

**Oracle Utilities Smart Grid Gateway
MV90 Adapter for Itron**

Administrative User Guide

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Chapter 1

MV90 Adapter Overview

The Oracle Utilities Smart Grid Gateway MV-90 Adapter for Itron the parsing, transformation, and loading of MV-90 binary format measurement data for use in Oracle Utilities applications. The following table describes the attributes of the adapter:

Attribute	Details
Currently Supported Version	SGG supports the .mv9 binary, mainframe data format.
Protocol	Binary file format.
Market(s)	Worldwide, but largely USA.
Architecture	AMR

The adapter uses Oracle Service Bus (OSB) to facilitate communication between Oracle Utilities Smart Grid Gateway and MV-90.

The following functionality is included:

Measurement Data Loading - data parsing and transformation from MV-90 binary format into the Oracle Utilities Service and Measurement Data Foundation unified format.

Measurement Data Processing - configurable mapping for MV-90 status codes to Oracle Utilities Service and Measurement Data Foundation standard values, along with configurable device event creation based on MV-90 status codes.

Chapter 2

MV90 Adapter Processing

This section provides details concerning the OSB processing 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.

Initial Measurement Data Loading

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 in a 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.

Initial Measurements

The usage data exported from the AMI head-end system as a file in MV-90 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-D5-USAGE-BASE** contains components responsible for the actual processing of incoming data. It should not be modified during configuration. This project can be upgraded without affecting the customization and environment settings added to the SGG-D5-USAGE-CM project.
2. **SGG-D5-USAGE-CM** allows for customization and simplifies future upgrades.

The runtime configuration settings for the SGG-D5-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	Valid Values
populateRawIMD	Determines if the initial measurement data is populated as raw data.	true

Element	Description	Valid Values
		false
callPreProcessing	Determines if the preprocessing proxy service is called.	true false
callPostProcessing	Determines if the postprocessing proxy service is called.	true false
destinationRootElementInterval	Holds the name of inbound web service for the interval IMD seeder.	
publishServices/service	Specifies the name of the business service within the OSB project used to publish data for external systems (such as Oracle DataRaker).	
filterUsage	Determines if usage should be filtered.	true false
usePhysicalChannel	Optional value. Determines whether the physical channel ID is passed to the IMD seeder to create the measuring component identifier number. If this is set to false, the MV90 LOGCHAN field is used.	true false (default)
fieldForDvclidN	Optional value. Specifies which field is used as the value for the device ID.	DC_RECID DC_CUSTID DC_METERID (default)
MV90ScalarChannelSuffix	Optional value. Holds a suffix value to be added to the measuring component identifier number when a scalar IMD is created for register reads. Default value is “_S”	
processMV90ScalarData	Optional value. Determines if register reads are processed.	true false (default)

Publishing Initial Measurement Data

The MV90 adapter can be configured to publish initial measurement data for use in Oracle DataRaker or other external systems. This functionality is supported through a combination of OSB components and BPEL composites.

Enabling Initial Measurement Data Publishing

Publishing data is enabled by referencing a publisher business service in the publishServices/service element in the EnvironmentSettings.xq file as follows:

```
<publishServices>
  <service>[publisherBusinessService]</service>
</publishServices>
```

The following components provided with the SGG-D5-USAGE-CM OSB project are used in publishing measurement data to Oracle DataRaker:

- The **DataRakerBusinessService** business service is used to send data to a pre-configured JMS queue (defined as an Endpoint URI), from which the data will be published. This is the business service that should be specified in the EnvironmentSettings.xq file.
- The **DataRakerServiceAccount** service account is used to define and maintain the user name and password needed to access the JMS queue defined in the **DataRakerBusinessService** business service.

Configuring Initial Measurement Publishing Output

The SGGDRIntegration BPEL composite handles publishing the data to Oracle DataRaker or other systems.

Initial measurement data is published in the “native” initial measurement data format (the format of the initial measurement seeder business object). This format includes normalized unit of measure and condition codes. See the *Oracle Utilities Smart Grid Gateway Adapter Development Kit Administrative User Guide* for more details about this format.

NOTE: Initial measurement data published via this feature is published prior to VEE processing. In addition, filtering can NOT be applied to data published via this feature.

The following parameters can be used to configure details of how the data is provided to Oracle DataRaker, including the directory where files are posted for Oracle DataRaker to consume, number of records per file, polling frequency, etc. These parameters are defined during installation. See the *Oracle Utilities Smart Grid Gateway Installation Guide* for more details about defining values for these parameters.

Parameter	Description	Default Value
SGG_DR_INT_QUEUE	JNDI name of queue to publish SGG payloads. This is the JMS queue defined in the DataRakerBusinessService business service. This should NOT be changed.	DataRakerQueue
SOA_DR_PUBLISH_SIZE	The number of records (SGG payloads) to accumulate in a published file.	100
SOA_DR_FILE_SIZE	The maximum file size for the accumulated (SGG payloads) file in kilobytes.	524288
SOA_DR_ELAPSED_TIME	The period of time in second which, when exceeded, causes a new outgoing file to be created.	600
SOA_DR_POLLING_FREQ	The polling frequency in seconds of the staging directory for new files.	60
SOA_DR_STAGING_DIR	Mount point/directory for the staging directory for accumulated SGG payload files. This is used internally and should NOT be changed.	/spl/sploutput/staging
SOA_DR_INTEGRATION_DIR	Mount point/directory from which Oracle DataRaker will consume the converted XML files.	/spl/sploutput/int

Filtering Usage

The MV90 adapter can be configured to filter initial measurement data passed into Oracle Utilities Smart Grid Gateway and Meter Data Management. Filtering data is enabled by setting the <filterUsage> element in the EnvironmentSettings.xq file to “true” as follows:

```
<filterUsage>true</filterUsage>
```

When filtering is enabled, only measurements whose <externalUOM> matches one of the values defined in the **MV90 UOM Code to Standard UOM Mapping** extendable lookup (D5-UOMtoStdUOMCodeMapLookup) are passed into the system for processing.

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-D5-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.

Prioritized Initial Measurement Processing

Processing of initial measurements can be prioritized by setting the Execution Method flag set to “Real Time” (D1RT), in which case the measurements are processed in real time rather than via batch processing.

See **Initial Measurement Data Prioritization** in the *Oracle Utilities Meter Data Management / Smart Grid Gateway Business User Guide* for more information.

Initial Measurement Data Load with Register Reads

In the MV90 format, measurement data can include interval data as well as register reads that can be used to create scalar measurements. For information on configuring the adapter for loading scalar data based on register reads, see [Override Processing Methods for Scalar Initial Measurement Data](#).

Base Package Business Objects

The MV-90 Adapter for Itron base package includes the following initial measurement business objects:

Business Object Name	Description
D5-InitialLoadIMDInterval	MV-90 Initial Load IMD
D5-InitialLoadIMDScalar	MV90 - Initial Load IMD - Scalar

Chapter 3

Configuring a MV90 Head-End System

This section outlines the configuration required for the Oracle Utilities Smart Grid Gateway MV-90 Adapter for Itron to receive usage from an MV-90 system.

Inbound Web Services

Inbound web services define the details of how messages are received from an external system, including incoming usage.

The following inbound web 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 inbound web services.

Inbound Web Service Name	Description
D1-InitialLoadIMD	IMD Seeder
D1-PayloadErrorNotif	Payload Error Notification
D1-PayloadStatistics	Payload Statistics
D1-PayloadSummary	Payload Summary

Note: The following apply to all of the above inbound web services:

Message Options

- **Trace:** No
- **Debug:** No
- **Active:** Yes

Operations

- **Operation Name:** Same as web service name
- **Schema Type:** Business Object
- **Schema Name:** Applicable business object code
- **Transaction Type:** Add

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 MV-90 system must be present in your system. If this is not present in your configuration, add it. Refer to the Oracle Utilities Application Framework documentation for more information about creating external systems.

External System - MV-90:

External System: MV90

Description: MV90 - Mainframe File Format

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 MV-90 system must be present in your system. If this is not present in your configuration, add it. Refer to the Oracle Utilities Meter Data Management / Smart Grid Gateway documentation for more information about creating service providers.

Service Provider - MV-90:

- **Service Provider:** MV90
- **Description:** Head-End System for MV90
- **External Reference ID:** MV90
- **External System:** MV90 - Mainframe File Format
- **Out Name/ID in Their System:** MV90
- **AMI Device ID Type:** Serial Number
- **AMI Measuring Component ID Type:**

Processing Methods

Processing methods define the format or means by which a service provider receives and/or sends data from and/or to the application, including as 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.

The following types of processing methods must be configured for the MV90 service provider. Refer to the Oracle Utilities Meter Data Management / Smart Grid Gateway 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 inbound web service uses this processing method to determine which type of initial measurement business object to instantiate when receiving usage from the MV-90 system.

Override Processing Methods for Scalar Initial Measurement Data

In the MV-90 format, meter read start and stop values can represent either a calculated read based on the interval data that is included in the MV90 data, or a register read that has been logged using a separate channel. When the values represent a register read the application can create a second file for the scalar initial measurements. The creation of a scalar initial measurement file is triggered by the Register Type flag, DC_REGTYPE, in the MV-90 data and the processMV90ScalarData variable in the EnvironmentSettings.xq file. The following register read values are valid for the DC_REGTYPE field:

Value	Description
V	Visual energy readings
D	Visual demand and energy readings
E	Encoder register readings (energy only).
B	Both encoder and visual energy readings.
C	Calculate stop meter readings from the encoder base reading

In order to configure your adapter to create scalar initial measurements based on register reads, first define new measuring component types and register measuring components. Then use the new measuring component types to specify override processing methods on the Initial Measurement Creation processing method for your service provider.

Measuring Component Types for Scalar Reads: To create initial measurement data for register reads, first create new measuring component types to represent the registers. These will be used to create measuring components for scalar reads.

Example Measuring Component Type

- **Measuring Component Type:** MV90_SCALAR_REG
- **Description:** MV90 Scalar Register
- **Measuring Component Business Object:** Register
- **Measurement Business Object:** Measurement
- **Service Type:** Electric Service
- **Allow Negative Consumption:** Allowed
- **Consumptive/Subtractive:** Subtractive
- **Read Method:** Automatic Read

Other attributes such as Value Identifiers, VEE Groups, and so on, should be defined based on requirements

Register Measuring Components for Scalar Reads: Use the new measuring component types to create measuring components for the scalar measurements created by the register read process. You must create a corresponding register measuring component for each interval channel for which you will receive scalar reads. The channel number for the registers must be based on the channel numbers of the corresponding interval channels, plus the suffix defined in the “MV90ScalarChannelSuffix” environment setting. The default value for this setting is “_S”. These registers must also be added to the device configuration used by the interval channels (in other words, both measuring components - interval and scalar - must be on the same device). The following table shows examples of these values for the measuring components:

Device Type/Serial Number	MV-90 Interval Channel Number	MV-90 Scalar Register Channel Number
MV90 Electric/00001	1	1_S
MV90 Electric/00002	1	1_S
MV90 Electric/00003	1	1_S

Override Processing Methods for MV-90 Service Provider: Add an override processing method to the Initial Measurement Creation processing method for the MV90 service provider for each register measuring component type. The business object for each override processing method should be “D5-InitialLoadIMDScalar”. The following tables shows examples of the override processing methods:

Measuring Component Type	Business Object
MV90 Scalar Register	D5-InitialLoadIMDScalar
Measuring Component Type 2	D5-InitialLoadIMDScalar
Measuring Component Type n	D5-InitialLoadIMDScalar

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 inbound web service uses this processing method to determine which type of device event business object to instantiate when creating device events based on interval status codes received with usage from the MV-90 system.

UOM Translation

UOM translation 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 MV90 UOM codes to standard UOM codes when receiving usage from the MV-90 system.

Chapter 4

Configuring MV90 Extendable Lookups

This section outlines some of the extendable lookups that must be configured for use with the MV-90 Adapter for Itron. Refer to the Oracle Utilities Application Framework documentation for more information about working with extendable lookups.

Interval Status Code to Event Mapping

The MV-90 adapter for does not accept device events from an MV-90 system, but can create device events based on specific interval status codes in an incoming usage reading. The MV-90 Interval Status Code to Event Mapping extendable lookup is used to determine which type of device event business object to instantiate when creating device events based on interval status codes received with usage from the MV-90 system.

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

- **MV90 Interval Status:** The interval status code used by the MV-90 system
- **Description:** A description of the MV-90 interval status code
- **Event Duration Mode:** The duration type for the event. Can be either “Individual” or “Continuous” (used for events with a duration, such as an outage).
- **Device Event Type:** The Device Event Type for the device event created for this interval status code. For status codes with an Event Duration Mode or “Continuous” this is the start event, or the first of the paired events created for this status code.
- **End Event Type:** The Device Event Type for the “end” device event created for this interval status code. For status codes with an Event Duration Mode or “Continuous” this is the start event, or the last of the paired events created for this status code.

Example: The MV-90 “Low Voltage” status code could be configured to create a “Low Voltage” device event as follows:

- **MV90 Interval Status:** <MV-90 interval status code for low voltage>
- **Description:** Low Voltage detected for meter
- **Event Duration Mode:** Individual
- **Device Event Type:** Low Voltage
- **End Event Type:** N/A

Example: The MV-90 “Power Outage” status code could be configured to create a “Last Gasp” device event, and a “Power Restoration” event as follows:

- **MV90 Interval Status:** <MV-90 interval status code for outage>
- **Description:** Outage
- **Event Duration Mode:** Continuous
- **Device Event Type:** Last Gasp
- **End Event Type:** Power Restoration

MV90 UOM Code to Standard UOM Code Mapping

Usage received from the MV-90 system may use utility-specific unit of measures (UOMs). These custom UOMs must be mapped to standard UOM codes. The MV90 UOM Code to Standard UOM Code Mapping extendable lookup is used to determine how to map MV90 UOM codes to standard UOM codes when receiving usage from the MV-90 system.

Each value defined for the MV90 UOM Code to Standard UOM Code Mapping extendable lookup should include the following:

- **Head-End Unit of Measure:** The unit of measure code used by the MV-90 system
- **Unit of Measure:** The unit of measure defined in the system.
- **Description:** A description of the unit of measure code.

Other Extendable Lookups

Business Object Name	Description
D5 - ChanelStatusCodeLookup	MV-90 Channel Status Code Lookup
D5-IntStsCdToCndMapPrLookup	Condition Mapping with Priority