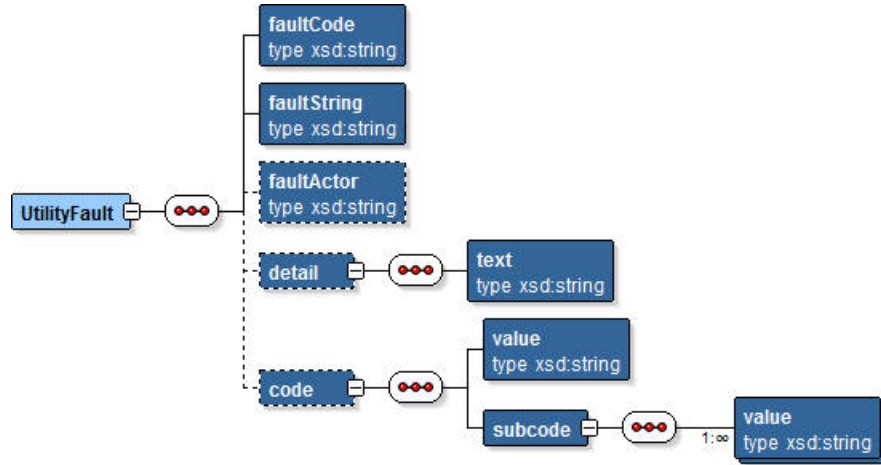
**Element:** LoadMeterIndexResult



Parameter	Description
loaded	A boolean value for whether or not the index was reloaded from the configuration file

**Fault** - UtilityFault

Fault with similar mapping to SGG/OUAF faults.



Typically, the faultCode, faultString, faultActor, and detail/text elements will be populated.

**ViewAuditTrail**

This web service returns the audit log for the entire session.

**Input - ViewAuditTrailInput**

**Part:** payload

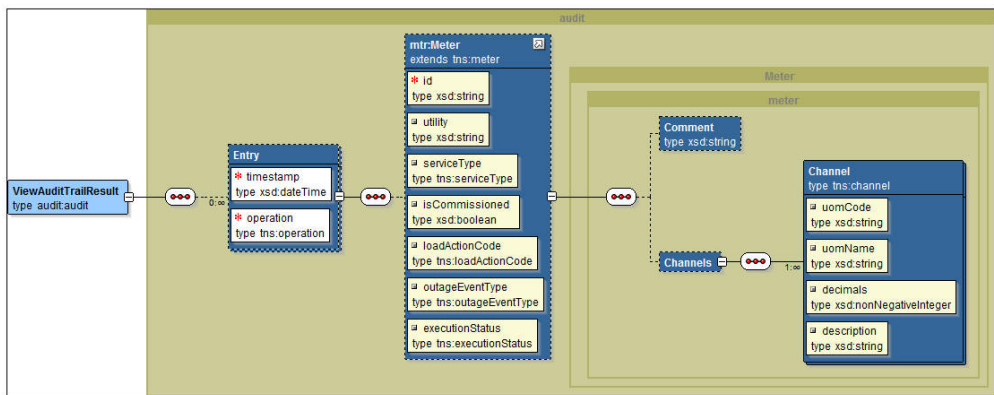
**Element:** ViewAuditTrailRequest

**Parameters:** This is an empty request. There are no parameters.

**Output - ViewAuditTrailOutput**

**Part:** payload

**Element:** ViewAuditTrailResult



This element is an entry consisting of a timestamp and an Operation. Each entry may have an associated meter object showing what changed.

**Fault -** See **UtilityFault** on page 2-27.

## Locate Meter Services

This section describes the locate meter web services of the test harness composite, including:

- **FindMeters**
- **IsMeterDefined**
- **GetMeter**

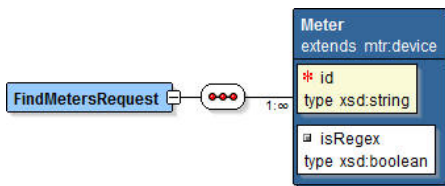
### FindMeters

This web service queries the data store for one or more meters. The difference between GetMeter and FindMeters is GetMeter can return at most one meter and it must match the provided ID exactly. GetMeter will throw an error if the ID is not found. FindMeters can return more than one meter (when using the regex) and will not throw an error when the ID does not match any of the meters in the index.

**Input** - FindMetersInput

**Part:** payload

**Element:** FindMetersRequest

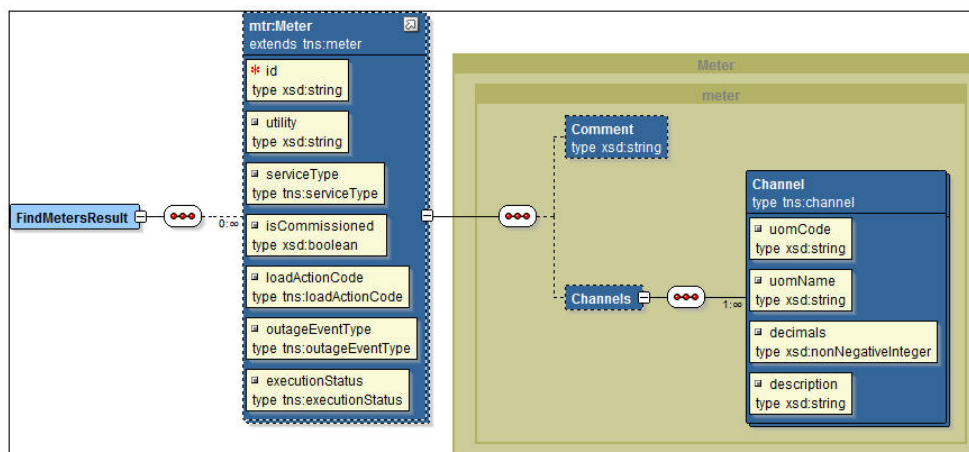


Parameter	Description
id	The meter ID for which to search
isRegex	The provided id can be a regex value when this parameter is true. Hint: to search for all meters in the system, use ".*" for the ID.

**Output** - FindMetersOutput

**Part:** payload

**Element:** FindMetersResult



Zero or more meter objects can be returned from the search

**Fault** - See **UtilityFault** on page 2-27. Unlike other methods, FindMeters does not throw an exception if the meter is not found.

### IsMeterDefined

This web service queries whether a particular meter is defined in the data store.

**Input - IsMeterDefinedInput**

**Part:** payload

**Element:** IsMeterDefinedRequest

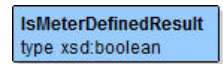


Parameter	Description
id	The meter ID for which to search

**Output - IsMeterDefinedOutput**

**Part:** payload

**Element:** IsMeterDefinedResult



Whether or not the provided ID is part of the index.

**Fault -** See **UtilityFault** on page 2-27. Thrown when meter id is not found.

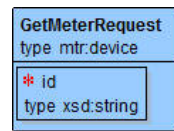
### GetMeter

This web service returns all the attributes of a single meter from the in-memory data store. The difference between **GetMeter** and **FindMeters** is **GetMeter** can return at most one meter and it must match the provided ID exactly. **GetMeter** will throw an error if the ID is not found. **FindMeters** can return more than one meter (when using the regex) and will not throw an error when the ID does not match any of the meters in the index.

**Input - GetMeterInput**

**Part:** payload

**Element:** GetMeterRequest

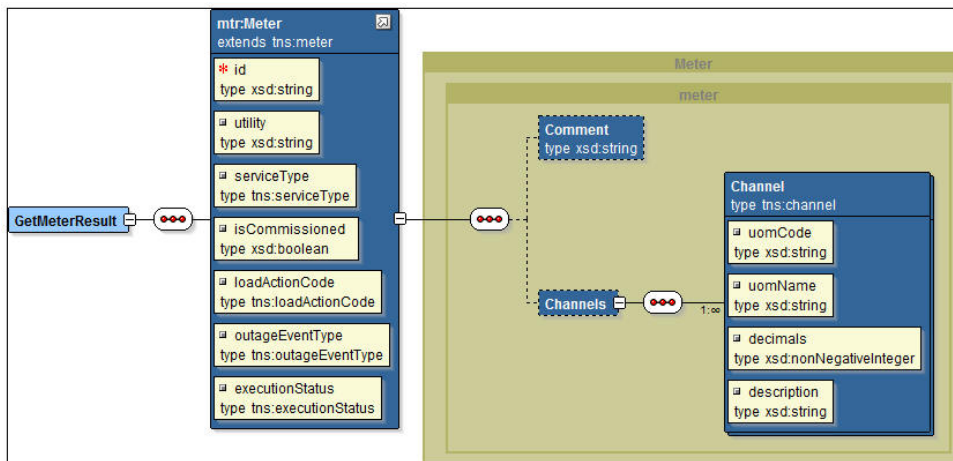


Parameter	Description
id	The meter ID for which to search

**Output - GetMeterOutput**

**Part:** payload

**Element:** GetMeterResult



The meter object requested by the ID.

**Fault** - See **UtilityFault** on page 2-27. Thrown when meter id is not found.

**Meter Administration Services**

This section describes the meter administration services of the test harness composite, including:

- **AddMeters**
- **RemoveMeter**
- **AddMeterChannel**
- **RemoveMeterChannel**
- **ReadScalarMeter**

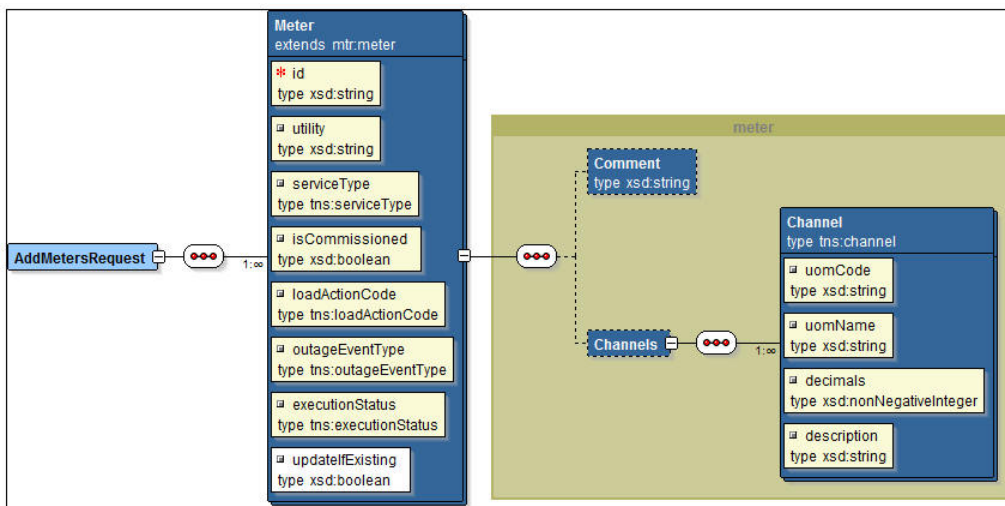
**AddMeters**

This web service adds a set of meters to the in-memory data store. This will not permanently add it to the control file.

**Input** - AddMetersInput

**Part:** payload

**Element:** AddMetersRequest

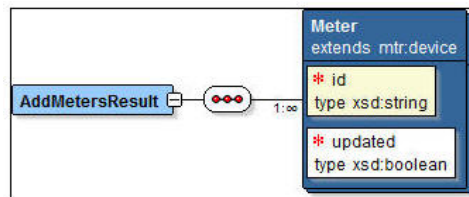


Parameter	Description
id	The identification code for the meter.
utility	An informational string.
serviceType	One of the valid ServiceType values (see schema). "Electric" is the only option at this time.
isCommissioned	Whether or not the meter is in a commissioned state.
loadActionCode	One of the possible LoadActionCode values used in Connect and Disconnect (see schema).
outageEventType	One of the possible OutageEventType values used in Device Status Check (see schema).
executionStatus	One of the possible ExecutionStates (see schema). These values control how the meter will respond to commands.
updateIfExistsing	Whether or not to update the meter with the provided values if it already exists in the index.
Comment	An informational string describing the purpose of the meter.
Channels	A listing of unit of measures supported by this meter.
uomCode	A code describing the unit of measure for the channel.
uomName	A short string containing the name of the unit of measure.
decimals	The number of digits to the right of the decimal that should be generated when reading the meter.
description	A longer description of the unit of measure.

**Output - AddMetersOutput**

**Part:** payload

**Element:** AddMetersResult



Whether or not each meter was added to the index.

**Fault -** See **UtilityFault** on page 2-27.

**RemoveMeter**

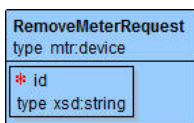
This web service removes a meter from the in-memory data store. This will not permanently remove it from the control file.

**Input -** RemoveMeterInput

**Part:** payload



**Element:** RemoveMeterRequest



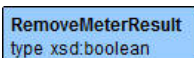
Parameter	Description
-----------	-------------

id	The ID for the meter to be removed.
----	-------------------------------------

**Output -** RemoveMeterOutput

**Part:** payload

**Element:** RemoveMeterResult



Whether or not the meter was removed from the index.

**Fault -** See **UtilityFault** on page 2-27. Thrown when meter id is not found.

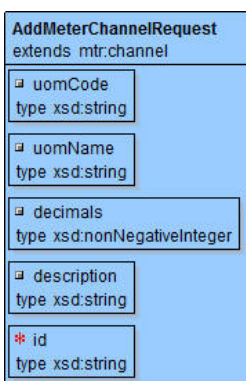
### AddMeterChannel

This web service adds a new channel to a single meter.

**Input -** AddMeterChannelInput

**Part:** payload

**Element:** AddMeterChannelRequest



Parameter	Description
-----------	-------------

id	The identification code for the meter.
uomCode	A code describing the unit of measure for the channel.
uomName	A short string containing the name of the unit of measure.
decimals	The number of digits to the right of the decimal that should be generated when reading the meter.
description	A longer description of the unit of measure.

**Output -** AddMeterChannelOutput

**Part:** payload

**Element:** AddMeterChannelResult

AddMeterChannelResult  
type xsd:boolean

Whether or not the channel was added to the index.

**Fault** - See **UtilityFault** on page 2-27. Thrown when meter id is not found.

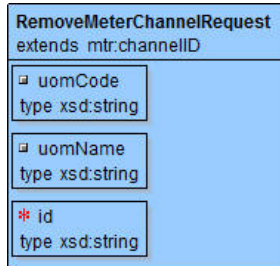
### RemoveMeterChannel

This web service removes a Channel from a meter.

**Input** - RemoveMeterChannelInput

**Part:** payload

**Element:** RemoveMeterChannelRequest



Parameter	Description
id	The ID for the meter to be removed.
uomCode	A code describing the unit of measure for the channel.
uomName	A short string containing the name of the unit of measure.

These three parameters are combined to locate a unique channel

**Output** - RemoveMeterChannelOutput

**Part:** payload

**Element:** RemoveMeterChannelResult

RemoveMeterResult  
type xsd:boolean

Whether or not the channel was removed from the meter.

**Fault** - See **UtilityFault** on page 2-27. Thrown when meter id is not found.

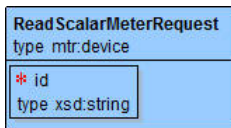
### ReadScalarMeter

This web service generates a scalar reading for each channel of a given meter.

**Input** - ReadScalarMeterInput

**Part:** payload

**Element:** ReadScalarMeterRequest

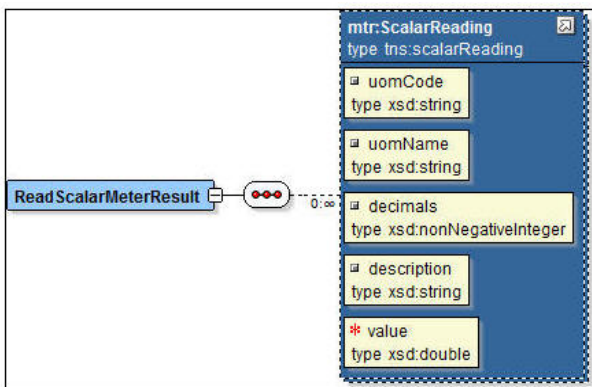


Parameter	Description
id	The ID for the meter to be read.

**Output -** ReadScalarMeterOutput

**Part:** payload

**Element:** ReadScalarMeterResult



Zero or more scalar readings for the given meter.

Parameter	Description
uomCode	A code describing the unit of measure for the channel.
uomName	A short string containing the name of the unit of measure.
decimals	The number of digits to the right of the decimal that should be generated when reading the meter.
description	A longer description of the unit of measure.
value	A random number representing the scalar reading.

**Fault -** See `UtilityFault` on page 2-27. Thrown when meter id is not found.

## Meter Attribute Administration Services

This section describes the meter attribute administration services of the test harness composite, including:

- **GetOutageEventType**
- **SetOutageEventType**
- **GetLoadActionCode**
- **SetLoadActionCode**
- **IsCommissioned**
- **SetCommissioned**
- **GetExecutionStatus**
- **SetExecutionStatus**

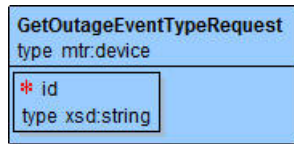
### GetOutageEventType

This web service queries the outage event type for a given meter. The OutageEventType is used by DeviceStatusCheck.

**Input** - GetOutageEventTypeInput

**Part:** payload

**Element:** GetOutageEventTypeRequest

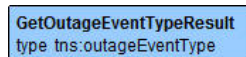


Parameter	Description
id	The ID for the meter for which the OutageEventType should be retrieved.

**Output** - GetOutageEventTypeOutput

**Part:** payload

**Element:** GetOutageEventTypeResult



The value of the OutageEventType attribute for the requested meter.

**Fault** - See **UtilityFault** on page 2-27. Thrown when meter id is not found.

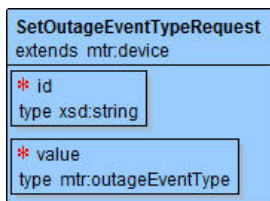
### SetOutageEventType

This web service updates the outage event type for a given meter.

**Input** - SetOutageEventTypeInput

**Part:** payload

**Element:** SetOutageEventTypeRequest




---

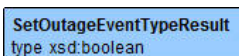
Parameter	Description
-----------	-------------

id	The ID for the meter for which the OutageEventType should be set.
value	The new value of OutageEventType to set on the meter.

**Output -** SetOutageEventTypeOutput

**Part:** payload

**Element:** SetOutageEventTypeResult



The boolean response indicates the success or failure of the update (not the current field status).

**Fault -** See **UtilityFault** on page 2-27. Thrown when meter id is not found.

### GetLoadActionCode

This web service queries the load action code for a given meter. This is the Connect/Disconnect behavior.

**Input -** GetLoadActionCodeInput

**Part:** payload

**Element:** GetLoadActionCodeRequest




---

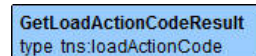
Parameter	Description
-----------	-------------

id	The ID for the meter for which the LoadActionCode should be retrieved.
----	--

**Output -** GetLoadActionCodeOutput

**Part:** payload

**Element:** GetLoadActionCodeResult



The value of the LoadActionCode attribute for the requested meter.

**Fault -** See **UtilityFault** on page 2-27. Thrown when meter id is not found.

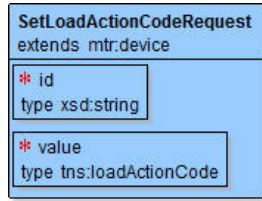
### SetLoadActionCode

This web service updates the load action code for a given meter.

**Input -** SetLoadActionCodeInput

**Part:** payload

**Element:** SetLoadActionCodeRequest

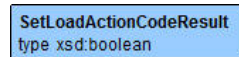


Parameter	Description
id	The ID for the meter for which the LoadActionCode should be set.
value	The new value of LoadActionCode to set on the meter.

**Output -** SetLoadActionCodeOutput

**Part:** payload

**Element:** SetLoadActionCodeResult



The boolean response indicates the success or failure of the update (not the current field status).

**Fault -** See **UtilityFault** on page 2-27. Thrown when meter id is not found.

### IsCommissioned

This web service queries the commissioning status for a given meter. This is the Commission/Decommission behavior.

**Input -** IsCommissionedInput

**Part:** payload

**Element:** IsCommissionedRequest

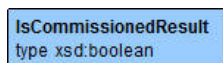


Parameter	Description
id	The ID for the meter for which the Commissioned status should be retrieved.

**Output -** IsCommissionedOutput

**Part:** payload

**Element:** IsCommissionedResult



The value of the Commissioned status attribute for the requested meter.

**Fault -** See **UtilityFault** on page 2-27. Thrown when meter id is not found.

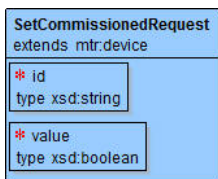
## SetCommissioned

This web service updates the commissioning status for a given meter.

**Input** - SetCommissionedInput

**Part:** payload

**Element:** SetCommissionedRequest

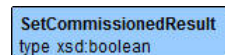


Parameter	Description
id	The ID for the meter for which the Commissioned status should be set.
value	The new value of Commissioned status to set on the meter.

**Output** - SetCommissionedOutput

**Part:** payload

**Element:** SetCommissionedResult



The boolean response indicates the success or failure of the update (not the current field status).

**Fault** - See **UtilityFault** on page 2-27. Thrown when meter id is not found.

## GetExecutionStatus

This web service queries the status of the property controlling the overall execution of the command.

**Input** - GetExecutionStatusInput

**Part:** payload

**Element:** GetExecutionStatusRequest

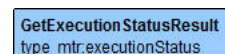


Parameter	Description
id	The ID for the meter for which the ExecutionStatus should be retrieved.

**Output** - GetExecutionStatusOutput

**Part:** payload

**Element:** GetExecutionStatusResult



The value of the ExecutionStatus attribute for the requested meter.

**Fault** - See **UtilityFault** on page 2-27. Thrown when meter id is not found.

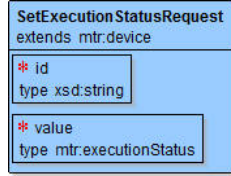
### SetExecutionStatus

This web service updates the property controlling the overall completion of the command.

**Input** - SetExecutionStatusInput

**Part:** payload

**Element:** SetExecutionStatusRequest



Parameter	Description
id	The ID for the meter for which the ExecutionStatus should be set.
value	The new value of ExecutionStatus to set on the meter.

**Output** - SetExecutionStatusOutput

**Part:** payload

**Element:** SetExecutionStatusResult



The boolean response indicates the success or failure of the update (not the current field status).

**Fault** - See **UtilityFault** on page 2-27. Thrown when meter id is not found.



# Appendix

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## Glossary

This glossary provides definitions of commonly used terms.

### **Command Effective Date/Time**

The date and time when a device command becomes effective.

### **Command Expiration Date/Time**

The date and time when a device command expires.

### **Commissioning**

A command issued to establish communication between a device and the head-end system. The goal is to ensure connectivity has been established with the device, that any information needed to communicate with the meter has been defined in both Oracle Utilities Smart Grid Gateway and the head end system, and the meter will begin capturing usage and events.

### **Decommissioning**

A command issued to inform the head-end system when a meter needs to be removed from a service point, so that no further reads or events will arrive from the meter. Decommissioning is invoked when a meter must be removed or deactivated. The goal is to stop any communication between the device and the head-end system.

### **Head-End System**

A system that collects measurement data and meter events for eventual submission to the application. Many devices can communicate to the application through a single head-end system. A utility may have numerous head-end systems through which they communicate with devices.

### **On-Demand Read**

A request for the most up-to-date reading from a particular meter. It is not guaranteed to return immediately; it could require a person to manually read the meter. The purposes are to check the meter's operational status and/or obtain a more recent reading than is currently available.

### **Payload**

An upload component which contains measurements and meter events in a format specific to the

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head-end. Payloads are part of the initial upload of measurement data.

**Remote Connect**

A command issued when a meter needs to be connected at a service point.

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